Washington State Autonomous Vehicle Work Group Executive Committee

Kick Off Meeting

June 27, 2018

Washington State Autonomous Vehicle Work Group

Washington State Transportation Commission

Agenda

Kick Off Meeting

1:00	**Introductions, Expectations & Priorities**
1:15	**Review SHB 2970 creating the AV Work Group**
1:30	**Organize**
2:45	**Overview of national trends & developments on AVs**
3:15	**American Association of Motor Vehicle Administrators (AAMVA) Guidelines for the Safe Testing & Deployment of Autonomous Vehicles (AVs)**
4:15	**State Agency Updates**
4:40	**Public Comment**
4:50	**Set next Meeting Date; Closing Remarks**
5:00	**Adjourn**

Washington State Autonomous Vehicle Work Group

Introductions

Jerry Litt
Chairman
Washington State Transportation Commission

Review Legislation & Policy

Paul Parker
Deputy Director
Washington State Transportation Commission

SHB 2970

Legislative Intent *(SHB 2970 (Sec. 3), Ch. 180, Laws of 2018)*:
"The legislature finds that establishing an autonomous vehicle work group, to be convened by the transportation commission, will facilitate state efforts to address the emergence of autonomous vehicle technology. It is the intent of the legislature for the transportation commission to develop recommendations for policy, laws, and rules for the operation of autonomous vehicles, with input from the autonomous vehicle work group, that enable Washington state to address the public policy changes necessitated by the emergence of this technology in an informed, thorough, and deliberate manner."

SHB 2970
Key Provisions

- The AV Work Group is to develop policy recommendations to address the operation of autonomous vehicles on public roadways.
- Executive branch agencies are identified who must participate.
- Requires four House and four Senate members – two from each caucus of each house.
- The Transportation Commission may invite additional participation as needed.
- The Work Group must:
  - Follow developments in AV technology, AV deployment, and federal, state and local policies that relate to AV operations.
  - The scope of this work must include commercial and passenger autonomous vehicles.
  - Explore approaches to modifying state policy, rules and laws to further public safety and prepare for AV technology deployment in the state.
  - Disseminate information
- The Transportation Commission must develop and update recommendations annually based upon input from the work group and report them to the Legislature and Governor.
- Recommendations may include changes to state law and rules.

Governor's Executive Order 17-02

Key Provisions

Executed June 7, 2017

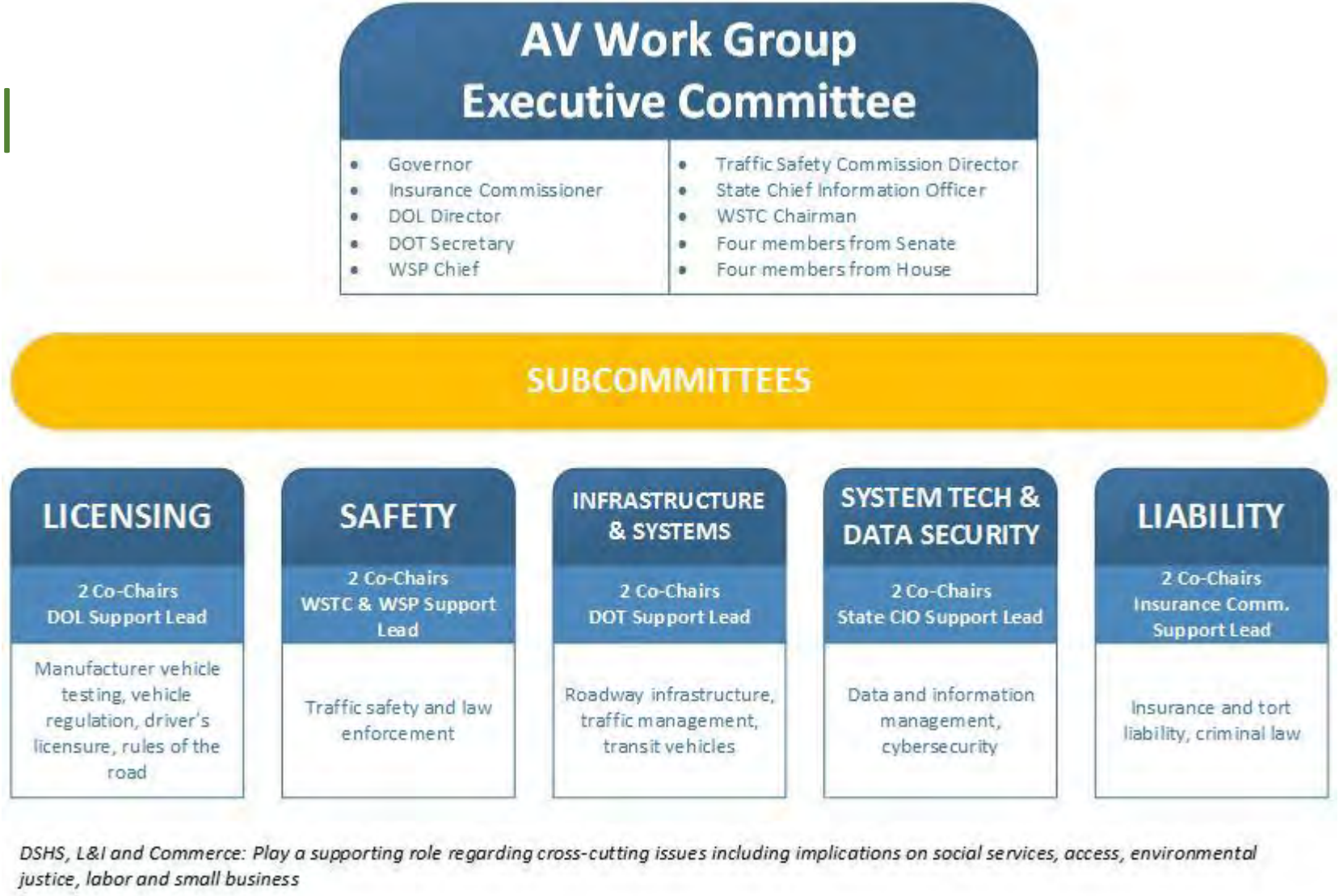
- Pilot programs are enabled throughout the state in partnership with entities that are developing AV technology equipment and such pilots may or may not have a human present in the vehicle.
- Entities conducting AV testing with a human present in the vehicle must self-certify to DOL they are compliant with all requirements including: possessing a valid drivers license; providing proof of financial responsibility as required by RCW 46.30.020; the operator must have ability to direct the vehicle's movement if assistance is needed; etc.
- Entities conducting AV testing without a human present in the vehicle must self-certify to DOL they are compliant with all requirements including: vehicles being equipped with automated driving systems that perform all aspects of driving on a part or full-time basis and must be able to bring the vehicle to a safe condition in the event of a system failure; providing proof of financial responsibility as required by RCW 46.30.020; etc.
- Entities may implement pilot programs immediately after providing notification to DOL.
- Establishes an interagency work group to advance the objectives of the Exec. Order and examine emerging automated transportation technology in other modes, including freight, aviation, transit, passenger rail, marine vessels and ferries, as well as points of convergence with connected, shared and electric vehicles.
- Work group includes representatives from the: Governor's Office, Dept. of Transportation, Dept. of Commerce, Dept. of Licensing, Wash. State Patrol, and the Traffic Safety Commission.

Organize

Reema Griffith
Executive Director
Washington State Transportation Commission

Sahar Shirazi
Project Facilitator
Planning and Policy Lead, AVs and Emerging Mobility, WSP

Proposed Organizational Structure



DSHS, L&I and Commerce: Play a supporting role regarding cross-cutting issues including implications on social services, access, environmental justice, labor and small business

Proposed Organizational Structure

Subcommittees

Licensing Subcommittee
Lead Agency: Dept. of Licensing
General Jurisdiction:

- Manufacturer vehicle testing
- Pilot certification
- Vehicle registration
- Driver's licensing
- Rules of the road

Liability Subcommittee
Lead Agency: Office of the Insurance Commissioner
General Jurisdiction:

- Insurance
- Tort liability
- Criminal law
- Judiciary

System Technology & Data Security
Lead Agency: Office of the State Chief Information Officer
General Jurisdiction:

- Data & information management
- Cybersecurity
- Privacy protection

Proposed Organizational Structure

Subcommittees

Safety Subcommittee
Lead Agency: Traffic Safety Commission & Washington State Patrol
General Jurisdiction:

- Traffic safety
- Law enforcement
- Synchronization with other safety priorities
- Traffic incident management

Infrastructure & Systems Subcommittee
Lead Agency: Dept. of Transportation
General Jurisdiction:

- Roadway infrastructure
- Traffic management
- Transit service & vehicles
- Advertising
- Right of way
- Multi-modal transportation
- Mobility as a service

Proposed Operating Procedures & Policies

Executive Committee

- **Responsibilities:**
- The AV Work Group Executive Committee has four primary responsibilities:
- Serve as the central clearinghouse for all AV related issues.
- Follow developments in AV technology, AV deployment, and federal, state, and local policies and efforts related to the operation of passenger and commercial AV's.
- Explore and identify modifications to state policy, rules, and laws to further public safety and prepare the state for AV deployment.
- Make recommendations to the Transportation Commission.

- **Operating Procedures & Policies:**
- Members are encouraged to participate in every meeting. If unable, a substitute should be designated.
- A majority of members present constitutes a quorum for purposes of meeting. All voting members must be present to advance recommendations.
- Recommendations will be advanced according to a 2/3 majority vote. Differences of opinion will be noted and included as part of the recommendations.
- The Chairman will not vote; substitutes cannot vote.
- The Chairman will be selected by the Executive Committee members.
- Meetings will be noticed, open to the public and public comment will be taken at each meeting.
- Meetings will be recorded and summaries will be posted online.

Proposed Operating Procedures & Policies

Subcommittees

- **Responsibilities:**
- Vet, explore, develop and identify challenges, needs, gaps and expectations related to AV policy, funding and jurisdiction.
- Assess what other states are doing and seek model policies.
- Provide general public education by informing the public of subcommittee discussions and recommendations in a transparent and accessible manner.
- Report information gathered and findings, along with recommendations to the Executive Committee.
- **Operating Procedures & Policies:**
- Each subcommittee will be co-chaired by one public sector and one private sector individual.
- Agency leads will support the subcommittees and work with co-chairs on setting meeting agendas.
- Subcommittees should meet at least quarterly and all meetings must be open to the public and materials made available online.
- Subcommittees should establish an odd number of required voting members in order to advance recommendations to the Executive Committee and a quorum of voting members must be present to do so.
- Recommendations will be advanced according to a simple majority vote. Differences of opinion will be noted and included as part of the recommendations to the Executive Committee.
- Recommendations must be provided utilizing a standardized form, to ensure consistent communication and consideration of implications, across all of the subcommittees.

Proposed Operating Procedures & Policies

Subcommittee Reporting Template

- Notes from meeting used to complete report
- Report out after meeting
- Include recommendation and path forward
  - Timeframe
  - Stakeholders
  - Fiscal Implications
  - Legal and policy requirements
  - Challenges and mitigation
  - Areas of impact
  - Votes
- Sent to Executive Committee for consideration

Proposed 2018/ 19 Workplan and Schedule

Reporting

- Annual Report - December 2018
- 2 Year Workplan and Funding Request
- 5 year Roadmap to Reach Identified Objectives

Executive Committee Meetings

- June 27 2018
- October, 2018 (TBD)
- July 2019 (TBD)

Agency Subcommittee Meetings

1-2 meetings between July 1 and October, 2018

1-2 meetings between October and Jul, 2019

- Identify Objectives, Vision, and Goals
- Collect research, expertise, and data
- Discuss and form recommendations, including implementation requirements
- Report findings

Elect Committee Chair

Jerry Litt
Chairman
Washington State Transportation Commission

Overview of National Trends and Developments on Autonomous Vehicles

Scott Shogan
Connected/Automated Vehicle Market Leader
WSP USA

June 27, 2018

FIVE PILLARS

Connected

Moves as part of **system**…in time, multi-modal

DATA: The key to new network management – people and freight

Automated

FULLY automated – can **move when empty**

HIGHLY automated – needs a « driver »

Pricing

Electric

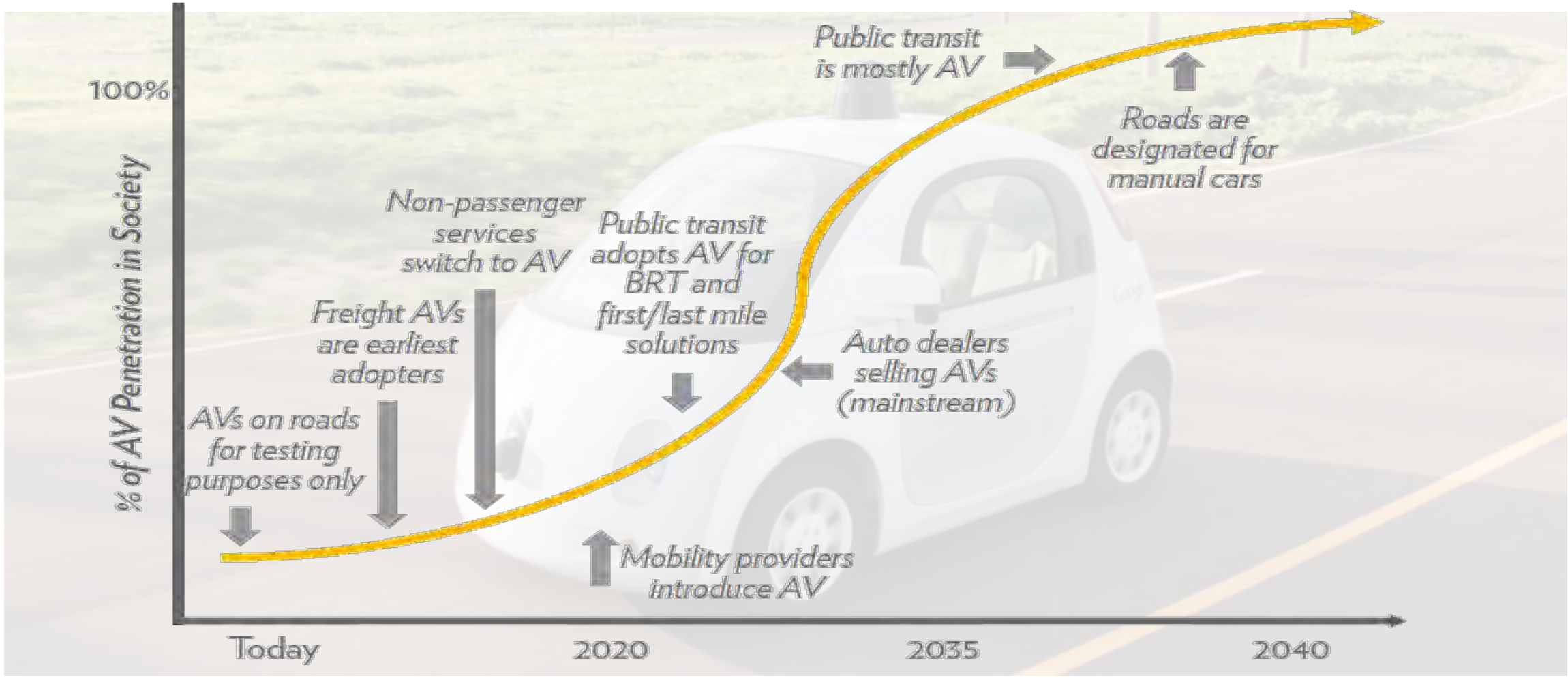
Ideally **electric** or other future energy source

Shared

Increased interest in shared fleets and use of "**mobility as a service**"

The key to **place-making** benefits

The Race to Driverless



Ford plans to have a "Level 4 vehicle in **2021,** no gas pedal, no steering wheel…"

- Former Ford Motor Company CEO Mark Fields

"Bosch said it saw level three vehicles being released…at the end of the decade, and level four driving not before **2025**"

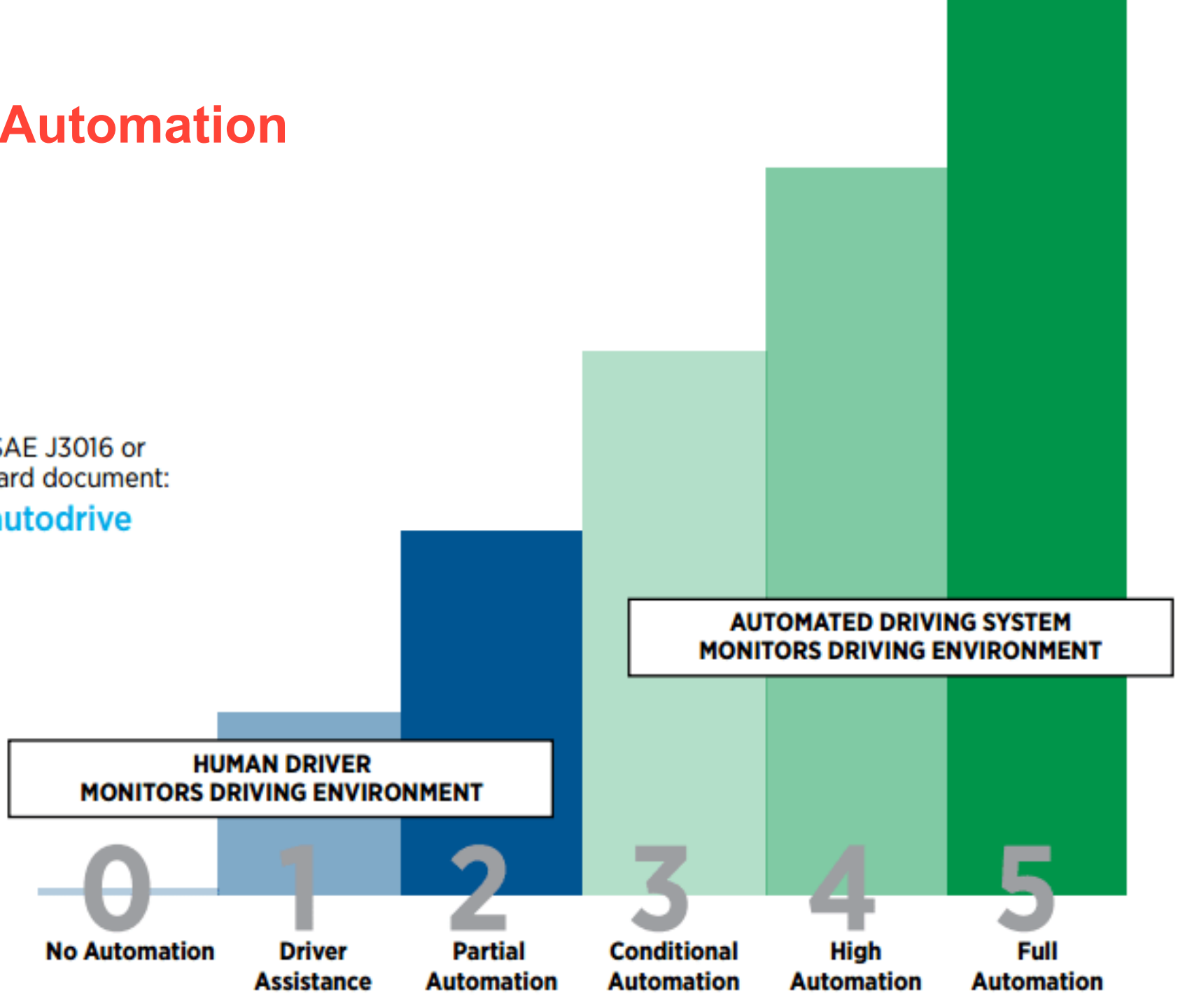
- Reuters

"We believe we have the chance to make level three, level four and level five doable [in **2021**]"

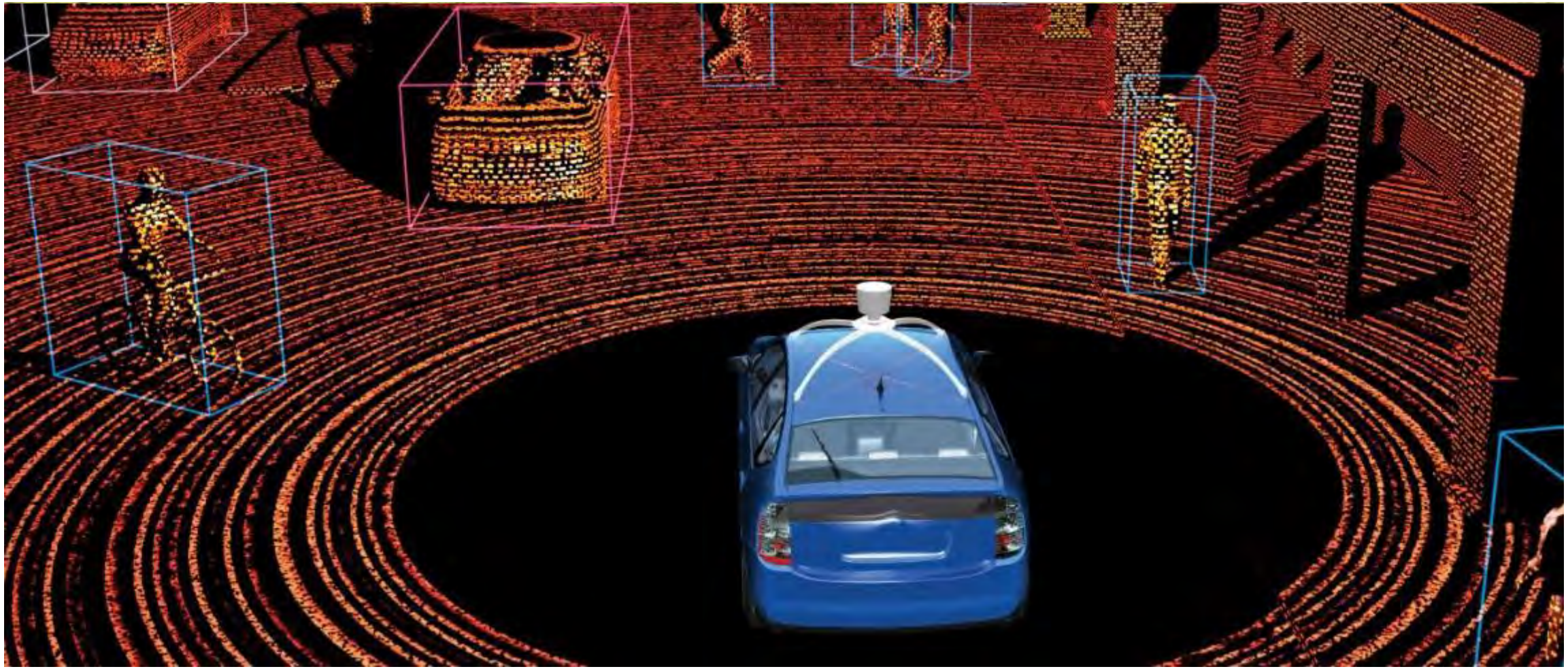
- BMW

Levels of Automation

Learn more about SAE J3016 or purchase the standard document:
www.sae.org/autodrive



Is this a connected car?



Source: Google

AV ≠ CV+1

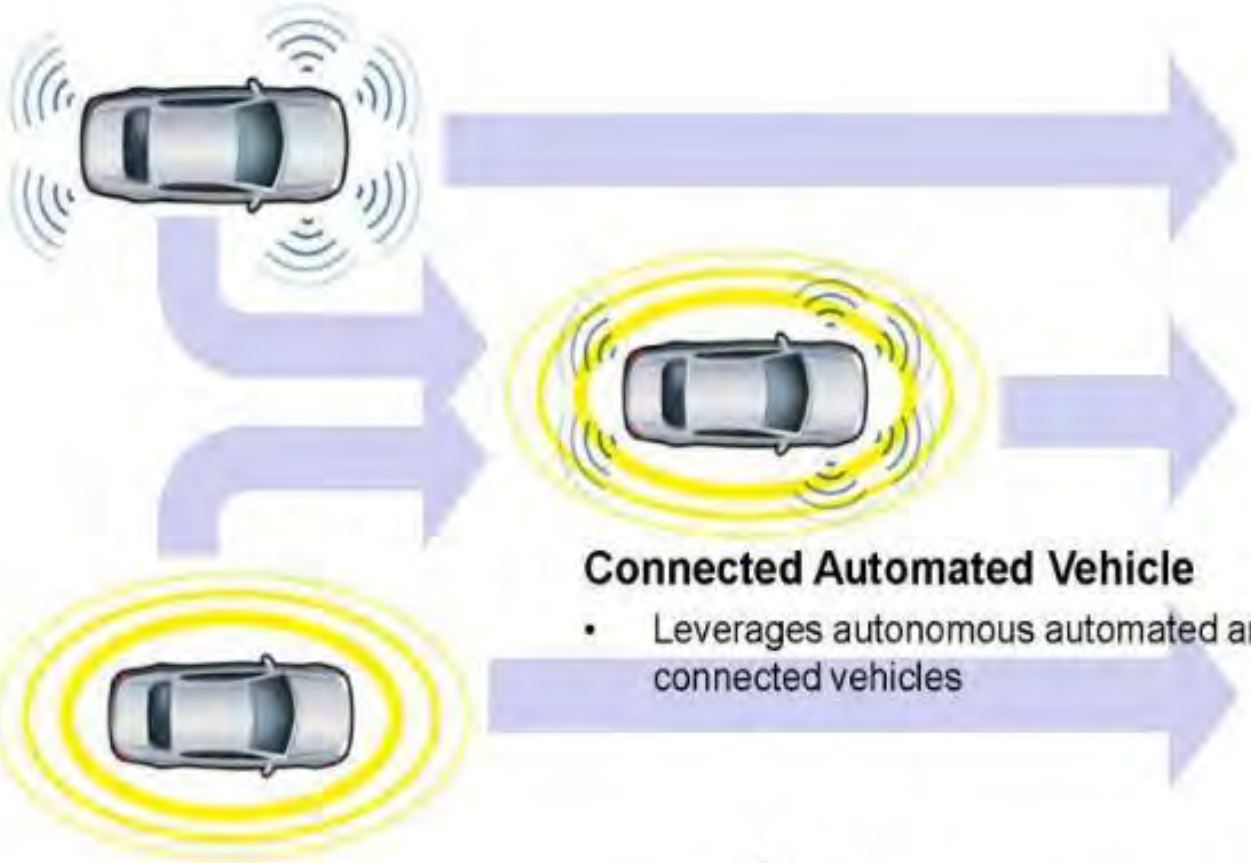
What is connected?

Cooperative communications systems

Linking vehicles together, to the roadside, and to the “cloud”

Interoperable systems that work across all equipment and manufacturers

CV and AV on a collision course



Autonomous Automated Vehicle

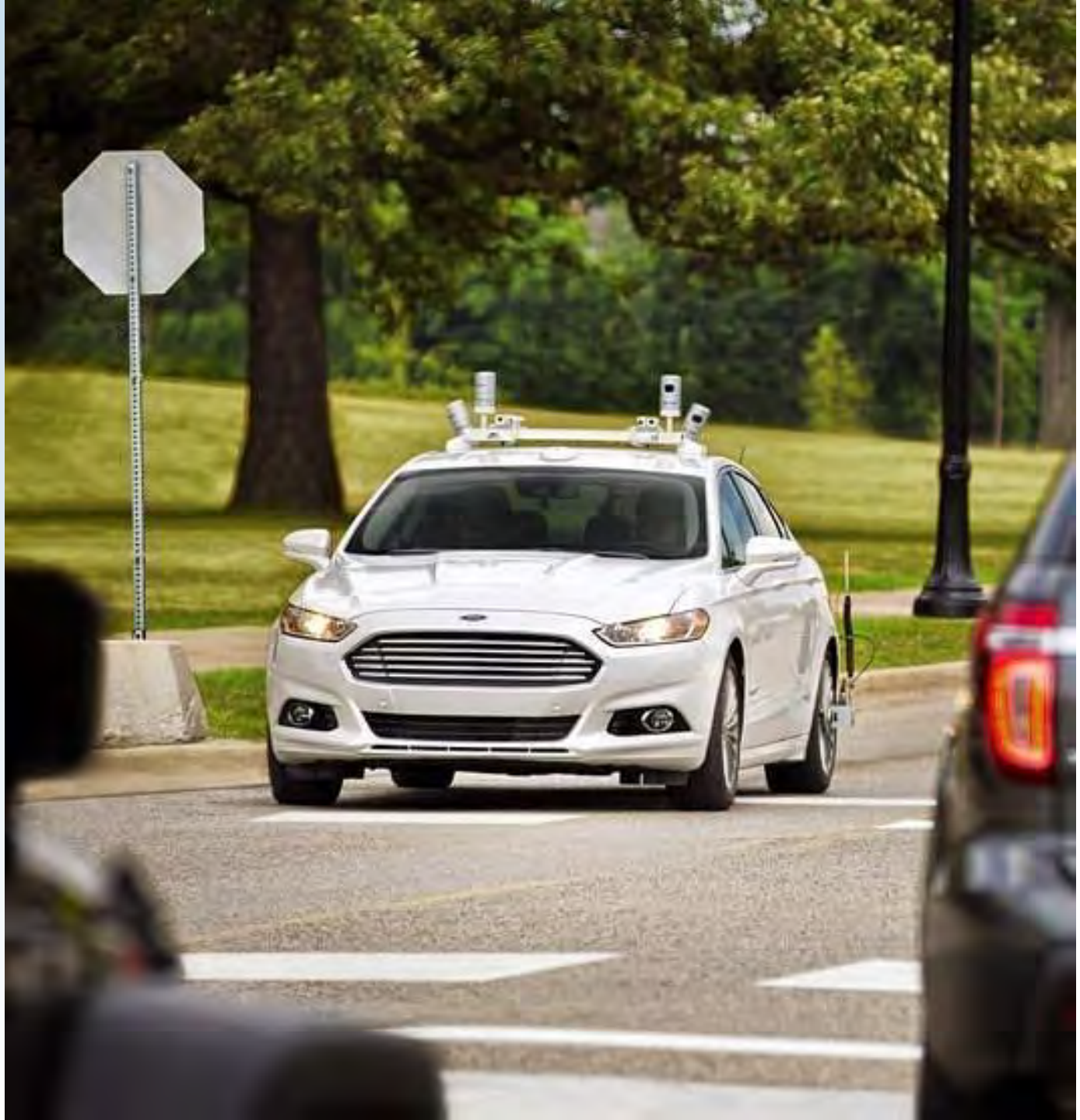
- Operates in isolation from other vehicles using internal sensors

Connected Automated Vehicle

- Leverages autonomous automated and connected vehicles

Connected Vehicle

- Communicates with nearby vehicles and infrastructure
- Not automated (level 0)



Role of CV in the AV Space

- AV “sees” with sensors and must interpret environment
- Sensors detect green indication, computer knows green means GO
- No context beyond what human driver can see

Role of CV in the AV Space

- In a CV environment, the other vehicles and the traffic signal are “talking” to the AV:
  - *Phase state*
  - *Time to phase change*
  - *Real-time optimal progression speed*
  - *Real-time route guidance based on signal delay*
  - *Identification of hazards out of the view of sensor systems*

Should we *believe* the hype?

AUTOMATED TAXIS S
AFFORDABLE TRANSP

EXTRA! EXTRA!

L THE DEATH
TION

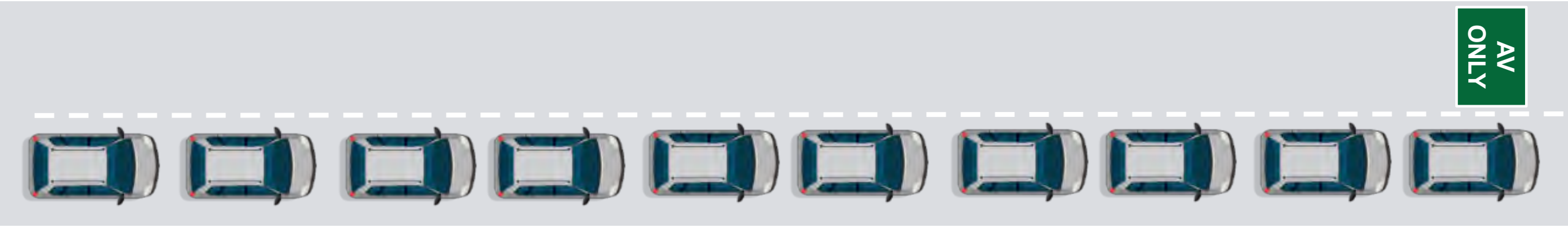
AUTONOMOUS CARS DECLARED
SOLUTION TO ALL MOBILITY PROBLEMS

Impacts on Safety and Capacity

Traffic Safety

What if cars (and trucks, and buses…) no longer crashed?

Changes in Roadway Capacity



Under low-volume conditions, vehicles travel at high speeds with sufficient spacing

As volume increases, speed decreases as vehicle headways decrease

If AVs could operate at high speed with low headways, huge potential capacity increases

Tremendous efficiency opportunities for freeways

…but this is MUCH harder

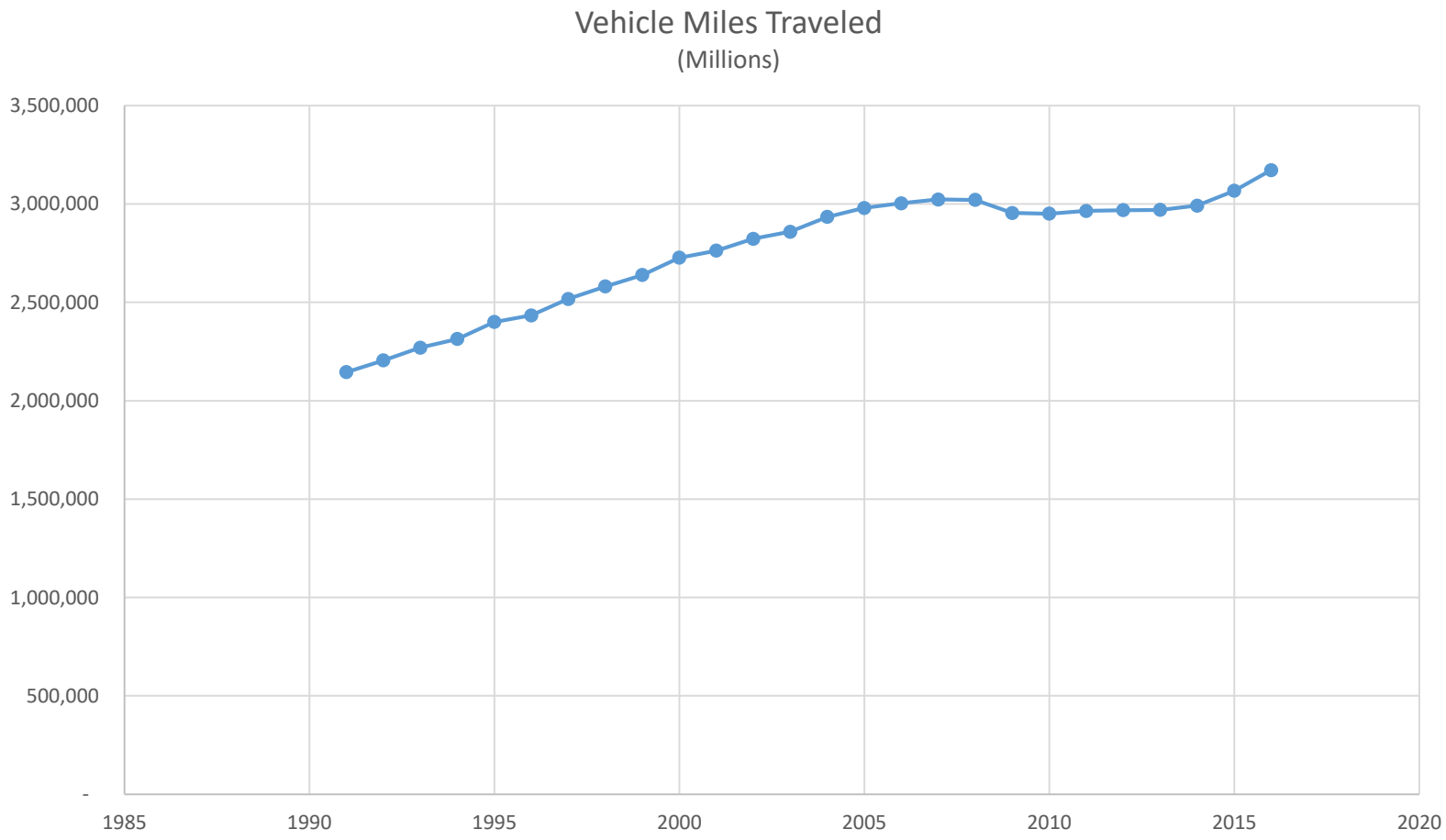
Travel Demand

VMT Growth Rate:

1.6%

Population Growth Rate:

0.8%



AV Changes in Vehicle-Miles Traveled (VMT)

When driving time is “regained”, how far might you ride in your car to work?

Changes in Demand & Opportunity

Will new segments of the population become “drivers?”

Impacts on Mobility and Public Transportation

Changes in Car Ownership Model

What if this…

Changes in Car Ownership Model

What if this…

…increasingly became this

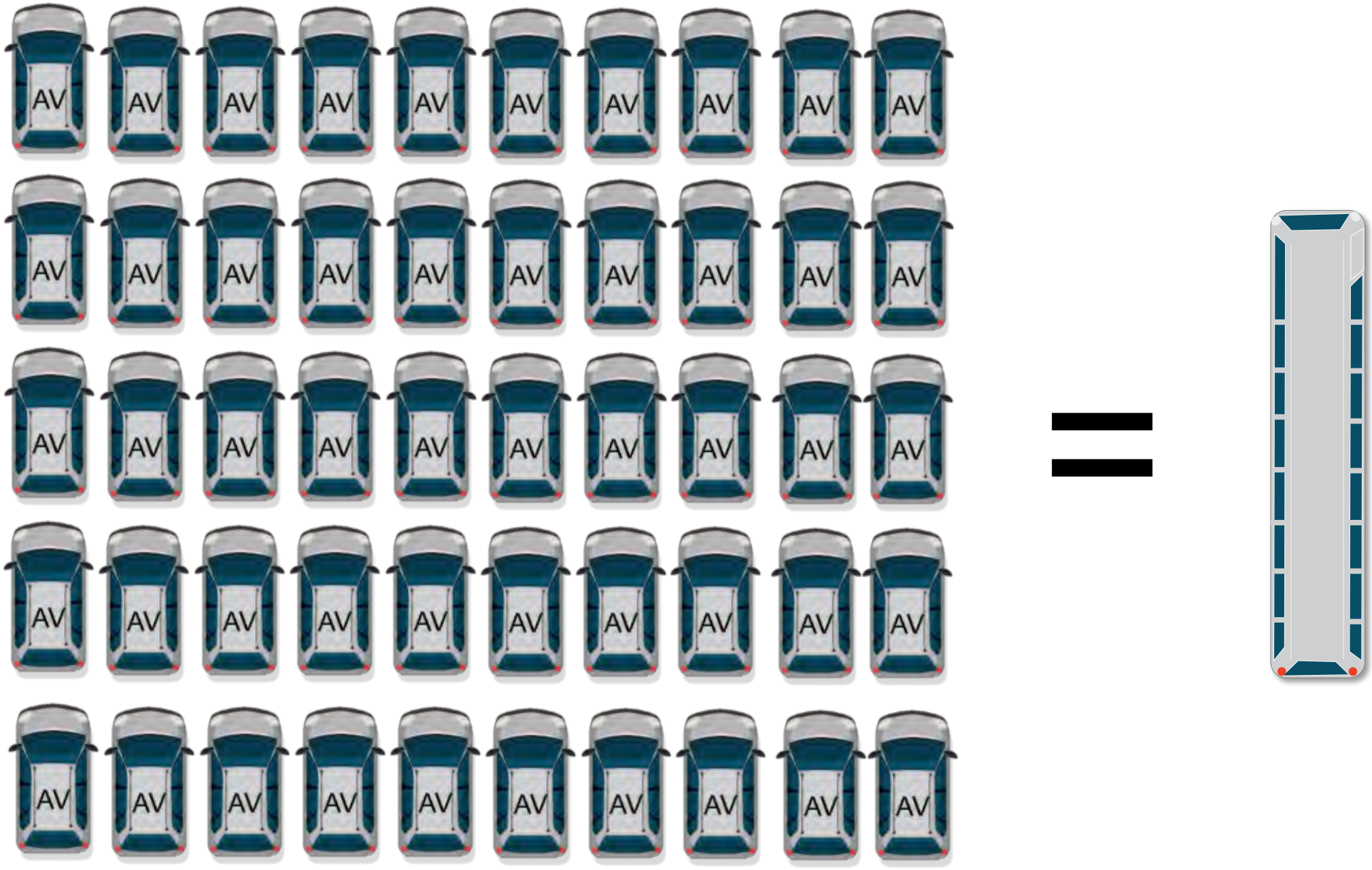
Potential to Change the Car Ownership Paradigm

Transit Ridership Decline

Researchers concluded factors such as lower fuel costs, increased teleworking, higher car ownership and the rise of alternatives such as Uber and Lyft are pulling people off trains and buses at record levels.

Washington Post, March 2018

Physical Street Space


AV
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Salesforce Tower, Indianapolis

— 49 Stories

— 905,000 Square Feet

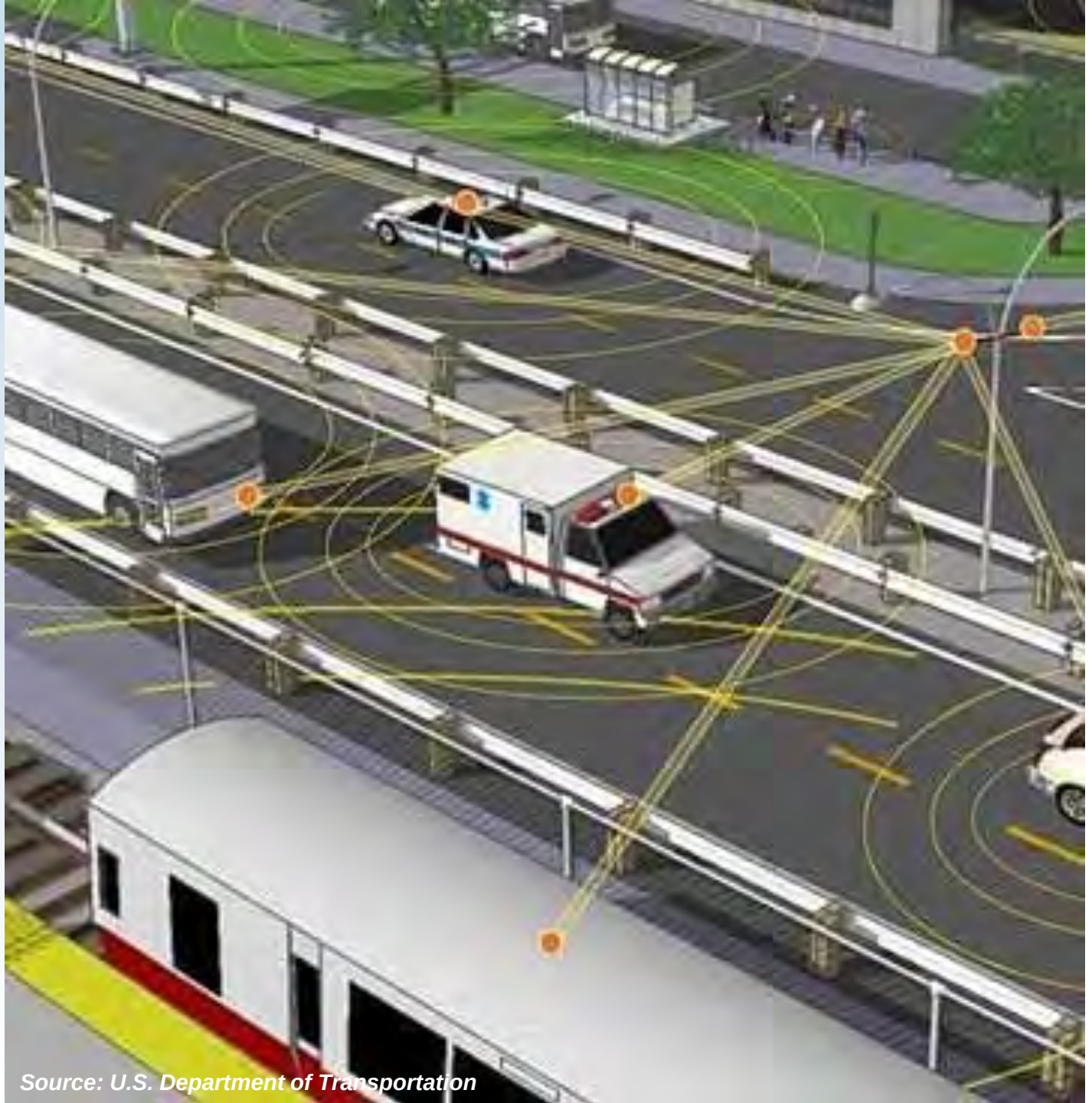
— As many as 5,000 daily occupants

What happens at 5:00pm when 5,000 people catch their driverless taxi?

Source: The Daily Beast

How does new mobility protect options for the elderly, disabled and economically disadvantaged?

Major Activities in New Mobility



Source: U.S. Department of Transportation

Connectivity

- CV Pilot Program
- Communications technology debate (DSRC vs. cellular)
- Smart Cities and data

Automation

- Commercial availability of Level 2 technologies
- Truck platooning and AV freight
- AV proving grounds
- AV shuttle deployments
- Drones, delivery robots

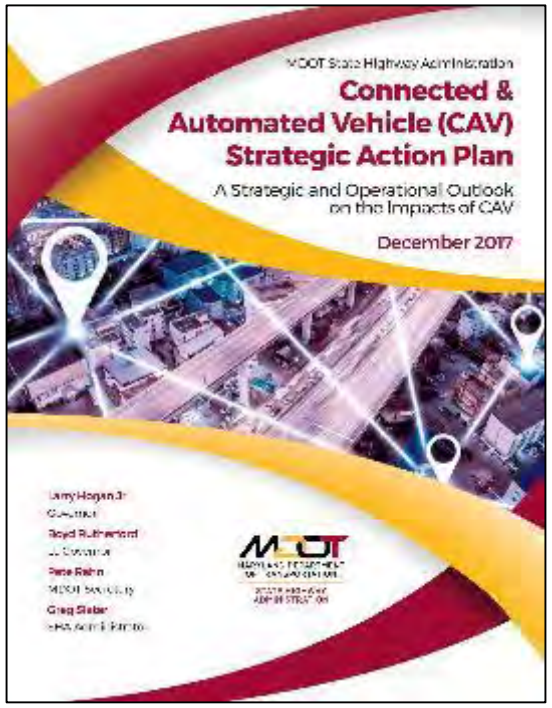
Shared Mobility

UBER

- Planned launches of AV taxi services
- Transit/TNC partnerships
- Carpool/vanpool programs
- Bikeshare/ scooters/ personal carshare, etc.

Electrification

- EV in the AV ecosystem
- EV infrastructure (fixed and inductive charging)
- Electrification initiatives and incentives



DriveOhio

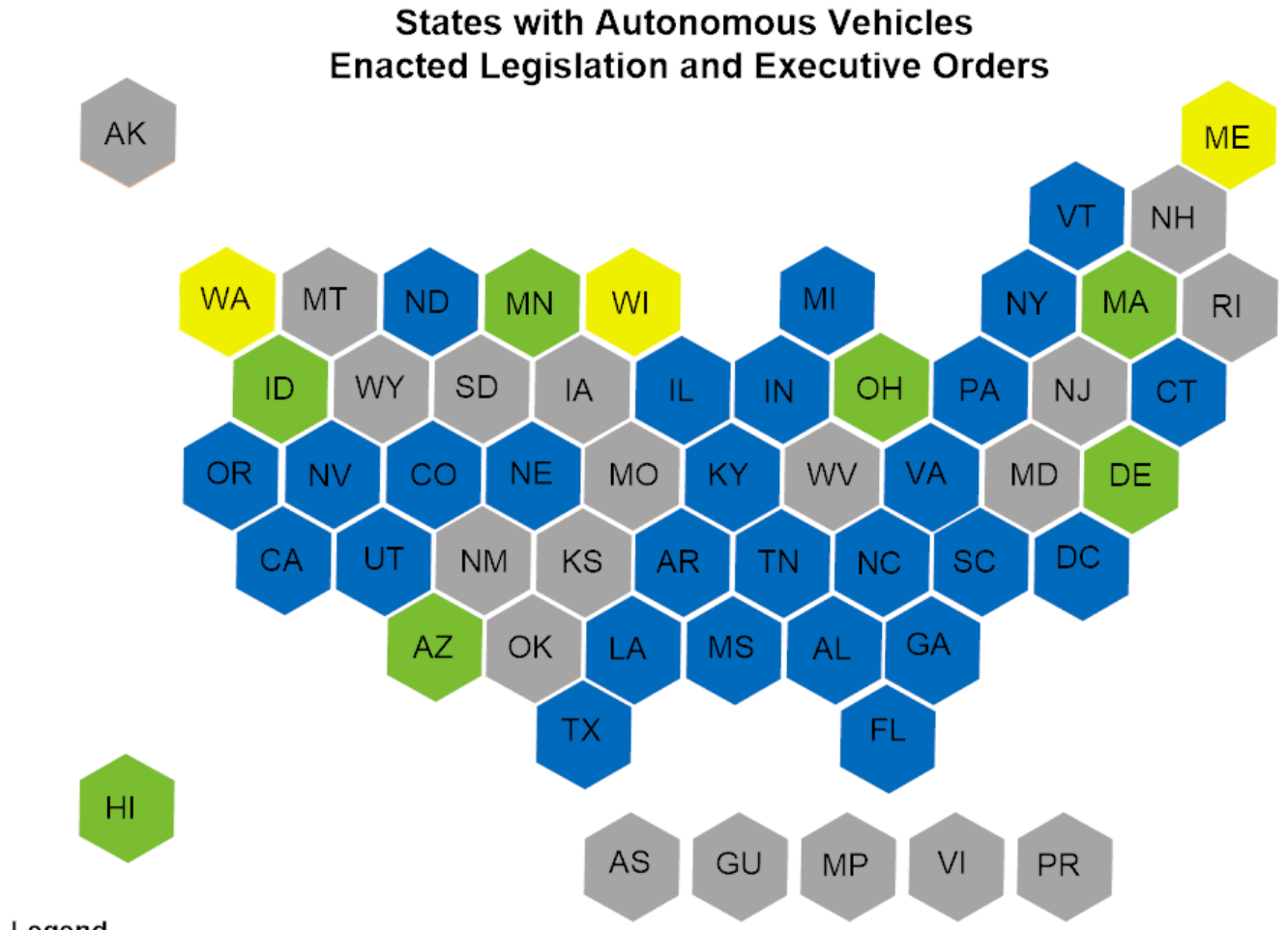
The Future of Smart Mobility

CDOT | ROADX

planetM

Strategy, Guidance and Organization

- Strategic planning for CAV/New Mobility
- Best practices and guidance documents through national organizations
- Establishment of CAV-specific offices within organizations
- Multi-agency work groups



Policy and Legislation

- State legislation and executive actions
- AV START act update
- Emerging policy issues (parking, curb space, enforcement)

Source: National Conference of State Legislatures

Federal Legislation

— House (H 3388 SELF DRIVE Act) passed the full House and awaits Senate action

— Senate Bill (S 1885 AV START Act) passed the Committee on Commerce, Science, and Transportation, but hasn't been brought to full vote of Senate yet

- Open issues include whether or not to include trucks, the pre-emption language, and the FMVSS exemption numbers
- Work continues behind the scenes to get the holds released and determine whether this bill stands alone or gets incorporated into an upcoming bill.
- Once it eventually passes the Senate, then a conference committee will be named to work out differences.
- Senate Environment & Public Works Committee held a hearing 6/13/18 to discuss the effects of CAV's on America's roads and bridges.

Federal Guidance

— 2016 – Federal Automated Vehicles Policy

— 2017 – Automated Driving Systems: A Vision for Safety 2.0

- The first two versions provided manufacturers with guidance on how the technology would be regulated by NHTSA and advised states on best practices for regulating them in their jurisdictions.

— 2018 – version 3.0 will reportedly go beyond by incorporating other modes

- Summer 2018 release anticipated
- We expect truck, bus, motorcycles, and more

Washington Autonomous Vehicle Working Group

June 27, 2018

Cathie Curtis, Director, Vehicle Programs, AAMVA
Brian Ursino, Director, Law Enforcement, AAMVA

AAMVA Mission and Vision

- Founded in 1933, the American Association of Motor Vehicle Administrators (AAMVA) represents to Motor Vehicle Administrators of all 69 states, provinces and territories of the U.S. and Canada
- Support uniformity and reciprocity among jurisdictions

Automated Vehicle Classification Terms

As adopted by SAE, International:

Level 0 – No Automation
Level 1 – Driver Assistance
Level 2 – Partial Automation
Level 3 – Conditional Automation
Level 4 – High Automation
Level 5 – Full Automation

Automated Vehicle Classification Terms

In vehicles available today:

Level 0 – No Automation

The human driver does everything

Level 1 – Driver Assistance

An automated system on the vehicle can sometimes assist the human driver conduct some parts of the driving task.

- Cruise Control
- Auto High beams
- Blind spot monitoring
- Lane departure warning
- Forward collision warning

60

Automated Vehicle Classification Terms

Example: Lane departure warning system

Automated Vehicle Classification Terms

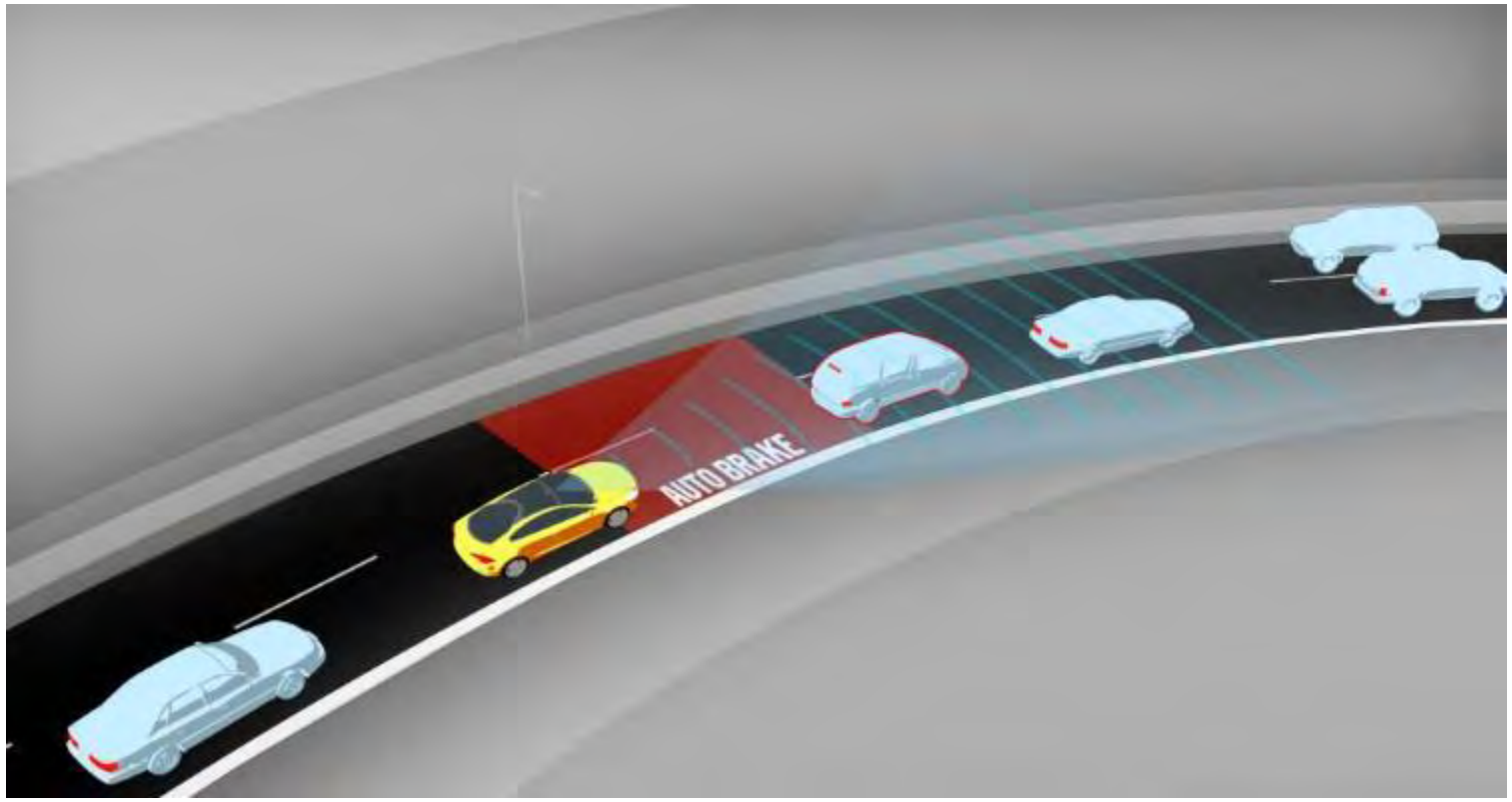
Level 2 – Partial Automation

An automated system on the vehicle can actually conduct some parts of the driving task, while the human continues to monitor the driving environment and performs the rest of the driving task.

- Automated braking
- Adaptive cruise control
- Lane centering

Automated Vehicle Classification Terms

Automated Emergency Braking



Adaptive cruise control can increase or decrease the vehicle's speed to maintain a following distance that is set. Advanced versions can even slow and stop the vehicle in traffic jams and then accelerate. May work with lane centering capabilities.

Automated Vehicle Classification Terms

Levels 3 – 5 In testing and development today also called HAVs

Level 3 – Conditional Automation

An automated system can both actually conduct some parts of the driving task and monitor the driving environment in some instances, but the human driver must be ready to take back control when the automated system requests.

Level 4 – High Automation

An automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated system can operate only in certain environments and under certain conditions.


UNIVERSITY
OF MICHIGAN

Level 5 – Full Automation

The automated system can perform all driving tasks, under all conditions that a human driver could perform them.

Uncertainly

Level 4 and 5 vehicles may be completely driverless and have no driver controls such as a brake or steering wheel.

Or

Some level 4 and 5 may be completely driverless and may also have driver controls such as a brake or steering wheel.

Recap

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

Full Automation

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.

AV Working Group

Autonomous Vehicles are a high priority for AAMVA.

- Established an Autonomous Vehicle Working Group in 2014.

16 US members
2 Canadian members
3 AAMVA staff
NHTSA and FMCSA representation

- Professional staff members of different motor vehicle and law enforcement agencies throughout North America.

- The report is based on a combination of research, experience, and knowledge accumulated over the last four years by the members of the AAMVA Autonomous Vehicles Working Group.

Guiding Principles

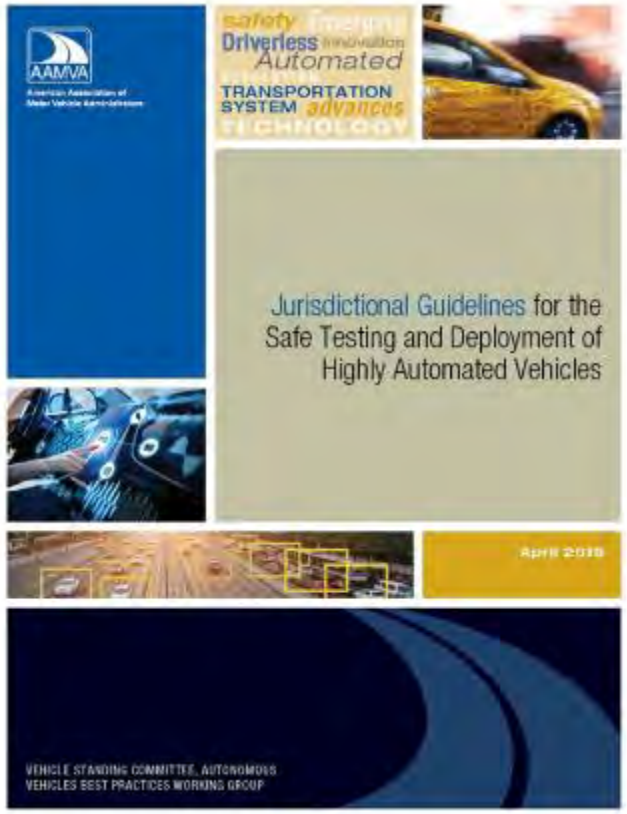
- Facilitating a consistent and balanced oversight approach by motor vehicle administrators to avoid inconsistent regulatory practices
- Supporting the research and development of technology which has the potential to improve traffic safety while providing mobility options for underserved populations
- Supporting the safe testing and deployment of HAVs
- Confirming the roles and responsibilities of jurisdictions and the federal

Autonomous Vehicles Working Group

Report: "Jurisdictional Guidelines for the Safe Testing and Deployment of Highly Automated Vehicles"

Purpose:

Provides voluntary recommended guidelines regarding motor vehicle administration and law enforcement for the safe testing and deployment of HAVs.



Published May 2018

Available on the AAMVA website

https://www.aamva.org/best-practices-and-model-legislation/

Report Table of Contents

Chapters 3. – 6. Guideline Formatting

Chapters 3 thru 6 include a comprehensive discussion of considerations in Administration, Vehicle, Driver and Law Enforcement. Each chapter includes:

- ✓A background discussion
- ✓Guideline(s) for testing and/or deployment of HAVs
- ✓Benefits of implementing the guideline(s)
- ✓Challenges that jurisdictions may face

There are a total of 88 recommendations contained in these chapters. Some are directed at the jurisdictions (65), and others at Manufacturers and Other Entities (23).

Chapter 3. Administrative Considerations

There are 6 recommendations in Chapter 3, including …

3.1.1 Identify a lead agency to manage an HAV committee and its work.

3.1.2 Establish an HAV committee.

3.1.3 The HAV committee should develop strategies for addressing testing and deployment in their jurisdiction.

3.1.4 Examine laws and regulations to address unnecessary barriers to safe testing, deployment and operation of HAVs.

Chapter 4. Vehicle Credentialing Considerations

Describes how to establish an application and permit process for HAV testing. Total of 20 recommendations.

4.1 Application for Permit to test HAVs
4.2 Vehicle Registration
4.3 Title and Branding New and Aftermarket HAVs
4.4 License Plates
4.5 Manufacturer Certificates of Origin
4.6 Financial Responsibility
4.7 Federal Motor Vehicle Safety Standards

Chapter 4. Vehicle Credentialing Considerations (continued)

Examples:

- 4.1.1 Require all manufacturers and other entities testing Level 3, 4 or 5 HAVs to apply for and be issued vehicle specific permits prior to testing on public roadways.
- 4.1.4 Require test registration permits to be carried in the test vehicle while on public roadways within their jurisdiction. Permit information should be made readily available to law enforcement via electronic means by the issuing jurisdiction.
- 4.4.1 Jurisdictions should not require a special license plate for HAVs. However, if a jurisdiction chooses to require a special license plate for HAVs, those plates should adopt the administrative, design and manufacturing specifications contained in the *AAMVA License Plate Standard*.
- 4.6.1 Require all HAVs permitted for on road testing to have minimum liability insurance, in the form and manner required by the MVA authority.

Chapter 5. Driver Licensing Considerations

There are 24 recommendations in Chapter 5

5.1 Driver and Passenger Roles Defined

5.2 Driver License Requirements for Testing by Manufacturers and Other Entities

5.3 Driver Training for Consumers for Deployed Vehicles

5.4 HAV Driver Training for Motor Vehicle Agency Examiners, Driver Education Programs and Private Instructors

5.5 Driver License Skills Testing with Automated Vehicle Technologies

5.6 Endorsements and Restrictions for Deployed Vehicles

Chapter 5. Driver Licensing Considerations (continued)

5.2.2 Require test HAVs be operated solely by employees, contractors, or other persons designated by the manufacturer of the HAV.

5.2.5 Support the safe testing without a human driver inside of the vehicle, by requiring a user designated by the manufacturer of the ADS technology or any such entity involved in the driverless testing of the HAV, to be capable of assuming control of the vehicle's operations.

5.3.2 Encourage communication between dealers and consumers including, but not limited to, acknowledgement of the sections in the vehicle "owner's manual" that relate to the HAV functions.

5.4.1 Provide training to driver license examiners on vehicle technologies including the operation of HAVs.

Chapter 6. Law Enforcement Considerations

There are 16 jurisdiction recommendations and 18 MOE recommendations

6.1 Crash/Incident Reporting
6.2 Criminal Activity
6.3 Distracted Driving
6.4 Enforcement of Permit Conditions
6.5 Establishing Operational Responsibility
6.6 First Responder Safety
6.7 Law Enforcement/First Responder Training
6.8 Vehicle Response to Emergency Vehicles, Manual Traffic Controls and Atypical Road Conditions
6.9 System Misuse and Abuse
6.10 Vehicle Identification
6.11 Adherence to Traffic Laws

Chapter 6. Law Enforcement Considerations (continued)

6.2.1 Jurisdictions that have HAV permitting requirements as described in Section 4.1 Application and Permit for Manufacturers or Other Entities to Test Vehicles on Public Roadways should require the designated test users (employees, contractors and other persons) to pass a background check, including, but not limited to, a driver history review and a criminal history check, prior to being authorized to operate a test HAV.

6.5.3 For vehicles classified as Levels 4 or 5, which may be operated without a licensed driver and where the driverless vehicle performs the DDT independent of human input, the registered owner should be responsible for its safe operation.

6.11.1 Monitor the progress of the Transportation Research Board project (NCHRP20-102(07) Implications of Automation for Motor Vehicle Codes to identify traffic and other laws that may need to be repealed or revised to accommodate HAV technology.

Chapter 7 Next Steps

Over the next few years the Working Group members will:

- Attend conferences, seminars and other forums focused on the technology as well as public policy to advance and share their expertise.
- Provide technical assistance to jurisdictions; currently developing a technical assistance plan.
- Provide support to updating driver licensing testing standards and training for driver license examiners.
- Work closely with industry and research stakeholders, state and federal government officials and national associations supporting transportation agencies.

Final Thoughts

- A successful path to the safe testing and deployment of HAVs must include appropriate government oversight developed in coordination with strong stakeholder engagement and should include representatives from broad reaching government organizations, government support associations, industry, research institutes and advocacy groups.

- The document provides voluntary guidance and recommendations that balances public safety with the advancement of vehicle innovations that has the potential to reduce crashes, fatalities, injuries and property damages.

State Agency Updates

- Captain Jay Cabezuela, Washington State Patrol
- Beau Perschbacher, Policy & Legislative Director, Department of Licensing
- Roger Millar, Secretary, Department of Transportation
- Lonnie Johns-Brown, Legislative Director, Office of the Insurance Commissioner
- Alex Alben, Chief Privacy Officer, Office of the Chief Information Officer
- Debbie Besser, Program Manager, Washington Traffic Safety Commission

Next Steps

- Questions?
- Public Comments
- Closing Remarks
- Next Meeting Date

Thank you for joining us!

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