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

Examining the Effectiveness of the NIST Laboratories

Wednesday, March 20, 2013
2:00 p.m. – 4:00 p.m.
2318 Rayburn House Office Building

Purpose

On Wednesday, March 20, 2013, the Technology Subcommittee will examine how the work
conducted at National Institute of Standards and Technology's (NIST) laboratories is aligned
with the promotion of American innovation and industrial competitiveness. The work of the
laboratories supports industries such as healthcare, information technology, manufacturing, and
construction. The hearing will also solicit recommendations on improving laboratory
effectiveness as the Committee considers reauthorizing NIST and its labs.

Witnesses

- **Dr. Willie E. May,** Associate Director for Laboratory Programs, National Institute of
  Standards and Technology
- **Dr. Ross B. Corotis,** Denver Business Challenge Professor, University of Colorado at
  Boulder; Member, Laboratory Assessments Board, National Research Council of the
  National Academy of Sciences

Background

The National Institute of Standards and Technology (NIST) is a non-regulatory agency within
the Department of Commerce. NIST's mission is to promote US innovation and industrial
competitiveness by advancing measurement science, standards and technology in ways that
enhance economic security and improve American quality of life.

NIST activities are primarily housed at two campuses, located in Gaithersburg, MD and Boulder,
CO.

In order to advance measurement science, standards, and technology, NIST currently operates
six laboratory units, with activities shared across the two campuses:

- **Material Measurement Laboratory (MML):** The MML serves as the national
  reference laboratory for measurements in the chemical, biological, and material sciences.
  The MML provides measurement services used by a broad set of industries including but
  not limited to: healthcare (biomarkers), renewable energy (measuring the quality of fuels)
  and forensic science (biometric identification techniques);

- **Physical Measurement Laboratory (PML):** The PML develops and disseminates national standards of measurement (e.g., length, mass, force and shock, acceleration, time and frequency, electricity, temperature, humidity and pressure.) This information supports consistent timekeeping, on which many technologies like the global positioning system (GPS) rely, and underpins the safety of our national electricity grid;

- **Engineering Laboratory (EL):** The EL develops and disseminates advanced manufacturing and construction technologies, guidelines, and services to the U.S. manufacturing and construction industries. Examples of EL work include researching ways to reduce the spread of fire in residential buildings and developing performance metrics for advanced manufacturing processes;

- **Information Technology Laboratory (ITL):** The ITL develops and disseminates standards, measurements, and testing for interoperability, security, usability, and reliability of information systems, including cyber security standards, guidelines and best practices for federal agencies and U.S. industry. ITL works in areas such as cloud computing, health information technology, and advanced voting technologies;

- **Center for Nanoscale Science and Technology (CNST):** The CNST provides industry, academia, NIST, and other government agencies with access to nanoscale measurement and fabrication methods and technology. CNST operates a shared-use NanoFab for nanotechnology development;

- **Center for Neutron Research (NCNR):** The NCNR provides a national user facility, utilized by universities, government and industry, to study neutron-based measurement capabilities. NCNR measurement capabilities allow researchers to answer questions in nanoscience and technology with a broad range of applications.

Authorizations/Appropriations

NIST Laboratory Programs	*(dollars in millions)* Authorization	Request	Appropriation
FY 2011	584.5	584.5	497.0
FY 2012	661.1	678.9	567.0
FY 2013	676.7	648.0	*

*NIST laboratory activities are currently operating under a continuing resolution, subject to sequestration.

National Research Council Assessments of NIST Laboratories

The National Research Council (NRC) has conducted assessments of the NIST laboratories since 1959.

In 2011, the NRC evaluated three of the six NIST laboratories: the Center for Nanoscale Science and Technology (CNST), the NIST Center for Neutron Research (NCNR) and the Information Technology Laboratory.

The assessments included key findings and recommendations for each of the laboratories.

The NRC recommendations for the CNST included:
- Further diversifying the user base for the NanoFab facility;
- Continuing to increase the CNST focus on industry as its key customer;
- Actively managing the balance between high-quality science and service;
- Continuing the effort to mature the focus and stature of newer research groups; and
- Considering enhancing the professional development of postdoctoral staff by offering opportunities to learn skills needed for non-academic careers – for example, in entrepreneurship.

The NRC recommendations for the NCNR included:
- Taking care that the next generation of senior researchers continues to develop and remain excited about their research;
- Maintaining collaborative efforts with the NIST Material Science Laboratory and the Physical Measurement Laboratory to aid the NCNR in extending its leadership in cold-neutron research; and
- Ensuring that the proposal review process continues to work effectively as the NCNR facility expands to meet greater demand for cold-neutron research capabilities.

The NRC recommendations for the ITL included:
- Considering plans to address the growth that will be needed to support the expanding workload of the Statistical Engineering Division and the Computer Security Division within this laboratory;
- Acquiring a permanent chief of the Advanced Network Technologies Division; and
- Devoting attention to strategic, long-term technical needs in cloud computing.

In 2012, the NRC conducted a Review of Manufacturing-Related Programs at NIST as well as a review of Best Practices in Assessment of Research and Development Organizations.

The NRC recommendations from the Review of Manufacturing Related Programs included:
- Having a process in place that carefully considers industry needs and inputs when selecting and planning the projects to pursue;
- Having a unified programmatic focus, supporting management, and the use of metrics designed to measure progress when coordinating the efforts of multiple, technologically diverse projects; and
- Having more structured coordination among teams across NIST.

Visiting Committee on Advanced Technology

The Visiting Committee on Advanced Technology (VCAT) of NIST was established in its current form by the Omnibus and Competitiveness Act of 1988 (PL- 100-418).

The VCAT's charter includes reviewing and making recommendations on general policy for NIST, its organization, budget, and programs within the framework of applicable national policies as set forth by the President and the Congress.

VCAT members are appointed by the Director of NIST and are comprised of both industry and academic stakeholders. Members are selected for staggered, three-year terms. There are currently 13 members of the VCAT, including 10 members from industry.

The 2012 VCAT Annual Report includes a number of recommendations with respect to NIST laboratories including, among others:
- Increased focus and investment in advanced manufacturing programs;
- Continued NIST research and standards development activities contributing towards the creation of a national public safety communication system;
- Continued strengthening of the planning and integration of NIST measurement services efforts; and
- Greater clarity and depth in strategic planning.

Issues for Examination

The Subcommittee will examine how the NIST labs contribute to NIST's mission of promoting American innovation and industrial competitiveness and how this contribution could be improved. In addition, witnesses have been asked to address how the NIST labs: prioritize project decisions; measure success and set metrics; and work with industry and academic customers.

Witnesses have also been asked to provide recommendations for how NIST can be more efficient and effective as the Committee considers legislative reauthorization.