Smart Cities and Transportation

New Jersey Transportation Planning Authority
A Symposium on Emerging Technology

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Overview

• Transportation Challenges
• USDOT Multimodal Collaboration
• ITS Strategic Plan
  • Connected Vehicles
  • Automated Vehicles
  • Smart Cities
Today’s Transportation Challenges

Safety
- 35,092 highway deaths in 2015
- 6.3 million crashes in 2015
- Leading cause of death for ages 5-24

Mobility
- 6.9 billion hours of travel delay
- $160 billion cost of urban congestion

Environment
- 3.1 billion gallons of wasted fuel
- 56 billion lbs of additional CO₂

Data Sources:
Strategic Plan

Program Categories

ACCELERATING DEPLOYMENT

CONNECTED VEHICLES

AUTOMATION

EMERGING CAPABILITIES

INTEROPERABILITY

ENTERPRISE DATA

http://its.dot.gov/strategicplan/index.html
Imagine a Transportation System in which VEHICLES CAN SENSE & COMMUNICATE Things That You Can’t.
Connected Vehicle Deployment in the U.S.

USDOT Deployment Efforts:
• NHTSA V2V Light Vehicle Notice of Proposed Rulemaking
• Connected Vehicle Pilots: New York City, Tampa, and Wyoming
• Professional Capacity Building: Webinars, Peer-to-peer, and Classroom Training
• Open Data Resources
• Connected Vehicle Help Desk
• Security Credential Management System
• Connected Vehicle Architecture
• V2I Deployment Coalition
• 5.9 GHz UNII Device Testing
• SmartColumbus
• FAST Act: ATCMTD Initiative

Locations Using 5.9GHz DSRC for Connected Vehicle Deployment

* Planned deployments in 2017
Source: Volpe – The National Transportation Systems Center (USDOT)

Number of DSRC-Enabled Vehicles: 32,813
Number of DSRC-Enabled Devices (V2V and V2I): 1,864
Connected Vehicle Pilot Deployment Program

PILOT SITES
- New York City
- ICF/Wyoming
- Tampa (THEA)

Connected Vehicle Pilot Deployment (up to 50 months)

PHASE 1
(up to 12 months)
- Concept Dev.
- Progress Gate

PHASE 2
(up to 20 months)
- Design/Deploy/Test
- Progress Gate

PHASE 3
(minimum 18 months)
- Maintain/Operate Pilot
- Transition

Routine Operations
(ongoing)
- Post-Pilot Operations

Follow-On Cooperative Agreement
Connectivity Unleashes the Full Potential of Automated Vehicles

**Connected Vehicle**
Communicates with nearby vehicles and infrastructure; Not automated

**Connected Automated Vehicle**
Leverages autonomous automated and connected vehicles

**Autonomous Vehicle**
Operates in isolation from other vehicles using internal sensors
USDOT Automation Policy and Deployment Initiatives

- JPO automation research
- Smart City Challenge
- NHTSA Automation Policy Guidance
- FMCSA ITE CMV workshop
- FHWA Automation Vision
- FAST Act: Advanced Transportation and Congestion Management Technologies Deployment Initiative
- Advisory Committee on Automation in Transportation (ACAT)

Advanced Technologies and Smart Cities

Technology convergence will revolutionize transportation, dramatically improving safety and mobility while reducing costs and environmental impacts.

- **Connected Vehicles**
- **Vehicle Automation**
- **Internet of Things**
- **Machine Learning**
- **Big Data**
- **Sharing Economy**

**Connected-Automated Vehicles**

**Benefits**
- Order of magnitude safety improvements
- Reduced congestion
- Reduced emissions and use of fossil fuels
- Improved access to jobs and services
- Reduced transportation costs for gov’t and users
- Improved accessibility and mobility

**Smart Cities**
The Smart City Challenge Vision Elements

**Technology Elements (Highest Priority)**

- **Vision Element #1**: Urban Automation
- **Vision Element #2**: Connected Vehicles
- **Vision Element #3**: Intelligent, Sensor-Based Infrastructure

**Innovative Approaches to Urban Transportation Elements (High Priority)**

- **Vision Element #4**: User-Focused Mobility Services and Choices
- **Vision Element #5**: Urban Analytics
- **Vision Element #6**: Urban Delivery and Logistics
- **Vision Element #7**: Strategic Business Models & Partnering
- **Vision Element #8**: Smart Grid, Roadway Electrification, & EVs
- **Vision Element #9**: Connected, Involved Citizens

**Smart City Elements (Priority)**

- **Vision Element #10**: Architecture and Standards
- **Vision Element #11**: Low-Cost, Efficient, Secure, & Resilient ICT
- **Vision Element #12**: Smart Land Use
SmartColumbus

**ENABLING TECHNOLOGIES**
- Columbus Connected Transportation Network (CCTN)
- Integrated Data Exchange
- Enhanced Human Services
- Electric Vehicle Infrastructure

**DEPLOYMENT DISTRICTS**
- Residential District
  - Linden
- Commercial District
  - Easton
- Downtown District
  - Urban Core
- Logistics District
  - Rickenbacker

**OUTCOMES**
- Safety
- Mobility
- Fuel Efficiency
- Jobs
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Transportation

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Public Safety

Public Services – Trash, Recycling, Water, and Waste Water

Energy

Telecommunications

Communications to support ITS and connected vehicle applications

Smart Payment

Smart payment applications for parking, transit, and other services

Health and Human Services

Applications to support healthier lifestyles (e.g., biking) and reduced emissions resulting in healthier people – or getting people to health care

Applications that support connectivity between Electric Vehicles and the Smart Grid or smart street lights triggered when vehicles are nearby

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Incident Management

Applications that reduce response times for first responders

Sensors on trash cans informing public services when they need to be picked up – reducing unnecessary fleet travel

Source: USDOT
Beyond Transportation – Internet of Things (IoT)

- A digital “nervous” system for the things that comprise our surroundings
- Pervasive sensors and actuators on fixed and mobile devices
- Data made widely accessible via networks

*by 2020 there will be 50 to 100 billion ‘things’ connected to the Internet…*
For More Information

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