



Minnesota Transportation Conference



Shared Autonomous Vehicles – Today and Tomorrow

PRESENTER



Paul Buharin, Region Vice President @ First Transit.

Paul began his career in student transportation in 1983, advancing to a school bus location manager before joining First Transit in 1993. He progressed through positions of increasing responsibility including Project Manager, General Manager and his most recent position as Senior Director of Operations, Central Region.

Through his 35-year career he has gained extensive transportation experience including school bus, charter, fixed-route, paratransit, airport and university shuttle and Shared Autonomous Vehicle (SAV).

Paul holds a bachelor's degree in education from the University of Minnesota. Go Gophers!

Paul is currently responsible for 11 operations and more than 1,100 employees.

FIRSTGROUP OVERVIEW



Greyhound
7,500 Employees
1,700 Vehicles



First Transit
19,500 Employees
36,000 Vehicles



First Bus
18,000 Employees
6,300 Vehicles



First Student
57,000 Employees
49,000 Vehicles

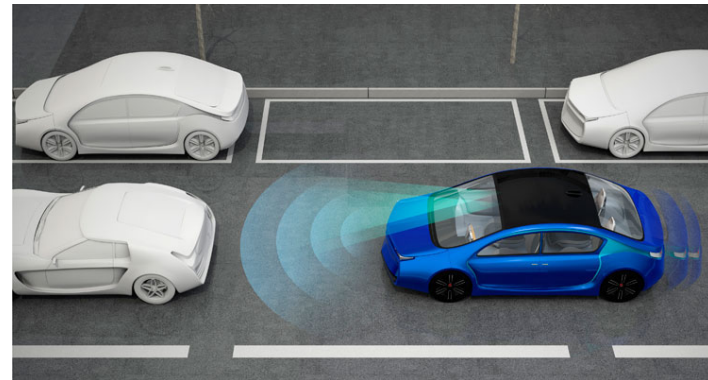


First Rail
7,500 Employees
2,800 Vehicles



AUTONOMOUS VEHICLES TODAY

Shared autonomous vehicles exist today, why doesn't everyone use them?



LEVELS OF AUTONOMY

Here's what you need to know about level 0-5

AUTOMATION LEVELS OF AUTONOMOUS CARS

LEVEL 0



There are no autonomous features.

LEVEL 1



These cars can handle one task at a time, like automatic braking.

LEVEL 2



These cars would have at least two automated functions.

LEVEL 3



These cars handle "dynamic driving tasks" but might still need intervention.

LEVEL 4



These cars are officially driverless in certain environments.

LEVEL 5



These cars can operate entirely on their own without any driver presence.

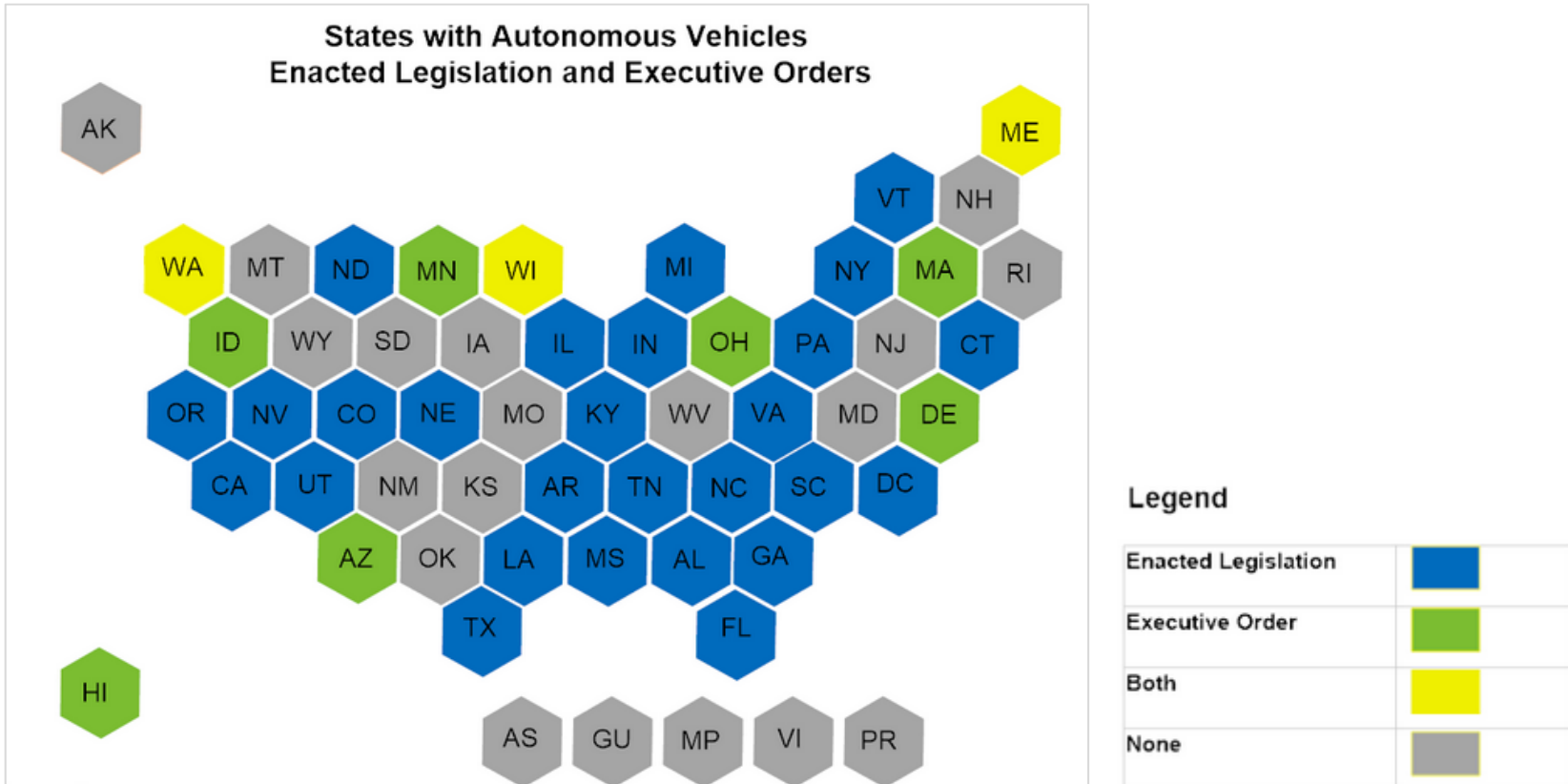
SOURCE: SAE International

BUSINESS INSIDER

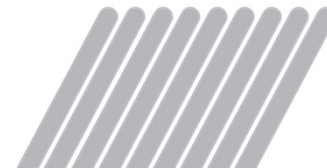


REGULATORY RESTRICTIONS

Current status of regulatory approval for SAV



Source: National Council of State Legislators



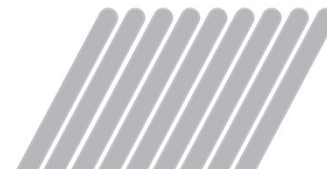
VEHICLES AND PLATFORMS

- Electric
- 6-15 passenger capacity
- Operating speed 15 mph
- Operates in most weather conditions*

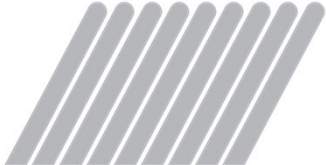
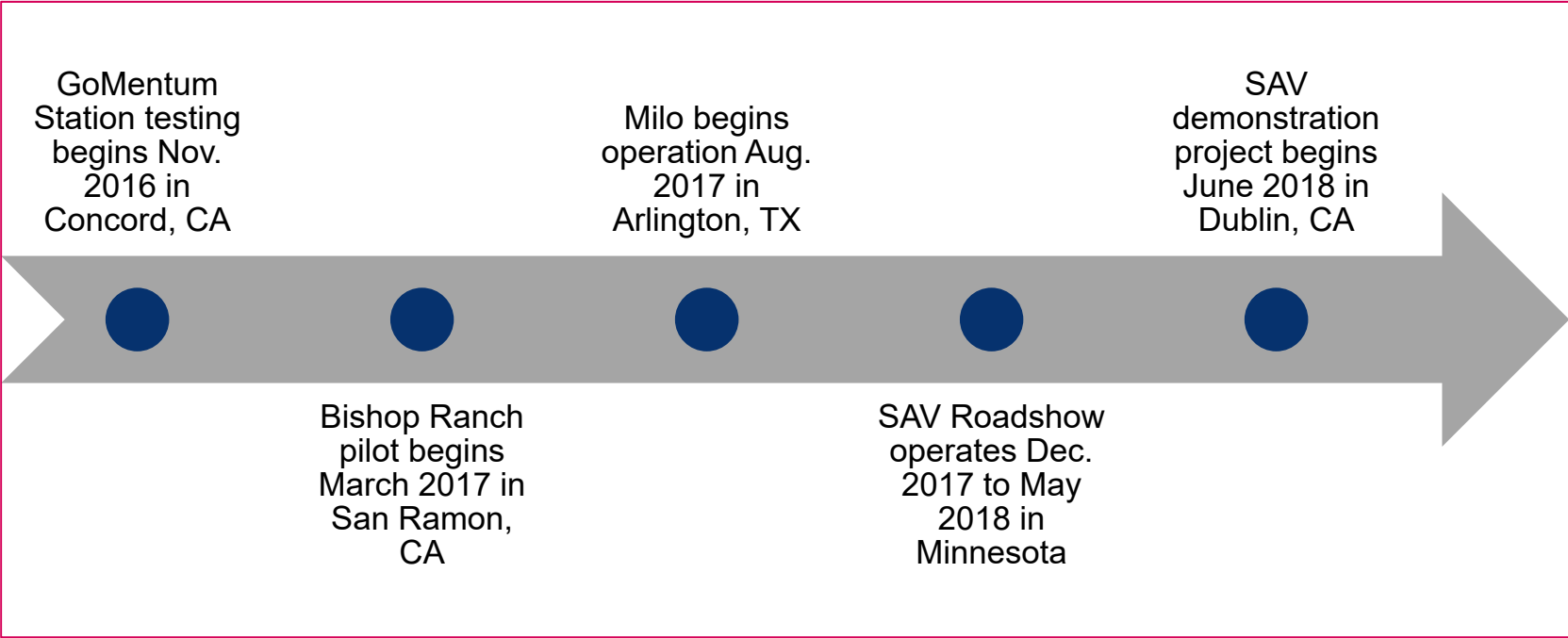
NAVYO®



EASY MILE



FIRST TRANSIT SAV OPERATIONS



FIRST TRANSIT SAV VIDEO



Slide 9

HK4

Give further detail on each SAV project as talking points only, I would mention partners in each project as well, they are listed in teh notes.

Hardin, Kayla, 9/13/2018

FIRST TRANSIT SAV OPERATIONS



**GoMentum Station
(Concord, CA)**



**Bishop Ranch Pilot
(San Ramon, CA)**



**Milo
(Arlington, TX)**



**Livermore Amador
Valley Transit
Authority SAV Pilot
(Dublin, CA)**



**Minnesota SAV
Roadshow
(various locations, MN)**

FIRST TRANSIT SAV OPERATIONS



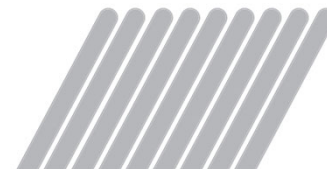
**Minnesota SAV
Roadshow
(Various locations, MN)**

- The first stop was at Nicollet Mall in downtown Minneapolis.
- The second stop was at 3M Global Headquarters.
- The third stop at the Minnesota Statehouse.
- The fourth stop in Rochester, Minn., in partnership with the Destination Medical Center.
- Final stop of the SAV roadshow is for public officials of Hennepin County, Minn.



FIRST TRANSIT SAV OPERATIONS – WHAT WE CAN BRING TO THE DISCUSSION!

- Fully trained staff will serve as onboard Customer Ambassadors
- Develop comprehensive maintenance plan
- Service and route planning
- Legislation experience
- AV-focused and regionally-based support
- Detailed implementation approach
- Experience with CV citywide networks



OPERATIONAL QUESTIONS

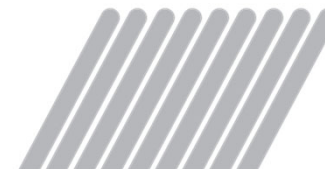
Do these vehicles meet ADA standards?

- EasyMile and NAVYA
 - Wheelchair ramp is 35" wide
 - Supports a load of 771 lbs.
- On-board screens
- Braille labeling of buttons
- Working toward ADA compliance – EM
- Full ADA compliance, to include wheelchair securement and enhanced accessibility features, expected in 2019

What limitations do you see with these vehicles?

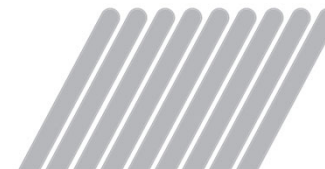
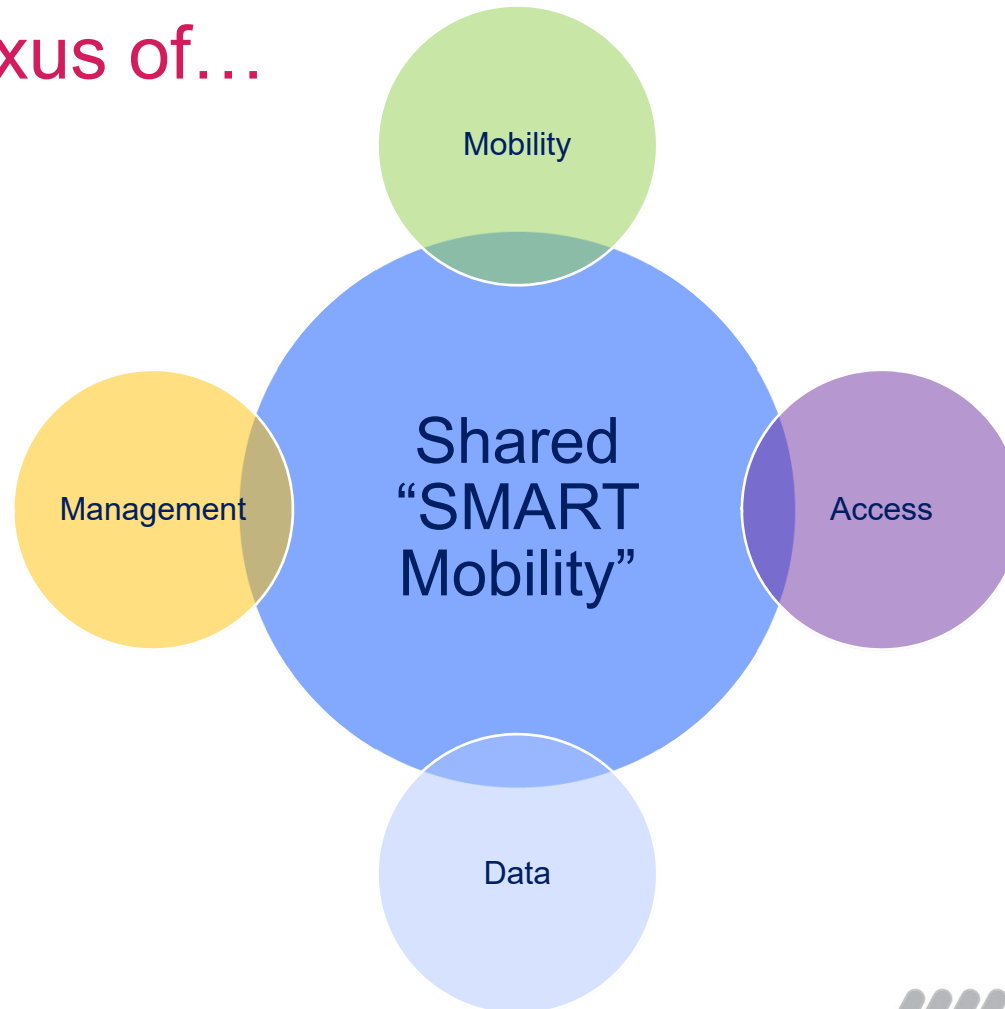
- Bi-directional (Std.)
- No U-turn required
- Minimum turning radiuses
- Lower speed
- Still testing CV platform

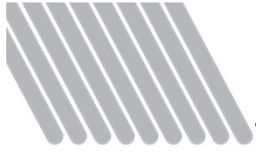
Both vehicles have been proven to be wheelchair accessible in operations



COMMITMENT TO OUR CUSTOMERS

The Nexus of...





WHAT WILL DRIVE THE SHIFT TOWARDS AV?

- Education on safety and the continued need for human intervention
- Powered by alternative energy sources
- Public education and adoption
- Integration with infrastructure, curb space, traffic patterns and other mobility modes
- Public policy
- Continued focus on equity
- Collaboration

THANK YOU FOR YOUR TIME TODAY

Paul Buharin
Region Vice President
Paul.Buharin@firstgroup.com



@FirstTransit

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