Industrial Keynotes

06/09/2018
Juan-Les-Pins
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?
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 a 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 GNSSS
- 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 2nd**

⇒ 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:

AEROSPACE Division

SOGECLAIR
AEROSPACE

CHECKAERO

ADM
AVIACOMP
S2E
Joint-venture

VEHICLE Division

SERAS INGENIERIE

VEHICLE Division

SIMULATION Division

SYNTHETIC ENVIRONMENT

GROUPE RENAULT

Area of expertise:

SOGECLAIR
AEROSPACE

CHECKAERO

ADM
AVIACOMP
S2E
Joint-venture

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

Area of expertise:

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

Area of expertise:

- Automotive
- Driving simulation
- Autonomous Driving
- Software development

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

Area of expertise:

- Train simulation
- Truck simulation
- Defense
- Training

2017 turnover: 147,3 M €
35% stake
65% stake
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
Comprehensive simulation software packages

- Research and Engineering markets
  **SCANeR™ Studio**

- Training/Awareness market
  **SCANeR™ DT**
SCANeR 1.8: modular, open, complete

OPTIONAL FEATURES

STUDIO Add-ons
- TERRAIN EDITION AND GIS IMPORT
- PARAMETRIC EXPLORATION
- CUSTOM VEHICLE DYNAMICS INTERFACE
- VEHICLE EDITION

CALLAS VEHICLE MODEL Add-ons
- TRUCK MODEL
- MILITARY MODEL
- LAP TIME SIMULATION

VISUAL Add-ons
- FUSION TECHVIZ
- AUGMENTED REALITY
- WARPING
- HEAD MOUNTED DISPLAY (HMD)

SENSORS Add-ons
- SEGMENTATION PLUGIN

OPTIONAL MODULES

Simulation Models
- TRAFFIC AND PEDESTRIAN
- RACING TRAFFIC

System Interfaces
- SENSORS
- HEADLIGHT (AFS, VISUAL HEADLIGHT)
- AUTONOMOUS DRIVING
- FORCE FEEDBACK STEERING WHEEL
- HIGH LEVEL ARCHITECTURE (HLA) GATEWAY

DATA SETS

- BDD
- USA
- EUROPE
- USA
- GERMANY
- M City
- MEXICO
- Barcelona

SCANeR Studio Essentials

SCANeR Studio Simulation Engine

Runs on workstation, simulators and HPC

(SDK, Real Time Communication layer, Models scheduling, Data recording, Simulation tools, etc.)
Key steps to a successful simulation

**Preparation step:**
- Terrain Mode
- Vehicle mode
- Scenario mode
- API Libraries

**Runtime step:**
- Realtime or offline simulation
- Real or virtual driver
- Multi modules synchronization
- Synchronized recording

**Post-processing step:**
- Analysis mode
SCANeR™ across the innovation lifecycle

Virtual Testing
Driving Simulation
Virtual Reality

Prototyping
Validation
CAD
GUI & Infotainment
Driver
Vehicle dynamics

Specification
AD / ADAS

Integration
Development

Headlight

AVSIMULATION
Integrated Platform for ADAS simulation

Environment:
- Traffic
- Road
- Pedestrian

Sensors:
- LIDAR
- Camera
- Radar

Driver
- Human or Autonomous

Vehicle Dynamics Model
Can be swapped with any VD model

Applications:
Software In the Loop
Driver In the Loop
Hardware In the Loop

ADAS development tools and standards
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.

Custom development:
- HUD simulation

Content and value add services:
- Premium content
- Validation Program
- Training Program
- Fine tuning
- Performance enhancement
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!
The Driving Simulation industry is undergoing a deep transformation

Shift from research to manufacturing

AVSimulation is also reshaping itselfs:
- 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