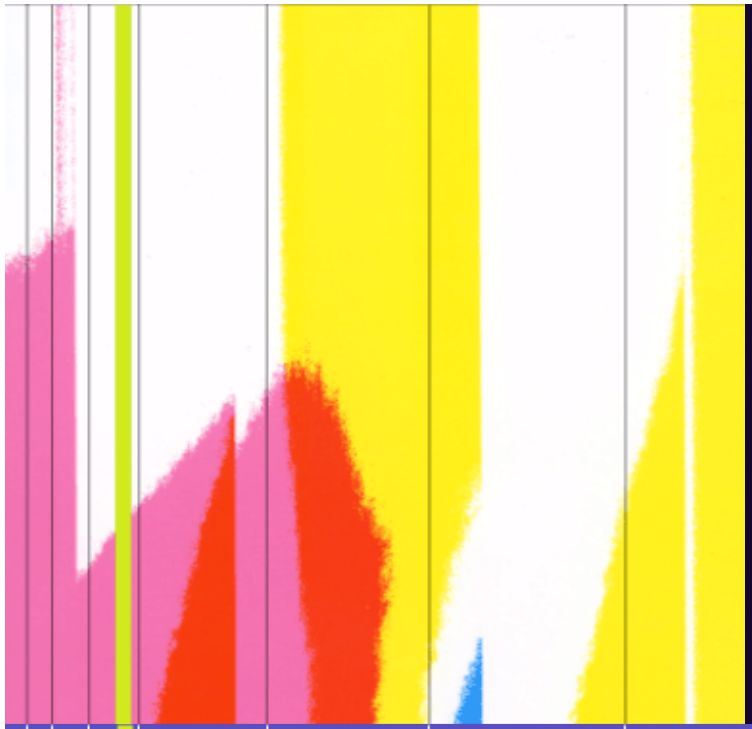


Fundamental research problems raised by heterogeneity in the design of embedded systems

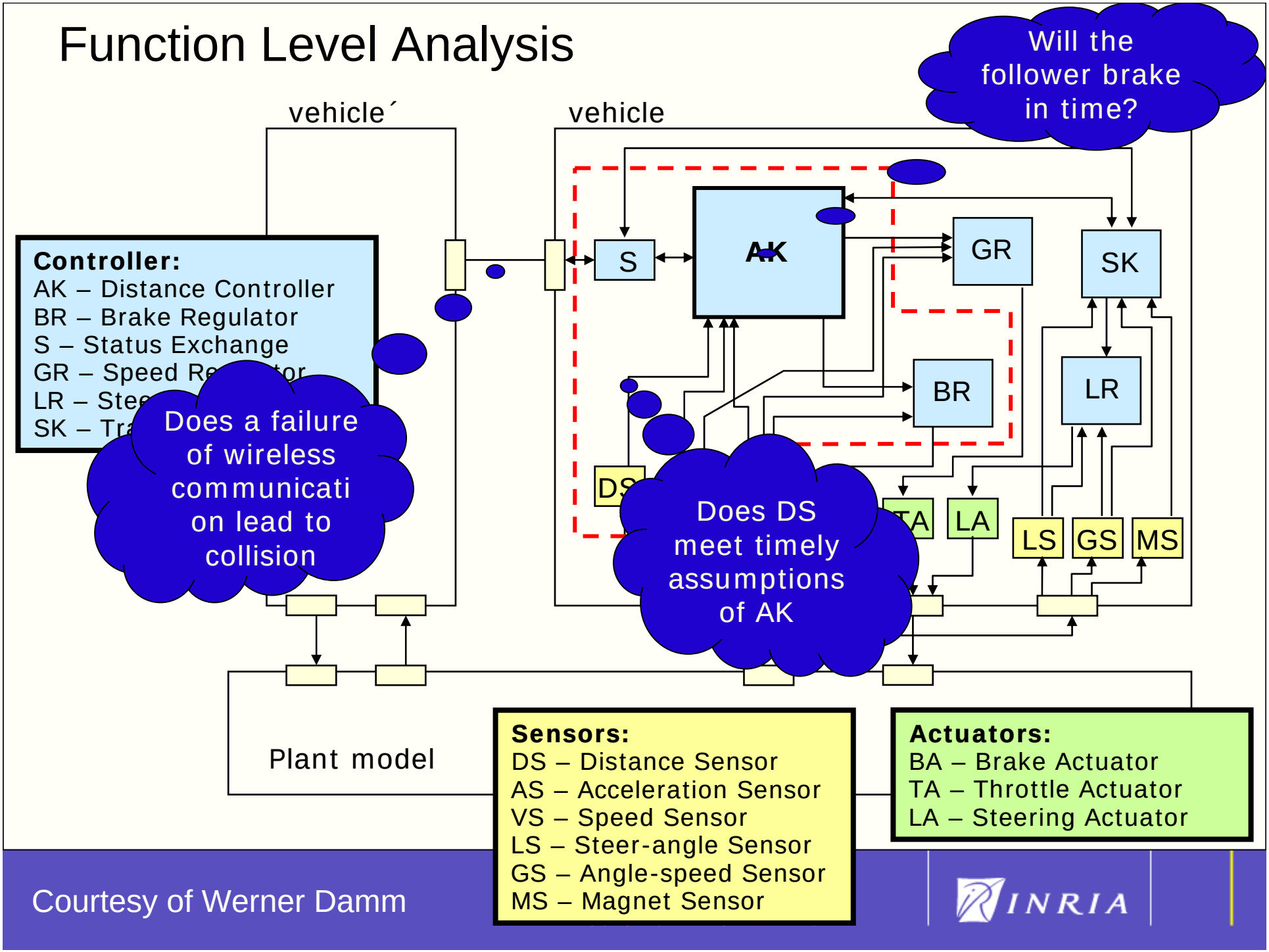
INSTITUT NATIONAL
DE RECHERCHE
EN INFORMATIQUE
ET EN AUTOMATIQUE

INRIA

Albert Benveniste, INRIA/IRISA, Rennes, France

CDC 2005, Sevilla

Function Level Analysis



Courtesy of Werner Damm

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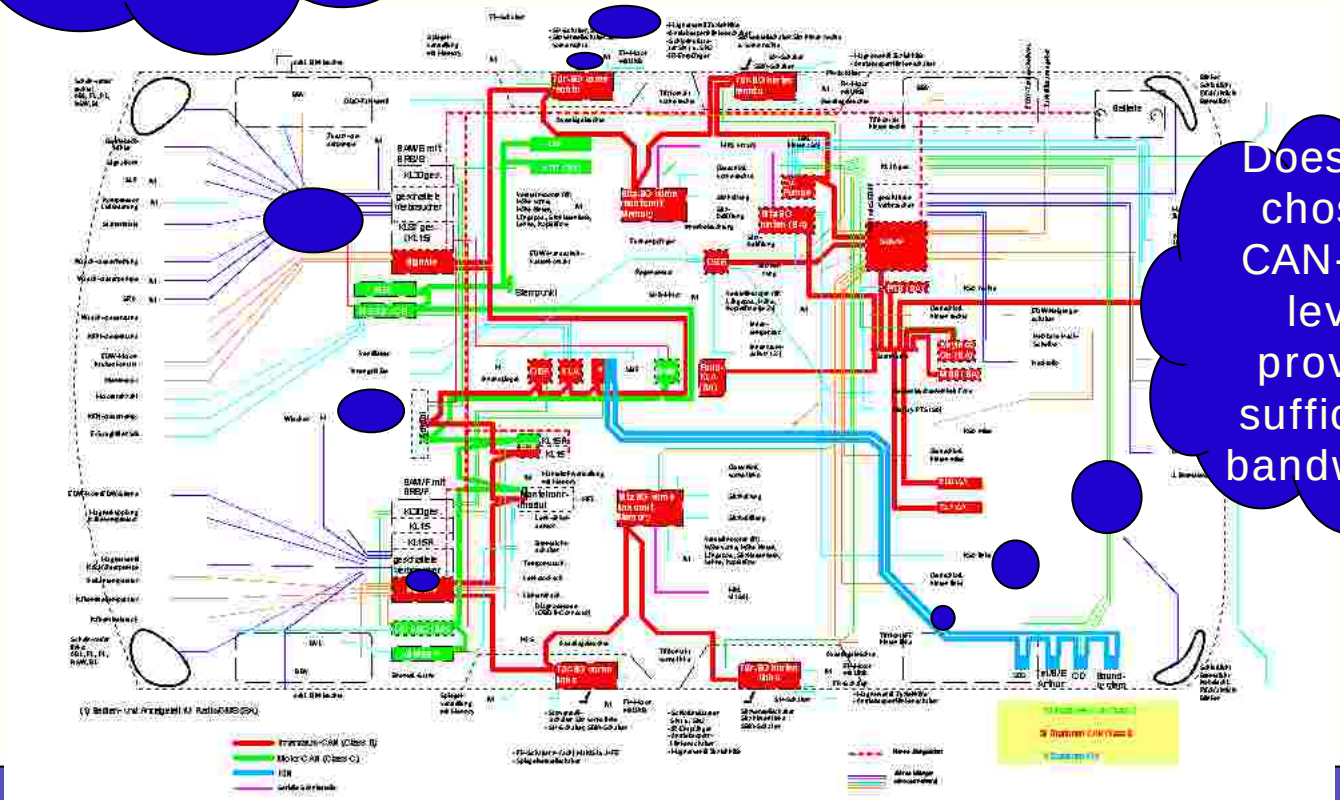
Vertical Analysis

Does the chosen Processor Guarantee assumed Worst Case Execution Times

Can I implement my function network on this ECU network?



Does the chosen CAN-Bus level provide sufficient bandwidth

Courtesy of Werner Damm

Requirements

- Components as part of *open systems*; support interface-based composition and refinement
- Functional and non-functional aspects *jointly handled*, at both component- and system-level
- Design space involves both functions and execution infrastructure
- With *heterogeneous and flexible* Models of Computation and Communication (MoCC)

Requirements → Research Challenges

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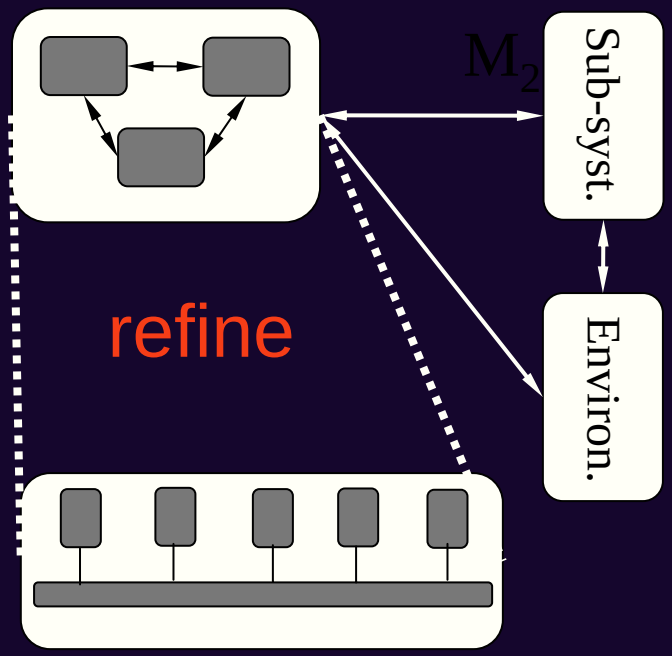

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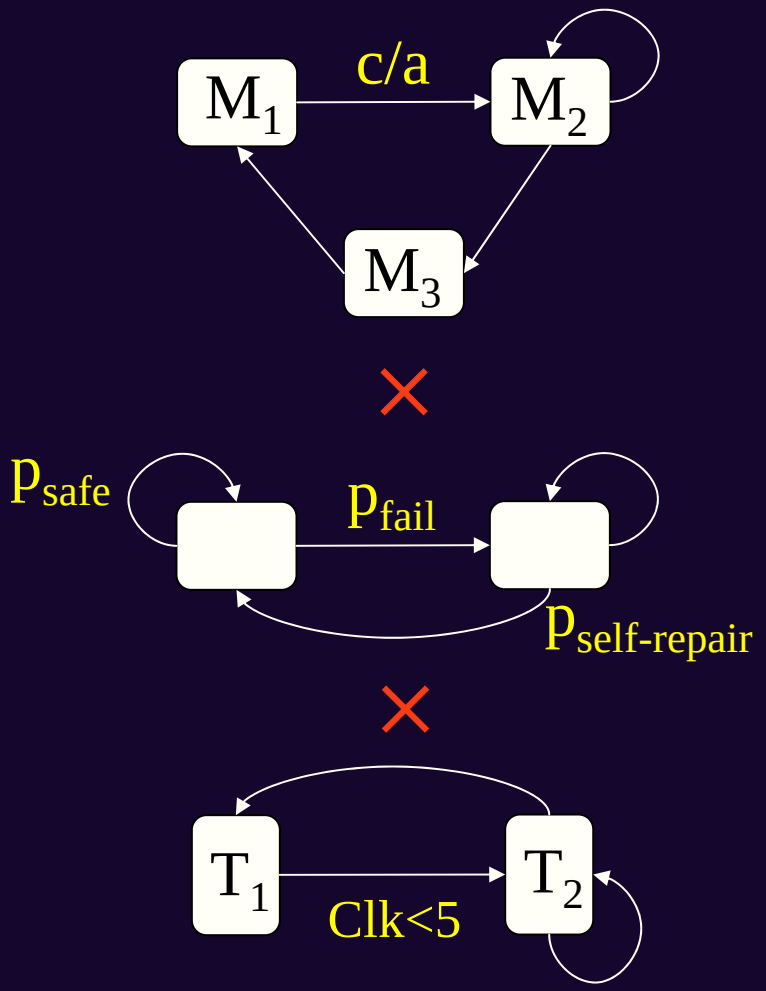

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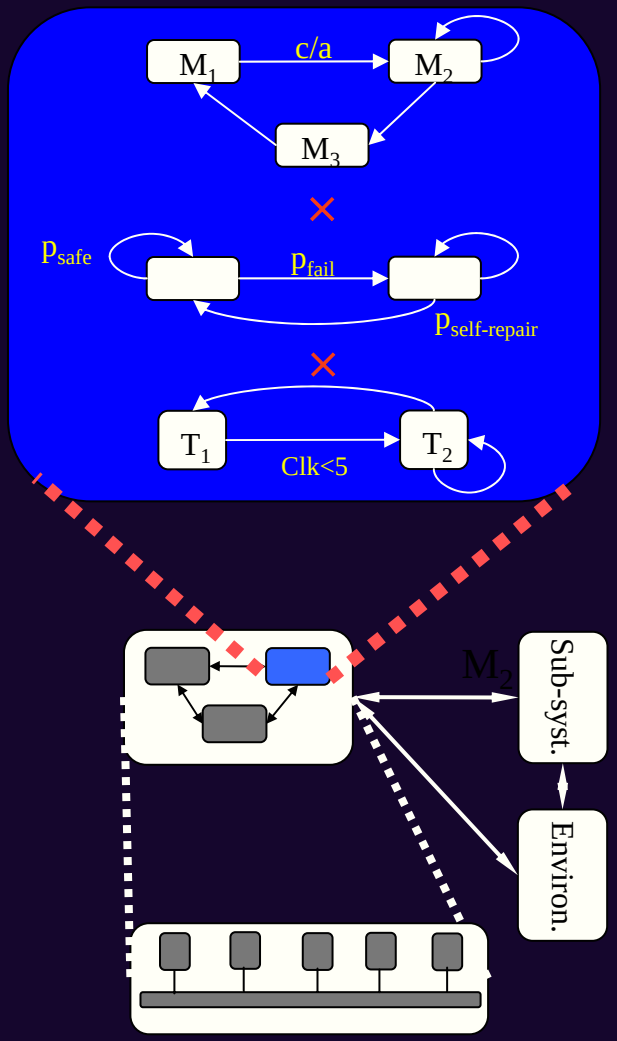

Requirements → Research Challenges

- How to compose, combine, and integrate designs from different MoCCs is a new active topic for research within the ARTIST2 EU-Network of Excellence community
- Low level expansion of these different MoCCs in terms of *interface automata* for compatibility checking
- Alternatively, more algebraic approaches are considered, where events are stamped with *tags*, which can combine functional and non-functional features