Thu, 21 March 2024
Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #204

# Editorial

## DVN-I @ Valeo HQ: Interior Experience, Driving Automation

DVN Interior had the opportunity to visit the VMTC (Valeo Mobility Technical Centre) in Créteil, just outside of Paris, France. It houses the CDA (Comfort and Driving Assistance) business group's R&D activities. On our visit, we discovered what is developing there: solutions for interior experience and driving automation, which you'll read about in this week's in-depth report.

Don't miss the upcoming **DVN Interior Workshop** in Köln on 23-24 April, where Valeo will give a lecture, "Evolution of Display and HMI", by Valeo Interior Experience Marketing Manager Rémi Mathieu. **Register here** for the workshop—quick, before all the seats are taken!

The workshop docket is close to final, and you can **download** the current version. The event will include the results of our newsletter survey; speaking of that, it's time to answer **Question № 5**.

And in the Design Lounge this week, you'll find fascinating words to better understand amazing capabilities of composite materials. We're glad you're here with us! If you haven't yet signed up to get full access to the whole library of DVN Interior newsletter and reports, do **join in**!

Sincerely yours,

Philippe Aumont
*DVN-Interior General Editor*

# In Depth Interior Technology

## DVN-I Visits Valeo CDA R&D HQ


L-R: BENOIST FLEURY (VALEO CDA PRODUCT MARKETING & EXTERNAL COMMUNICATION DIRECTOR) · PHILIPPE AUMONT (DVN INTERIOR GENERAL EDITOR) · RÉMI MATHIEU (VALEO CIX PRODUCT MARKETING MANAGER) · NOUR LAGHMANI (VALEO CIX PRODUCT MARKETING APPRENTICE) · JOACHIM MATHES (VALEO CDA CTO) · STÉPHANE DUTRÉ (VALEO CIX PRODUCT MARKETING DIRECTOR) (DVN IMAGES IN THIS ARTICLE EXCEPT AS NOTED)

### Valeo Introduction


VALEO IMAGE

Valeo teams are working to identify, understand and anticipate mobility needs – from two wheels to four or more, mobility for people and goods – and what technology is needed to meet these needs. With €22bn revenue in 2023 and112,700 employees, they invest almost 10 per cent of sales in research and Innovation, and 45 per cent of orders are related to products that did not exist three years ago.

Patent applications reflect Valeo's innovative spirit; Valeo ranks among the top three patent applicants in France, and top 50 in Europe.

Valeo has four strategic pillars:

- ADAS Acceleration
- Interior Experience Reinvention
- Lighting Everywhere
- Electrification Acceleration

**Comfort and Driving Assistance**

The CDA business group covers ADAS acceleration and interior experience reinvention, focusing on solutions for interior experience and driving automation. It represented in 2022 €4.3bn of revenue, with 23,000 employees at 28 production sites and 18 R&D centers. Main R&D centers are in France (Creteil), Germany (Bietigheim), Ireland (Tuam), Czechia (Prague), and USA (Troy, Michigan).

**Interior Experience Reinvention**


The Valeo unique approach combines car automation and interior experience, shaping each other. Cabin Monitoring and HMI enables aar automation, and vice versa. The interior experience is reinvented by car automation. Protection from the outside and taking care in the inside is what creates the interior cocoon. The above chart illustrates this interaction along the Driver's journey with ADAS features in blue, and Interior features in green.

Interior experience reinvention is structured around different product lines, such as sensors and driving, smart cockpit, and connected drive.

Valeo has the hardware and software needed to meet passenger demands for a safer, more immersive, and more connected driving experience. 'Reinvention of the interior experience' brings all the features needed for these use cases, which can be developed with these capabilities.

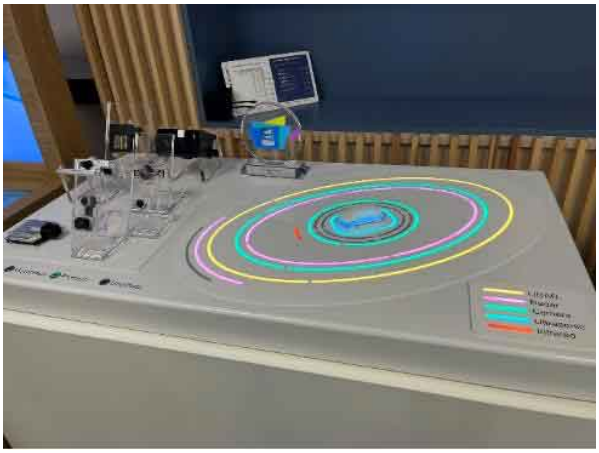
Interior Experience rests on six pillars, to focus on intuitiveness:

PANOVISION – VALEO IMAGE

- Interior cocoon: DMS for safety; cabin monitoring for comfort
- Displays: integrated wide and curved displays, hidden displays, and virtual floating images
- Head-up displays
- Steering wheel hub: hands-on detection; controls at hand
- Telematics
- Access controls: key fob for security and comfort


The complete product portfolio includes:

- Touch screens
- Digital instrument clusters
- AR head-up displays
- Smart surfaces
- Steering wheel HMI
- Hands-on detection
- Steering wheel electronics
- Interior microphones
- Life presence detection radars
- Driver monitoring systems
- Interior monitoring cameras
- Torque & steering angle sensors



Valeo's philosophy is to standardize and modularize these components as much as possible, to get economy of scale and affordability—only integration, HMI must be model-specific, thanks to design and styling adaptation.

Protection from outside uses cameras, lidasr, ultrasonic sensors, microphones, etc.

**Interior Cocoon**

VALEO IMAGE

The interior cocoon started around the driver, with driver identification/authentication, distraction, and drowsiness monitoring. Now it goes beyond, looking to the entire cabin, with occupants' classification, vital signs detection, and life presence detection. It will even do stress and emotion control.

The idea of the cocoon carries the values of safety and comfort, and the interior experience in this cocoon is adapted to the driving context—weather, traffic, nighttime or daytime, the safety hazards, etc.

Valeo's interior cocoon brings together several onboard technologies for improved passenger safety in the vehicle:

- Driver monitoring systems (DMS), which use a camera to analyze the driver's face using AI algorithms
- Cabin monitoring systems (CMS) to detect occupant behavior
- Life detection systems, to signal if a child is in the rear in a locked vehicle.

**Interior is Intuitive and Immersive**

New vehicle uses and capabilities impel each other's development with features and complex transitions; therefore, interior experiences are many, so they have to be intuitive and immersive to ease occupants' lives, while keeping them connected all the time to the world outside the vehicle (or at least to their social media accounts).

VALEO IMAGE

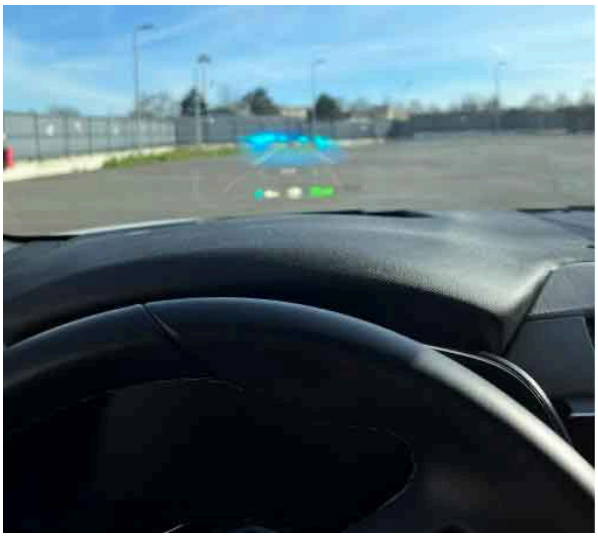
Valeo uses a dual-control test vehicle; the passenger can take over driving to put the driver in a real autonomous mode in a real road environment with traffic. It helps measuring experience, adaptation, and driver's trust to the system.


VALEO IMAGE

In-car HMI should reflect 'vehicle empathy', the ability of the system to accurately register occupants' behaviors and feelings. Integration of generative AI in HMI is said to help this, and AR HUDs bring the vision beyond the driver's field of view.

Interior adaptation is based on personalized dynamic interaction.

**Head Up Display (HUD)**

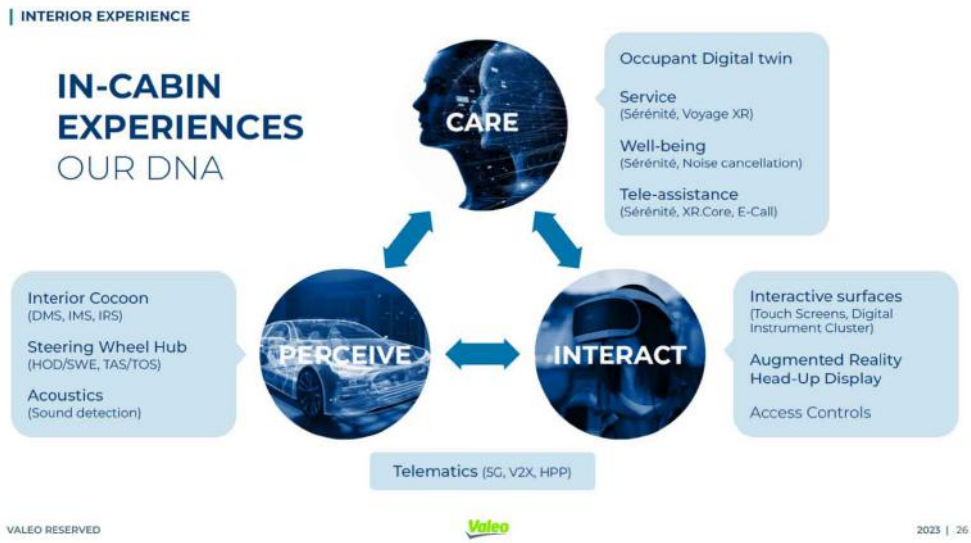


VALEO IMAGE

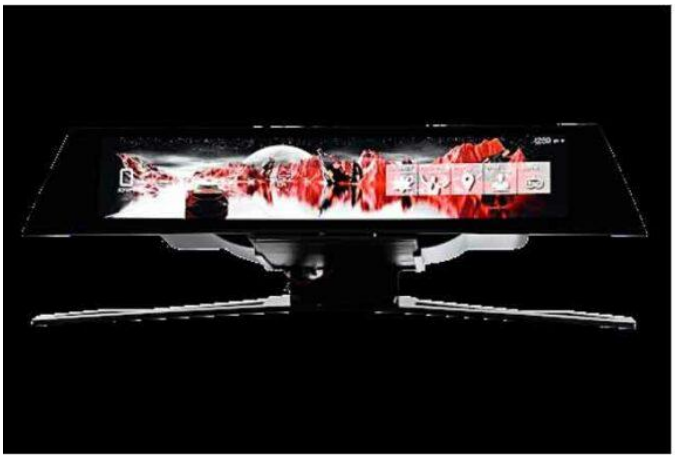
A HUD is part of the driving assistance system which allows the driver to keep their head up, looking at the road, while having access to crucial information in real time.

Valeo develops and produces a portfolio of HUDs, with three types:

- Windshield HUD: reflection on windshield for a floating image effect
- Combiner HUD: reflection on a dedicated 'blade' (small screen) adaptable to numerous different vehicles
- Augmented reality (AR) HUD: it creates a mixed reality by overlaying driving, safety, or navigation information over the real road environment. It started with combiner HUD, then expanded to windshield HUD. Both still requires space in the instrument panel, around 12 liters. Holographic HUDs are coming, but will be expensive at least at first.



**Displays**



21" DISPLAY IN PEUGEOT 3008 (L), COMPACT PANOVISION (R). (VALEO IMAGES)

Using TFT (thin-film transistor) technology, Valeo develops a full range of digital controls and instrument clusters. Touch screens with haptic feedback help occupants keep their eyes on the road, while interacting easily and intuitively with the vehicle. These tactile surfaces help create a new connective user experience for drivers. Valeo's modular approach provides solutions for all vehicle types, from entry-level right up to premium cars. Developments also include hidden displays—shy-tech or black panel effects— only visible when needed.

With new cockpit architecture, and display located at the bottom of the windscreen, the steering wheel becomes the control hub. In that position, display is less sensitive to resolution, because of the distance. The steering wheel hub includes small and elegant transparent displays.

Displays and screens have reached a plateau level, like 21" (4 × 1 kilopixel). With a density of one LED per $cm^2$, it is miniLED, used for backlighting or local dimming. MicroLEDs are orders of magnitude smaller, and they light directly.

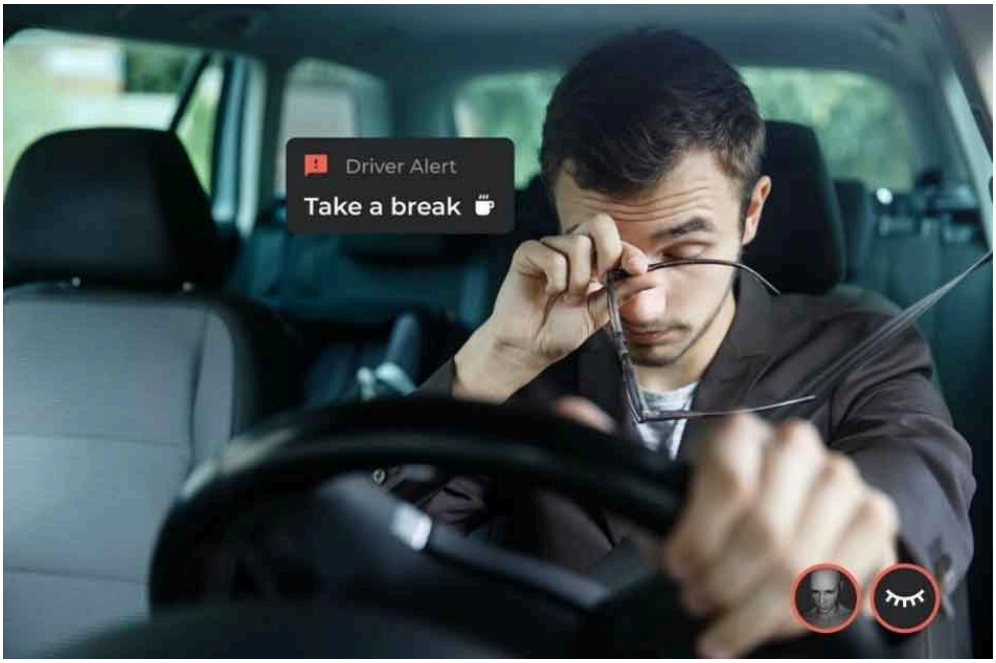

Peugeot touch screens will be manufactured on the new production line in the Valeo factory in Annemasse, France, now up to 21.6"!

**Smart Surfaces**


To ensure a smooth and intuitive HMI, Valeo proposes multiple car interaction technologies, including pushbuttons, rotary knobs, capacitive proximity sensors, infrared movement detection, and more. Their smart faceplate solution offers seamless integration of all display systems and interactive surfaces made in materials like wood, cork, and stone.

They offer a very wide choice of decorative techniques, depending on the desired effect: paint, tampo printing, chrome plating, laser etching, multi-injection, film application, piano-black effect, etc. Plastronics, or in-mold electronics, could be deployed as well.

**DMS**



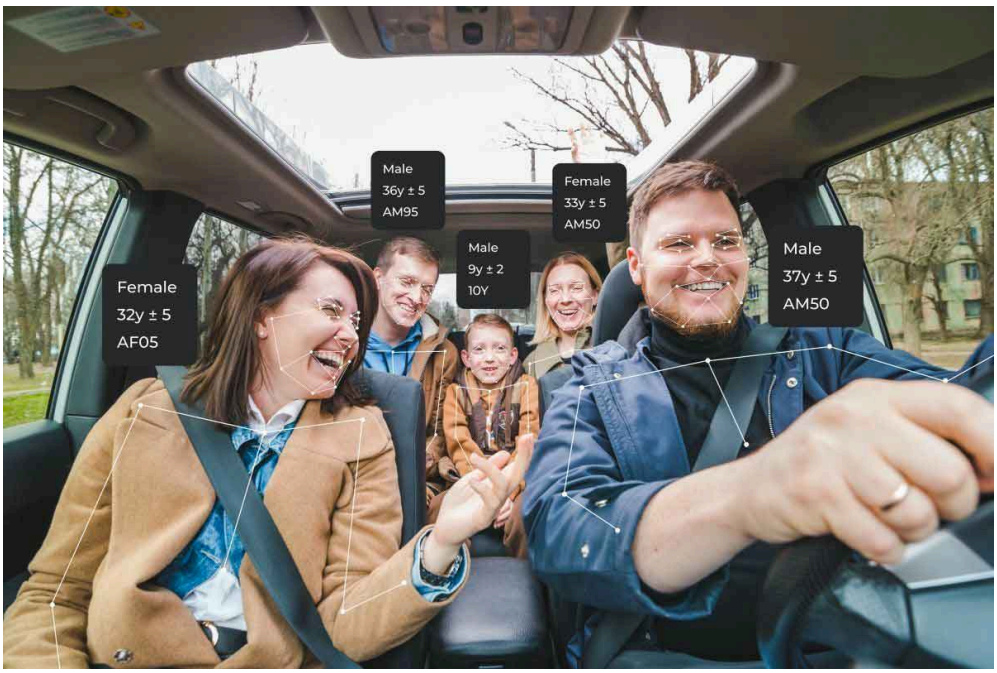

VALEO IMAGE

A driver monitoring system uses a camera to monitor driver alertness and check their level of vigilance. They'll soon be mandatory in Europe for new vehicles.

Valeo’s DMS can detect distraction and drowsiness, as well as offering other features like driver identification and facial emotion recognition. When it detects signs of sleepiness or distraction, the system transmits alerts to the driver to get the driver’s attention back on the task of driving. The system’s camera mounted on the dashboard also ensures that the driver has their eyes on the road.

Valeo’s DMS is in mass production with 'deep learning' algorithms, including a scalable ECU and cameras for driver identification, accurate head-and-eye tracking, and monitoring driver gaze for distraction or drowsiness.

**CMS**



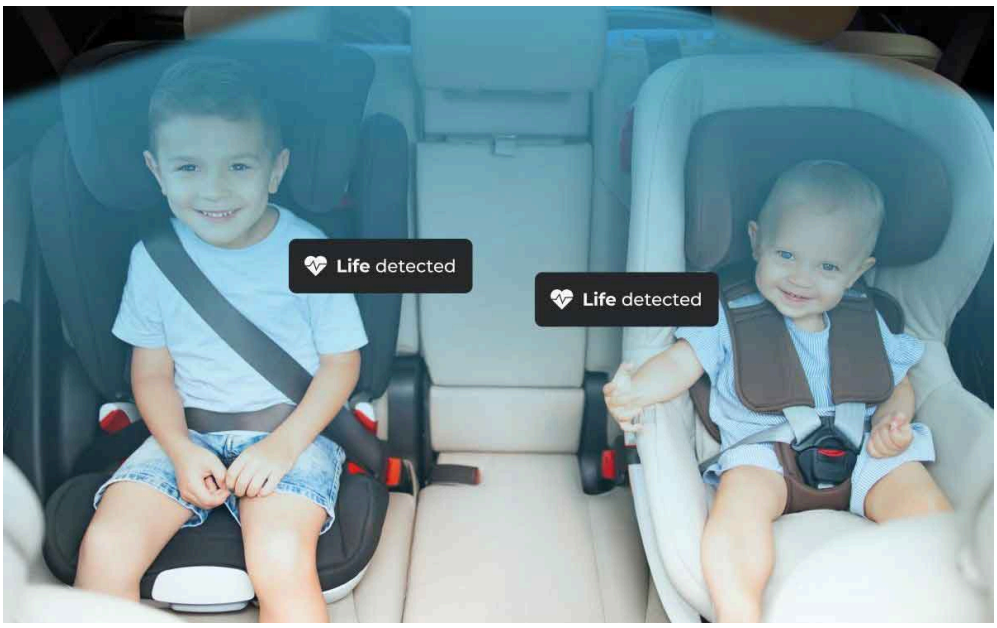

VALEO IMAGE

**CMS uses a camera sensor to classify human behavior and detect passenger movements. Valeo's interior monitoring system** allows the vehicle to adapt to the internal context by knowing the characteristics of occupants such as their posture, and then adapting elements such as the air temperature or the driving mode. In addition, in the event of an accident, the intensity and deployment timing of the airbags can be adjusted according to the position and size of each passenger.

CMS, equipped with a camera, also allows entertainment functions such as taking selfies to share experiences while traveling—equipped drivers will be calmed by knowing their car will never again hinder their very important, urgent postings to Facebook, Instagram, or TikTok.

Valeo's **gesture recognition** offers a natural and intuitive way to interact with the vehicle for even safer driving. Based on machine-learning algorithms and an in-house compact 3D camera, the feature is embedded in Valeo’s dome module.

**Life Detection System**




VALEO IMAGE

Valeo's life detector uses interior radar and AI algorithms to detect if there's life in the car, to make sure children or pets aren't forgotten and left behind. Once the engine is turned off and the car is locked, if the car detects that a person is still inside the vehicle, the system can activate an audible and visual alarm on a smartphone. The Valeo solution, mostly integrated in the overhead console, is based on a 60-GHz radar using a millimeter-wave detection system to detect occupants' body movements, even under visual obstacles such as clothing or blankets.

**Acoustic Systems**

VALEO IMAGE

Valeo has strong expertise in the design, integration, and manufacturing of acoustic solutions. They were first to market with a digital microphone in a series model in 2016 with a U.S. carmaker, and again the first to launch external microphones in 2020 with a European automaker.

Microphones in the cabin already serve a variety of functions: hands-free phone calls, voice command for interaction with the infotainment system, 'sound bubbles' as a next generation of active noise cancellation, eCall services, and more. Exterior microphones support detection of emergency vehicle sirens before the driver even hears them.

**CarLab**


CarLab is Valeo’s international and transversal network of innovation labs for human centric design, boosting innovation with three folded objectives: feasibility, viability, and desirability. Very much driven by 'design thinking, it does exploratory projects, project support, and nurtures an innovation culture.

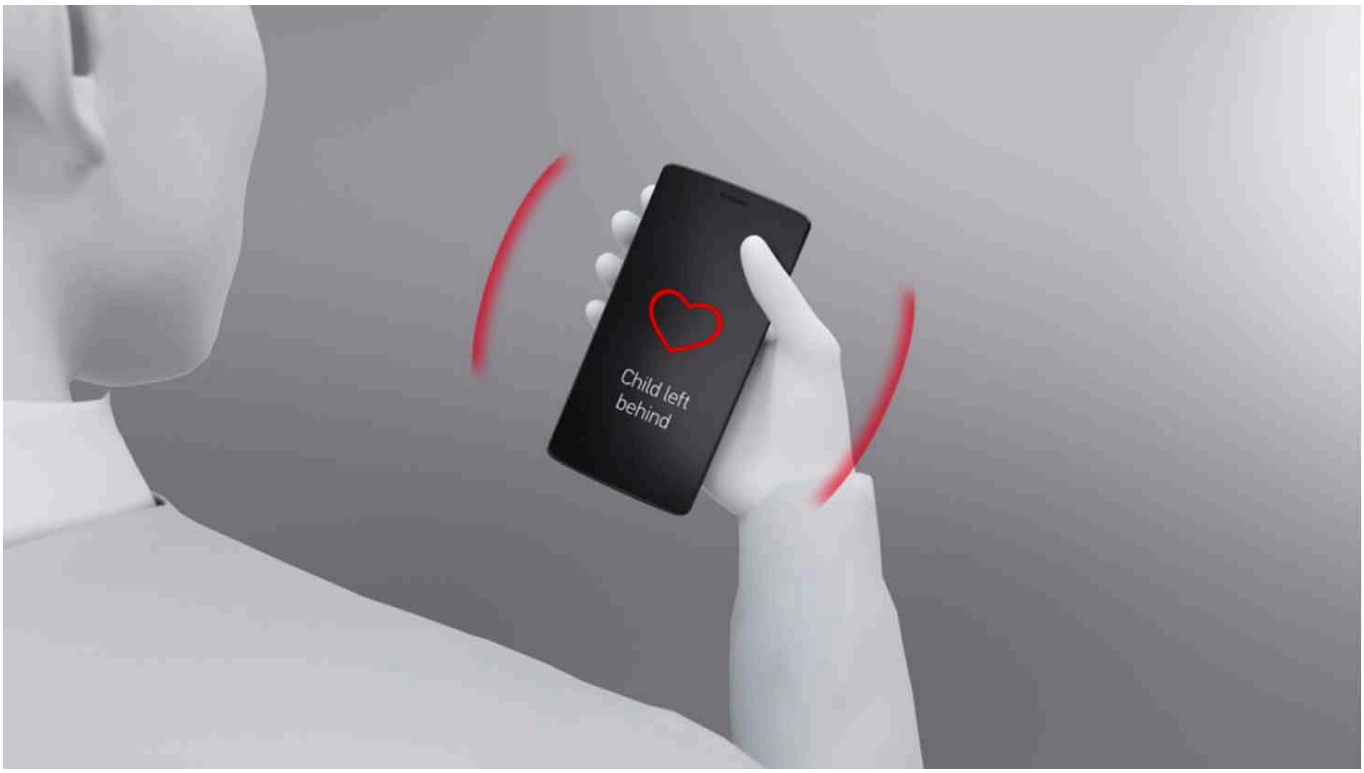
Each CarLab leads its own projects and brings support to other teams and innovation projects through workshops, design sprints, quick prototyping, and user testing, as well as open exchanges and events.

Valeo's Interior Experience Product Marketing Manager Rémi Mathieu will be speaking at the upcoming DVN Interior Workshop in Köln on 23-24 April; his talk is entitled Evolution of Display and HMI. Register here.

# Interior News

## Forvia Hella Upgrades Vehicle Access, Child Monitoring

INTERIOR NEWS




FORVIA IMAGE

Forvia Hella has had more series orders for digital access systems—smart car access systems—as well as the start of series production of the NCAP-relevant child-presence detection function. Both are based on ultra-wideband (UWB) technology with integrated AI.

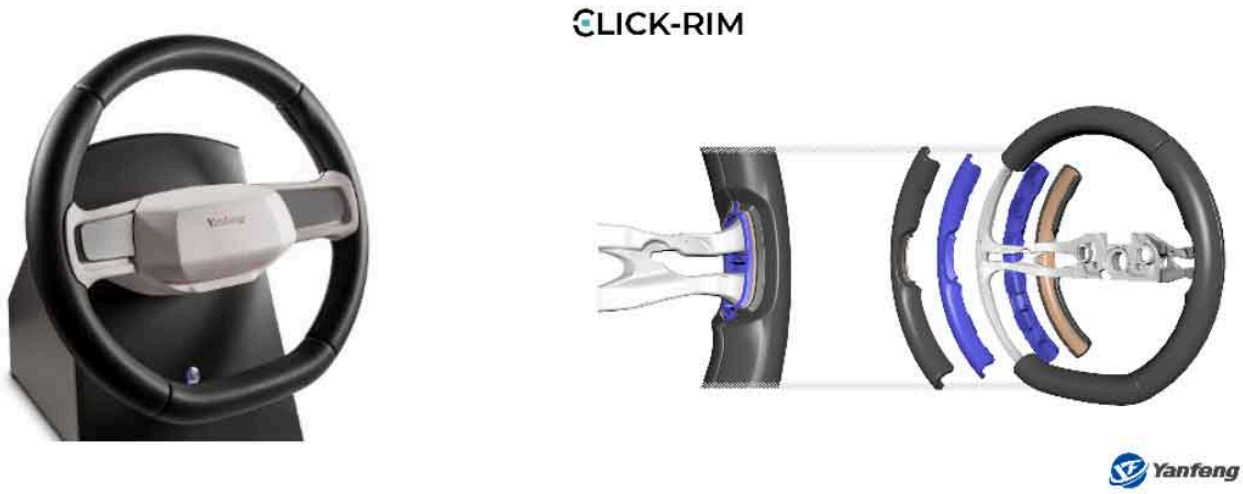
With Smart Access, the user can open and close the car completely hands-free and start the engine without having to pick up their smartphone. The integrated UWB technology, with its precise runtime measurement, is also designed to protect the vehicle against relay attacks—the unauthorized opening of a vehicle by hijacking the radio signal.

With the child presence detection system, UWB anchors in the passenger compartment use vital signs such as breathing rate and movement patterns of the occupants to detect whether children or infants have been left alone in the vehicle. If this is the case, parents or guardians receive an alarm on their mobile device after just a few seconds. All new vehicles in Europe and the USA must have such a system as standard from 2025 in order to receive the highest possible rating in the NCAP.

Forvia Hella Electronics Managing Director Jörg Weisgerber says, "The development of child presence detection shows how efficiently we can implement new end-user-relevant functionalities with our Smart Car Access system. We will also continue to work on adding new functions to the technology. The focus here will be on new solutions to prevent unauthorized access to the vehicle, for example, as well as new convenience functions such as hands-free opening of the boot."

# 'ClickRim': Yanfeng's Modular Steering Wheel

INTERIOR NEWS




YANFENG IMAGES

Yanfeng's 'ClickRim' concept was shown at CES 2024, as we reported here and here. Now there's more information.

The ClickRim is a modular steering wheel whose manufacturing process, according to Yanfeng CTO Patrick Nebout and Executive Director of Global Innovation Jeff Stout, cuts costs, ensures production volumes, and improves recyclability. The new process allows to solve the difficult tasks related to the manufacturing of wrapped steering wheels, which is time consuming and labor intensive: wheels are wrapped by applying a foam coating to the metal skeleton of the steering wheel, followed by bonding a heating mat, and finally wrapping-on the surface material. Each step requires precise manual processing, but the recent shortage of specialized labour has put high volume production into serious danger.

With the new process, individual segments or shells are wrapped fully automatically with spacer fabrics and leather, then clipped on to the steering wheel rim and connected to each other. The lighting and hands-off detection functions, as well as the heating mat, are preassembled and integrated directly into the shells. The modularity even allows the alternation of different type of shells, weather in textile, leather or natural fibers. The automaker's logo or the vehicle model branding can also be integrated directly into the shell during the wrapping process.

The individual shells can be easily disassembled, and materials can be all recycled. Moreover, the use of spacer fabrics instead of conventional foam in the wrapping process enable a $CO_2$ emission reduction of 1.0 kg per steering wheel.

Supplying high-volume programs would have been impossible in the past due to the labor-intensive process but the new automated process will allow Yanfeng to locate ClickRim plants close to vehicle production plants and easily meet high volume demands. The new ClickRim wheel has already passed main prototype testing and will be implemented in the medium/premium segment, as it is custom for wrapped steering wheels, in vehicles model with SOP planned for 2025.

# Shenzhen Automotive HUD and New Display-Light Quality Design Forum

INTERIOR NEWS


On March 9, the "GVIC Automotive HUD and New Display Light Quality Design Forum" with IFAL as the main organizer was successfully held in Shenzhen, China, with around 150 attendees from Automotive industry.


DVN Interior General Editor Philippe Aumont was invited to deliver an online speech. Follow James Shan's introduction, Philippe comprehensively introduced the trends of automotive interior including topics about cabin experience, interior design, HMI, Display, Safety, interior lighting, sustainability etc.

A lot of interesting contribution were presented, here’s a selection

Professor Guo Gang from Chongqing University deliver a speech focusing on "scene-experience-driven", introducing the innovative design ideas of intelligent cockpit and sharing how to optimize the user experience through scientific evaluation technology.

Associate Professor Xie Minzhi from Shanghai University of Science and Technology introduced the impact of graded alarms on autonomous driving takeover in emergency situations. He analyzed the important role of hierarchical alerts in autonomous driving systems from a practical application perspective, and how to effectively take over control of autonomous driving in an emergency.

Associate Professor Chen Chengming from Shanghai Ocean University shared his research on the human factors of in-vehicle HUD

Mingxuan Lu, Senior Optical Engineer at Synopsys, presented a detailed analysis of the optical solution for AR HUD. He introduced that in the design stage, the core of AR HUD lies in the precise construction of its optical system, which realizes the perfect integration of virtual images and the real world by optimizing lenses, mirrors and other components.

Le Gang, general manager of Shanghai Fuzhan Intelligent Technology, presented a new method for light quality detection of display products based on hyperspectral technology.

Wang Leilei, R&D Manager, shared Hasco Vision's practical experience in AR HUD-enabled cockpits.

Zhou Minjie, head of DLP application technology of TI (Shanghai), elaborated on the wide application and potential value of DLP technology in smart cars.

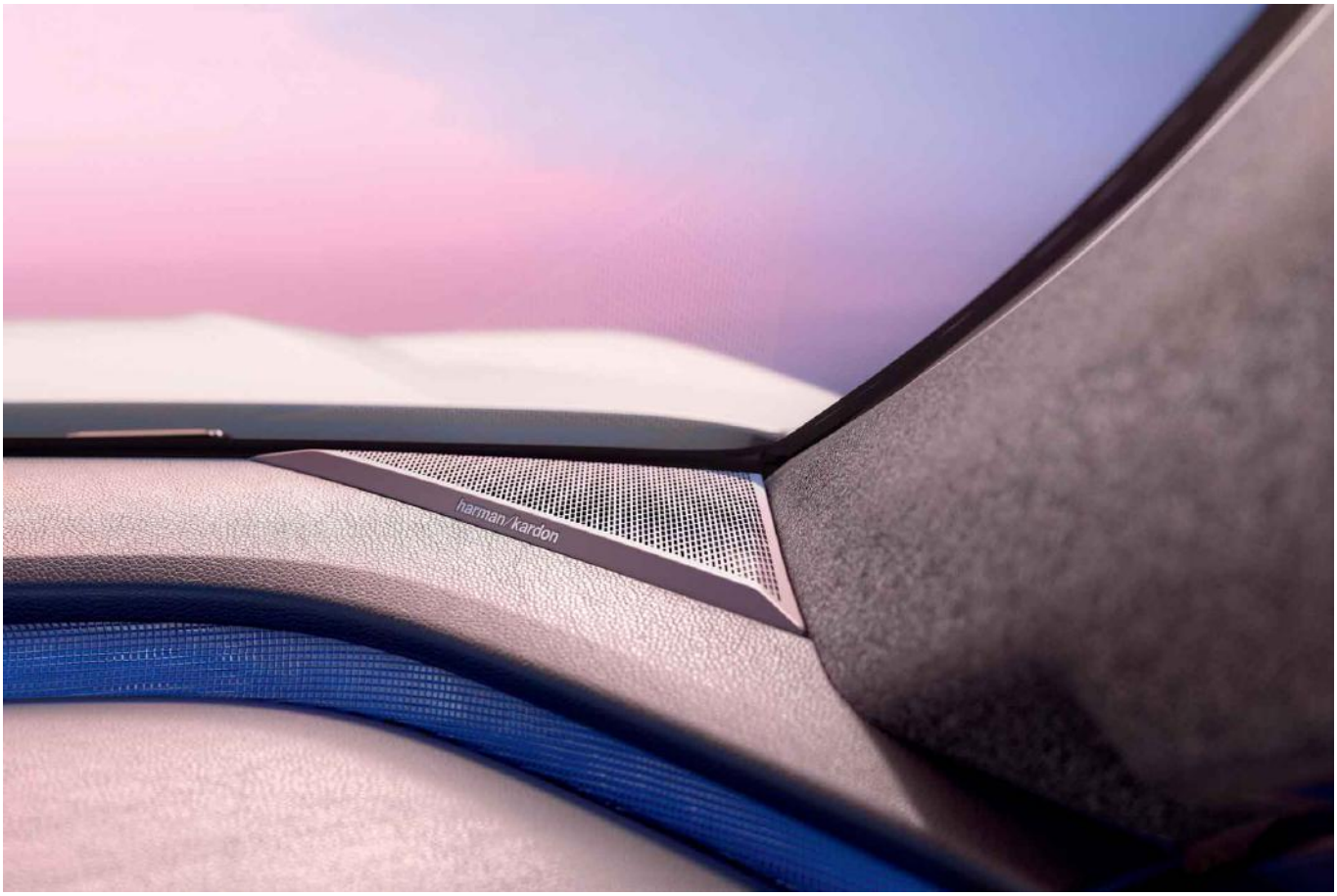
Dr. Yu Xin believes the integration of multi-scene optical display is the key to achieving display technology innovation. By integrating the display requirements and technical characteristics in different scenarios, we can develop display products that are more in line with the needs of users.

Dr. Zhai Jinhui of Diqing Optoelectronics shared the AR HUD solution for smart cars based on DLP technology from the perspective of optical optimization design of AR HUD.

Liu Haipeng, general manager of Elepn, introduced the innovative application in the field of DLP technology to achieve personalized customization and intelligent interaction.

# Harman Kardon Sound in Renault Scenic E-Tech

INTERIOR NEWS




HARMAN IMAGE

Harman International has continued their partnership with Renault, with a Harman Kardon premium sound system in the new Scenic E-Tech electric family car.

The audio system features an upgraded setup of nine high-performance speakers, including single-coil woofers in the front doors for improved performance in upper mid-range frequencies.

An external coupled subwoofer (ECS) has also been implemented to reduce the weight and volume of the subwoofer enclosure, while also delivering low-distortion bass reproduction. Combined with an eight-channel DSP digital amplifier with a total output of 410W, the speaker can deliver the full frequency range at any volume level.

The sound system also integrates advanced audio functions and technologies such as vehicle speed compensation, virtual center technology for a stable, well-defined soundstage, and Harman’s patented QuantumLogic Surround (QLS) algorithm. The QLS is designed to separate input sources and split them into individual streams and speakers to create immersive surround sound with a unique staging.

Passengers can also choose from five sound ambiences to suit their personal preferences: Studio, Concert, Podcast, Immersion and Club.

For the Scenic E-Tech electric, the designers used the same solution found in the Megane E-Tech electric, with the tweeter grilles mirroring the 60° pattern of the slash of the Harman Kardon brand logo.

Greg Sikora, Harman's Senior Global Director of Acoustic Systems Engineering, says the goal is for the system to "reveal all the nuances of finely tuned sound. In this, we benefited from Renault’s collaboration with Jean-Michel Jarre, with whom we have developed together the direction for the sound tuning of the Scenic E-Tech electric".

The Scenic E-Tech Electric won the Car of the Year 2024, as announced in Geneva during the recent autoshow.

# Innovative Interior, Snow Shake-Off in Nio ET9

INTERIOR NEWS


NIO IMAGES

Nio's new top-of-the-line electric ET9 offers many interior innovative features, and a snow shaking feature.

The car offers a high level of comfort and technology. Large screens, an intelligent chassis system, and numerous assistance systems offer a first-class driving experience. While Nio has not yet fully revealed the dashboard design, they've shared details of the rear passenger area: The premium rear seats offer up to 45-degree reclining backrests, extra-wide seat cushions and eleven additional customization features. The car also has seven electric sun blinds.

Other features include an eight-inch tablet screen between the seats, an electrically operated refrigerator and two 14.5-inch AMOLED screens on the back of the front seats. Instead of a traditional dashboard, there's a HUD and a 15.6-inch tablet screen on the center console. Nio also mentions a retractable steering wheel design for the intelligent pilot function. However, the most spectacular detail by far is probably the two-part roof window with integrated light strip.

The car has a new function to clear itself of snow: the chassis wobbles sideways like a dog shaking off water. The hydraulics can be controlled separately on all four tires.

# EuroNCAP Wants Important Controls Off Touchscreens

INTERIOR NEWS


MERCEDES-BENZ IMAGE

It's hardly a secret any more; using touchscreens for all car controls is **the wrong way to do it**. Soon, in an attempt to promote safer driving, car makers in Europe will be encouraged to stop using touchscreens for basic functions like turn signals and wipers. Euro NCAP will introduce new rules in January 2026 that require the vehicles they assess to have physical controls if they're to receive a top five-star safety rating.

While Euro NCAP testing is voluntary, it is widely backed by EU governments. Automakers use their five-star scores to market the safety of their vehicles. “The overuse of touchscreens is an industry-wide problem, with almost every vehicle-maker moving key controls onto central touchscreens, obliging drivers to take their eyes off the road and raising the risk of distraction crashes,” said Matthew Avery, director of strategic development at Euro NCAP. To be eligible for the maximum safety rating after the new testing guidelines go into effect, cars will need to use buttons, dials, or stalks for the horn, the hazard warning lights, the turn signals, the windshield wipers, and SOS calls.

Some manufacturers like Tesla and Volkswagen have gained a reputation for placing basic vehicle controls behind touch-sensitive interfaces. There’s no shortage of complaints about such features, but equipment manufacturers continue to push touchscreen interfaces because they’re cheaper to make than physical buttons and dials.

The Euro NCAP’s safety guidelines aren’t a legal requirement, but automakers take safety ratings seriously, so any risk of points being docked during such assessments is likely to be taken into consideration. Matthew Avery says, "It is our intention to adopt these new requirements in 2026 as stated and the vehicle manufacturers are aware and are in support of the initiative.”

# Audi Q2: New Infotainment, Virtual Cockpit

INTERIOR NEWS

AUDI IMAGE

Updates are in the offing for all new Audi Q2s: a new 8.8-inch MMI touch (or voice controlled) display with a resolution of 1,270 × 720 pixels will replace the previous rotary dial on the centre tunnel, including also an LTE module for fast data transfer and a Wi-Fi hotspot. A practical storage compartments is taking the place previously occupied by the rotary wheel. In addition, the new Q2 will feature the Audi Virtual Cockpit with a 12.3-inch instrument display, where users can determine themselves the size of certain elements.

The largest package, “MMI Navigation plus,” includes Audi connect services such as Remote & Control Query and vehicle information controls such as unlocking the doors or querying the fuel level, as well as navigation services with high-resolution satellite maps and services. The package also includes additional online services, such as Audi Traffic Information plus with lane-specific traffic flow data, information about on-street parking, online radio and online music recognition.

New hardware options include a 705 watt Sonos 3D audio system with 14 speakers, 15-channel amplifier and subwoofer, and the Audi phone box, enabling wireless charging of smartphones.

To further enhance safety, the Q2 models will also have traffic sign recognition systems, a lane departure warning system and rear parking assistance.

The new Audi Q2 will be available in Europe from the second quarter of 2024.

# The Design Lounge

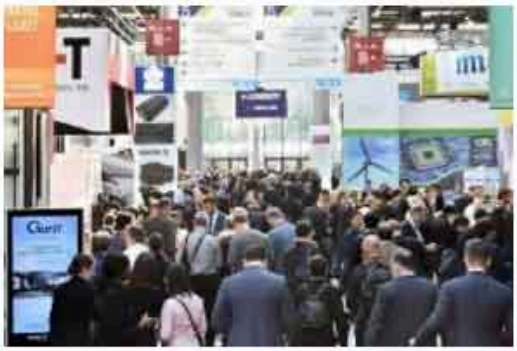
## JEC World '24

THE DESIGN LOUNGE

COFFEE CORNER
DVN
Interior

JEC World, the leading global event for business, innovation, and knowledge on composites, took place on 5-7 March at Paris-Nord Villepinte, displaying endless applications addressed to upcoming industrial challenges.

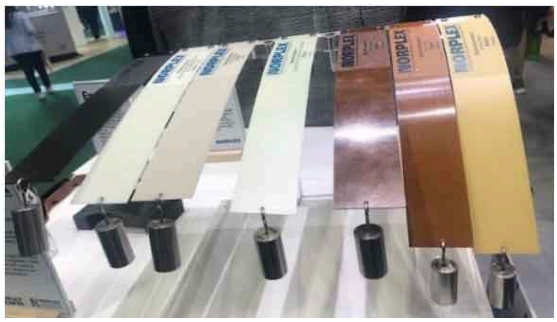




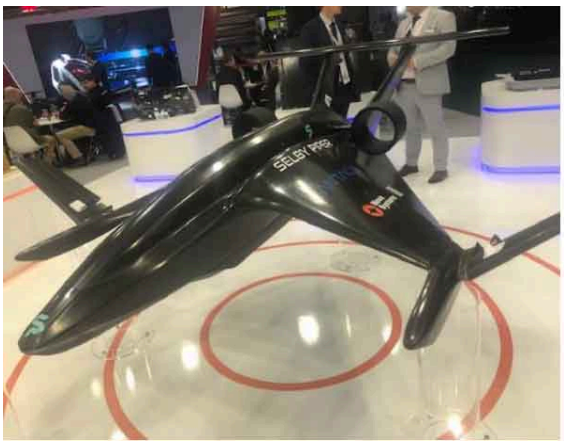

Exceeding 42,000 visitors; 1,200 exhibitors from over a hundred countries, and 26 pavilions in 72,700 square meters of show floor, JEC World gathered the whole value-chain of the composite materials industry, putting together not only all major global companies, but also innovative startups in the field of composites and advanced materials, experts, academics, scientists, and R&D leaders.


The main difference between plastics and composites is that plastic is a single material, while a composite is made up of multiple materials and the greatest advantage of the latter is threefold: strength and stiffness combined with light weight. Any other reflection beyond this baseline averred to be deeply puzzling. It is a challenging subject to approach in-depth, let alone defining it. Puzzling indeed, because some objects are part of another object. It is like if the material contained always a fourth dimension independently of its form.

Instead of being partially redundant -a material in another material - it is revealing an identity through its newly assimilated properties, and thus, qualifying as a composite unlike any other, rather unfortunate situation, of two materials just being glued or stuck together. The emergent characteristics are over and above a mere combination of the properties of their base constituents. In addition, emergent properties cannot be explained or accounted by the properties of the individual parts but, they arise holistically as being far greater than the sum of their fundamental early stages.

At this year's show, the idea of composites was put forth as a philosophy going beyond materials, to form, to entire objects and past self-contained items, thus contributing to the overall system or assembly.

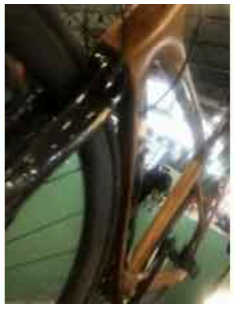



But there is more to it. The biggest advantage of modern composite materials is that they are light as well as strong and versatile. By choosing an appropriate combination of matrix and reinforcement material, a new material can be made to meet exactly the requirements of a particular application. Composites also provide design flexibility because many of them can be molded into complex shapes.



When wood, plastic, metal, or glass are not enough to do the job, then composites come into play, incorporating for instance the transparency of glass with the strength of metal, the grain of wood and the form-ability of plastics, all through the same process.

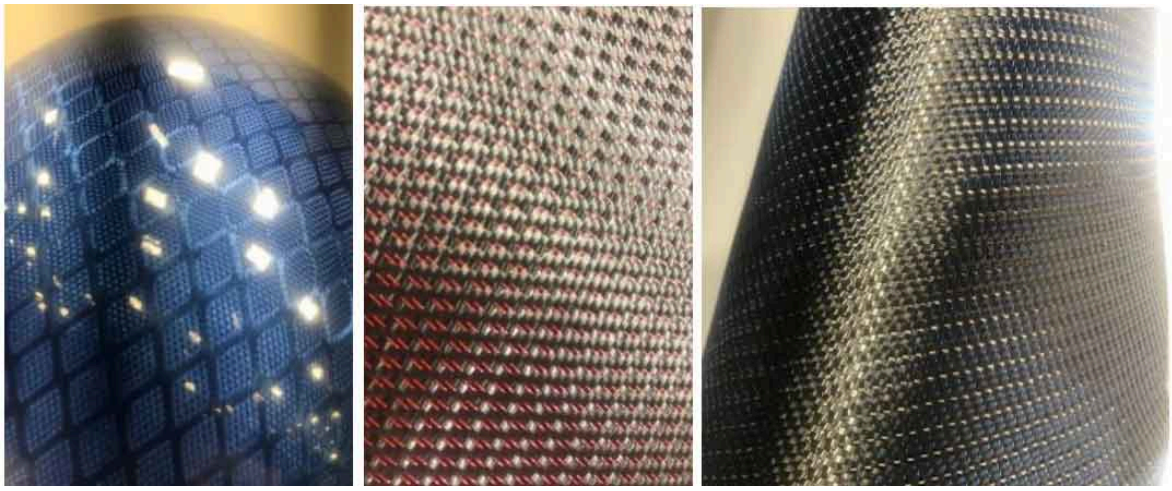


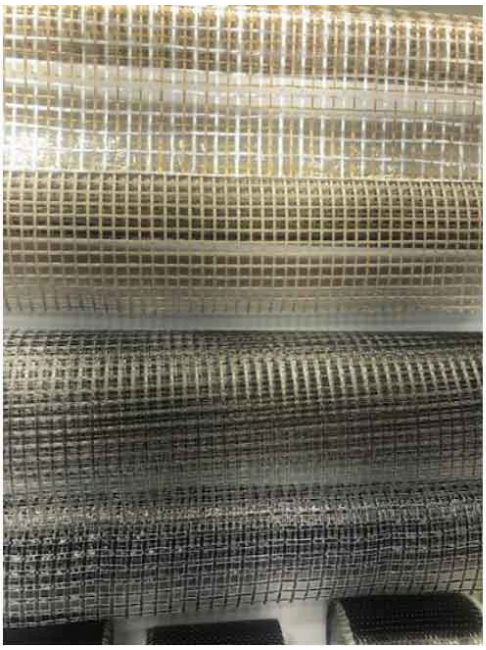
Fundamentally, polymer science is what distinguishes thermoplastics from thermoset composite materials. Thermoplastics soften when heated and can be remelted and reformed. Thermosets undergo an irreversible chemical reaction when heat-cured.

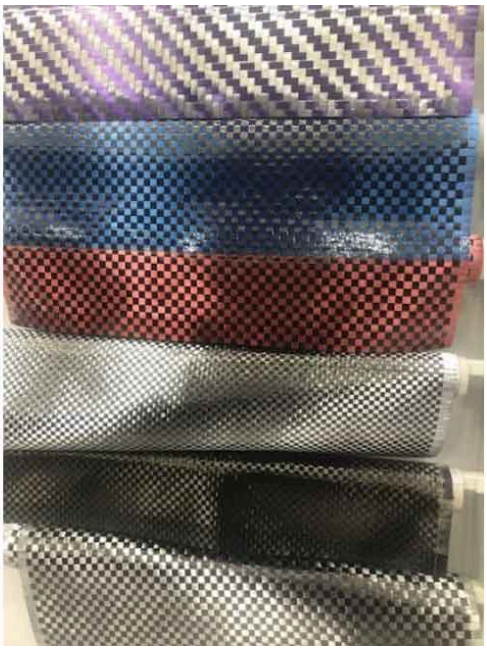
The critical difference between thermoplastics and thermosets is how the materials behave during the curing process. Thermosets strengthen when cured but form chemical bonds that make them impossible to remold. Thermoplastics do not form any chemical bond when curing, making them re-moldable and recyclable.

While chemical engineering (resin) is increasingly performant, at the structural end, the 'matrix', all possible weaved patterns are now attainable. Batches and silos are familiar vocabulary and in cases the weaving standards are at the height of the textile industry. In addition, exotic metals, like copper and stainless-steel fibers, visible or not to the human eye, raw or anodized, weaved in one axis or many, combined with optic fibers that could transport or emit light through the laminated surfaces, are now part of the weaving process.



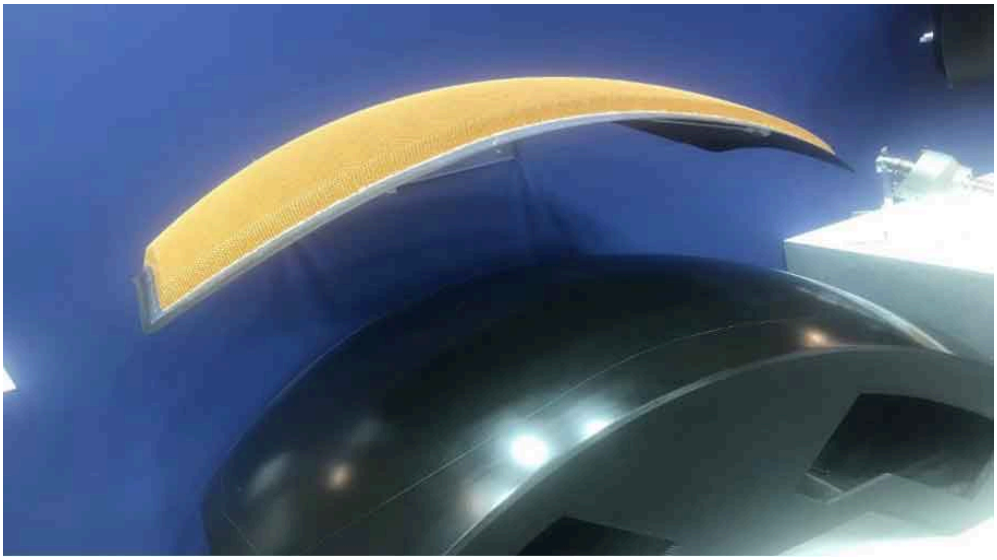
above and below: multi axial, and multi material fabrics showcasing Kevlar, carbon, glass, wool, copper, stainless steel, aluminum and optic fibers.





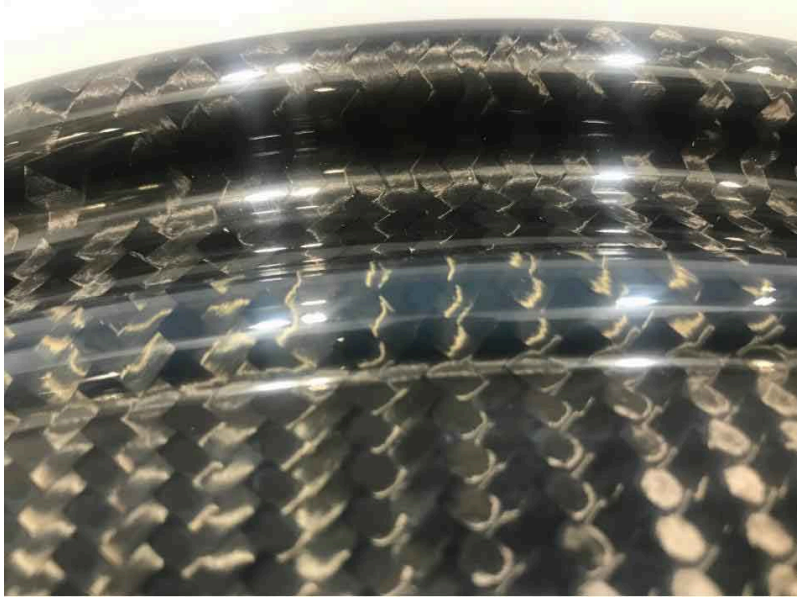
BEAUTY MEETS COMPETITION STANDARDS. ONE OF THE MOST GORGEOUS EXHIBITS, FILIPPI, 'THE FERRARI OF ROWING SCULLS' ENTIRELY REALIZED IN ANGELONI GROUP FABRICS.

Within the vast industry service and supply chain, JEC was a larger-than-life real-time demo-display of latest technologies, specifically developed for pre and post elaborations and treatments of composite parts. One of the most persuasive demo-displays was the CMS company's show-and tell of ultrasonic cutting technologies for composite fibers, fillers, and particularly Aramid paper honeycomb (picture below), Aluminum honeycomb and dry carbon fiber.



Additive manufacturing composite tooling with full range of CMS technologies for the processing of composite materials and parts: In the photo above, a mold is 3Dprinted and polished by the same machine. On the same platform(!), dry matrix cut and pre-preg layout and final part 3D finish. CMS is a large size composite tooling maker, offering applications of machining, from small parts all the way to wind turbine blades.

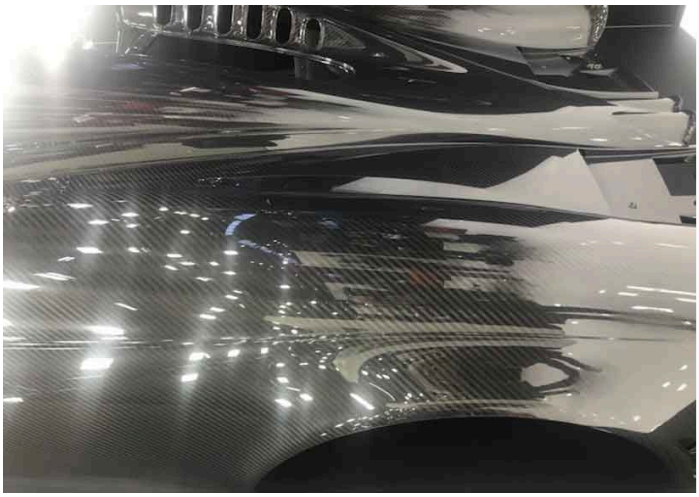
Because it is a process driven 'material', the standards of execution are often so high that we might feel confused or even uncomfortable when details like a parting line or a mold joint or any other signs of serial production are invisible. Indeed, even when something unplanned happens or shows up on the surface of the final part, it still looks compelling. In the case of Kaneka, a Japanese company specializing in liquid toughness for thermoset applications, a specific formula of the gel-coat would create an unexpected fisheye effect under certain radii. They worked hard to reduce that unexpected effect/optical illusion, but I like to think they should work harder to further amplify this cute and unpredictable 'mistake' in their process.



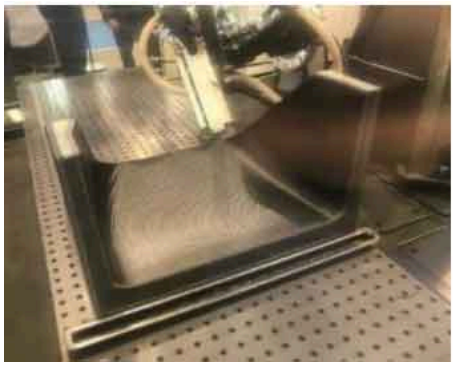
One of Kaneka's products is a liquid toughener in which Nano rubber-particles are homogeneously dispersed in a liquid curable resin with no need of a mixing process. Its performance on fracture toughness, endurance and heat is directly related to the optimal dispersion of the core-shell particles. These 100nm diameter rubber core particles are responsible for the exceptional performance but also the slight visual distortion under certain circumstances (picture above).

In the picture above the unexpected fisheye lens effect produced in a full carbon wheel rim at a radius bellow 25mm and, here below the rubber-core particles responsible for this effect dispersed in liquid state, giving a stunning milky and pearlescent hue.


This magnificent world of composites is condemned to exist most of the time under the skin, or beneath a paint. Every time it emerged on the surface it very rapidly became decorative, giving its place to fake carbon or fictional adhesive patterns. However, composites are more than just surface, they have depth, structure and often a multi axial matrix that can handle any degree of transparency or opacity, better than most other materials. What if instead of creating composites just for performance, we'd get equally interested in their visual performance and character. Besides the beautiful palette of color and finishes, this could also be an answer to the ongoing corridor-comment at JEC: composites are difficult to sell because they often are invisible.



In the case of Saertex, a maker of technical textiles and textile reinforcements made of carbon, glass, aramid, and natural fibers, a sports car side-panel was on display, showcasing the structural product next to the finished and painted car body. Indeed, the multi axial fabric, induced in resin, would create a translucent volume that would let light go through according to the weave and the angle that it is looked at. Magic! I had to admit that I was disappointed when I saw that the final part was painted over.



Over the years we investigated developing special paints, it might be that in cases we won't need them anymore because composites, besides their amazing structural and form abilities, can now achieve any solid hue, pearlescent, metallic, glossy or translucent, embedding in the process several layers of visual depth next to floating, yet very controllable, reflections, highlights and core lines. What a beautiful world that would be!

# News Mobility

## Hands-Free Speed is Unsafe: IIHS

NEWS MOBILITY

CADILLAC WITH SUPER CRUISE (GM IMAGE)

Hands-free driving systems don't do enough to keep drivers paying attention and roadways safe, according to a new study released recently by the Insurance Institute for Highway Safety.

The IIHS tested 14 semiautonomous driving systems across nine brands, ranging from GM's Super Cruise to Ford's BlueCruise and Tesla's Autopilot, and found that 11 of them earned a rating of "Poor."

“Most of them don’t include adequate measures to prevent misuse and keep drivers from losing focus on what’s happening on the road,” IIHS President David Harkey said, adding that marketing names such as Autopilot and Full Self Driving can confuse drivers into thinking the systems are more capable than they are in testing and reality.

There are no self-driving ($L^5$) cars on sale today. The most sophisticated systems in mass-produced cars are $L^2$ driver-assist systems that combine adaptive cruise control and active lane control to enable limited hands-free driving on mapped highways. Some automakers market their systems as $L^3$, such as Mercedes-Benz's new Drive Pilot system being rolled out in California and Nevada.

Partial automation has been touted as a luxury feature to ease fatigue during roadtrips, but the latest battery of tests by the IIHS found little correlation between semi-autonomy and safety.


IIHS IMAGE

The latest tests and resultant ratings aim to increase safeguards and reduce misuse of semiautonomous systems. The tests measure five test categories:

- Driver monitoring to make sure the driver's head or eyes are directed at the road and whether their hands are holding the steering wheel or not
- An attention reminder that makes an audible and visual warning within 10 seconds of a driver not paying attention
- Emergency procedures within 35 seconds of a driver not responding to warnings, including sending out SOS signals, slowing the car to a stop, and preventing the driver from restarting the system
- Drive involvement such as when adaptive cruise control brings the car to a stop; it should not restart until the driver is looking at the road, as well as other safeguards from a stop
- Essential safety features such as seat belts must be engaged before ADAS can be used.

# Genesis Onboard Sterilizer Cleans a Smartphone

NEWS MOBILITY

The G90 comes with what Genesis calls a 'UV-C LED sterilizer' in the rear-seat armrest. Drop a phone (or phone-sized object) you'd like cleaned into the compartment under the armrest, activate the compartment's six ultraviolet-emitting LEDs via a button labeled "UV-C," close the lid, and watch a little icon appear in the upper corner of the rear-seat armrest. Ten minutes later when the icon goes away, your item is cleaned. Genesis claims the ten-minute UV light bath is enough to eliminate 99.9 per cent of surface germs and bacteria.

Genesis includes two USB ports in the UV-C compartment, so you can charge a device while it's being cleaned. They warn users not to keep objects inside the chamber too long: "prolonged exposure under ultraviolet rays may change the color and shape" of an object.

It is a sanitization operation; there is a difference between the terms "sterilize" and "sanitize". Here the process don’t eliminate all germs (sterilize), but lowers their number (sanitize).

# General News

## Smart Eye's New DMS-CMS Design Wins

GENERAL NEWS

SMART EYE IMAGE

Smart Eye, developer of DMS software for the automotive industry, announced a breakthrough order from a major Korean car manufacturer. For the first time, Smart Eye will deliver features for both driver monitoring and cabin monitoring, extending their software to the entire vehicle cabin.

By extending DMS technology to the entire cabin and all passengers, Smart Eye's Automotive Interior Sensing system enables car manufacturers to offer new features for improved safety and comfort in their vehicles. Smart Eye's interior sensing technology is incorporating key components from Affectiva, pioneers in Emotion AI and part of the Smart Eye group since 2021.

The customer, a major Korean car manufacturer, has already sourced Smart Eye's DMS technology for several of its previous car models. The four new car models, including Smart Eye's Automotive Interior Sensing, will go into production between the end of 2025 and the first half of 2026.

Smart Eye has already received 319 design wins from 21 automakers. The company's eye tracking technology and iMotions biosensor software platform are also used in behavioral research to enable advanced research in academic and commercial sectors.

# Chinese Companies Dominate the Automotive LCD Market

GENERAL NEWS

POLESTAR IMAGE

Chinese manufacturers are on their way to capturing the global market for car screens. This repeats a pattern that has already been observed in the TV and smartphone display industries. With their large production capacities, which enable low costs and sales prices, manufacturers from China are now increasingly dominating the global market for automotive displays.

In the first half of 2023, the share of Chinese display manufacturers in the global automotive industry rose to 45 per cent, according to statistics from market research agency Omdia. This is "a significant increase in their share from seven percent a decade ago", writes Omdia. Two Chinese companies, BOE and Tianma, are leading the way. Together, they already dominated 30 per cent of the global market in the first six months of last year.

The parallel trends towards EVs and increasingly intelligent, digitally upgraded cars with their 'smart cockpits' are currently causing the automotive display industry to grow even faster than previously expected. But it is not only the price that makes Chinese products attractive. Manufacturers are also investing heavily in R&D and are constantly bringing new products onto the market that are driving the evolution of the good old screen into a kind of interactive touch-screen control center in which more and more driving functions are digitized and controlled via the screen.

One example is the new 8K Borderless Smart Screen from BOE—45 inches wide in the Geely Galaxy E8. Screens continue to expand from the driver's field of vision via the front passenger's zone to the field of vision of the passengers in the rear seats. They are growing not only more numerous but also bigger and with higher resolutions. On average, every car is currently equipped with 1.67 displays, and the trend is rising.

In addition to BOE and Tianma, IVO, CSOT, Hisense, and China Star are in the process of dominating the market for automotive LCD displays. In Europe, main suppliers are Continental, Harman, Marelli, Bosch, and Valeo.