NIST Update
Visiting Committee on Advanced Technology

James K. Olthoff
Associate Director performing the Nonexclusive Duties of the NIST Director

National Institute of Standards and Technology
U.S. Department of Commerce

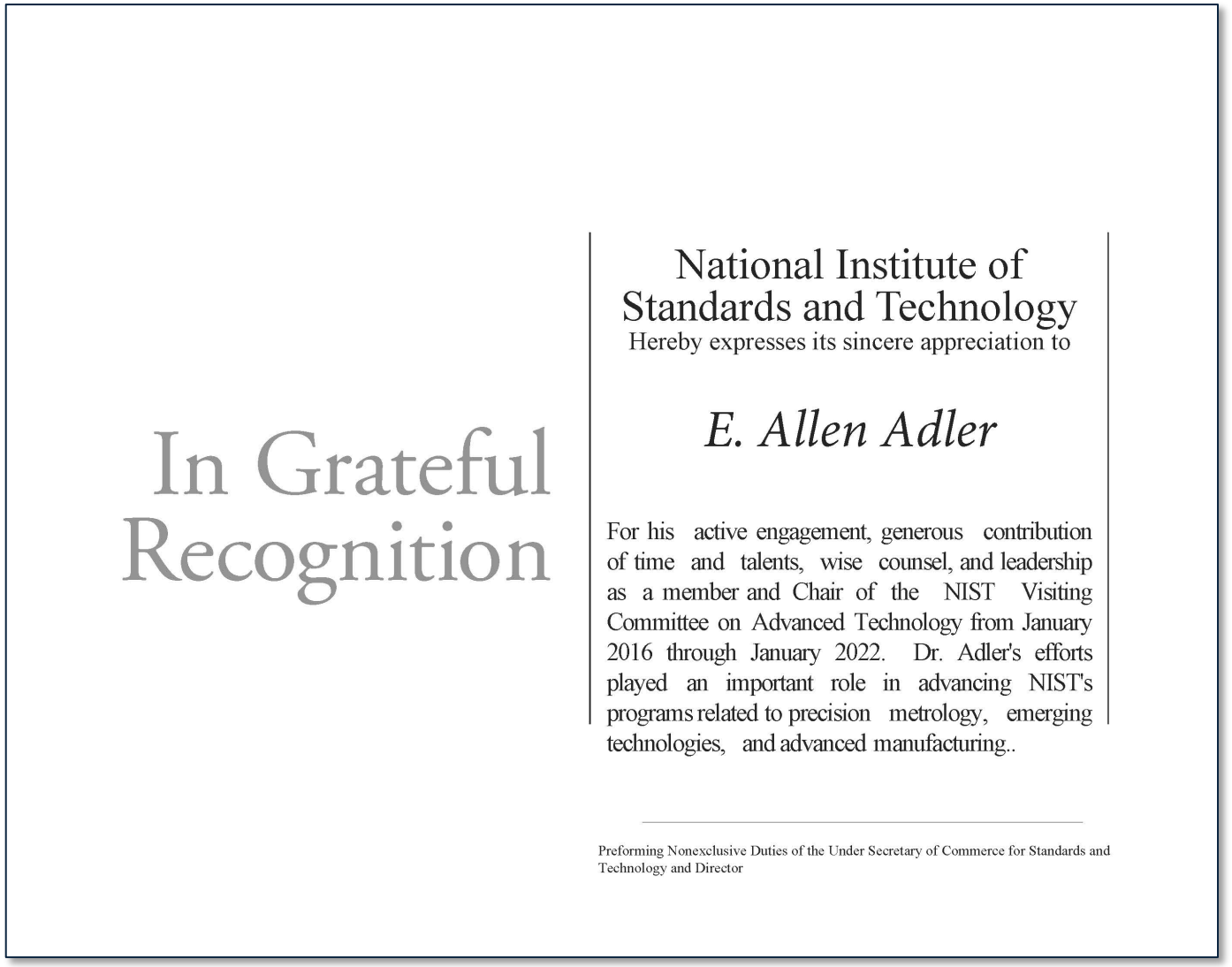
Virtual Meeting
October 26, 2021

VCAT Member Changes

Allen Adler (Chair)

Term ends January 24, 2022


Image Credit: NIST


In Grateful Recognition

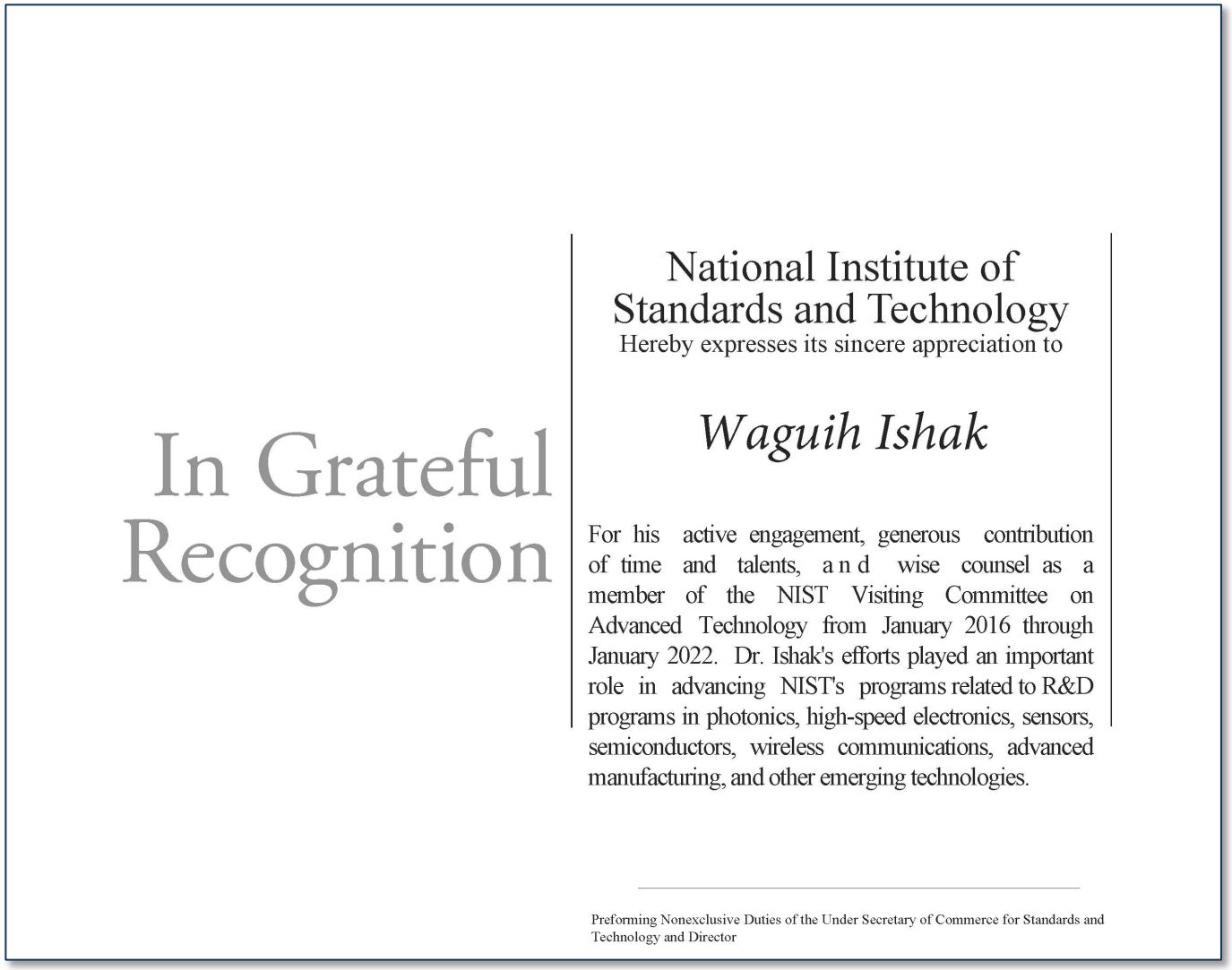
National Institute of Standards and Technology
Hereby expresses its sincere appreciation to

E. Allen Adler

For his active engagement, generous contribution of time and talents, wise counsel, and leadership as a member and Chair of the NIST Visiting Committee on Advanced Technology from January 2016 through January 2022. Dr. Adler's efforts played an important role in advancing NIST's programs related to precision metrology, emerging technologies, and advanced manufacturing..

Preforming Nonexclusive Duties of the Under Secretary of Commerce for Standards and Technology and Director

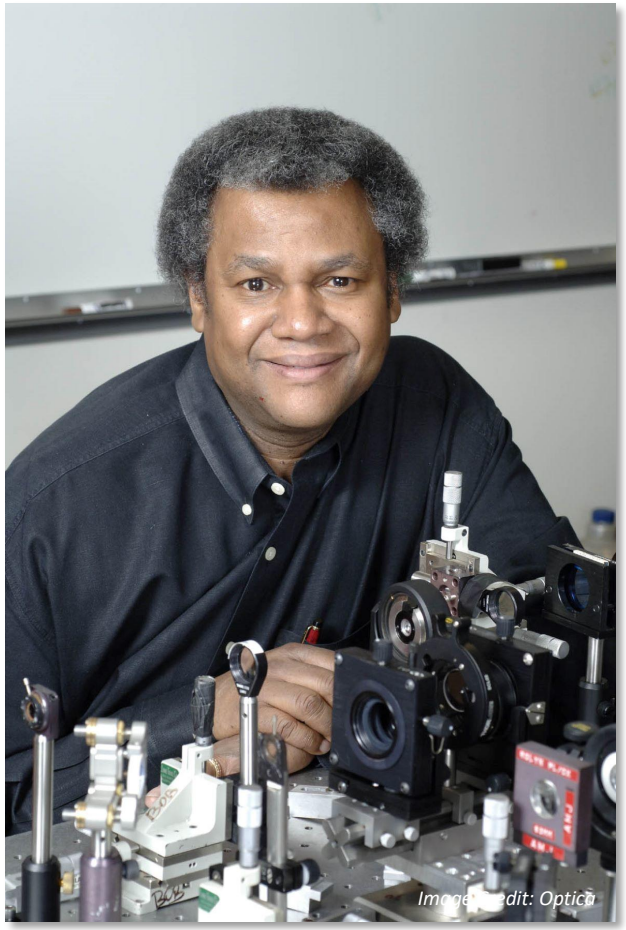
VCAT Member Changes



Waguih Ishak

Term ends January 24, 2022

Welcome New VCAT Member



Anthony M. Johnson

Director of the Center for Advanced Studies in Photonics Research (CASPR)

University of Maryland Baltimore County (UMBC)

NIST Leadership Changes


Image Credit: UMD

Dr. Laurie Locascio

Nominee for Under Secretary of Commerce for Standards and Technology, NIST Director

Vice President for Research at the University of Maryland, College Park and the University of Maryland, Baltimore

At NIST:

- Acting Principal Deputy Director and Associate Director for Laboratory Programs (ADLP)
- Material Measurement Laboratory (MML) Director

NIST Leadership Changes

Jennifer Huergo

Director,
Public Affairs Office

Jeffrey DiVietro

Acting Director, Technology Partnerships Office (TPO)

NIST Leadership Changes

Ms. Pravina Raghavan

Director,
Hollings Manufacturing
Extension Partnership (MEP)

Image Credit: U.S. Dept. of Commerce

Meeting Agenda

Session I: **NIST Update**

Session II: **Budget Update**

Session III: **NIST Climate In-Depth Discussion**

Session IV: **Cybersecurity In-Depth Discussion**

NIST Program Update – continued progress on our priorities

Session I: NIST Program Update

- NIST Update and Agenda Review
- Innovation and Industry Services Update
- Champlain Towers South Collapse Investigation Update
- NCNR Restart Update
- Safety Update

Artificial Intelligence Updates

AI Risk Management Framework

- Request for information JUL – SEP
- First virtual public workshop 19 – 21 OCT

Image Credit: NIST

U.S.-EU Trade and Technology Council (TTC)

- First meeting SEP 2021 had a focus on AI
- U.S. and EU to explore collaboration on privacy-preserving AI

National AI Advisory Committee (NAIAC)

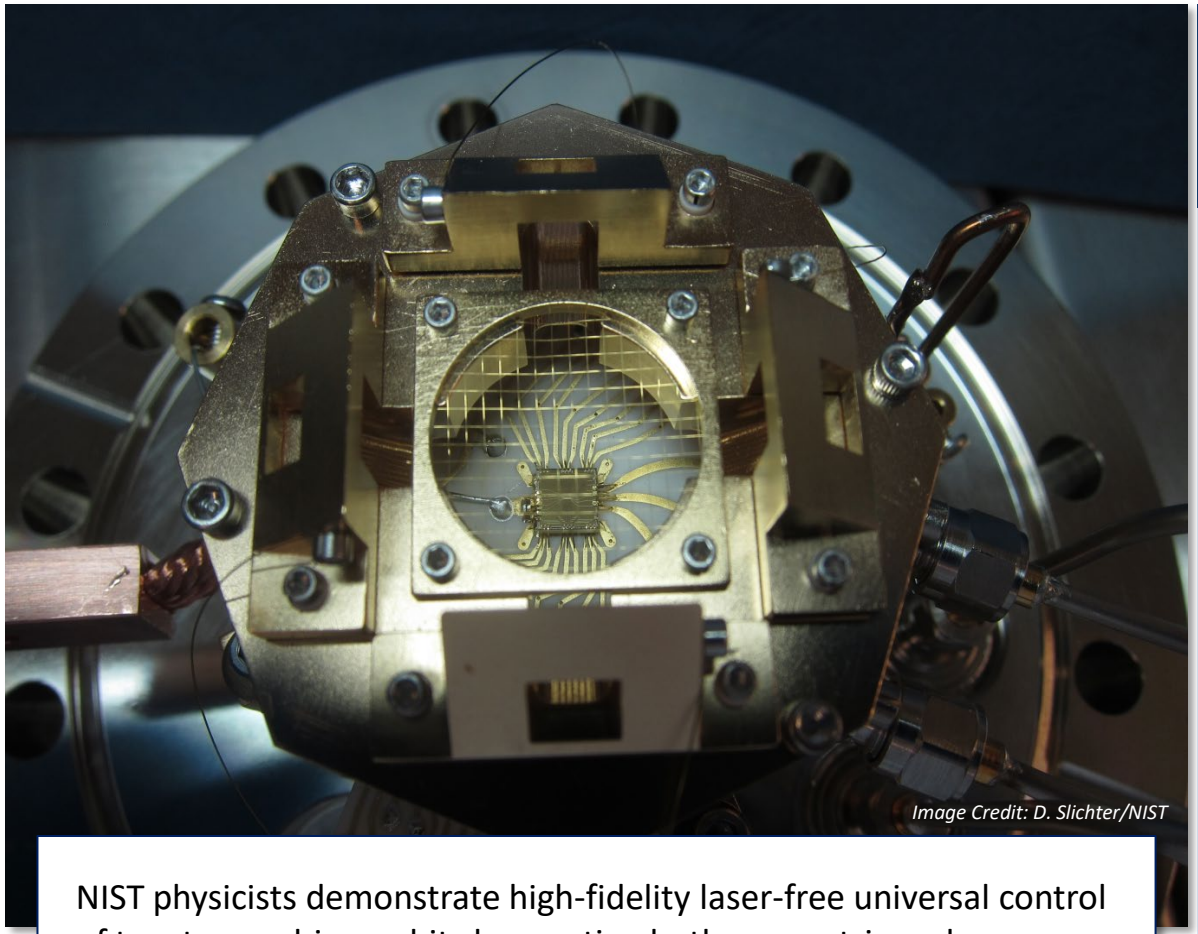
- Established launched call for nominations SEP
- To advise on AI topics including state of science and U.S. competitiveness, workforce issues

Hardware for AI

- Fabricating, measuring brain-inspired circuits and architectures
- Intersection of AI and quantum electromagnetics, nanoscale devices, applied physics

Image Credit: NIST

Quantum Information Sciences Updates



NIST physicists demonstrate high-fidelity laser-free universal control of two trapped-ion qubits by creating both symmetric and antisymmetric maximally entangled states. This could lead to new ways to make more powerful quantum computers based on ions (charged atoms).

Recent Workshops

19th International Workshop on Low Temperature Detectors
19-26 JUL

3rd Post-Quantum Cryptography Workshop
7-9 JUN

Recent Publications

High-fidelity laser-free universal control of trapped ion qubits
Nature
08 SEP

Topological frequency combs and nested temporal solitons
Nature Physics
05 AUG

Quantum-enhanced sensing of displacements and electric fields with two-dimensional trapped-ion crystals
Science
05 AUG

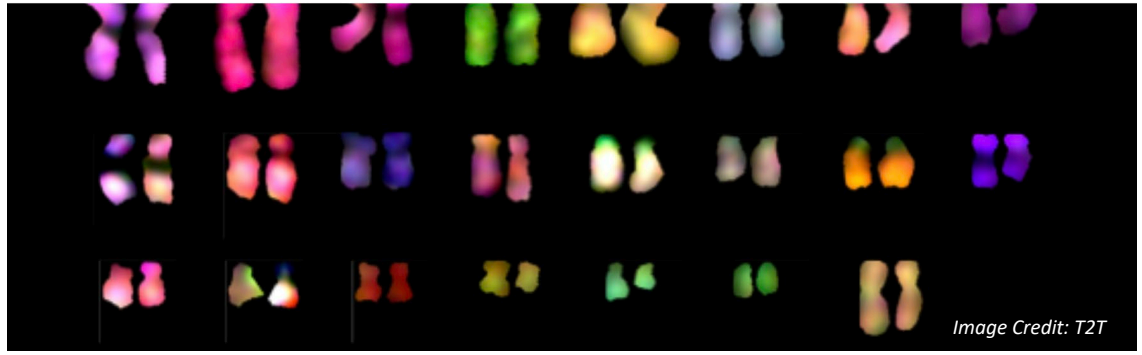
Quantum Economic Development Consortium (QED-C)

QED-C Introduces a Novel Approach to Measuring Performance of Quantum Computers
12 OCT

White House Summit on Quantum Industry and Society
05 OCT

Quantum Marketplace Webinars: A new series of monthly webinars highlighting QED-C companies in the quantum supply chain
26 AUG

Engineering Biology Update



"Two decades after the draft sequence of the human genome was unveiled to great fanfare, a team of 99 scientists has finally deciphered the entire thing. They have filled in vast gaps and corrected a long list of errors in previous versions, giving us a new view of our DNA." – **The New York Times**

https://sites.google.com/ucsc.edu/t2tworkinggroup

NIST co-led a team in the Telomere-to-Telomere (T2T) Consortium, which completed the last 7 % of the human genome

Benchmarking against the new NIST GIAB reference reduced errors up to 12-fold in 269 challenging, medically-relevant genes

Suite of high-profile preprints highlighted extensively in the media, including NY Times, The Atlantic, and New Scientist

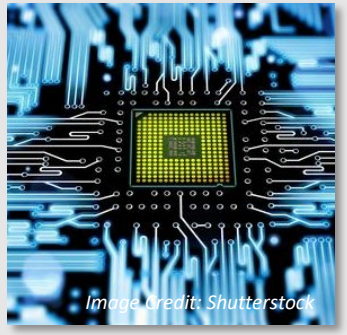
Image Credit: CDC

Advanced Communications Update

PSCR Division Open Innovation Prize Challenges

- 2021 First Responder Unmanned Aircraft System Challenge
- 2021 Mobile Fingerprint Capture for First Responders Challenge

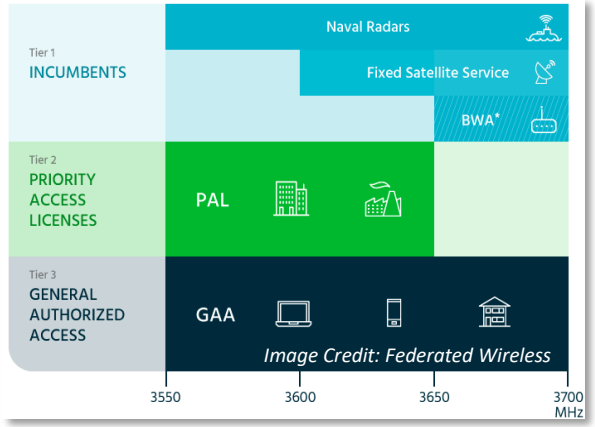
Securing the 5G Supply Chain through Measurements



- Developing measurements of signals radiated by user equipment (UE) that can discriminate between different UEs
- Engaging industry consortia to develop test use cases

Citizens Broadband Radio Service (CBRS) Sharing Ecosystem

- CTL to collect data for the Defense Spectrum Organization (DSO)
- Assess effectiveness of spectrum sharing between CBRS, DoD



Resilient and Intelligent NextG Systems (RINGS)

- New NSF grant program in partnership with NIST, DOD and industry partners including Apple, Ericsson, Google, IBM, Intel, Microsoft, Nokia, Qualcomm
- Goal is to accelerate research on RINGS

- $40M over 3 years to multidisciplinary projects that have significant impact on emerging Next Generation (NextG) wireless communications

Standards Update: The Way Forward

Increased PRC investment in R&D and SDO participation targeting critical and emerging (CET) technology creates a strategic challenge for the U.S.

Instead of "packing the room", the U.S. requires an agile and asymmetric approach built around:

1) **A sustained investment in R&D – a critical component of successfully influencing international standards**
2) **Expanded collaborations between allied governments, industry, and academia**
3) **A commitment to industry-led standards development processes**

NIST and DOC efforts will ensure that the U.S. and its allies have a sustainable foundation for continued leadership in SDO activity for CET

Image Credit: Atlantic Council

Standards Update: New International Engagement

Image credit: Official White House Photo by Adam Schultz

Quadrilateral Security Dialogue (Quad)

- **First-ever Quad Leaders Summit held in SEP 2021**
- **Released a joint statement that included CET standards**
- **U.S. (NIST) chairs the CET WG Standards Subgroup**
- **NIST leading efforts to facilitate coordination on technology standards development, including public and private sectors**
- **Addressing risks to U.S. economic and national security during the global deployment of 5G**

Image credit: State Department Photo by Ron Przysucha/ Public Domain

U.S.-EU Trade and Technology Council

- **Inaugural meeting "Pittsburgh Summit" in SEP 2021**
- **NIST and ITA Co-Chair Technical Standards Subgroup**
- **Identified AI as CET area of interest (advanced manufacturing and advanced communications TBD)**
- **Collaborating on a U.S.-EU** INTERNATIONAL Standards Alert **system**
- **Identifying opportunities to engage the private sector**

Standards Update: New Tools

Selected ISO New Work Item Proposals (NWIPs) of Note

In this section:

- **NWIPS that would establish a New Project Committee (PC)**
- **Proposal for the U.S. Relinquishment of ISO Technical Committee Secretariat**
- **ISO: NWIPS with no U.S. participation in the Technical Committee**
- **ISO: NWIPS in key areas with U.S. participation in the Technical Committee**
- **IEC: NWIPS in key areas with U.S. participation in the Technical Committee**

NWIPS that would establish a New Project Committee (PC)

Project Title	ISO TC	Proposer/ Secretariat	Comment Deadline
Promotion and Implementation of Gender Equality	New Project Committee	France	2021-06-25
Application of ISO 9001 in Policing Organizations	New Project Committee	Canada	2021-07-30

NIST National Institute of Standards and Technology U.S. Department of Commerce | INTERNATIONAL TRADE ADMINISTRATION | U.S. DEPARTMENT OF STATE

- Partnership between NIST, ITA, and DOS
- Managed by NIST Standards Coordination Office
- Notification service for U.S. Government staff
- 1140 USG subscribers (AUG 2021)
- Lists new international standards activities of potential interest to U.S. Government
- Increases awareness of PRC proposals while they are still potentially actionable
- Covers ISO and IEC activities but will expand to cover additional SDOs

NIST Proposed Infrastructure Construction Program

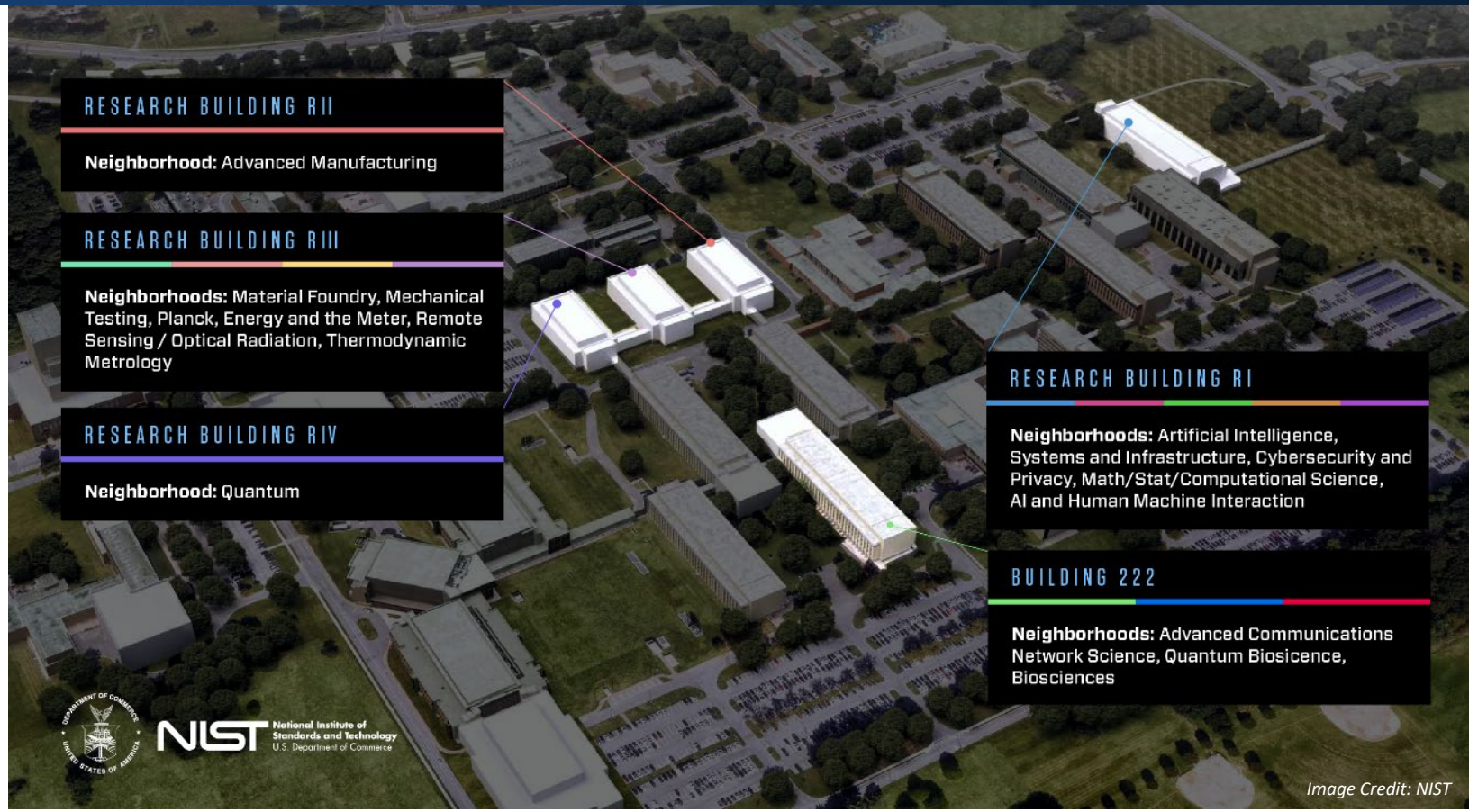
NIST infrastructure master plan reviewed in the context of congressional infrastructure legislation

Financial

- $4.2 billon program
- 80% of FY2020 deferred maintenance would be eliminated

Components

- Focuses on new construction and utility infrastructure
- 1 Mega Project for each campus
- Phasing, acquisition strategies, and prioritized project list developed
- Follow-on phases for remaining renovation



Laboratory Planning Approach

- Research Neighborhood concept aligns NIST research with Congressional priorities

Duration

- Gaithersburg: 12 years; Boulder: 5 years

NIST Research Neighborhoods Concept

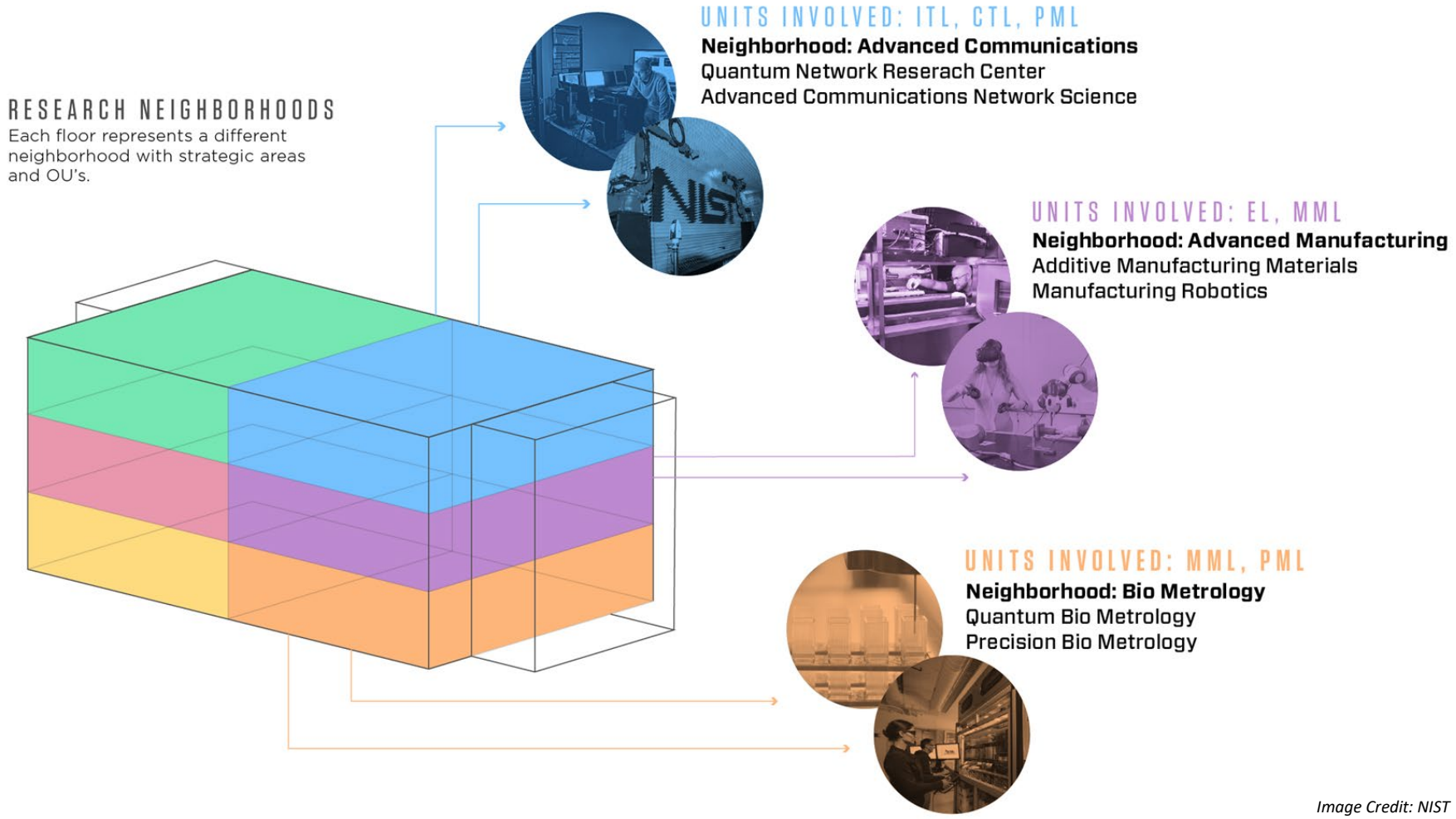


Image Credit: NIST

Concept Models

- Multiple OUs
- Synergistic areas
- 222 first and then all GPLs

Highlights

- Address critical and emerging technologies
- Each neighborhood will have laboratory space, computing resources, and collaboration spaces that encourage more diverse project teams, collaboration, and reduce redundancies

American COMPETE Act Studies

Image Credit: PopTika/Shutterstock

Studies on **emerging technology areas** to recommend policy and legislative proposals

- Established subject matter expert teams
- Contracted the Science and Technology Policy Institute (STPI) and Quantum Economic Development Consortium (QED-C)
- Request for Information (RFI) under review

Final report due to Congress 31 DEC 2022

Artificial Intelligence | Blockchain Technology

Internet of Things (IoT) | IoT in Manufacturing

New & Advanced Materials | Quantum Computing

3D Printing | Unmanned Delivery Service

DEIA at NIST | External Efforts

NIST is working with DOC in responding to several Executive Orders on Diversity, Equity, Inclusivity, and Accessibility (DEIA) in the federal workforce

- **EO 13985** Advancing Racial Equity and Support of Underserved Communities Through the Federal Government
- **EO 14019** Promoting Access to Voting
- **EO 14020** Establishment of the White House Gender Policy Council
- **EO 14035** Diversity, Equity, Inclusion, and Accessibility in the Federal Workforce

DEIA at NIST | External Efforts


Image Credit: Pexels

Grassroots efforts across NIST labs

- The Engineering Laboratory Diversity, Inclusion, and Belonging Council transitioned leadership after its inaugural year
- The Material Measurement Laboratory formed four Equity & Inclusivity Working Groups on Data and Tools, Work Environment, Advancement, and Processes
- The Information Technology Laboratory Diversity Committee continues work to achieve the vision and goals of NIST on Diversity in ITL

Office of Diversity, Equity, and Inclusion

- Conducted DEIA Listening and Learning Tour (AUG)

NISTIR 8366

- Guidance for NIST Staff on Using Inclusive Language in Documentary Standards

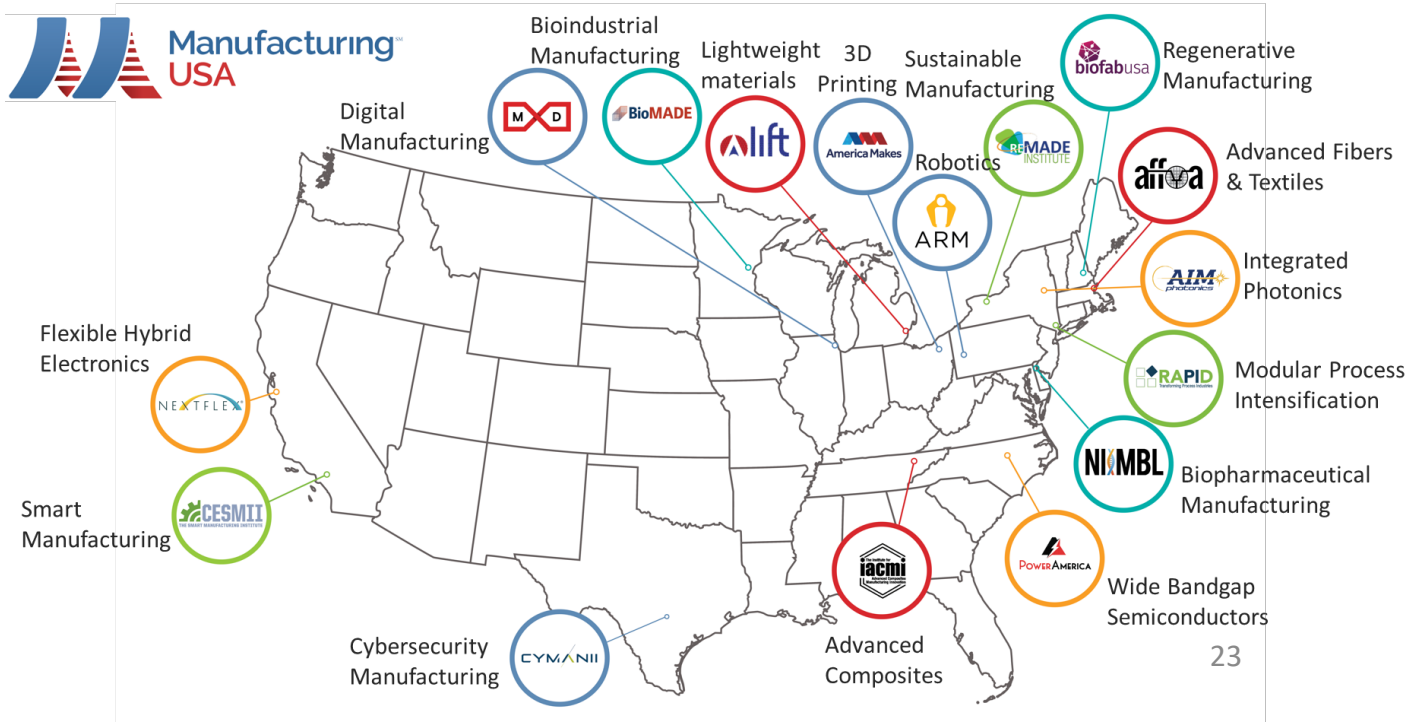
Manufacturing USA Program Update

Highlight: FY2021 Advanced Manufacturing Technology Roadmap Grants Program (MfgTech Roadmaps)

- Proposals to develop technology roadmaps for promising AM clusters with emphasis on areas of critical interest
- Establish new or strengthen existing manufacturing technology consortia
- $3M total. Anticipate funding 10 proposals ($300K each)
- Competition published in JUN 2021. Proposals due AUG 2021
- 51 applications under review. Anticipated award NOV/DEC 2021

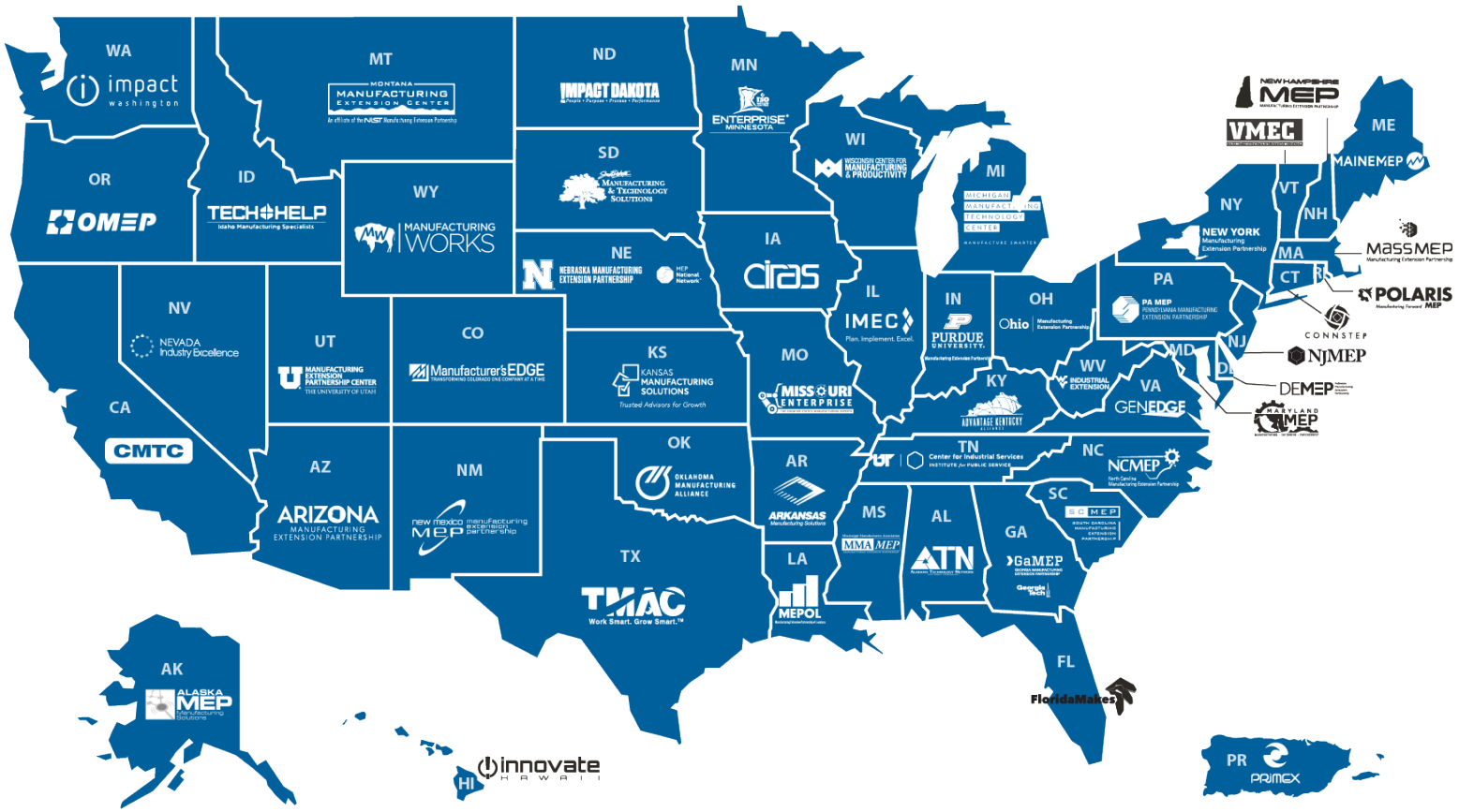
AMTECH
Advanced Manufacturing Technology Consortia

- **Builds off successful FY2012-2013 AmTech Program**
- **AmTech roadmap was leveraged for current Institutes**
- **In 2015, activities of AMTech were merged into MFG USA**



MEP Update

Highlight: FY2022 Priorities



Publish a new MEP National Network™ Strategic Plan for FY23-28

- Talent development
- Supply chain
- Technology demonstration

If $275M FY2022 appropriation occurs

- Onboard new MEP staff
- Increase MEP Center Base Award Cooperative Agreements by at least $40M
- Award at least $50M in new Competitive Awards to MEP Centers

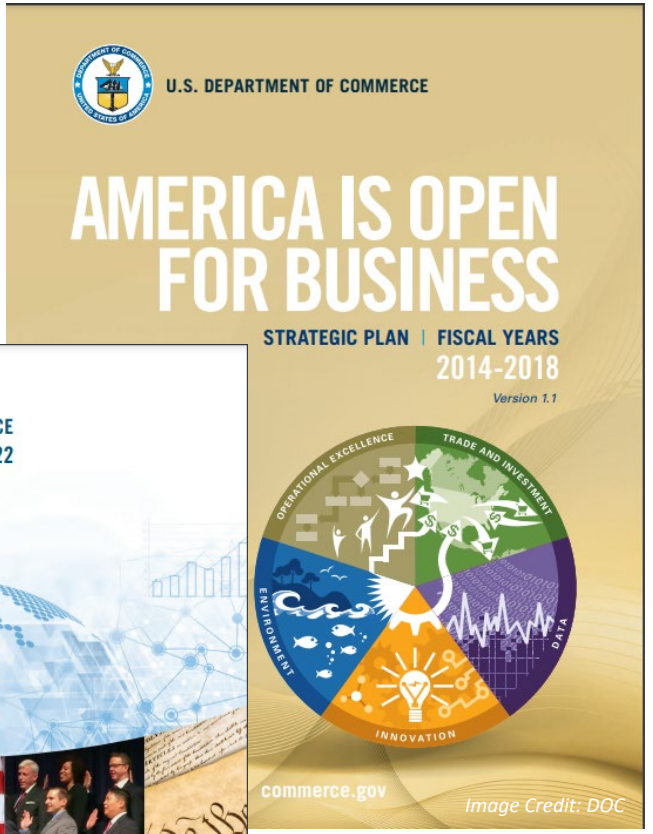
DOC Strategic Plan Update

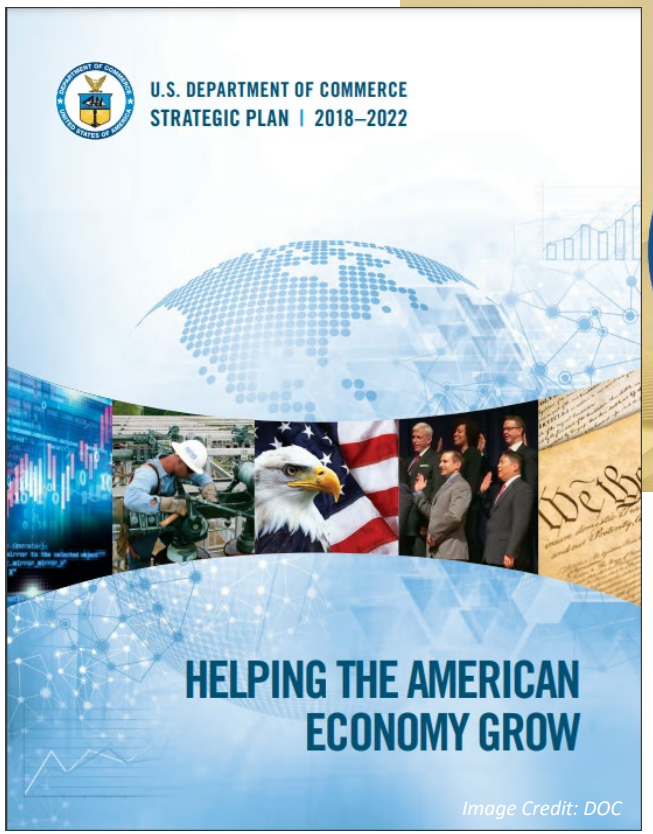
Key Themes

- Innovation and Global Competitiveness
- Economic Development
- Climate
- Equity (ethical and responsible data practices, making data more accessible)
- Customer Service

NIST's Role

- Revitalize U.S. manufacturing and strengthen domestic supply chains
- Accelerate development, commercialization, and use of critical and emerging science and technologies
- Improve the Nation's cybersecurity and protect Federal government networks





DISCUSSION