Technology Administration

Mission Statement

Technology Administration: 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.

The Technology Administration (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 its component organizations: the Office of Technology Policy, the National Institute of Standards and Technology (NIST) and the National Technical Information Service (NTIS).

Overview of Component Bureaus

Office of Technology Policy (OTP)

The Technology Administration's (TA's) Office of Technology Policy (OTP) provides policy guidance to the Secretary of Commerce and the Technology Administration's component agencies (NIST and NTIS) and serves as an advocate for innovation and industrial competitiveness within and outside government. The Under Secretary serves on the Executive Committee of the Committee on Technology within the President's National Science and Technology Council, coordinates the civilian technology efforts of federal agencies, and helps to shape federal civilian research and development (R&D) priorities based upon the needs 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 analytical, outreach, and policy development expertise of the OTP and the Office of Space Commercialization (OSC).

OTP works in partnership with the private sector to develop and advocate national policies and initiatives to build the U.S.'s economic strength. The OTP administers the National Medal of Technology, the highest honor awarded by the President of the United States for technological innovation. Also within the OTP, the Office of Technology Competitiveness promotes domestic technological competitiveness in four interrelated policy areas: technology development and transfer, business innovation, state and local efforts to promote technology-based economic growth, and work force preparation for a technology-driven future. The Office works closely with industry, conducts issue analyses, disseminates reports and other useful information, and supports the Assistant Secretary in developing and advocating policy tools that can advance U.S. innovation, technological growth, and competitiveness. OTP's Office of International Technology promotes international technology partnerships to strengthen U.S. competitiveness, and advocates policies to advance U.S. technology in the global economy.

National Institute of Standards and Technology (NIST)

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 twenty-first 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.

NIST operates under the authority of the National Institute of Standards and Technology Act (15 U.S.C. 271), which modifies The Organic Act that created the National Bureau of Standards (NBS) in 1901. In 1988, Congress renamed NBS as NIST, and also established the Regional Centers for the Transfer of Manufacturing Technology (15 U.S.C. 278k) and the Advanced Technology Program (15 U.S.C. 278n). The National Quality Program was established and its functions assigned to NIST by the Malcolm Baldrige National Quality Improvement Act of 1987 (15 U.S.C. 3711a).

Over the past year NIST has developed a new long-term strategic plan and planning process that provides a comprehensive approach to envisioning NIST's future, establishing long-term strategic goals, and implementing a plan for achieving those goals. As a key part of this planning effort, NIST senior leadership has identified the six comprehensive programmatic goals identified in the table below, which set the context for the Institute's Annual Performance Plan and budget request for FY 2004. The first three goals pertain to the NIST Laboratories' and goals four through six pertain to NIST's extramural programs. This plan also includes a performance logic model for each NIST program to describe the chain of value-creation from inputs to end-outcomes and to link performance evaluation methods to each stage of the impact path.

NIST: Programs, Core Functions, and Strategic Goals

Program	Core Functions	Strategic Goals
Laboratories	Traceability to the seven basic measurement units, measurement and test methods, calibration services, Standard Reference Materials, evaluated scientific data, impartial expertise and leadership in standards development, and research in support of these areas.	1. Research and develop the measurements and standards needed to support emerging science and technology-intensive industries. 2. Develop and efficiently disseminate the measurements and standards needed to support the nation's strategic interests in homeland security. 3. Assure the availability and efficient transfer of measurement and standards capabilities essential to established industries.
ATP	R&D grants to industry and universities.	4. Accelerate private investment in and development of high-risk, broad-impact technologies.
MEP	Technical assistance to smaller manufacturers.	5. Raise the productivity and competitiveness of small manufacturers.
Baldrige	Framework for evaluating and improving organizational quality and performance, and an award program to recognize role models.	6. Catalyze and reward quality and performance improvement practices in U.S. businesses and other organizations.

National Technical Information Service (NTIS)

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, all without appropriated funds. NTIS's revenue comes from (1) the sale of technical reports to business and industry, schools and universities, state and local government offices, and the public at large; and (2) from services to federal agencies that help them communicate more effectively with their employees and constituents.

Priorities/Management Challenges

OTP: Strategic Priorities for FY 2004

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 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 U.S.'s investment in R&D (public, private industry, venture capital); the strength of the human and physical infrastructure supporting the U.S.'s innovation system; and sustaining business conditions (such as taxes, trade, intellectual property protection, government regulations) that facilitate technological innovation and market risk-taking.

OTP's performance goal is to provide leadership in promoting national technology policies that facilitate U.S. pre-eminence in key areas of science and technology and to leverage technological innovation to strengthen the U.S.'s global competitiveness. This performance goal is supported by four general goals and objectives. OTP's FY 2003 APP identified three key action areas: outreach, analysis/education, and advocacy. These continue to be the broad areas in which OTP plans to accomplish its goals, and they have been incorporated into the FY 2004 plan within the following four general goals and objectives. These four goals, and brief examples of the strategies and activities and their tie-in to the mission and the FY 2003 goals are:

1. **Support and improve the U.S.'s innovation system** — In FY 2004, OTP will lead interagency working groups, community outreach events, and workshops (outreach), to identify barriers to and best practices of the U.S.'s innovation system (analysis). OTP will increase understanding of U.S. innovation through publication of policy papers and regulations, and promotion of the Medal of Technology Program and the GetTech Web site (advocacy).

2. **Advance the role technology plays in US economic growth and homeland security** — In FY 2004, OTP will facilitate dialogue and interaction between policymakers, and developers and users of emerging and productivity-enhancing technologies (outreach and advocacy), with the goal of promoting adoption by business, education, medicine, and research groups (education and advocacy).

3. **Strengthen the competitive position of the U.S.'s technology industries** — In FY 2004, OTP will initiate an examination of the effects of globalization and policies on U.S. high tech industries and the science and technology (S&T) workforce (analysis). Data will be collected from international counterparts (outreach) and results will be used to highlight actions and recommend policies that may help foster U.S. competitiveness (educate and advocate).

4. **Strengthen OTP's organization, capabilities, and resources to maximize the effectiveness of its activities and services** — In FY 2004, OTP, as a part of a comprehensive Workforce Restructuring Plan developed to bring the organization into alignment with the President's Management Agenda, will reorganize the structure of its workforce to embrace important policy issues for U.S. industry and the S&T community, such as globalization and technology-led economic development. In addition to press briefings, workshops, and roundtable discussions, OTP will also utilize electronic means to inform Congress, U.S. government agencies, and the public about OTP analytical findings (outreach and advocacy/education).

NIST: Strategic Priorities for FY 2004

Based on its long-term strategic planning efforts and an analysis of the most pressing needs related to the coming fiscal year, TA/NIST senior leadership identified several key priorities for FY 2004. These are:

- **Critical Improvements to NIST Facilities*:*** As technology advances, the need for more sophisticated and demanding measurements and standards also grows. NIST can develop and provide these capabilities and services only in stable, productive, and safe research and measurement laboratories. But many NIST laboratory facilities are decades old and are no longer capable of providing the stable research environment needed to efficiently conduct the advanced measurement research in many crucial areas—nanotechnology, information technology, communications, health care, homeland security, and others. To fulfill its mission requirements, NIST must invest in critical improvements in its Boulder and Gaithersburg facilities.

- **Measurements and Standards for Homeland Security:** The September 11 terrorist attacks on the United States claimed 3,000 lives and an estimated $150 billion in economic losses. NIST will help to reduce the threat of potential future attacks and will help prepare the nation to respond more effectively in the event of attacks, minimizing loss of life and economic damage. In FY 2004, NIST plans to focus on four urgent dimensions of homeland security (refer to NIST Performance Goal 2):

  1. Standards, technology, and practices for buildings and first responders, which will use an analysis of the technical cause of the collapse of the World Trade Center towers and the pattern of response to that crisis to develop cost-effective ways to strengthen buildings against attacks or natural disasters and assess ways to improve the safety and efficacy of first responders.

  2. Standards for biometric identification, as needed to support the USA Patriot Act.

  3. Measurement infrastructure for homeland security focusing on measurements, testing methods, and performance standards needed to improve the cyber security of federal information systems, and to support certification needs for technologies designed to detect and respond to chemical, biological, radiological, nuclear, and explosive threats.

  4. Measurements, standards, data, and testing methods to accelerate the development of quantum computing for cryptography and secure communications.

- **Infrastructure for Innovation:** Through its broad and vigorous measurement research, NIST works to anticipate the infrastructure needs of next-generation technologies and industries in the U.S. This forward-looking research not only yields improvements in NIST's measurement services, but also generates new knowledge, capabilities, and techniques that are transferred to industry, universities, and government. Next-generation measurement needs require NIST to focus its long-term research efforts on specific interdisciplinary technology areas where inadequate technical infrastructure is a barrier to development, commercialization, and public benefit: nanoscale measurements and data, and health care quality assurance (refer to NIST Performance Goal 1).

FY 2004 Program Changes

(Dollars in Thousands)

	Base		Increase/Decrease	
	FTE	Amount	FTE	Amount
Office of Technology Policy	49	$8,140	–4	–$125

Workforce restructuring: A decrease (–5 FTE, –$450) is requested to effect the transfer of the Office of Space Commercialization to the International Trade Administration and provide training to OTP personnel to develop the skills needed to address technology policy issues. Recognizing that legislative approval is necessary, funding for the Office of Space Commercialization has been taken out of the Technology Administration budget and will be provided through the International Trade Administration.

Supporting capacity building around the world – Digital Freedom Initiative (DFI): An increase (+1 FTE, +$325) is requested for OTP to serve a leadership role in a White House initiative that leverages U.S. leadership in the Information and Communication Technology (ICT) arena to advise entrepreneurs in developing nations as they plan to increase their efficiency and participate in the global economy.

	Base		Increase/Decrease	
	FTE	Amount	FTE	Amount
Chemical Science and Technology	244	$40,602	+2	+$1,000

An increase (+2 FTE, +$1,000) is requested to provide the advanced measurements, standards, and data that health care providers and researchers need to improve health care quality and reduce costs.

Of this amount, a transfer of $425 will be made to the NIST Working Capital Fund.

	Base		Increase/Decrease	
	FTE	Amount	FTE	Amount
Physics	179	$38,361	+24	+$14,950

An increase (+1 FTE, +$1,450) is requested to provide the necessary critical back-up elements for the NIST Time Scale and Time Dissemination services. The NIST Time scale provides the official U.S. time and synchronization of millions of clocks everyday for purposes ranging from consumer electronic products, to stock market transactions, to navigation.

Of this amount, a transfer of $1,190 will be made to the NIST Working Capital Fund.

An increase (+9 FTE, +$5,200) is requested to develop the measurements, standards, and data the private sector and other agencies need to support research and development (R&D) and accelerate the production of nanotechnology-based products and services 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 $1,800 will be made to the NIST Working Capital Fund.

An increase (+9 FTE, +$5,300) is requested to strengthen the national measurement infrastructure for radiation applications in homeland security. Improved radiation measurements are needed to better detect nuclear and radiological weapons of mass destruction before they are smuggled into the U.S.; to detect radiation threats such as explosives; and to safely and effectively sterilize containers potentially containing biowarfare agents such as anthrax.

Of this amount, a transfer of $500 will be made to the NIST Working Capital Fund.

An increase (+5 FTE, +$3,000) is requested to provide measurements, standards, data, and testing methods to accelerate the development of quantum information technology with applications in homeland security (cryptography and secure communications) and revolutionary computing.

Of this amount, a transfer of $1,000 will be made to the NIST Working Capital Fund.

	Base		Increase/Decrease	
	FTE	Amount	FTE	Amount
Building and Fire Research	114	$19,265	+5	+$4,000

An increase (+5 FTE, +$4,000) is requested 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	365	$56,291	+3	+$1,000

An increase (+3 FTE, +$1,000) is requested to provide standard methods for measurement of the accuracy of biometric identification systems in compliance with the USA PATRIOT Act of 2001.

	Base		Increase/Decrease	
	FTE	Amount	FTE	Amount
Research support activities	229	$46,202	0	+$6,700

An increase (+$1,200) is requested to provide funding for outsourcing the maintenance and operation of NIST's Advanced Measurement Laboratory (AML).

An increase (+$5,500) is requested to provide the additional research equipment needed to realize the capabilities of NIST's Advanced Measurement Laboratory (AML). When completed in 2004, the AML will be the world's best measurement laboratory, helping provide the measurements and standards needed by industry and science in key 21st century technologies.

	Base		Increase/Decrease	
	FTE	Amount	FTE	Amount
Advanced Technology Program	159	$110,807	–66	–$80,000

A decrease (-66 FTE, -$80,000) is included. Consistent with the Administration's emphasis on shifting resources to reflect changing needs, the 2004 Budget proposes to terminate the Advanced Technology Program (ATP). Funding is provided for administrative costs and closeout.

	Base		Increase/Decrease	
	FTE	Amount	FTE	Amount
Construction and major renovations	52	$34,370	+1	+$35,220

An increase (+$21,300) is requested to proceed with the next steps necessary to complete several urgently needed construction and major renovations projects on NIST's Boulder, Colorado, site. The construction and renovation projects include: completion of the Central Utility Plant ($10.8 million); design and limited renovation of Building 4 ($4.0 million); and renovation design of Building 1 ($6.5 million).

An increase (+$3,360) is requested to design the renovation of Building 220 at the Gaithersburg, Maryland, site.

An increase (+ 1 FTE, +$10,560) is requested to increase NIST's safety, capacity, maintenance, and major repairs base funding to an annual level of approximately $33 million to maintain NIST's Gaithersburg, Maryland, and Boulder, Colorado, sites.

Corresponding DOC FY 2004 Priorities

In addition, NIST addresses the following Departmental priorities for FY 2004:

- Providing Infrastructure for Technological Innovation—by accelerating technical innovation through advances in core science, technology, telecommunications, and manufacturing programs, and protection of intellectual property.

- Homeland Security and Critical Infrastructure Protection—by examining DOC programs in a post-9/11 context, by identifying what authorities or programs can be utilized to contribute to homeland security, and continuing to advance U.S. foreign policy and national security interests through the regulation of exports relating to critical goods and technologies.

Targets and Performance Summary

See individual Performance Goal sections for further description of each measure.

OTP 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

Measure	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Target	FY 2002 Actual	FY 2003 Target	FY 2004 Target
Support/improve American innovation system	New	New	New	Activities completed	Activities completed	Activities completed	Activities completed
Advance role of technology in U.S. economic growth and homeland security	New	New	New	Activities completed	Activities completed	Activities completed	Activities completed
Strengthen competitive position of American technology industries	New	New	New	Activities completed	Activities completed	Activities completed	Activities completed
Strengthen OTP's organization, capabilities, and resources to maximize the effectiveness of its activities and services	New	New	New	Activities completed	Activities completed	Activities completed	Activities completed

NIST Performance Goal 1: Research and Develop the Measurements and Standards Needed to Support Emerging Science and Technology-intensive Industries.

Measure	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Target	FY 2002 Actual	FY 2003 Target	FY 2004 Target
Technical publications produced[1]	2,270	2,250	2,207	2,050	2,236	2,100	2,200

NIST Performance Goal 2: Develop and Efficiently Disseminate the Measurements and Standards Needed to Support the Nation's Strategic Interests in Homeland Security

Measure	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Target	FY 2002 Actual	FY 2003 Target	FY 2004 Target
% activity and output milestones achieved	New	New	New	New	New	New	80%

NIST Performance Goal 3: Assure the Availability and Efficient Transfer of Measurement and Standards Capabilities Essential to Established Industries

Measure	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Target	FY 2002 Actual	FY 2003 Target	FY 2004 Target
Standard reference materials available	1,288	1,292	1,335	1,350	1,353	1,360	1,360
Standard reference data titles available	60	63	65	68	90	70	95
Number of items calibrated	3,118	2,969	3,192	2,900	2,924	2,900	2,800

NIST Performance Goals 1-3:							
Measure	**FY 1999 Actual**	**FY 2000 Actual**	**FY 2001 Actual**	**FY 2002 Target**	**FY 2002 Actual**	**FY 2003 Target**	**FY 2004 Target**
Qualitative assessment and performance evaluation using peer review	Completed	Completed	Completed	Complete	Completed	Complete	Complete
Economic impact studies	Completed	Completed	Completed	Complete	Completed	Complete	Complete

NIST Performance Goal 4: Accelerate Private Investment in and Development of High-risk, Broad-impact Technologies[2]							
Measure	**FY 1999 Actual[3]**	**FY 2000 Actual**	**FY 2001 Actual**	**FY 2002 Target**	**FY 2002 Actual**	**FY 2003 Target**	**FY 2004 Target**
Cumulative # of publications	468	565	747	770	Available May 2003	840	990
Cumulative # of patents filed	607	693	800	930	Available May 2003	1,020	1,220
Cumulative # of technologies under Commercialization	120	166	195	190	Available May 2003	210	250

NIST Performance Goal 5: Raise the Productivity and Competitiveness Small Manufacturers[4,6]							
Measure	**FY 1999 Actual[5]**	**FY 2000 Actual**	**FY 2001 Actual**	**FY 2002 Target**	**FY 2002 Actual**	**FY 2003 Target**	**FY 2004 Target**
Number of clients served by MEP Centers receiving federal funding	23,092	20,903	21,321	21,534	21,420	392	392
Increased sales attributed to MEP Centers receiving federal funding	$425M	$698M	$363M	$726M	Available December 2003	$13M	$13M
Capital investment attributed to MEP Centers receiving federal funding	$576M	$873M	$680M	$910M	Available December 2003	$17M	$17M
Cost savings attributed to MEP Centers receiving federal funding	$364M	$482M	$442M	$497M	Available December 2003	$9M	$9M

NIST Performance Goal 6: Catalyze and Reward Quality and Performance Improvement Practices in U.S. Businesses and Other Organizations							
Measure	**FY 1999 Actual**	**FY 2000 Actual**	**FY 2001 Actual[7]**	**FY 2002 Target**	**FY 2002 Actual**	**FY 2003 Target**	**FY 2004 Target**
Number of applications per year to Malcolm Baldrige National Quality Award and Baldrige-based state and local quality awards	1,067	911	646	954	Available May 2003	1,111	692
Number of Baldrige criteria mailed by BNQP and by Baldrige-based state and local quality programs	211,028	176,248	164,949	191,700	Available May 2003	177,870	165,363

NTIS Performance Goal 1: Enhance Public Access to Worldwide Scientific and Technical Information Through Improved Acquisition and Dissemination Activities

Measure	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Target	FY 2002 Actual	FY 2003 Target	FY 2004 Target
Number of new items available (annual)	New	New	505,068	510,000	514,129	520,000	525,000
Number of information products disseminated (annual)	New	New	14,524,307	16,000,0000	16,074,862	17,000,000	18,000,000
Customer satisfaction	New	New	97%	97%	98%	98%	98%

[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.*

[2] *Due to the cumulative nature of ATP's performance measures and the long time lags from project funding to the generation of measurable outputs and outcomes, performance data will continue to cumulate through the next several fiscal years before reflecting the budgetary changes proposed for FY 2004.*

[3] *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's Office of the Inspector General.*

[4] *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.*

[5] *In addition, the FY 1999 actual for "increased sales attributed to MEP assistance" 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.*

[6] *The FY 2003 estimate reflects the FY 2003 President's budget request, which provides funding for two centers.*

[7] *Data is 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)

OTP 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 Actual	FY 2003 Estimate	FY 2004 Base	Increase/ Decrease	FY 2004 Request
Under Secretary (US)/OTP	10.8	7.1	7.8	7.9	7.9	8.1	–0.1	8.0
Reimbursable	0.2	0.1	0.4	0.2	0.4	0.4	0.0	0.4
Total Funding	11.0	7.2	8.2	8.1	8.3	8.5	–0.1	8.4
IT Funding[1]	0.2	0.4	0.3	0.3	0.3	0.3	0.0	0.3
FTE	44	39	40	46	50	50	–4	46

NIST Laboratory Performance Goals (Goals 1-3):

1. Research and Develop the Measurements and Standards Needed to Support Emerging Science and Technology-intensive Industries

2. Develop and Efficiently Disseminate the Measurements and Standards Needed to Support the Nation's Strategic Interests in Homeland Security

3. Assure the Availability and Efficient Transfer of Measurement and Standards Capabilities Essential to Established Industries

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Estimate	FY 2004 Base	Increase/ Decrease	FY 2004 Request
Scientific and Technical Research & Services								
Electronics and Electrical Engineering	38.5	38.6	40.6	41.5	43.1	44.2	0.0	44.2
Manufacturing Engineering	19.1	19.0	18.9	19.4	21.6	21.8	0.0	21.8
Chemical Science and Technology	32.0	33.2	34.3	34.3	40.1	40.6	0.6	41.2
Physics	29.1	29.8	32.8	34.5	37.3	38.4	10.5	48.8
Material Sciences and Engineering	50.0	51.9	54.0	56.0	69.9	66.5	0.0	66.5
Building and Fire Research	14.9	15.2	17.6	20.2	19.3	19.3	4.0	23.3
Computer Science and Applied Math	42.5	46.5	55.6	56.4	54.9	56.3	1.0	57.3
Technology Assistance	17.6	17.8	17.8	18.1	19.0	19.1	0.0	19.1
Research Support Activities	31.7	26.2	29.0	44.5	84.1	46.2	6.7	52.9
Construction	19.6	200.5	37.7	70.6	70.4	34.4	35.2	69.6
Working Capital Fund								
Direct Investments	18.8	23.1	28.5	44.8	27.9	23.8	4.9	28.7
Reimbursable	100.5	110.7	115.5	125.7	154.5	149.2	0.0	149.2
Total Funding	414.3	612.5	482.3	566. 0	642.1	559.8	62.9	622.6
IT Funding[1]	48.0	50.2	54.2	64.0	66.3	63.7	0.0	63.7
FTE	2,762	2,670	2,594	2,607	2,761	2,762	25	2,787

NIST Performance Goal 4: Accelerate Private Investment and Development of High-risk, Broad-impact Technologies

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Estimate	FY 2004 Base	Increase/ Decrease	FY 2004 Request
Industrial Technology Services								
Advanced Technology Program	190.3	198.3	175.4	197.8	145.0	110.8	–80.0	30.8
Working Capital Fund	0.0	0.5	0.4	0.3	0.3	0.3	0.0	0.3
Total Funding	190.3	198.8	175.8	198.1	145.3	111.1	–80.0	31.1
IT Funding[1]	2.8	5.8	4.0	5.0	5.0	4.7	0.0	4.7
FTE	271	270	239	249	159	159	–66	93

NIST Performance Goal 5: Raise the Productivity and Competitiveness of Small Manufacturers

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Estimate	FY 2004 Base	Increase/ Decrease	FY 2004 Request
Industrial Technology Services								
Manufacturing Extension Partnership	127.9	103.3	105.9	108.2	18.2	12.6	0.0	12.6
Working Capital Fund	3.5	1.1	0.5	0.3	0.3	0.3	0.0	0.3
Total Funding	131.4	104.4	106.4	108.5	18.5	12.9	0.0	12.9
IT Funding[1]	2.6	2.9	1.5	3.1	2.4	2.1	0.0	2.1
FTE	109	91	87	89	89	89	0	89

NIST Performance Goal 6: Catalyze and Reward Quality and Performance Improvement Practices in U.S. Businesses and Other Organizations

	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Estimate	FY 2004 Base	Increase/ Decrease	FY 2004 Request
Scientific and Technical Research and Services								
National Quality Program	3.9	5.3	5.4	4.9	6.2	5.8	0.0	5.8
Working Capital Fund	2.3	3.5	1.1	0.2	1.8	1.8	0.0	1.8
Total Funding	6.2	8.8	6.5	5.1	8.0	7. 6	0.0	7.6
IT Funding[1]	0.5	0.7	0.7	0.3	0.3	0.3	0.0	0.3
FTE	39	51	49	54	55	55	0	55

NTIS Performance Goal 1: 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 Actual	FY 2003 Estimate	FY 2004 Base	Increase/ Decrease	FY 2004 Request
Reimbursable	33.3	38.3	34.7	27.7	50.9	41.5	0.0	41.5
Direct								
Total Funding	33.3	38.3	34.7	27.7	50.9	41.5	0.0	41.5
IT Funding[1]	9.9	9.9	9.8	10.7				
FTE	322	230	196	186	260	260	0	260

Discontinued Performance Goal: Protect the National Information Infrastructure	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Estimate	FY 2004 Base	Increase/ Decrease	FY 2004 Request
Scientific and Technical Research and Services								
Critical Infrastructure Protection Grant Program	N/A	N/A	5.0					
Total Funding	N/A	N/A	5.0					
IT Funding[1]	N/A	N/A	0.0					
FTE	N/A	N/A	2					

Grand Total	FY 1999 Actual	FY 2000 Actual	FY 2001 Actual	FY 2002 Actual	FY 2003 Estimate	FY 2004 Base	Increase/ Decrease	FY 2004 Request
OTP	11.0	7.2	8.2	8.1	8.3	8.5	–0.1	8.4
NIST								
Scientific and Technical Research and Services	279.3	283.5	311.0	329.8	395.5	358. 2	22.8	380.9
Industrial Technology Services	318.2	301.6	281.3	306.0	163.2	123.4	–80.0	43.4
Construction	19.6	200.5	37.7	70.6	70.4	34.4	35.2	69.6
Working Capital Fund	125.1	138.9	146.0	171.3	184.8	175.4	4.9	180.3
NTIS	33.3	38.3	34.7	27.7	50.9	41.5	0.0	41.5
Total Funding	786.5	970.0	818.9	913.5	873.1	741.4	–17.2	724.1
Direct	627.9	792.7	637.8	714.3	637.0	524.1	–22.1	501.9
Reimbursable[2]	158.6	177.3	181.1	199.2	236.1	217.3	4.9	222.2
IT Funding[1]	64.0	69.9	70.5	83.4	74.3	71.0	0.0	71.1
FTE	3,547	3,351	3,207	3,231	3,374	3,375	–45	3,330

[1] IT funding is included in total funding; total funding includes direct and reimbursable obligations.

[2] Reimbursable funding includes NIST working capital fund investments.

Skill Summary:

At the end of FY 2002, the staffs of the three component bureaus of TA reflected the following levels of educational attainment:

- Total OTP staff included 11% Ph.D., 22% M.A. or M.S., and 38% B.A. or B.S. holders.
- Total NIST staff included 28% 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., 19% M.A. or M.S., 18% B.A. or B.S. holders.
  - Advanced technology program: 48% Ph.D., 34% M.A. or M.S., 17% B.A. or B.S. holders.
  - MEP: 5% Ph.D., 64% M.A. or M.S., 27% B.A. or B.S. holders.
  - BNQP: 25% Ph.D., 38% M.A. or M.S., 25% B.A. or B.S. holders.
  - Total NTIS staff included 6% 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 its IT strategies. To achieve its 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 2004 Performance Goals

Office of Technology Policy (OTP)

Mission Statement

Develop and advocate national policies and initiatives that use technology to build America's economic strength.

Performance Goal: 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.

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 Technology Policy (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 U.S.'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.

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 U.S.'s economy.

In working to achieve the performance goal, OTP's efforts are focused on general goals (measures) and objectives that will support and improve the U.S.'s innovation system, advance the role technology plays in US economic growth and homeland security, and strengthen the competitive position of the U.S.'s technology industries.

General Goals (Measures) and Objectives

1. Support and improve the American innovation system.
   a. Strengthen the federal technology transfer system.
   b. Identify and advocate policies that promote the competitiveness of the U.S.'s S&T workforce.
2. Advance the role technology plays in US economic growth and homeland security.
   a. Increase policymakers' and public understanding of the importance to the US economy and homeland security of emerging and advanced technologies.
   b. Identify and advocate strategies that facilitate technology-led economic growth.
3. Strengthen the competitive position of the U.S.'s technology industries.
   a. Increase US policymakers' understanding of globalization's effects on competitiveness, technological development, and standards.
   b. Propose and recommend policy options on critical US business climate issues.
   c. Promote recognition and adoption in other countries of policies and practices that support the U.S.'s innovation and innovators.
4. Strengthen OTP's organization, capabilities, and resources to maximize the effectiveness of its activities and services.
   a. Transform OTP's internal organization and procedures to align with President's Management Agenda (PMA) objectives.

OTP has identified the following action plans, strategies, and activity milestones for FY 2003-2004 in each of the general goals (measures) and objectives. In addition to these programmatic goals, OTP identified an organizational and management goal that advances the organization's performance in keeping with the PMA.

For each of OTP's goals and objectives, performance metrics rely chiefly on milestone accomplishments in achieving specific activities. The following action plans' activities emphasize outreach, analysis and education, and advocacy—OTP's three key strengths—as strategies to accomplish its strategic goals and objectives.

Action Plans

To support its four strategic goals and associated objectives, OTP will pursue the following strategies, activities, and performance targets in FY 2003-2004.

General Goal #1: Support and improve the American innovation system.

Objective #1.a. Strengthen the federal technology transfer system

Strategies	Activities and Performance Targets
• Facilitate inter-agency coordination of regulatory and legislative policy initiatives. • Prepare and deliver reports on technology transfer practices and issues in response to Administration requests, congressional mandates, and emerging policy issues.	**FY 2004:** • Develop and publish legislatively mandated annual report to Congress and the President on U.S. government technology transfer activities and trends. • Publish and disseminate regulations clarifying Bahy-Dole policies to improve effectiveness of U.S. government technology transfer practices. • Facilitate development of educational materials for use at the national laboratories, such as Web sites, online resources, and videos. **FY 2003:** • Develop and publish legislatively mandated annual report to Congress and the President on U.S.government technology transfer activities and trends. • Convene interagency and stakeholder groups to develop recommendations for clarification or change to specific policies and proctices under the Bayh-Dole Act. • Assist with development of Web-based tools to facilitate consideration of national security factors in technology transfer at national labs.

Objective #1.b. Identify and advocate policies that promote the competitiveness of America's S&T workforce

Strategies	Activities and Performance Targets
• Prepare and deliver reports on innovation and technology issues in response to Administration requests, congressional mandates, and policy issues. • Regularly meet with industry leaders to identify excellence and best practices. Develop, publish, and disseminate the results as educational resources for policymakers and stakeholders.	**FY 2004:** • Manage the President's National Medal of Technology program to promote the economic value of technology innovation by providing public recognition to successful inventors. • Develop and promote S&T career-related Web content for GetTech Web site. **FY 2003:** • Develop and promote S&T career-related Web content for GetTech Web site. • Convene roundtable to identify likely impacts of the next-generation of educational and training technologies, and barriers to their development and adoption. • Manage the President's National Medal of Technology program to promote the value of technology innovation by providing public recognition to successful inventors.

General Goal #2: Advance the role technology plays in US economic growth and homeland security.

Objective #2.a. Increase US policymakers' understanding of the importance to the U.S. economy and homeland security of emerging and advanced technologies

Strategies	Activities and Performance Targets
• Prepare and deliver reports on emerging and advanced technology policy issues in response to Administration requests, Congressional mandates, and emerging needs. • Provide Administration and congressional policy-makers with policy options concerning emerging and advanced technologies. • Serve as industry advocate within White House (WH), U.S. government and international policy fora to work for adoption of policies to strengthen U.S. innovation in emerging and advanced technologies. • Organize press biefings and roundtable discussions to inform Congress, U.S. government agencies, industries, S&T community, and public about OTP analytical findings. Disseminate information on the Web.	**FY 2004:** • Work with biotechnology industry to help develop U.S. government statistical data series. • Analyze status and effects of U.S.government policies and investments related to critical emerging technologies. • Promote understanding and use of productivity-enhancing information technologies in business, education, medicine, and research. **FY 2003:** • Organize series of panel discussions to identify status, opportunities, and barriers to development and adoption of emerging technologies. • Prepare and disseminate summaries/analyses of quarterly panel discussions on emerging technologies, including recommendations for policymakers' actions. • In roundtables, conferences, and other public fora, promote understanding and use of productivity-enhancing information technologies (such as broadband Internet) in business, education, medicine, and research. • Participate in Office of Homeland Security initiatives (such as cyber security) as liaison to information commmunication technologies (ICT) industries. • Develop and publish report on status of telemedicine technologies. • Develop and publish first U.S. government survey of national biotechnology industries.

Objective #2.b. Identify and advocate strategies that facilitate technology-led economic development

Strategies	Activities and Performance Targets
• Prepare and deliver reports on strategies that facilitate technology-led economic growth. • Develop outreach events to provide information and promote infrastructure contributing to technology-led economic growth.	**FY 2004:** • Convene regional economic development officials, national experts, and other U.S. government/DOC interests to develop new OTP TLED initiatives and improve information dissemination to localities. • Initiate data collection and begin information dissemination on successful programs/efforts in TLED abroad. • Analyze current US digital opportunity efforts. • Consult with other U.S. goverment agencies and the private sector to coordinate international technology led economic development activities. **FY 2003:** • Develop, publish, and disseminate reports for use by state and local policymakers and the public, such as the fourth *State S&T Indicators* report. • Work with local communities, national experts, and other USG agencies to develop and deliver educational and training modules focused on developing capital and technology infrastructures for technology-led economic growth at the state and local levels.

General Goal #3: Strengthen the competitive position of American technology industries.

Objective #3.a. Increase US policymakers' understanding of globalization's effects on national interest, competitiveness, technological development, and standards

Strategies	Activities and Performance Targets
• Prepare and deliver reports on innovation and technology issues in response to Administration requests, Congressional mandates, and emerging needs. • Provide Administration and congressional policy-makers with policy options concerning U.S. innovation issues.	**FY 2004:** • Develop and publish analytical report on the impact of globalization on U.S. innovation. • Develop and publish comparative analytical report on technology and innovation policy and programs in selected other countries. • Convene quarterly discussions with industry and S&T community to evaluate progress on policy recommendations and to identify new policies. • Organize and launch an outreach campaign to enlist a large and diverse group of partners to support the Digital Freedom Initiative. • Lead an effort to develop training materials and programs for small businesses and entrepreneurs in "host" countries. **FY 2003:** • Develop and publish comparative analytical report on technology and innovation policy and programs in selected other countries. • Develop and publish first in a series of the impact of globalization on U.S.innovation infrastructure. Primary data collection will include field work and conferences with key stakeholders. • Develop policy recommendations based on OTP analytical findings and regular consulations with industry and the S&T community.

Objective #3.b. Propose policy options/recommendations on critical US business climate issues

Strategies	Activities and Performance Targets
• Liaison with technology industries to learn views on policy priorities. • Serve as industry advocate within White House, U.S. government and international policy fora to work for adoption of policies to strengthen U.S. innovation.	**FY 2004:** • Identify areas of improvement in R&D tax credit and develop policy papers/articles advocating adoption of credit with improvements. • Attend industry meetings and organize outreach events to learn views on policies including broadband, information and communications technology. Use TA's position as Asia-Pacific Economic Cooperative's (APEC) Industrial Science and Technology Working Group Webmaster to improve utilization of information technology for informatin dissemination and activities related to international policy and project management. • Advise the Secretary of Commerce on technology issues based on on-going analysis and conslations with industry and the S&T community. **FY 2003:** • Interact with industry to identify views and priorities on domestic and international policies and priority recommendations. • Attend industry meetings and organize outreach events to learn views on policies including tax, regulatory, litigation, e-commerce, standards, and others. • Use TA's position as APEC's Industrial Science and Technology Working Group Webmaster to improve utilization of information technology for informatin dissemination and activities related to international policy and project management. • Advise the Secretary of Commerce on technology issues based on on-going analysis and consultations with industry and the S&T community.

Objective #3.c. Promote recognition and adoption in other countries of policies and practices that support American innovation and innovators	
Strategies	**Activities and Performance Targets**
• Represent the U.S. government in bilateral and multilateral meetings.	**FY 2004:** • Continue to represent the U.S. in multilateral and bilateral meetings related to international technology policy. **FY 2003:** • 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. • 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.

General Goal #4: Strengthen OTP's organization, capabilities, and resources to maximize the effectiveness of its activities and services

Strategies	Activities and Performance Targets
• Transform OTP's internal organization and procedures to align with PMA objectives.	**FY 2004:** • Convene advisory group to assess current efforts and recommend future activities/directions. • Implement Workforce Restructuring plan to realign the TA organization, strengthen workforce skills, and continue to deploy innovative human resources practices, such as flexitour, telework, and other flexibilities. • Improve OTP's e-government participation through interagency participation in panels and improved Web presence.

FY 2003 & FY 2004 Targets

OTP re-examined its performance targets during FY 2002 as a part of an overall effort to further strengthen its performance, to align the targets with the President's Management Agenda (PMA), and to more accurately reflect the impact of OTP's efforts. The result of that reexamination was to regroup existing targets and add new targets. For the FY 2003 submission, TA's targets were grouped according to the three key action areas of Outreach, Analysis/Education, and Advocacy. Because of the overlap among the activities, and to align the targets with the PMA, TA restructured its efforts into one overarching goal and the four general goals and associated strategies, activities, and performance targets reflected in this submission.

Program Evaluation

OTP has incorporated the development of a program evaluation process into the FY 2004 plan, under general goal 4, with an activity and performance target to transform OTP's internal organization and procedures to align with PMA objectives by convening an advisory group to assess current efforts and recommend future activities and directions

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; the Department of State and the U.S. Trade Representative on international issues; 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; the Department of Health and Human Services, the National Institutes of Health, and the Food and Drug Administration on issues related to medical technologies; all the major federal science and technology agencies on technology transfer issues; and the Office of Science and Technology Policy on international S&T issues.

Government/Private Sector

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 U.S.'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. OTP can influence but not control other participants.

National Institute of Standards and Technology (NIST)

Mission Statement

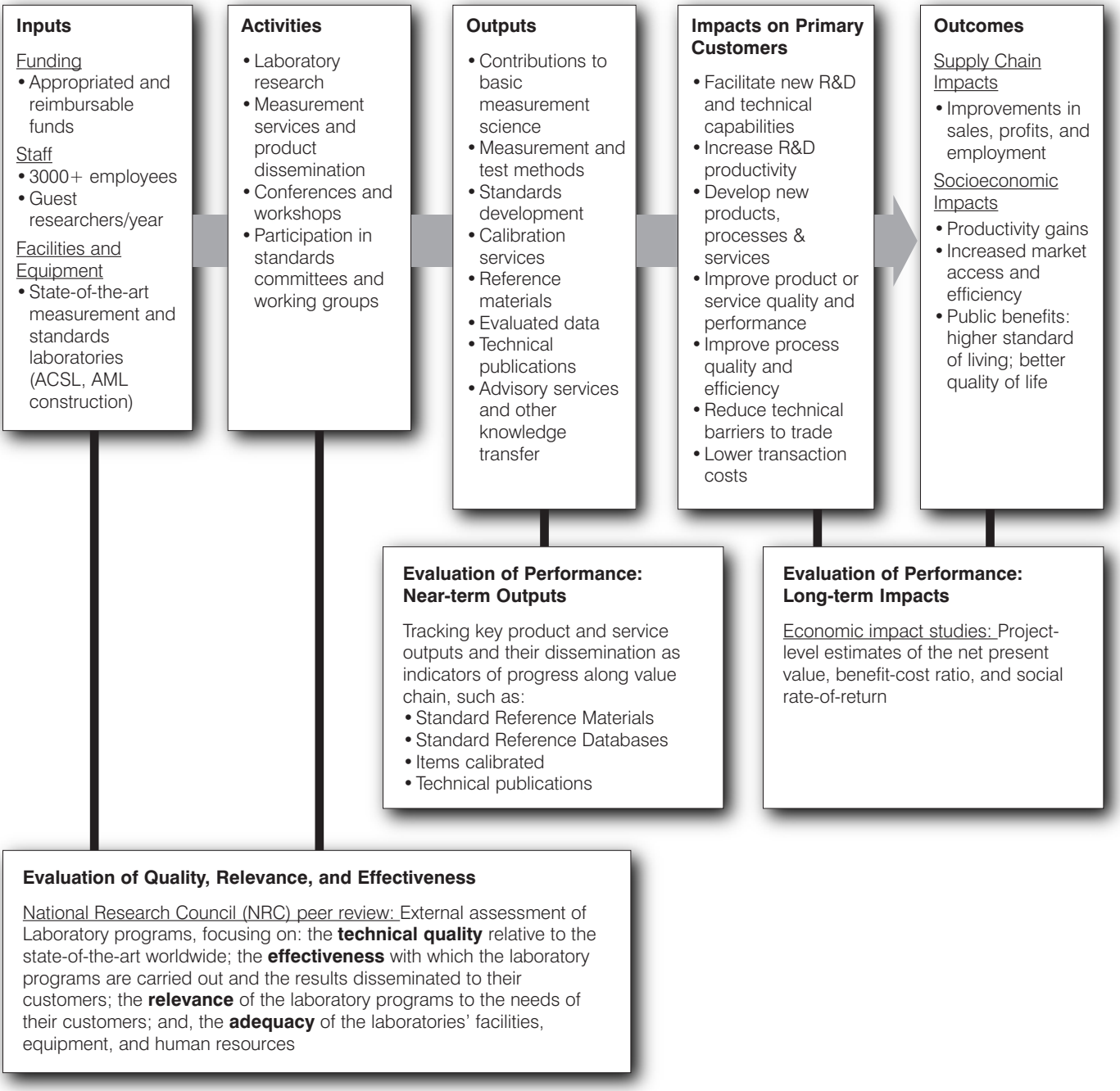
Develop and promote measurement, standards, and technology to enhance productivity, facilitate trade, and improve the quality of life.

Summary Information: NIST Performance Goals 1-3 (NIST Laboratories)

The first three performance goals for NIST pertain to the NIST Laboratory programs. The NIST Laboratories perform research to develop the measurement tools, data, and models for advanced science and technology. This model on the following page depicts the NIST Laboratories' value-creation chain—from inputs like funding and staff to outcomes like productivity gains and improved quality of life. The model also includes the evaluation methods and measures used to track progress along the impact path, each of which is described in more detail in the sections that follow.

NIST has designed its performance evaluation system to accommodate the organization's specific mission and impact path as well as to respond to the intrinsic difficulty of measuring the results of investments in science and technology. Like other federal science organizations, the primary output of NIST's laboratory 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 against each laboratory strategic goal using a mix, appropriate to each goal, of specific output tracking plus cross-cutting peer review and economic impact analyses. Taken together, these evaluation tools, combined with continual feedback from customers, provide NIST management and external stakeholders with a detailed and broad view of NIST's performance toward its long-term goals.

NIST Laboratories' Impact Path and Evaluation Methods: Results-based Management for Research



Alignment with the President's Management Agenda R&D Investment Criteria

A key component of the President's Management Agenda involves the development of criteria for evaluating investments in federal research and development (R&D) programs. As developed to date, the R&D investment criteria center on the evaluation of quality, relevance, and performance. As depicted in the impact and evaluation graphic above, NIST uses a combination of external peer review, output tracking, and retrospective economic impact studies to evaluate quality, relevance, and performance over time. NIST's peer review process is particularly productive, as it is comprehensive and ultimately focused on evaluating the quality, relevance, and effectiveness of NIST's efforts to serve its customers' current and prospective measurement and standards needs.

To evaluate prospective investment choices, NIST has recently completed a long-term strategic plan (NIST 2010) that used a combination of external trend analysis and specific opportunity assessments to identify areas where NIST's measurement, standards, and advisory services are critical to technological advancements that have enormous potential impact on the U.S.'s productivity, trade, and quality of life. The priorities described in this annual performance plan reflect that long-term strategic assessment. Where feasible, NIST also contracts for focused prospective economic analyses that estimate the costs associated with inadequate technical infrastructure in specific markets. Most recently NIST sponsored a study of the software industry, and found that the national annual costs of inadequate infrastructure for software testing ranges from $22.2 to $59.5 billion (more than half of these costs derive from error avoidance and mitigation activities of software users; the remaining costs reflect the additional testing resources that software developers must use due to inadequate testing tools and methods). Prospective studies of this nature are used to help NIST refine its investment choices within specific arenas of potential work.

NIST augments these evaluation methods with continual feedback from customers as well as broad policy and management oversight by the Visiting Committee on Advanced Technology. These mechanisms provide additional means for aligning NIST's work with customer needs and managing its programs in the most effective manner possible.

Cross-cutting Evaluation Methods and Data for NIST Goals 1-3

Qualitative assessment and performance evaluation using peer review

Since 1959, the NIST Laboratories have been reviewed annually by the National Research Council (NRC). The annual NRC Board on Assessment of NIST Programs review is independent, technically sophisticated, and extensive. The Board consists of approximately 150 scientists and engineers, organized into seven panels (one for each of the seven NIST 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.

Each year the lab-specific panels conduct a two to three-day on-site review of each laboratory's technical quality, paying particular attention to the following factors, as charged by the NIST Director:

- The technical merit/quality 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 their customers;
- The relevance of the laboratory programs to the needs of their customers;
- The ability of the Laboratories' facilities, equipment, and human resources to enable the Laboratories to fulfill their mission and meet their customers' needs.

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 2002 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 table on the following page provide summary statements for the laboratories, excerpted from NRC's 2002 report. NRC reports are posted at: http://books.nap.edu.

NIST Scientist Wins Nobel Prize for Discovery of a New State of Matter

NIST's Eric A. Cornell and Carl E. Wieman of the University of Colorado at Boulder won the 2001 Nobel Prize in physics for their creation of an entirely new state of matter called Bose-Einstein condensate (BEC). Cornell and Wieman made the discovery at JILA, a joint research institute operated by NIST and the University of Colorado. The BEC is the coldest known material in the universe, forming only when special laser and magnetic techniques are used to chill atoms to a few hundred billionths of a degree above absolute zero. At these ultra-cold temperatures, the atoms no longer behave as separate particles but instead behave as a giant single atom or molecule. The BEC appears very promising for a wide range of applications including extremely precise time standards, new forms of lithography for making microelectronic devices, and quantum computing.

Sample Statements from NRC Peer Review, FY 2002

Laboratory	
Electronics and Electrical Engineering (EEEL)	"The work under way in the Electronics and Electrical Engineering Laboratory continues to be of the highest technical quality. The impact of the programs on industry and other NIST customers is significant…The panel is pleased with the progress that has been made on strategic planning in the laboratory over the past year. The next step will be strengthening of the links between the laboratory-level plan and the NIST-level plan, as well as between the plans at the laboratory and the division levels…The laboratory has clearly placed increased emphasis on interactions with NIST customers; the panel applauds this outreach effort and has seen the positive impact that these relationships have on project selection and dissemination…The construction of the Advanced Measurement Laboratory at NIST Gaithersburg is a very special opportunity for NIST and EEEL." (p. 1-8).
Manufacturing Engineering (MEL)	"The quality of research in the laboratory is high overall. In general, the staff is highly competent and motivated to have a positive impact on U.S. competitiveness…The panel concurs with the broadening of the Manufacturing Engineering Laboratory mission statement to recognize manufacturing beyond that of discrete parts…MEL has made progress in its strategic and program planning efforts…The panel was impressed with the number of MEL researchers who had received awards and recognition from external organizations…MEL has improved its customer focus…The panel agrees with MEL's matrix management approach as a means to best utilize staff skills to accomplish laboratory objectives…The panel is concerned about the decline in the number of MEL technical staff and its impact on the laboratory's ability to meet its goals and objectives." (pp. 1-8, 1-9, 3-3).
Chemical Science and Technology (CSTL)	"Chemical Science and Technology Laboratory programs continue to have high technical merit overall…Several programs were noteworthy for the use and development of cutting-edge technologies…The panel found CSTL to be very proactive overall in identifying the customers of its work…all projects presented to the panel had a concise statement of the anticipated industrial use. The panel was pleased to see an increased awareness of customer impact…Particularly noteworthy for their relevance and effectiveness are the laboratory's efforts in Standard Reference Materials (SRMs), Standards Reference Databases (SRDs), and international standards activities…The panel is pleased with CSTL efforts in Web-based dissemination and finds that the laboratory's Web-based dissemination continues to improve in utility and effectiveness…" (pp. 1-9, 4-4).
Physics (PL)	"The Physics Laboratory continues its tradition of technical excellence and leadership. The awarding of the 2001 Nobel Prize in Physics to one of the laboratory's staff members is the most obvious evidence of this excellence…The Physics Laboratory reaction to the anthrax attacks of late 2001 was outstanding for its responsiveness to unanticipated national need and for its excellent utilization of established NIST skills and resources… The panel commends the leadership role that the Physics Laboratory is taking in the NIST-wide health care initiative and the strong focus that the laboratory has brought to its efforts in this area in the past year…The panel recommends enhanced efforts to develop interlaboratory collaborations and other partnerships that would help leverage Physics Laboratory resources while more effectively meeting NIST-wide strategic goals." (pp. 1-10).
Materials Science and Engineering (MSEL)	"The Materials Science and Engineering Laboratory continues to field programs of high technical merit and strong relevance and effectiveness…In general, the technical competence of staff members is very high, and their projects often push the state of the art and its applications…The laboratory's output is generally excellent in terms of both quality and quantity…Overall, the panel was pleased with the relevance and effectiveness of MSEL's programs…The panel is concerned that decreasing staff levels put core MSEL competencies at risk and hamper the laboratory's ability to step up to new challenges and priorities…The panel noted in particular that the laboratory is making better use of collaborations both within and outside of NIST…MSEL should seek further opportunities to leverage its human resources through appropriate collaborations…(pp. 1-10, 6-3).
Building and Fire Research (BFRL)	"The panel continues to be impressed by the high quality of scientific and technical work produced in the Building and Fire Research Laboratory. Commendable efforts are made to reach out to a broad variety of laboratory customers, ranging from large construction companies to local firefighting units, from code makers to academic researchers, and from standards committees to the public…The laboratory has taken the first step toward the development of a strategic plan…BFRL's existing expertise and programs have placed it in an excellent position to make many positive contributions to the nation's homeland security efforts…The panel is very supportive of BFRL's ongoing and planned activities [in homeland security] but cautions that it is vital for the laboratory to maintain a balance between short-term investigative work and long-term programs aimed at developing research and applications that are broadly relevant." (pp. 1-10, 1-11).
Information Technology (ITL)	"The technical merit of the work in [the Information Technology Laboratory] remains strong…the panel has been consistently impressed with the technical quality of the work undertaken. The panel also particularly applauds ITL staff's willingness to take on difficult technical challenges…The panel is impressed with the progress that has occurred in strategic planning in the [ITL], particularly in the emergence and acceptance of a framework under which laboratory activities operate…ITL has done a remarkable job of becoming more customer-oriented over the past several years. The panel applauds the laboratory's efforts in outreach and notes that the progress reflects improvement in a whole range of areas, from gathering wider and more useful input to help with project selection to increased dissemination and planning for how customers will utilize NIST results and products." (pp. 1-11, 8-3).

(NRC reports are posted at: http://www7.nationalacademies.org/NIST/NIST_reports.html)

Economic Impact Studies: Retrospective Evaluation of Long-Term Impacts

NIST Programs Benefit U.S. Industry and Consumers: the NTRM example

Accurate, real-time monitoring of polluting gases emitted by electric utilities, automobiles and other sources depends heavily on equipment calibration standards made by or traceable to the National Institute of Standards and Technology (NIST). A new study now available from NIST, *The Economic Impact of the Gas-Mixture NIST-Traceable Reference Materials Program* (NIST Planning Report 02-4), found that the gas-mixture NIST-Traceable Reference Materials (NTRM) program—an innovative mechanism for meeting a high demand for standards—returns between $21 and $27 in benefits for every dollar spent, with substantial benefits extending into the future.

The NTRM program was created in the early 1990s by NIST, the U.S. Environmental Protection Agency (EPA), and specialty gas companies to increase the availability of NIST-certified reference materials needed to monitor compliance with environmental regulations. Most EPA regulations for stationary source, mobile source and ambient air monitoring require that measurements be traceable to NIST. Under the program, gas companies manufacture standards according to NIST's technical specifications and submit these mixtures to NIST for certification. (NIST also produces a smaller number of its own gas-mixture Standard Reference Materials, the benefits of which were not evaluated in the study.)

In addition to greatly increasing the supply of gas-mixture standards, the NTRM program, after an initial start-up investment by NIST, minimizes on-going costs to taxpayers because it is now supported by industry fees. According to the study, benefits of the program include reduced measurement uncertainty, helping users of the reference materials to avoid some operations and maintenance costs and reducing credit expenditures in emissions trading (an innovative approach to environmental regulation that is generally believed to reduce total pollution-abatement costs). The program enables NIST to meet the needs of these impacted industries, while freeing up its resources to solve other critical standards issues.

NIST Planning Report 02-4 is available in Adobe Acrobat format from: www.nist.gov/director/prog-ofc/report02-4.pdf.

NIST uses retrospective microeconomic studies to assess the long-term impacts that derive from specific NIST Laboratories' programs or projects. NIST has been conducting economic impact studies on a regular basis since 1992, and initiates two to four new impact studies annually. Impact assessments of NIST's R&D in specific technical areas are conducted by external economic and technical experts contracted by NIST. These studies provide both quantitative estimates and qualitative assessments of the economic impacts resulting from the different types of technology infrastructure that 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 impact studies use the same quantitative metrics as industry, typically providing one or more of three metrics: 1) net present value and two efficiency measures; 2) a benefit-cost ratio, which compares the net present value of benefits and 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 reduce the net present value of the benefit time series to zero (i.e., to yield a benefit-cost ratio of one—the break-even point for a project). Recent impact studies also 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 (see table below).[1]

Economic Impact Studies: Long-term Outcomes of NIST Laboratory Research

Industry: Project	Year	Output	Outcomes	Measures
Chemicals: gas-mixture reference standards	2002	NIST-traceable reference materials	Lower regulatory compliance costs; improve market efficiency	SRR: 221-228%; BCR: 21-27; NPV: $49M to $63M
Communications: security (role-based access control)	2002	Generic technology reference models and security standards	Enable new markets; increase R&D efficiency	SRR: 62%; BCR: 109; NPV: $292M
Electronics: Josephson voltage standard	2001	Standard reference materials	Increase R&D efficiency; increase productivity; enable new markets	SRR: 877; BCR: 5; NPV: $18M
Communications: security (data encryption standards)	2001	Standard conformance test methods/services	Increase R&D efficiency enable new markets	SRR: 267-272%; BCR: 58-145; NPV: $345M-$1.2B
Pharmaceuticals: cholesterol measurement	2000	Standard reference materials	Increase productivity decrease transaction costs	SRR: 154%; BCR: 4.5; NPV: $3.5M
Photonics: laser and fiberoptic power and energy calibration	2000	Calibrations	Increase productivity decrease transaction costs	SRR: 43%-136%; BCR: 3-11; NPV: $48M
Chemicals: SRMs for sulfur in fossil fuels	2000	Standard reference materials	Increase productivity reduce transaction costs	SRR: 1,056%; BCR: 113; NPV: $409M
Semiconductors: software for design automation (IGBT semiconductors)	1999	Software model	Increase R&D efficiency increase productivity	SRR: 76%; BCR: 23; NPV: $10M
Chemicals: alternative refrigerants	1998	Standard reference data	Increase R&D efficiency increase productivity	SRR: 433%; BCR: 4
Materials: phase equilibria for advanced ceramics	1998	Standard reference data	Increase R&D efficiency increase productivity	SRR: 33%; BCR: 10
Materials: thermocouples	1997	Standard reference data (calibration)	Lower transaction costs increase product quality	SRR: 32%; BCR: 3
Pharmaceuticals: radiopharmaceuticals	1997	Standard reference materials	Increase product quality	SRR: 138%; BCR: 97
Photonics: optical detector calibration	1997	Standards and calibration services	Increase productivity	SRR: 72%; BCR: 3

SRR: social (internal) rate of return; BCR: benefit-cost ratio; NPV: net present value.

The benefit-cost ratio compares the net present value of benefits and costs over the time period being analyzed.

Social (internal) rate of return represents the annual percentage rate that would be required to reduce the net present value of the benefit time series to zero (i.e., to yield a benefit-cost ratio of one—the break-even point for a project).

[1] *Nadiri (National Bureau of Economic Research, 1993) estimates an average 20 to 30 percent private return and an average 50 percent social return on R&D conducted by private industry.*

Collectively, these studies validate NIST's fundamental impact logic model: they prove, in other words, that the measurement and standards infrastructure provided by NIST generates impacts on R&D productivity, market efficiency, product quality, and other factors—typically at a level that far exceeds the input costs.

Individually, 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.

Performance Goal 1: Research and develop the measurements and standards needed to support emerging science and technology-intensive industries

Corresponding Strategic Goal

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

Rationale for Performance Goal

Through its broad and vigorous measurement research, NIST works to anticipate the infrastructure needs of next-generation technologies and industries in the U.S. This forward-looking research not only yields improvements in NIST's measurement services, but also generates new knowledge, capabilities, and techniques that are transferred to industry, universities, and government.

Performance Evaluation Methods for Goal 1

- QUALITY, RELEVANCE, and EFFECTIVENESS: Peer review. Comprehensive external assessment of technical quality and research direction of NIST Laboratories (National Research Council review); see section above on crosscutting measurement methods for goals 1-3.
- PERFORMANCE: Outputs. Indicators of knowledge outputs, such as technical publications (see detail below).
- PERFORMANCE: Outcomes. Retrospective economic impact studies; see section above on crosscutting measurement methods for goals 1-3.

Next-generation measurement needs require NIST to focus its long-term research efforts on specific interdisciplinary technology areas where inadequate technical infrastructure is a barrier to development, commercialization, and public benefit: health care quality assurance, information/knowledge management, and nanoscale measurements and data. NIST currently has a broad range of competencies to draw on in each area, but emerging measurement and standards needs require a higher level of strategic focus, internal and external collaboration, and organizational commitment. Through its strategic planning processes, NIST has determined that these areas offer the greatest potential for increasing NIST's long-term impact on productivity, trade, and quality of life.

As with all NIST laboratory research, new work beginning in FY 2004 will be evaluated each year through extensive external peer review, as described above in the "cross-cutting measures" section. The results of these comprehensive evaluations are made available in annual reports by the National Research Council Board on Assessment of NIST Programs (the most recent evaluation can be found at: http://www7.nationalacademies.org/NIST/NIST_reports.html). In addition, NIST conducts

retrospective studies that seek to estimate the long-term benefits that derive from specific NIST products or services, as described above in the "cross-cutting measures" section. Collectively, these studies indicate the types and levels of public benefits that will likely derive from FY 2004 investments in NIST laboratory research.

In general, new research funded for FY 2004 will begin to generate tangible new outputs in FY 2006 and subsequent years. Since this goal centers on conducting research for potential future applications, NIST will rely most heavily on external peer review to evaluate performance in FY 2004. In addition, NIST will track a surrogate measure of new knowledge generated by the NIST Laboratories: the number of technical publications produced. Performance information on this indicator is provided below.

Measure 1: Technical Publications Produced

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	2,150	2,450	2,200	2,050	2,100	2,200
Actual	2,270	2,250	2,207	2,236		
Met/Not Met	Met	Not Met	Met	Met		

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 and Boulder sites. NIST uses publications as one of the mechanisms to transfer the results of its research 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 in technological forums where measurement standards and technologies developed by NIST staff (at times in collaboration with private sector partners) are disseminated. See also text box. 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.

Citation Rates Show High Demand for NIST Technical Publications

Print publications are a major channel through which NIST diffuses the scientific and technical knowledge generated by its staff. For GPRA 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 percent are published externally (such as in scientific journals), while the remaining 20 percent 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 (ISI), 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 ISI'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.

Over time, NIST expects a relatively constant level of high quality publications (approx. 2,000-2,200/year) by its technical staff. The target level for FY 2003 was produced on the basis of 2001 data, as per the terms of the FY 2003 Annual Performance Plan. The target level for FY 2004 has been updated to reflect final FY 2002 data (see also section above**, "Cross-Cutting Evaluation Methods for NIST Goals 1-3")**.

Performance Goal 2: Develop and efficiently disseminate the measurements and standards needed to support the nation's strategic interests in homeland security

Corresponding Strategic Goal

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

Rationale for Performance Goal

The terrorist attacks on September 11, 2001 and subsequent delivery of anthrax via the mail resulted in unprecedented death, destruction, and widespread disruption of everyday life in the United States. These attacks dramatically demonstrated that the U.S. homeland is vulnerable to terrorism. While the national response to these terrorist acts has been significant and effective, a coordinated national effort is required to secure the U.S. homeland from terrorist attacks in the future. Indeed, President Bush has declared that improving homeland security is one of the U.S.'s highest priorities.

The economic consequence of the recent terrorist attacks is estimated to be $151B, or 1.5 percent of U.S. domestic output. This total includes estimates of loss in the following areas:

Logistics	$65B
Insurance and Liability	$35B
Workplace Security	$18B
Information Technologies	$15B
Travel and Transportation	$12B
Employee Costs	$ 6B

A. Bernasek "The Friction Economy," Fortune 2/18/2002

NIST plays a distinct role in national efforts to improve homeland security. As in other times of national emergency, NIST responded to the initial terrorist attacks by quickly and effectively deploying its measurement and standards expertise to solve critical needs: technical support for mail irradiation; investigating and analyzing the World Trade Center, Pentagon, and Senate Hart Office Building sites; and accelerating development of protective equipment guides for first responders. NIST's competencies and capabilities build on measurements, standards, and technical advice that for years have helped federal, state, and local agencies and the private sector protect U.S. citizens from terrorist, military, natural disaster, and other types of threats.

Performance Evaluation Methods for Goal 2

- QUALITY, RELEVANCE, and EFFECTIVENESS: Peer review. Comprehensive external assessment of technical quality and research direction of NIST Laboratories (National Research Council review); see section above on crosscutting measurement methods for goals 1-3.
- PERFORMANCE: Outputs. Percent of activity and output milestones achieved (see detail on following page).
- PERFORMANCE: Outcomes. Retrospective economic impact studies; see section above on crosscutting measurement methods for goals 1-3.

Since homeland security activities continue to be developed within the federal government, NIST's FY 2004 budget for homeland security incorporates and responds to strategic directions set forth by the Administration and Congress (including, in particular, the National Strategy for Homeland Security). In FY 2004 NIST plans to focus on four urgent dimensions of homeland security:

1. Standards, technology, and practices for buildings and first responders, which will use an analysis of the technical cause of the collapse of the World Trade Center towers and the pattern of response to that crisis to develop cost-effective ways to strengthen buildings against attacks or natural disasters and assess ways to improve the safety and efficacy of first responders.
2. Standards for biometric identification, as needed to support the USA Patriot Act.
3. Measurement infrastructure for homeland security, focusing on measurements, testing methods, and performance standards needed to improve the cyber security of federal information systems and to support certification needs for technologies designed to detect and respond to chemical, biological, radiological, nuclear, and explosive threats.
4. Measurements, standards, data, and testing methods to accelerate the development of quantum computing for cryptography and secure communications.

As with all NIST laboratory research, new work beginning in FY 2004 will be evaluated each year through extensive external peer review, as described above in the "cross-cutting measures" section. The results of these comprehensive evaluations are made available in annual reports by the National Research Council's Board on Assessment of NIST Programs. In addition, NIST conducts retrospective studies that seek to estimate the long-term benefits that derive from specific NIST products or services, as described above in the "cross-cutting measures" section. Collectively, these studies indicate the types and levels of public benefits that will likely derive from FY 2004 investments in NIST laboratory research.

In addition to peer review and retrospective impact studies, NIST also will track its overall progress in developing and disseminating the diverse outputs—measurements, test methods, models, guidelines, standards, and related infrastructure tools—that support the U.S.'s strategic interests in homeland security, as to be specified in the FY 2004 NIST budget appropriation agreed to by Congress and the Administration.

Measure 2: Homeland Security: Percent of Activity and Output Milestones Achieved

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	New	New	New	New	New	80%
Actual						
Met/Not Met						

Explanation of Measure

This measure represents NIST's ability to deliver the activities and milestones for FY 2004 and subsequent years that are specified in and funded through the FY 2004 NIST appropriation. With respect to the President's FY 2004 budget request, this measure would capture NIST's activity and output performance in four major areas of infrastructure support for homeland security:

1. Homeland Security standards and practices.
2. Biometric identification standards.
3. Measurement infrastructure for Homeland Security.
4. Quantum information science.

Over time, NIST's portfolio of work for Homeland Security will contribute to significant national benefits, including more effective deterrence against terrorist attacks, improved safety for first responders, lower vulnerability and greater integrity of critical systems dependent on IT, and greater public protection. As described above, these end impacts will be evaluated where feasible through retrospective impact studies (see also section above**,** "**Cross-Cutting Evaluation Methods for NIST Goals 1-3**").

Performance Goal 3: Assure the availability and efficient transfer of measurement and standards capabilities essential to established industries

Corresponding Strategic Goal

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

Rationale for Performance Goal

A major component of the Commerce Department's mission is to promote U.S. competitiveness by strengthening and safeguarding the U.S.'s economic infrastructure. The economy and measurement infrastructure depend on accurate measurements and direct traceability to international standards. Measurement equivalency among international, national, and local laboratories is critical for the acceptance of test results for commerce, international trade, and health and safety.

Performance Evaluation Methods for Goal 3

- QUALITY, RELEVANCE, and EFFECTIVENESS: Peer review. Comprehensive external assessment of technical quality and research direction of NIST Laboratories (National Research Council review); see section above on crosscutting measurement methods for goals 1-3.
- PERFORMANCE: Outputs. SRMs available; SRD titles available; number of items calibrated.
- PERFORMANCE: Outcomes. Retrospective economic impact studies; see section above on crosscutting measurement methods for goals 1-3.

As the U.S. National Metrology Institute, NIST is charged with maintaining the national measurement and standards system and providing high-accuracy primary measurement services to anchor the nation's industrial enterprise to international primary standards. U.S. industry requires a high quality measurement infrastructure for product development, testing, instrumentation, process monitoring, and product performance enhancement. NIST's measurement services provide a common infrastructure for measurement functions in existing industries, allowing customers to verify and gain domestic and international acceptance of their measurement results by tracing them back to the primary national and international standards.

Measurement services for the United States originate at NIST and are disseminated through calibrations, artifacts, and reference data, which ensure product attributes, normalize the U.S.'s productive output, and facilitate domestic and international trade. NIST measurement services derive directly from NIST research efforts and are transferred through measurement standards, data, and technical services generated in the NIST Laboratories. Through these services NIST provides its customers in industry, government, and the scientific community in general with measurement uniformity, traceability, and equity in domestic and international commerce.

Today's global marketplace demands rapidly conducted and highly accurate measurements. NIST's measurement services support an increasingly diverse and dynamic group of customers whose needs rapidly change with advances in technology. NIST must establish and maintain effective customer feedback mechanisms so it can deliver high quality rapid service and continually react to emerging needs. In technology-based industries, NIST needs to respond to quality and cost pressures that call for more measurements with increasingly high precision and selectivity. These industries can be extremely measurement-intensive; for instance, measurements account for 25-30 percent of manufacturing costs in the semiconductor industry.

As with all NIST laboratory research, work conducted in FY 2004 will be evaluated through extensive external peer review, as described above in the "cross-cutting measures" section. The results of these comprehensive evaluations are made available in annual reports by the National Research Council's Board on Assessment of NIST Programs. In addition, NIST conducts retrospective studies that seek to estimate the long-term benefits that derive from specific NIST products or services, as described above in the "cross-cutting measures" section. Collectively, these studies indicate the types and levels of public benefits that will likely derive from FY 2004 investments in NIST laboratory research.

In addition to peer review and retrospective impact studies, NIST also tracks three output measures: Standard Reference Materials (SRMs) available, Standard Reference Data (SRD) titles available, and the number of items calibrated to NIST measurement standards. While NIST has diverse measurement and standards outputs, these three products and services represent major channels through which NIST delivers measurement and standards capabilities to established industries. As such, the set of output indicators provided below collectively illustrate the level at which NIST transfers measurement and standards capabilities to existing industries.

Measure 3a: Standard Reference Materials (SRMs) Available

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	1,315	1,300	1,315	1,350	1,360	1,360
Actual	1,288	1,292	1,335	1,353		
Met/Not Met	Not Met	Not Met	Met	Met		

Explanation of Measure

The number of Standard Reference Materials (SRMs) available illustrates the breadth of measurements supported by NIST. SRMs are certified for their specific chemical and material properties in the NIST Laboratories. SRMs are the definitive source of measurement traceability in the United States; 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. 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 text box on the following page describes an example of NIST SRMs that assure the accuracy of cholesterol tests.

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 measurement methods, standards, and Standard Reference Materials (SRMs) needed to assure 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 percent and a benefit-to-cost ratio of 4.5:1 during that timeframe.

The target level for FY 2003 was produced on the basis of 2001 data, as per the terms of the FY 2003 Annual Performance Plan. The target level for FY 2004 has been updated to reflect final FY 2002 data. Projections of future performance 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.

Measure 3b: Standard Reference Data (SRD) Titles Available

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	62	63	66	68	70	95
Actual	60	63	65	90		
Met/Not Met	Not Met	Met	Not Met	Met		

Explanation of Measure

This measure describes the number of Standard Reference Data (SRD) titles that the NIST Laboratories produce and make available through the NIST Standard Reference Data 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, assessed for reliability, and then evaluated to select the preferred values. The data represent a direct count of available SRD titles and are updated on an ongoing basis by the NIST Standard Reference Data Program. 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.

Historically, NIST has produced two new SRD titles per year while also providing numerous upgrades to existing databases. Each year, however, some database titles are eliminated from the NIST catalog. The target level for FY 2003 was produced on the basis of 2001 data, as per the terms of the FY 2003 Annual Performance Plan. The target level for FY 2004 has been updated to reflect final FY 2002 data. The increase in FY 2002 largely reflects a revised and more accurate tabulation of the

SRD titles available. In FY 2002 NIST changed its method for tabulating the databases that it makes available to the public. Prior tabulations did not sufficiently represent the number of discrete databases that are being made available through the Web; in some cases, several distinct databases had been counted as a single database because they are clustered at a single overarching Web address. Out-year estimates from FY 2004 forward will reflect this change in methodology, and will 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 3c: Number of Items Calibrated						
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	3,375	3,200	3,100	2,900	2,900	2,800
Actual	3,118	2,969	3,192	2,924		
Met/Not Met	Not Met	Not Met	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 (MAPs). 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. MAPs 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 target level for FY 2003 was produced on the basis of 2001 data, as per the terms of the FY 2003 Annual Performance Plan. The target level for FY 2004 has been updated to reflect final FY 2002 data. 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 long-term trend, individual years may fluctuate slightly, as with the slight increase from FY 2000 to FY 2001, due to the periodicity of multi-year calibration cycles.) This decline is taking place for two reasons. First, extended calibration cycles as well as changing technology and industry mergers continue to reduce the number of artifacts delivered to NIST for calibration. Second, NIST focuses on conducting calibrations that require a direct connection to the national standards, and on improving calibration accuracy in 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.

In general, new research funded for FY 2004 will begin to generate new outputs in FY 2006; as with all NIST laboratory research, new work beginning in FY 2004 will be evaluated each year through extensive external peer review, as described above.

Performance Goal 4: Accelerate private investment in and development of high-risk, broad-impact technologies

(This goal has been reworded since the publication of the FY 2001 Annual Program Performance Report (APPR) and FY 2003 Annual Performance Plan (APP). This goal was previously worded as "Accelerate technological innovation and development of the new technologies that will underpin future economic growth.")

Corresponding Strategic Goal

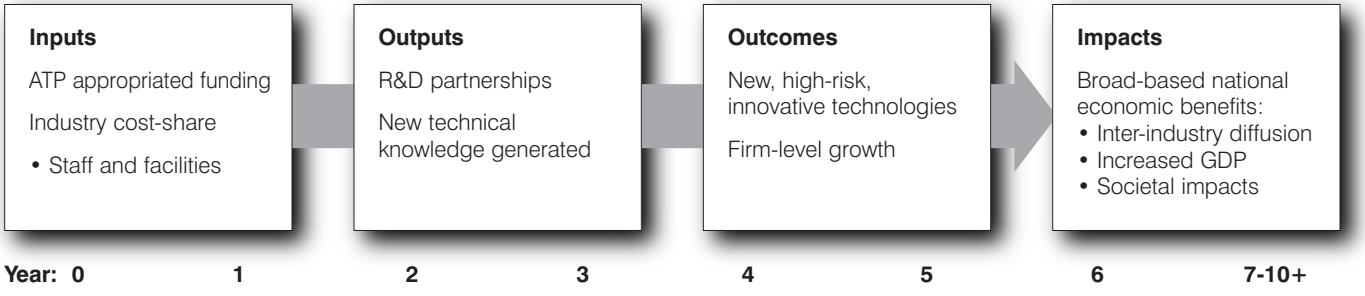
Strategic Goal 2: Provide infrastructure for innovation to enhance American competitiveness.

Rationale for Performance Goal

The Advanced Technology Program (ATP) is designed to encourage industry to identify and invest resources in high-risk, broad impact technologies—technologies with significant economic and societal promise, but with inadequate levels of private investment. The Program is structured to generate broad-based economic benefits by stimulating industry-led partnerships to develop new technologies. The ATP uses joint ventures and informal teaming arrangements to combine private investment and the best available scientific and technological talent in industry, universities, and government.

Consistent with the Administration's emphasis on shifting resources to reflect changing needs, the President's FY 2004 budget proposes to terminate the ATP. Funding is provided for administrative closeout costs of the program. Due to the cumulative nature of ATP's performance measures and the long time lags from project funding to the generation of measurable outputs and outcomes, performance data will continue to cumulate through the next several fiscal years before reflecting the budgetary changes proposed for FY 2004.

The "impact path" for the ATP—from inputs like appropriated funds and industry matching funds to long-term economic benefits—is illustrated below.



From the start of the program, evaluation has been a central part of ATP operations, as a management tool to provide feedback to project selection and program operations and to demonstrate program results to stakeholders and the public.

The ATP has developed a multi-component evaluation strategy to provide measures of progress and performance at various stages of its impact path: for the short-term, from the time of project selection and over the course of the ATP-funding period (inputs and initial outputs); for the mid-term, as commercial applications are pursued, early products reach the market, and dissemination of knowledge created in the R&D projects occurs (outcomes); and for the longer-term, as more fully-developed technologies diffuse across multiple products and industries, with related net impacts on formation of new industries, job creation, and U.S. economic growth (impacts).

Each of these major stages of ATP's impact path is described below, along with the corresponding performance evaluation methods employed. As appropriate, current performance data (both qualitative and quantitative) are provided, and out-year performance indicators are described.

Outputs

In the early and mid stages of project evolution, ATP tracks key outputs from projects through its Business Reporting System, a unique internal database created in 1993, which draws data from regular, systematic electronic project surveys and supplementary telephone surveys. Key indicators used to represent the generation and diffusion of new commercially relevant technical knowledge are patents and technical publications generated by ATP-funded projects. Taken together, these two indicators illustrate the generation and diffusion of technical knowledge created by ATP-funded R&D partnerships. The data below indicate ATP's cumulative progress on these two output measures (through FY 2001, the most recent data available).

Measure 4a: Cumulative Number of Publications						
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	480	680	720	770	840	990
Actual	468	565	747	Available May 2003		
Met/Not Met	Not Met	Not Met	Met			

Explanation of Measure

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. For FY 2001, the number of publications produced represents 104 percent 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. 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.

Measure 4b: Cumulative Number of Patents Filed						
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	640	770	790	930	1,020	1,220
Actual	607	693	800	Available May 2003		
Met/Not Met	Not Met	Not Met	Met			

Explanation of Measure

The second 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. For FY 2001, the number of patents produced represents 101 percent 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 patenting 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. Second, the patenting 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, the proclivity to patent varies significantly across technology areas and markets, due in part to differences in the utility and role of intellectual property protection. For example, biotechnology-focused projects may generate more patents than projects of an equivalent size in the IT or manufacturing sectors. As a result, patent activity (like publications) 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 also will analyze any trends that may indicate necessary adjustments to its projection models.

For all ATP output metrics, final data for FY 2002 will not be available until approximately May 2003 and will be reported in the FY 2003 Annual Program Performance Report.

Outcomes

In addition to tracking patents and technical publications, ATP's Business Reporting System also tracks mid-course outcomes of ATP-funded technology development projects. A key indicator is the number of technologies under commercialization. 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.

Measure 4c: Cumulative Number of Technologies Under Commercialization

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	120	170	180	190	210	250
Actual	120	166	195	Available May 2003		
Met/Not Met	Met	Not Met	Met			

Explanation of Measure

Commercialization is broadly defined as any group of activities undertaken to bring products, services, and processes into commercial applications, including development of commercial prototypes, adoption of processes for in-house production, development of spin-off products and processes, scale-up for volume production, and the sale and licensing of products and services derived from the technology base created by the ATP-funded project.

The data provide a cumulative direct count of the number of technologies commercialized, as determined through ATP's Business Reporting System. For FY 2001, the number of technologies commercialized represents 108 percent of the expected level. FY 2003 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 2002 will not be available until approximately May 2003 and will be reported in the FY 2003 Annual Program Performance Report.

To provide a more comprehensive measure of mid-term outcomes from ATP funding, the program recently implemented a Composite Performance Rating System and has compiled and published ratings of the first fifty completed ATP projects. Under the Composite Performance Rating System, each project is scored on a set of measures of knowledge creation and dissemination and progress toward commercial goals; these are summarized in the table below.

ATP's Composite Performance Rating System: Component Measures of Rating

Knowledge Creation and Dissemination Measures

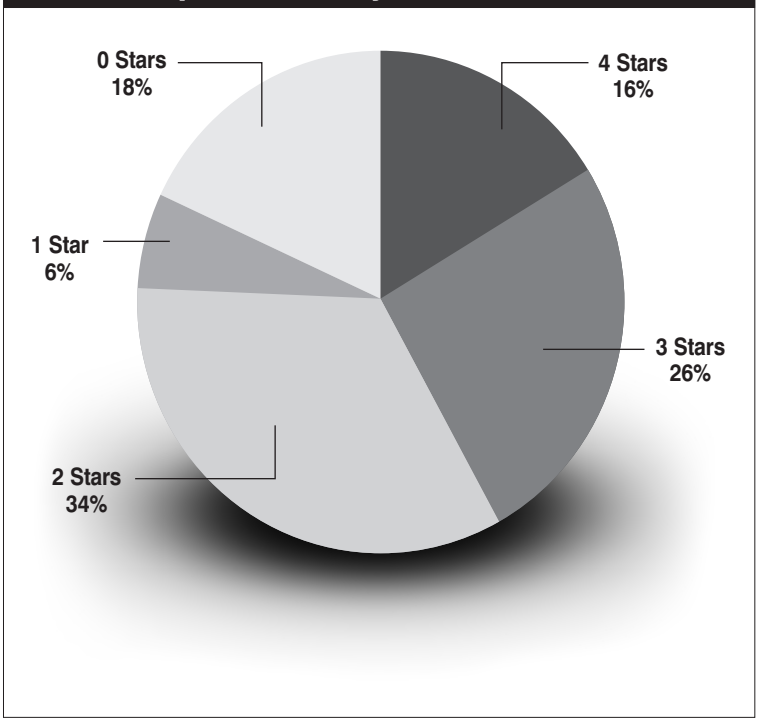
- Technical awards
- Collaborations
- Patent filings
- Publications and presentations
- New product/process in market or expected soon

Commercialization Progress Measures

- New product/process in market or expected soon
- Attraction of capital
- Employment gains
- Business awards
- Outlook

The results from all these measures are used to construct a composite performance score to indicate the overall project effectiveness against ATP's mission (measured two to three years after the end of ATP funding). The result is a four-star system of ratings, with scores ranging from zero to four stars. The results of this analysis for the first fifty completed ATP projects found that 16 percent of the projects are top-rated in terms of overall project performance, with four stars. Twenty-four percent are in the bottom group of zero or one stars. Sixty percent make up the middle group. Over the next several fiscal years NIST expects to continue evaluating the pipeline of completed ATP projects, applying the rating system to all projects two to three years after they have completed their ATP funding cycle. NIST will include the results of this on-going evaluation in future performance plans and reports.

Results from Composite Performance Ratings
First 50 Completed ATP Projects



Not all ATP projects are fully successful. Given the program's emphasis on funding high-risk, technology development that the private sector is unwilling and unable to fund alone, but which have the potential to result in broad-based benefits for the U.S. economy, dictates that most projects will fail to accomplish all their goals. Some projects are stopped before completion of the funding period. Others fail to meet all their technical goals, or encounter business difficulties before the technologies are commercialized.

Measuring Impacts

Fully successful ATP projects are expected to contribute significantly to the U.S. scientific and technical knowledge base, yield private benefits to the 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. To measure long-term economic impacts that derive from the set of funded ATP projects, the program conducts or contracts detailed and rigorous case studies. Where possible, these studies also estimate long-term project outcomes. For instance, one recent study of an ATP-funded joint R&D venture for closed cycle air refrigeration technology estimated a social rate of return of at least 83 percent and a benefit-to cost ratio of at least 220:1. Forthcoming studies include an evaluation of the economic benefits from a portfolio of projects in component-based software, and two additional studies that evaluate individual projects in digital video and digital mammography.

External Program Evaluation

To supplement its comprehensive internal evaluation methods, the ATP also receives external review and evaluation. The programmatic objectives and management of ATP are reviewed regularly by the Visiting Committee on Advanced Technology (VCAT), a legislatively mandated panel of advisors that meets quarterly to review NIST's general policy organization, budget, and programs, and by the Advanced Technology Program Advisory Committee. 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 (STEP). The results of the first NRC review are available in a report entitled *The Advanced Technology Program: Challenges and Opportunities,* published in 1999 and 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/.

Performance Goal 5: Raise the productivity and competitiveness of small manufacturers

(This goal has been reworded since the publication of the FY 2001 Annual Program Performance Report (APPR) and FY 2003 Annual Performance Plan (APP). This goal was previously worded as "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 continuous performance improvements. But the U.S.'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. 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.

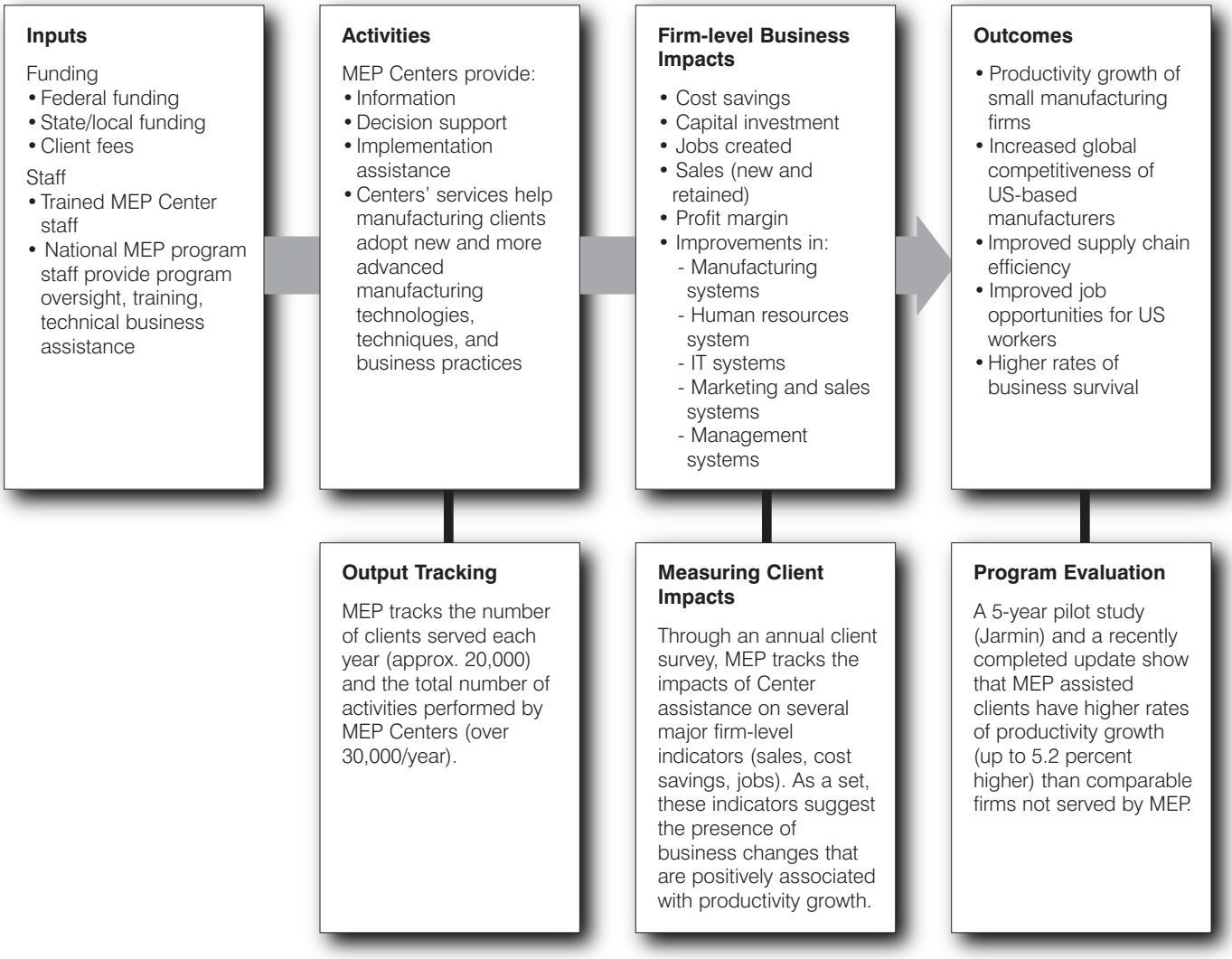
In FY 2000, MEP significantly improved the process by which it evaluates its clients' performance by updating its survey instrument and collection methods. Improvements to the survey design and implementation process have made it more likely that a larger number of surveyed clients will be able to provide 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/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 twelve-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.

MEP Impact: Improving the productivity of small manufacturing establishments

The model below demonstrates the impact path (or value creation chain) of the Manufacturing Extension Partnership (MEP) Program — from inputs such as appropriated funds and staff to end-outcomes such as productivity improvements for the small manufacturing sector. In addition, the model also depicts how NIST measures the progress of the MEP program along its impact chain.

MEP's Impact Path and Evaluation Methods: Results-based Management for Advisory Services



Measure 5a: Number of Clients Served by MEP Centers Receiving Federal Funding

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	New	New	New	21,543	392	392
Actual	23,092	20,903	21,321	21,420		
Met/Not Met				Not met		

(This measure has been reworded since the publication of the FY 2001 Annual Program Performance Report (APPR) and FY 2003 Annual Performance Plan (APP). This measure was previously worded as "Number of clients served by MEP managed extension services.")

Measure 5b: Increased Sales Attributed to MEP Centers Receiving Federal fFnding

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	443	670	708	726	13	13
Actual	425	698	636	Available December 2003		
Met/Not Met	Not Met	Met	Not met			

(This measure has been reworded since the publication of the FY 2001 Annual Program Performance Report (APPR) and FY 2003 Annual Performance Plan (APP). This measure was previously worded as "Increased sales attributed to MEP assistance.")

Measure 5c: Capital Investment Attributed to MEP Centers Receiving Federal Funding

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	359	864	913	910	17	17
Actual	576	873	680	Avail able December 2003		
Met/Not Met	Met	Met	Not met			

(This measure has been reworded since the publication of the FY 2001 Annual Program Performance Report (APPR) and FY 2003 Annual Performance Plan (APP). This measure was previously worded as "Capital investment attributed to MEP assistance.")

Measure 5d: Cost Savings Attributed to MEP Centers Receiving Federal Funding

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	New	545	576	497	9	9
Actual	364	482	442	Available December 2003		
Met/Not Met		Not Met	Not met			

(This measure has been reworded since the publication of the FY 2001 Annual Program Performance Report (APPR) and FY 2003 Annual Performance Plan (APP). This measure was previously worded as "Cost savings attributed to MEP assistance.")

Explanation of Measures

The goal of MEP is to assist small manufacturing establishments overcome barriers to productivity growth by providing information, decision support, and implementation assistance to help these businesses adopt new and more advanced manufacturing technologies, techniques, and business practices. The measures reported above allow MEP to track its activities (number of clients served) and the impact of its services on three key quantitative business indicators that as a set indicate changes that are positively associated with productivity 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.[1] Many of the benefits of MEP's services are intangible, difficult to quantify, and/or are qualitative in nature.

FY 2002 actuals are not yet available due to data collection requirements (lag is approximately one year). Assuming enactment of the President's FY 2003 budget request for MEP, federal support will be provided in FY 2003 only to those centers that are six years old or less (The President's FY 2004 budget request continues this policy). Under this proposal the national MEP program would focus on providing a central coordination role. This request is reflected in the FY 2003 and FY 2004 target performance levels. If the proposed changes to the program are enacted, MEP will reevaluate its performance measures.

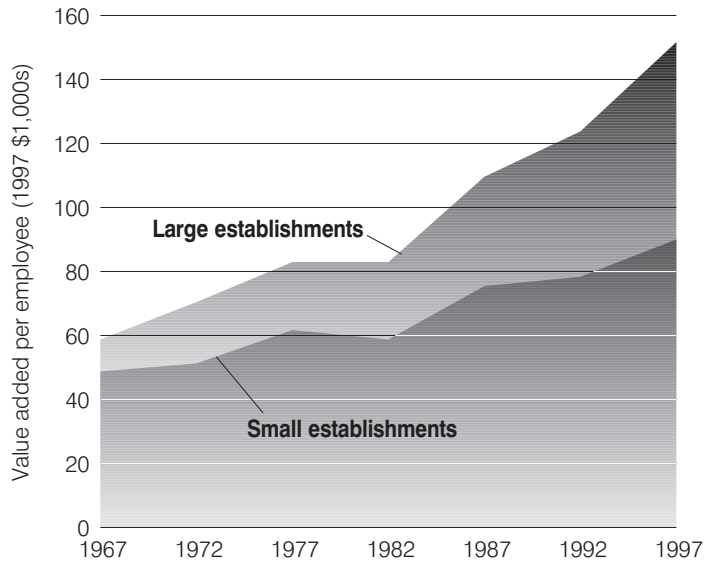
Program Evaluation for Manufacturing Extension Partnership Program (MEP)

Small manufacturers consistently lag large firms in productivity (see graph). The MEP program provides the types of resources needed by small manufacturing establishments to overcome cost and knowledge barriers to realizing productivity growth. The program's progress toward achieving its fundamental objective has been evaluated through rigorous, controlled-comparison studies that evaluate the productivity of MEP-served clients relative to similar companies that did not receive MEP assistance.

A five-year pilot study conducted by R.S. Jarmin of the Center for Economic Studies (U.S. Census Bureau) showed that MEP-assisted clients had significantly higher rates of productivity growth than non-MEP clients ($484M in additional value added for client firms).[2] A recently completed update to this original study (publication forthcoming) also prepared by the Center for Economic Studies (U.S. Census Bureau) found that the average MEP client experienced 5.2 percent higher productivity growth between 1996 and 1997 and 4.7 percent faster employment growth compared to non-MEP clients. The findings cover a larger subset of all MEP clients.

As with other NIST programs, the programmatic objectives and management of MEP are reviewed regularly by the Visiting Committee on Advanced

Labor Productivity by Firm Size



[1] *Reported data reflect the impact of MEP services primarily on small manufacturing establishments; on some occasions, Centers will elect to serve establishments with over 500 employees. Based on recently compiled survey data, approximately 95 percent of the clients served by MEP are small establishments with fewer than 500 employees; these clients account for approximately 93 percent of the attributed sales impacts.*

[2] *R.S. Jarmin, "Evaluating the Impact of Manufacturing Extension on Productivity Growth," Journal of Policy Analysis and Management, Vol 18, No. 1, Winter 1999, pp. 99-119.*

Technology (VCAT), a legislatively mandated panel of advisors that meets quarterly to review NIST's policies, organization, budget, and programs. MEP also is reviewed by its National Advisory Board (MEPNAB), which was established by the Secretary of Commerce in October 1996 and meets three times a year to 1) provide advice on MEP programs, plans, and policies; 2) assess the soundness of MEP plans and strategies; 3) assess current performance against MEP program plans; and 4) function solely in an advisory capacity, and in accordance with the provisions of the Federal Advisory Committee Act. The MEP members bring a variety of manufacturing backgrounds to the Board, including small and large manufacturing, labor, academia, economic development, consulting and state government. This mix provides MEP with the outside advice critical to maintaining and enhancing the program's focus on its customers—the U.S.'s smaller manufacturers.

Performance Goal 6: Catalyze and reward quality and performance improvement practices in U. S. businesses and other organizations

(This goal has been reworded since the publication of the FY 2001 Annual Program Performance Report (APPR) and FY 2003 Annual Performance Plan (APP). This goal was previously worded as "Assist 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), 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 6a: Number of Applications to the Malcolm Baldrige National Quality Award (MBNQA) and Baldrige-based State and Local Quality Awards

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	892	916	935	954	1,111	692
Actual	1,067	911	646	Available May 2003		
Met/Not Met	Met	Not Met	Not Met			

Measure 6b: Number of Baldrige Criteria Mailed by BNQP and Baldrige-based State and Local Quality Programs

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	203,700	197,600	193,600	191,700	177,870	165,363
Actual	211,028	176,248	164,949	Available May 2003		
Met/Not Met	Met	Not Met	Not Met			

Explanation of Measures

The Baldrige National Quality Program (BNQP) reports two key output metrics: (1) the total number of applications to the Malcolm Baldrige National Quality Awards (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 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 6b) indicates a downward trend over time – as more copies of the *Criteria* are distributed via the Internet, the Program expects to mail fewer documents. See text box for additional information about electronic distribution. Moreover, direct counts of Baldrige *Criteria* do not capture various formal and informal ways in which BNQP concepts can be disseminated, such as through academic programs, consulting channels, business and organizational management literature, etc.

Baldrige *Criteria*: Online Dissemination

In February 2001, the Baldrige National Quality Program began to track the number of times its *Criteria for Performance Excellence* documents were downloaded via the web [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 over 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.

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 is uneven and can take months to collect. For example, in January 2002, fifty-four state, regional, and local quality award programs were asked to provide information on these and other metrics. Overall, forty-one programs responded and, of these, five did not report application information for confidentiality or other reasons. 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 on 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.

Program Evaluation

Economics professors Albert N. Link, of the University of North Carolina, and John T. Scott, of Dartmouth College, recently examined the Malcolm Baldrige National Quality Award program and estimated the total economic benefits of the program at almost $25 billion, for a benefit-to-cost ratio of 207 to 1. They determined the total operational costs, including the value of executives' volunteered time to review applications, to be $119 million. Through 2000, forty-one 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 programmatic objectives and management of the BNQP are reviewed by the Visiting Committee on Advanced Technology (see VCAT information under "External Oversight and Evaluation" of the NIST Laboratories, following Performance Goal 3 above), a legislatively mandated panel of advisors that meets quarterly to review NIST's general policy organization, budget, and programs. In addition, the performance of BNQP is evaluated by the Board of Overseers, a federal panel of national quality experts from business and academia that advises the Secretary of Commerce. 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 Malcolm Baldrige National Quality Award. See http://www.quality.nist.gov for additional information.

NIST-wide External Program Review and Oversight

The programmatic goals and management policies of NIST as a whole, including each of its major programs, are reviewed regularly by the Visiting Committee on Advanced Technology (VCAT). The VCAT is a legislatively mandated panel of external advisors that meets quarterly to review NIST's general policy, organization, budget, and programs. Please refer to the text box for the current list of VCAT members; see also: http://www.nist.gov/director/vcat/index.htm for additional information on the VCAT, including its most recent annual report. As described earlier, NIST's overall approach to performance measurement consists of three distinct evaluation mechanisms: peer review and other forms of external assessment, economic impact studies, and quantitative output tracking. NIST uses these three evaluation mechanisms as a system that, combined with quarterly VCAT reviews, provides a comprehensive approach to results-based management over time.

NIST Visiting Committee on Advanced Technology (VCAT): Current Membership – 2002

Mr. Gary Floss, Business Partner
Bluefire Partners

Dr. Deborah L. Grubbe, Corporate Director, Safety & Health
DuPont Safety, Health, Environment

Dr. Lloyd R. Harriott, Professor
Dept. of Electrical and Computer Engineering, University of Virginia

Dr. Jennie Hunter-Cevera, President
University of Maryland Biotechnology Institute

Dr. Caroline A. Kovac, Vice President
Services, Applications and Solutions, IBM

Dr. Thomas A. Manuel, President
Council for Chemical Research

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

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

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

Dr. April M. Schweighart, Product Business Manager
Motorola

Dr. Masayoshi Tomizuka, Director,
Engineering Systems Research Center, University of California, Berkeley

National Technical Information Service (NTIS)

Mission Statement

Support the nation's economic growth and job creation by providing access to information that stimulates innovation and discovery.

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

Corresponding Strategic Goal

Strategic Goal 2: Provide infrastructure for innovation to enhance U.S. 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. Without appropriated funds, 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's revenue comes from (1) the sale of technical reports to business and industry, schools and universities, state and local government offices, and the public at large; and (2) from services to federal agencies that help them communicate more effectively with their employees and constituents.

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. NTIS is implementing a new initiative to provide the public with increased access to government information. The NTIS bibliographic database (from 1997 to the present) will be available via the Internet free of charge. NTIS will allow users to download any item in its collection that NTIS has in electronic format for a single low fee, or at no charge if it is less than twenty pages. In addition NTIS will create links that will hyperlink customers to other agency Web sites that offer documents for free download. These recent developments and initiatives are a result of NTIS's new business model that maximizes utilization of the World Wide Web and e-commerce in its information collection and dissemination activities.

NTIS collects its material primarily from U.S. government agencies, their contractors, and grantees, as well as from international sources. The NTIS permanent collection includes approximately three 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 498,000 online electronic items to its many customers, primarily researchers and business managers in private industry. The disseminated materials may include computer downloads, paper, microfiche, audiovisual, and electronic media.

Collection of scientific and technical information from various contributors, and dissemination of that information to an even larger audience is highly dependant on external factors and therefore, not entirely controllable. For example, the amount of new material available is highly dependent on budgetary and program decisions made by other agencies. NTIS's efforts to ensure the public easy access to available scientific and technical information enhanced acquisition and dissemination activities are implemented and monitored through the following performance measures.

Measure 1a: Number of New Items Available (Annual)

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	New	New	New	510,000	520,000	525,000
Actual			505,068	514,129		
Met/Not Met				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, their contractors and grantees, and also from international sources. NTIS collects approximately 27,000 scientific and technical reports annually and another 498,000 items in the form of articles, updates, advisories, etc. that are contained in various subscription products and databases it distributes. The number of new information products available each year from NTIS is approximately 525,000, but the number largely depends on input from other government agencies.

Measure 1b: Number of Information Products Disseminated (Annual)

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	New	New	New	16,000,000	17,000,000	18,000,000
Actual			14,524,307	16,074,862		
Met/Not Met				Met		

Explanation of Measure

This measure represents information disseminated and includes compact discs, diskettes, tapes, online subscriptions, Web site pages, as well as the traditional paper and microfiche products.

The shift in information dissemination practices from traditional paper copy to electronic-based dissemination has improved NTIS's ability to provide quality products, increase the number of products distributed, and the number of customers that have access to 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 1c: Customer Satisfaction

	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Target	New	New	New	97%	98%	98%
Actual			97%	98%		
Met/Not Met				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 maintain and possibly improve this very high rate of customer satisfaction are essential to the success of NTIS's performance and mission to collect and disseminate scientific and business-related information.

The percentage of satisfied customers is derived from the number of customer complaints compared to the total number of orders taken. It does not take into account inquires about the status of an order or other general questions.

Program Evaluation

The Office of the Inspector General (OIG) prepared an evaluation of NTIS' new business model. The model reflects NTIS' commitment to maximize dissemination of unclassified scientific, technical, engineering, and business-related information to U.S. business, industry and the public. The OIG recommendations were to: (1) make it clear that there are major uncertainties associated with the business model's estimates during future discussions and presentations of the model, (2) periodically review the projections to determine whether they are realistic and achievable, and (3) evaluate the impact of the new business model on NTIS' operations on a monthly basis, and determine whether the new model is achieving the desired results or whether modifications are needed.

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

NTIS's requirement to operate on a substantially self-sustaining basis precludes it from making all information in its collection available on the Web for free, despite the public's desire for this information and its aversion to paying for government information on the Web. NTIS is currently addressing this concern by putting its bibliographic database, from 1997 to the present, on the Internet for free and creating links to agency Web sites that support digital identifiers offering documents to the public for free downloading. In addition, if available, documents smaller than twenty pages can be downloaded for free from NTIS's Web site. Documents greater than twenty pages, if available in electronic form, can be downloaded for $8.95. Of course, all documents in the NTIS collection can be ordered in the traditional formats (i.e. paper and microfiche), if desired.

TA Data Validation and Verification

NIST's Program Office conducts an annual review of its quantitative performance data to ensure that it is complete and accurate. During this process, Program Office staff discuss the data with appropriate offices to assess results relative to forecasts and to understand long-term trends and drivers of performance. Program Office staff also evaluate the verification and validation procedures used by the offices that provide the source data and verify that the source data itself is identical to or consistent with the reported data. A set of NIST's quantitative performance measures and associated verification and validation procedures were audited recently by the Commerce Department Inspector General, and NIST has implemented the suggestions for improvement identified in that audit.

For its qualitative performance measure, the NIST Program Office provides summary findings from the annual NRC review of the NIST laboratories; the complete results of that evaluation are available for public review. The Program Office also provides the results from economic impact studies, which are conducted by external economists and technical specialists using well-developed research methods and standard economic and business analysis metrics, as specified and monitored by NIST. The TA Data Validation and Verification table can be found starting on the following page.

TA Data Validation and Verification

Performance Measure	Data Source	Frequency	Data Storage	Verification	Data Limitations	Actions to be Taken
OTP Measure 1a: Support and improve the American innovation system **OTP Measure1b:** Advance the role technology plays in US economic growth and homeland security **OTP Measure 1c:** Strengthen the competitive position of American technology industries	OTP	OTP performance is cumulative and is reported annually.	OTP	Data represent verifiable tabulations of OTP activities. For reporting activities, data are gathered and analyzed by technology policy analysts using accepted analytical practices, are submitted for peer review to other DOC bureaus, other agencies, and academia, as appropriate, prior to publication.	Output Only	None
OTP Measure 1d: Strengthen OTP's organization, capabilities, and resources to maximize the effectiveness of its activities and services	OTP	OTP	OTP	Data represent verifiable tabulations of OTP activities.	Output only	None
NIST Measure 1: Technical publications produced	NIST Office of Information Services.	Ongoing	Publications data are gathered and maintained by NIST Office of Information Services.	Data represent direct and verifiable counts of NIST technical publications that have been cleared for publication by the internal Washington and Boulder Editorial Review Boards. 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.	Output only	NIST will continue to provide additional information to supplement these output counts, such as providing the breakdown of internal vs. external publications.
NIST Measure 2: Homeland Security: Percent of activity and output milestones achieved	NIST Laboratories	Ongoing	NIST Director's Office.	Data represent direct and verifiable counts of activities performed and outputs produced, measured against expectations established in the FY 2004 budget appropriation. Internal verification includes review by NIST Director's Office.	Data provide information on activity and output milestones only.	There are no obvious replacements for milestone tracking; NIST continues to explore the use of additional metrics that could capture external sources of leverage and other factors related to downstream impact.

TA Data Validation and Verification *(Cont.)*

Performance Measure	Data Source	Frequency	Data Storage	Verification	Data Limitations	Actions to be Taken
NIST Measure 3a: Standard Reference Materials (SRMs) available **NIST Measure 3b:** Standard Reference Data (SRD) titles available **NIST Measure 3c:** Number of items calibrated	NIST Standard Reference Materials Program (measures 3a & 3b). NIST Calibration Program (measure 3c).	Ongoing	NIST Standard Reference Materials Program (measures 3a & 3b). NIST Calibration Program (measure 3c).	Data represent direct and verifiable counts of SRMs available to customers at the close of the fiscal year (measures 3a & 3b) and direct and verifiable counts of items calibrated by the NIST Laboratories (measure 3c). Internal verification includes review by NIST Technology Services and the NIST Director's Office and Budget Division.	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.
NIST measure applying to NIST performance goals 1-3: Qualitative assessment and performance evaluation using peer review	On-site interviews and discussions with NIST management and research staff by independent external scientific and technical experts, managed by the NRC.	Annual	NRC	Verification and oversight of laboratory-specific expert review panels provided by the NRC Board on assessment of NIST programs.	Data are qualitative in nature.	None
NIST measure applying to NIST performance goals 1-3: Economic impact studies	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. Project cost data are supplied by NIST,	Intermittent	Contractors collect and maintain all data. Survey results, cost data, and all calculations are presented in final reports.	Data are gathered and analyzed by highly qualified economists and technical specialists using well-developed research methods and standard economic and business analysis metrics, as specified and monitored by NIST.	Elements of study populations often are too diffuse to measure; availability and quality of industry data often are uneven; impact estimation typically requires counterfactual data, which can be difficult to estimate; outcomes are specific to each project—i.e., results are not cumulative and not readily comparable.	None
NIST Measure 4a: Cumulative number of publications **NIST Measure 4b:** Cumulative number of patents filed **NIST Measure 4c:** Cumulative number of technologies under commercialization	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 Business Reporting System (BRS). Separate portfolio-based telephone surveys are conducted of project participants funded prior to 1993 and for post-project data collection.	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.	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.	ATP's BRS has been evaluated by external auditors. 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, a recent OIG audit of NIST's performance measures included review of two of these metrics – technologies commercialized and patents filed – and resulted in changes to procedures.	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.	Administrative procedures have been enacted to increase reliability, per recent DOC IG audit.

TA Data Validation and Verification *(Cont.)*

Performance Measure	Data Source	Frequency	Data Storage	Verification	Data Limitations	Actions to be Taken
NIST Measure 5a: Number of clients served by MEP Centers receiving federal funding **NIST Measure 5b:** Increased sales attributed to MEP Centers receiving federal funding **NIST Measure 5c:** Capital investment attributed to MEP Centers receiving federal funding **NIST Measure 5d:** Cost savings attributed to MEP Centers receiving federal funding	The MEP client survey instrument was significantly revised in January 2000. The survey is administered by a private firm, Market Facts Incorporated (MFI), located in Arlington Heights, IL..	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 2000 was surveyed in January/February 2001. 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.	Survey data is sent directly to MEP for analysis. MEP reviews and stores survey data received from MFI.	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, a recent DOC OIG audit of NIST's performance measures included a review of one of MEP's measures ("increased sales attributed to MEP assistance"); in response to this audit, NIST implemented some improvements to data verification procedures.	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 (79 percent in the most recent survey, covering FY 2001). Reported data reflect the impact of MEP services primarily on small manufacturing establishments; on some occasions, Centers will elect to serve establishments with over 500 employees. Based on the most recently compiled survey data (covering clients interviewed during FY 2001), approximately 94 percent of the clients served by MEP are small establishments with fewer than 500 employees; these clients account for approximately 96 percent of the attributed sales.	Verification procedures recently improved per DOC OIG audit. 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.
NIST Measure 6a: Number of applications to the Malcolm Baldrige National Quality Award (MBNQA) and Baldrige-based state and local quality awards **Measure 6b:** Number of Baldrige Criteria mailed by BNQP and Baldrige-based state and local quality programs	Application data are collected and tracked by the Baldrige National Quality Program; some data collected from state and local programs.	Based on the application cycle. Data from state programs are collected annually.	Baldrige National Quality Program	Data represent direct and verifiable counts of BNQP business activities and processes. Internal verification includes review by the NIST Director's Office. Data collected from state and local programs may be incomplete.	Output only	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.

TA Data Validation and Verification *(Cont.)*

Performance Measure	Data Source	Frequency	Data Storage	Verification	Data Limitations	Actions to be Taken
NTIS Measure 1a: Number of new items available (annual)	NTIS operates and maintains internal systems for processing collected information into available products.	Internal management activity reports are produced daily, summaries are produced monthly.	All performance-related information is stored within NTIS systems.	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.	None	None
NTIS Measure 1b: Number of information products disseminated (annual)	NTIS records every transaction using a commercial order processing system modified to meet its specific needs together with a standard Web analysis software package used by industry.	IInternal management activity reports are produced daily, summaries are produced monthly.	All performance-related information is stored within NTIS systems.	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.	None	None
NTIS Measure 1c: Customer satisfaction	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.	Internal management activity reports are produced daily, summaries are produced monthly.	All performance-related information is stored within NTIS systems.	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.	None	None