



IMPLEMENTATION OF AUTOMATED ON-STREET PARKING: REQUIREMENTS AND CHALLENGES

Marcel Kascha (NFF), Virtual Conference,
16.12.2020



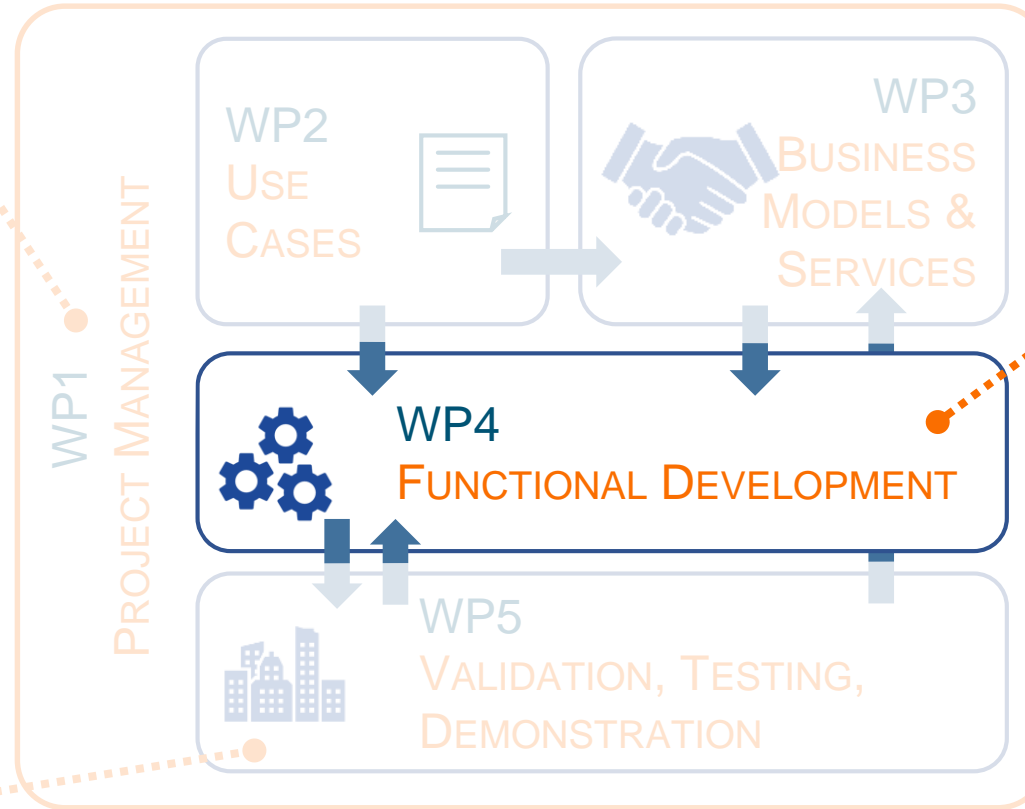
Introduction | Overview in project context

Project management

- Coordination and tracking of the project activities
- Support in all administrative and framework processes

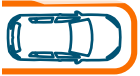
Validation and demonstration

- Implementation in demonstrator vehicles
- Testing and demonstration in real traffic conditions



Development of automated driving functions

- Localization
- Parking spot detection
- V2X communication
- Trajectory planning
- Interfaces to service layer



Definition | Automated Valet Parking (AVP)

1. Exit vehicle in drop-off zone



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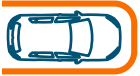
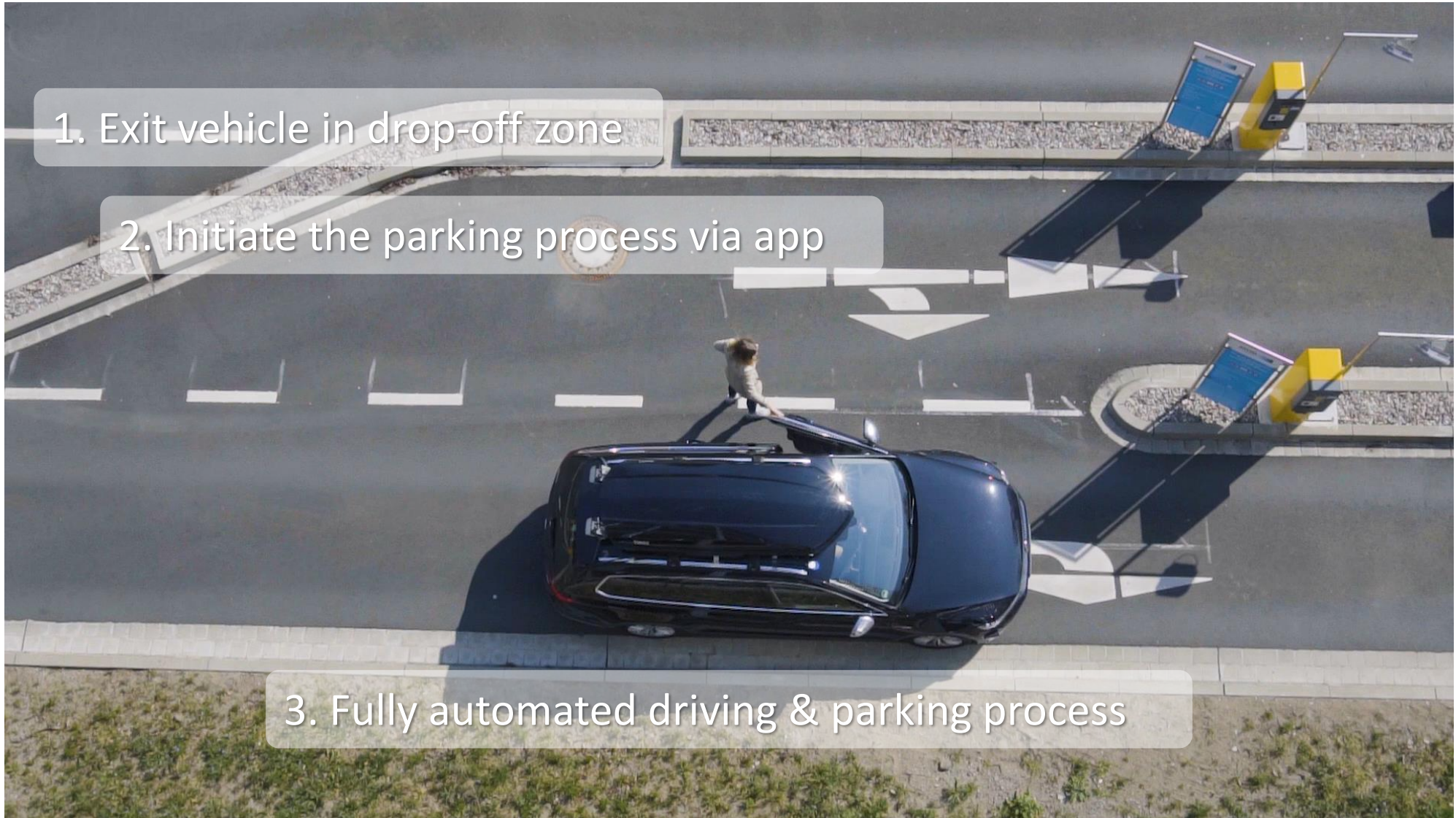
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Definition | Automated Valet Parking (AVP)

1. Exit vehicle in drop-off zone

2. Initiate the parking process via app

3. Fully automated driving & parking process



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Motivation | Advantages of Automated Valet Parking



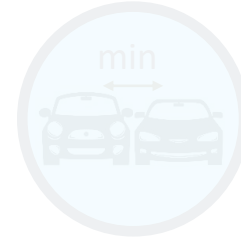
more time



more comfort



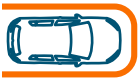
more safety



more efficiency

- Time savings due to elimination of the driving tasks
- Stress avoidance
- Additional services

- Reduction of accidents
- Increased perception of safety



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Motivation | Advantages of Automated Valet Parking



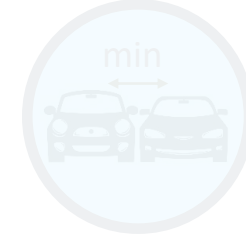
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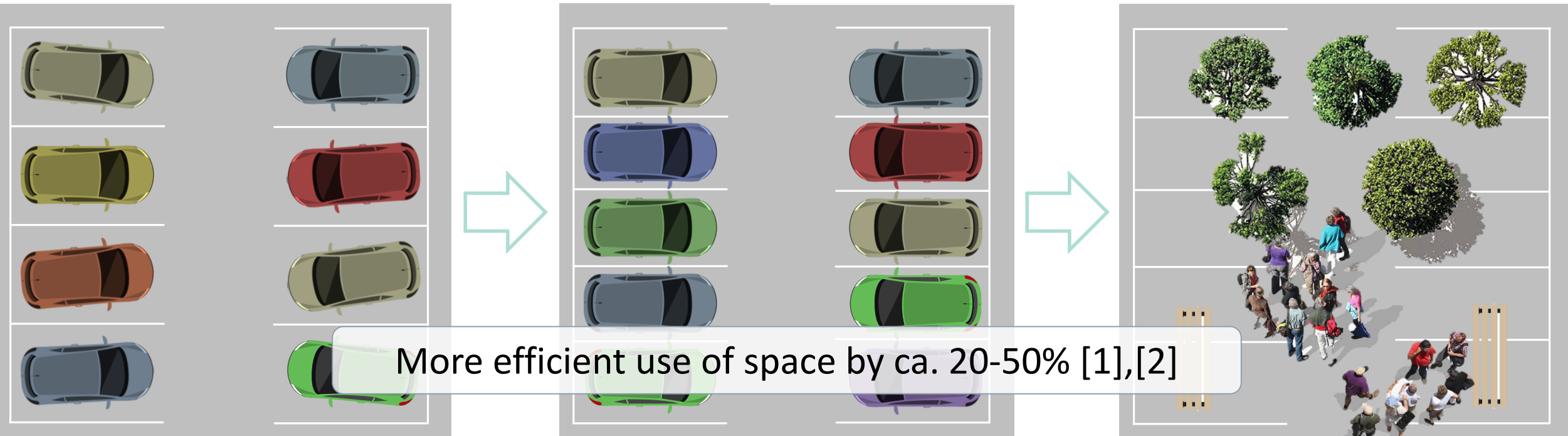
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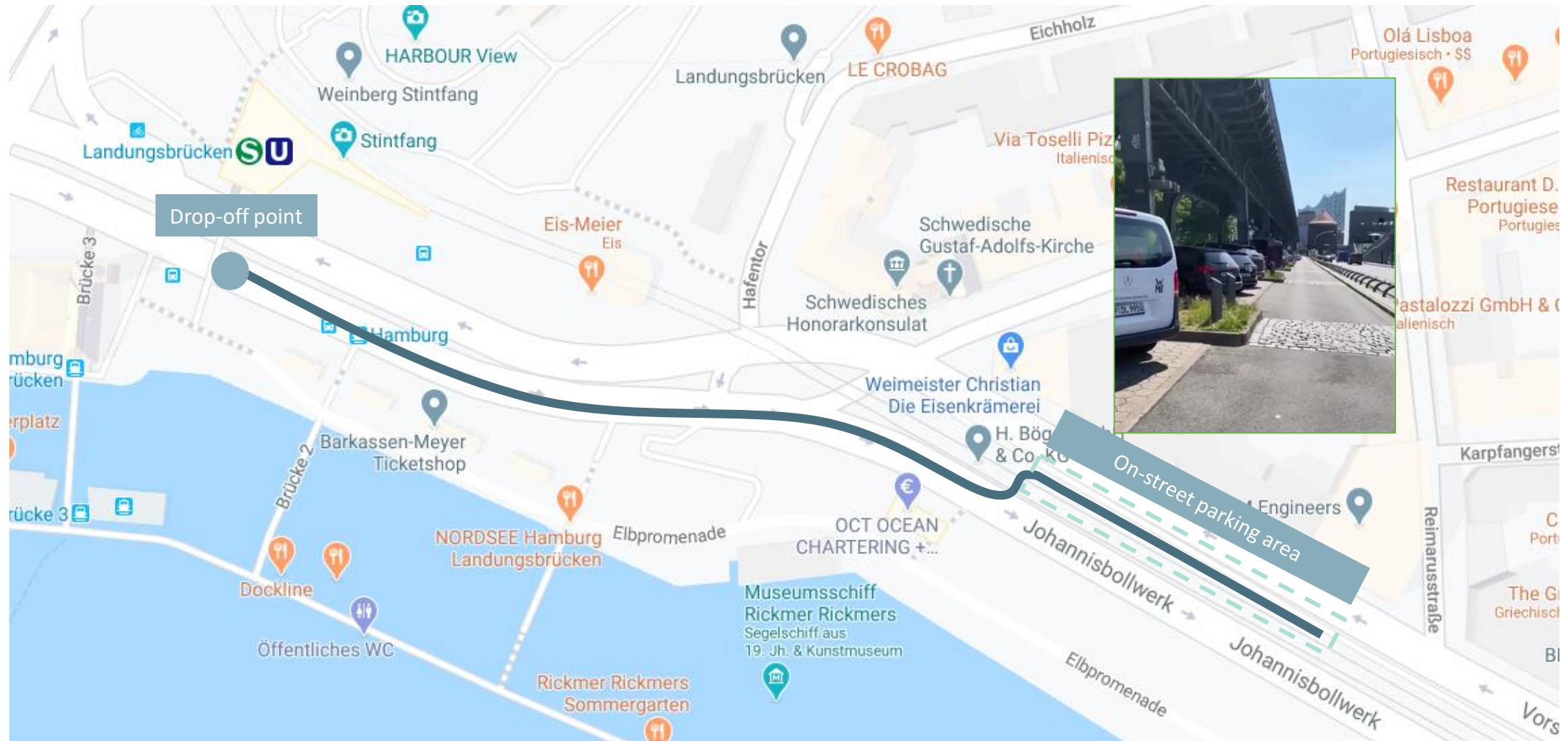
more safety



more efficiency



Demonstration Area | Hamburg Landungsbrücken



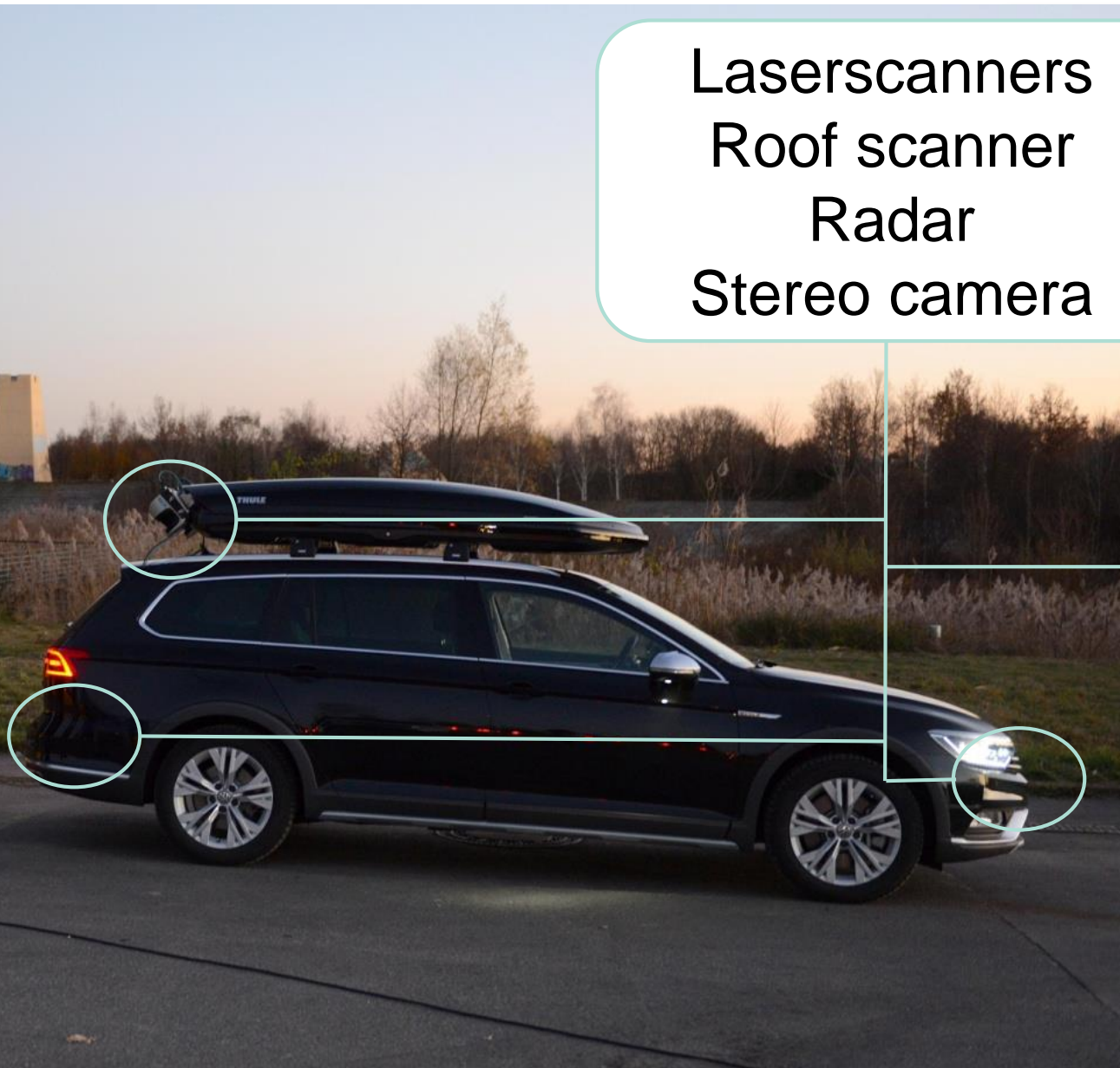
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Laserscanners
Roof scanner
Radar
Stereo camera

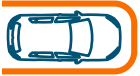
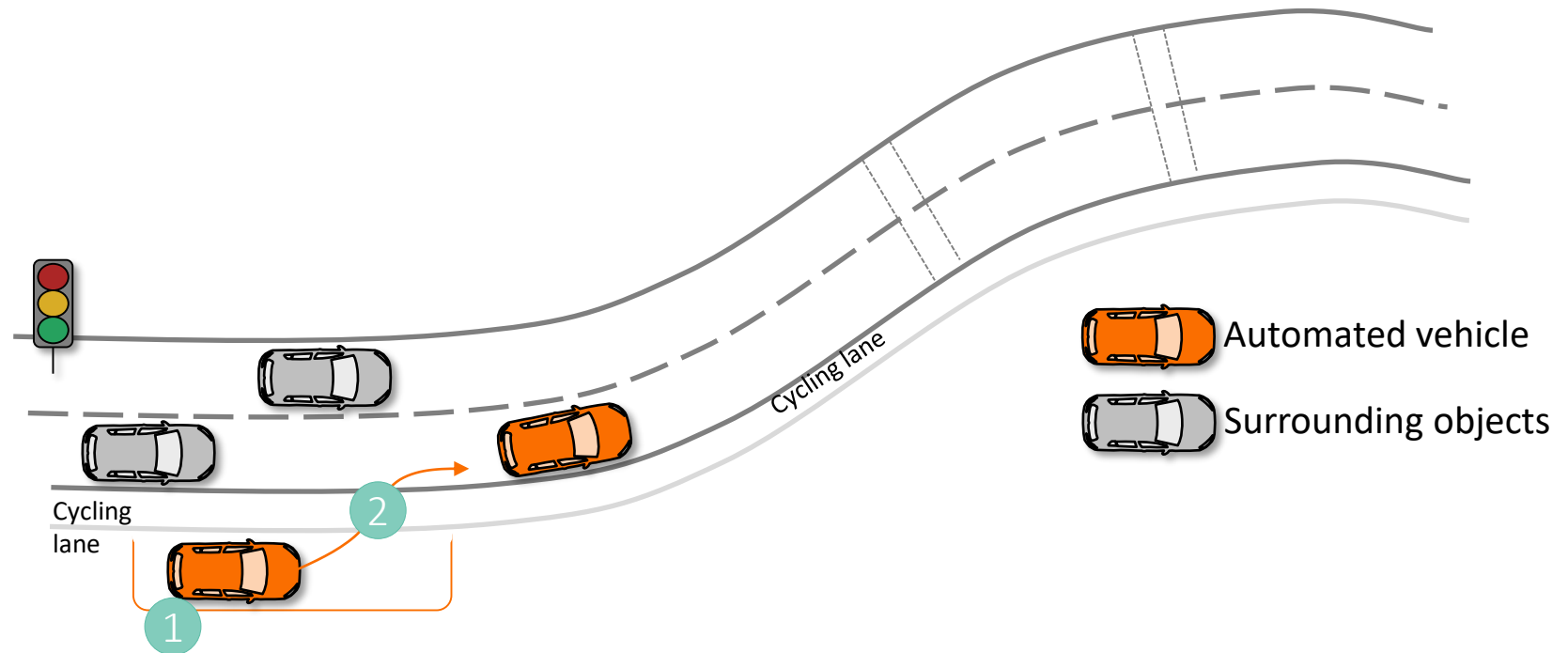
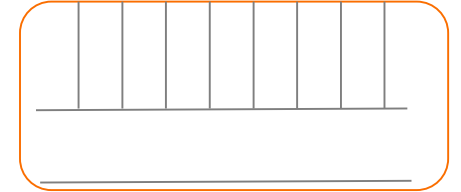


V2X module
controllers
Car PCs
Visualization

Driving Function | Maneuvers at the demo area

- 1 Drop-off and activation of AVP
- 2 Merging into traffic lane & passing cycling lane

On-street parking area



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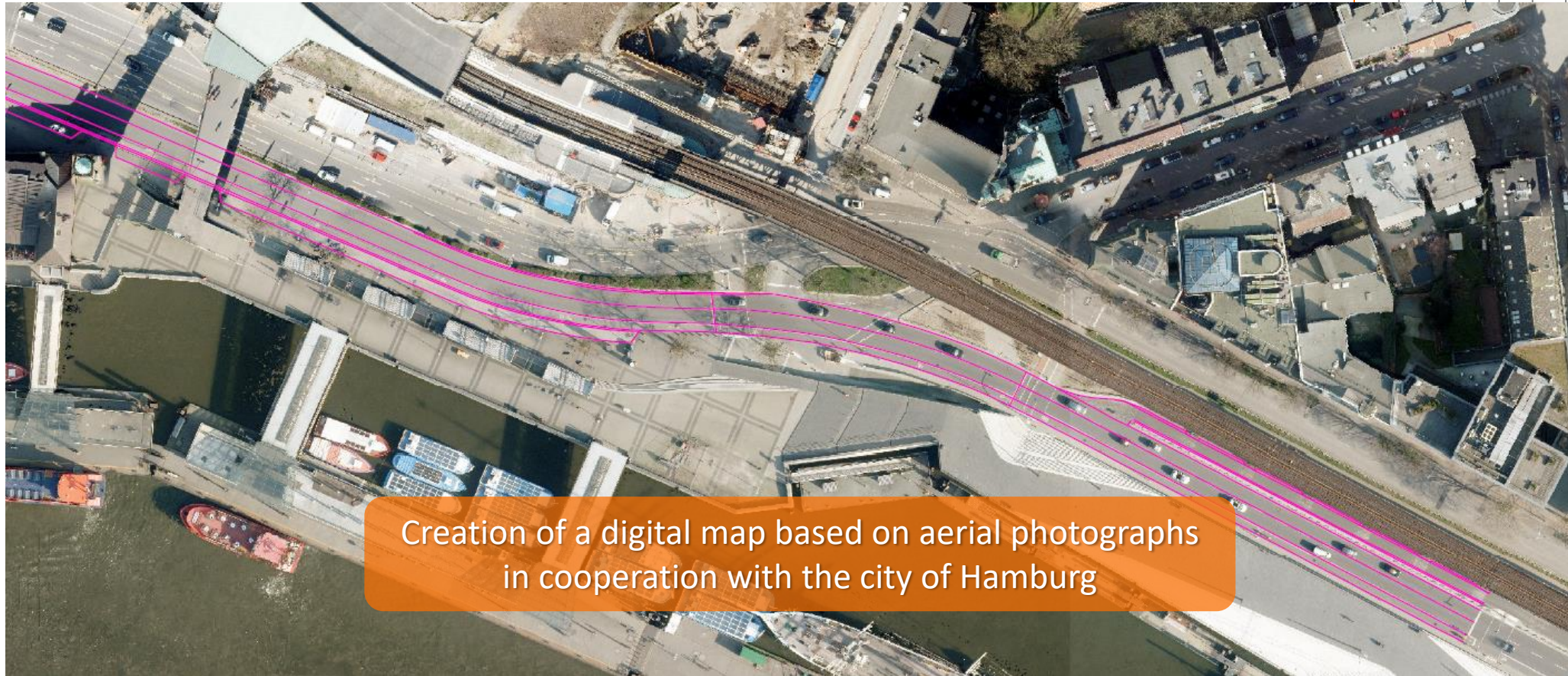
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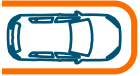
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On-street parking area



Creation of a digital map based on aerial photographs
in cooperation with the city of Hamburg



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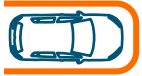
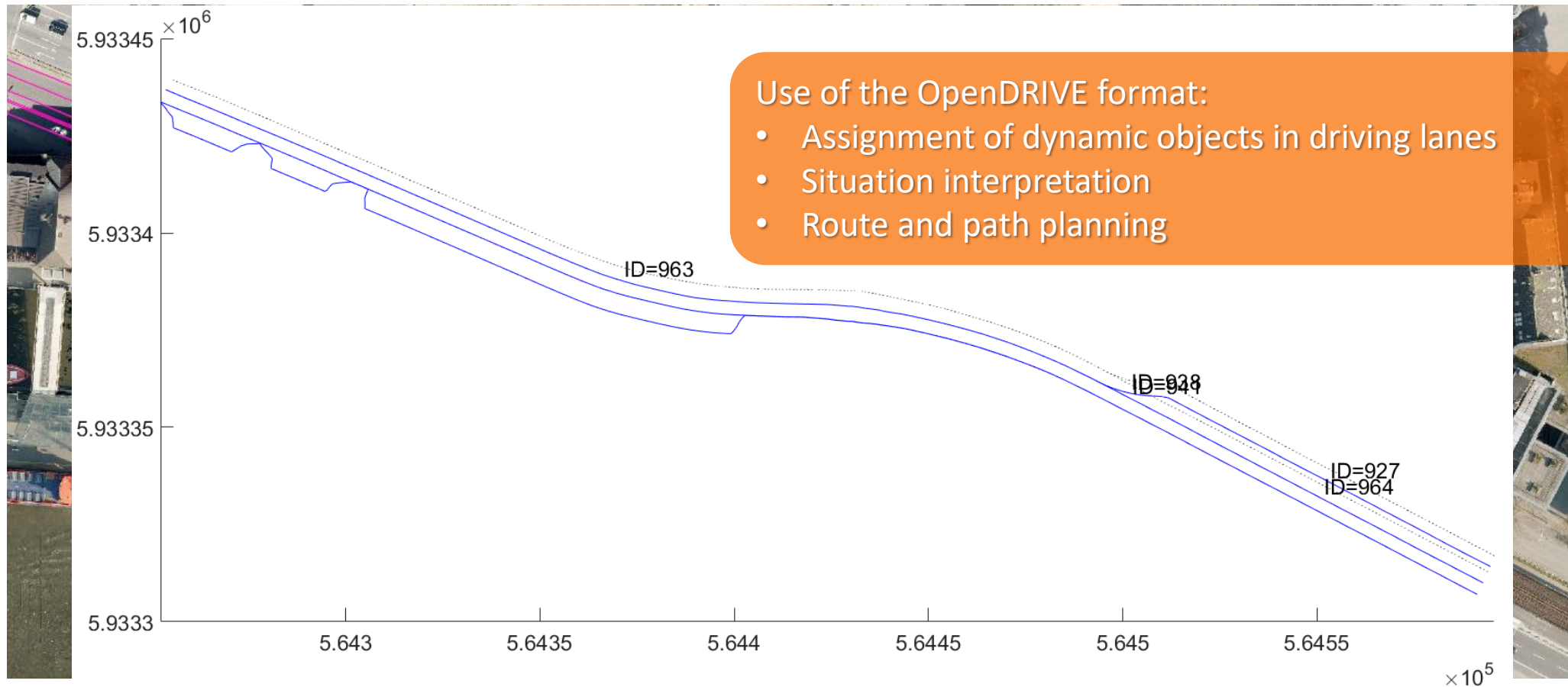
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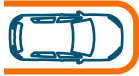
Driving Function | Maneuvers at the demo area

- 1 Drop-off and activation of AVP
- 2 Merging into traffic lane & passing cycling lane
- 3 Dynamic lane change on left lane
- 4 Passing traffic lights



Test track for automated and connected driving in Hamburg (TAVF)

- Communication between traffic signal systems and test vehicle via automotive WLAN
- Safe and comfortable longitudinal vehicle control

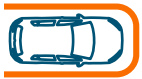
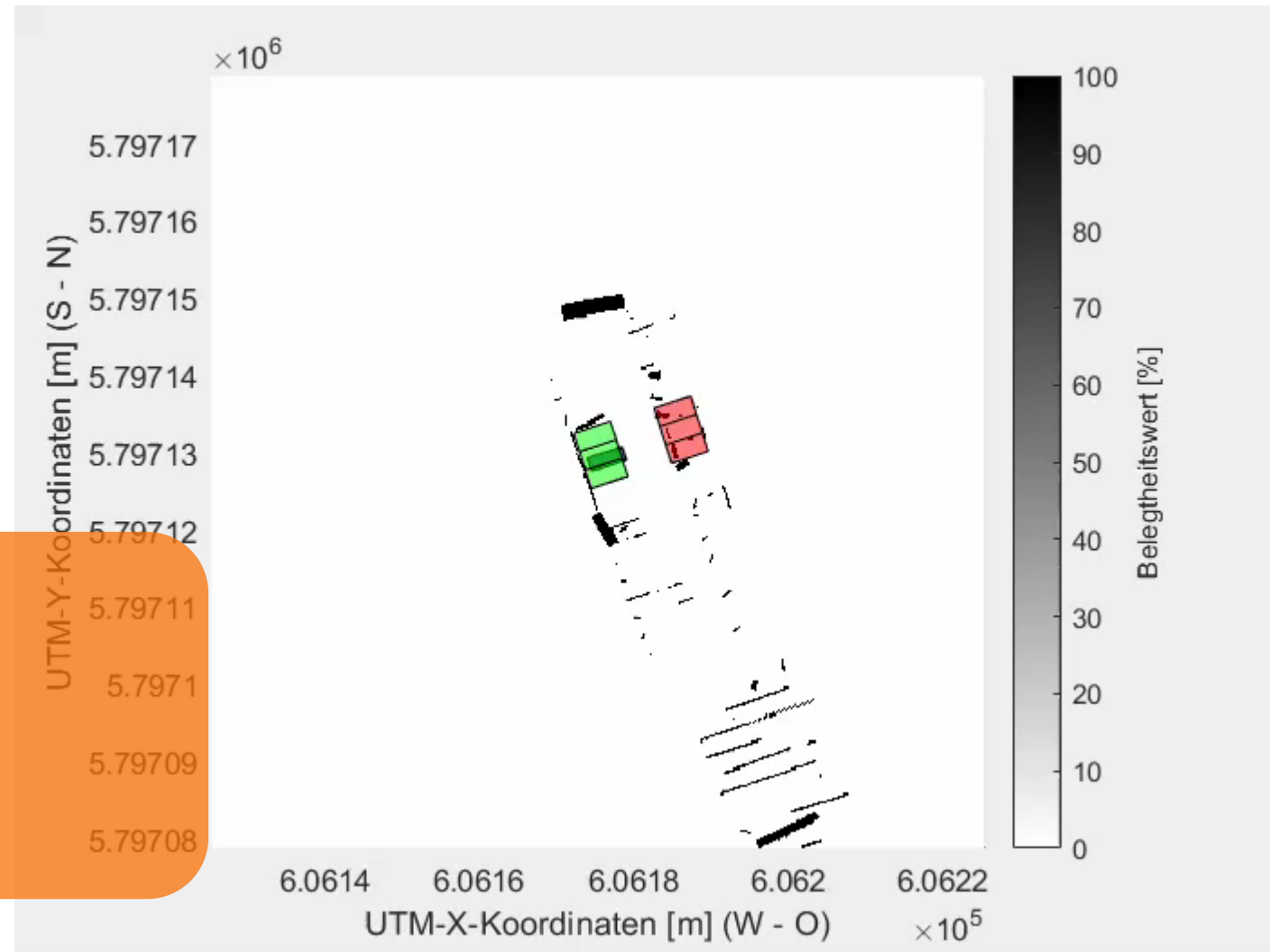


Driving Function | Maneuvers at the demo area

- 1 Drop-off and activation of AVP
- 2 Merging into traffic lane & passing cycling lane
- 3 Dynamic lane change on left lane
- 4 Passing traffic lights
- 5 Left turning to on-street parking area
- 6 Parking maneuver on vacant spot

Parking maneuver

1. Georeferencing of parking areas
2. Modeling of static environment
3. Identification of free parking spaces

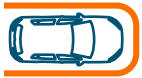
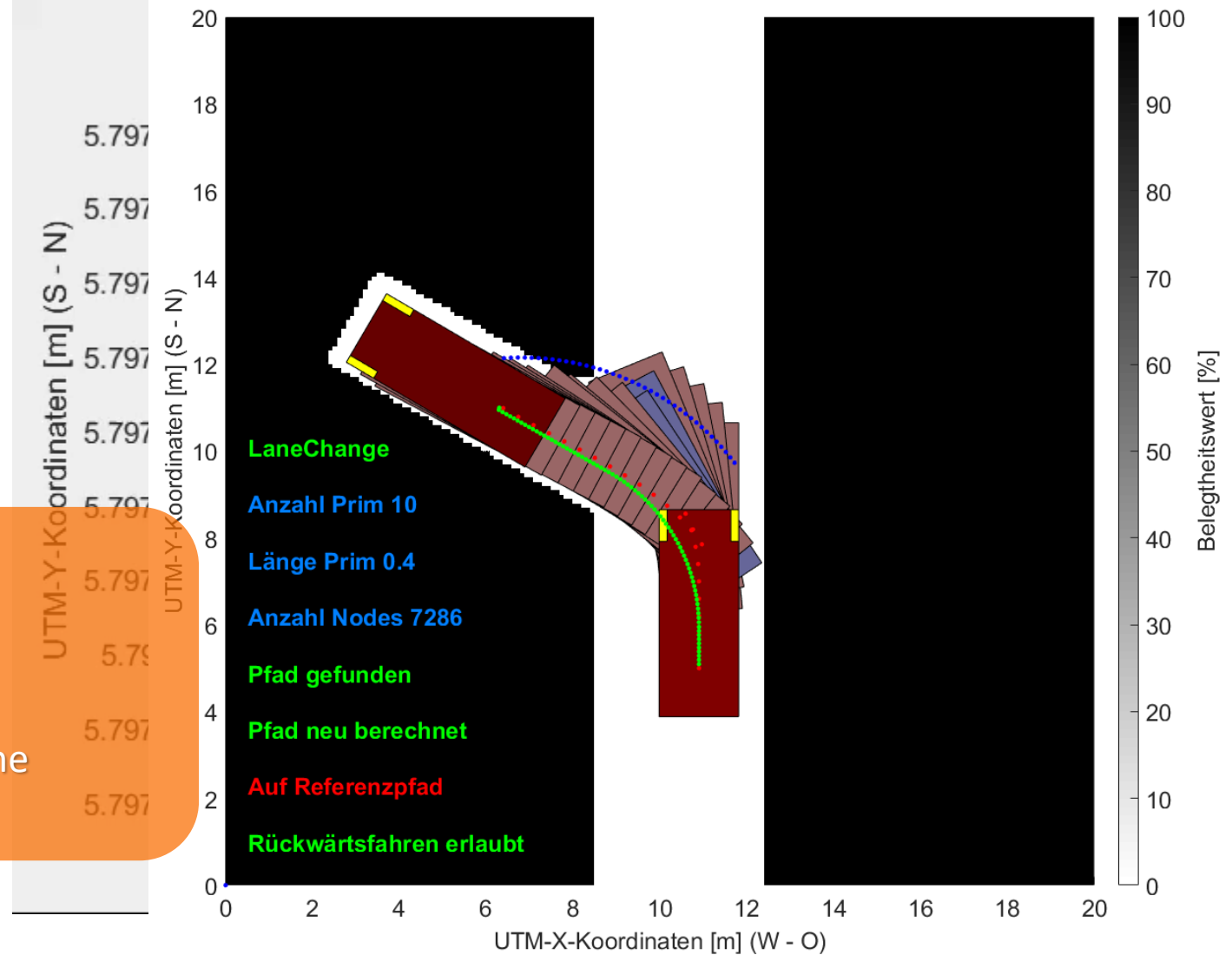


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Parking maneuver

1. Georeferencing of parking areas
2. Modeling of static environment
3. Identification of free parking spaces
4. Trajectory planning taking into account the environment



Summary | Real demonstration of the driving function



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Thank you!

Marcel Kascha (NFF), Institute of Automotive Engineering



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