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Report on the fitness of UN Regulations and UN Global Technical Regulations for their application to automated vehicles*

Submitted by the representatives of China, France, Germany, Japan, the Netherlands, the United Kingdom of Great Britain and Northern Ireland, the European Association of Automotive Suppliers and the International Organization of Motor Vehicle Manufacturer

The text reproduced below was prepared by the experts of the task forces commissioned to screen and review the UN Regulations and UN Global Technical Regulations (GTRs) of the World Forum for Harmonization of Vehicle Regulations (WP.29) on their fitness for automated driving. During its 186th session in March 2022, WP.29 requested each of its subsidiary Working Parties to conduct such a review of the legal instruments under its respective purview. This document summarises the results and the process of this review and offers an overview of the fitness for ADS of UN Regulations and GTRs.

This document represents the current opinions of the experts at the time of submission, and the recommendations contained inside may evolve significantly during the next steps of the process of reviewing and amending Regulations.

* In accordance with the programme of work of the Inland Transport Committee for 2023 as outlined in proposed programme budget for 2023 (A/77/6 (Sect.20), para 20.6), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

Contents

I. Foreword

1. Automation is often regarded as one of the most impactful evolutions of the automobile since its inception at the end of the nineteenth century. At this formative period for driverless vehicle technology, the industry and the public alike are turning their eyes to the authorities in search of guidance for a safe introduction of driverless vehicles onto public roads.

2. After more than a century of intense efforts towards road safety, motor vehicles benefit from an extensive, international regulatory framework fostered by the World Forum for Harmonization of Vehicle Regulations (WP.29). The necessity to offer a regulatory environment to define, test and approve (in the context of type approval) the performance (primarily the safety) of automated vehicles was recognised by the World Forum as early as 2018 with the creation of its subsidiary Working Party on Automated/Autonomous and Connected Vehicles (GRVA). Since then, experts have been undertaking the considerable task of drafting functional requirements and validation methods for automated driving systems.

3. Yet, even assuming that the intelligence of vehicles equipped with such technology could achieve a flawless execution of the driving task, it is without debate that the rest of the vehicle must also comply with the necessary provisions to guarantee its safety — both for its occupants and for all road users —, its integrity, its comfort, its ease of use anywhere in the world, and its limited impact on the environment. WP.29, through the 1958 Agreement[1] and the 1998 Agreement[2], is responsible (as of June 2023) for 166[3] active addenda to the 1958 Agreement (UN Regulations) and 23 addenda to the Global Registry (Global Technical Regulations). Each of these Regulations defines technical provisions and testing requirements for wheeled vehicles, their systems and part or characteristics of motor vehicles. However, Regulations were also created with certain assumptions on the design of the vehicle: that a driver would be present inside the vehicle and available at all times; that the driver would be seated at the front of the vehicle, with access to controls and indicators on the status of the vehicle; that doors would allow the driver to access the vehicle; etc. It is thus difficult to understand at first glance which Regulations are relevant to fully automated vehicles, and significant changes may be required for these relevant Regulations before they can be applicable to such vehicles.

4. Realising the pressing need to understand which Regulations could be applicable to vehicles with no driver and whether any changes might be required to that end, WP.29 requested[4] that all UN Regulations and Global Technical Regulations be reviewed by the subsidiary Working Parties, so that all relevant Regulations could then be amended to accommodate automated driving.

II. Screening scope and method

5. The screening task was carried out between October 2022 and June 2023. It covered the UN Regulations and Global Technical Regulations that entered into force before the end of the screening period — usually in their latest Series of Amendments and supplement. The screening did not cover other documents such as WP.29 Resolutions, interpretation documents for existing Regulations, or other documents which are not Regulations. In this

[1] Agreement concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations

[2] Agreement concerning the establishing of Global Technical Regulations for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles

[3] Regulations are numbered from 1 to 167, adding UN Regulation No. 13-H and subtracting the two removed UN Regulations No. 2 and 15

[4] ECE/TRANS/WP.29/1164, paragraph No. 30.

document, the term "Regulation" may be used indiscriminately for UN Regulations and UN Global Technical Regulations.

6. The screening task was carried out by each subsidiary Working Party of WP.29, each responsible for the Regulations under its purview. Thus, six screening task forces were established as follows:

(a) Working Party on Noise and Tyres (GRBP): chaired by the Netherlands and secretariat provided by the International Organization of Motor Vehicle Manufacturers (OICA);

(b) Working Party on Lighting and Light-Signalling (GRE)[5]: Chaired by Germany, and secretariat provided by the International Automotive Lighting and Light-Signalling Expert Group (GTB);

(c) Working Party on Pollution and Energy (GRPE): Chaired by the Netherlands;

(d) Working Party on General Safety (GRSG) provisions: Chaired by the Netherlands, and secretariat provided by OICA;

(e) Working Party on Passive Safety (GRSP): Chaired by Germany, and secretariat provided by OICA;

(f) GRVA: Co-chaired by France and China.

7. In addition to screening its own Regulations, the GRVA task force provided assistance in harmonising the screening process across the task forces, gathering high-level issues and reporting to WP.29.

Table 1
Distribution of Regulations across the subsidiary Working Parties of WP.29

Subsidiary Working Party	*Number of UNR*	*Number of GTR*
GRBP	21	1
GRE	44	0
GRPE	17	12
GRSG	41	2
GRSP	29	6
GRVA	14	2

8. The screening process was conducted with three objectives, which are detailed as follows:

(a) **Objective 1**: assess each Regulation on whether it is relevant for vehicles equipped with an ADS, which does not issue transition demands, independently of any manual driving capabilities.

(b) **Objective 2**: assess each relevant Regulation on its readiness regarding its application to automated vehicles. "Ready" means, in the case of a UN Regulation, that the current text of the Regulation can be applied consistently[6] by Type Approval Authorities and Technical Services looking to apply the Regulation to an automated vehicle.

(c) **Objective 3**: assess each Regulation that is relevant but not "Ready" for automation on whether major changes are needed to make it "Ready".

[5] The GRE screening taskforce (GRE TF AVSR) was established before the start of the screening process and was first created with the goal of amending UN Regulation No. 48 (installation of lighting and light-signalling devices) to make it applicable to automated vehicles.

[6] This does not include small, editorial amendments, which might be needed in the future.

9. The task forces only considered vehicles equipped with an Automated Driving System (ADS) that does not issue transition demands (hereafter referred to as "fully automated vehicles"), including in particular:

(a) Vehicles equipped with manual driving capabilities ("dual-mode vehicles");

(b) Vehicles not equipped with any manual driving capabilities;

(c) Vehicles that cannot transport occupants.

10. In addition to the above, several use cases were identified as directly or indirectly linked to automated driving. However, it was decided to consider these use cases only broadly, leaving specific analyses for later depending on future priorities for amendments. These use cases include:

(a) Vehicles which can be driven in either direction ("bidirectional vehicles");

(b) Vehicles with no manual driving capabilities and very restricted ODDs, such as automated urban shuttles or delivery robots;

(c) Vehicles with unconventional seating layouts and positions, such as rear- or side-facing seats, or seats with the ability to recline beyond current limitations;

(d) Vehicles with an onboard operator who is not a driver;

(e) Vehicles which allow for direct interactions with remote operators or supervision centres.

III. General results

11. During the screening process, it was found that the WP.29 regulations could be divided into four groups, in terms of relevance and readiness for fully automated vehicles:

A. Regulations relevant and ready for automated driving (although improvements might be desirable)

12. Some Regulations are not affected by the automation of the vehicles they are fitted in, such as:

(a) Certain Regulations for components (especially those without provisions for their installation on a vehicle);

(b) Regulations for aspects related to the physical characteristics of the vehicle; this is particularly the case for several Regulations in the domains of general and passive safety, such as those for external projections, fire resistance, heating systems, etc.

13. This group also includes Regulations that could be improved to better accommodate automated vehicles. For example, this is the case for UN Regulation No. 26 on external projections, where additional provisions could be drafted regarding sensors for automated vehicles.

Table 2
List of Regulations which are relevant and ready for fully automated vehicles

GRBP	*GRE*	*GRPE*	*GRSG*	*GRSP*	*GRVA*
R30, R54, R75, R106, R108, R109, R117, R124, R142, R164, GTR16	R37, R45, R99, R128, R148, R149, R150	R24, R103, R133	R26, R34, R58, R73, R118, R122, R162, R163	R22, R25, R42, R80, R114, R126, R129	R155, R156

B. Regulations which are relevant, not ready, and require minor changes

14. Some Regulations, while relevant for automated driving, cannot be considered as ready for an immediate application to fully automated vehicles due to the presence of provisions referencing elements directly related to manual driving (such as the driver themselves, the driver's seat, pedals or other manual controls, tell-tales, etc.) However, the Regulations in this group only contain a few provisions of this nature, and the provisions in question are not believed to require complex amendments.

Table 3
List of Regulations which are relevant, not ready, and require minor changes

GRBP	*GRE*	*GRPE*	*GRSG*	*GRSP*	*GRVA*
R9, R28, R41, R51, R59, R63, R64, R92, R138, R141, R165		R68, GTR19	R18, R39, R61, R67, R93, R97, R110, R116, R161	R32, R33, R111, R134, R146, GTR13	

15. In addition to the above, the Regulations below are only relevant to vehicles with occupants.

Table 4
List of Regulations which are relevant to fully automated vehicles with occupants only, not ready, and require minor changes

GRBP	*GRE*	*GRPE*	*GRSG*	*GRSP*	*GRVA*
			R66	R14, R25, R145, GTR1, GTR7	

C. Regulations which are relevant, not ready, and require major changes

16. Some Regulations, while relevant for automated driving, are in a state where their application to a fully automated vehicle is very difficult due to many references to vehicle characteristics incompatible with automated driving, or because significant new requirements would be needed to guarantee a satisfactory level of safety for fully automated vehicles. This is the case for several Regulations for basic vehicle functions such as braking, steering, lighting, as well as safety Regulations (electric safety, crashworthiness, etc.) Given the large number of changes needed for the Regulations in this group, the two tables below highlight the proposed priority of certain UNR and GTR.

Table 5
List of Regulations which are relevant, not ready, and require major changes.

GRBP	*GRE*	*GRPE*	*GRSG*	*GRSP*	*GRVA*
	R10, **R48**, R53, R74, R86	GTR2	**R43**, R55, R102, R105, R144, R147, **R160**, GTR6	**R94**, **R95**, **R100**, R127, R135, R136, R137, R153, GTR9, GTR14, GTR20	**R13**, **R13-H**, R78, **R79**, R90**,** GTR3

Note: In the table above, the text in bold indicates Regulations to be amended in priority (as defined in Chapter V, paragraph A. of this report); the text in italic represents Regulations

which are only applicable to two-wheeled vehicles and should be given a low priority for amendments.

17. In addition to the above, the Regulations below are only relevant to vehicles with occupants.

Table 6
List of Regulations which are relevant to fully automated vehicles with occupants only, not ready, and require major changes.

GRBP	*GRE*	*GRPE*	*GRSG*	*GRSP*	*GRVA*
			R107	**R11, R16, R17, R21, R29**	

Note: In this table, text in bold represents Regulations to be amended in priority (as defined in Chapter V, paragraph A of this report).

D. Regulations which are not relevant to fully automated vehicles

18. Some Regulations are not relevant for fully automated vehicles, either because they may only be applicable for vehicles equipped with manual driving capabilities and are unrelated to the driving task, or because they cover systems or characteristics whose performance is under the full responsibility of the ADS.

Table 7
List of Regulations which are not relevant for fully automated vehicles

GRBP	*GRE*	*GRPE*	*GRSG*	*GRSP*	*GRVA*
	R1, R3, R4, R5, R6, R7, R8, R19, R20, R23, R27, R31, R38, R50, R56, R57, R65, R69, R70, R72, R76, R77, R82, R87, R88, R91, R98, R104, R112, R113, R119, R123		R35, R36, R46*, R52, R60, R62, R71*, R81*, R121, R125*, R151*, R158*, R159*, R166*, R167*, GTR12	R12, R44	R89*, R130*, R131*, R139, R140*, R152*, R157, GTR8*

* The system or equipment covered in the Regulation should be handled by the ADS, guaranteeing at least the same level of performance.

19. While not necessarily relevant for fully automated vehicles outside of dual-mode vehicles, these Regulations may still require amendments regarding the interaction between manual and automated mode, the status of the system while the vehicle is in automated mode, or the behaviour of the system when a transition occurs from one mode to the other.

E. Additional considerations

20. Some Regulations have been reviewed regarding their technical compatibility with fully automated vehicles, but not regarding their relevance for high-level policies on traffic rules. This is the case for UN Regulations No. 105 and 111, on the safety of vehicles

transporting dangerous goods, and tank vehicles respectively. As of the writing of this report, it is unclear whether restrictions or prohibitions could apply to the use of these vehicles on public roads. However, the Regulations themselves are relevant for automated vehicles and could be made applicable via amendments, which is why they are marked as "relevant" in this report. Depending on high-level policies, these Regulations could be amended to specifically prohibit automated vehicles to comply with these Regulations (if the choice is made to forbid the type approval of such automated vehicles), or they could be amended to accommodate automated vehicles — leaving open the decision to allow or not allow such automated vehicles on public roads.

Note: the general overview of the screening results are provided in Figure 1 reproduced at the end of the Chapter V.

IV. Recommendations for drafting future Regulations

A. General principles

21. When drafting ADS Regulations, several basic features should be considered as part of the responsibility of the ADS:

(a) Reacting to all types of inputs from non-ADS Regulations, including all kinds of signals originally meant for the driver, and taking appropriate action;

(b) Ensuring the same level of performance as any action performed by the driver, or as any function designed to assist the driver;

(c) Allowing all tests for other Regulations to be carried out, e.g. by providing a test mode or other methods to specifically control the vehicle to perform the specified test protocol, even if the vehicle has no manual driving capabilities.

B. List of relevant keywords to carefully consider

22. Table 8 provides a list of relevant keywords, which could have an impact on its application to automated vehicles, if used in a non-ADS Regulation. Any occurrence of one of these words (or similar words) in a provision applicable to vehicles equipped with an ADS should therefore be accompanied with clear equivalent provisions for these vehicles.

23. While not relevant as a standalone keyword, it was also noticed that the word "system" in Regulations was often used in closed proximity with provisions, which are affected by automated driving.

C. Open issues

24. The following concepts were also identified as being relevant to drafting any future Regulation, but require more consideration before definitive guidance can be given:

1. Categories for automated vehicles

25. One key issue detected during the screening process is that of categories for automated vehicles. Indeed, current vehicle categories were all designed based on existing designs and use cases of vehicles. Automated vehicles represent a variety of new possible use cases, such as small urban vehicles with both seated and standing passengers, or delivery robots with no occupants at all, which do not correspond to any existing vehicle category. On the other hand, the purpose of vehicle categories is not only related to the purpose of the vehicle, but also to other administrative considerations such as registration, taxation, or driving licenses. A measured approach should therefore be taken to explore the benefits and added administrative burden of new categories or subcategories for automated vehicles. While discussions on this issue have started, amendments to Regulations will require Consolidated Resolution No. 3 (R.E.3) and Special Resolution No. 1 (S.R.1) to accommodate automated vehicles: it is

therefore recommended that these two Resolutions be immediately worked on jointly by GRSG and GRVA.

26. Additionally, existing categories represent an obstacle in the readiness of certain Regulations for automated vehicles, and particularly light quadricycles. While many scenarios exist for light automated quadricycles, such as in urban delivery applications, the closest appropriate category currently existing would be L_6 or L_7 (as per R.E.3) Note: S.R.1 does not include corresponding categories. However, several relevant Regulations (R78, GTR3, R136) are applicable to all vehicles of Category L / Category 3: this includes two-wheeled vehicles for which there was no use case for automation highlighted as urgent by the industry during the screening process. It would therefore be difficult to amend the whole Regulation to accommodate automated quadricycles. Alternatively, these categories of vehicles could be transferred to other Regulations for vehicles of M and N categories (R78 to R13-H, and R136 to R100 respectively). However, this would represent a significant increase in performance requirements for these vehicles.

2. Impact of the ODD on performance and testing requirements

27. Each automated vehicle may function within an ODD with exact, pre-determined boundaries on where the vehicle can drive. Many automated vehicles can thus only operate in specific environments (flat terrain, urban area, highway, etc.), at low speeds, or with other strong restriction on their operation. Most Regulations consider that vehicles are driven in a diverse range of environments, and performance requirements are dimensioned accordingly. Consideration could be given on whether the operational limitations of automated vehicles should be reflected in existing Regulations, such as those on braking, steering, lighting, crashworthiness, etc.

3. Overlap with ADS capabilities

28. Several Regulations related to basic vehicle functions (R13, R13-H, R78, R79, GTR3) or active safety features (R131, R140, R152, GTR8) describe requirements that are expected to be covered by the capabilities of the ADS. For instance, an automated vehicle should be able to brake in case of emergency, and should be able to do so with a level of performance at least equal to what would be required for an Advanced Emergency Braking System (AEBS). Similarly, the large number of testing scenarios related to braking could overlap with the testing requirements of a braking Regulation. Careful consideration should therefore be given on whether Regulations such as those on Electronic Stability Control (ESC) or AEBS may be considered irrelevant for automated vehicles, or have value as independent proofs of compliance of the vehicle as a whole with the performance level of specific features already applicable to non-automated vehicles. For the same reason, it may be relevant to maintain basic performance tests for Regulations on braking or steering in the interest of ensuring the compliance of the automated vehicle to these existing performance requirements.

4. Dual-mode interactions

29. Dual-mode vehicles may be equipped with several features, which might only be relevant in manual mode, especially driver assistance or active safety features. If those features are suspended when switching from manual to automated mode, their behaviour when switching again to manual mode should be the object of clear provisions, supporting the driver to safely regain control of the vehicle, also for the case when transitions only occur while the vehicle is stationary.

5. Test mode

30. Many Regulations contain testing provisions, which must be performed on a testing bench or a test track. In both cases, automated vehicles without manual driving capabilities should be able to perform the exact test scenarios described in the Regulation. While there are no requirements at this stage on how this can be achieved, one potential solution (in the context of type approval) is for the manufacturer to equip their vehicles with a test mode, which would allow any specific driving scenario to be generated by a Type Approval

Authority or Technical Service. Special attention should be given to this issue to provide clarity and clear rules to avoid concerns such as potential defeat devices or cycle beating.

6. Monitoring passengers

31. It is generally understood that automated vehicles should handle all aspects of the driving task that would be the responsibility of the driver in non-automated vehicles. One of such responsibility area is regarding the responsibility of the driver to monitor and guarantee the safety of the other occupants: this is illustrated, for instance, by safety belt reminders, and the ability of the driver to disable the electric operation of rear windows. How should the ADS react to occupants unfastening their safety belt while the vehicle is in movement? Should the ADS be able to prevent occupants from opening their window? The extent of the abilities of the ADS to exert this kind of responsibility is unclear at this stage.

7. Transport of children in automated vehicles

32. In relation with issue No. 6, the transport of children is to be considered with caution. Because additional responsibilities are expected of the driver when transporting children, it is unclear yet whether children could be allowed to travel in automated vehicles without the physical/ in person presence of an adult, in which case several Regulations would be affected.

33. A Global Forum for Road Traffic Safety (WP.1) Resolution[7] on the deployment of highly and fully automated vehicles in road traffic gives guidance for users of automated vehicles, mentioning the need for users to "meet the requirements for their proper use", and to "be aware and informed of their proper use".

8. User Roles

34. In general, it can be assumed that the ADS will take over the responsibility of receiving inputs from all vehicle systems, and of transferring appropriate information to relevant stakeholders (remote supervision centre, vehicle occupants, on-board operator, etc.) These user roles would be defined by the ADS as part of its definition taking into account user roles defined in road traffic conventions and similar legal instruments. However, it might be relevant in certain Regulations to define user roles for specific purposes: for example, in certain emergency situations, an acoustic warning audible to all occupants could be deemed necessary.

9. Transport of dangerous goods in automated vehicles

35. The transport of dangerous goods also comes with additional risks and responsibilities for the driver and may be the object of specific rules on how the vehicle should be dynamically driven, depending on the kind of goods transported. Therefore, whether UN Regulation No. 105 is applicable to automated vehicles should be studied in concertation with WP.15. This issue also applies, to some extent, to vehicles with complex dynamic behaviours, such as tank vehicles transporting liquids, concrete mixers, offroad vehicles, etc.

10. Active versions of Regulations

36. Many UN Regulations under the 1958 Agreement contain several versions (series of amendments), which are in force at the same time. It is unclear at this stage how the process of amending previous versions of UN Regulations should take place, whether automated vehicles should systematically be covered by a new series of amendments, etc.

[7] ECE/TRANS/WP.1/2018/4/Rev.3

Table 8
List of relevant themes and keywords for automated driving

Theme	*Related keywords*				
Human person	Driver Rider	Passenger	Person	Occupant	Crew (member)
Areas within the vehicle	Cockpit Driver's compartment Driving cab	Passenger compartment			
Body Parts	Hand Foot Arm Etc.				
Manual action	Lever Button Handle Switch	Push Pull Press Rotate	Force Muscular (energy)	Reach Accessible	Manual
Vision	Visible (Field of) view / vision See	Ocular Optical	Illuminate Display Recognise Identify	Monitor	
Audition	Audible Acoustic Hear				
Information to the driver	Warn Signal Alert	Inform Remind Indicate	(Check) lamp Symbol Mark Sign Colour Contrast Pictogram Text	Instrument panel Dashboard	
Physical controls	Steering wheel	Accelerator	Pedal	Gear shaft	
Driver decision	Override	Control Actuate Operate (Mis)use (De)activate	Intentional Choose Deliberate	Emergency	
Entering or exiting the vehicle	Evacuate Leave Exit Enter Board	Ingress Egress			
Physical components irrelevant for automated driving	Windscreen Windshield Sun visor Mirror Glazing				

Theme	*Related keywords*				
The keywords below are relevant when considering vehicles without occupants:					
Person on board	Seating position	R point H point	(Un)fasten (Un)buckle	Seated Standing	Armrest Headrest Safety belt Door

V. Next steps

A. Priorities for amendments

37. Assigning priority regarding which Regulations should be amended first must be decided based on factors including:

(a) National and regional needs for the certification (self-certification and type approval) of automated vehicles;

(b) Current relevance of use cases (e.g. two- wheeled automated vehicles currently have fewer use cases in active development than automated vehicles whose designs are based on passenger cars);

(c) The complexity of the changes needed.

38. It is generally agreed that the Regulations to be amended in priority should be those, which cover fundamental vehicle features, and which offer the greatest value for road safety and environmental performance (in terms of pollutant and GHG emissions). Therefore, the experts proposed the following Regulations as particularly urgent in their respective WP.29 subsidiary bodies (GRs):

Table 9
List of Regulations to be amended in priority

Subsidiary Working Party	*Regulations to be amended in priority*
GRBP	R9, R28, R51, R138, R165
GRE	R10, R48
GRPE	To be decided after all Regulations have been screened.
GRSG	R43, R107, R160, R.E.3, S.R.1
GRSP	R11, R14, R16, R 17, R 21, R29, R94, R95, R100
GRVA	R13, R13-H, R79

39. Although the open issues identified above must be addressed before Regulations can be amended, initial drafting can begin while working around these dependencies. For instance, provisions can be drafted based on the identified use cases for automated vehicles, even if new vehicle categories have not been decided yet. Indirect features of automated vehicles (bidirectional vehicles, unconventional seating positions) not related to the driving task could be considered at a later stage, given the fact that they are not direct consequences of automation.

B. Coordination between WP.29 subsidiary bodies (GRs)

40. Since the beginning of the screening process, the experts have identified the need to work with a common method and common deliverables, which has allowed the present document to offer a harmonised format and analysis for all Regulations. Furthermore, the

task forces anticipate that further collaborative work would be needed if Regulations are to be amended.

41. Indeed, all future amendments to legal instruments regarding their fitness for automated driving, although under the responsibility of the relevant subsidiary Working Party of WP.29, should follow the same principles and use similar language. This should be ensured by a continued coordination between GRs.

42. Additionally, many of the identified open issues were relevant to several GRs and might not be easily solved by WP.29 itself or one single subsidiary Working Party. Conversely, certain issues for a specific Regulation can only be solved with guidance from GRVA or its informal working group on Functional Requirements for Automated Vehicles (FRAV).

43. It is thus recommended that, in addition to each WP.29 subsidiary Working Party drafting the amendments to UN Regulations and UN GTRs under its purview (whether it be through its existing screening task force or by other means), a central team of experts should be established to continue the harmonisation efforts established during the screening process. This team could be mandated by WP.29 to coordinate the amendments proposed by each GR, and to accelerate the process of solving the open issues previously identified by directly approaching the relevant experts and working groups. This team should be composed of experts from each subsidiary Working Party of WP.29, as well as experts in automated driving. Administratively, this team of experts could thus report directly to WP.29. Alternatively, the mandate of the GRVA screening task force could be extended to take on this role of harmonising future work and accelerating the resolution of open issues.

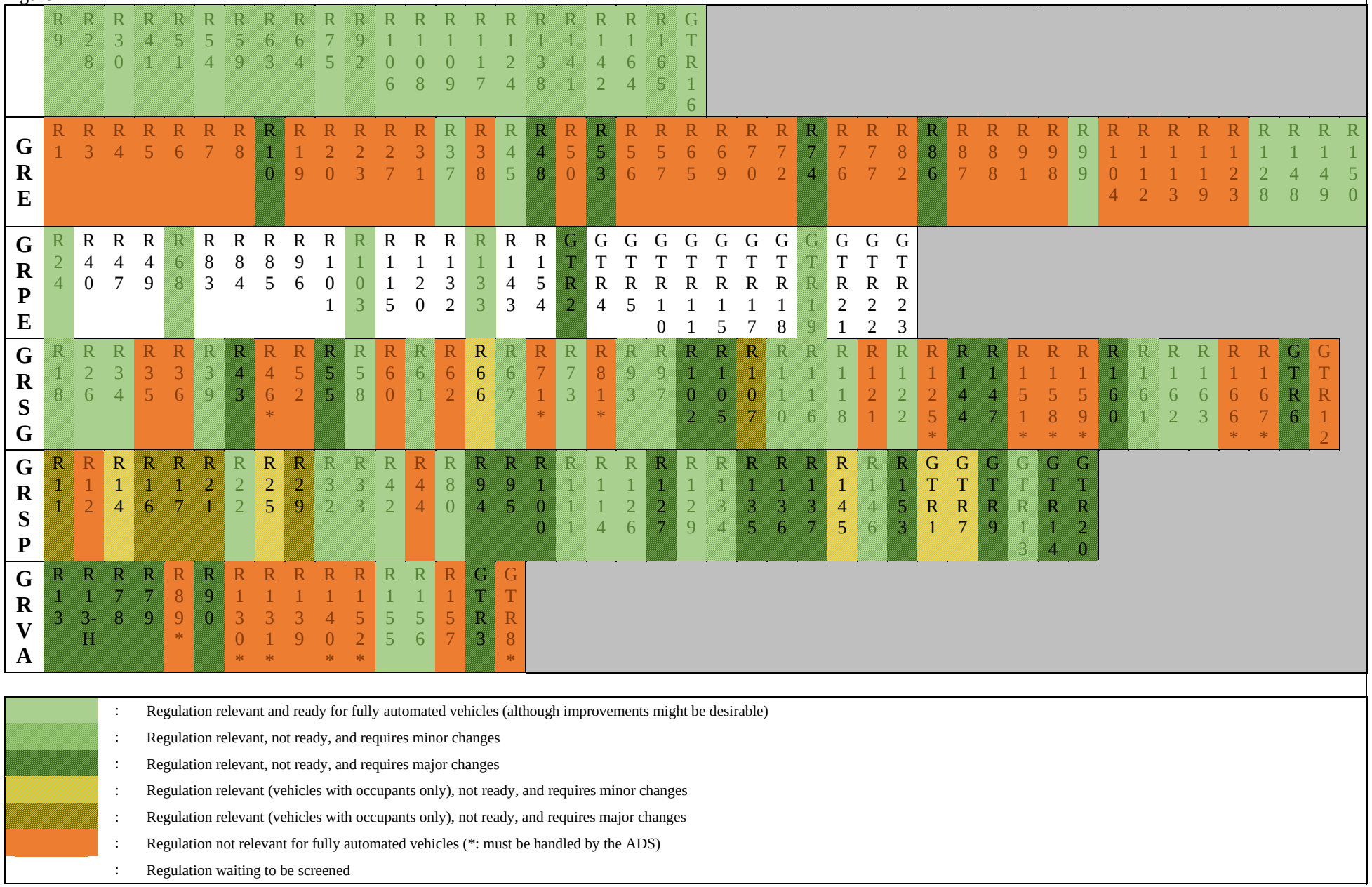
C. Expected guidance from WP.29

44. WP.29 may wish to decide to the start activities on amendments right away, or to take more time for discussions on vehicle categories, open issues etc. This report recommends starting the process of amending Regulations as soon as possible.

45. WP.29 may wish to confirm the list of Regulations to amend in priority. This report recommends that priority be given to the Regulations identified in Chapter V, paragraph A of this report.

46. WP.29 may wish to provide guidance on the continuation of coordination between GR. The authors recommend that a team of experts be mandated to accelerate the resolution of the identified issues, and to support and harmonise the process of amending UN Regulations and GTRs.

Figure 1


R9 R28 R30 R41 R51 R54 R59 R63 R64 R75 R92 R106 R108 R109 R117 R124 R138 R141 R142 R164 R165 GTR16
GRE
R1 R3 R4 R5 R6 R7 R8 R10 R19 R20 R23 R27 R31 R37 R38 R45 R48 R50 R53 R56 R57 R65 R69 R70 R72 R74 R76 R77 R82 R86 R87 R88 R91 R98 R99 R104 R112 R113 R119 R123 R128 R148 R149 R150
GRPE
R24 R40 R47 R49 R68 R83 R84 R85 R96 R101 R103 R115 R120 R132 R133 R143 R154 GTR2 GTR4 GTR5 GTR10 GTR11 GTR15 GTR17 GTR18 GTR19 GTR21 GTR22 GTR23
GRSG
R18 R26 R34 R35 R36 R39 R43 R46* R52 R55 R58 R60 R61 R62 R66 R67 R71* R73 R81* R93 R97 R102 R105 R107 R110 R116 R118 R121 R122 R125* R144 R147 R151* R158* R159* R160 R161 R162 R163 R166* R167* GTR6 GTR12
GRSP
R11 R12 R14 R16 R17 R21 R22 R25 R29 R32 R33 R42 R44 R80 R94 R95 R100 R111 R114 R126 R127 R129 R134 R135 R136 R137 R145 R146 R153 GTR1 GTR7 GTR9 GTR13 GTR14 GTR20
GRVA
R13 R13-H R78 R79 R89* R90 R130* R131* R139 R140* R152* R155 R156 R157 GTR3 GTR8*
: Regulation relevant and ready for fully automated vehicles (although improvements might be desirable)
: Regulation relevant, not ready, and requires minor changes
: Regulation relevant, not ready, and requires major changes
: Regulation relevant (vehicles with occupants only), not ready, and requires minor changes
: Regulation relevant (vehicles with occupants only), not ready, and requires major changes
: Regulation not relevant for fully automated vehicles (*: must be handled by the ADS)
: Regulation waiting to be screened

Annex 1

Results of the review – summary sheets of the analysis of each screened regulation

Figure 2
Template of summary sheets

Regulation No.	*The number and title of the Regulation, including the exact Series of amendments and supplement used during the screening process.*	**Date of review**	*Date of the creation of this one-page summary*
Scope	*Categories of vehicles (as defined in R.E.3 or S.R.1) which the Regulation is applicable to.*		
Content of existing Regulation	*Short explanation of the purpose of the Regulations or the provisions contained therein.*	**Specifics for dual-mode vehicles**	*Any provisions that have a particular effect on dual-mode vehicles, e.g. because of interactions between manual driving capabilities and a driving task carried out by the ADS, or because of issues that may occur during transitions between manual and automated modes.*
Content relevant for vehicles equipped with an ADS	*Examples of provisions particularly relevant when the driving task is carried out by an ADS, whether the vehicle be "dual mode", without manual driving capabilities or not designed to carry occupants.*	**Specifics for vehicles without manual driving capabilities**	*Any provisions that have a particular effect on vehicles not equipped with manual driving capabilities.* *Example: a "driver's seat" still exists in a dual-mode vehicle, but not in a vehicle without manual driving capabilities.*
Content to be covered by (potential) ADS Regulation	*Concepts related to the Regulation, and which should be handled by the ADS.*	**Specifics for vehicles without occupants**	*Any provisions that have a particular effect on vehicles not equipped that are not designed to carry occupants.* *Example: a "passenger compartment" does not exist in a vehicle that is not designed to carry occupants.*
Summary of recommended changes	*Possible (non-exhaustive) changes that could contribute to making the Regulation applicable to automated vehicles.*		
Notes	*Additional comments from the screening task force.*		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		*See OBJECTIVE 1*	
Readiness:	**Regulation ready**	*See OBJECTIVE 2*	
	Major amendments needed	*See OBJECTIVE 3*	

Annex 2

Results of the review – GRBP Regulations

Figure 3
Results of the review of GRBP Regulations

Regulation No.	09R08/02 (Sound emissions - L2, L4 and L5) 28R00/06 (Audible warning devices) 41R05/01 (Sound emissions - L3) 51R03/06 (Sound emissions - M, N) 59R03/00 (Replacement silencing systems) 63R02/05 (Sound emissions - L1) 92R02/00 (Non-Original Replacement Exhaust Silencing Systems) 138R01/03 (Quiet road transport vehicles) 165R00/00 (Reverse warning sound)	**Date of review**	7 February 2023
Scope	L, M, N; components; etc.		
Content of existing Regulation	Provisions on the levels and the measurement of sound emissions for various vehicles categories, warning signals and replacement silencing systems	**Specifics for dual-mode vehicles**	None, as long as the sound emissions in manual mode are representative of those in automated mode.
Content relevant for vehicles equipped with an ADS	Testing procedures	**Specifics for vehicles without manual driving capabilities**	Testing provisions might require a test mode.
Content to be covered by (potential) ADS Regulation	If the vehicle is not equipped with manual driving capabilities, a test mode or other means to perform the test scenarios should be available.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Testing provisions may need to be amended to account for automated vehicles (e.g. requiring that a test mode be provided by the manufacturer, or developing a specific procedure). - The test track might need specific requirements to support navigation and path planning of the automated vehicle.		
Notes	Vehicles whose ODD does not reach the speed required for testing may need adapted requirements		

Outcome of the review			
		Yes	**No**
Regulation applicable to fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	64R03/01 (Temporary-use spare tyres, etc.)	**Date of review**	7 February 2023
Scope	Components		
Content of existing Regulation	Provisions for various types of vehicle equipment used to replace or extend the mobility of flat tyres.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	- Warning signals, Run-Flat Warning Systems - Braking test carried out on a representative vehicle	**Specifics for vehicles without manual driving capabilities**	Testing provisions might require a test mode
Content to be covered by (potential) ADS Regulation	- The potential use of a spare tyre should be considered by the ADS. - The ADS should handle warning signals and take appropriate action.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Testing provisions may need to be amended to account for automated vehicles (e.g. requiring that a test mode be provided by the manufacturer, or developing a specific procedure). - The test track might need specific requirements to support navigation and path planning of the automated vehicle.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation applicable to fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	141R01/02 (Tyre Pressure Monitoring System - TPMS)	**Date of review**	7 February 2023
Scope	M, N, O_3, O_4		
Content of existing Regulation	Provisions on the effectiveness of the detection of low tyre pressure, and requirements for tests (puncture, diffusion and malfunction). Connection between towing and towed vehicles.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Despite being a warning system, the Regulation is relevant for automated vehicles because it gives information not directly related to the driving task.	**Specifics for vehicles without manual driving capabilities**	Testing provisions might require a test mode.
Content to be covered by (potential) ADS Regulation	The ADS should be able to handle TPMS warnings and take appropriate action.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Different requirements for automated vehicles could be considered if the tyre pressure, due to vehicle dynamic changes or asymmetric behaviours that might lead to false adaptive behaviour of the automated system. - Testing provisions may need to be amended to account for automated vehicles (e.g. requiring that a test mode be provided by the manufacturer, or developing a specific procedure). - The test track might need specific requirements to support navigation and path planning of the automated vehicle.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation applicable to fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	142R01/01 (Tyre Installation)	**Date of review**	7 February 2023
Scope	M, N, O		
Content of existing Regulation	Provisions on the installation of tyres such as fitment, load and speed capacities.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Potential interactions between the maximum design speed of the vehicle, the maximum speed of the ODD foreseen for a specific vehicle and tyre speed capacity could be considered in a similar way to the interaction with Speed Limiting Devices and Functions.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation		**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes	If bidirectional vehicles are to be considered, the use of bidirectional tyres should be considered in this Regulation.		

Outcome of the review			
		Yes	**No**
Regulation applicable to fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Annex 3

Results of the review – GRE Regulations

Figure 4
Results of the review of GRE Regulations

Regulation No.	48R08/02 (Instal. of lighting devices – M, N, O) 53R03/03 (Instal. of lighting devices – L_3) 74R02/02 (Instal. of lighting devices – L_1) 86R02/01 (Instal. of lighting devices – R, S, T)	**Date of review**	22 May 2023
Scope	L_1, L_3, M, N, O, R, S, T		
Content of existing Regulation		**Specifics for dual-mode vehicles**	
Content relevant for vehicles equipped with an ADS		**Specifics for vehicles without manual driving capabilities**	
Content to be covered by (potential) ADS Regulation		**Specifics for vehicles without occupants**	
Summary of recommended changes	See existing work of the GRE TF on AVSR, such as document ECE/TRANS/WP.29/GRE/2023/9 proposing amendments and definitions to make R48 applicable to automated vehicles.		

Notes	

Outcome of the review			
		Yes	**No**
Regulation applicable to fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Annex 4

Results of the review – GRPE Regulations

Figure 5
Results of the review of GRPE Regulations

Regulation No.	68R00/01 (Measurement of maximum speed)	**Date of review**	5 May 2023
Scope	M_1, N_1		
Content of existing Regulation	Provisions on the conditions and procedure to measure the maximum speed of a vehicle.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Provisions related to the measurement procedure on a straight or loop track, the absence of action on the steering wheel, etc.	**Specifics for vehicles without manual driving capabilities**	Provisions on reaching the maximum speed of an automated vehicle might require a test mode.
Content to be covered by (potential) ADS Regulation	If the vehicle is not equipped with manual driving capabilities, a test mode or other means to manually reach the maximum speed of the vehicle should be available.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	Minor amendments are needed to detail the testing procedure on automated vehicles (e.g. requiring that a test mode be provided by the manufacturer).		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	103R00/04 (Replacement pollution control devices)	**Date of review**	4 May 2023
Scope	Components		

Content of existing Regulation	Provisions on the conditions and procedure to ensure that replacement pollution control devices have the same performance (emissions, noise, durability, OBD compatibility) as original devices.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Provisions on the testing procedure	**Specifics for vehicles without manual driving capabilities**	Running urban cycles might require a test mode.
Content to be covered by (potential) ADS Regulation	- If the vehicle is not equipped with manual driving capabilities, a test mode or other means to manually reach the maximum speed of the vehicle should be available. - The ADS should be able to handle OBD malfunctions.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Testing provisions regarding urban cycles may need to be amended to account for automated vehicles (e.g. requiring that a test mode be provided by the manufacturer, or developing a specific procedure). - The test track might need specific requirements to support navigation and path planning of the automated vehicle.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		X

Regulation No.	133R00/01 (Reusability, recyclability and recoverability)	**Date of review**	11 April 2023
Scope	M_1, N_1		
Content of existing Regulation	Provisions on the preliminary assessment by the manufacturer and checks to be performed by the Competent Authority.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	GTR2 am 5 (Emissions measurement procedure – Two- and three-wheeled vehicles)	**Date of review**	9 May 2023
Scope	Two- and three-wheeled vehicles		
Content of existing Regulation	Method for the determination of the levels of gaseous and particulate pollutant emissions at the tailpipe, the emissions of carbon dioxide and the energy efficiency in terms of fuel consumption.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Testing procedures	**Specifics for vehicles without manual driving capabilities**	Rider requirements are inapplicable to vehicles without manual driving capabilities.
Content to be covered by (potential) ADS Regulation	If the vehicle is not equipped with manual driving capabilities, a test mode or other means to perform the test scenarios should be available.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Testing provisions may need to be amended to account for automated vehicles (e.g. requiring that a test mode be provided by the manufacturer, or developing a specific procedure). - The test track might need specific requirements to support navigation and path planning of the automated vehicle.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	GTR19 am 3 (WLTP EVAP)	**Date of review**	9 May 2023
Scope	1-2, 2 as defined in S.R.1		
Content of existing Regulation	Method to determine the levels of evaporative emission from light-duty vehicles in a repeatable and reproducible manner designed to be representative of real-world vehicle operation.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Testing procedures	**Specifics for vehicles without manual driving capabilities**	Testing provisions might require a test mode.
Content to be covered by (potential) ADS Regulation	If the vehicle is not equipped with manual driving capabilities, a test mode or other means to perform the test scenarios should be available.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Testing provisions may need to be amended to account for automated vehicles (e.g. requiring that a test mode be provided by the manufacturer, or developing a specific procedure). - The test track might need specific requirements to support navigation and path planning of the automated vehicle.		
Notes	This Regulation only applies to vehicles with engines fuelled with petrol / reference fuels.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Annex 5

Results of the review – GRSG Regulations

Figure 6
Results of the review of GRSG Regulations

Regulation No.	26R04/00 (External projections)	**Date of review**	30 January 2023
Scope	M_1		
Content of existing Regulation	Provisions for protruding parts of the external surface of the vehicle, to ensure the safety of Vulnerable Road Users	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	External projections due to sensors	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	The Regulation is applicable in its current state. Improvements could be considered, such as provisions for sensors replacing devices for indirect vision.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	34R03/02 (Prevention of fire risks)	**Date of review**	30 January 2023
Scope	M, N, O; components		

Content of existing Regulation	Safety of fuel tanks, and their installation in vehicles, specifically regarding the prevention of fire risks	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	References are made to Regulations (R94, R95) that expect the vehicle having occupants.
Summary of recommended changes	References to other Regulations (R94, R95) should be investigated if they are not applicable to automated vehicles without occupants.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	35R01/00 (Foot controls)	**Date of review**	30 January 2023
Scope	M_1		
Content of existing Regulation	Arrangement and mode of operation of pedals.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	39R01/02 (Speedometer and odometer)	**Date of review**	30 January 2023
Scope	L, M, N		
Content of existing Regulation	Provisions regarding the installation of speedometers (precision, legibility, markings) and odometers.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	- Odometers remain relevant for automated vehicles, e.g. for PTI or resale of the vehicle. - Speedometers are not needed for automated vehicles, but may be desirable for different reasons (on-board operator, information to passengers)	**Specifics for vehicles without manual driving capabilities**	The definitions of speedometer and odometer refer to "the driver": the odometer might need to refer to the vehicle user or owner instead.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	Minor amendments should be made, e.g. regarding the option to set units, the position of the odometer, etc.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	43R01/09 (Safety glazing)	**Date of review**	14 March 2023
Scope	L, M, N, O, T		
Content of existing Regulation	Safety glazing requirements for windscreens and windows with regards to driver visibility and occupant safety.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	The relevance of impact and optical requirements may depend on the specific use case of the ADS.	**Specifics for vehicles without manual driving capabilities**	Several definitions, general requirements, and tests may not be needed for ADS (e.g. Optical-distortion test and Wiper laboratory test). Annex 3 references the driver's visibility, steering wheel, eye point, and R point of the driver's seat.
Content to be covered by (potential) ADS Regulation	Equivalent occupant safety requirements for HUD screens or alternative windscreen solutions.	**Specifics for vehicles without occupants**	If occupants are not present but the vehicle is fitted with safety glazing, parts of the Regulation may still be applicable in the interest of the protection of the other road users.
Summary of recommended changes	- Modify definitions that reference driver, driver's field of vision, steering wheel, etc. - Modify the compliance tests (e.g. wiper laboratory and optical distortion test) to be performed if occupants are present. - Testing provisions may need to be amended to account for automated vehicles (e.g. requiring that a test mode be provided by the manufacturer, or developing a specific procedure).		
Notes	If bi-directional vehicles are to be considered, further amendments will be required, e.g. extending impact requirements to the rear windscreen.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	46R05/00 (Devices for indirect vision)	**Date of review**	21 February 2023
Scope	L, M, N; components		
Content of existing Regulation	- Performance criteria for mirrors - Performance criteria for Camera-Monitor-Systems - Functional requirements for CMS - Mandatory required fields of vision to be displayed to the driver - Geometrical requirements, minimum radii for mirrors and CMS - Impact tests for protruding parts	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	The concept of indirect vision is irrelevant for an ADS.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should sense its environment with a level of coverage at least equal to what would be achieved by a driver, from the driver's seat.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	If certain use cases require some kind of device indirect vision (on-board operator or user who needs to monitor or interact with the exterior of the vehicle), and if it is determined that these devices should be regulated, a new Regulation could be considered.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	55R02/02 (Mechanical coupling devices)	**Date of review**	14 March 2023
Scope	Components		
Content of existing Regulation	Requirements for coupling devices (design, operation, robustness) and vehicles fitted with such devices (attachment including remote indication and controls of coupling).	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Coupling requirements are not depending on whether a driver or occupants are present in the vehicle.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	- The ADS should function with all types of trailers which are part of its ODD. - The ADS should be able to handle any incorrect engagement of the locking system detected while driving, and to detect any abnormal dynamic behaviour resulting from incorrect coupling.	**Specifics for vehicles without occupants**	Remote coupling (indication and control) is particularly relevant for vehicles with no occupants on board.
Summary of recommended changes	- Certain references to driver, including those mentioning verifications by "feel", "sight" or "touch", should be amended. - Specific requirements related to remote indication and remote control should be considered for fully automated vehicles without occupants.		
Notes	Whether automated vehicles without human interaction (either on board, or during the coupling phase) are allowed to tow trailers is independent from this screening process.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	58R03/03 (Rear Underrun Protection - RUP)	**Date of review**	14 March 2023
Scope	M, N_1, O_1, O_2; components		
Content of existing Regulation	Provision for ensuring that vehicles protect other vehicles from rear underrun.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	For adjustable RUPDs only: an operator must verify the correct position of the device.
Summary of recommended changes	Requirements for adjustable RUPD, where an operator must verify the right position of the device, should be amended for vehicles with no occupants.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	60R00/05 (Controls & tell-tales)	**Date of review**	4 February 2023
Scope	L_1, L_3		

Content of existing Regulation	Control device, control position, control form operated by the driver (rider). Tell-tales, indicators, symbols, display positions, colours, etc. that informs the driver of the status of the vehicle.	**Specifics for dual-mode vehicles**	Dual mode vehicles must comply in manual mode, but do not need to provide tell-tales in automated mode.
Content relevant for vehicles equipped with an ADS	All controls should be directly actionable by the ADS, and all tell-tale information should be transmitted to the ADS directly.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	- Overall management of failures - Communication with vehicle occupants, remote supervision centres, on-board operator, etc.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	61R00/03 (External projections, commercial vehicles)	**Date of review**	30 January 2023
Scope	N		

Content of existing Regulation	Provisions for protruding parts of the external surface of the vehicle, to ensure the safety of Vulnerable Road Users	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	External projections due to sensors.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	References to the "cab" of the vehicle should be amended if the vehicle has no occupants, and therefore no compartment for a driver of passengers.
Summary of recommended changes	The Regulation should be slightly reworked to become applicable to automated vehicles without occupants. Other improvements could be considered, such as provisions for sensors replacing devices for indirect vision.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	62R01/00 (Protection against unauthorised use)	**Date of review**	4 February 2023
Scope	L_1–L_7, if fitted with handlebars		
Content of existing Regulation	Provisions for the steering lock of the vehicle and its security (breaking torque), security of physical keys (number of possible combinations).	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	This Regulation cannot be relevant for automated vehicles without introducing provisions for digital keys.	**Specifics for vehicles without manual driving capabilities**	The Regulation is inapplicable to vehicles without manual driving capabilities, as they would not be fitted with handlebars.
Content to be covered by (potential) ADS Regulation	Protection against unauthorised use in automated mode should also be guaranteed by the compliance of the vehicle with R155. However, as of June 2023, R155 is not applicable to L1–L5 vehicles.	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants, as they would not be fitted with handlebars.
Summary of recommended changes	None		
Notes	This Regulation does not seem to be relevant for automated vehicles, as it relies on the vehicle being fitted with handlebars.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	66R02 (Strength of superstructure)	**Date of review**	16 January 2023
Scope	M_2, M_3		
Content of existing Regulation	Provisions to ensure that the superstructure of the vehicle shall have the sufficient strength to ensure that the residual space during and after the rollover test on complete vehicle is unharmed.	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	References to the driver	**Specifics for vehicles without manual driving capabilities**	Reference to the driver's compartment
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is not applicable to vehicles with no occupants.
Summary of recommended changes	Minor references to the driver and the driver's compartment should be amended.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	67R04/01 (Liquified Petroleum Gas)	**Date of review**	13 January 2023
Scope	M and N vehicles equipped with LPG		
Content of existing Regulation	Specifications for and approval of LPG components, and vehicles equipped with an LPG system. Overall safety of the LPG system against overpressure, corrosion, ageing, extreme temperatures, etc.	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	Warnings, communication with the LPG ECU	**Specifics for vehicles without manual driving capabilities**	Reference to the accelerator pedal, etc.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	References to the passenger compartment
Summary of recommended changes	- Minor references to warnings, passenger compartment, etc. should be amended. - Communication between the LPG ECU and the ADS should be detailed. - Testing provisions may need to be amended to account for automated vehicles (e.g. requiring that a test mode be provided by the manufacturer, or developing a specific procedure).		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	71R00/00 (Driver's field of vision)	**Date of review**	21 February 2023
Scope	T		
Content of existing Regulation	- Minimum required field of vision - Requires the equipment of wipers if a windscreen is mounted	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should sense its environment with a field of vision at least equal to what is required by the Regulation.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	If certain use cases require some kind of field of vision (on-board operator or user who needs to monitor or interact with the exterior of the vehicle, passenger comfort), and if it is determined that these fields of vision should be regulated, a new Regulation could be considered.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	73R01/02 (Lateral Underrun Protection - LUP)	**Date of review**	14 March 2023
Scope	N_2, N_3, O_3, O_4; components		
Content of existing Regulation	Provision for ensuring that vehicles protect other vehicles from lateral underrun.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	For adjustable LUPDs only: an operator must verify the correct position of the device.
Summary of recommended changes	Requirements for adjustable LUPDs, where an operator must verify the right position of the device, should be amended for vehicles with no occupants.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	81R00/02 (Rear-view mirrors)	**Date of review**	4 February 2023
Scope	L_1, L_3, L_4		
Content of existing Regulation	- Size, shape, and curvature of mirror surface. - Impact test method of the mirror surface. - Strength test method of the mirror holder.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should gather rear-view information by other means than R81-compliant mirrors.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	93R00/01 (Front Underrun Protection - FUP)	**Date of review**	13 January 2023
Scope	N_2, N_3; components		
Content of existing Regulation	Provision for ensuring that vehicles of categories N2 and N3 protect other vehicles from front underrun.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	References to the driver's cabin
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	Minor references to the driver's cabin should be amended.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	97R01/08 (Vehicle Alarm Systems - VAS)	**Date of review**	16 December 2022
Scope	M_1, N_1; components		

Content of existing Regulation	Provisions on the efficacy of Vehicle Alarm Systems, including the design of the alarm signal and its reliability (test scenarios for true positives, absence of false positives)	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	Relevance depending on the use case: some automated vehicles may have no "compartment" to monitor with an alarm system.	**Specifics for vehicles without manual driving capabilities**	References to "driver's door", etc.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	Many references are made to "passenger compartment", "glazed area", "authorised user".
Summary of recommended changes	Many references to actions by a human (driver or "authorised user") should be amended, especially those implying the action of a human ("rotation of the ignition key", "opening the driver's door").		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	102R00/00 (Close Coupling Device - CCD)	**Date of review**	22 March 2023
Scope	Components		
Content of existing Regulation	Provisions on the automatic coupling and system failures of CCDs.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Several testing provisions expect a driver to "feel" any difficulty or abnormal behaviour in controlling the vehicle	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should be able to handle any incorrect engagement of the locking system detected while driving, and to detect any abnormal dynamic behaviour resulting from incorrect coupling.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	The Regulation should be modernised overall, and specifically testing provisions should be reworked with the assumption that the driving task might not be performed by a human.		
Notes	It is unclear at this stage whether this Regulation is likely to be applied to automated vehicles.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		X

Regulation No.	105R06/01 (Construction of ADR vehicles)	**Date of review**	3 February 2023
Scope	N, O transporting dangerous goods		
Content of existing Regulation	Construction of vehicles intended for the transportation of dangerous goods, such as their electrical and braking equipment.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	References to the driver and their actions	**Specifics for vehicles without manual driving capabilities**	References to the driver's cab etc.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	References to the driver may be transformed into references to an operator, but this assumes that a human is present inside the vehicle.
Summary of recommended changes	If the Regulation is applicable to automated vehicles, references to the driver and the cab should be amended.		
Notes	The screening process only considers the technical applicability of the Regulation to automated vehicles. It is still unclear whether automated vehicles should be able to transport dangerous goods, and if so, whether they are allowed to function with no human on board.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	107R10/00 (General construction)	**Date of review**	22 February 2023
Scope	M_2, M_3		
Content of existing Regulation	Provisions for the general construction of buses and coaches such as: protection against fire risks, masses & dimensions, stability, service doors and (emergency) exits, interior arrangements, etc.	**Specifics for dual-mode vehicles**	Clarifications are needed when certain provisions are handled differently in manual and automated mode.
Content relevant for vehicles equipped with an ADS	All interactions between passengers and the driver, or functions which the driver is expected to perform.	**Specifics for vehicles without manual driving capabilities**	Many schematics and provisions related to the driver's compartment should be reworked.
Content to be covered by (potential) ADS Regulation	The ADS must be able to handle all requirements related to the driver unless an on-board operator is present.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Many provisions should be created related to the information of passengers, interaction with the ADS, etc. - Many schematics and provisions related to the driver's compartment should be reworked. - Some provisions require further exploration, such as those implying that the driver or crew can physically offer their assistance in case of emergency: should on-board operators be required for certain classes of vehicles?		
Notes	The Regulation is not currently adapted for automated urban shuttles, as no category for such vehicles (standing passengers and fewer than 9 seats) exists in RE.3.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	110R05/00 (Compressed / Liquified Natural Gas)	**Date of review**	4 March 2023
Scope	M, N		
Content of existing Regulation	Provisions for the installation of compressed natural gas (CNG) and/or liquefied natural gas (LNG) for propulsion.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Provisions related to fuel selection and indicators	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should be able to handle fuel selection	**Specifics for vehicles without occupants**	Provisions regarding manual shut off valves and other manual components should be considered, if the Regulation is to be applicable to vehicles without occupants.
Summary of recommended changes	- In addition to amending provisions for pressure and fuel indicators, it should be clarified how fuel selection may be carried out in a fully automated vehicle. - Testing provisions may need to be amended to account for automated vehicles (e.g. requiring that a test mode be provided by the manufacturer, or developing a specific procedure).		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	116R01/00 (Protection against unauthorised use)	**Date of review**	7 March 2023
Scope	M_1, N_1; components		
Content of existing Regulation	- Locking systems (keys, including digital keys): provisions on the number of combinations or lock design, locking of the steering system, brakes, etc. - Alarm systems (efficiency, absence of false positives, etc.) - Immobilisers (setting and unsetting, etc.)	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	All provisions that are not purely physical (digital keys, impact of immobilisers on the engine, etc.)	**Specifics for vehicles without manual driving capabilities**	Some parts of the Regulation become irrelevant if there are no driving capabilities (physical keys, locking of the gear shaft, etc.)
Content to be covered by (potential) ADS Regulation	Protection against unauthorised use in automated mode should also be guaranteed by the compliance of the vehicle with R155.	**Specifics for vehicles without occupants**	Alarm systems remain relevant for detecting interference with the vehicle, even if there is no compartment subject to intrusion.
Summary of recommended changes	Minor amendments are required, such as references to the "driver's intention" and provisions related to manual driving capabilities or the presence of occupants.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	118R04/01 (Burning behaviour)	**Date of review**	14 March 2023
Scope	M_3 classes II and III		
Content of existing Regulation	Burning behaviour (ignitibility, burning rate and melting behaviour) and capability to repel fuel or lubricants of materials used in vehicles.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	The absence of a driver may negatively impact the reactivity on the measures that allow the evacuation (absence of anticipated indicators or remote interventions). Extending the scope to more categories of vehicles would give passengers more time for evacuation due to the use of materials with regulated performance regarding their fire behaviour.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	The Regulation is ready, but the scope may be extended to M_2 and all M_3 automated vehicles for safety reasons.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	121R01/05 (Controls, tell-tales and indicators)	**Date of review**	16 January 2023
Scope	M, N		
Content of existing Regulation	Provisions on the location and identification (symbols, illumination, colour) of controls, tell-tales, and indicators	**Specifics for dual-mode vehicles**	It should be specified whether tell-tales and indicators should be illuminated during automated mode.
Content relevant for vehicles equipped with an ADS	All controls should be directly actionable by the ADS, and all tell-tale information should be transmitted to the ADS directly.	**Specifics for vehicles without manual driving capabilities**	Vehicles without manual driving capabilities should not be equipped with controls related to the driving task.
Content to be covered by (potential) ADS Regulation	- Overall management of failures - Communication with vehicle occupants, remote supervision centres, on-board operator, etc.	**Specifics for vehicles without occupants**	The Regulation is not applicable to vehicles without occupants.
Summary of recommended changes	For dual-mode vehicles, the behaviour of tell-tales and indicators in automated mode should be specified. If certain use cases require some kind of controls, tell-tales, or indicators (on-board operator who should be informed in case of failures, information to the passengers), and if it is determined that they need to be regulated, drafting provisions for R121, R107 or a new Regulation could be considered.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	122R00/06 (Heating systems)	**Date of review**	3 February 2023
Scope	M, N, O		
Content of existing Regulation	Requirements on heating systems, if fitted, either to heat the passenger compartment or the loading compartment.	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes	The Regulation may not be applicable to certain automated vehicles with no passenger compartment and no loading compartment.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	125R02/02 (Forward field of vision of drivers)	**Date of review**	3 February 2023
Scope	M_1, N_1		
Content of existing Regulation	Provisions defining the zone which must be directly visible by the driver, from the driver's seat	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should sense its environment with a field of vision at least equal to what is required by the Regulation.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	If certain use cases require some kind of field of vision (on-board operator or user who needs to monitor or interact with the exterior of the vehicle, passenger comfort), and if it is determined that these fields of vision should be regulated, a new Regulation should be considered.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	144R01/01 (Accident Emergency Call System)	**Date of review**	7 February 2023
Scope	M_1, N_1		

Content of existing Regulation	Provisions on Emergency Call Systems in case of accidents: position determination, data transfer and voice communication with PSAPs, resistance to impact, etc.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	All	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	- The ADS should handle the malfunction of the system. - The ADS Regulation might need to introduce the possibility for the ADS to voluntarily activate the AECS in certain situations.	**Specifics for vehicles without occupants**	Some requirements are irrelevant or inapplicable (e.g. manual activation, reference to airbags) to vehicles without occupants, but AECS in general remain relevant.
Summary of recommended changes	Several requirements should be amended for vehicles without occupants: some to clarify their inapplicability (see above), others to introduce the notion of "user in charge" or "remote operator" as a point of contact with PSAPs.		
Notes	- AECS are currently intended to communicate with PSAPs (emergency services). Direct communication with remote supervision centres could be considered under R144. - The scope of the Regulation could be extended to include all vehicles equipped with an ADS and carrying occupants.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	147R00/00 (Mechanical coupling components for agricultural vehicles)	**Date of review**	22 March 2023
Scope	R, S, T; components		

Content of existing Regulation	Requirements for coupling devices (design, operation, robustness) and vehicles fitted with such devices (attachment including remote indication and controls of coupling).	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Coupling requirements are not depending on whether a driver or occupants are present in the vehicle.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	- The ADS should function with all types of trailers which are part of its ODD. - The ADS should be able to handle any incorrect engagement of the locking system detected while driving, and to detect any abnormal dynamic behaviour resulting from incorrect coupling.	**Specifics for vehicles without occupants**	Remote coupling (indication and control) is particularly relevant for vehicles with no occupants on board.
Summary of recommended changes	- References to a driver or operator should be amended when relevant. - The Regulation should be modernised overall, and specifically testing provisions should be reworked with the assumption that the driving task might not be performed by a human.		
Notes	Whether automated vehicles without human interaction (either on board, or during the coupling phase) are allowed to tow trailers is independent from this screening process.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	151R00/03 (Blind Spot Information System)	**Date of review**	30 January 2023
Scope	M_2, M_3, N_2, N_3		
Content of existing Regulation	Functional and performance requirements for blind spot information systems to inform the driver when turning to the right.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should provide the same level of performance and detection as what is required by the Regulation.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes	If information for low-speed manoeuvres is desirable (e.g. for on-board operators), it should not be regulated under R151.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	158R00/01 (Reversing motion)	**Date of review**	4 February 2023
Scope	M, N; components		
Content of existing Regulation	Provisions for means of rear visibility and detection by direct vision, rear-view Mirror, rear-View Camera System or Detection System	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should provide the same level of performance and detection as what is required by the Regulation.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes	If information for rear visibility is desirable (e.g. for on-board operators), it should not be regulated under R158.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	159R00/01 (Moving Off Information System)	**Date of review**	4 February 2023
Scope	M_2, M_3, N_2, N_3		
Content of existing Regulation	Onboard system to detect and inform the driver of the presence of pedestrians and cyclists in the close-proximity forward blind-spot of the vehicle and, if deemed necessary based on manufacturer strategy, warn the driver of a potential collision	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should provide the same level of performance and detection as what is required by the Regulation.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes	If information while moving off is desirable (e.g. for on-board operators), it should not be regulated under R159.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	160R01/01 (Event Data Recorder)	**Date of review**	6 February 2023
Scope	M_1, N_1		

Content of existing Regulation	Provisions for the recording, storage and retrieval of certain driving data. List of specific elements to record.	**Specifics for dual-mode vehicles**	An element indicating the driving mode at the time of the accident should be included.
Content relevant for vehicles equipped with an ADS	Most of the content is relevant. Specific elements related to the ADS and that are not in the scope of the DSSAD should be recorded by the EDR. Different conditions for triggering the recording of data should be considered (e.g. Minimum Risk Manoeuvre)	**Specifics for vehicles without manual driving capabilities**	Certain elements to record may no longer be relevant (including the driving mode indicator proposed above)
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	Existing elements to record conditions for triggering the recording of data may no longer be relevant (e.g. activation of a non-reversible occupant restraint system)
Summary of recommended changes	The Regulation could be applicable in its current state but should be improved. Specific elements related to the ADS and that are not in the scope of the DSSAD should be recorded by the EDR. Different conditions for triggering the recording of data should be considered (Minimum Risk Manoeuvre).		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	161R00/02 (Locking systems)	**Date of review**	8 March 2023
Scope	M_1, N_1; components		
Content of existing Regulation	Provisions for locking devices against unauthorised use (keys, including digital keys): provisions on the number of combinations or lock design., locking of the steering system, brakes, etc.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	All provisions other than the strictly mechanical protection against unauthorised use are relevant for automated vehicles.	**Specifics for vehicles without manual driving capabilities**	Some parts of the Regulation become irrelevant if there are no driving capabilities (physical keys, locking of the gear shaft, etc.)
Content to be covered by (potential) ADS Regulation	Protection against unauthorised use in automated mode should also be guaranteed by the compliance of the vehicle with R155.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	Minor amendments are required, such as references to the "driver's intention".		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	162R00/03 (Immobiliser)	**Date of review**	7 March 2023
Scope	M_1, N_1; components		
Content of existing Regulation	Provisions for immobilisers against unauthorised use (preventing the use of the engine without removing the immobiliser with the correct key or other device)	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	Protection against unauthorised use in automated mode should also be guaranteed by the compliance of the vehicle with R155.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	163R00/02 (Alarm system)	**Date of review**	8 March 2023
Scope	M_1, N_1; components		
Content of existing Regulation	Provisions for alarm systems against unauthorised use (indicating intrusion in or interference with the vehicle)	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	Protection against unauthorised use in automated mode should also be guaranteed by the compliance of the vehicle with R155.	**Specifics for vehicles without occupants**	The Regulation remains relevant for detecting interference with the vehicle, even if there is no compartment subject to intrusion.
Summary of recommended changes	None		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	166R00/00 (Close-Proximity to the Front and Lateral Sides of Vehicles)	**Date of review**	4 February 2023
Scope	M_1, N_1; components		
Content of existing Regulation	Provisions for means of front and lateral visibility and detection by direct vision, rear-view Mirror, rear-View Camera System or Detection System	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should provide the same level of performance and detection as what is required by the Regulation.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	167R00/00	**Date of review**	3 February 2023
Scope	M_2, M_3, N_2, N_3		
Content of existing Regulation	Direct Vision requirements to reduce blind spots for drivers.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Most of the Regulation refers to the sight of the driver, from the driver's seat, making the requirements inapplicable.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should have sensing abilities at least equal to what is required by the Regulation.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	If certain use cases require some kind of direct vision (on-board operator or user who needs to monitor or interact with the exterior of the vehicle, passenger comfort), and if it is determined that this kind of direct vision should be regulated, a new Regulation could be considered.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	GTR 6 am 3 (Safety glazing)	**Date of review**	14 March 2023
Scope	Category 1 and 2 as defined in S.R. 1		
Content of existing Regulation	Safety glazing requirements for windscreens and windows with regards to driver visibility and occupant safety.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	If occupants are present: Impact requirements would be applicable. Optical requirements may not be relevant.	**Specifics for vehicles without manual driving capabilities**	Several definitions, general requirements, and tests may not be needed for ADS (e.g. Optical-distortion test and Wiper laboratory test). Annex 3 references the driver's visibility, steering wheel, eye point, and R point of the driver's seat.
Content to be covered by (potential) ADS Regulation	Equivalent occupant safety requirements for HUD screens or alternative windscreen solutions.	**Specifics for vehicles without occupants**	If occupants are not present but the vehicle is fitted with safety glazing, parts of the Regulation may still be applicable in the interest of the protection of the other road users.
Summary of recommended changes	- Modify definitions which reference the driver, the driver's field of vision, or the steering wheel. - Extend the applicability of the impact requirements to the rear windscreen for bi-directional vehicles. - Testing provisions may need to be amended to account for automated vehicles (e.g. requiring that a test mode be provided by the manufacturer, or developing a specific procedure		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	GTR12 am 1 (Motorcycle controls, tell-tales, and indicators)	**Date of review**	14 March 2023
Scope	3-3 as defined in S.R.1		
Content of existing Regulation	Control device, control position, control form operated by the driver (rider). Tell-tales, indicators, symbols, display positions, colours, etc. that informs the driver of the status of the vehicle.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	All controls should be directly actionable by the ADS, and all tell-tale information should be transmitted to the ADS directly.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	- Overall management of failures - Communication with vehicle occupants, remote supervision centres, on-board operator, etc.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Annex 6

Results of the review – GRSP Regulations

Figure 7
Results of the review of GRSP Regulations

Regulation No.	11R04/02 (Door locks and hinges)	**Date of review**	29 November 2022
Scope	M_1, N_1		
Content of existing Regulation	Provisions to the performance of door locks and door hinges, including provisions on Child locks.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	The notion of operating doors and locks becomes more complex, as they might be operated by either the ADS or by occupants.	**Specifics for vehicles without manual driving capabilities**	Definitions such as "driver side" becomes irrelevant for vehicle without manual driving capabilities.
Content to be covered by (potential) ADS Regulation	The ADS should be able to open and close the doors of the vehicle. Regarding the operation of locks, more consideration should be given (see below).	**Specifics for vehicles without occupants**	The Regulation only applies to doors of compartments with occupants.
Summary of recommended changes	The concept of Child lock and locking in general should be carefully considered: should an ADS be able to lock occupants in the vehicle? Should children be able to travel unattended in automated vehicles? (See Open Issues)		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	12R04/05 (Protection against the steering mechanism)	**Date of review**	30 January 2023
Scope	M_1, N_1		
Content of existing Regulation	Protection of the driver (maximum force applied) against the steering mechanism in the event of impact and behaviour of the electrical power train (no electric shock, no electrolyte leakage)	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	If the vehicle is equipped with a steering column, and if an occupant might be present in front of it, the Regulation remains fully applicable.	**Specifics for vehicles without manual driving capabilities**	The Regulation is not applicable to vehicle without manual steering control. The electrical protection needs to be covered by R94 or R137.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is not applicable. The electrical protection needs to be covered by R94 or R137.
Summary of recommended changes	Minor amendments are needed: for instance, they could indicate the inapplicability of the Regulation to automated vehicles without manual controls, and which already comply with R94 or R137.		
Notes	If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), major amendments will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	14R09/02 (Safety belt anchorages)	**Date of review**	8 May 2023
Scope	M, N		
Content of existing Regulation	Provisions for the location, design and robustness of safety belt anchorages	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	Provisions related to the driver's seat, steering wheel or R point become inapplicable.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants
Summary of recommended changes	Minor amendments are needed for automated vehicles without manual driving capabilities.		
Notes	If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), more significant amendments will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	16R08/03 (Safety belts)	**Date of review**	8 May 2023
Scope	M, N, O, L_2, L_4, L_5, L_6, L_7, T; components		
Content of existing Regulation	Provisions on: - Safety-belts, restraint systems, child restraint systems (incl. ISOFIX); - vehicles equipped with safety-belts, safety-belt reminders, restraint systems, child restraint systems (incl. ISOFIX)	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Provisions regarding safety belt reminders and failure warnings.	**Specifics for vehicles without manual driving capabilities**	Provisions related to the driver's seat, steering wheel or R point become inapplicable
Content to be covered by (potential) ADS Regulation	- The ADS should be able to detect whether safety belts are fastened and take appropriate action. - The ADS should be able to handle failure warnings.	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants
Summary of recommended changes	- Many minor amendments regarding the driver's seat are needed, e.g. substituting it to a passenger seat; - The concept of safety belt reminder should be carefully considered: how should the ADS react if passengers unfasten their safety belt while the vehicle is driving?		
Notes	If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), major amendments will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	17R10 (Seats, anchorages and head restraints)	**Date of review**	13 March 2023
Scope	M_1, N_1, (M_2, M_3)		
Content of existing Regulation	Provisions on seats, their anchorages and their head restraints: design (size, seating positions, etc.) and safety performance (resistance to impact, moment, displaced luggage, etc.)	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	Provisions related to the driver's seat, steering wheel or R point become inapplicable
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants.
Summary of recommended changes	Many minor amendments regarding the driver's seat are needed, e.g. substituting it to a passenger seat;		
Notes	- If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), major amendments will be needed. - If bidirectional vehicles are to be considered, current restrictions on rear-facing seats for certain vehicle categories should be reconsidered.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	21R01/04 (Interior fittings)	**Date of review**	2 December 2022
Scope	M_1		

Content of existing Regulation	Provisions regarding: - the interior parts of the passenger compartment other than the rear-view mirror or mirrors; - the arrangement of the controls; - the roof or opening roof, and - the seat-back and the rear parts of seats. - power-operation of windows, roof panels and partition systems.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Most provisions regarding the protection of occupants and the operation of windows etc. by occupants remain relevant. Provisions related to driver controls (especially operation of windows etc. only possible for the driver) are not relevant.	**Specifics for vehicles without manual driving capabilities**	Provisions related to physical controls around the driver, such as the steering control, instrument panel, handbrake, pedals etc. are inapplicable to vehicles without manual driving capabilities.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants.
Summary of recommended changes	- The concept that some controls are only possible for the driver (one-touch closing, switching off rear window operation) should be re-evaluated. This issue is related to the question on whether children should be able to travel unattended in automated vehicles. (See Open Issues) - Many minor amendments regarding the interior layout of the vehicle related to the driver are needed.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	25R04/01 (Head restraints)	**Date of review**	26 December 2022
Scope	Components		
Content of existing Regulation	Requirements for head restraints to reduce the frequency and severity of injuries caused by rearward displacement of the head.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	References to "driver head restraint" become irrelevant for vehicles with no manual driving capabilities.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	Regulation not applicable
Summary of recommended changes	Minor amendments related to the driver's seat are needed.		
Notes	If new seating positions (side- or rear-facing seats, torso recline angles greater than 25°, unconventional seating layout) or bidirectional vehicles are to be considered, more work on the Regulation will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	29R03/05 (Protection of the occupants of the cab of a commercial vehicle)	**Date of review**	1 February 2023
Scope	N		
Content of existing Regulation	Provisions on the design of cabs to eliminate to the greatest possible extent the risk of injury to the occupants in the event of an accident. Provisions on the survival space in the cab after impact tests.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	Some provisions related to the steering wheel or the instrument panel become inapplicable to vehicles without manual driving capabilities.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants.
Summary of recommended changes	Amendments are needed for automated vehicles without manual driving capabilities (redefinitions related to the steering wheel and instrument panel)		
Notes	If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), major amendments will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	42R00/02 (Front and rear protective devices)	**Date of review**	16 January 2023
Scope	M_1		
Content of existing Regulation	Provisions on the behaviour of protective devices (bumpers, etc.) when involved in a collision at low speed so as to allow contacts and small shocks to occur without causing any serious damage.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Currently, the Regulation allows sensors to become damaged or broken after impact tests, but also requires the vehicle's steering and braking system to keep operating in a normal manner.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	The current tolerance for sensors to become broken after an impact test should be investigated, as the Regulation did not consider sensors as being a critical component of basic braking and steering performance.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	44R04/18 (Child restraint systems)	**Date of review**	31 January 2023
Scope	Components		
Content of existing Regulation	Design and performance requirements for the type-approval of child restraint systems, either as components or built into vehicle seating.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants.
Summary of recommended changes	None at this stage. However, consideration should be given on whether it is appropriate to leave R44 open to built-in child restraint systems in the long term.		
Notes	UN R44 was amended in recent years, firstly, to stop new type-approvals for most categories of child restraint system, and secondly, to remove the obligation of Contracting Parties to accept R44 type-approvals. Going forward, WP.29/GRSP intends that all new child restraints are approved to R129 only and has given Contracting Parties the option of refusing to allow the sale of R44 CRS in their territory. However, R44 type-approval can still be granted to child restraints in Mass Group III. Furthermore, the obligation to accept R44 type-approvals still applies for child restraints that are built-in to the vehicle seating. This means that new Group III boosters that are built-in to vehicle seats can continue to be approved to R44 and they must be accepted by all Contracting Parties. Built-in child restraints are currently rare. However, some OEMs report that built-in child restraints may be the best solution for driverless shuttle vehicles and car-share services. If built-in child restraints become more common, it may be necessary to update UN R44 to stop new type-approvals and to allow Contracting Parties to stop accepting approvals in their territory.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	80R04 (Strength and anchorages of seats in buses and coaches)	**Date of review**	13 March 2023
Scope	Components; M_2, M_3 of Classes II, III and B		
Content of existing Regulation	Provisions on seats, their anchorages and their installation in buses and coaches: design and safety performance.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants.
Summary of recommended changes	None strictly related to vehicle automation.		
Notes	- If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), major amendments will be needed. - If bidirectional vehicles are to be considered, current restrictions on rear-facing seats should be reworked.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	94R04/01 (Protection of occupants in the event of a frontal collision)	**Date of review**	5 December 2022
Scope	M_1, N_1		

Content of existing Regulation	- Protection of front passengers in case of a frontal impact; protection of the occupants of vehicles operating on electrical power from high voltage. - Provisions on electrical safety, fuel leakage, etc.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Some provisions are currently not fit for automated vehicles, such as door openings "de-activated by the driver"	**Specifics for vehicles without manual driving capabilities**	Provisions related to the driver's seat, steering wheel etc. are inapplicable to vehicles without manual driving capabilities.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	- Provisions related to the safety of occupants are not applicable for vehicles without occupants. - Provisions regarding leakage, fuel system integrity, etc. might be applicable. - Provision on the opening of doors might not be applicable.
Summary of recommended changes	- Many minor amendments regarding the interior layout of the vehicle, especially around the driver's seat, are needed. The definition of vehicle width should be reconsidered to take into account sensors. - If the provisions on leakage etc. are applicable to vehicles without occupants, this should be clearly specified.		
Notes	- If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), major amendments will be needed. - If bidirectional vehicles are to be considered, current restrictions on rear-facing seats should be reworked.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	95R05/02 (Protection of occupants in the event of a lateral collision)	**Date of review**	30 November 2022
Scope	M_1, N_1		

Content of existing Regulation	- Protection of front passengers in case of a lateral impact; protection of the occupants of vehicles operating on electrical power from high voltage. - Provisions on electrical safety, fuel leakage, etc.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Some provisions are currently not fit for automated vehicles, such as door locking systems "de-activated by the driver"	**Specifics for vehicles without manual driving capabilities**	Provisions related to the driver's seat, steering wheel etc. are inapplicable to vehicles without manual driving capabilities.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	- Provisions related to the safety of occupants are not applicable for vehicles without occupants. - Provisions regarding leakage, fuel system integrity, etc. might be applicable. - Provision on the opening of doors might not be applicable.
Summary of recommended changes	- Many minor amendments regarding the interior layout of the vehicle, especially around the driver's seat, are needed. The definition of vehicle width should be reconsidered to take into account sensors. - If the provisions on leakage etc. are applicable to vehicles without occupants, this should be clearly specified.		
Notes	- If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), major amendments will be needed. - If bidirectional vehicles are to be considered, current restrictions on rear-facing seats should be reworked.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	100R03/01 (Electric power train)	**Date of review**	28 November 2022
Scope	M, N; components		
Content of existing Regulation	Provisions on the safety of the electric power train (electrical shock), Rechargeable Electrical Energy Storage System (shocks, vibrations, fire resistance, low and high temperatures, thermal propagation, warnings)	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	- The provisions on the warning system are relevant to vehicles equipped with an ADS. - Many definitions, such as active driving possible mode, are inapplicable when an ADS is controlling the vehicle.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	- The ADS should consider the energy level of the REESS and adjust its high-level route planning accordingly. - The ADS should be able to handle warnings (for failures, thermal events, etc.) and take appropriate action.	**Specifics for vehicles without occupants**	Most provisions remain relevant for vehicles without occupants, for the protection of other road users, the prevention of thermal events, the intervention of emergency services, etc.
Summary of recommended changes	- Many minor amendments are required, especially definitions related to driving modes (reference to the acceleration pedal), driving conditions, and the behaviour of the warning system (which warning signals should be directly communicated to the passengers of an automated vehicle?) - Certain provisions on charging, besides the obvious difficulty of charging the vehicle in the absence of a driver, should be investigated to understand any potential effect on the ADS, such as the impossibility of vehicle movement while charging.		
Notes	The absence of a driver may negatively impact the speed of the evacuation of the vehicle in case of thermal propagation or other critical events, despite the presence of advance warnings in the Regulation. Whether this negative impact is significant and whether specific provisions should be drafted for automated vehicles is unclear at this stage.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	114R00/00 (Replacement airbag modules)	**Date of review**	13 March 2023
Scope	Components		
Content of existing Regulation	Provisions for replacement airbag modules and systems.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Provisions related to the driver are inapplicable to automated vehicles.	**Specifics for vehicles without manual driving capabilities**	Provisions for airbag modules for steering wheels are inapplicable.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants
Summary of recommended changes	Minor amendments related to the driver are needed, but the Regulation is already easily applicable to automated vehicles in its current state.		
Notes	If bidirectional vehicles are to be considered, more significant work on the Regulation will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	127R04/00 (Pedestrian safety)	**Date of review**	11 January 2023
Scope	M_1, N_1		
Content of existing Regulation	Provisions on minimising the risk of injuries in case of collision (leg or head) of a pedestrian (child or adult) with the vehicle.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Provisions related to ARHSS are relevant for automated vehicles that are equipped with one.	**Specifics for vehicles without manual driving capabilities**	- Provisions related to the driver's seat, R point etc. are inapplicable to automated vehicles without manual driving capabilities - Vehicles without a windscreen may be the object of specific provisions
Content to be covered by (potential) ADS Regulation	The ADS should be able to use ARHSS automatically in compliance with the Regulation.	**Specifics for vehicles without occupants**	New geometric criteria are needed for vehicles not designed to carry occupants.
Summary of recommended changes	- Amendments related to the interior layout of the vehicle are needed, such as references to the driver's R point. - Vehicles without a windscreen might need further consideration. - ARHSS for automated vehicles might need further consideration.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	129R03/06 (Enhanced child restraint systems)	**Date of review**	26 January 2023
Scope	Components		
Content of existing Regulation	Design and performance requirements for the type-approval of enhanced child restraint systems, including i-Size and ISOFIX, either as components or built into vehicle seating.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants.
Summary of recommended changes	None at this stage.		
Notes	This regulation applies to child restraint systems only. In most cases, these are separate from the vehicle, but they can also be "built-in" to the vehicle seating. The compatibility between child restraints and vehicles is regulated closely between UN R129 and UN R14, R16 and R145. Although not stated explicitly, UN R129 assumes that vehicles travel forwards only and that all seating in the vehicle is forward-facing. The regulation then defines child restraints according to the direction they face in the vehicle. It also sets different limits on the approval of child restraints and the requirements they must fulfil according to their orientation. Today, vehicles with rear-facing seating are a grey area with respect to the installation of CRS, but they are also quite rare. If bi-directional vehicles, and vehicles with new seating layouts become more common, it may be necessary to amend UN R129 to specify clear limits on the use of child restraints and/or to explain the basis for the direction they face in the vehicle. Some examples are shown below, but there are numerous references to the child restraint orientation throughout UN R129. Similarly, the provisions in UN R129 for built-in child restraints are vague and incomplete. Built-in child restraints are currently rare. However, some OEMs report that built-in child restraints may be the best solution for driverless shuttle vehicles and car-share services. If built-in child restraints become more common, it will be necessary to update UN R129 to ensure built-in products are subject to a complete set of provisions and requirements.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	134R01/01 (Hydrogen-fuelled vehicles - HFCV)	**Date of review**	10 January 2023
Scope	M, N; components		
Content of existing Regulation	Performance and testing requirements for compressed hydrogen storage systems (impact, extreme temperatures, on-road performance etc.), their components, and the vehicle incorporating them (fuelling, protection against flammable conditions and leakage, post-crash integrity, etc.)	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Provisions on the tell-tale signal warning are inapplicable to automated vehicles.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should handle failure warnings and take action accordingly.	**Specifics for vehicles without occupants**	- Certain provisions related to the passenger compartment might not apply to vehicles without occupants. - Other than the above, the possibility of requiring a lower level of safety for vehicles without occupants is not considered at this stage.
Summary of recommended changes	- Amendments are needed regarding warning signals to the driver. - If certain provisions (e.g. leakage in the passenger compartments) are not applicable to vehicles without occupants, they should be clearly specified.		
Notes	If bidirectional vehicles are to be considered, more significant work on the Regulation will be needed (labelling location of the vehicle, installation of the hydrogen storage system not subject to the frontal impact test)		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	135R02/00 (Pole-side impact)	**Date of review**	10 January 2023
Scope	M_1, N_1		
Content of existing Regulation	- Provisions to reduce the risk of serious and fatal injury of vehicle occupants in pole-side impact crashes by limiting the forces, accelerations and deflections measured by anthropomorphic test devices in pole side impact crash tests and by other means. - Provisions on fuel system integrity, electrical and hydrogen safety	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Some provisions are currently not fit for automated vehicles, such as door openings "de-activated by the driver"	**Specifics for vehicles without manual driving capabilities**	Provisions related to the driver's seat, steering wheel etc. are inapplicable to vehicles without manual driving capabilities.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	- Provisions related to the safety of occupants are not applicable for vehicles without occupants. - Provisions regarding leakage, fuel system integrity, etc. might be applicable. - Provision on the opening of doors might not be applicable.
Summary of recommended changes	- Many amendments regarding the interior layout of the vehicle, especially around the driver's seat, are needed. The definition of vehicle width should be reconsidered to take into account sensors. - If the provisions on leakage etc. are applicable to vehicles without occupants, this should be clearly specified.		
Notes	- If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), major amendments will be needed. - If bidirectional vehicles are to be considered, more significant work on the Regulation will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	137R02/02 (Frontal collision, restraint system)	**Date of review**	4 December 2022
Scope	M_1, N_1		
Content of existing Regulation	- Protection of passengers in case of a frontal impact; protection of the occupants of vehicles operating on electrical power from high voltage. - Provisions on electrical safety, fuel leakage, etc.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Some provisions are currently not fit for automated vehicles, such as door openings "de-activated by the driver"	**Specifics for vehicles without manual driving capabilities**	Provisions related to the driver's seat, steering wheel etc. are inapplicable to vehicles without manual driving capabilities.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	- Provisions related to the safety of occupants are not applicable for vehicles without occupants. - Provisions regarding leakage, fuel system integrity, etc. might be applicable. - Provision on the opening of doors might not be applicable.
Summary of recommended changes	- Many minor amendments regarding the interior layout of the vehicle, especially around the driver's seat, are needed. The definition of vehicle width should be reconsidered to take into account sensors. - If the provisions on leakage etc. are applicable to vehicles without occupants, this should be clearly specified.		
Notes	- If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), major amendments will be needed. - If bidirectional vehicles are to be considered, more significant work on the Regulation will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	145R00/02 (ISOFIX anchorages and i-Size seating positions)	**Date of review**	1 February 2023
Scope	Any vehicle fitted with ISOFIX or i-Size		
Content of existing Regulation	Provisions on the design, positioning and robustness of ISOFIX anchorages and i-Size seating positions.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	The Regulation is inapplicable to vehicles without occupants.
Summary of recommended changes	Minor amendments related to the driver's seat are needed.		
Notes	If new seating positions (side- or rear-facing seats, torso recline angles greater than 25°, unconventional seating layout) or bidirectional vehicles are to be considered, more work on the Regulation will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	146R00/00 (Hydrogen-fuelled vehicles – L1–L5)	**Date of review**	10 January 2023
Scope	L_1–L_5; components		
Content of existing Regulation	Performance and testing requirements for compressed hydrogen storage systems, their components, and the vehicles incorporating them.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Provisions on the tell-tale signal warning are inapplicable to automated vehicles.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should handle failure warnings and take action accordingly.	**Specifics for vehicles without occupants**	- Certain provisions related to the passenger compartment might not apply to vehicles without occupants. - Other than the above, the possibility of requiring a lower level of safety for vehicles without occupants is not considered at this stage.
Summary of recommended changes	- Amendments are needed regarding warning signals to the driver. - If certain provisions (e.g. leakage in the passenger compartments) are not applicable to vehicles without occupants, they should be clearly specified.		
Notes	If bidirectional vehicles are to be considered and compatible with vehicle categories in the scope of this Regulation, more significant work will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	153R00/02 (Electric power train safety and fuel system integrity at rear-end collision)	**Date of review**	2 December 2022
Scope	M_1, N_1		
Content of existing Regulation	Provisions on electrical safety, fuel leakage, etc. in the event of a rear-end collision against the vehicle.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	One provision referring to the driver's seat becomes inapplicable.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	- All provisions related to the interior layout of the vehicle, especially the passenger compartment, are inapplicable. - The rest of the Regulation may be applicable.
Summary of recommended changes	Many amendments regarding the interior layout of the vehicle, especially around the passenger compartment, are needed for automated vehicles without occupants.		
Notes	If bidirectional vehicles are to be considered, more significant work will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	GTR01 am 2 (Door locks and door retention components)	**Date of review**	26 December 2022
Scope	Components		
Content of existing Regulation	Requirements for vehicle door locks and door retention components, including latches, hinges, and other supporting means, to minimize the likelihood of occupants being thrown from a vehicle as a result of impact. This regulation applies to vehicle door locks and door retention components on side or back doors that lead directly into a compartment that contains one or more seating accommodations.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	Some notions such as "driver side" become meaningless when the vehicle has no manual driving capabilities.
Content to be covered by (potential) ADS Regulation	The ADS should be able to handle door closure warnings and take action accordingly, including in situations where the ADS cannot close the door automatically.	**Specifics for vehicles without occupants**	The Regulation is not applicable to vehicles without passengers containing seating accommodations.
Summary of recommended changes	Minor amendments (redefinitions) are needed to make the Regulation applicable to automated vehicles with occupants.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	GTR07 am 1 (Head restraints)	**Date of review**	26 December 2022
Scope	1-1, 1-2, 2 as defined in S.R.1		
Content of existing Regulation	Requirements for head restraints to reduce the frequency and severity of injuries caused by rearward displacement of the head.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	References to "driver head restraint" become irrelevant for vehicles with no manual driving capabilities.
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	Regulation not applicable
Summary of recommended changes	Minor amendments related to the driver's seat are needed.		
Notes	If new seating positions (side- or rear-facing seats, torso recline angles greater than 25°, unconventional seating layout) or bidirectional vehicles are to be considered, more work on the Regulation will be needed.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	GTR09 am 2 (Pedestrian safety)	**Date of review**	27 December 2022
Scope	1-1, 1-2, 2 as defined in S.R.1		
Content of existing Regulation	Provisions to bring about an improvement in the construction of certain parts of the front of vehicles, include passenger cars, vans and light trucks, which have been identified as causing injury when in collision with a pedestrian or other vulnerable road user.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	- Provisions related to the driver's seat, R point etc. are inapplicable to automated vehicles without manual driving capabilities - Vehicles without a windscreen may be the object of specific provisions
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	New geometric criteria are needed for vehicles not designed to carry occupants.
Summary of recommended changes	- Amendments related to the interior layout of the vehicle are needed, such as references to the driver's R point. - Vehicles without a windscreen might need further consideration.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	GTR13 (Hydrogen Fuel Cell Vehicles - HFCV)	**Date of review**	16 January 2023
Scope	1-1, 1-2 as defined in S.R.1		
Content of existing Regulation	Provisions to minimize human harm that may occur as a result of fire, burst or explosion related to the vehicle fuel system and/or from electric shock caused by the vehicle's high voltage system.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	Provisions on tell-tales	**Specifics for vehicles without manual driving capabilities**	Testing provisions using the driver's seat as a reference point
Content to be covered by (potential) ADS Regulation	The ADS should be able to handle failure warnings and take appropriate action.	**Specifics for vehicles without occupants**	- Certain provisions related to the passenger compartment might not apply to vehicles without occupants. - Other than the above, the possibility of requiring a lower level of safety for vehicles without occupants is not considered at this stage.
Summary of recommended changes	Minor amendments are needed, especially provisions on tell-tales and testing provisions.		
Notes	Bidirectional vehicles should be considered in a second step - Identification of Hydrogen Fuelled Vehicles: labelling location of the vehicle. - Installation of the hydrogen storage system not subject to the frontal impact test: it restricts currently only front of the vehicle. In case of bi-directional vehicle, it could be both front and rear.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed		X

Regulation No.	GTR14 (Pole-side impact)	**Date of review**	22 February 2023
Scope	1-1, 1-2, 2 as defined in S.R.1		
Content of existing Regulation	Provisions to reduce the risk of serious and fatal injury of vehicle occupants in side impact crashes by limiting the forces, accelerations and deflections measured by anthropomorphic test devices in pole side impact crash tests and by other means. This may complement other side impact tests.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	All provisions related to the driver's seat, pedals, steering wheel etc. become inapplicable to vehicles without manual driving capabilities.
Content to be covered by (potential) ADS Regulation	The ADS should be able to handle warnings and take appropriate action.	**Specifics for vehicles without occupants**	Provisions related to the safety of occupants are not applicable for vehicles without occupants; however, provisions regarding leakage, fuel system integrity, etc. may be applicable to these vehicles.
Summary of recommended changes	- Many minor amendments regarding the interior layout of the vehicle, especially around the driver's seat, are needed. - If the provisions on leakage etc. are applicable to vehicles without occupants, this should be clearly specified.		
Notes	- If new seating positions are to be considered (side- or rear-facing seats, torso recline angles greater than 25°), major amendments will be needed. - If bidirectional vehicles are to be considered, current restrictions on rear-facing seats should be reworked.		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	GTR20 (Electric vehicle safety)	**Date of review**	2 December 2022
Scope	1, 2 as defined in S.R.1		
Content of existing Regulation	Safety-related performance of electrically propelled road vehicles and their rechargeable electric energy storage systems. The purpose of this regulation is to avoid human harm that may occur from the electric power train.	**Specifics for dual-mode vehicles**	None (full compliance required)
Content relevant for vehicles equipped with an ADS	- The provisions on the warning system are relevant to vehicles equipped with an ADS. - Many definitions, such as active driving possible mode, are inapplicable when an ADS is controlling the vehicle.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	- The ADS should consider the energy level of the REESS and adjust its high-level route planning accordingly. - The ADS should be able to handle warnings (for failures, thermal events, etc.) and take appropriate action.	**Specifics for vehicles without occupants**	Most provisions remain relevant for vehicles without occupants, for the protection of other road users, the prevention of thermal events, the intervention of emergency services, etc.
Summary of recommended changes	- Many minor amendments are required, especially definitions related to driving modes (reference to the acceleration pedal), driving conditions, and the behaviour of the warning system (which warning signals should be directly communicated to the passengers of an automated vehicle?) - Certain provisions on charging, besides the obvious difficulty of charging the vehicle in the absence of a driver, should be investigated to understand any potential effect on the ADS, such as the impossibility of vehicle movement while charging.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Annex 7

Results of the review – GRVA Regulations

Figure 8
Results of the review of GRVA Regulations

Regulation No.	13R12/02 (Braking)	**Date of review**	11 May 2023
Scope	M_2, M_3, N, O		
Content of existing Regulation	- Applicable to towing and towed vehicles, incl. those involved in a modular vehicle combination - No physical breakage of mechanical components (well dimensioned) - Operating forces of service braking system, secondary braking system and parking brake system to ensure they can be handled by the driver - Connections, communication, compatibility between towing and towed vehicles - Operating of endurance braking systems; coupling force control - Braking performance in nominal cases (Service, parking brake, endurance brake) - Braking performance in failure cases (Secondary and residual braking) - HMI: controls available to the driver and warnings issued to warn the driver - ABS requirements & EVSC requirements - Requirements regarding energy supply and storage	**Specifics for dual-mode vehicles**	- Consider that the braking demand can be requested by the actuation of manual controls (driver) or by generation of the ADS - HMI - Warning/failure signals (system status/condition)
Content relevant for vehicles equipped with an ADS	- System robustness (well dimensioned) - Connections, communication and compatibility between towing and towed vehicles - Operating of endurance braking systems; coupling force control - ABS requirements & EVSC requirements - Braking performance service/secondary/parking braking under nominal conditions - Braking performance under failure conditions and in "maintenance mode" - Warnings, failure, status signals to be provided to the	**Specifics for vehicles without manual driving capabilities**	- HMI - Warning/failure signals (system status/condition)

	ADS (e.g. to ensure ADS algorithm to respond adequately, to warn the operator, control tower, occupants if or when appropriate, etc.) - Status and warning signals sent by trailer regarding braking, EVSC, ABS, TPMS - Performance considering max design speed of the vehicles, that the ADS is in control of the entire driving dynamics (safety concept incl. transfer to MRC) - Annex "CEL" (safety concept) to be applied to the basic braking system (from interface receiving the braking demand originating from the ADS to its actuation)		
Content to be covered by (potential) ADS Regulation	- Generation of braking demand by the ADS - Response to warning, failure and status signals from both the towing and the towed vehicle - HMI intended for communication with driver (control tower, occupants, etc.) (- Overarching safety concept and management for the safe operation of the ADS)	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Replacing the driver actuating the braking control with the braking demand generated by the ADS (external brake request via interface) - Testing section, Annex 4 to be updated, including some pass criteria related to the driver and require special software, test mode, or other means of implementing test protocols. - If testing provisions can depend on the ODD, the vehicle speed control strategy and the likelihood of frequent braking should be considered. - Warnings, failure and status signals to be transmitted to the ADS to ensure adequate response , including those from the trailer(s) and those linked to truck–trailer incompatibility - Definitions to be checked, e.g. for Automatically Commanded Braking - Update of Annex 18 as appropriate: Annex "CEL" (safety concept) to be applied to the basic braking system (from interface receiving the braking demand originating from the ADS to its actuation)		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	13HR01/04 (Braking)	**Date of review**	11 May 2023
Scope	M_1, N_1		
Content of existing Regulation	-No physical breakage of mechanical components (well dimensioned) - Operating forces of service braking system, secondary braking system and parking brake system to ensure they can be handled by the driver - Braking performance in nominal cases (Service and parking brake) - Braking performance in failure cases (Secondary braking system) - Warnings to be issued to warn the driver - ABS requirements - (ESC regulated in UN R 140) - (BAS regulated in UN R 139)	**Specifics for dual-mode vehicles**	- Consider that the braking demand can be requested by the actuation of manual controls (driver) or by generation of the ADS - HMI - Warning/failure signals (system status/condition)
Content relevant for vehicles equipped with an ADS	- System robustness (well dimensioned) - Braking performance under nominal conditions - Braking performance under failure conditions - Braking performance in "maintenance mode" - Warnings/failure signals to be provided to the ADS (e.g. to ensure ADS algorithm to respond adequately, to warn the operator/control tower/occupants as/if appropriate, etc.) - Performance considering max design speed of the vehicles, that the ADS is in control of the entire driving dynamics (safety concept incl. transfer to MRC), - Annex "CEL" (safety concept) to be applied to the basic braking system (from interface receiving the braking demand originating from the ADS to its actuation)	**Specifics for vehicles without manual driving capabilities**	- HMI - Warning/failure signals (system status/condition)
Content to be covered by (potential) ADS Regulation	- Generation of braking demand by the ADS - Response to warning/failure signals - HMI intended for communication with driver (control tower, occupants, etc.) (- Overarching safety concept and management for the safe operation of the ADS)	**Specifics for vehicles without occupants**	None

Summary of recommended changes	- Provisions related to the driver or driver control should be deleted or amended as appropriate. - Test procedure, Annex 3 should be reconsidered regarding necessity and implementation method with the case of mode/vehicles without manual driving capabilities. -- Special software, test mode, or other means of implementing test protocols: to keep the specified vehicle speed, to achieve the maximum deceleration instead of 500 N pedal input by the driver, etc. -- If testing provisions can depend on the ODD, the vehicle speed control strategy and the likelihood of frequent braking should be considered. - Update of Annex 18 as appropriate: Annex "CEL" (safety concept) to be applied to the basic braking system (from interface receiving the braking demand originating from the ADS to its actuation)
Notes	Applicability to certain use cases (such as low-speed automated vehicles) is still unclear, and could be solved by introducing vehicles categories for automated vehicles, by creating a new Regulation, etc.

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	79R04/03 (Steering)	**Date of review**	22 May 2023
Scope	M, N, O		
Content of existing Regulation	- Ensure that all components of the steering system are designed properly to ensure a high level of safety: - No physical breakage of mechanical components (well dimensioned) - Steering forces are at levels which can be handled by the driver, even in case of failure - Steering performance (including behaviour, e.g. self-centring) in nominal cases - Steering performance in failure cases - Warnings to be issued to the driver - ADAS specific requirements	**Specifics for dual-mode vehicles**	Consider that the steering demand can be requested by the actuation of manual controls (driver) or by the ADS HMI Warning/failure signals (system status/condition) State of ADAS features after transitions of control State of ADAS features during ADS control
Content relevant for vehicles equipped with an ADS	- System robustness (well dimensioned) - Steering performance under nominal conditions - Steering performance under failure conditions - Steering performance in any "maintenance mode" - Warnings/failure signals to be provided to the ADS (e.g. to ensure ADS algorithm to respond adequately, to warn the operator as/if appropriate, etc.) - Performance considering max design speed of the vehicles, that the ADS is in control of the entire driving dynamics (safety concept incl. transfer to MRC) - Annex "CEL" (safety concept) to be applied to the basic steering system (from interface receiving the steering demand originating from the ADS to actuation)	**Specifics for vehicles without manual driving capabilities**	Need for behavioural requirements (e.g. self-centring, rear-wheel steer prohibition) Applicability of ADAS features
Content to be covered by (potential) ADS Regulation	Detection of failures (including those which would normal be recognised by a driver but not electrically detected). Overarching safety concept and management for the safe operation of the ADS.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Revise Scope with respect to "ACSF-B2, ACSF-E, Autonomous Steering" and associated definitions. - Revise provisions covering handling and driveability. - Revise definition of "steering control" and all references to driver operation. - Introduce provisions covering the state of ADAS systems during ADS operation and following transition to manual driving. - Revise testing requirements, considering ADS actuation ("test mode"). - Revise failure warnings to cover transmission to ADS.		

	- Consider failures that are currently detected directly by the driver (vibration, noise, increase in force, etc). - Revise PTI / roadworthiness provisions. - Revise Annex 6 (CEL) to clarify boundary of assessment; ensure alignment with corresponding annexes in other Regulations.
Notes	If bidirectional vehicles are considered, further amendments will be required. If test provisions can be adapted depending on the ODD, further work on the Regulation will be required.

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	89R00/03 (Speed Limiting Devices and functions)	**Date of review**	10 May 2023
Scope	M, N; components		

Content of existing Regulation	- Speed Limiting Devices and Functions (setting a fixed, maximum speed to the vehicle) - Adjustable Speed Limiting Devices and Functions (where the driver can set the speed limit of the vehicle)	**Specifics for dual-mode vehicles**	Transition between automated and manual mode. State of the device or function during automated mode
Content relevant for vehicles equipped with an ADS	The interaction between the SLD and automated driving is unclear: should the device work during automated driving? Should the speed limitation be managed in the ADS regulation?	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	- The ADS must comply with traffic rules, which includes any potential maximum speed for certain vehicles. - Any adjustable speed limitation feature should be handled by the ADS.	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Harmonize the following with other Regulations for functions affecting speed: transition between automated and manual mode, state of the system during automated mode. - If SLDs remain active during automated mode, specific provisions should be added. For now, it is assumed that SLDs and SLFs are not relevant for automated vehicles.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	90R02/10 (Replacement brake parts)	**Date of review**	11 May 2023

Scope	Components		
Content of existing Regulation	Provisions for approval of replacement brake parts	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	- Test procedures where pedal force or line pressure is the input (without a brake pedal, how may this be generated and measured?) - Changes may be introduced to R13 and R13-H for vehicles not equipped with a brake pedal, such as achieving service braking performance within a certain time as an alternative to the 500N pedal force at 6.43m/s²
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	- Vehicle categories to be updated to cover new automated vehicles categories - Several parts of the test procedure need to be addressed.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**		X
	Major amendments needed	X	

Regulation No.	130R00/01 (Lane Departure Warning System)	**Date of review**	14 November 2022
Scope	M_2, M_3, N_2, N_3		

Content of existing Regulation	- Provides warning to driver when they drift out of lane - Performance requirements (lane markings to be identified, conditions under which it should operate, response to lane crossing, failure detection, activation and deactivation criteria) - Degree of warnings and timings for the driver	**Specifics for dual-mode vehicles**	Transition between automated and manual mode. State of the system during automated mode.
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	Harmonise the following with other Regulations for active safety functions: transition between automated and manual mode, state of the system during automated mode.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	131R02/00 (Advanced Emergency Braking System - AEBS)	**Date of review**	9 May 2023
Scope	M_2, M_3, N_2, N_3		
Content of existing Regulation	- The system detects a potential forward collision, provides the driver with an appropriate warning and activates the vehicle braking system to decelerate the vehicle with the purpose of avoiding or mitigating the severity of a collision in the event that the driver does not respond to the warning. - During any action taken by the system, the driver can take control and override the system.	**Specifics for dual-mode vehicles**	Transition between automated and manual mode. State of the system during automated mode.
Content relevant for vehicles equipped with an ADS	Emergency braking demand, speed range and speed reduction in specified scenarios.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	- The ADS should specifically guarantee the same level of performance as what is required by the AEBS. - Response to warning/failure signals. - HMI intended for communication (with remote supervision, occupants, etc.)	**Specifics for vehicles without occupants**	None
Summary of recommended changes	Harmonise the following with other Regulations for active safety functions: transition between automated and manual mode, state of the system during automated mode.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	139R00/01 (Brake Assist System - BAS)	**Date of review**	14 November 2022
Scope	M_1, N_1		
Content of existing Regulation	Prescriptions on systems for delivering strong braking when detecting a certain force or speed applied by the driver to the braking pedal.	**Specifics for dual-mode vehicles**	Transition between automated and manual mode. State of the system during automated mode.
Content relevant for vehicles equipped with an ADS	None	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes	Harmonise the following with other Regulations for active safety functions: transition between automated and manual mode, state of the system during automated mode.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	140R00/04 and GTR8 (Electronic Stability Control - ESC)	**Date of review**	9 May 2023
Scope	M_1, N_1		
Content of existing Regulation	- Yaw moment generated by adjusting the braking force of a single wheel to enhance the directional stability of the vehicle; - Control algorithm to determine whether there is a need to change the output torque of the engine; corresponding method to achieve the adjustment of the output torque, helping the driver maintain the control of the car. - Test Procedures (e.g. Sine with Dwell test and "ESC Off" control check.).	**Specifics for dual-mode vehicles**	Transition between automated and manual mode. State of the system during automated mode.
Content relevant for vehicles equipped with an ADS	Emergency braking demand, speed range and speed reduction in specified scenarios.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	- The ADS should specifically guarantee the same level of performance as what is required by the ESC. - Response to warning/failure signals. - HMI intended for communication (with remote supervision, occupants, etc.)	**Specifics for vehicles without occupants**	None
Summary of recommended changes	Harmonise the following with other Regulations for active safety functions: transition between automated and manual mode, state of the system during automated mode.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	152R02/02 (Advanced Emergency Braking System - AEBS)	**Date of review**	9 May 2023
Scope	M_1, N_1		
Content of existing Regulation	- The system automatically detects a potential forward collision, provides the driver with an appropriate warning and activates the vehicle braking system to decelerate the vehicle with the purpose of avoiding or mitigating the severity of a collision in the event that the driver does not respond to the warning. - During any action taken by the system, the driver can take control and override the system.	**Specifics for dual-mode vehicles**	Transition between automated and manual mode. State of the function during automated mode.
Content relevant for vehicles equipped with an ADS	Emergency braking demand, speed range and speed reduction in specified scenarios.	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS should specifically guarantee the same level of performance as what is required by the AEBS. Response to warning/failure signals. HMI intended for communication (with remote supervision, occupants, etc.)	**Specifics for vehicles without occupants**	None
Summary of recommended changes	Harmonise the following with other Regulations for active safety functions: transition between automated and manual mode, state of the system during automated mode.		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		

Regulation No.	155R00/01 (Cybersecurity)	**Date of review**	14 November 2022
Scope	M, N; O if fitted with ECU; L_6-L_7 if ADS		
Content of existing Regulation	Company-wide management of cybersecurity and implementation on the electronic architecture of vehicles (Risk assessment, test results and mitigations) Management of risks along the whole supply chain (including suppliers) Detection of and response to cyberattacks, analysis and forensics of successful attacks Periodical reporting to authorities of surveillance activities	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	All parts related to the vehicle type	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS Regulation should be contingent to the existence and validity of a R155 type approval	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes	(Keeping the lists in Annex 5 up to date with the technology used in automated vehicles, e.g. interactions with infrastructure or other vehicles)		

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	156R00/00 (Software Updates)	**Date of review**	14 November 2022
Scope	M, N, O, R, S, T		
Content of existing Regulation	Company-wide management of software updates and implementation on vehicles Security of software updates and safety of their execution Traceability of updates, in particular changes related to type approved functions and communication with the Approval Authority to ensure continuous validity of Type Approvals Specific prescriptions for over-the-air updates	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	All parts related to the vehicle type HMI for fully automated vehicles may not be present inside the vehicle (e.g. remote supervision centre)	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	The ADS Regulation should be contingent to the existence and validity of a R156 type approval	**Specifics for vehicles without occupants**	None
Summary of recommended changes	None		
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles		X	
Readiness:	**Regulation ready**	X	
	Major amendments needed		

Regulation No.	157R01/00 (Automated Lane Keeping System)	**Date of review**	14 November 2022
Scope	M, N		
Content of existing Regulation	Definition of an operational design domain Level 3 system: details on fail-safe response (MRM, transitions) Human-Machine Interface and communication of information to the human driver Guidance on scenarios Data storage (DSSAD) Series 01 of amendments: lane change procedures	**Specifics for dual-mode vehicles**	None
Content relevant for vehicles equipped with an ADS	Regulation is not inherently relevant because the task force covers automated driving systems which do not issue transition demands	**Specifics for vehicles without manual driving capabilities**	None
Content to be covered by (potential) ADS Regulation	None	**Specifics for vehicles without occupants**	None
Summary of recommended changes			
Notes			

Outcome of the review			
		Yes	**No**
Regulation relevant for fully automated vehicles			X
Readiness:	**Regulation ready**		
	Major amendments needed		