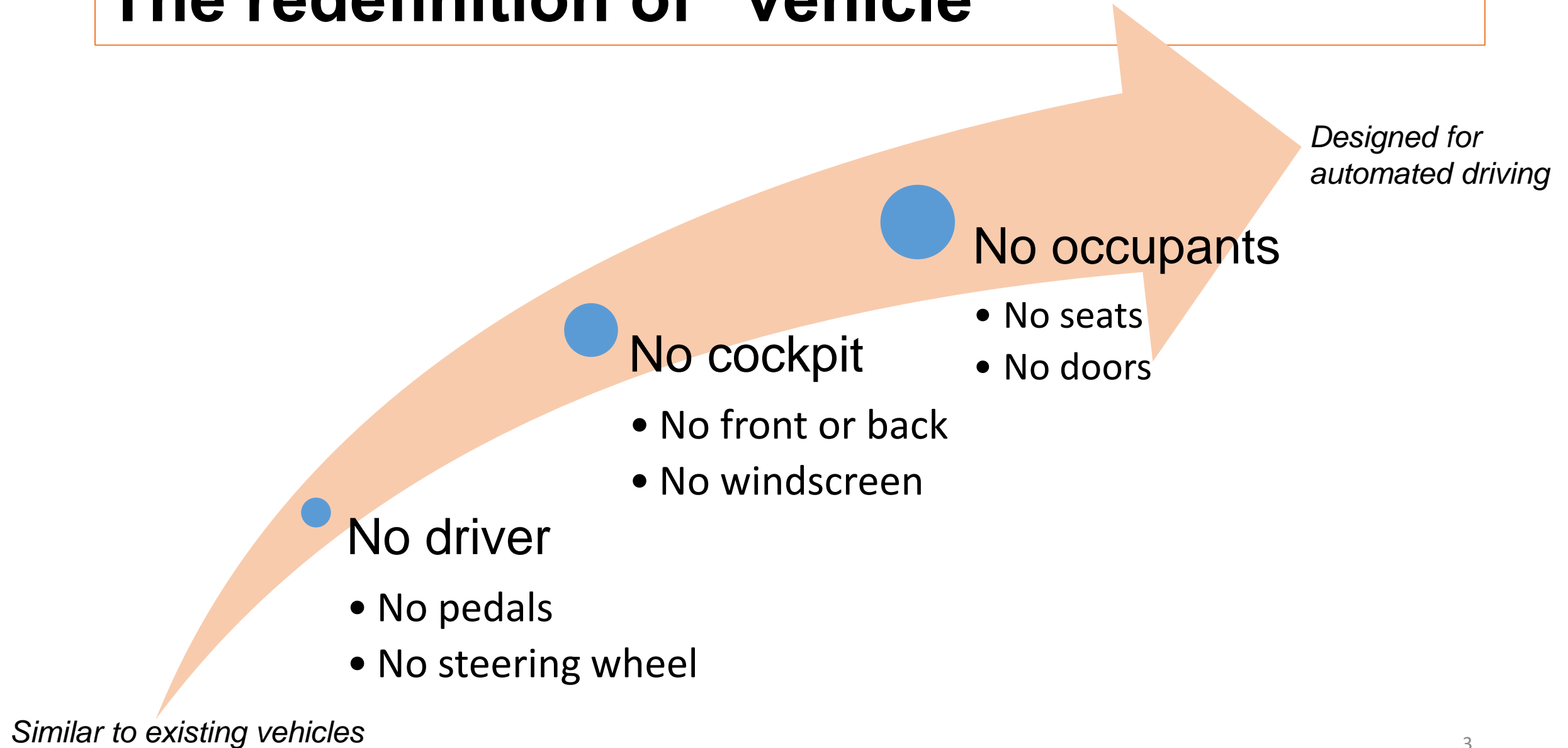


Reviewing GRVA Regulations And GTRs On Their Fitness For ADS

Background

- WP.29 manages more than 200 Regulations, GTRs and other documents concerning motor vehicles and their equipment
- Regulations rely on specific technical provisions to ensure a globally harmonised framework for performance and testing
- Most Regulations were drafted according to the traditional definition of a motor vehicle, which needs a **human to perform the driving task**

The redefinition of “vehicle”



Consequence on existing Regulations

- Some prescriptions need to be slightly modified

UNECE R102 §2.2.1. “Straight line stability test”

*Vehicles shall be tested at a speed of 85 +5/-0 km/h and remain aligned. During the test, it must be possible to travel along a straight section of the road without unusual steering correction **by the driver**.*

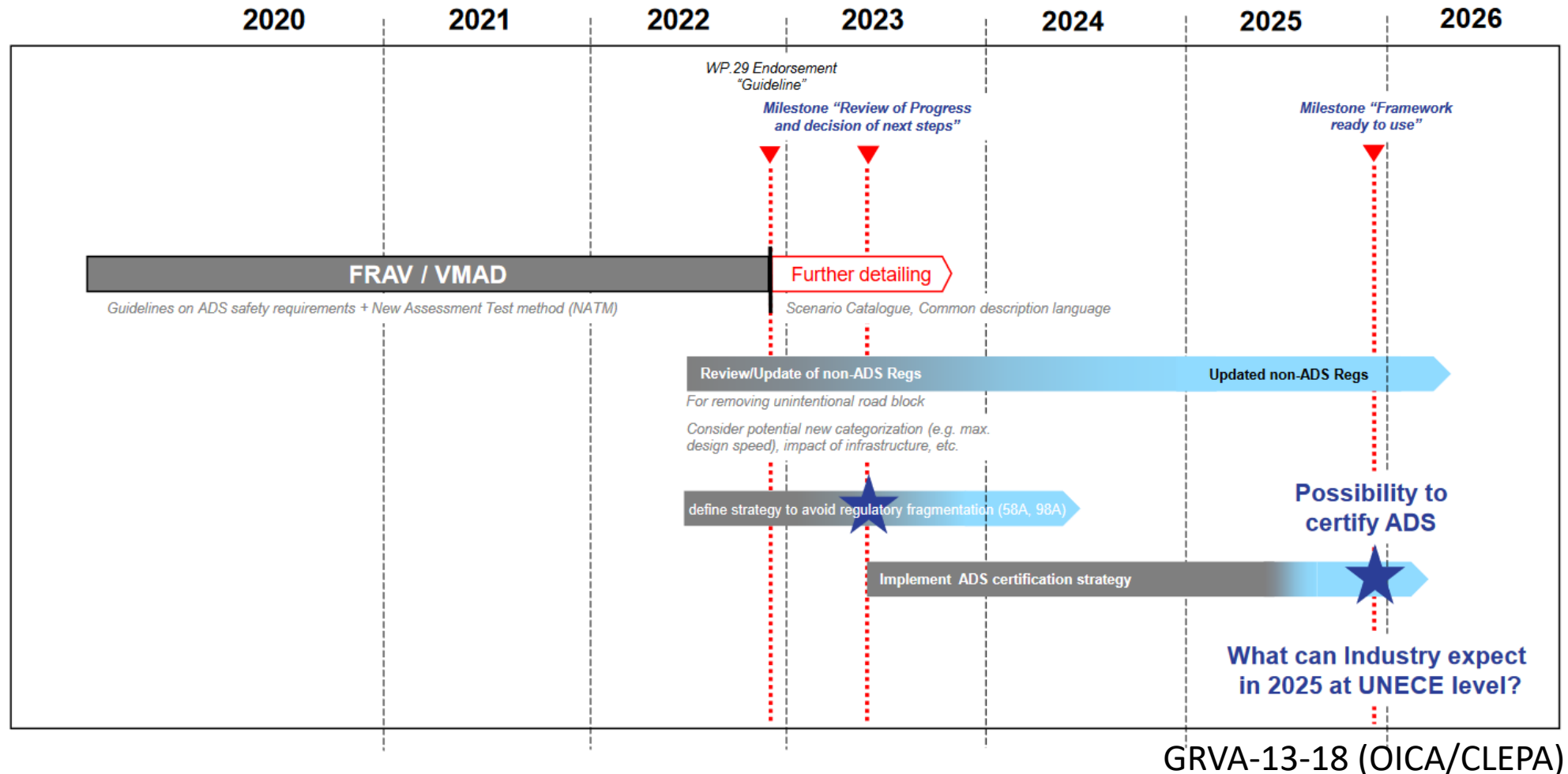
- Other prescriptions make no sense with automated driving

UNECE R13 §5.1.2.2. “Secondary braking system”

*The **driver** shall be able to achieve this braking action from his **driving seat** while keeping at least **one hand** on the **steering control**.*

- We need to consider both the **text** and the **spirit** of Regulations

Industry timeline



Mandate from WP.29

- At its 186th session in March 2022, WP.29 requested all its subsidiary working parties to perform a screening of the UN Regulations and Global Technical Regulations (GTR) of relevance regarding their fitness for Automated Driving Systems (ADS) until ~~March 2023~~.

*Pending request for deadline extension until **June 2023** to let each GR approve the results of their taskforce before WP29*

- At its 14th session in September 2022, GRVA gave additional guidance as to what kind of automated vehicles to consider, etc. (informal document GRVA-14-54r1)

FADS activities

High-level assessment of GRVA Regs & GTRs

Completed

Detailed screening of GRVA Regs & GTRs

Ongoing

Contact point for taskforces of other GRs for automated driving topics

Ongoing

High-level assessment of GRVA Regs & GTRs

DRAFT



Regulation applicable to Automated Vehicles/driverless vehicles: yes no

UN Regulation No. 79 (Steering)	UN Group: GRVA	Potential approach for application: no amendment required amendment new Regulation
<p>Content Summary (existing Regulation)</p> <ul style="list-style-type: none"> • Ensure that all components of the steering system are designed properly to ensure high level of safety: • No physical breakage of mechanical components (well dimensioned) • Steering forces are at level which can be handled by the driver, even in case of failure • Steering performance in nominal cases • Steering performance in failure cases • Warnings to be issued to warn the driver • ADAS specific requirements 	<p>Summary of required changes</p> <ul style="list-style-type: none"> • Replacing the driver actuating the steering control with the steering demand generated by the ADS • Testing section to be updated • Warnings/failure signals to be transmitted to the ADS to ensure adequate response • Driver assistance content not applicable to ADS vehicles could be deleted for standalone Regulation for AV's • Definitions reviewed/added/amended • Scope 	
<p>Content relevant for FAV's / driverless vehicles</p> <ul style="list-style-type: none"> • System robustness (well dimensioned) • Steering performance under nominal conditions • Steering performance under failure conditions • Steering performance in „maintenance mode“ • Warnings/failure signals to be provided to the ADS (e.g. to ensure ADS algorithm to respond adequately, to warn the operator/control tower/occupants as/if appropriate, etc.) • Performance considering max design speed of the vehicles, that the ADS is in control of the entire driving dynamics (safety concept incl. transfer to MRC), ... 	<p>Specifics for vehicles that can be driven manually and driverless:</p> <ul style="list-style-type: none"> • Consider that the steering demand can be requested by the actuation of manual controls (driver) or by generation of the ADS • HMI • Warning/failure signals (system status/condition) 	
<p>Content to be covered by (potential) ADS Regulation</p> <ul style="list-style-type: none"> • Generation of steering demand by the ADS • Response to warning/failure signals • HMI intended for communication with driver (control tower, occupants, etc.) 		

This template can both serve as a preliminary analysis of a Regulation before its detailed review, and as a final report to give a summary of the detected issues and possible options

High-level assessment of GRVA Regs & GTRs

R13	To be determined by detailed screening
R13H	To be determined by detailed screening
R78	To be determined by detailed screening
R79	To be determined by detailed screening
R89	To be determined by detailed screening
R90	Applicable
R130	Mostly not applicable
R131	Mostly not applicable
R139	Mostly not applicable
R140	Mostly not applicable
R152	Mostly not applicable
R155	Applicable
R156	Applicable
R157	Not applicable
GTR3	Not applicable
GTR8	Mostly not applicable

Applicable = can be used for automated vehicles with minor changes

Mostly not applicable = not applicable to automated driving but relevant for dual-mode vehicles

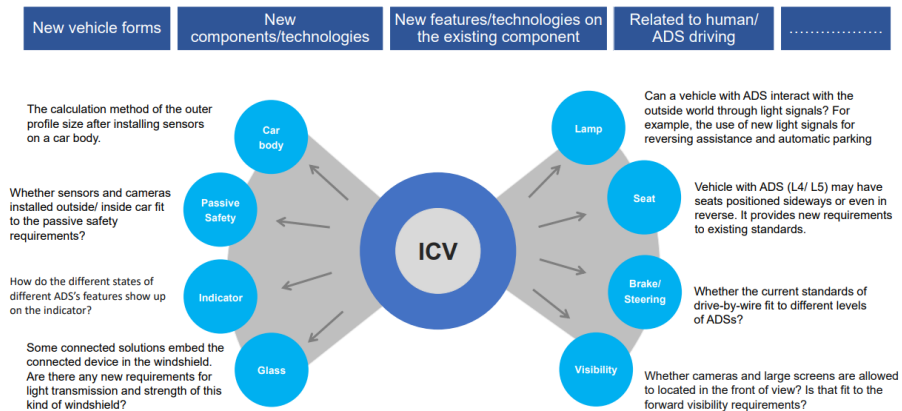
Not applicable = not relevant for Level 4 or 5 automated vehicles

To be determined = depending on the results, either amendments or a new Regulation may be needed

Detailed screening of GRVA Regs and GTRs

- Points of interest:
 - **Use cases:** full automation, dual-mode, no occupants, etc.
 - **Possible approaches:** amending Regulations, drafting specific Regulations for automated vehicles, creating new vehicle categories, etc.
 - Consider both **explicit and implicit concepts**

Relevant terms for scanning Regulations and GTRs								
Word	Variations							
Driver	Person	Passenger	Rider					
Driving seat	Seating position	R point	Driving position	H point				
Foot	Pedal							
Hand	Steering wheel	Direction	Lever	Handle	Button	Push	Pull	Press
Eye	See	Visible	Ocular					
Hear	Audible							
Telltale	Warning	Signal	instrument pane	Display				
Steering Wheel								
Manual								
Actuate	Force	Reach	Action					
(De)Activate	(De)Activation	Override	Control	Switch				
Front	Forward	Fore	Foremost					
Rear	Rearward	Aft	Rearmost	Behind				



Detailed screening of GRVA Regs and GTRs

	R130	Lane Departure Warning System (LDWS)	Issue	Issue for fully automated vehicles?	Issue for dual mode vehicles?	vehicles without occupants?
1		function has been deactivated. The yellow warning signal specified in paragraph 5.4.2 below may be used for this purpose.	OK			
43	5.3.2.					
44	5.4.	<i>Warning indication</i>	NA			
45	5.4.1.	The lane departure warning referred to in paragraph 5.2.1 above shall be noticeable by the driver and be provided by:				
46	(a)	at least two warning means out of optical, acoustic and haptic; or				
47	(b)	one warning means out of haptic and acoustic, with spatial indication about the direction of unintended drift of the vehicle.				
48	5.4.1.1.	Where an optical signal is used for the lane departure warning, it may use the failure warning signal as specified in paragraph 5.4.2 below in a flashing mode.	OK			
49	5.4.2.	The failure warning referred to in paragraph 5.2.2 above shall be a yellow optical warning signal.	OK			
50	5.4.3.	The LDWS optical warning signals shall be visible when the ignition (start) switch is turned to the 'on' position (start) switch is in a position between the 'off' and 'on' positions designated by the manufacturer as a check (power-on)). This requirement does not apply to dual-mode vehicles in a common space.	D50			
51	5.4.4.	The optical warning signals shall be visible when the driver is in a satisfactory condition of the signals must be visible from the driver's seat.				

Test Test D50 ...

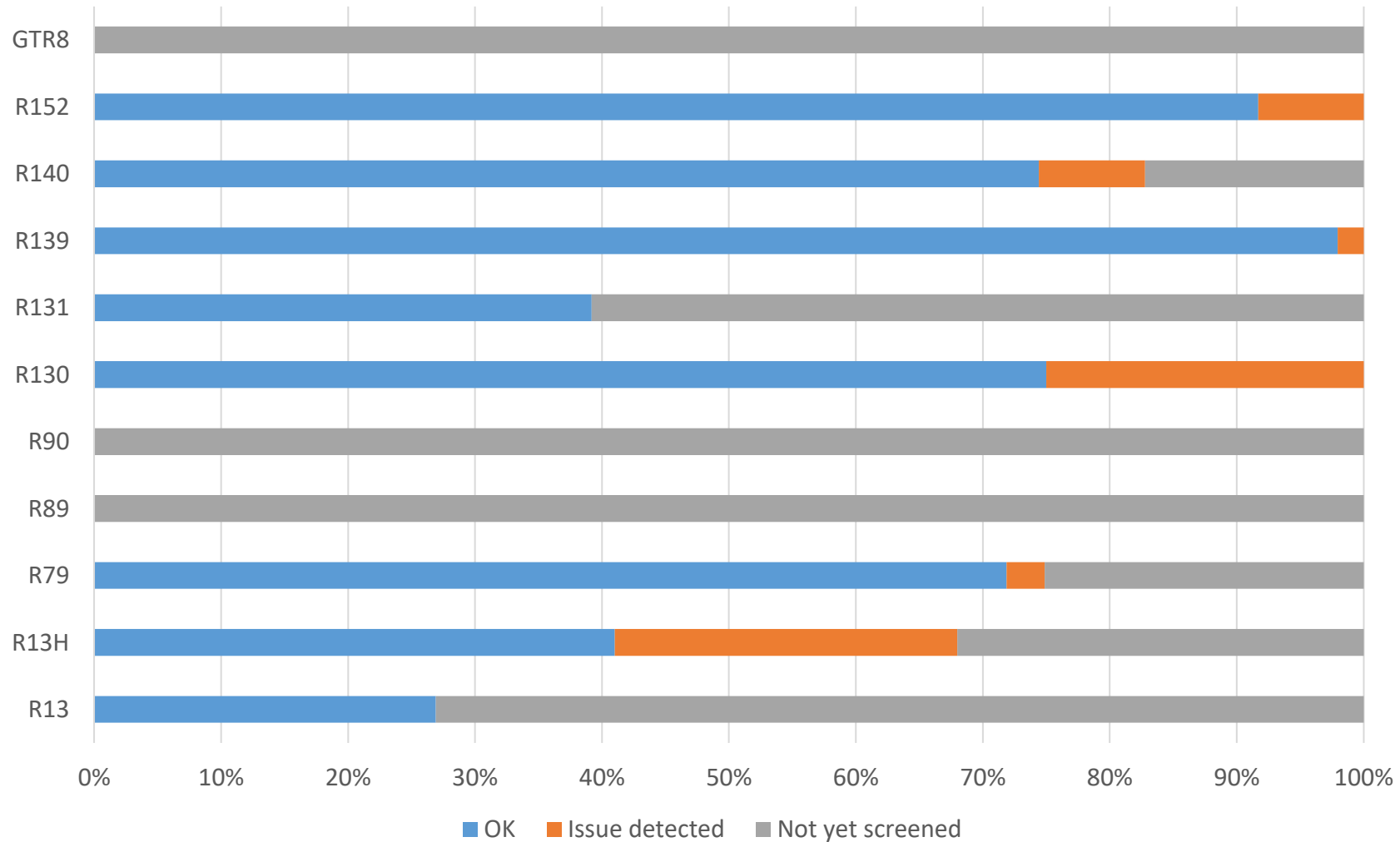
FR: Need to check how this applies to dual-mode vehicles when powering on

Reply

Online collaborative environment and example of a detailed review

Detailed screening of GRVA Regs and GTRs

Progress of the detailed screening of GRVA Regulations and GTRs



Most annexes not included yet

Common work method across GRs

The taskforces of the different GRs have agreed to work on the same deliverables:

- **High-level summaries** for each Regulation (cf. slide 8)
- **Comprehensive files** for the detailed screening (cf. slide 11)
- A “**whitebook**” for handling automated driving when drafting new Regulations

Note: The review does not include definitive solutions for changing Regulations, but taskforces may offer suggestions (amendments, new Regulations, new vehicle categories...)

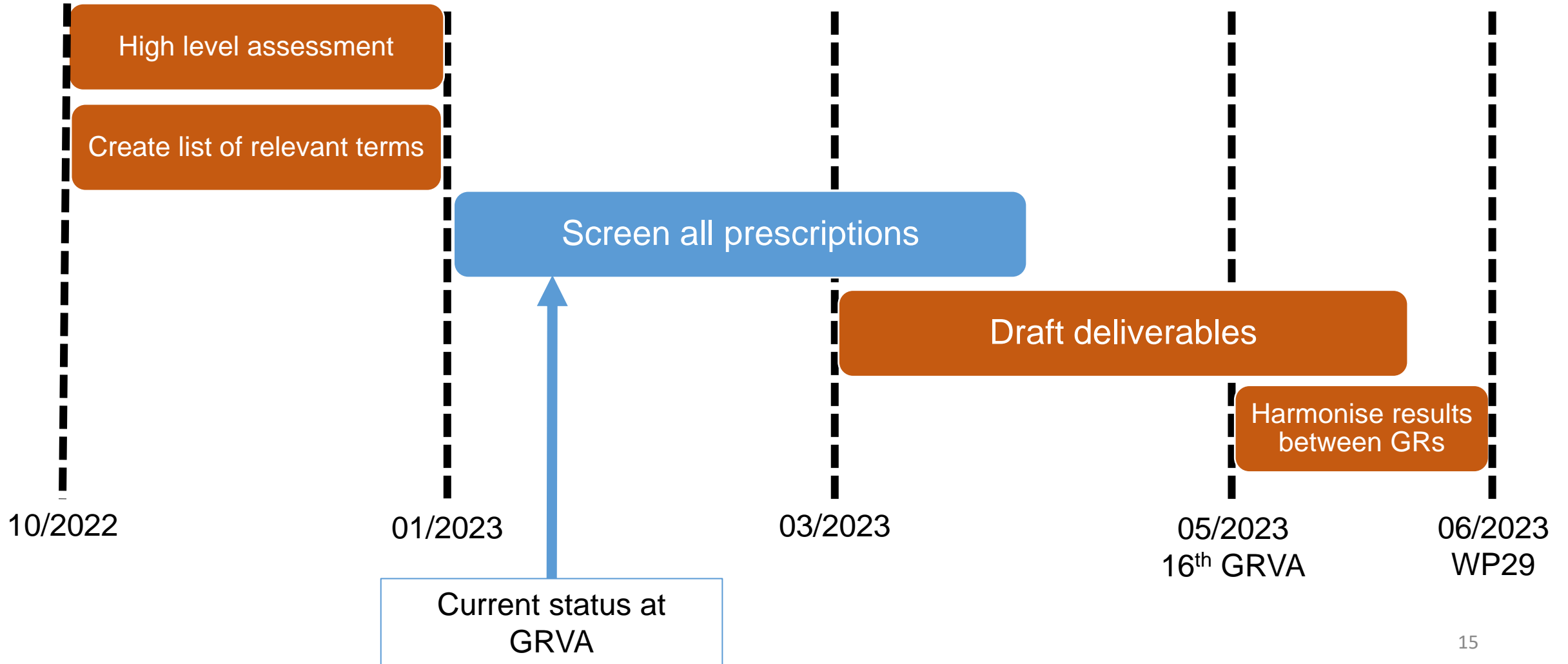
Common work method across GRs

The GRVA taskforce has contributed by:

- Providing **templates**
- Sharing high-level **open issues**
- **Presenting** the reviewing process to GRPE, EC, etc.

GRSG and GRSP have also started their detailed review

Timeline



Next steps

- Complete the detailed screening
 - Particular attention to **annexes** and **testing**
- Compile **open issues** and share with other taskforces
- **Hybrid meeting** planned for March 2023 + potential meeting in China in May

No. of the issue	Title	General Description	Regulation(s) affected
1	Active safety systems and dual mode	If a system is considered not applicable to automated driving, how should it be handled for dual mode vehicles? Option 1: Regulation not applicable in automated mode Option 2: system automatically deactivated in automated mode Option 3: other	R130 R131 R139 R140 R152 GTR8
2	"On by default" systems in dual mode	When a system is required by a Regulation to be automatically activated on vehicle start-up (or master control switch, engine start/run cycle, etc.), but is not applicable to automated driving (e.g. AEBS), what state should it return to when switching from automated to manual mode? Option 1: ON Option 2: whichever state it was in before automated mode, or ON if the vehicle started in automated mode Option 3: other	R130 R131 R139 R140 R152 GTR8
3	Active safety systems optical warning signals	Most active safety systems require an optical warning signal, e.g. to indicate that they are not available or deactivated. Should this kind of signal be displayed in automated mode if this active safety system is not applicable? Option 1: Yes Option 2: No Option 3: Other	R130 R131 R139 R140 R152 GTR8
		R78 gives prescriptions for vehicles of L category. Only vehicles of L6 and L7 categories are seen by the industry as realistic targets for vehicle automation. How should we handle the review of R78?	

Contact information

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