

# OPENPASS USE CASES

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# BACKGROUND – USE CASES IN „NHTSA SLIDES“



## USE CASE TRAFFIC-SCENARIO SIMULATION

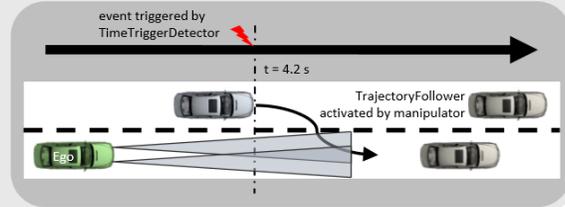


### Features:

- 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



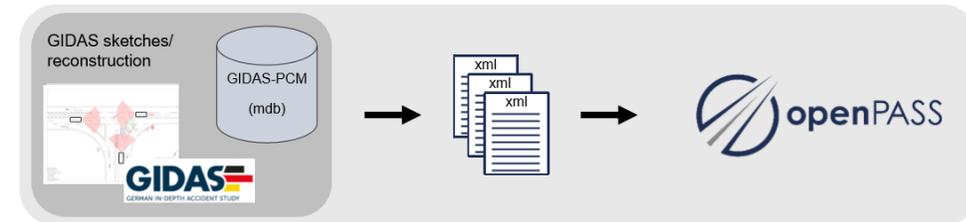
## USE CASE CRASH RE-SIMULATION



### 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?



Use case definition „bottom up“: driver member / SC define features → provide examples to general public

Need for consolidation of „our use cases“ due to ongoing development → prioritize where we want to go..

- PCM pull request (v0.5 → v0.7) + VW user story „vehicle dynamics“ → „PCM use case 2.0 (0.8)“
- use of openPASS as traffic simulation tool and basis of driver development?
- OpenSCENARIO (ALKS, Scenario API..)

# GOAL: USE CASE CONSOLIDATION REQUIREMENTS → FEATURES



“Use cases are a technique for capturing, modelling and specifying the requirements of a system.” (Wikipedia)

As an open source initiative, we have “interfaces to the outside world”..

- From inside openPASS: development of core, core modules, components + configs & parameters
- ...to the outside world: fields of application of the platform/simulation tool openPASS

Identify the relevant fields of application for openPASS – not just the “general public”:

- Standardization projects, research projects, other OEMs, other stakeholder, other FOSS projects, other software developers..

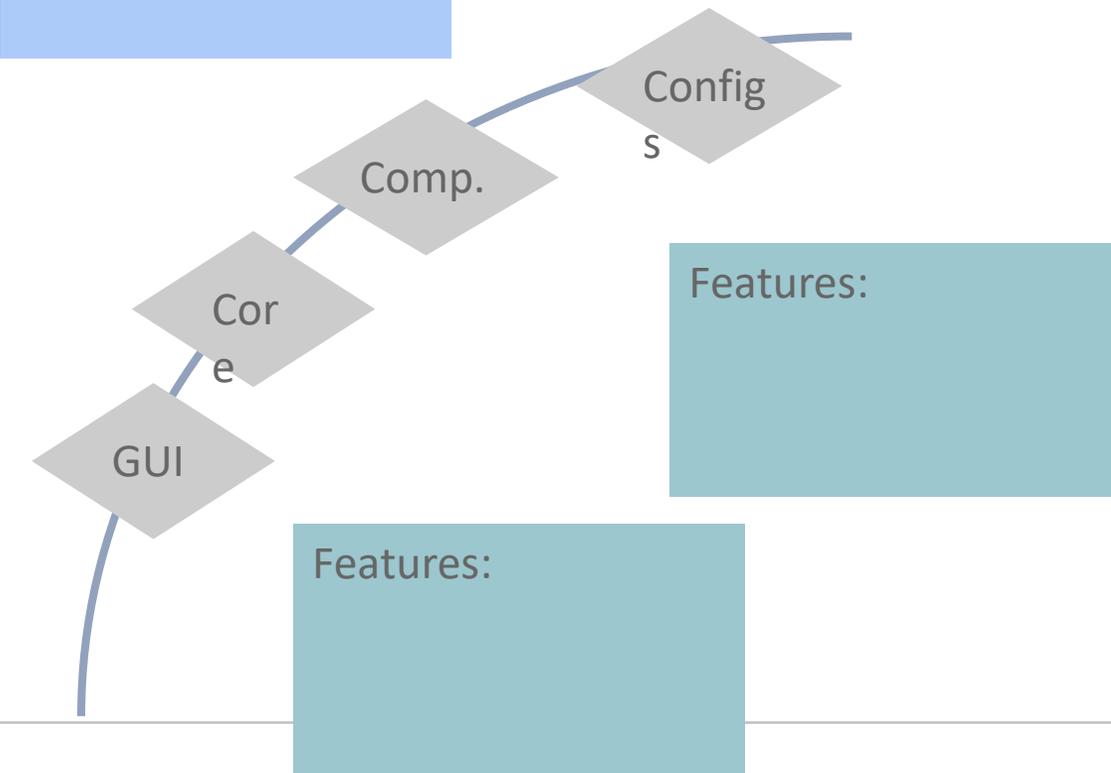
Consolidation — what happens in openPASS, what happens somewhere else?:

- a) If use case is clear & agreed → derive requirements & specify features
- b) If use case out of scope → „draw the line“ & define interface

# USE CASE XY (TEMPLATE)

Description of field of application

Requirements



VOLKSWAGEN  
GROUP OF AMERICA



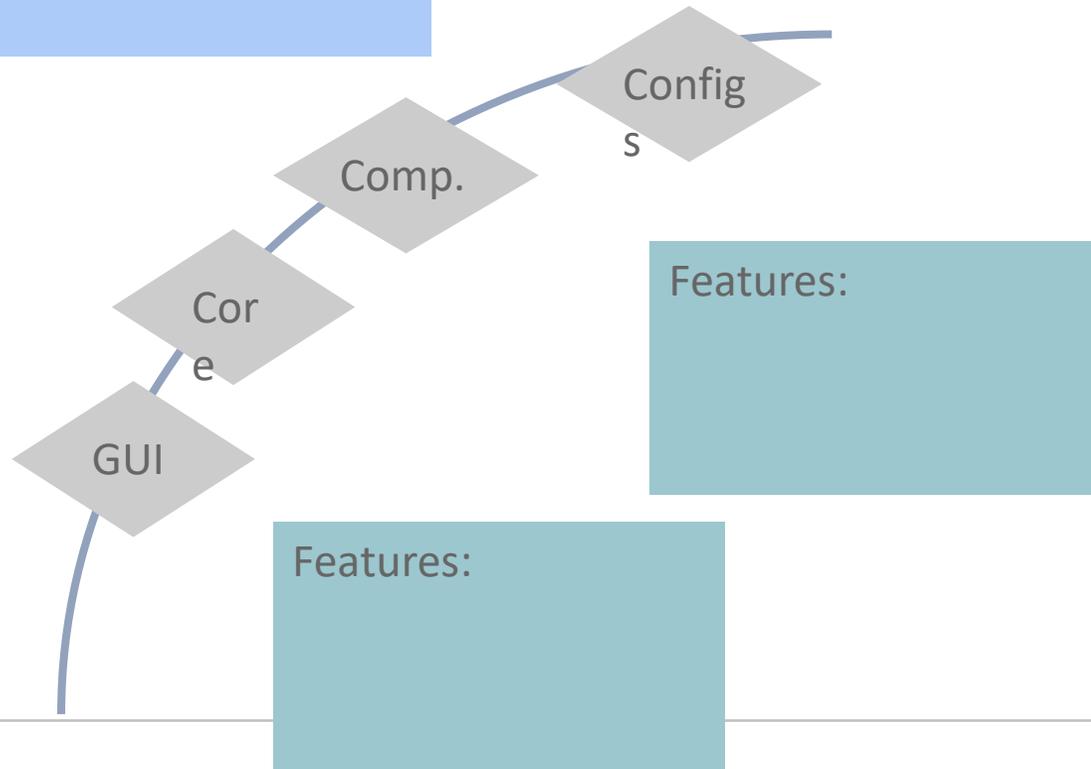
- In which initiatives or funded projects do you use (or want to use) openPASS – and how? Do you want other parties to use openPASS in similar way?
- What requirements in terms of configs, modules, validation etc. do you have?
- How would an “openPASS use case” (features, modules, configs) address your needs?
- Long-term vision: Do you see further development steps based on openPASS beyond this use case?

# USE CASE „TEST ALKS XOSC SCENARIOS“



Requirements

GitHub with ALKS xosc examples from SET Level



- In which initiatives or funded projects do you use (or want to use) openPASS – and how? Do you want other parties to use openPASS in similar way?
- **The open source scenarios defined in the context of SETLevel/ASAM OpenSCENARIO can be simulated with openPASS for test purposes**
- What requirements in terms of configs, modules, validation etc. do you have?
- openPASS must interpret the xosc content and provide further configs/components
- How would an “openPASS use case” (features, modules, configs) address your needs?
- Long-term vision: Do you see further development steps based on openPASS beyond this use case?

# EXEMPLARY NEXT STEPS FOR OPENPASS DEVELOPMENT → USE CASE „ALKS XOSC“



- Define acceptance criteria: „the openPASS user can test all scenarios“
- should OpenSCENARIO adaptations in xlst remain necessary? – yes, explain them in docu
- GUI integration?
- Enable simulation of 4.2\_x, 4.3, 4.4, 4.6\_2
  - What OpenSCENARIO functionality is missing?
  - What components / driver features are needed?
- Documentation: describe execution flow & used components on openPASS homepage / docu page
- Make openPASS v0.7 available as something you can easily download
- Conduct release review

Tool for accident re-simulation /  
„PCM community“ (GIDAS)

Traffic simulation for accident  
research / prediction of future  
scenarios (OSCCAR)

openPASS = core

Harmonized abstract scenario /  
environment API & re-usable  
components

Scenario-based virtual testing  
(SET Level, V&V Methoden)