Intelligent Transportation Systems Joint Program Office

Connected Vehicles and Smart Cities

NORTH TEXAS SMART CITIES SUMMIT

May, 2017

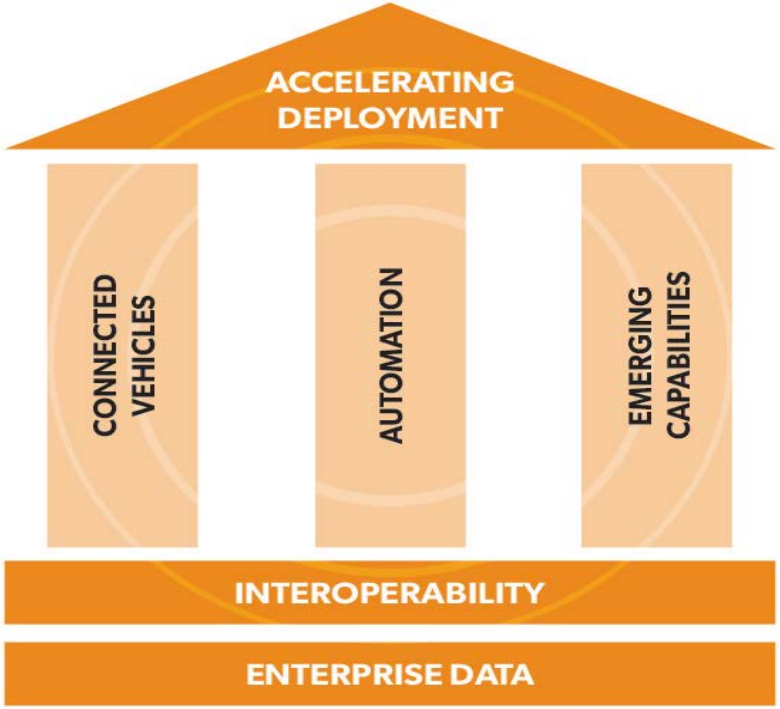
Egan Smith
Managing Director
ITS Joint Program Office
U.S. Department of Transportation

ITS JPO Strategic Plan

VISION

Transform the Way Society Moves

Conduct research, development, and education activities to facilitate the adoption of information and communication technology to enable society to move more safely and efficiently.



Connected Automation - Greatest Benefits

Autonomous Vehicle

Operates in isolation from other vehicles using internal sensors

Connected Automated Vehicle

Leverages autonomous and connected vehicle capabilities

Connected Vehicle

Communicates with nearby vehicles and infrastructure

Presentation Overview

- Leading In – Connected Vehicle Pilots
- Smart Cities Initiative
- Lessons Learned
- Update on Columbus
- What's Next

CONNECTED VEHICLE PILOT
Deployment Program

ITS Joint Program Office

https://www.its.dot.gov/pilots/

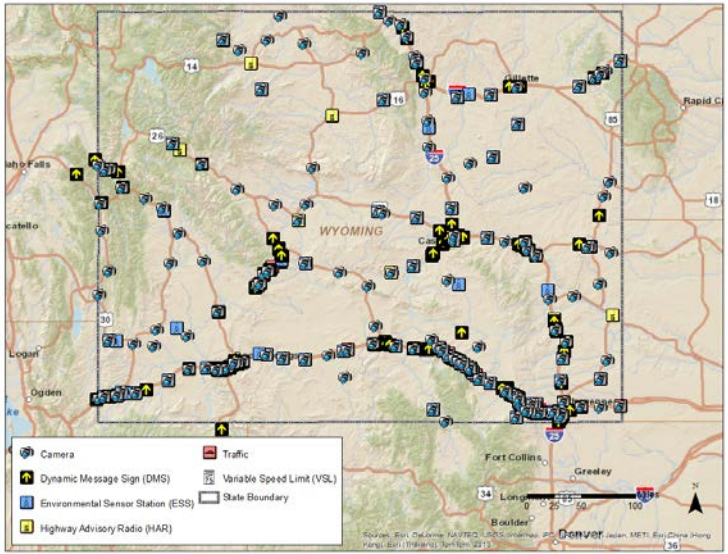
WYOMING PILOT DEPLOYMENT OVERVIEW

Objective:

- Reduce the number and severity of adverse weather-related incidents (including secondary incidents) in the I-80 Corridor to improve safety and reduce incident-related delays.
  - Focused on the needs of the commercial vehicle operator in the State of Wyoming

Approach:

- Equip fleet vehicles (combination of snow plows, maintenance fleet vehicles, emergency vehicles, and private trucks) that frequently travel the I-80 corridor to transmit basic safety messages (BSMs), collect vehicle and road condition data and provide it remotely to the WYDOT TMCs
- Deploy DSRC roadside equipment (RSE) to supplement existing assets and initiatives
- Provide shared road weather data with freight carriers who will then transmit this data to their trucks using existing in-vehicle systems



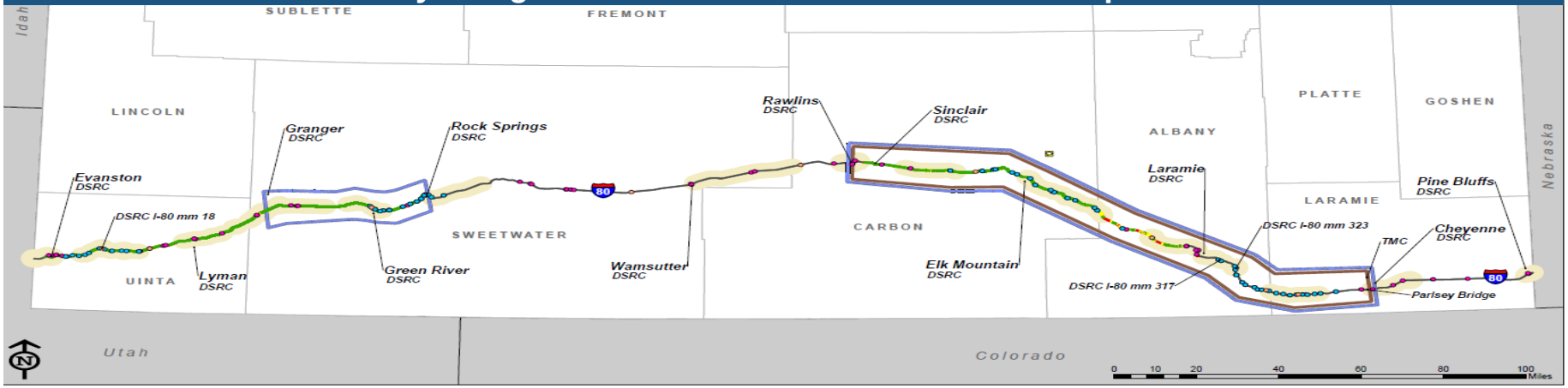
Source: Wyoming DOT

Deployment Team:

- Prime Consultant: ICF International; Partner State: Wyoming DOT
- Sub Consultants: Trihydro Corporation, National Center for Atmospheric Research, University of Wyoming, Catt Laboratory and McFarland Management

Wyoming Pilot Deployment Site: High Priority Corridor

Wyoming I-80 Corridor – Connected Vehicle Map



Created by: mddrake Date: 3/23/2015

The State of Wyoming and its agencies make no express or implied warranties as to this map and the data it displays. Users of this information should review or consult the primary data and information sources to ascertain the reliability or usability of the information. The State of Wyoming and its agencies assume no liability associated with the use or misuse of this information and specifically retain sovereign immunity and all defenses available to them by law.

Legend

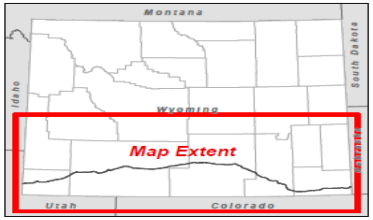
- High Profile Wind Warning Area
- AVL/Tablet Snow Plows
- STIP Areas 2015-2018

WyoLink - Signal Strength

- Good
- Spotty
- Unreliable

- I-80, Wyoming
- Possible Locations Roadside DSRC *(Going into/out ofeach town off I-80 for supportingVSL Application. These include locations with mm labels)*

- WiFi Locations (9 within 500 ft of I-80)
- VSL Devices (122 on I-80)
- Truck Parking (55 on I-80)



Source: Wyoming CV Pilot Deployment Team

TAMPA (THEA) PILOT DEPLOYMENT OVERVIEW

Objective:

- The primary objective of this deployment is to alleviate congestion and improve safety during morning commuting hours.
  - Deploy a variety of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) safety, mobility, and agency data applications to create reinforcing benefits for motorists, pedestrians, and transit operation.

Approach:

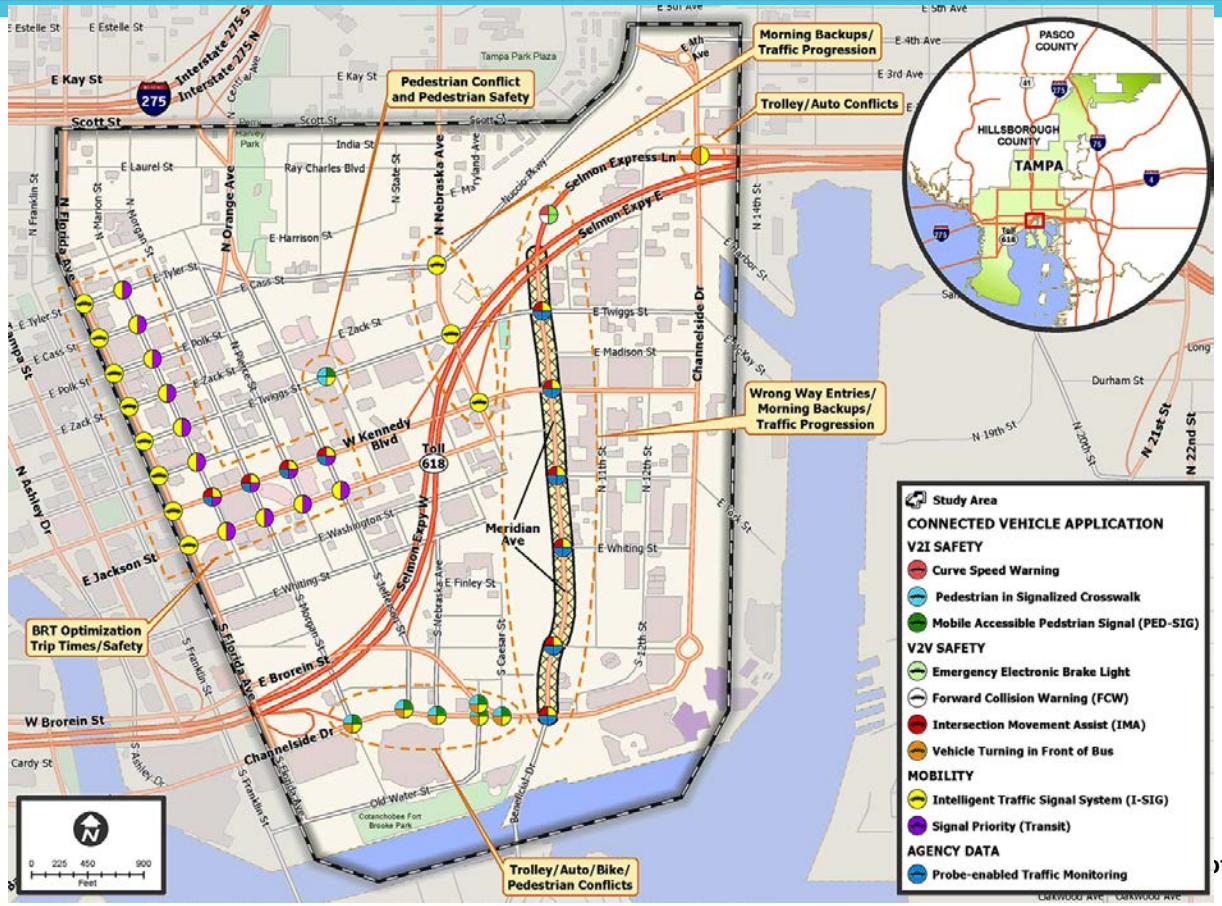
- Deploy a variety of connected vehicle technologies on and in the vicinity of reversible express lanes and three major arterials in downtown Tampa to solve the following transportation challenges:
- Morning peak hour queues, wrong-way entries, pedestrian safety, bus rapid transit (BRT) signal priority optimization, trip time and safety, streetcar trolley conflicts, and enhanced signal coordination and traffic progression.

Source: THEA

Deployment Team:

- Prime Consultant: Tampa Hillsborough Expressway Authority (THEA)
- Sub Consultants: HNTB Corporation, Siemens Industry, Inc., Booz Allen Hamilton, Center for Urban Transportation Research at University of South Florida and Global-5 Communications

Tampa (THEA) Pilot Deployment Site
An Overview of Downtown Tampa



New York City (NYC) Pilot Deployment Overview

Objective:

- Improve safety and mobility of travelers in New York City through connected vehicle technologies
  - Aligned with the NYC's Vision Zero initiative, which seeks to reduce crashes and pedestrian fatalities, and increase safety of travelers in all modes of transportation

Approach:

- Equip up to 8,000 vehicles (taxis, buses, commercial fleet delivery trucks, and City-owned vehicles) that frequently travel in Midtown Manhattan and Central Brooklyn to transmit and receive connected vehicle data
- Install V2I technology at high-accident rate arterials:
  - Upgrade 239 traffic signals along 1st, 2nd, 5th, and 6th Avenues in Manhattan and Flatbush Avenue in Central Brooklyn (emergency evacuation route)
  - Deploy Roadside equipment (RSE) along FDR Drive

Source: NYC DOT

Deployment Team:

- Prime Consultant: NYC DOT
- Sub Consultants: JHK Engineering, Battelle, Cambridge Systematics, KLD Engineering, Security Innovation and Region 2 University Transportation Research Center

NYC Pilot Deployment Site

Manhattan Grid

- Closely spaced intersections (600' x 250')
- Day vs. Night conditions
- Residential/commercial mix
- High accident rate (red dot) (2012-2014)
  - 20 fatalities
  - 5,007 injuries
- 204 intersections

Central Brooklyn – Flatbush Ave

- Over-Height restrictions
  - Tillary St.; Brooklyn Bridge
- High accident rate (red dots) (2012-14)
  - 1,128 injuries
  - 8 fatalities
- Average AM speed 15 mph
- 35 intersections

Manhattan – FDR Drive

- Limited access highway
- Excludes trucks/buses
- Short radius of curvature
- Over-Height restrictions
- $1,958,497 in Over-Height incident delay costs (2014)
  - 24% of City-wide total

Source: NYC DOT

The Smart City Challenge

- Encourage cities to put forward their best and most creative ideas for innovatively addressing the challenges they are facing.
- Demonstrate how advanced data and intelligent transportation systems (ITS) technologies and applications can be used to reduce congestion, keep travelers safe, protect the environment, connect underserved communities, and support economic vitality.

The Smart City Challenge

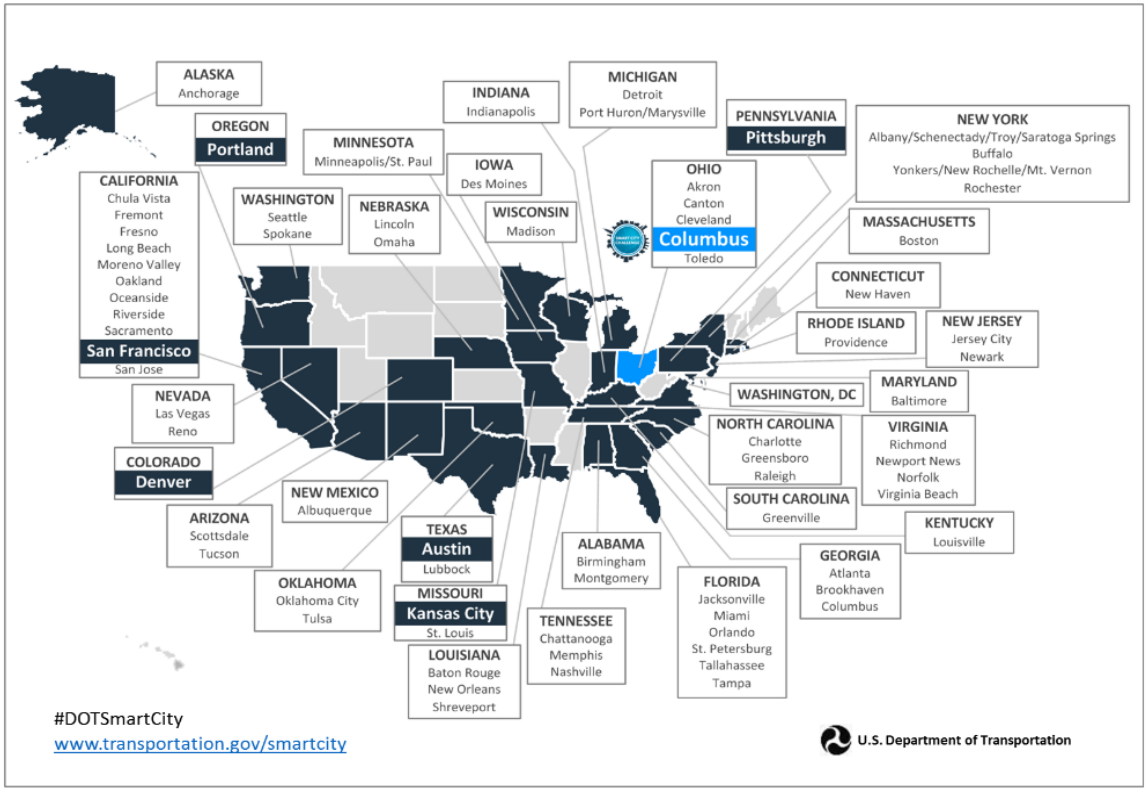
$500 million in partnerships identified in by the seven Smart City Challenge Finalists

150+ partnerships identified by the Smart City Challenge Finalist

78 applications received for the Smart City Challenge

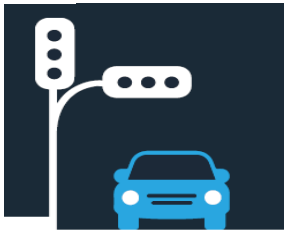
7 Smart City Challenge Finalists announced in March 2016

1 Smart City Challenge Winner

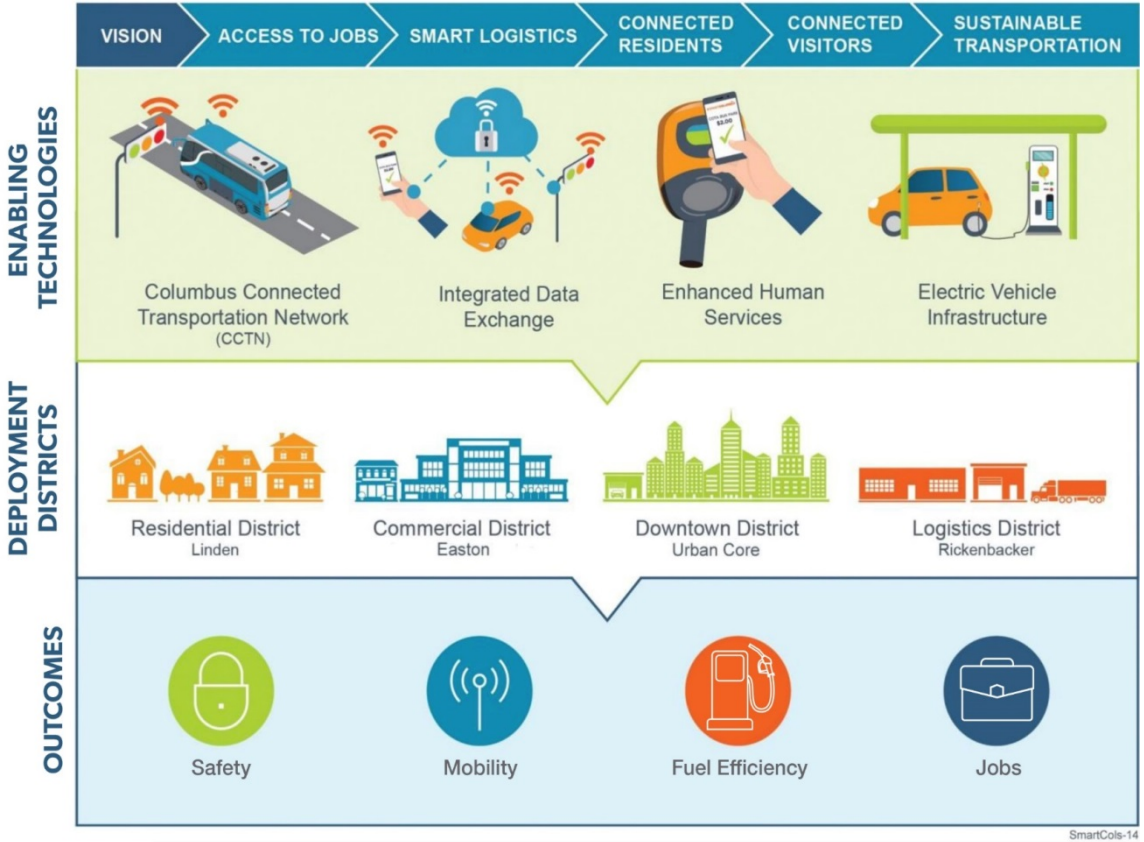


Lessons Learned - Mobility Challenge

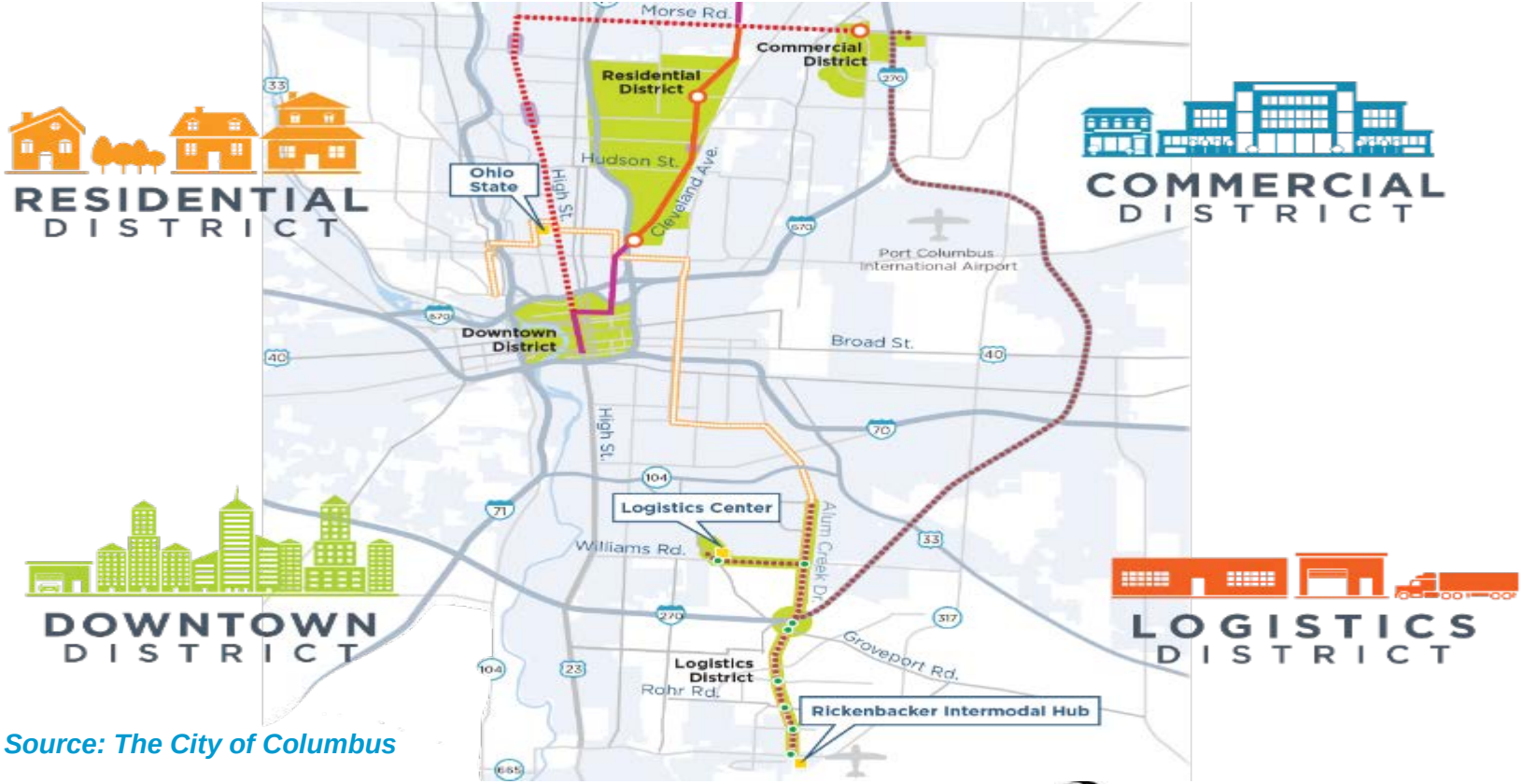
1) First and last mile connection for transit users
2) Coordination data collection and analysis across systems
3) The movement of freight into and within a city
4) Inefficiency in parking systems and payment
5) Outdated traffic signal timing caused congested freeways and arterial streets



SMARTCOLUMBUS



SMARTCOLUMBUS Districts



Source: The City of Columbus

SMARTCOLUMBUS Solutions

- Leverage the new COTA CMAX Bus Rapid Transit (BRT) Line
- Equip intersections with Dedicated Short Range Communications (DSRC) technologies
- Provide new mobility and safety applications
- Create neighborhood hubs providing transportation options
- Deploy Smart Lighting and free public Wi-Fi to improve safety, make the neighborhood more walkable, and provide access to information

Proposed Applications

- Dynamic Transit Operations
- Connection Protection
- Dynamic Ridesharing
- Integrated Multi-Modal Electronic Payment
- Transit Signal Priority
- Transit Stop Pedestrian Warnings
- Pedestrian in Signalized Crosswalk Warnings
- Vehicle Turning Right in Front of Bus Warnings
- Forward Collision Warning
- Emergency Brake Light Warning
- Eco-Approach and Departure

SMARTCOLUMBUS Solutions

Electric Autonomous Vehicles

Three fixed routes supporting first mile / last mile (FMLM) equipped with inductive charging stations

Enhanced Human Service

Available via both a smartphone application and deployed kiosks

CCTN Build Out

Signal Phase and Timing (SPaT), Emergency Vehicle Preemption, and Transit Signal Priority (TSP)

Source: The City of Columbus

SMARTCOLUMBUS Solutions

Event Parking Management

- Partnership with Experience Columbus and associated agencies that collectively manage more than 42,000 parking spaces
- Multilingual, multi-modal trip planning application allowing travelers to “reserve and book” parking

Loading Zone Parking Management

- Video equipment capable of monitoring loading zones
- Install and operate a real-time parking availability service for freight delivery

Permit-Only Parking

- Radio frequency identification (RFID) stickers to collect information on the permitted vehicles in zones

Transit Benefit Program

SMARTCOLUMBUS Solutions

- Intelligent truck warning and routing application to minimize incidents due to low bridges or narrow roads
- Regional Truck Parking Information and Management System

Source: The City of Columbus

Professional Capacity Building - Objective

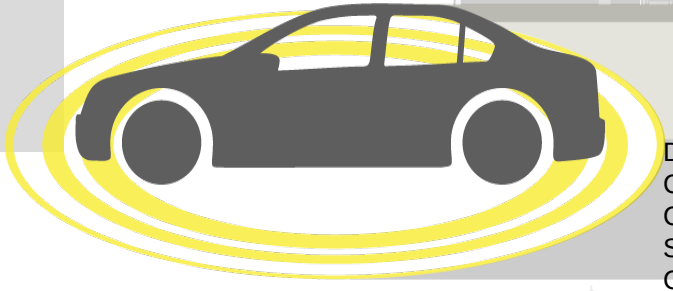
Early Deployer Technical Assistance: Accelerate testing and deployment of interoperable connected ITS technologies during the early stages of deployment when development of standards, best practices, and support systems and processes are also ongoing and collaboratively build upon the state of the practice.

Funding for ITS Deployment

- General eligibility – Through the Planning Process
  - CV deployments are eligible for Federal aid funding where eligibility for ITS investments have been previously established
  - **Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) Grants:** $60M annually in competitive grants between 2016 and 2020 for the development of model deployment sites for large scale installation and operation of advanced transportation technologies to improve safety, efficiency, system performance, and infrastructure return on investment. http://www.grants.gov/custom/viewOppDetails.jsp?oppId=282433
  - **Mobility on Demand (MOD) Sandbox:** Provides a venue through which integrated MOD concepts and solutions are demonstrated in real-world settings. FTA seeks to fund $8M for project teams to innovate, explore partnerships, develop new business models, integrate transit and MOD solutions, and investigate new, enabling technical capabilities. **Proposals Due: 7/5/16** https://www.transit.dot.gov/research-innovation/mobility-demand-mod-sandbox-program

Other USDOT Efforts to Enable Connected, Smart Communities

Advanced Transportation and Congestion Management Deployment (ATCMTD) Program Grant Winners (http://transportation.house.gov/fast-act/technology-grants.htm)



Denver, CO

Denver will implement three intelligent vehicle projects: a Connected Traffic Management Center (TMC) and Connected Fleets; Travel Time Reliability as a City Service for Connected Freight; and Safer Pedestrian Crossings for Connected Citizens.

Pittsburgh, PA

Deploy “Smart Spine” corridors in Pittsburgh that improve connections between isolated neighborhoods and major centers of employment, education and healthcare.

Thank You

Egan Smith
Email: egan.smith@dot.gov

Website:
http://www.its.dot.gov

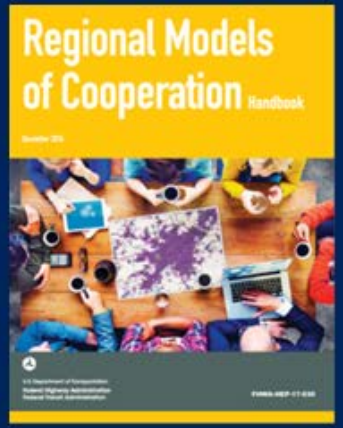
Smart Cities and the Connection to Transportation Planning

North Texas Smart Cities Symposium
University of Texas at Dallas
May 16, 2017

The Transition of Planning: Performance Based Planning and Programming

- By August 31, 2017, States select 2018 safety targets
- By February 27, 2018, MPOs select 2018 safety targets
- On or after May 27, 2018, States and MPOs phase-in the 2018 safety targets into their planning processes
  - New transportation plans, updates, and amendments shall include system performance reports evaluating the safety targets
  - New STIPs/TIPs and amendments shall include discussions of the anticipated effect of the STIP/TIP toward achieving the safety targets

Regional Models of Cooperation



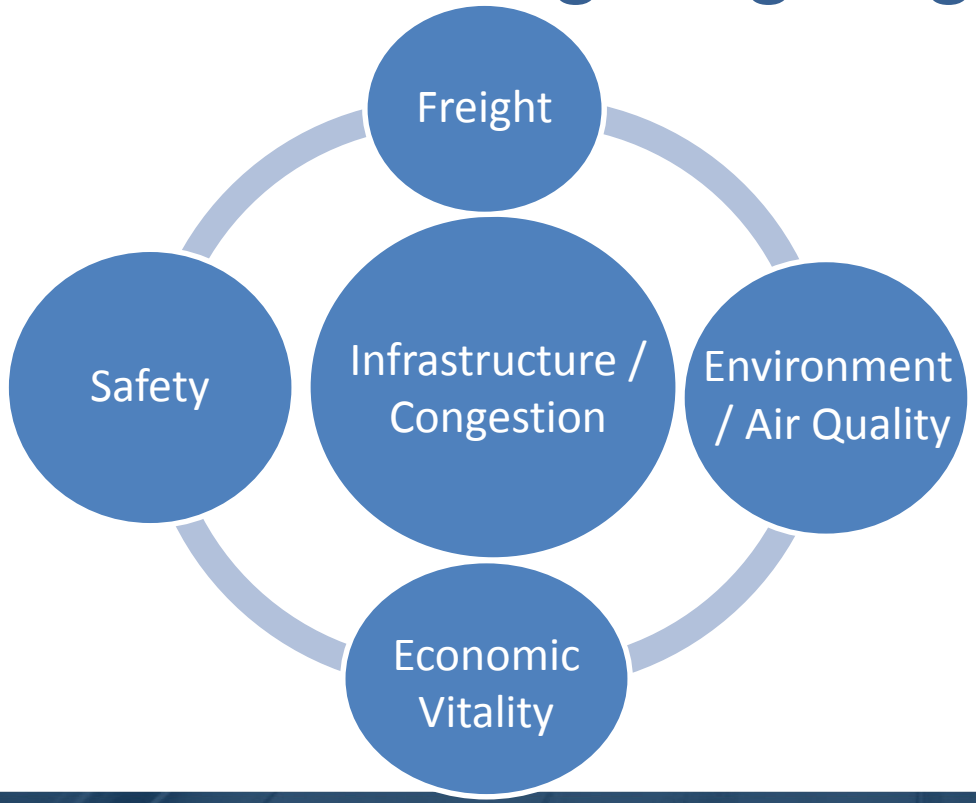
Efficiency through technology and collaboration

Every Day Counts — innovation, ingenuity, invention, imagination

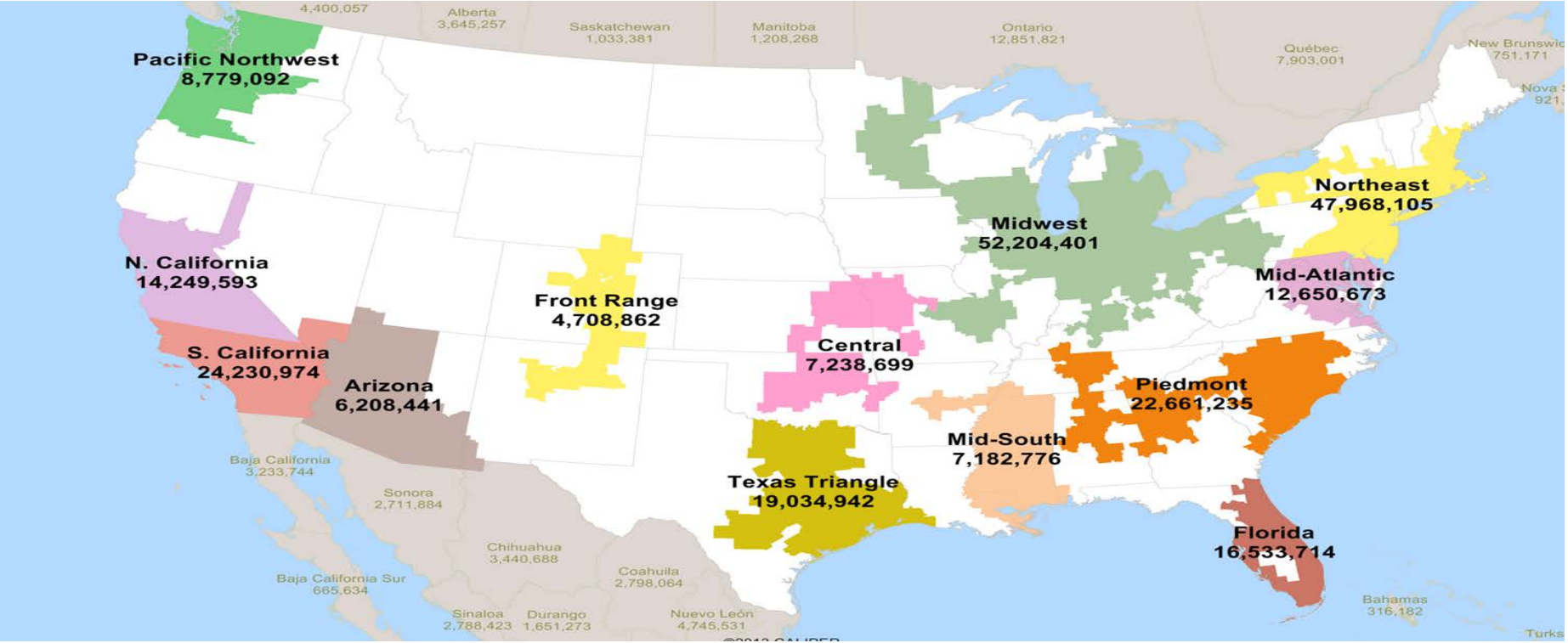
U.S. Department of Transportation
Federal Transit Administration

U.S. Department of Transportation
Federal Highway Administration

Key Issues Surrounding Megaregions



FHWA's Interest in Megaregions



Megaregions Workshops

- **Northeast (PA, NY, NJ, CT, RI, MA, VT, NH, ME)**
  - August 8-9, 2017; Providence, RI

    Freight and Economic Development
- **Great Lakes/Chicago (IA, IL, IN, MI, MN, MO, WI)**
  - August 28-29, 2017; Chicago, IL

    Freight and Connected Vehicles
- **Texas (TX, LA, AR, OK)**
  - Early Fall 2017; Location TBD

    Freight

THE BIG PICTURE

"A city that uses information and communications technology to enhance its livability, workability, and sustainability."

The Smart Cities Council

How to Integrate Smart City Strategies Into the Planning Process

Planning Capacity Building Program

- Mission and Focus
- Peer Exchange Program
- Guidebooks and Resources Page
- Briefing Book for Transportation Planning Officials

Thank You!

James Garland
Planning Capacity Building Team Leader
FHWA Office of Planning, Environment, and Realty
Washington, DC
202-366-6221 Office
James.Garland@dot.gov
www.planning.dot.gov