FY 2007 Annual Performance Plan

Technology Administration

Mission Statement

The Technology Administration'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 industry and other stakeholders to maximize technology's contribution to U.S. economic growth. Through its two component bureaus, the National Institute of Standards and Technology (NIST) and the National Technical Information Service (NTIS), TA fulfills its broad responsibilities and contributes to the Department's strategic goal of fostering science and technological leadership by promoting new models of technology transfer and R&D collaboration, identifying problems and barriers to technological innovation, developing and offering solutions and draft legislation to take advantage of opportunities presented by technological advancement, protecting intellectual property, enhancing technical standards, advancing measurement science, and making scientific and technical information available to other agencies and the public.

National Institute of Standards and Technology

NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards and technology in ways that enhance economic security and improve our quality of life. 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 extramural programs, including the Hollings Manufacturing Extension Partnership (MEP), to help smaller firms adopt new manufacturing and management technologies and improve their overall competitiveness; 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.

Each of NIST's major programs and their corresponding strategic goals (outlined below) contributes to the Department's mission to promote U.S. competitiveness by strengthening and safeguarding the U.S. economic infrastructure.

NIST: Programs, Core Functions, and Strategic Goals[1]

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. Promote innovation, facilitate trade, ensure public safety and security, and help create jobs by strengthening the Nation's measurement and standards infrastructure
MEP	Technical assistance to smaller manufacturers	2. 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	3. Catalyze, recognize, and reward quality and performance improvement practices in U.S. businesses and other organizations

[1] The Advanced Technology Program has a core function through FY 2006.

National Technical Information Service

NTIS provides the American public with permanent and ready access to scientific, technical, and business research through the acquisition, organization, and preservation of data added to its permanent collection. NTIS collects, classifies, coordinates, integrates, records, and catalogs scientific and technical information from whatever sources, foreign and domestic, that may stimulate innovation and discovery and then disseminates that information to the public. In an effort to provide the American public with increased access to the vast collection of government information, NTIS utilizes advanced e-commerce channels, including providing downloads of any item in its collection that is in electronic format for a single low fee or at no charge if under five pages. NTIS also helps other Federal agencies interact with and better serve the information needs of their own constituents by providing information management services.

Priorities/Management Challenges

NIST: Strategic Priorities for FY 2007

Based on 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 2007. These are:

- **Improve NIST's Facilities and Infrastructure*:*** 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.

- **Develop New Measurement and Standards Infrastructure Technologies:** Through its broad and vigorous measurement research, NIST works to anticipate the infrastructure needs of next-generation technologies and industries in the United States. 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 and standards 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, including nanometrology for the future electronics and semiconductor industries; biometrology for chemical, drug, agriculture, forensics, and healthcare industries; and quantum computing.

- **Respond to New National Priorities:** New national needs have been identified to which NIST is uniquely positioned to respond because of its multidisciplinary technical expertise, objectivity, and mission, and because of its ability to develop objective and technically rigorous standards. NIST will use these abilities to develop, test, and deploy enterprise integration standards and other national and international standards.

NTIS: Strategic Priorities for FY 2007

NTIS' priority is to contribute successfully to the Department of Commerce's strategic goal of fostering science and technological leadership through improved productivity, quality, dissemination, and efficiency of research. To that end, NTIS is committed to increasing the number of new items it makes available, increasing the number of information products disseminated annually and enhancing customer satisfaction.

Unit Cost Measures

NIST

The FY 2005 PART assessment of the NIST Laboratories noted that "R&D-performing organizations typically cannot provide unit cost measures of efficiency due to the long timeframe for research, multivariate inputs, and diverse sets of outputs that derive from R&D activities." NIST is developing unit cost measures for the MEP program. NIST has agreed to identify alternative measures of programmatic efficiency.

NTIS

NTIS' primary objective is to collect, disseminate, and preserve scientific and technical information. This valuable information is made available for distribution in a variety of formats designed to accommodate customers' needs. Two of these formats are representative of the shift of information dissemination from the traditional paper product to electronic dissemination. The average cost to disseminate this information to the public is reflected in the unit cost measures below.

	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Unit cost to disseminate a paper product	$83.31	$87.75	$90.00	$95.00	$100.00	$105.00
Unit cost to disseminate an electronic product	$5.88	$6.59	$6.25	$6.00	$5.75	$5.50

As more information is disseminated electronically and advances in e-government continue to be made, unit cost of electronic dissemination is expected to continue to decline. Conversely, larger documents are still requested in print while smaller documents are electronically disseminated. Larger documents, because of their size, color, and print requirements, are more costly per unit.

PART Assessment

NIST

- **NIST Laboratory Program**
  The PART assessment of the NIST Laboratories during the FY 2005 budget cycle found the Laboratories to be "effective." Details on the PART's findings are provided in the sections pertaining to NIST Performance Goal 1.

- **Advanced Technology Program**
  The PART assessment of the NIST Advanced Technology Program during the FY 2004 budget cycle found ATP to be "adequate." Details on the PART's findings are provided in the section pertaining to NIST Performance Goal 2.

- **Hollings Manufacturing Extension Partnership**
  The PART assessment of the NIST Hollings Manufacturing Extension Partnership Program during the FY 2004 budget cycle found the MEP Program to be "moderately effective." Details on the PART's findings are provided in the section pertaining to NIST Performance Goal 3.

NTIS

A PART assessment for NTIS has not been conducted.

Target and Performance Summary

NIST Performance Goal 1: Promote innovation, facilitate trade, ensure public safety and security, and help create jobs by strengthening the nation's measurements and standards infrastructure

	FY2001 Target	FY2001 Actual	FY2002 Target	FY2002 Actual	FY2003 Target	FY2003 Actual	FY2004 Target	FY2004 Actual	FY2005 Target	FY 2005 Actual	FY2006 Target	FY2007 Target
Qualitative assessment and review of technical quality and merit using peer review	Complete	Completed	Complete	Completed	Complete	Completed	Complete	Completed	Complete	Completed	Complete	Complete
Peer-reviewed technical publications	New	New	New	New	New	1,267	1,300	1,070	1,100	1,148	1,100	1,100
Standard Reference Materials Sold	New	31,985	New	30,906	New	29,527	29,500	30,490	29,500	32,163	30,000	30,000
NIST-maintained datasets downloaded	New	New	New	New	New	55,653,972	56,000,000	73,601,352	80,000,000	93,000,000	80,000,000	80,000,000
Number of calibration tests performed	New	New	New	14,617	New	13,987	New	12,503	New	12,849	12,000	12,000

NIST Performance Goal 2: Accelerate private investment in and development of high-risk, broad-impact technologies[1]

	FY2001 Target	FY2001 Actual	FY2002 Target	FY2002 Actual	FY2003 Target	FY2003 Actual	FY2004 Target	FY2004 Actual	FY2005 Target	FY 2005 Actual	FY2006 Target	FY2007 Target[2]
Cumulative number of publications	720	747	770	969	840	1,245	990	1,462	1,520	Available 05/2006	1,760	N/A
Cumulative number of patents	790	800	930	939	1,020	1,171	1,220	1,254	1,340	Available 05/2006	1,550	N/A
Cumulative number of projects with technologies under commercialization	180	195	190	244	210	271	250	296	320	Available 05/2006	320	N/A

[1]This performance goal is applicable only through FY 2006. Due to the cumulative nature of ATP's performance measures, there is a 3-5 year lag from initial project funding to the generation of measurable outputs and outcomes; performance data will continue to accumulate through the next several fiscal years before reflecting the budgetary changes proposed for fiscal year 2007. FY 2005 targets have been revised to reflect final FY 2004 data. Actual data for FY 2005 will be available in May 2006.

[2]Phase-out of the ATP program will be initiated in FY 2006; therefore, performance targets for FY 2007 are not applicable.

NIST Performance Goal 3: Raise the productivity and competitiveness of small manufacturers

	FY2001 Target	FY2001 Actual	FY2002 Target	FY2002 Actual	FY2003 Target	FY2003 Actual	FY2004 Target[4]	FY2004 Actual[5]	FY2005 Target[6]	FY 2005 Actual	FY2006 Target[7]	FY2007 Target[8]
Number of clients served by MEP Centers receiving Federal funding[3]	New	21,420	21,543	18,748	16,684	18,422	6,517	16,090	16,640	Available 12/2006	18,997	TBD
Increased sales attributed to MEP Centers receiving Federal funding	$708M	$636M	$726M	$953M	$522M	$1,483M	$228M	$1,889M	$591M	Available 12/2006	$674M	TBD
Capital investment attributed to MEP Centers receiving Federal funding	$913M	$680M	$910M	$940M	$559M	$912M	$285M	$941M	$740M	Available 12/2006	$844M	TBD
Cost savings attributed to MEP Centers receiving Federal funding	$576M	$442M	$497M	$681M	$363M	$686M	$156M	$721M	$405M	Available 12/2006	$461M	TBD

NTIS Performance Goal 1: Enhance public access to worldwide scientific and technical information through improved acquisition and dissemination activities

	FY2001 Target	FY2001 Actual	FY2002 Target	FY2002 Actual	FY2003 Target	FY2003 Actual	FY2004 Target	FY2004 Actual	FY2005 Target	FY 2005 Actual	FY2006 Target	FY2007 Target
Number of New Items Available (Annual)	New	505,068	510,000	514,129	520,000	530,910	525,000	553,235	530,000	658,138	660,000	665,000
Number of Information Products Disseminated (Annual)	New	14,542,307	16,000,000	16,074,862	17,000,000	29,134,050	18,000,000	25,476,424	25,800,000	26,772,015	27,000,000	27,100,000
Customer Satisfaction	New	97%	97%	98%	98%	97%	98%	96%	95% - 98%	98%	95% - 98%	95% - 98%

[3]FY 2001 and FY 2002 data for this measure have been adjusted from previously reported figures. Actual counts reported in the FY 2004 Annual Performance Plan were the result of a reporting error.

[4] FY 2004 targets are based on the FY 2004 Consolidated Appropriations bill, which included an annual level for MEP of $39.6M (which, less recessions, netted $38.7M).

[5] Due to the funding cycle of MEP Centers the MEP system was able (on a one-time basis) to manage the funding decrease in FY 2004 with minimal impact to actual Center funding levels. The MEP system would not be able to sustain the current number of centers in the event of future funding cuts of a similar nature.

[6]FY 2005 targets are based on an appropriation of $106M.

[7]FY 2006 targets are based on an appropriation of $104.6M.

[8]FY 2007 targets are under development and are expected in summer 2006.

Skill Summary:

At the end of FY 2005, the staffs of the three component bureaus of TA reflected the following levels of educational attainment:

- Total US/OTP staff included 5% Ph.D., 32% M.A. or M.S., and 42% B.A. or B.S. holders.
- Total NIST staff included 31% Ph.D., 15% M.A. or M.S., and 19% B.A. or B.S. holders. The breakdown of professional staff by major NIST organization was:
  - NIST Laboratories: 59% Ph.D., 18% M.A. or M.S., 17% B.A. or B.S. holders
  - Advanced Technology Program: 46% Ph.D., 32% M.A. or M.S., 20% B.A. or B.S. holders
  - Hollings Manufacturing Extension Partnership: 67% M.A. or M.S. holders
  - Baldrige National Quality Program: 29% Ph.D., 29% M.A. or M.S., 29% B.A. or B.S. holders
- Total NTIS staff included 6% M.A. or M.S. and 22% B.A. or B.S. holders.

Resource Requirements Summary

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

NIST Laboratory Performance Goal: Promote innovation, facilitate trade, ensure public safety and security, and help create jobs by strengthening the Nation's measurement and standards infrastructure

	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Actual	FY 2006 Estimate	FY 2007 Base	Increase/ Decrease	FY 2007 Request
Total Funding	579.2	614.2	576.9	621.6	763.2	596.8	104.6	701.5
IT Funding	64.6	67.5	63.1	65.6	67.5	70.4	0.0	70.4
FTE	2,707	2,725	2,672	2,503	2,713	2,720	147	2,867

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

	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Actual	FY 2006 Estimate	FY 2007 Base	Increase/ Decrease	FY 2007 Request*
Total Funding	198.1	199.7	187.2	138.3	83.0	91.5	-79.0	12.5
IT Funding	5.0	5.3	2.1	2.2	1.5	0.0	0.0	0.0
FTE	249	247	204	207	153	129	-68	61

* No appropriation is being requested for FY 2007; obligations are funded by projected prior year carryover.

NIST MEP Performance Goal: Raise the productivity and competitiveness of small manufacturers

	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Actual	FY 2006 Estimate	FY 2007 Base	Increase/ Decrease	FY 2007 Request
Total Funding	108.5	111.3	46.9	102.7	113.2	105.0	-58.3	46.7
IT Funding	3.1	2.6	1.5	1.0	1.0	1.0	0.0	1.0
FTE	89	89	68	71	64	64	-18	46

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

	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Actual	FY 2006 Estimate	FY 2007 Base	Increase/ Decrease	FY 2007 Request
Total Funding	27.7	27.7	19.2	15.9	48.7	41.0	0.0	41.0
IT Funding	10.7	5.7	5.4	3.5	3.6	3.6	0.0	3.6
FTE	186	181	165	157	200	200	0	200

Grand Total	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Actual	FY 2006 Estimate	FY 2007 Base	Increase/ Decrease	FY 2007 Request
Total Funding	913.5	952.8	830.1	878.5	1008.0	834.4	-32.7	801.7
IT Funding	83.4	81.1	72.1	72.3	73.6	74.0	0.0	75.0
FTE	3,231	3,242	3,109	2,938	3,130	3,113	61	3,174

NIST Performance Goal 1: Promote innovation, facilitate trade, ensure public safety and security, and help create jobs by strengthening the Nation's measurement and standards infrastructure.

Corresponding DOC Strategic Goal and Objective:

Strategic Goal 2: Foster science and technological leadership by protecting intellectual property, enhancing technical standards, and advancing measurement science.

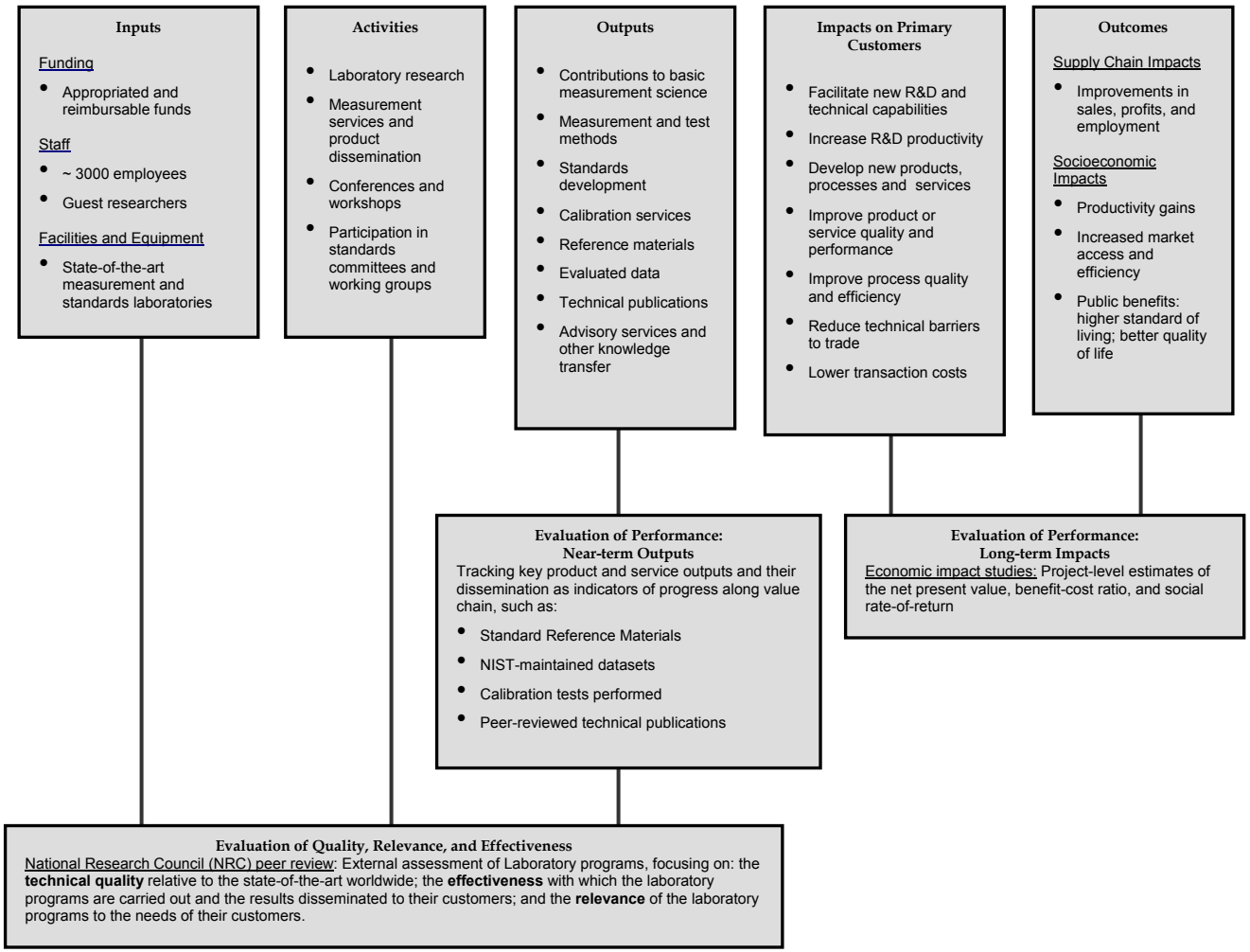
General Goal/Objective 2.1: Develop tools and capabilities that improve the productivity, quality, dissemination, and efficiency of research.

Rationale for Performance Goal:

As the National Measurement Institute for the United States, NIST is uniquely responsible for establishing and maintaining an efficient system that links the fundamental units of measurement to the measurement methods used by industry, universities, and other government agencies. The Nation's ability to innovate, grow, and create high value jobs relies on a robust scientific and technical infrastructure – including the measurement and standards provided by the NIST Laboratories. The NIST Laboratories perform research to develop the measurement tools, data, and models for advanced science and technology. The model below depicts the NIST Laboratory Program's value-creation chain – from inputs like funding and staff to outcomes like productivity gains and improved quality of life. The model also includes the methods and measures used to evaluate quality, relevance, and performance 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 unique 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, the NIST Laboratory Program evaluates its performance using an appropriate mix of specific output tracking, 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 Laboratory Program: Impact and Evaluation Logic Model



FY 2007 Program Changes:

Program Initiatives	Funding Request	Anticipated Impact	Location of Program Justification in the Budget Document
Physical Science to Enable Innovation: A Measurement Science & Standards Initiative	$72,000,000	As part of the President's 10-year American Competitiveness Initiative, an increase of $72M is requested for key investment to promote U.S. innovation and global competitiveness: ▪ Enabling Nanotechnology from Discovery to Manufacture – will develop and make available the world's most advanced nanoscale measurement and fabrication methods to partners from industry, universities, and other government agencies through the full establishment of a Center for Nanoscale Science and Technology (CNST). ▪ NIST Center for Neutron Research (NCNR) Expansion and Reliability Improvements: A National Need – will expand and improve the NCNR by developing better hydrogen cold source and optical systems to deliver more neutrons to the instruments; developing a neutron scattering instrument to enable new, more sensitive, higher spatial resolution analytical tools; and improving facility maintainability and reliability by replacing aging control systems. ▪ Enabling the Hydrogen Economy – will enable development of more powerful, efficient, and durable fuel-cell designs; ensure accurate measures of hydrogen at points of sale; and facilitate safer storage, distribution, and delivery of hydrogen in the marketplace. ▪ Manufacturing Innovation through Supply Chain Integration – will foster a seamless global supply chain – shortening design-to-manufacturing cycle, improving quality, and lowering costs. ▪ Quantum Information Science-Infrastructure for 21st Century Innovation – will enable unbreakable encryption for verifiably secure electronic financial transactions and exchange of classified information as well provide vastly greater computing power usable for breaking non-quantum encryption. This will be accomplished both via in-house research and through the establishment of a Joint Quantum Institute, a strategic partnership between NIST, a university, and the National Security Agency. ▪ Structural Safety in Hurricanes, Fires, and Earthquakes – will enable a reduction in the risk of losses from extreme natural events. ▪ Synchrotron Measurement Science and Technology: Enabling Next Generation Materials Innovation – will provide the measurement science and standards capabilities required to collaboratively develop state-of-the-art tools for properly characterizing and evaluating the complex materials necessary to transition innovative research into manufactured solutions. ▪ International Standards and Innovation: Opening Markets for American Workers and Exporters – will support U.S. competitiveness and innovation by ensuring that U.S. businesses are equipped to satisfy standards-related requirements in key export markets. ▪ Innovations in Measurement Science – will advance NIST's capabilities in the core measurement science areas underpinning technology innovation, enabling NIST to anticipate industry needs and develop the measurement science needed by the next generation of technology. ▪ BioImaging: A 21st Century Toolbox for Medical Technology – a partnership with the National Institutes of Health and the bioimaging industry that will provide the necessary measurements to pave the way for innovative diagnostics.	Scientific and Technical Research and Services Appropriation; NIST Laboratories Activity

Program Initiatives	Funding Request	Anticipated Impact	Location of Program Justification in the Budget Document
Physical Science to Enable Innovation: A Measurement Science & Standards Initiative		▪ Cyber Security: Innovative Technologies for National Security – will develop methodologies to provide mechanisms to assign security confidence levels, to measure improvements in the overall security of a system, and to identify and mitigate would-be attackers. ▪ Biometrics: Identifying Friend or Foe? – will develop appropriate measurements and standards to support testing and evaluation of enhanced biometric systems.	Scientific and Technical Research and Services Appropriation; NIST Laboratories Activity
Physical Science to Enable Innovation: A Measurement Science & Standards Initiative	$12,000,000	As part of the President's 10-year American Competitiveness Initiative, an increase of $12M is requested for: Construction Related Expenses of the NIST Center for Neutron Research Expansion – expansion of the Nation's leading neutron research facility resulting in increased cold neutron beam capacity necessary for next-generation neutron scattering instruments; increased number of world-class neutron instruments; and increased scientific collaborations with an array of external research participants.	Construction of Research Facilities Appropriation; Construction and Major Renovations Activity
Facilities Improvement Plan	$20,100,000	As part of the President's 10-year American Competitiveness Initiative, an increase of $20.1M is requested for improvements in the infrastructure necessary for accurate measurement research at NIST, as needed to foster technological innovation and enable new generations of science, technology, and competitive products.	Construction of Research Facilities Appropriation; Construction and Major Renovations Activity

The program changes for the NIST Laboratory Programs represent specific "projects" or research areas NIST will develop in support of the Nation's technical infrastructure. While these projects link directly to the goals of the NIST Laboratory Programs, progress and performance is measured at the individual project level through milestone tracking of major project outputs, such as those described in the budget narratives. Without funding, those outputs will be forgone along with the associated benefits (outcomes) described in each narrative.

Measure 1a: Qualitative assessment of technical quality, merit or relevance, and performance using peer review

Explanation of Performance Measure:

Since 1959, the NIST Laboratories have been reviewed annually by the National Research Council (NRC). The annual NRC Board on Assessment (BOA) of NIST Programs review is independent, technically sophisticated, and extensive. The assessment process focuses on the quality, relevance, and technical merit of the NIST Laboratories Program to ensure it is developing and promoting the infrastructure tools and measurement standards needed by industry, academia, and other government agencies.

The review 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. 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 quality and merit of the laboratory programs relative to the state-of-the-art worldwide;
- The effectiveness with which the laboratory programs are carried out and the results disseminated to their customers;
- The relevance of the laboratory programs to the needs of their customers; and
- The ability of the Laboratories' facilities, equipment, and human resources to enable the Laboratories to fulfill their mission and meet their customers' needs.

In FY 2004, the reporting process was modified to allow additional focus on the technical exchange between NIST staff and the reviewers as well as increased interactions among external reviewers. While the NRC BOA continues to conduct on-site annual reviews and feedback, the Board produces a biennial report that includes findings over the two year evaluation period. The 2004-2005 assessment report is available at http://www7.nationalacademies.org/nist/. The table below provides summary statements for the laboratories excerpted from NRC's 2004-05 report.

Sample Statements from NRC Peer Review, FY 2005

LABORATORY	
Electronics and Electrical Engineering (EEEL)	"The overall technical quality of EEEL continues to be very high and innovative. The EEEL has an outstanding staff, a solid history of achievement, and close ties to customers. The projects are generally well aligned with the NIST mission and provide an excellent value for the money to the country and its industrial infrastructure…. Metrology, though recognized as NIST's core competency, is being seriously compromised in recent years, particularly through funding competition with the Strategic Focus Areas. The EEEL should undertake a conscientious reexamination of this trend in order to reach a clear decision about the laboratory's level of commitment to metrology and to develop a strategy for implementing the decision." (pp. 4-1, 4-2).
Manufacturing Engineering (MEL)	"All MEL divisions for the most part are doing excellent technical work. For the programs evaluated, the divisions demonstrated that their activities were focused on those programs determined most essential to the mission of MEL and NIST. In some cases… projects had reached the stage of needing reevaluation and redirection on the basis of work being done elsewhere and shifts in priorities. Adjustments in assignments will continue to be a key activity of MEL management, to ensure that projects are properly concluded and new ones are started in a logical manner." (p. 6-1).
Chemical Science and Technology (CSTL)	"The CSTL is truly a national resource, conducting outstanding research to support the continued development of a wide range of measurement capabilities, providing critical and reliable chemical and physical properties data and essential reference standards. Its work spans the entire scientific spectrum, from fundamental physics through chemistry and into biology, and supports an astonishingly diverse group of industries. The quality of the scientific staff is superb, and the laboratory has undergone a rather dramatic transformation over the past decade or so to become entrepreneurial and customer-focused while being mindful to maintain and advance its core competencies." (p. 3-1).

Physics (PL)	"During the assessment period there has been excellent progress in the development and advancement of optical standards, an area in which NIST excels…. A challenge faced by the Physics Laboratory is the need to retain and recruit high-profile scientists who are in demand by universities or industry….. In general, the relevance of the work in all divisions of the Physics Laboratory is high to very high." (pp. 8-2, 8-7).
Materials Science and Engineering (MSEL)	"The MSEL has impressive programs of very high quality and technical merit as well being both relevant and effective…. The MSEL fulfills its NIST mission well, and effectively disseminates information through the production of Standard Reference Materials (SRMs), Recommended Practice Guides, and databases….[The NIST Center for Neutron Research's] internal science program covers an impressive range with excellent depth. Good topics are pursued with highly visible results, and many problems addressed have technological interest. Nonetheless, there must be steady critical review of the technical relevance and scientific novelty of the internal work." (pp. 7-1, 7-9).
Building and Fire Research (BFRL)	"In the past 2 years, BFRL has had an outstanding record of service to the country…. The BFRL was very active during the past 2 years, to a large extent because of the extra burdens of major research for the country on the WTC [World Trade Center] investigations and the application of new and developed procedures for the determination of contaminant spread in buildings. The WTC activities, along with the investigation of the fire at The Station nightclub in Rhode Island, represent the first two official investigations carried out under NCSTA [National Construction Safety Team Act of 2002]. The excellent manner in which these investigations were carried out is a highlight of this period for BFRL and an example of the ability of this laboratory to marshal expertise, both from in-house and from outside consultants, and to manage such investigations in a fully professional manner." (pp. 2-1, 2-2).
Information Technology (ITL)	"The Information Technology Laboratory ranks with the best of the U.S. government laboratories in the quality and merit of its technical work. The technical quality of the work is uniformly very high across all six divisions…. The projects reviewed generally evinced high technical quality because of the caliber of the scientists, the significant accomplishments in the work, and the collaboration with other scientists enabling breakthrough work that could not be done in isolation." (pp. 5-3).

Measure 1b: Peer-reviewed technical publications

Technical publications represent one of the major mechanisms NIST uses to transfer the results of its research to support the nation's technical infrastructure and provide measurements and standards – vital components of leading-edge research and innovation – to those in industry, academia, and other government agencies. Each year, NIST's technical staff produces a total of 2,000 to 2,200 manuscripts and publications with approximately 50-60 percent appearing in prestigious scientific peer-reviewed journals. This measure is a direct count of NIST technical manuscripts that have been reviewed and approved for publication in peer-reviewed journals by the NIST Editorial Review Boards at both the Gaithersburg and Boulder sites, as well as the number of approved manuscripts actually published in peer-reviewed journals in that fiscal year. A peer-reviewed journal is a publication in which articles are formally reviewed by the journal's editors and/or a panel of experts and respected researchers in a specific field of study before being accepted for publication. Ulrich's Periodical Directory (www.ulrichsweb.com) is used to determine the status of a publication in which a NIST manuscript appears. This measure reflects in part the quality and demand for NIST publications.

In addition to peer-reviewed journals, NIST publishes its measurement methods and standards through conference proceedings, NIST interagency reports, and special publications. For example, the NIST Journal of Research highlights NIST's research and development in the area of metrology and related fields of physical science, engineering, applied mathematics, statistics, biotechnology, and information technology. Also, special publications such as NIST Recommended Practice Guides target specific industries and provide users with valuable guidance on specialized measurement techniques and methods for interpreting results.

FY 2006 and FY 2007 Targets: This measure represents a direct count of the number of NIST technical manuscripts that have been reviewed and approved for publication in peer-reviewed journals by the NIST Editorial Review Boards at both the Gaithersburg and Boulder sites plus the number of approved manuscripts

published in peer-reviewed journals in each fiscal year. This measure was adopted in FY 2005 to better reflect the quality and demand for NIST research results and standards services. While NIST expects to produce a consistent number of technical publications peer-reviewed publications over time, target estimates may need to be adjusted once additional trend data are available.

Measure 1c. Standard Reference Materials (SRMs) sold

Standard Reference Materials 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. SRMs are certified in the NIST Laboratories for their specific chemical and material properties. Customers use SRMs to achieve measurement quality and conformance to process requirements that address both national and international needs for commerce and trade and public safety and health. For example, NIST recently developed a new SRM that will help researchers better measure oxidative DNA damage implicated in the progression of cancer and other diseases. SRM 2396, the first standard provided by NIST to be used in the field of oxidative DNA damage and repair, can be used to calibrate equipment and methods to help establish measurement accuracy and consistency among different laboratories.

FY 2006 and FY 2007 Targets: This measure represents a direct count of the number of SRM units sold to customers in industry, academia, and other government agencies. Recent trends illustrate a high (roughly 30,000 per year) but slightly declining number of SRMs disseminated annually, predominantly due to technological improvements in equipment and testing methods that will continue to reduce the overall frequency with which test equipment and methods are calibrated using reference materials. NIST expects this trend to stabilize over time, resulting in a consistent number of SRMs disseminated annually.

Measure 1d. Downloads of NIST-maintained datasets

NIST provides on-line access to over 80 scientific and technical databases. These databases cover a broad range of substances and properties from a variety of scientific disciplines. Some datasets – such as the NIST Chemistry WebBook, NIST Physical Reference Data Systems, and the NIST Ceramics WebBook – are comprehensive and contain a large number of databases, while others serve very specific applications. NIST's on-line data systems are heavily used by industry, academia, other government agencies, and the general public and represent another method NIST uses to deliver its measurements and standards tools, data, and information. This measure is a direct count of the average annual number of downloads of NIST-maintained data. While this count demonstrates a very high level of data dissemination, it does not capture the distinct number of users that have accessed the databases. (NIST cannot and does not collect user-specific data on web transactions.)

FY 2006 and FY 2007 Targets: This measure was developed and incorporated into the FY 2005 annual performance plan. While over time NIST expects a consistent level of on-line data dissemination, it is difficult to develop long-term target estimates without additional trend data, and FY 2006 and 2007 targets may need to be adjusted.

Measure 1e. Number of calibration tests performed

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. 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). MAPs are quality control programs for calibrating entire measurement systems.

The output data represent a direct count of calibration tests performed. The data provide information on service output levels only and represent a measure of throughput but not workload per se, as the time and calibration effort required can vary substantially across calibration tests. As with SRMs and NIST-maintained data, downstream impact is a function of the nature of individual calibration services provided more than the sheer volume of tests performed.

FY 2006 and FY 2007 Targets: This measure has been adjusted to better demonstrate the level of calibration output. NIST has moved from reporting the number of items calibrated to reporting the number of tests performed in a given fiscal year. FY 2007 represents the first year NIST will begin formally reporting progress on this measure; however, historical data have been provided. While the annual demand for calibrations can fluctuate due to several factors outside NIST's control, including changes in the calibration intervals of large customers, changes in the average calibration interval rate in any given year, consolidation of calibration activities within large R&D organizations, and industry consolidation (as, for example, in defense-related industries), NIST expects to perform a consistent number of calibrations annually.

External Program Evaluation:

Visiting Committee on Advanced Technology

The programmatic goals, strategic direction, 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. 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.

NIST Visiting Committee on Advanced Technology (VCAT): FY 2005 Membership		
Dr. John F. Cassidy, Senior Vice President, Science and Technology United Technologies Corporation	**Mr. Scott Donnelly**, Senior Vice President, General Electric Co.	**Mr. Gary D. Floss**, Managing Director Bluefire Partners, Inc.
Dr. Deborah L. Grubbe, P.E., VCAT Vice Chair, Vice President, Group Safety BP International	**Dr. Lou Ann Heimbrook**, Vice President Global Operations, Merck Research Laboratories Merck & Co., Inc.	**Dr. Donald B. Keck**, Retired Vice President, Research Director Corning Incorporated
Mr. Edward J. Noha, Chairman Emeritus CNA Financial Corporation	**Dr. Juan M. Sanchez**, Vice President for Research University of Texas, Austin	**Mr. Thomas A. Saponas**, Retired Senior Vice President and Chief Technology Officer Agilent Technologies
Dr. April M. Schweighart, VCAT Chair, Retired Product Business Manager Motorola	**Dr. James W. Serum**, President SciTek Ventures	**Dr. E. David Spong,** Vice Chairman ChangeAgent, Inc.
Dr. W. Wyatt Starnes, Chairman & CEO SignaCert, Inc.	**Mr. Robert T. Williams**, Vice President Track-Type Tractors Division Caterpillar, Inc.	

Program Assessment Rating Tool

During the FY 2005 budget cycle, the NIST Laboratory Programs were assessed using the Program Assessment Rating Tool (PART). The evaluation of the NIST Laboratory Programs was positive, with an overall rating of "effective." The PART assessment included the following highlights:

- The NIST Laboratory Programs have a clear, well-defined, and unique purpose. The measurement and standards capabilities provided by the NIST Laboratory Programs are a critical component of the Nation's scientific, technical, and economic infrastructure.

- The NIST Laboratory Programs are well-managed with strong strategic planning, program management, and performance evaluation processes. NIST's external advisory committees and peer review system are a particularly strong component of its management and evaluation system.

- During the course of the PART review, NIST began to revise its long-term goals and improve some of its quantitative output metrics. NIST made a number of corresponding revisions in time for the new goals and metrics to appear in this integrated budget submission and performance plan for FY 2005.

Responses to PART recommendations related to long-term goals and quantitative output metrics were implemented in the FY 2005 combined budget and performance plan. NIST will continue to work to continuously improve performance measures and identify useful measures of efficiency. The PART noted that R&D-performing organizations typically cannot provide unit cost measures of efficiency due to the long time frame for research, multivariate inputs, and diverse sets of outputs that derive from R&D activities.

Crosscutting Activities:

Intra-Department of Commerce

- **NOAA:** NIST works with NOAA on the Federal Natural Disaster Reduction Initiative, which is focused on reducing the costs of natural disasters and saving lives through improved warnings and forecasts and information dissemination. Also, NIST and NOAA are among a group of Federal agencies focused on the global climate change initiative to accelerate new global observation technologies to improve the understanding of global climate change.
- **NTIA:** NIST and NTIA cooperate to support development of ultrawideband signal technology, a new wireless technology that will improve communications for emergency services and other applications.
- **ITA:** NIST has a long history of collaboration with ITA on technical barriers to trade. Currently, NIST & ITA are collaborating closely under the terms of the DOC Standards Initiative.

Other government agencies

NIST provides research and services in measurement and standards to almost every other agency in the Federal government with scientific missions contracted through specific Interagency Agreements or memoranda of understanding. NIST measurement research, services, and facilities have long contributed to national defense and security, to the nationwide safety and quality assurance systems that ensure the accuracy of health care measurements, to the accuracy of environmental measurements, and to law enforcement standards. NIST plays an essential role in a wide variety of intragovernmental and government–industry coordination committees. For example, NIST has leadership positions on the committees, subcommittees, and working groups of the National Science and Technology Council (NSTC).

Private sector

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

External Factors and Mitigating Circumstances:

Industry-specific business conditions and technological developments affect the level and range of demand for NIST products and services over time. In general, NIST seeks to mitigate the effects of external technological and market uncertainties by maintaining varied and close relationships with its customer base. Through conferences, workshops, technology roadmaps, and many other forms of interaction with its customers, NIST regularly evaluates and adjusts to the direction and level of demand for measurements, standards, reference data, test methods, and related infrastructural technologies and services.

NIST Performance Goal 2: Accelerate private investment in and development of high-risk, broad-impact technologies (this goal is discontinued for the FY 2007 Budget).

Corresponding DOC Strategic Goal and Objectives:

Strategic Goal 2: Foster science and technological leadership by protecting intellectual property, enhancing technical standards and advancing measurement science.

General Goal/Objective 2.1: Develop tools and capabilities that improve the productivity, quality, dissemination, and efficiency of research

Explanation of Performance Measures:

The FY 2007 Budget continues the phase-out of the ATP program, a grant program for businesses that was intended to develop new technologies for commercial use.

In the early and mid stages of project evolution, ATP tracks key outputs from projects through its Business Reporting System, an internal database drawing data from regular, systematic electronic project surveys and supplementary telephone surveys. Key indicators in FY 2006 representing the generation and diffusion of new commercially relevant technical knowledge are patents and technical publications generated by ATP-funded projects.

Measure 2a: Cumulative Number of Publications

Publications indicate the diffusion of technical knowledge that results from ATP investment in the development of new technologies, and participants in more than half of ATP-funded projects have published and presented papers in technical professional journals. The 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.

FY 2006 Targets: 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 publication 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, publication activity will be affected by changes in ATP's completed project portfolio. Phase-out of the ATP program will be initiated in FY 2006; therefore, performance targets for FY 2007 are not applicable.

Measure 2b. Cumulative Number of Patents

The second of ATP's output measures focuses on the creation of new knowledge resulting from ATP-funded projects. The measure represents a cumulative direct count of the number of patents filed by all ATP-funded research project participants through the close of a given fiscal year.

FY 2006 Targets: 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, and 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. Phase-out of the ATP program will be initiated in FY 2006; therefore, performance targets for FY 2007 are not applicable.

Measure 2c. Technologies Under Commercialization

In addition to tracking patents and technical publications, ATP's Business Reporting System also tracks mid-course outcomes of ATP-funded technology development projects up through six years after ATP funding ends. A key indicator is the number of projects with technologies under commercialization. This metric tabulates the cumulative number of projects with 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 or services, which in turn improve the prospects for technology-led economic growth.

FY 2006 Targets: Out-year projections are based on extrapolations of past commercialization rates and projections of projects initiated and completed. Similar to the publication and patent metrics, the number of projects with technologies under commercialization may be impacted by delays in ATP project completion and/or project terminations. Phase-out of the ATP program will be initiated in FY 2006; therefore, performance targets for FY 2007 are not applicable.

Program Evaluation:

To provide a more comprehensive measure of mid-term outcomes from ATP funding, the program implemented a Composite Performance Rating System and has compiled and published ratings of the first 100 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	Commercialization Progress Measures
▪ Technical awards ▪ Collaborations ▪ Patent filings ▪ Publications and presentations ▪ New product/process in market or expected soon	▪ 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 100 completed ATP projects found that 11 percent of the projects are top-rated in terms of overall project performance, with four stars. Twenty-eight percent are in the bottom group of zero or one stars. Sixty-one percent make up the middle group.

External Program Evaluation:

Visiting Committee on Advanced Technology/ATP Advisory Committee

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) 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. Additional information on the ATP Advisory Committee, including its most recent annual report, is available at http://www.atp.nist.gov/adv_com/ac_menu.htm.

National Research Council

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 report from the second NRC review was published in 2001 and is available online at http://www.nap.edu/books/030907410X/html/.

Program Assessment Rating Tool (PART)

During the FY 2004 budget cycle, ATP was evaluated using the new Program Assessment Rating Tool (PART) and received an "adequate" rating.

Cross-cutting Activities:

Other government agencies

The Advanced Technology Program (ATP) leverages the expertise of scientists and engineers from a wide variety of government agencies and laboratories participating on ATP Source Evaluation Boards. In addition, ATP program managers work with program managers from other government agencies to ensure that projects are complementary and relevant: coordination committees in several disciplines have been brought together for this purpose. This also creates an opportunity to examine government R&D from a high level for specific technologies.

External Factors and Mitigating Circumstances:

ATP was designed to fund high-risk technologies through grants to industry; both the nature of the projects and the location of the research performance intrinsically convey a high degree of uncertainty and a relatively low degree of control. For instance, the rate at which ATP-funded technologies were commercialized varied in part due to technological uncertainties intrinsic to the R&D enterprise and in part to the particular strategies and efforts of the businesses performing the research. Other metrics, such as publication and patenting rates, will be affected not only by the success of the technology development effort but also by company-specific strategies and market conditions. For example, patenting is more common in some industries than others, and a variety of factors affect the patenting and/or publishing choices of individual firms. Variation in growth rates and development trajectories add additional uncertainty: some technologies are commercialized rapidly once the research is completed, while others require extensive product development and clinical trials before significant commercialization can occur. There are no practical mitigation strategies for these external sources of uncertainty other than maintaining robust program management and data collection systems. Over the course of ATP funding, companies are required to abide by the terms and conditions of the cooperative agreement, which include intellectual property and commercialization provisions.

NIST Performance Goal 3: Raise the productivity and competitiveness of small manufacturers.

Corresponding DOC Strategic Goal and Objective:

Strategic Goal 2: Foster science and technological leadership by protecting intellectual property, enhancing technical standards and advancing measurement science

General Goal/Objective 2.1: Develop tools and capabilities that improve the productivity, quality, dissemination, and efficiency of research

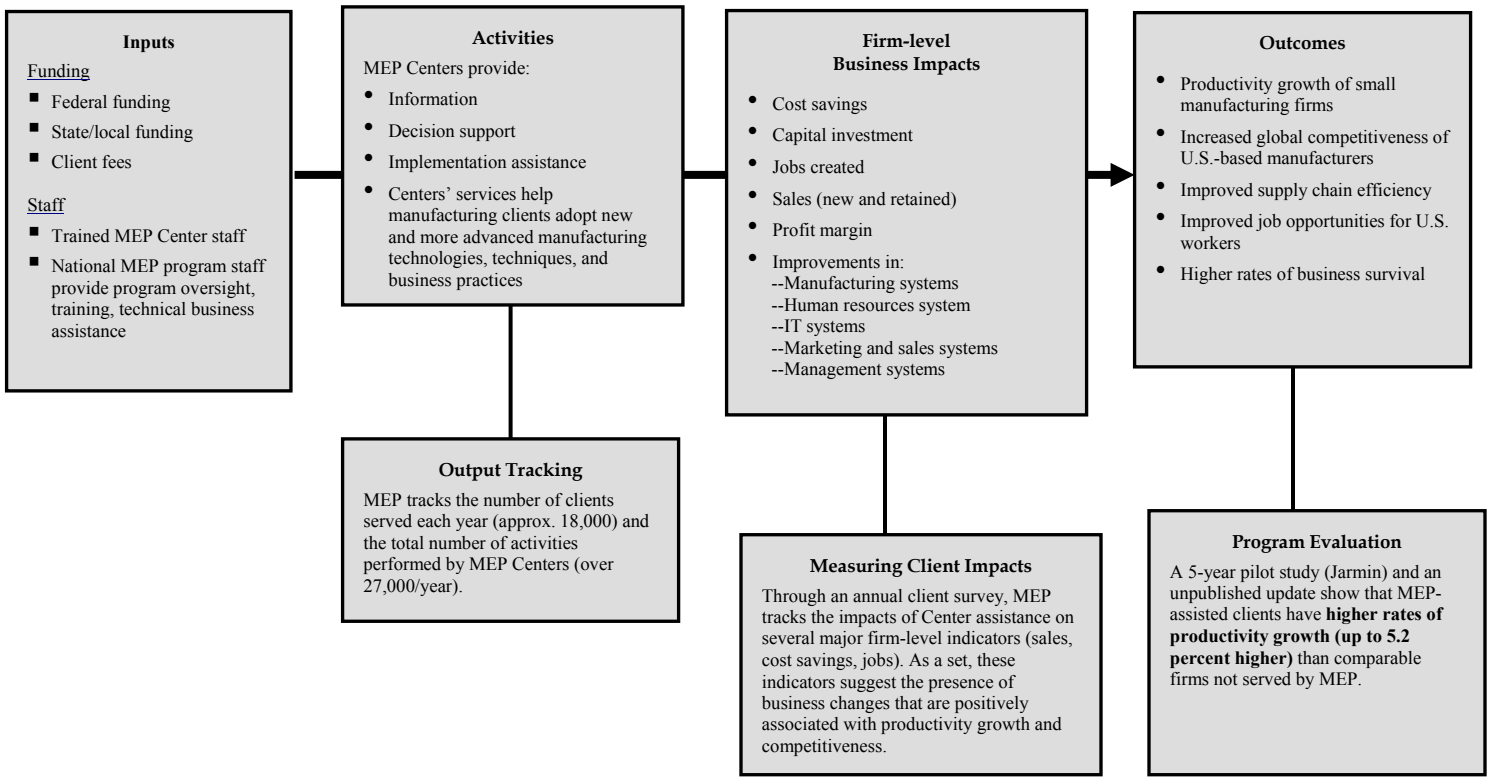
Rationale for Performance Goal:

Operating under the authority of 15 U.S.C. 278k, the MEP is a federal-state-local partnership program that provides small U.S. manufacturers with access to manufacturing technologies, resources, and expertise. The MEP program consists of a network of manufacturing extension centers which are linked to state, university, and private sources of technology and expertise to promote innovation and competitiveness by assisting small manufacturers in adopting new and advanced manufacturing technologies, techniques, and business practices.

The Nation's 344,000 small manufacturers employ over eleven million people 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 is crucial; and the Nation's future manufacturing productivity and competitiveness will rest largely on the ability of these small establishments to improve their quality, raise their efficiency, and lower their costs. The MEP network helps small companies transform themselves into high performance enterprises – productive, innovative, customer-driven, and competitive – by efficiently providing high value technical and advisory services including access to industry best practices.

MEP's ultimate goal is to measurably improve the productivity and competitiveness of all its clients. The model below demonstrates the impact path (or value creation chain) of the 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



Explanation of Performance Measures:

MEP's network of manufacturing assistance centers works at the grassroots level with each MEP center, providing their local manufacturers with expertise and services tailored to their most critical needs. The program uses the measures below to demonstrate both a level of activity as well as the outcomes resulting from the services MEP Centers provide.

Measure 3a. Number of clients served by MEP Centers receiving Federal funding

MEP works with the Nation's small manufacturing firms to provide assistance to overcome barriers to productivity growth and competitiveness. This measure represents the annual number of new and repeat clients served by MEP Centers who received training, technical, and business assistance ranging from informational seminars and training classes to in-depth technical assistance in areas such as lean implementation, ISO 9000, and quality improvement practices.

FY 2006 and FY 2007 Targets: FY 2006 targets are based on an appropriation of $104.6M. FY 2007 targets are under development and expected in summer FY 2006.

Measure 3b. Increased sales attributed to MEP Centers receiving Federal funding
Measure 3c. Capital investment attributed to MEP Centers receiving Federal funding
Measure 3d. Cost savings attributed to MEP Centers receiving Federal funding

Together the measures above – increased sales, capital investments, and cost savings, all attributed to MEP Centers receiving Federal funding – provide quantitative indicators of the bottom-line impacts MEP services provide. As a set, these measures indicate changes that are positively associated with productivity growth and competitiveness – two factors that are crucial for American manufacturers to manage and succeed in the rapidly changing manufacturing environment. Data are collected through an annual survey of clients receiving services from MEP Centers.

FY 2006 and FY 2007 Targets: FY 2006 targets are based on an appropriation of $104.6M. FY 2007 targets are under development and expected in summer FY 2006.

External Program Evaluation:

Economic Studies

The MEP program provides resources needed by small manufacturing establishments to overcome cost and knowledge barriers to realizing productivity growth and improvements in business performance. 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. One study, 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).[1] An unpublished update to this original study also

[1] 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.

prepared by the Center for Economic Studies 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.

National Academy of Public Administration (NAPA)

NAPA, an independent, nonpartisan organization chartered by Congress to improve government performance, recently completed the second part of a two-phase review of the MEP program. The first phase focused on re-examining MEP's core premise, and NAPA found: "…barriers to improving the productivity of small manufacturers identified by earlier studies remain, although they have changed in their relative impacts.... The Panel finds that the core premise of the Program remains viable as it is fulfilling its mission by leveraging both public and private resources to assist the nation's small manufacturers." The second phase evaluated alternative business models for the program. NAPA provided several recommendations, including:

- Emphasize technology diffusion, product development, and supply chain integration services.
- Build an integrated national network.
- Improve the national coordination of state level organization partnering.
- Review and adopt business best practices used by other federal/state programs.
- Improve the system-wide sharing of knowledge and information and the systems for measuring performance.
- Coordinate with other DOC manufacturing related programs.
- Include structural and operational changes in the strategic planning processes.

Full text versions of the reports are available at http://www.napawash.org/Pubs/NIST0903.pdf and http://www.napawash.org/Pubs/NIST6-2-04.pdf

Visiting Committee on Advanced Technology (VCAT)/MEP National Advisory Board

As with other NIST programs, the programmatic objectives and management of MEP are reviewed regularly by the Visiting Committee on Advanced Technology (VCAT) and its National Advisory Board (MEPNAB), which was established by the Secretary of Commerce in October 1996. The Board 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 MEPNAB 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. small manufacturers. Additional information on MEP's National Advisory Board, including its most recent annual report, is available at http://www.mep.nist.gov/about-mep/advisory-board.html#annualreport.

Program Assessment Rating Tool (PART)

In conjunction with the FY 2004 budget, MEP was evaluated using the PART instrument and received a rating of "moderately effective."

MEP scored lowest in the "program purpose and design" section of the PART, reflecting OMB's assessment that "it is not evident that there is a need for a Federal response in this area." OMB did not make any specific recommendations for MEP program management to implement.

Cross-cutting Activities:

Intra-Department of Commerce

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

Other government agencies

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

Private sector

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

External Factors and Mitigating Circumstances:

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

NTIS Performance Goal 1: Enhance public access to worldwide scientific and technical information through improved acquisition and dissemination activities.

Corresponding DOC Strategic Goal

Strategic Goal 2: Foster science and technological leadership by protecting intellectual property, enhancing technical standards, and advancing measurement science

General Goal/Objective 2.1: Develop tools and capabilities that improve the productivity, quality, dissemination, and efficiency of research

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) services to Federal agencies that help them communicate more effectively with their employees and constituents.

NTIS promotes the development and application of science and technology by providing technologically advanced global e-commerce channels for dissemination of its specialized information to business, industry, government, and the public. The NTIS bibliographic database (from 1990 to the present) is available via the Internet free of charge. Users are allowed to download items in the collection in electronic format for a single low fee or at no charge if under five pages. These initiatives are a result of NTIS's innovative business model that maximizes utilization of the World Wide Web and e-commerce in its information collection and dissemination activities.

Explanation of Performance Measures

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

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 30,000 scientific and technical reports annually and another 635,000 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 665,000, but the number largely depends on input from other government agencies.

Measure 1b. Number of Information Products Disseminated (annual)

This measure represents information disseminated and includes compact discs, diskettes, tapes, online subscriptions, Web site pages, as well as 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 increase 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 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.

FY 2006 and FY 2007 Targets:
The FY 2006 and FY 2007 targets have been increased to reflect increases in expected dissemination activity, as demonstrated in the FY 2005 actual data.

Measure 1c. Customer Satisfaction

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 inquiries about the status of an order or other general questions.

Program Evaluations:
The Office of the Inspector General (OIG) contracted with KPMG and prepared its audit (Audit Report No. FSD-17433-6-0001/November 2005) of NTIS' FY 2005 Financial Statements that includes a review of the Annual Report detailing NTIS' program activity. The audit results indicated that NTIS has established an internal control structure that facilitates the preparation of reliable financial and performance information.

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. Specific examples are listed below:

- Department of Agriculture (Team Nutrition) - NTIS provides USDA with bulk order processing and distribution of its nutrition education materials to its constituents.
- Department of Treasury (U.S. Customs) - NTIS hosts a Web site on behalf of U. S. Customs Service allowing the dissemination of information on legal rulings.
- Office of Personnel Management (OPM) – Recommends NTIS to other government agencies for e-learning support.

External Factors and Mitigating Circumstances:

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 1990 to the present, on the Internet for free. In addition, if available, documents smaller than five pages can be downloaded for free from NTIS's Web site. Documents greater than five pages, if available in electronic form, can be downloaded for a fee. Of course, all documents in the NTIS collection can be ordered in the traditional formats (i.e. paper and microfiche), if desired.

Data Validation and Verification

NIST

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 review 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. 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 table below summarizes the data validation and verification processes for each organization in the Technology Administration.

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
NIST Measure 1a: Qualitative assessment and review of technical quality and merit 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 reviews; biennial reports	NRC	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 1b: Peer-reviewed technical publications	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 manuscripts to be published in peer-reviewed journals and have been cleared for publication by the internal Washington and Boulder Editorial Review Boards. Internal controls include verification using random checks of review paper work with approved publications by ISD staff and data review by the NIST Director's Office.	Output only	None

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
NIST Measure 2a: Standard Reference Materials (SRMs) sold NIST Measure 2b: NIST-maintained datasets downloaded NIST Measure 2c: Number of calibration tests performed	NIST Technology Services	Ongoing	NIST Technology Services	Data represent direct and verifiable counts of: 1) the number of SRMs sold to customers 2) the number of times a NIST-maintained dataset has been downloaded; and 3) items of calibration tests performed by the NIST Laboratories. Internal controls include verification and review by NIST Technology Services and the NIST Director's Office and Budget Division.	Data provide information on output levels only. NIST measure 2b reflects the number of users accessing these datasets; it does not reflect unique users or capture how the data was used.	None.
Measure 3a: Cumulative number of publications* NIST Measure 3b: Cumulative number of patents filed NIST Measure 3c: Cumulative number of technologies under commercialization *These measures are applicable only through FY 2006.	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.	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.	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.	None.

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
NIST Measure 4a: Number of clients served by MEP Centers receiving Federal funding NIST Measure 4b: Increased sales attributed to MEP Centers receiving Federal funding NIST Measure 4c: Capital investment attributed to MEP Centers receiving Federal funding NIST Measure 4d: Cost savings attributed to MEP Centers receiving Federal funding	The client impact survey is administered by a private firm, Synovate 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 2004 was surveyed in January/February 2005. This process is used 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 Synovate.	Internal controls include verification significant review of the Synovate data by MEP staff. Criteria are in place for identifying outliers in the data. Centers verify the outlier and if necessary, the data are revised based on the Center review.	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. Synovate uses standard survey techniques to clean the data, ensure accuracy and reliability, and improve the response rate. Reported data reflect the impact of MEP services primarily on small manufacturing establishments; on some occasions, Centers may elect to serve establishments with over 500 employees.	None.
NTIS Measure 1a: Number of New Items Available (Annual)	NTIS operates and maintains internal systems for collecting acquisition statistics.	Data is available daily. Reports are produced monthly.	All data is stored within NTIS systems.	NTIS' accounting and budget offices analyze and report performance data to management. Data verification is provided through regular internal independent auditor reporting.	Output Only	None

Performance Measure	Data Source	Frequency	Data Storage	Internal Control Procedures	Data Limitations	Actions to be Taken
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.	Internal management activity reports are produced daily, summaries are produced monthly.	All data is stored within NTIS systems.	NTIS' accounting and budget offices analyze and report performance data to management. Data verification is provided through regular internal independent auditor reporting.	Output Only	None
NTIS Measure 1c: Customer Satisfaction	NTIS operates and maintains internal systems for processing collected information. 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 information is stored within NTIS systems.	NTIS accounting and budget offices analyze and report performance data to management. Data verification is provided through regular internal and independent auditor reporting.	None	None