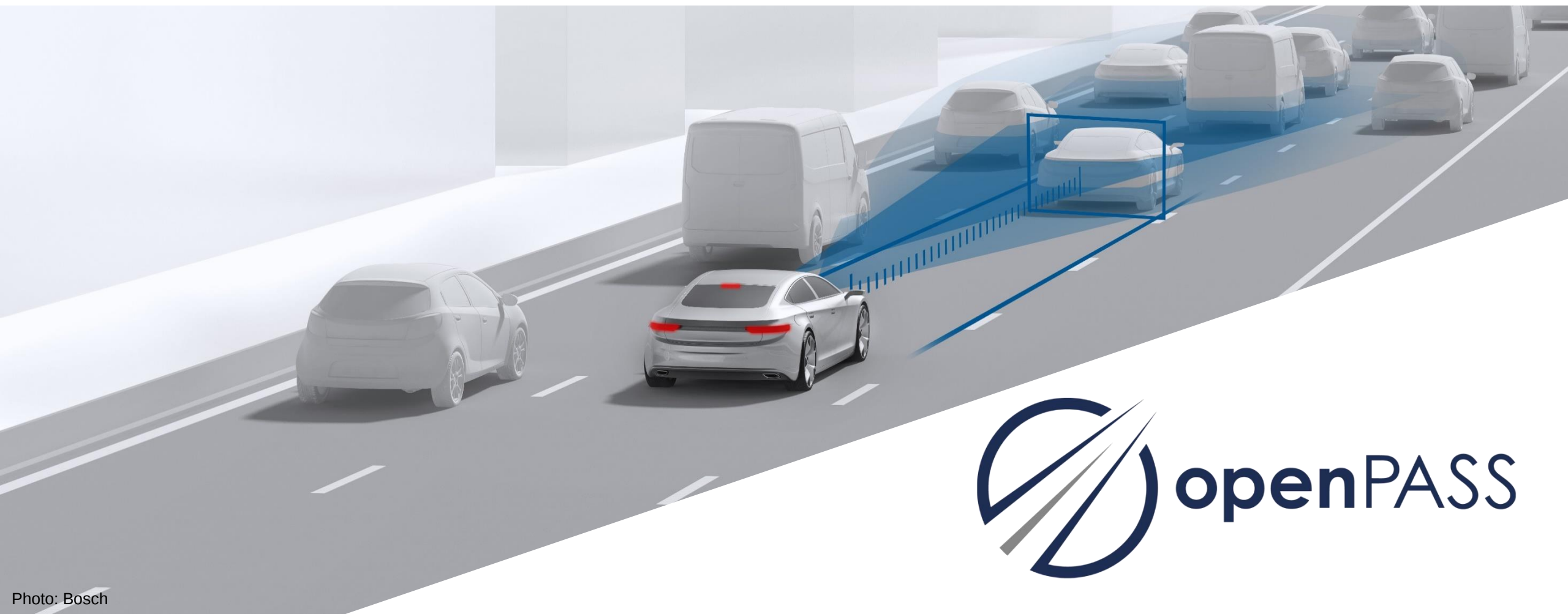


# OPENPASS

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# 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



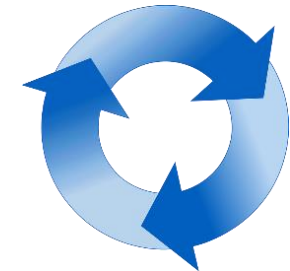
**Traffic simulation** of highway,  
rural and urban scenarios

**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**

# WORKING GROUP



## openPASS Working Group

Driver members:



**BMW  
GROUP**



**BOSCH**



**VOLKSWAGEN**  
GROUP OF AMERICA

User member:

Service provider:

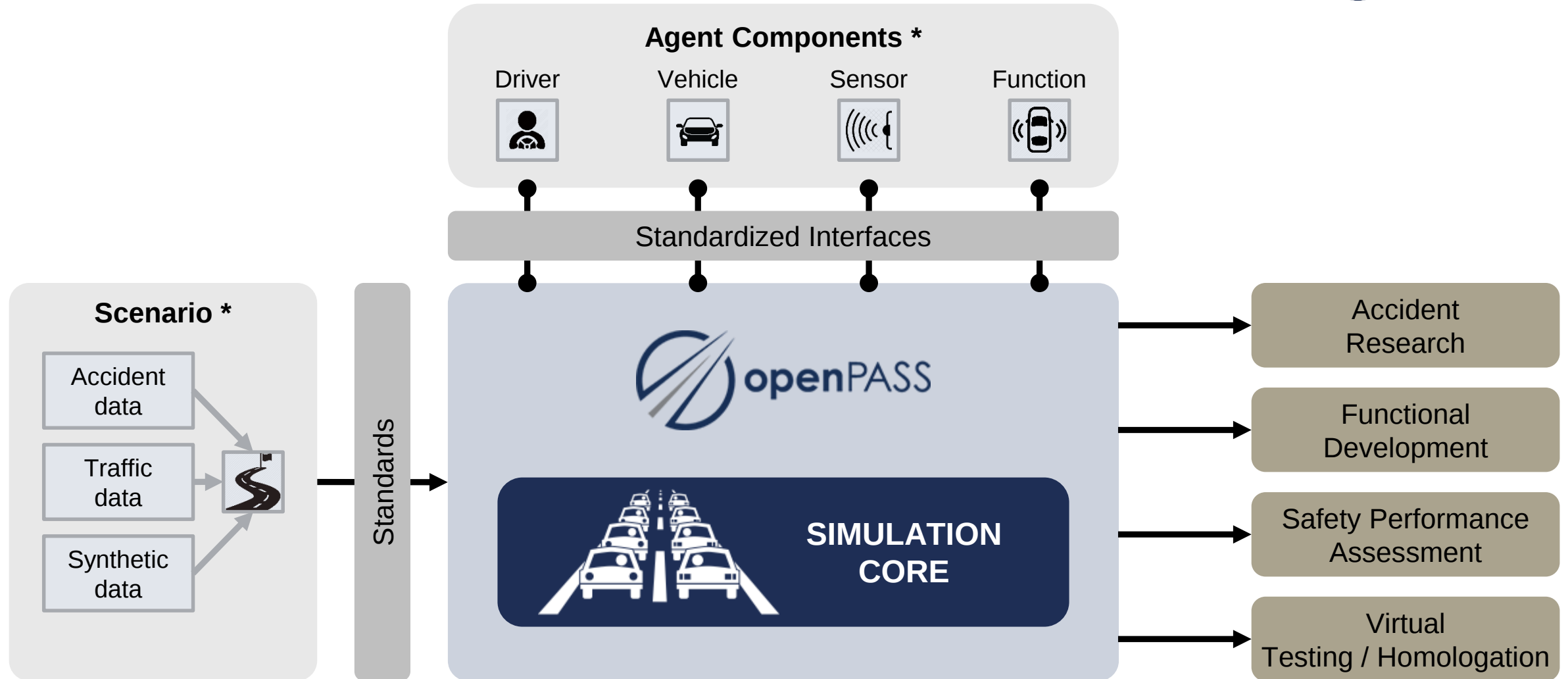
**TOYOTA**



## Eclipse Automotive Working Groups

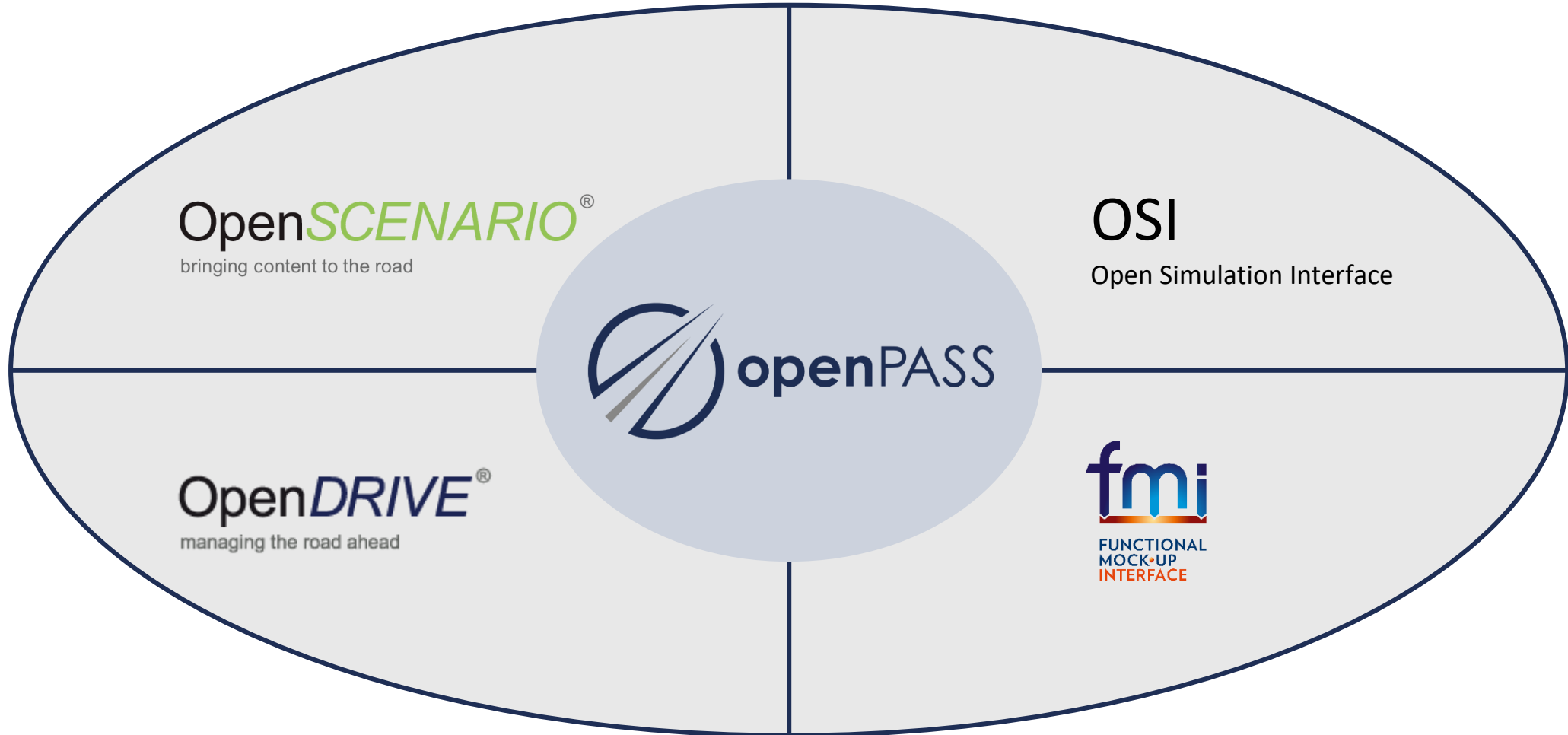


# PLATFORM CONCEPT

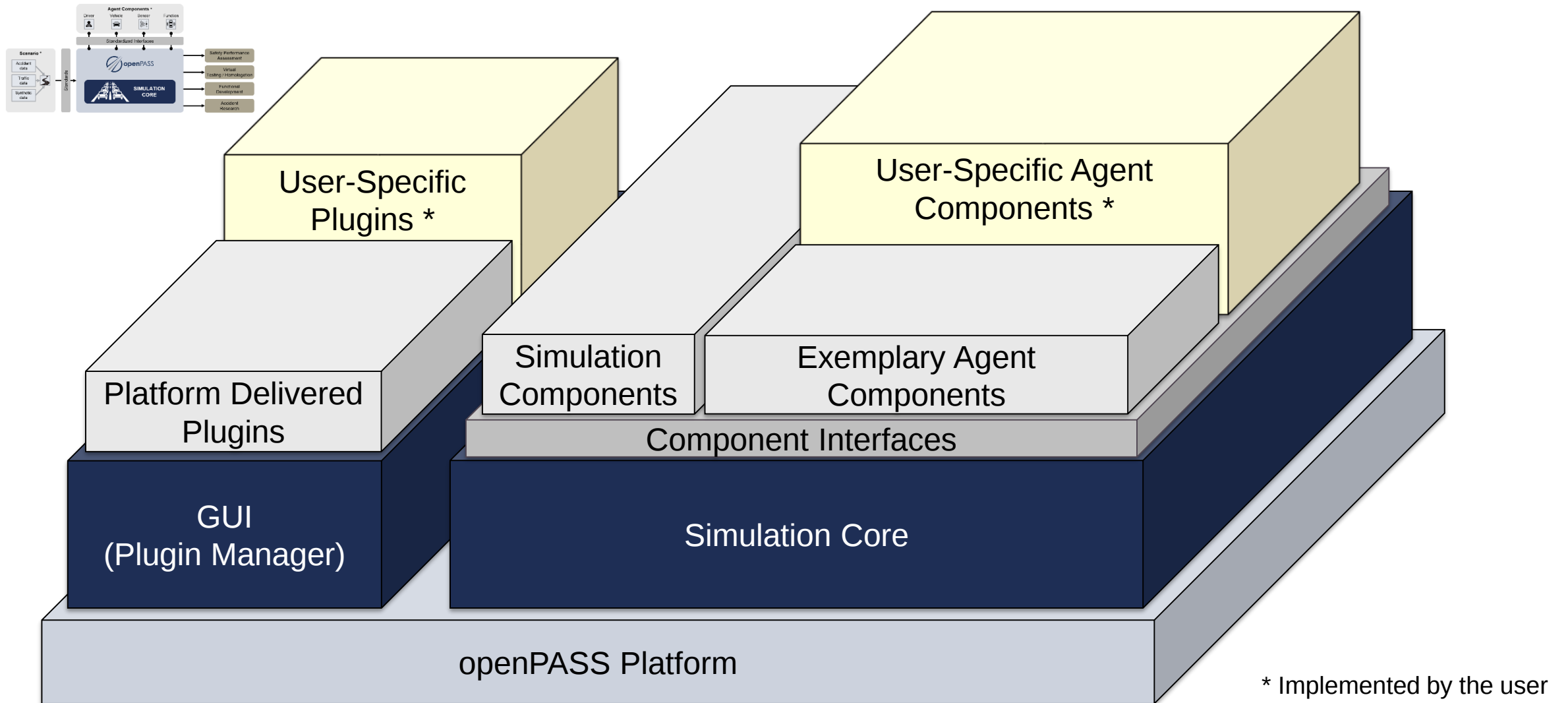


\* Simple examples are provided

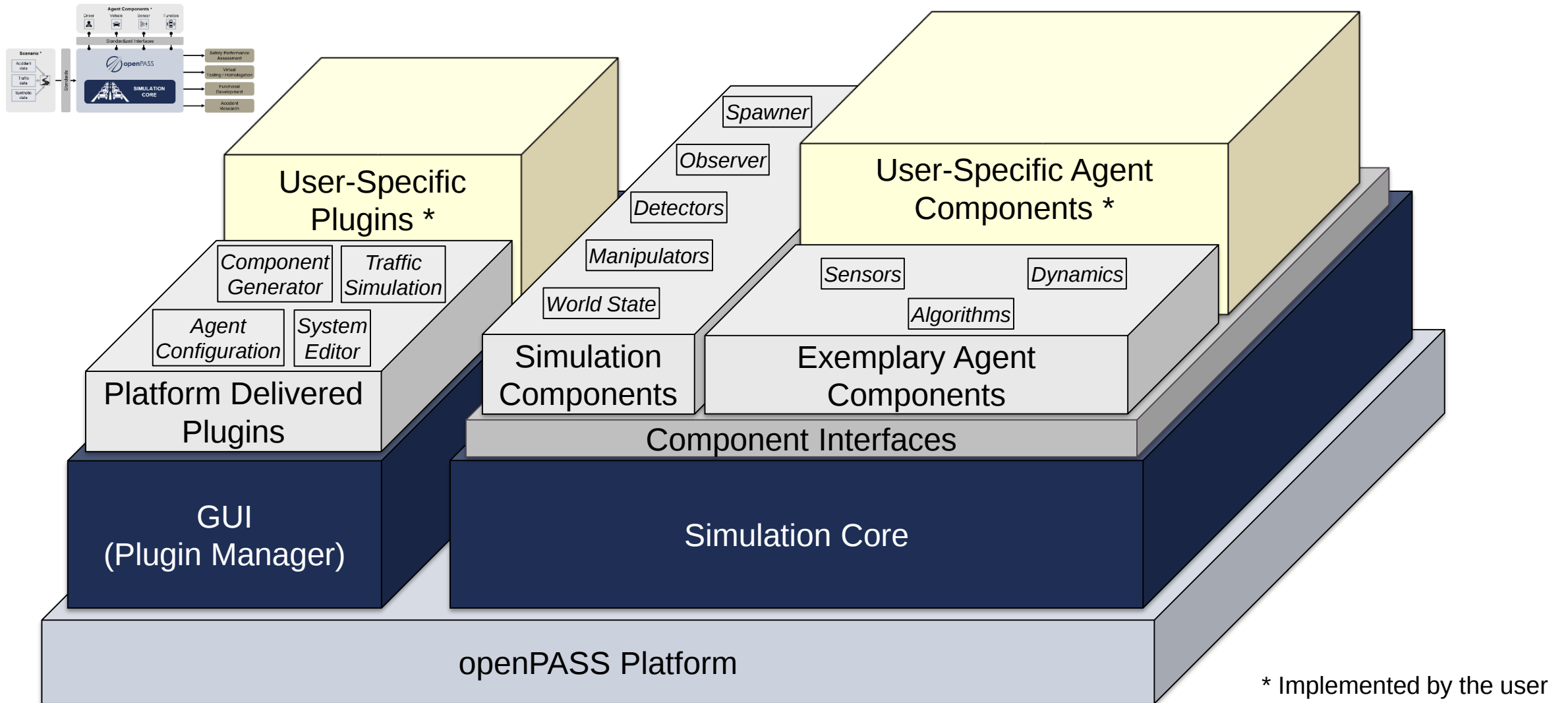
# CURRENTLY AND FUTURE SUPPORTED STANDARDS



# PLATFORM STRUCTURE



# PLATFORM STRUCTURE



# SIMULATION PROCESS USER PERSPECTIVE

## Simulation Process



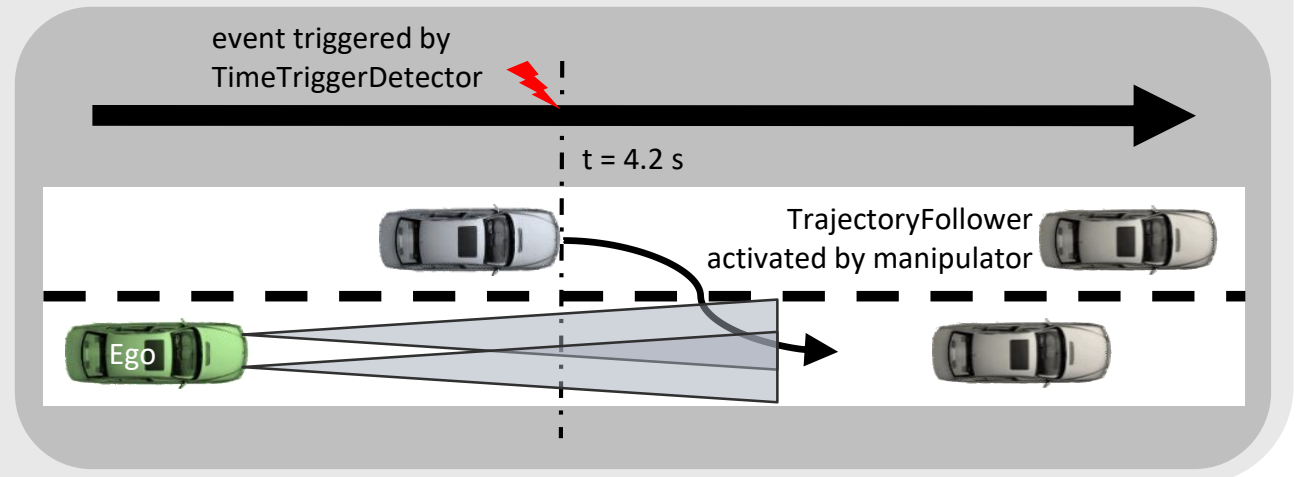
# USE CASE TRAFFIC-SCENARIO SIMULATION

## 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

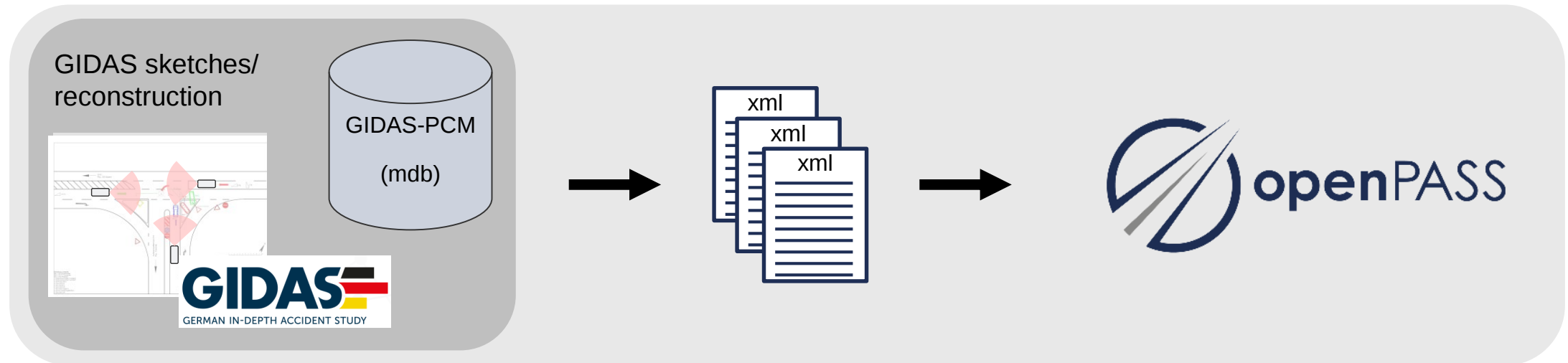


# USE CASE CRASH RE-SIMULATION

## 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?**



# EXEMPLARY SIMULATION RESULTS

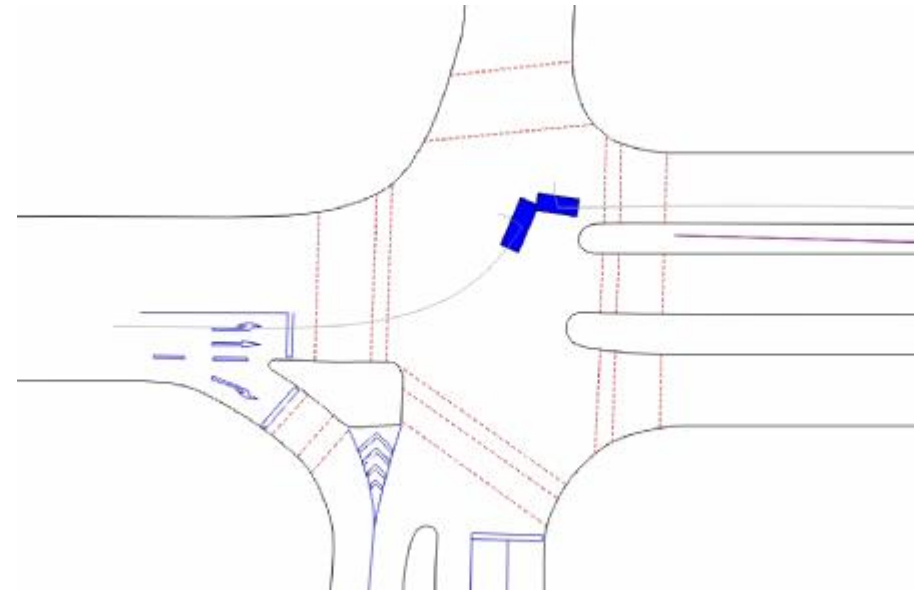
## Traffic-scenario simulation

AEB intervention triggered by passive cut-in manoeuvre



## Crash re-simulation from GIDAS-PCM case

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



# TIMELINE



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

08/2016  
Foundation of  
openPASS



01/2018  
New  
driver  
member



06/2018  
New  
user  
member

**TOYOTA**

11/2018  
New  
driver  
member



2016

2017

2018

2019

2020

2021+

03/2017  
Initial  
commit

09/2017  
PCM  
mod.

02/2018  
V0.5  
PCM

02/2020  
V0.6  
OSI

10/2020  
V0.7  
Urban

...

Eclipse Project **sim@openPASS**

- 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

# 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               |
| General Assembly       | 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](https://www.eclipse.org/org/workinggroups/openpasswg_charter.php)

# COMMUNICATION WITH THE WORKING GROUP



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For more information, contact us or subscribe to the public WG mailing list:

<https://accounts.eclipse.org/mailling-list/openpass-wg>