

# US Activity in Transit Automation and Accessibility

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USDOT John A. Volpe National Transportation Systems Center 3<sup>rd</sup> SIP-adus Workshop on Connected and Automated Driving Systems Wednesday, November 16, 2016

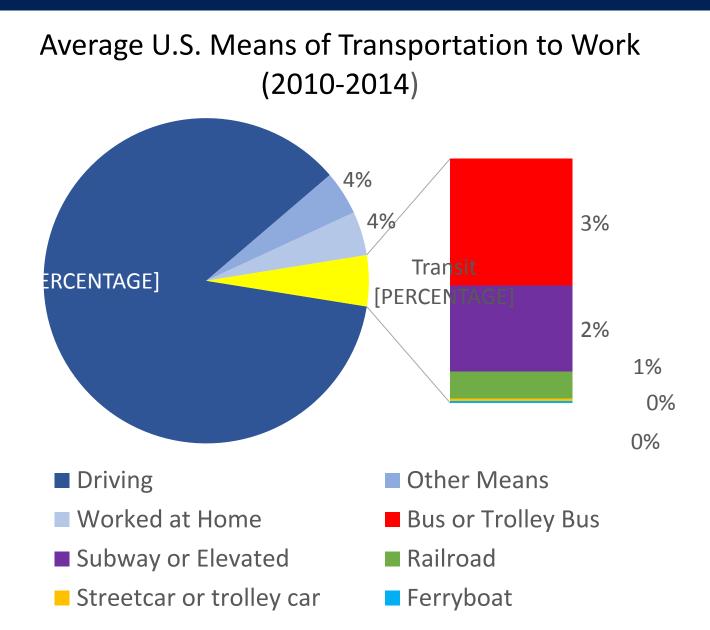
### Outline

- Context
  - Transportation in the United States
  - Current public and private research
- USDOT Research
  - Smart City Challenge
  - ATCMTD Grants
  - Mobility on Demand
  - Transit Automation Research Plan

### Context: U.S. Commuter Mode Split

- Vast majority of commuter trips in private vehicles
- Transit modes account for 6% of commuter trips

 Majority of transit trips are by bus



# US Research Snapshot: Transit Automation

- Transit Vehicle Assist and Automation (VAA)
   Lane Transit District, OR and AC Transit, CA
- Applied Robotics for Installations and Base Operations (ARIBO)
   Fort Bragg, NC; Fort Leonard Wood, MO; and West Point, NY
- Local Motors Olli shuttle testing
   National Harbor, MD; Las Vegas, NV; and Miami, FL
- EasyMile EZ10 shuttle testing in Contra Costa Bishop Ranch and GoMentum Station, CA
- Municipal Automated Shuttle System
   *Beverly Hills, CA*





ARIBO Vehicle

# US Research Snapshot: Mobility-on-Demand

- Smart Mobile Operation: OSU
   Transportation Hub (SMOOTH)
   Columbus, OH
- Uber testing Ford Fusion and Volvo XC90
   Pittsburgh, PA
- Lyft testing Chevy Bolt San Francisco, CA and Scottsdale, AZ
- Google testing Chrysler Pacifica Mountain View, CA
- MIT/Ford mobility-on-demand service testing Cambridge, MA

MIT/Ford MOD Vehicles



Uber Automated Vehicle



# USDOT Research

Highlights



Source: The City of Columbus

https://www.youtube.com/watch?v=bFobyi6eRGI

### **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





**Vision Element #10** 

Architecture and Standards



**Vision Element #11** 

Low-Cost, Efficient, Secure, & Resilient ICT



**Vision Element #12** 

Smart Land Use

### Columbus, Ohio Automation Initiatives

- Six wheelchair accessible electric autonomous vehicle shuttles will be deployed in the commercial deployment district
- Arterial freight platooning will be deployed in the logistics district
- V2X technology on up to 3,000 vehicles of various types for transit signal priority, freight signal priority, eco-approach and departure, forward collision warning and stopped vehicle ahead





### FAST Act: Advanced Transportation and Congestion Management Technologies Deployment Initiative

- The ATCMTD Program makes competitive grants for model deployment sites of advanced transportation technologies to improve safety, efficiency, system performance, and infrastructure return on investment.
- Eligible technologies include:
  - V2V and V2I
  - Autonomous vehicles and collision avoidance systems
- \$65M Smart city technology deployments: Pittsburgh, San Francisco, Los Angeles, Portland and Denver.
- San Francisco
  - Automated shuttle service to Treasure Island

https://www.fhwa.dot.gov/fastact/funding.cfm

### One Hundred Fourteenth Congress of the United States of America

#### AT THE FIRST SESSION

Begun and held at the City of Washington on Tuesday, the sixth day of January, two thousand and fifteen

To authorize funds for Federal-aid highways, highway safety programs, and transit programs, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

#### SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

- (a) Short Title.—This Act may be cited as the Fixing America's Surface Transportation Act or the "FAST Act".
- (b) Table of Contents.—The table of contents for this Act

Sec. 1. Short title; table of contents.

#### DIVISION A SURFACE TRANSPORTATION

Sec.	1002.	Definitions. Reconciliation Effective date.	of	fund
Sec.	1004.	References.		

#### TITLE I\_FEDERAL-AID HIGHWAYS

#### Subtitle A-Authorizations and Programs

		and the second
Sec.	1101.	Authorization of appropriations. Obligation ceiling.

1105. Nationally significant freight and highway projects. 1106. National highway performance program. 1107. Emergency relief for federally owned roads.

Railway highway grade crossings. Surface transportation block grant program

Highway use tax evasion projects.

Construction of ferry boats and ferry terminal facilities. Highway safety improvement program. Congestion mitigation and air quality improvement program

erritorial and Puerto Rico highway program.

Federal lands and tribal transportation programs.

1118. Tribal transportation program amendment 1119. Federal lands transportation program

Tribal transportation self-governance program State flexibility for National Highway System modifications.

1123. Nationally significant Federal lands and tribal projects program.

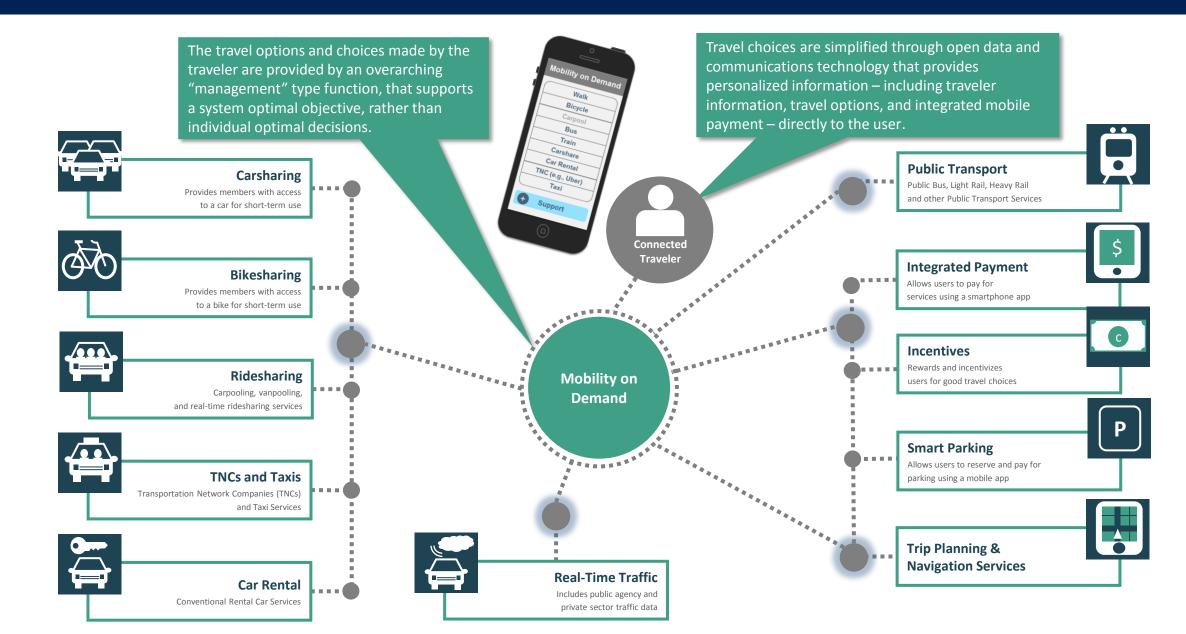
Subtitle B.—Planning and Performance Management

Metropolitan transportation planning Sec. 1202. Statewide and nonmetropolitan transportation planning

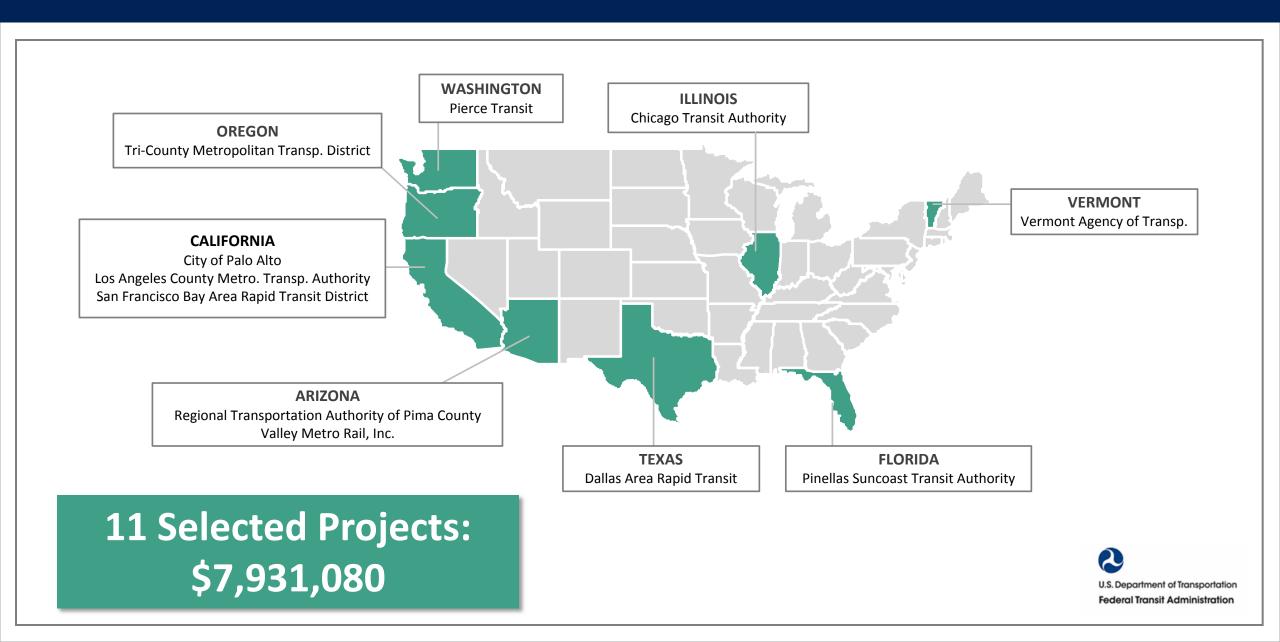
Subtitle C-Acceleration of Project Delivery

Sec. 1301. Satisfaction of requirements for certain historic sites.

# Mobility on Demand Sandbox



# Mobility on Demand Sandbox FY16 Awardees



# FTA Transit Automation Analysis Research Plan

### Identify use cases

• Identify, analyze, and prioritize use case scenarios for automating transit bus operations

### Engage stakeholders

• Interviews, workshops, and presentations

### Develop a plan

• for future transit automation development and demonstration projects

### Accelerate deployment

• Identify knowledge transfer opportunities and ways to accelerate deployment



# Preliminary Findings

- Transit industry is risk-averse, and constrained by funding and regulation
- Automation and the platform economy have the potential to transform the transit industry
  - New players
  - New service concepts
  - New business models
- Awareness, trust, and acceptance are uncertain among fleet operators, drivers, unions, public
- Early opportunities in closed environments (transitways, maintenance yards) and in collision-avoidance
- Existing technology for light-duty vehicles is portable to HD vehicles, such as buses and trucks.
- Smart Cities projects nationwide could help create the critical mass that will lead to these technologies being adopted in transit vehicles.

### For More Information

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