



**The Journal of Robotics,
Artificial Intelligence & Law**

Editor's Note: Biometrics

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Automated Vehicles 3.0: Preparing for the Future of Transportation

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The SEC's State of Play on Cryptocurrency

Thomas K. Potter, III

Everything Is Not *Terminator*: Public-Facing Artificial Intelligence Policies—Part II

John Frank Weaver

- 71 Editor’s Note: Biometrics**
Steven A. Meyerowitz
- 75 Biometrics: Is It Always About You?**
Paul B. Keller and Jenny Shum
- 97 Price Fixing: “It Was the Machines, Sarah!”**
Dante A. Stella and Howard B. Iwrey
- 109 Automated Vehicles 3.0: Preparing for the Future of Transportation**
Susan H. Lent, Greg W. Guice, and Ashley Edison Brown
- 117 Policymakers Focusing on Artificial Intelligence**
Greg W. Guice, Diana E. Schaffner, Ed Pagano, and Hans Christopher Rickhoff
- 123 The SEC’s State of Play on Cryptocurrency**
Thomas K. Potter, III
- 141 Everything Is Not *Terminator*: Public-Facing Artificial Intelligence Policies—Part II**
John Frank Weaver

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Automated Vehicles 3.0: Preparing for the Future of Transportation

Susan H. Lent, Greg W. Guice, and Ashley Edison Brown*

The Department of Transportation has issued version 3.0 of its guidance on the testing and deployment of vehicles equipped with autonomous driving systems. The authors of this article explain the guidance, which provides greater clarity regarding the steps the Department will take to achieve its core mission of promoting safety without sacrificing innovative opportunities.

The Department of Transportation (“DOT”) issued version 3.0¹ of its guidance (the “Guidance”) on the testing and deployment of vehicles equipped with autonomous driving systems (“ADS”). This third iteration of DOT guidance focuses on how automation will be safely integrated across passenger vehicles, commercial vehicles, on-road public transportation, and the roads on which they operate. The Guidance incorporates feedback from manufacturers and technology developers, infrastructure owners and operators, commercial motor carriers, the bus transit industry, and state and local governments.

DOT Programs and Policies

AV 3.0 outlines the roles of the National Highway Traffic Safety Administration (“NHTSA”), Federal Motor Carrier Safety Administration (“FMCSA”), Federal Highway Administration (“FHWA”), and Federal Transit Administration (“FTA”) in ensuring the safe integration of autonomous vehicles into the transportation system. The Guidance identifies steps that each of the agencies will take to encourage innovation while ensuring safety. In particular:

- NHTSA, which regulates vehicle safety, will initiate a rule-making to consider changes to Federal Motor Vehicle Safety Standards that are relevant only when a human driver is

in a vehicle in addition to approaches to streamlining the processing and awarding of exemptions.

- FMCSA, which regulates the safety of commercial motor carriers operating in interstate commerce, will issue an Advance Notice of Proposed Rulemaking to accommodate the introduction of ADS into commercial motor vehicles.
- FHWA will update its Manual on Uniform Traffic Control Devices to take into account autonomous technologies.
- FTA will ensure the safe integration of autonomous transit vehicles through research and studies.

Best Practices

AV 3.0 identifies best practices for state, local, and tribal governments integrating autonomous vehicles into their transportation systems, including:

- Reviewing laws and regulations to ensure they do not obstruct testing and deployment of automated systems.
- Adopting policies and procedures, such as licensing and registration, to account for automated vehicles.
- Assessing infrastructure components, such as road markings and signage, so they are useful to the operation of automated vehicles.
- Providing guidance, information, and training to prepare the transportation workforce and the general public for the operation and use of automated vehicles.

Best Practices for State Legislatures

AV 3.0 includes specific recommendations for state legislatures developing autonomous vehicle legislation, such as:

- Avoid overly prescriptive or unnecessary legislation that could create a barrier to the testing, deployment, or operation of autonomous vehicles, and seek technical assistance from the DOT.
- Use terminology already being developed through voluntary, consensus-based, technical standards, such as SAE terminology.

- Assess state roadway readiness, such as infrastructure readiness and uniformity of road markings, signage, and quality of pavement conditions.

Best Practices for State Highway Officials

State highway safety officials should establish programs that address driver education and testing, licensing, pedestrian safety, and vehicle registration and inspection. Building on what was identified in *A Vision for Safety 2.0*,² AV 3.0 suggests that officials consider minimum requirements for driver training and licensing procedures for test vehicles at different automation levels. Officials should also identify and address issues such as congestion or the transportation of minors or persons with disabilities.

Considerations for Infrastructure Owners and Operators

The Guidance makes the following recommendations for infrastructure owners and operators involved in planning, design, construction, maintenance, and operation of roadway infrastructure:

- Establish cross-jurisdictional approaches and work with first responders to develop commonly understood traffic law enforcement practices and emergency response plans.
- Work with automated vehicle developers and testers in order to learn from their testing and pilots how to identify potential infrastructure requirements or opportunities for transportation planning, infrastructure design, and traffic operations management.
- Build and train a workforce that is prepared for automated vehicles.
- Identify data needs and opportunities to exchange data to help automated vehicles navigate challenging and unique roadway environments and changing traffic laws.
- Work with stakeholders and the FHWA to review and revise the existing Uniform Vehicle Code (a model set of traffic laws) that states consult when considering their own traffic codes.

- Support scenario planning tools that allow states to review multiple scenarios for the use of automation technologies and analyze any issues.

Considerations for State Commercial Vehicle Enforcement Agencies

The Guidance recommends that state commercial vehicle enforcement agencies examine the compatibility of their intra-state regulations with the federal requirements concerning ADS-equipped commercial motor vehicles and determine whether the state should amend its intrastate regulations.

Considerations for Public Transit Industry

The Guidance notes that transit agencies should examine pilot projects regarding retrofitting transit vehicles with advanced driver-assisted capabilities and operating low speed automated vehicles or shared automated vehicles, by working with local partners to create and implement complete streets concepts. The Guidance also states that transit agencies must consider accessibility for persons with disabilities.

Considerations for Local Governments

Local governments should consider how to best facilitate the safe testing and operation of autonomous vehicles on local streets, including the need for curb space for pick-ups and drop-offs, land use considerations, and effect of autonomous vehicles on traffic congestion.

Cybersecurity Threats to State, Local, and Tribal Governments

The Guidance recommends that state, local, and tribal governments invest in improvements to cyber defenses and infrastructure to protect critical infrastructure.

The Private Sector's Role

The private sector should play a role in the safe deployment of ADS by demonstrating safety through voluntary safety self-assessments (“VSSAs”). A *Vision for Safety 2.0* introduced the 12 safety elements that ADS developers should consider in developing and testing their technology. The new Guidance reaffirms that companies should publish their VSSAs to build public confidence and acceptance. The Guidance also recommends that the private sector engage in outreach with the public and the DOT agencies. The private sector is also called on to support and contribute to the development of voluntary, consensus-based, and performance-oriented technical standards. The Department sees standards as an effective means to support interoperable integration of technologies into the transportation systems.

The Road Ahead

In the Road Ahead section of the Guidance, the DOT discusses its “five core strategies” to accelerate the integration of automated vehicles into the nation’s transportation system. The five components are:

1. Engage stakeholders and the public to address concerns and expectations, and to answer questions that can help inform the DOT’s technical standards and policymaking in this space.
2. Provide best practices and policy considerations to support stakeholders as they seek to integrate automation into the transportation system. Best practices are to be based on research and evolve as the technology evolves.
3. Support voluntary technical standards and incorporate them, where appropriate, into the DOT effort to integrate automation technologies into the transportation system.
4. Conduct technical research to educate policy decisions and agency actions.
5. Modernize regulations through the process provided for in the Administrative Procedures Act to ensure regulations do not unnecessarily impede automation.

In addition to these strategies that are primarily focused on how the DOT will navigate the autonomous vehicle space, the DOT provides guidance for manufacturers on a risk management strategy to promote safety. The process is not meant to be a directive, but is one example of how a company can seek to ensure “safety risks are appropriately managed and testing is conducted in accordance with applicable laws and regulations.” In addition, the process is one in which the DOT seeks to engage collaboratively with the ADS manufacturers to discuss key issues. The three-stage approach is:

1. Develop technology in a controlled environment and with restricted road testing to validate the completeness of use cases, and to verify that implemented software can perform the assigned functions.
2. Expanded road testing to build statistical confidence in software and hardware, and to observe system failures and execution of fail-safe and other operational behaviors.
3. The “limited to full” ADS deployment phase is achieved when the manufacturer reaches “statistical confidence” in the software, validates underlying safety assumptions, gathers user and public feedback, and undertakes fine-tuning in user compatibility areas.

Conclusion

This new iteration of autonomous vehicle guidance is significant in that the DOT recognizes the need for it to issue regulations to remove regulatory roadblocks to testing and deployment of autonomous vehicles. It addresses the advent of autonomous commercial vehicles and transit buses, and offers additional best practices and recommendations for state and local governments and the private sector. AV 3.0 attempts to balance the need to maintain flexibility in light of constantly evolving technology with the importance of ensuring autonomous vehicles are safely integrated into the transportation network.

Notes

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1. <https://www.transportation.gov/av/3>.
2. https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf.