Governor Walker's Steering Committee
on Autonomous and Connected Vehicle Testing and Deployment

MINUTES

Meeting #4
January 17, 2018
9:00 am – 12:00 noon

Wisconsin State Capitol
Room 412 East
Madison, WI

1. Secretary Ross called the meeting to order. Daniel Yeh, staff to the committee, called the roll. (attendance list is provided at the end of these minutes)

2. Secretary Ross noted that Mr. Yeh will be leaving WisDOT soon to take a position in the state of Maryland. Brad Basten, WisDOT Economic Development Officer, will be the new staff contact for the committee.

3. Representative Neylon moved to approve the minutes from the November 18 meeting, seconded by Commissioner Nickel. The committee approved the motion.

4. George Ivanov of Waymo presented the company's first **Safety Report as submitted to US DOT, October 2017.** Slides from the presentation will be posted to the CAV Committee web page. The full report and other supporting material may be downloaded at https://waymo.com/safetyreport/.

   Mr. Ivanov presented that fully self-driving vehicles are here and continues to test their fleet at a rate of 12,000 miles per day, feeding real world test data back into the simulation models for increasingly accurate models. Waymo is investigating driverless services and potential market demand models for their vehicles.

   a. Secretary Ross asked how other drivers who may not be obeying posted speed limit react to AV that are observing the speed limit. Mr. Ivanov noted that slow speed areas have seen a variety of driver reactions, good and bad. At higher speed levels, state agencies have discussed with Waymo about the expected speed to maintain flow of traffic despite the posted limits.

   b. Representative Neylon asked which states Waymo is using for testing. AZ, CA and MI (snow weather). What led to Michigan? Waymo had a facility and access to supplier base and the winter weather provided good testing opportunities. Does Waymo have ancillary products developed through R&D? Not at this time but potential exists. What about mapping, could it be leased? Every company in AV has different mapping systems so they wouldn't be interchangeable at present. Should government adjust signs or markings? Some tech relies on signs but Waymo's tech doesn't rely on a standard; the vehicle adjusts even to poor signs or marking. Other technologies do rely on signs and marking at this time.

c. Mr. Lewandowski asked whether Wisconsin could provide a path to public deployment. At current level of laws, there do not appear to be restrictions in Wisconsin.

d. Dr. Noyce inquired as to whether the Waymo system is essentially designed to operate without signals and markings. AV could operate with few or no devices but that is not the situation in an environment with human drivers. Waymo carefully examines the situation in every new state that it tests.

e. Ms. Heady asked whether Waymo integrates with states' 511 systems. Not specifically in Wisconsin, but such information is helpful to know in advance although it is not absolutely necessary. Waymo does utilize 511 and other public data.

f. Mr. Mellon asked whether Waymo maps are governed by RFCs (agreed upon technical standards, processes and terms). Mr. Ivanov: There are no current standard for mapping. Data is only used by Waymo and Waymo vehicles as there are no industry standards. Does Waymo utilize geofencing? Yes, Waymo AV will only operate within the geofence. Is Waymo mapping ahead and then adjusting as testing occurs? Yes, Waymo detects changes in the roadway and can share those updates with other vehicles, i.e. the ability to navigate movable traffic cones.

g. Representative Kuglitsch asked whether the Arizona testing was public roads and whether any specific approval was needed. There was communication with state and local officials but no specific approval or permitting was needed. Was any public infrastructure needed and do some other systems need infrastructure, will there be multiple technologies with different needs? Much of the V2I tech (vehicle to infrastructure) predates the latest AV tech. Eventually envision a consolidation of the types of tech although some companies may choose differentiation, utilizing different public infrastructure.

h. Mr. Cyra asked how Waymo communicates with the vehicle? A combination of cellular and wifi (not V2I). Waymo monitors conditions and situations and responds accordingly. Waymo does not rely on such systems to be 100% operative and has redundant cell systems.

i. Mr. Caya asked about Waymo's thoughts about semi-automated systems in comparison to fully automated. Waymo's experience that occupants over rely on partially-automated systems and safe use of the system can be unpredictible. Due to that, and licensing and training requirements, there is no advantage to Level 3 autonomy.

j. Ms. Lewis clarified that the GM SuperCruise is considered a Level 2 system and automakers are now designing fully integrated Level 2 and 3 systems that does better to engage the driver including tracking eye movement.

k. Mr. Lewandowski asked about the nature of the rider support team. It is still a small team that is today designed for vehicle feedback in a testing environment.

l. Mr. Rafferty asked about Level 4 operations in winter weather conditions. Today Waymo can handle light to moderate weather situations but is not able to handle severe weather in a fully driverless setting. There are approximately 50 companies doing testing in CA, but only about 3 testing in MI. There is no government side research. What about crash worthiness for vehicles with non-standard design such as rear-facing passengers or certain equipment not installed? Currently all vehicles are still subject to all federal standards. Ms. Lewis indicated the Alliance is a stakeholder on a NHTSA Office of Research project that is identifying and addressing FMVSS barriers for AV certification and deployment. Through this work the Alliance is providing input on near-term solutions and identifying areas that require a longer-term effort, such as alternative seating designs that would require new crash test dummies.

m. Senator Risser asked what happens if something goes wrong. Mr. Ivanov referenced redundant safety systems noted in the safety report. Each system has a backup and is monitored continuously. The system is rigorously designed for a safe failure mode and will safely pull over and stop if needed.

n. Mr. Vandeloo asked about the hypothetical "Trolley Problem"; how does the vehicle choose what to collide with if a crash is imminent? The sensors have a 1000 ft range for initial detection of obstructions. It classifies moving objects by characteristics: e.g. trucks, cars, motorcycles, pedestrians, animals. Flexible algorithms predict how they behave, how they interact with the roadway, and potential trajectories. The goal being to not put the vehicle into a conflict situation.

5. Carla Jacobs, Public Affairs of Uber Technologies Incorporated, presented experiences with **Uber Driverless Vehicle Experiment in Pittsburgh**.
Slides from the presentation will be posted to the CAV Committee web page.
Uber's ATG (Advanced Technology Group) is collaborating with Carnegie Mellon to develop AV technology. Uber has tested 50,000 rides using Uberpool with select customers to gauge customer acceptance and effect on local traffic congestion. After testing in Pittsburg for a year, they found the majority of customers were comfortable choosing an autonomous vehicle for their trip (with Uber drivers behind the wheel at this time). Uberpool had a positive effect on traffic congestion. After working with state and local government they are now adding Phoenix to the testing program. It is legal to operate an AV with a driver behind the wheel and have passed state inspections.

a. Mr. Neitzel asked about any public awareness campaign. Ms. Jacobs responded that it was a limited roll out to select customers. They are now doing a general outreach to media and other users.

b. Mr. Lewandowski asked about the size of area used for testing. Testing was done in the downtown only and restricted to a geofenced area.

c. Mr. Rafferty asked about the Uber - city relationship and any expectations for what Uber will do for city. Ms. Jacobs responded that all vehicles have a safety driver,

(they initially started with an engineer in car as well). No changes were needed to meet regulations.

d. Rafferty: Federal USDOT *Automated Driving Systems (ADS): A Vision for Safety 2.0 is* released and they are working on version 3.0 that will address truck and other modes. These are voluntary guidelines. What do you want to see from states?
Jacobs: Leave open the opportunity to test between states and cities.
Ms. Lewis added, there needs to be one point of contact in state. There are no testing barriers at this time, all Alliance members plan to publish a Voluntary Safety Self-Assessment (VSSA) per the 2017 DOT ADS Guidance 2.0.
Lewis: GM has just released its own Safety Self-Assessment (http://www.gm.com/content/dam/gm/en_us/english/selfdriving/gmsafetyreport.pdf). The GM Cruise AV planned to be available 2019 in a ridesharing network and will not have driver controls. The Cruise AV has been tested in Phoenix and San Francisco. Barriers are that they will need to get approval to deploy the vehicle without pedals and a steering wheel from NHTSA.

6. Scott Hoselton, President of ACS presented information on **Engine & Vehicle Testing Considerations.**
7. Slides from the presentation will be posted to the CAV Committee web page.
Mr. Hoselton commented that it is necessary for the Market, Regulations, and Technology to progress together for the best results. Regulations need to be clear for industry.
3 considerations:
   - Readiness of infrastructure – all platforms
   - Tolerances for repeatable operations
   - Access to policy changes.

   a. Ms.Lewis asked, What is ACS's roll in developing test standards? Hoselton: ACS works with companies to establish appropriate test standards. It is good to have partnership while the development of new technology happens.

   b. Mr. Lewandowski asked, Do you foresee a standard test bench for AV? Hozelton: That is already happening. Maryland has developed AV dyno.

   c. Mr Caya asked, What, in your opinon should the states roll be?
Hozelton: States should be a champion of new technology. They should take a leading roll in integrating technologies.

8. Reaction and discussion to presentations

   a. Mr. Mellon: What future products do you foresee?
Ivanov: Waymo's first model will be offering commercial transportation services. Personal ownership of vehicles will come later. What kinds of service? Could be rental, commercial trucking and other unknown markets at this time.

Ms. Lewis: Services being discuss right now include Toyota E-pallet, AV delivery cars, mobile stores (shoes). Low speed shuttle services and ridesharing operation will likely come first.

b. Sen. Risser: We discussed requesting comments from the Attorney General. Rob Kovach responded that he had forwarded questions to consider to the AG office, but nothing formal was submitted to AG. He just offered ideas to think about.
Ross: We have no response. May need his opinion for next meeting. Yeh will make that contact.

c. Mr. Vandeloo asked, Are there unintended issues that have come up?
Ivanov: While working with Peterbuilt we have found that operating on freeways is simpler than urban driving. Once level 4 AV is complete, can experiment with truck delivery's. The U.S. Postal Service very interested in this technology for obvious reasons.

d. Vandeloo: Is there a preference for internal combustion vehicles vs electric vehicles?
Ivanov: Every vehicle that we have used has been at least a plug in or hybrid. This is mainly due to the electrical needs of the current operating equipment. Easier to base the technology on these vehicles.
Lewis: AV doesn't need battery based vehicle. Could even be natural gas powered if equipped correctly..

e. Mr. Cyra asked, What are the legal and insurance opinions regarding this technology?
Ivanov: Waymo uses commercial insurance with standard vehicles. There will not be new models until public roll out. They are investigating a variety of business models in different states; fleet, rental, trucking, vehicles for hire.

f. Cyra: What are other drivers' reactions to AV's on the road?
Ivanov: People are not noticing any difference in driving with AV's. In the testing areas, they are getting used to seeing them sharing the road.

g. Mr. Mellon: From a legislative standpoint, there is an opportunity to deal with AV as a subset of vehicles, similar to electric and hybrid classifications. This can be used when developing legislation or tax laws.
Ivanov: No state has linked AV and electric vehicles.
Ms. Lewis: Regulations would not help adoption.

h. Mr. Vandeloo: There likely will be an increased demand on electrical infrastructure with increased adoption.
Sec. Ross: At the CES conference and Governors AV conference, by moving to a ride share model this could result in massive reduction of vehicles on the road and infrastructure. (especially parking).
Sec. Ross: A Tesla semi can run 24 hrs (vs operators who are limited to driving restriction per day) AV can fill up gap time.

Vandeloo**:** Need for special electrical grid to recharge in 5 hrs.
Cyra: There is an analogy for gas stations and pipelines to support gasoline powered vehicles that didn't exist when ICE first were adopted.
Lewis: People frequently don't know where charging stations are when traveling. Manufacturers (and customers) are adding a significant amount of home charging infrastructure.

Mr. Lewandowski: Generac produces home, gas powered generators. There might be an application for mobile generators to power electrical charging stations.

i. Mr. Ivanov: What is the general scope of this committee?
Secr. Ross: Don't stand in a way of changes for industry.

9. Next steps

The next committee meeting is scheduled for February 28, 2018

10. Commissioner Nickel moved to adjourn the meeting.
Rep. Fields seconded the motion.
Secretary Ross adjourned the meeting.

Members attending:
Secretary Dave Ross
Steve Caya
Steven Cyra
Representative Fields
Kathy Heady (for Mark Hogan)
George Ivanov
Representative Kuglitsch
Jeff Lewandowski
Anne Marie Lewis
Ric Mellon
Will Neitzel
Representative Neylon
Commissioner Nickel
David Noyce
Peter Rafferty
Senator Risser
Jacob Vandeloo
Jason Tolleson
Senator Testin