Submitted by the chairs of the expert groups
on regulatory fitness for Automated Driving Systems

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# Report on the fitness of WP.29 Regulations and Global Technical Regulations for their application to automated vehicles (status as of March 2024)

The text reproduced below was prepared by the expert groups commissioned to screen, review and amend 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, and supersedes the previous report WP.29/2023/86 submitted to the World Forum in 2023, itself re-submitted as GRVA/2023/18. This update contains up-to-date information on the work of the expert groups.

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.

# 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 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 March 2024) for 169[3] active Addenda to the 1958 Agreement (UN Regulations) and 24 Addenda to the Global Registry (Global Technical Regulations). Each of these Regulations defines technical provisions and testing requirements for systems 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 document, the term "Regulation" may be used indiscriminately for UN Regulations and UN Global Technical Regulations.

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[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 170, adding UN Regulation No. 13-H, subtracting the two removed UN Regulations No. 2 and 15, and not counting UN Regulation No. 0

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

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

(a) Working Party on Noise and Tyres (GRBP). Chair: Netherlands, and secretariat: International Organization of Motor Vehicle Manufacturers (OICA);

(b) Working Party on Lighting and Light-Signalling (GRE)[5]; task force on Automated Vehicle Signalling Requirements. Co-chairs: Germany and the United Kingdom of Great Britain and Northern Ireland; and secretariat: the International Automotive Lighting and Light-Signalling Expert Group (GTB);

(c) GRE; informal working group on electromagnetic compatibility. Chair: Germany, and secretariat: OICA.

(d) Working Party on Pollution and Energy (GRPE). Chair: Netherlands;

(e) Working Party on General Safety (GRSG) provisions. Chair: Netherlands, and secretariat: OICA;

(f) Working Party on Passive Safety (GRSP). Chair: Germany, and secretariat: OICA;

(g) Working Party on Automated/Autonomous and Connected Vehicles (GRVA): Co-chairs: China and France.

7. In addition to screening its own Regulations, the GRVA task force provided coordination and 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 | 18 | 13 |
| GRSG | 42 | 2 |
| GRSP | 30 | 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.

[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 Regulation No. 48 (installation of lighting and light-signalling devices) to make it applicable to automated vehicles. The GRE informal working group on electromagnetic compatibility was also established before the start of the screening process.

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

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

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 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 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 | R85, R103, R133, GTR19 | R26, R34, R58, R73, R118, R122, R162, R163 | R42, R80, 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, 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 | | R24, R68, R103, | 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, R17, 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 | R83, R101, R168, GTR2 | **R43**, R55, R102, R105, R144, R147, **R160**, R169, GTR6 | **R94**, **R95**, **R100**, R127, R135, R136, R137, R153, GTR9, GTR14, GTR20 | **R13**, **R13-H**, R78, **R79**, R90**,** GTR3 |

*Note:* In this table, 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, R21, R29,** R114 | |

*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 | R84 | R35, R36, R46*, R52, R60, R62, R71*, R81*, R121, R125*, R151*, R158*, R159*, R166*, R167*, GTR12 | R12, R22, 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.

## IV. Recommendations for drafting future Regulations

### A. General guidance

21. Basic principles — 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.

22. Transitions of control and fallback users — It was previously foreseen that automated vehicles which are equipped with manual controls and allow transitions of control from an ADS to a human driver (also called “fallback user”) while the vehicle is moving could be a source of issues related to the behaviour of certain regulated systems (such as those automatically deactivated during ADS operation). However, it has since been determined that any requirement related to fallback users or transitions of control should be limited to ADS Regulations, and should not be present in non-ADS Regulations.

23. Safety of ADS and physical testing for automated vehicles with manual controls — In general, automated vehicles equipped with manual controls for normal vehicle operation in the context of a non-ADS Regulation (e.g., in the context of UN Regulation No. 79 on steering equipment: a steering wheel) need only be tested in one driving mode in the context of that Regulation. For UN Regulation No. 79, a vehicle equipped with both an ADS and a steering wheel may be tested in manual mode and may not need further testing in automated mode.

24. Supplements and Series of amendments — While no definitive guidance can be given yet on the best way to amend relevant UN Regulations and whether new Series of amendments or new supplements are more appropriate, ADS is a new technology that is often not present in existing type approvals. To that effect, supplements can be preferable to new Series of

amendments when no existing approvals would be affected by the changes introduced. Furthermore, the expert groups believe that new technologies such as ADS should generally follow the most recent level of requirements from the latest Series of amendments to a given Regulation. However, some subsidiary Working Parties update simultaneously several series of amendments to their UN Regulations: therefore, adopting a supplement to only the latest series of amendments to these Regulations might complicate the management of future supplements which simultaneously amend several series of amendments to that Regulation.

25. Conformity of Production and Periodical Technical Inspections — Compliance regarding the Conformity of Production of a vehicle is determined by the compliance to the Regulation itself. In many instances, adapting Regulations to automated vehicles should have no impact on Conformity of Production. However, it is still unclear to what extent special provisions might be required for Periodical Technical Inspections of driverless vehicles.

26. Transmission of signals — It is understood that the ADS is responsible for the whole Dynamic Driving Task, and that any requirement on the behaviour of the ADS should be included only in ADS Regulations. In Regulations where warnings and other signals are only issued to the driver (as opposed to passengers or other vehicle users), all warnings should therefore be transmitted to the ADS: no special provisions are required in the adaptation of the Regulation to automated vehicles. However, requirements on warning signals that are intended for passengers or other vehicle users may require further scrutiny.

27. Rationale for which new definitions to include — In many non-ADS Regulations, the definitions of “operational function” and “ODD” are sufficient to understand what an ADS is, in the context of the amended Regulations. Nevertheless, the expert groups advocate for the existence of a central document which would allow the easy inclusion of any useful definition related to ADS without lengthening the “Definitions” section of non-ADS Regulations.

## B. List of relevant keywords to carefully consider

28. Table 8 provides a list of relevant keywords which, if used in a non-ADS Regulation, could have an impact on its application to automated vehicles. 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.

29. 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.

30. **Regarding the word “driver”: requirements that** only apply to a human driver and which should not be applied in the context of an automated vehicle may remain unchanged, as the default interpretation of the word **should always be** as a **“human driver”. Conversely, other requirements using the word “driver”** which should **apply when an ADS is operating the vehicle** should be amended in most cases**.**

## C. Open issues

31. 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 or subcategories for automated vehicles

32. One key issue detected during the screening process is that of categories for automated vehicles. Indeed, current vehicle categories are 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, 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.

33. GRSG and GRVA have thus established a joint task force on Automated Vehicle Categories (TF AVC) which has been tasked with providing guidance on how automated vehicles may be described with international vehicle categories or subcategories. The results of this task force will then be used to amend the scope and requirements of relevant Regulations.

### 2. Impact of the ODD on performance and testing requirements

34. 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

35. 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 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 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. Test mode

36. 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 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.

### 5. Monitoring passengers

37. 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 such area of responsibility 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.

## 6. User Roles

38. 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...) 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.

## 7. Transport of dangerous goods in automated vehicles

39. 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 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.

Table 8
**List of relevant themes and keywords for automated driving**

| *Theme* | *Related keywords* | | | | |
|---|---|---|---|---|---|
| *Human person* | Driver<br>Rider | Passenger | Person | Occupant | Crew (member) |
| *Areas within the vehicle* | Cockpit<br>Driver's compartment<br>Driving cab | Passenger compartment | | | |
| *Body Parts* | Hand<br>Foot<br>Arm<br>Etc. | | | | |
| *Manual action* | Lever<br>Button<br>Handle<br>Switch<br>(Gear) selector / lever<br>Clutch | Push<br>Pull<br>Press<br>Rotate<br>Pump<br>Release<br>Engaged<br>Depressed<br>Key-on | Force<br>Muscular (energy) | Reach<br>Accessible | Manual |
| *Vision* | Visible<br>(Field of) view / vision<br>See | Ocular<br>Optical | Illuminate<br>Display<br>Recognise<br>Identify | Monitor | |
| *Audition* | Audible<br>Acoustic<br>Hear | | | | |

| *Theme* | *Related keywords* | | | | |
|---|---|---|---|---|---|
| *Information to the driver* | Warn<br>Signal<br>Alert | Inform<br>Remind<br>Indicate<br>Ignore | (Check) lamp<br>Symbol<br>Mark<br>Sign<br>Colour<br>Contrast<br>Pictogram<br>Text<br>Flashing light<br>Malfunction indicator | Instrument panel<br>Dashboard | |
| *Physical controls* | Steering wheel | Accelerator | Pedal | Gear shaft | |
| *Driver decision* | Override | Control<br>Actuate<br>Operate<br>(Mis)use<br>(De)activate | Intentional<br>Choose<br>Deliberate | Emergency | |
| *Entering or exiting the vehicle* | Evacuate<br>Leave<br>Exit<br>Enter<br>Board | Ingress<br>Egress | | | |
| *Physical components irrelevant for automated driving* | Windscreen<br>Windshield<br>Sun visor<br>Mirror<br>Glazing | | | | |
| *Person on board* | Seating position | R point<br>H point | (Un)fasten<br>(Un)buckle | Seated<br>Standing | Armrest<br>Headrest<br>Safety belt<br>Door |

# V. Next steps

## A. Priorities for amendments

40. 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.

41. 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 GR:

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 |

42. 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. Timeline for amending relevant Regulations

43. At its 190th session in June 2023, WP.29 endorsed the list of priority Regulations proposed in the section above. This section provides a tentative timeline for the submission of amendment proposals by the expert groups to their respective subsidiary Working Party, taking into account the other activities of WP.29 on automated vehicles.

44. The expert groups considered the guidance given by WP.29 on the development of a UN Regulation and UN GTR for ADS, which is to start in 2024 and to continue until 2026. The expert groups also considered the work of the joint task force of GRSG and GRVA on categories for automated vehicles (TF AVC): this task force was requested to issue first proposals for the amendment of the Consolidated Resolution No. 3 (R.E.3) and Special Resolution No. 1 (S.R. 1) in 2024.

45. As of March 2024, GRVA has already adopted amendment proposals submitted by its task force FADS to amend UN Regulations No. 13, 13-H and 79 on braking and steering, to include all automated vehicles which are also equipped with manual controls. These amendments will enable the homologation of various kinds of vehicles equipped with ADS not covered by UN Regulation No. 157, such as automated parking functions.

Table 10
Provisional schedule for GRBP Regulations

| **September 2024** | **February 2025** | **September 2025** |
|---|---|---|
| Informal documents<br>Priority Regulations | Working documents<br>Priority Regulations<br><br>Informal documents<br>Non-priority Regulations | Working documents<br>Non-priority Regulations |

Table 11
Provisional schedule for GRE regulations

| **March 2024** | **October 2025** | **2026** |
|---|---|---|
| Working document for R10 (7th series of amendments)<br><br>Working document for R48 | Informal document for R10 (8th series of amendments)<br><br>Depending on guidance from GRE, documents for R86 and/or R53 | Working document for R10 (8th series of amendments) |

Table 12
Provisional schedule for GRPE Regulations

[Reserved – to be completed after all Regulations are screened]

Table 13
Provisional schedule for GRSG Regulations

| **April 2024** | **April 2025** | **After October 2025** |
|---|---|---|
| First informal document for R107 | Depending on the progress of the task force on automated vehicle categories, working document for R107 | Informal and working documents for other priority Regulations and non-priority Regulations |

Table 14
Provisional schedule for GRSP Regulations

| **December 2024** | **May 2025** | **December 2025** |
|---|---|---|
| Informal documents<br>Priority Regulations | Working documents<br>Priority Regulations<br><br>Informal documents<br>Non-priority Regulations | Working documents<br>Non-priority Regulations |

Table 15
Provisional schedule for GRVA Regulations

| **January 2024** | **January 2025** | **May 2025** | **April 2026** | **September 2026** |
|---|---|---|---|---|
| Working documents R13, R13-H, R79 (with manual controls) | Informal documents R13, R13-H, R79 (without manual controls) | Working documents R13, R13-H, R79 (without manual controls) | Working documents Non-priority Regulations | Working document Non-priority Regulations |

## C. Coordination between WP.29 subsidiary bodies (GRs)

46. 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.

47. 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.

48. 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).

49. 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.

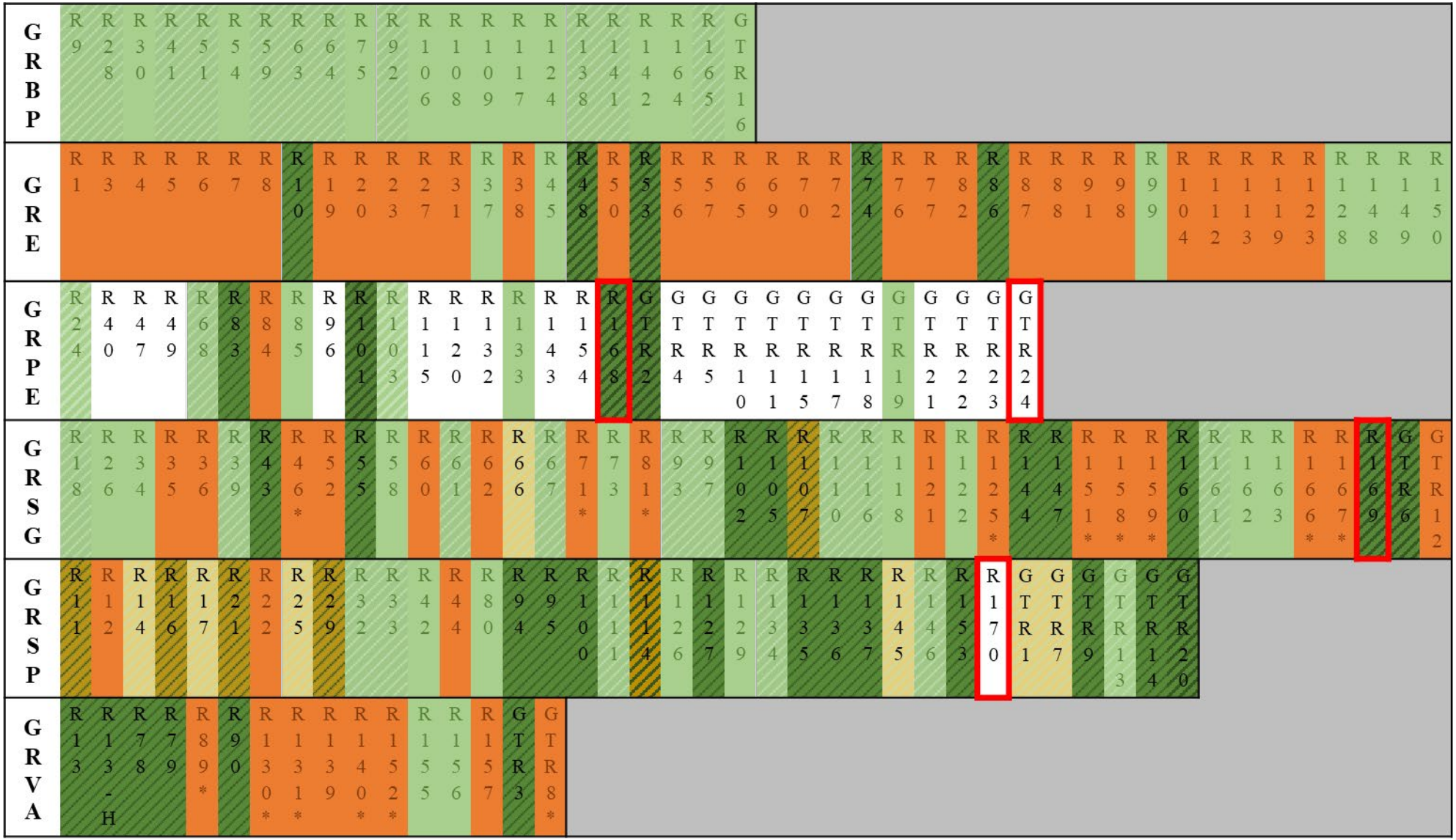
50. To better fulfil the tasks assigned by WP.29, and to provide a clearer depiction of TF-FADS's work in coordinating the tasks of subordinate task forces under each GR, it is suggested to create a timeline chart. This will help clarify the progress of each TF in specific regulatory revisions, ensuring alignment and uniformity in the timing of deliverables.

## D. Requested guidance from WP.29, at its 192nd session in March 2024

51. WP.29 may wish to consult the proposed timeline for amending the relevant UN Regulations and GTRs, and to provide guidance to its subsidiary Working Parties on the resources to allocate for drafting these amendments.

52. WP.29 may wish to provide guidance on the continuation of coordination between GRs. The authors recommend that the GRVA task force on FADS continue to support the expert groups in harmonising the amendments to UN Regulations and GTRs.

**Figure 1 – Table of screening results, updated March 2024 (new Regulations adopted by WP.29 are highlighted in red)**



# 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)<br>28R00/06 (Audible warning devices)<br>41R05/01 (Sound emissions - L3)<br>51R03/06 (Sound emissions - M, N)<br>59R03/00 (Replacement silencing systems)<br>63R02/05 (Sound emissions - L1)<br>92R02/00 (Non-Original Replacement Exhaust Silencing Systems)<br>138R01/03 (Quiet road transport vehicles)<br>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).<br>- 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<br>- 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.<br>- 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).<br>- 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.<br>- 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).<br>- 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)<br>53R03/03 (Instal. of lighting devices – $L_3$)<br>74R02/02 (Instal. of lighting devices – $L_1$)<br>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.<br>- 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).<br>- 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).<br>- 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 | |

# 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.<br>- 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.<br>- Modify the compliance tests (e.g. wiper laboratory and optical distortion test) to be performed if occupants are present.<br>- 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<br>- Performance criteria for Camera-Monitor-Systems<br>- Functional requirements for CMS<br>- Mandatory required fields of vision to be displayed to the driver<br>- Geometrical requirements, minimum radii for mirrors and CMS<br>- 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.<br>- 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.<br>- 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<br>- 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 |

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|---|---|---|---|
| **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.<br>- Communication between the LPG ECU and the ADS should be detailed.<br>- 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 |

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|---|---|---|---|
| **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<br>- 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** | | |

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|---|---|---|---|
| **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** | | |

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|---|---|---|---|
| **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.<br>- Impact test method of the mirror surface.<br>- 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 |

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|---|---|---|---|
| **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 |

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|---|---|---|---|
| **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 |

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|---|---|---|---|
| **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 | |

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|---|---|---|---|
| **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.<br>- Many schematics and provisions related to the driver's compartment should be reworked.<br>- 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 | |

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|---|---|---|---|
| **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.<br>- 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 |

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|---|---|---|---|
| **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.<br>- Alarm systems (efficiency, absence of false positives, etc.)<br>- 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 |

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|---|---|---|---|
| **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** | | |

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|---|---|---|---|
| **Regulation No.** | 121R01/05 (Controls, tell-tales and indicators) | **Date of review** | 16 January 2023 |
| **Scope** | M, N | | |

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|---|---|---|---|
| **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<br>- 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.<br>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** | | |

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|---|---|---|---|
| **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** | | |

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|---|---|---|---|
| **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** | | |

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|---|---|---|---|
| **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.<br>- 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.<br>- 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 | |

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|---|---|---|---|
| **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.<br>- 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.<br>- 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 | |

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|---|---|---|---|
| **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.<br>Specific elements related to the ADS and that are not in the scope of the DSSAD should be recorded by the EDR.<br>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 (Direct Vision) | **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:<br>Impact requirements would be applicable.<br>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.<br>- Extend the applicability of the impact requirements to the rear windscreen for bi-directional vehicles.<br>- 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).<br>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<br>- 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:<br>- Safety-belts, restraint systems, child restraint systems (incl. ISOFIX);<br>- 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.<br>- 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;<br>- 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.<br>- 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 |

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

| | | | |
|---|---|---|---|
| **Content of existing Regulation** | Provisions regarding:<br>- the interior parts of the passenger compartment other than the rear-view mirror or mirrors;<br>- the arrangement of the controls;<br>- the roof or opening roof, and<br>- the seat-back and the rear parts of seats.<br>- 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)<br>- 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 |

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|---|---|---|---|
| **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** | | |

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|---|---|---|---|
| **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.<br>- 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** | | |

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| **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.<br>- 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.<br>- Provisions regarding leakage, fuel system integrity, etc. might be applicable.<br>- 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.<br>- 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.<br>- 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 | |

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|---|---|---|---|---|
| **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.<br>- 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.<br>- Provisions regarding leakage, fuel system integrity, etc. might be applicable.<br>- 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.<br>- 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.<br>- 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 | |

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|---|---|---|---|
| **Regulation No.** | 100R03/01 (Electric power train) | **Date of review** | 28 November 2022 |
| **Scope** | M, N; components | | |

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|---|---|---|---|
| **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.<br>- 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.<br>- 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?)<br>- 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 | |

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|---|---|---|---|
| **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 not applicable to automated vehicles. | **Specifics for vehicles without manual driving capabilities** | Provisions for airbag modules for steering wheels are not applicable. |
| **Content to be covered by (potential) ADS Regulation** | None | **Specifics for vehicles without occupants** | The Regulation is not applicable to vehicles without occupants |
| **Summary of recommended changes** | Significant amendments related to the driver are needed. | | |
| **Notes** | If bidirectional vehicles are to be considered, additional 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 | |

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|---|---|---|---|
| **Regulation No.** | 127R04/00 (Pedestrian safety) | **Date of review** | 11 January 2023 |
| **Scope** | $M_1$, $N_1$ | | |

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|---|---|---|---|
| **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<br>- 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.<br>- Vehicles without a windscreen might need further consideration.<br>- 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 | |

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|---|---|---|---|
| **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.<br><br>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** | | |

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|---|---|---|---|
| **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.<br>- 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.<br>- 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 |

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|---|---|---|---|
| **Regulation No.** | 135R02/00 (Pole-side impact) | **Date of review** | 10 January 2023 |
| **Scope** | $M_1$, $N_1$ | | |

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|---|---|---|---|
| **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.<br>- 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.<br>- Provisions regarding leakage, fuel system integrity, etc. might be applicable.<br>- 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.<br>- 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.<br>- 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 | |

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|---|---|---|---|
| **Regulation No.** | 137R02/02 (Frontal collision, restraint system) | **Date of review** | 4 December 2022 |
| **Scope** | $M_1$, $N_1$ | | |

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|---|---|---|---|
| **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.<br>- 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.<br>- Provisions regarding leakage, fuel system integrity, etc. might be applicable.<br>- 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.<br>- 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.<br>- 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 | |

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|---|---|---|---|
| **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 |

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|---|---|---|---|
| **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.<br>- 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.<br>- 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 |

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|---|---|---|---|
| **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.<br>- 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 | |

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|---|---|---|---|
| **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.<br>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 |

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|---|---|---|---|
| **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 |

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|---|---|---|---|
| **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<br>- 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.<br>- 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 | |

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|---|---|---|---|
| **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.<br>- 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<br>- Identification of Hydrogen Fuelled Vehicles: labelling location of the vehicle.<br>- 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 |

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|---|---|---|---|
| **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.<br>- 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.<br>- 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 | |

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| **Regulation No.** | GTR20 (Electric vehicle safety) | **Date of review** | 2 December 2022 |
| **Scope** | 1, 2 as defined in S.R.1 | | |

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|---|---|---|---|
| **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.<br>- 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.<br>- 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?)<br>- 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 | |

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# Annex 7

## Results of the review – GRVA Regulations

Figure 8
**Results of the review of GRVA Regulations**

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|---|---|---|---|
| **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<br>- No physical breakage of mechanical components (well dimensioned)<br>- Operating forces of service braking system, secondary braking system and parking brake system to ensure they can be handled by the driver<br>- Connections, communication, compatibility between towing and towed vehicles<br>- Operating of endurance braking systems; coupling force control<br>- Braking performance in nominal cases (Service, parking brake, endurance brake)<br>- Braking performance in failure cases (Secondary and residual braking)<br>- HMI: controls available to the driver and warnings issued to warn the driver<br>- ABS requirements & EVSC requirements<br>- 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<br>- HMI<br>- Warning/failure signals (system status/condition) |
| **Content relevant for vehicles equipped with an ADS** | - System robustness (well dimensioned)<br>- Connections, communication and compatibility between towing and towed vehicles<br>- Operating of endurance braking systems; coupling force control<br>- ABS requirements & EVSC requirements<br>- Braking performance service/secondary/parking braking under nominal conditions<br>- Braking performance under failure conditions and in "maintenance mode"<br>- Warnings, failure, status signals to be provided to the | **Specifics for vehicles without manual driving capabilities** | - HMI<br>- 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.)<br>- Status and warning signals sent by trailer regarding braking, EVSC, ABS, TPMS<br>- 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)<br>- 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<br>- Response to warning, failure and status signals from both the towing and the towed vehicle<br>- HMI intended for communication with driver (control tower, occupants, etc.)<br>(- 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)<br>- 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.<br>- If testing provisions can depend on the ODD, the vehicle speed control strategy and the likelihood of frequent braking should be considered.<br>- 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<br>- Definitions to be checked, e.g. for Automatically Commanded Braking<br>- 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)<br>- Operating forces of service braking system, secondary braking system and parking brake system to ensure they can be handled by the driver<br>- Braking performance in nominal cases (Service and parking brake)<br>- Braking performance in failure cases (Secondary braking system)<br>- Warnings to be issued to warn the driver<br>- ABS requirements<br>- (ESC regulated in UN R 140)<br>- (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<br>- HMI<br>- Warning/failure signals (system status/condition) |
| **Content relevant for vehicles equipped with an ADS** | - System robustness (well dimensioned)<br>- Braking performance under nominal conditions<br>- Braking performance under failure conditions<br>- Braking performance in "maintenance mode"<br>- 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.)<br>- 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),<br>- 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<br>- Warning/failure signals (system status/condition) |
| **Content to be covered by (potential) ADS Regulation** | - Generation of braking demand by the ADS<br>- Response to warning/failure signals<br>- HMI intended for communication with driver (control tower, occupants, etc.)<br>(- Overarching safety concept and management for the safe operation of the ADS) | **Specifics for vehicles without occupants** | None |

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| **Summary of recommended changes** | - Provisions related to the driver or driver control should be deleted or amended as appropriate.<br>- Test procedure, Annex 3 should be reconsidered regarding necessity and implementation method with the case of mode/vehicles without manual driving capabilities.<br>-- 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.<br>-- If testing provisions can depend on the ODD, the vehicle speed control strategy and the likelihood of frequent braking should be considered.<br>- 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:<br>- No physical breakage of mechanical components (well dimensioned)<br>- Steering forces are at levels which can be handled by the driver, even in case of failure<br>- Steering performance (including behaviour, e.g. self-centring) in nominal cases<br>- Steering performance in failure cases<br>- Warnings to be issued to the driver<br>- 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<br>HMI<br>Warning/failure signals (system status/condition)<br>State of ADAS features after transitions of control<br>State of ADAS features during ADS control |
| **Content relevant for vehicles equipped with an ADS** | - System robustness (well dimensioned)<br>- Steering performance under nominal conditions<br>- Steering performance under failure conditions<br>- Steering performance in any "maintenance mode"<br>- Warnings/failure signals to be provided to the ADS (e.g. to ensure ADS<br>algorithm to respond adequately, to warn the operator as/if appropriate, etc.)<br>- 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)<br>- 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)<br>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).<br><br>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.<br>- Revise provisions covering handling and driveability.<br>- Revise definition of "steering control" and all references to driver operation.<br>- Introduce provisions covering the state of ADAS systems during ADS operation and following transition to manual driving.<br>- Revise testing requirements, considering ADS actuation ("test mode").<br>- Revise failure warnings to cover transmission to ADS. | | |

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| | - Consider failures that are currently detected directly by the driver (vibration, noise, increase in force, etc).<br>- Revise PTI / roadworthiness provisions.<br>- 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.<br>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 | |

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

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|---|---|---|---|
| **Content of existing Regulation** | - Speed Limiting Devices and Functions (setting a fixed, maximum speed to the vehicle)<br>- 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.<br>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.<br>- 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.<br>- 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?)<br>- 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<br>- 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 | |

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|---|---|---|---|
| **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<br>- Performance requirements (lane markings to be identified, conditions under which it should operate, response to lane crossing, failure detection, activation and deactivation criteria)<br>- Degree of warnings and timings for the driver | **Specifics for dual-mode vehicles** | Transition between automated and manual mode.<br>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** | | |

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|---|---|---|---|
| **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.<br>- 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.<br>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.<br>- Response to warning/failure signals.<br>- 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** | | |

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|---|---|---|---|
| **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.<br>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** | | |

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|---|---|---|---|
| **Regulation No.** | 140R00/04 and GTR8 (Electronic Stability Control - ESC) | **Date of review** | 9 May 2023 |
| **Scope** | $M_1$, $N_1$ | | |

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|---|---|---|---|
| **Content of existing Regulation** | - Yaw moment generated by adjusting the braking force of a single wheel to enhance the directional stability of the vehicle;<br>- 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.<br>- Test Procedures (e.g. Sine with Dwell test and "ESC Off" control check.). | **Specifics for dual-mode vehicles** | Transition between automated and manual mode.<br>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.<br>- Response to warning/failure signals.<br>- 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.<br>- 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.<br>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.<br>Response to warning/failure signals.<br>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** | | |

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|---|---|---|---|
| **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)<br>Management of risks along the whole supply chain (including suppliers)<br>Detection of and response to cyberattacks, analysis and forensics of successful attacks<br>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<br>Security of software updates and safety of their execution<br>Traceability of updates, in particular changes related to type approved functions and communication with the Approval Authority to ensure continuous validity of Type Approvals<br>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<br>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<br>Level 3 system: details on fail-safe response (MRM, transitions)<br>Human-Machine Interface and communication of information to the human driver<br>Guidance on scenarios<br>Data storage (DSSAD)<br>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** | | |