National Institute of Standards and Technology
- NIST FY 2015 Constituent Budget Overview Webinar-

Working with Industry to Accelerate Innovation

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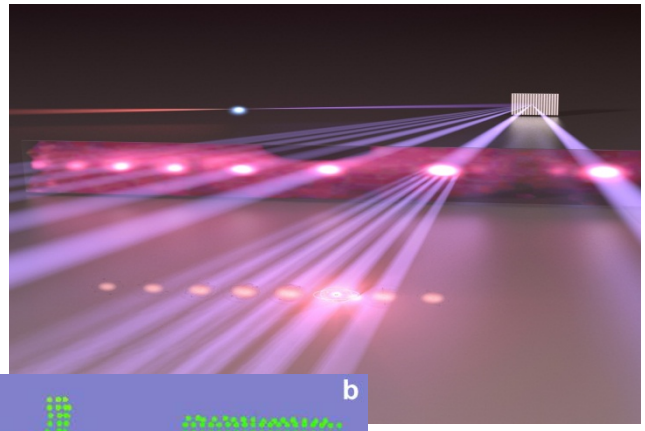
Advancing U.S. Innovation and Competitiveness

The Administration's FY 2015 request for NIST:

- **Prioritizes resources towards core delivery of NIST measurement science and standards mission**

- **Maintains support for top NIST and Administration priorities**
  - Accelerate development of U.S. advanced manufacturing infrastructure
  - Promote U.S. leadership in emerging technologies
  - Strengthen federal laboratories ties to needs and demands of U.S. industry

- **Continues investments for needed facility renovations**



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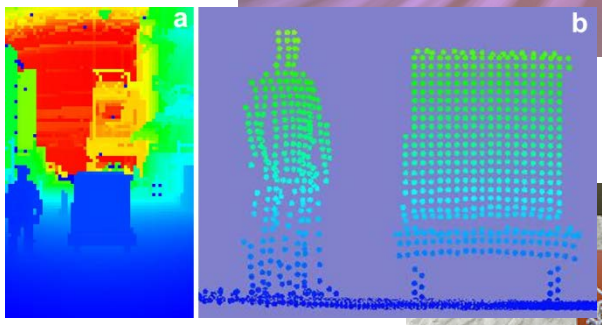
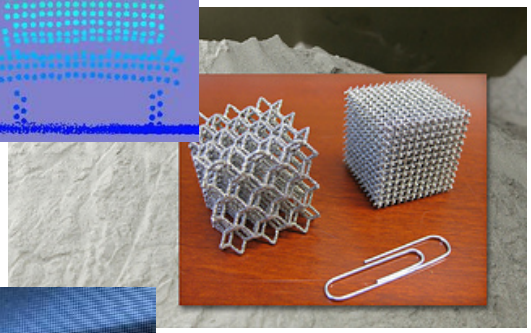


NIST



Credit: Young/NIST

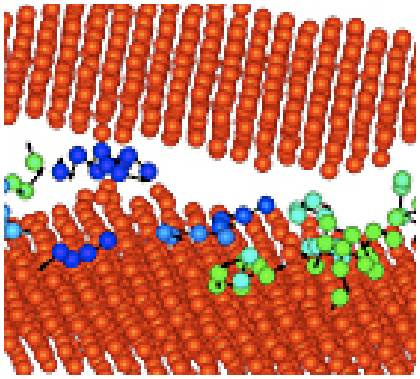
Rathe

Focusing our Investments

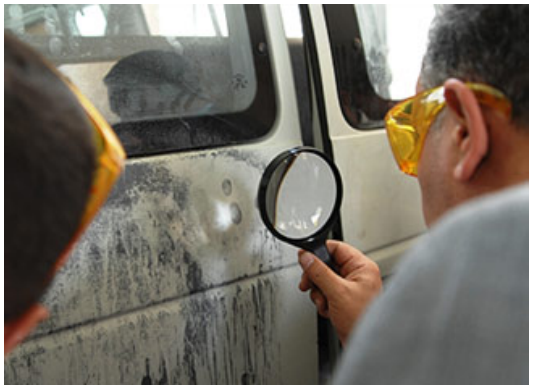
FY 2015 Request Addresses Challenges in the Following Priority Areas:

- Cyber-Physical Systems
- Synthetic Biotechnology
- Lab-to-Market Transformations
- Advanced Materials
- Forensics
- Advanced Manufacturing Technologies
- Support for Small and Medium Manufacturers

Credit: Synthetic Biology Group, RLE AT MIT



Credit: NIST



Credit: NIST

NIST FY 2015 Budget Request Compared to FY 2014 Enacted
(Dollars in millions)

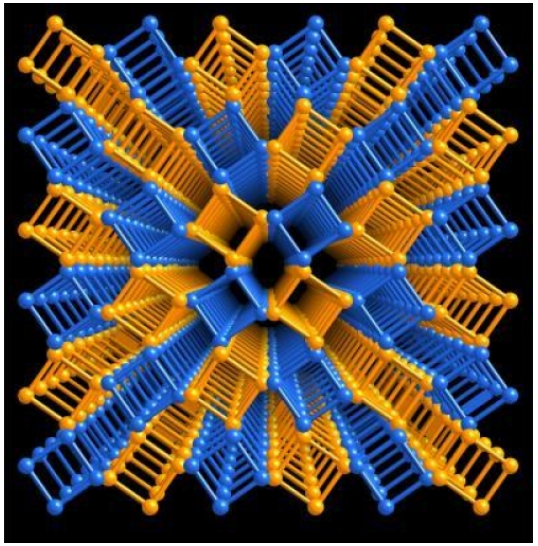
		FY 2013 Enacted	FY 2014 Enacted	FY 2015 Request	+/(-) Over FY 2014 Enacted
STRS		**$579.8**	**$651.0**	**$680.0**	**$29.0**
Laboratory Programs		517.1	578.0	597.5	19.5
Corporate Services		17.3	17.3	17.3	0.0
Stds Coord & Special Pgms		45.4	55.7	65.2	9.5
ITS		**$133.6**	**$143.0**	**$161.0**	**$18.0**
Advanced Mfg Tech Consortia		10.6	15.0	15.0	0.0
Hollings Mfg Ext Partnership		123.0	128.0	141.0	13.0
Mfg Innovation Inst Coordination	1/			5.0	5.0
CRF		**$56.0**	**$56.0**	**$59.0**	**$3.0**
Construc & Major Renovations		11.8	11.8	14.8	3.0
Saf, Cap, Maint & Maj Repairs		44.2	44.2	44.2	0.0
Total, NIST Discretionary		**769.4**	**850.0**	**900.0**	**50.0**

1/ Manufacturing Innovation Institutes Coordination is a newly proposed program in FY 2015.

NIST FY2015 Scientific and Technical Research Services Program ($680 M, + $ 29M over FY 14 Enacted)

The FY 2015 budget proposes the following increases:

- Forensics + 3.5 M
- Cyber-Physical Systems + $7.5 M
- Advanced Materials + 5 M
- Synthetic Biotechnology + $ 7 M
- Lab-to-Market transformations + $ 6M



Credit: Penn State University, Gopalan lab, Ryan Haislmaier Courtesy: Science Daily

Credit: IDG Connect

Measurement Science and Standards for Forensics (+$3.5M)

This initiative will enhance scientific validity of forensic evidence and investigation impacting crime laboratories and criminal courts across the United States.

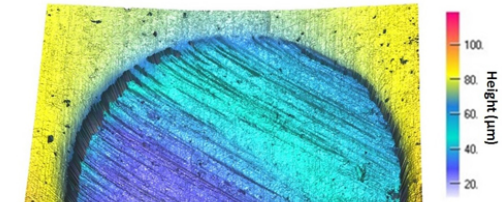
Public trust in the justice system relies on the validity and certainty of evidence submitted.

-Variations in federal, state, local, and tribal jurisdictions underscore importance of integrated approach

NIST work provides the measurement science and standards to strengthen the practice of forensic science.

NIST will:

- Develop measurement tools to enable reliable and accurate forensic practice
- Strengthen the statistical foundation for existing forensic methods
- Improve accuracy and reliability of how forensics is done through calibration systems, reference materials and databases, standards and robust outreach.



Credit: NIST

Credit: Robert Raithe

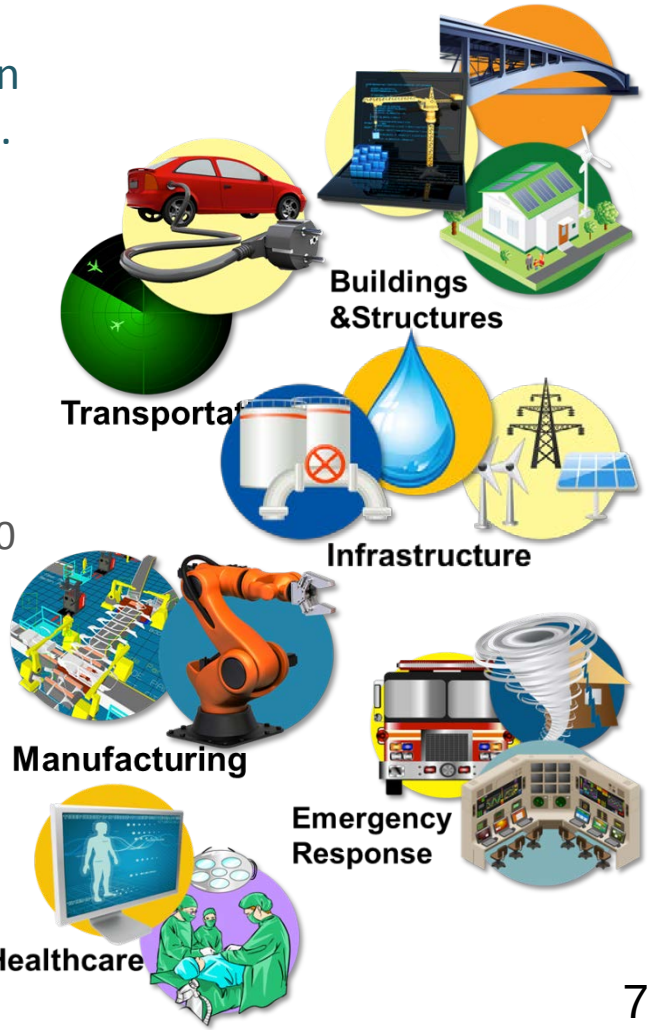
Credit: NIST

Measurement Science for Cyber-Physical Systems (CPS) ($7.5M)

This initiative will improve the predictability, safety, and security of cyber-physical systems in manufacturing, infrastructure, transportation, networking, and information technology.

The US has an opportunity to capture strategic markets in manufacturing, transportation, and other vital industries.

- Over a 15 period, new cyber physical systems can save
  - $30 billion in aviation sector fuel costs,
  - $66 billion in power generation, and
  - $27 billion in freight rail costs.
- Future CPS technologies could reduce by half the current $80 billion/year cost of traffic congestion.



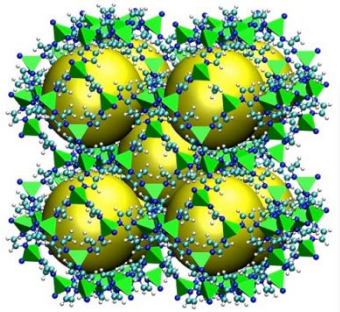
NIST will provide focused measurement science and research targeting fundamental requirements for CPS including:

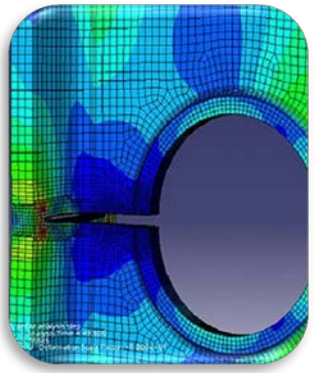
- Modeling and simulation
- Formal methods for diagnostics and prognostics
- Cybersecurity
- Test beds and development tools

Advanced Materials Discovery and Data Tools for Industry ($5 M)

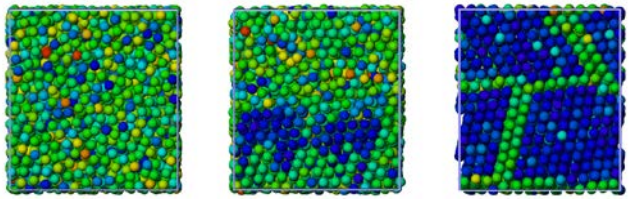
NIST is a key player in the Administration's Materials Genome Initiative, aiming to dramatically increase the pace for bringing new materials to market.

- Today, it frequently takes 20 years or more to transition a new material from discovery to practical use, costing companies precious time and money.
- By leveraging resources and partnerships, NIST will assist US manufacturers in achieving "materials by design" for high-tech products in a range of industrial sectors - from aerospace and automotive to computer chips, functional inks and solar cells.





This increase enables NIST to meet the ambitious timelines demanded by industry and other stakeholders to provide interoperability and accessibility of materials data. In FY 2015, NIST will:



- Expand technical competence in computational methods, to augment existing capabilities in experimental materials science.
- Collaborate with Federal agencies, non-profit organizations, and other stakeholders to host materials data from a variety of sources as part of the **NIST Materials Data Repository** (under development in FY 2014)
- Leverage key partnerships with the Chicago-based Center for Hierarchical Materials Design (CHiMaD), a NIST-sponsored Center of Excellence initiative in FY 2014.

Credits: NIST, Kuster & Wildhaber Photography

Engineered Biology: Ensuring Quality and Predictability in Synthetic Biological Systems (+$7 M)

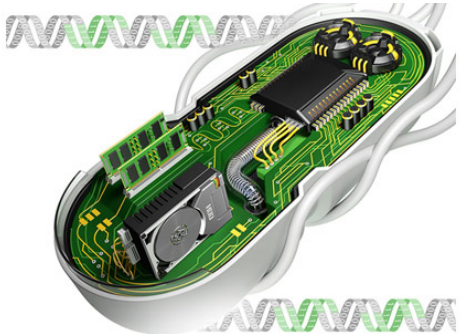
This initiative will ensure quality and predictability in the design of synthetic biological system for efficient production of fuels, chemical feedstocks, pharmaceuticals, and medical therapeutics.

- Leverage the potential to revolutionize manufacturing in numerous business sectors.
- World-wide market size has > $1 trillion potential.[1]
- Lack of measurement and standardization tools are slowing commercialization.

Credit: Bilfinger SE via Creative Commons

NIST will:

- develop measurement tools and standards for quality assessment/quality control of biological systems.
- develop characterization protocols to assess biological activity at the genetic level.
- develop and deploy predictive computer models to evaluate biological response.
- lead road-mapping and standardization efforts.



Credit: Liang Zong and Yan Liang, MIT Press

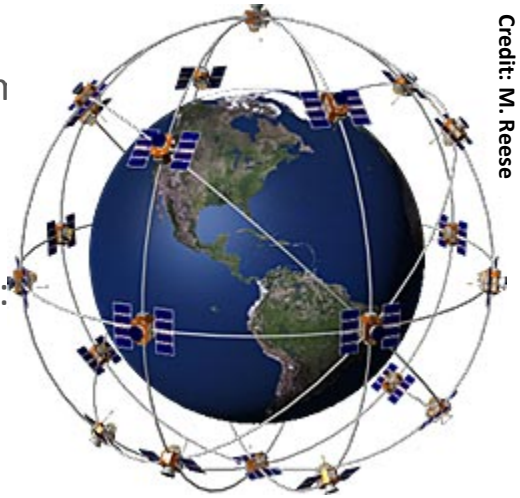
[1] Current Uses of Synthetic Biology for Chemicals and Pharmaceuticals, Biotechnology Industry Organization, http://www.bio.org/sites/default/files/Synthetic_Biology_Everyday_Products_0.pdf

Strengthening Lab-to-Market Technology Transfer (+$6 M)

This initiative will enable the development and dissemination of strategies to accelerate transfer and commercialization of federal technologies.

Federally funded R&D (nearly $40 billion annual investment) has:

- Nurtured life changing technologies e.g. Internet, global positioning systen (GPS), leading-edge vaccines.
- Significant economic impact through local job creation and technology innovation, etc.
- E.g., in 2005-2009, 103 Dept. of Navy tech transfer agreements resulted in:
  - $ 200 M in direct economic output
  - Sustained approx. 670 jobs in 103 companies, with estimated average compensation of $79,300.
  - Estimated addition 1,960 jobs created from indirect impacts



Credit: M. Reese

NIST will:

- Identify policies to streamline and promote technology transfer collaborations between federal agencies and with the private sector, especially in the manufacturing sector.
- Facilitate easy discovery, simplify understanding, and accelerate licensing of Federal lab-developed intellectual property.
- Develop tools to evaluate and implement metrics for improved performance analysis for technology from both federal laboratories and that of federally funded R&D

Credit: NIST

NIST FY 2015 Industrial Technology Services ($161.0M, +$18.0M)

Targeted Investments to Drive Continued Innovation in Manufacturing and Industry

Hollings Manufacturing Extension Partnership $141.0M (+$13.0M)

Expanding efforts to deliver services targeting technology innovation and commercialization for domestic manufacturers.

MEP

MAKE IT IN AMERICA
MANUFACTURING EXTENSION PARTNERSHIP

Advanced Manufacturing Technology Consortia $15.0M

Industry-led consortia to assess critical long-term industrial research challenges, develop technology roadmaps, and conduct pre-competitive research, to accelerate the pace of innovation and advanced manufacturing technologies throughout various industrial sectors.

AMTech

Manufacturing Innovation Institutes Coordination $5.0M (new)

Collaboration among the manufacturing institutes will be facilitated by the NIST-hosted interagency Advanced Manufacturing National Program Office (AMNPO). The network of institutes will provide the innovation infrastructure to support regional manufacturing hubs, and ensure that our manufacturing sector is a key pillar in an economy.

Advanced Manufacturing Technology Consortia (AMTech) ($15.0M)

AMTech is supporting R&D in advanced manufacturing by convening consortia to strengthen long-term U.S. leadership in critical technology areas

AMTech establishes and strengthens industry-driven consortia to identify industrial research needs. AMTech bridges the early-stage funding gap by convening the value chain with industry to undertake long-range pre-competitive research.

AMTech-Supported Consortia will:

Develop technology roadmaps to support research on long-term precompetitive technology needs across multiple industrial sectors. Catalyze consortia formation through support of critical projects advancing measurement science and standards on new materials and processes.

AMTech Awards will:

Continue Technology Roadmaps: *In FY 2013, NIST held the first AMTech competition for Technology Roadmaps, and is on track to issue awards in May 2014.*

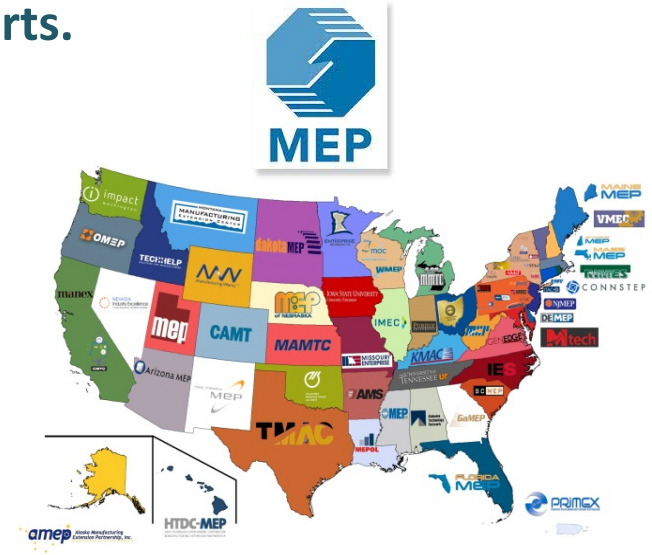
Advance technology transfer: *In FY 2014 hold a competition for project support grants to implement research results.*

Hollings Manufacturing Extension Partnership ($141.0M, +$13.0M)

This Federal-state-industry partnership provides U.S. manufacturers with access to technologies, resources, and industry experts.

MEP Centers located in all 50 states and Puerto Rico work directly with local manufacturing communities, as a strategic advisor to connect manufacturers to public and private resources essential for competitiveness and profitability.

A strong domestic manufacturing base is essential to supporting the Nation's economy and national security.



In FY 2015, MEP will:

Expand efforts to help small manufacturers adopt emerging technologies, reduce costs, and develop strategies for market expansion.

Create tools, services and training to help firms innovate and enter into new markets.

Support critical national priorities such as sustainable manufacturing , export expansion, workforce development, and supply chain competitiveness.

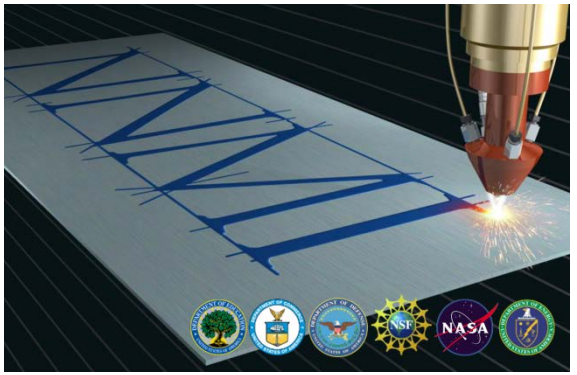
E3: ECONOMY - ENERGY - ENVIRONMENT
A SUSTAINABLE GROWTH STRATEGY

USA NATIONAL INNOVATION MARKETPLACE

National Network of Manufacturing Institutes

A network of institutes will develop and diffuse transformative capabilities for long term competitiveness of U.S. manufacturing

U.S. Manufacturing must continue to innovate in order to remain competitive in high-value add manufacturing.



- National need to ensure that good research ideas generated in the U.S. are translated into advances in industrial capabilities.
- Introduced in 2012; Envisioned network of up to 45 institutes
- Four institutes have been awarded to date and four more are planned for FY 14.
- Advanced Composites Manufacturing Innovation Institute competition announced for 2014 by DOE; three additional DOE/DOE competitions anticipated in 2004

Working with other Federal agencies and partners in universities and industry, NIST will:

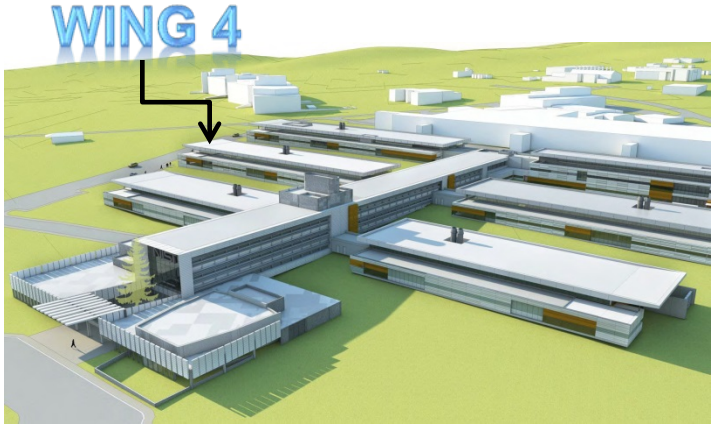
- create a network of competitively-selected co-funded regional institutes, forming the National Network for Manufacturing Innovation; and
- through the Advanced Manufacturing National Program Office, create network-wide platforms to establish and share best practices.

NIST FY 2015 Construction of Research Facilities Requests ($59.0M, +$3.0M over FY 2014 enacted)

These funds will enable renovation and construction of research facilities to strengthen NIST's core facilities to secure U.S. leadership in measurement science

Boulder Building 1 Renovation ($11.1M in FY 2015, -$0.7M)

- Multi-year Boulder project initiated in FY 2010; $11.1M in FY 2015 would support the next phase of renovation.
- Funding will enable the first phase of construction for the interior and exterior renovation of Wing 4.
- Specifically, FY 2015 funding will:
  - complete the seismic reinforcement (interior and exterior)
  - remediate hazardous materials
  - utilities will be connected to the site utility distribution system
  - construct new building envelope and service galley

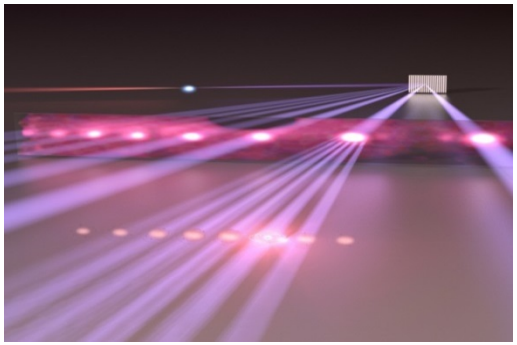


Gaithersburg Building 245 Renovation (+$3.7M in FY 2015)

- Increase provides for the initiation of planning, programming, acquisition and concept development, of the preferred option upon identification and approval during the Department's Scalable Acquisition Project Management Framework
- Highly specialized facility to meet radiation physics measurements and research programs
- Compromised programs due to current facility conditions
- Recent study identified numerous architectural, mechanical, plumbing, electrical and life safety/fire code deficiencies
- Infrastructure systems are beyond their useful life

Opportunity, Growth, and Security Initiative

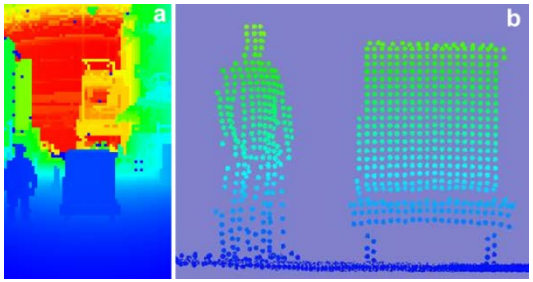
Additional support through the proposed Opportunity, Growth, and Security Initiative will strengthen NIST's R&D capabilities and facilities enabling NIST to more effectively address significant challenges in key national priority areas.



Baxley/JILA

$2.4B to establish a 45 institute National Network for Manufacturing Innovation.

- The Institutes will support manufacturing by allowing new manufacturing processes and technologies to more smoothly from basic research to implementation, in addition to providing much needed support for work-force development.



NIST

$115M to strengthen scientific research at NIST:

- Fully resource initiatives in advanced manufacturing, cybersecurity, forensic science and disaster resilience.
- Accelerate much needed renovation of NIST scientific facilities
- Support increased activities in advanced communications and advanced quantum science
- Strengthen its current cryptographic capabilities
- Expand data science and data analytics capabilities
- Increase forensic science R&D and related standardization efforts

Rathe

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Thank you for participating