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AKTIENGESELLSCHAFT

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*Automated Driving Applications and
Technologies for Intelligent Vehicles*

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Wolfsburg
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*Adapt|Ve:
Automated driving applications and
technologies for intelligent vehicles*



// Facts

Budget:	EUR 25 Million
European Commission:	EUR 14,3 Million
Duration:	42 months (January 2014 - June 2017)
Coordinator:	Aria Etemad, Volkswagen Group Research
8 Countries:	France, Germany, Greece, Italy, Spain, Sweden, The Netherlands, United Kingdom



// 30 partners



// Motivation for automated driving functions

Zero
emission

Reduction of fuel consumption & CO₂ emission
Optimization of traffic flow



Demographic
change

Support unconfident drivers
Enhance mobility for elderly people



Vision zero

Potential for more driver support by avoiding
human driving errors



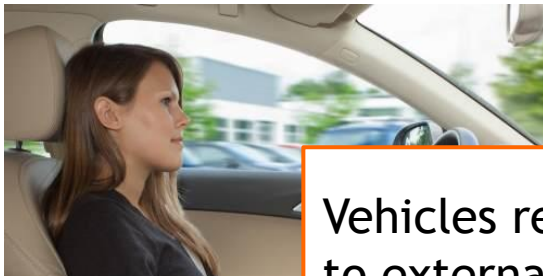
// Potentials of automated driving



Drivers are supported in demanding or repetitive tasks.



Vehicles dynamically adapt the level of automation according to the current situation.

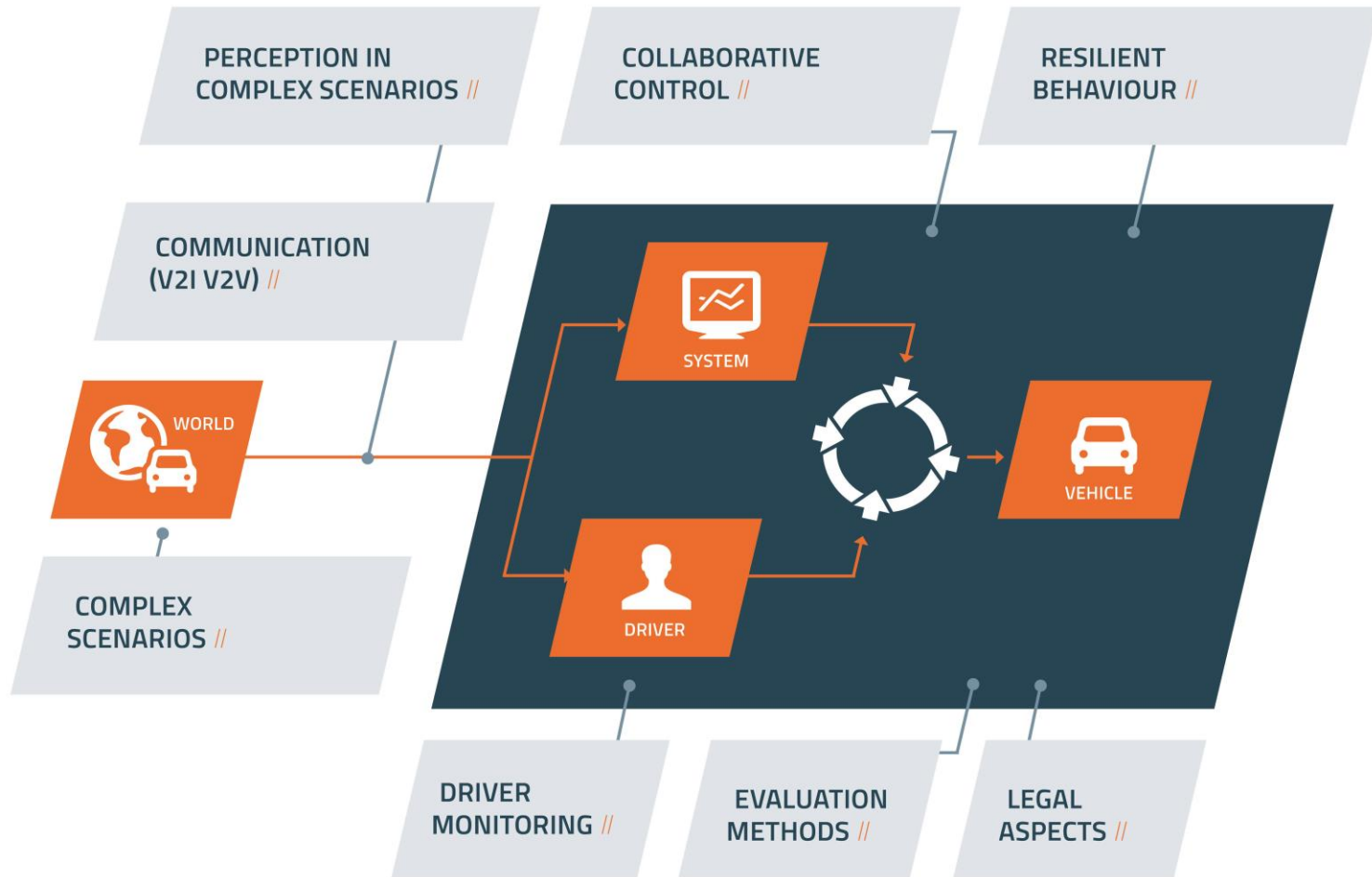


Vehicles react more effectively to external threats.

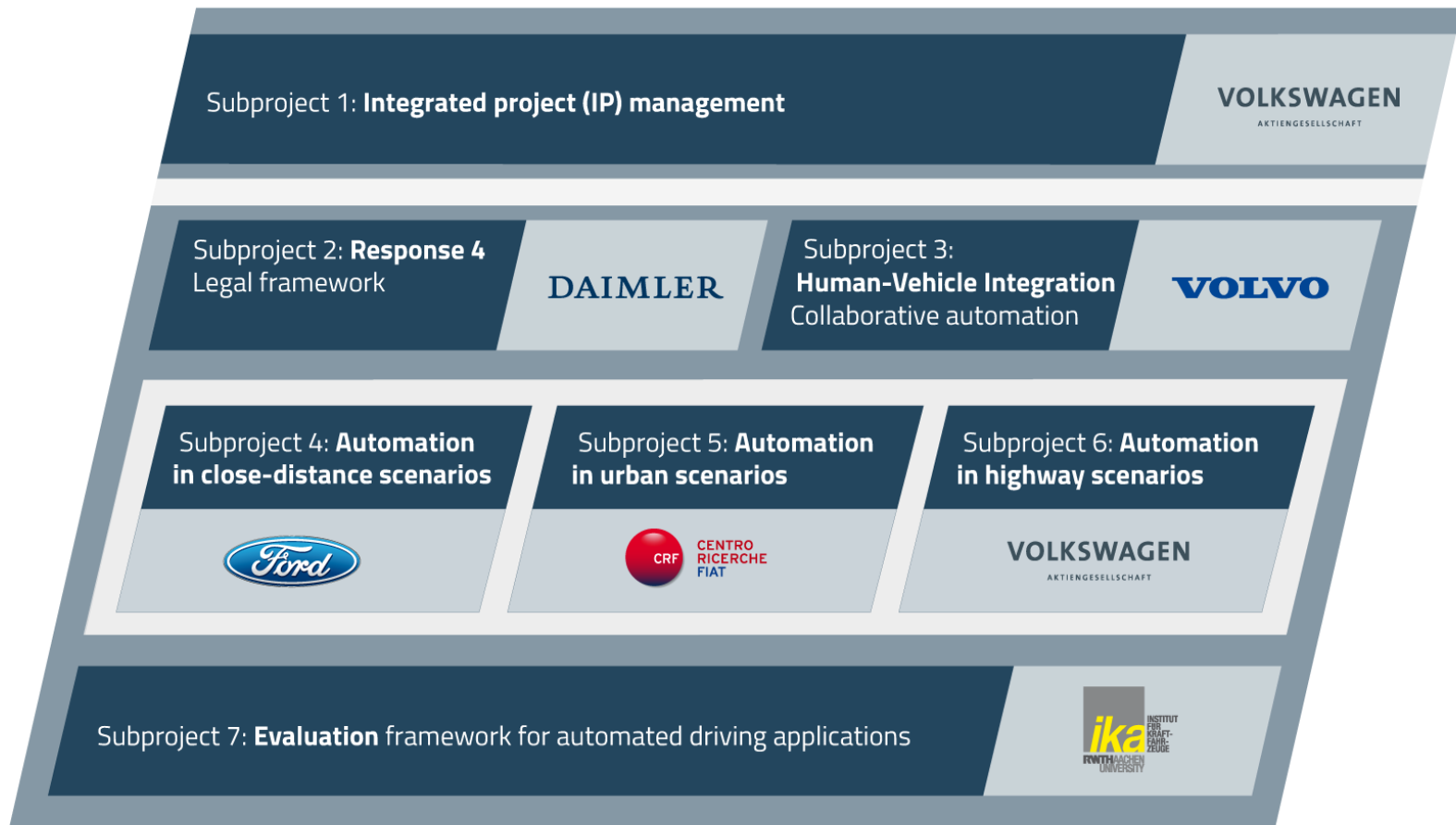


Vehicles are resilient to different types of system and human failure.

// AdaptIVe: Objectives



// AdaptIVe: Structure



// Demonstrators and Functions



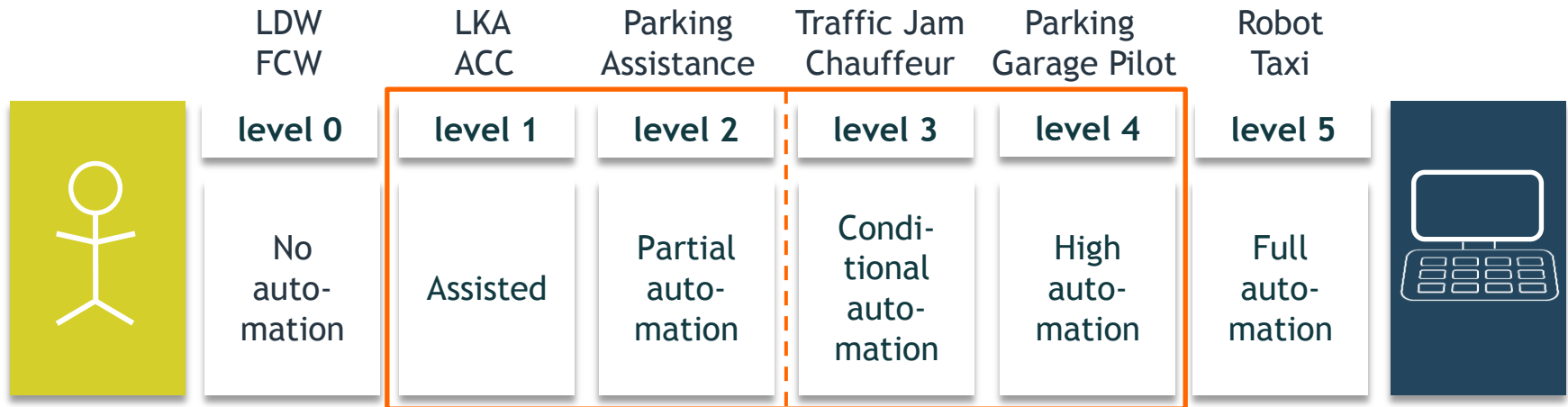
e.g. automated parking,
parking assistance, ...

e.g. intersections and
traffic lights, urban
roundabouts, ...

e.g. cooperative merging,
predicted driving, danger
spot intervention, ...

stop & go, minimum risk manoeuvre

// Levels of driving automation acc. to VDA and SAE



Driver in the loop

- No significant change with respect to existing driver assistance systems

Driver out of the loop

- Not in accordance with regulatory law (Vienna Convention of 1968, national road law)
- ➔ need for action

Source: SAE document J3016, "Taxonomy and Definitions for Terms Related to On-Road Automated Motor Vehicles", issued 2014-01-16, see also http://standards.sae.org/j3016_201401/

// Automation in highway scenarios: Innovation

- Extensions to the existing **V2V communication** protocols based on ITS G5 will be specified to **enable dialog and negotiations** before and during lane change or filter-in manoeuvres.
- Fault-tolerant and resilient **system architecture** for highly automated driving functions

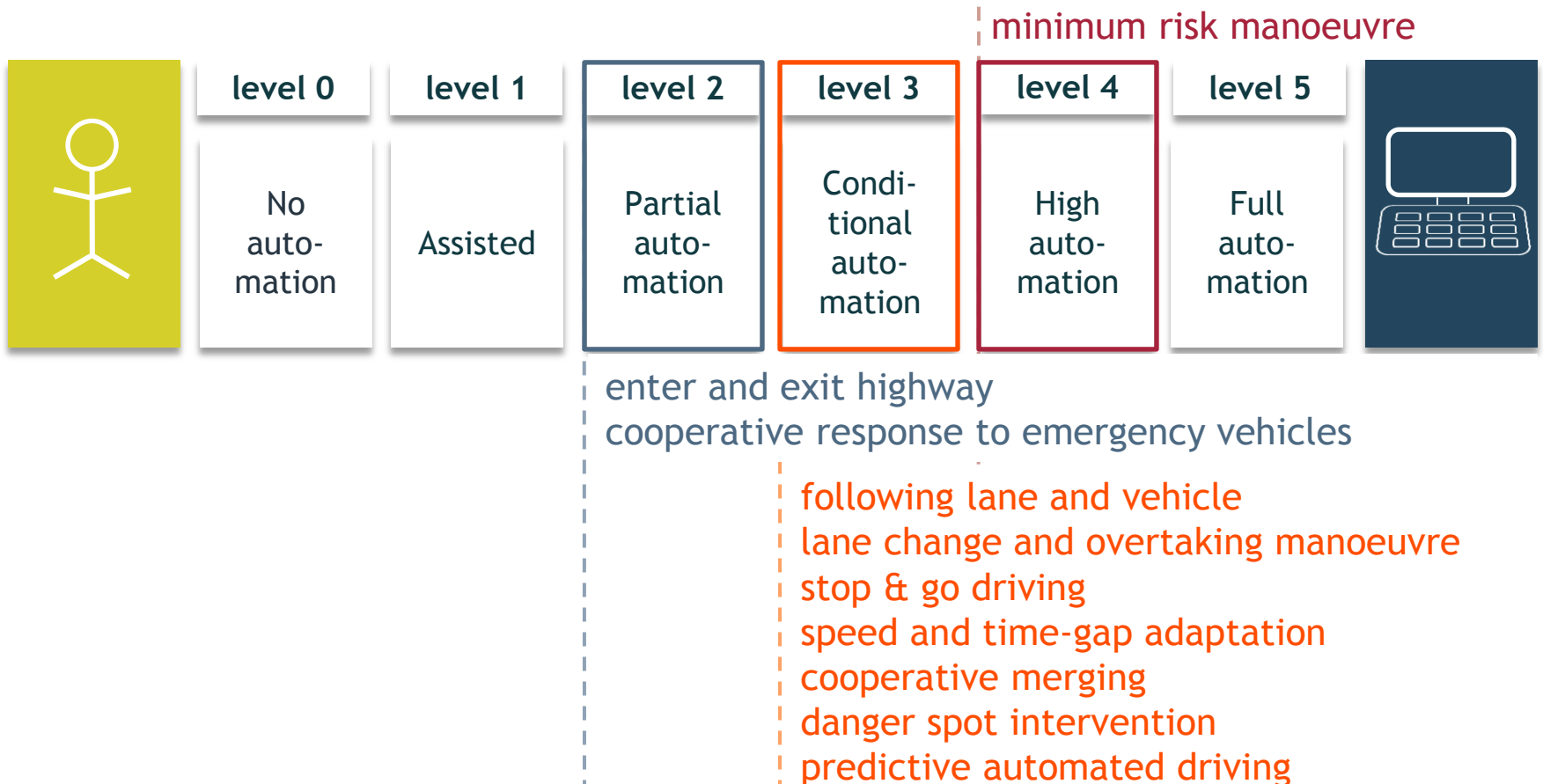


// Automation in highway scenarios: Innovation

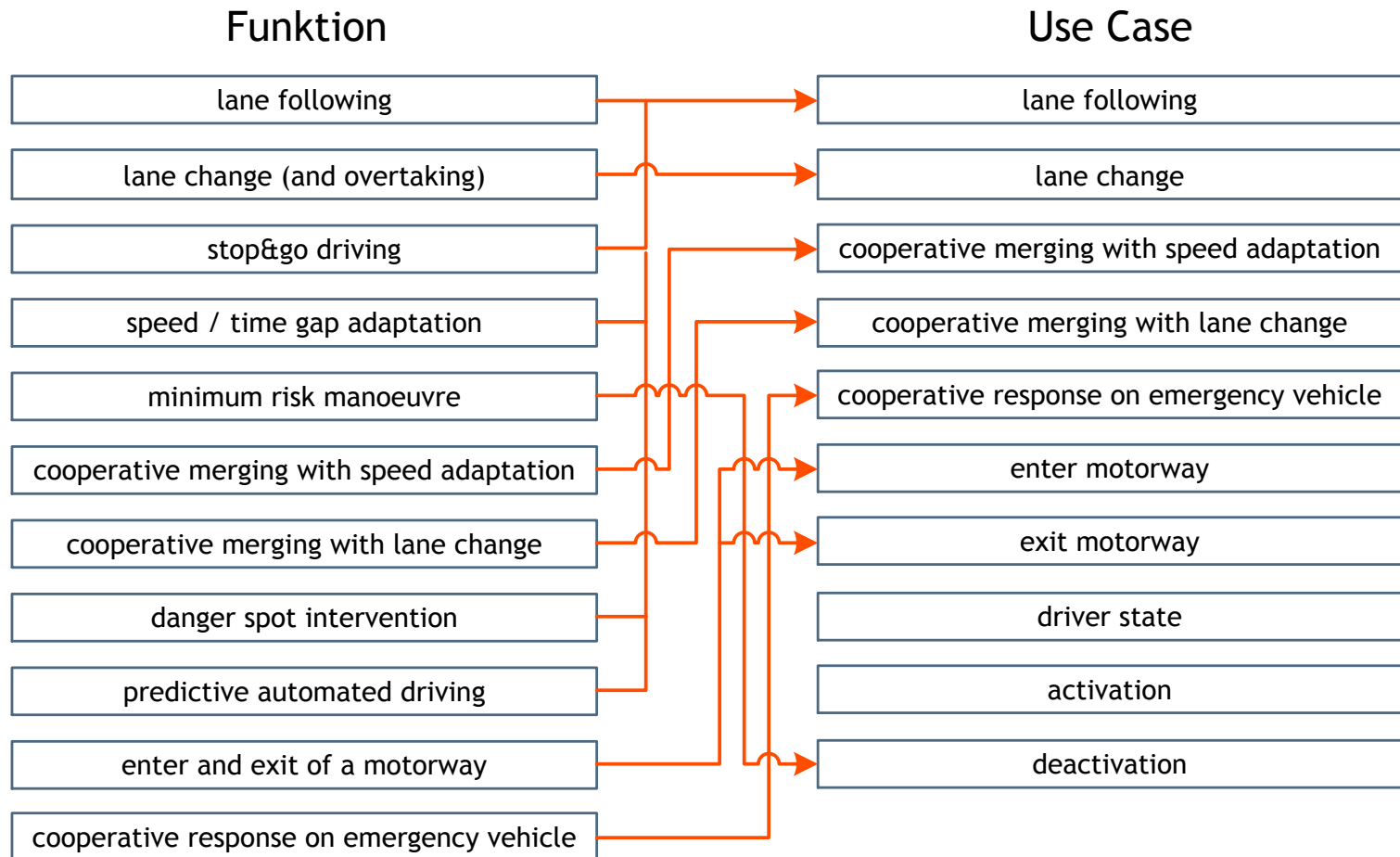
- Improve **energy efficiency** using information of traffic control systems, digital maps and vehicle sensors, **Predictive automated driving style**
- **Driver take-over situations** e.g. from “partial automated” to “driver only” or “conditional automated” to “driver only” demonstrated and evaluated
- Particular manoeuvres like the minimum risk manoeuvres **transparently indicated** to other traffic participants



// Automation in highway scenarios: Functions

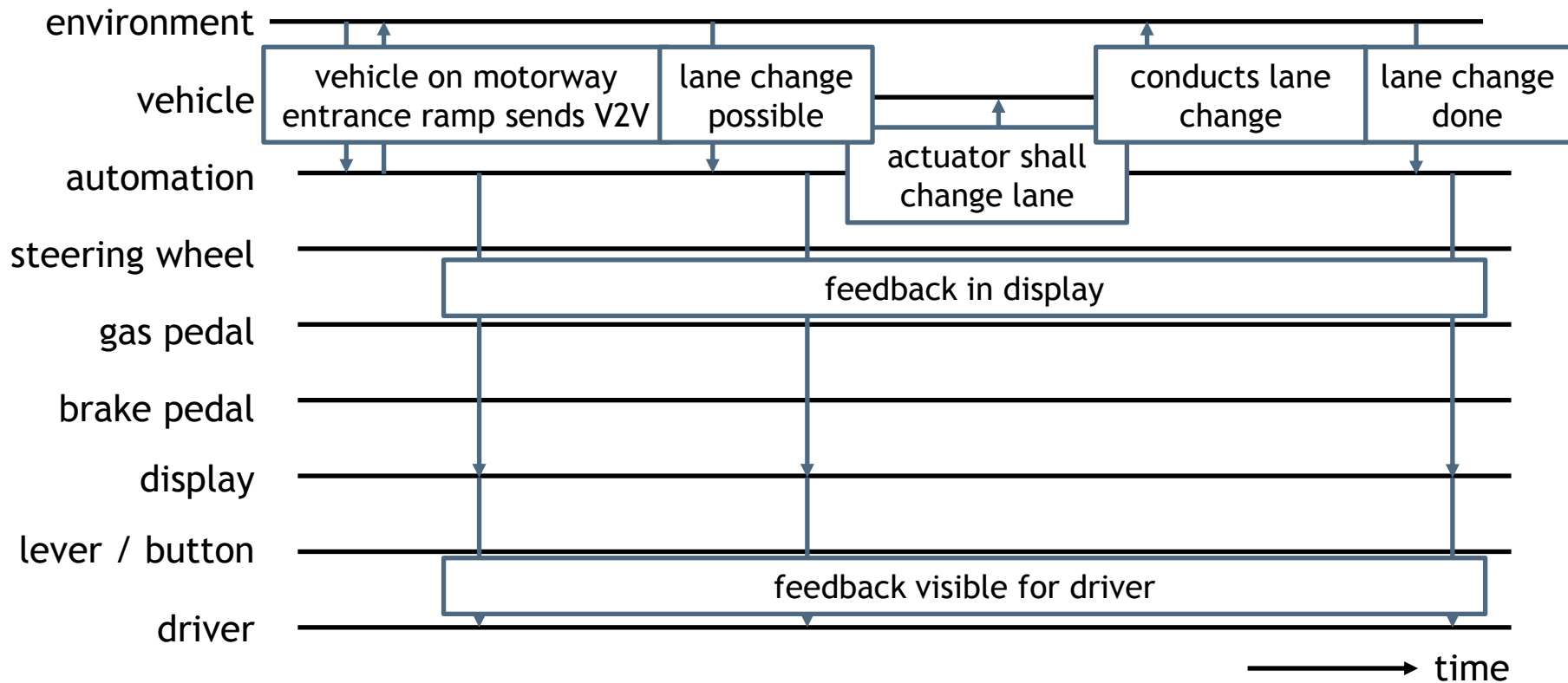
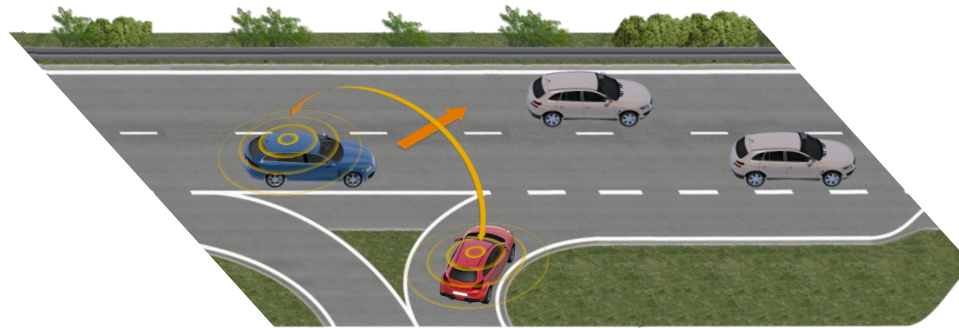


// Automation in highway scenarios: Use Cases



Use cases are used by SP3 for studies regarding Human-Vehicle-Integration.

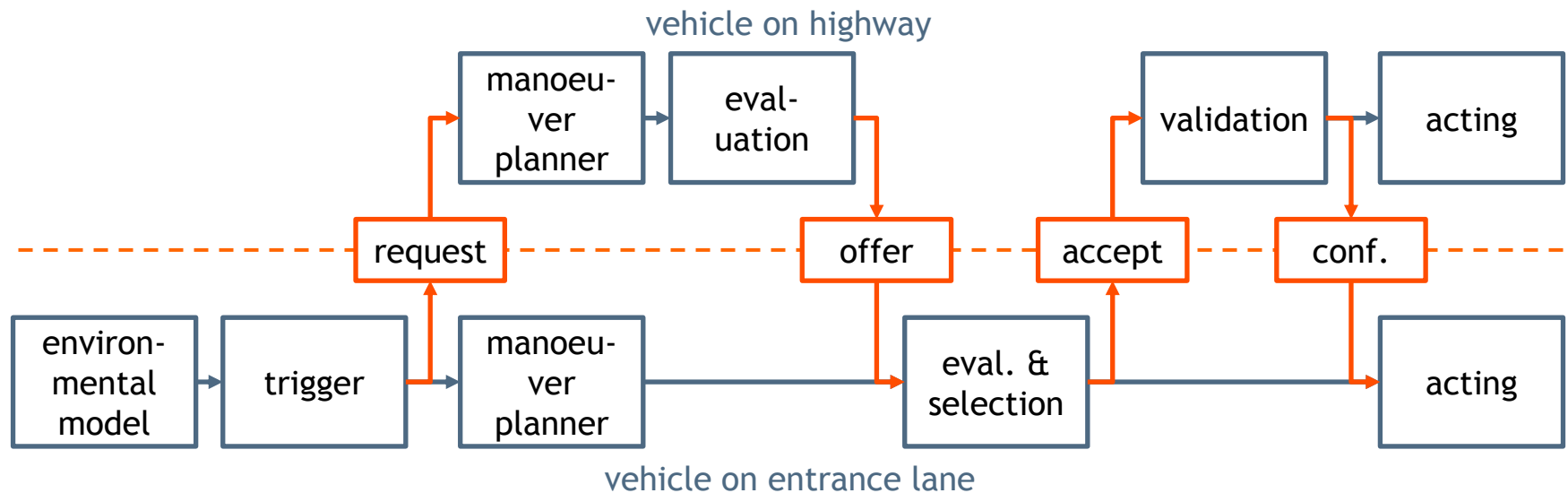
// Use Case: Cooperative merging with lane change



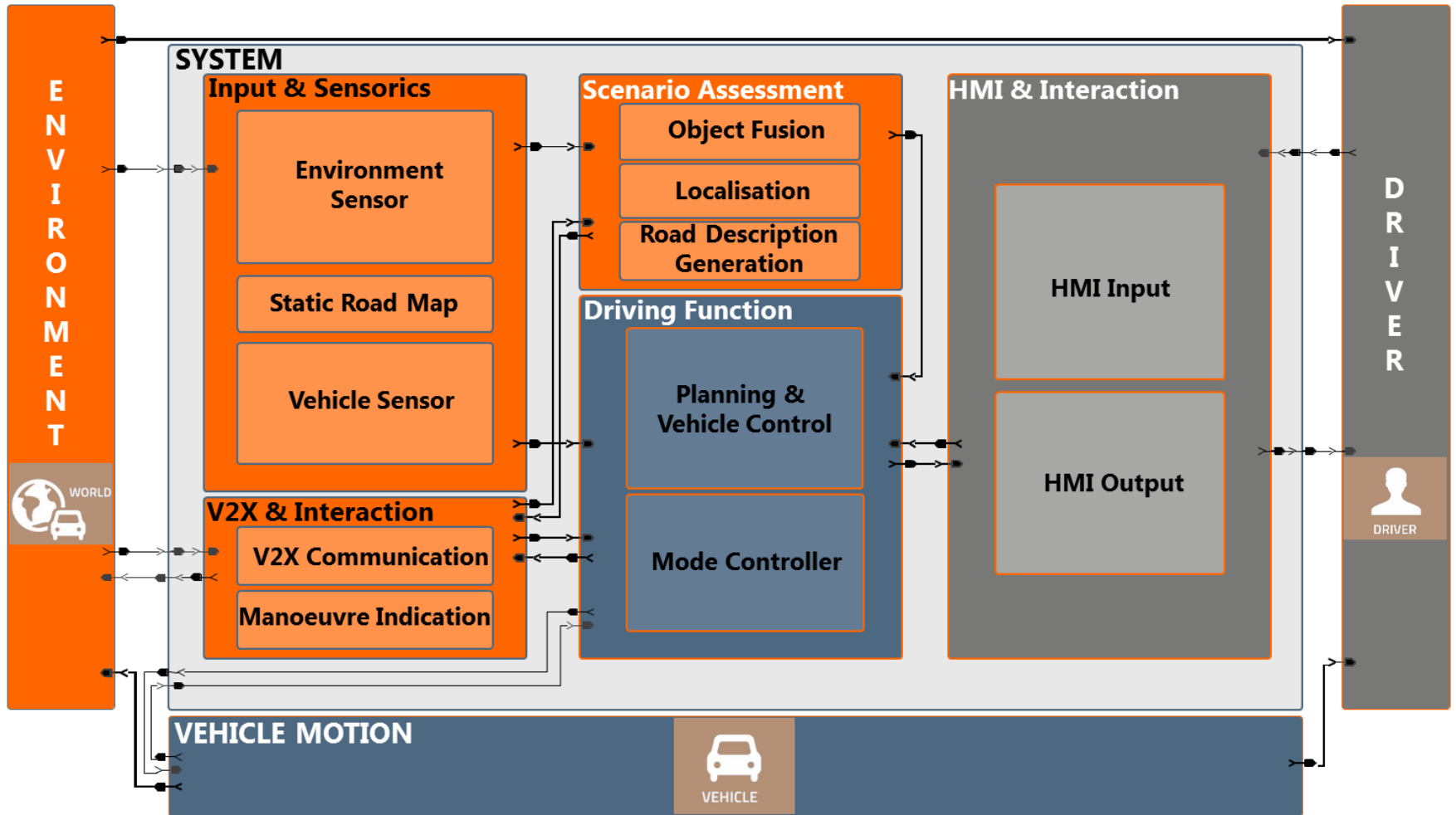
// Extension of V2V-protocols

- An extension is required for the development of cooperative automated driving functions
- It has to cover phases of sensing, planning, acting and error handling
- The protocol extension will be used for the discussion with standardisation organizations

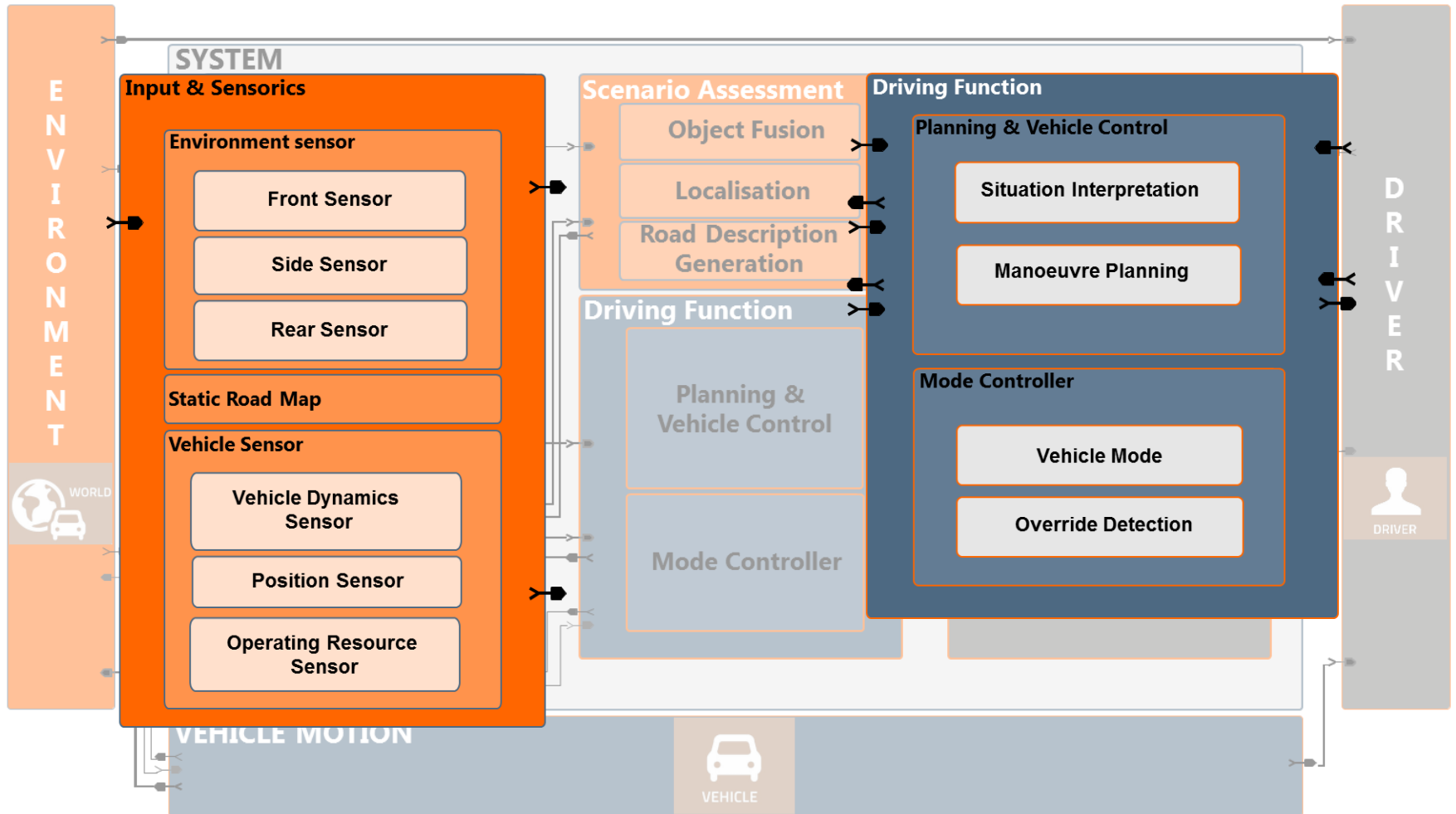
Proposal for cooperative merging:



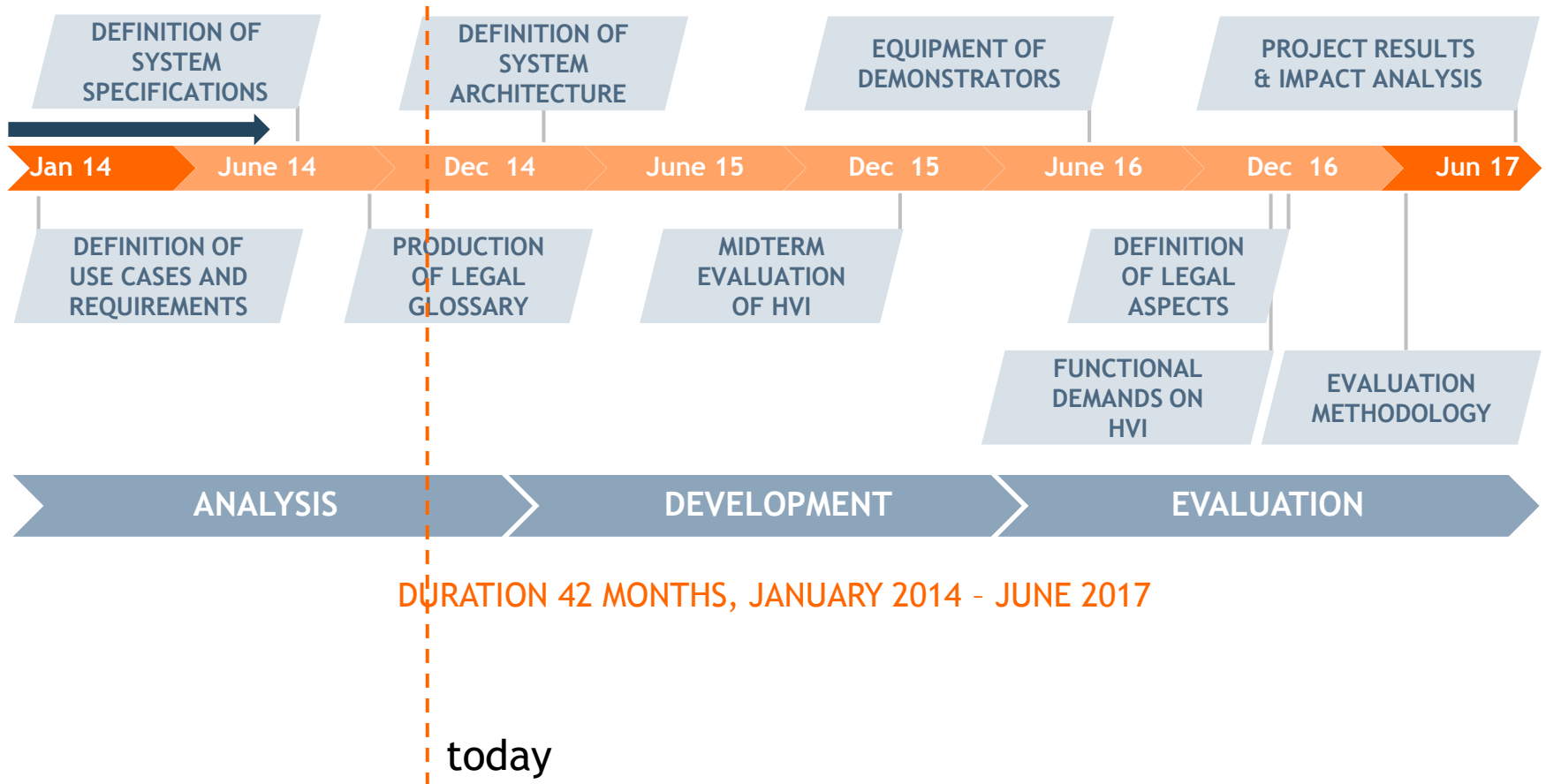
// Architecture: Overview



// Architecture: Overview



// Timeline





Co-funded by
the European Union

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Thank you.

