Research Project MEHREN
Potentials of Highly-Integrated Wheel Hub Drives for New Vehicle Concepts

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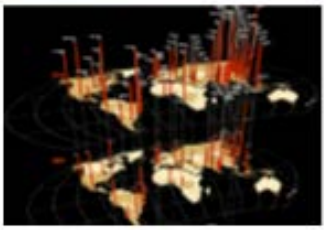
Motivation
Urbanization Is Challenging Tomorrow's Mobility



By 2030, an additional 1.4 bn. people will be living in metropolitan regions.



Wheel Hub Drive
Will It Work?

Unsprung mass

Impact load

Environmental conditions

Wheel Hub Drive
Will It Work?

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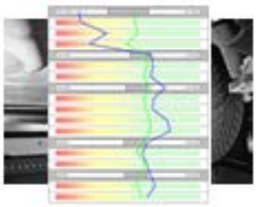
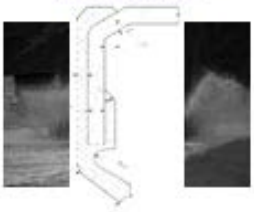
Unsprung mass



Impact load

Environmental conditions



Wheel Hub Drive
Stages of Development at Schaeffler

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Today

E-WD Alpha
Basic tests drives

E-WD Beta
Complete functional integration

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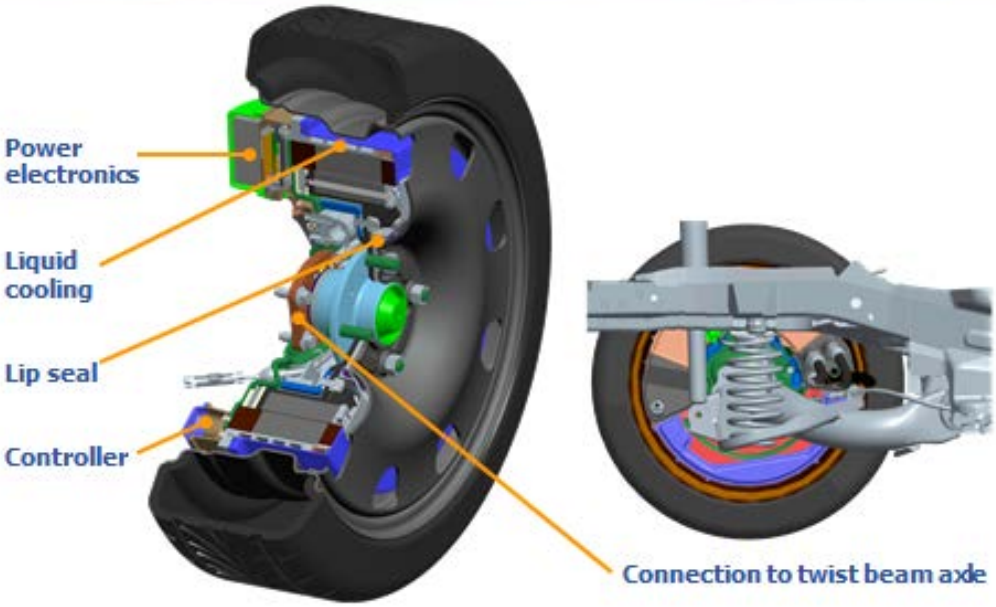
E-WD Gamma
Systems engineering for series preparation

Wheel Hub Drive
Current E-Wheel Drive Design

Torque:	350Nm / 700Nm (continuous /peak)
Performance:	33kW /40 kW (continuous /peak)
Voltage:	360...420V
Additional mass:	45kg

Wheel Hub Drive
Current E-Wheel Drive Design



Technology Demonstrator
Joint Ford/Schaeffler Development Project

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Targets:

- **Component testing of E-Wheel Drive**
- **Implementation of basic driving strategy**
  (longitudinal dynamics, torque vectoring, wheel slip control)
- **Attribute testing: steering, handling, ride, performance, NVH**
- **Functional safety relevant investigations**

Technology Demonstrator
Vehicle Configuration

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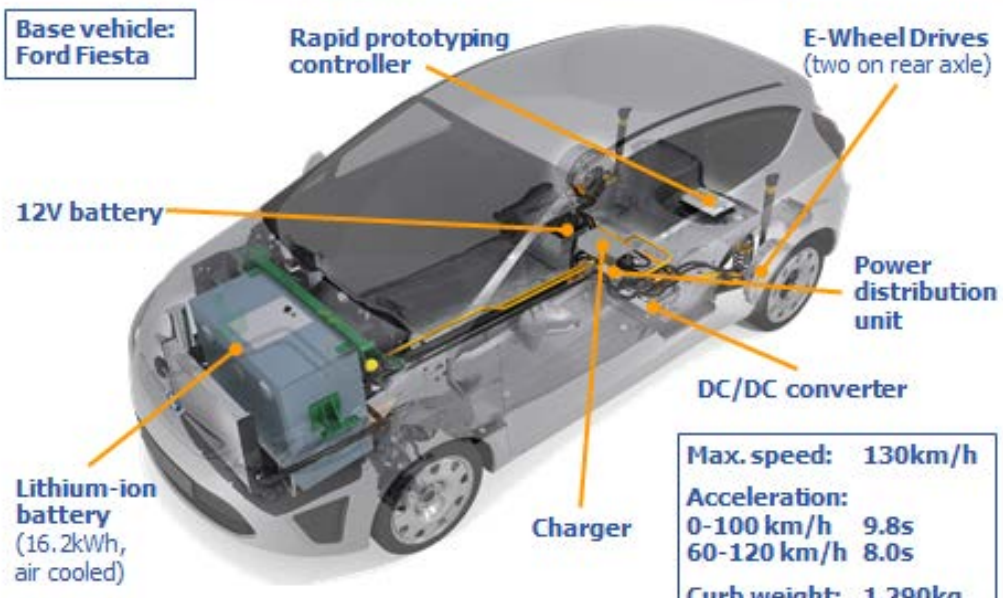
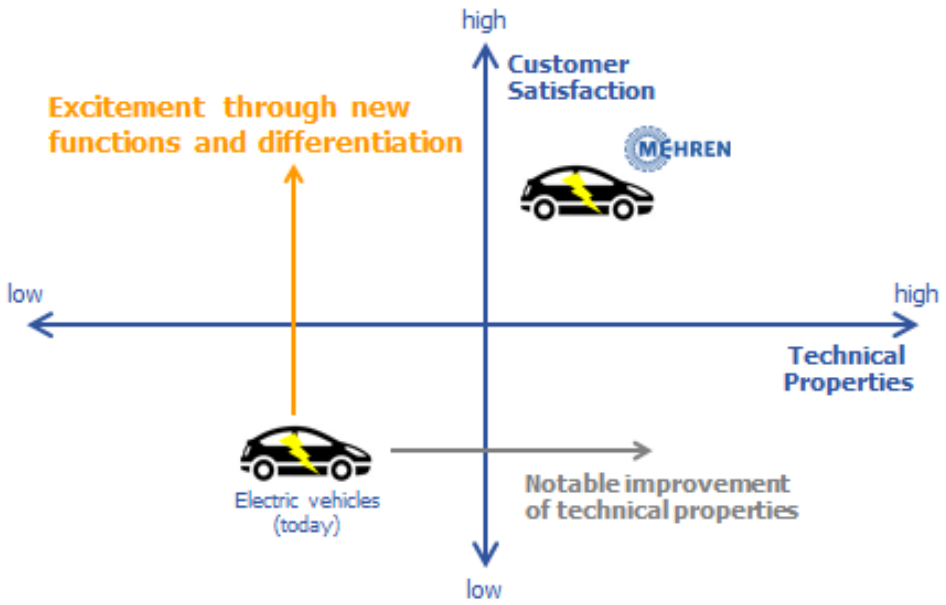


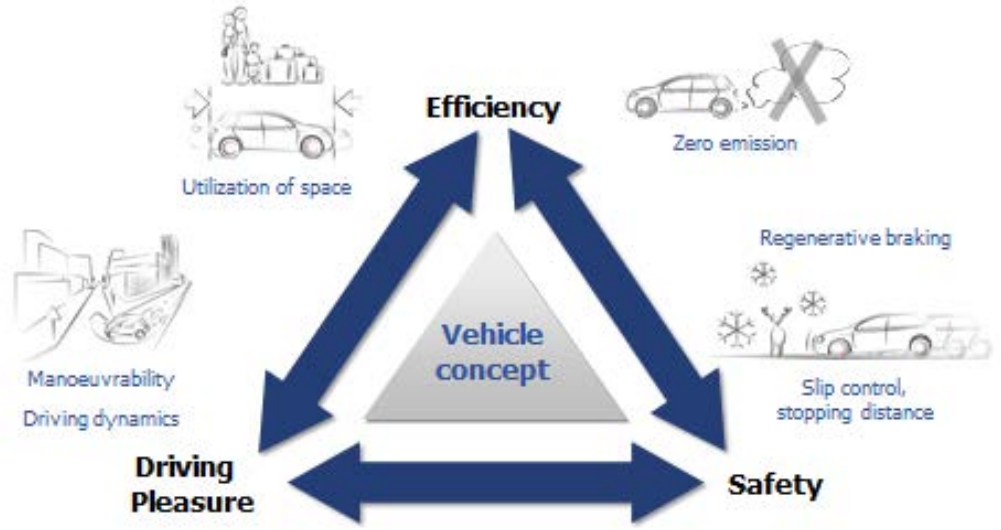
Technology Demonstrator
Main Findings

- Good driving performance in all tested drive cycles; series performance requirements not yet fully met
- Drive cycle braking possible with regenerative braking only; integration of friction brake insufficient (thermal behaviour)
- Unsprung masses not critical for driving safety and comfort within relevant speed range
- Mechanical robustness of the E-Wheel Drive demonstrated
- Drive noise emissions and transfer into body too high

Vehicle Concept
Motivation



Vehicle Concept
Goals



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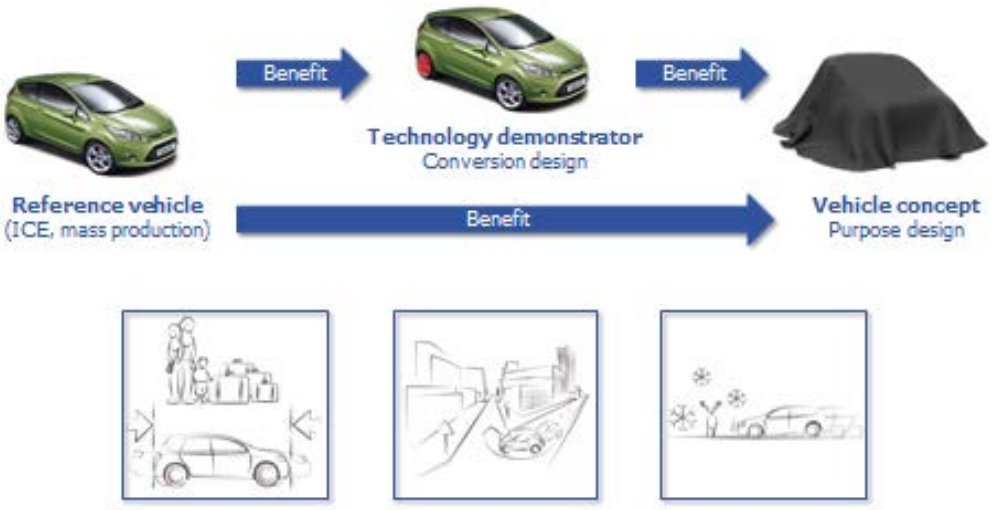
Vehicle Concept
MEHREN Approach



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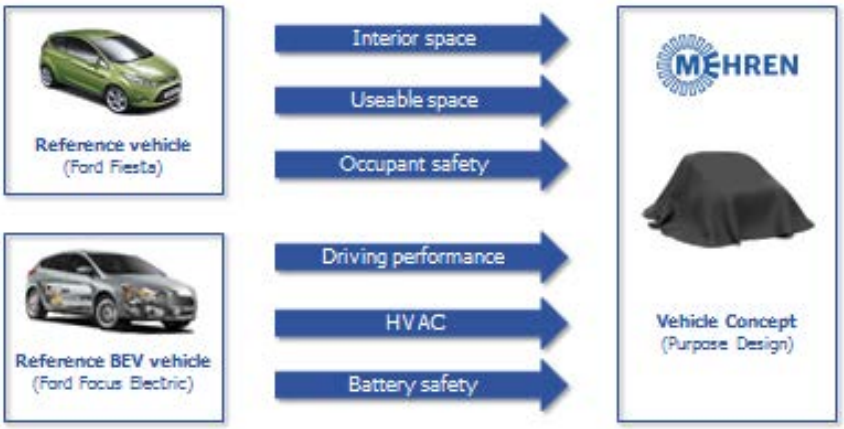
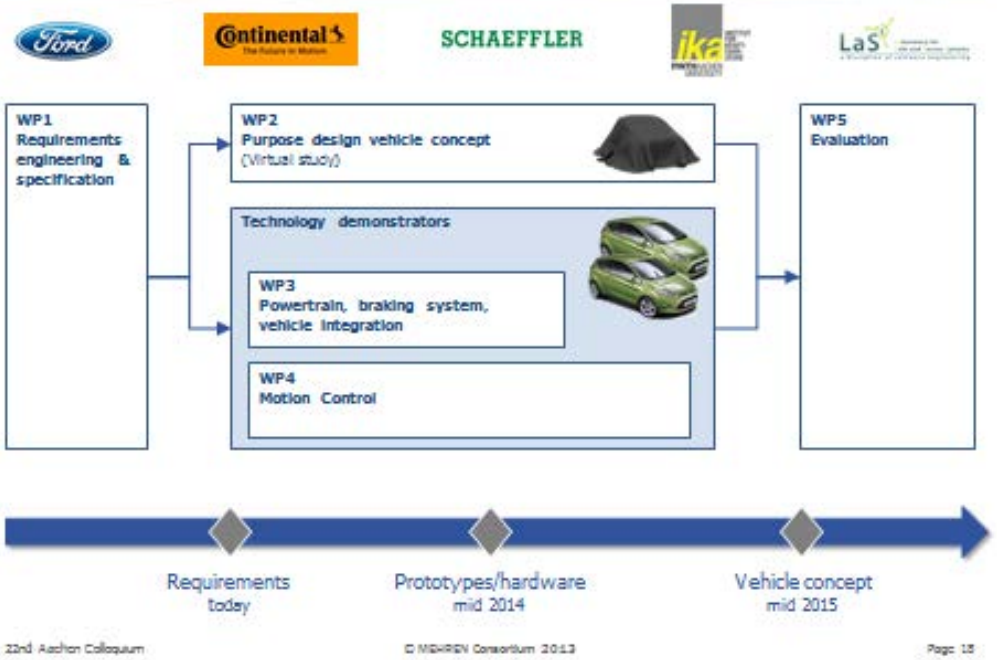
Vehicle Concept
Definition of Requirements



Outlook



Thank You for Your Attention