



JAMA-CLEPA
BUSINESS SUMMIT

JAMA-CLEPA Business Summit

Venice, 27 & 28 October 2016

*European automotive suppliers meet
Japanese vehicle manufacturers*



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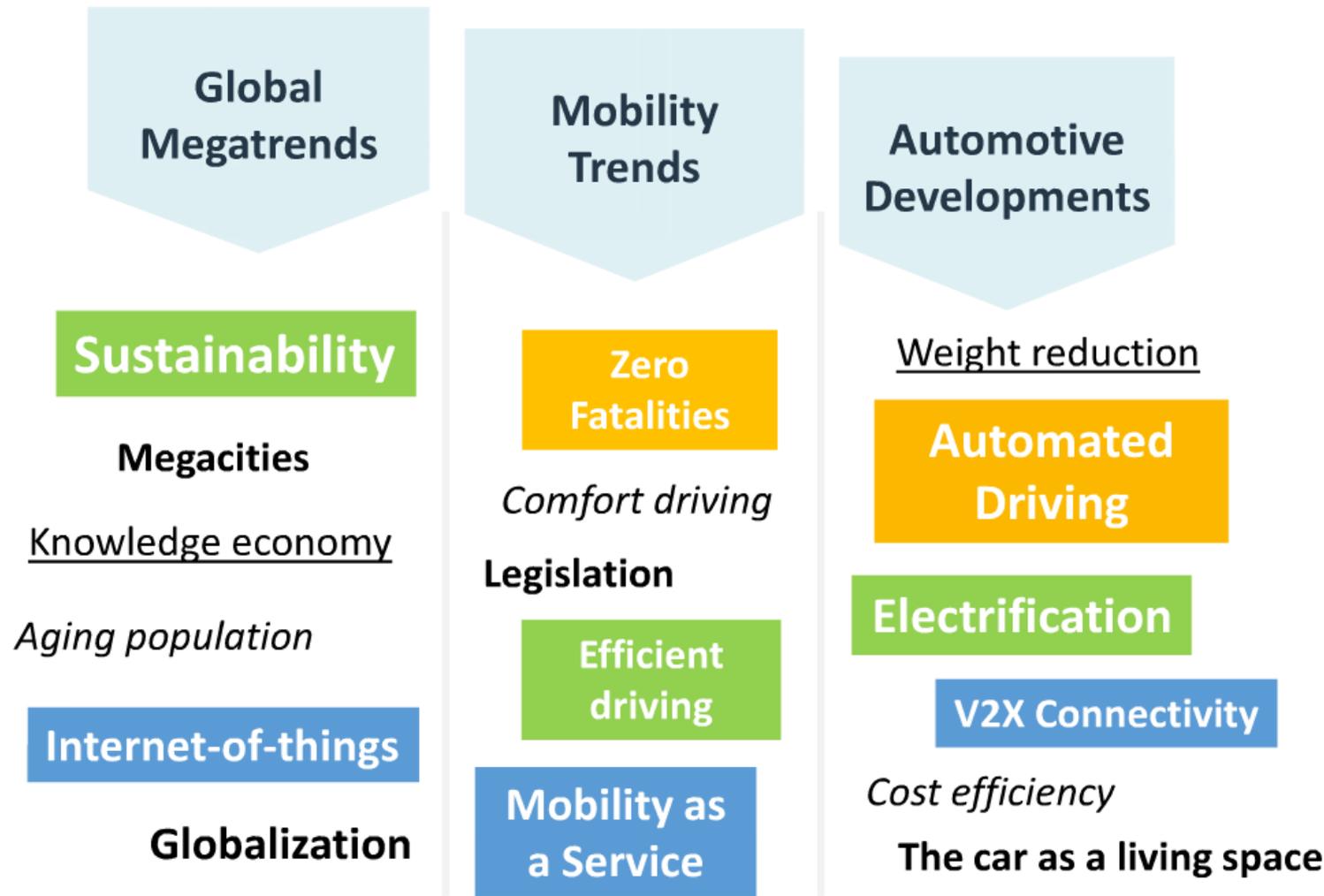
Safe driving

*Joaquim Huguet,
Body & Passive Safety Director
Applus IDIADA*

*European automotive suppliers meet
Japanese vehicle manufacturers*

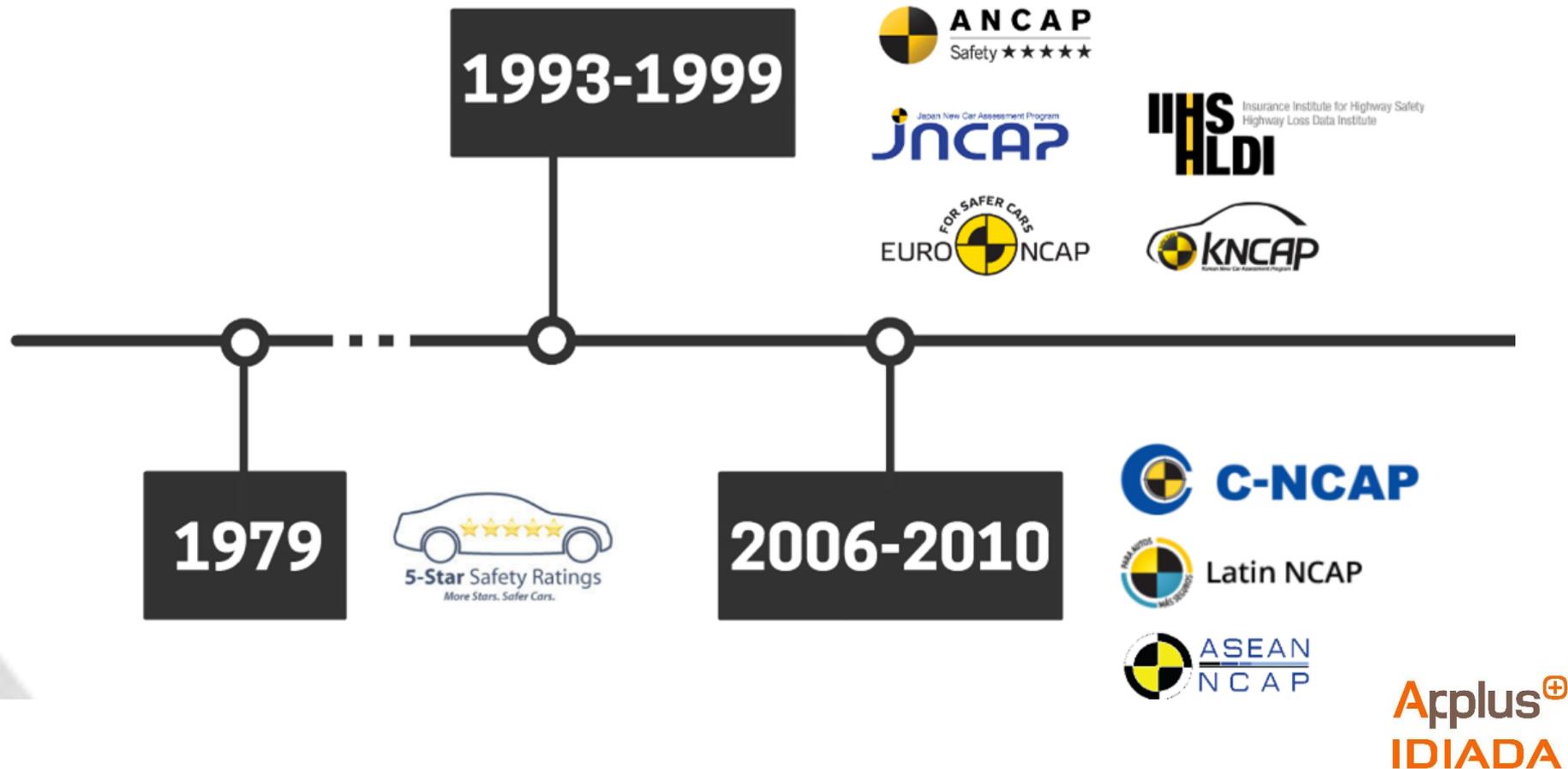
Source: 2016 Bertil Aldman Memorial Lecutre, Michiel Van Rattinger

Megatrends



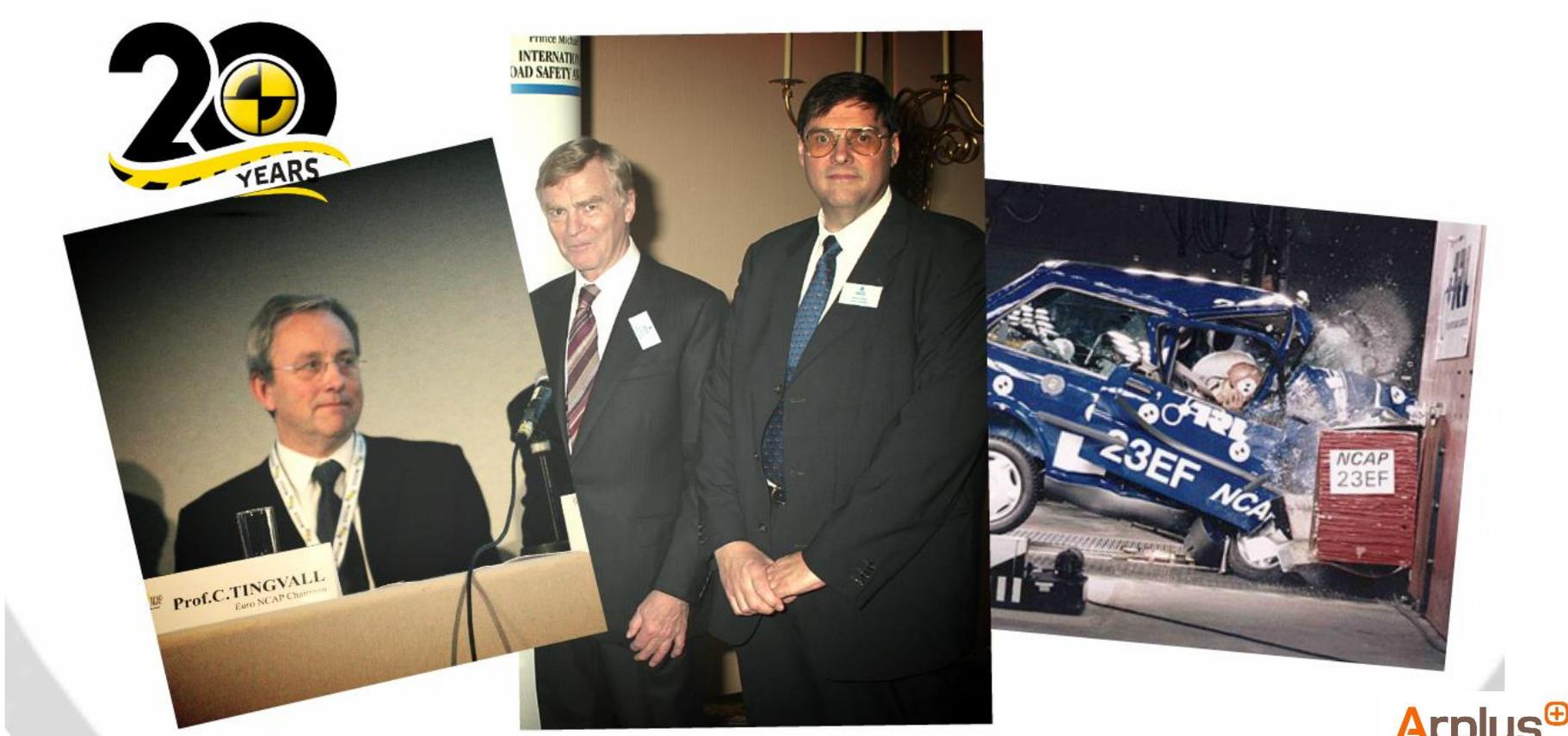
Vehicle Safety Driven by Consumer Safety Ratings

NHTSA started NCAP in 1979 – in the nineties the concept exploded onto the global scene



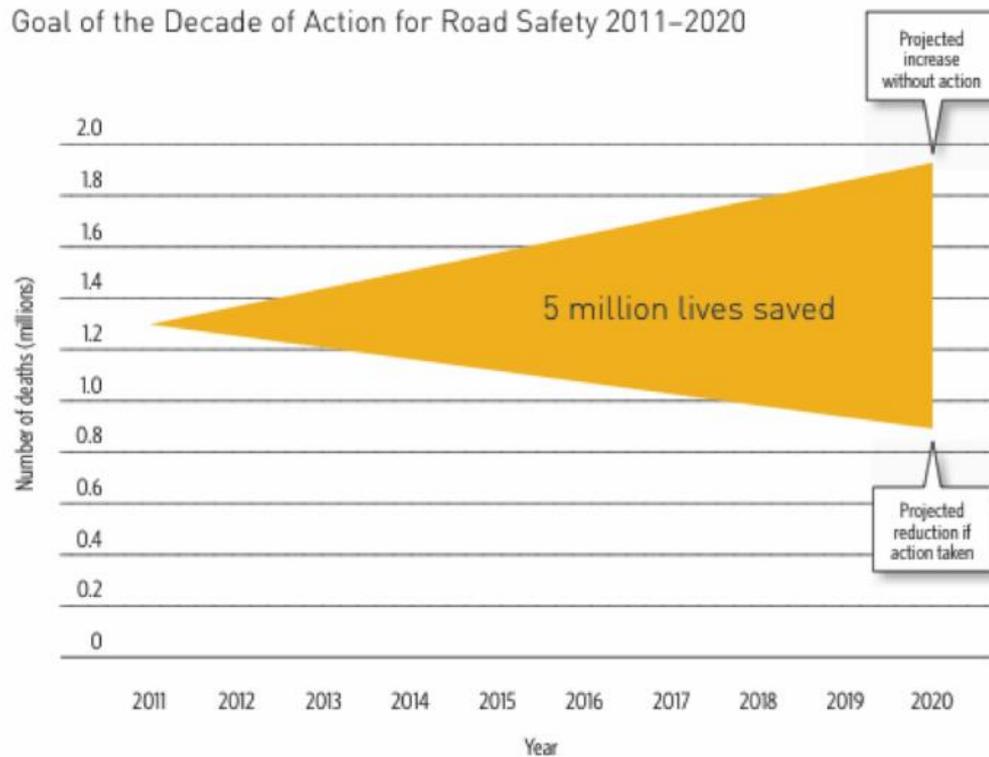
Euro NCAP

DfT, FIA and SRA were instrumental in setting up Euro NCAP – today a consortium of 12 members and 8 test facilities



Decade of Action

Safer vehicles have a star role in the Decade Action for Road Safety



SAVING
MILLIONS
OF LIVES



World Health
Organization

Applus⁺
IDIADA

Democratizing Safety

Global Passenger Car Production



Source: Democratizing car safety: roadmap for safer cars 2020 (Global NCAP, 2015)

Road Deaths per 100,000 Population



Front and side impact crash tests still form the backbone of most rating programs today – but priorities are changing

Emerging Themes – Narrow Overlap

IIHS Small Overlap Impact

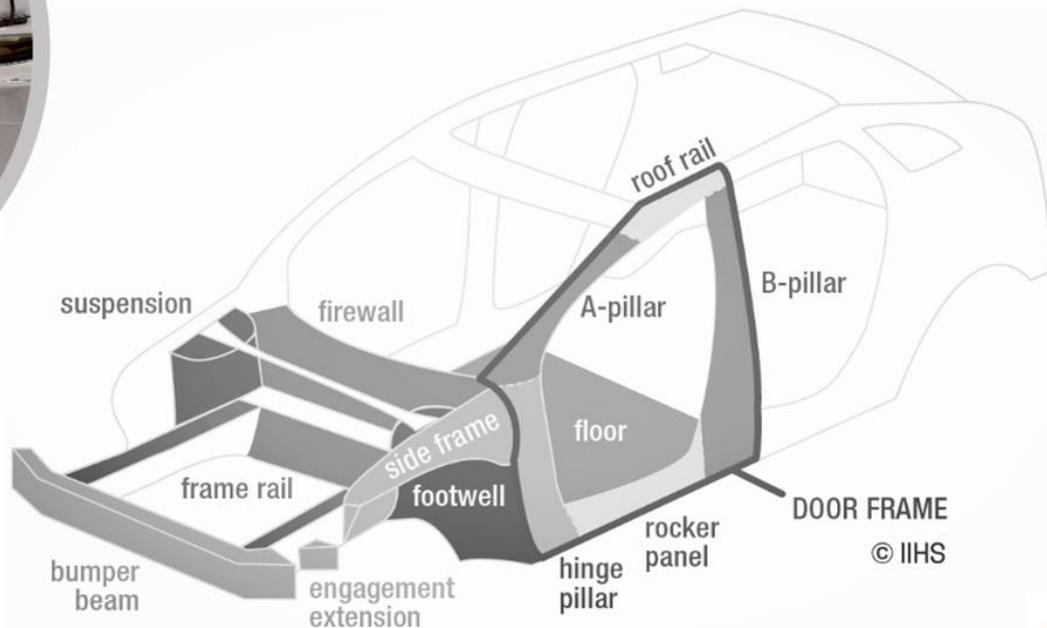


Emerging Themes – Narrow Overlap

IIHS Small Overlap Impact



Areas modified for small overlap performance in the SOI test



Emerging Themes – Narrow Overlap

US NCAP Oblique MDB impact

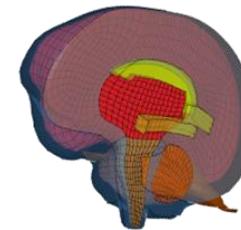


Moving barrier: 2486 kg. RMDB, 90km/h, 15 degrees and 35% moderate overlap. Stationary vehicle under test

Emerging Themes – Narrow Overlap

Advanced Frontal Impact dummy THOR

THOR offers human-like characteristics in crash and state-of-the-art measurement capability



New and refined injury criteria, e.g. Brain Injury Criterion (BrIC)

Emerging Themes – Front Compatibility



Moving barrier: 140 kg, PDB face; 50 km/h; 0 degrees and 50% overlap. Vehicle speed: 50 km/h. THOR-50M, Q10 and Q6

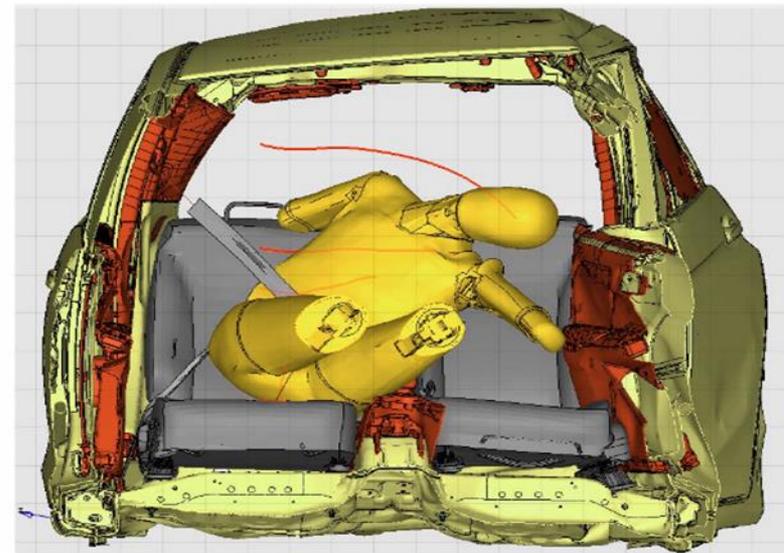
Emerging Themes – Far Side Crash

About a third of killed or seriously injured occupants in side impact are involved in far side crashes

Cooperative Accident Study (2016)



Reducing head and thorax injuries by keeping the occupant in place and avoiding hard contact with the far side of the vehicle.

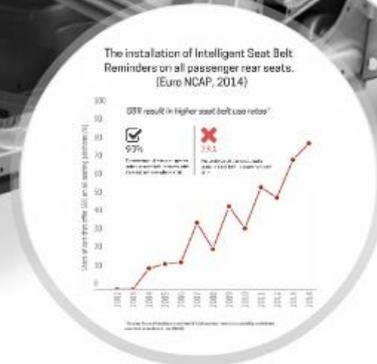
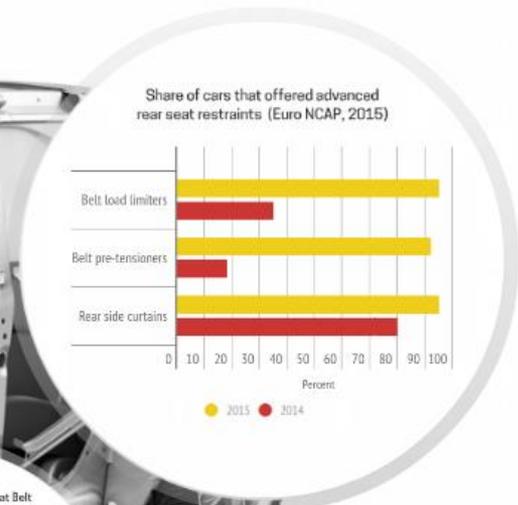
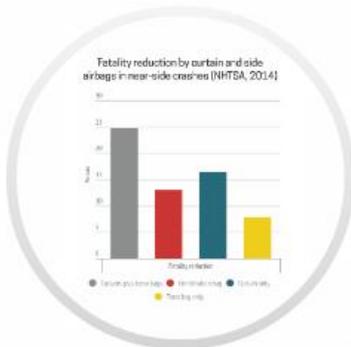


Investigations into a Far-Side Impact Sled (FSIS) simulator

(Source: ACEA, 2016)

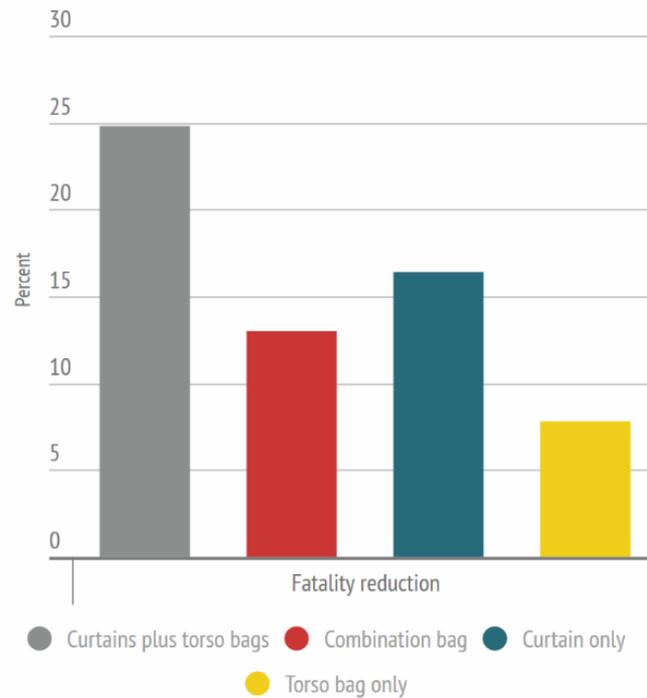
Seat, Bag & Belts

NCAP's true influence comes to light in the fast adoption of head protection airbags, advanced seat belts, anti-whiplash seats, etc..

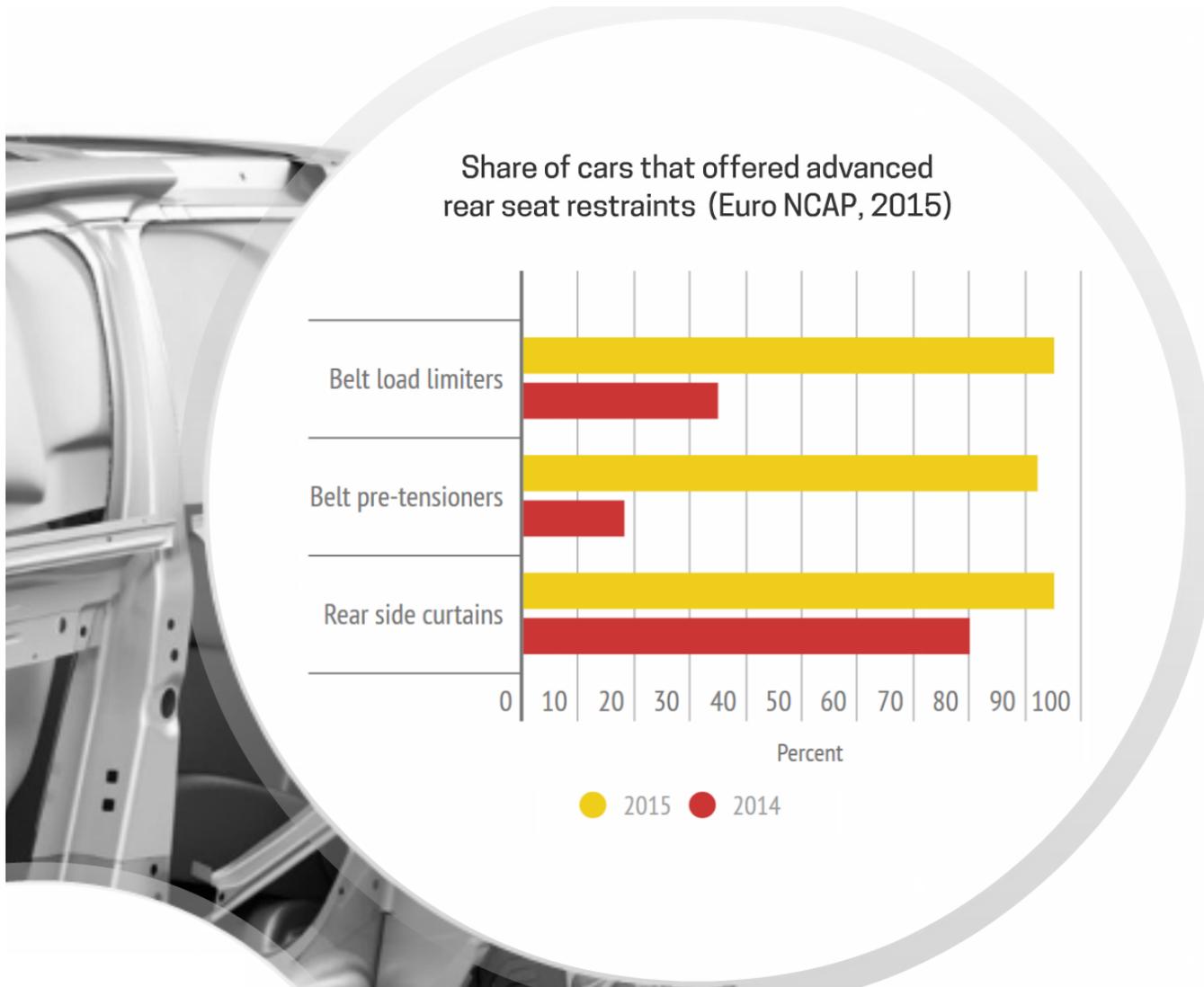


Seat, Bag & Belts

Fatality reduction by curtain and side airbags in near-side crashes (NHTSA, 2014)

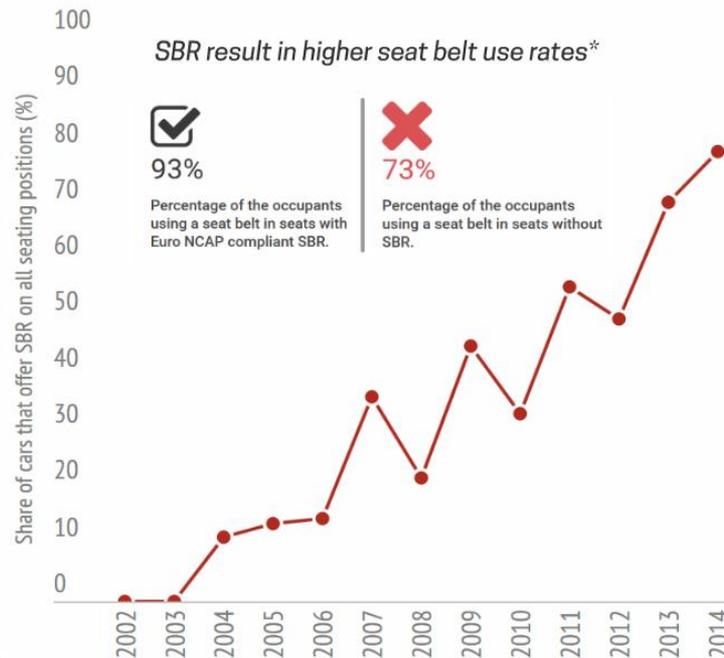


Seat, Bag & Belts



Seat, Bag & Belts

The installation of Intelligent Seat Belt Reminders on all passenger rear seats.
(Euro NCAP, 2014)



* Source: Nonconformities in real-world fatal crashes—electronic stability control and seat belt reminders. A. Lie (2012)

Child Protection

Safe transportation of infants and children requires dedicated solutions – still, good child protection does not carry sufficient weight in most NCAPs



LATCH, ISOFIX and i-Size



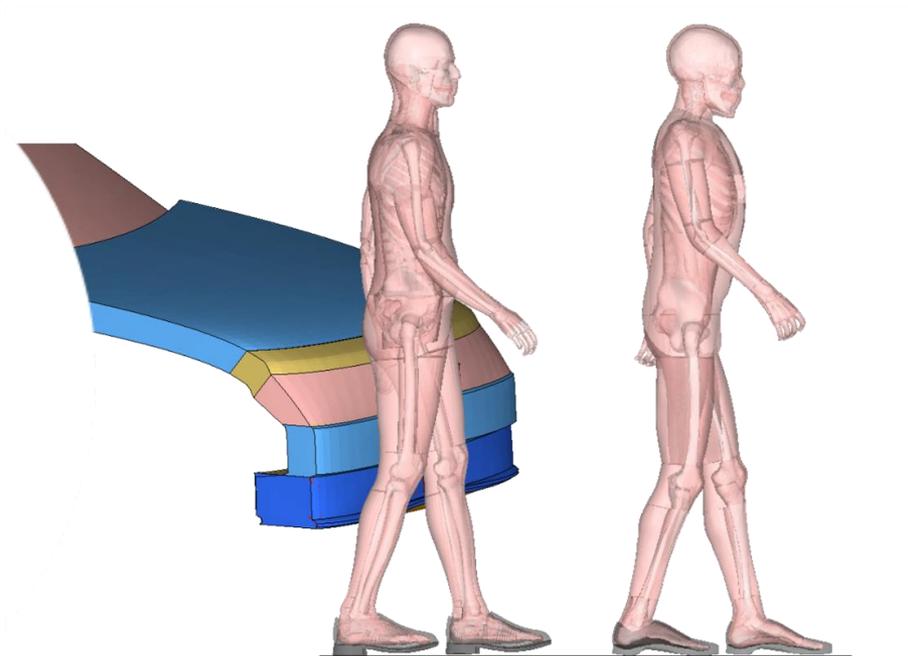
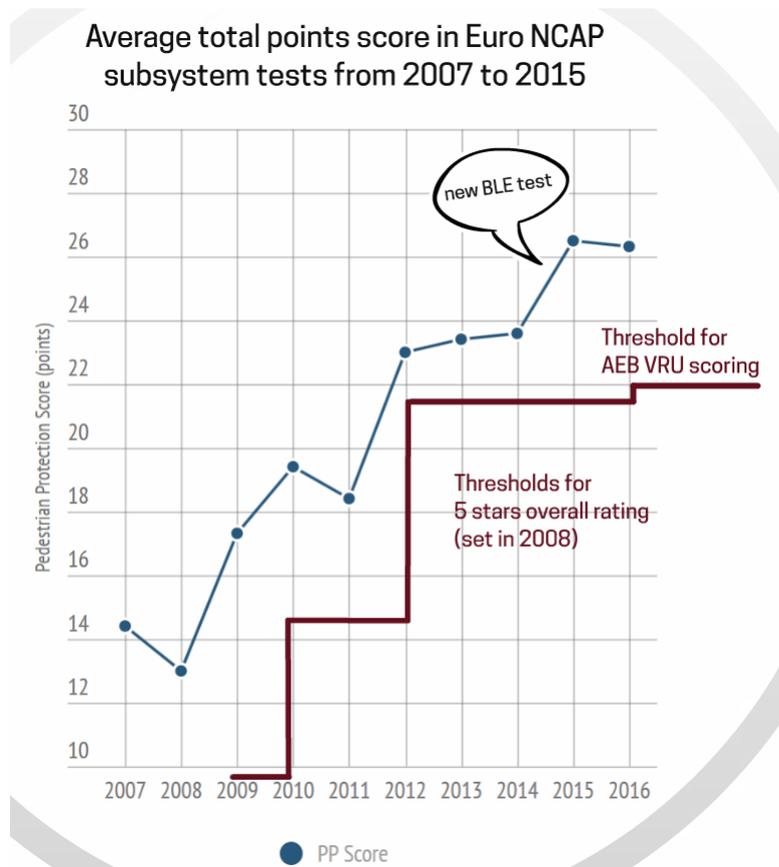
Child Occupant Protection ratings for low and middle income countries.



Euro NCAP's assessment includes vehicle provisions, CRS installation and Q6/Q10 testing

Pedestrian Protection

Sub-system testing meant that vehicle front-end structures became more forgiving in pedestrian collisions



The "Assessment of Vehicles with Deployable Systems" procedure is the first example of HBM-based virtual testing in ratings

Advanced Technology

From 2010 onwards, NCAPs started to lock on to the emerging crash avoidance and driver assistance systems



Global Differences

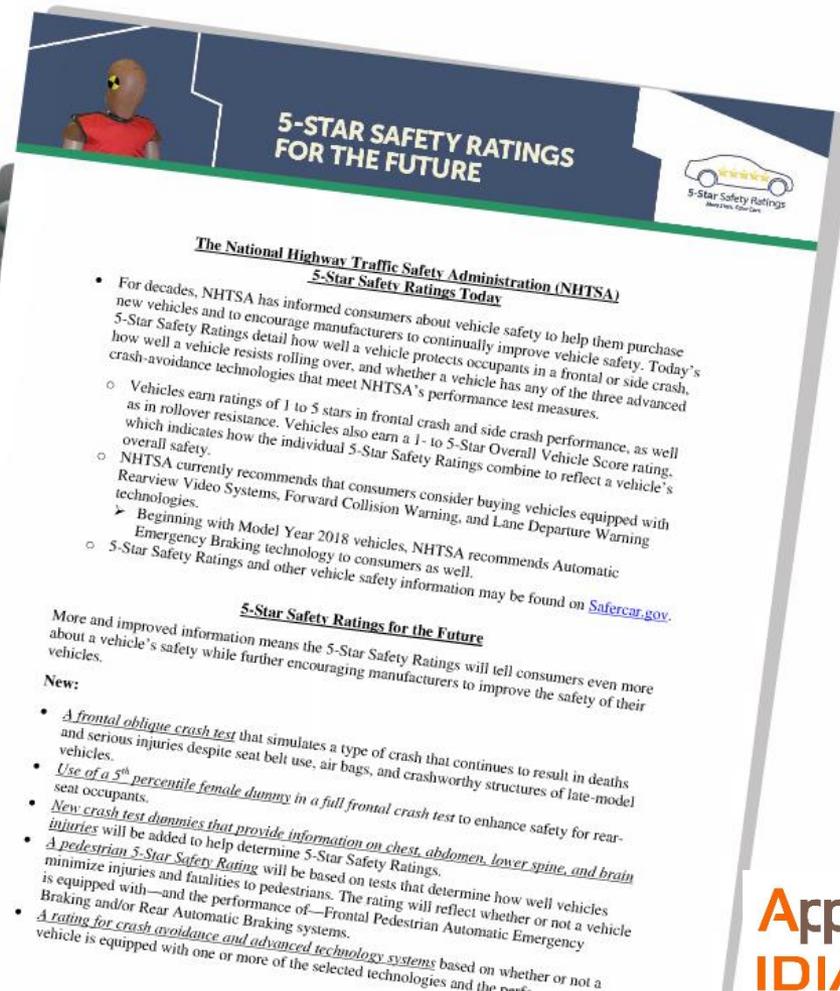
No NCAP is the same – there are commonalities but also many differences

2016	Front Moderate Offset	Front Full Overlap	Front Small Overlap	Side Barrier	Side Pole	Roll-over Roof crush	Whiplash sled	ISOFIX/LATCH	Pedestrian Subsystem	Seat Belt Reminder	ESC or Braking	FCW / AEB	LDW / LKA	Speed Assist	Rearview Camera	Adaptive Headlights
ASEAN NCAP	●			●				●		●	●					
Australasian NCAP	●			●	●		●		●	●	●	●	●	●	●	●
China NCAP	●	●		●	●		●			●	●					
Euro NCAP	●	●		●	●		●	●	●	●	●	●	●	●		
IIHS	●		●	●		●	●	●				●				●
Japan NCAP	●	●		●			●		●	●	●	●	●		●	
Korea NCAP	●	●		●		●	●		●	●		●	●			
Latin NCAP	●			●	●			●		●	●					
US NCAP		●		●	●	●						●	●		●	

- Test included in vehicle rating
- Bonus points or pre-condition in the rating (not always tested)
- Recommendation, award or stand-alone rating

Integrated Safety Ratings

NCAPs are slowly coming around to the benefits of an integrated safety rating

5-STAR SAFETY RATINGS FOR THE FUTURE

The National Highway Traffic Safety Administration (NHTSA)
5-Star Safety Ratings Today

- For decades, NHTSA has informed consumers about vehicle safety to help them purchase new vehicles and to encourage manufacturers to continually improve vehicle safety. Today's 5-Star Safety Ratings detail how well a vehicle protects occupants in a frontal or side crash, how well a vehicle resists rolling over, and whether a vehicle has any of the three advanced crash-avoidance technologies that meet NHTSA's performance test measures.
 - Vehicles earn ratings of 1 to 5 stars in frontal crash and side crash performance, as well as in rollover resistance. Vehicles also earn a 1- to 5-Star Overall Vehicle Score rating, overall safety.
 - NHTSA currently recommends that consumers consider buying vehicles equipped with Rearview Video Systems, Forward Collision Warning, and Lane Departure Warning
 - Beginning with Model Year 2018 vehicles, NHTSA recommends Automatic Emergency Braking technology to consumers as well.
 - 5-Star Safety Ratings and other vehicle safety information may be found on Safercar.gov.

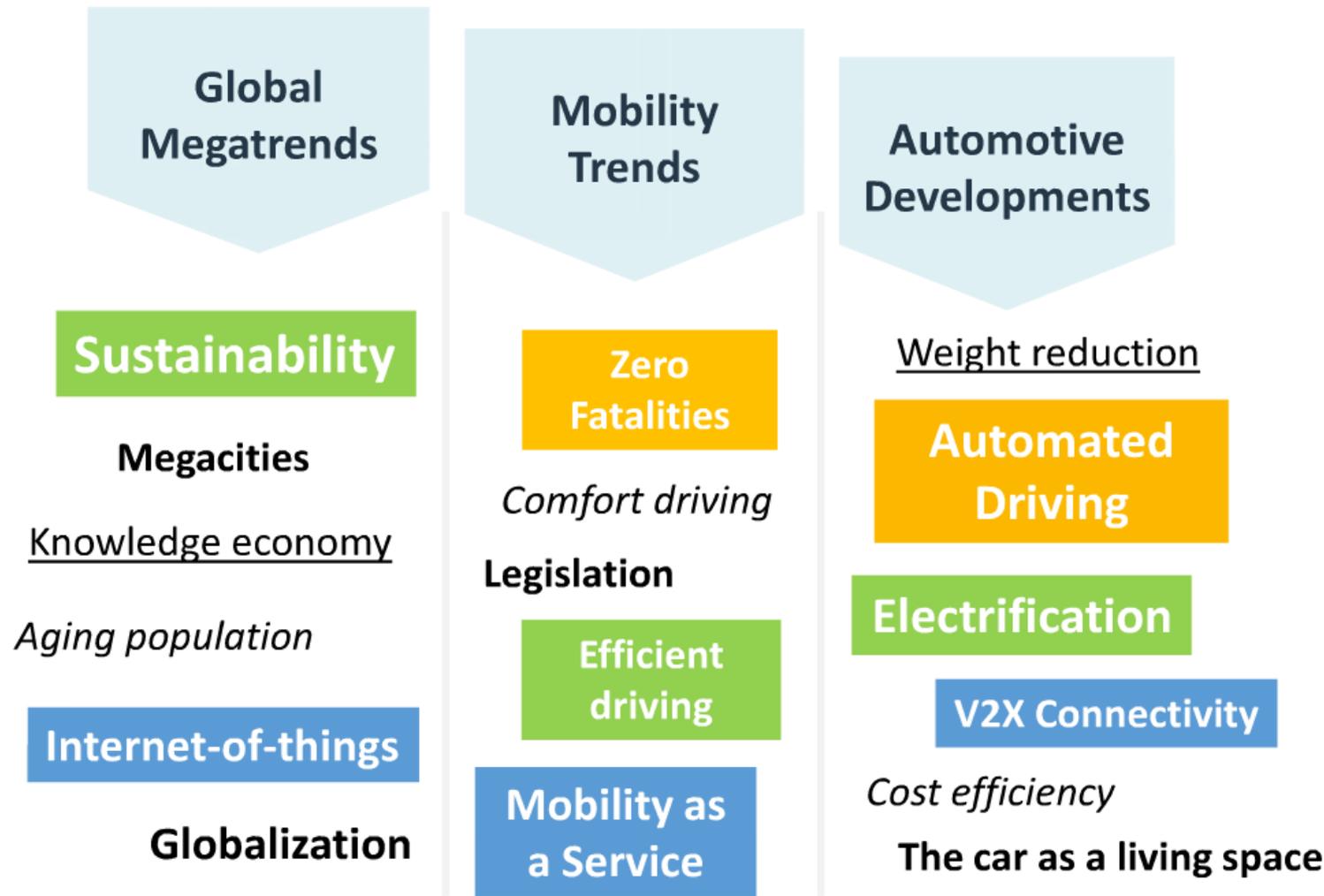
5-Star Safety Ratings for the Future

More and improved information means the 5-Star Safety Ratings will tell consumers even more about a vehicle's safety while further encouraging manufacturers to improve the safety of their vehicles.

New:

- A *frontal oblique crash test* that simulates a type of crash that continues to result in deaths and serious injuries despite seat belt use, air bags, and crashworthy structures of late-model vehicles.
- Use of a 5th percentile female dummy* in a full frontal crash test to enhance safety for rear-seat occupants.
- New crash test dummies that provide information on chest, abdomen, lower spine, and brain injuries* will be added to help determine 5-Star Safety Ratings.
- A *pedestrian 5-Star Safety Rating* will be based on tests that determine how well vehicles minimize injuries and fatalities to pedestrians. The rating will reflect whether or not a vehicle is equipped with—and the performance of—Frontal Pedestrian Automatic Emergency Braking and/or Rear Automatic Braking systems.
- A *rating for crash avoidance and advanced technology systems* based on whether or not a vehicle is equipped with one or more of the selected technologies and the test.

Megatrends



Cars are Getting Smarter

Cars are developing “senses” but they are still far from being called intelligent

Act

Seatbelt, airbags, etc.

Sense

Crash sensors

Think

ACU, Domain Controller, etc.



Sense

Vehicle dynamic sensors, vision systems, GNSS antennas

Think

Slip, steering, braking control, ECU, etc.

Act

Steering system, braking system, HMI, engine management

Smarter is Safer?

9 of 10 crashes caused by
human error

Crash avoidance
features reduce crashes

Driver has more support

More systems are
being offered

Reduced crash risk



but human drivers are still way
better than self-driving cars

but effectiveness is still low
and not all systems are good

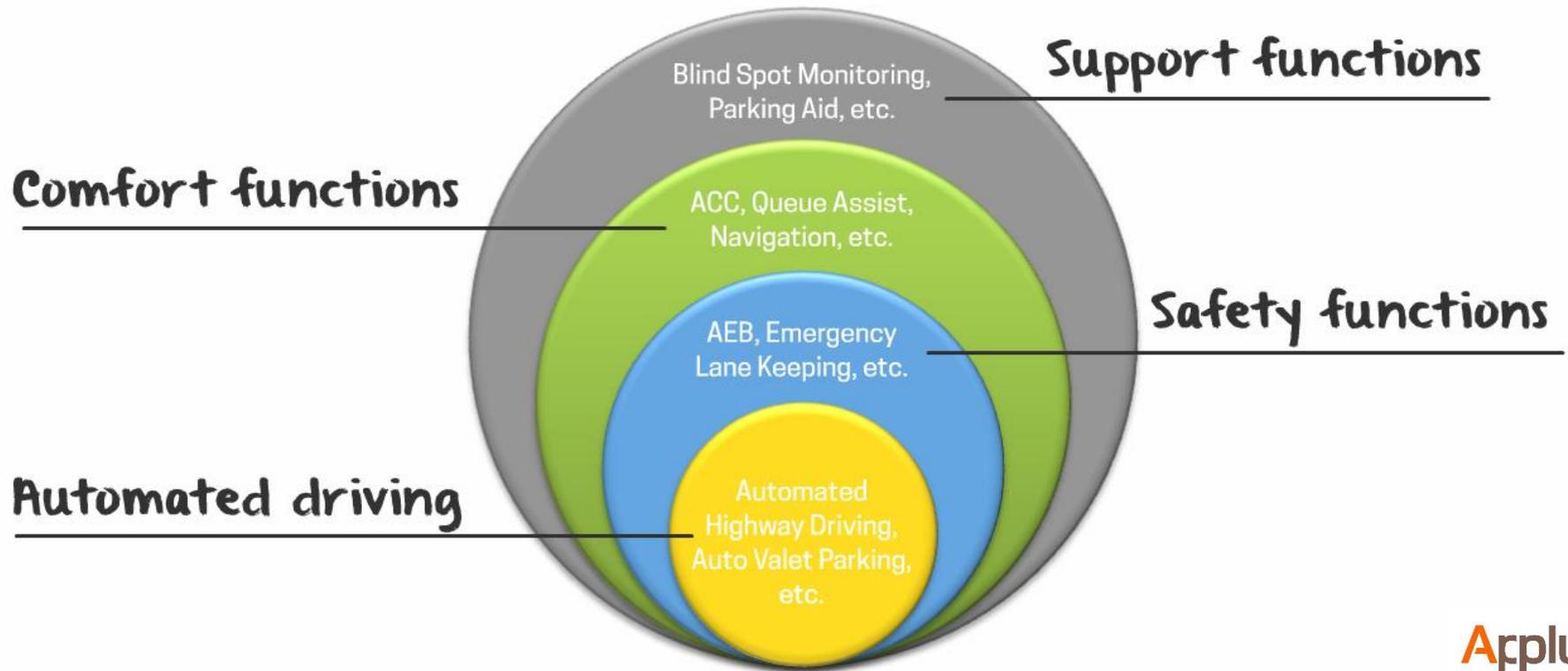
but smarter vehicles may be giving
drivers a false sense of security

but not all features are equally
acceptable or used

but new safety risks arise (cyber-
security, hand-over, software error)

Towards Automated Driving

The push towards automated driving will accelerate the spread of safety systems and drive integration across functions



Ratings for a New Safety Era

Coming to grips with rapidly evolving auto technology and telematics solutions – the 4 biggest challenges we face



Rating of
automated driving
functions



Incorporating
telematics & cloud
system updates

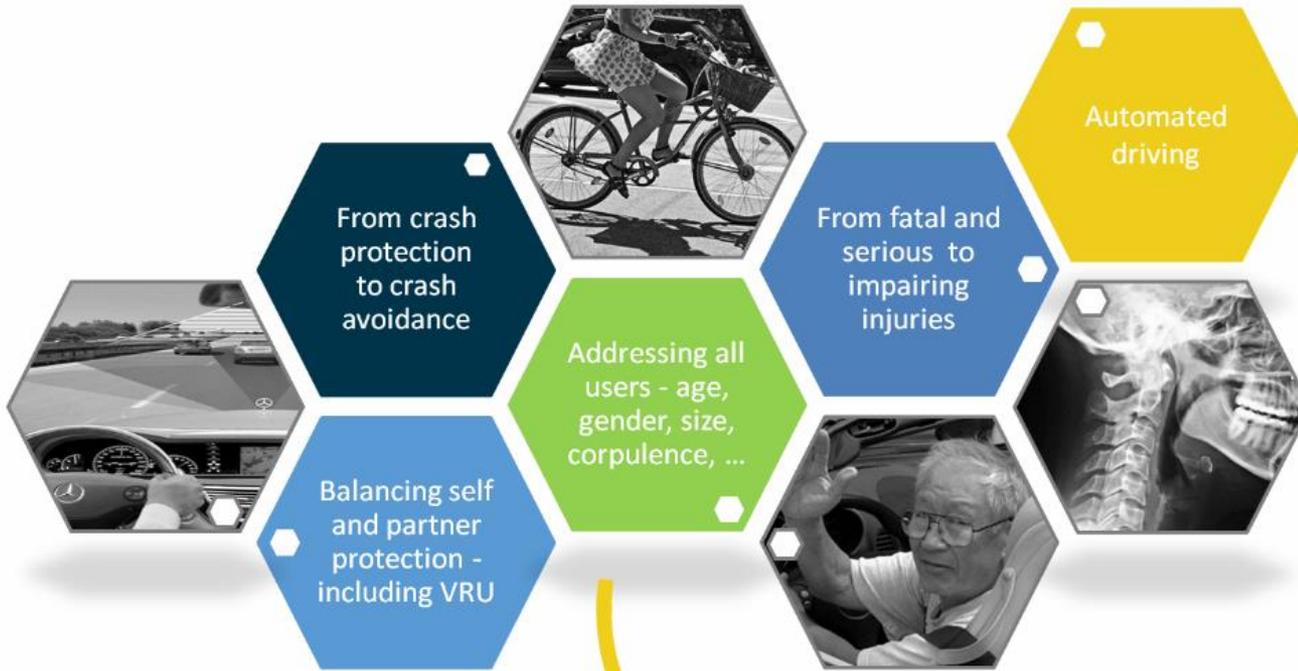


Changing
occupant interior
environment



Safety assessment
based on real
traffic scenarios

Towards Zero Fatalities



Traditional disciplines are important but they are no longer the whole story!

The Ironies of Automation

The driver's role will gradually change from pilot to operator overseeing machine driving. Ironically, the role of the human may become more crucial for safe driving



Quality of feedback
Inattention
Trust
Brittleness
Rapid onboarding
Complacency
Situation awareness
Skill atrophy
Nuisance alerts

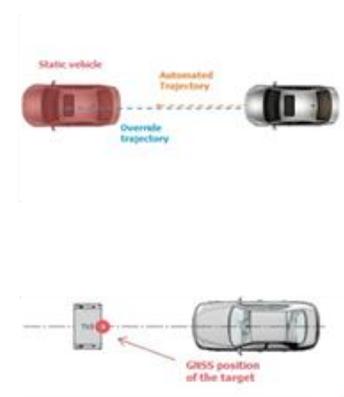
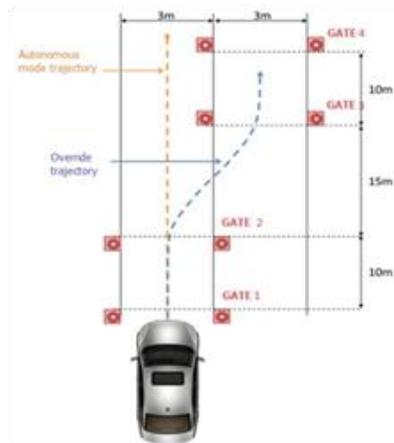
Source: "Ironies of Automation" by Lisanne Bainbridge

Tertiary Safety – eCall

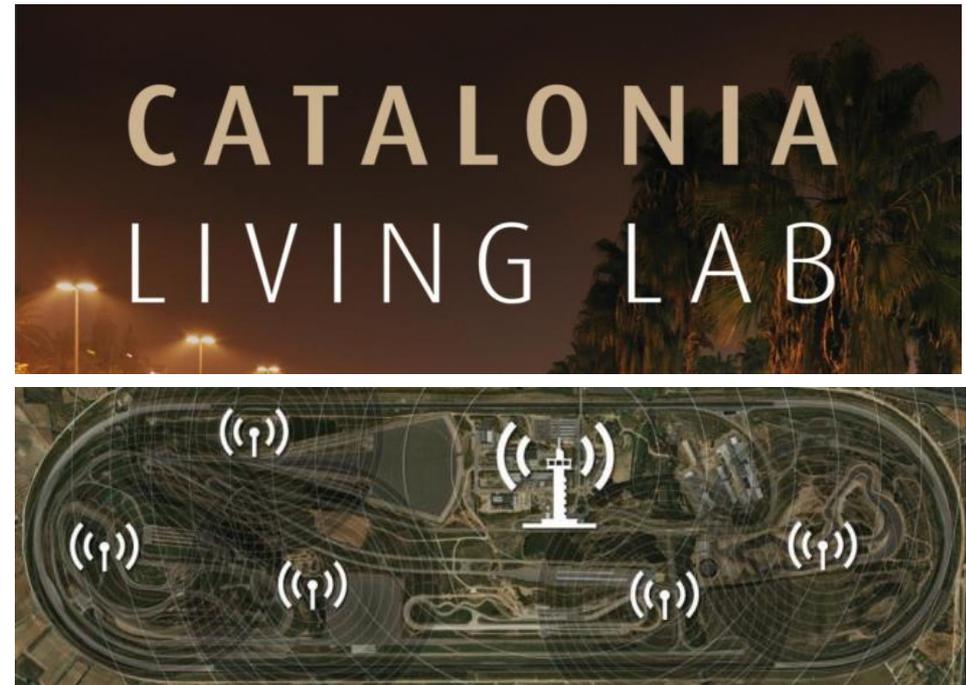
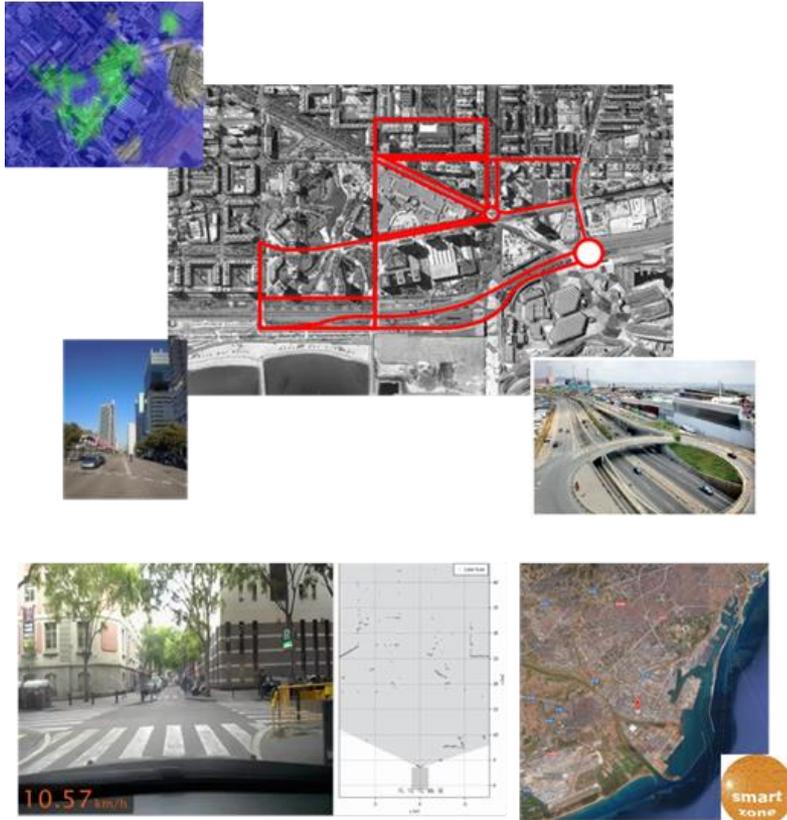
Testing and validation of ERA-GLONASS and eCall systems for both component and vehicle levels



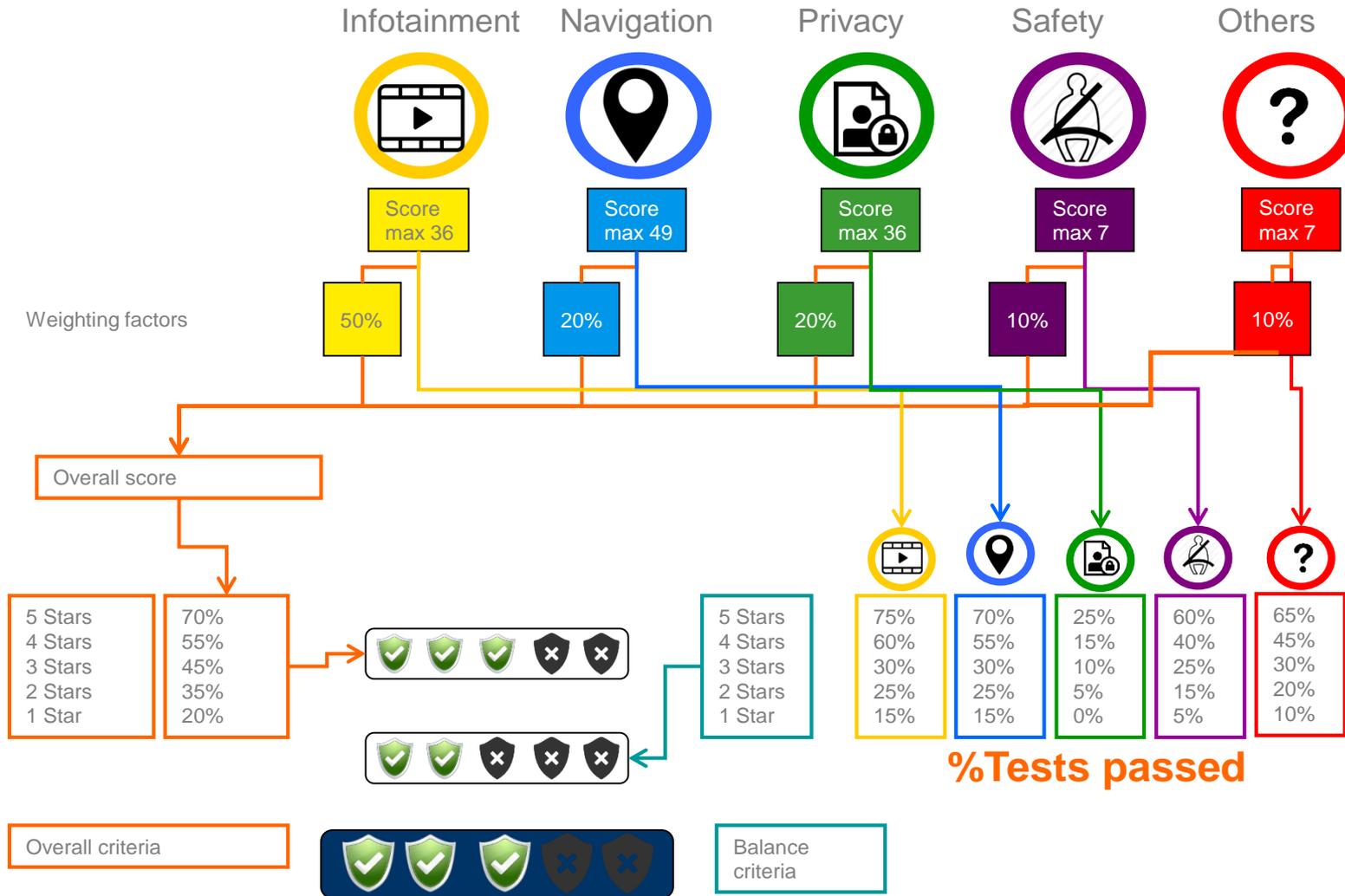
Catalonia Living LAB, Safer AD



Catalonia Living LAB, Safer AD



Cyber Security, Future Rating?



Advanced Human Surrogates

Will the age of crash test dummy dominance finally have to come to an end?

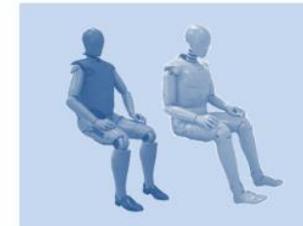
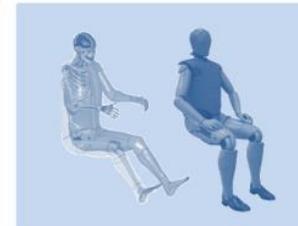
2025

Corpulence and other body proportions, seating postures, muscle attenuation.



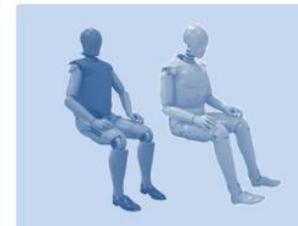
2015

Increased complexity: angled and lower severity test configurations, different occupant sizes



2005

Collinear and perpendicular test configurations



Biomechanics research

Product Development

Regulation & NCAP



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Thank you for your attention!
ご清聴ありがとうございました。
Grazie per l'attenzione!

*European automotive suppliers meet
Japanese vehicle manufacturers*