AAMVA
American Association of Motor Vehicle Administrators

Autonomous Vehicles & CDL Legislative and Regulatory Implications

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Automated Vehicle Classification Terms

As adopted by SAE, International:

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

Automated Vehicle Classification Terms

In vehicles available today:

Level 0 – No Automation

The human driver does everything

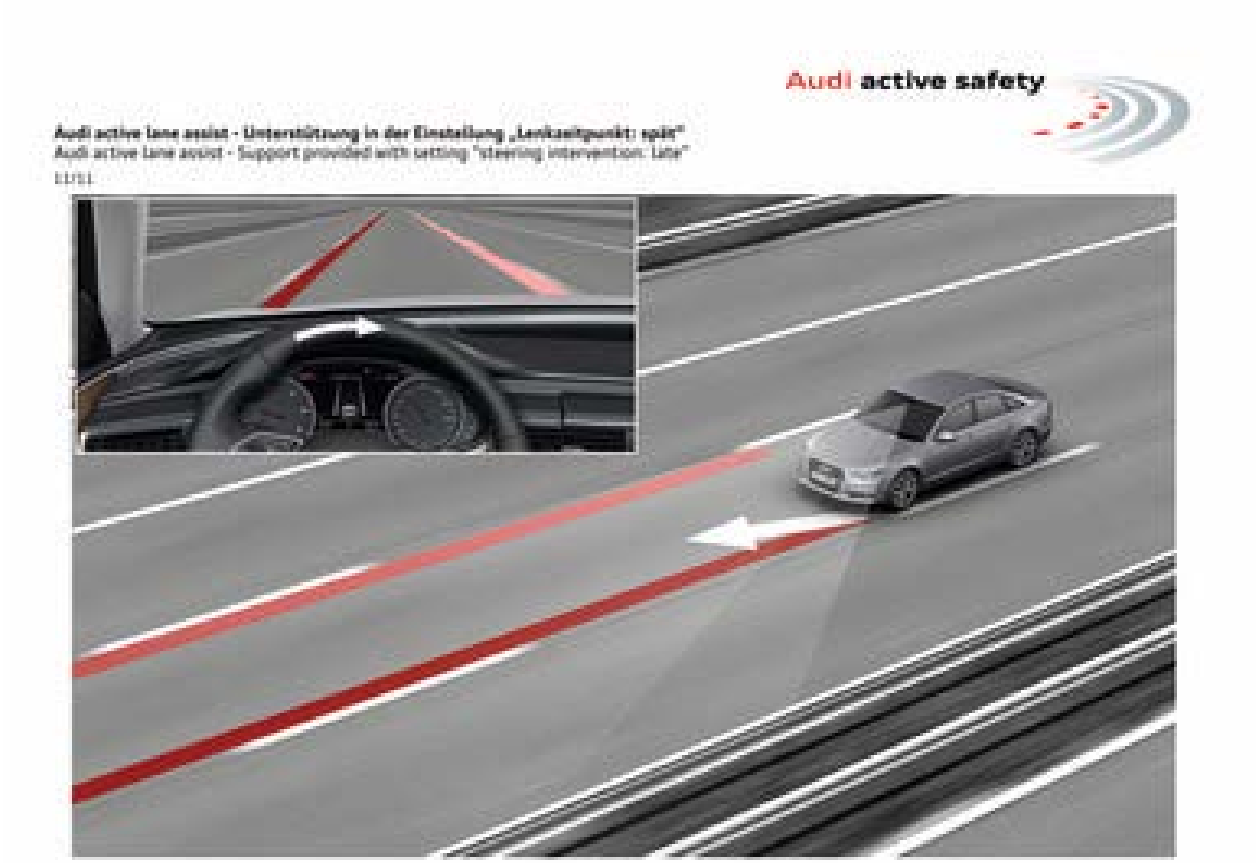
Level 1 – Driver Assistance

An automated system on the vehicle can sometimes assist the human driver conduct some parts of the driving task.

- Cruise Control
- Auto High beams
- Blind spot monitoring
- Lane departure warning
- Forward collision warning

Automated Vehicle Classification Terms

Example: Lane departure warning system



Automated Vehicle Classification Terms

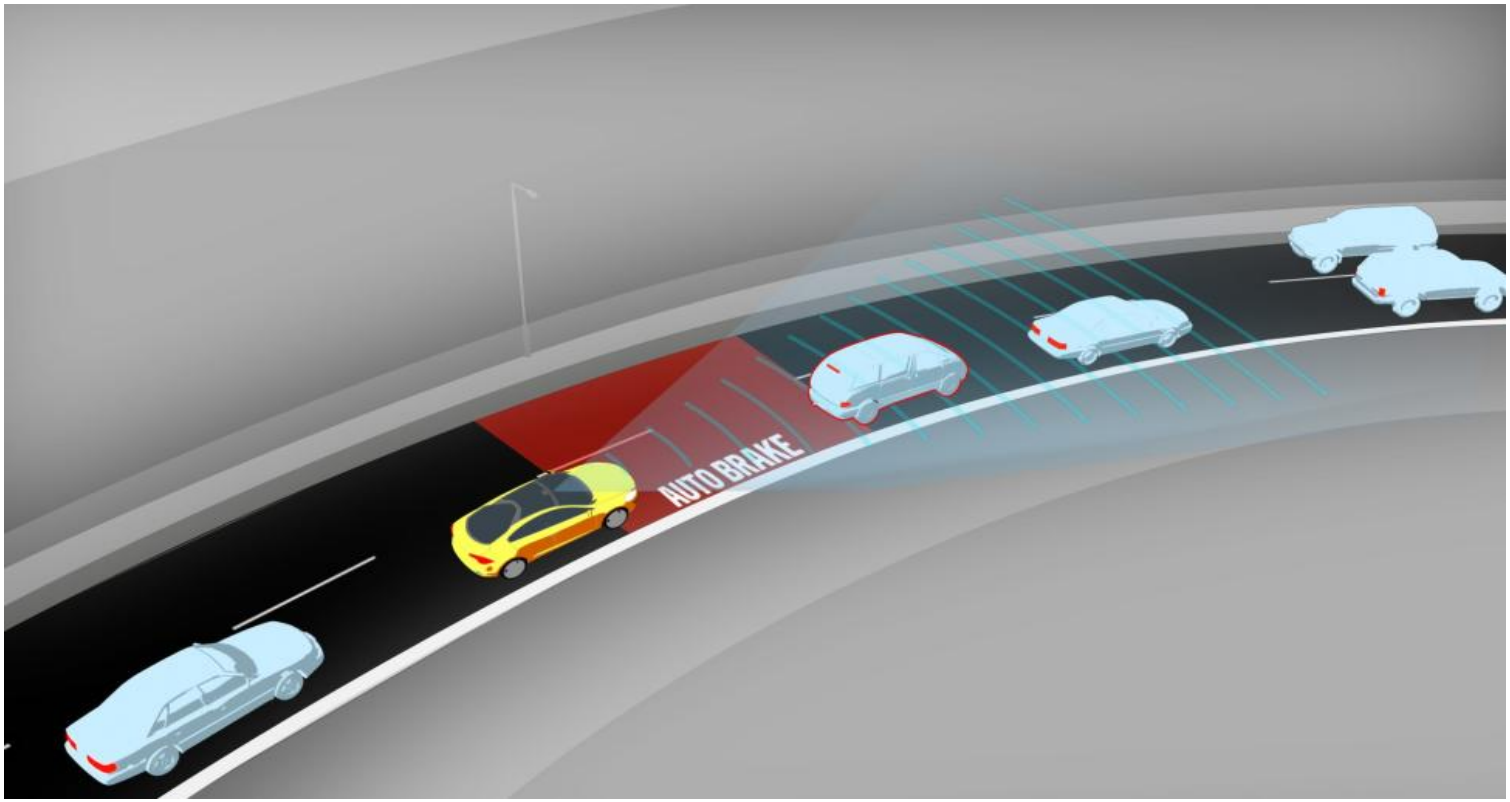
Level 2 – Partial Automation

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

- Automated braking
- Adaptive cruise control
- Lane centering

Automated Vehicle Classification Terms

Automated Emergency Braking



Adaptive Cruise Control

Adaptive cruise control can increase or decrease the vehicle's speed to maintain a following distance that is set. Advanced versions can even slow and stop the vehicle in traffic jams and then accelerate. May work with lane centering capabilities.

Automated Vehicle Classification Terms

Levels 3 – 5 In testing and development today also called HAVs

Level 3 – Conditional Automation

An automated system can both actually 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.

High Automation

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.

Automated Driving Systems

Level 5 – Full Automation

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

Uncertainty

Level 4 and 5 vehicles may be completely driverless and have no driver controls such as a brake or steering wheel.

Or

Some level 4 and 5 may be completely driverless and may also have driver controls such as a brake or steering wheel.

Technologies being used

- **LIDAR** Laser Illuminating Detection and Ranging – or LIDAR – is used to build a 3D map and allow the car to "see".
- **Radar** units allow the car to avoid impact by sending a signal to the on-board processor to apply the brakes, or move out of the way.
- **High-Powered Cameras** mounted to the exterior with slight separation in order to give an overlapping view of the car's surroundings.
- **Sonar** narrow field of view and its relatively short effective range (about 6 meters).
- **Positioning** GPS data, and driving speed to accurately determine the precise position of each vehicle.
- **Sophisticated Software** processes all of the data in real-time as well as modeling behavioral dynamics of other drivers, pedestrians, and objects around the vehicle. While some data is hard-coded into the car, such as stopping at red lights, other responses are learned

Autonomous Working Group

- The AVWG was established in the fall of 2014
- The groups consists of 22 members (20 are from the US and 2 from Canada) jurisdictional members and 3 AAMVA staff. FMCSA is also represented with a member on the working group.
- There are three sub-groups focusing on issues that impact testing and deployed vehicles
- Drivers: Education, Testing and Licensing
- Vehicles: Permits, Registration and Title
- Law Enforcement: Concerns and Challenges

AAMVA AVWG

- Guiding Principles:
- Facilitate a consistent and balanced oversight approach by motor vehicle administrators to avoid inconsistent regulatory practices;
- Supporting research and development of technology which has the potential to improve traffic safety while providing mobility options for underserved populations;
- Supporting the safe testing and deployment of automated driving systems and confirming the roles and responsibilities of jurisdictions and the federal government.

AAMVA AVWG

- "Jurisdictional Guidelines for Safe Testing and Deployment of Highly Automated Vehicles"

The purpose is to provide voluntary recommended guidelines regarding motor vehicle administration and law enforcement for the safe testing and deployment of automated driving systems.

It was published in May of 2018 and is available on the AAMVA website

http://aamva.org/best-practices-and-model-legislation/

ADS Commercial Applications

Platooning:

- Allows trucks to follow each other closely connected electronically to reduce drag and be more fuel efficient.
- Several companies have been researching and developing platooning plans for some time.
- Technologies being used include lane departure, adaptive cruise control as well as collision warning systems.

Autonomous Vehicles

Some topics that are being discussed and need more research are :

- Remote operator
- Licensing and Endorsements / Restrictions
- Driver shortage
- Platooning

Benefits of Platooning

According to the North American Council for Freight Efficiency:

- Carriers are hoping for a 7% savings in fuel costs
- Industry experts are suggesting that may be more like 4% to 5% based infrastructure concerns and traffic congestion.
- Autonomous platooning would allow trucks to follow at distances that would be unsafe for human operators.

Platooning

- Currently there are 17 states that allow for platooning.
- Several other states have legislation proposed but language will have to be drafted to address many jurisdictions that have laws about following to close.
- Current proposed legislation in many states will exempt platooning from the following too close laws.

Platooning

- While the legislative language with each jurisdiction is similar for platooning, there are differences between the state descriptions that may cause issues as the technology advances.
- Industry partners are hoping to eliminate any “patchwork” legislation that would impede any interstate commerce.

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Recap

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

Full Automation

0	1	2	3	4	5
No Automation	**Driver Assistance**	**Partial Automation**	**Conditional Automation**	**High Automation**	**Full Automation**
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

Federal publication

- The Self Drive Act passed the House of Representatives in September of 2017
- This bill fell short regarding autonomous trucks as it excluded vehicles over 10,000 lbs.
- Also excluded were buses carrying more than 10 people.
- The transportation of dangerous materials was also excluded from the bill.

Federal publication

- Preparing for the Future of Transportation

  Automated Vehicles 3.0

- US DOT has created six principles to shape policy for automated vehicles and are listed below:

1. Prioritize Safety

"Automation offers the potential to improve safety for vehicle operators and occupants, pedestrians, bicyclists and motorcyclists and other travelers sharing the road. USDOT will lead the efforts to address potential safety risks and advance the life saving potential of automation, which will strengthen public confidence in these emerging technologies."

US DOT

2. Remain Technology Neutral

"To respond to the dynamic and rapid development of automated vehicles, the Department will adopt flexible technology-neutral policies that promote competition and innovation as a means to achieve safety, mobility and economic goals. This approach will allow the pubic – not the Federal Government – to choose the most effective transportation and mobility solutions.

US DOT

3. Modernize Regulations

"USDOT will modernize or eliminate outdated regulations that unnecessarily impede the development of automated vehicles or that do not address critical safety needs. "

.4 Encourage a consistent regulatiory

"Conflicting state and local laws and regulations surrounding automated vehicles create confusion, introduce barriers and present challenges. USDOT will promote regulatory consistency so that automated vehicles can operate seamlessly across the nation."

US DOT

5. Prepare actively for automation

“US DOT will provide guidance, best practices, pilot programs and other assistance to help our partners plan and make the investment needed for a dynamic and flexible automated future.”

US DOT

6. Protect and enhance the freedoms enjoyed by Americans

"US DOT embraces the freedom of the open road, which includes the freedom for Americans to drive their own vehicles. We envision an environment in which automated vehicles operate alongside conventionally, manually-driven vehicles and other road users."

Questions

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