



US Activity in Transit Automation and Accessibility

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

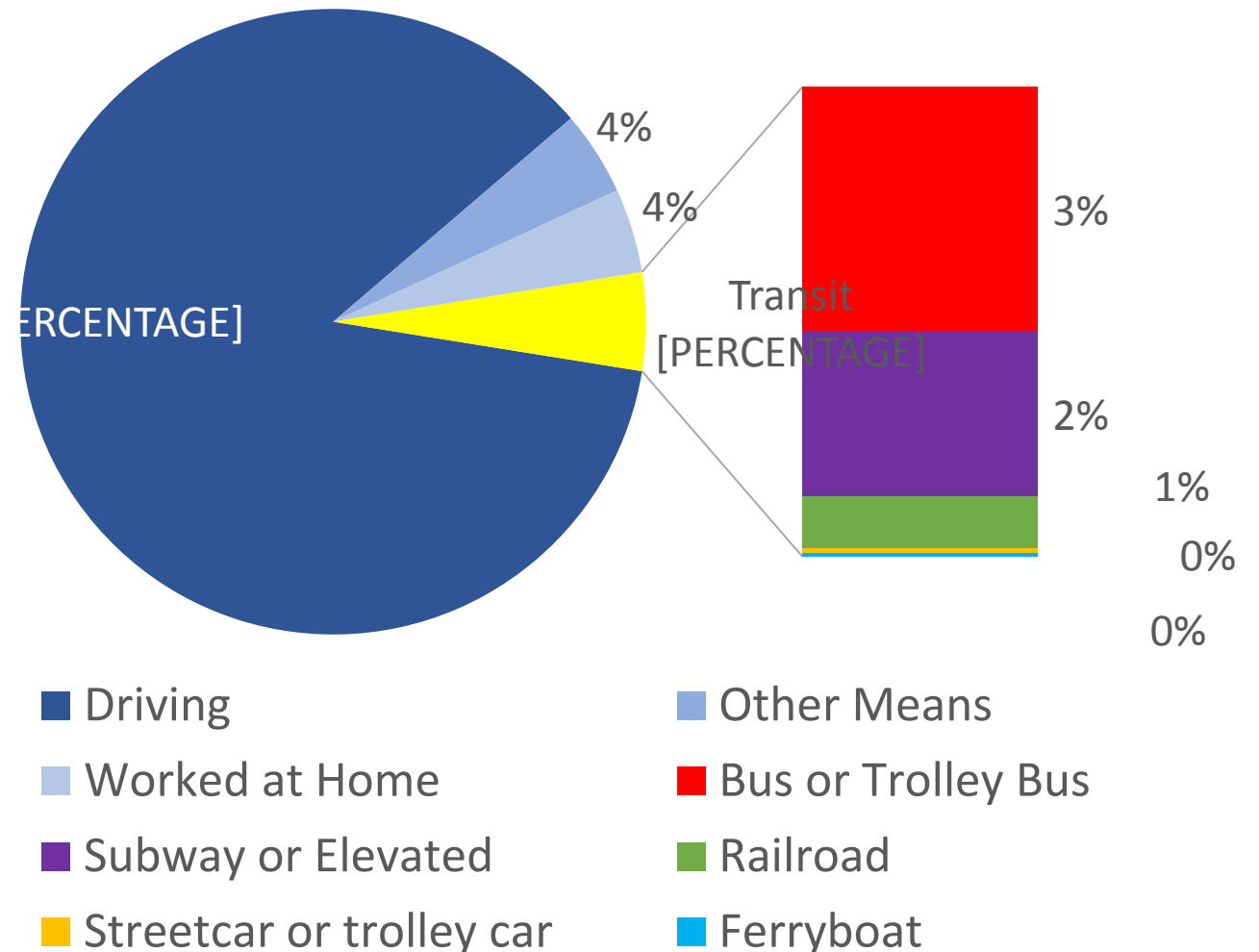
Outline

- 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

Average U.S. Means of Transportation to Work (2010-2014)



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

VAA
Precision
Docking



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



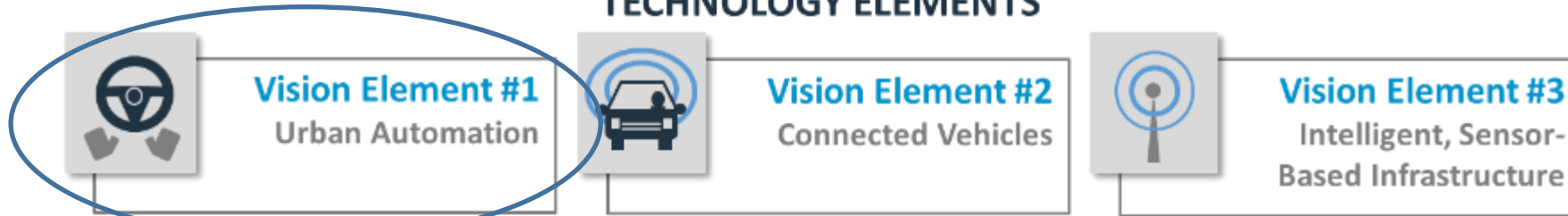
#SMARTCOLUMBUS

Source: The City of Columbus

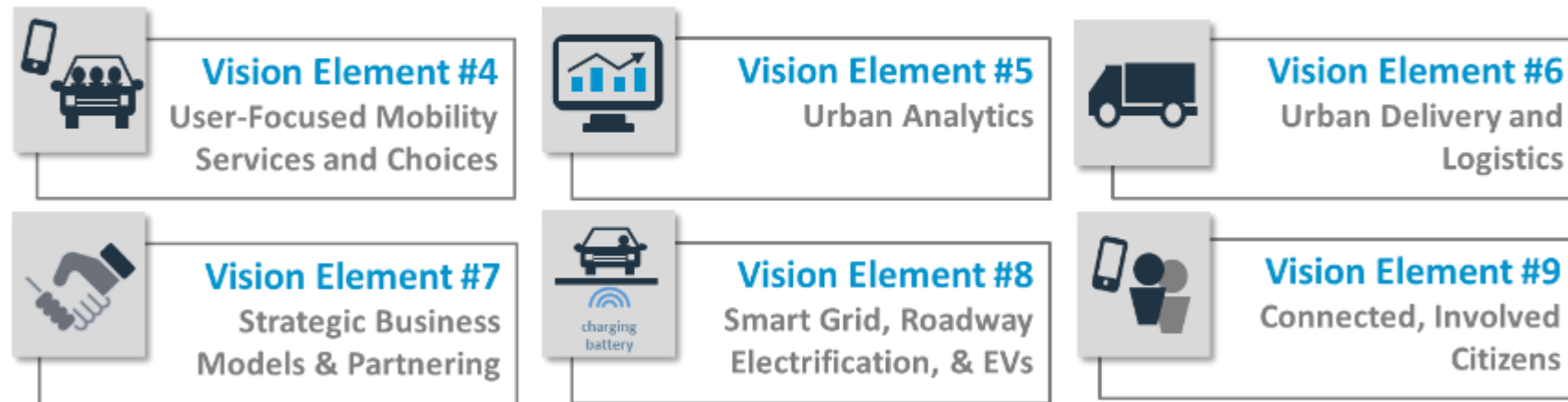
<https://www.youtube.com/watch?v=bFobyi6eRGI>

USDOT Vision Elements

TECHNOLOGY ELEMENTS



INNOVATIVE APPROACHES TO URBAN TRANSPORTATION ELEMENTS



SMART CITY ELEMENTS



Columbus, Ohio Automation Initiatives

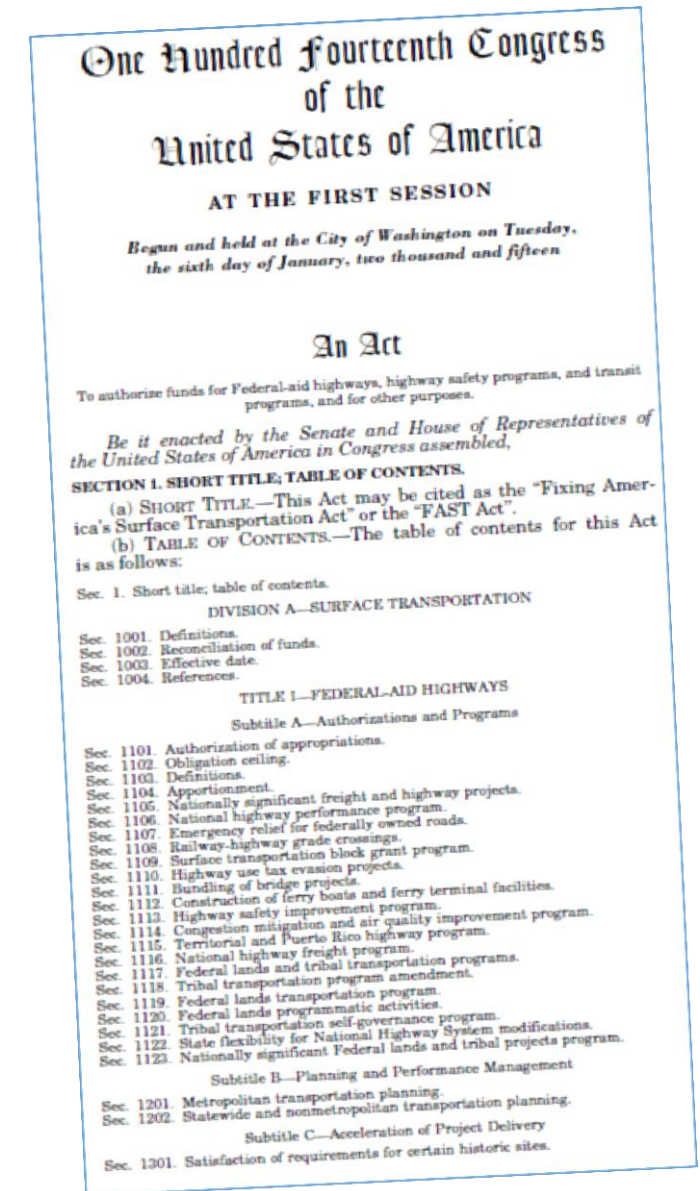
- Six wheelchair accessible electric autonomous vehicle shuttles will be deployed in the commercial deployment district
- Arterial freight platooning will be deployed in the logistics district
- V2X technology on up to 3,000 vehicles of various types for transit signal priority, freight signal priority,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



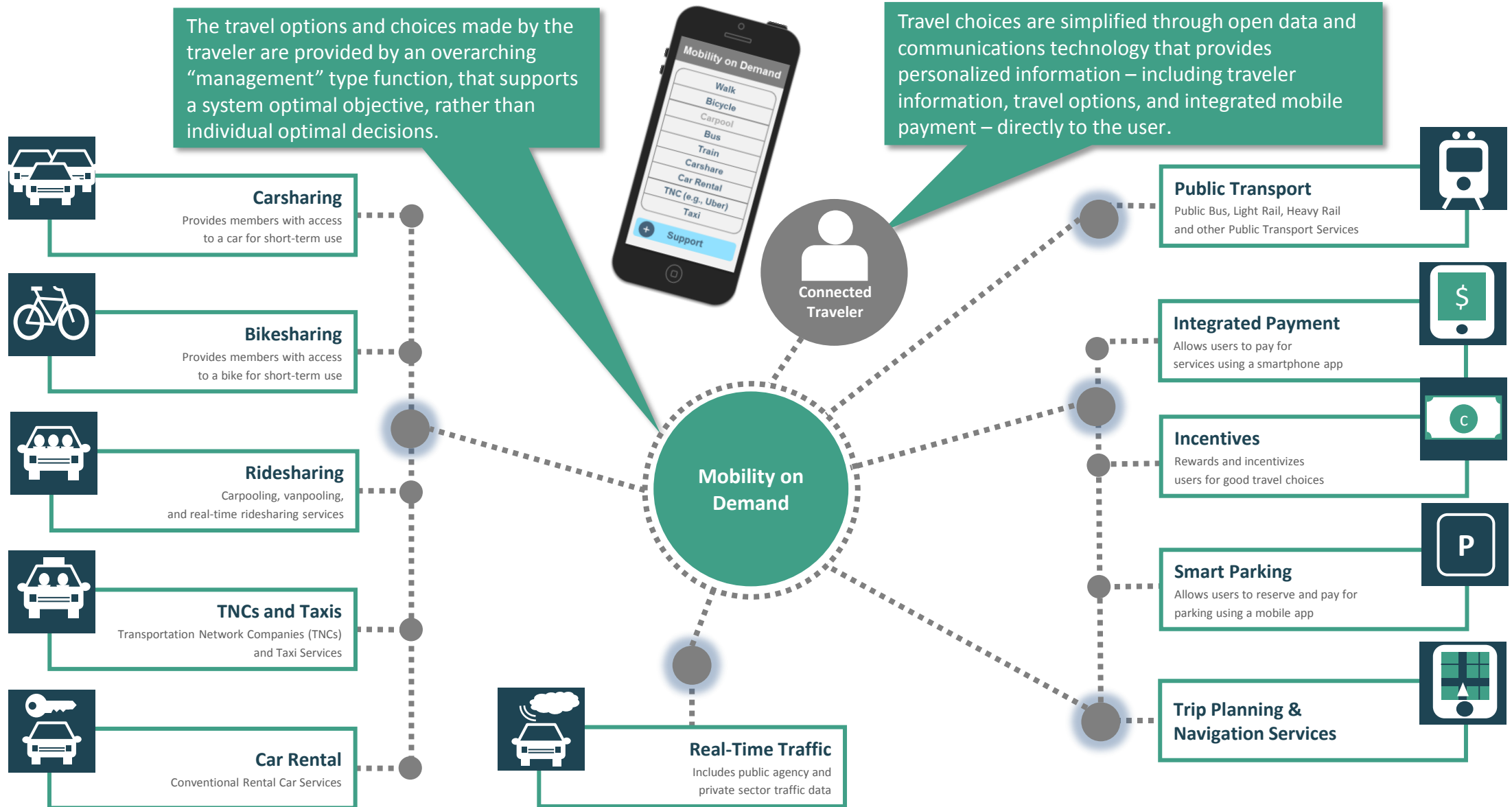
FAST Act: Advanced Transportation and Congestion Management Technologies Deployment Initiative

- 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

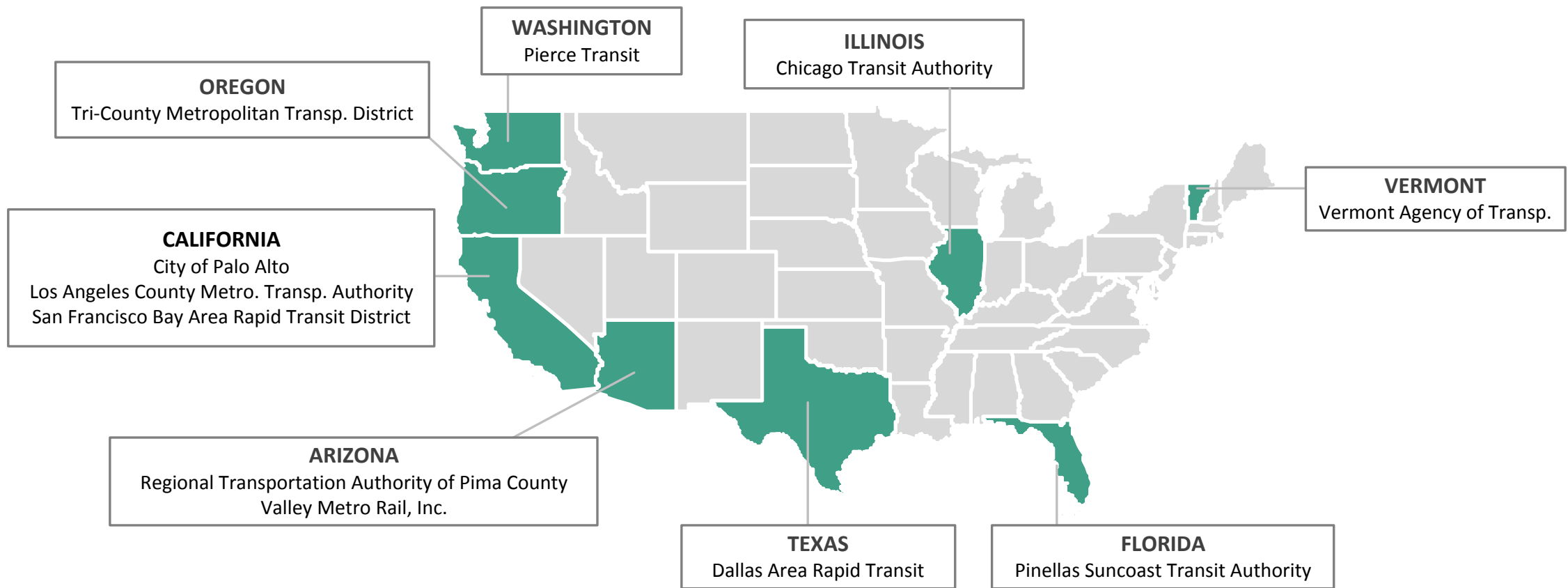
<https://www.fhwa.dot.gov/fastact/funding.cfm>



Mobility on Demand Sandbox



Mobility on Demand Sandbox FY16 Awardees



**11 Selected Projects:
\$7,931,080**

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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