

DAIMLERCHRYSLER

Future mechatronical platform for easy application of assistant systems - EU-project PEIT

PEIT - Powertrain Equipped with Intelligent Technology

**Feierlich wissenschaftliche Tagung
der Ungarischen Akademie der Wissenschaften
„Nutzfahrzeugkonstruktionen und Verkehrssicherheit“**

**Retirement of Prof. Dr.-Ing. habil. Egon-Christian von Glasner
Budapest, July 1st 2003
Dr.-Ing. G. Spiegelberg**

Motivation of PEIT

Accident report



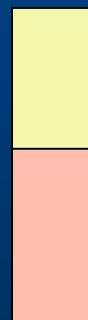
In Germany alone about 60.000 people / year are injured or lose life in accidents

The most dangerous accident classes with heavy good vehicles involved are:

- jack knifings,
- trailer oscillations
- roll overs
- lane departures



Goal : decreasing the numbers of accidents by 50 % until 2010

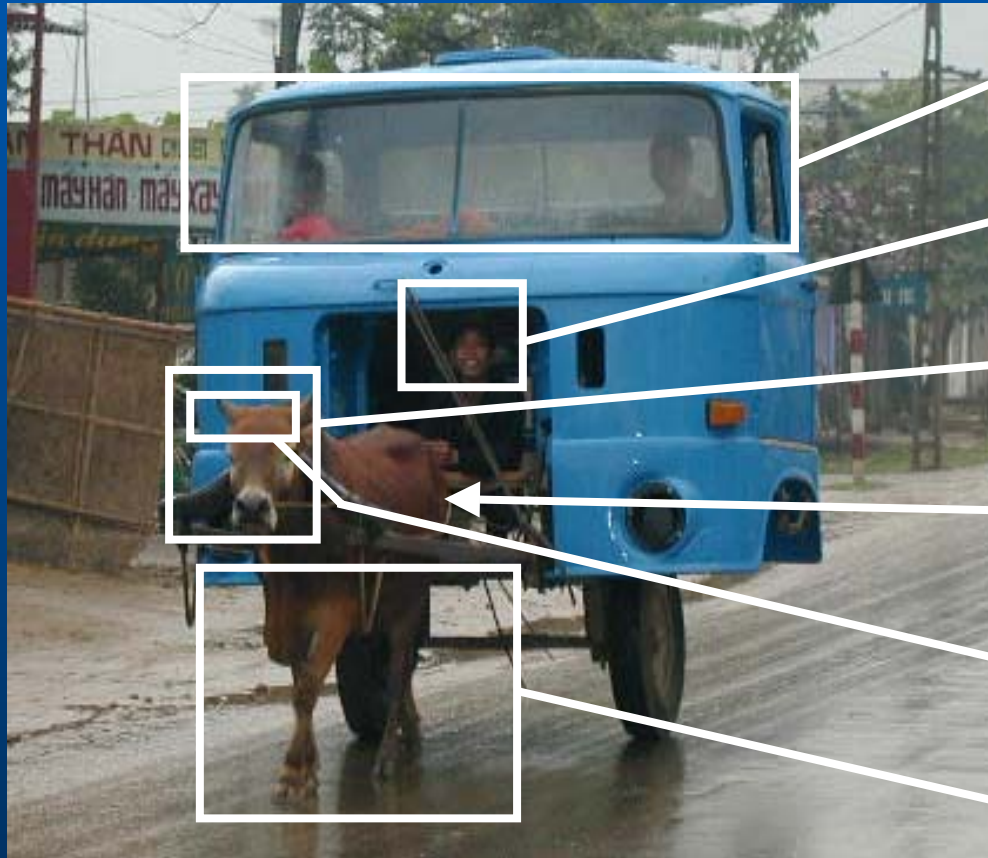


~ 40 % preventable with an warning system

~ 60 % preventable with an controlling system

60 000 injured/killed people per year

Biological analogon



Load

**primary surrounding
evaluation**

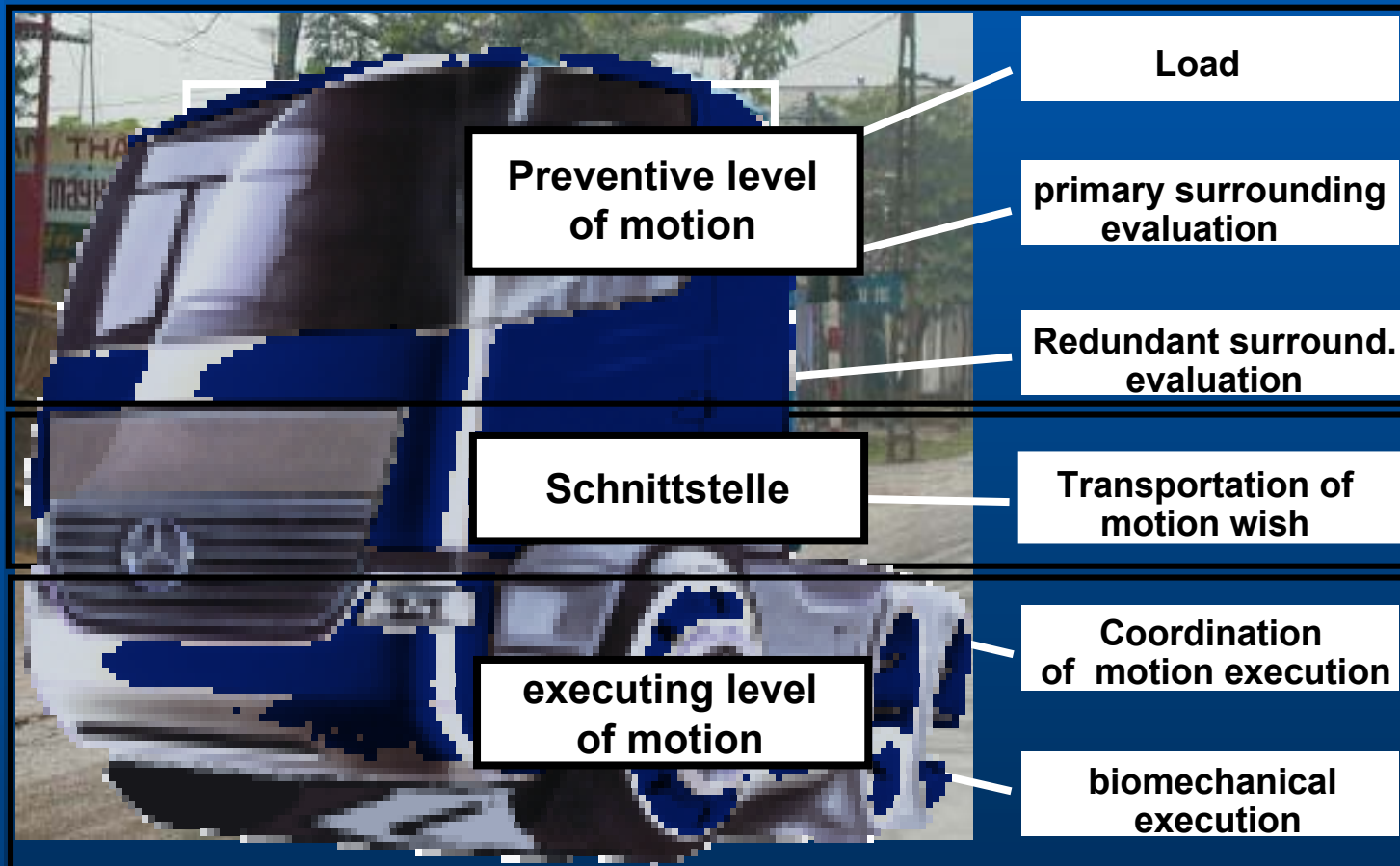
**Redundant surround.
evaluation**

**Transportation of
motion wish**

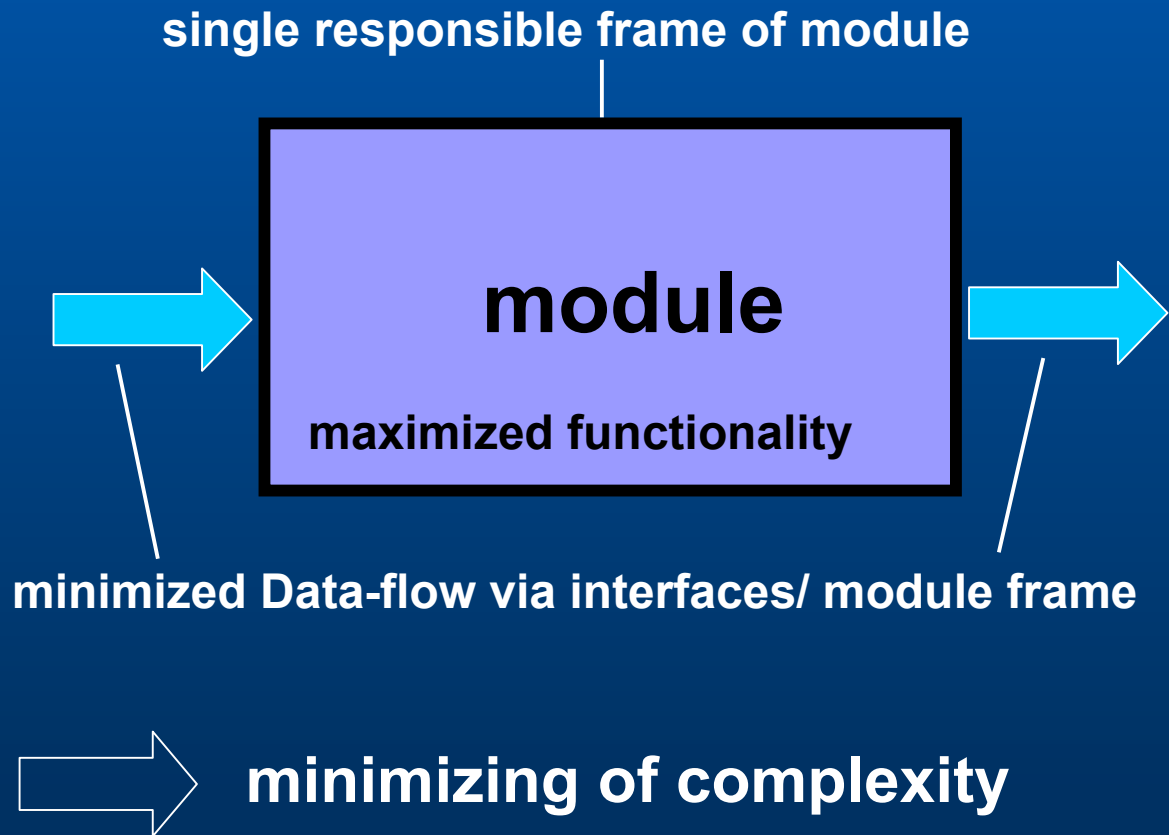
**Coordination
of motion execution**

**biomechanical
execution**

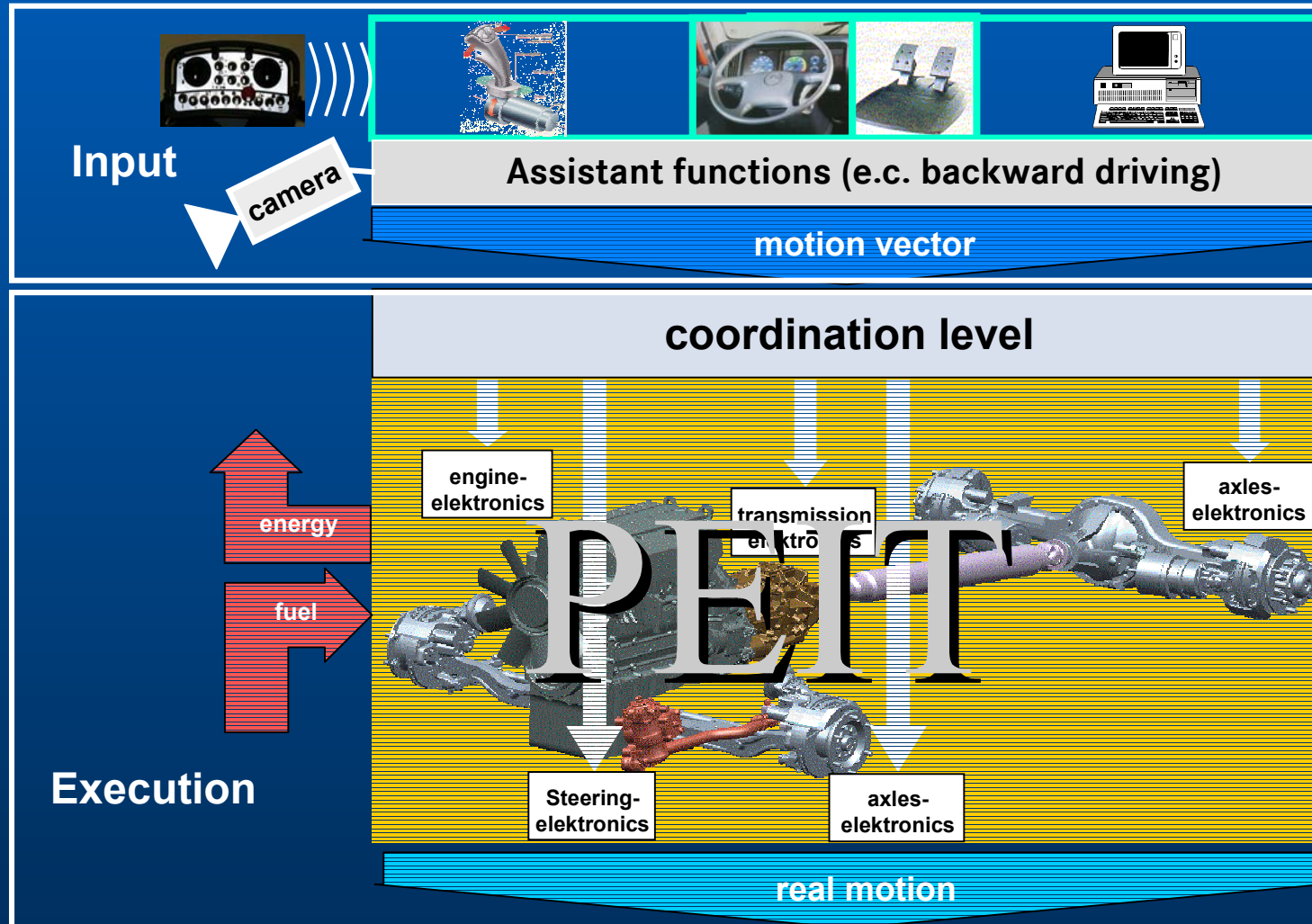
Switch over to technical system



Concept of modularisation



Technical system



What is PEIT ?

An european project financed by the european commission in the 5.th frameprogram

Powertrain
Equipped
with
Intelligent
Technologies



www.eu-peit.net

Running from September 2001 until September 2004

Goal of PEIT

Motivation



Improve

- overall traffic safety
- traffic efficiency for heavy goods vehicles
- accident prevention

by the integration of intelligent technologies into a powertrain.

Objectives of PEIT

General Objectives



An overall improvement in safety with a fully electronically controlled powertrain.

This is achieved by integrating:

- **Centrally co-ordinated secure Drive-by-Wire platform**

- **New kind of Assistant Systems ESP with steering control**

- **Show European Homologation path of PEIT approach**

- **Interface for easiest application of assistant systems**

Co-Operation Partners

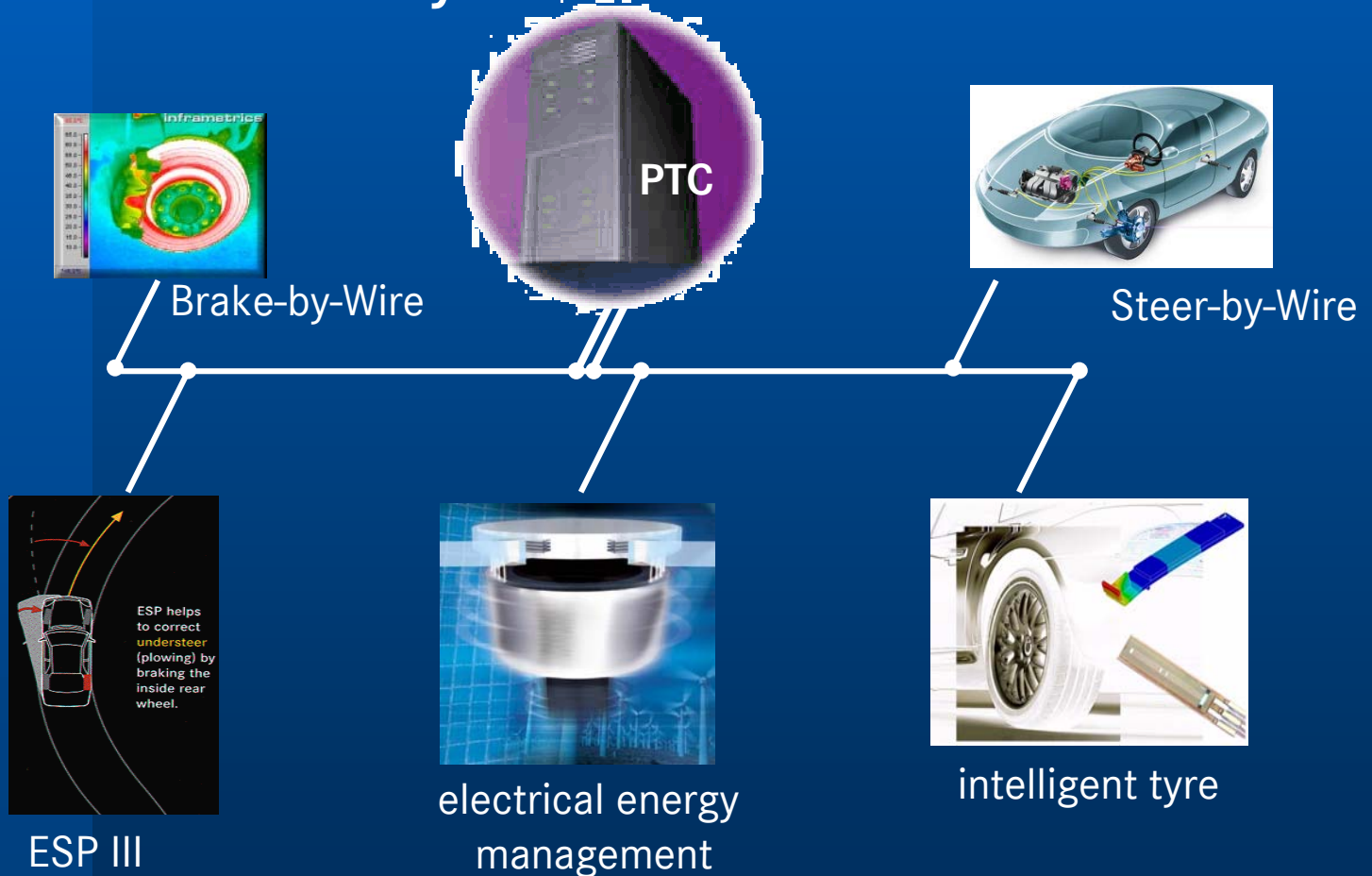


- **DaimlerChrysler AG**
- Continental
- iQ-Battery
- **Knorr Bremse**
- IVECO
- Diehl Avionik
- Kraftfahrt-Bundesamt
- **Universität Budapest**
- **Universität Karlsruhe**
- Technische Universität Braunschweig
- TÜV-Nord
- RW-TÜV
- TÜV-Süd

Objectives of PEIT

Central Architecture

- Development of secure Drive-by-Wire Platform
- New kind of Assistant Systems



Objectives of PEIT

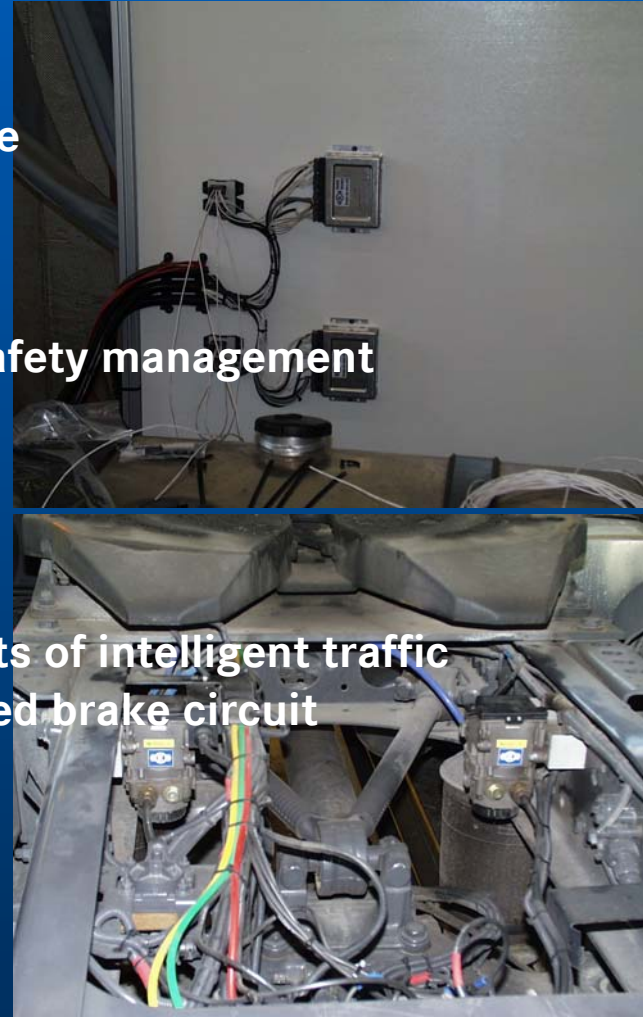
Brake-by-Wire



- 2-electronic-circuit-architecture

- new hardware structure and safety management philosophy

- meets the specific requirements of intelligent traffic applications in case of one failed brake circuit



Objectives of PEIT

Steer-by-Wire

(essential for ESP with steering control)



- 2-electronic-circuit-architecture

- new hardware structure and safety management philosophy

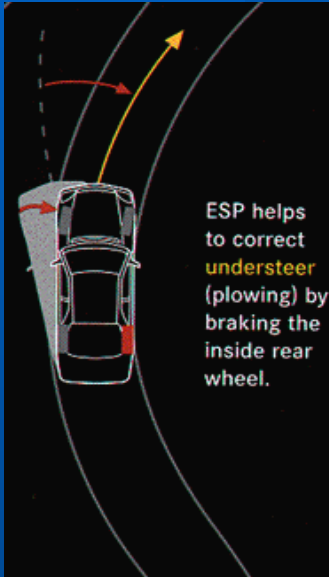
- the steering system intervenes to improve the vehicle dynamics *(e.g. in the dead zone of former ESP or during braking on μ -split surface)*



Objectives of PEIT

ESP III

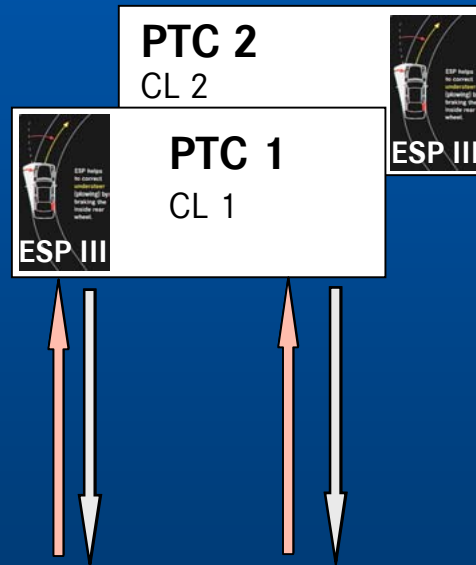
(ESP with steering control)



- **next generation of a reactive assistant system**
- **increase of safety level**
 - reduction of braking distance
 - increase of vehicle stability in critical situations
- **control of steering, braking and engine functions possible due to the central architecture of PEIT**

Objectives of PEIT

Powertrain Controller



- coordinated, optimised movement-specification
- Movementdemand, Status signal



PTC - Powertrain Controller
ESP III - Electronic Stabilisation Program

Objectives of PEIT

Homologation aspect


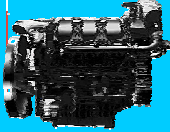




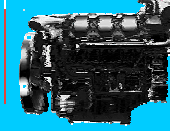


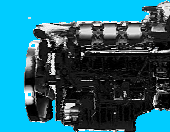











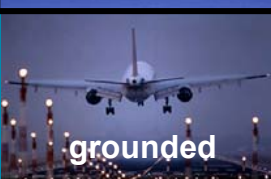


- Defining of an European Homologation path for
 - * New kind of Powertrain Architecture
 - * Drive by Wire technologies
 - * Driver Assistant Systems

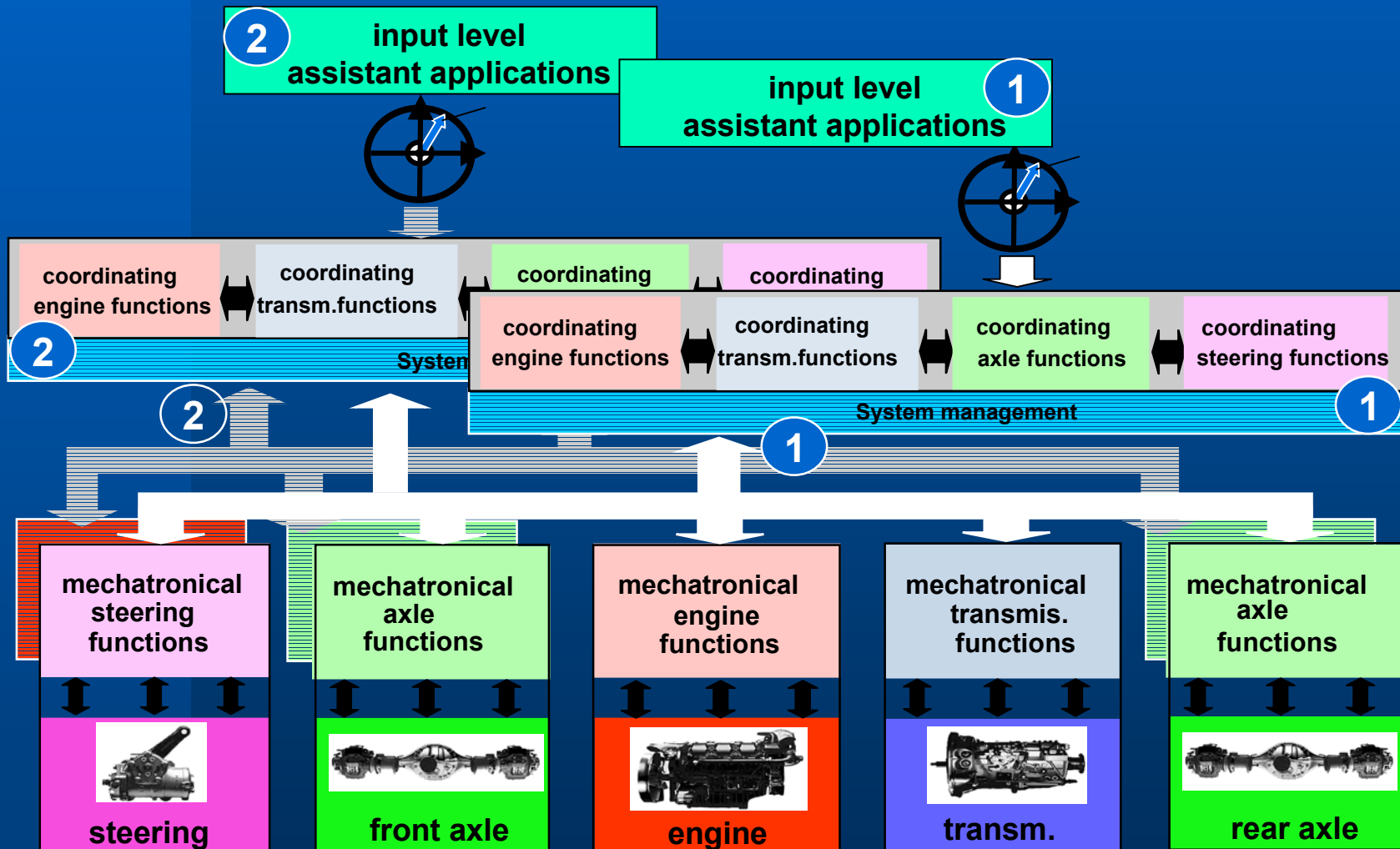
This is already done with date of 6.6.2003 in Stuttgart

Use of best practice

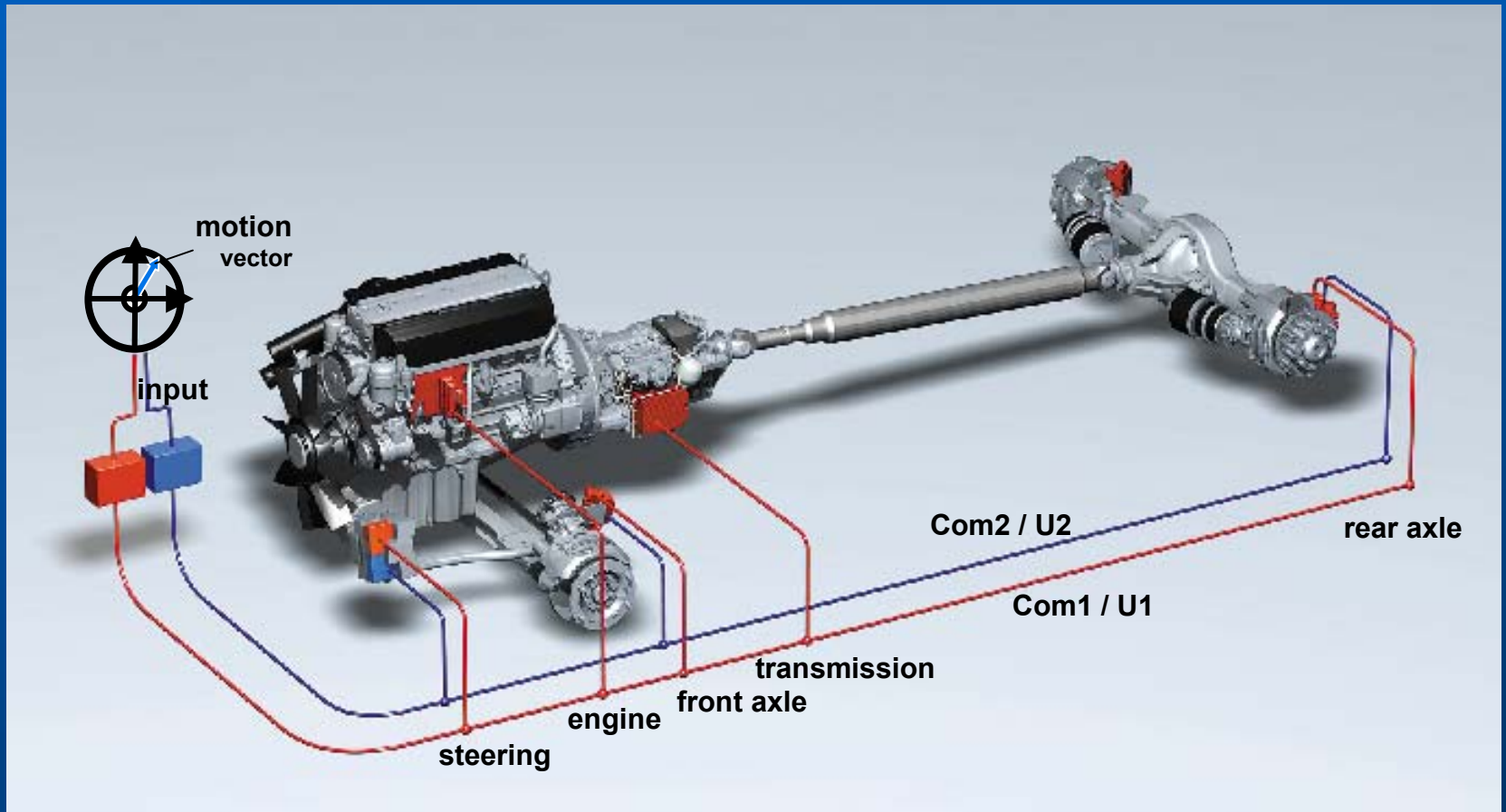
avionics

	longitudinal dynamics			concept of mobility
lateral dynam.			vertical dynamics	
				
				
				
				 flying
				 grounded

Redundant system architecture



Realisation of the module



PEIT Testbench



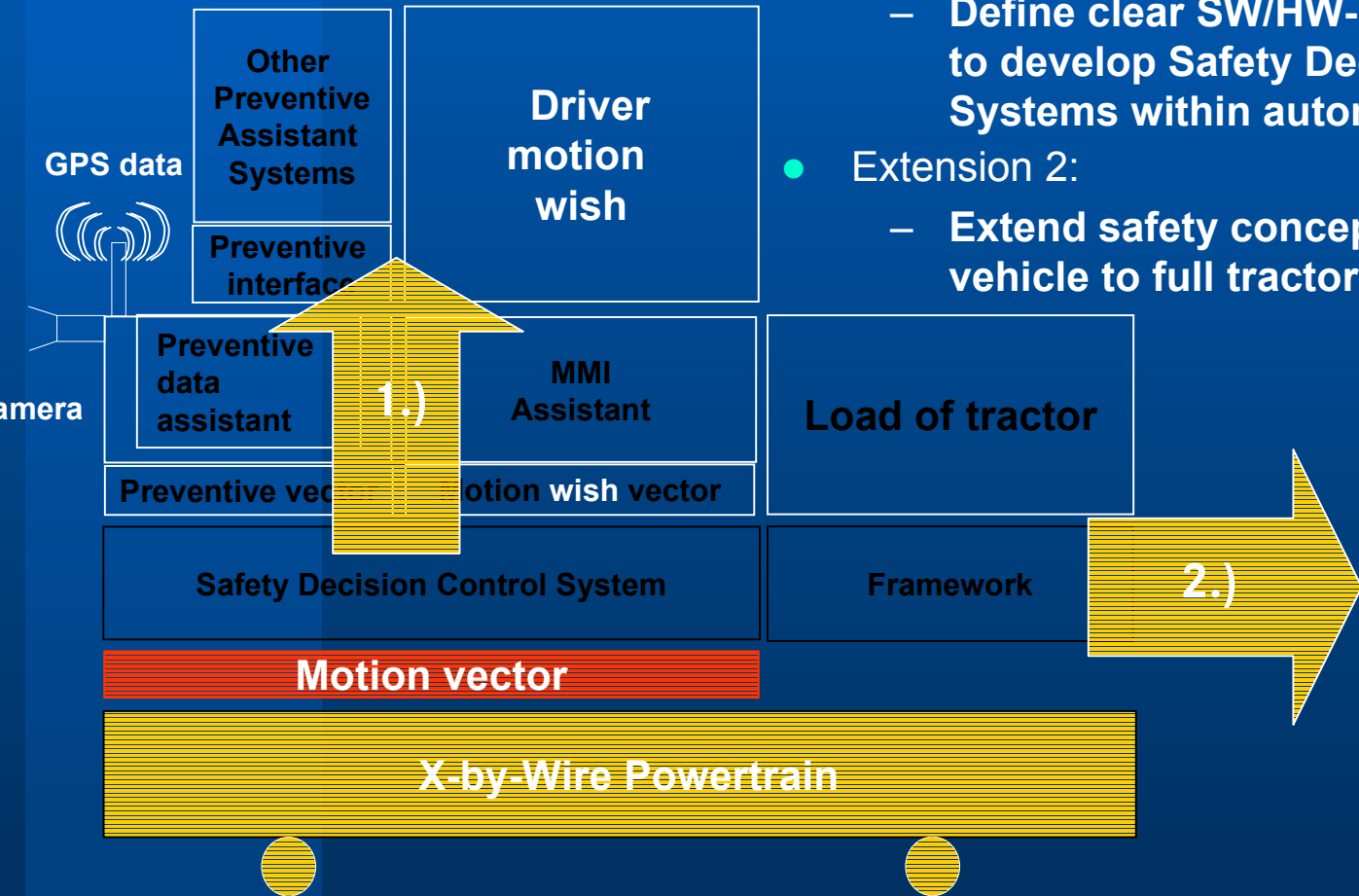
Platform for HMI



Platform for all assistant systems

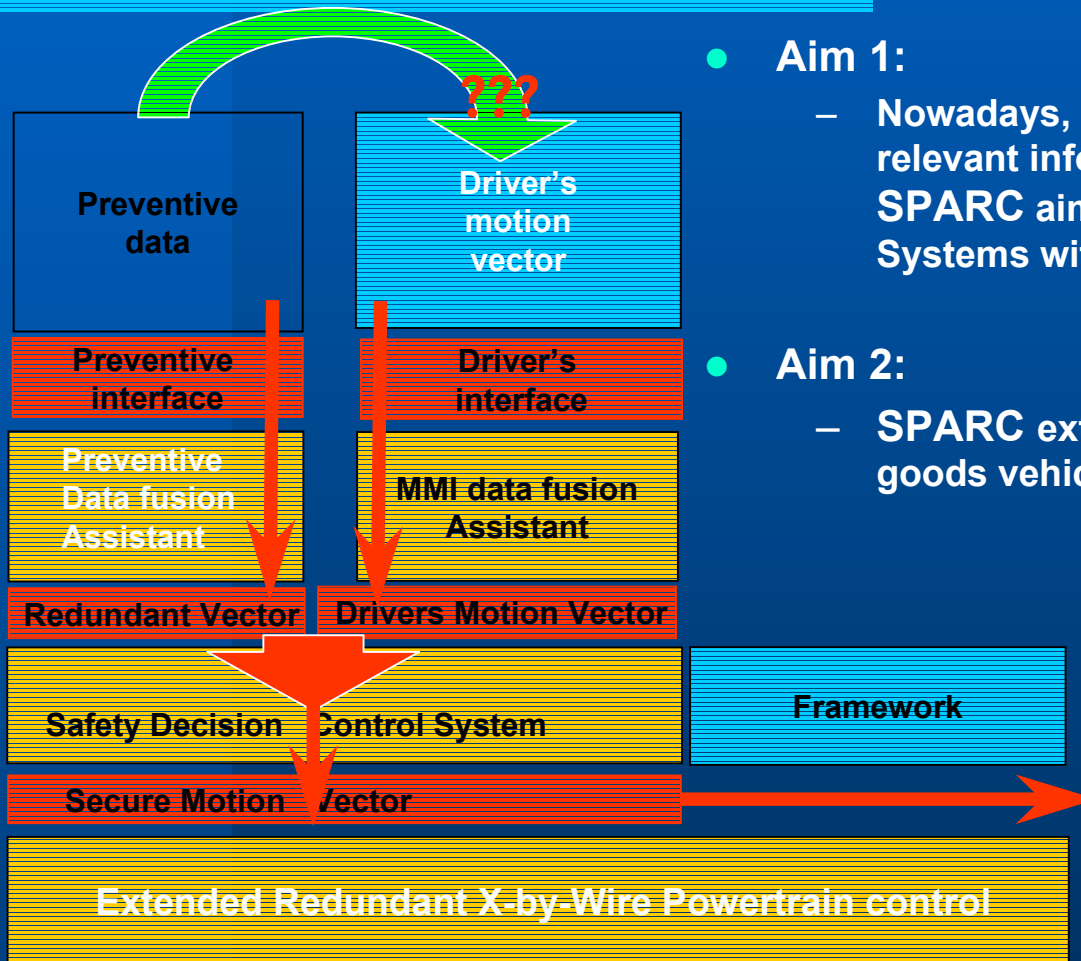


Extend previous work of project PEIT



- Extension 1:
 - Define clear SW/HW-interfaces of newly to develop Safety Decision Control Systems within automotive applications
- Extension 2:
 - Extend safety concept of heavy goods vehicle to full tractor-trailer combination

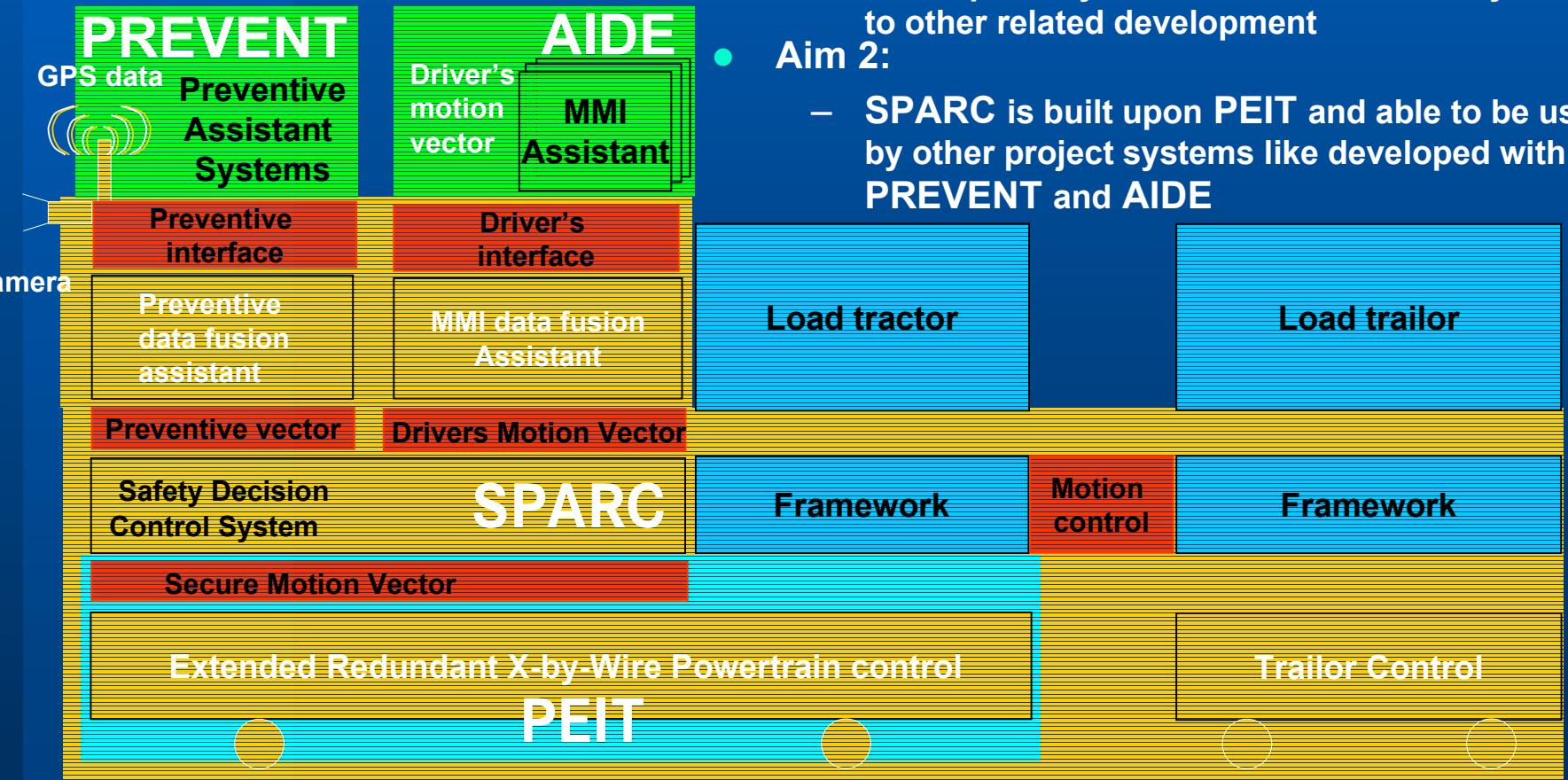
Safety Decision Control System SDFS



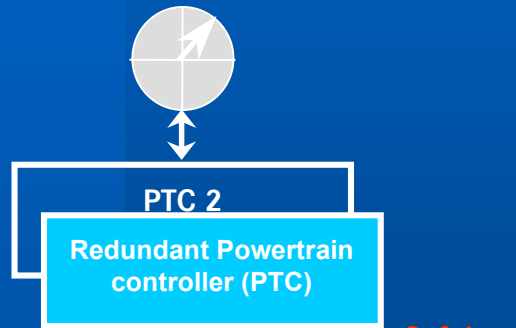
- **Aim 1:**
 - Nowadays, Preventive Systems passes safety relevant information towards the driver directly. **SPARC** aims at a Safety Decision Control Systems within automotive applications
- **Aim 2:**
 - **SPARC** extends this safety concept of heavy goods vehicle to full tractor-trailer combination

Interface to external systems/projects

- Aim 1:
 - Define clear SW/HW-interfaces of newly to develop Safety Decision Level control Systems to other related development
- Aim 2:
 - SPARC is built upon PEIT and able to be used by other project systems like developed within PREVENT and AIDE

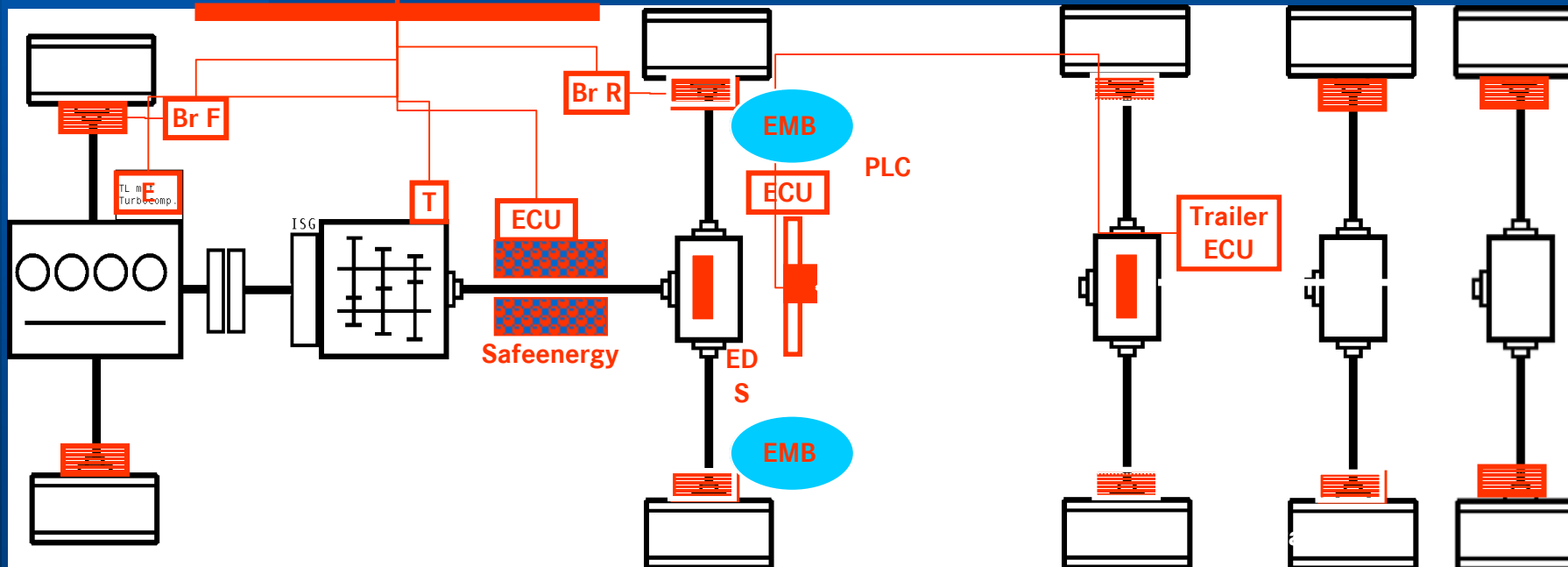


Safety concept of full tractor-trailer

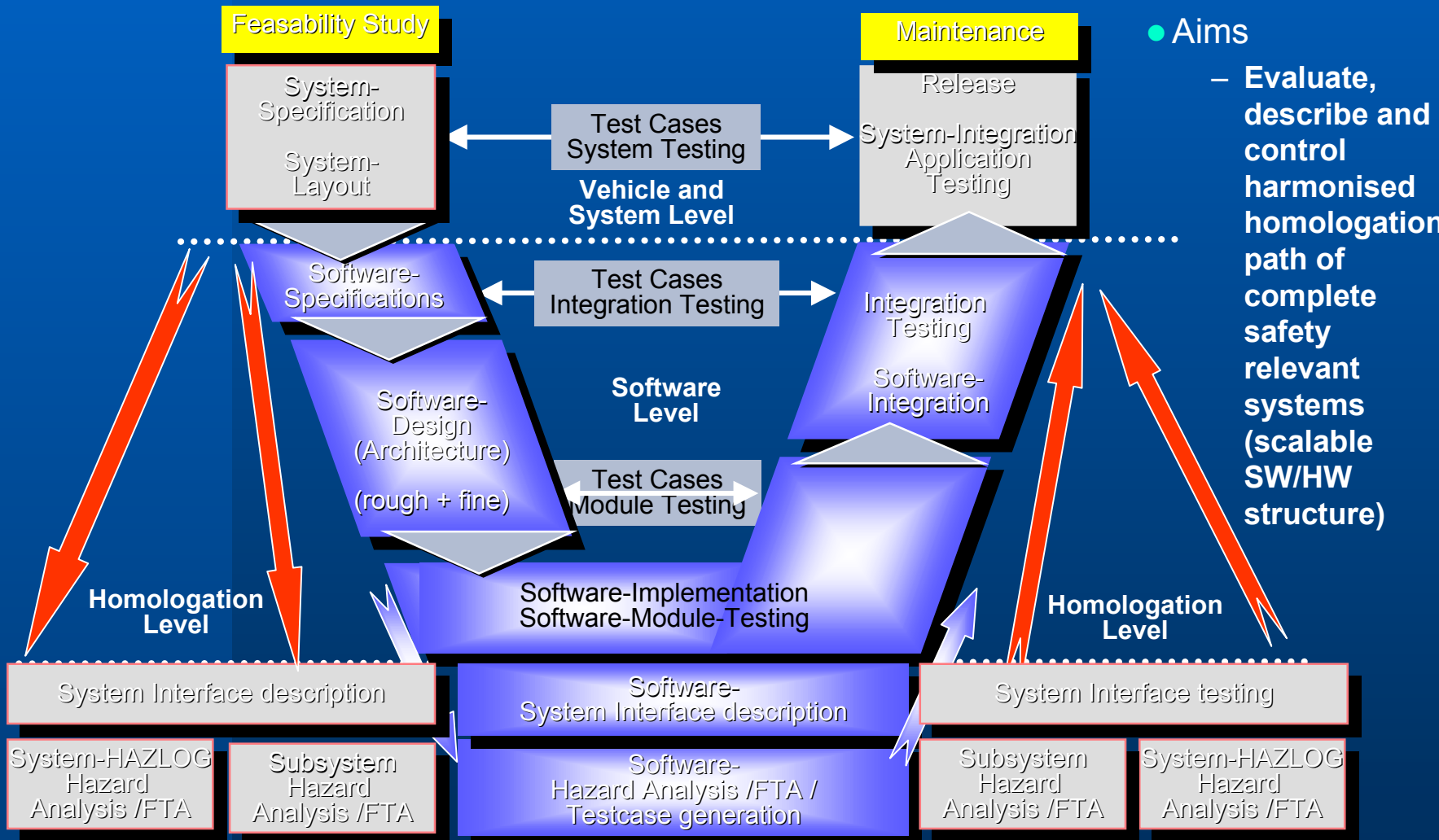


- Aims

- Extend safety concept of heavy goods vehicle to full tractor-trailer combination
- Define clear SW/HW-interfaces within automotive redundant control systems
- scalable SW/HW from heavy duty truck to smallest passenger car



Used homologation path of PEIT



Modular scalable SPARC concept



Modular scaleable SPARC concept set-up



SPARC



Powertrain-Controller



Steer-by-Wire Power-by-Wire Shift-by-Wire Brake-by-Wire

Commercial Vehicle

European projects
PEIT and
now SPARC



Powertrain-Controller



Steer-by-Wire Power-by-Wire Shift-by-Wire Brake-by-Wire

PEIT-Dissemination

www.eu-peit.net



Thank you for attention



Good bye Prof. v. Glasner

..... and hello for further steps

