

Future car

*Advanced Driver Assistance Systems & Connected
Autonomous Vehicles*

Technology evolution, challenges and skills and expertise

Topics covered

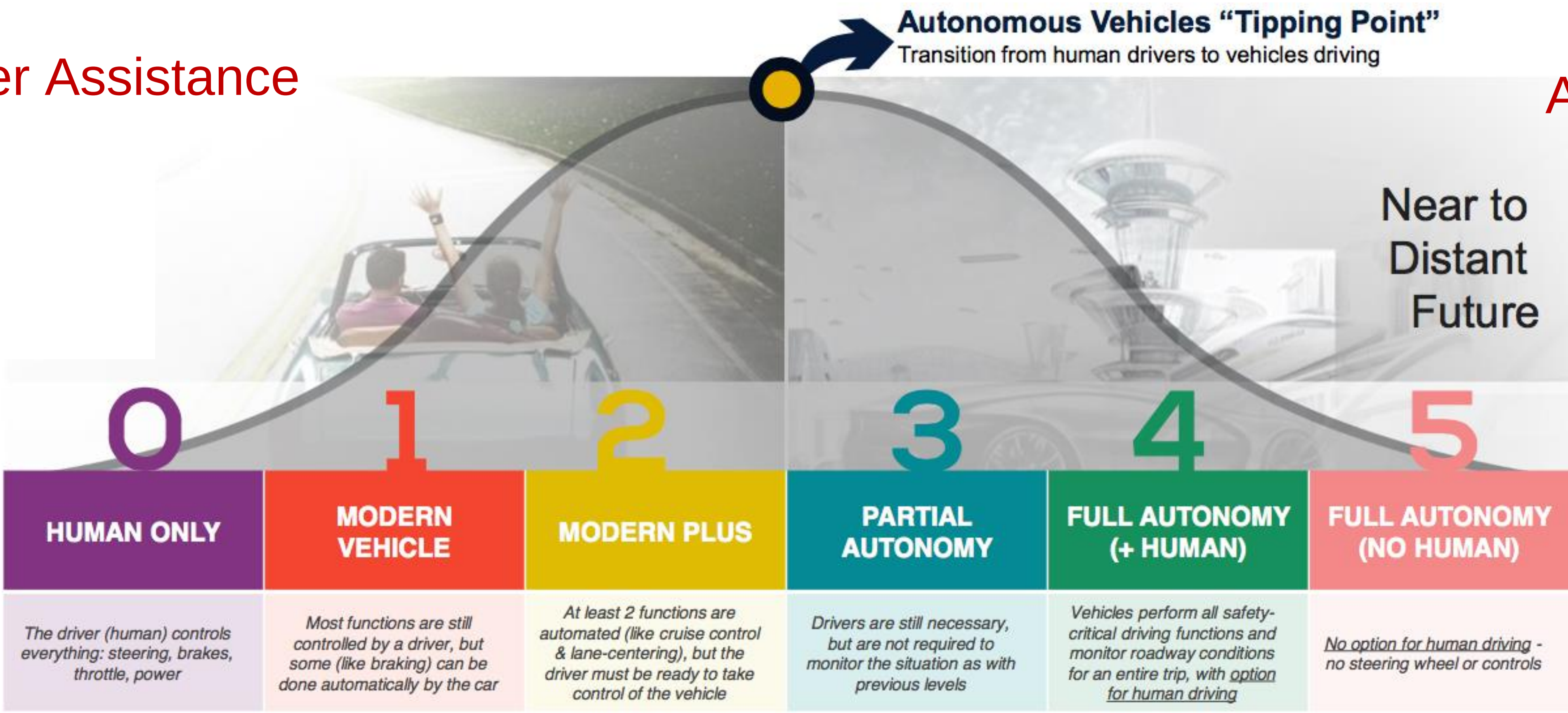
- ▣ *ADAS to autonomous vehicles*
- ▣ *OEM vs aftermarket challenges*
- ▣ *What's driving change*
- ▣ *Technology and skills requirements*
- ▣ *The future?*



Increasing vehicle complexity to make roads safer

Driver Assistance

Automation

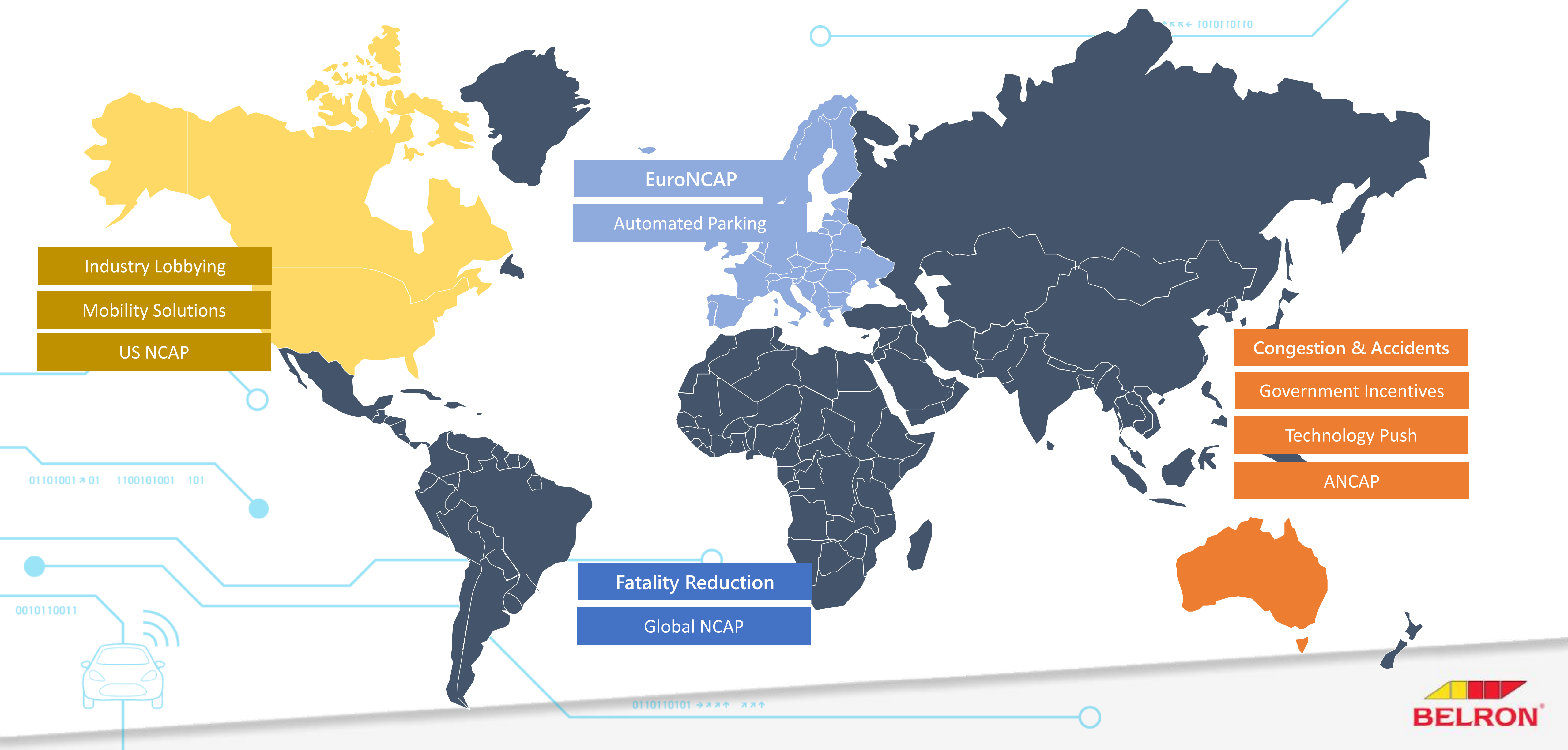


<http://www.techrepublic.com/article/autonomous-driving-levels-0-to-5-understanding-the-differences/>

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What's driving safety



Initiatives like EuroNCAP accelerate progress

2016 – Introduction of a **dual rating** system

- Standard base model rating
- Optional safety rating on model equipped with 'safety pack'

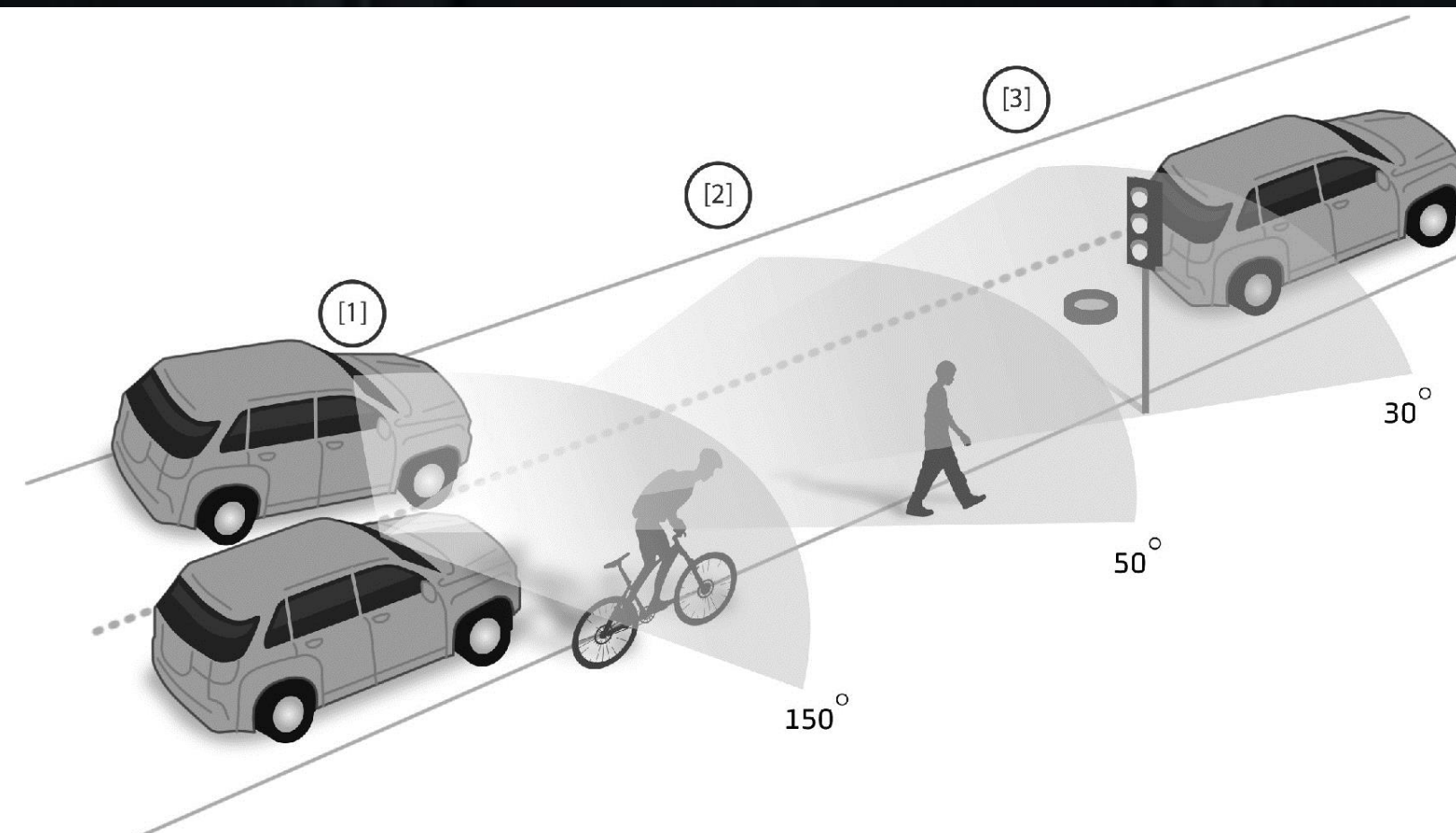
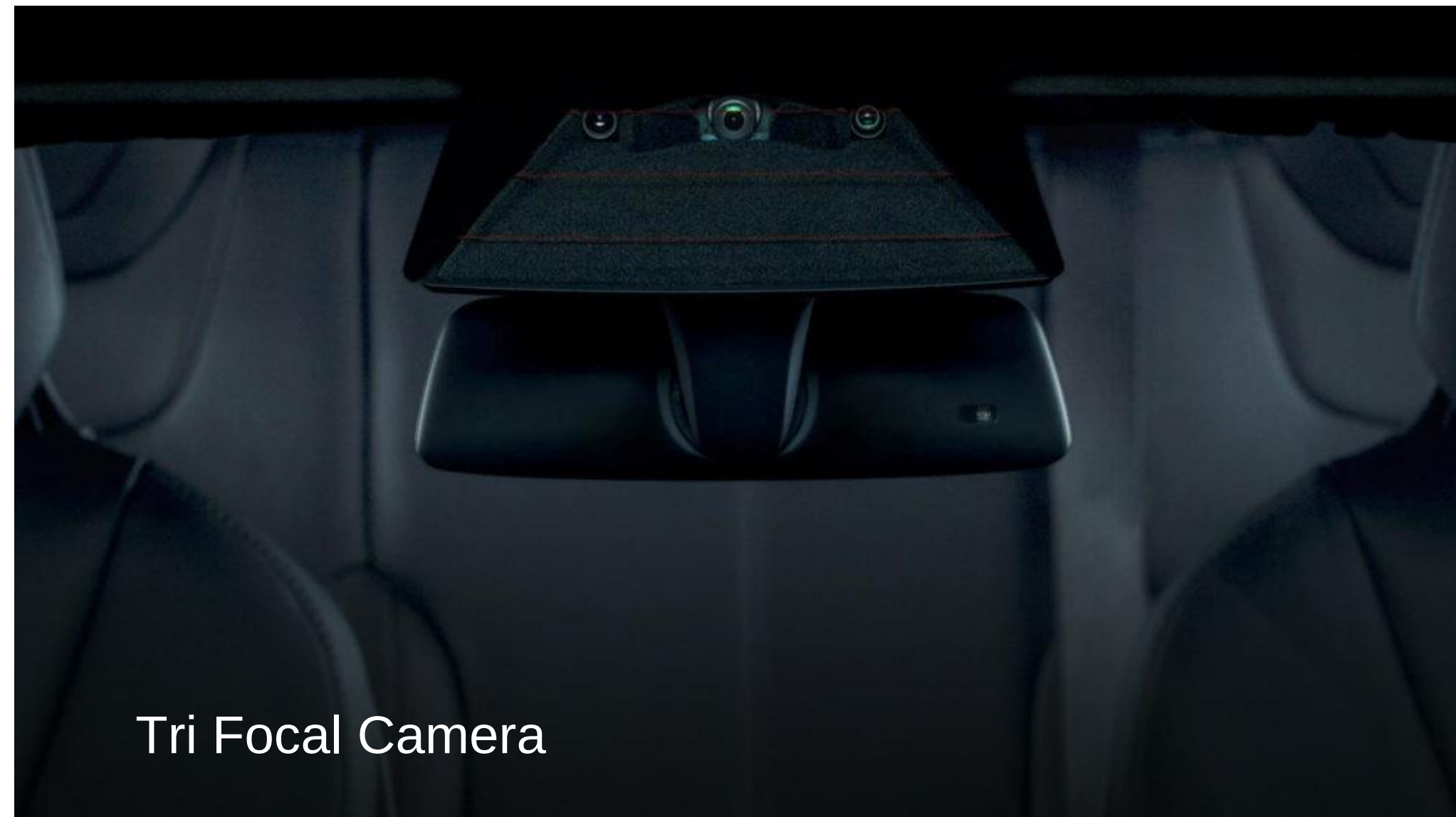


Roadmap to 2025

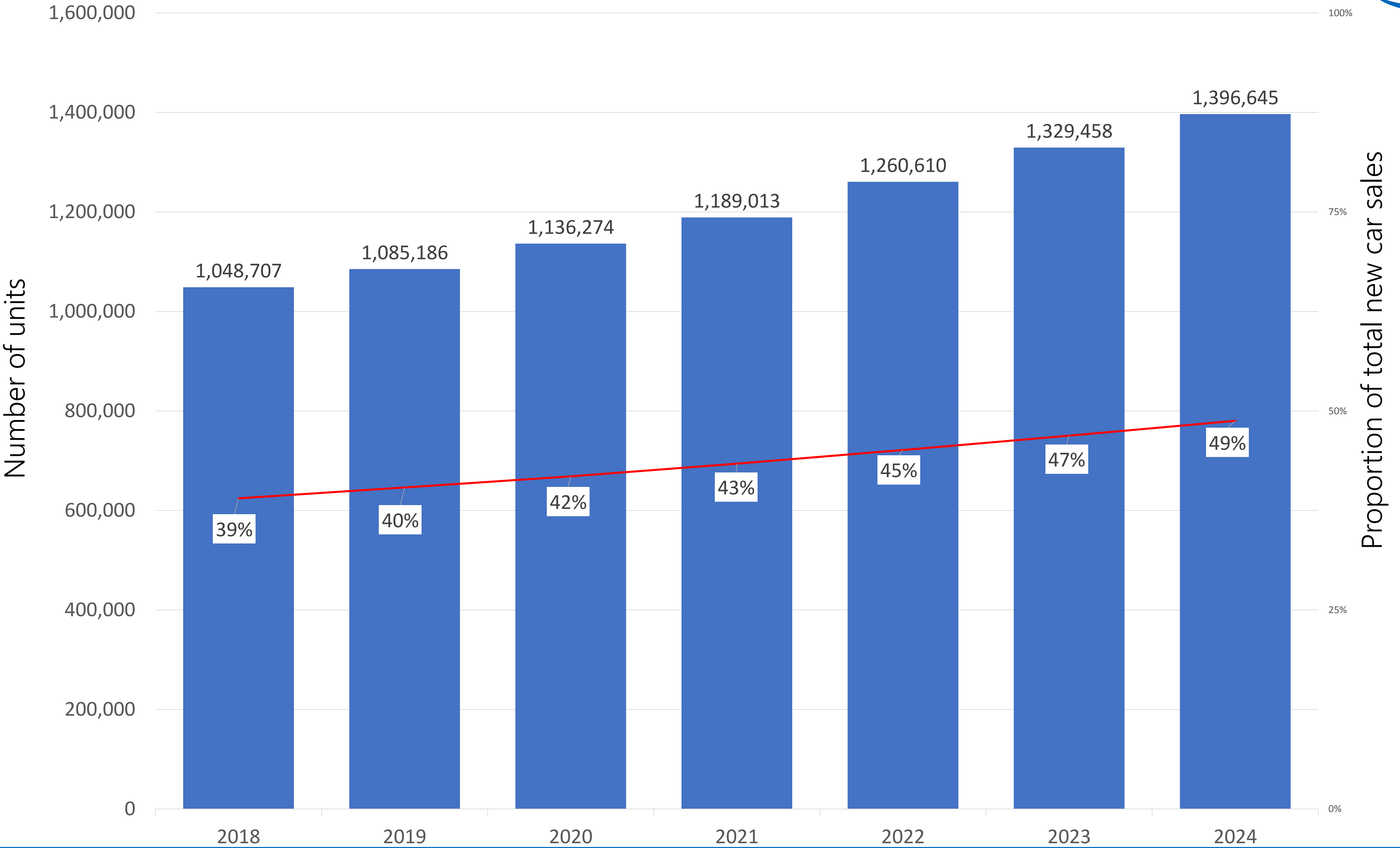
- Introduction of new grading for **Automated Driving**
- Revised standard safety assessments
 - Automatic Emergency Steering
 - Next generation LKA and Across Path
 - e-Call, V2V and V2X for active safety and rescue
- Possible new **Green NCAP** with environmental rating/testing



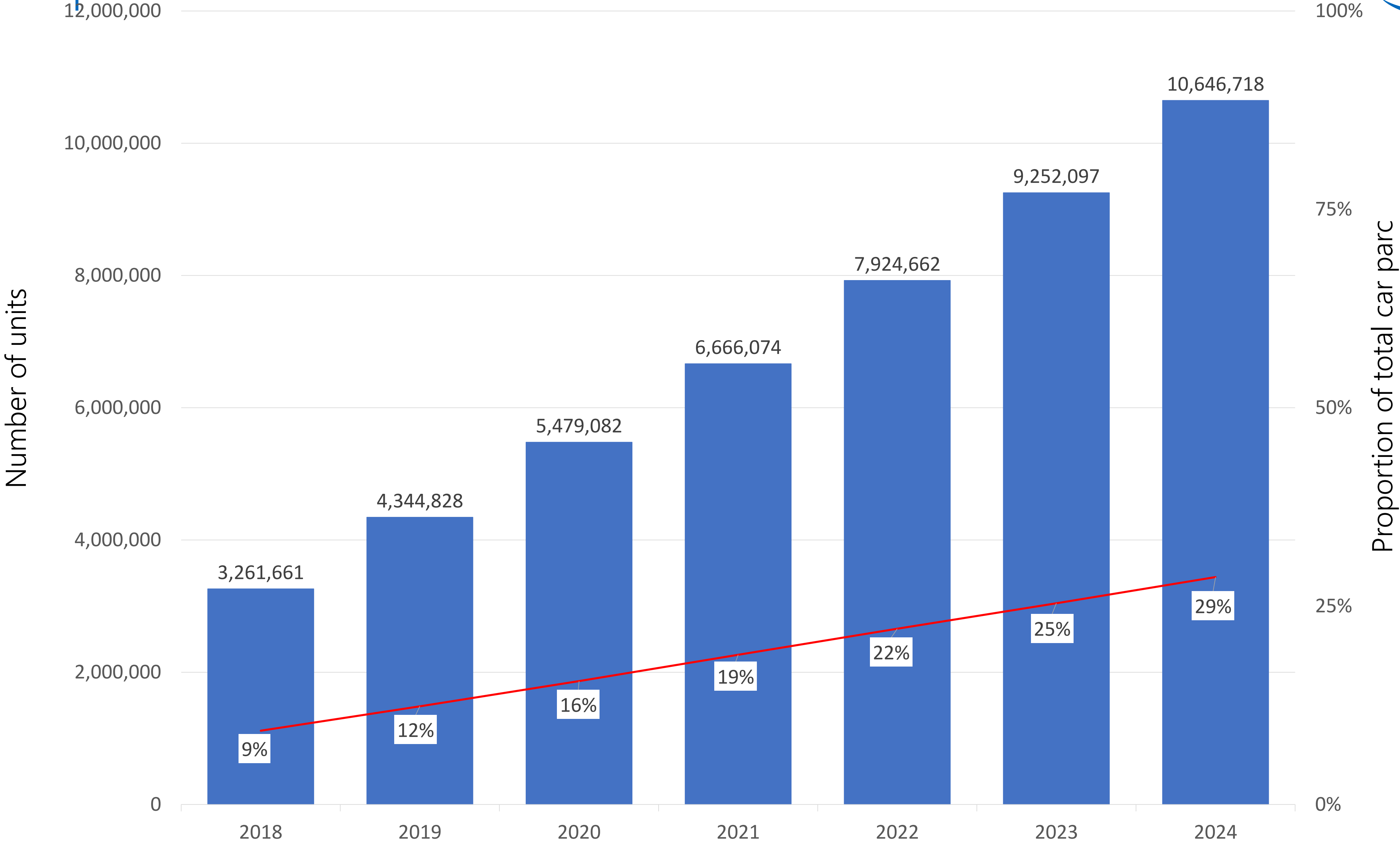
More cameras and sensors



UK: new vehicle sales fitted with front camera

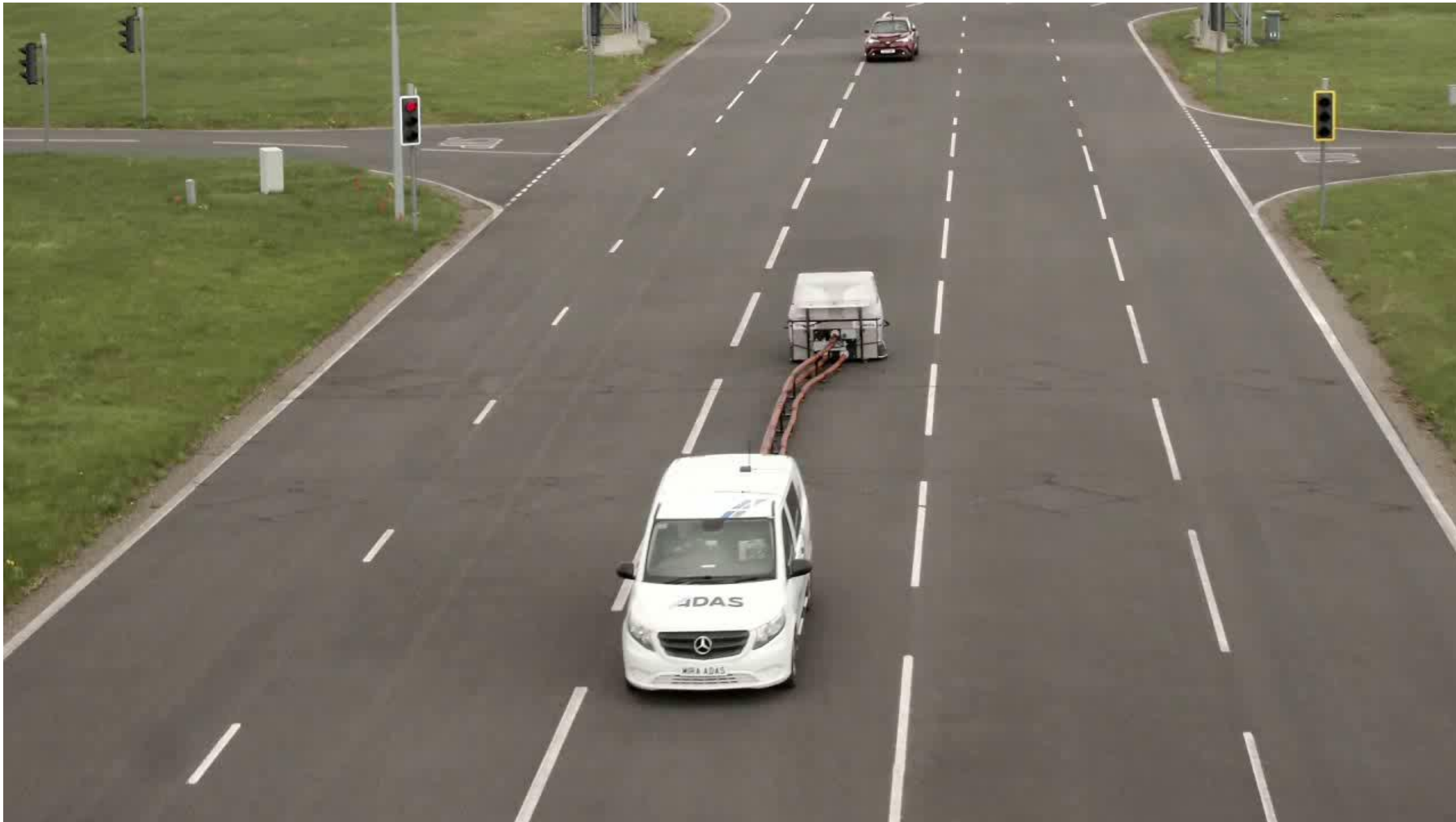


UK car parc fitted with front camera



Need For Calibration

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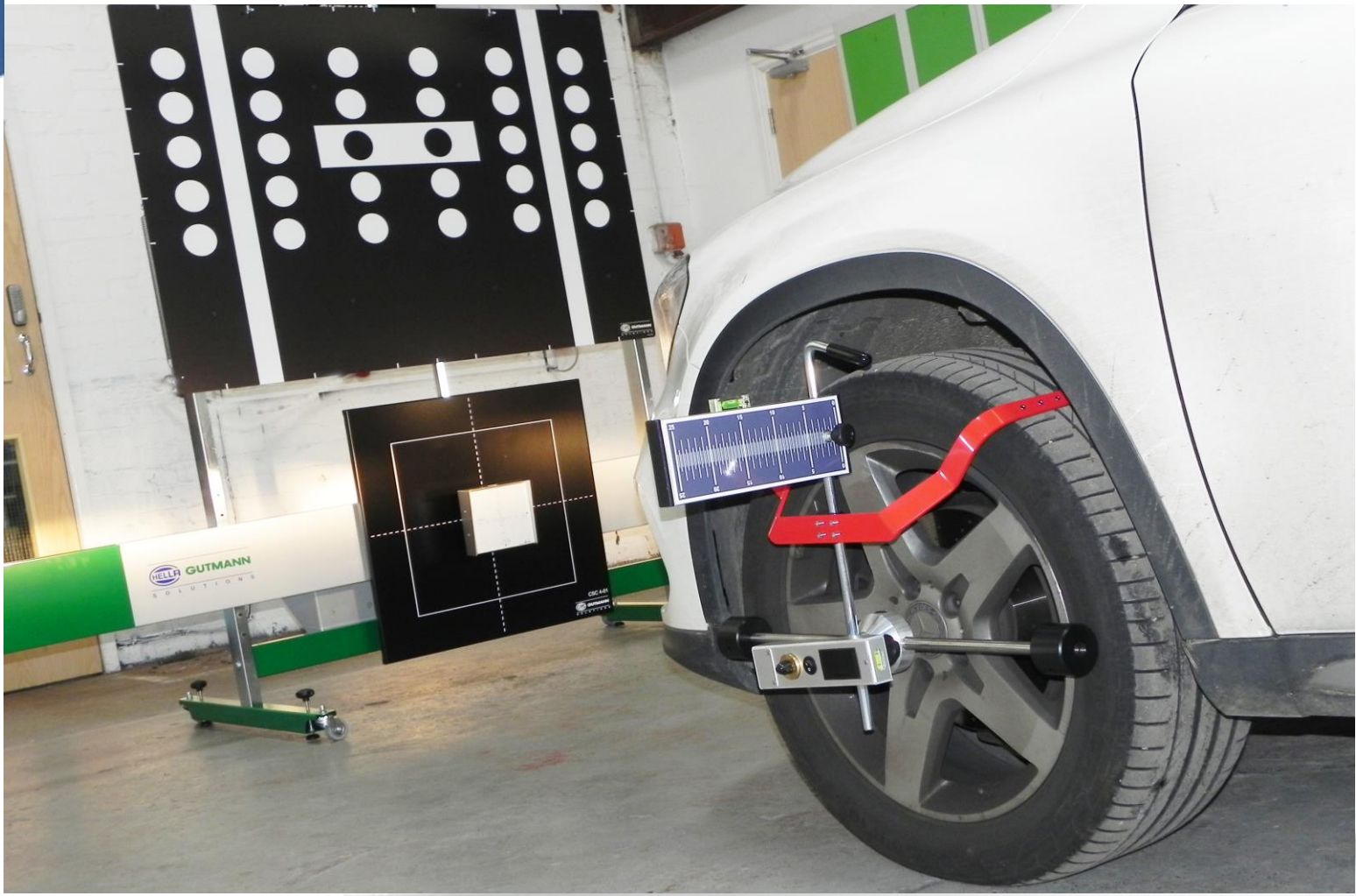
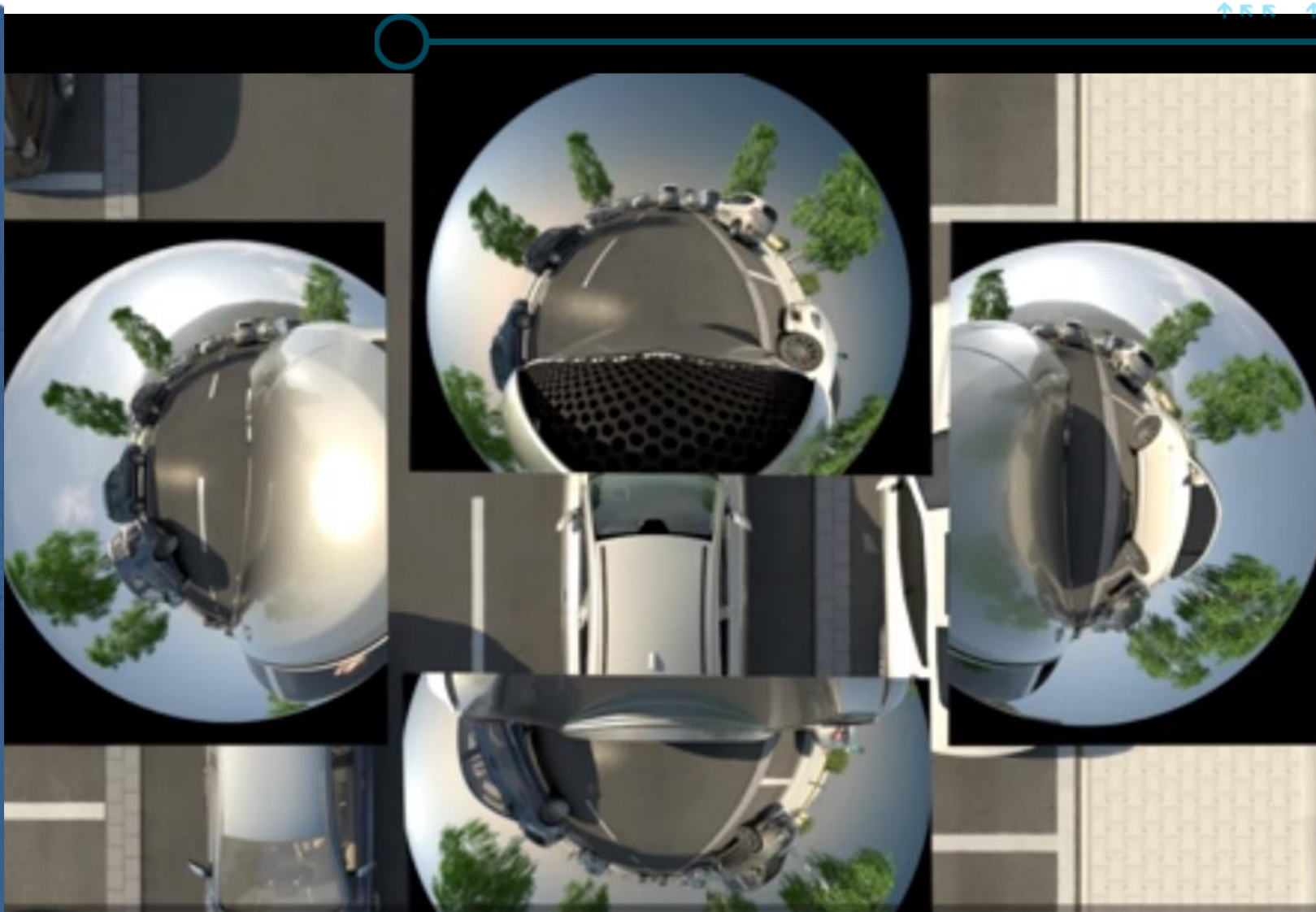
AEB

LKA

Camera calibration



Multiple sensor calibration



WARNING

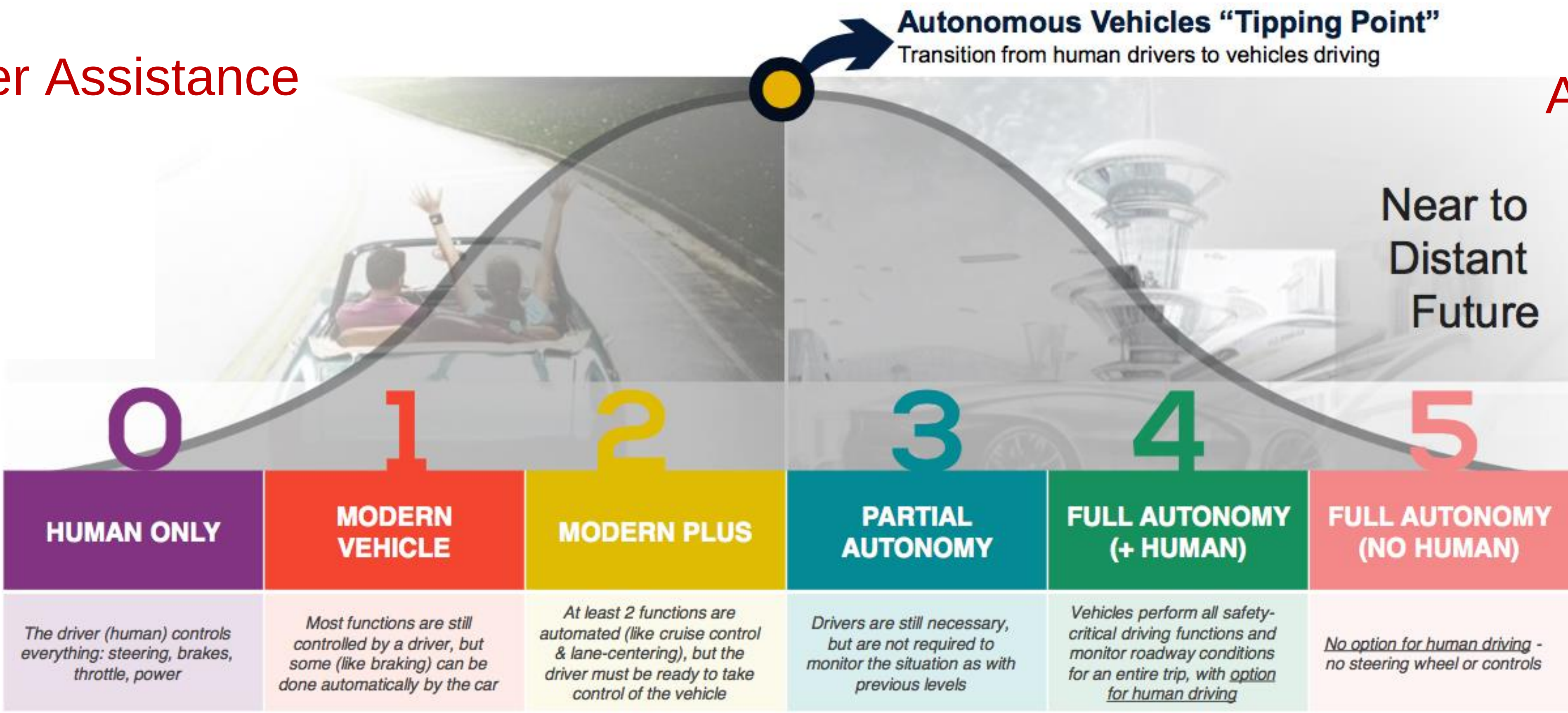
THE TESTS YOU ARE ABOUT TO WITNESS WERE PERFORMED
BY PROFESSIONAL STUNTMEN AND DRIVERS ON A CLOSED COURSE
IN A CONTROLLED ENVIRONMENT.

HYUNDAI INSISTS THAT YOU DO NOT, UNDER ANY CIRCUMSTANCES,
ATTEMPT ANY OF THE FOLLOWING TESTS.

Increasing vehicle complexity to make roads safer

Driver Assistance

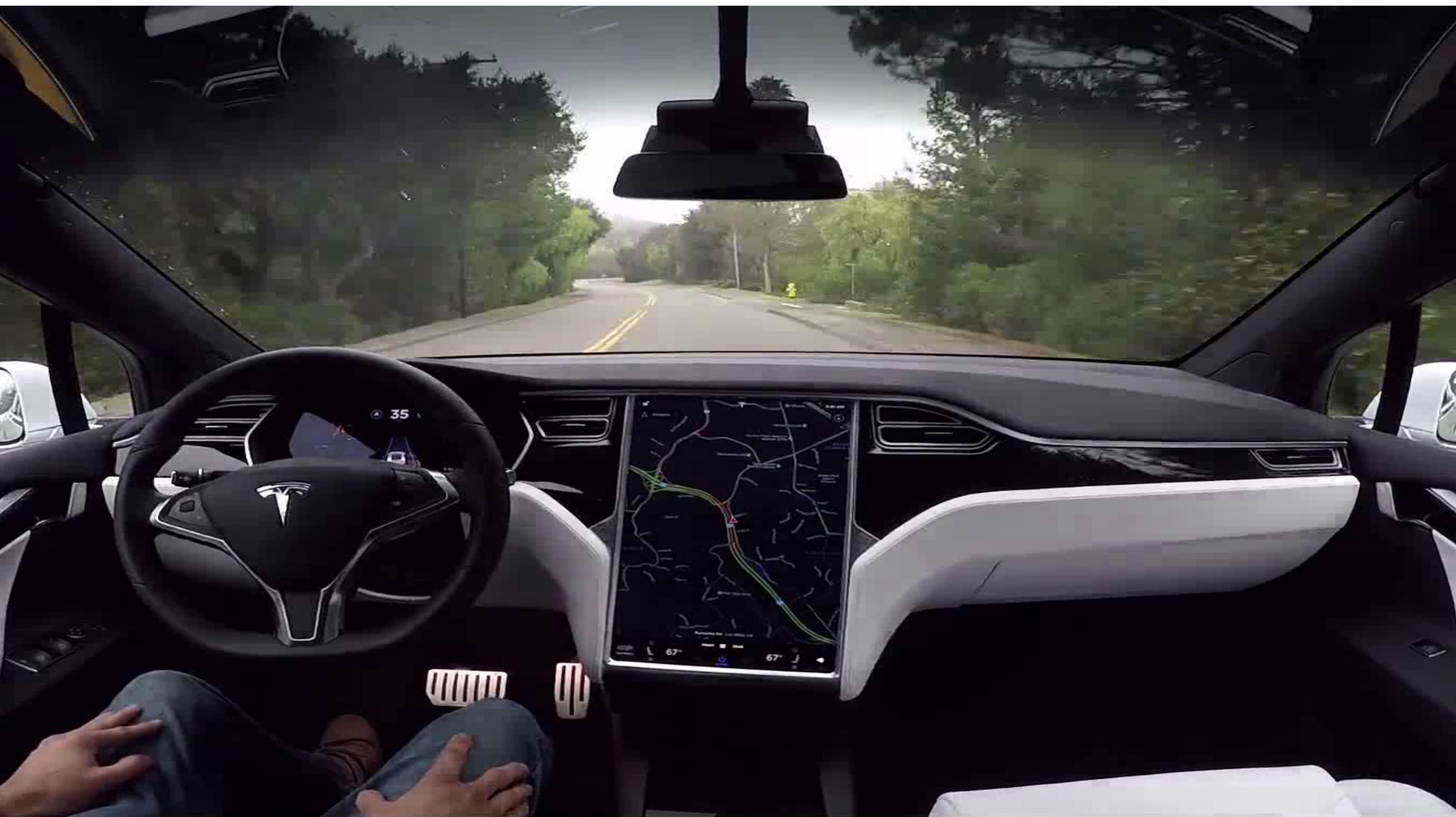
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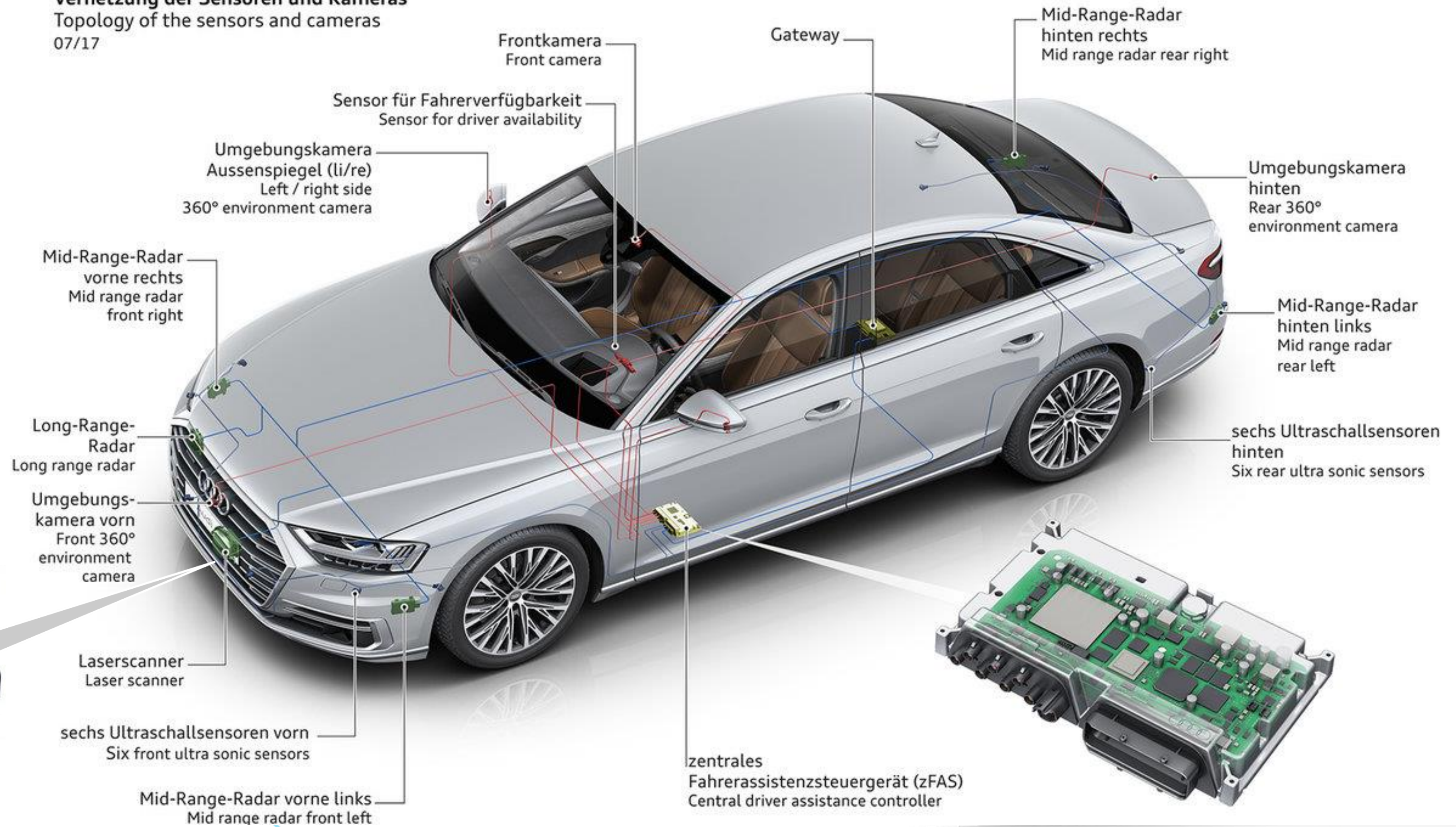
Legend for the main view:

- MOTION FLOW (Green dashed line)
- LANE LINES (Red solid line)
- LANE LINES (Purple solid line)
- ROAD FLOW (White vertical bars)
- IN-PATH OBJECTS (Green rectangle)
- ROAD LIGHTS (Yellow rectangle)
- OBJECTS (Blue rectangle)
- ROAD SIGNS (Purple rectangle)

Audi A8 2018

Audi A8

Vernetzung der Sensoren und Kameras
Topology of the sensors and cameras
07/17



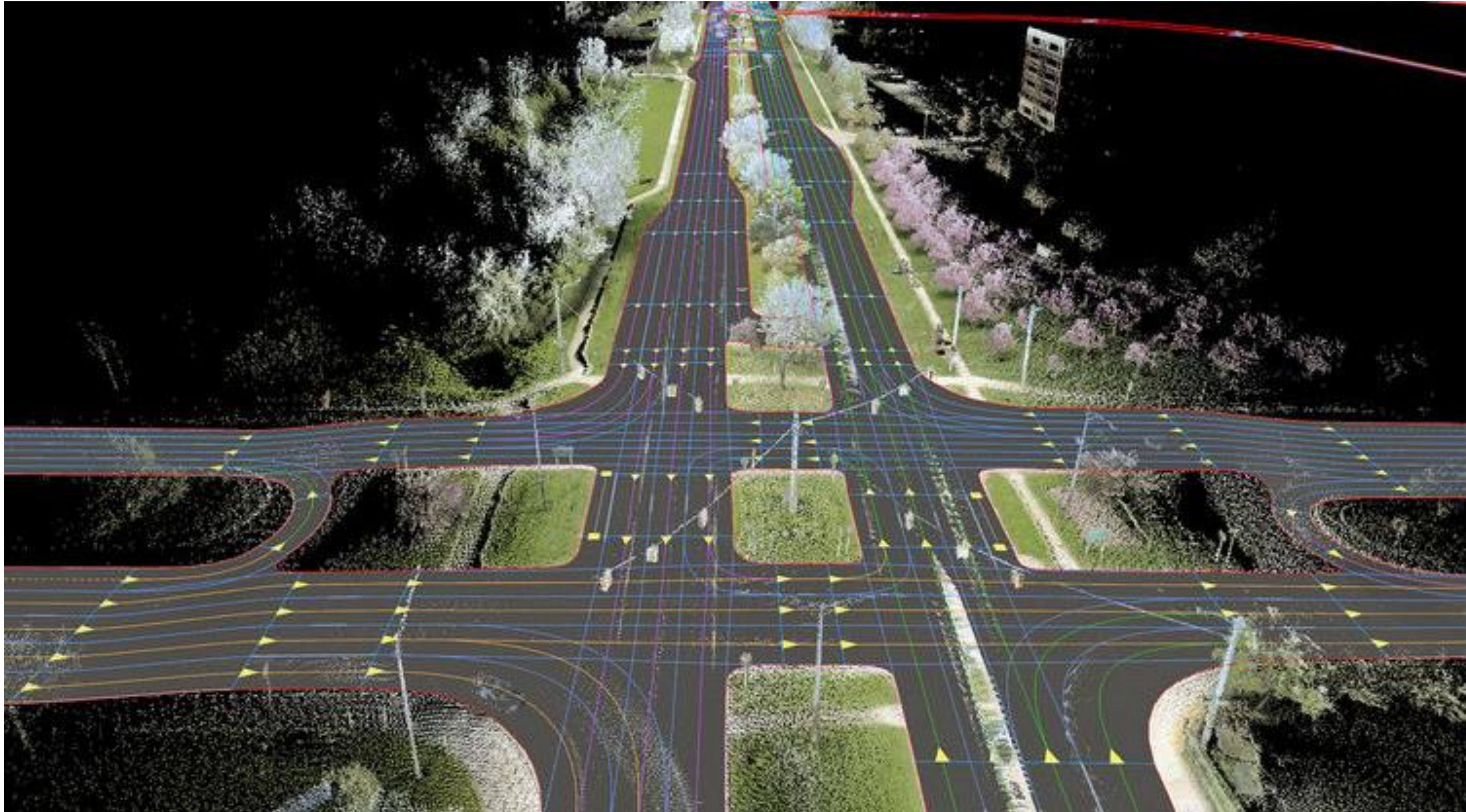
0110110101 → ↑ ↑ ↑ ↑



Machine learning



High definition maps



V2X – connected car

Vehicle-to-Pedestrian (V2P)



e.g. pedestrian in
walkway ahead

Vehicle-to-Network (V2N)



e.g. traffic queue five
kilometers ahead

Vehicle-to-Vehicle (V2V)



e.g. emergency
vehicle approaching



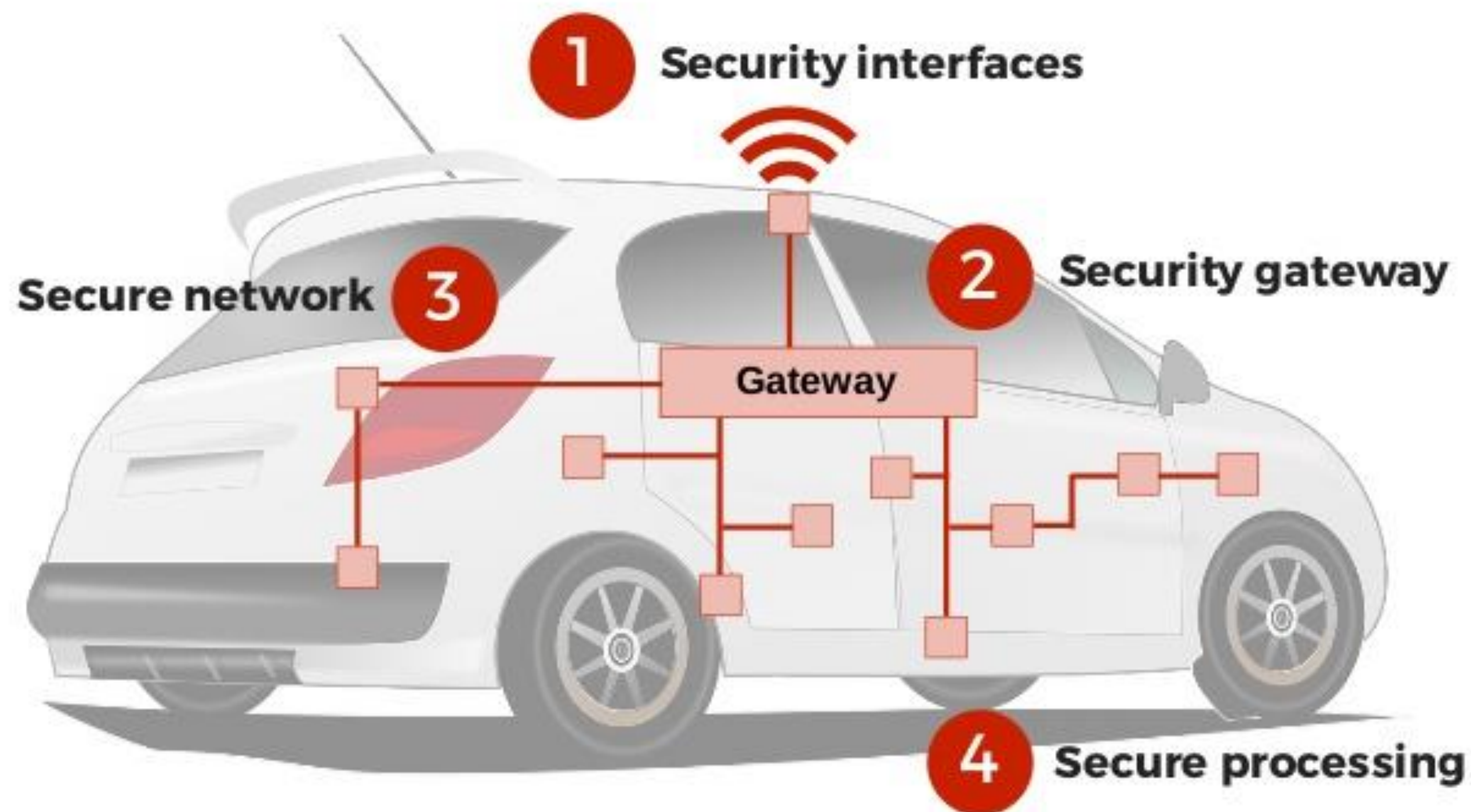
Vehicle-to-Infrastructure (V2I)



e.g. traffic signal ahead
turning red

The secure gateway

4-LAYER AUTOMOTIVE SECURITY FRAMEWORK

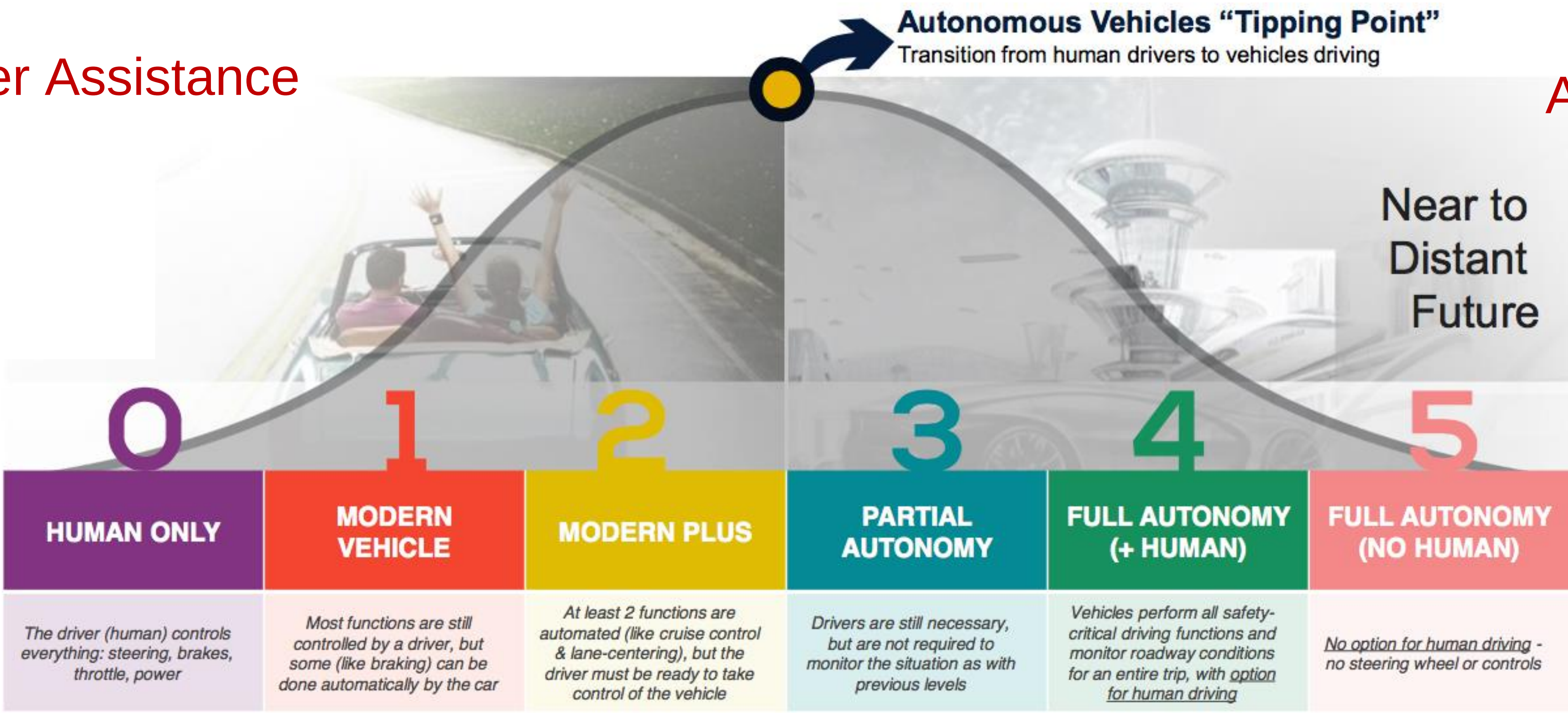




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Thank you

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