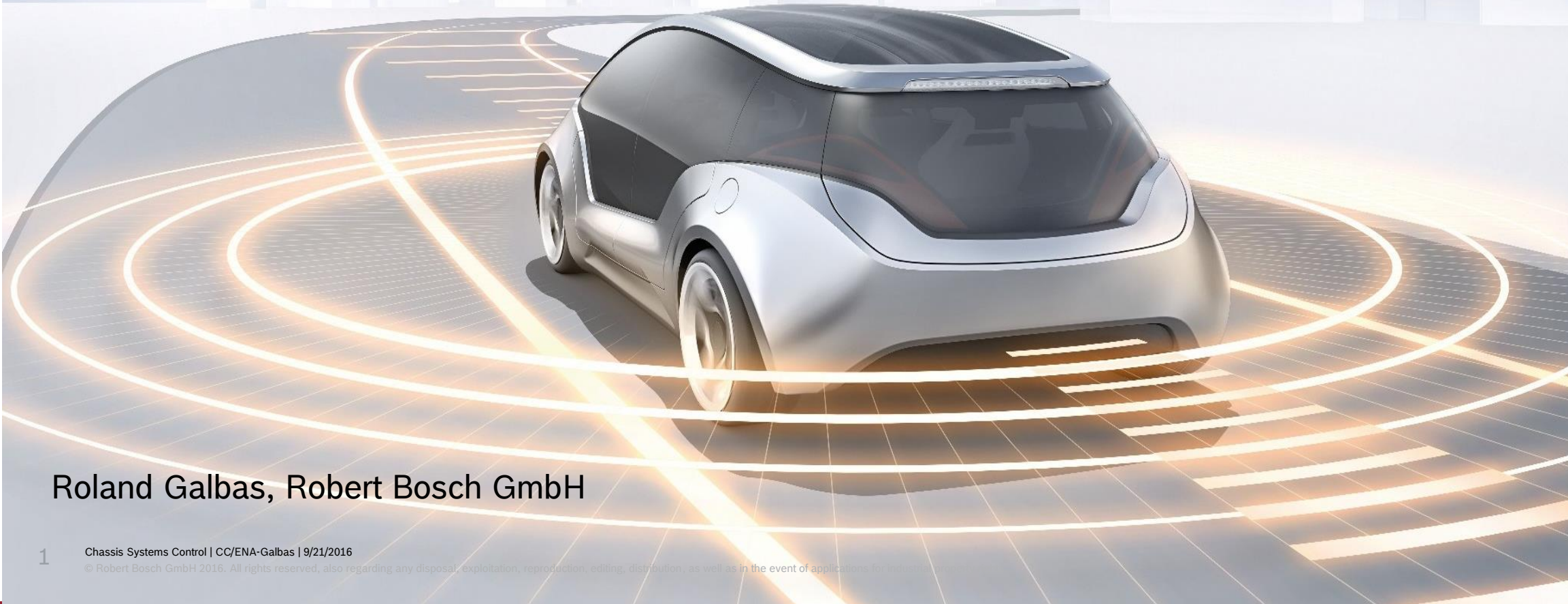


AMAA - 22.10.2016 BRUSSELS

HIGHLY AUTOMATED DRIVING - DISRUPTIVE ELEMENTS AND CONSEQUENCES



Roland Galbas, Robert Bosch GmbH

Can we predict upcoming developments?

What do we expect?

- ▶ Disruptive elements by highly automated driving and changes towards the complete vehicle system.

What Challenges do we face?

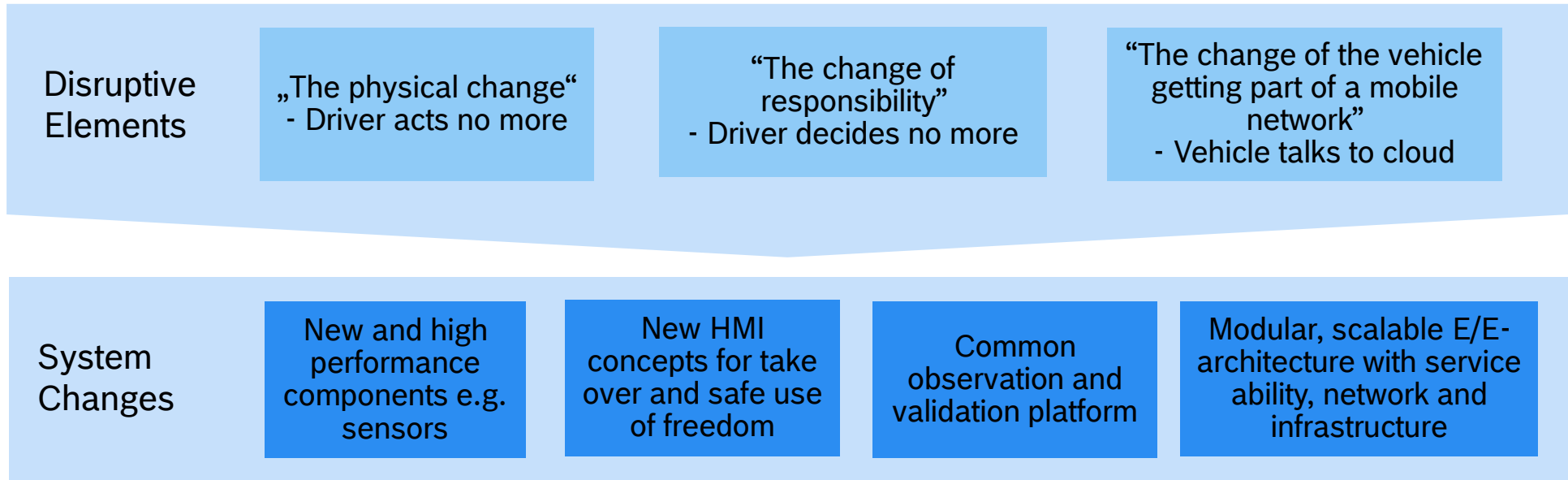
- ▶ Derived topics of automotive development.

Which approaches will cope?

- ▶ Necessities for facing global competition.

What do we expect regarding upcoming development?

► Disruptive elements by highly automated driving and changes towards the complete vehicle system.

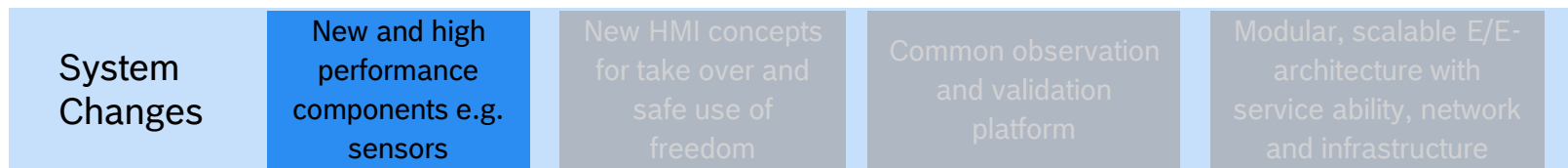


“The physical change“

The actuation role of the driver and the driver as preceptor, decider and observer turns to the vehicle – “Driver is no more fail-safe backup”.

Consequences

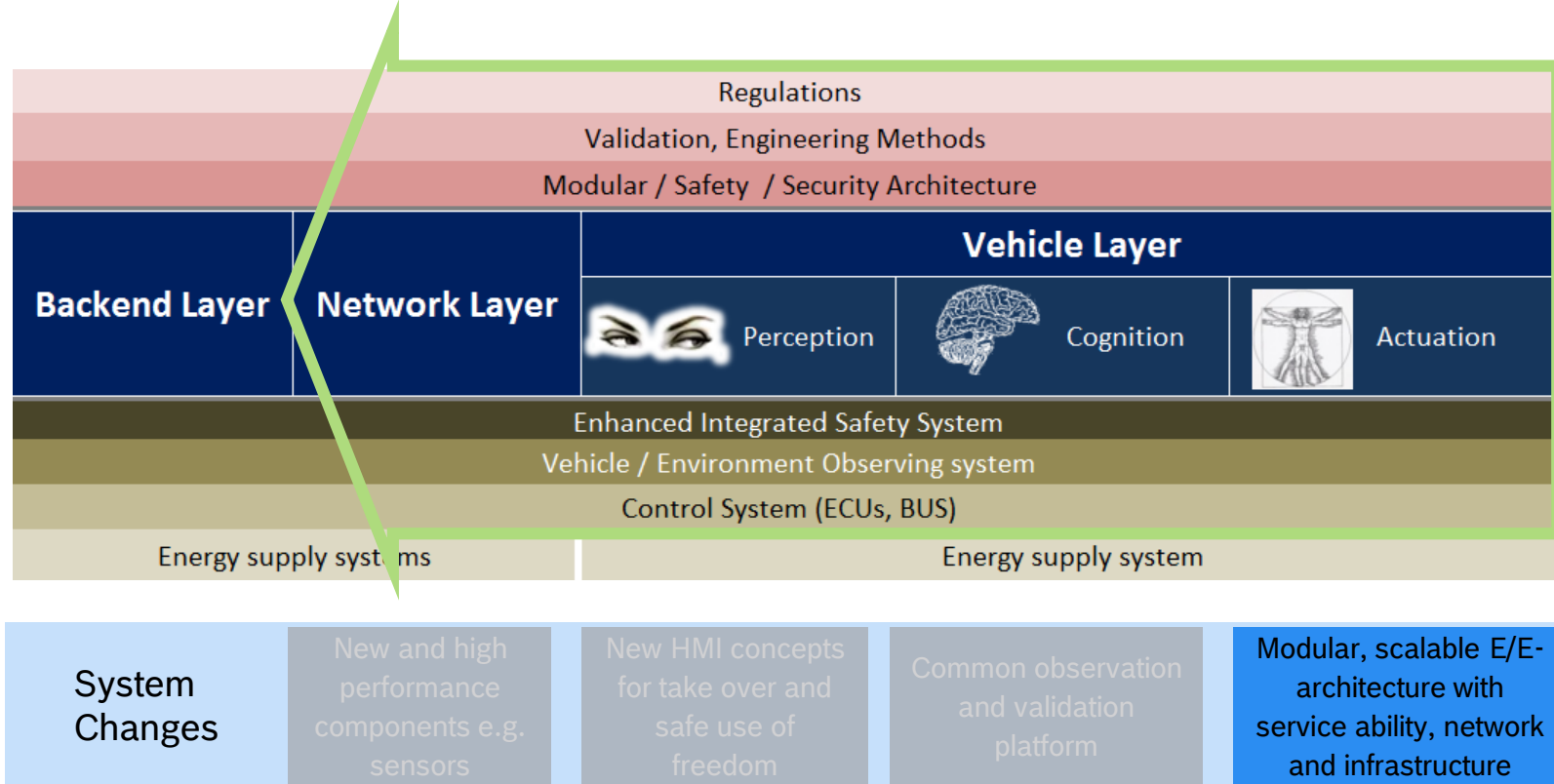
- The driver can't be considered as mechanical backup. System design has to cover “fail operational” ability.
- The typical “fail operational” design of braking, steering and subsystems as e.g. power-net requires redundancies.
- Interference of systems e.g. with power net leads to a considerable complexity and thus to a enormous solutions space.



“The change of the vehicle towards a part of a mobile network”

Consequences

- External mobility data will be part of driving functions - including safety impacts.
- Vehicle subsystems impose independent needs for in- and external data exchange.

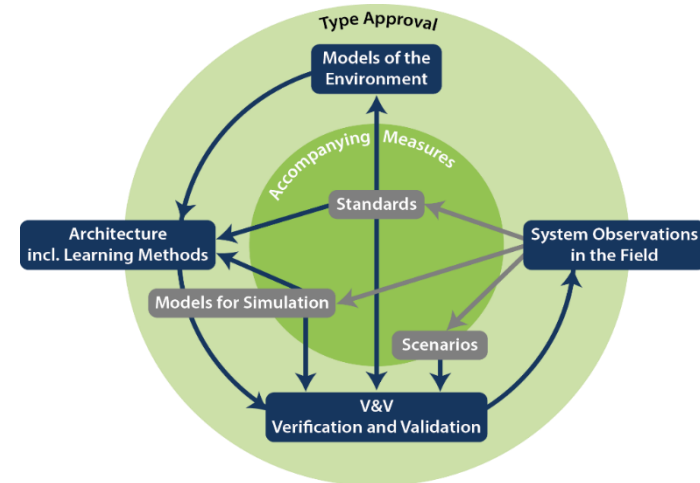


“The change of responsibility”

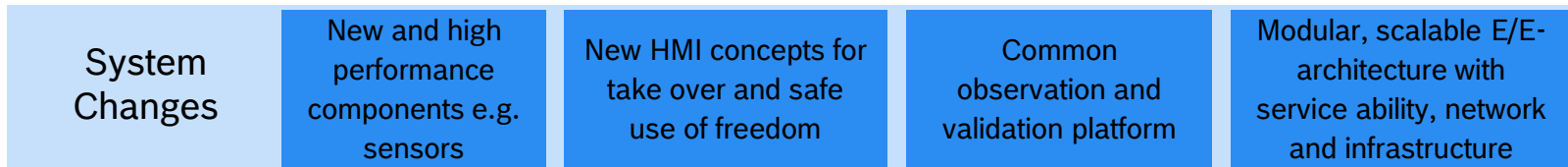
Responsibility is transferred from driver to vehicle. Changes, uncertainties and given risks of open word traffic originally handled by the driver are now to be handled by the vehicle itself – “Driver is no more responsible”.

Consequences

- Safe and comfortable use of new freedom (primary customer value).
- Higher safety expectations - Reason:
 - Machine better than human.
 - Product liability risk transfer to OEM.
- Common and permanent observation and learning.



Common and permanent observation and learning - Source: SafetTrans e.v.



What Challenges do we face?

► Derived topics of automotive development.

Costs

- Significant safety relevant system changes including completely new components
 - mainly not visible to the customer.

Complexity

- Strongly divergent solution space of functional and technological combinations.
- Fusion of the digital/telecommunication-world and the automotive-world.

Time to market

- New “digital” players & solutions will strongly reshape already established solutions. Early market deployment of new solutions will establish de-facto standards.
- Regulations & methods have European wide to adapt and to harmonized.

Witch approaches will cope?

► Necessities for facing global competition.

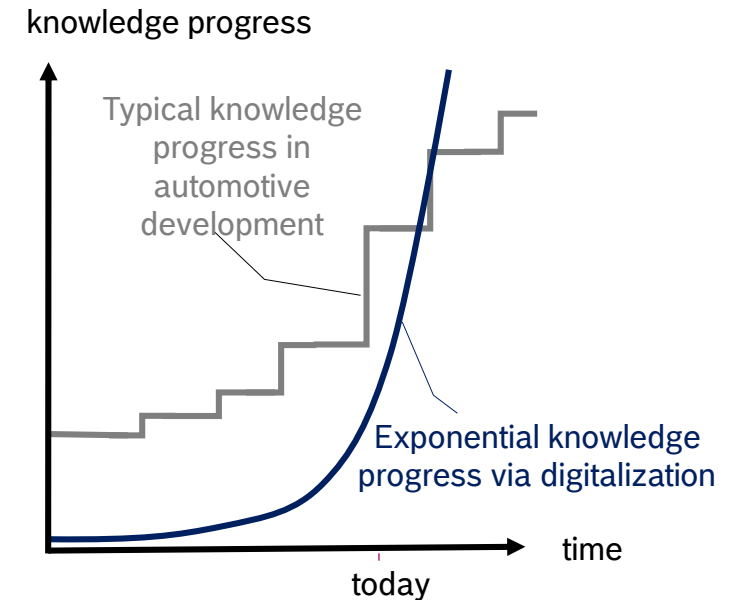
Collaboration

Common European development and especially a common safety assessment can:

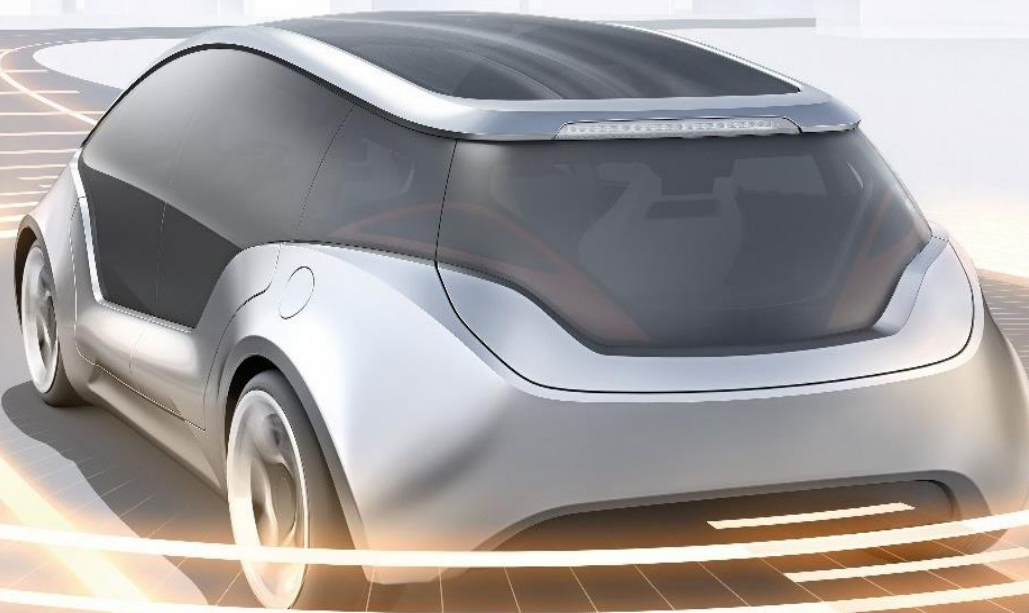
- Mitigate the (product) liability risks,
- Minimize investment risks e.g. by quasi standards,
- Accelerating the legal harmonization process and enable early market deployment.

Digitalization - driver of the scenario and also the key to it.

- Cope with complexity e.g. to find optimized solutions using new technologies (e.g. deep learning).
- Reduce “time to market” e.g. by transforming real world test into simulation.
- Enable new business options & models.



Thank you for your Attention.



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