



Executive Summary of 2020 Annual Report

Texas CAV Task Force 2020 Annual Report

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Disclaimer

The contents of this white paper reflect the views of the Texas CAV Task Force members, who are responsible for the information presented herein. The contents do not necessarily reflect the official views or policies of the State of Texas or any Texas state agencies. The white paper does not constitute a standard, specification, or regulation, nor does it endorse standards, specifications, or regulations. This white paper does not endorse practices, products, or procedures from any private-sector entity and is presented as a consensus broad opinion document for supporting and enhancing the CAV ecosystem within Texas.

Texas CAV Task Force Charter

The Texas CAV Task Force was created at the request of Texas Governor Greg Abbott in January 2019. The Texas CAV Task Force is responsible for preparing Texas for the safe and efficient rollout of CAVs on all forms of transportation infrastructure.

The primary functions are:

1. Coordinating and providing information on CAV technology use and testing in Texas.
2. Informing the public and leaders on current and future CAV advancements and what they mean in Texas. This process includes reporting on the current status, future concerns, and how these technologies are changing future quality of life and well-being.
3. Making Texas a leader in understanding how to best prepare and wisely integrate CAV technologies in a positive, safe way, as well as promoting positive development and experiences for the state.

The Texas CAV Task Force is composed of a voting group of no more than 25 members and represents the full spectrum of CAV stakeholders.

The goal of the Texas CAV Task Force is to be a single point of information and coordination for all CAV activities in Texas. Activities the Texas CAV Task Force may undertake include hosting industry meetings, developing white papers, creating a knowledge base for best practices, and collaborating and reporting on lessons learned. The Texas CAV Task Force will serve as a clearinghouse of

information for those seeking to pursue innovative CAV technology in Texas. The Texas CAV Task Force will be an incubating hub for any CAV policy recommendations that may need to be brought before the Texas Legislature and governor.

The Texas CAV Task Force is charged with providing a website as a single portal for CAV activities in Texas to inform the public, industry, and others. The Texas CAV Task Force is also charged with providing white papers on the most pertinent topics related to connected and automated vehicle technologies and development. This document describes the topics addressed in 2020 by the Texas CAV Task Force.

White Paper Executive Summaries

As a part of its initial efforts, the Texas CAV Task Force was asked to provide white papers across several topics related to connected, automated, and autonomous vehicle technologies. The Texas CAV Task Force focused on five areas and limited the scope of the white papers to discussing key concepts to understand the current situation and identifying issues and opportunities for ways forward among topics in those areas. The white papers were developed by five related subcommittees.

Connected and Automated Vehicle Terminology **A White Paper from All Subcommittees**

During discussions, the subcommittees identified the need for the public to understand common terms. This white paper contains a broad set of terms applicable to the industry and technology and serves as a basis for developing a mutual understanding and common foundation.

This white paper is found in Appendix A of the Texas CAV Task Force 2020 Annual Report.

Automated Vehicle Safety Validation, Data, and Metrics **A White Paper from the Subcommittee on Safety, Liability, and Responsibility**

CAVs are expected to increase the safety of motor vehicles, with the potential to greatly reduce the number of annual vehicle crashes and fatalities. A key public concern is the safety of fully autonomous vehicles and advanced automation technologies.

This white paper discusses state and federal roles and the state of the practice. The U.S. Department of Transportation has developed guidance, and the National Highway and Traffic Safety Administration (NHTSA) and Federal Motor Carrier Safety Association have made initial efforts to address rules updates. NHTSA has guidelines on voluntary safety self-assessments and is reviewing the Federal Motor Vehicle Safety Standards. States have varied in their approaches to facilitate safe testing and operations, and the paper reviews states' safety standards and policy development. The paper covers the work of standards bodies and data initiatives related to vehicle safety, examines NHTSA's Model Minimum Uniform Crash Criteria, and discusses the potential for reporting crash factors related to automated vehicles (AVs).

State of Texas safety and liability opportunities include:

- Promote ongoing and open public-private stakeholder dialogue and collaboration efforts on safety information and transparency.
- Discuss data sharing with AV companies, focusing on what data can be shared, cannot be shared, and are open for discussion.
- Encourage discussion between operators and developers and law enforcement to explore how to incorporate AV and automated driving function crash factors into state crash report forms (CR-3).
- Design an AV public education campaign developed with national partners, with distribution carried out by local officials and first responders.
- Continue to work with AV developers to create a website showing a map of AV testing and deployments within Texas.

This white paper is found in Appendix B of the Texas CAV Task Force 2020 Annual Report.

Understanding Perceptions and Opinions about Connected and Automated Vehicle Technology: Advancing the Dialogue

A White Paper from the Subcommittee on Education, Communication, and User Needs

Advances in connected and automated technology, both in vehicles and infrastructure, are changing how systems are operated, managed, and maintained. The rate of advancement will continue to increase. Potential safety and other benefits will be affected by the rate of public acceptance and adoption. Effective education and outreach are needed to build awareness, encourage engagement, increase public understanding, and inform adoption.

This white paper begins by addressing the need for common terms the public understands. The paper discusses gaining public perceptions of CAVs. It closes with an approach and strategies for successful education and outreach.

State of Texas CAV education and communication opportunities include:

- Tailor outreach and education to specific communities and audiences, supported by research, appropriate multimedia, and measures of effectiveness. Use a stakeholder engagement strategy and a complementary public outreach plan informed by:
 - Audience identification.
 - Market research.
 - Message design.
 - Consistent and continual message delivery.
- Achieve and educate about common terminology.
- Continue development and update of the Texas CAV Task Force website.
- Continue pilots and demonstrations supported by research and community surveys.
- Develop information on emergent issues including impacts on workforce, education, and land use and environment, economic development, freight, etc.

This white paper is found in Appendix C of the Texas CAV Task Force 2020 Annual Report.

Connected and Automated Vehicle Data Issues and Opportunities
A White Paper from the Subcommittee on Data, Connectivity, Cybersecurity, and Privacy

Connected vehicles (CVs) and AVs use an array of sensors and other technologies to collect vast amounts of data from their own vehicles and the environment around them, as well as rely on volumes of different types of data from various sources to operate safely. A safe and successful integration of both CVs and AVs into the state’s transportation ecosystem depends on understanding and addressing an array of critical policy and planning issues related to vehicle data.

This white paper is intended to build community knowledge about CAV data that informs safety, policy, stakeholder engagement, and technology practices. The paper provides an overview of CAV technologies and federal and state policies to frame the understanding of the related data concepts. It addresses CV and AV data privacy, security, and cybersecurity challenges. The paper also examines CV and AV data use, generation, and ownership concepts. The paper closes with the opportunities and challenges for data sharing and data exchange. These issues require ongoing collaboration among public- and private-sector stakeholders.

State of Texas CAV data opportunities include:

- Continue working as public-private partners to deal with issues such as data ownership, access, use, sharing, exchange, privacy, and cybersecurity protection. One exercise to inform these issues is answering the following questions:
 - Which entities are collecting, storing, and using CV and AV data—how, for what purposes, and with what protections?
 - What data gaps exist that hinder innovation and furthering the public interest?
 - What data can be shared or exchanged to facilitate the safe and successful integration of CVs and AVs into the transportation ecosystem?
- Address the ownership, technical, and policy issues surrounding these high-priority data categories. This will accelerate the safe deployment of CVs and AVs in Texas, providing information on work zones, real-time traffic and road conditions, roadway inventories, signal phase and timing, cybersecurity, and safety performance.
- Examine CV and AV data management challenges and solutions for both public- and private-sector agencies including collection, transmission, storage, and analytics.

This white paper is found in Appendix D of the Texas CAV Task Force 2020 Annual Report.

Connected and Automated Vehicle Infrastructure Needs for Automated Freight
A White Paper from the Subcommittee on Freight and Delivery

The freight network is at the heart of the Texas economy. The freight industry is moving toward a more connected and automated future. By investing in smart infrastructure, maintaining an attractive regulatory environment, and taking a proactive approach to workforce development, Texas will improve roadway safety, optimize freight operations, and grow the Texas economy.

This white paper provides an overview of the ground-based freight ecosystem, highlighting challenges and opportunities in three environments:

- Long-haul.
- Warehouses, distribution centers, and intermodal facilities.
- Last-mile delivery.

The paper identifies applicable federal and state policies. It describes several connected and automated freight vehicle types under development. Each vehicle is designed to operate in at least one of the following infrastructure environments: highway, local street, and sidewalk. In addition, this paper examines shifts in the Texas freight workforce as the trucking industry evolves from a driver-based profession to a skills-based labor market. Finally, the paper describes the infrastructure needs to enable connected freight capabilities and the potential safety benefits.

State of Texas freight CAV opportunities include:

- Prioritize roadway maintenance along CAV corridors, focusing on lane striping, pavement quality, and signage.
- Sponsor research into gaps in common infrastructure challenges such as work zone, forced merges, and transfer points.
- Expand the Texas connected freight network to include local roads, using the Texas Connected Freight Corridors project as an opportunity to develop critical applications, gain experience in CV technology, and formulate best practices for deployment.
- Continue to examine the potential needs for infrastructure enhancement and/or refinement, including items such as transfer points, changes to sidewalk design, and ways multiple vehicle types can travel safely and cooperatively on the same infrastructure at different speeds.
- Continue to discuss information-sharing opportunities with the private sector, including items related to geometry, signage, and safety.
- Work with the private sector to identify opportunities for increased CV connectivity and technology, and work with partners to identify high-priority applications and locations for future efforts.
- Provide information on executed and planned CV deployments to the public, and educate them on the benefits of adopting the technology.
- Invest in workforce development programs that upskill workers and create new educational pathways.

This white paper is found in Appendix E of the Texas CAV Task Force 2020 Annual Report.

Connected and Automated Vehicle Licensing and Registration **A White Paper from the Subcommittee on Licensing and Registration**

State of Texas laws have led to a recent wave of CAV innovation and experimentation—on roads and streets and sidewalks, in cities, and on rural highways—operating within a range of public- and private-sector agencies and operators with state regulations that focus on regulating drivers,

operators, and vehicles. As these technologies continue to advance and be adopted by the public, it is important to understand their impacts on federal and state authorities and what areas may need future policy clarity.

This white paper identifies current federal and State of Texas agencies' roles and responsibilities, as well as the roles and responsibilities of other individuals and organizations that can also impact AV policy. The paper covers current licensing, certification, registration, titling, vehicle sales, and operations requirements. The paper addresses some expectations of CAVs in Texas, as well as gaps in driver/operator and vehicle regulation requirements for AVs. It provides some case studies of other states' licensing and registration requirements.

State of Texas opportunities for future CAV operational clarity include:

- AV developers and the Texas Department of Public Safety could collaboratively discuss compliance with state motor vehicle equipment standards and current AV configurations, particularly for personal delivery devices and zero-occupant vehicles.
- AV developers and manufacturers, the Texas Department of Motor Vehicles, and the Texas Automobile Dealers Association could discuss how current dealer licensing/sales laws and registration rules affect the range of commercial relationships between original equipment manufacturers and AV developers.
- If some AV developers are considering alternatives that include AV operation entirely by remote operators (rather than by onboard software that controls vehicle driving tasks), the AV industry may want to interact with applicable state agencies to determine how the current regulatory structure addresses such operations.
- The AV industry and national associations of state transportation and motor vehicle agencies can develop guidelines for best practices for identifying AV vehicles and responsible parties for meeting licensing and operating requirements of state law.

This white paper is found in Appendix F of the Texas CAV Task Force 2020 Annual Report.