



American Association of
Motor Vehicle Administrators



What Happens When the Driver Is a Robot? Autonomous Vehicles, Human Behavior & Safety

OHS-06

March 27, 2017

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American Association of
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AAMVA Mission and Vision

OUR MISSION

serve North American
motor vehicle & law enforcement agencies
to accomplish their missions

OUR VISION

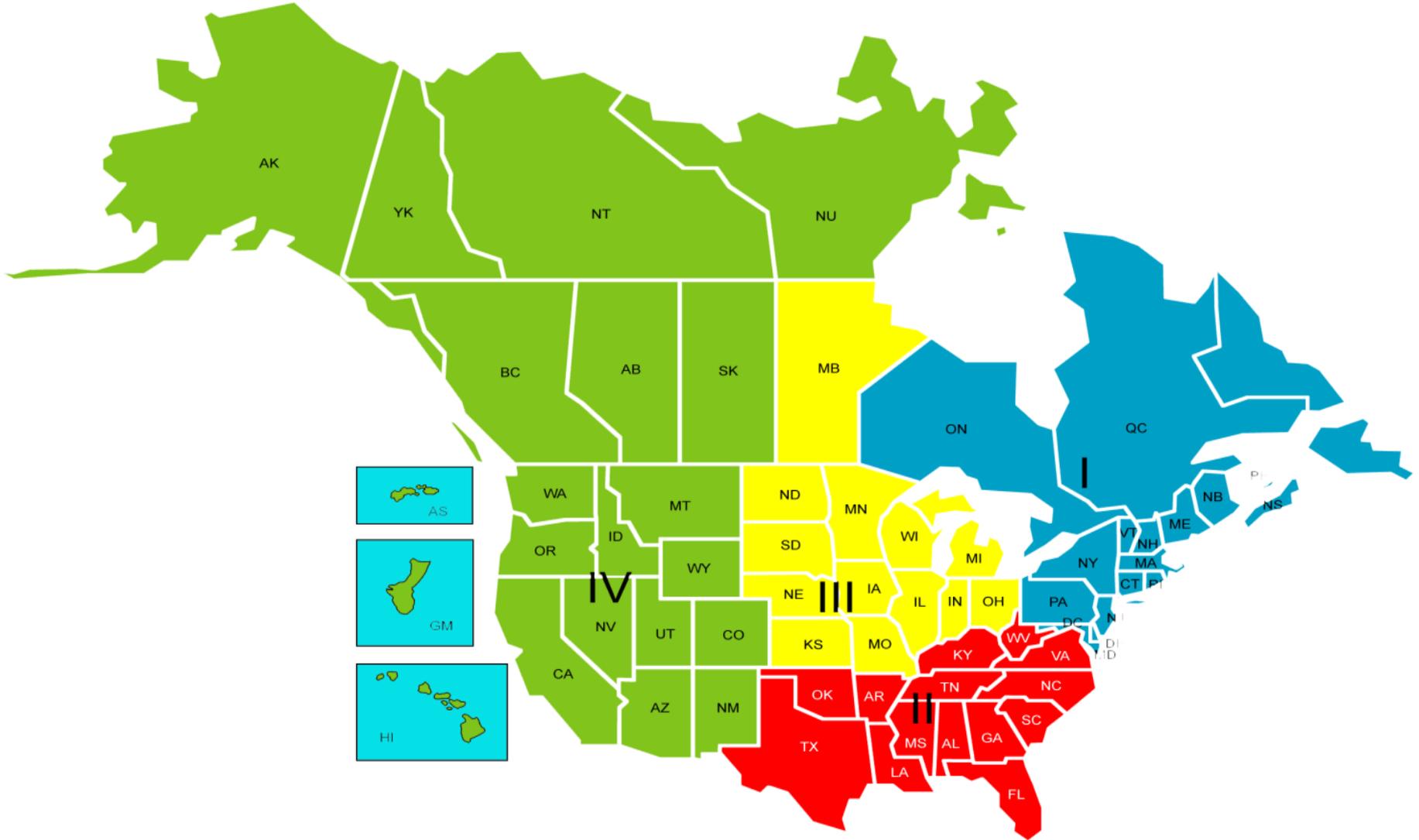
safe drivers
safe vehicles
secure identities
saving lives!

Founded in 1933, the American Association of Motor Vehicle Administrators (AAMVA) represents the Motor Vehicle and State Police/Highway Patrol and Provincial Police Administrators of all 69 states, provinces and territories of the U.S. and Canada



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AAMVA Community

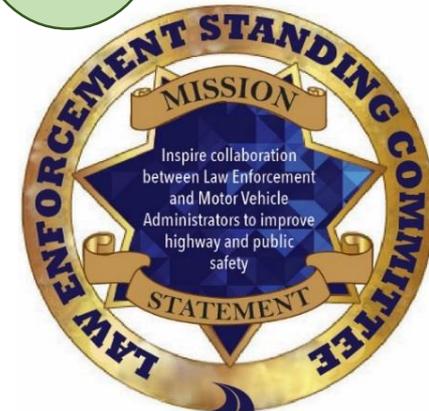
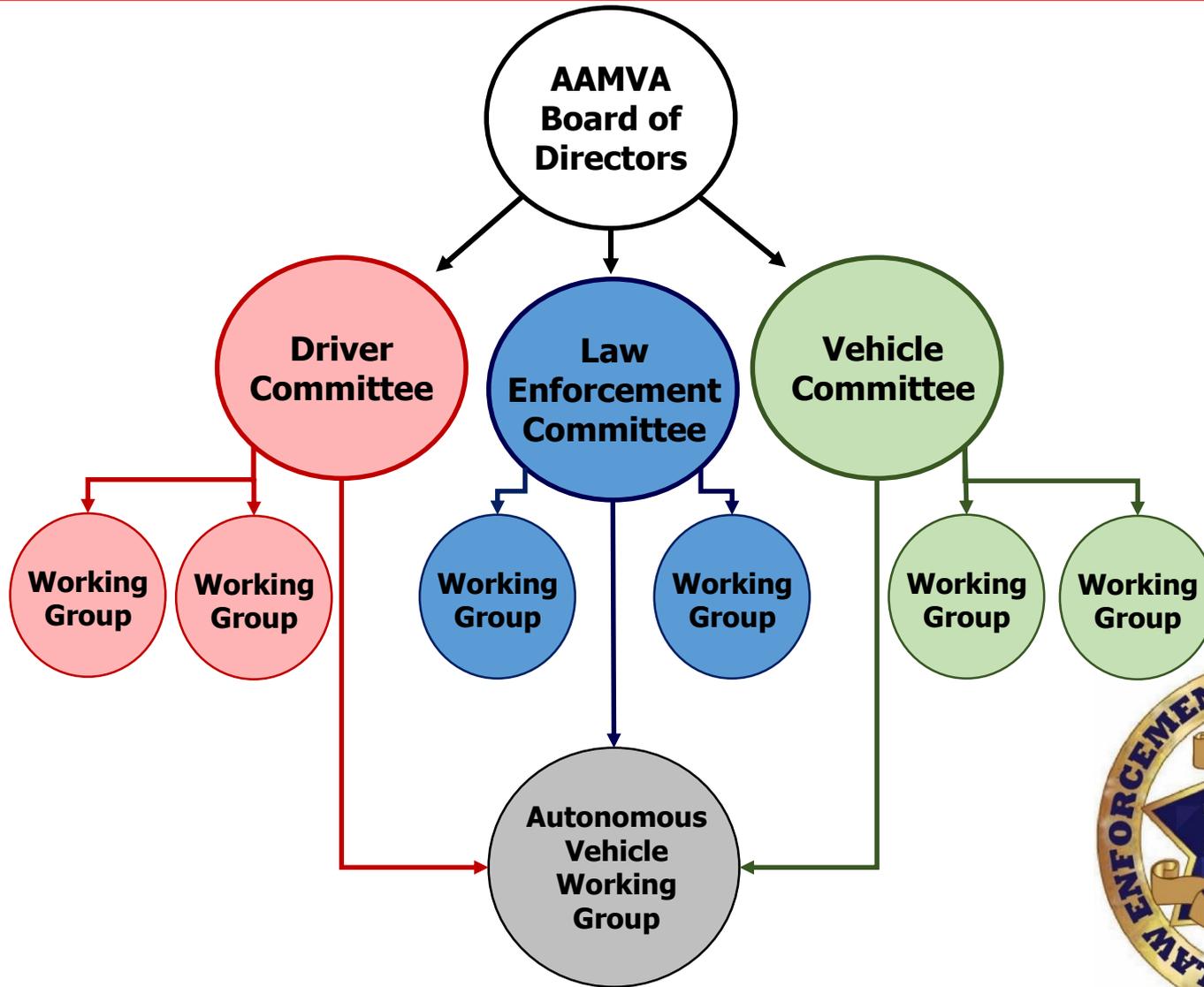


Safe Drivers · Safe Vehicles · Secure Identities · Saving Lives



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Governance & Standing Committee Structure





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New Technologies

Among AAMVA's top priorities is helping our members prepare for new technologies expected by drivers such as:

Mobile Drivers Licenses...



...and Automated Vehicles





Automated & Autonomous Vehicles – SAE Levels

SAE level	Name	Narrative Definition	Execution of Steering and Acceleration/Deceleration	Monitoring of Driving Environment	Fallback Performance of Dynamic Driving Task	System Capability (Driving Modes)
Human driver monitors the driving environment						
0	No Automation	the full-time performance by the <i>human driver</i> of all aspects of the <i>dynamic driving task</i> , even when enhanced by warning or intervention systems	Human driver	Human driver	Human driver	n/a
1	Driver Assistance	the <i>driving mode</i> -specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the <i>human driver</i> perform all remaining aspects of the <i>dynamic driving task</i>	Human driver and system	Human driver	Human driver	Some driving modes
2	Partial Automation	the <i>driving mode</i> -specific execution by one or more driver assistance systems of both steering and acceleration/deceleration using information about the driving environment and with the expectation that the <i>human driver</i> perform all remaining aspects of the <i>dynamic driving task</i>	System	Human driver	Human driver	Some driving modes
Automated driving system ("system") monitors the driving environment						
3	Conditional Automation	the <i>driving mode</i> -specific performance by an <i>automated driving system</i> of all aspects of the dynamic driving task with the expectation that the <i>human driver</i> will respond appropriately to a <i>request to intervene</i>	System	System	Human driver	Some driving modes
4	High Automation	the <i>driving mode</i> -specific performance by an automated driving system of all aspects of the <i>dynamic driving task</i> , even if a <i>human driver</i> does not respond appropriately to a <i>request to intervene</i>	System	System	System	Some driving modes
5	Full Automation	the full-time performance by an <i>automated driving system</i> of all aspects of the <i>dynamic driving task</i> under all roadway and environmental conditions that can be managed by a <i>human driver</i>	System	System	System	All driving modes

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AAMVA Vehicle Classification Terms

AAMVA is adopting classification terms similar to SAE:

Level 0 – No Automation
Level 1 – Driver Assistance
Level 2 – Partial Automation
Level 3 – Conditional Automation
Level 4 – High Automation
Level 5 – Full Automation

The term **Highly Automated Vehicles (HAV)** has recently emerged which includes SAE Levels 3, 4 and 5.



AAMVA Vehicle Classification Terms

Levels 0 – 3 are in vehicles available today ...

Level 0 – No Automation

The human driver does everything.

Level 1 – Driver Assistance

An automated system on the vehicle can sometimes assist the human driver conduct one or more driving tasks.

Level 2 – Partial Automation

An automated system on the vehicle can conduct some parts of the driving task, while the human continues to monitor the driving environment and performs the rest of the driving tasks.



HAVs in testing and development today ...

Level 3 – Conditional Automation

An automated system can conduct some parts of the driving task and monitor the driving environment in some instances, but the human driver must be ready to take back control when the automated system requests.

Level 4 – High Automation

An automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated system can operate only in certain environments and under certain conditions.

Level 5 – Full Automation

The automated system can perform all driving tasks, under all conditions that a human driver could perform.

Federal Automated Vehicles Policy

Federal Automated Vehicles Policy

*Accelerating the Next Revolution
In Roadway Safety*



September 2016

Published September 2016 and can be found at www.transportation.gov/AV

Section 1 – Vehicle Performance Guidance for Automated Vehicles

(outlines best practices for safe pre-deployment development and testing prior to commercial sale; sets USDOT expectations of industry).

Section 2 – Model State Policy

(recognizes states' sovereignty while encouraging a consistent national framework rather than a patchwork of inconsistent laws. References partnership with AAMVA).



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September 2016

Section 3 – NHTSA’s Current Regulatory Tools (being expanded to include streamlined review and exemption request processes).

Section 4 – New Tools and Authorities (Identifies potential new tools, authorities and regulatory structure to enable safe and expeditious deployment of new technologies).



U.S. Department
of Transportation





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Federal Automated Vehicles Policy

Section 2 – Model State Policy (cont.)

Federal responsibilities include:

- Setting safety standards for new motor vehicles and motor vehicle equipment;
- Enforcing compliance with the safety standards;
- Investigating and managing the recall and remedy of non-compliances and safety-related motor vehicle defects on a nationwide basis;
- Communicating with and educating the public about motor vehicle safety issues and;
- Issuing guidance to achieve national safety goals.

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Section 2 – Model State Policy (cont.)

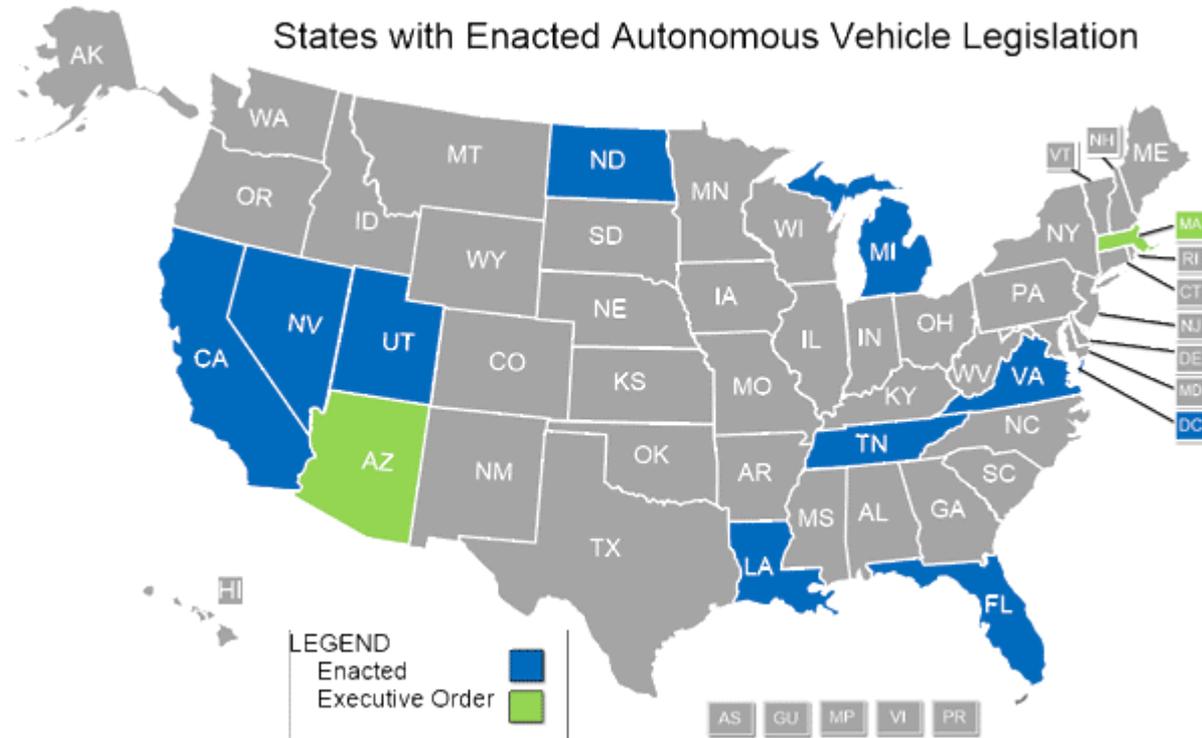
State responsibilities include:

- Licensing (human) drivers and registering motor vehicles in their jurisdictions;
- Enacting and enforcing traffic laws and regulations;
- Conducting safety inspections, when States choose to do so; and
- Regulating motor vehicle insurance and liability.



Regulatory Uncertainty – States with Enacted AV Legislation

Uniform guidelines for Highly Autonomous Vehicle deployment and operation will provide certainty for OEMs, aid in the quick and efficient deployment of these vehicles, and enhance traffic safety.



Source: National Council for State Legislatures



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AAMVA Autonomous Vehicle Working Group

The AVWG has three sub-groups focusing on issues impacting:

- **Drivers: Licensing & Testing;**
- **Vehicles: Titling & Registration; and**
- **Law Enforcement: Concerns & Challenges**





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AAMVA Autonomous Vehicle Working Group

Concurrent with the development of the Federal Automated Vehicles Policy, the AAMVA Autonomous Vehicle Working Group was and is working on completing “Guidelines for the Regulation of Highly Automated Vehicles” ...

This is a final piece of work that will provide the states a companion document in support of the USDOT Model State Policy to help implement the model state policy from a state perspective.

*** Anticipate publishing in 2017**



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AAMVA's Guidelines for the Regulation of Automated Vehicles

The **Guidelines for the Regulation of Highly Automated Vehicles** may include the following general topical areas:

- Administration
- Testing Vehicles on Public Roadways
- Jurisdictional Permission to Test (Permitting Process)
- Testing by Manufacturers
- Driver Training & Examination Considerations for Deployed Vehicles
- Registration and Title Considerations for Deployed Vehicles
- **Law Enforcement Considerations for Deployed Vehicles**



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Law Enforcement Considerations for Deployed Vehicles

- **Crash and Incident Reporting**
- Criminal Activities
- Distracted Driving
- Enforcement/Penalties
- First Responder Safety
- Law Enforcement and First Responder Training
- **Vehicle Response to Emergency Vehicles, Manual Traffic Controls, and Atypical Road Conditions**
- **System Misuse and Abuse**
- Vehicle Identification
- Violation Codes Programming
- **Rules of the Road**



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Crash and Incident Reporting

For purposes of the AAMVA Report, crash investigation relates to investigating crashes between Autonomous Vehicles (AVs) and other vehicles, persons, animals, or objects whether or not the AV is responsible.

The U.S. Department of Transportation provides Minimum Model Uniform Crash Criteria (MMUCC) crash report guidance to the states. AAMVA is on the MMUCC Committee which is currently developing the Fifth Edition for publication in 2017 to include AV data elements. (Fourth Edition was published in 2012)





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Vehicle Response to Emergency Vehicles, Manual Traffic Control, and Atypical Road Conditions

Traffic safety is often dependent on the ability of a driver to recognize and respond appropriately to a wide variety of hazards in an ever-changing roadway environment. These hazards include, but are not limited to both moving and stopped emergency vehicles, emergency workers and other pedestrians manually directing traffic, changing traffic patterns or conditions in roadway construction and maintenance zones, crash scenes, road debris or other obstructions.

The NHTSA Federal Automated Vehicles Policy refers to such vehicle operational functions as Object and Event Detection and Response (OEDR). OEDR refers to the detection by the driver or Highly Automated Vehicle (HAV) system of any circumstance that is relevant to the immediate driving task, as well as the implementation of the appropriate driver or HAV system response to the circumstance.



Concern For Connected Vehicle Hackings Prompts Federal Study

January 25, 2017: A bipartisan bill prescribing a Highway Traffic Safety Administration study on cyber security in connected vehicles entered consideration in the House of Representatives. In partnership with the Federal Trade Commission, the Defense Department, and others, the study would create a standard for isolating vehicle software systems, storing system data, and preventing data breaches.

AAMVA is tracking this bill as it moves through the legislative process.

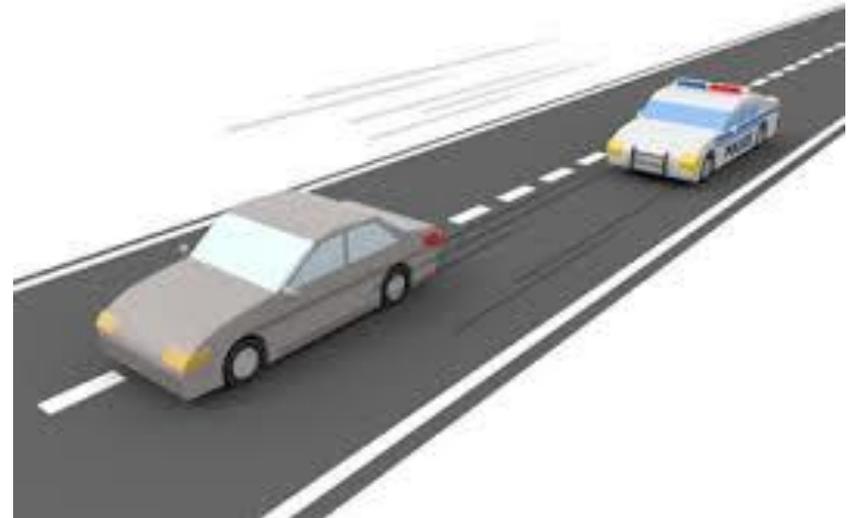


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Rules of the Road

Issue: Should HAV's strictly adhere to Rules of the Road?

Issue: In general, many traffic laws are similar from jurisdiction to jurisdiction. However, there are also many traffic laws that are jurisdiction specific.





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