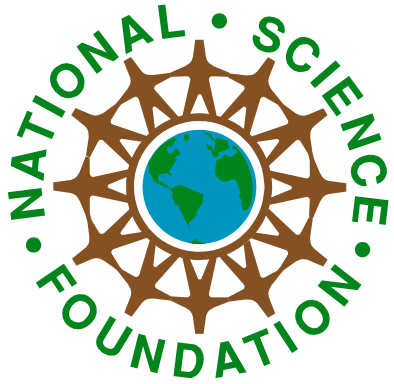
FY 2004 PERFORMANCE PLAN

National Science Foundation

FY 2004 GPRA
Performance Plan



February 3, 2003

Note: This GPRA performance plan was developed solely by NSF staff. It reflects discussions of general principles with elements of the research and education communities, the administration, and congressional staff.

ABOUT NSF

Created in 1950, NSF is an independent U.S. government agency responsible for advancing science and engineering in the United States across a broad and expanding frontier. NSF operates no laboratories itself, but rather carries out its mission primarily by making merit-based grants and cooperative agreements to individual researchers and groups, in partnership with colleges, universities, and other institutions – public, private, state, local, and federal – throughout the U.S.

NSF invests in the best ideas from the most capable people, as determined by competitive merit review. NSF evaluates proposals for research and education projects using two criteria: the intellectual merit of the proposed activity and its broader impacts. NSF uses merit review to select about 10,000 new awards each year from about 35,000 competitive proposals submitted by the science and engineering research and education communities.

NSF provides funding to sustain the advance of many research fields and thus, to expand the boundaries of knowledge. NSF supports a portfolio of investments that reflects the interdependence among fields and between research and education. It promotes disciplinary strength while embracing interdisciplinary research and education activities. Agency investments promote the emergence of new disciplines, fields, and technologies, along with the development of scientists and engineers able to embrace them and create the next generation of results. By providing these resources, NSF contributes to the health and vitality of the U.S. research and education enterprise. NSF resources enable and enhance the nation's capacity for sustained growth and prosperity.

EXECUTIVE SUMMARY

The National Science Foundation's (NSF) continuing mission, as set out in the preamble to the National Science Foundation Act of 1950, reads, "To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes."

With this mission and within the framework established by the FY 2001 - FY 2006 NSF Government Performance and Results Act (GPRA) Strategic Plan, the National Science Foundation presents its FY 2004 GPRA Performance Plan.

NSF's activities align with its three strategic outcome goals:

- PEOPLE – Developing "a diverse, internationally competitive and globally engaged workforce of scientists, engineers, and well-prepared citizens";
- IDEAS – Enabling "discovery across the frontier of science and engineering, connected to learning, innovation and service to society"; and
- TOOLS – Providing "broadly accessible, state-of-the-art and shared research and education tools."

NSF's management goals are agency-wide goals that enable the Foundation to make progress toward attaining its strategic outcome goals. They are organized into three performance areas:

- Proposal and Award Management, including merit review;
- Business Practices, including cost efficiency, E-government and information technology security; and
- Human Capital, including staff diversity and education.

In FY 2004, approximately 95 percent of NSF's budget request ($5,481 million) is designated for investments the agency makes in support of its strategic outcome goals – PEOPLE ($1,153 million), IDEAS ($2,696 million), and TOOLS ($1,341 million). The remaining 5 percent of the budget request ($291 million) is for Administration and Management, which provides operating support for activities such as reviewing proposals, issuing awards and overseeing projects.

GPRA GOALS FOR STRATEGIC OUTCOMES

NSF is the only agency of the federal government exclusively devoted to promoting basic research and education at all levels and across all fields of science and engineering. NSF does not conduct research and education activities directly, but supports others who do so. External factors related to institutional partners, the private sector, and government affect how individuals and groups respond in proposing and conducting research, which in turn impacts NSF's progress toward attaining its GPRA strategic outcome goals.

As with all basic research, the outcomes associated with NSF research and education investments in FY 2004 are likely to be unpredictable in content and timing. Many of these activities require years to develop and the outcomes can only be judged retrospectively. For these activities, it is difficult to link long-term outcomes directly to annual budgets. In the short-term, investment in diverse portfolios can be described and identified, and it is these investments that will determine whether short-term outputs and long-term outcomes resulting from the portfolio of current awards will be as significant as past outputs and outcomes.

In addition to investing in core research and education activities, NSF annually identifies and invests in emerging opportunities that hold exceptional promise to advance knowledge. For example, the

President's Math and Science Partnership, Workforce for the 21st Century, and increasing graduate student stipends for the Graduate Research Fellows in K-12 Education, Graduate Research Fellowships and Integrative Graduate Education and Research Traineeships programs are FY 2004 priorities for investment related to the PEOPLE strategic outcome goal.

FY 2004 priority areas for investment related to NSF's IDEAS goal include Biocomplexity in the Environment (BE); Information Technology Research (ITR); Nanoscale Science and Engineering (NSE); Mathematical Sciences; and Human and Social Dynamics (HSD). The ITR and NSE activities are highly coordinated, cross-agency programs where NSF chairs the working group or is designated lead agency.

FY 2004 investment priorities related to the TOOLS strategic outcome goal focus on investments in Major Research Equipment and Facilities Construction, SRS Survey redesign, and Cyberinfrastructure.

NSF also supports basic research in conjunction with the Foundation's participation in a wide range of cross-cutting activities, including the FY 2004 interagency research and development priorities identified jointly by the Office of Science and Technology Policy and the Office of Management and Budget. These include Networking and Information Technology Research & Development (NITRD), National Nanotechnology Initiative, Climate Change Science and Technology, Homeland Security and Antiterrorism R&D, Molecular-level Understanding of Life Processes, and Education Research.

GPRA GOALS FOR MANAGEMENT

NSF has developed a set of management goals that support attainment of its strategic outcome goals. Development of annual management goals is informed by the NSF Strategic Plan, previous agency Performance Plans, internal deliberations, past performance, and reasonable projections for future levels of performance.

Embedded within the FY 2004 portfolio of goals are a number that respond to initiatives highlighted in the FY 2002 President's Management Agenda or that have otherwise been identified by the Office of Management and Budget, or the General Accounting Office, in NSF's annual review of financial and administrative systems as required by the Federal Managers' Financial Integrity Act, or by the NSF Office of Inspector General. Other remaining challenges are handled with internal management controls and processes under the purview of the internal NSF Management Controls Committee (MCC), chaired by the Chief Financial Officer. That committee provides continuing and long-term senior executive attention to NSF's management challenges and reforms (detailed in Appendix B).

PRESIDENT'S MANAGEMENT AGENDA

The President's Management Agenda includes five government-wide initiatives: Strategic Management of Human Capital; Competitive Sourcing; Improved Financial Performance; Expanded E-Government; and Budget and Performance Integration. For each initiative, OMB tracks agency progress with a scorecard consisting of "green, yellow and red lights" that reflects agency status. The most recent NSF scorecard gives a "green light" to NSF for the Improved Financial Performance and Expanded E-Government initiatives.

NSF's Performance Plan contains FY 2004 performance goals related to human capital, budget-performance integration and to E-government. Aspects of the other two initiatives are being addressed with internal controls and processes, within the framework outlined in the agency's Administration and Management Strategic Plan.

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I. INTRODUCTION

In response to the Government Performance and Results Act of 1993, the National Science Foundation presents this sixth GPRA Performance Plan. It is based on NSF's GPRA Strategic Plan FY 2001 - 2006[1], finalized in September 2000.

A. NSF MISSION

NSF's continuing mission is set out in the preamble to the National Science Foundation Act of 1950 (Public Law 810507):

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

The Foundation's organic legislation authorizes it to engage in the following activities, among others:

- Initiate and support scientific and engineering research, and programs to strengthen scientific and engineering research potential, and education programs at all levels, and appraise the impact of research upon industrial development and the general welfare;
- Award graduate fellowships in the sciences and engineering;
- Foster the interchange of scientific information among scientists and engineers in the United States and foreign countries;
- Foster and support the development and use of computers and other scientific methods and technologies, primarily for research and education in the sciences;
- Evaluate the status and needs of the various sciences and engineering and take into consideration the results in correlating research and educational programs with other federal and non-federal programs;
- Maintain a current register of scientific and technical personnel, and in other ways provide a central clearinghouse for the collection, interpretation, and analysis of the data on scientific and technical resources of the United States, and provide a source of information for policy formulation by other federal agencies;
- Initiate and support specific scientific and engineering activities in connection with matters relating to international cooperation, national security, and the effects of scientific and technological applications upon society;
- Initiate and support scientific and engineering research, including applied research, at academic and other nonprofit institutions;
- Strengthen research and education innovation in the sciences and engineering, including independent research by individuals, throughout the United States; and
- Support activities designed to increase the participation of women and minorities and others underrepresented in science and technology.

The NSF Act confers on the Presidentially-appointed National Science Board the responsibility for establishing policies of the Foundation. The Act also directs the Board to advise the President and Congress to assure the productivity and excellence of the nation's science and engineering enterprise.

[1] For convenience, we will refer to the NSF GPRA Strategic Plan FY 2001 - 2006 as the Strategic Plan in the remainder of this document.

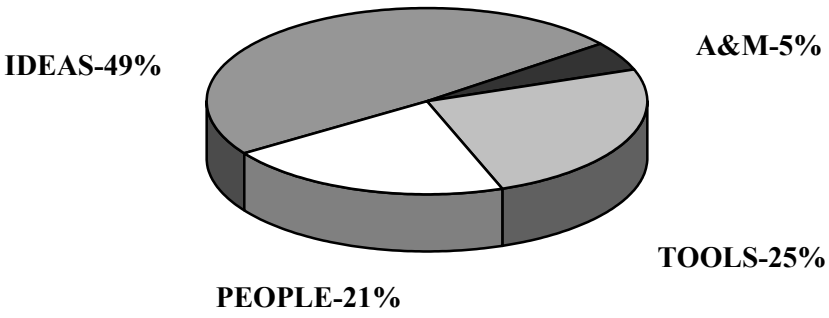
B. NSF GPRA GOALS

NSF's GPRA performance goals are organized in two categories – Strategic Outcomes and Management (see Section II). Goals associated with the strategic outcomes anticipate long-term results derived from NSF awards. The management goals focus on means and strategies that enable the Foundation to successfully work toward attainment of its strategic outcomes.

Approximately 95 percent of NSF's budget goes directly to investments the agency makes in support of its PEOPLE, IDEAS, and TOOLS strategic outcome goals. The remaining 5 percent goes toward Administration and Management (A&M), which provides operating support for activities such as reviewing proposals, issuing awards, and overseeing projects.

The NSF budget justification contains information on the full range of activities covered by support for PEOPLE, IDEAS, and TOOLS. For the FY 2004 budget request, resources allocated to the PEOPLE outcome goal total $1,153 million (cf. $1,087 million for FY 2003 and $995 million in FY 2002); those related to the IDEAS outcome goal total $2,696 million (cf. $2,559 million for FY 2003 and $2,436 million in FY 2002); and those that support the TOOLS outcome goal total $1,341 million (cf. $1,122 million for FY 2003 and $1,112 million in FY 2002). The diagram below shows the distribution of FY 2004 funding among NSF's three strategic areas.

FY 2004 BUDGET REQUEST OF $5.48 BILLION



GPRA GOALS FOR STRATEGIC OUTCOMES

To accomplish the NSF mission to promote the progress of science, NSF invests in the most capable people, supporting their creative ideas, and providing them with cutting-edge research and education tools. Outcomes from the grants and cooperative agreements NSF awards provide evidence of the success of the agency's investments in PEOPLE, IDEAS, and TOOLS. In developing the FY 2004 NSF award portfolio, NSF staff will be guided by the Strategic Plan and this GPRA Performance Plan, which include strategic outcome goals related to:

- **PEOPLE** – *Developing "a diverse, internationally competitive and globally engaged workforce of scientists, engineers, and well-prepared citizens."*

  NSF invests in the best and brightest students, researchers, and educators to ensure a well-prepared workforce and citizenry. In addition, the agency strives to create the capacity to serve all students well. The agency provides support for formal and informal science, technology, engineering and

mathematics (STEM) education at all levels – preK-12, undergraduate, and graduate – and for professional development and public science-literacy projects. Investments aimed at the PEOPLE strategic outcome goal relate to the parts of NSF's mission directed at strengthening scientific and engineering research potential and science and engineering education programs at all levels.

- **IDEAS** – *Enabling "discovery across the frontier of science and engineering, connected to learning, innovation, and service to society."*

  NSF invests in ideas to provide a deep and broad fundamental science and engineering knowledge base. The Foundation provides support for creative, cutting-edge research that yields new and important discoveries and promotes the development of new knowledge and techniques within and across traditional boundaries. This strategic outcome goal derives from the part of NSF's mission directed at initiation and support of scientific and engineering research.

- **TOOLS** – *Providing "broadly accessible, state-of-the-art and shared research and education tools*."

  NSF invests in tools to provide widely accessible, up-to-date science and engineering infrastructure. It provides support for a wide range of instrumentation, multi-user facilities, digital libraries and computational infrastructure. This strategic outcome goal derives from the parts of NSF's mission directed at programs to strengthen scientific and engineering research potential, to support the development and use of computers and other scientific methods and technologies, and to provide an information base on science and engineering appropriate for development of national and international policy.

GPRA GOALS FOR MANAGEMENT

Management excellence underpins all of the agency's activities. NSF has developed a set of agency-wide management goals that support attainment of the strategic outcome goals and address initiatives presented in the President's Management Agenda (PMA). The framework for developing management goals is guided by the Strategic Plan, previous agency Performance Plans, internal deliberations, past performance, and reasonable projections for future levels of performance.

The FY 2004 portfolio of management goals contains a number that address the President's Management Agenda or focus on management challenges and reforms identified by the Office of Management and Budget (OMB), or the General Accounting Office (GAO), in NSF's annual review of financial and administrative systems as required by the Federal Managers' Financial Integrity Act, or by the NSF Office of Inspector General. For each challenge and reform identified, the actions the Foundation is taking to address it are discussed throughout the text of this document and are summarized in Appendix B. The complete set of management goals is presented in Section II.

THE PRESIDENT'S MANAGEMENT AGENDA

The President's Management Agenda includes five government-wide initiatives: Strategic Management of Human Capital; Competitive Sourcing; Improved Financial Performance; Expanded E-Government; and Budget and Performance Integration. For each initiative, OMB prepares a scorecard consisting of "green, yellow, and red lights" that reflects agency status and progress in achieving the standards for success ("getting to green"). The most recent scorecard gives "green light" status to NSF for the

Improved Financial Performance and Expanded E-Government initiatives. That same scorecard gives NSF a red in Human Capital, Competitive Sourcing and Budget-Performance Integration.

The following discussion focuses on five OMB criteria needed for success in budget-performance integration. The discussion illustrates the planning and development activities associated with getting to green for a PMA initiative.

- **BUDGET-PERFORMANCE INTEGRATION**

  Integrating Budget and Performance is one of five government-wide initiatives in the President's Management Agenda. Its purpose is straightforward – to link funding to results. Since enactment of GPRA in 1993 and the Chief Financial Officers Act in 1990, NSF has integrated performance information into its budget requests and planning framework. The PMA has helped NSF focus on how best to further elevate its efforts to integrate budget and performance.

  There are two criteria for budget-performance integration for which NSF is successful:
  - Collaboration: Agency has an integrated approach to budgeting and planning.
  - Validation/Effectiveness: Agency documents its effectiveness through Committee of Visitor (COV) reports and other external independent program evaluations.

  There are currently three criteria for budget-performance integration for which NSF is not successful:
  - Goals, objectives, and targets: Agency budget does not tie resources to results and provides limited focus on outcomes.
  - Alignment: NSF has a centralized account (Salaries and Expenses) that funds program resources.
  - Full cost: Agency budget does not charge the full budgetary cost to individual activities.

  The paragraphs and tables below summarize NSF's current approach to implementing this initiative and the agency's strategy for "getting to green." Central to achieving this aim is development of a Budget and Performance Integration Plan that will guide the agency's activities for achieving green status. The draft Plan has been discussed with OMB, with the NSF Advisory Committee for Business and Operations, and it has been shared with the NSF OIG.

  NSF has a *collaborative/integrated* approach to long-range planning and budgeting. These activities are distributed throughout the agency's program directorates and offices, with coordination activities centralized within the Office of Budget, Finance, and Award Management (BFA) and the Office of Information and Resource Management (OIRM). Responsibility for development, coordination and innovation in GPRA activities resides with a team of senior managers – the agency's GPRA Infrastructure Implementation Council (GIIC) – who report directly to the agency's Chief Operating Officer. GIIC is assisted by an integrated planning/budget working group composed of key staff from the program directorates and offices, BFA and OIRM. In addition, the Budget Planning Liaison Group, comprised of program and budget staff, participates in the budget formulation process.

  NSF's *effectiveness* is documented by its COVs and other independent evaluations (e.g., the AC/GPA) and with the analytic Program Assessment Rating Tool (PART) developed by OMB. The PART assesses program performance in four areas: purpose, strategic planning, program management and program results. The PART complements and reinforces GPRA, emphasizing the link between budget and performance. Resulting PART ratings inform the budget process and highlight areas in need of improvement. During formulation of the FY 2004 Budget, OMB

completed PARTs on select programs for each agency. For NSF this included PARTs for the TOOLS strategic area and the Geosciences Directorate. OMB's PART review for NSF programs under the TOOLS strategic outcome goal documented clear purpose, quantifiable annual goals, and optimally designed programs.

Per GPRA legislation, NSF is in the process of updating its GPRA Strategic Plan. A draft of the revised plan is due to OMB on March 1, 2003, with the final plan due by September 30, 2003. It is anticipated that the plan will contain a performance structure that links *outcome goals, output targets, and resources*. It will also resolve the definition of a "program", which will enable NSF to complete its Budget and Performance Integration Plan. To date, NSF has developed a draft outline of the plan and has engaged the National Science Board in discussions related to its development.

The *alignment* criterion addresses whether NSF's budget is aligned with program goals in such a way that the impact of different funding levels on the agency's ability to achieve its goals is readily known. At present, NSF has identified strategic outcome goals and has determined which program areas contribute to each.

The crosswalk below links NSF's five budget accounts to its PEOPLE, IDEAS, and TOOLS strategic outcome areas. The funds within the Research and Related Activities and Education and Human Resources accounts are distributed among the three NSF outcome areas. The allocation of funds in these two accounts to the conceptual PEOPLE, IDEAS, or TOOLS area is made on a program-by-program basis.

FY 2004 BUDGET & PERFORMANCE INTEGRATION

(Estimated Millions of Dollars)

	STRATEGIC OUTCOME			
Account	PEOPLE	IDEAS	TOOLS	A&M
Research and Related Activities	388	2,557	1,120	42
Education and Human Resources	765	139	19	15
Major Research Equipment and Facilities Construction	0	0	202	0
Salaries & Expenses	0	0	0	226
Office of the Inspector General	0	0	0	9
Total[a]	$1,153	$2,696	$1,341	$291

[a] Numbers may not add due to rounding.

An additional crosswalk (below) provides further information on deployment of PEOPLE-IDEAS-TOOLS resources among individual budget activities associated with NSF's nine directorates and offices. It also provides an estimate of the Administration & Management (A&M) operating support required for each directorate. The FY 2004 A&M request of $291 million provides support for salaries and benefits of NSF employees; general operating expenses, including key activities related to human capital and information management systems; and audit and Inspector General activities.

PROGRAMMATIC CROSSWALK FOR FY 2004 STRATEGIC OUTCOMES

(Estimated Millions of Dollars)

	STRATEGIC OUTCOME				
	PEOPLE	IDEAS	TOOLS	Administration & Management	Total[b]
Biological Sciences	51	448	59	4	562
Computer and Information Science and Engineering	57	354	166	7	584
Engineering	83	435	11	7	537
Geosciences	37	395	248	8	688
Mathematical and Physical Sciences	125	670	260	6	1,061
Social, Behavioral and Economic Sciences	15	151	40	5	212
Office of Polar Programs	6	78	241	4	330
Integrative Activities	14	24	94	0	132
Education and Human Resources	765	139	19	15	938
Other[a]	0	0	202	234	437
Total[b]	$1,153	$2,696	$1,341	$291	$5,481

[a] Other budget items include Major Research Equipment and Facilities Construction ($202 million, Tools); Salaries and Expenses ($226 million, Administration and Management); and Office of Inspector General ($9 million, Administration and Management).

[b] Numbers may not add due to rounding.

Among NSF's strategies to further enhance *alignment* of budget and program goals is reexamination of its existing account structures – in the context of updating the NSF GPRA Strategic Plan. NSF recognizes that this effort requires attention to the Foundation's Strategic Plan and consideration of organizational alignment, distribution of budgetary resources, and the allocation of costs both to organizations and to outcomes. The expected added value to NSF managers is central in identifying areas to examine and in deciding whether to add or change existing structures.

The *full budgetary cost* criterion focuses on integrating the cost of program outputs and outcomes with performance. NSF is continuing to develop and refine methodology for allocating full budgetary cost to "programs" (see the section entitled "Full Budgetary Costing" in NSF's FY 2004 Budget Request to Congress). In addition, it is directly addressing cost efficiencies related to individual administrative functions and changing aspects of the functions as appropriate in order to generate cost savings. The FY 2004 GPRA goal – to calculate cost savings from utilizing videoconferencing in place of certain travel – is the first step in quantifying potential cost efficiencies associated with one such function. In addition, the resource sections associated with selected agency management goals provide an initial attempt to address the cost issue more broadly.

NSF recently engaged the services of an external management-consulting firm, PricewaterhouseCoopers Consulting, to conduct an integrated performance, cost, and budget strategy assessment, with the intent of obtaining different scenarios to meet our growing requirements in this arena. This study included a best practices survey of public and private enterprises, and input from NSF senior staff on financial and performance information needed for management and budgetary decisions. NSF senior management are evaluating the results of the study to determine the most appropriate and useful cost and performance information to develop and monitor.

GAO's analysis of FY 2002 agency progress in linking plans and budgets (GAO 02-236, January 2002) concluded that NSF was among the group of agencies that "linked program activities to performance goals, showed funding levels needed to achieve goals, and allocated funding from

program activities to performance goals . . . the first step in defining the performance consequences of a budget decision." That report also noted that "agencies' initial efforts to link performance plans to their statements of net costs are encouraging and improving." NSF's FY 2001 Accountability Report was its first where the Statement of Net Costs aligned administrative costs with the strategic outcome goals.

C. MEANS AND STRATEGIES

The means and strategies NSF uses to accomplish its mission of promoting the progress of science and engineering research and education have both process-based and programmatic components. The Strategic Plan identifies three *process-based strategies* – developing intellectual capital (i.e., investing in projects that enhance individual and collective capacity to perform), integrating research and education (i.e., investing in projects that infuse learning with the excitement of discovery), and promoting partnerships (i.e., investing in projects that optimize the impact of PEOPLE, IDEAS, and TOOLS on the economy and on society) – that span all NSF activities. They guide the agency in establishing priorities, identifying opportunities, and designing new programs and activities.

Programmatic strategies focus on specific NSF programs and activities, and on the funding needed to support them. These activities reflect the Foundation's funding priorities. They show how the agency balances its highly targeted investments with its broad-based, disciplinary support in order to address workforce issues, maintain the nation's capacity to produce new discoveries, and identify areas of unmet opportunities in which future investments will be productive.

The Strategic Plan gives priority to: (1) support for competitive investigator-initiated research and education along a broad, expanding frontier of science and engineering; (2) identification of and support for "unmet opportunities" that will strengthen and cross-fertilize the science and engineering disciplines and that promise significant future payoffs for the nation; and (3) emphasis on several "transcendent" areas of emerging opportunity that enable research and education across a broad frontier of science and engineering. The transcendent areas identified in the Strategic Plan are Information Technology, Biocomplexity in the Environment, Nanoscale Science and Engineering, and 21st Century Workforce.

D. CROSS-CUTTING ACTIVITIES

Collaboration and partnerships between disciplines and institutions and among academe, industry, and government encourage the transfer of people, ideas, and tools throughout the public and private sectors. NSF's Strategic Plan (Appendix 4) emphasizes the importance of partnerships as a core strategy for enabling Foundation activities. While NSF participates in a wide range of cross-cutting activities, the agency has chosen to highlight its contributions only in areas related to FY 2004 interagency research and development priorities identified by the Office of Science and Technology Policy and the Office of Management and Budget. These include:

- **Networking and Information Technology Research & Development (NITRD):** Networking and computing technologies are increasingly important technologies for the American economy, national and homeland security, and progress across science and engineering. The most recent government-wide plan for research in this area is available at http://www.ccic.gov. In FY 2004, NSF will emphasize investments that support improving the security of computer, network and information systems; begin to develop a new cyberinfrastructure to enable science and engineering disciplines to work more efficiently through shared instruments and data; advance computational,

simulation, and data interpretation methods for more detailed analysis; and that advance computational methods for speech and language technologies.

- **National Nanotechnology Initiative (NNI):** This initiative holds great promise broadly across many scientific fields and most sectors of the economy. NSF emphasizes long-term fundamental research aimed at discovering novel materials, phenomena, processes and tools; addressing NNI Grand Challenges; supporting new interdisciplinary centers and networks of excellence, including shared user facilities; supporting research infrastructure; and addressing research and educational activities on the societal implications of advances in nanoscience and nanotechnology. Priority in funding will be given to: (1) research to enable the nanoscale as the most efficient manufacturing domain; (2) nanobiotechnology, and nanobiology for improving human performance; (3) innovative nanotechnology solutions to biological-chemical-radiological-explosive detection and protection; (4) the discovery, understanding and potential application of phenomena specific to the nanoscale; (5) development of new instrumentation and standards; (6) the education and training of the new generation or workers for the future industries; and (7) establishing of the National Nanotechnology Infrastructure Network (NNIN) for user facilities, development of new instrumentation, and training. The most recent information on NNI is available at http://www.nano.gov

- **Climate Change Science and Technology:** A key aspect of the Administration's science-based climate change policy is investment in research and development (R&D) that will address major climate policy decisions and provide a framework for understanding and addressing long-term climate change. NSF's areas of emphasis include understanding the Earth's carbon cycle, research on climate change risk management, and advancing our ability to model dynamic multivariate systems. Additional information on this initiative is available at http://www.usgcrp.gov/usgcrp/ccst.htm

- **Homeland Security and Antiterrorism R&D:** Data mining to support antiterrorism analysis requires the ability to construct patterns from multiple, heterogeneous, data sources, some of which occur as massive streaming data sources in multiple languages. NSF will support research on ways to identify portions of these data that should be saved for analysis, or that contain new information on a developing knowledge structure. Of equal importance, NSF will support research on sharing data across agencies and from data sets that are separated by policy and by law. In these circumstances, research will explore methods to share data that either preserve privacy or include "probable cause" as a part of the data representation to be enriched by mining. Additional efforts are being funded in management of knowledge-intensive, high technology organizations, bioterrorism countermeasures, biometrics, geospatial information fusion (particularly in epidemiology), and biological sensors and sensor networks.

- **Molecular-level Understanding of Life Processes:** The past few years have seen major advances in our ability to sequence, analyze, and utilize complex genomic information from plants, animals, and microorganisms. Coupling such sequence and structural data to modern computational power and new experimental approaches that permit molecular manipulation of biological systems has the potential to unravel the complexity of life at all structural levels. Sequence data has already proven itself to be critical for homeland security forensic purposes.

  Efforts such as the Interagency Microbe Project, a microbe sequencing and physiology effort (http://www.reeusda.gov/1700/funding/rfamgsp.htm); the Interagency Working Group on Metabolic Engineering (http://www.epa.gov/opptintr/metabolic/index.htm); the National Plant Genome Initiative (http://www.reeusda.gov/nri/pubs/plntgen.htm); and The Ecology of Infectious Diseases Program (http://www.nsf.gov/pubs/2003/nsf03507/nsf03507.html) all address fundamental patterns of molecular interactions which are reflected in function and behavior at the cellular, tissue,

organismal, and population levels. NSF will focus on many of these areas; for instance, the 'Living Networks' area of emphasis will foster a molecular understanding of life at all levels of biological organization from genes to ecosystems. Other interdisciplinary programs such as the 'Frontiers in Integrative Biological Research' specifically seek the most innovative approaches to understanding the complexity and integration of life processes across all levels of organization.

- **Education Research:** Continuing as a high priority of the Administration, the No Child Left Behind (NCLB) Act of 2002 calls for research that enables the successful development and implementation of science-based programs and practices. Information on the government-wide Interagency Education Research Initiative is available at http://www.ed.gov/offices/OERI/IERI.

  NSF will emphasize research on science and math education, the development and evaluation of science and math materials and research on the assessment of science, mathematics and technology learning. NSF will also support innovations in the preparation and professional development of math and science teachers and, through the Centers for Learning and Teaching, will explore new ways to engage scientists, engineers and mathematicians in K-12 education as well as how to prepare the next generation of teacher educators. In addition, in cooperation with other federal agencies such as the Departments of Education and Commerce and the National Aeronautics and Space Administration, NSF will continue to support research on the effect of technology on learning and the development and evaluation of new approaches to the use of educational technology to support learning. Research on the science of learning and development of strategies to enhance the research community that can address learning and education questions will also be supported. NSF also manages the Math and Science Partnership. This program offers activities in teacher preparation and professional development, the development of linkages between K-12 and the professional science, technology, engineering and mathematics (STEM) communities and supports research on the impact of partnerships on educational outcomes. All MSP-funded projects contribute to the MSP Learning Network, a network of researchers and practitioners studying and evaluating promising strategies to improve K-12 student achievement and other student outcomes in mathematics and science. The MSP effort is itself a partnership between two federal agencies, the NSF and the U.S. Department of Education (ED), who have defined the program linkages necessary to manage this joint investment in mathematics and science education for the greatest effectiveness.

E. EXTERNAL FACTORS AFFECTING SUCCESS

External factors bearing on NSF's ability to achieve its strategic outcome goals are discussed in the Strategic Plan (Appendix 2). These factors stem largely from the fact that NSF does not conduct research and education activities directly (e.g., NSF does not manage its own laboratories) but supports awardees that do so. Circumstances of institutional partners in academe, the private sector, and the government affect how individuals and groups respond in both proposing and conducting research and education.

Additionally, NSF cannot regulate the current condition and quality of research and education facilities and platforms throughout the country, even though it may support the infrastructure. Other factors beyond NSF's control include appropriations, indirect cost rates, government-wide policies, inflation, the budget and plans of other R&D agencies, the uncertainty and risk inherent in research, the availability of technology and the pace of technological innovation.
NSF's influence and leadership extends well beyond its budget. Given its unique role, NSF brings together diverse elements of the larger science and engineering community to achieve its mission. This positions the agency to: (1) establish partnerships that leverage funds and (2) provide leadership that catalyzes new directions for research and education.

II. SUMMARY TABLE

FY 2004 GPRA PERFORMANCE GOALS

NSF's performance goals for FY 2004 are organized in two categories:

- Strategic Outcome Goals (rationale, measurement approach, and baseline information provided in Section III); and
- Management Goals (rationale, measurement approach, and baseline information provided in Section IV).

FY 2004 GPRA Performance Goals

Strategic Outcome Goals	No.	Annual Performance Goals[A]	FY 2004 Areas of Emphasis	
			Prospective Reporting: Investments in Emerging Opportunities	Retrospective Reporting, as Relevant
PEOPLE **Developing "a diverse, internationally competitive and globally engaged workforce of scientists, engineers, and well-prepared citizens."**	**III-1**	***NSF's performance for the PEOPLE Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority of the following indicators:*** • Development of well-prepared researchers, educators or students whose participation in NSF activities provides experiences that enable them to explore frontiers or challenges of the future; • Contributions to development of a diverse workforce through participation of underrepresented groups[B] in NSF activities; • Development or implementation of other notable approaches or new paradigms[C] that promote progress toward the PEOPLE outcome goal.	❑ Math and Science Partnership ❑ Priority Area: - Workforce for the 21st Century ❑ Graduate Student Support	❑ PreK-12 Education, e.g., - Systemic Reform ❑ Undergraduate Education, e.g., - REU ❑ Graduate and Professional Development, e.g., - IGERT - GK-12 - CAREER ❑ Centers for Learning and Teaching (CLT) ❑ Broadening Participation, e.g., - Partnerships for Innovation - Historically Black Colleges and Universities – Undergraduate Program - Louis Stokes Alliances for Minority Participation

A These performance goals are stated in the alternative form provided for in GPRA legislation.
B For example, women, underrepresented minorities, persons with disabilities or underserved institutions.
C For example, broad-based, program-wide results that demonstrate success related to improved math and science performance for preK-12 students, or professional development of the STEM instructional workforce, or enhancement of undergraduate curricular/laboratory/instructional infrastructure, or highly synergistic education and research activities, or international collaborations, or communication with the public regarding science and engineering.

FY 2004 GPRA PERFORMANCE GOALS (CONTINUED)

STRATEGIC OUTCOME GOALS	NO.	ANNUAL PERFORMANCE GOALS[A] (CONTINUED)	FY 2004 AREAS OF EMPHASIS	
			PROSPECTIVE REPORTING: INVESTMENTS IN EMERGING OPPORTUNITIES	RETROSPECTIVE REPORTING, AS RELEVANT
IDEAS **Enabling "discovery across the frontier of science and engineering, connected to learning, innovation, and service to society."**	**III-2**	***NSF's performance for the IDEAS Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority of the following indicators:*** • Discoveries that expand the frontiers of science, engineering, or technology; • Connections between discoveries and their use in service to society; • Partnerships that enable the flow of ideas among the academic, public or private sectors; • Leadership in fostering newly developing or emerging areas.	❑ Priority Areas: - Biocomplexity in the Environment - Information Technology Research - Nanoscale Science and Engineering - Mathematical Sciences - Human and Social Dynamics ❑ Core research and education activities ❑ Science of Learning Centers	❑ Balance of portfolio, including projects that are innovative, high-risk, or multidisciplinary ❑ Priority Areas: e.g., <u>Current</u> - Biocomplexity in the Environment - Information Technology Research - Nanoscale Science & Engineering <u>Former</u> - Life & Earth's Environment - Information Technology for the 21st Century - Knowledge & Distributed Intelligence ❑ Core research and education activities ❑ Centers, e.g., - STCs, ERCs, MRSECs. ❑ EPSCoR

A These performance goals are stated in the alternative form provided for in GPRA legislation.

FY 2004 GPRA PERFORMANCE GOALS (CONTINUED)

STRATEGIC OUTCOME GOALS	NO. ANNUAL PERFORMANCE GOALS[A] (CONTINUED)	FY 2004 AREAS OF EMPHASIS	
		PROSPECTIVE REPORTING: INVESTMENTS IN EMERGING OPPORTUNITIES	RETROSPECTIVE REPORTING, AS RELEVANT
TOOLS **Providing "broadly accessible, state-of-the-art and shared research and education tools."**	***III-3 NSF's performance for the TOOLS Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority of the following indicators:*** • Development or provision of tools[D] that enables discoveries or enhances productivity of NSF research or education communities; • Partnerships with local, state or federal agencies, national laboratories, industry or other nations to support and enable development of large facilities or other infrastructure; • Development or implementation of other notable approaches or new paradigms[E] that promote progress toward the TOOLS outcome goal.	❑ Major Research Equipment and Facilities Construction (MREFC) ❑ Cyberinfrastructure ❑ Science Resources Statistics (SRS) Survey Redesign	❑ Major Research Equipment and Facilities Construction ❑ Major Research Instrumentation (MRI) Program ❑ Science and Engineering policy analyses, information, reports and databases ❑ Scientific databases and tools for using them, including the National STEM Education Digital Library

A These performance goals are stated in the alternative form provided for in GPRA legislation.

D For example, includes research and education infrastructure such as large centralized facilities, or integrated systems of leading-edge instruments, or databases, or widely utilized, innovative computational models or algorithms, or information that provides the basis for a shared-use networked facility.

E For example, broad-based, program-wide results that demonstrate success related to management/utilization of large data sets/information bases, or development of information and policy analyses, or use of the Internet to make STEM information available to NSF research or education communities, or exceptional examples of broadly accessible tools shared by NSF research and education communities.

FY 2004 GPRA Performance Goals (continued)

Performance Area	No.	Annual Performance Goals for Management
Proposal and Award Management		
Use of Merit Review	IV-1	At least 85 percent of basic and applied research funds will be allocated to projects that undergo merit review.
Implementation of Merit Review Criteria – Reviewers	IV-2	At least 70 percent of reviews with written comments will address aspects of both review criteria.
Implementation of Merit Review Criteria – Program Officers	IV-3	For at least 90 percent of decisions to fund or decline proposals, Program Officers will comment on aspects of both review criteria.
Customer Service – Time to Prepare Proposals	IV-4	Ninety-five percent of program announcements will be publicly available at least three months prior to the proposal deadline or target date.
Customer Service – Time to Decision	IV-5	For 70 percent of proposals, be able to inform applicants whether their proposals have been declined or recommended for funding within six months of deadline or target date, or receipt date, whichever is later.
Efficiency – Award Size	IV-6	NSF will increase the average annualized award size for research grants to $128,000.
Efficiency – Award Duration	IV-7	The average duration of awards for research grants will be 3.0 years.
Facilities – Construction and Upgrade	IV-8	For ninety percent of construction, acquisition and upgrade projects, keep any negative cost and schedule variances to less than 10 percent of the approved project plan.
Facilities – Operations & Management	IV-9	For ninety percent of operational facilities, keep scheduled operating time lost to less than 10 percent.
Business Practices		
Cost Efficiency – Videoconferencing	IV-10	NSF will assess the cost efficiencies associated with administrative processes. Performance Indicator: - Calculation of the agency-wide cost savings realized by the use of videoconferencing.
Electronic Business	IV-11	NSF will continue to integrate its internal electronic grants process with the E-government initiative. Performance Indicators: - 90 percent of program announcements will be posted to Fed Grants. - 75 percent of declined proposals will be processed using E-decline signatures.
Security Program – Information Technology & Physical Security	IV-12	NSF will maintain and enhance the agency-wide security program to ensure adequate protection of NSF's infrastructure and critical assets. Performance Indicators: - 95 percent of NSF's major systems will achieve Level 3 compliance in accordance with the NIST Security Self-Assessment Framework. - Implementation of a "Smart ID" pilot to provide staff with a standard identification card for authentication and access control.

FY 2004 GPRA PERFORMANCE GOALS (CONTINUED)

PERFORMANCE AREA	NO.	ANNUAL PERFORMANCE GOALS FOR MANAGEMENT (CONTINUED)
Human Capital		
NSF Staff – Diversity	IV-13	NSF will ensure that diversity considerations are embedded in activities related to agency staffing of scientists and engineers. Performance Indicator: - NSF will complete development of the NSF S&E diversity plan initiated in FY 2003 and begin implementation of its recommendations.
NSF Staff – Diversity	IV-14	NSF will show an increase over FY 2000 in the total number of appointments to NSF science and engineering staff and management from underrepresented groups.
Workforce Learning	IV-15	The NSF Academy will develop a broad array of competency-based learning opportunities that will enable all staff to perform critical functions supporting NSF's vision and goals. Performance Indicators: - Identification of staff requiring Facilities / Center Project Management training. - Initiation of development of a curriculum that leads to certification in Facilities / Center Project Management.
Workforce Planning	IV-16	NSF will develop competency-based occupation classification alternatives that support the agency's strategic business processes and capitalize on its technology enabled business systems. Performance Indicators: - Identification of workforce competencies needed to support the majority of NSF's strategic business processes. - Development of new positions or revision of position descriptions in order to address emerging business process requirements.

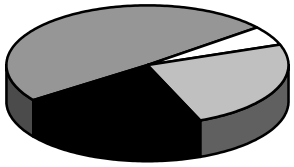
III. GOALS FOR STRATEGIC OUTCOMES

NSF has developed performance goals with descriptive standards to evaluate the results of its investments in research and education, per the GPRA option to set performance goals in an alternative form.

A. PEOPLE STRATEGIC OUTCOME GOAL

STRATEGIC OUTCOME GOAL III-1: Developing "a diverse, internationally competitive and globally engaged workforce of scientists, engineers, and well-prepared citizens."

21%



PEOPLE = $1,153 M

NSF's investments in PEOPLE enable the Foundation to meet its mission of promoting the progress of science, while facilitating the creation of a diverse, internationally competitive and globally engaged workforce of scientists, engineers and well-prepared citizens. In order to achieve the PEOPLE strategic outcome, NSF supports formal and informal science, technology, engineering and mathematics (STEM) education at all levels – preK-12, undergraduate, and graduate – as well as professional development of faculty and teachers and public science-literacy projects that engage people of all ages in life-long learning. The Foundation also supports programs specifically designed to promote the integration of research and education, such as the Integrative Graduate Education and Research Traineeship Program (IGERT), Research Experiences for Undergraduates (REU) and the Faculty Early Career Development Program (CAREER). In partnership with the research and education community, state and local education agencies, civic groups, industry, and parents, NSF fosters the continued development of research-informed, standards-based STEM education at all levels.

FY 2004 Performance Goal III-1: NSF's performance is successful when, *in the aggregate*, results reported in the period demonstrate significant achievement in the majority of the following indicators:

- Development of well-prepared researchers, educators or students whose participation in NSF activities provides experiences that enable them to explore frontiers or challenges of the future;
- Contributions to development of a diverse workforce through participation of underrepresented groups[2] in NSF activities;
- Development or implementation of other notable approaches or new paradigms[3] that promote progress toward the PEOPLE outcome goal.

Comparison to FY 2003 Goal: This goal is identical to the FY 2003 performance goal.

Baseline: Goal III-1 was a new performance goal for FY 2001. NSF was successful in achieving this goal in FY 2001 and in FY 2002.

[2] For example, women, underrepresented minorities, persons with disabilities or underserved institutions.

[3] For example, broad-based, program-wide results that demonstrate success related to improved math and science performance for preK-12 students, or professional development of the STEM instructional workforce, or enhancement of undergraduate curricular/laboratory/instructional infrastructure, or highly synergistic education and research activities, or international collaborations, or communication with the public regarding science and engineering.

Means and Strategies for Success:

Related to process – continue to:

- Support, through merit-based grants and cooperative agreements, the most promising and capable individuals and groups throughout the U.S.;
- Pay particular attention to development of people beginning careers in science and engineering;
- Use all aspects of NSF activity to embed diversity in the science and engineering workforce;
- Maintain existing partnerships and explore opportunities for developing new partnerships that focus on broadening participation. These include making presentations at national and regional meetings involving minority-serving organizations and at formal campus meetings of NSF programs (e.g., EPSCoR and LSAMP);
- Focus on (a) preparation and professional development of teachers of mathematics and science; and (b) alignment of standards, rigorous curricula and assessments;
- Support production of well-trained researchers and educators by providing a variety of NSF activities (e.g., programs with industry; NSF centers) to afford interactive research and education opportunities for students, post-doctoral scientists and faculty at all career stages;
- Support approaches that integrate research and learning activities, encourage the partnering of the K-12 and higher education communities and develop intellectual capital;
- Encourage attendance at international meetings, faculty/student exchange opportunities, and research utilizing international facilities and field/logistics centers in order to further the engagement of the NSF community in international activities; and
- Promote increased linkages between formal programs and informal activities such as those involving museum and science center exhibits, public fora, or the Internet in order to communicate with the public.

Related to programs:

- Provide grants of sufficient size and duration to improve the efficiency of the research process.
- Provide financial support for activities specifically addressing the PEOPLE strategic outcome. For FY 2004 the budget request is about $1,153 million, an increase of $66 million over the FY 2003 request of $1,087 million. Major components of the Foundation's investments in PEOPLE focus on investments in programmatic activities related to (1) K-12 education, (2) undergraduate education, and (3) graduate and professional development. EHR provides a major focus for much of NSF's education and workforce investments; however, these efforts are integrated with complementary activities across the Foundation.
- Support programmatic themes highlighted in the section labeled FY 2004 Areas of Emphasis (discussed in the NSF Budget Request, detailed below and listed in the table in Section II.)

FY 2004 Areas of Emphasis:

Math and Science Partnership (MSP): The Math and Science Partnership, a program for which the first awards were made in FY 2002, is a national effort to unite higher education with schools and school districts to raise student achievement in mathematics and science. MSP plays an important role in the Presidential education initiative, *No Child Left Behind*. The program supports promising partnerships of institutions of higher education (especially faculty members in mathematics, science and/or engineering), schools and school districts, and other key stakeholders to engage in evidence-based activities designed to increase student participation and success in advanced mathematics and science, and to improve quality, quantity and diversity in the teacher workforce. Successful MSP projects will serve as models for educational partnerships. The program also supports research, evaluation and technical assistance of all aspects of the MSP program in order to build the knowledge base of what works, where it works and why it works. The requested FY 2003 funding

level is $200 million and the FY 2004 request level is $200 million. The MSP effort is itself a partnership between two federal agencies, the NSF and the U.S. Department of Education (ED), who have defined the program linkages necessary to manage this joint investment in mathematics and science education for the greatest effectiveness.

- *Workforce for the 21st Century:* For the next five years, NSF will develop an integrated research and education effort to address science and engineering workforce needs. The primary goals of this effort are to prepare scientists, mathematicians, engineers, technologists and educators capable of meeting the challenges of the 21st century; to attract more U.S. students to science and engineering fields; and to broaden participation in science and engineering fields. To achieve these goals, three integrative investments will be pursued. Beginning in FY 2004, Integrative Institutional Collaborations will enable institutions to develop complementary activities that weave together, vertically integrate, and augment support from existing programs, creating a seamless route of advancement for students from the K-12 through post-doctoral levels. Workforce Research will promote study of the factors that influence career choices; analyze the quality and productivity of the pathways that students use to prepare for science and engineering careers or advance in their careers; and evaluate programs designed to increase and broaden participation in science, mathematics, and engineering areas at all levels. In future years, support will be added for Faculty for the Future, which will support development of innovative approaches to the education of new K-12 and higher education faculty, particularly those aimed at attracting and retaining members of underrepresented groups, and will provide early and mid-career faculty at Minority-Serving Institutions with research-based faculty development opportunities in laboratories at research-intensive universities. (Request = $9 million)

- Increasing *Graduate Student Stipends* is one strategy to attract more U.S. citizens, nationals, and permanent residents into graduate education in science and engineering. The stipend for NSF fellows and trainees for the 2003-2004 academic year is $25,000. In the 2004-2005 academic year, NSF will increase stipends for its Graduate Research Fellowships (GRF), NSF Graduate Teaching Fellows in K-12 Education (GK-12), and Integrative Graduate Education and Research Traineeships (IGERT) fellows to $30,000. The number of students supported will increase to about 5,000.

- *Other*, for Retrospective reporting:
  - > PreK-12 Education: This area of emphasis includes educational systemic reform initiatives such as Rural Systemic Initiatives (RSI) and the Urban Systemic Program (USP).
  - > Undergraduate Education: This area includes the Research Experiences for Undergraduates (REU) Program as well as programs enhancing undergraduate curricular, laboratory, and instructional infrastructure, and those supporting the undergraduate instruction of students traditionally underrepresented in the science, engineering, and technological workforce.
  - > Graduate and Professional Development: Examples include IGERT and GK-12. IGERT meets the need for a cadre of broadly prepared Ph.D.s by sponsoring development of innovative, interdisciplinary, research-based graduate education and training programs in Ph.D.-granting institutions. GK-12 places graduate and advanced undergraduate students in K-12 schools to serve as science and mathematics content resources for teachers and as role models for young students.
  - > The Faculty Early Career Development (CAREER) program supports early-career faculty within the context of their overall career development. It combines research support and education of the highest quality in a single program. (Request = $128 million.)
  - > The Partnerships for Innovation (PFI) program focuses on connections between new knowledge created in the discovery process and learning and innovation. The goals of the program are: (1) to stimulate the transformation of knowledge created by the national research and education enterprise into innovations; (2) to broaden the participation of all types of academic institutions

and all citizens in NSF activities to more fully meet the workforce needs of the national innovation enterprise; and (3) to create the associated enabling infrastructure. (Request = $10 million.)

> The Historically Black Colleges and Universities Undergraduate Program provides awards to enhance the quality of undergraduate STEM programs through curricular reform and enhancement, faculty development, research experiences for undergraduates, upgrading of scientific instrumentation, and improvement of research infrastructure. (Request = $20 million.)

> The Louis Stokes Alliances for Minority Participation (LSAMP) program strengthens and encourages STEM baccalaureate degree production of students from underrepresented populations by utilizing the knowledge, resources, and capabilities of a broad range of organizations from the academic, federal, and commercial sectors. The effectiveness of LSAMP is demonstrated by significant increases in the number of minority students in STEM fields earning baccalaureate degrees. (Request = $33 million.)

Data Sources Used in External Assessment Process: Examples of relevant information include student, teacher and faculty participants in NSF activities; demographics of participants; descriptions of student involvement; education and outreach activities under grants; demographics of science and engineering students and the S&E workforce; number and quality of educational models, products and practices; number and quality of teachers trained; student outcomes including enrollments in mathematics and science courses, retention, achievement, and science and mathematics degrees received; press releases, and scientific publications.

This information may be included in PI project reports (annual and final), program / division / directorate annual reports, agency internal collections, formal external evaluations or special studies, or internal / external information systems.

These sources of information may be utilized in Committees of Visitors reports and in the report of the Advisory Committee for GPRA Performance Assessment (AC/GPA).

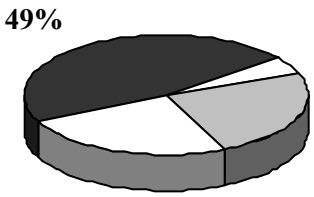
Data Sources for Determining Results: Independent assessments and external third-party evaluations, including the AC/GPA report that assesses performance using the GPRA alternative form; external reports from awardees; internal and external information systems and external studies; and independently maintained databases.

Criteria for success are presented in the performance goal statement.

Data Limitations: Qualitative information requires the judgment of experts; the substance and timing of outcomes from research and education activities are unpredictable; some external databases are not under agency control; long-term data is needed to assess the ultimate impact of outcomes; there is a potential for self-reporting bias.

B. IDEAS STRATEGIC OUTCOME GOAL

STRATEGIC OUTCOME GOAL III-2: Enabling "discovery across the frontier of science and engineering, connected to learning, innovation, and service to society."



IDEAS = $2,696 M

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 the Foundation 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.

FY 2004 Performance Goal III-2: NSF's performance is successful when, *in the aggregate*, results reported in the period demonstrate significant achievement in the majority of the following indicators:

- Discoveries that expand the frontiers of science, engineering, or technology;
- Connections between discoveries and their use in service to society;
- Partnerships that enable the flow of ideas among the academic, public or private sectors;
- Leadership in fostering newly developing or emerging areas.

Comparison to FY 2003 Goal: This goal is identical to the FY 2003 performance goal.

Baseline: Goal III-2 was a new performance goal for FY 2001. NSF was successful in achieving this goal in FY 2001 and in FY 2002.

Means and Strategies for Success:

Related to process – continue to:

- Support the most promising ideas through merit-based grants and cooperative agreements to individual researchers and groups, in partnership with colleges, universities, and other institutions – public, private, state, local, and federal – throughout the U.S.;
- Make awards focused on discoveries that create or have potential for use in service to society;
- Encourage partnerships and cooperative research efforts – among disciplines, in different sectors, and across international boundaries;
- Take informed risks in emerging research areas where consensus on appropriate directions (e.g., theory, methodology, or knowledge) is just beginning to form;
- Partner with a diverse range of investigators (e.g., new, minority) and institutions (e.g., research universities, community colleges, EPSCoR states, minority-serving institutions);
- Identify and support major cross-disciplinary priority areas where U.S. and NSF leadership are important;
- Identify and provide support for new and emerging opportunities;

- Develop and support a high-quality, balanced award portfolio that considers disciplines and fields, interdisciplinary research areas, and emerging opportunities; and
- Utilize the NSF core strategies of integrating research and education, promoting partnerships, and developing intellectual capital.

Related to programs:

- Provide grants of sufficient size and duration to improve the efficiency of the research process.
- Provide financial support for programs specifically addressing the IDEAS strategic outcome. For FY 2004, this investment totals about $2,696 million, an increase of $137 million over the FY 2003 request of $2,559 million. Investments in research grants and centers are the principal components of NSF's investments in IDEAS. The FY 2004 request continues to support core disciplinary research and education across the NSF.
- Support programmatic themes highlighted in the section labeled FY 2004 Areas of Emphasis (discussed in the NSF Budget Request, highlighted below and listed in the table in Section II). These themes focus on aspects of the entire NSF portfolio and on priority areas that hold exceptional promise to advance knowledge.

FY 2004 Areas of Emphasis:

- *Priority Areas:*
  - > *Biocomplexity in the Environment* (BE) became a priority area in FY 2000. Study of complex environmental systems is a key element of local, national and global security and is critical to the development of new scientific and technological capabilities that will significantly advance our ability to anticipate environmental conditions and thus improve environmental decision-making. The BE priority area is designed to give NSF the capability to respond to the demand for new approaches to investigating the interactivity of biota and the environment. Activities in this area for FY 2004 will emphasize microbial genome sequencing, ecology of infectious disease, dynamics of coupled natural and human systems, coupled biogeochemical cycles, genome-enabled environmental sciences and engineering, instrumentation development for environmental activities, and materials use: science, engineering and society. (Request = $100 million).
  - > *Information Technology Research* (ITR) is an NSF priority area whose aim is to extend the frontiers of IT, improve our understanding of IT and its impacts on our society, and help prepare Americans for the Information Age. ITR is a collaboration across NSF's activities and is coordinated as part of NSF's participation in the multi-agency NITRD effort. In FY 2004, ITR will exploit and deepen the research initiated to this point and will continue to expand research in multidisciplinary areas, focusing on fundamental research that will lead to profound insights about our physical, biological and social world; it will continue to support research to enable the wide and secure deployment of pervasive IT through new classes of ubiquitous applications, the creation of new paradigms to achieve high-levels of trust in cyberspace and the development of new tools and methods to enhance our national security and critical infrastructure protection. (Request = $303 million).
  - > *Nanoscale Science and Engineering (NSE)* is supported in conjunction with the multi-agency National Nanotechnology Initiative (NNI). NSF is emphasizing long-term, fundamental research aimed at discovering novel phenomena, processes, and tools; addressing NNI Grand Challenges; supporting new interdisciplinary centers and networks of excellence including shared user facilities; supporting research infrastructure; and addressing research and educational activities on the societal implications of advances in nanoscience and nanotechnology. This investment will be expanded in FY 2004 to develop and strengthen critical fields (including nanobiotechnology, manufacturing at the nanoscale, and education) to

establish the science and engineering infrastructure and workforce needed to exploit the opportunities presented by these new capabilities. (Request = $249 million.)

> *Mathematical Sciences.* For FY 2004 NSF is continuing this priority area in order to strengthen the mathematical foundations of science and society. The fundamental mathematical sciences – embracing mathematics and statistics – are essential not only for the progress of research across disciplines, they are also critical to training a mathematically literate workforce for the future. FY 2004 areas of emphasis for this priority area include: fundamental mathematical and statistical sciences, advancing interdisciplinary science and engineering, mathematical and statistical challenges posed by large data sets, managing and modeling uncertainty, modeling complex nonlinear systems, and advancing mathematical sciences education. (Request = $89 million.)

> *Human and Social Dynamics.* This priority area seeks to better understand the causes and ramifications of change, to increase our collective ability to anticipate the complex consequences of change (cultural, scientific and technological, economic, individual, political, and social), to better understand the dynamics of the human mind, to better understand the cognitive and social structures that create and define change, and to help people and organizations better manage profound or rapid change. For FY 2004 NSF will focus research on enhancing human performance through integration of nanotechnology, biotechnology, infotechnology and cognitive science, decision-making under uncertainty, agents of change, modeling human and social dynamics, spatial social science and instrumentation and data resource development (Request = $24 million.)

- *Core Research and Education Activities*: NSF will continue to invest in core research activities and education opportunities evolving from prior investments in disciplinary and interdisciplinary research. These ongoing activities build strength in the science and engineering (S&E) disciplines, enable the development of new and emerging fields, and provide leadership to improve the health and continued vitality of the nation's STEM education. Examples of specific core activities for FY 2004 include 21st Century Biology, sensor technology, fundamental research on environmental issues, CyberTrust Security research, microbial genome sequencing, renewed support for research and infrastructure in the physical sciences and continued funding for EPSCoR.

- *Science of Learning Centers.* The SLC program creates multidisciplinary, multi-institutional Centers to expand our understanding of learning through research on the learning process, the context of learning and learning technologies, leading to enhanced understanding of how people think and learn. SLCs will serve as national "learning" resources, and will play a critical role in developing a broad base of research that will inform our approach to national educational and workforce challenges. The SLC investment will support a diverse portfolio of projects, providing leadership across a broad range of science and engineering approaches, including research that will speak to and learn from educational reform, workforce development, and the linkage of educational strategies to economic development, and add generally to the knowledge base in cognition. (Request = $20 million.)

- *Other*, for Retrospective reporting:
  > Balance of portfolio: Focuses on development of an award portfolio that is balanced with respect to support for: emerging opportunities; involvement of new investigators and members of underrepresented groups; and projects characterized as high-risk, multidisciplinary, or innovative. High-risk research is exploratory in nature – there is often a lack of experimental data or methodologies, little consensus on theory, information and/or approach, and a significant probability of failure associated with the research. If successful, such high-risk research could result in significant scientific or technological advances.

- Life and Earth's Environment (LEE) is a former area of emphasis that encompassed a wide range of activities designed to foster research on the complex interdependencies among living organisms and the environments which affect, sustain and are modified by them.
- The Information Technology for the 21st Century (IT^2) initiative addressed issues and concerns raised by the President's Information Technology Advisory Committee (PITAC) in its 1999 report. Past investments focused on software systems, high-end computing, the impacts of information technologies and terascale computing systems.
- Knowledge and Distributed Intelligence (KDI) is a former area of emphasis that aimed to improve our ability to discover, collect, represent, transmit and apply information. It included activities such as research on knowledge networking, learning and intelligent systems, new challenges to computation, and next generation Internet.
- Centers (e.g., STCs, ERCs, MRSECs). Science and Technology Centers (STCs) are university-based research efforts that foster a new collaborative culture among researchers and educators at all levels in academia, industry, government laboratories and other public and private organizations. They provide an opportunity to explore challenging and complex research problems that often require interdisciplinary expertise and high-risk approaches, access to state-of-the-art instrumentation and facilities, and a commitment of high levels of support for sustained periods of time.
- Experimental Program to Stimulate Competitive Research (EPSCoR). Through its EPSCoR program NSF works with state governments, higher education institutions and businesses to improve the academic research infrastructure and national R&D competitiveness in states that have historically received lesser amounts of federal academic R&D funding.

Data Sources used in External Assessment Processes: Examples of relevant information include published and disseminated results, including journal publications, books, software, and audio or video products created; contributions within and across disciplines; organizations of participants and collaborators (including collaborations with industry); contributions to other disciplines, infrastructure, and beyond science and engineering; use beyond the research group of specific products, instruments, and equipment resulting from NSF awards; and the role of NSF-sponsored activities in stimulating innovation and policy development.

This information may be included in PI project reports (annual and final), program / division / directorate annual reports, agency internal collections, formal external evaluations or special studies, press releases, scientific publications, or internal / external information systems.

These sources of information may be utilized in Committees of Visitors reports and in the report of the Advisory Committee for GPRA Performance Assessment (AC/GPA).

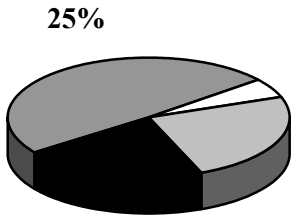
Data Sources for Determining Results: Primary sources include formal external third-party evaluations, such as the AC/GPA report that assesses performance using the GPRA alternative form, external databases and reports from awardees, and independent assessments.

Criteria for success are presented in the performance goal statement.

Data Limitations: Qualitative information requires the judgment of experts; the substance and timing of outcomes from research and education activities are unpredictable; external databases are not under agency control; long-term data is needed to assess the ultimate impact of outcomes; there is a potential for self-reporting bias.

C. TOOLS STRATEGIC OUTCOME GOAL

STRATEGIC OUTCOME GOAL III-3: Providing "broadly accessible, state-of-the-art and shared research and education tools."



TOOLS = $1,341 M

As the issues researchers face increasingly involve phenomena at or beyond the limits of our measurement capabilities, their study requires the use of new generations of powerful tools. Examples of such tools include instrumentation and equipment needed by individual investigators in the conduct of their research, multi-user facilities, digital libraries, accelerators, telescopes, research vessels and aircraft and earthquake simulators. In addition, funding devoted to the TOOLS strategic outcome area provides resources needed to support large surveys and databases as well as computational and computing infrastructures for all fields of science, engineering, and education.

NSF provides support for large multi-user facilities that meet the need for state-of-the-art, world-class research platforms vital to new discoveries and the progress of research. NSF support may include construction, upgrades, operations, maintenance, and personnel needed to assist scientists and engineers in the conduct of research at such facilities. NSF consults with other agencies and international partners to avoid duplication and optimize capabilities for American researchers.

All of these investments enable the Foundation to meet its mission of promoting the progress of science, while responding specifically to direction in the NSF Act of 1950 to foster and support the development and use of computer and other scientific and engineering methods and technologies, primarily for research and education in the sciences and engineering.

FY 2004 Performance Goal III-3: NSF's performance is successful when, *in the aggregate*, results reported in the period demonstrate significant achievement in the majority of the following indicators:

- Development or provision of tools[4] that enables discoveries or enhances productivity of NSF research or education communities;
- Partnerships with local, state or federal agencies, national laboratories, industry or other nations to support and enable development of large facilities or other infrastructure;
- Development or implementation of other notable approaches or new paradigms[5] that promote progress toward the TOOLS outcome goal.

Comparison to FY 2003 Goal: This goal is identical to the FY 2003 goal.

[4] For example, includes research and education infrastructure such as large centralized facilities, or integrated systems of leading-edge instruments, or databases, or widely utilized, innovative computational models or algorithms, or information that provides the basis for a shared-use networked facility.

[5] For example, broad-based, program-wide results that demonstrate success related to management/utilization of large data sets/information bases, or development of information and policy analyses, or use of the Internet to make STEM information available to NSF research or education communities, or exceptional examples of broadly accessible tools shared by NSF research and education communities.

Baseline: Goal III-3 was a new performance goal for FY 2001. NSF was successful in achieving this goal in FY 2001 and in FY 2002.

Means and Strategies for Success:

Related to process – continue to:

- Support, through merit-based grants and cooperative agreements of sufficient size and duration, the most promising projects proposed by individual researchers and groups throughout the U.S.;
- Partner with other federal agencies, states, private organizations, national laboratories, or other nations to develop infrastructure by capitalizing on and leveraging the human and financial resources of each group;
- Operate an internal NSF capital planning process that encourages the development of innovative capabilities and meets the infrastructure needs of the U.S. community served by NSF;
- Develop and implement improvements for selecting, managing and overseeing large facility projects (cf. NSF Large Facility Projects Management and Oversight Plan, September 2001);
- Ensure that the breadth of infrastructure needs of the scientific community are examined regularly through workshops, panels, advisory groups, or other mechanisms;
- Provide broad support to the information technology community and others involved in innovative applications of cutting-edge IT tools for science and engineering;
- Upgrade the computation and computing infrastructure for all fields of science and engineering;
- Provide information on the status of the domestic / foreign science and engineering enterprise to inform science policy and priority setting;
- Develop and support a high-quality, balanced portfolio that invests in disciplines and fields, interdisciplinary research areas, and emerging opportunities; and
- Utilize the NSF core strategies of integrating research and education, promoting partnerships, and developing intellectual capital.

Related to programs:

- Provide financial support for activities specifically addressing the TOOLS strategic outcome. For the FY 2004 budget request, this investment totals about $1,341 million, an increase of $219 million over the FY 2003 request of $1,122 million. The principal components of this TOOLS portfolio are investments in research instrumentation and research facilities (capital and otherwise).
- Support programmatic themes highlighted in the section labeled FY 2004 Areas of Emphasis (discussed in the NSF Budget Request, detailed below and in Section II).

FY 2004 Areas of Emphasis:

- *Investments in Major Research Equipment and Facilities Construction (MREFC)*: This account provides funding for capital expenditures for the construction and acquisition of major research facilities that provide the U.S. scientific community with unique capabilities at the cutting-edge of science and engineering. In FY 2004, $202 million is requested to support seven ongoing projects. MREFC support requested for FY 2003 was $126 million.

- *Cyberinfrastructure.* In FY 2004 NSF will take the first step in an initiative to create cyberinfrastructure that will advance the existing S&E infrastructure of high-performance computers and networks to a new level by integrating these resources with sensors, data resources and new analysis and visualization capabilities. These resources will enable new types and depths of research by using massive data resources, supporting deeper detail for computational analysis and opening new frontiers for analysis and understanding. The aim of this initiative is to create

cyberinfrastructure that is resilient, highly capable, adaptable and extensible. It would support networks, storage systems, high-end computing engines, middleware, basic sensing mechanisms, and all the associated services and bring next-generation computer and networking capabilities to researchers and educators nationwide.

- *S&E Data Collection, Analysis and Reporting; Databases and SRS Survey Redesign:* The work of NSF's Division of Science Resources Statistics (SRS) involves survey development, data collection, analysis, information compilation, dissemination, and customer service to meet the statistical demands of a diverse user community interested in the nation's science, engineering, and technology enterprise. In FY 2004, NSF will provide approximately $24 million for this program in order to maintain the core surveys and analytical activities that produce the information necessary for fulfilling its statutory mandate to produce data and analysis on the scientific and engineering enterprise. Survey redesign activities for the National Survey of College Graduates based on the 2000 Decennial Census will continue, and a redesigned survey will be conducted. The National Academy of Sciences will conduct a review of the SRS R&D collection systems in light of the changing nature of research and development. A comprehensive study of the feasibility of developing a new survey to collect information about individuals in postdoctoral positions will be undertaken.

- *Other*, for Retrospective reporting:
  > The Major Research Instrumentation (MRI) Program was established to improve the condition of scientific and engineering equipment for research and research training in our nation's academic institutions. In FY 2004, NSF will provide $90 million for this program.
  > Scientific databases and tools for using them are a critical component of NSF activity. They are a main focus within Information Technology Research, a NSF priority area since FY 2000. The K-16 National STEM Education Digital Library, which totals about $24 million in FY 2004, is another important component in this area.

Data Sources used in External Assessment Processes: Examples of relevant information include descriptions of new tools and technologies, shared-use of facilities, multidisciplinary databases, software, newly-developed instrumentation, and other inventions; data, samples, specimens, germ lines, and related products of awards placed in shared repositories; facilities construction and upgrade costs and schedules; and operating efficiency of shared-use facilities.

This information may be included in PI project reports (annual and final), program / division / directorate annual reports, agency internal collections, formal external evaluations or special studies, press releases, scientific publications, or internal / external information systems.

These sources of information may be utilized in Committees of Visitors reports and in the report of the Advisory Committee for GPRA Performance Assessment (AC/GPA).

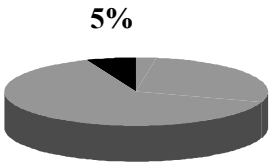
Data Sources for Determining Results: Primary sources include formal external third-party evaluations, such as the AC/GPA report that assesses performance using the GPRA alternative form, and external databases and reports from awardees and independent assessments.

Criteria for success are presented in the performance goal statement.

Data Limitations: Qualitative information requires the judgment of experts; the substance and timing of outcomes from research and education activities are unpredictable; external databases are not under agency control; long-term data is needed to assess the ultimate impact of outcomes; there is a potential for self-reporting bias.

External Factors: In most cases, NSF does not directly operate the facilities that it supports. Typically, the Foundation makes awards to external entities to undertake construction, management and operation of facility projects. NSF's relationship with these organizations is often collaborative in nature and is defined in cooperative agreements between NSF and those organizations.

IV. GOALS FOR MANAGEMENT



A&M = $291 M

Excellence in managing NSF's activities is critical to achievement of the Foundation's mission-oriented outcome goals. Development of management goals included in this FY 2004 Performance Plan was guided by the Strategic Plan, previous Performance Plans, internal deliberations, agency past performance, and reasonable projections for future levels of performance. In developing the FY 2004 portfolio of management goals, NSF limited the number of goals while focusing on those of fundamental importance to the Foundation. The FY 2004 goals emphasize Foundation-level activities. In general, the management goals that largely impact one organizational unit are addressed through internal controls and processes.

As in FY 2003, this year's Goals for Management section contains paragraphs entitled *Resources Required*. Where information is available, these paragraphs identify the additional human and financial resources necessary to achieve the annual performance target. Where the additional resources are unknown or cannot be determined at this time, acknowledgment is made that staff and/or financial resources will be needed. Once determined, this information will be incorporated into future Performance Plans. Successful progress toward goal achievement, as the goals are currently developed, may be contingent upon receipt of the additional resources as stipulated.

The FY 2004 portfolio of goals contains a number that address the President's Management Agenda and focus on management challenges and reforms identified by the Office of Management and Budget, or the General Accounting Office, in NSF's annual review of financial and administrative systems as required by the Federal Managers' Financial Integrity Act, or by the NSF Office of Inspector General. NSF recognizes the importance of the issues identified and has addressed a significant number through the GPRA goals included in this document. The remainder is addressed by other means. The actions the Foundation is taking to address each challenge or reform are discussed in Appendix B.

The President's Management Agenda is comprised of five major government-wide initiatives: Strategic Management of Human Capital; Competitive Sourcing; Improved Financial Performance; Expanded E-Government; and Budget and Performance Integration. For each initiative, OMB prepares a scorecard consisting of "green, yellow and red lights" that reflects agency status and progress in achieving the standards for success ("getting to green").

For FY 2004, NSF is addressing the human capital, budget-performance integration and E-government initiatives with GPRA goals. The remaining two initiatives are being addressed with internal management controls and processes within the framework outlined in NSF's Administration and Management Strategic Plan.

The performance goals included in this management section are largely accomplished through the A&M function. The FY 2004 budget request for A&M totals $291 million compared to $261 million for FY 2003 and $231 million for FY 2002.

A. PERFORMANCE AREA: PROPOSAL AND AWARD MANAGEMENT

This section on proposal and award management focuses on merit review, customer service, efficiency – award size and duration, and facilities management. Success in achieving these goals is dependent upon such factors as high quality external review, sufficient staff resources and operating expenses, administrative requirements, and electronic information systems that support the various processes.

MERIT REVIEW

NSF's merit review process is the keystone for award selection. NSF invests in the best ideas from the most capable people, as determined by competitive merit review. NSF evaluates proposals for research and education projects using the two criteria established by the National Science Board in 1997 – the intellectual merit of the proposed activity and its broader impacts. 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."

NSF relies on expert evaluation by selected peers when evaluating proposals and making funding decisions. Each year, more than 250,000 merit reviews assist NSF Program Officers in evaluating proposals submitted for consideration. NSF's merit review process is critical to fostering the highest standards of quality, excellence and accountability – standards for which NSF is internationally recognized.

Use of Merit Review

FY 2004 Performance Goal IV-1: At least 85 percent of basic and applied research funds will be allocated to projects that undergo merit review.

Guidelines associated with OMB's R&D Investment Criteria (published in FY 2002) state, "A customary method for promoting R&D quality is the use of a competitive, merit-based process."

The definition of "*Merit-reviewed scientific research with competitive selection and external (peer) evaluation"* as specified by OMB in FY 2000, is "Intramural and extramural research programs where funded activities are competitively awarded from a pool of qualified applicants following review by a set of external scientific or technical reviewers (often called peers) for merit. The review is conducted by appropriately qualified scientists, engineers, or other technically-qualified individuals who are apart from the people or groups making the award decisions, and serves to inform the program manager or other qualified individual who makes the award."

In FY 2000 NSF reduced its 90 percent target for this performance goal in response to a revision of the government-wide definition of merit-reviewed scientific research as specified by OMB in FY 2000 (see above). Based on this revised definition, and OMB's recommended target level of 70 to 90 percent, NSF established an 85 percent target.

Indicator: Percent of basic and applied research funds allocated to projects that undergo merit review.								
	FY 1997	**FY 1998**	**FY 1999**	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Baseline	85%							
Goal			N/A*	80%*	85%	85%	85%	85%
Result		86%	86%	87%	88%	88%	&	&

* The FY 1999 goal was based on the pre-FY 2000 definition of merit-reviewed scientific research and is therefore, not comparable to the goals in FY 2000 and beyond. The 80% estimated goal, recalculated from NSF's original goal of 90%, is based on the OMB definition of merit reviewed scientific research disseminated in FY 2000.
& = Data not yet available.
N/A = Not Applicable

Means and Strategies for Success:

> Utilize external merit review wherever feasible for proposals received by NSF.

> Make exceptions to the external merit review requirement in situations where external reviewers may be difficult to find or where timeliness is crucial (such as for studies of volcanic eruptions or earthquakes).

Resources Required: This goal can be achieved with NSF's requested FY 2003 staff and budgetary resources.

Data / Data Source: The information used to calculate the percentage of basic and applied research funds allocated to merit-reviewed scientific research with competitive selection and external (peer) evaluation is maintained in the NSF Proposal, PI and Reviewer System (PARS), the Award System and the Financial Accounting System (FAS). Data is reported in the Enterprise Information System (EIS).

Data Limitations: There is a possibility of funds not being properly assigned to basic/applied categories.

Implementation of Merit Review Criteria – Reviewers

FY 2004 Performance Goal IV-2: At least 70 percent of reviews with written comments will address aspects of both review criteria.

Comparison to FY 2003 Goal: The FY 2004 goal is identical to the FY 2003 goal.

Baseline: Results from FY 2003 will serve as the baseline for this goal. NSF had similar goals in FY 2001 and FY 2002. NSF was judged not successful in achieving a similar goal in FY 2001 because reviewers did not consistently address the broader impacts criterion. In FY 2002, 84 percent of reviews received by NSF contained information in both the intellectual merit and broader impacts text boxes.

Means and Strategies for Success:

> In FY 2004, NSF will continue to develop and apply recommendations that focus on strategies to stress the importance of both reviewers and proposers using both criteria. For example, NSF now provides a web-based link to examples of broader impacts in the instructions for proposal preparation.

> The Grant Proposal Guide (GPG) now specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one page Project Summary. The GPG also

reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

> The FastLane system has been enhanced to remind/inform PIs of the new proposal preparation requirements.

Resources Required: This goal can be achieved with NSF's requested FY 2003 staff and budgetary resources.

Data / Data Source: In FY 2004, the Foundation expects almost all reviews to be submitted to NSF electronically via FastLane. There are separate text boxes in FastLane for reviewers to provide assessments relative to each merit review criterion. Therefore, NSF will be able to determine the number and percentage of reviews that contain comments in both text boxes.

Data Limitations: Proposals may not contain adequate information on the broader impacts of the proposed activity. Information may not be placed in the relevant text box when the review is completed. FastLane statistics do not provide qualitative information on the content of reviewer responses to each criterion.

Comment: Potential considerations a reviewer can employ to evaluate the "broader impacts" criterion include the extent to which proposed activities will: advance discovery and understanding while promoting teaching, training, and learning and vice versa; broaden participation of underrepresented groups; enhance the infrastructure for research and education; enhance scientific and technological understanding; and benefit society.

Implementation of Merit Review Criteria – Program Officers

FY 2004 Performance Goal IV-3: For at least 90 percent of decisions to fund or decline proposals, Program Officers will comment on aspects of both review criteria.

Comparison with FY 2003 Goal: In FY 2003 NSF expects Program Officers to comment on aspects of both review criteria in at least 80 percent of decisions to fund or decline proposals. This target level is increased to 90 percent for FY 2004.

Baseline: NSF had similar goals in FY 2001 and FY 2002. In FY 2001 NSF was successful in achieving a similar goal. In FY 2002 approximately 78% of review analyses commented on aspects of both merit review criteria.

Means and Strategies for Success:

> Encourage management to monitor the percent of review analyses (Form 7s) that address both criteria.

> Explore implementation of an electronic review analysis form that contains separate text boxes for Program Officers to provide assessments relative to each merit review criterion.

> In FY 2002, NSF issued Important Notice 127, dated July 8, 2002, entitled *Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion*. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of proposals submitted to NSF and specifies that, effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary.

Resources Required: Additional staff to develop an electronic review analysis form or other automated approaches to provide information on Program Officer usage (on Form 7s) of both criteria. Successful progress on this goal, as currently developed, may be contingent upon receipt of additional financial resources and/or staffing.

Data / Data Sources: NSF staff currently sample the review analyses (Form 7s) to determine the percent that comment on aspects of both criteria. In the future there is the possibility of developing an enhanced electronic Form 7 (the Review Record that contains the Program Officer's recommendation to fund or decline the proposal) with text boxes delineated for each review criterion. The implementation of such a strategy would allow information on the percent of review analyses that address both merit review criteria to be captured electronically.

Data Limitations: Proposals may not contain adequate information on the broader impacts of the proposed activity.

CUSTOMER SERVICE

Customer service has the potential to impact the number and quality of proposals received and thus NSF's ability to meet its strategic outcome goals. In 1995, NSF adopted a set of customer service standards, primarily related to proposal submission and review processes, focusing on grantees and potential grantees (*applicants*) as the primary *customers* for NSF's administrative processes. In a survey, applicants valued three standards most highly: (1) clear guidelines for proposal content and preparation, (2) a minimum of three months between release of program announcements and proposal deadlines and (3) notification of the proposal funding recommendation within six months of proposal submission. The survey measured baseline levels of customer satisfaction with reference to FY 1995 experiences. Subsequent surveys conducted in FYs 1999 and 2000 produced similar results.

FY 2004 performance goals focus on customer service related to 1) the time between release of program announcements and proposal deadlines and 2) notification of proposal funding recommendation within six months of proposal submission. The third standard valued by applicants – providing clear guidelines – is addressed in internal NSF clearance processes.

Time to Prepare Proposals

FY 2004 Performance Goal IV-4: Ninety-five percent of program announcements will be publicly available at least three months prior to the proposal deadline or target date.

Indicator:	**Percent of program announcements publicly available at least three months prior to the proposal deadline or target date.**						
	FY 1998	**FY 1999**	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Baseline	66%						
Goal		95%	95%	95%	95%	95%	95%
Result		75%	89%	100%	94%	&	&

& = Data not yet available.

Means and Strategies for Success:

> Each directorate has designated a clearance liaison to coordinate and plan funding activities. This has improved understanding and awareness of this goal throughout the Foundation.

> NSF will provide clearance for announcements and solicitations that do not meet this customer service standard only in unusual cases where there is a clear need to have a deadline or target date less than three months from the date of release.

Resources Required: This goal can be achieved with NSF's requested FY 2003 staff and budgetary resources.

Data / Data Source: A record of the date of release of each announcement is maintained in NSF's Online Document System (ODS). The deadline date and information on whether the announcement / solicitation is subject to this goal and whether it met the goal is maintained in the Program Information Management System (PIMS). It is expected that as of FY 2003 data will be reported in the Enterprise Information System.

Data Limitations: None identified.

Comments:

> A number of continuing programs have standing or previously established deadline dates. Some of these programs reissue announcements within 90 days of a proposal due date. As long as that deadline date was previously announced, thereby providing the community with at least 90 days to prepare a proposal, the announcement is considered to be in compliance with this GPRA goal.

> Program Announcements and Program Solicitations that inform the community of an opportunity to seek NSF funds (other than supplements to an existing award) and have a deadline or target date are considered "Program Announcements" for the purposes of this GPRA goal. Interagency program announcements where NSF is not the lead agency and announcements regarding awards provided by the NSB (e.g. The National Medal of Science) are not considered "Program Announcements".

Time to Decision

FY 2004 Performance Goal IV-5: For 70 percent of proposals, be able to inform applicants whether their proposals have been declined or recommended for funding within six months of deadline or target date, or receipt date, whichever is later.

Indicator:	**Percent of proposals processed within 6 months of deadline or target date, or receipt date, whichever is later.**							
	FY 1997	**FY 1998**	**FY 1999**	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Baseline	61%							
Goal			70%	70%	70%	70%	70%	70%
Result		59%	58%	54%	62%	74%	&	&

& = Data not yet available.

Means and Strategies for Success:

> During FY 2001, NSF initiated a series of staff brainstorming sessions on "time to decision" in order to identify effective practices related to timely processing of proposals. The results of these sessions have been widely disseminated throughout NSF.

> "Real-time" management reports to help staff pinpoint pending proposals in danger of exceeding the six-month processing goal were developed and are distributed monthly to NSF senior management.
> Some divisions have added "performance on prompt handling of proposals" to their performance evaluation criteria for Program Officers.
> Managers and staff throughout the Foundation are being recognized for efforts to improve timely processing of proposals and thereby reduce the time to decision.
> NSF staff continue to work towards shortening the award process time by making more effective use of electronic mechanisms in conducting reviews, working cooperatively to eliminate overloads and bottlenecks, and carefully tracking the stage of processing and age of all proposals.

Resources Required: This goal can be achieved with NSF's requested FY 2003 staff and budgetary resources.

Data / Data Source: Deadline and target dates are maintained in NSF's FastLane system. The proposal receipt date and date of Division Director concurrence with a Program Officer's recommendation on a proposal are maintained in NSF's Proposal, PI and Reviewer System (PARS). Data is reported in the Enterprise Information System.

Data Limitations: None identified.

Comment: The "time to decision" is the length of time between the closing date (deadline or target date) of an announcement or the date of receipt of a proposal (whichever is later) and the date a Division Director concurs (electronically) with the Program Officer's recommendation on the proposal.

BROADENING PARTICIPATION

NSF is strongly committed to increasing the participation of science and engineering researchers, educators and students from groups currently underrepresented in the science and engineering enterprise in all NSF activities. One of NSF's two merit review criteria applied to every competitively evaluated proposal considers, among other factors, "How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?" Congress has enacted legislation giving NSF explicit responsibility for addressing issues of equal opportunity in science and engineering. This assignment reflected the serious underrepresentation of women, minorities, and persons with disabilities in the science and engineering workforce. Through the authorization and appropriation processes, the Congress has made clear, as well, its concern that participation in NSF activities be open to a diverse set of academic institutions.

Recognizing that meeting NSF's mission and making progress toward all of its outcome goals requires maximum diversity of intellectual thought, over the next decade NSF seeks to:

– Increase the participation of scientists and engineers from underrepresented groups in NSF's merit review process (mail and panel review);
– Increase the participation of scientists and engineers from underrepresented groups in NSF's workshops and conferences;
– Increase the number of proposals submitted by and awards made to scientists and engineers from underrepresented groups; and
– Increase the number of scientists and engineers from underrepresented groups appointed by NSF to its staff.

In FY 2004 NSF will continue to focus on the first and fourth of these efforts. The first is discussed in the following paragraphs. The fourth is discussed in the section entitled NSF Staff - Diversity.

Diversity – Reviewer Pool

In FY 2001 NSF developed and implemented an electronic system to request demographic data, on a *voluntary* basis, from all reviewers. In FY 2002, the agency's GPRA goal for reviewer pool diversity focused on establishing a baseline for participation of members of underrepresented groups in NSF proposal review activities. NSF was not successful in achieving this goal. NSF requested and collected demographic data from reviewers but given the low response rate there is not enough information to establish a baseline. A total of 37,943 distinct reviewers returned their reviews on proposals decided upon in FY 2002. Demographic information is available for 3,507 of these reviewers and 1,168 (33%) of these 3,507 reviewers are members of an underrepresented group.

In FY 2003, NSF will continue to request demographic information from reviewers and to focus on increasing the number of reviewers that voluntarily provide data via efforts to educate reviewers on the purpose of the data collection.

No performance goal related to reviewer diversity is included in this plan. However, development of a future performance goal will again be considered once NSF determines whether it is feasible to set quantitative targets for participation levels of underrepresented groups based on additional data provided in response to FY 2003 NSF requests. Since current information on race, gender and ethnicity is available for less than 10 percent of those who participated in NSF proposal review activities in FY 2002, it is not possible to reliably characterize the reviewer pool at this time.

Means and Strategies for Success:

> Continue efforts to identify additional reviewers from underrepresented groups (including women, underrepresented minorities, persons with disabilities, and individuals in underserved universities) through:
  - Participation of NSF staff in conferences involving underrepresented groups or minority-serving institutions.
  - Collection and sharing of potential reviewer data made available by associations and institutions serving groups that are underrepresented in science and engineering.

> Encourage participation of members of underrepresented groups in activities such as NSF workshops or conferences so NSF is made aware of the review expertise of each.

EFFICIENCY – AWARD SIZE AND DURATION

In FY 2004, NSF will continue to address Foundation-wide concerns about research grant size and duration. Award size and duration are important factors in obtaining high quality proposals and ensuring that there are adequate resources to complete the proposed work. NSF has noted that its current award size and duration might result in inefficiency at U.S. academic institutions if scientists and engineers devote a greater proportion of their time to preparing proposals rather than to conducting research.

Increasing award size and duration is a priority highlighted in NSF's Strategic Plan. Determining the "right" grant size was one of OMB's FY 2002 management reform activities highlighted for NSF. Specifically, OMB asked the agency to develop metrics to measure the efficiency of the research process and determine the "right" grant size for the types of proposals that the Foundation funds. (See

Appendix B.) In response to this request, NSF contracted with Mathematica Policy Research, Inc. to assist in the development and administration of two surveys – one for Principal Investigators and one for institutions. Final results became available in May 2002. The analysis provided by Mathematica offered several alternative methods of determining the right grant size. The Foundation's long-term goal is to reach an average annualized award size of $250,000 and average award duration of 5.0 years.

FY 2004 Performance Goal IV-6: NSF will increase the average annualized award size for research grants to $128,000.

Indicator:	Average annualized award size for research grants.						
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Baseline	$90,000						
Goal				$110,000	$113,000	$125,000	$128,000
Result		$94,000	$105,800	$113,601	$115,666	&	&

& = Data not yet available.

FY 2004 Performance Goal IV-7: The average duration of awards for research grants will be 3.0 years.

Indicator:	Average duration of awards for research grants (in years).						
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Baseline	2.7						
Goal		2.8	N/A	3.0	3.0	3.0	3.0
Result		2.8	2.8	2.9	2.9	&	&

& = Data not yet available.
N/A = Not Applicable.

Means and Strategies for Success:

> Use electronic monitoring systems to keep track of average award size and duration and to modify funding strategies as needed.

> Increase award size for priority areas, focused competitions, and other programs.

Resources Required: Approximately $60 million is needed to increase average annualized award size from the FY 2003 goal of $125,000 to $128,000 in FY 2004, assuming that there is no increase in the FY 2003 number of awards and that the FY 2004 average award duration is 3.0 years, identical to the FY 2003 goal.

Data / Data Source: Data on award size and duration are maintained in NSF's Proposal, PI and Reviewer System (PARS) and Award system. Data is reported in the Enterprise Information System.

Data Limitations: None identified.

External Factor: Because the increases are budget dependent, award size and/or duration targets may fluctuate.

Comment: These two performance goals (IV-6 and IV-7) are applicable only to competitive research grants, a subset of awards that focuses on awards to individual investigators and small groups.

FACILITIES MANAGEMENT

Throughout its history, NSF has enjoyed a successful track record of providing state-of-the-art facilities for science and engineering research and for the education and training of next-generation researchers. Over time, NSF's portfolio of facilities has grown and diversified to include shared-use infrastructure, instrumentation, equipment, and distributed platforms. NSF's responsibility is to ensure that the research and education communities continue to have access to these state-of-the-art facilities, to provide the support needed to utilize them effectively, and to provide timely upgrades when needed to maintain U.S. leadership in research and education.

NSF's FY 2004 investment in tools for the research and education communities is approximately $1.3 billion. In view of the magnitude of its current and planned investments and the increasing complexity of facilities, NSF recognizes the importance of proper management and oversight of this portfolio – from assuring that new projects are delivered on schedule, within budget and according to specifications to seeing that facilities are operated in the most efficient, cost-effective manner possible.

After several years of GPRA reporting for facilities, NSF conducted a comprehensive internal review of its facilities goals in FY 2002. As a result of that review, NSF introduced revised goals for facility construction and operation in FY 2003. The revised goals more accurately capture NSF's performance and in addition are in alignment with OMB guidance in Circular A-11 related to management of capital assets. For example, the revised goal on construction activities incorporates the Earned Value technique, a widely accepted project management tool for measuring progress.

NSF is developing a Facilities Management and Oversight Guide to convey its expectations for sound project management by NSF staff and awardees. The Guide collects the best practices of NSF, its partners in other federal agencies, and its awardees for planning, managing and overseeing all aspects of facilities. The Guide stresses the need for comprehensive planning, cost estimating and scheduling, and provides users with recommended tools and resources for performing these tasks.

The **construction and upgrade** goal applies to all ongoing projects and those completed within FY 2004 that have a total project cost of at least $5 million.

FY 2004 Performance Goal IV-8: For ninety percent of construction, acquisition and upgrade projects, keep any negative cost and schedule variances to less than 10 percent of the approved project plan.

Comparison to FY 2003 Goal: This is identical to the FY 2003 goal.

Once constructed, NSF expects its **operational facilities** to enable researchers to perform cutting-edge research that expands the frontiers of discovery. NSF's goal in this area focuses on measuring a facility's ability to provide the required operating time.

This operations goal applies to all NSF-supported facilities that received greater than $1 million in annual operations and maintenance support.

FY 2004 Performance Goal IV-9: For ninety percent of operational facilities, keep scheduled operating time lost to less than 10 percent.

Indicator:	Comparison with scheduled operating time.					
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Goal	Keep operating time lost due to unscheduled downtime to less than 10 percent of the total scheduled operating time.	Keep operating time lost due to unscheduled downtime to less than 10 percent of the total scheduled operating time.	For 90 percent of facilities, keep operating time lost due to unscheduled downtime to less than 10 percent of the total scheduled operating time.	For 90 percent of facilities, keep operating time lost due to unscheduled downtime to less than 10 percent of the total scheduled operating time.	For 90 percent of operational facilities, keep scheduled operating time lost to less than 10 percent.	For 90 percent of operational facilities, keep scheduled operating time lost to less than 10 percent.
Result	Majority of facilities successful.	22 of 26 (85%) facilities successful.	25 of 29 (86%) facilities successful.	26 of 31 (84%) facilities successful.	&	&

& = Data not yet available.

Facilities: Success Strategies, Resources and Data:

The following sections apply to both facilities goals (IV-8 and IV-9) presented above.

Baseline: Results from FY 2003 will provide the baseline for goal IV-8. For goal IV-9, FY 2001 data provides the baseline.

Means and Strategies for Success:

> Ensure that cost and schedule plans are realistic and that they contain appropriate contingency.
> Ensure that operational plans are reasonable and realistic.
> Ensure that NSF Program Officers work closely with awardee project managers.
> Ensure that all possible appropriate actions are taken to:
  – keep construction projects within cost and on schedule.
  – maintain operating schedules to the extent possible.
> Provide learning opportunities in large facility project management via the NSF Academy and other venues.

Resources Required: A variety of resources are required to support technical, project management, and business operations staff, and for travel and training requirements. Staff assure a sufficient-sized workforce for the labor-intensive effort of efficient and effective management and oversight of the construction and operation of facilities. Travel resources allow NSF personnel managing and overseeing NSF-supported facilities to interact more closely with project partners. Training funds enable staff to remain current with respect to cutting-edge and best practices in managing and overseeing facilities. Successful progress in meeting the goals of completing projects on time, on budget and within performance specifications, and operating NSF-supported facilities efficiently and effectively, may be contingent upon receipt of the staffing and/or financial resources identified.

Data / Data Source: In order to improve reporting on performance goals related to facilities, NSF initiated development in FY 1999 of a Facilities Reporting System. This system, a FastLane module, receives information on operations and construction from facility managers external to NSF. The system is reviewed annually and revised as needed in order to reflect changes to goals, and incorporate

recommendations provided by internal and external customers to improve clarity and ease of use. It is undergoing extensive revision in FY 2003. Data is compiled and reported in the Enterprise Information System.

Data Limitations: NSF expects the quality and consistency of the information provided to continue to improve as facility managers and NSF staff gain experience with responding to newly developed reporting requirements. NSF addresses the accuracy and completeness of the information through internal review and interactions between NSF staff and the managers of the facilities.

External Factors: Factors such as adverse weather, natural disasters, or failure of partners to act as planned can have a significant impact on meeting deadlines for construction projects and operating plans.

B. PERFORMANCE AREA: BUSINESS PRACTICES

A state-of-the-art communications and technology infrastructure is essential to NSF's success in managing an increasing workload. The Foundation is aggressively moving towards an integrated paperless processing environment while providing customer-responsive, high-quality mission support. The following have been implemented or are in progress:

- Successful full implementation of electronic proposal submission and grantee reporting functions;
- Internal electronic grants processing leveraging NSF's success in web-based interactions with the external community;
- Active leadership and cooperation among federal agencies in conducting business electronically;
- Active leadership in government/university forums for addressing business practices; and
- Learning opportunities for staff.

In order to obtain broad-based external support and guidance for the business and operations aspects of the agency the Foundation established a Business and Operations Advisory Committee in FY 2001. This NSF Advisory Committee provides recommendations to the Office of Budget, Finance and Award Management and the Office of Information and Resource Management.

NSF's approach to its business practices is also aligned with the E-Government initiative included in the President's Management Agenda. In the most recent scorecard, NSF received a "green light" for both the *status* and *progress* in implementing the E-Government initiative. The GPRA goals related to electronic travel, electronic government and information technology and physical security discussed below support this initiative.

COST EFFICIENCY – VIDEOCONFERENCING

Over the past several years the use of videoconferencing at the National Science Foundation has evolved from a demonstration project to a part of normal business operations. Videoconferencing is now viewed throughout the business world as a possible alternative to travel in some situations. In addition to eliminating the security and safety concerns associated with travel, videoconferencing also offers cost-efficiencies such as minimizing staff time spent on travel and reducing travel costs.

Videoconferencing is not a direct replacement for travel, but an appropriate, balanced combination of travel and videoconferencing will maximize efficiencies while allowing NSF staff to "visit", virtually and physically, more sites.

Increasing the usage of videoconferences at NSF was a GPRA goal in FY 2001. NSF met its goal of increasing usage of video-conferencing by 100% over the FY 1999 level. The number of videoconferences in the Foundation continues to grow, though the percentage of growth has slowed.

Until recently, the cost savings realized by the use of videoconferencing have not been quantified. In FY 2002, one NSF office, the Office of Polar Programs (OPP), estimated its travel savings from the use of videoconferencing at $140,000. In FY 2003, NSF will establish methods of calculating agency-wide savings resulting from use of videoconferencing, where appropriate, in place of travel. In FY 2004, NSF will capture information required to calculate the cost savings from the use of videoconferencing throughout the Foundation.

Quantifying cost efficiencies associated with innovative business processes and administrative systems such as videoconferencing will illustrate that the changes NSF is making to various administrative functions lead to cost savings.

FY 2004 Performance Goal IV-10: NSF will assess the cost efficiencies associated with administrative processes.
Performance Indicator:
> Calculation of the agency-wide cost savings realized by the use of videoconferencing.

Comparison to FY 2003 Goal: This is a new goal for FY 2004.

Baseline: None. Cost savings associated with videoconferencing are not currently calculated.

Means and Strategies for Success:
> Investigate the Office of Polar Program's methodology for capturing costs and determine its adaptability to the Foundation as a whole.
> Define the assumptions about travel and about videoconferencing that will be used to quantify cost savings.
> Develop a questionnaire to capture the required information.
> Ensure all directorates with videoconferencing programs are included in the results.
> Identify intangible, non-quantifiable benefits associated with videoconferencing (e.g., improved management of projects)

Resources Required: This goal can be achieved with NSF's requested FY 2003 staff and budgetary resources.

Data / Data Sources: Completed questionnaires and information on airfares and per diem rates.

Data Limitations: There is the possibility of incomplete capture of information across the Foundation.

ELECTRONIC GOVERNMENT

NSF is expanding electronic government capabilities consistent with the goals of the President's Management Agenda. As a leader in electronic systems development and implementation, NSF is committed to leveraging technology to minimize the burden on our customers and increase efficiencies agency-wide. NSF, as an official partner agency in the E-grants effort, has contributed approximately $1.8 million, as well as staff resources, to this interagency effort. NSF will continue to use its expertise, experience and substantial accomplishments to promote intergovernmental electronic grants efforts.

On October 1, 2000, NSF became the first agency to perform all of its mission-critical interactions with its proposal applicants through the web. This represented a milestone, and was the first step in creating a completely electronic business process for proposal and award management. NSF's ultimate goal is to create an electronic environment capable of performing all internal and external functions from proposal submission through final project closeout.

NSF's FastLane system makes use of the Internet to allow NSF customers to exchange information with the agency. FastLane functions permit users to prepare and submit proposals, proposal reviews and project reports, determine the status of proposal and funding actions, submit post-award requests and notifications, interactively cooperate in drafting panel evaluations of proposals, initiate cash requests, manage organization information, view reviews and award letters, and perform other basic interactions. Internal electronic grants processing is performed through NSF's Electronic Jacket. NSF is the only federal agency currently receiving proposals electronically as a standard operating procedure. Its web-based interface with grantee organizations was built through collaborations involving both NSF staff and the research and education communities.

The agency's Business Analysis, started in FY 2002, will serve as the driver for implementing NSF's next generation E-government capability. This multi-year effort will guide future technology investments and provide the overarching framework for assuring that technology optimizes business value and mission performance. As part of this effort, NSF will (1) develop an Enterprise Architecture that will provide a blueprint for defining current business processes, applications, information resources, and technical infrastructure; (2) determine the knowledge bases, applications, and supporting technology that are needed to support evolving NSF mission needs; and (3) define a transition strategy and plan for achieving an integrated Enterprise Architecture that is consistent with NSF's business goals and operational priorities.

The Program Information Management System (PIMS), which went into production on October 1, 2002, provides a comprehensive database of NSF funding opportunity information. It will allow NSF staff to update information about funding opportunities, route them through electronic review and approval, and generate new program announcements and solicitations. PIMS will also serve as a data source for the NSF web site, FastLane and other NSF automated systems. NSF will use PIMS to generate synopses of NSF funding opportunities for the Fed Grants portal. Fed Grants, a portal to program announcements from a variety of government agencies, is administered by the General Services Administration and is part of the overall E-grants initiative.

As part of the Foundation's progress toward an electronic environment, NSF now electronically captures signatures. This allows the agency to produce electronically signed declination letters and therefore to utilize email to notify PIs whose proposals have not been awarded for funding. It is no longer necessary to produce a paper declination letter to be signed and sent via U.S. mail.

FY 2004 Performance Goal IV-11: NSF will continue to integrate its internal electronic grants process with the E-government initiative.
Performance Indicators:
> 90 percent of program announcements will be posted to Fed Grants.
> 75 percent of declined proposals will be processed using E-decline signatures.

Comparison to FY 2003 Goal: NSF's FY 2003 goals related to "E-business" focused on receipt and electronic processing of Principal Investigator award transfers and on implementation of Phase III of the web-based Electronic Jacket. The FY 2004 goal retains the emphasis on E-business while continuing progress on new tasks in this area.

Baseline: The percentage of program announcements posted to Fed Grants during the first year it is in production, expected to be FY 2003, will serve as the baseline for this goal.

FY 2001 data will serve as the baseline for the percent of proposals processed using E-decline signatures. In FY 2001 there were 20,953 declines, with 11,479 (~ 55%) processed using E-decline signatures.

Means and Strategies for Success:
> Work cooperatively in the interagency E-grants efforts;
> Continue consolidation of back-end systems into the web-based Electronic Jacket;
> Add E-decline signatures to the paperless workflow in the Electronic Jacket;
> Continue information flow and outreach to NSF customers and users;
> Develop and test the system-to-system interface between PIMS and Fed Grants; and
> Continue to participate in the E-grants pilot.

Resources Required: This goal can be achieved with NSF's requested FY 2003 staff and budgetary resources.

Data / Data Sources: The PIMS will track the percent of announcements posted to Fed Grants. Data to assess the percent of declines that are processed using E-decline signatures is maintained in FastLane and other NSF databases (ProdSql7-Jacket data).

Data Limitations: None identified.

Comments:
> The Expanded Electronic Government initiative is one component of the President's Management Agenda.
> NSF is one of only a few agencies with a database management system for providing information on funding opportunities sophisticated enough to take advantage of the system-to-system interface to E-grants.
> Program Announcements and Program Solicitations that inform the community of an opportunity to seek NSF funds (other than supplements to an existing award) and have a deadline or target date are considered "Program Announcements" for the purposes of this GPRA goal. Interagency program announcements where NSF is not the lead agency and announcements regarding awards provided by the NSB (e.g., the National Medal of Science) are not considered "Program Announcements".

External Factors:
> Successful implementation of GSA's Fed Grants portal will be required.

SECURITY PROGRAM: INFORMATION TECHNOLOGY & PHYSICAL SECURITY

NSF's FY 2004 security initiative includes the creation of an integrated security platform and implementation of current and emerging security tools and technologies. Currently the Foundation uses a number of independent information systems and databases to manage physical and logical access to its facilities and computer networks. The current systems need to link data in order to propagate global changes to access rights across NSF's numerous IT platforms. NSF will create an integrated security platform and exploit "smart technology" to enforce security rules and to ensure consistent security over the entire enterprise. The new system will permit security-relevant data to be synchronized across all entities and platforms.

The NSF information technology and physical security program is designed to protect NSF infrastructure and critical assets while maintaining an open and collaborative environment. Our approach to security includes implementation of appropriate protective measures to ensure the privacy, integrity, and security of information and information technology resources needed by NSF and the broad research community while allowing appropriate access and availability to users, and ensuring the physical safety of our staff and visitors.

NSF is committed to maintaining a safe and secure environment for its 1,600 employees and contractors. This presents a unique and ongoing challenge because of public access to the facility and the estimated 50,000 visitors who participate in panels and meetings annually.

Significant advances in "smart technology" have occurred during the past several years. Given the heightened security awareness resulting from the events of September 11, 2001, NSF is seeking ways to improve the agency's security posture without diminishing the sense of an open environment for employees and visitors.

NSF's information technology security program encompasses all aspects of information security, including policies and procedures, risk assessments and security plans, managed intrusion detection services, vulnerability assessments, disaster recovery, and technical and management security controls. NSF's IT security program continues to focus on security as an integral component of the Foundation's business operations. The agency is adhering to the NIST Security Self-Assessment Guide for Information Technology Systems to assure compliance as required by law. This guidance identifies five levels of security. Level 1 requires development of security policies. Level 2 requires development of procedures to implement the policies. Level 3 is achieved when the policies and procedures are implemented. Level 4 requires testing of the procedures. Level 5 is an integrated, comprehensive program with decision-making based on cost, risk, and mission impact.

In FY 2002, the Foundation implemented an agency-wide security program in response to the Government Information Security Reform Act (GISRA). Policies were reviewed, developed and published. A security-training program for all NSF staff and contractors was developed and implemented.

As part of this FY 2002 program, an inventory of all NSF systems was conducted and risk assessment questionnaires were completed on all systems. This risk assessment approach includes a consideration of major factors in risk management: the value of the system or application, threats, vulnerabilities, and the effectiveness of current or proposed safeguards. NSF is reviewing its systems in accordance with the NIST framework and with the guidelines in OMB Circular A-130. To date, nineteen major systems have been identified. NSF's security posture is at Level 2 as of the end of 2002.

In FY 2003, the IT and physical security program will be enhanced. Agency-wide security procedures and control techniques will be developed. Ninety-five percent of major systems will have approved security plans on file and have documented certification and accreditation. Contingency plans will be developed for all general support systems.

"Major system" is a generic term used here to include both general support systems (GSS) and major applications, as defined in OMB Circular A-130. A general support system is an interconnected set of centrally provided information resources under the same direct management control that share common functionality. A GSS normally includes hardware, software, information, data, applications, communications, and people. The NSF Local Area Network (LAN) is an example of a GSS. A major application is an application that requires special attention to security due to the risk and magnitude of the harm resulting from the loss, misuse, or unauthorized access to or modification of the information it contains. Examples of NSF's major systems are the Financial Accounting System (FAS) and the Proposal, PI and Reviewer System (PARS).

To achieve NIST Level 3 compliance in major systems will require implementation of system security plans and procedures and periodic review of security controls.

FY 2004 Performance Goal IV-12: NSF will maintain and enhance the agency-wide security program to ensure adequate protection of NSF's infrastructure and critical assets.
Performance Indicators:
> 95 percent of NSF's major systems will achieve Level 3 compliance in accordance with the NIST Security Self-Assessment Framework.
> Implementation of a "Smart ID" pilot to provide staff with a standard identification card for authentication and access control.

Comparison to FY 2003 Goal: In FY 2003 the performance indicators for this goal are:
- 95 percent of major systems will have approved security plans on file.
- 95 percent of major systems will have documented certification and accreditation.

For FY 2004 the performance indicators retain the emphasis on information technology security while continuing progress on new tasks in this area. The "Smart ID" pilot indicator has been added.

Baseline: In FY 2002 none of the major systems have achieved Level 3 compliance. The "Smart ID" pilot is a new performance indicator in FY 2004.

Means and Strategies for Success:
> Develop and implement, as required, appropriate IT and physical security polices and procedures.
> Provide and document security training for NSF staff and on-site contractors, with more in-depth training for those with significant IT security responsibilities.
> Contract for and implement a routine penetration-testing program to identify security vulnerabilities.
> Perform requirements study for an integrated security platform.
> Field-test a Commercial-Off-The-Shelf Secure Access system with a limited group of users.
> Establish a collaborative team of IT and physical security staff.

Resources Required: Funding has been requested in the FY 2003 budget to procure a "smart technology" secure access system. Cost estimates for this system are $3 million. Additional resources will be necessary to maintain and upgrade all aspects of NSF's enhanced security program.

Data Sources/Data Limitations: Completed NIST self-assessments for all major systems. In FY 2003 a project plan for the smart technology implementation will be developed that will outline the components of the pilot program. Indicator achievement will be measured relative to that plan.

C. PERFORMANCE AREA: HUMAN CAPITAL

The NSF Strategic Plan states that "a diverse, capable, motivated staff that operates with efficiency and integrity" is a critical factor for NSF success. For more than 50 years, the agency has promoted the progress of science, drawing upon its talented, diverse workforce to catalyze science and engineering discovery, learning and innovation. NSF has a long history of being at the forefront in providing a work environment conducive to supporting and motivating its staff.

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 encouraging development of its permanent workforce and complementing it by capitalizing upon current staffing flexibilities such as the Intergovernmental Personnel Act and the Visiting Scientist Program. These flexibilities provide a cohort of rotating scientists and engineers who typically spend 1-3 years with the agency. Together with permanent staff, these rotators bring their research and professional experience to inform NSF's science, engineering, and education investments. Following their NSF assignments, these researchers and educators return to their home or other organizations with an informed perspective on federal science and engineering research and education priorities.

Throughout the federal government there is increasing recognition that human capital is a valuable asset that needs to be managed strategically. Within NSF, approximately 44 percent of the science and engineering excepted service employees, 63 percent of the executive service employees and 24 percent of the general schedule employees will be eligible to retire in 5 years. In addition, NSF experiences approximately a 25 percent turnover of science and engineering professional staff every two years because of its extensive use of visiting scientists and engineers. These factors, coupled with the increased complexity in proposal review and award, the implementation of electronic proposal processing and E-business practices, and new internal and external requirements for accountability, performance measurement and oversight, make succession planning, recruitment, retention, and adapting the skill mix of employees critical human capital issues for the Foundation.

The five-year A&M plan guides NSF's efforts to approach these human capital issues strategically. The implementation of this plan has been aided by the ongoing Business Analysis in which NSF, in partnership with Booz Allen Hamilton, is systematically examining all facets of human capital planning – organizational alignment and optimum workforce size and composition, identification and provision of needed competencies and skills, and recruitment and retention of staff to meet current requirements and ensure effective succession.

NSF's efforts to approach human capital issues strategically are in alignment with the government-wide initiative on human capital included in the President's Management Agenda. The most recent scorecard gives a "red light" to NSF's *status* for the human capital initiative. On that same scorecard, NSF has a "green light" for *progress* for implementing actions to achieve green status. The GPRA goals on workforce learning and workforce planning discussed below directly support this initiative.

NSF STAFF – DIVERSITY

NSF has an ongoing interest in ensuring that diversity considerations are embedded in activities related to agency staffing of scientists and engineers. In concert with the human capital goals of the President's Management Agenda, NSF's approach to strategic workforce planning ensures that the agency has the *right people with the right competencies in the right jobs at the right time*. NSF's approach to succession planning encompasses both the development of critical talent and core competencies from within, and the identification and recruitment of strategic talent from the outside. This two-pronged approach allows the agency to anticipate and meet its staffing needs in the challenging, dynamic environment that constitutes work at the science and engineering frontier and ensures that employees are well prepared to meet agency challenges in the near- and longer-terms.

An ongoing, key component of this strategy is the recruitment and retention of highly qualified staff that reflects the diversity of America. The NSF Strategic Plan encourages a policy that recognizes that a diverse workforce – i.e., one that includes members of underrepresented groups and reflects institutional and geographic differences – broadens the agency outlook and talent base and enables it to better serve both its research and education communities and ultimately all citizens. Science and engineering (S&E) staff are one of three employment categories for which NSF maintains demographic data (the other two are business and operations staff and program support staff). S&E staff and management include all staff normally categorized as "scientists and engineers". This group includes Program Officers as well as senior executives and management staff with science and engineering backgrounds who are involved in program planning and agency management.

There is underrepresentation (relative to the general U.S. population) of women, certain minority groups, and persons with disabilities within the NSF S&E staff. Realistic goals for closing this representation gap vary across the different research and education areas; however, NSF intends to continue its efforts to develop effective strategies designed to attract and retain a diverse corps of science, engineering, and education professionals. Agency recruitment practices will continue to involve proactive searches for qualified candidates, in combination with earnestly practiced inclusivity and review by NSF management.

For this FY 2004 Performance Plan, NSF continues an existing goal on S&E appointments from underrepresented groups and maintains a focus on ensuring that diversity considerations are embedded in activities related to agency staffing of scientists and engineers. The agency's goal related to total number of hires to S&E staff and management will be continued, at least through FY 2004, until both the workforce analysis and diversity plans are finalized. Results will serve to inform the agency's development of future performance goals for its human capital.

In FY 2003, an internal task force comprised of representatives across the directorates and program offices will initiate development of a S&E diversity plan to help ensure that diversity considerations are embedded in staffing decisions throughout the Foundation. The task force will examine relevant statistical information regarding NSF staff, the geographic and institutional diversity of our IPAs and VSEEs, and identify issues requiring special attention during the recruitment and retention of a diverse workforce. The FY 2004 goal focuses on completion of the task force's report and initiation of implementation of its recommendations.

Performance Goal IV-13: NSF will ensure that diversity considerations are embedded in activities related to agency staffing of scientists and engineers.
Performance Indicator:
> NSF will complete development of the NSF S&E diversity plan initiated in FY 2003 and begin implementation of its recommendations.

Baseline: No baseline exists. This is a continuation of a goal developed in FY 2003.

Means and Strategies for Success:
> Present NSF S&E diversity plan to NSF senior management for discussion;
> Conduct inreach activities with key NSF staff (e.g., division director and working group meetings) to discuss recommendations within and implementation of the diversity plan.
> Examine and consider the data and recommendations developed by organizations such as the Committee on Equal Opportunities in Science and Engineering (CEOSE) in its 2002 report; and
> Identify best practices and areas for investment within the NSF portfolio related to diversity issues.

Resources Required: To be determined. May include additional business/operations staff or contractors with IT expertise to maintain information bases that capture institutional and geographic data for the NSF IPAs and Visiting Scientists, Engineers and Educators (VSEEs). Successful progress on this goal, as currently developed, may be contingent upon receipt of the staffing and/or financial resources identified.

FY 2004 Performance Goal IV-14: NSF will show an increase over FY 2000 in the total number of appointments to NSF science and engineering staff and management from underrepresented groups.

Indicator:	**Total number of appointments to S&E staff and management from underrepresented groups.**				
	FY 2000	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Baseline / Result:					
Women	46	59	63	&	&
Members of under-represented minority groups	25	32	33	&	&
Goal				Increase over FY 2000.	Increase over FY 2000.

& = Data not yet available.

Means and Strategies for Success:
> Continue to encourage members of underrepresented groups to apply for NSF science and engineering staff and management positions through increased outreach efforts – including targeted advertising, participation by NSF staff in selected professional engineering, scientific and education conferences, invitations to members of underrepresented groups to participate as proposal reviewers, attendance at employment fairs, and site visits to minority institutions and organizations;
> Make presentations on the full breadth of NSF opportunities at regularly scheduled meetings (e.g., Experimental Program to Stimulate Competitive Research, Louis Stokes Alliances for Minority Participation, etc.); and

> Encourage Program Officers to develop and maintain contacts with individuals, professional societies, and other groups that focus on broadening the participation of underrepresented groups and on eliminating barriers associated with their participation.

Resources Required: Financial resources to travel and conduct outreach activities; staff to develop and maintain internal databases. Successful progress on this goal, as currently developed, may be contingent upon receipt of resources identified.

Data / Data Sources: Demographic data on the actual number of appointments to S&E staff and management in the NSF workforce is maintained in Division of Human Resources Management databases.

Data Limitations: Provision of diversity-related information is voluntary and therefore may be incomplete.

External Factor: NSF can collect information only by categories agreed upon within the current federal data collection standards.

Comment: Prior to FY 2003, the agency focused on Program Officers and equivalent in this goal. For FY 2003, the goal and associated baseline were expanded to include all staff normally categorized as "scientists and engineers". This group includes those staff counted in previous GPRA reports as well as senior executives and management staff with science and engineering backgrounds who are involved in program planning and agency management.

WORKFORCE DEVELOPMENT

NSF is engaged in a Business Analysis, in partnership with Booz Allen Hamilton. This effort is examining the five elements of the President's Management Agenda in a coherent, comprehensive manner, with iterative reviews of human capital during the process to facilitate integration of NSF's human capital strategies with strategic and programmatic planning. This analysis is providing information needed to identify future workforce competencies within the context of how the agency plans to perform its work in the future in a constantly-expanding science and engineering frontier, and to ensure that staff receive the education and development necessary to provide for effective succession in key positions.

NSF believes that workforce challenges can be met with the continued professional development of its personnel. The NSF Academy, a contemporary organizational and professional development program that creates and integrates innovative learning opportunities, embodies the Foundation's dedication to advanced technologies and continuous learning. As such, the Academy is the linchpin for individual and workforce development. In FY 2003 NSF intends to initiate a national search to recruit and hire a Dean and to establish an Advisory Group to inform the Academy on progress and recommend approaches for evaluation.

The NSF Academy integrates existing workforce development programs and associated learning opportunities into a strategically aligned learning system. Informed by the recommendations of the Business Analysis, leadership and succession planning will be built into the competency-based curriculum, thereby providing all employees with the opportunity to gain the skills and knowledge necessary to compete for leadership and management roles.

Through this activity, the agency has placed a greater emphasis on providing opportunities for personnel to update and expand project management and business-related skills, as well as on ensuring that these skills are sought out and valued in the recruitment and hiring of additional permanent personnel. In addition, the Academy addresses the impact of technology innovation on NSF's workforce. These changes demand new and increasing IT skills in almost all career fields, as well as the development of new IT-related staff positions.

Workforce Learning

Performance Goal IV-15: The NSF Academy will develop a broad array of competency-based learning opportunities that will enable all staff to perform critical functions supporting NSF's vision and goals.
Performance Indicators:
> Identification of staff requiring Facilities / Center Project Management training.
> Initiation of development of a curriculum that leads to certification in Facilities / Center Project Management.

Comparison to FY 2003 Goal: NSF's FY 2003 goal related to workforce learning focused on development of new courses or revision of existing courses to address program management, leadership development, and technology and business process training. The FY 2004 goal retains the emphasis on workforce learning while addressing the specific need of NSF staff to manage increasingly large and complex facility projects.

Baseline: These are new indicators and no baseline exists.

Means and Strategies for Success:
> Analyze results from the Business Analysis to help identify job duties and competencies required for Facilities / Center Project Management
> Obtain Directorate, Staff Office and policy input to identify NSF positions requiring Facilities / Center Project Management training; courses relevant to specific positions; and requirements for certification.
> Work with vendor(s) to determine / develop curriculum for certification program(s) in Facilities / Center Project Management;
> Based on input from NSF staff, select the most appropriate and effective methods of learning, i.e., instructor-led classes, E-learning, distance learning, and other learning delivery methods available through technology;
> Obtain contractor support to develop curriculum and/or classes, as needed;

Resources Required: This goal can be achieved with NSF's requested FY 2003 staff and budgetary resources.

Comments:
> The NSF Academy provides a comprehensive suite of courses tied to competency requirements. A Basic Course for Project Management was piloted in FY 2002 and offered again in FY 2003. A total of 43 employees received the training. Two additional courses have subsequently been added to the curriculum. In addition, the Basic Course will be revised to incorporate the NSF Facilities Guidelines currently under development.
> Deputy, Large Facilities Projects may approve external courses as part of the curriculum.

Workforce Planning

The second of NSF's workforce goals for FY 2004 addresses future workforce needs through implementation of the preliminary findings and recommendations of the Business Analysis. The FY 2004 effort includes initial development of human resource standards that link employee competencies with critical business processes and emerging technology.

Foreseeing the workforce challenges before it, NSF has taken some preliminary steps to identify emerging workforce needs. For example, the agency has been exploring the potential of increasing the number of entry-level science and engineering positions, providing opportunities for science and engineering internships, and funding academic advancement and career development programs. A strategic facet of this workforce investment is its impact on new entrants to the science and engineering workforce where there are a greater number of individuals from groups presently underrepresented in science and engineering.

Performance Goal IV-16: NSF will develop competency-based, occupation classification alternatives that support the agency's strategic business processes and capitalize on its technology-enabled business systems.

Performance Indicators:

> Identification of workforce competencies needed to support the majority of NSF's strategic business processes.

> Development of new positions or revision of position descriptions in order to address emerging business process requirements.

Comparison to FY 2003 Goal: NSF's FY 2003 goal related to workforce planning focused on identification of workforce competencies for all current NSF job families and on identification of competency-based, classification alternatives. The FY 2004 goal focuses on association of workforce competencies with NSF's business processes and adds the addition or revision of positions in accordance with the identified competencies as an indicator. The emphasis on workforce planning is retained while continuing progress on new tasks in this area.

Baseline: NSF has currently identified five core strategic business processes. These are resource allocation, merit review, award management and oversight, knowledge management and performance assessment and accountability. The number may be revised as a result of the Business Analysis. Position descriptions currently exist for all NSF positions.

Means and Strategies for Success:

> Identify current workforce skill mix and skill gaps;

> Analyze emerging and future workforce needs;

> Identify optimal occupational groupings in support of mission and business practices; and

> Work collaboratively with the business analysis contractor to identify new types / classes of positions.

Resources Required: Current staff and business analysis contractor to provide needed functional expertise to conduct the activity and additional FTE and contractors to support position development. Successful progress on this goal, as currently developed, may be contingent upon receipt of the staffing and/or financial resources identified.

Data / Data Source: Findings of the Business Analysis, including workforce competencies and future business requirements, and current position documentation. The newly established or revised positions will be reviewed externally for relevance to emerging business process requirements.

Data Limitations: Undefined.

V. VERIFICATION AND VALIDATION (V&V)

OMB's FY 2002 Circular A-11 guidance pertaining to GPRA indicates that performance plans should:

- Identify the means the agency will use to verify and validate the measured performance values;
- Provide information on data sources; and
- Provide information on actions to improve completeness and reliability of performance data.

A. TYPES AND SOURCES OF PERFORMANCE DATA AND INFORMATION

Most of the data that underlie achievement assessments for strategic outcome goals originate outside the agency and are submitted to NSF through the Project Reporting System, which includes annual and final project reports for all awards. Through this system, performance information / data such as the following are available to program staff, and are compiled by NSF staff for third party evaluators and other external committees:

- Information on People – student, teacher and faculty participants in NSF activities; demographics of participants; descriptions of student involvement; education and outreach activities under grants; demographics of science and engineering students and workforce; numbers and quality of educational models, products and practices used/developed; number and quality of teachers trained; and student outcomes including enrollments in mathematics and science courses, retention, achievement, and science and mathematics degrees received;
- Information on Ideas – published and disseminated results, including journal publications, books, software, and audio or video products created; contributions within and across disciplines; organizations of participants and collaborators (including collaborations with industry); contributions to other disciplines, infrastructure, and beyond science and engineering; use beyond the research group of specific products, instruments, and equipment resulting from NSF awards; and role of NSF-sponsored activities in stimulating innovation and policy development; and
- Information on Tools – published and disseminated results; new tools and technologies, multidisciplinary databases; software, newly-developed instrumentation, and other inventions; data, samples, specimens, germ lines, and related products of awards placed in shared repositories; facilities construction and upgrade costs and schedules; and operating efficiency of shared-use facilities.

Most of the data supporting management goals can be found in NSF central systems, as noted in the description accompanying each goal. These NSF central systems include the Enterprise Information System (EIS); FastLane, with its Performance Reporting System and its Facilities Reporting System; the Online Document System (ODS); the Proposal, PI, and Reviewer System (PARS); the Awards System; the Electronic Jacket; and the Financial Accounting System (FAS). These systems are subject to regular checks for accuracy and reliability.

The Division of Human Resources Management (HRM/OIRM) maintains information related to staff recruitment and staff training. OEOP databases are also available for reporting purposes.

B. COMPLETENESS AND RELIABILITY OF PERFORMANCE DATA

NSF's FY 2002 Performance and Accountability Report noted that the agency's results draw upon data that are complete and reliable. Standards for complete and reliable data, as presented in OMB Circular A-11, focus on the following issues (selected for relevance to NSF):

- Performance data are considered complete if actual performance is reported for every performance goal and indicator in the annual plan; and
- Performance data are considered reliable if there is neither refusal nor a marked reluctance by agency managers or decision-makers to use the data in carrying out their responsibilities, and data are further defined as reliable when the agency managers use the data contained in the annual report on an ongoing basis in the normal course of their duties.

C. DATA VERIFICATION &VALIDATION ACTIVITIES

In order to verify and validate the measured values of actual FY 2004 performance, NSF intends to use a process similar to the one used in FY 2000, FY 2001, and FY 2002. NSF engaged an external third party, International Business Machines Corporation (IBM) Business Consulting Services (formerly PricewaterhouseCoopers LLP), to verify and validate selected GPRA performance results as well as the process through which supporting data was compiled. IBM documented the processes NSF follows to collect, process, maintain, and report selected performance data. They identified relevant controls and commented on their effectiveness. Based on GAO guidance, they provided an assessment of the validity and verifiability of the data, policies, and procedures NSF used to report results for the FY 2002 management goals.

APPENDICES

A. ACRONYMS

B. MANAGEMENT CHALLENGES AND REFORMS

C. COMPARISON OF NSF GOALS – FY 2003 AND FY 2004

D. INTERIM ADJUSTMENTS TO NSF GPRA STRATEGIC PLAN FY 2001 – FY 2006 AND DEVELOPMENT OF AN UPDATED STRATEGIC PLAN

APPENDIX A: ACRONYMS

A&M	Administration and Management
AC/GPA	Advisory Committee for GPRA Performance Assessment
BE	Biocomplexity in the Environment
BFA	Office of Budget, Finance and Award Management
CAREER	Faculty Early Career Development Program
CEOSE	Committee on Equal Opportunities in Science and Engineering
CLT	Center for Learning and Teaching
COV	Committee of Visitors
DOE	Department of Energy
ED	Department of Education
EHR	Directorate for Education and Human Resources
EIS	Enterprise Information System
EPSCoR	Experimental Program to Stimulate Competitive Research
FAIR	Federal Activities Inventory Reform
FAS	Financial Accounting System
FTE	Full-Time Equivalent
FY	Fiscal Year
GAO	General Accounting Office
GIIC	GPRA Infrastructure Implementation Council
GISRA	Government Information Security Reform Act
GK-12	Graduate Teaching Fellowships in K-12 Education
GPG	Grant Proposal Guide
GPRA	Government Performance and Results Act
GRF	Graduate Research Fellowship
GSS	General Support System
HR	Human Resources
HRM	Division of Human Resource Management
IERI	Interagency Education Research Initiative
IGERT	Integrative Graduate Education and Research Traineeship
IT	Information Technology
IT^2	Information Technology for the 21st Century
ITR	Information Technology Research
ITS	Information Technology Security
K-12	Kindergarten through twelfth grade
K-16	Kindergarten through college
KDI	Knowledge and Distributed Intelligence
LEE	Life and Earth's Environment
LSAMP	Louis Stokes Alliances for Minority Participation
MCC	Management Controls Committee
MREFC	Major Research Equipment and Facilities Construction (Account)
MRI	Major Research Instrumentation
MRSEC	Materials Research Science and Engineering Center
MSP	Math and Science Partnership
NAPA	National Academy of Public Administration
NASA	National Aeronautics and Space Administration
NCLB	No Child Left Behind
NIST	National Institute of Standards and Technology
NITRD	Networking and Information Technology Research and Development
NNI	National Nanotechnology Initiative
NRC	National Research Council
NSB	National Science Board
NSE	Nanoscale Science and Engineering
NSF	National Science Foundation
NVO	National Virtual Observatory
ODS	Online Document System
OEOP	Office of Equal Opportunity Programs
OIG	Office of Inspector General
OIRM	Office of Information and Resource Management
OMB	Office of Management and Budget
OPP	Office of Polar Programs
PARS	Proposal, PI and Reviewer System
PFI	Partnerships for Innovation
PI	Principal Investigator
PIMS	Program Information Management System
PITAC	President's Information Technology Advisory Council
PMA	President's Management Agenda
PwC	PricewaterhouseCoopers LLP
R&D	Research and Development
REU	Research Experiences for Undergraduates
RSI	Rural Systemic Initiatives
S&E	Science and Engineering
SLC	Science of Learning Center

SRS	Division of Science Resources Statistics
STC	Science and Technology Center
STEM	Science, Technology, Engineering and Math
USAP	United States Antarctic Program
USGS	United States Geological Survey
USP	Urban Systemic Program
V&V	Verification and Validation
VSEE	Visiting Scientists, Engineers and Educators

APPENDIX B: MANAGEMENT CHALLENGES AND REFORMS

This appendix contains a discussion of management issues presented in the President's Management Agenda or identified for NSF and other federal agencies by OMB or GAO, in NSF's annual review of financial and administrative systems as required by the Federal Managers' Financial Integrity Act, or by the NSF Office of Inspector General. The OIG issues addressed are those included in a December 23, 2002 memorandum on NSF's management and performance challenges.

Many of the issues discussed also fall within the purview of the internal NSF Management Controls Committee (MCC), chaired by the Chief Financial Officer. That committee provides continuing and long-term senior executive attention to NSF's management challenges and reforms.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Merit Review and its Role in Fostering Diversity (OIG)	
NSF's OIG (December 2002*) noted "Increasing the participation of minority scientists as proposers, reviewers, and investigators, while maintaining the integrity of the award process, remains an important priority and challenge for NSF." The OIG notes that the NAPA study on the Foundation's criteria for project selection, which focused on the impact of the "broader impacts" criterion recommended "broader-based review panels with participants drawn from a wider range of institutions, disciplines and underrepresented minorities" but also noted that low participation in voluntary data disclosure has hampered accurate data tracking .	NSF considers its merit review process the keystone for award selection. The agency evaluates proposals using two criteria – the intellectual merit of the proposed activity and its broader impacts. NSF staff rely on expert evaluation by selected peers when evaluating proposals and making funding decisions. Each year, more than 250,000 merit reviews are provided to assist NSF with the evaluation of proposals. NSF focuses its management activities on a wide variety of issues related to merit review – including use of both merit review criteria by reviewers and program officers, broadening participation, and enhancing customer service. For example, NSF revised its guidance to proposers in the *Grant Proposal Guide* (GPG) to reflect the importance of the broader impacts criterion. In FY 2001 NSF developed and implemented an electronic system to request demographic data, on a *voluntary* basis, from all reviewers. Participation was disappointingly low. As a result the agency was unsuccessful in achieving its FY 2002 GPRA goal for establishing a reviewer pool diversity baseline. In FY 2003, NSF will continue to request demographic information from reviewers and to focus on increasing voluntary participation via efforts to educate reviewers on the purpose of the data collection. Development of a related future performance goal will be considered once the feasibility of setting quantitative targets for participation levels of underrepresented groups based on the limited data available is assessed. Summary: Issue addressed with internal management controls and processes. Related issues addressed with FY 2004 GPRA Goals IV-1, 2, 3, and 5

*The December 2002 OIG reference that appears throughout this section refers to the NSF Inspector General's statement concerning NSF's Management and Performance Challenges. See the NSF FY 2002 Performance and Accountability Report to view a copy.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Management of Large Infrastructure Projects (OMB;OIG)	
In response to OMB concerns related to NSF's capability to manage proposed multi-year, large facility projects given their magnitude and costs NSF was asked to develop and submit a plan to OMB that documents its costing, approval, and oversight of major facility projects. The NSF OIG (December 2002) has noted that "NSF has made progress toward correcting the types of problems identified" in audits. The OIG also recognized that NSF will "continue to make needed improvements to the guide over time."	NSF continues its efforts to improve management and oversight of its large facility projects in accordance with the plans laid out in the *Large Facility Projects Management & Oversight Plan,* available at http://www.nsf.gov/bfa/lfp/document/finalplan.pdf. This facilities plan has four major foci: • Enhance organizational and staff capabilities and improve coordination, collaboration, and shared learning among NSF staff and external partners; • Implement comprehensive guidelines and procedures for all aspects of facilities planning, management and oversight; • Improve the process for reviewing and approving Large Facility Projects; and • Practice coordinated and proactive oversight of all facility projects. In August 2002, NSF launched a new search for a Deputy Director for Large Facility Projects and named an interim Deputy Director. Selection is anticipated in February 2003. Implementation of the elements of the plan is underway, including training, guidance and establishment of Project Advisory teams. Summary: Issue addressed with FY 2004 GPRA Performance Goals IV-8 and IV-9 and internal management controls and processes.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Award Administration (OIG)	
Award administration is a broad term used to describe the award and program monitoring directed toward scientific progress and the oversight exercised by BFA (Office of Budget, Finance, and Award Management) over grantees' financial management of NSF awards. The NSF OIG (December 2002) noted that " [T]he Guide is generally responsive to the recommendations outlined in the FY 2001 Management Letter Report and represents an important first step to improving NSF's post-award administration practices" but encouraged more detail and more emphasis on lower risk awardees.	To address the need for increased oversight of the agency's complex and diverse portfolios, the NSF A&M Strategic Plan includes a framework for Award Management and Oversight that focuses on a collaborative, multi-functional award management and oversight process that is informed by risk management strategies and verifies that projects are in compliance. NSF has drafted a strategic plan and a *Risk Assessment and Award Monitoring Guide* for assessing and managing awardee risks and assets focusing on financial and administrative monitoring to insure proper stewardship of federal funds at awardee institutions. This plan is risk-based and is being piloted at a number of institutions and will be refined based on our assessment of these reviews. Summary: Issue addressed with internal management controls and processes.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
GPRA Data Quality (OIG)	
The NSF OIG (December 2002) noted "[W]e continue to have concerns about the validity and quality of NSF's Government Performance and Results Act (GPRA) data and outcome measures." Particular concerns were expressed about the perception of too many GPRA goals, the need for more agency level data capture to support programs, and the need for clarity in the priority setting process.	Since the FY 2000 GPRA reporting cycle, NSF has engaged an external party, IBM Consulting (IBM), [formerly Pricewaterhouse Coopers LLP (PwC)], to provide an independent verification and validation (V&V) of selected GPRA goals. The V&V focused on reliability of data, on processes to collect, process, maintain, and report the data, and on program reports prepared by external experts. IBM mapped NSF procedures against GAO guidance for polices and procedures that underlie GPRA performance reporting. IBM's FY 2000, FY 2001 and FY 2002 assessments were positive and constructive and have helped NSF be in compliance with standards set forth in OMB Circular A-11. NSF will reassess its GPRA outcome measures during preparation of the updated and revised Strategic Plan, due to OMB on March 1, 2003. The agency also engaged the services of an external management-consulting firm, PricewaterhouseCoopers Consulting, to conduct an integrated performance, cost, and budget strategy assessment, with the intent of obtaining different scenarios to meet our growing requirements in this arena. This assessment was completed in August 2002. Information derived from this assessment was used to develop an action plan for integrating budget, cost and performance activities. The plan was submitted to OMB to formalize NSF actions for implementing the PMA. Copies of the action plan have also been provided to the OIG and NSF's Business and Operations Advisory Committee. Summary: Issue addressed with external V&V and internal management controls and processes.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Management of U.S. Antarctic Program (OIG)	
The NSF OIG (December 2002) has stated that "The successful operation of the USAP requires unique management and administrative skills combined with knowledge of the special needs of Antarctic researchers." They also note that "[O]ne issue that has been raised in Committee of Visitors (COV) reports, as well as our audit work, is the need to improve long-range capital planning and budgeting for repairing and maintaining the Antarctic infrastructure, including facilities, transportation, and communications.	NSF agrees with the OIG that the safety of scientists and workers, environmental concerns, and the national interests of the U.S. Government require unique management and administrative skills that are responsive to the special needs of Antarctic scientific research. In order to meet these challenges, NSF staff utilize their special expertise to: • Implement next steps in long range plan for renovating/updating McMurdo Station infrastructure. • Coordinate Department of Defense, NASA, USGS and DOE activities; • Oversee environmental, health, safety, and medical activities; • Oversee construction and maintenance of all infrastructure at three U.S. stations in Antarctica (roads, fire stations, clinics, power stations, heating, communications, ground stations, air traffic control, ground vehicles, food services, sewage treatment, water supplies, etc.); • Coordinate support of scientists in Antarctica, construction of specialized science instrumentation, etc.; • Plan and budget for the above activities; and • Select science projects for deployment on the basis of merit review and ability to meet logistics requirements. Summary: Issue addressed with internal controls and processes.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
The Math and Science Partnership Program (OIG)	
NSF's OIG notes in December 2002 that "[T]he sustained involvement of NSF remains essential. NSF program officers now need to provide extensive coaching of the new projects …[and] will also need to assist project partners in building a shared sense of purpose and in coordinating efforts. Also, those projects involving awardees with limited experience in handling federal funds will require close monitoring of all aspects of their projects, including financial and administrative matters. Therefore, 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, while at the same time administering the subsequent program solicitation of approximately $200 million.	NSF has developed a comprehensive award oversight and management plan for all Math and Science Partnership awards. NSF made 24 MSP awards in FY 2002. Larger, more complex awards were made as cooperative agreements. These cooperative agreements will describe the post-award management and oversight that will support the work of MSP partnerships in realization of their goals; management and oversight activities will draw upon NSF's strong, community-based site visit processes. The lead partners responsible for both fiscal and project management of MSP-supported projects will, for the most part, be institutions with significant experience handling federal funds. For lead partners with no prior experience working with NSF or other federal funds, NSF staff will work closely with these organizations in the monitoring of all aspects of the project, including financial and administrative matters. NSF has also set up workshops and provided technical assistance resources for grantees and prospective grantees. Summary: Issue addressed with internal controls and processes.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Electronic Government (PMA, OMB, GAO)	
Expanded electronic government is one of the government-wide initiatives presented in the *President's Management Agenda for 2002*. That document states that "the administration's goal is to champion citizen-centered electronic government." Specifics were delineated in the February 27, 2002 E-government Strategy Document, http://www.whitehouse.gov/omb/inforeg/egovstrategy.pdf, which includes E-grants, E-travel and E-payroll/HR projects of relevance to NSF.	The NSF Administration and Management Strategic Plan provides the framework for agency activities that address the President's Management Agenda E-government initiative. The results of NSF's E-government initiatives are significant and earned NSF the only E-government "green light," as of the July 2002 scorecard from OMB. The OMB mid-session review reports that NSF is a "model for successful E-Government." In FY 2002, NSF received 99.99% of proposals through electronic systems. NSF's FastLane system, which handles virtually all business transactions with proposers and awardees, exemplifies what can be achieved in E-government information system design, development, and implementation. NSF continues to be an active leader in interagency E-government efforts through the government-wide E-grants initiative as well as actively participating in E-travel and E-payroll/HR activities. Summary: Issue addressed with FY 2004 GPRA Performance Goal IV-11 and internal management controls and processes.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Data/Information (IT) Security (GAO, OMB, OIG)	
The NSF OIG (December 2002) stated "The agency is to be commended for the improvements in its security program made in the past year, including implementation of a mandatory security awareness training program, formal assignment of security responsibilities and authorities, restructuring of key security positions, appointment of an agency-wide security officer, and establishment of updated security policies and procedures. These accomplishments help build a foundation for a comprehensive security program and demonstrate the agency's commitment to information security." Nevertheless, concern was expressed that "more improvements are needed." GAO (01-758) noted that recent audits continue to show that federal computer systems are riddled with weaknesses that make them highly vulnerable to computer-based attacks and place a broad range of critical operations and assets at risk of fraud, misuse and disruption.	The NSF Information Technology Security (ITS) Program remains focused on ensuring that NSF infrastructure and critical assets are appropriately protected while maintaining an open and collaborative environment for science and engineering research and education. An agency-wide ITS program has been implemented encompassing all aspects of information security. Documentation in accordance with OMB Circular A-130, "Management of Federal Information Resources" of risk assessments and commensurate security plans for major systems is prepared and independently reviewed. NSF has comprehensive disaster recovery plans and capabilities, which are tested on an annual basis at a hot-site location. Additional resources have been requested to enhance the agency's overall security posture through the use of emerging "smart technology." NSF has implemented policies and processes to monitor and protect against intrusion attempts. Routine penetration testing is planned to start in FY 2003. In accordance with Government Information Security Reform Act (GISRA) and the Computer Security Act, NSF has implemented a program of IT security training to all NSF staff and contractors who use NSF computer systems. Summary: Issue addressed with FY 2004 GPRA Performance Goal IV-12 and internal management controls and processes.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Erroneous Payments to Recipients of Government Funds (PMA, OMB)	
OMB guidance and the *President's Management Agenda for 2002* addresses improved financial performance for federal agencies, including erroneous payments. In addition, the General Accounting Office (GAO) recently issued an executive guidance, which outlines strategies for agencies to effectively manage improper payments.	NSF has always understood its fiduciary responsibility to ensure taxpayer funds entrusted to it are properly controlled and disbursed. Consequently, NSF has a culture of high operating efficiencies and sophisticated systems, which results in few improper payments. NSF has already adopted many of the strategies suggested by GAO in its internal controls as part of daily business functions. Since all NSF payment functions are centrally located, the agency has the ability to do pre-payment review of all payments, which keeps the amount of improper payments low. A formal post payment risk assessment reinforced that assertion. Also, NSF is in compliance with OMB reporting requirements in this area. Summary: Issue addressed with internal NSF management controls and processes.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Cost-Sharing (OIG)	
The NSF OIG (December 2002) noted that "… audit work indicates that NSF grantees continue to experience significant problems in accounting for cost sharing, raising questions about whether required contributions are actually being made. The issues cited in our reports are primarily related to the commingling of reimbursable and cost-shared expenses, time and effort reporting, and cost-sharing certification."	During FY 2002, BFA began development of the Risk Assessment and Award Monitoring Guide. This document establishes the strategic framework for assessing and managing awardee risks and assets. Cost sharing is identified as a high-risk factor and was focused on in development of the risk assessment protocol, currently being pilot tested with a sample set of organizations. NSF envisions increased on-site review to provide important business and managerial assistance to awardees in this area. In addition, BFA has been assessing issues that have surfaced since implementation of Important Notice 124, *Implementation of the New Cost Sharing Policy.* At the August 2002 meeting of the National Science Board (NSB), the Audit and Oversight Committee affirmed the importance of this issue and requested that NSF develop more explicit policies and procedures related to implementation of the "tangible benefit" criterion of the cost sharing policy. These activities are under way. In addition, at its November 2002 meeting, the NSB approved clarifications to its 1999 cost sharing policy that will are expected to improve cost sharing negotiations. Summary: Issue addressed with internal management controls and processes.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Competitive Sourcing [A-76 Competitions and FAIR Act Inventories] (PMA, OMB)	
The *President's Management Agenda* proposes to increase competition for commercial activities performed by the government as listed on agency Federal Activities Inventory Reform (FAIR) Act inventories. The FY 2003 guidance for agencies is to complete competitions on a total of 15% of the FTE listed on their FAIR Act inventories. The Administration's long-term goal is to open at least one-half of the Federal positions listed on the FAIR Act inventory of commercial functions to competition with the private sector. Agency plans should outline how the agency intends to meet these goals. OMB has recently released a draft revision to its Circular A-76 and NSF will monitor the impact of these changes.	NSF has entered into a multi-year contract to conduct a Strategic Business Analysis. The agency intends to use the findings and recommendations from the workforce study part of this effort to redefine its FAIR Act inventory. This will underpin the development of a strategic competitive sourcing plan that optimally supports future business needs and is responsive to the *President's Management Agenda* requirements. Development of this plan will begin in FY 2003. 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 federal employees has increased by only one percent, due in part to the agency's effective use of competitive sourcing. In addition, NSF annually relies upon more than 50,000 volunteer, non-federal reviewers for proposal review and award oversight. Summary: Issue addressed with internal management controls and processes and through development of a Business Analysis.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Cost Accounting Systems (OIG, PMA)	
NSF's OIG noted in December 2002 that "[m]anagerial (cost) accounting information is used to assess operational effectiveness and efficiency. Cost information not only adds significant value to activities such as budgeting, cost control, and performance measurement, but also is useful in informing capital investment decisions such as prioritizing the funding of large infrastructure projects…. NSF should use its accounting systems to capture total project or outcome costs and supply information useful to the Congress, OMB, the National Science Board and NSF management." In addition, NSF is rated "red" on the Budget-Performance Integration initiative of the President's Management Agenda in part because the NSF Budget does not charge the full budgetary cost to individual activities.	The Foundation has engaged the services of an external management-consulting firm to conduct an integrated performance, cost, and budget strategy assessment, with the intent of obtaining different scenarios to meet our growing requirements in this arena. This study included a best practices survey of public and private enterprises, and input from NSF senior staff on financial and performance information needed to make better management and budgetary decisions. The assessment was completed in August 2002. NSF incorporated the major findings and recommendations from this study into a draft plan for integrating budget, cost, and performance, which has been shared with OMB, the OIG, and with the NSF Advisory Committee on Business and Operations. The draft plan will be updated based on the input and guidance received and will focus on determining the most appropriate and useful cost and performance information to develop and monitor. A major step in this process will be the revision of the NSF GPRA Strategic Plan in FY 2003, because the alignment criteria set forth in the PMA do not correspond to the program framework outlined in NSF's current strategic plan. Summary: Issue addressed with internal management controls and processes and external expert advice.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Workforce Planning and Training (Human Capital) (PMA, OMB; GAO; OIG)	
GAO *(GAO-01-236, April 2001)* has identified shortcomings of many agencies involving key elements of modern strategic human capital management, including (1) strategic planning and organizational alignment; (2) leadership continuity and succession planning; and (3) acquiring and developing staff whose size, skills, and deployment meet agency needs. The NSF OIG (December 2002)notes that "[p]lanning for NSF's future workforce needs and training the large number of temporary staff continue to be serious concerns." Personnel records also indicate that since 1996, NSF's reliance on temporary staff has increased in tandem with the size of its appropriation … [and that t]he increase in temporary staff places a greater burden on the agency, particularly Human Resource Management, to continually recruit and train these personnel and find them suitable office space. Additionally, the *President's Management Agenda (2002)* includes strategic management of human capital as a government-wide initiative.	NSF's flexible and motivated workforce currently includes approximately 650 permanent and visiting scientists and engineers (about 65% of whom are permanent government employees), 450 administrative personnel who provide business operations support, and approximately 300 program support personnel. Consistent with the goals of the President's Management Agenda, and NSF enabling legislation, the agency uses personnel flexibilities. These include planned turnover through short-term rotational appointments. NSF has a steadfast commitment to empower a workforce of teams and individuals who are continuously expanding their capabilities to shape the agency's future. To sustain its high-performing workforce, NSF is exploring ways 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, a renewed focus on continuous learning and an increased emphasis on leadership and succession planning. The formal establishment of the NSF Academy in 2002 is also a critical strategic step. NSF has entered into a multi-year contract to perform a Strategic Business Analysis which will examine organizational alignment and the workforce size, skill mix, and deployment necessary to ensure mission accomplishment. This effort continues through FY 2005; NSF will develop and implement human capital strategies and an human resource accountability system during this timeframe as findings and recommendations are received. Summary: Issue addressed with GPRA FY 2004 Performance Goals IV-13, IV-14, IV-15, IV-16 and internal management controls and processes.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Efficiency of the Research Process (OMB)	
In discussions with OMB, NSF has asserted that the current size of its grants and their duration might result in inefficiency at U.S. academic institutions if scientists and engineers devote a greater proportion of their time to preparing proposals than to conducting research. OMB has asked the agency to develop metrics to measure the efficiency of the research process and determine the "right" grant size for the types of proposals that the Foundation funds.	NSF contracted with Mathematica Policy Research, Inc. to assist in the development and administration of two surveys – one for Principal Investigators and one for institutions. An internal NSF Working Group on Award Size and Duration has been established. Focus groups that included both temporary (rotators) and permanent NSF staff provided input to the survey design. Both surveys were administered in early 2002. Final results were provided in May 2002 and shared with the public. The contractor's analysis offered several alternative methods of determining the right grant size. NSF management agreed that increasing the award size and duration is one of the agency's top priorities. The Foundation's long-term goal is to reach an average annualized award size of $250,000 and average award duration of 5.0 years. Summary: Issue addressed with FY 2004 GPRA Goals IV-6 and IV-7; internal management controls and processes; activities external to NSF.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Federal Funding of Astronomy and Astrophysics (OMB)	
NSF and NASA provide more than 90 percent of Federal funds for academic astronomy research and facilities. Historically, NASA has funded space-based astronomy and NSF has funded ground-based astronomy as well as unsolicited astronomy research proposals. Recent changes (e.g., the share of grants funding and the need for more integration of ground and space-based facilities) suggest that the Federal government's management and organization of astronomical research should be assessed.	A National Academy of Sciences committee was directed to assess the current disposition of management and operational responsibilities for Federal support of astronomical sciences. The NRC reported in September 2001 and recommended that "The National Science Foundation's astronomy and astrophysics responsibilities should not be transferred to NASA" and that the Federal government should develop a single integrated strategy for astronomy and astrophysics research that includes supporting facilities both on the ground and in space. NSF and NASA have established a joint National Astronomy and Astrophysics Advisory Committee to provide advice upon request to both NSF and NASA on selected issues of mutual interest and concern. NSF and NASA are also working jointly in efforts involving the National Virtual Observatory (NVO), one of the highly recommended initiatives in the NRC's Decadal survey of Astronomy and Astrophysics. Summary: Issue addressed with activities external to NSF.

MAJOR MANAGEMENT CHALLENGE	STEPS TO ADDRESS CHALLENGE
Budget for Administration and Management (OIG)	
In December 2002, the OIG noted that: "It is increasingly apparent that NSF's staff is in need of two basic resources to do its job: office space and travel funds. This year's management certification of the agency's internal controls contains multiple cautionary statements from senior managers about these two issues and their impact on operations." In particular they noted that "the agency cannot afford to wait for the results of its Business Analysis, which is not expected to conclude until 2006, to begin planning for and acquiring new offices." They further note that "[t]he shortage of travel funds affects NSF's ability to successfully address several of the management challenges identified here" and that "NSF should seek to maximize the effectiveness of staff by allocating more funding for these two essential resources."	This resource challenge is being addressed through budget analyses and planning, through ongoing assessments of space management and allocation and through increased emphasis on innovative and creative approaches such as telecommuting. NSF is also exploring cost efficiencies that can be gained in the move to E-travel and in the use of video conferencing. Summary: Issue addressed with internal management controls and processes and activities external to NSF.

APPENDIX C: COMPARISON OF NSF GOALS FY 2003 AND FY 2004

This section compares goals contained in the FY 2003 Revised Final GPRA Performance Plan with those in this FY 2004 GPRA Performance Plan.

Strategic Outcome Goal	FY 2003 Goal (Revised Final Plan)	FY 2004 Goal (Final Plan)	Explanation of Change
PEOPLE – Developing "a diverse, internationally competitive and globally engaged workforce of scientists, engineers, and well-prepared citizens."	III-1a: NSF's performance for the People Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority of the following indicators: • Development of well-prepared researchers, educators or students whose participation in NSF activities provides experiences that enable them to explore frontiers or challenges of the future; • Contributions to development of a diverse workforce through participation of underrepresented groups in NSF activities; • Development or implementation of other notable approaches or new paradigms that promote progress toward the PEOPLE outcome goal. III-1b: NSF will significantly enhance the quality of K-12 mathematics and science education available to all students in Math and Science Partnership schools. Performance Indicators: • Evidence in the award portfolio of the infrastructure to support high quality programs addressing issues related to teacher workforce capacity, including preservice education and inservice professional development of math and science teachers as well as alternative routes into the profession (e.g., scientists and engineers becoming teachers.) • Evidence within Partnership school systems of the infrastructure needed to improve math and science education and to measure improvement, i.e., the adoption of appropriate assessments of student achievement, as well as the initiation of the collection of achievement data that can be disaggregated by ethnicity, socioeconomic status, gender, etc.	III-1: NSF's performance for the People Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority of the following indicators: • Development of well-prepared researchers, educators or students whose participation in NSF activities provides experiences that enable them to explore frontiers or challenges of the future; • Contributions to development of a diverse workforce through participation of underrepresented groups in NSF activities; • Development or implementation of other notable approaches or new paradigms that promote progress toward the PEOPLE outcome goal.	Unchanged. The FY 2004 Plan does not contain a performance goal related to the MSP because it will be too early to assess progress for outcomes from NSF investments. As an area of emphasis, the MSP program will be assessed for its potential to generate the proposed outcomes (i.e. the promise/potential of the MSP award portfolio).

Strategic Outcome Goal	FY 2003 Goal (Revised Final Plan)	FY 2004 Goal (Final Plan)	Explanation of Change
IDEAS -- Enabling "discovery across the frontier of science and engineering, connected to learning, innovation, and service to society."	III-2: NSF's performance for the Ideas Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority of the following indicators: • Discoveries that expand the frontiers of science, engineering, or technology; • Connections between discoveries and their use in service to society; • Partnerships that enable the flow of ideas among the academic, public or private sectors; • Leadership in fostering newly developing or emerging areas.	III-2: NSF's performance for the Ideas Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority of the following indicators: • Discoveries that expand the frontiers of science, engineering, or technology; • Connections between discoveries and their use in service to society; • Partnerships that enable the flow of ideas among the academic, public or private sectors; • Leadership in fostering newly developing or emerging areas.	Unchanged.
TOOLS -- Providing "broadly accessible, state-of-the-art and shared research and education tools."	III-3: NSF's performance for the Tools Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority of the following indicators: • Development or provision of tools that enables discoveries or enhances productivity of NSF research or education communities; • Partnerships with local, state or federal agencies, national laboratories, industry or other nations to support and enable development of large facilities or other infrastructure; • Development or implementation of other notable approaches or new paradigms that promote progress toward the TOOLS outcome goal.	III-3: NSF's performance for the Tools Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority of the following indicators: • Development or provision of tools that enables discoveries or enhances productivity of NSF research or education communities; • Partnerships with local, state or federal agencies, national laboratories, industry or other nations to support and enable development of large facilities or other infrastructure; • Development or implementation of other notable approaches or new paradigms that promote progress toward the TOOLS outcome goal.	Unchanged.

Performance Area	FY 2003 Goal (Revised Final Plan)	FY 2004 Goal (Final Plan)	Explanation of Change
Use of Merit Review	IV-1: At least 85 percent of basic and applied research funds will be allocated to projects that undergo merit review.	IV-1: At least 85 percent of basic and applied research funds will be allocated to projects that undergo merit review.	Unchanged.
Implementation of Merit Review Criteria - Reviewers	IV-2: At least 70 percent of reviews with written comments will address aspects of both generic review criteria.	IV-2: At least 70 percent of reviews with written comments will address aspects of both review criteria.	Unchanged.
Implementation of Merit Review Criteria – Program Officers	IV-3: For at least 80 percent of decisions to fund or decline proposals, program officers will comment on aspects of both generic review criteria.	IV-3: For at least 90 percent of decisions to fund or decline proposals, Program Officers will comment on aspects of both review criteria.	The target level for this goal has been increased from 80 percent to 90 percent.
Time to Prepare Proposals	IV-4: 95 percent of program announcements will be publicly available at least three months prior to the proposal deadline or target date.	IV-4: 95 percent of program announcements will be publicly available at least three months prior to the proposal deadline or target date.	Unchanged.
Time to Decision	IV-5: For 70 percent of proposals, be able to inform applicants whether their proposals have been declined or recommended for funding within six months of receipt.	IV-5: For 70 percent of proposals, be able to inform applicants whether their proposals have been declined or recommended for funding within six months of deadline of target date, or receipt date, whichever is later.	The wording of the goal has been revised slightly to reflect the method used to calculate the “time to decision.”
Award Size	IV-6: Increase average annualized award size for research grants to $125,000.	IV-6: NSF will increase the average annualized award size for research grants to $128,000.	The target level for this goal has been increased by $3,000.
Award Duration	IV-7: Maintain the FY 2002 goal of 3.0 years for the average duration of awards for research grants.	IV-7: The average duration of awards for research grants will be 3.0 years.	Unchanged
Facilities –Construction and Upgrade	IV-8: For ninety percent of construction, acquisition and upgrade projects, keep any negative cost and schedule variances to less than 10 percent of the approved project plan.	IV-8: For ninety percent of construction, acquisition and upgrade projects, keep any negative cost and schedule variances to less than 10 percent of the approved project plan.	Unchanged.
Facilities – Operations and Management	IV-9: For ninety percent of operational facilities, keep scheduled operating time lost to less than 10 percent.	IV-9: For ninety percent of operational facilities, keep scheduled operating time lost to less than 10 percent.	Unchanged.

Performance Area	FY 2003 Goal (Revised Final Plan)	FY 2004 Goal (Final Plan)	Explanation of Change
Cost Efficiency – Videoconferencing	No goal included.	IV-10: NSF will assess the cost efficiencies associated with administrative processes. Performance Indicator: - Calculation of the agency-wide cost-savings realized by the use of videoconferencing.	A cost efficiency goal related to savings resulting from the use of videoconferencing has been added.
Electronic Business	IV-10: NSF will continue to advance "e-business" by receiving through FastLane and processing electronically 90 percent of PI award transfers. IV-11: NSF will continue to advance "e-business" by implementing Phase III of the Electronic Jacket application. Performance Indicator: Implementation of the electronic capability for assigning proposal processing tasks, forwarding proposals to other programs as necessary, and delegating proposal action authority.	IV-11: NSF will integrate its internal electronic grants process with the E-government initiative. Performance Indicators: - 90 percent of program announcements will be posted to Fed Grants. - 75 percent of declined proposals will be processed using E-decline signatures.	The Foundation is moving towards an electronic environment capable of performing all internal and external functions from proposal submission through final project closeout. The FY 2004 goal retains the emphasis on E-business while continuing progress on new tasks in this area.
Security Program – Information Technology and Physical Security	IV-12: NSF will maintain and enhance the agency-wide security program to ensure adequate protection of NSF's IT infrastructure and critical assets. Performance Indicators: - 95 percent of major systems will have approved security plans on file. - 95 percent of major systems will have documented certification and accreditation.	IV-12: NSF will maintain and enhance the agency-wide security program to ensure adequate protection of NSF's infrastructure and critical assets. Performance Indicators: - 95 percent of NSF's major systems will achieve Level 3 compliance in accordance with the NIST Security Self-Assessment Framework. - Implementation of a "Smart ID" pilot to provide staff with a standard identification card for authentication and access control.	For FY 2004 the performance indicators retain the emphasis on information technology security while continuing progress on new tasks in this area. The "Smart ID" pilot indicator has been added.

Performance Area	FY 2003 Goal (Revised Final Plan)	FY 2004 Goal (Final Plan)	Explanation of Change
NSF Staff – Diversity	IV-13: NSF will ensure that diversity considerations are embedded in activities related to agency staffing of scientists and engineers. Performance Indicator: Initiate development of a NSF S&E diversity plan.	IV-13: NSF will ensure that diversity considerations are embedded in activities related to agency staffing of scientists and engineers. Performance Indicator: NSF will complete development of the NSF S&E diversity plan initiated in FY 2003 and begin implementation of its recommendations.	Future goals and associated performance indicators have not yet been developed. The recommendations of the FY 2003 internal, ad hoc task force will guide their development.
	IV-14: NSF will show an increase over FY 2000 in the total number of appointments to NSF science and engineering staff and management from underrepresented groups.	IV-14: NSF will show an increase over FY 2000 in the total number of appointments to NSF science and engineering staff and management from underrepresented groups.	Unchanged.
Workforce Learning	IV-15: NSF will align or develop competency-based curricula, through the NSF Academy, that provide cross-functional, work-based team learning opportunities. Performance Indicator: Initiate development of new courses or revision of existing courses to address program management, leadership development, and technology and business process training.	IV-15: The NSF Academy will develop a broad array of competency-based learning opportunities that will enable all staff to perform critical functions supporting NSF's vision and goals. Performance Indicators: - Identification of staff requiring Facilities / Center Project Management training. - Initiation of development of a curriculum that leads to certification in Facilities / Center Project Management.	The FY 2004 indicator retains the emphasis on workforce learning while implementing specific curricula

Performance Area	FY 2003 Goal (Revised Final Plan)	FY 2004 Goal (Final Plan)	Explanation of Change
Workforce Planning	IV-16: NSF will develop competency-based, occupation classification alternatives that support the agency's strategic business processes and capitalize on its technology enabled business systems. Performance Indicators: - Identification of workforce competencies for all current NSF job families. - Initiate identification of competency-based, classification alternatives.	IV-16: NSF will develop competency-based occupation classification alternatives that support the agency's strategic business processes and capitalize on its technology enabled business systems. Performance Indicators: - Identification of workforce competencies needed to support the majority of NSF's strategic business processes. - Development of new positions or revision of position descriptions in order to address emerging business process requirements.	The FY 2004 indicators retain the emphasis on workforce planning. The first indicator expands NSF's focus to association of workforce competencies with NSF's business processes. The addition or revision of positions in accordance with the identified competencies is added as an indicator.

APPENDIX D:
INTERIM ADJUSTMENTS TO NSF GPRA STRATEGIC PLAN FY 2001 – FY 2006
AND DEVELOPMENT OF AN UPDATED STRATEGIC PLAN

Recent NSF planning efforts have focused on developing:

1) A 5-year Administration & Management Strategic Plan.
2) A Large Facility Projects Management and Oversight Plan (submitted to OMB and Congress in September 2001).
3) Changes to NSF's GPRA reporting processes (establishment of the Advisory Committee for GPRA Performance Assessment – utilized in FY 2002 reporting).
4) Strategies to address the President's Management Agenda and other initiatives of the new Administration.
5) Budget-Performance Integration Plan
6) GPRA Strategic Plan – NSF will submit a revised draft of its GPRA Strategic Plan to OMB on March 1, 2003 and a final updated plan no later than September 30, 2003. NSF submitted its existing FY 2001 – 2006 Strategic Plan in September 2000.

Results of the above-mentioned activities will provide guidance for Foundation activities over the next six months, until a revised NSF Strategic Plan is developed and approved by OMB.