Automated Buses: Fantasy or Reality?

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Public Transportation in the U.S.

U.S. Public Transit Facts

- 34 million boardings every weekday
- 10.2 billion annual trips in 2017
- $68 billion a year industry in U.S.
- 73% of dollars flow to private sector
- More than 400,000 direct employees
- Supports an additional 2 million jobs

APTA's Strategic Focus

SAFETY & SECURITY FIRST

RESOURCE ADVOCACY

WORKFORCE DEVELOPMENT

DEMOGRAPHIC SHIFTS

TECHNOLOGICAL INNOVATION

Transit Experiencing Multiple Disruptions

- Technology (AVs, EVs, apps)
- Business Platforms (TNCs, bike & scooter sharing)
- Data (real-time info, optimized trip planning)

Courtesy: Medium

Key Questions

How do we manage the gap between expectation and reality on AVs?

What is the right balance between regulation and enabling innovation?

How should transit agencies plan for disruption?

Heading Toward Full Automation

- Automation is **already here**; i.e. lane assist
- **Full (or very high) automation** is the game changer
- It's coming … but **not** tomorrow

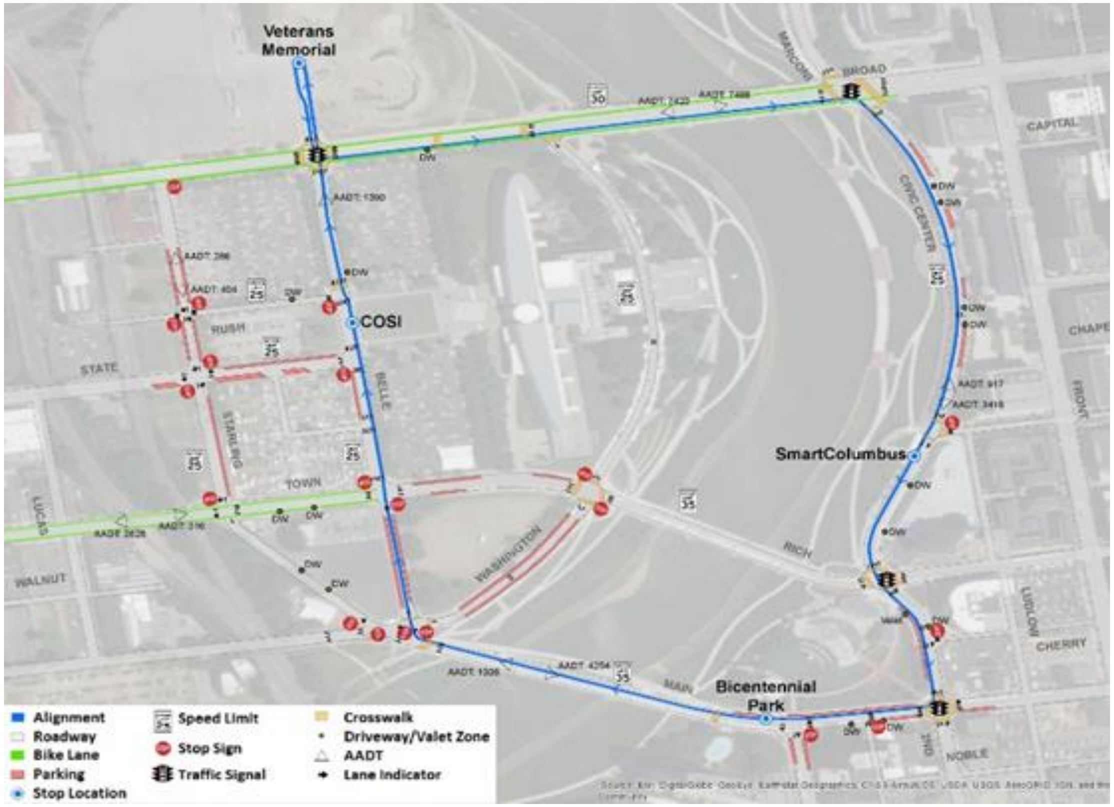
0	1	2	3	4	5
No Automation	**Driver Assistance**	**Partial Automation**	**Conditional Automation**	**High Automation**	**Full Automation**
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

Automated Transit Shuttles in the U.S.

Multiple cities across the U.S. are piloting automated vehicle (AV) service using small, low speed shuttle buses

AV Shuttle Pilots: Columbus, OH

- AVs pilot through partners *DriveOhio* and Ohio State University; May Mobility operating the service
- Part of the *Smart Columbus* initiative



Primary route for Smart Columbus AV Shuttle

AV Shuttle Pilots: Austin, TX

In 2017, Cap Metro and RATP Dev ran a one-week trial, using a EasyMile AV from EuropE

Cap Metro now looking to run a larger test program in downtown Austin

Courtesy: RATP Dev

AV Shuttle Pilots: Las Vegas

The "Hop On" Shuttle

Partners include AAA, RTC, Keolis & City of Las Vegas

8-passenger NAVYA shuttle

Runs half-mile route in downtown Las Vegas

Images courtesy: AAA NCNU

Other AV Shuttle Pilots

- **Grand Rapids** Autonomous Mobility Initiative
- **Denver RTD**, Colorado DOT, Panasonic & EasyMile
- **Minnesota DOT** with 3M, Easy Mile & First Transit
- **Valley Metro** partnered with Waymo for a “first & last mile” AV pilot in Phoenix
- **Denton County Transportation Authority** piloting on-demand AV service in Texas with drive.ai
- And more coming…

Key Issues to Consider

How do we make AVs commercially viable for transit?

- Safety first – for passengers & public
- Cybersecurity threats – when, not if
- Where do AVs provide the greatest utility for transit – don't be a solution looking for a problem
- Move beyond the small shuttle bus
- Move beyond short, fixed routes: Can it provide on-demand service?
- Address workforce concerns – AV shuttles will still need onboard staff

Opportunities for Transit

Transit can be a test bed for automation before it hits the consumer market

Transit agencies know how to operate fleets

AVs as potential solution for first/last mile and paratransit/on-demand services

Visit APTA's Mobility Innovation Hub

www.apta.com