Automotive 48 Volt Power Supply and Electrification Systems Forum

Key Learnings Benefit

- Meet the world’s top 48V professionals to discuss future trends and drivers for electrification
- How to understand the background to the Indian passenger car market and its consumers
- How to see potential solutions of 48V technology appraised against this market
- Gain insight into EU technology roadmap
- Envisioning how the new hybrid functions which increase comfort, drivability and fuel economy at low absolute add-on cost
- Understand the potential for wider systems electrification with a 48v architecture
- Explore energy saving potential if straight crank assist versus use of recovered power in other areas

In the Chair Day 1
Dr. Heinz Rebholz
Senior Engineer for Energy Systems
Porsche

In the Chair Day 2
Robert Ball
Lead Engineer – Electrical Engineering
Tata Motors European Technical Centre

Speaker’s Committee

Bernhard Klein
Head of Business Development, Hybrid Electric Vehicle BU
Continental

Olivier Coppin
Powertrain Systems Innovation and System Engineering Director
Valeo Powertrain Systems Business Group

David Alexander
Senior Analyst, Energy
Navigant Research

Dr. Andrés Caldevilla
Technical Manager - Advanced Research, Corporate R&D Eching
Denso International Europe

Andreas Baumgardt
Head of Drive Control / Battery System
volabo

Adrian Patzak
Managing Director
volabo GmbH

Dr Will Drury
Global Technical Expert – Power Electronics
Ricardo Group

Daniel Lautensack
Head of LPG Electric Vehicle Charging Infrastructure
ABB

Ryan Maughan
Managing Director
AVID Technology Group Limited

Dr. Anton Mayer
Vice President Corporate Engineering & R&D
Core Product Group
Magna International Europe

Anton Z. Miric
Head of Product Management, Materials Solutions, Global Business Unit
Heraeus Electronics

Peter Dietrich
Product Manager Materials Solutions
Heraeus Electronics

Anthony Law
Product Manager
McLaren Applied Technologies

Magnus Boh
Scientific Assistant, Laboratory for Power Electronics, Electrical Drives and Automation Engineering
Cologne University of Applied Sciences

Christoph Fehrenbacher
Managing Director Europe
A123Systems

Maik Cordes
Technical Sales Lead EMEA
Johnson Controls Power Solutions

Dirk Spiers
President
Spiers New Technologies

Pete James
Director / Technical Specialist
Lyra Electronics

David Hellwig
Business Development Electrification Germany
AVL DEUTSCHLAND GMBH

Documentation Sponsor:

AVL

For further information on speaker & delegates opportunities, please contact:
John Isaac, Tel: +420 270 005 479, Email: johni@bisgrp.com
Wednesday 15th February 2017

08:00 Registration and Morning Coffee
08:30 Chairman’s Opening Remarks
08:40 Round table Discussion and Card Exchange

This is an early opportunity in the conference for all participants to make a few minute introductory speeches, learn about each other’s experience, projects and network with other attendees.

48 VOLT SYSTEMS: CONTEXT AND OVERVIEW

09:00 Opening Address

48 Volt Market Expectation and Volume Predictions
- Motivation of 48V technology
- Pros and cons
- Trends in 48V
- What is the future of 48V?

Bernhard Klein
Head of Business Development Hybrid Electric Vehicle BU Continental

09:30 Case Study

48V Systems (functions / components) and Advantages
- Drivers for hybridization
- Low voltage hybrid functions
- Introduction to boosted hybrid
- Effect on pollutants
- Net board architecture modularity
- Components modularity and scalability
- 48V road map vs other tensions systems

Olivier Coppin
Powertrain Systems Innovation and System Engineering Director
Volvo Powertrain Systems Business Group

10:00 Case Study

48V Application to the Indian Market
- India is a huge market for passenger cars, with some significant differences to western markets
- Indian traffic is unique(!)
- 48V mild hybrid technologies have the potential to fit well in India

Robert Ball
Lead Engineer – Electrical Engineering
Tata Motors European Technical Centre

10:30 Case Study

Projected Low-Voltage Technology Adoption
- 48V Technology Trends
  - 12V start-stop limitations
  - 48V micro hybrid
  - Electric turbochargers
  - Motors/generators
  - Other potential 48V technology
  - 48V Energy Storage Technology
  - Li-ion batteries
  - Advanced lead-acid batteries
  - Ultracapacitors
  - Flywheels

David Alexander
Senior Analyst, Energy
Navigant Research

11:00 Morning Coffee and Networking

11:30 Case Study

Technology Roadmapping and Link to 48V Power Supply and the Different Car Segments
- Comparing and adding 48V device to the technology roadmaps for different car segments

Dr. Andrés Calderella
Technical Manager - Advanced Research, Corporate R&D Eching
Denso International Europe

12:00 Case Study

48V Traction – A Safe, Cheap and Efficient Alternative
- State of the art: Power below 20 kW @ 48V
- Presentation of a novel extra-low voltage drivetrain up to 300 kW (ISCAD)
- Enhancement of driving range due to high efficiency
- Advantages and challenges of 48V traction

Adrian Patzak
Managing Director
volabo GmbH

12:30 Case Study

High Power Roadmap for Electric Vehicles
- Current status of charging infrastructure
- Available vehicles in the market
- Challenges for electric infrastructure
- The Charging infrastructure for the upcoming years

Daniel Lautensack
Head of LPG Electric Vehicle Charging Infrastructure, ABB Automation Products

13:00 Lunch Time
14:00 Coffee and Networking Break

INNOVATIVE MATERIALS AND COMPONENTS FOR COST REDUCTION

14:10 Case Study

48V Customer Value and Cost Weighing:
Customer Value versus Total Costs Discussion of 48 V Systems
- Innovative Material Solutions for 48V Power Modules
  - Highly reliable substrate-die attach material solution system
  - Reduces complexity and cost of module assembly process
  - Enable residue free die attach process and eliminate post reflow cleaning process
  - Significantly reduce oven maintenance effort due to less contamination by flux condensates
  - Reduce Capex and save production floor space
  - Yield improvement through less splatter

Jointly presented by:
Anton Z. Miric
Head of Product Management, Materials Solutions, Global Business Unit
Heraeus Electronics
Peter Dietrich
Product Manager Materials Solutions
Heraeus Electronics

14:40 Case Study

48V Electrification Taking a Systems Approach Beyond Crank Assist
- Examining the potential for a wider systems approach to 48V electrification in light and heavy duty vehicles and smart energy utilisation in real world driving
- Delivering improved engine thermal management and emissions control through systems electrification
- Reducing total cost of vehicle development program through use of modular 48V electrified systems
- Improving the efficiency, performance and cost effectiveness of high voltage HEV and EV platforms through 48V ancillary systems

Ryan Maughan
Managing Director
AVID Technology Group Limited

EMISSIONS AND STANDARDISATION ISSUES

15:10 Case Study

48V systems – Much More than CO2 Reduction in 2025
- Why 48 V?
  - 48V for CO2 – Emission and Driving functionalities
  - 48V for Autonomous Driving
  - 48V for Comfort Feature
  - Expected Penetration Rates of 48 V
  - Technical Solutions

Dr. Anton Mayer
Vice President Corporate Engineering & R&D Core Product Group
Magna International Europe

15:40 Case Study

AVL 48V Mild Hybrid Solutions
- AVL diesel solution
- AVL gasoline solution
- AVL Strengths

David Hellwig
Business Development Electrification Germany
AVL DEUTSCHLAND GMBH

16:10 Case Study

48 Volt System - Hybridization and Electrification
- Approach the component development around 48V systems when observed from the system performance improvement view
- How some of the R&D work Ricardo is undertaking has shown significant improvement in CO2 emissions
- How electric machines and power electronics may evolve to provide further improvement and develop in line with 48V systems of the future

Dr Will Drury
Global Technical Expert – Power Electronics
Ricardo Group

16:40 Interactive Session: Standardisation Process
French car makers will submit an NWIP to ISO for a 48V standard. Currently the only available 48V standard is the German VDA 320 which is the 48V standard for automotive systems. International technical discussions about further standardisation will go into detail after handing in the NWIP to ISO in the second half of 2016.

Interactive plenary
- Key outputs from the sessions
- Conclusion and Next Steps
- Reflections from the delegates on the conference

17:30 Closing Remarks from the Chair and End of Day One
Thursday 16th February 2016

08:30 Registration and Morning Coffee
09:00 Chairman’s Opening Remarks

09:30 Case Study
**48V Traction Battery – xHEVs and BEVs**
- High power low voltage traction
- Introduction of a low voltage (48V) high power traction battery
- Investigation of a highly parallel cell configuration
- Measurement results of efficiency of parallel and serial connected cells

Andreas Baumgardt
Head of Drive Control / Battery System
volabo

10:00 Case Study
**Power Electronics for 48 V Systems**
- 48V architecture in motorsport applications
- Compact DC-DC converter design
- Low-volume manufacturing
- Potential automotive applications

Anthony Law
Product Manager
McLaren Applied Technologies

10:30 Case Study
**Elimination of the 12V Battery**
- Power consumption of the 12V grid
- Changed requirements of the 48V grid
- Advantages and disadvantages of a single 48V grid

Magnus Boh
Scientific Assistant, Laboratory for Power Electronics, Electrical Drives and Automation Engineering
Cologne University of Applied Sciences

11:00 Morning Coffee and Networking

11:30 Case Study
**Automotive 48V Li-Ion Battery Systems**
- Automotive 48V Battery Requirements
- System Design Challenges
- Li-Ion Cell Chemistry Options
- Use Case: Battery Sizing for Emission Reduction

Christoph Fehrenbacher
Managing Director Europe
A123 Systems

12:00 Break-out Session

Group A
**Design Challenges of High Power 48V Power Converters**

Pete James
Director / Technical Specialist
Lyra Electronics

Group B
**Impact of 48 Volt Applications to the CO2 Fleet Average Emissions**
- CO2 Reduction due to 48V

13:00 Lunch Time
14:00 Coffee and Networking Break

14:10 Panel Discussion
**How to manage dual 12V and 48V on-board systems**
- Which components should use which voltage?
- Are two batteries needed?
- Will all components eventually be 48V or is dual voltage effectively a permanent situation?

Moderator:
David Alexander
Senior Analyst, Energy
Navigant Research

Panellist:
Dr Maik Cordes
Technical Sales Lead EMEA
Johnson Controls Power Solutions EMEA

15:00 INTERACTIVE WORKSHOP
Workshops offer delegates the chance to dive deeply into the issues that can make the biggest difference to their organisations. Take the time to really work through the opportunities and challenges that you are facing, brainstorm solutions with other attendees and debate solutions and new directions with the workshop leaders.

Interactive Session: 48V systems are a distraction, time to move to full EV's
- Start Stop and mild hybrid is just a place holder
- We need the best engineers work on full EV's
- Full EV's offer the best experience

Dirk Spiers
President
Spiers New Technologies

17:00 Chairman’s Closing Remarks and End of Conference
We are the Business Intelligence Services company based in Europe. We believe that knowledge is the most powerful asset, especially, in the context of time and money. This inspires us to work with top professionals, global leaders and experts active in Oil & Gas, Energy, Construction, Telecommunications, Pharmaceutical, Automotive and Financial Services. We are an exclusive platform supporting ambitious, progressive and forward-thinking companies and empowering them with the best market practices for today’s fast changing markets.

- **Powerful KNOWLEDGE**
  …cutting-edge information, newest trends and valuable insights

- **Global BUSINESS LEADERS only**
  …senior executives, industry leaders, experts and decision-makers

- **NETWORKING opportunities**
  …connection with your peers, sharing experience and benchmarking

For more information see www.bisgrp.com
Conference Speakers

Andreas Baumgardt, Head of Drive Control / Battery System, volabo
Andreas Baumgardt was born in Muenchen, Germany, in 1987. He received the M.Sc. degree in Mathematical Engineering from the Universitaet der Bundeswehr Muenchen in 2011. Since then he is working at this university on his Ph.D. thesis in the fields of automotive power nets. In 2015 he continues his research in the FEAAM GmbH as senior scientist in the field of low voltage high power traction. Since 2016 he works as head of drive control in the volabo GmbH. His focus lies on control, power electronics and battery system.

Adrian Patzak, Managing Director, volabo GmbH
Adrian Patzak received his Master degree in Electrical Engineering from the University of Applied Sciences Regensburg, Germany, in 2011. He continued his scientific carrier at the Universitaet der Bundeswehr Muenchen where he worked as a research assistant mainly on automotive power systems and starter-generators. Since September 2015 he coordinates research and development on 48 V high power traction systems as a Senior Scientist at the Research Center for Electrical Drives and Actuators Munich. His focus is on efficiency improvement of electrical drives and safe e-mobility.

Anthony Law, Product Manager, McLaren Applied Technologies
Anthony is a Systems Engineer specialising in electric drive technology. During his 7-year career at McLaren he has worked on the hybrid system for the McLaren P1 road car and Formula One energy recovery systems. Since moving to McLaren Applied Technologies his focus has been on developing new business opportunities in the field of electric drive systems. He is now Product Manager within McLaren Applied Technologies’ Automotive business unit.

Anthony is a Systems Engineer specialising in electric drive technology. During his 7-year career at McLaren he has worked on the hybrid system for the McLaren P1 road car and Formula One energy recovery systems. Since moving to McLaren Applied Technologies his focus has been on developing new business opportunities in the field of electric drive systems. He is now Product Manager within McLaren Applied Technologies’ Automotive business unit.

Dr. Andrés Caldevilla, Technical Manager - Advanced Research, Corporate R&D Eching, Denso International Europe
Dr. Andrés Caldevilla holds degrees in electrical engineering from the Technical University of Madrid and in mechanical engineering from the Technical University of Vienna (2000). In 2008 he received the Ph.D. degree on energy storage devices for hybrid electric vehicles from the Technical University of Vienna. Since then, he is working in the field of electromobility. He completed in 2011 an MBA program in the University of Applied Sciences of Munich, specializing in project and contract management. Since 2011 Andrés is working for DENSO AUTOMOTIVE Deutschland GmbH (Eching, Germany). His current role in the Corporate R&D department is Advanced Research Technical Manager, focusing on new technologies and products. He leads the EU Technology Roadmap activity by DENSO International Europe and is involved in several EU-funded research projects (FP7, H2020), as well as EU technology platforms (ERTRAC, EGVIA, VDA FAT).

Anton Zoran Miric, Heraeus Deutschland GmbH & Co. KG, Hanau Germany, GBU Hereaues Electronics, Material Solutions, Vice President Product Management
Anton Miric studied Mechanical Engineering, Foreign Trade and Sales & Marketing Management and works at HDE-HET-Material Solution House in Hanau as Product Manager – focus of the activity are Material Solutions for power electronics. He has 25 years experience with joining, interconnect and substrate materials for micro- and power electronic applications. Anton Miric is member in different associations & committees, e.g. ECPE, ZVEI, NPE, VDA, eNova, INEMI.
Conference Speakers

Bernhard Klein, Director Business Development, BU Hybrid Electric Vehicle, Powertrain, Continental

Bernhard Klein has worked in the Automotive Electronics and Systems area for nearly twenty-five years and is currently the Director Business Development of the Hybrid Electric Vehicle Business Unit at Continental. During his career he has had several assignments in the area of Interior Systems in software and system design for navigation, telematics and multimedia systems. After a certain time as product and portfolio manager for interior and powertrain systems, Mr. Klein took over the responsibility for Strategy and Marketing of electric powertrain in Continental.

03/1995 – 05/2008 Interior
- Advanced Development, Multimedia Systeme
- Team leader, Telematics Software
- Group leader, Requirement Engineering

Introduction of Requirement Engineering Process
- Group leader Change Management
- Product Line Manager

Seit 06/2008 Powertrain
- Portfolio Manager, Segment Electric Drivetrain
- Portfolio Manager, BU Hybrid Electric Vehicle (HEV)
- Director Business Development, BU HEV

Daniel Lautensack, MBA, Head of LPG – Electric Vehicle Charging Infrastructure, ABB Automation Products GmbH

The ABB EVCI department has its focus on the DC fast charging infrastructure for electric vehicles. The focus is on fast charging within 15 min for private vehicles and up to 600kW for electric buses. Daniel is leading the department since May 2013. Daniel Lautensack was before he joined the EVCI department director for strategic business development Central Europe for the ABB Full Service® offering and started with ABB in July 2008. He was responsible for consulting, merger and acquisitions, marketing and sales. Prior to this appointment, Daniel Lautensack was Director Strategic Business Development for an International Consulting Company in the UK. Further he was working for DAZEL Europe in France, Documentum, InterCAP Graphic Systems, Universal Instruments and as Freelancer in several M&A and Outsourcing projects. Daniel Lautensack has a strong background in industries like Pharmaceutical, Oil & Gas, Discrete Manufacturing, Aerospace and Defense. Main projects where delivered to accounts like NOKIA, Lufthansa, Heidelberg Druckmaschinen, Exxon, TetraPak, Daimler, AstraZeneca, SAP, KLM, Lockheed Martin, Boeing and others on a global base. Daniel Lautensack has a degree in mechanical engineering, computer science and received his MBA in Finance and General Management from the Washington State University in Seattle.

David Alexander, Senior Analyst Energy, Navigant Research

David Alexander is a senior research analyst contributing to Navigant Research’s Transportation Efficiencies program, with a focus on hybrid and electric commercial vehicles, fuel efficiency technologies, and autonomous driving. He is responsible for the Advanced Transportation Technologies research service. Before becoming an analyst, Alexander worked for more than 22 years as an engineer and consultant in the automotive industry, completing projects for GM, Ford, Volvo, and Magna. Transitioning from automotive project management in 2002, Alexander worked as an editor at SAE Magazines, where he wrote and edited detailed technical articles for publications including Automotive Engineering International and Aerospace Engineering. Prior to joining Navigant Research, Alexander was a principal research analyst at ABI Research, where he led the firm’s automotive technology practice. He is often quoted in technical articles on the latest automotive technology in online and print publications. Alexander holds a BSc in mechanical engineering from Brunel University in London, England.

Dirk Spiers, President, Spiers New Technologies

Dirk Spiers is the founder and President of Spiers New Technologies. He is a pioneer and leader in the repair, remanufacturing and refurbishment of advanced battery packs as well as the manufacturing of Energy Storage Systems (ESS) with new or second life battery modules and cells. His experience in reman, battery, solar and wind technologies puts him at the forefront of developing programs to manage the life cycle battery packs and using battery storage systems with renewable energy sources. He has developed and established Advanced Battery Pack programs with some of the leading EV OEM’s. Spiers New Technologies specializes in the manufacturing, refurbishment and repair of high voltage powertrain systems and Energy Storage Systems. Their state-of-the-art, energy neutral, battery center is based in Oklahoma City where they work on the battery packs of all the leading OEM’s.

Dr. Heinz Rebholz, Senior Engineer for Energy Systems, Porsche

Heinz Rebholz was responsible for 48V systems and components at the Porsche development center. With the professorship for power electronics at the University of Applied Science HTWG Konstanz he is now working on new automotive power systems, 48V-Systems and DCDC converters.
Conference Speakers

Christoph Fehrenbacher, Managing Director Europe, A123 Systems
Christoph Fehrenbacher is the Executive Director European Technical Center at A123 Systems. Most recently, Mr. Fehrenbacher has focused on engineering support for automotive customers and new business development in Europe. Prior to joining A123 in October of 2010, Mr. Fehrenbacher spent 10 years at BEHR where he held several positions in advanced engineering and innovation management, including 4 years as a project manager for Lithium-Ion system development. Earlier in his career, he worked in energy storage development at the German Aerospace Center. Mr. Fehrenbacher holds a degree in Aerospace Engineering from the University of Stuttgart.

Magnus Boh, Scientific Assistant, Laboratory for Power Electronics, Electrical Drives and Automation Engineering, Cologne University of Applied Sciences
The ABB EVCI department has its focus on the DC fast charging infrastructure for electric vehicles. The focus is on fast charging within 15 min for Dipl.-Ing. (FH) Magnus Böhm. Since 2012, he works as a scientific employee at the Laboratory of Automation and Electrical Drives at the CUAS. He has specialized in development of converter for hybrid and electrical vehicles.

Maik Cordes, Technical Sales Lead EMEA, Johnson Controls Power Solutions EMEA
Maik Cordes joined Johnson Controls in 2001 and currently serves as the technical sales lead for Johnson Controls Power Solutions EMEA. In this role, he is responsible for automaker relationships across the full spectrum of their business and technology needs. Since joining Johnson Controls, Maik has held various roles with increased customer visibility as key account director for major OEMs both in China and Europe. Cordes received a diploma in analytical chemistry and a Ph.D. in Science from the University of Hanover Science.

Dr. Ing. Olivier COPPIN – R&D innovations Director VALEO Power Train
Following a mechanical engineer diploma (CET/ISUPMECA) and a PhD in mechatronics (Ecole Centrale de Paris), I joined PSA Peugeot Citroen as Cockpit architect. I joined then the Vehicle Architecture team and was in charge of the B Segment platform. After 10 years in synthesis architecture team, I created the Advanced Integration team in the Research and Innovation department, as responsible for the innovations integration in development vehicle projects. I joined then the alternative powertrain department and became responsible for advanced Hybrid and transmissions programs. After 7 years in this field I joined Valeo Powertrain team as R&D and innovation director, in charge of innovative prospection and advanced powertrain projects. I deal with systems and technologies addressing the fuel consumption reduction (hybridization, energy management and recovery, powertrain management optimization...). I’m also in charge of collaborative projects with external partners and customers.

Robert Ball, Lead Engineer – Electrical Engineering, Tata Motors European Technical Centre
Robert Ball is a Lead Engineer at Tata Motors European Technical Centre, where he develops HV batteries. He has worked on electric and hybrid vehicles of various types for over 20 years, in both academia and industry. Robert started as an engineering apprentice at BAE, graduated with a BSc Hons in Electronics, Computer and Systems Engineering from Loughborough University (UK) and later with an MPhil in automated testing from Lancaster University (UK). He has worked in the automotive industry since 2002, in which time he has been involved in the design and development of a variety of hybrid systems, from the first KERS systems for F1 racing through to hybrid commercial vehicle powertrains.

Ryan Maughan, Managing Director, AVID Technology Group Limited
Ryan Maughan, BEng, MSc, CEng, FIMechE, CHgr, MCMi is a Chartered Engineer and a Fellow of the Institute of Mechanical Engineers. He has a degree in Mechanical Engineering from University of Manchester and an MSc in Engineering from the University of Durham. Ryan founded the AVID Technology Group in 2004 and has led its growth and development ever since. Ryan spent his formative years learning about high performance engineering and developing a unique blend of hands-on practical skills with high-level engineering expertise in the motor sport industry. Followed by 4 years of working in a high precision machining business, AVID was born with the mission from the outset to develop new technology to reduce emissions and fuel consumption from vehicles through electrification and intelligent control. He has worked in the automotive industry since 2002, in which time he has been involved in the design and development of a variety of hybrid systems, from the first KERS systems for F1 racing through to hybrid commercial vehicle powertrains.

Dr. Will Drury, Global Technical Expert – Power Electronics, Ricardo Group
Dr. Will Drury is currently Global Technical Expert – Power Electronics across the Ricardo Group and is responsible for the delivery of electric machines, power electronics, battery pack and hybrid component development projects for Ricardo Europe, leading a team of engineers on the development and implementation of entire drive systems through client projects. Will supports Ricardo’s work on this across a worldwide client base delivering new technology platforms and working closely with existing and potential clients on technology innovation with extensive work with clients in Europe, China and the USA. He works directly on the application of electric drive (eMachines, power electronics and control) to a wide range of applications including automotive, rail, clean energy, marine and off-highway. Will has a keen interest in the development of power electronics and their application throughout the transport infrastructure looking at novel ways to apply existing products as well as embracing emerging technologies. Will is a Chartered Engineer, Fellow of the IET and Senior Member of the IEEE.