WASHINGTON STATE
AUTONOMOUS VEHICLE
WORK GROUP

MEETING SUMMARY

Meeting: Safety Subcommittee
Location: Virtual Meeting - Zoom
Date: April 14, 2021

Attendees:

Name	Organization
Aidan Ali-Sullivan	Waymo
Debi Besser	Washington Traffic Safety Commission (WTSC)
Daniela Bremmer	Washington Department of Transportation (WSDOT)
Brian Chandler	DKS Associates
Lt. Brian Clenna	Seattle Police Department
Chief Steve Crown	Wenatchee Police Department
Dr. Andrew Dannenberg	University of Washington
Doug Dahl	TransitLab
Mandie Dell	WTSC
Sam Dreiman	Argo.AI
Katharine Flug	Washington State Department of Health
Ryan Gammelgard	State Farm
Marie Hagglund	State Farm
Samantha Kersel	TechNet
Rep. Bad Klippert	Washington State Representative
Roger Lanctot	Strategy Analytics
Mi Ae Lipe	Driving in the Real World
Kimberly Mathis	Washington State Patrol (WSP)
Doug McClanahan	WSDOT
Kyle Miller	WSDOT
John Milton	WSDOT
Markell Moffett	WSP USA
Pam Pannkuk	WTSC
Manuela Papadopol	Designated Driver
Ryan Peters	National Highway Safety Administration (NHTSA)
Terry Ponton	WTSC
David Putnam	Washington State Patrol (WSP)
Commissioner Jim Restucci	WSTC Commissioner, AV Work Group Executive Committee Chair
Trisena Sharff	Washington State Patrol (WSP)
Ryan Spiller	Alliance for Automotive Innovation
Courtney Stewart	Washington State Patrol (WSP)
Derek Viita	Strategy Analytics
Shannon Walker	City of Seattle
Alan Werner	Washington Society of Professional Engineers

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Name	Organization
Ian Wesley	WSDOT
Bryce Yadon	Futurewise

WELCOME & INTRODUCTIONS

Captain Trisena Scharff & Manuela Papadopol

- Co-chair introductions
- Walkthrough agenda

Topic closed.

UPDATE ON SSB5460

Debi Besser

- Senate Bill 5460[1] – Implementing recommendations of the autonomous vehicle work group
    - Sponsored by Senator Nguyen
    - Passed in both the Senate and the House, headed to the Governor's desk to sign
    - Creates definition of "autonomous vehicle" to only include SAE levels 4 and 5, and removes RCW 46.37.480 section 1 relating to restriction of television viewers in vehicles
        - Rulemaking authority for Department of Licensing was removed from substitute bill
- The work this subcommittee is doing is being noticed and acted on in the legislature
- The bill was based on our recommendations going through the AV Work Group process – recommendations are made to the Executive Committee, then the Washington State Transportation Commission, then included in the annual report to the Legislature
- Elements of the substitute bill
    - Establish a definition of "autonomous vehicles" as SAE Levels 4 and 5 only
        - A topic of a lot of discussion over the past couple years
            - Should it include Advanced Driver Assistive Systems (ADAS)?
            - A lot of confusion around the term "autonomous vehicles" as it is referenced in the Executive Order and last year's "establishing minimum requirements for the testing of autonomous vehicles" House Bill 2676[2]
    - Repealed the prohibition of TV screens in vehicles (RCW 46.37.480 section 1)
        - There are many TV screens in vehicles today that are safety systems and should be there

[1] Autonomous Vehicle Work Group legislation SB 5460, 2021-22 session: https://app.leg.wa.gov/billsummary?billnumber=5460&year=2021

[2] Establishing minimum requirements for the testing of autonomous vehicles HB 2676, 2020 session: https://app.leg.wa.gov/billsummary?BillNumber=2676&Chamber=House&Year=2019

        - The RCW section is an outdated law – there are other laws related to distracted driving that address the original intent of this section
        - Repealing this section of the RCW clears the way for platooning and other safety features
    - The bill also included a section that moved the effective date of HB2676 section 2 on reporting back one year, to October 1, 2022

Topic closed.

UPDATE ON WTSC PROJECT ON ADAS SURVEY AND EDUCATION PLAN

Debi Besser

- Washington Traffic Safety Commission (WTSC) (*not to be confused with WSTC, the Washington State Transportation Commission, the entity that runs this AV Work Group)* is conducting an ADAS Survey and Education Plan project
- Project is funded by the National Highway Traffic Safety Administration (NHTSA)
- Project includes an advisory committee subgroup made up of volunteers from this AV Safety Subcommittee
- Project started in October 2020 and runs through September 2021
- Genesis of this project was a 2019 AAA study that found when drivers are using ADAS functionality, such as adaptive cruise control (ACC) and lane keeping assistance (LKA) for a few months, they start to feel like the car drives itself, and survey participants stated they were 80% more likely to engage in distracting tasks instead of paying attention to the road, such as looking out the window or reaching into the backseat
    - This is an issue that needs to be address now – this technology is in many cars on the road today
- Goals of the project:
    - Measure and understand (through a survey) Washingtonians' beliefs and behaviors are as they relate to ADAS, focusing on ACC and LKA
    - Develop a communications plan to educate drivers
        - Correct common misunderstandings of the capabilities of these systems
        - Importance of maintaining attention on driving
    - Implement communications plan beginning October 2021
- Resource: Consumer Reports published Recommended Common Naming – can help educate consumers
    - https://advocacy.consumerreports.org/wp-content/uploads/2019/11/CR-ADAS-Common-Naming-One-pager.pdf

Topic closed.

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INCREASING LEVEL OF ADAS IN VEHICLES, IMPACT ON THE EVOLUTION OF LIABILITY, AND DATA ACCESS IN THE CASE OF A CRASH

Ryan Gammelgard and Maria Hagglund, State Farm

- Understanding ADAS and its impacts on the evolution of liability and data access (in the case of a crash) is important not just for auto manufacturers and local governments, but also for insurance, legislators, law enforcement
- State Farm has been considering the types of topics this subcommittee is discussing from the insurance perspective, focusing on developments and researching these issues – public policy issues with AV and ADAS technologies
- Groundwork for public policy positions on AV and ADAS technologies:
    - Safety is paramount
        - State Farm supports automated technologies
        - Seatbelts
        - Airbags
            - State Farm took the USDOT to the supreme court to force them to enforce airbag laws
        - Rearview cameras
        - Rear passenger detection – a technology that reminds the driver to take a child out of the backseat when they exit the vehicle
    - Insurer data access in critical
        - Not just for the insurance industry, other stakeholders as well
    - Standards should be set at national level – give authority to USDOT and NHTSA to look at uniform safety standards to build into vehicles, have a consistent approach across the country
        - AVs being developed now is a race to the bottom – some states are allowing a 'free for all' testing environment, test wherever you want… this can lead to unsafe outcomes
        - Other states, like WA and CA, are more focused on balancing innovation and safety
        - States have an important role in rollout of AVs
            - As we move into a future state with higher levels of AV, we can create a parallel
                - States manage vehicle licensing, driver licensing, state regulatory schemes, regulating insurance – keep that structure
    - Is there a need to move forward changing any liability schemes or structures?
        - Courts are equipped to handle liability issues, see how the technology evolves before rushing to create a new liability structure
        - No fault system? Victim compensation fund?
            - Not enough AVs on road to make those determinations
            - Want to be careful to not create a bad liability system in efforts to encourage innovation
        - Data security and privacy standards must adapt to the reality of AVs

        - Happening now with cars on roads
    - Focus on human factors
        - Continue focusing on the impacts of human factors, the interplay between human and technology
        - This is a really big issue, causing State Farm concern and where we are focusing a lot of research efforts
        - In a survey, 64% of respondents indicated they would be more likely to engage in at least one secondary task when the vehicle is driving itself compared to when they are driving
        - Not focusing on road activities, potentially critical safety issues
            - Phone
            - Videos
            - Nap
        - State Farm 2016 and 2018 AV survey
        - Not just a Level 4 and 5 issue – this is impacting vehicles on roads today
        - This will be a huge issue in Level 3 vehicles
        - Vehicle could do driving 90%+ of the time, there is a good chance the driver is not paying attention
    - Survey asked participants theoretically, how do you think you are going to act and engage? There are enough vehicles on the road now that people have actually interacted with this technology and are using it
- Recent research…
    - State Farm conducted a national survey with a little over 1,000 primary decision makers (for insurance) who have a valid drivers license
    - Among those with or without ACC or LKA, the percentage of survey respondents who said they "frequently" or "sometimes" engage in this behavior while driving was astonishing
        - Reading or sending text messages
            - With ACC: 62%; Without ACC: 49%
            - With LKA: 62%; Without LKA 51%
        - Interacting with cell phone apps
            - With ACC: 56%; Without ACC: 42%
            - With LKA: 54%; Without LKA 44%
        - Manually entering a phone number
            - With ACC: 52%; Without ACC: 38%
            - With LKA: 56%; Without LKA 38%
        - Holding the phone while talking
            - With ACC: 60%; Without ACC: 50%
            - With LKA: 42%; Without LKA %

        - Using video chat on cell phone
            - With ACC: 39%; Without ACC: 19%
            - With LKA: 42%; Without LKA 20%
    - Respondents know they are being surveyed by an insurance company and are admitting this
    - This is a reality – consumer education is needed
    - How does this inform us with Level 2 and Level 3 vehicles with ADAS features?
        - Car company may call ADAS "self-driving" or "auto pilot", however the driver is still expected to engage with the vehicle
        - For Level 2 and Level 3 vehicles, the human operator is still responsible for everything, and for taking control back over in the case of a safety critical situation
        - How long does it take someone to engage back into the task of driving a vehicle if there is a safety critical situation?
            - The driver must recognize what is going on, take back control, and make appropriate decisions
            - State Farm partnered with Virginia Tech to explore this and found that it can take anywhere from 15 seconds to 2 minutes for a driver to reorient themselves and take control of the vehicle back
            - Research was done on a test track, where a vehicle was equipped with Level 4 automated technology and cameras installed; people were paid just to try to pay attention to the road while the vehicle drove in automated mode on the test track
                - The only job for these participants were to sit in the driver's seat and pay attention to the road
                - After about 15 minutes, most participants found it very difficult to pay attention
                - Drivers were looking around, nodding off, not stating engaged
    - State Farm has its own enterprise research team and research facility to test out technology and look at these issues, able to partner with impressive research universities
    - Current driving automation features require human monitoring of automation
        - Drivers of those vehicles are inclined to engage in other tasks and take longer and more frequent glances away from the roadway
        - From the insurance industry perspective, this is a big concern and has real world impacts – if the technology is not calibrated correctly, if more driving tasks are occupied by the vehicle and the driver is not paying attention, that is a big concern from a liability perspective – who is liable in the event of a crash?
        - For Level 4 and 5 AVs, the assumption is that liability will move more into the product liability space, whereas lower levels of automation are going to cause discussions about what liability looks like and how human factors play into things

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- Data Access
  - Type of data created and retrievable from advanced driver systems (ADS) and ADAS are necessary for event reconstruction and liability assessment, proper pricing and underwriting of vehicles
  - Accessibility is important to the general population, determine the safety and reliability of AV technology
  - Insurers need access to data timely, complete and useful
  - Availability standardized to the extent providers sharing data in the same way
  - Data created by AVs falls under 4 categories
    - Vehicle control – what the ADS did
    - Saliency – What ADS thought was important
    - Sensing – What the sensors saw
    - General parameters
  - In late 2018, State Farm started a sponsored engagement with Carnegie Mellon to test automated vehicle functionality in various situations
    - Testing the approach to handle information relevant to crashes
    - ADS event data recorders were used, with the last 5 to 10 minutes of driving data were retained. The ADS event data recorders included:
      - Individual sensor data (static and moving obstacles)
      - Forwarding looking and in-cabin views
      - Sensor fusion outputs (obstacle classification)
      - Localization – where the vehicle is it terms of latitude and longitude
      - Driving context – at intersection, lane change, speed, etc.
      - Decision-making – traffic light status, slowing down
      - Current and planned path and speed profiles
      - Health status of hardware and software tasks
      - V2X communications
- Critical information for crash investigation, crash records, causation, this data needs to be made timely available to insurers and law enforcement
- Example: Recent Tiger Woods accident
  - Vehicle's data recorder stated the vehicle was speeding at 82MPH, the posted speed limit was 45MPH
  - No steering input and no brake application in timeframe prior to the crash
  - Data was provided to the insurer in a non-proprietary format
- Need relevant data for liability, insurers, underwriters, etc.; respecting proprietary data and identifying only data variables that are consistent with the types of data available in today's vehicles
- In May 2019, the Governor's Highway Safety Association (GHSA) and State Farm hosted an interdisciplinary panel on traffic safety education and law enforcement amid the advent of AV technology

    - After the panel, a white paper was published with recommendations for state highway safety offices and the broader safety community
    - White paper documented key issues that AV raise and recommends what to do to prepare
    - This AV Work Group and Subcommittee is already doing some of the recommendations
    - Recommendations included:
        - Develop and deploy safety messages
        - Maintain focus on today's ongoing traffic safety challenges
        - Develop and deploy uniform policy and training for first responders, police, court officials responding to and investigating AV crashes
- Conclusion – AV issues are complex, and require:
    - Collaboration
    - Clear, consistent, accurate information on AVs
    - Consistency across states on how they regulate
    - Consistency across AV developers on how they operate
    - Cooperation to deduce training
    - Performance standards
    - Standard set of necessary data
- Early April 2021, State Farm responded to the NHTSA notice of rulemaking safety framework
- State Farm is working with the GHSA on AV research, putting together other research, more to come
    - Expect to publish in August or September 2021, in conjunction with annual meeting

Topic closed.

PAVEMENT MARKINGS

Doug McClanahan, WSDOT

- Pavement markings to support machine vision systems
- Pavement markings help people stay on the road, helps driving assistive technologies as well
- WSDOT is changing their mindset – treating delineation as more than just a maintenance function, but also important for preservation, safety, operations, efficiency, economics
    - There are many stakeholders, not just maintenance, but funding comes from just maintenance
    - Pavement markings are an operational need, not just a maintenance requirement
- Presenter drove an ADAS-enabled vehicle across the US and found one of the technology limitations – how it read pavement markings, it kept wanting to take off-ramps when on highways, thinking it was following the correct line marking

  - This brought forward a recommended change in WSDOT pavement marking plans, and WSDOT has already implemented the change – adding chevron markings in the neutral area
- One pavement marking change from Manual on Uniform Traffic Control Devices (MUTCD) that WSDOT is reconsidering is wider lines for higher speeds
  - Standard is 6 inches, with 8-inch wider lines for higher speeds
  - Having wider edge lines indicates a huge return on investment in increasing the obviousness of the line with an 80:1 benefit cost
  - An alternative to wider lines is to instead focus on constrast – make the standard line brighter and easier to see even when wet
    - Technology is available now by vendors for "beads" (elements) that can work even when wet or recovering from a wet condition
    - More expensive, but there is a night and day difference
    - Auto manufacturers are also looking at other potential ways to detect markings, such as thermal
- Have conducted some early work to understand materials needs to increase the obviousness of lines
  - Numbers are relatively small
  - Need funding first, then equipment and training for field
  - More things to consider than just numbers for materials only
- Updates in pavement markings can support Target Zero, supporting crash reduction – may be the highest cost to benefit ratio, 78:1
- Next steps
  - Review and comment on MUTCD notice of proposed rulemaking
  - WA State MUTCD adoption
  - In depth review of current pavement marking maintenance and asset management
  - Right place, right time – the cost is high but coming down rapidly and such high benefit cost ratio
  - Construction team is on board to do 2 or 3 projects with the new materials to see how the crews react, how the product lasts, etc. – those projects are being setup now
- Discussion:
  - For WSDOT's purview, this would apply to WSDOT-maintained roadways, state and federal
  - Local agencies may take this on as well, WSDOT/the State can show leadership
    - Procurement - When the state goes out for contracts with suppliers, cities can buy from the same contract the state sets up through volume purchasing
    - Many local agencies are not waiting for the state and are moving forward with all-weather elements and tapes, such as Olympia who has lots of new tape form materials for pavement markings
  - Sometimes there are no pavement markings in the first place
  - Infrastructure & Systems Subcommittee put forward two recommendations last year – one for enhanced pavement markings and one for work zone data

- Need support for this, need champions – funding is an issue to move these recommendations forward, even though they are small projects
- Need to find resources for these types of improvements
- These improvements are not just for Level 4 and 5 AVs, this benefits everyone today

Topic closed.

WHAT THE HECK IS LEVEL 3?

Roger Lanctot, Strategy Analytics

- Real world view of what is happening on the road, thinking of auto makers and supplier community bringing these systems to market
- Semi-autonomous experience we are seeing today, what is coming to market, a lot is confusing – each automaker takes a different approach to semi-auto value proposition
- Ultimate the objective is to make roads safer, to save lives. There are currently 100 fatalities per day.
- US is fourth in the world for fatalities on highways; fatality rates are twice as high as Europe
- First point of confusion – SAE J3016 levels of vehicle automation
    - Levels 0 (zero), 1 or 2, eyes on, hands on, in control
    - Level 3 eyes on, maybe hands off
    - Level 4 eyes off, hands off
    - Level 5 no driver
- Level 2+ vehicles should require a briefing/training when you purchase the vehicle
    - Highly unlikely features and functions work identically from car to car
- United Nations and European regulators are pursuing a value proposition to require minimum expected performance elements, even for semi-automated technology
- GM SuperCruise self-driving technology manages driver attentiveness – If driver's eyes are on the road, they can take their hands off the wheel, if they stop paying attention to the road they are required to place their hands back on the wheel
- Driver monitoring means different things to different car companies…
    - Where your eyes are fixed
    - Some driver monitoring doesn't have a tool to monitor your eyes, may not be configured adequately to fulfill function required
    - Non-trivial value proposition
- Toyota TeamMate just announced
        - This follows a different philosophy
        - Safety top priority, ultimate goal of reducing fatalities
        - Is it ready for market? What does it actually mean / do?

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- Automakers are struggling to deliver technology to the marketplace related to the angling and positioning of the vehicle – elements of u-blocks, trimble, swift nav, here maps, lidar map scan from usher…all designed to determine where the vehicle is…a very specific application, very complex enabling technology, very expensive
- 100 vehicles under a leasing arrangement in Japan, true Level 3 vehicles with speed limited to 50KPH
    - Can take hands off the wheel and turn your attention away
    - Of the care says driver must take back control, it gives you 30 seconds to retake control
        - A lot can happen in that 30 seconds – Manufacturer would be liable
- 2021 Genesis GV80 that Tiger Woods was driving had highway driving assist, automatic emergency braking, collision avoidance
    - Were those features turned on or available on that type of road?
    - Was Tiger conscious when he left the roadway?
        - Solutions in Europe are being worked on for driver incapacitation
    - We have the technology to prevent this from happening
    - Need more of this technology, not less
- Ford BlueCruise just announced
- Tesla has introduced the collaborative driving experience
    - Full self-driving activated – When approaching a stoplight the Tesla uses the human driver as a sensor, asking it for inputs/feedback
    - If you try certain things in a Tesla when in self-driving mode, the vehicle slows down and stops – Open the door at high speeds, take off seatbelt
- United Nations Economic Commission for Europe (UNECE) is developing acceptable Level 3 scenarios
    - Euro NCAP 2023/2024…requiring driver monitor in the vehicle if they want to get a 5-star safety rating
- Carmakers are trying to monetize expensive development efforts around AVs
    - Robotaxis proving more difficult than originally anticipated
    - Av shuttles in defined routes is a limited opportunity
    - Trying to bring to market a semi-autonomous proposition, something they can charge for
    - All of these systems come with a driver monitor
    - More automation in the vehicle may actually force the driver to pay more attention, requires active engagement
        - Collaborative driving: Pay attention, fully engaged experience – may be a more engaging experience than a non automated vehicle
- Regulators around the world are recognizing need for teleoperations, remote operations, etc. – vehicles can get into situations where it is needed, such as recovery from emergency situations

Topic closed.

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PUBLIC COMMENT AND OPEN DISCUSSION

Debi Besser

- Public comment
  - *No public comment*
- Open discussion:
  - Many of the topics we are discussing are issues on the roadways today, not just for future AVs
  - Familiarity with and understanding of ADAS is a bridge to AV education
  - Are AV developers considering / planning fort he need for an AV to be programmed to pull over to the side of the road when emergency vehicles with flashing lights are behind them?
    - Yes, at least some AV developers are planning for this scenario. The AV industry is fragmented, some may be including while others are not.
    - Some AV developers are combining autonomy development with remote assistance capabilities in case the autonomy system fails an action and/or a remote operator needs to take over
      - This type of item is considered in AV Law Enforcement Interaction Plans
      - There is a growing awareness and appreciation for Law Enforcement's engagement with AVs
        - Voice recognition capabilities to recognize a police siren
        - Enhanced reporting of vehicle data from a collision scene
        - Turning on vehicle cameras to see the state of a passenger
      - Law Enforcement Interaction Plans bridge the gap for Law Enforcement when they have questions about the technology
        - A document is helpful, but only to those in the office, not those in the field
        - Possible to offer in-person training, such as what Waymo has done, allowing Law Enforcement to come kick the tires, see the vehicles, understand where documentation is within the vehicle, where the killswitch is located, etc.
  - Considering there are currently no AV-specific regulations for assigning fault in Washington, in the case of a violation or collision, officers on the scene would still hold the person in the driver seat responsible even if the vehicle was in 'autonomous' mode at the time of the incident

MEETING ADJOURNED

Next AV Safety Subcommittee meeting:
Wednesday, May 12, 2021 @ 10 am