



DEIS - DEPENDABILITY ENGINEERING INNOVATION FOR CPS

21st International Forum on Advanced Microsystems for
Automotive Applications (AMAA)

Berlin, 25-26 September 2017



● DEIS IN AN NUTSHELL

➤ DEIS : Dependability Engineering Innovation for CPS

- Funding scheme: H2020 ICT-01-2016
- Status: Project start by January 1st, 2017
- Duration: 3 years
- Consortium: 10 partners
- Total budget: approx. 4.800k€
- Coordinator: AVL List

➤ Project targets

- Improve Cyber-Physical Systems (CPS) by the introduction of **Digital Dependability Identity (DDI)**
 - Efficient synthesis over the supply chain
 - Safe and secure composition of highly distributed and autonomous CPS



DEIS TECHNICAL APPROACH

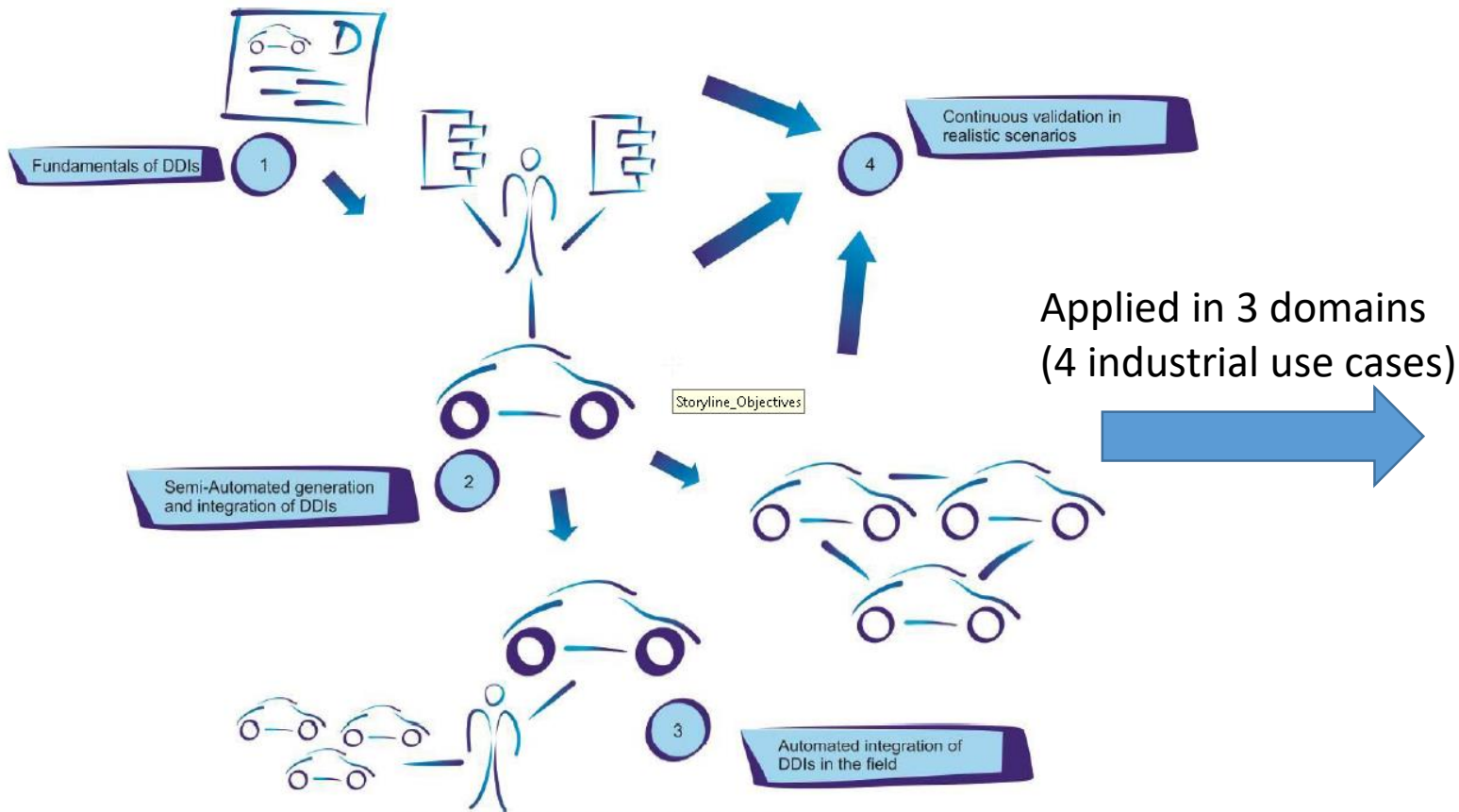


Figure 1: Project Concept in a nutshell

Automotive -
physiological
parameter
monitoring



Automotive –
Driver simulator
for automated
driving functions

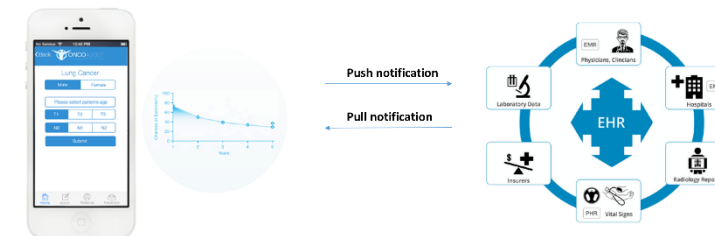


Railway -
European Train
Control System



Automated Integration of DDIs

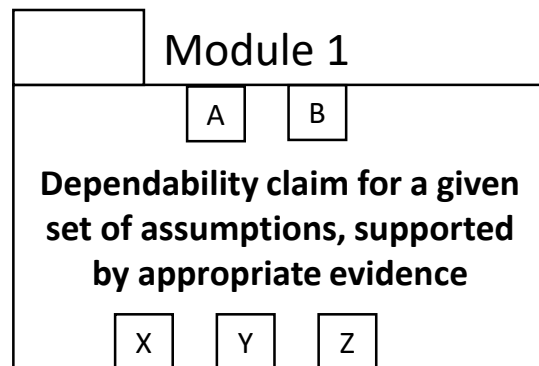
Healthcare –
app for
oncology
professionals



• THE DDI ENGINEERING FRAMEWORK (1/3)



1

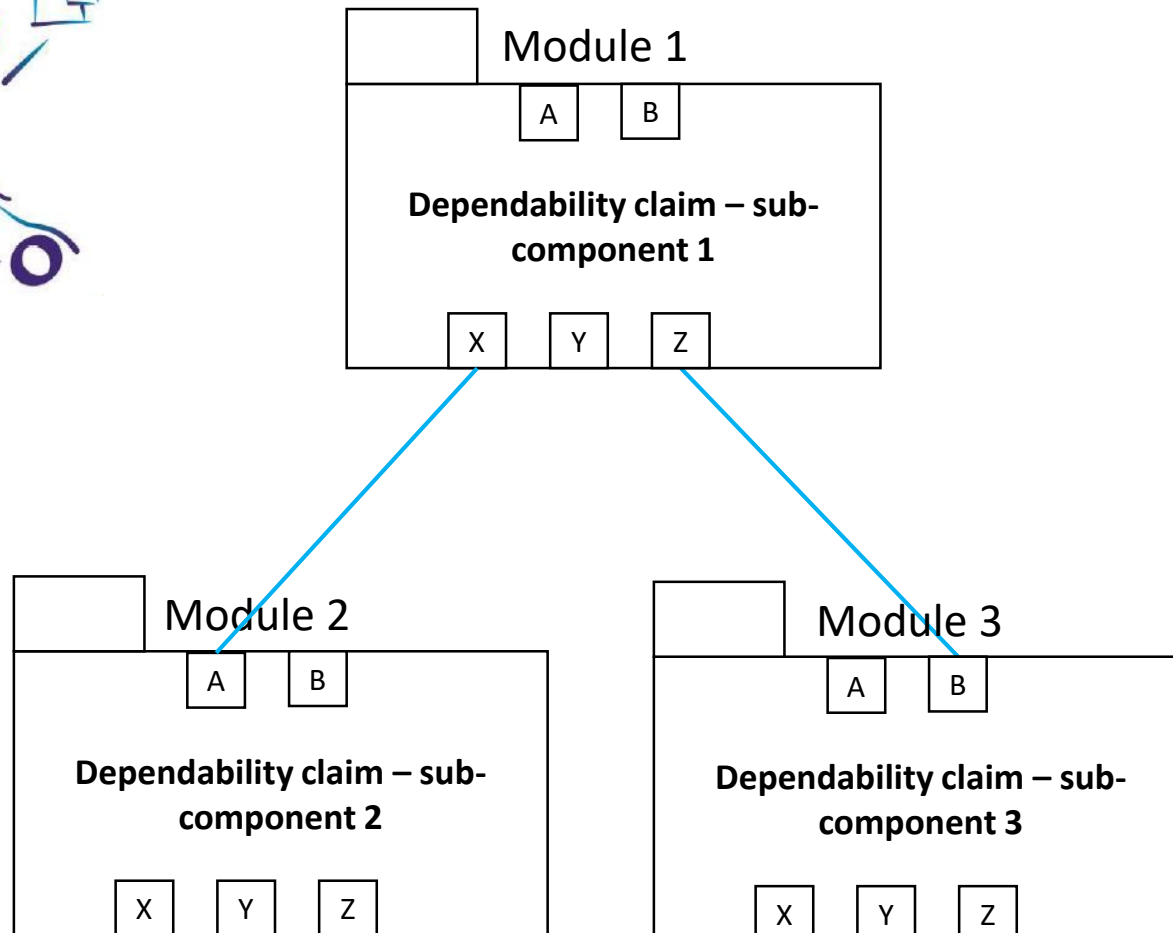


Target: Capability to formalize and automatize the generation of a component's claim argumentation

Possible approach: safety & cyber-security concepts supported by appropriate risk and threat analysis as well as appropriate V&V activities

Example: *the vehicle is able to optimize its velocity profile according to environment and traffic light information*

• THE DDI ENGINEERING FRAMEWORK (2/3)

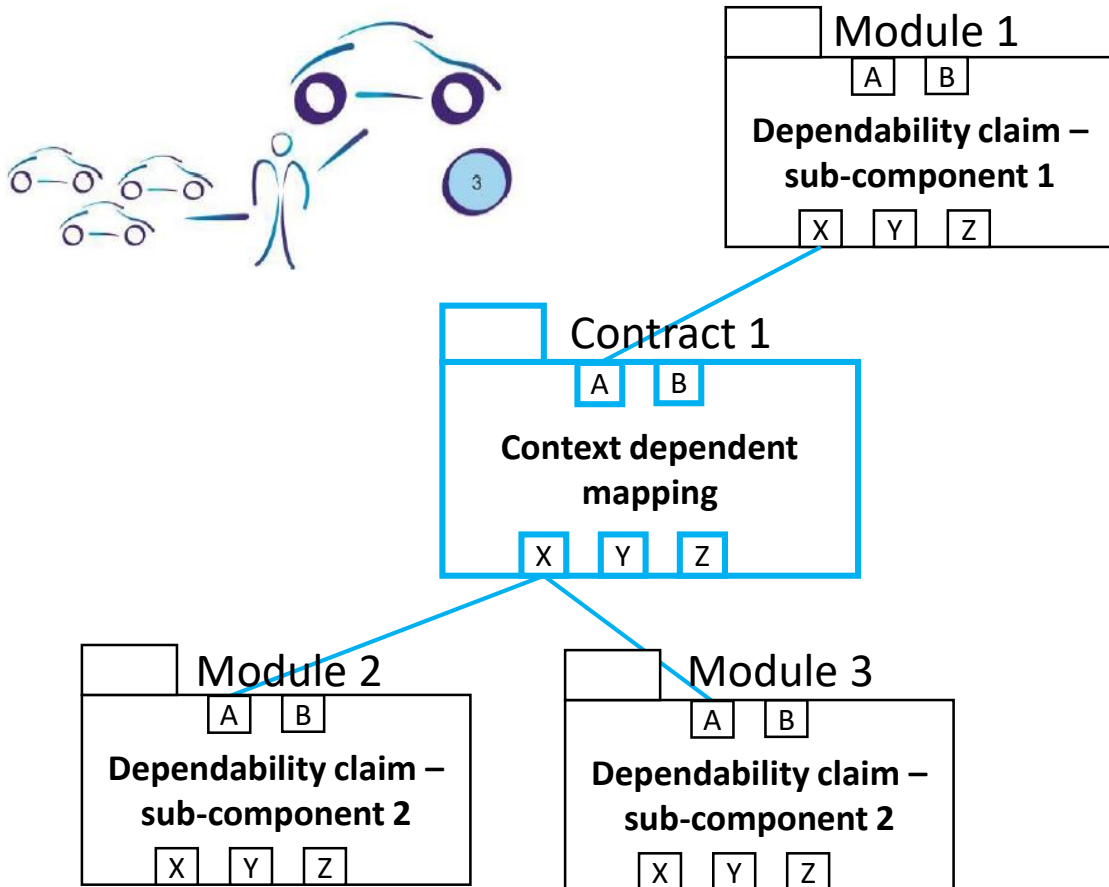


Target: Capability to map component's claims into an overall system dependability argumentation

Possible approach: Dependability assurance framework, e.g., SACM™

Example: *the vehicle is able to optimize its velocity profile according to **own environment sensors** and traffic light information **provided by the infrastructure***

• THE DDI ENGINEERING FRAMEWORK (3/3)

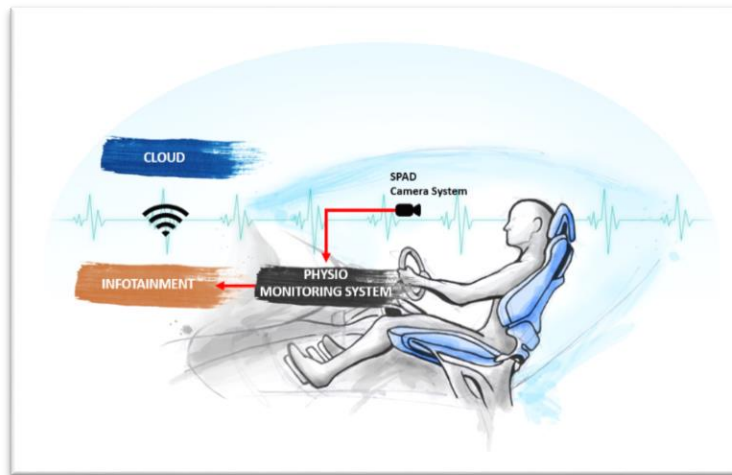


Target: Capability (a) to manage variability and (b) to automatize the mapping process during creation of the overall system dependability argumentation

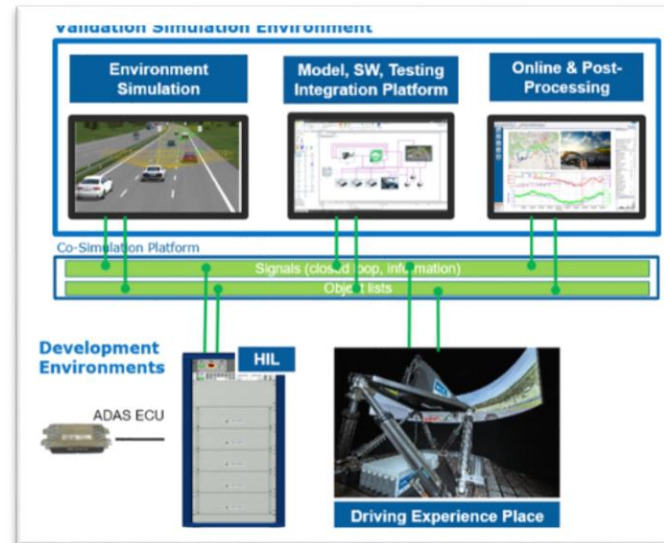
Possible approach: enhancing dependability assurance frameworks by conditional dependability certificates

Example: *the vehicle is able to optimize its velocity profile according to own environment sensors and traffic light information **provided by the infrastructure or provided by its in-vehicle camera or car-to-car communication***

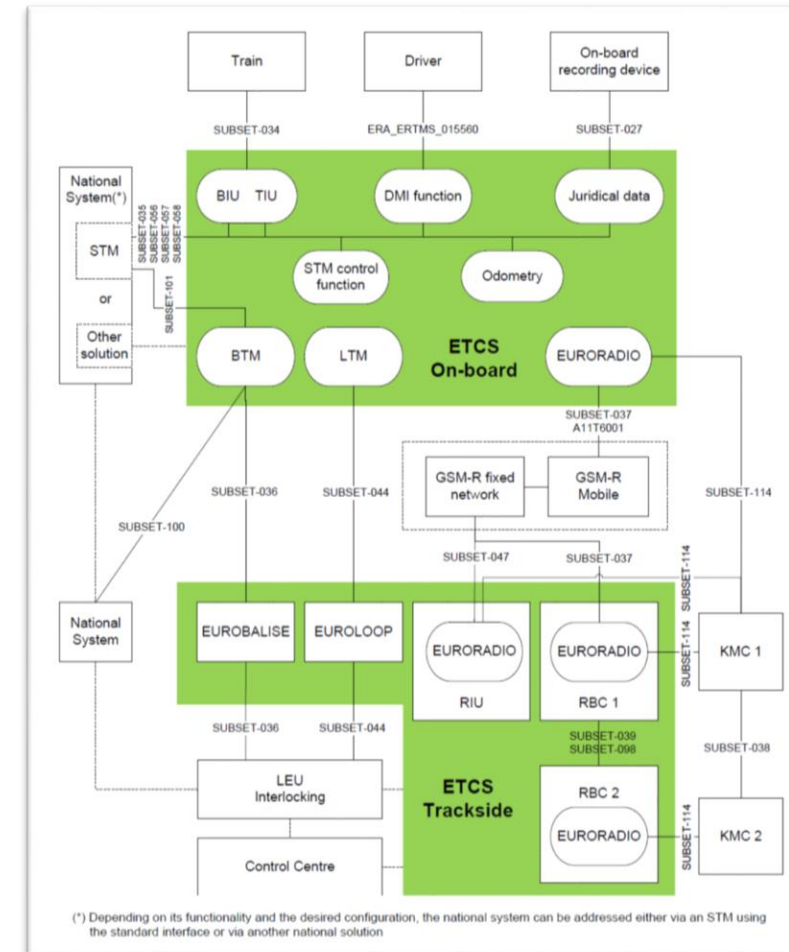
• THE DEIS INDUSTRIAL USE CASES



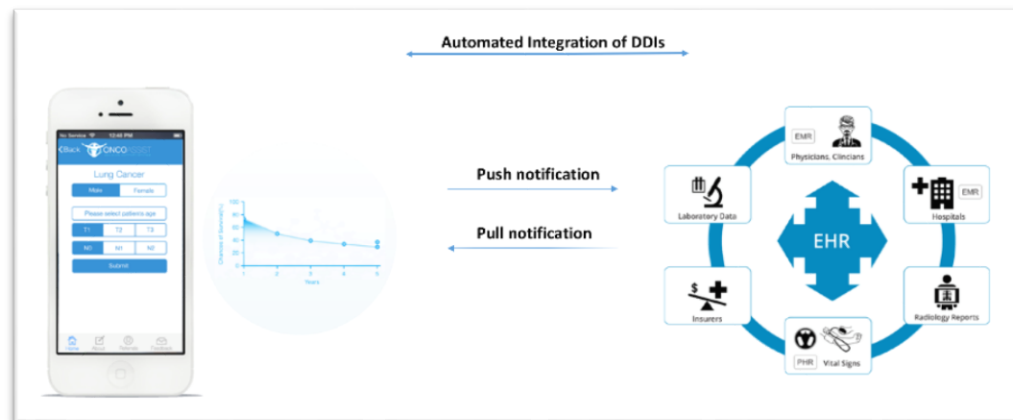
Automotive - physiological parameter monitoring



Automotive – Driver simulator for automated driving functions



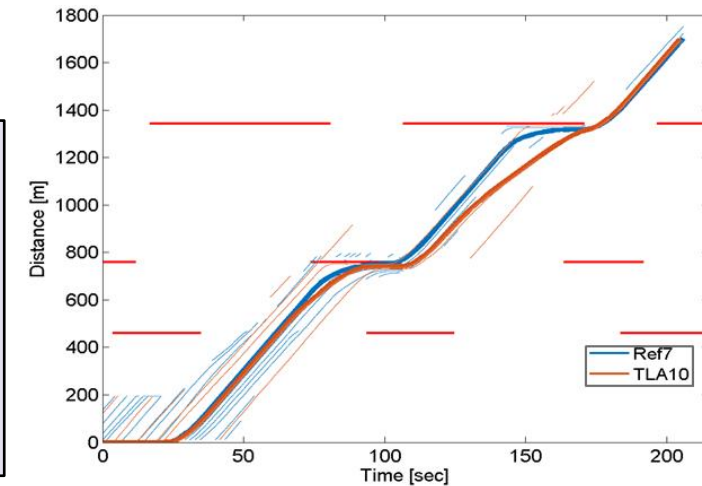
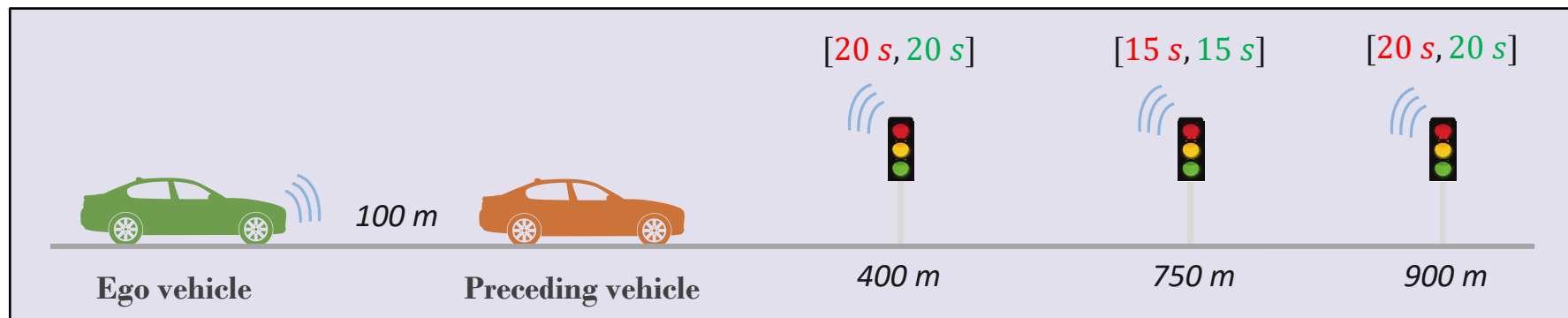
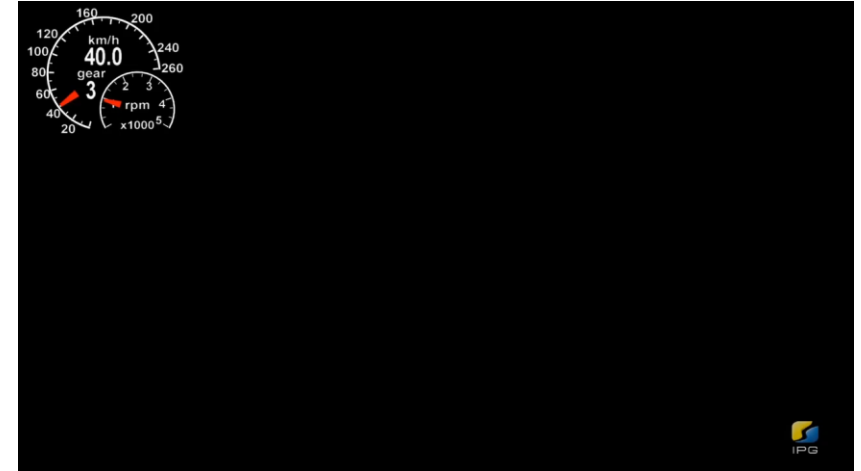
Railway - European Train Control System



Healthcare – app for oncology professionals

● EXAMPLE: TRAFFIC LIGHT ASSISTANT

- Scenario with 3 TL & preceding vehicle.
- Vehicle with TLA catches 'Green Wave'.
- TLA predicts preceding vehicle.
- Reduced FC with similar travel time.



● SUMMARIZING

- DDI engineering framework as
 - Opportunity to improve efficiency of dependability engineering in complex supply chains
 - Enabler for usage of trusted connectivity for dependable systems of systems
- Four industrial use cases exploring the application of DDI in three different domains

➔ What would be YOUR DDI application?

www.deis-project.eu