Thu, 21 April 2022
Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #108

Editorial

Just Four Days Til The DVN Interior Workshop!

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The DVN Interior Workshop is just four days away now. The agenda is finalized; in today's newsletter you'll find the full docket of lectures and sessions. Major themes include human-machine interface; head-up displays; driver and occupant monitoring; interior lighting; functional surfaces; interior air quality, and materials + sustainability.

There'll be two substantial keynotes from Forvia and BMW, and 34 lecturers from presenters representing Bentley; Yanfeng; Grupo Antolin; AMS Osram; Forvia; Hella; Preh; Novem; Ansys; Covestro, and numerous technology companies including Uniphy; Sigmasense; Elmos; Lumentum; Seoul Semiconductor, and feno. Keep reading for the full list.

As vehicle interiors become the third living space—along with home and work—the user experience shifts to match in accord with increasing vehicle automation and connectivity; new kinds of interactions between the occupants and the vehicle, and new safety and wellbeing approaches. So much is happening, so fast, and the DVN Interior Workshop is the efficient, enjoyable, productive way to get a comprehensive grasp on how vehicle interiors are evolving.

It's also a grand opportunity to meet and network with your peers. Over 100 attendees are already registered. Are you in? If not, **move fast**; only a few seats remain available.

The whole DVN Interior team is looking forward meeting you all in Köln!

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

DVN Interior Köln Workshop – Full Docket

The DVN Interior Workshop comes to Köln in just a few days on 25-26 April—that's next Monday-Tuesday. With just four days to go, we'll summarize here why you should attend, and present the full docket.

The rubric for the Workshop is **Experience Interior • Technology for Safety, Comfort, and Fun**.

The automotive industry is rethinking the interactions among driver, passengers, and vehicle. The driver will continue to drive for the time being, increasingly supported by more automated systems, such as HMI, HUD, DMS, and more. The passenger compartment will be transformed into a live-work space: a cinema; a game room, or just a living area. It's not enough for this multipurpose room-on-wheels to have all the provisions and amenities for working and relaxing with recreational activities; it will also have to have all the safety required of any automobile.

The hub of this transformation is the center screen, getting progressively bigger and bigger. HMI; HUDs; DMS-OMS; functional surfaces; interior lighting; materials and air quality. The Workshop sessions are organized to efficiently and enjoyably enlighten attendees on all the latest research, developments, and innovations; and to spur topical discussion.

The six sessions are:

HMI: Human Machine Interaction

HMI refers to the interaction between a human and a machine of any kind, whether it be hardware, software, or a mix of both. As a car is an entire ecosystem of interconnected systems and parts—machines—HMI is crucial for the automotive interior industry. It's where design and engineering intersect with customer experience. People expect seamless, permanent connectivity and interaction with their world during any boring commute.

HUD (head-up displays) are an augmentation of the view through the windshield to keep the driver's eyes focused with no need to flick and focus back and forth between the road and the car's controls and displays. Lectures in this session include:

- *Augmented Reality: HUD vs. Display*
  (University of Pforzheim; Prof. Dr. Blankenbach)

- *Can Automotive HMI be Safe and Beautiful, Intuitive, Robust and Economic?*
  (Uniphy; CEO Jim Nicholas)
- *Enabling New Interactive Experiences in the Automotive Cockpit*
  (Sigmasense; CTO Gerald Morrison)
- *Haptic Controls on Touch Screens*
  (Preh Group; Matthias Lust)

Driver Monitoring Systems

Regulators and consumer organizations are pushing the industry to improve safety with a mandatory application of DMS. The planets seem to be aligned, as many companies—established suppliers and startups alike—are innovating to make it happen.

Aside from forthcoming regulations, and as in-car distractions proliferate and non-integrated connectivity aggravates the matter, this is a societal issue and the automotive industry is investing a lot in it, supported by tangentially peripheral sectors such as digital; sensor; software, and others. DVN Interior has been publishing on the topic since the beginning.

DMS started out as a safety feature to reduce accidents related to driver drowsiness and inattention. As they evolve to become more advanced, the industry will leverage this detection technology to improve more aspects of all vehicle occupants' health and comfort. Aside from detection of mission-critical criteria, similar technology could detect mood-related criteria to improve the whole occupant experience during the trip.

After a market forecast perspective, the session will include these lectures:

- *DMS Market Status and Perspective*
  (Yole Development; Zine Bouhamri)
- *Advanced Occupant Monitoring for the Vehicle of the Future*
  (Fraunhofer IOSB; Dr. Frederik Diederichs)
- *Increasing Comfort and Safety of AVs by Integrating Sensors into the Interior Design*
  (Ansys; Eugen Meier)
  High-Performance VCSELs for Automotive In-Cabin Applications
  (Lumentum; Matt Everett)
- *DMS & 3D HUD Using Melexis ToF Evaluation Kit*
  (Melexis; Arthur Duhamel)
- *Safety and security aspects for interior lighting semiconductor components for sensing technologies*
  (Elmos; Jatin Taker)

Interior lighting of a vehicle is more than a purely functional element. Modern lighting concepts have long been an integral part of an ambience perceived as high-quality and appealing. Light can increase comfort and feelings of wellbeing and safety. On a functional level, well-designed interior lighting makes it easier for the driver to find and use vehicle controls—especially at dusk or night, but increasingly also in daylight conditions. It supports infotainment, and creates a fascinating welcome and driving experience.

Interior Lighting

Intelligent, networked, and individually-controllable interior lighting expands the range of applications. For example, ambient lighting can adapt to the mood or activity in the car when passengers are listening to music or watching a film. In dangerous situations, light can project warnings into the cockpit to increase safety in situations where the driver's perception is limited. It visually improves surfaces and materials. Lighting is increasingly a pillar of interaction between the vehicle and the driver, an integral part of the vehicle's safety system.

Due to the abundance of innovations in this sector, there will be *two* interior lighting sessions:

Interior Lighting I

- *Beyond Basic Functional Interior Lighting Communication*
  (Bentley Motors; Mohamed Abd El Ghani)
- *Overhead Light Console for High-Quality and Individual Interior Lighting*
  (AMS Osram AMLS; Tobias Huber)
- *Future Shapes of Interior Lighting Applications*
  (Forvia-Hella; Michael Bandel)
- *ILaS Network – the New Lighting Architecture*
  (Inova; Stefan Hoffmann)

Interior Lighting II

- *Blurred Lines Between Automotive Displays & Lighting*
  (Faurecia/DesignLED; James Gourlay)
- *Integrated Interiors—A New Seamless Design Layer*
  (Novem; Dominique Heilborn)
- *Ambient Lighting Goes Functional*
  (Melexis; Michael Bender)

Automotive Interior is Colorful, Categorizing Various Lightsource Solutions for RGB Applications
(Osram; Michael Brandl)
- *PMMA Light Guides With Laser Etched Microstructure Enable Ultra-Thin Surface Lighting*
(Feno; Tobias Seidl)

Functional Surfaces

Interior surfaces are increasingly home to integrated switches and controls. The proliferation of features runs the risk of becoming too complex. From a design and cognitive standpoint, and thanks to sensor technology, it is now possible to create a natural extension of touch screens in any interior surface, to combine it in an overall sleeker design.

A next step is "shy tech": morphing controls, buttons, and other controls that appear then disappear beneath what looks like a smooth surface when a hand is detected, It is another way to clean up the interior with permanent physical switches and perhaps to activate functions without needing to dive into touchscreen menus. A key goal is to reduce time spent looking away from the road. Lectures in this session include:

- *Decorative HMI Surfaces With Embedded Functions*
(PolyIC; Dr. Wolfgang Clemens)
- *Functional Surfaces as Part of Integrated Products*
(Yanfeng Technology; Dr Dirk Blomeyer)
- *The Car Interior as a New Living Space: Light Projections*
(Grupo Antolin; Vanesa Hortelano Santos)
- *Demanding Requirements for Interior Projection Met by Micro-Optical Solutions*
(Suss MicroOptics; Christopher Bremer)

Interior Air Quality+Materials

IAQ (interior air quality) is growing in importance as more driving is done in dense urban traffic and people are increasingly aware—and concerned—about it. The recent pandemic has, of course, reinforced this concern. IAQ is quantified as the concentration of pollutants like CO_2, NO_x and VOCs. Now it's moving beyond traditional negatives measuring and adding a positive evaluation through fragrance, which is becoming a major criterion of occupant perceived quality and a design element reflecting the signature of the brand.

Materials is another key focus, as today's simple fact is that sustainable materials are practically mandatory. Pushes and pulls at every level of the value chain call for cutting down on carbon footprint and weight, and to introduce the new exotic new natural material to reflect with look and feel the environmentally-friendly positioning of the product. New materials bring with them a complex new value chain which has to be developed. Novel choices like recycled polyurethane granulate; wool; recycled polyester from PET bottles, recycled and biomass-derived polymers—each brings its innovations and challenges.

Presentations in this session:

- *The Challenge of Passenger Compartment Sanitation*
(Grupo Antolin; Diego Val Andrés)
- *Passenger Protection and Comfort by Violeds (LED UV Radiation)*
Seoul Semiconductor; Nils Benter)
- *Challenging the Status Quo, High Tech Material for Future Auto Interior*
(Covestro; Ciro Piermatteo)
- *Multifunctional Textiles*
(FLT; Björn Sobischek)
- *Creation and Optimization of Virtual Prototypes Accounting for Material Properties per VDI 5596*
(Ansys; Günther Hasna)

Interior News

In-Cabin Sensing Set for Huge Growth: Cipia

INTERIOR NEWS

Cipia, specialists in in-car computer vision, announced last December their first purchase order from Technomous, as well as the start of production with Chinese automaker SAIC. Last month, they announced a Chinese automaker will equip their new models with Cipia's Driver Sense Driver Monitoring Solution (DMS).

Cipia was founded back in 2007 as an eyesight technologies company focused on embedded computer vision. Initially, the company wanted to revolutionize the way users interact with their mobile phones; televisions; laptops, and other consumer electronics devices, and work with consumer electronics manufacturers such as Lenovo; Toshiba, and Sony.

Since 2019, Cipia has specialized exclusively in the automotive market, catering to automakers and tier-1 suppliers as well as telematics service providers with driver monitoring for fleets. Driver Sense is their computer vision- and AI-based driver monitoring system for integration as part of the vehicle's safety system.

Driver Sense's role in the vehicle is to analyze driver's state and inform other vehicle systems. It is up to the carmakers, as system integrator, to define, design, and enable the actions that occur once driver distraction, drowsiness etc. are detected. If there are no automated functions at all, then the least the vehicle can do is to issue visual and auditory warnings, to help refocus the driver on the road.

Cipia technology is based on embedded computer vision AI, which runs locally in the vehicle. No image is sent out for analysis, and system doesn't retain images. An infrared video stream is used for the analysis, allowing operation under all lighting conditions.

China is a major market for Cipia, but the company has also been increasing their presence in Europe. In the US, Cipia has already been selected for nine models in serial production. Product VP Tal Krzypow says "In-cabin sensing faces huge growth. First, the regulatory trend and safety standards adoption, in Europe and in the US clearly highlight that automated functions and driver monitoring go hand in hand. For example, Euro NCAP expects intervention of the automated ADAS functions such as forward collision warning and low-level braking, in the event of driver impairment. Vehicles with L^2 capabilities require driver monitoring as well, to prevent complacency or misuse of the automated functions. There is no doubt, up to L^3 autonomy, the need for driver monitoring increases".

By the way, next week DVN Interior Workshop includes a 6 lectures DMS session.

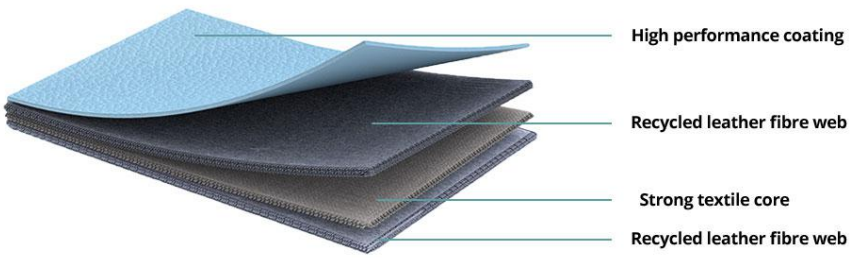
ELeather: "Leather Done Better"

INTERIOR NEWS

A ROLL OF ELEATHER (ELEATHER IMAGE)

"Leather done better" is the slogan of ELeather, a company specializing in engineered leather and based in Peterborough, England. They export to more than 50 countries, and have established a sturdy global customer base, providing a better passenger experience to bus operators and automakers. They supply over 200 airlines, and their materials upholster over 12,000 rail vehicles.

Engineered leather is an advanced material made with up to 50 per cent traditional leather fibers. It's engineered to be scuff and scratch resistant, and due to controlled stretch it maintains its form and shape with no bagging, even after prolonged use. This means longer service life and reduced need for replacement. It retains the luxurious look and feel of traditional leather at the same time providing enhanced comfort associated with soft trim.

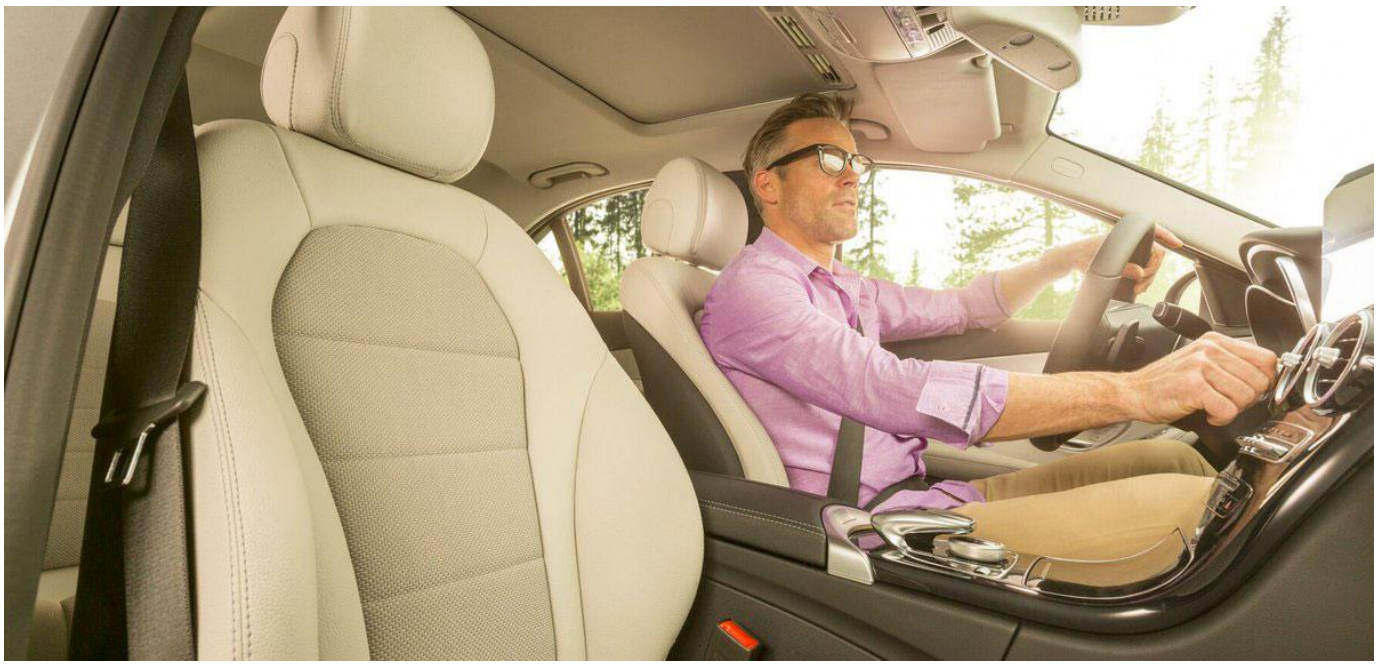


Eleather's founder, Chris Bevan, started the company in 2007 out of disappointment with what he saw as unnecessary waste, He sought a more sustainable way of producing leather, coming up with a method to entangle waste leather fibers around a high-performance core using just water—a process called hydroentanglement.

ELeather uses 55 per cent less land and water in their process, with less than 40 per cent of the carbon emissions of traditional leather. Even 95 per cent of the water used is recycled. ELeather meets stringent automotive criteria while being available in every kind of finish one would expect from traditional leather. It's blemish free, and comes in consistent, ready-to-cut rolls that need no inspection or patterning and can reduce the weight of a car by at least 4 kg.

Covestro's Low-Carbon TDI for Car Seats

INTERIOR NEWS



Covestro says their renewable toluene diisocyanate (TDI) material provides a significant reduction in CO_2 emissions from cradle to factory gate.

TDI is an important raw material for the production of flexible polyurethane foam used in car seats and a variety of other applications. Covestro manufactures the renewable TDI both in Dormagen, Germany, and in Caojing, China, using the mass balance method. Both sites are certified to the ISCC PLUS standard.

Covestro CTO Dr Klaus Schäfer says "Already years ago, our unique gas phase technology was a milestone toward more energy efficiency in the production of TDI. After that we committed ourselves to ensure a further reduction in emissions from our production by switching to green electricity. This additional improvement now makes it clear how consistently we are pursuing our path to climate-neutral production and the circular economy: By using mass-balanced renewable raw materials, we are now also striving to significantly reduce our indirect emissions in the supply chain and to offer products with a reduced carbon footprint".

The company says customers can use the TDI as a drop-in solution, as it can be implemented rapidly and easily in existing production processes without the need for technical modifications. It meets consumer demands for more sustainable production while still possessing the optimal comfort and high breathability of fossil-based products, while also fulfilling expectations of the automotive industry as an alternative raw material for car seat cushions with a lower carbon footprint.

Volvo Invests in Bcomp for Flax Fibers

INTERIOR NEWS

CONCEPT RECHARGE INTERIOR WITH FLAX COMPOSITES (VOLVO IMAGE)

Volvo Cars, through their Tech Fund venture capital arm, has made a strategic investment in Bcomp, an innovative Swiss firm developing high-performance, lightweight materials based on natural fibers,

Bcomp (See DVN Interior 5 November 2020) uses fibers from flax, a plant material that offers significant savings in terms of weight, energy use and emissions versus regular plastic parts. The material also enables design options for æsthetic surfaces. Flax is a flowering plant cultivated as a food and fiber crop in temperate climates.

Volvo and their Polestar division are both actively exploring the use of natural fiber composites in their forthcoming pure electric cars. Volvo used Bcomp's materials in their most recent concept car, the Concept Recharge; a flax composite is used for the lower storage areas, the back of the headrest and the footrest. Bcomp calculates that compared to regular plastic parts, the natural fiber-based composites are up to 50 per cent lighter; use up to 70 per cent less plastic and generate up to 62 per cent less CO_2.

Revealed in the summer of 2021, the Concept Recharge demonstrates the steps Volvo aims to take in all areas of pure electric car development to reduce the carbon footprints of their processes and cars. The company plans to sell only fully electric cars by 2030, and aims to be a climate-neutral business by 2040.

Marelli, BlackBerry Extend Collaboration

INTERIOR NEWS

MARELLI IMAGE

BlackBerry will extend the existing collaboration in China with Marelli, a move that follows previous technology collaborations focused on digital cluster developments in 2016 and 2018. Marelli has chosen the BlackBerry QNX Neutrino RTOS and BlackBerry QNX Hypervisor to power the Cockpit Domain Controller, an in-vehicle infotainment and instrument cluster system.

BlackBerry and Marelli began co-developing embedded cockpit systems for four major Chinese automakers in 2016. In 2018, the two companies extended the collaboration to use the QNX platform in Marelli's electronic systems cockpit and digital instrument cluster solution.

Mercedes-Geely Smart Small SUV

INTERIOR NEWS

SMART IMAGES

The arrival of the new zero-emissions Smart #1 hatchback marks the resurrection of the once pioneering Smart company as an electric-only brand built in China. It is a new joint venture between Mercedes-Benz, who designed the car; and Geely, who handled most of the engineering work.

The #1, announced for the end of this year, is a four-door SUV, 427 centimeters long.

The cockpit is largely devoid of switches and buttons. Information relevant to driving is provided via the digital instrument cluster in 9.2” format and a 10” head-up display. In the center of the dashboard there is a 12.8” touchscreen as a display and control unit for infotainment and other vehicle functions. Operation is simplified by the integrated voice control system.

The new Smart is of course connected to the Internet, so OTA updates and remote access are possible. Assistance systems include distance cruise control, adaptive high beams, lane keepers, highway assist, traffic jam assist and parking assist.

There is space for up to three people in the rear. The rear seat can be moved lengthwise to vary the luggage volume in the trunk from 273 to 411 liters. If more storage space is needed, the rear seat backrest can be folded down in a 60/40 ratio. The new Smart also offers a 15-liter frunk under the front hood, which can accommodate a charging cable, among other things.

Audi's Urbansphere Concept: New Mobility Interior Design

INTERIOR NEWS

AUDI IMAGE

Audi is giving a glimpse of their premium future with three electric car concepts. Following the Skysphere (DVN Interior 19 August 2021) and the Grandsphere (DVN Interior 9 September 2021) concept, the Urbansphere concept will be unveiled in a few days, but teaser images have been floated.

Audi says the car speakes to the needs and wants of customers in Chinese megacities: "In places where personal space is scarce, the concept car offers the largest interior space an Audi has ever had". The Urbansphere concept demonstrates how automated driving transforms the interior into a mobile experience space without a steering wheel, pedals or displays. The study documents how Audi interprets the car as a third living space.

A console, which appears to be between the seats, opens to reveal four cups of tea. Presumably, this area is heated to keep the drinks warm. The illuminated walls are still present from the earlier teaser. Against of one of there, there's a controller that appears to let the seats move into a nearly flat position, which would be useful for napping.

The Urbansphere concept is a large crossover with short overhangs and a striking rear end. The three Sphere concept cars interpreted the industry's paradigm shift in design in different ways - "decidedly dynamic, prestigious or also created for use on long journeys," according to Audi. “In any case, the needs and quality of experience of the occupants were at the top of the specifications for the three studies. They present lines, technologies and spaces of experience that are to be found in the first production cars of the Audi brand as early as the mid-2020s.”

The Design Lounge

Light Design. Covestro "Clear Until Lit'

By Rob Miller

THE DESIGN LOUNGE

Next year will be the 70th anniversary of Hermann Schnell having invented polycarbonate at Bayer (now Covestro) in Germany. One might think every possible variant of polycarbonate (PC) has been developed and achieved, but luckily for lighting designers, Covestro continues innovating and tuning their materials to create new lighting effects when coupled with LEDs. Their relentless effort has led to a unique light management effect in polycarbonate that unlocks amazing new possibilities in interior and exterior lighting. Today's example is Covestro's Edge Lighting Materials: Makrolon LED 2245 EL for exterior applications, and Makrolon Ai 2215 EL for interior applications. These new materials offer substantial new design opportunities for trim surfaces, while expanding possibilities for external applications like headlamps and tail lamps.

Covestro's engineering polymers technical marketing manager Mark Torgerson is one of the scientists working on this technology along with others inside Covestro in the USA as well as Germany. He says "This lighting game-changer has broad new application potential to enhance the looks of complex lighting designs and unique lighting effects for the interior. The way this polycarbonate works, the product is *clear until lit*. Clear when LEDs are off, but when LED lighting is placed on one or more edges of the part, the entire surface becomes evenly illuminated and transmits light and glows."

FOUR IDENTICAL 50 × 75 MM CHIPS OF MAKROLON AI2215 EL WITH NO ILLUMINATION (TOP) AND WITH WHITE, RED, GREEN, AND BLUE LEDS ILLUMINATING THE BOTTOM EDGE (BOTTOM). RED, GREEN AND BLUE CAN BE BLENDED TO MAKE ANY COLORS.

And it does that beautifully! The small set of 3" × 2" samples shown to me were neatly aligned on a stand that had different colors of LED lights beneath them. The material is colorless and transparent-looking at first, but the magic instantly started when LEDs next to the hidden edge of the material plates were switched on Each polycarbonate panel came to life and glowed very uniformly with the color of its LED light. The beautiful edge lighting that surrounded the part stood out as an accent.

Torgerson says Covestro has been working on this type of polycarbonate for almost a year, with the specific needs and wants of the automotive market in mind, and its growing material lighting needs.

The Many Uses

Clear Until Lit has many uses. Some are general ambient lighting, like interior trim and on-door spears. It also has suitable applications in automaker branding elements like badging. It's also a lovely way to get a nice, even glow without worrying about hot spots. The LEDs along the edge homogenize only a few millimeters into the part, eliminating the need for air gaps and diffusion elements – perfect for illuminating a hotspot-free surface in tight spaces.

One could also imagine adding texture and patterns to the material, yielding even more visual interest from the uniform illumination. Different diffusion levels are also available, increasing this material's functional design looks.

Torgerson says "Covestro continues to work with customers on applications development ideas with this material to further its use. So far, interest has been brisk, and many unique ideas are coming from the market for use with this product."

The product has some great benefits: no hot spots to manage; very thin stack-ups are possible; no diffusion films are required, and no air gaps are needed.

Headlamps and Tail Lamps too!

A LIGHT CYLINDER AROUND THE PROJECTOR BEAM – BACK EDGE OF CYLINDER ILLUMINATED

Covestro has shown a headlamp mockup showcasing Clear Until Lit material prominently on the lamp's outboard side.The cylindrical design tube surrounding the circular low-beam projector lens is clear when it is off. When the lights come on, the design excitement starts: the leading edge of the tube glows bright white, while the main body of the structure takes on a translucent soft diffused glow, significantly adding fascination interest to the design.

Other Possible Applications

- Instrument panels
- HMI touch applications
- Film / graphic overlays that require illumination
- Interior door trim
- Light pipes (illuminated pipes to out-couple some of the light)

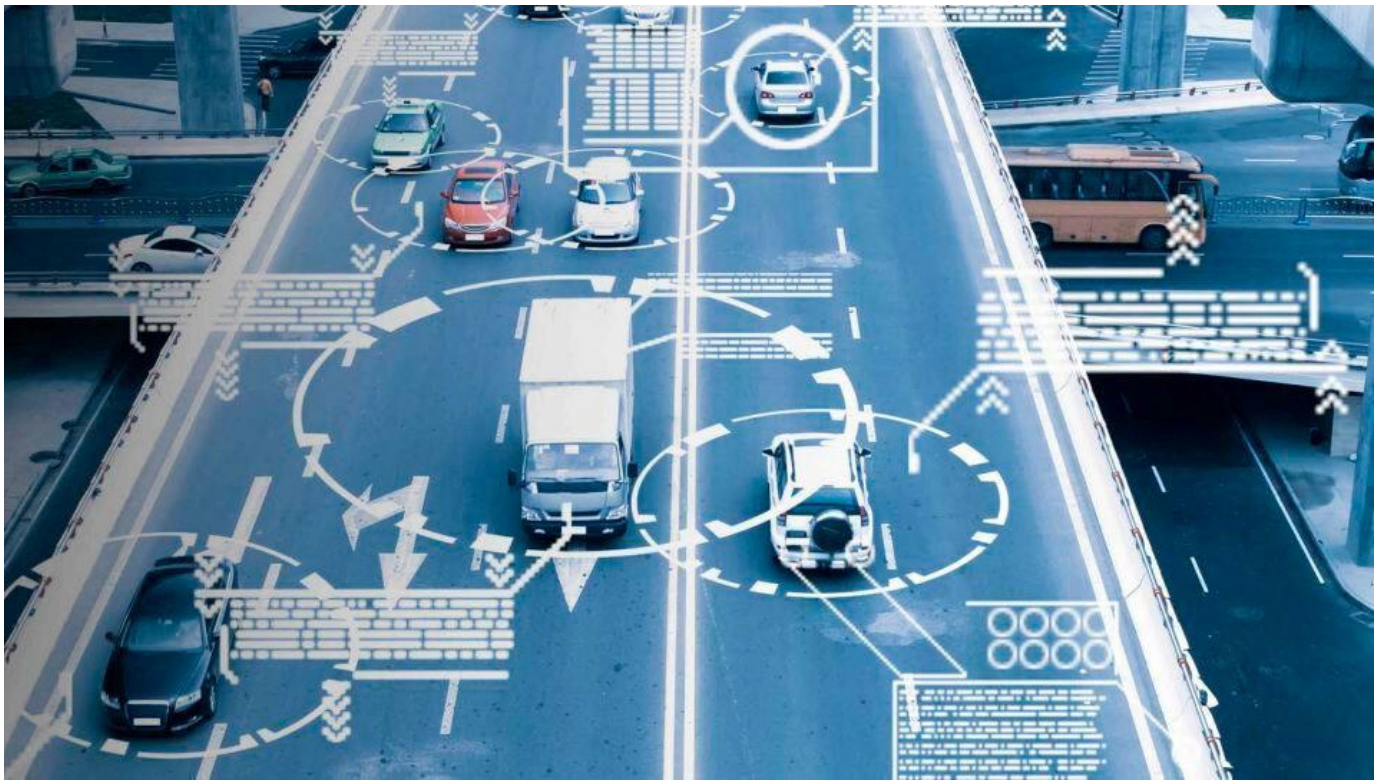
- Grille accents
- Exterior B-pillar trim
- Exterior accent panels
- Grille accents

New innovative materials will continue to expand the creative uses and applications for LED lighting. Covestro's Clear Until Lit material is a significant step in that direction for new designs with illumination. As a lighting designer myself, new materials in plastics especially excite me and open up even more imaginative creative ideas and uses.

News Mobility

Automated Driving: Mobile Radio Signal as Sensor

NEWS MOBILITY



SEAGATE IMAGE

The 5G mobile communications standard is the basis for the first time that real and virtual objects can be controlled remotely via a communications network, either individually, in interactive groups, or in a swarm. Currently, companies in particular are taking advantage of the possibilities offered by 5G with "campus networks".

5G and the campus networks are all about professional applications. In the next stage, 6G, the professional functions from 5G will be rolled out to the masses. Remote control of vehicles in urban traffic, for example.

Autonomous driving in urban traffic is only possible if the vehicles can interact with their environment (V2x). Therefore, the participants must be able to sense their surroundings in 3D and they must communicate with each other. In the best case, when communication and sensor technology take place via a mobile radio signal.

The radar spectra used today are not sufficient. This is also because the number of components involved is constantly increasing. Each radar unit must detect its surroundings very precisely. Interference must be avoided. According to the current state of the art, a radar unit cannot make contact with other radar units in the vicinity, which is currently compensated for by massive frequency requirements.

Experts are discussing various techniques for implementation. JC&S (Joint Communication & Sensing) is designed to use the radio signal of the mobile network not only for communication, but also for sensor functions such as radar or spectroscopy. The clever thing about JC&S is that it uses the signals emitted by base stations or mobile terminals anyway. Prof. Gerhard Fettweis explains: "If we insert a minimal pause when a radio signal is transmitted from A to B, the resulting echo can be used to create a radar image. This is only possible with 6G, although initial realizations show that the approach works."

Sensor signal packets for radar functions can also be integrated into data signals, whereby the mobile radio signal virtually transports the sensor function as well. It should be emphasized that JC & S is very resource-efficient: Existing infrastructure is used, and by sharing the radio signals, very little frequency spectrum is required.

General News

Strong Growth for Marquardt Group

GENERAL NEWS

MARQUARDT IMAGE

Despite the pandemic; material shortages, and rising prices, the Marquardt Group performed very well in the past fiscal year, according to their own figures: the supplier generated sales of just under €1.3bn in 2021; an increase of more than 12 per cent ove the previous year.

Germany-based Marquardt, is a company with expertise in mechatronics. They have positioned themselves at the confluence of mechanics, electronics and information technology to provide HMI solutions; switches; interior lighting, and sensors. They benefit in particular from electromobility, the upgrading of vehicle interiors, and the general trend toward greater comfort, sustainability, and improved climate protection through more efficient products.

The automotive sector accounts for more than three quarters of the supplier's sales. One of the growth drivers was the S3 capacitive door handle sensor. This is in extremely high demand among customers in Asia and Europe. Marquardt was equally successful in the series production start-up of new control panels for the center consoles of premium vehicles.

The company won new customers, particularly in Asia, with its "Push and Drive 3" drive authorization system: The "PnD3" platform makes access to passenger cars and commercial vehicles suitable for mass use via smartphone, among other things; the secure transfer of the digital key is also expected to open up new offers and business models for fleet managers, car-sharing providers and car rental companies.

Despite the difficult environment and increased cost pressure, Marquardt has made numerous investments in their sites; in research and development, and in further transformation. For example, the company opened a technology factory at their headquarters in Rietheim-Weilheim. There, new manufacturing technologies and materials for the family-owned company's global series production are tested, qualified and improved. Products include highly integrated user interfaces and displays for vehicle interiors. Expenditure on research and development amounted to an above-average 10 per cent of sales in fiscal 2021.

Mercedes Hires 3,000 Software Developers

GENERAL NEWS

MERCEDES-BENZ IMAGE

In order to catch up on software in the car, Mercedes-Benz is recruiting around 3,000 software developers worldwide. In Sindelfingen, southwest of Stuttgart, around 1,100 employees are developing software, and there have already been around 700 new hires at this location alone.

"We want to be at the forefront of vehicle software," says Mercedes board member and CTO Markus Schäfer, who is responsible for development and purchasing. He cited the development of self-driving cars as an example. According to Schäfer, new working time models have been agreed with the works council for the software specialists in Sindelfingen. Including the new hires, Mercedes wants to employ around 10,000 software specialists in the global network. India, China and the U.S. are also important locations.

"The automobile is the most complicated product when it comes to software," Schäfer said. Mercedes-Benz uses its own "MB.OS" operating system. Technical challenges in the coming years are the electrification and digitization of cars. According to CEO Ola Källenius, self-driving cars offer great potential. The manufacturer wants to enable highly automated driving in the S-Class.

The key strategic question is whether automakers should aim to be an Apple—a company that owns the entire chain from hardware, to software, through to the point-of-sale—or should they be an Android/Microsoft focusing on the operating system and integrate into hardware provided by other companies? The two strategies are fundamentally different and have massive implications. And there's probably no good answer at the moment. VW Cariad or Stellantis-Qualcomm partnerships; which will be the model to prevail? Time will tell!