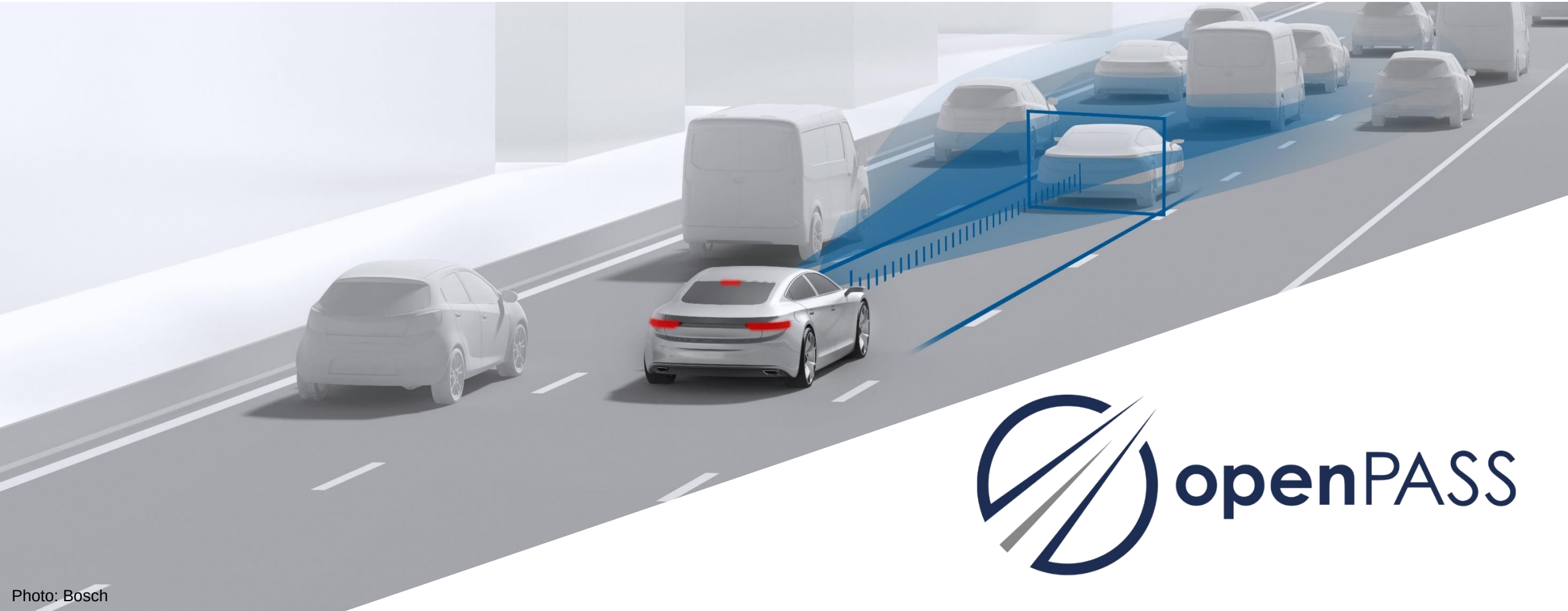
OPENPASS



openPASS

Photo: Bosch

TARGET OBJECTIVES

openPASS
(open **P**latform for **A**ssessment of **S**afety **S**ystems)

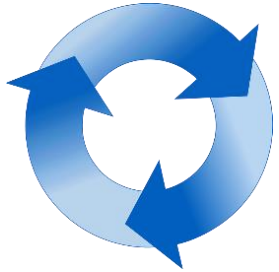
High level of transparency and acceptance through publicly available open source platform

Traffic simulation of highway, rural and urban scenarios

Stochastic variation of scenarios

Standardized interfaces for model integration

Reproducibility through deterministic simulation



Harmonized and flexible platform for effectiveness assessment of advanced driver assistance systems and automated driving

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WORKING GROUP

openPASS Working Group

Driver members:

BMW GROUP, BOSCH, TÜV SÜD, VOLKSWAGEN GROUP OF AMERICA

User member:

TOYOTA

Service provider:

itk ENGINEERING

Eclipse Automotive Working Groups

openPASS

OpenADx

openMobility

openGENESIS

openMDM Measured Data Management

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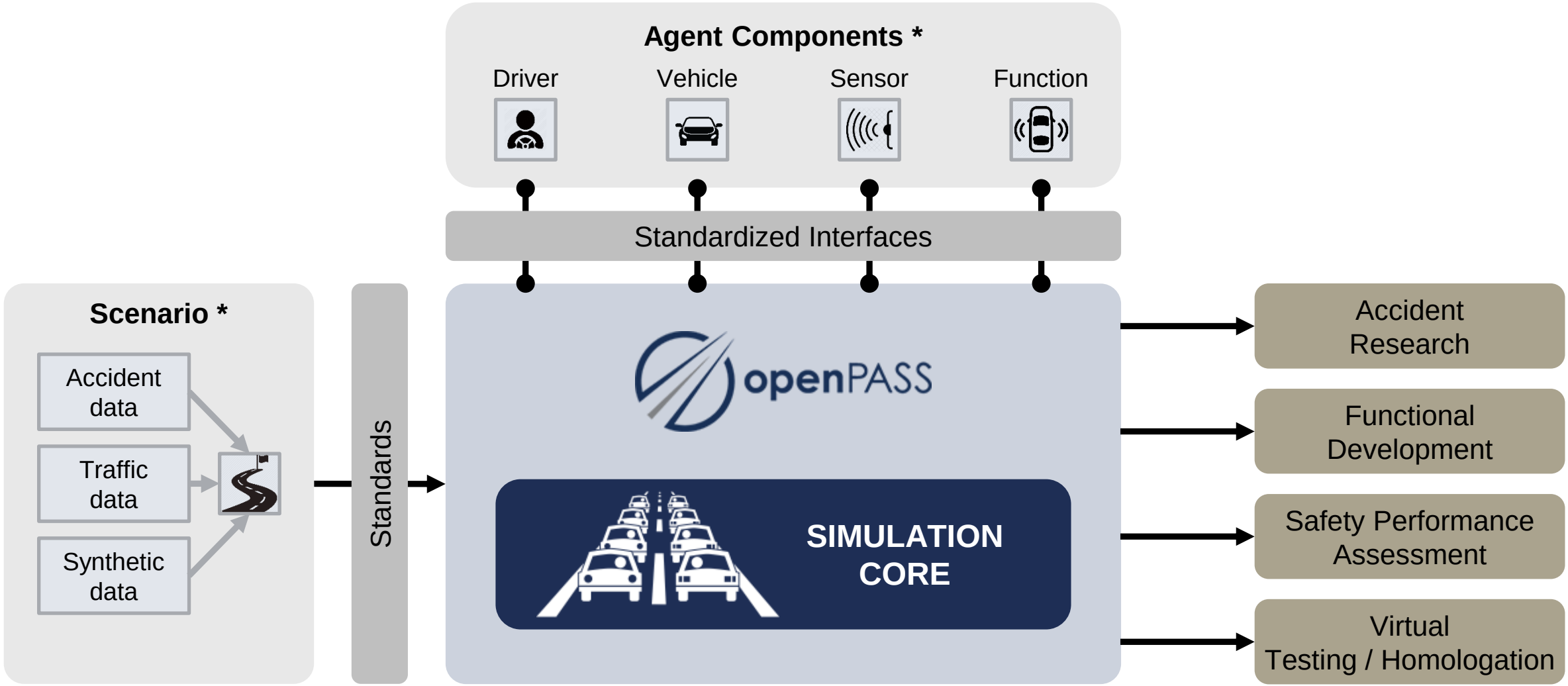
PLATFORM CONCEPT



* Simple examples are provided

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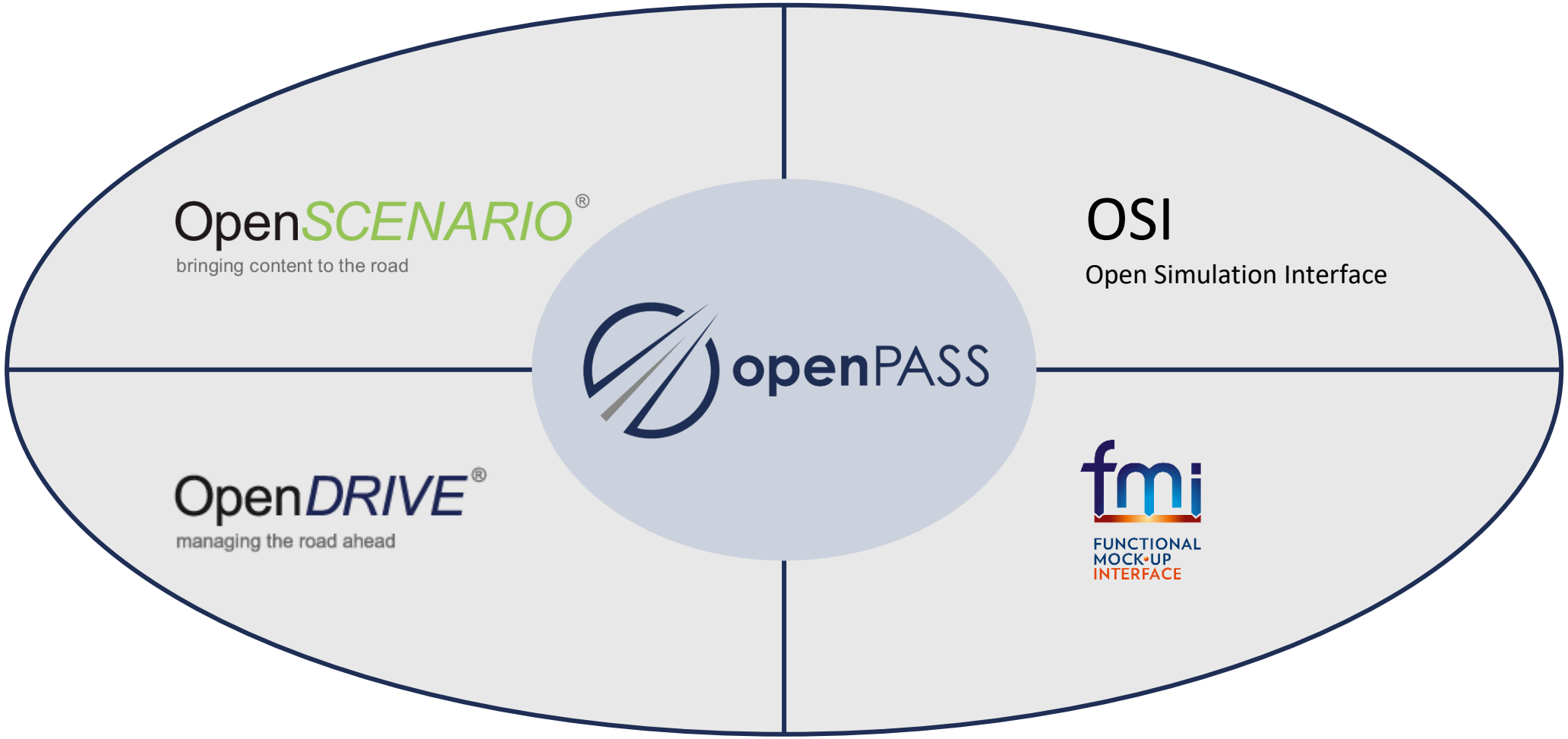
CURRENTLY AND FUTURE SUPPORTED STANDARDS



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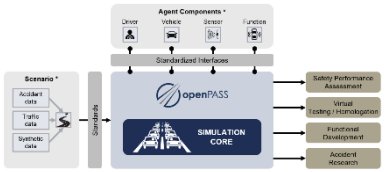
PLATFORM STRUCTURE



User-Specific Plugins *

User-Specific Agent Components *

Platform Delivered Plugins

Simulation Components

Exemplary Agent Components

Component Interfaces

GUI (Plugin Manager)

Simulation Core

openPASS Platform

* Implemented by the user

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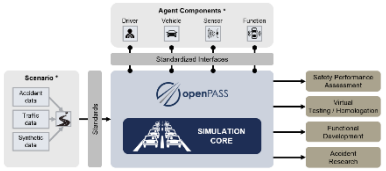
PLATFORM STRUCTURE



User-Specific Plugins *

Component Generator

Traffic Simulation

Agent Configuration

System Editor

Platform Delivered Plugins

Spawner

Observer

Detectors

Manipulators

World State

Simulation Components

User-Specific Agent Components *

Sensors

Dynamics

Algorithms

Exemplary Agent Components

Component Interfaces

GUI (Plugin Manager)

Simulation Core

openPASS Platform

* Implemented by the user

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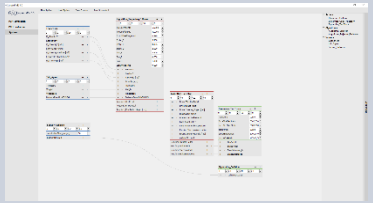
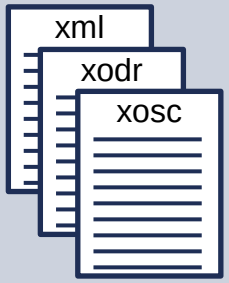
SIMULATION PROCESS
USER PERSPECTIVE

Simulation Process

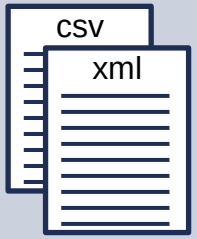


Configuration through GUI

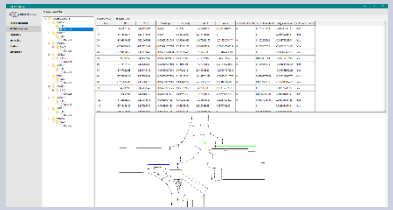


Configuration files

Simulation execution



Output files



Evaluation in GUI

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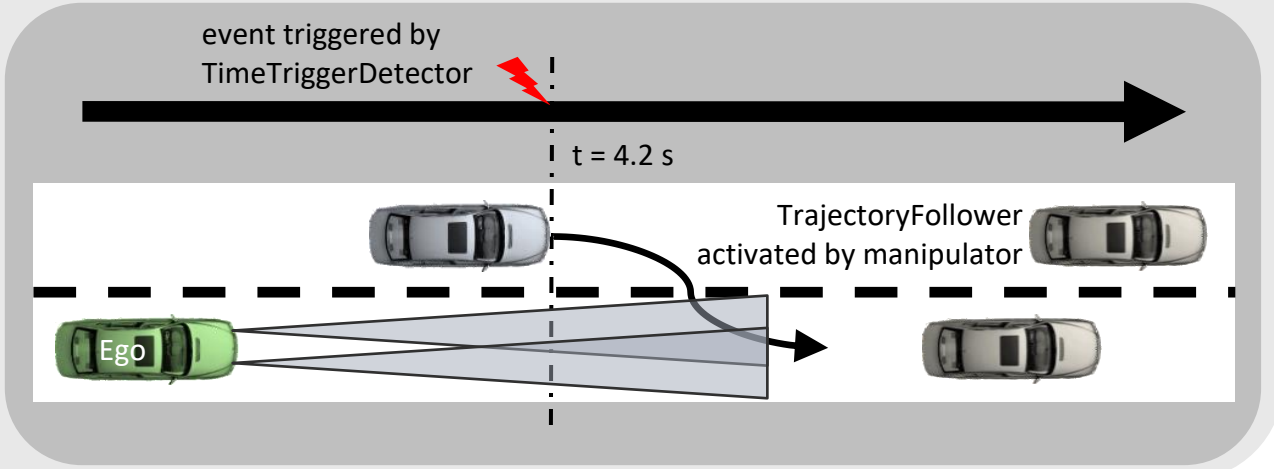
USE CASE
TRAFFIC-SCENARIO SIMULATION

Features:

- Closed loop simulation of traffic scenarios
- Stochastic variation of the scenarios
- Intervention through detection of events and triggered actions
- Faster-than-real-time execution of the simulation

Example: AEB intervention triggered by passive cut-in manoeuvre

- Highway scenario with random surrounding traffic
- Ego vehicle with simple AEB system and abstract sensors
- Time-based event trigger
- Trajectory controlled lane change for scenario vehicle



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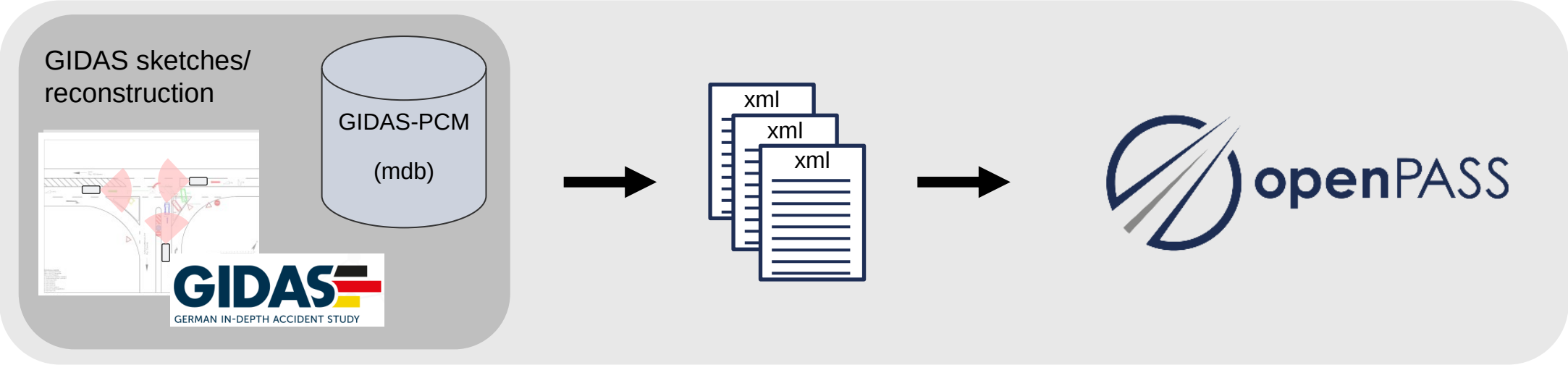
USE CASE
CRASH RE-SIMULATION

Features:

- Create configuration files from GIDAS-PCM accident scenario database
- Stochastic variation of the scenarios (positions, velocities)
- Basis components for re-simulation: sensor, trajectory follower, two track vehicle model, impact calculation
- Store results in csv files in case folders

Example question: How many selected cases could be avoided by a AEB function?



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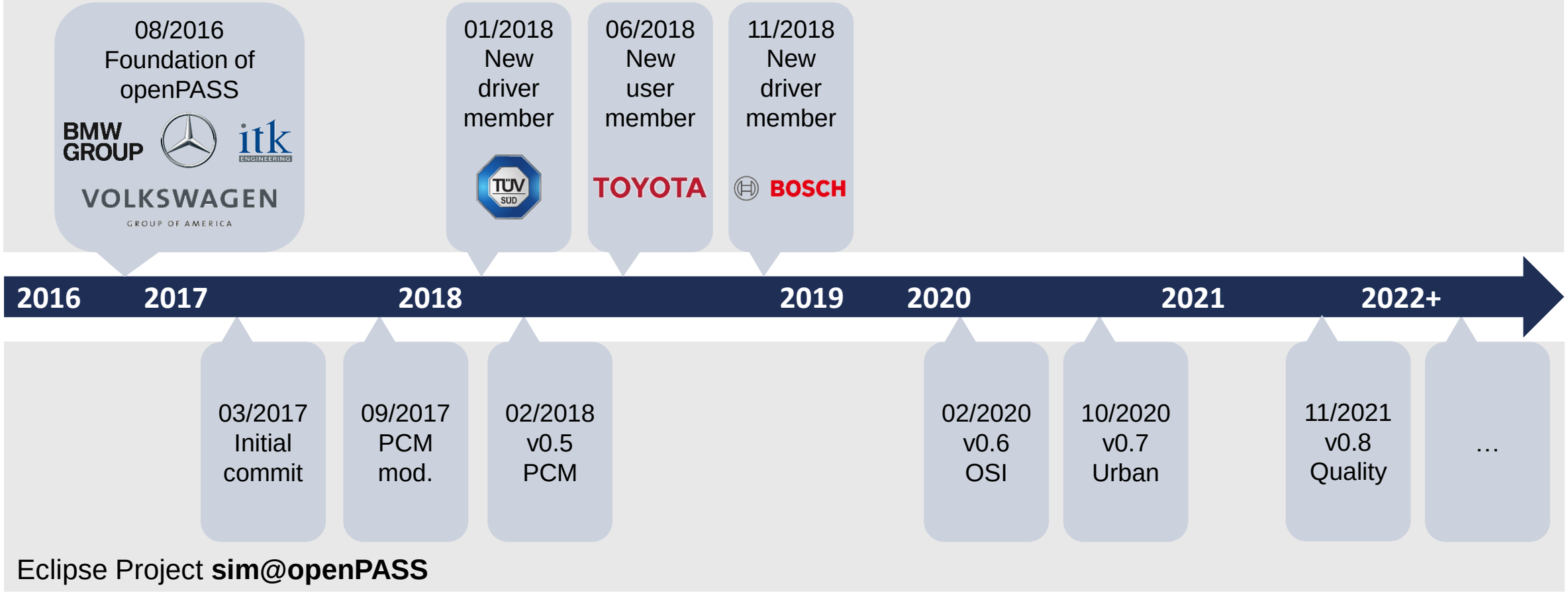
TIMELINE

Eclipse Working Group **openPASS** (idea for openPASS generated within P.E.A.R.S. in 2014)



Eclipse Project **sim@openPASS**

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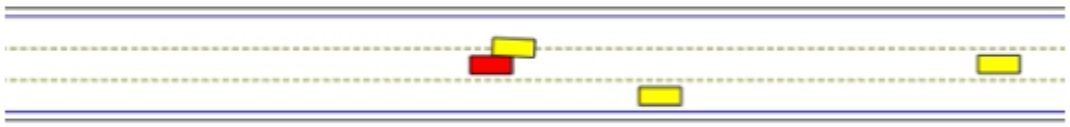
EXEMPLARY SIMULATION RESULTS TRAFFIC-SCENARIO SIMULATION

Traffic-scenario simulation without AEB

No AEB intervention



Traffic-scenario simulation

AEB intervention triggered by passive cut-in maneuver

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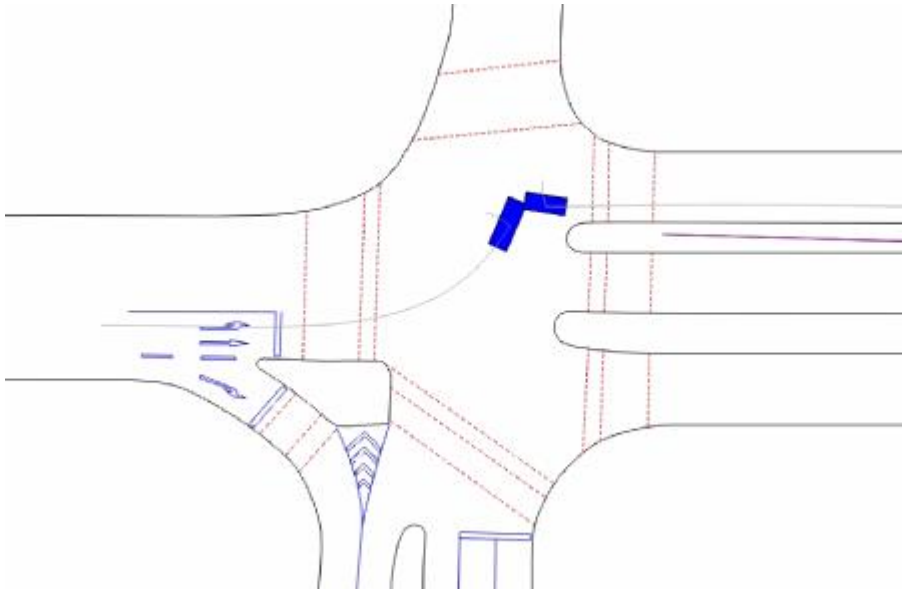
EXEMPLARY SIMULATION RESULTS CRASH RE-SIMULATION

Crash re-simulation from GIDAS-PCM case

Oncoming collision at intersection (LTAP – “left turn across path”) with post-crash behaviour



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CONCLUSION

- openPASS is an open source platform for effectiveness assessment of advanced driver assistance systems and automated driving
- Open source platform for high level of acceptance and transparency
- Modular structure for easy platform extension und inclusion of user-specific models
- Support for standards and standardized interfaces for a flexible simulation setup
- Exemplary applications of openPASS:

Crash re-simulation

Traffic-scenario simulation

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PARTICIPATION IN THE WORKING GROUP

Membership Privileges

Privilege	Driver Member	User Member	Service Provider Member	Project Manager
Steering Committee	X	Elected	Elected	-
Architecture Committee	X	-	-	X
Quality Committee	X	Elected	Elected	X
GeneralAssembly	X	X	X	-

The company should be at least an Eclipse Solution Member

- Networking and learning
- The annual membership fee for Solutions Members is tiered based on revenue

Working Group participation agreement

- Contribution in development of openPASS
- Discussion of the roadmap
- Active collaboration with the working group

For more information, look at the openPASS charter:
https://www.eclipse.org/org/workinggroups/openpasswg_charter.php

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https://accounts.eclipse.org/mailing-list/openpass-wg

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