ELIV 2024

VDI-Berichte Volume 2441

Bonn, Germany 15-17 October 2024

ISBN: 979-8-3313-1464-4

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2024) by VDI Verlag GmbH All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact VDI Verlag GmbH at the address below.

VDI Verlag GmbH VDI Platz 1 40468 Dusseldorf, Germany

Phone: 49 211 61 88-560 Fax: 49 211 61 99-97560

www.vdi-nachrichten.com

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400 Fax: 845-758-2633 Email: curran@proceedings.com Web: www.proceedings.com

¬ AI Automotive ASIL & GenAI

	How to Integrate GenAl in Automotive Enhance GenAl or Change Development Philosophy? U. Bodenhausen, Vector Consulting Services GmbH, Stuttgart	1
	Speeding up Generative-AI in Software-Defined Vehicles J. Richenhagen, FEV.io, Aachen; M. Engelhard, FEV Consulting, Cologne; J. Jeub, FEV Consulting, Aachen; S. Kriebel, FEV.io, Munich; A. Kugler, FEV.io, Aachen	13
٦	Automotive Trend Session AI Automotive	
	Building and scaling a machine learning platform to unlock Al in connected car services S. Zimmermann, W. Lenders, T. Lian Abt, M. Kuhn, P. Weber, A. Ganser, BMW Group, Munich	29
	Quo vadis Vision Zero – Can Al help us to make our vision come true? P. Dreiseitel, R. Grewe, Continental AG, Frankfurt	41
	Auditing Guidelines for AI-based AD/ADAS Components focusing on AI Security G. Schneider, F. Woitschek, ZF Friedrichshafen AG, Artificial Intelligence Lab, Saarbrücken; A. von Twickel, R. Plaga, Federal Office for Information, Bonn	53
1	AI Automotive New Dimensions	
	From Niche to Mainstream: Harnessing Generative AI for Automotive Excellence GenAI is not Enough! A. Vickers, P. Fintl, D. Hughes, M. Roberts, Capgemini Engineering, Bristol/Munich/Oxford/Cambridge	67
	Al in Traffic: New Dimensions of Vehicle Intelligence New method for optimizing traffic flow through Al-based implementation of real-world traffic data from other road users K. Szelechowicz, K. A. Rösler, University of Applied Science Ruhrwest, Mülheim a. d. Ruhr	81
	Enabling Automotive MLOps with Open-Source Based Software X. Wang, A. Hübner, Bertrandt IngBüro GmbH, Gaimersheim; M. Kühl, Red Hat GmbH, Grasbrunn; B. Zlotnik, Red Hat Israel Ltd., Raʻanana, Israel	93

Automotive Trend Session Digital Homologation

	Statistical methods and Monte-Carlo simulation ensure the safety case of the environmental sensor performance in BMW's first L3 function, the BMW Personal Pilot L3 A. Schleich, F. Modes, T. Schaller, M. Werling, BMW Group, Munich	105
	The Path to Virtual Homologation Aspects of the necessary framework for product safety in ADAS/AD C. Wiegand, F. Sontheim, JE. Stavesand, dSPACE GmbH, Paderborn; A. Amoroso, Continental Corporation, Frankfurt am Main; S. Rößner, SIEMENS AG, Munich	117
1	Software/SDV	
	Has the holy grail been found? Using Linux for safety-related applications M. Neukirchner, Erlangen	127
	State-of-The-Art of Foundation Software for Software-Defined Vehicle L. Hendrawan, R. Martin, L. Abdelkader, Blackberry QNX, Munich, Ottawa, Canada	133
	Managing the complexity of joint steering, braking and powertrain coordination in emerging vehicle E/E architectures N. Haegele, Robert Bosch GmbH, Abstatt	141
1	Software Open Source	
	AUTOSAR and SOAFEE as Part of the SDV Alliance: Unifying the Software Defined Vehicle Ecosystem M. Niklas-Höret, AUTOSAR, Munich; B. Rill, Arm, Munich	151
1	Software Cloud, Connect & Rust	
	Automotive Vehicle Connectivity 2030 G. Schmitt, F. Fitzek, M. Gruffke, BMW Group, Munich	157
	LightOpen – a cloud-based lighting personalization service M. Peter, HELLA GmbH & Co. KGaA, Lippstadt	167

	Bring TSN cloud native support to SDV architectures F. Ozog, SOAFEE hypervisor working group, Paris, France	179
	Rust integration based on interoperability in legacy software P. Faymonville, C. Schwager, ITK Engineering GmbH, Rülzheim	213
٦	Processes SDV	
	 SpecBook-Copilot – Efficient Formalization of Requirements using Artificial Intelligence in the Development of MB.OS M. Obstbaum, I. Wior, J. Kasper, P. Vaudrevange, S. Khan, M. Keckeisen, TWT GmbH Science & Innovation, Stuttgart; M. Staib, R. Freitag, J. Schneider, Mercedes-Benz AG, Sindelfingen 	221
	Using Simulation in the Development of V2X Applications CarMaker V2X Interface and Local Hazard Warning V. Lizenberg, F. Specka, IPG Automotive GmbH, Karlsruhe; J. Hauenstein, M. Mayer, CARIAD SE, Wolfsburg	233
	Testing Variant-Rich Software-Defined Mobility Systems Methods, Future Challenges and Innovative Concepts L. Hettich, J. Stümpfle, M. Weyrich, University of Stuttgart, Institute of Industrial Automation and Software Engineering (IAS), Stuttgart	243
	Optimizing Electronics Architecture for the deployment of Convolution Neural Networks using System-Level Modeling D. Shankar, Mirabilis Design Inc., Santa Clara, USA; T. Jose, Mirabilis Design Inc., Chennai, India	257
7	Automated Driving	
	Using Large Language Models to generate critical driving situations for virtual and hybrid ADAS/AD testing L. Eisemann, L. Toettel, T. Watzl, T. K. Rupp, J. Schaper, Porsche Engineering, Bietigheim-Bissingen	265
	Ensuring ADAS functionality during periodic technical inspection ADAS/AD functionalities over a vehicle's lifetim T. Ost, DEKRA SE, Stuttgart; D. Petanjek, AVL DiTest, Graz, Austria; M. Beer, Rohde&Schwarz GmbH & Co KG, Munich	281

Ensuring high reliability inside fail-operational systems Key prerequisite for SAE L3->L5 compliant automated driving L. Badescu, Elektrobit Austria GmbH, Vienna, Austria	293
Importance of CATR technology in testing 4D imaging radars A. Jain, Keysight Technologies, Boeblingen	299
Transformation of Working	
Collaborate with Chinese Partners to Navigate the SDV Transformatio A. Wang, Neusoft Europe, Shenyang, China	n 303
Cockpit & Customer Experience In-Cabin	
Immersive In-car AR Live Gaming Enabled by SDV Architecture, ADAS Cameras & Al Software P. Reilhac, Valeo, Bietigheim-Bissingen; C. Nowakowski, A. Manila, J. Almeida, Valeo, San Mateo, USA	313
Biometrics and sensor fusion for enhanced in-cabin safety and comfor Reducing complexity and increasing possibilities through a holistic approach to in-cabin monitoring W. Steinmann, B. Sondermann, Rheinmetall Dermalog SensorTec GmbH, Neus	327
Leveraging Al/ML Techniques in Software Defined Architecture: Towards Emotional Quotient Prediction in Smart Automotive Cabins by Integrating Physiological and Vehicle Data. Al-driven Smart Cabin in SDV enhances vehicle experience Gowrishankar S, Muralidhara KV, M. Ghivari, KPIT Technologies GmbH, Munich	343
Cockpit & Customer Experience Ecosystems	
Generative AI based GUI reconfiguration using Natural Language	
Processing Leveraging the benefits of small and local LLMs T. Schäfer, FEV.io, Munich; J. Kottig, D. Macke, FEV.io, Aachen	359
Electric vehicles in 2024 Current UX challenges and concepts for the coming decade A. Bachmann, P3 automotive GmbH, Hanover; A. Matarage, Independent consultant, Stuttgart	379

Mobility System Architecture

	When innovation demand meets E/E architecture Further endeavours into next-gen architectural designs T. Huck, A. Achtzehn, Robert Bosch GmbH, Abstatt	395
	Managing Reuse and Dependencies of Hardware and Software Components in SDV Architectures F. Schreiner, Continental Engineering Services GmbH, Frankfurt am Main	407
	Transition from Domain to Zonal Network Architecture for Software Defined Vehicles (SDV) F. Ottofuelling, Intrepid Control Systems, Karlsruhe	419
1	Processes/Virtual, Simulation, Requirements	
	Dead in 100 ms Responsive (customer) functions require well-designed event chains and excellent timing requirements O. Schmidt, R. Münzenberger, INCHRON AG, Erlangen; M. Glück, Volkswagen AG, Wolfsburg	429
	A New Era for Software Verification: Heterogeneous Multicore Compute With Model-Based Design and Virtual ECUs K. Brand, Synopsys, Australia; T. Tang, MathWorks, Germany; D. Selvaraj, Infineon, Bangalore, India	437
	From Reality to Simulation: Automatized Transfer and Simulation of Critical Driving Scenarios with Digital Twins N. Neis, L. Eisemann, D. Hermann, J. Zhou, L. Toettel, Porsche Engineering Group, Weissach	453
1	E-Vehicle Mobility Vehicle Range	
	Battery-Integrated Multilevel Inverter Technology A Highly Integrated Electric Drivetrain Approach and its Technical Implementation in a Distributed Real-Time System D. Simon, T. Wenka, Porsche Engineering Group, Bietigheim-Bissingen	467

Boosting vehicle range by mating semiconductor technologies 477 M. Münzer, S. Zhang, C. Bauer, D. Graovac, Infineon Technologies AG, Neubiberg

E-Vehicle Mobility Charging

Integration of chargers and the gridHow to Improve the Charging Experience of Your Customersby Better Integration with the Electricity GridT. van Wijk, ElaadNL, Arnhem, The Netherlands

Mapping the Future Role of Electric Vehicles as Energy Storage Systems:
A Comprehensive Study on Current Market Trends and Future Projections for AC and DC Bidirectional Charging
Detailed Review of Market Strategies for Bidirectional Charging
across 42 Global Automotive OEMs
F. Cigarini, P3 automotive GmbH, Stuttgart

Advances in Electric Vehicle Charging505Mapping between User Needs and Technology505M. Stapelbroek, R. Savelsberg, M. Wegener, FEV Europe GmbH, Aachen;505M. Faßbender, RWTH Aachen University, Aachen505

Electronics Technologies

Automotive eFuses: Challenges of Today and Solutions for the Future C. Lankeit, R. Dorociak, M. Teuber, O. Lüdtke, J. Ziethen, FORVIA HELLA, Lippstadt	517
Enabling an Open Eco-System for Chiplet based Automotive SoCs Chiplets are the future for automotive SoCs and Road towards first Generations	529
M Schaffert Robert Bosch GmbH Stuttgart	

M. Schaffert, Robert Bosch GmbH, Stuttgart

Security TARA & More

TARAs Performed on Different Levels of the Supply Chain –
Experiences Based on Real Example ESLF
Insights into Applying ISO/SAE 21434:2021 in Automotive Cybersecurity 541
T. Liedtke, Magility Cyber Security GmbH, Wendlingen; R. Messnarz, I.S.C.N.,
Graz, Austria

Efficiency in UNECE R155553Type Approvals for Small OEMS – Lessons Learned553F. Langner, Aston Martin Lagonda, Bietigheim-Bissingen; W. McCaig, T. Nilges,1TK Engineering, Rülzheim

Security/Al

Recommendations for the practical use of Ethernet Security-Protocols and beyond S. Schran, R. Jung, A. Mukherji, ETAS GmbH, Stuttgart	565
Contribution of Artificial Intelligence in Automotive Cyber Security Management System More Cybersecurity through Artificial Intelligence U. Akcakoca, EDAG Engineering GmbH, Ingolstadt	579