

## **Preparatory note in view of the WP.29 brainstorming on automated vehicles, scheduled in June 2017**

### **I. Introduction**

1. In November 2014, the Informal Working Group on ITS refocused its activities more specifically on automated driving and was renamed the IWG on ITS/AD. The group coordinated activities on partial automation so far. Under the guidance received by the group, GRRF and its IWG on ACSF updated Regulation No. 79 and especially the provisions related to ACSF and CSF. GRRF is continuing these activities following the guidance received from the IWG on ITS/AD and WP.29.

2. At the March 2017 session of WP.29, the representative of the United Kingdom, co-chair of the IWG on ITS/AD, proposed that the World Forum initiates activities towards the development of a strategic vision of an "*automated vehicle*". He argued that societies and individuals tend to think of "*automated vehicle*" rather than of ordinary vehicles with automated functions such braking and/or steering systems, in the context of UN Vehicle Regulations Nos. 13-H and 79. He continued by highlighting that the issues extended beyond the conventional vehicle categories typically covered by the UN Regulations and this would be a new area to consider in the future. He emphasized that the IWG on ITS/AD is ready to take the initiative in starting to discuss the development of such a strategic approach of an "*automated vehicle*" during the meeting of the IWG on 16 March 2017. WP.29 decided that the World Forum would hold an initial detailed discussion on the matter during the 172nd session of WP.29 in June 2017

### **II. Considerations on vehicle categories.**

3. The idea proposed by the Chair of the IWG on ITS/AD is to explore the possibilities to define technical provisions applicable for "*automated vehicles*" independently of the existing one for ordinary vehicles.

4. To date, it is not possible to distinguish non automated vehicles from automated one by only using the vehicle categories defined in R.E.3 and/or S.R.1. Without any change in the classification, by default the scope of the existing UN Regulations including non-automated vehicles would also include the similar vehicles equipped with automation features.

5. Among a number of classifications of vehicle automation, the classification proposed by SAE J3016 with 6 levels is the most used. It is considered by the IWG on ITS/AD but was not used for the purpose of regulatory activities by GRRF so far.

### **III. Different concepts of automated vehicle and their vehicle categories according to the existing definitions**

6. Most of the traditional vehicle manufacturers are marketing some passenger cars with automation functionalities. These vehicles are derived from existing platforms that are fitting under the M<sub>1</sub> category (R.E.3) or category 1-1 vehicle (S.R.1).

7. The same can be said about heavy vehicle automation in terms of category.

8. In the context of new mobility concepts, different concepts are designed. Here a few examples:

(a) The Waymo "*self-driving car*" (former Google) is a certified FMVSS No. 500 compliant vehicle. It is intended to be used in traffic at low speed. The corresponding vehicle category would be L<sub>7</sub> (R.E.3). Waymo also provides automation features to Fiat Chrysler Automobiles (FCA) and its Chrysler Pacifica minivans.

(b) Some other concepts are developed and tested, such as "*autonomous pods*". One concept is the one developed by Catapult, being worth to mention in this context, as it is intended to be used on sidewalks. Such concepts can be classified under some vehicle categories defined in R.E.3 e.g. L7. In that case, the most challenging issue for regulators is to amend traffic rules to permit the intended use, as, in most countries, vehicles are not allowed on sidewalks.

(c) Some concepts may not fall in any categories, e.g. an  $M_2$  like *autonomous shuttle* with less than eight seats would neither really fall under the  $M_2$  nor under the  $M_1$  category.

#### IV. Considerations on the performance of such new concepts

9. For the purpose of this chapter, let's consider that automated vehicles are classified as a new vehicle category. In this present case, it means that none of the existing regulations (e.g. passive safety, active safety related ones) would include these vehicles in their scope. A manufacturer could not get an approval according to a steering or braking regulation, nor a seat belt regulation or a crash test regulation.

10. This raises the question of the necessary performance of these vehicles with regard to traditional safety and environmental criteria.

(a) If a vehicle is used on traffic, one could argue that automated vehicles should comply with the existing performance requirements. Active safety features are not providing safety in the same circumstance as passive safety features. In term of energy efficiency and environmental protection, these vehicles are expected to provide environmental benefits compared to existing traditional vehicles and in some case intended to provide mobility in sensitive places such as city centres or in the "last mile", close to housing in residential areas. Therefore, in order to secure the existing benefits of current technologies, automated vehicles should be subject to the same level of stringency in term of energy efficiency and environmental protection as traditional vehicles equipped with conventional propulsion systems.

(b) If a vehicle is intended to be used outside of normal traffic conditions, e.g. on dedicated and segregated lanes, the same conclusions could be drawn. These vehicles could be compared to trains, that are also used on segregated lanes (railways) but for which risks of collision exist, with other similar vehicles or at level crossing with conventional road traffic. If a vehicle is intended to be driven on sidewalks, one could argue that it should comply with the highest standards of pedestrian protection.

#### V. Ideas

11. In order to make it possible to identify these vehicles e.g. in case of specific provisions or exemptions, it is proposed to define two categories X and Y respectively for Automated and Driverless to be used in the same manner as the category G for off-road vehicles, i.e.:

Currently:  $M_1G$  is an off-road  $M_1$  passenger car

Proposed:

- $M_1X$  would be a driverless vehicle of category  $M_1$ .
- $N_3Y$  would be an automated vehicle of category  $N_3$ .

12. It is also proposed to insert a new category 3-6 in S.R.1 to include quadricycles.

13. This proposal doesn't fully address the case 8(c) above.