WASHINGTON STATE
AUTONOMOUS VEHICLE
WORK GROUP

MEETING MINUTES

Meeting: Infrastructure & Systems Subcommittee

Location: WSDOT Headquarters, Olympia

Date: October 2, 2018

Time: 9am-noon

Attendees:

(See separate attachment)

Discussion Items:

1. **Welcome and Introductions** (Roger Millar, WSDOT):

- Washington State Department of Transportation (WSDOT) Secretary Roger Millar provided an overview of the importance that preparing for "Autonomous" or Connected and Automated Vehicles requires a broader perspective of the transportation system and services. The transportation system's challenges require broader and multifaceted thinking and solutions, including automated and connected transportation, it's not just about the vehicles. Automation will affect all systems and modes. Automation will involve all partners, private and public.

  :

  a. Traffic fatalities on Washington roads continuing to increase. Increasing safety of the traveling public and WSDOT workforce remains WSDOT's #1 priority
  b. If developed and implemented through a guiding policy framework with regulations that don't inhibit innovation, but protect against the risks, these new technologies have many potential benefits such as:
     I. **(Safety)** Reducing the 94% of crashes that are caused by human error
     II. **(Mobility/Equity)** Increasing the mobility for those that can no longer drive, which will have a positive impact on social independence and quality of life.
     III. **(Sustainability/Environment**) A proactive policy framework is needed if we want to significantly improve the sustainability of our transportation system by increasing vehicle occupancy, enabling the seamless connection from one

transportation mode to another, maximizing the use of the existing infrastructure footprint.

IV. **(Time saving)** We focus on the possibility of time saving in the hopes that we can all continue the same travel and commuting behaviors. Reclaiming our ability to work, play, sleep, eat and text while our fully autonomous vehicle(s) takes care of the rest as we drive from the distant areas to our chosen location may come to fruition, but it misses the near term opportunities that "Highly" Automated Vehicles bring today, while raising concerns that we may need to give up that vintage car or the JOY of vehicle ownership.

2. **Setting the Stage** (Roger Millar, WSDOT):

   Secretary Millar discussed the role of the Washington AV Workgroup Infrastructure and Systems Subcommittee:

   a. Open discussion/sounding board to make recommendations to the Washington State AV Work Group Executive Committee and the subcommittees intention to develop a 2019 action plan
   b. Role/approach of subcommittee:
      i. The group is intended to be a discussion forum - a place where information goes out from the state to the constituents
      ii. Goal is not to get to consensus, and voting on recommendations will not take place
      iii. Record and capture all ideas so that decision makers are aware of them and take them into consideration
   c. Next meeting of the subcommittee will be December 14
   d. Prior to the next meeting the intent is to circulate a high level 2019 action plan for subcommittee working group member review and comment.
   e. Secretary Millar provided context for the shifting model of transportation and mobility, and defined the concept of Cooperative Automated Transportation (CAT) and the need for a guiding, proactive CAT policy framework (see attached for complete transcript).

3. **Open Discussion** (Facilitated by Roger Millar, WSDOT)
   a. Do we have the right people around the table? Who is missing?
      i. The group weighed in on this question in reviewing the roster:
         1. Advertising – info/entertainment in cars/taxis/etc. Advertising on transit systems. Buses, billboards. Permitting of advertising and where technology is taking us. Social media aspect and media not really discussed in regard to AV. People wanting to sell you stuff. GRS5G want to pitch you while you are in your car…is it safe?
         2. Front and Center. One America
         3. Include Regional WSDOT personnel

4. Equity Groups
5. Mobility companies (Lyft, Uber, ReachNow) TNC
6. Auto Alliance
7. Academic/University System
8. ASCE Impact Committee – Advertising
9. School boards and real estate developers
10. Tech companies (Microsoft, Google) Challenge Seattle outreach
11. "What is the goal, focused objectives to ensure we attain something that moves the needle."
12. FMCSA – Other Modal
13. TNCs that are running bikeshare, etc.
14. Private carriers that deal with large employers
15. Open call"

b. Are any organizations and/or interest groups over Or under represented?
    i. No specific responses to this question.

4. **Creating a Picture of Cooperative Automated Transportation System** (Les Jacobson, WSP; Ted Bailey, WSDOT)
    a. Les Jacobson provided an overview of CAT technology and Federal action surrounding CAT
    b. Ted Bailey discussed CAT activities in Washington
    c. Les Jacobson presented an overview of Washington State's CAT framework, and the activities of the other subcommittees
    d. See attached transcript for additional details.

5. **Identifying a 2019 Action Plan** (Ted Bailey and Daniela Bremmer, WSDOT)

Ted Bailey and Daniela Bremmer presented survey results from a survey of subcommittee members and interested parties (there were 53 invitations sent, with 42 responses)

i. How would you categorize your understanding of the Autonomous/Automated Vehicle (AV) and Connected Vehicles (CV) subject area on a scale from 1 to 100?
    ii. Average score of 64 (1 = needs a detailed primer
    iii. 100 = Could instruct a CV / AV 101 course)
    iv.
    v. 14 responses of 80 or higher
    vi. 2/3 have experience working in area of AV and CV
vii. Enabling Policy & Program Survey Results:
    i. 30 members want to develop a strategic plan or policy framework
    ii. 21 members want to develop protocol testing on public roads
    iii. 11 members want to develop a AV/CV grant program
    iv. 6 members want Public outreach and education

v. 8 members suggested other options

viii. Near Term Pilots & Deployments Survey – "**Other Ideas" Submitted in the Survey**:

i. Need for Regulatory Framework

1. Develop a program for Cities and Counties to coordinate with the State in establishing local regulatory frameworks for AV/CV testing, pilots, and deployment
2. Support for local jurisdictions, consistent regulatory framework
3. Protocols and requirements not just for testing of AV technology but also applications of AV technology.
    i. (Examples: zero occupancy tax, sliding scale VMT etc. to ensure that AVs improve transportation without adding # of vehicles, VMT and worsening congestion and energy use)
4. Safety requirements and infrastructure needs to prioritize safety.
5. Equity implications of AV technology
6. Open Data / Data Sharing / Cyber Security / Data Privacy
    i. Understanding what will happen to the data created by Autonomous Vehicles - will it be given to public agencies for study or use / will it stay within private AV companies / what are the legal, privacy, and protection implications for citizens?
7. Will infrastructure need to adapt to AV technology or will AV technology be perfected to adapt to the infrastructure?

ii. Need Funding for Transportation Infrastructure & Systems

1. Road Pricing

iii. Commute Trip Reduction Act

1. Cross-reference above with changes to state Commute Trip Reduction Act and include in corridor planning strategies

iv. Other Ideas Submitted in the Survey

1. Need for Regulatory Framework
2. Funding for Transportation Infrastructure & Systems
3. Commute Trip Reduction Act

ix. Near Term Pilots and Deployments Survey Results:

i. First/mile last mile connections to transit – 27 members
ii. Connected traffic signal timing information – 18 members
iii. SAE Level 1 driver Assisted Truck Platooning – 17 members
iv. On-Demand AV vanpools – 16 members
v. Low-speed AV shuttles – 15 members
vi. Expanding the electric vehicle charging network – 11 members
vii. Open data/data sharing – 9 members
viii. Automated bus braking and pedestrian detection – 8 members
ix. Traffic and signal priority for pedestrians and bicyclists – 8 members
x. Autonomous roadway construction zone safety trucks – 8 members

xi. Roadway machine readable signing and striping – 8 members
xii. HOV occupancy detection – 7 members
xiii. Other near-term implementation ideas? – 4 members
xiv. Bikeshare and E-Bikes – 3 members
xv. Use of small unmanned aerial systems – 3 members
xvi. Use of drones for vegetation management – 0 members
xvii. Roadway winter operations info through the cloud – 0 members

x. Near Term Pilots and Deployments Survey – "**other ideas" submitted through the survey:**
i. Data privacy and security
ii. Bus platooning to create a "true" BRT (rail on surface) for buses as well as AV buses
iii. Campus bus automation

xi. Enabling policies and programs:
i. AASHTO CAT ELT will have a compendium of best practices I the near future. Different states/different places. Take advantage of what other people/places are doing.
ii. Enabling Legislation to enable On-Road testing

6. Open Group Discussion (Facilitated by Roger Millar, WSDOT):

Secretary Millar facilitated a group discussion around the following central questions based on the previous presentation and discussion:

Given everything we have presented and discussed:

- Does this resonate with how your organization is preparing?
- Do we have the right people around the table?
- Are any organizations and/or interest groups over OR under represented?

The following are the remarks captured from attendees during that discussion:

a. How do we discourage from driving SOV (AV) and encourage shared AV to prevent plugging up the roadways? Reduce congestion.
b. How much should be left to the Federal Government (Avoid the patchwork of State Legislative). What is the state role versus local role versus federal role?
i. Regulate infrastructure, not how to build the vehicle
c. States need to have a voice in the DSRC vs 5G discussion
d. The State of California came forward with pretty thick stack of statutes – too much legislation too soon
e. Broad policy framework will take years to develop. Timing of Policy Framework alongside other work. How do we T-up near term actions while parallel processing near term actions (grant funding).

f. How do we engage citizens, private groups?
g. WA State has maintained a "light touch" approach for on-road testing
h. Are there test plans in place for DSRC vs 5G?
i. What do our roadways of the future look like? Infrastructure of our roadways is how we make everyone safer.
    i. Focus on what our roadways look like "urban centers" protected bike lanes and wide sidewalks.
    ii. What are the existing collision and friction points on our current roadways?
    iii. Need to spend more on future infrastructure, but still have the problem with funding presently
j. Walkable urbanism, how does tech fit in?
k. Collaboration of regional working groups from other states that have similar practices. How to bring the best practices of each state together. Cooperation and Collaboration – national organizations
    i. Goal is to bring Nationwide information back
l. Vulnerable road users. How are AVs going to interact with vulnerable road users (infrastructure side). Highlighted by testing that is already underway. (Something this subcommittee should focus on)
m. Curb space is going to be competitive/valuable. Privatize curb space to generate funding for grant program (P3), Curb space use policy in general (managing/pricing).
n. Think about range of use cases for AV. Delivering food, clothing, etc. (*ODOT has published a range of use cases). Think bigger than the cars
o. Think about who benefits and who pays. Analysis should be done with minimum appropriate set of data for policy decision making.
    i. Missed opportunity. What we want from the data. Lessons learned. Establish set of metrics across all the testing.
p. On the Connected side what can we do to "set ourselves up"
q. Focus on EV charging capacity statewide. 10-year life of charging stations. Proofing and prepping for end of life cycle of EV charging stations and replacement of facilities and updating when tech updates.
r. Make infrastructure investments through a lens of equity. How are we making sure that when we are funding grant programs for striping, etc. that they are equally/fairly funded.
s. How integrated is this discussion with "community planning"? Study and quantify changes in behavior.
t. EV grid deployment. AV/EV are tied together. What if we focused on producing MaaS that enhanced the connection of technologies that are in place and operational today.
u. Short term legislation: relative to curb space
v. Employers incentivized to use mass transit/AV/etc. Have them look towards the future. CTR
w. Short sighted to think we don't need to invest in highways. Land use. Add capacity.

x. What are other states are doing to get ready for infrastructure (specifically the ones that are considered leaders)
    i. Focus on the basics (leveraging what IOO (agencies) are already doing effectively)
    ii. During the last legislative session WSDOT requested an increase to Maintenance signing and striping budgets
y. Open sourced data system. DSRC. Fiber optic system. Building stage for the future for fiber optic. Fiber optic cables in R/W
z. Don't want states (IOO) to "Gold Plate" their infrastructure prior to testing. We don't want to just test these vehicles on under perfect conditions. Need to take in account what we the current conditions and what the future conditions are. Shouldn't be a limiting factor.
aa. The infrastructure "status" issue is why some are focused on drone technology
bb. Government understanding private vehicle ownership. Understanding the patterns of Private Vehicle Ownership/Use
cc. WA State needs to be ready for both a SOV / Shared Mobility futures and on-AV / AV transition period
dd. Concerns over potential for VMT increases
    i. Encouraging/enabling private sector investment while protecting the publics interests.
ee. Infrastructure investments need to be reality based
ff. How are we going to pay for infrastructure (VP by TOD, RUC) – should be on the Work Plan agenda
gg. Crash data recording (get more data from the vehicles). Traffic data reporting
hh. AV/CV – How do we really focus the conversation, near tm actions, start with tangible list
ii. Get private sector involvement since they are building/developing the future
jj. Suggest – Take 1-3 applications or use cases
    i. AV Shuttle, Bellevue Commute Pool
    ii. Roads, EV Charging, R/W Curb Space, Actual Service Delivery
    iii. Trucking Use Case
    iv. Successfully deliver used cases by the end of 2019
kk. Systems/software issues at Intersections
ll. Somewhere in this "need to look at the larger costs to Society"
    i. Health costs
    ii. Movie Wall-E (ATD)
    iii. Building for what we want more of
mm. Future proofing (use of Shoulder, Fiber resiliency)
nn. Dividing focusing what professional organizations are focused on
oo. What are the goals of what we want to focus on (Prep for Dec 14th meeting) – DRAFT CAT Policy framework with some metrics?

pp. Several subcommittee members suggested to focus on two or three feasible and actionable ideas for 2019 and to resist the temptation of taking on too much initially.

7. **Next Steps/Closing Remarks** (Roger Millar, WSDOT):
    a. Prepare a subcommittee progress report for the WA State AV WG Executive committee meeting on October 24th
    b. Prepare a draft 2019 Action Plan for subcommittee input prior to the next meeting on December 14th
        i. Secretary Millar indicated that, as suggested by various members, the work plan is intended to be specific, focusing on three key areas which are achievable and represent needs identified through the subcommittee survey and today's discussion.

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MEETING TRANSCRIPT OF PRESENTATIONS

ATTACHMENT

Slide 4: Do our old standards meet today's demands?

a. Old model? Still viable
b. We have prioritized vehicles over people
    i. This has caused a high cost and demand for roadways
    ii. Within a short time, that capacity is used up. This is called "induced demand" or "latent demand" as Increased roadway capacity entices land development sprawl and new traffic to use the facility.
    iii. Resulting in congestion levels same as before investment

Slide 5: New way to look at transportation system:

a. Vehicle is just a part of the system. Need to think how vehicle fits into the system instead of just the vehicle. Otherwise we miss out on harnessing the full capabilities of everything.
b. Implementation of connected and automated vehicles and application of shared mobility principles, we can vastly increase the person-carrying capacity of our roadways within the same footprint
c. Don't replace human driver with robot; rather harness technologies for a more sustainable future
d. Reduce pressure on transportation system caused by sprawling development
e. Minimize congestion
f. Reduce vehicle miles as people live closer/work closer together
g. Focus on first/last mile solutions that integrate with public transportation investments
h. Shared mobility encourage/maybe incentivized.

Slide 6: Preparing for "Autonomous" or Connected and Automated Vehicles requires a broader perspective

a. Require broader and multi-faceted thinking and solutions
b. Automation will affect all systems and modes
c. Automation will involve all partners, private and public

Slide 7: Cooperative Automated Transportation (CAT):

a. Looking at entire system, not just the vehicle. Integrated system
    i. Cooperative: It indicates all systems and modes work together. Deploying technology to encourage all modes of transportation to work

in concert to provide travelers a safe, sustainable, and integrated multimodal transportation system.

ii. Automated: It applies to automating all transportation types and "autonomous" indicates independents and not interdependent. By automating some or all of the functions of or access to various vehicle types (automobile, van, plane, truck, bus, rail, ferry, bicycle, scooter, etc.), traffic management systems, integrated multimodal trip planning and pavement systems along with other functions of the transportation system will greatly improve our collective ability to leverage our limited funding to get the most capacity and safety out of the entire multimodal transportation system.

iii. Transportation: Indicate inclusion of all modes and systems. The entire transportation system working together (vehicles, infrastructure, modes, services, etc.) to provide safe, reliable and cost-effective transportation options to make our communities more livable, improve economic vitality, and improve the safety of our entire multimodal transportation system.

b. Why do we need a CAT Policy Framework?
    i. Connected and automated transportation has the promise to radically change and improve the mobility, safety and efficiency of Washington's transportation system. However, there is also the potential for adding more systems users, hence for the technology to increase sprawl and congestion. This would further challenge our ability to establish a sustainable transportation system. But, at the same time, we want to enable the deployment of these transformative technologies for all the benefits they have to offer. This dilemma creates a need for careful consideration and further prompted the CAT policy framework development at WSDOT. In addition, this draft framework also provides the opportunity for engagement, dialogue and joint direction setting with our partners. The needs of our partners and the traveling public are diverse so we understand that a guiding policy framework needs to be developed in a collaborative and transparent manner.
c. CAV versus CAT

Slide 8: WSDOT's vision for CAT (S8)

a. Looking to integrate into the good planning and economy that WA has put into place. Do not see it as dependent. See it as connected with cities, and groups and general public.
b. A CAT Policy framework will guide strategic investments that will support an automated future, consistent with our vision of:

i. Increased livability,
ii. Economic development,
iii. Sustainable development patterns that encourages walking and biking.

Slide 9: WSDOT's Draft CAT Policy Goals:

a. Organization for innovation: Need to adapt the system to all of the innovations and continue to grow/develop. How to organize for innovation?
b. Shared mobility: Looking and community/state/nation not having a car sit idle and less parking and more curbside parking. Need to take that into account
c. Economic vitality and livability: Adapt technology for economic vitality and livability. Adapt traffic signals. Do we need signs? Ramp metering needed anymore if cars are smart? Don't need parking but rather more streets? Think of different contexts
d. Land use: Just for rich people or others? Address use for all different groups
e. Equity
f. Safety: 90% of crash that happen in WA are human error. Taking human error out of equation…no computer is perfect, and it is concerning. Can we use new technology to enhance and protect environment?
g. Environment
    i. Our draft policy framework proposes eight policy goals. These policy goals build on the Washington State's Six Statutory Policy Goals; and Results Washington, the Governor's Strategic Plan (WA State Transportation Policy Goals -RCW 47.04.280))
        1. Economic Vitality (Results WA: Prosperous Economy)
        2. Preservation
        3. Safety (Results WA: Healthy and Safe Communities)
        4. Mobility
        5. Environment (Results WA: Sustainable Energy and a Clean Environment)
        6. Stewardship
    ii. Results WSDOT, the agency's strategic plan, provides the vision, mission and values that guide the work of the agency and the CAT draft policy framework.
    iii. The CAT policy framework closely aligns with and supports the three focus areas of our strategic plan: – Inclusion, Practical Solutions and Workforce Development.
        7. Slide 10: Cooperative Automated Transportation (CAT) - See chart on slide
h. Green ones are the areas we are asked to look at. Is this list complete or does it needed to be expanded? How we use this in winter operations. Autonomous Truck mounted attenuator. HOV Occupancy Detection. Data and data sharing…private sector sharing a lot

i. Driver assistive truck platooning
j. Bike share/e-bikes
k. Unmanned aerial systems (amazon package delivery - drones). Also moving people using drones. Can they go over your backyard?
l. First/last mile (AV Shuttles) – need more park and ride spots. Best park & ride is your own garage. Bring first/last mile for pub transit
m. AV On-Demand Flexible
n. Looking at all areas
o. Automated or "Autonomous", Connected, Electric, Shared Vehicles are all part of the broader MaaS / MOD Ecosystem that we believe fits under the umbrella of Cooperative Automated Transportation

Creating a Picture of Cooperative Automated Transportation System

ii. Slide 13: A Connected Automated Vehicle is one component of CAT:
    i. Difference between a connected vehicle and autonomous vehicles:
        1. Connected vehicles are NOT automated but communicate with nearby vehicles and the infrastructure
            i. The most standardized and developed technology for this type of Vehicle to Vehicle and Vehicle to Infrastructure Communication is DSRC – Dedicated Short Range Communication using the 5.9Ghz band
        2. Autonomous vehicles are NOT connected but operate on the roadway using sensors, Global Positioning Systems (GPS), high definition mapping systems and other technologies to operate in isolation from other vehicles.
    ii. From WSDOTs perspective *"Autonomous" implies independence, when in reality all of the parts of the transportation system are interdependent."*
    iii. A connected car be AV or electric, but it doesn't have to be. Fully AV uses internal sensors. Most benefit when you have fully connected AV. More cost effective and efficient.
iii. Slide 14: SAE – Six levels automation
    i. 0 – No automation (1967 Chevelle)
    ii. 1 – Driver assistance: Features such as cruise control, blind spot monitoring, lane departure warning, lane keeping, autonomous cruise control, automatic braking (1993 Accord)
    iii. 2 – Partial automation: or *Hands off the wheel, eyes on the road."* has certain modes in which the car can take over both the pedals AND the wheel, but only under certain conditions, and the **driver must maintain ultimate control** over the vehicle. (Tesla autopilot 2018)

iv. 3 – Conditional automation: Requires the human driver to be able to respond appropriately to a request to intervene and regain control of the vehicle and monitoring of the driving environment. (Uber self-driving car)
v. 4 – High automation: These systems fully automate the driving task under most conditions, but do not preclude the vehicle being operated by a human driver in unusual or emergency situations. (Waymo geofenced shuttle)
vi. 5 – Full automation: The only difference between Level 4 and 5 is now the vehicle can Automate the driving task under all conditions. (Waymo off-road shuttle)
    1. A Level 5 vehicle does not mean the vehicle won't have a steering wheel, the driver always retains the option to resume control of the vehicle.
vii. The industry needs to be mindful of using terms such as "Autopilot" and "Super cruise" and continue to educate drivers so the use of the technology aligns with the capability of the vehicle.
viii. SAE 1 & 2 can save lives

iv. Slide 15: Mobility as a service / Mobility on Demand:
    i. Bundling of all transportation needs through a single operator. Having a payment device that can pay for all services through one account. One account manager
    ii. MaaS has the potential to change how we think about mobility, how we pay for it, how we consume it, and how governments collect revenue to support it.
    iii. Go Monrovia– City using Lyft and Lime as package for transit anywhere in city. Rides are subsidized by city at 50 cents for shared ride and $3 for personal and happen straight through Lyft app. Lime is still separate app, but promoted through same program.
    iv. Whim is best example of true MaaS– bundled services, all available at different subscriptions via one app that allows trip planning and payment
v. Slide 16: Automated:
    i. Commercial availability of Level 2 technologies. Lot of options that can do automated functions/driver assist options/are commercially available today.
    ii. Truck platooning and AV freight: Freight operators can reduce cost. Only first driver has to be on while other drivers are off. Can cover more ground/less drivers. This is being tested and is nearing deployment (SAE Level 1).

iii. AV proving grounds: Lot of private and DOT. (Level 4) have been piloted and deployed in a number of locations around the US and internationally.
iv. AV shuttle deployments: Silicon Valley, City of Columbus. Drones and delivery robots. Cusp of being commercial
v. Automation extends beyond just passenger vehicles – drones, delivery robots, etc. are all examples of automation which are increasingly extending into our cities.

vi. Slide 17: Connected:
    i. Connected with anything. Test and pilot these things. Phase and timing of Spat Challenge.
        1. Communication technology set aside in early 2000s. Low latency and unreliable. Now 5 G…do we really need DSRC. DSRC is short range and need antennas all over. Debate continues between DSRC technology and emerging cellular-based standards (C-V2X), with the industry looking for migration pathways between the two.
        2. A large number of states are joining the Signal Phase and Timing (SPaT) challenge, a call to action for all 50 states to deploy at least 20 SPaT-enabled signal locations by 2020, a sign of strong state-level investment towards safety
        3. Smart cities and data: how we can use it to make cities more vibrant and further goals for cities including environmental justice. More than transp. Including power. The data availability from connected vehicles is more broadly being looked at as part of the Smart Cities ecosystem – how can such data be leveraged and fused with other data to improve overall municipal systems efficiency?

vii. Slide 18: Electric:
    i. EV in the AV ecosystem
        1. Not directly related to CAT, vehicle electrification is highly intertwined with the development of AV
        2. More efficient, helps environmental side
        3. Vast majority of AVs under development are on an electric vehicle platform
        4. EV is seen as essential for AVs operating in fleets, thereby reducing the cost of maintenance and the down-time for vehicle operation
    ii. EV infrastructure (fixed and inductive charging)

1. Need to plan for that. Look at overall and ecosystem. Reduce reliance on oil and the emissions it generates. Lot EV infrastructure needed.
2. Lot of electrification initiatives and incentives. Higher speed/faster charging stations

iii. Electrification initiatives and incentives
1. Proliferation of EV will further drive changes to revenue streams for government agencies

viii. Slide 19: Shared:
i. Planned launches of AV taxi services.
1. First/last mile of transit
2. While shared mobility exists today, the addition of automation and connectivity is expected to lead to rapid expansion of shared mobility, by reducing costs
3. AV taxi services are planned by multiple automotive and technology developers, with some announced launches as soon as 2019

ii. Transit/TNC partnerships
1. TNC replace or supplement transit

iii. Carpool/vanpool programs
1. Those who can't drive
2. Reduce vehicle ownership

iv. Bikeshare/scooters/personal car share, etc.
1. Shared, on-demand mobility is expanding with new types of modes and vehicle form-factors, increasing options in urban areas for travel

ix. Slide 20: Driver-Assistive Truck Platooning:
i. As of September 2018, 17 states have made allowance for commercial deployment of driver-assistive truck platooning. Sixteen have passed legislation (Alabama, Arkansas, Georgia, Indiana, Kentucky, Louisiana, Michigan, Mississippi, Nevada, North Carolina, Oregon, South Carolina, Tennessee, Texas, Utah, and Wisconsin), and one has acted administratively (Ohio).
1. Big for enviro success and efficiency.

ii. Four other states (Arizona, Colorado, Florida, and New Mexico) allow limited commercial deployments of truck platooning.

iii. Three states (California, New York, and Virginia) allow for testing of truck platooning, with others expressing interest.

iv. Illinois and Pennsylvania currently have legislation pending which would allow full commercial deployment of truck platooning.
1. Things need to be addressed

x. Slide 21: Future uses for Public R/W:
    i. Leveraging the Public Right of Way Asset
        1. Opportunities here with regards to public right of way
        2. Telecom Partnerships (Long term lease agreements)
            i. 5G small cell deployment
                1. The evolution of 5G small cell technology will increase opportunities for partnership with telecom providers wishing to deploy infrastructure in the public r/w
            ii. Fiber optic truck lines to facilitate Smart City Applications
                1. WSDOT and other local agencies have received increasing requests to open up the R/W to install Fiberoptic cable for smart cities and other applications. There are partnership opportunities that could help offset / minimize future transportation system preservation costs, but the typical long-term lease agreement use to guide these types of partnerships may not be enough to protect the public R/W for future uses 50-100 years out. (For example, even if provided for in the lease agreement, will public agencies really be able to enforce a relocation clause 50 years from now if the fiber optic lines support multiple smart city applications in large markets?)

c. CAT in Action in Washington (slides 22-30):

i. Slide 22:
    i. We is greater than me. Football analogy
    ii. “Autonomous Vehicles” or “Connected Automated Vehicles” are just part of the picture when it comes to the transition of the Transportation System and Services.
    iii. It is important that we don’t lose the broader perspective and get distracted by all the technology and capability of the new vehicles themselves.

ii. Slide 23: Multimodal Transportation:
    i. Incorporating CAT Policy Goals into a guiding policy framework that will serve as reference point for short and long-term planning
    ii. Encouraging partnership
    iii. Reclaiming urban spaces
    iv. Equitable access to jobs and housing

v. Sustainable transportation system
    1. Considerable discussion and debate is still needed, but I believe we can all agree that our current transportation isn't equitable, isn't sustainable and we need to do something to guide the technology solutions toward addressing the growing needs rather than making things worse.

vi. WSDOT Draft CAT Policy Goals Appendix
    1. WSDOT Draft CAT Policy Goals
        i. Organizing for innovation
        ii. Shared mobility
        iii. Economic vitality and livability
        iv. Infrastructure and Context Sensitive street design
        v. Land use
        vi. Equity
        vii. Safety
        viii. Environment
    2. Organizing for innovation
        i. Draft CAT Policy Goal: Technologies associated with CAT provide the opportunity to revolutionize the way transportation systems are provided and maintained in Washington state. WSDOT should frame its deployment of CAT so it can flexibly and quickly adapt to changes in technology and transportation advancements to maintain its role as a national leader in this space.
    3. Share mobility
        i. Draft CAT Policy Goal: In order to minimize traffic congestion and urban sprawl with the deployment of CAT, WSDOT and its partners should encourage and incentivize shared mobility. Particular emphasis should be given to buttress effective and convenient high-capacity public transit.
    4. Economic vitality and livability
        i. Draft CAT Policy Goal: Implementation of CAT should enhance WSDOT's local partners' plans to enhance economic vitality and livability. WSDOT should emphasize automated, connected, and electric mobility to optimize system efficiency and provide greater and more direct access to jobs, economic centers, and other valued destinations.
    5. Infrastructure and Context Sensitive Street Design

i. Draft CAT Policy Goal: As we move into a future with increased autonomy and shared mobility, it is important to plan and design our transportation infrastructure with consideration for all modes. While balancing the needs of automated passenger vehicles, our transportation system will safely and efficiently accommodate pedestrians, bicyclists, public transportation, and freight.

6. Land use
    i. Draft CAT Policy Goal: The implementation of CAT should advance state, regional, and local land use goals. WSDOT is committed to encouraging development of dense, vibrant, and transit-oriented communities in urban areas while preserving and enhancing rural and resource lands. Implementation of CAT should not incentivize urban sprawl. Land use and growth management decisions implemented by state statue along with local government policies and ordinances will need to be coordinated in new ways in order to achieve the vision of this CAT policy framework.
7. Equity
    i. Draft CAT Policy Goal: Deployment of CAT should ensure the benefits of automated mobility are equitably distributed across all segments of the community and that the negative impacts of automated mobility are not disproportionately borne on traditionally marginalized geographic or demographic communities.
8. Safety
    i. Draft CAT Policy Goal: Advanced driving systems and highly automated vehicles will be deployed in a manner that increases the safety and security of the transportation system and its users.
9. Environment
    i. Draft CAT Policy Goal: Preserve and protect the environment through the implementation of CAT.

iii. Slide 24: Public Transportation:
    i. Pierce Transit has been piloting
        1. Automated pedestrian detection which has reduced pedestrian-related crashes

2. Use of subsidized transportation network company (TNC) trips first and last mile connections to and from transit centers and bus stops
3. Partnership with Lyft (seven-month negotiation to fill in gaps) – Transit system not providing enough services so Lyft fills in. Pierce has Grant but what happens when it runs. How to fill in gap. DOT create grant program. Finding other ways to fund grant opportunities
    i. Help relieve parking congestion by providing rides to and from Sound Transit's Puyallup Sounder Station and provide rides home at night for Pierce College Puyallup students.
    ii. Lyft rides will be provided at no cost to the rider in specific areas (or "zones") within Pierce Transit's service area, on certain days and at specific times of the day. See map and chart for details.

ii. WSDOT is exploring
1. Rural micro-transit, like flexible routing and/or flexible scheduling of automated minibuses in rural areas First/last mile connections
2. Ideally, new funding sources would be identified to establish a new Grant Program that could be modeled after the existing Commute Trip Innovations Grant (CTIG) program they already administer today.
3. These types of investments should be guidance by a CAT Policy Framework that we work to establish together.
4. Potential Grant Program
    i. Sanjay - Don't do services for free because grants run out and don't scramble to find more grant money/funding. At start have revenue stream that is fair. Roger - Transit agencies today to serve underserved populations. CIP versus operating solutions. Instead of building larger P&R look at first/last mile solutions. Give people choices. Sanjay – Failure with ORCA. Subsidies, more fair fares. Don't upcharge those can afford to give it free to those that can't. Make it fair.

iv. Slide 25: Multimodal Connection Hub:
i. Design of I-405 corridor and 85th St.
1. A three-tier interchange along an Interstate corridor in WA State (I-405 and 85th Street). The top tier will be the interstate

and the bottom tier the local street. The middle tier will be a multimodal hub accommodating pedestrian, transit, and shared mobility or automated vehicle drop-off/pickup locations.
2. The ability to accommodate shared mobility and automated vehicles was a planned and noted benefit of this alternative.
3. The project is still in scoping phase.

ii. Scott K - Adjusting project success metrics. Harmonize cost with possibility that use won't be as much as predicted.

v. Slide 26: Autonomous Truck Mounted Attenuator (ATMA) - Work Zone Safety:
   i. Low-speed striping operations.
      1. 40 attenuators impacts per a year in WA (Striping operations).
      2. WSDOT is participating in a pooled fund that is investigating the benefits of Autonomous Truck Mounted Attenuator Vehicles (A TMA)
      3. Very beneficial for work safety.
      4. The (A TMA) shown in the Bottom Left and Top Right pictures are manufactured by Royal Trucking Inc. using technology developed for the US Military by the Kratos company and Micro Systems Inc.
      5. The (A TMA) is equipped with technology that allows the vehicle to follow the lead pilot truck at a high degree of accuracy and variable following distances.
      6. Taking the driver out of the attenuator truck will increase the safety of WSDOT maintenance crews.
      7. WSDOT sent a Maintenance field crew to Colorado to explore their use of ATMAs as the technology exists today. The reports we very positive leading to discussion of considering piloting the use of (ATMAs for low speed roadway striping operations.

vi. Slide 27: Winter Roadway Operations:
   i. Connected Vehicle Winter Operations Pilot
      1. Tracked snowplows and their actions (For example, speed, blade movement, material application)
      2. The real-time data is shared through the cloud and with other data platforms
      3. This info is now available to be provided to a connected vehicle
   ii. In the future they are considering DSRC applications that would push Data Directly to Vehicles from the field equipment. In exchange, this field equipment would ideally obtain Basic Safety Message (BSM) for DSRC equipped vehicles traveling our mountain passes. The BSM includes information such, as traction control, breaking, wiper activity, and more than would benefit winter maintenance operations.

iii. Informing the Public – Weather Responsive Traffic Management
    1. Snow plow operations ahead
    2. Chains required
    3. Closing the roadway

vii. Slide 28: Machine Readable Signing and Striping –
    i. Use in rural setting to improve driving conditions and lower accidents
    ii. We are considering of improving roadway signing and stripping across the state. Every year a large number of our fatalities are rural run-off the road.
        1. A modest investment in pavement markings edge line alone coupled with the increased use of Level 2 vehicles on the road could make a significant impact in these types of collisions.
    iii. Vehicles that are on the road today are using signing and striping for speed monitoring, lane keeping and lane departure type driver assistive technologies.
        1. The improved signing may include coding that vehicle sensors can interpret.
    iv. For striping the current intention would be to use the same 4" stripe we install today with WSDOT Maintenance crews, it just may be a higher contrast stripe that is applied more often.

viii. Slide 29: Traffic Signal Operations – Communicating with the transportation infrastructure:
    i. The Traffic Operations Division is working to integrate 5G and DSRC technology to allow vehicles (including public transportation) to communicate with transportation infrastructure, such as traffic signals, to increase operational efficiency.
    ii. WSDOT is participating in the AASHTO SPaT (Signal Phase and Timing (SPaT) challenge which sets a target for all 50 states to implement technology improvements 20 traffic signal locations by 2020. This pilot will allow us to learn how to interpret and deploy this technology.
        1. There are 4 locations across Washington at 23 intersections are along
            i. SR 27, Spokane Valley (3)
            ii. SR 522, north of Lake Washington (10)
            iii. SR 305, Bainbridge Island (6)
            iv. SR 500, Vancouver (4)
        2. Using DSRC technology the SPaT message information is sent directly to nearby vehicles which is important for the low latency communications needed for vehicles to eventually act upon the information for braking and acceleration.

3. Using a Centralized System approach the SPaT message is sent to the cloud to where it can be consumed by connected vehicles using a heads up display in the vehicle, such as this Audi shown in the pictures. This 3rd party approach significantly reduces or eliminated the need for WSDOT to add roadside infrastructure for this CV technology.

iii. Trying to get all traffic signal timing shared through cloud. Bicyclist and 3rd party legal problems. DSRC: do it at a few places throughout the state

ix. Slide 30: EV Charging Infrastructure:

i. Uses a portion of the annual electric vehicle registration fee to provide matching grants

1. EV Registration Fee is $150 per year, only a portion of this fee goes to this grant program.

ii. $1 million in state funding used to encourage private sector investment for 15 new locations totaling $2.5 million

1. The charging stations are not on the highway they are located at highway interchanges at private businesses (shopping malls, fueling stations, etc.)

iii. $100M would complete the gap map with charging station(s) every 70 miles

d. National Framework Overview (slides 31-40):

i. Slide 31:

ii. Slide 32: Automobile History:

i. Transportation technology evolves quickly. At the 1900 New York City Easter Parade, only one automobile was present in a sea of horses and carriages. Just 13 years later, only one horse was present in a sea of automobiles. Revolutionary back then. Subtler today, but still big changes.

ii. The time to transition from today's fleet to the future of connected and automated vehicles is uncertain, full of variables and policy decisions, but one thing is for certain. Highly Automated Vehicles are entering the market rapidly, so we need to be proactive.

iii. Slide 33: So when will "Autonomous" Vehicles Arrive? – Ten competitors have publicly projected market dates between 2019 and 2022 for SAE Level 4 Vehicles:

i. Some things software might handle. We are 99.9% of the way there. Just need to climb Mt. Everest.

ii. According to some recent research completed through the WASHTO Emerging Leaders program, these 9 vehicle manufacturers are currently testing at various levels and have publicly projected market dates for

SAE Level 4 Vehicles that will be release to our roadways within the next 5 years.

1. Daimler - Level 4 AV by 2020
2. VW - Level 4 AV by 2020
3. BMW - Level 4 AV by 2021
4. Volvo - Level 4 AV by 2020
5. Delphi - Level 4 AV by 2022
6. Renault Nissan - Level 4 AV by 2020
7. GM - Level 4 AV by 2019
8. Hyundai – Level 4 AV by 2030
9. Fiat/Chrysler/Waymo Waymo-Fiat/Chrysler - Level 4 AV by 2019
10. Ford – Level 4 AV by 2021

iii. At the very least this means that in the coming years there will be increasing levels of highly automated vehicles on the roadways with varying levels of capability

iv. For example: Tesla has stated publicly their current models are SAE Level 5 ready today ……. from a hardware standpoint

v. What is missing? Software and consistent nationwide Legislation. This means:

vi. In the future, Tesla owners could be able to go to Level 5 with just a software upgrade.

vii. Telsa has stated publicly that their Level 2 vehicles on the road today are Level 5 ready from a hardware standpoint. This will allow them to provide higher levels of automation something as simple as an over the air software upgrade.

viii. Some conflicts that level 4 cars may not be able to handle. Driver still has to be engaged. Level 4s may be geofenced into certain areas. Tesla at level 2, to get to level 5 they just need to develop software and push to existing Teslas on road.

iv. Slide 34: National Efforts:

i. AASHTO

1. Created a multi-state working group on Connected and Autonomous Vehicles, focused on education, research, coordination, and technical guidance

ii. SAE

1. Set standards, such as for AV classification levels, and continues to teach courses, publish research, and provide information on technical aspects of CAV. They are holding more and more events in the AV space as well

iii. AAMVA

1. Utilized its working group to create guidelines for local and state jurisdictions who want to test and deploy level 4 and 5 AVs. Their guidelines include policy and technical recommendations

iv. Coalition for Future Mobility
    1. Includes dozens of private stakeholders and advocacy groups, including ITS America, Lyft, AUVSI, SAFE, automotive part manufacturers (such as tire companies) and various disability groups, pushing for advancement of federal legislation such as the AV START ACT, to promote benefits of AVs

v. Other national groups, including APTA, AARP, NACTO, and many others have formed working groups, research initiatives, and guidance around AVs

v. Slide 35: Federal Legislation:
    i. House (H 3388 SELF DRIVE Act) passed the full House and awaits Senate action
    ii. Senate Bill (S 1885 AV START Act) passed the Committee on Commerce, Science, and Transportation, but hasn't been brought to full vote of Senate yet
    iii. Open issues include whether or not to include trucks, the pre-emption language, and the FMVSS exemption numbers
    iv. Work continues behind the scenes to get the holds released and determine whether this bill stands alone or gets incorporated into an upcoming bill.
    v. Once it eventually passes the Senate, then a conference committee will be named to work out differences.
    vi. Some federal legislation that deals with more development of AV
        1. Some passed committee but hasn't been brought to full vote of Senate. Unclear when federal legislation will happen

vi. Slide 36: Federal Guidance:
    i. 2016 – Federal Automated Vehicles Policy
    ii. 2017 – Automated Driving Systems: A Vision for Safety 2.0
        1. The first two versions provided manufacturers with guidance on how the technology would be regulated by NHTSA and advised states on best practices for regulating them in their jurisdictions.
    iii. 2018/19 – version 3.0 will reportedly go beyond by incorporating other modes
        1. We expect truck, bus, motorcycles, and more
        2. Version 3.0 is anticipated in the next year, and is expected to incorporate other vehicle types

vii. Slide 37: Policy and Legislation:

i. State legislation and executive actions
    1. To date, 35 states and DC have passed legislation related to AV, signed executive orders, or both
    2. Much of this legislation is centered around allowable testing, and requirements for vehicle controls and occupants
ii. Emerging policy issues (parking, curb space, enforcement)
iii. See slide for graphic. Going across country and lot of states are getting very interested in this. Parking/curb space need to be dealt with

viii. Slide 38: Strategy, Guidance and Organization:
    i. Strategic planning for CAV/New Mobility
    ii. Best practices and guidance documents through national organizations
        1. Groups trying to improve
    iii. Establishment of CAV-specific offices within organizations
    iv. SPaT challenge
    v. Development of CAT-specific offices have occurred in a number of locations
        1. Organizations around the country are developing strategic planning for how to integrate CAT and emerging mobility solutions, and how to organize those efforts
        2. Marketing/branding around CAT efforts
    vi. Multi-agency work groups

ix. Slide 39: Policy Framework Efforts:
    i. San Francisco wanted to inventory existing mobility options and utilize performance metrics to ensure overall mobility system is getting the region closer to its goals
    ii. Los Angeles created the Urban Mobility strategy in a similar fashion, stressing the needs of the area and honing in on data standards for emerging mobility
        1. Lot of policy framework efforts in place
    iii. Both cities, and others who have undertaken this effort, utilize high-level policies to frame the mobility environment, then work to benchmark the information they have, create pilots and programs to gather new information, and metrics to evaluate their performance toward their goals

x. Slide 40: AASHTO CAT Policy, Legislative and Regulatory Work Group – Work Plan Priorities through June 2019:
    i. Secretary Millar Co-Chairs the AASHTO CAT Policy Legislative and Regulatory Work Group
    ii. Activity #1: Create a clearinghouse for sharing CAT policy frameworks completed or under development

iii. Activity #2: Identify funding opportunities and financing models to enable near-term CAT investments
iv. Activity #3: Identify model regulations that enable near-term pilots and deployments
v. Top priorities –
1. Guidelines for AV testing on public roads
2. Truck platooning – driver assisted (SAE Level 1)
3. HOV lane enforcement

e. Washington State Framework Overview (slides 41-50):

i. Slide 41:
ii. Slide 42: How is Washington state preparing?:
i. On June 7th, 2017 Governor Inslee signed an Executive Order forming an AV Workgroup to examine emerging automated transportation technology in other modes, including freight, aviation, transit, passenger rail, marine vessels and ferries, as well as points of convergence with connected, shared and electric vehicles.
ii. On March 22, 2018, Governor Inslee signed Substitute House Bill 2970 placing the Transportation Commission with the responsibility to convene a work group to develop policy recommendations to address the operation of autonomous vehicles on public roadways in the state.
iii. Slide 43: Governor's Executive Order 17-02 Key Provisions –
i. Executed June 7, 2017
1. Pilot programs are enabled throughout the state in partnership with entities that are developing AV technology equipment and such pilots may or may not have a human present in the vehicle.
2. Entities conducting AV testing with a human present in the vehicle must self-certify to DOL they are compliant with all requirements including: possessing a valid driver's license; providing proof of financial responsibility as required by RCW 46.30.020; the operator must have ability to direct the vehicle's movement if assistance is needed; etc.
3. Entities conducting AV testing without a human present in the vehicle must self-certify to DOL they are compliant with all requirements including: vehicles being equipped with automated driving systems that perform all aspects of driving on a part or full-time basis and must be able to bring the vehicle to a safe condition in the event of a system failure; providing proof of financial responsibility as required by RCW 46.30.020; etc.
4. Entities may implement pilot programs immediately after providing notification to DOL.

5. Establishes an interagency work group to advance the objectives of the Exec. Order and examine emerging automated transportation technology in other modes, including freight, aviation, transit, passenger rail, marine vessels and ferries, as well as points of convergence with connected, shared and electric vehicles.
6. Work group includes representatives from the: Governor's Office, Dept. of Transportation, Dept. of Commerce, Dept. of Licensing, Wash. State Patrol, and the Traffic Safety Commission.

iv. Slide 44: SHB 2970:
   i. Legislative Intent *(SHB 2970 (Sec. 3), Ch. 180, Laws of 2018)*:
      1. *"The legislature finds that establishing an autonomous vehicle work group, to be convened by the transportation commission, will facilitate state efforts to address the emergence of autonomous vehicle technology. It is the intent of the legislature for the transportation commission to develop recommendations for policy, laws, and rules for the operation of autonomous vehicles, with input from the autonomous vehicle work group, that enable Washington state to address the public policy changes necessitated by the emergence of this technology in an informed, thorough, and deliberate manner."*

v. Slide 45: SHB 2970 Key Provisions:
   i. The AV Work Group is to develop policy recommendations to address the operation of autonomous vehicles on public roadways.
   ii. Executive branch agencies are identified who must participate.
   iii. Requires four House and four Senate members – two from each caucus of each house.
   iv. The Transportation Commission may invite additional participation as needed.
   v. The Work Group must:
      1. Follow developments in AV technology, AV deployment, and federal, state and local policies that relate to AV operations.
      2. The scope of this work must include commercial and passenger autonomous vehicles.
      3. Explore approaches to modifying state policy, rules and laws to further public safety and prepare for AV technology deployment in the state.
   vi. Disseminate information

vii. The Transportation Commission must develop and update recommendations annually based upon input from the work group and report them to the Legislature and Governor.
viii. Recommendations may include changes to state law and rules.

vi. Slide 46: Washington State Autonomous Vehicle Workgroup:
    i. WSDOT is a member of the Transportation Commission's Autonomous Vehicle workgroup Executive Committee which has established 5 subcommittees
    ii. WSDOT Secretary Roger Millar will Chair the Infrastructure and Systems subcommittee that will focus discussion on Roadway infrastructure, Traffic management, Transit service & vehicles, Advertising, Right of way, Multi-modal transportation, and Mobility as a service.
    iii. All subcommittees are an advisory body to the Executive Committee who is an advisory body the Transportation Commission who is an advisory body to the Legislature.
    iv. The Executive Committee had their first meeting back in June 2018.
    v. Subcommittee discussions have all begun with the Infrastructure and Systems subcommittee having its first meeting on October 2nd In Olympia.
vii. Slide 47: WSDOT Organizational Efforts External Engagement:
    i. The CAT Program is being established to enhance WSDOTs ability to participate in local, regional, and national partnerships, work groups and will continue to pursue federal grants, research, pilots, and demonstration projects while increasing WSDOTs institutional capability and capacity to implement CAT strategies.
    ii. In addition, the CAT Program Work Group which works alongside the Assistant Secretary for Multimodal Development & Delivery and the Secretary of Transportation supporting WSDOTs engagement in the
        1. Governors Autonomous Vehicle Work Group
        2. Washington State Autonomous Vehicle Working Group
        3. AASHTO CAT Coalition
        4. ITS America
            i. The Intelligent Transportation Society of America advances the research and deployment of intelligent transportation technologies to save lives, improve mobility, promote sustainability, and increase efficiency and productivity.
viii. Slide 48: Engagement Opportunities:
    i. A lot of opportunities
    ii. Examples of external venues where WSDOT has participated and found significant value

iii. On September 19th the Transpo Group hosted an AV Policy Conference on Mercer Island,
iv. In late October, FHWA will have another "National Dialogue on Highway Automation" in Phoenix focused on Operations.
v. Dec 3rd, Innovations and Partnerships in Transportation Conference in Tacoma, will have TSMO and CAT Breakout Sessions
vi. Dec 10-11th, ITS Washington TSMO Training and Annual Meeting (Secretary Millar will be giving a Key Note address on Dec 11th)

ix. Slide 49: On-Road testing and deployment in Washington:
    i. Shortly after the Governor Signed the Executive Order The WA State Department of Licensing established a website that allows companies to self-certify the on road testing of AVs in Washington State with provision for testing with and without a driver behind the wheel.
    ii. Department of Licensing Autonomous Vehicles: Self-certification testing in Washington state. Seven companies self-certified to handle testing in WA.
        1. Dooblai LLC
        2. May Mobility
            i. May Mobility, for example, manufactures a low speed AV Shuttle that operates in mixed traffic.
        3. Navya Inc.
        4. NVIDIA Corporation
        5. Simple Solutions
        6. TORC Robotics
        7. Waymo LLC
x. Slide 50: Policy Framework Efforts:
    i. New mobility playbook for City of Seattle
        1. Vision
        2. Values
        3. Principles for Mobility
        4. Next Steps
    ii. New Mobility playbook created a vision and value structure for mobility in the city
    iii. Principles for mobility, such as "put people and safety first" and "advance race and social justice" helped create lens to view new mobility options through, aligned with vision and values
    iv. Playbook included next steps and actions, based on 5 "plays" that came from vision, values, and principles. Including research, education, partnerships, and some pilots
    v. Version 2.0 coming…

f. Summary of other Washington State AV Work Group sub-committees' progress (slides 51-56):

i. Slide 51:
   i. **DOL**- Introductory Meeting, who is everyone who is missing, casual conversation, no structured overview, what are the issues, scope of the group, developing a charter, not too much discussion on what is going to happen in-between meetings., consensus based. Casual stakeholder.
   ii. **Safety** – Structured – opening remarks by the Co-Chairs, AV 101, came in with 5 or 8 specific topics with other categories, completed some brainstorming, Voting DOTs to identify priorities, topics not that clearly defined, facilitator didn't capture enough detail about the topics. Long list of other topics, ideas. No commitment on how to move things forward. 3 pages of topics to vote on. No restrictions on the who can vote and how many per agency. going to process the recommendations live during the meeting. No follow-up in between meetings.
   iii. **Data Security:** Discussion of scope and membership. Focus on privacy standards and minimum consumer privacy protection. Next steps include education on various issues
   iv. **Liability** – How should decisions be made, consensus based with use of a minority report. Discussion on who the actual voting members are, allow proxy or email voting, each organization will have 1 vote. Who should be invited to participate. Reaching out to other states – more information for next meeting. Short Term – Mid Term – Long Term goals – Format for the next meeting.

ii. Slide 52: Washington State AV Work Group subcommittees progress report – Licensing:
   i. One meeting held to date
   ii. Approved subcommittee charter
   iii. Established goals for the coming year
   iv. Next meeting scheduled for October 5th

iii. Slide 53: Washington State AV Work Group subcommittees progress report – Infrastructure and Systems:
   i. Reminder that all subcommittees are functionally advisory bodies to the Legislature.
   ii. Reminder that this subcommittee is focused on
      1. **<u>Legislative Focus Areas</u>**
         i. Roadway infrastructure
         ii. Traffic management
         iii. Transit service & vehicles/ Public Transportation
         iv. Advertising
         v. Right of way

vi. Multimodal transportation
vii. Mobility as a service

iii. Reminder that of the Role/Approach of this Subcommittee
1. Open Discussion Forum
2. Gather input toward the development of a 2019 Action Plan

iv. Progress report will be developed for the October 24th Executive Committee Meeting based on the pre-meeting survey, todays discussion and other input from working members.

iv. Slide 54: Washington State AV Work Group subcommittees progress report – Liability:
i. One meeting held to date
ii. Developed decision-making and voting process
iii. Created a list of issues to be tackled by the subcommittee

v. Slide 55: Washington State AV Work Group subcommittees progress report – Safety:
i. Three meetings held to date
ii. Conducted AV 101 education
iii. Discussed key topics including educating the public, understanding "black box" data, health impact assessment, and AV certification

vi. Slide 56: Washington State AV Work Group subcommittees progress report – System Tech and Data Security:
i. One meeting held to date
ii. Conducted overview of key provisions of the legislation
iii. Initiated scope discussion and identification of subcommittee membership