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Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #143

# Editorial

## So Much Technology At CES!


CES '23 was as close as the event has yet come to pre-pandemic size and dynamism, with an impressive number of exhibitors; visitors, and endless show halls. CES is arguably the most influential tech event in the world, and it's also one of the largest and most important auto shows. At least 274 automotive and mobility exhibitors covered more than 40,000 $m^2$, a 70 per cent increase in floor space from last year's pandemic-depressed levels.

BMW announced their futuristic i Vision Dee electric car; Stellantis presented their new Peugeot Inception concept; Vinfast's presence was among the signs of a strong Asian role in the auto tech industry, and Sony and Honda revealed their EV prototype and marque, built with Epic Games' Unreal Engine technology to provide next-level entertainment; communication, and safety features.

CES really is *the* show for technology makers, providers, and suppliers. Major tier-1s clearly invested a great deal to demonstrate their technology leadership—Bosch; Continental; Valeo; Forvia; ZF; Magna; Marelli, and super-numerous others. There had to have been *thousands* of startups!

The DVN team collected an enormous amount of information, and this week's in-depth article covers the automakers and cars. Next week's will cover the main tier-1s, and a complete report will be made available before the end of the quarter.

The magic of CES is energizing, combining the immeasurable amount of new technology within an industry moving toward software-defined vehicles in context of the CASE megatrends. CES is also unique because of its size, and probably because—for better and worse—the city of Las Vegas is what it is. It helps shore up faith that our industry will to continue to progress in sustainability; user experience; digitalization, and services. We will strive to bring that excitement to you with our words and pictures!

Sincerely yours,

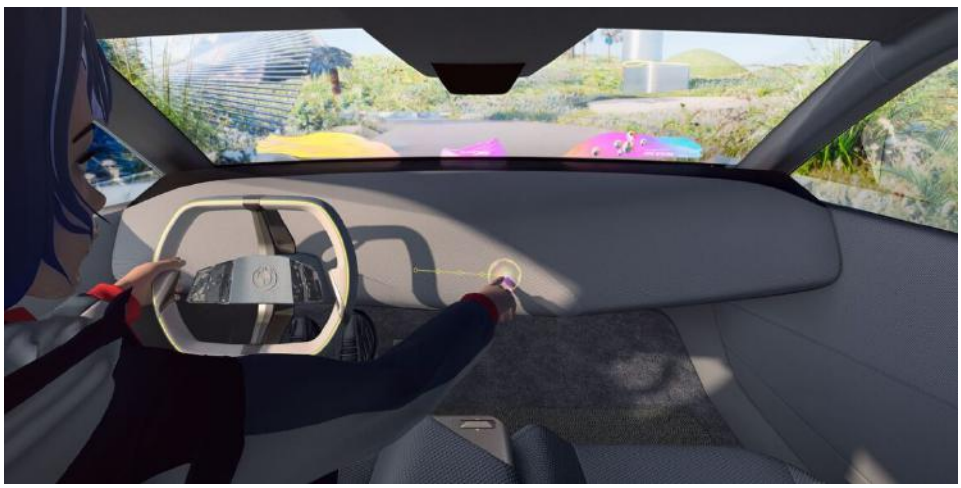
Philippe Aumont
*General Editor, DVN-Interior*

# In Depth Interior Technology

## Automakers at CES: Software Everywhere!

At CES last week, BMW CEO Oliver Zipse and Stellantis CEO Carlos Tavares gave keynote speeches. Zipse unveiled a concept car highlighting BMW's vision of a digital vehicle. Stellantis showed the best of their technology, and Tavares said, "You will see how we offer electrified and zero-emission powertrains, how our software makes mobility easier and safer, and how sustainability is embedded in all our decisions" about the concept vehicles on display, summarizing the main tech trends of the whole industry.

### BMW's i Vision Dee Can Transport You to a Fantasy World



BMW IMAGES

BMW's i Vision Dee, revealed on the first evening of CES, reflects perfectly the show and the overlay of the old physical automotive world and the digital-metaverse world to form the so-called 'phygital' realm.

Dee stands for Digital Emotional Experience, and the immersive interior experience is the portal to a new territory, to take you there so completely that you may forget you're in a car stuck in traffic.

BMW says some of the car's tech will be on their 2025 'Neue Klasse' EVs. But the extent to which the Dee's interior technology can take you—projecting the fantasy world of your choice into the cabin—will require $L^4$ or $L^5$ autonomous driving capability to be fully deployed.

The vehicle is also a chameleon outside, the car's exterior is equipped with 240 'E Ink' segments that can be controlled individually; you could go with a solid color if you want, but each separate panel can be customized so you can go wild with patchwork designs.

BMW chose to extend the screen pillar-to-pillar by simply widening the head-up display in the car, turning the windshield into a kind of infotainment screen. BMW said this kind of HUD will be used in production models starting in 2025.

Drivers use a 'mixed-reality slider' to decide just how much navigation and traffic information they want on the windshield and from there can retreat ever further into their own fantasy world.

"I want to be more than just a car," the concept car said in a soothing voice. "I'm your portal to the virtual world, but also back to the real world. Together we will enjoy our drive wherever you want to go. No matter where you are, where you want to be".

Projection across the windshield's full width allows information to be displayed on the largest possible surface, which only becomes recognizable as a display once activated. BMW piped up: "In parallel, dimmable windows can also be used to gradually fade out reality. Mixed reality can be experienced in [the] BMW i Vision Dee in an immersive way that engages different senses without requiring any additional tools, creating a new dimension of driving pleasure".

The car was presented in a sort of Hollywood-style show by CEO Oliver Zipse, assisted by Arnold Schwarzenegger for some great storytelling, with emotion and experience. The presentation was heavy on predictions and vision statements; rather lighter on actual specific capabilities of the vehicle.

DVN IMAGES

## Stellantis: Concept Cars and CEO talk

### RAM 1500 Revolution BEV Truck Concept


DVN IMAGE


STELLANTIS IMAGES


A central chunk of Stellantis' Dare Forward 2030 strategy, for transition to an all-electric lineup, the Ram Revolution is a full-size truck—a big one, with a roomy-looking passenger compartment. There's a big glass roof, and a configurable interior (a one-button setting adjusts the entire cabin experience; options include Productivity; Social; Party; Relaxation, and make-your-own modes). A pass-through into the frunk can carry items up to 18 feet long. The midgate also features jump seats, which act as a third row of seating.

The rest of the interior is very concept-looking; easily visible thanks to no B-pillars, with an almost oval steering wheel and highly stylized seats. Infotainment includes a big central touchscreen, and the driver gets a screen as well. The screens add up to 28" of touch-sensitive area, and there's a HUD as well. The lower display has three different positions depending on the task at hand: minimal view; extended view, and full screen view, and iy can be removed and used in different areas of the truck. The upper screen can also slide on the Ram Rail attachment system.

Seating and flexibility are prioritized; the center console can be removed for more space, or the center console armrest converts to a workstation surface. Lightweight seats feature integrated seatbelts; grab handles, and speakers which can fold flat along with extended recline, which also deploys the jump seats.

Smaller than traditional truck mirrors, the rearview mirror is packed with a range of sophisticated technologies, including a reversing camera with 360-degree views; speakers, and receivers compatible with voice assistants such as Alexa and Siri. There are sideview cameras rather than mirrors.

The truck is a sustainability-forward design, with unique and resourceful materials throughout the interior. Examples include light, resilient Greyslate Nanostone veneer and apple leather, a byproduct from the apple industry. There's a textured floor composed of recycled rubber and cork particles.

## Peugeot Inception

DVN IMAGES


The Inception will be an $L^4$ AV, and when the car is driving itself, the 'Hypersquare' control retracts into the dashboard and a large screen slides out from the floor.

The Inception's user interface is based on the latest generation of consumer electronics, presented as touch-tap-swipe commands. The screen displays information, has various controls accessible using thumbs at each corner, as well as voice recognition.

The interior continues Peugeot's i-Cockpit design, inspired by video games, with digital electric controls and steer-by-wire technology. There's a small, low-set steering wheel that does not block the instrument panel. The conventional steering wheel is replaced by a 'Hypersquare' control system with a square tablet-style screen.

The center of the Hypersquare is a tablet-type screen dedicated to the distribution of control information. The pictograms for the different features (HVAC; radio volume; ADAS, etc.) are displayed on the two side panels to

facilitate access to the chosen control. The latter is located inside the circular recesses and can be accessed by moving the thumb only, without taking your hands off the steering control.

Sustainable 'molded textiles' are also used throughout the interior. Scraps of 100 per cent polyester fabric from the design center's prototyping workshops or from suppliers are re-used to make load-bearing or trim parts. The seats are covered with a velvet made from 100 per cent recycled polyester, which extends onto the floor and features 3D patterns to act as a floor mat.

## Carlos Tavares' Comments

Tavares said during his keynote address that Stellantis is becoming a "mobility tech company" to improve how people move; socialize, and entertain themselves. He said the company is massive in scale but has the soul of a startup:


"The need to innovate for our future is greater than ever. Companies must be both transformative while profitable; be tech minded but driven to serve human needs," he said. "Humans are, first and foremost, seeking a sense of safety in this uncertain, chaotic world that is marred by crisis after crisis."

Carlos Tavares sees the European auto industry at a crossroads in competition with Chinese rivals. Europe's auto industry could be forced to massively reduce its production capacity in the face of rising competition from China, Tavares said:

"The price difference between European and Chinese vehicles is significant. If nothing is changed in the current situation, European customers from the middle class will increasingly turn to Chinese models. The purchasing power of many people in Europe is decreasing noticeably. Regulations in Europe ensure that EVs built in Europe are about 40 per cent more expensive than comparable vehicles made in China," he said. "If we don't optimize our cost structure, we cannot absorb the additional cost of electrification," which risks leading to elevated car prices and a shrinking market. "If the market shrinks, we don't need so many plants. Some unpopular decisions will have to be made."

## VW's ID.7 with a digital camouflage look


VW IMAGE

VW showcased their first fully-electric sedan based on the modular electric drive matrix (MEB). It was presented with a smart camouflage, which uses unique technology and multilayered paintwork to create light effects on parts of the vehicle. The ID.Aero3 concept vehicle initially presented in China already provided a preview of the new model, which embodies an aerodynamic design concept and can achieve ranges of up to 700 kilometers (per WLTP)

The ID.7 premium sedan offers a curated climate and comfort experience, including a new display concept; an augmented-reality HUD; a 15-inch screen; new HVAC controls in the first level of the infotainment system, and illuminated touch sliders.

The car can detect when the driver is approaching based on their key, and will already start to cool the interior on hot summer days or heat the interior on cold days before the driver gets into the vehicle. Newly designed 'smart air vents' control the flow of air and move dynamically to distribute the air over large areas as quickly as possible. If there are passengers in the car, the air can be directed straight to the body or ventilate the interior indirectly. These functions are always visible on the new large display and can be activated and saved individually for each user. Special requests can be activated using voice commands. If the user says "Hello Volkswagen, my hands are cold!", the ID.7 responds by starting the steering wheel heating function. At the same time, warm air is directed towards the hands.

The camouflaged sedan features a digital design with unique paintwork, which lights up the ID.7 interactively. 40 layers of paint have been applied, of which some are conductive while others have insulating properties. 22 areas of the vehicle can be controlled separately and are electrified below the top layer of paint (electroluminescence) so that they light up. If all this is connected to a sound system, the rhythm is visualized by illumination of individual areas.

The QR codes on the hood and on both sides provide an interface between the physical and digital worlds. The entire camouflage also takes the QR code theme further and thus hides the contours of the final production vehicle.

The advantages of the modular MEB platform with short overhangs and long wheelbase (2.97 meters) provide benefits for the interior. In the ID.7, this results in the character of a luxury sedan with an especially spacious feel.

Since the first ID.3 models were handed over to customers in September 2020, VW has delivered 500,000 ID-family vehicles worldwide through their subsidiaries—around one year earlier than planned.

## Mercedes

DVN IMAGES

Mercedes-Benz pitched the idea of technology as a key driver of desire. It means making life easier by turning automated driving into reality; substantially improving in-car entertainment, and giving their customers back precious time.

At CES they introduced Automatic Lane Change as an $L^2$ upgrade. Drive Pilot, their $L^3$ system for conditionally automated driving, is already available in Germany and soon, after certification, in California and Nevada.

The new Burmester audio system boasts 1,750 watts powering up to 31 speakers and eight exciters that transfer vibrations, creating an acoustic environment where you hear and feel every sound. They are also creating perfect harmony between the sound experience and premium content in collaboration with Apple Music, Universal Music Group and Dolby Laboratories. 'Approved in a Mercedes-Benz' recordings make vehicles the best place to listen to premium high-fidelity music. Mercedes recently added ZYNC to ensure the best quality streaming content is available.

Lightweighting is playing such an important role that MB gave it a special showcase.


Focus is put on simplicity of lightweight design, where the EQXX represents efficiency in interior design, with lightweight structures integrated within the interior aesthetics. Trim elements are simplified, and a visionary interior material perspective brings in many startup sustainable, light and luxurious materials


DVN IMAGES

It includes vegan leather; 100 per cent bamboo carpet; 3D-printed household waste, and Desertex all-leather derived from cactus.

## Vinfast


DVN IMAGE

VinFast is now a trending name in the EV world. At CES, the Vietnamese automaker gave a closer look at their VF 6 crossover and VF 7 SUV, which were already presented in DVN Interior for the Paris Autoshow In-Depth review.

## Sony Honda Afeela

DVN IMAGES

Sony and Honda presented their new electric car marque, Afeela. Their joint venture aims to have an EV ready for the North American market by 2026. Sony Honda Mobility CEO Yasuhide Mizuno said, "Afeela represents our concept of an interactive relationship where people feel the sensation of interactive mobility and where mobility can detect and understand people and society by utilizing sensing and AI technologies".

Over 40 sensors, including cameras, radar, ultrasonic, and lidar, will be embedded all over the exterior of vehicle, enhancing its ability to detect objects and drive autonomously.


The interior features digital displays of a type that are certainly new for Honda, spanning the dashboard, two more for the rear passengers and video camera sideview mirrors, which are legal in some countries, but not yet in the U.S.

The electronics in the vehicle are run by the Qualcomm Snapdragon Digital Chassis and use infotainment software developed by Epic Games. Indeed, it is based on a fully integrated PS5 for gaming and entertainment. According to Mizuno, the plan was to "develop a car as hardware that will cater to the entertainment and network we would like to offer".

Sony sees cars as a crucial platform for the future of Sony tech and entertainment products. They want to the design and development process too, even if making cars is incredibly risky and expensive, especially for a company that has never done it before. Of course, Honda is part of the development, developing their own lineup of EVs—starting with the Prologue, which is being built in collaboration with General Motors.

# Interior News

## ZF's New Heated Seatbelts

INTERIOR NEWS


ZF IMAGES

ZF's 'Heatbelt' concept for EVs promises to save battery energy, and it sounds like something drivers will want. Heated seats and steering wheels have almost become something standard today, and automakers and suppliers haven't really extended other heated elements in the car.

At CES, ZF showed a heated seatbelt they say could increase EV range by up to 15 per cent by reducing the energy required to keep passengers warm. The technology looks simple; it relies on a special webbing that integrates heating conductors, designed to give a uniform sense of warmth positioned close to the body. The 'Heatbelt' is only marginally thicker than a standard seatbelt.

The belts are engineered to heat up very quickly to around 100 °F (38 °C), with one of the main advantages being decreased energy usage as EVs use their batteries to generate cabin heat, as opposed to combustion-engine vehicles which use waste heat.

"The contact elements for the electrical heating circuits are positioned in such a way that they do not interfere with belt operation or retraction," says. "Special belt retractors at other installation positions are not necessary. Since all relevant characteristics of the seatbelt remain the same, there are not any added procedures or qualifications for the automaker.

It's clear that automakers are looking at everything to reduce energy consumption in EVs, and local heating, instead of heating the whole cabin is probably the easiest solution. Other solution are currently in development, such as radiant door panel, or zonal heating.

# Chrysler's Cockpit of the Future

INTERIOR NEWS

STELLANTIS IMAGE

Chrysler will be the first Stellantis brand in North America to deploy new cockpit technology, which the automaker says will learn driver preferences. At CES, Stellantis demonstrated a mockup of their two-seat Chrysler Synthesis layout.

The Synthesis design incorporates several upcoming Stellantis tech platforms, including STLA Smart Cockpit; STLA Brain, and STLA AutoDrive. The automaker brands the trio as "Advanced Technology for Real Life", and says it will be able to adapt and enhance the user interface over time, including machine learning to adapt to use preferences.

The system also allows Stellantis to make OTA vehicle updates, as well, to enable the "quick creation and updating of software features, automatically downloading content and enhancements over the air to keep the vehicle fresh, exciting and capable during each day of ownership".

Chrysler has said the OTA approach will link together hardware and software generations. The Chrysler Synthesis is shaped by the Harmony in Motion design language that Stellantis says is "contemporary, sustainable and technology focused." The dashboard is sleek and angular, evocative of science fiction display.

STLA AutoDrive is a flexible system that can receive OTA updates. It delivers $L^3$ autonomous driving that allows for hands off the steering wheel and eyes off the road. Stellantis said the Synthesis demonstration illustrates a day in the life of the future Chrysler ownership experience, with particular emphasis on certain features:

- MyDay, which 'synthesizes and syncs multiple aspects of the customer experience, including calendars and schedules, vehicle status info such as charge status, home smart tech features, weather updates and more',

- Vehicle Welcome: a virtual personal assistant welcomes the owner based on biometric recognition,
- Productivity: autonomous driving will let occupants multitask and access a suite of productivity-based activities such as video conferencing; lunch location recommendations that have convenient parking and charging options; and smart home 'wake up' for their return at the end of the day.
- Chill/Zen/Fun modes: This option creates a sensory experience that includes in-vehicle fun and wellness experiences (meditation, karaoke, DJ game), while the vehicle is stationary or driving autonomously.
- The Synthesis Music Experience, which allows customers to create and synthesize their own music.

# Elmos Semiconductors for New Interiors

INTERIOR NEWS


ELMOS SEMICONDUCTORS FOR NEW INTERIORS

At CES, Elmos showed off innovative semiconductor solutions for the mobility of the future.

Automotive interior lighting of freely-definable colors arouses emotions so that passengers feel more comfortable and well-being. Elmos LED controllers are said to be energy-efficient and adept at creating homogeneous ambient lighting. Beside indirect lighting in the footwell or via light strips, cutting-edge future lighting concepts will feature animated surface illumination, such as on the dashboard and inside the doors. Elmos also provides versatile design and safety options, including flowing dynamic taillight animations using Elmos' LED controller solutions.

Gesture Recognition and Smart Surfaces: As a pioneer of in-car gesture recognition, Elmos Halios® ICs offer optical gesture detection via infrared technology for displays. Even novel operating concepts with invisible surface switches, which only become visible when approached, can be easily incorporated with Elmos technology and tested interactively using a demonstrator.

# Audi VR Merges Real, Virtual Worlds

INTERIOR NEWS

AUDI IMAGE

At CES 2019, Audi said they would transform their vehicles into an experience platform for virtual reality (VR). This year at CES, Audi came back to offer current content and a new VR game through 'experience rides'. Following the launch in Germany, the VR entertainment offering will become available in other European markets next year.

Audi is the first automaker to bring virtual reality entertainment by Holoride to series production. It's a new technology that adapts the virtual content to the car's driving movements in real time. For example, if the vehicle takes a right turn, the spaceship in the virtual world will also fly to the right. If the car accelerates, the spaceship speeds up, meaning a ride in the car becomes a multimodal gaming event. A bonus is that by synchronizing the user's visual and felt experiences, holoride reduces the risk of motion sickness, which many passengers experience when watching movies or other dynamic content in a moving car.

Audi initiated the development of this innovative VR or XR (extended reality) technology for rear seat passengers, presenting it for the first time at CES 2019. The novel form of entertainment received numerous trade show awards. holoride went on to advance the technology and commercialize it for different manufacturers. After launching the platform in Germany in fall, Holoride will enter other European markets in early 2023.

"Integrating Holoride into our models means we are redefining in-car entertainment," said Giorgio Delucchi, Audi's Head of Digital Experience/Business. "Combining real-time vehicle data with virtual content creates a completely new type of experience. Vehicle digitalization is an essential building block in the ongoing transformation of the interior into a third living space."

Cariad, VW's automotive software company, developed the technical requirements to use Holoride in selected Audi models. For the first time, Cariad was also present at CES with a Central Plaza pavilion, presenting innovative solutions including some from Audi or with Audi's involvement.

# Nvidia Gaming Platform For Mobility Passengers

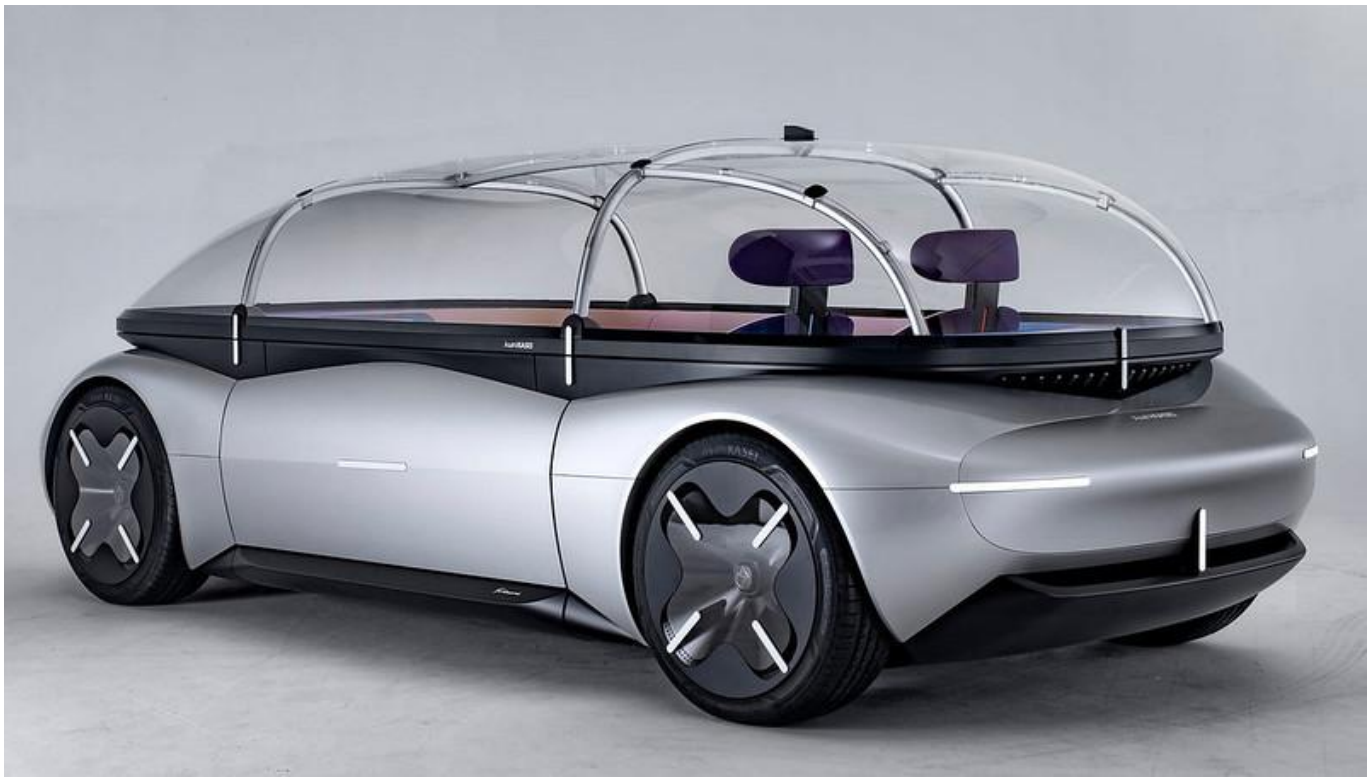
INTERIOR NEWS


The Gaming industry is getting interest into automotive, starting with Sony and Audi at CES. Use cases already exist. However, if the driver is driving, the context is not yet there. Once driving is no longer the primary task, the future of mobility may become entirely focused on entertainment in a way those early pioneers could only dream of, when shifting from an automobile to a low-speed commuter, where people will want immediately to occupy their available time.

GeForce Now, Nvidia's popular cloud gaming service that allows you to play games like Fortnite and Apex Legends on your phone, tablet, and TV, is soon coming to your car. At CES this year, Nvidia announced a partnership with Hyundai Motor Group; Polestar, and BYD to integrate the gaming platform to several internet-connected vehicles. A passenger in the car can load up GeForce Now in a built-in display and play games such as Rocket League with a connected gamepad.

# Asahi Kasei's AKXY2 Concept Vehicle Brings Material Focus

INTERIOR NEWS



ASAHI KASEI IMAGE

At CES, Japan-based multinational chemical company Asahi Kasei presented solutions throughout the entire value chain, from raw materials and production technologies to the usage of recycled and recyclable materials, for the automotive industry in the revolutionary transition to electrified, autonomous and more sustainable mobility. With a vast product range spanning water-based polycarbonate coating to lightweight resins, Asahi Kasei draws from over 100 years of innovation across their diverse businesses for the technology in the AKXY2. Virtually everything in the vehicle that can be seen, touched, and interacted with is made from Asahi Kasei original or collaborative technology.

The concept behind the AKXY2 collects the evolving needs of car occupants into themes revolving around Sustainability, Satisfaction and Society—the '3 Ss' that will change how occupants use cars and how they will more thoroughly integrate into our lives.

From textiles and engineering plastics to elastomers, the Asahi Kasei materials integrated into the vehicle contribute to a lower carbon footprint. The interior surfaces are covered by Dinamica®, a premium microfiber resembling suede partially made of recycled polyester. Sage Automotive Interiors, an Asahi Kasei subsidiary, can also provide other sustainable fabrics utilizing raw materials that range from recycled PET, bio-based PET, natural blends, and ocean waste. The cabin's built-in $CO_2$ sensor allows optimal air quality while reducing energy usage to extend range.  It includes:

**SoForm**™: a glass fiber-reinforced, scratch-resistant polypropylene that has low gloss, low emissions, chemical resistance, and structural performance.

**Cubit**™: a mono-material 3D honeycomb fabric that can replace a portion of polyurethane foam in vehicles. The front and back surfaces can use recycled polyester fiber that can be recycled again and some grades of Cubit use plant-derived raw materials for roughly 40 per cent of the connecting thread

**Polycarbonate (PC) Glazing**: a water-based hard coating that is durable enough for PC to replace glass on vehicles, reducing total vehicle weight by 40-50 per cent.

**Dinamica® Pure**: a premium microfiber resembling suede that is solvent-free and uses partially recycled content for exceptional performance and beauty.

Asahi Kasei will also feature innovative VR/AR and autonomous smart home technologies that illustrate how automobiles and homes will be seamlessly integrated.

# The Design Lounge

## EyesOn Design Honor to Stellantis Designer Ralph Gilles

THE DESIGN LOUNGE

The Detroit Institute of Ophthalmology will honor Stellantis design boss Ralph Gilles with the 2023 EyesOn Design Lifetime Design Achievement Award.

The annual prestigious award is given to an automotive design honoree selected by previous winners. Gilles will receive his award at a ceremony on June 16, 2023, at the Conner Center, the former Dodge Viper assembly plant in metro Detroit.

In 2022, Gilles marks 30 years with Stellantis and its predecessor companies. He has overseen and contributed to the creation of a vast portfolio of eye-catching designs for the Chrysler, Dodge, Jeep and Ram brands. His vehicles include the Chrysler 300, Dodge Viper SRT, Ram 1500, Jeep Grand Cherokee and concept vehicles including the Chrysler Portal, Chrysler Airflow and Dodge Charger Daytona SRT.

The award, launched in 1988, recognizes lifetime achievement in automotive design. This Spring at a ceremony, Gilles will join previous winners such as Peter Brock; Ed Welburn; Chris Bangle; Gilles' mentor Tom Gale; Sergio Pininfarina; Tom Gale; Walter de'Silva; Chris Bangle; Peter Schreyer, and Ed Welburn.

"I'm a little shocked because it's so significant and because you feel kind of welcomed into this community, said Gilles, a dual Canadian-U.S. citizen.

# CES: Car Interiors are Catching Up

THE DESIGN LOUNGE

COFFEE CORNER
DVN
Interior


IMAGE: CREATIVE COMMONS ATTRIBUTION 2.0 GENERIC

In a post-pandemic trendsetting scene, teams and individuals have been empowered with true multiplayer capabilities—reducing time, distance, and remoteness. Addictive UX patterns made us scroll endlessly with no goal, generating information overload and wasting time. On the other hand, knowledge-exchange communities were focusing on quality content. Remote working created a void and an identity disorder at HR departments, giving a hint for talent-focused apps aiming at helping companies to scale their culture. New ways of financing have been adopted once companies could demonstrate a repeatable sales process. Security incidents and challenges have raised several new companies with the intention to robust and futureproof IT systems. Notable new affordable experiences have been created that gave hope to smaller size companies ever seeking for solutions.

We've realized that even over a year after Covid a lot of issues of digital infrastructure that powered the health system persisted. The adoption of digital health models endorsed a forward move on diagnosis and pre- and post-care monitoring. The wearables market skyrocketed, and Europe does not lead this trend. Security raised important issues. The digital realm is global, and that requirea making global supply chains more secure and also greener. Gifts under this year's Christmas tree were more and better wearables with the idea of a higher fidelity sound, image and immersive experiences.

CES 2023 opened doors with the ambition to further pursue all these topics. What started out as a trade show focused exclusively on consumer electronics (however those were defined in any given year) has really become quite a car show as cars become driveable, rideable consumer electronics. Automakers increasingly bring with their latest concepts and visions of personal transport. While single tech sector showcases their latest specialty products, automakers are stepping out of their comfort zone proposing electric vehicles. The exciting part is that their new proposals are already absorbing the surrounding tech, synthesized into a new type of transport system; product, or vehicle with embedded massive displays; headrest speakers, and interactive lights. These technologies and more are completely changing car interiors, and spurring automakers to reimagine car aesthetics.

# News Mobility

## Self-Driving Vehicles for MaaS

NEWS MOBILITY


DVN IMAGE

Five years ago, at CES 2018, most automakers were talking about self-driving cars. Technology continues to progress, mainly with all the sensing technology necessary to guide and assist (ADAS) the vehicle, and to understand all the other users, including the vulnerable ones. And CES was a rich showcase for many of these technologies, including lidar. But what we saw this year is more related to mobility, with any examples of shuttle vehicle, including interior whose target is mostly to entertainment occupants during the commute.

Recent news is not reflecting a healthy market. GM's Cruise self-driving car company lost USD $1.4bn last year alone. Car and tech companies came together to support Argo AI; when it was shut down in early November, Lyft took a $137m bath. Ford wrote off $2.7bn and noted in their earnings report that they will shift focus from the $L^4$ autonomous systems being developed by Argo AI, to driver-assistance technologies such as adaptive cruise control and lane-switching assistance.

Mobility vehicle innovations seem to be driven by tier-1 suppliers, examples this year including Mobis; Toyota Boshoku, and ZF. Hyundai Mobis presented their Vision TO vehicle, which features an autonomous driving system comprising cameras; radar, and lidar, as well as seats that can be folded and rotated to take advantage of the absence of a driver. It is said to show how future mobility tools can be used for leisure, relaxation and outdoor activities, including by using the glass on the vehicle as a movie screen,


DVN IMAGE

Toyota Boshoku featured vehicle interior space solutions for the MaaS market mated for autonomous technology in the future—watch for more detail soon.


ZF VEHICLE, PRESS CONFERENCE – DVN IMAGE

ZF's next-generation shuttle will be capable of $L^4$ autonomous driving and thus, where the local legislative framework permits, is capable to maneuver in mixed traffic without a safety steward. With this, ZF is enabling the operation of autonomous transport systems in densely populated areas with no need for segregated or dedicated shuttle lanes.

Benteler subsidiary Holon presented their electric AV shuttle based on the electric platform Benteler developed together with Bosch and Pininfarina. The sensor and control systems for the automated driving functions come from Mobileye.

Asahi Kasei showed their AKXY2 concept car, and even if the focus was primarily on materials and sustainability, it is still a shuttle type of vehicle.


DVN IMAGE

Motrex positioned the future of the IVI market with human-oriented automotive HMI technology for mobility.

**Applied EV**


DVN IMAGE

Founded in 2015 by a team seeking to improve global transport solutions, Applied EV combines heritage in automotive innovation with software development and deep robotics capability.

DVN IMAGE

Zoox was founded to make personal transportation safer, cleaner, and more enjoyable —. To achieve that goal, the team created a whole new form of transportation, to provide mobility-as-a-service in dense urban environments.

# Four-Seater Flying Car Announced

NEWS MOBILITY


ASKA IMAGE

Everybody is dreaming of a vehicle which can just fly over traffic jams. Of course, It will not be that simple, for 3D air traffic control is even more complex than 2D traffic on the ground.

At CES this year, US-based Aska announced what may be the world's first four-seater flying car. The Aska A5 is an electric-powered vehicle, the size of a small SUV, that can travel on the road and up to 400 km by air with a single charge. It's also equipped with a small gas engine that can give you an extra 80 km. And you can expect it to hit the roads (and skies) soon. According to CEO Guy Kaplinsky, the Federal Aviation Administration could approve the A5 this month, and the company plans to begin a ride-sharing service with a fleet of flying vehicles in 2026. The A5 can be had for the low, low price of just USD $789,000, and you can pay a $5,000 deposit to get on the preorder list right now.

# General News

## TI V2G Tech to Solve Peak Electricity Demand

GENERAL NEWS


TEXAS INSTRUMENT IMAGE

Texas Instruments' showcases at CES included their latest products and technologies for vehicle electrification, driver assistance, robotics, and renewable energy applications.

Ageing electric grids face unprecedented demand around the world and the strain will only grow with vehicle electrification. But what if electric vehicles (EVs) could ease the burden by returning power to the grid? The concept, known as vehicle-to-grid, or V2G, envisions fleets of EVs providing battery power to reinforce electric grids, particularly during peak demand. The vision is gaining traction as new charging and battery-storage solutions emerge and proven technologies are redeployed.

While vehicle electrification is part of that journey, managing the power demands of millions of EV owners will be a challenge. The energy required to drive the average EV 100 miles is about the same amount needed to power the average home each day. If everyone charges up at the same time, grids could face serious stress. Overall capacity is OK, it is 'only' a peak hours issue.

Semiconductor technologies that enable bidirectional charging can turn EVs and their batteries into energy storage systems that can return power to the grid when required. One of the building blocks for creating more efficient V2G solutions is wide-bandgap technology like gallium nitride (GaN). GaN effectively triples the power density—the amount of power managed in each form factor—of the power supply or power management system in applications such as on-board chargers in EVs, EV charging stations and energy storage systems, compared to traditional silicon devices. That translates into designs with faster charging, reduced system size and lower cost of ownership.

Sensing technology is also key in the pursuit of efficiency when moving energy between EVs and the grid. To implement the voltage and current control loops in power conversion systems, microcontrollers need isolated, fast, and accurate voltage and current readings.

Monitoring the state of charge helps EV owners manage their energy more effectively. An accurate monitor can help get up to 20 per cent more capacity out of a battery without risking permanent damage to the cells. For example, some EV owners may not need to keep their cars' batteries fully charged all the time if they are only commuting to work. The increased accuracy of smart sensing technologies could enable the EV to alert owners about the best time to return power to the grid or charge up their homes. EV owners, meanwhile, will need smart human-machine interfaces (HMIs) like displays and touch-pads that can connect via various protocols,

Building infrastructure to drive vehicle electrification will take time. From a technology standpoint, however, the pieces are all in place. The environmental benefits of V2G are also compelling, through more efficient power-load management.