

# Industrial Keynotes



**AVSIMULATION**

**06/09/2018**

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# Agenda

1. The End of Driving Simulation?
2. Autonomous Vehicles: the new UI
3. Augmented Realities
4. Choose your factions
5. No genuine AI without flawless simulation
6. Building trust
7. How AVSimulation can help

# The End of Driving Simulation?

Technology innovations are rapidly transforming the driving experience — and even the concept of a “car”—itself.

If we are driven by self-driving cars do we need Human In the Loop simulators?

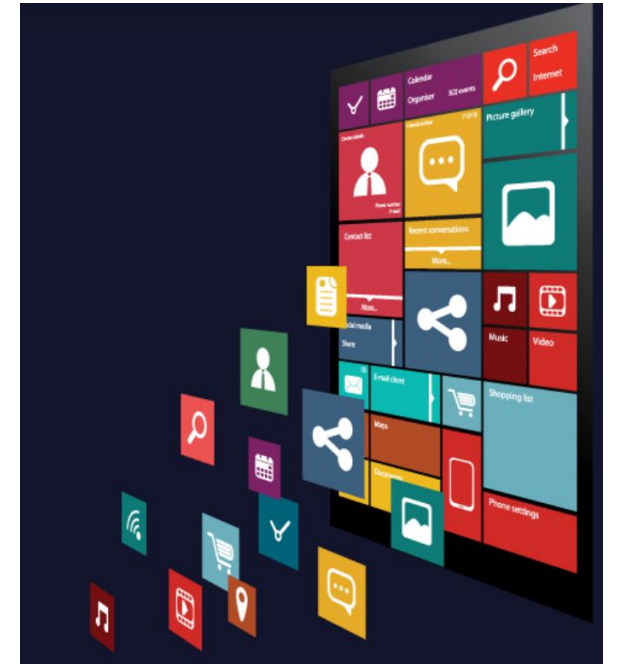
# AV the new UI

Once cars drive people, what is the role of a “cockpit”?

- Experience above all
- Less performance and horse power
- More **comfort, entertainment**, capacity and high-tech experiences
- Why are Apple and Google so focused on self-driving cars?
- Because it might be the ultimate User Interface to do online shopping

Driving simulators will become key to test **ergonomics** and user acceptance while being driven

## It is far from the end of driving simulation!



# Augmented Realities

- Virtual reality will improve in quality
- Augmented and mixed-reality will see an explosion in use-cases
- We will see even more AR use cases in construction, engineering, marketing and maybe even next-gen heads-up displays in cars.
- The shift to more AR is already boosting the rise of virtual 3D representations of physical products
- Soon, every car that leaves a factory will come with such a digital copy



# Choose your factions

- Compress timeframes to reduce Time-to-market
- Rather than creating a collection of sophisticated capabilities in-house and risking longer development cycles, automotive businesses must engage the **ecosystem**—**startups, universities** and **digital transformation companies** such as **IBM, Microsoft, Amazon or Atos**—to deliver leading-edge capabilities.
- For the first time, major rivals are collaborating to design future value chains that transform businesses, products and even the market itself. When speed is everything, these types of **partnerships** are what can accelerate the development of new services and features for automakers.
- Competitive advantage will not be determined by an organisation alone but by the strength of the **partners** and **ecosystems** chosen.
- Embrace **standards**



# No genuine AI without flawless simulation

- Deep learning is heavily used in **segmentation** /shape recognition
- However most AV manufacturers focus on **rule-based AI** for decision to avoid unpredictable behaviours
- Focus seems to be rather on mass **validation** instead of AV **training** through deep learning
- Simulation will become a prerequisite before launch
- But in order to do so it needs to be extremely realistic

Flawless simulation is an enabler and a prerequisite for AI based decision

# The devil is in the details

As explained by Dr. Hans-Peter Schöner in the opening keynotes:

- Sensor models are key for LIDAR, RADAR, cameras but also Maps and GNSS
- Physics based sensor simulation
- Realistic modelling of pedestrians
- Interaction and influence of emotions and other drivers
- Visuals will have to be improved

Motion sickness

Sound...

***“We choose to go to the Moon **in this decade** and do the other things, not because they are easy, but **because they are hard**; because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one we intend to win, and the others, too.”***

***John F. Kennedy 12/09/1962***



# Building Trust

- Safety
- Reliability
- Cybersecurity

But the most important is to build **TRUST**

Uber accident has damaged the trust that was built by the AV community

Validation and development process need to be flawless

⇒ Simulate 1st, drive 2<sup>nd</sup>

⇒ The quality of the simulation is as important as the number of miles driven



# How AVSimulation can help

# 30 years experience in Simulation, Automotive and Engineering

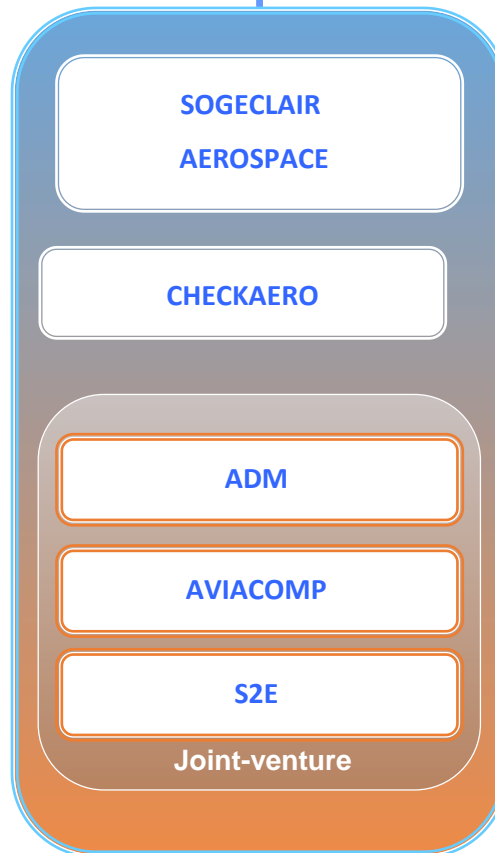
Shareholding structure:



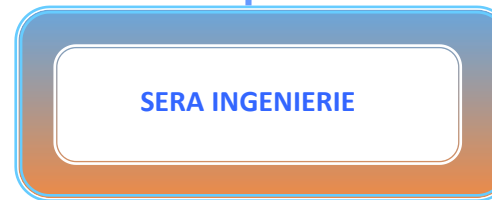
**SOGECCLAIR GROUPE RENAULT**

2017 turnover: 147,3 M€

**AEROSPACE Division**



**VEHICLE Division**

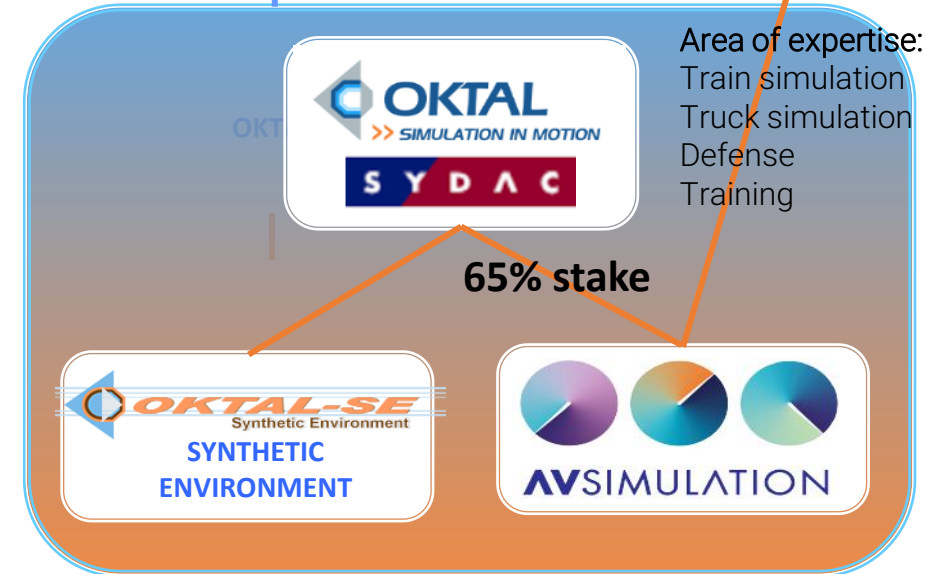


**Area of expertise:**

- Vehicle architectures
- Suspensions
- Body and aerodynamics
- Structures and mechanical parts,
- Hydraulic systems and components
- Control laws for mobility
- Test benches and special machines
- Simulators hardware
- Driveline design



**SIMULATION Division**



**35% stake**

**Area of expertise:**  
Train simulation  
Truck simulation  
Defense  
Training

**65% stake**

**Area of expertise:**

Synthetic environment rendering software in both Electro-Optic (Visible, Infrared) and Radio-Frequency (Radar, GNSS) domains.

Creation date : 2017  
2017 Turnover: 5,9 M €  
Staff Members: 50

**Area of expertise:**

- Automotive
- Driving simulation
- Autonomous Driving
- Software development

# We combine software and advanced simulators

## SCANeR™

Single simulation platform:

- Workstation
- Distributed

Wide range of driving simulators:



Value add services:

- Customized content such as scenarios
- System integration
- Consulting

# Software Product

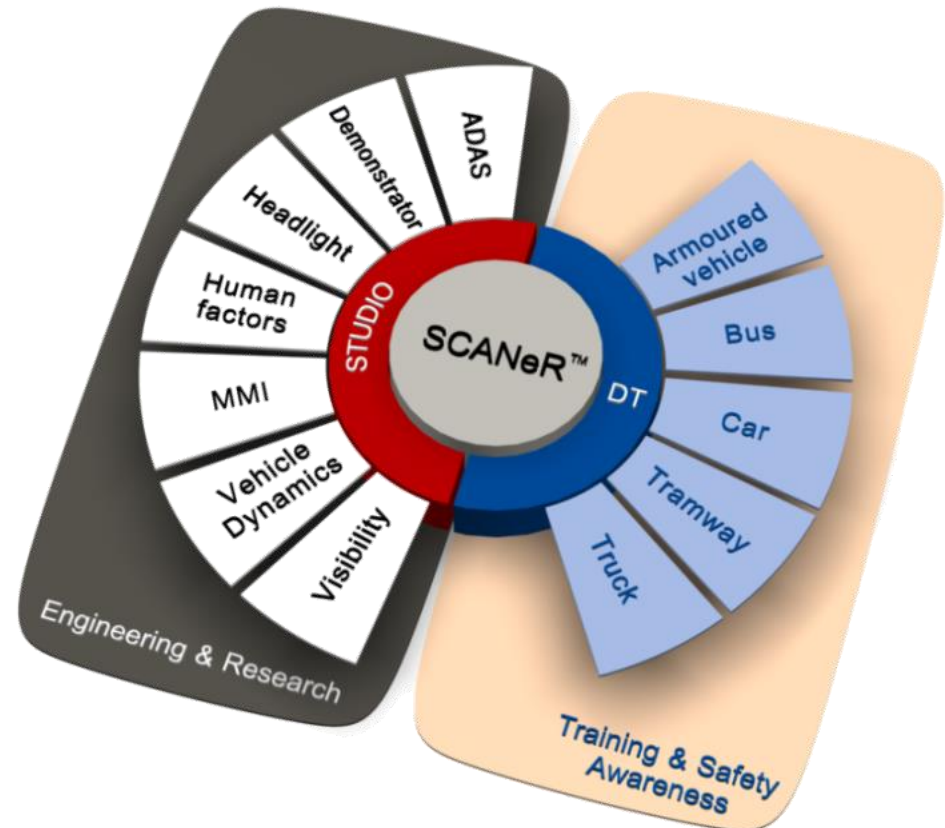
Comprehensive simulation software packages

- Research and Engineering markets

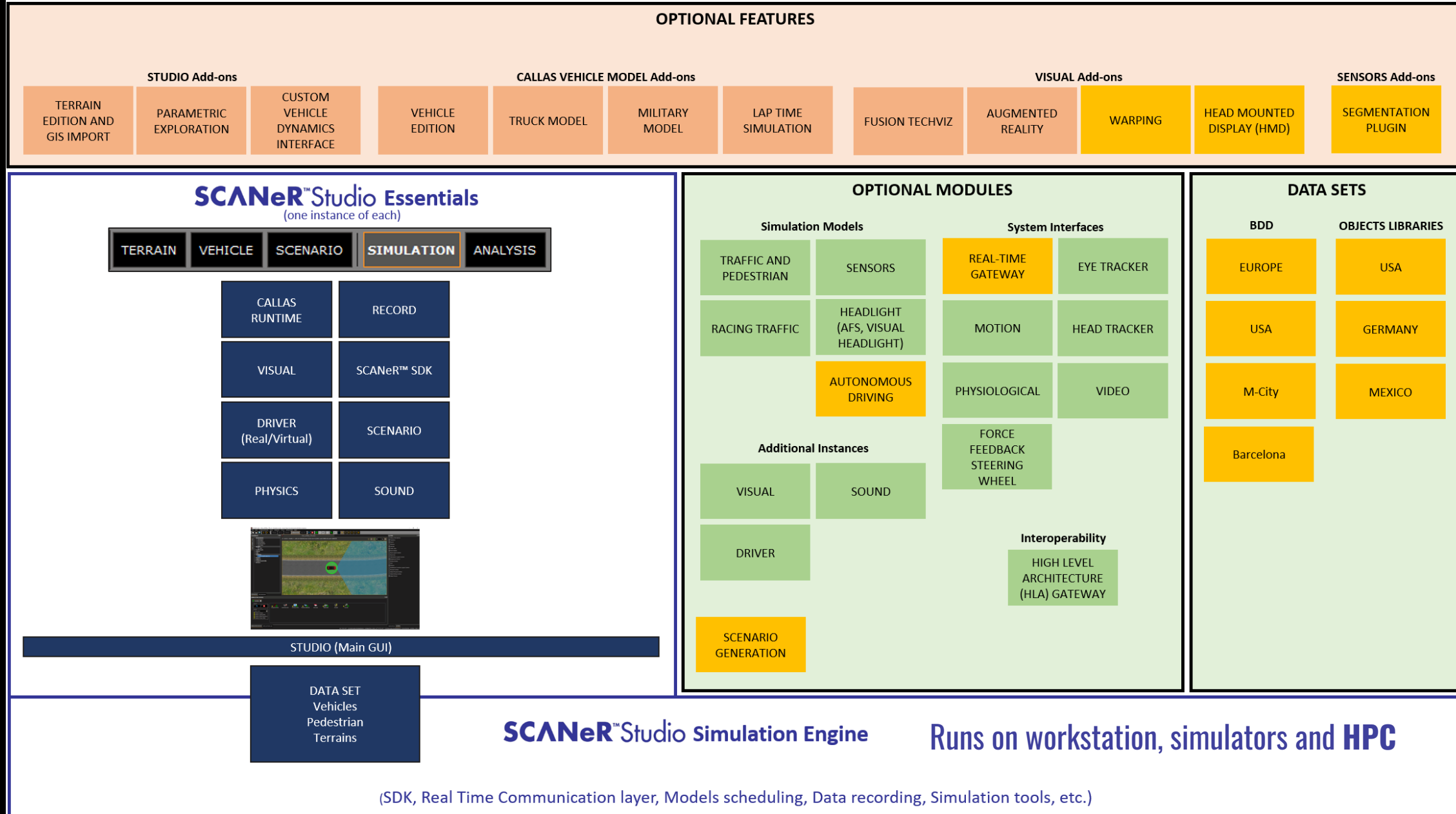
**SCANeR™ Studio**

- Training/Awareness market

**SCANeR™ DT**



# SCANeR 1.8: modular, open, complete





# Key steps to a successful simulation



## Preparation step:

- Terrain Mode
- Vehicle mode
- Scenario mode
- API Libraries

Automation

## Runtime step:

- Realtime or offline simulation
- Real or virtual driver
- Multi modules synchronization
- Synchronized recording

## Post-processing step:

- Analysis mode





# SCANeR™ Studio all in one simulation platform

SCANeR™ Studio

## Integrated Platform for ADAS simulation

### Environment:

- Traffic
- Road
- Pedestrian



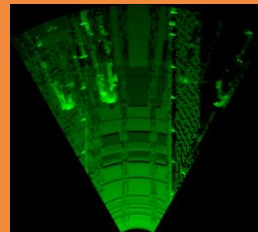
### Driver



Human  
or  
Autonomous

### Sensors:

- LIDAR
- Camera
- Radar



### Vehicle Dynamics Model

CALLAS Automotive 4.9

Can be swapped with any VD model

Linux



Windows

## ADAS development tools and standards



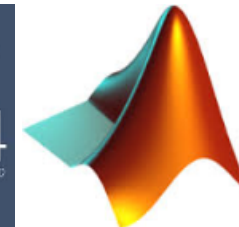
TestStand™

vector



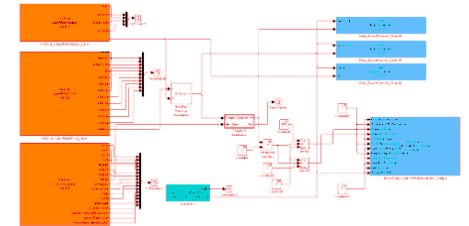
SIMULATION  
WORKBENCH

RT-LAB  
dSPACE



## Applications:

### Software In the Loop



### Driver In the Loop



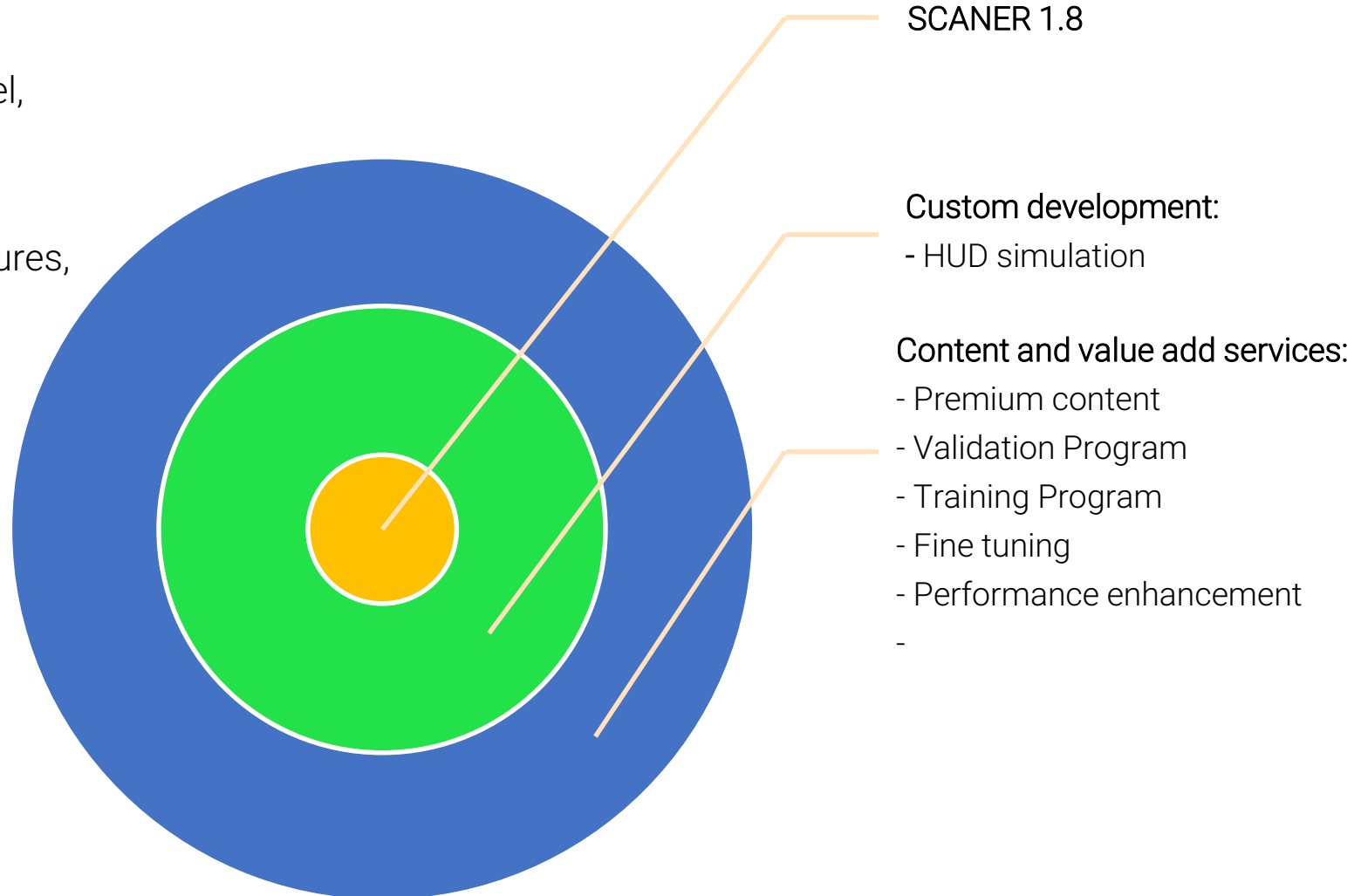
### Hardware In the Loop



# SCANeR roadmap and value add services

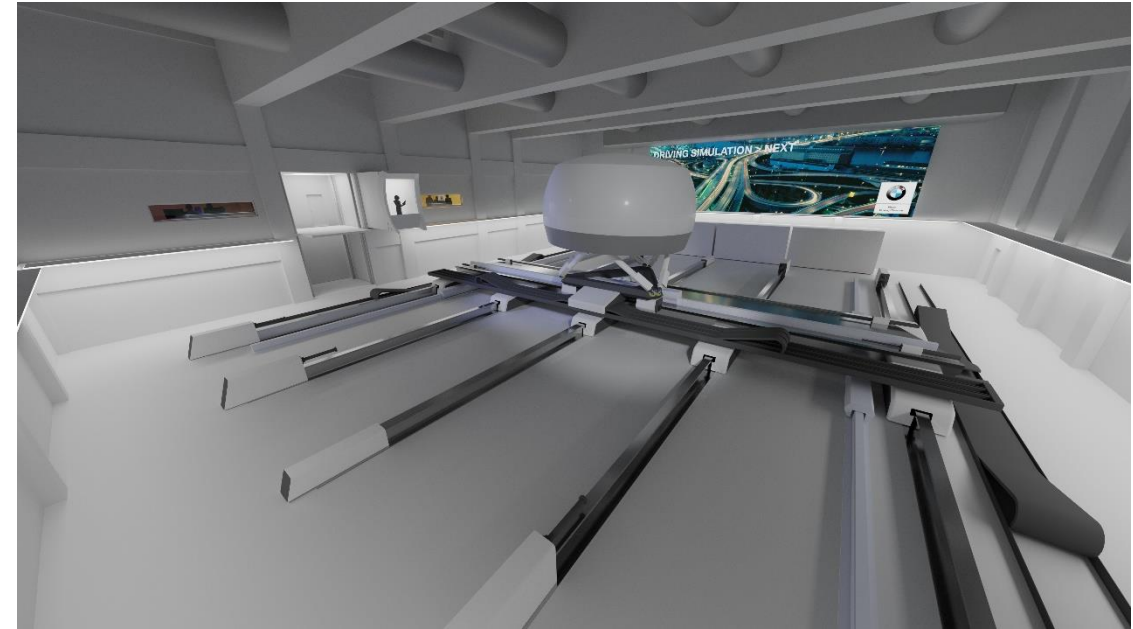
Focus for 1.8:

- Terrain and traffic modules improved,
- Sensors:
  - New sensor camera model,
  - Road sensor output more convenient,
  - New target detection features,
  - Physical sensors level 1 / functional.
- HPC
- Realistic visuals
- Scenario automation tools:
  - ScenarioImporter
  - ScenarioGenerator,
  - ScenarioBatch.



# A Simulator for every use case (and budget)

- VR headset + PC + SCANeR: a portable solution to discover driving simulation
- **Compact and multipurpose simulators:** a cost effective modular approach
- **Headlights simulator:** high end visual rendering (high resolution, high contrast) + cockpit. Does not need to be dynamic.
- **HMI / Human Factor simulator:**
  - Static for the uses cases: dashboard and ergonomics testing
  - Dynamics for cognitive ergonomics
  - VR / Cave simulator: static driving simulator leveraging Virtual Reality
- **Simulator for ADAS and autonomous vehicle validation, sensors and connected vehicles:**
  - Use case: HIL, MIL, SIL, DIL
  - High performance, fidelity and dynamics
- **Parallel simulators** for mass simulation



# Our customers

Willkommen BMW!



# Our goals

The Driving Simulation industry is undergoing a deep transformation

Shift from research to manufacturing

AVSimulation is also reshaping itself:

- Reviewing our product range to focus on use cases
- Identifying the right partners
- Actively looking for talent

Our objectives:

- Position SCANeR as the leading OS for all simulators
- Become the world leader in end-to-end AV Simulation solutions
- Meet our customer expectations
- Foster partnerships



# Thank you

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