Welcome to the Saxton Transportation Operations Laboratory
GWU Students!
April 15, 2014
Northeast Autonomous Vehicle Summit
Town Hall Panel 1
U.S. DOT Smart City Challenge

Dale Thompson, FHWA, Office of Operations Research & Development
Turner Fairbank Highway Research Center

- **Research Capabilities**
  - 20+ labs, 110 Federal, 175 contractors
  - National Research Fellows, visiting researchers

- **Research Funding**
  - $100M per year
Status

- Solicitations: 8
- Projects awarded: 75; Active 31
  - $76 M Federal
  - $29 M Match

Focus Areas

- Connected highway systems
- Human behavior and travel choices
- Breakthrough concepts in material science
- Technology for assessing performance
- New technology and advanced policies for energy and resource conservation
Operations Focus Areas

Enabling Technologies

Concepts and Analysis

Operations Applications

Linking Testbeds to Living Laboratories

Cooperative Vehicle-Highway Testbed

Technology Testing

Data Resources

External Stakeholders, Applications, and Data

‘What-ifs’
Cooperative Adaptive Cruise Control (CACC) Research

CACC
A Story About Progress

Credit: USDOT
GlidePath Prototype Application

- Test examines the environmental and fuel economy benefits of partial-automation on a Ford Escape Hybrid
  - Overrides human longitudinal control, allowing the vehicle to travel at optimum speed to proceed through an intersection without stopping at red lights
  - Connected Vehicle-to-Infrastructure (V2I) technology combined with partial automation
- The Result: **22% fuel economy improvement** with partial automation versus 7% with manual driving
- Next phase of research will test the application in multi-intersection environments

Credit: USDOT
Tech Timeline

1939: General Motors (GM) introduces the automated highway system at the New York World’s Fair.

1957: First image of automated vehicles surfaces in an advertisement by American electric.

1967: Invention of Cruise Control.


1978: Eureka PROMETHEUS Project becomes the first autonomous vehicle project.

1987: GM introduces the first in-car navigation system—Guidestar.

1993: The Internet becomes publicly available.

1995: The Internet becomes publicly available.

1997: Automated Highway Simulation in San Diego, CA.

2000: 3G mobile data connectivity is on the rise.

2004: DARPA Grand Challenge kicks off military automated vehicles.

2010: Google X launches self-driving car project.

2015: Continental launches the Road Database Project.

2016: Traffic Jam Assist and CACC are Level 2 Automation breakthroughs.

2020: Uber Fleet is driverless.

2030: Continental launches the Road Database Project.

2040: Truck platooning a reality.

2050: All cars are autonomous.

2050: Truck platooning a reality.

2030: Uber Fleet is driverless.

2020: Google X launches self-driving car project.
We Are On the Verge of A Transformation

Connected Automation

SMART CITY

Information & Communications Technology

Internet of Things

Photo: Google

Photo: World Bank

Photo: Pixabay
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, respond to climate change, connect underserved communities, and support economic vitality.
USDOT Vision Elements

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

INNOVATIVE APPROACHES TO URBAN TRANSPORTATION ELEMENTS
- 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
- Vision Element #10: Architecture and Standards
- Vision Element #11: Low-Cost, Efficient, Secure, & Resilient ICT
- Vision Element #12: Smart Land Use
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

#DOTSmartCity
www.transportation.gov/smartcity
SMARTCOLUMBUS

VISION
- ACCESS TO JOBS
- SMART LOGISTICS
- CONNECTED RESIDENTS
- CONNECTED VISITORS
- SUSTAINABLE TRANSPORTATION

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

OUTCOMES DEPLOYMENT
- RESIDENTIAL DISTRICT
- COMMERCIAL DISTRICT
- DOWNTOWN DISTRICT
- LOGISTICS DISTRICT

Source: The City of Columbus
Integrated Data Exchange (IDE)

Non-Transportation Data Sources

Data from Smart COLUMBUS Program

Transportation Data Sources

Integrated Data Exchange (IDE)

Private App Developers
Public Sector
Private Sector
Independent Evaluators

Source: The City of Columbus
RESOURCES

FHWA Office of Operations:
- FHWA Office of Operations Website: http://ops.fhwa.dot.gov/
- Turner-Fairbank Highway Research Center Website: http://www.fhwa.dot.gov/research/tfhrc/offices/operations/

ITS-JPO:
- Automated Vehicles: https://www.its.dot.gov/automated_vehicle/
- CV Pilots: https://www.its.dot.gov/presentations/egan_smith/FutureTransportationCV-AV.pdf
- Research Data Exchange: https://www.its-rde.net/

Smart City Challenge:
- Finalist Cities & Applications: https://www.transportation.gov/smartcity/7-finalists-cities/
- Advanced Technology Grants: https://www.transportation.gov/Briefing-Room/Advanced-Technology-Transportation-Projects/
- Smart City Challenge Resource Guide: https://www.transportation.gov/smartcity/otherfunding/

CACC:
- Video Link: https://www.youtube.com/watch?v=2-WoV8nKQUE

Contact:
Dale Thompson
Dale.Thompson@dot.gov