

Technical Assessment of the Capital Facility Needs of the National Institute of Standards and Technology

The National Institute of Standards and Technology (NIST) plays a critical role in promoting U.S. innovation and supporting public health, medicine, and industrial competitiveness. NIST programs contribute to practically all aspects of our daily lives, from pharmaceuticals to nuclear security, from baby food safety to natural disaster resilience, from cybersecurity to manufacturing. The NIST mission is accomplished primarily at its campuses in Gaithersburg, Maryland, and Boulder, Colorado. These facilities total about 5 million square feet, with 80% of that space used for laboratory research.

The essential research being performed at NIST is drastically hindered by the alarming physical condition and functionality of its 1950s and 1960s era facilities. At the request of Congress and NIST's Office of Facilities and Property Management (OFPM), the National Academies assessed NIST's current capital facility needs. The study committee found that due to severe funding deficits over a span of decades, many NIST laboratories are not able to consistently provide an effective environment to support sensitive equipment and groundbreaking research, with about 63% of NIST research facilities failing to meet federally established standards for acceptable building conditions. The report recommends a significant funding increase to support modernization and repairs for NIST facilities.

Learn more and download the report at <https://nap.nationalacademies.org/catalog/26684>.

MODERNIZING NIST LABORATORY AND UTILITY INFRASTRUCTURE

The deteriorating condition of NIST facilities is hindering its mission by causing substantive delays in key technology and national security work, serious damage to highly specialized and costly equipment, and significant loss of technical staff productivity. The committee



recommends that **NIST should modernize laboratory facilities to meet measurement science and mission-focused research and development challenges, and to attract and retain the scientists and engineers required to solve these challenges.**

While the condition and functionality of NIST laboratories is critical, campus infrastructure is equally important and problematic. Both campuses are impacted by intermittent power outages, and the central utility plant in Gaithersburg has no reserve capacity and a high volume of water and steam leaks, causing building leaks and foundation failures. The committee recommends that **NIST should address the underlying deficiencies with campus infrastructure including the central utility plants, distribution systems, and electrical power quality and continuity to ensure that the modernization plan investment is effective.** If not developed in conjunction with laboratory modernization, the requirements of the new laboratories will continue to not be met.

FUNDING FOR NIST'S COORDINATED RECOVERY PLAN

Funding for facilities sustainment, restoration, and modernization comes from a single government appropriation of two general categories: Safety,

Capacity, Maintenance, and Major Repairs (SCMMR) and Construction and Major Renovations (CMR). NIST's OFPM Draft Coordinated Recovery Plan identifies the annual SCMMR and CMR funding requirements for making existing NIST facilities fit for use by 2033.

The Recovery Plan includes a Sub-Plan for Recapitalization to support research program growth, expand capabilities, and enable NIST to recover from significant mission impairment. **The committee finds that the OFPM Sub-Plan for Recapitalization is sound, and that NIST should seek CMR funding of \$300-\$400 million annually for at least 12 years to enable NIST to restore lost mission capabilities and provide facilities for new programs.**

The Recovery Plan also includes a Sub-Plan for Stabilization, which would require at least 12 years of \$120-\$150 million annual SCMMR funding to sustain existing facilities and return obsolete components to fitness. The committee believes that NIST is capable of implementing its Recovery Plan upon receipt of sufficient and consistent funding. Therefore, the committee recommends that **OFPM's entire NIST Draft Coordinated Recovery Plan should be approved and fully funded as soon as possible, subject to continuing refinement.**

COMMITTEE ON TECHNICAL ASSESSMENT OF THE CAPITAL FACILITY NEEDS OF THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

ROSS B. COROTIS (NAE), University of Colorado Boulder, *Chair*; **DOUG ALDRICH**, Aldrich & Associates, LLC; **JAMES B. CLAYTON**, Institute for Responsible Infrastructure Stewardship; **JAMES "JACK" DEMPSEY**, Asset Management Partnership, LLC; **ERIC DILLINGER**, Woolpert Inc.; **VIRGINIA K. HOLTZMAN BELL**, U.S. Coast Guard (retired); **STEVEN H. McKNIGHT**, Virginia Tech; **CHRISTINE MERDON**, Merdon Strategies, LLC; **KENT ROCHFORD**, SPIE (The International Society of Optics and Photonics); **C. DAVID TURNER**, U.S. Army (retired), 3E Turner & Associates; **JORGE R. URRUTIA**, MSI Universal; **MARK WEATHERLY**, Weatherly Consulting, LLC

STAFF CAMERON OSKVIK, Director, Board on Infrastructure and the Constructed Environment; **JAMES C. MYSKA**, Senior Program Officer, Study Director; **JAYDA WADE**, Research Associate; **JOSEPH PALMER, SR.**, Senior Program Assistant; **RADAKA LIGHTFOOT**, Finance Business Partner

FOR MORE INFORMATION

This Consensus Study Report Highlights was prepared by the National Academies' Board on Infrastructure and the Constructed Environment based on the report *Technical Assessment of the Capital Facility Needs of the National Institute of Standards and Technology* (2023).

The study was sponsored by the National Institute of Standards and Technology. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project. This Consensus Study Report is available from the National Academies Press (800) 624-6242 | <http://www.nap.edu> | <http://www.nationalacademies.org>

Division on Engineering and Physical Sciences

**NATIONAL
ACADEMIES** Sciences
Engineering
Medicine

Copyright 2023 by the National Academy of Sciences. All rights reserved.