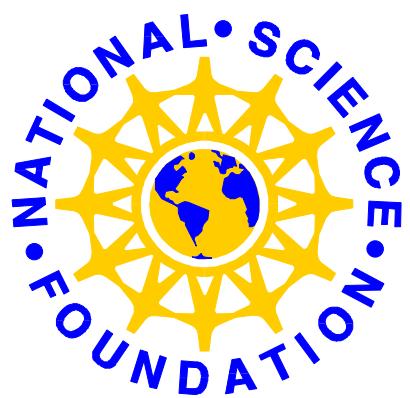


Administration & Management

Strategic Plan



Introduction

NSF's leadership in advancing the frontiers of science and engineering research and education is complemented by its commitment to excellence in administration and management (A&M). The agency has a solid history of leveraging its agile, motivated workforce, management processes, and technological resources to promote the progress of science and engineering¹ through investments in PEOPLE, IDEAS, and TOOLS².

For more than 50 years, NSF's high-performing workforce has enabled discovery, learning, and innovation across the science and engineering frontier in research and in education. New customer-focused eGovernment capabilities have significantly improved the agency's ability to solicit, review, select, award, and report on government-funded research and education projects. The agency's paper-based work processes have evolved to capitalize on technology-enabled ways of doing business, allowing the agency to serve as an effective and capable steward of the taxpayer's resources.

NSF's focus on demonstrating management excellence is sharpened through attention to specific issues. For example, the President's Management Agenda mandates that NSF, like other agencies, demonstrate consistent results through proven management practices in: Human Capital Management; Expanding eGovernment; Competitive Sourcing; Financial Management; and Budget and Performance Integration. In addition, the agency proactively addresses management challenges identified through internal review and oversight as well as those identified by the agency's Inspector General and the General Accounting Office.

Global trends in science and engineering research and education as well as emerging societal trends also influence the agency's A&M priorities and approaches. For example:

- The scope and complexity of science and engineering opportunities and challenges at the frontier increasingly require partnership approaches in project development, review and execution.
- Technological innovation -- especially in such areas as high-speed computing, communications, and collaboration -- is yielding new approaches to scientific inquiry and education, boosting productivity and increasing access to science and engineering research and education opportunities for all.
- The importance of science and engineering discovery, learning and innovation is gaining greater prominence and at the same time is subject to more public scrutiny, requiring that the agency operate with due emphasis on accountability, openness, and responsiveness to the citizenry.
- The realities of today's world require that NSF appropriately secure its resources and institute adequate safeguards for its working environment and critical systems.

¹ NSF's statutory mission is: to promote the progress of science; to advance the National health, prosperity and welfare; to secure the National defense; and for other purposes.

² PEOPLE, IDEAS and TOOLS are NSF's GPRA strategic outcome goals.

Administration & Management Goals

The agency's highest standard for excellence in management is sought through close attention to the following A&M strategic goals:

- ***Human Capital***: a diverse, agile, results-oriented cadre of NSF knowledge workers committed to enabling the agency's mission and continuously expanding their capabilities to shape the agency's future.
- ***Business Processes***: effective, efficient, strategically aligned business processes that integrate and capitalize on the agency's human capital and technology resources.
- ***Technologies and Tools***: flexible, reliable, state-of-the-art business tools and technologies designed to support the agency's mission, processes, and customers.

Achievement of these goals demands a sustained commitment to business innovation achieved through consideration of what the agency does and how it does it.

Implementation strategies capitalize upon the complex interdependencies between *Business Processes*, *Technologies and Tools* and *Human Capital* investments. They support NSF's science and engineering research and education mission and acknowledge stakeholder needs, including those of individual researchers and educators and those of the agency's institutional partners.

NSF Business Analysis: A Systemic Approach

Beginning in FY'02 NSF will initiate a comprehensive, multi-year Business Analysis, the outcomes of which will inform A&M investments for the foreseeable future. The Business Analysis will:

- Document each of the agency's core *Business Processes* and define its contribution to the NSF mission
- Define process effectiveness and efficiency improvements that leverage past experience, capitalize on best practices in the public and private sectors, and respond to emerging mission-related trends
- Develop future-looking *Business Process* scenarios and criteria for success
- Define a *Human Capital Management Plan* to provide next-generation human capital capabilities. The Plan will identify future-looking workforce competencies and describes human capital strategies and approaches to support the *Business Process* scenarios and to capitalize on opportunities afforded by *Technologies and Tools* innovations.
- Define an *Integrated Technologies and Tools Plan* (business infrastructure tools, knowledge bases, and technologies) that describes an overall integrated technical and information architecture for future systems and capabilities in support of the agency's *Business Processes*.

The following mission-focused core *Business Processes* define how the agency delivers value to its science and engineering stakeholders and to the nation and form the framework for the Analysis:

Resource Allocation: setting the right priorities...

A resource management process that incorporates performance results and other inputs to prioritize agency programmatic and management investments across organizational levels, resulting in a balanced, performance-based portfolio.

Merit Review: identifying people, ideas and tools with the greatest potential for impact...

A fair, competitive, transparent merit review process for selecting projects, managed in the context of priorities, and through which the agency realizes its outcome goals.

Award Management and Oversight: the award cycle, beginning to end...

A collaborative, multi-functional award management and oversight process that (1) is informed by appropriate risk management strategies, (2) ensures performance outcomes are appropriately identified, (3) optimizes connections between discovery, learning, innovation and widespread practice through effective evaluation and communication, and (4) verifies that projects are in compliance with award agreements and federal regulations.

Knowledge Management: the right information, in the right places, at the right time...

A comprehensive set of information management and communication activities that capture, synthesize and highlight knowledge generated by NSF's investments – in order to provide NSF management and the agency's many stakeholders with reliable, readily available, and accessible information about agency priorities, achievements, and contributions.

Performance Assessment and Accountability: the highest standards of excellence and integrity...

A thorough performance assessment and accountability process that develops and measures effective performance indicators and ensures the agency is held accountable for meeting its mission and goals.

Business Analysis inputs and outputs are summarized in the table that follows.

Business Analysis: Inputs and Outputs

Inputs	Outputs
NSF GPRA Strategic Plan	
NSF Budget and Performance Plans	
NSF Organizational Structure	
President's Management Agenda	
Management Challenges	
NSF Staff and Other Stakeholder Workshops and Interviews	
Business Processes (Five processes identified earlier)	Business Processes - Future Scenarios <ul style="list-style-type: none"> - Criteria for success - Quality and efficiency measures
Human Capital Current workforce skill mix/competencies	Human Capital Management Plan <ul style="list-style-type: none"> - Competency-based occupation classification system – characteristics and alternatives - Competency-based performance management system - Revised FAIR Act inventory & competitive sourcing plan - Competency-driven organizational and individual learning strategies - Recruitment and retention strategies - Refined leadership and succession planning approaches - Organizational structure and alignment opportunities
Technologies and Tools Current Enterprise Architecture	Integrated Technologies and Tools Plan <ul style="list-style-type: none"> - Next Generation eGov Capabilities/Process <ul style="list-style-type: none"> - Technology requirements - Pilots for Proof of Concept - Alternatives, business case and migration strategy - Future Enterprise Architecture requirements - Migration strategy and plan - Business infrastructure opportunities

The outcome of NSF's Business Analysis is an A&M management and investment strategy focused on quality, efficiency, agility, flexibility and mission responsiveness

and designed to realize the agency's *Human Capital, Business Processes and Technologies and Tools* goals.

Addressing the President's Management Agenda

The Business Analysis also serves as an overall framework for agency activities planned within each of the President's Management Agenda initiative areas. The remainder of the Plan describes NSF's A&M approach to address the President's government-wide initiatives:

- ❖ Strategic Management of Human Capital
- ❖ Expanding Electronic Government
- ❖ Competitive Sourcing
- ❖ Improved Financial Performance
- ❖ Budget and Performance Integration.

President's Management Agenda

Strategic Management of Human Capital

NSF supports discovery, learning and innovation to secure U.S. world leadership in science and engineering. The agency's diverse, knowledge-rich workforce of approximately 650 permanent and visiting scientists and engineers (about 65 percent of whom are permanent government employees), 450 administrative personnel (who provide business operations support), and approximately 300 program support personnel enable the agency to meet its mission and goals. NSF's workforce is complemented by 200 on-site contractors who perform commercial administrative duties in, for example, the agency's mailroom, copy center, health unit, and travel center, and who also provide software and systems development support. In addition, 1,200 off-site contractors augment NSF staff in realization of the agency's programmatic objectives.

Leadership and Results

NSF's commitment to human capital is articulated in its Human Capital goal – to prepare a diverse, agile, results-oriented cadre of NSF knowledge workers committed to enabling the agency's mission and continuously expanding their capabilities to shape the agency's future.

A. Human Capital Planning Strategy

NSF's approach to strategic workforce planning or succession planning ensures that the agency has the *right people with the right competencies in the right jobs at the right time*. NSF's approach to succession planning encompasses both the development of critical talent and core competencies from within, and the identification and recruitment of strategic talent from the outside. This two-pronged approach allows the agency to anticipate and meet its staffing needs in the challenging, dynamic environment that constitutes work at the science and engineering frontier and ensures that employees are well-prepared to meet agency challenges in the near- and longer-terms.

The agency considers the following inter-related issues in implementation of its ongoing workforce planning activity.

- *Context*: understanding the agency's future mission-oriented opportunities and challenges
- *Work Processes/Practices*: determining how agency work processes and practices are evolving or changing
- *Quality of Worklife*: assessing the agency's quality of worklife to optimize productivity and long-term human resource efficacy, and identifying future opportunities and needs
- *Human Capital Demand*: determining staffing levels and skill sets and competencies to meet anticipated future work requirements, and identifying skill gaps

- *Human Capital Supply*: developing plans to meet staffing level demands and to develop critical competencies through recruitment, competitive outsourcing and/or continued development of in-house expertise
- *Special Needs*: identifying pressing needs that require special action to recruit, appoint and/or retain workers with the required knowledge and skills
- *Human Capital Priorities*: developing human capital initiatives and investment priorities to maximize agency opportunities and overcome challenges

Consistent with this approach and as a precursor to the more comprehensive, forthcoming Business Analysis, in FY'01 NSF conducted an agency-wide workforce planning exercise that was informed by NSF's future mission-oriented opportunities and challenges and its increasingly IT-intensive business processes and practices.

Amongst other things, the analysis revealed the following:

- importance of providing a strategically-aligned portfolio of continuous learning programs to respond to emerging science and engineering opportunities and challenges, to meet changing nature of NSF work, and to close identified skill gaps
- pent-up demand for staffing level increases totaling 250 FTE to respond to increasing and increasingly complex workload requirements
- development of career progression opportunities in administrative/clerical positions at higher grade levels to ensure recruitment/retention of critical human capital competencies/skills
- development of new types of positions to meet evolving business practices and workload requirements
- workforce skill gaps identified in areas such as project management, database management, enhanced IT skills, performance assessment, and leadership development.

Informed by this analysis, NSF senior management determined the agency's human capital investment priorities to be:

- an increasing investment in the NSF Academy³ to develop agency human capital competencies in areas such as project management, IT and leadership development
- the creation of additional science assistant positions to effect increased efficiencies and to increase effectiveness of program directors by reducing their more routine processing workload
- the strategic recruitment of science and engineering personnel with expertise to complement talent resident in-house
- development of telecommuting and alternative schedule strategies to optimize quality of worklife and realize productivity improvements

Where appropriate, these priorities are reflected in the agency's FY'03 budget request.

The activities described in B. - E. below are representative of strategic activities undertaken to support the agency's succession planning activities.

³ See discussion of the NSF Academy on p 9 and p 11.

B. Human Capital Recruitment Strategies

Growing competition from the private sector in attracting and recruiting staff, especially those with state-of-the-art science, engineering and IT skills, demands a proactive outreach and marketing plan. The agency's plan includes targeted outreach activities to scientists, engineers and students who are underrepresented in the science and engineering workforce. The effectiveness of advertising methods, as well as more direct recruiting, is evaluated on an ongoing basis and an increased emphasis is being placed on online advertising. And to improve the efficiency of the hiring process, the agency is now implementing an e-Recruit pilot that seeks to reduce the current lengthy, paper-intensive recruitment process.

To meet the needs of the agency's work at the science and engineering frontier, NSF draws upon current hiring flexibilities to attract a cadre of temporary scientists and engineers who are leaders in their respective fields and who join the agency for periods of 1- 3 years. Using these hiring flexibilities, NSF engages scientists and engineers who motivate agency innovation in perspective and stimulate investments that may not occur otherwise.

C. Development of Human Capital - Creating a High-Performing Learning Organization

NSF currently provides a range of strategic learning and career development programs coordinated via the NSF Academy. These include a Leadership Development Program, a catalog of in-house courses providing *Technologies and Tools*-related and other critical skills training, an NSF Forum Series, courses available via satellite and distance learning, information on external courses and programs, a tuition support program for program support personnel, career counseling and assessment, and a Learning Resources Center. These activities enhance the skills of the agency's workforce, build critical competencies in support of the agency's mission and strategic goals, and groom future generations of agency leaders.

To meet critical competency needs and to close skill gaps, the agency is currently conducting an e-learning pilot that combines a Web-based learning management system and content library with over 1200 online courses offered by two established e-learning vendors. The agency acquired 200 licenses for the pilot through interagency agreement for a period of one year. The pilot has been implemented in stages, with Business Operations and Science and Engineering staff volunteers assessing courses for quality, content, relevance to NSF mission and associated workload demands and ease of use. From November, 2001 through March 31, 2002, 45 participants took 32 different courses in competency areas such as financial management, project management, leadership, management and information technology. In April, 61 new participants joined the pilot group and the remaining 90 licenses will be offered NSF-wide in June.

D. Performance-Based Reward Structure

NSF has developed a comprehensive system of awards and incentives that motivate improved performance, including monetary awards, recognition ceremonies, time-off awards, awards celebrating collaborative group achievements, and promotion opportunities. Low performance is rare in a competitive, high-achieving organization, and the agency uses current hiring flexibilities to ensure human capital “best fit” within the organization. When necessary, the agency has used available mechanisms, including removal, to address unsatisfactory performance.

E. Telecommuting

Longer commutes, increased traffic congestion, and a desire to better balance work and family needs combine to make telecommuting one of the work/life programs most desired by employees. A recent NSF study found that opportunities exist to increase workforce participation in telecommuting. Both Business Operations and Science and Engineering personnel represent ideal candidates for telecommuting. Business Operations personnel spend 30-50 percent of their time performing on-line, structured administrative duties that do not require face-to-face interaction with other staff. Science and engineering personnel spend 40-60 percent of their time on focused activities such as reading, writing, or analyzing data. The agency is committed to further developing its telecommuting pilot, recognizing that technology barriers will be increasingly minimized as the agency moves to an “any time, anywhere” virtual office concept.

Standards for Success

NSF’s future *Human Capital* investments will be informed by the agency’s Business Analysis and are described within the framework of the President’s Human Capital standards for success.

I. Organizational Alignment

NSF’s Business Analysis promises to reveal organizational alignment opportunities. For example, the impact of a growing budget coupled with an increasingly complex and multidisciplinary portfolio of science and engineering research and education priorities may reveal organizational alignment opportunities that will improve the effectiveness and efficiency of one or more of the agency’s core business processes. Opportunities revealed will be examined for mission-focused value-added in terms of quality of results, customer service, and efficiency.

II. Citizen-Centered, Mission-Focused Organizational Structure

NSF's organizational and business structures are designed for efficiency and effectiveness. Each year, the agency receives approximately 30,000 science and engineering research and education proposals. Through funding of the best proposals as determined by merit review, NSF promotes the progress of science and engineering through investments in PEOPLE, IDEAS and TOOLS.

The agency encourages stakeholder participation in decision-making and priority setting through its *Business Processes* (especially the Merit Review process) and through its community-based advisory structures. Furthermore, many NSF-supported activities – including the NSF web site and its public information activities – help to boost public awareness of science, engineering, and technology and create a more engaged citizenry.

The Business Analysis may reveal citizen-centered, mission-focused structural opportunities that have not previously been identified.

III. High-Performing, Learning Organization

NSF Academy: One of NSF's future *Human Capital* opportunities is to integrate existing workforce development programs and associated learning opportunities into a strategically aligned learning system that supports the agency's performance culture and capitalizes upon its technology-enabled business environment. This will be accomplished through the NSF Academy.

In its full implementation, the NSF Academy will create and integrate innovative *Human Capital* learning opportunities aligned with the agency's Strategic Plan, supporting its *Business Processes* and leveraging its *Technologies and Tools*. Working in concert with learning partners in the public and private sectors, the NSF Academy will provide a comprehensive suite of organization and career-enhancing programs. Pedagogies will merge theory with practice, knowledge with experience, and will facilitate cross-functional, team-oriented and individual learning experiences that focus on contemporary organizational challenges.

Leadership and succession planning will be built into the skill development curriculum providing all employees the opportunity to gain the skills and knowledge necessary to compete for leadership and management roles.

Specific activities to be undertaken include:

- Align current workforce training programs with the agency's critical *Business Processes*
- Identify workforce development opportunity gaps
- Align and/or develop new competency-based curricula that provide cross-functional, work-based organization, team, and individual learning opportunities
- Design and implement career “mapping” tools that align individual and

- organizational goals, contribute to the agency's succession planning and include opportunities for job rotations, details and other developmental assignments
- Capitalize on e-Learning opportunities and their promise for enhanced performance by further developing the current e-learning pilot - new online NSF business system tutorials developed and introduced in FY'02 will establish structure and standards for future additions and enhancements.

Leadership and Succession Planning: NSF will continue to refine and improve its succession planning process for identifying, assessing, developing and retaining talent to ensure leadership continuity in all positions within the agency. Specific activities to be undertaken include:

- Embedding leadership development opportunities in all NSF Academy curricula. (A leadership competency analysis is being carried out in FY'02 (see IV. below) to identify skills required for leadership roles at NSF.)
- Developing an improved leadership and succession planning process that is closely linked with initiatives made available through the NSF Academy and with strategic recruitment and retention initiatives.

IV. Assess Workforce Skill Gaps/Deficiencies

NSF's Business Analysis will facilitate the integration of the agency's human capital strategies with its strategic and programmatic planning – to identify workforce size, skill mix and deployment necessary to ensure mission accomplishment. In defining its current Human Capital environment, the agency will document its workforce competency/skill-mix baseline. It will also examine attrition trends and quantify potential workforce attrition through retirement over the next five years.

During and following a high-level, future-looking analysis of the core *Business Processes*, NSF will identify its future workforce requirements, including knowledge, skills, and competencies necessary to realize core *Business Process* scenarios.

The agency will carry out a gap analysis that identifies new human capital competency/skill requirements, and strategies will be identified and implemented to recruit, retain, and develop (through the NSF Academy) employees to meet these future organizational needs. Recruitment strategies will capitalize on the agency's current hiring flexibilities and will identify additional desirable flexibilities.

As part of the Business Analysis, NSF will define a new Occupation Classification System to support its competency-based human capital management approach. This system will include the definition of new positions that result from the competency development and analysis. Strategies to migrate from the present KSA-based system to a competency-based alternative will be developed and implemented. In the process, positions with competitive sourcing potential will be identified.

V. Merit-Based Rewards

NSF will modernize its incentive and reward system to sustain and invigorate the agency's performance culture. The resulting system will comply with standards for internal accountability and will incorporate compensation and reward approaches built on objective and dynamic market criteria determined by marketplace studies. The agency is committed to deploying a compensation and reward system that provides flexibility to competitively compensate/reward individuals and teams for their mission-essential skills and competencies, as well as their overall contribution to the organization.

VI. Workforce Skill Mix for eGovernment and Competitive Sourcing

As described in **IV.** above, NSF will identify a comprehensive set of competencies and skills critical to its future success. The Business Analysis will identify workforce competencies that support and enable the agency's critical *Business Processes*, and its eGovernment competitive sourcing, financial management and budget and performance integration initiatives.

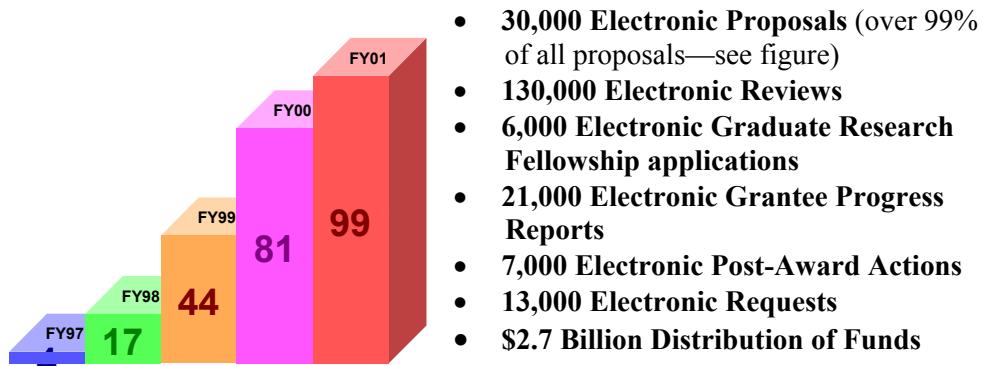
President's Management Agenda Expanding Electronic Government

Leadership and Results

NSF was one of the founders of the Federal Commons initiative and remains committed to the new Government-wide eGrants Initiative. The agency will be a partner on the eGrants team led by Department of Health and Human Services and already works closely with the National Institutes of Health in the development of electronic systems supporting grants processes for the science and engineering research and education community. While other agencies plan for electronic grant submissions, in October 2000, NSF started conducting virtually all business interactions and transactions electronically with its customers, the grantee community, through its new FastLane system.

The FastLane system exemplifies what can be achieved in eGovernment information system design, development and implementation. Over 200,000 scientists, engineers, educators, technology experts and academic administrators use FastLane's web-based system to submit proposals for funding, peer-review these proposals and report on the progress of their NSF-funded projects. Universities and other organizations request funding increments and report on billions of dollars in expenditures through this system. In addition, the public can access titles, authors, funding amounts and abstracts of NSF awards.

The results of NSF's eGovernment initiatives are significant. In FY'01, NSF received and processed more than:



In June 2001, NSF implemented electronic signatures for proposals (so far over 20,000 electronic signatures have been collected, saving grantees over \$150,000 in express

mail costs). By the end of FY'01, the agency had completed ten paperless processing pilots.

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

Plans for Next Generation Capability

The agency's Business Analysis will serve as the driver for implementing its next generation eGovernment capability. This multi-year effort will guide all future technology investments and provide the overarching framework for assuring that technology optimizes business value and mission performance.

A. NSF Enterprise Architecture

NSF will follow a disciplined approach for assuring that new investments are planned and evaluated within the context of an overall Enterprise Architecture framework. This approach will be consistent with, and complementary to, the Business Analysis described earlier in this Plan. The NSF Integrated Enterprise Architecture will: (1) provide a blueprint for defining current business processes, applications, information resources, and technical infrastructure; (2) support definition of the knowledge bases, applications, and supporting technology that are needed to support evolving NSF mission needs; and (3) define a crisp transition strategy and plan for achieving an integrated Enterprise Architecture that is consistent with NSF business goals and operational priorities.

Development and evolution of the NSF Enterprise Architecture will mirror the phased approach and timeline for the Business Analysis. As part of the activity to "Refine the Overall Strategic Framework," and subsequent Business Analysis for core processes, NSF will complete the following:

- Define the current architecture at a high level, focusing on current business processes and information flows; existing applications and systems; and the supporting technology infrastructure.
- Define an initial target architecture that reflects NSF's assessment of future opportunities and needs for new knowledge bases, applications, and technologies needed to enable evolving business processes.
- Develop an initial migration strategy to guide the sequence of activities to achieve the target architecture.

As changes to business processes and requirements are made in later phases of the Business Analysis, the Enterprise Architecture and migration strategy will be updated to assure it reflects evolving business and operational priorities.

B. Implement Next Generation eGovernment Capabilities

NSF's phased approach for implementing next generation eGovernment capabilities will result in delivery of high priority technologies and capabilities to assure NSF's management excellence

Core Processes: Merit Review and Award Management and Oversight

NSF's first phase of implementing next generation eGovernment capabilities will focus on two core business processes: Merit Review and Award Management and Oversight. Based on the focused Business Analysis performed in these two areas, NSF will answer the following questions:

- What information is needed to support the *Business Process*?
- What applications are needed to provide the information?
- What technology is needed to support the applications?
- What is needed to assure data quality and consistency?

Initial planning to enable the Merit Review and Award Management and Oversight processes has been completed and is reflected in the FY'03 Exhibit 300, Capital Plan for a new initiative called the Proposal, Review, and Awards Management Integration System (PRAMIS). PRAMIS will improve internal NSF processing as a complement and extension to the common processes and products planned for the Government-wide eGrants initiative and Federal Commons, focusing on integration and improvement of internal, back office NSF functions. As with Fastlane, NSF will assure that internal business process improvements and IT capabilities are integrated with Government-wide eGrants initiatives to streamline and simplify electronic grants management across the Government.

To mitigate project risk, NSF is adopting a phased approach for PRAMIS. Phase I is planning and definition; Phase II involves acquisition and implementation. Phase I plans call for the formulation of a baseline assessment and initial business case; establishment of an integrated project team; completion of the Business Analysis and functional requirements definition; and completion of technical alternatives study, security, privacy and return on investment analyses. Based on the business case(s) and priorities established, a phased, modular acquisition of high priority capabilities, consistent with Federal guidelines and the NSF Enterprise Architecture, will be initiated. When complete, NSF will be able to support the Merit Review and Award Management and Oversight processes with an integrated suite of systems and streamlined, technology-enabled business processes in place of current standalone, stovepipe applications. In addition, this system will seamlessly interface with and extend current capabilities of the inter-agency eGrants initiative.

Core Processes: Resource Allocation, Performance Assessment and Accountability, and Knowledge Management

Subsequent phases of requirements and plans for enabling capabilities will be defined as part of the Business Analysis for remaining core processes, and will generally follow the disciplined approach highlighted below:

- Define information, applications, and technology needed to support the business process
- Analyze alternatives with priority given to market-based solutions, where feasible, and incorporation of best practices
- Establish business case, investment plan, and migration strategy for decision-making
- Implement pilots and prototypes for proof of concept
- Acquire and implement needed capabilities
- Make necessary upgrades or updates to NSF Enterprise Architecture.

The result of this multi-year approach will be phased implementation of technology needed to enable critical business processes consistent with NSF priorities and available resources.

C. Productivity Improvements

NSF has a solid track record of obtaining productivity improvements through the use of management and technology innovations, evidenced by the historically low ratio of administrative and management overhead required to manage over \$4 billion in science and engineering research and education grants. As part of NSF's phased approach for implementing next generation eGovernment capabilities, opportunities for improving productivity for common functions will be addressed. Highlights of the current status and plans in key areas included within the President's Management Agenda are:

Knowledge Management - The Foundation continues to advance discovery while taking steps to promote the dissemination, integration, and application of new knowledge. NSF continues to invest in web-based capabilities for disseminating information about research and education opportunities, reviewing an annual workload of 30,000 competitive proposals, and communicating results broadly. NSF's Knowledge Management goals are to provide contextually appropriate information to the people who need it when they need it; locate best practices and expertise; enable sharing and collaboration; and ensure individual knowledge is captured in a repository of organizational knowledge. Four projects will be implemented to support aspects of Knowledge Management:

- *Human Capital Knowledge Bases* – As part of our *Human Capital* initiative, NSF will implement a number of pilots to support workforce management requirements. For example, knowledge bases in support of the NSF Academy will be developed to support the Agency's vision to grow as a learning organization. In addition, web-based learning systems and other innovative learning delivery methods will equip personnel with the skills necessary to

ensure the effective use of NSF's electronic business systems. Other knowledge bases to support workforce assessments and competency requirements will also be piloted.

- *Program Information Management System (PIMS)* -- PIMS will consolidate NSF's program information into a single comprehensive database that can be used flexibly for searching, for preparing outputs of program information (e.g., the Guide to Programs, NSF program announcements, NSF web sites), and for providing data to other NSF automated systems. PIMS will allow program officers to update information about their programs in one single application. PIMS will provide authoritative information about NSF programs.
- *Final Project Report Knowledge Base* -- Every year, thousands of Principal Investigators submit final project reports that capture the results of their NSF-funded projects. Because these reports are rich in information, NSF will implement a capability to allow scientists and engineers to "mine" the reports for numerous purposes (e.g., find expertise in specific fields of science and engineering to support Merit Review processes). The knowledge base can provide a wealth of information about NSF funding and areas of concentration, spark new ideas for new research and education directions, and provide a critically needed final reports historical archive.
- *Committee of Visitors Information Repository* -- Each year, NSF conducts formal evaluations of its programs using Committees of Visitors. These committees review approximately one-third of NSF's programs each year. The results of the Committees of Visitors reviews are used for a variety of purposes, including being a significant part of the GPRA reporting process. This knowledge base will provide synthesized information useful to these groups in their evaluation of NSF programs.

Customer Relationship Management (CRM) – NSF currently supports over 200,000 external customers from institutions using FastLane, logging over 4,500 calls a month for customer care and services. This is in addition to the 2,500 calls a month supported within the Foundation by other personnel. A strategic priority for FY'02 is the "Customer Care" initiative that seeks to significantly improve customer relationships and service delivery, including implementation of commercial CRM software and telephone integration. Functions to be supported include improved customer contact, helpdesk management, web self-service, skills-based routing, customized business logic automation, and a rich knowledge base of information. Initial implementation will be completed in FY'02, resulting in a significantly improved capability to support NSF's science and engineering customer base. In FY'03 and beyond, NSF will continue to assess the feasibility of extending the CRM software into other customer support functions (e.g., NSF Information Center), and implement, where appropriate.

Enterprise Resource Management – In FY'01, NSF successfully implemented a new Financial Accounting System and Integrated Payroll System. It is anticipated that these systems will remain in an operations and maintenance status for the next five to seven years. NSF does plan, however, to evaluate Enterprise Resource Management commercial products as legacy administrative systems (e.g., human resources

management, procurement, travel) are scheduled for modernization or enhancements. More intuitive, user-friendly systems that provide more robust functionality will allow permanent staff as well as the many temporary rotators to focus their efforts on problem resolution rather than routine, repetitive administrative activities.

Anytime, Anywhere Access/Remote Access - Advances in information technology, the Internet, and computing devices provide the means for an "any time, anywhere" office concept. Access and security will become increasingly vital in providing the type of virtual office that NSF staff and customers require. NSF will continue to invest in current and emerging technologies to support evolving work approaches and requirements. Planned initiatives include:

- *Remote Access* - This initiative is principally aimed at providing secure remote access to address the increasing need to accommodate remote staff, remote merit review panels, and collaborative, work teams. NSF will experiment with new technologies or new ways of integrating existing technologies to respond to the growing need for collaboration and mobility. Actions include pilots, technology assessments, and acquisition and implementation of capabilities consistent with requirements and the NSF Enterprise Architecture.
- *Telecommuting* - In support of the President's telecommuting goals, NSF is committed to broadening access and interoperability by investing in innovative communication infrastructure technologies expanding secure remote computing and communication capabilities of NSF's workforce. Implementation of this initiative will ensure user-friendly, secure remote access to NSF assets and resources to meet evolving workforce requirements. Telecommuting is critical for distance workers at remote locations in the field, on travel, on campus, and is an important recruiting tool for a next generation workforce.
- *Wireless technology* - NSF will continue to assess, pilot, and implement wireless technology and devices, such as hand-held computers and wireless laptops, to improve efficiency, productivity, and customer service. This new technology will allow for easy remote checking of e-mail, Internet access, and communication to NSF systems.
- *NSF's videoconferencing program* - In the past few years, videoconferencing at NSF has become a business tool for a variety of uses, and it is anticipated that it will continue to play an increasing role at the Foundation. Uses include panel meetings, job interviews, staff meetings with remote staff and contractors, meetings with Principal Investigators, Advisory Committee meetings, National Science Board meetings, and training. As travel becomes more expensive and inconvenient, as the use of Internet-based videoconferencing grows, and as telecommuting increases, there will be a greater need for this method of providing "virtual" access to a "virtual" office.

D. Other eGovernment Initiatives

Information Technology Security - NSF is focused on assuring that infrastructure and critical assets are appropriately protected while maintaining an open and collaborative environment for science and engineering research and education. The agency has

established a strong and comprehensive Information Technology Security (ITS) program that is consistent with Government-wide guidance and is patterned after industry best practices.

The majority of NSF's significant information technology assets are managed within the Office of Information and Resource Management, which serves as the organizational focus of the ITS program. OIRM administers NSF's sophisticated technological infrastructure, providing the hardware, software and support systems necessary to manage the Foundation's grant-making process and to maintain advanced financial and accounting systems. The NSF Chief Information Officer (CIO) provides overall leadership for the ITS program, and ensures that policy, procedures, and activities are coordinated among OIRM Divisions and other NSF program management initiatives.

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

NSF's comprehensive ITS program encompasses all aspects of information security, including policy and procedures, risk assessments and security plans, managed intrusion detection services, vulnerability assessments, and technical and management security controls. While much has been accomplished, the ITS program must evolve to meet inevitable threats to NSF assets and resources. NSF is responding to ITS vulnerabilities identified in the FY'01 audit process, which will improve the agency's overall information technology security posture. The vulnerabilities and associated recommendations addressed application security design, data base security, intrusion detection, network infrastructure security, file-sharing and remote access, access to application source code, physical access, and administration of systems and facility access privileges. Corrective action has been taken to minimize or eliminate these vulnerabilities and where appropriate, additional procedures will be implemented during FY'02 and FY'03 to limit the possibility of similar vulnerabilities occurring in the future. NSF will continue to identify areas where ITS improvements are appropriate, and to identify steps that can be taken to reasonably address areas of significant risk.

The agency continues to: develop additional security-related policies and procedures; offer training and education activities; refine security assessments, plans and controls; and incorporate best practices and lessons learned into established defensive measures.

In FY'03, NSF plans to initiate projects to use multi-technology such as smart cards and a public key infrastructure to ensure more efficient physical and logical security. By using multi-technology cards, employee identification and passwords can be initiated and deleted in a "one stop shopping" methodology. The agency will also

assess and implement more sophisticated security, authentication, and access capabilities such as digital signatures and the use of public key infrastructure.

The National Science Foundation remains committed to providing a reliable and secure information technology infrastructure. During FY'02 and beyond, the continued improvement of the ITS program is an agency priority.

Government Paperwork Elimination Act (GPEA) -NSF is committed to meeting the Government-wide deadline for providing electronic alternatives for transactions with the public, business, and other governments. As requested, NSF has re-evaluated GPEA schedules and has accelerated conversion plans for one initiative that did not initially meet the October 2003 Government-wide deadline. As soon as possible in 2003, but no later than October 2003, the last of the honorary awards will be implemented in the electronic environment.

Standards for Success

In addition to the plans described in the preceding section, the agency is addressing the core criteria described in the President's scorecard standards for success in the following ways:

I. Strategic Value

NSF has two major system investments requested for funding as part of the FY'03 budget. These are the Financial Accounting and Payroll System, which are in an operations/maintenance phase, and the new Integrated Proposal, Review, and Awards Management Integration System which is a new initiative starting in FY'02. As required in OMB Circular A-11, both initiatives are identified in the FY'03 Information Technology Investment Portfolio (Exhibit 53) and in FY'03 Capital Plans (Exhibit 300). NSF will develop business cases (i.e., Capital Plans) for all major system investments identified as part of the Business Analysis. These plans and all other required information related to information technology investments will be submitted as requested in future budget processes.

II. IT Program Performance

Major IT projects are consistently operating within 90 percent of submitted Capital Plan (Exhibit 300) cost, schedule, and performance targets. In the area of IT reform, NSF continues to execute its formal IT investment planning process incorporating the requirements of the Clinger-Cohen Act and other applicable laws, regulations, and guidelines. Two key groups, an internal CIO Advisory Group, and a new external Business and Operations advisory group comprised of executive leaders from government, industry, and academia, provide oversight and advice on NSF's IT plans and operations and assure overall IT management performance and results. NSF is also

implementing more rigorous internal reviews consistent with industry and other Government best practices of all IT investments and projects (significant and small) to improve cost, schedule, and performance results.

As described earlier, evolving the NSF Enterprise Architecture is a strategic priority for NSF to assure that it supports changing business practices and priorities, funding decisions, and technology advances. NSF is committed to an Enterprise Architecture framework that supports more effective investments in information technology, evolving strategic and tactical business priorities, and its value as a living blueprint for systems and business migration.

III. Citizen One-Stop Service Delivery

NSF will continue to focus on meeting citizen one-stop service delivery goals. Two areas of focus for NSF are:

- *Government-wide Portals* - NSF provides information to citizens by applying automated procedures for displaying announcements of grants funding opportunities through the interagency FedBizOpps.gov site. NSF developed a Java client that can select NSF funding information from the agency's electronic systems and sends it to the centralized FedBizOpps for automatic posting, through XML, onto the interagency web site. NSF participates in Interagency Edison, collaborates closely with NIH in developing grant submission applications, appears prominently in Firstgov.gov, and developed elements for the Federal Commons portal. NSF is active in the Inter-Agency Electronic Grants Committee (IAEGC), developed a web-based grid portal to consolidate access to advanced computing systems, and for the last seven years has operated the FinanceNet financial management web portal.
- *The Digital Government* – NSF runs a Digital Government research and education program that, among other things, improved citizen access to government statistical data, managed information and knowledge for law enforcement, implemented a testbed of high-speed communications for comprehensive emergency management, and is ensuring security for web-based statistical analysis of confidential data. As part of this program, NSF developed a partnership, known as "dg.o" (DigitalGovernment.Org), that partners computer scientists and federal, state and local agencies to improve the quality and scope of on-line government services. The dg.o consortium will support participating research and education institutions and the digital government community by giving researchers insight into federal agency needs, transferring emergent information technology from academia to member agencies, acting as an information source across agencies, and helping to leverage resources through collaboration.

IV. Minimizing Burden, Using ebXML and Other Open Standards

NSF remains committed to minimizing burden on the public by using ebXML and other open standards. Initiatives in this area are:

- *FastLane Data Collection* (FY'94 to present) – The NSF FastLane system significantly reduces the burden on our grantees by storing their profiles for reuse every time they submit a proposal. This is true for both individuals and organizations. This process means that the information (e.g. full name, contact information, academic degree and demographic information for individuals) is entered into the system only once, although it can be updated at any time. In addition, past proposal submissions, budgets, progress reports, requests and other submissions are accessible by users and may be edited or updated, as required, for future submissions. This also reduces the workload of administrators, scientists, engineers, educators and grant writers. Approximately 220,000 individual profiles and 5,000 organization profiles are stored in FastLane.
- *EDI/XML Submissions* (FY'01 to FY'03) – NSF worked closely with grantees to become the first Federal grant-making agency to accept Electronic Data Interchange (EDI) data streams, using the Federal EDI 4010 transaction set, for proposal submissions from customers. NSF is planning a process that will also accept XML data streams, based upon the data dictionary developed by the Federal Commons. In addition, as a leader in using open standards to receive transmissions from our customers, the agency developed a web-based system for Federal Commons that, when implemented, will enable the data to be sent as XML data streams to participating agencies.
- *Electronic External Data Exchanges* (FY'03 and beyond) – As NSF expands the number of information technology systems to support its mission and business activities, an increasing number of these systems will be dependent on data that come from external data sources. Some examples of this are zip codes from the U.S. Postal Service, Congressional districts from the Census Bureau, and DUNS numbers from Dun and Bradstreet. Keeping these data current is a manual process requiring hundreds of staff hours each year. By creating electronic data exchange with these data sources, NSF will reduce the burden on its staff to keep the data current, thereby improving data quality.

V. Intergovernmental: Deploying eGrants

NSF leads other Federal grant-making agencies in electronic grant submission and management. Since October 2000, nearly all grant proposals are required to be submitted electronically through NSF systems. Proposal submission, peer-review, panel analysis, progress reporting, individual and organization registration, cash requests, Federal Cash Transaction Reports, post-award requests, award letters, proposal status, supplemental funding requests and numerous other electronic grants interactions are all performed through NSF's electronic systems.

NSF has partnered with the Federal Commons and plans to continue to be active in interagency electronic grant efforts through the eGrants initiative. NSF enthusiastically brings to eGrants the expertise, experience and substantial accomplishments of an organization that has completely implemented electronic grants.

President's Management Agenda Competitive Sourcing

For many years NSF has capitalized on the potential of competitive sourcing to achieve its mission. While the agency is comparatively small and has a federal workforce of only about 1,300, many times that number are involved each year in realizing the agency's goals.

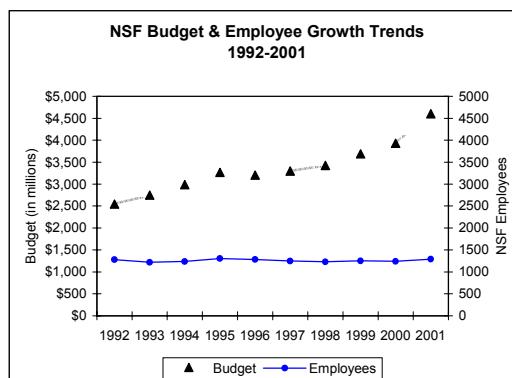
Leadership and Results

NSF's most fundamental role is to select and oversee a wide range of competitively sourced science and engineering research and education projects.

- Nearly 200,000 people are directly supported through NSF grants, awards and related activities, receiving salaries, stipends, or participant support. This includes over 25,000 senior researchers and educators, almost 25,000 graduate students, and almost 100,000 K-12 teachers and students.
- These grants and awards are awarded through a competitive merit review process; each year, more than 50,000 volunteer, non-federal reviewers take part in the merit review process and in oversight review of ongoing awards.

In addition, each year, approximately 130 scientists, engineers and educators come to NSF through the Intergovernmental Personnel Act for periods of 1 – 3 years to work with permanent staff in managing the agency's programmatic activities and 1,200 contractors are supported through competitive contracting methods, and augment NSF staff to realize programmatic objectives.

NSF has already competitively sourced its commercial administrative functions, including its mailroom, copy center, health unit, travel center, and much of its software and systems development, bringing the total for contractor personnel to 1,400. A high level of competitively sourced commercial activities over the years has enabled NSF to focus its small workforce on its core business needs and mission-essential functions. Due in part to its forward-looking and highly effective implementation of competitive sourcing, although NSF's budget has increased by more than 80 percent in the past ten years, the number of NSF federal employees has increased by only 1 percent -see below.



Standards for Success

NSF supports the President's Management Agenda to competitively source commercial non-governmental activities. And, consistent with other core considerations in the Agenda, the agency seeks to ensure that human capital decisions are strategically driven and support the agency's mission and goals. Improved performance and results thus serve as the drivers for competitive sourcing decisions.

I. Public-Private or Direct Conversion Competition

In FY'00, NSF's Federal Activities Inventory Reform (FAIR) Act Inventory identified 533 FTE as subject to competitive sourcing. Since FY'00 however, the nature of many of these positions has changed, due in large measure to NSF's rapidly evolving, technology-enabled business environment. Furthermore, as the agency begins a Business Analysis and migration toward a competency-based occupation classification system that may redefine all NSF positions, NSF's FY'00 FAIR Act inventory will become increasingly obsolete.

Consequently, the agency plans to draw upon its Business Analysis to redefine its FAIR Act inventory. This will place the agency in a strong position to develop a strategic competitive sourcing plan that optimally supports its future business needs. Development of this plan will begin in FY'03.

II. Approved Competition Plan

In FY'02 the agency will initiate a comprehensive Business Analysis to help determine A&M investments for the foreseeable future. Outputs of the analysis will include:

- Competency-based occupation classification system – characteristics and alternatives;
- A revised FAIR Act inventory and competitive sourcing plan;
- Competency-driven organizational and individual learning strategies;
- Recruitment and retention strategies;
- Leadership and succession planning alternatives; and
- Organizational structure implications.

The Analysis will provide NSF with a comprehensive framework for its next-generation workforce, including a strategic, mission-oriented plan for competitive sourcing. NSF is committed to maintaining a small, efficient, agile workforce focused on realizing its mission and goals. While fewer federal employees may be needed to perform commercial activities, more employees with different skills may be needed to maintain core capabilities and manage contractors' performance. Through strategic competitive sourcing, NSF can effectively leverage the inherently governmental roles of policy and decision-making with the resources and expertise of the private sector.

III. Inter-Agency Commercial Support

NSF does not believe that this standard is relevant to its business. However if, in the course of refreshing legacy systems [e.g., payroll, personnel] any agency cross servicing options are identified, these will be considered on an appropriate competitive basis. NSF will also review its small inventory of Inter-Service Support Agreements to confirm that it is in compliance.

President's Management Agenda **Improved Financial Performance**

NSF's ability to embrace change and move forward quickly with implementation strategies has been key to NSF's financial management performance success, where a focus on both current requirements and future opportunities drive innovation.

Leadership and Results

NSF has successfully automated the "back-office" business of processing financial transactions. Harnessing the power of the Internet, the agency has developed a "direct business model" of business operations analogous to high performing private sector corporations which allows direct contact with customers in real-time.

During FY'01, NSF was able to accept, reconcile, and process over \$3.2 billion or 99.7% of all grant expenditures transactions via the Internet with direct integration to the agency's financial management system. NSF activities in this area may be adopted in the eGrants activity of the eGovernment initiative.

In FY'01, NSF received an unqualified opinion on its financial condition, providing a solid foundation for a discussion of agency performance and strategic investments in PEOPLE, IDEAS, and TOOLS. A new finance and payroll system was integrated into NSF's enterprise architecture successfully and seamlessly. And the agency continues to provide timely, accurate, and integrated financial and non-financial systems.

Plans for Next Generation Capability

NSF will continue to raise performance standards to ensure more effective and efficient operations through innovations that promise continued results-oriented progress.

A. Erroneous Payments.

NSF's fiduciary responsibility is to ensure that taxpayer funds entrusted to the agency are properly controlled and disbursed. NSF's goal has always been to make payments to the correct recipient, in the correct amount, each and every time. Consequently, the agency has a culture of high operating efficiencies and sophisticated systems, which result in very few improper payments.

The General Accounting Office (GAO) recently issued executive guidance (GAO-02-69G), which outlines strategies for agencies to effectively manage improper payments. NSF has already adopted many of these strategies in internal controls integrated into daily business functions.

Since all NSF payment functions are centrally located, NSF conducts a pre-payment review of all payments, which minimizes the number of improper payments. The

agency has also begun a review of payment processes through a statistical sample of all payments. The review will be complete in April 2002 and reported to OMB in May 2002. Additionally, NSF developed a tracking system for documenting and correcting in real-time those rare erroneous payments revealed during daily business activities.

NSF's goal is to reduce improper payments to a zero tolerance level. With current systems augmented by systems currently under development, this goal is very attainable. Currently, NSF is developing an automated accounts payable module to its financial system with paperless invoices and electronic receiving reports. This new process will electronically track the status of all payments, provide for electronic approvals, and process payments through Treasury utilizing strong system controls to ensure that payments are processed on time, in the correct amount, and to the proper vendor.

B. Increase Grant Monitoring

NSF has taken steps to increase award monitoring activities, paying particular attention to post-award reviews generally, developing and applying a risk assessment methodology, and developing tools to conduct on-site reviews. These steps build on many existing controls in place in the agency's pre-award environment.

The following initiatives support the agency's emphasis on effective grant monitoring:

Large Facility Projects Management and Oversight: In FY'01, NSF completed its Large Facility Projects Management and Oversight Plan, which outlines NSF's goals and strategies for integrating its current procedures and processes into a next-generation system for selecting, managing and overseeing large facility projects. In FY'02, NSF proceeded with implementation of this Plan. A Large Facility Projects Guidelines and Procedures Manual is currently being developed, the personnel selection process for the Deputy, Large Facility Projects is drawing to a close, and specialized tools to be used in the conduct of Total Business System Reviews (TBSR) have been developed. Furthermore, a pilot TBSR has been completed using these specialized monitoring tools at the National Center for Atmospheric Research (NCAR).

Post-Award Management: NSF has strengthened procedures for monitoring awardees' administrative and financial management practices and compliance with laws and regulations.

- Risk Plan - The agency has developed a draft risk plan that defines broad risk factors and includes a more specific matrix of weighted factors. This matrix provides the algorithms for describing relative risk across the non-facilities awards universe. The draft includes a standard award review protocol that describes both pre-award desk reviews and on-site monitoring review activities, and the standard information that will be documented for each on-site visit.

- Benchmarking – NSF's approach to post-award management is informed by best practices established in other organizations. To this end, NSF benchmarked the post-award monitoring activities of other federal grants-making agencies and subsequently modified monitoring tools to incorporate best practices.
- Developing Critical Competencies - The agency has procured the services of a training firm to develop a customized course on post-award monitoring. This course is offered through the NSF Academy, with the curriculum focused on integrated programmatic and administrative activities across the awards management continuum.
- On-site Grant Monitoring – A risk-based, on-site grant monitoring methodology has been designed to supplement the agency's current awards management system, which includes a substantial financial and administrative monitoring component including the submission of financial status reports throughout the award lifecycle. A pilot program of on-site monitoring visits is currently being conducted. This pilot is designed to test the agency's proposed site visit methodology, tools, and site visit report format and will consist of a minimum of 15 visits to be completed by September 30, 2002.

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

- Property-Reporting Requirements - The agency has developed effective monitoring tools for government-owned equipment in the custody of awardee institutions responsible for large research and education awards and projects to ensure compliance with property reporting requirements.

C. Financial Management Systems Security

NSF remains committed to providing a reliable and secure information technology structure for financial information. The agency will continue to expand and refine the program to provide even better safeguards for the future. NSF will continue to address this in its ITS program described in the Expanding Electronic Government section of this Plan.

Standards for Success

In addition to the plans described in the preceeding section, the agency is addressing the core criteria described in the President's scorecard standards for success in the following ways:

I. Financial Management Systems Meet Federal Financial Management System Requirements and Applicable Federal Accounting and Transaction Standards

NSF's financial management systems have met federal financial management system requirements and applicable federal accounting and transactions standards since 1996. The agency will build upon its current best practices to meet the requirements of quarterly financial statement compilation and reporting along with continuing to provide real-time financial information for effective decision support. NSF is planning for future expansion of electronic transaction processing in areas such as an electronic travel system.

II. Accurate and Timely Financial Information

OMB Bulletin 01-09 "Form and Content of Agency Financial Statements" dated September 25, 2001, instituted 5 significant reporting changes: Accelerated Reporting, Interim Reporting, Comparative Reporting, Budget Integration and Integrated Reporting. While the agency has implemented comparative reporting since FY'00 when it was incorporated in the FY'00 Accountability Report, the agency is taking the following steps to meet the additional requirements.

NSF considers accelerated and integrated reporting as one effort. The agency has developed detailed plans that are being implemented to meet the accelerated FY'03 and future deadline for a combined Performance and Accountability Report. Plans focus on revising the agency's GPRA reporting process and structure and revising financial statement preparation and audit dates. NSF is also working to automate the closing of its books and financial statement compilation to provide interim financial reporting. In the past, NSF has prepared interim reports but the agency is now undertaking a more systematic methodology to meet interim reporting necessary (semiannual, quarterly or monthly). NSF will send OMB a joint NSF CFO and OIG schedule that describes how the agency will meet the new reporting dates.

NSF additionally participates on the CFO Council Accelerated Financial Statement Reporting Committee to keep abreast of and to provide active input on this issue.

III. Integrated Financial and Performance Management Systems Supporting Day-to-Day Operations

NSF's financial system has the capability to provide full project cost information to decision-makers. The system provides the ability to record and capture information for cost identification fields called program reference codes. These program reference

codes function as project codes, allowing the financial system to track and maintain full cost data at the project level. Additionally, NSF's financial system has recently been enhanced and now allows NSF staff to query cost information at various levels.

The agency's Executive Information System (EIS) provides transactional data as well as summary information on performance indicators, which are utilized by NSF staff to support decision-making. In addition, NSF is working with consultants to help further refine processes that merge financial (cost) and performance information.

IV. Unqualified and Timely Audit Opinion on the Annual Financial Statements; No Material Internal Control Weaknesses Reported by the Auditors

NSF has submitted annual audited financial statements and audit opinion within prescribed deadlines since 1996. The agency has received an unqualified opinion on those financial statements since 1998. NSF is committed to realizing a submission of unqualified and timely audit opinions within the deadline of February 1 for fiscal year 2002 and earlier dates beginning in fiscal year 2004. With its highly automated and agile financial systems, NSF is well positioned to meet all required deadlines.

In addition, NSF has not had a material weakness in internal controls since 1998. The agency is proactively addressing all FY '01 audit findings, and is dedicated to the effective mitigation of material weaknesses in internal controls in fiscal year 2002 and beyond.

President's Management Agenda **Budget and Performance Integration**

Since enactment of the Government Performance and Results Act of 1993 (GPRA) and the Chief Financial Officers Act of 1990, NSF has integrated budget request and performance information. The agency's results-centric approach to long-range planning and budget development has focused attention on strategic outcome goals and mission-responsiveness.

Leadership and Results

A. Approach to Budget and Performance Integration

NSF's long-range planning and budget activities are distributed throughout the agency's program Directorates and Offices, with coordination activities centralized within the Office of Budget, Finance and Award Management (BFA) and the Office of Information and Resources Management (OIRM). Responsibility for development, coordination and innovation in GPRA activities reside with a team of four senior NSF managers - the agency's GPRA Infrastructure Implementation Council (GIIC) - who report directly to the agency's Chief Operating Officer. Currently, the GIIC Chair is the agency's Chief Financial Officer; other GIIC principals include the Chief Information Officer, the Director of NSF's Office of Integrative Activities, and the Senior Associate, Strategy, Policy and Planning from the Office of the Director. GIIC is assisted by a working group (WG) composed of key staff from the program Directorates and Offices, BFA and the Budget Division and OIRM, many of whom are also members of the agency's Budget Planning Liaison Group.

The agency's annual Budget Request and its annual GPRA Performance Plan provide an agency-wide picture of program and management activities planned for a given year within the context of the agency's Strategic Plan. In consultation with the agency's senior managers in the program Directorates and Offices, GIIC and the GIIC WG coordinate preparation of the annual performance plan which is developed in concert with the agency's Budget Request. GIIC and GIIC WG members ensure that the Budget Request and the GPRA Performance Plan reflect the annual set of agency-wide strategic outcome and management goals.

External experts convened as Committees of Visitors and Advisory Committees assess the effectiveness of resulting outcomes derived from the agency's investments in PEOPLE, IDEAS and TOOLS. Issues highlighted by these groups facilitate the identification of emerging common themes, and catalyze discussion of research and education needs and special opportunities. Issues identified are discussed by senior management and the resulting iterations of evaluation, planning and budgeting that occur across program and business operations functions within the agency contribute to development of a strategic, performance-based OMB Budget Request and accompanying Performance Plan.

Each year, NSF's Accountability and Performance Reports build on the framework established in the GPRA Strategic Plan to provide a unified presentation describing how the agency achieves its mission and desired outcomes and results. These reports describe programmatic and management goals and results, and management controls in place. The Accountability Report describes the agency's financial status and NSF compliance with laws and regulations – thereby attesting to NSF's effective stewardship of the science and engineering enterprise and the integrity with which the agency undertakes its mission.

With implementation of the agency's GPRA Strategic Plan in FY'01, the agency's FY'01 Accountability and Performance Reports were the first to reflect the strategic outcome goals of PEOPLE, IDEAS and TOOLS.

B. Budget Account Structure

In FY'00, during development of the NSF GPRA Strategic Plan, the agency examined the potential of alternative budget account structures. The agency-wide working group charged with doing so concluded that the agency should retain its current account structure, noting that a migration to an outcome goal-oriented account structure did not guarantee improved agency performance. In fact, the group indicated that an artificial, separation of PEOPLE, IDEAS and TOOLS had significant potential to reduce the effectiveness of NSF investments to realize the agency's mission, vision and strategic goals. They concluded that the agency's current account structure best supported the strong interrelationships and interdependencies between PEOPLE, IDEAS and TOOLS investments.

Consequently, NSF has chosen to present a *crosswalk* between its budget account structure and its PEOPLE, IDEAS and TOOLS performance-based structure. The use of this crosswalk reflects the complexity of NSF investments and emphasizes the synergy among NSF's three strategic outcome goals.

C. Performance-Based Budget Justification

Prior to the implementation of GPRA, NSF's budget justification reflected the complex interplay among the established appropriations accounts by presenting the budget by key program functions – Research Project Support, Research Facilities, Education and Training, and Administration and Management. The relationship between the appropriations accounts and the key program functions was described in a funding crosswalk as well as in the written justification.

Beginning with the FY 2001 Budget Request to OMB and then the Congress, NSF recast its budget to represent the agency's strategic outcome goals of PEOPLE, IDEAS, and TOOLS. This was partly accomplished by presenting a crosswalk between the existing appropriations account structure and the new strategic goals, in an approach similar to that described above. In addition, the budget justification was restructured to

consistently describe the influence of the strategic goals on specific program Directorates and Offices.

With the completion of the FY 2001 Accountability and GPRA Performance Reports, NSF has now taken this new performance-based structure full-circle. This experience will contribute to the tighter integration of performance and budget information in future budget justifications. In fact, GAO found that NSF was among agencies that “not only developed the required linkage and provided an estimate of funding associated with expected performance, but also clearly indicated how that funding was derived or allocated from the program activities of their budget requests – the first step in defining the performance consequences of a budget decision.” (*GAO-02-236 Managing for Results p.13*)

D. Participation in the Federal CFO Council

NSF participates in the Performance/Budget Integration committee established by the CFO Council to identify actions agencies may take to demonstrate effective budget and performance integration strategies. This committee will develop a best practices document that will be shared government wide.

E. Workshop on Budget and Performance Integration

In May 2002 NSF, in coordination with OMB and the President’s Management Council, will convene an invitational workshop to explore the knowledge base that informs budget and performance integration and to identify research opportunities that will refine methodologies in this rapidly developing area of interest. The workshop, entitled “Strengthening Program Effectiveness Measurement of Federal Programs” will include scholars who are recognized experts in performance measurement. This workshop is likely to inform not only NSF’s approach to budget and performance integration, but approaches taken by OMB and other Departments and agencies throughout government.

Standards for Success

In addition to the plans described in the preceding section, the agency is addressing the core criteria described in the President’s scorecard standards for success in the following ways:

I. Integrated Planning and Evaluation Involving both Budget and Program Staff

NSF’s approach to GPRA implementation, and the congruence of this approach with the budget development process, currently provide the framework for effective integration of planning and evaluation activities. The agency will continue to improve its effectiveness through a variety of approaches. One involves an over-arching

analysis of the *Resource Allocation* process, the *Performance Assessment and Accountability* process and the *Knowledge Management* process as outlined in the Business Analysis. While each of these processes is separately identified for the purposes of the Business Analysis contract, they are, of course, deeply intertwined. Together, they assure budget and performance integration, especially after additional criteria for success are identified.

Supporting *Human Capital* and *Tool and Technologies* strategies that support NSF's mission-oriented processes will facilitate a tighter integration of planning and evaluation. For example, increased interaction between program and planning staff can be effected through internal details, internal workshops, additional presentations on aspects of GPRA and the President's Management Agenda (PMA), and more complete development of NSF's corporate systems such as the Enterprise Information System.

II. Streamlined, Clear, Integrated Agency Plan/Budget

Beginning with the FY'01 Budget Request to OMB and then the Congress, NSF recast its budget to represent the new strategic outcome goals of PEOPLE, IDEAS and TOOLS. The agency then prepared the FY'01 Performance and Accountability Reports using the PEOPLE, IDEAS and TOOLS framework.

Based on the new reporting requirements for FY'02 GPRA reporting, NSF will prepare a single Performance and Accountability Report that incorporates what are currently two separate reports -- the Foundation's annual GPRA Performance Report and the annual Accountability Report. This new report will build on the agency's past successes to provide a streamlined, clear, integrated presentation that describes and links the agency's performance goals, output targets and resources necessary to support these goals in the context of past investment results. Quantitative output and outcome measures will be monitored throughout the course of each year using NSF corporate systems; qualitative outcome and output measures will be assessed using both retrospective and prospective approaches.

III. Alignment of Staff, Budget Accounts and Program Activities

NSF's annual Budget Request includes a crosswalk that aligns the budget account structure with the agency's three strategic outcome goals, and contains information on the amount and range of programmatic activities to be provided given the resource support provided for PEOPLE, IDEAS and TOOLS.

Future efforts to align budget accounts, staff and program/activities will be informed by the pending workshop on Budget and Performance Integration and approaches used to explore full budgetary cost.

IV. Full Budgetary Cost

NSF's strategic outcome goals are realized through the efforts of the agency's partners in the science and engineering research and education communities. This impacts how the agency might determine full budgetary costs associated with mission accounts and activities in support of strategic goals. With respect to administrative and management expenses, in FY'01 the Statement of Net Cost described in the agency's Accountability Report aligned administrative costs with strategic outcome goals.

GIIC discussions will explore approaches to full budgetary cost; these discussions will be informed by the NSF Workshop on Budget and Performance Integration to be held in May 2002. Analysis of a range of cost-benefit studies, evidence-based logic models and benchmarking studies will be examined under this standard. Assignment of overhead and capital costs to programs will also be addressed. In addition, NSF has contracted with Pricewaterhousecoopers (PWC) to assist the agency in evaluating cost information.

V. Program Effectiveness

NSF's effectiveness as an agency is judged by its mission responsiveness and successful progress toward meeting its outcome goals. Qualitative assessment of NSF's portfolio is conducted by external experts who use both retrospective and prospective approaches. Their judgments are influenced by their experience-based norms and incorporate investment criteria such as quality and relevance that are widely used across the federal government. In concert with the President's Management Council, NSF monitors quarterly and reports annually, management performance based on quantitative management goals and investment process goals.

Program assessments provided by external experts, and program evaluations conducted under contract provide evidence of the effectiveness of NSF programs. The agency uses these analyses to formulate future budget requests. The Business Analysis will reveal opportunities to further strengthen the relationship between program effectiveness and budget formulation, with particular emphasis on the *Resource Allocation and Performance Assessment and Accountability* core business processes. However other core business processes will impact this standard for success – for example, program effectiveness is also dependent on achievement of the effective *management and oversight* of NSF's grants and contracts.