Safe and Efficient Electrical Vehicle

Project presentation

Joint EC / European Green Cars Initiative Clustering Event 2012

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Agenda

Simplified Architecture by the use of Decision Units

- eFuture outline
- Technological challenges and approach
- Architecture concept and function examples
- Exploitation and cooperation

Outline of eFuture

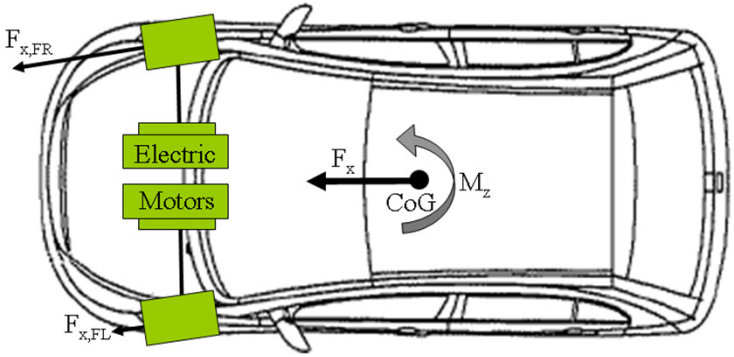
„Safe and Efficient Electrical Vehicle“

- Funded by the European Commission (grant no. 258133)
- Duration 3 years (until September 2013)
- Budget ca. 7 Mio. Euro
- Funding ca. 4 Mio. Euro
- 6 partners from 4 countries
  4 from industry
  2 research institutes
- Coordinator:
  Intedis, Würzburg

Technological challenges

„Safe and Efficient Electrical Vehicle“

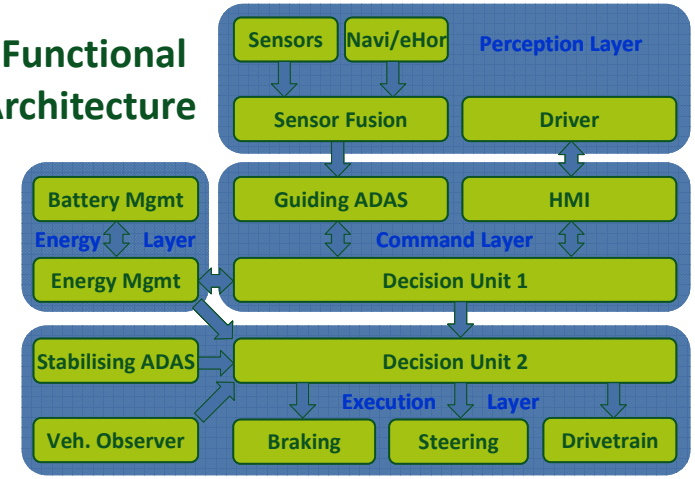
- **Safety**
  - 2 front electric motors
  - Agility vs. controlling risk
  - Functional safety (ISO 26262)
- **Efficiency**
  - Enhancing the driving range by intelligent and anticipatory functions with inclusion of the driver („virtual range extender“)
- **Intelligent functional architecture**
  - Support of Safety by hierarchic composition and clear task sharing
  - Support of Efficiency by green functions and green parameters

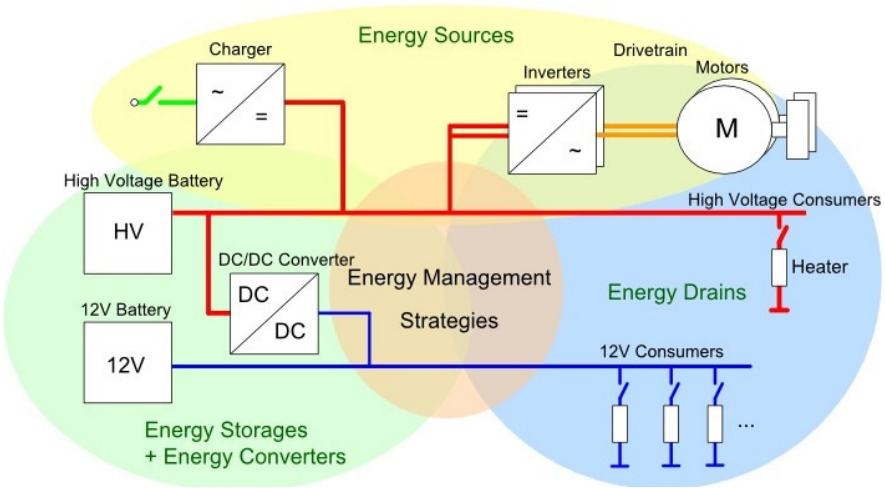


Technological approach

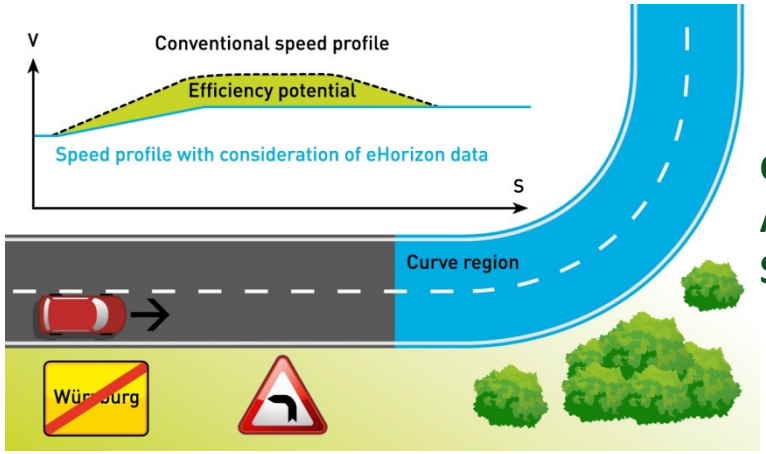
„Safe and Efficient Electrical Vehicle“

Functional Architecture





Energy management



Green Assistance Systems

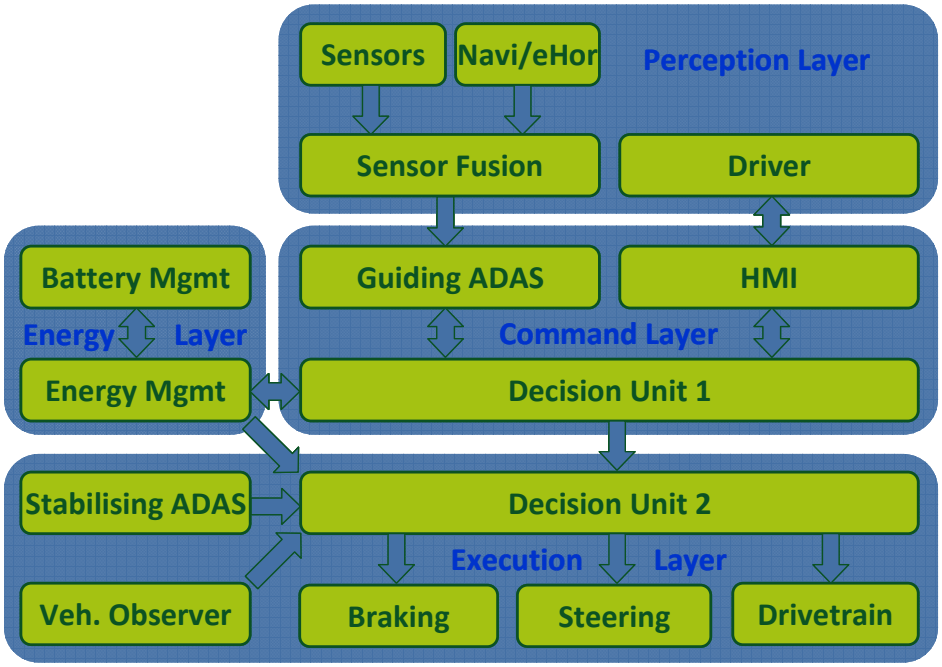
Driver Coaching

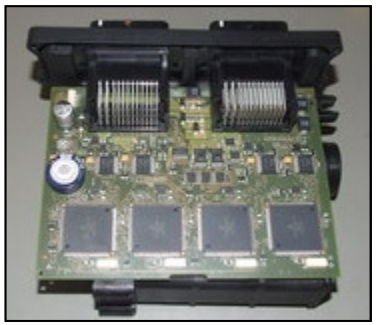
eFuture's compact functional architecture

...supports energy efficiency and safety

- Corresponding domains between SW and HW
- Introduction of decision units as central intelligence functions
- Allowing for various new functions

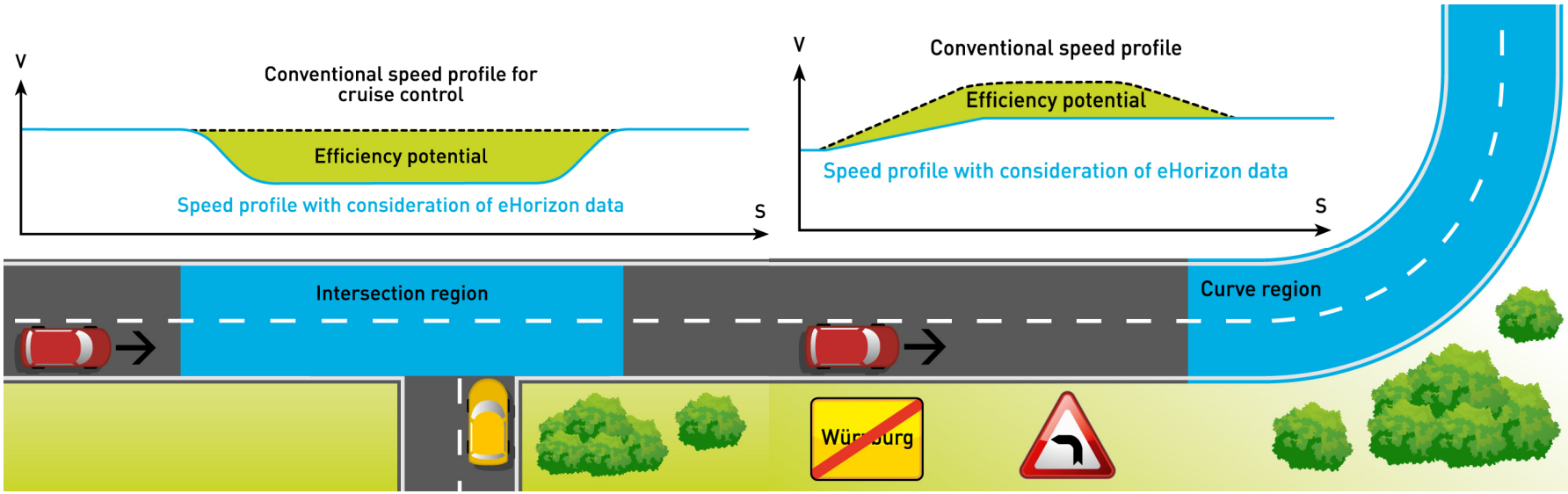
Adv. Energy Mgmt. | Energy Modes | Driver Coaching | Smart & Green ACC | Vehicle Observer | Torque Vectoring





Example 1: Green assistance systems

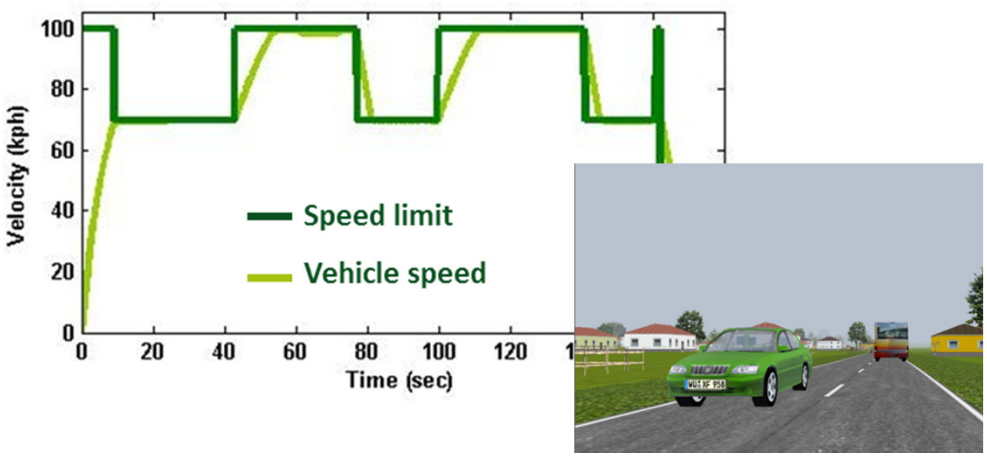
- Implementation of eHorizon for improvement of safety and efficiency
- ADAS speed profiles adapted to road topography



Example 2: Driver Coaching

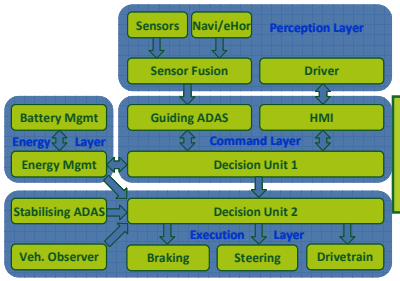
Taking the driver into the efficiency control loop

- Driving style evaluation, efficiency advices
- Driver acceptance studies to prevent annoying messages
- Investigation of power limitations to save energy (ECO mode)

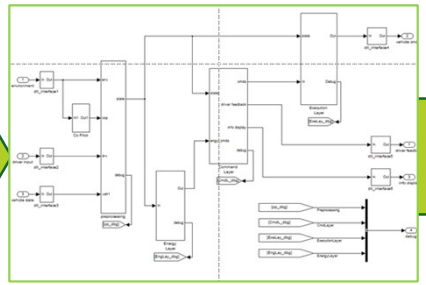


Vehicle Integration

- Migration from simulation to the vehicle
- Validation of the concept



Functional Architecture



Simulation Model

Lab Testing

Exploitation and cooperation

- **Exploitation potential of project results**
  - Use of functional architecture as a prototype for an open domain controller architecture
  - Using functions (Green ADAS, Energy Management, Driver Coaching) as prototypes for further virtual range extenders
  - The functional safety concept can serve as a starting point for multi wheel driven vehicles
- **Topics for cooperation**
  - Extending the Green ADAS functions to route planning
  - Aligning torque vector and driving stability concepts

- **We are open to discuss future project cooperations (next FP7 call!)**

Thank you for your attention.

Questions?

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