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Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #127

Editorial

Light On Surfaces Makes Interiors Appealing

MERCEDES BENZ EQ CONCEPT (MERCEDES IMAGE)

Surveys consistently show convergent results on how car users are changing, and basing their purchasing decision on car interior, and on the user experience they'll get. We've been **reporting** on these findings for quite a while now; clearly, the trend has traction: interior lighting and new materials together are key criteria for creating appealing interiors.

Last week we spoke about what's one inch below the surface, and this week we'll look at the layer one inch *above,* including the interplay of surface materials and light. This week's in-depth report explores how combination of both, lighting and material together are creating a new layer of consumer appeal.

The intensity of endeavor for interior digital solutions is rapidly climbing, and suppliers are entering partnerships at what seems like a record rate: Harman with Caaresys; Grupo Antolin with Trinamix, and AMD with Ecarx are three such partnerships with special relevance in the automotive interior world. Cockpits will be digital; occupants will be monitored, and HMI will be the cement, consolidating user experience and safety.

Glad you're with us, and keep reading for the detailed program of the upcoming Think Tank seminar in Köln on 28-29 November. Come and **join in**!

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

Light and Materials to Make Car Interior Appealing

BMW IMAGE

Prominent US-based market research firm J.D. Power and Associates' APEAL study—that is, **A**utomotive **P**erformance, **E**xecution and **L**ayout—is based on 84,165 owners' survey responses on new vehicles after 90 days' ownership.

In 2022, overall satisfaction has declined for the first time since 2014, with the following key findings:

- Mass-market brands decrease in emotional appeal: The 19-point score gap between premium and popular-price brands has widened to 31 points this year, as mass-market brands decline 4 points and premium brands improve 8 points;
- Porsche ranks highest among all brands with a score of 888, a six-point improvement from 2021. Dodge is the highest-ranked mass market brand for a third consecutive year with a score of 882, identical to its score a year ago;
- EVs score worse than combustion-engine vehicles. The score for PHEVs is 835 and is 832 for hybrids. In comparison, the composite index score for combustion-engine vehicles is 846. Pure EVs (excluding Tesla) underperform ICE vehicle with an index score of 838.
- Tesla vehicles are summarized separately from the EV composite score because the brand's dominance in the category would skew the results of all other EVs. It is important to understand that certain attributes of Tesla models continue to outperform other EVs, though there are notable challengers such as the Mercedes-Benz EQS
- Tesla is included in the industry calculation for the first time, with a score of 887. However, because Tesla Motors does not allow J.D. Power access to owner information in the states where that permission is required by law, Tesla models remain ineligible for awards.

From another perspective, Continental published recently their Continental Mobility Study 2022, which is the seventh edition of this survey, first carried out in 2011. Continental and the market and social research institute Infas asked 6,000 people aged 18 and older in Germany; France; Norway; the USA; Japan, and China about their mobility needs both in everyday life and in relation to travel.

It covered general mobility needs, attitudes toward sustainability aspects, especially electric mobility, and in-car technological developments. The survey also focused on many people's concerns about the affordability of personal mobility and on the car as a possible shelter and place of retreat when travelling, particularly considering the Covid-19 pandemic.

This shelter idea, previously identified around 2000 as a cocoon idea, is creating an additional dimension to the valuation of a car interior.

We could try to understand what are the interior architecture, lay-out, technologies, HMI, materials, and so on, influencing the perception of interior appeal. It's a complex process, where it is almost impossible to have a deterministic model.

However, let make it a try to review recent technologies and how it could influence positively user perception.

Ambient Lighting and Safety Perception

BMW IMAGE

Automakers are increasingly using ambient lighting inside their vehicles, a trend that not only makes the cabin nicer but could increase safety and consumer perceptions about the quality of the car.

A study by engineers at BMW and the Lighting Engineering Group at Ilmenau University of Technology found ambient lighting improved drivers' perceptions of a vehicle's interior. Such lighting, which is offered in an array of colors in a growing number of mid- and high-end automobiles, intensifies spatial perception, enhances the perceived quality of materials and makes drivers feel safer.

The number of light sources inside an automobile has grown tremendously in the past decade; previous studies have shown that distracting and uncomfortable glare is eliminated when luminance is kept below 0.1 cd/m^2. Other studies show drivers feel less distraction when they can control the lighting level.

In conducting the **study**, researchers had 31 people 'drive' a real car in a simulator. Light levels on the simulated roadway varied from 0.1 to 1.5 cd/m^2. The engineers tested a dozen lighting scenarios with different colors; luminances, and positions. Drivers were questioned on spatial perception within the car; interior quality; perceived safety, and other factors. Their emotional states also were recorded via questionnaire before and after the test.

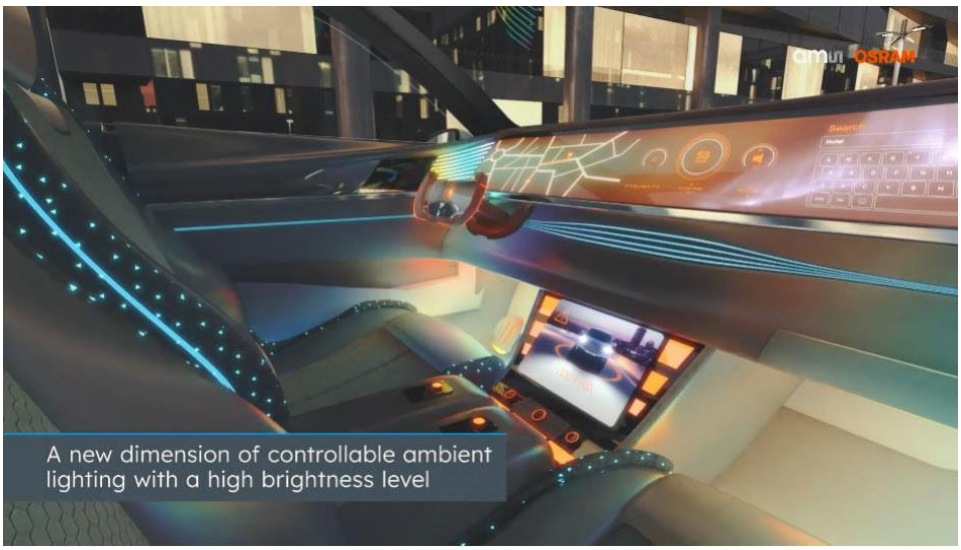
Each driver's perception of the vehicle improved through the use of ambient light. Drivers found the interiors more spacious, the interior design and finish more attractive and the controls easier to use. They felt safer, too. But a little goes a long way; a few well-placed lights is just as effective as a whole lot of lights, and increasing the brightness did nothing to enhance the driver's impressions. On the contrary, it led to complaints of distracting glare.

Drivers perceived blue lighting as brighter than orange or red, which is consistent with research finding that light with a greater blue content stimulates significantly more discomfort glare ("psychological glare") than same-intensity light with a lesser blue content. The researchers suggest color is important for brand identity, but the test offered no conclusive results on the effect of ambient light on drivers' emotional states.

The researchers also found ambient light didn't influence driver performance, but the test wasn't very strenuous, as the drivers did nothing more than stay in their lane. The researchers would like to expand the study to include more lighting colors and examine the extent to which ambient lighting helps or hinders tasks like finding controls and using features like a nav system. They're also curious about interior lighting that responds to input from passengers; the car, and the environment.

"The advantages and problems arising from such systems, as well as their acceptance by the drivers, have still to be tested and verified," says Luca Caberletti, the BMW engineer who led the project. "Nevertheless, they offer a new, interesting, emotional and much more colored way of understanding and developing vehicle interior lighting".

Ambient Lighting makes you feel at home



OSRAM IMAGE

Osram Opto Semiconductors—Ambient Lighting

Osram OS (Opto-Semiconductors) offers a wide range of products in various power classes, sizes and wavelengths of LEDs, and all common IR technologies—from IREDs to VCSELs and lasers. The interplay of all these components creates a unique driver experience thanks to ambient lighting.

With RGB LEDs, Osram has calibration and binning that provides a significant improvement of the color homogeneity. They also allow the use of multiple intensity and color binnings without compromising color accuracy.

Increased performance and efficiency of design freedom Osram offers miniaturized LEDs that do not compromise on performance or energy efficiency. Therefore, the latest LED generations ensure the maximum freedom of design.

Applications are possible directly for material illumination, foot room illumination, roof lighting, which support an overall appeal assessment of the interior.

Surface Materials and Lighting

Lighting is powerful, and picking the right material is critical. And surface materials not only reflect light, but also influence light going through. To produce translucent or transparent, high-quality optical parts, the material must be free of surface defects and impurities. That's what Covestro is working on. This is essential to reduce the cost of rejects, especially when incorporating expensive electronic components and matching different elements into one system.

In most cases, LEDs for interior lighting are accompanied by additional electronic components, the narrowest space limitations, heat, and complex software to run light effects. Covestro's Makrolon-AI is one solution to do the job. When selecting this material, automakers get proven color, materials and finish. In fact, this plastic is known for its brilliant colors, high color homogeneity, quality consistency and narrow viscosity range. What is the result? Dynamic lighting solutions that are dramatic, differentiating, emotional and aesthetic. Again, direct effect on appeal (and

APEAL survey ratings). High-purity Makrolon-AI polycarbonate enables, bigger size-screens, curved 3D shapes, safety-replacing glass components, optical performance, touch, sensors and cameras, aesthetic surface design patterns, backlit multi-material surfaces and more.

Kurz Decopur: light to pass through

KURZ IMAGE

Leonard Kurz—plastic experts based in Fürth, Germany—have developed Decopur, which makes effects in interiors. With single-image designs that allow light to pass through, with overlapping structures that create a pronounced three-dimensional appearance and simulate fascinating depth. And all in combination with backlighting effects that lend interiors a custom-made and special atmosphere.

IMD-Decopur combines IMD (in-mold design), with its flexibility; diversity, and quality in the design of plastic and other surfaces, and PU (polyurethane) for crystal-clear surfaces that are extremely durable and self-healing. Crystal-clear polyurethane lends fantastic depth effects to surfaces, highlighting the decoration underneath.

Digital Projection

PLASTIC OMNIUM IMAGE

As previously **reported in DVN Interior**, digital projection systems offer a wide range of vehicle design options and numerous possibilities for interior perception and customization. Plastic Omnium Lighting offers to transform the vehicle into a living room on wheels (and its surroundings) into an interactive canvas for functional light scenarios. In doing so, they create the basis for completely new vehicle signatures and offer a wide range of possibilities for displaying individual content—from static motifs and patterns to dynamic videos, inside (and outside) the vehicle.

Interior News

Harman Buys Caaresys for OMS

INTERIOR NEWS

CAARESYS COFOUNDER AND CEO ILYA SLOUSHCH (HARMAN IMAGE)

Harman International, a wholly-owned subsidiary of Samsung, have bought Caaresys—a Netanya, Israel-based company founded in 2017 to develop occupant monitoring systems powered by contactless, low-emission radar. **Already introduced in DVN Interior**, Caaresys has successfully partnered with leading automakers and provides a mass production solution for cabin monitoring including vital sign sensing; passenger localization, and child presence detection.

The in-cabin radar sensor and algorithm solution from Caaresys will strengthen Harman's automotive product offerings, building on the company's consumer-centric digital cockpit and ADAS solutions. With Caaresys' contactless vital signs sensing and real-time insights from that information, Harman can now offer new levels of in-vehicle safety, comfort, and wellbeing support.

Caaresys' technology uses biometrics to detect the location, health condition and state of each vehicle occupant. The non-intrusive sensing system is a small RF radar that can be integrated anywhere in a vehicle cabin. By dint of a sophisticated radar signal processing algorithm, the system detects seat occupancy and monitors passenger biometrics including respiration rate; heart rate, and heart rate variability. The system is said to offer highly accurate sensing even in the constantly fluctuating driving environment, and an ability to operate in static or driving mode.

Caaresys cofounder and CEO Ilya Sloushch will lead the newly established in-cabin radar team at Harman. He says unlike in-car cameras, a primary benefit of the Caaresys technique is that seats, passengers, and other objects do not block the radar signals.

Antolin, Trinamix Partner for Face Recognition

INTERIOR NEWS

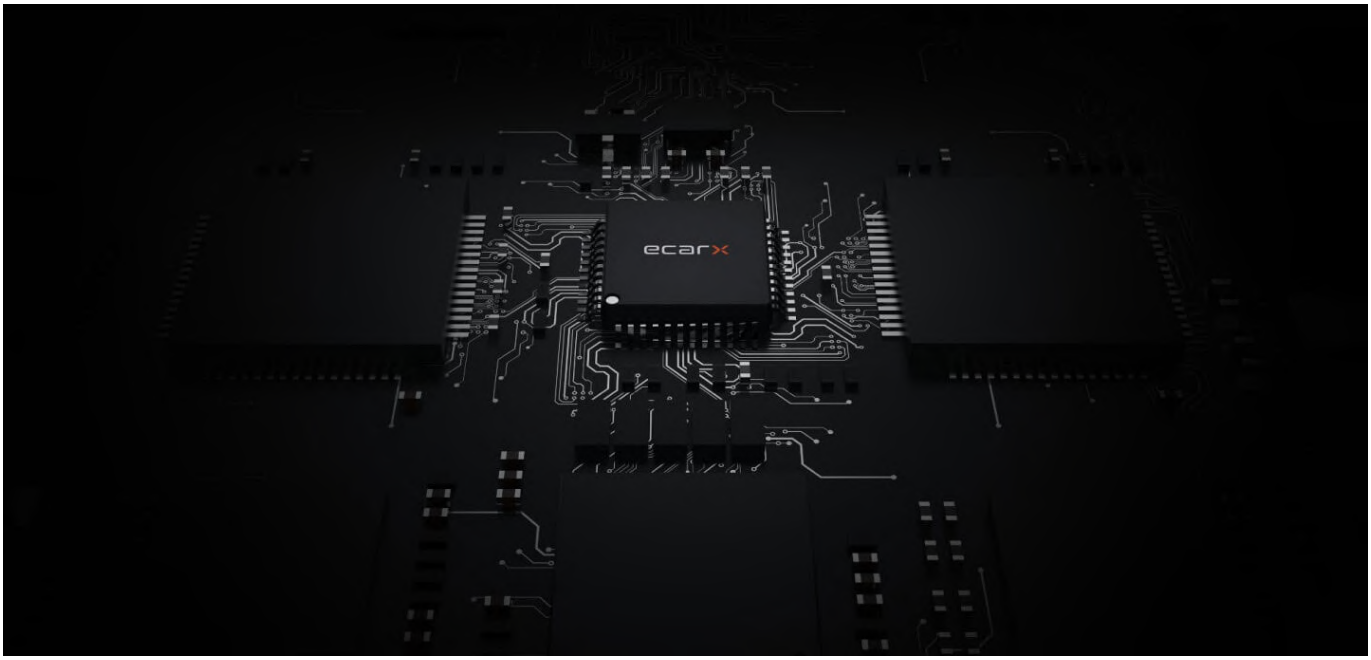
Grupo Antolin and Trinamix, a BASF subsidiary and leader in biometric solutions, will jointly develop solutions for secure and convenient vehicle access by integrating Trinamix's face authentication technology into Grupo Antolin's product portfolio.

Antolin will take advantage of their expertise in smart surfaces for vehicle interiors to also offer advanced exterior HMI systems. Building on their expertise in stronger biometric protection, Trinamix will thereby extend their activities beyond smartphone applications.

Trinamix Face Authentication, which is certified to meet highest biometric security levels, operates on patent-protected algorithms to verify a person based on skin detection. The novel combination of software and hardware has the potential to authenticate drivers based on their biometrics as soon as they get close to their car. While allowing for a stronger data protection and premium performance on the consumer side, the solution comes with low hardware requirements for a seamless and easy integration.

AMD, Ecarx to Develop Digital Cockpit Solutions

INTERIOR NEWS



AMD IMAGE

Semiconductor manufacturer AMD has announced a strategic collaboration with Ecarx, a global mobility tech company, to work together on an in-vehicle computing platform for next-generation EVs, expected to be in mass production for global rollout in late 2023. Ecarx is a Chinese tech company cofounded in 2016 by Geely owner Li Shufu to develop Android-based systems for Geely's various car brands.

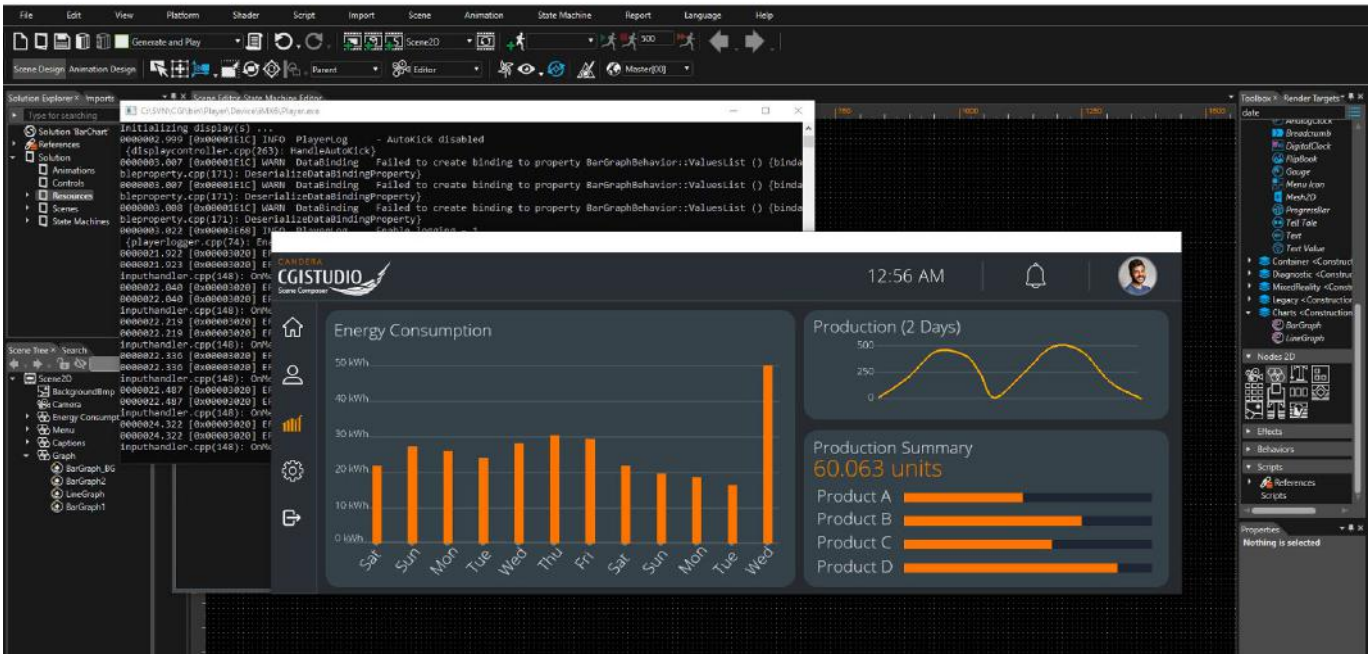
The Ecarx digital cockpit will be the first in-vehicle platform to be offered with AMD's Ryzen Embedded V2000 processors and Radeon RX 6000 Series GPUs along with Ecarx hardware and software.

Combining the extensive experience in automotive digital cockpit design of Ecarx with AMD advanced computing power and stunning visual graphic rendering capabilities, the companies aim to deliver an innovative in-car experience. The digital cockpit will launch with advanced features including driver information mode; head-up display; rear seat entertainment; multiple displays; multi-zone voice recognition; high-end gaming, and a full 3D user experience.

"As car companies seek to deliver immersive experiences and intelligent features for their next-generation electric vehicles, the AMD-powered Ecarx digital cockpit will address these needs for the global automotive market," said AMD VP and embedded-business general manager Rajneesh Gaur.

Candera Updates HMI Design Software

INTERIOR NEWS



CANDERA IMAGE

According to Candera, new features include an improved user interface, the ability to import graphics directly from Adobe XD using the program's Smart Importer function, accompanying documentation to help integrate CGI Studio 3.11 into an automotive cybersecurity environment according to the ISO/SAE 21434 standard, and a new extended control set to speed up HMI creation.

Candera, based in Linz, Austria, is an HMI tool provider and development partner for worldwide automotive and industrial customers. Candera supports their customers with the CGI Studio tool. Based on AI-detection technologies, the Smart Importer accelerates the HMI creation process by facilitating direct import of a design file while adding functionality automatically. Users can import graphics files into CGI Studio from Adobe Photoshop, Sketch, Axure RP, and now also Adobe XD. Relevant components such as gauges, sliders and buttons are then automatically detected, and the proper functionality can be added to each element.

With version 3.11, Candera is also looking to support automotive automakers and tier-1s in the successful integration of CGI Studio into their cybersecurity-related HMI applications. To this end, documentation is provided with 3.11 to guide cybersecurity experts through the recommended way of integrating CGI Studio as an off-the-shelf product. It introduces the available configuration options for an ISO/SAE 21434 cybersecurity software stack, and lists known vulnerabilities related to the product as well as to the various third party and open-source software (OSS) components. A CVSS v3.0 vulnerability report is also attached to support Threat Analysis and Risk Assessment (TARA).

Other updates include the addition of easily implementable bar graphs and line graphs. Furthermore, hardware support has also been expanded to include NXP Semiconductors' i.MX 8M Nano Applications Processor and STMicroelectronics' STM32MP1.

CANDERA IMAGES

Nio ET7 Features Dirac Sound Optimization

INTERIOR NEWS

NIO IMAGE

Swedish digital audio developer Dirac and Chinese EV manufacturer Nio are to collaborate on the ET7 sound system, which will adopt the Dirac Opteo Professional automotive sound optimization solution.

The ET7 features a standard configuration of 1,000 watts; 23 speakers, and 20 amplifier output channels. Its four main channels are high; midrange, and bass speakers in three units, with a subwoofer and four overhead channel speakers—see our previous coverage of the Dolby system.
Within the cabin, speakers can't be positioned as optimally as they would, for example, in a home theater. As a result, speakers interfere with each other, causing distortion and reducing audio clarity. The interference increases when more speakers are used. In addition, the car cabin itself adds unwanted sound coloration, resulting in muddy, booming sound that makes it difficult to discern where sound is coming from.

Featuring patented Multiple-Input/Multiple-Output (MIMO) mixed phase impulse response correction technology, Dirac Opteo Professional solution addresses these challenges by enabling all the speakers in a car to work intelligently together and co-correct each other's impulse response. The solution is stated to 'erase' the car cabin—removing the unwanted effects of the cabin in ways previously regarded as possible only in theory. It also creates ideal loudspeaker responses for maximum fidelity and achieves a very good bass performance.

Lucid Air Sapphire's Exclusive Interior Materials

INTERIOR NEWS

LUCID MOTORS IMAGES

Lucid Motors is launching the Lucid Air Sapphire, a new top-of-the-line version of their Air EV. The Sapphire bristles with state-of-the-art luxury features. The interior is dominated by a massive 34" 5K-resolution curved display with specially-configured drive modes and performance settings. It floats above the dashboard, contributing to a minimalistic space-conscious layout. Furthermore, the dash incorporates high-quality machined physical buttons for temperature settings and volume adjustments.

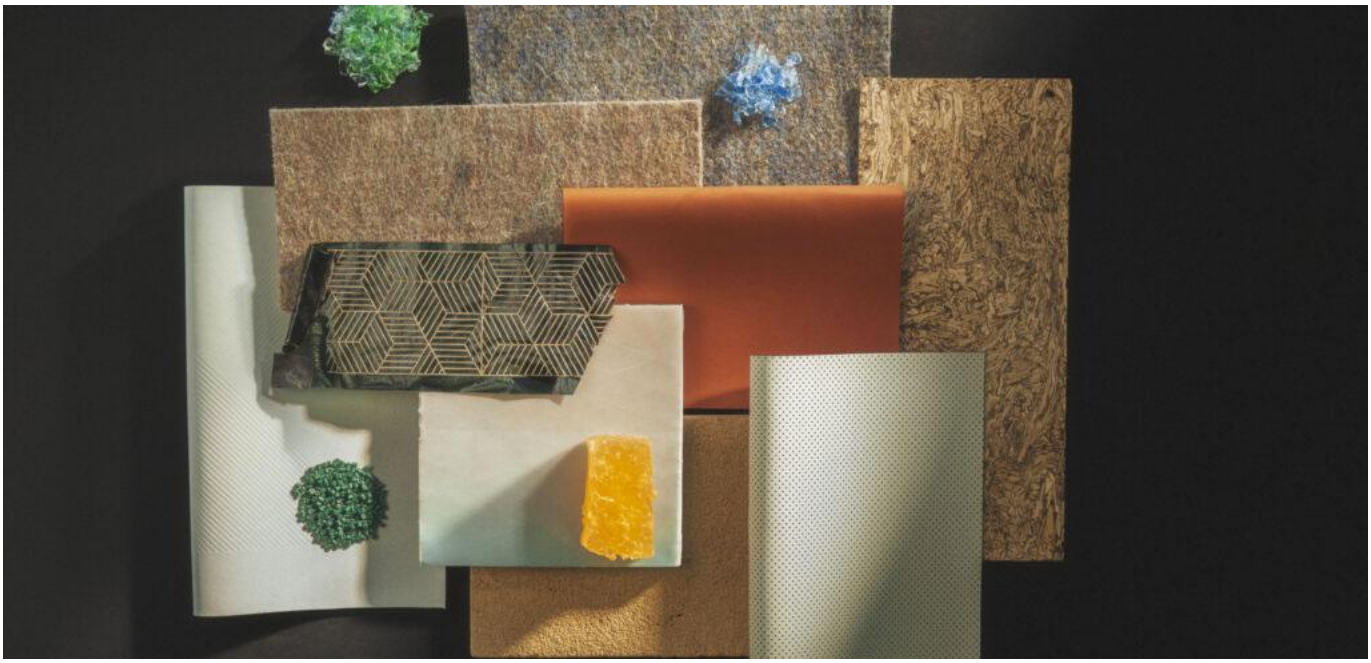
With its Space Concept philosophy, the Lucid Air offers a full-size luxury-class interior while maintaining a sporty appeal. Its interior offers a rich and airy feel, with most of its canopy being made of glass. Extensive use of premium leather and effective space management ensures the cabin remains opulent and luxurious. On the inside, the new Air Sapphire features 18-way power sport seats upholstered in black leather and Alcantara with Sapphire blue contrast stitching. Per Lucid, the seats—although designed for spirited driving—provide heating, cooling, and massage. The dashboard and doors are decorated with Mojave dark wood veneers while the steering wheel and upper roof structure for the glass roof are trimmed in black Alcantara.

The benefits for drivers are wide-reaching, with improvements to turn-in; cornering balance across all speeds; corner exit, and high-speed stability and disturbance rejection. The driving experience differs across drive modes to give multiple characters in conjunction with steering; suspension; powertrain, and brake settings. The Sapphire features stiffer front and rear springs; special damper settings; stiffer bushings; and tunable ABS; traction; stability control, and electronic power steering. Standard carbon ceramic brakes provide high stopping power and contribute to impressive driving characteristics.

The Design Lounge

BMW, Mini to Launch Vegan Interiors

THE DESIGN LOUNGE



BMW IMAGES

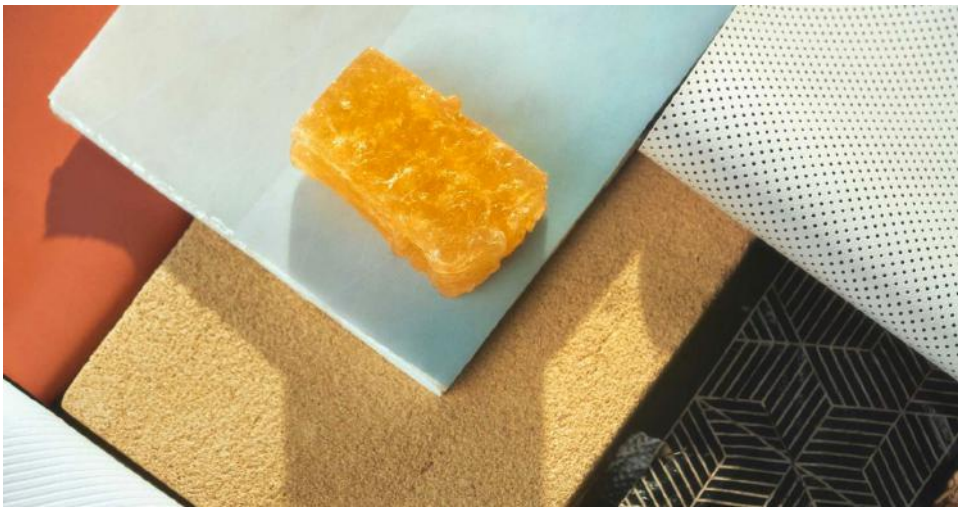
The BMW Group plans to launch their first vehicles featuring completely vegan interiors in 2023. This is being made possible primarily through the development of innovative materials with leatherlike properties. BMW is thus serving the demand for vegan and leather-free interiors, which is set to increase further in the near future, almost everywhere in the world.

Material selection has a key role to play in achieving the CO_2 reduction goal. Replacing raw materials of animal origin makes a significant contribution to increasing sustainability. The introduction of a new surface material for steering wheels will see the proportion of vehicle components that contain traces of raw materials of animal origin fall to less than one percent in the respective BMW and MINI vehicles. As a result, these materials will now only be found in areas that are not visible to the customer, for example in various waxy substances such as gelatin used in protective coatings, lanolin in paints, tallow as an additive in elastomers, and beeswax as a flux for paints.

BMW has for a long time been offering various fabric alternatives to leather. Now, for the first time, it is possible to offer a suitable substitute for leather for the most demanding interface between driver and vehicle. The steering wheel surfaces must fulfil demanding criteria when it comes to appearance, wear resistance and durability. "With a steering wheel made from a high-quality vegan surface material, we are fulfilling the wishes of our customers who do not want to make any compromises in terms of look, feel and functionality. The innovative material withstands wear and tear caused by abrasion, perspiration and moisture and has all the desirable properties of leather," says Uwe Köhler, Head of Development Body, Exterior Trim, Interior at the BMW Group. The only distinguishing feature of the new material will be a new grain effect on the steering wheel rim.

It's all in the detail: The floor mats for various models are made from mono-material, thus avoiding material mixes that are difficult to recycle. As a result, BMW saves around 23,000 tons of CO_2 and an additional 1,600 tonnes of waste every year, since the recycled floor mats and waste material are also reused within the production process.

Research and development in the field of secondary raw materials and sustainable materials are also a top priority. Future vehicle generations will offer other attractive alternatives to leather. BMW is working with startup companies to develop innovative bio-based materials. Compared to the synthetic leathers previously used, these result in around 45-per-cent lower CO_2 emissions. Mirum™, which is 100-per-cent bio-based and petroleum-free, can mimic all the properties of traditional leather. Another new material, Deserttex™, is made from pulverized cactus fibers with a bio-based polyurethane matrix. With these materials, replacing raw materials of animal origin can be combined with a significant reduction in CO_2.



DS Aero Sport Lounge: A Balance of Shelter and Prospect

THE DESIGN LOUNGE

COFFEE CORNER
DVN
Interior

It would be difficult for our contemporary minds to imagine such a multiple activity as the one of the 'marchands merciers' of Paris in the 18th century. Their role of managing the creation and reassuring the sales of meticulously designed and crafted objects for interior spaces has set French luxury across borders. Their extensive network of craftsmen reassured beautiful and fashionable compositions of often complex pieces. Tablet makers, hosiers, carpenters, weavers, mirror makers, tailors, button makers, upholsterers, spanners, furriers, fan makers, drapers, engravers, clothes makers, dyers, goldsmiths, wig makers and fairground merchants were highly skilled specialists that composed their R&D, in today's vocabulary, aptitude. Companies like Saint-Gobain evolved to contemporary manufacturing specialists and addresses as Rue du Faubourg-Saint-Honoré gained their prestige as their showrooms.

Same place, in 2009 and on the same narrative a new brand was born on the fine attempt to dial the rich historic tradition into an intricate contemporary object. Thus, the DS premium automotive brand is launched to embody the French Avant-garde appeal. Its design director, T.Metroz, holds a cabinet-maker (ebeniste) degree.

One of the recent projects, the DS Aero Sport Lounge, showcases a state-of-the-art interior expressed through generous volumes yet with a lot of visibility, light and transparency. Car interiors have evolved on the basic notion of shelter and prospect. The attempt though of putting the two in perfect balance into a commercial fashionable product is a complex operation and over the years generated infinite market research studies. However, automotive history has shown that factual statistics are only reassuring for short time; difficult is to make something exciting and this, is the holy grail of car design. But there is more, everything that concerns the final touch, each single surface, material or surface treatment, that we are in contact with while inhabiting an interior (static or in motion), needs to be equally mastered. The final appeal becomes its identity, what converts the product into a brand!

The blade of the dashboard and the seat backs of the DS Aero Sport Lounge are made of hay marquetry putting a sustainable process into an ancient craft. Comfort and shelter and are put on the forefront through a cutting-edge foam technology shaping the voluminous enveloping seats adorned with cotton sateen. In the door panels, microfiber technology along with three different materials are woven, by an exceptional artisan, to a fabric that provides ambient light. Navigation menus are projected on the dashboard and information is staged on the windshield by augmented reality while driving. Between the seats, the central armrest serves as a guide, while erasing the constraints of touch tablets thanks to Leap Motion and Ultrahaptic technologies: gesture commands can receive a sensory response. The IRIS artificial intelligence finds its place in the center of the dashboard activated through simple phrases.

News Mobility

Smart Traffic Management Cuts CO2

NEWS MOBILITY

DVN IMAGE

Clever traffic light control, smart logistics and networked individual transport, that's how intelligent mobility can save CO2 emissions. By 2027, for example, global CO_2 emissions savings from intelligent traffic management systems could reach 205 million tonnes, according to the study "Smart Traffic Management—The End of Urban Congestion" by Juniper Research. This year, CO_2 savings would have been 145.7 million t. The savings calculated for 2027 would be almost double the CO_2 emissions of UK domestic traffic in 2019.

According to the study, the most important influencing factor should be the reduction of traffic jams through optimized traffic control. This is because necessary stops at traffic lights, for example, are associated with braking and acceleration processes that have a strong impact on urban road traffic emissions. Fewer stops therefore mean smoother traffic flow, less wasted waiting time, and lower environmental impact. To this end, intelligent traffic management uses digital technologies based on real-time data to reduce congestion and minimize emissions. The study identifies intelligent intersections as a key driver in this regard. According to the study, intelligent intersections are expected to reduce the number of hours spent in traffic by an average of 36 hours per year per driver worldwide by 2027.

The study predicts that investment in smart intersections will increase to USD $10.2bn by 2027, up from $5.7bn in 2022. It expects smart intersection providers to focus on improving connectivity between road vehicles and the local road network. Providers would need to leverage 5G's low latency combined with machine learning algorithms to enable real-time network adjustments and improve traffic flow. A complementary approach to improve traffic flow is to predict the road profile and upcoming dynamic events such as traffic lights. V2X technologies are designed to enable this prediction. The GLOSA system (Green Light Optimal Speed Advisory) instructs the driver to adjust their speed so they can safely pass the next traffic light in the green phase.

Vehicles will also benefit from the use of cooperative traffic signals switched according to traffic conditions. The first cooperative traffic signal systems are already in use and will be the technology of the future, especially for implementing automated driving functions in motor vehicle traffic.

In addition to optimized traffic control, intelligent logistics and networked individual transport can also reduce mobility emissions. As the digital association Bitkom has calculated, accelerated digitization in logistics could save up to 8 million tonnes of CO_2 in 2030. Intelligent logistics is based on two levers: route and freight optimization and additive manufacturing, which enables products to be manufactured locally and in line with demand, thus shortening global supply chains.

Tele-Driving for Accelerated AV Phase-In

NEWS MOBILITY

MIRA IMAGE

Düsseldorf-based startup Mira, a newly-founded subsidiary of the Rheinmetall Group, is developing automated, driverless mobility. They plan to make this possible by means of teleoperation; that is, the remote control of vehicles in public road traffic.

Mobility connectivity in rural areas, high traffic density in inner cities, sustainable freight transport and efficient supply chains are currently at the top of the public discourse. Driverless mobility concepts promise effective solutions for many of these acute challenges. The current technical state of autonomous driving still requires human interaction in numerous edge situations. Such edge cases can probably only be solved in the long term with a combination of human and artificial intelligence. That's Teleoperation, which provides the technical basis for this and already enables new sustainable mobility solutions to become reality.

Teleoperation will enable the spatial decoupling of driver and vehicle. This allows a vehicle to be controlled from any location via a driver's stand. Visual information of the current traffic situation, transmitted via a 4G or 5G mobile network, allows the driver to operate this vehicle safely.

The startup's teleoperation technology consists of a modular, scalable overall system of certified hardware and software that, according to the company, meets the highest requirements for functional safety and cyber security.

Two use cases lend themselves to teleoperation in public and industrial transport:

• **Teleoperation for autonomous vehicles:** The teleoperator supports a self-driving, driverless vehicle in the event of a problem such as a system failure or an unsolvable driving task by taking over the vehicle guidance task. This can be done indirectly by assessing and releasing an alternative route suggested by the vehicle or by a corresponding specification by the teleoperator. If necessary, the teleoperator can also directly take over vehicle control such as steering, braking and accelerating and then return the vehicle to the automated driving mode. Teleoperation can thus be used to meet the legal requirement for technical supervision of autonomous driving vehicles.

• **Teleoperation of non-autonomous driving vehicles:** The teleoperator guides a driverless vehicle continuously and directly from a driving position. This spatial decoupling of driver and vehicle can significantly increase the efficiency of the driving personnel deployed in non-self-driving vehicles and vehicles can be driven (logistics, first/last mile) or delivered (rental cars, car-sharing vehicles) in an optimized manner, especially over longer distances.

Mira already offers StVZO-compliant teleoperation technology for use in passenger cars, commercial vehicles, and special vehicles. Initial testing to demonstrate and evaluate realistic customer business models is taking place in Düsseldorf's industrial harbor. This pilot project is supported by the licensing authorities of the district government, the city of Düsseldorf and TÜV Rheinland as technical expert. Further operational areas are already in preparation.

General News

Luxgen n7 is First Foxtron Model

GENERAL NEWS

Taiwanese automaker Luxgen has unveiled their n7 electric CUV, the first production model to be designed and developed in partnership with Foxtron, the newly formed automotive division of Taiwanese contract manufacturer and Apple iPhone producer Foxconn.

Previewed by the Foxtron Model C concept revealed last November, the 7-seat n7 goes on sale in Taiwan in October.

Exports of the new model are planned, according to Luxgen officials, though details of planned markets and possible delivery dates have not yet been made public.

The styling of the new Luxgen model is heavily influenced by the Model C, which was designed in partnership with Italian design house Pininfarina.

Earlier information provided by Foxtron revealed the Model C concept measures 4.64 m long with a wheelbase of 2.86 m; similar dimensions are expected for the n7.

The Luxgen7 SUV uses premium leather seat available with heating, ventilation, electronic massage, and lumbar support adjustment, as well as high-end Clarion audio system and JBL speakers. It is also fitted with the Think+ onboard computer system which offers video and audio entertainment, telecommunication, GPS navigation, as well

as four advanced visual assistance systems including Eagle View+ (a 360° surveillance system), Side View+ (blind spot monitoring), LDWS+ (lane departure warning) and Night vision+ (high sensitivity night vision enhancement).

A unique feature is the anti-theft sport seat: if a driver will press the button on the anti-theft seat for three seconds before locking the doors with the remote control, the seat will slide forward and lean against the steering wheel to deny unauthorized operation of the vehicle.

The basis for the new CUV is Foxtron's open-source MIH electric-car platform. It supports several different driveline layouts, including single-motor rear-wheel drive and dual-motor all-wheel drive. The battery of the n7 is integrated wholly within a skateboard-style chassis.

Luxgen is a subsidiary of Yulon Motor, Taiwan's largest automaker by volume.

Hyundai To Use TomTom Tech for Europe

GENERAL NEWS

HYUNDAI IMAGE

Geolocation technology from Amsterdam-based TomTom will be standard equipment in all Hyundai and Kia vehicles built for the European market. The navigation company will provide the automaker's vehicles with maps and real-time traffic data.

After the Hyundai Motor Group's premium Genesis marque launched in Europe in summer 2021 with TomTom technology, Hyundai and Kia customers will now benefit from high-quality maps that support each car's in-dash navigation system and L^2 automated driving features.

The navigation specialist's advanced mapping systems help automakers develop automation by enabling a vehicle's ADAS to better anticipate the road ahead. This is made possible through TomTom's ADAS Map, which delivers the vehicle's systems with improved road information including road gradient, curvature, speed limits and more. Hyundai's proprietary Highway Driving Assist depends on such information to change speed and navigate highway ramps and curves in the road.

"We are thrilled that all Hyundai and Kia drivers in Europe will benefit from the comfort and safety provided by TomTom's best-in-class geolocation technology," said Haeyoung Kwon, vice president and head of the infotainment development group at Hyundai Motor Group. "TomTom is a partner we trust to deliver highly accurate map data that enhances our Highway Driving Assist technology, and real-time traffic information that helps us optimize navigation guidance and ETAs."

Antoine Saucier, managing director of TomTom Automotive, added, "It's a pleasure to expand our relationship with Hyundai Motor Group so that each and every one of their cars in Europe will be equipped with TomTom's technology. Hyundai Motor Group is one of the most innovative and forward-thinking players in the automotive industry, and we look forward to collaborating over the coming decade, creating pioneering solutions that provide freedom of movement in a safe, enjoyable and clean way".