



Euro NCAP

and the New Era of Vehicle Safety
Assessment



Michiel van Ratingen

4 November 2025

About Euro NCAP

28



**Informing car
buyers since 1997**

16



**Supported by 16
public and private
organizations**

20%



**Covering 20% of
the global car
market**

1000+



**Over 1,000 car
ratings published**

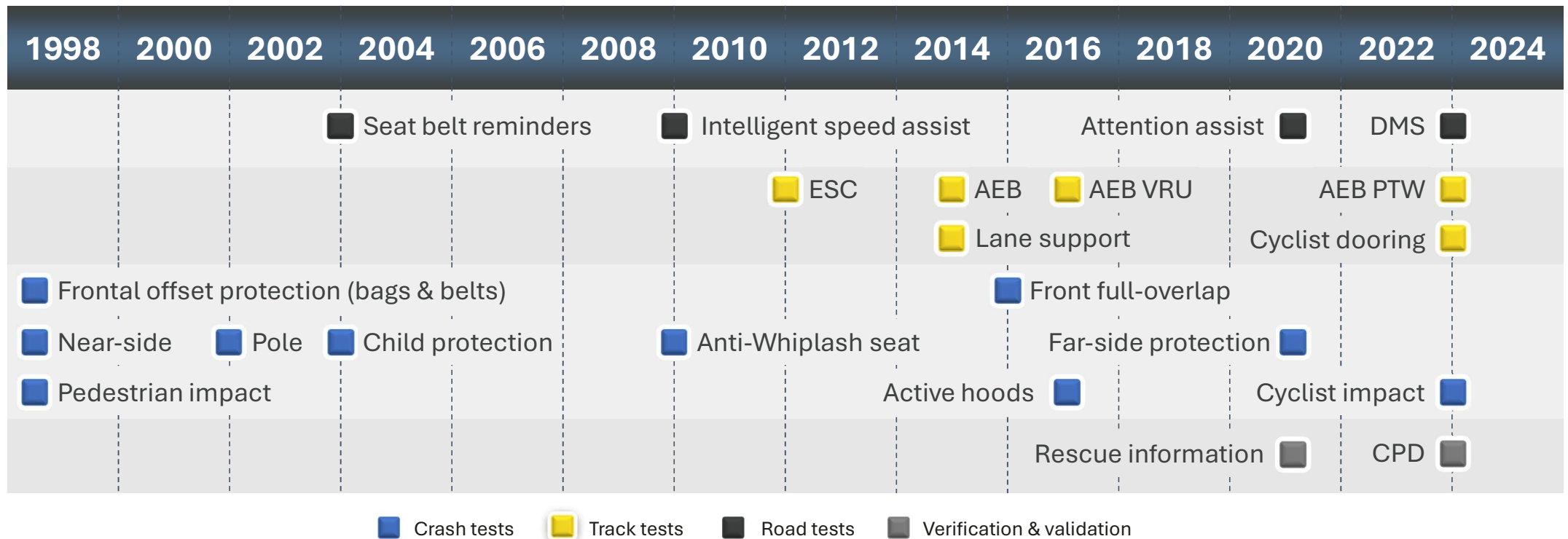
135K



**Helped save
estimated 135,000
lives**

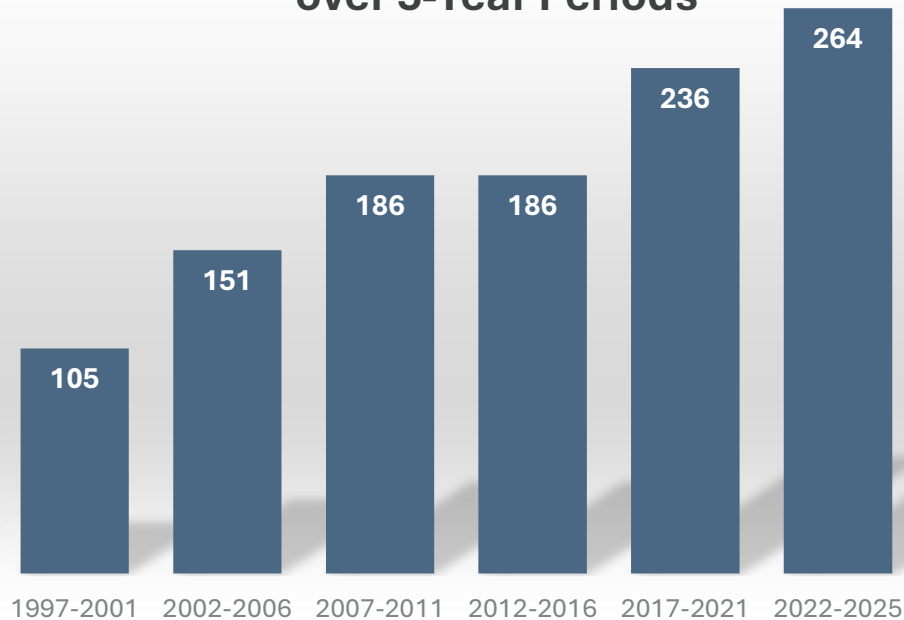
How Safety Ratings Drive Progress

Evolution of Euro NCAP “5-stars” safety tests



Informing Car Buyers

**Number of Ratings Published
over 5-Year Periods**



Valid ratings, 78%

Cars rated in the last six years, three out of four have received 5-stars

New car registrations in EU and UK, 3rd quarter of 2025

Expired ratings, 16%

Cars rated more than six years ago

New entrées, 4%

New cars, nominated for testing

Not rated, 2%

Cars never tested

Safety Democratised

Auto-braking, lane support & ISA



Load-limiting seatbelts, airbags & anti-whiplash head restraints



Energy absorption & body shell stability



Side curtain for head protection



Pedestrian-friendly front-end



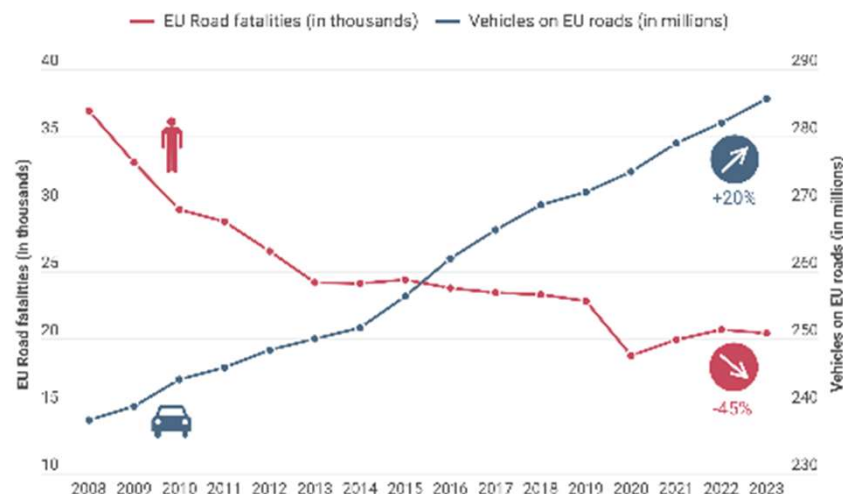
Rear seat belts & anchorages

Road Safety in the EU

European roads are among the safest

About 45% fatality reduction since 2008 but the rate of decline has been decreasing.

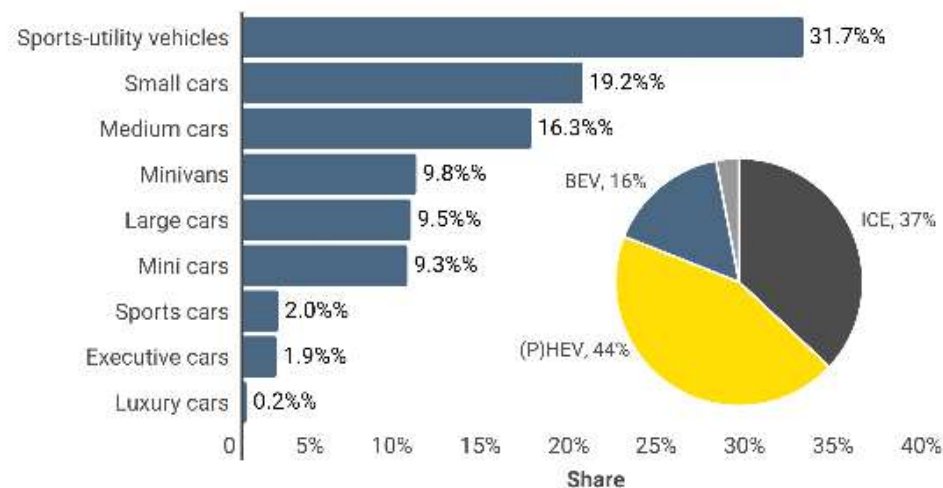
Almost half of casualties are vulnerable road users.



Market trends

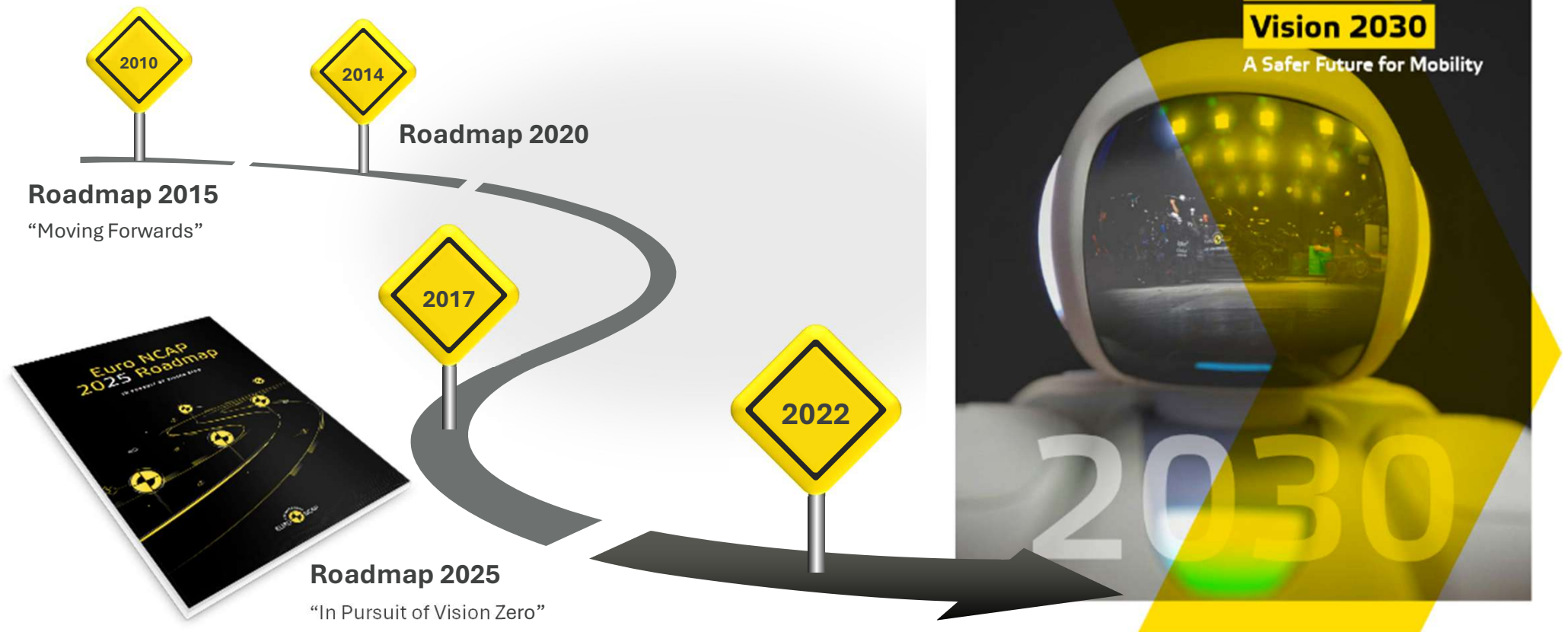
New car sales (13M), average car age (12.5 years).

Fleet is changing, SUV and BEV reached 32% and 16% market share, respectively: weight increase 150 kg.



© ACEA 2025

Euro NCAP Roadmap



Key Safety Priorities



Safe adoption of **Assisted and Automated driving** systems.

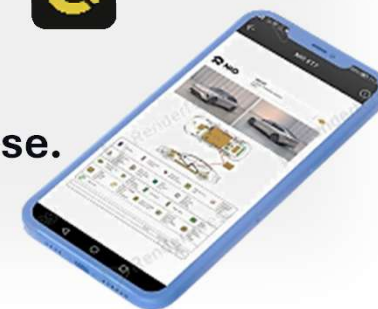
Robust and efficient **ADAS** preventing crashes with other **vehicles and VRUs**.



Improve **crash protection** for adults and children with greater focus on **population diversity**.



Rescue information and technology for safe and effective **emergency response**.



New Rating Approach

Covering 4 stages of a crash, allocating safety technology and tests to the relevant stages ...



Safe Driving

Focuses on technology support towards a safer driving experience, assessing systems like SBR, DMS and Speed Assistance.



Crash Avoidance

Addresses technology for preventing collisions through warnings or interventions, divided into Frontal Collisions, Lane Departure, and more.



Crash Protection

Evaluates traditional crash protection systems, covering Frontal and Side impacts, Whiplash protection and VRU crashes.



Post-crash Safety

Targets the crucial “golden hour” of emergency response with focus on Rescue information, Post-crash Intervention and Extrication.

Vision 2030 Rating Scheme

Safe Driving		Crash Avoidance		Crash Protection		Post-Crash	
Occupant Monitoring	30	Frontal Collisions	60	Frontal Impact	40	Rescue Information	40
Seatbelt usage	10	Car & PTW	40	Offset	20	Rescue Sheets	35
Occupant classification	10	Pedestrian & Cyclist	20	Full Width	10	Rescue Guide	5
Occupant presence	10			VT & Sled	10		
Driver Engagement	30	Lane Departure Collisions	20	Side Impact	35	Post-Crash Intervention	25
Driver Monitoring	25	Lane Departure	10	MDB	15	Advanced eCall	20
General Vehicle Controls	5	Car & PTW	10	Pole	10	Multi-collision Brake	5
Vehicle Assistance	40	Low Speed Collisions	20	Farside	10	Vehicle Extrication	35
Speed Assistance	20	Car & PTW	10	Rear Impact	5	Energy Management	20
ACC Performance	15	Pedestrian & Cyclist	10	VRU Impact	20	Occupant Extrication	15
Steering Assistance	5			Head impact	10		
				Pelvis & Leg impact	10		
Weight: 20	100	Weight: 20	100	Weight: 50	100	Weight: 10	100

Safe Driving

Occupant Monitoring

Checking who is in the vehicle

Intelligent **Seat Belt Reminders**, including seat occupancy and misuse detection

Occupant classification systems

- Airbag deactivation on front passenger seat
- "Stature classification" enabling adaptive restraints based on occupant's size, seating position, etc.

Child Presence Detection using direct in-cabin sensing, e.g. camera, infrared, mmWave radar, to detect vital signs



Driver Engagement



Test
B&B
Europe Asks Carmakers to Bring Back Physical Controls for 5 Star Safety on Road

Knowing the driver's state

Driver monitoring systems detecting and addressing driver distraction and phone use
Vehicle response to "non-transient states", fatigue, (micro)sleep & unresponsiveness

Preventing distraction by design

HMI evaluation of **general vehicle controls**

- Driving, Comfort & Infotainment

"Bring Back Buttons" campaign

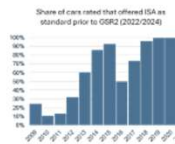
Vehicle Assistance

Enhancing driver safety and comfort

Speed Assistance performance over and beyond GSR2, including local hazard information by cloud and/or direct communication

ACC & Lane centering performance

- "Highway" scenarios: broken-down car, cut-in, cut out, PTW, etc.



On-Road Testing

Complementing track testing

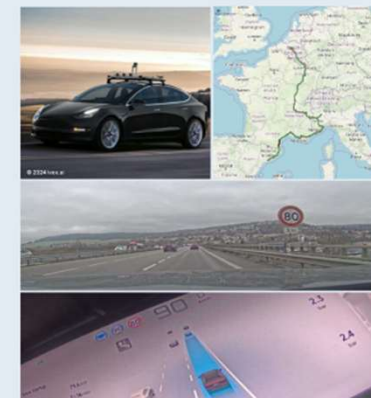
Evaluate vehicles in real driving conditions

Using ground truth sensors

External lidar, camera and in-cabin camera

First application

Speed Limit Information verification of 2,000 km in multiple European countries
Monitor driver acceptance of ADAS (LSS, ACC, etc.)



Occupant Monitoring

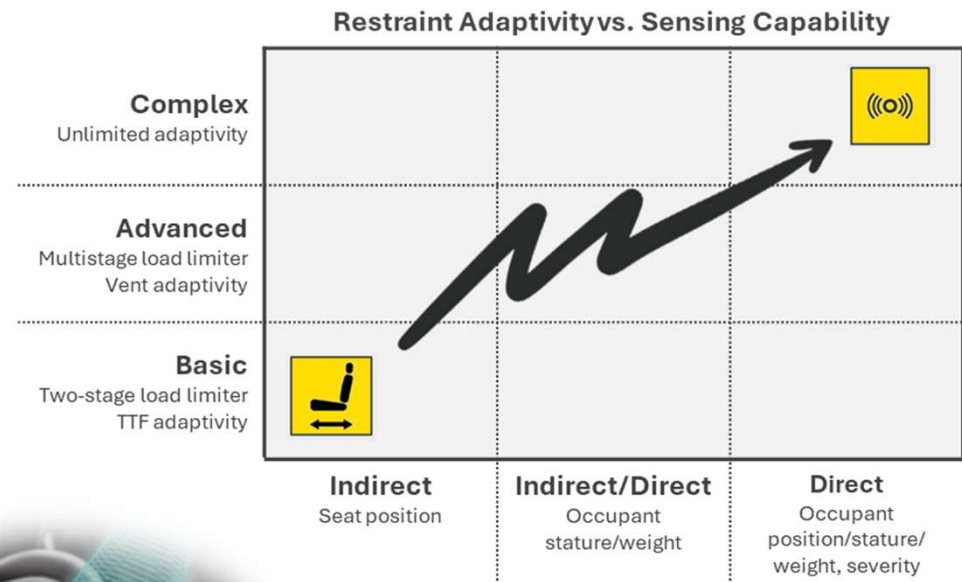
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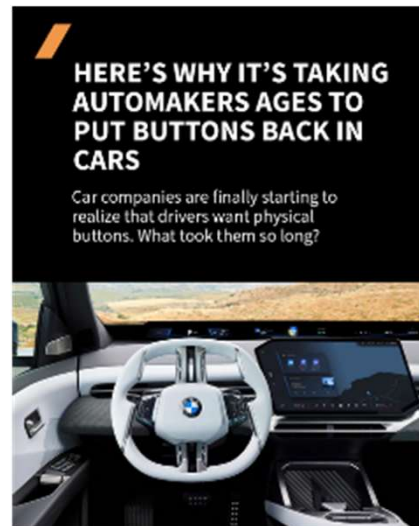
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Driver Engagement



Tech
DAD

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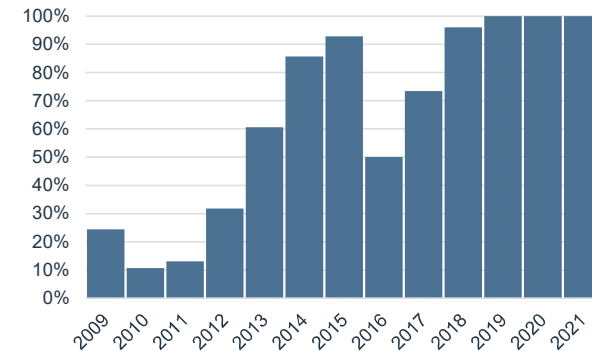
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Share of cars rated that offered ISA as standard prior to GSR2 (2022/2024)



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Complementing track testing

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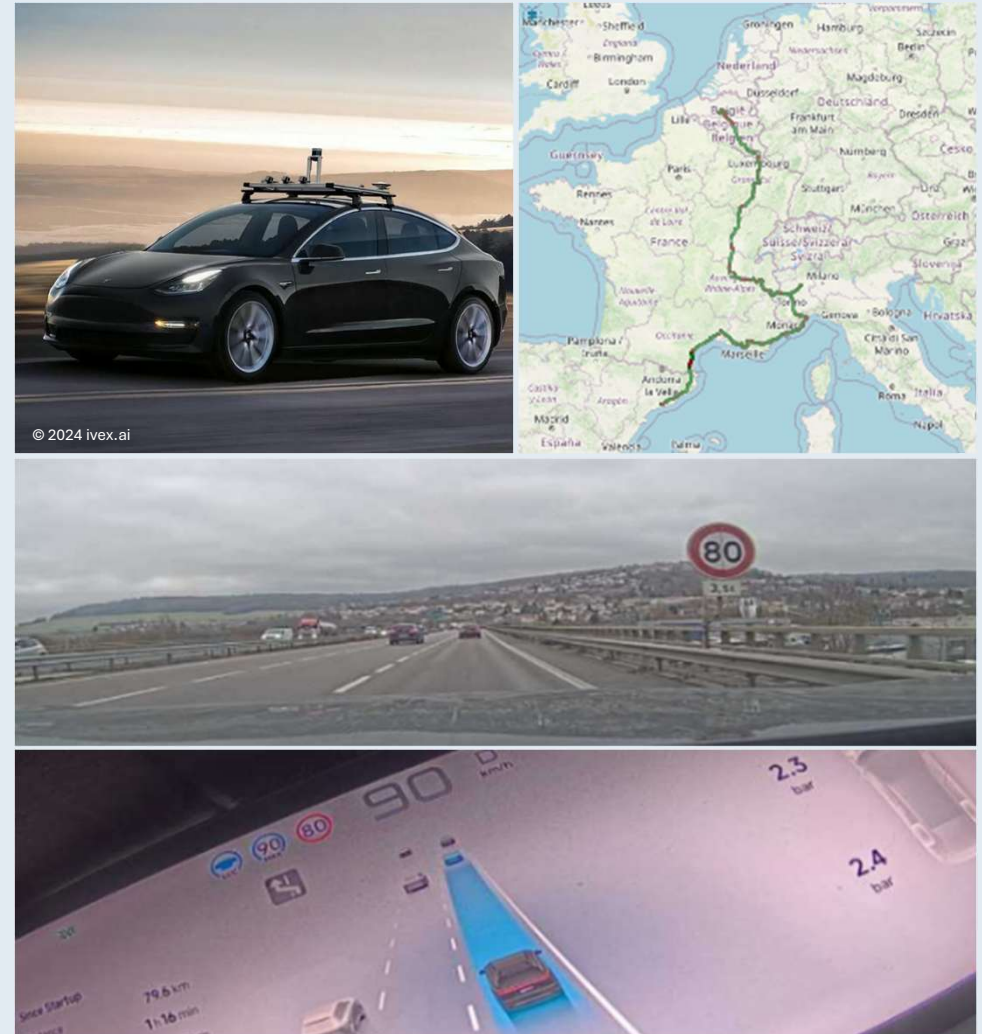
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Crash Avoidance

Frontal Collisions

Standard test scenarios

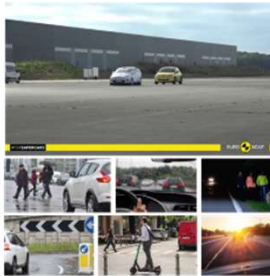
AEB/AES test scenarios involving car, PTW, cyclist and pedestrians, at different speed, overlap, day/night, ...

OEM provides predictions, NCAP verifies

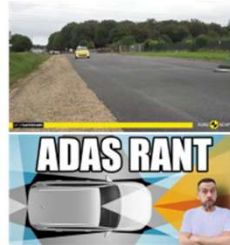
Robustness test scenarios

Algorithm verification: explores "extended scenarios" such as narrow overlap, where degraded performance is tolerated

Perception verification: validates the effect of clutter, weather, appearance, based on FOT/road drive (OEM self-declaration)



Lane Departure Collisions



Testing road edge, oncoming & overtaking scenarios

Single vehicle **lane departure** & ELK tests involving car and PTW

Standard and robustness (algorithm and perception) scenarios

Driver acceptance

Check "drivability" on track, e.g., overriding torque <3 Nm

Link to DMS (sensitivity based on driver attentiveness)

Low Speed Collisions

Crashes occurring at low speed but with potentially fatal outcome

Includes new start-from-stop, crossing and turning scenarios for cars and PTW

Crashes occurring at low speed involving pedestrians and cyclists ...

- Forwards (pedal error)
- Reverse manoeuvring (backover)
- Cyclist crossing
- Cyclist dooring (stationary vehicle)



Virtual Testing ADAS

Why virtual testing?

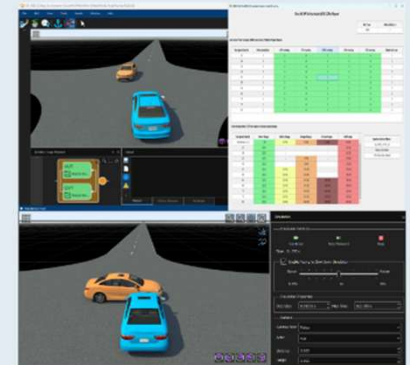
Number of potential test scenarios has grown exponentially – expensive and time-consuming

Especially "corner cases" are prone to damage to test vehicle and/or equipment

VTA procedure

OEM in-house simulations with validated high-fidelity vehicle dynamics model

Used to provide predictions for AEB and LSS assessment (verified by Euro NCAP)



Frontal Collisions

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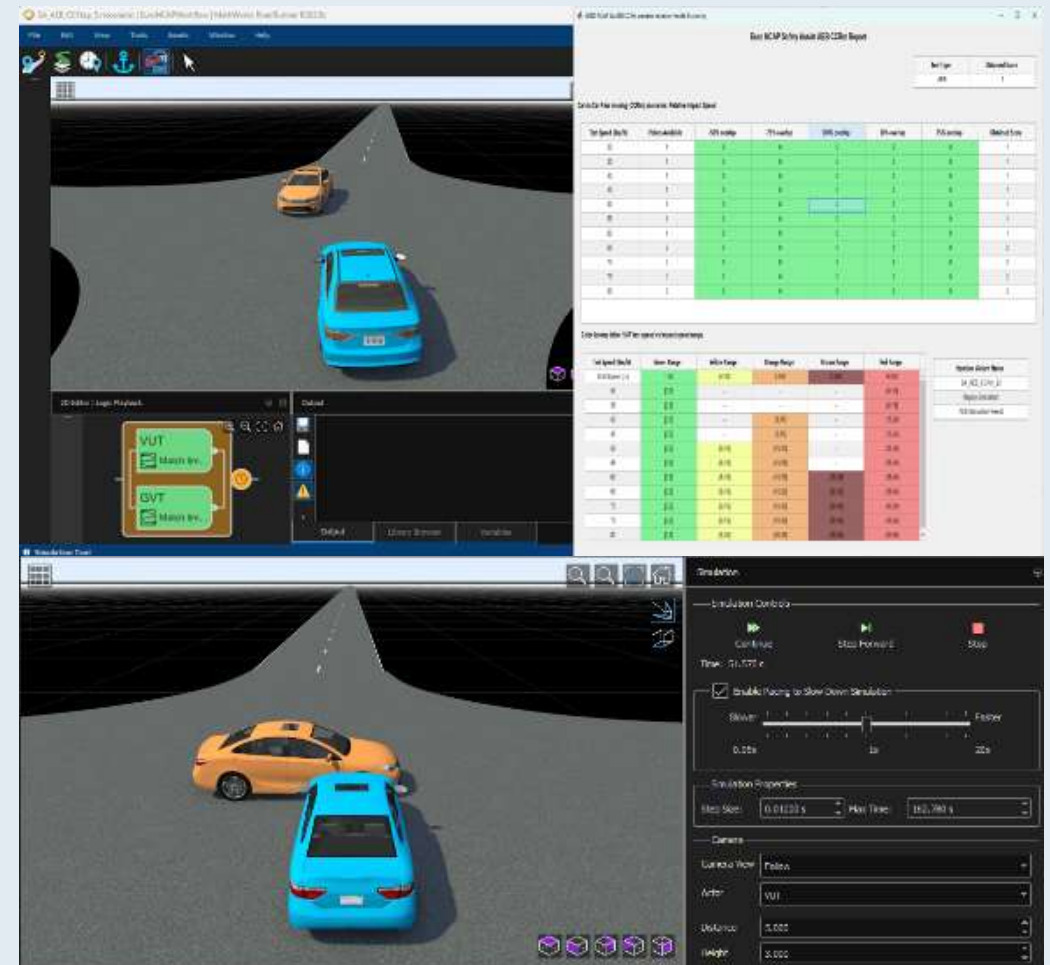
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© MathWorks Automated Driving Toolbox

Crash Protection

Frontal & Side Impact

"Equity in Safety" assessment: protection of adults and children



- Injury risk assessment
- Front and side impact
- Adult and child ATDs



- Injury risk assessment & vehicle interior model validation
- Load case variations
- Adult ATDs



- Injury risk assessment
- Load case variations
- Adult CAE models (ATD, HBM)

Rear Impact

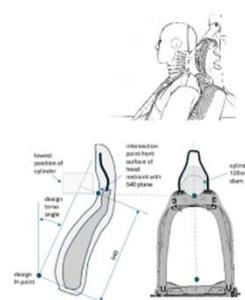
Rear protection is assessed through sled tests and static measurements

Promoting well-designed head restraints and seats to reduce the risk of **whiplash neck injury**
Applies to front and rear (static only) passengers

New requirement

Test method and evaluation criteria are unchanged, except for a new "seat structure" assessment

- Improving head support for smaller occupants



VRU Impact

Sub-system tests

Evaluate vehicle's **front-end design** and its ability to reduce injury risk to pedestrians and cyclists

Headforms, upper leg and lower leg (aPLI)



Incentive for A-pillar protection

Severe **head injuries** are increasingly caused by impacts with A-pillar
Additional reward to promote countermeasures and better protection

A-Pillar scoring example

Example	20 km/h	30 km/h	40 km/h	Score
A	1400 < 1500	1400 < 1700		1.00
B	1400 < 1700	1400 < 1700		2.00
C		1400 < 1700		3.00
D	Default red: 1400 < 1700			0.00
E	Default red: 1400 < 1700			0.00
F	Default red: 1400 < 1700			0.00
Total				6.00

Virtual Testing Crashworthiness

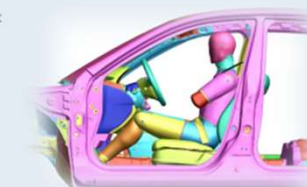
VTC procedure

Already applied to Farside assessment since 2023

VTC server offers automation of data upload, quality and validation checks

Application to frontal impact

H-III family model certification environments
Quality & validation criteria



© 2024, Daimler AG, Daimler AG

Frontal & Side Impact

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Frontal & Side Impact

“Equity in Safety” assessment: protection of adults and children

		Frontal Impact	Side Impact
Baseline	Full-scale (Euro NCAP)	Moderate off-set, medium speed (50 kph) MPDB; THOR-50M driver and HIII-5F front passenger. Q6, Q10 on rear seat: Vehicle Based Assessment prerequisites. Full-width rigid, low speed (35 kph) HIII-5F driver and rear passenger, THOR-50M driver front passenger, elderly IRF, full-width deformable barrier (TB042)	Perpendicular barrier (60 kph) AE-MDB; WS50M driver. Q6, Q10 on rear seat: Vehicle Based Assessment prerequisites. Oblique side pole (32 kph) WS50M driver (and front passenger for cars equipped with center airbag). New rollover requirements: sensing and standing airbag
	HW Sled (VM in-house)	BIW tests (50, 56 kph) HIII-50M, 5F and 95M driver/front passenger, OEM R137 (or generic) pulses Knee-mapping test	BIW Farside tests (60, 32 kph) WS50M driver, AEMDB and Oblique Pole pulses, 75deg
Robustness	CAE Sled (VM in-house)	VTC simulations (35, 50, 65 kph) HIII-50M, 5F and 95M driver/front passenger ATD models, FWDB, OEM R137 (or generic) pulses, seating variations. (HBM 50M monitoring)	VTC Farside simulations (60, 32 kph) WS50M driver, AEMDB (60°, 75°, 90°) and Oblique Pole (75°, 90°) pulses, seating height variations

Virtual Testing Crashworthiness

VTC procedure

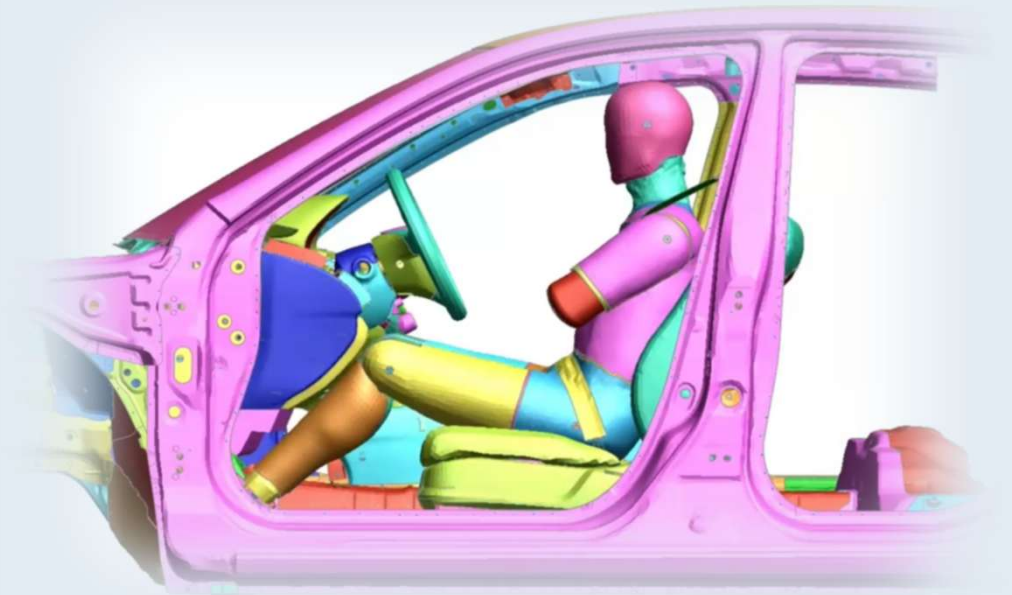
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Quality & validation criteria



HBM Monitoring

Gaining experience with HBM occupant simulations

HBM Qualification Requirements (CP550)

Ergonomic HBM positioning

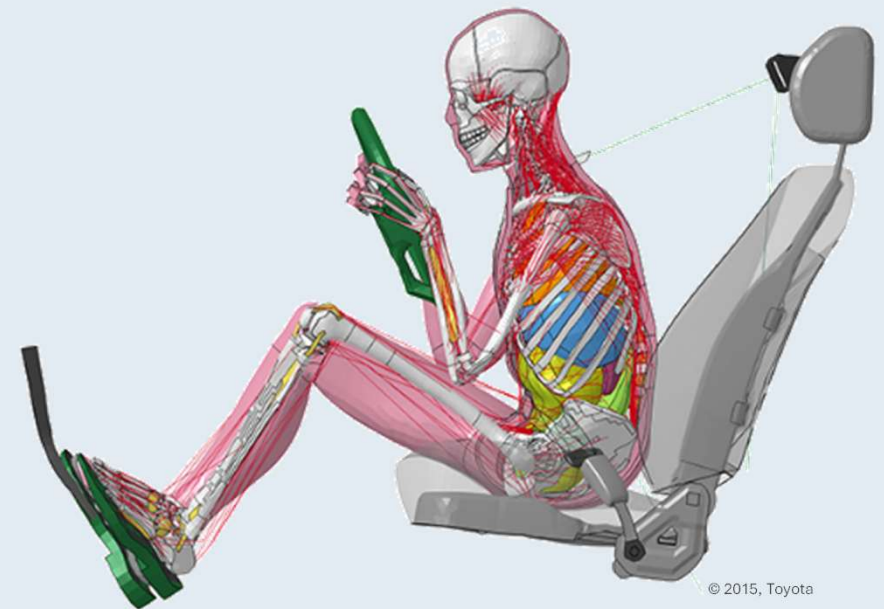
Quality criteria for simulation setup, such as max. Hourglass Energy, mass added, etc.

Collecting kinematic data, reaction forces and rib strains

Four HBM frontal impact use cases

- Variation in seating positions and D-Ring position

No injury assessment / scoring



Rear Impact

Rear protection is assessed through sled tests and static measurements

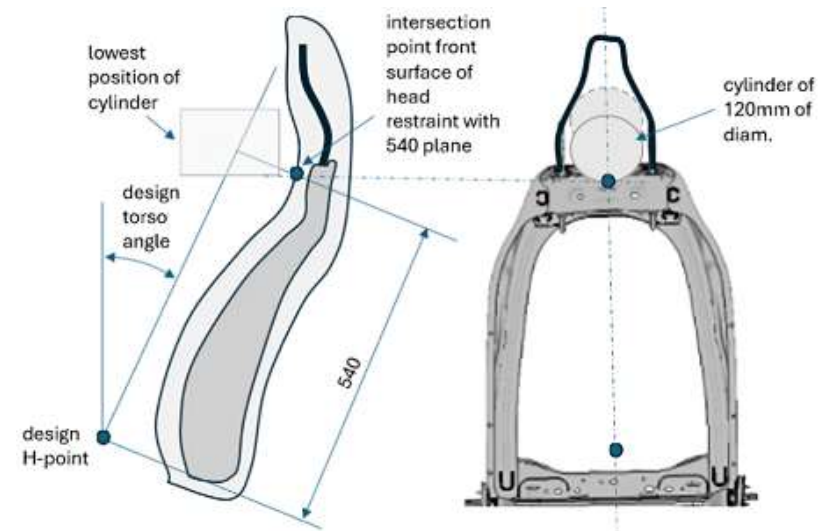
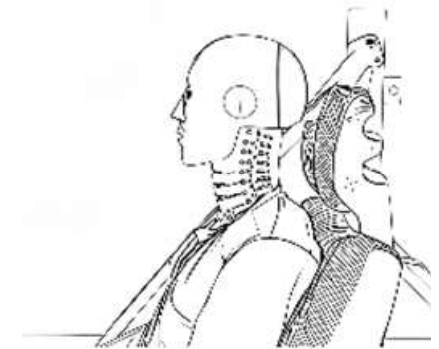
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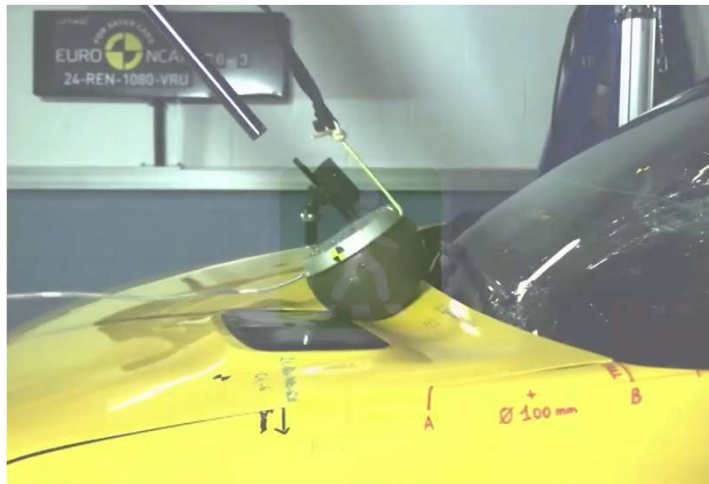


VRU Impact

Sub-system tests

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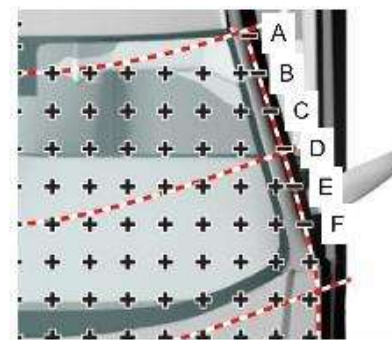


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Additional reward to promote countermeasures and better protection

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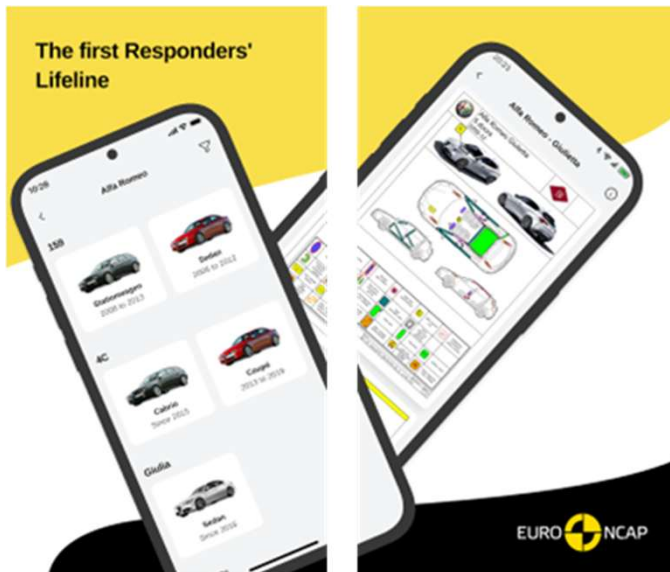


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Post-Crash Safety

Rescue Information

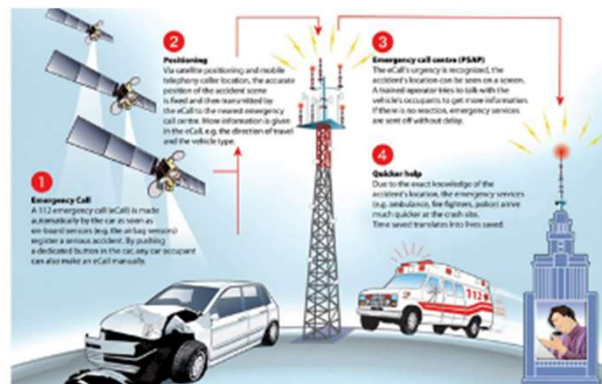
ISO 17840 compliant **Rescue sheet** and **Emergency Response Guide**



Post-Crash Intervention

Advanced e-Call: 112 eCall MSD including optional parameters and TPS eCall

Multi-collision brake and automatic **hazard warning lights** activation



Vehicle Extrication

Energy management: energy source deactivation, marking and thermal runaway prevention

Occupant extrication (post-crash belts, doors & tailgate opening and submergence)



2026 Passenger Car Safety Rating Scheme

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Weight: 20	100	Weight: 20	100	Weight: 50	100	Weight: 10	100

Reflections

New era of vehicle assessment

Safety technology's growing complexity and integration — transformational changes in the rating system, offering more structure, clarity, and flexibility

Focus on robustness

Higher complexity and shorter car development times can compromise quality

Engineering flaws, sub-optimization and insufficient real-world testing

User acceptance and ADAS effectiveness

Provide information to inform the driver of risky situations, issue warnings only in relevant cases to avoid annoyance, and ensure interventions occur with no false positives

Understanding the impact of new technology

Old problems, new challenges

Outlook

Euro NCAP started working on the rating revision for 2029 ...



Safe Driving

- “Vision” (direct vision, lighting, V2X);
- Sensing of impaired driving, using on-road & synthetic data;
- Automated Driving functions.



Crash Avoidance

- Enhance robustness verification using on-road evaluation;
- Consumer acceptance;
- Scrap & build, V2X integration.



Crash Protection

- THOR-5F and revised MPDB;
- HBMs for restraint robustness evaluation and VRU protection;
- Female Whiplash injury risk.



Post-crash Safety

- Euro RESCUE link to license plate;
- Advanced notification by V2X;
- Energy management criteria, e.g. easy & fast disabling (HV, SRS, 48V).

About Euro NCAP

Euro NCAP provides consumers with an independent assessment of the safety level of the most popular cars sold in Europe.

Euro NCAP is a catalyst for encouraging significant safety improvements to new car design. We hope that when buying a new car **Euro NCAP** will help you choose for safety.



CONTACT US

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Thank You for Listening



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