

Governor's Advisory Council on Connected and Automated Vehicles

Subcommittee on Vehicle Registration,
Driver Training and Licensing

Welcome and Introductions



Subcommittee Goals

Subcommittee Goal

To formulate and recommend to the Advisory Council changes to Minnesota statutes, rules and policies related to registration, driver training and licensing for connected and autonomous vehicles.

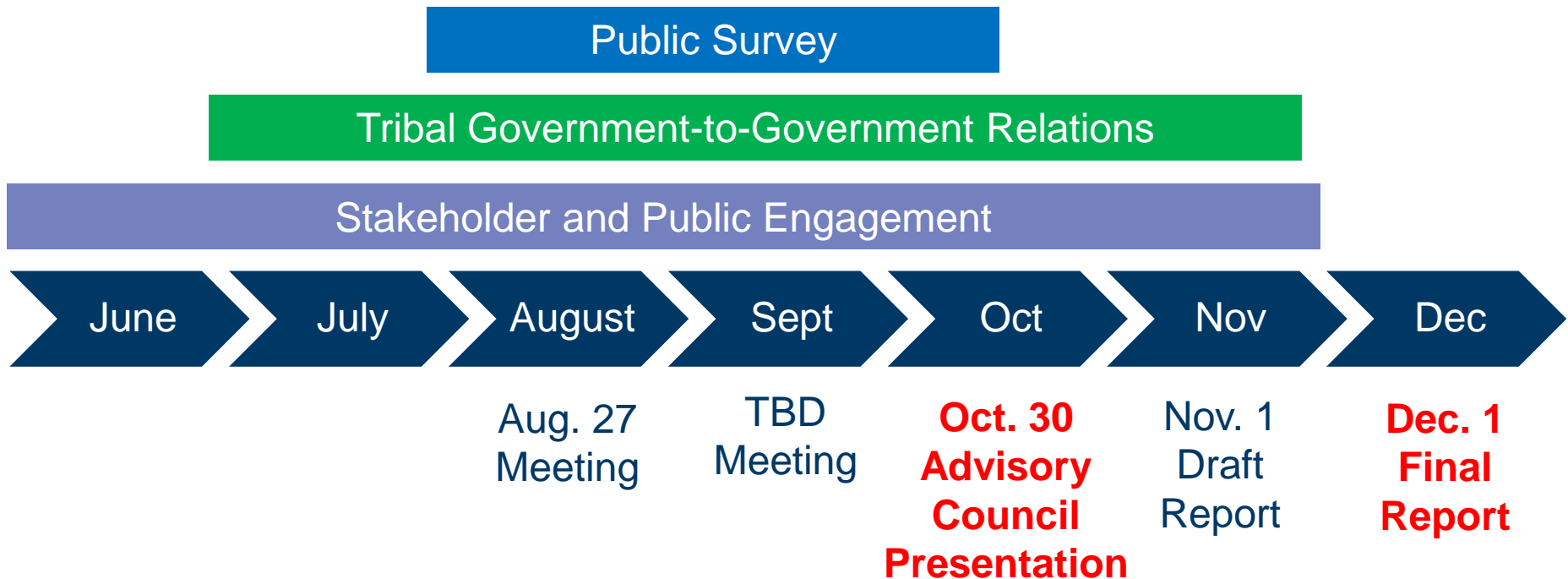
Subcommittee Process

- Participation
 - Meeting materials available on **MnDOT website**
 - Meeting updates at www.dot.state.mn.us/automated/publicmeetings.html
 - Participate in a **meaningful way**
- Discussion
 - Consider the themes of **safety, risk, equity and environment**
 - Consider immediate, **short-term outcomes**
- Recommendation
 - Clear, **consensus-based** recommendations (or reasons for differences)
 - Present recommendations to Advisory Council **October 30th**

Subcommittee Charter

- Meetings **open to the public**
- **Respectful** discussion, opportunities to be heard and **listen**
- May submit written comments on **comment cards**
- Notes taken on **consensus** or **summary** of discussion
- Meeting **notes approved by liaisons** and sent to subcommittee members for additional comments
- Meeting evaluation emailed after meeting

Key Dates





Review of Executive Order & Goals

Governor's Executive Order Establishing the Advisory Council

Consult with government, stakeholders, auto & tech industry, business, labor, advocacy groups, universities, communities experiencing transportation barriers



Prepare and submit a report to the Governor and Legislature by **December 1, 2018**



Advise and support government to support **testing and deployment** of CAV

Governor's Advisory Council on CAV

Advisory Council

Interagency CAV Team

Transportation
Infrastructure

Cyber Security
& Data Privacy

Vehicle
Registration,
Driving
Training,
Licensing

Insurance and
Liability

Traffic
Regulations &
Safety

Economic &
Workforce
Development,
Business
Opportunities

Accessibility
and Equity

Land Use &
Planning

Public
Feedback

Public
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Governor's Advisory Council on CAV



Advisory Council Goals

1. **Brand** Minnesota as a place to test and deploy CAV
2. **Engage the public**
3. **Educate** the general public
4. **Develop actionable recommendations** to facilitate the adoption of CAV in a manner that enhances our quality of life, while providing flexibility to account for evolving technology
5. **Recommend mobility strategies**

Public Feedback Opportunities



Connected + Automated Vehicles

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Automated Vehicle
Use sensors and cameras on vehicles to guide the operation of the vehicle without human intervention.



Connected Vehicle
Communicate with other vehicles and roadside infrastructure using wireless technology.

Available and Future Automation

Today



Levels of Automation:
Adaptive Cruise Control, Auto Emergency Steering, Automatic Lane Keeping, Park Assist, etc.

Future



Levels of Automation:
Possible no steering wheel, no pedals, etc.

Types of Connected and Automated Vehicle Applications



Types of Automated Vehicles



Passenger

Commercial

Transit

DRIVE SERIOUS SAVINGS

WITH STREET-LEGAL ELECTRIC VEHICLES



SAFE & SOUND
No license or special permits required. No special insurance. No special registration.

SHUTTLE & TOURS
Perfect for short-term use in parking lots, airports, and other high-traffic areas.



ZERO EMISSIONS

VALUABLE SAVINGS
No gas, no oil, no maintenance. Lower insurance rates.

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Free MN Highway Maps



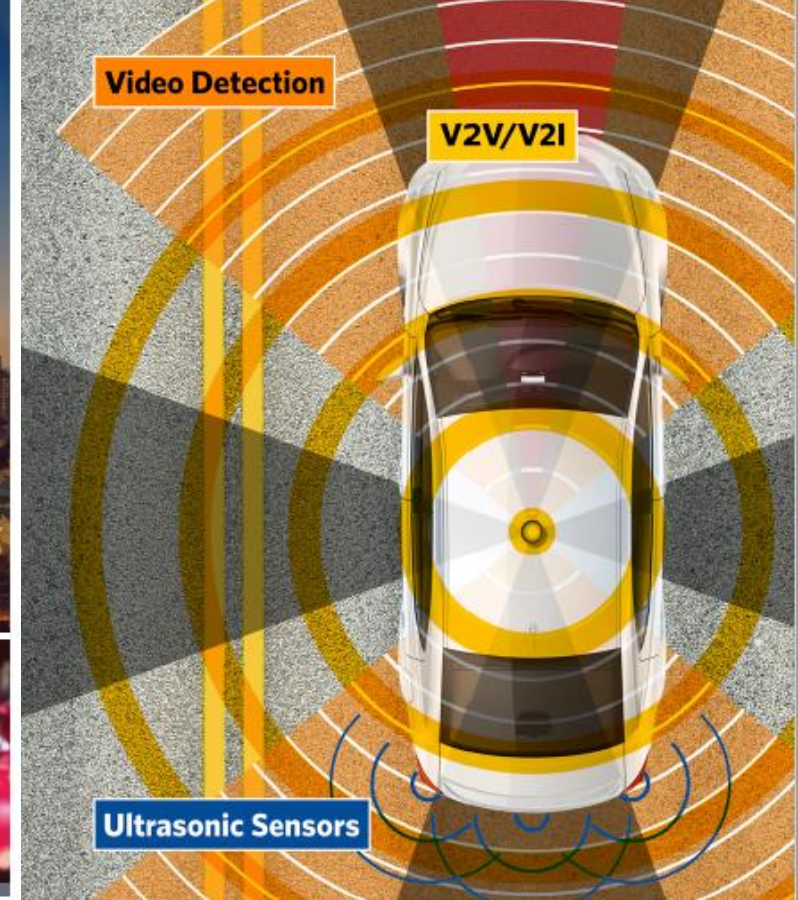
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Interagency Team

- Policy position papers
- Branding
- Testing & Deployment
- Partnerships



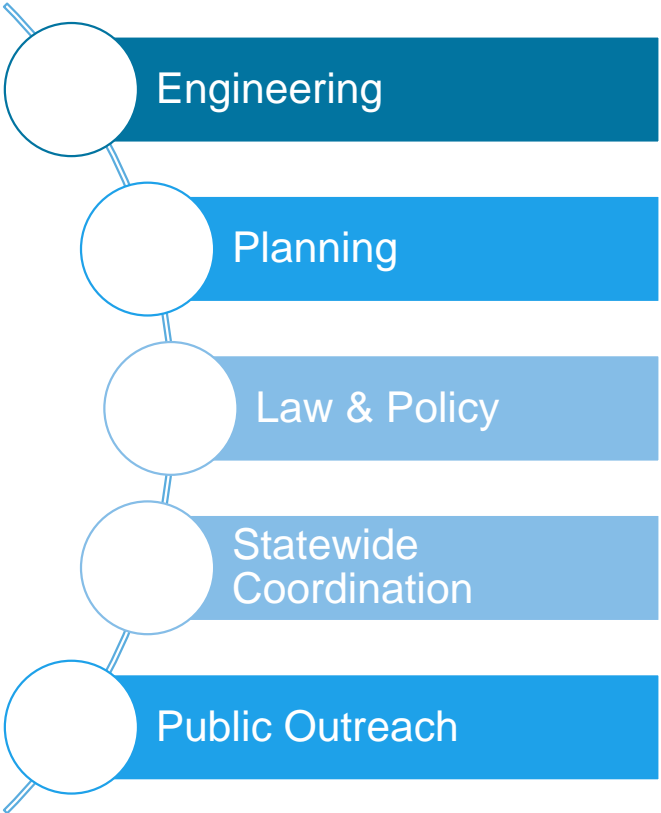
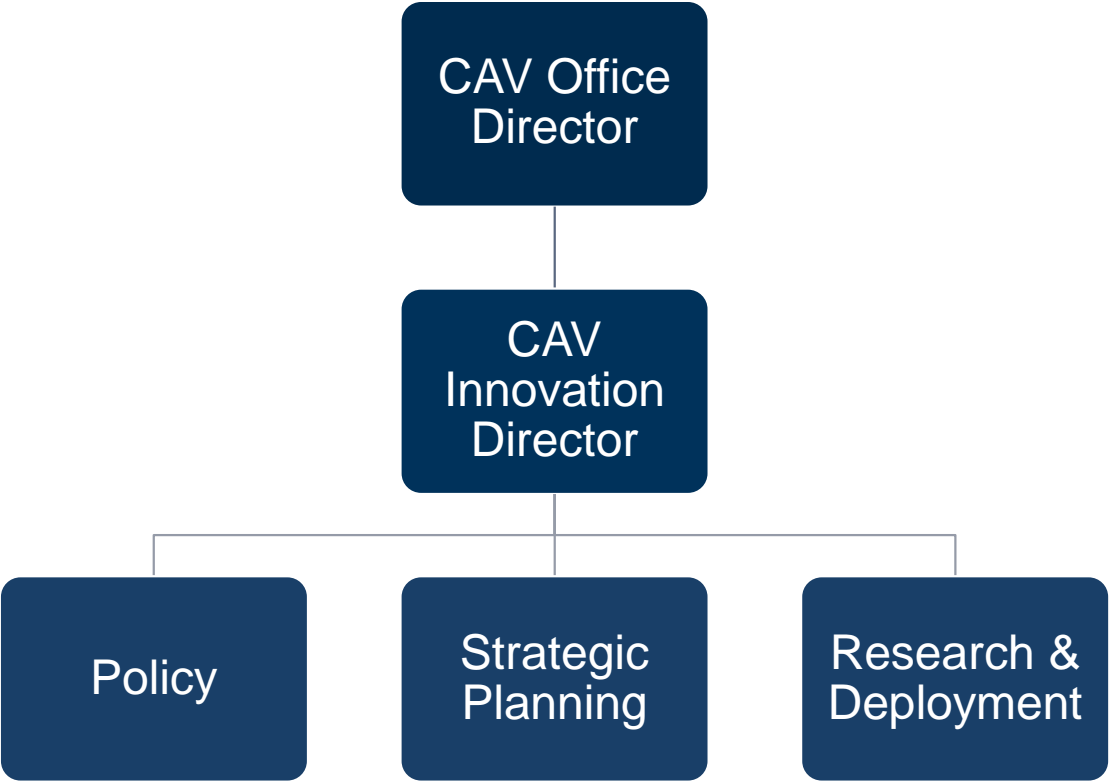


Overview of Connected & Automated Vehicles



Who We Are

MnDOT CAV-X Office





Why We're Here

Automated Vehicles



Automated vehicles can **take control** of some or all aspects of **driving tasks**.

Uses for Automation

Types of Automated Vehicles



Passenger



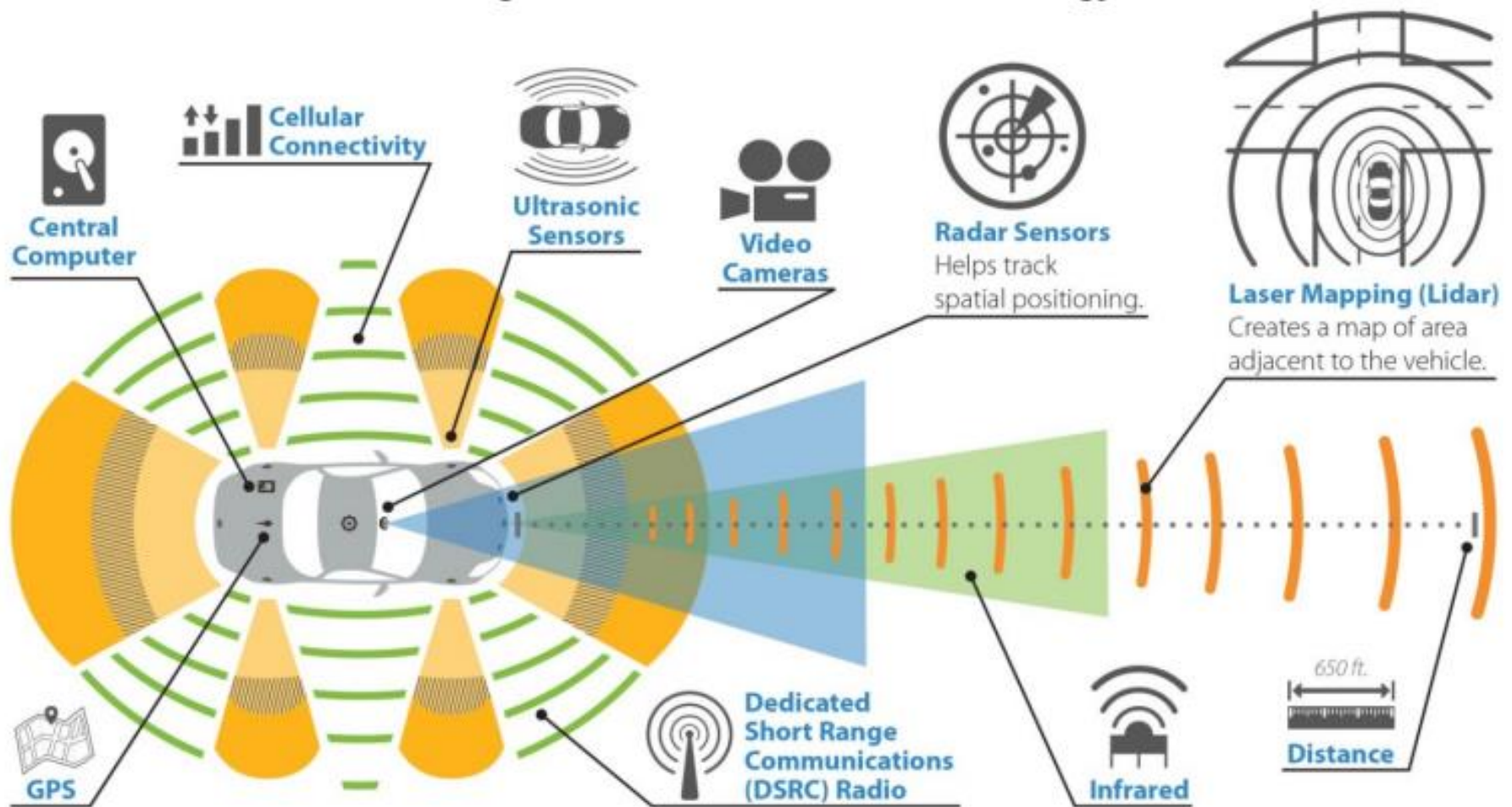
Commercial



Transit



How does it work?





0

No Automation

Zero autonomy; the driver performs all driving tasks.

1

Driver Assistance

Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.

2

Partial Automation

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.

3

Conditional Automation

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.

4

High Automation

The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.

5

Full Automation

The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

Society of Automotive Engineers (SAE) Levels of Automation

Types of Automated Vehicles

Available and Future **Automation**

Today



Levels of Automation:

Adaptive Cruise Control, Auto Emergency Braking, Automatic Lane Keeping, Partial "hands off"

Future



Levels of Automation:

Possibly no steering wheel, hands off technology

CAV Technology Already Available



Self-Parking



Signal
Countdowns

Connected Vehicles

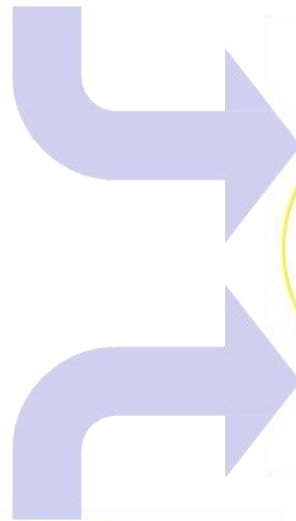


Connected vehicles **“talk”** to **infrastructure**, other vehicles, and potentially other modes (bikes, peds, transit)

Connected & Automated Vehicles

Autonomous Vehicle

Operates in isolation from other vehicles using internal sensors



Connected Automated Vehicle
Leverages autonomous and connected vehicle capabilities

Connected Vehicle

Communicates with nearby vehicles and infrastructure



CAV Benefits

Types of Connected and Automated **Vehicle Applications**



Electric Vehicles



Majority of CAV being developed on **battery, solar, or electric-generator** platforms.

Shared Mobility

Shared use of a vehicle, bicycle, or other transportation mode on an **as-needed basis**

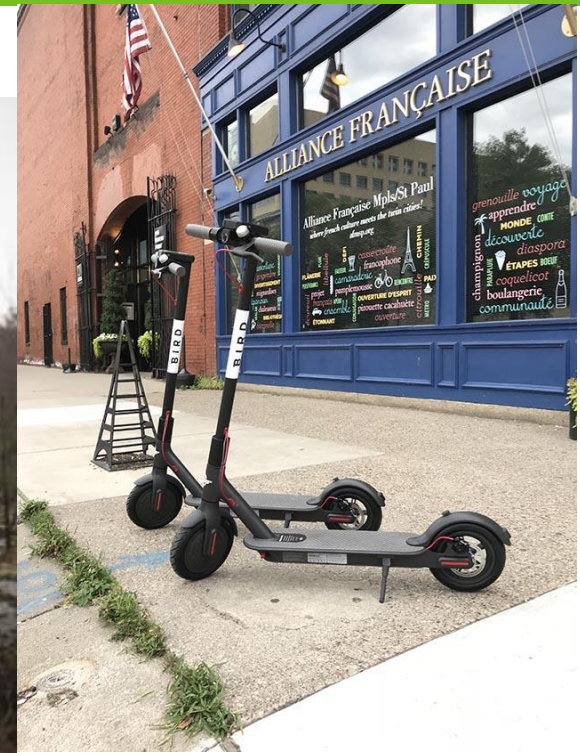
1 account to access, plan, and pay for private and public transportation options



Vehicle: Think Broadly



Truck Platooning



Dockless scooters & bikes



Thank you

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Highly Automated Vehicles

lessons from the AAMVA
international conference

TOM HENDERSON, DRIVER AND VEHICLE SERVICES

AAMVA International Conference

Two sessions on HAV were presented.

AAMVA Jurisdictional Guidelines for Safe Testing and Deployment of Highly Automated Vehicles.

- The working group concluded the successful path to safe testing and development of HAV requires strong government and stakeholder engagement.
- Guidelines for driver licensing, motor vehicle administration, and law enforcement.
- The guide is available to download from the AAMVA website in the Autonomous Vehicle Information Library -- at www.aamva.org.

AAMVA International Conference

HAV discussion with states and industry:

- States don't know everything about HAV right now; learn more then regulate and change laws.
- Current laws probably cover most things HAV.
- People are going to be afraid of HAV - this is to be expected but cannot be a limiting factor.
 - Americans have been flying for 100+ years and commercially flying for 70+ years yet some people are afraid of flying.
- Test vehicle branding and some sort of special license plate would be a best practice.

AAMVA International Conference

- When testing, the test driver is critical.
- Some lessons learned following the Arizona HAV fatality.
 - States must demand a solid safety plan from manufacturers including driver training qualifications.
 - States should require some form of real time driver monitoring.
 - The collision avoidance system, if equipped, must be turned on.
 - Two safety drivers at speeds greater than 25 MPH might be desirable.
 - Manufacturers must explain the disengagement process from automated to manual driving; states must be comfortable with this process.
 - States should not incentivize testers to NOT disengage the AV with excessive reporting or that disengaging is seen as some sort of failure in testing.

AAMVA International Conference

- Minnesota is on the right track –
 - Governor's Executive Order
 - Advisory Group and Sub-Committees
 - Interagency Working Group

Discussion

Driver Training Questions

1. What are your thoughts on driver training opportunities for users of this technology and others impacted (e.g., pedestrians and bicycles)?
2. What training do you recommend be required to use complex vehicle dashboard systems or vehicle automation?
3. Vehicles could be driven by technology or remote operators (no human driver in the vehicle, only passengers). How might to individuals who don't have a driver's license access these vehicles? What regulatory changes do you recommend?

Licensing & Registration Questions

1. How do you recommend the state plan for potentially more labor-intensive driver exams in automated vehicles?
2. What are your recommendations for incorporating automated vehicles into the State's general driver testing requirements?
3. Should registrations require the level of automation to be identified?

AV Testing Questions

1. Should the state require AVs to be identified when testing? E.g. using a “green light” to show it’s in AV mode.
2. To allow the safe testing of highly automated vehicles in Minnesota, what vehicle regulation, driver training, and licensing process do you recommend?

Other Questions

1. If truck platooning becomes legal in Minnesota, what vehicle regulation, driver training, and licensing practices would need to be implemented?
2. As vehicles communicate with other vehicles, or communicate with infrastructure such as signal systems, does this present any challenges to vehicle registration, driver training, and licensing? If so, what are the challenges, and are there mitigation factors?
3. As use of shared vehicles increases, and the potential that these vehicles could be automated in the future, are there regulatory changes that we should be considering?
4. Did we address safety, risk, equity and environment?
5. Other questions or topics?

Next Steps & Closing

Next Steps

- Comments and feedback via comment cards or CAVfacilitators@mediationcentermn.org
- Participants review meeting minutes
- Post-meeting online survey
- Public CAV survey on www.state.mn.us/automated/
- September 24th: Next meeting
- October 30th: Present to Advisory Council

Thank you

**Dawn Olson & Tom Henderson,
Minnesota Department of
Department of Public Safety**