

Washington State Autonomous Vehicle Demonstration Corridors

PRESENTED TO Washington State AV Work Group

Friday, September 11, 2020

Research and Policy Team





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DISCOVERY INSTITUTE

The Transportation Futures Research Fellowship Cascadia Center for Regional Development

Collaboration for Success



The ACES Northwest Network is a unique collective working together to realize the benefits of new technologies while sharing the story of how the automated, connected, electric, and shared revolution is transforming how we connect in this new era in the Puget Sound region.



https://www.linkedin.com/showcase/acesnwnetwork



WE WANT YOU TO BE ENGAGED!



Questions during the presentations?

Click on the Q&A button and then type your question in the Q&A window that appears on the Zoom screen.

We'll choose a few questions to answer live. Others may be answered in the Q&A window by our panelists.



Data and Analysis



Autonomous Vehicle Plan for the I-5 Seattle/Vancouver B.C. Corridor

AUTHORS: TOM ALBERG AND CRAIG MUNDIE AND DANIEL LI AND CONNOR RAIKES





Automated Freight COVID-19's Impact Corridor Assessment on Freight



Motorways (i.e., freeways; includes nearly all Interstates and many toll roads)



MOTOR VEHICLES ONLY (defined by statute)

- Controlled (managed) access
- Limited access at interchanges only
- Heavy vehicles KEEP RIGHT
- LEFT LANE reserved for higher-speed PASSING ONLY
- Safe for speeds exceeding 85 mi/hr (130 km/hr used in Europe) in many segments



Motorways



HOV lanes segregate traffic and could present an opportunity for AV demonstrations, particularly those conducted in cooperation with fleets and managed to optimize flow.





Road Users Today

Today's Road Users

- Distracted, impaired, and rushed
- Traveling at new times of the day with differing needs
- Humans *and* machines, assisted by technology
- Level 1 and 2 being used as Level 3 or even Level 4
- ADAS is already here in millions of vehicles
- Freight
 - Interstate and regional, intermodal, cross-border
- Shared-Ride Services
 - public transit, numerous options for shared-ride services
- Equity for all users!

Outcomes

- Safety improvements with minimal costs to the public agency, allowing for improved maintenance funding as safety goals are achieved
- Infrastructure for people and machines, for tomorrow and today, the logical next steps in building out a network of *connectivity* like never before, with new fuel sources built in now
- High probability of safe operation for AVs and conventional vehicles (including those with ADAS)
- Improved comfort and efficiency for shared-ride services, with safety benefits for public transit

What do AVs Need?

- Machine Vision
 - Includes visible light cameras and LiDAR
 - positioning data from various sources
 - Conflict avoidance
- Communications
 - Low-latency, with possibilities of C-V2X with 5G or DSRCcompliant protocols; loT for work zone performance
- Energy
 - Solar photovoltaics coupled with energy storage
 - Leased State land for new fuel depots, operated by the private sector with tax incentives promoting investment

- Motorways: I-5, I-90, a portion of SR 18
- All lanes and exit ramps will have capabilities
- Can this State adopt motorway operational philosophies that promote safety as a function of efficiency, a rules-driven approach that machines can understand if uniformly applied?
- Enhanced Markings and Delineation
- Optimization for Safety and Efficiency
- Communications
- Electric Vehicle Charging

Upgrades to Pavement Markings

- Wider lane lines, as a trial in complex areas initially
- Diagonal markings for ramp terminals, everywhere
- Improved consistency for exit ramp signing
- Improved delineation, supports HD mapping localization

Work Zone Integration

- Full communications capabilities in work zones, perhaps even down the device level, for vehicles and signs
- Substantial opportunity for private sector to invest in smart work zones for measuring and management of traffic to increase incentive payments and reduce possibility of liquidated damages for road builders

Optimization for Safety and Efficiency

- Goal is to reduce congestion and improve predictability of roadway for seamless AV driving domain transitions
- Lengthen acceleration and deceleration lanes
- Reduce weaving by constructing collector/distributor roadways and braided ramps for complex interchanges
- Improve compliance for lane use by heavy vehicles and slower traffic, harmonizing traffic flow and improving safety for all users
- Provide failsafe areas at ramp terminals and ahead of critical areas where automated driving is expected to terminate based on anticipated domain implementations

Communications

- Goal is to provide low-latency high-reliability communications essential for V2X applications, with provisions for dedicated network links
- Central spine of fiber-optic capacity
- Leased space in cabinets for a variety of vendors
- Technology- and protocol-agnostic approach allowing for maximum innovation and flexibility
- Coupled with future growth in commercial cellular
- Builds out loT wide-area networking capabilities sorely needed by public transit and AV implementations

• Electric Vehicle Charging

- New partnerships for solar photovoltaic energy production and storage
- Opportunities to generate revenue for rest areas and truck parking areas in public-private partnerships with existing service providers, including utilities and small business owners alike
- Includes electric power hookups sourced from on-site solar/battery systems, eliminating truck idling
- Site management plans for these facilities will curate natural shade from trees, complementing solar generation canopies, reducing overall effects of heating from the sun and providing protection from precipitation



Fulfills Goals of Many Advocates . . .

- West Coast Green Highway
- West Coast Clean Transit Corridor
- Western Governors Association Electrification Roadmap
- Cascade Chapter, Association of Unmanned Vehicle Systems International
- 5GAA Automotive Association
- Institute of Transportation Engineers

... and achieves transportation policy goals!







Tom Alberg and Bryan Mistele are the co-founders of the ACES Northwest Network





RESEARCH REPORT

Conversation



