DVN-I
Automotive Interior

Thu, 20 January 2022 Weekly Newsletter NEWSLETTER #95

Editorial

Future Is Unpredictable?

SIX AIRBAGS MANDATORY IN INDIA? (HYUNDAI IMAGE)

VUCA stands for volatility, uncertainty, complexity, and ambiguity. It's likely to be the next big buzzword for the automotive industry as a result of Covid, according to the market analysts at Cox Automotive. VUCA is used to describe the situation of constant, unpredictable change that is now the norm throughout industry (writ large) as businesses gear up for a new year full of the now-usual unusual challenges.

Industry faces VUCA from regulatory; usage and ownership; technology, and business standpoints, to name just a few. Car interiors are at the crossroads of these unknowns, and the challenge is less about being prepared for any scenario; more about being flexible enough to quickly react to whatever comes down the pike. DVN Interior is here to get you prepared for unpredictable eventualities, and the upcoming DVN Interior Workshop (25-26 April in Cologne, Germany) is being put together to that end. We'll keep you posted with details. In the meantime, come **join in** if you're not yet a DVN-Interior subscriber.

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

Car Interior as Health, Safety Cocoon

FAURECIA-ZF ADVANCED VERSATILE STRUCTURE (FAURECIA IMAGE)

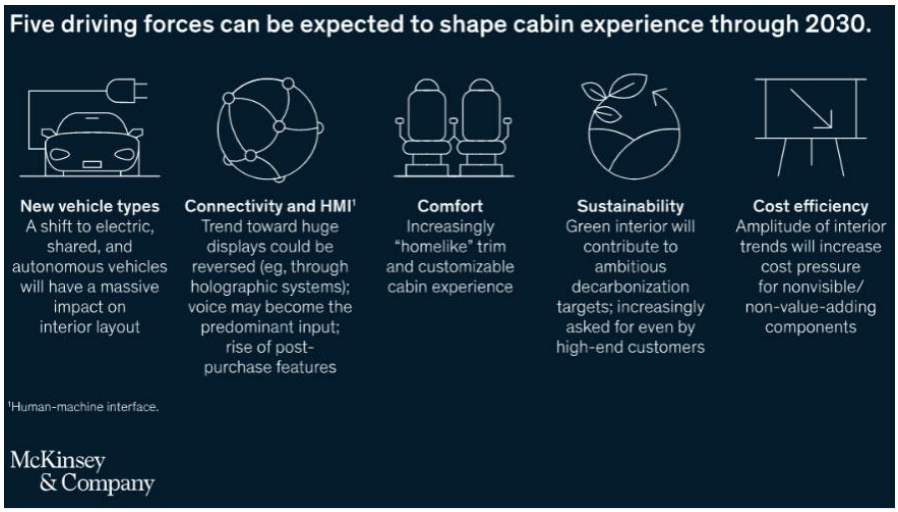
The idea to transform the vehicle into a sort of healthy cocoon was explained by Christophe Périllat, Deputy CEO of Valeo, during his press conference at the CES a couple of weeks ago: air and surface purifiers, comfort and wellbeing systems, driver monitoring sensors to keep watch for distraction and fatigue, occupant monitoring sensors to prevent forgetting a child, intelligent sun visors: the tools are multiplying to make occupants feel safe in their car. This safe and healthy dimension places the car interior at center stage of tomorrow's mobility.

McKinsey Research

A McKinsey report published late last year describes revolutions in how automakers produce and market their products. In the new paradigm, the report says, a car's interior and the accompanying cabin experience are two of the most important vehicle differentiators. As such, affiliates of a vehicle brand are not waiting for the next start of production of a vehicle but for the next operating-system update; automakers introduce new HMI systems as stand-alone products to as much anticipation and fanfare as new models; and car magazines discuss comfort levels rather than acceleration and horsepower.

To assess the growing importance of vehicle interiors, McKinsey looked at insights from eight sources. These included an analysis of the interiors of over 50 current and concept vehicles; discussions and in-depth expert interviews with over 60 decisionmakers from 25 leading companies; consumer surveys; and panel discussions with automotive experts. They also analyzed mobility patterns by customer segment and drew on their work with automotive companies on vehicle interiors, connectivity, HMI, and the customer experience.

This scrutiny revealed the growing significance of vehicle interiors and the in-car experience. For instance, it revealed that 71 per cent of automotive executives expect vehicle interiors to become more important, while only 38 per cent held the same views about vehicle exteriors. Homing in on this clear trend, McKinsey reviewed the evolution of vehicle interiors in response to five forces:



Electrification and AVs will have a massive effect on interior layouts and could enable features that were previously unimaginable, such as swivel seats or pillar-to-pillar screens. Similarly, innovations in connectivity and HMI could alter the cabin experience. For instance, automated assistants might have an improved ability to respond to the voices of all passengers. The cabin itself will become more comfortable, with more homelike features such entertainment systems, interior lighting, automatic climate control systems, fragrance diffusion, and features that enhance the driving (or 'passenging') experience. As makers experiment with new interiors they must keep sustainability issues in mind, since customers are increasingly concerned about decarbonization. Cost control will also be crucial, especially for features even if visible or adding value, as feature-overloaded vehicles can pose a psychological threshold of economics (perceived value).

After discussing innovations in vehicle interiors, our article describes five strategic imperatives for automakers and suppliers that will emerge. McKinsey summarized it in five major development directions:
• HMI technology, over-the-air (OTA) capabilities, and future materials
• New forms of partnerships to get capabilities in an increasingly complex cabin
• Raise customer experience as a top priority
• Rethinking and accelerating the journey from concept to cabin
• Reducing complexity to optimize costs and increase customer convenience

As vehicle interiors evolve, automakers and suppliers have to understand users' needs and how to put them at the center of an ecosystem. That's at least nominally the value proposition of CES, which is now one of the biggest auto shows in the world (er, when Covid isn't decimating it), and also a huge consumer technology show triggering cross-fertilization among the digital, health, entertainment, home, and other sectors.

Valeo

UV AIR PURIFIER TECHNOLOGY BY VALEO IS DISPLAYED ALONGSIDE A VITAL SIGNS SCREENING SYSTEM (AFP IMAGE)

Valeo offers technologies including driver attention control; air filtration with personalized thermal comfort to each passenger, and others contributing to strengthen the cocoon around occupants.

For buses and coaches, Valeo has also released an air purifier said to eliminate more than 95 per cent of viruses, including that of Covid-19, during journeys with passengers.

Cabin Air

Sweden-based CabinAir has developed air purifiers for cars that can be integrated into the passenger compartment or simply installed in the cup holder as an aftermarket accessory.

Marelli

Marelli picked up a CES Innovation Award for their IAQ (indoor air quality) purification system. It uses UV-A and UV-C light with a titanium dioxide (TiO_2) filter to destroy bacteria and virus-causing particles, including COVID-19.

Marelli also developed the dashboard for an EV, with haptic buttons to provide the user with a tactile response. Haptics increase safety as the driver can operate features of the vehicle without taking their eyes off the road.

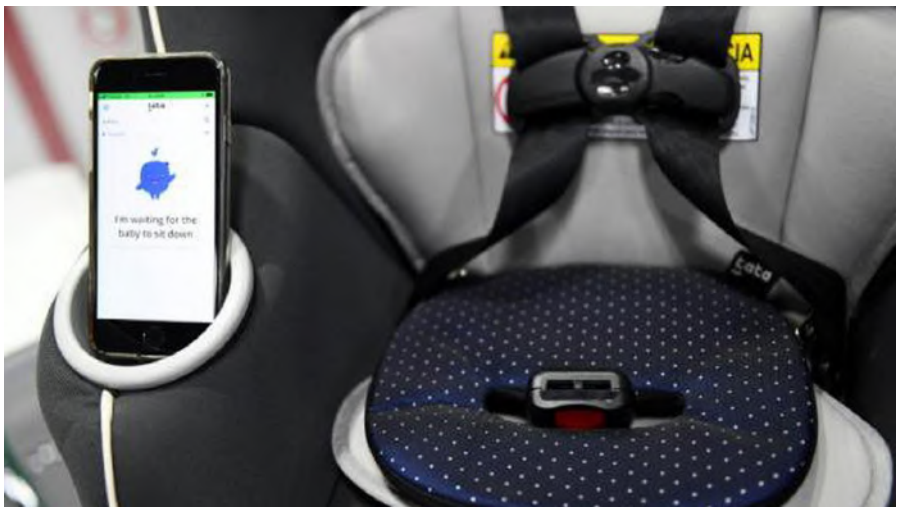
Gentex

Gentex is working on a nanofiber-based sensor to monitor air quality and identify possible contaminants. A year ago Gentex announced their acquisition of Vaporsens, who developed a nanofiber chemical sensing technology to monitor IAQ and identify airborne contaminants.

GENTEX IMAGE

Last September, Gentex announced the acquisition of Israel-based Guardian Optical Technologies, whose infrared-sensitive, high-resolution camera combines machine vision, depth perception, and micro-vibration detection. This proprietary sensor configuration allows the system to not only monitor the driver, but also the entire vehicle cabin and all its objects and occupants, assessing their behavior, gestures, and activities.

Filo



TATA PAD BY FILO, A SMART BABY CAR SEAT ALARM TO ALERT WHEN A CHILD IS LEFT IN A VEHICLE (FILO IMAGE)

Italian startup Filo came to Las Vegas to launch their infant seat cushion in the United States, where a few dozen babies and small children cook to death when left behind in hot cars every year. In Italy, a law requires

warning systems on child seats. Filo's cushion, linked via Bluetooth to the parent's phone, can spot if a child —as opposed to a bag—remains in their seat when the driver leaves the vehicle and alert them.

Now let's take a look at some CES Innovation Awards, with a focus on interior sensing, for improved safety and comfort.

Smart Eye

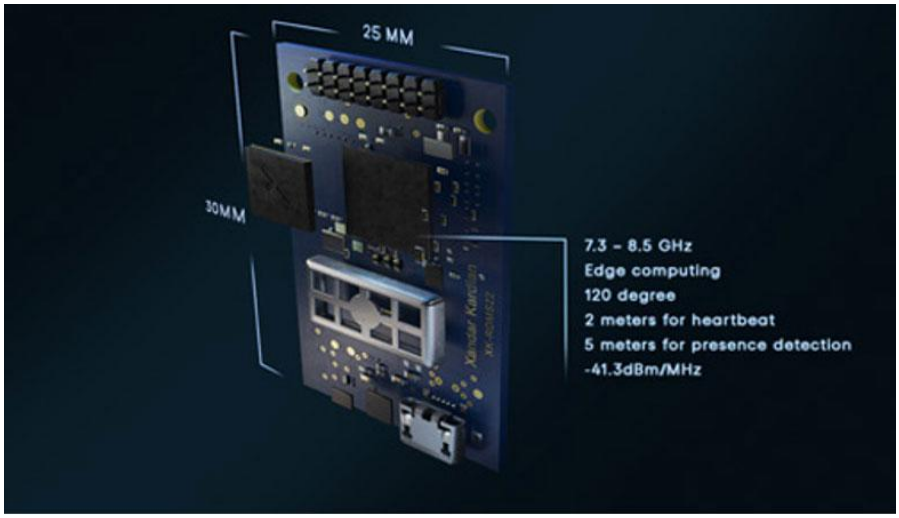
As described in DVN Interior on 5 August 2021, Smart Eye's Automotive Interior Sensing combines driver monitoring system (DMS) with cabin monitoring to provide deep, human-centric insight into what is happening inside a vehicle. The system keeps track of the state of the driver, the cabin and all passengers by detecting eye gaze, head movement, body posture, occupancy, activities, children, pets, and objects. Powered by Affectiva's Emotion AI, it also captures nuanced emotions, reactions and facial expressions. It enables automakers and tier-1s to build vehicles that improve safety by understanding dangerous driving behavior, and unlock features and services that enhance wellness, comfort and entertainment.

Cipia

Cipia's FS10 is a video telematics platform for monitoring fleet drivers and the external environment of the vehicle. The device provides alerts to the commercial fleet driver when drowsiness, distraction, sleep, or dangerous actions are detected (e.g., using a mobile phone). In addition, the device provides alerts to the fleet manager to surface events which require intervention in real time, and assists in building statistics for

smarter and more efficient fleet management over time (e.g., detecting routes which cause distractions or drowsiness).

Xandar Kardian



The need for contact-free, continuous monitoring (CFCM) of physiological parameters such as vital signs have become more important as vehicles become increasingly automated, resulting in less focused drivers. Contact-free sensors should also be unaffected by weather, lighting conditions and even the type of clothing the driver/passenger is wearing. Xandar Kardian uses impulse UWB radar that can safely sense through all types of clothing and work in all types of environmental factors with stupendous reliability and accuracy. The makers say it is the world's first and only FDA 510(k) cleared radar sensor for monitoring heart and respiration rates using radar.

Conclusion

Attention to the health and wellbeing of the driver has long been growing progressively. After seeking to make the seats and cabins more ergonomic—Volvo was an early practitioner, advertising their consultation with orthopedists in designing their seats in the 1960s and '70s. The art has advanced and proliferated a great deal since then. tools came along to identify, for example, possible heart problems, then solutions to monitor the driver and their fitness to drive.

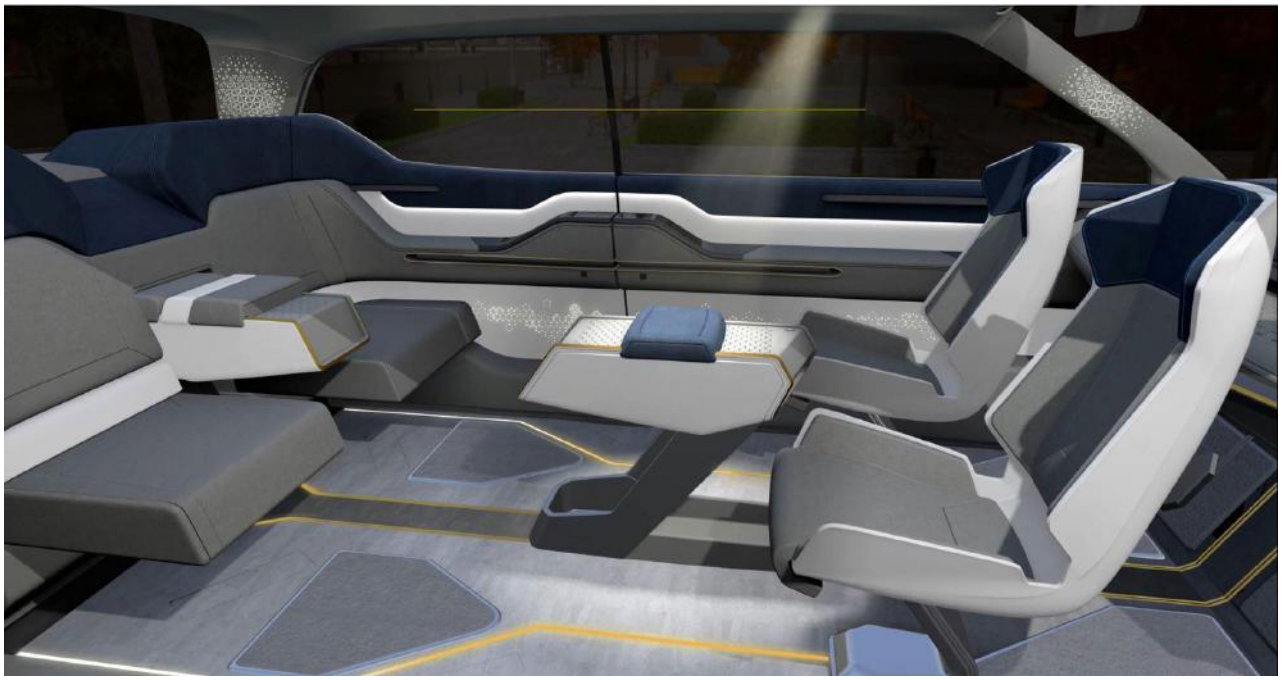
The proliferation of sensors in the car was then fueled by new regulations; in Europe, for example, driver drowsiness/distraction warning systems are required.

The cabin experience is increasingly taking the spotlight away from automotive elements that have traditionally dominated headlines—engine performance, exterior design, and powertrains. The rapidly evolving CASE megatrends are changing the configuration of cars and allow vehicle occupants to enjoy new experiences, in their cocoon, during trips.

Interior News

Grupo Antolin in-Pulse is Urban Century Concept

INTERIOR NEWS



GRUPO ANTOLIN IMAGE

Grupo Antolin have a new virtual interior concept car called the in-Pulse (see **video**). This interior of the future is Grupo Antolin North America's vision of a flexible car interior space. It offers a comfortable interior that transforms to provide users with a personalized driving experience as well as convenient storage. The concept car offers ready-to-market solutions combined with looking-forward technologies. The interior is based on an electric L^4 SUV. Technologies such as active acoustics systems, projection of information on interior surfaces, and personalized functional lighting integrated in the headliner substrate, as well as retractable automatic sunvisors allow the creation of individual comfort bubbles.

Improving the quality of life in the vehicle interior has become a market priority, so the in-Pulse offers new air purification systems and sterilization solutions for interior surfaces and personal belongings. The aim is to create a safer environment for the occupants. Advanced driver-assistance systems are also part of the product portfolio exhibited with the seamless integration camera-driven DMS and OMS, which are leveraged to automate in-cabin comfort and infotainment preference settings.

Smart surfaces take a prominent position through a new generation of trim and decorative parts: capacitive solutions combined with haptic technologies, ambient and functional lighting to improve driving experience. Seamless incorporation of morphing surfaces in the instrument panel, floor console and door panel, as well as the new morphing cup holders that adapt to all types of beverage containers, are a new path to clean and pure surfaces.

Sustainability is everywhere! Natural and sustainable materials offer a high-end perception: cork, stone, vegetable leather or natural fabric for surfaces are the materials of choice for this natural touch. Chemically foamed plastics are present as well, but there's natural-fiber technology, too, and laser welding contribute to the light weight required for EVs.

Toyota Boshoku's Advanced Cabin Concepts

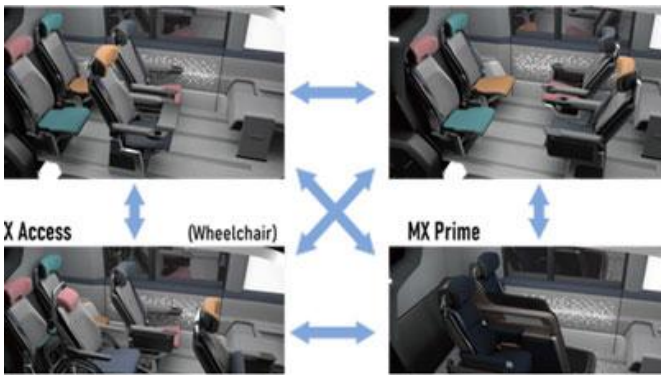
INTERIOR NEWS

TOYOTA BOSHOKU IMAGES

Toyota Boshoku revealed two interior concepts based on autonomous driving for the future mobility interior space solution for the MaaS community via their online site. They aim to be the "interior space creator" leading the creation of new value in mobility spaces. The Toyota Boshoku group primarily manufactures and sells automobile-related parts such as seats, interior and exterior components, and unit components. They've also entered the aircraft and railway seat business.

MX221: MaaS rideshare interior Space Concept

MX221 is a collaboration project between Toyota Group's Jtekt, Aisin, Denso, Toyoda Gosei, Tokai Rika and Toyota Boshoku. Assuming L^4 autonomous driving becomes mainstream after 2030, the urban area rideshare mobility concept is based on the theme of "diversatility" which allows various reconfigurable interior spaces through the exchangeable interior and seating modules that meet various consumer and service providers' needs.



Seat layout that can be adapted to a variety of users Structure that allows seat modules and seat components to be detached or replaced.

In addition, it is equipped with an advanced system that optimally controls air conditioning, lighting, sound, fragrance, haptic vibration stimulation, and images according to the occupants' condition and surrounding scenes. **See video**

MaaS Services Space Concept: Moox

This is a MaaS space concept that will be used in various services such as businesses and entertainment. Equipped with the Tailored Space System, the Moox enables appropriate space arrangement for each purpose by detaching and replacing seats and interior items depending on the application. It also provide new experiences with content offerings linked to vehicle location information and a sensory stimulation control system that monitors passenger behavior and emotions and provides corresponding experience.

Recycling Carbon Fibers is Still a Challenge

INTERIOR NEWS

COMPOSITES EUROPE IMAGE

Carbon fiber is light, stable, strong, and decorative. It can be used all over the place in a vehicle interior: for seat structures, IP cross-car beam, and numerous others. Carbon fiber reinforced plastics (CFRP) consist of synthetic fibers woven and bonded together using epoxy resins or other materials.But recycling this material, especially in combination with other materials, is difficult and costly.

Jörg Lacher, speaking on behalf of the German Association of Secondary Raw Materials, says "The main problem of recycling of carbon fiber is not the fiber itself, but that it is closely connected to other materials, which makes recycling, i.e. material recovery, more difficult or, until now, impossible".

LIGHTWEIGHT HYBRID STEEL/GMT COMPOSITE IP CARRIER (FAURECIA IMAGE)

The BMW i3 electric car has a carbon body. BMW also uses carbon in the A, B and C pillars, the tunnel and the roof of the current 7 Series, reducing the vehicle weight by a total of up to 130 kilograms compared to its predecessor. The automotive industry is bound by the EU's environmental regulations, which require that 95 per cent of each vehicle's weight must be recoverable, and 85 per cent recyclable. A BMW spokeswoman says: "On average, up to 50 per cent of the starting material can be reused when recycling CFRP. Carbon is treacherous when combined with metal, as it is found in several car parts. Shredding CFRP produces

conductive, combustible fiber dust, which poses a risk of damage and disruption to shredders and waste incinerators. It only decomposes at much higher temperatures than those prevailing in a waste incinerator".

The experts at the Federal Environment Agency expect that with the increasing use of carbon and other composite materials, recycling will become more complex in the future, with corresponding costs. New treatment technologies will have to be developed and implemented on a large scale through investments.

Nio Proposes AR Glasses Instead of Monitors

INTERIOR NEWS

NIO IMAGE

Will there be no more monitors in the car of the future? Li Bin, the founder of the Chinese e-car startup Nio, firmly believes in this vision. In the future, all information from the cockpit will be projected directly onto the driver's retina with the help of AR or VR.

NIO ET5 (NIO IMAGE)

Late last year, Li Bin unveiled the ET5 car, which he says will be available with AR glasses when it starts shipping this September, so goes the claim. The glasses offered by Nio weigh 76 grams, look like normal sunglasses, and simulate a large screen in front of the user's eyes.

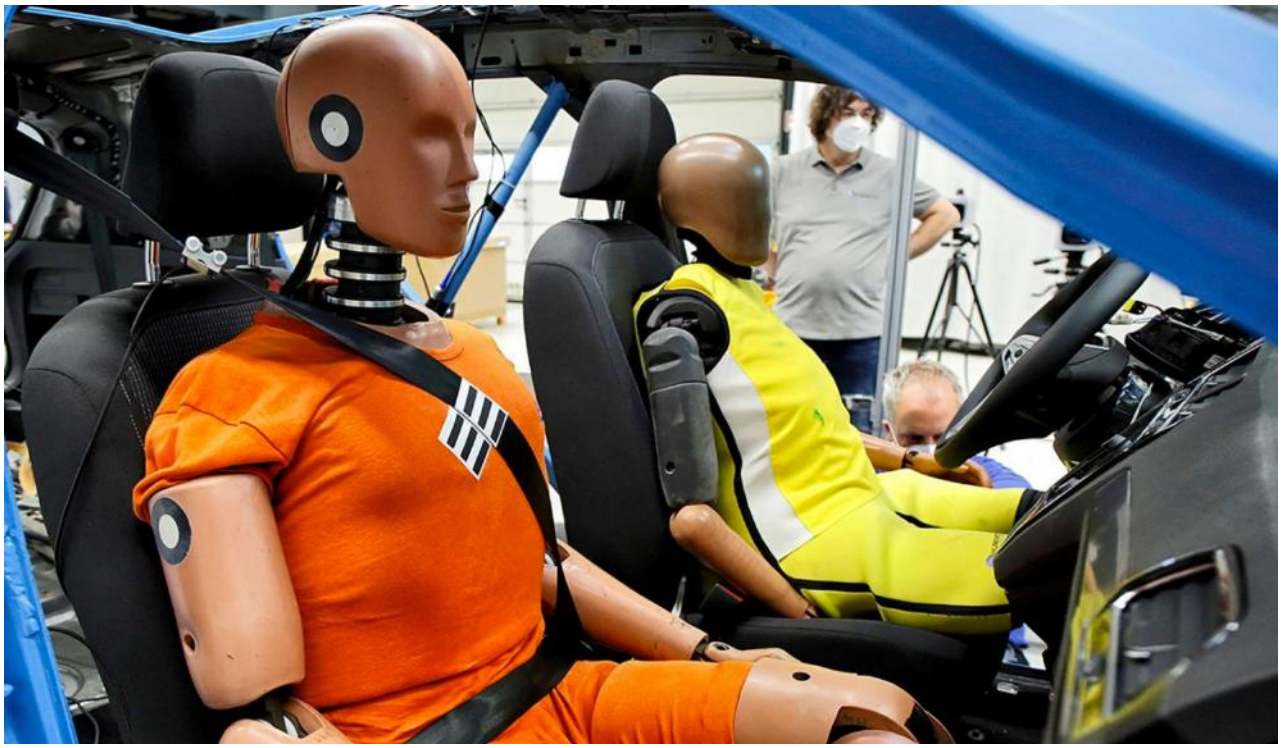
For the time being, the AR glasses from Nio can only be used for the entertainment system in the car. The driver—as long as they are not driving—and the other passengers can use them to watch films. Navigation and other information will remain on a monitor in the center of the cockpit.

Nio has developed their new AR glasses together with the Chinese startup Nreal. Through venture capital subsidiary Nio Capital the car company has a direct stake in the startup, as well as another such startup called Nolo, who will also offer glasses for the ET5.

Li Bin says "if the AR and VR experience is done well, we definitely don't need a big horizontal monitor anymore in the future".

Biofidel Dummy with Humanoid Physique for Crash Tests

INTERIOR NEWS



ADAC IMAGE

A car is driven into an obstacle without braking. BANG! Sound of falling glass. Sheet metal deforms and anthropomorphic dummies are thrown around in the interior. For years, researchers have been constructing collision tests in this way to test the safety of vehicles or to reconstruct accidents. The only way to understand internal human body behavior was through postmortem analysis of human vehicle occupants. Now a new dummy variant can also represent and record internal injuries—especially important to understand pregnant women or spleen behavior, for example.

It was more than 20 years ago that the Berlin accident researcher Michael Weyde found that he could not use conventional dummies to conduct forensic tests for court cases. "In car accidents with pedestrians or cyclists, the conventional dummies were too rigid and too shape-shifting. The damage the dummies caused to the vehicles in the test did not appear in reality," he says.

So, Weyde optimized the standard dummies. Initially, he wanted to use them to evaluate damage to the vehicle, but realized that injuries could also be realistically represented with the appropriate replacement body. Michael Weyde designed his own Biofidel Dummy, a dummy that comes close to the human physique and with the help of which injuries can be evaluated much better.

A special silicone now reproduces soft tissue, muscles and fat and resembles the human counterparts in terms of deformation. In addition, there is a new type of skin made of a latex mixture. The actual Biofidel-Dummy measures 1.78 m and weighs 78 kg. That corresponds exactly to the European 50^{th}-percentile man. The dummy does not cover children, women and very tall or fat men yet, but Weyde says he expects the "family" to grow within the next few years.

Stellantis Infotainment System with Amazon Alexa

INTERIOR NEWS

STELLANTIS IMAGE

Amazon and Stellantis are jointly developing the software for the STLA SmartCockpit which will be used in all 14 Stellantis car brands. The application of the services as well as the user interfaces of the infotainment system will differ depending on the brand and vehicle in the Stellantis Group. The STLA SmartCockpit platform is expected to use Amazon products and solutions developed specifically for vehicles from 2024. The software-defined platform will offer Alexa voice assistant, audio streaming, navigation, vehicle maintenance, e-commerce marketplaces and payment services, among others.

The AI-supported and cloud-based system is capable of learning and can make individual operating suggestions to the user. For example, family vehicles could offer an excursion planner that recommends media content, sights, restaurants and other fun stops along the route. For Jeep vehicles, there could be a digital "off-road coach". New apps and features can be integrated via app stores in the vehicles. Regular over-the-air updates (OTA) should make it possible to update the software. The cooperation also includes the joint venture "Mobile Drive" founded by Stellantis and Foxconn in 2021, in which digital cockpits and connected services are developed.

The deal with Amazon also shows how many alliances are being forged between car manufacturers and tech companies right now, without regard to possible rivalries. Stellantis, for example, is already working with Google's sister company Waymo on robotaxi development, while Amazon has its own developer of autonomous driving technology in house with the acquisition of the start-up Zoox.

News Mobility

Mobileye Keeps in Lane, Even Without Markings

NEWS MOBILITY

E-vehicles from the Volkswagen Group are the first to get a lane departure warning system from Intel subsidiary Mobileye, which works even without the otherwise necessary lane markings. Instead of being guided by white or yellow lines on the road, the system follows the line that other vehicles have traced previously on the road, based on amassed data. It's an innovation embedded in reality, where roads could be damaged, worn out, and covered by snow or ice.

Mobileye manager Johann Jungwirth says "Today, conventional lane assistants can only be used on about half of the driven kilometers (…) markings are missing, [or] they cannot be recognized by the vehicle's cameras due to rain, snow or dirt".

Volkswagen is integrating the corresponding information from Mobileye's cloud database into their driver assistance system for semi-autonomous driving. The globally aggregated swarm data can then be used in the electrified VW, Škoda, and Seat models that are based on the VW Group's MEB platform.

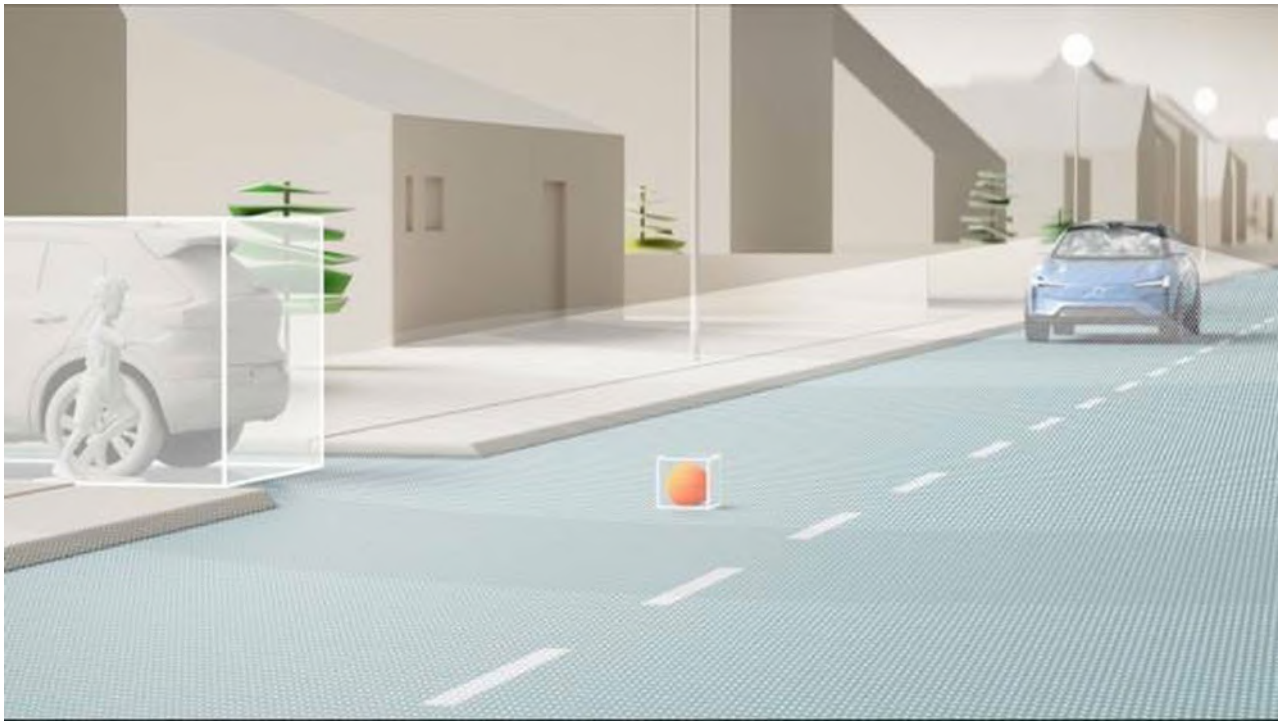
Ford plans to use Mobileye's Road Experience Management technology in future versions of Ford's "Blue Cruise" driver assistance system with stop-and-go and lane-centering technology, so customers will eventually be able to drive their vehicles hands-free while being supervised by a camera which detects whether the driver is concentrating on the road.

Mobileye also presented a chip system for autonomous driving up to L^4, with market launch slated for 2025. Jungwirth says "Autonomous driving becomes possible with the new chip, you then usually only have a second smaller processor for redundancy…the time of self-driving cars is now really dawning. I don't see anything that can stop us, neither regulatory, nor technical, nor in terms of customer acceptance".

The new concept relies on all-round vision with eleven cameras as well as additional data from radar and lidar sensors. Mobileye now has self-driving test cars on the roads in Tel Aviv, Munich, Paris, and Tokyo.

Autonomous Volvos Coming to America

NEWS MOBILITY



VOLVO IMAGE

Volvo is planning to introduce a highly automated driver assistance system. The "Ride Pilot" is to be used in a future battery-electric SUV, first in California. One lidar sensor, five radars, eight cameras, 16 ultrasonic sensors, and a laser scanner will support L^3 autonomy in the upcoming XC90, to be introduced this year. Volvo is working with Zenseact and Luminar on the sensor technology and software, including wireless over-the-air updates. The hardware will be standard on every vehicle built, but selectively software-enabled.

The target group includes business people who want to get work done on the morning drive in stop-and-go traffic. In future, they could activate the assistance system temporarily or permanently for a fee as part of a kind of subscription model.

In Europe, the Mercedes S-Class will let the car do everything at up to 60 km/h in heavy traffic or congested situations on suitable stretches of highway. Audi has had the necessary technology on the A8 since 2017, but has not been allowed to activate it so far for legal reasons.

General News

Detroit NAIAS Returns to Motor City This Fall

GENERAL NEWS

FORD EXHIBIT AT 2018 NAIAS (WIKIPEDIA IMAGE)

NAIAS, the North American International Auto Show—also known as the Detroit auto show—has a plan for returning. Organizers have announced September 17-25 as the public days, with a charity event on the 16th and press/industry days on the 14th and 15th. It will happen at the Huntington Place, the venue formerly known as Cobo Hall, with supporting events held around the downtown area.

Rod Alberts, executive director of the Detroit Auto Dealers Association and the NAIAS, made the official announcement last week, during the 2022 North American Car, Truck, and Utility Vehicle of the Year Awards, also held in Detroit. The traditional, old-school Detroit auto show hadn't been held since January of 2019, three years ago. The 2020 show was going to be moved to a June date but got canceled when government officials needed Huntington Place for treating what was thought would be a wave of Covid-19 patients. A year later the 2021 show was canceled by the Delta variant of Covid-19. An event called Motor Bella was held last fall at the M1 Concours in Pontiac, Michigan, but bad weather depressed turnout. Last summer the auto dealers who put on the Detroit auto show held an event called the Motor City Car Crawl, with vehicles staged in six downtown parks in anticipation of similar events that will support the big September auto show. That event was a success, which bodes well for the big show coming this fall.

The Detroit show was long held in January, a holdover from decades ago when the whole world clamored for American cars, and were willing to brave snow, ice, and subfrozen temperatures to see them. The world has changed, and the January timeframe put NAIAS in competition with CES, as well.

China Mandates Car EDRs

GENERAL NEWS

GAMINGSYM IMAGE

EDR (Event Data Recorders) —the so-called "black box"—have become mandatory in cars in China. From 1 January, all passenger cars produced in China must be equipped with one. China is thus following a number of other countries that require by law the automatic recording of vehicle data before, during and after an accident, including the USA since 2014 and South Korea since 2015. In the European Union, a similar regulation will apply to new cars from March 2022, and then to all new vehicles on EU roads from 2024.

EDRs can record data relevant to accident analyses. This includes, among other things, the speed at the time of the collision, the steering angle, whether the brakes were applied, the operational status of the engine, and whether the occupants were wearing seat belts or not. Following DMS regulations, it could include driver status.

Especially in view of the increasing number of driving assistance functions, and with a view to future autonomous driving, the Chinese legislator has decided in favor of the EDR obligation, reports the Chinese car portal Gasgoo. “Road accidents can be caused by human fault, but also by system settings of the vehicle, especially software systems. The safety of cars in the just beginning era of autonomous driving is the main reason for the obligation to install a black box”.

The regulation paves the way for a new billion-dollar industry in China. According to the latest forecasts by Chinese automotive associations, up to 27.5 million new vehicles will be sold in China in 2022, 23 million of them passenger cars. "The black-box market in the automotive industry is about to explode," headlines Gasgoo. “Companies in the relevant value chain, including manufacturers of MCU control chips, storage media, independent power supply for EDR devices, sensor technology and accessories for data extraction, can prepare themselves for rapidly growing demand”.