

3rd International VDI Conference

Automotive Sensor Systems

Sensor Technologies on the Way to Autonomous Driving

February 11-12, 2020, Munich, Germany

- Innovations, Challenges and Trends in ADAS Sensing
- Impact of AI on Vehicle Perception Technology
- Testing, Simulation & Validation of Sensor Functions and ADAS Systems
- Mapping Technologies for Vehicle Perception
- Regulatory Framework & Standardization
- Functional Safety Challenges

+ Interactive World Café Session

+ International VDI Workshop

Meet international Experts from:



09:00 Registration, Networking & Welcome Coffee

10:00 Chair's Welcome and Opening Address

Dipl.-Ing. Holger Meinel, Independent Automotive Radar Expert, Germany

I. Setting the Scene: Innovations, Challenges and Trends in ADAS Sensing

10:15 From Driving Aid to Autonomy: Will Sensors rise to the Challenges?

- Key external sensing requirements for SAE levels 1 to 4
- Why do we need interior cabin monitoring?
- Sensing is only the first step - What about detection and classification?

Alain Dunoyer, Head of Autonomous Car Division, SBD, UK

10:45 Achieving a sufficient Level of Perception & Prediction Accuracy in Sensor Suites

- Primary indicators of level 4 and 5 autonomy technology readiness
- Limitations in long-range perception and prediction
- Key perception challenges
- Combining dynamic object tracks and camera information

Hemant Sharma, Head of Department, Advanced Safety Systems & Software, Aptiv, Germany

II. Advanced Sensing Solutions and Future Requirements (Part I)

11:15 Vehicle-Level-Performance-driven Sensor Selection and Specification

- Vehicle-level-performance cascade to active chassis systems requirements
- High-level controls strategy definition based on active systems requirements
- High- and low-level controls strategy leading to sensor selection and specification

Dr.-Ing. Basileios Mavroudakis, Sr. Manager – Advanced Technology & Control Systems, Aston Martin Lagonda, UK

11:45 An efficient Method for vehicular Radar System Integration

- Controversy requirements in terms of sensor coverage vs. redundancy of information
- Sensor performance and clash with surrounding parts
- Prediction of installed performance before prototyping

Niels Koch, Component Owner Radar Systems, Audi AG, Germany

12:15  Lunch

13:45 Adverse Weather Effect on automotive Radar

- Automotive sensors need to operate in adverse weather conditions
- Radar is the most weather agnostic sensor
- Current radar loss models are not accurate for heavy rain/snow conditions
- Challenges of automotive radar operation in adverse weather

Daniel Flores Tapia, Staff Radar Engineer, Cruise, USA

14:15 Interactive World Café Session

During the interactive World Café Session, we invite you to directly engage with other experts. Discuss and identify challenges within your sector as well as problems, needs and solutions.

Exemplary Topic:

- Early Sensor Fusion – A mean to fully exploit the Potential of Data Fusion?
- Simulation & Validation of Sensor Functions

15:30  Networking & Coffee Break

Advanced Sensing Solutions and Future Requirements (Part II)

16:00 The Race to a low Cost LiDAR System

- Different flavors of LiDAR, the supply chain, commercial aspects and potentials
- Benchmarking LiDAR approaches regarding cost, maturity timeline and integration
- Review of the current LiDAR supply chain and market players

Chidananda Panigrahi, Sr. Technical Research Analyst, IHS Markit, Germany

16:30 Solid-State LiDAR – Towards Low-Cost 3D Sensing

- State-of-the-art LiDAR technologies
- The solid-state LiDAR sensor approach
- SPAD arrays for highly sensitive LiDAR detectors
- Novel BSI technology for high resolution SPAD arrays

Werner Brockherde, Head of Optical Sensor Systems, Fraunhofer IMS, Germany

III. Mapping Technologies for Vehicle Perception

17:00 Mapping the Road to Autonomous Driving

- Why ADAS and AD need digital maps
- Building and maintaining HD Maps
- Completing the car-to-cloud-to-car HD map loop
- Using AI for map making and semantic segmentation

Alessio Colombo, Manager Software Engineering, TomTom, The Netherlands

17:30 Slot reserved for NIO

Divya Agarwal, Software Engineer, NIO, USA

18:00 End of Conference Day One



Get-together

At the end of the first conference day we kindly invite you to use the relaxed and informal atmosphere for in-depth conversations with other participants and speakers.

Out
of the
Box**09:00 The Social Nature of Perception**

- Social nature of traffic as an underappreciated aspect of AV's
- Social nature of our species impacts the very nature of our perception
- Norms define how we perceive the world
- Taking for granted that others share our way of understanding the world
- Addressing the social nature of perception

Erik Vinkhuyzen, Autonomous Driving Researcher, Alliance Innovation Lab Silicon Valley, USA

IV. Functional Safety Framework & Standardization**09:30 The Scope of SOTIF compared to ISO26262**

- Safety critical sensing – An interdisciplinary challenge
- Background and motivation of SOTIF
- The scope of SOTIF compared to ISO26262
- Problems and challenges of SOTIF

Dr. Håkan Sivencrona, Safety Program Manager, Zenuity, Sweden

10:00 Functional Safety Argumentation of Deep Neural Networks

- Usage of DNN's in the automotive industry
- Limitations of a traditional V&V approach applied to DNNs
- Diversity patterns for DNN's
- Responsibilities between OEM, Tier1 and Tier2
- Future challenges with the functional safety argumentation of DNN's in automotive safety applications

Antonio Vilela, Automotive Systems Safety Engineer, NVIDIA, Germany

10:30 ☕ Networking & Coffee Break

V. Impact of AI and Sensor Fusion on Perception Technology**11:00 Machine Learning and its Impact on Sensor Fusion**

- Traditional sensor fusion world
- Additional dimensionality from ML
- Impact and complexity due to the new dimensions
- Processing information complexity

Bharanidhar Duraisamy, Development Engineer, Daimler AG, Germany

11:30 AI on inherently fused LiDAR and Camera

- Challenges in fusing LiDAR data with camera data
- Concept of inherently fused LiDAR-camera system
- Extending the fusion for 360° views
- AI needs for LiDAR-camera fusion

Geert Caenen, Head of Software Development, XenomatiX, Belgium

12:00 Sensor Fusion Data Annotation and Validation

- What is sensor fusion?
- Challenges with sensor fusion data
- Annotation and validation of sensor fusion data

Mohammad Musa, Founder & CEO, Deepen AI Inc., USA

12:30 🍴 Lunch

VI. Testing, Simulation & Validation of Sensor Functions and ADAS Systems**13:30 Challenges of synthetic Scenario Generation for ADAS Development**

- ADAS innovation relies on massive amounts of data
- ADAS / AD system requirements and challenges
- Sensor Data and Scenario requirements and challenges
- Hardware requirements depending on sensor model and scenario complexity

Dr. Florian Baumann, CTO Automotive & AI, Dell EMC, Germany

14:00 Safety Validation of Sensor Functions for Autonomous Driving under complex environmental Conditions

- Reliability assess of sensor technologies under real environmental conditions
- Modeling complex environmental conditions in simulation
- Replacing physical testing with simulations that replicate AV performance and operating scenarios
- Embedded software code that meets the safety standards is critical

Günther Hasna, Director Application Engineering EMEA and Team Lead Sensors and Photonics, Ansys, Germany

14:30 Testing HAD Systems with Simulation

- Importance of simulation in verification and validation of highly automated systems
- Standardization and safety requirements for simulations
- Correlation of measurement data and models

Dr. Juergen Holzinger, Pogram Manager ADAS Project House, Global Research & Technology Management, AVL, Austria

15:00 ADAS low Speed Maneuvering: An active Area for Core AD Functions to be developed and verified in Mass-Production

- Gap between current and expected ADAS and AD systems
- Enable 3D sensing using low cost sensors by available ADAS ECU
- Advanced sensor fusion to compensate the deficiencies of one by the abilities of others

Dr.-Ing. Duong-Van Nguyen, Head of ADAS, Panasonic Automotive Systems Europe GmbH, Germany

15:30 Conference Chair's closing Remarks

15:45 End of Conference

Building the general Safety Concepts for AV's - Defining the Principals of Functional Safety

Workshop Chair:

Håkan Sivencrona, Safety Program Manager, Zenuity, Sweden

Date and Venue:

February 10, 2020, Rilano Hotel, Munich

Time:

09:00-16:00

Content:

Functional Safety is a truly interdisciplinary challenge: From environment perception over safety critical sensing to decision making and vehicle control, functional safety principles are vital. No question, ADAS research and development of new concepts, including verification, ODD expansion and definition or risk consideration will play a key role in the upcoming years. This interactive workshop covers everything from defining the safety norm and product definition to ODD definition and system design. Focus will be on J3016, ISO 26262, SOTIF and use cases of applying ISO 21448, underlined by real world examples. The scope and clarity of SOTIF, which tackles hazardous behavior of a system free from E/E system faults, is compared to the one of ISO 26262. The workshop contents are partially based the Swedish research project ESPLANADE.

Introduction

- Overview of J3016
- Background and Motivation of ISO 26262 and SOTIF
- SOTIF: Status, objective, problems and what it does not solve

Main Part - ADS Functional Safety Concept

- Operation Design Domain (ODD)
- Sensors and perception capability
- Decision making and control
- Dynamics
- Vehicle Control
- Actuation capability

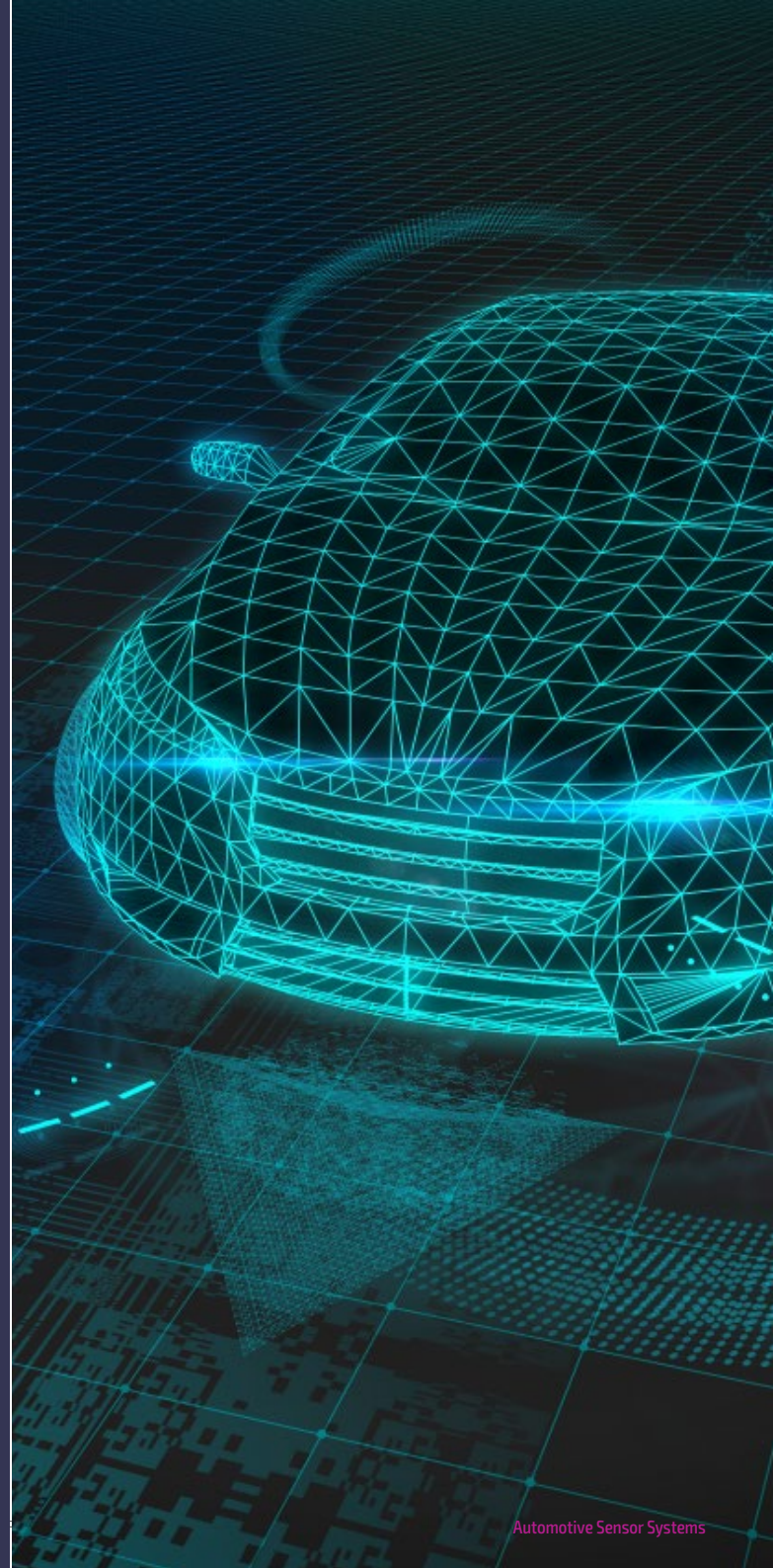
Breakout Sessions in Groups

- Apply the functional safety framework to different use cases
- How will this affect the approach to vehicles systems safety?

Discussion and Conclusion

- Key takeaways
- How will this be realistically applied to day-to-day?

(Please note that the number of participants is limited. Registrations and individual parts and segments of the workshop are subject to confirmation)



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Conference venue
The Rilano Hotel München
Domagkstr. 26
80807 Munich, Germany
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Hotel room reservation: A limited number of rooms has been reserved for the benefit of the conference participants at the The Rilano Hotel München.

Please refer to "VDI Conference". For more hotels: www.vdi-wissensforum.de/hrs

VDI Wissensforum service package: The conference package includes the conference documents (online), beverages during breaks, lunch and the get together on February 11, 2020.

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Participation Fee + VAT

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(01K0921020) € 1840

and

Workshop 10.02.2020
(015T953001) € 950

or

Package Price (Please tick the boxes)

(Conference + 1 Workshop) € 2510

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