Overview of the NIST Engineering Laboratory

Kirk Dohne, Associate Director
Engineering Laboratory

NIST Mission

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

measurement science

Creating the experimental and theoretical tools – methods, metrics, instruments, and data – that enable innovation

standards

Disseminating physical standards and providing technical expertise to documentary standards that enable comparison, ensure interoperability, and support commerce

technology

Driving innovation through knowledge dissemination and public-private partnerships that bridge the gap between discovery and the marketplace

EL Mission

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NIST at a Glance

www.nist.gov

NIST's reputation: our biggest strength

NIST's reputation allows it to punch above its weight

- NIST is recognized as having deep technical excellence
- NIST is seen as an uncompromising measurement science laboratory, the best in the world
- NIST is known for its neutrality, providing unbiased results
- NIST is industry-focused, providing extensive ties to companies, consortia and associations
- NIST is non-regulatory and doesn't make (but can inform) policy, allowing open discussions with stakeholders

NIST's reputation for excellence and neutrality provides a means for convening diverse stakeholders to address complex technical issues

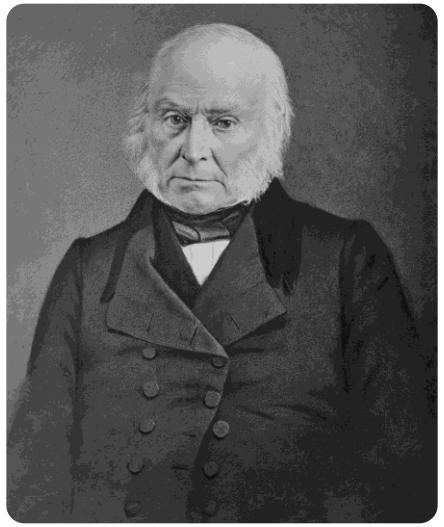
Measurements are Critical to Commerce

“Uniformity in the currency, weights, and measures of the United States is an object of great importance, and will, I am persuaded, be duly attended to.”

George Washington, State of the Union Address, 1790

“The Congress shall have the power to…fix the standard of weights and measures”

Article I Section 8, 1789



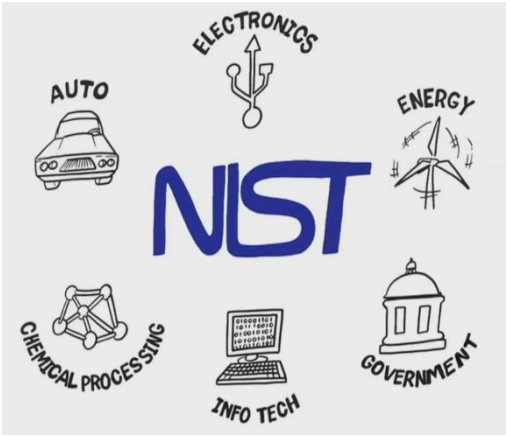
"Weights and measures may be ranked among the necessities of life to every individual of human society."

John Quincy Adams, 1821

Measurements are Critical to Innovation

- If you know how to measure something, you can design it, improve it, and compare it

- NIST measurement science provides foundation for innovation in every industry and economic sector, from manufacturing to health care to defense



https://www.youtube.com/watch?v=2j9BGVKbzS4

NIST's Unique Role in Documentary Standards

Providing support to industry and government for voluntary standards development

<u>NIST's unique role</u>

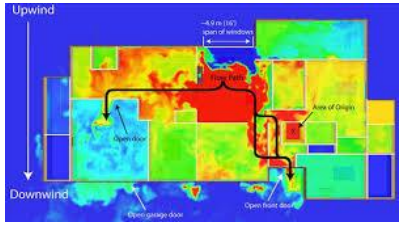
- NIST coordinates standards policy among federal agencies (National Technology Transfer and Advancement Act, 1996)
- NIST Director is President's principal advisor on standards (American Innovation and Competitiveness Act, 2016)
- NIST's laboratory expertise provides measurement-based and unbiased data to improve decision-making in standards bodies

<u>Expert participation</u>

- 400+ NIST technical staff in 100+ standard committees
- Leadership in international standards bodies such as ASTM, IEEE, ISO, IEC

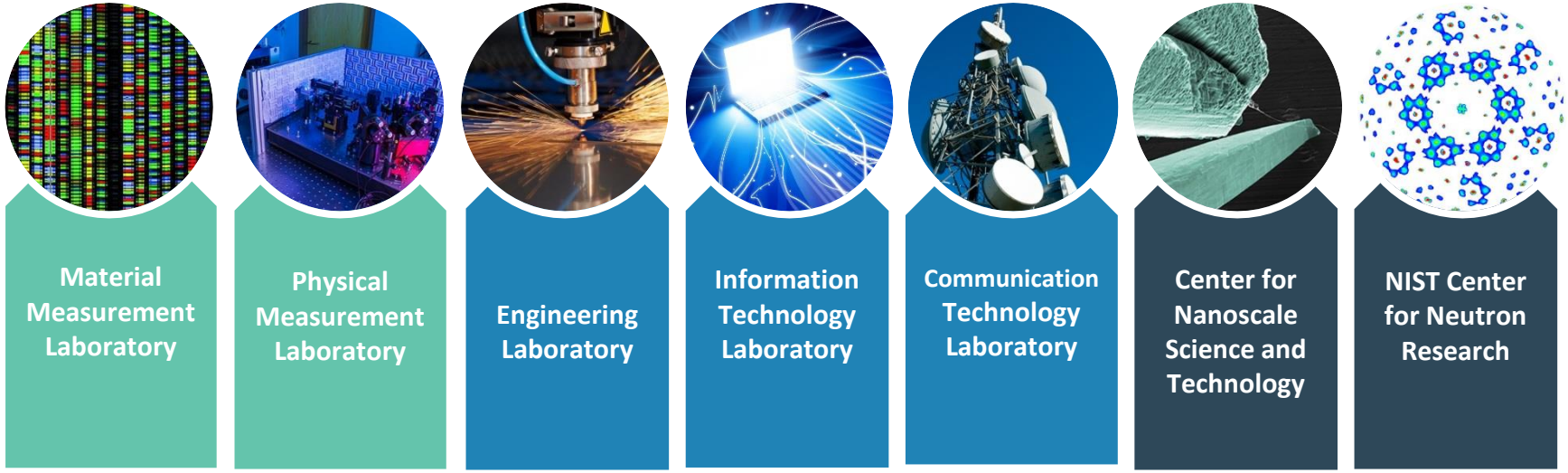
NIST robotics standards are catalyzing U.S. manufacturing transformation

Standards and conformity assessment requirements for public safety comms equipment is transforming emergency response



NIST studies of fire behavior led to changes in U.S. building codes, which saved lives

NIST Laboratory Programs

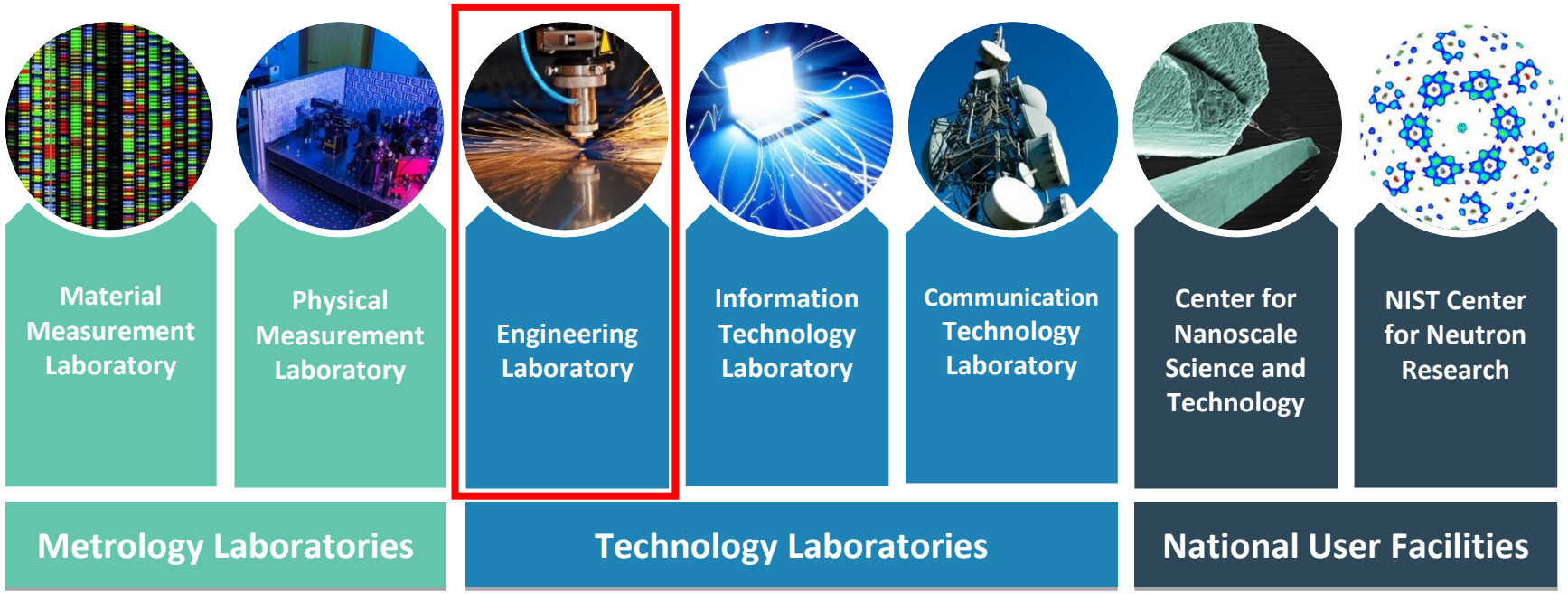


Driving innovation through Measurement Science and Standards

Accelerating the adoption and deployment of advanced technology solutions

Providing world class, unique, and cutting-edge research facilities

NIST Laboratory Programs



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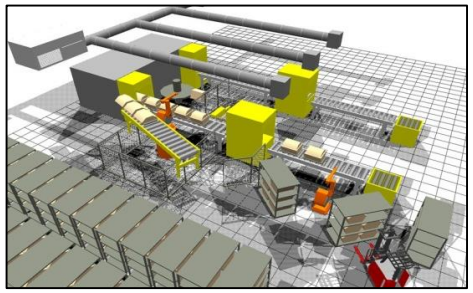
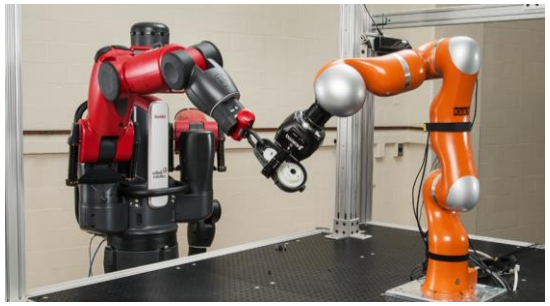
Focus on Smart Manufacturing

Smart Manufacturing Operations Planning and Control

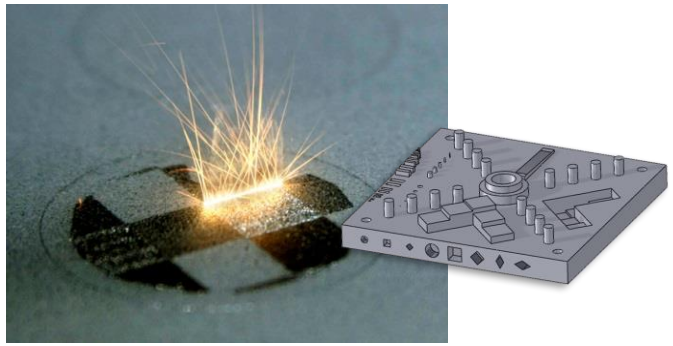
Smart Manufacturing Systems Design and Analysis





Robotic Systems for Smart Manufacturing

Measurement Science for Additive Manufacturing



NIST and Advanced Manufacturing

A partner to US manufacturers sector for more than a century, NIST helps the nation's manufacturers to invent, innovate, and create by:

- **Precision measurements** – manufacturers use NIST test methods, measurement tools, and scientific data every day
- **Advanced materials** – NIST is building a materials infrastructure to accelerate the timeline from design to deployment of new materials
- **Partnerships** – collaborations with the private sector and academic organizations help advance and disseminate research and support US manufacturers

NIST labs develop measurements and tools for areas including robotics performance

Manufacturing USA is a nationwide network of public-private institutes to meet technical needs and create tomorrow's workforce

Hollings Manufacturing Extension Partnership centers in every US state provide services to small and medium manufacturers

"It is therefore the unanimous opinion of your committee that no more essential aid could be given to manufacturing […] than by the establishment of the [National Bureau of Standards]."
House Committee report, May 1900

Final Message

- NIST and the Engineering Laboratory play an essential Federal government role by developing new measurement science, standards, and technology throughout manufacturing.
- Our role is to underpin standards and trade that supports US companies and helps them get better products to market faster.