

November 26, 2018

Mr. Finch Fulton
Deputy Assistant Secretary for Transportation Policy
Office of the Secretary (OST)
U.S. Department of Transportation (DOT)
1200 New Jersey Avenue S.E.
Washington, DC 20590

Re: Docket No. DOT-OST-2018-0149;

Dear Deputy Assistant Secretary for Transportation Policy Fulton:

The American Association of State Highway and Transportation Officials (AASHTO) is pleased to provide comments on the U.S. Department of Transportation's "Preparing for the Future of Transportation: Automated Vehicles 3.0 (AV 3.0)" Notice of Request for Comments (Docket Number DOT-OST-2018-0149), issued in Washington, D.C. on October 9, 2018. Representing all 50 states, the District of Columbia, and Puerto Rico, AASHTO serves as a liaison between state departments of transportation and the federal government.

AASHTO's attached comments on the AV 3.0 document include general comments about the USDOT Automation Principles articulated at the beginning of the document and a separate section on suggested future changes and additions we would like to be made to subsequent updates to the document. This letter represents additional comments to a joint comment letter AAHSTO signed with our sister organizations that covers additional scope of the AV 3.0 document that our members had. In addition, AASHTO is submitting more detailed comments in response to the NHTSA ANPRM, *Pilot Program for Collaborative Research on Motor Vehicles With High or Full Driving Automation*, (Docket Number NHTSA-2018-0092).

AASHTO and the state DOTs appreciate USDOT's continued leadership to help clear the way for the safe and timely adoption of automated vehicles (AVs). While there is tremendous potential in significantly improving transportation mobility and accessibility for people with AVs, the top priority for AASHTO and the state DOTs is the safety associated with the implementation of AVs. Safety has been, and will remain, at the forefront of AASHTO's policy goals as state DOTs have the primary responsibility for the safe and efficient movement of people and goods on our nation's highways and streets.

We appreciate the opportunity to provide these comments and look forward to working with OST, UDOT on the development of the scope of this work and its outcomes. If you would like to discuss the issues raised in this letter, please contact Matthew Hardy, Ph.D., AASHTO's Program Director for Planning and Performance Management at (202) 624-3625.

Sincerely,

A handwritten signature in blue ink that reads "Carlos M. Braceras". The signature is written in a cursive style and is contained within a thin black rectangular border.

Carlos M. Braceras

President, American Association of State Highway and Transportation Officials
Director, Utah Department of Transportation

Section 1: Comments on USDOT Automation Principles

1. We will prioritize safety.

We agree with USDOT's statement in AV 3.0 that the first principle, and highest priority, must be the safety of all roadway users: vehicle operators and occupants, pedestrians, bicyclists, motorcyclists, and other travelers. The safety of all users of the transportation system is the most important consideration for AASHTO and state DOTs with respect to transportation infrastructure and the emerging deployment of connected and automated vehicles (CAVs). It is estimated that over 90 percent of fatal vehicle crashes are a result of human error some of which could be mitigated through CAV technologies. These new technologies have the potential to significantly decrease crashes and fatalities occurring on the transportation system and positively influence the safety of not only of the transportation system users (drivers, passengers and riders), but also highway maintenance and construction workers, transit passengers, bicyclists, and pedestrians. While the prospect for safety improvement is exciting, we are also acutely aware that CAVs are innovative technologies and there are still many uncertainties associated with them.

2. We will remain technology neutral.

AASHTO recognizes the future is uncertain with regard to automated vehicle (AV) technological innovation and the industry must remain flexible with regard to technical approaches and standards development. One example is the 5.9 GHz wireless spectrum reserved for vehicle safety applications. AASHTO believes that the future of AVs will include connected vehicles (CVs) as well (see further comments later in this letter). Currently, there is debate about how the CV environment will be created: Dedicated Short Range Communication (DSRC), 5G, a combination of both, or other technologies. AASHTO's current position is that DSRC, which operates in the 5.9 GHz spectrum, is the only viable technology available to support CV applications at this time. Its use to enhance safety, and ultimately reduce crashes and fatalities, is critical and USDOT should continue to both protect the spectrum solely for vehicle safety application uses and support DSRC deployment and use for CV applications. However, AASHTO does recognize that future technologies may become available to support a CV environment that are similar or better than DSRC and the industry must flexible to adopt these technologies as appropriate.

3. We will modernize regulations.

AASHTO supports USDOT efforts to modernize existing regulations. The research, development, and testing of AVs has generated many questions about the applicability of existing regulations that were not established with AVs in mind. As mentioned in AV 3.0, state DOTs are concerned with how updates to the Federal Motor Vehicle Safety Standard (FMVSS) may change the historical roles of NHTSA (regulating the design, construction, and performance of a motor vehicle) and the states (regulating the licensing of motor vehicle operators, registration of vehicles, and enforcement of traffic laws). AASHTO is providing more detailed comments on this topic as part of our comments on Docket Number NHTSA-2018-0092, *Pilot Program for Collaborative Research on Motor Vehicles With High or Full Driving Automation*.

4. We will encourage a consistent regulatory and operational environment.

Rightfully so, each state enacts laws and creates regulations for the licensing, registration and insuring of vehicles, and states have provided reciprocity of registrations and licenses from other states through harmonization of minimum requirements. As states begin to grapple with how to approach AVs, some have instituted restrictions on their operation, requiring special license plates or limiting their operation to specific areas, while others are treating AVs as a standard motor vehicle, allowing operation anywhere under any safe condition. As the technology advances faster than the ability of state regulatory agencies or legislatures to respond, obsolete laws and regulations may hinder technological advancements or encourage companies to operate in states that offer favorable regulatory environments. Thus, a patchwork system for the operation of AVs could slow nationwide deployment, leading to the uneven accrual of benefits across the states. AASHTO supports state DOTs commitment to work with their sister state agencies to ensure a unified national framework to facilitate the development, testing, and deployment of CAV technologies, including further state-driven harmonization of state-level traffic and vehicle rules. One on-going effort is the Autonomous Vehicle Best Practices Working Group, hosted by the American Association of Motor Vehicle Administrators (AAMVA) that is providing states and other stakeholders a venue to gather, organize and share information about AV testing, operation and regulation.

5. We will prepare proactively for automation.

AASHTO looks forward to working collaboratively with NHTSA, local governments, and the private sector on the testing and deployment of CAV. For example, infrastructure owners and operators want more information from the automakers about what infrastructure elements they need in order to successfully deploy the technology. The advent of automated driving systems and CV technology represents a new paradigm in the relationship between these two segments of the transportation community. If we are to provide infrastructure that supports these new technologies, both physical (roadways, bridges, traffic signals, signs, work zones, etc.) and digital (software applications, algorithms, business intelligence, data analytics, mobile telecommunications, etc.), all stakeholders will need to work and prepare together. Already, AASHTO has a number of committees, joint working groups, and research projects underway addressing this issue. Please visit <http://cav.transportation.org> for more information.

6. We will protect and enhance the freedoms enjoyed by Americans.

AASHTO supports the fact that AV 3.0 expands the discussion to include all roadway users. One of the concerns that AASHTO had with AV 2.0 was the lack of acknowledgement of all roadway users. It is clear in AV 3.0 that the deployment of AVs must address the safety and needs of all roadway users including drivers, transit, pedestrians, bicyclists, motorcyclists, freight, and more. Additionally, AASHTO supports the sixth principle stating the policies and actions of USDOT pertaining to AVs will protect and enhance the freedoms enjoyed by Americans regardless of how they choose to travel.

Section 2: General Comments

1. State DOTs Need Additional Funding and Flexibility in Order to Deploy CAV

Technologies and Accommodate CAV Vehicles— AV 3.0 does not address an important concern of the state DOTs regarding funding and flexibility for deployment and maintenance of CAV technologies. States are struggling to find the fiscal resources to maintain their current infrastructure, and the need to retrofit roads, bridges and other assets to accommodate CAVs presents an undue financial burden to state DOTs. CAV benefits will not accrue unless states can afford to make the necessary investments to accommodate them. There are a number of test bed and pilot CV programs taking place where there is much learning about CV hardware deployment. As with all technology, costs can change rapidly as the new developments exponentially occur.

Many unknowns remain on the costs necessary to ensure AV safe operability on public roadways. Currently, state DOTs and other infrastructure owners are uncertain on precisely which roadway characteristics are critically important to the safe and efficient operation of AVs (i.e. pavement condition, signage, detailed GPS base maps, striping, and others). We know some of the developers' general needs from industry comments to USDOT identifying the importance of signage, lane marking, and striping. In fact, one state has responded to this concern by going from 4-inch to 6-inch stripes to help the technology developers with their sensors and lane departure warning systems. Other states, however, are not as willing to modify their lane striping widths due to the significant investment required. Further, there is uncertainty whether or under what circumstances replacing pavement marking for purpose of AV deployment is a capital investment (eligible under FHWA programs) or a maintenance activity ineligible for reimbursement.

2. A Future with Both Connected and Automated and Vehicles

—AV 3.0 discusses the role of connected and/or cooperative vehicles on page 13. As infrastructure owners and operators, state DOTs agree that establishing a strong foundation for AVs requires robust connectivity for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication. There are a lot of agencies supporting the development and deployment of CAV systems which is evident in the significant commitment that state and local agencies have already made in leading, supporting, and fostering the testing and deployment of CV technologies. To date, 33 locations in the US are deploying CV technologies under sponsorship of USDOT and seventeen locations are deploying the technologies without sponsorship from USDOT. Combined, this represents 72,000 vehicles on the road and 65,000 devices installed or planned on the infrastructure.

Many of these CV deployments involve state transportation agencies with AASHTO's assistance in their efforts. For example, AASHTO is supporting a national traffic signal phasing and timing (SPaT) challenge, seeking to deploy DSRC 5.9 GHz infrastructure with SPaT broadcasts in at least one corridor or network (approximately 20 signalized intersections) in each state by January 2020. As of August 30, 2018, at least 26 states have committed to the challenge. More than 200 signals are broadcasting SPaT and more than 2,000 additional signals are planned – a significant investment by state and local transportation agencies. However, the lack of further federal guidance regarding V2V and

V2I communication standards is creating uncertainty among state and local agencies. Absent clear direction, states and local agencies will likely make no significant implementation of CV technology, with the uncertainty to invest in DSRC, 5G, or both for V2I communications.

AASHTO recommends that USDOT consider the following actions to ensure a CV future:

- Integrate CV technologies with the development and deployment of AVs to maximize public safety.
- Ensure that USDOT’s effort to establish a nationwide standard for V2V safety communications continues unimpeded such that other CV applications can be developed and deployed.
- AASHTO also recognizes the future is uncertain with regard to technological innovation. The industry must remain flexible with regard to technical approaches and standards development. While AASHTO believes that DSRC is the only viable technology available now to support a CV environment, we also recognize that any standards development occurring now should not impede technological innovation and implementation in the future.
- A universal, seamless approach to cyber security management and CV communication is essential for the widespread deployment of CVs. The Federal government should quickly lead this development through standardization and appropriate research and technology demonstration programs, as this has become a critical path item for deployment. This will enable states to better understand when and how to make appropriate investment decisions.

3. **All States Can Play a Vital Role as Innovation Laboratories and Offer Flexible Models for Testing**—AASHTO believes that each state can provide value in the testing and deployment of AVs and supports the elimination of the designations of the ten “Automated Vehicle Proving Grounds” as announced on January 19, 2017 stated on page 17 of the AV 3.0 document. Already, many states have essentially opened the doors for AV companies to come to their states to begin the testing and deployment of AVs. For example, the Illinois Department of Transportation launched a new statewide, multiagency initiative to develop a testing program for connected and AVs aimed at advancing the state to the forefront in research on these emerging safety technologies. The program “Autonomous Illinois” will connect communities interested in CAV testing with industry, universities, research institutions and other technology partners. More information on other state deployments and programs are available at <http://cav.transportation.org>.

Clearly, the states are interested in being at the forefront of this technology and serving as the testing and proving ground for it regardless of a designation by USDOT. However, AASHTO is concerned with the proliferation of USDOT “best practices” documents on various topics related the testing and deployment of AVs. AASHTO would suggest that USDOT reorient the discussion and focus on providing forums for collaboration in order for state and local agencies to share lessons learned and develop case studies on various AV deployment aspects. A “best practice” brings a connotation that other practices not identified

in the list that may be adopted by a state are not the optimum when that may not be the case, especially with such a new field like AVs.

4. **Continue To Engage and Collaborate with Partner Agencies and Organizations—**

AASHTO is pleased to see that the USDOT recognizes the importance of collaboration between Federal, State and local governments and the private sector. On page 18 of the AV 3.0 document, USDOT specifically spells out roles for state legislatures, infrastructure owners and operators, state highway officials and others. AASHTO fully supports USDOT in articulating the need for collaboration among the many partners that will be involved in the deployment of CAVs. AASHTO looks forward to working collaboratively with USDOT, local governments, and the private sector on the testing and deployment of CAVs. For example, infrastructure owners and operators want more information from the automakers about what infrastructure elements they need in order to successfully deploy the technology. The advent of automated driving systems (ADS) and CV technology represents a new paradigm in the relationship between these two segments of the transportation community. We recognize that automakers work in a very competitive environment and may be challenged to reach consensus on their needs. Similarly, road agencies range in size, capability and perspective. However, if we are to provide infrastructure that supports these new technologies, both physical (roadways, bridges, traffic signals, signs, work zones, etc.) and digital (software applications, algorithms, business intelligence, data analytics, mobile telecommunications, etc.), clearer guidance from the automaker industry would be helpful.

To this end, AASHTO suggests that USDOT take a more proactive role in supporting and establishing ongoing collaboration opportunities. Working with other industry partners, USDOT could greatly expanded overall industry collaboration to include broader and active participation from both public and private sectors. They could also leverage existing structures in place such as the Cooperative Automated Transportation (CAT) Coalition, the Connected Vehicle Pooled Fund Study, and the Collision Avoidance Metrics Partnership that bring together state and local DOT representatives, research partners, USDOT, auto industry, original equipment manufacturers, and technology vendors.

In the near term, AASHTO strongly suggests that USDOT focus on the following collaboration opportunities:

- *Develop a stronger focus on transportation automation at the national level—* AASHTO is beginning the process of developing The National Strategy on Highway Automation that will lay out a multi-phase approach to deploying automation technology throughout the US on the full extent of the NHS and the top 100 metropolitan areas by 2030. The national strategy will focus attention on developing the digital highway infrastructure needed to make the deployment of automation technologies ubiquitous in the US.
- *Ensure Infrastructure Readiness—*An important component of the national strategy is to ensure the existing transportation infrastructure is ready. AASHTO has funded a project called the *National Automation Readiness Framework: Coast-to-Coast*

Automated Mobility by 2025 which will develop a national highway automation readiness framework that is specifically designed for greater accessibility, safety, affordability, efficiency, and connectivity and that could serve as the model for the country.

- *Updating of the MUTCD*—AV 3.0 states that FHWA will pursue an update to the 2009 MUTCD that will take into consideration AV technologies and other needs. AASHTO supports this effort and looks forward to collaborating with FHWA. We expect that the updates to the MUTCD will include close coordination with state DOTs, especially for states who revise the MUTCD guidance to reflect their own regulations.

5. Any New Laws or Regulations Must Maintain the Current Federal-State Regulatory Paradigm— Ultimately, it is in the best interest of society that vehicles equipped with ADS be introduced as quickly as possible to realize the saving of lives and improving the quality of life, and a collaborative approach on the challenges will help avoid pitfalls on a much-needed deployment pathway. The traditional division of responsibilities for vehicle safety, under purview of the federal government, and safe operation of vehicles through licensing and registration under purview of the state government has worked well and needs to be maintained in the future. However, the advent of AVs is blurring the role of the vehicle and the operator subject to traditional jurisdictional lines and requires a new collaborative approach to what lies ahead. Just as states have worked hard to assure reciprocity of drivers' licenses through alignment and uniformity of education and testing requirements, they will do the same when it comes to uniformity nationwide for AVs and working with the federal government to ensure a common understanding of AV behavior and expectations of the infrastructure. AASHTO has provided more detailed comments on this topic in its comment letter to the NHTSA ANPRM, *Pilot Program for Collaborative Research on Motor Vehicles With High or Full Driving Automation*, (Docket Number NHTSA-2018-0092).

6. Engaging with First Responders and Public Safety Officials—AASHTO is pleased to see the discussion on page 33 of AV 3.0 focused on the interaction of first responders and public safety officials with AVs. USDOT can play an important role in helping to educate first responders about this technology but they should do this as part of existing state and local training programs rather than create a new training process or program.

7. CAVs Will Produce Significant Amounts of Data and There is a Data Governance Gap—AV 3.0 addresses data in a number of different areas throughout the document in a crosscutting manner. The most direct is on page 30 discussing *Identify Opportunities for Voluntary Data Exchanges*. AASHTO supports the ideas and concepts in this section. However, AASHTO sees the data concerns of CAVs as much more complex and that the needed laws, regulations, and guidance are simply not well known at this time. It is very likely that CAVs will collect and transmit massive amounts of data from an array of sensors and cameras. These data elements will become extremely valuable to many different stakeholders. For example, AV data could include origin-destination and ridership data (for better planning), the condition of pavements, signs, and road markings (for better asset management) and vehicle speed, braking and turning movements (for better safety and traffic flow management). Should such information become available to state and local

transportation officials through AVs, the improved data quality would likely facilitate improved planning and decision making. The availability of such information from AVs also could reduce some state data collection costs, freeing up personnel and funds for other important uses. However, this data would likely be valuable and useful to others as well. For example, law enforcement could use the information as evidence of a crime that was committed near a vehicle. The private sector will likely collect some aspect of the data and monetize it in some way such as insurance companies using the data to inform rate setting.

Without controls in place to regulate or monitor use of the data that CAVs generate, there could be significant mistrust and apprehension about use of the data. There needs to be clarification over who "owns" the data that CAVs generate and the circumstances under which it can be obtained; otherwise fears over invasions of privacy will likely increase. To complicate matters, most state agencies are subject to open government records requests, which can become very burdensome. Data sharing should be evaluated carefully to determine which data is able to be shared with all entities.

- 8. Public Education**—AV 3.0 mentions the need for state, local and tribal governments to educate and prepare the public about the deployment of AVs. Educating the public on the capabilities of CAVs is extremely important and requires the support of all levels of government, including the federal government. The public perception of CAVs is limited to what they are able to find. USDOT, along with state, local, and tribal governments, should be making concerted efforts to partner with the private sector and the media regarding a realistic timeframe for deploying CAVs as well as the benefits and capabilities of CAVs.
- 9. Recognize the Potential for Negative Societal and Consumer Costs**—While AV 3.0 mentions the upside of deploying AV technologies such as reduced traffic fatalities and congestion, it does not address the downside associated with uneven distribution of benefits to society. Some very difficult lessons were learned with the construction of the interstate highway system which negatively affected many communities in the path of the roadways with benefits not being evenly accrued by all communities. We need to learn from these past experiences and ensure similar outcomes do not occur with the deployment of AVs. Already, consumers face different cost consequences with AVs including access to the technology on new vehicles and rising repair and maintenance costs. Current and short-term outlook for costs and benefits suggests access to the safety and mobility technology will be focused on more affluent consumers. With the public benefits of this technology in view, a serious policy discussion is needed on how to enable larger numbers of travelers to benefit. This may go well beyond the regulatory mission of transportation agencies, but should be part of the overall discussion.