**Automated Driving Systems (ADS) and Advanced Driver Assistance Systems (ADAS) Resources**

# NHTSA and AAMVA Resources

* **[NHTSA - Automated Driving Systems 2.0: A Vision for Safety](https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf%22%20%5Co%20%22NHTSA%20-%20Automated%20Driving%20Systems%3A%20A%20Vision%20For%20Safety%20%282.0%29)** (September 2017)

A Vision for Safety replaces the Federal Automated Vehicle Policy released in 2016. This updated policy framework offers a path forward for the safe deployment of automated vehicles by: Encouraging new entrants and ideas that deliver safer vehicles; Making Department regulatory processes more nimble to help match the pace of private sector innovation; and Supporting industry innovation and encouraging open communication with the public and with stakeholders.

<https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf>

* [**NHTSA - Preparing for the Future of Transportation: Automated Vehicles 3.0**](https://www.transportation.gov/av/3)(October 2018)

AV 3.0 builds upon Automated Driving Systems 2.0: A Vision for Safety (ADS 2.0). AV 3.0 expands the scope to all surface on-road transportation systems and was developed through the input from a diverse set of stakeholder engagements, throughout the Nation. AV 3.0 is structured around three key areas: advancing multi-modal safety,

reducing policy uncertainty and outlining a process for working with U.S. DOT.

<https://www.transportation.gov/av/3>

* [**NHTSA - Ensuring American Leadership in Automated Vehicle Technologies: Automated Vehicles 4.0 (January 2020)**](https://www.transportation.gov/sites/dot.gov/files/docs/policy-initiatives/automated-vehicles/360956/ensuringamericanleadershipav4.pdf)

AV 4.0 builds upon AV 3.0 by expanding the scope to 38 relevant United States Government (USG) components which have direct or tangential equities in safe development and integration of AV technologies. AV 4.0 is structured around three key areas: USG AV Principles, Administration Efforts Supporting AV Technology Growth and Leadership and USG Activities and Opportunities for Collaboration. AV 4.0 seeks to ensure a consistent USG approach to AV technologies, and to detail the authorities, research, and investments being made across the USG so that the United States can continue to lead AV technology research, development, and integration. <https://www.transportation.gov/sites/dot.gov/files/docs/policy-initiatives/automated-vehicles/360956/ensuringamericanleadershipav4.pdf>

* [**NHTSA Volunteer Safety Self-Assessment Template (September 2017)**](https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/voluntary_safety_self-assessment_for_web_101117_v1.pdf)

NHTSA has provided a template on the types of summary information that entities may want to provide to the public to demonstrate how they are addressing safety.

<https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/voluntary_safety_self-assessment_for_web_101117_v1.pdf>

* [**AAMVA’s Jurisdictional Guidance for the Safe Testing and Deployment of Highly Automated Vehicles Edition 1**](https://www.aamva.org/GuidelinesforTestingDriversinVehicleswithADAS_Final/)(May 2018)

The purpose of this report is to address how automated vehicle technology will directly impact vehicle registration and titling programs; driver training, testing, and licensing programs; enforcement of traffic laws; and first response to traffic related incidents. This report contains recommendations for jurisdictions that choose to regulate testing and deployment of HAVs. The recommendations are voluntary; jurisdictions are not required to adopt them. <https://www.aamva.org/GuidelinesTestingDeploymentHAVs-May2018/>

* **[AAMVA’s Guidelines for Testing Drivers in Vehicles with ADAS](https://www.aamva.org/GuidelinesforTestingDriversinVehicleswithADAS_Final/%22%20%5Co%20%22AAMVA%E2%80%99s%C2%A0%20Guidelines%20for%20Testing%20Drivers%20in%20Vehicles%20with%20ADAS)** (September 2019)

As vehicle technologies continue to evolve, examiners will be faced with greater challenges in determining a driver license applicant’s eligibility for full licensure . Examiners will need to examine and base their decisions on the outcomes of the test and grading the actions of the applicant, not the vehicle. This document focuses on the technology classified by the Society of Automotive Engineers International (SAE) as Advanced Driver Assistance Systems (ADAS) levels 1 and 2. To meet the changing needs in driver testing, jurisdictions will need to revise their driver testing programs as vehicle technologies continue to evolve. This includes enhancing skills tests, driver license testing materials, and driver license examiner training. <https://www.aamva.org/GuidelinesforTestingDriversinVehicleswithADAS_Final/>

# Research, Development

* [**AAA Foundation for Traffic Safety Understanding the Impact of Technology: Do Advanced Driver Assistance and Semi-Automated Vehicle Systems Lead to Improper Driving Behavior? Full Report**](https://aaafoundation.org/understanding-the-impact-of-technology-do-advanced-driver-assistance-and-semi-automated-vehicle-systems-lead-to-improper-driving-behavior/) **/** [**Fact Sheet**](https://aaafoundation.org/wp-content/uploads/2019/12/ADAS-Fact-Sheet.pdf) (December 2019)

In this study, the Virginia Tech Transportation Institute leveraged data from two

previous naturalistic driving studies (NDS). The study examined driver behavior, various measures of driving performance, engagement in secondary (non-driving) tasks, driver drowsiness and involvement in safety-critical events.

* [**AAA Foundation for Traffic Safety Advanced Driver Assistance Technology Names Full Report**](https://www.aaa.com/AAA/common/AAR/files/ADAS-Technology-Names-Research-Report.pdf) **/** [**Fact Sheet**](https://newsroom.aaa.com/2019/11/aaa-consumer-reports-j-d-power-and-the-national-safety-council-unite-to-adopt-common-naming-for-advanced-driver-assistance-technology/)(January 2019)

The intent of this paper is to create a dialog with the automotive industry, safety organizations and legislators about the need for common naming for advanced driver assistance systems. Within this report, AAA is proposing a set of standardized technology names for use in describing advanced safety systems. AAA acknowledges that this is a dynamic environment, and that further input from stakeholders and consumer research will further refine this recommendation.

* [**Implications of Automation for Motor Vehicle Codes**](https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4006)

The objective of this research was to provide state departments of transportation (DOTs) and motor vehicle departments with guidance and resources to assist with the legal changes that will result from the roll out of connected and automated vehicles. This research:

* Provides a review applicable existing laws and regulations that may need reconsideration as connected vehicles (CV) and connected and automated vehicles (AV) become more widely used with a focus on how these codes need to be revised (and how soon).
* Expected changes to motor vehicle laws, regulations, and statutes related to CV and AV may affect current driving practices and continuous responsibility for managing traffic safety hazards.
* Identifies barriers to implementation of new Rules of the Road resulting from the roll out of CV and AV and develop strategies to overcome them.
* Addresses processes and stages for modifying relevant motor vehicle code, laws, regulations, and statutes.
* [**GHSA Automated Vehicle Safety Expert Panel: Engaging Drivers and Law Enforcement**](https://www.ghsa.org/resources/AV19)

On May 8, 2019, GHSA and State Farm® hosted an expert panel meeting in Washington, D.C. to discuss traffic safety education and law enforcement amidst the advent of automated vehicle technology. This white paper summarizes the outcomes of that meeting and provides a number of recommendations for State Highway Safety Offices and the broader safety community. Former senior NHTSA official Dr. Jim Hedlund authored the paper. <https://www.ghsa.org/resources/AV19>

* **[AASHTO CAT/CAV Initiatives in States](https://transportationops.org/sites/transops/files/CAT%20Funding%20Initiatives%20in%20the%20States%20-%20June%202019.pdf%22%20%5Co%20%22AASHTO%20CAT/CAV%20Initiatives%20in%20states)**

A key goal of the CAT Coalition’s Working Group on Policy, Regulation, and Legislation was to understand how state and local DOTs are funding their respective CAT activities and the general scale of funding they are investing. The survey targeted state DOTs on CAT/CAV Capacity and Funding Approaches in the States, and it was administered in April 2019. The survey consisted of three, key sections: 1. Agency Capacity and Organization Section 2. Agency Funding and Financing Section 3. Agency Deployment and Partnerships Section. This document presents the results of the survey. [https://transportationops.org/sites/transops/files/CAT Funding Initiatives in the States - June 2019.pdf](https://transportationops.org/sites/transops/files/CAT%20Funding%20Initiatives%20in%20the%20States%20-%20June%202019.pdf)

* [**IIHS Report: New Studies Highlight Driver Confusion About Automated Systems**](https://www.iihs.org/news/detail/new-studies-highlight-driver-confusion-about-automated-systems)Vehicles are getting increasingly sophisticated, with more and more of them able to stay in a lane and maintain a set speed and following distance with minimal driver input. But this kind of automation has limitations that can be tricky for drivers to grasp, and two new IIHS studies highlight misperceptions or gaps in drivers' understanding. One study revealed how the names manufacturers use for these systems can send the wrong messages to drivers regarding how attentive they should be. Another found that drivers don't always understand important information communicated by system displays. <https://www.iihs.org/news/detail/new-studies-highlight-driver-confusion-about-automated-systems>
* [**International Association Chiefs of Police (IACP) Quick Take: 6 NHTSA Lessons from Investigating ADAS Vehicle Collisions: Top Takeaways on Self-Driving Vehicle Investigations**](https://www.policeone.com/vehicle-incidents/articles/iacp-quick-take-6-nhtsa-lessons-from-investigating-adas-vehicle-collisions-8GWI9A0U8nY4SNWj/)

This is a short excerpt shared with police chiefs and crash scene investigators by John Brophy, Chief, Crash Investigation Division, NHTSA at the IACP in October of 2019 on ‘How driving automation systems impact crash investigations.’

<https://www.policeone.com/vehicle-incidents/articles/iacp-quick-take-6-nhtsa-lessons-from-investigating-adas-vehicle-collisions-8GWI9A0U8nY4SNWj/>

* [**Autonomous Vehicle Technology: A Guide for Policy Makers**](https://www.rand.org/pubs/research_reports/RR443-2.html)(RAND 2016)

Anderson, James M., Nidhi Kalra, Karlyn D. Stanley, Paul Sorensen, Constantine Samaras, and Tobi A. Oluwatola, Autonomous Vehicle Technology: A Guide for Policymakers. Santa Monica, CA: RAND Corporation, 2016.

<https://www.rand.org/pubs/research_reports/RR443-2.html>

* [**Responsible Assessment Standards for Conditional Automation/Dual Control Vehicles**](https://www.namic.org/pdf/publicpolicy/200108_cadc_final.pdf)(Dec. 2019)

NAMIC proposes the need for standards that define what the CADC vehicles can and cannot do before they are operated on the public roads, which could greatly increase consumer confidence, provide more protection to developers, help guide regulators, and enable law enforcement and insurers to understand and mitigate crashes.

<https://www.namic.org/pdf/publicpolicy/200108_cadc_final.pdf>

* [**11 Industry Leaders white paper “Safety First for Automated Driving.”**](https://www.daimler.com/innovation/case/autonomous/safety-first-for-automated-driving-2.html)
Along with Aptiv, Audi, Baidu, BMW, Continental, Fiat Chrysler Automobiles, HERE, Infineon, Intel and Volkswagen, Daimler has published a white paper entitled Safety First for Automated Driving. As well as covering all relevant safety methods for Level 3/4 SAE automated driving, the paper introduces a traceability system, which extends from the primary goal – being safer than the average driver – right down to the individual safety objectives of the various components. <https://www.daimler.com/innovation/case/autonomous/safety-first-for-automated-driving-2.html>
* [**Autonomous Vehicles Readiness Index (AVRI)**](https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/02/2019-autonomous-vehicles-readiness-index.pdf)

The Autonomous Vehicles Readiness Index (AVRI) is a tool to help measure 25 countries’ level of preparedness for autonomous vehicles. It is a composite index that combines 25 individual measures from a range of sources into a single score. The intended core audience for the AVRI is public sector organizations with responsibility for transport and infrastructure. It should also be of interest to other public and private sector organizations that are involved with, or make use of, road transport. <https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/02/2019-autonomous-vehicles-readiness-index.pdf>

* [**Uber’s Public Safety Official & First Responders Guide**](https://medium.com/%40UberATG/our-public-safety-officials-and-first-responders-guide-73f7a49d4df7) (October 2019)

The purpose of this guide is to provide information to trained public safety officials and first responders on how to safely interact with an Uber ATG developmental self-driving vehicle (SDV) in the event of an emergency. This guide applies specifically to on-road Uber ATG developmental vehicles with a highly trained Mission Specialist behind the wheel. [https://medium.com/@UberATG/our-public-safety-officials-and-first-responders-guide-73f7a49d4df7](https://medium.com/%40UberATG/our-public-safety-officials-and-first-responders-guide-73f7a49d4df7)

* [**Washington State 2019 AV Work Group**](https://avworkgroupwa.org/)

The Washington State Legislature and the Washington State Transportation Commission (WSTC) are preparing for the arrival of autonomous vehicles (AVs). Through 2023, a diverse executive Work Group and seven Subcommittees will develop recommendations to prepare for this advancing technology. These recommendations include possible policies, laws and rules to support the safe operation of AVs on public roadways in the state. <https://avworkgroupwa.org/>

* [**Washington State Autonomous Vehicle Work Group - 2018 Annual Report**](https://www.aamva.org/WSAVWG-2018AR/) (January 2019)

This document represents a summation of the Work Group’s efforts during the first partial year of engagement. This annual report documents the organization and composition of the Work Group, summarizes the key points of discussion and decisions as part of various Work Group meetings, and outlines initial recommendations and next steps for 2019, including anticipated activities and required funding for the 2019-2021 biennium. <https://www.aamva.org/WSAVWG-2018AR/>

* [**US Army, Michigan State Police drive automotive Cybersecurity**](https://www.army.mil/article/231070/us_army_michigan_state_police_drive_automotive_cybersecurity)(Dec. 17, 2019)

U.S. Army engineers and scientists specializing in automotive cybersecurity with their colleagues from the Michigan State Police (MSP) demonstrated the results of applying Army cybersecurity tools to the law enforcement agency's fleet vehicles.

<https://www.army.mil/article/231070/us_army_michigan_state_police_drive_automotive_cybersecurity>

# Law/ Policies

* [**PennDOT Issues Guidance for Increased Safety Oversight of Highly Automated Vehicles**](https://www.penndot.gov/pages/all-news-details.aspx?newsid=514)

Following discussions and meetings with the state's Autonomous Vehicle Policy Task Force and more than a dozen automated vehicle technology companies, PennDOT issued guidance to enhance safety oversight of Highly Automated Vehicles (HAVs) in Pennsylvania. <https://www.penndot.gov/pages/all-news-details.aspx?newsid=514>

* [**Autonomous Vehicles: A Public Regulatory Policy Guide - March 2018 (National Society of Professional Engineers)**](https://www.aamva.org/AV-PublicRegPolicyGuide-NSPE-March2018/)

This document provides public policy decision makers, regulators, manufacturers, and others with guidelines to measure the safety readiness of autonomous vehicles under consideration for deployment. <https://www.aamva.org/AV-PublicRegPolicyGuide-NSPE-March2018/>

* [**Report to the Utah Legislature: Best Practices for Regulation of Autonomous Vehicles on Utah Highways**](https://www.aamva.org/UTReportOnBPforRegulationOfAVInUT/)(October 2016)

This report has been prepared in response to House Bill 280, passed during the 2015-16 Session of the Utah Legislature, which requires that the Department of Public Safety, in consultation with the Division of Motor Vehicles and the Department of Transportation, shall “study, prepare a report, and make recommendations regarding the best practices for regulation of autonomous vehicle technology on Utah highways.” <https://www.aamva.org/UTReportOnBPforRegulationOfAVInUT/>

* **[Ontario’s Pilot Regulation to Test Automated Vehicles](https://www.aamva.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=7346&libID=7321)** (Oct. 13, 2015)

On December 17, 2013, the Ontario Ministry of Transportation (MTO) posted a proposed automated vehicle pilot framework on the Ontario Regulatory Registry for consultation as well as held multiple stakeholder consultations regarding testing automated vehicles on Ontario’s roads since that time. This pilot program will allow us to establish and refine rules and monitor and evaluate the safety of automated vehicles prior to them potentially becoming widely available to the public. <https://www.aamva.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=7346&libID=7321>

* [**Autonomous | Self-Driving Vehicles Legislation**](http://www.ncsl.org/research/transportation/autonomous-vehicles-legislation.aspx)(National Conference of State Legislatures)

NCSL has a NEW[autonomous vehicles legislative database](https://www.ncsl.org/default.aspx?tabid=31006), providing up-to-date, real-time information about state autonomous vehicle legislation that has been introduced in the 50 states and the District of Columbia.

<https://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx>

# Jurisdictional Applications to Test ADS-Equipped Vehicles

The following is a list of jurisdictional application for AV testing reviewed by the AVWG. This may not be a complete list of all jurisdictional applications.

Arizona - <https://azdot.gov/motor-vehicles/professional-services/autonomous-vehicles-testing-and-operating-state-arizona>

California - <https://www.dmv.ca.gov/portal/dmv/?1dmy&urile=wcm:path:/dmv_content_en/dmv/vehindustry/ol/auton_veh_tester>

Connecticut - <https://www.ct.gov/opm/lib/opm/igp/org/transportation/fav_framework_agreement_final.pdf>

Maryland - <http://www.mva.maryland.gov/safety/MarylandCAV/>; <http://www.mva.maryland.gov/safety/EOI-test-highly-automated-vehicles-in-Maryland.htm>;  <http://www.mva.maryland.gov/_resources/docs/PermitProcessforTestingHAVs.pdf>

Massachusetts - <https://www.mass.gov/guides/testing-automated-driving-systems-in-massachusetts>

Nevada - <https://dmvnv.com/pdfforms/obl326.pdf>

New York - <https://dmv.ny.gov/dmv/apply-autonomous-vehicle-technology-demonstration-testing-permit>

Ontario - <http://www.mto.gov.on.ca/english/vehicles/automated-vehicles.shtml>

Oregon - <https://www.oregon.gov/ODOT/Programs/Pages/AV-Testing.aspx>

Pennsylvania - <https://www.penndot.gov/ProjectAndPrograms/ResearchandTesting/Autonomous%20_Vehicles/avtesting/Pages/avtesting.aspx>

Rhode Island - <https://www.ri.gov/press/view/33096>