DR. WERNER HUBER.

HEAD OF DRIVER ASSISTANCE AND PERCEPTION.

BMW GROUP.

ON THE WAY TOWARDS AUTOMATIC DRIVING. THE AUTOMOBILE WORLD CHANGES.

Automated Driving is a customer request.

Sheer driving pleasure will also mean to relieve the driver. **Time** spent in the vehicle can be **used productively**.

Automation-Change

New players are entering the market

Google and Uber run the „Driverless Car“ as Game Changer for **urban mobility** („Automated Ridesharing“).

Pull: Customer Benefits

HAD is the chance, to make the next big step towards **accident free driving**.

Push: New Players

Actors from other markets with deep knowledge in **robotics** and **artificial intelligence.**

AUTONOMOUS DRIVING HELPS TO ENSURE OUR POSITION AS TECHNOLOGY LEADER.

STRATEGY NUMBER ONE NEXT

Technology and innovation leader

Future focus: Powertrain technologies

Efficient Dynamics NEXT

Hydrogen

Future focus: Digitalization

Connectivity

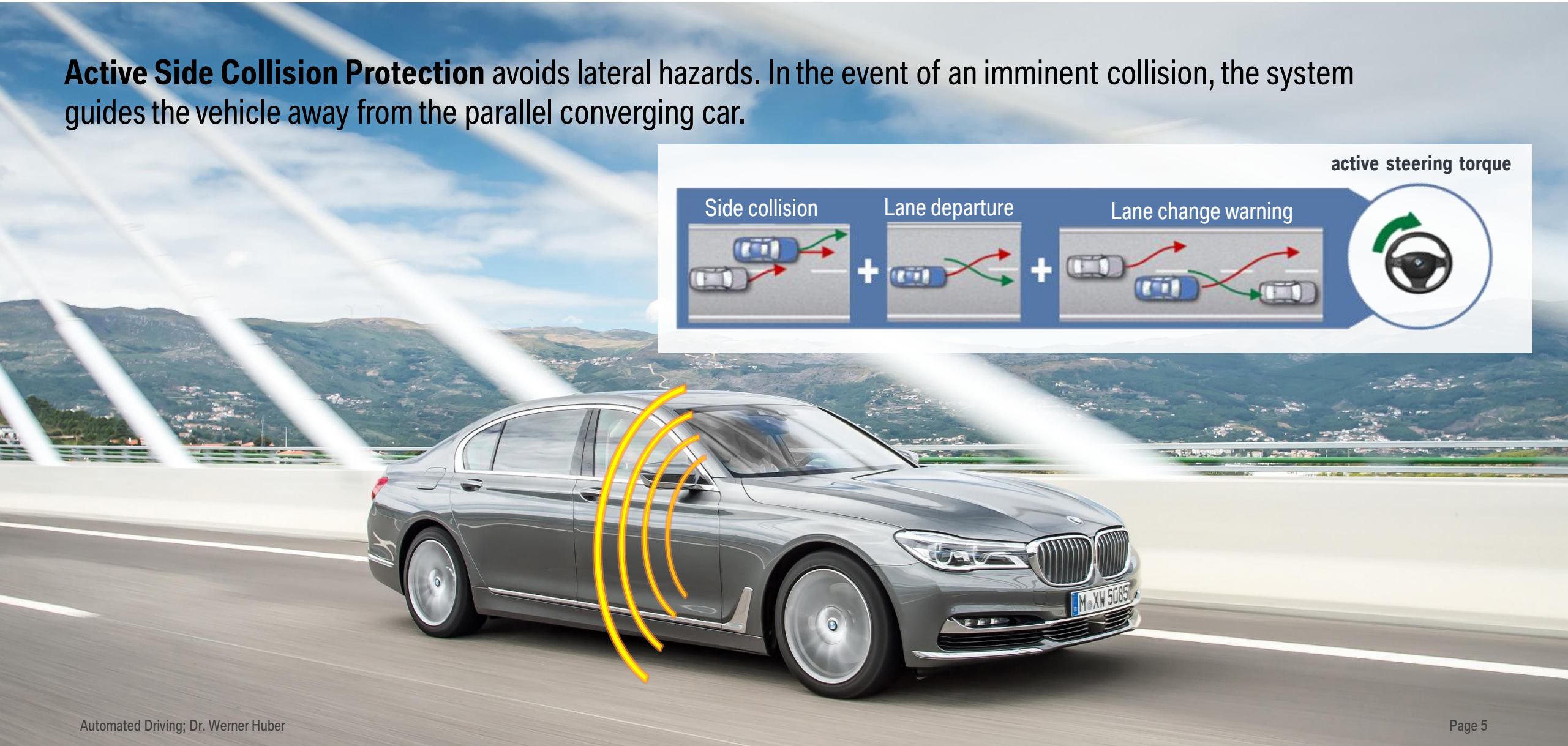
Artificial Intelligence

Autonomous driving

TODAY: THE NEW BMW 7 SERIES DRIVER ASSISTANCE PROVIDES COMFORT AND SAFETY AT THE HIGHEST LEVEL.

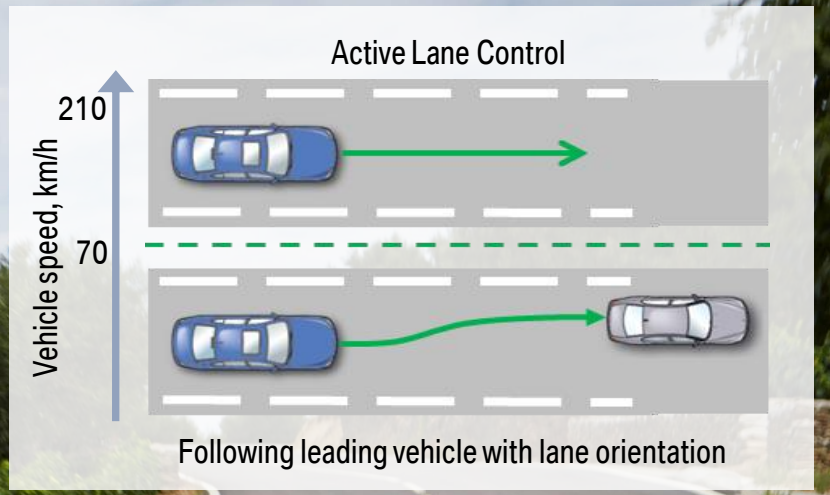
A NEW DIMENSION IN SAFETY.
ACTIVE SIDE COLLISION PROTECTION.

Active Side Collision Protection avoids lateral hazards. In the event of an imminent collision, the system guides the vehicle away from the parallel converging car.



PURE TRAVEL COMFORT.
STEERING & LANE CONTROL ASSISTANT.

The **Steering and Lane Control Assistant** actively assists in steering the vehicle towards the centre of a lane, relieving the driver from a monotonous driving task.

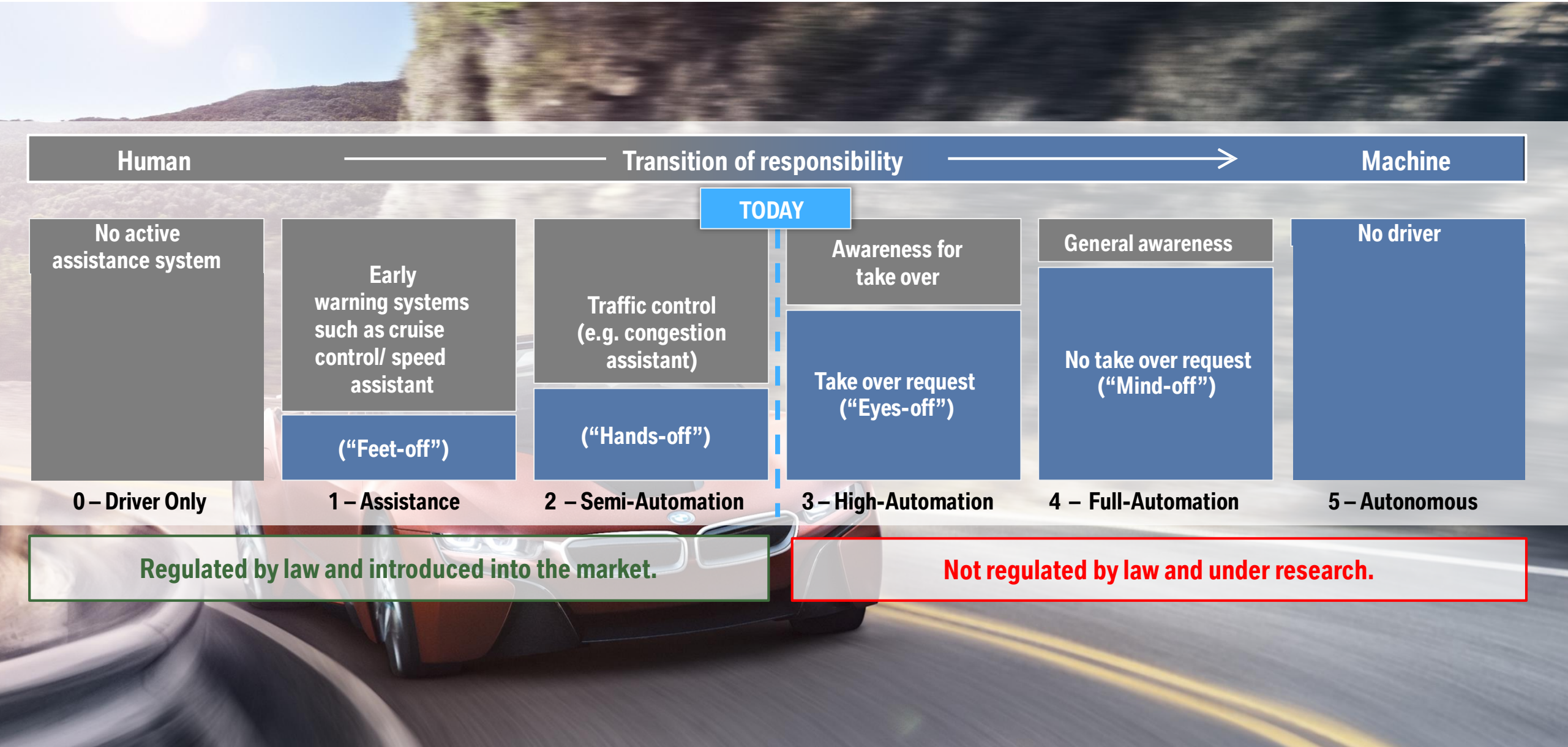


NEW PARKING EXPERIENCE.
REMOTE CONTROLLED PARKING.

Remote Control Parking allows the driver to comfortably initiate the automated parking procedure from outside the vehicle when the car must be parked in a narrow space or garage.

Automated Driving; Dr. Werner Huber

FUTURE: CHANGE OF RESPONSIBILITY FROM DRIVER TO VEHICLE. DEGREES OF AUTOMATION.



FIRST IDEAS BEING IMPLEMENTED TEN YEARS AGO

BMW Track Trainer (2006).

Remote Controlled Parking (2008).

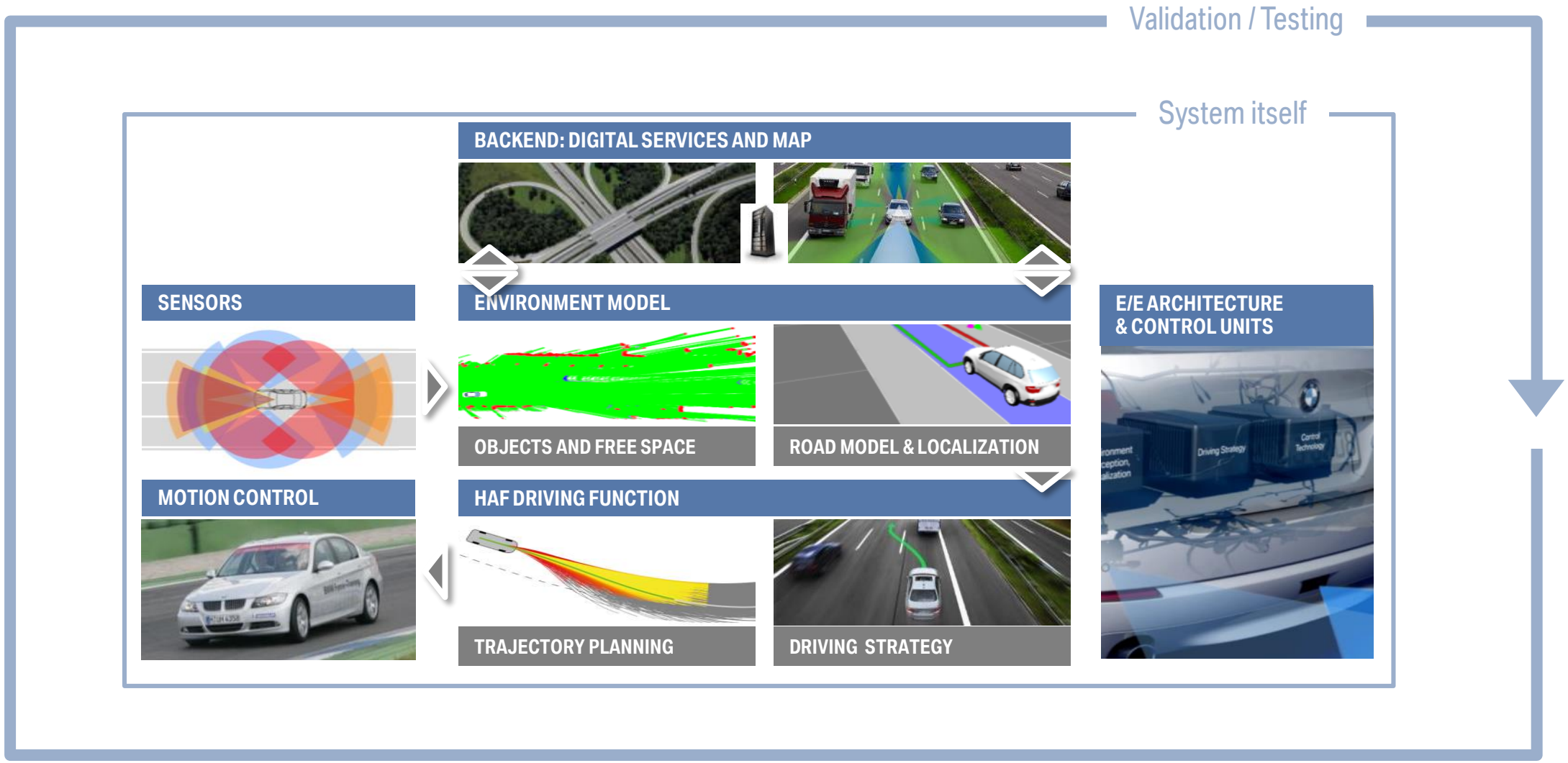
Emergency stop assistant (2009).

Highly automated driving on the motorway (Gen1: 2011; Gen2: 2014)

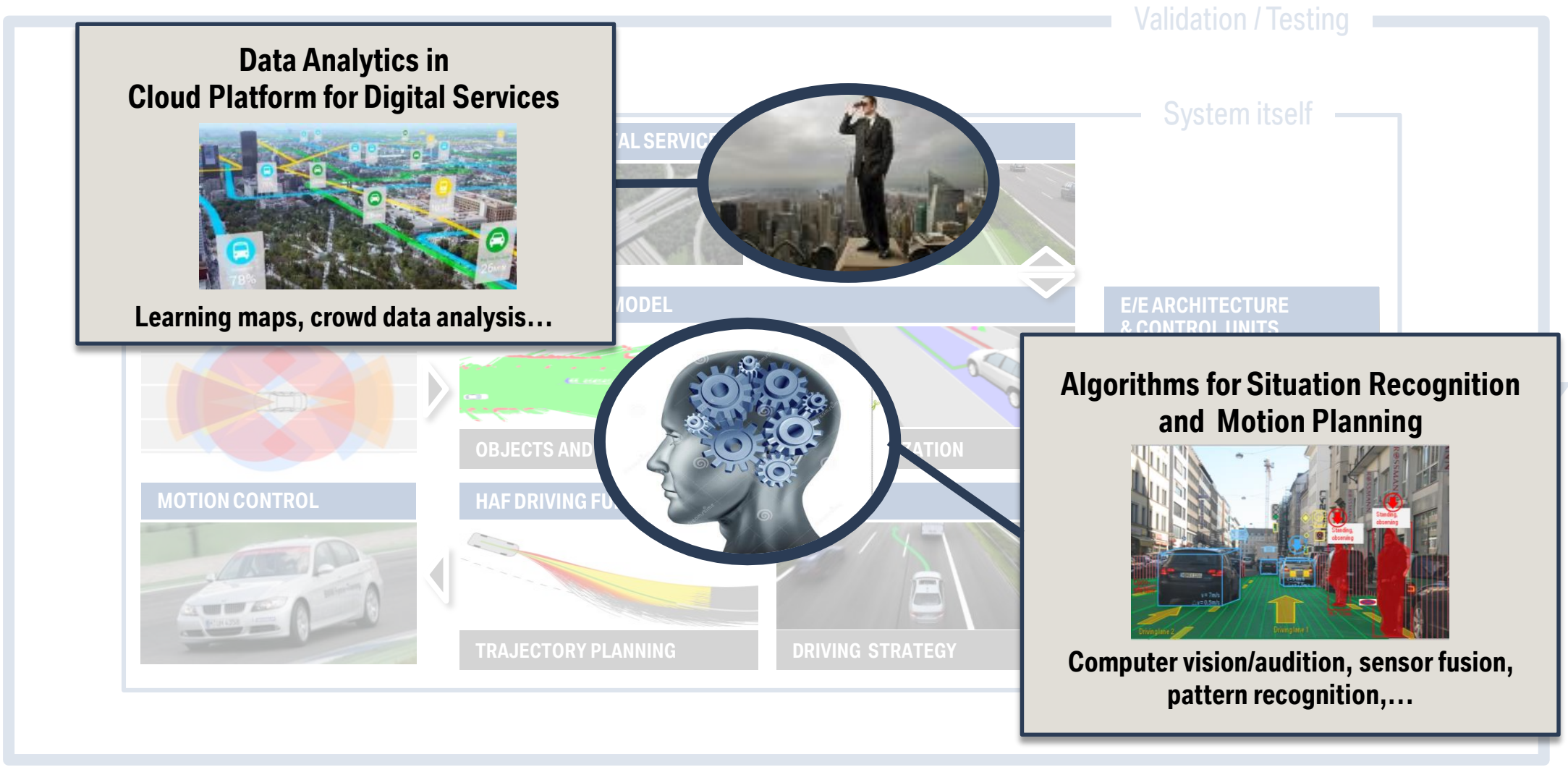
Highly automated driving at the limits of vehicle dynamics (2014).

Fully automated remote valet parking (2015).

MANY TECHNOLOGIES TO BE MASTERED ON THE WAY TO HAD. VEHICLE HAS TO ACHIEVE A SAFE STATE AT ANY TIME.



ARTIFICIAL INTELLIGENCE METHODS ARE CRUCIAL ELEMENTS.



First step: highly automated driving on motorways.

Motorway: Manageable complexity, structurally separated opposite lanes.

Human driver: "Still part of the game", doesn´t need to monitor the system, secondary tasks allowed, **BUT** he has to respond appropriately to a request.

Step 1

60 100

Traffic Jam Assistant

- 0 to 60 km/h in traffic situations.
- Following mode: Slower cars ahead.

Step 2

130

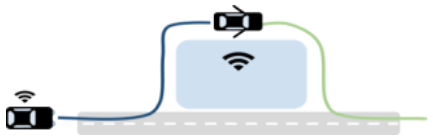
Highway Pilot

- 0 to 130 km/h in mixed traffic.
- Entry to exit.
- Managing all motorway use cases: construction areas, tunnels, obstacles…
- Comfortable and cooperative driving behaviour, keeping to all traffic rules.

ANOTHER INTERPREATION OF AUTOMATED DRIVING: “BMW TAKES OVER AT YOUR REQUEST” (LAS VEGAS, CES 2015).

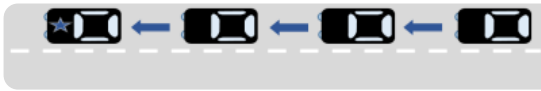
NEW MOBILITY SERVICES.

Step 1



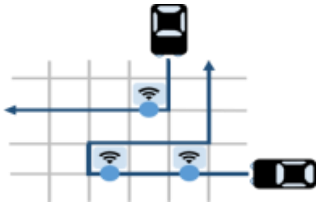
Autonomous Driving
to /from customer

Step 2



Autonomous Relocation
during Night

Step 3



Fully Automated
Driving/Ridesharing

CONCLUSION.

- Automated driving serves the driver, as it could significantly shape an accident-free and sustainable individual mobility.
- Artificial Intelligence and Robotics drive the future automotive development for vehicle automation.
- Strategic partnerships and co-operations becomes a crucial element.
- On the way towards automatic driving many technologies will be introduced to enhance the active safety of cars (during manual operation).
- Remaining challenges comprise cost-efficient industrialization as well as technological, social and legal aspects.
- A joint collaboration of all key players is necessary. BMW is active in all relevant working groups.

THANK YOU FOR YOUR ATTENTION.

DR. WERNER HUBER.

HEAD OF DRIVER ASSISTANCE AND PERCEPTION.