

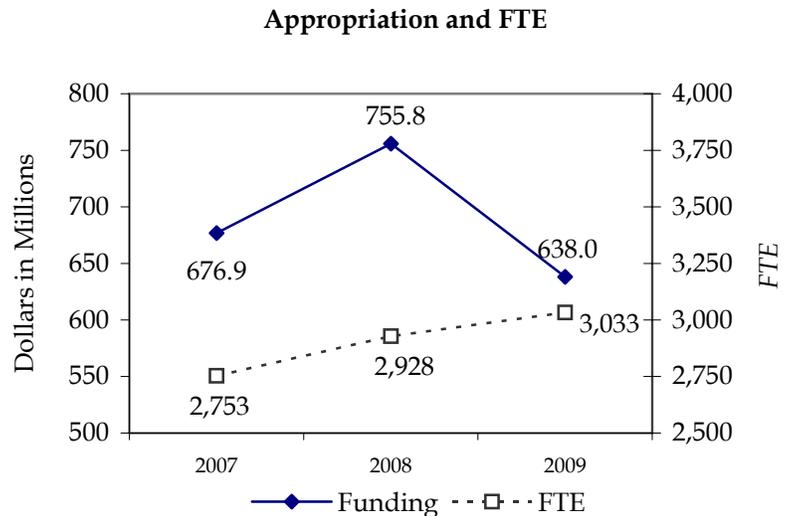
National Institute of Standards and Technology

The mission of the National Institute of Standards and Technology (NIST) 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 needed by U.S. industry to compete in the twenty-first century. NIST technology, measurements, and standards help U.S. industry invent and manufacture superior products reliably, provide critical services, ensure a fair marketplace for consumers and businesses, and promote acceptance of U.S. products in foreign markets. As manufacturing, service sector, and national priorities change, NIST responds to the Nation's most critical and emerging needs. In addition to its core measurement, testing, and standards functions, NIST also conducts 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 is a relatively small component of the Nation's scientific R&D enterprise. To maximize its effectiveness, NIST selects major research initiatives that are highly leveraged to provide the greatest possible return to the American taxpayer on the investment of NIST resources. NIST's FY 2009 Scientific and Technical Research and Services (STRS) and Construction of Research Facilities (CRF) appropriations budget request of \$634 million is an integral component of the President's 10-year American Competitiveness Initiative (ACI). The FY 2009 President's Budget for NIST emphasizes strategic areas in which NIST has unique expertise that are critically important to the Nation's future economic and physical security, and are among the Administration's top research and development (R&D) priorities.

American Competitiveness Initiative

As part of the President's 10-year American Competitiveness Initiative (ACI) to significantly increase Federal funding for basic research in the physical sciences, NIST will target its \$634 million request to key investments that promote U.S. innovation and industrial competitiveness. The initiatives described in the *Highlights of Program Changes* under STRS and CRS outline the Administration's FY 2009 investment priorities for NIST.



Summary of Appropriations

Funding Levels

Appropriation	<u>2007 Actual</u>	<u>2008 Estimate</u>	<u>2009 Estimate</u>	<u>Increase (Decrease)</u>
Scientific and Technical Research and Services	\$434,371	\$440,517	\$535,000	\$94,483
Industrial Technology Services	183,819	154,840	4,000	(150,840)
Construction of Research Facilities	58,686	160,490	99,000	(61,490)
Total Appropriation	676,876	755,847	638,000	(117,847)
Transfers of funds from Election Assistance Commission, STRS	4,950	3,250	4,000	750
Transfers of funds from Community Oriented Policing Services Office, DoJ to Office of Law Enforcement Standards, STRS	0	1,880	0	(1,880)
Unobligated balance, rescission, ITS	(7,000)	(18,800)	0	18,800
Working Capital Fund, STRS	[1,300]	[1,250]	[12,300]	[11,550]
Budget Authority				
Scientific and Technical Research and Services	439,321	445,647	539,000	93,353
Industrial Technology Services	176,819	136,040	4,000	(132,040)
Construction of Research Facilities	58,686	160,490	99,000	(61,490)
TOTAL, BUDGET AUTHORITY	674,826	742,177	642,000	(100,177)
FTE				
Scientific and Technical Research and Services	1,830	1,995	2,147	152
Industrial Technology Services	192	133	47	(86)
Construction of Research Facilities	50	54	60	6
Working Capital Fund	681	746	779	33
Total	2,753	2,928	3,033	105

Highlights of Budget Changes

Appropriation: Scientific and Technical Research and Services

Summary of Requirements

	<u>Detailed</u>		<u>Summary</u>	
	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>
2008 Appropriation			1,995	\$440,517
Adjustments to Base				
<u>Adjustments</u>				
Restoration of FY 2008 Deobligation Offset		\$1,000		
Restoration of base reductions from prior years		14,136		
Less FY 2008 unrequested projects		(893)		
Subtotal, Adjustments			0	14,243
<u>Other Changes</u>				
2008 Pay raise		1,661		
2009 Pay raise		4,633		
Payment to the Working Capital Fund		77		
Full year cost in 2009 of positions financed for part year in 2008	2			
Change in compensable days		(805)		
Civil Service Retirement System (CSRS)		(222)		
Federal Employees' Retirement System (FERS)		355		
Thrift Savings Plan		147		
Federal Insurance Contributions Act (FICA) - OASDI		212		
Health insurance		226		
Employees' Compensation Fund		(10)		
Travel:				
Mileage		1		
Postage		9		
Printing and reproduction		13		
Other services:				
Working Capital Fund		126		
Commerce Business System		132		
NARA		10		
Electricity rate decrease		(179)		
Natural gas rate increase		1,193		
Supplies and materials: Scientific journal subscriptions		65		
General pricing level adjustment:				
Transportation of things		29		
Rent payments to others		29		
Communications, utilities, and miscellaneous charges		58		
Other services		1,269		
Supplies and materials		420		
Equipment		701		
Subtotal, other cost changes			2	10,150
TOTAL, ADJUSTMENTS TO BASE			2	24,393
2009 Base			1,997	464,910
Program Changes			150	71,090
TOTAL REQUIREMENTS			2,147	536,000
Recoveries from Prior Year Obligations			0	(1,000)
2009 APPROPRIATION			2,147	535,000

Comparison by Activity

DIRECT OBLIGATIONS	2008 Currently Avail.		2009 Base		2009 Estimate		Increase / Decrease	
	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>
NIST Laboratories								
Laboratories and technical programs								
Electronics & electrical engineering	233	\$57,091	233	\$52,542	251	\$58,382	18	\$5,840
Manufacturing engineering	109	23,188	109	24,305	111	25,305	2	1,000
Chemical science & technology	246	49,086	246	51,606	288	67,406	42	15,800
Physics	218	55,004	218	57,261	259	70,411	41	13,150
Materials science & engineering	168	36,769	168	38,653	168	38,653	0	0
Building & fire research	118	23,952	118	25,177	124	32,427	6	7,250
Computer science & applied math.	350	69,312	350	69,767	365	80,767	15	11,000
Standards & technology services	93	18,466	93	19,444	93	19,444	0	0
Innovations in measurement science	84	19,344	86	20,515	95	23,015	9	2,500
Postdoctoral fellowship program	100	11,143	100	11,660	100	11,660	0	0
Computer support	5	6,803	5	7,000	5	7,000	0	0
Business systems	25	10,579	25	10,867	25	10,867	0	0
Research support external projects	0	893	0	0	0	0	0	0
Subtotal, Labs & technical programs	1,749	381,630	1,751	388,797	1,884	445,337	133	56,540
National research facilities								
NIST center for neutron research	151	38,370	151	39,719	155	41,719	4	2,000
Center for nanoscale science and technology	45	26,320	45	27,101	58	32,101	13	5,000
Subtotal, National research facilities	196	64,690	196	66,820	213	73,820	17	7,000
Subtotal, NIST laboratories	1,945	446,320	1,947	455,617	2,097	519,157	150	63,540
Baldrige National Quality Program	50	8,175	50	8,543	50	8,543	0	0
TOTAL DIRECT OBLIGATIONS	1,995	454,495	1,997	464,160	2,147	527,700	150	63,540
FINANCING								
Unobligated balance, start of year		(9,098)					0	0
Recovery of prior year obligations		(1,000)		(1,000)		(1,000)	0	0
Subtotal, financing	0	(10,098)	0	(1,000)	0	(1,000)	0	0
TOTAL BUDGET AUTHORITY	1,995	444,397	1,997	463,160	2,147	526,700	150	63,540
Transfers from EAC		(3,250)		0		(4,000)		(4,000)
Transfers from OLES, DoJ		(1,880)		0		0		0
Transfers to Working Capital Fund		1,250		750		12,300	0	11,550
TOTAL APPROPRIATION	1,995	440,517	1,997	463,910	2,147	535,000	150	71,090

Highlights of Program Changes

	Base		Increase / Decrease	
	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>
<u>NIST Laboratories</u>	1,751	\$388,791	+133	+\$62,090
<u>National Research Facilities</u>	196	\$66,597	+17	+\$9,000

As a component of the President's 10-year American Competitiveness Initiative (ACI), an increase (+150 FTE, +\$71,090) is requested under the STRS appropriation. Of the \$71,090 increase requested, a transfer of \$11,550 will be made to the NIST Working Capital Fund.

Technological innovation drives the Nation's economic growth and sustains our competitiveness in world markets. "Innovation will be the single most important factor in determining America's success through the 21st century," according to the Report of the National Innovation Initiative, Council on Competitiveness, December 2004. A 2005 National Academy of Sciences report, *Rising Above The Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, states, "Economic studies conducted even before the information-technology revolution have shown that as much as 85 percent of measured growth in U.S. income per capita is due to technological change." New technologies require a sophisticated set of supporting tools to succeed. These tools include knowledgeable people with easy access to key information, measurement science, and production technologies. NIST plays a fundamental role in ensuring access to this innovation toolset.

The FY 2009 President's Budget request for NIST provides the Nation with essential tools to enable continued innovation and economic vitality. It strongly supports the Department of Commerce goal to promote U.S. innovation and industrial competitiveness.

Detailed presentations of the performance output and outcome measures for each of these components of this initiative are in the NIST Congressional budget justification. Components of this initiative include the following:

NIST Center for Neutron Research (NCNR) Expansion and Reliability Improvements	+4	+\$2,000
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This request is the third fiscal year of funding increases required in the five-year project for the NCNR expansion. The NCNR is the Nation's leading neutron research facility and serves more scientists and engineers than all other U.S. facilities combined. NIST has begun construction of the expanded instrument hall (called the Guide Hall) and the required support and utility buildings for the new cold source, instruments, and experimental activities. A prototype liquid hydrogen cold source, twice as bright as the current cold source, has been constructed and successfully tested at NIST. In consultation with the national research community, NIST has developed concept proposals for the five neutron scattering instruments and associated guide tubes. The requested FY 2009 funding will support the next phase of the NCNR expansion. This phase initiates installation, testing, and commissioning of the new neutron instruments that promise to bring new neutron measurement capability to U.S. researchers, either by exceeding current capabilities by up to a factor of 100, or by providing capabilities that are not presently available in the United States.

Environment, Health and Safety Measurements & Standards for Nanotechnology (includes a \$4,000 transfer to the Working Capital Fund)	+23	+\$12,000
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Hundreds of nanotechnology products are already in the marketplace and the potential for growth is tremendous. The National Science Foundation predicts \$1 trillion dollars in revenue to the world's economy from nanotechnology by 2015. Industry is increasingly finding that the unknown environmental, health, and safety (EHS) risks of nanotechnology is a threat to innovation and competitiveness. Therefore, it is critical that potentially dangerous nanomaterials be detected before they can harm the public. Otherwise, industrial innovation, and ultimately the American public, will suffer from an uncertain regulatory, liability, and investment environment. The next breakthrough technology or new cancer cure should

not be halted by unsubstantiated fears of adverse health effects from nanotechnology. There is no measurement infrastructure currently in place to assess the EHS impacts, if any, that these materials pose. The National Nano-technology Initiative working group on EHS has designated NIST to lead in developing metrologies to determine any EHS effects of these materials.

With this increase, NIST will launch a coordinated effort for leveraging nanotechnology expertise and resources across its laboratories and facilities to develop analytical methods for quantifying the type and amount of nanomaterials in biological materials, the environment, and the workplace. Accurate and validated protocols and reference materials will be developed to define the uses and limitations of major analytical methods. Metrologies to enable understanding of EHS properties of nanomaterials will be developed, including techniques for standardizing assessment of nanoparticle size and size distribution, shape, structure, and surface area, and characterizing nanoparticle chemical composition, purity, and heterogeneity. It is only through such standardization and characterization that the understanding and prediction of nanoparticle and nanomaterial EHS impact will be realized.

Measurements and Standards to Accelerate Innovation in the Biosciences (includes a \$2,200 transfer to the Working Capital Fund)	+19	+\$10,000
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While tremendous Federal and industry investment in the biosciences has dramatically increased our understanding of the complexity of living systems (e.g., the Human Genome Project), concurrent investments in bioscience physical measurement capabilities have not kept pace. No measurement infrastructure exists to assure that the data collected are accurate, comparable, easily used, or correctly interpreted by the biosciences community. The lack of such an infrastructure is stifling the Nation's ability to capitalize on its investment in the life sciences. The recent National Academies report, *Cancer Biomarkers: The Promises and Challenges of Improving Detection and Treatment*, names NIST and highlights the need for the creation of standards for biomarker discovery, validation, and usage. Provision of new measurement tools requires a combination of complex physical and information science expertise that lies outside the traditional life sciences community, but is resident at NIST. Enhanced bioscience physical measurement capabilities would dramatically reduce both the time and cost associated with drug development. This is done by increasing efficiency in the drug development process through the early identification of potential problems with candidate drugs before they enter the more costly pre-clinical and clinical trial stages of development.

With this increase, NIST will apply physical and chemical science expertise in microfluidics, microarrays, cellular imaging, and single molecule measurements to develop quantitative measurement technologies and standards necessary for a traceable measurement infrastructure. This measurement infrastructure can address the current barriers to the measurement and modeling of biological systems. NIST will continue to collaborate closely with the National Institutes of Health and industry to ensure that the NIST biosciences measurement program addresses the highest priority measurement barriers of the life science community, as well as providing the next generation measurement technology for the biosciences.

Quantum Information Science/Enabling Innovation through Quantum Science (includes a \$1,100 transfer to the Working Capital Fund)	+16	+\$7,000
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Quantum-based experiments led to many of the technological advances that defined the last century. Advances in quantum mechanics have enabled everyday devices such as computers, cell phones, and even laser scanners found at the checkout counter of every grocery store. Yet the quantum realm holds more surprises, and more possibilities. The exploitation of quantum behavior for innovative leaps in technology requires overcoming barriers to creating the devices that will constitute future quantum technologies. NIST will enhance its Nobel-prize winning work by pushing the limits of scientific understanding in the quantum realm, and building advanced tools and techniques to measure and manipulate nature's smallest particles.

Enabling Nanotechnology from Discovery to Manufacture (includes a \$2,000 transfer to the Working Capital Fund)	+13	+\$7,000
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Emergent breakthroughs in nanotechnology promise to spur economic growth and development in the early 21st century by increasing the value of existing products, enabling new products, and fostering the growth of high-tech jobs in the U.S. economy. By 2015, sales of nanotechnology-related products are predicted to exceed \$1 trillion, with far-reaching effects in many industries.¹ These predictions will only be realized if our Nation can cost-effectively incorporate innovative nanotechnologies into the advanced manufacturing of products and devices. Moving from fundamental discoveries to valuable and marketable devices and products depends upon a measurement infrastructure that allows industry sectors to accurately and reliably differentiate among innovative solutions at the nanoscale.

NIST will continue to build the Nation's nanoscale measurement infrastructure that will nurture and ensure U.S. leadership in the production and use of nanotechnology. Specifically, NIST will construct additional tools for the characterization of nanostructures through advances in materials science, modeling, simulation, and three dimensional imaging. Furthermore, NIST will partner with industry to provide the necessary measurements and standards to enable the development of ultimate CMOSs (complementary metal oxide semiconductors) and thereby continue the rapid increase in the delivered value of semiconductor devices, allowing U.S. semiconductor manufacturers to keep pace in the competitive nanotechnology era.

Measurements and Standards for the Climate Change Science Program (includes a \$1,000 transfer to the Working Capital Fund)	+15	+\$5,000
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For more than a decade, the United States has invested heavily in scientific activities related to climate change. In February 2002, the U.S. Climate Change Science Program (CCSP) was launched as a collaborative interagency program. The program was designed to improve the government-wide management of climate science and climate-related technology development. Among the top priorities in the 10-year strategic plan produced by the CCSP were better methods for understanding the impact of aerosols on global warming and calibrating satellites used for understanding the current state of Earth's atmosphere. NIST will develop the necessary measurement science and standards to improve the accuracy of climate change predictions, providing policymakers with accurate information about the advantages and consequences of various policy options.

Innovations in Measurement Science (includes a \$500 transfer to the Working Capital Fund)	+9	+\$3,000
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The NIST Innovations in Measurement Science Program is one of NIST's primary mechanisms for keeping pace with the measurement requirements needed for innovation in U.S. industry. This program is used to advance NIST's capabilities in the core measurement science areas underpinning technology innovation. Just as industry must innovate to survive in a competitive environment, NIST must develop innovative approaches to measurement challenges. NIST uses this program to anticipate industry needs and develop the measurement science needed by the next generation of technology. The increased funding would mean more and faster measurement innovation to meet emerging industry needs.

National Earthquake Hazard Reduction Program Initiative	+2	+\$3,250
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There are close to \$8.6 trillion of structures and 75 million people located in urban areas of moderate to high earthquake risk. National Research Council studies estimate that a single large earthquake in the U.S., like the one that struck Kobe, Japan, in 1995, could cause damage of \$100 to \$200 billion. This initiative will fund research for advanced mitigation technologies and create guidelines for the rehabilitation of existing structures.

¹ M.C. Roco and W.S. Bainbridge, eds., 2001, *Societal Implications of Nanoscience and Nanotechnology*, Springer, pp. 3-4.

Disaster Resilient Structures and Communities +4 +\$4,000

Despite significant progress in disaster-related science and technology, natural and technological disasters in the United States are responsible for an estimated \$52 billion in average annual costs in terms of lives lost, disruption of commerce and financial networks, properties destroyed, and the cost of mobilizing emergency response personnel and equipment. Natural hazards including extreme winds (hurricanes, tornadoes, windstorms) and storm surge, wildland fires, earthquakes, and tsunamis are a continuing and significant threat to U.S. communities. Human activities that are accidental, criminal, or terrorist can lead to disastrous community losses as well. A single event such as a major earthquake or hurricane could potentially cause \$80 billion to \$200 billion in economic losses in the affected areas. For FY 2009, the scope of the \$4.0 million initiative includes work on the disaster resilience of structures and communities during extreme winds and storm surge, fires at the wildland-urban interface, and strong-motion earthquakes.

Cyber Security +12 +\$5,000

Our Nation’s industry, citizens and government rely upon the secure, robust and efficient operation of countless interconnected computer systems. Ensuring this security requires constant re-examination of existing protocols and technical structures in response to emerging threats. This initiative focuses on developing infrastructure critical to enabling timely and effective response to emerging threats.

NIST-generated infrastructure will include a high-level framework for the generation, distribution, use, storage and destruction of the cryptographic keys used to secure communications over the network, a critical element of an overall strategy toward more effective Identity Management. A key focus of the effort will be meeting the critical challenges of affordability, flexibility, usability, and global scalability with security. The effort will be conducted in technical consultation with the National Security Agency (NSA) and other Department of Defense (DoD) elements, as well as other government agencies and non-government organizations.

Going at Light Speed: Optical Communications and Computing +18 +\$5,840

The success of U.S. communications is a fundamental driver of productivity gains and economic growth, and a key platform for innovations in many current and future industries (e.g., telemedicine, entertainment, and security). For this reason the President, in “A New Generation of American Innovation,” has called for all Americans to have “universal, affordable access to broadband technology.” As broadband use increases, it will eventually require transmission rates that are 100 times faster than are available today. The U.S. communications network was not designed for this large amount of data traffic. The information transmission that is our Nation’s economic lifeblood is being choked both within our computers and along the transmission lines that connect them.

To take full advantage of the existing infrastructure and enable the next generation data transmission needs, industry must: 1) develop faster fiber-optic transmission lines and flexible transmission systems that diagnose and reconfigure the paths that signals follow in response to changing conditions; and 2) enable light-speed (photonic rather than electronic) operation in the computers to which these transmission systems connect. Industry currently lacks the optical measurement capabilities essential to achieve these goals.

NIST is positioned to lead in developing the precise measurement capabilities and standards that will be necessary to allow systems from multiple vendors to interoperate as well as overcome critical communications bottlenecks. NIST is already the world leader in high-speed measurements and optoelectronic measurements and will work with industry to expand its efforts to include research and development of: 1) new measurement, data analysis, and modeling tools that utilize signal measurements to remotely diagnose the locations of transmission problems on flexible networks, and 2) new nanoscale measurement techniques for analyzing light-based circuitry. This initiative will address industry’s and the Nation’s need for higher speed, flexible networks by developing measurements that permit light speed communications from the scale of a computer to the scale of the Nation’s optical network.

Enabling Hydrogen Economy (includes a \$750 transfer to the Working Capital Fund)	+10	+\$4,000
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The development of a robust hydrogen economy will help the United States use energy more efficiently and cleanly and reduce the Nation's dependence on foreign sources of energy. NIST research will enable more powerful, efficient, and durable fuel-cell designs and high-volume manufacturing through the development of measurement tools, material characterization, theory, and models that allow real-time diagnostics of hydrogen fuel cell performance; ensure accurate measures of hydrogen at points of sale; and ensure safer storage, distribution, and delivery of hydrogen in the marketplace.

Biometrics: Identifying Friend or Foe?	+3	+\$2,000
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Strategies for finding terrorists can be complicated by their efforts to disguise themselves among innocent civilians. As a counter to this, the implementation of biometric technologies (identifying an individual based on physical characteristics, such as fingerprinting, facial recognition, iris scans, etc.) shows great promise in improving the accuracy, consistency, and efficiency of identification devices. Enhanced biometric systems, with the associated test and evaluation infrastructures, have been identified as a Presidential research and development priority to further reduce vulnerabilities in protecting the homeland. The Department of Homeland Security (DHS), Federal Bureau of Investigations (FBI), and the State Department (US-VISIT) currently partner with NIST to draw on and leverage NIST's long experience and expertise in measurement science and standards in biometric technologies. NIST will develop measurements and standards to support testing and evaluation of enhanced biometric systems including approaches using multiple modes of identification.

Manufacturing Innovation through Supply Chain Integration	+2	+\$1,000
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The manufacturing and construction sectors represent a major fraction of the U.S. gross domestic product and U.S. employment. Global competitiveness in these industries is critical to maintaining the Nation's standard of living. The inefficient exchange of product design and business data in manufacturing and construction costs the U.S. economy in excess of \$25 billion per year. This initiative will advance industry towards a seamless global supply chain – shortening design-to-manufacturing cycle, improving product quality, and lowering costs. NIST will develop standards, measurements, and testing tools that are fundamental to enabling efficient supply chains, maintaining competitiveness, and increasing innovation.

STRS Initiative Name	Electronics & Electrical Engineering	Manufacturing Engineering	Chemical Science & Technology	Physics	Building & Fire Research	Computer Science & Applied Mathematics	Innovations in Measurement Science	National Research Facilities	Working Capital Fund
NIST Center for Neutron Research (NCNR) Expansion and Reliability Improvements								\$2,000	
Environment, Health and Safety Measurements & Standards for Nanotechnology			\$8,000						\$4,000
Measurements and Standards to Accelerate Innovation in the Biosciences			\$7,800						\$2,200
Quantum Information Science/Enabling Innovation through Quantum Science				\$5,900					\$1,100
Enabling Nanotechnology from Discovery to Manufacture								\$5,000	\$2,000
Measurements and Standards for the Climate Change Science Program				\$4,000					\$1,000
Innovations in Measurement Science							\$2,500		\$500
National Earthquake Hazard Reduction Program Initiative					\$3,250				
Disaster Resilient Structures and Communities					\$4,000				
Cyber Security						\$5,000			
Going at Light Speed: Optical Communications and Computing	\$5,840								
Enabling Hydrogen Economy				\$3,250					\$750
Biometrics: Identifying Friend or Foe?						\$2,000			
Manufacturing Innovation through Supply Chain Integration		\$1,000							
STRS TOTAL	\$5,840	\$1,000	\$15,800	\$13,150	\$7,250	\$7,000	\$2,500	\$7,000	\$11,550

Appropriation: Construction of Research Facilities**Summary of Requirements**

	<u>Detailed</u>		<u>Summary</u>	
	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>
2008 Appropriation			54	\$160,490
Adjustments to Base				
<u>Adjustments</u>				
Adjustment for Boulder/Gaithersburg construction		(\$42,562)		
Less FY 2008 unrequested projects		(81,342)		
Subtotal, Adjustments				(123,904)
<u>Other Changes</u>				
2008 Pay raise		33		
2009 Pay raise		111		
Reversal of self-imposed reduction in unfilled FTE taken in FY 2007	6			
Change in compensable days		(20)		
Civil Service Retirement System (CSRS)		(5)		
Federal Employees' Retirement System (FERS)		9		
Thrift Savings Plan		4		
Federal Insurance Contributions Act (FICA) - OASDI		6		
Health insurance		6		
General pricing level adjustment:				
Communications, utilities, and miscellaneous charges		2		
Other services		502		
Supplies and materials		68		
Equipment		9		
Subtotal, other cost changes			6	725
TOTAL, ADJUSTMENTS TO BASE			6	(123,179)
2009 Base			60	37,311
Program Changes			0	61,689
2009 APPROPRIATION			60	99,000

Comparison by Activity

	2008 Currently Avail.		2009 Base		2009 Estimate		Increase / Decrease	
	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>
DIRECT OBLIGATIONS								
Construction & Major Renovations	54	\$177,570	60	\$37,311	60	\$99,000	0	\$61,689
TOTAL DIRECT OBLIGATIONS	54	177,570	60	37,311	60	99,000	0	61,689
REIMBURSABLE OBLIGATIONS		153	0	0	0	0	0	0
TOTAL OBLIGATIONS	54	177,723	60	37,311	60	99,000	0	61,689
FINANCING								
Unobligated balance, start of year (Direct)		(17,080)				0		
Offsetting collections from:								
Non-Federal sources		(153)				0		
Subtotal, financing		(17,233)				0		
TOTAL BUDGET AUTHORITY/ APPROPRIATION	54	160,490			60	99,000		

Highlights of Program Changes

	Base		Increase / Decrease	
	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>
<u>Construction and major renovations</u>	60	\$37,311	0	+\$61,689

As a component of the President's 10-year American Competitiveness Initiative (ACI), an increase (0 FTE, +\$61,689) is requested under the Construction appropriation. Components of this initiative include the following:

Building 1 Extension (B1E) - Providing the Tools of Science to Support Sustained Scientific Advancement and Innovation	0	+\$43,538
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This initiative is the final year of funding for the phased construction of the Building 1 extension (B1E) in Boulder aimed at providing new high-performance laboratory space with stringent control of temperature, vibration, humidity, and air cleanliness. The FY 2008 appropriation provides \$23.6 million of construction and major renovation funding for the B1E project. With the requested funding in FY 2009, NIST will finish construction, increasing the level of the laboratory space in B1E to achieve required performance. The improved space will enable NIST to support scientific discovery and technical development of transformational technology in homeland security, telecommunications, nanotechnology, precision timing, hydrogen energy sources, precision electrical standards, biotechnology, applications of lasers, electromagnetic interference testing, quantum computing and quantum communications, and other national needs.

JILA Expansion: Preparing the Next Generation of Physicists	0	+\$13,000
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NIST proposes to expand the laboratories at JILA, a joint institute of the University of Colorado and NIST of the highest class, in which the two institutions have forged important scientific advances together since the early 1960s. JILA currently houses the laboratories of three Nobel laureates, two MacArthur Genius prize winners, seven members of the National Academy of Sciences, and five members of the Academy of Arts and Sciences. The working relationship between JILA and NIST is mutually beneficial, and many of NIST's top researchers hold faculty appointments with the University.

JILA is an international leader in Atomic, Molecular, and Optical (AMO) science - a field that the National Academy of Sciences says is "key to training our best scientists, engineers and technical professionals." NIST is the lead Federal agency in AMO science, accounting for almost 40 percent of all Federal funds for research in this area. The additional space made available through this two-year expansion will enable NIST to support scientific discovery and develop new tools of science that will advance the frontiers of science in all fields. The JILA expansion will increase the capacity to train the next generation of AMO scientists. Current facility space is inadequate, constrains the number of researchers who can work in this field, and will present safety-related difficulties if not expanded. The Federal government's return on investment in expanding JILA will be increased since the cost will be shared between NIST (\$22.5 million over two years) and the University of Colorado. The University of Colorado will contribute \$5 million in direct funding in addition to valuable in-kind contributions, including the land, utilities infrastructure such as electricity, chilled water and steam, and other services.

A detailed presentation of the performance output and outcome measures for this initiative is found in the NIST Congressional budget justification.

Safety, Capacity, Maintenance, and Major Repairs (SCMMR)	0	+\$5,151
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This initiative provides additional base funding in support of NIST's Safety, Capacity, Maintenance, and Major Repairs (SCMMR) program to facilitate the reduction of the deferred maintenance backlog. A 2004 report from consultants Hanscomb, Faithful and Gould (HF&G) reported that, based upon a business case analysis, the annual SCMMR allowance should be at least three percent of the building replacement value of NIST facilities. This increase will over time help decrease the deferred maintenance backlog of safety, capacity, maintenance, and major repairs.

Appropriation: Industrial Technology Services**Summary of Requirements**

	<u>Detailed</u>		<u>Summary</u>	
	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>
2008 Appropriation			133	\$154,840
FY 2008 unobligated balance rescission				(18,800)
Adjustments to Base				
Adjustments				
Restoration of FY 2008 Deobligation Offset		\$6,200		
Restoration of FY 2008 unobligated balance rescission		18,800		
Subtotal, adjustments			0	25,000
Other Changes				
2008 Pay raise		47		
2009 Pay raise		317		
Payment to the Working Capital Fund		12		
Change in compensable days		(55)		
Civil Service Retirement System (CSRS)		(15)		
Federal Employees' Retirement System (FERS)		24		
Thrift Savings Plan		10		
Federal Insurance Contributions Act (FICA) - OASDI		14		
Health insurance		15		
Employees' Compensation Fund		(22)		
Other services:				
Working Capital Fund		19		
Electricity rate decrease		(7)		
Natural Gas rate increase		66		
General pricing level adjustment:				
Transportation of things		1		
Rent payments to others		1		
Postage		1		
Communications, utilities, and miscellaneous charges		6		
Printing and reproduction		2		
Other services		213		
Supplies and materials		12		
Equipment		22		
Subtotal, other cost changes			0	683
Less Amount absorbed			0	(683)
TOTAL, ADJUSTMENTS TO BASE			0	25,000
2009 Base			133	161,040
Program Changes			(86)	(150,840)
TOTAL REQUIREMENTS			47	10,200
Recoveries from Prior Year Obligations				(6,200)
2009 APPROPRIATION			47	4,000

Comparison by Activity

DIRECT OBLIGATIONS	2008 Currently Avail.		2009 Base		2009 Estimate		Increase / Decrease	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Advanced Technology Program/ Technology Innovation Program	66	\$70,231	66	\$71,400	28	\$6,200	(38)	(\$65,200)
Hollings Manufacturing Extension Partnership Program	67	91,043	67	89,640	19	4,000	(48)	(85,640)
TOTAL DIRECT OBLIGATIONS	133	161,274	133	161,040	47	10,200	(86)	(150,840)
FINANCING								
Unobligated balance, start of year		(19,734)						
Recovery of prior obligations		(5,500)		(6,200)		(6,200)		
Subtotal, financing		(25,234)		(6,200)		(6,200)		
TOTAL BUDGET AUTHORITY	133	136,040	133	154,840	47	4,000		
Unobligated balance, rescission		18,800						
TOTAL APPROPRIATION	133	154,840	133	154,840	47	4,000		

Advanced Technology Program (ATP)/Technology Innovation Program (TIP). The FY 2009 budget includes no new funding for ATP/TIP. The FY 2009 amount shown above reflects carryover of unobligated balances from prior year appropriations.

Hollings Manufacturing Extension Partnership (MEP). The FY 2009 budget discontinues MEP and requests \$4 million for the orderly discontinuation of the program.

Appropriation: Working Capital Fund**Comparison by Activity**

DIRECT OBLIGATIONS	2008 Currently Avail.		2009 Base		2009 Estimate		Increase / Decrease	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Obligations		\$1,250		\$750		\$12,300	0	\$11,550
Reimbursable Obligations	746	175,709	740	148,495	779	148,495	39	0
WCF Investments		(46)		0			0	0
TOTAL OBLIGATIONS	746	176,913	740	149,245	779	160,795	39	11,550
FINANCING								
Unobligated balance, start of year		(140,778)		(140,778)		(140,778)		0
Unobligated balance, end of year		140,778		140,778		140,778		0
Offsetting collections from:								
Federal funds		(127,404)		(100,779)		(100,779)		0
Non-Federal sources		(48,259)		(47,716)		(47,716)		0
Subtotal, financing	0	(175,663)	0	(148,495)	0	(148,495)	0	0
TOTAL BUDGET AUTHORITY	746	1,250	740	750	779	12,300	39	11,550
TRANSFERS								
From other accounts		(1,250)		(750)		(12,300)		(11,550)
TOTAL, APPROPRIATION	746	0	740	0	779	0	39	0

Performance Outcomes and Measures

(Dollars reflect obligations in Millions)

The activities under the NIST accounts support the Department's strategic goal to "Promote U.S. innovation and industrial competitiveness." In FY 2009, NIST will focus on one performance outcome involving the activities of the NIST laboratory program. The following table shows the measures that NIST uses to gauge its performance.

	2007 Actual/ Target ¹	2008 Estimate / Target	2009 Estimate / Target
Outcome 1: Promote innovation, facilitate trade, and ensure public safety and security by strengthening the Nation's measurement and standards infrastructure.	\$662.4	\$808.6	\$787.5
Qualitative assessment and review of technical quality and merit using peer review	Completed	To complete	To complete
Citation impact of NIST-authored publications	> 1.1	>1.1	>1.1
Peer-reviewed technical publications	1,272	1,100	1,150
Standard reference materials sold	32,614	31,000	31,000
NIST maintained datasets downloaded	130,000,000	140,000,000	140,000,000
Number of calibration tests performed	27,489	12,000	12,000
Outcome 2: Raise the productivity and competitiveness of small manufacturers - Hollings Manufacturing Extension Partnership (MEP) ²	\$107.3	\$91.6	\$4.0
Number of clients served by MEP centers receiving Federal funding	21,237	14,500	N/A
Increased sales attributed to MEP centers receiving Federal funding	\$762	\$630	N/A
Capital investment attributed to MEP centers receiving Federal funding	\$955	\$485	N/A
Cost savings attributed to MEP centers receiving Federal funding	\$521	\$330	N/A
Discontinued Outcome: Accelerate private investment in and development of high-risk, broad-impact technologies - Advanced Technology Program ³	\$93.3	\$70.4	\$6.2
Total	\$863.0	\$970.6	\$797.7

1. For Outcome 2, due to the nature of the measures, the FY 2007 actuals will not be available until the FY 2010 budget submission. Therefore, the FY 2007 targets are presented here rather than the actuals.
2. The FY 2009 budget submission proposes the elimination of the Hollings MEP program. Therefore, there are no FY 2009 performance targets.
3. The performance outcome for ATP was discontinued due to the phase-out of ATP program that began in FY 2007. No new funds for the Technology Innovation Program (successor to the Advanced Technology Program) are requested for FY 2009.