

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY**

Examining Federal Advanced Manufacturing Programs

**Tuesday, September 10, 2013
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building**

Purpose

On Tuesday, September 10, the Subcommittee on Research and Technology will hold a hearing to examine federal advanced manufacturing programs, with a focus on research and development programs at the National Institute of Standards and Technology, and to review H.R. 1421, the “Advancing Innovative Manufacturing Act of 2013” sponsored by Committee Ranking Member Eddie Bernice Johnson.

Witnesses

- **Dr. Alan Taub**, Professor, Material Science and Engineering, University of Michigan
- **Dr. Thomas Baer**, Executive Director, Stanford Photonics Research Center, Stanford University
- **Mr. Mark Muro**, Senior Fellow and Policy Director, Metropolitan Policy Program, Brookings Institution

Background

Manufacturing has been a significant part of American productivity since the industrial revolution. Manufacturing’s share of gross domestic product is approximately 11 percent, and manufacturing output has risen by 13 percent in the last several years. However, organizations such as the Information Technology and Innovation Foundation (ITIF) and the Council on Competitiveness have expressed concern that U.S. manufacturing competitiveness might be declining relative to other industrialized countries.^{1,2} These concerns were shared by the President’s Council of Advisors on Science and Technology (PCAST) in a June 2011 report.³

While these organizations outline a range of priorities, they agree that advanced manufacturing will be a key driver in preserving American economic competitiveness.

The PCAST defines advanced manufacturing as “a family of activities that (a) depend on the use and coordination of information, automation, computation, software, sensing, and networking, and/or (b)

¹ S. Ezell and R. Atkinson, “The Case for a National Manufacturing Strategy,” April, 2011, The Information Technology and Innovation Foundation. <http://www.itif.org/files/2011-national-manufacturing-strategy.pdf>

² Council on Competitiveness Report, Make: An American Manufacturing Movement, December 2011, <http://www.compete.org/publications/detail/2064/make/>

³ “Report to the President on Ensuring American Leadership in Advanced Manufacturing,” June 2011. The President’s Council of Advisors on Science and Technology, <http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-advanced-manufacturing-june2011.pdf>

make use of cutting edge materials and emerging capabilities enabled by the physical and biological sciences.”⁴

This hearing will examine federal advanced manufacturing programs with a particular focus on current and proposed programs at the National Institute of Standards and Technology. The hearing will also review H.R. 1421, the “Advancing Innovative Manufacturing Act of 2013.”

National Institute of Standards and Technology

The National Institute of Standards and Technology (NIST) is a non-regulatory agency within the Department of Commerce. Originally founded in 1901 as the National Bureau of Standards, NIST’s mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. By working closely alongside industry, NIST has become recognized as a provider of high-quality information utilized by the private sector.

NIST supports U.S. manufacturing through a combination of measurement science research programs conducted through NIST Scientific and Technical Research Services and through extramural manufacturing programs, including the Manufacturing Extension Partnership and the Advanced Manufacturing Technology Consortia Program.

Scientific and Technical Research and Services

NIST currently operates six laboratory units, under the Scientific and Technical Research and Services (STRS) line in the budget, which conduct research and development for measurement science, standards, and technology. Research at the NIST laboratories is intended to advance the agency’s mission of promoting US innovation and industrial competitiveness by developing and supplying test methods, measurement tools and know-how, and scientific data that are embedded in the processes, products and services of nearly every U.S. manufacturing industry, as well as the nation's service sector. NIST measurement research and services support advances and applications in a comprehensive range of technologies, materials, devices, information networks, and other areas.

NIST STRS is funded at \$579.8 million for Fiscal Year 2013.

Manufacturing Extension Partnership

NIST’s Hollings Manufacturing Extension Partnership (MEP) works with small and mid-sized U.S. manufacturers to help them create and retain jobs, increase profits, and save time and money. The nationwide network provides a variety of services, from innovation strategies to process improvements to green manufacturing. MEP also works with partners at the state and federal levels on programs that put manufacturers in position to develop new customers, expand into new markets and create new products.

MEP field staff has over 1,300 technical experts – located in every state – serving as trusted business advisors, focused on solving manufacturers’ challenges and identifying opportunities

⁴ Ibid.

for growth. MEP provides resources in five key areas: technology acceleration, supplier development, sustainability, workforce and continuous improvement.

MEP was funded at \$119.4 million for Fiscal Year 2013.

Advanced Manufacturing Technology Consortia Program

The Advanced Manufacturing Technology Consortia (AMTech) Program, initially proposed by the Administration in the FY 2012 budget without explicit legislative authorization, is designed to incentivize the formation of and provide resources to industry-led consortia that will support basic and applied research on long-term, pre-competitive and enabling technology development for the U.S. manufacturing industry. The objective of AMTech is to establish and strengthen technology consortia, driven by industry, to identify and prioritize research projects addressing long-term U.S. industrial research needs.

AMTech received initial funding of \$14.2 million for Fiscal Year 2013.

Advanced Manufacturing National Program Office

In June 2011, the Administration launched the Advanced Manufacturing National Program Office (AMNPO), an interagency office that includes the Department of Commerce (through NIST), the Department of Defense, the Department of Energy, NASA and the National Science Foundation. The AMNPO does not have its own line item in the budget, but rather is supported through participant agency appropriations.

Housed at NIST, the AMNPO is intended to provide coordination of federal advanced manufacturing activities. It is tasked with identifying opportunities for investments in R&D, precompetitive collaboration, and shared infrastructure to support U.S. manufacturing. It is also intended to build links to technology and innovation partnerships involving U.S. manufacturers, universities, state and local governments, and other organizations.

The National Network for Manufacturing Innovation (NNMI)

The President's FY13 and FY14 budget requests included a proposal for a one-time mandatory fund of \$1 billion to establish the National Network for Manufacturing Innovation, a public-private partnership of competitively-selected institutes that would each concentrate on a particular area of advanced manufacturing technology development. According to background information provided by the Administration, the goal of the institutes is to "bring together industry, universities and community colleges, federal agencies, and regional and state organizations to accelerate innovation by investing in industrially relevant manufacturing technologies with broad applications, and to support manufacturing technology commercialization by bridging the gap between the laboratory and the market."⁵

The Administration envisions the NNMI to be the foundation of a U.S. innovation infrastructure of linked regional hubs of manufacturing excellence. The NNMI also includes an emphasis on education and workforce development in advanced manufacturing skills. The Administration

⁵ National Network for Manufacturing Innovation <http://www.manufacturing.gov/amp/nnmi.html>

proposes up to 15 institutes are proposed across the country, with the federal support to last 5-7 years. The Committee on Science, Space and Technology held a hearing (<http://science.house.gov/hearing/technology-and-innovation-subcommittee-hearing-assembling-facts-examining-proposed-national>) to review the Administration's NNMI proposal in the 112th Congress.

In August 2012, the Administration announced a pilot manufacturing institute, the "National Additive Manufacturing Innovation Institute (NAMII)," based in Youngstown, Ohio to accelerate and integrate additive manufacturing technologies to the U.S. manufacturing sector and to increase domestic manufacturing competitiveness. The pilot institute was established by reprogramming \$30 million in appropriations for the Department of Defense (DOD), the Department of Energy (DOE), NASA, NSF and other federal agencies. In the 2013 State of the Union Address, the President announced plans for three additional manufacturing institutes to be funded through DOD and DOE appropriations.

In early August, Rep. Tom Reed (NY) and Rep. Joe Kennedy (MA) introduced H.R. 2996 the "Revitalize American Manufacturing and Innovation Act of 2013," (<http://congress.gov/cgi-bin/query/z?c113:H.R.2996>;) to authorize the creation of a Network for Manufacturing Innovation Program, based on the President's proposal except that the fund would authorize \$600 million instead of \$1 billion. Sen. Sherrod Brown (OH) and Sen. Roy Blunt (MO) introduced a companion measure, S. 1468, the "Revitalize American Manufacturing and Innovation Act of 2013," in the Senate.

H.R. 1421, "The Advancing Innovative Manufacturing Act of 2013."

The Advancing Innovative Manufacturing Act of 2013 would authorize the AMTech program at NIST, to develop industry-led, public-private consortia to identify, prioritize, and address long-term, precompetitive industrial research needs in the area of advanced manufacturing, including through the use of technology roadmaps and transfer of technology platforms and infrastructure.

It also requires the NIST Director to carry out a pilot program through the award of competitive, merit-reviewed grants, cooperative agreements, or contracts to small- or medium-sized manufacturers to enhance the innovative capabilities and competitiveness of such manufacturers through support for research and development that will promote the field of advanced manufacturing and lead to the commercialization of new products, processes, or technologies.

The bill directs the Secretary of Commerce to establish an innovation voucher pilot program to accelerate innovative activities and enhance the competitiveness of small- and medium-sized manufacturers, which shall: (1) foster collaborations between such manufacturers and research institutions, and (2) enable the manufacturers to access technical expertise and capabilities that will lead to the development of innovative products or manufacturing processes.

The bill authorizes the National Science Foundation to revise the program of grants for education and training in advanced manufacturing so that such grants are provided to community colleges for the development and implementation of innovative education reforms for advanced manufacturing workforce training.

H.R. 1421 includes the following authorization amounts for Fiscal Years 2014 - 2018:

FY 2014: \$140,000,000

FY 2015: \$155,500,000

FY 2016: \$169,750,000

FY 2017: \$172,250,000

FY 2018: \$180,000,000

Issues for Examination

Witnesses have been asked to: assess Federal advanced manufacturing research and development programs, including research and development programs at the National Institute of Standards and Technology; provide recommendations to policy makers for prioritizing spending on advanced manufacturing research and development programs in the current budget environment; and to provide thoughts on H.R. 1421, the “Advancing Innovative Manufacturing Act of 2013.”

Members will also be interested in examining how to prevent duplication of federal manufacturing programs, and how to define appropriate roles for the Federal government and for the private sector in advanced manufacturing research and development programs.