Industry Trends

Emmanuel Chevrier – CEO AVSimulation

emmanuel.chevrier@avsimulation.com

Latest News on Autonomous Driving

Cruise operate a fleet of **200** vehicles with operators

Waymo started giving rides without operator

Pony.ai and **Baidu** kicked-off AD in Beijing (60 km2 ODD) and Guangzhou (100 robotaxis), without safety operators

Tesla seeing controversy over Autopilot (and sleeping drivers)

VW partners with **Argo AI** to launch L4 **ID Buzz** for both people and goods in Hamburg by 2025

Meanwhile OEMs:

- Focus on safety-focused Level 2/2+ systems
- Start L3 and valet parking solutions
- Want to generate revenue from subscriptions and **services**

⇒ Human is still In the Loop, transitions are key

Autonomous Trucks racing ahead

TuSimple, **Plus**, **Aurora** and **embark** claim they will launch AD truck services between 2023 and 2025

Sweden-based **Einride** now coming to the USA

Solo AVT electric L4 truck platform

Partnerships to reduce TTM:

- **Volvo Group** and **Navistar** (VW/Triton Group) to integrate sensors, hardware and x-by-wire (electronics)
- **Waymo** is collaborating with **Mercedes Benz Trucks**

Going electric:

- **Mercedes Benz Trucks**, **Volvo** Group and **BYD** full electric
- UK-based startup **Volta Trucks** promising, a 16-ton e-truck in 2023
- USA, **Nikola Motor** delivered heavy duty e-tractors in 2022
- **Tesla** to launch in 2023 or 2024.

⇒Tradeoff between Autonomous, EV and reach

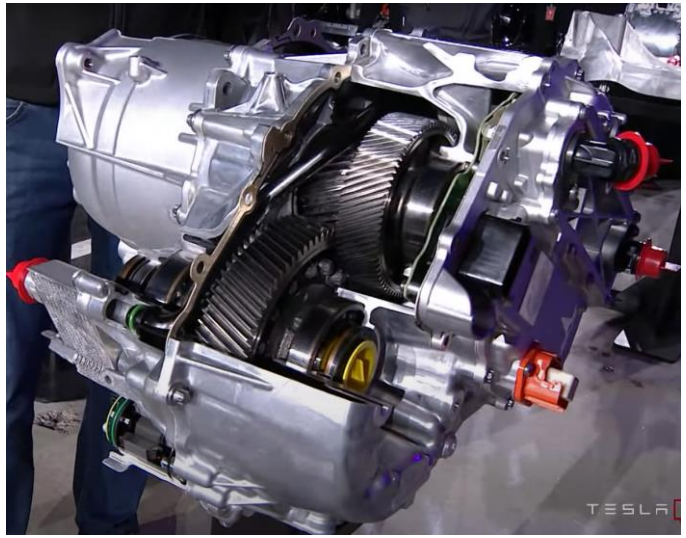
Last Mile Delivery going autonomous

- Demand for urban last-mile delivery is expected to grow by 78% by 2030
- Full electrification of LCVs required
- Autonomous can generate savings: 24*7 service, etc.
- **Rivian** has a deal to supply 100k e-vans to Amazon
- **Arrival** will provide UPS with 10k e-vans
- **GM** is making a comeback on the commercial vehicle market with Brightdrop

⇒ Autonomous a competitive advantage for LCVs

The Future is Electric but demands efficiency

- Demand Quickly Building Momentum
- Increasing Pressure on the Industry
- OEMs Plan to Go Full Electric
- Battery EV sales doubled in 2021 to reach about 4.5M units
- Race towards
  - Motors
  - Power Electronics
  - Aerodynamics
  - Other Efficiency-Enhancing Factors



⇒ Ongoing Optimisation

Maximizing Lifetime Customer Value with New Business Models

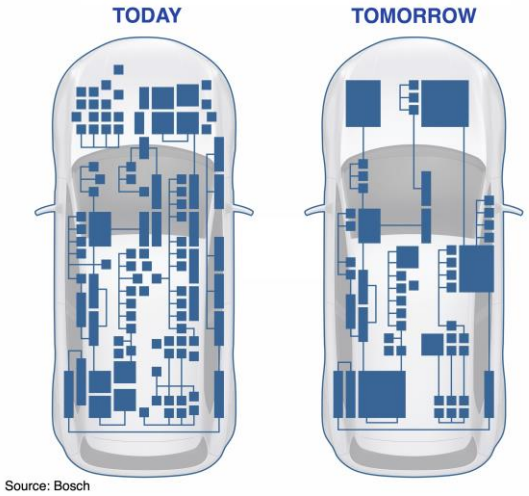
- OEMs Can Maximize Customer Lifetime Value with New Tech
- Android Automotive on the **Renault** Megane e-tech
- **Tesla** pushing OTA upgrades and options for $
- Increase Customer Lifetime Value
- An Ecosystem-Based Approach to “Usership”
- Vehicles are the UX and entry point to marketplaces
- Security will require huge investments

⇒ Simulate User experience to optimize shopping basket

Software-Defined Car and Digital Twins

Deep transformation of the electronic architecture:

- ECUs consolidation and virtualization
- Frequency and complexity of SW releases is increasing
- Renault turning digital twin into a competitive advantage:
  - ✓ Improve collaboration, reduced rework
  - ✓ DIL, VR & augmented reality
  - ✓ Optimized user experience throughout a vehicle's life,
  - ✓ Shorter development / deployment cycles and new revenue streams



Source: Bosch

Megane e-tech digital twin

⇒ Solution from System Architecture to Massive Simulation

Simulation and Virtual Tests are key

Driving Simulation means friving change towards succss:

- Reducing volumes of prototype
- Refining and robustifying specs
- First-time-right and TTM reduction

Driving Simulators:

Human factor more critical than ever:

- Driver monitoring
- Transitions
- AD learning
- AD, ADAS and new services validation
- Experiencing the digital twin
- Need to be integrated in the value chain and PLM

⇒ Strategic

AVSimulation builds the most advanced driving simulators

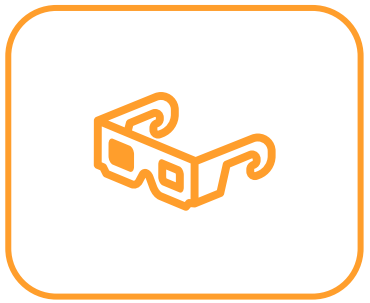
DSC 2022 EUROPE VR

- Multi-purpose, unmatched level of realism and immersion
- Widest range of use cases addressed with one simulator
- 9 Degrees of freedom motion with X/Y combined 1G accelerations
- 360° immersive projection experience
- Fully functional mock-up, exchangeable
- 7 m Ø carbon dome design
- Audio & video supervision
- CE certified
- Powered by SCANeR

Renault Group

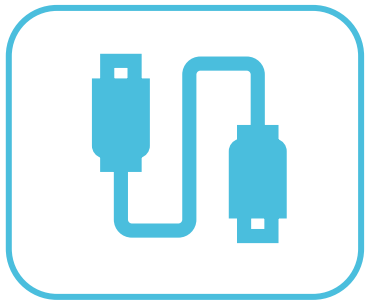
Designing and delivering ROADS

9 m/s – 1G
VELOCITY – ACCELERATION
Simultaneous



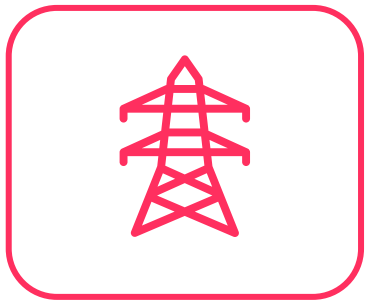
360° - 2D/3D headtracking
Projection system

+30
PARTNERS



12
KILOMETRES
Cables

92
TONS
Moving mass



2,5
MW

Paris
Detroit
Nagoya
Toronto

AVSIMULATION

DSC 2022 EUROPE VR

SOGECLAIR

GROUPE RENAULT

DASSAULT SYSTEMES

UTAC

2017

Creation of AVSimulation

+ 100 employees

13M€ in 2021

+ 150 customers

+ 100 simulators

SCANeR

Driving Simulators

Services Provider

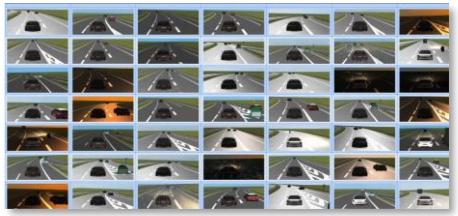
DSC 2022 EUROPE VR

avsimulation.com

AVSIMULATION

SCANeR Use Cases

Massive Simulation



Machine Learning

Headlights

Sensors

Virtual Reality - HPC

Virtual Testing - Driving Simulation

UTAC

Validation

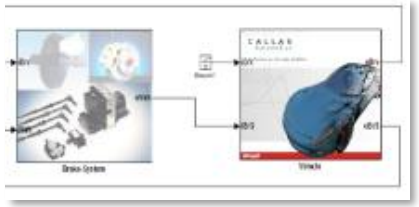
EURO NCAP

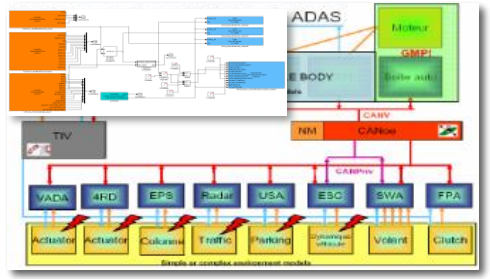
GUI & Infotainment

Driver

CAD

Vehicle dynamics





AD/ADAS

SCANeR Test Platforms

DSC 2022 EUROPE VR

Workstation

Cloud

HMD

HPC

Virtual Reality - HPC

VIL

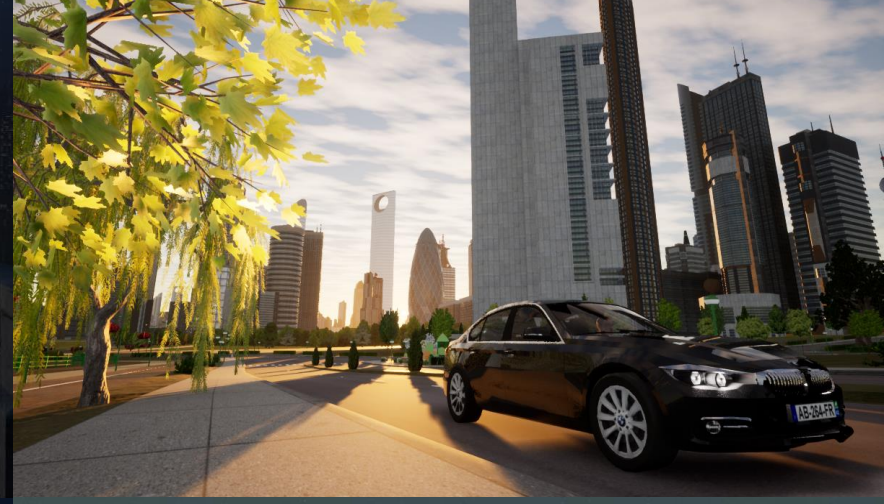
Cave

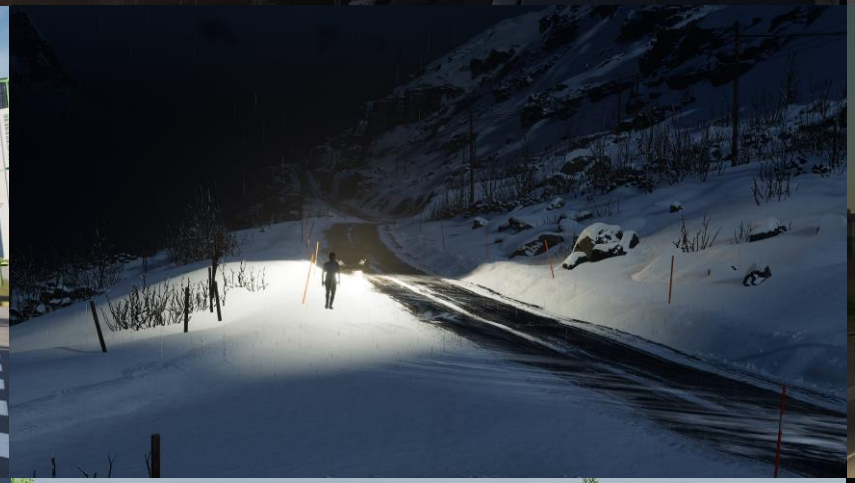
Virtual Testing - Driving Simulation

High Performance Simulator

HIL

Compact Driving Simulator

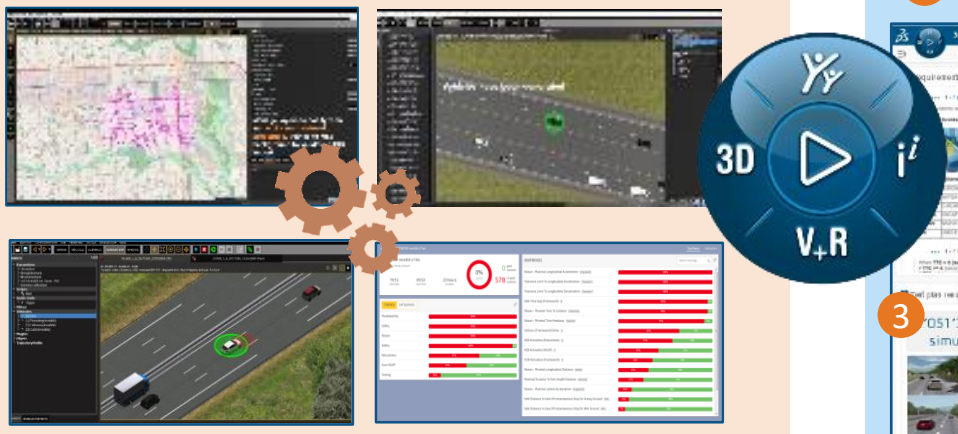




CATIA SCANeR
Systems Engineering enabling Virtual Twin Experience

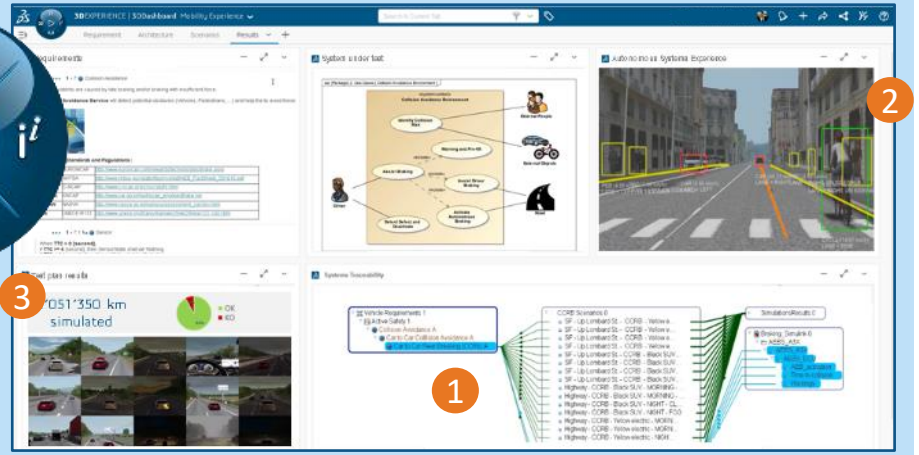
AS-IS: SCANeR standalone

Best in Class ADAS/AD Simulation solution, deployed with **ad-hoc integration** and **customization** at our clients



TO-BE: Mobility 3DEXPERIENCE Twin

1. Lifecycle, Configuration Management & Tracability
2. End to End Solution from System Architecture to Massive Simulation
3. Feedback loop from V+R test



Out of the Box Solutions

-80% Rework loops related to issues

-30% Development costs

-20% Time to market

+10% Additional Revenues from Software

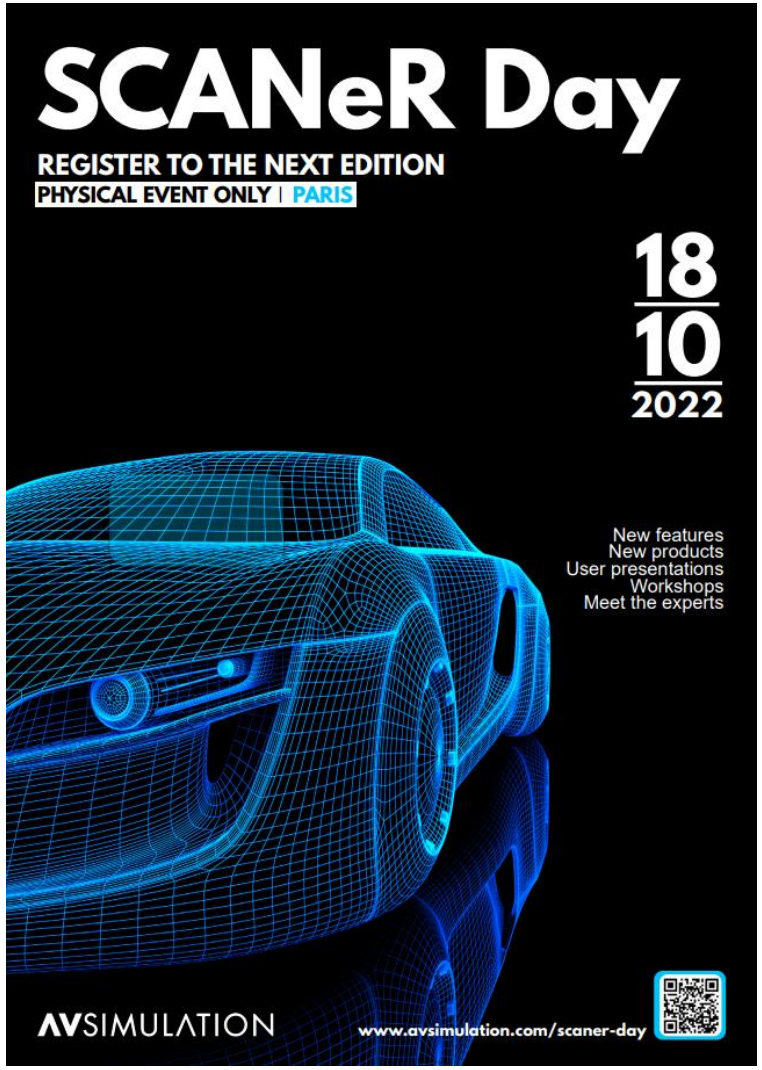
Don’t miss SCANeR Day on October 18

- AVSimulation will demo:
  - New terrain editor
  - Massive simulation on AWS cloud
  - And much more…

- October 17: visit of the UTAC homologation center, presentation of the correlation between simulation and track tests. This event will take place in the afternoon (1:00-6:30 pm).

- October 19: Visit (again) the biggest driving simulator in the world: ROADS at Renault. This event will take place over half a day.

- SCANeR Day - AVSimulation



Europe Office

1, Cours de l'Ile Seguin
92 100 Boulogne - Billancourt
+ 33 1 46 94 97 80

—

US Office

2791 Research Drive
Rochester Hills,
MI 48309
+1 248 564 2009

—

Japan Office

MAC Systems
Kusumoto 15Bld. 6F 1-7-2 Nishiki, Naka-ku
Nagoya-shi
460-0003
Japan
+81-52-223-2811

—

AVSIMULATION