VEHICLE electronics

The monthly magazine for automotive electronics engineers

Qualcomm takes over AIMotive from Stellantis

Car maker Stellantis has sold its automated driving and simulation company AIMotive to Qualcomm.

This sees the two companies extend their existing partnership beyond cockpit and connectivity to power adas and automated driving.

Founded in Hungary in 2015, AIMotive was acquired by Stellantis in 2022.

The plan is for Snapdragon Ride Pilot to enable Level 2+ hands-free autonomy at scale across millions of vehicles on a single, unified platform, replacing the fragmented tech stacks that have long defined the industry.

Qualcomm's technologies now power adas, cockpit and connectivity across Stellantis vehicles, all integrated within STLA Brain as a unified platform.

The result is a consistent foundation across the line, faster deployment and continuous over-the-air improvement.

STLA Brain is Stellantis' electronic and software platform, enhancing cockpit, connectivity and adas performance.

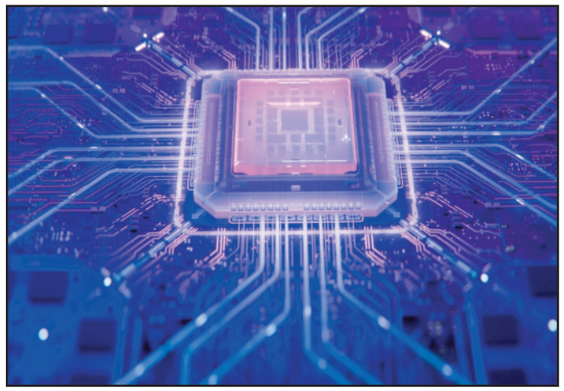
Adas now represents roughly one-third of Qualcomm's automotive pipeline. More than one million vehicles already in production run adas on Snapdragon Ride.

Built to scale across brands and segments, Snapdragon Digital Chassis SoCs support Stellantis' broader strategy to improve cost efficiency through platform standardisation.

The scalable technology aims to accelerate time to market, enable continuous feature upgrades and enhance the driving experience.

The Snapdragon Ride Pilot adas platform can scale from active safety and regulatory features to Level 2+ hands-free autonomy and beyond.

Building on existing work across cockpit and connectivity, the expanded collaboration supports greater compute performance and AI-driven capabilities across Stellantis' vehicle portfolio.



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BMW expands quantum computing collaboration

Quantinuum and BMW have expanded their collaboration into a multi-year partnership with a mission to unlock future mobility by applying quantum computing to materials science.

Since 2021, BMW and Quantinuum have been collaborating on joint research focused on tackling complex problems in industrial chemistry to support the advancement of mobility.

The collaboration has progressed from foundational algorithm development to simulations of molecular systems, allowing the researchers to unlock insights into catalytic activity, reaction pathways and material performance in energy-relevant environments.

The companies have now agreed to extend the work.

"Quantinuum is focused on driving commercial adoption of quantum computing through close collaboration with industry leaders on high-impact applications," said Rajeeb Hazra, CEO of Quantinuum. "Our expanded partnership with BMW underscores this focus, and we're excited to scale the meaningful work we've been advancing together."

Researchers at BMW are using Quantinuum's trapped-ion architecture, which provides the high-fidelity operations to simulate molecular systems accurately, particularly electrochemical processes that play a critical role across a range of technologies relevant to sustainable mobility and the design and optimisation of fuel cells.

BMW will leverage successive generations of Quantinuum's quantum computers. This includes the current Helios system and upcoming Sol planned for 2027 and Apollo for 2029.

"We have been exploring quantum computing for many years," said Martin Tietze, BMW vice president. "Together with partners such as Quantinuum, we translate advances in quantum hardware into real-world applications supporting the development of future vehicle generations."

Quantinuum's progress towards large-scale, fault-tolerant systems helps ensure that, as the hardware increases performance, BMW can apply computational power to catalyst chemistry research, targeting critical oxygen reduction reaction processes at platinum catalysts to cut costs and improve energy efficiency.



Foxconn fights off cyber attack but data stolen

Electronics giant Foxconn has confirmed that its North American factories fought off a cyber attack from the Nitrogen ransomware group but not before the crooks claim to have stolen 8Tbyte of data and more than 11 million files.

Nitrogen claims the stolen files include confidential project documentation, technical drawings and internal instructions tied to major Foxconn customers including Apple, Nvidia, Intel, Google and Dell.

Researchers said some leaked documents appeared to include hardware schematics and component information for customer projects.

Security researchers warned leaked hardware documentation could potentially aid counterfeit operations or help threat actors identify exploitable vulnerabilities in hardware and firmware ecosystems.

Foxconn, also known as Hon-Hai Technology, in recent years moved into car manufacturing with an open platform model. It is not clear whether any automotive customers have been affected.

A statement from Foxconn said: "Some of Foxconn's factories in North America suffered a cyber attack. The cyber-security team immediately activated the response mechanism and implemented multiple operational measures to ensure the continuity of production and delivery."

The company added that affected factories were currently resuming normal production.



Foxconn at Autotronics trade show in Taipei

The main worry though quality, is not going to do is the stolen data could be used to create counterfeit goods.

"While this is undoubtedly a blow to Foxconn, the damage this could cause to the general public is immensely greater," said Josh Marpet, a security consultant at Finite State. "Fake iPhones, fake laptops, fake merchandise of any kind, with sub-standard build the original corporate reputations any good."

The other danger is the firmware and code being in the open makes it easier for hackers to find flaws that could be exploited quickly.

"Product security becomes an absolute mandate in this scenario," said Marpet.

Damon Small from Xcape's board of directors said the breach moved the ransomware conversation from operational disruption to long-term architectural risk.

"This isn't just about stolen IP, it's about providing adversaries with a detailed roadmap of the physical and logical infrastructure underpinning global AI and data centre operations," he said.

Silicon Motion achieves ISO 26262 for solid-state storage

Silicon Motion, a specialist in NAND flash controllers for solid-state storage, has achieved ISO 26262 functional safety process certification.

This demonstrates the firm's investment in automotive-grade engineering to enable safe, reliable and high-performance storage technologies for future vehicles.

The certification covers automotive product development processes, including functional safety management, system architecture, hardware and software development, verification, validation, and supporting operational processes.

Aligning its engineering workflows and quality systems with ISO 26262 should enhance its capability to support automotive applications such as intelligent cockpits, adas, telematics, digital dashboards and AI-driven in-vehicle storage.

Open-source reference speeds SDV work

Automotive Grade Linux (AGL) has announced the initial availability of its open-source SoDeV reference platform via the latest AGL Unified Code Base (UCB) release, Ultimate Unagi, enabling software-first development decoupled from hardware constraints.

AGL SoDeV is a reference platform for building software-defined vehicles (SDVs). It combines the AGL UCB with Linux containers, VirtIO, Xen hypervisor, Zephyr Rtos and other Linux Foundation projects in a single pre-integrated package that runs on automotive systems-on-chip (SoCs), on virtual machines or in the cloud.

SoDeV enables automakers and suppliers to decouple software development from hardware availability, accelerating SDV time to market.

As the automotive industry accelerates its transition to SDVs, the demand for a shared, open-source software foundation has never been greater. AGL brings together a growing coalition of automakers, tier-one suppliers and technology companies to co-develop and maintain a common software stack, reducing fragmentation, accelerating time to market and enabling rapid innovation across the vehicle.

The initial version of the reference platform enables developers to build and test an SDV on Renesas Sparrow Hawk reference boards and cloud-based processor environments.

Announced late last year, the reference platform combines the UCB with multiple open-source projects hosted by the Linux Foundation to support consolidation of ECUs, hardware abstraction through virtualisation and cloud integration for SDVs.

Developed through a joint effort by AGL member companies, the UCB provides a production-ready open-source platform for SDVs. The latest Ultimate Unagi release is updated to Yocto Project Scarthgap LTS release 5.0.16 for improved stability and build reproducibility.



HighTec and SiFive collaborate on Risc-V

HighTec EDV-Systeme is collaborating with SiFive to accelerate safety-ready Risc-V software development for automotive and industrial systems.

The partnership brings together HighTec's safety-qualified LLVM-based toolchains for Rust and C/C++ and SiFive's safety-focused Risc-V IP.

This joint offering helps software developers to adopt Risc-V more efficiently through an integrated approach to safety, security, performance and scalable software development.

The shift towards software-defined architectures in automotive and industrial systems is fuelling demand for open and flexible platforms with strong safety features. Risc-V's open instruction set architecture enables innovation and customisation, while supporting the safety, security and performance requirements.

The combination of HighTec's qualified toolchains with SiFive's safety-focused IP lets software developers simplify their integration and shorten time to production for their safety-relevant Risc-V designs.

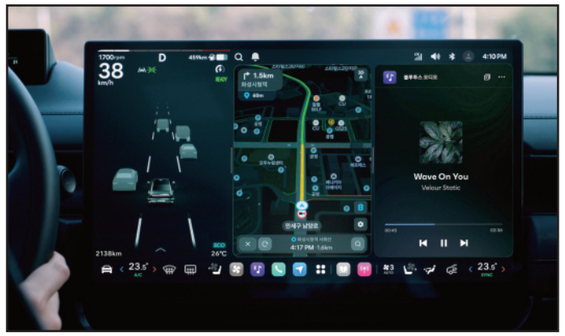
The HighTec Rust and C/C++ toolchain is qualified according to ISO 26262 Asil D and the ISO 21434 cyber-security standard, enabling the rapid generation of high-performance code for safety-critical automotive and industrial applications.

Built on LLVM technology, the toolchain supports SiFive's Risc-V IP and tuned performance enhancements, enabling hybrid development that combines legacy C/C++ code with modern Rust.

HighTec's qualification kit helps accelerate and simplify tool qualification, supporting safety and security certification activities.



Accelerating safety-ready Risc-V development



Hyundai's large central display

Hyundai uses AI to transform infotainment

Hyundai has unveiled an infotainment system to transform the mobility experience.

As a step in the group's transformation into a software-centric mobility company, Pleos Connect is built on the three pillars of intuitiveness, safety and openness to combine a mobile-friendly user environment with AI, creating a scalable and intuitive platform.

The system will receive continuous feature and performance enhancements via over-the-air (OTA) updates. It will debut on the group's new vehicles later this year in South Korea.

The goal is to equip around 20 million Hyundai, Kia and Genesis vehicles with Pleos Connect by 2030.

There are two main displays. The first is a large central screen divided into three sections. One shows essential data including speed and warning lights, along with 3D graphics of surrounding objects and people. Another is the app screen, used for navigation, media and third-party applications. The bottom bar provides one-tap access to recently used or pinned apps.

The second display is positioned directly in front of the driver to keep the driver's focus forward. It presents key information such as speed, media and turn-by-turn directions directly in the line of sight.

Driver safety is enhanced through physical buttons on the steering wheel and below the large central screen, allowing quick access to key controls without using the touchscreen.

A three-finger gesture lets drivers reposition app windows easily or close apps instantly, supporting safer and more convenient interaction with in-vehicle applications.

Green Hills partners AMD on SoC applications

Green Hills Software is working with AMD to provide combined hardware and software for developing applications based on the AMD second-generation Versal AI Edge adaptive SoC.

This includes using the safety-certified Integrity and μ-Velosity real-time operating systems, the μ-Visor and Integrity Multivisor hypervisors, compilers, and the Multi debugger with system visualisation tools.

The offering of rtos, hypervisors and development tools is unique because it represents a single source for both Versal AI Edge compute core complexes – Arm Cortex-A78AE and Cortex-R52 – and is focused on meeting critical production requirements in automotive, aerospace and robotics applications.

This lets manufacturers and tier-one suppliers safely consolidate mixed-criticality ECU functions while reducing system complexity and lowering development cost and time to production.

The Versal AI Edge devices are single chips built on a hardware foundation of enhanced safety (Asil D and Sil 3), performing three processing phases: FPGA preprocessing, AI inference and postprocessing. Postprocessing is powered by Arm CPUs and enabled by Green Hills for complex decision-making and control for safety-critical applications.

"Customers developing embedded applications need a hardware and software foundation they can rely on," said Simon George, director at AMD. "This combination allows developers to more efficiently build and deploy intelligent, safety-critical applications for automotive, aerospace, healthcare and robotics."

Green Hills VP Dan Mender added: "The increasing complexity of safety- and security-critical embedded systems demands a tightly integrated, proven software foundation that developers can trust. Our collaboration with AMD brings together industry-leading, production-ready safety-certified software with adaptive SoCs."



JSW and Tata establish SDV technology centre

JSW Motors and Tata Elxsi have forged an alliance to establish the JNext technology centre in Pune, India.

The centre will serve as an engineering hub to support the development of software-defined, AI-powered mobility, aligned with the industry shift towards connected and electrified vehicles.

A memorandum of understanding (MoU) was signed between the two partners to formalise the partnership.

The centre will enable close collaboration with JSW Motors' R&D, manufacturing and leadership teams. Tata Elxsi will lead the implementation of the connected vehicle platform and unified customer experience app for JSW's upcoming vehicle programmes, owning the platform end-to-end, from conceptualisation and integration to production and aftersales support, in partnership with a broader ecosystem.

The collaboration aligns with JSW's vision of building a technology-led, new-energy mobility ecosystem in India, supporting indigenisation and localisation across the vehicle value chain.

This partnership will bring capabilities across digital and data-driven offerings such as user experience design, cloud platforms, over-the-air frameworks and digital twins. It will span location-based services, cyber security, AI and ML analytics, 5G-enabled technology, and immersive technologies such as AR, VR and XR to enhance the customer experience across the ownership lifecycle.

"We are building a technology-led, new-energy mobility ecosystem that is deeply rooted in India and globally competitive," said Ranjan Nayak, CEO of JSW Motors.

Manoj Raghavan, CEO of Tata Elxsi, added: "The future of mobility will be increasingly connected and software-defined, where vehicles continuously evolve through software, data and intelligent systems."



Inside the Tata Sierra

The engagement will extend into software-defined vehicle architectures and intelligent platforms for diagnostics, performance optimisation and predictive maintenance, along with testing, validation, functional safety and cyber-security frameworks aligned with global standards.

- The eSync Alliance's specifications have been adopted for production of the new Tata Sierra, marking the alliance's first deployment for a software-defined internal combustion engine vehicle in India. Delivered by alliance member Excelfore in partnership with Tata Motors, the programme is said to be a landmark validation of open, standards-based OTA software updates and remote diagnostics.

Loxo picks Innoviz lidar for L4 platform

Loxo has signed a letter of intent (LoI) to integrate Innoviz's InnovizTwo long-range lidar into its Digital Driver L4 autonomous driving system.

InnovizTwo serves as a core layer enabling physical AI systems that must perceive, reason and act in the real world under the laws of physics, supporting high-fidelity 3D understanding for autonomous operation.

Innoviz and Loxo are engaged in advanced stages of testing and evaluation of InnovizTwo for Loxo's dedicated autonomous vehicle platform. Subject to the successful completion of this process, Loxo plans to nominate Innoviz as its lidar supplier for this platform.

The Digital Driver technology stack powers autonomous delivery with purpose-built and retrofitted electric vehicles designed to meet the growing demands of urban and regional logistics across Europe, in applications such as transport, retail and postal delivery.

As Loxo prepares to begin development of its next driverless vehicles, the company evaluated different lidar providers, and found Innoviz's lidar has the potential to be the best fit for its platform including meeting the required performance, reliability and supply continuity.

TÜV SÜD gives thumbs-up for Vector Canoe platform

Vector has received safety certification for its Canoe platform from TÜV SÜD.

The certificate confirms that Canoe is qualified for development processes in accordance with IEC 61508, ISO 26262, IEC 62304 and EN 50716.

Users benefit from reduced effort for tool qualification evidence and audit preparation, more investment security, and a reliable basis for tool-related safety assurance.

The certification covers core functional areas of Canoe. These include analysing communication flows and automated testing of virtual and real systems. It also includes simulation, diagnostics and stimulation mechanisms for targeted fault and response analysis.

Thus it confirms Canoe meets the requirements for a T2 offline support tool for safety-related developments.

For users, certification means a reduction in day-to-day project work. Using a certified tool reduces the effort required for in-house tool qualification because an independent assessment is already available.

At the same time, planning reliability increases because Canoe is a tested tool that supports compliance with regulatory requirements and reduces risks in safety-related projects. This is decisive, especially with long product life cycles.

The four products are qualified for all safety integrity levels according to IEC 61508 and EN 50716, all automotive safety integrity levels according to ISO 26262, and all software safety classes according to IEC 62304.

Vector plans to renew Canoe's safety certification regularly. This ensures future versions of the products will meet the requirements of the relevant safety standards.

This should provide a tested, future-proof tool for developing and testing safety-related software and embedded systems in the long term.

Intel powers McLaren computing



Intel has been named the official compute partner of the McLaren Formula One, Arrow McLaren IndyCar and McLaren F1 Sim Racing teams.

Intel Xeon and Core Ultra processors will support McLaren's performance-critical workloads, including computational fluid dynamics, aerodynamic analysis, vehicle-dynamics simulation, race strategy analytics and the real-time decision systems that connect the McLaren Technology Centre in Woking to every race garage on the global calendar.

Formula One racing and IndyCar generate and rely on massive volumes of data from telemetry and simulation to real-time race strategy, where a difference in milliseconds can determine outcomes.

Intel helps McLaren turn those data into actionable insight through a secure, scalable compute foundation spanning CPUs that support data intensive AI workloads, low latency edge computing and diverse software platforms.

Intel technologies will be deployed within McLaren's trackside edge computing to enable real-time analytics and race-day-decision making. It will also power simulation, aerodynamics and digital twins, as well as AI platforms to accelerate design cycles and predictive modelling.

Open Alliance calls for standards alignment

The cost of developing autonomous driving will remain unnecessarily high unless the sector aligns around a single set of interoperable standards, according to the Open Alliance.

Analysis shows demand for Automotive Ethernet rising sharply, with vehicle Ethernet ports expected to triple to 3.42m sockets by 2032, though fragmented strategies and regional disparities risk slowing advancements.

A report from Tech Insights reveals that while Automotive Ethernet is growing rapidly, adoption remains highly uneven across leading OEMs and regions.

The Open Alliance advocates for stronger alignment around its specifications and best practices to reduce variability, avoid duplicated integration efforts and ensure Automotive Ethernet deployments scale efficiently.

"Automotive Ethernet is set for rapid yet uneven growth as new architectures, higher sensor bandwidth and emerging applications drive a near-tripling of Ethernet sockets in vehicles by 2032," said Open Alliance president Suma Prabhakara. "As regions like China grow in overall socket share but remain internally fragmented, the Open Alliance's role in reducing variability and accelerating consistent, standards-based adoption becomes even more important."

The report found the Automotive Ethernet socket market is set to grow from approximately 962,000 sockets in 2025 to 3.42 million in 2032, with the average number of Ethernet sockets per vehicle forecasted to rise from 11 to 27 by 2030.

However, the findings also note that a small group of OEMs install 4.5 times more Ethernet ports per vehicle than the rest of the market. This means that while adoption is growing across the market, the overall maturity levels are volatile and vary widely across different OEMs and regions.

Serdes is expected to grow alongside, not be displaced by, Ethernet, while time sensitive networking is projected to be underpinning nearly half of all Ethernet-equipped vehicles by 2030.

Blood alcohol level detector integrated in vehicle cockpit

Continental spinoff Aumovio and Trinamix have developed a way to measure blood alcohol levels by placing a finger on a sensor, delivering precise results within seconds.

The experience is intuitive and as easy to use as a fingerprint scan on a smartphone.

The sensor can be discreetly integrated into existing cockpit elements, maintaining a clean, unobtrusive interior design.

"By integrating blood alcohol measurement directly into the vehicle cockpit, we are clearly demonstrating how health and safety features can be seamlessly and discreetly incorporated into the vehicle interior while enhancing the user experience," said Pavel Prouza from Aumovio. "With this, we are increasing road safety while maintaining the usual level of convenience."



Sensor detects alcohol levels from one finger

The system uses small near-infra-red (NIR) spectroscopy technology developed by Trinamix to determine blood alcohol levels.

"When a fingertip is placed on the sensor, invisible light pulses are emitted into the tissue beneath the skin, where any ethanol molecules present can be detected," said Wilfried Hermes, director at Trinamix. "The characteristic reflection of the light is then analysed using AI-based evaluation methods to precisely derive the alcohol content in the blood."

The technology has demonstrated its functionality and performance in a clinical study registered with Deutsches Register Klinischer Studien, the German clinical trials register.

Aumovio emerged last year as a spinoff from Continental's former automotive group and has since established itself as an independent technology company.


Univrses technology collects road data

Pirelli buys stake in road monitoring firm Univrses

Tyre maker Pirelli has acquired a 30% stake in Univrses, a specialist in computer vision and AI, with the option to reach a majority stake.

The goal is to strengthen its products for road network monitoring and autonomous driving.

This will see the integration of the Univrses 3DAI AI-based computer vision into the Pirelli Cyber Tyre system.

The technologies allow the use of onboard cameras and tyres to collect data that provide feedback on road conditions. These insights could help road authorities make better decisions and deploy resources more effectively.

Pirelli Cyber Tyre integrates hardware and software to collect data from sensors inside the tyres, process the information using proprietary software and algorithms, and communicate in real time with the vehicle's electronics and with the cloud.

Univrses' technology, originally developed to give cars the ability to make sense of their surroundings, has been adapted to turn vehicles into AI-enabled road monitoring agents.

The Swedish company developed the 3DAI software to give autonomous vehicles perception capability and an AI-powered system that digitises city and roadside infrastructure, fed by the data from sensors, such as cameras, installed on vehicles.

A project is already underway in Italy. In 2025, Pirelli launched a monitoring system for the regional road network to create an up-to-date map of infrastructure conditions. This provides analyses based on data collected by tyres and processed through the Cyber Tyre platform, with visual data collected via cameras and interpreted using Univrses tech.

"Continuous monitoring and data are becoming the new foundation for infrastructure asset management, and Univrses technology is able to provide powerful analytical capabilities based on reliable and frequently updated data," said Jonathan Selbie, CEO of Univrses.

Founded in 2015, Univrses is based in Stockholm.

Over the past seven years, Univrses has worked with vehicle manufacturers to develop autonomous driving and adas functionality, with its software already integrated into flagship models from several global brands.

By adapting this core technology for road assessment, the company supports authorities at all levels across Europe, including Sweden's Trafikverket and National Highways in England, to deliver high-fidelity infrastructure intelligence.

In the Netherlands, Univrses has recently joined the Romo road monitor initiative for European road management. It includes the Dutch government, automotive suppliers such as Stellantis and Mercedes-Benz, and the EU.

Romo converts anonymised vehicle data into insights for road authorities, improving functions such as asset and weather management, plus road safety.

Polyn tapes out chip to monitor tyre-road friction

Polyn Technology, a specialist in neuromorphic analogue signal processing, has taped out an engineering chip with a neuromorphic core for tyre friction monitoring.

This is Polyn's first chip developed in cooperation with GlobalFoundries. The milestone accelerates the adoption of intelligent, physics-aware sensing technologies for adas and autonomous driving.

Following real-world validation and data-driven development, the chip is for estimating tyre-road friction and leverages neural networks to process high-frequency sensor data.

The system is trained on diverse driving conditions to estimate the peak friction coefficient in real time, enabling predictive insight into road grip before critical events such as braking occur.

Validation through controlled braking scenarios demonstrates alignment with real-world friction behaviour across standard surfaces, including asphalt, concrete and aquaplaning conditions.

Michigan researchers show value of adas

Researchers from the University of Michigan Transportation Research Institute (UMTRI) have found that cars equipped with adas features are involved in fewer crashes on public roads.

The study examined approximately 12 million General Motors model year 2020 to 2024 vehicles and matched them to more than 700,000 police-reported crashes across 18 states.

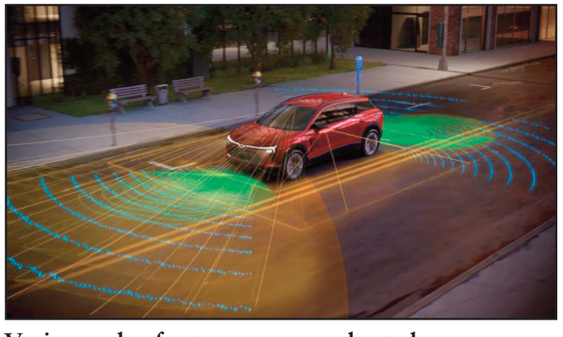
The findings show vehicles equipped with specific safety technologies have statistically significant lower rates of certain types of crashes, demonstrating the features support crash avoidance and injury severity mitigation.

These include automatic emergency braking, front pedestrian braking, lane-keep assist with lane departure warning, forward collision alert and IntelliBeam.

Among vehicles with these safety and driver assistance features, researchers found reductions of 86% in reversing crashes, 57% in rear-end crashes with injury, 35% in front pedestrian crashes with injury, 15% in roadway departure crashes and 13% in lane-change crashes,

"These findings give us real-world evidence that GM's safety technologies are doing exactly what they're designed to do: helping drivers avoid crashes and reducing injuries in everyday driving environments," said Susan Owen, GM technical fellow.

To estimate the effect of each feature, the team compared the rate of system-relevant crashes with control crashes unaffected by the system for vehicles with and without the features. The analysis accounted for driver behaviour, road conditions and vehicle type.



Various adas features were evaluated



Dolby brings immersive sound to BMW 7 Series

BMW picks Dolby Atmos for 7 Series

The latest BMW 7 Series uses Dolby Atmos to bring immersive audio into the vehicle cabin, marking the start of its rollout across BMW's vehicle portfolio.

This marks the start of the rollout of Dolby Atmos across BMW's portfolio to broaden access to premium in-car entertainment.

It delivers Dolby Atmos through BMW's Bowers & Wilkins Diamond surround-sound system. Dolby Atmos enables artists to craft and deliver three-dimensional sound experiences that place audio all around the listener, delivering greater depth, clarity and detail.

Dolby is working with automakers such as BMW to transform the vehicle cabin into a fully immersive media environment, enabling consumers to enjoy premium music and audiobook experiences.

Cinematic video services featuring Dolby Atmos are also being introduced in select markets, including China.

"Our collaboration with BMW marks an important step in bringing immersive audio into more aspects of everyday life," said John Couling, senior vice president at Dolby. "As vehicles evolve into connected digital environments, we're working together to make the car a powerful new space for entertainment."

In the new BMW 7 Series, the listening experience is delivered through up to 36 speakers and 1965W, combining Diamond Dome tweeters, headrest speakers and roof-mounted 3D channels to leverage the precision of Dolby Atmos.

The result is a three-dimensional listening environment that turns the interior into an immersive audio space.

NXP and Quanta deliver zonal networking

NXP is working with Quanta to deliver a deterministic zonal networking platform purpose-built for future vehicle architectures.

Built on NXP's S32 automotive processing platform and TrustMotion MotionWise middleware, it enables predictable communication across zonal vehicle networks.

This addresses a major OEM pain point: ensuring deterministic timing across hosts and network components, which reduces late-stage integration risk.

Through a plug-and-play development flow that can accelerate development significantly, NXP is helping users such as Quanta speed the time required to deploy modern software-defined vehicle (SDV) designs.

It supports automated topology discovery, schedule generation and deployment through a continuous integration workflow. By combining MotionWise deterministic scheduling and communication with a scalable hardware and software foundation, it provides automotive OEMs with a turnkey approach to developing and deploying zonal SDV architectures.

Delivered as a single, validated platform integrating automotive-grade compute, networking and system orchestration, it enables end-to-end determinism across hosts and network, rather than leaving OEMs to assemble and validate these capabilities themselves.

As automakers move from distributed, domain-based ECU architectures towards zonal and cross domain EE systems, legacy designs are increasingly limiting their ability to deliver software-defined functionality at scale. Ensuring deterministic timing across distributed compute and networking has become a critical challenge, directly affecting performance, integration complexity and time to market.

This collaboration addresses this by delivering predictable, end-to-end latency and low jitter across ECUs and in-vehicle networks, helping ensure system level quality of service while reducing late-stage integration risk.

Its plug-and-play development approach enables automated configuration, scheduling and deployment, which can accelerate SDV programme timelines. The platform also supports latency-sensitive use cases, including audio over Ethernet, HPC up-integration, real-time RCP control and smart energy networking, enabling OEMs to scale a unified zonal architecture across multiple vehicle programmes.

This integrates NXP's scalable S32 processing platform, in-vehicle networking and system power management portfolio with MotionWise deterministic scheduling and communication. Elements include S32 automotive processors for safe, secure and OTA ready zonal compute; TSN enabled networking using SJA1110 switches; Can and Lin connectivity; and scalable multi-PMIC power management.

This delivers a unified hardware-software architecture that supports automated configuration, CI and CD deployment, and continuous optimisation based on runtime data. OEMs can thus reduce integration barriers, move more efficiently from concept to production, and deploy a single, scalable zonal platform across vehicle classes and EE architectures.

NXP and Quanta are also working towards future alignment with the NXP CoreRide zonal reference system to support broader SDV system integration.

NXP's deterministic zonal networking is available now to OEMs and ecosystem partners, with demonstrations underway on Quanta development platforms. Additional showcases are planned throughout 2026.



Platform purpose-built for vehicle architectures

Traffex

Steve Rogerson reports from the Traffex show in Coventry, UK

MOVING ON

There has been a change of tone. When it comes to intelligent traffic management systems (ITS), the world has moved on from pilots and experimentation to real implementation at scale.

That was the view of Alistair Gollop, founder of ITS Now, as he opened the TechTalks conference session at May's Traffex show in Coventry.

"Sectors are coming to the realisation that ITS is no longer optional but an essential enabling layer," he said.

From connected vehicles to automated freight, there was an underlying truth that ITS was the mechanism that made it possible.

"Cities are no longer asking should they deploy digital infrastructure but how fast they can deploy it," he said. "Governments are preparing the regulatory framework that will shape this. Change is happening at pace. People are not just talking about the future of mobility, they are shaping it."

However, he said though transport systems were no longer niche, they needed to be fundamentally more human centred.

"We have to look beyond the technology and focus on outcomes," he said.

Data will play a key role in this, both from the infrastructure and from road users, and that will necessitate some form of standardisation, and here governments can help.

Darren Capes, head of road infrastructure technology at the UK government's Department for Transport (DfT), said transportation was all about data and AI.



Darren Capes promised government funding announcement this year



Alistair Gollop: "Change is happening at pace."

"The future will be around data and connectivity," he said. "I am talking about the technology we will be using in five, ten or fifteen years hence. The challenge is how we use the data to make things more efficient."

Essential to this is making sure the technology works consistently across the road network.

"We need to provide services that work consistently," he said. "That challenge is happening now. People are already using connected services and connected data. There are lots of connected services out there."

But a lot of those connected services were being done in a proprietary way by large multinationals.

"This is not necessarily the best way to do that," he said. "We want common repeatable ways that the data are reaching all roads users so the benefits of the technology are available to all."

He said in the same way there were rules for how road signs gave information, the data that are available inside the vehicle should also have rules.

"We need to ensure that happens in an open common way," he said. 'We need to preserve the format of the road signs when they are displayed in vehicles."

This was the way he said to ensure the users got the best service that could be delivered whatever the underlying technology and the age of the vehicle.

"There are too many standards competing with each other," he said, "so we have to decide which standards to follow and how to police that."

However, he said the industry had to be realistic that some things would be done in different ways but that did not mean the way the users received or interacted with the technology had to be different. He compared this with the WhatsApp messaging app that looked the same on Android and iOs devices despite the technology underneath being different.

"A lot of these technologies will be developed beyond the UK, beyond Europe, so we have little influence on how it is developed but we can set standards as to how the user sees it," he said.

What was important, he said, was there were data in the infrastructure that could be useful to road users, and the road users have data that could be useful to the infrastructure. These data have to be married.

"We have to decide which end-user applications we need the data for," he said. "That will affect how we do this. We also have to decide how the data in the infrastructure will be useful to, say, Google. It is about how we make the best use of infrastructure data and vehicle data."

For governments this meant providing a neutral framework and, he stressed, funding.

"The government needs to put its money where its mouth is and we will, later this year," he promised. "This will allow companies to come in and develop within the framework. We will this year make an announcement



Gafoor Din: "Proactive is better than reactive maintenance."

about funding of pilot projects. I will be able to say more about that later this year."

This should be good news for local councils in the UK. Gafoor Din, service manager for traffic control at Warwickshire County Council, said funds were needed from central government.

But he also said it was important for councils to move from reacting to incidents in traffic infrastructure technology to planned maintenance.

"We want technology that has a better lifecycle and maintenance programme," he said. "When we go out to tender, we have to look for good maintenance contracts as well. Proactive maintenance is better than reactive maintenance."



To help councils with projects, Fyld has a mobile app that will look at videos and requirements to help teams when they are onsite.

According to Fyld's vice president Scott Broadley, this uses AI to analyse the captured information and intervene if it sees a problem.

"Operators will report what is going on on-site and the AI will correct that if necessary with intervention," he said. "We can support the teams and provide remote supervision."

Addressing the needs of vulnerable road users was Georgio Potenza, business development manager at AGD Systems. The company provides real-time pedestrian detection technology to help local traffic agencies monitor crossings as part of initiatives to reduce road deaths. This, he said, has become more urgent in recent times with the growth of e-bikes and e-scooters sharing pedestrian areas. Some crossings that coped before are now struggling.

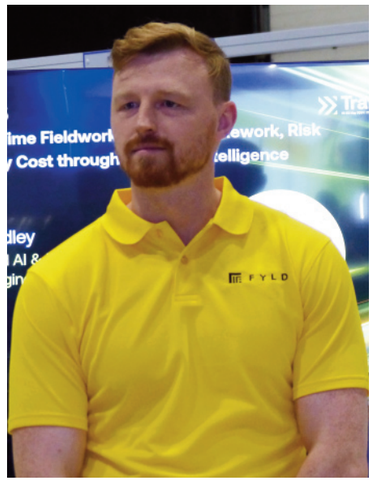
"We have to work with the existing layouts and meet today's challenges," said Potenza. "We can detect how many people are at a crossing, what is the safe limit and whether people are being pushed into the carriageway. And we have to take into account new types of vehicles such as e-scooters."

The technology can detect whether pavement saturation has been reached. It uses image recognition and machine-learning technology analysed by AI to help authorities react to situations quickly.

"There is a real need for this type of product," said Gollop. "We need tools to provide this type of real-time information."

Despite the need for standardisation, Capes believes the future will see a hybrid of technologies.

"I don't think it will happen that the future road network will all have the same technology," he said, "because the needs on the main highways are different to rural Yorkshire, for example."



Scott Broadley: "AI provides remote supervision."

In summary, while companies and experts are buoyant with ITS being depolyed at scale, there is still a battle to be won as standards compete. But every new industry goes through this and it will be sorted out because the world now demands a joined-up transport system.



Georgio Potenza: "We have to work with the existing layouts."

SIMULATION & MODELLING



ADDING AI TO DESIGN

Robert Ter Waarbeek shows how to advance automotive development with AI-enabled model-based design

Automotive development is evolving as software-defined vehicle programmes introduce faster feature cycles and more complex system interactions while meeting strict requirements for safety, reliability and long-term maintainability.

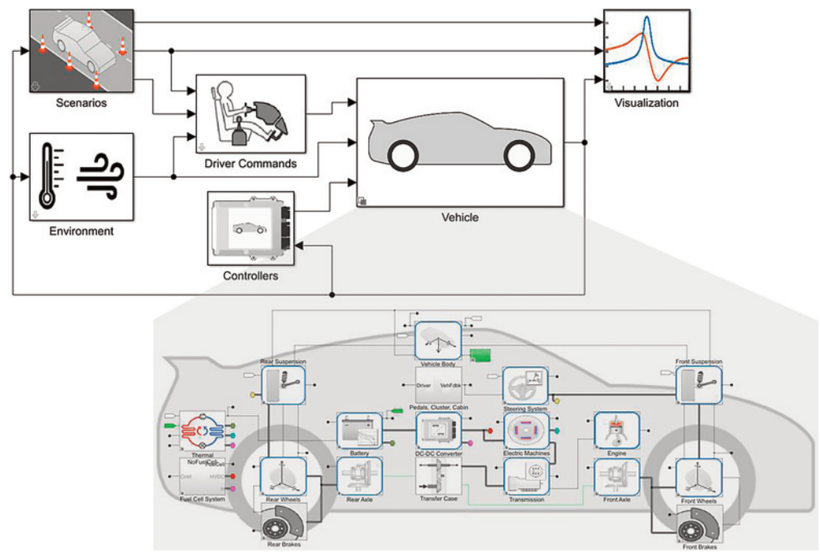
Generative AI (gen AI) is now part of engineering workflows. It can help increase development speed, but its nondeterministic behaviour, lack of physics awareness and limited traceability make it difficult to apply directly to safety-critical systems.

These characteristics make verification, certification and traceability challenging when gen-AI-generated outputs are introduced without constraints. Model-based design addresses these issues through deterministic execution, executable specifications and physics-based simulation.

Foundation

Simulation is the foundation of trust in gen-AI-assisted engineering workflows. It provides a controlled environment where system behaviour can be verified early and repeatedly.

Model-based design enables closed-loop simulation within continuous development



Model-based design integrates scenarios, environment, driver inputs and controllers into an executable system model that supports system-level verification

SIMULATION & MODELLING

pipelines, allowing gen-AI-assisted artefacts to be validated continuously in virtual environments long before software reaches hardware.

Closed-loop simulation uncovers defects that emerge only from real-time interaction between software, hardware and physical dynamics, such as instability, timing issues, saturation and integration errors.

Unlike regular software tests that validate code logic in isolation, simulation validates system behaviour against requirements under realistic operating conditions, catching safety- and performance-critical issues much earlier.

In leading organisations, shift left is not a one-time activity; virtual verification is embedded directly into CI and CD pipelines. Every change triggers automated builds and simulation runs, exercising models against representative scenarios and acceptance criteria. Verification becomes continuous, not episodic.

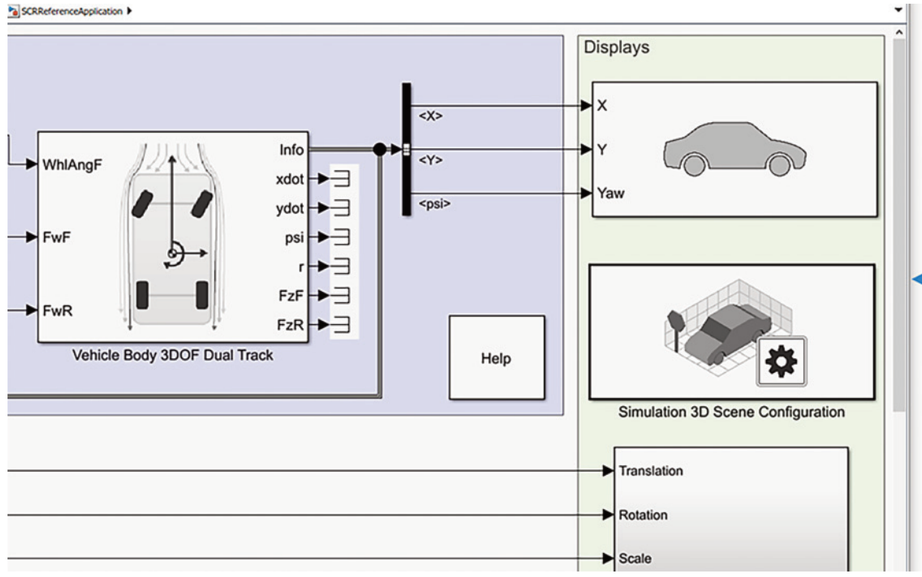
Scalable

Automotive EE architectures are transitioning from ECU-centric networks to zonal and centralised computing platforms. Software is no longer bound to specific hardware configurations but must now operate reliably across heterogeneous compute targets while remaining portable and scalable, from small controllers to high-performance vehicle computers.

Model-based design supports this requirement by separating system behaviour and software intent from hardware implementation.

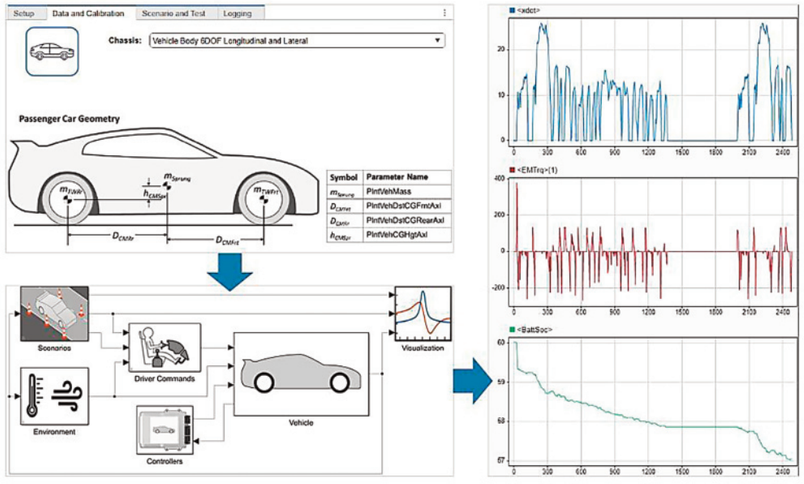
Engineers develop executable models that serve as stable sources of truth. The models can generate production-ready code for a wide range of processors and operating systems, including platforms incorporating AI inference engines and hardware accelerators such as GPUs, DSPs and NPUs.

This approach enables the development and validation of AI-enabled functions such as virtual sensors at the system level, reduces the need to reengineer algorithms for each target, and improves efficiency and consistency across platforms.





Closed-loop simulation connects system models to realistic driving scenarios, enabling early validation of vehicle behaviour in virtual environments



Shift-left development embeds simulation and virtual testing in early design stages, continuously validating system performance and supporting data-driven iteration

Collaboration

Engineering organisations must transform their collaboration models to keep pace with increased complexity. Integrating simulation, virtualisation and automated verification directly into CI and CD workflows supports rapid iteration across software, AI models and hardware acceleration strategies.

This model-centric approach helps organisations operate more quickly while preserving robustness, safety and long-term maintainability in the era of software-defined and AI-driven vehicles.

Deterministic

AI is most effective in automotive development when embedded within a deterministic modelling framework. Within model-based design tools, gen-AI-generated content is automatically tied to established interfaces, data definitions and architectural constraints. Model context protocol (MCP) capabilities empower engineers with AI assistance while preserving the rigour, repeatability and certification readiness.

Long-term maintainability and certification readiness require deterministic behaviour, transparent audit trails and verification evidence that accumulates throughout the lifecycle. Model-based design naturally supports these goals by linking requirements, models, test suites and generated code.

Continuous simulation produces verification data throughout development rather than only at the end of a programme.

When gen-AI-generated artefacts follow the same workflows, they inherit this structure.

This ensures that productivity gains do not come at the cost of safety, quality or compliance, and that gen AI can be adopted at scale.

Conclusion

Gen AI and model-based design offer a structured path for accelerating automotive software development while maintaining trust, safety and engineering rigour.

Model-based design provides determinism, physics-based validation and traceability. Gen AI adds efficiency and supports faster iteration when integrated within these boundaries.

This combination enables earlier insight into system behaviour and deployment across diverse hardware architectures.

The model-centric approach ensures consistent collaboration across engineering teams and promotes reuse and consistency across global programmes.

Gen-AI-enabled model-based design provides a scalable and reliable foundation for developing robust and certifiable automotive systems.



Robert Ter Waarbeek is principal automotive industry manager at MathWorks

PUBLIC TRANSPORT

FROM PILOT TO PUBLIC

Rolf Gramenske explains why autonomous mobility in public transit needs to be reimagined

Vehicle Electronics

Autonomous shuttle projects today demonstrate that vehicles can drive. However, the real challenge begins afterward: How can this be transformed into a resilient, scalable and safely controllable public system?

Autonomous mobility in public transportation is still often viewed on too small a scale. Many current projects focus on individual demonstrators, clearly defined test areas or small shuttle fleets. Technologically, these projects are important, but they address only part of the actual challenge.

For the central question is no longer whether autonomous vehicles can drive in principle. The key question is whether this can be developed into a scalable public mobility system. It is precisely at this point that a significant gap currently exists between successful testing and actual regular operation.

The German federal government also describes the current market situation as a phase between completed testing and a lack of scaling. At the same time, there is a shortage of production-ready offerings as well as robust operator and business models for autonomous shuttle systems.

The industry association Bitkom shares this view. In its latest position paper, the association calls for larger pilot regions, broader service areas and a higher number of vehicles to gain reliable insights into scalability and economic viability. Similar developments are emerging internationally.

Singapore already explicitly views autonomous shuttle systems as an integral part of the public transit network and no longer merely as technology demonstrators. The focus there is on integration, network supplementation and long-term operational viability.



Movement must remain safely controllable at all times

Demonstrator

This is precisely where the real technical challenge begins. A vehicle that drives autonomously under defined conditions does not yet constitute a robust public transportation system.

In pilot operations, many risks can still be mitigated through limited spaces, simple scenarios or additional intervention options. In subsequent regular operations, however, the requirements change fundamentally.

Then vehicles must: function under varying environmental conditions; exhibit reproducible behaviour; remain continuously available; and be safely controllable even outside of ideal scenarios.

This shifts the perspective. The challenge of autonomous mobility is no longer solely perception or driving function, but the safe and controllable execution of movement in real-world operation. This is precisely where the fundamental system question arises: How can vehicle movement remain controllable at all times, even when conditions vary, systems degrade or human intervention is no longer immediately available?

For developers, OEMs and system architects, this represents a fundamental shift in perspective. Scaling does not arise solely from more vehicles or larger fleets. Above all, scaling means reproducible and controllable movement in real-world operation. The “Handbook of Autonomous Driving in Public Transport” therefore explicitly describes autonomous mobility not merely as a technological issue, but as an integrated operational and systemic task.



Can autonomous vehicles develop into scalable public mobility?

Control

This is precisely where it becomes clear why many current approaches are reaching their limits. Autonomous systems are already capable of very reliable detection, analysis and decision-making. The real test, however, begins where decisions must be consistently and safely translated into vehicle movement under real-world conditions.

This brings a topic to the forefront that is still underestimated in many discussions: the technical controllability of movement. For public transportation, this means: control must be reproducible; behaviour must remain predictable; and systems must remain capable of functioning even in the event of disruptions.

The gap between pilot operations and public-scale deployment is therefore not merely a matter of regulation, financing or operator logic. It is, above all, a matter of system architecture.

Anyone who seriously intends to bring autonomous mobility into regular service in public transit must conceive of vehicle control from the outset as a scalable, fail-operational system function.

Scalable

Autonomous mobility does not become relevant to the public simply because individual vehicles can drive autonomously. What is crucial is that movement remains safely controllable at all times, even in real-world operations. This is precisely where the real challenge of the next generation of mobility lies, and the foundation for scalable autonomous systems.

For developers and system architects, this means a fundamental shift in perspective: in the future, vehicle control must be conceived as an independent, fail-operational system layer independent of individual vehicle platforms or isolated pilot applications.

This form of scalable vehicle control can be the technological foundation for autonomous, software-defined and safely controllable mobility systems.



Rolf Gramenske is director of technical sales at Arnold NextG

ON THE ROAD

Volkswagen's ID Polo GTI adds technology and massages to a 50-year heritage

RUB DOWN

Vehicle Electronics



Vehicle comes with many assist systems as standard

Half a century since the debut of the first GTI, Volkswagen is now presenting an all-electric sports car with a digital cockpit and the option to have a massage while you drive.

The ID Polo GTI has an output of 166kW and passes the 100km/h mark from a standstill in 6.8s.

Like with the first GTI in 1976, the drive power of the ID Polo GTI is also transferred to the wheels via the front axle at a maximum of 290Nm that is available at lightning speed. This power is proportioned thanks to the electronically controlled front differential lock equipped as standard.

The world premiere took place at May's 24-hour race at the Nürburgring. Pre-sales are scheduled to start in Germany this autumn at a price of under €39,000.

With its clear design and front-wheel drive, the ID Polo GTI continues the legacy of the first Golf GTI from 1976. Hereditary characteristics have been visually and technically reinterpreted. In addition to the front differential lock, the standard technical equipment includes the adaptive DCC sports suspension and progressive steering specially developed for the GTI.

A new feature is the driving profile, which is activated by a button on the sports steering wheel. All drive and chassis systems – including the power delivery of the electric motor, the standard-equipment progressive steering and the adaptive DCC sports chassis also on board as standard – are switched to maximum sportiness with one click. The cockpit also changes to a specific colour and graphics scheme.

The APP290 drive system is responsible for propulsion. This is supplied with power by the nickel-manganese-cobalt battery with an energy content of 52kWh net. It enables a WLTP range of up to 424km and can be charged at DC stations with up to 105kW. Thanks to a particularly constant charging curve, the battery can be charged from ten to eighty per cent in about 24 minutes at a DC quick-charging station.

In terms of body layout, it follows the new Volkswagen Pure Positive design language, creating a compact sports car with a clear and powerful stance atop its standard alloy wheels. The iconic red stripe is a distinctive feature at the front. It has served as a hallmark of this sporty brand since the first Golf GTI. The stripe stretches over almost the entire width, with a 3D GTI logo incorporated on the left.

An LED light strip, the illuminated VW badge and the standard IQ.Light LED matrix headlights are positioned above this as a horizontal bar. The air intake with a characteristic GTI honeycomb pattern is slightly lower down. Two red-painted vertical elements are incorporated in the outer areas. Their design resembles the towing eyes from motor sports.

The C-pillar was inspired by the first Golf; this states clearly this is a Volkswagen.

A stabilising element is the straight-lined window shoulder, and the rear end also has a striking design: the GTI is equipped with a roof spoiler that is divided in the middle.

The light design is characterised by the standard IQ.Light version of the tail light clusters, each with two outer three-dimensional LED elements. The transparent areas between them and the VW logo are also illuminated in red. The two-part black rear diffuser has a muscular appearance.

Interior

Red and black dominate the interior. The colours can be found in a number of features in the cockpit landscape. These include the contrasting red topstitching on the sports steering wheel and the red marking incorporated in the steering wheel rim at 12 o'clock,



Digital instruments and infotainment display are arranged on one visual axis

ON THE ROAD

similar to the marking commonly used in motor sports.

A narrow red stripe extends across the entire width of the dash panel. Red topstitching is used in the doors and on the front outer edges of the standard-equipment premium sport seats (front) and rear seats. The inner surfaces of the seats are upholstered in a fabric that reinterprets the legendary tartan check of historic GTI models.

The red GTI emblem is integrated into the integral head restraints on the front sports seats. This can also be found illuminated on the multi-function sports steering wheel. The two paddles for adjusting the recuperation level are another new steering wheel feature.

Cockpit

The digital cockpit – the digital instruments – and the infotainment display are arranged on one visual axis. The digital cockpit measures 26cm across the diagonal and offers different display views.

If the driver uses the View button on the steering wheel to activate the retro display, for example, the instruments are transformed into the style of a late Golf I.

The infotainment system touch display located in the centre of the dash panel measures 32.77cm across the diagonal and is as large as a premium tablet. If the retro display is active, graphic details in the style of the Golf I are also displayed here. An example of this is the track display for songs, which is then shown as a cassette, the portable form of music storage popular in the 1980s.



Bridgestone Potenza Sport available as option

Space

Passengers have 19mm more interior space available than in the Polo GTI4 with combustion engine. The interior width and headroom have also increased, while the luggage compartment volume has grown by more than 25 per cent from 351 to 441 litres.

When the rear seat backrests are folded down, the load capacity increases to 1240 litres (Polo MQB: 1125 litres). This extra space makes the car more of a dynamic all-rounder than any of its predecessors.

The detachable ball coupling offers additional variability: with a drawbar load of 75kg, this can easily hold a bicycle carrier with two e-bikes. Thanks to a towing capacity of up to 1.2 tonnes (braked, 12 per cent gradient), this small Volkswagen can also pull motorbikes on a trailer, for example.

Options

Optional equipment includes a high-end sound system from Harman Kardon with a music output of 425W and ten speakers, including a centre speaker for clear voice transmission, and a subwoofer.

Also available as an option is a large panoramic sunroof.

One new feature for this segment is the pneumatic massage function for the electrically adjustable 12-way front seats.

For drivers who prefer a particularly dynamic experience, a premium sports tyre, the Bridgestone Potenza Sport specifically developed for the ID Polo GTI, will be available as an option.



Tail light clusters each have two outer three-dimensional LED elements

Connected

The vehicle comes with a large number of assist systems as standard. Assist systems such as the next generation of Travel Assist will be additionally available as optional equipment.

Since the system uses online data, it has been renamed Connected Travel Assist. The system for assisted lateral and longitudinal guidance can now also detect red traffic lights and automatically brake the car to a standstill within the system limits.

One-pedal driving enables rapid deceleration through control of the accelerator alone.

Ethernet phy transceivers integrate safety and security

Single-pair Ethernet (SPE) phy transceivers from Microchip are available in 100baseT1, 1000baseT1 and dual-speed 100/1000baseT1 to deliver secure, reliable and scalable Ethernet connectivity for automotive and other mission-critical applications.

The LAN878x and LAN888x phys integrate hardware-based Macsec security compliant with IEEE 802.1AE-2018, providing frame-level confidentiality, data integrity and replay protection without adding latency or software complexity.

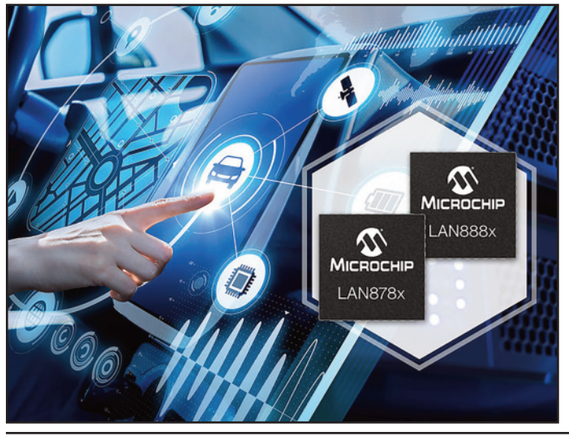
Native time-sensitive networking (TSN) support enables deterministic, low-latency communication for adas, zonal gateways and safety-critical control networks.

The families go beyond security and performance by delivering functional safety engineered for ISO 26262 Asil B. On-chip diagnostics and link monitoring increase visibility, accelerate fault detection and support stronger system-level safety mechanisms than traditional SPE phys.

To simplify platform scalability and design reuse, the families offer pin-compatible SKUs across 100baseT1 and 1000baseT1 variants, as well as SGMII and RGMII host interfaces. This compatibility allows designers to reuse existing hardware designs while scaling network bandwidth to meet evolving performance requirements.

All devices have a maximum junction temperature of +150˚C and operate from -40 to +125˚C.

The transceivers are supported by hardware evaluation platforms; SGMII, USB and PCIe plug-in boards; and Linux software drivers.

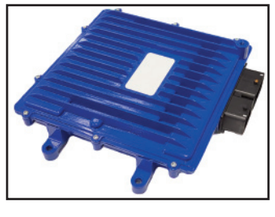


ECU consolidates architecture control

A control platform from New Eagle can simplify electrified vehicle architectures by consolidating charging and supervisory control in one ECU.

The OpenECU NX3 leverages expanded hardware, software and engineering capabilities from the recent acquisition of Pi Innovo. It extends New Eagle's unified Raptor and OpenECU platform, enabling more system integration, scalability and development efficiency across electrified vehicle programmes.

The single controller combines megawatt charging system (MCS) and combined charging system (CCS) protocols with full vehicle supervisory control.





Support packages

MathWorks has announced hardware support packages that directly connect model-based design and simulation to execution on the Renesas RH850/U2A microcontroller for automotive and the RA6T2 for industrial controls.

The Matlab and Simulink integrations let engineering teams move from simulation to running embedded code on hardware with automated build, flashing and on-target execution while accelerating dev cycles by eliminating many manual integration steps.

The support packages give engineering teams a consistent model-based design workflow across automotive and industrial programmes, reducing integration effort and accelerating deployment.

The RH850/U2A, widely used in automotive ECUs, provides the deterministic performance and safety-critical features required for EV motor control, adas and body electronics.

IC manages EV lithium battery packs

An automotive battery-management IC from ST Microelectronics includes all the features needed to manage lithium battery packs in hybrid and full electric vehicles, as well as industrial energy storage systems, and 48 and 96V applications.

The L9963F brings under-the-skin improvements to the L9963E as a compatible replacement that requires no hardware or software changes for existing users.

One device can monitor from four to 14 stacked cells, thereby addressing applications up to 48V. Connecting multiple ICs permits larger arrays of up to 31 battery packs with a total of 434 series cells.

Coulomb counting inside supports pack overcurrent detection in ignition on and off states. A redundant cell-measurement path, with ADC swap, enhances safety and enables limp-home functionality.

The device can take its power from the monitored battery and integrates circuitry to generate stable internal references and ensure measurement precision, including a voltage regulator and bootstrap.

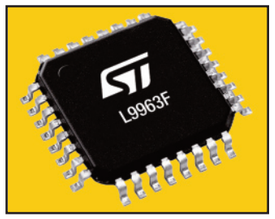
Support for cell-balancing current up to 200mA helps safeguard battery health, and it can keep the integrated balancing-mosfet drivers active for a timed period after entering low-power operation. This silent-balancing mode maintains protection while taking little energy from the battery.

With nine GPIO pins and an SPI interface for control and monitoring, the device also has fault-detection and notification functions.

It complies with ISO 26262 and is Asil-D ready for use in functional-safety applications.

With synchronised current and voltage sampling, with no de-synchronisation delay between samples, it integrates a 16bit voltage ADC with ±2mV maximum error in the 0.5 to 4.3V range. This synchronisation accuracy extends across multiple stacked ICs, leveraging the 2.66Mbit/s isolated serial communication interface to ensure maximum 4μs latency between the first and 31st device in the chain.

It is in production now in a 10 by 10mm TQFP64 package.



Power combination targets automotive SoCs

Rohm has combined its BD968xxC PMIC series with the BD96340MFFC driver mosfet, targeting automotive SoCs used in adas, driver monitoring and sensing cameras.

Conventional power supply architectures often require customisation to accommodate differences among SoC manufacturers and generations, frequently leading to redesigns during model rollouts. This increases development time and verification workload.

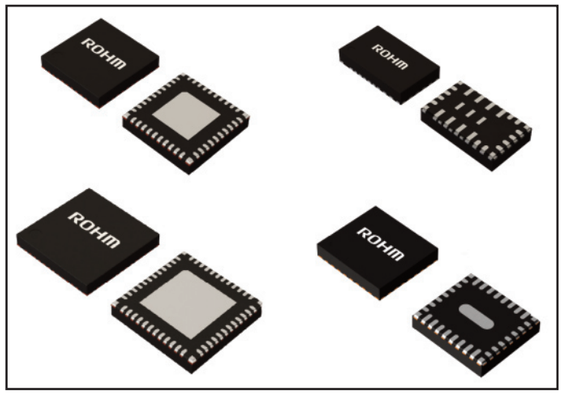
To address this, the combination is based on a configurable design concept enabling flexible adaptation to a wide range of SoC power requirements.

It allows scalable power supply designs that support a wide range of SoCs, from low end to high end, by flexibly configuring combinations of configurable PMICs, sub PMICs and driver mosfets according to application requirements.

This scalable approach reduces development effort during platform expansion while enhancing power efficiency and design reuse.

All PMICs are designed for a 2.7 to 5.5V input. The BD96803QxxC and BD96811FxxC are for standalone operation with low-end SoCs.

The BD96805QxxC and BD96806QxxC, when combined with the BD96340MFFC driver mosfet, can support low-voltage, high-current demands required by high-performance SoCs.



LED controller integrates DC-DC converter

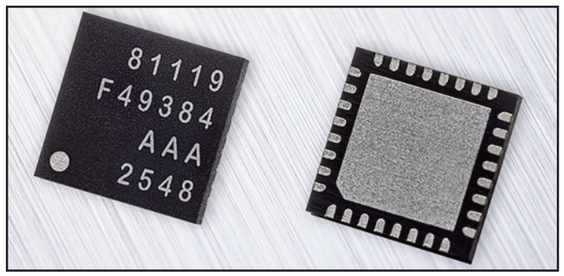
An 18-channel Lin RGB LED controller from Melexis has an integrated DC-DC converter to simplify and optimise automotive lighting systems.

By generating the LED supply voltage locally on chip, the MLX81119 reduces power dissipation, external components and space requirements in dense vehicle applications such as door panels, dashboards and charge port lighting.

In conventional architectures, supplying LEDs via external DC-DC converters increases heat generation, component count and layout complexity.

The device addresses this by integrating a 1A DC-DC converter that generates an optimised local LED supply voltage, programmable between 2.5 and 6V.

Rather than dissipating excess voltage as heat, the device dynamically adapts the LED supply to the active colour mix and operating conditions, reducing power losses and thermal stress.



This level of voltage optimisation is not achievable with fixed external DC-DC converters.

With 18 low-side current sources configurable up to 60mA and independent 16bit PWM control, it supports up to six RGB LEDs per device, enabling smooth colour transitions and lighting animations.

Built-in direct and indirect temperature sensing allows active compensation across all channels, maintaining stable colour points over the automotive temperature range.

It integrates a complete Lin system, including transceiver and protocol handler, compliant with Lin 2.x and SAE J2602. Developed to ISO 26262, the device supports up to Asil-B implementations depending on the system safety concept, making it suitable for functional safety-relevant interior and exterior lighting.

It can operate with as few as two capacitors and a single inductor, eliminating the need for a separate DC-DC controller and associated passives. This enables more compact lighting modules and eases integration in cramped locations.

The device can be configured as a Lin-controlled power and IO extension; its 18 channels can support auxiliary loads or distributed functions within a module.

LED control is managed by the firm's 16bit microcontroller. The integrated memory subsystem includes 32kbyte of flash, 13.5kbyte rom and 4kbyte ram to support the application, LED calibration coefficients and additional system data.

The device comes in a 5 by 5mm QFN32 package, operates from a 5.5 to 28V supply, and includes diagnostic capabilities such as overcurrent detection, short current protection and overtemperature.

Redriver provides four channels for smart cockpits

An automotive-compliant 32Gbit/s, four-channel linear redriver from Diodes boosts signal integrity for high-speed protocols such as PCI Express 5.0, SAS4 and CXL.

Targeting smart cockpit architectures that integrate adas, infotainment and instrument clusters into one unit, the PI3-EQX32904Q addresses the growing signal-integrity problems posed by these AI-driven computing platforms.

Designed for GPU-plus-CPU SoC architectures, the device employs a 0.13μm silicon germanium (SiGe) bicmos process to ensure robust, high-speed data transmission, delivering elevated linearity and low jitter.

The device also supports modern standby (S0 low power idle) mode, with power consumption below 5mW in deep standby while being ready for rapid wake-up.





L4 cameras

Automotive-grade cameras from Tier IV are for autonomous driving systems.

The MP camera series, built with hard-to-source automotive-grade components, meets the quality requirements of production vehicles and is available at scale.

Level-four optimised, proprietary image and flexible camera control deliver high-fidelity visual data for driverless operations.

They seamlessly integrate with Autoware open-source software for autonomous driving, reducing system development time.

Manufacturing and quality control is being managed by a partner with proven automotive experience to ensure stable and scalable supply.

There are initially three models, with more to be introduced in phases. The three are the C1-195 MP, C2-030 MP and C2-062 MP.

The cameras are built for a wide range of imaging applications.

HV relays aid transition to 800V

At June's Battery Show in Stuttgart, Gruner will present its latest high-voltage relays for current and future vehicle architectures.

With the transition from 400 to 800V architectures and higher, the demands on switching components continue to rise. High-voltage relays must safely handle extreme currents, ensure safe disconnection in the event of a fault and operate reliably under mechanical stress.

Currently in the development and prototyping phase is the type 860 bank relay, type 870 and 880 main relays, and a type 890 charging relay.

The type 870 is designed as a main relay for modern 450V vehicle architectures.

It offers reliable switching performance even under demanding automotive conditions.

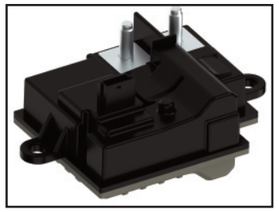
The relay can handle continuous currents of 100A and withstand short-term currents of over 6kA for 5ms.

For 800V systems, the type 880 handles continuous currents up to 500A and withstands short-time currents above 22kA for 5ms. The switching voltage reaches up to 1kV DC. With shock resistance up to 60g, the relay is designed for harsh operating environments.

The type 890 has a short-circuit current carrying capacity of up to 27kA and a contact resistance of less than 90$\mu\Omega$, ensuring low power loss and high efficiency. The high short-circuit current carrying capacity is achieved through advantageous current conduction inside the relays.

The monostable version is optimised for energy-saving operation with a holding power of less than 2W. These characteristics make the relay suitable for EV charging architectures.

The relays are available in monostable and bistable versions and comply with IEC 61810-1 and IEC 60664.



MLVs handle 48V power supplies

High-temperature, automotive-grade multilayer varistors (MLVs) from Kyocera AVX are engineered for 48V supplies.

They are part of the firm's TransGuard VT series, which was the first to offer MLVs rated for +175°C operation.

They are zinc-oxide-based ceramic semiconductor devices that combine bidirectional overvoltage protection and EMI and RFI attenuation capabilities in SMT packages. They reduce the need for discrete MLCCs, providing cost and board space savings.



The latest models are designed and tested for use up to +150°C in motor vehicles with 48V power supplies and are qualified to VDA-320. They're available in five EIA chip sizes (0805, 1206, 1210, 1812 and 2220) and rated for 56V DC or 40V AC working, 100 to 110V clamping, 48V jump start, 30 to 1500A, 0.2 to 9J transients, and capacitance values from 80 to 2800pF.

Rectifiers deliver high current ratings

Providing space-saving, high efficiency products for commercial, industrial and automotive applications, Vishay has introduced 16 Fred Pt ultrafast rectifiers in the low profile DFN6546A package with wettable flanks.

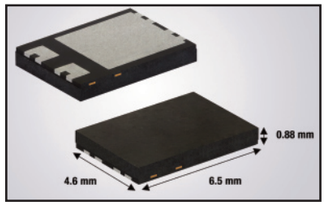
The 200V devices provide current ratings from 6 to 15A and are available in commercial and AEC-Q101 qualified versions.

The DFN6546A has a 6.5 by 4.6mm footprint and a typical height of 0.88mm, letting the rectifiers make more efficient use of PCB space.

At the same time, the devices' optimised copper mass design and die placement technology allow for thermal performance that enables operation at higher current ratings.

Compared with 200V components in the SMPC (TO-277A) package with the same footprint, the rectifiers offer a 10% lower profile and a 50% higher current rating.

The single and dual devices are for high frequency inverters, DC-DC converters, freewheeling diodes, load dump protection, clamps and snubbers, reverse and series polarity protection, and LED backlighting.



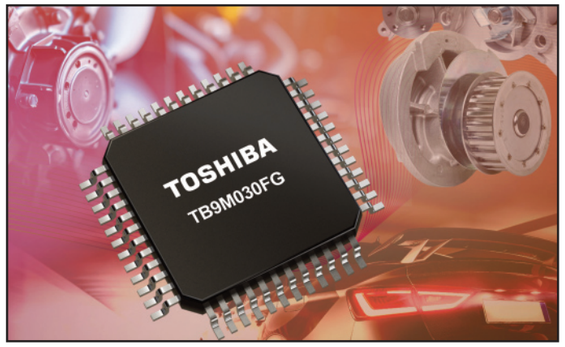
Typical automotive applications include ECUs, LED lighting, adas, lidar, cameras, and 48V boardnets, chargers and battery management systems in EVs and HEVs.

The devices provide low reverse leakage current and operate from -55 to +175°C, while their low forward voltage drop of 0.75V combined with a fast reverse recovery time and low reverse recovery charge reduces power losses to improve efficiency.

The wettable flanks allow for automatic optical inspection, eliminating the need for an x-ray inspection.

Suitable for automated placement, the rectifiers have an MSL moisture sensitivity level of one, per J-STD-020, LF maximum peak of 260°C. The components are RoHS-compliant and halogen-free, and their matte tin-plated leads meet the JESD 201 class-two whisker test.

Samples and production quantities are available with lead times of eight weeks.



MCU and gate driver control BLDC motors

Toshiba has started shipping engineering samples of the AEC-Q100 compliant TB9M030FG, an addition to the SmartMCD series that integrates an MCU and motor driver.

It is suitable for low-speed, sensorless field-oriented control (FOC) of brushless DC (BLDC) motors used in automotive applications such as electric water pumps, oil pumps, fans and blowers.

Sensorless control of three-phase BLDC motors presents challenges in accurately detecting rotor position at low speeds, creating a strong demand for high-performance sensorless FOC technology capable of delivering stable control from a standstill.

The TB9M030FG integrates a 32bit MCU with an Arm Cortex-M0 core, 64kbyte flash memory and an additional 12kbyte of rom and 4kbyte of ram.

The gate driver controls and drives the n-channel power mosfets for three-phase BLDC motor operation. The product also features a Lin transceiver and a power system that can operate at automotive battery levels.

This integrated part is housed in a QFP48 package, typically measuring 9 by 9mm.

The product also incorporates Toshiba's vector engine co-processor supporting short FOC cycle times and reducing CPU workload and software programme size in motor control applications.

In addition, sensorless control technology enables position FOC control from zero speed through the low-speed range when used with optimised PM-synchronous motors, such as three-phase BLDC motors with magnetic anisotropy in the rotor, allowing the generation of reluctance torque due to differences in magnetic reluctance within the motor.

Oscilloscope focuses on vehicle diagnostics

Saelig is selling the Micsig AHO1 oscilloscopes for vehicle diagnostics and troubleshooting.

The oscilloscopes has a 12bit ADC, four analogue channels with 200MHz bandwidth, a real-time sampling rate of 1GS/s, and a memory depth of 110Mpts.

Its 3cm thick portable design, built-in high-capacity Li-ion battery and USB type C charging make it suitable for mobile and outdoor repairs. With a general and automotive dual-software architecture and dedicated test modes for engines, sensors and EV systems, it supports internal combustion and new energy vehicle diagnostics.

The software suits professional vehicle diagnostics and general electronic measurements. It also incorporates a multimeter function, supporting simpler measurements including voltage, current, resistance, continuity testing, diode testing and capacitance measurement.

The soft rubber casing provides a comfortable grip as well as protective capabilities, yet maintains a compact enclosure that fits into a backpack.

Equipped with a 16000mAh capacity, long-life Li-ion battery, the oscilloscope also supports charging via power banks, eliminating worries about battery life.

For automated or remote testing, these oscilloscopes support SCPI commands, mobile apps, or smartphone and PC-based remote-control situations. An HDMI output can drive external displays or projectors.

It uses a 12bit resolution ADC, offering up to 4096 quantisation levels, which is 16 times more than traditional oscilloscopes with 8bit A-D converters. This allows users to observe tiny waveform details more thoroughly.

There are three modes: 20cm touchscreen, physical buttons and knobs, or both.

Segmented storage divides the available storage space into multiple small segments, making analysis of intermittent, rare signals more accurate and efficient.

The standard kit provides automotive repair-specific accessories, such as probes and alligator clips, while the master kit adds a professional carrying case and accessories.

The oscilloscope measures 26.4 by 17.5 by 3.0cm and weighs 1.7kg.



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