GUIDEBOOK

DSC 2024 EUROPE VR

Driving Simulation & Virtual Reality Conference & Exhibition

Palais des Congrès et de la Musique, Strasbourg | France

Organized by

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Sponsored by

The Driving Simulation Conference gathers driving simulation specialists from the industrial and academic communities as well as commercial simulation providers. This 23rd edition follows that of 2023, held in Antibes, in a hybrid version with about 300+ participants. The exhibition is coming back towards 40 professional exhibitors and up to 400 on site participants. With about 80 speakers in scientific and industrial product solution sessions, keynotes, tutorials and round tables, you will get the latest trends in XIL (MIL, SIL, HIL, DIL, VIL, CIL) and XR simulation for ADAS, automotive HMI and driving simulation design, motion sickness and rendering, as well as connected and autonomous vehicle verification and validation.

Themes include state of the art in driving simulation technology, research and developments, extended with progressively emerging virtual and augmented reality (XR) developments. This year's program will also host a special session on virtual validation and certification tools for autonomous and connected vehicles along with advanced driving assistance system (ADAS) applications. Human factors and motion rendering nevertheless will stay as a now traditional axes of the conference.

You are welcome to the DSC 2024 Europe Conference organized by the Driving Simulation Association, in cooperation with Arts et Métiers Institute of Technology, Gustave Eiffel University, and Renault, held on September 18-20 in Strasbourg for the conference and exhibition!

The way for tomorrow's vehicle

Table of content

We are committed to bringing you the best opportunity to meet and network with many **customers, prospects and partners** in the field of driving simulation.

Authors, keynote speakers and delegates are attending this conference with the common aim of hearing about the latest developments in the field and will be keen to learn about your technology and services. This year's conference will ensure that the event has the buzz you need to generate interest in your products.

The DSC Organizing Team wishes to all participants and exhibitors a great time at the Driving Simulation Conference Exhibition 2024!

Palais des Congrès et de la Musique,
Strasbourg – France

WiFi : DSCEurope2024
Password : PDC092024

Organizing Committee

Andras Kemeny | *Conference chair*

President, Driving Simulation Association
Member of Board of Directors, ASAM

Florent Colombet | *Program Co-Chair*

Treasurer of Driving Simulation Association
Innovation Project Manager, Renault

Jean-Rémy Chardonnet | *Program Co-Chair*

Driving Simulation Association
Professor, Arts et Métiers

Maryam Jafari Raviz | *Conference Assistant*

Driving Simulation Association
Intern DSA

Shaunak Deodatta Shelke | *Conference Assistant*

Driving Simulation Association
Intern DSA

The scientific committee is composed of recognized academics, OEM, Tier 1 or Standardisation body experts involved in driving simulation research activities in their organisations. Being member of the Scientific Committee involves also a commitment to avoid using his or her committee role in any individual consultancy activity, which may influence his or her objectivity in reviewing or any other undertaken committee task.

Chairman

Andras Kemeny	Driving Simulation Association (France)

Scientific Committee Members

Mohammad Bahram	BMW Group R&T (Germany)
Gerd Baumann	FKFS (Germany)
Klaus Bengler	Technical University Munich (Germany)
Jost Bernasch	The Virtual Vehicle (Austria)
Jelte Bos	TNO (The Netherlands)
Heinrich H. Bülthoff	Max Planck Institute (Germany)
Frank Cardullo	State University of NY (United States)
Viola Cavallo	University of Gustave Eiffel (France)
Jean-Rémy Chardonnet	Arts et Métiers Institut of Technology (France)
Florent Colombet	Renault (France)
George Drettakis	INRIA (France)
Magnus Eek	VTI (Sweden)
Stéphane Espié	University of Gustave Eiffel (France)
Zhou Fang	Renault (France)
Martin Fischer	DLR (Germany)
Massimiliano Gobbi	Polytechnic University of Milan (Italy)
Siddartha Khastgir	University of Warwick (UK)
Joseph K. Kearney	University of Iowa (United States)
Franck Mars	CNRS (France)
Philippe Mathieu	University of Lille (France)
Frédéric Mérienne	Arts et Métiers (France)
James Oliver	Iowa State University (United States)
Jean-Christophe Popieul	Hauts-de-France Polytechnic University (France)
Paolo Pretto	Virtual Vehicle (Austria)
Richard Romano	University of Leeds (United Kingdom)
Joost Venrooij	BMW Group (Germany)

Technical Committee

The Technical committee is composed of recognized industrial experts or managers of OEM, Tier 1 or research institutes involved in the driving simulation industrial ecosystem. Being member of the Technical Committee involves also a commitment to avoid using his or her committee role in any individual consultancy activity, which may influence his or her objectivity in reviewing or any other undertaken committee task.

Chairwoman

Luz Amanda Garcia Galeano	EBUSCO (Netherlands)

Technical Committee Members

Omar Amhad	NADS (United States)
Florent Colombet	Renault (France)
David Defianas	Stellantis (France)
Benjamin Engel	ASAM (Germany)
Vincent Honnet	SystemX (France)
Andras Kemeny	Driving Simulation Association (France)
Martin Peller	BMW (Germany)
Stéphane Régnier	Renault (France)
Martin Sevenich	Continental (Germany)
Georg Stettinger	Infineon (Germany)

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Keynotes are historically inspiring talks given by eminent scientists in the field of driving simulation, completed now by important industrial executives.

Andras Kemeny, Conference Chair | *President, Driving Simulation Association, Member of the Board of Directors, ASAM*

"Self-driving technology, driving simulation and XR"

Pr. James Oliver | *Iowa State University, United States of America*

"XR Trends: Challenges and Opportunities in the Automotive Industry"

Thomas Nguyen That | *Head of Strategy & Products, AVSimulation, France*

Dennis Marcus | *Commercial Manager Automotive & Motorsport, Cruden, Netherlands*

Didier Wautier (Head of Autonomous Vehicle Simulation & Virtual reality department, Renault, France)

"From Digital vehicle to Virtual twin to Immersive virtual twin"

Marius Dupuis (Chief Executive Officer, ASAM e.V.)

"ASAM standards – from simulation to SDV"

1 pm — REGISTRATION

WELCOME DRINK

1:45 pm — CONFERENCE OPENING - *Cassin Auditorium*

"Self-driving technology, driving simulation and XR"

Pr. Andras Kemeny | Conference Chair
(President, Driving Simulation Association
Member of the Board of Directors, ASAM)

2 pm — SPECIAL SESSION - *Londres Room*
The role of AI in the ADS lifecycle
Chairman : Georg Stettinger

2 pm — "Trustworthiness Assessment for AI-driven ADS"

Speaker: Georg Stettinger (Infineon)

2:25 pm — "Role of virtual simulation tools for AI-based ADS design"

Speaker: Sergey Abrashov (Ansys)

2:50 pm — "AI Safety: Challenges and solution approaches"

Speaker: Daniel Schneider (Fraunhofer)

3:15 pm — "Towards Defining Safe Behaviour for Automated Vehicles – An MBSE-based Approach for Traceable Behaviour Specification"

Speaker: Marcus Nolte, Nayel Fabian Salem (TU Braunschweig)

3:40 pm — BREAK

4:10 pm — SPECIAL SESSION - *Londres Room*

French ecosystem activities for AD deployment

Chairman: Emmanuel Arnoux

Introduction: Scope of the system studied: From vehicle to technical system / from ADAS to ADS/ARTS

Speaker: Emmanuel Arnoux (Renault)

4:15 pm — Presentation of French ecosystem transversal activities

Speaker: Jean-François Sencerin (PFA)

4:35 pm — EU and UN regulations

Speaker: Fabrice Herveleu (UTAC)

4:45 pm — *DISCUSSIONS*

4:55 pm — Safety Demonstration Framework : SAM Project proposal

Speaker: Christophe Bohn (SystemX)

5:15 pm — Scenarios methodology from MOSAR to ADScene and beyond

Speaker: Erwan Revert + Mohamed Tlig (SystemX)

5:35 pm — *DISCUSSIONS*

5:45 pm — Conclusion: Sensors, numerical/physical correlation and AI design

Speaker: Emmanuel Arbaretier (Airbus Protect)

6:00 pm — SESSION CLOSURE

Thursday, September 7th 2023

8 am — REGISTRATION

WELCOME DRINK

9 am — KEYNOTE - *Cassin Auditorium*

"XR Trends: Challenges and Opportunities in the Automotive Industry"
Pr. James Oliver | *Iowa State University, United States of America*

9:30 am

SCIENTIFIC PAPER SESSION **Virtual Reality**	SCIENTIFIC PAPER SESSION **Simulation Design**
Chairman: Jean-Rémy Chardonnet	*Chairman: Martin Peller*
Cassin Auditorium	*Londres Room*
9:30 am A Comparison of Human Machine Interaction in Mixed Reality and CAVE Driving Simulators *Tekcan, Cagdas (Volkswagen AG); Kroys, Alexander (Volkswagen AG); Kovacevic, Nedim (Technische Universität Berlin); Schulte, Svenja Nicole (Technische Universität Berlin); Stark, Rainer (Technische Universität Berlin); Ortmeier, Frank (Otto von Guericke University Magdeburg)*	A Design Methodology for Compositional Simulation: The Digital-Twin Interconnect Framework *Abdelsalam, Mohamed (Siemens, ICS) ; Forrai, Alexandru (Siemens, STS)*
9:55 am Validation of Hardware for looking around in a VR based Driving Simulation (VALHaLa) (Short) *Temme, Gerald (German Aerospace Center); Bergen, Melina; Nicolay, Eric; Gröne, Kilian; Rehm, Michaela; Fischer, Martin*	ProCue: State-of-the-Art Motion Cueing For All Simulators (Short) *BROWN, Craig (BrownSim Ltd)*

EXHIBITION

10:15 am

Development of a Playful VR Training Sequence for a Treadmill-based Pedestrian Simulator

Temme, Gerald (DLR); Fischer, Martin; Melina, Bergen; Gröne, Kilian; Rehm, Michaela; Wegener, Jan

Revolutionizing Driving Simulation: Introducing the Driver-in-Motion Full Spectrum (DiM FSS) Simulator

Minen, Diego (VI-grade); Allman-Ward, Mark; Bogema, David

10:40 am

Measurement of tracking setup accuracy for virtual reality driving platforms calibration's

VISBECQ, Nicolas (AB Volvo); DROUET, Thomas (Renault Group); SALIOU, Tristan (AB Volvo)

Highly Flexible Mixed Reality Driving Simulation Environment for HMI Development

- *Gommel, Henrik (GOTECH Fahrzeugentwicklungs- und Konstruktionsgesellschaft mbH); Beck, Matthias; Gommel, Philip*

11:05 am — BREAK

11:20 am — *POSTER PRESENTATION*
Rhin Hall

12:30 am — LUNCH

2:00 pm — INDUSTRIAL KEYNOTE SESSION - *Cassin Auditorium*
Chairman : Andras KEMENY

Thomas Nguyen That | *Thomas Nguyen That (Head of Strategy & Products, AVSimulation, France)*

Dennis Marcus (Commercial Manager Automotive & Motorsport, Cruden, Netherlands)

EXHIBITION

EXHIBITION

"From Digital vehicle to Virtual twin to Immersive virtual twin"

Didier Wautier | *(Head of Autonomous Vehicle Simulation & Virtual reality department, Renault, France)*

3:00 Pm

INDUSTRIAL PITCHES

Chairman: Florent Colombet

Cassin Auditorium

Pertech Solutions
Luc Doerenbecher (CEO & Sales Director, Pertech Solutions, France)

IPG Automotive
Thomas Karasiewicz (Application Engineer, IPG Automotive, France)

ASCS e.V: ENVITED academy – Simulation of Automated Vehicles
Alexander F. Walser (Managing Director, ASCS e.V, Germany)

Neural Balance Innovation: "Galvanic Stimulation and Performance Enhancement in Simulation"

Dr. Stéphane Besnard (Associate Professor at University of Caen Normandy)

VI-grade: "Human-Centric Development of Software-Defined Vehicles: The 'Zero Prototypes' Approach"
Michael Hoffmann (Zero Prototype Evangelist, VI-grade, Italy)

Traxara Robotics: Introducing TDrive – Redefining Motion and Haptics for Driving Simulation
Dr. Arnold Free (Chief Executive Officer, Traxara Robotics, Canada) & Dr. Kamran Ghaffari (CTO, Traxara Robotics, Canada)

EXHIBITION

EXHIBITION

rFpro: "Transforming the realism and usability of driving simulation"
Sharan Ramachandran (Business Development Manager, rFpro, United Kingdom)

Dynisma: Infinite yaw, Infinite possibilities: Continuous Disruption in Driving Simulation
Will Snyder (Commercial Manager, Dynisma, United Kingdom)

Ansible Motion: The New Virtual Proving Ground: End-to-End Solutions
Salman Safdar (Sales Director, Ansible Motion, United Kingdom)

SCALE-1 Portal: "A Practical Approach to Mixed Reality in the Automotive Industry"
Emmanuel Icart (President & Business Developer, SCALE-1 Portal, France)

Mecnica ATD Europe: Enhancing Automotive Experiences through Real-Time Emotion Monitoring
Josselin Vilpoux (InnerEye Product Line Manager at Macnica ATD Europe)

Van Halteren Technologies: "Advantages of a High-Performance Hexapod for Driving Simulators with Offboard Visuals"
Rik de Swart (Sales Manager Motion Simulation Technology, Van Halteren Technologies, Netherlands)

EXHIBITION

4:00 pm — BREAK

4:25 pm

SCIENTIFIC PAPER SESSION
Perception and Human Factors
Chairwoman: Viola Cavallo
Cassin Auditorium

Functional near-infrared spectroscopy (fNIRS) and Eye tracking for Cognitive Load classification in a Driving Simulator Using Deep Learning
Khan, Mehshan Ahmed (Institute for Intelligent Systems Research and

PRODUCT SOLUTION SESSION
Simulation Design & ADAS
Chairman: Omar Ahmad
Londres Room

TRM: an advanced driver model for driving simulation
Bleher, Thomas (BMW Group); Brauer, Jens; Rock, Teresa

EXHIBITION

Innovation Deakin University Geelong); Asadi, Houshyar (Institute for Intelligent Systems Research and Innovation Deakin University Geelong); Qazani, Mohammad Reza Chalak (Faculty of Computing and Information Technology (FoCIT) Sohar University); Lim, Chee Peng (Institute for Intelligent Systems Research and Innovation Deakin University Geelong); Nahavandi, Saied (Swinburne University of Technonology)

4:50 pm

Vehicle-and-driver stability analysis by a simple model and by a dynamic driving simulator

Della Rossa, Fabio (Politecnico di Milano); GOBBI, Massimiliano; Mastinu, Giampiero; Milivinti, Massimiliano; Previati, Giorgio

From HD Maps to OpenDRIVE to 3D simulation environment: automatizing the content creation for ADAS/AD simulations

Luca Gasbarro (AnteMotion); Matteo Ragni; Mattia Buff

5:15 pm

Integrating Data Sources into the Process of Human Driver Performance Model Development (Short)

Beckmann, Jobst Nikolaus Bertram (Institute for Automative Engineering (ika) RWTH Aachen University); Russ, Fabian; Legran, Philipp; Eckstein, Lutz

Proximity perception in virtual reality to position in a simulated cockpit

Javier Victor POSSELT (RENAULT S.A.S.), Jean-Remy CHARDONNET(ENSAM)

5:35 pm

Correlations of seat pressure distribution and perception of (dis)comfort in autonomous driving to parametrize digital human models

REINHARD, René (Fraunhofer Institute for Industrial Mathematics ITWM); HARANT, Monika (Fraunhofer Institute for Industrial Mathematics ITWM); EMMERICH, Sebastian (Fraunhofer Institute for Industrial Mathematics ITWM); OBENTHEUER, Marius (Fraunhofer Institute for Industrial Mathematics ITWM); FAHSE, Niklas (Institute of Engineering and Computational Mechanics ITM, University of Stuttgart); FEHR,

Test and validation of perception-based ADAS: modern solutions to traditional challenges

Raul Sena Ferreira (Continental Engineering Services); Sara Messara (Continental Engineering Services)

EXHIBITION

Jörg (Institute of Engineering and Computational Mechanics ITM, University of Stuttgart); KLEER, Michael (htw saar); LINN, Joachim (Fraunhofer Institute for Industrial Mathematics ITW

6:00 pm — SESSION CLOSURE

8:00 pm — COCKTAIL DINNER PARTY

Friday, September 20th 2024

8 am — REGISTRATION - *2nd floor*

9 am — KEYNOTE - *Cassin Auditorium*

"ASAM standards – from simulation to SDV"
Marius Dupuis | *(Chief Executive Officer, ASAM e.V.)*

	SCIENTIFIC PAPER SESSION **Simulator Sickness** *Chairman: Jim Oliver* *Londres Room*	PRODUCT SOLUTION SESSION **ADAS** *Chairman: Stéphane Espié* *Cassin Auditorium*
9:30 am	Simulator sickness does not differ between drivers with monocular and binocular vision *KESHAVARZ, Behrang (University Health Network,Toronto Metropolitan University); DE LUCA, Nadia (University Health Network,Toronto Metropolitan University); CAMPOS, Jennifer (University Health Network,University of Toronto); MORO, Stefania (York University); PECK, Katlyn (University Health Network); STEEVES, Jennifer (York University); HAYCOCK, Bruce (University Health Network,University of Toronto)*	Assessment of a hydroplaning ADAS through a dynamic driving simulator *Montini, Edoardo (Politecnico di Milano); Salierno, Marco; Frigerio, Stefano; Melzi, Stefano*
9:55 am	Advancing ISO 2631-1 by considering pre-emesis symptoms in carsickness *BOS, Jelte E. (TNO); NOOIJ, Suzanne (TNO); SOUMAN, Jan L. (TNO); DIELS, Cyriel (Royal College of Art)*	LIDAR Simulation of weather conditions perturbation for an automotive LiDAR sensor *Noutatiem Guiafaing, Youri Mikhail (IRT SYSTEMX); Prabakaran, Sylvestre (AVSimulation); Kone, Tchoya-Florence (VALEO); Ridzuan, Ammar (AVSimulation); Attou, Otmane (VALEO)*
10:20 am	Towards a common understanding of Simulator Sickness (Short)	Fault Detection and Recovery for Automotive Perception Sensors Based on AI and with Regard to Driver Comfort

EXHIBITION

EXHIBITION

	Talsma, Tessa M. W. (Delft University of Technology); De Winkel, Ksander N.; Happee, Riender	*Scheffmann, Marco (FKFS); Salah, Alia; Reuss, Hans-Christian*
10:45 am	BREAK	
11:00 am	SCIENTIFIC PAPER SESSION **Motion Cueing Algorithm** *Chairman: Joost Venrooij* *Cassin Auditorium*	PRODUCT SOLUTION SESSION **ADAS** *Chairwoman: Luz Amanda Garcia Galeano* *Londres Room*
11:00 am	Downsampling for Efficient Tuning of Nonlinear Model Predictive Control Motion Cueing Algorithm *GONZALEZ, Camilo (Deakin University); KOOIJMAN, Lars (Deakin University,Monash University); LIM, Chee Peng (Deakin University); ASADI, Houshyar (Deakin University)*	Spider: advanced driving simulation software at BMW *Bleher, Thomas (BMW Group); Bahram, Mohammad (BMW Group); Plass, Michael (Philosys); Wagner, Sebastian (BMW Group)*
11:25 am	Sequential Motion Cueing Algorithms: Using the Best Algorithm in each Situation *Jacumet, Robert (BMW,Technical University of Munich); Wagner, Sebastian (BMW); Schwienbacher, Markus (BMW); Wollherr, Dirk (Technical University of Munich); Leibold, Marion (Technical University of Munich)*	Holistic Testing of Connected Automated Vehicles *Rolle, Mike(dSPACE); Peperhowe, Michael; Sievers, Gregor*
11:50 am	Motion Cueing in BMW's Driving Simulation Center: Our Experiences Versus Common Knowledge *Kolff, Maurice (BMW,Delft University of Technology); Jacumet, Robert (BMW,Technical University Munich);*	A Scalable Unreal Engine Based Testing Platform for the ASAM OpenX Standards and Safety PoolTM Scenarios *Mitchell, Joseph (University of Warwick); Baker, Peter;*

EXHIBITION

EXHIBITION

11:50 am	*Venrooij, Joost (BMW); Wagner, Sebastian (BMW); Schwienbacher, Markus (BMW); Peller, Martin (BMW); Pool, Daan M. (Delft University of Technology); Mulder, Max (Delft University of Technology)*	*Chodowiec, Emil; Zhang, Xizhe; Khastgir, Siddartha; Jennings, Paul*
12:15 pm	Assessment of vehicle dynamics using high-performance driving simulator *FANG, Zhou (Renault); NIDIOT, Jean-Michel; COLLINET, Jean-Christophe; THEILLIER, Dominique; COLOMBET, Florent; WAUTIER, Didier; REGNIER, Stephane*	Automatic generation of simulation scenarios from ADScene scenario descriptions *Mohellebi, Hakim (Renault); Regnier, Stephane (Renault); Vaillant, Eric (Renault); Arnoux, Emmanuel (Renault); Moirot, Franck (Stellantis); Theel, Florian (Stellantis)*
12:40 pm	Workspace Envelope Manipulation for Stewart Platform Simulators with Redundant Degrees of Freedom (Short) *Legran, Philipp (ika, RWTH Aachen University); Russ, Fabian; Beckmann, Jobst; Eckstein, Lutz*	Virtual environment modeling for accurate Radar sensor simulation (Short) *PALMIER, Vanessa (IRT systemX); PRABAKARAN, Sylvestre (AVSimulation); CHAVES, Caio (AVSimulation); SERVEL, Alain (IRT systemX); RIDZUAN, Ammar (AVSimulation); FAUCHER, Florian (OKTAL-SE); MOUSAIN, Johann(Renault Group)*
1:00 pm	LUNCH	
2:30 pm	SCIENTIFIC PAPER SESSION **Validation of Driving Simulation** *Chairman: Martin Fischer* *Cassin Auditorium*	SCIENTIFIC PAPER SESSION **Simulation Design** *Chairman: Zhou Fang* *Londres Room*
	Developing a Methodology to Assess Data Completeness of Driving Scenarios for Testing Autonomous Vehicles: A Focus on ODD-Specific Objectives	First steps in system identification of the Dresden Driving Simulator (DDS) from a (N)V(H)-perspective – current progress

EXHIBITION

EXHIBITION

2:30 pm

Hadj Selem, Fouad (Vedecom); Ben Nejma, Ghada (Vedecom); Kheriji, Walid (Vedecom); Durville, Laurent (Vedecom); Mohamed Cherif, Rahal (Vedecom); Geronimi, Stephane (Stellantis); Arnoux, Emmanuel (Renault)

Roßmeier, Willy; Stanglmayr (Technische Universität Dresden), Maximilian; Plaettner, Stefan; Prokop, Günther

2:55 pm

Optimization of the Steering Feel with Neural Networks for Force Feedback Systems

Dieing, Andreas (FKFS); Baumann, Gerd (FKFS); Knecht, Kevin (FKFS); Kehrer, Martin (FKFS); Reuss, Hans-Christian (Institute of Automotive Engineering Stuttgart (IFS))

A multiphysical tire-centered procedure for vehicle digitalization in outdoor virtualized scenarios

Farroni, Flavio (University of Naples Federico II); Minen, Diego (VI Grade S.r.l.); Fichera, Gabriele (University of Catania); Schilirò, Roberta (BE CAE & Test S.r.l.); Napolitano Dell'Annunziata, Guido (University of Naples Federico II); Sammartino, Andrea (Megaride S.r.l.); Montenegro, Massimo (ALMA-tech S.r.l.s.)

3:20 pm

A protocol to evaluate and compare traffic light systems (Short)

BOMPARD, Jules (Université de Lille); MATHIEU, Philippe; NONGAILLARD, Antoine

Variant-aware Reconfiguration of Automotive Virtual Test Environments (Short)

Seidel, Luca (KIT); Guissouma, Houssem (KIT); Schmid, Andreas (Vector Informatik GmbH); Sax, Eric (KIT

3:35 pm

Practical Considerations Towards a Common Understanding of Driving Simulator Validity

HIMMELS, Chantal (BMW AG, Technische Hochschule Ingolstadt, Johannes Kepler University Linz); FISCHER, Martin (German Aerospace Center); PARDUZI, Arben (BMW AG); RIENER, Andreas (Technische Hochschule Ingolstadt)

Procedural improvement of models and textures of 3D urban scenery: A case study

Garcia de Pedro, Jorge (University of Leeds); Horrobin, Anthony John; Solernou, Albert

EXHIBITION

4:00 pm	CLOSING *Cassin Auditorium*
	DSC 2024 Europe VR Organization Committee
4:20 pm	*END of DSC 2024 Europe VR*

SCIENTIFIC POSTERS

Driver-in-the-loop shared control in automated driving: A simulator study

Mohamed Radjeb OUDAINIA (Hauts-de-France Polytechnic University, INSA Hauts-de-France); Chouki SENTOUH (Hauts-de-France Polytechnic University, INSA Hauts-de-France); Tran AnhTu NGUYEN (Hauts-de-France Polytechnic University, INSA Hauts-de-France); Jérôme FLORIS1, Philippe SIMON(Hauts-de-France Polytechnic University, LAMIH); Jean-Christophe POPIEUL(Hauts-de-France Polytechnic University, INSA Hauts-de-France)

Concept of Machine Learning Based Scene Classification with Real and Simulated Radar Data

LANG, Lukas (Universtity of Stuttgart); REUSS, Hans-Christian

Performance and Frequency Analysis to Identify Dynamic Limits of a Driving Simulator

RUSS, Fabian (ika, RWTH Aachen University); Legran, Philipp; Beckmann, Jobst; Eckstein, Lutz

Study on behavioural validity of a Mixed-Reality Driving Simulator for Interior Design Evaluation

FISCHER, Lutz (University of Stuttgart); Gritzbach, Julia (University of Stuttgart); Holzapfel, Christian (FKFS Forschungsinstitut für Kraftfahrwesen und Fahrzeugmotoren Stuttgart); Rommel, Pascal (University of Stuttgart); Baumann, Gerd (FKFS Forschungsinstitut für Kraftfahrwesen und Fahrzeugmotoren Stuttgart); Holder, Daniel (University of Stuttgart); Maier, Thomas (University of Stuttgart)

Bicycle Simulator Use: Risk Index Evaluation

Ayad, Lama (Université Gustave Eiffel); Imine, Hocine (Université Gustave Eiffel); De Crescenzio, Francesca (University of Bologna); Gohil, Paras (University of Bologna); Lantieri, Claudio (University of Bologna)

Enhancing Driver-Vehicle Interaction in Forward Collision Warning Systems: A Comprehensive Evaluation of Multimodal Alerts in a Longitudinal Dynamic Driving Simulator

Kaskaya, Safa Muhammet (Technical University of Darmstadt); Kraft, Edward; Rinderknecht, Stephan

The influence of environmental complexity on the validity of simulation experiments

Schramm, Benedikt (BMW AG, University of Applied Sciences Ingolstadt); Himmels, Chantal (BMW AG, University of Applied Sciences Ingolstadt, Johannes Kepler University Linz); Cao, Hubert (BMW AG);

Interaction between L4 AVs and human drivers in a take-over scenario

Linda Boscaro (Università Vita-Salute San Raffaele Milan), Veronica De Guglielmo (Politecnico di Milano), Andrea Fossati (Università Vita-Salute San Raffaele Milan), Andrea Galbiati (Università Vita-Salute San Raffaele Milan), Massimiliano Gobbi (Politecnico di Milano), Giampiero Mastinu (Politecnico di Milano), Giorgio Previati (Politecnico di Milano), Edoardo Sabbioni (Politecnico di Milano), Maria Gabriella Signorini (Politecnico di Milano), Antonella Somma (Università Vita-Salute San Raffaele Milan), Luca Subitoni (Politecnico di Milano), Lorenzo Uccello (Politecnico di Milano)

Gray Wolf Optimization Algorithm for Fuzzy Logic Driver Behavior Model

Daniel CISNEROS LOMBERA (Université Polytechnique Hauts-de-France, Institute of Research and Technology SystemX), Hossam GLIDA (Université Polytechnique Hauts-de-France, INSA Hauts-de-France), Chouki SENTOUH (Université Polytechnique Hauts-de-France, INSA Hauts-de-France), Boussaad SOUALMI (Institute of Research and Technology SystemX), Jean-Christophe POPIEUL (Université Polytechnique Hauts-de-France, INSA Hauts-de-France)

Simulating the interior of a shuttle bus by integrating the Human-in-Loop approach with Mixed Reality

Subramanian, Thirumanikandan (University of Stuttgart); Remlinger, Wolfram

Multimodal characterization of mental fatigue onset on professional drivers in simulated conditions

Di Flumeri, Gianluca (Sapienza University of Rome, BrainSigns srl); Giorgi, Andrea (Sapienza University of Rome, BrainSigns srl); Ronc,Vincenzo (BrainSigns srl, Sapienza University of Rome); Vozzi, Alessia (Sapienza University of Rome, BrainSigns srl); Arico, Pietro (BrainSigns srl, Sapienza University of Rome); Borghini, Gianluca (Sapienza University of Rome, BrainSigns srl);Sportiello, Simone (Roma Tre University); Petrelli, Marco (Roma Tre University); Polidori Carlo (Italian Association of Road Safety Professionals (AIPSS)); Varga, Rodrigo (Instituto Tecnologico de Castilla y Leon); Van Gasteren, Marteyn (Instituto Tecnologico de Castilla y Leon); Barua, Arnab (Mälardalens University); Uddin Ahmed, Mobyen (Mälardalens University); Babiloni, Fabio (Sapienza University of Rome, BrainSigns srl,

Hangzhou Dianzi University)

PRODUCT SOLUTION POSTERS

BAY Zoltan's Driving simulation and digital twin approach, creating simulation environments

Zsombor Zsiros (Bay Zoltán), Peter Ungar, Csaba Nemeth, Zoltan Miklos2, Mark Lelkes, Szabolcs Szavai

Reduced Cross-Axis Distortion Motion Cueing

Brown, Craig (BrownSim Ltd)

Simulation Architecture for Real-time Driver-Pedestrian Co-Simulation using Motion Capture

ARAMRATTANA, Maytheewat (The Swedish National Road and Transport Research Institute (VTI)); Ochel, Lennart

Steering Feel Tool Development for Virtual Calibration in Driving Simulator

Sole Avila, Ricard (Toyota Motor Europe); Rios Lazcano, Andrea M.(Toyota Motor Europe); van der Sande, Tom (Eindhoven University of Technology); van Overloop, Peter (Toyota Motor Europe)

A Virtual Test Bench for the Development of Highly Automated Driving Functions

BACHOREK, Adam (Fraunhofer IESE); LUEKEN-WINKELS, Benedikt (Fraunhofer IESE); SCHWENK, Stefan (Fraunhofer IESE); MEILER, Martin(CADFEM Germany GmbH); MIRONOV, Irina (CADFEM Germany GmbH)

Characterizing vehicle platooning feasibility using a realistic driving simulator

HALIM, Carol (BeamNG GmbH, German University in Cairo); GHANTOUS, Milad (German University in Cairo); SOUBRA, Hassan (École Centrale d'électronique); PAPAMICHAIL, Chrysanthi (BeamNG GmbH)

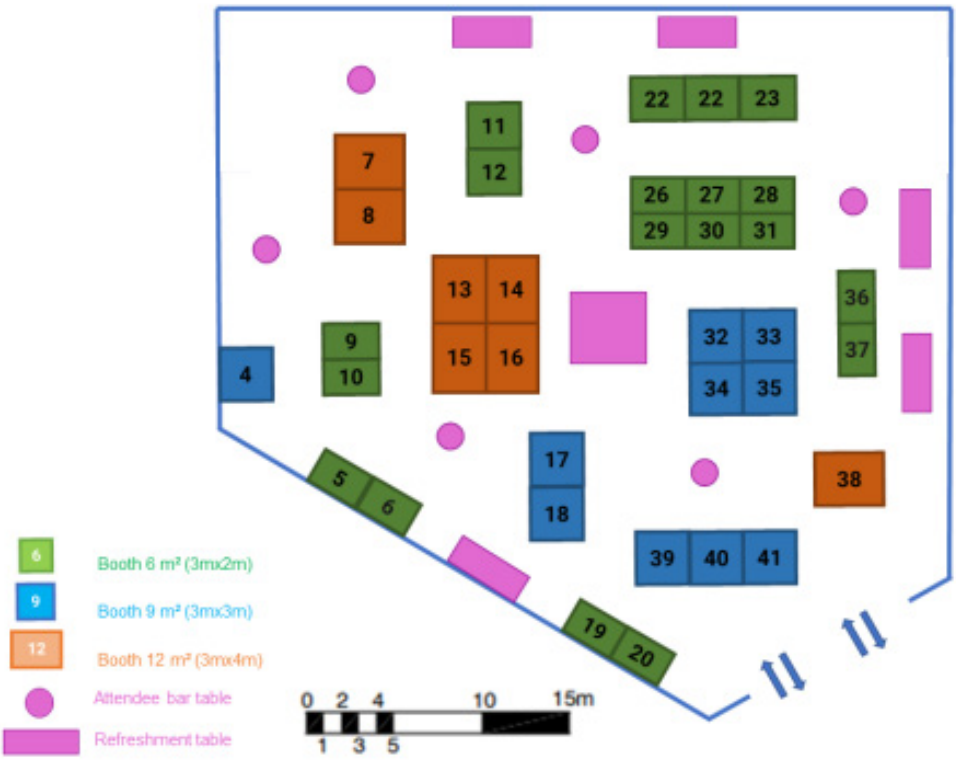
Camera sensor characterization with a simulation testing bench

Youri Mikhail, NOUTATIEM GUIAFAING (IRT SYSTEMX); Sylvestre, PRABAKARAN (AVSimulation); Ammar, RIDZUAN (AVSimulation); Johann, MOUSAIN (RENAULT); Jerome , LORENZI (RENAULT)

An Enhanced Steering Simulation Based on Haptic Feedback from Mixed Hardware-in-the-Loop Steering Bench and Multi-contact Tire Model

Torres, Goncalo (Università degli Studi di Napoli Federico II); Veneroso, Luca (Meccanica42); Annicchiarico, Claudio (Meccanica42); Capitani, Renzo (Meccanica42); Angelillo, Lucio (Megaride S.r.l.); Farroni, Flavio (Università degli Studi di Napoli Federico II)

Floor Plan



Organized by DSA *With the cooperation of* Université Gustave Eiffel

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Arts et Métiers Sciences et Technologies

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cruden

Cruden is the world's leading designer, manufacturer and integrator of professional open architecture driving simulators for the automotive, motorsport and marine industries. We supply flexible, durable, high performing real-time simulators and their modular components: hardware, software, vehicle models, content and screens and projectors.

Our driver-in-the-loop (DIL) simulators and Panthera Software Suite are designed to slot into customers' existing tool chains so their engineers can be up and running quickly with a future-proof system that does not tie them to any one supplier. Having recognized the potential of engineering simulators to save time and money through DIL testing since the 1990s, we have installed over 100 driving simulators globally and gained a firm reputation as a trustworthy simulator expert.

www.cruden.com

AVSIMULATION

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AVSimulation is a leading provider of advanced simulation solutions for the automotive industry and academia.

Our flagship software, SCANeR™, enables automotive manufacturers and researchers to develop, test, and validate mobility systems within highly realistic virtual environments. From ADAS to autonomous vehicles, SCANeR offers diverse scenarios for assessing safety, performance, and functionality. With a range of simulators and custom solutions available, AVSimulation accelerates the development and deployment of all mobility systems, driving towards safer and more efficient transportation solutions.

www.avsimulation.fr

dSPACE

Gold Sponsor

dSPACE est l'un des principaux fournisseurs mondiaux de solutions de simulation et de validation pour le développement de véhicules électriques autonomes et connectés. La gamme de solutions de bout en bout de l'entreprise est utilisée en particulier par les constructeurs automobiles et leurs sous-traitants pour tester les composants logiciels et matériels bien avant que les nouveaux modèles ne soient autorisés à prendre la route. dSPACE n'est pas seulement un partenaire recherché pour le développement de véhicules, il l'est aussi pour son savoir-faire sur lequel s'appuient les ingénieurs des secteurs de l'aéronautique et de l'automatisation industrielle. Notre portefeuille s'étend de la fourniture de solutions complètes de simulation et de validation aux services d'ingénierie et de conseil ainsi qu'aux activités d'apprentissage et de support. Avec plus de 2 500 employés dans le monde entier, dSPACE a implanté son siège social à Paderborn en Allemagne, dispose de trois centres de projets en Allemagne et accompagne de près ses clients grâce aux sociétés dSPACE locales implantées aux États-Unis, au Royaume-Uni, en France, au Japon, en Chine, en Croatie, en Corée, en Inde et en Suède.

www.dspace.com

Silver Sponsor

ASAM e.V. (Association for Standardization of Automation and Measuring Systems) is a non-profit organization that promotes standardization of tool chains in automotive development and testing. Our members are international car manufacturers, suppliers, tool vendors, engineering service providers, and research institutes.
ASAM's vision is to accelerate engineering for mobility: We believe that mastering the increasing complexity and disruptive challenges in the automotive industry requires a stronger cooperation and collaboration between all stakeholders, OEMs, tool vendors, service providers and research institutes. To ensure that all parties have the same understanding and speak the same 'language', ASAM provides a platform to agree on standards, to exchange information, and to allow collaboration within a legal and anti-trust compliant setting.
In addition, ASAM provides support in connecting members, coordinating work groups, and developing, releasing, and maintaining standards. Our active community includes more than 400 member organizations around the world. These members ensure that ideas with market relevance will progress into standards and that these standards are used worldwide.
The standards developed at ASAM span a wide range of use cases in automotive development, test, and validation. They define file formats, data models, protocols, and interfaces. All ASAM standards aim to enable easy exchange of data and tools within and across tool chains. They are applied worldwide.
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www.asam.net

Silver Sponsor

FKFS
RESEARCH IN MOTION.

www.renaultgroup.com

Silver Sponsor

SystemX is a Research and Technology Organisation (RTO - Institut de Recherche Technologique - IRT), dedicated to the digital engineering of systems, and expert in the analysis, modelling, simulation and decision support for complex systems. SystemX coordinates partnership-based research projects, bringing together academics and industrials in a multidisciplinary and cross-cutting perspective. Together, they strive to lift key scientific and technological barriers to the benefit of 4 priority fields of application: Mobility and Autonomous Transport, Industry of the Future, Defence and Security, Environment and Sustainable Development. Within the framework of use-case oriented projects, SystemX researcher engineers answer the great challenges of our time, both for society and technology, thus contributing to accelerate the digital transformation of industries, services and territories.

www.irt-systemx.fr

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www.renaultgroup.com

Arts et Métiers Sciences et Technologies

Arts et Métiers Institute of Technology is a French « Grande Ecole d'Ingénieur » founded in 1780 specializing in mechanical, industrial and energy engineering. The Laboratory of Engineering in Cyberphysical Systems (LISPEN) has an education and research team specialized in XR for 25 years with extensive work on individualized interaction in immersive environments, cybersickness reduction and perception issues. The team has large immersive facilities including a 5-sided CAVE, head-mounted displays, multi-sensory interaction devices, physiological and behavioral measurement devices. LISPEN has also an activity in driving simulation, with facilities including dynamic and static simulators, coupled with immersive technologies, and addressing scientific issues related to HMI, simulator sickness, perception and motion cueing.

artsetmetiers.fr

SIA SOCIÉTÉ DES INGÉNIEURS DE L'AUTOMOBILE

Since 1927, the "Société des Ingénieurs de l'Automobile" (Automotive Engineers Society) brings together all the specialists and enthusiasts of the automotive industry and its technologies. It has more than 1,800 individual or group and relies on a database of more than 18,000 car experts and our aim is to promote the development and knowledge sharing of engineers, managers and technicians in the automotive field.
SIA is built on its diverse communities of experts covering all areas of new technologies in product engineering as well as quality, purchasing and production from the automotive and

reflects on the vast stakes of the second automotive revolution, with the 21st century in the spotlight: autonomous vehicle, hyper connected vehicle, revolution towards affordable zero emission and electrification, Big Data and cybersecurity or the emergence of artificial intelligence.
SIA is renowned in the world of automotive engineering for its conferences, workshops and congresses of international level through more than thirty annual scientific meetings.
SIA participates actively in the French automotive industry in connection with the main professional organizations and on an international level as a member of the FISITA.

www.sia.fr

Université Gustave Eiffel

The Gustave EIFFEL University was born out of the merger of Université Paris-Est Marne-la-Vallée and IFSTTAR, the Institute for European Research on Cities and Regions, Transport and Civil Engineering. It includes a school of architecture, EAV&T, and three engineering schools, EIVP, ENSG Géomatique and ESIEE Paris. By creating for the first time in France a three-way partnership between a university, research organisations and schools of architecture and engineering , it will have the specific purpose of fostering national and international partnerships to meet the major societal challenges generated by the profound changes in urban areas, which are already home to 55% of mankind.

www.univ-gustave-eiffel.fr

Booth 21

full-Solution Provider for highly accurate data. products and services: global data capturing and providing high density point clouds, surface models, HD-Maps and 3D-environments.

.

www.3d-mapping.de

Booth 9

Actronika provides haptic solutions, seamlessly integrating touch functions into human-machine interfaces. Catering to consumer expectations for enhanced safety, smoothness, and comfort, this technology is versatile – from elevating smartphone user experiences to minimizing distractions in-vehicle touch screens. Whether through immersive vests or other devices, Actronika aims to reconnect people with tangible material experiences, offering multi-sensory engagement in our ever-digital world.

www.actronika.com

Booth 29

Agility3 are experts in simulation 3D visuals and interactive 3D applications.

We create stunning 3D models, 3D virtual environments and databases designed to work with driving simulators.
We develop immersive interactive applications and VR experiences to validate designs and enable research..

We produce dynamic 3D visuals for bespoke simulations. Our solutions integrate with simulations and common data environments.
Specialising in the Automotive/Connected Autonomous Mobility and Rail domains, Agility3's technology:
– enables innovative research,
– helps train perception systems,
– helps challenge, test and validates autonomous vehicle systems,
– enables good Human Factors design,
– de-risks real-world trials,
supporting vehicle development and informing decision makers, engineers and designers.

For more information contact info@agility3.co.uk.

agility3.co.uk

ansible motion
driving simulation excellence

Booth 37

Ansible Motion creates and deploys a wide range of Driver-in-the-Loop (DIL) simulators around the world for all types of vehicles, driving scenarios, experiments and product development aims. From small desktop systems to full size dynamic simulators, Ansible Motion's products deliver class leading virtual test driving experiences. Featuring advanced computational and mechanical performance capabilities, they create compelling virtual worlds for drivers and product development engineers.

www.ansiblemotion.com

ANTEMOTION
INNOVATIVE AUTOMOTIVE ENGINEERING COMPANY

Booth 30

AnteMotion, is an Italian engineering specialized in the development of simulation tools for Autonomous Vehicles (ADAS/AV) virtual Testing, Training & Validation, with our engineering competencies and know how we are capable of providing, not just software license, but turn key solutions for the client's needs.

We do respond to some of the ADAS/AV validation challenges with:
1. MAZE: fully automatic tool to generate OpenDRIVE based on HD maps, today we have a good partnership with HERE HD Live Maps, agreements with other map suppliers (Korea & Japan) are being discussed.
2. PROCEDURAL WORLDS: Procedural toolchain for an highly automatized modeling of high-quality realistic 3D environments, real-time simulation ready, perfectly aligned to an OpenDRIVE (input of Procedural Worlds).
3. MIDGARD: Open simulation framework render engine for ADAS/AD, based on top of Unreal Engine 5.4, real-time, providing top notch photorealistic image quality and open to be programmed and extended by the end users.

antemotion.com

Arts Sciences et Technologies et Métiers

Booth 20

Arts et Métiers Institute of Technology is a French « Grande Ecole d'Ingénieur » founded in 1780 specializing in mechanical, industrial and energy engineering. The Laboratory of Engineering in Cyberphysical Systems (LISPEN) has an education and research team specialized in XR for 25 years with extensive work on individualized interaction in immersive environments, cybersickness reduction and perception issues. The team has large immersive facilities including a 5-sided CAVE, head-mounted displays, multi-sensory interaction devices, physiological and behavioral measurement devices. LISPEN has also an activity in driving simulation, with facilities including dynamic and static simulators, coupled with immersive technologies, and addressing scientific issues related to HMI, simulator sickness, perception and motion cueing.

artsetmetiers.fr

Booth 6

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JOIN US!

www.asam.net

Automotive Solution Center for Simulation

Booth 19

Simulation is THE key for mobility. Simulation gives mobility a future. In line with this vision, we research, implement and promote simulation in line with high-performance computing and artificial intelligence as a key technology in the virtual development process through and with our expert community. As a non-profit association, the Automotive Solution Center for Simulation – ASCS e.V. – has been facilitating innovation and technology transfer through networking and collaboration at eye level since 2008. Our members trust in the ASCS as a platform that enables coopetition as a compliant multiplier, catalyst and accelerator for digital transformation in the automotive and mobility sector. | http://www.asc-s.de

The ENVITED research cluster (ENvironment for VIrtual TEst Drive) pools leading experts in the field of data-driven virtual development, verification, validation and homologation of automated driving functions to stay one step ahead of the game. The ENVITED research cluster is a long-term and member-driven initiative with the goal of adding strategic value to simulation through new methods, collaborative processes and cross-domain knowledge transfer. Our members benefit from professional exchange and the advancement of strategic project plans in four key areas:
DATA POOL: Shared, reusable and refined simulation data with high quality from multiple sources.
DATA ECOSYSTEM: Digital identities and improved interoperability in a distributed ecosystem with not compromised data traceability for continuous proof of validation.
INNOVATION HUB: Joint research and development of innovative simulation methods and processes.
CAREER CHANNEL: Application-oriented strengthening and networking of young talents and experts.
LINKS FOR MORE INFORMATION:
• http://www.envited.market
• https://github.com/openMSL
• identity.ascs.digital
• http://www.gaia-x4plcaad.info
• http://www.envited.academy

www.asc-s.de

AVSIMULATION

Booth 14

AVSimulation is a leading provider of advanced simulation solutions for the automotive industry and academia.

Our flagship software, SCANeR™, enables automotive manufacturers and researchers to develop, test, and validate mobility systems within highly realistic virtual environments. From ADAS to autonomous vehicles, SCANeR offers diverse scenarios for assessing safety, performance, and functionality. With a range of simulators and custom solutions available, AVSimulation accelerates the development and deployment of all mobility systems, driving towards safer and more efficient transportation solutions. *Booth n°8*

www.avsimulation.fr

AVESREALITY

Booth 22

DAVES Reality automates HD-map 3D virtual world creation, to empower simulation-based testing and synthetic training data generation in ADAS and AD. With our AI-enabled solution, based on satellite images and other real-world geodata, we follow the vision to deliver any place on earth as simulation-grade 3D environment including an own HD-roadmap.

avesreality.com

SAPIENZA UNIVERSITÀ DI ROMA
BRAINSigns

Booth 26

BrainSigns is a company founded in 2011 as a spin-off of Sapienza University of Rome, which develops innovation from scientific knowledge in the recording and analysis of signals produced by brain activity and other human physiological processes. The applications are of interest in all cases in which the monitoring, instant by instant, of a person's instinctive reactions can generate value, in terms of understanding human behaviour and its causes in relation to the work it is doing, the interface it is managing and/or the product it is interacting with.
Alongside scientific research, BrainSigns has recently entered the field of technology development, through the production of the Mindtooth system (https://mindtooth-eeg.com/). Mindtooth is an Electroencephalographic system with special features of wearability, reliability and user-friendliness, developed by BrainSigns itself thanks to the European H2020 Fast-Track-to-Innovation funding programme. Mindtooth aims to bring electroencephalography-based applications within everyone's reach, and thus enable new frontier applications based on the intelligible measurement of the user's brain activity.
Assessing the driver's experience and performance from a cognitive and emotional point of view is one of the main research topics in BrainSigns. Simulators are a key tool in this research area.
Driver data, vehicle data and context data combined – ITCL and BrainSigns have a long history of
collaboration and jointly present collection of this complete triangle of data. Both entities currently collaborate in the FitDrive.eu project, researching fitness-to-drive monitoring of professional drivers (EC Funded under Horizon 2020).

brainsigns.com

cruden

Booth 38

Cruden is the world's leading designer, manufacturer and integrator of professional open architecture driving simulators for the automotive, motorsport and marine industries. We supply flexible, durable, high performing real-time simulators and their modular components: hardware, software, vehicle models, content and screens and projectors.

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www.cruden.com

dSPACE

Booth 35

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www.dspace.com

DYNISMA®
MOTION SIMULATION REDEFINED

Booth 16

Dynisma deliver the most dynamic, accurate and realistic driving simulators in the world. Combining class leading motion bandwidth in all six degrees of freedom and sub 5ms motion latency, Dynisma Motion Generators (DMG) are widely regarded as 'the most realistic' and 'responsive' driving simulators commercially available.
Founded by ex-F1 driving simulator engineer Ash Warne in 2017, the company has rapidly grown and now operates from its Technology Campus in Bristol, UK, where an expert team of engineers design, manufacture and support turnkey driving simulators for motorsport teams and automotive OEMs worldwide.
F1 born and bred DMG technology has set new standards in driving simulation, particularly today in the automotive industry, Dynisma recently being named as McLaren Automotive' s Official Motion Simulator Partner.
Using the lowest latency and highest bandwidth motion platforms in the world, car makers are able to virtually develop ride, handling, NVH and ADAS with near perfect correlation – all in the same simulator, accelerating new car development and saving millions in prototype costs.
Discover why our simulators are consistently named as the 'world's best'.
Speak with one our friendly team to arrange your drive

www.dynisma.com

epicnpoc

Booth 14

Founded in 2018 by a team of experts in innovation, design and software engineering, EPICNPOC is a French technology company that empowers innovation and advanced development teams to create prototypes for innovation – better and faster.

Our software solution, BOWL®, enables our customers to create quickly innovative prototypes with contextual and personalized experiences for multi-users. Our BOWL® Studio combines no-code and low-code features to enable UX Designers and software engineers to collaborate around a single tool.
BOWL® Studio integrates a rich set of features ready to use, and is compatible with the software assets you can produce with your development tools.

With BOWL® Studio, you can jumpstart, develop and experience new projects at sprint one.
JUMPSTART your project thru a no-code approach with a collection of ready-to-use features.
DEVELOP your project by integrating your features and designing the desired product experience.
EXPERIENCE your smart product through test, play and learn while your setup becomes functional.
Based on a service-oriented architecture, BOWL® Studio proposes a fast and robust process for reusable asset production and integration to create large and sustainable ecosystems of functions, ready for production and commercialization.
At EPICNPOC, we create the tools for smart product makers, to Make Your Experience Real.

epicnpoc.com

exail

Booth 12

The Exail group, through Exail Robotics and its site in Lannion, has developed its know-how and experience in the fields of driving and aeronautical simulation since 1986 to become a major player in France and internationally. Its teams develop innovative and safe solutions integrating advanced technologies to meet the requirements of customers in the following markets

Aviation simulation – flight training (Airbus, Boeing, Regional Jets, military aircraft)
Aviation simulation – maintenance training (Airbus, Boeing)
Driving simulation – civil market (two wheels, light vehicles, heavy vehicles)
Driving simulation – defense market (armored vehicles)

On these different markets, Exail offers its catalog products or solutions specifically developed to best meet the customer's needs. From the pre-project phase to on-site installation and maintenance in operational condition, Exail masters the entire life cycle of its supplies in order to offer controlled and durable solutions.

Relying on a potential of about 1500 people within the group, Exail develops on its markets by taking advantage of the cross-fertilization of technological skills, methodology and best practices acquired on many cases. Its technical capabilities are based on the multidisciplinary skills of its engineers and technicians in the development of complex system simulations, 3D graphic databases, man-machine interfaces, educational modules, and also in the mechanical, electronic, automatic and computer fields.

www.exail.com

FKFS
RESEARCH IN MOTION.

Booth 32

www.fkfs.de

Fraunhofer
ITWM

Booth 28

The Fraunhofer Institute for Industrial Mathematics ITWM is one of the world's largest mathematical research institutes. We see our task in further developing mathematics as a key technology, in giving innovative impulses, and in implementing them practically together with industrial partners. The close cooperation with partners from industry guarantees the high practical relevance of our work. Our area "Mathematics for Vehicle Development" (MF) is divided into the two departments "Dynamics, Loads and Environmental Data" (DLU) and "Mathematics for the Digital Factory" (MDF) as well as the tire simulation project group and the cross-sectional unit MF Technical Center, which takes care of testing and measurement technology. In particular, we develop methods and tools for system simulation involving environmental data and usage variability.

www.fraunhofer.de

foretellix

Booth 34

Foretellix is the leading provider of safety-driven verification and validation solutions for Automated Driving Systems and ADAS. Foretellix's Foretify™ platform helps automotive, trucking, and mining customers to ensure safety, reduce development costs, and accelerate time-to-market. Foretellix is headquartered in Israel, with offices in the US, Europe, and Asia.

www.foretellix.com

ICT

Booth 39

ICT AG is a solution and full-service provider in live communication with AV technology for trade shows, retail stores, events, TV & film, brand spaces, simulation environment and studios. In short: We build the best possible stage in space for big brands. And this for about 35 years.

www.ict.de

InnerEye

Booth 13

InnerEye, an Israeli company founded in 2013 by AI and neuroscience experts Prof. Amir Geva and Prof. Leon Deouell, has been pioneering the integration of neurotechnology and AI.
By analyzing the drivers brain activity, the system monitors and predicts the drivers states and emotions, such as concentration, stress, drownsiness. This solution is meant to support professional engineers designing futuristic automotive applications.

innereye.ai

Booth 18

As a global leader in virtual test driving technology, IPG Automotive develops innovative simulation solutions for vehicle development. Designed for seamless use, the software and hardware products can be applied throughout the entire development process, from proof-of-concept to validation and release. The company's virtual prototyping technology facilitates the automotive systems engineering approach, allowing users to develop, test and validate new systems in a virtual whole vehicle.
IPG Automotive is an expert in the field of virtual development methods for the application areas of Autonomous Vehicles, ADAS, Powertrain, and Vehicle Dynamics, committed to providing support to master the growing complexity in these domains. Together with its international clients and partners, the company is pioneering simulation technology that is increasing the efficiency of development processes.

www.ipg-automotive.com

Booth 26

ITCL Technology Centre develops realistic driving simulators focusing on extensive data collection for research purposes and the use of real-life maps to create driving environments.
It is a medium-sized, private, not-for-profit Institute of Technology active in Transport & Mobility, AI, Cybersecurity, Manufacturing, Healthcare and Food industry, with offices in Burgos and Madrid and very close to the market (>65% revenue from private sector).

Driver data, vehicle data & context data combined – ITCL and BrainSigns have a long history of collaboration and jointly present collection of this complete triangle of data. Both entities currently collaborate in the FitDrive.eu project, researching fitness-to-drive monitoring of professional drivers (EC Funded under Horizon 2020).

itcl.es

Booth 15

www.motionxp.com

Booth 13

Macnica ATD Europe, part of Yokohama Macnica Inc., one of the world's largest semiconductor distributors, combines decades of B2B semiconductor and imaging distribution experience with a vast product range, including AI solutions.

Macnica ATD Europe distributes InnerEye, an Israeli company founded in 2013 by AI and neuroscience experts. By analyzing the drivers brain activity, the system monitors and predicts the drivers states and emotions, such as concentration, stress, drowsiness. This solution is meant to support professional engineers designing futuristic automotive applications.

www.macnica.co.jp

Booth 7 and 8

Meccanica 42 S.r.l. stands out as industry leader, specialized in the provision of advanced tools and innovative methodologies in the automotive industry field. The company is dedicated to the production of high-tech leading-edge devices customized to the specific customers' needs, aimed at optimizing the control of the vehicle's dynamic and enhance the performance of mechatronic systems.

Meccanica 42 team is made up of a selected group of highly qualified engineers, specialized in a wide range of disciplines, including mechanic, electronic and software technologies. Their main aim is to perfect the dynamic performances of mechanical systems, focusing on land vehicles through an approach based on research and continuous development.
Meccanica 42's products consist mainly of two lines: Hardware-in-the-Loop test benches for steering systems, braking systems and vision systems (cameras) to be used in combination with real time simulators on the one hand, and in-vehicle mounted devices for the development of advanced functions (brake actuators, steering actuators and advanced control units) on the other hand. These two product lines improve automotive development processes at every stage, redefining the boundary between simulation and testing and allowing the best of both worlds to be tapped in each phase..

www.meccanica42.com

NBI NEURAL BALANCE INNOVATION

Booth 31

Neural Balance Innovation (NBI) is an innovative Deeptech start-up. Our primary goal is to develop and deploy our STIMBOX, a novel sensory stimulation device that specifically targets the balance organ in a non-invasive manner.
This project is based on the combined expertise of the best French specialists in neuroscience of balance, as well as cutting-edge academic research expertise in sensor technology and signal processing. Through this new sensory approach, we can effectively act on the balance and motor systems, as well as sensory synchronization.
We are currently developing two devices:
The first aims to reduce cybersickness and enhance the immersive experience in Virtual Reality by artificially stimulating the inner ear, thereby providing sensations of movement. This device has a wide range of potential applications, from virtual reality entertainment to applications such as pilot training to strengthen their skills and improve their performance.
The second aims to reduce motion sickness and provide gradual desensitization through a dedicated application.

nbi.fr

Booth 36

rFpro, a member of the AB Dynamics Group plc, provides a simulation environment for the automotive and motorsport industries. It is used for the development and testing of autonomous vehicles, ADAS, vehicle dynamics and human factor studies. rFpro's automotive customers are the world's largest car manufacturers, tier one suppliers and sensor developers. We enable them to simulate, test and validate new sensors, control systems and vehicle hardware systems. In motorsport we are the market leader of professional driver-in-the-loop simulator software – our customers include past and present champions of every leading motorsport category. We maintain the largest library of digital circuit models (digital twins) including race circuits for F1, NASCAR, WEC, IMSA, Indy, Formula E, Super-GT and Australian V8 Supercars..

rfpro.com

Booth 7 and 8

Rohde & Schwarz is a leading global provider of test and measurement solutions for the automotive industry.
With a strong focus on innovation and R&D, we support the development of autonomous and connected vehicles, ADAS applications, and virtual and augmented reality (XR) technologies.
Our solutions enable the creation of immersive simulation environments, virtual validation and certification, and advanced testing and measurement capabilities.

www.rohde-schwarz.com

Booth 17

Safety Pool™ Scenario Database is the world's largest public database of scenarios for Automated Driving System testing, validation, and certification. It was founded by Deepen AI and WMG, University of Warwick, UK. This database is a global initiative for certifiable AV Safety that is informed by industry needs, embraced by regulators, and recognised by governments worldwide.
The Verification and Validation (V&V) team's research at WMG focuses on the entire V&V pipeline for Automated Driving including test scenarios, simulation-based testing, safety argumentation and is influencing international standards and policies to enable a safe introduction of Automated Vehicles. As a leading academic research team, we collaborate with international and local policymakers, regulators, and industrial partners on various research projects and policy implementations across the verification and validation spectrum.

www.safetypool.ai

SENSEGLOVE

Booth 4

SenseGlove's proprietary force feedback technology enables lifelike interactions, allowing users to feel size, density and resistance of virtual objects. Unlike controllers, the gloves allow you to hold, push, touch, connect and squeeze the virtual like it's real. Every interaction using the SenseGlove makes virtual reality feel like a physical, real-world environment.
The Nova 2, SenseGlove's newest haptic glove, is equipped with Active Contact Feedback to simulate feeling inside the user's hand, making any virtual object that comes in contact with the whole palm feel more realistic-whether it's a car wheel, laboratory flask, or just an apple. Nova 2 is the only wireless compact glove on the market that features palm feedback. The new gloves combine the three most advanced haptic feedback technologies in a wireless compact design; active contact feedback, force feedback, and vibrotactile feedback. The Nova 2's increased potential in making the virtual more realistic aims at improving XR experiences for users. It is a game-changer for simulating feedback from power tools used in VR training: drills, saws and grinders, hammers, pliers, rehabilitation tools or any other dynamic objects that come in contact with the palm. This glove doesn't just restrict finger movements around virtual objects; it encompasses the whole palm, allowing users to feel a range of interactions, from breaking an egg to shaking hands. Nova 2 also introduces a new level of engagement in social and multiplayer scenarios. Users can now high-five a colleague across the globe and feel the response or shake hands with a business partner, sensing their grip in return.

www.senseglove.com

sensodrive

Booth 41

Sensodrive Simulators. Perfect Simulations – Perfect Results. Sensodrive is a spin-off from the German Aerospace Center (DLR). The company was founded in 2003 by researchers from the DLR. Sensodrive is specialized in torque technology as well as in high-performance simulators. Sensodrive develops and produces tens of thousands of torque sensors and torque-controlled actuators every year for renowned companies worldwide. It was first company to launch specialized torque sensors for robotic drives. In addition to its leading role in drive technology, Sensodrive is known for its state-of-the-art force feedback products. The sophisticated simulators stand out due to sensitive force feedback and impressive realism.
From the steering wheel to pedals, to rotary and push buttons, or an entire simulator cockpit – the Sensodrive simulators enable highend simulations in research and development. You´re not just anybody. And our products aren´t just any products. Welcome to Sensodrive.

www.sensodrive.de

SCALE-1 PORTAL

Booth 10

SCALE-1 PORTAL brings immersive technologies and applications to the global market. Discover highly immersive rooms, mobile virtual reality projector, and a range of business applications & services of virtual, augmented and mixed reality, for the consumer and the Professional.

www.indus.scale1portal.com

smart eye

Booth 33

Smart Eye is the global leader in Human Insight AI, technology that understands, supports and predicts human behavior in complex environments.

Bridging the gap between humans and machines for a safe and sustainable future. Smart Eye was founded in 1999, is publicly traded and headquartered in Sweden with offices in the US, UK, Germany, Denmark, Egypt, Japan, Singapore and China. Through our Research Instruments, Smart Eye offers the world's most advanced eye tracking systems for analyzing human behavior. Offering unparalleled performance in complex environments, our carefully crafted instruments enable unparalleled insights into human behavior and human-machine interaction in automotive, aviation, assistive technology, media & marketing, behavioral science and many more fields.

www.smarteye.se

THIERRY CLÉMOT
SIMULATOR ENVIRONMENTS

Booth 27

Thierry CLEMOT's company creates 3D environments for cars simulators. Real environments are created from high accuracy 3D Laser Scan. Available quickly, our 100 km urban model "CITY" allows us to create every exercices needed in fictive environments.
Today, our models are used by cars manufactures in the US, Asia or Europe, what about you?
Don't hesitate to consult the database catalog on thierryclemot.com

thierryclemot.

traxara
robotics

Booth 40

Traxara provides high-fidelity force-feedback haptic controls and motion systems for driving simulators. Our products include force-feedback steering wheels, pedals, joysticks and motion platforms. Our TDrive system is a high-performance, unified haptics and motion software and hardware platform and easy to integrate with any simulator framework. We offer integration services, ensuring optimum performance while saving development time. Our products include:

– TMotion actuator kits for 2- and 3-DOF applications
– TMotion 6DOF a high performance, affordable and compact motion system
– TWheel for high-fidelity force-feedback steering with 20 N-m torque
– TShifter a 2DOF haptic high-torque device for automatic or manual shifting

traxara.com

Booth 7 and 8

VI-grade is the global provider of disruptive vehicle development solutions that are paving the way to developing vehicles with Zero Prototypes.
Its human-centric solutions comprise industry-leading real-time simulation software, professional driving simulators and Hardware-in-the-Loop solutions that accelerate product development across the transportation industry.
The company's suite of scalable driving simulators covers a wide performance range to assess the multi-disciplinary driving experience. These proven solutions enable OEMs, suppliers, research centers, motorsport teams and universities to reduce physical prototypes while accelerating innovation in their quest to get ever nearer to achieving the ultimate development goal of Zero Prototypes.
VI-grade is part of HBK's Virtual Test Division, which focuses on providing real-time software, simulator, and hardware-in-the-loop solutions to virtually test products throughout the development cycle, helping companies accelerate innovation and reduce time-to-market, and improve their competitive advantage.

www.vi-grade.com

Booth 23

Headquartered in Bilbao (Spain), Virtualware is a global pioneer in developing virtual reality solutions for large industrial, educational, and healthcare conglomerates. Virtualware's flagship product, VIROO, facilitates the adoption of virtual reality in enterprises thanks to its ease of use, robustness, and scalability. Recognized as a pioneering XR platform for training, VIROO is fast becoming the global reference for developing and deploying multi-user VR applications in industry and education.

The VRaaS platform is already being used by more than 40 companies and institutions around the world, including GE Vernova, Ontario Power Generation, Gestamp, ADIF, the Spanish Ministry of Defense, Invest WindsorEssex, McMaster University, the University of El Salvador, Conalep and EAN University.

www.virtualwareco.com

Booth 17

warwick.ac.uk

Booth 5

Pertech Solutions is the only company in France that designs, develops, manufactures, and markets both hardware and software Eye Tracking solutions.
Our Eye Tracking solutions allow for the analysis of user behavior through eye movements on various 2D and 3D platforms, whether in real or simulated environments.
Pertech Solutions has established a strong presence across diverse sectors, including automotive (Renault, PSA, Samsung Motors), aerospace (ISAE, BEA, Airbus, ASL Airlines), industry (Fives Pillard, Newtec Bag Palletizing, Clemessy SA), and the web. We are known for delivering innovative solutions that offer significant technological advantages.

www.pertech-solutions.fr

Driving Simulation Association

The *Driving Simulation Association* aims to:

- **promote and encourage driving simulation in all its aspects:** research, studies, developments, applications and products;
- **facilitate communication between people** involved or interested in driving simulation;
- **contribute to the organization of scientific conferences in the area of driving simulation,** Driving Simulation Conference (DSC) Europe, DSA seminars
- **organize special interest groups** (SIG) Driving Simulation Experience (SIGDSEP)
- **inform** about recent events new and trends

and our Partners

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Join the association, register now!

driving-simulation.org

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driving-simulation.org