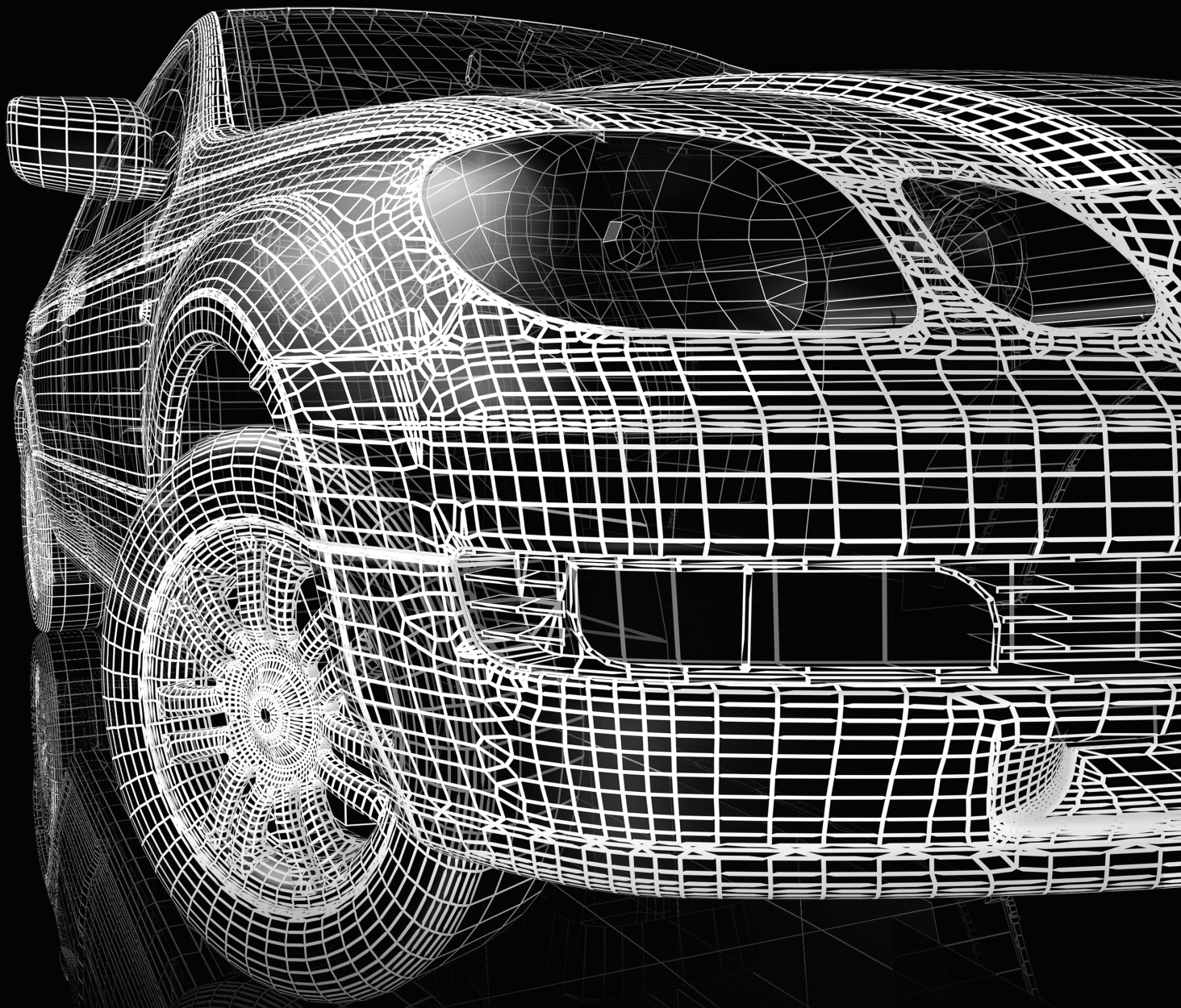


**WIND**<sup>TM</sup>

AN INTEL COMPANY

# WIND RIVER

## AUTOMOTIVE SOLUTIONS





# The Software-Enabled Automobile

Software is a key differentiating factor for today's automakers. It is critical to harnessing the opportunities of autonomous driving, creating the connected car, delivering unique driving and infotainment experiences, ensuring all-around safety, and generating new revenue streams from innovative applications. But automotive software is becoming increasingly complex, because it must support greater functionality to meet consumer expectations, address competitive pressures, integrate disparate platforms, and adapt quickly to the ever-accelerating rate of technological change, while maintaining compliance with safety and security requirements and remaining within cost targets. Software complexity, in turn, slows time-to-production and increases development costs, creating a vicious cycle.

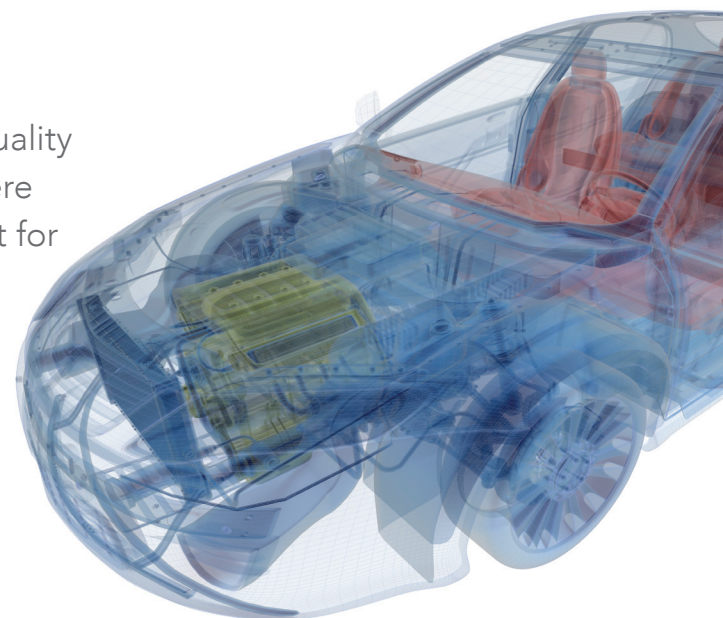
For example, a high-end modern car has more than 100 million lines of code, 145 actuators, over 4,000 signals, 75 sensors, and more than 70 on-board computers analyzing 25 GB of data per hour. In addition, the car might have as many as 100 different electronic control units (ECUs) managing both safety-critical and non-safety-critical functions. The more complex systems become, the higher the risk that functions will interfere with each other or that one or more systems will fail.

Connected cars provide a further example: employing V2X communications, they will be able to alert each other and the infrastructure to road hazards or impending collisions. But as cars become more dependent on wireless connectivity, both within the vehicles and externally, they become more vulnerable to outside interference, whether accidental or with malicious intent. So ensuring cybersecurity is of paramount importance for the connected car.

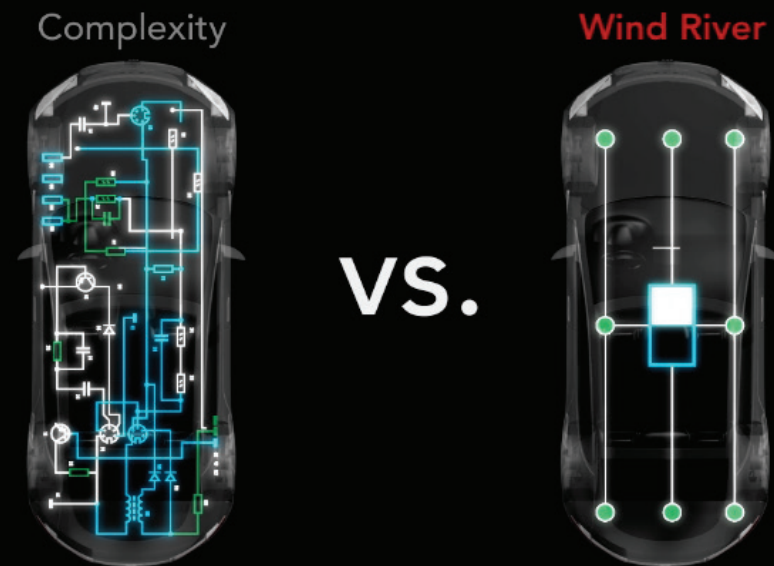


"Wind River helped us develop an advanced, high-quality product while meeting challenging deadlines. We were able to shorten development time by over 50 percent for our engine control units for motorsports use."

—Markus Kirschner, Group Leader for Hardware Development, Bosch Motorsport



# Simplifying the Connected Car



*Tackle complexity, increase predictability, reduce costs, and speed time-to-production for your automotive projects with Wind River.*

An experienced software integrator such as Wind River® can help automotive original equipment manufacturers (OEMs) and their Tier 1 suppliers manage complexity, alleviate risk, increase predictability, and shorten development time. Our expertise in software integration, tools, and lifecycle management, and our proven, customizable software solutions, will enable you to focus on higher-level innovation, accelerate time-to-market, and adapt on the fly.

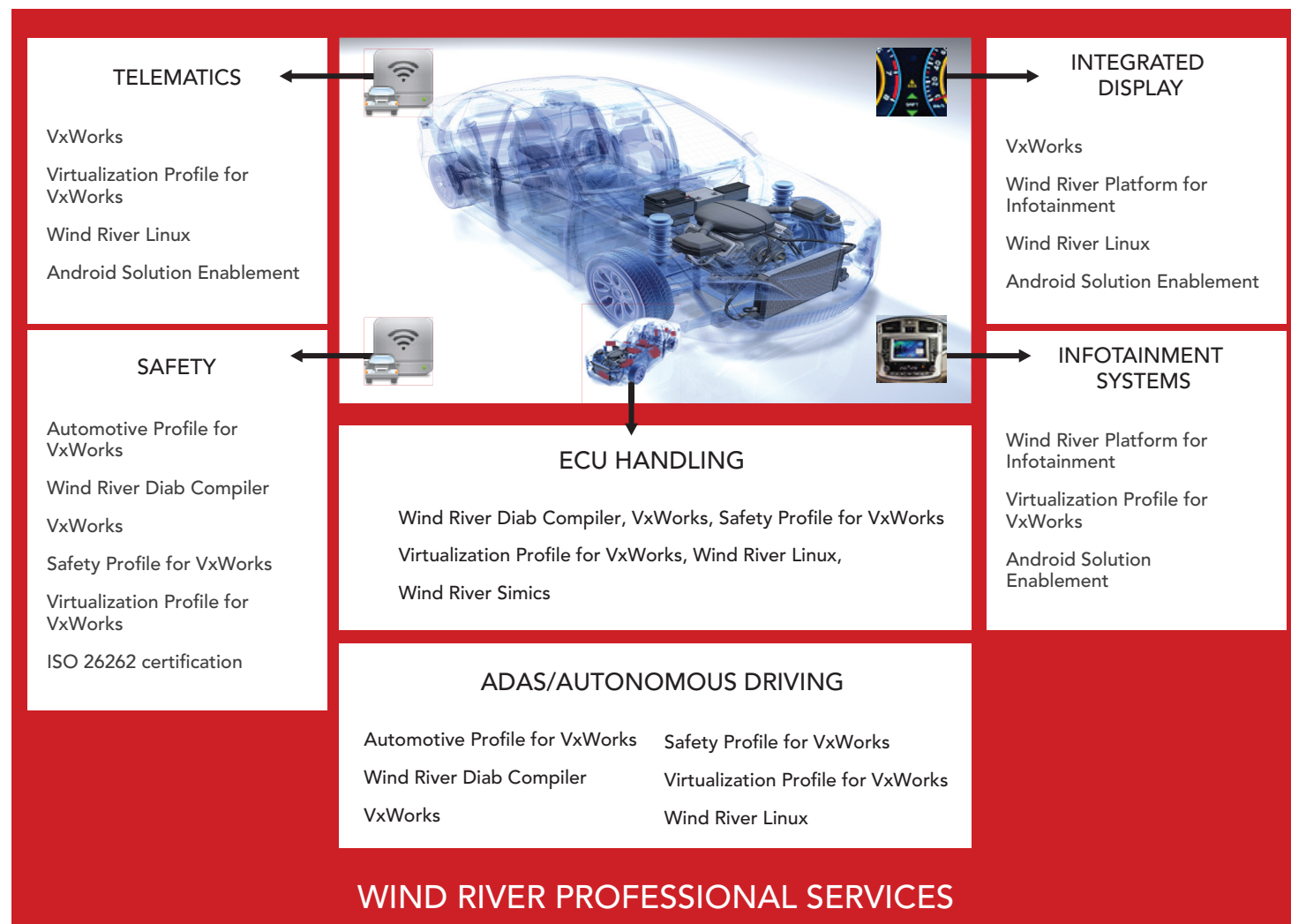
- 30+ years of leadership in secure software development and integration
- 100+ automotive projects annually
- 90+ percent of automotive tier 1 and original equipment manufacturers worldwide
- 300+ dedicated automotive engineers worldwide
- #1 integrator of Android in automotive
- Founding member of the GENIVI® Alliance and winner of the Most Valuable Contributor award in 2013
- Founding member of the Yocto Project and Gold Member of the advisory board
- Bronze level member in Automotive Grade Linux (AGL)
- Member of the Car Connectivity Consortium (CCC)
- Affiliate member in AUTOSAR under Intel
- Nine consecutive years of Service Capability & Performance (SCP) certification for Wind River Customer Support

# Partner with an Experienced, Trusted Vendor

In partnership with our automotive customers, we are pioneering new approaches to integrating and consolidating embedded systems for streamlining the design, development, and production of next-generation automotive controls and applications.

Our comprehensive portfolio of software, tools, and expertise is helping automakers and their suppliers build safe, secure, and certifiable intelligent systems while lowering costs and speeding the evolution of new capabilities, including:

- The connected cockpit
- Telematics
- In-vehicle infotainment (IVI)
- Advanced driver assistance systems (ADAS)
- Autonomous driving
- Android device enablement



# Clarion

“Wind River helped us reduce the complexity of the project with a constant dedication to quality and innovation. Despite the challenges that we faced throughout the development process, we were able to meet our cost targets as well as our time-to-market requirements.”

—T.K. Tan, Managing Director, Clarion Malaysia

# MOBIS

“Wind River has a strong reputation as the leading automotive expert with experienced engineers who can handle the complicated matters of custom software development, integration, and testing. We see tremendous value in partnering with Wind River.

—Jaeoh Cha, Principal Research Engineer, Hyundai MOBIS



# Accelerate Innovation Through Wind River Automotive Excellence

In order to stay ahead of the market trends and offer solutions for our customers' latest challenges, Wind River strategically focuses on the following areas:

## Secure a Solid Foundation for Innovation

Based on our long history of embedded and open source expertise, Wind River provides proven automotive solutions for all of the most important open source distributions. Wind River is a maintainer of the Yocto Project's meta-ivi and the GENIVI Baseline Integration Team, as well as a contributor to Tizen and Android, and we also deliver our own Linux distribution in Wind River Linux and Wind River Platform for Infotainment.

We also offer virtualization and ECU consolidation solutions for customers who need to comply with automotive safety and security constraints. And we offer simulation tools (Wind River Simics®) for simulating complex automotive environments, reducing development time and cost, and allowing sophisticated testing scenarios.

## Reduce Complexity and Increase Predictability

Integrating software packages and managing millions of lines of code are complex and difficult tasks. Wind River has partnered with more than 20 automotive independent software vendors (ISVs) to bring you the integrated software solutions you need. In order to make our integration process predictable, manageable, and transparent, we are CMMI 3–certified, and our processes are ISO 26262– and Automotive SPICE–compliant. We offer tools and expertise for almost all phases of the software development process, from definition and architecture to testing, validation, and long term maintenance and support.

## Enrich the In-Vehicle Multimedia Experience

Extensive multimedia and graphics support is key to creating a differentiated user experience. It requires seamless integration between software and hardware to deliver on single and multiple screens. Our multimedia offer is based on our extensive expertise in areas such as audio management, DVD drive management, graphics, and user interfaces. We also provide specific technologies for rear seat entertainment and technical components critical for a seamless multimedia experience.

## Provide Seamless Connectivity Capabilities

Automotive consumers today expect full-feature IVI systems to provide advanced connectivity capabilities that allow users to connect their own devices to the car and to the cloud. Consumer electronics connectivity, cloud services, and remote vehicle services are critical areas where we focus our expertise in consumer telematics, firmware management, and Internet and device security. We also offer smartphone connectivity and projection solutions for iOS, Android, and Windows-based devices, and we partner with the best-in-class to offer app garage, Web radio, and cloud music.





“Responsive, efficient technical support allowed our project to go full-speed ahead, without any stops or delays. Wind River was a constant presence during the entire project. The same Wind River people we met at the beginning of the project still support our products, and we find that priceless.”

—Riccardo De Filippi, Head of Development,  
Magnetit Marelli Motorsport



“The automobile is a complex environment and introducing new software and capabilities is a highly complicated task. In order to deliver the highest quality and get to market quickly, it is critical to work with an expert like Wind River who possesses extensive automotive, embedded, and open source experience. Wind River is helping us address new challenges in the rapidly changing automotive market.”

—Kelvin Du, Vice President, PATEO

# Differentiate Your Offerings with Wind River Automotive Solutions

## Automotive Profile for VxWorks

Automotive Profile for VxWorks® offers auto manufacturers and their suppliers an AUTOSAR-compliant, ISO 26262-certifiable software platform for pioneering ADAS and autonomous vehicle innovations. It also enhances our VxWorks real-time operating system with key safety, security, and integration features, and safely consolidates applications onto a single hardware platform.

## Wind River Platform for Infotainment

Wind River Platform for Infotainment is a Linux- and Yocto Project-based, GENIVI-compliant run-time platform specifically tuned for the IVI market. The platform takes full advantage of open source innovations and flexibility while leveraging a comprehensive build system and development tools. Building IVI products using this Wind River commercial-grade platform reduces overall development costs, minimizes project risks, and shortens project timelines.

## Wind River Android Solution Enablement

Wind River Android solution enablement includes commercial add-on software modules optimized for the latest Android operating system. The modules fill the gap between the Android Open Source Project and specific automotive industry requirements. Modules addressing capabilities such as iOS connectivity, fast boot, and phone projection technologies can be sold separately or bundled with device-specific functionality that can differentiate your product.

Our automotive professional services organization has a broad base of IVI projects in which Android was integrated and adapted for automotive use cases. For example, Android phone-oriented use cases must be re-wired for use in an infotainment head unit.

## Wind River Diab Compiler

The majority of automotive OEMs take advantage of Wind River Diab Compiler, a best-in-class development tool used in numerous projects validated by TÜV NORD for automotive functional safety and in AUTOSAR. Developed in adherence to an Automotive SPICE (Software Process Improvement and Capability Determination) Level 2 process, Diab Compiler enables the creation of high-quality, standards-compliant object code that helps boost application performance and reduce memory footprint. Diab Compiler ISO 26262 Qualification Kit offers a model-based environment to simplify tool qualification for ISO 26262 and other safety standards.

## VxWorks

The VxWorks real-time operating system (RTOS) delivers the uncompromising deterministic performance and low latency required for automotive safety-critical applications. Together with Safety Profile for VxWorks and Virtualization Profile for VxWorks, the RTOS offers the ability to create robust partitioning within one or multiple operating systems on single core or multi-core processors. The modular architecture of VxWorks, in which the OS kernel is separated from applications, protocols, and other packages, allows software components to be upgraded, added, or removed in a targeted fashion without impacting the rest of the system. Knowing that functions that have already been tested will not be impacted when new, non-overlapping features are added also helps ensure a more predictable and robust software integration process.

## Virtualization Profile for VxWorks

Blow away your requirements for performance, cost, size, and power with Virtualization Profile for VxWorks, a Type 1 embedded hypervisor that's built from the ground up for low latency, determinism, and multi-core performance—all in the smallest possible footprint. You'll increase product security by consolidating multiple operating systems of mixed levels of criticality onto the same single core or multi-core processor without the burden of complete re-certification. And Virtualization Profile supports multiple Wind River operating systems, including Wind River Linux and VxWorks, embracing the broadest hardware ecosystem, and is backed by an award-winning global and local support team.

## Wind River Simics

Wind River Simics simulates systems—from the smallest to the most complex—so you can adopt groundbreaking new development techniques that are simply not possible with physical hardware. These new techniques accelerate every phase of your development lifecycle, dramatically reducing the risk of shipping late, overrunning budget, and sacrificing quality.

## Wind River Professional Services

A CMMI Level 3–certified organization, Wind River Professional Services provides planning, development, integration, testing, deployment, and management services to help you tackle the challenges related to automotive software development. Our expertise has helped our OEM and Tier 1 customers achieve driver safety and optimize human–machine interface (HMI) usage, software and infrastructure security and connectivity, location-based services, mobile device synchronization, and data analytics.

Our professional services organization has design centers in all geographic regions, with a strong presence in Korea, Germany, France, the UK, Sweden, Romania, China, Japan, and the U.S. Our global presence allows us to offer local support and distributed development teams. The automotive practice focuses on excellence in delivery and automotive software development processes. Our project management practice and tools allow development predictability and reliability, high-quality deliverables, and premium long term maintenance and support services.

## Global Support

Wind River Customer Support can help you overcome challenges and get the most out of your implementation of our technology. We are proud to deliver world-class customer support and have achieved SCP certification for nine consecutive years. We also offer long term support to continue providing assistance long after devices have been shipped.

## Wind River Education Services

Wind River provides education services that speed the time-to-productivity of your project team. We offer deeply technical, hands-on training led by experienced engineers, mentoring to accelerate technology integration, and on-demand learning. Our services are flexible to meet the learning needs of your team and the constraints of your budget.



“The devices we are working on today are more sophisticated than they were a few years ago. It is essential for us to maintain close relationships with industry leaders such as Wind River to make sure we stay at the leading edge of automotive technology, functionality, and safety.”

—Dr. Udo Judaschke, Director of PLM Systems, Software, and Verification, Continental Automotive IT





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For more information visit:

[www.auto.windriver.com](http://www.auto.windriver.com)

or call 800-545-9463

or write to [inquiries@windriver.com](mailto:inquiries@windriver.com).