SEMI GAAC Automotive Forum

B. Weiss
Vice President Global Business Development
SEMI, Milpitas, United States

Biography

As Vice President of Business Development and Product Management, Bettina Weiss supports the diverse product needs of association members, as well as assesses strategic emerging opportunities for member company engagement in the extended global manufacturing supply chain.

Weiss joined SEMI in 1996 and held a variety of positions in SEMI's International Standards department, including department lead, until 2008. From 2008 to 2012 she had global responsibility for SEMI's Photovoltaic/Solar Business Unit which then expanded into a broader business development role including the integration of SEMI Strategic Association Partners FlexTech and MEMS & Sensors Industry Group. In addition, since 2017, Weiss has been responsible for developing strategy and global implementation plans of SEMI's Smart Transportation vertical platform, with its current emphasis on the automotive electronics supply chain.

Prior to joining SEMI, Weiss worked in sales and marketing positions at Metron Semiconductor and Varian Semiconductor in Munich, Germany. She holds a BA from the International School for Applied Languages in Munich, Germany, and is a certified translator for Anglo-American Law and Economics.

Rethinking car software and electronics architecture

O. Burkacky
Partner
McKinsey & Company, Munich, Germany

Abstract

The most important parts of cars are shifting from mechanical to digital, heralding big changes in the industry's competitive stakes.

While the path forward for both technologies and business models remains uncertain, I will share ten hypotheses regarding tomorrow's automotive electrical or electronic architecture and its implications.

Biography

- Based in McKinsey & Company's Munich office since 2007
- He is part of Digital McKinsey
- He leads McKinsey's Embedded Software initiative and Software Service Line in Europe
- He is also a member of the Advanced Industries Practice, specifically automotive and semiconductor industry with focus on product development

Sharing Data for reliable Automotive industry: A win-win between Semis, Tier1s & OEMs

D. Glotter
Founder & CEO
Optimal+, Holon, Israel

Abstract

In recent years almost 90% of innovations in cars are based on electronics. Radar, Lidar, Sensors, Cameras, Dashboards, Driver assist systems and so on, have turned the car into the world's most complex mobile computer system.

Last year Audi stated that they are *"seeing 24 cars roll off the assembly line and fail test at zero KM, due to electronics component failure"*. Because of this, companies like Audi are demanding quality levels measured in Defective Parts Per Billion, or in some cases, they are simply counting "incidents".

According to NHTSA 2016 Recall Data, in the last 4 years there is an increase of 3X in Electronics related recalls. In 2016 BMW claimed that 22% of their warranty cost are related to the electronics

< b >And the situation is only going to get worse. In phase 2&3 of the autonomous cars , there is going to be even more < b >mission critical electronics going into cars. The cars themselves will be on the road much longer due to a shift to car sharing. Meaning that reliability problems will manifest themselves faster.

That is why data of billions of electronic components need to be analyzed to see what might go wrong - and not just report it but prevent bad products from reaching the market. And yet, the same time, we also help them significantly increase their efficiency, reduce costs, and get to market faster - That is all about lifecycle analytics for reliable electronics.

Thus, data from across the supply-chain needs to be assembled and thoughtfully shared without compromising IP of each party… data from Chip manufacture, board assembly, ECUs, systems and end-products, and also collect and analyse product return data. (RMA's)

Once the product lifecycle data is available we can start sharing data through a trusted 3rd party.

I will give an example how we helped a Tier-1 manage the incoming material AND manage its own quality for higher yields & better qualities - < b >The outcome was a Win-Win.

Biography

Dan founded Optimal+ (formerly named OptimalTest) in 2005 and was among the pioneers of Big Data Analytics for the Semiconductor industry and lately for the Electronics industry as well. Before founding the company, Dan held various senior positions in semiconductor and test operations at Intel from 1994 to 2004.During his tenure at Intel, Dan has received the Intel Achievement Award and the Intel Quality Award. Dan holds a BS in Engineering from the Technion and an MBA in Finance from Bar-Ilan University.

Automotive Electronics Standards – Action needed: Platform for Automotive Semiconductor Requirements along the supply chain

A. Aal
Semiconductor Strategy & Reliability
Volkswagen AG, Wolfsburg, Germany

Abstract
The automotive supply chain faces many challenges, today, one being the lag of system level reliability assessment capability. The reason for this lies within the hierarchical design process from semiconductor to the assembled PCB and to the ECU level with corresponding test specifications that unfortunately often (increasing trend) do not longer cover the relevant degradation / failure mechanisms. Those arise from increased operation hour requirements in conjunction with semiconductor assembly / integration schemes that on the one side support increased performance needs, but on the other side suffer from limited capabilities w.r.t. automotive environmental loads.
In order to enable a manageable and risk optimized design flow, designers need reference boundaries to design within actual limits given from individual operation MPs (environment, system construction and operation strategy). Today, those boundaries are missing as the variety of individual customer specific mission profiles (MPs) cannot be managed / supported by semiconductor vendors.
A way out of this dilemma are standardized MPs against which vendors can equally qualify their products, while customers can select the most suitable parts that fit into their application mission profile.
This presentation shows one principle methodology how new categories, classes can be used to systematically identify capability gaps between component and system and how the current industry initiative TRACE intends to align new automotive categories and classes along the supply chain in an active manner.

Biography
Andreas Aal drives the semiconductor strategy and reliability assurance activities within the electric-/electronic development department at Volkswagen, Germany, which he joint 2011. His activities concentrate on technology capability enhancement of nodes down to 12 nm as well as optimization of power electronics for automotive applications. He is involved in two semiconductor related European projects and is a strong representative of the through-the-supply-chain-joint-development approach.
Mr. Aal has been working within the semiconductor industry since 1998 holding different positions from engineering to management working on production monitoring, process and technology development, qualification and failure analysis. He was involved in device optimization, the development of test structure design as well as new combined stress/measurement and data analysis methodologies for qualification and fWLR monitoring. He continues working in those fields, not within, but together with the semiconductor industry while the primarily focus is system reliability and optimized design flows.
Andreas (certified reliability professional) published and co-authored various papers, has given invited talks and tutorials, serves as reviewer for different Journals and has served in the technical and management committee for IEEE IIRW. He is a member of the IEEE Electron Devices, CPMT, Nuclear and Plasma Sciences, Reliability and Solid-State Circuits Societies and also a frequent participant / contributor of the JEDEC subcommittee 14.2. Since 2007 he is chair of the German ITG group 8.5.6 (VDE) on (f)WLR, reliability simulations and qualification. He is one of the founding members of the SEMI Global Automotive

Advisory Council.

A modular and scalable approach for autonomous driving

K. Wang
Director, ADAS Technology
Visteon, Karlsruhe, Germany

Abstract
Technology development drives the realization of autonomous driving. Complexity, diversity and cost-efficiency are the main challenges. A platform with modularity and scalability is key to shorten time to market and to enable future reusability.

Biography
As director of ADAS technology, Kai Wang is responsible for providing overall leadership in ADAS Architecture, establishing and maintaining technology roadmaps and representing all key technology disciplines in Visteon. He is one of the key contributors of DriveCore™ concept which is a unique, open, scalable centralized domain controller for autonomous driving. Before DriveCore™, he was system architect and key contributor of SmartCore™, the industry-first automotive grade cockpit domain controller solution offered by Visteon. Before joining Visteon, he focused on core R&D area in mobile communication, connectivity and ASIC design in world leading technology companies, such as Nokia and Datang.

Driving automotive Innovation – comprehensive design

B. Huhnke
Vice President Automotive Strategy
SYNOPSYS, Mountain View, United States

Abstract
What an exciting time we live in: self-driving cars, fully electric and always connected to the internet to provide the user a seamless transportation experience. Many announcements around the mobile phone on wheels have been made. Some of the most exciting innovations happening in our cars: cars are becoming our co-pilots as intelligent technologies make them safe and secure, more comfortable, and more autonomous. And with full connectivity the car becomes the new gold mine, a big data collector processing real time traffic data and millions of miles per day.
To enable smart, connected and autonomous vehicles, the car's electronic architecture, its supporting soft and hardware design and release processes must be adjusted. Any failure in the field results in very high cost and liability to the car manufacturer. Requirements for a robust, comprehensive design of a fault tolerant system must be newly formulated. A holistic view of the system failure rate along the supply chain, lifecycle of automotive development and production is necessary. Consequently, robustness, safety, and security of self driving systems must be significantly increased and be monitored continuously.
Robust design begins in the early phase of car concepts. Automotive IP centers of excellence have been created, to ensure automotive compliant intellectual property for faster, smarter, low-energy chips reducing risk and development time. Automotive SoC design is meeting the highest safety integrity levels (ASIL) providing ADAS IP as design basis for the new advanced driver assistants architecture. By providing a simulation platform based on the processor models, early virtual prototyping, emulation, and functional verification from modelling to test bench deployment becomes possible. Software experts will be required to ensure fault tolerant, highly reliable, functionally safe and secure software along the automotive lifecycle.

Biography
Dr. Burkhard Huhnke is the Vice President of Automotive Strategy at Synopsys. He joined Synopsys earlier this year. Prior to Synopsys, he was SVP of Product Innovation & E-Mobility at VW, based in Silicon Valley. He was responsible for synchronizing VW's innovation activities and alliances to identify new concept ideas, business models and partners in the US and had end-to-end ownership of the electric vehicle platform in North America. Prior to that, he held several positions both in the US and Germany, including Senior GM, Electronics System Integration and Whole Vehicle Integration. Dr. Huhnke studied electrical engineering, at the University of Braunschweig. His dissertation about optical distance measurement was awarded with the International Measurement Prize.
Dr. Huhnke serves as Research Fellow the Hult Business School in San Francisco, and is a member of the Board of Advisors at the College of Engineering at University of Tennessee Knoxville and at the College of Engineering and Computer Science at University of Tennessee Chattanooga.

Automotive & advanced manufacturing

N. Balderson
Director of Quality
GLOBALFOUNDRIES, Dresden, Germany

Abstract

With the rapidly increasing demand for semiconductor devices in vehicles driven by the electrification of the drive train and by the vision of self-driving cars, the semiconductor manufacturers are challenged to elevate advanced technologies to automotive standards much earlier in the technology life cycle. At the same time the need for ultra-low power and high performance devices requires the usage of advanced transistor architectures and smaller nodes.

GLOBALFOUNDRIES 22FDX technology has been developed to offer ultra-low power and high performance devices coupled with RF integration. NVM offerings are currently being added and directly target Grade 1 applications. The boundary conditions for automotive applications have been built in right from the beginning of the development process. Besides the AEC Q100 temperature and reliability requirements the technology also needs to pass more stringent and tighter variation controls than consumer grade technologies.

Bundling together advanced manufacturing detection & control methods, reliability proven technologies, automotive specific services, and consequent risk mitigation throughout the entire lifecycle, the GLOBALFOUNDRIES AutoPro Service Package provides the right approach to master the new automotive challenge.

In our presentation we will show that this requires a holistic approach for technology development and qualification that drives beyond regular reliability tests and must include the specific manufacturing process characteristics and implementation in the fab. Special effort must be spend to ensure very early maverick or variation detection during processing as well as process variation reduction and control using advanced techniques.

Biography

Nicholas Balderson is the Director of Quality at GLOBALFOUNDRIES in Dresden, Germany. He is responsible for ensuring the Advanced Quality Execution System to go above and beyond Customer expectations. Dresden's quality success includes full Automotive Certification as well as delivery according to GLOBALFOUNDRIES AutoPro standard. Nic joined GLOBALFOUNDRIES in 2015 and quickly took over Quality leadership. Prior to that, he spent 5 years with AREVA Nuclear Power in various project management roles, and 10 years with Infineon/Qimonda in program management for package development. Nic is a Magna Cum Laude graduate of Virginia Commonweatlh University and holds a degree in electrical engineering as well as a Masters in Business Administration from Wayne State University.

Revolution of Automotive Architectures through IT and Network Infrastructure Concepts

S. Singer
Fellow & Director, EMEA CAS Automotive
NXP, FAE, Muenchen, Germany

Abstract

The Automotive Industry is seeing more dramatic changes in the next few years than in previous decades combined. Vehicles are becoming always connected and part of the internet. Drive trains evolve from combustion engines to mixtures of hybrid and electric vehicles with new challenges (e.g. for reach). Most dramatic is the change to more and more assisted driving up to future level 3-5 automated vehicles.
All of those factors result in the development, that existing E/E architectures are not capable of supporting those requirements. Instead of small evolutionary changes some more dramatic departure is required. While the new functions demand new solutions, many of the existing functions in a vehicle (e.g. body comfort functions, …) do not require new features and therefore a new architecture, that allows the reuse of many legacy ECUs without changes can have a huge economic benefit.
The presentation will show how concepts from IT and Network Infrastructure Solutions can be brought into Automotive while taking automotive specific requirements (e.g. startup times, thermal management) into consideration. The presentation will touch on several of the attributes and consequences, e.g. of different functions into one box (Virtualization, Isolation, Validation) and Communication schemes for such an architecture.
Additionally we need to consider, that cars are an attractive Target for Hackers. In highly networked cars we need to be concerned about protecting privacy, increasing safety and preventing unauthorized access. Connected vehicles create a multi dimensional challenge to address vehicle safety (Zero accidents by human error), security (Zero accidents by system hacks), functional safety and also device reliability. Another topic is, that such a new architecture requires rethinking of conventional wisdom for functional safety.

Biography

Stefan Singer is a Technical Fellow at NXP Semiconductors in Munich, Germany. He leads the European Automotive Field Applications Team and has held a number of positions at Motorola Semiconductor, Freescale and NXP in the US and Germany. Stefan holds a Dipl.-Ing. degree from the Technical University in Munich.
Due to his personal background in communication, networking and Automotive he has passion for automotive networking architectures (especially Ethernet) and Computing.