The National Institute of Standards and Technology: An Appropriations Overview

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Summary

The National Institute of Standards and Technology (NIST), a laboratory of the Department of Commerce, is mandated to 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.

Continued funding for NIST extramural programs directed toward increased private sector commercialization has been a major issue. Some Members of Congress have expressed skepticism over a "technology policy" based on providing federal funds to industry for development of pre-competitive generic technologies. This approach, coupled with pressures to balance the federal budget, led to significant reductions in funding for NIST. The Advanced Technology Program (ATP) and the Manufacturing Extension Partnership (MEP), which accounted for over 50% of the FY1995 NIST budget, were proposed for elimination. In 2007, ATP was terminated and replaced by the Technology Innovation Program (TIP).

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. As part of the American Competitiveness Initiative, announced by former President Bush in the 2006 State of the Union, the Administration stated its intention 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). While additional funding has been forthcoming, it remains to be seen how support for internal R&D at NIST will evolve and how this might affect financing of extramural efforts such as TIP and MEP. As the 111th Congress debates the budget and the economic stimulus, the resulting dispensation of funding for NIST programs may influence the way by which the federal government supports technology development for commercial application.

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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) as a laboratory of the Department of Commerce. Unlike most federal laboratories, NIST has a mission specified by statute (15 U.S.C. 271-282a), has a separate 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.

A dual approach is used to accomplish this mission. Research and development is performed within the NIST laboratory facilities while two extramural initiatives, the Technology Innovation Program (TIP)and the Manufacturing Extension Partnership (MEP), are administered by the organization. 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]

NIST is composed of seven internal research laboratories (Electronics and Electrical Engineering, Manufacturing Engineering, Physics, Chemical Science and Technology, Materials Science and Engineering, Building and Fire Research, and Information Technology), as well as a Center for Nanoscale Science and Technology and a Center for Neutron Research. 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 American Competitiveness Initiative announced in the 2006 State of the Union Address by former President Bush, the Administration called for a doubling of funding for in-house research performed by NIST.

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

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

programs were created including the now terminated Advanced Technology Program (ATP), 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.

Prior to its elimination in 2007, 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.[2] 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; 824 projects were funded.

The Technology Innovation Program[3] was authorized to replace ATP in the America COMPETES Act (P.L. 110-69) and funded in the FY2008 appropriations legislation. While similar to ATP in the intent to promote high risk R&D that would be of broad economic benefit to the Nation, large firms are not eligible to receive grants. In addition, while universities participating in a joint venture could not be the direct recipient of a grant under the ATP activity, under TIP, universities may qualify for grants if they are partnered with a small or medium-sized firm.

The Regional Centers for the Transfer of Manufacturing Technology were expanded in 1994 to include the State Technology Extension Program and are now known as the Hollings Manufacturing Extension Partnership (MEP).[4] 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. Manufacturers are offered 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.

In a related development, the America COMPETES Act authorized the creation, but did not fund, several new manufacturing programs to be administered by NIST including collaborative manufacturing research pilot grants for partnerships between industry and other educational or research institutions to develop new manufacturing processes, techniques, or materials; a manufacturing fellowship program with stipends available for post-doctoral work at NIST; and a manufacturing research database. These activities differ from the established 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.

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

[3] See CRS Report RS22815, *The Technology Innovation Program*, by Wendy H. Schacht

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

NIST Appropriations

Beginning in FY1991, the NIST budget experienced marked growth as Congress funded external grant programs—the Advanced Technology Program and the Manufacturing Extension Partnership—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 FY1999 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 offered a significant cut in support for MEP in the FY2003 budget. The proposed 89% decline in MEP 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 and maintained support for manufacturing extension.

FY2004 appropriations of $610.7 million for NIST were included in P.L. 108-199. In-house R&D under the Scientific and Technical Research and Services (STRS) account was funded at $337.2 million. Financing for the Manufacturing Extension Partnership program decreased significantly to $38.7 million. ATP received $170.5 million and construction totaled $64.2 million. The following year, P.L. 108-447 provided NIST with funding of $695.3 million with MEP support increased to pre-FY2004 levels at $107.5 million. The STRS account received $378.8 million, ATP was financed at $136.5 million, and the construction budget totaled $72.5 million.

NIST appropriations totaled $752 million in FY2006. Support for the STRS account increased to $394.8 million. MEP was funded at $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 110th Congress passed P.L. 110-5, providing $676.9 million for NIST. 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 request included $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 Baldrige National Quality Program) while funding for MEP would be reduced to $46.3 million. The construction budget would have totaled $93.9 million.

The FY2008 Consolidated Appropriations Act, provided NIST with $755.8 million, an increase of 11.7% over FY2007. Support for the STRS account increased 1.4% to $440.5 million (including the Quality Program). The Technology Innovation Program, which replaced ATP, was appropriated $65.2 million (with an additional $5 million from FY2007 ATP unobligated balances), 17.6% below the previous fiscal year. Funding for MEP totaled $89.6 million, 14.4% less than FY2007. Support for construction almost tripled to $160.5 million.

The Bush Administration's original FY2009 budget request proposed $638 million in funding for NIST. On June 6, 2008, the former President submitted a series of amendments to his budget including a reduction of $2 million in the amount requested for NIST (from the MEP program).

The new request of $636 million was 15.9% below the earlier 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) was to increase 21.5% to $535 million, while MEP would be provided $2 million to close out the federally financed portion of the program. Construction support would decline 38.3% to $99 million.

During the 110th Congress, H.R. 7322, as reported from House Committee on Appropriations, would have funded NIST at $816.9 million, 8.1% above FY2008. The STRS account would have increased 13.7% to $500.7 million while support for TIP at $65.2 million would remain constant and MEP funding would increase 36.2% to $122.0 million. Construction spending was to decrease 19.6% to $129.0 million. S. 3182, as reported by the Senate Committee on Appropriations, would have provided $813.5 million for NIST, an increase of 7.6% over FY2008. Included was $489.5 million for the STRS account (an 11.1% increase), $65.0 million for TIP, and $110.0 million for MEP (a 22.8% increase). The construction budget would have declined 7.2% to $149.0 million.

No final FY2009 appropriations legislation was enacted by the close of the 110th Congress. P.L. 110-329, the Consolidated Security, Disaster Assistance, and Continuing Appropriations Act, 2009, provides, in part, funding for NIST at FY2008 levels through March 6, 2009.

In the 111th Congress, P.L. 111-8, the FY2009 Omnibus Appropriations Act, funds NIST at $819.0 million. The STRS account receives a 7.2% increase to $472.0 million while support for MEP totals $110.0 million (a 22.8% increase) and financing for TIP remains constant at $65.0 million. The $172.0 million for construction reflects a 7.2% increase in funding.

Also in the current Congress, H.R. 1, as originally passed by the House, provided an additional $100.0 million for the STRS account (to the appropriated funds in the Continuing Resolution), as well as $70.0 million more for TIP and $30.0 million more for MEP. The construction budget would have received an extra $300.0 million for a "competitive construction grant program for research science buildings." The initial Senate passed version of H.R. 1 included an additional $168.0 million for the STRS account with the construction budget to expand with an additional $307.0 million. The final version of the American Recovery and Reinvestment Act of 2009, P.L. 110-5, provides an extra $220.0 million for the STRS account to be used for "research, competitive grants, additional research fellowships and advanced research and measurement equipment and supplies," as noted in the Joint Explanatory Statement of the Committee on Conference. An additional $360.0 million is included for construction, of which $180.0 million "shall be for the competitive construction grant program for research science buildings." The law also directs the transfer of $20.0 million from the Health Information Technology initiative to NIST to "create and test standards related to health security and interoperability in conjunction with partners at the Department of Health and Human Services," according to the Joint Statement.

Issues for Congress

Continued funding for the extramural programs at NIST has been a major issue. 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 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 appropriations bills as passed by the House did not contain funding for ATP and many of the budget proposals submitted by former President Bush called for abolishing the program. In the 110th Congress, legislation replaced ATP with the TIP initiative and provided financing for the new program. In the FY2003 budget proposal, the Bush 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 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. The President's FY2009 budget request once again included an effort to close out the federally funded portion of the program but the final FY2009 appropriations legislation increased financing for MEP.

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. Support for in-house R&D in FY2003 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, financing of these in-house activities once again increased. As part of the American Competitiveness Initiative, announced by former President Bush in the 2006 State of the Union, the Administration stated its intention 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; the final FY2007 appropriations legislation included a 10% increase for the STRS account. For FY2008, the increase in support for internal research and development was 1.4%, below the 15.2% and 15.6% increases in the initial House and Senate FY2008 appropriations bills and the President's FY2008 budget proposal. The Administration's FY2009 budget contained a 21.5% increase in funding for the STRS account; both the House and Senate appropriation bills introduced during the 110th Congress also included increases but at amounts less that the budget request. In the current Congress, P.L. 110-5 provides significant additional funding for these activities. Thus, it remains to be seen how support for internal R&D at NIST will evolve and how this might affect financing of extramural efforts such as TIP and MEP. As the 111th Congress continues to debate budget issues, the resulting dispensation of funding for NIST programs may influence the way by which the federal government supports technology development for commercial application.

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