Roadmap to the Future

AV Work Group Legacy Deliverable

Based on the information and insights that have been gathered throughout the five-year course of the Autonomous Vehicle (AV) Work Group, this report serves as the Roadmap to Washington's mobility future, proving a foundational resource for lawmakers to consider and refer to as deliberations occur around the advancement and regulation of autonomous vehicles (AVs) in Washington State. It also provides guidance for public agencies, as well as private and community partners, on what to focus on and develop as the state prepares for automated vehicle technologies to safely test and deploy on Washington public roadways.

Five key areas serve as the building blocks for this Roadmap, focusing on the key components necessary to research, understand, develop, and refine during ongoing preparations to safely accommodate AV operations on Washington's public roadways: Agency Readiness, Public Outreach, Safety, Testing & Pilots, and Path to Deployment.

For each of the key components, the following table presents areas of action for considered by decision makers as they deliberate on what AV policies are needed to guide AV testing and deployment on the state's public roadways.

Key Component	Future Consideration	Objective	Actions	Examples
Agency Readiness	Permitting	Refine the state's existing permitting and notification program for AV use on public roadways.	Resource agencies with dedicated staff and resources to holistically manage an AV permitting program, from assessing on-road testing applications and operations, to compliance, to deployment (the current small-scale program is operated by the Department of Licensing). Determine what other agencies, if any, play a role in the permitting process, and provide resources and authorization for those agencies to engage.	California DMV has a robust permitting process for AV testing and deployment, with three levels: Driver Required, Driverless Testing, and Deployment (with passengers). The process includes state approvals, permit fees, and continued change notification. Arizona law allows AVs to operate on public roads without a driver after submitting a set of written statements.
Agency Readiness	Infrastructure	Identify and prioritize infrastructure investment needs to support efficient and safe AV operation in the near- and long-term.	Prepare an AV strategic plan which identifies needed investments statewide, and organizational needs to implement identified actions. An AV strategic plan should address the level of need for physical and digital infrastructure investments, as well as funding, resources, and partnerships needed to implement investments. The AV strategic plan should include evaluation equity opportunities and impacts in infrastructure needs and improvements. Appoint a State AV lead agency to lead the strategic planning effort, as well as coordinate activities across the various state agencies who play a role the testing and deployment of AVs.	Multiple states, including Connecticut, Florida, Maryland, Michigan, Minnesota, and Pennsylvania have completed AV strategic plans that outline and prioritize agency actions.

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Agency Readiness	Multi-State Coordination	Coordinate with neighboring states to ensure common approaches for travel and interstate commerce.	Create a standing forum for coordination with representatives from Oregon and Idaho and/or the WASHTO area.	The Mid America Association of State Transportation Officials (MAASTO) created a 2030 CAV Regional Strategy, committing the region to: • Ongoing information sharing of best practices • Collaborating on regional projects • Developing a regional CAV strategy • Hosting an annual summit MAASTO, like WASHTO, is primarily comprised of State DOT representatives. Other organizations, like ITS America, could also be utilized to take a broader focus that includes other statewide agencies and partners.
Agency Readiness	Infrastructure Planning & Safety	As infrastructure investments continue to be made, begin to consider the needs of AVs and other emerging technologies.	Identify opportunities for complimentary investments that support AV accommodation and also result in increasing safety for the general motoring public to ensure AVs – and all road users – can be safely supported by infrastructure. Examples of infrastructure enhancements that could be invested in now for current road user safety as well as AV preparedness includes: • Updating pavement markings with consistent and clearer markings and reflectivity for AV technologies (e.g., LiDAR, cameras) to identify pavement markings and traverse roadways appropriately • Managed curb space: Cities can define curb spaces within their jurisdiction, including applicable usage for various curb space areas. One AV use case managed curb space assists with is city-approved robotaxi pick-up/drop-off locations that reduces or removes potential road user safety for both the road user in the robotaxi as well as other road users that may traverse the defined area.	Michigan DOT has focused on foundational Connected Autonomous Vehicles (CAV) investments that are adaptable and can be upgraded as appropriate, such as communications technologies and supporting infrastructure, data management tools, and wider striping and other updates in conjunction with larger construction projects.
Agency Readiness	Agency Preparedness through Training	Develop skillsets within state agencies to understand AV industry developments, regulatory requirements, and partnerships.	Develop training resources for state agencies which support their ability to remain current on technology and AV industry advancements.	Maryland's ongoing CAV Working Group enables coordination between state agencies to develop plans, experience AV testing, hold educational and engagement workshops, and more. National organizations offer AV-related educational resources, including FHWA, NHTSA, the CAT Coalition, PAVE, SAE, and IEEE, among others.

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Agency Readiness	Partnerships	Develop and further cultivate partnerships with the private sector for strategic AV testing and investment in the state.	Create a state-level office focused on developing strategic private sector partnerships within the AV and technology space to support the advancement of a methodical process of preparation for AVs. Partnership cultivation should include identifying opportunities to address a variety of AV impacts, such as workforce, infrastructure, equity, and safety.	In Michigan, an Office of Future Mobility and Electrification was created in 2020 to support partnership development and direct investment across state government. In 2020, the Jacksonville Transportation Authority partnered with the Mayo Clinic, Beep, and NAVYA to deploy autonomous vehicles for transporting medical supplies and COVID-19 tests during the pandemic – highlighting a key benefit and use case of public/private partnerships and investment.
Public Outreach	Public Education	Provide public education and outreach to advance understanding around the benefits and limitations of AV technologies, to encourage safe and effective deployment.	Assign a lead state agency and authorize and resource them to develop a public AV outreach plan that could include statewide focus groups, surveys, etc. The AV outreach plan should include an equity strategy that identifies approaches and processes for engaging under-represented communities.	The Partners for Automated Vehicle Education (PAVE) maintains a database of automated vehicle related resources, including webinars and reports on AV policy, social impacts, technology, and terminology. This database provides resources the state can use to assist in educating the public on AV technology with existing materials collected from a broad range of stakeholders and invested entities, including academic institutions, agencies, and experts in the industry The National AV Pooled Fund, led by DriveOhio, has an active engagement plan with private partners and public outreach through PAVE.
Public Outreach	Collaboration	Collaborate with partner states, peer agencies, and technology developers to identify best practices, and identify consensus approaches to managing the operation of AVs.	State agencies and policy makers should actively engage in dialogues with industry organizations and representatives through working groups, conference attendance, conversations, and more. Actively engage with other states/jurisdictions and AV representatives to stay informed on what's happening around the country and what WA can replicate as it works to prepare for AV operations.	Several states – such as Massachusetts, Texas, Maryland, Washington, Oregon, California, and Wisconsin – had and/or currently have a state-level automated vehicle working group that convenes public, private, non-profit, community, advocate, and academic partners together to collaboratively share insights on automated vehicle technologies and their impacts.

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Safety	Law Enforcement / First Responders	Ensure that AV companies understand LE/FR needs before deploying. Ensure that LE/FRs understand how to interact with AVs.	Require a LE/FR Interaction Guide that either engages with the LE/FR in each jurisdiction where AV testing and/or deployment is occurring OR is centrally provided at the state-level, with state agency(ies) disseminating to localities.	Massachusetts requires AV companies applying to test in the state to prepare and make available a First Responders Interaction Plan to law enforcement agencies and other first responders operating in the permitted testing areas in the state, detailing how agencies interact with the AV in emergency and traffic enforcement situations. Arizona requires a Law Enforcement Interaction Plan from AV companies testing and operating without a safety driver present in the vehicle, which includes protocols on how law enforcement safely removes the AV from the roadway, information on what cities the AV is operating is, and how to safely tow the vehicle.
Safety	AV Incident Reporting & Analysis	Monitor AV testing and deployment activities to enable the informed regulatory decision making and advance public safety.	Develop requirements and a framework for incident reporting and incident analysis at the state level. Start with requiring the collection of information that is currently collected by NHTSA and determine whether state-level reporting is needed to supplement. Use incident reporting information to develop and shape minimal risk and liability profiles and liability requirements for various deployment scenarios. For example, a low-speed, fixed-route AV shuttle that operates in a private campus will likely have a different risk profile and potentially different liability requirements than an AV that operates freely at varying speeds across multiple public roadway types (city street, rural road, state highway). Determine any potential legal, operational, and/or financial penalties to assess an AV company operating in Washington if one of its AVs is responsible for the cause of a safety incident (e.g., collision with other vehicle).	Companies approved to test AVs in California need to report any collision that resulted in property damage, bodily injury, or death within 10 days of the incident. NHTSA has developed a framework for automated driving system testable cases and scenarios.

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Safety	Vulnerable Road User Safety	Set expectations and requirements for AV operational performance and ensure there is a clear understanding of AV operations by all road users.	Conduct public outreach on any AV testing, pilot, or deployment. Identify road safety related information, such as road signage, that will require improvements to clearly communicate presence of AVs and expectations of how road users may interact with an AV.	The UDOT Automated Shuttle Project included many roadside signs, like the ones shown here.
Safety	Data and Cybersecurity	Safeguard the security and privacy of data and communications related to AVs, especially in safety-critical situations.	Invest resources to execute or support initiatives that focus on data management, data security, data privacy, and cybersecurity, including network security for remote operations and policies related to personally identifiable information. Direct agencies executing or supporting these initiatives to leverage industry best practices, and fill in with gaps as needed, for data privacy and data sharing standards for any data collected by or shared with the State.	The U.S. DOT's Work Zone Data Exchange (WZDx) initiative enables infrastructure owners and operators (IOOs) to make work zone data available for third party use, such as automated technology providers to help automated driving systems, as well as human drivers, navigate more safely.

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Testing & Pilots	Pilots	Provide the public first-hand experience with AVs, enable the exploration of possible operational considerations unique to Washington in preparation for future AV deployment, and identify approaches to harnessing AV opportunities that increase equity and access.	Conduct a state-sponsored and managed AV pilot project in multiple locations statewide. Create a state-led grant program to encourage local municipalities and/or companies to manage their own AV projects. Integrate public engagement as a core component of a pilot.	Utah DOT partnered with UTA for an automated shuttle pilot project that provided passenger service at 8 locations over 17 months. Experiencing the technology first-hand resulted in increased AV understanding and trust. Minnesota DOT created the CAV Challenge, an open and rolling procurement for public and private entities to propose CAV solutions to improve safety, efficiency, equity, and mobility. State leaders have funded 10+ projects totaling over $5.5 million. Minnesota's first AV shuttle deployment was a three-day demo during the Super Bowl, focusing on public engagement, including signage, flyers, and two staff on board to answer questions.
Testing & Pilots	AV Testing Lessons Learned	Document learnings from testing activities in-state to inform policy making and future AV deployment. Stay informed of lessons learned from other jurisdictions' testing and pilot activities to further inform decision makers.	Direct the State Transportation Commission to develop a lessons learned inventory from other jurisdictions' AV testing efforts and activities. Direct the state agency(ies) responsible for leading any AV pilots in Washington, or monitoring AV testing activities, to document and share lessons learned from AV testing and pilots with peer agencies, lawmakers, and other states to continue building on AV lessons learned across the country.	The Utah DOT-led pilot program included an extensive lessons learned document which outlined infrastructure needs, policy requirements, and user experience findings related to the pilot effort. During its purview, the Washington State AV Work Group invited several jurisdictions (Utah, Arizona, California, Michigan, etc.) to share their experiences and lessons learned in AV testing and pilot initiatives. These lessons learned are documented in the Work Group's Annual Reports.

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Path to Deployment	Define a Clear Path to Deployment	Provide clear expectations of regulatory agencies, supporting entities, and companies deploying AVs in Washington.	Assign and resource a lead state agency to coordinate across decision makers, peer agencies, community partners, and AV industry partners to define what a "clear path to deployment" means in Washington State. This effort should leverage other states' AV policies to align where applicable to reduce a patchwork of policy.	The Texas A&M Transportation Institute published research for the "Paths of Automated and Connected Vehicle Deployment: Strategic Roadmap for State and Local Transportation Agencies". The research proposed two paths jurisdictions could take – Revolutionary and Evolutionary. In the Revolutionary Path, the private sector pushes technologies to the market through research and development investments, with regulatory and policy issues not hindering progress. In the Evolutionary Path, policies and regulations slow testing and deployment while taking a deliberative approach, with the private sector making incremental improvements in advanced driver assistance systems. The Revolutionary Path takes a light-regulatory approach with the industry leading the charge, while the Evolutionary path takes a heavier-regulatory approach with jurisdictions regulating how and when AVs can be deployed. Arizona and California, among other states, explicitly state that AVs can be deployed in their respective states, with parameters as to how, when, and where an AV can be deployed in an operational manner.
Path to Deployment	Monitor and Address Changes at the Federal Level	Monitor AV policy activity happening at the federal level and take action as needed when AV policies shift nationally.	Assign and resource a state agency to monitor activity happening at the federal level for AV policy, regulation, and operational approaches. Direct the assigned lead agency to keep apprised of and communicate with decision makers and peer agencies federal shifts in AV policies and approach.	The Pennsylvania DOT, along with the Department of Community and Economic Development, hosts an annual Automated Vehicle Summit, where department secretaries and industry leaders present recent findings and actions affecting automated vehicle policy, including activity and changes at the federal level. The National Conference of State Legislatures (NCSL) hosts an Autonomous Vehicles Legislative Database and associated reports that includes information on what federal action is being taken year to year.
Path to Deployment	Local Regulation	Actively collaborate with and support local-level AV policy, regulation, and testing and deployment activities.	Assign and resource a lead agency to maintain ongoing coordination and collaboration with cities in Washington to act in concert with cities conducting AV research, policymaking, and/or testing and deployments. This coordination includes identifying consistent approaches across cities, where applicable, coordinating public communication and messaging, leveraging lessons learned from other localities, etc.	Smart Columbus AV shuttle project team members initially pursued City of Columbus approval for microtransit operators. However, during this process, it was determined that registering with the Public Utilities Commission of Ohio instead would enable them not to have to pursue licensure at the city level, because the state's permit supersedes that of the city. The state's license was easier to receive, however the back-and-forth of the process led to delays.