

Considerations on the categorization of Automated Vehicles

- Update -

Status of work

- OICA/CLEPA have worked further on the categorization of automated vehicles, assessing the S.R. 1 vehicle categories, similar to the R.E. 3 proposed amendments
- Additionally, the wording of the definitions for dual-mode vehicles and driverless vehicles was refined, considering the feedback received during GRVA-16 and in order to further align with the work ongoing in FRAV, VMAD and the Integration Group

Vehicle categorization under R.E.3

New sub categories for Automated Vehicles (AV's)

Subcategory A „Driverless Vehicles with ADS“

Designed primarily for the carriage of people

Designed primarily for the carriage of goods

Subcategory D „Dual Mode vehicles“

Designed primarily for the carriage of people

Designed primarily for the carriage of goods

Subcategories X & Y „Low speed driverless AV's“



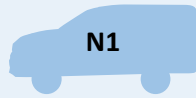
Driver seat + max. 8 add. seats, no limitation of GVM



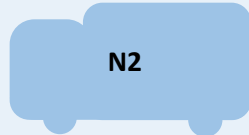
Driver seat + more than 8 add. seats, GVM max. 5 t



Driver seat + more than 8 add. seats, GVM exceeding 5 t



GVM \leq 3.5t



3.5t < GVM \leq 12t



GVM > 12t

Examples:



e.g. Robotaxi



e.g. Hub-2-Hub truck



e.g. AVP equipped vehicle



seated only, max. 9 seats



More than 9 seats or standing passengers, GVM Max. 5t



More than 9 seats or standing passengers, GVM exceeding 5t

*Class I, II, III and Class A, B can be carried over

With or w/o passengers



GVM \leq 3.5t



3.5t < GVM \leq 12t



GVM > 12t

Examples:



< [25] km/h
e.g. Campus shuttle



[25] km/h \leq v \leq [50]
e.g. Urban shuttle

Vehicles which can be driven manually under nominal conditions

AV's which do not require a driver/fallback-ready user

Categories according to Consolidated Resolution R.E.3

Required amendments to existing Definitions:

2.2. Category M - Power-driven vehicles having at least four wheels and used for the carriage of passengers

- 2.2.1. "Category M1": Vehicles used for the carriage of passengers and comprising not more than ~~eight~~ **nine** seats ~~in addition to the driver's seat.~~
- 2.2.2. "Category M2": Vehicles used for the carriage of passengers, comprising more than ~~eight~~ **nine** seats ~~in addition to the driver's seat or designed to carry standing passengers,~~ and having a maximum mass not exceeding 5 tonnes.
- 2.2.3. "Category M3": Vehicles used for the carriage of passengers, comprising more than ~~eight~~ **nine** seats ~~in addition to the driver's seat or designed to carry standing passengers,~~ and having a maximum mass exceeding 5 tonnes.
- 2.2.4. Vehicles of categories M2 and M3 belong to:
 - 2.2.4.1. For vehicles having a capacity exceeding ~~[22] occupants 22 passengers in addition to the driver,~~ there are three classes of vehicles:
 - 2.2.4.1.1. "Class I": Vehicles constructed with areas for standing passengers, to allow frequent passenger movement.
 - 2.2.4.1.2. "Class II": Vehicles constructed principally for the carriage of seated passengers, and designed to allow the carriage of standing passengers in the gangway and/or in an area which does not exceed the space provided for two double seats.
 - 2.2.4.1.3. "Class III": Vehicles constructed exclusively for the carriage of seated passengers.
 - 2.2.4.1.4. A vehicle may be regarded as belonging in more than one class. In such a case it may be approved for each class to which it corresponds.
 - 2.2.4.2. For vehicles having a capacity not exceeding ~~[22] occupants 22 passengers in addition to the driver,~~ there are two classes of vehicles:
 - 2.2.4.2.1. "Class A": Vehicles designed to carry standing passengers; a vehicle of this class has seats and shall have provisions for standing passengers.
 - 2.2.4.2.2. "Class B": Vehicles not designed to carry standing passengers; a vehicle of this class has no provision for standing passengers.

Categories according to Consolidated Resolution R.E.3

New categories:

New “Dual-mode” sub category:

2.x. Dual-mode vehicles with Automated Driving Systems

2.x.1. Definition.

Dual-mode vehicles are vehicles of category M or N which can be driven manually and which are equipped with an Automated Driving System allowing the vehicle to be driven in an automated mode not issuing a [system initiated deactivation to manual driving] requiring an interaction by a driver to take back manual control (e.g. a fallback user).

2.x.2 Categorization

Dual-mode vehicles are categorized into two categories, based on the maximum operational design speed of the Automated Driving System. In cases where the Automated Driving System consists of multiple features, e.g. low-speed and high-speed ADS features, the feature with the highest maximum design speed is defining the maximum design speed of the Automated Driving System and therefore considered for the dual-mode categorization.

2.x.2.1. Category D are dual mode vehicles having a maximum operational speed of the Automated Driving System exceeding [25] km/h.

2.x.2.2. Category Z are dual mode vehicles having a maximum operational speed of the Automated Driving System not exceeding [25] km/h.

2.x.3. Combined designation

Symbols M and N may be combined with symbol D or Z. For example, a vehicle of category M1 which is suited for dual-mode use having a maximum operational speed of the Automated Driving System exceeding [25] km/h may be designated as M1D.

Categories according to Consolidated Resolution R.E.3

New categories (continued):

New “Driverless Vehicles” sub category:

2.y. Category A – Driverless vehicles with Automated Driving Systems

2.y.1. Definition.

Driverless vehicles are vehicles of category M or N which are equipped with an Automated Driving System **which by design prevents** the vehicle to be driven **manually except for specific purposes outside nominal operation (e.g. maintenance, remote intervention, ...)**.

2.y.2. Combined designation

Symbols M and N may be combined with symbol A. For example, a vehicle of category M1 which is considered an driverless vehicle shall be designated as M1A.

New “Low speed driverless vehicles” sub categories:

2.z. Low-speed driverless vehicles with Automated Driving Systems

2.z.1. Definition

2.z.1.1. Category X are vehicles belonging to category A, but having a maximum design speed not exceeding [25] km/h.

2.z.1.2. Category Y are vehicles belonging to category A, having a maximum design speed exceeding [25] km/h but not exceeding [50] km/h

2.z.2. Combined designation

Symbols M and N may be combined with symbol X or Y. For example, a vehicle of category M1 which is considered a low-speed driverless vehicle of Category Y shall be designated as M1Y.

Vehicle categorization under S.R.1

New sub categories for Automated Vehicles (AV's)

Subcategory A „Driverless Vehicles with ADS“

Designed primarily for the carriage of people

Designed primarily for the carriage of goods

Subcategory D „Dual Mode vehicles“

Designed primarily for the carriage of people

Designed primarily for the carriage of goods

Subcategories X & Y „Low speed driverless AV's“

Examples:



e.g. Robotaxi



e.g. Hub-2-Hub truck



e.g. AVP equipped vehicle

1-1A

seated only, max. 9 seating positions

1-2A

1-2A

More than 9 passengers (standing and/or seated)

With or w/o passengers

2A

2A



Examples:

1-2X

< [25] km/h
e.g. Campus shuttle

1-2Y

[25] km/h <= v <= [50]
e.g. Urban shuttle

Vehicles which can be driven manually under nominal conditions

AV's which do not require a driver/fallback-ready user

Categories according to Special Resolution S.R.1

Required amendments to existing Definitions:

1. POWER DRIVEN VEHICLES WITH FOUR OR MORE WHEELS
 - 1.1. "Category 1 vehicle" means a power driven vehicle with four or more wheels designed and constructed primarily for the carriage of (a) person(s).
 - 1.1.1. "Category 1-1 vehicle" means a category 1 vehicle comprising not more than ~~eight~~ **nine** seating positions ~~in addition to the driver's seating position~~. A category 1-1 vehicle cannot have standing passengers.
 - 1.1.2. "Category 1-2 vehicle" means a category 1 vehicle designed for the carriage of more than ~~eight~~ **nine** passengers, whether seated or standing, ~~in addition to the driver~~.
 - 1.2. "Category 2 vehicle" means a power driven vehicle with four or more wheels designed and constructed primarily for the carriage of goods. This category shall also include:
 - i) tractive units
 - ii) chassis designed specifically to be equipped with special equipment.

Categories according to Consolidated Resolution S.R.1

New categories:

New “Dual-mode” sub category:

2.x. Dual-mode vehicles with Automated Driving Systems

2.x.1. Definition.

Dual-mode vehicles are vehicles of category M or N which can be driven manually and which are equipped with an Automated Driving System allowing the vehicle to be driven in an automated mode not issuing a [system initiated deactivation to manual driving] requiring an interaction by a driver to take back manual control (e.g. a fallback user).

2.x.2. Categorization

Dual-mode vehicles are categorized into two categories, based on the maximum operational design speed of the Automated Driving System. In cases where the Automated Driving System consists of multiple features, e.g. low-speed and high-speed ADS features, the feature with the highest maximum design speed is defining the maximum design speed of the Automated Driving System and therefore considered for the dual-mode categorization.

2.x.2.1. Category D are dual mode vehicles having a maximum operational speed of the Automated Driving System exceeding [25] km/h.

2.x.2.2. Category Z are dual mode vehicles having a maximum operational speed of the Automated Driving System not exceeding [25] km/h.

2.x.3. Combined designation

Symbols 1-1, 1-2 and 2 may be combined with symbol D or Z. For example, a vehicle of category 1-1 which is suited for dual-mode use having a maximum operational speed of the Automated Driving System exceeding [25] km/h may be designated as 1-1D.

Categories according to Consolidated Resolution S.R.1

New categories:

New “Driverless Vehicles” sub category:

2.y. Category A – Driverless vehicles with Automated Driving Systems

2.y.1. Definition.

Driverless vehicles are vehicles of category M or N which are equipped with an Automated Driving System **which by design prevents the vehicle to be driven manually except for specific purposes outside nominal operation (e.g. maintenance, remote intervention, ...)**.

2.y.2. Combined designation

Symbols 1-1, 1-2 and 2 may be combined with symbol A. For example, a vehicle of category 1-1 which is considered an driverless vehicle shall be designated as 1-1A.

New “Low speed driverless vehicles” sub categories:

2.z. Low-speed driverless vehicles with Automated Driving Systems

2.z.1. Definition

2.z.1.1. Category X are vehicles belonging to category A, but having a maximum design speed not exceeding [25] km/h.

2.z.1.2. Category Y are vehicles belonging to category A, having a maximum design speed exceeding [25] km/h but not exceeding [50] km/h

2.z.2. Combined designation

Symbols M and N may be combined with symbol X or Y. For example, a vehicle of category M1 which is considered a low-speed driverless vehicle of Category Y shall be designated as M1Y.

Proposal for next steps

- *OICA/CLEPA wishes to renew their wish to have a joint Workshop established on the topic of Categorization of Automated Vehicles between GRVA and GRSG in order to have experts in the field on Automated/Autonomous Vehicles and Vehicle Categorization collectively working together on the subject.*
- *OICA/CLEPA is planning to introduce this concept also at the upcoming session of GRSG-126 in October 2023*



Thank you