Automated Shuttle Buses in Transit Operations

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APTA

2018 Fare Collection/Revenue Management & TransITech Conferences

Jacksonville, Florida

April 9-11, 2018

Funding: FAST Act

Advanced Transportation and Congestion Management Technologies Deployment Initiative (ATCMTD) 2016-2020

1st Year: Issue Date: March 3, 2016, Applications Due: June 24, 2016, Awarded

2nd year: Issue Date: April 12, 2017, Applications Due: June 12, 2017, Awarded

3rd Year: Coming Up

4th and 5th Year Remaining

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V2V Communications

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Road Testing

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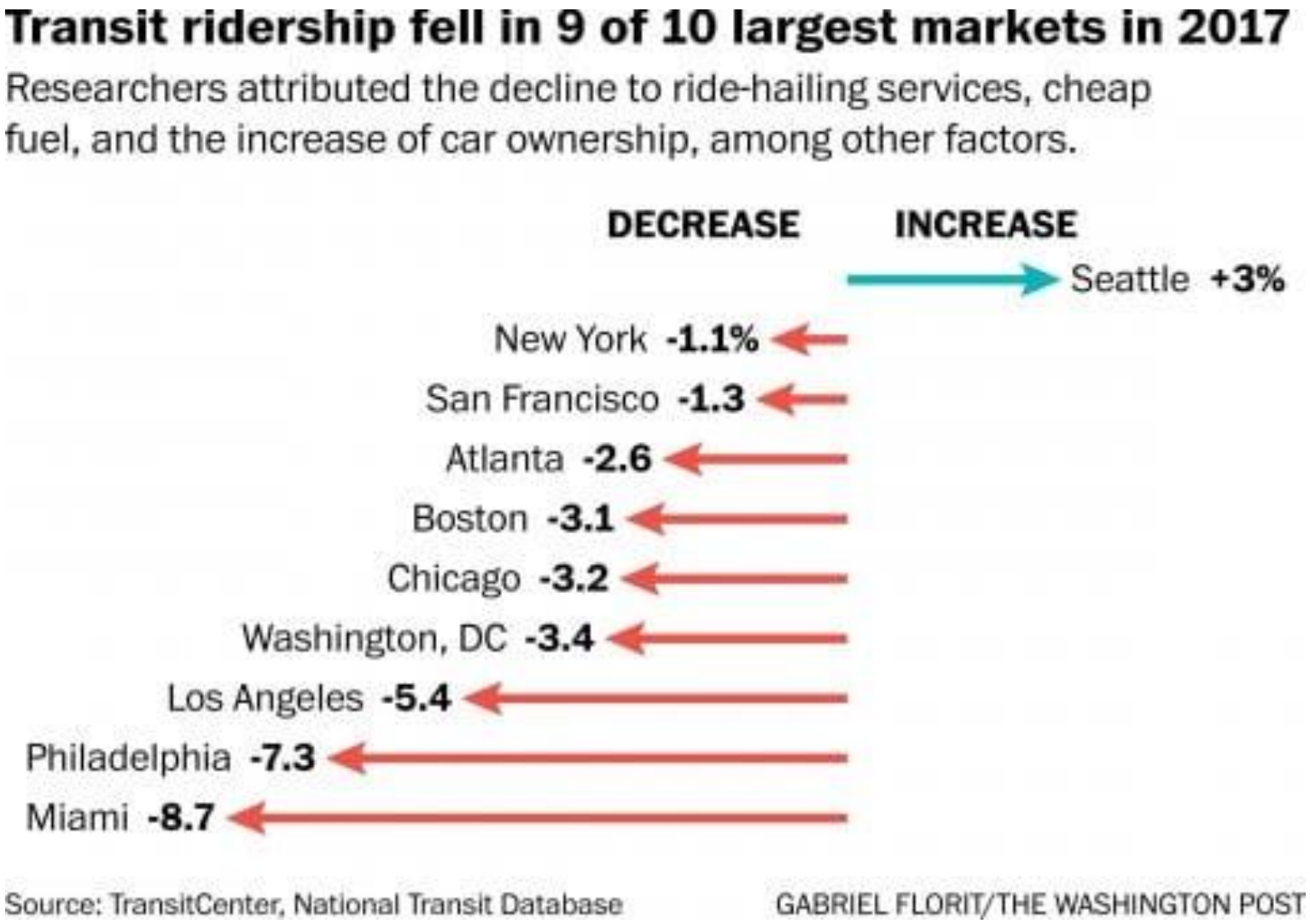
Transit Ridership



Some of the Shuttles

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SAE/NHTSA Level of Automation	4 – High Automation	**Passenger Capacity**	12-15
Drive	Battery Electric	**Wheelchair Accessible**	Yes
Charging	On-board or inductive	**AC/Heating**	Yes
Range	3-10 hours (depends on environment and AC/heating usage)	**Size**	L: 12-14 ft. W: 6-7 ft. H: 8-9 ft.
Recharge Time	2-8 hours (depends on voltage and/or charging strategy)	**Wheelbase**	9-10 ft.

Top Speed	25 mph (40 km/h)	**Weight**	3,000 lbs.
Average Operating Speed	12.5 mph (20 km/h)	**Payload Capacity**	3,000 lbs.
Localization	LIDAR, GPS	**Gross Vehicle Weight**	6,000 lbs.
Sensing	LIDAR, optical camera, RADAR, INS	**Human-Machine Interface**	Touchscreen, speakers/ microphone, digital signage, horn, lights
Communication	DSRC; 4G; Wi-Fi	**Remote Supervision**	Emergency link and two-way communication

Transit Benefits

1. Provides for First Mile/Last Mile
2. Eliminates Wait Time
3. Provides for Seamless Transfers
4. Improves Transit Reliability
5. Improves Customer Satisfaction
6. Increases Transit Ridership
7. Reduces Operating Costs
8. Increases Total System Throughput
9. Decreases Primary & Secondary Incidents
10. Stimulates Economic Growth
11. Short Project Development/Implementation Timeframe
12. Electric Vehicles, Zero Emissions
13. Addresses Paratransit Needs
14. Enables Mobility on Demand (MOD)

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Legislation

- **US House: “Self Drive Act” Passed the House, Referred to Senate**
- **US Senate: Renamed “AV START Act”, Passed Senate Committee**
- **Held Up in the US Senate**
- **Conference Committee: TBD**

Regulation & Guidance

- Development of Automated Vehicles 3.0 (AV 3.0) is underway and to be released Summer 2018
- US DOT V2I Deployment Guidance (Phase II just started with 3 Working Groups)
- V2V Communications (DSRC Mandate, the 5G issue)

Accident in Las Vegas

Shoes Appear

In-View

The Driver, Moments Before

Early Lessons Learned

1. Find a Passionate Champion
2. Funding is Key
3. Have Vision, Mission Statements, Strategic, Business & Marketing Plans
4. Plan Big. Start Small with the “Low Hanging Fruit”
5. Under Promise
6. Share Information
7. Media often gets it wrong
8. Do not underestimate Permitting Requirements
9. Better Insurance
10. Plan for Accidents
11. Test & Re-Test
12. Keep Going, Do Not Give-Up
13. Remember that Riders Rule

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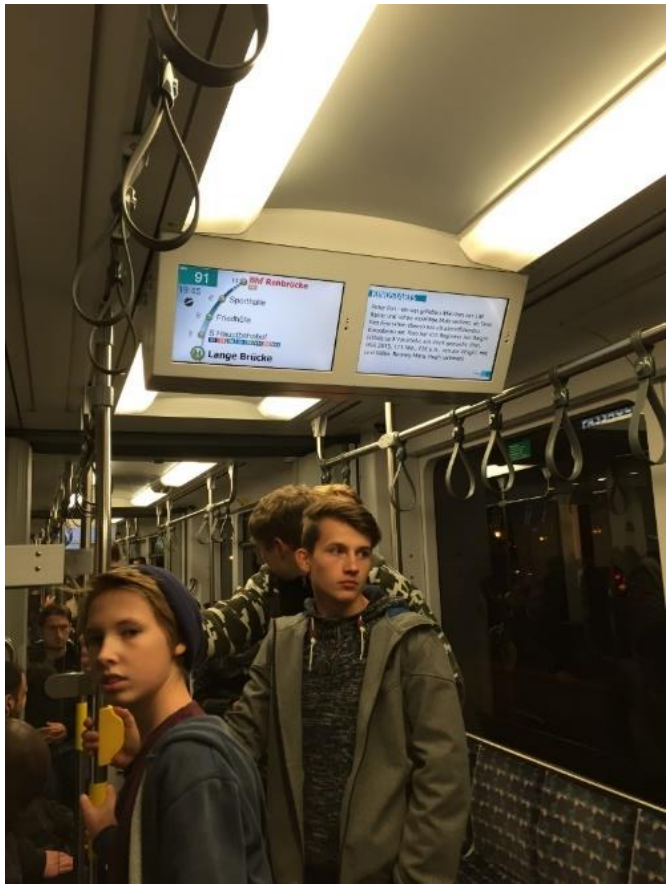
New poll:

Research suggests 50% of all new vehicles will have V2V tech by 2022. Will U.S. road infrastructure be in a state to maximize the potential safety implications this might bear?

Data Ownership & Spectrum Sharing



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There is no Interoperability without:

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