

# NIST's 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



# Challenge Types

- Software/Apps
- Creativity
- Ideation
- Technical demonstration and market empowerment

# Conducting a Challenge – 1 of 2

- Clearly define problem
- Develop a clear vision of success
- Define desired impact
- Plan for connecting outcomes to impact





# Conducting a Challenge – 2 of 2

- Establish who is needed to participate
- Consider what is needed to enable participation
- Catalyze new interactions and team formation
- Create a clear communication plan
- Establish a defined timeline with milestones

# Example: Global City Teams Challenge (GCTC)

- Launched September 2014
- Mid-course Tech Jam Feb. 2015
- Festival June 2015

Sokwoo Rhee  
NIST  
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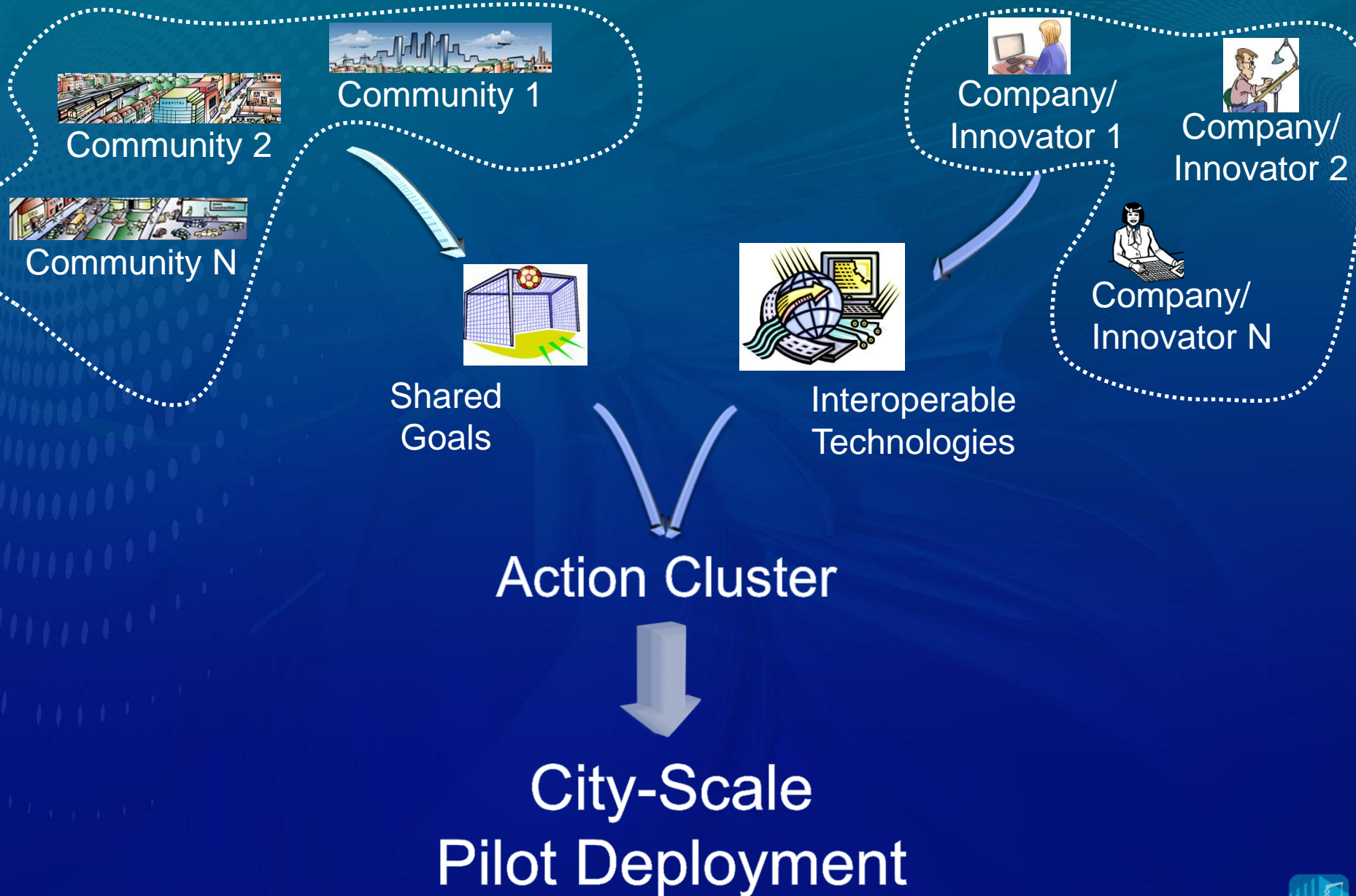


# Goals of Global City Teams Challenge

- Document current capabilities and identify real needs and challenges by interacting directly with industry on actual deployments
- Highlight interoperability and standards-based solutions by focusing on reproducible deployments
- Unite sectors and integrate technologies through a team-based approach
- Define a unifying smart city architecture, highlight use of existing standards, and identify standards gaps by comparing diverse solutions
- Identify measurement science challenges by working with teams to understand where they found limitations and hurdles
- Establish NIST as a credible partner to smart city/cps stakeholders



# The GCTC Process





# Partners

## Industry

- US-Ignite
- ARM Holdings
- Cisco
- Extreme Networks
- GE
- Intel
- Juniper Networks
- Qualcomm

## Federal

- NSF
- DOE
- DOT
- HHS
- ITA





# Current Status

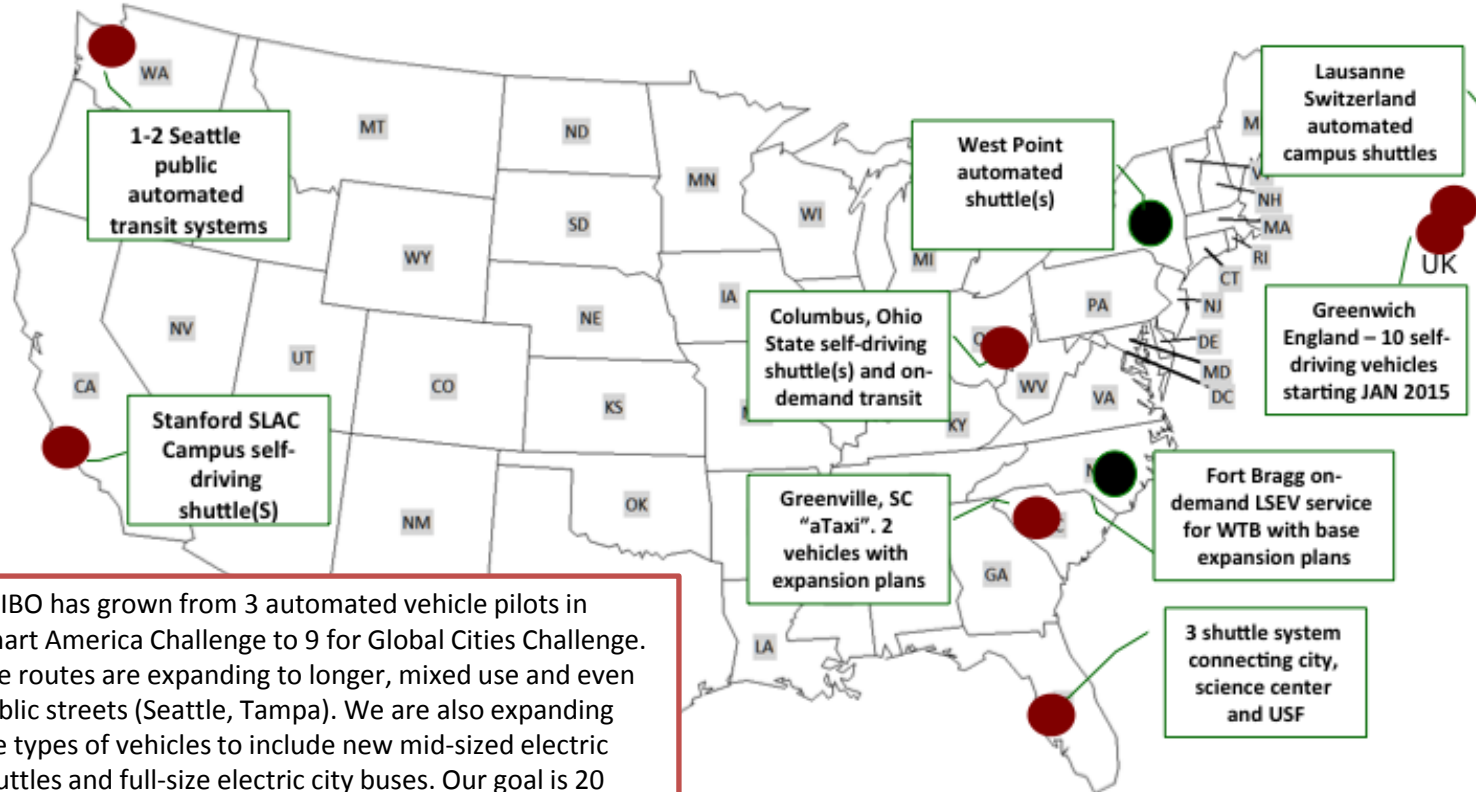
- 45+ teams/clusters, >150 companies and universities
  - Cities include: Chattanooga, Chicago, Columbus, Kansas City, New York, Portland, San Francisco, Tampa, Washington DC, Montgomery, Fairfax, and Arlington counties, and others.
  - Companies include: Aethena, AT&T, Cisco, Helios, IBM, Lucid Design, Microsoft, Qualcomm, Siemens, Verizon, and others.
  - Universities include: Carnegie Mellon, Clemson, George Mason, Iowa State, MIT, Stanford, Vanderbilt, Mass General, University of North Texas (NSF is providing an opportunity for supplemental funding to academic researchers)
  - Goals include: resilience to natural disasters, environmental sustainability, assisted living, energy efficiency, public health, intelligent transportation, smart grid, and others



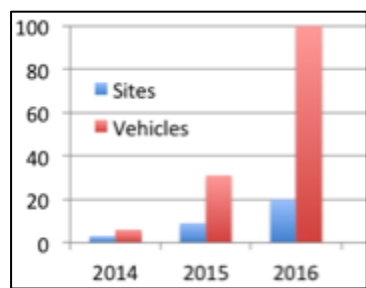


ARIBO marries technology and operational context to demonstrate and experiment with autonomous vehicle systems in real-world, semi-controlled environments. It is a *practical-to-tactical* approach that will guide the U.S. application of, and investment in, robotic technologies and automated vehicle policy. ARIBO is the U.S. self-driving living laboratory...

## GLOBAL CITIES CHALLENGE 2015



ARIBO has grown from 3 automated vehicle pilots in Smart America Challenge to 9 for Global Cities Challenge. The routes are expanding to longer, mixed use and even public streets (Seattle, Tampa). We are also expanding the types of vehicles to include new mid-sized electric shuttles and full-size electric city buses. Our goal is 20 sites and at least 100 vehicles by 2017.





# Lower Manhattan's Smart Neighborhood Pilot

## Technical Specifications

- Sensors including air quality, noise, light, and/or motion sensors will be integrated into the current infrastructure of connected trash compactors and recycling bins ( )
- Information/data being outputted by these sensors would be collected wirelessly through a central system that would allow users to obtain and manipulate the data

## Location

Lower Manhattan - Using the Downtown Alliance's free public Wi-Fi network and 174 connected trash compactors and recycling bins

## What

Providing real-time data for city planners, businesses, academia, and entrepreneurs to better understand how the city, and its population, is changing over time

## How

Develop a sensor data network that will monitor air quality, traffic patterns, noise levels, and/or sunlight

## Why

Address Priorities of the DeBlasio Administration such as:

- Data that leads to the reduction of Pedestrian Deaths
- Data that helps understand and improve Air Quality
- Data that improves the City's resiliency planning

Optimize Urban Development and Livability such as:

- Traffic information of pedestrians, bikes, cars, or trucks to better understand urban mobility
- Increase livability by monitoring Air Quality, Sunlight, and/or Noise Pollution



**EVERYTHING HAPPENING IN  
LOWER MANHATTAN**





Applications  
built on IoT

Applications  
built on IoT



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Open and Interoperable Platform (The Internet of Things)

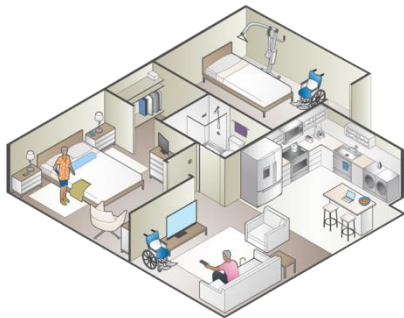
Proprietary platform  
conforming to  
industry standard

Proprietary platform  
conforming to  
industry standard

Proprietary platform  
conforming to  
industry standard

Open platform  
conforming to  
industry standard

Diverse forms  
of connectivity



Public Sector  
Apps built on  
the IoT.

Identify  
existing open  
standards and  
protocols that  
will allow  
varying  
devices to  
share their  
data securely.

A diverse  
ecosystem of  
IoT products  
make up a real  
world test  
bed. Many use  
cases will be  
demonstrated.

University of California-Irvine, Massachusetts Institutes of Technology, IBM, Intel, AT&T, SigFox, Brivo Labs, Senseware, N5 Sensors, the Telemedicine and Advanced Technology Research Center (TATRC), Responder, Del Ray Analytics, biobright, EIC Data, IoT DC, Captiva, Earth Networks, Victory Housing and more to come



# For additional information

- Web Site:  
[www.nist.gov/smartgrid](http://www.nist.gov/smartgrid)
- Global City Teams Challenge:  
[www.nist.gov/cps/sagc.cfm](http://www.nist.gov/cps/sagc.cfm)
- Grid 3.0 Workshop – Mar. 26-27, 2015  
[www.nist.gov/cps/grid-3-workshop.cfm](http://www.nist.gov/cps/grid-3-workshop.cfm)
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