Thu, 19 May 2022
Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #112

Editorial

OTA, SOTA, RTR—Making Sense Of The Alphabet Soup

BMW IMAGE

OTA (over-the-air) and SOTA (software-over-the-air) connectivity facilitate the implementation and management of numerous vehicle features and services, but they also bring their own challenges, including potential conflict with RTR (right-to-repair). This week's in-depth article looks at this constellation of technologies and issues.

Also this week are driver focused touchscreens really the best solution? How will Grupo Antolin's strategy and business model create stakeholder value? Faurecia is commercializing their newest perceptual image processing and immersive user experience, and Jaguar Land Rover has announced a new "open innovation" strategy. Plus: functionalized fiber composite hollow profiles for cockpits, and a low-carbon, lightweight solution for interior plastics. These and more interior and mobility topics are in this week's DVN-I Newsletter. We hope you enjoy reading it. If you haven't yet signed on as a DVN-Interior member, we welcome you to come **join us**!

We never stop working for you, and we're glad you're here.

Sincerely yours,

Carsten Befelein
DVN-Interior Consultant

In Depth Interior Technology

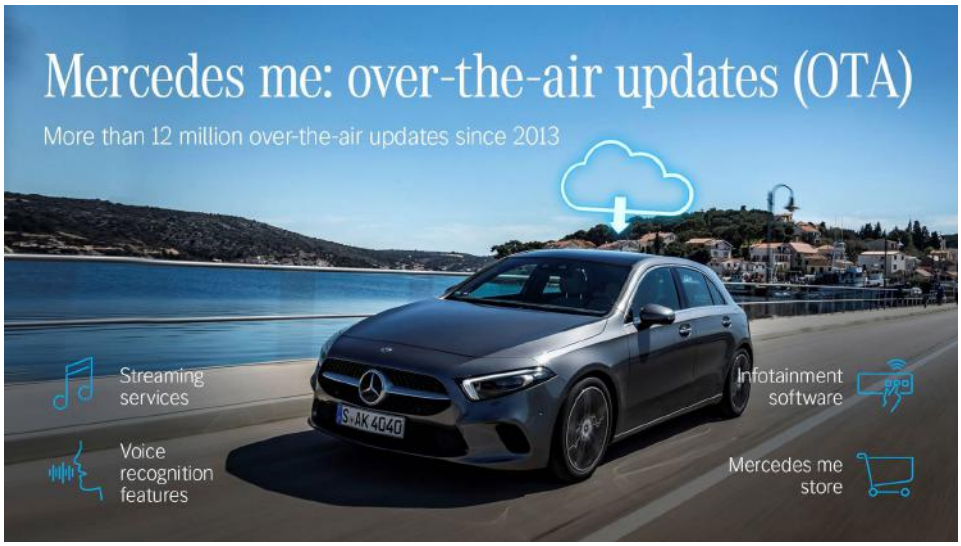
Over the Air Connectivity for Vehicles

TELEKOM IMAGE

Cars are moving computers with software controlling more and more essential functions. Over 100 million lines of code present a constant challenge to keep the system up to date (patch the inevitable security flaws and bugs; add and remove functions, etc). Regular updates to firmware and software are unavoidable. A hassle for vehicle users if they had to bring the car to a shop for the service every time, but over-the-air updates (OTA) will, at least in theory, eliminate that need.

Automatic software updates via the internet have been standard for laptops, smartphones, and the like for years. In the automotive industry, however, they are still relatively rare. Most of the time, vehicle owners are called to the workshop to install updates or have safety recalls done. A decade ago came the first OTA updates, mostly for non-critical infotainment functions. Today, some automakers regularly carry out updates over the air. As before, these mostly involve non-safety-critical systems, such as navigation maps or the sound system. Mobile software updates of safety systems or functions directly related to driving are just beginning to slowly catch on. As they gain traction and the capabilities expand, perhaps vehicle obsolescence will be slowed down, as new features can be added via firmware or software. Then again, there is another edge to that sword—keep reading.

Aside from remote updates, automotive manufacturers have found other applications for OTA technology, including telematics and ADAS. Drivers can experience greater functionality from smart vehicles than ever before, such as live vehicle information and analytics which feed wirelessly to vehicle displays and maintain ADAS to keep drivers safe through autonomous emergency braking systems.



MERCEDES-BENZ IMAGE

A rosy picture, but OTA changes to vehicles come with challenges. An Automotive IQ survey of more than 100 automotive industry professionals found many of them flagged issues like legacy technology compatibility, security, and regulatory compliance as problematic barriers to OTA. With 68 per cent of survey respondents flagging security concerns as the primary obstacle to OTA and SOTA (software-over-the-air) implementation, it is clear that security concerns will need to be addressed.

Aside from security issues, 42 per cent of survey respondents cited legacy technology issues as a significant barrier to the implementation of OTA and SOTA initiatives. Automakers need to rethink how they design the update process, because there are about 20 to 30 different systems on a vehicle that might need to be updated. This can represent a significant inconvenience to the customer, detracting from the convenience offered by OTA updates in the first place.

And speaking of the customer, end users for substantial reasons can't be faulted for mistrusting the whole idea. For just one example, most people sooner or later have a bad experience with a routine update of their computer or phone: maybe it breaks features that were working before; it makes new problems; it takes away functionality they wanted to keep using; it changes how the device works in a way the user dislikes, or in the worst cases it "bricks" the device, rendering it useless. It's an inconvenience and a nuisance if a phone or computer isn't working, but it's a much bigger deal if the car isn't working.

The implementation of S/OTA initiatives will also require keeping up with national and international regulations on things like vehicle standards and data security. Automakers have to develop vehicle architectures; compliant monitoring, update, and support models and also ensure they have a comprehensive customer relationship management system (CRM). This will all be necessary to ensure that all data relating to individual customers and their vehicles is handled in accord with privacy laws such as the GDPR (in the EU since 2018; an American equivalent seems unlikely to materialize). There are also UN Regulations to comply with, and right-to-repair regulations.

GDPR necessitates complete control over and accountability for customer data, which becomes much more challenging when dealing with numerous, complex OTA updates and information transfers. UN Regulations require measures be implemented across four distinct disciplines that support approval of vehicle computational security management systems and software update management systems: managing vehicle risks; securing vehicles by design to mitigate risks along the value chain; detecting and responding to security incidents across vehicle fleets, and providing safe and secure software updates and ensuring vehicle safety is not compromised while introducing a legal framework for OTA updates to vehicle software.

Right-to-repair regulations exert a similar need for efficient management of customer data, as the regulations require technical data and repair instructions to be made available to vehicle owners and the independent motor trade, rather than locking down vehicles and exerting proprietary secrecy on this information so customers are forced to go through manufacturer channels for repairs. These are examples of why the implementation of a unified customer, technology and process approach is now crucial for automakers to maintain regulatory compliance with OTA and SOTA implementations.

Then there is the sinister dark side of this constellation of technology. Put simply, a car that can be repaired, enhanced, and upgraded over the air can equally be damaged, degraded, and downgraded over the air. And not necessarily just by third-party hackers; sometimes the bad actor is the very party nominally responsible for keeping the user safe.

The basis issue: when an automaker or a Tier maintains MDM privileges over their cars (mobile device management—similar to what corporate-owned computers have so the company's IT department can

remotely operate-upgrade-downgrade-delete-track-etc), there's nothing stopping them from remotely editing the car's logs, replacing uncomfortable data with a version more complimentary to their side. These issues will have to be addressed in a forthright, candid, transparent manner before consumers will feel safe about OTA.

Despite the challenges involved, the implementation of OTA and SOTA initiatives can offer significant benefits for automakers and drivers alike, including the potential for improved safety. Tesla: in 2018 they said an OTA update reduced the braking distance of Model 3 vehicles.

Telematics is essentially the process of transmitting information over long distances and is used to facilitate remote management of vehicles. The ability to have remote OTA transmission of all relevant vehicle data, including data relating to aspects such as location or repair diagnostics, is hugely beneficial for organizations that manage fleets or even individual vehicles. One of the key benefits of the application of OTA and SOTA for telematics involves the collection of data. A vehicle fleet generates an enormous and valuable lake of data which, over time, an organization can apply to improve the quality of the product or service on offer. Aside from offering real-time diagnostics regarding currently-required vehicle maintenance, telematics can also assist with predictive maintenance. For example, if telematics are providing information that a vehicle being driven in a certain way that will likely bring about the failure of a component or system after a predictable amount of time or mileage, that information can be leveraged to reduce the frequency of vehicle breakdown through preventive maintenance.

It is also likely that we will see increasing ability for automakers to track the status of connected vehicles with the aim of identifying ideal times to update or upgrade software. The industry is likely to see the continued development of connected vehicles' abilities to provide a connectivity 'health check' that informs automakers of the status of a vehicle, whether it is ready to receive an update and even help with prediction of ideal update windows, to minimize inconvenience to the driver.

Volkswagen is transforming themselves into an agile, software-oriented mobility provider. One step towards this is the OTA capability: all ID models will now receive regular software updates via mobile phone. Previously, the updates were only available to a few customers in the "First Movers Club". The ID software version 2.3 offers new functions and optimizes existing ones. With the networking of the entire ID fleet, Volkswagen is creating the basis for new customer-oriented business models.

VW IMAGE

All in all, OTA and SOTA connectivity helps to facilitate the implementation and management of numerous vehicle features and services, including ADAS, which enhances driver safety and telematics enabling automakers to stay informed about the status of vehicles or fleets. Given the galloping development of new features for applications such as vehicle safety and convenience—not likely to slow down soon—the application of OTA and SOTA connectivity to help manage these features will become de rigueur.

Interior News

Are Driver Focused Touchscreens the Best Solution?

INTERIOR NEWS

VNC AUTOMOTIVE IMAGE

Automotive software company VNC says the headlong race towards giant driver-focused touchscreens is depriving users of the best in-car experience. According to VNC, the wholesale replacement conventional controls by touchscreen interfaces risks alienating customers; compromising safety, and attracting action by regulators.

A recent study by the UK's Transport Research Laboratory and road safety charity IAM Roadsmart found drivers take their eyes off the road for up to 20 seconds when asked to play a track from Spotify using a touchscreen interface—long enough to travel over a third of a mile at 70 mph. While doing so, drivers failed to maintain their lane position or respond appropriately to a simulated emergency. All in all, reaction times increased by as much as 57 per cent. That compares very badly to driving with a blood alcohol level just over limit (reaction times increase by 12 per cent). Drivers are increasingly fed up with having to use the touchscreen to do anything and everything, and with the European Commission estimating that driver distraction is a factor in up to 30 per cent of crashes, regulators and legislators will likely be compelled to do something about it.

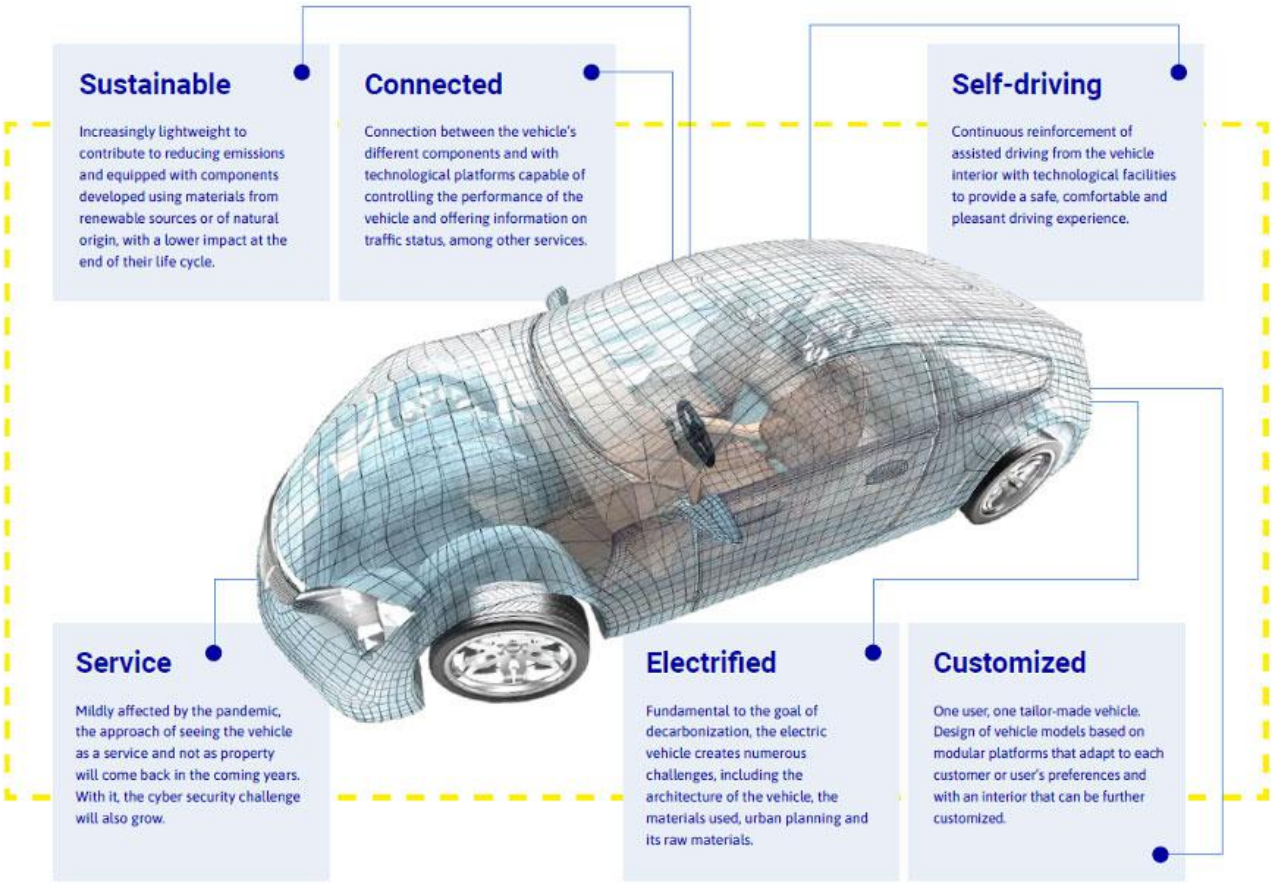
VNC suggests alternatives, such as BMW's gestural control and voice control systems. Nevertheless, the likes of these aren't developed yet to the point of Apple's Siri and Google Assistant.

VNC Automotive CEO Tom Blackie says automakers are "locked in a race" for bigger and bigger touchscreens. "Having a giant touchscreen interface is really about saving hardware costs by implementing everything in software", he says. "Recently there's been growing disquiet as years of ergonomic study and usability experience are abandoned in the rush to cram everything onto a single screen".

Blackie appreciates some automakers separating driver-focused display screens from those to be used only by passengers, calling that a step toward "digital democracy" allowing each occupant to enjoy an individual experience tailored appropriately for whatever else that occupant might be doing.

Grupo Antolin's State of the Company Report

INTERIOR NEWS



ANTOLIN IMAGES

Grupo Antolin has published their 2021 Integrated Report explaining how their strategy and business model create stakeholder value in the short; medium, and long term.

The report, **available online**, explains Antolin's corporate strategy and policies in terms of an integrated and sustainable business model that covers all areas: innovation; environmental strategy; talent and diversity management; supply chain, and business ethics. It identifies opportunities for improvement, as well.

Based on an internal and external analysis, Antolin carried out a detailed study of the relevant issues using the concept of double materiality. As a result, the impact of environmental; social, and governance (ESG) issues on the value of the business is examined, as well as the impact of the business on its surroundings and the environment.

Antolin's sustainable business model follows their roadmap the 2030 Agenda for Sustainable Development with its 17 Objectives, as well as the United Nations Global Compact and its Ten Principles. The report reflects and describes the company's commitment by highlighting, among others, eight company best practices and their contribution to the related SDGs.

Main objectives include CO_2 emission reduction; carbon neutrality; circular business; responsible supply chain; sustainable innovation; advanced innovation; new materials and processes; strategic partnerships, and diversity and safety.

Faurecia's Perceptual Display Platform Vision

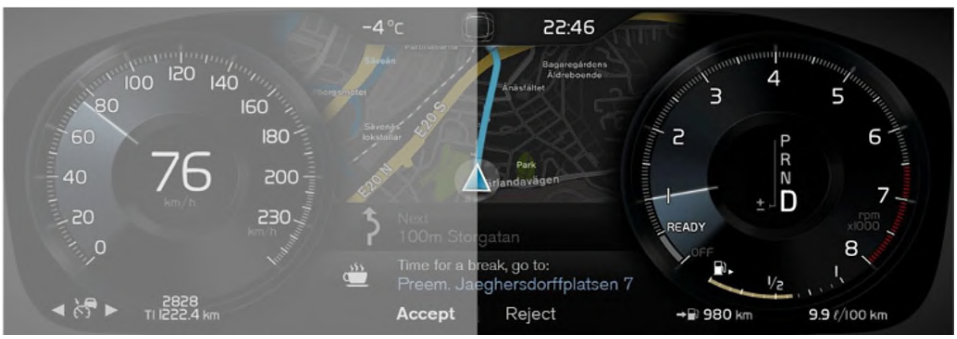
INTERIOR NEWS

FAURECIA IMAGES

Faurecia, a Forvia company, has unveiled their newest perceptual image processing and immersive user experience solutions. The solutions build on Faurecia's perceptual display space expertise, which features their IRYStec brand of enhanced cockpit display screens, and also address major industry megatrends including energy efficiency; personalization, and safety.

Faurecia IRYStec founder and general manager Tara Akhavan says "IRYStec is a pioneer in perceptual image processing and was first to incorporate elements such as learned color, eye aging, and perceived image quality into an automotive display. Our newest innovations provide consumers with a perceptual and immersive user experience while providing automakers with cost effective, energy efficient solutions".

Faurecia is unveiling the following new perceptual image processing solutions:



MyDisplay is a platform solution that creates a personalized, enhanced visual experience. MyDisplay incorporates physiological algorithms that mimic how our eyes work to enhance the 3D, color, and brightness of the screen in one seamless process, thus providing a more personalized visual experience optimized for the driver's specific needs and age.

Smart Dimming delivers 30-per-cent energy savings without compromising display screen quality. It integrates with existing vehicle sensors, which enables a more affordable solution for automakers looking to minimize commodities and costs; reduce weight, and optimize battery usage while maintaining image quality.

Camera Visual Enhancement incorporates smart image processing and sensors to compensate for inclement weather effects on external cameras within electronic mirrors, rearview and surround view cameras. Screen

readability increases by up to 50 per cent in night, rain, fog or snow, which helps create a safer driving experience.

Immersive Display combines high and low-definition screen areas to create a seamless user experience. Customizable to screen shapes and sizes to create an immersive display experience within the entire cockpit.

Perceptual image processing combines physiological principles such as eye aging, perceived quality, and learned color with computer science algorithms to optimize display screens for individual users. Faurecia was one of the first suppliers to commercialize this Perceptual Display Platform that launched in 2020 on the Mercedes-Benz E-Class Cabriolet.

JLR Open Innovation for Modern Luxury Vision

INTERIOR NEWS

2022 JAGUAR XE (JAGUAR IMAGE)

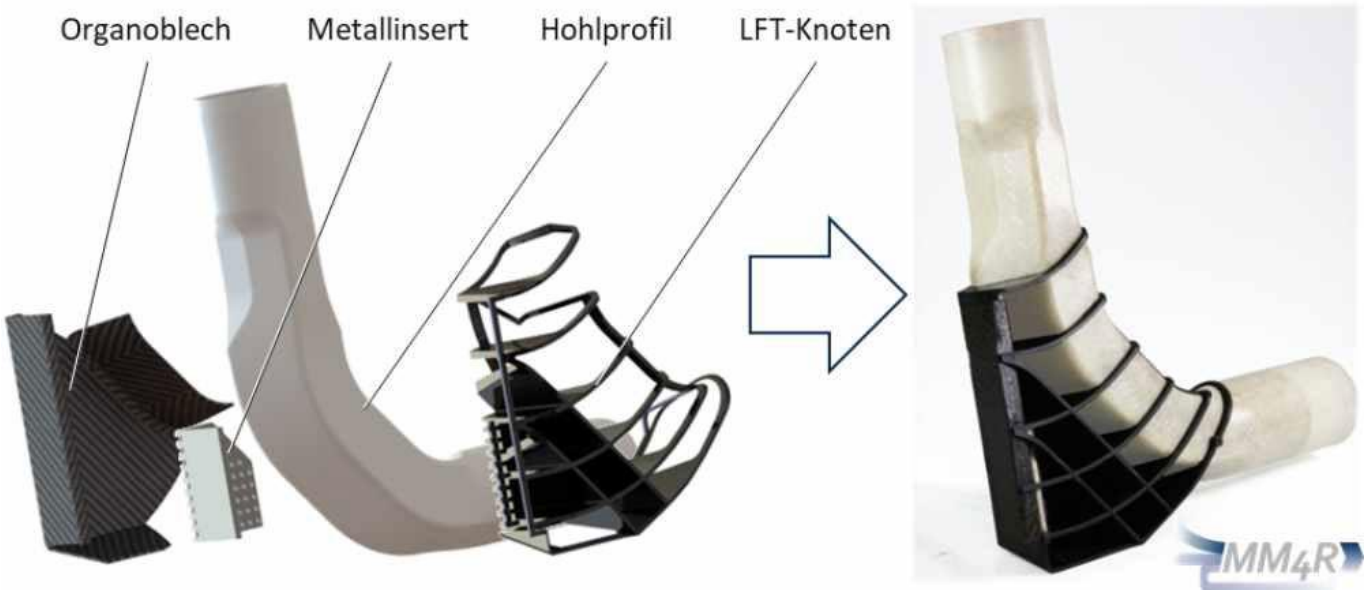
Jaguar Land Rover has announced a new Open Innovation strategy to accelerate next-generation technology and sustainability to support their "Modern Luxury" vision.

Open Innovation will drive collaborations with startups; scale-ups, and external organisations on electrification; connectivity; digital services; the metaverse; intelligent enterprise; manufacturing; supply chain, and sustainability.

The announcement is part of Jaguar Land Rover’s "Reimagine" strategy to create world’s most desirable luxury vehicles for the most discerning customers. They've launched an innovation hub in the UK, in partnership with corporate innovation platform and investors. Two other partnerships will provide access to the vibrant Latin American startup ecosystem. This Open Innovation program will help the business identify digital services, products, tools, and processes to attain carbon neutrality by 2039.

Functionalised Hollow Fiber Composite Profiles for Cockpits

INTERIOR NEWS



TUD/ILK IMAGE

Under the leadership of Porsche, nine project partners want to develop hollow functionalised fiber composite profiles ("FuPro") to be used instead of aluminium-magnesium ones as cockpit crossmembers, and bring them to series-production readiness.

ILK, the Institute for Lightweight Construction and Plastics Technology at TU Dresden is one of the project partners (FuPro). The FuPro design combines hollow thermoplastic fiber composite profiles; organic sheets, and injection molding. Porsche is calling it "Recycling-friendly multi-material design for lightweight structures".

With a single material system consisting of short, long, and continuous fiber-reinforced semifinished products, the FuPro construction method offers great design freedom. It is also recyclable. However, individual production technologies still need to be optimized for energy consumption and process time. In addition to the further development of the necessary production technology, the partners are also planning sustainability assessments. The research and development project is funded by the Federal Ministry of Economics and Climate Protection (BMWK) and supervised by Project Management Jülich.

Toyoda Gosei's Light, Low-Carbon, Interior Plastics

INTERIOR NEWS

Japanese multinational Toyoda Gosei, a developer of plastics, rubber and LED technologies, has a cellulose nanofiber (CNF)-reinforced plastic for automotive components, intended to reduce their carbon footprint throughout their lifetime, from raw material procurement and production to recycling and disposal.

The material offers several benefits compared to traditional plastic reinforcements. CNF has one fifth the weight and five times the strength of steel, which means when used as a reinforcing material in plastic or rubber, parts can be made thinner and foam molding becomes easier. When the material is reused after vehicles are scrapped, little strength is lost from heating and melting, facilitating the recycling of automotive components. It is a material that does not increase the total amount of CO_2 in the atmosphere. Even when CNF is incinerated, the only CO_2 emitted is that which was absorbed by the plant during its growth.

The Design Lounge

BMW Brings Digital Art to Vehicle Interiors

THE DESIGN LOUNGE

BMW IMAGE

BMW says they will be the first manufacturer to bring digital art to vehicle interiors, working in conjunction with Chinese digital artist Cao Fei.

Digital Art Mode features Fei's work as part of BMW's My Modes concept, which creates a holistic user experience featuring both a functional and an emotional level, that can be created at will by pushing a button or via voice control. This is achieved by the synchronization of parameters such as drive and steering control, mood lighting and sound, as well as the color scheme and graphics on the vehicle display.

The Digital Art Mode offers an additional option for drivers to personalize their driving experience according to their preferences and interests. The feature will be made available this year; certain models will be available with the Digital Art Mode as a customized optional feature from the factory, while others can be retrofitted via remote software upgrades.

BMW Group's SVP of digital cars Cristoph Grote says "With the new Digital Art Mode, BMW Cultural Engagement reaches new heights while creating something entirely unique. For the very first time, we are making digital art an integral part of the modern driving experience in a car and use innovative technology to transform mobility into an individual, highly exclusive and emotional experience".

The artwork available on the curved interior display and created by Cao Fei, represents the continuous change of a globalized and interconnected world and is named "Quantum Garden", featuring galaxies of visual spaces filled with dots, light beams and nebulae constantly moving toward and away from each other at varying speeds while growing and shrinking again and again.

In her artwork, produced especially for the Digital Art Mode, Cao Fei says she combines reflections on global connections and correlations with the pursuit of a collaborative form of what is, in Asian cultures, often described as the perfect harmony of humankind and nature: "The desire to connect is omnipresent. It is about how we can synergize with the world, live with nature and renew our energy", she says.

News Mobility

Stellantis Free2move Buys Car-Share Biz from BMW, Mercedes

NEWS MOBILITY

SHARE NOW IMAGE

Stellantis has agreed to buy the Share Now car-sharing business from BMW and Mercedes-Benz as the two German automakers focus on the software part of their mobility alliance. Stellantis wants to position itself as a global leader in car-sharing, using this step announced on Tuesday to expand its existing business in the area.

Share Now, the European market leader, allows customers to use smartphones for short-term rentals of cars including BMW, Mini, Mercedes, Smart and Fiat vehicles in cities.

Brigitte Courtehoux, who heads Stellantis' mobility division Free2move, said the deal was part of the group's plans to grow net revenue from that business to €700m in 2025 and to €2.8bn in 2030, up from €40m last year. Stellantis will strengthen their mobility division Free2move via the deal, hoping a global push to cut emissions will also drive demand for car-sharing and open new profit streams. Over the next decade, Stellantis intends to expand Free2move's presence worldwide, growing it to 15 million active users.

BMW and Mercedes started car-sharing in 2011 and 2008, respectively, as a way to get younger buyers to try their brands and keep up with changing mobility needs in cities. Share Now is the European market leader, but has struggled to turn a profit.

Stellantis, with their broad presence in North America through the Chrysler; Dodge; Ram, and Jeep brands, could have better chances for car-sharing success.

By selling the division, BMW and Mercedes will focus on the two remaining parts of their mobility cooperation: Free Now, an app that enables booking cars, taxis, e-scooters and e-bikes, and the charging infrastructure booking app Charge Now.

In Parallel, Volkswagen Group is closing in on the acquisition of Europcar as part of a broader push to create a mobility services platform.

Autonomous Drive Systems for Public Transport

NEWS MOBILITY

ZF IMAGE

Everyone agrees that local public transportation must become more efficient in order to be more attractive to customers. In practice, however, the shortage of drivers, the question of profitability and the costly reactivation of disused rail lines put the brakes on many dreams.

One answer to many of these challenges could be autonomous transport systems (ATS). The aim is to make local public transport more attractive and more efficient in order to encourage more and more people to use it. Automotive supplier ZF has become a manufacturer of such vehicles through their acquisition of the company 2Getthere, and is currently presenting their Group Rapid Transport (GRT) model to politicians, transport operators and the press in Schweinfurt, Germany.

The shuttle offers space for 22 people, and can travel autonomously in road traffic, but can also be used in separate lanes. With its emission-free electric drive, it reaches a speed of up to 40 km/h. On structurally separated lanes, shuttle passengers drive past the traffic jam and thus gain a significant time advantage. That's in contrast to traditional public transport, which takes longer than the use of personal cars. The solution with structurally separated lanes turns this ratio around in favor of shuttle users. Thanks to the high frequency and punctuality of autonomous shuttles, many passengers will then reach their destination more quickly and comfortably.

General News

Suppliers Joust for Software Development Profits

GENERAL NEWS

MERCEDES-BENZ IMAGE

Software will carry on being profitable for the foreseeable future, so automakers want control of the value chain. But they face stiff competition from tier-1 suppliers.

Automated driving, digital additional services, and temporarily-bookable functions such as seat heating all offer opportunities for automakers to milk more and more money from vehicle users on an ongoing basis—and it is not just premium manufacturers paying attention to the revenue potential offered by new software architectures. The software-defined vehicle is the industry's overall goal, but software is increasingly unwieldy for automakers.

Timo Kronen, a partner at the Berylls consultancy, says faulty software will continue to prevent automakers keeping up with the production launches of important models. Methods and processes are still too closely aligned with the established approach to hardware development, he says.

What is striking in the course of the software-defined vehicle is that the major suppliers are falling behind. Many automakers are looking to tech companies for their partnerships. For example, Nvidia with Mercedes; Jaguar Land Rover and various Chinese startups; Qualcomm with BMW and VW; and Mobileye, which belongs to Intel. The system suppliers are themselves in the middle of the process of transforming their business models and working practices. This is where some automakers' executives lack patience and then select partners for software development as quickly as possible.

With the new forms of cooperation, the business relationships between automaker and supplier will change in terms of who's exposed to what risks, where sales occur, who takes on the payments, intellectual property rights, and more. Traditional suppliers like Bosch; Continental; ZF, and the like have margins around four to six per cent; tech companies are used to rather larger profit margins. Around 30 per cent for Nvidia and Qualcomm; over 20 per cent at Intel.

ISELED Alliance Virtual Conference

GENERAL NEWS

Shortly earlier this month, an ISELED-Alliance meeting was held as a virtual conference. Robert Kraus, CEO of Inova Semiconductors and Head of the ISELED Alliance, opened the event.

In the ISELED / ILaS session, Thomas Rothhaupt reported on the technical progress of ILAS and the digital ISELEDs. Robert Isele of BMW, who was head of interior lighting for many years and recently moved to technical purchasing, gave a presentation on the application spectrum of ILAS and ISELEDs at BMW.

In the microcontrollers session, NXP's Armin Winter contributed with the topic "ISELED / ILaS Support on S32K Update", and Stefan Kouba of Microchip gave a presentation on "Microchip ISELED / ILaS Status Update".

In the LEDs session, Dominant's Hartmut Wettengel presented "seddLED Product Family Roadmap"; Everlight's Du-Yeal Kim's talk was entitled "Everlight SmartLED Roadmap", and CoAsia's Brian Park spoke on "CoAsia Itswell IC Built-in Smart RGB Intro".

Erick Parra, of Technica Engineering, gave a guest presentation titled "Introduction to an ILaS Capture Module". Eclat Digital's Louis Dellieu presented "Eclat Digital - A New Path to Light Simulations" and Inova Semiconductors' Stefan Hoffmann provided a technology update on ISELED / ILaS.

In the Applications session, Prof. Dr. Karl-Heinz Blankenbach of HS Pforzheim presented "RGB LED Displays are Best for Exterior Displays". Uno Minda Systems' Christoph Steinberger's lecture was on "ISELED Gateway"; TactoTek's Markus Thamm presented "Beyond Just Light", and Forvia's James Gourley reported on "SmartLEDs for Automotive Lighting & Displays: New Demos and Use Cases".

After the lectures, Hongbright; Intron; Lextar, and Polycontact presented themselves as new candidates for ISELED-Alliance meeting, which has already grown to 44 members in a short time.