Transit in an Autonomous Vehicle Environment

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Our Team



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What We Hope You Gain Today

An understanding of how AVs work.

Knowledge of how AVs may impact your company, agency, and community.

Ideas about how you can prepare for and work with AVs.



What Exactly is an Autonomous Vehicle?

Autonomous Vehicle (AV)

AVs travel through a combination of sensors, cameras, radar and artificial intelligence.

Advanced control systems can interpret sensory information to detect obstacles and choose the most appropriate navigation path.



History







VaMor's Mercedes Van

Google's Toyota Prius

Lexus' AV Battery

Advantages

Little to no driver error causing accidents

Better traffic coordination

Increased road capacity

Better perception of environment

Increased speed limits



Greater independence of those who do not drive

Reduced cost of insurance premiums, fuel



FULL AUTOMATION

- **HIGH AUTOMATION**
- **CONDITIONAL AUTOMATION**



- **PARTIAL AUTOMATION**
 - **DRIVER ASSISTANCE**

NO AUTOMATION



Where Are AVs Legal in the U.S.?



Law Passed
Executive Order
Pending
All Failed
None Considered

U.S. Department of Transportation (US DOT) & AVs



Committed to facilitating a new era of transportation innovation and safety.

Drafted document to provide framework approach to safe integration of AVs.

US DOT Approach to Shaping Policy for AVs

Principles

- 1. Prioritize safety
- 2. Remain technology neutral
- **3. Modernize regulations**
- 4. Encourage a consistent regulatory and operational environment
- 5. Prepare proactively for automation
- 6. Protect and enhance the freedoms enjoyed by Americans

New Players, Same Game?

Implementation

Private ownership

Corporate ownership

New & different players



Parking

Reduced need for parking spaces.

Increased pick-up and drop-off infrastructure.

Development opportunities.





Travel Patterns

Longer Distances

More Trips

Increase of Vehicle Miles Traveled

Road Capacity



Real Estate

Development Opportunities Urban vs. Rural Housing Prices Transit Oriented Development



How will AVs Impact Transit Ridership?

Choice Riders

Additional transportation option

Improved amenities



Captive Riders

Additional transportation option Improved on-demand response Challenge: Passenger Assistance (Paratransit)



Ridership: Traditional Thoughts

Focus on core corridors

Exit corridors with low ridership



Ridership: Applications

AV Technology benefits *all* users equally.

Application is the challenge.



Ridership: Applications

Transit and AVs can work together

- Connections *matter*, ceding ground harms utility of the overall network
- AVs can improve access for first-mile / last-mile connections (LRT, BRT, Rail)
- Transit addresses core capacity issues



How do AVs Work in Practice?

Waymo Phoenix, AZ

Partnership with Phoenix Valley Metro.

Better last mile mobility.

Focus on enhancing, not replacing transit.

AR

Pilot – First Transit

First Transit operating SAV (Shared Autonomous Vehicle) pilots across United States

- Livermore, CA
- San Ramon, CA
- Concord, CA
- Arlington, TX
- Multiple Locations, MN

Focus is shuttles

Transit know-how



Pilot – Siemens Combino Tram

Siemens test in Potsdam, Germany Autonomous Tram in mixed traffic with pedestrians

Not production technology



Pilot – Mercedes-Benz Future Bus

20 km BRT route in the Netherlands Semi-Autonomous:

- Normally autonomous
- Regulations require operator when oncoming, unseparated (no barrier) traffic is present
- Driver may take control at any time



How do AVs Benefit Transit?

Benefits to Transit





Collision Avoidance Emergency Braking Steering & Lane Keeping Bus Platooning Improved Service to Passengers with Disabilities

Transit Advantages

Vehicle Capacity

Fleet Knowledge

Safety and Cost

Priority Service

Dedicated Lanes/Right-of-Way

•Transit Signal Priority



MaaS Partnerships

Start thinking bigger picture.

Facilitate connections for the entire network.

Policies conducive to partnerships.



Thank you!

Questions?