North Texas Smart Cities Summit

Connecting Vehicles and Smart Cities
CONDUCT RESEARCH, DEVELOPMENT, AND EDUCATION ACTIVITIES TO FACILITATE THE ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGY TO ENABLE SOCIETY TO MOVE MORE SAFELY AND EFFICIENTLY.

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/
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

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

Source: Wyoming CV Pilot Deployment Team
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.

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
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

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) (2012-2014)
  - 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.
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 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*
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
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.
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](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](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)

**Pittsburgh, PA**

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

**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.
Thank You

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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
Key Issues Surrounding Megaregions

- Freight
- Economic Vitality
- Safety
- Infrastructure / Congestion
- Environment / Air Quality

U.S. Department of Transportation
Federal Highway Administration
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
“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!

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