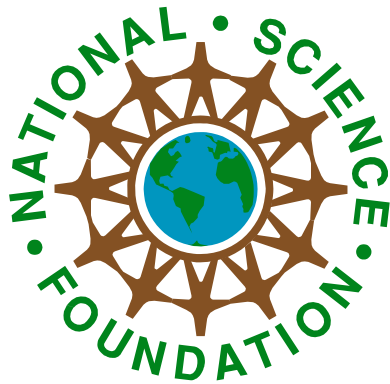


National Science Foundation

FY 2002 Revised Final GPRAs Performance Plan



February 20, 2002

Note: This GPRAs 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. Operating no laboratories itself, NSF 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, determined by competitive merit review. NSF evaluates proposals for research and education projects using two criteria: the intellectual merit of the proposed activity and the broader impacts of the activity on society. NSF uses merit review to select about 10,000 new awards each year from about 30,000 competitive proposals submitted by the science and engineering research and education communities.

NSF provides the funding that sustains many research fields as advances in these fields expand the boundaries of knowledge. Equally important, the agency provides seed capital to catalyze emerging opportunities in research and education. NSF supports a portfolio of investments that reflects the interdependence among fields, promoting disciplinary strength while embracing interdisciplinary activities. The investments promote the emergence of new disciplines, fields, and technologies. By providing these resources, NSF contributes to the health and vitality of the U.S. research and education enterprise, which enables and enhances the Nation's capacity for sustained growth and prosperity.

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I. INTRODUCTION

In response to the mandate provided by the Government Performance and Results Act of 1993 (GPRA) to account for program results through the integration of strategic planning, budgeting, and performance measurement, the National Science Foundation presents this fourth GPRA Performance Plan. It is based on NSF's updated GPRA Strategic Plan FY 2001 - 2006¹, finalized in September 2000, and upon newly developed strategic outcomes included therein.

In developing this revised final plan, NSF made several changes that are reflected in outcome and management goals and associated indicators. The changes in goal statements are based on aspects of FY 2001 performance, Congressional action on the NSF budget request and agency interest in accelerating selected activities related to human resources, award oversight, and data management. This version of the FY 2002 Performance Plan also incorporates minor corrections, additions, and deletions made to the April 9, 2001 copy. Performance updates for FY 2001 were not included, nor were changes to budgetary numbers included throughout the text of this revision.

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 Act authorizes and directs NSF to initiate and support:

- basic scientific research and research fundamental to the engineering process;
- programs to strengthen scientific and engineering research potential;
- science and engineering education programs at all levels and in all the various fields of science and engineering; and
- an information base for science and engineering appropriate for development of national and international policy.

The NSF Act conferred on the Presidentially appointed National Science Board the responsibility for establishing the policies of the Foundation and serving as its governing board. 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.

B. NSF GOALS

NSF has organized its annual performance goals for FY 2002 into two categories -- Strategic Outcomes and Management. The Strategic Outcomes anticipate long-term results derived from NSF awards. The Management Goals focus on factors and strategies that enable the Foundation to successfully implement and attain its Strategic Outcomes. The investment goals of previous years have been subsumed within this category.

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

GOALS FOR STRATEGIC OUTCOMES

To accomplish the NSF mission to promote the progress of science, NSF invests in the most capable people, supporting their best ideas, and providing them with the tools they need. NSF's outcomes from its grants and cooperative agreements provide evidence of the success of its investments in people, ideas, and tools. In developing the FY 2002 NSF award portfolio, NSF staff will be guided by the NSF Strategic Plan and this GPRA Performance Plan, which includes 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. It provides support for formal and informal science, mathematics, engineering and technology (SMET) education at all levels – pre K-12, undergraduate, graduate – in addition to professional development and public science literacy projects that engage people of all ages in life-long learning. Investments in activities aimed at the strategic outcome related to people derives from the parts of NSF's mission that are directed at (1) programs to strengthen scientific and engineering research potential and (2) science and engineering education programs at all levels and in all fields of science and engineering.

- **Ideas** – *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. It provides support for 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 derives from the part of NSF's mission directed at basic scientific research and research fundamental to the engineering process.

- **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 derives from the parts of NSF's mission directed at (1) programs to strengthen scientific and engineering research potential and (2) an information base on science and engineering appropriate for development of national and international policy.

These three broad themes are described in a format that requires *qualitative* assessment of associated achievements. Long-term outcomes identified for each provide the basis for retrospective, results-oriented performance assessment. Annual performance goals are determined by assessing past performance and by making reasonable projections for future levels of performance.

GOALS FOR MANAGEMENT

Excellence in managing NSF's activities underpins all of its goals. Factors identified in the NSF strategic plan and previous performance plans as especially important to the Foundation's management activities are organized here into five performance areas. Selected aspects of each are assessed by means of the quantitative performance goals presented in section IV of this document.

Embedded within this group of goals are a set that focus on seven management reforms that OMB and NSF have agreed to address during FY 2002 (Appendix VII). These reforms relate to: NSF's ability to administer and manage a growing portfolio of program activities; documenting the efficiency of the research process; enhancing

NSF's capability to manage large facility projects; issues related to federal funding of astronomy and astrophysics; performance-based contracts; on-line procurement; and the NSF FAIR Act inventory. Some of the reforms are addressed in this document, but others will be implemented in activities not covered by this plan. A summary of NSF's response to each of the reforms is presented in the table on page 18.

The five performance areas (proposal and award processes, the award portfolio, award oversight and management, business practices, and human resources and workplace) are introduced below, along with examples of issues addressed in management goals related to each.

- **Proposal and Award Processes:**

- > Merit review – e.g., use of generic review criteria;
- > Customer service – anticipating and responding to concerns of the NSF community as they relate to merit review, e.g., the time required by NSF managers to complete review and notify investigators about a proposal award or decline decision; and
- > Broadened participation – e.g., increased participation in the NSF merit review processes of individuals who are members of underrepresented² groups.

Additional qualitative aspects of the proposal and award process are addressed in COV (Committees of Visitors) reviews by external experts assessing performance relating to strategic outcomes. These include use of both review criteria by reviewers and program officers, appropriateness of the review mechanism, and aspects of reviewer selection such as expertise and geographic and institutional balance.

- **Award Portfolio:**

- > Award size and duration

Additional qualitative characteristics of the award portfolio are addressed in COV reviews conducted by external experts during assessment of progress toward the strategic outcomes. These include aspects such as integration of research and education, attention to maintaining openness in the system through the support of new investigators and an appropriate balance of high risk, multi-(inter)-disciplinary and innovative projects.

- **Award Oversight and Management:**

- > Oversight for large infrastructure and other projects; and
- > Facilities – e.g., federal guidelines for facility construction, upgrades and operations.

- **Business Practices:**

- > Electronic business, including e-processing of proposals; and
- > Security reform.

- **Human Resources and Workplace:**

- > Diversity of NSF staff; and
- > Staff learning and development.

C. MEANS AND STRATEGIES

NSF's primary function is to make 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 –

² Underrepresented groups include women, underrepresented minorities (American Indian/Alaskan native, Black, Hispanic, Pacific Islander), and persons with disabilities.

throughout the U.S. By providing these resources, NSF contributes to the health and vitality of the U.S. research and education enterprise, which enables and enhances the Nation's capacity for sustained growth and prosperity. The means and strategies NSF uses to accomplish its mission of promoting the progress of science and engineering have both process and programmatic components. The NSF Strategic Plan identifies three *process-based strategies* – developing intellectual capital, integrating research and education, and promoting partnerships – that cut across all NSF activities. They guide the agency in establishing priorities, identifying opportunities, and designing new programs and activities. Projects that embody these core strategies and promise to help the Foundation achieve its outcome goals are identified in the NSF merit review process.

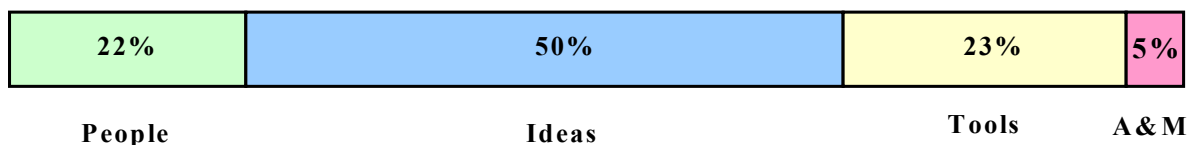
Programmatic strategies focus on specific NSF programs and activities, and on the funding needed to support them. These activities reflect the Foundation's funding priorities. They show how the agency balances its highly targeted investments with its broad-based, disciplinary support in order to address workforce issues and to 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 for NSF gives priority to the following: (1) support for competitive investigator-initiated research and education along a broad, expanding frontier of science and engineering; (2) identification and support for “unmet opportunities” that will strengthen and cross-fertilize the science and engineering disciplines and 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 are information technology, biocomplexity in the environment, and nanoscience and engineering, – all first included in the NSF 2000 Performance Plan – and Learning for the 21st Century, which was introduced under a different title in FY 2001.

D. RESOURCES

Approximately 95 percent of NSF's budget goes directly to the investments it makes in support of its goals for the strategic outcomes – People, Ideas, and Tools. The remaining 5 percent of the budget goes toward administration and management, which provides operating support for the immediate activities of the agency: processing applications, issuing awards, and oversight of projects.

Estimating resources directly related to strategic outcomes at the programmatic level leads to the following distribution of NSF's budget resources. For the FY 2002 budget request, resources related to People total \$ 1,002 million (c.f. \$888 million for FY 2001); those related to Ideas total \$ 2,220 million (c.f. \$2,251 million for FY 2001); and those for Tools total \$ 1,024 million (c.f. \$1,061 for FY 2001). Activities are assigned to a particular outcome goal depending on their principal objectives. These resources do not include H-1B visa receipts. The NSF budget justification contains information on the amount and range of activities covered.



This high-level view of how NSF deploys its budget misses a key facet of NSF's approach – the multiple purposes its investment serves. For example, research and education projects, usually categorized under the Ideas strategic outcome, almost always provide funds to involve graduate students in the work, thus contributing to the development of people. Likewise, many research and education projects involve the innovative use of or development of tools that have impact well beyond the specific project. The contributions of these more indirect

investments are important to NSF meeting its goals, and NSF program managers are expected to take such potential contributions into account in making their award decisions.

Proposals and awards are managed through nine programmatic organizations (or budget lines): seven directorates, the Office of Polar Programs and the Office of Integrative Activities³. The following table presents a crosswalk of the strategic outcomes for FY 2002. Dollar estimates are made at a programmatic level based on the principal objectives of the activity. The FY 2002 budget request for Administration and Management (A&M) of \$227 million provides support for salaries and benefits of persons employed at the NSF; general operating expenses, including key activities to advance the agency's information systems technology and to enhance staff training; and audit and Inspector General activities.

PROGRAMMATIC CROSSWALK FOR STRATEGIC OUTCOMES: FY 2002

(Estimated Millions of Dollars)

	STRATEGIC OUTCOMES			Total ³	Administration & Management
	PEOPLE	IDEAS	TOOLS		
BIO ¹	49	365	64	477	6
CISE	57	288	118	463	8
ENG	69	352	3	424	7
GEO	19	319	217	556	3
MPS	98	538	222	858	6
SBE	10	120	28	159	5
OPP	4	72	197	273	3
IA	0	27	54	81	0
EHR	696	139	25	860	12
Other ²	0	0	96	96	177
	\$1,002	\$2,220	\$1,024	4,246	\$227

¹ BIO = Biological Sciences; CISE = Computer and Information Science and Engineering; ENG = Engineering; GEO = Geosciences; MPS = Mathematical and Physical Sciences; SBE = Social, Behavioral, and Economic Sciences; OPP = Office of Polar Programs; IA = Integrative Activities; EHR = Education and Human Resources.

² Other budget items include Major Research Equipment (\$96 million, Tools); Salaries and Expenses (\$170 million, Administration and Management); and Office of Inspector General (\$7 million, Administration and Management)

³ Numbers may not add due to rounding.

Human resources utilized in fulfilling the NSF mission include a staff of about 600 scientists and engineers (65% of whom are permanent government employees), 450 business operations personnel, 350 program support personnel, and 200 on-site contractors who support the agency's work. Additionally, NSF also draws upon an additional 1,200 off-site contractor FTEs to meet its programmatic responsibilities. Members of the science and engineering community who provide expert evaluation of proposed projects in the more than 200,000 reviews they prepare each year are another critical human resource component. They donate tens of thousands of hours each year to assist NSF program officers in evaluating the research and education proposals submitted to NSF.

NSF's outstanding information management systems are critical in enabling the agency to process annually approximately 30,000 competitive proposals, 10,000 new awards and 10,000 continuing awards in an effective and efficient manner. NSF information and data sources include central databases such as the electronic Project

³ These nine programmatic organizations are referred to as directorates in the remainder of the document.

Reporting System, the Enterprise Information System (EIS), the FastLane system, the Proposal, PI and Reviewer System (PARS), the Award System, the Integrated Personnel System, the Financial Accounting System, and the Online Document System. Other aspects of NSF's information management systems are presented in the Verification and Validation section (V) of this plan.

E. CROSS-CUTTING ACTIVITIES AND PROGRAMS

Collaboration and partnerships between disciplines and institutions and among academe, industry, and government enable the movement of people, ideas, and tools throughout the public and private sectors. NSF has emphasized the importance of partnerships as a core strategy for enabling Foundation activities in its Strategic Plan (Appendix 4.)

Federal agencies may share similar programmatic goals. Mission and general goals guide the specific research and education activities of each agency. However, different agencies may at times define strategic outcomes and performance goals that are similar. NSF often jointly funds research and education activities with other agencies – it partners where there are shared interests and takes complementary approaches where appropriate. NSF actively participates in many interagency initiatives and planning activities. NSF staff also work with staff of other agencies during the review of proposals for joint initiatives to ensure that the role of each agency is clearly identified and supported appropriately.

The cross-cutting examples presented below are grouped into People, Ideas, or Tools categories depending on their principal objectives. All provide important contributions to NSF's strategic outcomes.

EXAMPLES OF CROSS-CUTTING ACTIVITIES - PEOPLE

- **President's Math and Science Partnership Initiative:**
This initiative provides funds for States to join with institutions of higher learning in strengthening math and science education at the K-12 levels. NSF's strong base of activity aimed at improving K-12 math and science education enables it to play a central role in this element of the President's education initiative. NSF will coordinate with related efforts at the Department of Education.
- **Interagency Participation in Support of International Student Assessment Studies.**
NSF and the U.S. Department of Education's National Center for Education Statistics and Office for Educational Research and Improvement jointly sponsor the development, collection, and publication of results of the Third International Mathematics and Science Study. The study was repeated in 32 nations in 1999 and included special procedures to provide information about students in 13 States and 14 districts. The three agencies continue to work together to make this series of studies more relevant to communicating ways for improving mathematics and science education.
- **Fellowship/Traineeship Activities for Graduate Education.** Many agencies support research and education activities in academic institutions, usually with a specific mission orientation. Their activities contribute to developing the workforce in science and engineering, both directly and indirectly. Most work indirectly through support of research assistants. In addition to NSF, the following agencies have dedicated fellowship or traineeship activities for graduate education in science and engineering: National Institutes of Health, Department of Education, Department of Defense, Department of Agriculture, and Department of Energy, among others.
- **Best Practices Study to Increase Participation of Underrepresented Groups.** NSF staff coordinated a best practices study of programs aimed at increasing the participation of underrepresented groups in science,

mathematics, engineering and technology. Also participating were the Department of Health and Human Services and the National Aeronautics and Space Administration. The study indicated that effective practices vary considerably across agencies. Further, the NSF-sponsored undergraduate program differs from others in its emphasis on faculty and institutional practices and its targeting of students who represent a broad spectrum of academic achievement.

EXAMPLES OF CROSS-CUTTING ACTIVITIES - IDEAS

- **Interagency Planning Activities Linking Research to National Priorities.** NSF is an active participant in many interagency efforts. In all of these activities, NSF's role is at the fundamental end of the research and development spectrum. They include:
 - > Information Technology Research,
 - > Nanoscience, Engineering and Technology,
 - > U.S. Global Change Research Program,
 - > High Performance Computing and Communications,
 - > Education Research,
 - > Integrated Science for Ecosystems Challenges,
 - > Children's Research, and
 - > Plant Genome Research, among others.
- **Information Technology Research & Development (IT R&D):** NSF has been designated the lead Federal agency for Information Technology Research – a six agency activity which includes the Department of Energy, the Department of Defense, the National Aeronautics and Space Administration, the National Institutes of Health, and Department of Commerce (National Oceanic and Atmospheric Administration & National Institutes of Standards and Technology.) A recent discussion of themes and responsibilities of participating agencies is included in the document “INFORMATION TECHNOLOGY- The 21st Century Revolution” (NSTC Interagency Working Group on IT R&D; Supplement to the President's FY 2001 Budget.)
- **Nanoscience, Engineering, and Technology:** In FYs 1999, 2000 and 2001, NSF worked in partnership with other Federal agencies in planning nanoscale science and engineering activities. NSF chairs an interagency Subcommittee on Nanoscience, Engineering and Technology, in cooperation with the Department of Defense, the Department of Energy, the National Institutes of Health, the National Aeronautics and Space Administration, the Department of Commerce, the National Institute for Science and Technology, the Environmental Protection Agency, the Department of Transportation, the Department of Justice and the Department of Treasury. A recent discussion of thematic interests and responsibilities of participating agencies is included in the document “NATIONAL NANOTECHNOLOGY INITIATIVE – Leading to the Next Industrial Revolution” (NSTC Subcommittee on Nanoscience, Engineering and Technology (<http://www.nsf.gov/home/crssprogm/nano/nni2.htm>))
- **Interagency Research in Biological Sciences.** NSF is involved with numerous agencies in support of research in the biological sciences, including:
 - > Interagency Arabidopsis Genome Project (USDA/DOE/NIH/NSF as lead agency), which has a goal of understanding biological processes underlying plant growth and development;
 - > NSF/NIH/USDA International Cooperative Biodiversity Groups;
 - > NSF/NASA Neurolab, which also involves NIH, the Office of Naval Research and international partners to support ground based research leading to experiments flown on the NASA space shuttle;
 - > the Human Brain Project (NIH/NSF/DOD/DOE/NASA), which is a broad Federal research initiative to support research in the neurosciences and the new field of neuroinformatics;

- > Ecology of Emerging Infectious Diseases (NSF/NIH/USDA/NASA/DOI).
- **Interagency Education Research Initiative (IERI).** The President's Committee of Advisors on Science and Technology has made recommendations with respect to establishing a strong research base for education and learning, particularly in investigating the role of learning technologies. NSF, the National Institutes of Health, the National Institute of Child Health and Development, and the Department of Education have worked to establish a joint research activity, the Interagency Education Research Initiative, to address those recommendations.
- **Interagency Arctic Research and Logistics.** NSF is one of twelve federal agencies supporting Arctic research and logistics. NSF provides interagency leadership for research planning as directed by the Arctic Research Policy Act of 1984.
- **Integrated Science Activities in the Antarctic.** NSF is charged with managing all U.S. activities in the Antarctic as a single, integrated program. The U.S. Antarctic Program implements national policy to maintain Antarctica as an area of international cooperation reserved for peaceful purposes, to preserve and pursue unique opportunities for scientific research to understand Antarctica and its role in global environmental systems, to protect the environment, and to assure the conservation and sustainable management of the living resources in the surrounding oceans.
- **Complementary Research Activities.** A variety of federal agencies support basic research in academic institutions. Even though some of this research has a mission orientation, the resultant outcomes contribute to developing areas related to NSF's strategic outcomes. NSF's general approach is to work with other agencies to ensure development of a complementary set of activities. Interactions with the agencies identified below are particularly important for fundamental research:
 - > National Institutes of Health (NIH): biosciences, genomics, biomedical research, chemistry, behavioral sciences, cognitive development;
 - > Department of Energy (DOE): high energy and nuclear physics, materials, high end computing, genomics;
 - > Department of Defense (DOD): engineering, computer and information science and engineering, mathematics;
 - > Department of Commerce (DOC): ocean and atmospheric sciences, global climate change, meteorology, atomic and molecular physics;
 - > National Aeronautics and Space Administration (NASA): astronomical sciences, global climate change;
 - > Department of Agriculture (USDA): biosciences, genomics;
 - > Department of Education (ED): learning research and education; and
 - > Environmental Protection Agency (EPA): environmental research and education.

EXAMPLES OF CROSS-CUTTING ACTIVITIES - TOOLS

- **Facility Sharing.** Interagency coordination and cooperation are particularly important in the effective planning and management of facilities, which often have large capital construction base and continuing operating costs. NSF has both formal and informal agreements with several other agencies to ensure that needed infrastructure is available to U.S. researchers without inappropriate overlap or duplication. For example, NSF and the Department of Energy cooperate to support U.S. involvement in the Large Hadron Collider at the European Organization for Nuclear Research (CERN). This is a formal agreement between the two agencies on behalf of the U.S. with the international partnership building the Collider. On a more informal level, NSF generally develops and supports ground-based astronomy facilities, while NASA does the same for space-based facilities.

- **Support of the U.S. Academic Research Fleet.** The U.S. Academic Research Fleet provides essential support to enable productive basic research in oceanography. NSF provides a majority of the support for operation, maintenance, and upgrade of the Academic Research Fleet. NSF, in partnership with the Office of Naval Research, supports and manages a ship inspection program to oversee safety practices, crew training, maintenance, operational procedures, and shipboard science laboratory facilities. Ship operations are coordinated through the University-National Oceanographic Laboratory System (UNOLS), a consortium of 57 institutions, 20 of which currently operate ships. Other federal agencies using these vessels coordinate through NSF and UNOLS.
- **Interagency Access to Leading-Edge Computing Capabilities.** The Terascale Computing Systems project, a part of the Information Technology Research priority area, will enable U.S. researchers to gain access to leading edge computing capabilities. The project is connected to NSF's existing Partnerships for Advanced Computational Infrastructure (PACI), and will be coordinated with the activities of other agencies, such as the Department of Energy, to leverage the software, tools, and technology investments.

EXAMPLES OF CROSS-CUTTING ACTIVITIES – BUSINESS PRACTICES

- **Federal Demonstration Partnership.** NSF is an active participant with other agencies in the Federal Demonstration Partnership, a joint effort of government and academe to address commonality of processes and reporting requirements that facilitate federally funded research and education activities in academe.
- **Federal Committee on Statistical Methodology.** NSF is one of many public and private agencies with responsibilities for obtaining statistical information on areas of important national interest. NSF and other agencies share information on statistical, information technology, and other methods and resources through this committee and related groups.

Appendix 4 of the NSF Strategic Plan discusses cross-cutting areas with other agencies. It describes and acknowledges the importance of cooperation between NSF and other agencies in addressing a broad spectrum of activities, while avoiding duplication and inappropriate overlap.

F. EXTERNAL FACTORS AFFECTING SUCCESS

External factors bearing on NSF's ability to achieve its strategic outcomes are discussed in Appendix 2 of the Strategic Plan. These factors stem largely from the fact that NSF does not conduct research and education activities directly and, therefore, *influences* results rather than *controls* them. In particular, the circumstances of institutional partners in academe, the private sector, and the government affect how individuals and groups are able to respond in both proposing and conducting research and education. Also, the information used in evaluating NSF outcome goals is derived from reports submitted by awardees, and that is in turn evaluated by external committees of experts.

Additionally, NSF cannot control the current condition and quality of research and education facilities and platforms throughout the country, even though it may support the infrastructure. Likewise, the characteristics of the science and engineering workforce are dependent on the systems in which individuals are educated and trained. Other factors beyond NSF's control include appropriations, indirect cost rates, government-wide policies, inflation, budget and plans of other R&D agencies, uncertainty and risk inherent in research, availability of technology and the pace of technological innovation.

G. ASSESSING AGENCY PROGRESS TOWARD STRATEGIC OUTCOMES

Implementing the Government Performance and Results Act of 1993 (GPRA) has been a challenge for NSF and other agencies with missions involving research and education activities. Both the substance and timing of outcomes from research and education activities are unpredictable, which creates difficulty in linking research and education outcomes to annual investments and the agency's annual budget. The true value of NSF is seen in its outcomes -- however, the results of research and education are long-term and therefore must be judged retrospectively.

NSF obtained Office of Management and Budget (OMB) approval for use of the "alternative form". This allows the Foundation to assess progress toward meeting its outcome goals annually using a retrospective approach and a qualitative scale. In using the alternative form, NSF depends on committees of external experts who use their collective experienced-based norms to determine the level of the agency's "success" in achieving its goals.

For the assessment of outcome goals, NSF defines the goals using a qualitative standard that describes expected "successful" performance. For FY 2002 outcome goals, NSF performance is deemed "successful" when, in the aggregate, results reported in the period demonstrate significant achievement for specified indicators⁴. These sets of indicators were developed for aggregated Foundation activities. For any given activity or program within the Foundation, only selected indicators among these sets may be relevant.

Progress toward NSF's outcome goals is influenced by investments made across the agency. Whereas investments are designated as primarily providing support to one of the three strategic outcome goals, some serve multiple purposes and contribute toward other goals as well. Thus, NSF's guidance to the committees of external experts reviewing NSF progress requires them to consider the program's influence on all strategic outcome goals, not just those most directly and obviously linked to the programs. The assessment results provided by these committees of external experts are aggregated across the agency to arrive at an agency-wide assessment of success in achieving strategic outcomes. Assessment of goal achievement takes into account such factors as: (1) specified performance indicators for each performance goal; (2) the success to which NSF strategies and plans are implemented; (3) the level of resources invested; (4) external factors; and (5) the agency's capability to be flexible and respond rapidly to emerging opportunities.

Performance assessment at NSF is supported with information obtained during the following activities.

APPLICANT AND GRANTEE INFORMATION / MERIT REVIEW :

All applicants and grantees provide results from previous NSF support, information about existing facilities and equipment available to conduct the proposed research, where the research is to be conducted, biographical information on the primary investigators, other sources of support, and certifications specific to NSF. Information is required at the time of application, at the time of an award, and in annual and final project reports. All information is reviewed by NSF staff. It is utilized during merit review and is included in the package of information available to external committees conducting performance assessments. The merit review process provides a rigorous first phase of assessment of NSF's research and education portfolio.

PROGRAM EVALUATION BY COMMITTEES OF VISITORS (COVs)

⁴ In FY 1999, NSF applied a two-level set of standards in the assessment process which allowed programs to be judged either "successful" or "minimally effective" in meeting NSF's goals. Based on feedback in FY 1999, NSF revised the two-level standard to one level, which allowed programs to be judged "successful" or not successful in meeting NSF's goals.

To ensure the highest quality in processing and recommending proposals for awards, NSF reviews its programs on a three-year cycle for their performance in administering the merit review process. This includes disciplinary programs in the nine directorates and offices, and some cross-disciplinary programs managed across directorates. The reviews are performed by Committees of Visitors (COVs), usually set up as a subcommittee of a directorate advisory committee. The COV members form an independent group of credible, external experts, selected to ensure an independent review that reflects a diversity of perspectives and balanced programmatic investment. COV reports are submitted to advisory committees for each directorate and to NSF's Director.

In FY 1997, FY 1998, and early FY 1999, NSF ran a series of experiments with advisory committees and their subcommittees to determine how to adapt existing COV processes to obtain effective assessments of outcomes. At that time, the scope of the COV review was expanded to include the integrity and efficiency of processes leading to awards; the relationships among award decisions, program goals, and Foundation-wide programs and goals; and the results of awards as they relate to GPRA goals. These experiments led to the development of standard reporting guidelines for COVs and advisory committees for use in assessing results for FY 1999, FY 2000, and FY 2001.

In FY 2001, NSF began the initial planning on a project to improve the quality, consistency, and availability of data, reports and charts for Committees of Visitors reviews. In this new project, a basic set of data-based reports will be generated centrally, both to reduce costs and to improve consistency across all NSF organizations. Currently, each organization individually produces reports and charts for its COVs. This new approach is expected to result in more coherent feedback and advice from NSF COVs and advisory committees. Initial planning for the project began in FY2001, with completion of implementation planned for late FY 2002 or early FY 2003.

DIRECTORATE ASSESSMENT BY ADVISORY COMMITTEES:

Directorate Advisory Committees review COV reports, available external evaluations, and annual directorate performance reports. They judge program effectiveness, describe strengths and weaknesses, and provide advice on priorities. Their recommendations are reviewed by management and considered by NSF when evaluating existing programs and future directions for the Foundation. Advisory committees have full access to a variety of data sources necessary to carry out their assessment. The credibility of these advisory committee reports rests on the provision of qualitative detail about program results and the COV process. All advisory committees are subject to Federal Advisory Committee Activity (FACA) rules.

NSF manages its research and education activities through nine programmatic organizations: the directorates for Biological Sciences (BIO), Computer and Information Science and Engineering (CISE), Education and Human Resources (EHR), Engineering (ENG), Geosciences (GEO), Mathematical and Physical Sciences (MPS), Social, Behavioral, and Economic Sciences (SBE); the Office of Polar Programs (OPP), and the Office of Integrative Activities (OIA). All of these units, except for OIA, have a standing external advisory committee—made up of members representing universities, industry, and other federal agencies—that reviews activities of the directorate and makes recommendations on program priorities and funding. With the implementation of GPRA, the directorate advisory committees also take on the role of assessing the progress of the directorate in relation to the NSF-wide GPRA goals.

The reports of COVs and advisory committees are reviewed by NSF management. The assessments they provide are used in determining the success of the agency in achieving its outcome goals and are used in developing the annual GPRA Performance Report.

II. SUMMARY TABLES:

A. ANNUAL PERFORMANCE GOALS

NSF annual performance goals for FY 2002 are organized in two categories:

- Strategic Outcomes (rationale, measurement approach, and baseline information found in Section III); and
- Management (rationale, measurement approach, and baseline information found in Section IV).

B. NSF'S RESPONSE TO FY 2002 OMB REFORMS

This table contains a summary of NSF's response to FY 2002 OMB reforms. The seven reforms include:

- Efficiency of the research process (NSF specific);
- Management of large facility projects (NSF specific);
- Administration and management of program portfolios (NSF specific);
- Funding of astronomy and astrophysics (NSF specific);
- Performance-based contracts;
- On-line procurement; and
- A-76 competitions and FAIR Act inventory

FY 2002 GPRA PERFORMANCE GOALS

Strategic Outcomes	No. Annual Performance Goals ¹ for Strategic Outcomes	FY 2002 Areas of Emphasis
<p>PEOPLE</p> <p>Outcome Goal: Developing “a diverse, internationally competitive and globally engaged workforce of scientists, engineers, and well-prepared citizens.”</p>	<p>III-1a <i>NSF’s performance² for the People Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority (4 of 7) of the following indicators:</i></p> <ul style="list-style-type: none"> ▪ Development of well-prepared scientists, engineers or educators whose participation in NSF activities provides them with the capability to explore frontiers and challenges of the future; ▪ Improved science and mathematics performance for U.S. K-12 students involved in NSF activities; ▪ Professional development of the SMET instructional workforce involved in NSF activities; ▪ Contributions to development of a diverse workforce through participation of underrepresented groups (women, underrepresented minorities, persons with disabilities) in NSF activities; ▪ Participation of NSF-supported scientists and engineers in international studies, collaborations, or partnerships; ▪ Enhancement of undergraduate curricular, laboratory, or instructional infrastructure; and ▪ Awardee communication with the public in order to provide information about the process and benefits of NSF supported science and engineering activities. 	<ul style="list-style-type: none"> <input type="checkbox"/> K-12 Education <ul style="list-style-type: none"> - President’s Math and Science Partnership <input type="checkbox"/> Priority area: <ul style="list-style-type: none"> - Learning for the 21st Century <ul style="list-style-type: none"> - Centers for Learning and Teaching (CLT) - NSF Graduate Teaching Fellows in K-12 Education (GK-12) <input type="checkbox"/> Broadening Participation: <ul style="list-style-type: none"> - Minority-Serving Institutions (MSI) programs <input type="checkbox"/> Graduate Student Stipends: <ul style="list-style-type: none"> - Increasing stipends for GRF, IGERT, and GK-12
	<p>III-1b After three years of NSF support, over 80 percent of schools participating in systemic initiative programs will:</p> <ol style="list-style-type: none"> (1) implement a standards-based curriculum in science and mathematics with at least one-third of their teachers; (2) provide professional development for at least one-third of their teachers; and (3) improve student achievement on a selected battery of math and science tests at one or more of three educational levels (elementary, middle and high school). 	

¹ These performance goals are stated in the alternate form provided for in GPRA legislation.

² For individual programs/activities, performance assessment in practice refers to appropriate or relevant indicators only.

FY 2002 GPRA PERFORMANCE GOALS (CONTINUED)

Strategic Outcomes	No. Annual Performance Goals ¹ for Strategic Outcomes (Continued)	FY 2002 Areas of Emphasis
<p>IDEAS</p> <p>Outcome Goal: Enabling “discovery across the frontier of science and engineering, connected to learning, innovation, and service to society.”</p>	<p>III-2 <i>NSF’s performance² for the Ideas Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority (4 of 6) of the following indicators:</i></p> <ul style="list-style-type: none"> • Discoveries that expand the frontiers of science, engineering, or technology; • Discoveries that contribute to the fundamental knowledge base; • Leadership in fostering newly developing or emerging areas; • Connections between discoveries and their use in service to society; • Connections between discovery and learning or innovation; and • Partnerships that enable the flow of ideas among the academic, public or private sectors. 	<ul style="list-style-type: none"> <input type="checkbox"/> Balance of portfolio, including projects that are innovative, risky, or multidisciplinary <input type="checkbox"/> Priority areas: <ul style="list-style-type: none"> -Biocomplexity in the Environment -Information Technology Research -Nanoscale Science and Engineering <input type="checkbox"/> Core research and education activities <ul style="list-style-type: none"> - Interdisciplinary mathematics
<p>TOOLS</p> <p>Outcome Goal: Providing “broadly accessible, state-of-the-art and shared research and education tools.”</p>	<p>III-3 <i>NSF’s performance² for the Tools Strategic Outcome is successful when, in the aggregate, results reported in the period demonstrate significant achievement in the majority (4 of 6) of the following indicators:</i></p> <ul style="list-style-type: none"> ▪ Provision of facilities, databases or other infrastructure that enable discoveries or enhance productivity by NSF research or education communities; ▪ Provision of broadly accessible facilities, databases or other infrastructure that are widely shared by NSF research or education communities; ▪ Partnerships, e.g., with other federal agencies, national laboratories, or other nations, to support and enable development of large facilities and infrastructure projects; ▪ Use of the Internet to make SMET information available to the NSF research or education communities; ▪ Development, management, or utilization of very large data sets and information-bases; and ▪ Development of information and policy analyses that contribute to the effective use of science and engineering resources. 	<ul style="list-style-type: none"> <input type="checkbox"/> Investments in Major Research Equipment (MRE) <input type="checkbox"/> Continued Investments in: <ul style="list-style-type: none"> - Major Research Instrumentation (MRI) Program - Science & Engineering information, reports, and databases - Scientific databases and tools for using them - National SMETE Digital Library

¹ These performance goals are stated in the alternate form provided for in GPRA legislation.

² For individual programs/activities, performance assessment in practice refers to appropriate or relevant indicators only.

FY 2002 GPRA PERFORMANCE GOALS (CONTINUED)

Performance Area	No.	Annual Performance Goals for Successful Management
Proposal and Award Process		
Use of Merit Review	IV-1	At least 85% of basic and applied research funds will be allocated to projects that undergo merit review.
Implementation of Merit Review Criteria – Reviewers ¹	IV-2	Reviewers will address the elements of both generic review criteria at a level above that of FY 2001. Performance Indicator: Percent of reviews using both merit review criteria.
Implementation of Merit Review Criteria – Program Officers ¹	IV-3	Program Officers will consider elements of both generic review criteria in making decisions to fund or decline proposals. Performance Indicator: Percent of review analyses (Form 7s) that comment on aspects of both merit review criteria as determined by directorate or advisory committee sampling.
Customer Service – Time to Prepare Proposals	IV-4	Ninety-five percent of NSF program announcements will be available to relevant individuals and organizations 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 receipt.
Diversity – Reviewer Pool	IV-6	Establish a baseline for participation of members of underrepresented groups in NSF proposal review activities.
Award Portfolio		
Award Size	IV-7a	NSF will increase the average annualized award size for research projects to a level of \$113,000, compared to a goal of \$110,000 in FY 2001.
Award Duration	IV-7b	NSF will maintain the FY 2001 goal of 3.0 years for the average duration of awards for research projects.

¹ These performance goals are stated in the alternate form provided for in GPRA legislation.

FY 2002 GPRA PERFORMANCE GOALS (CONTINUED)

Performance Area	No.	Annual Performance Goals for Successful Management (Continued)
Award Oversight and Management		
Award Oversight	IV-8	NSF will develop and initiate a risk assessment / risk management plan for awards. Performance Indicators: <ul style="list-style-type: none"> > Development of an appropriate risk assessment model. > Development of an effort analysis to determine necessary resource allocation (personnel, travel and training). > Completion of a pilot program testing the risk assessment monitoring tools at several high-risk awardee institutions.
Construction and Upgrade of Facilities	IV-9a	For 90 percent of facilities, keep construction and upgrades within annual expenditure plan, not to exceed 110 percent of estimates.
	IV-9b	Ninety percent of facilities will meet all major annual schedule milestones.
	IV-9c	For all construction and upgrade projects initiated after 1996, when current planning processes were put in place, keep total cost within 110 percent of estimates made at the initiation of construction.
Operations and Management of Facilities	IV-10	For 90 percent of facilities, keep operating time lost due to unscheduled downtime to less than 10 percent of the total scheduled operating time.
Business Practices		
Electronic Business	IV-11	NSF will continue to advance the role of "e-business" in review, award, and management processes. Performance Indicator: NSF will double the FY 2001 number of paperless projects that manage the competitive review process in an electronic environment.

FY 2002 GPRA PERFORMANCE GOALS (CONTINUED)

Performance Area	No.	Annual Performance Goals for Successful Management (Continued)
Security Program	IV-12	<p>NSF will implement an agency-wide security program in response to the Government Information Security Reform Act. (New Goal)</p> <p><u>Performance Indicators:</u></p> <ul style="list-style-type: none"> > Risk assessments and certification to operate will be documented and retained. > Policies will be developed and disseminated. > Security management structure will be implemented. > Security related changes to personnel policies (as necessary) will be documented.
Human Resources and Workplace		
NSF Staff – Diversity	IV-13	NSF will show an increase over FY 2000 in the total number of hires to NSF science and engineering positions from underrepresented groups.
Workforce Training	IV-14	<p>NSF will establish an internal NSF Academy to promote continuous learning for NSF staff. (New Goal)</p> <p>Performance Indicator: Availability of new or revised courses that contribute to an organized curriculum for NSF staff.</p>
	IV-15	<p>NSF will initiate a strategic business analysis to provide a comprehensive perspective on its future workforce requirements.</p> <p>Performance Indicators:</p> <ul style="list-style-type: none"> > Request for Proposals to perform the strategic business analysis will be released. > Skill mix / competencies of the current NSF workforce will be examined.
Work Environment	IV-16	<p>NSF will establish various baselines that will enable management to better assess the quality of worklife and work environment within the Foundation.</p> <p>Performance Indicator: Development of an employee survey.</p>

SUMMARY OF NSF RESPONSES TO FY 2002 OMB REFORMS

OMB REFORM	NSF RESPONSE
A. Efficiency of the Research Process	Addressed in FY 2002 Performance Plan (Goals IV-7a and IV-7b) and in Foundation and external focus groups established in timeframe requested.
B. Management of Large Facility Projects	Addressed in FY 2002 Performance Plan (Goals IV-8, IV-9, and IV-10).*
C. Administration and Management of Program Portfolios	Staffing addressed in FY 2002 Performance Plan (Goals IV-13, IV-14, and IV-15 and IV-16); systems management addressed as components of individual goals in the Plan.
D. Astronomy and Astrophysics	Addressed external to this FY 2002 Performance Plan; NSF-NASA panel to be established.
E. Performance – Based Contracts	Does not apply using OMB guidelines; NSF performance at or above stated levels.
F. On-Line Procurement	Does not apply using OMB guidelines; NSF performance at or above stated levels.
G. A-76 Competitions and FAIR Act Inventory	Internal working group to develop a plan for addressing this reform.**

* Update: Recent activities external to this revised performance plan include development of a Large Facility Projects Management and Oversight Plan submitted to OMB and Congress in September 2001.

** Update: A strategic business analysis to be initiated in FY 2002 will inform a redefinition of the agency's FAIR Act inventory and will enable NSF to develop a competitive sourcing plan.

III. GOALS FOR STRATEGIC OUTCOMES

NSF has developed performance goals for results of its investments in research and education as descriptive standards, under the GPRA option to set performance goals in an alternative form. The descriptive standards characterize successful performance. In some instances there are a few related performance goals stated in a more standard format.

A. PEOPLE STRATEGIC OUTCOME

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

NSF 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, mathematics, engineering and technology (SMET) education at all levels – pre K-12, undergraduate, graduate, - in addition to professional development 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 Integrative Graduate Education and Research Training (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, business and industry, and parents, NSF fosters the invigoration of research-informed standards-based SMET education at all levels.

FY 2002 Performance Goal III-1a: NSF’s performance is successful when, *in the aggregate*, results reported in the period demonstrate significant achievement in the majority (4 of 7) of the following indicators:

- Development of well-prepared scientists, engineers or educators whose participation in NSF activities provides them with the capability to explore frontiers and challenges of the future;
- Improved science and mathematics performance for U.S. K-12 students involved in NSF activities;
- Professional development of the SMET instructional workforce involved in NSF activities;
- Contributions to development of a diverse workforce through participation of underrepresented groups (women, underrepresented minorities, persons with disabilities) in NSF activities;
- Participation of NSF-supported scientists and engineers in international studies, collaborations, or partnerships;
- Enhancement of undergraduate curricular, laboratory or instructional infrastructure; and
- Awardee communication with the public in order to provide information about the process and benefits of NSF-supported science and engineering activities.

Baseline: The baseline for this goal will be based on results from FY 2001. Goal III-1a was a new performance goal for FY 2001.

NSF has long been involved in systemic activities at the K-12 level. At the start of the 1990s, the Foundation initiated major programs for systemic reform of science, mathematics, engineering, and technology education. These projects were unique in their involvement of broad partnerships and development of comprehensive goals, solutions, and actions. NSF’s most recent activity in the K-12 area focuses on the President’s Math and Science Partnership Initiative introduced in FY 2002.

Comment: For individual programs/activities, performance assessment in practice refers to appropriate or relevant indicators only.

The Math and Science Partnership (MSP) enacts a portion of the President's vision, enunciated in *No Child Left Behind* and will build on NSF's dedication to educational reform through support of partnerships that unite the efforts of local school districts with science, mathematics, engineering and education faculties of colleges and universities. The strategic focus of the MSP is to engage the nation's higher education institutions and other partners in K-12 reform by calling for significant commitments to improving the quality of science and mathematics instruction in the schools and to investing in the recruitment, preparation and professional development of highly competent science and mathematics teachers. The MSP is an investment intended to serve *all* students so that learning outcomes cannot be predicted based on race/ethnicity, socio-economic status, gender or disability. The first awards under this initiative will not be made until late FY 2002 so that performance results will not begin to appear until FY 2003. NSF will include a goal in the FY 2003 Performance Plan related to the MSP.

FY 2002 Performance Goal III-1b: After three years of NSF support, over 80 percent of schools participating in systemic initiative programs will (1) implement a standards-based curriculum in science and mathematics with at least one-third of their teachers; (2) provide professional development for at least one-third of their teachers; and (3) improve student achievement on a selected battery of math and science tests at one or more of three educational levels (elementary, middle and high school).

FY 1999 Result: In 1999, 46 NSF-sponsored projects implemented mathematics and science standards-based curricula in over 81 percent of participating schools, and provided professional development for more than 156,000 teachers. All participating educational systems demonstrated some level of improvement in student achievement in mathematics and science on a battery of system-selected assessment instruments.

FY 2000 Result: This goal was achieved. In 2000, 47 Systemic Initiative projects implemented mathematics and science standards in over 80 percent of the participating schools and provided professional development for more than 214,792 teachers. The Systemic Initiative projects reported improved student achievement in math in 81% of the 4,187 schools and improved student performance in science in 86% of the 2,474 schools using the same assessments for the last 3 years.

FY 2001 Result: Data not yet available.

Means and Strategies for Successful Implementation for Goals III-1a,1b:

Related to process:

- To enhance the math and science skills of all students – address preparation and professional development of teachers of math and science, alignment of standards, rigorous curricula and assessments, and gaps in preparation of disadvantaged students;
- Support the most promising and capable people 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.;
- Initiate outreach activities to states, local districts, higher education institutions, and other relevant organizations
- Emphasize the NSF core strategies of integrating research and education, promoting partnerships, and developing intellectual capital;
- Encourage partnerships and cooperative research and education efforts – among disciplines, among scientists, engineers, and educators in different sectors, and across international boundaries;

- To develop expanded participation of underrepresented groups in NSF activities - explore partnerships with professional societies, industry, academe, federal agencies, and other groups that focus on broadening participation; make presentations on the full breadth of NSF opportunities at national and regional meetings of minority-serving organizations, and at regularly scheduled campus meetings such as those involving the EPSCoR (Experimental Program to Stimulate Competitive Research) and LSAMP (Louis Stokes Alliances for Minority Participation) programs;
- Collect and utilize reliable data for decision-making and accountability;
- To produce well-trained scientists, engineers, and educators – provide opportunities for involvement in non-academic activities, including interactions with industry; ensure sufficient size/number of centers-type activities so as to afford broad and interactive research and education opportunities involving students, post-doctoral scientists and faculty at all career stages;
- To further the engagement of the NSF community in international activities – support attendance at international meetings, faculty/student exchange opportunities, and research utilizing international facilities and field/logistics centers;
- To enhance development of the instructional workforce – support approaches that integrate research and learning activities; encourage partnering of K-12 and higher education communities and support the use of educational and information technologies in classrooms of teachers participating in NSF-funded projects;
- To communicate with the broader public – support increased linkages between formal programs and outreach/informal science and engineering activities such as museum and science center exhibits, public fora, mass media (press releases) or internet activities; and
- Provide grants of sufficient size and duration to improve efficiency and effectiveness of educators and researchers.

Related to programs:

- Provide financial support for activities specifically addressing the People Strategic Outcome. For FY 2002 the budget request is about \$ 1,002 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 for FY 2002 highlighted in the section labeled FY 2002 Areas of Emphasis (detailed below; also see the Summary Table of Performance Goals);

FY 2002 Areas of Emphasis:

- *President’s Math and Science Partnership (MSP):* The MSP provides funds to unite the efforts of local school districts with science, mathematics, engineering and education faculties of colleges and universities, as well as with other partners, to strengthen mathematics and science education at the preK-12 levels. NSF’s strong base of activity aimed at preK-12 mathematics and science education enables it to play a central role in this Presidential initiative. The appropriated FY 2002 funding level is \$160 million.
- *Enhancing the Instructional Workforce:*
 - > *Centers for Learning and Teaching (CLT)* is an integrative element of the Learning for the 21st Century priority area. These proposed centers will link K-12 and higher education to provide research-informed lifelong learning opportunities for the instructional workforce. The first centers were funded in FY 2001. The EHR advisory committee will review progress in developing a strong portfolio of awards in this activity, along with preliminary findings.
 - > The *NSF Graduate Teaching Fellows in K-12 Education (GK-12)* program places graduate and advanced undergraduate students in K-12 schools to serve as science and mathematics content resources for teachers. The program provides participating students with exposure to the opportunities and challenges of K-12 teaching, while introducing K-12 students and teachers to active researchers. The program was

initiated in FY 1999 – approximately 50 awards supporting about 500 students have been made during the past three years. The EHR Advisory Committee will be asked to examine the set of awards for progress in this activity.

- *Broadening Participation:*
 - > *Minority-Serving Institutions (MSI).* Included in this group of programs is one involving Tribal Colleges that encourages Native Americans to pursue information technology and other science and technology fields of study, as well as increases the capability of these colleges to offer relevant science and technology courses and enhance K-12 education in feeder school systems. This group also includes the Historically Black Colleges and Universities-Undergraduate Program (HBCU-UP), which focuses on strengthening the research infrastructure and education in participating institutions and contributes to the goal of increasing numbers of minorities obtaining SMET baccalaureate degrees. It also includes the Model Institutions of Excellence Program.
- *Increased Stipends for Graduate Students:* Increasing stipends is one strategy to attract more U.S. citizens, nationals, and permanent residents into graduate education in science and engineering. The current stipend for most NSF fellows and trainees is \$18,000. The long-term NSF goal is to increase stipends to a level of \$25,000. In FY 2002, NSF will increase stipends for its GRF, GK-12, and IGERT fellows to a level of \$21,500.

Data / Data Sources and Data Limitations: Included in Section V.

External Factors that Affect Performance:

- NSF provides very little of the overall national investment for the development of the science and engineering workforce. Meeting workforce goals requires a gradual change in process and philosophy of educating the workforce. It also implies a commitment on the part of institutions and their faculties to provide a broad range of high-quality educational opportunities and to enhance the diversity of the science and engineering workforce.
- NSF K-12 activities must be developmental and catalytic, given the small fraction of total resources in K-12 education represented by NSF's funding. Again, achieving goals for these activities implies a gradual change in the structure of education in mathematics and science. This also requires a commitment on the part of school districts, schools, and their faculty to modify their approaches in order to identify resources and enhance achievement.

B. IDEAS STRATEGIC OUTCOME

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

Investments in ideas support cutting edge research that yields new and important discoveries and promotes the development of new knowledge and techniques within and across traditional boundaries. These investments enable 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 projects provide a rich foundation for broad and useful applications of knowledge and the development of new technologies. Support in this area also promotes the education and training of the next generation of scientists and engineers by providing them with an opportunity to participate in discovery-oriented projects. NSF-funded centers provide an enhanced environment for broad interdisciplinary research and education at all levels.

FY 2002 Performance Goal III-2: NSF’s performance is successful when, *in the aggregate*, results reported in the period demonstrate significant achievement in the majority (4 of 6) of the following indicators:

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

Baseline: The baseline for this goal will be based on results from FY 2001. Goal III-2 was a new performance goal for FY 2001.

Comment: For individual programs/activities, performance assessment in practice refers to appropriate or relevant indicators only.

Means and Strategies for Successful Implementation:

Related to Process:

- 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 connections with 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);
- Identify and support major cross-disciplinary priority areas where U.S. and NSF leadership are important;
- Utilize the NSF core strategies of integrating research and education, promoting partnerships, and developing intellectual capital; and
- Provide grants of sufficient size and duration to improve efficiency and effectiveness.

Related to Programs:

- Provide financial support for programs specifically addressing NSF's strategic outcome related to Ideas. For FY 2002, this investment totals about \$2,220 million, a decrease of \$31 million from FY 2001. Investments in research and education grants and centers are the principal components of NSF's investments in Ideas. The FY 2002 request continues the emphasis on core disciplinary research and education across the NSF.
- Support programmatic themes for FY 2002 highlighted in the section labeled FY 2002 Areas of Emphasis (detailed below; also see the Summary Table of Performance Goals). These themes focus on aspects of the entire NSF portfolio and on priority areas such as Information Technology Research (ITR); Biocomplexity in the Environment (BE); and Nanoscale Science and Engineering.
- Develop and support a balanced award portfolio that considers discipline and fields, interdisciplinary research areas, and emerging and "unmet" opportunities.

FY 2002 Areas of Emphasis:

- *Appropriate balance of portfolio:* Balance with respect to characteristics such as support of emerging opportunities, integration of research and education, involvement of new investigators and members of underrepresented groups, and balance among projects characterized as high-risk, multidisciplinary, and 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 there is a significant probability of failure associated with the research. If successful, such high-risk research could result in a significant advance in the scientific or technological field.
- *Priority areas:*
 - > *Biocomplexity in the Environment (BE)* is an interdisciplinary priority area that focuses on understanding the interrelationships that arise when living things at all levels interact with their environment. It became an area of focus in FY 1999, with a special competition on the *Interrelationships between Microorganisms and Biological, Chemical, Geological, Physical, and Social Environments*. In FY 2000, NSF sponsored a \$50 million competition -- *Integrated Research to Understand and Model Complexity Among Biological, Physical, and Social Systems*; and in FY 2001, NSF sponsored a \$ 55 million competition – *Integrated Research and Education in Environmental Systems*. Activities in FY 2002 will have a similar focus, with emphasis on 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. Preliminary results arising from awards made as a result of the first of these competitions will be available for assessment in FY 2002. COVs and advisory committees will also be able to examine the active portfolio of awards/investments/results.
 - > *Information Technology Research (ITR)* is an NSF priority area supported in conjunction with an IT R&D multi-agency initiative begun in FY 2000. NSF is designated the lead federal agency in this partnership to improve ways to gather, store, analyze, share and display information. The program increases access to terascale computing power, enabling researchers to tackle problems previously considered too complex to address. Research in FY 2002 will expand into multidisciplinary efforts, with a focus on fundamental research at the interfaces between scientific areas. Other studies will explore large-scale networking, high-end computation and infrastructure, human-computer interactions, and the impact of IT on our society. COVs and directorate advisory committees will review progress in developing a strong portfolio of awards/investments in this activity.
 - > *Nanoscale Science and Engineering (NSE)*, a NSF priority area in its second year, is supported in conjunction with the multi-agency National Nanotechnology Initiative. NSF has been a pioneer among federal agencies in fostering the development of nanoscience and technology. The Foundation's investments include research and education activities supported through individual investigator awards,

small groups, centers, instrumentation and facilities. Focus areas for FY 2002 include biosystems at the nanoscale, nanoscale structures, and novel phenomena and quantum control, design tools and nano-systems specific software, nanoscale processes in the environment, multi-scale, multi-phenomena modeling and simulation at the nanoscale, manufacturing processes at the nanoscale, and studies on the societal implications of nanoscale science and engineering. Activities in FY 2002 will expand fundamental research on phenomena at molecular and atomic scales and develop new techniques to facilitate application. COVs and advisory committees will assess the resulting portfolio or awards/investments.

- > *Core Research and Education Activities:* NSF will continue to invest in ongoing core activities that build strength in the 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 science, mathematics, engineering, and technology (SMET) education. Examples of specific FY 2002 activities include support for interdisciplinary mathematics programs, genome enabled science, quantum science and engineering, and planetary energetics and dynamics. COVs and advisory committees will be asked to examine the set of awards relevant to their directorate for potential influence on progress within the core and associated areas. Interdisciplinary mathematics is a FY 2002 area of emphasis for NSF.

- *Cross-cutting Areas:* Within NSF's FY 2002 budget request, several other multidisciplinary areas of research are identified as being of particular importance for their potential connections to use in service to society. These areas fit within the Foundation's priority areas, but additionally they involve partnerships with other agencies and/or other countries. These multidisciplinary areas of research include:
 - *Global Change Research* is a component of NSF's environmental portfolio. This research is supported in conjunction with NSF's participation in the U.S. Global Change Research Program. COVs and advisory committees will address performance in global change research, including both past results and the current portfolio. FY 2002 activities will include understanding the dynamics of natural and human systems and generating the knowledge needed to preserve, manage and enhance the natural environment.
 - *Plant Genome Research* received a major funding increase in FY 1998. At that time, NSF initiated a program of support for research and infrastructure development, consistent with the recommendations of the 1998 report of the National Science and Technology Council entitled *National Plant Genome Initiative*. In FY 2001, COVs and the BIO advisory committee reviewed progress in developing a strong portfolio in this area, including interactions with other agencies, other nations, and the private sector. FY 2002 activities will emphasize functional genomics and training in plant genomics.

Data / Data Sources and Data Limitations: Included in Section V.

C. TOOLS STRATEGIC OUTCOME

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

As the research issues we face increasingly involve phenomena at or beyond the limits of our measurement capabilities, many of these research areas can only be studied and problems solved through the use of new generations of powerful tools. NSF investments provide state-of-the-art tools for research and education, such as instrumentation and equipment, multi-user facilities, digital libraries, research resources, accelerators, telescopes, research vessels and aircraft and earthquake simulators. In addition, resources support large surveys and databases as well as computation and computing infrastructures for all fields of science, engineering, and education. Support includes funding for construction, upgrade, operations, and maintenance of facilities, and for personnel to assist scientists and engineers in conducting research at the facilities. 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 2002 Performance Goal III-3: NSF’s performance is successful when, *in the aggregate*, results reported in the period demonstrate significant achievement in the majority (4 of 6) of the following indicators:

- Provision of facilities, databases or other infrastructure that enable discoveries or enhance productivity by NSF research or education communities;
- Provision of broadly accessible facilities, databases or other infrastructure that are widely shared by NSF research or education communities;
- Partnerships, e.g., with other federal agencies, national laboratories or other nations, to support and enable development of large facilities and infrastructure projects;
- Use of the Internet to make SMET information available to the NSF research or education communities;
- Development, management, or utilization of very large data sets and information-bases; and
- Development of information and policy analyses that contribute to the effective use of science and engineering resources.

Baseline: The baseline for this goal will be based on results from FY 2001. Goal III-3 was a new performance goal for FY 2001.

Comment: For individual programs/activities, performance assessment in practice refers to appropriate or relevant indicators only.

Means and Strategies for Successful Implementation:

Related to process:

- Support the most promising projects through merit-based grants and cooperative agreements to individual researchers and groups throughout the U.S.;
- Engage other federal agencies, national laboratories, and other nations as partners in developing infrastructure by capitalizing and leveraging the human and financial resources of each group;
- Operate a disciplined internal NSF capital planning process, with attention to innovative capabilities and infrastructure needs of the U.S. community served by NSF;
- Ensure that the breadth of community infrastructure needs is examined regularly through workshops, panels, advisory groups, or other mechanisms;
- Continue broad support to the information technology community and members of other core programs involved in innovative applications of cutting-edge IT tools for science and engineering;

- Utilize the NSF core strategies of integrating research and education, promoting partnerships, and developing intellectual capital; and
- Provide grants of sufficient size and duration to improve efficiency and effectiveness.

Related to programs:

- Provide financial support for activities specifically addressing the Tools strategic outcome. For the FY 2002 budget request, this investment totals about \$ 1,024 million. The principal components of this Tools portfolio are investments in research instrumentation and research facilities (capital and otherwise).
- Support programmatic themes for FY 2002 highlighted in the section labeled FY 2002 Areas of Emphasis (detailed below; also see the Summary Table of Performance Goals).
- Develop and support a balanced portfolio that considers disciplines and fields, interdisciplinary research areas, and emerging or “unmet opportunities”; and
- Provide appropriate human and financial resources for development, upgrade, maintenance, and oversight of facilities.

FY 2002 Areas of Emphasis:

- *Investments in Major Research Equipment:* This account provides funding for capital expenditures for the construction and acquisition of major research facilities that provide unique transformational capabilities at the cutting edge of science and engineering. Projects supported by this account are intended to expand the boundaries of technology and offer significant new research opportunities, frequently in completely new directions. Funding for three current MRE projects (LHC, NEES, Terascale) is included in the \$ 96 million for FY 2002. MRE support for FY 2001 was \$121 million.
- *Continued investments in:*
 - > *The Major Research Instrumentation Program (MRI).* Established to improve the condition of scientific and engineering equipment for research and research training in our nation's academic institutions. This program seeks to improve the quality and expand the scope of research and research training in science and engineering, and to foster the integration of research and education by providing instrumentation for research-intensive learning environments. In FY 2002, NSF will provide \$50 million for this program to support the acquisition and development of research instrumentation for academic institutions.
 - > *S&E Information, Reports, and Databases:* The work of NSF's Division of Science Resources Studies (SRS) involves survey development, data collection, analysis, information compilation, dissemination, and customer service to meet the statistical demands of a diverse user community concerning the nation's science, engineering, and technology enterprise. In FY 2002, NSF will provide approximately \$ 16 million (including \$ 2 million for A&M) for this program to support a continuing emphasis on improving the relevance and quality of its data. An advisory committee will assess these activities.
 - > *Scientific databases and tools for using them.* This is a critical component of activity under Information Technology Research, one of NSF's priority areas since FY 2000. Also included in this group of Tools is continued support for the K-16 *National SMETE Digital Library*, which totals about \$ 27 million in FY 2002.

Data / Data Sources and Data Limitations: Included in Section V.

IV. PERFORMANCE GOALS FOR MANAGEMENT

Excellence in managing the agency's processes is an NSF objective on par with the Foundation's mission-oriented outcome goals. The framework for developing the management goals included in this plan was developed from the Strategic Plan, previous performance plans, internal deliberations, and newly developed OMB management reforms. These performance goals address the effectiveness and efficiency of NSF's management activities in support of its mission.

NSF's strategic plan articulates four critical factors in managing for excellence:

- operating a credible, efficient merit review system;
- exemplary use of and broad access to new and emerging technologies for business application;
- a diverse, capable, motivated staff that operates with efficiency and integrity; and
- implementation of mandated performance assessment and management reforms in line with agency needs.

Within this group of NSF management goals is a subset that addresses management reforms which OMB and NSF have agreed to address during FY 2002 (Appendix VII). These reforms covered in this document relate to NSF's ability to:

- document the efficiency of the research process (Goals IV-7a and IV-7b);
- enhance NSF's capability to manage large facility projects (IV-8, IV-9; and IV-10); and
- administer and manage a growing portfolio of program activities (IV-13 and IV-14).

Current goals that address these reforms are noted within the parentheses associated with each reform activity.

The performance goals included in this management section are largely accomplished through the Administration and Management (A&M) function. The FY 2002 budget request for A&M totals \$ 227 million compared to \$ 216 million for FY 2001.

A. PROPOSAL AND AWARD PROCESSES

The goals included within this section focus on merit review, customer service, and broadening participation. Success in achieving these goals is dependent upon factors such as high quality external review, sufficient staff resources and operating expenses, administrative requirements/oversight, and electronic information systems that support the 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 two criteria -- the intellectual merit of the proposed activity and the broader impacts of the proposed activity on society. The two criteria now in place were established by the National Science Board in 1997. 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."

Evaluation of proposals and funding decisions made through the process of merit review rely on expert evaluation by selected peers. Each year, more than 200,000 merit reviews are conducted to help NSF program officers evaluate the proposals submitted for consideration. NSF's merit review process is critical to fostering the highest standards of excellence and accountability—standards for which NSF is known the world over.

Processing of NSF proposals starts with receipt of the proposals by the NSF Proposal Processing Unit. This unit assigns proposals to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal and who have no conflicts of interest. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and also persons who should not review the proposal. These suggestions may serve as an additional source in the reviewer selection process, at the Program Officer's discretion. Program Officers may obtain comments from assembled review panels or from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards and declines. When a decision has been made, verbatim copies of reviews, excluding the names of the reviewers, and summaries of review panel deliberations, if any, are provided to the proposer.

NSF uses the advice of COVs and directorate advisory committees in monitoring some aspects of these performance goals.

- **Performance Area: Use of Merit Review**

FY 2002 Performance Goal IV-1: At least 85% of basic and applied research funds will be allocated to projects that undergo merit review.

The target for this performance goal was revised from 90 percent in FY 1999 and FY 2000 in order to adjust for the revision to the government-wide definition of merit-reviewed scientific research as specified by OMB in FY 2000 (see below). NSF has established an 85 percent target, which is within the 70 percent to 90 percent range suggested by OMB. This performance goal applies to federal science, space, and technology agencies.

DEFINITION:

“Merit-reviewed scientific research with competitive selection and external (peer) evaluation - 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.”

Performance Indicator:	Percent of funds allocated to proposals which undergo merit review.					
	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002
Baseline	85%					
Goal			N/A	80% *	85%	85%
Result		86%	86%	87%	&	&

* The 80% estimated goal, recalculated from NSF's original goal of 90%, is based on the new OMB definition of merit reviewed scientific research.

& = Data not yet available.

Means and Strategies for Success:

- > The vast majority of proposals received by NSF undergo external merit review. The Foundation makes a few exceptions to this general requirement in situations where objective external reviewers may be difficult to find or where timeliness is crucial such as for studies of volcanic eruptions or earthquakes. It also considers exceptions when researchers propose such new ideas that knowledgeable external reviewers do not exist.

Data: Maintained in NSF's Proposal and Award systems.

Comments:

- > FY 2000 Results: Based on NSF's original goal, which included merit reviewed projects as a percentage all NSF funding, the Foundation exceeded the original goal of 90% for FY 1999 and FY 2000 by achieving results of 95% for both years (see section VI. Appendix). FY 2001 results are not yet available.
- > NSF has calculated a new baseline, target level, and results based on OMB's revised merit review definition issued in FY 2000. Using OMB's new definition, which measures merit reviewed scientific research as a percentage of research and development funding, NSF exceeded the estimated 80% goal, reaching 87% for FY 2000. The new OMB merit review definition does not include funds for merit-reviewed scientific research with limited competitive selection (e.g., applicants that are limited to organizations that were created to largely serve Federal missions, such as Federally-Funded Research and Development Centers [FFRDCs]). It does not include merit-reviewed scientific research with competitive selection and internal (program) evaluation (for example, reviews conducted from within the agency program, without additional independent evaluation, such as NSF's Small Grants for Exploratory Research [SGERs]).

- **Performance Area: Implementation of Merit Review Criteria— Reviewers**

FY 2002 Performance Goal IV-2: Reviewers will address the elements of both generic review criteria at a level above that of FY 2001.

Performance Indicator: Percent of reviews using both merit review criteria. This can be assessed with FastLane data. It is also examined with the alternative format by COVs and advisory committees.

Baseline: A baseline will be established in FY 2001.

Means and Strategies for Success:

- > NSF has modified program announcements to encourage proposers to provide information on all relevant aspects of the merit review criteria. NSF has recently re-issued guidance to the applicants and reviewers, stressing the importance of using both criteria in the preparation and evaluation of proposals submitted to NSF.
- > In FY 2001 separate screens were added in FastLane to enable reviewers to address each merit-review criterion separately. Information for this goal will be collected from the FastLane database and reviewed by committees of external experts.

Data: In FY 2002, the Foundation expects most reviews to be submitted to NSF electronically via FastLane. Since there are separate sections for responses to each of the merit review criteria, NSF will be able to track and count reviews that address both criteria.

Comments:

- > On September 20, 1999, NSF issued Important Notice # 125 to Presidents of universities and colleges, encouraging Principal Investigators to address the merit review criterion, “the broader impacts of the proposed activity”, in their proposals and reviews. This criterion addresses 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.

- **Performance Area: Implementation of Merit Review Criteria— Program Officers**

FY 2002 Performance Goal IV-3: Program officers will consider elements of both generic review criteria in making decisions to fund or decline proposals.

Performance Indicator: Percent of review analyses (Form 7s) that comment on aspects of both merit review criteria as determined by directorate or advisory committee sampling. This is currently assessed with the alternative format by COVs and advisory committees.

Baseline: A baseline will be established in FY 2001, and external experts will determine program officer progress in use of both criteria.

Means and Strategies for Success:

- > COVs and advisory committees for each NSF directorate will monitor this performance goal. The advisory committees along with their subcommittees will address questions on implementation of the merit review criteria, using selected samples of reviews that they routinely examine in their judgment of the effectiveness of the review process.

CUSTOMER SERVICE

Customer service has a potential impact on the number and quality of proposals received and thus on NSF’s ability to meet all outcome goals. In 1995, NSF adopted a set of customer service standards, primarily related to the proposal review process, treating 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 program announcements and proposal deadlines, and (3) notification of proposal funding recommendation within six months of proposal submission. The survey measured baseline levels of customer satisfaction, with reference to FY 1995 experiences. The survey was repeated in FY 1999, with similar results.

The FY 2002 performance plan focuses on the latter two of these standards, ones to which NSF staff have devoted special attention since the standards were adopted.

- **Performance Area: Customer Service – Time to Prepare Proposals**

FY 2002 Performance Goal IV-4: Ninety-five percent of program announcements will be available to relevant individuals and organizations at least three months prior to the proposal deadline or target date.

Performance Indicator:	Percent of program announcements and solicitations available at least 3 months prior to proposal deadline or target dates.				
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002
Baseline	66%				
Goal		95%	95%	95%	95%
Result		75%	89%	&	&

& = Data not yet available.

Means and Strategies for Success:

- > The Foundation staff understand that scientists and engineers require sufficient time to prepare outstanding submissions. To encourage new investigators and solicit quality proposals, and based on responses to customer surveys, NSF has agreed to make program announcements and solicitations available at least 90 days prior to the deadline for submission. All programs are strongly encouraged to make their program announcements and solicitations available at least three months prior to submission deadlines.
- > Of the announcements that did not meet the 3-month goal, the most common reason was delays in posting them on the web. NSF has focused its efforts on addressing potential bottlenecks in the announcement posting process. NSF has reviewed and revised the timing of clearance procedures, in order to ensure that web posting of announcements will occur in a timely manner. Additionally, in FY 2000, a web-based system for creating program announcements was put in place. The Program Announcement Template System (PATS) has decreased the time required for an announcement to be posted on the NSF web site, which will aid the agency in achieving this goal.
- > In an effort to improve accuracy of data on the time available for PIs to prepare proposals (web posting to deadline), NSF is enhancing its tracking system. The Foundation is developing a Program Information Management System (PIMS), which is a relational database designed to collect information and track the progress of publications such as program announcements and solicitations created in the PATS.
- > NSF staff work toward this performance goal by limiting the number of special competitions requiring individual program announcements and solicitations at any given time, planning for such competitions as far in advance as possible, and initiating clearance processes at least six months prior to the anticipated proposal deadlines.

Data: Data on the date of release and the deadline date for each announcement is maintained in NSF's Online Document System.

- **Performance Area: Customer Service – Time to Decision**

FY 2002 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 receipt.

Processing proposals within six months of receipt has been a challenging goal for NSF. NSF's long-term goal continues to be processing 95 percent of proposals within six months.

Performance Indicator: Percent of proposals processed within 6 months of receipt.						
	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002
Baseline	61%					
Goal			70%	70%	70%	70%
Result		59%	58%	54%	&	&

& = Data not yet available.

Means and Strategies for Success:

- > The Foundation is currently reviewing the situation to see what, if any, processing measures can be changed in order to facilitate the Foundation meeting this goal. Factors that may come into play in the decision-making process include the preference of some programs at NSF to use mail review rather than panel review. Mail review tends to take longer to complete. Another factor is that programs tend to hold some highly rated proposals until the end of the fiscal year or even into the next fiscal year, in anticipation that more funds might become available. (Some directorates are now considering that proposals should not be held over.) A third factor is that processing of international and cross-directorate awards takes more time.
- > Some divisions have added "performance on prompt handling of proposals" to their performance evaluation criteria for program managers.
- > NSF staff will work towards shortening the award process time by making more effective use of electronic mechanisms in conducting the review, working cooperatively to eliminate overloads and bottlenecks and carefully tracking the stage of processing and age of all proposals.

Data: Maintained in NSF's Proposal and Award systems.

Comment: FastLane captures the closing date for all proposals submitted in response to a program announcement or solicitation. The closing date may be a deadline or a target date. The start date for measuring the dwell time for these proposals would be the closing date or the date of receipt at NSF, whichever is more recent. If no closing date exists, the receipt date will be used. A proposal has been processed and a decision made when it has attained electronic division director concurrence.

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. Congress has enacted legislation giving NSF explicit responsibility for addressing issues of equal opportunity in science and engineering. This assignment of responsibility reflected the serious underrepresentation of women, minorities, and persons with disabilities in the science and engineering workforce, underrepresentation that persists to this day, although some progress has been made.

Recognizing that progress toward all outcome goals for research and education requires maximum diversity of intellectual thought, NSF is focusing its attention on enhancing the participation of groups currently underrepresented in science and engineering in all its programs. In order to realize this increased participation, and so contribute to the development of a dynamic, diverse, human resource pool in science and engineering, over the next decade NSF seeks to:

- Increase the participation of scientists and engineers from underrepresented groups in NSF's merit review process;
- 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 this plan, we have focused on the first and the last of these processes.

- **Performance Area: Diversity— Reviewer Pool**

FY 2002 Performance Goal IV-6: Establish a baseline for participation of members of underrepresented groups in NSF proposal review activities.

Means and Strategies for Success:

- > Seek voluntary demographic data from all reviewers electronically;
- > Collect data on potential reviewers from professional associations and institutions serving groups that are underrepresented in science and engineering – e.g., including women, persons with disabilities, underrepresented minorities, and individuals in underserved institutions;
- > Provide a continuing opportunity, e.g., on the NSF web site, for would-be reviewers to identify themselves and volunteer to be reviewers;
- > Inform Program Officers of the availability of the new reviewers;
- > Encourage members of underrepresented groups in SMET fields to participate in the NSF merit review process either as a reviewer or panel member; and
- > Encourage increased participation of members of underrepresented groups in NSF conferences and workshops where they may come into contact with NSF program staff.

Data: Information on reviewers will come from activities developed as part of the implementation of this performance goal in FY 2001 and FY 2002.

B. Award Portfolio

A balanced award portfolio assures NSF's success in attaining or progressing toward its strategic outcomes. The diverse set of investments made across the Foundation provides the basis for new and important discoveries, while promoting the development of a base of knowledge and techniques utilized within and across traditional disciplinary boundaries. A judicious mix of the kinds of projects, in the long run, proves more effective in attaining the Foundation's broad strategic outcomes than concentrating on a single type of project. Fifty years of promoting the progress of science demonstrates it is not always possible to predict the next "hot" field, nor which institution or facility will foster the next breakthrough. Many years of knowledge-building, paradigm-confirming science may be necessary before a field is ready to leap forward.

The majority of NSF’s portfolio characteristics are assessed by external experts participating in COVs and advisory committees. This includes qualitative aspects such as the integration of research and education, openness in the system - through the support of new investigators - and appropriate balance of high risk, multi-(inter-) disciplinary and innovative projects. Several quantifiable aspects - such as award size and duration are examined in the two quantitative goals that follow.

- **Performance Area: Award Size and Duration**

In FY 2002, NSF will continue efforts to address the Foundation-wide concerns about research grant size and duration – this priority is highlighted in NSF’s Strategic Plan and is one of OMB’s new management reform activities for NSF. Adequate award size and duration are important both to obtaining high quality proposals and to ensuring that proposed work can be accomplished as planned.

NSF has asserted that the current size of its grants and their duration might result in an inefficient research process at U.S. academic institutions. Increased award size and duration would presumably enable scientists and engineers to devote a greater portion of their time to productive research rather than preparing proposals. OMB has asked the agency to develop metrics to measure the efficiency of the research process and determine the “right” size grant for the myriad types of proposals that the Foundation funds. (Appendix VII; section A).

Given adequate funding, the Foundation’s current target is to increase the average annualized award size for research grants to \$150,000 by FY 2005; and to increase award duration to 4 years by FY 2005. Because the increases are budget-dependent, the award size and/or duration targets may fluctuate.

These performance goals are applicable only to competitive research grants (a subset of awards that focuses on awards to individual investigators and small groups).

FY 2002 Performance Goal IV-7a: NSF will increase the average annualized award size for research projects to a level of \$113,000, compared to a goal of \$110,000 in FY 2001.

Performance Indicator:		Average annualized award size.				
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	
Baseline	\$90,000					
Goal				\$110,000	\$113,000	
Result		\$94,000	\$105,800	&	&	

& = Data not yet available.

FY 2002 Performance Goal IV-7b: NSF will maintain the FY 2001 goal of 3.0 years for the average duration of awards for research projects.

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

& = Data not yet available.

Means and Strategies for Success:

- > NSF staff work toward these performance goals by carefully examining the resources and time needed to complete the work proposed, using the guidance of reviewers as needed.
- > NSF staff also use electronic monitoring systems to keep track of average award size and duration and to modify funding strategies as needed.
- > Targeted solicitations – increased award size for the priority areas, focused competitions, and other programs.

Data: Maintained in NSF's Proposal and Award systems.

C. AWARD OVERSIGHT AND MANAGEMENT

As NSF seeks to achieve its goals, increasingly more complex projects -- many utilizing large infrastructure components -- are being initiated. At present, approximately 23% of the NSF research budget is allocated to the support of facilities. About \$96 million is requested for the Major Research Equipment (MRE) account in FY 2002. Review and management of these large MRE projects are currently guided by the draft document "Interim Guidelines for Planning and Managing Major Research Equipment Account Programs."

Management of large facility projects is an area highlighted in the OMB reforms for NSF. OMB notes that NSF's capability to manage multi-year, large facility projects needs to be enhanced, even though the agency has done well in keeping past projects on schedule and on budget. OMB has asked that NSF submit a plan* that documents its plans for costing, approval, and oversight of major facility projects. The plan should include information on how NSF intends to enhance its capability to estimate costs and provide oversight of project development and construction.

The two sections below highlight aspects of NSF award oversight and federal guidelines for construction and operations of large multi-user facilities.

- **Performance Area: Award Oversight**

The emphasis of this performance area is on award oversight. At any given time, NSF has approximately 30,000 active awards in its portfolio, including grants, cooperative agreements, contracts, and interagency activities. Of this number, the agency makes 10,000 new awards annually. The volume of awards and increases in the agency's budget require improvement in the management of effective award monitoring.

NSF's current internal control activities on awards include grant policy reviews, awardee and staff assistance outreach, and both desk and on-site monitoring reviews. All controls are aimed at reducing potential problems through the pre-award, award and post-award administration continuum.

In FY 2002, to better focus award-monitoring efforts, NSF is developing a risk assessment protocol focused towards on-site monitoring efforts. A new position was created to provide a focus for award monitoring. A primary responsibility of the incumbent in this position is to develop a risk-based review approach for all NSF awardees and projects. NSF's intent is to maximize the effectiveness of available award monitoring resources by focusing on awards identified as having significant risk.

The award monitoring expert will work in conjunction with the Deputy, Large Facilities Projects, in the Office of Budget, Finance, and Award Administration and will participate in the development of Total

* Update: NSF has recently completed a Large Facility Projects Management and Oversight Plan and submitted it to OMB in September 2001.

Business System Review protocols for on-site reviews of NSF's major awards. Staff in the Division of Grants and Agreements, working with program directors, will be charged with defined business oversight responsibilities for the major investment activities of the Foundation.

FY 2002 Performance Goal IV-8: NSF will develop and initiate a risk assessment / risk management plan for awards.

Baseline: No baseline exists. This is a new performance goal for FY 2002.

Performance Indicators:

- > Development of an appropriate risk assessment model.
- > Development of an effort analysis to determine necessary resource allocation (personnel, travel, and training).
- > Completion of a pilot program testing the risk assessment monitoring tools at several high-risk awardee institutions.

Means and Strategies for Success:

- > Develop a risk assessment protocol and monitoring plan based on risk factors identified within the Foundation.
- > Use award data to identify a subset of those awards with a high risk potential.
- > Conduct a pilot of the risk assessment protocols to test our assumptions.

Data/Data Source: The risk assessment protocol will be printed and distributed to staff who will conduct the on-site monitoring activities. Award data will be analyzed to identify the pilot institutions that will be visited. The institutions identified in the pilot program will be visited in FY 2002. In FY 2003, trip reports will be assessed to determine if additional risk criteria should be added to the protocol.

Data Limitations: None identified.

Comments:

- > The development of the risk assessment protocol and monitoring plan is in the nascent stages of development and may be revised based on the results of the pilot testing program.
- > After the initial pilot testing, the plan is to increase the award base that will be reviewed based on refinement of the risk assessment levels.

• **Performance Area: Facility Construction/Operations**

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. Such facilities often test the limits of technological capability, and planning must take into account the exploratory nature of the facilities themselves. NSF consults with other agencies to avoid duplication and optimize capabilities for American researchers. It cooperates with other agencies in construction of facilities, where it will facilitate use across broad communities of researchers. Many major facilities involve international cooperation.

NSF provides funding for the construction and acquisition of major research facilities that provide unique capabilities at the cutting edge of science and engineering. The Foundation has provided construction funds for only a few facilities – typically such facilities cannot be duplicated at more than one site. NSF puts a high premium on professional initial planning for construction and upgrade of facilities.

Facilities must also operate efficiently and reliably and must offer appropriate opportunities if they are to be valuable to those they serve. NSF program officers work closely with facility directors to ensure that the facilities have appropriate resources to conduct operations and to provide maintenance support that ensures reliable operations.

The facility goals included in this section (IV 9 – 10) are organized in two categories -- Construction and Upgrade of Facilities, and Operations and Management of Facilities -- using earlier guidance given to Federal science, space and technology agencies (National Science Foundation, National Aeronautics and Space Administration, Department of Energy). The means and strategies, data, and comments sections below apply to all of the facilities goals. In the discussions for several goals below, note that NSF has established successful performance at the 90% level. The government-wide function 250 goal is for all facilities.

Baseline: Results from FY 1999 provide the baseline for all facilities goals until FY 2001. Changes implemented in FY 2001 are discussed below.

- The annual “within cost” goal for FY 2002 has been revised slightly so that when at least 90 percent of facilities meet the federal standard, the goal is considered achieved. This change was made because NSF places great importance on accurate planning for construction and upgrade of facilities, but we recognize that the unique, state-of-art projects being supported stretch the limits of technological capability. As a result there may be unforeseen expenditures. NSF expects that the vast majority of its projects will be within budget. However, it does not believe the agency should be considered unsuccessful overall in these areas if a small percentage of facilities are unable to meet the goal. Therefore, to provide the flexibility necessary for NSF to report realistic and achievable goals, we are reestablishing the level deemed “successful” at 90% of the facilities. This change will be evaluated over time to determine if 90% is the appropriate level for these goals.
- The annual “on schedule” goal has also been slightly revised so that NSF considers itself “successful” if ninety percent of the facilities meet all annual milestones by the estimated completion date. This change was made because NSF places great importance on accurate planning for construction and upgrade of facilities, but we recognize that the unique, state-of-art projects being supported stretch the limits of technological capability. As a result there may be unexpected construction delays. NSF expects that the vast majority of its projects will be on schedule. However, it does not believe the agency should be considered unsuccessful overall in these areas if a small percentage of facilities are unable to meet the goal. Therefore, to provide the flexibility necessary for NSF to report realistic and achievable goals, we are reestablishing the level deemed “successful” at 90% of the facilities. This change will be evaluated over time to determine if 90% is the appropriate level for these goals.
- The “operating time” goal has also been revised from 100% to 90% because NSF recognizes that some facilities may have a failure rate greater than 10%, but that this is balanced overall by facilities that operate more reliably. NSF expects that the vast majority of facilities will keep operating time lost due to unscheduled downtime to less than 10% of the operating time. We do not believe the agency should be considered unsuccessful if a small percentage of the facilities are unable to meet this goal. Therefore, to provide the flexibility necessary for NSF to report realistic and achievable goals, we are reestablishing the level deemed “successful” at 90% of the facilities. This change will be evaluated over time to determine if 90% is the appropriate level for these goals.

Means and Strategies for Success:

For all facilities goals:

- > Careful planning ensures that construction and operating plans are realistic and contain needed contingency funds.

- > NSF Program Officers work closely with the project directors to ensure that performance goals can be met.
- > Where potential problems are identified, the program officer will immediately inform the NSF-wide team assigned to that project so that all appropriate actions can be taken to keep construction projects within cost and schedule and to maintain operating schedules to the extent possible.
- > External factors such as extremely adverse weather or failure of partners to act as planned can have a significant effect on construction projects and operating plans.

Data: In order to report on the government performance goals related to Facility Operations and Construction and Upgrades, in FY 1999 NSF initiated development of a new Facilities Reporting System, which is linked to the Performance Reporting System, a module of the existing FastLane system. The module is used to collect information on operations and construction from Facilities Managers external to NSF. As is the case with any new data collection effort, we expect the quality of the information provided to improve from year to year as managers gain experience with gathering and reporting the required data. This system was available for full use early in FY 2001.

- **Performance Area: Construction and Upgrade of Facilities**

NSF puts a high premium on initial planning for construction and upgrade of facilities that is thorough and professional. Every year, in its Budget Justification to Congress, NSF sets out a cost plan and schedule for major construction and upgrade projects currently underway or planned for initiation in the Major Research Equipment account. Cost plans and schedules are also developed for other construction and upgrade projects funded through the Research and Related Activities account. NSF has established performance goals and measurements with respect to these plans and expects each construction and upgrade activity to meet them.

FY 2002 Performance Goal IV-9a: For ninety percent of facilities, keep construction and upgrades within annual expenditure plan, not to exceed 110% of estimates.

Performance Indicator: Comparison with planned annual costs.				
	FY 1999	FY 2000	FY 2001	FY 2002
Goal	Keep construction and upgrades within annual expenditure plan, not to exceed 110% of estimates.	Keep construction and upgrades within annual expenditure plan, not to exceed 110% of estimates.	For 90% of facilities, keep construction and upgrades within annual expenditure plan, not to exceed 110% of estimates.	For 90% of facilities, keep construction and upgrades within annual expenditure plan, not to exceed 110% of estimates.
Result	Majority of projects were within 110% of estimates.	11 of 11 (100%) projects were within 110% of estimates.	&	&

& = Data not yet available.

FY 2002 Performance Goal IV-9b: Ninety percent of facilities will meet all major annual schedule milestones.

Performance Indicator: Comparison with planned annual schedule.				
	FY 1999	FY 2000	FY 2001	FY 2002
Goal	Keep construction and upgrades within annual schedule, not to exceed 110% of estimates.	Keep construction and upgrades within annual schedule, not to exceed 110% of estimates.	Ninety percent of facilities will meet all major annual schedule milestones by the end of the reporting period.	Ninety percent of facilities will meet all major annual schedule milestones.
Result	Majority of projects were within 110% of estimates.	7 of 11 (64%) of projects were within 110% of estimates.	&	&

& = Data not yet available.

FY 2002 Performance Goal IV-9c: For all construction and upgrade projects initiated after 1996, when current planning processes were put in place, keep total cost within 110 percent of estimates made at the initiation of construction.

Performance Indicator: Comparison with planned total cost.				
	FY 1999	FY 2000	FY 2001	FY 2002
Goal	For all construction and upgrade projects initiated after 1996, keep total cost within 110% of estimates made at the initiation of construction.	For all construction and upgrade projects initiated after 1996, keep total cost within 110% of estimates made at the initiation of construction.	For all construction and upgrade projects initiated after 1996, keep total cost within 110% of estimates made at the initiation of construction.	For all construction and upgrade projects initiated after 1996, keep total cost within 110% of estimates made at the initiation of construction.
Result	No projects completed.	No projects completed.	&	&

& = Data not yet available.

- **Performance Area: Operations and Management of Facilities**

FY 2002 Performance Goal IV-10: For 90 percent of facilities, keep operating time lost due to unscheduled downtime to less than 10 percent of the total scheduled operating time.

Performance Indicator: Comparison with scheduled operating time.				
	FY 1999	FY 2000	FY 2001	FY 2002
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% of facilities, keep operating time lost due to unscheduled downtime to less than 10 percent of the total scheduled operating time.	For 90% of facilities, keep operating time lost due to unscheduled downtime to less than 10 percent of the total scheduled operating time.
Result	Majority of facilities successful.	22 of 26 (85%) of facilities successful.	&	&

& = Data not yet available.

In FY 2000, NSF did not achieve this goal because “success” was defined as 100% of facilities would meet this goal.

D. NSF BUSINESS PRACTICES *

A state-of-the-art communications and technology infrastructure has been essential to NSF’s success in managing an increasing workload. This investment also provides incentives for the recruitment and retention of high quality employees. Activities underway or under consideration include:

- continuing experimentation with new means to do business electronically;
- active leadership among federal agencies in doing business electronically;
- active leadership in government/university forums for addressing business practices;
- testing in contained situations;
- training for staff;
- development of implementation plans involving all parts of NSF and issuance of Important Notices to institutions;
- movement to full implementation in cooperation with proposers, reviewers, and staff.

To increase the number of formal forums where NSF may obtain recommendations that can be used to inform management on both short-term and visionary workplace issues, the Foundation is considering:

- establishing a Business and Operations Advisory Committee to provide broad-based external support and guidance for the business and operations side of the agency. This new NSF Advisory Committee would provide recommendations to the Office of Budget, Finance and Award Management and the Office of Information and Resource Management. Activities to create this committee will begin in FY 2001 and the Committee is expected to be fully operational with two formal meetings per year beginning in FY 2002.

* Update: In FY 2002, the agency will initiate a comprehensive Strategic Business Analysis, the outcomes of which will inform A&M investments for the foreseeable future. Specifically, the Analysis will define the strategic relevance of each *Business Process* and its contribution to the NSF mission; develop five-year process scenarios and criteria for success; define efficiency and effectiveness improvements that leverage past experience and emerging trends; define *Human Capital* competencies needed for current and future work strategies and approaches; and identify *Enabling Technology* (knowledge bases, technologies and tools) that assure an innovative, flexible, and adaptive organization.

- utilization of a research organization to review one or more aspects of the operation of NSF. It is envisioned that the Office of Information and Resource Management will form a partnership with a research organization - the NSF Digital Government Program or another Government agency - to provide research into one or more aspects of NSF's operation. Workshops comprised of external experts, working with internal staff to analyze a specific area, will provide the means for effecting this type of review. The process may include determining best practices world-wide, or an analysis of burgeoning and future technologies that may be incorporated into current or future processes.

• **Performance Area: Electronic Business**

NSF is the only federal agency currently receiving proposals electronically as a standard operating procedure. Its web-based interface with grantee institutions, termed FastLane, was built through collaborations involving both NSF staff and the research and education communities. NSF has continued to expand use of FastLane and other "e-business" technologies, with the ultimate goal of creating a largely electronic environment from submission of proposal through final project closeout. Establishing an internal paperless process is a many-year effort, requiring an overhaul of previous methodologies that were primarily paper-based. Over the next several years we will test and implement various aspects of paperless processing, with the goal of establishment of an Electronic Jacket (E-Jacket).

FY 2002 Performance Goal IV-11: NSF will continue to advance the role of "e-business" in review, award, and management processes.

Performance Indicator: NSF will double the FY 2001 number of paperless projects that manage the competitive review process in an electronic environment.

Compared to results of the FY 2001 pilots, the competitive review process will be broadened to include additional and more complex NSF programs, as well as to encompass e-signatures which is a key step towards development of the Electronic Jacket.

Performance Indicator:	Number of competitions where the review process is conducted in an electronic environment.	
	FY 2001	FY 2002
Baseline		
Goal	10	20
Result	&	&

& = Not yet available.

Means and Strategies for Success:

- Continue experimentation with paperless processes in selected competitions.
- Improve and market FastLane ease of use through outreach programs.
- Pilot web enabled E-Jacket.

Comments:

- NSF has experimented with paperless processes in selected competitions. By the end of FY 2000, NSF's goal was to have the technological capability of taking competitive proposals submitted electronically through the entire proposal and award/declination process without generating paper within NSF. This goal was not achieved due to lack of electronic signature capability. During FY 2001, NSF initiated projects designed to enable piloting full electronic submission/ processing.

- Some small, focused competitions have been managed largely through paperless processes.
- The results from the 10 paperless pilots in FY 2001 should generate information to serve as a springboard for future, more comprehensive electronic processing initiatives.

External factors:

- Many reviewers are not comfortable receiving proposals for review electronically. In order to assure a credible, reliable review process, it is important to provide paper copies of proposals for reviewers who request them.

Data: The Office of Information and Resource Management has developed a checklist for documenting usage of paperless pilots. Data will also be verified through various automated systems.

- **Performance Area: Government Information Security Reform**

On October 30, 2000, the President signed into law the FY 2001 Defense Authorization Act (P.L. 106-398) including Title X, subtitle G, "Government Information Security Reform." It amends the Paperwork Reduction Act (PRA) of 1995 by enacting a new subchapter on "Information Security." The Act primarily addresses the program management and evaluation aspects of security. The Act requires: 1) annual agency program reviews; 2) annual Inspector General (IG) evaluations; 3) agency reporting to OMB the results of IG evaluations; and 4) an annual OMB report to Congress summarizing the materials received from agencies. Agencies will submit this information as part of the budget process. One of the provisions requires that each agency must include in their performance plan a description of the implementation of the agency-wide security program.

FY2002 Performance Goal IV-12: NSF will implement an agency-wide security program in response to the Government Information Security Reform Act.

Baseline: This is a new goal for FY2002.

Means and Strategies for Success:

Following current guidance (including the Government Information Security Reform Act of 2000, OMB Circular A-130) and GAO FISCAM Audit Guide, NSF's security program planning and management will include the following:

- > Conduct risk assessments of all mission critical systems and certify for operation;
- > Publish policies documenting security program;
- > Establish a security management structure and assign security responsibilities; and
- > Incorporate security related issues into personnel policies and provide ongoing training of staff.

Performance Indicators:

- > Risk assessments and certification to operate will be documented and retained.
- > Policies will be developed and disseminated.
- > Security management structure will be implemented.
- > Security related changes to personnel policies (as necessary) will be documented.

Comments:

In conjunction with the Office of the Inspector General, an annual review of the security program will be conducted.

E. HUMAN RESOURCES AND WORKPLACE

The NSF Strategic Plan notes that “a diverse, capable, motivated staff that operates with efficiency and integrity” is a critical factor for NSF success. The Foundation has a long history of being at the forefront in providing a work environment conducive to supporting and motivating its staff. This section addresses agency activities as they relate to NSF human resources and workplace issues. This area of emphasis overlaps with another of the OMB reforms -- NSF’s ability to administer and manage a growing portfolio of program activities. Components of this activity include staffing and resource management, program management, and systems and data management (Appendix VII).

A major contribution that will guide the future of NSF’s effort in this area will be a 5-year workforce strategic plan currently under development. This planning study will be submitted to OMB no later than July 20, 2001.*

- **Performance Area: NSF Staff — Diversity**

In order to increase the diversity of the U.S. science and engineering workforce, it is particularly important that NSF Program Officers exemplify that diversity. Yet this is the segment of the NSF workforce that shows the highest levels of underrepresentation of women, those minority groups underrepresented in science and engineering careers, and persons with disabilities. Realistic goals for closing that gap vary across research and education areas. The most important link in the recruitment chain may be finding and attracting appropriate candidates to NSF.

FY 2002 Performance Goal IV-13: NSF will show an increase over FY 2000 in the total number of hires to NSF science and engineering positions from underrepresented groups.

Indicator: Total number of hires to S&E positions from under-represented groups.						
	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002
Baseline	16 women / 15 members of under-represented minority groups were hired	N/A	N/A			35 women / 19 members of under-represented minority groups were hired
Goal		N/A	N/A	Increase over FY 1997 baseline in total number of hires.	Increase over FY 1997 baseline in total number of hires.	Increase over FY 2000 baseline in total number of hires.
Result				35 women / 19 members of under-represented minority groups were hired	&	&

& = Data not yet available.

* Update: Human capital issues are now included as a component of the agency’s 5-year Administration and Management Strategic Plan. NSF submitted its most recent draft of this document to OMB in December 2001.

Means and Strategies for Success:

- > NSF will encourage members of underrepresented groups to apply for NSF science and engineering positions through increased outreach efforts including targeted advertising, attendance at job fairs, and site visits to minority institutions and organizations.
- > NSF will also create a registry for minorities interested in serving on advisory committees and panels, which are major pipelines for recruiting rotators and visiting scientists.

Data: Trend data on both the actual number of hires to S&E positions and the aggregate numbers of underrepresented group members in the NSF S&E workforce are to be maintained by the Division of Human Resources Management. Over time, NSF expects to see a positive trend both in the number of new hires and in the total number represented in the S&E workforce.

Comments:

- > In FY 1999, NSF demonstrated efforts to attract applicants from groups that are underrepresented in the science and engineering staff compared to their representation among Ph.D. holders in their fields.
- > Results: The FY 2000 goal was achieved. NSF met its goal of exceeding the total number of 1997 S&E hires (16 women and 15 members of underrepresented groups).

- **Performance Area: Workforce Training**

NSF has developed a 5-year Administration and Management Strategic Plan (December 2001) to guide its future investments in human capital. It describes the agency's commitment to provide a continuous learning environment for its workforce. The agency's existing workforce development programs and other learning activities are being integrated into a strategically designed learning system that supports a performance culture and capitalizes on its technology-enabled business environment.

FY 2002 Performance Goal IV-14: NSF will establish an internal NSF Academy to promote continuous learning for NSF staff.

Performance Indicator: Availability of new or revised courses that contribute to an organized curriculum for NSF staff.

Baseline: This is a new goal in FY 2002.

Means and Strategies for Success:

- > Obtain input about needs from NSF employees at all levels;
- > Establish an NSF Planning Group comprised of NSF staff to obtain input and provide guidance and an NSF-wide perspective;
- > Implement recommendations from the Program Management Seminar Report, in conjunction with guidance from the Program Management Seminar Advisory Group;
- > Initiate and regularize seminars by industry and government leaders designed to inform NSF about short-term and visionary workforce issues;
- > Pilot e-learning.

Data: Employee input (focus groups or surveys), the workforce planning report, internal NSF course catalogues, and the course content for the Program Management Seminar.

The **second of NSF's workforce goals** for FY 2002 focuses on a multi-year strategic business analysis* that will be initiated in FY 2002. Among other objectives, this analysis will define Human Capital competencies needed for current and future work strategies and approaches. Driven by a constantly-expanding science and engineering frontier, fundamental changes in NSF business processes and practices, and by the potential retirement of an experienced generation of NSF staff, it will be one of the agency's most critical undertakings in the near-term.

FY 2002 Performance Goal IV-15: NSF will initiate a strategic business analysis to provide a comprehensive perspective on its future workforce requirements.

Performance Indicators:

- > Request for Proposals (RFP) to perform the strategic business analysis will be released.
- > Skill mix/competencies of the current NSF workforce will be examined.

Baseline: This is a new goal in FY 2002.

Means and Strategies for Success:

- > Identify emerging workforce needs.
- > Work collaboratively with the NSF Academy to address training needs and skill development.

Data: Availability of released RFP. Formal documentation developed during analysis.

• **Performance Area: NSF Staff— Work Environment**

During FY 2001 NSF initiated plans to develop and implement an organizational assessment tool to develop meaningful data on the NSF work environment. This survey, when implemented and analyzed, will provide the Foundation with data and baselines needed to set specific goals for the future. NSF aims to improve the workplace environment, enhance employee potential and promote higher performance. NSF management, supported by the Human Resources Management Division and the Office of Equal Opportunity will develop activities related to this employee survey.

FY 2002 Performance Goal IV-16: NSF will establish various baselines that will enable management to better assess the quality of worklife and work environment within the Foundation.

Performance Indicator: Development of an employee survey.

Baseline: This goal was not achieved in FY 2001.

Means and Strategies for Success:

- > NSF will develop, distribute and analyze results of an employee survey.

Data: Employee surveys will be used to capture information on this goal. A number of work environment indicators and employee attitudes will be identified through this effort.

Comments: NSF's intent with this goal is to improve the workplace environment, enhance employee potential and promote higher performance.

* Update: Included in the agency's newly developed 5-year A&M Strategic Plan (December 2001).

V. VERIFICATION AND VALIDATION – COLLECTION, REPORTING, AND VALIDATION OF PERFORMANCE INFORMATION

A. DATA COLLECTION, VERIFICATION, AND VALIDATION

The data used in reporting NSF's success in achieving its goals are of two types. *Qualitative* output and outcome information, collected and reported using the alternative form allowed by the Act, is used to assess the Outcome Goals and the implementation of the two merit review criteria goals. *Quantitative* data collected through electronic systems are utilized for the performance target levels of the Management Goals. Options for grading the Foundation are limited to successful or not successful.

NSF expects to use a process similar to the one used in FY 2000 to verify and validate selected FY 2001 GPRA performance information. In FY 2000, the Foundation engaged an external third party, PricewaterhouseCoopers LLP (PwC), to verify and validate selected FY 2000 GPRA performance data as well as the process through which supporting data was compiled. In their final reports, PwC concluded that NSF was reporting its GPRA measures with "sufficient accuracy such that any errors, should they exist, would not be significant enough to change the reader's interpretation as to the Foundation's success in meeting the supporting performance goal...." Furthermore, PwC concluded that NSF "relies on sound business processes, system and application controls, and manual checks of system queries to confirm the accuracy of reported data. We believe that these processes are valid and verifiable." For the Outcome Goals, PwC verified and validated the goal achievement data tables.

DATA RELATED TO GOALS FOR STRATEGIC OUTCOMES:

The data / information shown below provide a foundation for the formal GPRA alternate-form assessments conducted by external experts such as COVs and ACs. The data are included in the PI project reports (annual and final – submitted through the Project Reporting System), program/division/directorate annual reports, agency internal collections, formal external evaluations or special studies, press releases, scientific publications, or internal/external information systems. They are aggregated by NSF staff and made available to the external assessment committees.

- **Data/Information on People :**
Example 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 workforce; numbers and quality of educational models, products and practices; number and quality of teachers trained; and student outcomes including enrollments in mathematics and science courses, retention, achievement, and science and mathematics degrees received.
- **Data/Information on Ideas:**
Examples include results, published and disseminated; journal publications, books, software, audio or video products; 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.

Data/Information on Tools:

Examples include 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.

To encourage cooperation, NSF has worked with the university community to minimize the added reporting and assessment burden so as to encourage cooperation. This is important to having a viable performance report for NSF. More direct efforts to verify and validate information in the Project Reporting System would add significantly to the cost and to the burden on the grantee community.

DATA RELATED TO MANAGEMENT GOALS:

Most of the data supporting management goals can be found in the NSF's central systems. 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/IRM) maintains information related to staff recruitment and staff training, under the guidance of the Chief Information Officer. Office of Equal Opportunity Programs databases are also available for reporting purposes.

B. DATA/INFORMATION SOURCES AND LIMITATIONS

The sources of data used in the performance report are organized into sections on Strategic Outcomes and Management, and also according to goal.

For outcome goals, the collection of qualitative data during assessment may be influenced by factors such as a lack of long-term data to assess the impact of outcomes, the potential for self reporting bias, the unpredictable nature of discoveries, and the timing of research and education activities. For the quantitative management goals, the assessment may be influenced by accuracy of data entry into central computer systems, lack of experience in using new reporting systems or modules, or individual non-responsiveness (e.g., self-reporting of diversity information; workplace surveys).

COV and AC reports may lack sufficient justification for ratings or may provide incomplete information. To address this issue NSF is continuing to modify its reporting templates and improve guidance to committees and staff in order to improve the completeness and consistency of the reports. This will aid NSF in compiling qualitative information. Additionally, NSF has focused on clarifying language in goal and indicator statements.

In addition, a new COV data project will substantially improve the quality, consistency and availability of data, reports and charts that are used by NSF advisory committees. These committees, in addition to providing advice to the NSF organization, provide assessments used in NSF's annual GPRA reporting. Currently, each NSF organization produces its own reports and charts for each of its committees. In this project, the reports will be generated centrally to reduce costs and improve quality and consistency across all NSF. The initial planning for the project begins in FY 2001 with the majority of the implementation to be completed in FY 2002. The project will be completed early in FY 2003.

SOURCES AND LIMITATIONS FOR DATA/INFORMATION ON STRATEGIC OUTCOMES

The performance results for Strategic Outcome Goals are tabulated from reports collected from all areas of NSF, as prepared by committees of external experts (COVs and ACs). Results for each goal are aggregated across the agency and compared with expected performance according to how the goal is stated.

STRATEGIC OUTCOMES	DATA/INFORMATION SOURCES	DATA LIMITATIONS
<p>People</p> <p>Ideas</p> <p>Tools</p>	<p>External reports from awardees; independent assessments and third-party evaluations, including COV reports and advisory committee (AC) reports using alternative form; The specific data/information that provides part of the basis for COV and AC reporting are discussed in Section V, part A.</p>	<p>Non-quantitative information requires judgment of experts; basis for judgment not always evident; substance and timing of outcomes from research and education activities are unpredictable; external databases not under central quality control; long-term data needed to assess impact of outcomes; potential for self-reporting bias; process to collect and aggregate data needs improvement.</p> <p>NSF's electronic Project Reporting System: NSF anticipates that the completeness and reliability of the information will improve over time, as investigators and institutions become increasingly comfortable with its use. FY 1999 was the first year of its full implementation. Electronic submission of project reports was required in FY 2000.</p>
<p>K-12 Systemic Activities: After three years of NSF support, over 80% of schools participating in a systemic initiative program will implement a standards-based curriculum in science and mathematics with at least one-third of their teachers; provide professional development for at least one-third of their teachers; and improve student achievement on a selected battery of math and science tests at one or more of three educational levels (elementary, middle and high school).</p>	<p>Internal and external information systems and external studies; independent assessments and evaluations, including COV and AC reports.</p>	<p>Additional research and analysis are required to further understand the impact of K-12 educational interventions. Also, strategies are needed to facilitate more effective data reporting and documentation. In response there is interaction with districts to facilitate more effective data reporting and use. Third party evaluations and research studies are being conducted to enhance assessment and interpretation of quantitative results and to address issues of attribution. Collection of academic achievement information is limited to those schools that utilize the same assessments systems over a three-year period.</p>

SOURCES AND LIMITATIONS FOR DATA/INFORMATION ON MANAGEMENT GOALS

Internal databases are maintained to collect, verify, and validate data pertaining to management goals. These goals are relevant to the means and strategies used by NSF to support the outcome goals and the processes by which NSF shapes its portfolio of awards. They are also relevant to use of new and emerging technologies, training of NSF staff, and implementation of management reforms to improve service to NSF's customers.

GOAL	DATA / DATA SOURCES	DATA LIMITATIONS
IV-1: Use of Merit Review	Maintained in NSF's Proposal, PI and Reviewer System (PARS), Award System and Financial Accounting System	Possibility of funds not being properly assigned to basic/applied categories.
IV-2: Implementation of Merit Review Criteria – Reviewers	Reviews from external sources submitted via FastLane contain separate sections for assessments relative to each merit review criterion; External experts will also assess.	FastLane statistics do not provide qualitative information on the content of reviewer responses to each criterion. COVs and ACs may incompletely or inadequately address the issue in their reports.
IV-3: Implementation of Merit Review Criteria – Program Officers	Assessment of aggregate NSF performance is based on COV and AC reviews.	Proposals may not contain adequate information on the broader impacts of the proposed activity. COVs and ACs may incompletely or inadequately address the issue in their reports.
IV-4: Time to Prepare Proposals	A record of the date of release and the deadline date for each announcement is currently maintained in NSF's Online Document System (ODS).	It is possible that the deadline date in the ODS will differ from the date in the announcement due to data entry error. NSF staff monitor to minimize this possibility.
IV-5: Customer Service - Time to decision	The closing date or date of receipt are captured in FastLane and the date of division director concurrence with a program officer's recommendation on a proposal are maintained in NSF's Proposal, PI and Reviewer System and Award system.	None identified.
IV-6: Diversity – Reviewer Pool	FastLane contains voluntarily provided demographic data (specifically, gender, race, ethnicity, citizenship, and disability) on reviewers.	Data is based on voluntary self-reporting, perhaps leading to an underestimate of the participation levels of underrepresented groups.

<p>IV-7a: Award size</p>	<p>Maintained in NSF's Proposal, PI and Reviewer System and Award system.</p>	<p>None identified. Award size and duration issues are being examined by the internal NSF Working Group on Award Size and Duration.</p>
<p>IV-7b: Award duration</p>	<p>Maintained in NSF's Proposal, PI and Reviewer System and Award system.</p>	<p>None identified. Award size and duration issues are being examined by the internal NSF Working Group on Award Size and Duration.</p>
<p>IV-8: Award oversight</p>	<p>Availability of a printed risk assessment protocol. Documented visits to institutions participating in the pilot program. IPERS and internal travel and training systems.</p>	<p>None identified.</p>
<p>IV-9a: Construction and upgrade: 90% within 110% of annual expenditure plan estimates</p>	<p>The Facilities Reporting System, which is linked to the Performance Reporting System, is a module of NSF's FastLane. It collects information on operations and construction from Facilities Managers external to NSF. EIS is used to aggregate the data and assess overall NSF performance.</p>	<p>The reporting system was implemented in FY 2000; facilities managers still gaining experience in collecting and reporting this information. NSF expects the completeness and reliability of the information provided to continue to improve as managers gain experience with gathering and reporting the required data. NSF addresses the accuracy and completeness of the information through interactions between NSF staff and the managers of the facilities.</p>
<p>IV-9b: Ninety percent of facilities will meet all major annual schedule milestones.</p>	<p>The Facilities Reporting System, which is linked to the Performance Reporting System, is a module of NSF's FastLane. It collects information on operations and construction from Facilities Managers external to NSF. EIS is used to aggregate the data and assess overall NSF performance.</p>	<p>The reporting system was implemented in FY 2000; facilities managers still gaining experience in collecting and reporting this information. NSF expects the completeness and reliability of the information provided to continue to improve as managers gain experience with gathering and reporting the required data. NSF addresses the accuracy and completeness of the information through interactions between NSF staff and the managers of the facilities.</p>

<p>IV-9c: Construction and upgrade: For projects initiated after 1996, total costs within 110% of estimates</p>	<p>The Facilities Reporting System, which is linked to the Performance Reporting System, is a module of NSF's FastLane. It collects information on operations and construction from Facilities Managers external to NSF. EIS is used to aggregate the data and assess overall NSF performance.</p>	<p>The reporting system was implemented in FY 2000; facilities managers still gaining experience in collecting and reporting this information. NSF expects the completeness and reliability of the information provided to continue to improve as managers gain experience with gathering and reporting the required data.</p> <p>NSF addresses the accuracy and completeness of the information through interactions between NSF staff and the managers of the facilities.</p>
<p>IV-10: Operations & Management: for 90% keep operating time lost to less than 10% of total scheduled operating time</p>	<p>The Facilities Reporting System, which is linked to the Performance Reporting System, is a module of NSF's FastLane. It collects information on operations and construction from Facilities Managers external to NSF. EIS is used to aggregate the data and assess overall NSF performance.</p>	<p>The reporting system was implemented in FY 2000; facilities managers still gaining experience in collecting and reporting this information. NSF expects the completeness and reliability of the information provided to continue to improve as managers gain experience with gathering and reporting the required data.</p> <p>NSF addresses the accuracy and completeness of the information through interactions between NSF staff and the managers of the facilities.</p>
<p>IV-11: Electronic Business</p>	<p>Internal data bases</p>	<p>Minimal risk of bias due to use of questionnaires. Independent verification of two paperless criteria is not possible.</p>
<p>IV-12: Security Program</p>	<p>Internal data bases</p>	<p>None</p>
<p>IV-13: NSF Staff – Diversity</p>	<p>Integrated Personnel System (IPERS); Office of Equal Opportunity Programs databases.</p>	<p>Measure may not be accurate because applicants are not required to provide the information according to law. Gender is not self-reported and this may lead to errors or underreporting. Data entry errors are possible.</p>
<p>IV-14: Workforce Training (Academy)</p>	<p>Internal course catalogues and calendars</p>	<p>None identified.</p>
<p>IV-15: Workforce Training (Strategic Business Analysis)</p>	<p>Released RFP. Formal documentation developed during analysis.</p>	<p>None identified.</p>

IV-16: Work Environment	Employee survey.	Participation in the survey is voluntary and response to a particular set of issues may therefore vary depending on percent of workforce participating.
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C. NSF DATA QUALITY PROJECTS

During FY 2001, NSF continued the data quality program. The objectives of the project are:

- Complete the functionality of the data dictionary for all NSF-wide information systems to ensure that meta-data describing the data is identified and thoroughly documented.
- Continue evaluation of the quality of the data in NSF databases with primary focus on data supporting GPRA goals.
- Ascertain the causes of the data quality problems and develop systematic methods for correction.
- Promulgate data quality policies and procedures NSF-wide.

Integration of existing systems is being addressed in FY 2001 through P&E funding for integration of FastLane and PARS, AWARDS, and FAS. The Division of Information Systems meets with the Division of Grants and Contracts monthly regarding systems integration issues. Aspects of this data quality project also address OMB's management reform related to NSF's ability to administer and manage its growing portfolio of program activities,

In FY 2000, NSF engaged an external third party, PricewaterhouseCoopers LLP (PwC), to verify and validate selected FY 2000 GPRA performance data as well as the process through which supporting data was compiled. They documented the processes through which NSF collects, processes, maintains, and reports selected performance data. They noted relevant controls and discussed if the controls were being used. They also mapped NSF procedures against GAO criteria for supporting processes to be considered valid and verifiable. For the outcome goals, PwC verified and validated the goal achievement data tables.

In their final reports, PwC concluded that NSF was reporting its GPRA measures with "sufficient accuracy such that any errors, should they exist, would not be significant enough to change the reader's interpretation as to the Foundation's success in meeting the supporting performance goal...." Furthermore, PwC concluded that NSF "relies on sound business processes, system and application controls, and manual checks of system queries to confirm the accuracy of reported data. We believe that these processes are valid and verifiable."

In addition, a new COV data project will substantially improve the quality, consistency and availability of data, reports and charts that are used by NSF advisory committees. These committees, in addition to providing advice to the NSF organization, provide assessments used in NSF's annual GPRA reporting. Currently, each NSF organization produces its own reports and charts for each of its committees. In this project, the reports will be generated centrally to reduce costs and improve quality and consistency across all NSF. The initial planning for the project begins in FY 2001 with the majority of the implementation to be completed in FY 2002. The project will be completed early in FY 2003.

NSF will continue to further refine data collection methods and systems to address areas in need of improvement as time and funds allow. For example, NSF now has several years of experience reporting GPRA results for the "Award Oversight and Facilities Management" performance area, and it has recently initiated discussions to develop improved reporting practices. The current goals in this performance area and their associated reporting procedures are undergoing comprehensive internal review and may be revised in the future. Revisions will consider recommendations of PricewaterhouseCoopers (January 2002 report), external facilities managers, and NSF Program Officers.

VI. APPENDIX: MODIFICATIONS TO NSF GOALS FROM THE FY 2002 FINAL PERFORMANCE PLAN TO THE FY 2002 REVISED FINAL PERFORMANCE PLAN

This section compares goals contained in the FY 2002 GPRA Performance Plan submitted on April 9, 2001 with those developed for this FY 2002 Revised Final GPRA Performance Plan.

ANNUAL PERFORMANCE GOALS FOR NSF STRATEGIC OUTCOMES

FY 2002 Original Performance Goal: At least half of the states will activate partnerships with institutions of higher education aimed at strengthening K-12 math and science education through the President's Math and Science Partnership Initiative (MSP).

FY 2002 Revised Performance Goal: Not included.

Explanation of change: The goal has been removed from the FY 2002 Performance plan as a result of the timing of Congressional action. The awards for this program are now not expected to be made until late in FY 2002. NSF is committed to this initiative, which is now called the Math and Science Partnership (MSP), and the FY 2003 Performance Plan will contain a goal related to the MSP.

FY 2002 Original Performance Goal: After three years of support, over 80 percent of schools participating in systemic initiative programs will (1) implement a standards-based curriculum in science and mathematics; (2) further professional development of the instructional workforce; and (3) improve student achievement on a selected battery of tests.

FY 2002 Revised Performance Goal: After three years of NSF support, over 80 percent of schools participating in systemic initiative programs will (1) implement a standards-based curriculum in science and mathematics with at least one-third of their teachers; (2) provide professional development for at least one-third of their teachers; and (3) improve student achievement on a selected battery of math and science tests at one or more of three educational levels (elementary, middle and high school).

Explanation of change: The revised wording of the goal clarifies the threshold for success in each criterion.

ANNUAL PERFORMANCE GOALS FOR NSF MANAGEMENT

FY 2002 Original Performance Goal: Reviewers will address the elements of both generic review criteria at a level above that of FY 2001.

FY 2002 Original Performance Indicator: Percent of reviewers using both merit review criteria.

FY 2002 Revised Performance Indicator: Percent of reviews using both merit review criteria.

Explanation of change: The wording of the indicator was revised to accurately reflect current practice with respect to tracking the usage of the merit review criteria.

FY 2002 Original Performance Goal: Program Officers will consider elements of both generic review criteria in making decisions to fund or decline proposals.

FY 2002 Original Performance Indicator: Percent of Program Officers using both merit review criteria.

FY 2002 Revised Performance Indicator: Percent of review analyses (Form 7s) that comment on aspects of both merit review criteria, as determined by directorate or advisory committee sampling.

Explanation of change: The wording of the indicator was revised after FY 2001 performance reporting. The change enables quantitative measurement.

FY 2002 Original Performance Goal: Members of underrepresented groups will show increased participation in NSF proposal review activities over FY 2001.

FY 2002 Revised Performance Goal: Establish a baseline for participation of members of underrepresented groups in NSF proposal review activities.

Explanation of change: This goal was adjusted based on actual performance data from FY 2001. NSF made significant progress in establishing a process in FY 2001 and has begun web-based collection, on a voluntary basis, of demographic data from participants in NSF proposal review activities. However, there is not enough FY 2001 data available against which to compare FY 2002 participation. FY 2002 will be the first full year of data collection, hence the change in the goal.

FY 2002 Original Performance Goal: NSF will review its large infrastructure projects in order to identify best management practices.

FY 2002 New Performance Goal: (Goal substitution for award oversight performance area.) NSF will develop and initiate a risk assessment / risk management plan for awards.

Explanation of change: This goal statement was adjusted based on actual performance data from FY 2001. It was largely achieved in FY 2001 with completion of the Large Facility Projects Management and Oversight Plan (September 2001) and the hosting of a “Best Practices for Facilities” workshop on 9/21/01. The new goal accelerates NSF’s attention to the area of award oversight.

FY 2002 Original Performance Goal: Ninety percent of facilities will meet all major annual schedule milestones by the end of the reporting period.

FY 2002 New Performance Goal: Ninety percent of facilities will meet all major annual schedule milestones.

Explanation of change: This goal was adjusted based on actual performance reporting experience in FY 2001 and feedback from facilities managers, NSF program officers and PricewaterhouseCoopers.

FY 2002 Original Performance Goal: NSF will continue to advance the role of “e-business” in review, award, and management processes.

FY 2002 Original Performance Indicators: (1) NSF will double the number of paperless projects that manage the competitive review process in an electronic environment. (2) NSF will increase its use of videoconferencing by 20 percent over the base year of FY 2001.

FY 2002 Revised Performance Goal: NSF will continue to advance the role of “e-business” in review, award, and management processes.

FY 2002 Revised Performance Indicator: NSF will double the number of paperless projects that manage the competitive review process in an electronic environment.

Explanation of change: The videoconferencing indicator was dropped based on actual performance data from FY 2001. The Foundation far exceeded the FY 2001 goal of "increasing use of a broad-range of videoconferencing/long distance communications technology. Videoconferencing is now a routine part of operations at the Foundation and therefore videoconferencing no longer needs to be a performance indicator. NSF has both ISDN (digital dial-up video) and Internet-based videoconferencing. NSF also has its own videoconferencing "bridge" which allows for multipoint conferencing capability using either protocol individually or both protocols simultaneously.

FY 2002 Original Performance Goal: NSF will implement an agency-wide security program in response to the Government Information Security Reform Act.

FY 2002 Original Performance Indicators:

- > Risk assessments and certification to operate will be documented and retained.
- > Policies will be disseminated and maintained on an internal security web site.
- > Security management structure will be reflected in organizational descriptions and related position descriptions.
- > Security related changes to personnel policies (as necessary) will be documented.
- > Formal training will be documented in Training System.

FY 2002 Revised Performance Indicators:

- > Risk assessments and certification to operate will be documented and retained
- > Policies will be developed and disseminated
- > Security management structure will be implemented
- > Security related changes to personnel policies (as necessary) will be documented

Explanation of change: The wording of the indicators was revised to accurately reflect NSF's current activities.

FY 2002 Original Performance Goal: NSF will establish an internal NSF Academy to promote continuous learning for NSF staff.

FY 2002 Original Performance Indicator: Availability of new courses that contribute to an organized curriculum for NSF staff.

FY 2002 Revised Performance Indicator: Availability of new or revised courses that contribute to an organized curriculum for NSF staff.

Explanation of change: The wording of the indicator was revised to broaden the elements comprising a strategically designed learning system.

FY 2002 Performance Goal (New): NSF will initiate a strategic business analysis to provide a comprehensive perspective on its future workforce requirements.

FY 2002 Performance Indicators:

- > Request for Proposals (RFP) to perform the strategic business analysis will be released.
- > Skill mix/competencies of the current NSF workforce will be examined.

Explanation: This goal was originally intended to be an FY 2003 goal. However, in light of President's Management Agenda's focus on Strategic Management of Human Capital, NSF will accelerate initiation of this analysis in FY 2002.

FY 2002 Performance Goal (Continued): NSF will establish various baselines that will enable management to better assess the quality of worklife and work environment within the Foundation.

FY 2002 Performance Indicator: Development of an employee survey.

Explanation: This goal was developed based on actual FY 2001 performance data. The FY 2002 Final Performance Plan noted that specific work environment goals for FY 2002 would be set after the survey was distributed and analyzed. NSF was not successful in finalizing and distributing the survey in FY 2001 and thus it was unsuccessful for this goal in FY 2001. It will continue as a goal in FY 2002.

VII. APPENDIX: OMB MANAGEMENT REFORMS FOR FY 2002

During FY 2002, NSF and OMB have agreed to address the first four NSF-specific management reforms outlined below. The linkages and goals in this document that respond to each are included in the text of this Performance Plan (see summary on page 16). The last three reforms address additional federal agency management guidance.

A. DOCUMENT THE EFFICIENCY OF THE RESEARCH PROCESS

NSF asserts that the current size of its grants and their duration might be resulting in an inefficient research process at U.S. academic institutions. Researchers might be spending too much time writing proposals instead of doing actual research. The agency has increased grant size and duration in previous years, particularly through its priority research areas; however, there is little documentation that this is having a positive impact on research output. With the assistance of U.S. academic research institutions, the agency should develop metrics to measure the efficiency of the research process and determine what is the “right” size of a grant for the myriad types of research the agency funds. These metrics and grant size determination should be developed in time for consideration of the FY 2003 NSF budget submission.

B. ENHANCE NSF’S CAPABILITY TO MANAGE LARGE FACILITY PROJECTS

NSF has several multi-year, large facility projects awaiting approval for funding. Although the agency has done well in keeping past projects on schedule and on budget, OMB believes that NSF's capability to manage proposed projects needs to be enhanced given the magnitude and costs of future projects. NSF should submit a plan to OMB by April 1st that documents its plans for costing, approval, and oversight of major facility projects. This plan should include information on how NSF intends to enhance its capability to estimate costs and provide oversight of project development and construction. This plan should help ensure that NSF is able to meet cost and schedule commitments for major facility projects.*

C. IMPROVE NSF’S ABILITY TO ADMINISTER AND MANAGE A GROWING PORTFOLIO OF PROGRAM ACTIVITIES

Although NSF has had robust increases in its program responsibilities and budgets in the past decade, funding for administration and management has remained relatively flat. Concern has been expressed by NSF and the NSF IG about the adequacy of staffing at a time when the agency is facing succession planning, recruiting problems and management of more complex programmatic activities. The agency has been able to keep pace with the increased workload by investing in information technology. And this shift to complex systems requires more sophisticated skills from our workforce. At the same time, NSF seeks to further diversify the workforce at all levels. A number of areas related to these needs were cited as management challenges by both the IG and the NSF Management Controls Committee including systems and data management; program management; and staffing and resource management. NSF is in the process of developing a 5-year strategic plan for the workforce needs of the agency based upon a workforce planning study. NSF should submit this plan to OMB no later than July 20 for consideration of the FY 2003 budget.

* Update: Recent activities external to this revised performance plan include development of a Large Facility Projects Management and Oversight Plan submitted to OMB and Congress in September 2001.

D. FEDERAL FUNDING OF ASTRONOMY AND ASTROPHYSICS

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. Several changes have evolved which suggest that now is the time to assess the Federal government's management and organization of astronomical research.

- First, NSF's share of funding for individual research grants in astronomy has fallen from 60 percent at the beginning of the 1980's to 28 percent, largely in response to constrained budgets. NASA's share of the grants funding has risen commensurately.
- Second, the May 2000 Decadal Survey report of the Astronomy and Astrophysics Survey Committee has recommended a series of ground and space based initiatives intended to maintain U.S. leadership in astronomy.
- Third, the Decadal Survey also makes the case that future progress in astronomy will require more integration between ground and space based facilities, and cross-wavelength and cross-discipline research. It may be that the separation of ground and space based research and the division of responsibilities between NSF and NASA may no longer be the optimal model for the Federal government's support and management of astronomy.

NSF and NASA should establish a Blue Ribbon Panel, including representation from the National Research Council's Space Studies Board and Committee on Astronomy and Astrophysics, to assess the current disposition of management and operational responsibilities for Federal support of astronomical sciences and, specifically, the pros and cons of transferring NSF's astronomy responsibilities to NASA. The panel may also develop alternative options. The Panel should also assess how NASA might effectively integrate ground-based and space-based astronomy activities. This assessment should be completed by September 1, 2001.

E. PERFORMANCE BASED CONTRACTS

Making greater use of performance-based contracts: For FY 2002, the Performance-Based Contracting (PBC) goal is to award contracts over \$25,000 using Performance-Based Service Contracting (PBSC) techniques for not less than 20 percent of total eligible service contracting dollars. This goal is based on the goals established under the Government-wide Acquisition Performance Measurement Program established by the Procurement Executives Council (PEC).

F. ON-LINE PROCUREMENT

Expanding the application of on-line procurement: For FY 2002, agencies will post (a) all synopses for acquisitions valued at over \$25,000 for which widespread notice is required and (b) all associated solicitations unless covered by an exemption in the Federal Acquisition Regulation on the government-wide point-of-entry website (www.FedBizOpps.gov). The President's commitment is to shift procurement to the Internet at the same rate as the private sector and to increase competition and accessibility.

G. A-76 COMPETITIONS AND FAIR ACT INVENTORIES

Expanding A-76 competitions and more accurate FAIR Act inventories: For FY 2002, agencies will complete public-private or direct conversion competitions on not less than 5 percent of the FTE listed on their Federal Activities Inventory Reform Act inventories. Agency plans will include the number of FTE by function and location being competed, training requirements and planned contract support. The President's commitment 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. If

the agency does not believe that it will achieve these goals within the FY 2002 Budget time-frame, the agency should describe the actions the agency intends to take in order to mitigate this problem. Agencies should provide a time-line showing when it expects to achieve this FY 2002 Budget goal. Office of Federal Procurement Policy staff are ready to work with you as you prepare these plans and coordinate their budget impacts, if any, with your budget examiners.**

** Update: A strategic business analysis to be initiated in FY 2002 will inform a redefinition of the agency's FAIR Act inventory and will enable NSF to develop a competitive sourcing plan.