

# Regulatory fitness for Automated Driving Systems

## Presentation of horizontal issues to IWG ADS

GRBP TF AVRS — GRE TF AVSR — GRE IWG EMC — GRPE TF AVRS — GRSG TF AVRS — GRSP TF AVRS — GRVA TF FADS



## Horizontal topic 2 – Non-DDT tasks of the driver (1/7)

Regulations contain many provisions where the role of the driver extends beyond the simple operation of the vehicle:

Regulation	Examples of non-DDT tasks of the driver
R11	<p>2.9. "Door closure warning system" is a system that will activate a <b>visual signal located where it can be clearly seen by the driver when a door latch system is not in its fully latched position</b> and while the vehicle ignition is activated.</p> <p>6.3.2. Each rear side door shall be equipped with at least one <b>locking device which, when engaged, prevents operation of the interior door handle</b> or other interior latch release control [...]</p>
R13	<p>5.2.1.11.2.1. "It shall be possible to <b>easily assess this wear on service brake linings from the outside or underside of the vehicle</b>, without the removal of the wheels, by the provision of appropriate inspection holes or by some other means. This may be achieved by utilizing simple standard workshop tools or common inspection equipment for vehicles. Alternatively, a sensing device per wheel. [...], which will warn the driver at his driving position when lining replacement is necessary, is acceptable [...]"</p>
R16	<p>2.41. "Safety-belt reminder", means a system dedicated to <b>alert the driver when any of the occupants do not use the safety-belt</b>. The system is constituted by a detection of an unfastened safety-belt and by two levels of driver's alert: a first level warning and a second level warning.</p>
R21	<p>5.8.4.2. All rear-window, roof-panel and partition <b>switches intended for use by occupants in the rear of the vehicle shall be capable of being switched off by a driver-controlled switch</b> which is located forward of a vertical transverse plane passing through the R points of the front seats.</p>
R100	<p>6.14. Warning in the case of a thermal event within the REESS. The REESS or vehicle system shall provide a signal to activate the <b>warning specified in paragraph 5.2.3. in the case of a thermal event in the REESS</b></p>

These requirements mainly focus on informing the driver, or on making easier a task that is performed or initiated by the driver.

# Horizontal topic 2 – Non-DDT tasks of the driver (2/7)

Regulation	Examples of non-DDT tasks of the driver
<p><b>R107 Annex 3</b></p>	<p>7.5.7.1. [...] in the event of activation of an alarm system: [...]            B) <b>After a single positive action of the driver</b> on any of the door controls in the driver's compartment, all power-operated doors [...] shall open and shall remain in the opened position. [...]</p>
	<p>7.6.5.5. Where controls are provided for the driver to open and close a power-operated service door, they shall be such that <b>the driver is able to reverse the movement of the door at any time</b> during the closing or opening process.</p>
	<p>7.6.6.4.1. The driver shall be able to <b>inhibit the automatic closing process</b> by actuation of a special control. A <b>passenger shall also be able to inhibit</b> the automatic closing process directly by pressing a special push-button.</p>
	<p>7.6.10.6. When a <b>passenger is standing on a power-operated retractable step</b>, the corresponding door shall be incapable of being closed. [...] This requirement shall not apply to any door within the driver's direct field of view.*</p>
	<p>7.2.3.1. Space shall be provided in the driver's area, in a position clearly visible to the driver in his seating position, for the markings provided for in paragraph 3.3. of Annex 11**.</p>

\*In other words, the driver is responsible for **checking for the presence of passengers on retractable steps**.

\*\*Such as the maximum number of seated or standing passengers. In other words, the driver or crew member is responsible for **checking the number of passengers inside the vehicle**.

## Horizontal topic 2 – Non-DDT tasks of the driver (3/7)

**“Automated Driving System (ADS)”** means the vehicle hardware and software that are collectively capable of performing the entire Dynamic Driving Task (DDT) on a sustained basis.

**“Dynamic Driving Task (DDT)”** means the real-time operational and tactical functions required to operate the vehicle.

**“Tactical function”** means a capability to perceive the vehicle environment and control real-time planning, decision, and execution of manoeuvres, including conspicuity of the vehicle and its motion.

**“Operational function”** means a capability to control the real-time motion of the vehicle.

*Definitions taken from GRVA-18-50r1*

- Currently, an ADS is only defined as a system capable of performing the dynamic driving task of the vehicle.
- GRVA IWG ADS documents only require the ADS to *“comply with traffic rules in accordance with application of relevant law within the area of operation”*
- concrete requirements explicitly mention an interaction with passengers:
  1. *“Pursuant to a **passenger request**, the ADS shall bring the vehicle to a safe stop.\*”*
  2. *“The ADS shall not initiate motion unless the **safety risks to the passenger(s) have been mitigated”***
  3. *“An ADS that controls the operation of **doors** shall provide an **emergency override** to the user\*\*”*
  4. (another requirement in p. 37 will be developed as a separate horizontal topic)

\*R107 may need to be amended to introduce the presence of a button or other user interface to make this stop request.

\*\*This requirement is similar to R107 §7.6.6.4.1.

## Horizontal topic 2 – Non-DDT tasks of the driver (4/7)

**Option 1:** the ADS\* is in charge of **both DDT tasks and non-DDT, safety-relevant tasks**. The **ADS Regulation** should contain requirements on how the ADS is evaluated on non-DDT tasks to ensure the safety of relevant vehicle users. In non-ADS Regulations (e.g., R107), an ADS is assimilated to a human driver and may override non-DDT automatic actions (like the operation of doors) if they are part of its safety concept.

Benefits of option 1: corresponds to existing requirements of the ADS Regulation (see examples 1 and 3 in the previous slide). Considers the ADS to be a full replacement of the driver in all aspects. Additional requirements that are not present in existing non-ADS Regulations can be created.

**Option 2:** the ADS\* is in charge of **both DDT tasks and non-DDT, safety-relevant tasks**. Each Regulation shall ensure that the ADS reacts appropriately to the information transmitted through requirements of that Regulation.

Benefits of option 2: a high level of safety is ensured in each Regulation. Each GR may define what is considered to be an “appropriate reaction” depending on the information transmitted to the ADS.

**Option 3:** the ADS is in charge of **only the DDT**. Non-DDT tasks are to be **handled through each Regulation** as “automatic” functions, the safety of which must be demonstrated as part of the compliance with each Regulation. In non-ADS Regulations (e.g., R107), an ADS is assimilated to automatic functions, independent from one another.

Benefits of option 3: non-DDT aspects of automated vehicles are tackled from the perspective of existing Regulations (a non-compliance in performing the DDT is separated from a non-compliance in operating doors).

**Option 4:** These tasks shall be covered under regional or national law.

## Horizontal topic 2 – Non-DDT tasks of the driver (5/7)

### Illustration with the following requirement of UN R107:

7.5.7.1. [...] in the event of activation of an alarm system: [...] B) **After a single positive action of the driver** on any of the door controls in the driver's compartment, all power-operated doors [...] shall open and shall remain in the opened position. [...]

#### Option 1

R107

*Unchanged\**

R ADS

***New section: Non-DDT safety tasks***  
***"The ADS shall respond appropriately to signals received from other vehicle systems"***

#### Option 2

R107

***"For vehicles equipped with an ADS, the manufacturer shall demonstrate that the ADS responds appropriately when the conditions for paragraph 7.5.7.1. are met."***

R ADS

*Unchanged*

\*In all four options, R107 should still be amended for ADS fitness purposes

## Horizontal topic 2 – Non-DDT tasks of the driver (6/7)

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### Option 3

R107

*Existing text of 7.5.7.1. B) +*

**“For vehicles equipped with an ADS, in the absence of a designated person responsible for the opening of doors, doors shall open automatically in accordance with NEW ANNEX”**

*NEW ANNEX based on existing annexes for electronic control systems (R79 Annex 6, R13-H Annex 8...)*

R ADS

*Unchanged*

### Option 4

R107

*Unchanged*

R ADS

*Unchanged*

National laws

**CP A: “In case of fire, all doors of an ADS vehicle shall open automatically ”**

**CP B: “In case of fire, the ADS shall open all power-operated doors [...] ”**



## Horizontal topic 2 – Non-DDT tasks of the driver (7/7)

### NEW OPTION 5:

- **The ADS may perform non-DDT safety tasks.** They must be listed and described in the ADS safety case. The assessor must check that the tasks are performed in accordance with national traffic law.
- If the ADS relies on a remote operator to perform these tasks, they must also be documented but will be checked at the national level.
- National law should define the list of mandatory non-DDT tasks. Performance of non-DDT tasks by a remote operator is evaluated at the national level.
- In non-ADS Regulations, the ADS may be assimilated as an automatic function or as a replacement of the driver (see open question).

#### UNR 107

- Facilitates the operation of doors by the driver
- Has provisions for automatic doors
- **[Open question – see below]**

#### UNR ADS

- If the ADS controls the doors, describes how they are controlled
- If not, describes how the remote operator controls the doors

#### NATIONAL LEVEL

- Mandates when doors must be opened (fire, etc.)
- Checks correct operation of doors by remote op.

*Open question: does the remote operator interact directly with non-ADS Regulations, or is it handled through the ADS?*

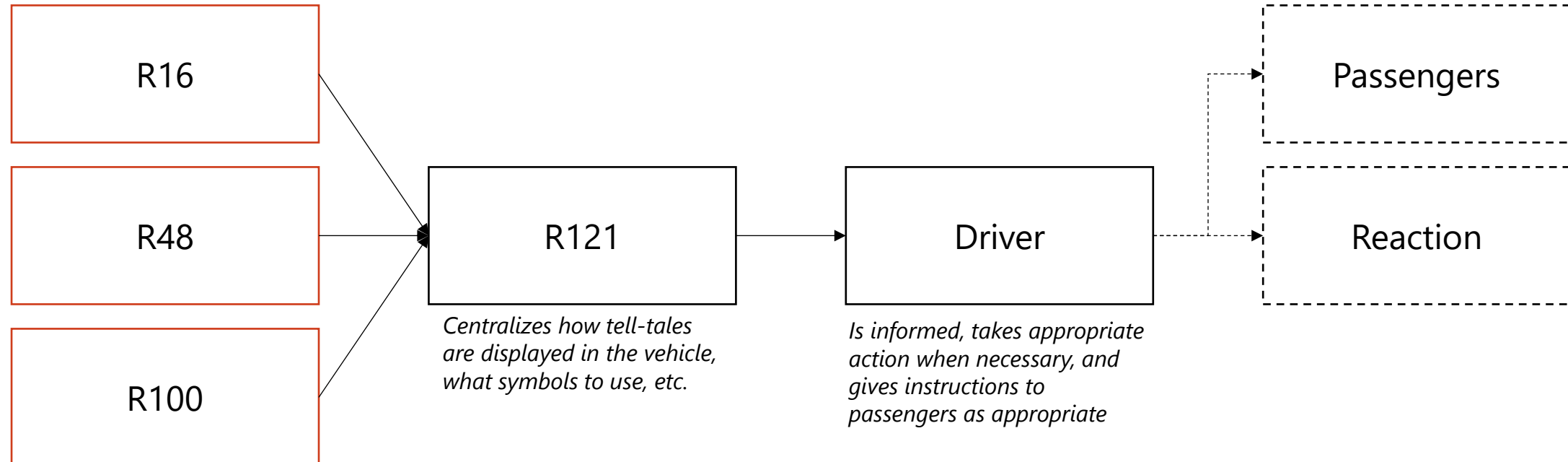
**Option A:** introduce provisions for remote operators in R107.

**Option B:** R107 only refers to "the ADS" regardless of whether the task is done by the ADS itself or a remote operator.

# Horizontal topic 3 – Communication with ADS users (1/4)

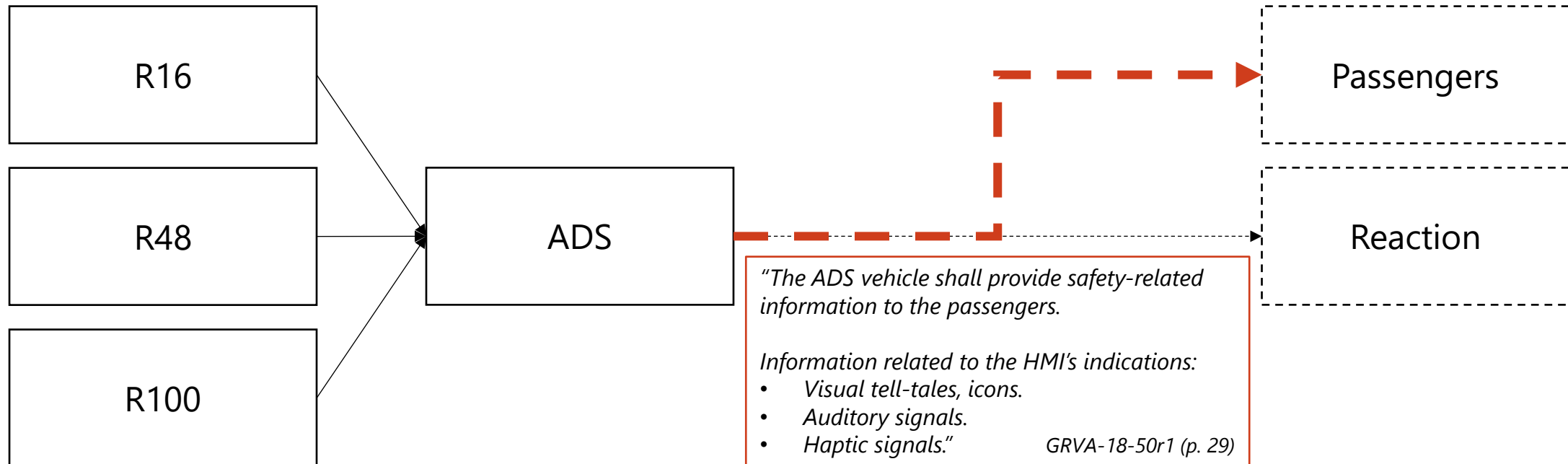
In a conventional (non-ADS) vehicle, nearly all information goes to the driver, who has full responsibility to react to regulatory vehicle or safety information (DDT-related or not), but also to communicate to passengers and to give instructions.

**Each Regulation** defines what information should be communicated with a warning / tell-tale, when warnings should be triggered, etc.



## Horizontal topic 3 – Communication with ADS users (2/4)

In an automated vehicle, information is transmitted directly to the ADS.  
The ADS Regulation requires the ADS to provide safety-related information to passengers, **but does not specify what information is relevant, when to provide it, how, and to whom.**



Communication from the ADS to users depends on the criticality of the information and on user roles.  
There is currently **no requirement for the ADS to transmit any specific safety-relevant information defined in an existing Regulation.**

## Horizontal topic 3 – Communication with ADS users (3/4)

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**Option 1:** do not define any specific requirements for the transmission of information to users; this should be decided by the ADS, and communication strategies may be different from one ADS to another.

**Option 2:** each Regulation may introduce requirements for information directly to passengers when no driver is present in the vehicle.

**Option 3:** a master table defines expected transmission from the ADS to vehicle users. This table could be integrated in the ADS Regulation or a separate Regulation.

Regulation	Paragraph	Description of the information	Type of signal (visual / auditory / haptic)	Relevant users
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# Horizontal topic 3 – Communication with ADS users (4/4)

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<b>Benefits of Option 1</b>	<b>Benefits of Option 2</b>	<b>Benefits of Option 3</b>
<ul style="list-style-type: none"><li>- No need to amend existing Regulations or the ADS Regulation.</li><li>- OEMs are free to define any strategy for communicating with vehicle users.</li><li>- Allows for more innovation in ADS operation.</li></ul>	<ul style="list-style-type: none"><li>- No need to amend a master table each time a new warning or information is added to any Regulation.</li><li>- Requirements for each kind of information can be precisely drafted in each Regulation, rather than in a master table.</li><li>- Direct communication from the vehicle to the users, without transiting through the ADS.</li></ul>	<ul style="list-style-type: none"><li>- Clear, harmonised guidance in one location for when and how the ADS should transmit information.</li><li>- Information comes from the ADS and not from the vehicle. New methods of information delivery could thus be considered (vocal messages, etc.)</li><li>- A master table may also include information specific to the ADS performance of the DDT.</li></ul>

# Wrap-up

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## Horizontal Topic 2

- Regulations contain many provisions where the role of the driver extends beyond the simple operation of the vehicle.
- It is expected that many ADS will perform some of these functions,
- Yet, Current IWG ADS draft provisions do not contain requirements to ensure that they are performed safely.
- Some of these functions may be performed by a remote operator, and it is unclear at this stage how non-ADS Regulations should handle them.

## Horizontal Topic 3

- GRs are concerned about the potential lack of harmonisation between ADS vehicles due to the absence of centralised guidance on how warnings should be handled by the ADS.
- Guidance could be forced *via* the existing Regulations for certain critical warnings, but guidance at the ADS level (interpretation document?) could be beneficial.

**Proposals must be ready for the joint meeting of the fitness expert groups on 6 and 7 February 2025 in Paris, France**

# Contact information

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