U.S. DEPARTMENT OF COMMERCE

TECHNOLOGY ADMINISTRATION

Technology Administration

Mission Statement

The Technology Administration's (TA's) mission is to work with U.S. industry to maximize technology's contribution to U.S. economic growth by maintaining and improving key components of the nation's technological infrastructure; fostering the development, diffusion, and adoption of new technologies and leading business practices; creating a business and policy environment conducive to innovation; and disseminating technical information.

TA works with U.S. industry to maximize technology's contribution to U.S. economic growth. Led by the Under Secretary for Technology, TA fulfills its broad responsibilities through three component organizations:

The Office of the Under Secretary for Technology provides policy guidance to the Secretary of Commerce and the Technology Administration's component agencies and serves as an advocate for innovation and industrial competitiveness within and outside government. The Under Secretary coordinates the civilian technology efforts of federal agencies and helps to shape federal civilian research and development (R&D) priorities based upon the views of industry. The Under Secretary also provides counsel to the Secretary of Commerce on all matters affecting innovation and coordinates with counterpart offices in the trade and economic agencies to create unified, integrated trade and technology policies. Pursuant to these roles, the Under Secretary oversees and utilizes the analytic, outreach, and policy development expertise of the Office of Technology Policy (OTP) and the Office of Space Commercialization.

The National Institute of Standards and Technology (NIST) develops and disseminates measurement techniques, reference data, test methods, standards, and other infrastructural technologies and services required by U.S. industry to compete in the 21st century. In addition to its core measurement, testing, and standards functions, NIST also conducts several extramural programs, including the Advanced Technology Program, to stimulate the development of high-risk, broad-impact technologies by U.S. firms; the Manufacturing Extension Partnership, to help smaller firms adopt new manufacturing and management technologies; and the Baldrige National Quality Program, to help U.S. businesses and other organizations improve the performance and quality of their operations by providing clear standards and benchmarks of quality.

The National Technical Information Service (NTIS) operates a central clearinghouse of scientific and technical information that is useful to U.S. business and industry. NTIS collects scientific and technical information; catalogs, abstracts, indexes, and permanently archives the information, disseminating products in the forms and formats most useful to its customers; develops electronic and other new media to disseminate information; and provides information processing services to other federal agencies.

Priorities

Technical infrastructure for 21st century innovation

Leading-edge scientific and technical work requires multiple disciplines, high levels of collaboration among organizations and people with diverse capabilities, and highly specialized facilities and complex tools. For more than a century, the NIST laboratories have successfully collaborated with industry and universities to provide the measurement techniques and technical tools needed by America's innovators.

To continue this record of success, NIST must respond to new and challenging demands in areas where public and private R&D investments are large, measurement and standards capabilities are critical, and the potential benefits are substantial and broad. Possible areas of priority for NIST include health care, nanotechnology, information technology (IT) security, and IT interoperability. In these areas and others, NIST will build on its tradition of using strategic partnerships with industry, universities, and other governmental agencies to implement highly leveraged R&D infrastructure solutions that maximize their impact through strategic use of collaborative research, R&D grants, personnel exchange, and joint planning.

Policies and business environment that encourages innovation

Technology is a fundamental component of economic growth and rising living standards. Technological progress drives national productivity growth, provides U.S. industries with a competitive edge in world markets, and also serves as a linchpin for effective national security. As such, it is critical that federal policies remain abreast of national and international trends and promote a positive environment for technological and business innovation. The associated policy issues are diverse and numerous, including technology transfer and productive partnerships among the many public and private organizations that conduct research and drive commercialization of innovative products and processes, the health of the nation's investment in R&D (public, private industry, and venture capital), the strength of the human and physical infrastructure supporting the nation's innovation system, and the maintenance of business conditions (such as taxes, trade, intellectual property protection, and government regulations) that facilitate technological innovation and market risk taking.

Opportunities for small manufacturers

Small and medium-sized manufacturers face a complex set of demands: they must increase production efficiency, respond quickly to market changes, use knowledge effectively, and deliver customized products to diverse supply chain partners and customers. Moreover, large firms at the center of manufacturing supply chains are increasingly demanding that their smaller supply chain partners productively use e-business practices and technologies and operate at internationally competitive cost and quality levels.

These market pressures raise the need for low-cost, fast, high-quality tools and training to help smaller manufacturers adopt e-business practices—the types of services that can be provided most readily and efficiently through the NIST Manufacturing Extension Partnership (MEP) program. The MEP program, a national network of more than 400 centers and offices that brings together federal, state, local, and private resources, continues to help small manufacturers overcome the information and cost barriers to adopting high performance practices.

Performance excellence in health care and education organizations

Established in 1988, NIST's Baldrige National Quality Program (BNQP) has become a highly visible public-private partnership that identifies and encourages performance excellence in U.S. manufacturers, service companies, educational organizations, and health care providers. The criteria for the annual Malcolm Baldrige National Quality Award are widely distributed and help organizations enhance their competitiveness by focusing on two goals: delivering ever-improving value to customers and improving overall organizational performance. The BNQP is a highly leveraged public investment that generates broad economic and societal benefits.

Beginning with the 1999 award cycle, the BNQP added two new award eligibility categories, education and health care, and developed detailed performance criteria for these two sectors. For the education award, participation is open to for-profit and not-for-profit public, private, and government organizations that provide education services in the United States and its territories. The addition of these two categories has received wide praise, and each is expected to generate broad benefits. For instance, as Chair of the National Education Goals Panel, then-Governor of Wisconsin Tommy Thompson stated, the Baldrige criteria for education "can provide educators with a framework and strategies for improving their schools and helping children to reach high standards." Through the BNQP, the nation has an opportunity to broadly apply leading-edge thinking about performance, quality, and accountability to education and health care organizations. NIST will continue to champion and support this innovative program.

Adequately supporting NIST's core mission by investing wisely in facilities and equipment modernization

NIST's leading-edge measurement research requires consistent investment in facilities and equipment. In order for NIST to meet stringent industry measurement requirements in such diverse areas as nanotechnology, semiconductors, biotechnology, advanced manufacturing, and information technology, new state-of-the-art facilities and equipment are required.

Unfortunately, many of NIST's 32-47-year-old facilities are inadequate to support some types of measurement research essential to U.S. industry in the development of new technologies. The principal inadequacy involves the lack of high-quality systems to maintain extremely precise environmental controls, including temperature, humidity, vibration, electric power quality, and air cleanliness. In addition, NIST has insufficient resources to acquire the advanced and expensive research equipment needed to meet current industry measurement demands and conduct metrology research to meet future demands.

NIST plans to address these challenges with a combination of new construction; renovation of existing facilities; strategic investment in state-of-the-art equipment; and attention to safety, capacity, maintenance, and major repair needs. With appropriations received so far, NIST has constructed an advanced chemical sciences laboratory and has begun construction of an advanced measurement laboratory in Gaithersburg, Maryland, which is slated for completion in 2004. In order to take full advantage of the technical possibilities afforded by these exciting new facilities, NIST staff members require increased and consistent investments in equipment. Additional funds for facilities support and modern laboratories at the Boulder, Colorado site are urgently needed. Moreover, NIST's backlog of safety, capacity, and major repair needs at both sites continues to grow.

FY 2003 Program Changes

Under Secretary/Office of Technology Policy

	Base		Increase/Decrease	
	FTE	Amount	FTE	Amount
Experimental Program to Stimulate Competitive Technology	1	$618	-1	-$618

A decrease of -1 FTE and -$618 is included to reflect the conclusion of the Experimental Program to Stimulate Competitive Technology.

National Institute of Standards and Technology

Scientific and Technical Research and Services

Federal Activities Inventory Reform (FAIR) Act Studies	0	$0	0	+$300

An increase of 0 FTE and +$300 is included to conduct FAIR Act studies to meet the requirements in the President's Management Agenda for FY 2003.

Chemical Science and Technology	236	$38,298	+7	+$3,000

An increase of +7 FTE and +$3,000 is included to provide advanced measurements and standards that improve the quality and reduce the cost of health care in the United States. Of this amount, a transfer of $500 will be made to the National Institute of Standards and Technology (NIST) Working Capital Fund.

Physics	183	$35,317	+4	+$4,000

An increase of +4 FTE and +$4,000 is included to provide measurements, standards, and data for private sector development of advanced nanotechnologies, including applications in most major industrial sectors, such as health care, semiconductors, information technology, communications, defense, biotechnology, and magnetic data storage. Of this amount, a transfer of $1,200 will be made to the NIST Working Capital Fund.

Materials Science and Engineering	333	$61,481	+17	+$6,000

An increase of +17 FTE and +$6,000 is included to ensure the continuing competitiveness of U.S. neutron measurement capabilities supporting advances in new materials, biology, chemistry, engineering, physics, and many other critical applications by strengthening the scientific research programs at the NIST Center for Neutron Research.

Building and Fire Research	114	$17,359	+4	+$2,000

An increase of +4 FTE and +$2,000 is included to develop and implement, through a public-private program, the standards, technology, and practices needed for cost-effective safety and security of buildings, including emergency response.

	Base		Increase/Decrease	
	FTE	Amount	FTE	Amount
Computer Science and Applied Mathematics	326	$53,576	+11	+$3,000

An increase of +4 FTE and +$1,000 is included to continue the Computer Security Expert Assist Team made up of computer security experts at NIST who will provide assistance to Federal agencies on a reimbursable basis.

An increase of +7 FTE and +$2,000 is included to accelerate critical technologies that enhance the effective detection, preparedness, prevention, protection, response, recovery, and incident management of natural and manmade disasters by integrating communication systems, networks, computing devices, sensors, and other relevant applications.

Of this amount, a transfer of $150 will be made to the NIST Working Capital Fund.

Research Support Activities	234	$47,285	+13	+$39,695

An increase of 0 FTE and +$35,000 is included to provide the advanced measurement and research equipment needed to realize the capabilities of NIST's Advanced Measurement Laboratory in Gaithersburg, Maryland, which is due for completion in October 2003.

An increase of +13 FTE and +$4,695 is included to expand NIST's intramural research through programs such as the very successful Building Competence for Advanced Measurements Program (formerly known as the Technical Competence Program), which supports the development of cutting-edge new measurement capabilities that will be needed to support future advances in industry and science.

Of this amount, a transfer of $2,350 will be made to the NIST Working Capital Fund.

Industrial Technology Services

Advanced Technology Program	254	$224,994	-92	-$78,839

A decrease of -92 FTE and -$78,839 is included. The total FY 2003 request provides funding for new awards and continues funding projects begun in prior years. In addition, NIST proposes reforms designed to improve the program.

Manufacturing Extension Partnership	90	$108,208	0	-$95,285

A decrease of 0 FTE and -$95,285 is included to return the program to its original funding plan, which called for the phase-out of federal monies to Manufacturing Extension Program (MEP) centers after six years of funding. Federal funding will continue to be provided to support MEP centers that are less than six years old and to fund administrative oversight of the program.

Construction

	Base		Increase/Decrease	
	FTE	Amount	FTE	Amount
Construction and Major Renovations	51	$21,649	+2	+$32,845

An increase of 0 FTE and +$15,000 is included for fit-up and relocation expenses related to NIST's Advanced Measurement Laboratory in Gaithersburg, Maryland, which due for completion in October 2003.

An increase of +2 FTE and +$17,300 is included to begin the next steps to complete several urgently needed construction and renovation projects at NIST's Boulder, Colorado site, including a new primary electrical service and the first phase of a Central Utility Plant.

An increase of 0 FTE and +$545 is included to increase NIST's safety, capacity, maintenance, and major repairs base funding to maintain the Gaithersburg, Maryland and Boulder, Colorado sites.

Targets and Performance Summary

(See individual Performance Goal section for a description of each measure)

Performance Goal 1: Provide leadership in promoting national technology policies that facilitate U.S. pre-eminence in key areas of science and technology and leverage technological innovation to strengthen American global competitiveness

Measures	FY 1999 Target	FY 1999 Actual	FY 2000 Target	FY 2000 Actual	FY 2001 Target	FY 2001 Actual	FY 2002 Target	FY 2003 Target
Outreach to Stakeholders	New	New	New	New	New	New	Activities Completed	Activities Completed
Policy Analysis and Education	New	New	New	New	New	New	Activities Completed	Activities Completed
Policy Advocacy	New	New	New	New	New	New	Activities Completed	Activities Completed

Performance Goal 2: Provide technical leadership for the nation's measurement and standards infrastructure and ensure the availability of essential reference data and measurement capabilities

Measures	FY 1999 Target	FY 1999 Actual	FY 2000 Target	FY 2000 Actual	FY 2001 Target	FY 2001 Actual	FY 2002 Target	FY 2003 Target
Qualitative assessment and performance evaluation using peer review [1]	Complete	Completed	Complete	Completed	Complete	Completed	Complete	Complete
Economic impact studies [1]	Complete	Completed	Complete	Completed	Complete	Completed	Complete	Complete
Standard Reference Materials Available	1,315	1,288	1,300	1,292	1,315	1,335	1,350	1,360
Standard Reference Data Titles Available	62	60	63	63	66	65	68	70
Number of Items Calibrated	3,375	3,118	3,200	2,969	3,100	3,192	2,900	2,900
Technical Publications Produced [2]	2,150	2,270	2,450	2,250	2,200	2,207	2,050	2,100

Performance Goal 3: Accelerate technological innovation and development of the new technologies that will underpin future economic growth [3]

Measures	FY 1999 Target	FY 1999 Actual	FY 2000 Target	FY 2000 Actual	FY 2001 Target	FY 2001 Actual	FY 2002 Target	FY 2003 Target
Economic impact studies [1]	Complete	Completed	Complete	Completed	Complete	Completed	Complete	Complete
Cumulative Number of Technologies under Commercialization	120	120	170	166	180	Available 5/02 [4]	190	210
Cumulative Number of Publications	480	468	680	565	720	Available 5/02 [4]	770	860
Cumulative Number of Patents Filed	640	607 [5]	770	693	790	Available 5/02 [4]	930	1,040

Performance Goal 4: Improve the technological capability, productivity, and competitiveness of small manufacturers[6]

Measures	FY 1999 Target	FY 1999 Actual[7]	FY 2000 Target	FY 2000 Actual	FY 2001 Target	FY 2001 Actual	FY 2002 Target	FY 2003 Target
Increased Sales Attributed to MEP Assistance	$443M	$425M (Final Estimate)	$670M	$698M	$708M	Available Late-2002	$726M	Discontinued[8]
Capital Investment Attributed to MEP Assistance	$359M	$576M (Final Estimate)	$864M	$873M	$913M	Available Late-2002	$910M	Discontinued[8]
Cost Savings Attributed to MEP Assistance	New	$364M (Final Estimate)	$545M	$482M	$576M	Available Late-2002	$497M	Discontinued[8]

Performance Goal 5: Assist U.S. businesses and other organizations in continually improving their productivity, efficiency, and customer satisfaction by adopting quality and performance improvement practices

Measures	FY 1999 Target	FY 1999 Actual	FY 2000 Target	FY 2000 Actual	FY 2001 Target	FY 2001 Actual[9]	FY 2002 Target	FY 2003 Target
Number of Applications per Year to Malcolm Baldrige National Quality Award and Baldrige-based State and Local Quality Awards	892	1,067	916	911	935	646	954	1,110
Number of Baldrige Criteria Mailed by BNQP and by Baldrige-based State and Local Quality Programs	203,700	211,028	197,600	176,248	193,600	164,949	191,700	177,870

Performance Goal 6: Enhance public access to worldwide scientific and technical information through improved acquisition and dissemination activities

Measures	FY 1999 Target	FY 1999 Actual	FY 2000 Target	FY 2000 Actual	FY 2001 Target	FY 2001 Actual	FY 2002 Target	FY 2003 Target
Number of New Items Available (Annual)	New	New	New	New	New	505,068	520,000	550,000
Number of Information Products Disseminated (Annual)	New	New	New	New	New	14,524,307	15,325,711	16,155,711
Customer Satisfaction	New	New	New	New	New	97%	97%	98%

1 Peer review and economic impact studies are not cumulative; therefore, numerical targets and performance data are not applicable and are not provided here. For a complete copy of the most recent peer review report on the NIST laboratories

6 FY 2001 actuals are not yet available due to data collection requirements (lag is one year). FY 2000 actuals are reported here for the first time.

8 The President's budget request proposes to terminate federal funding for all mature MEP centers. The national program will continue to provide funding for two MEP centers, and MEP will focus on providing a central coordination role. In light of these proposed changes to the program, MEP will reevaluate its performance measures for FY 2003 and subsequent years. These measures will not be linked directly to the services rendered by MEP centers no longer receiving federal funding.

9 Data based on applications to and Criteria disseminated by BNQP and 41 out of 54 state and local programs.

Resource Requirements Summary

(Dollars in Millions. Funding amounts reflect total obligations.)
Information Technology (IT)
Full-Time Equivalent (FTE)

Performance Goal 1: Provide leadership in promoting national technology policies that facilitate U.S. pre-eminence in key areas of science and technology and leverage technological innovation to strengthen American global competitiveness

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Available	FY 2003 Base	Increase / Decrease	FY 2003 Request
Under Secretary (US)/OTP	10.8	7.1	7.8	8.2	8.7	-0.6	8.1
Reimbursable	0.2	0.1	0.4	0.6	0.6	0.0	0.6
Total Funding	11.0	7.2	8.2	8.8	9.3	-0.6	8.7
IT Funding	0.2	0.4	0.3	0.2	0.2	0.0	0.2
FTE	44	39	40	51	51	-1	50

Performance Goal 2: Provide technical leadership for the nation's measurement and standards infrastructure and ensure the availability of essential reference data and measurement capabilities

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Available	FY 2003 Base	Increase / Decrease	FY 2003 Request
NIST							
Scientific and Technical Research & Services							
Electronics and Electrical Engineering	38.5	38.6	40.6	41.8	44.5	0.1	44.6
Manufacturing Engineering	19.1	19.0	18.9	20.7	22.0	0.0	22.0
Chemical Science and Technology	32.0	33.2	34.3	35.9	38.3	2.5	40.8
Physics	29.1	29.8	32.8	33.7	35.3	2.8	38.1
Material Sciences and Engineering	50.0	51.9	54.0	59.0	61.4	6.1	67.5
Building and Fire Research	14.9	15.2	17.6	20.1	17.4	2.0	19.4
Computer Science and Applied Math	42.5	46.5	55.6	55.4	53.6	2.9	56.5
Technology Assistance	17.6	17.8	17.8	18.4	19.3	0.0	19.3
Research Support Activities	31.7	26.2	29.0	44.9	47.3	37.4	84.7
Construction	19.6	200.5	37.7	86.7	21.7	32.8	54.5
Working Capital Fund							
Direct Investments	18.8	23.1	28.5	23.1	20.8	4.2	25.0
Reimbursable	100.5	110.7	115.5	136.0	137.9	0.0	137.9
Total Funding	414.3	612.5	482.3	575.7	519.5	90.8	610.3
IT Funding	48.0	50.2	54.2	65.9	68.3	0.6	68.9
FTE	2,762	2,670	2,594	2,719	2,721	94	2,815

Performance Goal 3: Accelerate technological innovation and development of the new technologies that will underpin future economic growth

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Available	FY 2003 Base	Increase / Decrease	FY 2003 Request
NIST							
Industrial Technology Services							
Advanced Technology Program	190.3	198.3	175.4	185.0	225.0	-78.8	146.2
Working Capital Fund	0.0	0.5	0.4	0.7	0.5	0.0	0.5
Total Funding	190.3	198.8	175.8	185.7	225.5	-78.8	146.7
IT Funding	2.8	5.8	4.0	5.2	5.9	-0.6	5.3
FTE	271	270	239	254	254	-92	162

Performance Goal 4: Improve the technological capability, productivity, and competitiveness of small manufacturers

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Available	FY 2003 Base	Increase / Decrease	FY 2003 Request
NIST							
Industrial Technology Services							
Manufacturing Extension Partnership	127.9	103.3	105.9	111.3	108.2	-95.3	12.9
Working Capital Fund	3.5	1.1	0.5	0.4	0.4	0.0	0.4
Total Funding	131.4	104.4	106.4	111.7	108.6	-95.3	13.3
IT Funding	2.6	2.9	1.5	2.8	3.1	-0.2	2.9
FTE	109	91	87	90	90	0	90

Performance Goal 5: Assist U.S. businesses and other organizations in continuously improving their productivity, efficiency, and customer satisfaction by adopting quality and performance improvement practices

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Available	FY 2003 Base	Increase / Decrease	FY 2003 Request
NIST							
Scientific and Technical Research and Services							
National Quality Program	3.9	5.3	5.4	5.7	5.8	0.0	5.8
Working Capital Fund	2.3	3.5	1.1	2.1	2.1	0.0	2.1
Total Funding	6.2	8.8	6.5	7.8	7.9	0.0	7.9
IT Funding	0.5	0.7	0.7	0.9	0.9	0.0	0.9
FTE	39	51	49	50	50	0	50

Performance Goal 6: Enhance public access to world wide scientific and technical information through improved acquisition and dissemination activities

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Available	FY 2003 Base	Increase/ Decrease	FY 2003 Request
NTIS							
Reimbursable	33.3	38.3	34.7	49.5	41.0	0.0	41.0
Direct							
Total Funding	33.3	38.3	34.7	49.5	41.0	0.0	41.0
IT Funding	9.9	9.9	9.8	N/A	N/A	N/A	N/A
FTE	322	230	196	260	260	0	260

Discontinued Performance Goal: Protect the national information infrastructure

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Available	FY 2003 Base	Increase / Decrease	FY 2003 Request
NIST							
Scientific and Technical Research and Services							
Critical Infrastructure Protection Grant Program	N/A	N/A	5.0	0.0	0.0	0.0	0.0
ITS: Institute for Infrastructure Protection							
Working Capital Fund							
Total Funding	N/A	N/A	5.0	0.0	0.0	0.0	0.0
IT Funding	N/A	N/A	0.0	0.0	0.0	0.0	0.0
FTE	N/A	N/A	2	0	0	0	0

Grand Total	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Available	FY 2003 Base	Increase / Decrease	FY 2003 Request
US/OTP	11.0	7.2	8.2	8.8	9.3	-0.6	8.7
NIST							
Scientific and Technical Research and Services	279.3	283.5	311.0	335.6	344.9	53.8	398.7
Industrial Technology Services	318.2	301.6	281.3	296.3	333.2	-174.1	159.1
Construction	19.6	200.5	37.7	86.7	21.7	32.8	54.5
Working Capital Fund	125.1	138.9	146.0	162.3	161.7	4.2	165.9
NTIS	33.3	38.3	34.7	49.5	41.0	0.0	41.0
Total Funding	786.5	970.0	818.9	939.2	911.8	-83.9	827.9
Direct	627.9	792.7	637.8	726.8	708.5	-88.1	620.4
Reimbursable	158.6	177.3	181.1	212.4	203.3	4.2	207.5
IT Funding	64.0	69.9	70.5	75.0	78.4	-0.2	78.2
FTE	3,547	3,351	3,207	3,424	3,426	1	3,427

IT funding is included in total funding; total funding includes direct and reimbursable obligations.
Reimbursable funding includes NIST working capital fund investments.

Skill Summary:

At the end of FY 2001, the staffs of the three component bureaus of TA reflected the following levels of educational attainment:

- Total US/OTP staff included 9% Ph.D., 22% M.A. or M.S., and 37% B.A. or B.S. holders.
- Total NIST staff included 29% Ph.D., 14% M.A. or M.S., and 18% B.A. or B.S. holders. The breakdown of professional staff by major NIST organization was:
- NIST laboratories: 54% Ph.D., 18% M.A. or M.S., 18% B.A. or B.S. holders
- Advanced technology program: 48% Ph.D., 32% M.A. or M.S., 18% B.A. or B.S. holders
- MEP: 6% Ph.D., 65% M.A. or M.S., 24% B.A. or B.S. holders
- BNQP: 14% Ph.D., 57% M.A. or M.S., 14% B.A. or B.S. holders
- Total NTIS staff included 5% M.A. or M.S. and 20% B.A. or B.S. holders.

IT Requirements:

The IT systems NIST operates will continue to shape the ability of its employees to effectively and efficiently accomplish their work and achieve NIST's mission. It is essential that NIST be able to provide an integrated, effective suite of IT resources and services that support current NIST personnel and organizational needs, anticipate the future needs of the organization, and enable NIST to appropriately disseminate information to the public. The efficiency and quality of NIST activities, including technology transfer services and many administrative functions, depend upon seamless, powerful, and highly accessible IT resources. Intramural research programs comprise the bulk of NIST's high-performance and laboratory-based computing needs and drive our IT strategies. To achieve our IT objectives, NIST must:

- Upgrade computing and communications systems on a regular basis, focusing on high-end computational resources, networking, and electronic information dissemination capabilities; data storage capacity; and security conditions
- Promote interoperability within and across hardware and software platforms
- Provide enhanced management information systems, particularly e-commerce applications for internal systems

- Develop central support for local workstations, improving user efficiency and system security
- Develop more coordinated and integrated public information dissemination technologies, keeping in mind the Administration's commitment to making government information more easily accessible and useful to the public
- Deploy computer systems security to protect business and scientific information.

FY 2003 Performance Goals

Performance Goal 1: Provide Leadership in Promoting National Technology Policies that Facilitate U.S. Pre-eminence in Key Areas of Science and Technology and Leverage Technological Innovation to Strengthen American Global Competitiveness

(This goal has been reworded since the publication of the FY 2000 Annual Program Performance Report and FY 2002 Annual Performance Plan. This goal was previously worded as: "Promote technology-based growth through partnerships with industry.")

Corresponding Strategic Goal

Strategic Goal 2: Provide infrastructure for innovation to enhance American competitiveness

Rationale for Performance Goal

The Technology Administration's (TA's) Office of the Under Secretary/Office of Technology Policy (US/OTP) serves as a key focal point within the federal government for leadership on civilian technology policy. It supports technology-based growth through a range of programs and policy development activities, addressing both domestic and international matters, that work as a whole to identify key policy needs and options, strengthen the capacities for technological innovation by the nation's industry and science and technology (S&T) community, and hasten the transfer of new scientific and technological advances to the private sector for commercial development.

US/OTP plays an important role in developing and coordinating national technology policy, working in partnership with industry and the S&T community and serving as an advocate for policies that leverage the benefits of new technology and enhance the strength of the nation's economy.

In working to achieve the performance goal, US/OTP's effort normally involves activities throughout the fiscal year in each of three key action areas:

1. Outreach: Engage U.S. industry and the nation's S&T community on salient issues and policy needs.

2. Analysis and Education: Prepare timely, value-added analyses and educate policymakers about the nation's resources, competitiveness, and capabilities for research and development (R&D) and innovation.

3. Advocacy: Advocate policies, programs, and partnerships to promote U.S. innovation and enable technology-led economic growth.

To effectively communicate the diversity and breadth of its leadership, policy analysis, and advocacy functions, US/OTP has identified the following action priorities for FY 2002-2003 in each of these areas, along with corresponding strategies, implementation activities, and achievement milestones. US/OTP's performance metrics rely chiefly on milestone accomplishments, marking progress on the specific activities in the following action plans.

Action Plans

For each of the three key action areas, US/OTP will pursue the following action priorities, strategies, activities, and performance targets in FY 2002-2003.

1. **Outreach:** Engage U.S. industry and the nation's S&T community on salient issues and policy needs.

Current Action Priorities:

- Establish US/OTP as a portal for the S&T industry and research communities to interface with the Administration.
- Establish groups to advise and comment on US/OTP assessment and policy activities.

Strategies	Activities and Performance Targets
• Facilitate inter- and intra-agency policy discussions to foster coordinated Administration response to policy issues • Regularly meet with industry leaders to discuss policy concerns • Utilize various interactive channels (including the Internet) to disseminate statistical and other analytic information and to participate in a dialogue with stakeholders	FY 2003: • Develop mechanisms for regular, independent review of OTP's outreach and policy analysis activities FY 2002: • Organize and manage intra- and interagency groups to coordinate Administration positions on e-commerce and IT policy issues, technology transfer policies, and emerging technologies • Actively participate in stakeholder originated events to solicit information on policy concerns and offer Administration positions • Convene meetings with U.S. industry members of TA-led bilateral advisory groups (such as, Israel, China, and Greece and the Balkans) to identify policy issues affecting U.S. technology and commercial interests • Convene meetings with representatives of the Asia-Pacific Economic Cooperative (APEC) Business Advisory Council and the Organisation for Economic Co-operation and Development (OECD) Business and Industry Advisory Committee to obtain business input on policy issues for discussion with APEC's Industrial S&T Working Group and OECD's Innovation and Technology Working Group • Organize local and field roundtables to identify and discuss stakeholder and Administration perspectives on critical policy issues, such as the U.S. IT workforce, technology-led economic development, e-commerce, and homeland defense • Improve US/OTP's capabilities for electronic communications with customers and stakeholders to solicit views and provide links to U.S. government policy information

2. **Analysis and Education:** Prepare timely, value-added analyses and educate policymakers about the nation's resources, competitiveness, and capabilities for R&D and innovation.

Current Action Priorities:

- Prepare independent analyses, reports, and policy recommendations on critical domestic technology policy issues, including federal technology transfer policies and practices, the IT workforce, business R&D investment, and development status of emerging technologies.

- Analyze and compare U.S. and foreign technology strategies (such as, R&D support, technology transfer policies, taxation, and policies on competition and regulation).
- Provide educational opportunities for policymakers and stakeholders to receive objective information about complex issues concerning science and technology, technological innovation, and S&T policy.

Strategies	Activities and Performance Targets
• Prepare and deliver reports on innovation and technology issues in response to Administration requests, Congressional mandates, and emerging needs • Disseminate analyses in public forums and through electronic channels, in addition to written documents	FY 2003: • Complete and deliver the statutory nanual report on federal agency technology transfer to the President and Congress • Continue studies of U.S. development status and barriers to emerging technologies FY 2002: • Complete and deliver the statutory biennial report and annual report on federal agency technology transfer to the President and Congress • Complete and deliver the requested report on foreign participation in federal laboratory technology transfer to the White House's Office of Science and Technology Policy • Complete and deliver the congresionally-mandated study of U.S. supply and demand of IT workers • Prepare annual analysis of the current landscape of U.S. R&D investment • Initiate studies of U.S. status in development of key emerging technologies
• Collect, analyze, and disseminate comparative information on the S&T policy strategies of the United States and foreign nations • Use international expertise to prepare position papers for the White House, the Department of Commerce, and other senior U.S. government officials meeting with foreign S&T counterparts	FY 2003: • Continue to research and analyze U.S. and foreign sources of information to update data on foreign innovation and technology transfer policies • Examine technology workforce development practices of emerging economies with successful, higly skilled workforce strategies FY 2002: • Develop data on the current technology transfer policies and practices of certain other nations, for example, European Union members and Japan • Analyze the technology workforce development practices of certain other nations
• Develop educational resources and opportunities for dialogue for policymakers and stakeholders	FY 2003: • Continue to develop regular public events for presentation of facts and perspectives on important policy issues • Create content for educational outreach efforts associated with the GetTechnology and Medal of Technology programs FY 2002: • Develop and contribute to regular public events to present facts and perspectives on important policy issues, including biotechnology, international technology transfer practices, workforce and educational issues, and e-commerce • Create and maintain value-added web content and information about Department of Commerce, TA, industry association, and think tank technology-related policy or strategy papers

	• Coordinate outreach and enhance content for the private-public GetTechnology campaign for middle-school teachers, students, and parents (in conjunction with the National Association of Manufacturers and other private parties)

3. **Advocacy:** Advocate policies, programs, and partnerships to promote U.S. innovation and enable technology-led economic growth

Current Action Priorities:

- Develop national policies that help sustain a favorable climate for U.S. business innovation and address federal R&D, S&T workforce, IT infrastructure (that is, broadband and e-commerce), biotechnology, technology transfer, intellectual property rights, and other priorities.
- Promote improvements to federal technology transfer laws, policies, and programs.
- Advance the practices and approaches for promoting technology-led economic growth at state, regional, and local levels.
- Support U.S. technology and innovation goals and related commercial interests in the international arena.

Strategies	Activities and Performance Targets
• Provide Administration and congressional policymakers with policy options concerning U.S. innovation issues	FY 2003: • Work with Congress and industry to identify policy needs and options growing out of US/OTP's report on the U.S. supply and demand for IT workers FY 2002: • Work closely with White House staff and other policymakers on current issues related to technology and homeland defense
• Manage the federal interagency working group on technology transfer to develop policy recommendations to improve national technology transfer practices • Provide information and recommendations on federal technology transfer activities to Congress and the Administration • Participate in a dialogue with the Federal Laboratory Consortium, Association of University Technology Managers, National Technology Transfer Center, industry groups, and others with interests in technology transfer policy issues	FY 2003: • Work with the Administration, Congress, and federal agencies to implement the policy recommendations forthcoming from the US/OTP report on foreign participation in federal laboratory technology transfer • Work with the interagency working group to review the findings of the Department of Commerce's recent annual reports on federal agency technology transfer and identify areas for policy initiatives and options. • Facilitate development of educational materials for use at the national laboratories, such as web sites, online resources, and videos FY 2002: • Convene national laboratory and industry research directors to develop recommendations for improvements in education and outreach related to technology transfer at the national laboratories
• Develop and disseminate	

information to assist state, regional, and local decisionmakers to support technology-led growth and innovation	FY 2003: • Work with Department of Commerce economic development and minority business agencies to increase the number and diversity of grants for technology-led economic development • Develop web-based tools to assist state, regional, and local leaders who are seeking information about technology-led economic development FY 2002: • Prepare *State Indicators* report to provide state leaders with benchmarks and metrics to assess policy progress and impacts • Award and oversee grants for state-originated policy experiements, such as the experimental program to stimulate competitive technology, to stimulate technology-led economic growth • Interact with state, regional, and local leaders to identify information needs and disseminate new information • Manage existing projects analyzing best practices in technology-led economic development and disseminate findings to state, regional, and local officials
• Represent the U.S. government in bilateral and multilateral meetings	FY 2003: • Continue to represent the United States in multilateral and bilateral meetings related to international technology policy FY 2002: • As lead of the U.S. delegation to the semi-annual meetings of the APEC Industrial S&T Working Group, work with other federal agencies to encourage APEC collaboration on critical technology issues • As U.S. government representative to the semi-annual meetings of the OECD Technology and Innovation Policy Working Group, incorporate U.S. interests into OECD approaches to intellectual property rights protection, business investments in R&D, technology transfer, and workforce mobility • Represent the U.S. government in ad hoc international technology meetings, such as the Global Business Dialogue on e-Commerce • As lead of the U.S.-Israel Science and Technology Commission, develop and implement bilateral projects (for example, workshops and training) that advance U.S. technology and commercial interests through cooperation with Israel in biotechnology and information technology

FY 2001 Program Evaluation for Performance Goal 1: Provide Leadership in Promoting National Technology Policies that Facilitate U.S. Pre-eminence in Key Areas of Science and Technology and Leverage Technological Innovation to Strengthen American Global Competitiveness

US/OTP did not conduct a formal program evaluation for FY 2001. US/OTP is currently considering a number of options for establishing an appropriate program evaluation process.

Discontinued Measures

Number of Roundtables, Seminars, and Negotiations Held with Industry, Government, and Academia to Advance TA Policy Goals

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	New	25	25	Discontinued	Discontinued
Actual	25	30	38		
Met/Not Met		Met	Met		

Data Validation and Verification:

Data source: US/OTP
Frequency: US/OTP performance data cumulate throughout the year and are reported annually.
Data storage: US/OTP
Verification: Data represent verifiable tabulations of US/OTP activities.
Data limitations: Outputs only; discontinued measure.
Actions to be taken: Discontinued measure.

Explanation of Measure

US/OTP previously tracked the number of roundtables, seminars, and negotiations held as an output measure of its programmatic activities. This measure has been replaced with a more detailed set of key action areas, associated strategies, and activity milestones. This new system provides a more comprehensive picture of the policy analysis and advocacy functions of US/OTP and attempts to measure activities based upon outcomes rather than outputs.

Cross-cutting Activities

Intra-Department of Commerce

OTP works with the National Institute of Standards and Technology, the National Oceanic and Atmospheric Administration, and the National Telecommunications and Information Administration on technology transfer issues; with the U.S. Patent and Trademark Office on intellectual property matters; with the National Telecommunications and Information Administration on telecommunications issues concerning technology innovation; with the Bureau of Export Administration on technology export issues; and with the International Trade Administration on issues related to international technology.

Other Government Agencies

OTP works with the Departments of Education and Labor on workforce and education issues; works with the Department of State and the U.S. Trade Representative on international issues; with the U.S. Patent and Trademark Office, the Bureau of Export Administration, and a variety of agencies on technology transfer activities and on intellectual property rights issues; with the Department of Health and Human Services, the National Institutes of Health, and the Food and Drug Administration on issues related to medical technologies; with all the major federal science and technology agencies on technology transfer issues; and with the Office of Science and Technology Policy on international S&T issues.

Government/Private Sector

US/OTP works closely with private industry and the S&T community to develop and coordinate national technology policy; it also serves as an advocate for policies that best leverage the benefits of new technology and contribute to the nation's economy.

External Factors and Mitigation Strategies

Outputs associated with coordination and leadership functions depend in part upon the interest and commitment of numerous public and private sector participants operating at the state and federal levels. US/OTP can influence but not control other participants.

Performance Goal 2: Provide Technical Leadership for the Nation's Measurement and Standards Infrastructure and Ensure the Availability of Essential Reference Data and Measurement Capabilities

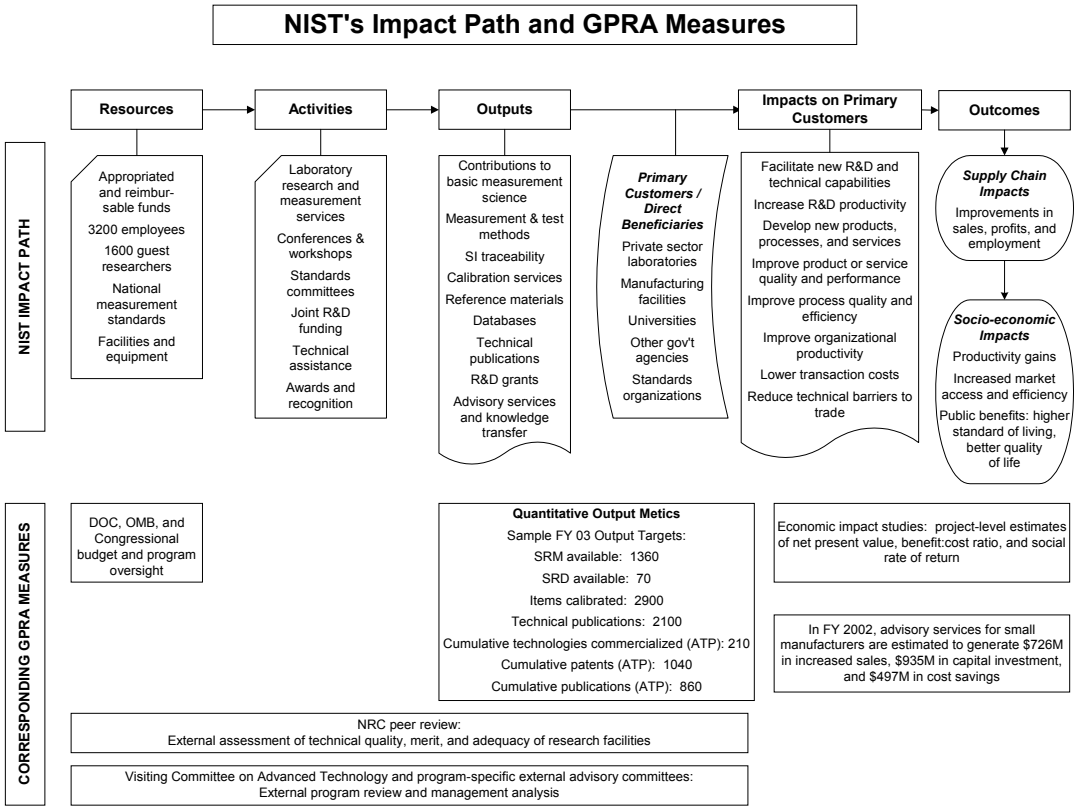
Corresponding Strategic Goal

Strategic Goal 2: Provide infrastructure for innovation to enhance American competitiveness

Rationale for Performance Goal

The National Institute of Standards and Technology (NIST) laboratories develop and deliver measurement techniques, reference data, test methods, standards, and other infrastructural technologies and services that provide a foundation for industry in all stages of commerce: research, development, testing, production, and marketing. The NIST laboratories also support U.S. firms in the global marketplace by working to eliminate trade barriers associated with different national standards, testing, and certification requirements. Since its establishment in 1901 as the National Bureau of Standards, NIST has collaborated closely with industry to anticipate and address the nation's measurement, standards, and technology needs.

NIST as a whole has designed its performance evaluation system to accommodate the organization's diverse outputs as well as to respond to the intrinsic difficulty of measuring the results of investments in scientific and technological products and services. Like other federal science organizations, the primary output of NIST's research is scientific and technical knowledge, which is inherently difficult to measure directly and comprehensively. In addition, the outcomes from research often do not begin to accrue until several years after the research program has been completed, and the diffusion of benefits often affects broad segments of industry and society over long time periods. Given these challenges, NIST evaluates its performance and plans its work in part through direct customer feedback, but also through three distinct evaluation mechanisms: (1) peer review and other forms of external assessments, (2) economic impact studies, and (3) quantitative output tracking. Taken alone, no individual measurement mechanism can provide a comprehensive source of performance evaluation data. Taken together, however, the three evaluation mechanisms, combined with continual feedback from customers, collectively provide NIST management and external stakeholders with a highly detailed and reliable set of performance data encompassing NIST's strategic goals.



This model depicts NIST's general path of impact – from inputs like funding and personnel to outcomes like improvements to supply chains, productivity gains, and improved quality of life. As explained above, NIST evaluates its performance and plans its work through several mechanisms, including external peer review, quantitative output tracking, and downstream economic impact studies. The model also depicts the performance evaluation methods and measures used at the different stages of NIST's value chain.

Measure 2a: Qualitative Assessment and Performance Evaluation Using Peer Review

Peer review assessments and reports are inherently qualitative and noncumulative in nature; therefore, numerical targets and performance data are not applicable and are not provided here. NIST's peer review process is described in more detail in the sections that follow.

Explanation of Measure

Since 1959, the National Research Council (NRC) has annually reviewed the NIST laboratories. The annual NRC Board on Assessment of NIST Programs review is independent, technically sophisticated, and extensive. In FY 2001, the NRC board was composed of approximately 150 scientists and engineers, organized into seven panels (one for each of the seven laboratories) plus two sub-panels for specialized programs. Panel reviews are reported at the division level (the major organizational unit for the laboratories) and build upon assessments of research processes at the project and program levels.

In FY 2001, each panel conducted a two- to three-day on-site review of each laboratory's technical quality, paying particular attention to the following factors:

- The technical merit of the laboratory programs relative to the state-of-the-art worldwide
- The effectiveness with which the laboratory programs are carried out and the results disseminated to the laboratories' customers
- The relevance of the laboratory programs to the needs of customers
- Insofar as they affect the quality of the technical programs, the adequacy of the laboratories' facilities, equipment, and human resources.

Technology, science, and industry are becoming increasingly multi-disciplinary, as are NIST measurement and research programs supporting advances in technology and industry. Recognizing this important trend, in FY 2001 NIST and the NRC Board on Assessment agreed to convene an additional panel to evaluate NIST programs across all the laboratories supporting the U.S. semiconductor industry. The NRC Board on Assessment's Panel for Semiconductor Programs met in April 2001 to assess the quality of microelectronics programs within the NIST laboratories.

The NRC panel reports for each laboratory provide the basis for a comprehensive annual peer review report on the NIST laboratories. As in prior years, the NRC report for FY 2001 provides each laboratory, and NIST as a whole, not only with an external quality assessment, but also with valuable information that it can use for its own performance assessment, planning, and management functions. The tables below provide summary statements for the laboratories, excerpted from NRC's 2001 report. The full report is available at http://search.nap.edu/html/nist2001/.

NRC Review of NIST's Microelectronics Programs

For the first time in FY 2001, the NRC Board on Assessment conducted a cross-cutting programmatic review of a subset of NIST's programs. The review focused on NIST's work in support of the semiconductor industry. "The Panel for Microelectronics was established in response to the increasing need . . . to manage and assess interdisciplinary programs in a way that transcends the organizational lines of the institute." The panel was charged with reviewing the quality of microelectronics programs across all of the NIST laboratories, including assessing the technical quality of the programs; the relevance of projects to industry and the degree of coordination with customers; the effectiveness of cooperation across operating units; and the adequacy of NIST human resources, equipment, and facilities for the goals of these programs.

The panel found that most projects "showed good technical approaches to real problems being faced by the industry ... Although highly applicable technical projects are being developed and carried out at the individual investigator level, the interdisciplinary technical needs of most microelectronics projects transcend NIST's current organizational lines. An overall strategic plan is necessary for NIST to maximize the effectiveness of its program in microelectronics ... Good mechanisms exist for obtaining industry input and feedback on projects. This information must be better managed and shared, however, and applied in a structured process to overall program and project selection and prioritization. The results of individual projects are generally well disseminated to technical peers in industry . . . Good grassroots coordination between researchers is occurring in many projects. However, a more formal overall management structure for the microelectronics program is needed if the full advantages of program coordination are to be realized... "

Sample Statements from NRC Peer Review, FY 2001

Full report is available at http://books.nap.edu/html/nist2001/

Laboratory	
Electronics and Electrical Engineering (EEEL)	EEEL "continues to provide world-class leadership in metrology research and services. The staff are strongly focused on building high-quality programs that meet important industrial needs, and the laboratory is working to strengthen its processes for feedback from its customers . . . The flat budgets of EEEL stand in stark contrast to the rapid technological progress occurring in the industries served by EEEL and the impact of these industries on the economic health of the nation . . . The EEEL strategic planning processes are appropriately focused on developing a plan that contains a laboratory-level set of goals and objectives. This plan, along with the laboratory mission and values statements, is helping EEEL management set priorities and select programs within the current constraints on budget and human resources."
Manufacturing Engineering (MEL)	
Chemical Science and Technology	"The panel is pleased by the strong focus on industrial needs and processes in the Chemical Science and Technology Laboratory. The industrial sectors impacted by the laboratory's work include semiconductors, biotechnology, healthcare, and chemical processing among others. There are also a number of government agencies that are well served by the activities of the laboratory including the Environmental Protection Agency, National Institute of Justice, and the Department of Defense . . . The technical activities in the Chemical Science and Technology Laboratory continue to be of the highest caliber. The identification of strategic directions will help guide the selection of new programs and allow the laboratory to organize its responses to changing industry needs across its divisions . . . Staffing levels within the laboratory are a concern."
Physics	"The Physics Laboratory is an indispensable national asset in terms of the technical capability that it maintains for the nation. Many of its capabilities are unique in the nation; some are unique in the world. Its world-class research aims at long-term goals in fundamental standards and metrology . . . While many programs in the Physics Laboratory are clearly reaching their customers in industry and the scientific community, others did not have a clear focus. Clearly articulated overall strategic goals for the Physics Laboratory would improve the alignment of individual programs with the laboratory mission and improve communication of the value and effectiveness of programs to NIST stakeholders . . . The laboratory's initiative in quantum computing is a model of vision, organization, and technical excellence. It is based on a strong existing competency in an area in which the laboratory leads the world. Despite the long-term, high-risk nature of the project, the Physics Laboratory has very specific goals that bode well for program success."
Materials Science and Engineering	"The work of the Materials and Science and Engineering Laboratory is of high technical merit and is well recognized externally. Laboratory managers understand that to maintain forefront work on metrology, they must foster the basic science that underlies this metrology. Laboratory researchers are well coupled to their customers through industry groups; however, the panel suggests clearer articulation of laboratory-wide goals and vision. This would help individual researchers to place their work in the greater context of the laboratory and focus their projects more tightly against larger objectives . . . Restricted budgets have caused the laboratory to shift resources away from equipment purchase toward support of staff. However, the panel notes that leadership in measurement science demands cutting-edge equipment...The panel was pleased to observe that the laboratory had implemented many of the recommendations from the previous review, such as . . . the expansion of work on the characterization of electronic materials and microstructure, and expanded use of the postdoctoral program."
Building and Fire Research	"The Building and Fire Research Laboratory supports a diverse array of customers including the construction industry, materials producers, and the fire service community. Relevant NIST products include software packages to enable external use of NIST models, new measurement methods and technologies, and basic research that enables the development of advanced materials . . . The panel continues to be impressed with the technical quality of the staff and the projects under way in the Building and Fire Research Laboratory...A strategic plan is needed to define long-term goals for the laboratory and establish a uniform culture across the divisions. Such a plan should raise the understanding of laboratory objectives both inside and outside the laboratory. Increased focus on understanding customer needs and defining dissemination mechanisms early in projects would also enhance the laboratory's impact."

Information Technology (ITL)	"Overall, the panel is extremely pleased with the progress made in the [ITL] since the last assessment. Under the guidance of the (relatively) new laboratory director, the management team as a whole has become significantly stronger . . . The new strategic plan more clearly lays out the laboratory's goals and responsibilities and is organized so as to tie each division very specifically to the laboratory and NIST missions . . . Increasing the visibility of the work done in the [ITL] is an important goal for management... Publications in respected journals and presentations at quality conferences are key elements in this outreach effort. Industry is increasingly using closed consortia instead of open processes to develop standards. In some cases, these closed groups are fairly inclusive and can be the most effective forum for NIST staff to impact industry standards. The [ITL] should consider developing a policy on when participation in closed consortia is appropriate as well as on how NIST can encourage industry to utilize open, or at least inclusive, approaches to standards development."

Measure 2b: Economic Impact Studies

Economic impact studies are not cumulative; therefore, aggregate numerical targets and performance data are not applicable and are not provided here. NIST's process for conducting economic impact studies, as well as the results of studies completed in FY 2001, are described in the sections that follow.

Explanation of Measure

NIST augments the performance information obtained through peer review with formal microeconomic assessments of the long-term impacts that derive from the NIST laboratories' programs. NIST has been conducting economic impact studies on a regular basis since 1992 and initiates approximately four new impact studies annually. External economic and technical experts contracted by NIST conduct these impact assessments of NIST's research and development (R&D) in specific technical areas. These studies provide both quantitative estimates and qualitative assessments of the economic effects that result from the different types of technology infrastructure NIST provides to U.S. industry. Quantitative estimates compare project costs with quantitative impact evidence in such areas as productivity, quality, time-to-market, transaction costs, sales, market share, and profits.

NIST uses the same project impact metrics as industry. Quantitative estimates of impact typically are provided in one (or more) of three forms: (1) net present value and two efficiency measures; (2) a benefit-cost ratio, which compares the net present value of benefits with costs over the time period being analyzed; and (3) a social (internal) rate of return, which represents the annual percentage rate that would be required to yield a benefit-cost ratio of one, the break-even point for a project. Recent impact studies also seek to provide qualitative descriptions of impacts that are significant but difficult to quantify, such as the impact of NIST infratechnologies on R&D strategies and capabilities, organizational efficiency, market access, and effectiveness in working with external actors such as suppliers and standards organizations. Studies conducted over the last five years indicate that NIST outputs generate rates of return on R&D that consistently exceed the estimated average returns on R&D conducted by private industry.[1] In addition to quantitative information, these studies also provide management with a broader range of useful qualitative information on such important factors as the nature of the R&D life cycle in individual industries; the points at which measurement technologies affect R&D, production, and market transactions at different levels of the supply chain; and the modes of potential impact associated with different types of NIST infratechnologies. Additional information about economic impact studies is presented in the table below.

[1] In 1993, the National Bureau of Economic Research estimated an average 20-30%private return and an average 50% social return on R&D conducted by private industry.

NIST Programs Benefit U.S. Industry and Consumers: The Josephson Volt Standard (JVS) Example

In August 2001, NIST released the results of an economic impact assessment of its JVS program. The study shows that the JVS program has resulted in significant economic benefits for U.S. voltage measuring equipment industries and for U.S. consumers of electricity.

The U.S. electricity supply industry is the largest in the world, with approximately one-fourth of global generation capacity and 120 million retail customers. Supplying electricity involves numerous commercial and industrial activities, including trading bulk electricity, marketing to retail customers, and metering retail sites. All of these activities are measurement intensive.

NIST spearheaded an international effort to develop and implement an intrinsic volt standard, based on superconducting Josephson junctions. The research improved measurement accuracy by an order of magnitude and led to implementation of the Josephson effect as the basis for the legal representation of the volt. Diffusion of this advanced measurement technology to government and industrial users has enabled the development and sale of advanced electrical measurement instrumentation worldwide.

The study quantified the economic benefits from the JVS program's impact on new equipment sales. The NIST research and technology transfer activities resulted in an estimated net benefit to the economy of $45 million (net present value in 2000 dollars). In terms of efficiency measures, the program produced a benefit-cost ratio of 5:1 and a social (internal) rate of return of 877%.

Data Validation and Verification:

Data source: Research is contracted to economic and technical experts who generate quantitative estimates and qualitative information using performance data gathered through industry surveys and field research. NIST supplies project cost data.
Frequency: Intermittent
Data storage: Contractors collect and maintain all data. NIST presents survey results, cost data, and all calculations in final reports.
Verification: Highly qualified economists and technical specialists gather and analyze data using well-developed research methods and standard economic and business analysis metrics, as specified and monitored by NIST.
Data limitations: Elements of study populations are often too diffuse to measure; availability and quality of industry data are often uneven; impact estimation typically requires counterfactual data, which can be difficult to estimate; outcomes are specific to each project, that is, results are not cumulative and not readily comparable.
Actions to be taken: None

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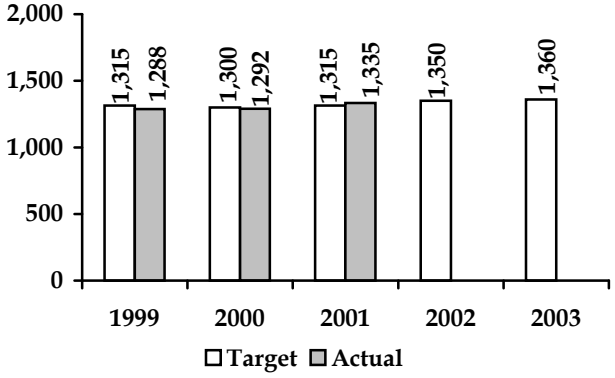
Economic Impacts of NIST Laboratory Outputs: Estimates from Studies Published in FY 2001

Study Title	*Economic Impact Assessment of NIST's Josephson Volt Standard Program*	*The Economic Impacts of NIST's Data Encryption Standard (DES) Program*
Customer Base	Electronic test and measurement instrument manufacturers	Encryption hardware and software manufacturers and encryption system users
NIST Outputs	Superconductor-based volt standard and calibration services	Data encryption standard and conformance test methods and services
Outcomes/Impacts	Greater R&D efficiency, faster time to market, and higher productivity	Accelerated technology diffusion and enabled market expansion
Impact Metric: Benefit-cost Ratio[2]	5:1	58:145
Impact Metric: Social (Internal) Rate of Return[3]	877%	267-272%

Measure 2c: Standard Reference Materials (SRMs) Available



Data Validation and Verification

Data source: NIST SRM program
Frequency: Ongoing
Data storage: NIST SRM program
Verification: Data represent direct and verifiable counts of SRMs available to customers at the close of the fiscal year. Internal verification includes review by NIST Technology Services and the NIST Director's Office and Budget Division.
Data limitations: Data provide information on output levels only.
Actions to be taken: There are no obvious replacements for these output tabulations; NIST continues to explore the use of additional metrics that could capture leverage in the secondary market and other factors related to downstream impact.

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	1,315	1,300	1,315	1,350	1,360
Actual	1,288	1,292	1,335		
Met/Not Met	Not Met	Not Met	Met		

[2] The benefit-cost ratio compares the net present value of benefits with costs over the time period being analyzed.

[3] Social (internal) rate of return represents the annual percentage rate that would be required to yield a benefit-cost ratio of one, the break-even point for a project.

Explanation of Measure

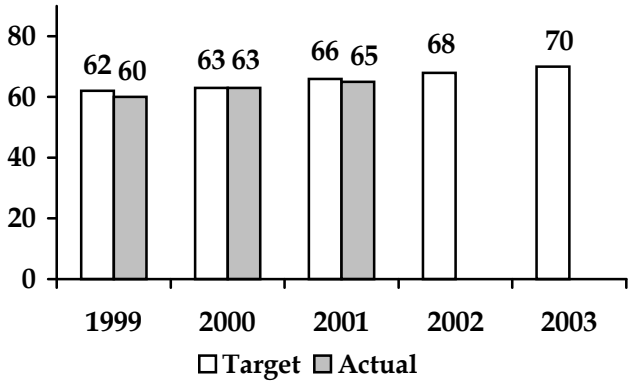
SRMs are the definitive source of measurement traceability in the United States. They are material samples that are certified for their specific chemical and material properties in NIST laboratories. NIST develops, certifies, and distributes SRMs, and approximately 1,300 currently are available for use in (1) industrial materials production and analysis, (2) environmental analysis, (3) health measurements, and (4) basic measurements in science and metrology. All measurements using SRMs can be traced to a common and recognized set of basic standards that provides the basis for compatibility of measurements among different laboratories. So, for example, a private (or university or hospital) laboratory that analyzes blood cholesterol levels in blood samples could purchase an NIST SRM for cholesterol, which would contain an exactly known amount of cholesterol. The laboratory could use this sample, with its known and certified properties, to tests its machines and procedures to determine if it is indeed providing patients with accurate cholesterol measurements and/or to implement changes to ensure future accuracy. This SRM and many others support an accurate measurement infrastructure for healthcare in the United States. In addition, as economic exchange has become more global, customers are using SRMs to achieve measurement quality and conformance to process requirements that address both national and international needs for commerce and trade. The data represent a direct count of SRMs available to customers at the close of the fiscal year and are tracked on an ongoing basis by NIST Technology Services. Data provide information on output levels only. There are no obvious replacements for these output tabulations; NIST continues to explore the use of additional metrics that could capture leverage in the secondary market and other factors related to downstream impact. As with other NIST products and services, downstream outcomes are measured through project-specific economic impact studies.

The FY 2001 target has been met. Out-year projections assume slight growth in the number of SRMs available, given NIST's strategy of focusing on those SRMs that cannot be produced by secondary laboratories and that have broad and/or high downstream impact. In establishing its out-year projections, the NIST SRM program monitors, among other things, trends in emerging technologies, new regulations that will depend on SRMs for enforcement, and the reference material needs of other federal agencies.

Standard Reference Materials Improving Health Care: Cholesterol Measurements

Diagnosing and treating cardiovascular disease requires accurate measurements of cholesterol and its constituents. Since 1966, NIST has developed and disseminated the measurement methods, standards, and SRMs needed to ensure the accuracy of cholesterol tests. As a result of NIST's work, clinical laboratories and other users have adopted increasingly accurate measurement techniques and have significantly reduced uncertainties in cholesterol measurement results. Due to better measurements, fewer patients have been misdiagnosed, public health has been improved, and health care costs have been lowered significantly. The economic benefits of NIST's Cholesterol Standards Program have been analyzed in an independent study by TASC, Inc. The study covered the period of 1986-1999 and estimated a social rate of return of 154% and a benefit-to-cost ratio of 4.5:1 during that timeframe.

Measure 2d: Standard Reference Data (SRD) Titles Available



Data Validation and Verification

Data source: NIST SRD program
Frequency: Ongoing
Data storage: NIST SRD program
Verification: Data represent a direct and verifiable count of SRD products developed and disseminated by NIST. Internal verification includes review by NIST Technology Services and the NIST Director's Office and Budget Division.
Data limitations: Output only
Actions to be taken: There are no obvious replacements for these output tabulations. NIST continues to explore the use of additional metrics that could capture use rates, leverage, and other factors that may provide partial indicators of downstream impact.

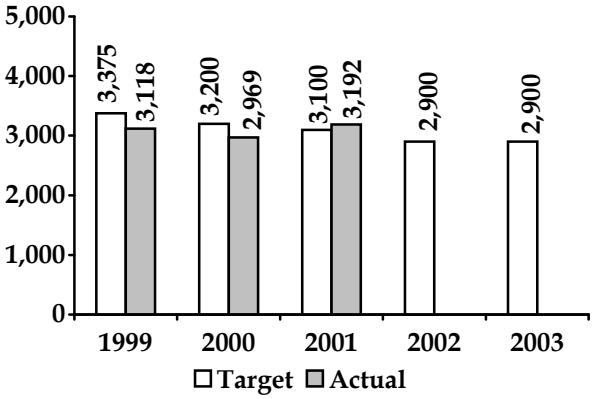
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	62	63	66	68	70
Actual	60	63	65		
Met/Not Met	Not Met	Met	Not Met		

Explanation of Measure

This measure describes the number of SRD titles that the NIST laboratories produce and make available through the NIST SRD program. Standard reference databases provide numeric data to scientists and engineers for use in technical problem solving, research, and development. These recommended values are based on data that have been extracted from scientific and technical literature and assessed for reliability. The data represent a direct count of available SRD titles and are updated on an ongoing basis by the NIST SRD program. Of the 65 SRD titles currently available, 47 are available for sale and 18 are free online systems. Data provide information on output levels only. There are no obvious replacements for these output tabulations. NIST continues to explore the use of additional metrics that could capture use rates, leverage, and other factors that may provide partial indicators of downstream impact.

Actual performance in FY 2001 represents 98.5% of the target. Although the FY 2001 target was not precisely met, actual performance did exceed actual performance in FY 2000, showing an upward trend over time. Historically, NIST has produced two new SRD titles per year. At the same time, NIST also provides numerous upgrades to existing databases. Each year, however, some database titles are eliminated from the NIST catalog. Out-year projections assume modest growth in the total number of SRD titles available. Over time, a larger percentage of these titles will be distributed via the Internet.

Measure 2e: Number of Items Calibrated



Data Validation and Verification

Data source: NIST calibration program
Frequency: Ongoing
Data storage: NIST calibration program
Verification: Data represent direct and verifiable counts of items calibrated by the NIST laboratories. Internal verification includes review by NIST Technology Services and the NIST Director's Office and Budget Division.
Data limitations: Output only
Actions to be taken: There are no obvious replacements for these output tabulations. NIST continues to explore complementary metrics that could capture leverage in the secondary market and other factors that may provide partial indicators of downstream impact.

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	3,375	3,200	3,100	2,900	2,900
Actual	3,118	2,969	3,192		
Met/Not Met	Not Met	Not Met	Met		

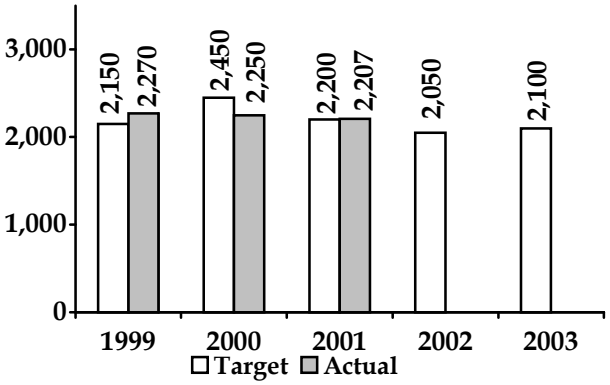
Explanation of Measure

This measure illustrates the quantity of physical measurement services provided by NIST for its customers, including calibration services, special tests, and measurement assurance programs. NIST offers more than 500 different types of physical calibrations in areas as diverse as radiance temperature, surface finish characterization, and impedance. NIST calibration services and special tests are characterizations of particular instruments, devices, and sets of standards with respect to international and national standards. NIST calibration services provide the customer with direct traceability to national and international primary standards. Measurement assurance programs are quality control programs for calibrating entire measurement systems. The output data represent a direct count of the number of items external customers sent to NIST for formal calibration services. The data provide information on service output levels only and represent a measure of throughput but not workload per se, as the number of tests and/or the time and calibration effort required can vary substantially across items. As with SRMs and SRD titles, downstream impact is a function of the nature of individual calibration services more than the sheer volume of items calibrated. There are no obvious replacements for these output tabulations. NIST continues to explore complementary metrics that could capture leverage in the secondary market and other factors that may provide partial indicators of downstream impact.

The FY 2001 target was met. Out-year forecasts show a relatively high but slightly declining number of items calibrated. This is in keeping with a long-term trend, over the past several decades, of a decline in the number of items calibrated by NIST. Despite this overall trend, individual years may fluctuate slightly (as with the slight increase from FY 2000 to FY 2001) because of multi-year calibration cycles. NIST expects to provide fewer but more highly leveraged calibration services (that is, calibrations services that are widely used by the private sector to support a broader base of secondary calibration services) over time. NIST's strategy is driven by the need to effectively manage demand from its major industry and government customers for these services. NIST is pursuing two strategies: (1) performing only those calibrations that require a direct connection to the national standards and (2) improving calibration accuracy in those areas where new industry demands are

emerging. Through this overall approach NIST can efficiently leverage its primary calibration services to support a broader base of secondary calibrations conducted within the private sector.

Measure 2f: Technical Publications Produced



Data Validation and Verification

Data source: NIST Office of Information Services
Frequency: Ongoing
Data storage: Publications data are gathered and maintained by NIST Office of Information Services.
Verification: Data represent direct and verifiable counts of NIST technical publications that have been cleared for publication by the internal editorial review boards in Gaithersburg, Maryland and Boulder, Colorado. Internal verification includes review by the NIST Director's Office. In addition, in the past year database improvements have been made to better track and report publication counts.
Data limitations: Output only
Actions to be taken: NIST will continue to provide additional information to supplement these output counts, such as providing the breakdown of internal and external publications.

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	2,150	2,450	2,200	2,050	2,100
Actual[1]	2,270	2,250	2,207		
Met/Not Met	Met	Not Met	Met		

[1] FYs 1999 and 2000 actuals have been adjusted slightly from the previously reported figures due to improved database systems and data verification procedures that have been implemented in recent months.

Explanation of Measure

This measure represents the annual number of technical publications generated by the NIST laboratories' staff. The number is a direct count of the number of technical publications approved by the NIST editorial review boards at the Gaithersburg, Maryland and Boulder, Colorado sites. NIST uses publications as one of the mechanisms to transfer the results of its work to the U.S. private sector and to other government agencies that need cutting-edge measurements and standards. Many of these publications appear in prestigious scientific journals and withstand peer review by the scientific community. Others appear

Technical Publications: High Demand for Accurate information

Print publications are a major channel through which NIST diffuses the scientific and technical knowledge generated by its staff. For Government Performance and Results Act purposes, NIST reports the number of publications generated by its staff as a partial indicator of the institute's research output. Of these technical publications produced annually, approximately 80% are published externally (such as in scientific journals), while the remaining 20% are NIST reports and special publications.

In addition, within the scientific community, citation rates often are used to gather additional information about the demand for or relevance of published research; the cumulative number of citations per publication provides a rough gauge of the level of use and hence impact of the publications. NIST has assessed the citation rates for its publications by using data collected by the Institute for Scientific Information, which has been collecting research publication data for more than 40 years and now maintains the most comprehensive source of available publication data for scientific and technical organizations. According to these data, NIST's relative impact—that is, the average citation rate per NIST publication relative to the Institute for Scientific Information's baseline citation rate number for all scientific and technical organizations in its database—from 1981 through 1999 has been consistently above average. These data indicate that NIST consistently produces relevant scientific and technical publications that are cited frequently and hence used quite broadly.

in technological forums where measurement standards and technologies developed by NIST staff (at times in collaboration with private sector partners) are disseminated. Data are updated on an ongoing basis by the NIST Office of Information Services. Data are not adjusted for quality and do not capture impact.

FY 2001 actual performance slightly exceeded the target for the fiscal year. Possible reasons for exceeding the target include improvements in information technology tools that facilitate publication, specific research findings that resulted in additional publishable work, and activities associated with the NIST centennial year celebration (2001). Over time, NIST expects a relatively constant level of high quality publications (approx. 2,000-2,200 per year) to be produced by its technical staff.

FY 2001 Program Evaluation for Performance Goal 2: Provide Technical Leadership for the Nation's Measurement and Standards Infrastructure and Ensure the Availability of Essential Reference Data and Measurement Capabilities

Formal, comprehensive program evaluations are not possible for the NIST laboratories because of the complexity of the NIST laboratories' programs, their diverse roles and customer base, and the long timeframes from research to economic impacts. NIST does, however, conduct rigorous laboratory-wide evaluations of technical program quality, relevance, and effectiveness. As explained in section 2a, the NRC annually reviews the NIST laboratories. The full report is available at http://search.nap.edu/html/nist2001/. In addition, the programmatic objectives and management of the laboratories and NIST as a whole are reviewed by the Visiting Committee on Advanced Technology, a legislatively mandated panel of external advisors that meets quarterly to review NIST's general policy, organization, budget, and programs. As described previously, NIST's overall approach to performance measurement consists of three distinct evaluation mechanisms: peer review and other forms of external assessments, economic impact studies, and quantitative output tracking. The NIST laboratories use these three evaluation mechanisms as a system that, combined with the Visiting Committee of Advanced Technology review, provides a comprehensive picture of laboratory performance at various phases of NIST's value chain.

NIST VISITING COMMITTEE ON ADVANCED TECHNOLOGY (VCAT)
MEMBERSHIP – 2001

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Dr. Lloyd R. Harriott
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Dr. Caroline A. Kovac, VCAT Vice Chair
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Dr. Thomas A. Manuel, VCAT Chair
President, Council for Chemical Research

Dr. James W. Mitchell
Director, Materials, Reliability and Ecology Research Laboratory, Bell Labs, Lucent Technologies

Dr. Wayne H. Pitcher, Jr.
Technology Management Consultant

F. Raymond Salemme
Founder, President, and Chief Scientific Officer, 3-Dimensional Pharmaceuticals, Inc.

Dr. Juan M. Sanchez
Vice President for Research, University of Texas, Austin

Dr. April M. Schweighart
Director of Customer Programs, Motorola

Cross-cutting Activities

Intra-Department of Commerce

The NIST laboratories work with other Department of Commerce bureaus, including the National Oceanic and Atmospheric Administration and the National Telecommunications and Information Administration, on issues of joint interest to the Department of Commerce, the Administration, and Congress. For example, NIST works with the National Oceanic and Atmospheric Administration on the Federal Natural Disaster Reduction Initiative, which focuses on reducing the costs of natural disasters and saving lives through improved warnings and forecasts and information dissemination. NIST and the National Telecommunications and Information Administration cooperate to support development of ultra wideband signal technology, a new wireless technology that will improve communications for emergency services and other applications.

Other Government Agencies

NIST provides research and services in measurement and standards to almost every agency with scientific missions in the federal government through specific interagency agreements or memoranda of understanding. NIST measurement research, services, and facilities have long contributed to

national defense and security, to the nationwide safety and quality assurance systems that ensure the accuracy of health care measurements, to the accuracy of environmental measurements, and to law enforcement standards. NIST plays a large role in a wide variety of intragovernmental and government–industry coordination committees. For example, NIST has leadership positions on the committees, subcommittees, and working groups of the National Science and Technology Council.

Government/Private Sector

NIST's mission is to work with industry to develop and apply technology, measurements, and standards. As such, the NIST laboratories have extensive and diverse interactions with industry, which provide an important source of information about the quality, direction, and future demand for NIST products and services. Many of the laboratories' primary outputs, such as SRMs and calibration services, are critically important to the quality and cost efficiency of products and production processes throughout U.S. industry. In addition, the NIST staff use technical publications, conferences, and workshops as mechanisms to transfer the results of their work to the U.S. private sector and to other government agencies that need cutting-edge measurements and standards.

External Factors and Mitigation Strategies

Industry-specific business conditions and technological developments affect the level and range of demand for NIST products and services over time. For instance, annual demand for calibrations—only one of numerous outputs of the NIST laboratories—can fluctuate due to several factors outside NIST's control, including changes in the calibration intervals of large customers, changes in the average calibration interval rate in any given year, consolidation of calibration activities within large R&D organizations, and industry consolidation (as, for example, in defense-related industries). In general, NIST seeks to mitigate the effects of external technological and market uncertainties by maintaining varied and close relationships with its customer base. Through conferences, workshops, technology roadmaps, and many other forms of interaction with its customers, NIST regularly evaluates and adjusts to the direction and level of demand for measurements, standards, reference data, test methods, and related infrastructural technologies and services.

Performance Goal 3: Accelerate Technological Innovation and Development of the New Technologies that Will Underpin Future Economic Growth

Corresponding Strategic Goal

Strategic Goal 2: Provide infrastructure for innovation to enhance American competitiveness

Rationale for Performance Goal

Market pressures often deter firms from investing in particular types of technology and research and development (R&D) projects. For instance, private industry does not account for a large percentage of the nation's basic R&D, because firms must be able to earn appropriate returns within a time frame and at a level satisfactory to investors. For the same reasons, industry tends to avoid investing or significantly underinvests in certain types of enabling technologies such as infrastructural technologies, which require distinct competencies and are broadly applied; multi-use technologies, which benefit multiple segments of an industry or group of industries; and high-potential breakthrough technologies, which typically involve risk levels and time frames that far exceed the horizons of individual firms. In each of these areas, the financial and market interests of individual firms tend to produce a suboptimal level of investment for the economy and society as a whole. To address this problem, the Advanced Technology Program (ATP) provides industry with the opportunity to invest in and develop innovative technologies that promise significant commercial payoffs and broad benefits for the nation.

ATP evaluates its performance through a combination of methods, including economic assessments of project developments and long-term impacts, output tracking, detailed status reports on completed projects, and various activity metrics. ATP continually strives to define the state of the art in technology impact and outcome evaluation. Highly qualified academic and consulting economists and other experts in evaluation, in addition to in-house staff, assist ATP in planning, modeling, and developing databases and in conducting surveys, case studies, and statistical and econometric analyses.

Measure 3a: Economic Impact Studies

Economic impact studies are not cumulative; therefore, aggregate numerical targets and performance data are not applicable and are not provided here. Additional information is provided below.

Explanation of Measure

Fully successful ATP projects will contribute significantly to the U.S. scientific and technical knowledge base, yield private benefits to innovators, and ultimately yield benefits to others in the United States through market, knowledge, and/or network spillovers. The measurement of long-term economic outcomes requires well-established projects with technological outputs that have been in the market for long time periods.

Few technologies generated through ATP funding have existed for long enough to generate impact data that would support reliable estimates of benefit-cost ratios, social rates of return, and similar outcome measures. However, significant interim impacts have been generated by the ATP projects funded to date. For instance, in FY 2000 ATP updated its analysis of data gathered through its

business reporting system, which confirmed the results of Powell and Lellock's 2000 study, *Development, Commercialization, and Diffusion of Enabling Technologies: Progress Report*, and extended the findings to encompass a larger portfolio of projects and participants and a longer period of ATP funding. This study found positive results for each of ATP's major programmatic goals:

1. Generating high-risk, high-impact technologies: 73% of organizations reported that ATP projects carried a higher level of technical risk than could be supported by industry alone, and 38% of the applications represent new-to-the-world solutions.

2. Fostering collaboration: 86% of organizations reported that their projects had involved collaboration with other organizations (88% of those organizations reported that ATP was responsible to a great or moderate extent for the collaboration).

3. Accelerating the development and commercialization of advanced technologies: 86% of organizations reported they would not have undertaken the project without the aid of ATP or were significantly ahead in their R&D cycles as a result of ATP funding.

In addition to analyzing data gathered through the business reporting system (BRS), ATP also conducts or contracts detailed and rigorous case studies. These studies focus on evaluating ATP's performance in the three output categories that derive from ATP's core programmatic goals. Where possible, these studies also estimate long-term project outcomes.

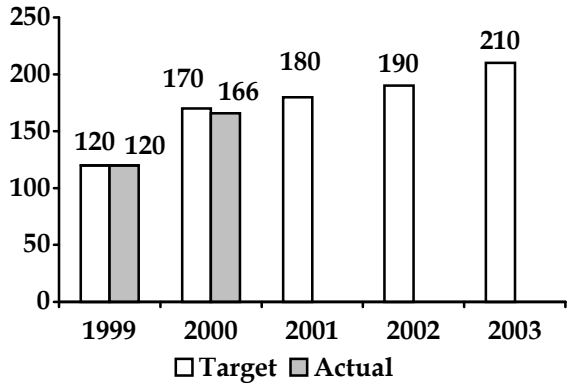
ATP Economic Evaluation Studies: Evidence of Performance on Programmatic Goals

	ATP Outputs			ATP Outcomes
Completed Studies[1] (Year and Type)	Fund High-risk, High-impact R&D	Foster Collaboration	Accelerate Development and Commercialization	Generate Economic Spillovers (Such as Broad-based Economic Benefits)
Closed Cycle Air Refrigeration: Cross-cutting Applications in Food Processing, Volatile Organic Compound Recovery, and Liquefied Natural Gas Industries (2001; case study)	New air-based, closed-cycle refrigeration technology for delivering ultra-cold temperatures for food processing, volatile organic compounds, and liquefied natural gas applications	Collaborators include: Air Products and Toromont Process Systems	Technology development would not have occurred without ATP support	This technology has been developed and tested and is now in the marketing phase. As a result, the return on ATP investment for the food processing industry and end consumers is projected to be: • Net present value: $459-$585 million • Internal rate of return: 83-90% • Benefit-cost ratio: 220:1 to 280:1 Additional benefits are expected to include improved food safety, reduced operating costs in food service industries, reduced diesel emissions from fewer trucks hauling cryogens, reduced diesel emissions from ocean-going vessels, and cross-industry diffusion of knowledge.
Estimating Future Consumer Benefits From ATP-Funded Innovation: The Case of Digital Data Storage (2000; Two Case Studies with Projections)	Two new data storage technologies: one based on linear scanning and magnetic tape, and one based on optical tape	Collaborators included a tape media company, Imation; a data storage systems company, Seagate Technology; two small technology companies, Advanced Research Corporation and Peregrine Recording Technology; and four universities	Investments would not have occurred without ATP support	These new data storage technologies improve the performance of information and computing systems by offering faster saving and retrieval of information and increased storage capacity. Spillover benefits to purchasers or users are projected to be $2.2 billion for the new magnetic tape technology and $1.5 billion for the new optical tape technology.
Economic Impacts of Flow-Control Machining Technology: Early Applications in the Automobile Industry (1999; Case Study with Projections)	New flow-control machiningproces ses for achieving precision in airflow-balancing for engine components	Collaborators included Extrude Hone and General Motors, Ford, the University of Nebraska, and the University of Pittsburgh	Collaborative research project would not have occurred without ATP support	New flow-control maching technologies improve engine performance, fuel efficiency, and emissions output; these outputs in turn increase revenues for auto manufacturers. Spillover benefits accrue to consumers as well as to other manufacturers (turbine engines, diesel injectors, and rocket fuel orifices).

Benefits of ATP Funding of Medical Technologies (1998; Seven Case Studies with Projections)	Seven new tissue engineering technologies		All seven projects reported R&D acceleration and higher probability of success because of ATP funding	Preliminary estimates based on a single early application of each technology suggest a high social rate of return.
Advanced Technologies and Systems for Controlling Dimensional Variation in Automobile Body Manufacturing (1997; Case Study with Projections)	New dimensional control technologies	Collaborators include seven auto supplier companies, two universities, and two major U.S. automotive companies	Collaborative research project would not have occurred without ATP support	Reduced production costs ($10–$25 per vehicle) and maintenance costs ($50–$100 per vehicle); estimated long-term impacts include higher customer satisfaction, increased market share, increased output, and higher employment.
Early Stage Impacts of the Printed Wiring Board (1997; Case Study)	New manufacturing processes for printed wiring board interconnect systems; 214 research papers produced	Collaborators include four printed wiring board producers and two supplier/user companies, and Sandia National Laboratory	Approximately half of the 62 research tasks would not have been performed at all; others were undertaken sooner than would have been in the absence of ATP support	Research cost savings of $35.5 million; time to implement new processes shortened for approximately 80% of research tasks; and productivity gains to date in 40% of research areas, with an estimated value of $5 million.

1 Copies of completed studies can be obtained at: http://www.atp.nist.gov/eao/eao_pubs.htm.

Measure 3b: Cumulative Number of Technologies under Commercialization



Data Validation and Verification
(see end of performance goal 3 measure summaries for information on all ATP metrics)

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	120	170	180	190	210
Actual	120	166	Available May 2002		
Met/Not Met	Met	Not Met			

Explanation of Measure

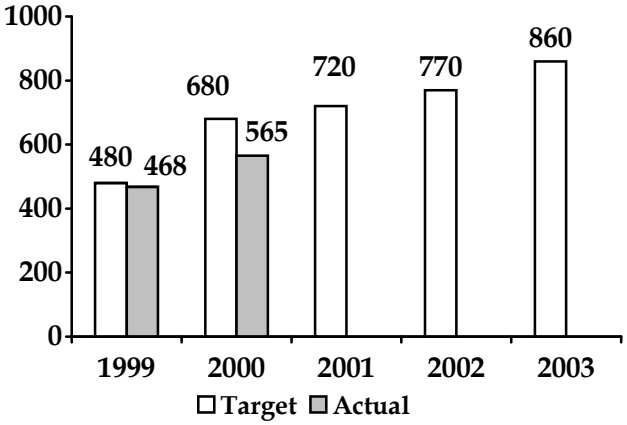
This metric tabulates the cumulative number of new technologies under commercialization that are traceable to all ATP-funded projects through the close of a given fiscal year. The measure indicates the extent to which ATP-funded research and development has either leveraged or catalyzed new products and services, which in turn improve the prospects for technology-led economic growth. NIST uses this metric--in combination with patent and publication data--to assess ATP's impact on the generation and diffusion of new, commercially relevant technologies and technical knowledge.

Commercialization is broadly defined as any group of activities undertaken to bring products,

derived from the technology base created by the ATP-funded project.

The measure provides a cumulative direct count of the number of technologies commercialized, as determined through ATP's BRS. Final data for FY 2000 are reported here for the first time (this information was not included in previous Government Performance and Results Act-related reports). For FY 2000, the number of technologies commercialized represents 98% of the expected level; FY 2002 and out-year projections are based on extrapolations of past commercialization rates and projections of projects initiated and completed. These projections have been updated to take into account all currently available performance and budgetary data. For all ATP output metrics, final data for FY 2001 will not be available until approximately May 2002 and will be reported in the FY 2002 Annual Program Performance Report.

Measure 3c: Cumulative Number of Publications



Data Validation and Verification
(see end of performance goal 3 measure summaries for information on all ATP metrics)

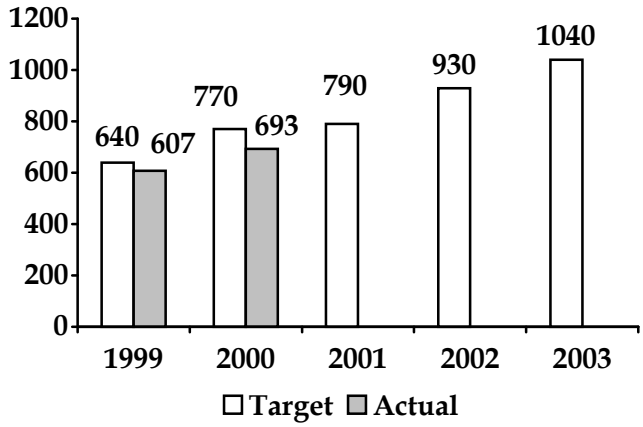
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	480	680	720	770	860
Actual	468	565	Available May 2002		
Met/Not Met	Not Met	Not Met			

Explanation of Measure

The second of ATP's suite of output metrics, this cumulative count of publications generated by all ATP-funded research through the close of a given fiscal year represents a major channel for the diffusion of technical knowledge that results from ATP funding. Final data for FY 2000 are reported here for the first time (this information was not included in previous Government Performance and Results Act-related reports). In FY 2000, the number of publications produced represents 83% of the expected level. Projections are based on extrapolations of past publication rates and projections of projects initiated and completed over time and are updated to reflect all currently available data. These targeting mechanisms are not perfectly accurate for several reasons. For example, the publications data are impacted by delays in ATP project completion and/or project terminations, both of which are difficult to predict years in advance. In addition, publication rates vary significantly across technology areas. As a result, publications activity will be affected by changes in ATP's completed project portfolio. While these factors and others make perfectly accurate targeting difficult, ATP will continue to track its publications count closely, and also will analyze any trends that may indicate necessary adjustments to its projection models.

For all ATP output metrics, final data for FY 2001 will not be available until approximately May 2002 and will be reported in the FY 2002 Annual Program Performance Report.

Measure 3d: Cumulative Number of Patents Filed



Data Validation and Verification
(see end of performance goal 3 measure summaries for information on all ATP metrics)

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	640	770	790	930	1,040
Actual	607[1]	693	Available May 2002		
Met/Not Met	Not Met	Not Met			

1 FY 1999 actual has been adjusted very slightly from the previously reported figure (from 616 to 607, a 1.5% change) due to data verification improvements made in consultation with an audit team from the Department of Commerce Office of the Inspector General.

Explanation of Measure

The third of ATP's set of output measures, these data represent cumulative direct counts of the number of patents filed by all ATP-funded research project participants through the close of a given fiscal year. Final data for FY 2000 are reported here for the first time (this information was not

included in previous Government Performance and Results Act-related reports). For FY 2000, the cumulative number of patents filed represents 90% of the expected level. Projections are based on extrapolations of past patenting rates and projections of projects initiated and completed over time and are updated to reflect all currently available data. These targeting mechanisms are not perfectly accurate for several reasons. First, the patent approval process is difficult to predict, and thus, for example, it is possible that patents projected to materialize in one fiscal year might not occur (or be reported) until the following year. Secondly, the patenting data are affected by delays in ATP project completion and/or project terminations, both of which are difficult to predict years in advance. In addition, patenting rates vary significantly across technology areas. For example, biotechnology-focused projects may generate more patents than projects in the information technology or manufacturing sectors. As a result, patent (like publications) activity will rise or fall as ATP's completed project portfolio shifts to a different mix of projects. While these factors and others make perfectly accurate targeting difficult, ATP will continue to track its patent count closely and will also analyze any trends that may indicate necessary adjustments to its projection models.

For all ATP output metrics, final data for FY 2001 will not be available until approximately May 2002 and will be reported in the FY 2002 Annual Program Performance Report.

Data Validation and Verification:

Data source: Data are gathered from the portfolio of ATP project participants (funded since 1993) through company filings of patent information to the NIST grants office (a legal requirement) and an electronic survey instrument under ATP's BRS. Separate portfolio-based telephone surveys are conducted of project participants funded prior to 1993 and for post-project data collection.
Frequency: Annual over the course of ATP funding for projects funded since 1993; intermittent for projects funded prior to 1993; every two years (up to six years) after ATP funding ends
Data storage: ATP's Office of Economic Assessment maintains BRS data in an integrated set of databases covering both descriptive information about the funded organizations and survey responses for all participants in ATP-funded research projects.
Verification: External auditors have evaluated ATP's BRS. In addition, all ATP reports using BRS data and patent reports filed through the NIST grants office are monitored closely by ATP for research quality and are subject to extensive NIST-wide review and critique prior to being issued. In addition, an on-going Office of Inspector General audit of NIST's performance measures includes review of two of these metrics: technologies commercialized and patents filed.
Data limitations: The BRS electronic survey and other telephone survey instruments represent a standardized reporting system. Standard sources of uncertainty include variation in interpretation of specific questions; variation in the estimation techniques used in response to specific questions; variation in the quality of industry data; and missing values.
Actions to be taken: If/when additional suggestions are received from the team currently auditing a subset of these performance measures, changes will be considered.

FY 2001 Program Evaluation for Performance Goal 3: Accelerate Technological

The Visiting Committee on Advanced Technology, a legislatively mandated panel of advisors that meets quarterly, and the ATP Advisory Committee regularly reviews the programmatic objectives and management of ATP. The ATP Advisory Committee is charged with (1) providing advice on ATP programs, plans, and policies; (2) reviewing ATP's efforts to assess the economic impact of the program; (3) reporting on the general health of the program and its effectiveness in achieving its legislatively mandated mission; and (4) functioning solely as an advisory body, in accordance with the provisions of the Federal Advisory Committee Act.

Over the past decade, ATP has been the subject of external reviews focused on program performance, including two broad programmatic reviews by the National Research Council (NRC) Board on

Science, Technology, and Economic Policy. The results of the first NRC review are available in a report entitled *The Advanced Technology Program: Challenges and Opportunities*, published in 1999 and available online at http://www.nap.edu/books/0309067758/html/. The second NRC review resulted in a recent report called *The Advanced Technology Program: Assessing Outcomes*, which was published in the summer of 2001 and is available online at http://www.nap.edu/books/030907410X/html/. This most recent evaluation found, among other things, that:

- " . . . the Advanced Technology Program is an effective federal partnership program . . . Its cost-shared, industry-driven approach to funding promising new technological opportunities has shown considerable success in advancing technologies that can contribute to important societal goals such as improved health diagnosis (for example, breast cancer detection), developing tools to exploit the human genome (for example, colon cancer protection), and improving the efficiency and competitiveness of U.S. manufacturing."
- "The extensive assessments of the program show that it appears to have been successful in achieving its core objective, that is, enabling or facilitating private sector R&D projects of a type, or in an area, where social returns are likely to exceed private returns to private investors."

The report also offers additional findings and a series of recommendations for ATP intended to further improve the effectiveness of the program and to enhance cooperation with other federal and state initiatives.

Cross-cutting Activities

Other Government Agencies

ATP leverages the expertise of scientists and engineers from a wide variety of government agencies and laboratories participating on ATP source evaluation boards. In addition, ATP program managers work with program managers from other government agencies to ensure that projects are complementary and relevant; coordination committees in several disciplines have been brought together for this purpose. This also creates an opportunity to broadly examine government R&D for specific technologies.

Government/Private Sector

ATP was established to co-fund with the private sector a broad array of path-breaking new industrial technologies. The program solicits proposals for innovative, high-risk R&D in any industry or field of technology that offers the potential for widespread benefits for the U.S. economy and society as a whole. ATP projects range from aquaculture to X-ray lithography, and the program has contributed significantly to technological advances in fields as diverse as automated DNA analysis, automobile assembly, tissue engineering, and software systems. Companies of any size may apply to ATP; small companies have developed many successful projects. Many universities have participated in ATP-supported research, but industry must lead ATP projects.

External Factors and Mitigation Strategies

ATP has little control over many aspects of the performance measures listed in this document. ATP is designed to fund high-risk technologies through partnerships with industry; both the nature of the projects and the location of the research performance intrinsically convey a high degree of uncertainty and a relatively low degree of control. For instance, the rate at which ATP-funded technologies are commercialized will vary in part due to technological uncertainties intrinsic to the

R&D field and in part to the particular strategies and efforts of the businesses performing the research. Other metrics, such as publication and patenting rates, will be affected not only by the number of technologies commercialized but also by company-specific strategies and market conditions. For example, patenting is more common in some industries than others, and a variety of factors affect the patenting and/or publishing choices of individual firms. Variation in growth rates and development trajectories add additional uncertainty; some technologies are commercialized rapidly once the research is completed, while others require extensive product development and clinical trials before significant commercialization can occur. There are no practical mitigation strategies for these external sources of uncertainty other than maintaining robust program management and data collection systems. ATP insists that its companies abide by the terms and conditions of the cooperative agreement, which include intellectual property and commercialization provisions.

Performance Goal 4: Improve the Technological Capability, Productivity, and Competitiveness of Small Manufacturers

Corresponding Strategic Goal

Strategic Goal 2: Provide infrastructure for innovation to enhance American competitiveness

Rationale for Performance Goal

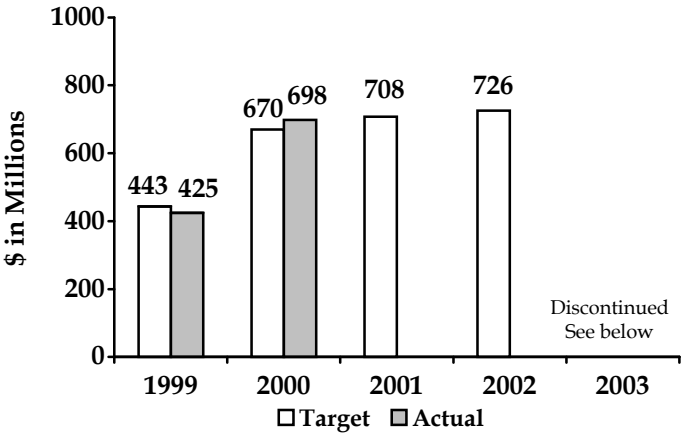
While U.S. manufacturing firms are among the most productive in the world, small manufacturing establishments consistently lag behind their larger counterparts, which are able to apply their greater financial, technical, and human resources to production modernization and continual performance improvements. But the nation's 361,000 small manufacturers employ approximately 12 million people—about two-thirds of the manufacturing workforce—and produce intermediate parts and equipment that contribute more than half of the value of U.S. manufacturing production. Their role in manufacturing supply chains means that the nation's future manufacturing productivity will rest largely on the ability of these small establishments to improve their quality, raise their efficiency, and lower their costs.

The comparatively low productivity growth of small U.S. manufacturing establishments can be attributed to numerous factors, including technical, cost, and information barriers. The National Institute of Standards and Technology (NIST) helps small manufacturers overcome these barriers through the Manufacturing Extension Partnership (MEP). MEP, a federal-state-local partnership program consisting of a national network of centers and field offices, provides information, decision support, and implementation assistance to help businesses adopt new and more advanced manufacturing technologies, techniques, and business practices. Through an annual client survey, MEP reports on performance measures that track the impact of MEP assistance on several major business indicators, including (1) increased sales attributed to MEP assistance, (2) capital investment attributed to MEP assistance, and (3) cost savings attributed to MEP assistance.

In FY 2000, MEP significantly improved the process by which it evaluates its clients' performance by updating its survey instrument and collection methods. Improvements to the survey design and implementation process have made it more likely that a larger number of surveyed clients will be able to provide quantifiable responses to interview questions. For example, new categories of questions were added to improve data utility and the wording of the questions was revised to improve accuracy and efficiency. In addition, clients are asked to comment on the impact of MEP services on intermediate outcomes such as improvements in manufacturing, sales and marketing, human resources, information and management systems, and client satisfaction. The survey process is client-based rather than activity-based; it takes a more holistic approach, asking clients to estimate how the entire group of services an MEP center has provided over the previous two years has affected business performance in the 12-month period prior to the survey date.

Two additional factors should be noted when considering the measures discussed below. First, MEP's data collection and reporting process lags by approximately one year due to the requirements of its surveying procedures; for example, clients who completed a project with MEP in January 2000 were surveyed in early 2001. Second, in the sections that follow, the targets for FY 1999 were computed using the old survey and method. The actual data for FY 1999 and FY 2000 and all out-year projections are based on the new survey instrument and process.

Measure 4a: Increased Sales Attributed to MEP Assistance



Data Validation and Verification

(See end of performance goal 4 measures for validation and verification information for all MEP metrics.)

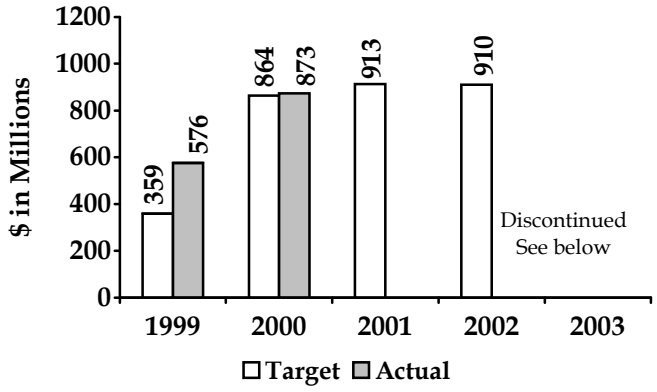
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	$443M	$670M	$708M	$726M	Discontinued
Actual	$425M[1]	$698M	Will Be Available Late 2002		
Met/Not Met	Not Met	Met			

1 FY 1999 actual has been adjusted slightly from the previously reported figure (from $447M to $425, a 4.9% change) due to data verification improvements made in consultation with an audit team from the Department of Commerce's Office of the Inspector General.

Explanation of Measure

See explanation of measures after measure 4c.

Measure 4b: Capital Investment Attributed to MEP Assistance



Data Validation and Verification

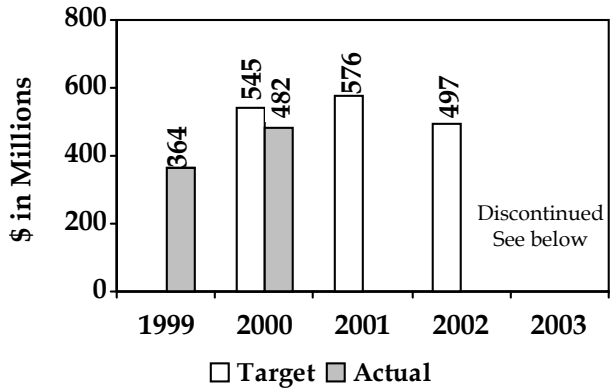
(See end of performance goal 4 measures for validation and verification information for all MEP metrics.)

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	$359M	$864M	$913M	$910M	Discontinued
Actual	$576M	$873M	Will Be Available Late 2002		
Met/Not Met	Met	Met			

Explanation of Measure

See explanation of measures after measure 4c.

Measure 4c: Cost Savings Attributed to MEP Assistance



Data Validation and Verification

(See end of performance goal 4 measures for validation and verification information for all MEP metrics.)

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	New	$545M	$576M	$497M	Discontinued
Actual	$364M	$482M	Will Be Available Late 2002		
Met/Not Met	New	Not Met			

Explanation of Measures

The goal of MEP is to help small manufacturing establishments overcome barriers to productivity growth by providing information, decision support, and implementation assistance so these businesses can adopt new and more advanced manufacturing technologies, techniques, and business practices. Measures 4a, 4b, and 4callow MEP to track the impact of its services on three key quantitative business indicators that as a set suggest the presence of business changes that are positively associated with productivity and revenue growth: (1) increased sales attributed to MEP assistance, (2) capital investment attributed to MEP assistance, and (3) cost savings attributed to MEP assistance. The measures represent only partial indicators of the impact of the MEP centers.[4] Many of the benefits of MEP's services are intangible, difficult to quantify, and/or are qualitative in nature.

FY 2001 actuals are not yet available because of data collection requirements (lag time is approximately one year). However, FY 2000 data are reported here for the first time and demonstrate the significant client outcomes attributable to the program. FY 2000 figures are based on survey responses from 4,890 clients. The program has exceeded two of its three fiscal year 2000 targets.

[4] Reported data reflect the impact of MEP services primarily on small manufacturing establishments; sometimes, centers will elect to serve establishments with more than 500 employees. Based on recently compiled survey data (as of mid-2001),

Actual performance on the third measure, "cost savings attributed to MEP assistance" represents approximately 89% of the target value.

The President's FY 2003 budget request proposes to terminate federal funding for all mature MEP centers. The national MEP program will continue to provide funding for two centers, and MEP will focus on providing a central coordination role. In light of these proposed changes to the program, MEP will re-evaluate its performance measures for FY 2003 and subsequent years. These measures will not be linked directly to the services rendered by MEP centers no longer receiving federal funding.

Data Validation and Verification:

Data source: The MEP client survey instrument was significantly revised in January 2000. A private firm, Market Facts Incorporated (MFI), located in Arlington Heights, Illinois, administers the survey.
Frequency: The survey is conducted four times per year, and clients are selected based on when they completed the first project with an MEP center in the previous year. For example, a client that completed a project with an MEP center in February 1999 was surveyed in January/February 2000. This change was implemented to reduce respondent burden, raise overall response rates, and improve data quality. Clients are asked to estimate how the group of MEP-provided services over the previous two years has affected their business performance in the 12-month period prior to the survey date.
Data storage: Survey data is sent directly to MEP for analysis. MEP reviews and stores survey data received from MFI.
Verification: Internal verification includes significant review of the MFI data by MEP staff. Criteria are in place for identifying and verifying significant outliers in the data. In addition, an ongoing Office of the Inspector General audit of NIST's performance measures includes a review of one of MEP's measures ("increased sales attributed to MEP assistance") and may result in suggested improvements to data verification procedures.
Data limitations: As with similar survey instruments, sources of uncertainty include variation in interpretation of specific questions, variation in the estimation techniques used in response to specific questions, variation in the quality of industry data, missing values, and other common survey problems. MFI uses standard survey techniques to clean the data, ensure accuracy and reliability, and improve the response rate, which is over 70%. Reported data reflect the impact of MEP services primarily on small manufacturing establishments; sometimes, centers will elect to serve establishments with more than 500 employees. Based on recently compiled survey data (as of mid-2001), approximately 95% of the clients served by MEP are small establishments with fewer than 500 employees; these clients account for approximately 93% of the attributed sales impacts.
Actions to be taken: Internal verification procedures are being reviewed and changes will be considered. Decisions about implementing additional improvements to verification procedures depend on a number of factors including the impact of these changes on MEP's relationships with the centers and clients, cost, and feasibility

FY 2001 Program Evaluation for Performance Goal 4: Improve the Technological Capability, Productivity, and Competitiveness of Small Manufacturers

The Visiting Committee on Advanced Technology, a legislatively mandated panel of advisors that meets quarterly to review NIST's general policy organization, budget, and programs, reviews the programmatic objectives and management of the MEP program. In addition, MEP evaluates its performance through a combination of methods, including (1) independent evaluation of MEP program plans and policies by the MEP National Advisory Board, (2) legislatively mandated independent panel reviews of individual MEP center operations and outcomes conducted using criteria adapted from the Malcolm Baldrige National Quality Award, (3) regular program oversight and periodic review of individual MEP center operations and outcomes by NIST staff, and (4) special studies of national program impacts. These reviews and assessments use a variety of performance measures, including output tabulations, estimates of interim impacts on client competitiveness derived from regular surveys of MEP center clients, and analyses of more detailed information regarding the operations and performance of individual MEP centers. MEP uses the information obtained through these review mechanisms primarily to anticipate potential changes that may impact small manufacturers (such as to the economic or regulatory environments), improve the quality of the services MEP centers provide to their clients, and develop or adapt products and services for dissemination through the MEP centers.

Cross-cutting Activities

Intra-Department of Commerce

MEP has collaborated with the International Trade Administration, the Minority Business Development Agency, and the Economic Development Administration on a number of projects. For example, MEP has worked with the International Trade Administration on efforts to open global markets to American small and medium-sized manufacturers interested in but inexperienced with exporting activities.

Other Government Agencies

MEP collaborates with a wide range of agencies that regulate or provide programs and services that affect small manufacturing businesses, including the Departments of Agriculture, Defense, Energy, Health and Human Services, Housing and Urban Development, and Labor, as well as with the Environmental Protection Agency, National Aeronautics and Space Administration, and the Small Business Administration.

Government/Private Sector

As described previously, MEP centers, delivering services to firms in all 50 states and Puerto Rico, work directly with small and medium-sized manufacturing establishments—typically, those with fewer than 500 employees. Because the MEP centers are joined together in a network through NIST, even the smallest firms are able to tap into the expertise of knowledgeable manufacturing and business specialists throughout the United States. MEP centers assist firms in areas such as quality management systems, business management systems, human resource development, market development, materials engineering, plant layout, energy audits, and environmental studies.

External Factors and Mitigation Strategies

The economic and technological environment for small manufacturers in the United States continues to change rapidly. To maximize its effectiveness, MEP must not only respond rapidly to its clients' changing needs, but also must anticipate changes in the business environment facing small manufacturers.

Performance Goal 5: Help U.S. Businesses and Other Organizations in Continually Improving Their Productivity, Efficiency, and Customer Satisfaction by Adopting Quality and Performance Improvement Practices

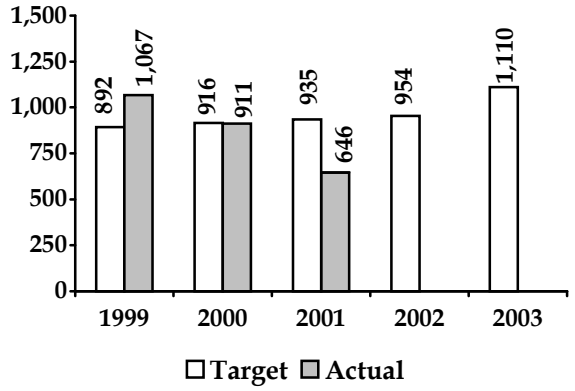
Corresponding Strategic Goal

Strategic Goal 2: Provide infrastructure for innovation to enhance American competitiveness

Rationale for Performance Goal

Quality and performance improvement have become requirements—not options—for competitive businesses and high-performance organizations of all types. Through the Baldrige National Quality Program (BNQP), the National Institute of Standards and Technology (NIST) provides a systematic and well-tested set of business values, performance criteria, and assessment methods that all organizations can use to improve their productivity and effectiveness. Overall, BNQP catalyzes the business community to define what organizations must do to improve their performance and attain (or retain) market leadership and provides a mechanism for broadly disseminating that information.

Measure 5a: Number of Applications to the Malcolm Baldrige National Quality Award (MBNQA) and Baldrige-based State and Local Quality Awards



Data Validation and Verification

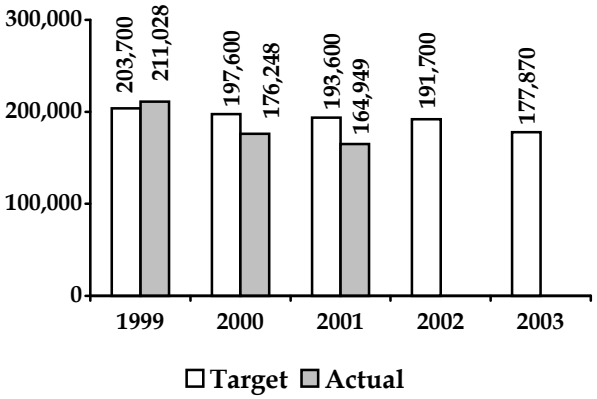
Data source: BNQP collects and tracks application data; some data are collected from state and local programs.
Frequency: Based on the application cycle; data from state programs are collected annually.
Data storage: BNQP
Verification: Data represent direct and verifiable counts of BNQP business activities and processes. Internal verification includes review by the NIST Director's Office.
Data limitations: Output only; data collected from state and local programs may be incomplete (see explanation below)
Actions to be taken: NIST will provide additional information to supplement these output counts, such as information about online usage of Baldrige criteria materials and will explore possible new or replacement measures. Recently completed assessment of the program provides information on economic impact of the award program.

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	892	916	935	954	1,110
Actual	1,067	911	646		
Met/Not Met	Met	Not Met	Not Met		

Explanation of Measure

See explanation of measure for measure 5b.

Measure 5b: Number of Baldrige Criteria Mailed by BNQP and Baldrige-based State and Local Quality Programs



Data Validation and Verification

Data source: BNQP collects and tracks application data; some data are collected from state and local programs.
Frequency: Based on the application cycle; data from state programs are collected annually.
Data storage: BNQP
Verification: Data represent direct and verifiable counts of BNQP information dissemination. Internal verification includes review by the NIST Director's Office.
Data limitations: Output only; data collected from state and local programs may be incomplete (see explanation below). Recently completed assessment of the program provides information on economic impact of the award program.
Actions to be taken: NIST will provide additional information to supplement these output counts, such as information about online usage of Baldrige criteria materials and will explore possible new or replacement measures.

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	203,700	197,600	193,600	191,700	177,870
Actual	211,028	176,248	164,949		
Met/Not Met	Met	Not Met	Not Met		

Explanation of Measures

BNQP reports two key output metrics: (1) the total number of applications to the MBNQA and Baldrige-based state and local awards, which reflects high-level corporate commitment to quality and high-performance business practices throughout the country and (2) the number of printed BNQP *Criteria for Performance Excellence* documents that are distributed by BNQP and Baldrige-based state and local quality programs, which illustrates the dissemination of BNQP concepts and methods. Both of these metrics illustrate progress on core BNQP objectives: expanding the program itself and promoting the growth of quality awareness and performance excellence throughout the United States. However, the data are only partial representations of BNQP's output. The application count does not capture the large number of organizations that use Baldrige criteria internally but do not formally apply for MBNQA or state awards. The number of

Baldrige Criteria: Online Dissemination

In February 2001, BNQP began to track the number of times its *Criteria for Performance Excellence* documents were downloaded via the web (available at http://www.quality.nist.gov). From February 2001 through the end of the fiscal year, the three types of Baldrige criteria -- for business, healthcare, and education -- were downloaded more than 400,000 times. This total demonstrates the very high level of dissemination of the criteria, especially when considered in conjunction with the number of Baldrige documents distributed via mail. However, this count should not be interpreted as the number of distinct users who have read or utilized the documents. It is a direct count of the number of times the documents were downloaded in Adobe Acrobat form. For technical and privacy reasons, it is not possible to determine the number of unique users, if the document was printed, or how long each user spent on the site.

documents mailed also does not capture additional dissemination channels, such as electronic acquisition and dissemination; reproduction of the Baldrige criteria in textbooks, articles, and other documents; and secondary modes of copying and distribution. This is one reason why the number of Baldrige criteria mailed (measure 5b) indicates a downward trend over time; as more copies of the *Criteria for Performance Excellence* are distributed via the Internet, the program expects to mail fewer documents. Moreover, direct counts of Baldrige criteria do not capture various formal and informal ways that BNQP concepts can be disseminated, such as through academic programs, consulting channels, business and organizational management literature, and so on.

A portion of the discrepancy between target levels and actual performance is due to the difficulties inherent in collecting data from state and local programs. Data from state programs are uneven and can take months to collect. For example, in January 2002, 54 state, regional, and local quality award programs were asked to provide information on these and other metrics. Overall, 41 programs responded, and of these one program reported that its application information is confidential, six reported that they do not track criteria distribution or distributed criteria solely through their web sites, and four indicated that they did not operate an award cycle in 2001. The completeness and timeliness of data generated by state quality programs is difficult to influence. Even with these collection challenges, however, the available data provide a rough proxy for the leveraging effect of the MBNQA state-level programs. BNQP uses other methods to assess the program's relevance and utility, such as occasional executive surveys and review of anecdotal evidence.

FY 2001 Program Evaluation for Performance Goal 5: Help U.S. Businesses and Other Organizations in Continually Improving Their Productivity, Efficiency, and Customer Satisfaction by Adopting Quality and Performance Improvement Practices

Economics professors Albert N. Link, of the University of North Carolina, and John T. Scott, of Dartmouth College, recently examined the BNQA and estimated the total economic benefits of the program at almost $25 billion, for a benefit-to-cost ratio of 207:1. They determined the total operational costs, including the value of executives' volunteered time to review applications, to be $119 million. Through 2000, 41 companies had received the Baldrige National Quality Award, and NIST had received 785 applications. However, thousands of other organizations of all sizes and in all sectors of the economy have benefited by using the Baldrige *Criteria for Performance Excellence* as the foundation for performance management and quality improvement programs. Thousands of paper and electronic copies of the criteria are disseminated each year to organizations across the country. Professors Link and Scott examined data from a survey of corporate members of the American Society for Quality (ASQ). They estimated the total benefits to the ASQ members from using the criteria to be $2.17 billion. To determine the benefits to the economy as a whole, they extrapolated the ASQ data based on the assumption that other companies in the economy benefit to the same extent as ASQ member companies.

In general, the Visiting Committee on Advanced Technology, a legislatively mandated panel of advisors that meets quarterly to review NIST's general policy organization, budget, and programs, reviews the programmatic objectives and management of the BNQP. In addition, the Board of Overseers, a federal panel of national quality experts from business and academia that advises the Secretary of Commerce, evaluates the performance of BNQP. An important part of the board's responsibility is to assess how well BNQP is serving the national interest. The board reviews all aspects of BNQP, including the adequacy of the Baldrige criteria and processes for making Baldrige Awards and reports its recommendations to the Secretary. Other annual external reviews are provided to NIST by the Panel of Judges and the Foundation for the MBNQA. See http://www.quality.nist.gov for additional information.

Cross-cutting Activities

Other Government Agencies

BNQP provides the Office of Personnel Management with Baldrige criteria, processes, and Baldrige Examiner Board members for the Presidential Quality Award.

Government/Private Sector

BNQP has proven to be a remarkably successful government and private sector team effort. The annual government investment of about $5 million is bolstered by a contribution of more than $100 million from private sector and state and local organizations, including $10 million raised by private industry to help launch the program and the time and efforts of hundreds of largely private sector volunteers. The cooperative nature of this partnership is perhaps best illustrated by the Baldrige Award's Board of Examiners. Each year, more than 300 experts from industry, educational institutions, governments at all levels, and nonprofit organizations volunteer many hours reviewing applications for the award, conducting site visits, and providing each applicant with an extensive feedback report citing strengths and opportunities to improve.

External Factors and Mitigation Strategies

BNQP's ability to further promote quality awareness and performance excellence will depend in part upon acquiring the formal authority to conduct research, develop data on best practices, and generate self-assessment primers and other educational materials.

Performance Goal 6: Enhance Public Access to Worldwide Scientific and Technical Information through Improved Acquisition and Dissemination Activities

(This goal has been reworded and renumbered since the publication of the FY 2000 Annual Program Performance Report and FY 2002 Annual Performance Plan. This goal was previously worded as: "Collect, organize, preserve, and disseminate government scientific, technical, and business-related information (NTIS).")

Corresponding Strategic Goal

Strategic Goal 2: Provide infrastructure for innovation to enhance American competitiveness

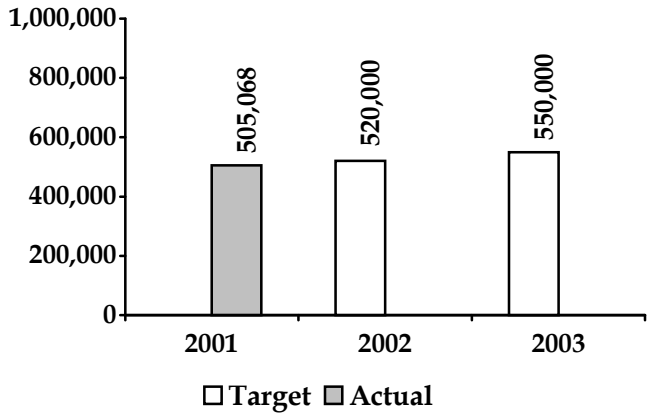
Rationale for Performance Goal

The National Technical Information Service (NTIS) operates a central clearinghouse of scientific and technical information that is useful to U.S. business and industry. NTIS collects scientific and technical information; catalogs, abstracts, indexes, and permanently archives the information; disseminates products in the forms and formats most useful to its customers; develops electronic and other new media to disseminate information; and provides information processing services to other federal agencies.

NTIS continues to meet the challenge of permanent preservation of and ready access to the taxpayers' investment in research and development through the acquisition, organization, and preservation of the titles added annually to the permanent collection. NTIS promotes the development and application of science and technology by providing technologically advanced global e-commerce channels for dissemination of specialized information to business, industry, government, and the public and is implementing an initiative that will enable users to locate and download information directly from agency Internet sites.

NTIS collects its material primarily from U.S. government agencies and their contractors and grantees, as well as from international sources. The NTIS permanent collection includes approximately 3 million titles, including reports describing the results of federally sponsored research, statistical and business information, audiovisual products, computer software and electronic databases developed by federal agencies, and reports prepared by foreign research organizations. NTIS maintains a permanent repository of these information products as well as offering approximately 460,000 online electronic subscription items to its many customers, primarily researchers and business managers in private industry. The disseminated materials may include computer downloads, paper, microfiche, audiovisual, or electronic media.

Measure 6a: Number of New Items Available (Annual)



Data Validation and Verification:

Data source: NTIS operates and maintains internal systems for processing collected information into available products. NTIS records every transaction using a commercial order processing system modified to meet its specific needs
Frequency: Internal management activity reports are produced daily, while summaries are produced monthly.
Data storage: All performance-related information is stored within the NTIS order processing system.
Verification: NTIS accounting and budget offices analyze and report performance output data and revenue and cost data to management. Data verification is provided through regular internal and independent auditor reporting.
Data limitations: New measure; to be determined
Actions to be taken: New measure; TBD

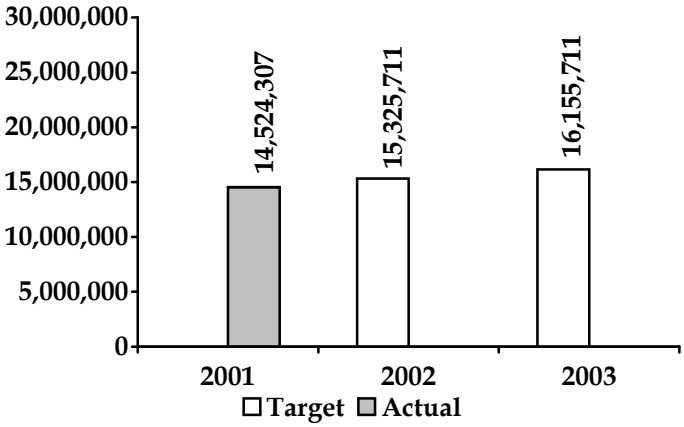
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	New	New	New	520,000	550,000
Actual	N/A	N/A	505,068		
Met/Not Met					

Explanation of Measure

The number of items available for sale to the public from NTIS includes scientific, technical, and engineering information products added to the permanent collection, as well as items made available through online electronic subscriptions.

Each publication added to the permanent collection is abstracted, catalogued, and indexed so that it can be identified and merged into the permanent bibliographic database for future generations of researchers and the public who may benefit from this valuable research. Other information products are available as full text documents in electronic format through numerous NTIS online information services. This material is acquired primarily from U.S. government agencies and their contractors and grantees, but also from international sources. The number of new information products available each year from NTIS is approximately 500,000, but the number largely depends on input from other government agencies.

Measure 6b: Number of Information Products Disseminated (Annual)



Data Validation and Verification:

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Data limitations: New measure; to be determined
Actions to be taken: New measure; to be determined

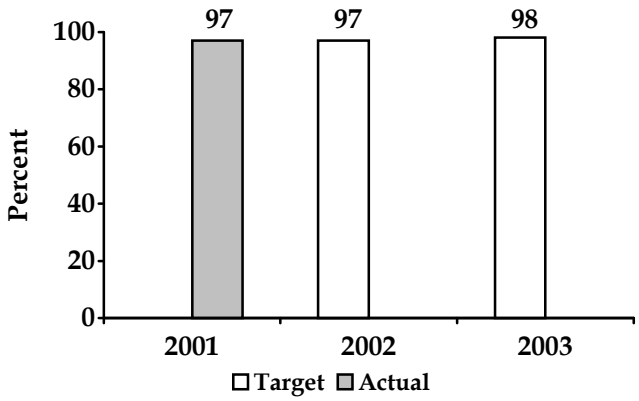
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	New	New	New	15,325,711	16,155,711
Actual			14,524,307		
Met/Not Met					

Explanation of Measure

This measure represent the number of information products distributed including compact discs, diskettes, tapes, online subscriptions, web site hits, as well as the traditional paper and microfiche products.

The shift in information dissemination practices from traditional paper copy to electronic-based products has improved NTIS's ability to provide quality products and increase the number of products distributed and the number of customers that have access to the valuable scientific and technical information. NTIS is continually striving to stay abreast of the latest technological advances in information dissemination processes to improve its ability to meet the demands of the public. NTIS is currently implementing an initiative that will enable customers to locate and download information directly from the originating agency Internet site. NTIS continues to enhance its ability to stay current in the e-commerce environment, while continuing to serve customers that require the more traditional distribution methods, as demonstrated in our targets above.

Measure 6c: Customer Satisfaction



Data Validation and Verification

Data source: NTIS operates and maintains internal systems for processing collected information into available products. NTIS records every transaction using a commercial order processing system modified to meet its specific needs.
Frequency: Internal management activity reports are produced daily, while summaries are produced monthly.
Data storage: All performance-related information is stored within the NTIS order processing system.
Verification: NTIS accounting and budget offices analyze and report performance output data and revenue and cost data to management. Data verification is provided through regular internal and independent auditor reporting.
Data limitations: New measure; to be determined
i b k b d d

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	New	New	New	97%	98%
Actual	N/A	N/A	97%		
Met/Not Met					

Explanation of Measure

This measure represents the percentage of NTIS customers that are satisfied with the quality of their order, the ease of order placement, and the timely processing of that order. Orders for NTIS's vast collection of scientific and technical information are received by phone, fax, mail, and online and are filled in a variety of formats. NTIS's continual efforts to improve customer satisfaction are essential to the success of NTIS's performance and mission to collect and disseminate scientific and business-related information.

FY 2001 Program Evaluation for Performance Goal 6: Enhance Public Access to Worldwide Scientific and Technical Information through Improved Acquisition and Dissemination Activities

Agency reviews of these performance measures reinforce recent concerns that the use of the Internet, as well as source agency budgetary and program decisions, are adversely affecting the number of items entered into the permanent archive. NTIS recognizes that the migration from traditional paper copy reports to electronic products is inescapable and is exploring various methods of preserving and disseminating electronic information.

Discontinued Measures

Number of Items in Archive

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	2,873,431	2,924,416	2,966,200	Discontinued	Discontinued
Actual	2,874,416	2,916,204	2,952,777		
Met/Not Met	Met	Not Met	Not Met		

Data Validation and Verification

Data source: NTIS operates and maintains internal systems for processing collected information into available products. NTIS records every transaction using a commercial order processing system modified to meet its specific needs.
Frequency: Internal management activity reports are produced daily, while summaries are produced monthly.
Data storage: All performance-related information is stored within the NTIS order processing system.
Verification: NTIS accounting and budget offices analyze and report performance output data and revenue and cost data to management. Data verification is provided through regular internal and independent auditor reporting.
Data limitations: None
Actions to be taken: Discontinued measure

Number of Documents Reproduced from Electronic Media

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Target	600,000	750,000	850,000	Discontinued	Discontinued
Actual	721,295	805,332	707,311		
Met/Not Met	Met	Met	Not Met		

Data Validation and Verification

Data source: NTIS operates and maintains internal systems for processing collected information into available products. NTIS records every transaction using a commercial order processing system modified to meet its specific needs.
Frequency: Internal management activity reports are produced daily, while summaries are produced monthly.
Data storage: All performance-related information is stored within the NTIS order processing system.
Verification: NTIS accounting and budget offices analyze and report performance output data and revenue and cost data to management. Data verification is provided through regular internal and independent auditor reporting.
Data limitations: None
Actions to be taken: Discontinued measure

Explanation of Measures

Unlike the new measures that have replaced them, these measures do not adequately convey a useful return on investment for this program. The decline in the number of documents reproduced from electronic media between FY 2000 and FY 2001 is a result of several factors: outsourcing high-volume print runs for subscription products, outsourcing of color printing to provide customers with a better quality product, and reduced demand for traditional products.

Cross-cutting Activities

Other Government Agencies

NTIS provides a variety of services that assist other agencies in developing, producing, and disseminating their information. These services include fax management services; reproduction of paper, computer, and microfiche products; billing and collection services; product storage and distribution; web hosting; and database management and distribution.

External Factors and Mitigation Strategies

Discontinued Performance Goal: Protect the National Information Infrastructure

Corresponding Strategic Goal

Strategic Goal 2: Provide infrastructure for innovation to enhance American competitiveness.

Rationale for Performance Goal

This performance goal will be discontinued. The Critical Infrastructure Protection Grants program (CIPGP) was funded for the first time for FY 2001. The program was not funded for FY 2002, and funding for FY 2003 is not proposed. Previously, activity milestones were established to gauge the effectiveness of the program in its early stages (for FY 2001).

Discontinued Measures

Activity Milestones Related to Program Establishment

Explanation of Measure

The primary objective of CIPGP was to fund research to provide solutions to the information security problems that are central to critical infrastructure and that are not being adequately addressed. A secondary objective of the program was to cultivate a security-capable and security-conscious community.

Milestones

As detailed in previous Government Performance and Results Act reports, in its formative stages the CIPGP was evaluated through the timely and successful completion of appropriate activity milestones, including:

- Completing an implementation plan for the program
- Making staffing decisions, as necessary
- Establishing grant review teams and possible advisory committees
- Coordinating and supporting the competitive grant review process
- Awarding the first round of research grants
- Disseminating the results of the funded research to all relevant parties through the National Institute of Standards and Technology (NIST) web site, publication in professional journals, and focused meetings, as appropriate
- Establishing an evaluation system for the program.

The following chart depicts the CIPGP's progress toward meeting these activity milestones in FY 2001.

FY 2001 Progress, Critical Infrastructure Protection Grants Program

Activity Milestones	Status
Complete an implementation plan for the program	CIPGP plan completed in December 2000; approved by Congress in April 2001
Make staffing decisions, as necessary	Staffing decisions made for the following positions: selection official, an initial CIPGP director (for the evaluation process), and CIPGP co-directors (grant selection through the present)
Establish grant review teams and possible advisory committees	A list of reviewers was assembled, consisting of scientists from NIST and from other government agencies; all reviewers were government employees; the CIPGP director also worked closely with the NIST Grants Office and the NIST Legal Office
Coordinate and support the competitive grant review process	• Reviewers were provided with guidance on proposal review, which included relevant portions of the federal register notice and explanations of the numerical scoring system • Each proposal was assigned to at least three reviewers, with a goal of assigning two NIST reviewers and one outside reviewer; the reviewer scores were averaged and the proposals were sorted • The selection official then evaluated the proposals, the reviews, the program goals, the possibilities for future funding, the evaluation criteria, and the variety of the proposals; in this process, the selection official was assisted by other CIPGP staff members; the consistency of the reviews, the comments of the reviewers, and the needs of the program were all considered • Because of the uncertainty of future Congressional program funding, the CIPGP team concluded that many proposals should initially be funded for two years
Award the first round of research grants	The CIPGP received 133 proposals requesting roughly $73M; only $5M was available; after a thorough review process, nine proposals were selected for full or partial funding.
Disseminate the results of the funded research to all relevant parties through the NIST web site, publication in professional journals, and focused meetings, as appropriate	Results of the proposal process have been disseminated through letters, NIST press releases, and the CIPGP website; see http://csrc.nist.gov/grants/index.html for additional information; as research results are obtained, they will be published