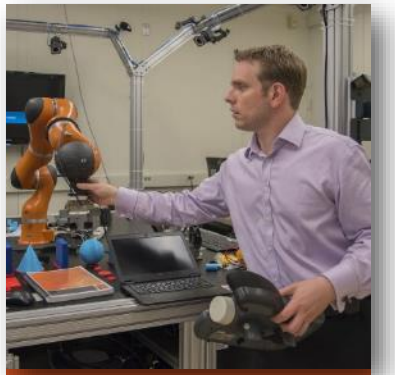
FY 2021 Administration R&D Budget Priorities – NIST Alignment

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

VCAT

October 29th, 2019

NIST Programmatic Priorities



Advanced Manufacturing

Cybersecurity

Disaster Resilience

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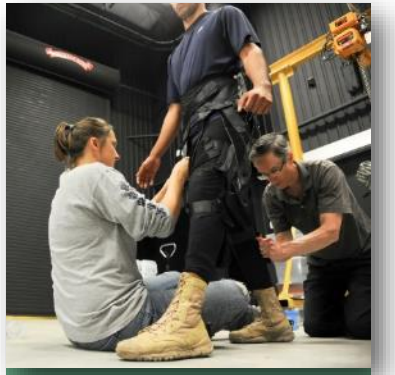
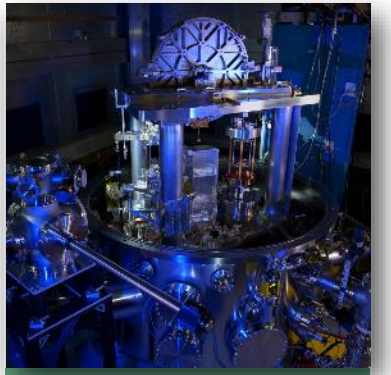
Engineering Biology

Internet of Things



Documentary Standards

Technology Transfer



Measurement Dissemination

Quantum Science

Artificial Intelligence

Five R&D Budgetary Priorities

American Security

Leadership in Industries of the Future

Energy and Environmental Leadership

Health & Bioeconomic Innovation

Space Exploration and Commercialization

OMB Five R&D Budgetary Priorities

I. American Security

- Advanced Military Capabilities
- Critical Infrastructure Resilience
- Semiconductors
- Critical Minerals

Selected Relevant NIST Activities

- community resilience, WUI, NEHRP, structural performance, engineered materials, Public Safety Communications Advanced Composites , cybersecurity, PNT
- MEP – providing support and assistance to local manufacturers after disasters

Disaster Resilience

Relevant NIST activities

- single and few atom device fabrication, neuromorphic, integrated photonics, nanophotonic circuits, imaging and characterization, optical 3D metrology, nCORE

OMB Five R&D Budgetary Priorities

II. American Leadership in Industries of the Future

Artificial Intelligence, Quantum Information Science, and Computing

Quantum Science:

- QEDC, Quantum-based metrology, Quantum engineering, Quantum Communications, JQI, JILA, QuICS, post-quantum cryptography

Artificial Intelligence:

- Trustworthy AI, application in materials communications, IoT, biosciences

Quantum Science

Artificial Intelligence

Advanced Communications Networks and Autonomy

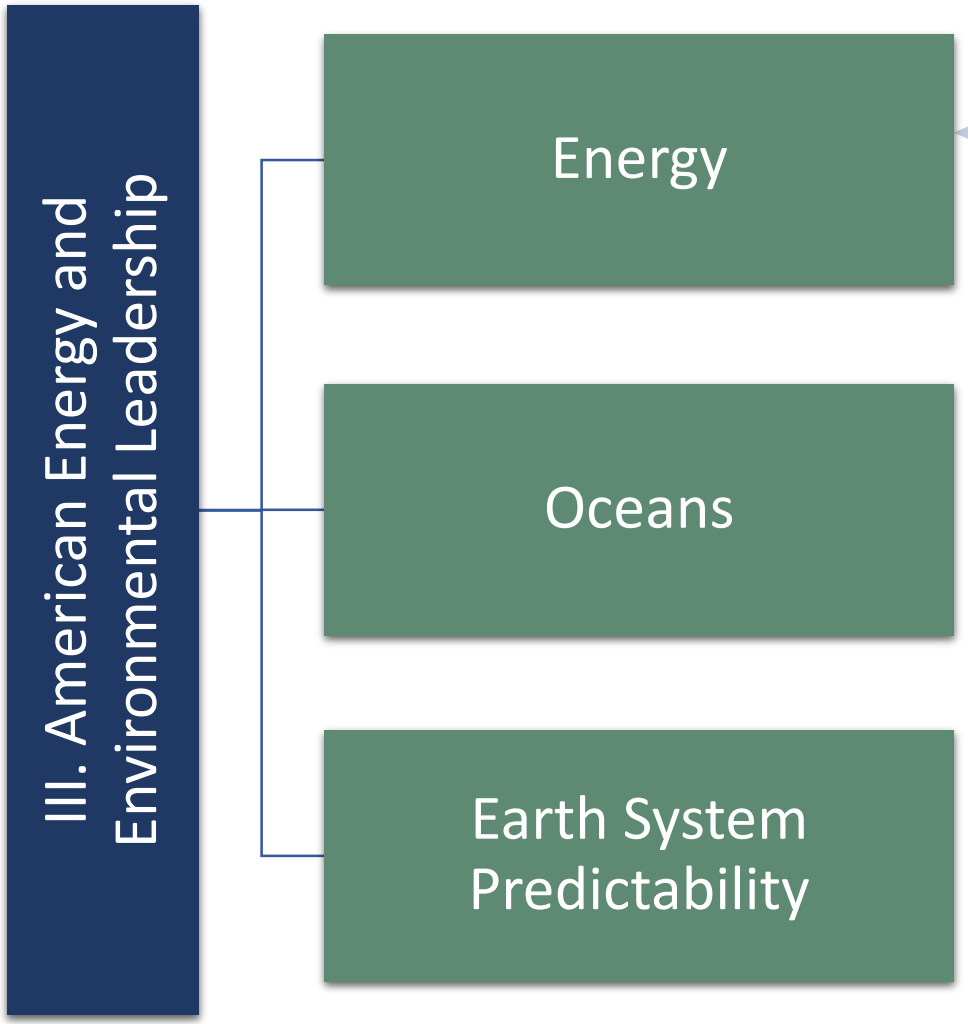
- public safety communications, next generation wireless, spectrum sharing, metrology of communications, trustworthy networks, cyber physical systems/IoT cybersecurity, 5G standards, UAS Challenge

Advanced Manufacturing

- additive manufacturing, robotics, integration, smart manufacturing , advanced materials, biomanufacturing, precision measurements, nSOFT
- Manufacturing USA
- MEP Network

Advanced Manuf-ing

OMB Five R&D Budgetary Priorities



Relevant NIST Activities

- Net-Zero Energy, High-Performance Buildings, Embedded Intelligence in Buildings, Smart Grid, biofuels, sustainability and recycling

Related Efforts:

- Sensor development and calibrations for earth observations, GHG monitoring and prediction, water quality, HML, ocean plastics, marine specimen bank

OMB Five R&D Budgetary Priorities

IV. American Health & Bioeconomic Innovation

- Biomedicine
- Veteran Health and Wellness
- Bioeconomy

Relevant NIST Activities

- clinical diagnostics, medical imaging, biomanufacturing and characterization of complex biotherapeutics, NIIMBL, IBBR, detection of synthetic opioids, standards for health IT

Engineering Biology

Relevant NIST Activities

- Gene editing consortia, advanced sequencing, proteomics, genomic reference materials, living measurement systems foundry (pro and eukaryotic systems), JIMB

OMB Five R&D Budgetary Priorities

V. American Space Exploration and Commercialization

"…return of Americans to the Moon's surface by 2024 and utilizing the Moon as a proving-ground for a future human mission to Mars".

"…in-situ resource utilization on the Moon and Mars, cryogenic fuel storage and management, in-space manufacturing and assembly, and advanced space-related power and propulsion capabilities".

Participating Laboratories:

- CTL – hosted a workshop on Space Commerce
- ITL – cybersecurity in space operations

Activities supporting Space Exploration:

- Advanced manufacturing
- Materials development and measurements
- Sensors for space measurements

Five High-Priority Crosscutting Actions

Build and Leverage a Diverse, Highly Skilled American Workforce

Create and Support Research Environments that Reflect American Values

Support Transformative Research of High Risk and Potentially High Reward

Leverage the Power of Data

Build, Strengthen, and Expand Strategic Multisector Partnerships

Priority Crosscutting Actions

- Build and Leverage a Diverse, Highly Skilled American Workforce
- Create and Support Research Environments that Reflect American Values
- Support Transformative Research of High Risk and Potentially High Reward
- Leverage the Power of Data
- Build, Strengthen, and Expand Strategic Multisector Partnerships

1. STEM literacy
2. Increase diversity, equity, and inclusion in STEM
    1. help build R&D capacity at institutions that serve high proportions of underrepresented or underserved groups
    2. foster collaboration and coordination among higher education institutions, the private sector, and nonprofits
3. Prepare STEM workforce, including college-educated STEM workers
    1. facilitate the advancement of early career R&D professionals
4. Prepare skilled trades that do not require a four-year degree.

Priority Crosscutting Actions

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- Build, Strengthen, and Expand Strategic Multisector Partnerships

Four high-priority areas related to research environments require significant attention:

1. Reducing administrative burdens on Federally-funded research;
2. Improving rigor and integrity in research;
3. Creating safe and inclusive research environments; and
4. Protecting American research assets.

Priority Crosscutting Actions

- Build and Leverage a Diverse, Highly Skilled American Workforce
- Create and Support Research Environments that Reflect American Values
- **Support Transformative Research of High Risk and Potentially High Reward**
- Leverage the Power of Data
- Build, Strengthen, and Expand Strategic Multisector Partnerships

"…ensure that review processes fully consider the possible rewards, risks, and benefits of failure for potentially transformative research."

Priority Crosscutting Actions

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Cross-Agency Priority (CAP) Goal 2, "Leveraging Data as a Strategic Asset," describes three objectives:

1. develop a long-term, enterprise-wide Federal Data Strategy to better govern and leverage the Federal Government's data
2. enable Government data to be accessible and useful for the American public, businesses, and researchers
3. improve the use of data for decision-making and accountability for the U.S. Government, including for policy-making, innovation, oversight, and learning.

Priority Crosscutting Actions

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- Build, Strengthen, and Expand Strategic Multisector Partnerships

1. Prioritize investments and policies that facilitate or strengthen multisector partnerships
2. Advance regional collaboration for innovation economies
3. Support research infrastructure
4. Further the objective of CAP Goal 14 to "Improve Transfer of Federally-Funded Technologies from Lab-to-Market
5. Leverage existing and create new partnerships, share best practices, data, user facilities, and other resources to the extent possible
6. Define measures of success and describe how relevant R&D investments improve the number, variety, and quality of partnerships
7. Consider methods to reduce regulatory and administrative barriers and align incentives to facilitate multisector engagement

Questions?