



OPEN HOUSE
UK 2025



CarMaker 14 Feature Highlights

OPEN HOUSE UK 2025

Session 1

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What Is New in CarMaker?



HD Scenarios

Available for
download!

Parking garage



Mountain road



San Francisco



A9 Garching



UK Highway



Suburban Street



City Tunnel



New HD Scenario UK Country Road

- Driving on the left-hand side
- Large multi-lane roundabouts
- Road marking degradation
- Total length: ~3km
- Created by IPG Automotive's partner Agility3

**High level of visual realism:
Winding country roads**



New HD Scenario Chinese Tollway

- Large motorway service station on each side
- Complex building geometry
- Complex multi-lane toll road barrier
- Total length: ~3km
- Created entirely by IPG Automotive

**High level of visual realism:
Dense traffic on complex merging lanes**



3D Assets

Animal Assets



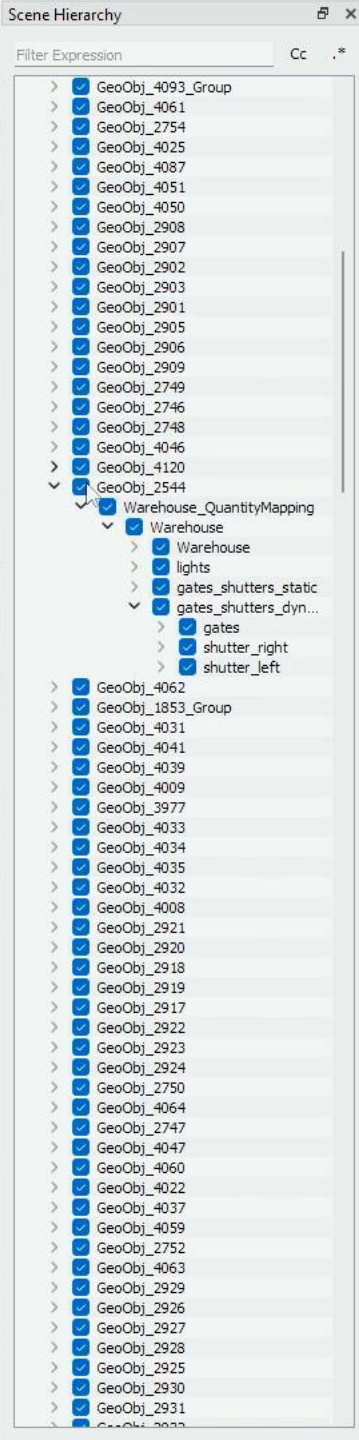
Continuously Growing 3D Asset Library



Weather and Lighting – Challenging Camera Perception Feed



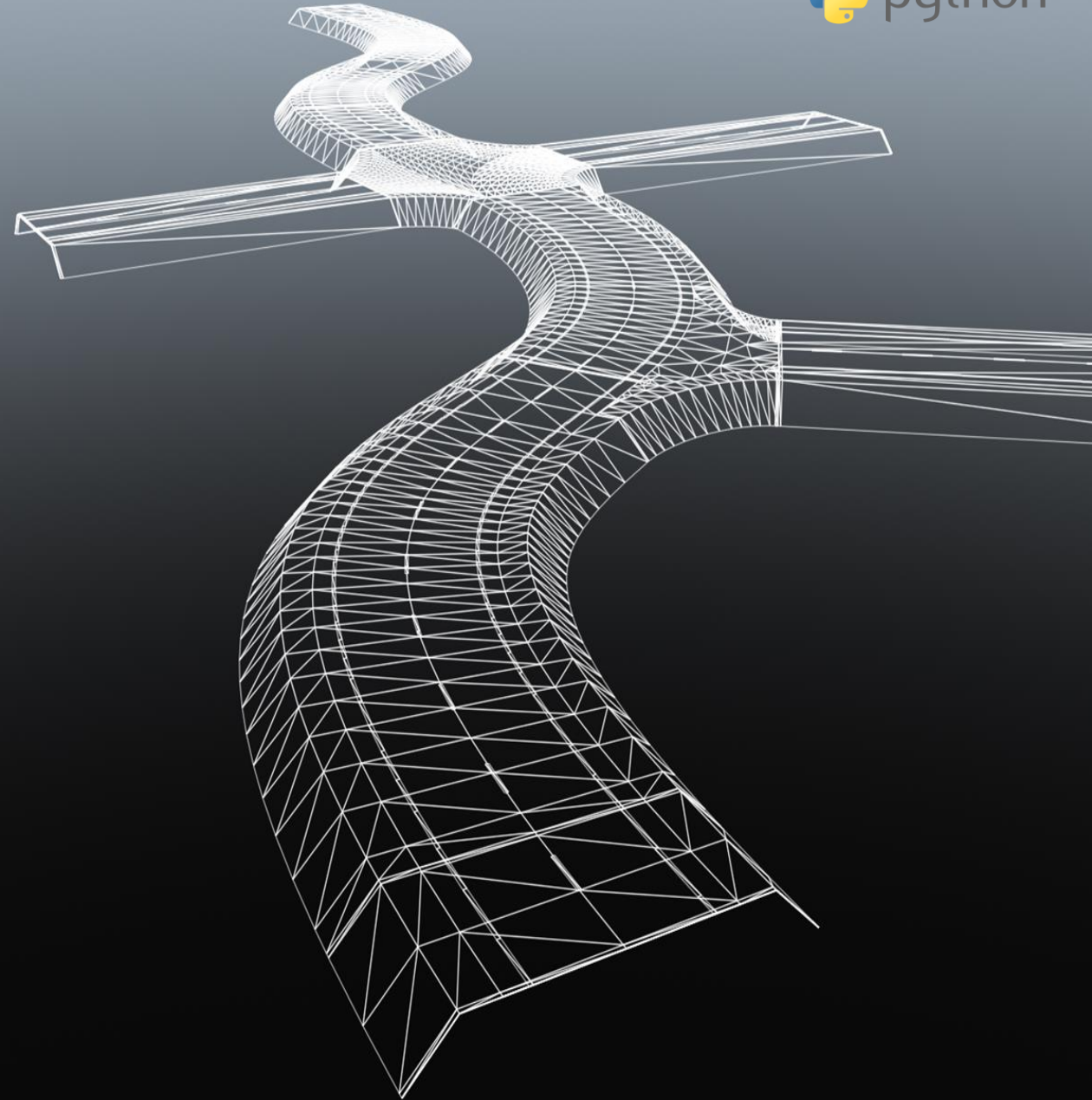
Environment – Simulation-Controlled 3D Assets



Python Based Road API

- Extended c-based Road API by a Python interface to call existing road functions
- Directly output/write road files in .rd5 or .xodr format

**Automate the road build process
via Python API**



ASAM Standards OpenDRIVE

- Now supporting up to version 1.8
- RoadAPI can now export .xodr



ASAM Standards OpenSCENARIO XML

- Now supporting up to version 1.2
- New *Actions*
- New manoeuvre steps for *Tracking* and ego *Routing change*
- New *Global Events* with *Actions*
- Transitions via *DynamicsShapes*



Interoperability across different tools

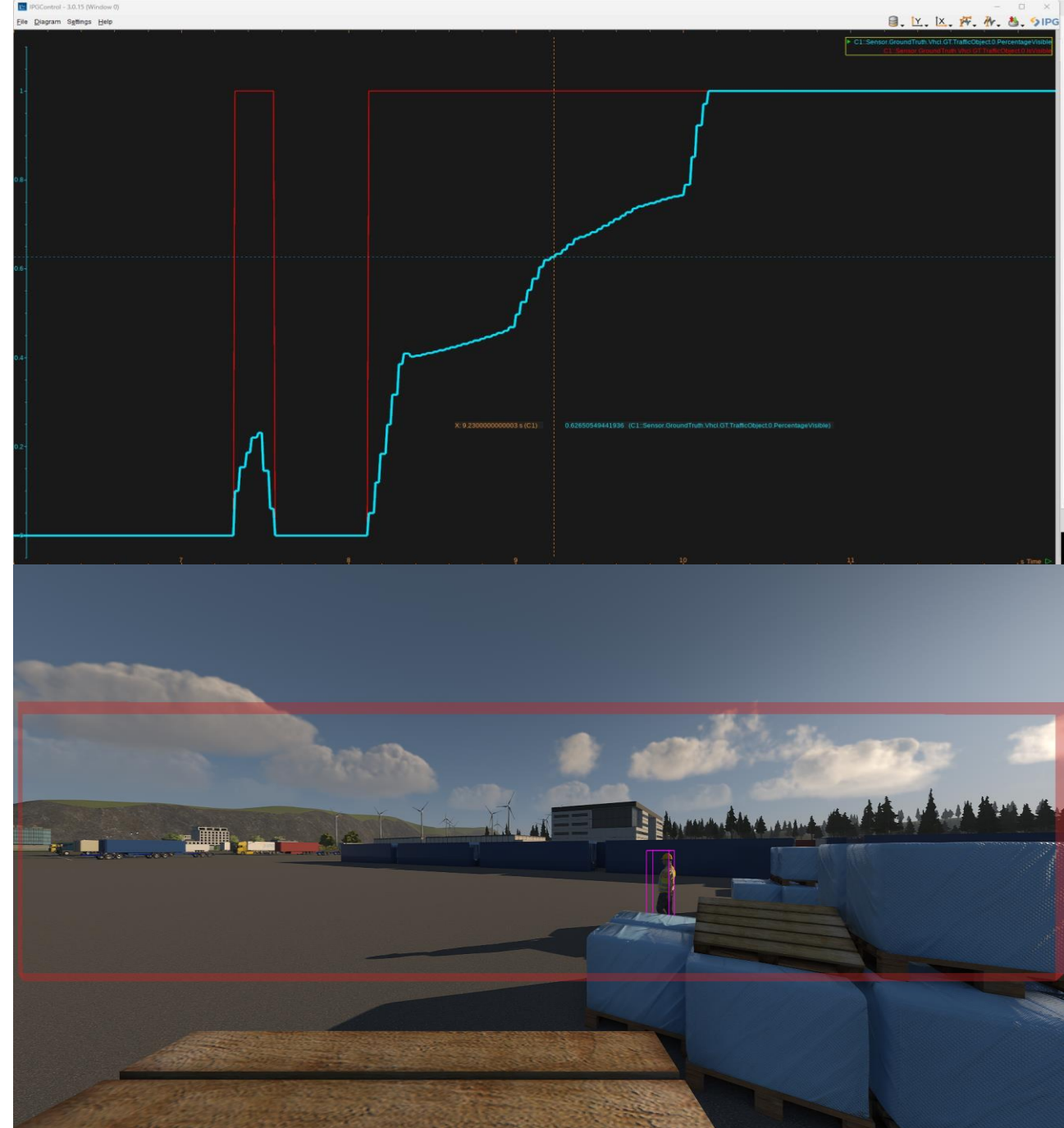
Driver – Route Change



Ground Truth Sensor

- Providing ground truth information of all 3D static/dynamic objects and 2D line markings
- Ability to consider 3D object occlusion based on bounding boxes

One central and performant source for all relevant ground truth sensor information



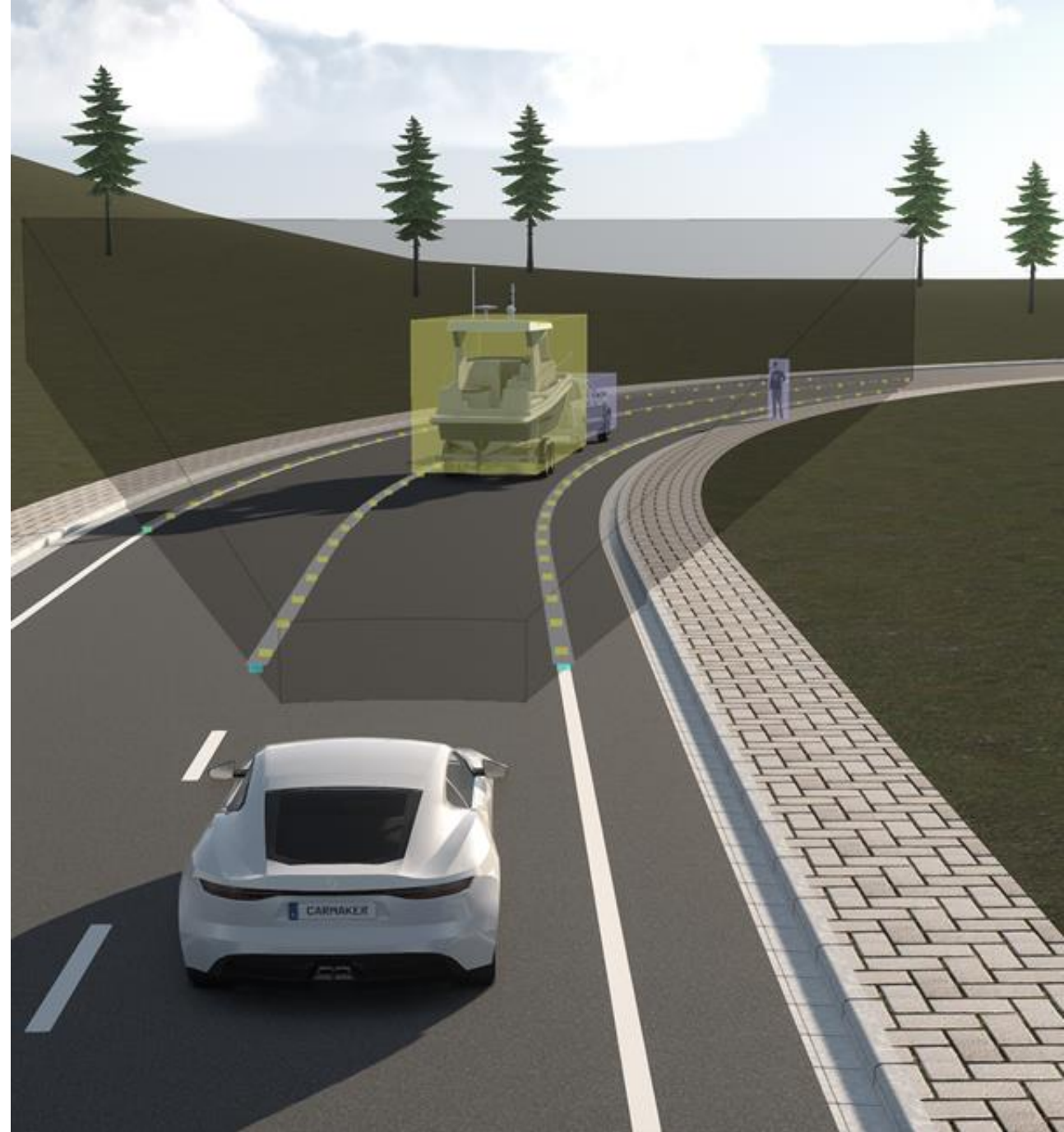
Ground Truth Sensor – Considering Object Occlusion



Ground Truth Sensor

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- Considering 3D line occlusion based on bounding boxes

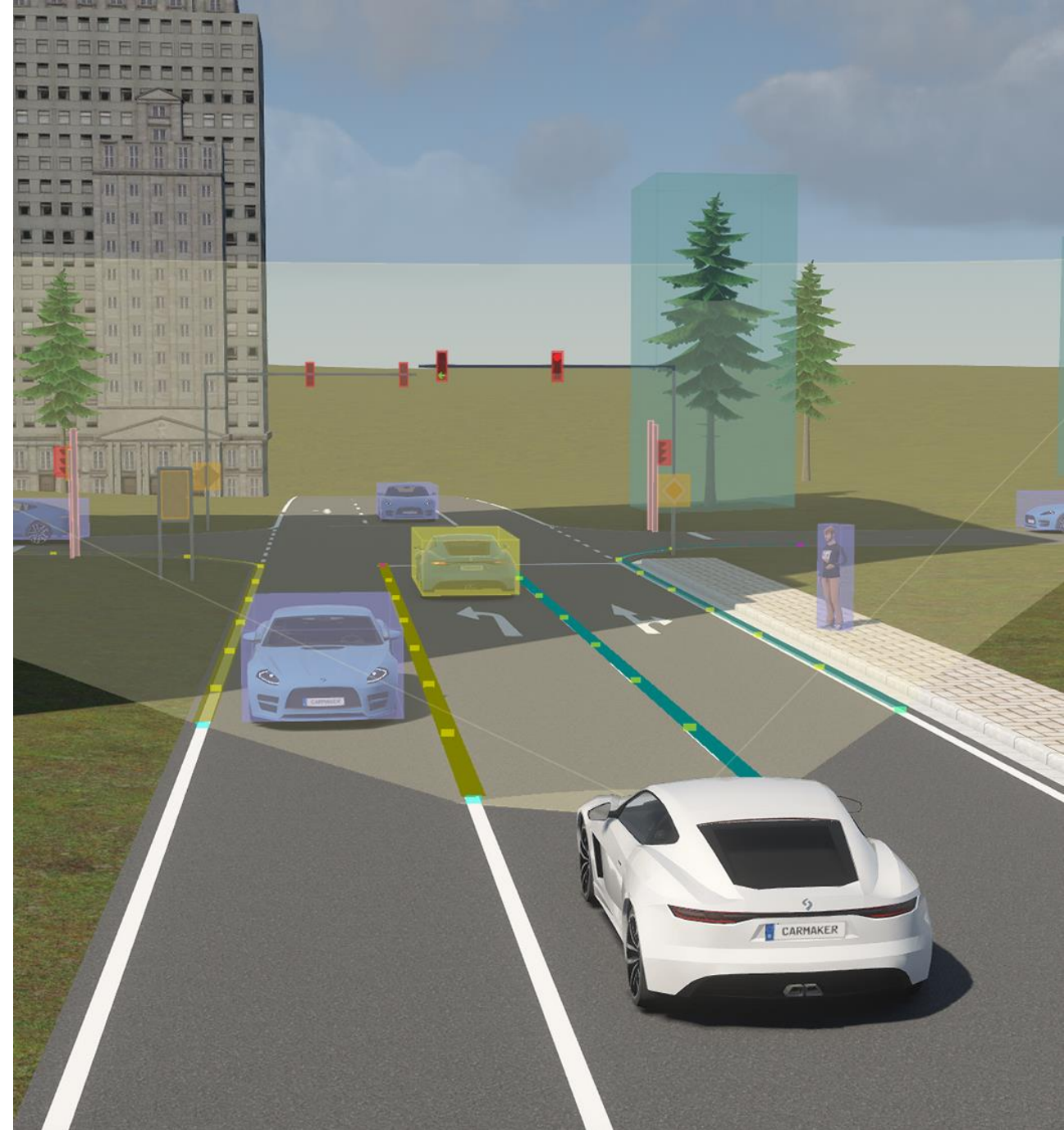
**Access to phenomenological
ground truth line detection**



Ground Truth Sensor

- Providing ground truth information of all 3D static/dynamic objects and 2D line markings
- Ability to consider 3D object & line occlusion based on bounding boxes
- Considering 3D line occlusion based on bounding boxes
- Visualise sensor output in MovieNX

Very powerful debugging tool



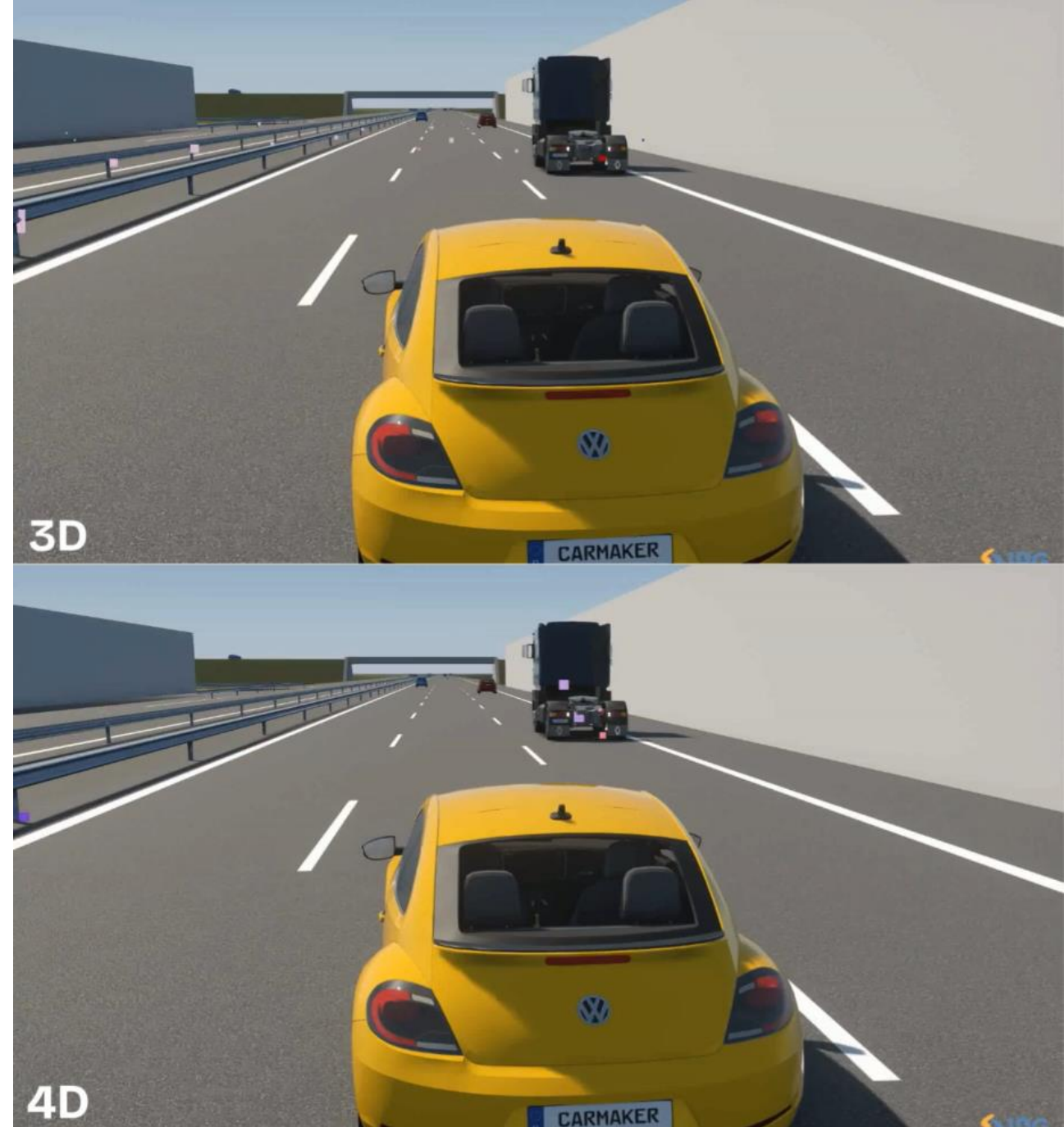
Flexible Sensor Mount - V2X Applications – Sensor Based Scenario Events



Elevated Radar Detections

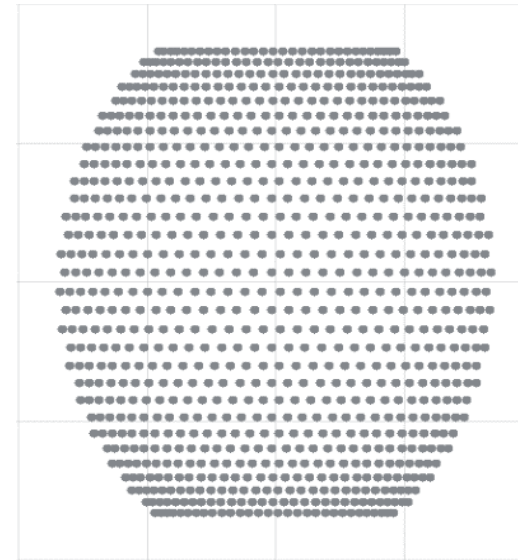
- Raw signal detections for range, velocity, azimuth and elevation angle (4D radar)
- Fully integrated into the entire signal processing chain of CarMaker
- Custom angular processing via C code-based GPU coding interface (CUDA)

Precise object tracking and classification with 4D radar point cloud output

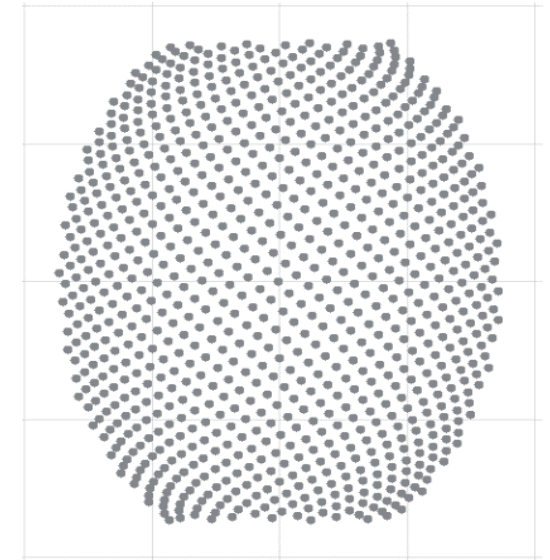


Optimised Static Ray Pattern

- New selectable ray pattern based on *Fibonacci Lattice* for better static distribution
- With same number of rays, better illumination of the scene
- Available for Radar RSI and Ultrasonic RSI



Legacy: Phi-Theta



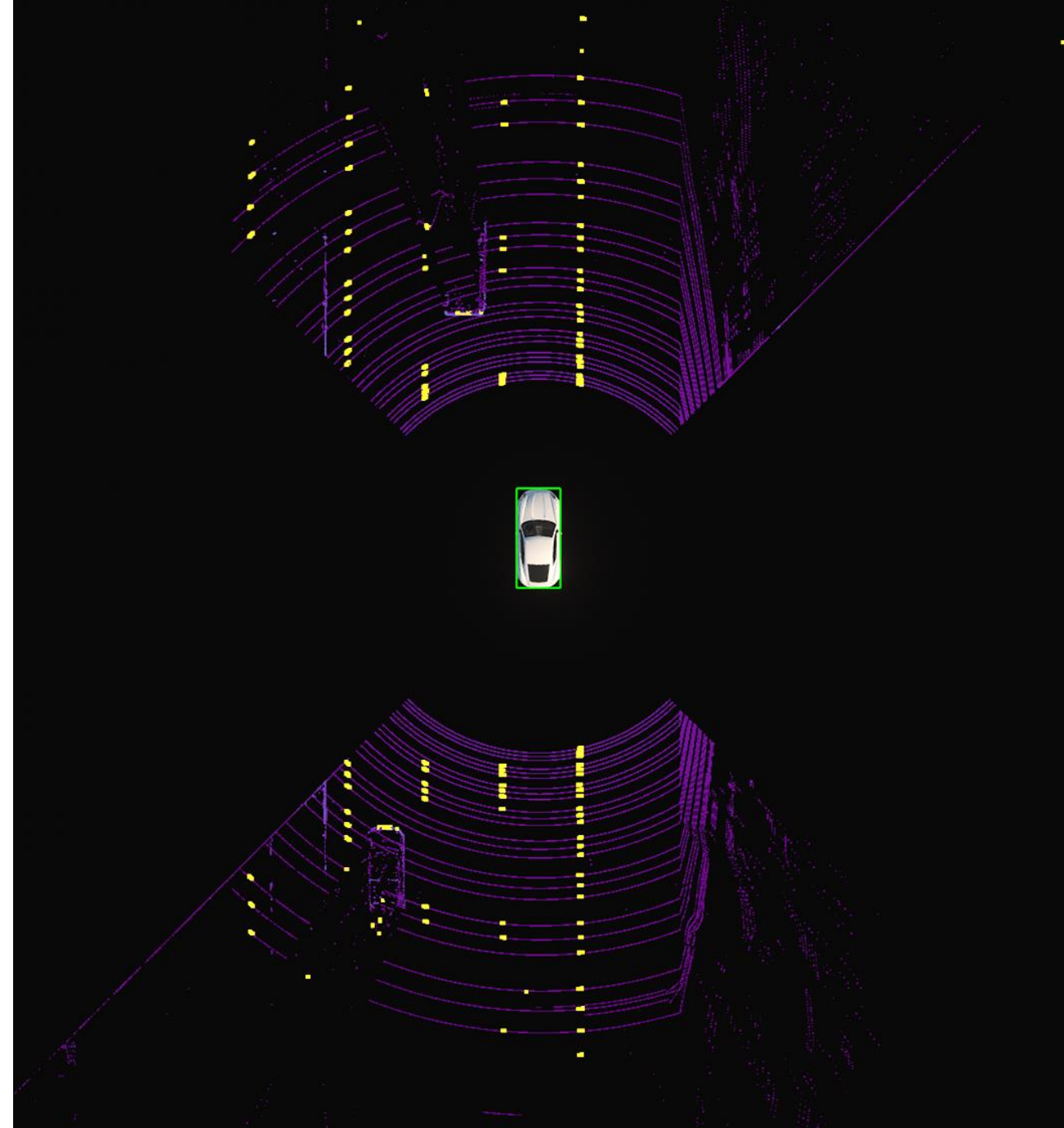
New: Fibonacci

Improved sensor detections due to more evenly distributed foundational ray density

External RSI Sensor Motion

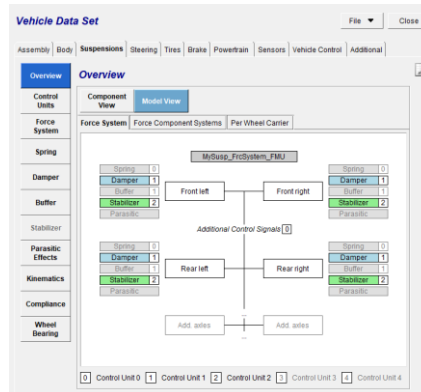
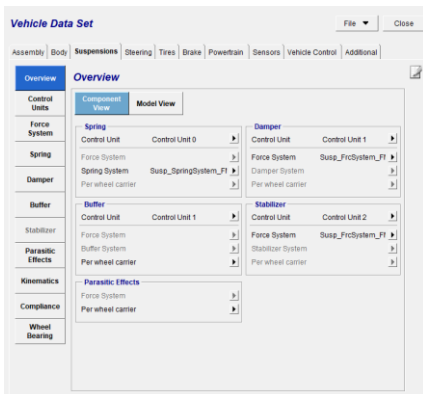
- Custom sensor motion for Physical Sensor Models (Ultrasonic RSI, Radar RSI, Lidar RSI)
- Possibility to apply either a constant motion or sporadic vehicle pitch/roll compensation

**Active sensor motion
required for mechanical rotating lidar**



Suspension Control

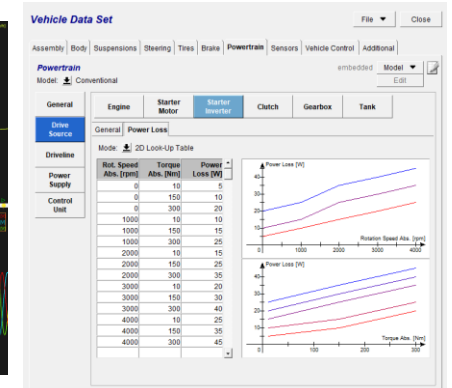
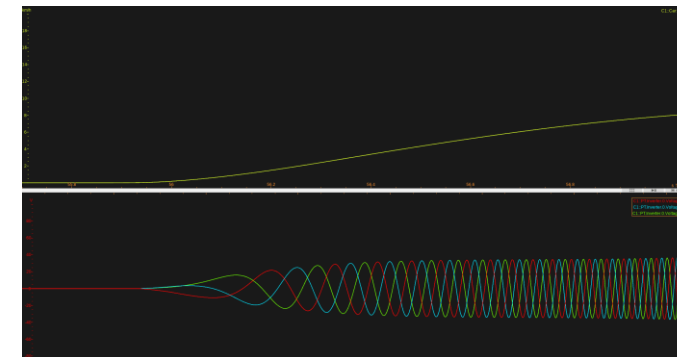
- Improved usability for the suspension Model Class
- Multiple control signals per wheel carrier and/or type of force element



Enhanced modelling for complex vehicle architectures

Inverter

- Introduction of a new Model Manager class *Inverter*
- Output: ideal voltage sinus curve
- Power losses determined by operating point



Configure a complete EV setup containing battery/cell, inverter and e-motor

Trailer Towing

- Ability to hitch & unhitch during simulation
- Now supporting up to 20 trailers at a time
- Full sensor support on all trailers

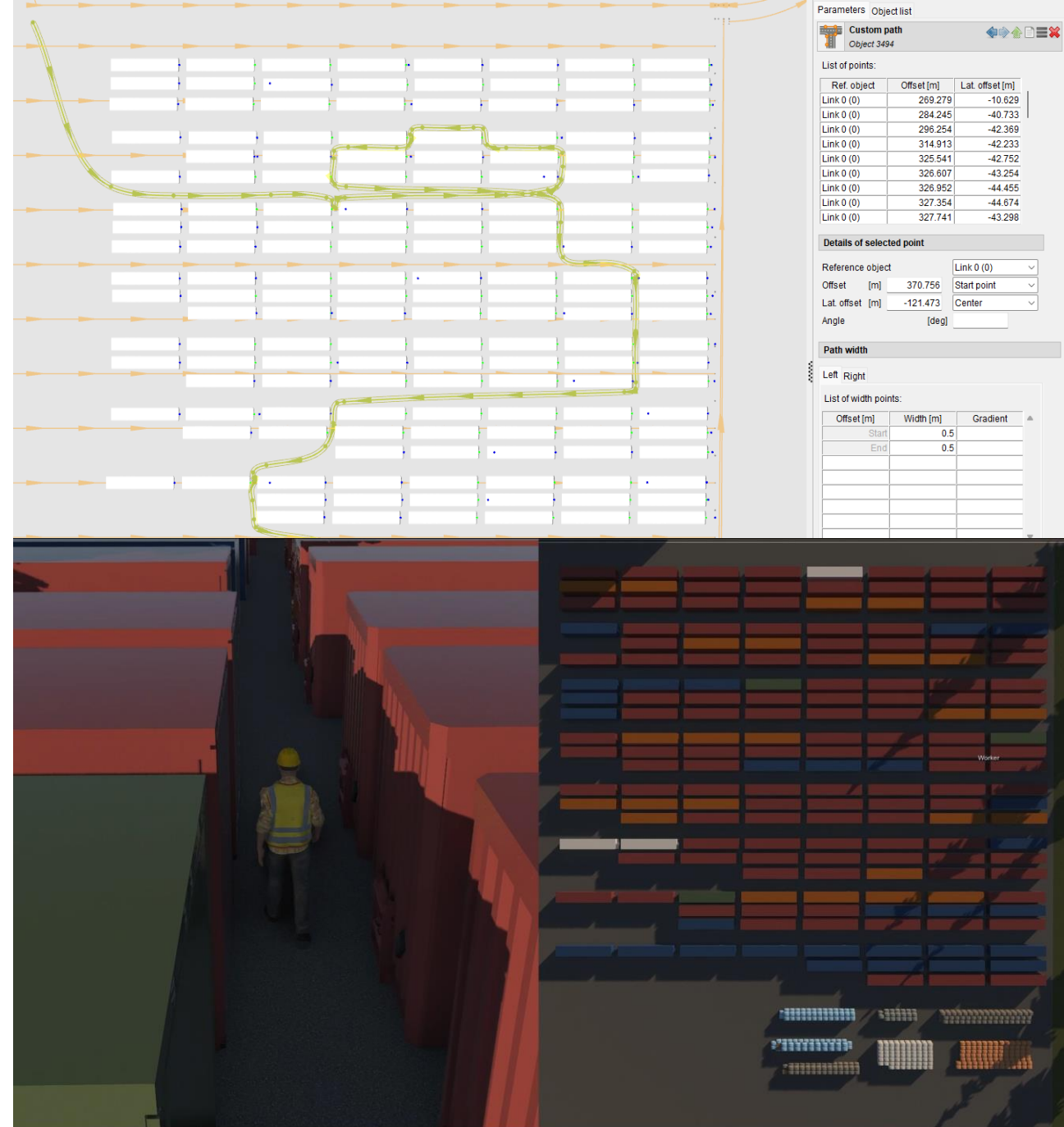
Testing of complex towing and automated hitching for cars and multi-trailer semitrucks



Pedestrian Traffic

- Fully flexible definition of a 2D *CustomPath*
- Adjustable width along the path
- Multiple pedestrians can be placed on a path
- Works across junctions and road links

Generate complex pedestrian trajectories or footpaths with ease



Cockpit Applications

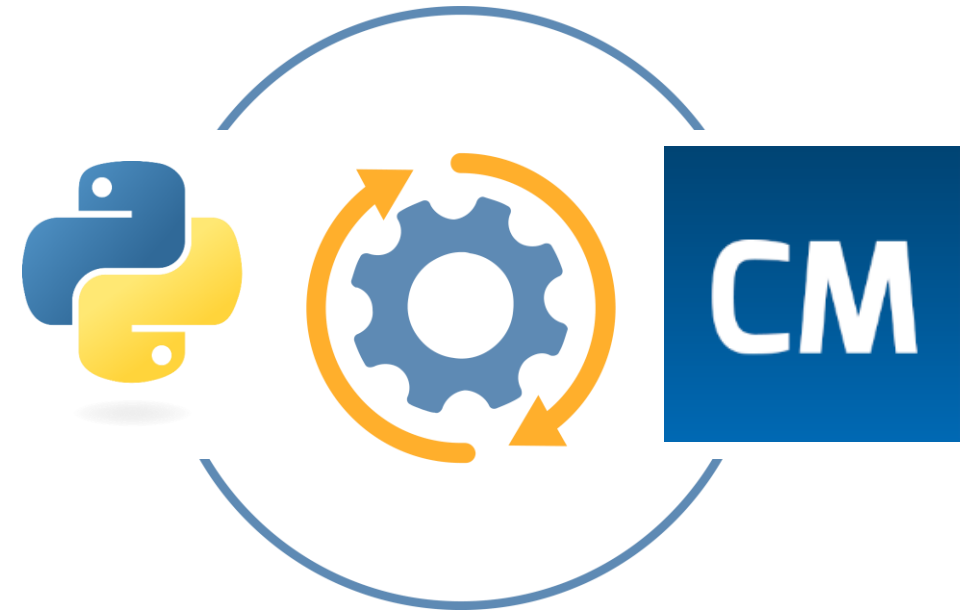
- Highly detailed interior assets for car and truck
- Project static text or dynamic simulation quantities to a 2D drivers' perspective via Python API
- Separate VR add-on available

Immersive driving simulator experience



Python API

- Model check: plausibility check for compiled vehicle models including all submodels and parameterisation data
- Model check now part of CarMaker Python API



**Automate your model check routine
& run all entirely headless**

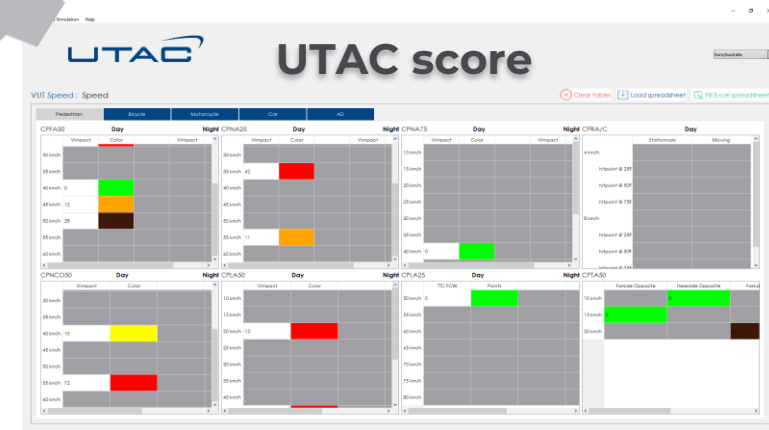
ISO26262 Certification

- Officially certified by TÜV Nord
- Tool Confidence Level 3 (TCL3)
- Automotive Safety Integrity Level D (ASIL-D)

High-fidelity simulation with credible results

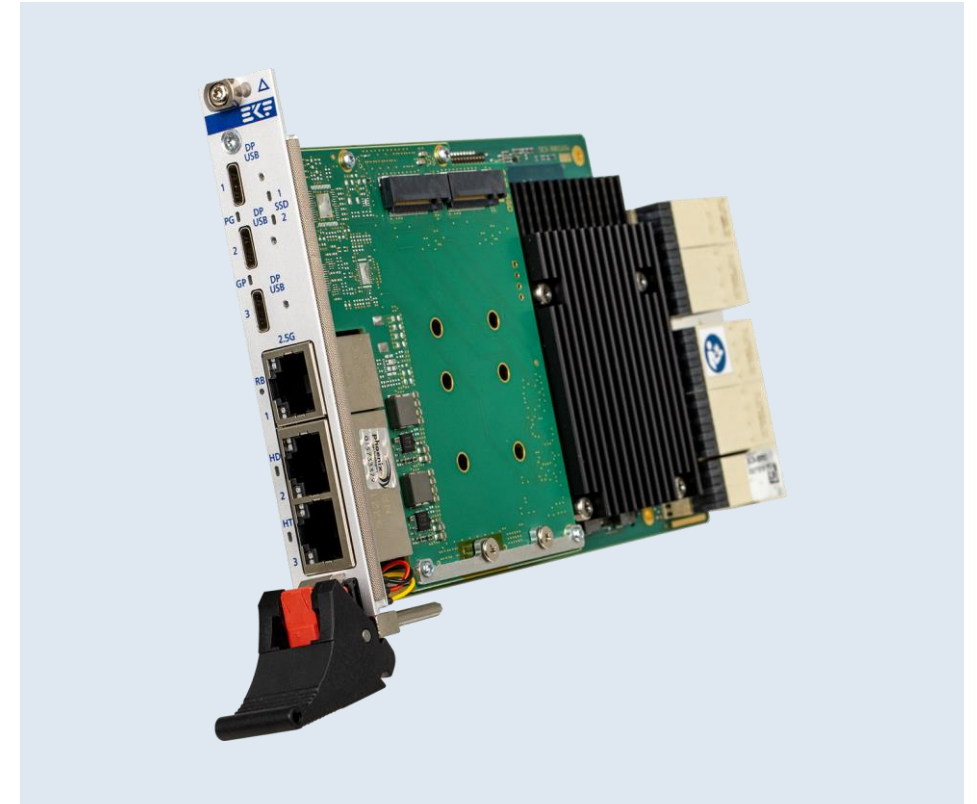
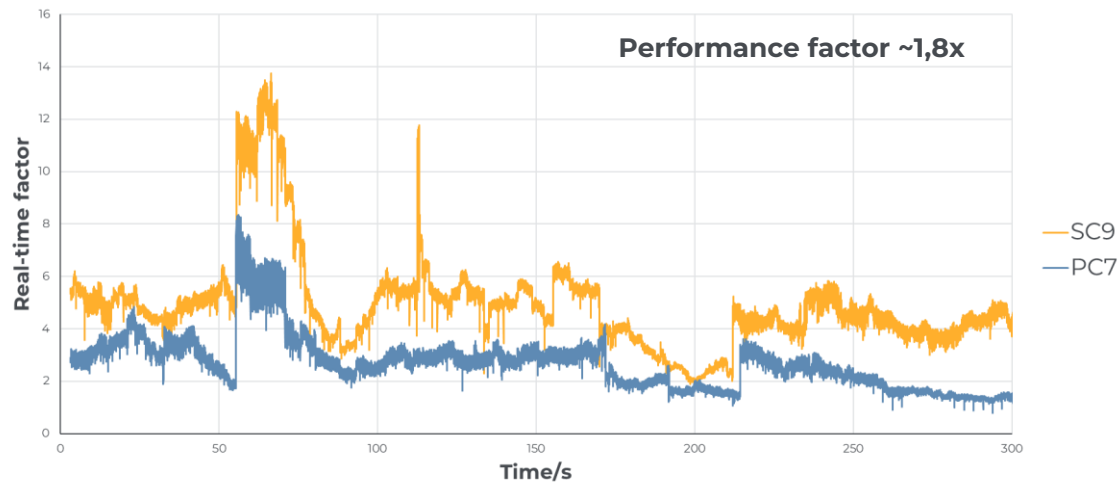


Partnership UTAC and UTAC Scoring Set



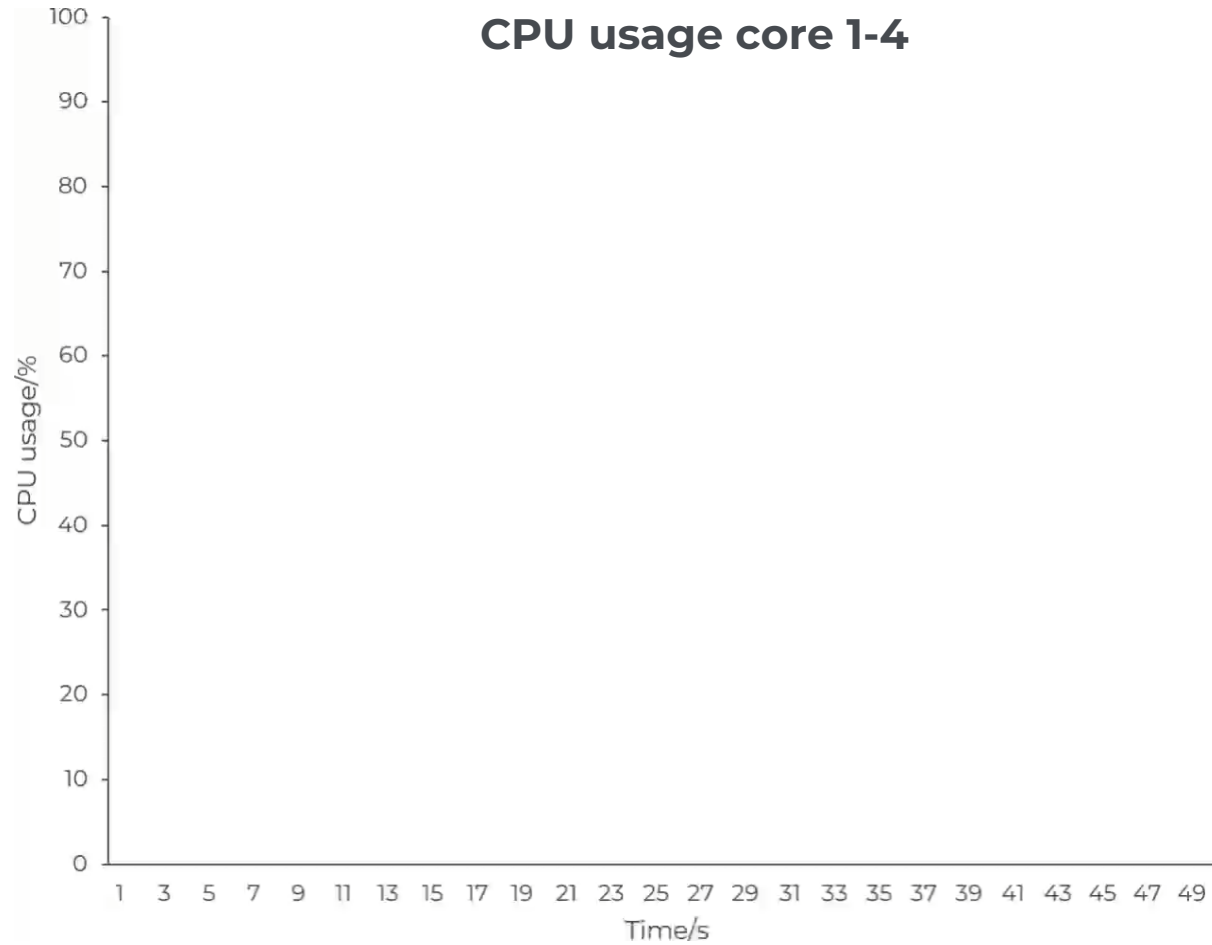
New Single-Board Computer – SC9

- CPU with 8 cores
(Xeon W-11865MRE 8C 2.6/4.7 GHz)
- Adapted to IPG Automotive specifications



More cores (8) – Basis for future applications

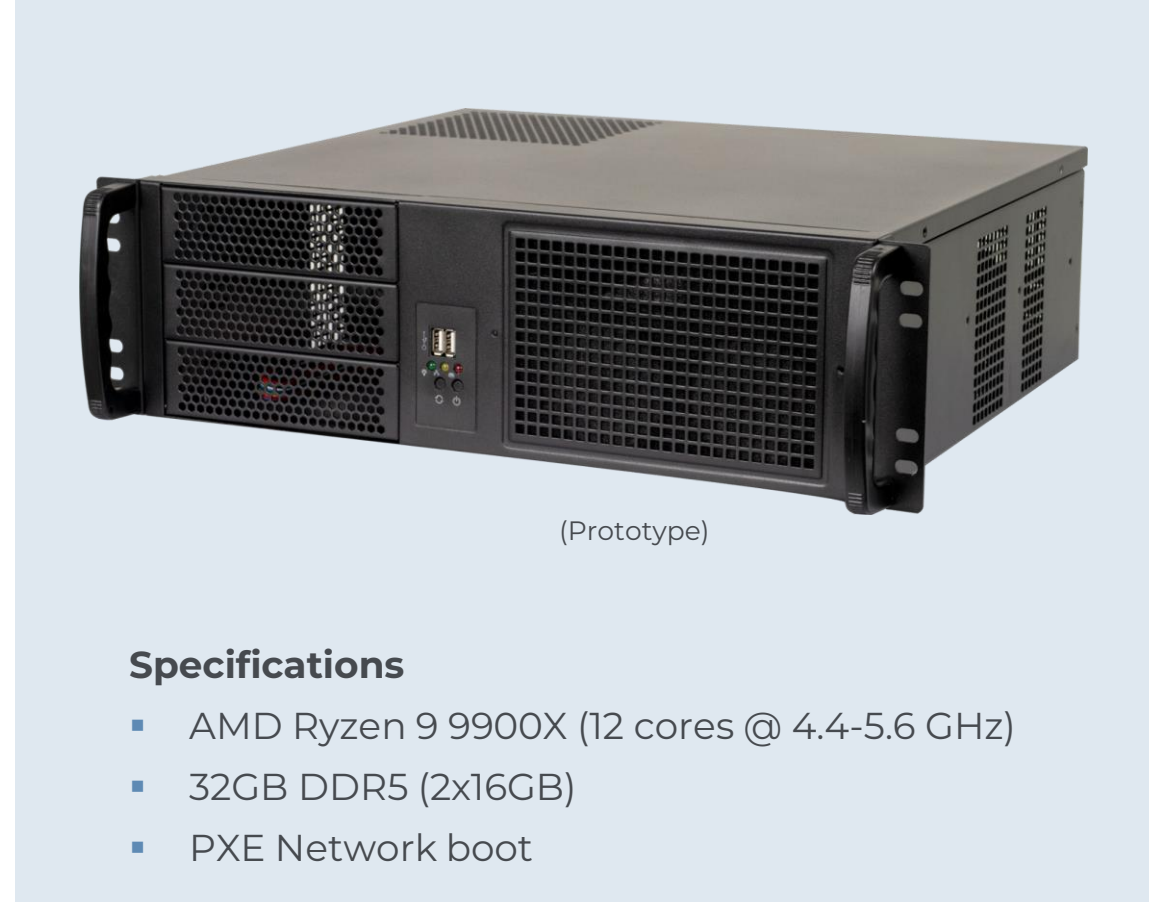
Benefit of Parallelisation



4x complex tyre model, CDTire

Enhanced Real-Time PC

- New real-time PC platform, for extended and computationally intensive applications
- New modules based on PCIe (e.g. Automotive Ethernet w. MACsec)
- Basis for PCIe extension



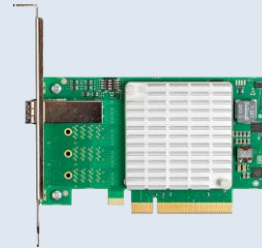
More processing power (complex models) and more available bandwidth

PCIe Extension

- Serial bridge adapter replaces SBC in Xpack4
- PCIe bridge adapter will be plugged into the enhanced real-time PC
- CarMaker will run on the enhanced real-time PC
- Xpack4 provides the IO interfaces as an extension of the enhanced real-time PC



Serial bridge adapter



PCIe



Subrack 8 serial hybrid
(Prototype)



Enhanced real-time PC
(Prototype)

Combines the advantages of precise IO interfaces and a powerful real-time PC

Coming Soon

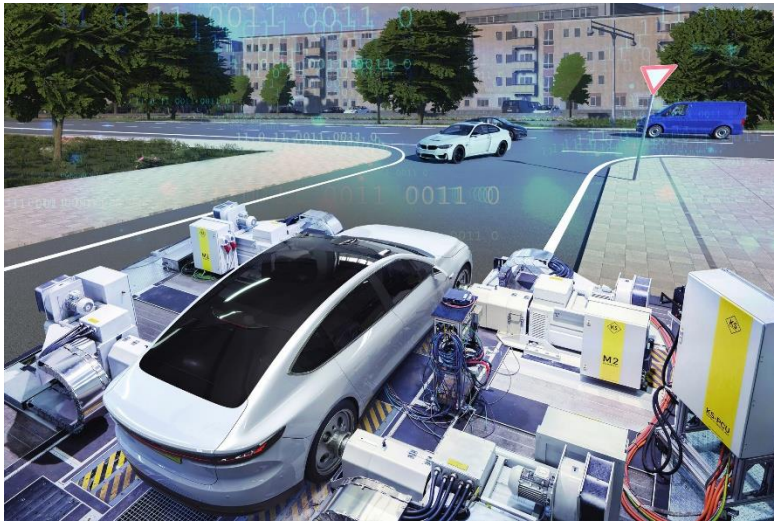
MotorCycleMaker Electric Powertrain

- Driveline & Powertrain
 - New BEV Mcycle model for PT and PTControl
 - New model to integrate wheel hub motors
 - Option to select chain, shaft or belt drive
- Braking & Recuperation
 - Rework of brake model structure
 - New brake control model for integration of recuperation strategies
- Supporting co-simulation (MM4Simulink)
- Full GUI support



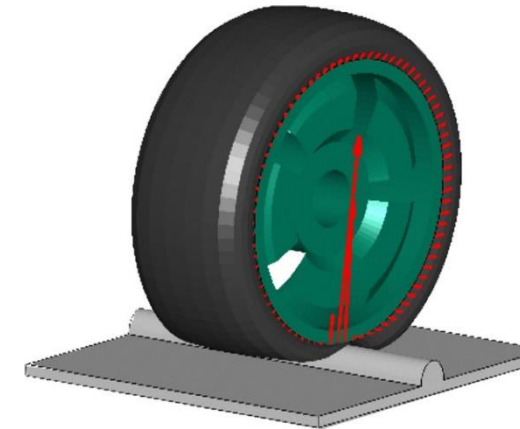
Create electric mcycle vehicle models and integrate your custom controls via Simulink

Optimise IPGDriver for Endurance



Ability to run large-scale virtual endurance tests on testbed facilities (24/7@365)

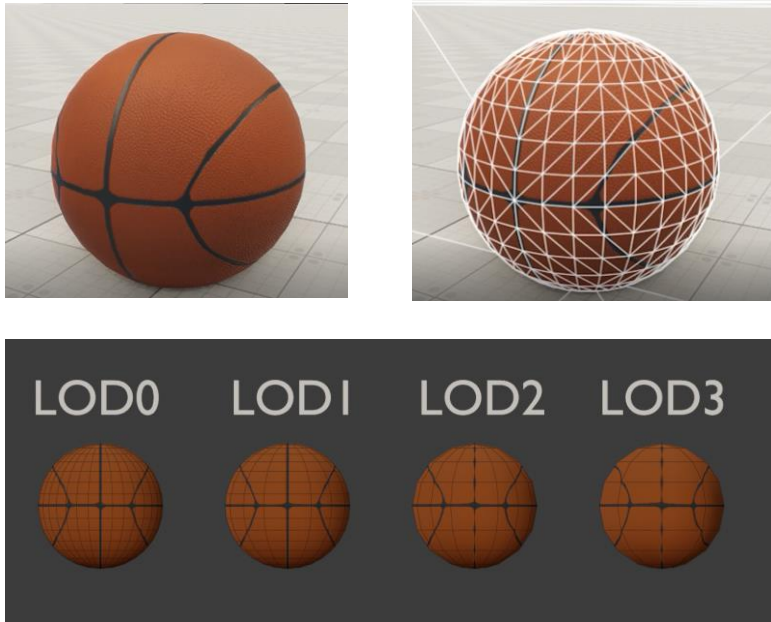
Native CDTire Support Interface



© Fraunhofer ITWM

Direct integration of highly realistic tire models without the need for any additional interfaces

Start Reworking 3D Asset



Improve asset quality & details while simultaneously optimising render performance

Integration of virtual ECUs



Tool alignment for seamless integration of vECUs from Silver into CarMaker

Outro

