

Real Life Safety

Autoliv Capital Markets Day 2015

Autoliv

Technology

Johan Löfvenholm

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() Non-US GAAP reconciliations are disclosed in our 8-K/10-K/10-Q filings available at www.sec.gov or www.autoliv.com*

Technology for Real Life Safety

- **Megatrends**
- **How we work to develop safer cars**
- **Towards Autonomous Driving the Real Life Safety way**

Saving lives on the road is a key health priority as our world continues to grow and develop

Total 2004

Leading Cause	%
1 Ischaemic heart disease	12.2
2 Cerebrovascular disease	9.7
3 Lower respiratory infections	7.0
4 Chronic obstructive pulmonary disease	5.1
5 Diarrhoeal diseases	3.6
6 HIV/AIDS	3.5
7 Tuberculosis	2.5
8 Trachea, bronchus, lung cancers	2.3
9 Road traffic injuries	2.2
10 Prematurity and low birth weight	2.0

1.3 million

Total 2030

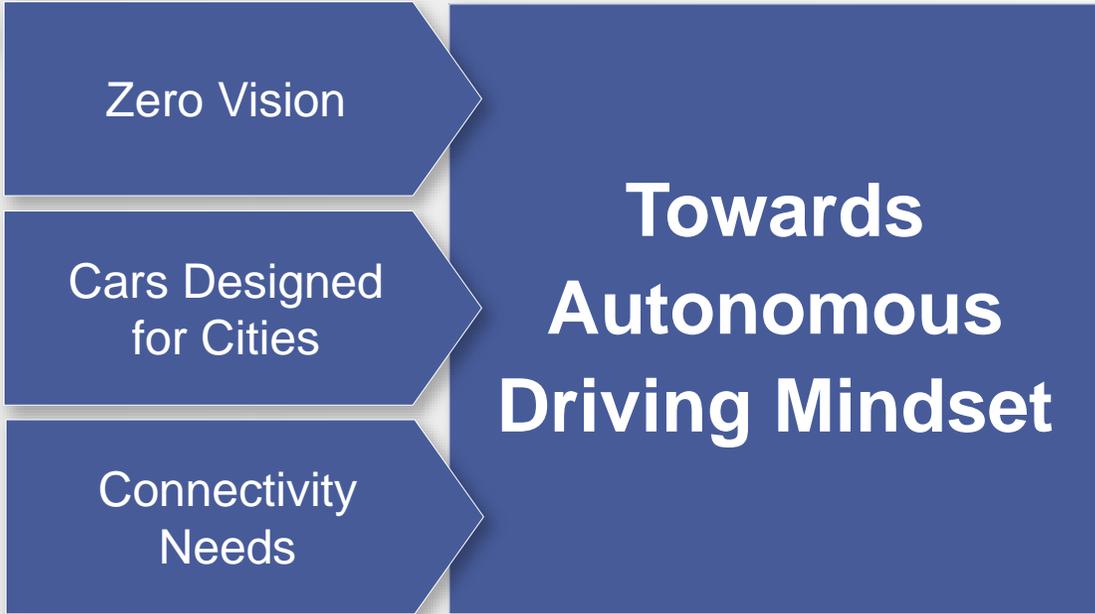
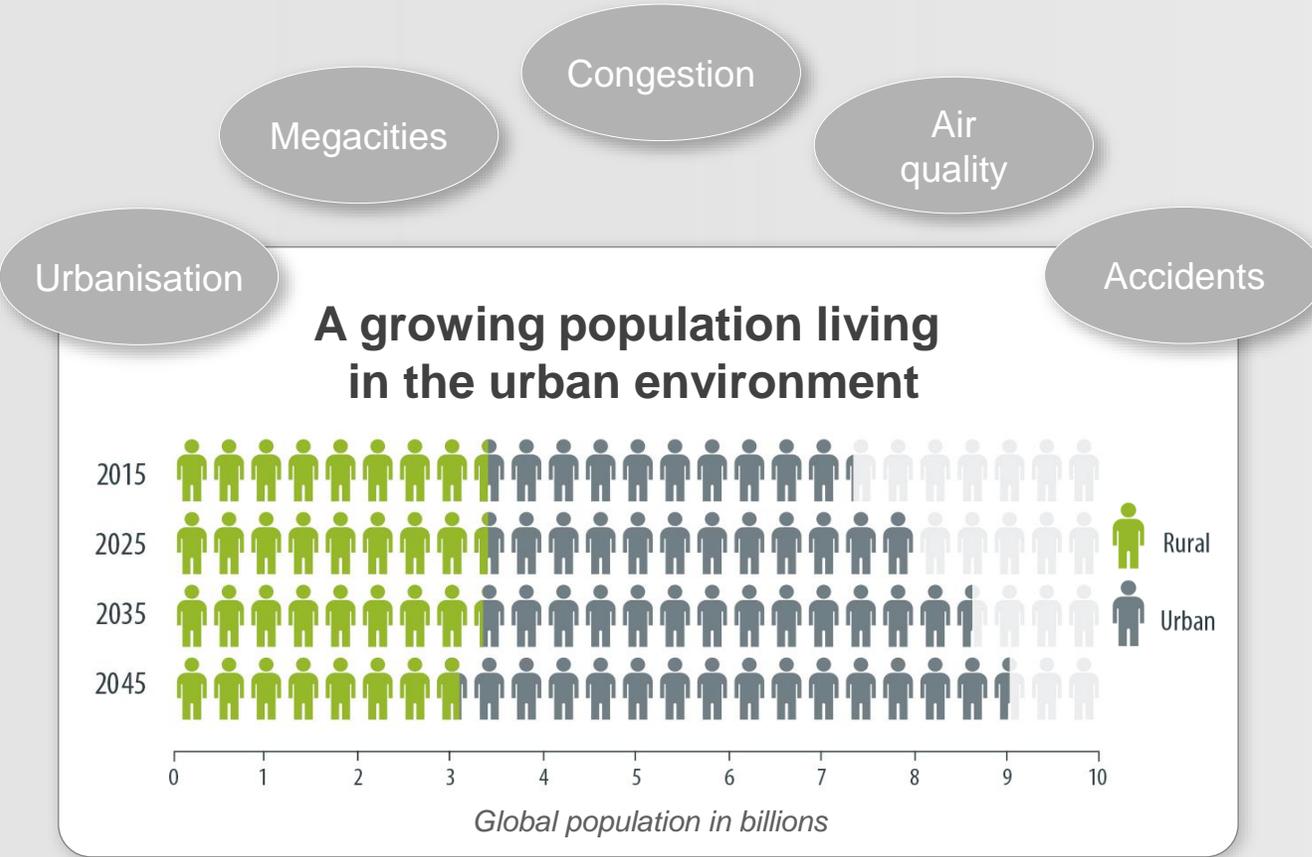
Leading Cause	%
1 Ischaemic heart disease	14.2
2 Cerebrovascular disease	12.1
3 Chronic obstructive pulmonary disease	8.0
4 Lower respiratory infections	3.8
5 Road traffic injuries	3.6
6 Trachea, bronchus, lung cancers	3.4
7 Diabetes mellitus	3.3
8 Hypertensive heart disease	2.1
9 Stomach cancer	1.9
10 HIV/AIDS	1.8

2.4 million



Source: World Health Organization

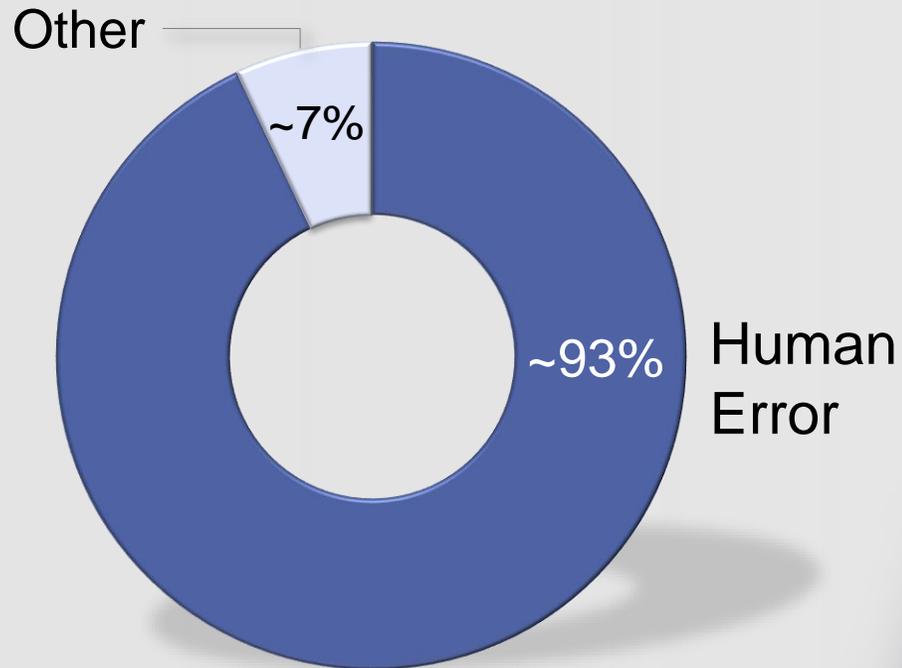
Urbanization creates even more challenges to saving lives



Source: UN World Urbanization Prospects: 2011 Revision

Eliminating human error by Autonomous Driving can prevent millions of crashes while adding convenience

Traffic fatalities



Autonomous Driving:

- Prevents millions of crashes
- Reduces the severity of injuries and property damage

Additional Benefits:

- Increases driver comfort and productivity
- Uses infrastructure more efficiently
- Improves mobility



Our industry and society envision Autonomous Driving coming soon...

" We will see more change in the industry in the next five to ten years than we have in the last fifty"

Mary Barra, CEO of GM

" What is important for us is that the brain of the car, the operating system, is not iOS or Android or someone else but it's our brain. We do not plan to become the Foxconn of Apple"

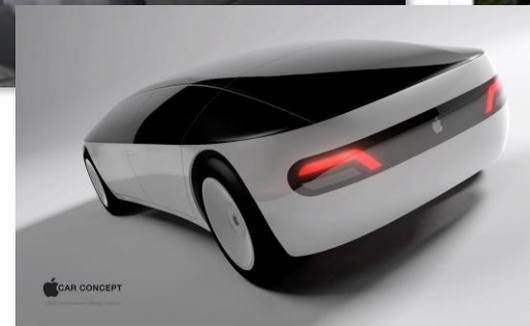
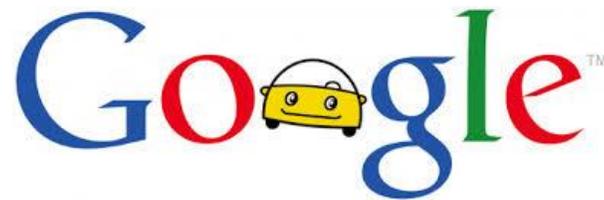
Dieter Zetsche, CEO of Daimler



UBER



TESLA

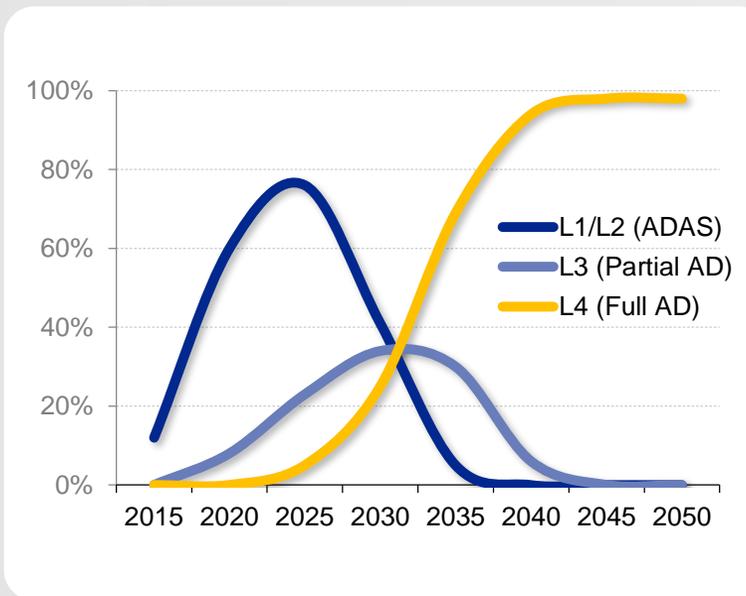


Some predict full AD to start take off already around 2025...

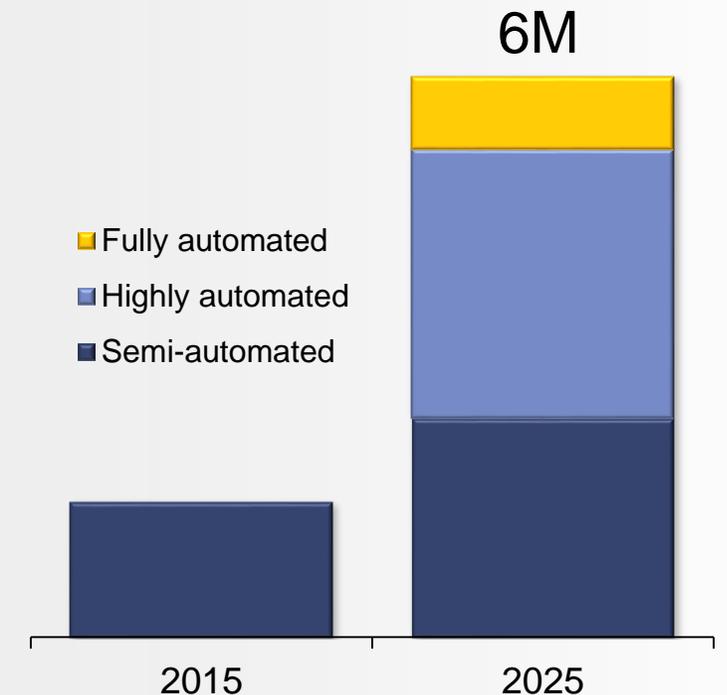
Enablers / inhibitors*

- Hardware Development
- Software Development
- V2V Penetration
- Regulatory Framework
- Consumer Acceptance

Autonomous Driving Penetration*



Automated Vehicles Globally**



(*) Goldman Sachs Global Investment Research: Monetizing the rise of Autonomous Vehicles, Sept. 17 2015 (European example) (**) Frost & Sullivan

But, are we discounting optimistic expectations too early?

1950s



1960s

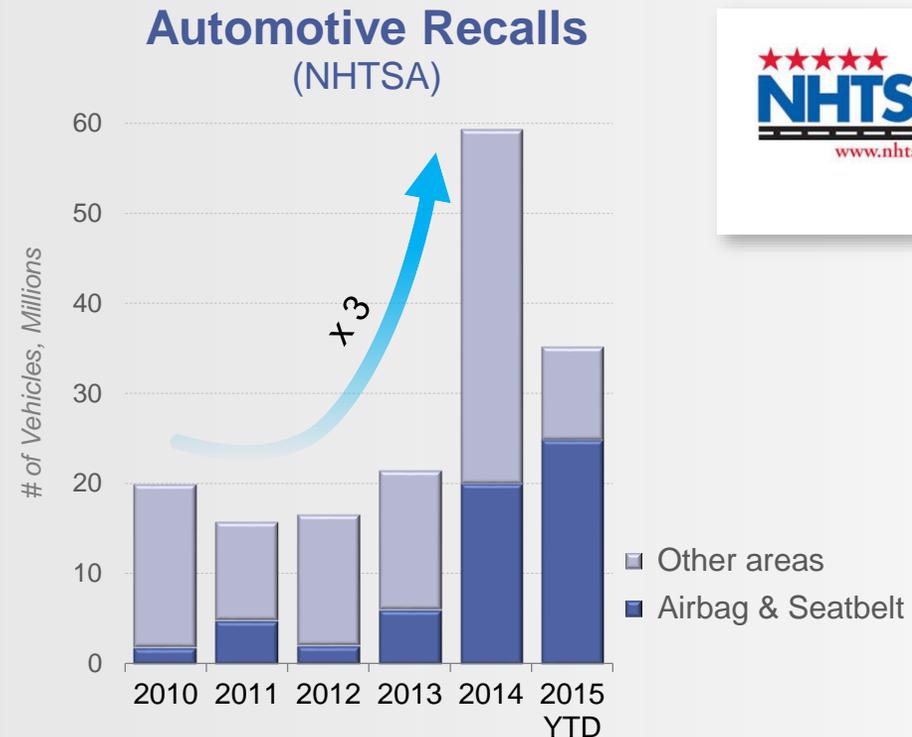


1967 / 2001

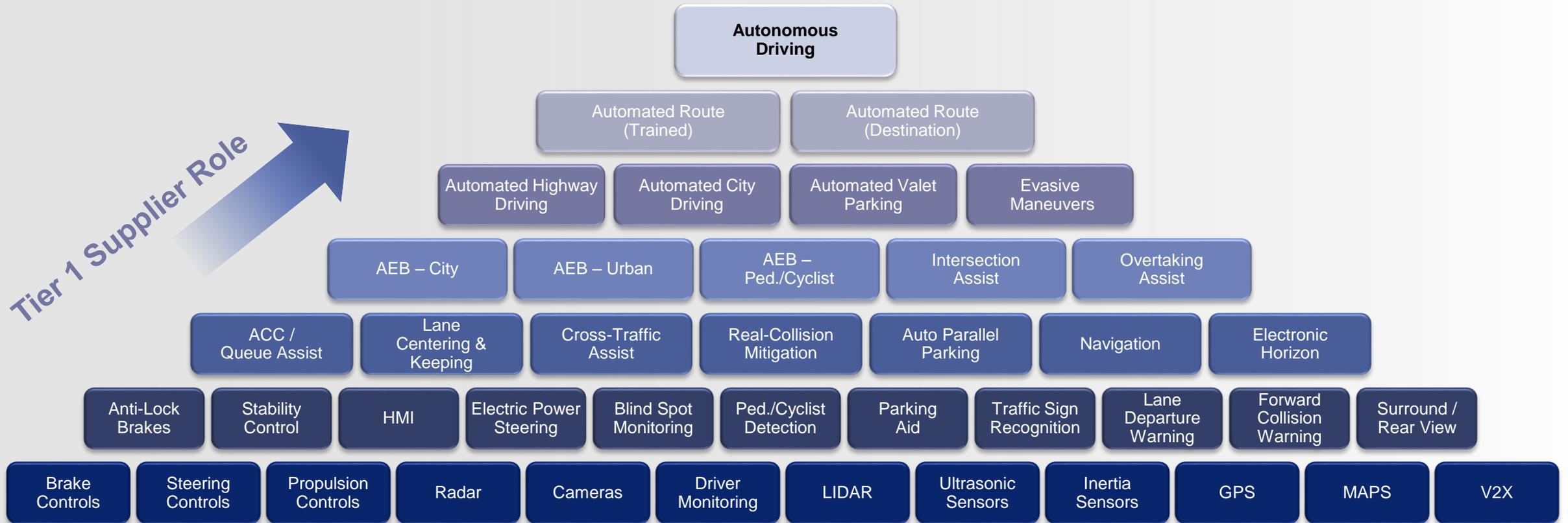


Increased complexity creates industry challenges

- Much lower tolerance from Customers for any quality related issues in vehicles
- OEMs increasingly sensitive
 - Recalls decided for reasons which previously would not result in a recall
 - Increased focus on warranty data to find issues and decide about recalls
- National Authorities apply more pressure

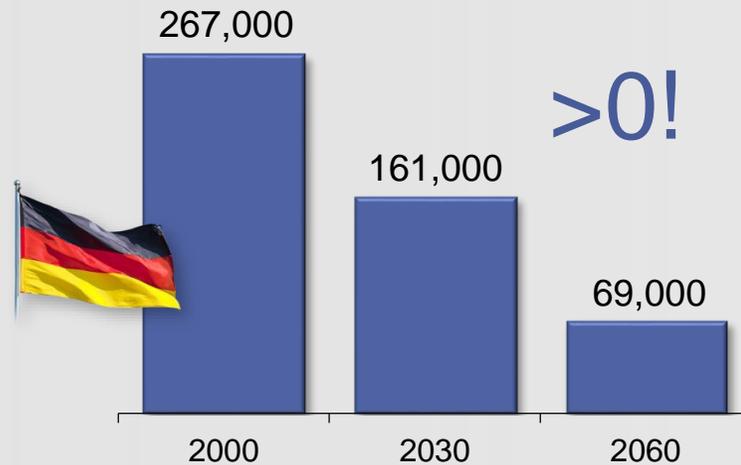


So, how do we as an industry cope with increased complexity?

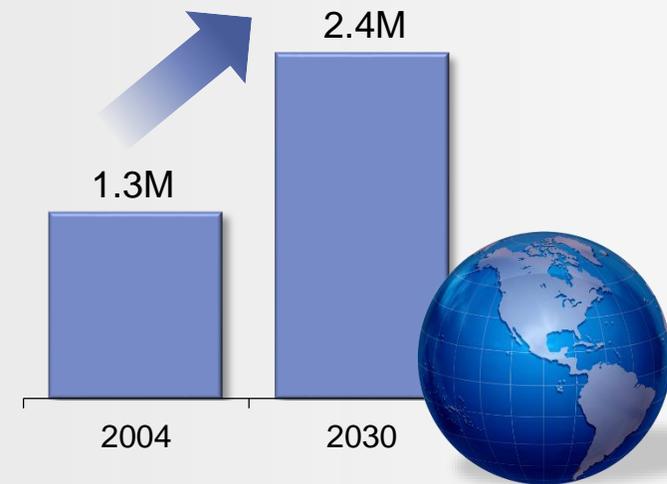


Strong belief in Passive protection in concert with Active even beyond full Autonomous Driving

German accidents with injured car occupants*



Global road traffic injuries**



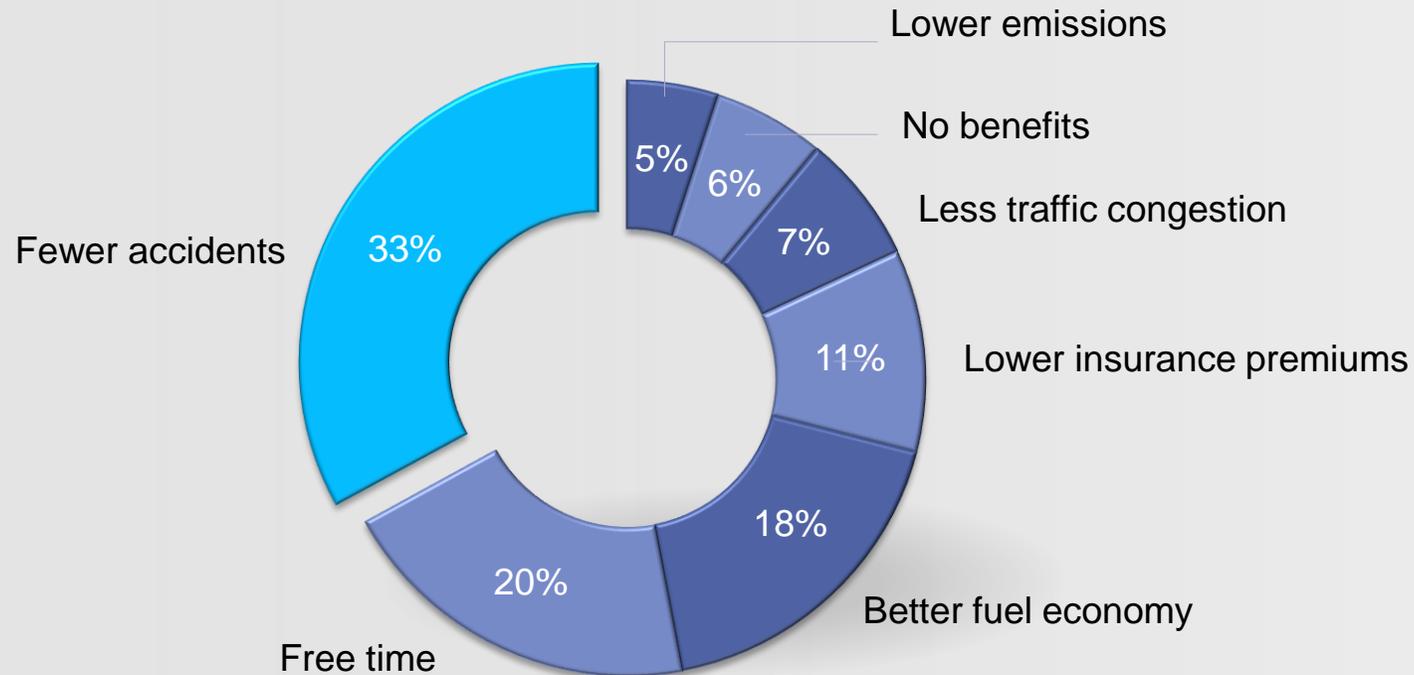
STOP THE CRASH PARTNERSHIP



(* Destatis/GIDAS: T. Unselt, Daimler VDI Conference 2013 (** WHO

People want safe cars

AD benefits you are most interested in*



(*) Goldman Sachs Global Investment Research: Monetizing the rise of Autonomous Vehicles, Sept. 17 2015

A holistic real life approach to automotive safety to save more lives



Technology for Real Life Safety

- Megatrends
- How we work to develop safer cars
- Towards Autonomous Driving the Real Life Safety way

Industry Pioneer with Strong Heritage

More than 60 years of innovation in Automotive Safety

MECHANICAL

PYROTECHNICAL

ELECTRONICS

DIGITAL



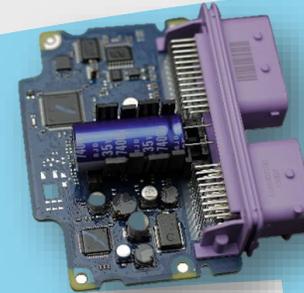
1950s



1980s



1990s



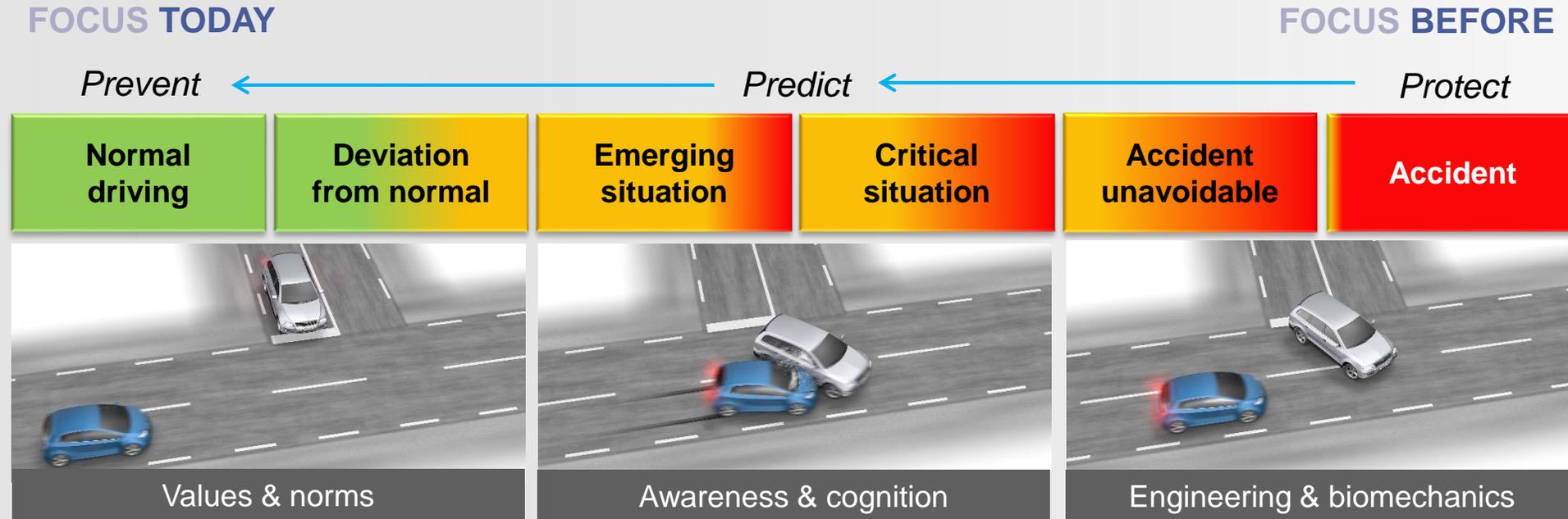
2000s



2010s

Real Life Innovation and Development

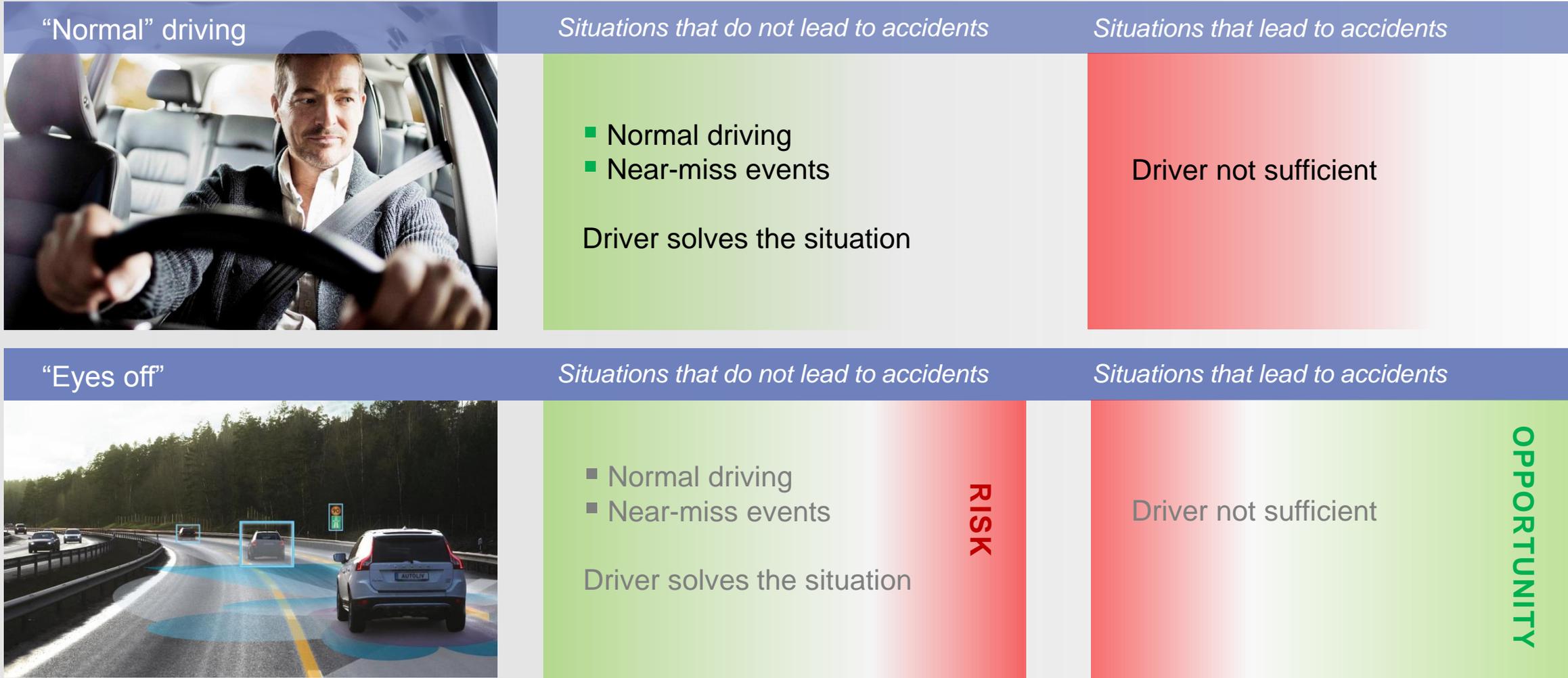
We can now predict and prevent crashes, but...



We integrate **Passive** and **Active Safety** with **Human Behavior** know-how to **Bring Back the driver** to normal driving

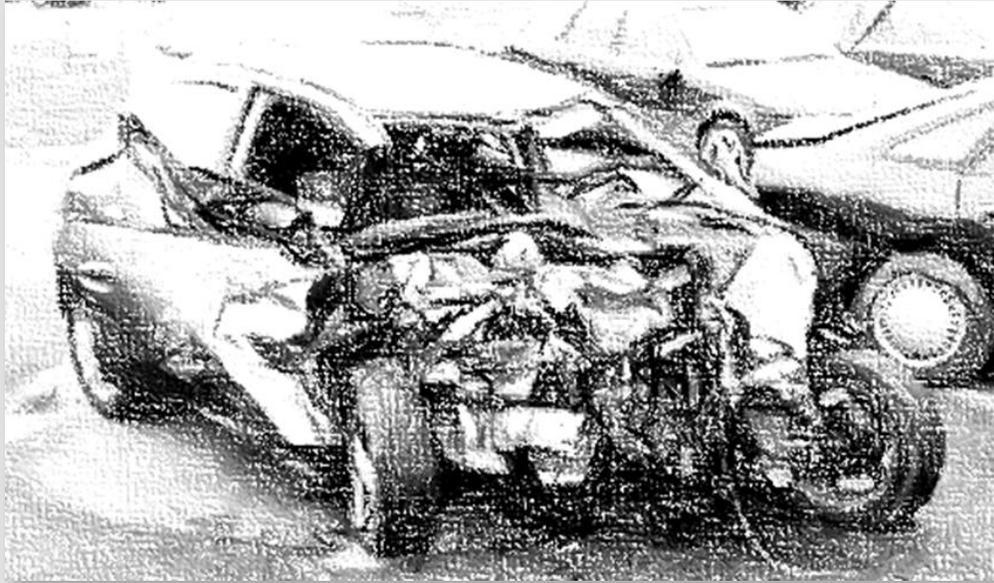
Real Life Innovation and Development

... we may underestimate risks with higher level AD...



Real Life Innovation and Development

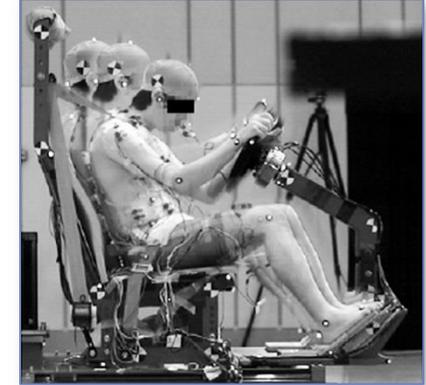
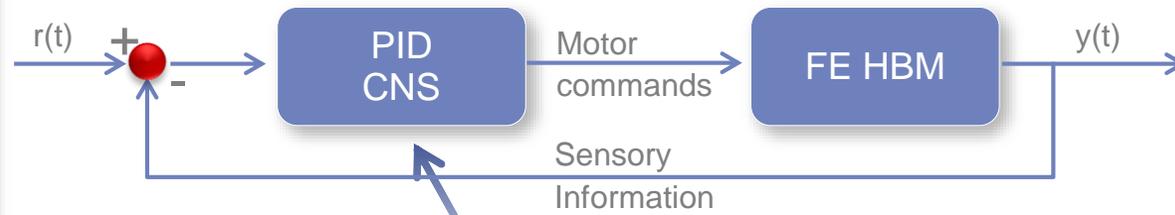
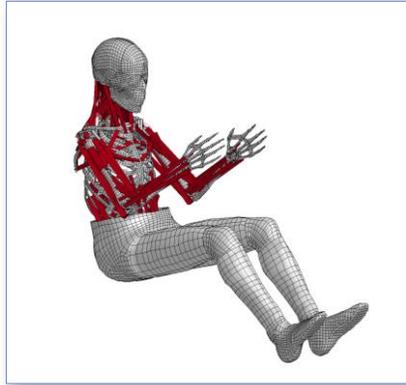
... and we need to better understand real load cases



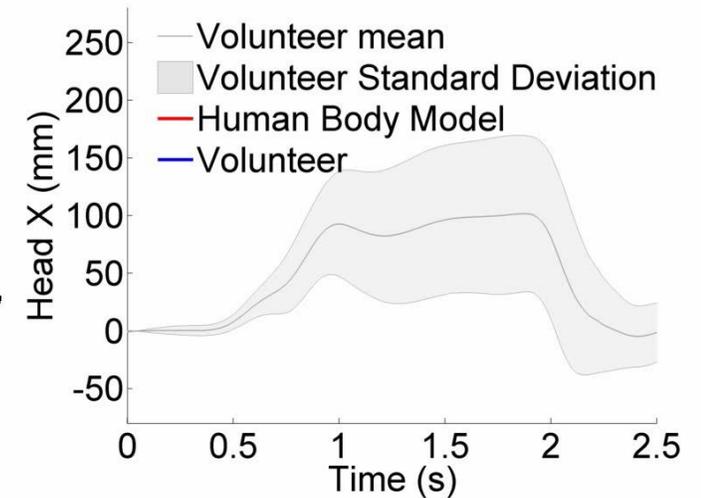
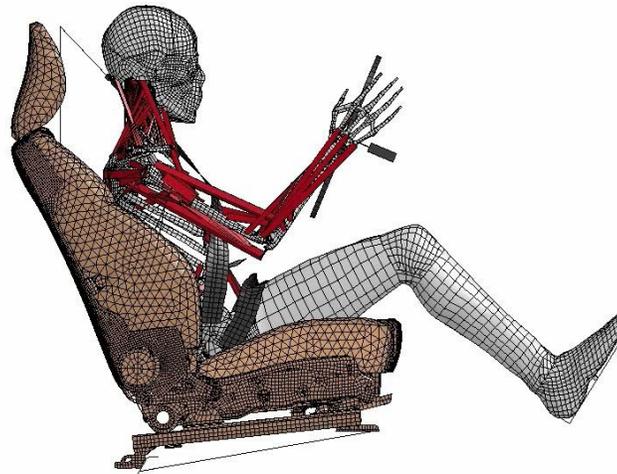
Both cars had the same safety rating...

Real Life Innovation and Development

Therefore we execute RD&E with Real Life Safety mindset



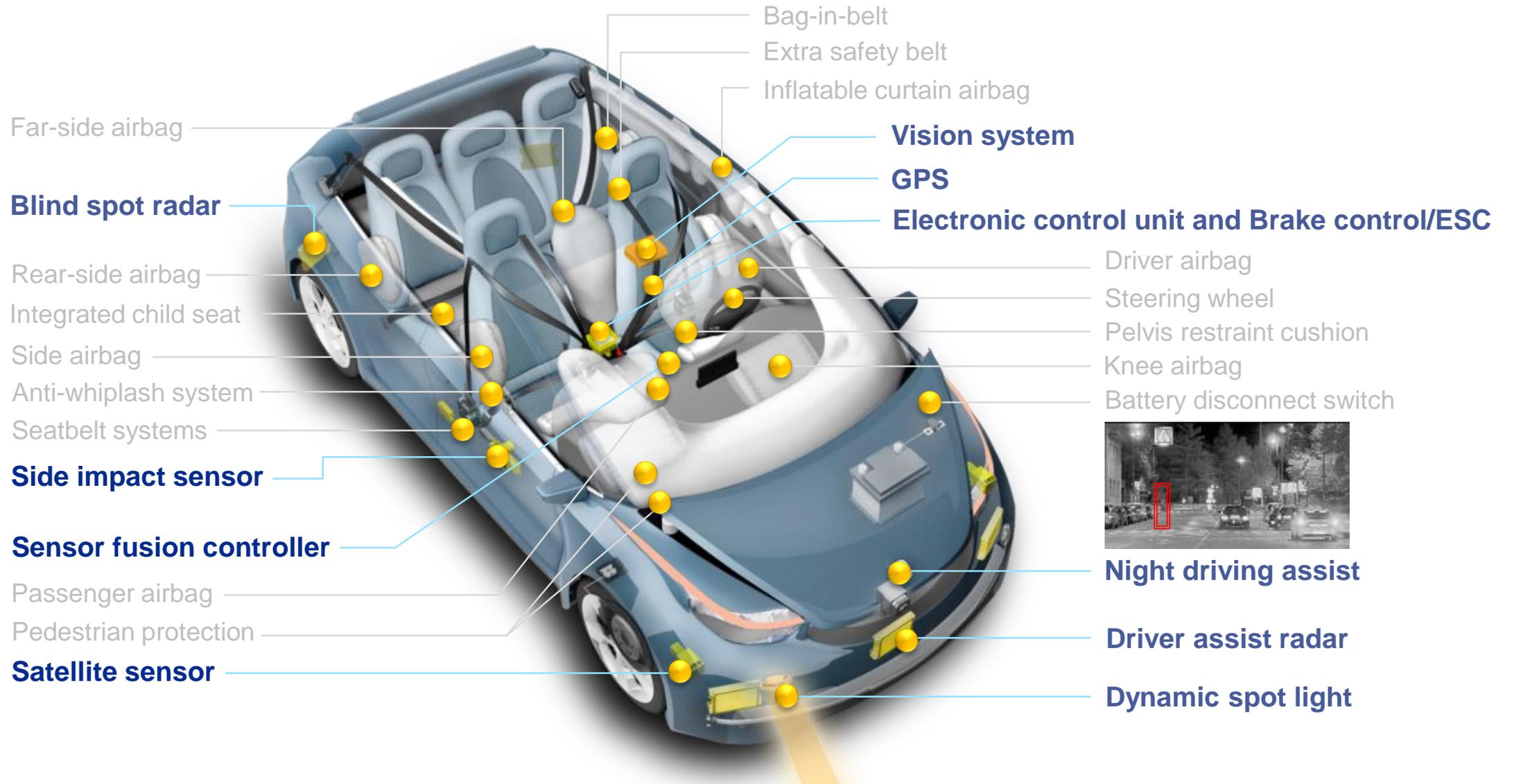
Ejima et al. (2008)



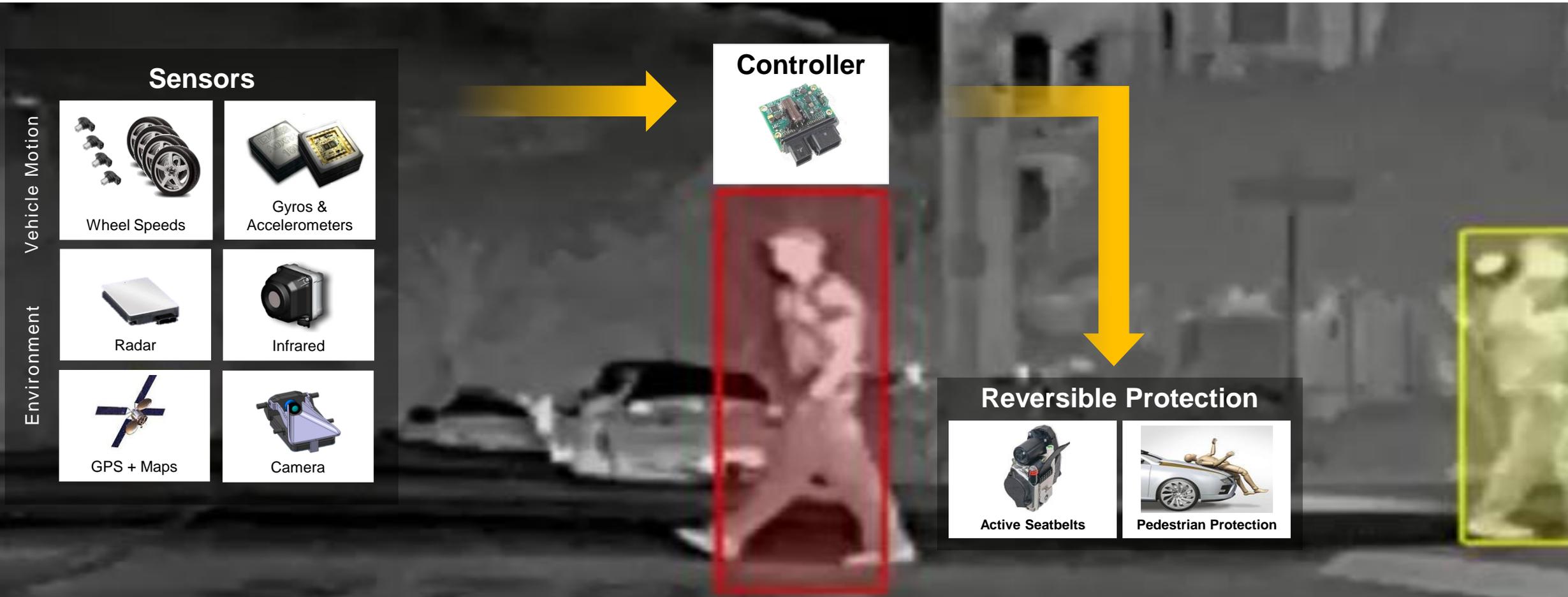
With our Passive portfolio operating in...



... concert with Active solutions we...



... fuse real life into Automotive Safety



(*) Active Safety / Passive Safety / System Integration / Humans Sciences

Technology for Real Life Safety

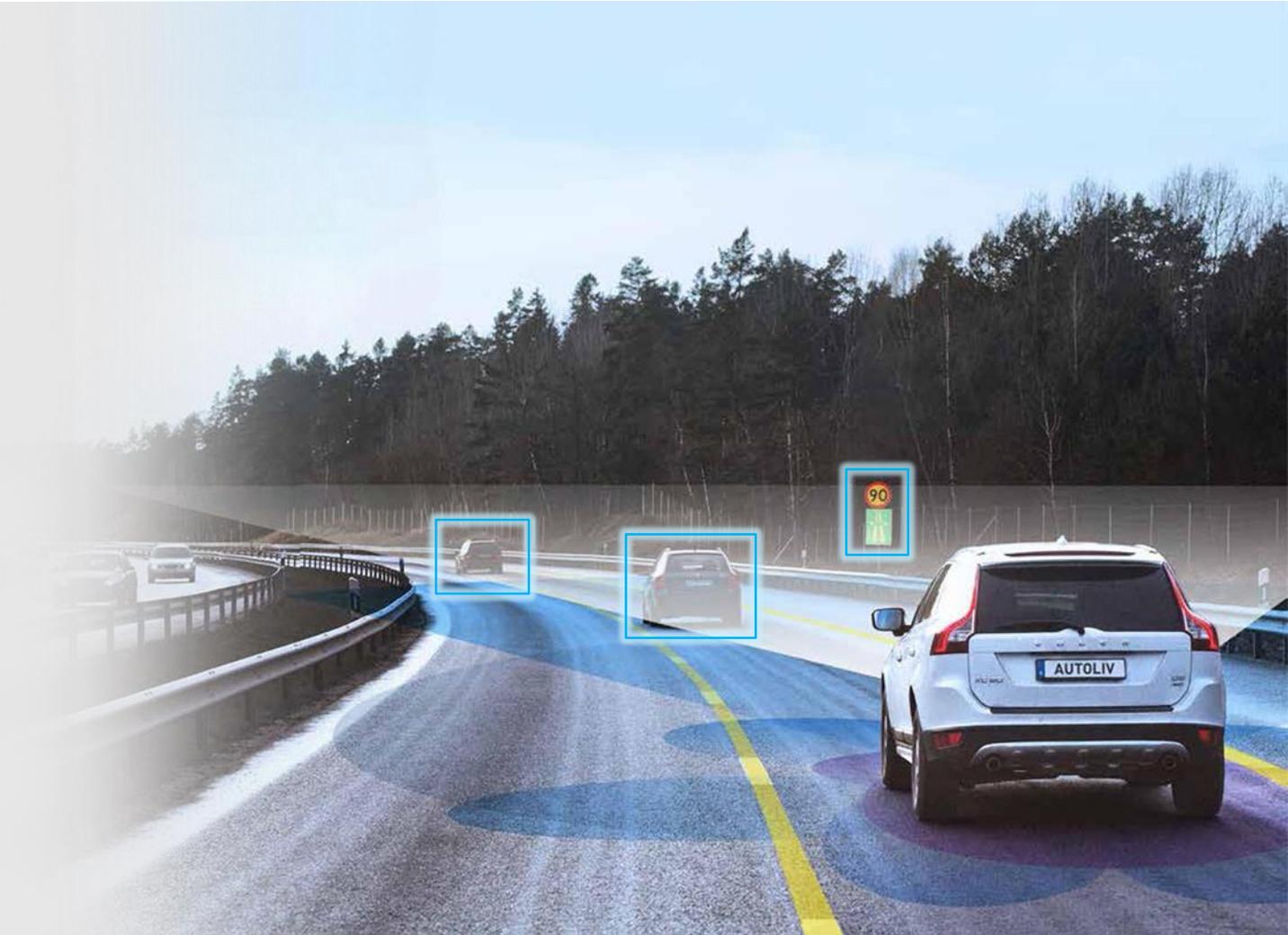
- Megatrends
- How we work to develop safer cars
- Towards Autonomous Driving the Real Life Safety way

Towards Autonomous Driving the Real Life Safety way

Our holistic approach detects scenarios over and beyond current rating requirements



This is how we lead development of Real Life Safety



Towards Autonomous Driving the Real Life Safety way

We source, develop in-house and with partners as well as acquire

- ADAS stepping stone to Real Life Autonomous Driving

- Enable AD features and functionality in close cooperation with leading OEMs

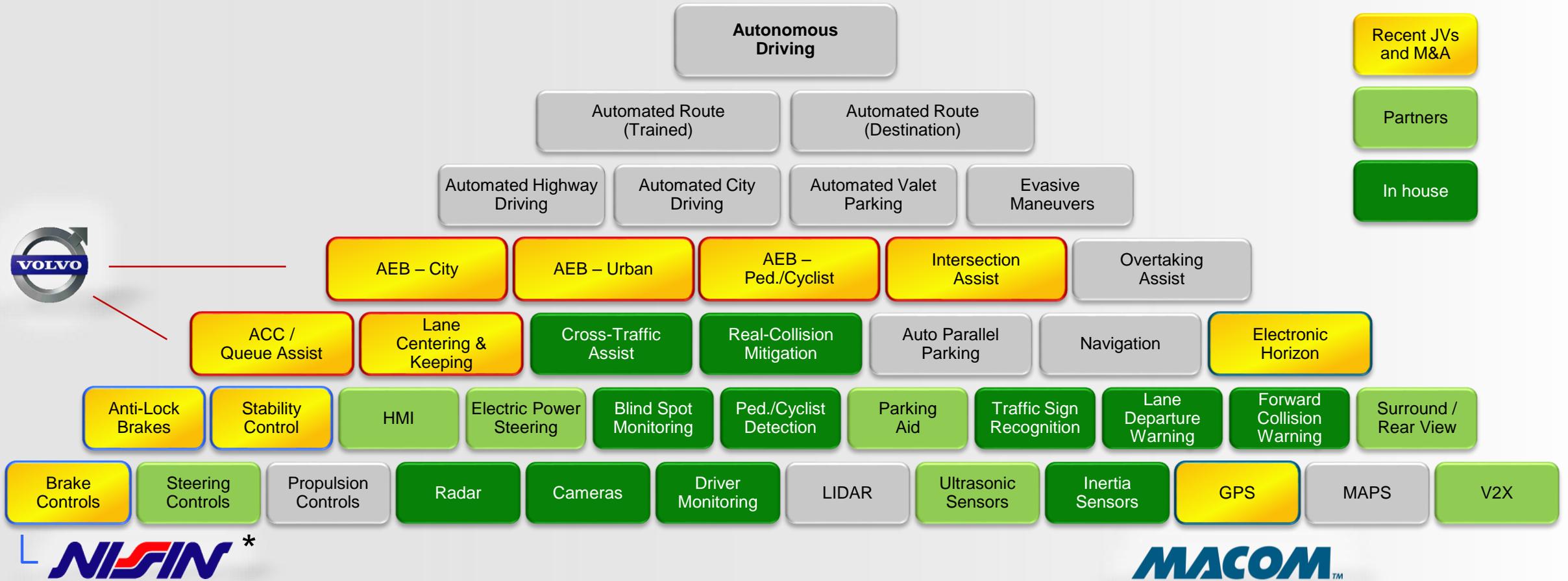
- Evolve from an ADAS system supplier towards AD capabilities

- Purchase certain building blocks available in the market
- Jointly develop AD building blocks in cooperation with leading OEMs
- Develop key AD building blocks in-house and through bolt-on M&A



Towards Autonomous Driving the Real Life Safety way

Our current footprint within the pyramid

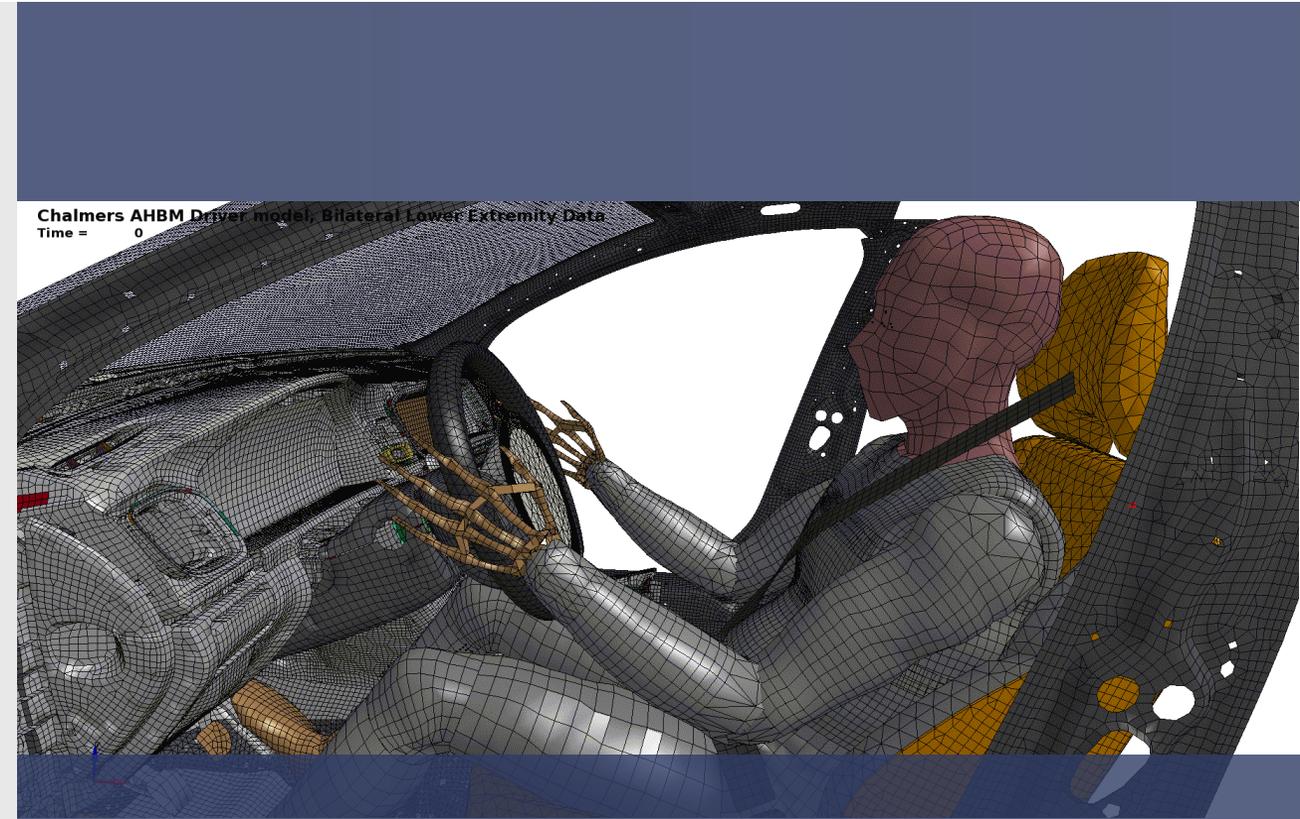


(*) When transaction is closed

Towards Autonomous Driving the Real Life Safety way

It is about anticipating new situations

- AEB will eliminate many crashes
- Remaining crashes will be at lower speeds
- Important to bring driver in optimal position



Active and Passive restraint systems
working in concert

Towards Autonomous Driving the Real Life Safety way

It is about tailoring machine to human behavior

- The challenge is for technology to sense if driver *really* is in control and carefully adopt AEB in appropriate ways
- It is human-machine-interaction done in a real life way

Eyes off

Hands off

Alco sensing

Feet on pedals



Towards Autonomous Driving the Real Life Safety way

It is about innovating core passive safety

- Hands on wheel and Eyes on road
- Intuitive handover between driver and car



Smart steering wheel enables human-machine-interaction.

Towards Autonomous Driving the Real Life Safety way

It is about sensing and acting on real-life conditions

- Nissin Kogyo JV (when closed) will bring key know-how in-house
- We will even better be able to integrate enhanced sensing and brake control
- With direct access to wheel speed sensor data, surface friction calculations are facilitated and improved



We can provide enhanced braking control for different weather conditions.

Towards Autonomous Driving the Real Life Safety way

It is about real life sensing

- Stereovision is about enhanced sensing to act on unexpected dangers

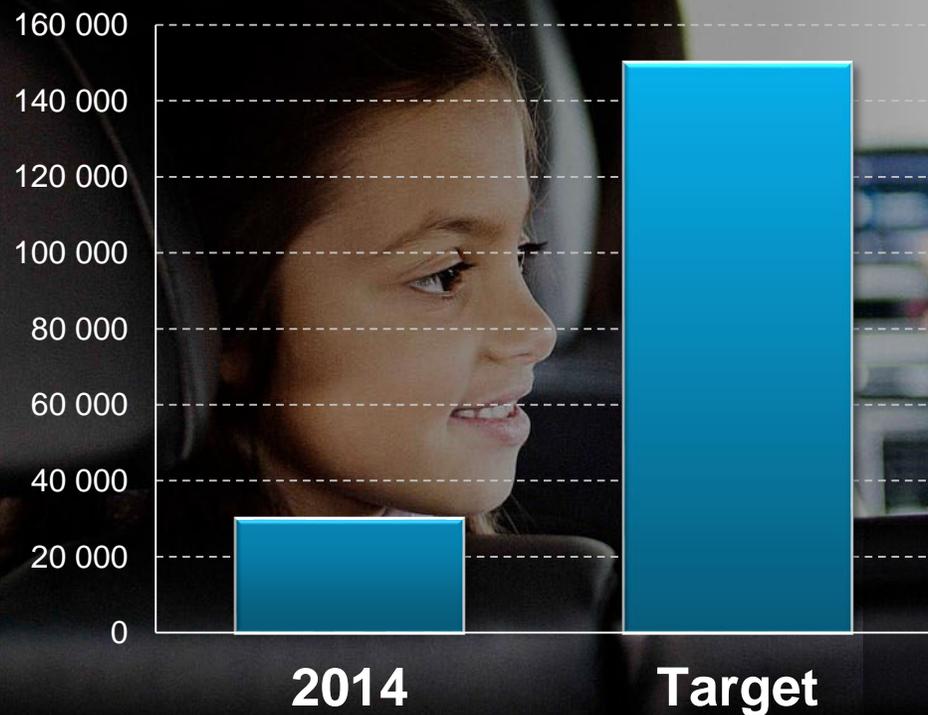


We can provide automated braking in situations over and above things strictly learnt.

We Save More Lives

Human lives saved by our products

... additionally they prevent ten times as many severe injuries



Let us now experience it!



Thank you!



Autoliv

Every year, Autoliv's products save over 30,000 lives

and prevent ten times as many severe injuries