

VDI

4th International VDI Conference

Connected Off-Highway Machines

Connectivity and the Future of Autonomous Mobile Machines

May 14 - 15, 2019, Dusseldorf, Germany

Keynote:
SAP SE

- The Future of Autonomous Mobile Machinery
- The Benefits and Challenges of Connectivity for the Off-Highway Industry
- New Business Models for Connected Mobile Machines
- Facing Challenges of Machine Coordination
- Out-of-the-Box: Where are the Automotive and Aerospace Industries heading?

+ Workshop on Cyber Security

+ Panel Discussion on AI

+ World Cafés

Meet international Experts from:

APPAREO

ARCURE

AVR

CAT

Continental

Deere

Garrett
ADVANCING MOTION

Honeywell
THE POWER OF CONNECTED

itk

JOHN DEERE

KOMATSU

Kubota

LIEBHERR

RioTinto

SAP

STW

TECHNISCHE UNIVERSITÄT
KAISERSLAUTERN

TOPCON



Universität Stuttgart

van den berre
aardappelen



An event organized by VDI Wissensforum GmbH
www.vdi-international.com/01K0902019





Supporting Experts

Dr. sc. nat. Anton Demarmels, Director Technology Management, Ammann Schweiz AG, Switzerland

Jeff Herrin, Vice President R&D, Danfoss Power Solutions, USA

Michael Gomes, Vice President, Topcon Agriculture, USA

Dipl.-Ing. Eugen Schobesberger, Managing Director, Liebherr EMtec GmbH, Germany

Dipl.-Ing. (FH) Martin Frank, Research Engineer, Specialist Intelligent Machines, Volvo Construction Equipment GmbH, Germany

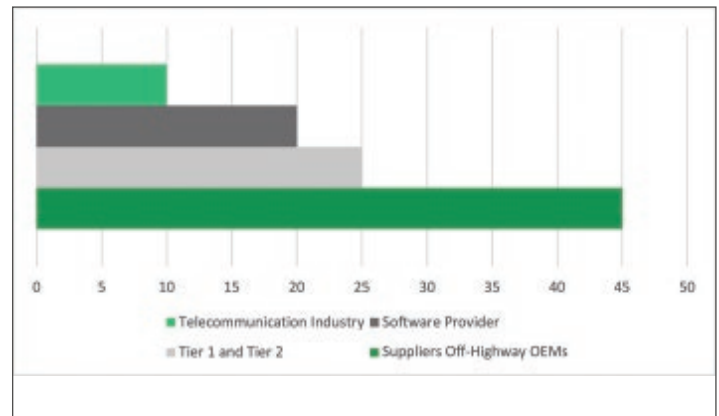
Vik Vandecaveye, Manager Advanced Data Analysis, CNH Industrial Belgium N.V., Belgium

About us



The Association of German Engineers (VDI) is one of the largest technical-scientific associations in Europe. Throughout the years, the VDI has successfully expanded its activities nationally and internationally to foster and impart knowledge about technology-related issues. As a financially independent, politically unaffiliated and non-profit organization the VDI is recognized as the key representative of engineers both within the profession and in public.

Expected Participants according to Industries



Reasons to attend

- Meet international experts from the off-highway industry
- Learn about the latest automation trends and developments
- Hear about best practice examples from end-users
- Network with peers from different off-highway areas
- Benefit from case studies and practical insights
- Prepare for the Digital Transformation
- Discuss the impact of connectivity on your industry

08:30 Registration & welcome coffee

10:00 Chair's welcome and opening address

I. New Business Models

10:15 New Business Models and Revenue Potential through connected Off-Highway Vehicles

Keynote

- Vehicle generated data: A new mega market
- New business models to monetize vehicle data
- Increased revenue and reduced costs through data created by off-highway machines

Kai Hessenmüller, Product Manager, SAP Leonardo, IoT Moving Assets, SAP SE, Germany

10:45 The Farm of the Future – An End-user's perspective on Connectivity

- Precision farming and soil scanning in praxis
- Internet of things sensors
- Yield mapping for yield potential
- Generating data from your vehicles

Jacob van den Borne, CEO, van den borne aardappelen, The Netherlands

11:15 Value of Connectivity for improving your Business – A practical Experience Report

- Operating efficiently with connected machines
- Connectivity for additional customer value
- Using your connectivity – Targeted marketing and product development

Dr. Marius Basting, Digital & Technology Manager Europe, Caterpillar S.A.R.L., Switzerland

II. Connectivity – Solutions & Use Cases

11:45 Digital Platforms for Connected Machines

- Platform to provide collaboration between digital systems
- Third party enablement that drives innovation
- Importance of standards to scale connectivity integrations

Randall Kasparbauer, Engineering Manager, Intelligent Solutions Group, John Deere, USA

12:15  Lunch

13:45 Mobile Mapping and accurate Positioning Solutions for connected Machines

- The importance of UAV and mobile mapping systems
- Efficiency through accurate 3D Planning
- Centimetric level positioning of autonomous vehicle via global GNSS correction service
- Learning from the past – Use cases

Yann Roussel, BM for OEM GNSS & Mobile Mapping Europe, Topcon, France

14:15 Connectivity in Construction and Mining Equipment: Experience and Use Cases

- How OEMs can build a successful IoT ecosystem
- Big data: Threats and opportunities
- Standardization of equipment data
- Connecting your machines on site and in quarries: Use cases and lessons learned

Enrico Borella, Product Manager Telematics, Komatsu Europe, Belgium

14:45 Panel Discussion on Artificial Intelligence – Where are we headed?

Experts from the automotive, agriculture, construction & mining industry discuss what AI means for the industries and what the future could look like

15:15  Networking & coffee break

III. The Value of Data & ML in a changing Economy

15:45 From Potato shed to Potato Cloud

- Data sharing agriculture as a key for further growth
- Cloud based IOT & connectivity solutions for data gathering in real-time
- Data exchange standardization
- New business models and the future of data sharing

Dr. Ir. Koen Uyttenhove, IOT Manager, AVR, Belgium

16:15 Processes are only half the Battle – Organizational and Technical Challenges of Security Engineering

- Security engineering process overview
- Practical examples of organizational and technical security pitfalls
- Experiences with mitigation strategies for the pitfalls
- Security aspects of working with external security service providers

Dr.-Ing. Jens Köhler, R&D Manager Cyber Security, ITK Engineering, Germany

16:45 Vehicle Diagnostis and Prognostics

- Construction of physical models for prognostics and diagnostics
- Enhancing the base model with machine learning
- Balancing the model building with the ability to scale across component variations

Kjeld Jespersen, Director Connected Vehicles, Honeywell, Switzerland

Out-of-the-Industry

17:15 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.

IV. The Future of Autonomous Mobile Machinery

09:00 Mine of the Future – The Benefits of Autonomous Vehicles for Value Creation

- Concept and challenges of using autonomous ground vehicles for heavy load transportation in an Aluminium plant
- The AGV guiding technology and targeted final solution
- The key axis to implement a 4.0 roadmap

Stéphane Prodent, Manager Automation & Advanced Technologies Area, Rio Tinto, France

09:30 Edge Computing For Artificial Intelligence

- Challenges of edge inference
- Techniques for optimization of neural networks
- Survey of processing hardware for edge inference
- Applications for autonomous vehicles

Josh Gelinske, Director AI Systems, Appareo Systems LLC, USA

10:00 Concept of a semi-automated Excavator

- The necessity of modifying the current machine concept
- Analyzing the dynamic behavior of the hydraulic system
- Implementation of automated motion control for the excavator
- Realizing load mass and load position estimation
- The importance of connectivity for coordinating IT systems

Stéphane Walter, Group Leader, Liebherr Colmar, France & **Prof. Dr. Oliver Sawodny**, Institute for System Dynamics, University Stuttgart, Germany

10:30 ☕ Networking & coffee break

11:00 Autonomous Machine Software Architecture

- Machine interface and sensor interface
- Autonomous layer architecture options
- Safety in automation

Chris Woodard, Software Business Development Manager & **Elza Marisa Paiva de Figueiredo**, Autonomous Systems Manager, both: Danfoss Power Solutions Europe, USA

11:30 Status of Research & Development on autonomous agricultural Machines in Japan

- The benefits of automation for farmers
- An automation level regulated by the Japanese government and its use case
- Lessons learned and use cases of Kubota

Nobushige Ichikawa, General Manager of Farm Machinery Engineering Europe Dept., Kubota Corporation, Japan

12:00 🍽️ Lunch

13:00 World Cafés

From elephants to ants – Can automation be an enabler for new machine concepts? – Uwe Müller, Chief Project Manager, Volvo Construction Equipment

How can AI improve mobile robotics? – Sabri Bayoudh, CTO, Arcure
Embedded and Cyber Security: What are challenges and drivers in your business? – Roland Marx, CC Embedded Security, OSB AG

Preventive maintenance through smart components – Quo vadis? – Michael Christian Lorenz, Business Development Digital Solutions, Continental Reifen Deutschland GmbH

FutureSite test center – Towards interconnected autonomous mobile machinery – Prof. Dr. Georg Jacobs, Head of Institute for Machine Elements and System Engineering, RWTH Aachen University and further experts!

14:30 ☕ Networking & coffee break

V. Realizing Opportunities of Machine Coordination

15:00 Moving forward to fully connected, autonomous Road Construction

- Connecting machines in swarm/autonomy applications
 - Utilizing new communication and positioning technologies
 - Development of high performance electronics with gateway functionality
- Stefan A. Lang**, Head of System-Technology; co-authors: K. Niestroj, System-Technology, all: Sensor-Technik Wiedemann GmbH, Dr. P. Decker, Software and Control Systems, BOMAG GmbH, Germany

15:30 Cooperating Autonomous Tandem Rollers exploiting AMMCOA

- Cooperation of the autonomous BOMAG tandem rollers BW154 and BW174 of the AMMCOA project within road construction scenarios
- Behavior-based control for distributed task assignment using the REACTION architecture and iB2C
- Tests on the virtual B10 highway simulated in the Unreal Engine
- Off-road collaboration with the real rollers on the off-road test environment ZAK

Patrick Wolf, Research Assistant Robotics Research Lab; co-authors: Thorsten Ropertz, Robotics Research Lab, Prof. Dr. Karsten Berns, Robotics Research Lab, all: TU Kaiserslautern, Dr. Peter Decker, Bomag GmbH, Germany

16:00 Closing remarks

16:15 End of conference

Cyber Security for Off-Highway Vehicles

Workshop Chair:

Dipl.-Phys. Roland Marx, Head of Competence Center, Embedded Security, OSB AG, Germany

Date and Venue:

May 13, 2019

Crowne Plaza Hotel, Dusseldorf, Germany

Time:

10:00 - 16:00

Content

Introducing security mechanisms into an existing ecosystem and product lifecycle may be both – complicated and dangerous.

Security engineering should start as early as possible to reduce risks and save costs. To be aware of what OEMs/TIERs might consider for future developments, as well as current products, we designed this workshop with a special focus on the Off-Highway industry.

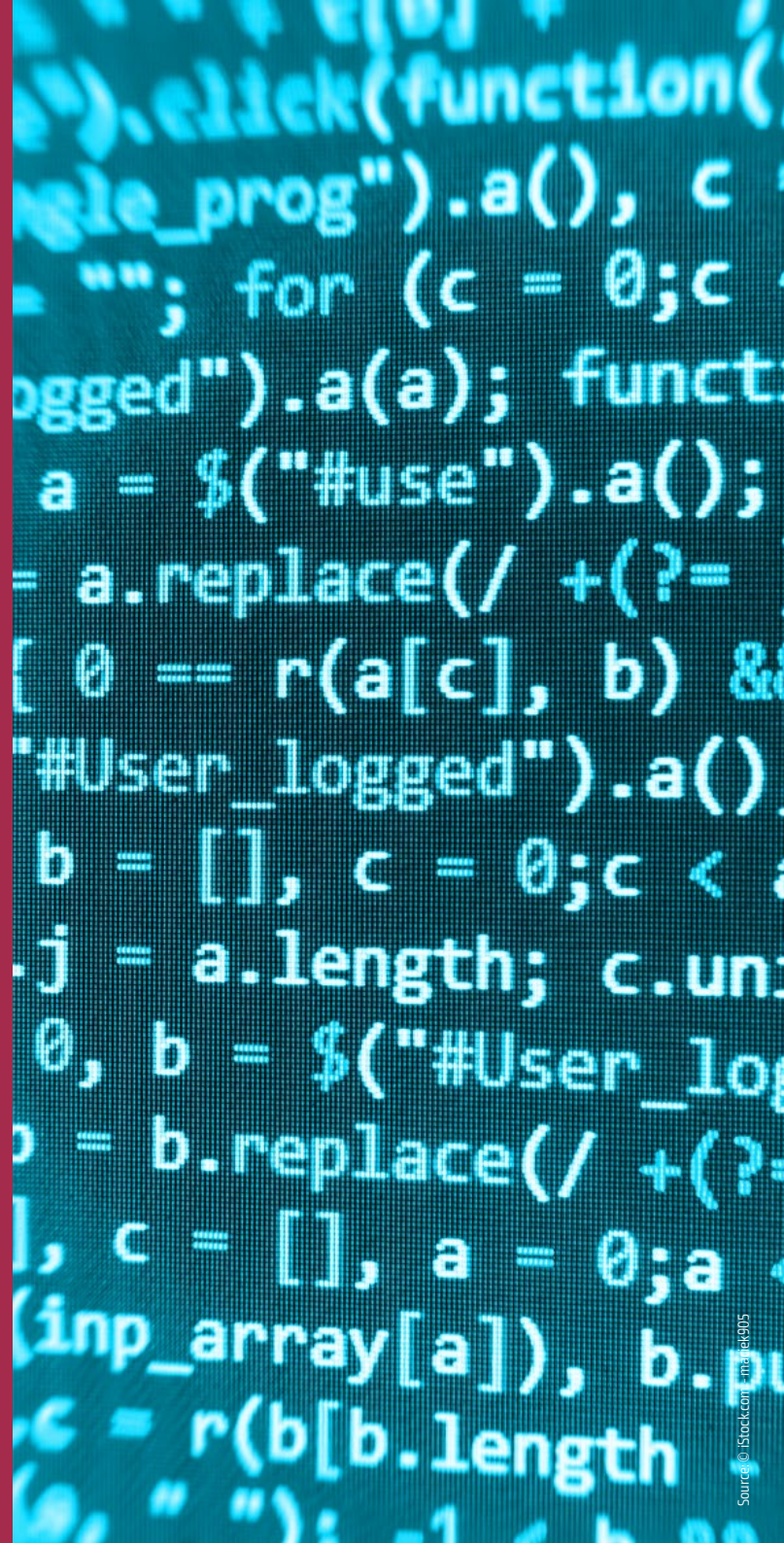
It will give you an intuition for the broad spectrum of embedded and cybersecurity topics that (will) concern modern Off-Highway Machines, agricultural vehicles as well as IoT devices.

To get a better understanding, we start by virtually designing a secured agricultural grade ECU for onboard communication with a remote link for data transmission and Software Over-The-Air capabilities. We will also cover the most critical part - non-functional prerequisites like secure key storage and the management of keys and X.509 certificates within a PKI (Private Key Infrastructure). With this knowledge we will derive necessary changes to manufacturing processes and will have a guided discussion about several actual topics of interest.

This workshop shall also be a forum for discussing lessons learned, benefits and risks, as well as identifying organizational hurdles and branch specific challenges.

Agenda

- Introduction to cyber security for off-highway and agricultural vehicles intuition
- Understanding security aspects – Virtual design of an OTA capable ECU
- Real life example: Small OEM and security requirements tractor implement management – Securing automation in agriculture
- Guided introduction and discussion on security related topics of interest (such as „Vehicles 2 X – Requirements to join the ‘Network‘“ and „GDPR in Vehicles – Privacy, Authenticity & Security“ or „ISO 21434 – Road Vehicles / Cybersecurity Engineering“)



International VDI Conference Year

Electrified Off-Highway Machines

Date and venue:

May 14-15, 2019
Dusseldorf, Germany

Renowned speakers will discuss the following topics:

- Developments in Powertrain Electrification
- Approach & Solution in Design and Development
- Emission Regulation and Treatment Technology
- Battery Technology for Off-Highway Applications
- Case Studies in Off-Highway Electrification

+ **Workshop on Engine & Aftertreatment Enhancement**
+ **Panel Discussion on Battery and Fuel Cell Technology**

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3rd International VDI Conference Year

Smart Farming

Date and venue:

May 14-15, 2019
Dusseldorf, Germany

Renowned speakers will discuss the following topics:

- Internet of AgriThings: Case Studies – Is the WWW the solution?
- Paving the Way to Smart Farming in real Practice
- Enabling Technologies and Solutions for Digital Farming
- Farming as a service – New Business Models
- Artificial Intelligence in Agriculture – From Assistive Technologies to Autonomy
- Data-driven Value – How to get the most out of Farming Data
- Start-Ups: Transforming the Agriculture Sector

+ **Interactive Round Table Discussions**

www.vdi-international.com/12K0100019



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Exhibition / Sponsoring

If you want to meet with and reach out to the first-rate experts attending this VDI conference and to powerfully present your products and services to the well-informed community of conference participants, please contact:

Christoph Brockerhoff
Project Consultant
Exhibitions & Sponsoring
Phone: +49 211 6214-228
Fax: +49 211 6214-97228
Email: brockerhoff@vdi.de



Become a speaker

Become a speaker at our international VDI Conferences. Make yourself known in the industry and discuss best practice examples with other international experts. We are looking for speakers on: Road Construction and Sensor & HMI Technologies for the Off-Highway Industry.

Please submit your topic to:
Maria Baumeister
Product Manager International Business
Phone: +49 211 6214-284
Email: baumeister@vdi.de

Registration

Terms and Conditions

Registrations: Registrations for conference attendance must be made in writing. Confirmation of your registration and the associated invoice will be mailed to you. Please do not pay your conference attendance fee until you have received our invoice and its invoice number to be stated for transfer. German VAT directives apply. Please state your VAT-ID with your registration.

Conference venue
Crowne Plaza Düsseldorf-Neuss
Rheinallee 1
41460 Neuss, Germany
Phone: +49 2131 7700
Email: mailus@cphotelduesseldorfneuss.com
Website: <https://www.cphotelduesseldorfneuss.com/en>



Hotel room reservation: A limited number of rooms has been reserved for the benefit of the conference participants at the Crowne Plaza Düsseldorf-Neuss, mailus@cphotelduesseldorfneuss.com. 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 May, 14, 2019.

Conference attendance conditions and terms: By way of your registration you accept the conference attendance conditions and terms of VDI Wissensforum GmbH as binding. Any cancellation of your registration must be made in writing. We will charge you only an administrative fee of € 50.00 plus German VAT if you cancel your registration earlier than 14 days ahead of the conference date. Any cancellation that reaches us after this deadline will entail the conference attendance fee as stated in our invoice to be charged in full. The date of the post office stamp of your written cancellation will be the decisive criterion. In that case, we will gladly mail you the conference documents on request. Subject to agreement, you may name a substitute participant. Individual parts and sections of conferences and seminars cannot be booked. You will be informed without delay if an event has to be cancelled for unforeseeable reasons. In that instance, you will be entitled only to a refund of your conference attendance fee if already paid. We reserve the right to exchange speakers and/or change the program sequence in exceptional cases. In any case, the liability of VDI Wissensforum GmbH is restricted exclusively to the conference attendance fee.

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4th International VDI Conference

Connected Off-Highway Machines



Register online!

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Yes, I will participate as follows:

Participation Fee + VAT

VDI Conference 14.-15.05.2019
(01K0902019) € 1840

Workshop 13.05.2019
(01ST940001) € 950

Package Price (Please tick the boxes)

(Conference + 1 Workshop) € 2500

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* For the price category 2, please state your VDI membership number

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