



## **CRS Report for Congress**

# **The National Institute of Standards and Technology: An Appropriations Overview**

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### **Summary**

The National Institute of Standards and Technology (NIST) has a mandate to increase the competitiveness of U.S. firms and provide the measurement, calibration, and quality assurance techniques that underpin U.S. commerce. Congressional debate has focused on the merits of NIST's external R&D programs directed toward increased private sector commercialization, including the Advanced Technology Program (ATP) and the Manufacturing Extension Partnership (MEP). The level of funding for internal research efforts has also been scrutinized by Congress. FY2007 appropriations legislation provides NIST with \$676.9 million. P.L. 110-161, the FY2008 Consolidated Appropriations Act, funds NIST at \$755.8 million. The law also finances a new initiative, the Technology Innovation Program, to replace ATP. The President's FY2009 budget proposal requests \$638 million for NIST.

### **Mission and Background**

The National Institute of Standards and Technology, formerly the National Bureau of Standards (NBS), was established by the NBS Organic Act of 1901 (P.L. 56-177). NIST is part of the Technology Administration of the Department of Commerce. Unlike most national laboratories, NIST has a mission specified by statute (15 U.S.C. 271-282a), has its own authorization and appropriation, and is headed by a Senate-confirmed presidential appointee. Prior to 1988, the mission of NBS was to develop and maintain standards and measurement support for scientific investigations, engineering, manufacturing, commerce and educational institutions, as well as to provide technical and advisory services to other government agencies on scientific and engineering problems.

The Omnibus Trade and Competitiveness Act of 1988 (P.L. 100-418) changed the name of NBS to the National Institute of Standards and Technology and mandated the agency provide technical services to facilitate the competitiveness of U.S. industry. NIST is directed to offer support to the private sector for the development of pre-competitive

generic technologies and the diffusion of government-developed innovation to users in all segments of the American economy. Laboratory research is to provide measurement, calibration, and quality assurance techniques that underpin U.S. commerce, technological progress, improved product reliability, manufacturing processes, and public safety.

## **NIST Appropriations**

Beginning in FY1991, the NIST budget experienced marked growth as Congress funded external grant programs — the Advanced Technology Program (ATP) and the Manufacturing Extension Partnership (MEP) — authorized by P.L. 100-418. However, the 104<sup>th</sup> Congress curtailed the expansion of support for NIST and overall funding levels decreased 18% between FY1995 and FY1997. In FY1998, the NIST budget again increased as P.L. 105-119 appropriated \$677.9 million. Under P.L. 105-277, NIST received \$641.1 million in funding, approximately 5% less than the previous year. For FY2000, P.L. 106-113 provided NIST with \$635.8 million after a mandated rescission. P.L. 106-553 funded NIST at \$598.3 million in FY2001. The following year, P.L. 107-77 financed NIST at \$674.5 million, an increase of 13% over the earlier figure.

The Bush Administration first proposed a significant cut in support for MEP in the FY2003 budget. The proposed 89% decline in funding was due to the President's recommendation that centers in operation for more than six years do so without federal financing. However, P.L. 108-7 provided NIST with \$707.5 million in FY2003 funds (after a mandated rescission) and maintained support for manufacturing extension.

P.L. 108-199, the FY2004 Consolidated Appropriations Act, provided NIST with \$610.7 million after a rescission included in the act. The STRS account was funded at \$337.2 million. Financing for MEP decreased significantly to \$38.7 million while ATP received \$170.5 million. Construction funding totaled \$64.2 million. The following year, P.L. 108-447 provided NIST with FY2005 funding of \$695.3 million (after mandated rescissions). The STRS account received \$378.8 million. MEP was funded at \$107.5 million, an increase that brought support up to pre-FY2004 levels. ATP was financed at \$136.5 million and the construction budget totaled \$72.5 million.

P.L. 109-108, FY2006 appropriations, funded NIST at \$752 million (after mandated rescissions). Support for the STRS account totaled \$394.8 million, including the Baldrige Quality Program. MEP received \$104.6 million, while financing for ATP declined to \$79 million. Construction more than doubled to \$173.6 million. No final FY2007 appropriations legislation was enacted until the 110<sup>th</sup> Congress passed P.L. 110-5, providing \$676.9 million for NIST. Funding for the STRS account increased to \$434.4 million, construction support decreased to \$58.7 million, while ATP was financed at \$79.1 million and MEP received \$104.7 million.

The Administration's FY2008 budget requested \$640.7 million for NIST, 5.3% below FY2007, due primarily to the absence of financing for ATP and reduced support for MEP. The STRS account would have received \$500.5 million (including the Quality Program) while funding for MEP would be reduced to \$46.3 million. The construction budget would have totaled \$93.9 million.

The appropriations bill initially passed by the House, H.R. 3093, provided \$831.2 million for NIST, including \$500.5 million for the STRS account, \$93.1 million for ATP,

and \$108.8 million for MEP. Construction support was \$128.9 million.<sup>1</sup> The version of H.R. 3093 passed by the Senate provided \$863.0 million for NIST, of which \$30.8 million was to be directed toward unrelated programs in other agencies. The STRS account was to receive \$502.1 million (including the Quality Program). ATP was to be financed at \$100 million (minus the above mentioned \$30.8 million) and support for MEP would have totaled \$110 million. Construction funding would have been \$150.9 million.

P.L. 110-161, the FY2008 Consolidated Appropriations Act, provides NIST with \$755.8 million, an increase of 11.7% over FY2007. Support for the STRS account increases 1.4% to \$440.5 million (including the Quality Program). The Technology Innovation Program (TIP), which replaces ATP, is appropriated \$65.2 million (with an additional \$5 million from FY2007 ATP unobligated balances), 17.6% below the previous fiscal year. Funding for MEP totals \$89.6 million, 14.4% less than FY2007. Support for construction almost triples to \$160.5 million.

The President's FY2009 budget request proposes \$638 million in funding for NIST, 15.6% below the current fiscal year due to an absence of support for TIP and a significant decrease in financing MEP. Funding for the STRS account (including the Quality Program) is to increase 21.5% to \$535 million, while MEP would be provided \$4 million to close out the federally financed portion of the program. Construction support would decline 38.3% to \$99 million.

**Table 1. NIST Appropriations, FY2007-FY2009**  
(millions of dollars)

NIST Appropriation		P.L. 110-5 (FY2007)	FY2008 Budget Request	P.L. 110-161 (FY2008)	FY2009 Budget Request
STRS		434.4	500.5	440.5	535
Industrial Technology Services	ATP/TIP**	79.1	0	65.2**	0
	MEP	104.7	46.3	89.6	4
	Subtotal	183.8	46.3	154.8	4
Construction		58.7	93.9	160.5	99
Total		676.9	640.7	755.8	638

**Note:** Figures may not add up because of rounding.

\* Does not include \$30.8 million to be used for non-NIST related programs.

\*\* ATP is now the Technology Innovation Program

**Scientific and Technical Research and Services (STRS).** The NIST in-house R&D effort, involving approximately 3,300 scientists, engineers, technicians, and support personnel (plus some 1,200 visiting scientists per year from industry, academia, and other government agencies), is conducted at laboratories in Maryland and Colorado. A major emphasis is cooperative research with industry to overcome technical barriers to

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<sup>1</sup> The sum of these figures may not total \$831.2 million because of rounding.

commercialization of emerging technologies. NIST participates with U.S. companies in collaborative R&D programs in 130 research areas.<sup>2</sup>

NIST is composed of seven internal research laboratories.<sup>3</sup> Research is focused on measurement, evaluated data, standards, and test methods; basic “infrastructural technologies” that enable development of advanced technologies, and which industry can use to characterize new materials, monitor production processes, and ensure the quality of new product lines. As part of the President’s American Competitiveness Initiative announced in the 2006 State of the Union Address, the Administration has called for a doubling of funding for in-house research performed by NIST.

**Industrial Technology Services (ITS).** In response to what was perceived as the necessity of maintaining a strong manufacturing base, Title V of the Omnibus Trade and Competitiveness Act (P.L. 100-418) “significantly expands the role of NIST as the Government’s lead laboratory in support of U.S. industrial quality and competitiveness.” To this end, NIST was given specific technology transfer functions, and several programs were created including the Advanced Technology Program, Regional Centers for the Transfer of Manufacturing Technology, and State Technology Extension. These efforts were designed to facilitate industrial activities to utilize advanced process technology; to promote cooperative ventures among industry, universities, and government laboratories; and to encourage shared risks, accelerated development, and increased skills.

The Advanced Technology Program provided seed funding, matched by private sector investment (generally of at least 50% of costs), to companies or consortia of universities, businesses, and government laboratories for development of generic technologies that have broad application across industries.<sup>4</sup> Awards, based on technical and business merit, were made for high-risk work past the basic research stage but not yet ready for commercialization. The first awards were made in 1991; to date, 824 projects have been funded. NIST restructured part of ATP to manage groups of projects in “well-defined” programmatic areas designed for long-range support which were selected in conjunction with industry. A general competition also continued. In FY1999, the focused programs were dropped in favor of one competition for all technologies.

The America COMPETES Act, P.L. 110-69, authorized a new Technology Innovation Program (TIP) to replace ATP; P.L. 110-161 appropriated funding for this initiative. While similar to ATP in the intent to promote high risk R&D that would be of broad economic benefit to the Nation, there are several differences in the operation of TIP which is limited to small and medium-sized firms only.

Initial funding for ATP was \$36 million in FY1991. Financing of ATP increased steadily until FY1995 when funding expanded significantly to \$431 million. However, support began to decline the following year. Since FY2000, the initial House-passed

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<sup>2</sup> Available at the National Institute of Standards and Technology website: [<http://www.nist.gov/>].

<sup>3</sup> These are Electronics and Electrical Engineering, Manufacturing Engineering, Physics, Chemical Science and Technology, Materials Science and Engineering, Building and Fire Research, and Information Technology.

<sup>4</sup> For more information on ATP and TIP see CRS Report 95-36, *The Advanced Technology Program*, by Wendy H. Schacht.

appropriations bills have not included financing for ATP; for the first time, the FY2007 bill reported from the Senate Committee on Appropriations also did not fund ATP.

As required by law, NIST created Regional Centers for the Transfer of Manufacturing Technology.<sup>5</sup> Expanded in 1994 to include the State Technology Extension Program, and now known as the Hollings Manufacturing Extension Partnership, this activity is designed to transfer expertise and technologies developed under NIST programs to small and mid-sized U.S.-based manufacturing firms. Funded through cooperative agreements with non-profit or state and local organizations, competitive awards were originally made for up to six years (now extended). Non-federal sources are required to provide 50% or more of each Center's capital and costs during this time period. P.L. 105-309 permits the federal government to support centers after the six years if a positive, independent evaluation is made every two years. Federal funding is limited to one-third of the capital and annual operating and maintenance costs of the center. Centers offer expertise, needs evaluation, application demonstrations for new production technologies, training, and information dissemination.

Centers are located in all 50 states and Puerto Rico with approximately 400 regional offices. NIST also assumed support of the 36 centers originally funded by the Department of Defense through its Technology Reinvestment Project when funding for this program was terminated in FY1994. The initial appropriation in FY1988 was \$12.5 million. Further funding showed slight increases until FY1994, when the original program was expanded and appropriations grew to \$30.3 million. The \$90.6 million funding for FY1995 included support for a new program, LINKS, to tie together federal, state, and local agencies, the private sector, and the manufacturing outreach institutions through communications and data systems. Support for the program continued to grow until FY1999 when statutory requirements reduced the federal financial commitment as centers reach six years of operation.

A new program of partnerships between industry and educational or research institutions to develop manufacturing processes, techniques, or materials is authorized in P.L. 110-69. In addition, a manufacturing fellowship program would be created with stipends available for post-doctoral work at NIST. These activities differ from the existing MEP effort in which no new manufacturing research is conducted as existing manufacturing technology is applied to the needs of small and medium-sized firms.

## Issues for Congress

Beginning with the 104<sup>th</sup> Congress, many Members expressed skepticism over a "technology policy" based on providing federal funds to industry for development of pre-competitive generic technologies. This philosophical shift from previous Congresses, coupled with pressures to balance the federal budget, led to significant reductions in funding for NIST. The Advanced Technology Program and the Manufacturing Extension Partnership, which accounted for over 50% of the FY1995 NIST budget, were proposed for elimination. While, in the past, strong support by the Senate led to their continued financing, funding for ATP remained controversial. Since FY2000, the original

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<sup>5</sup> For more information on the MEP, see CRS Report 97-104, *Manufacturing Extension Partnership Program: An Overview*, by Wendy H. Schacht.

appropriations bills as passed by the House did not contain funding for ATP and many of the budget proposals submitted by President Bush called for abolishing the program. In the current Congress, legislation replaced ATP with the TIP initiative and provided funding for the new program. The Administration also recommended suspension of federal support for those manufacturing extension centers in operation for more than six years in the FY2003 budget. The following year, P.L. 108-199 significantly cut funding for the MEP program. However, the FY2005 Omnibus Appropriations Act brought support for MEP back up to the level necessary to fully fund the existing centers, although the President's FY2009 budget request once again includes an effort to close out the federally funded portion of the program.

While much of the legislative debate has focused on ATP and MEP, increases in spending for the NIST laboratories that perform the research essential to the mission responsibilities of the agency have tended to remain small: a 3.7% increase between FY1995 and FY1996, a 3.5% increase in FY1997, no increase for FY1998, and 3.1% for FY1999. During FY2000, there was less than a 1% increase in support. However, FY2001 appropriations were 11% above the previous year while the figure for FY2002 included a 2.7% increase in funding. In FY2003, support for in-house R&D was 12% more than the previous fiscal year; although the FY2004 figure decreased by 5.5%, funding for FY2005 included a 12% increase. In FY2006, support for these in-house activities once again increased. As part of the American Competitiveness Initiative, announced by the President in the 2006 State of the Union, the Administration will attempt to double over 10 years funding for "innovation-enabling research" done at NIST through its "core" programs (defined as internal research in the STRS account and the construction budget). To this end, the President's FY2007 budget requested an increase of 18.3% for intramural R&D at NIST. In the 109<sup>th</sup> Congress, the FY2007 appropriations bill passed by the House, as well as the version of the bill reported from the Senate Committee on Appropriations, reflected this increase although no final appropriations bill was enacted. The FY2007 appropriations legislation passed in the current Congress, provides for an additional increase in funding for programs under the STRS account, as did the initial FY2008 appropriations bills passed by the House and Senate and the President's FY2008 budget proposal. The final FY2008 appropriations legislation provided a 1.4% increase over FY2007, below the 15.2% and 15.6% increases in the initial bills. It remains to be seen how support for this effort will evolve and how this might affect financing of extramural efforts such as TIP and MEP. As the 110<sup>th</sup> Congress debates the FY2009 budget, the resulting dispensation of funding for NIST programs may influence the ways by which the federal government supports technology development for commercial application.<sup>6</sup>

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<sup>6</sup> See CRS Report RL33528, *Industrial Competitiveness and Technological Advancement: Debate Over Government Policy*, by Wendy H. Schacht.