

VISITING COMMITTEE ON ADVANCED TECHNOLOGY
National Institute of Standards and Technology

December 6, 2016

The Honorable Penny Pritzker
Secretary
Department of Commerce
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Secretary Pritzker:

On behalf of the VCAT, we would like to commend NIST for its outstanding achievements over the past decade while being assigned increasing national responsibilities. In the recent past, NIST has demonstrated its extraordinary competence and capability in becoming a center of action and responsibility in national priorities including advanced manufacturing, advanced communications, cybersecurity, forensic science, and disaster resilience. NIST has also garnered new extramural programs, including Manufacturing USA (formerly the National Network for Manufacturing Innovation), and has improved the execution of the Hollings Manufacturing Extension Partnership. NIST's success in these areas is a testament to the culture of exceptionalism that NIST has demonstrated since its founding in 1901.

Despite these achievements, there remains much to be done. A number of laboratory initiatives have been left unfunded or funded at levels far below the commensurate need. At the same time, new technical challenges continue to emerge that would benefit from NIST's approach and expertise. With an eye toward keeping NIST in a strong position, the VCAT has spent the past year examining areas where we see NIST facing the biggest risk. The VCAT is concerned that without growth in budget the scope of NIST's responsibilities threatens to outrun NIST's abilities to build the foundational research and development core that support these engagements. We have toured laboratories where advanced science is conducted, and the facilities are woefully inadequate and suffer from years of deferred maintenance and upgrades due to budget constraints. NIST's need for sophisticated laboratory facilities is urgent and increasing, just as NIST's abilities are being called upon to further explore the necessary research for addressing the extended responsibilities with which it is being tasked.

As a leading research organization, NIST must be able to collaborate with the best in the world, compete for extraordinary personnel, and operate at the speed of innovation in order to effectively deliver on its mission. NIST's extramural programs must have significant room for growth to reach maximum impact.

Maintaining NIST's Core Research Strength

Since 2012, NIST has seen a growth in its Laboratory budget. The increase has supported new capacity for scientific research to support national priorities, primarily advanced manufacturing, cybersecurity, advanced communications, and disaster resilience. NIST has addressed these priorities through a combination of intramural research and externally-focused programs. However, these increases have not met the need in these

Secretary Pritzker
Page 2

areas. In addition, other national priorities have also been only partially funded or left unfunded. Without adequate resources and research facilities, the Nation will lose a critical element of its innovation ecosystem.

Over the past year, the VCAT has reviewed examples of extraordinary unfunded Legislative or Executive branch demands placed on NIST in Smart Grid standards, the Cybersecurity Framework, the Presidential Commission on Cybersecurity, and responsibilities for Public Safety Communications. NIST has superbly executed on these demands, demonstrating the function of its outstanding underlying technical capability – but unless carefully managed, unfunded mandates can drain that well of expertise.

Facilities to Enable Groundbreaking Science

NIST's research in measurement science pushes the boundaries of the possible, exceeding the capabilities of what can be done anywhere in the world. However, many of the research teams are housed in increasingly outdated, unreliable, deteriorating, and potentially unsafe facilities that directly limit measurement capabilities. In recent years, the capital budget has been squeezed in the budget process, damaging NIST's capabilities for updating and renovating its facilities built in the 1950s and 1960s to match 21st century research needs.

The VCAT is aware that significant investments are badly needed in renovating deteriorating facilities on NIST's campuses, notably Building 245 in Gaithersburg and Building 1 in Boulder. These investments will enhance safety and security of NIST's facilities and strengthen the research they house. The VCAT has observed the slow pace of these renovations and also learned that these investments address only part of a larger problem of significantly underfunded maintenance and renovation funds. As NIST's footprint, scope of responsibilities, and complexity and sensitivity of research has grown, its budget for repairs and maintenance has been flat or decreasing. NIST currently has a maintenance backlog of \$346M, with an annual appropriation for maintenance and repair averaging less than \$50M, insufficient to address the need.

Collaborations to Extend Capabilities

NIST is a critical partner with the private sector to develop the infrastructure necessary for innovation. This engagement is a key piece of the ecosystem that supports the competitiveness of the U.S. economy. To transfer the technology, methods, and standards developed at NIST and through these partnerships to the American private sector inescapably involves participation of scientists and engineers who are the best in the world, and who are sometimes foreign nationals. These efforts enhance the competitiveness of American industry.

Secretary Pritzker
Page 3

Put succinctly, in order for NIST to execute its mission successfully, it must have access to the best minds in the world. While many highly talented scientists and engineers are US citizens, it is necessary to recognize that the pool of talent in other countries may exceed our own. It is in the interest of NIST – and, indeed, the Nation – for NIST to maintain an open research environment that balances information, intellectual property, and physical security with collaboration and scientific collegiality.

With these issues in mind, the VCAT wishes to make some important recommendations regarding NIST at this time of transition.

Recommendations

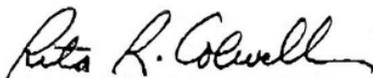
- **NIST’s facilities maintenance budget must be increased to a level commensurate with the need – that is, to a base of about \$107M per year.** NIST’s facilities maintenance budgets have dropped significantly over the past several years leaving creating a backlog of deferred maintenance. At current funding levels NIST will lose the capabilities to support the kind of boundary-pushing, high-precision science required of it.
- **To accommodate increased demand for measurement science solutions in existing and emerging technology areas the NIST research budget should grow by approximately 10% per year to achieve a base of approximately \$1B.** The VCAT applauds NIST’s increased performance and responsibilities for advanced manufacturing and cybersecurity over the past few years but there are still many unmet demands that increased funding would address. Furthermore, the VCAT encourages NIST to continue to pursue stronger programs in advanced communications, bioscience, and resilient infrastructure and communities.
- **The VCAT recommends increased funding for Manufacturing USA, the Hollings Manufacturing Extension Partnership (MEP) program, and the Baldrige Performance Excellence program to fund additional industry-driven manufacturing institutes, enable the MEP program to serve more small and medium manufacturers, and support the Baldrige program’s efforts to promote the adoption of cybersecurity best practices respectively.** The VCAT recognizes the unique position NIST’s extramural programs play in the Nation’s innovation ecosystem, especially in advanced manufacturing, and encourages continued expansion in those programs. Further, we are encouraged by the active participation NIST’s scientists have had in the Manufacturing USA program and the renewed focus of MEP on technology transfer, and the potential expansion of Baldrige into Cybersecurity. We recommend that NIST continue to strengthen these interactions.

VISITING COMMITTEE ON ADVANCED TECHNOLOGY
National Institute of Standards and Technology

Secretary Pritzker
Page 4

- **To most effectively meet stakeholder demand, NIST should be able to maintain maximum control over the allocation of budgetary resources.** NIST's Scientific and Technical Research and Services budget line should be under NIST leadership's discretion to ensure a strong, stable, and flexible funding base is available to NIST's laboratory programs. This will ensure maintenance of the intramural expertise, long-term research perspective, and programmatic agility so critical to NIST's mission delivery. With the ever-increasing pace of innovation, NIST must be able to look forward to establish intramural capabilities before the demand arises.
- **New technological priorities, convening requirements, and programmatic mandates must be adequately supported with additional funds in their first year. Furthermore, NIST must plan for the full lifetime needs of these programs.** NIST is a long-standing institute and while new and important demands always take priority, previous demands cannot simply be abandoned. Many demands of NIST's expertise have a long life; while the funding requirements may taper off, they do not become zero.
- **NIST must retain an atmosphere of openness and collaboration conducive to maintaining its ability to work with the best scientists in the world.** The VCAT is mindful of the risks associated with this, but believes that they can be adequately mitigated by robust internal processes and controls proactively managed by NIST Leadership.
- **NIST, working with Congress and the Administration, should be allowed to adopt authorities and best practices across the Government that would enable NIST to have the necessary speed and workforce quality.** These include Other Transaction Authority and premium pay authorities.

Sincerely,



Dr. Rita R. Colwell
VCAT Chair



Mr. William Holt
VCAT Vice Chair