VDI

21st International VDI Congress

Dritev

On-site and via livestream

October 13 and 14, 2021, Bonn, Germany

Main topics:

- Design of electric drives
- Concepts for conventional and electrified drives
- Optimised mechanical components for hybrids and e-drives
- Latest test methods for the validation of components
- Simulation and AI-supported design in development
- Expectations of the younger generations towards mobility
- Plenary speeches: Concepts and ideas for the automotive industry on the way to climate-neutral mobility

Dritev interactive

Innovation Slam
Speakers Corner
Dritev Night
Car Presentation

www.dritev.com

Meet international experts from

AVL, BMW, MINI, BorgWarner, CLEPA European Association of Automotive Suppliers, DELL, DIEHL Metall Schmiedetechnik, esi get it right, FEV, FREUDENBERG INNOVATING TOGETHER, FZG, GKN AUTOMOTIVE, HEXAGON, Romax TECHNOLOGY, Ghofer powertrain, HYUNDAI, automotive engineering iav, INSTITUT FÜR FAHRZEUGTECHNIK Prof. Dr.-Ing. Ferit Küçükay, MAGNA, Mercedes-Benz, PORSCHE, SCHAEFFLER, TECHNISCHE UNIVERSITÄT DARMSTADT MASCHINENBAU IMS We engineer future, TEIJIN, TREMEC, TU Graz Graz University of Technology, UNIVANCE Humanity and Technology UNIVANCE CORPORATION, vcst, vtesco TECHNOLOGIES, VDA Verband der Automobilindustrie, ZF GROUP

Workshops (in German)

- Entwicklung und Funktion brennstoffzellenbasierter Antriebssysteme
- Chancen für die agile Systementwicklung durch ASD-Agile Systems Design
- NVH im E-Antriebsstrang

Accompanying event

7th International VDI Conference
Drivetrain Solutions for Commercial Vehicles

Program Overview

VDI Wissensforum

Workshops
Tuesday, October 12, 2021, Maritim Hotel Bonn

Held in German only!

09:00 – 17:00

- Entwicklung und Funktion brennstoffzellenbasierter Antriebssysteme (01ST805021)
- Chancen für die agile Systementwicklung durch ASD-Agile Systems Design (02ST385021)
- NVH im E-Antriebsstrang (01ST022021)

1st Congress Day
Wednesday, October 13, 2021

07:45 Registration

08:30 Welcome address and plenary speeches (Stream 1)

10:25 Coffee break and visit of the exhibition

	Stream 1	Stream 2	Stream 3	Stream 4
11:15	Dritev: Drive Architecture	Dritev: Hybrid Concepts	Dritev: AI and Multi-Objective Optimization	Accompanying conference: Drivetrain Solutions for Commercial Vehicles
12:45	Lunch and visit of the exhibition			
14:15	Electric Drive	Dedicated Hybrid Transmission	Testing	Drivetrain Solutions for Commercial Vehicles
15:45	Coffee break and visit of the exhibition			
16:30	Plenary speeches (Stream 1)			Drivetrain Solutions for Commercial Vehicles

18:00 End of the 1st congress day

18:30 Dritev Night

Dritev

Sign up: www.dritev.com

2nd Congress Day
Thursday, October 14, 2021

	Stream 1	Stream 2	Stream 3	Stream 4
08:30	Dritev			Accompanying conference
	Simulation	Actuation Systems	Tribological Systems	Drivetrain Solutions for Commercial Vehicles
10:30	Coffee break and visit of the exhibition			
11:15	Innovation Slam (Stream 1)			Drivetrain Solutions for Commercial Vehicles
12:45	Lunch and visit of the exhibition			
14:15	E-axles and Electrified AWD	Shifting Elements and Dampers	Components	Drivetrain Solutions for Commercial Vehicles
16:00	Awarding of the Best Presentation Award for Junior Engineers			
16:15	Closing remarks and end of congress			

Dritev

Your international technology congress for powertrain developers in Bonn!

1st Congress Day
Wednesday, October 13, 2021

07:45 Registration

Stream 1 – Auditorium

08:30 Opening and welcome address

Dipl.-Ing. Matthias Zink, CEO Automotive Technologies, Schaeffler AG, Bühl, Germany

Plenary speeches

08:45 Challenges of the automotive industry on the way to climate-neutral mobility

- Types of drive and infrastructure
- Automatisation and data management
- Current regulation in Brussels and Geneva

Dr.-Ing. Joachim Damasky, Managing Director, VDA e. V., Berlin, Germany

09:10 Opportunities for automotive suppliers in the Green Deal context

- The role of suppliers in the transition towards climate-neutral mobility
- Industry transformation towards a clean and digital mobility: An inclusive transition
- Technology neutrality as a means to strengthen the global competitiveness of our industry

Thorsten Muschal, CLEPA President and Faurecia's Executive Vice President of Sales and Program Management, Brussels, Belgium

09:35 Vehicle-integrated photovoltaics – Generating energy onboard the vehicle

- Never charge again? Solar ranges for cars and commercial vehicles
- Current research status on glass-based roof systems (passenger cars) and box-body-integrated high-voltage photovoltaic systems (trucks)
- Outlook: From gimmick to irreplaceable cost and CO_2-saver

Christoph Kutter, M. Sc., Scientist and Program Manager, Co-authors: Dr. Martin Heinrich, Head of Team PV for Mobility and Dr. Holger Neuhaus, Head of Department Module Technology, all Fraunhofer ISE, Freiburg, Germany

10:00 World first mass production FCEV HDT (Fuel Cell Electric Vehicle Heavy Duty Truck) – technologies and operating status

- Why FCEV for future? Advantages compare to BEV; development history of Hyundai HDT, BUS and passenger car
- Performance of FCEV HDT, components and connectivity service
- Operation status in Switzerland: total number of HDTs, total mileage, fuel efficiency, customer's feedback, connectivity service for fleet entrepreneur, amount of CO_2-reduction

Dipl.-Ing. Martin Zeilinger, Executive Vice President, Head of Commercial Vehicle development division, Hyundai Motor Company, South Korea;
Dipl.-Ing. Nabil Nachi, Head of department, Fuel Cell Electric Commercial Veh. Dev., Hyundai Motor Europe Technical Center, Ruesselsheim, Germany

10:25 Be interactive – Meet & Greet in the exhibition area and car presentation

11:15 Change to parallel sessions

Stream 1

Drive Architecture
Konstantin Neiß, Mercedes-Benz

11:15 Sustainable Powertrain Solutions – The changing role of powertrain from Magna's perspective
- Market and energy forecasts – reliability vs. volatility
- How unexpected developments change the rules of the game
- New main drivers: Dominant electrification, connected functionality and personalization
- The shift from hardware to software requires new business models

Walter Sackl, Director Global Product Management, Magna Powertrain GmbH & Co. KG, Lannach, Austria

11:45 Modular transmission systems for future BEV platform applications
- Generation of powertrain properties for an entire vehicle fleet
- Development of a modular powertrain platform with focus on transmission technologies
- Integration of add-on modules and systems
- Focusing on development challenges – overall package, efficiency and costs

Dipl.-Ing. René Kockisch, Team Manager Transmission Mechanics, Co-Authors: Erik Schneider and Dr. Jörg Müller, all IAV GmbH, Stollberg, Germany

12:15 Analysis of propulsion system architectures across vehicle segments and markets
- Simulation tool to analyze drivetrain topologies
- Impact of different levels of electrification
- Results for different vehicle segments and markets

John Shutty, M. Sc., Chief Engineer, BorgWarner Inc., Auburn Hills, USA, Co-Authors: Daniel Gajowski, M. Sc., Ludwigsburg and Dipl.-Ing. Alexander Moser, Ketsch, both BorgWarner Drivetrain Engineering GmbH, Germany

Stream 2

Hybrid Concepts
Dr. Gerd Rösel, Vitesco Technologies

Tremec HDCT – Electrification of TREMEC's high performance dual clutch transmission
- Hybrid layout strategies for high performance applications
- P2.5-P3 hybrid dual clutch transmission concept discussion
- Demonstrator HDCT design & test review

Ir. Leroy de Ruijsscher, System Engineer, TREMEC, Zedelgem, Belgium

Design and Development of a High Performance Hybrid DCT
- Specification and Capability of high performance, 8 speed hybrid DCT
- Design Approach
- Test and Development Methodology
- Manufacturing Summary

Andrew Lowis, Mech. Eng., Engineering Director, Co-Authors: Rob Smith, M. Eng. and Shane Dusautoy, B. Sc., all hofer Powertrain UK Ltd., Warwick, UK

Modular and highly functional hybrid platform for subcompact cars up to full-size SUV
- Trade-off between CO_2 TtW, CO_2 WtW, performance and costs for future powertrains
- Identification of well-balanced hybrid-powertrain configurations
- Modular design approach for a dedicated hybrid platform
- Systematical development of an electro-mechanical actuation system and a scalable construction kit for the electric motors

Erik Schreiterer, M. Sc., Team Manager, Transmission and Hybrid Systems, Co-Authors: Dipl.-Ing. Erik Schneider and Dr.-Ing. Christoph Danzer, all IAV GmbH, Stollberg, Germany

Stream 3

AI and Multi-Objective Optimization
Prof. Dr.-Ing. Stephan Rinderknecht, TU Darmstadt

Driveability optimization of electrified powertrains utilizing machine learning based control and the interaction with ADAS/AD systems
- Driveability assessment and oscillation problem analysis of ICEV, P2, DHT and BEV
- Powertrain modeling including EM and FOC control for driveability simulation
- Active damping control to compensate powertrain oscillation and improve the driveability
- Proactive driveability optimization using ADAS/AD Information

Xianfeng Zhang, M. Sc., Research Associate, Vehicle Drivetrain, Co-Author: Prof. Dr.-Ing. Ferit Küçükay, both TU Braunschweig, Germany

Holistic Design of All-Wheel Drive Electric Powertrains using a Multi-Objective Optimization Algorithm
- Optimal power distribution between front and rear axle considering the electrical machine type
- Investigation of a disconnect unit
- Holistic optimization under the aspect of technical and economic objectives

Bastian Krüger, M. Sc., Doctoral Student, Advanced Development Transmission and Powertrain, Co-Authors: Dr.-Ing. Dirk Dennin, both BMW AG, Munich and Prof. Dr.-Ing. Peter Tenberge, Ruhr-Universität Bochum, all Germany

The rising Challenges of AI in the Automotive Industry
- AI in automotive on a large scale
- Challenges of AI in the automotive industry – Tool and partner selection, data management, Data Scientist availability, security and industry trends
- Use cases and best practice examples

Lawrence Vivolo, Senior Business Development Manager, Storage, Semiconductor and Automotive Design and Manufacturing, Dell Technologies, Santa Clara, USA

12:45 Time for Business Lunch – Meet & Greet in the exhibition area and car presentation

Stream 1

Electric Drive
Dr. Markus Nussbaumer, BMW Group

14:15 BorgWarner P2 Modules – from HV to 48V
- Modular kit for P2 architectures – full coverage of all applications (PHEV, HEV and MHEV)
- Extended product portfolio – especially for 48V P2 hybrid powertrains

Dipl.-Ing. (TH) Martin Dilzer, Technical Specialist eProducts, BorgWarner Drivetrain Engineering GmbH, Ketsch, Germany

14:45 Technology Building Blocks for future Electric Drive System
- Advanced EM and PE cooling for higher peak and nominal power
- SiC MOSFETs, 800V and variable high frequency switching strategy for best PE efficiency
- Enhanced control for high efficiency and smooth operation
- Optimized system topology and control for highest power density and best cycle efficiency

Dipl.-Ing. Theodor Gassmann, Director Advanced Engineering GKN ePowertrain, GKN Driveline International GmbH, Lohmar, Germany, Co-Authors: John Foulsham and Daniel Beeby, both: GKN Innovation Centre UK, Abingdon, United Kingdom

15:15 Future High Voltage Architectures for Electric Vehicles – New Semiconductors enable 800V competitiveness
- Impact of Silicon Carbide on the drivetrain
- Holistic High Voltage architecture evaluation
- Future evolution of the high voltage architecture
- 400V and 800V gap is closing

Dr.-Ing. Philip Brockerhoff, Head of High Voltage Systems and Modules, Co-Author: Dr. Ayman Ayad, both Vitesco Technologies GmbH, Regensburg, Germany

Stream 2

Dedicated Hybrid Transmission
Dr. Carsten Bünder, Magna

Novel "Two-Drive-Transmission for Long-Range" Powertrain: Ecology and Efficiency meet Driving Comfort
- Novel Dedicated Hybrid Powertrain Concept
- Electric and Hybrid Multi-Speed Transmission with two E-Motors
- Improving Ecology, Efficiency and Driving Comfort

Felix Langhammer, M. Sc., Research Associate, Co-Authors: Aaron Kappes, M. Sc. and Dr.-Ing. Andreas Viehmann, all TU Darmstadt, Germany

E-Axle with multi driving modes for BEV & Mild HEV P4
- Dual Motor-2Speed e-Axle with 4 driving modes and 2 regeneration modes
- High performance, max. speed and low electric power consumption in real world
- Easy & flexible adaptation with thin and flat design
- Seamless shifting

Kotaro Hirano, Manager Product Development, Co-Author: Tomoyuki Hara, both UNIVANCE Corporation, Washizu, Japan

Scaling the functionality of a DCT-based DHT to segment-specific requirements – the new high torque DHTplus
- The new DHTplus considering segment-specific requirements
- Further functionalities for higher vehicle segments
- Detailed solutions for best possible efficiency and performance

Dr.-Ing. Sebastian Idler, Engineering Project Leader Hybrid Transmissions, Co-Author: Dr.-Ing. Carsten Bünder, both Magna PT B.V. & Co. KG, Untergruppenbach, Germany

Stream 3

Testing
Dipl.-Ing. Georg Bednarek, Stellantis

High-voltage component test of battery electric vehicles? Only in a system context!
- Requirements for system interconnection tests of automotive high-voltage systems
- Complexity through variant diversity in powertrain configurations
- Simulation of vehicle components that do not yet physically exist

Dipl.-Ing. (FH) Konrad-Fabian Wittwer, Team Manager Measurement Hardware & Products, Co-Authors: Sven Hönicke and Jens Liebold, all IAV GmbH, Stollberg, Germany

Development of a method for the automated validation of the shift quality of modern dual clutch transmissions on full-vehicle test benches
- Complete automation of the test sequence and result evaluation
- Control of the vehicle by signal manipulation
- Approach to time optimization of maneuver catalogs
- Realistic calculation of the longitudinal acceleration based on the wheel torques

Dipl.-Ing. John Köber, Application Engineer, Co-Authors: Dipl.-Ing. (FH) Thomas Breitinger, both Dr. Ing. h. c. F. Porsche AG, Stuttgart and Univ.-Prof. Dr.-Ing. Dr. h. c. Albert Albers, Karlsruher Institut für Technologie (KIT), all Germany

Development of an innovative and modular test bench to analyze gear shift in electrified powertrains
- Conception and construction of a test bench to analyze gear shift
- Modular design for an easy exchange of the test unit
- Testing of a smart gear shift actuator using the test bench
- Investigation of the gear shift behavior of dog clutches with angular position controlled synchronization or differential speed

Guanlin Gao, M. Sc., Research Associate, Co-Authors: Daniel Schöneberger, M. Sc. and Prof. Dr.-Ing. Stephan Rinderknecht, all TU Darmstadt, Germany

15:45 Be interactive – Meet & Greet in the exhibition area and car presentation

Stream 1 – Auditorium

16:30 Rethink the wheel: Respectfully activating and informing young people on YouTube & Co.
Marvin Neumann, B. A., Producer, Editor and Moderator, objectiv media GmbH, Mainz, Germany

17:15 What is Mobility for the Generations X, Y and Z?
Prof. Dr. Joost van Treeck, Dean of Studies Business Psychology (M. Sc.), Fresenius University of Applied Sciences Hamburg & Managing Director, Cronbach GmbH, Hamburg, Germany

18:00 End of the 1st Congress Day

18:30 Dritev Night – The place you have to be!
Your networking spot for the international powertrain community: Meet colleagues and project partners and use the informal atmosphere to get to network anew.
Meeting Point: Pier "Alter Bundestag"

Dritev interactive – New ideas, more added value for your business

Speakers Corner

Ask the drive system experts

Do you still have questions? You are welcome to meet our speakers in the speakers corner following the sessions. Straightforward, subject-specific and instantaneously.

Car Presentation

Powertrain systems with an emotional appeal

Be it a standard vehicle, a fancy roadster or a real headturner – they all need to be presented to their audience in their own specific way, no matter how perfect the drive unit. Learn about current vehicle concepts and ask the experts at the congress about the vehicles' characteristic features and how the specific drive solutions have been integrated.

Media Partner

POWDER METALLURGY REVIEW

2nd Congress Day
Thursday, October 14, 2021

Stream 1
Simulation
Dr. Thomas Casper, Porsche

08:30 Finite Element approach for analyzing noise and vibration in electric drives
- Simulation approach for analyzing noise and vibration in electric drives
- Realistic modelling of the mutual influence in the motor transmission interface
- Analysis of the acoustic impact of manufacturing defects and component tolerances

Dr.-Ing. Annette Fröhlcke, Development Engineer, Co-Authors: Dr.-Ing. Michael Felbermaier and Dipl.-Ing. Alfons Britten, all Dr. Ing. h. c. F. Porsche AG, Weissach, Germany

09:00 Thermal Simulation according to Maturity Level in E-Drive Development
- Cooling system as a key element for the overall system performance
- Demand for thermal simulation at different stages of development process
- Overview of cooling methods and system architectures for e-drives
- State of the art CFD, multi-phase spray, CHT, and system simulation methods
- A maturity level oriented systematic approach for thermal simulation of e-drives

Dr. Kemal Caliskan, Manager Simulation Electric Drives, Co-Authors: Philipp Neidhardt and Dr. Rohith Kasibhatla, all ZF Friedrichshafen AG, Schweinfurt, Germany

09:30 Advanced Design of Dedicated Hybrid Drivetrains
- Holistic and modular method for computerized generation and optimization of 3D design concepts of Dedicated Hybrid Drivetrains
- Algorithms for densely packed 3D CAD models: Combining the component dimensioning with a predictive collision analysis in consideration of vehicle platform requirements
- Validation of different solving algorithms and a cost function based evaluation using case studies

Dipl.-Ing. Marco Giannantonio, Electrified Drivetrain Concepts, Co-Authors: Dr.-Ing. Steffen Henzler, both Mercedes Benz AG, Stuttgart and Prof. Dr.-Ing. Stephan Rinderknecht, Institute for Mechatronic Systems, TU Darmstadt, all Germany

Stream 2
Actuation Systems
Dipl.-Ing. Hans-Peter Fleischmann, AUDI

Shifting Performances Validation of a dog clutch for multi-speed eDrives
- Torque interruption during shifting is the main hurdle for a massive adoption of multi-speed transmissions
- The dog clutch technology and its major benefits regarding electric actuation, zero-backlash, progressive engagement and high efficiency
- Optimization of system settings to obtain various shifting DNA's, like comfort and sport shifting

Ir. Gilles Herbillon, e-Drives Development Manager, VCST, Sint-Truiden, Belgium

Flexible Electro-hydraulic Actuation Systems for Multi-speed Electrified Drivetrains
- Requirements for actuation systems in multi-stage electrified drivetrains for passenger cars
- Presentation of newly developed flexible electro-hydraulic concepts based on proven series technology
- Highly efficient actuation of shift elements by high and low pressure systems

Dipl.-Ing. Alexander Nees, Supervisor Application Engineering Hydraulics, Co-Author: Dipl.-Ing. (FH) Matthias Burmeister, both BorgWarner Drivetrain Engineering GmbH, Ketsch, Germany

Modular Park by Wire System for Electric Drive Units
- Safety critical
- Mechanical park lock system actuated by wire
- Extraordinarily compact
- Current multi speed power-shift EDU

Dipl.-Ing. Ralph Fleuren, Product Manager, Co-Authors: Dr.-Ing. Gereon Hellenbroich and Dr.-Ing. Jan Nowack, all FEV Europe GmbH, Aachen, Germany

Stream 3
Tribological Systems
Prof. Dr.-Ing. Karl-Viktor Schaller

Test method A/16,6/90 with injection lubrication for discriminating different lubricants for dual-clutch transmissions
- Scuffing load capacity of lubricants for dual-clutch transmissions
- Standardized test method A10/16,6/90 with dip lubrication
- Test method A/16,6/90 with injection lubrication

Dr.-Ing. Michael Hein, Head of Department Worm gears and Bevel gears, Fatigue life analysis, FZG, Technical University of Munich, Co-Authors: Dr.-Ing. Daniel Kadach, AGCO GmbH and Prof. Dr.-Ing. Karsten Stahl, FZG, Technical University of Munich, Garching, Germany

Functionalized Twaron® aramid pulp in friction paper for enhanced performance in AT systems
- New aramid pulp product resulting in significantly increased friction paper strength at similar paper porosity
- Use of this pulp product enables the production of friction paper to meet increasing performance demands in terms of strength and friction behavior

Dr. ir. Micky Vertommen, Researcher, Product & Application Development, Co-Authors: Ing. Frank Diedering-Ypma and Dr. Tony Mathew, all Teijin Aramid B.V., Arnhem, The Netherlands

Development of a new test method to investigate the wear behavior of hypoid gear oils
- Wear investigations of gear oils
- Development of a wear test of hypoid oils
- Presentation of initial experimental results

Alexander Drechsel, M. Sc., Research Associate, FZG, Technical University of Munich, Garching, Germany

10:00 Frontloading in (Hybrid-) Transmission integration at BMW using multidimensional Objective Assessment of Vehicle Character – Introduction of a new Methodology showcasing PowerOn-Upshifts in the Conflict Area of Emotional Branding

- Frontloading during the vehicle development process
- Driveability assessment – Vehicle characteristics
- PowerOn-Upshift strategies (comfortable, dynamic…)
- Pattern recognition in measurement data

DI Andreas Ramsauer, Development Engineer, AVL List GmbH, Graz, Austria, Co-Authors: Armin Pujari, BMW AG, Munich, Germany and DI (FH) Patrick Schatz, AVL List GmbH, Graz, Austria

Parking Lock Integration for Electric Axle Drives by Multi-Objective Design Optimization

- Optimal parking lock integration by computer-based design method
- Considering effects of parking lock package and parking-lock-induced load cases
- Multi-objective optimization on e-drive system level
- Complexity reduction by supporting decision-making in the early development phases

Dipl.-Ing. Dominik Lechleitner, University Project Assistant, Institute of Automotive Engineering, Co-Authors: Dipl.-Ing. Martin Hofstetter, both TU Graz and Dipl.-Ing. Christoph Gsenger, Magna Powertrain GmbH & Co. KG, Albersdorf-Prebuch, all Austria

Democratizing & promoting detailed lubricant considerations early in the Design Process to support efficiency-led Optimization for Transmissions

- Considering detailed lubricant properties early in the product development process to optimize transmissions for efficiency
- Integrating lubricant suppliers with OEMs/customers through a streamlined process
- Designing and optimizing lubrication by taking into account real contact conditions

Dhruva Aaradhya, Product Manager, Romax Technology part of Hexagon, Nottingham, UK

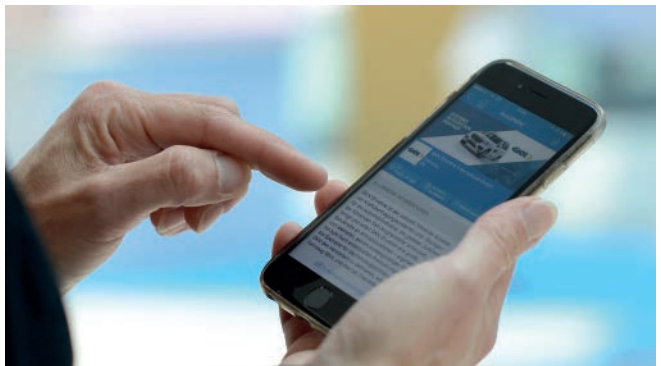
10:30 Be interactive – Meet & Greet in the exhibition area and car presentation

Stream 1 – Innovation Slam

11:15 The Innovation Slam is our offer to start-ups, future workshops, incubators … from the powertrain community:
Start-ups, researchers, developers and innovators present their current projects in a witty short form on the Dritev stage.
In a maximum of 10 minutes, they introduce their innovative applications, which will be part of the next generation of powertrains.

Apply with a meaningful title and abstract of max. ½ DIN A4 page by August 31, 2021 to **rothhagen@vdi.de.**
All participants of the Innovation Slam will receive free professional communication training for preparation.

12:45 Time for Business Lunch – Meet & Greet in the exhibition area and car presentation



Program

Stream 1

E-axles and Electrified AWD
Dr. Rainer Link, GKN ePowertrain

14:15 Hybrid AWD Challenges and Benefits for Specific Vehicle Categories – Challenges and Solutions
- CO_2 benefits of all-wheel drive electrification
- Improvement of longitudinal and lateral dynamics
- Cost benefits through adaptable hardware and software modules
- Scaling electrification for vehicle-specific traction and dynamic requirements

Simon Kaimer, Global Product Manager AWD 4WD eDS Attributes and Function, MAGNA Powertrain GmbH & Co. KG, Lannach, Austria

14:45 TREMEC HYbrid DRive Axle – Hybridization enables RWD dynamics in a FWD car
- Mechanical AWD and e-AWD combined in one
- Rear wheel drive biased driving experience
- Torque vectoring functionality for added fun to drive
- Modularity to add or remove functions

Ir. Jannick De Landtsheere, Chief Engineer Design & Development, TREMEC, Zedelgem, Belgium

15:15 AVL Light DCT Highly Efficient 2 Speed e-Axle, Shiftable under Load
- High speed E-Machine
- Smart Park Lock
- Single Dry Clutch – For the ultimate improvement of the transmission efficiency, we use a dry multi plate clutch in the AVL architecture
- Power flow architecture guarantee a comfortable power shift with low-loss gear shifting

Dipl.-Ing. Christian Schmidt, Project Manager Design, Co-Authors: Henrik Dhejne, both AVL List GmbH, Graz, Austria; Joakim Karlsson, AVL MTC Motortestcenter AB, Haninge, Sweden and Dr. Zhong Hu, HUAWEI Technologies Co. Ltd.

15:45 Switch to auditorium

16:00 Awarding of the Best Presentation Award for Junior Engineers (Stream 1)

16:15 Closing remarks and end of congress

Stream 2

Shifting Elements and Dampers
Dipl.-Ing. Volker Heinz, BorgWarner Drivetrain Engineering

Energy-efficient hydraulic control for the multi-speed transmission of an electric vehicle
- Energy efficiency of electric drives and its influence on the range and top speed of electric vehicles
- The use of multi-speed transmissions in electric vehicles and their influence on the range
- Energy efficiency analysis of the transmission HCU and its hydraulic controls
- Increase of energy efficiency through accumulator charging circuits

Dipl.-Ing. (FH) Thorsten Hillesheim, Technical Director, Freudenberg Sealing Technologies, Remagen, Germany

The Pendulum Rocker Damper: Providing flexible damper characteristics for hybrid powertrains
- Requirements of torsion dampers for hybrid powertrains
- Limitations with state-of-the-art torsion dampers
- New concept "Pendulum Rocker Damper" based on innovative coil spring actuation
- Application examples in combination with torque limitation systems within different hybrid powertrain architectures

Dr.-Ing. Martin Häßler, Expert Advanced Engineering Clutch Systems, Co-Author: Dr. Olaf Werner, both Schaeffler Automotive GmbH & Co. KG, Bühl, Germany

Modular Starting and Damping System integrated in 48 V Hybrid Architectures
- Starting system for hybrid vehicle architectures to increase efficiency
- Enabler for beltless combustion engines
- Axial short Damper including ICE start system

Dr.-Ing. Tobias Kaufhold, Engineer Advanced Product Engineering, Co-Authors: Florian Schneider, M. Sc. and Dipl.-Ing. Alexander Moser, all BorgWarner Drivetrain Engineering GmbH, Ketsch, Germany

Stream 3

Construction and Design of Components
Prof. Dr.-Ing. Karsten Stahl, Technical University of Munich

Simulation of induced axial forces on planetary wheel bearings at example of ZF's 8-speed automatic transmission
- Identification of sources for induced axial forces in a planetary gear system by Finite Elemente simulation under high rotational velocities
- Assessment of influences of manufacturing tolerances and derived potentials for optimization
- Reduction of computational costs by integration of innovative methods (co-simulation, reduced order models)

Dipl.-Ing. Simon Dussinger, Team Leader Crash, Impact & Safety Virtual Performance Solution, Engineering System International GmbH, Neu-Isenburg, Co-Authors: Dr. Bernd Harter and Bernd Wiedenmann, both ZF Friedrichshafen AG, all Germany

Shift elements with low drag losses, high actuation energy efficiency and integrated overload protection
- Two solutions for stable-state (cone-) clutches: Through bistable disc spring or spring energy store and change of force sense
- Low drag losses and high energy actuation energy efficiency by energy store without outer forces
- Integrated overload protection: Elimination of peak torques and protecting neighbor components in drivetrain

Dr.-Ing. (FH) Tobias Skubacz, Development Engineer, Co-Authors: M. Sc. Christoph Burkhardt and Dipl.-Ing. Hendrik Sura, all Diehl Metall Stiftung & Co. KG, Röthenbach a. d. Pegnitz, Germany

Gear Design Challenges of 2-speed-AMT High Torque E-Drives
- Gear Macrogeometry and Microgeometry Design
- Design requirements of gearbox system components and their influence on gears
- Achieving Robustness against manufacturing variation
- Gear Whine Analysis to confirm the design process

Pranav Barve, B. Eng., Electric Drives System Architect, VCST, Sint-Truiden, Belgium

VDI Society Product and Process Design

The VDI Society Product and Process Design (VDI-GPP) and its technical divisions provide all sectors with verified knowledge on the design of products and processes and their optimization in terms of quality and the time- and cost-benefit ratio.
This verified knowledge covers the entire product lifecycle, from the product idea and product development, marketing and service to recycling using optimized methods, tools and systems, including the necessary information technology.
This ensures the successful connection of market and technology for the purpose of sustainable growth and profit. The VDI-GPP – as the largest technical division in the VDI – provides a platform for specialist discussion and cooperation ranging from the technological state of the art and continuous improvement to trends in development.
The task of the VDI-GPP is to concentrate the extensive range of services of the VDI in these fields, display them in summary and constantly improve them. This also includes the lively exchange of ideas with other VDI societies. The activities of the society are planned and coordinated by an advisory board staffed with decision-makers working on an honorary basis.
The secretariat is located in the VDI building in Düsseldorf. Besides the main secretariat, the regional chapters, which take care of the VDI members in their own areas, include work groups active in the field of product and process design.

VDI Society Automotive and Traffic Systems Technology

The VDI Society for Vehicle and Transport Technologies, VDI-FVT in short, has around 28,000 members that are affiliated to at least one of its 8 technical sections. This makes it the second biggest of the VDI's dedicated societies. VDI-FVT is the community for engineers working in the vehicle industry, as well as for engineers dealing with transport and traffic outside manufacturing industries.
Traditionally, a majority of members work in automotive. VDI-FVT is the German affiliate of the world federation of automotive engineers' societies, FISITA, and it is the intellectual sponsor of many big conferences on automotive technology and thus fosters exchange and knowledge transfer both nationally and internationally. It also sponsors Formula Student Germany, awarding VDI membership to all German participants, and promotes other student competitions for transport engineers. VDI-FVT has recently reconstituted technical sections for rail and marine technologies, as well as space and aircraft. It is putting a strong focus on transport and traffic in general and aims to mediate between technology and society.

7th International VDI Conference

"Drivetrain Solutions for Commercial Vehicles"

October 13-14, 2021, World Conference Center Bonn, Germany

Main topics:

- Reduction of CO_2 emissions based on driveline optimization
- Discussion of new drive technologies: BEV, fuel cells, e-PTO
- Dimensions and scale of electrical components e. g. e-axles
- Best practices for the hybridization of commercial vehicles
- Future and improvements in efficiency of conventional powertrains
- Data and cyber security in the driveline system

Conference chair:

Dipl.-Ing. Thomas Landsherr, Vice President, Engineering Powertrain – Transmission and Driveability Development (EPD), MAN Truck & Bus SE, Munich, Germany

Meet international experts from

AVL Commercial Driveline & Tractor Engineering | BPW Bergische Achsen | Brudeli Green Mobilty | CLEPA | ESCRYPT | Faun Umwelttechnik | FEV Group | Ford Otosan | Fraunhofer Institute for Solar Energy Systems ISE | Fraunhofer Institute for Transportation and Infrastructure Systems IVI | Hino Motors | Hyundai Motor Company | IAV | J.M. Voith | Liebherr-Mischtechnik | MAHLE Filtersysteme | MAN Truck & Bus | RhoMotion | Scania | VDA | ZF Friedrichshafen | ZF Group, Commercial Vehicle Control Systems, WABCO

Further details and the final program can be found here
www.vdiconference.com/01TA809021

Free of charge for the participants of the Dritev Congress

9 am – 5 pm Maritim Hotel Bonn

Workshops are held in German only

Entwicklung und Funktion brennstoffzellenbasierter Antriebssysteme

Ihre Leitung: Dipl.-Ing. Sascha Ott, Mitglied der Institutsleitung und Geschäftsführer, IPEK – Institut für Produktentwicklung und KIT-Zentrum Mobilitätssysteme, Karlsruher Institut für Technologie (KIT)

Zielsetzung

Der Spezialtag vermittelt die Grundlagen von Brennstoffzellenantrieben in automobilen Antrieben. Die Teilnehmenden lernen das Basiswissen zum Aufbau und Funktion dieser Technologie kennen, aber auch Methoden zur Entwicklung und Validierung von brennstoffellenbasierten Antrieben. Darüber hinaus werden mögliche Konfigurationen und Möglichkeiten zur technisch-wirtschaftlichen Bewertung vermittelt. Es werden die entwicklungstechnischen Herausforderungen bei der Umsetzung beleuchtet, wie z. B. welche Antriebstopologien für eine möglichst lange Lebensdauer der Brennstoffzelle besonders gut geeignet sind. Zudem werden Energieeffizienz, Lebensdaueraspekte, Kühlung aber auch NVH-Verhalten diskutiert.

Inhalte des Spezialtages

- Grundlagen der Brennstoffzellentechnologie
- Antriebsarchitekturen für den Einsatz von Brennstoffzellen
- Ökonomisch und ökologisch sinnvolle Antriebssysteme identifizieren
- Entscheidungshilfen für die Auswahl der Antriebstopologien
- Wärmehaushalt von Brennstoffzellenantrieben verstehen
- NVH-Verhalten von brennstoffzellenbasierten Fahrzeugen
- Besonderheiten und Unterschiede zu batterieelektrischen Antrieben

Mehr Details unter: www.vdi-wissensforum.de/01ST805021

Chancen für die agile Systementwicklung durch ASD-Agile Systems Design

Ihre Leitung: Katharina Dühr, M. Sc., Leiterin, Forschungsgruppe für Entwicklungsmethodik und Entwicklungsmanagement, IPEK – Institut für Produktentwicklung, Karlsruher Institut für Technologie (KIT)

Zielsetzung

Agil und Antriebssystementwicklung – wie passt das zusammen? Fokus dieses Spezialtags ist die Erarbeitung von Lösungen zum gezielten Einsatz von Agilitätsansätzen in der Antriebssystementwicklung durch ASD – Agile Systems Design. Dies erfolgt durch Vorstellung von Grundlagen agiler Entwicklungsmethodiken, sowie deren system- und branchenspezifischen Implementierung anhand von Beispielen aus der Praxis. Die Teilnehmenden können dabei eigene Beispiele aus der täglichen Arbeit einfließen lassen.

Inhalte des Spezialtages

- Agilität in der Antriebsystemtechnik: Chancen, Herausforderungen und Lösungen für die Praxis durch ASD – Agile Systems Design
- Typische Aktivitäten, Situationen und Aufgaben in der Antriebssystemtechnik identifizieren, kategorisieren und priorisieren
- Identifikation von Hemmnissen beim gezielten Einsatz von Agilität zur Aufgabenbewältigung
- Ausarbeitung von Lösungen zur Überwindung der Hemmnisse durch die Prinzipien des ASD – Agile Systems Design
- Reflexion der Erkenntnisse und gemeinsame Definition potentieller nächste Schritte in einer interaktiven Plenumsdiskussion

+ Interaktiver Schnupperkurs: Scrum erleben und erlernen leicht gemacht

Mehr Details unter: www.vdi-wissensforum.de/02ST385021

NVH im E-Antriebsstrang

Ihre Leitung: Mario Schwalbe, Teamleiter NVH, IAV GmbH, Stollberg

Zielsetzung

Die Qualität von elektrifizierten und rein elektrischen Fahrzeugen wird endnutzerseitig immer stärker auch durch Geräusche, Vibrationen und Schwingungen beurteilt. Während bei hybriden Antrieben mit geringer elektrischer Leistung bekannter maßender Verbrennungsmotor viele Phänomene überdeckt erfordern speziell Plugin-Hybrid- und rein elektrische Fahrzeuge eine kritische Analyse bestehender Ansätze. Dieser VDI-Spezialtag bietet eine Einführung in Begrifflichkeiten, Konzepte und Methoden der Fahrzeugakustik. Gezeigt wird unter anderem, wie der Weg von der Anregung bis zur Schallabstrahlung mittels FEM in einem digitalen Zwilling abgebildet werden kann. Markante Beispiele werden dabei detailliert erörtert und Lösungsvorschläge aufgezeigt.

Inhalte des Spezialtages

- Grundlagen Geräusche, Vibration und Schwingungen
- NVH in der Fahrzeugakustik
- Anregung, Schwingungsentstehung und Übertragungspfade im Elektromotor und in der Verzahnung
- Mehrkörpersimulation zur Berechnung von körperschallrelevanten Größen
- Finite Elemente Methode zu Bestimmung von luftschallrelevanten Größen
- Der digitale Zwilling im NVH-Kontex

Mehr Details unter: www.vdi-wissensforum.de/01ST022021

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Sollten die Spezialtage nicht als Präsenzveranstaltungen stattfinden können, werden sie digital durchgeführt.

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The participants – Your customers

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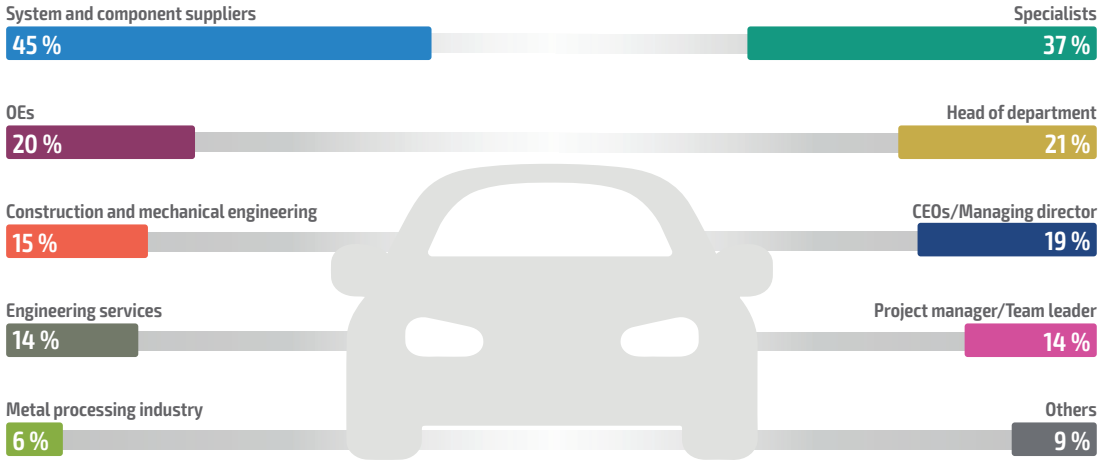

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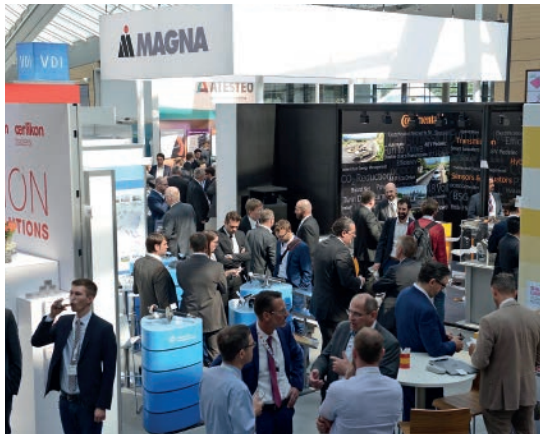

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