



American Association of
Motor Vehicle Administrators

Automated Vehicles - Technical Assistance for North Carolina

Agenda Item #5

February 27 – 28, 2020

OUR VISION

Safe drivers

Safe vehicles

Secure identities

Saving lives!

SAE Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles

- This SAE Recommended Practice (J3016_201806) describes *motor vehicle driving automation systems* that perform part or all of the *dynamic driving task (DDT)* on a *sustained* basis. It provides a taxonomy with detailed definitions for six levels of *driving automation*, ranging from *no driving automation* (level 0) to *full driving automation* (level 5), in the context of *motor vehicles* (hereafter also referred to as “*vehicle*” or “*vehicles*”) and their *operation* on roadways.
- Each level (0 – 5) will be more fully explained by Cathie Curtis in the next segment
- ***AAMVAs Jurisdictional Guidelines for the Safe Testing and Deployment of Vehicles Equipped with Automated Driving Systems – Edition 2 (Chapter Two)*** provides definitions for approximately 50 Autonomous Vehicle Terms. Only those deemed most helpful to this meeting are being covered.

Advanced Driver-Assistance Systems (ADAS) - Systems designed to help drivers with certain driving tasks (e.g., staying in the lane, parking, avoiding crashes, reducing blind spots, and maintaining a safe headway). ADAS are generally designed to improve safety or reduce the workload on the driver. With respect to automation, some ADAS features could be considered SAE Level 1 or Level 2, but many are Level 0 and may provide alerts to the driver with little or no automation

Automated driving system (ADS) – the hardware and software that are collectively capable of performing the entire DDT on a sustained basis, regardless of whether it is limited to a specific ODD; this term is used specifically to describe a Level 3, 4, or 5 driving automation system.

ADS Dedicated Vehicle (ADS-DV) – a vehicle designed to be operated exclusively by a level 4 or level 5 ADS for all trips within its given ODD limitations (if any). An ADS-DV is a truly “driverless” vehicle.

ADS-equipped vehicle - a vehicle equipped with an Automated Driving System (ADS).

ADS-equipped Dual-Mode Vehicle – a type of ADS-equipped vehicle designed for both driverless operation and operation by a conventional driver for complete trips

Automated vehicle (AV) – any vehicle equipped with autonomous technology that has been integrated into that vehicle.

Driver – a user who performs in real-time part or all of the DDT and DDT fallback for a particular vehicle.

Deploy/deployment/deployed – the operation of a vehicle on public roads by members of the public who are not employees, contractors, or designees of a manufacturer or other testing entity.

Dynamic driving task (DDT) – all of the real-time operational and tactical functions required to operate a vehicle in on-road traffic, excluding the strategic functions such as trip scheduling and selection of destinations and waypoints and including without limitation:

1. Lateral vehicle motion control via steering (operational);
2. Longitudinal vehicle motion control via acceleration and deceleration (operational);
3. Monitoring the driving environment via object and event detection, recognition, classification, and response preparation (operational and tactical);
4. Object and event response execution (operational and tactical);
5. Maneuver planning (tactical); and
6. Enhancing conspicuity via lighting, signaling and gesturing, and so on (tactical).

- **Dynamic driving task (DDT) fallback** – the response by the user or by an ADS to either perform the DDT or achieve a minimal risk condition after occurrence of a DDT performance-relevant system failure(s) or upon ODD exit, or the response by an ADS to achieve minimal risk condition, given the same circumstances.
- **(Human) user** – a general term referencing the human role in driving automation.
- **Minimal risk condition** – a condition to which a user or an ADS may bring a vehicle after performing the DDT fallback to reduce the risk of a crash when a given trip cannot or should not be completed.
- **Operational design domain (ODD)** – the specific conditions under which a given driving automation system or feature is designed to function, including, but not limited to, driving modes. An ODD may include geographic, roadway, environmental, traffic, speed, and temporal limitations. Previously, the term “driving mode” was used; “ODD” is now the preferred term for many of these uses.

- **Remote Driver** - A driver who is not seated in a position to manually exercise in-vehicle braking, accelerating, steering, and transmission gear selection input devices (if any) but is able to operate the vehicle.
- **Data collection mechanisms (DCM)** – includes, but is not limited to, recording media such as on-board Electronic Data Recorders (EDR); on-board CPU(s); cloud-based CPU(s), etc. Source: SAE 1660.
- **Manufacturer** – an individual or company that designs, produces, or constructs vehicles or equipment. Manufacturers include original equipment manufacturers (OEMs), multiple and final stage manufacturers, upfitters (individuals or companies making changes to a completed vehicle before first retail sale or deployment), and modifiers (individuals or companies making changes to existing vehicles after first retail sale or deployment).

- **Other entities and educational institutes** – any individual or company, that is not a manufacturer, involved with helping to design, supply, test, operate, or deploy automated vehicles, technology, or equipment.

- **Connected Vehicles** - Networked wireless communications among vehicles, the infrastructure, and passengers' personal communications devices:

V2V - vehicle to vehicle

V2I - vehicle to infrastructure

V2E or V2X - vehicle to everything

A vehicle can be ADS-equipped; can be a connected vehicle; or can be both ADS-equipped and connected.