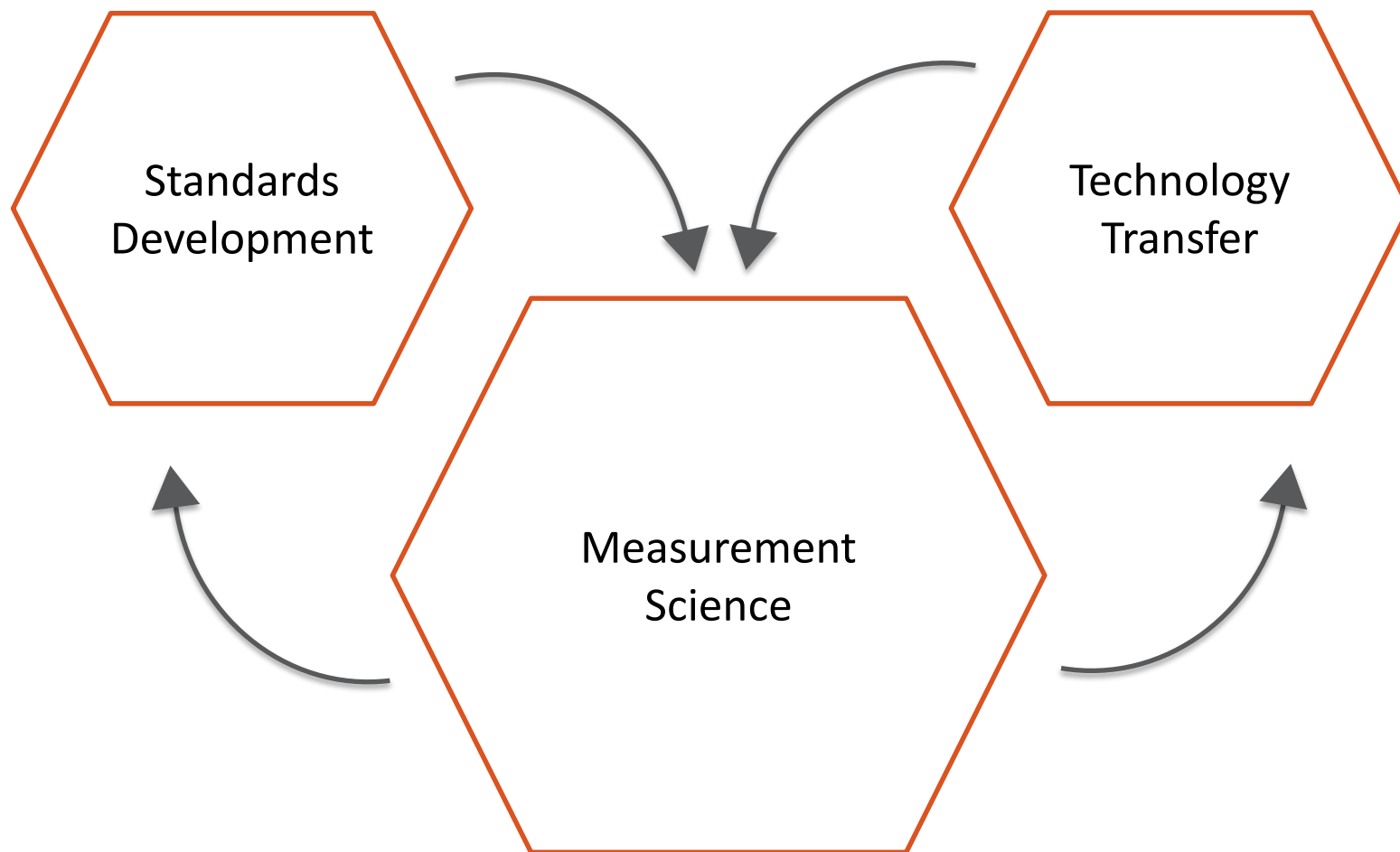# Balancing the NIST Core

Kent Rochford

Associate Director for Laboratory Programs

June 7, 2016

What is the NIST Core?

What is the NIST Core?

- Foundation for everything we do
  - Unique to the NIST mission

- Developed internally
  - Intramural research focus
  - Allows self direction

- Requires engagement with stakeholders to ascertain measurement needs
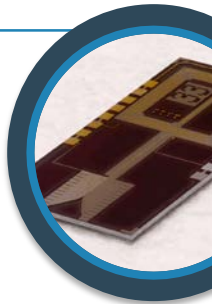
Measurement Science

What is the NIST Core?

- **Measurement standards**
  - SRMs, SRD, calibrations
  - Enable traceability
  - International responsibilities

- **Documentary standards**
  - NIST technical expertise and neutrality
  - Lends credibility and authority to SDOs

Standards Development

What is the NIST Core?

- Defined broadly
  - SRMs, SRD, calibrations
  - Publications, patents
  - Workshops, conferences
  - Consortia
  - Guest researchers
  - Other agency work
- Requires active engagement
  - No "throwing it over the fence"
  - Participation informs planning

Technology Transfer

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

Attributes of the Core

- **Long-term**
  - Research can address hard problems with sustained focus

- **Self-directed**
  - Allows anticipation of needs
  - Grows expertise over a broad mandate

- **Intramural**
  - Captive expertise fulfills unique role in science/commerce
  - Protects objectivity & neutrality

Long-term, self-directed, intramural research

Maintaining the Core

- Base funding provides stability

- New or high-priority ideas funded internally through
  - Innovations in Measurement Science (IMS)
  - Strategic and Emerging Research Initiatives (SERI)
  - Lab-level initiatives
  - Base redirection

IMS: 5 year / $5M, high-risk, high-reward, peer reviewed, management selected

SERI: up to 3 year, size varies, leadership directed

Maintaining the Core

- Growth set by Administration, Congress, and NIST leadership
  - Affects small portion of budget
  - Focused on specific priorities
  - May come with outsized obligations that pull from core

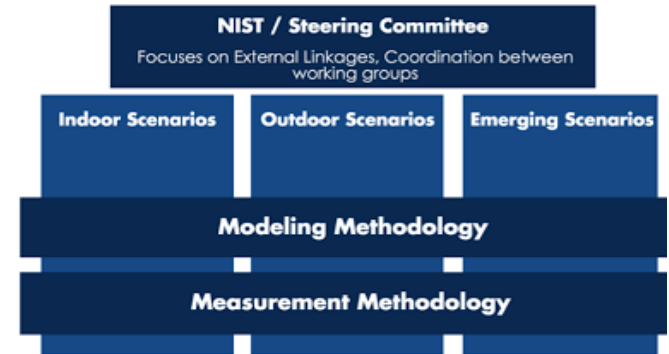- NIST reputation is leading to repeated demands on the core

Long-term, self-directed, intramural research

Things that can overtake the core:
- Underfunded obligations
- Unfunded mandates
- Special administration initiatives
- **Extramural convening**

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

NIST's Convening Role

- **NIST is an attractive convener**
  - Technically competent
  - Industry focus / contacts
  - Non-regulatory
  - Neutral
  - Credible

- **Technology topics often complex**
  - Deep technical issues
  - Multi-stakeholder involvement

NIST / Steering Committee
Focuses on External Linkages, Coordination between working groups

Indoor Scenarios	Outdoor Scenarios	Emerging Scenarios

Modeling Methodology

Measurement Methodology

Frameworks
Consortia
Common Definitions
Challenges
Commissions

Necessary for Successful Convening

- Motivated stakeholders

- NIST expertise in subject area

- NIST relationship and credibility with stakeholders

- Commitment by NIST leadership
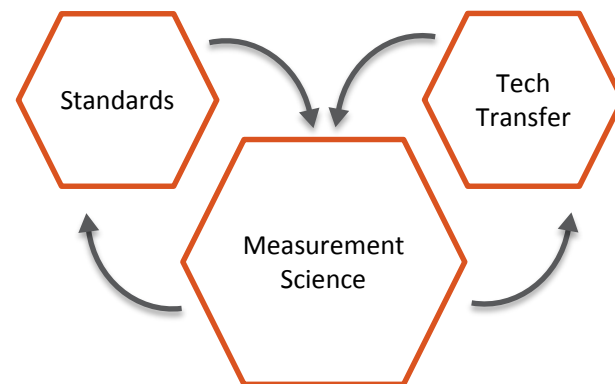
Global City Team Challenge Expo Peter Cutts/NIST

NIST has a long history of successful convening, but is the nature changing?

Legislated Mandates

- Voting standards (ITL)

- FISMA (ITL)

- Smart Grid (EL)

- National Construction Safety Team Act (EL)

- National Earthquake Hazards Reduction Program (EL)

- National Windstorm Impact Reduction Program (EL)

- Public Safety Communication Research (CTL)

IB

Union Calendar No. 158

107TH CONGRESS
1ST SESSION

H. R. 2275

[Report No. 107–263]

To amend the National Institute of Standards and Technology Act to ensure the usability, accuracy, integrity, and security of United States voting products and systems through the development of voluntary consensus standards, the provision of technical assistance, and laboratory accreditation, and for other purposes.

Can be directed as:

Authorizing acts (unfunded)

Appropriations (funded)

Administration Mandates

- Cybersecurity Framework (ITL)

- Materials Genome (MML)

- Climate Action Plan (EL)

- Forensic Organization of Scientific Area Committees (SPO)

- Commission on Enhancing National Cybersecurity (ITL)

NIST set up, staffed, and funded the Commission on Enhancing National Cybersecurity

Trend Towards Convening: Frameworks

2008 2009 2010 2011 2012 2013 2014 2015 2016

Smart Grid

Dec 2007
Legislation

Cybersecurity

Feb 2013
Executive Order

Disaster Resilience

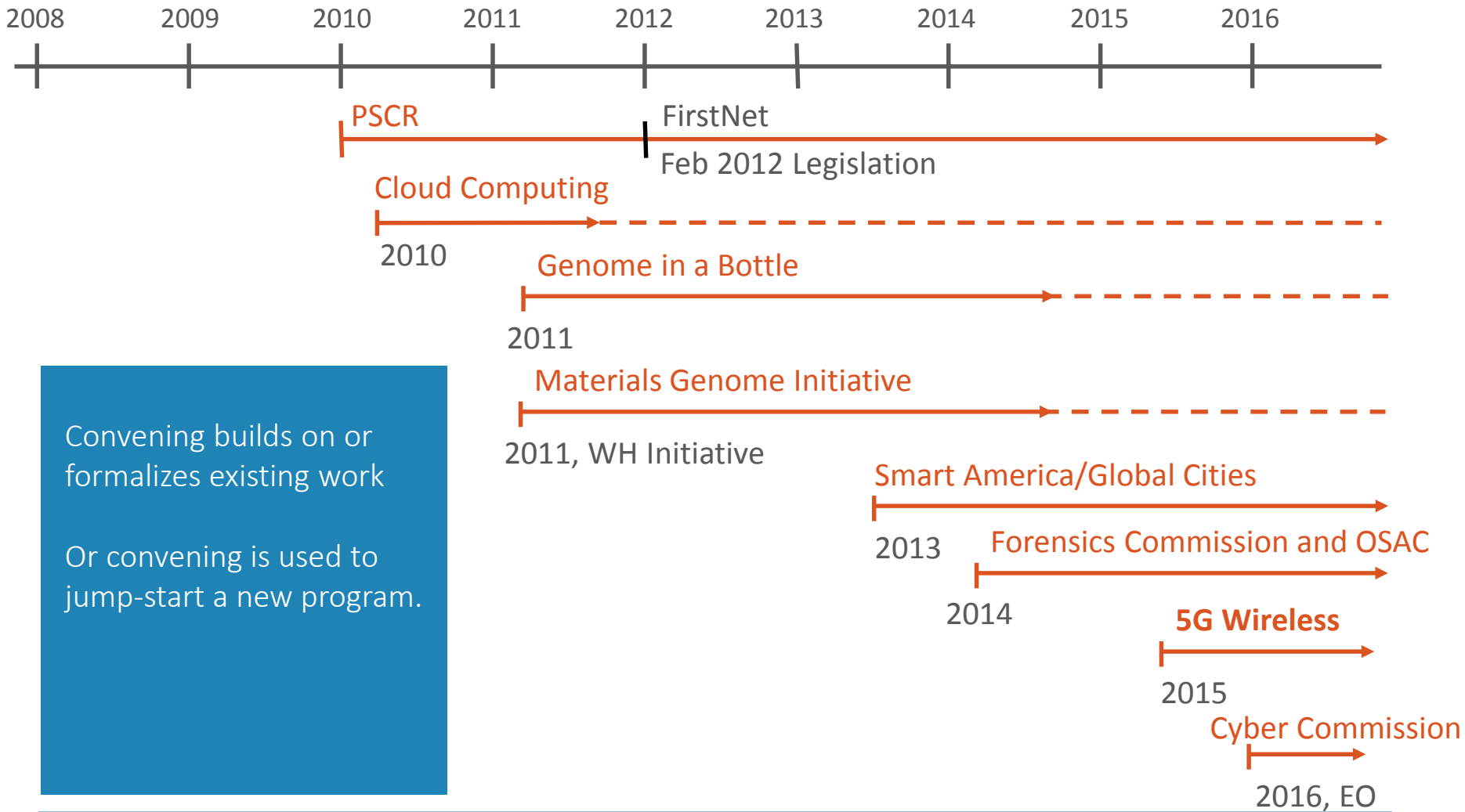June 2013
Climate Action Plan

Big Data

June 2013

Cyber-Physical Systems

June 2014
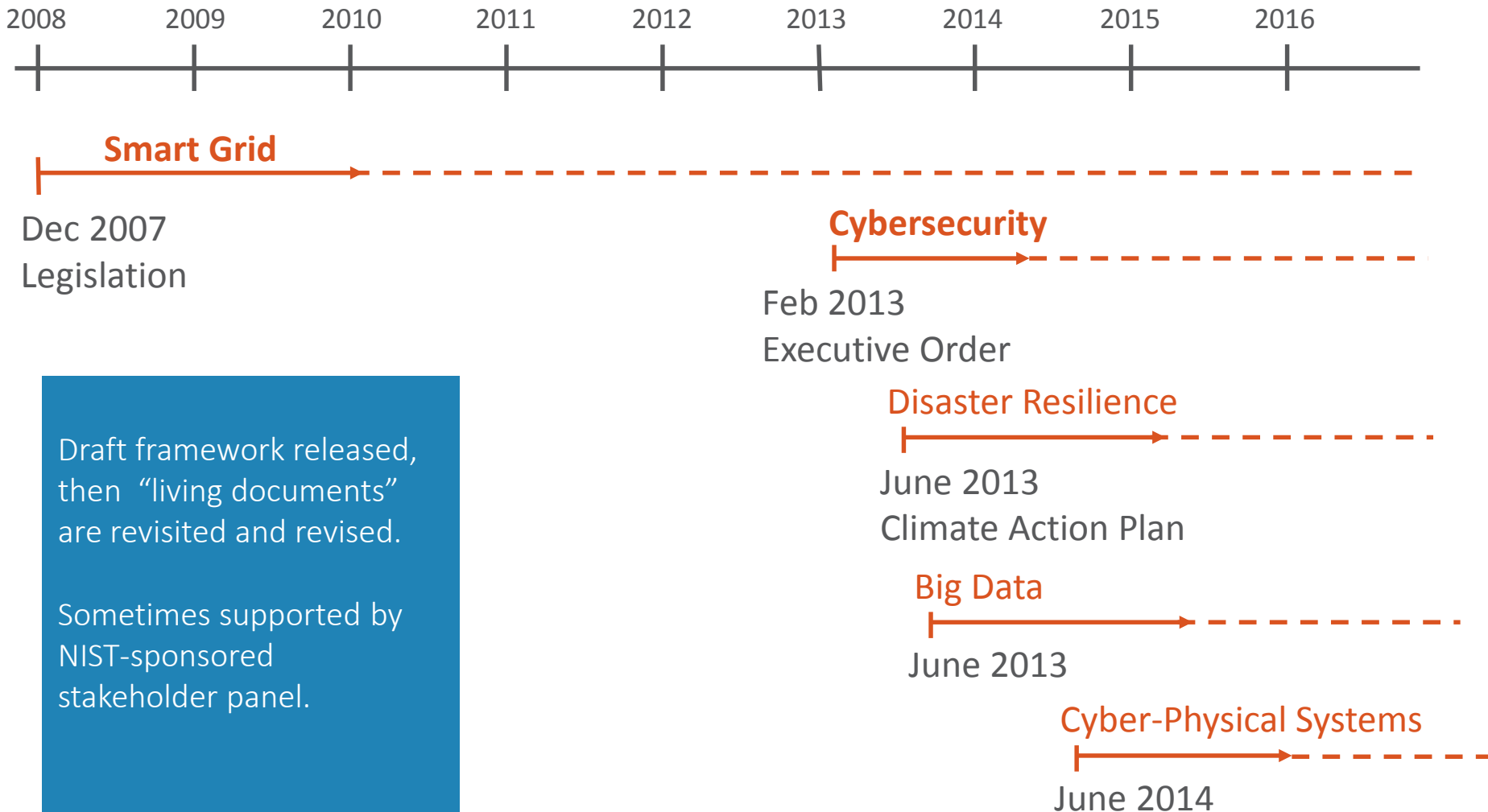
Draft framework released, then "living documents" are revisited and revised.

Sometimes supported by NIST-sponsored stakeholder panel.

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

Trend Towards Convening: and More

2008   2009   2010   2011   2012   2013   2014   2015   2016

PSCR

FirstNet

Feb 2012 Legislation

Cloud Computing

2010

Genome in a Bottle

2011

Materials Genome Initiative

2011, WH Initiative

Convening builds on or formalizes existing work

Or convening is used to jump-start a new program.

Smart America/Global Cities

2013

Forensics Commission and OSAC

2014

5G Wireless

2015

Cyber Commission

2016, EO

Costs and Benefits of Convening

- **Benefits**
  + Increases visibility among stakeholders
  + Inputs guide internal research programs
  + Leverages others to expand competency
  + Reputation enhanced by successes
  + **NIST is seen as the "go to" organization**

- **Costs**
  – Opportunity cost: pulls resources from the bench
  – Depletes competence
  – Inefficiencies of pace
  – Hard to spin off or end
  – May bias stakeholder perspective of NIST
  – **NIST is seen as the "go to" organization**

Not the First Time…

- ## In 1970s, NIST was overleveraged
  - Other agencies funded ~ 40% of lab programs

- ## Response was the *Competence Program*
  - Aimed at 15% of lab budget
 - Now known as *Innovations in Measurement Science* at ~3% of budget
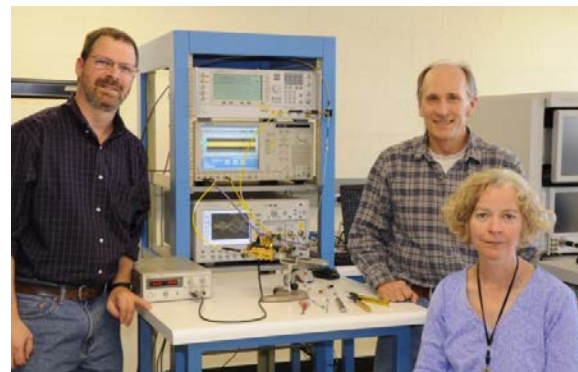
IMS has evolved into a program that funds high-risk ideas to advance the measurement science core

Charge to VCAT

NIST convening has produced many important outcomes, but this role has expanded

- What is the proper balance between measurement science core and convening?

- How should we evaluate this balance?

- When should we say no?

- What are the risks?

Standards

Tech Transfer

Measurement Science
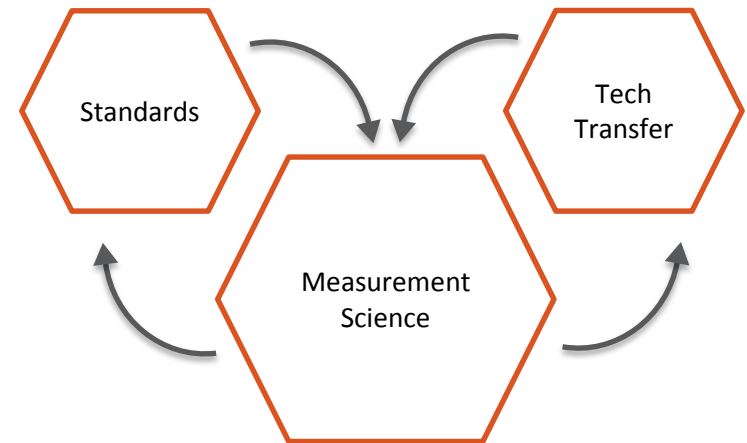
Agenda

Stakeholder Perspectives

- Bob Doering, Research Manager, Technology and Manufacturing Group, Texas Instruments
- Andy McMillan, President and Managing Director, BACnet International
- Roger Peniche, Director of Worldwide Engineering and Product Innovation, Fluke Calibration
- Gail Folena-Wasserman, Senior Vice President, Biopharmaceutical Development, MedImmune

Case Studies

- Smart Grid – Dave Wollman, Deputy Director, Smart Grid and Cyber-Physical Systems Program Office, Engineering Laboratory
- Cyber Framework – Kevin Stine, Chief, Applied Cybersecurity Division, Information Technology Laboratory
- 5G Wireless – Nada Golmie, Chief, Wireless Networks Division, Communications Technology Laboratory

Lab Director Perspectives

- Jim Olthoff, Director, Physical Measurement Laboratory
- Laurie Locascio, Director, Material Measurement Laboratory
- Howard Harary, Director, Engineering Laboratory
- Chuck Romine, Director, Information Technology Laboratory