

Wisconsin Automated Vehicle External (WAVE) Advisory Committee
Meeting Minutes
March 29, 2022 - 9:00am-2:50pm
- Meeting Held Via Video Teleconference -

WAVE Members Present: Steve Caya, Jerry Deschane, Paul Fontecchio, Glenn Fulkerson, Chris Hardy, Art Harrington, Nathan Houdek, Debby Jackson, Nick Jarmusz, Luke Junk, Neal Kedzie, Jeff Lewandowski, Mike Long, Raymond Mandli, Cory Mason, Steven Michek, Kevin Muhs, Nick Musson, Jennifer Neugart, Jeff Peterson, Adonica Randall, Matt Regnier, Jeff Smith, Stephanie Sward, Yang Tao, Evan Umpir, Mary Wolf

WAVE-Member Organization Proxies Present: Andi Bill, Daniel Holt, Christian Plata, Tyler Wenzlaff, Tom Winker

Wisconsin Non-Driver Advisory Committee Members Present: Patrick Daoust, Rishelle Eithun, Tami Jackson, Denise Jess, Curtis Lemke, Adam Lorentz, Karen Melasecca

Guests: Bryan Albrecht, Gateway Technical College
Sara Bennett, National Highway Traffic Safety Administration
Justin Owens, Virginia Tech Transportation Institute
John Reblin, Chair of WisDOT's Motorcycle Safety Advisory Committee and ABATE of WI Executive Director
Tammy Trimble, Virginia Tech Transportation Institute

Wisconsin Department of Transportation (WisDOT) Staff Present: Stephanie Arduini, Brad Basten, Hannah Brown, Sarah Buzzell, June Coleman, Carrie Cox, Tracy Drager, Michael Denruiter, Alexander Gramovot, Paul Hammer, Kyle Hemp, Randy Hoyt, Mark Knickelbine, Elizabeth Lloyd-Weis, Reed McGinn, Lisa Morrison, Stacey Pierce, Anne Reshadi, Ian Ritz, Rodney Saunders Jr., Erin Schwark, Mike Schwendau, Ethan Severson, Ryan Spaight, Aileen Switzer, Kaleb Vander Wiele, Charles Wade

- **Welcome and Opening Remarks**
 - Paul Hammer, WisDOT Deputy Secretary

Deputy Secretary Paul Hammer welcomed Committee members to the fourth WAVE meeting, thanking them for taking time out of their schedules to discuss connected and automated vehicles (CAVs). Deputy Secretary Hammer mentioned the theme for the meeting was the safe deployment of CAV technology in Wisconsin as it relates to preparing law enforcement and first responders, and the needs of the state's vulnerable road users such as motorcyclists, pedestrians, bicyclists, the young, the elderly and individuals with disabilities.

- **Meeting Overview and Recap of 2nd WAVE Meeting**
 - Aileen Switzer, Division of Budget and Strategic Initiatives Administrator

Aileen Switzer welcomed the attendees and provided an overview of the meeting agenda. The Division Administrator recognized the members of the Wisconsin Non-Driver Advisory Committee attending the meeting as they play a critical role in determining how non-drivers will intersect with CAV technology and safety. Aileen mentioned the topics for the previous WAVE Advisory Committee meeting focused on transportation equity as it relates to the adoption of CAV technology. Twenty-two WAVE member organizations attended the September 2021 meeting.

- **WAVE Assessment and Membership Renewal**
 - Aileen Switzer, Division of Budget and Strategic Initiatives Administrator

Aileen Switzer highlighted the purpose of the committee as identified in the committee's charter and notified the members that WisDOT staff will be surveying members to assess the value and effectiveness of the committee.

- **WisDOT CAV Strategic Work Plan Update**
 - Brad Basten, Division of Budget and Strategic Initiatives

Brad Basten gave an overview of the [CAV Strategic Work Plan](#) and provided project updates from the Work Plan subcommittees.

- **Voices of the WAVE**
 - WAVE Members

Three committee members – Abaxent, LLC., AAA-The Auto Club Group, and Mandli Communications, Inc. - provided an update on their recent CAV-related activities.

- **CAV Strategic Work Plan Focus Area on Law Enforcement and First Responders**
 - Brad Basten, Division of Budget and Strategic Initiatives
 - Hannah Brown, Division of Budget and Strategic Initiatives

Brad Basten and Hannah Brown provided an overview of a survey completed by the Traffic Incident Management Enhancement Coalition to gather feedback on the members’ knowledge, perceived benefits, and concerns of CAV technology.

- **Panel: CAV Safety and Law Enforcement and First Responders**
 - Facilitator: Hannah Brown, Division of Budget and Strategic Initiatives
 - Panel Members:
 - Sara Bennett, National Highway Traffic Safety Administration
 - Trooper Tracy Drager, Division of State Patrol
 - Tammy Trimble, Virginia Tech Transportation Institute

Sara Bennett presented on the National Highway Traffic Safety Administration’s (NHTSA) mission and the agency approach to vehicle safety, which includes the Federal Motor Vehicle Safety Standards, vehicle recalls, crash ratings and research; and key statutory provisions relating to NHTSA. She provided an overview of NHTSA’s automated driving system research:

- System safety performance – Test track, simulation, & on-road tools development; Testable cases; safety metrics and measures
- Subsystems testing and functional safety – Sensor capabilities/limitations, fusion, redundancies; Perception, maneuvers & execution
- Crashworthiness – Alternative seating configurations, advanced test dummies; Unoccupied vehicle compatibility
- Human factors - Human-Machine Interface; Driver Monitoring Systems; Communication of intent; accessibility; teleoperations

Sara’s presentation closed with a description of NHTSA’s Standing General Order which “requires manufacturers and operators of Automated Driving Systems and SAE Level 2 Advanced Driver Assistance Systems equipped vehicles to report crashes to the agency.”

Trooper Tracy Drager from WisDOT’s Division of State Patrol provided an overview of the potential benefits and concerns of CAV technology from the perspective of law enforcement, including improved roadway safety through decreased speeding and unintentional roadway departures. The presentation continued by highlighting potential concerns for law enforcement such as how to identify a CAV and how to determine if the CAV’s operating systems are up to date.

Tammy Trimble, from the Virginia Tech Transportation Institute, highlighted how to prepare law enforcement and first responders for automated vehicle technologies. The overview contained the following key operational scenarios experienced by law enforcement and first responders:

- Responding to an incident
- Securing the scene
- Traffic direction and control
- Traffic stops and checkpoints
- Abandoned or unattended vehicles
- Stabilization and Extrication

Tammy's presentation closed by identifying the six curriculum topics below to "help reduce uncertainty and misconceptions regarding [AV] technologies and identify how [law enforcement and first responders] may interact with them in the field."

1. Understanding the difference between advanced driver assistance systems and automated driving systems equipped vehicles
2. Identifying advanced driver assistance systems technologies on the road today
3. Understanding governmental responsibilities regarding vehicle oversight
4. Anticipating advanced driver assistance systems- and automated driving systems-equipped vehicle deployment
5. Interacting with automated driving systems-equipped vehicles
6. Understanding and accessing data

- **Panel: CAV Safety and Vulnerable Road Users**

- Facilitator: Mike Schwendau, Division State Patrol
- Panel Members:
 - Chris Hardy, Columbia County Highway Commissioner
 - Erin Schwark, Division of Transportation System Development
 - John Reblin, Chair of WisDOT's Motorcycle Safety Advisory Committee; and Executive Direct, ABATE of Wisconsin
 - Justin Owens, Virginia Tech Transportation Institute

Chris Hardy, from Columbia County began with an overview of the types of work zones and work zone tools already in use. The presentation continued by identifying potential benefits and concerns of CAV technology as it relates to work zones and work zone workers. The benefits include increased work zone awareness, prevention of tailgating, speed moderation and increase driver attention. Chris highlighted the following as potential concerns for CAV technology adoption as it relates to work zone and work zone workers:

- Work zones can be mobile, such as mowers, and the work zone changes frequently
- Work zones can lack use of signage
- CAV work zone technology and the training needed may be expensive

Erin Schwark from the Division of Transportation System Development highlighted the positives and challenges of CAV technology in work zones as outlined below.

- CAV positives in work zones
 - Potential speed limit compliance
 - Vehicle spacing
 - Decreased human error
 - Worker safety
 - Worker presence devices
 - Work zone intrusion alerts

- CAV challenges in work zones
 - Work zone traffic control
 - Pavement markings
 - Signing
 - Drums vs barrier wall
 - Detour routes
 - Flicker rates
 - Temporary portable rumble strips/temporary rumble strips
 - Worker safety

Erin's presentation concluded with "what can we do now" with CAV technology and increasing safety in work zones, including leveraging smart technology, such as, smart arrow boards, portable work zone location sensors, temporary signals and work zone instruction.

John Reblin, Executive Director of ABATE of Wisconsin, provided a brief history of ABATE, the positives and concerns of CAV technology and what can be done moving forward from the motorcyclists' perspective. He is encouraged that states are starting to work together and share information, but highlighted the limited testing of motorcycles and CAV technology interaction as a concern. John closed his presentation with the need for the following.

- Share information and exchange ideas
- Receive stakeholder input from all road users when testing

Justin Owens from Virginia Tech Transportation Institute presented on the safety implications and opportunities of CAVs for pedestrians, bicyclists, and individuals with disabilities, in addition to research needs on the interaction between CAVs and vulnerable road users (VRUs). Opportunities include flexible transportation, improved safety and tailer assistance for vulnerable road users. Justin's presentation identified the following as future research needs:

- How will the behavior of different VRUs be predicted and accommodate by automated vehicles?
- How can interfaces be developed/refined to communicate vehicle intention to VRUs?
- How can Assisted Driver Systems (ADS) be deployed in a manner that is fair to all and targets users who need it most?

- **Racine Shuttle Video Demonstration**
 - Andi Bill, UW-Madison's TOPS Lab
 - Mayor Cory Mason, City of Racine
 - Bryan Albrecht, Gateway Technical College

Mayor Cory Mason and Bryan Albrecht introduced the presentation by Andi Bill on the Racine shuttle, the Badger. Andi's presentation provided an overview of the Badger's sensor technology, the route the shuttle operates on and video demonstrations on how the Badger analyzes the roadway.

- **Small Group Discussions**

Attendees moved into facilitated small group breakout rooms to discuss the following two questions. A summarized list of responses to the questions can be found in Appendix A.

1. What safety concerns and/or benefits do you see affecting the organization you represent on WAVE with the adoption of CAVs? What information do your organization's stakeholders need regarding CAV safety?
2. What actions can help inform, mitigate concerns, and expand safety benefits of CAVs for law enforcement and first responders; construction zones/workers; motorcyclists; bicyclists, pedestrians and individuals with disabilities?
 - a) Inform
 - b) Mitigate concerns
 - c) Expand safety benefits

- **Report out – small group discussion**

Each small group was called on and asked to share their main takeaway from the WAVE meeting and the small group discussion.

- **Closing Remarks**

- Aileen Switzer, Division of Budget and Strategic Initiatives Administrator

Aileen Switzer thanked the committee members, Wisconsin Non-Driver Advisory Committee members, WisDOT staff, and panelists for their time and participation. She reminded the committee of the assessment survey and closed the meeting by highlighting the importance of the committee's input with the future adoption of CAV technology.

Appendix A - Summary of Responses to Small Group Questions – March 29, 2022

Note: Responses are not listed in any order and may have been mentioned by multiple groups.

- 1. *What safety concerns and/or benefits do you see affecting the organization you represent on WAVE with the adoption of CAVs? What information do your organization's stakeholders need regarding CAV safety?***
 - Safety messages would have to show the program was successful in other areas with similar weather
 - It would need to be shown to be successful in more populated areas before people in the rural areas will buy in
 - How will the CAV technology handle ice?
 - There needs to be both testimonials as well as data. We need to have a variety of people, the citizens of an area that has it, come out and give the value they have seen in it
 - It must be about making residents' lives better. Particularly when it comes to people with disabilities
 - Going to have to remind people that it's safe. We need to outline to the people in the community that there's real world applications and here's the public interest
 - Can CAV's really see pedestrians? If so, there will be fewer fatalities. Until it can be verified, it is a concern
 - Need to make sure the technologies are vetted and not bias from manufacturer; true safety benefits, that benefit everyone
 - What are the technology needs for the infrastructure not only for travel, but to react/avoid congestion, closed lanes?
 - What is the design criteria to help the technology perform to reach the goal of safety?
 - What is the goal of the product? Once that is determined can probe at the limitations of a goal/technology
 - WisDOT work zones are always changing even within the hour, so may be difficult to keep up with changes
 - Concerns with how the sensors will be able to discern between different conditions
 - Automatic vehicle requires more trust that there won't be a mistake with the technology. Many people used to the human interaction. User interface – how do you tell it where to go, how to make sure it's accessible for all. People need predictability
 - In rural areas high speed internet is not always there and still an issue
 - Opportunities for efficiency with freight; potential for fewer accidents involving freight
 - Questions of liability; technology (sensors, connected communication, etc.) consistency and dependability; how AVs will adjust to OSOWs; reliability, cost, and security of adopting CAV technologies
 - Lack of including motorcycles in the testing process of CAVs. Additional info needed: Testing process/metrics, results as related to motorcycles. More transparency as to stakeholder involvement along with communication streams
 - Straight-line driving vs everyday obstacles (buses coming from side of road back into traffic, vulnerable pedestrians with hearing/visual impairments)
 - Make consumers aware of limitations (eyes need to be on the road); misunderstanding about what vehicles are capable of; find way to rate technologies for consumers; asymmetry; end goal is safety to get fatalities to 0; if we lived in other states, we would see more of these vehicles (weather issues)
 - Ability of vehicles to get info real-time so vehicle behind can get that information sooner to enhance safety (sensors in the vehicle are keeping them on the road)
 - Need to create use stories [cases] so people understand this is viable. Bring knowledge to that table early so people can start getting used to the idea. Communicate the benefits of CAV
 - Access in rural areas may limit benefit. Concern is transferring modes, example from Uber/Lyft may be a hassle. Impressed with the topic of accessibility being discussed or brought up at WAVE
 - Focus on a statewide and multi-state level integration of technology and communication cohesiveness. Are you getting a safety benefit with limited use of the technology? Work toward vision zero and show the safety benefit

2. What actions can help inform, mitigate concerns, and expand safety benefits of CAVs for [law enforcement and first responders; construction zones/workers; motorcyclists; and bicyclists, pedestrians and individuals with disabilities]?

a) Inform

b) Mitigate concerns

c) Expand safety benefits

(Examples: partnership(s), pilot project(s), training materials, communication strategies, etc.)

- Show how it helps first responders get to a scene faster
 - What would it mean for the FD if on the way to a scene they could use that time on the way to a scene, they can prep for what to expect when they get there. The way this can help benefit first responders can help show how it keeps the public safer and might help gain public acceptance
- Start with a smaller demo to show there won't be these issues. Then pick an agency to test on a larger scale. Start small to build the benefits
- Education on understanding the difference of the human eyes and eyesight technology
- Demographic information for incidents would be helpful. This would give the ability to send the appropriate resources. Whether it is too much or not enough. Putting fewer first responders in a dangerous position
- The condition and location of lane marking is even more important now
- A few states allow a truck mounted attenuator without a driver for work zones
- States are piloting other technologies that tie into the workers vest to warn when a vehicle is not where it should be. Would be good to get that information in the vehicles. We need to make sure that work zones are set up consistently, will be helpful
- Pilots of AVs in work zones would be good to find the benefits. There are test tracks available for pilots. WisDOT is starting some of this with the Work Zone Data Exchange
- We need to advocate for infrastructure (fiber) in rural areas as well as urban
- You can be very close to urban areas and still not have internet available, may be an economic challenge as well. Non-drivers may be in poverty and need to address these issues. We can't price people out of this. One of the biggest costs of public transportation is the drivers, so there is hope that it could become more affordable
- Educate and communicate with workers and users, including pros and cons of technologies; learn about work zone tools/technologies via pilots; acknowledged different challenges depending on planned vs. unplanned closures
- Work zone invasion detection to communicate directly to workers in the immediate area
- Work zone alerts for drivers via cell phone or in-vehicle
- More inclusion in sharing information at decision making level to give accurate information, such as, motorcycle operation/needs. May help with buy in
 - Subject matter experts need to be available for proper terminology and operations of towing, motorcycles, etc.
- Use motorcycles in testing along with using video footage for outreach purposes to increase credibility of evaluation process
- Municipalities really look to the states for guidance on regulation. Talk about known issues, concerns before moving on to more advanced issues
- Be deliberate with communication on what we know now to promote buy-in with stakeholders. This will allow the public to also input to current challenges, can be very helpful with solutions
- Address misunderstanding/skepticism within motorcycle group even though CAVs should improve safety; for a motorcycle, large SUV/truck have larger blind spots; fatalities for vulnerable pedestrians/bikes/motorcyclists have increased since 2009 (i.e., SUV/truck sales have increased)
- "Nothing about us without us." Stakeholders need to be at the table for discussions
- Communication and education vital to success. Prepare people for new tech coming forward