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CRS Report for Congress

The National Institute of Standards and Technology: An 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. FY2006 appropriations legislation provided $752 million for NIST, an increase of 8.2% over FY2005 (after mandated rescissions) and financed ATP, although at a reduced rate, despite the President's budget and the original House-passed bill that included no support for the program. While no final FY2007 appropriations legislation was enacted during the 109th Congress, a series of continuing resolutions financed NIST at FY2006 levels through February 15, 2007. In the current Congress, P.L. 110-5 provides NIST with $675 million for FY2007. The President's FY2008 budget request for NIST totals $640.7 million and includes a significant cut in support for MEP and no funding for ATP. This report will be updated as events warrant.

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 Budget

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 104th 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 0.65% across-the-board rescission), an increase of almost 5% above the previous year, and maintained support for manufacturing extension.

P.L. 108-199, the FY2004 Consolidated Appropriations Act, funded NIST at $610.7 million after a 0.59% across-the-board rescission included in the act (but not including the NIST portion of a rescission to Department of Commerce unobligated balances), almost 14% below the FY2003 appropriation. The STRS account was funded at $337.2 million (a 5.5% decrease from FY2003). MEP was financed at $38.7 million (a 63% reduction from the previous fiscal year) and ATP received $170.5 million, 4.6% below FY2003. Construction funding totaled $64.2 million.

The FY2005 Omnibus Appropriations Act (P.L. 108-447) provided NIST with $695.3 million (after a mandated 0.8% across-the-board rescission and a 0.54% rescission from Commerce, Justice, State discretionary accounts), 14% above FY2004 funding. The STRS account received $378.8 million, 12% over the previous fiscal year. MEP was funded at $107.5 million, an increase of 178% that brought support up to pre-FY2004 levels. ATP was financed at $136.5 million (20% below FY2004), and the construction budget totaled $72.5 million. The legislation also rescinded $3.9 million in unobligated balances from prior year funds in the ATP account.

P.L. 109-108, FY2006 appropriations, provided $752 million for NIST, an increase of 8.2% over FY2005 funding (after mandated rescissions). Support for the STRS account totaled $394.8 million, including $7.3 million for the Quality Program. This amount was an increase of 4.2% over the previous fiscal year. MEP received $104.6

million (not including a $7 million rescission from unobligated balances) and ATP was financed at $79 million. Funding for MEP decreased slightly while support for ATP declined 42% from the earlier figure. Construction more than doubled to $173.6 million.

The Administration's FY2007 budget included $581.3 million for NIST, 22.7% below the previous fiscal year. Support for the internal R&D activities under the STRS account would have increased 18.3% to $467 million (including $8 million for the Quality Program). There was no funding for ATP and support for MEP declined 55.7% to $46.3 million. Construction funding would total $68 million, a 60.8% decrease from FY2006.

No final FY2007 appropriations legislation was enacted in the 109th Congress; however, a series of continuing resolutions funded NIST at FY2006 levels through February 15, 2007. The 110th Congress passed P.L. 110-5, which appropriates $675 million for NIST in FY2007. Funding for the STRS account increases 9.6% to $432.8 million, construction support decreases 66% to $58.6 million while other programs remain at FY2006 levels.

The President's FY2008 budget request includes $640.7 million for NIST. Internal research under the STRS account would increase to $500.5 million. There would be no funding for the Advanced Technology Program and the Manufacturing Extension Partnership would be reduced significantly to $46.3 million. Construction expenses would total $93.9 million.

Table 1. NIST Appropriations, FY2006-FY2008
(millions of dollars)

NIST Appropriation		P.L. 109-108* (FY2006)	P.L. 110-5* (FY2007)	FY2008 Budget Request
STRS		394.8	432.8	500.5
Industrial Technology Services	ATP	79	79	0
	MEP	104.6	104.6	46.3
	Subtotal	183.6	183.6	46.3
Construction		173.6	59	93.9
Total		752	675	640.7

Figures may not add up because of rounding.
* Figures include mandated rescissions from discretionary budgets but not unobligated balances.

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 commercialization of emerging technologies. NIST participates with U.S. companies in

collaborative R&D programs in 130 research areas.[1] Since 1988, NIST has participated in over 960 formal Cooperative Research and Development Agreements with industry.

NIST is composed of seven internal research laboratories.[2] Much of the research is focused on measurements, evaluated data, standards, and test methods. NIST sees these activities as supporting basic "infrastructural technologies" which enable the 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 the 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 provides 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.[3] Awards, based on technical and business merit, are 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, 736 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.

Initial funding for the Advanced Technology Program 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 appropriations bills have not included financing for ATP; for the first time, the FY2007 bill reported from the Senate Committee on Appropriations also does not fund ATP.

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[1] Available at the National Institute of Standards and Technology website: [http://www.nist.gov/].

[2] These are Electronics and Electrical Engineering, Manufacturing Engineering, Physics, Chemical Science and Technology, Materials Science and Engineering, Building and Fire Research, and Information Technology.

[3] For more information on the ATP, see CRS Report 95-36, *The Advanced Technology Program*, by Wendy H. Schacht.

As required by law, NIST created Regional Centers for the Transfer of Manufacturing Technology.[4] 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.

Issues for Congress

Beginning with the 104th 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 were key players in the former Clinton Administration's civilian technology development strategy, and which accounted for over 50% of the FY1995 NIST budget, were proposed for elimination. However, strong support by the former Administration and the Senate led to their continued financing. Yet funding for ATP remains controversial. Since FY2000, the original appropriations bills as passed by the House did not contain any financial support for ATP, although the final legislation funded the program. For the first time, the FY2007 bill reported from the Senate Committee on Appropriations during the 109th Congress also provided no funding for ATP. In addition, many of the budget proposals submitted by President Bush called for abolishing the program. In the FY2003 budget, the Administration also recommended suspension of federal support for those manufacturing extension centers in operation for more than six years. The following year, P.L. 108-199, the FY2004 Consolidated Appropriation Act, significantly cut funding for manufacturing extension. However, the FY2005 Omnibus

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[4] For more information on the MEP, see CRS Report 97-104, *Manufacturing Extension Partnership Program: An Overview*, by Wendy H. Schacht.

Appropriations Act brought support for MEP back up to the level necessary to fully fund the existing centers.

Although much of the legislative debate has focused on the Advanced Technology Program and the Manufacturing Extension Partnership, 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 109th 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 appropriation legislation 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 does the President's FY2008 budget proposal. It remains to be seen how support for this effort will evolve and how this might affect financing of extramural efforts such as ATP and MEP. As the 110th Congress debates the budget, the resulting dispensation of funding for NIST programs may influence the ways by which the federal government supports technology development for commercial application.[5]

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[5] See CRS Report 95-50, *The Federal Role in Technology Development*, by Wendy H. Schacht.