

Considerations on the categorization of Automated Vehicles

- Q&A's based on comments received during GRVA-16 -

Additional introductory explanation on GRVA-16-13

- The document is intended to highlight the need for introducing categories specifically for Automated Vehicles
- As a first exercise OICA/CLEPA has worked on the details of the categories defined in R.E.3 applicable to the 1958 Agreement, since the detailed definitions herein are more complex than the categories defined in S.R.1 applicable to the 1998 Agreement.
- OICA/CLEPA will continue to work on the topic and would welcome to have a dedicated Workshop between GRVA and GRSG on this matter, since GRSG is in charge of the aforementioned Resolutions, while GRVA having the expertise on the matter of Automated Vehicles.

Questions & Answers:

- Q1: What are the requirements a Dual Mode Vehicle (as defined in the document) has to comply with?
- A1: A Dual Mode Vehicle will have to comply, due to the possibility of being driven manually, with the full set of requirements (non-ADS Regulations) applicable to a conventional (manual driven) vehicle and in addition with the respective ADS requirements (ADS Regulation). Depending on the use case the requirements set out in the non-ADS Regulations may have to be (re-)assessed additionally in the automated mode (ADS active).

Questions & Answers:

Q2: Why is the high level of complexity defined in the proposal needed?

A2: OICA/CLEPA believe that the complexity is limited, since only two main subcategories are introduced: Category D for Dual Mode vehicles and Category A for driverless automated vehicles. The three additional subcategories are specifically targeting low speed applications, which from OICA/CLEPA point of view should be addressed differently compared to the main subcategories A and D. This is justified by the limited maximum design speed and/or limited maximum operational speed of the ADS, since performance requirements are expected to be adapted accordingly. This may even lead to the creation of (a) new Regulation(s) covering vehicles with a max. design speed below 25 km/h. The three subcategories X, Y, Z are intended to highlight this need for adequate performance requirements adapted to the use-cases.

Questions & Answers:

Q3: How does the proposed categorization support other needs e.g. for law enforcement (has the driver to perform the DDT or has the ADS taken over)?

A3: The proposed categorization is supporting these needs, since only category D vehicles will have the DDT performed either by a driver or the ADS (not requiring a Transition Demand, as defined in UN R 157).

Questions & Answers:

Q4: Why is category Z (low-speed dual mode vehicles) needed?

A4: OICA/CLEPA believe that for the low speed use cases of category Z, addressing parking applications with a max. operational ADS design speed not exceeding [25 km/h], a re-assessment of the non-ADS Regulation requirements in low speed automated mode is not required, especially since dedicated test scenarios for such functionalities are expected to be introduced. Examples for already established requirements or requirements in preparation are given in the EU activity on ADS (dedicated Annex to the European ADS Regulation 2022/1426, as well as the German AFGBV dealing with the ADS approval, as well as an dedicated requirements catalogue issued by KBA).

Questions & Answers:

Q5: How is the topic of Automated Vehicles without occupants addressed, since GRSP has identified a need to exclude such vehicles from the occupant protection requirements easily?

A5: OICA/CLEPA has also considered a new category dedicated to vehicles not designed to carry occupants. However, the current proposal does not introduce such dedicated category due to a balanced approach (increasing the number of categories vs. addressing the applicability via dedicated amendments of the scope in the non-ADS Regulations). OICA/CLEPA is open to further discussions, if a new dedicated (sub-)category for driverless Automated Vehicles not designed to carry occupants would be more appropriate.

Questions & Answers:

Q6: Why does the definition of subcategory D and A refer to Transition Demand?

A6: The intention of using the term Transition Demand, as defined in UN Regulation No. 157, was to make clear that vehicles with systems issuing such a Transition Demand and requiring a fall back (ready) user are not to be covered by these categories.

Since vehicles with ALKS according to UN R157 are already approved and in operation, it is seen as evidence that such vehicles do not need to be assigned to any new, dedicated vehicle category. Once the FRAV/VMAD definitions are finalized they will enable the use of harmonized terms, also for the proposed definitions of Automated Vehicle categories.

Questions & Answers:

Q7: Why is category L not considered in the AV categorization proposal?

A7: As OICA is not in charge of category L vehicles, but IMMA is, the proposal did not reflect on vehicles of category L. Since the basic categorization concept is not changed there should be no implications on category L vehicles expected.

Slides taken from GRVA-16-13

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“

M1
Driver seat + max. 8 add. seats, no limitation of GVM

M2
Driver seat + more than 8 add. seats, GVM max. 5 t

M3
Driver seat + more than 8 add. seats, GVM exceeding 5 t

N1
GVM \leq 3.5t

N2
3.5t < GVM \leq 12t

N3
GVM > 12t

Examples:

M1D
e.g. Robotaxi

N3D
e.g. Hub-2-Hub truck

M1Z
e.g. AVP equipped vehicle

M1A
seated only, max. 9 seats

M2A
More than 9 seats or standing passengers, GVM Max. 5t

M3A
More than 9 seats or standing passengers, GVM exceeding 5t

With or w/o passengers

N1A
GVM \leq 3.5t

N2A
3.5t < GVM \leq 12t

N3A
GVM > 12t

Examples:

M2X
< [25] km/h
e.g. Campus shuttle

M2Y
[25] km/h \leq v \leq [50]
e.g. Urban shuttle

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

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 ~~[23] 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 ~~[23] 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 Transition Demand, requiring an interaction by a driver to take back manual control (e.g. a fallback-ready 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 allowing the vehicle to be driven in an automated mode not issuing a Transition Demand, requiring an interaction by a driver to take back manual control (e.g. a fallback-ready user) and which [cannot be driven manually under nominal conditions/are not falling under the definition of dual mode vehicles].

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.



Thank you