DVN-I
Automotive Interior

Thu, 14 October 2021 Weekly Newsletter **NEWSLETTER #82**

Editorial

Micro-LED Future Offer For Design, Safety, Comfort

EVERLIGHT RGB LEDS (EVERLIGHT IMAGE)

The next DVN Workshop will happen early next year. Watch your DVN-I Newsletter for more information; for now, we're excited to announce it'll include a session devoted to interior lighting. As a technology preview, this week's in-depth article focuses on microLED technology. As lighting takes on an ever-bigger role in automotive interior design for decor, display, and HMI, new technologies like microLED are evolving to enhance interiors, so take a look at this week's explainer.

And the interior news of the week confirms the importance of displays in automotive interiors, with articles about display integration into complex surfaces, and whole new architectures. Displays aren't yet anywhere near fully laden with added-value content for improving safety; this week you'll read about a bunch of new strategies and techniques demonstrating that screens and connectivity are not just toys, but a real pillar of safer mobility.

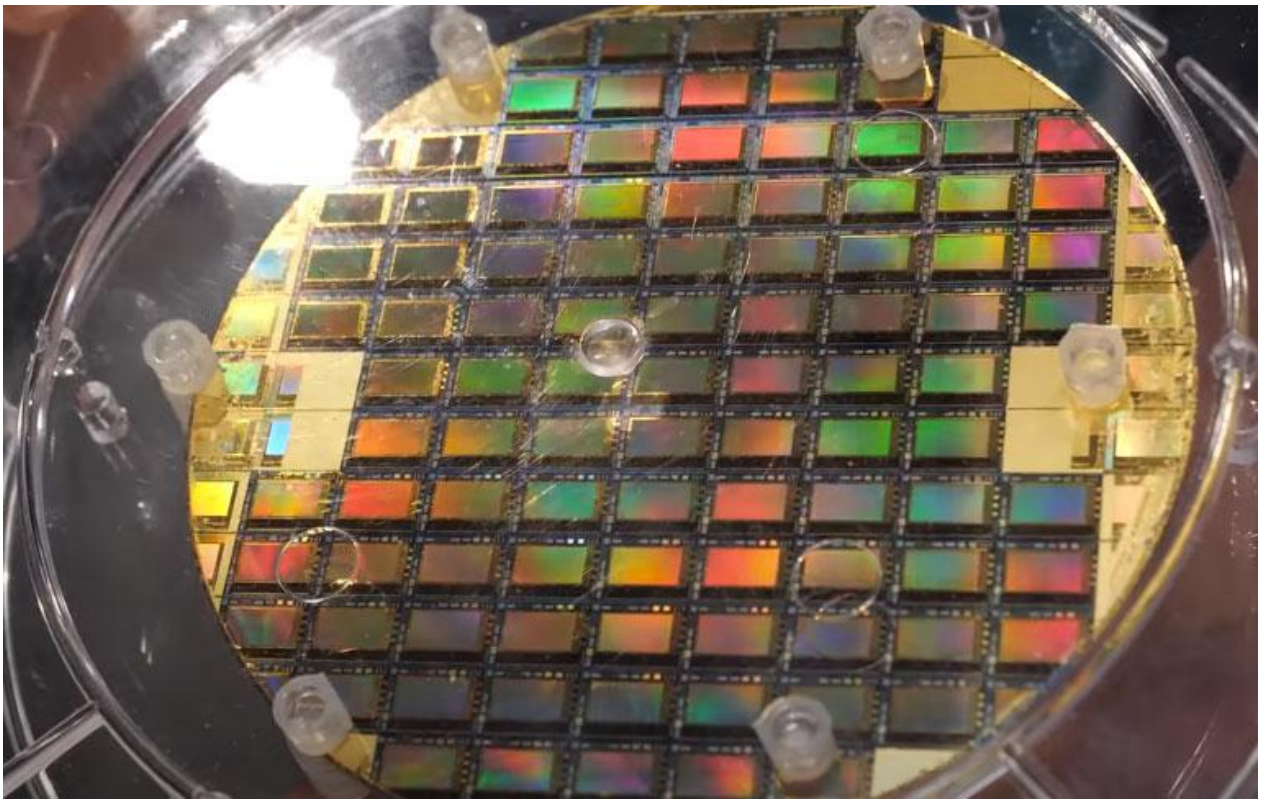
As always, we're glad you're here as part of the DVN-I community! If you not yet a member, come **join us**!

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

MicroLEDs For Next-Generation Display And Lighting



MICROLED MATRIX: 2 MEGANITS AND 10,000 DPI (JBD IMAGE)

MicroLED—sometimes written as µLED—is a flat screen technology based on arrays of microscopic LEDs, made of InGaN(Indium Gallium Nitride), that form the individual picture elements (pixels). Like OLEDs and plasma screens, µLED pixels are self-illuminating, dimmable, and can be switched off completely, so they don't require backlighting as in LCDs (liquid crystal displays). In general, microtechnology defines itself with geometric structures and dimensions in the micrometer range (0.1 µm to 1 mm). Manufacturers such as PlayNitride and Sony define µLEDs as those with a luminous width smaller than 50 µm or a luminous area smaller than 0.003 mm 2.

MicroLEDs are regarded as a probable OLED-killer, for µLEDs offer longer life without brightness deterioration—an effective lifespan of around 20,000 hours (versus 5,000 for OLED); higher brightness and contrast: (~200 lm/W vs. 100 for OLED); freedom from burn-in effects even after long-lasting still image display; and greater resistance to environmental aggressors such as UV radiation, moisture, and oxygen. Like OLEDs, µLEDs are expensive to produce, so as of last year the market was still nascent. However, µLEDs are evolving at a galloping pace, and the production cost is dropping.

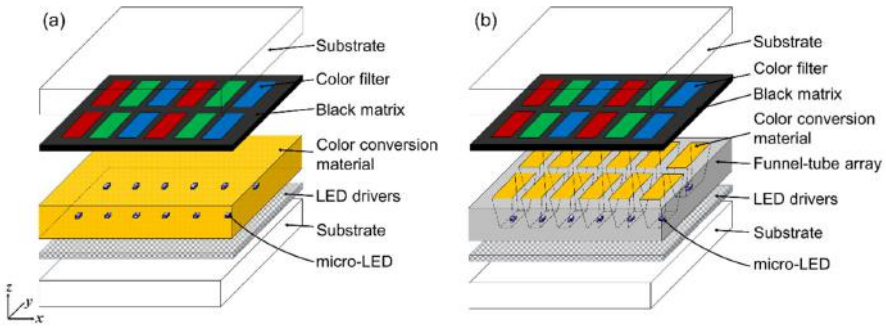
MicroLEDs also offer a sturdy collection of advantages over LCD displays with LED backlighting: much higher contrast and deeper black level; much faster response time; better color fidelity and viewing angle range; higher efficiency, and lower power consumption (as only those pixels that need to be lit are lit at any given time). Here again, though, there is the higher cost due to LCD being such a long-established technology and µLED being new.

Prototypes and Manufacturing Processes

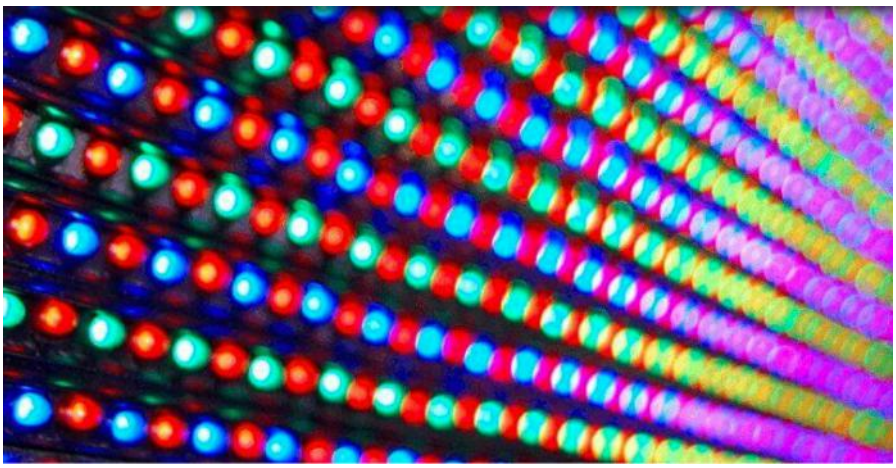
Mounting, imprinting and stamping technology

The microscopic LEDs can be mechanically mounted on a screen surface by a robot, which is a very slow and laborious process. Or there can be a mass-transfer process wherein the individual light-emitting diodes are removed from a cut wafer in a group and then stamped onto a screen surface.

MicroLED arrays are also produced monolithically in a batch process on a suitable substrate of sapphire or silicon. The preferred material is inorganic, monocrystalline GaN (Gallium Nitride) formed by epitaxy on the substrate. The LEDs are not subsequently separated, but retained as a display matrix. There are challenges such as doping for different colors, contacting as a matrix arrangement, and mechanical stability during transfer from the manufacturing substrate to a display substrate. These have not yet been solved in a commercially-viable manner, but research and development are ongoing.



Producing µLED displays is still a challenge. It requires a fast, precise and reliable transfer process. Until now, in LED production a single particle in the reactor chamber led to a defect on a single chip (a section of the wafer) among thousands. For the production of conventional LEDs, a few hundred defects per wafer are of no practical disadvantage; these defects are simply sorted out in an automated process. In the production of µLEDs, that's not practicable because of the scales and sizes involved. Thousands of LED chips (arrays) of a few micrometers in size are picked up and transferred in a special pick-and-place process. One defect makes a dead pixel that cannot be replaced, thus rendering the entire array useless. Therefore, an almost defect-free process is necessary that minimizes defects to such an extent that a yield is achieved that permits the economically viable production of µLEDs.



Jasper Display Corp. (JDC) is one of several companies that offers a CMOS backplane and driver platform to allow LED partners to develop their own complete display hardware and software systems. The silicon backplane is a digitally modulated, addressable active matrix, and the highly configurable driver supports a wide array of modulation schemes with constant-current LED drivers.

JDC’s silicon backplane uses PWM to digitally and directly drive displays; proprietary modulation patterns can be used as desired. It works for monochrome and full-color µLEDs, JDC says their backplane reduces development cost, risk, and time-to-market; and that it offers smallest pixel size; high efficiency, brightness, and contrast; rapid response time, and long lifespan.

The µLED market is still at a very early stage. Some companies, including Sony, Samsung, LG, and others are offering ultra-large µLED TVs as ultrapremium devices. Samsung, for example, are now offering their first "consumer" 110-inch 4K µLED TV. With its price of around USD $150,000 it's not really for regular consumers, but it is a step forward in Samsung's goal to advance their µLED display technology; now's the part where we watch for the price to trend downward and commercial applications to increase.

In future, consumer electronics suppliers will all have to stress and focus on innovative display technology not only in their R&D work, but in their marketing. The advantages of new technologies like µLED—more sharpness and contrast, deeper blacks, greater brilliance, lower energy consumption, and on and on—are so enormous that no manufacturer can afford to ignore them.

Initially, the new displays will probably be used in wearables—smartwatches and fitness trackers; that kind of thing. These offer the ideal entry point because they use small displays, require a high pixel density and their small batteries place a high premium on energy efficiency. Another market eagerly

awaiting the new technology is virtual- and augmented-reality. For example, a headset with MicroLEDs is significantly lighter than headsets with other display technologies, and can be operated wirelessly for many hours thanks to low power consumption.

Once production has been standardized to such an extent that mass production of even very large panels becomes possible at reasonable cost, manufacturers of screens for the living room or vehicle cockpits are likely to switch to µLEDs, because the market is huge and hungry for ultra-flat, energy-saving devices with brilliant images through a giant viewing angle.

SONY IMAGE

MicroLED displays seem likely to enter the market in the near future. There are dozens of companies working on the technologies, components, and processes and the future of the industry looks…well, *bright*!

Whether and when displays or interior lighting elements with µLED technology will find their way into vehicle interiors depends on the evolutionary progress and path their technologies, techniques, and cost will take. It is conceivable to have displays or dynamically-illuminated surfaces with special geometries that can be easier integrated into the three-dimensional surfaces of the car interior. It will as well improve HMI and safety, through higher definition screens and then, quicker driver response time–but speaking of time, for now we will just have to wait!

Interior News

Nova Car eXperience For UX and Intuitiveness

INTERIOR NEWS

Following previous concepts Nova Car № 1 and № 2, Novares unveiled four new concept cars at an event held recently in Paris.

Headquartered in France, Novares—a company resulting from the 2016 merger of Mecaplast and Key Plastics—is a global plastic solutions provider who design and manufacture plastic injection components and systems for the automotive industry.

These four vehicles feature the latest Novares innovations, jointly developed with startups and innovative companies to address challenges in green mobility; intuitive & safe user interface; and new UX for health-wellness-safety-comfort.

Two of the vehicles incorporate technologies at an advanced stage of development focused on user experience and intuitive interface. These account for 16 innovations presented this year, to be available soon for commercial applications. The two other concept cars, featuring innovations dedicated to combustion engines and electric motors, are still at an early stage of innovation.

The user-experience demonstrator bristles with innovations for smoother, quieter, more comfortable and more practical journeys. Traffic and engine noise reduction technology, haptic feedback controls and elegant displays; the car's interior offers optimum comfort.

The intuitive-interface car showcases easy-to-use systems for a simpler and more intuitive HMI. Efficient and invisible ventilation, curved displays and mirrors, backlighting, and new ways of presenting messages.

Novares' innovation strategy is supported by three pillars: R&D; the Nova Car Open Innovation Lab, and Novares Venture Capital to invest strategically to develop lasting partnerships, particularly with innovative startups. To date, the company has invested €12.9m in four startups and innovative enterprises: FlexEnable, APAG CoSyst, Actronika and Quad Industries.

FlexEnable Flexible Displays To Fit 3D Interiors

INTERIOR NEWS

FlexEnable is a spinoff of the University of Cambridge. They created an organic transistor technology platform for flexible displays and sensors, and offer screens on thin film that can be formed onto almost any surface. Their product is OLCD-based—organic/liquid crystal display. It has an LCD frontplane and a shatterproof organic thin-film transistor (OTFT) backplane. Film technology from FlexEnable was shown at this year' SID (Society for Information Displays) Symposium on Vehicle Displays and Interfaces.

Greater functionality and increasing density of displays are undeniable trends in the automotive interior. Right now that mostly means increasing the number of flat panels, which sets up a collision course with design and real-estate limitations. That's why 3D shaped screens are a must, for application on the backs of seats, doors and curved dash surfaces.

FlexEnable partnered with Novares for OLCD concepts including an A-pillar display that shows what is outside the pillar, and an interior sideview monitor. For even better images, the FlexEnable Dual Cell OLCD concept can achieve HDR contrast levels of around 1,000,000:1.

The dash is the 3D landscape of vehicle interiors, and FlexEnable's technology means displays can be much more integrally designed rather than grafted in or added on; the company says their technology "provides the conformability required to open up a wide range of new concepts for automotive displays. Displays can be inserted into tight interior spaces without disrupting interior ergonomics".

Flexible liquid crystal cells can also be used for colored-neutral, rapidly switchable smart window films that can be biaxially conformed to automotive glazing.

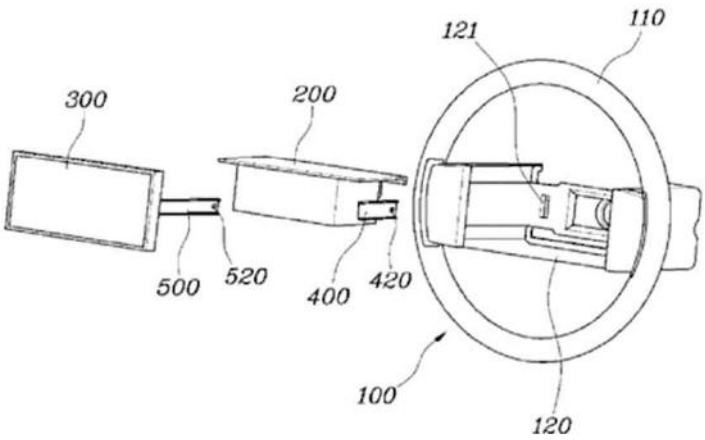
Hyundai's Patent-Pending Display Steering Wheel

INTERIOR NEWS

HYUNDAI RENDERING & PATENT FILING DIAGRAM

Hyundai supplied drawings alongside the application showing a two-spoke steering wheel with a display spanning the 9:00 to 3:00 position.

FIG. 1



This design addresses the issue whereby some drivers' vision of the instrument cluster is impaired by the steering wheel itself. With the most pertinent information displayed on the steering wheel, the driver gets an unimpeded view of information such as vehicle and engine speed and vehicle range. That said, the display moves along with the wheel, which may not be very convenient. Unless, of course, the wheel center becomes fixed, as Citroën did some years back with the C4 around years 2005-2010, by transforming the steering wheel into a small central console, via a fixed central hub mounted on the wheel. This seemingly very practical idea has not been used in other models, for some strange reason.

CITROËN FIXED-HUB STEERING WHEEL

The patent describes how the airbag will fold out of the steering wheel without being obstructed bythe digital display, or damaging it. Hyundai has previously experimented with touchscreen steering wheel controls which can change functions depending on what needs to be controlled. But this new patent describes a screen that displays information rather than controls. They previously revealed their Genesis Mint concept (DVN Interior May 21, 2019), including a widescreen display within the steering wheel. This patent filing could be part of that development.

BMW 4 Series Coupé Interior Design and Technology

INTERIOR NEWS

The BMW 4 Series Coupé has a uniquely spacious interior in terms of head space, knee, elbow and shoulder room. Rear seats split 40/20/40, and when flipped forward, open up even more cargo space (440 liters). Several places are opened to store things, including an under-armrest box, glovebox, cup holders, and partitioned door bins. A powered front seat, with contoured side bolsters, slides and lifts to give easy entry to the back seat.

M Sport models come with sports seats with M-specific upholstery; an M-logo leather steering wheel; door sill plates and digital instrumentation bearing the M logo, a dark-colored headliner, and aluminum interior trim decoration in chrome dotted around.

BMW IMAGES

Driver interaction within hand reach starts with the Control Display touchscreen, the iDrive controller, and the buttons for the Driving Experience Control switch and electric parking brake. It also includes multifunction buttons on the steering wheel, voice control, or optional gesture control.

The Live Cockpit Professional package provides a digital screen grouping comprising a 12.3” instrument cluster behind the steering wheel and a 10.25” central control display. Connected Package Professional is included on all models, comprising BMW TeleServices, Intelligent Emergency Call, Real Time Traffic

Information with hazard warning, Remote Services and Concierge Services. Smartphone integration is covered with Apple CarPlay and Android Auto, enabling services such as Google Assistant, Google Maps, music streaming services, and WhatsApp messaging service. The switch to BMW Operating System 7 also brings the Remote Software Upgrade function to the new 4 Series. All updates can be imported over the air, either on a smartphone via BMW Connected or directly into the car using its built-in SIM card. The HUD provides a 70 per cent larger projection area, optimized graphics, and additional content, while the tunes are pumped via a a Harman Kardon surround sound system.

Interior premium styling comes from classy materials such as Vernasca leather (split corrected leather, coated, grain surface embossed with synthetic polymer top coat).

The structure of the dashboard itself is based around horizontal lines, with its width further emphasized by the contours and electroplated strips wrapping around the door panels. The outer edges of the high-set center console have knee pads.

TomTom To Use Real Time Weather Data In Sat-Navs

INTERIOR NEWS

TOMTOM IMAGE

Approximately 22 per cent of vehicle accidents annually are attributed to weather related causes. So, Tom Tom the Dutch Navigation Service Supplier has teamed up with weather, environmental and industrial measurement specialist, Vaisala from Finland, to bring actionable road weather data to the TomTom Hazard Warnings service.

TomTom's tabular weather service is focused on providing real-time weather information for drivers. It provides both the current weather conditions and a forecast over multiple time periods, and supports multiple (linked) geographical areas for the reports.

The system is claimed to create time-critical signals that alert drivers and automated vehicles to safety-critical incidents as they happen. These incidents include traffic, weather, and road hazards. It uses Vaisala's data to deliver early warnings related to weather hazards such as slippery roads, reduced visibility and strong winds, road surface measurements and driving conditions forecasts.

It also detects the impact of weather conditions on travel time (ETA), events and incidents. These data enable to analyze probabilities of weather changes in near future. It covers continent-wide road networks across the US and Europe, with other geographical regions set to follow. TomTom claims they are the first company to use real-time weather data when calculating routes and ETAs.

Will Mini EV Be The Future Of City Commute?

INTERIOR NEWS

CITROEN AMI—A 2.41-M CARTO FIT INTO ANY PARKING SPACE. (CITROËN IMAGES)

Conventional small cars are giving way to a whole range of micro-mobiles. Does the future of urban mobility belong to them?

While conventional small cars are having a hard time in the face of stricter pollution standards and expensive electrification, new electric tiny cars are pushing into the city as light vehicles. "It's not just the exhaust fumes that cause us problems in the city," says Wim Ouboter of Micro Mobility Systems in Munich. It's also about the excessive space requirements: "Often enough, five meters and more than two tons of car are moved just to get one person from A to B." Therefore, he has developed the **Microlino** (DVN Interior March 12, 2020), which is to be launched at the turn of the year: Just 2.50 m long and only 1.50 m wide, it will be sold from €12,500 and is designed for city traffic with a maximum range of 200 km and a top speed of 90 km/h.

The **Citroën Ami** (DVN Interior March 12, 2020), will compete as a light vehicle. The same model will also hit the road in 2022 as the **Opel Rocks-e** (DVN Interior Sept 1, 2021). It aims to score points with its clean drive, small format, smart design and low price. Those who buy the Rocks-e pay little, and the plan is for it to lease for less than the cost of a monthly transit pass. A purchase price of around €7,000 is being talked about.

ACM E-TAXI IN MUNICH (ACM IMAGE)

Variable in a different sense is the **City One** by the Munich start-up ACM. Already very compact and with its radically simplified equipment designed for small prices of up to €15,000, it only has a range of about 100 km in the standard version. But the highlight are the additional batteries. They are as big as a rolling suitcase and can be installed in the rear if necessary. This increases the price, but the range climbs to up to 240 km.

Remember George Jetson's flying car that folded up into a briefcase at the touch of a button in the 1962 cartoons? That's getting closer to reality, as it seems; the **City Transformer** from Israel can make itself thin at the push of a button. Just 1.40 m wide, the wheels of the tiny car with two seats arranged one

behind the other are then retracted and the width shrinks to one meter, according to the manufacturer. Although the Stromer is then only allowed to drive 45 km/h instead of 90 km/h, it always finds a lane in a traffic jam and a space in a car park.

FRANK STRONACH'S SARIT

Magna magnate Frank Stronach, who is now 89 years old, also wants to launch a narrow-gauge one-and-a-half-seater called **Sarit**. Stronach wants to produce it in Magna's home country of Canada starting next year. The Sarit, which is sort of in between a car and a bicycle, is to be launched with a range of 100 km and a top speed of 25 km/h for about €4,000.

SAIC GM WULING MINI EV (GM IMAGES)

In China is the best-selling electric car is currently the **Mini EV**, built by SAIC GM Wuling. With a range of 180 km for the equivalent of €4,000, it sold more than twice as many cars in the first seven months as the second-place Tesla Model 3. Crashworthiness…? Well…different markets have different priorities.

The Design Lounge

BMW 2 Series Active Tourer Modernized

THE DESIGN LOUNGE

Flying a bit under the radar after the IAA in Munich this year, BMW introduced their 2nd-generation 2 Series Active Tourer MPV. Originally introduced in 2014 along with the 7-seat version called the Grand Tourer, this was BMW's first go at a front wheel drive "people mover". Now, nearly 8 years later, the Active Tourer receives a revamp still based on the original platform from 2014 but now with a hybrid powertrain option.

2 SERIES ACTIVE TOURER MK 1 (LEFT), MK 2 (RIGHT)

The new exterior with a sharp, simpler surface execution using an upright grill gives the car a more modern CUV proportion. The biggest change/update occurs within the interior with the UX/HMI display first seen in the BEV iX.

Although the platform is carried over from the previous generation, the overall feeling of the interior has drastically changed with this latest UX/HMI into a more drivers oriented/sportier aesthetic.

The form language has an angular and more dynamic appearance. This is also seen in the seating execution with the headrests now ‘nested’ into the backrest creating a ‘sport bucket’ feeling.

Even though the technology of BMW's standalone HUD display comes from the previous model, the visual integration and graphics used now harmonize with the new digital cluster, as opposed to the previous pointer dials.

There's an impressively cleaner/airier feel to the new car although they both share the same basic packaging constraints. The key differentiating items being the change of colorway, with a contrasting dark floor and the elimination of the floor to center-console integration. The previous car had a stacked ‘layer-cake’ feeling that had the center-console/instrument panel protruding and bisecting the front compartment.

The new Active Tourer has a stronger horizontal theme along with the now separate cluster/UX/HMI display that reduces the overall mass of the instrument panel and opens the front compartment for the driver, passenger and their belongings.

Rounder and more island-like forms in the previous model's seatback panels and trim. With light colorways, the previous model had little contrast, giving it a soft and friendly appearance.

See how the use of a dark contrasting colorway with more angular forms on both the back panel and trim increase the dynamic sportiness of the rear seats, while keeping functionality intact.

PREVIOUS (ABOVE) AND NEW (BELOW 2 SERIES ACTIVE TOURER

Obviously, the biggest change to the interior is the implementation of BMWs' latest cluster/UX/HMI display as seen in the iX BEV. The inclusion of this panel along with the HUD and wireless charging integrated into the floor console/center-stack fully modernizes the interior.

Also of note is the use of trellis-type detailing on the steering wheel lower spoke that adds a bit of interest and attention to detail missing from the previous model.

Regarding functionality, the center-stack/floor console of the new model prioritizes the use of occupant electronics and personal items. The previously dominant shifter, HMI controller, and HVAC controls are now removed to focus on the users' personal items such has smartphones, charging ports and storage (cup holders).

Previously dominating this region of the interior, the vehicles driving functions are now ‘downsized’ on the center armrest that clearly highlights the interior purpose more towards the occupants' needs, rather than the function of driving itself.

News Mobility

_Car interiors Unplugged

NEWS MOBILITY

BMW F10 528I

32. Privacy versus property (follow up)

(Part of an ongoing series introducing automotive interiors as an evolution of our habitat)

It has been said that submarine crew, after mission, do not drive their cars for a couple of days until their vision totally adapts to real-world depth of field. Wallpaper-like manmade spaces set by smart screens, long, linear and rectangular sceneries, often with no focal points, sealed with artificial light, air and sound, lack the essentials. A view to the natural surroundings and the physical experience guarantees the direct relation of who we are in a given moment in space. Corporate buildings or modern residential developments are raised under the architectural dilemma of lasting beauty versus fast return, thus a rare ‘room with a view’ to a natural landscape, feels like a shot of endorphins. A certain submarine syndrome broke surface in our, aesthetically challenged, confined habitat soon after the pandemic.

Aesthetics involve all senses. A blind computer screen cannot offer that, neither a bland interior space. Spirit and sense of place cannot exist without collective cultural memory and all the deeper material dimensions within. And this is no small order, it is about our living environment and our senses, not just our eyeballs.

Unlike corporate offices and large residential developments, car interiors, half-transparent to the outside scenery, are likewise very physical/tactile places. The skin of such environment deploys dissimilar smells, textures, forms, functions and materials, often extending into three-dimensional carefully designed objects or purposeful details, at times with an astonishing ‘click’ or even a musical sequence of more clicks. Tactile, physical, acoustic…a car interior touches you too, even constantly, even in some of the most intimate parts of your body, frequently ‘hugging’ you with no restrictions... We have created a world that is more compelling than any other setup, well accessible to each one.

At this very moment, cars are switching into something different and we realize that their interiors are nonetheless the most sophisticated confined spaces we know. They combine equally rich worlds of cognitive experiences that involve all senses, contrary to urban buildings, either residential or corporate.

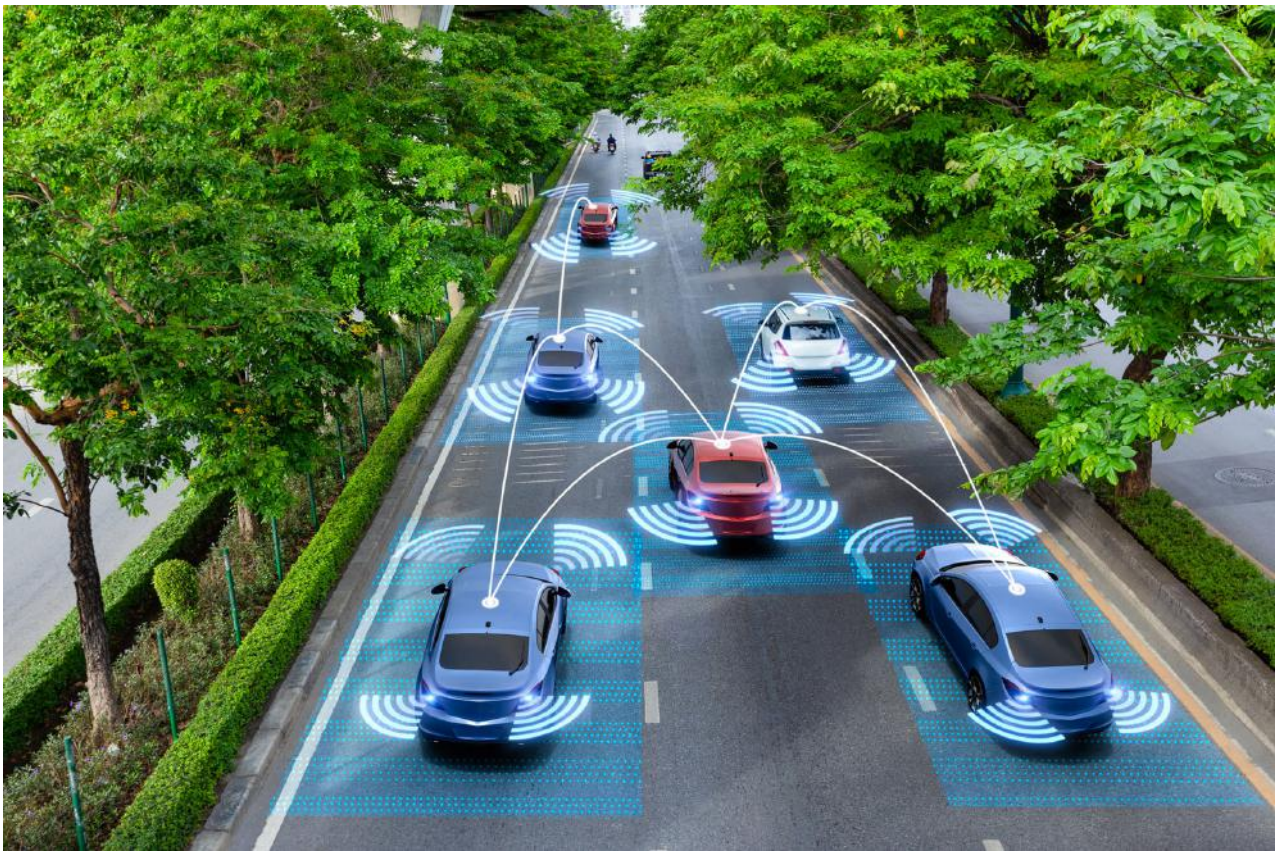
When today’s destination can be anywhere, Home is not just the place where you were born or live, it is the place where you become yourself, surrounded by personal items with stories to tell. Objects become experiences of our everyday life in a similar way the very distinctive, one-spoked Citroën DS19 steering wheel in 1955 for the first time converted routine steering into a suspended choreography framed around the dials. A 1963 Ford thunderbird cylindrical extruded metal gauges, were seemingly coming straight from the engine block, to tell the engine's tales, while the ‘wooden’ blinker sound of a first-gen BMW 7 series (1977) was filling the space, causing a ‘ritual’ silence to announce the imminent change of direction. Since, there are undeniably many more interiors, such as Volvo XC90 center console knob and toggle switches, crafted meticulously with watchmaking precision. We just want to touch them before even knowing what they do. In Audi TT, analog-merging-digital air vents convert the feel of airflow on the skin of your fingertips to an instant visual graphic. Peugeot 208 ‘materializes’ dials as precious holographic jewels-behind-glass while DS3 door handle and vent titanium frames, are engraved with elaborate algorithmic patterns and contours that aspire to rare historic relics and artifacts.

If museum collections of precious objects are about moments in time and storytelling, then car interiors are depictions of defined spaces and itinerant adventures that withstood the test of time.

_to be continued…
_____INDUSTRIOUS__

The Autonomous Vehicle Miracle Will Not Happen: Study

NEWS MOBILITY



A Harvard and MIT **study** concludes that autonomous vehicles won't solve all of the problems associated with the personal car, for a couple of reasons: AVs will have a hard time being competitive with regular cars, and their practical performance in economic, environmental and other such terms depends largely on how they are used.

The study illustrates that an Autonomous Taxi (AT) financial proposition, while being more favorable than Conventional Taxi (CT), remains—contrary to existing discourse—less favorable than Personal Vehicles (PV). ATs impose a cost of between US $1.42 and $2.24 per mile, compared to $3.55 and $0.95 per mile incurred when using CTs and PVs respectively.

It identifies previously-overlooked parameters, the most notable being capacity utilization and profit incentive, as significant impediments to achieving cost parity between ATs and PVs. Omission of these parameters lowers AT rider costs to as low as $0.47 per mile.

The study documents that rebound effects do not require cost parity between ATs and PVs. It shows that AT introduction produces a net increase in energy consumption and emissions, despite ATs being more expensive than PVs.

And it identifies and quantifies the technological, behavioral and logistical pathways—namely, conformance to AT-specific energy profile, ride-pooling and 'smart deployment'—required to achieve net reduction in energy consumption and emissions owing to AT deployment.

Overall, this study underlines the limits of a simplistic vision of AV, and underlines the importance of the system which surrounds the deployment of this new technology. In particular, she stresses that the main optimization factor is that which relates to the optimization of use. Sharing journeys (or carpooling) is imperative for the VA to be of collective interest.

The ecosystem needs to anticipate this need, and allow road users to share segments of journeys, as for collective transport.

General News

Continental JV With AI Horizon

GENERAL NEWS

CONTINENTAL IMAGE

Continental is founding a joint venture with Chinese AI-specialist startup Horizon Robotics to produce hardware and software for driver assistance systems and automated driving.

Continental will be the majority shareholder. The joint venture is to be based in the Jiading District in Shanghai, and will employ 200 people. The new company will serve both the Chinese market and international automakers. Founded in 2015, Horizon Robotics is based in Beijing. Among other things, they develop AI chips.

The joint venture also reportedly signed a memorandum of understanding to collaborate with Elektrobit to supply the software for the underlying standardized vehicle infrastructures.

Chinese startups are supposed to "save" German car manufacturers and suppliers. Since the beginning of this year, it has become increasingly clear that both German automakers such as Daimler and suppliers such as Bosch, Continental, and ZF are relying heavily on cooperation with Chinese startups.

Major transformations in the automotive industry—electrification and digitalization with trends such as autonomous and connected driving—can neither be handled by traditional car companies nor by e-car startups alone, goes the wisdom. One technological development follows the other too quickly, from smart cockpits to lidar sensors, from algorithms and autonomous driver assistance systems to AI chips and new business models.

Qualcomm, SSW Scoot Past Magna to Buy Veoneer

GENERAL NEWS

Chipmaker Qualcomm and SSW Partners, a New York-based investment partnership, are buying Veoneer for USD $37 per share in an all-cash transaction, representing a total equity value for Veoneer of $4.5bn.

The deal edges out Canada-based Magna International, who refused to raise their bid for Veoneer; Qualcomm's offer is an 18 per cent premium to Magna's $31.25-a-share bid. The deal is expected to close next year.

At closing, SSW will sell Veoneer's Arriver business to Qualcomm and "lead the process of finding strong, long-term strategic partners" for Veoneer's other units, the companies say.

Magna, whose previous offer to buy Veoneer had been accepted, said Veoneer's board determined that the previously announced proposal by Qualcomm is a "superior proposal" in terms of the previously announced merger agreement between Magna and Veoneer, which allowed that agreement to be unwound if Magna chose not to beat it.