



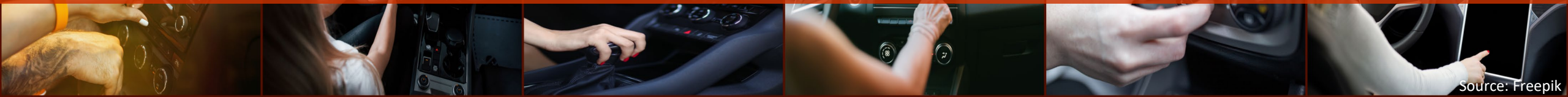
Safe use of general controls: towards a Euro NCAP assessment protocol to target distraction by design

Ilse Harms (RDW), Greta Große (UDV), Tina Gehlert (UDV), Florian Savona (UTAC), Ruggero Ceci (Trafikverket), & Adriano Palao (Euro NCAP)

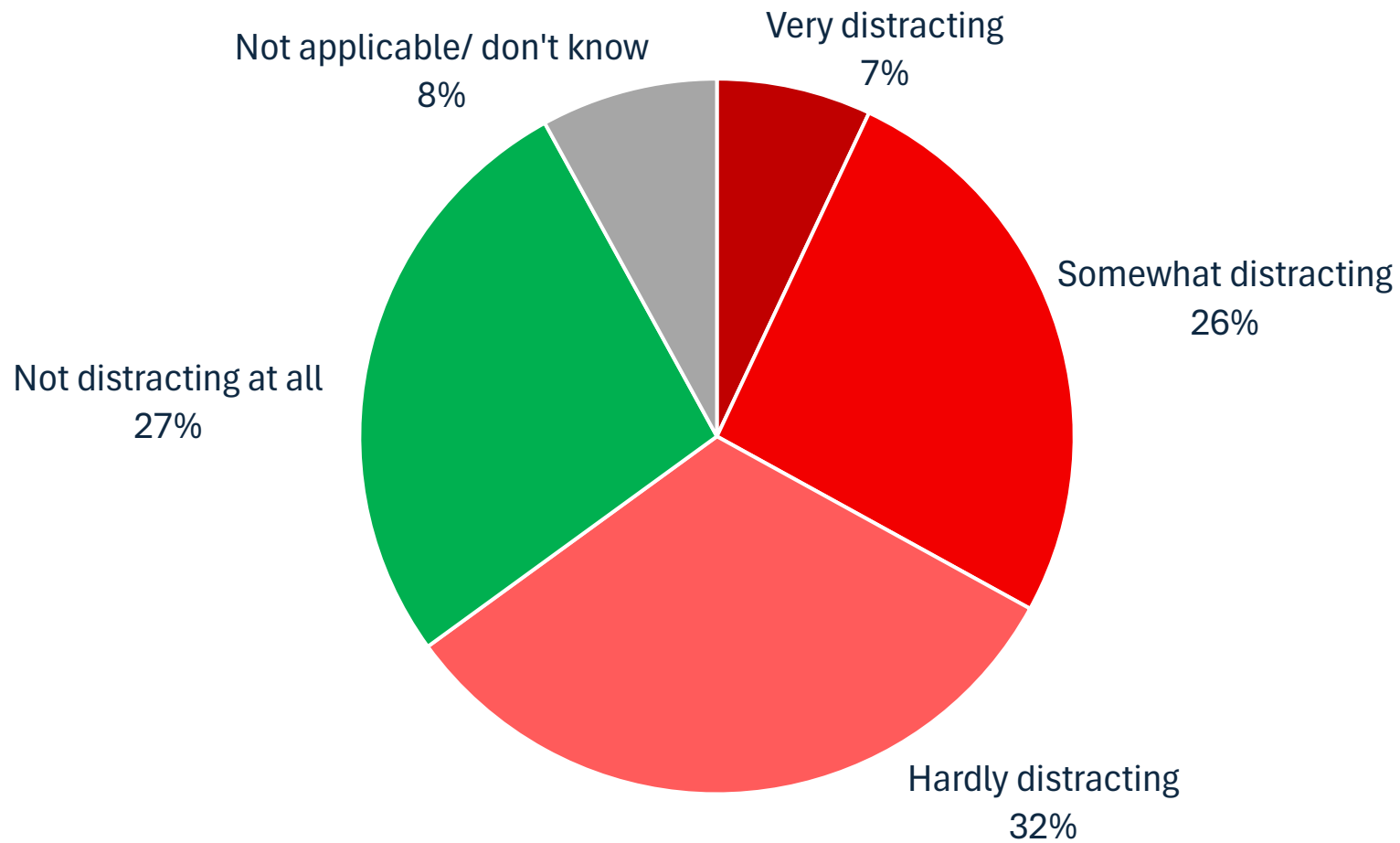
24 October 2024



**Poor HMI design can lead to unnecessary long glances off the road view.
Depending on the interaction design,
operating your vehicle may cause unnecessary distraction.**




Degree of distraction for ADAS operation in the Netherlands



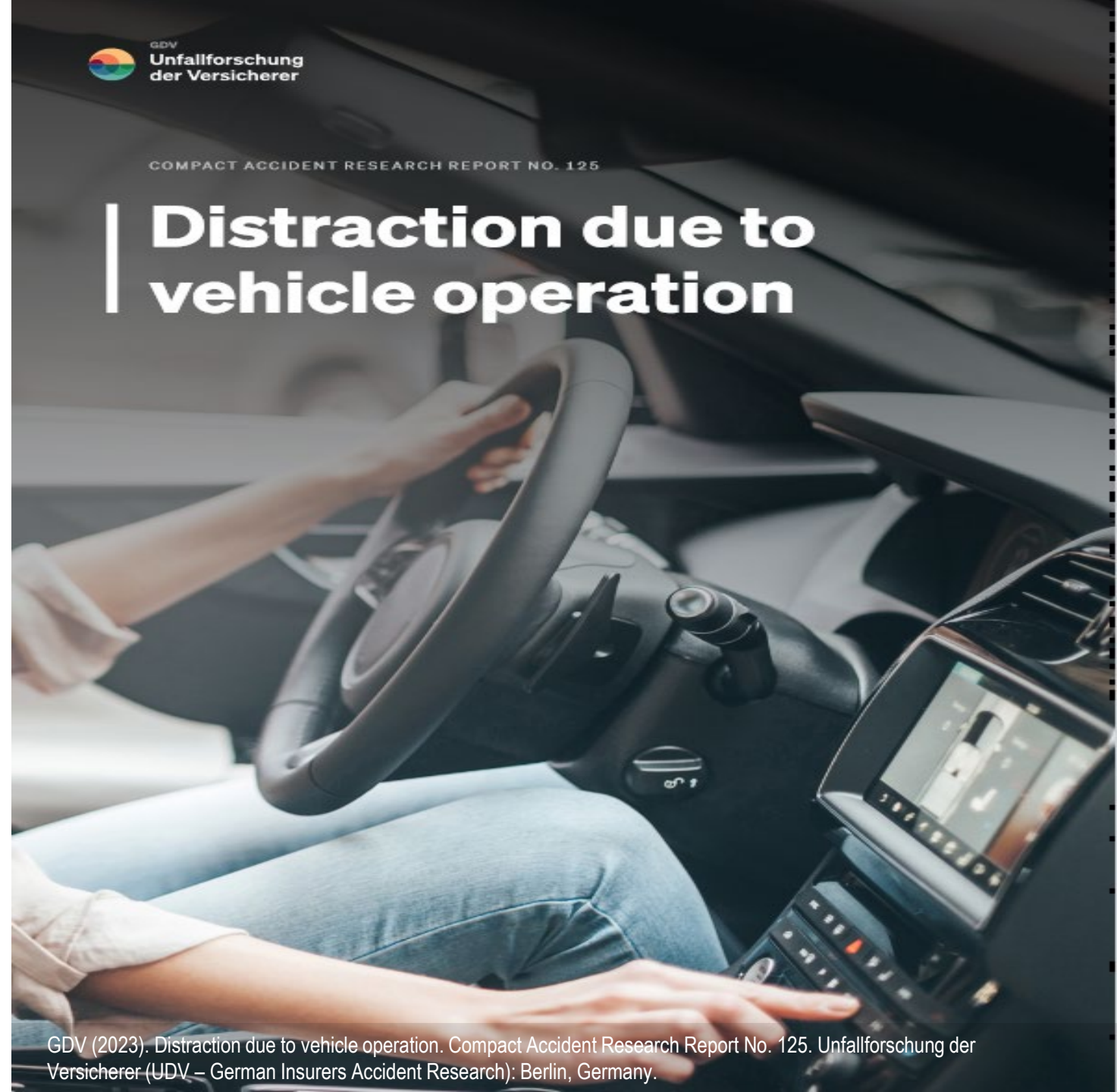
Self-reported distraction.
Representative of the Dutch
driver owning a car built
between 2017 and 2023

Source: Rijkswaterstaat (2023). Onderzoek
rijtaakondersteunende systemen (ADAS) 2023;
bezit, gebruik, waardering en kennisniveau.



UDV: ‘Currently there are no regulations or mandatory best practice that define how to design increasingly complex HMI that distract drivers as little as possible from their driving task’

RDW: ‘HMI in regulations are mostly on symbols and telltales only’



Goal of Euro NCAP's HMI & HF WG:

In other words, that its **human machine interaction** is designed in such a way that it allows the driver to interact with the vehicle, while driving safely and avoiding over-trust.

Who makes the protocol?

human factors experts

technical experts

→ Euro NCAP, RDW, TNO, BAST, UDV, Trafikverket, CSI, UTAC, Ministry of Economy Luxembourg, IDIADA, ADAC, Virtual Vehicle Research Austria, Vegvesen, Thatham, Horiba Mira

→ Advise by ACEA, CLEPA, independent experts



Consumers must be able to trust that a five-star rated car can also be operated safely




Euro NCAP
Vision 2030

A safer future for mobility

General Vehicle Controls Protocol – work in progress

Safe use of general controls

- Goal: prevention of distraction by design
 - How: evaluate controls for functions used whilst driving
 - Step-by-step approach: start small in 2026
 - Aim for 2026: targeting ‘worst practices’
- 
- Checklist (not dossier)
 - Pass/ fail
 - Foundation in NHTSA Guidelines and GDV decision tree

→ Multi-modal interaction according to functionality

Physical Interaction

Voice Interaction

→ Use of established principles for interaction design

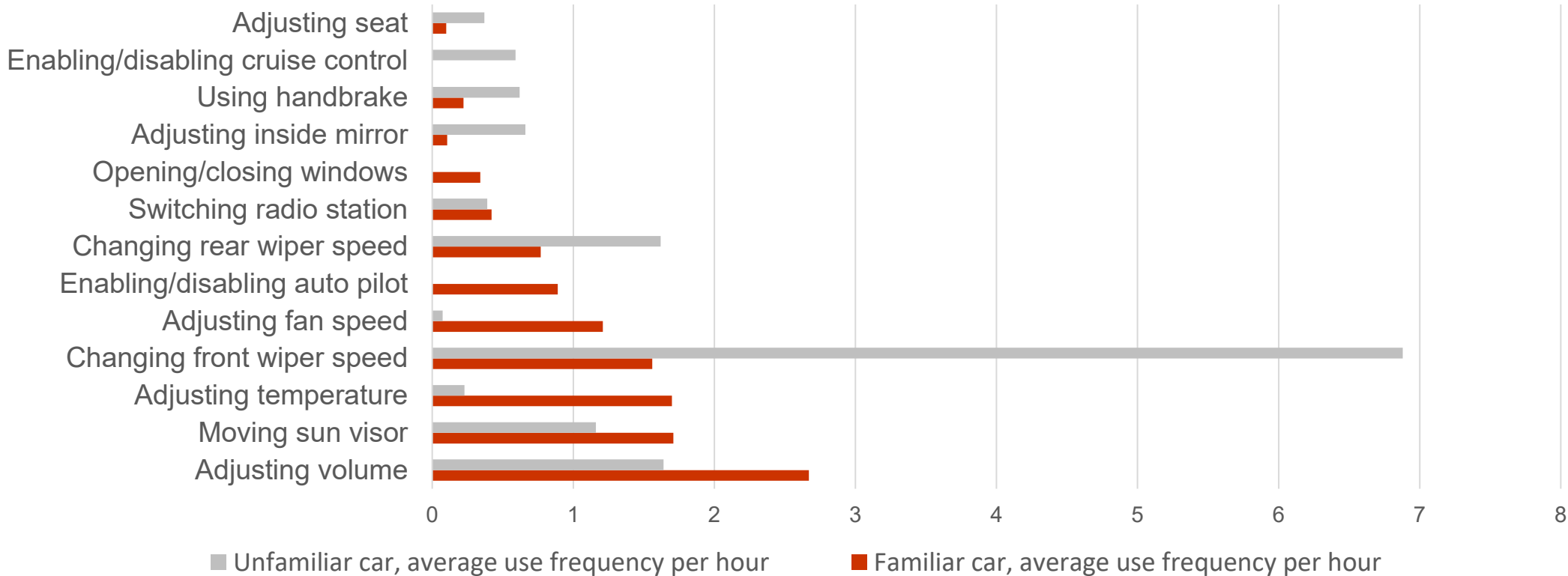
Control Identification

Control Interaction

Function Response

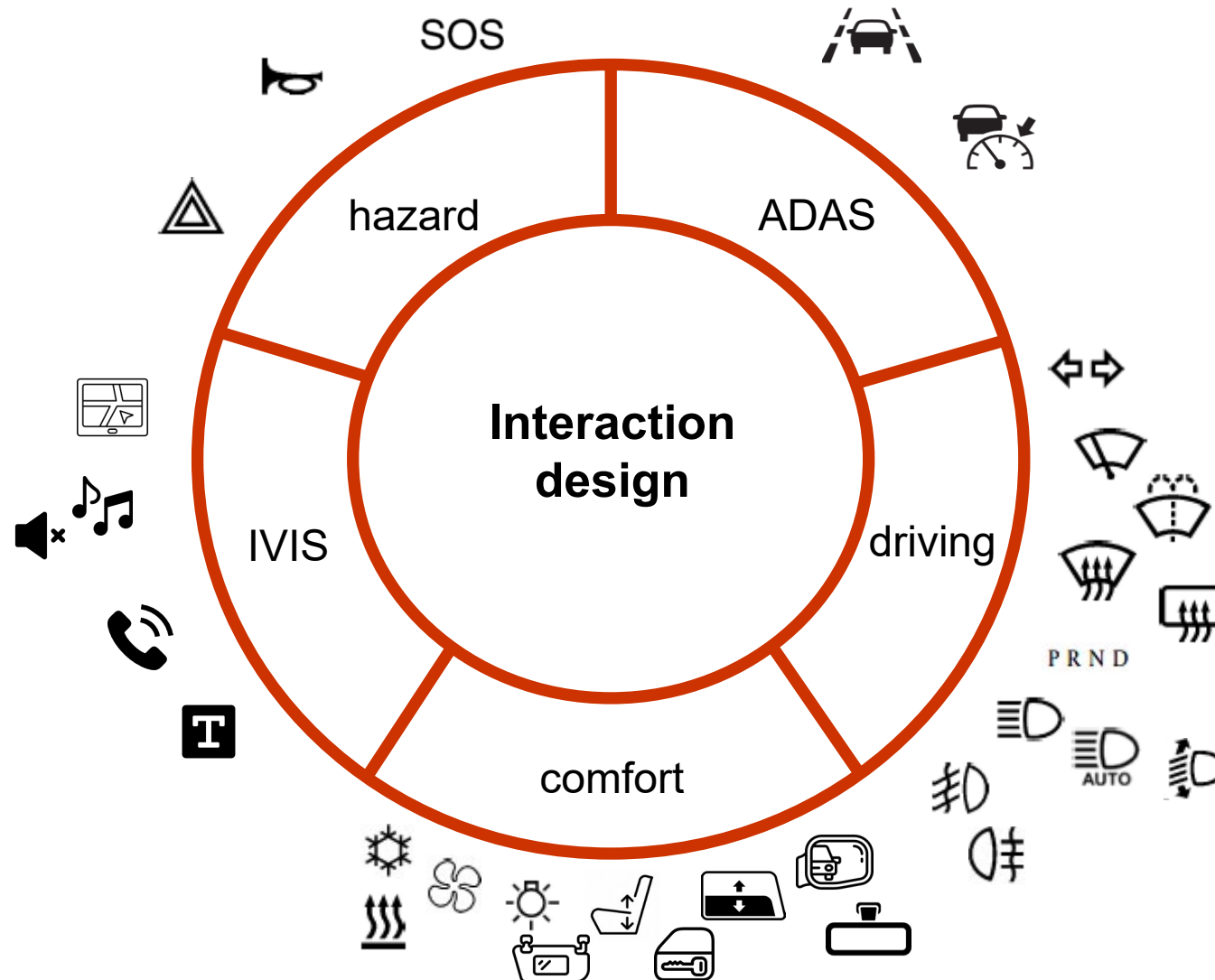
Frequently used controls while driving: a real-world study (Auerbach, 2024)

Most frequently performed tasks in a familiar vs unfamiliar car



* Using the indicator light has been excluded in the figure (fam car = 66.2 vs. unfam car = 66.6 times per hour)

Functions used while driving



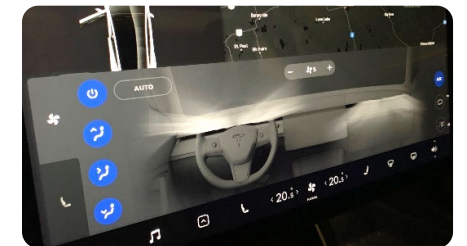
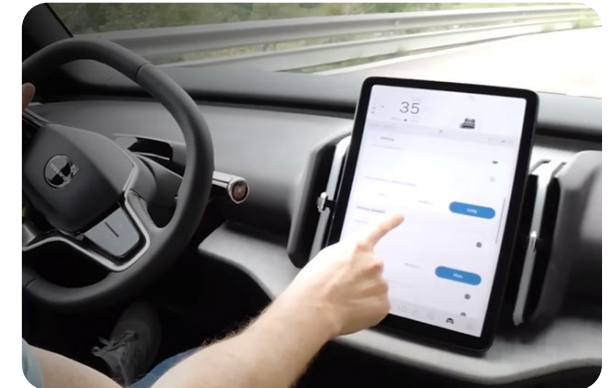
'Bring Back Buttons'

'Traditional' controls can have good properties for interaction by drivers

- Dedicated location
- Tactile reference for identification
- Intuitive interaction
- 'Kinesthetic' feedback

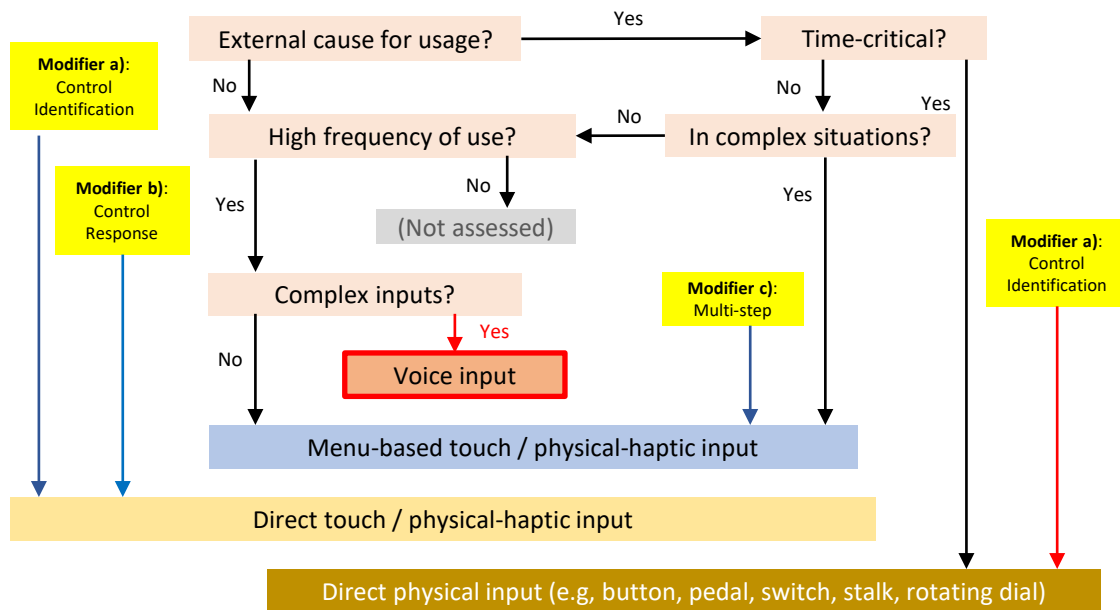
Emerging technologies can also have interaction properties without distraction associated visual load

There are bad examples...



Draft Assessment Structure

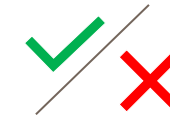
- Decision matrix - classification for assessment criteria according to functionality



- Assessment checklist – specification of assessment criteria

- Driving Task
- Hazard Functions
- In-vehicle Systems
- Comfort Features

Implementation meets decision matrix?



Modifiers for interaction quality



Functions	Actions/Tasks	Function Implementation	Initial judgement	Modifiers			Scores
			Action/Task	a) Control Identification	b) Control Response	c) Multi-step	Sub-score (Action/Task)
Audio Entertainment	Tune the radio to a pre-determined station	Direct voice input	PASS	N/A	N/A	FALSE	0.08
	-Play < artist name/song title/genre type >	N/A	Not fitted			FALSE	0.00
	-Change the audio source	Direct voice input	PASS	N/A	N/A	FALSE	0.08
	-Adjusting volume	Direct physical input (e.g. button, pedal, switch, etc.)	PASS	PASS	N/A	FALSE	0.08
	-Mute the audio system	Direct physical input (e.g. button, pedal, switch, etc.)	PASS	PASS	N/A	FALSE	0.08
	-Switching Audio Entertainment OFF	Direct physical input (e.g. button, pedal, switch, etc.)	PASS	PASS	Audible/Virtual	FALSE	0.08

Physical Interaction Criteria

Function interaction by use of a physical input...

- Button / switch / dial
- Touch panel / screen

Primary means of use and assessment for 2026

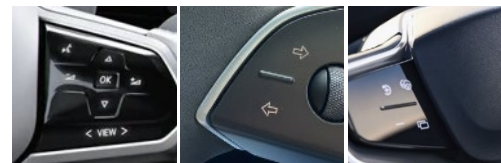
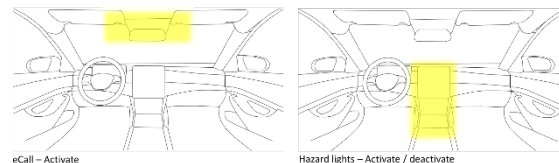


Control Identification

Location

Physical and/or visual reference

Sizing and separation



Control Response

Kinesthetic / Tactile / Haptic feedback

Operation state

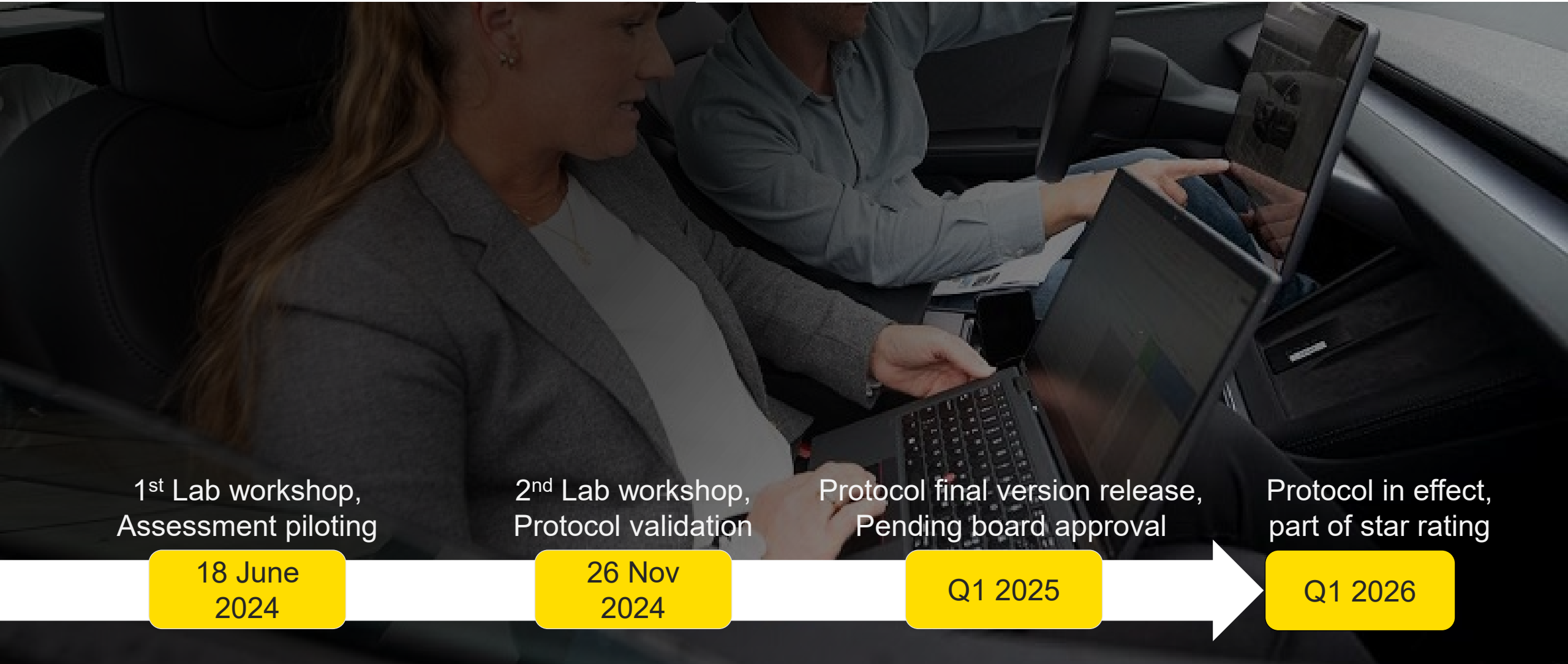
Audible feedback

Visual feedback



Checklist validation





1st Lab workshop,
Assessment piloting

18 June
2024

2nd Lab workshop,
Protocol validation

26 Nov
2024

Protocol final version release,
Pending board approval

Q1 2025

Protocol in effect,
part of star rating

Q1 2026

'Bring Back Buttons'

THE BYTE.

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Valuation Events Entertainment Drivers

KNABS AND DIALS

EUROPE TELLS AUTOMAKERS TOUCHSCREENS AND KNOBS ARE SAFER

CARSCOOPS LATEST NEW CARS SCOOPS

Has Touchscreen Tech Gone Too Far? Euro NCAP Thinks So

...rating points if certain car functions can't be operated without using the... we really want hard keys to make a comeback?

March 10, 2024 at 16:30 29

THE SUNDAY TIMES Home UK World Comment Business & Money Sport Life & Style Culture Puzzles Magazines

Car industry told to dial back use of touchscreens

Drivers are often forced to look away from the road to access basic driving functions

Nicholas Hellen, Transport Editor

Sunday March 03 2024, 12:00am GMT, The Sunday Times

SAFE?

Car industry told to dial back use of touchscreens and more earn 5-star safety rating in 2026

Euro NCAP will introduce new testing rules in 2026 that require vehicles to have physical controls to earn the highest safety score.

Thank you!



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