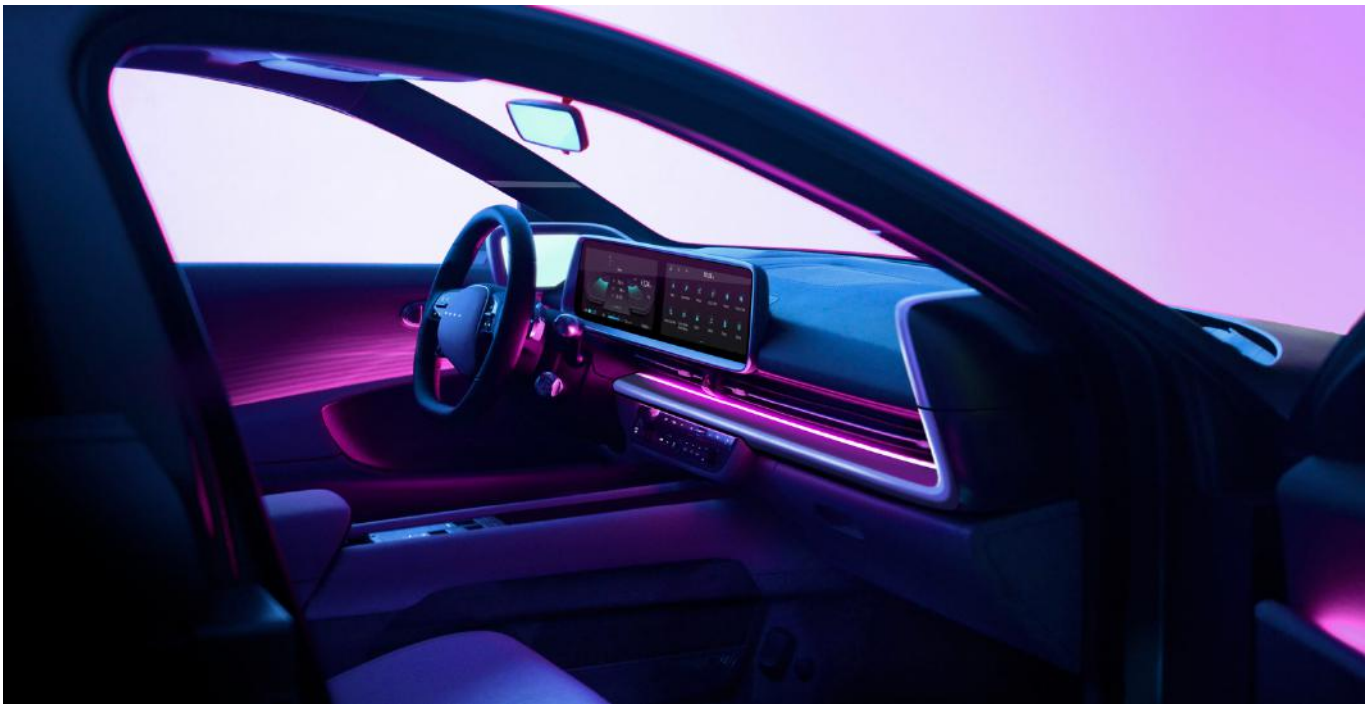
Thu, 7 July 2022
Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #119

Editorial

Interior Experience And Comfort Is Central To The Future!



HYUNDAI IONIQ 6 (HYUNDAI IMAGE)

Imagine a world wherein a car's interior, and the accompanying cabin experience, are the two most important vehicle differentiators. In this world, people aren't waiting for the next new car reveal, but for the next operating system update; automakers will introduce new HMI as standalone products to as much anticipation and fanfare as today's new models, and car magazines discuss user experience and comfort levels rather than acceleration and horsepower.

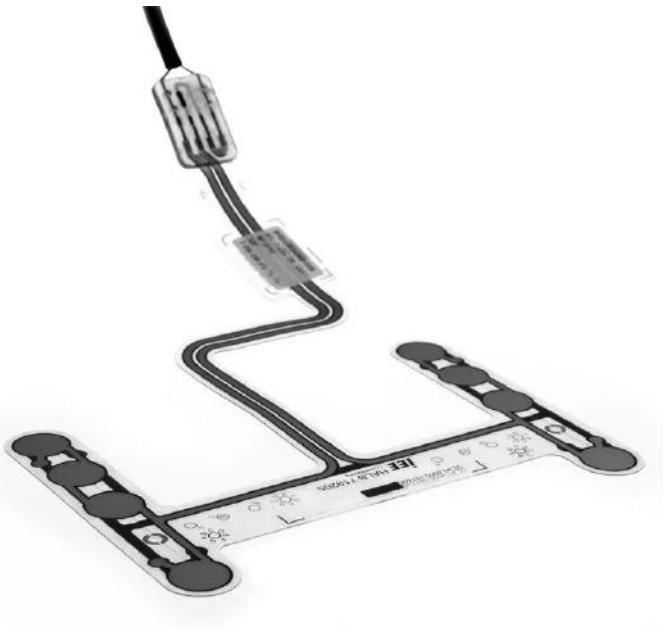
The rapidly evolving CASE megatrends—Connectivity, Automation, Shared services and Electrification—are changing the configuration of cars and allow vehicle occupants to enjoy new experiences during trips. A recent McKinsey study clearly revealed the growing significance of vehicle interiors and the in-car experience. For instance, 71 per cent of automotive executive respondents to a survey expect vehicle interiors to become more important, while only 38 per cent hold the same views about vehicle exteriors.

This week's DVN-I Newsletter brings you articles about safety; HMI, and sustainability. The in-depth article is about seat belt reminders, a topic different than it looks at first glance. Enjoy reading!

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

In-Cabin Safety: Seat Belt Reminder and More



OCCUPANT CLASSIFICATION SENSING MAT IN 2001 (IEE IMAGE)

Seat Belt Reminder

How do you reliably detect a seat occupant and remind them to fasten their belt? Let' have a look!

Luxembourg-based IEE is a sensor company; for 30 years, they've been delivering car interior sensing solutions to the world's industry. Ever since seat belts first started becoming mandatory in some countries in the 1960s and belt-usage laws began to take effect, gradually growing to also include rear seat passengers, car makers have been trying to improve seat belts by making them safer, more comfortable and increasingly intelligent.

However, while the efficacy of a seat belt has been proven beyond any doubt over the years, some people still don't use them, despite it being a legal obligation. Enter seat belt reminders.

IEE IMAGE

Seat belt reminders provide warning signals—simple audiovisual ones like a chime and a seat belt icon on the dashboard or, more recently, text displays and beeping that grows louder and louder. These deliberately-annoying reminders are there to motivate vehicle occupants right now (versus the faraway, murky maybe-consequences of the text in a lawbook somewhere) to buckle up before they start their journey. Are they

effective? Yes! Audiovisual seat belt reminders have proven to reduce the number of unbelted occupants by 80 per cent.

A seat belt/starter interlock was very briefly required most of half a century ago in the United States. It was an idea put forth by then-Ford executive Lee Iacocca to stave off an airbag mandate; at that time, American seatbelt usage rates were approximately zero per cent and airbags were incorrectly regarded as a replacement for seat belts rather than a supplemental restraint. So **1974-model cars came with an interlock**: the belts in all occupied front seats had to be buckled or the engine couldn't be cranked.

The system was immediately and viciously hated by the American motoring public. The mechanically-inclined quickly figured out which wires to cut and solder to defeat the system; those without technical skill found that leaving the belts buckled and just sitting on them did not work—there was a logic module that required the correct sequence (sit, buckle, turn key) or else the starter would not function. There was an underhood bypass button that could be pressed to give one “free" start in case of system fault. Taping the button down wouldn't work; it had to be pressed each time.

The components of the day were not very reliable, especially within what automakers would pay. Too, seat occupancy was detected with weight sensors; this made problems with bags of groceries, brief cases, parcels and suchlike. System faults and nuisances were common. That was on top of the U.S. public's rabid scornful dismissive hatred of seat belts and their perceived infringement on personal freedom—of course, now we know that the libertarian argument that belt nonuse affects only the nonuser is wrong; an unbelted driver is much more likely to be knocked unconscious and/or out of position to control the car by a first impact, making subsequent impacts much more likely.

Shortly after a critical mass of congressmen bought new 1974 cars, the interlock requirement was repealed and a (rare) exemption was enacted to the prohibition on rendering inoperative a vehicle safety device or system. Federal Motor Vehicle Safety Standard 208 was amended; instead of an interlock, a seat belt reminder system was weakly required: a buzzer or chime had to sound for seven seconds if the ignition key were turned on without the driver's seat belt fastened. No logic module or anything else; idiots could simply fasten the belt behind them or cut off the belt and leave the tongue permanently buckled in.

Now we have much more accurate and precise ways of detecting seat occupancy by a human vs. an inanimate object—DMS-OMS are getting really smart, and today's automotive electronics are quite a bit more dependable. Defeating a current-day interlock would be much harder than it was in 1974. But then again, few people would try; decades of education and social and legal pressure have gradually brought most Americans to a view of the matter supported by science: seat belts unequivocally save lives and prevent injuries.

Nevertheless, idiots will never be an endangered species, and even smart people sometimes just forget. In the 1990s, seat belt reminders began to attract attention outside the United States. Some vehicle manufacturers introduced more advanced SBR systems with audio visual signals and warning escalations. At IEE, they have been offering front passenger seat sensor mats for seat belt reminders since 1997. In 2014 they produced their first rear seat occupant detection sensors to support advanced belt reminders for all vehicle occupants.

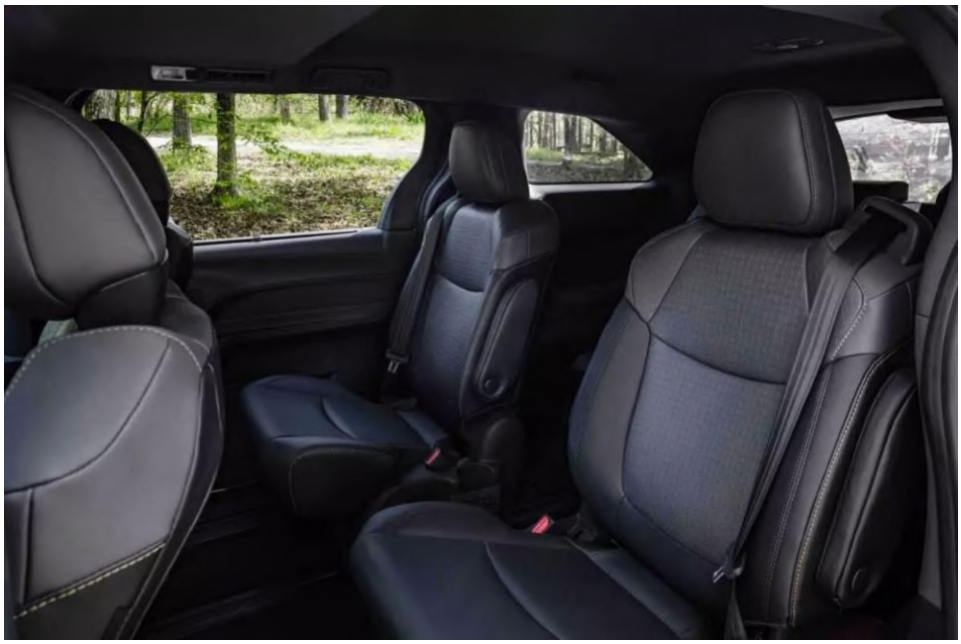
In 2002, EuroNCAP began to grant bonus points to cars with seat belt reminders, helping to improve the vehicle's safety star rating. The first five-star ratings were enabled via the belt-reminder points. Since then, belt-reminder incentives have played a significant role in the EuroNCAP ratings and became a strong driver for automakers choosing to install belt reminders.

More efforts are being deployed to reach this target and save more lives. An annual seat belt campaign is rolled out in the EU countries every year in March intended to educate and enforce good practice. Still, where education fails, technology and legislation together can help. In 2009, regulations caught up and belt reminders finally became mandatory for the driver seat in the EU for new passenger cars—quite a few decades after that same requirement took force in North America.

1st September 2019 marked the start of a new era, as the seat belt reminders became mandatory for every seat in new cars in the EU—advanced belt reminder systems in the front seats of newly introduced vehicle models of any vehicle category, and simpler belt reminders in the rear seats. Two years later on 1 September 2021, the phase-in period ended and the requirements applied to all newly produced vehicles (even older designs) in the EU market.

Vayyar Imaging: CPD, SBR, CRS, Safety

AutoTech Detroit brings together the full automotive tech industry to showcase the newest tech and the latest vehicles. DVN Interior attended; here's what Vayyar had on display.



TOYOTA'S 4D RADAR CABIN AWARENESS CONCEPT (TOYOTA IMAGE)

Vayyar Imaging exhibited a broad range of leading automotive technology companies to showcase the future of automotive, including cabin monitoring and ADAS live demonstrations using Vayyar's imaging radar solutions.

Ian Podkamien, VP and head of Vayyar's automotive, robotics, safety, and mobility markets, took the opportunity to publish an article; here are the highlights:

In-cabin monitoring upcoming regulations, changes to EuroNCAP standards, when NHTSA has announced its first occupant protection safety standards for vehicles with automated driving systems, covering everything from seatbelt reminders to advanced airbags, that's a major shift for automakers and suppliers. Compliance with these new requirements for a wide range of in-cabin applications is a major challenge.

New in-cabin regulations focus on additional single-function sensors to support each requirement. But with electronics expected to represent about 50 per cent of vehicle cost by 2030, there's a clear need for a smarter, more streamlined strategy. Automakers, therefore, are leveraging the platform model for its scalability potential.

Child Presence Detection (CPD) regulation remains high on the international agenda. EuroNCAP will award points for CPD in new passenger vehicles from 2023. In the U.S., the passage of the Hot Cars Act has created the impetus for a new NHTSA CPD mandate.

To meet impending EU and U.S. CPD standards, automakers are carefully considering available technologies. Traditional solutions rely on weight sensors, simple radars, smart keys or door sequencing—all susceptible to false alarms and mis-detects. Furthermore, vehicles with standard CPD technology wouldn't achieve a top EuroNCAP rating for CPD. Only solutions enabling detection and occupant classification can earn the full four points, and only those preventing false alarms triggered by adults while ensuring a positive user experience, will be fully effective.

Seat belt reminders (SBR) are also under the microscope. Key markets including the EU and Japan already require rear seat SBR—still not yet required in the U.S. under FMVSS 208.

Standard solutions for rear seat SBR also depend on multiple weight sensors, which are notoriously prone to false alerts caused by heavy luggage, while increasing the car's cost.

Smart airbags are another critical dimension of the evolving in-cabin ecosystem. In the U.S., recent amendments to FMVSS 208 demand advanced airbag suppression and low-risk deployment in the presence of a child restraint system (CRS); in a crash an airbag must always be deployed for an adult, but never for a child aged up to 18 months, posing a significant technological challenge.

When a passenger isn't properly seated, the accuracy of weight-based occupancy sensors can be affected, potentially leading to failed airbag deployment and serious injury. In the case of airbag suppression for young children, the mass of the infant and their CRS must be considered. More sophisticated child seats can weigh up 9 kg, the same as a year-old baby, making a combined weight of 18 kg, that is the equivalent to that of a 6-year-old child. A single weight-based seat sensor may therefore be unable to differentiate between a baby or an older child and will fail to ensure airbag suppression as mandated by FMVSS 208. European regulation

won't be far behind; in 2018, EuroNCAP introduced a standard assessment for automatic passenger airbag disabling systems.

Additional weight-based sensors can enable baseline compliance with new CPD, SBR and airbag suppression regulations. But more single-function sensors introduce greater complexity and expense. Single-sensor solutions for CPD, SBR and airbag suppression are estimated to cost USD $60 per car. This represents almost $4bn for the 65 million new cars sold in 2021.

As motorists become more aware of the latest in-cabin safety technologies, they'll demand vehicles with such advanced systems. Automakers have another option, one that reduces costs and complexity while delivering unprecedented safety across all in-cabin categories.

Next Step Technology with 4D Radar

High-resolution, single-chip 4D imaging radar technology not only negates the need for additional weight-based sensors but also enables automakers to replace legacy in-cabin systems. Some variations of this leading-edge technology leverage a large antenna array, providing exceptionally high-resolution data to enable detection of people and objects and classification of adults and children with pinpoint accuracy.

A multifunctional 4D imaging radar platform provides a rich, multi-dimensional point cloud image that simultaneously addresses global in-cabin requirements applications for CPD, rear bench SBR and smart airbags, while supporting scalability to future features including intruder alerts; gesture control, and occupant position monitoring. Automakers can reduce sensor count and achieve significant savings while earning the highest possible safety ratings. DVN Interior published an in-depth **article** on in-cabin monitoring with radar in May 2021.

Interior News

Zync Expands In-Car Entertainment at Mercedes-Benz

INTERIOR NEWS

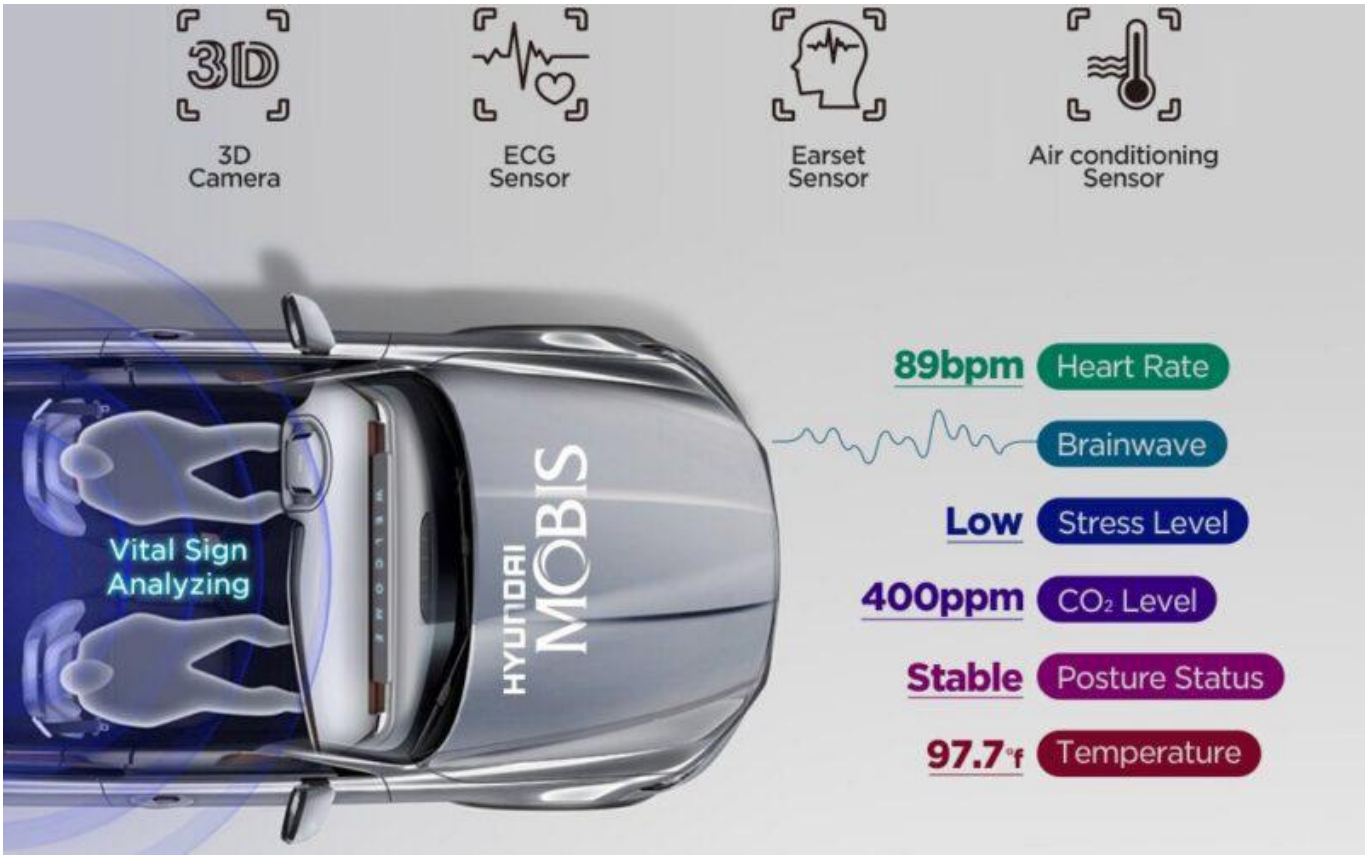
MERCEDES-BENZ IMAGE

Mercedes-Benz and the startup Zync have agreed on a partnership. Zync will provide its platform for digital entertainment in Mercedes-Benz vehicles. This will allow customers to access many streaming services. The scalable, cloud-based Zync platform will be seamlessly integrated into Mercedes-Benz hardware and current and future operating systems. Page layouts will be optimized to make the best use of the visual quality and resolution of each infotainment system and its screens.

Mercedes-Benz aims to introduce the first additions for Zync in the EQS and the S-Class in Europe at the end of 2022. Other models are to follow in 2023. An active Mercedes-Benz Me account is required to use Zync, and the MBUX entertainment package is also a prerequisite. The service is currently to be offered free of charge for one year. Zync offers video streaming, on-demand content, interactive experiences, local video programs, sports, news, games and much more. Currently, more than 30 streaming services are available. Depending on legislation, streaming services will be limited to passenger or rear seat passenger screens while driving, or only audio playback will be available.

Mobis Smart Cabin Controller to Watc Drivers' Vital Signs

INTERIOR NEWS



HYUNDAI MOBIS IMAGE

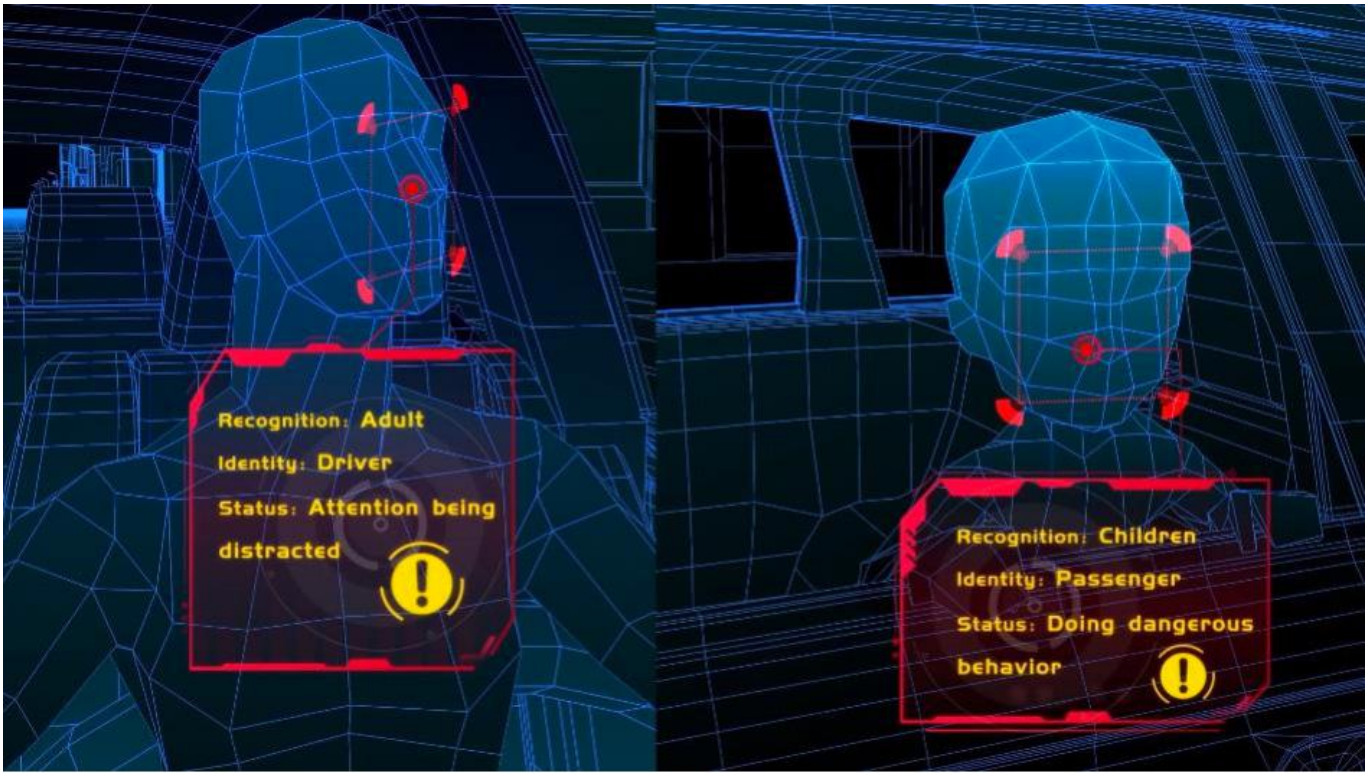
Hyundai Mobis has developed a controller that analyzes a driver's vital signs such as posture; heart rate, and brainwaves. Called the Smart Cabin Controller, the technology consists of four sensors to measure the vital signs of occupants, a controller to analyze these signs and software logic.

Although there are already controllers in the mobility industry capable of processing certain vital signs, this is claimed to be the first time a dedicated healthcare controller has been developed that can perform an integrated analysis of various vital signs. Hyundai Mobis expects that the controller will enable the vehicle to play a role as a sort of mobile health check-up center.

The Smart Cabin Controller is equipped with a 3D camera that captures the posture of occupants, an ECG sensor mounted on the steering wheel, an ear-set sensor to measure the brainwaves flowing around ears, and an HVAC sensor to measure the temperature/humidity and CO_2 level of the cabin. The controller analyzes various vital signs collected from these sensors in real time to help with safe driving. For example, it recommends switching to autonomous driving mode if the ECG sensor detects a high stress level in the driver, and it opens windows or switches to the outside-circulation mode if the CO_2 level is too high. This technology is expected to evolve to be able to guide the vehicle to a hospital in case of an emergency, such as cardiac arrest.

Minieye's Neural Network In-Cabin Sensing

INTERIOR NEWS



MINIEYE IMAGE

Founded in 2013, Shenzhen-based Minieye is a vehicle sensing solutions provider working to reduce traffic accidents and improve vehicle occupant safety and advance the automation of vehicles. They've developed a product portfolio to meet the various demands for specific markets, including their L0-2 ADAS solution iSafety; their L2+ intelligent pilot solution iPilot; their smart cockpit perception and interaction solution iCabin, and their high-precision map service iMap (Apple might have an iWord or two to iSay about these product iNames; stay tuned).

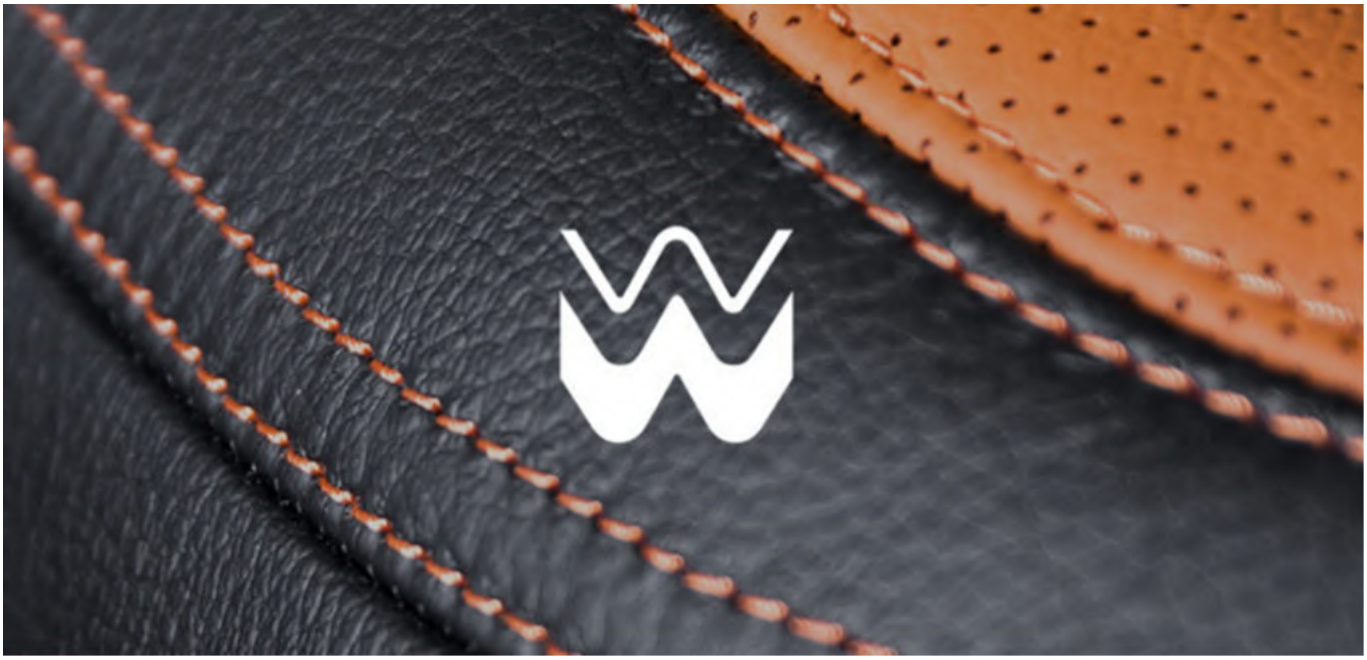
By combining visual sensing based on a neural network with sensor fusion, this in-cabin sensing technology can analyze the conditions and behaviors of passengers and drivers through monitoring eyelid, gazing direction, movement of head and body, and in-cabin objects.

Minieye's I-CS solution is to provide comprehensive in-vehicle sensing solutions for smart cockpits and autonomous vehicles, by leveraging embedded computer vision and artificial intelligence with infraredcameras. I-CS tracks visual attributes such as head orientation, gaze, gesture, body movements, identities, along with analyzing intentions and behaviors. In addition, I-CS also detects objects inside a vehicle that are closely related to in-cabin activities. Their self-designed edge computing infrastructure allows our algorithms to run with high efficiency on automotive level chips, making it possible to offer larger combinations of visual sensing features in one set of solution. They support a large variety of platforms, including ARM, FPGA, and other specialized neural network chips. I-CS provides a uniquely broad range of cutting-edge visual sensing features, and does it with full capacity and ultimate performance on hardware platforms.

With an aim to create brand new interactive driving experience, the system integrates AR-Navi, AR-HUD, virtual rearview mirror and recognition of voice, gesture, body movement and heart rate.

Woodbridge's Bio-Sourced Sustainable Seat Foam

INTERIOR NEWS



WOODBRIDGE IMAGE

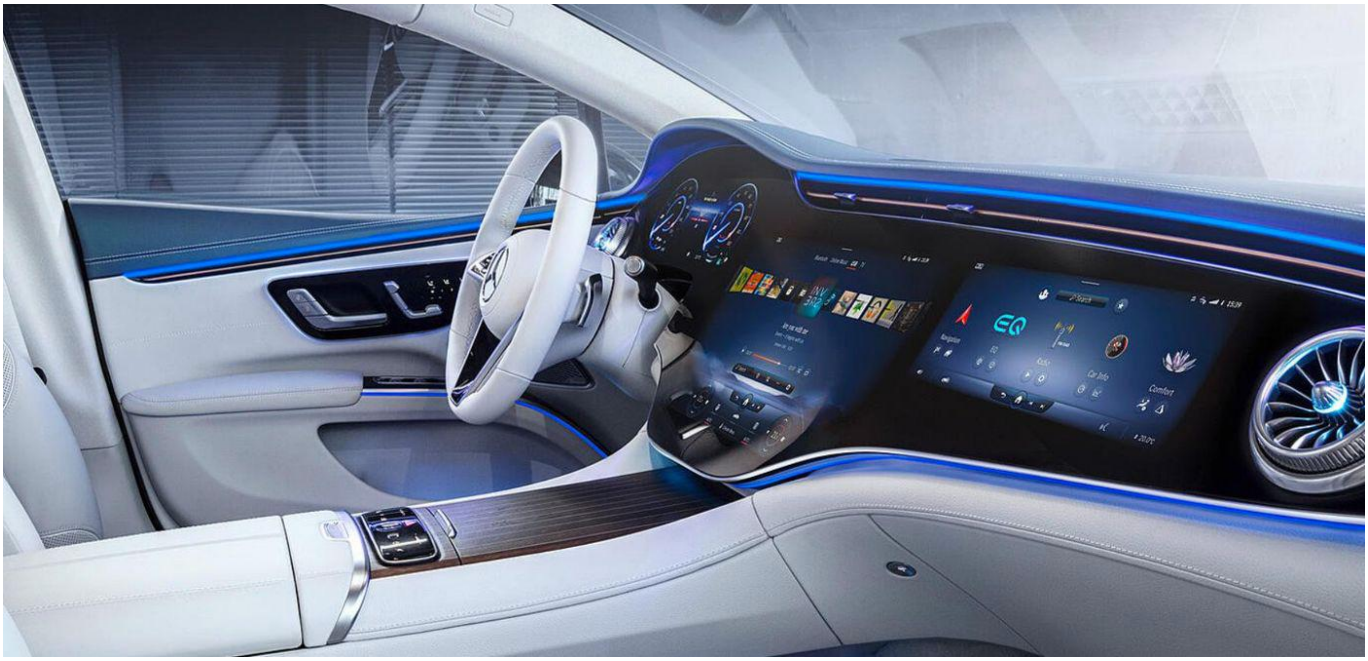
US foam producer Woodbridge has developed a process to integrate biogenic carbon (biocarbon) in its purest form into the company's polyurethane (PU) seating foam chemistry. The new product, TrimVisible Bio, is stated to enable a cradle-to-grave reduction in CO_2 footprint for automotive seating foam without compromising material properties, performance and comfort.

The original TrimVisible (recognized for its black color) was released as a molded seat foam solution that provided a quality improvement. TrimVisible LE was the second generation offering that established a benchmark for low-VOC and low-odor performance in the industry. With the introduction of the company's third-generation product, TrimVisible Bio, Woodbridge hope to build upon the product line's success.

Woodbridge partnered with a certified sustainable managed forest and developed a proprietary process to convert residue from lumber processing into a high-purity form of biocarbon. After a lifetime of net CO_2 absorption, dead or decaying trees and forest waste are normally a source of CO_2 emissions through decomposition or combustion as part of the biocarbon lifecycle. The Woodbridge process sequesters the biocarbon by effectively locking CO_2 in a form that can be used to engineer solutions that significantly reduce the CO_2 footprint of products.

Qt + Bosch = Platform HMI

INTERIOR NEWS



MERCEDES-BENZ IMAGE

The Qt Company is collaborating with Bosch to deploy a unified cross-platform HMI design and development framework to provide auto makers with the tools to create a solution-ready digital cockpit.

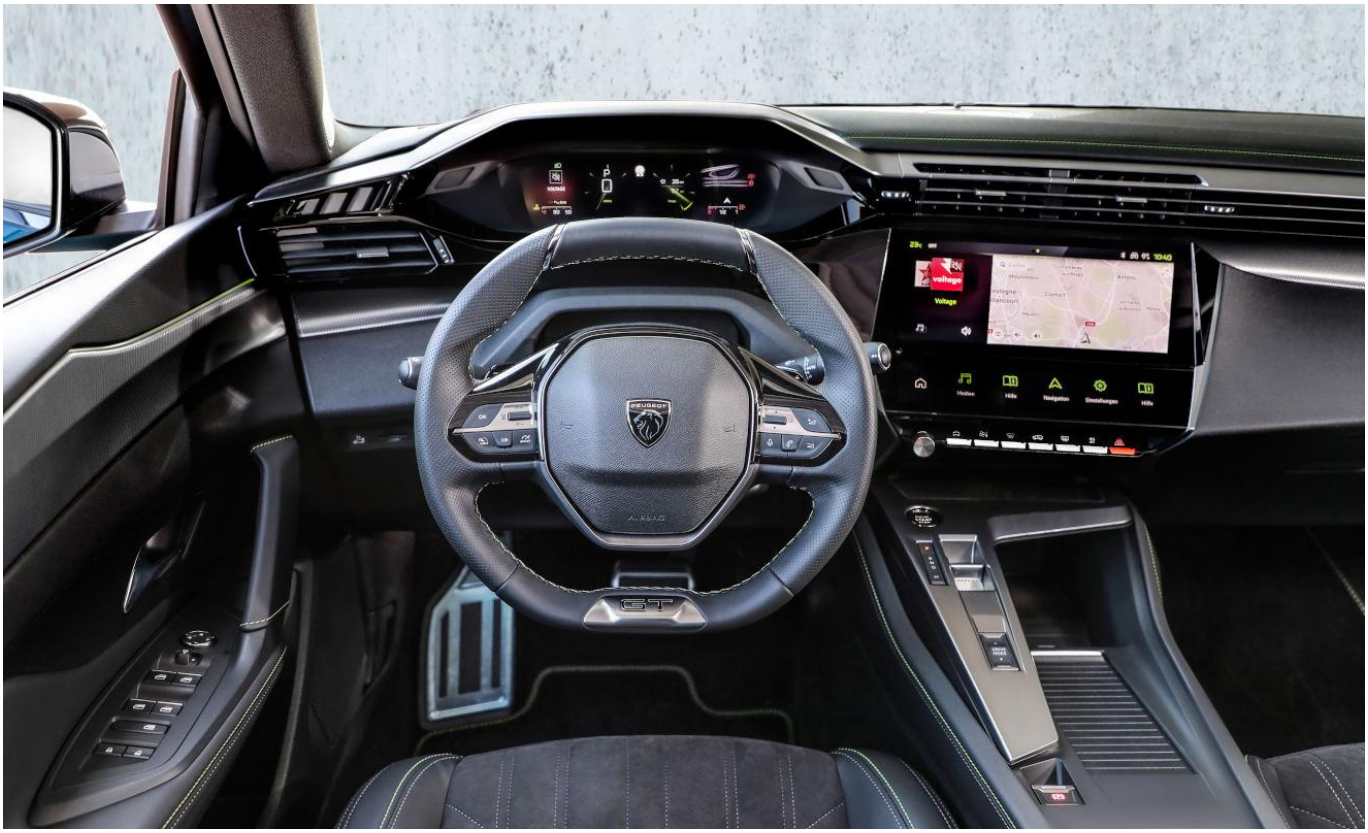
With the latest addition from Qt for micro controller units (MCUs), the platform can now be developed and deployed to any automotive grade micro-processing units (MPUs) and MCUs. The solution can be used across any operating system or software platform environment, including the likes of Integrity RTOS, QNX Neutrino RTOS, Android Automotive OS, and Automotive Grade Linux (AGL), as well as the newest addition to the Qt offering, Autosar Classic.

The collaboration between Qt and Bosch enables automakers to build out the entire digital cockpit, and for the first time, Qt for MCU enables Qt HMI to be deployed on top of the Autosar Classic platform. OEMs can maximize the efficiency of graphics compute and safety while reducing the bill-of-material cost. Development needs can also be scaled up and down when using Qt, and software developed with Qt is reusable and scalable source code. This improves productivity and reduces the product time to market.

The collaboration eliminates the need to buy additional hardware as many features, such as heating, ventilation and air conditioning (HVAC), and electric mirrors, can be enabled on a single system-on-a-chip (SoC). The rich user interface for MPUs and MCUs as a result of the HMI and Autosar integration will give the end user unparalleled visuals when making use of both safety-critical and non-safety critical HMIs within the digital cockpit.

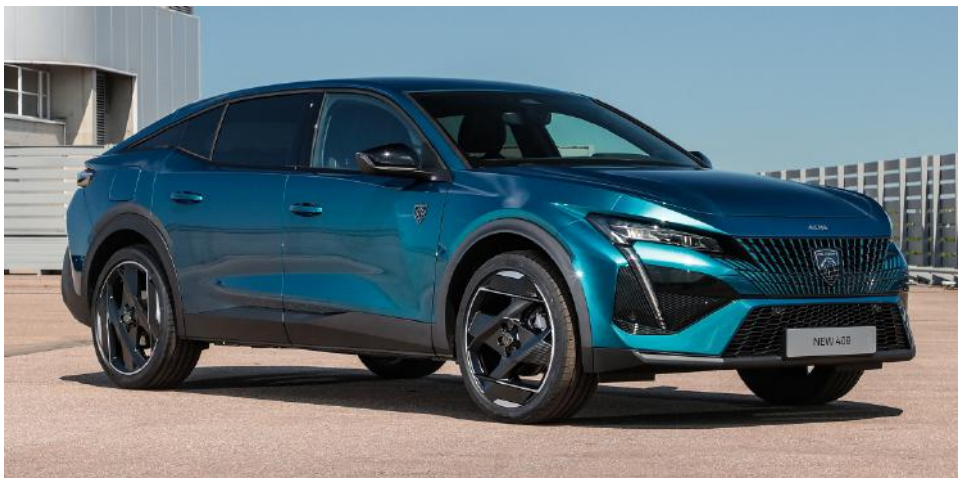
Peugeot 408 has Digital-Analog Interior, AGR "Best" Seats

INTERIOR NEWS



PEUGEOT IMAGES

The new Peugeot 408 is said to be about controlled efficiency and a high-level digital experience. The driver's seat has been awarded the AGR (Aktion Gesunder Rücken in German , Action for Healthy Back) label by an independent German association of ergonomics and back health experts. The label recognizes both the ergonomics and the range of adjustment provided on this seat. The seats are also available with 10-way power adjustment with two memory settings for the driver, six-way power adjustment for the passenger, as well as an eight-pocket air massage with five different programs.



The interior is a mix of digital and analog. There are classic buttons and switches on the steering wheel and under the monitor. The high-definition 10" central touchscreen is fully customizable, with multiple windows and intuitive widgets or shortcuts that respond just like a tablet. It's easy to swipe through the different menus from left to right, or up and down for notifications, or with a three-finger tap to bring up the application wall. The cell phone can also be mirrored onto it. Its new infotainment system is ergonomically optimized and intuitive in everyday use, offering each driver the smartphone and automotive worlds combined. Each driver can define, maintain and select their own display, cabin atmosphere and setting preferences using one of the eight profiles that can be stored in the system.

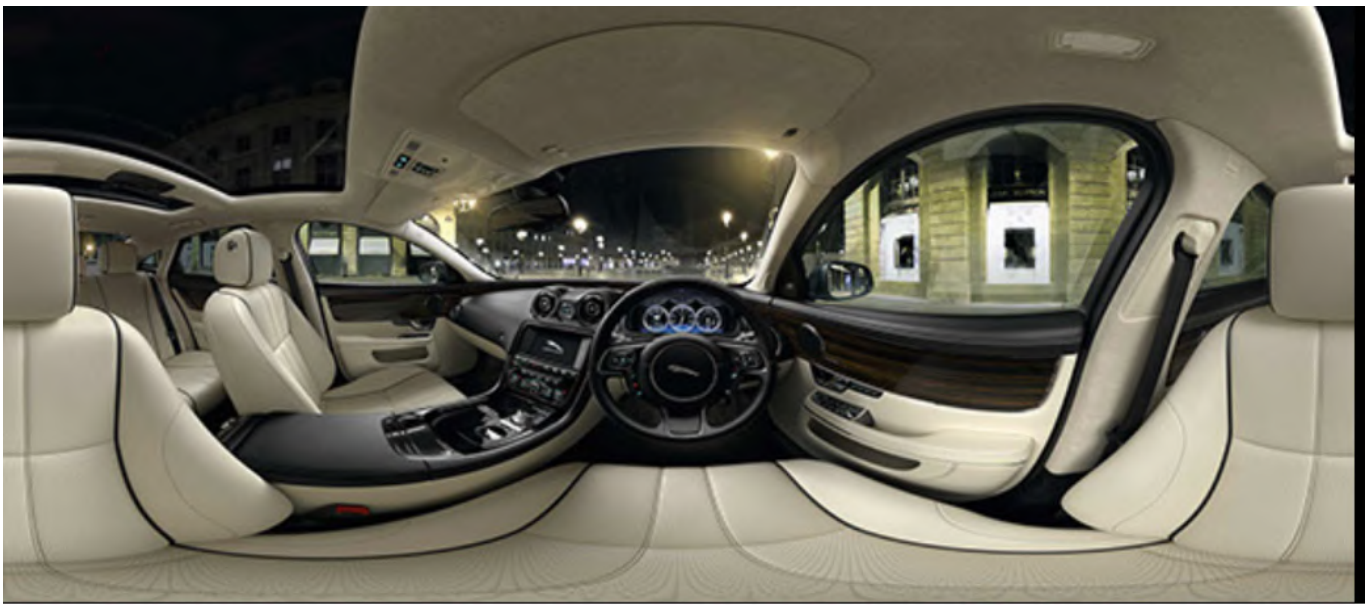
The mirroring function wirelessly connects smartphones to the infotainment system, and it is now possible to connect two phones via Bluetooth at the same time for added convenience. The "OK Peugeot" natural-language voice recognition improves safety and is said to be easy to use. It provides access to all infotainment functions. To assist users and answer their questions, the system includes on-board documentation and tutorials.

With fully 30 assistance systems, the car offers a wide range of electronic helpers that keep a digital eye on the surroundings thanks to six cameras and nine radar units. Examples include distance radar with stop-and-go function, automatic emergency braking with collision warning even when reversing, active lane assist or 180-degree rear camera. In addition, there is a night vision device that looks up to 250 meters ahead in the dark to bring people or animals into the infrared field of vision. It is not yet known which of the numerous systems will only be available at extra cost. The market launch will be early next year.

The Design Lounge

3D Visualization and the Art of Storytelling in Design

THE DESIGN LOUNGE



JAGUAR-XJ 360° INTERIOR CG VISUALS (BRIGHTPARAMETERS IMAGE)

Big things are changing with designing new vehicles. Developing new concepts and understanding how they might look in the real-world environment is crucial for customer acceptance and ultimate success. At automaker design studios worldwide, new visualization tools are being implemented daily. Placing a vehicle in different life-like situations gives designers and marketing professionals real-world data on how the brand might look, feel and succeed with future consumers. Having a great design on the screen is one thing, but how it looks in our natural world is another. It's like finding the perfect chair in the store, bringing it home to your house, and discovering you don't like how it fits into your environment.

The same goes for cars.

Placing the car exterior with color choices in various outdoor scenes can provide critical clues to design wins. How does the overall design fit with the environment? How does the exterior lighting look? How does the brand look against its competition? Real-time 3D technology is a staple in the automotive industry. And its use brings new efficiencies, awareness, and fewer design mistakes to vehicles in this competitive marketplace.

Time is money

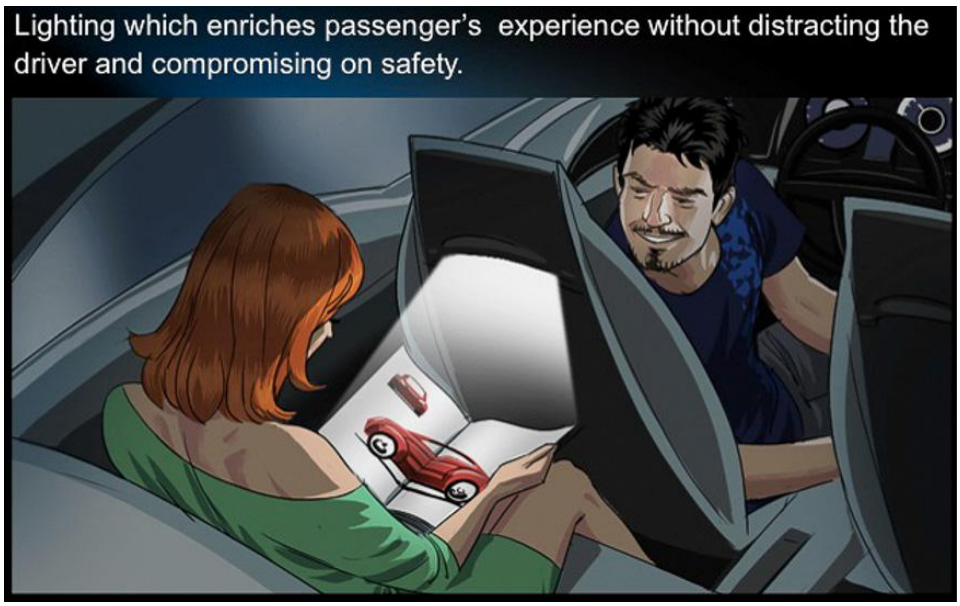
In the past, automakers made designs based on market research, market trends, and gut feeling about their brand and the competition they wanted to attack. This process was often successful. However, brand competitiveness has increased as the world has become more sophisticated. As a result, designers and marketing executives have realized that accurate word 3D simulation and the art of storytelling with the brand in real-world situations are essential to target the consumer correctly. However, doing this takes time and a lot of it. With the advent of more powerful tools, combining these elements with the design can now be achieved in one day, depending on the complexity of the simulation.

HONDA'S 3D VISUALIZATION SOFTWARE IN USE (HONDA IMAGE)

3D software has become so sophisticated during design review meetings that design and marketing groups can adjust the interactive experience in real-time to showcase the vehicle in different ways, scenes involving all types of weather scenarios, and time of day. These are called scripts. In addition, now, for the first time, lighting designers can accurately see how the lighting looks on the exterior and even the interior through the car's windows. Thus, a real visual value creates the space for visual storytelling. Another aspect is how the car's overall look fits in with its environment. We've all seen past vehicles that are plain ugly and seem to become even more ugly on the road.

Adding different 'scripts' together creates different life-base scenarios that put the brand through its paces and bring out the positives and negatives of the design. For example, the software can be fully automated to follow predefined routes or be user-controlled to provide an interactive driver experience. Most of us don't think about what our vehicles look like in pouring rain, thick fog, and heavy rain. But now automakers can and do. Having these visual tools allows for designing better cars that can perform and, in some cases, be seen as the designer meant it to be.

As Rob Miller, in my world as a lighting designer, I have used storytelling for most of my career to convey advanced designs and applications and show real-world applications of light. Mine are comic-like drawings, but they accurately depict the intent and value of the design's plans. The art of storytelling and visualization is a powerful yet globally understood message that needs no explanation.



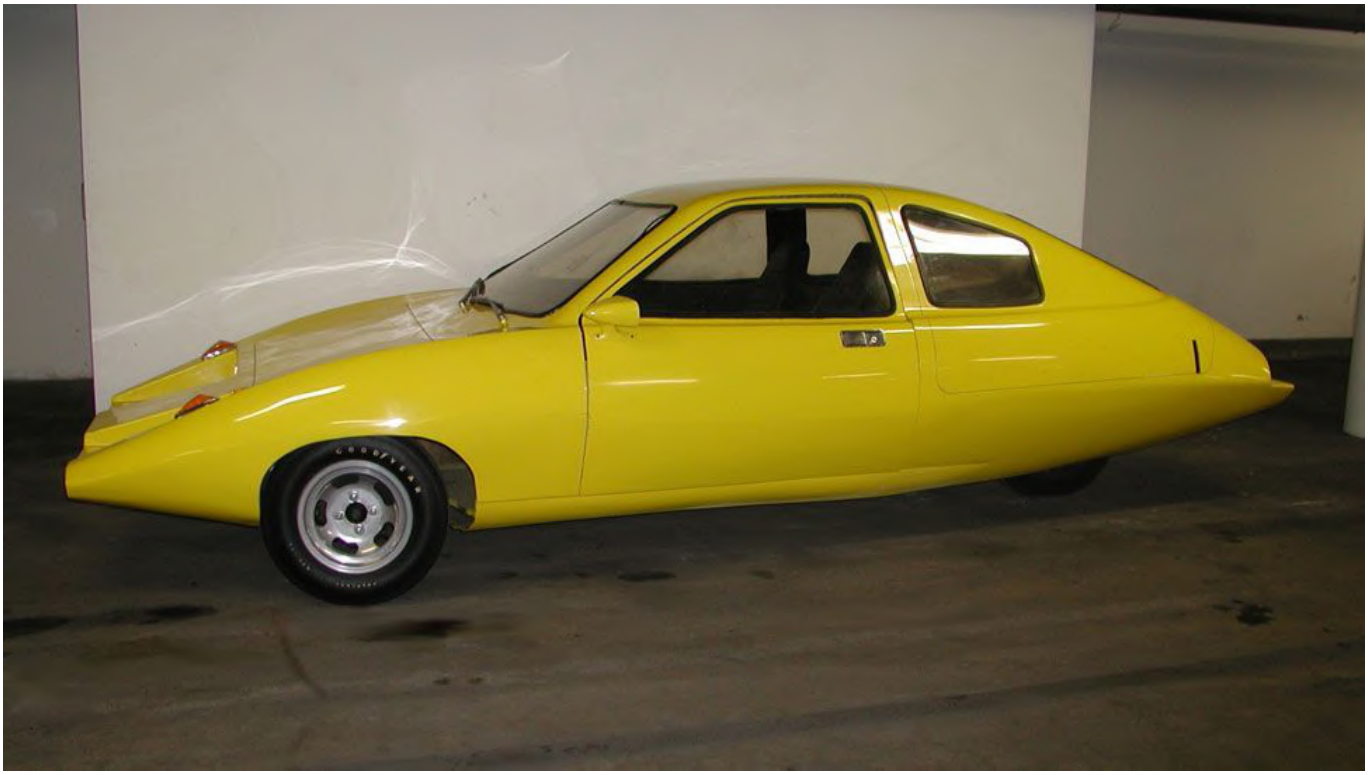
SIMPLE STORYBOARD EXAMPLE THAT CONVEYS A CONCEPT *(ROBERT MILLER & DESIGN GROUP ITALIA IMAGE)*

Interiors can and do benefit from 3D visualization. There is so much value riding on the scope of the interior with color and materials. Designing these elements ergonomically with all the new technology in a car is a challenging prospect. Even the internal reflections on surfaces and windows are fair game and can be visualized.

Finally, as our VR world encompasses all of us, imaging, storytelling, and experiences become even more important for future products. Next time you put on that VR headset and become immersed in the scene, remember the vehicle you are driving was there when it was being developed. You selected that brand and model for a reason, and most likely, it was played out on a 3D simulation script.

The Mystery of the Dale

THE DESIGN LOUNGE



THE DALE CAR, 1974 (CURBSIDECLASSIC IMAGE)

DVN-I Coffee Corner

It is remarkable how many people have tried to build their own car and produce it in the relatively short automotive history of just a century. It is also amazing how many suffered the consequences and ended up incarcerated. Seemingly, all made the same mistake: underestimating the production costs of their beloved concept, and that is when entrepreneurship turned into a human adventure.

In the case of Twentieth Century Motor Car Corporation, their flagship three-wheeled vehicle **the Dale** was promoted under the popular specifications of low fuel consumption during the mid-1970s fuel crisis—its promoter stated the car would knock the hell out of Detroit; top-level automotive executives besides their impressive CVs they are often characterized by strong drive and confidence as well as larger than life ambitions.

Geraldine Elizabeth Carmichael, the Dale's promoter, was a 6-foot-tall transgender woman who had announced to become the new Henry Ford of the fuel crisis era. In 1973, she was already fugitive from her 1961 arrest for counterfeiting U.S. currency. While on the run, she faked a serious car accident in an effort to shed her identity. Soon after, her meeting with the inventor of Dale shifted her goals into marketing the unique low fuel consumption vehicle at the time of the Arab oil embargo. Widely covered in the press, Carmichael went as far as giving a Dale as a first prize in a television game show (which luckily nobody won because the car was still a prototype).

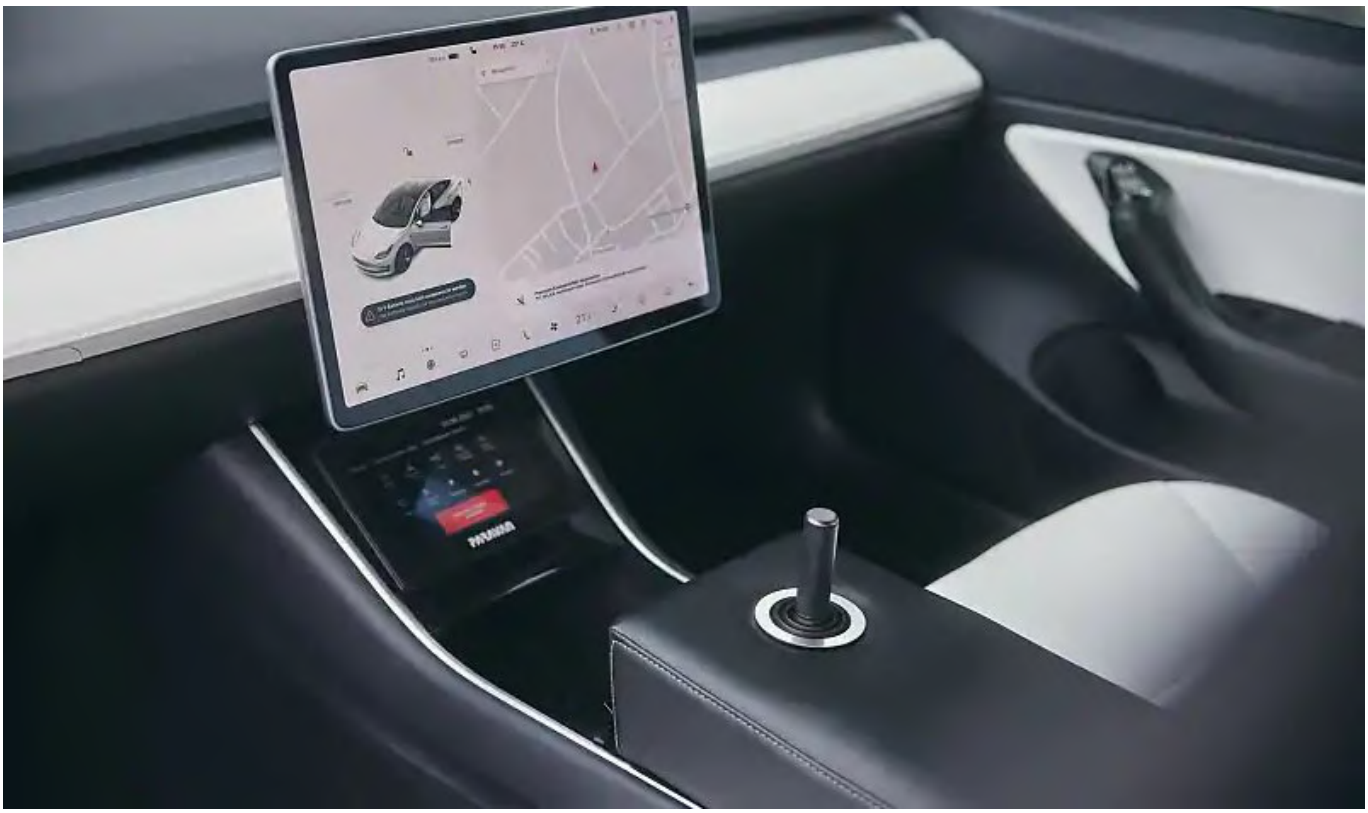
Following accusations of financial impropriety at the Twentieth Century Motor Car Corporation, Carmichael was charged with 31 counts of grand theft; fraud, and corporate security violations. She went into hiding, and was featured in a 1989 episode of the "Unsolved Mysteries" TV show. A viewer's tip led police to Carmichael, who was working at a flower shop. She served 18 months in a men's prison, despite having been recognized as a woman by the courts. According to the FBI, Carmichael married four times and had ten children.

I do not know how many titles a car executive could claim but it might be that people always needed a hero; after all, as claimed in ***the Lady and the Dale***, that is what America is all about.

News Mobility

Joystick to Drive Future Vehicles

NEWS MOBILITY



PARAVAN-SCHAEFFLER IMAGE

Classic steering wheels and gas pedal pedals could soon be superfluous. Paravan-Schaeffler is developing and testing drive-by-wire systems in racing with a joystick.

The cockpit of the modified Tesla Model 3 is even cleaner than before. Only the vertical tablet interrupts the strictly geometric lines of the interior. Nevertheless, the EV accelerates at full power and fires around the corner so fast that passengers have to hold on tight.

With just a quick movement of the of the joystick, the vehicle was steered and braked for rapidly-sequential racing maneuvers. Instead of a steering wheel and the pedals, the car is controlled by a four-way joystick: twitch it left or right for directions; forward for braking, or rearward for acceleration (presumably this opposite-of-intuitive configuration for braking and acceleration is a safety measure). It's almost like a video game under real conditions on real roads. Any mistake would be disastrous, but the stick reacts immediately and reliably to the slightest movement of the hand. A model without value? A fun project? No way! "This is how cars will be driven in the future. Without cranking the steering wheel," explains Hubert Hügle, head of development at the Schaeffler Paravan joint venture.

Toyota Boshoku's Self-Driving Pod Car Interiors

NEWS MOBILITY

TOYOTA BOSHOKU IMAGE

Toyoda Boshoku was founded as a textile maker in 1918 by Sakichi Toyoda, great-grandfather of Toyota Motor President Akio Toyoda. They changed the “d" to a “t" in their name in 2004. Today, they rank № 27 on *Automotive News*' list of the top 100 global suppliers, with global sales of USD $9.33bn in 2021.

In aerospace, Richard Chung (CBO & Center Chief, Interior Space Visioneering Center) notes, a plane stays in operation for 25 years, getting a new interior every six years or so. Toyota Boshoku wants to transfer that model to fleets on the ground. Ride-hailing and robotaxis will account for nearly 40 percent of the mobility market by 2030, when L^3 and L^4 automated driving become commonplace, Toyota Boshoku predicts. Owned or leased vehicles, by contrast, should make up about 30 per cent of the market. By 2050, it forecasts an even more dramatic shift, with L^5 robotaxis making up 80 per cent.

But futuristic fleet operators are already planning their first moves. Chinese ride-hailing giant Didi eyes 1 million robotaxis in 2030. In Texas, Toyota Motor and Aurora Innovation Inc. are testing an autonomous ride-hailing fleet.

Meanwhile, Cruise and Waymo have won permits to launch commercial autonomous vehicle services in California. Cruise said the approval makes it the first company offering a driverless commercial ride-hailing service, seen as a crucial step toward a future of robotaxis.

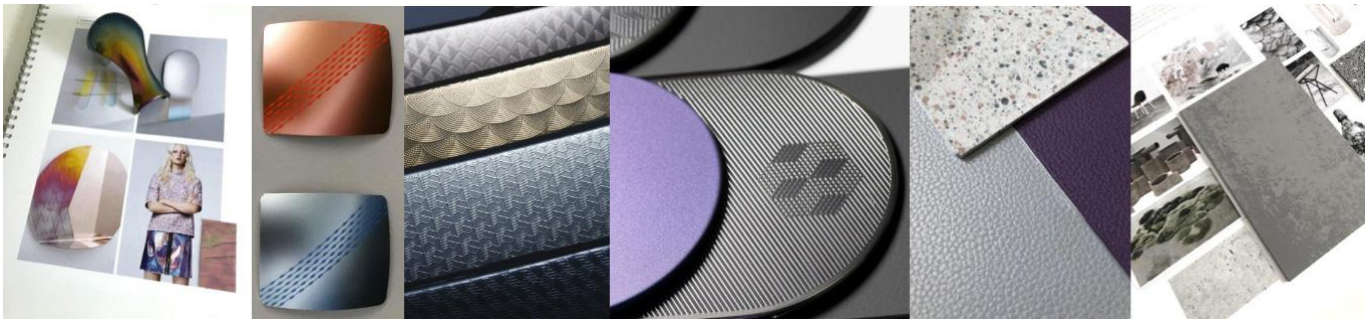
All this movement will spur automakers to make vehicles to fill those fleets. Those such as Kia are making such purpose-built vehicles a pillar of their future expansion plans. By Chung's estimates, today's human taxi driver averages 35,000 miles a year, on eight-hour shifts. L^4 autonomous robotaxis, however, could operate 20 hours a day, racking up as many as 87,000 miles a year—about 522,000 milesover the robotaxi's anticipated six-year life span.

“We want to be a company that grows even further, even with new customers or new segments," Chung said. “We want to be a company that determines its own destiny."

General News

New CEO for Plastivaloire

GENERAL NEWS



PLASTIVALOIRE IMAGES

A new step in the evolution of the Plastivaloire Group governance, initiated a year ago: Antoine Doutriaux took over as CEO on 6 July 2022; Patrick Findeling became Chairman of the Group Board of Directors on the same day.

This important step will strengthen Plastivaloire, which has become an international group over the last 10 years. Their development centers conduct the product and tool research, by integrating innovative processes proposed by the R&D department.

The industrial locations spread across Europe allow for an optimization of costs and logistics.

Groupe Plastivaloire, with Head Office in Langeais, France, has 6000 employees, and produces plastic primarily in the following areas:

- Cockpits, decoration and mechanisms
- Seat parts
- Lighting and signaling
- Exterior appearance parts
- Under-the-hood parts

Recent process innovations include

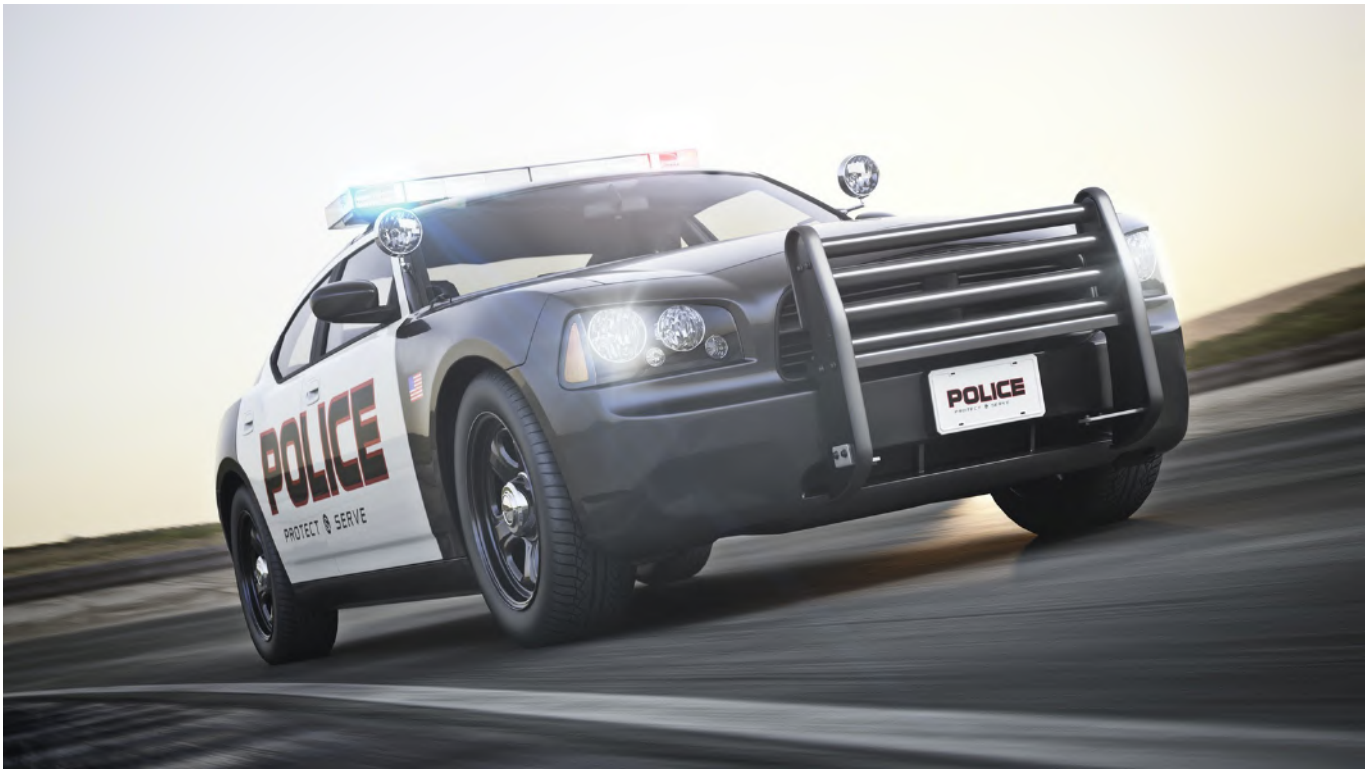
- Cubic®, or water transfer, a 3-dimensional decoration process on all types of parts or materials. The principle consists in transferring onto the part a decoration printed on a PVA film. The PVA film (polyvinyl alcohol) is a water-soluble film that will be deposited on the surface of a water tank. After

receiving a spray of ink activator, the film will then dissolve on the surface of the water and spread evenly. During the immersion of the part in the vat, the inks of the decoration will then be printed on it in 3 dimensions. Cleaning and varnishing are then necessary to ensure the protection of the decoration.

- Structured Chrome: This innovative decoration process for plastic parts is carried out with a single single-cavity mold with injection of a specific material.

Verizon's Connected Police Cruiser Prototype

GENERAL NEWS



VERIZON IMAGE

Verizon is a U.S. telecommunications conglomerate, well known to many Americans as their only option for telephone and internet connectivity services. At the 2022 National Sheriffs' Association annual conference, Verizon Frontline unveiled a “reimagined," connected police cruiser. The prototype, called the MUTT (Mobile Utility Technology Transport), leverages the carrier's millimeter-wave and C-Band 5G network and several additional connectivity and computing features.

Currently, the vehicle is designed to support 4G LTE, 5G and 5G connectivity to Mission Critical Push To Talk (MCPTT), General Mobile Radio Service (GMRS) and Land Mobile Radio (LMR) communications capabilities, as well as two laptops, a tablet, a smartphone, a printer and an onboard server.

MUTT's built-in kit will allow it to deploy a drone, which will enable first responders on the scene of an emergency to gain enhanced situational awareness or to stream video in near-real time back to an Emergency Operations Center (EOC), according to Verizon. In addition, the prototype has two routers—compared to the either a single router or a MiFi typical of police cruisers—making it possible to dedicate one to the heavy data usage required by video and another to remaining communications needs.

Verizon say they plan to add satellite connectivity to the MUTT as well: “Verizon Frontline's MUTT will be able to serve as a mobile, dedicated private network, and will help ensure first responders on the front lines have access to the secure, reliable mission-critical communications capabilities they need, when they need them most".

Last year, Verizon Frontline announced a Tactical Humanitarian Operations Response (THOR) vehicle, developed in collaboration with the Department of Defense through NavalX and the SoCal Tech Bridge. The THOR vehicle is a mobile and private rapid-response command center that is compatible with Verizon's mm-wave 5G network and mobile edge compute (MEC) and is suitable for hard-to-reach or hard-to-navigate environments and situations, such as in military environments or when responding to natural disasters like wildfires, hurricanes or tornadoes.