

Dr. Dieter Schuller, Opel Automobile GmbH



IMAGinE

12 MAY 22

FINAL EVENT



Intelligent Maneuver Automation –
cooperative hazard avoidance in realtime

OUTLINE

IMAGinE at a glance

Vision & Motivation

Collective perception & Maneuver coordination

Core innovations

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IMAGinE at a glance

Overview

- **Objective:** Develop **cooperative maneuver coordination** on the basis of **collective perception**
- **Timing:** 2016/09/01 – 2022/05/31
- **Budget/Funding:** 38.2 M€ / 17.9 M€



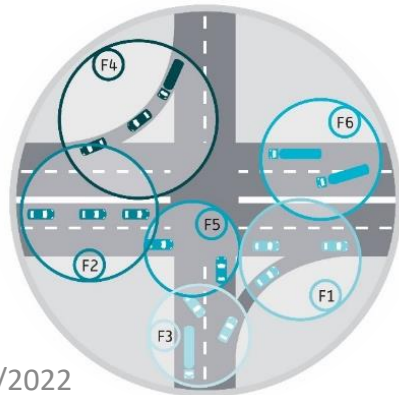
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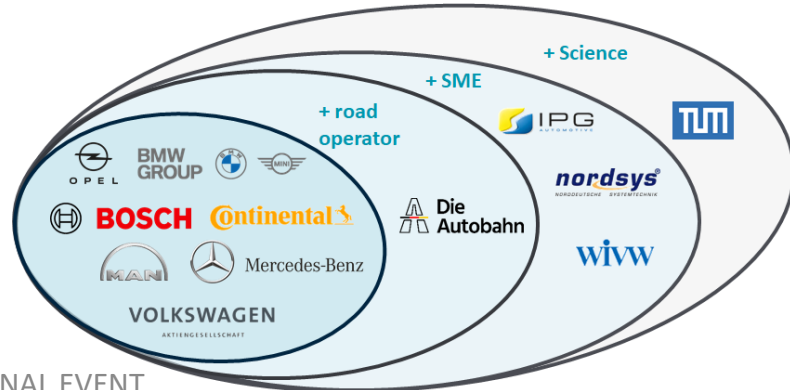
Federal Ministry
for Economic Affairs
and Climate Action

on the basis of a decision
by the German Bundestag

6 cooperative functions



12 project partners



IMAGinE at a glance

Project partners



7 Large players in automotive industry

- BMW, Bosch, Continental, MAN, Mercedes-Benz, Opel, Volkswagen

1 Road Operator

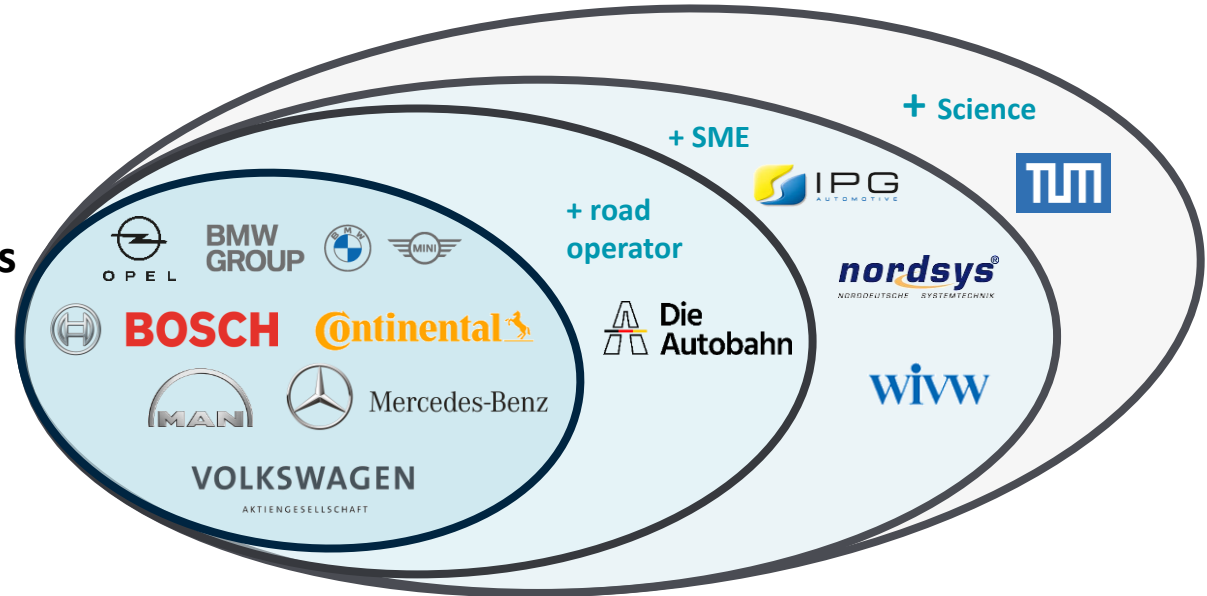
- Autobahn des Bundes

3 Small/Medium Enterprises

- IPG, Nordsys, WiVW

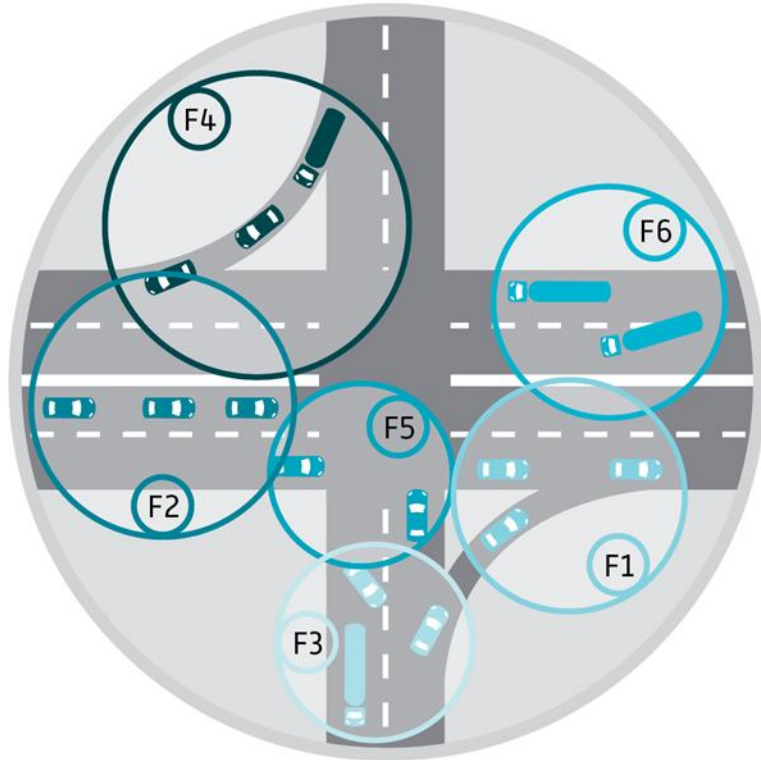
1 University

- TU Munich



IMAGinE at a glance

Cooperative functions



- F1** Cooperative merging on highways
- F2** Cooperative longitudinal control on highways
- F3** Cooperative overtaking on rural roads
- F4** Cooperative strategic traffic distribution
- F5** Cooperative turning at junctions
- F6** Cooperative overtaking by heavy-goods vehicles on highways

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Vision

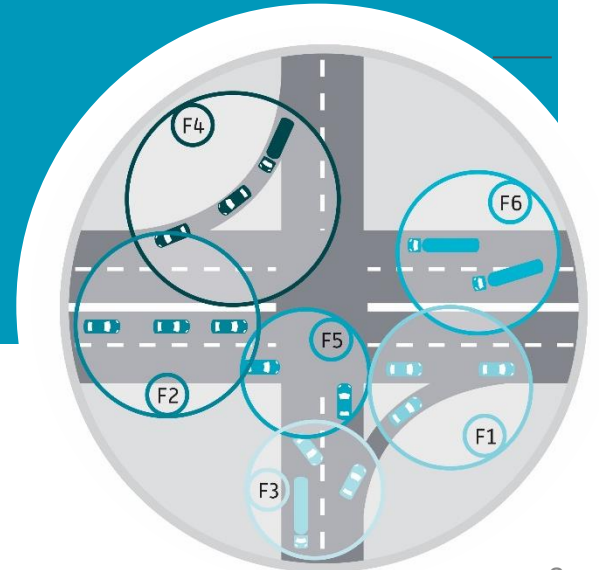
“Talk first, then act.”

IMAGinE is paving the way for cooperative driving.

Communication-based coordination of driving maneuvers enables substantial **improvement** for

- preventive support of accident-free driving
- optimization of traffic flow

and, thus, to arrive in a more safe, efficient and comfortable manner.



Motivation

Cooperative driving: Innovation steps

IMAGinE creates a sound technological basis

- based on results of previous research projects
- for the **transition** from **information exchange** between vehicles to **cooperative maneuver coordination**
- and allows, thus, to realize the **cooperation potential** among vehicles and between vehicles and infrastructure

| | |
|------------------------|---|
| Decision making | (Maneuver coordination and execution) |
| Synchronization | (Collective situation interpretation) |
| Exchange | (Distribution of situation data and intended actions) |
| Inform | (V2X, e.g., traffic condition) |
| See | (External sensors, radar, camera, e.g., ACC) |
| Feel | (Internal sensors, wheel speeds, e.g., ESC) |

IMAGinE

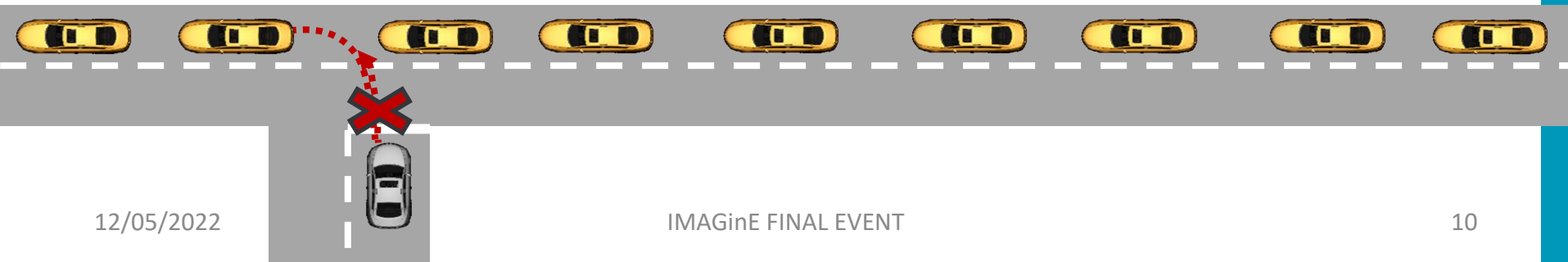
previous
R&D projects

Motivation

Automation: requires increased cooperation

Why cooperative behaviour will be essential also in an automated world:

- Increasing degrees of automation aim at higher comfort and safety levels for the driver
- Automated systems tend to behave more defensively than the average driver
- In certain situations, automated systems depend on cooperative behaviour of other road users



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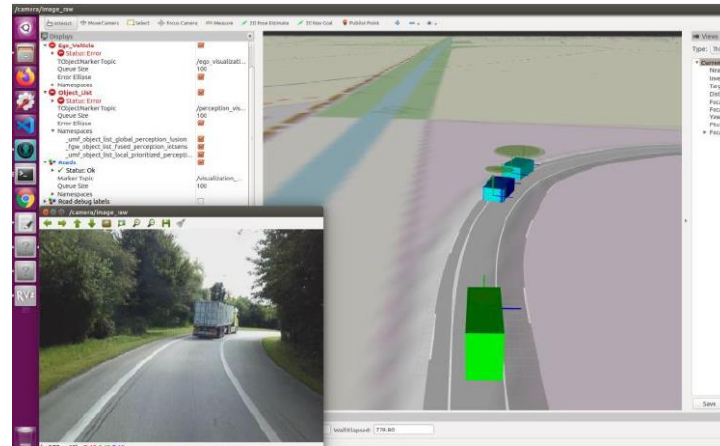
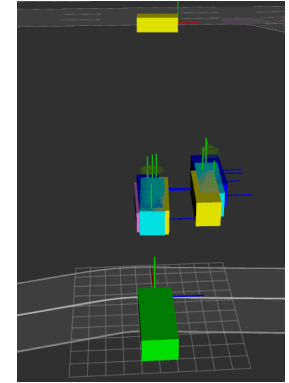
V2x – Collective perception

„See with the eyes of others“

V2x enables vehicles to

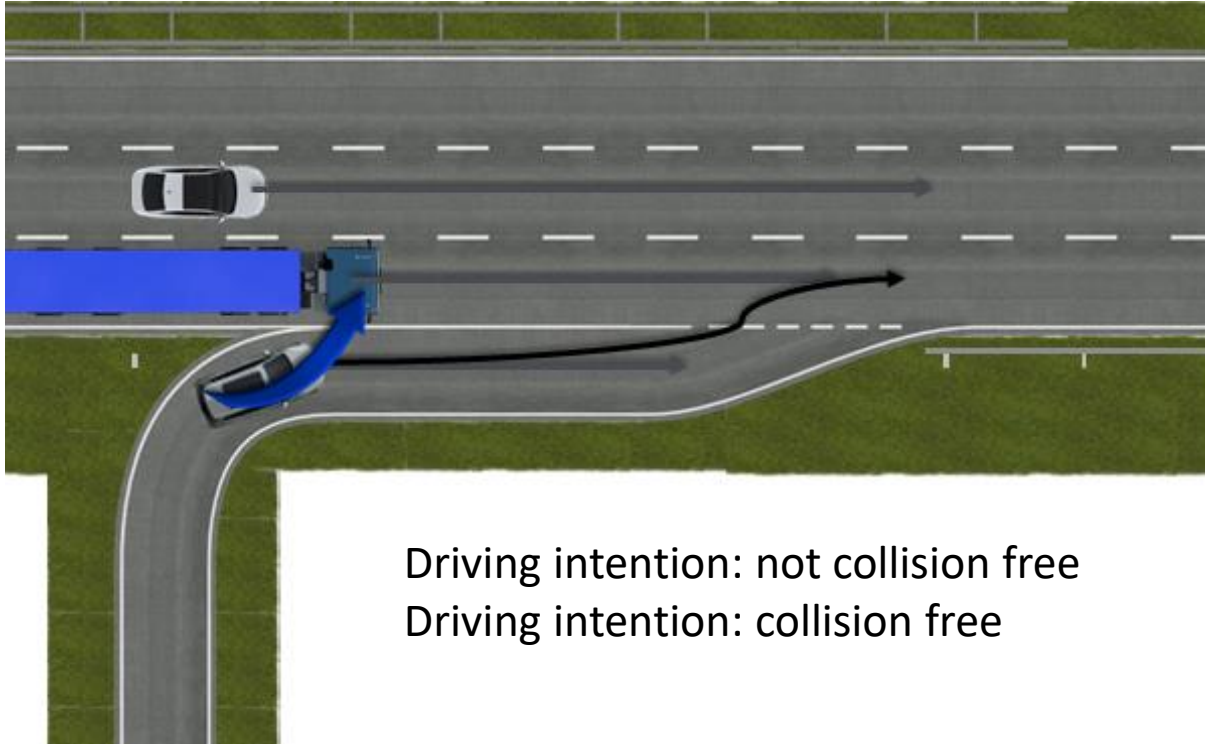
- share position, heading and velocity
- exchange objects detected by own sensors

Common environment goes beyond own sensing capabilities



Cooperative maneuver coordination

Planning and negotiation of driving intentions



© CAR 2 CAR
Communication
Consortium

Driving intention: not collision free
Driving intention: collision free



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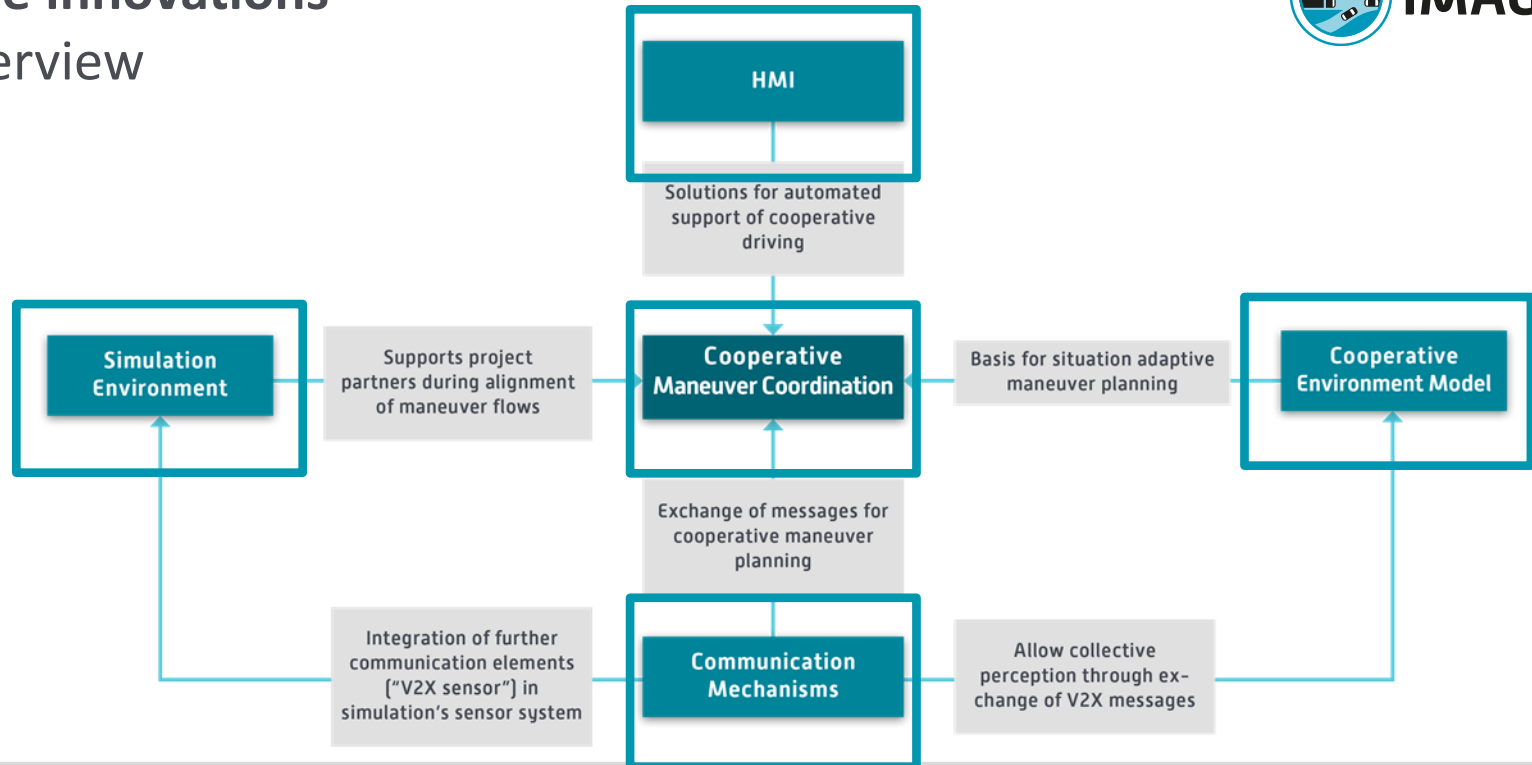
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Overview



IMAGinE fundament

- Results from previous research projects
- ETSI and CEN standards
- CAR 2 CAR Communication Consortium: day 1 use cases

THANK YOU

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Images: IMAGinE, CAR 2 CAR Communication Consortium

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