Safe and Efficient Electrical Vehicle

Joint EC / EPoSS / ERTRAC Expert Workshop 2011
Electric Vehicle System Integration and Architecture
30 JUNE 2011
Berlin

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Agenda

- » **Objectives**
- » **Partners and work packages**
- » **Architecture definition – Ideas and Challenges**

EC funded corporate research project, 2010-2013, framework: Green Cars Initiative
Grant number 258133

Objectives of the project

- **Innovative E/E Architecture**: ***how to design a lean and interconnected component set for FEV*.**
  - Holistic approach to overcome separate ECUs and account for Domain Controller trend
- **Adaptive driveline**: ***how to facilitate safe and efficient driving by an intelligent two motor concept*.**
  - Achieve advanced driving stability while maintaining a high level of functional safety
- **Human energy management**: ***how to support the driver for intelligent energy use*.**
  - Proper choice of driving modes
  - Efficient driving
- **Greening the ADAS**: ***how to use driver assistance ecologically.***
  - New functions to support safe and efficient driving
  - Take advantage of extended environment knowledge

Partners

INTEDIS
E/E Architecture, Vehicle Specifications, PM

TATA Motors Engineering Technical Centre
Vehicle Concept, Vehicle & Prototype builds,

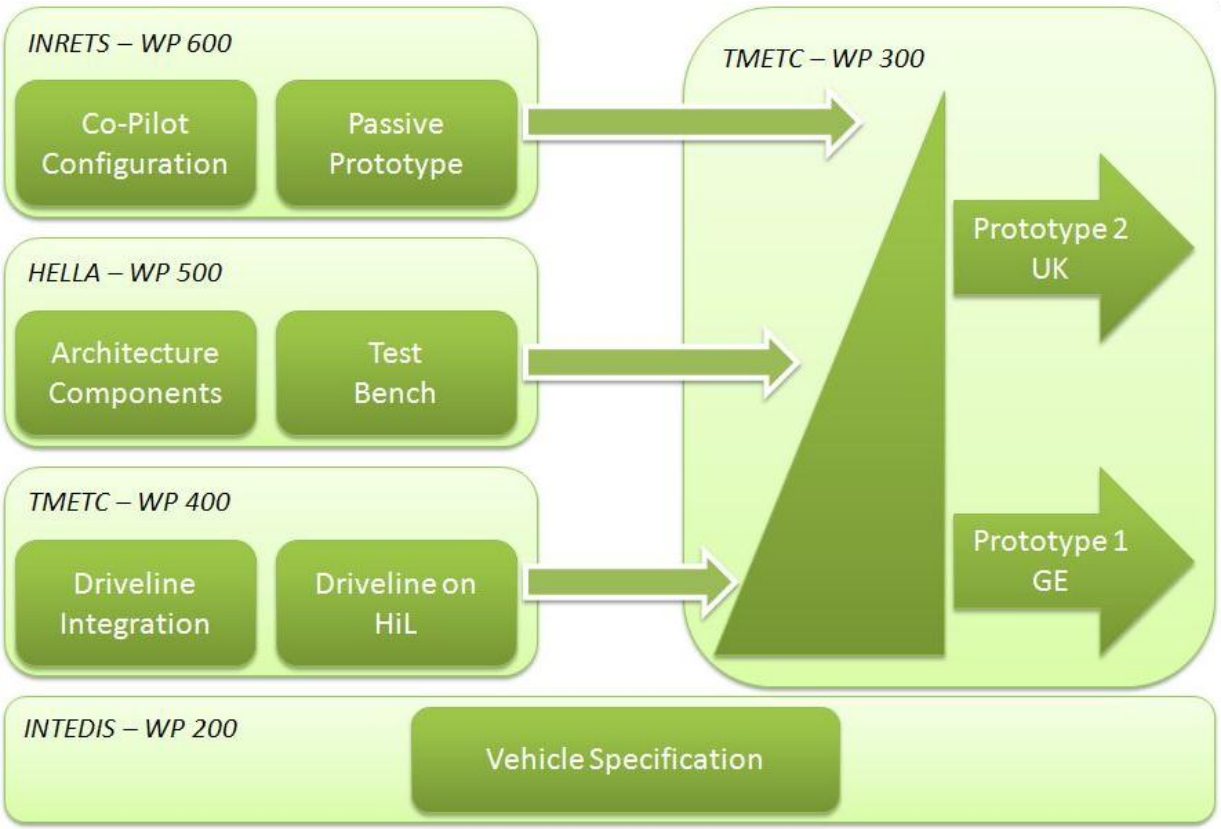
HELLA – Electronic Components, Energy & Battery Management

MILJØBIL
Traction Battery – Concept and builds

IFSTTAR
Virtual Co-Pilot, Green ADAS

Würzburg Institute for Traffic Science
Driver Acceptance, HMI functions

Working Packages

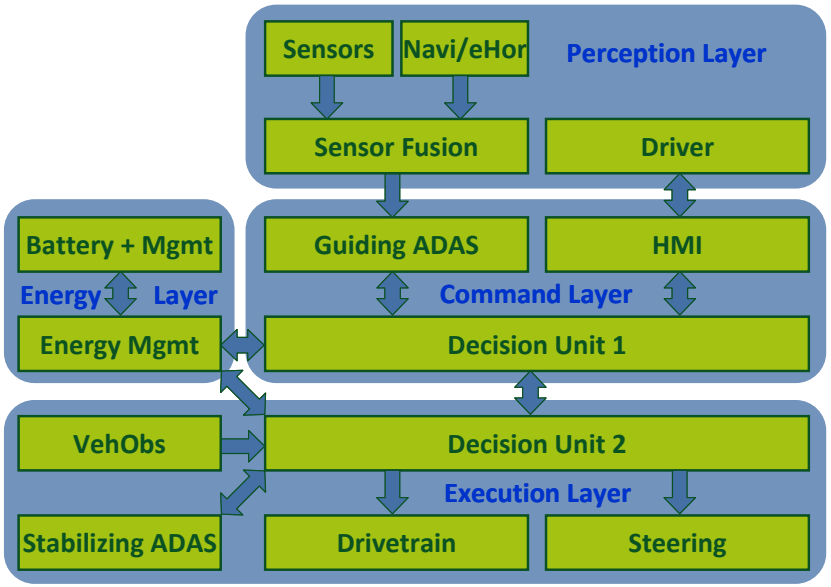


- ***Start of project***
  - *Sept. 2010*
- ***End of project***
  - *Aug. 2013*
- ***Milestones every 6 months***
- ***24 deliverables***
- ***Project coordination by Intedis (WP 100)***

Architecture definition

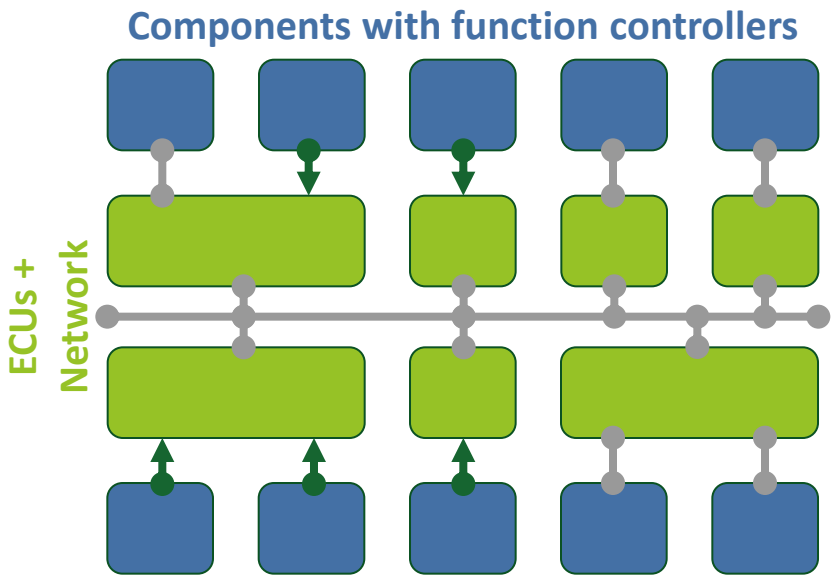
- **Basic ideas**
  - Reduce number of control units
  - Create new functions by using existing functions
  - Arbitrate between comfort, efficiency and safety by decision units
  - Managing the transfer from assisted to manual driving and v.v.

Layer model with Decision Units

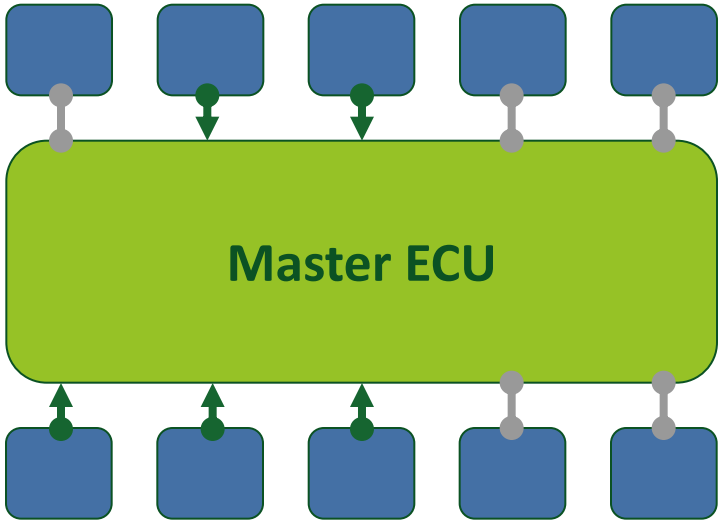


Architecture definition

- **Basic ideas**
  - Reduce number of control units
  - Today‘s situation vs. the extreme



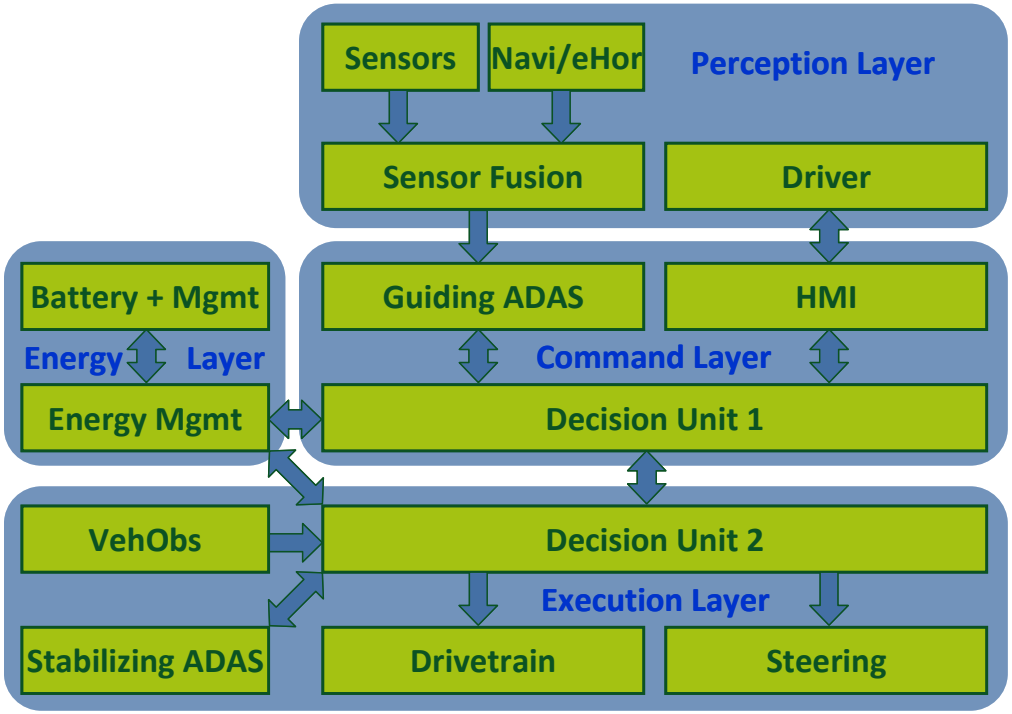
Today



Tomorrow?

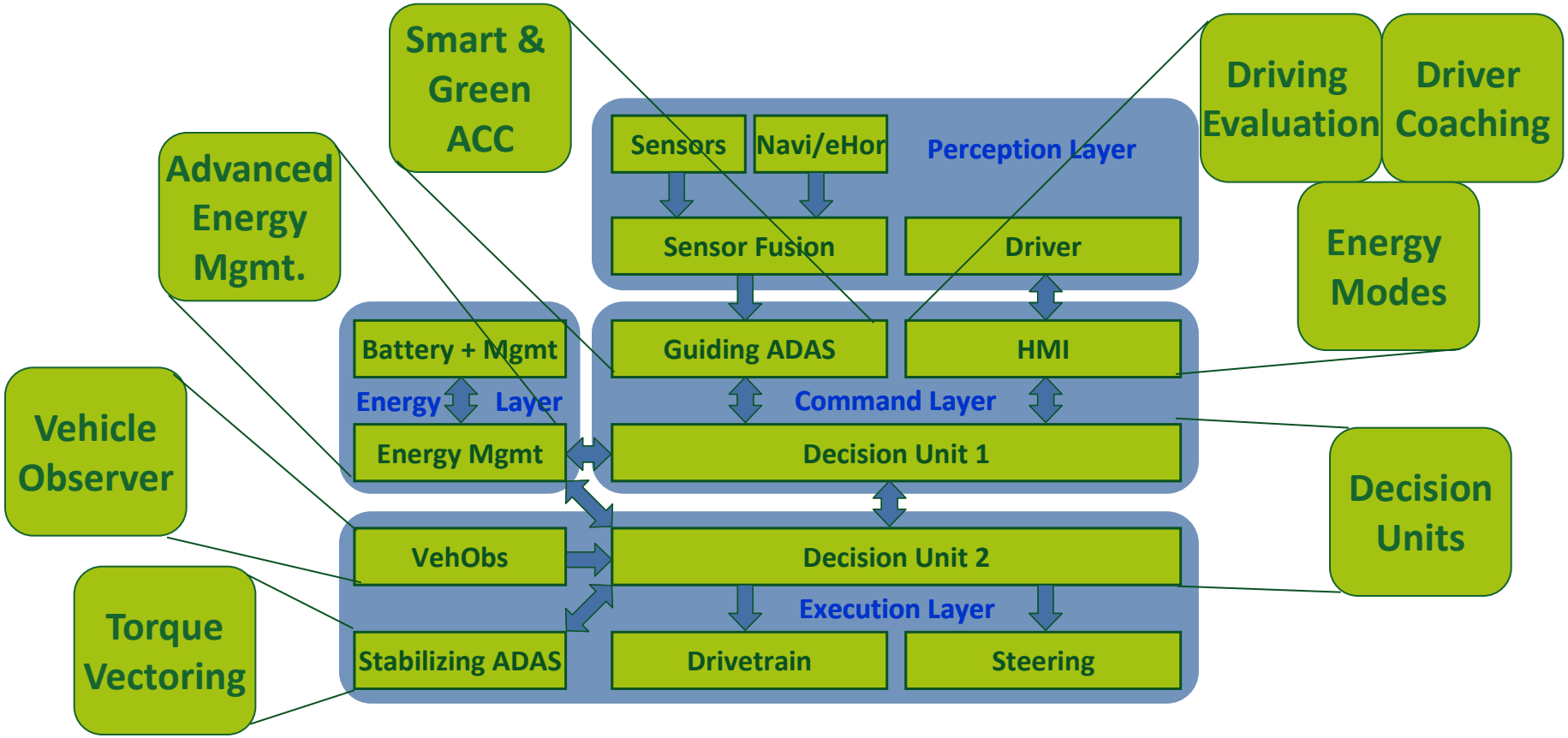
Architecture definition

- **Basic ideas**
  - Reduce number of control units
  - Intermediate solution with Decision Units as central intelligence



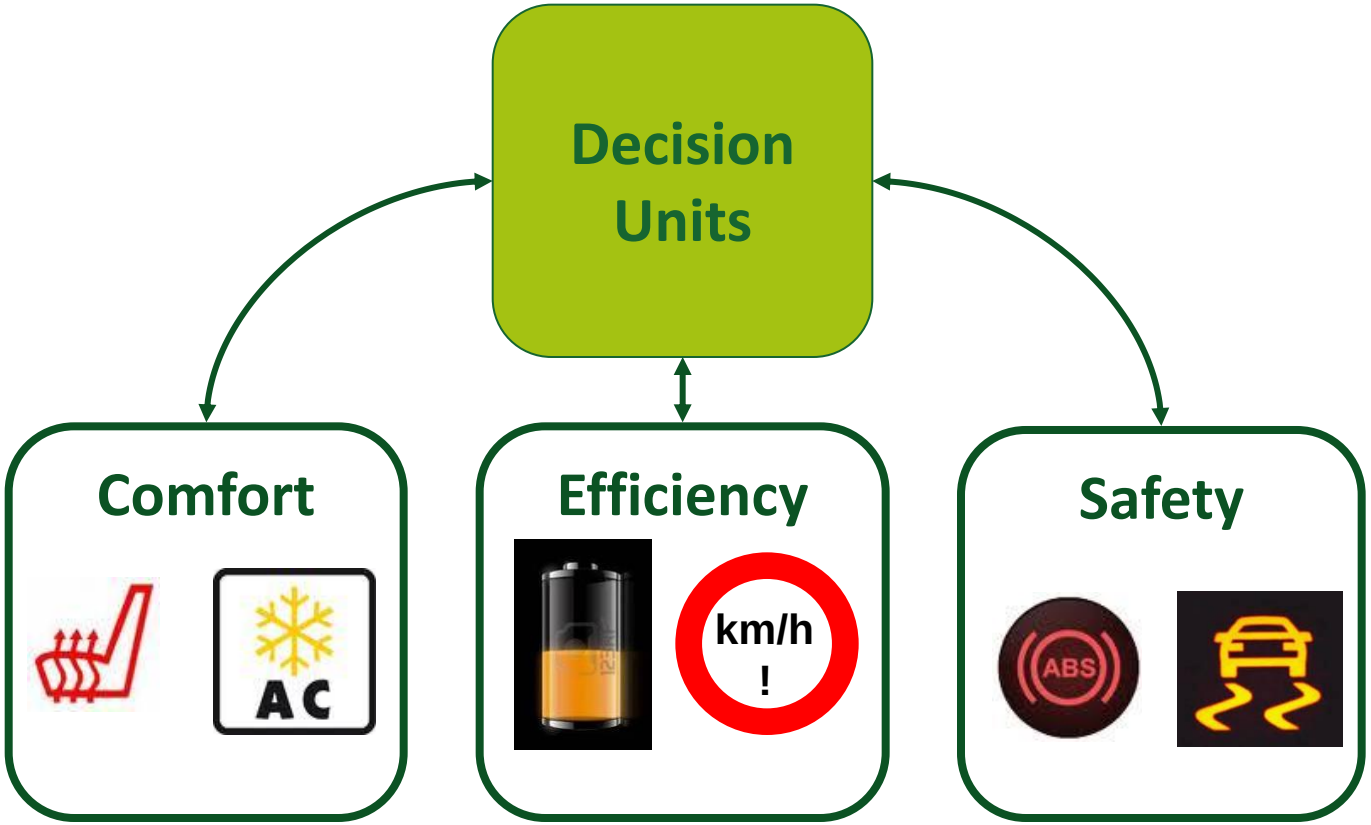
Architecture definition

- **Basic ideas**
  - Create new functions by using existing functions



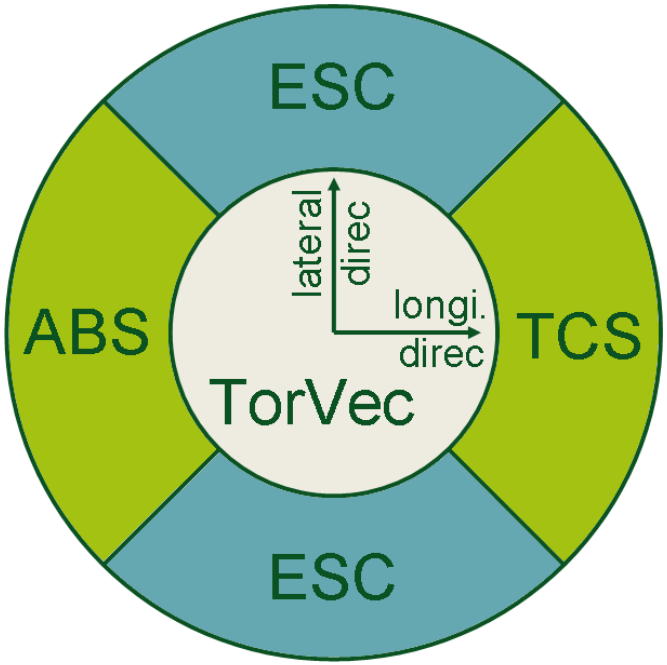
Architecture definition

- **Basic ideas**
  - Arbitrate between comfort, efficiency and safety by decision units



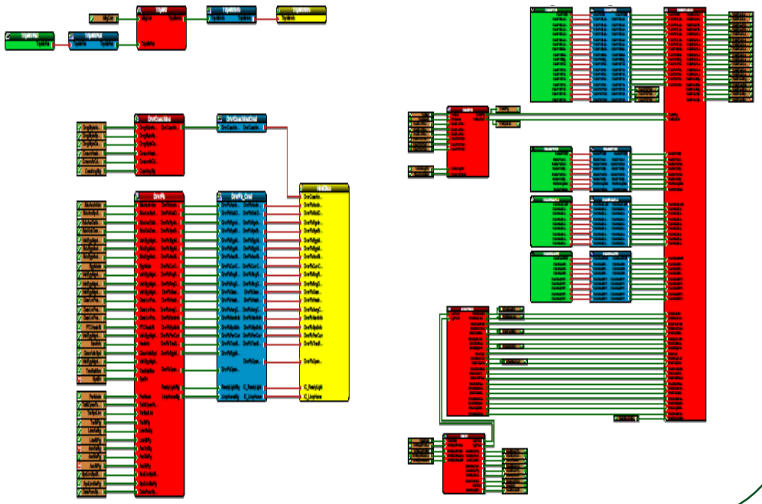
Architecture definition

- **Basic ideas**
  - Managing the transfer from assisted to manual driving and v.v.
  - Example: Choice and transition of stabilizing ADAS in the DU2

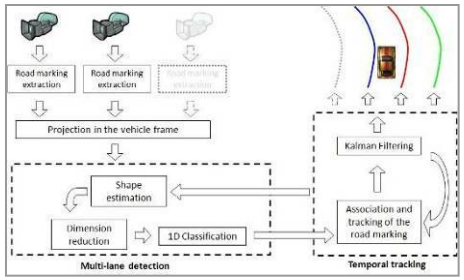


Tools for architecture development

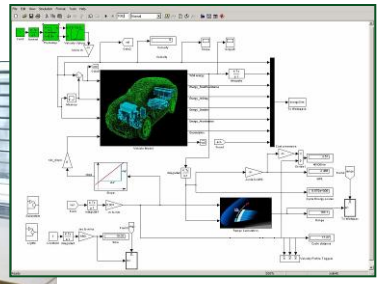
Functional modelling



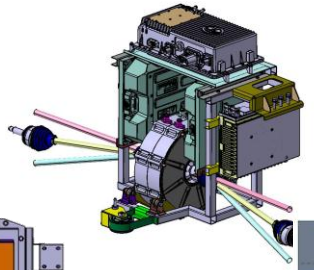
Function and scenario definition



Vehicle modelling

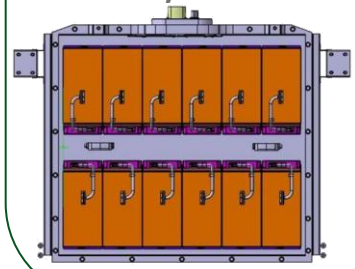


Definition of hardware concept

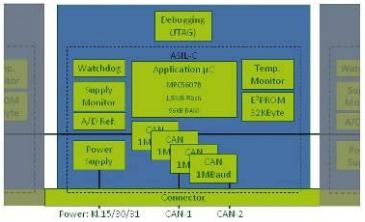


motors

battery

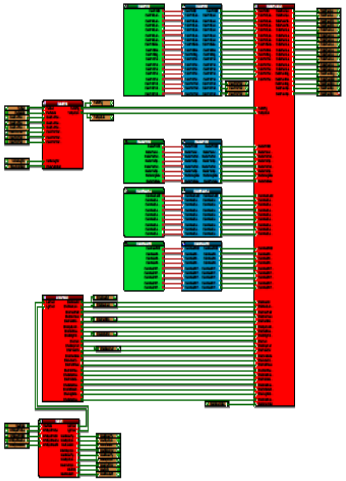


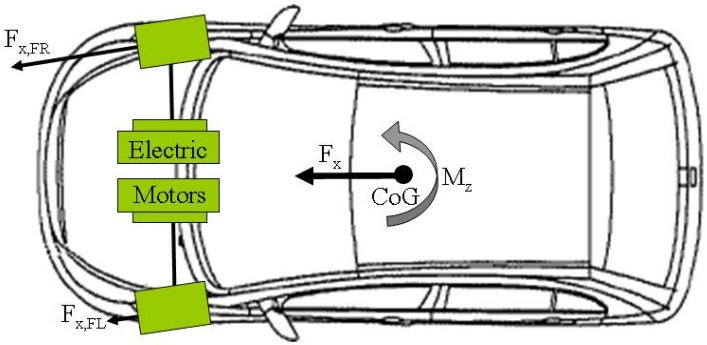
head unit



Challenges

- » *Align all functions in a consistent model*
- » *Implement a Functional Safety Concept for an electric drivetrain with two front motors*
- » *Set up prototype (HW&SW) and validate functions and architecture*





eFuture

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Thank you for your attention. Questions?

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