GLOBAL CITY TEAMS CHALLENGE 2016
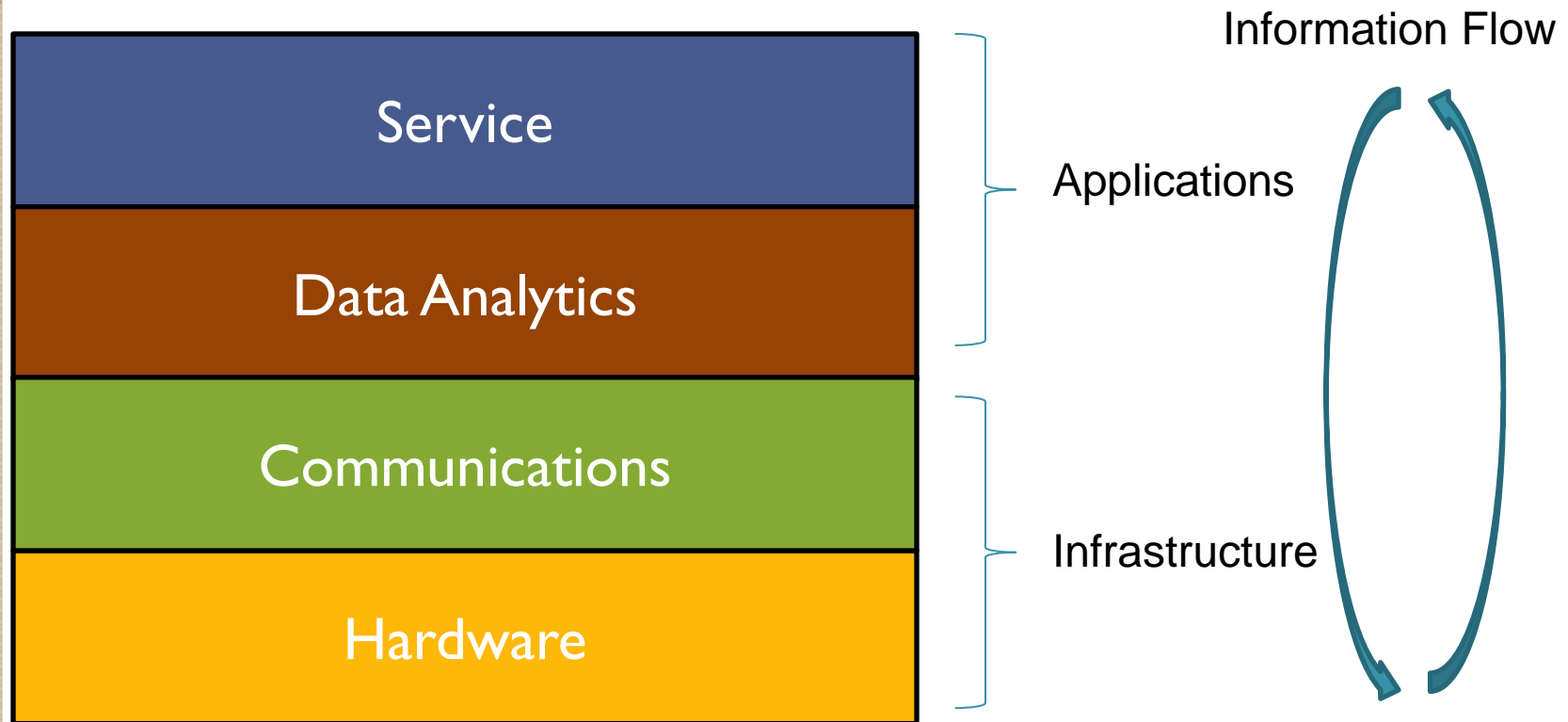
Sokwoo Rhee

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National Institute of Standards and Technology (NIST)

US Department of Commerce

Internet of Things (IoT) and Smart Cities

Public Sector IoT: Smart Cities and Communities

- Smart City: Use smart technologies such as IoT and CPS to improve the quality of life in cities and communities
- Many smart community efforts are one-off projects with heavy emphasis on customization and inadequate consideration for future upgradability and extensibility
- Lack of clear measurability of success impedes broader adoption of the solutions
- As a result, many Smart Cities/Communities deployments are isolated and do not enjoy the economy of scale.
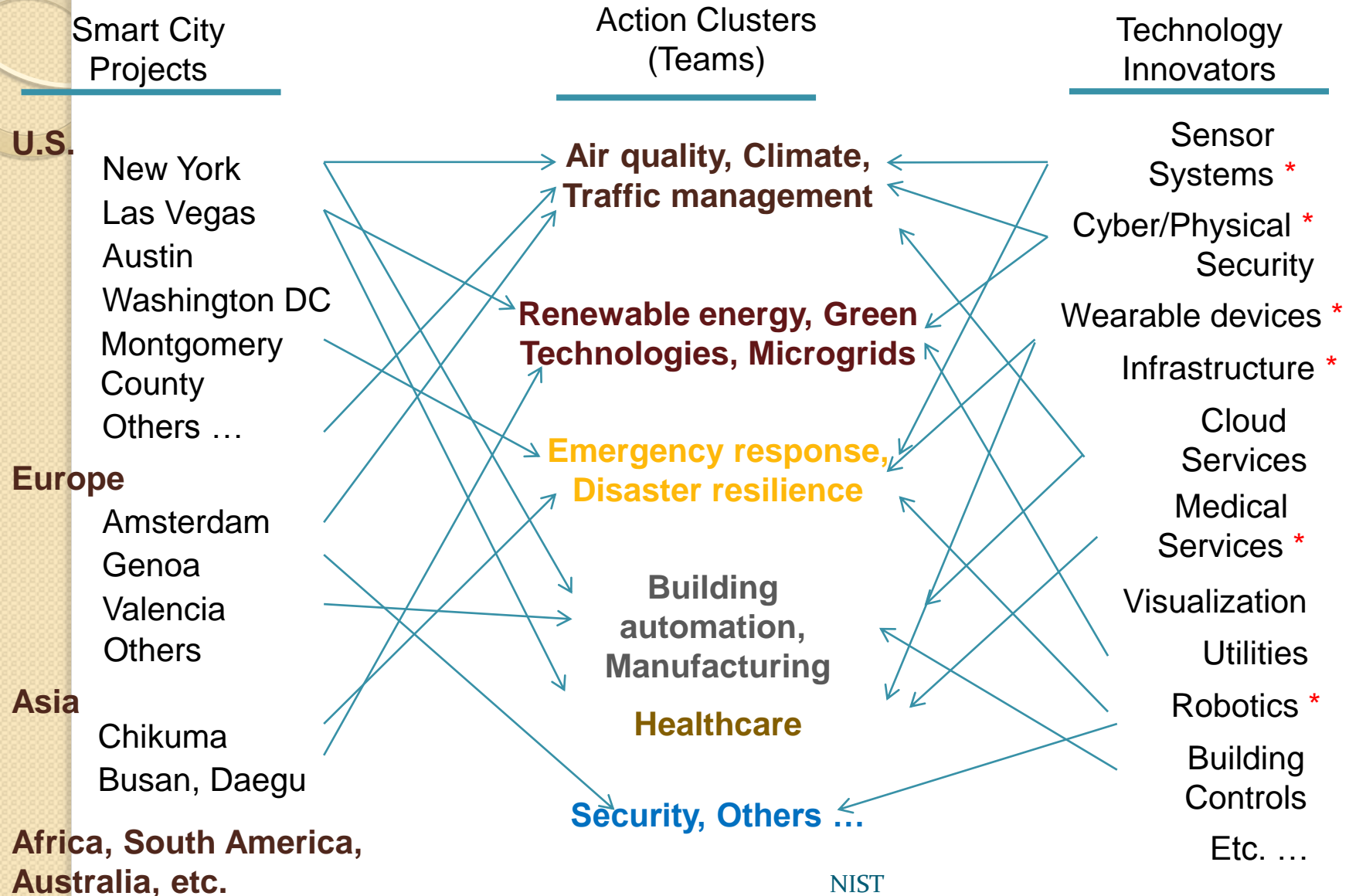
Global City Teams Challenge

- Establish and demonstrate <u>replicable, scalable and sustainable</u> models for incubation and deployment of interoperable, standard-based IoT solutions and demonstrate their *<u>measurable</u>* benefits in Smart Communities/Cities

The Approach

Timing Issues *

Smart City Projects

Action Clusters (Teams)

Technology Innovators

U.S.
New York
Las Vegas
Austin
Washington DC
Montgomery County
Others …

Europe
Amsterdam
Genoa
Valencia
Others

Asia
Chikuma
Busan, Daegu

Africa, South America, Australia, etc.

Air quality, Climate, Traffic management

Renewable energy, Green Technologies, Microgrids

Emergency response, Disaster resilience

Building automation, Manufacturing

Healthcare

Security, Others …

Sensor Systems *
Cyber/Physical * Security
Wearable devices *
Infrastructure *
Cloud Services
Medical Services *
Visualization
Utilities
Robotics *
Building Controls
Etc. …

GCTC 2015 Expo on June 1 at National Building Museum in Washington DC

Source: National Building Museum web site

- Exhibitions and presentations from over 60 teams in partnership with 50+ municipal governments and 200+ companies/universities/organizations
- Special Session with the **King Willem-Alexander and Queen Maxima** of the Netherlands
- Keynote Speeches
  - **Anthony Foxx**, US Secretary of Transportation
  - **Tom Kalil**, Deputy Director of White House Office of Science and Technology Policy
  - **Willie May**, Director of NIST and Under Secretary of Commerce
  - **Jim Kurose**, Assistant Director, NSF
- 1500 attendees including smart cities experts, CPS/IoT stakeholders, cities, communities, federal governments, industry and academia
- 50+ media outlets from around the world

Over 60 Cities in GCTC 2016 (Partial list shown):

- Portland, OR
- Newport News, VA
- Greenville, SC
- Raleigh, NC
- Montgomery County, MD
- Winooski, VT
- Santa Rosa, CA
- New York, NY
- Washington, DC
- Kansas City, MO
- Nashville, TN
- Austin, TX
- Amsterdam (Netherlands)
- Genova, Perugia (Italy)
- Coruna, Valencia (Spain)
- Saint-Quentin (France)
- Abuja City, Obia-Akpor City (Nigeria)
- Busan, Seoul, Daegu (Korea)
- Chikuma (Japan)

StormSense Project

Forecasting Flooding from Storm Surge, Rain, and Tide

Partners (as of April 2016):

Newport News — Where Great Things Are Happening

VIMS | WILLIAM & MARY — VIRGINIA INSTITUTE OF MARINE SCIENCE — 75 YEARS

HAMPTON VA

THE CITY OF PORTSMOUTH

THE CITY OF NORFOLK

VB Virginia Beach

City of CHESAPEAKE Virginia

York County VIRGINIA — America's Future Since 1781

CITY OF WILLIAMSBURG

CHRISTOPHER NEWPORT UNIVERSITY

WETLANDS WATCH — Protecting and Conserving Wetlands

VDH VIRGINIA DEPARTMENT OF HEALTH — Healthy People in Healthy Communities

SCALE — Safe Community Alerting Network Phase Two

Applications built on IoT | Applications built on IoT | **SCALE** Safe Community Alerting Network | Applications built on IoT | Applications built on IoT

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
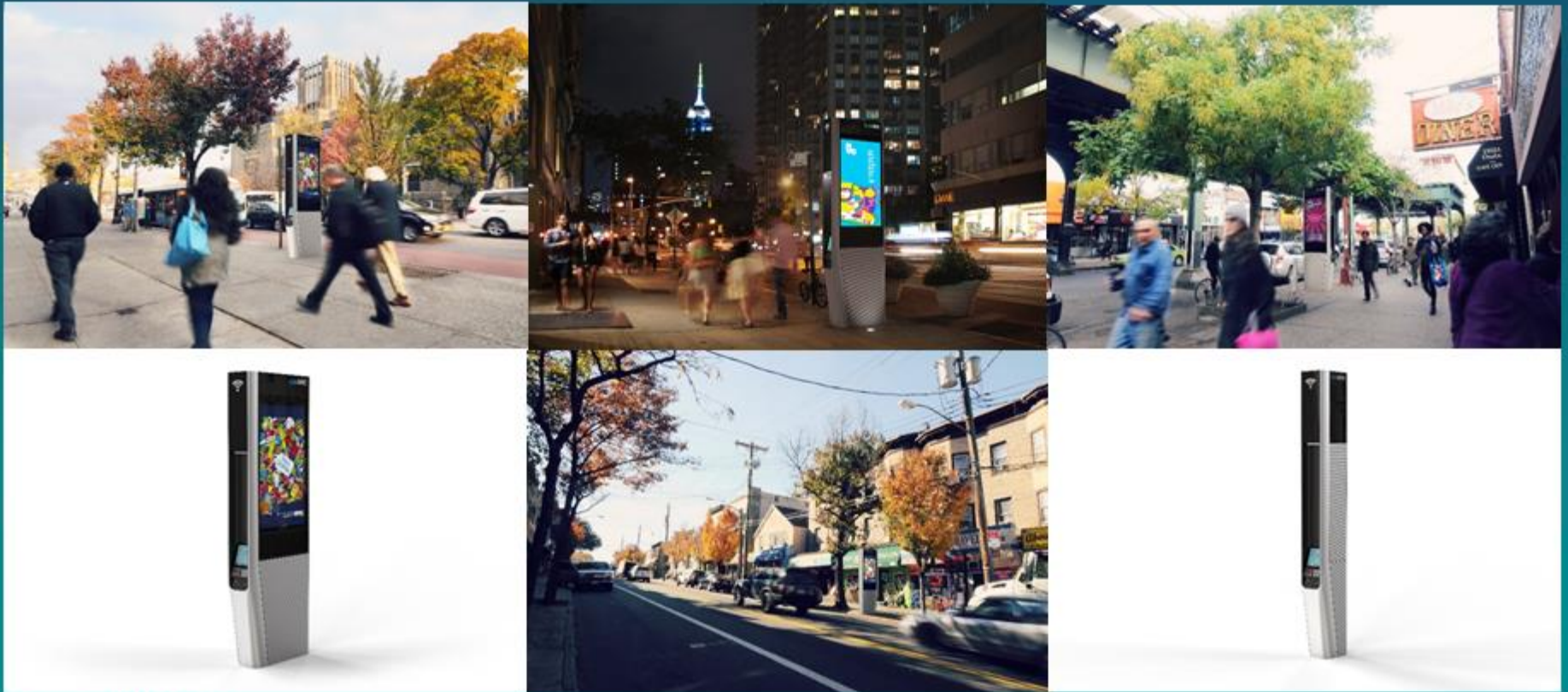
Public Sector Apps built on the IoT.

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

LinkNYC by City Bridge

First-of-its-kind communications network that will bring the fastest available municipal Wi-Fi to millions of New Yorkers and visitors

Greenville Smart City Vision

Connected, Intelligent Transit
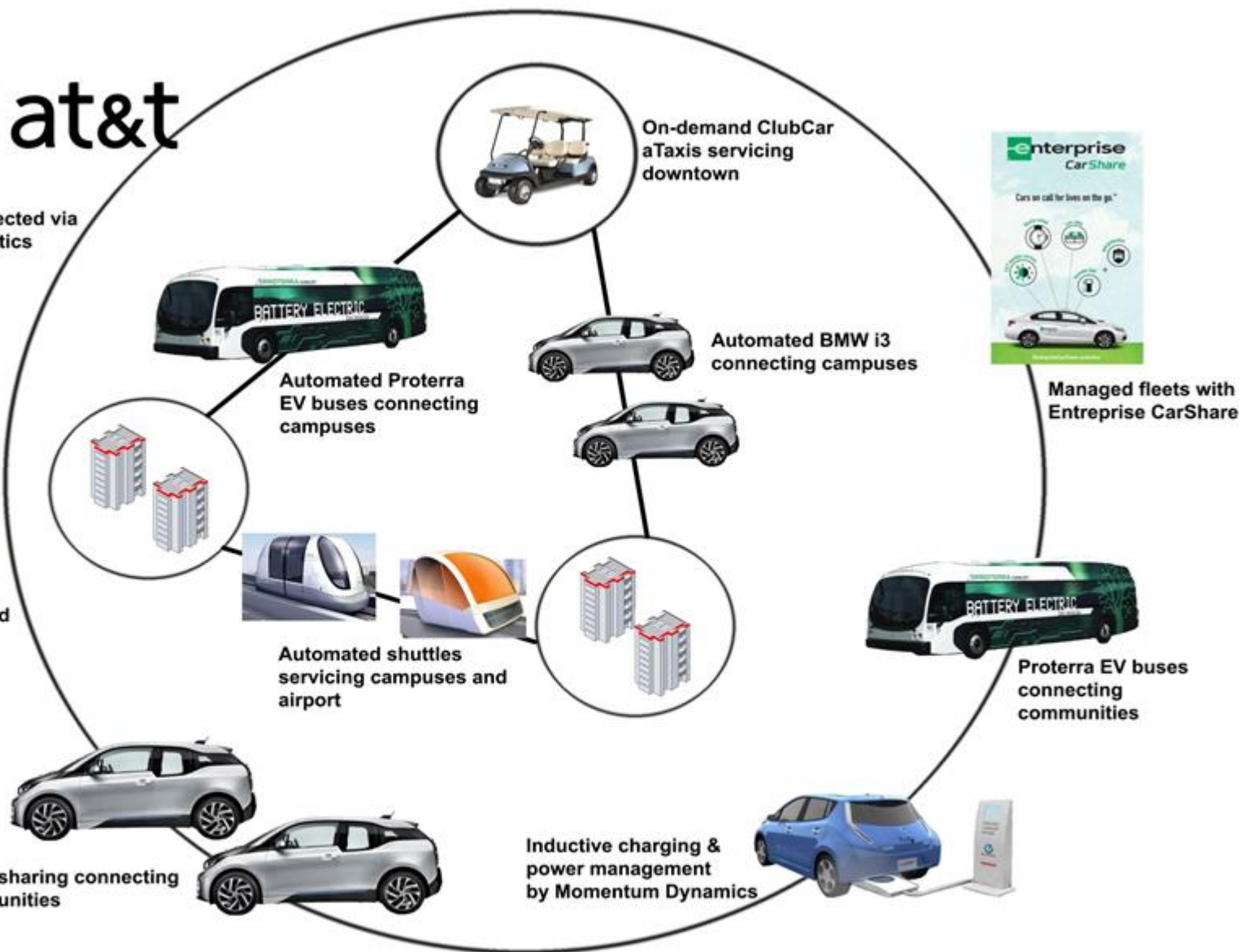
First Mile/Last Mile Solutions

- On demand automated vehicles will move passengers the first mile to the bus stop and the last mile from the bus stop (bottom picture).

- Scheduled or on demand vehicles will move passengers through a closed loop within OSU campus (through roads and pedestrian areas, top picture).

- The vehicles will:
  - use automated driving technology;
  - use V2V communication for convoy driving;
  - be equipped with vulnerable road user protection technology enabling them to function in pedestrian zones.

- SMOOTH will keep track of vehicles and guide them.

- Smartphone applications will be developed to schedule and track the on-demand automated vehicles.
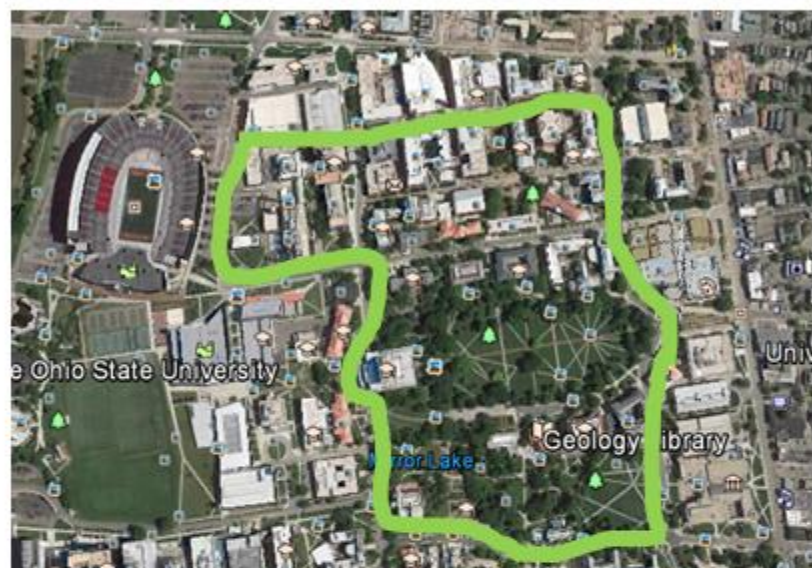
PARTNERS

Ohio State University - Center for Automotive Research

City of Columbus

Mid-Ohio Regional Planning Commission (MORPC)

Team ARIBO

Location: Columbus, Ohio

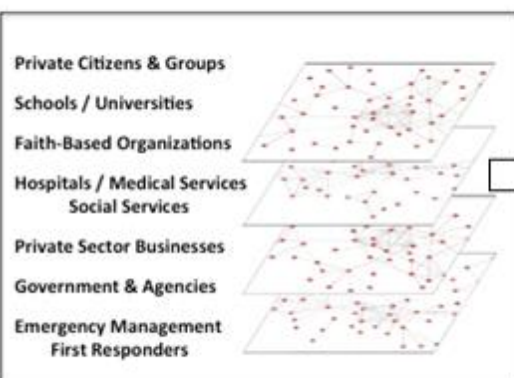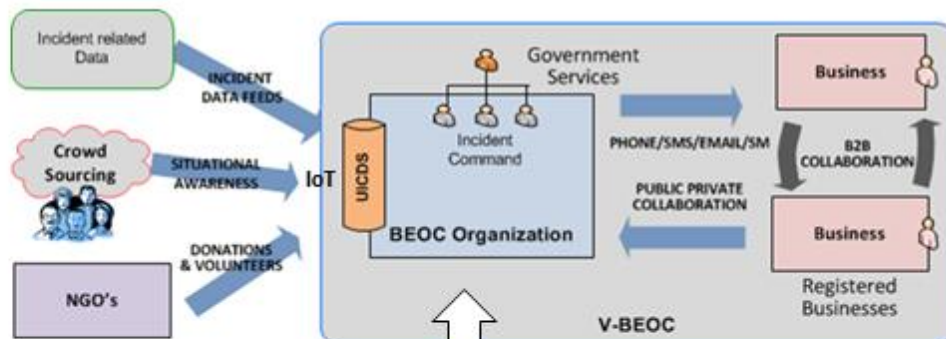# Automating the First and Last Miles

Global Cities Team Challenge
Human Geography Mapping for Enhanced Community Resilience
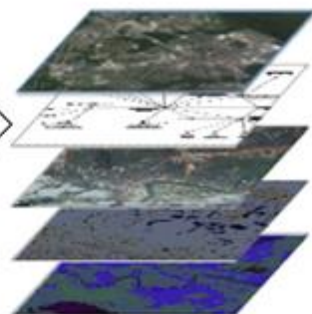### Annapolis, Maryland

2003 - Hurricane Isabel caused $400M in damage to the Annapolis, Maryland community

Virtual Business Emergency Operations Center

Incident related Data

INCIDENT DATA FEEDS

Crowd Sourcing

SITUATIONAL AWARENESS

IoT

DONATIONS & VOLUNTEERS

NGO's

Government Services

Incident Command

UICDS

BEOC Organization

PHONE/SMS/EMAIL/SM

PUBLIC PRIVATE COLLABORATION

Business

B2B COLLABORATION

Business

Registered Businesses

V-BEOC

HUMAN GEOGRAPHY

- Private Citizens & Groups
- Schools / Universities
- Faith-Based Organizations
- Hospitals / Medical Services Social Services
- Private Sector Businesses
- Government & Agencies
- Emergency Management First Responders

COMMUNITY INFRASTRUCTURE

- Event / Impact space
- Civic infrastructure
- Critical infrastructure
- Built environment
- Natural environment
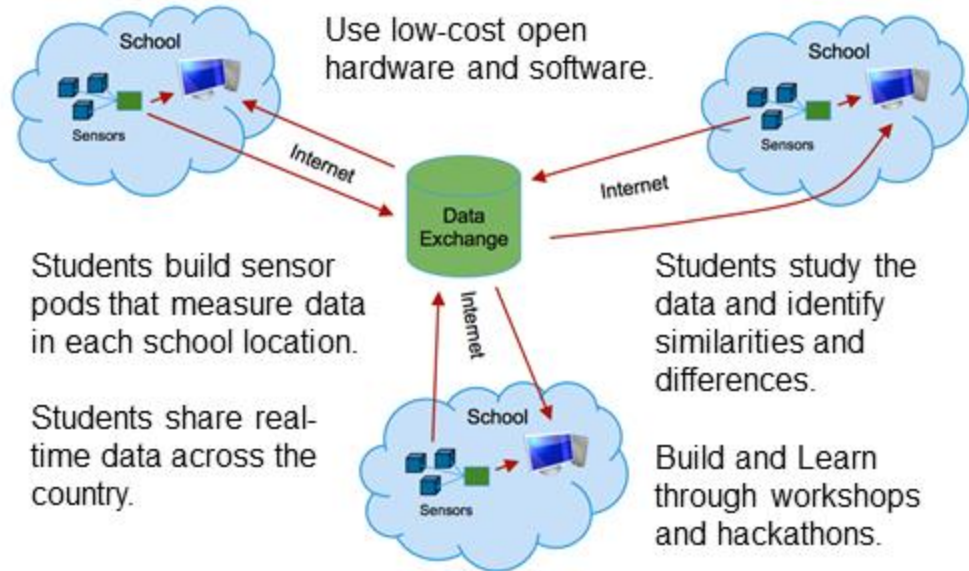
Open Standards

Situational Awareness

A resilient community requires the integration of human capital into resources and infrastructure.

Berkman — The Berkman Center for Internet & Society at Harvard University

OGC — Open Geospatial Consortium, Inc.

The City of ANNAPOLIS Maryland

AΣthena Analytics

TCecure — Our Eyes Where You Need Them

UNIVERSITY of LOUISIANA Lafayette

Bringing Internet of Things Know-How to High School Students

Today's students will be building the smart cities and communities of tomorrow. The time to start learning is now.

Use low-cost open hardware and software.

Students build sensor pods that measure data in each school location.

Students study the data and identify similarities and differences.

Students share real-time data across the country.

Build and Learn through workshops and hackathons.

Why?

- Strengthen STEM education and interest
- Learn about open hardware and software
- Learn to program hardware and sensors
- Learn how to share and analyze data
- Consider ways to leverage high-speed connectivity where available

IoT DC — Internet of Things DC   IoT Dev Labs   ARLINGTON VIRGINIA   VirginiaTech National Capital Region   Innovation Program Montgomery County, Maryland   **+**   **Students, High Schools, Educators and Volunteers**

Current Partners of GCTC 2016

GLOBAL CITY TEAMS CHALLENGE

- Partners
  - US-Ignite
  - US Government Agencies: NSF, ITA, DoT, State Department, GSA, NCO/NITRD, Census, NTIA
  - Non-US Central Governments: Netherlands, Italy, South Korea, Japan
  - Corporations:
  - Non-profits: FIWARE, World e-Governments (WeGO), Industrial Internet Consortium (IIC), MetroLab Network, R20, ICMA, USGBC
- Participating Members (partial list)
  - Qualcomm, Bosch, Siemens, Microsoft, CH2HL, Mueller Water, PEPCO, Hitachi, Sensity Systems, Big Belly, Senseware, Link Labs, Vizias, Pecan Street, Inc., InterInnov, TeamDev, Hostabeem, MIT, Vanderbilt, Carnegie Mellon University, Georgia Institute of Technology, University of North Texas, George Washington University, Wireless Research Center NC, Downtown DC BID, IoT Dev Labs, Inc, National Capital Planning Commission (NCPC) and more
- More than 60 cities around the world are currently participating.

GCTC 2016

- Aims to demonstrate <u>quantifiable/measurable</u> benefits to the cities and communities
  - Traffic jam reduction by 20%?
  - Air pollution reduction by 25%?
  - Energy reduction by 30%?
- 20-month process (2 Phases)
  - 1st Phase by June 2016 – Team building phase
  - 2nd Phase by June 2017 – Implementation phase
- **Tech Jam: March 22-23, 2016, NIST**
  - Over 50 Action Clusters will present their plans and identify additional partners
  - Office Hours by NSF, ITA and industry Partners
  - Poster sessions by participants

GCTC Expo, June 13-14, 2016

- GCTC 2016 Phase I Expo: **June 13-14, 2016, Austin Convention Center, Austin, TX, United States**

  ◦ Featuring exhibitions and project presentations from Action Clusters, and opportunities to engage with other teams and Smart City leaders from industry, government, and academia

  ◦ Visit US-Ignite Expo site www.gctcexpo.org for more details and registration.

  ◦ A short project plan needs to be submitted by April 29, 2016 to be considered for 2016 Expo presentation and exhibition - See the instructions at: https://www.us-ignite.org/globalcityteams/participation-guide

  ◦ Although the GCTC Expo is co-located with US Ignite's Application Summit and the Smart Cities Innovation Summit, the GCTC Expo is a separate and distinct event. The GCTC Expo will have its own exhibition space and its own process for registration. Acceptance as a speaker or exhibitor by the US Ignite Application Summit or the Smart Cities Innovation Summit events does not entitle an organization to speak or exhibit at the GCTC Expo

Funding Opportunities for GCTC

- **NSF EAGER Grant (NSF Office Hours today and tomorrow)**
  - Up to $300,000 for each award for fundamental research inherent to the real-world problems.
  - Grant applications are due **April 1, 2016**.
  - For US participants who is an active member of a GCTC Action Cluster, working on a project that will build upon the results of a previous or active NSF-funded project.
  - Info: http://www.nsf.gov/pubs/2016/nsf16036/nsf16036.jsp
- **US-Ignite GCTC Leadership Fund**
  - Cash awards to exceptional Action Clusters and travel support to the GCTC Expo in June 2016, available to both US and non-US participants
  - Applications are due **April 15th, 2016**.
  - Info: https://www.us-ignite.org/globalcityteams/leadership-fund/
- **NIST Replicable Smart City Technologies (RSCT) Grant Program**
  - For US local governments participating in the GCTC.
  - Three $100,000 awards for US local governments participating in the GCTC.
  - The application deadline is **May 12, 2016.**
  - Info: http://www.grants.gov/web/grants/view-opportunity.html?oppId=281680

For More Information

- Contact
  - Sokwoo Rhee (sokwoo.rhee@nist.gov)

- Challenge web site: Meet the action clusters
  - www.globalcityteams.org

- GCTC 2016 Tech Jam Webcast
  - http://www.nist.gov/cps/gctc-smart-city-webcast.cfm

- GCTC 2016 Expo (Austin, TX, USA, June 13-14, 2016)
  - http://www.gctcexpo.org/

- Social Media
  - Twitter #globalcityteams
  - Linkedin Group https://www.linkedin.com/groups/8285610