interACT

Designing cooperative interaction of automated vehicles with other road users in mixed traffic environments

Virtual Final Event

The interACT scenarios – defining and documenting essential urban scenarios for the development and evaluation of interACT solutions

Marc Wilbrink

German Aerospace Center (DLR)

18th June 2020

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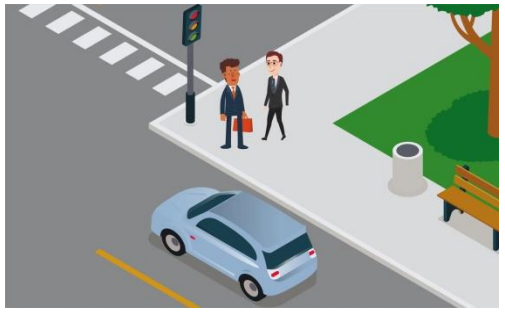
The challenge

5th Objective

Methodology for assessing the quality of interaction

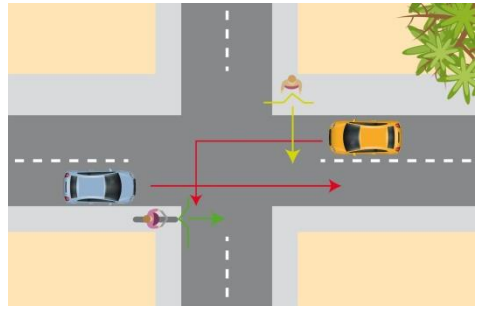
1st Objective

Psychological models



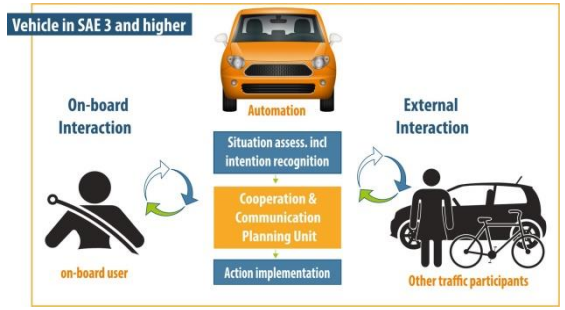
4th Objective

Novel HMI elements



2nd Objective

Intention recognition & behavioural predictions



3rd Objective

CCPU & safety layer

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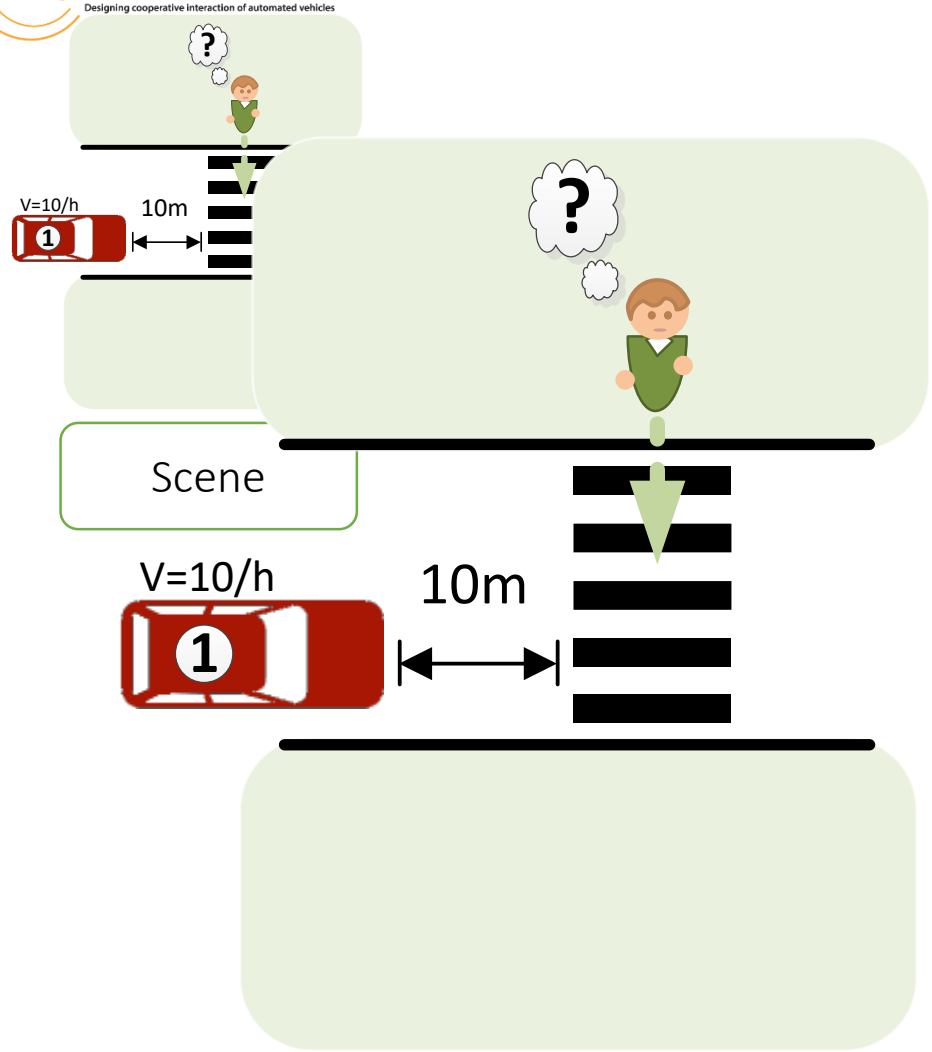
Scene



- Persists only several seconds
- Snapshot of the environment including
  - Scenery (Lane network, stationary elements, traffic lights, obstacles)
  - Dynamic elements (cars, road users)
  - All included agents

Ulbrich, S., Menzel, T., Reschka, A., Schuldt, F., Maurer, M. (2015): Defining and Substantiating the Terms Scene, Situation and Scenario for Automated Driving. IEEE International Annual Conference on Intelligent Transportation Systems (ITSC), Las Palmas, Spanien, pp. 982-988

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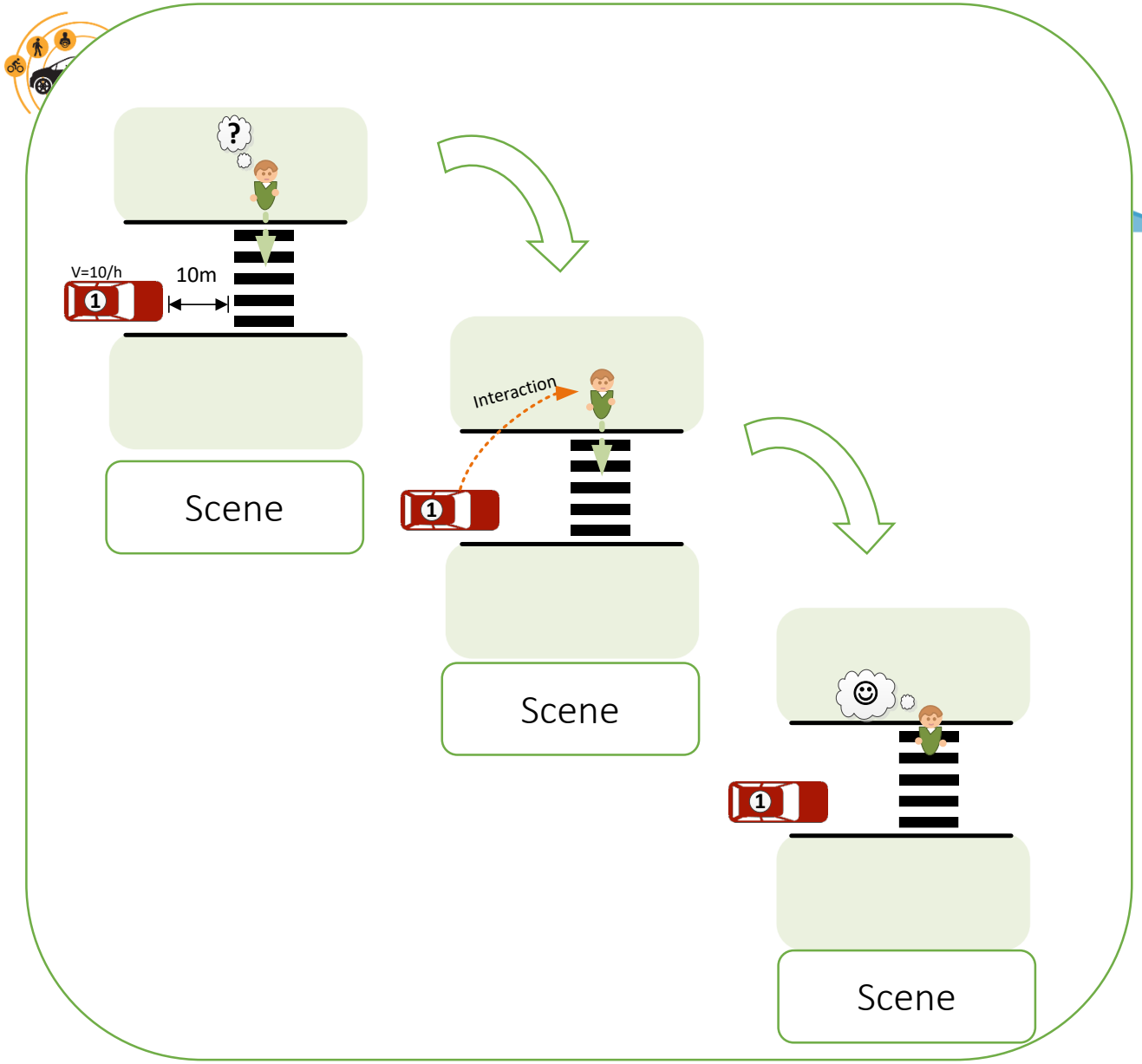
Scenario



- Temporal development between several scenes
- A sequence of scenes connected by actions & events
- Includes goals of the agents
- Spans a certain amount of time

Ulbrich, S., Menzel, T., Reschka, A., Schuldt, F., Maurer, M. (2015): Defining and Substantiating the Terms Scene, Situation and Scenario for Automated Driving. IEEE International Annual Conference on Intelligent Transportation Systems (ITSC), Las Palmas, Spanien, pp. 982-988

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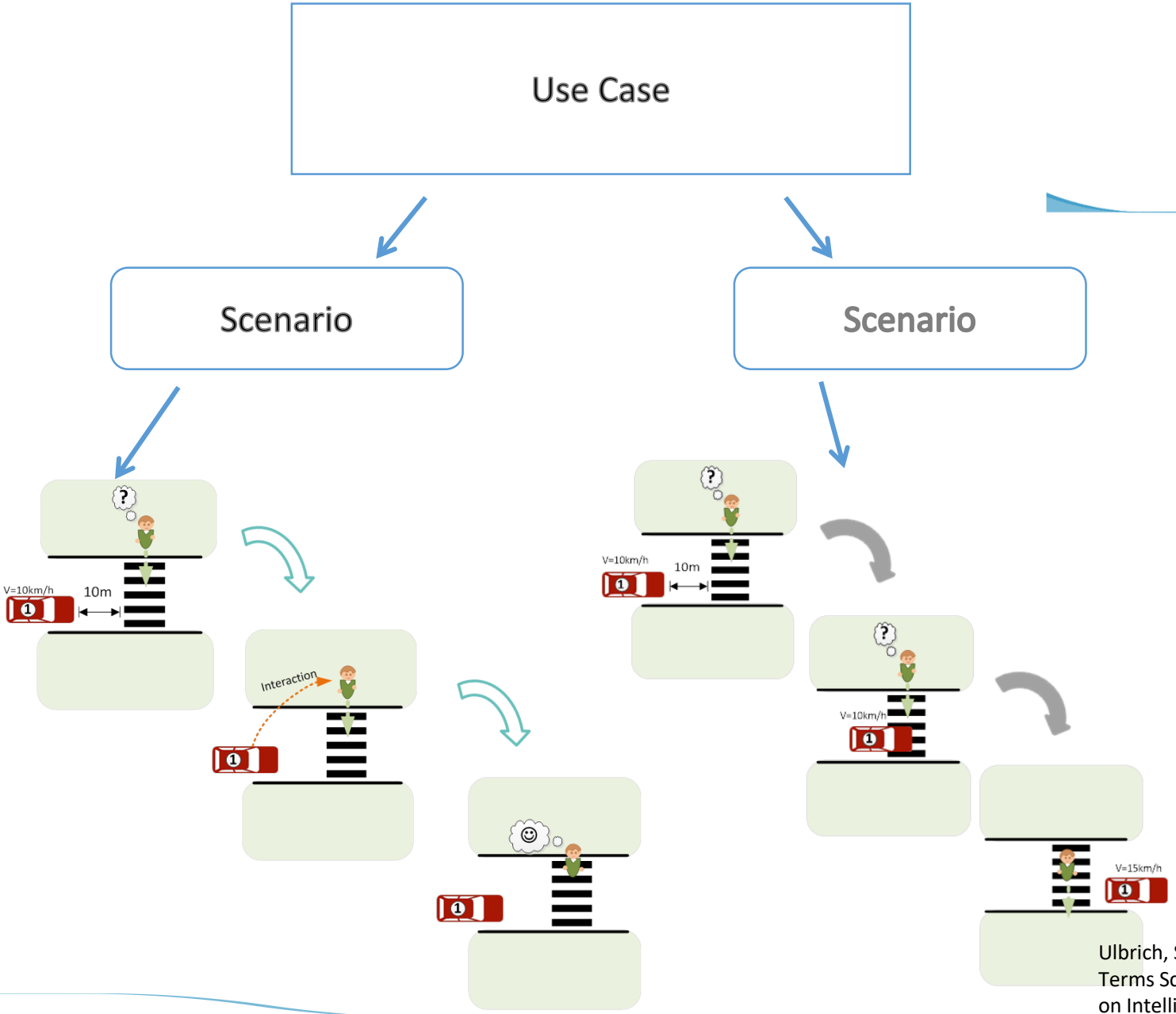
Use Case



- Definition of one or several scenarios
- Description of the functional range and the desired behaviour
- Specification of system boundaries

Ulbrich, S., Menzel, T., Reschka, A., Schuldt, F., Maurer, M. (2015): Defining and Substantiating the Terms Scene, Situation and Scenario for Automated Driving. IEEE International Annual Conference on Intelligent Transportation Systems (ITSC), Las Palmas, Spanien, pp. 982-988

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Selection process

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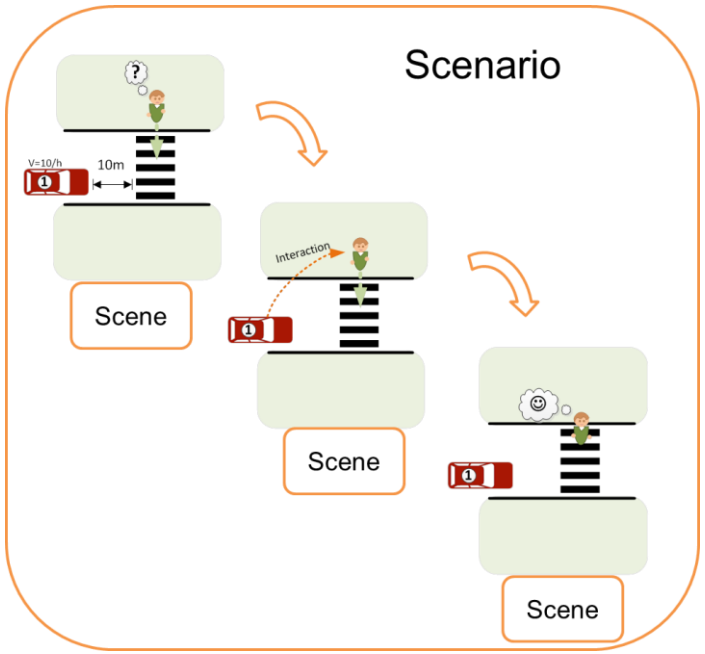
Common definition of use case and Scenario



Workshops to identify relevant use cases

Rating and agreement of addressed use cases

- relevance for safety
- frequency of occurrence
- relevance for traffic flow
- need for interaction with human road user
- Realisation in demo vehicles
- Realisation in driving simulator

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Must have use cases in interACT

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1. React to crossing non-motorised TP at crossings without traffic lights
2. React to an ambiguous situation at an unsignalised intersection
3. React to non-motorised TP at a parking space
4. React to vehicles at a parking space

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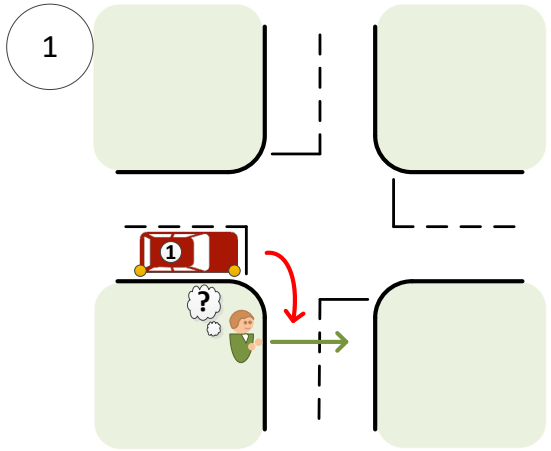
1

React to crossing non-motorised TP at crossings without traffic lights



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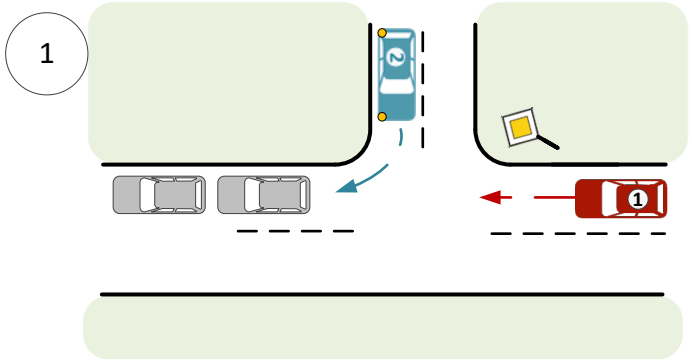
2 React to an ambiguous situation at an unsignalised intersection



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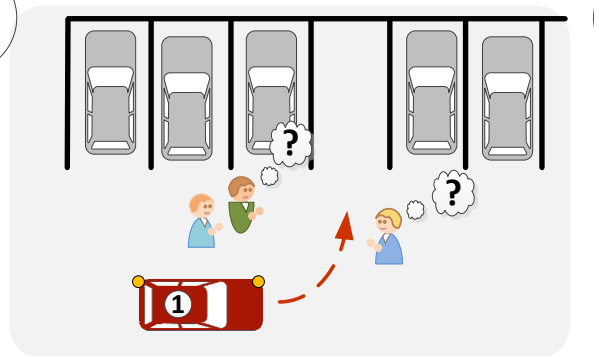
3

React to non-motorised TP at a parking space

1



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4 React to vehicles at a parking space

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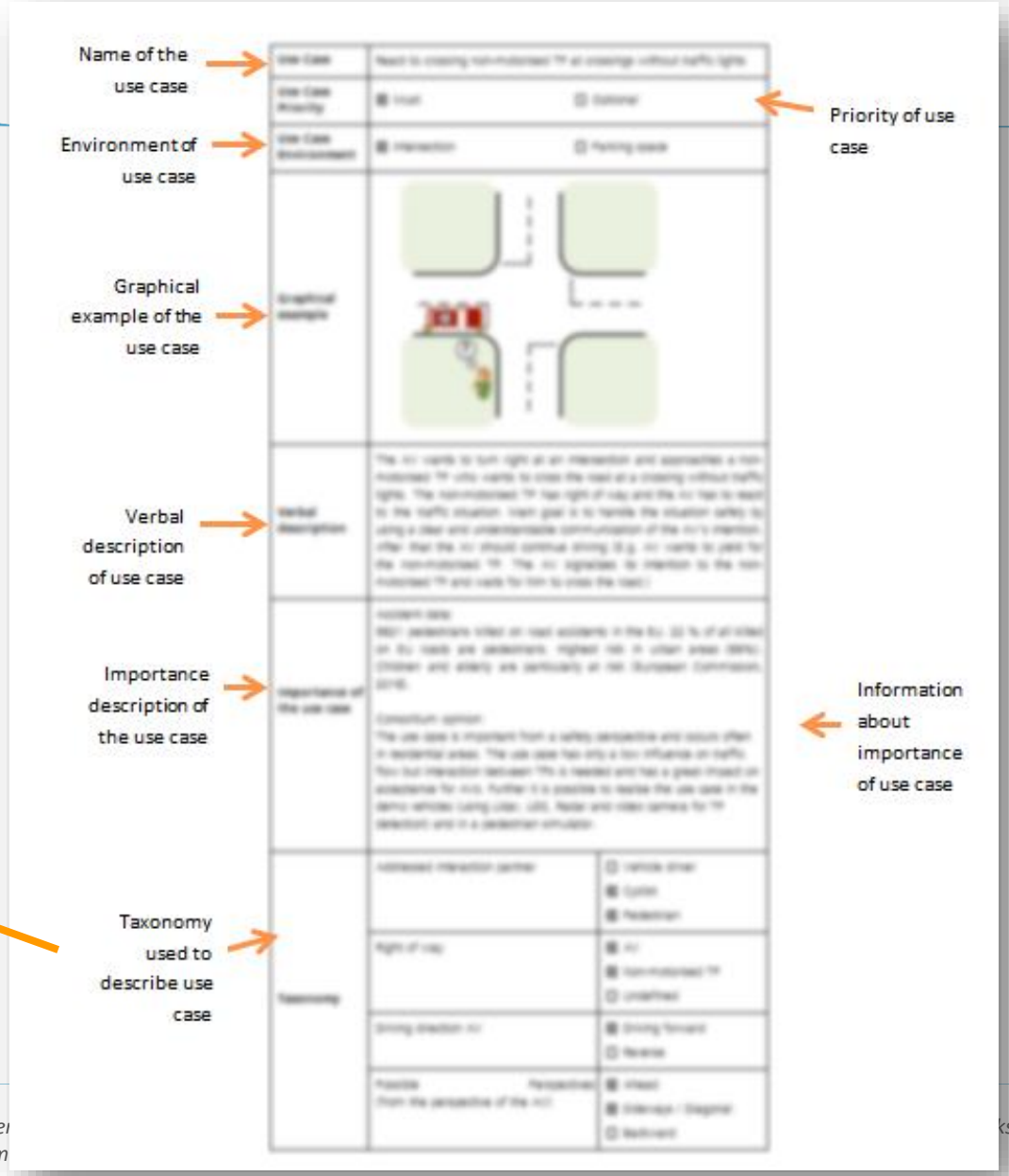
Use Case description

- Addressed interaction partner(s)
- Right of way
- Driving direction AV
- Possible perspectives of the interaction (from the perspective of the AV)



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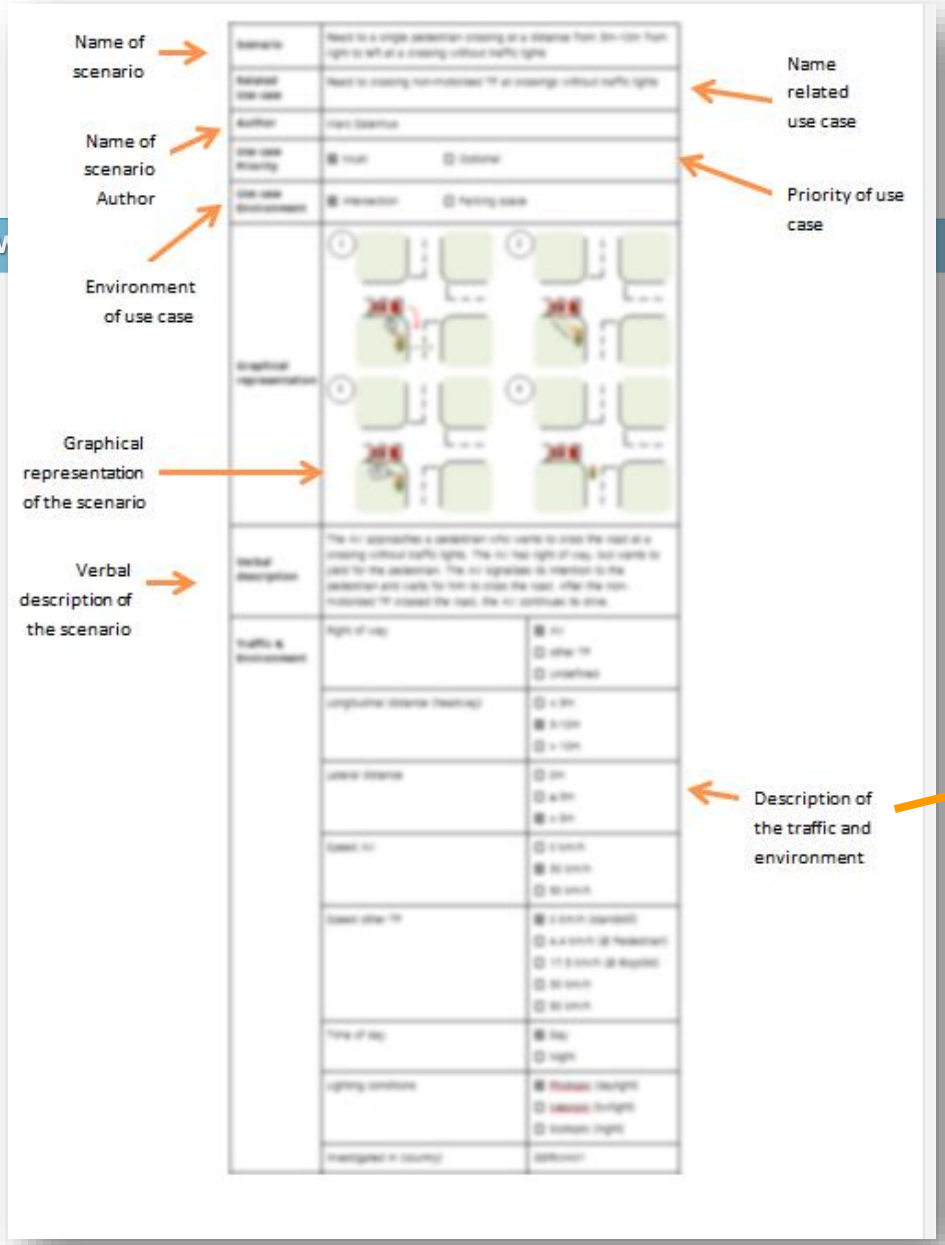
Scenario description



- Right of way
- Longitudinal/ Lateral Distances
- Speed of AV
- Speed of other TP
- Time of Day
- Lighting conditions

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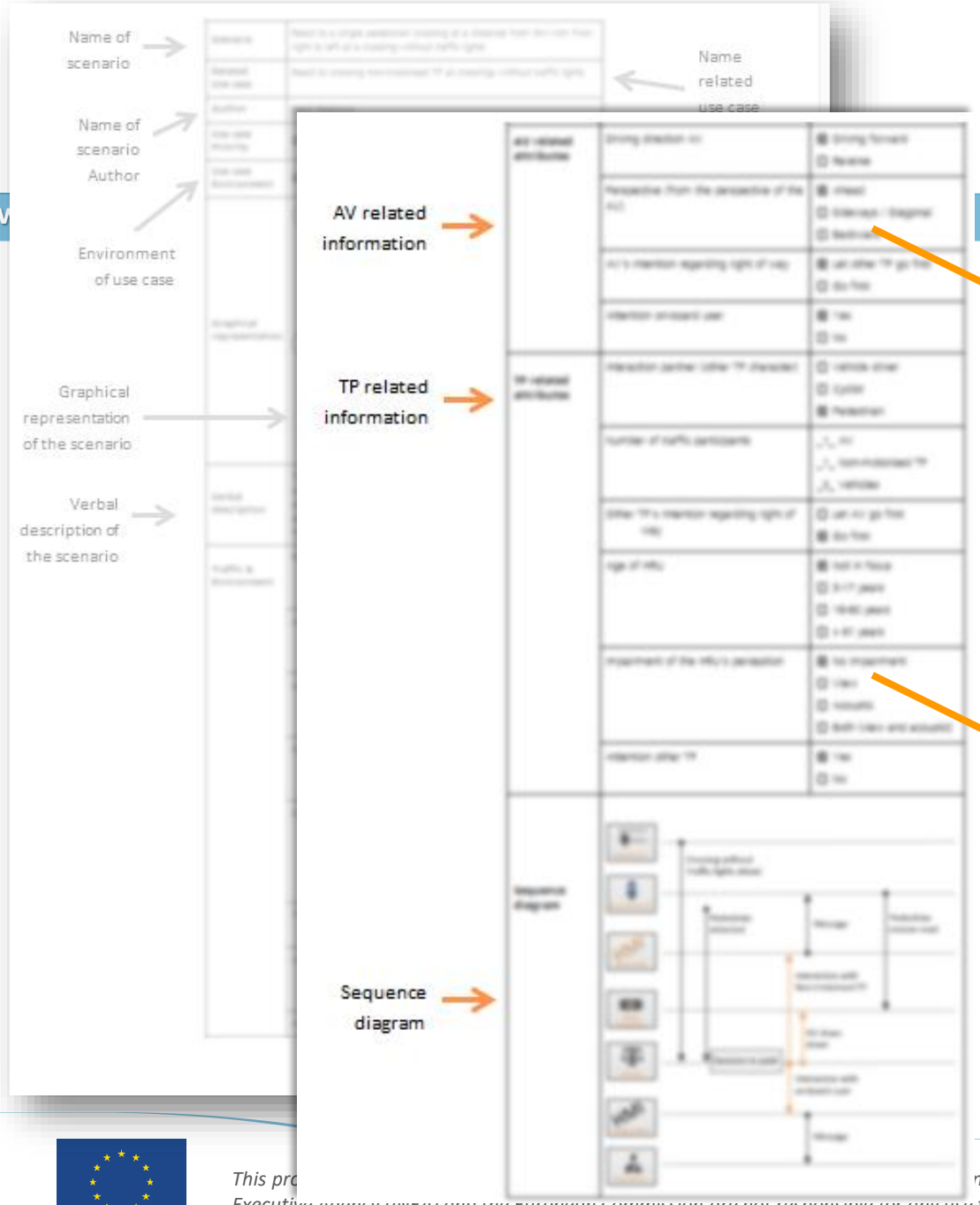
Scenario description



- Driving Direction of AV
- AV's intention regarding right of way
- Attention on-board user towards traffic situation

- Interaction partner (type)
- Number of Traffic participants
- Attention other TP towards AV

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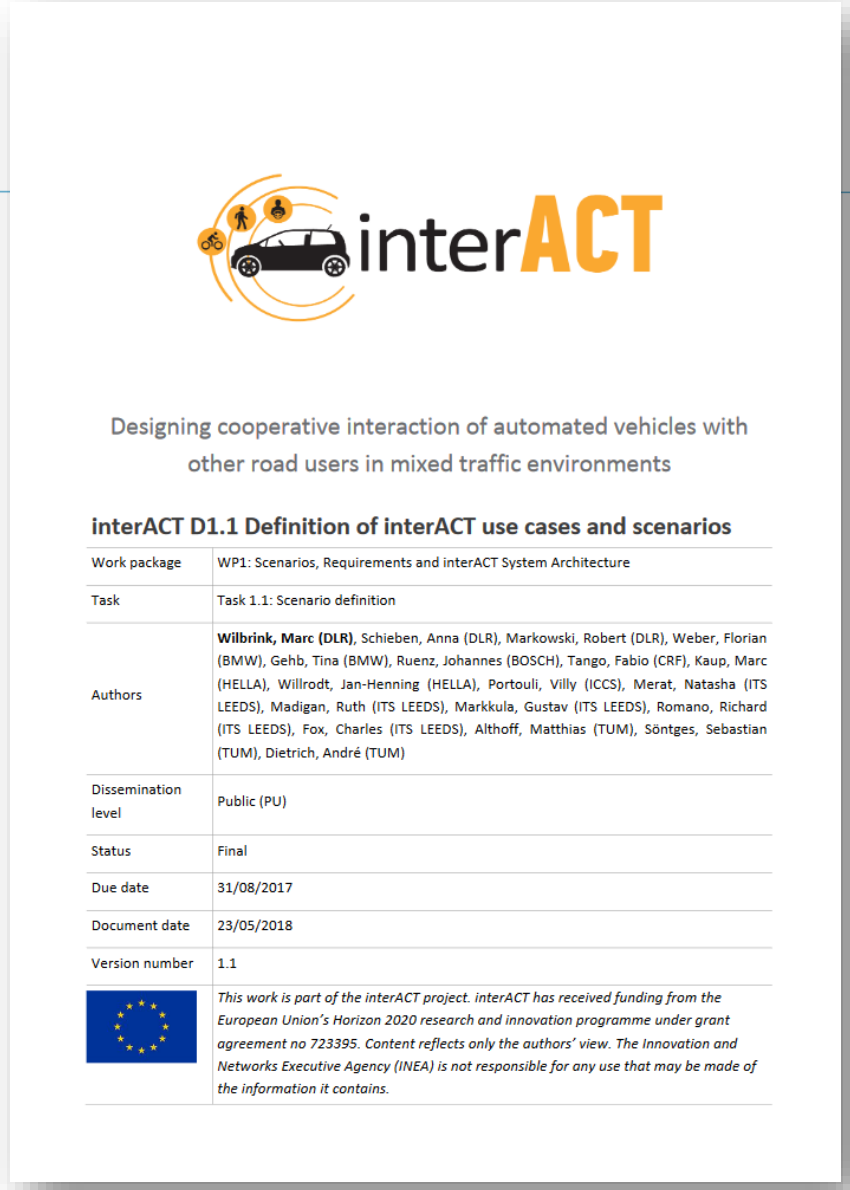
Deliverable D1.1 – Definition of interACT use cases and scenarios

https://www.interact-roadautomation.eu/projects-deliverables/



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interACT D1.1 Definition of interACT use cases and scenarios

Work package	WP1: Scenarios, Requirements and interACT System Architecture
Task	Task 1.1: Scenario definition
Authors	**Wilbrink, Marc (DLR)**, Schieben, Anna (DLR), Markowski, Robert (DLR), Weber, Florian (BMW), Gehb, Tina (BMW), Ruenz, Johannes (BOSCH), Tango, Fabio (CRF), Kaup, Marc (HELLA), Willrodt, Jan-Henning (HELLA), Portouli, Villy (ICCS), Merat, Natasha (ITS LEEDS), Madigan, Ruth (ITS LEEDS), Markkula, Gustav (ITS LEEDS), Romano, Richard (ITS LEEDS), Fox, Charles (ITS LEEDS), Althoff, Matthias (TUM), Söntges, Sebastian (TUM), Dietrich, André (TUM)
Dissemination level	Public (PU)
Status	Final
Due date	31/08/2017
Document date	23/05/2018
Version number	1.1
	This work is part of the interACT project. interACT has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 723395. Content reflects only the authors' view. The Innovation and Networks Executive Agency (INEA) is not responsible for any use that may be made of the information it contains.

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Thank you!

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DLR

Marc Wilbrink,
Marc.wilbrink@dlr.de

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