

VOLKSWAGEN

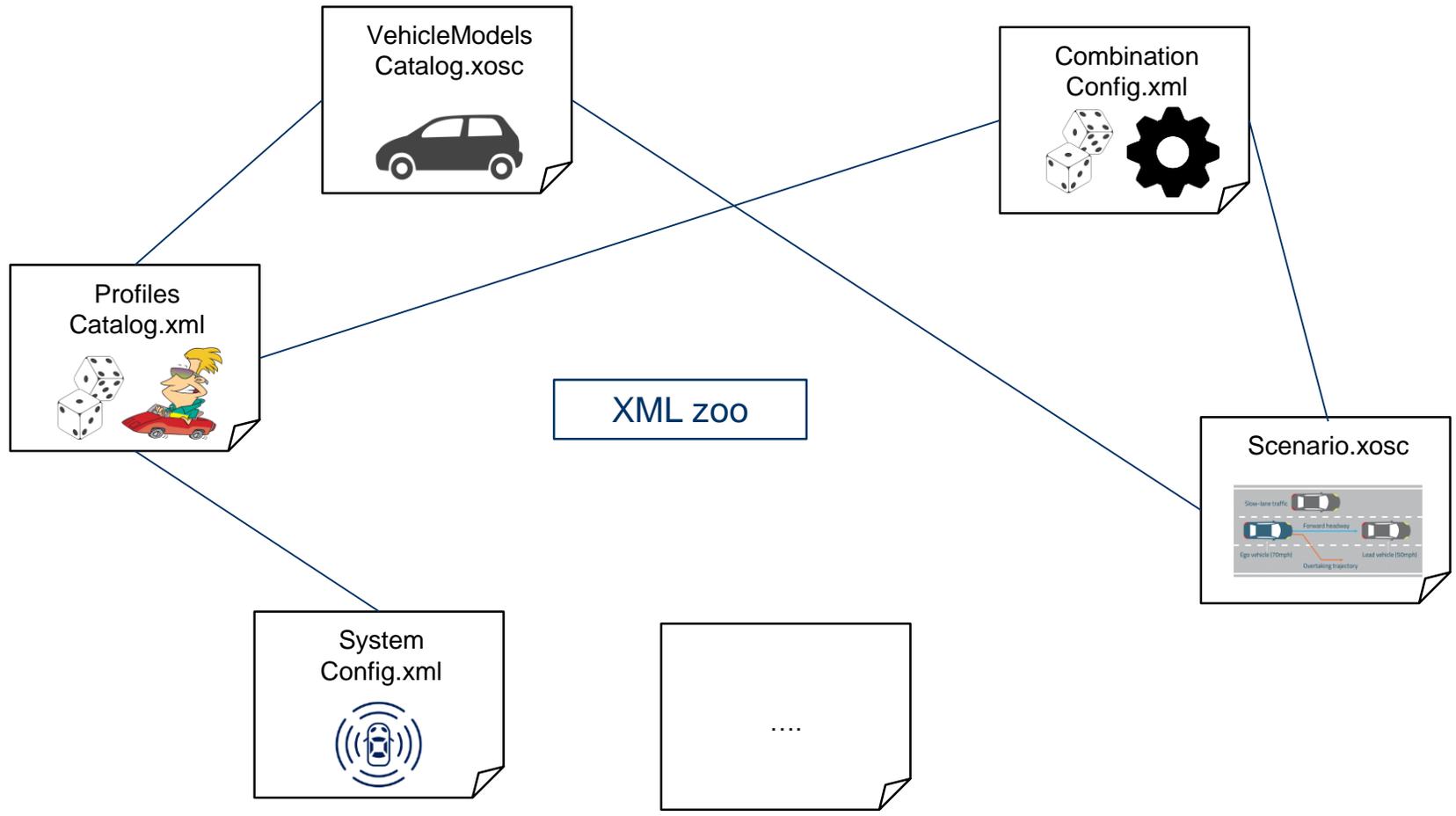
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SIM@OPENPASS ARCHITECTURE COMMITTEE GUI - SESSION

OPENPASS GUI - DEMO

WHAT HAS TO BE CONFIGURED BEFORE STARTING A SIMULATION?

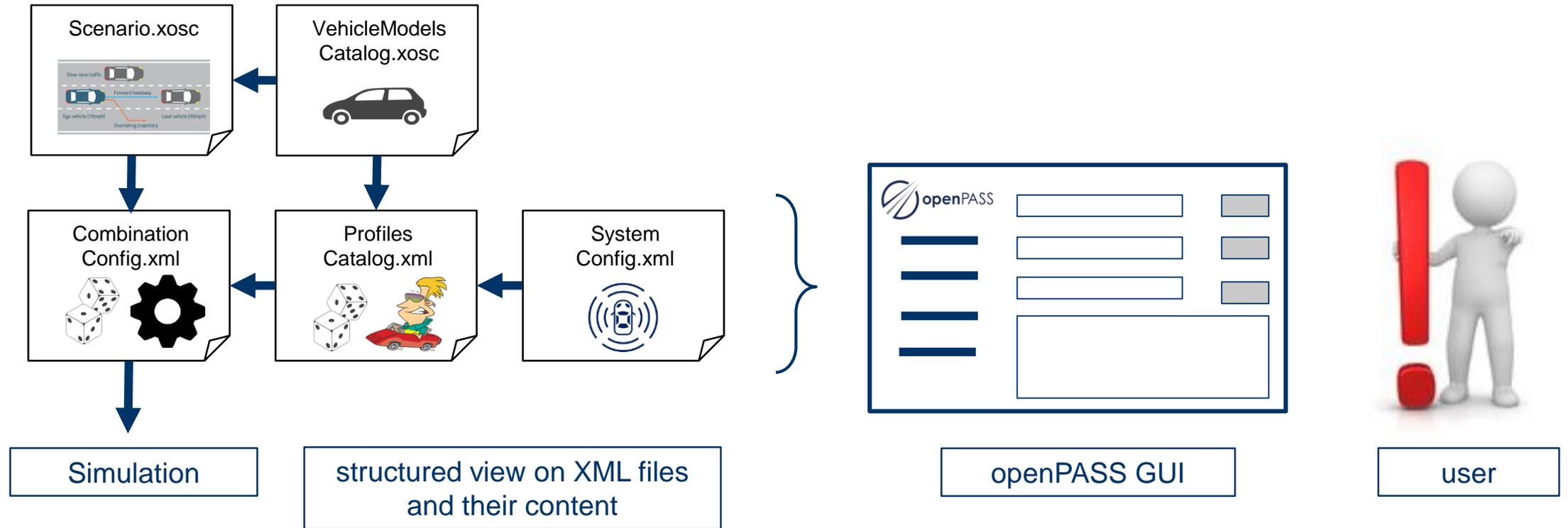


user



OPENPASS GUI - DEMO

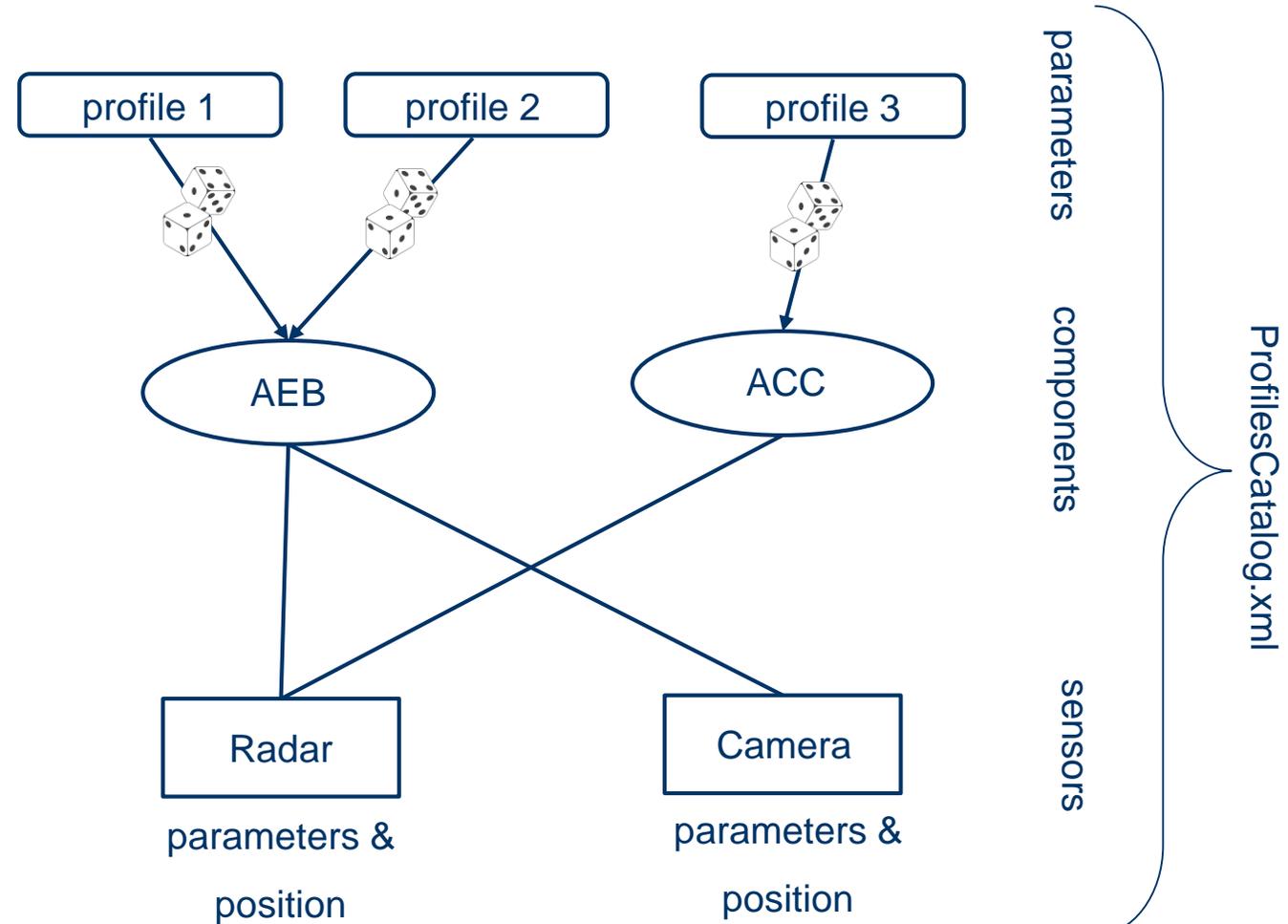
WHAT HAS TO BE CONFIGURED BEFORE STARTING A SIMULATION?



HOW TO EQUIP VEHICLE PROFILES WITH ADAS?

PROFILE-BASED ANSATZ (CURRENT STATE)

- incorporate algorithm dll's (components) of specific types into vehicle
- connect algorithms to sensors with specific parameters and positions in the vehicle
- parameterisations (profiles) can be assigned to components with given probabilities
- **limitation:** 1 algo + n sensors per ADAS
- **advantage:** flexible parameterization and optimized instantiation



HOW TO EQUIP VEHICLE PROFILES WITH ADAS?

SYSTEMCONFIG (CURRENT STATE)

- reference a system from the systemConfig
- advantage:** connect arbitrarily many components of different types (Algo, Sensor, Actuator, Misc, Logical, ...) → high complexity
- limitation:** fixed parameterisation in each system, no probabilities & repeated instantiation

The screenshot displays the systemConfig.xml interface with several panels and their parameters:

- EgoSensor**: 201, EgoPositionX, EgoPositionY, EgoVelocityX [m/s], EgoVelocityY [m/s], EgoVelocityAbsolute [m/s], EgoAccelerationX [m/s^2], EgoAccelerationY [m/s^2], EgoYawAngle [rad].
- Init_Agent**: 0, Trajectory, Weight, Wheelbase, DistanceFrontAxleToCOG.
- Sensor_Collision**: 200, penetrationTime_ms [ms] (30), CollisionOccurred.
- Algorithm_TrajectoryFollower**: 101, TireCoefficient1 (50,000), TireCoefficient2 (50,000), FrontWheelAngleLimit (0,440), Brake_P (3,700), Brake_I (0,005), Brake_D (2,000), Gas_P (3,400), Gas_I (0,050), Gas_D (1,000), LookAheadTime (0,200), PositionX, PositionY, YawAngle [rad], Velocity [m/s], Weight, Wheelbase, DistanceFrontAxleToCOG, Required_GasPedal, Required_BrakePedal, Required_FrontWheelAngle [rad].
- Algorithm_Selector**: 100, Driver Throttle Pedal, Driver Brake Pedal, Driver Steering Angle [rad], Cpa active, Cpa Brake Pedal, Lane Assist active, Lane Assist BrakeSuperpose, Evasive Steering Assist active, Evasive Steering Angle [rad], collisionOccurred, Resulting Throttle Pedal, Resulting Brake Pedal, Resulting Steering Angle, Resulting BrakeSuperpose.
- Dynamics_TwoTrack**: 1, Radius of the tires [m] (0,300), Tire's max. force [N] (5000,000), Tire's slide force [N] (4000,000), Tire's slip at max. force (0,100), Engine power [W] (100000,0), Max. brake torque [Nm] (-10000,0), Throttle, Brake, Av. front wheel angle, Superposed brake, Vertical force on tires, Inertia force vector.
- Dynamics_Collision**: 0, CollisionOccurred.



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Long-term Goal

Unified pathway utilizing advantages of both approaches!

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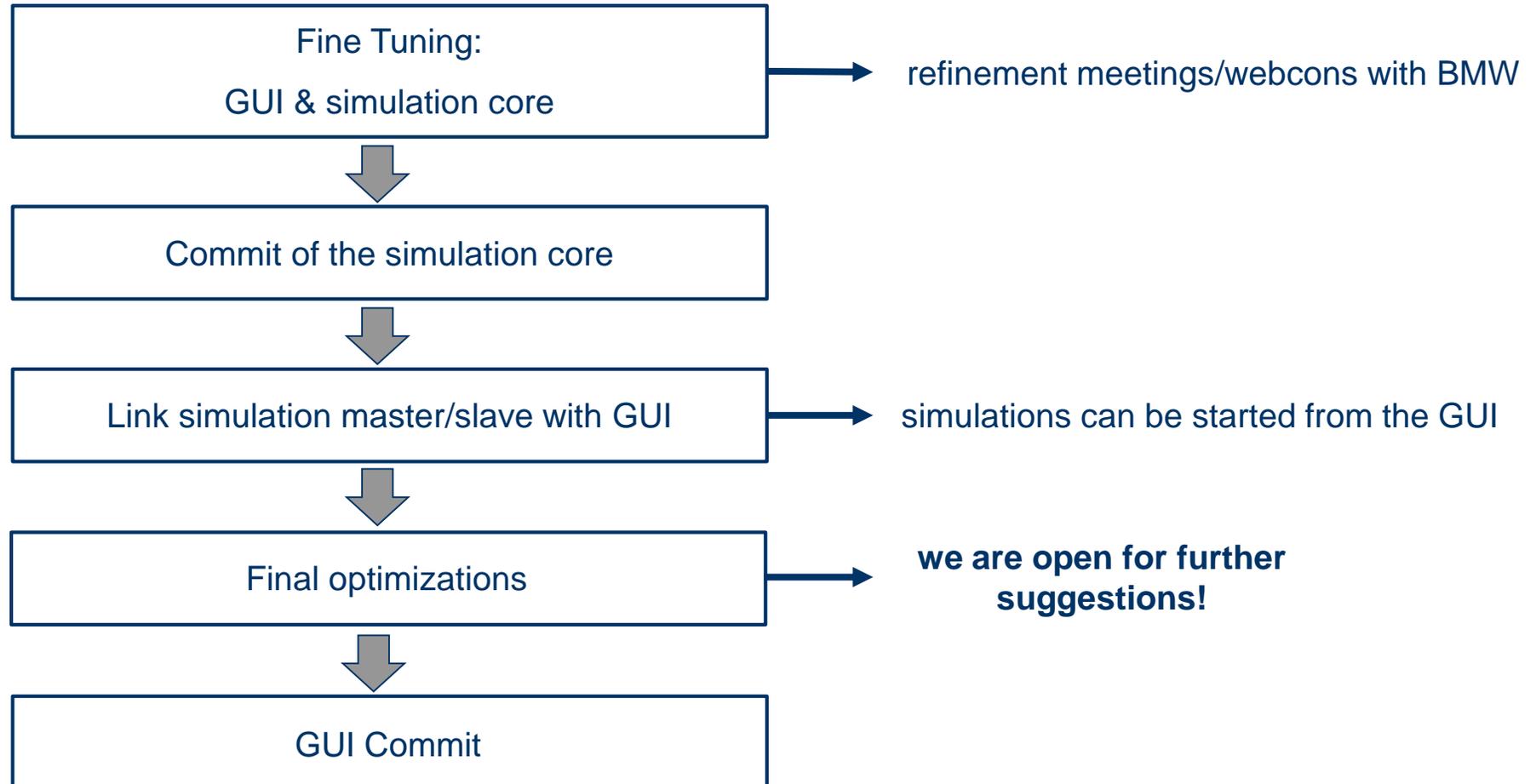
- EgoSensor:** Parameters include EgoPositionX, EgoPositionY, EgoVelocityX [m/s], EgoVelocityY [m/s], EgoVelocityAbsolute [m/s], EgoAccelerationX [m/s^2], EgoAccelerationY [m/s^2], and EgoYawAngle [rad].
- Init_Agent:** Parameters include Trajectory, Weight, Wheelbase, and DistanceFrontAxleToCOG.
- Sensor_Collision:** Parameters include penetrationTime_ms [ms] and CollisionOccurred.
- Algorithm_TrajectoryFollower:** Parameters include TireCoefficient1, TireCoefficient2, FrontWheelAngleLimit, Brake_P, Brake_I, Brake_D, Gas_P, Gas_I, Gas_D, and LookAheadTime.
- Algorithm_Selector:** Parameters include Driver Throttle Pedal, Driver Brake Pedal, Driver Steering Angle [rad], Cpa active, Cpa Brake Pedal, Lane Assist active, Lane Assist BrakeSuperpose, Evasive Steering Assist active, Evasive Steering Angle [rad], collisionOccurred, Resulting Throttle Pedal, Resulting Brake Pedal, Resulting Steering Angle, and Resulting BrakeSuperpose.
- Dynamics_TwoTrack:** Parameters include Radius of the tires [m], Tire's max. force [N], Tire's slide force [N], Tire's slip at max. force, Engine power [W], and Max. brake torque [Nm].
- Dynamics_Collision:** Parameter includes CollisionOccurred.

Arrows indicate connections between these components, illustrating the high complexity of the current state.



GUI PULL REQUEST

ROADMAP – GUI SUPPORT FOR SCENARIO-BASED SIMULATIONS



GUI BUG REPORTS

CURRENT STATUS – COMMITTED SOON

- Bug #989: Component priorities not shown when loading a system → **fixed**
- Bug #990: System name not shown → **fixed** (in hierarchical system editor)
- Bug #977: start-button not visible when starting openpass.exe (in fact the whole action menu) → **fixed**
- Bug #1075: „start simulation“-button disabled in simulation plugin even if all files are selected → **fixed**
(Simulation plugin can now be used to simulate current OSI Use Case)
- Bug #980: Add units to meta data xml of PCM components → **please re-assign!**
- Bug #981: Re-organizatzion of ressources → **addressed** by using the subfolder „gui“ for GUI plugins. We propose a subfolder „components“ for both xml- and dll-files of components as well (To-Do for sim-part).
- Bug #1003: strong dependence on Project Plugin → **to discuss**



NEXT STEPS FOR RELEASE > 0.6

SUGGESTIONS

- **XML workshop:** gain better understanding of the file structures and, possibly, find optimizations
- **Generic ADAS equipment:** think about unified pathway combining systemConfig and profile-based ansatz
- **Visualisation of simulation results:** Who can do it?

