**DEPARTMENT OF TRANSPORTATION**

# Governor's Advisory Council on Connected and Automated Vehicles
# Vehicle Registration, Licensing and Training

## Meeting Notes
Meeting Date: August 29, 2018 9:00 – 11:30 AM

**General Meeting Notes** (recorded ideas, lists generated by the group, and themes, not verbatim record)

Kristin White, MnDOT, Presentation on Connected and Automated Vehicles
- Governor issued Executive Order that requires a report to Governor, Legislature by Dec. 1st to discuss recommendations on changes to state law, rule, and policy
- Governor's Advisory Council on CAV has 4 main themes: safety, risk management, equity, and environment
- State of Minnesota has 4 main priorities focusing on CAV: connected, automated, electric and shared mobility
  - State uses SAE levels of automation, levels 3, 4, and 5 are highly automated vehicles (HAV)
  - State considering other uses like signal phasing and timing, truck platooning, automated shuttle services, mobility as a service (MaaS), and automated delivery

Tom Henderson, DPS, Presentation
- AAMVA (American Association of Motor Vehicle Administrators) Jurisdictional Guidelines for Safe Testing and Deployment of Highly Automated Vehicles is a good resource. It will be posted on the Subcommittee website (http://www.dot.state.mn.us/automated/publicmeetings.html) and sent to the subcommittee email list.
- Highlights from AAMVA Conference State and Industry forum
  - States don't know everything about HAV right now; learn more then regulate and change laws.
  - Current laws probably cover most things HAV. (Highly Automated Vehicles)
  - Test vehicle branding and some sort of special license plate would be a best practice.
  - When testing, the role of the test driver is critical.
  - States must demand a solid safety plan from manufacturers, including driver training and 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 penalize testing companies for reporting disengagements (when the AV shuts off and the human driver has to take over). Disengagements should not be seen as a point of failure
- Minnesota is on the right track with the –
  - Governor's Executive Order
  - Advisory Group and Sub-Committees
  - Interagency Working Group

**Meeting Discussion**

**Clarifying Questions**
- Is each state going to do their own road AV testing? States are making decisions based on their own state laws; AAMVA is trying to coordinate these efforts
- Commercial vehicles are in the scope of these discussions
- Uniformity for interstate travel is critical; commercial vehicles travel through different states in a single day/trip

**Driver Training**
- Need to work with OEMs (official equipment manufacturers) to provide training to technicians, training schools, and drivers.  Currently auto manufacturers don't provide training for drivers, dealers, or third party purchasers
  - Concern around how you train for multiple/different manufacturers; how do you train for all the different AVs on the market?
  - Could we have 3rd party certified tester to train drivers?
  - Need to think about motorcycle endorsements
- Driver training and licensing requirements, may be different SAE levels of automation
- Test driver versus vehicle
  - Currently human drivers are tested, however automation is part of the vehicle. Currently vehicle automation systems are not tested for driving skills
  - Liaisons and CAV-X noted that NHTSA/FMCSA guidelines define the roles of the federal government and the roles of the states.  The federal government will be responsible for the vehicle while the states will be responsible for the driver.  Given this, it is unlikely that Minnesota would have a role in testing the vehicle.
  - Would the human driving test have the AV turned on? How do we test driver's skills with and without automation in use?
- With new controls in CAV, discussion of what training would be required.  Who would do the training? What if the AV systems go down?
  - What does it take to be a CAV "technician?"/human test driver?  Is this regulated?

- o AV technology differs by manufacturer so may be difficult to standardize.
  - o Who does the training? State or OEM?
  - o There will need to be back-up systems, so human driver/technician needs to be able to meet current training and licensing requirements in case the automation does not work.
  - o Does current state law require hands on the wheels? How do we monitor human driver?
  - o Need a qualified AV driver (e.g. owner) and qualified human test driver
  - o Should we use simulations to test AVs? Often not as good as on-the-road testing
- Liaisons and CAV-X noted that AAMVA recommendations state states should not establish endorsements at this time for SAE levels of automation. Currently, rules of the road apply whether using technology or not in a vehicle. Drivers are still required to be alert and aware.
- Accessibility
  - o How do we think about minimum age to use CAV?
  - o Benefits for accessibility for those younger than current driving age.
  - o Benefits for disability, single parents, others.
  - o AAMVA recommends not requiring a license for Level 4-5 AVs
- AV Driving Behavior Notifications/Signaling
  - o How do we let other drivers know when the automation is being used? Or should we?
  - o How do we let other road users know when the automation is being used? Or should we?
  - o If we recommend using a light when AV is in use, this could have unintended negative impacts
- Testing Environment
  - o How will examiners distinguish between different types of AVs? (e.g. different manufacturers)
  - o Test will be longer. Could have 2 test: (1) current standards; (2) ability to use automation.
  - o Would need to have a fleet of AVs which are expensive
  - o Need to train on the transition of Level 0 through 5 vehicles. It will be complex for trainers to be able to test all these levels of technology

**Licensing**
- Discussion of the benefits/drawbacks of signaling other drivers when the vehicle is in automated mode.
  - o What behavior is incentivized if people around a vehicle know it is in automatic?
  - o Do you want people to know? (It could attract attention or encourage interference OR it could create comfort through awareness.)
  - o Plan for human interaction, positive and negative.

- What about commercial platoons? Public awareness important. Otherwise, for example, a motorist might call 911 for tailgating/seemingly dangerous behavior.
- Plan for accessible use – Liaisons and CAV-X Office noted that per AAMVA guidance 5.6.4 states should not require licenses or training for SAE levels 4 and 5.
- Different driver requirements for different locations/roads? May not make practical sense. Policy is to have uniformity in the state. People drive from rural roads to city and vice versa. This is different discussion than standards for testing vehicles on roads.
- Discussion of driving track vs. street testing for AVs and commercial vehicles
    - Real-life has benefits – good to have combination of track and real life
    - Need infrastructure to test
    - Discussion of whether virtual road make sense for testing. It could be a virtual test before allowing on road testing. Simulators don't recreate the same as feeling the road and can't take the place of a road test.
    - Not good for end-use test (by manufacturers)
- Resources
    - If we have longer testing requirements, we need more resources and more locations for testing centers
    - Example of "imaginary lines" at Eagan testing facility. This would not be able to accommodate AVs. Would need to invest in infrastructure to support testing AV drivers and vehicles
- Commercial drivers' license (CDL) requirements should be uniform amongst states. E.g. Wisconsin's CDL testing may be easier than Minnesota's
- Commercial drivers' license (CDL) test protocol should be uniform between states
- Discussion of automatic reporting of collisions, 911 call. Agreed to refer this discussion to safety subcommittee. Outside the scope of this subcommittee.
- Licensing – how do examiners differentiate between cars? Skills to be an examiner?
    - What technology can be used during a test?
    - Exams will be longer.
    - It makes sense to have two tests. One for driver and one for use of technology.
- Transition period when there will be a mixed fleet of highly automated vehicles (HAV), which the CAV-X Office noted are SAE Levels 3-5 and non-HAV
    - Required retrofitting of was discussed, probably not practical
    - Who can service CAV? There is a link to the insurance and liability subcommittee, which is discussing this. Using an approved/manufacturer to service vehicle reduces risk.
- Discussion of the cost of vehicles. CAV will be expensive. Who will have access?

**Vehicle Registrations**
- Discussion of the importance of data about the level of car be required for registration. Liaisons noted this is per AAMVA Jurisdictional Guidelines 4.3.2 and 4.3.3. Need to know how many AVs are out there and which SAE level they are.

- In the short term for HAV testing, the current vehicle registration process could be used but in the future, the vehicle registration process might require revisions.
- Reciprocity with other states
  - Practical issue – how does the State of Minnesota stay ahead of change?
  - Reciprocity already exists in current state law. MN should recognize AV registrations of other states. Without this flexibility interstate commerce would be challenged.
  - Interstate reciprocity: MN doesn't recognize some states because their training doesn't meet our standards
  - Don't want to create barriers to interstate travel
- Vehicle Maintenance
  - State should not mandate retrofitting as this would be controversial and expensive
  - Who can service these AVs?
  - Could address maintenance on annual registration renewal; if AV hasn't been maintained, it can't be registered
  - How is ongoing maintenance of AV technology enforced? Maybe like the annual emissions testing used to be. Challenge is proprietary information from manufacturers. Perhaps require proof of vehicle inspection by manufacturer/approved service.

**AV Testing/Permitting**
- Things will change, can't monitor daily (like vehicle insurance requirement for license … checked when renewed, not more frequently)
  - Public will expect oversight
  - Is manufacturers' safety self-certification acceptable to meet state standards? Liaisons note that the federal government is responsible for vehicle safety standards through a self-certification process by manufacturers
  - What can DPS do?
  - Testing AVs requires connectivity and infrastructure (for example currently law enforcement can access information about a car/driver on the road)
  - What resources are needed?
- To test a platoon there would be at least two trucks
- Safety drivers for testing
  - Driver qualifications high
  - Higher skill jobs
- Will commercial trucking competitors work together? Liaisons noted that Minnesota may wish to address requiring uniform/inter-changeable technology in AVs for platoon testing so the technology tested can be used in multiple trucks and carriers.
- Each automated vehicle is different, but for testing purposes the State may be able to test on more uniform/similar AV applications.
- Cyber security an issue. It might be possible to steal freight, detour truck, or use the truck for terrorism.
- What information is required to test a vehicle on the road today?
  - Disclosure

- o Self-certification
- o Testing – on designated highways or is anywhere in the state okay?
- Does Minnesota need to issue a permit to test AVs?
  - o Currently there is no permit to test AVs. Liaisons note that AAMVA recommendations in Chapter 4 discuss AV test permitting.
  - o Current AAMVA recommendations discuss requiring an AV testing permit
  - o What happens if no additional permit required?
  - o Would need authorizing language in state law
- Railroads are testing AV. Some locations use biometric security measures. Some railroads conducting research on how to identify owner/operator of AV if it's a level 4-5 with no human driver or passenger; testing location recognition programs to eliminate driver wait times. Homeland security driver ID – currently allows access to certain areas only by driver security clearance.  How is there a positive security ID if there is no person in the vehicle?
- How do we get the right information at the right time?
- Driver easy/safety/time involved should all be considered

## Tentative Recommendations –

- There is general consensus of this subcommittee that commercial licensing should be uniform for interstate travel; need reciprocity. Liaisons note that there is already reciprocity amongst states for commercial driver licensing and registration. Uniformity must be allowed for efficient interstate commerce.
- There is agreement that there is a need for further research into endorsements/driver training for commercial CDL (appropriate testing for vehicle being tested – might be similar to current motorcycle endorsement)
- There is general consensus that there may be standards for test driver quality
- There is general consensus that CAV disengagement should not be discouraged in order to encourage safety to the public.  Some other states have learned that reports of disengagement could create a disincentive.
- There is consensus that at some point in technology development there may need to be two licensing tests: one for drivers and one for technology.
- Need guidance on how to train testing technicians – will the schools initiate training or the manufacturers? There was a lack of consensus regarding whether the manufacturers will need to train or whether the state or driving schools. Liaisons recommend proposing that Minnesota requires information to understand how an AV human test driver is trained.
- Need endorsements for each level of automation; title of vehicle could be branded by the SAE level of automation. Liaisons note that this is contrary to AAMVA's recommendations.
- Need to distinguish training and endorsements of an owner of an AV passenger vehicle and that of an AV human test driver. Liaisons note that this is contrary to the role of current federal and state responsibilities. Liaisons note that the training and

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| testing of a Minnesotan who owns an AV in the future will be different than the training and testing requirements of a current AV human test driver. |
| **Next Steps** – any follow up and who is responsible, by what date |
| <ul><li>CAV-X will provide sample CAV reports from other states to the subcommittee.</li><li>CAV-X will forward AAMVA report (America Association of Motor Vehicle Administrators).  Recommended subcommittee members review this report before the next meeting.</li><li>Facilitator's notes will be reviewed by the liaisons and CAV-X, then posted on the subcommittee website (http://www.dot.state.mn.us/automated/publicmeetings.html), and emailed to subcommittee members.  Comments on the meeting notes are welcome.</li><li>A meeting evaluation will be sent to the subcommittee</li><li>Next meeting date is September 24, 2018 from 9:00 AM – noon at  MNDOT Shoreview Training Center 1900 County Rd I, Shoreview, MN 55126</li><li>Refer discussion of automatic collision reporting/911 call to the safety subcommittee. This subcommittee thinks it makes sense, however outside its scope.</li></ul> |
| **Parking Lot** - items for follow up at subsequent meetings |
| <ul><li>Review Tom Henderson's learnings from AAMVA conference (summarized in General Meeting Notes above). Are any of these points potential recommendations?</li></ul> |