DVN-I
Automotive Interior

Thu, 24 March 2022 Weekly Newsletter **NEWSLETTER #104**

Editorial

Foam, Sweet Foam

RECTICEL IMAGE

Soundproofing is essential for the comfort and wellbeing of passengers, especially as noise is now understood to be harmful to the health. Recticel offers a versatile range of acoustic absorption and insulation solutions that can help reduce sound levels and NVH (Noise, Vibration, and Harshness) problems, including reverberation noise—surely reason enough to have a closer look at foams for vehicle interiors; that's the subject of this week's in-depth article.

Other coverage this week includes the interior comfort highlights of the new Mercerdes EQS; dynamic virtual reality for passengers; night vision dashboard design; an open-source automotive software platform; next-generation smart HMIs, and much more—think about of the dangers of networking in the new vehicle generations and form your own opinion about Tesla's AV sensor technology, for example.

And don't miss the upcoming live **DVN-Interior Workshop in Köln on 25-26 April**. It is the best place to meet with your colleagues and counterparts; to exhibit and experience the latest innovations, and to talk and listen about the whole constellation of interior topics with the world's top experts. Stay tuned and **connect with us** to access the DVN-I workshop member account. If you haven't yet registered, you'll want to **do so** while space remains available. And of course, if you're not yet a DVN-Interior member, do come **join us**!

We are glad you're with us here in the DVN-I community.

Sincerely yours,

Carsten Befelein
DVN-Interior Consultant

In Depth Interior Technology

Recticel's Foams for Vehicle Interiors

RECTICEL IMAGES THROUGHOUT

The trend towards greater comfort in vehicles is here to stay! Recticel's automotive foams offer specific tactile and aesthetic characteristics to enhance the driving and ownership experience and help manufacturers to make better, more performant cars.

Recticel develops and manufactures foams for components in vehicle interiors with simple, low-emission processing as well as a homogeneous surface appearance and a soft-touch feeling. Foams are available with a fine or open cell structure for a wide range of applications. High stretchability, thermoformability, and good recovery behaviour at critical radii are further advantages of the foams for interior components.

Recticel supplies tier-1 and -2 automotive suppliers worldwide with foams for automotive interior components including headliners; seats (including air-conditioned ones); door panels, and arm rests.

The product range includes over 200 PUR foams. These are based on polyether and polyester, and are individually tailored to customer requirements.

Decorative foams for headliners are particularly easy to process, e.g. by means of flame and adhesive laminations. They are hydrolysis-stable, and provide high stretchability and durability; homogeneous, uniform cell structures, and good thermoformability. They have low VOC and fogging values, so they're low in odor and emissions.

The 120-metre-long-block technology results in up to 50 per cent fewer glue lines than competing products.

Recticel also offers new sustainable foams with resource-saving polyurethanes based on renewable raw materials. Ether-based prepolymer is the solution for modern headliners with regular surfaces, soft-touch feeling, and improved interior climate for the consumer, while automakers benefit from easy processing, durability, and efficient use of materials.

Upholstery foams increase seating comfort with a feel-good factor. For air-conditioned seats the reticulated foams with open cell structure enable air exchange..

PUR polyester foams are easy to process; suited for flame and adhesive laminations, and have a high elongation; a cell structure conducive to homogeneous surfaces, and a good thermoformability. PUR polyether foams have a low VOC content for low fogging, low emissions, and low odour. And, they are hydrolytically stable and durable.

In armrests and door panels, the haptics contribute to the high-quality impression of the automotive interior. The homogeneous surfaces of special foams enable a soft-touch feeling. High ductility, thermoformability, and good recovery behaviour at often very small radii make PUR polyester and polyether foams particularly suitable for this application.

Some typical technical data of foams from Recticel. Parameters from left to right:

Product • Product Group • Net density • compressive stress • tensile strength • fracture strain • compression set • fogging

Produkt	Produktgruppe	*Nettorohdichte [kg/m³] DIN EN ISO 845	*Druckspannung [kPa] DIN EN ISO 3386-1	Zugfestigkeit [kPa] DIN EN ISO 1798	Bruchdehnung [%] DIN EN ISO 1798	Druckverformungsrest [%] DIN ISO 1856 (50 %, 70°C, 22 h)	Fogging, gravimetrisch [mg] DIN 75201 - B
B 50 H-LF	Polyester PUR foam	50	8,0	>200	>100	<10	<1
B 60 N-LF	Polyester PUR foam	60	7,0	>120	>150	<5	<1
B 65 N-LF	Polyester PUR foam	65	7,0	>120	>150	<5	<1
B 75 N-LF	Polyester PUR foam	75	7,5	>130	>180	<5	<1
OBoTrim Nature 3540 T	Polyether PUR foam	35	4,0	>100	>180	<6	<1
B 4550 PFK-LF	Polyether PUR foam	45	5,0	>100	>160	<5	<1
B 5560 FK-LF	Polyether PUR foam	55	5,0	>100	>150	<5	<1
B 6060 GL-LF	Polyether PUR foam	60	6,5	>120	>150	<5	<1
B 6560 GL-LF	Polyether PUR foam	65	7,0	>120	>150	<5	<1
B 6560 FR-LF	Polyether PUR foam	65	6,0	>120	>150	<5	<1
B 7560 FR-LF	Polyether PUR foam	75	5,0	>120	>170	<5	<1

Interior News

Interior Highlights of the Mercedes EQS SUV

INTERIOR NEWS

MERCEDES IMAGE

What will people do in cars when they needn't actually drive any more because autonomous vehicles have grown up and taken over? The first steps toward expanding in-car entertainment are already done with the new Mercedes EQS SUV**.**

The new all-electric model, the third to ride on the company's dedicated EV architecture, will feature a massive 56-inch MBUX Hyperscreen. The 12.3-inch OLED display in front of the passenger will stream video while the car is moving. Passengers will have to wear headphones to avoid distracting the driver, and Mercedes will also employ a second safeguard to guarantee the driver is paying attention: the car will dim the passenger screen if it catches the driver trying to look at it, using the driver monitoring system to track their eyes.

Mercedes will pair their massive Hyperscreen with one of seven interior color combinations, using fine leathers and wood to craft inviting cabins. Mercedes highlighted one interior trim feature that combines laser-cut magnolia wood with stainless steel inlays. The EQS will also feature a Dolby Atmos sound system and the company's air purification system, which receives a new scent called "№ 6 Mood Mimosa".

The EQS will offer third-row seating Mercedes says is more comfortable than the third-row seats in the GLE. The EV architecture allows for an SUV with generous interior dimensions; The EQS is said to be able to hold up to four golf bags—that's got to be worth at least a golf-clap!

Audi's Backseat Virtual Reality

INTERIOR NEWS

AUDI IMAGE

Audi brings virtual reality entertainment from tech entertainment startup Holoride into series production. Starting this summer, passengers will be able to take a seat in the rear and use VR (virtual reality) glasses to access media such as games, films, and interactive content. The virtual content will adapt in real time to the driving movements of the car. Audi models with the latest expansion stage of the modular infotainment system (MIB 3) will be Holoride-capable from this June. The new technology will be presented at the South by Southwest (SXSW) festival in the USA.

Holoride adapts virtual content in real time to the movements of the car. This enables "elastic content", that adapts to driving movements, time, and route. Audi's description: "If the car drives through a right-hand bend, for example, the spaceship in the imaginary world also flies to the right. If the vehicle accelerates, so does the spaceship". The motion-synchronized journey through virtual worlds is also intended to reduce the risk of travel sickness. To use Holoride, an approved VR headset must be paired with the vehicle. The connection is wireless via Bluetooth Low Energy (BLE).

The new technology is first being launched in Germany, England, and the USA; other markets are to follow successively.

TechnoTeam's Night Vision Dashboard

INTERIOR NEWS

BIERITZ INSURANCE IMAGE

TechnoTeam was founded in Germany in 1991 by researchers at the Ilmenau University of Technology. Their products are based on their work in image processing, recognition, and applications development.

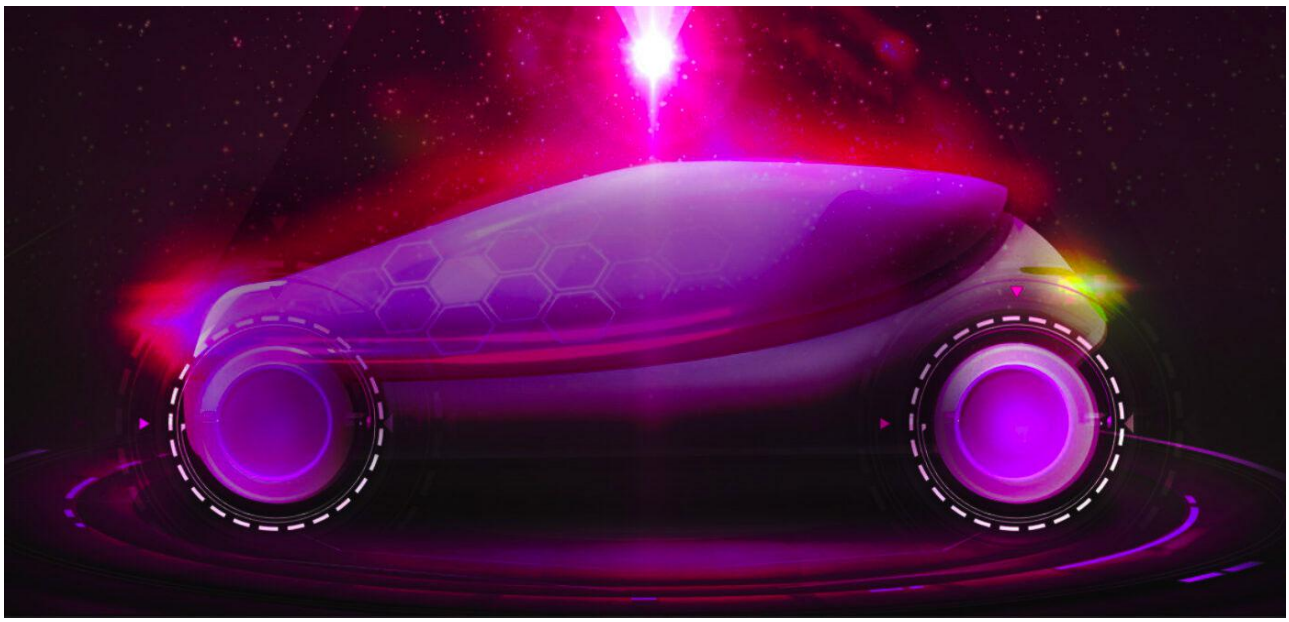
TechnoTeam developed and commercialized one of the earliest image-resolving light and color measurement devices for use in both laboratory applications and industrial automation; their products can be found around the world supporting the development and manufacture of products such as displays; headlamps; and luminaires, and have become the standard of excellence for light metrology in the automotive industry.

Originally employed for the application of the automotive night-vision dashboard design, the LMK LabSoft simple package offers an especially designed statistical operator for backlit symbol detection. For characterizing background-lit symbols, not only the mean luminance also the minimum and the maximum as well as the position within the symbol are of interest. For recording these values, the symbol object is used. The luminous region of the symbol is determined by means of an adapted threshold algorithm. The minimum and the maximum of all local means are displayed, together with their positions. The spot size and minimum distance to the edge of the symbol can be set.

In combination with the LMK camera series, the optimized lens has a large aperture for fast measuring times despite low luminance levels. The minimum measuring distance of the focusable lens is about 28 cm. The resulting viewing fields are about 30 × 22 mm, permitting the reliable evaluation of structure widths up to 0.2 mm.

Eclipse: An Open-Source Automotive Software Platform

INTERIOR NEWS



ECLIPSE FOUNDATION IMAGE

The Eclipse Foundation, which champions open-source software development, has formed a new Software-Defined Vehicle (SDV) working group dedicated to developing a software platform for the automotive industry. The organization says the initiative has the support of companies from across the automotive, IT, cloud, and services industries—including automakers such as Daimler and Toyota, and tier-1 suppliers such as Bosch; Continental; Denso; ZF, and other industry leaders including Cap Gemini, AVL, and Microsoft.

Eclipse believes electrification, autonomous vehicles, advanced driver assistance systems and in-car digital experience are dramatically transforming the system architectures embedded in vehicles. Automotive architectures are moving from networks of special purpose devices to kind of servers on wheels, where more powerful general-purpose computers are responsible for implementing and coordinating the various systems in the automobile, including the ones which keep occupants safe on the road. And these systems architectures are rapidly changing how automotive software needs to be built.

The vision of SDV is to radically transform the automotive industry by developing a common software platform that all participants in the automotive industry can use in an openly licensed, royalty-free manner. From an IT technology perspective this is not particularly radical. After all, open-source platforms and 'software-defined everything' (e.g. storage, networking, data center, radio, infotainment, etc.) are two of the defining trends in the IT industry over the past decade.

In the case of open-source platforms, the trend has been driven by eliminating the cost of non-differentiating software, decreasing the time to market in delivering complex systems, and reducing risk by relying on proven software platforms and components. Software-defined everything has largely been driven by Moore's Law and the resulting cost savings of replacing special-purpose devices with general-purpose computers running special-purpose software.

Free software platforms which provide a software stack for the core non-differentiating technologies will quickly lead to disruptive technical and business innovations across the value chain in any industry.

Eclipse SDV is hoped to provide a radical departure from 'business as usual' approach in automotive by focusing on open source software stacks, liberally licensed software specifications, and a community-based, collaborative approach to innovation rather than the top-down, architecture-driven, consensus-based models of the past.

Next-Generation Smart HMIs from Hyundai and Uniphy

INTERIOR NEWS

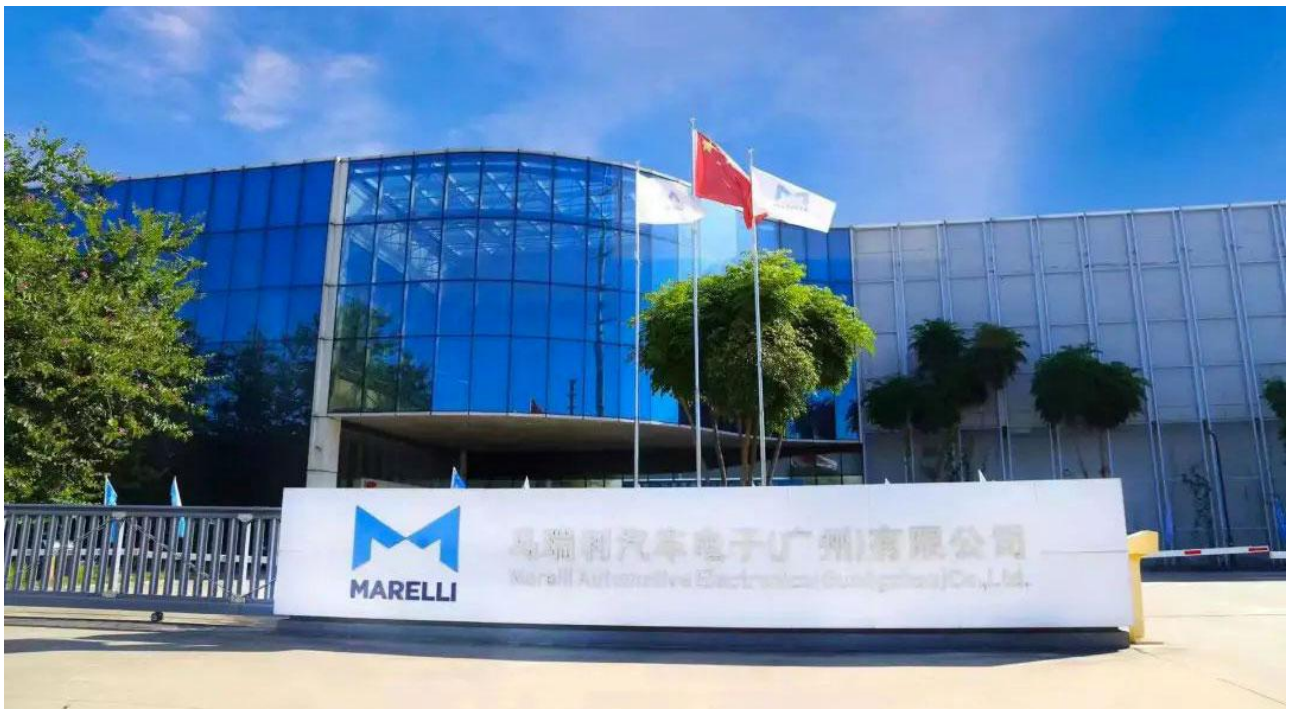
UNIPHY IMAGE

Uniphy's revolutionary 3D smart-surface solution combines novel algorithms and patented technologies to allow standard materials and mainstream manufacturing processes to be deployed to deliver feature-rich and freeform 3D smart interfaces. The Uniphy solution truly transforms what has been possible in product design. It enables designers to freely create HMIs that are beautiful and experiences that are intuitive and natural, whilst also delivering robustness and remaining economical. The technology goes, as Uniphy says, "beyond touch" and unifies non-conductive, finger pressure touch sensing with the integration of physical HMI features including dials, buttons & sliders. It also supports haptic feedback, touch-gesture and proximity recognition while also being able to host additional proprietary or third-party HMI features including voice user interfaces, as found in smart devices.

Uniphy CEO Jim Nicholas will speak at the DVN Interior Workshop with a lecture entitled: "Can automotive HMI be Safe as well as Beautiful, Intuitive, Robust and Economic?". Register **here**!

Marelli's New China R&D Center for Auto Electronics

INTERIOR NEWS



HOMEBASE OF MARELLI AUTOMOTIVE ELECTRONICS, GUANGZHOU (MARELLI IMAGE)

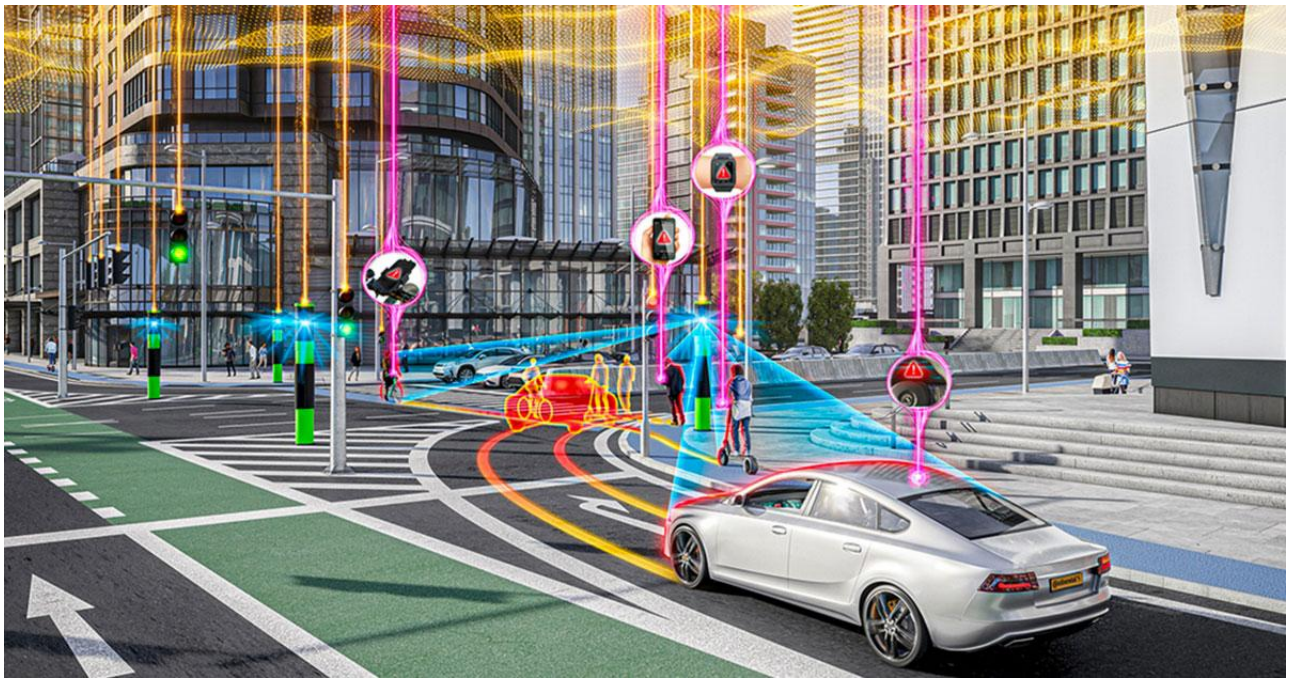
Marelli Automotive's Guangzhou plant was founded in 1996 as the global supplier's first manufacturing base in China. Now, Marelli has inaugurated a Guangzhou-based R&D center, and completed the expansion of their Guangzhou plant. As the China R&D hub of Marelli's automotive electronics business unit, the newly-unveiled facility leads the R&D of the company's most innovative products—such as their R-Touch cockpit domain controller (CDC); Dyna-View display (with integrated CDC that manages two operating systems and up to four displays), and Horizon-HUD—all these products were showcased at CES this year.

Marelli global executive vice president and China-president David Fan says "The unveiling of the China R&D center and the completion of Guangzhou plant's new assembly lines signify a milestone for Marelli's joint development with Guangzhou's automotive industry. They also represent a powerful evidence of the company's continuous endeavor to further develop smart cockpit technologies and boost the development of ICV (intelligent-connected vehicle) business in China".

News Mobility

Dangers of networking in the vehicle

NEWS MOBILITY



CONTINENTAL IMAGE

As cars grow increasingly networked, they grow increasingly vulnerable to cyberattacks. The risk of being victimized this way is still low for now, but it is unlikely to stay that way.

Digital attacks on cars are currently causing more astonishment than horror. For example, when researchers manage to bring a Tesla to a halt by remote control or confuse the camera system of a robo-car prototype with manipulated road signs so that the vehicle completely loses its orientation. So far, however, there are only a few highly networked cars, hackers need in-depth specialised knowledge and the criminal business models are lacking.

The number of criminal applications is currently still correspondingly small. The most notorious is called jamming, in which the radio signals of car keys are intercepted in order to open and steal the vehicle without authorisation. At the same time, criminal technology is evolving. Where special knowledge is often needed today, simple technical understanding will suffice in the future, because the software and hardware for attacks can increasingly be easily ordered on the deep web, along with information on typical security gaps in various vehicles.

And when it comes to the design of the criminal machinations, the only limit is creativity. The spectrum ranges from deliberately diverting a car into a dark alley to shutting down the traffic systems of entire city centers. In the first case, a wallet and watch could become prey; in the second, a ransom extorted from the city treasury makes the hack attractive. Similar money could be made by accessing the manufacturer's servers and stealing customer data. But smaller scams are also possible: if you manage to disguise the true electronic identity of your vehicle, you can trick the automated payment systems of fuel stations, charging stations or car parks, for example.

The United Nations has already responded to the new threats: a UN Regulation on the subject lists seven overarching and 30 subordinate descriptions of vulnerabilities and threats posed by cyber attacks, which car manufacturers can use to guide their countermeasures.

Trend Micro also has recommendations: the car manufacturers' back-end servers, which could otherwise be used for attacks on vehicles or for data extraction, must be secured above all. In addition, cars must be protected against so-called DoS attacks, in which they are bombarded with so many requests and information via their communication channels that the computing power collapses—an attack that is also known from the traditional internet. And protection against attacks via third-party software is necessary. These are, for example, apps for the infotainment system.

Musk Stripped Teslas of Radar. Now What?

NEWS MOBILITY

TESLA IMAGE

Automated driving, to be effective and safe, requires a variety of different high-performance sensors to provide accurate object detection and sufficient redundancy. That's the unanimous view of automakers, suppliers, researchers, academics…everyone whose opinion matters. Everyone except Elon Musk, who says Lidar is for loser and has stripped the radar sensors off Tesla vehicles, going to a system relying only on eight cameras for 360° monitoring of the vehicle's surroundings with a range of up to 250 metres, supplemented by twelve ultrasonic sensors.

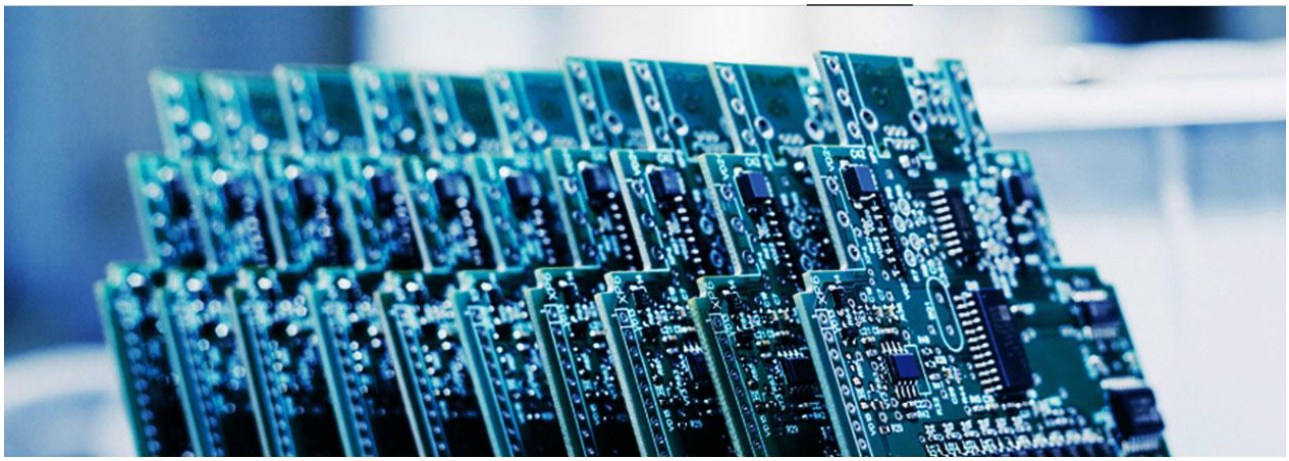
The claim is that Tesla has been able to significantly improve its camera systems, and dropping radar means a considerable cost savings. Nevertheless, it's hard to find fault with one of the sturdy arguments against a pure camera solution: there is no perfect sensor for driver assistance systems and automated driving. Rather, different sensor modalities complement each other. For example, radar—unlike cameras—is not affected by poor light and visibility conditions. And with the help of lidar, data can be recorded quickly with very high accuracy. This is why Mercedes-Benz (for one example of many) relies on a sensor net consisting of radar sensors, cameras, lidar sensor, ultrasonic sensors and microphones. The performance of radar sensors has also improved significantly over the last ten years, and the change from SiGe-BiCMOS-based transceivers to Si-CMOS is one of the most important factors for future performance improvements.

Instead of individual, separate sensors, the trend is instead towards sensor fusion: the linking of data from different sensors or information sources in order to arrive at a precise state estimate. "Where radar, cameras and ultrasonic sensors were used for independent functions in the past, all relevant data can now be linked intelligently and simultaneously by means of sensor fusion," is how author Michael Nolting put it in his book, *Artificial Intelligence in the Automotive Industry*. This is what makes automated driving possible in the first place, as it enables robust object recognition. Nevertheless, Mr. Musk is certain he's right and the entire rest of the world is wrong. Is he onto something, or just on something? Time will tell in the long run, but for now the world's auto safety regulators are growing increasingly alarmed at the numbers and kinds of crashes Teslas are causing and getting involved in.

General News

Automotive Semiconductor Market Hots Up

GENERAL NEWS



INOVA IMAGE

The global semiconductor industry is poised for a decade of growth, according to an analysis of the chip market by management consultants McKinsey & Co. The industry's turnover reached USD $600bn last year, and could grow by 6 to 8 per cent annually during the decade. This would take the industry past the $1tn threshold in 2030.

Ondrej Burkacky, a senior partner in McKinsey's Munich office—and head of global semiconductor consulting—says "The digitalisation of all areas of life and all businesses has accelerated significantly once again as a result of the Corona pandemic. Megatrends such as working from home, the growth of artificial intelligence and the increasing demand for electric cars mean demand for semiconductors will pick up strongly; provided that the overall economy remains fundamentally on a stable growth path despite changes in the general conditions, such as higher inflation". Already in 2021, the semiconductor industry grew by 20 per cent.

How the War on Ukraine Affects the German Car Industry

GENERAL NEWS

Shortage of raw materials, production stops and bottlenecks in cable harnesses: the war on Ukraine is becoming an ever greater problem for the automotive industry. The VDA (German Association of the Automotive Industry) says "The manufacturers and suppliers worldwide are working at full speed to compensate for the breakdowns and disruptions in the supply chains and to ramp up alternatives". That means supply chains are interrupted by the Russian belligerence and its devastating effects. Transport is restricted, and production in supplier factories is down, not least because some of them and their roads have been bombed.

According to media reports, Mercedes-Benz has stopped production in Russia and exports to the country. The same applies to Daimler Truck. Volkswagen has also suspended their Russian business, and BMW has stopped building cars in—and exporting to—Russia.

VDA says "The disruptions to train and ship connections added by the war, as well as restrictions on air traffic, are already having a significant impact on supply and logistics chains", and expects a tightening of parts supply. In addition, supply chains to and from China, for example, are coming under pressure because land routes through the crisis region are also increasingly ruling out transport. There will also be a reduction in the supply of wiring harnesses in the short term. "Cable harnesses are a complex component, some of which are custom-made for each vehicle model. There is hardly any stock here," says the VDA.

The VDA expects that in the long term the automotive industry will be confronted with shortages and price increases for raw materials. This particularly affects raw materials from Russia and Ukraine: neon gas with impact on semiconductor production; palladium for catalytic converters, and nickel, an important raw material for the production of lithium-ion batteries.

BMW Buys Alpina

GENERAL NEWS

BMW IMAGE

BMW and Alpina Burkard Bovensiepen have agreed to take over the rights to the Alpina brand against the background of the transformation of the automotive industry. The longstanding cooperation agreement, which was last extended by five more years at the end of 2020, expires on 31 December 2025. Shares in the company, which was founded in 1965, will not be acquired by BMW. "By acquiring the brand rights, we will be shaping the long-term continuation of this traditional brand with an eye to the future. We are very pleased to welcome the Alpina brand to the BMW family," says Pieter Nota, Member of the Board of Management of BMW AG responsible for Customer, Brands and Sales.

In order to secure the Buchloe location in the long term, the vehicle tuner Alpina is strategically realigning itself. The risks posed by the transformation and increasing regulation are growing, especially for small-series manufacturers. "We made a conscious decision not to sell Alpina to just any manufacturer, because BMW and Alpina have been working together in a spirit of trust for decades. For this reason, it is strategically the right decision that the Alpina brand will be managed by the BMW Group in the future." The current business of tuning BMW vehicles will continue until the end of 2025. The service, spare parts and accessories business for current and historic BMW-Alpina vehicles will be guaranteed at the Buchloe site in the long term. Alpina will then become part of the BMW Group in 2026. The closing of the transaction is still subject to approval by the relevant antitrust authorities.