DVN-I
Automotive Interior

Thu, 7 January 2021 Weekly Newsletter **NEWSLETTER #44**

Editorial

2021- For The Best Of Automotive Interior

As 2020 came to an end, and will probably enter history books because of Covid-19 and the related recession, let us hope as we enter 2021 that the vaccines will do their job to end the pandemic, and that the automotive and mobility industry will fully leverage this new environment.

First of all, the automotive event-year is starting off with CES, which will happen online for the first time ever. That seems good and appropriate, but we're sad that we won't be meeting and interacting physically with our colleagues and friends.

We will work to give you here a trend flavor of the event, as it will probably set the tone of the coming year and more even if nobody is able to assess yet when we enter the post

COVD world. Surely health, cleanliness, digitalization, and automation will accelerate for the best of new mobility, where interior is playing a bigger role, including occupant monitoring and protection. We will keep you posted, starting with the next edition of the Newsletter.

We at DVN-Interior will continue to bolster our leading position keeping you right up to date on all matters concerning automotive interiors and the constellation of products, services, materials, suppliers, researchers, and all others building the new mobility world. This week you'll find in-depth coverage of displays, and the Design Lounge looks at what's cooking in delivery vehicles. If you're not yet a DVN-I member, take the opportunity to start the new year with us. Subscribe **here**.

We wish you a fine start for a successful and, above all, healthy new year, and we're glad you're with us in the DVN Interior community!

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

Trends and Solutions for Automotive Displays

SOURCE: LG, SAINT-GOBAIN

The trends for automotive displays are mainly driven by user experience, interior design, connectivity, electrification, shared mobility and autonomous driving.

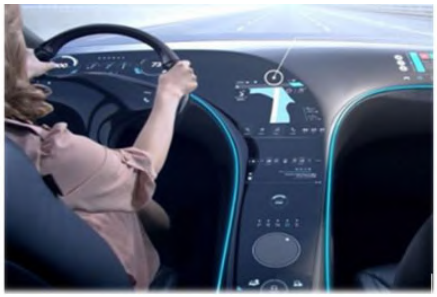
Today and in the near future we'll drive cars with semi-automated functionality. There we have still restricted opportunities for reading or working during driving, because we are still forced to take control of the vehicle at any time.

CLOCKWISE FROM UPPER LEFT: MERCEDES, CONTINENTAL, TESLA, GOOGLE

The evolution from semi-automated to autonomous driving vehicles (AV) has a huge impact on the number, size, and design of displays. In AVs with optional manual driving, you may be able to rotate the front seats for a face-to-face communication or for video conferences with large table displays or touchscreens.

The trend for dashboard-integrated displays is going towards pillar-to-pillar displays and touchscreens with smart surfaces and new HMI concepts.

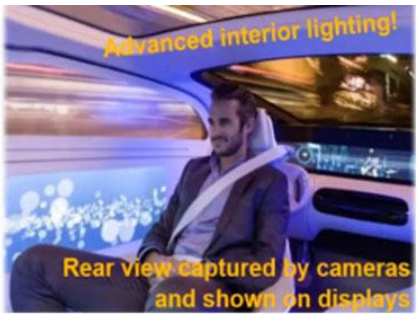
The next development step for automotive displays is going from 2D towards 3D displays for an improved perception of the manifold information and towards flexible, shaped and curved displays for a seamless integration into the car interior components.



IMAGES: LEIA, CONTINENTAL, VISIONOX

The full autonomous driving vehicle (AV) will become a rolling living room for relaxing, watching TV, gaming or an office for working, video conferences etc., because eyes-off-the-road will become possible and normal, it will change the in-car activities revolutionary. The use of displays will increase from minutes today to many hours a day in future.

Vehicle occupants will be surrounded by several large displays and touch screens for controlling functions, different camera viewpoints, communication, info- and entertainment. Displays will more and more dominate the interior design and user experiences.

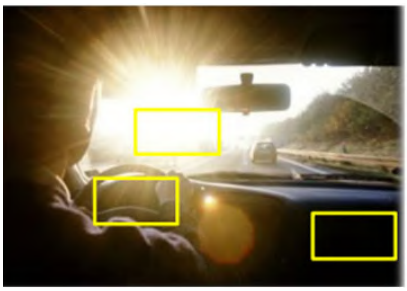


IMAGES: RINSPEED, HARMAN, PANASONIC, HYUNDAI

At the same time, apps for personal smartphones, developed by digital/software companies, will play an increasing role for in-car experiences with more limited influence from automakers.

The technical challenges will increase with the future requirements for automotive displays.

The main challenges for "high quality" automotive in-vehicle displays are:
• Reading displays: eye adaption versus luminance, reduced reflections, efficiency, and so on
• Reproduction image on display: original scene vs. display vs. vision
• Eye matching and seamless integration: resolution, peak luminance, color, flexible displays, response time, high frame rate, black panel when off, etc.



IMAGES: VISTEON, SPECTRACAL

The technical trend for displays is going towards higher resolution (headed for 300ppi), LCD at lower temperatures and OLED with higher frame rate and less motion blur, larger luminance range (trending toward 10 kcd/m^2) and wider color gamut.

Audi, with their e-tron CMS, won a SID (Society for Information Display) Application Award last year for their door panel integrated 7" OLED display with 1,280 × 800 resolution and a very fast switching time—we reported on this in the DVN-Interior Newsletter of 7 July 2020.

IMAGE: AUDI

The SID Display Componentawardwent to **Corning** for their cold-formed curved display. Usually, glass is bent at higher temperatures and the following processes like coating and ink printing have to be adapted to the curved form. Cold-formed glass is manufactured in the first step in a flat shape for strengthening, coating and printing. In the next step the glass is bent to the final shape at room temperature, a great advantage for ease and cost of production.

SOURCE: CORNING

Another SID Display Component award went to **Tanvas** for their touch surface haptics which enable programmable tactile and texture effects by an electric field to modulate the haptics via friction. Tanvas developed the first automotive solution on the basis of solid-state actuators to replace the traditional haptics by vibration. The driver can keep his eyes on the road while searching, finding and adjusting operations. This technique works as well for large and shaped displays and smart surfaces.

SOURCE: TANVAS

Head-up displays (HUD) are going towards AR (augmented reality). The conventional HUD has a typical FOV (field of view) up to 6° × 3° and a projection distance of 2 - 3 meters for only operational data. The future AR-HUD will need new HUD techniques, to get a FOV > 20° × 10° with an aimed projection distance of 2 - 30 meters.

SOURCE: PROF. DR. BLANKENBACH

If the goal for a future HUD is the complete visual presentation information of the environment on the windscreen, new AR-HUD techniques are necessary.

Transparent displays in the windshield could be a competitor or supplement to the AR-HUDs. With a high transparency (>70 per cent) they can be a useful information source for drivers, passengers and other road users. However, high luminance (>2000 cd/m^2) and focusing properties are necessary and presently pose considerable technical challenges.

SOURCE: LG, SAINT-GOBAIN

According to a market forecast from Yole Développement, the global market for car-interior displays is expected to reach $23bn in 2025 with a CAGR (2020-2025) of 12 per cent. Displays will represent more than 70 per cent of the revenues. Autonomous driving

will certainly be an additional lever for the demand, development activities and new technologies for displays, touchscreens and new HMI concepts.

Interior News

CES 2021 Technology Show: Online Next Week

INTERIOR NEWS

While the digital CES won't be able to replicate the Las Vegas tech extravaganza of past years, there should still be plenty to watch for at the online-only CES 2021 next week.

The CES organization held a Tech Trends conference at the end of October, and several announcements since then have given reliable hints on what will be presented.

The health crisis has accelerated existing uptrends such as digital health, cloud-based services, work-from-home technology, robotics for cleaning and logistics, and a variety of digital transformation technology—CPU/GPU, IoT, VR/AR, AI, etc.

For vehicle and mobility technology, automated driving and smart cities would be the most important themes, including as well application of new/upgraded digital technology.

For automated driving, early visions of fully self-driving robotaxis have given way to more immediate and pragmatic use of driver-assist technology.

Smart cities will become the preferred test fields for robo taxis, within an extended sensor network to keep track of air pollution, proximity, noise, traffic, vulnerable road users, and other suchlike. Contact tracking technology will accelerate where traffic and safety could almost become a by-product!

Back to office with smarter and safer buildings is also a post pandemic trend—hygienically clean air and surfaces, touchless voice and gesture technology, AR/VR—where seamless transfer to the auto world is expected.

Child seats, Hassle for Families?

INTERIOR NEWS

According to a study made by finance professors Jordan Nickerson (MIT) and David Solomon (Boston College), there's a correlation between number of children per family and car child seat complexity.

The study, called "Car Seats as Contraception", was first reported by The Economist early last month. It found that increasingly stringent child car seat laws are correlated to fewer families with three children in the US between 1973 and 2018.

Many factors probably factor into the average American birth rate per woman dropping from 2.12 children in the 1970s to 1.73 children on average in 2018. None of societal explanations examined by the professors—education, profession, contraception—overlaps neatly with birth-rate curves. But they did find an intriguingly counterintuitive one: increasingly protective child car-seat laws.

The legal requirements went from securing only children under age three in safety seats in the 1980s to now securing children in safety seats until they're at least eight years old. The study authors suggest this has discouraged parents from having a third child.

According to their findings, the birth rate dropped 0.73 per cent in women giving birth to a third child when the other two children still needed safety seats—which The Economist called a significant fraction of the 9.36 per cent of women in the sample who became third-time mothers.

The data provides a direct correlation, the authors claim, with vehicle space being the crucial factor. Fitting three kids in the back seat or even the way back seat in wagons.

ESI Virtual Prototyping Supports JMDA's Red Dot Design Award

INTERIOR NEWS

Created in 1973, ESI Group is a leading player in Virtual Prototyping solutions; headquartered in Paris, France, with a staff of approx. 1,200 experts, and locations in more than 20 countries.

With specialized expertise in the field of materials physics, the company has developed and perfected, over the past 45 years, a sharp mastery of digital simulation solutions. Seeking to go beyond the traditional conception of PLM (product lifecycle management), ESI has developed a holistic approach focused on industrial productivity and product performance, beyond their development, throughout their life cycle—they call it Product Performance Lifecycle™.

With a relationship that spans more than a decade, JMDA Design and ESI Group worked together on the Tinyseats child car seat project which resulted in the famous Red Dot Award: Design Concept 2020.

JMDA Design is a global provider of product design services, has over 30 years of experience in the industrial sector. The company is in its 105th child car seat iteration.

Using Virtual Prototyping, and then virtual testing, they were able to validate the product without the need of any physical prototypes or tests. It ends up with innovative, cutting-edge child restraint systems with optimized dynamic performance, de-risking all safety issues, within a fully controlled envelop of time and budget.

Tinyseats are a very lightweight, compact and convertible car seat suitable for children from 9 months old.

VW's AR-HUD for ID EV

INTERIOR NEWS

Volkswagen has become the first high-volume automaker to offer an augmented-reality head-up display system for the compact segment, in their ID.3 and ID.4 fully-electric models.

The system overlays information over the outside world and display them on the windshield in a dynamic fashion. Usually, this type of system would first end up on high-end models exclusively. Not this time; it's innovation for all, which could bring us back to the real meaning of Volkswagen ("people's car").

Here's how it works: the information being projected onto the windshield is separated into two fields and levels. There's a large window for the dynamic displays in the driver's field of view at a virtual distance of around 10 m, with a diagonal measuring roughly 1.8 m. This far-range window holds information from the assist and navigation systems.

The close-range window, on the other hand, is a flat band under the large far-range window, showing the driving speed, road signs, and assist plus navigation symbols as static images. These appear to float roughly 3 m in front of the driver.

All displays are aligned with the exterior view from outside the vehicle and are shown dynamically. When the vehicle approaches a junction where it should turn off according to the navigation route, the driver sees two indications: in the first step, an advance notification on the road level, and then three arrows located at the junction. The closer the driver gets to the junction, the larger the arrows become. At the same time, their textures fade in order to ensure a clear view of the road.

Symbols appear as an aid only when the adaptive cruise control or travel-assist is activated, so as to minimize distraction.

VW ID buyers can specify the augmented reality head-up display as part of the Infotainment Package Plus, which also includes the Discover Pro navigation system with touch display.

Miko's Eco-Friendly Microfiber Fabric

INTERIOR NEWS

VW ID.3 FRONT SEAT WITH DINAMICA TRIM

Dinamica® is a luxury microfiber suede from Miko, made primarily from recycled polyester fiber and 100 per cent recyclable.

Established in 1997, Miko is an Italian company. Miko is a partner of Asahi Kasei, a leading Japanese company, which provides the raw base material. In 2015, Miko was acquired by Sage Automotive Interiors, one of the world's leading providers of automotive textile, headquartered in Greenville, South Carolina, USA.

Dinamica meets the most stringent requirements of the automobile industry for comfort, elasticity (trimability and resistance), breathability, and durability. It can be used in various parts inside a vehicle: seats, headliners and dashboards.

Its production process is similar to that used for paper recycling, in which no harmful chemical substances are used. The recycled polyester contained in Dinamica derives from polyester fibers (T-shirts, fibers, etc.) and PET (bottles, plastic, etc.). Recycling polyester means reducing energy consumption and CO_2 emissions by 80 per cent compared to the traditional petrol-based polyester production process.

It is composed of three layers: face, inner scrim and backing. Submerged in a water solution, the inner scrim attracts small polyester fibers, which are suspended in the liquid, to both surfaces; these are compacted using a water-based needle punching process. The microfiber is then immersed in a water polyurethane bath, with no solvents. This process compacts the fibers, making them elastic and resistant.

Vintage-Inspired EV Concept From Alpha

INTERIOR NEWS

Irvine California-based EV startup Alpha unveiled a vintage-look EV: it's the company's Ace coupé, a small city car with a cool retro styling. It's the second concept unveiled by Alpha, after the Icon, which is a sort of SUV-Van-Truck configurable concept.

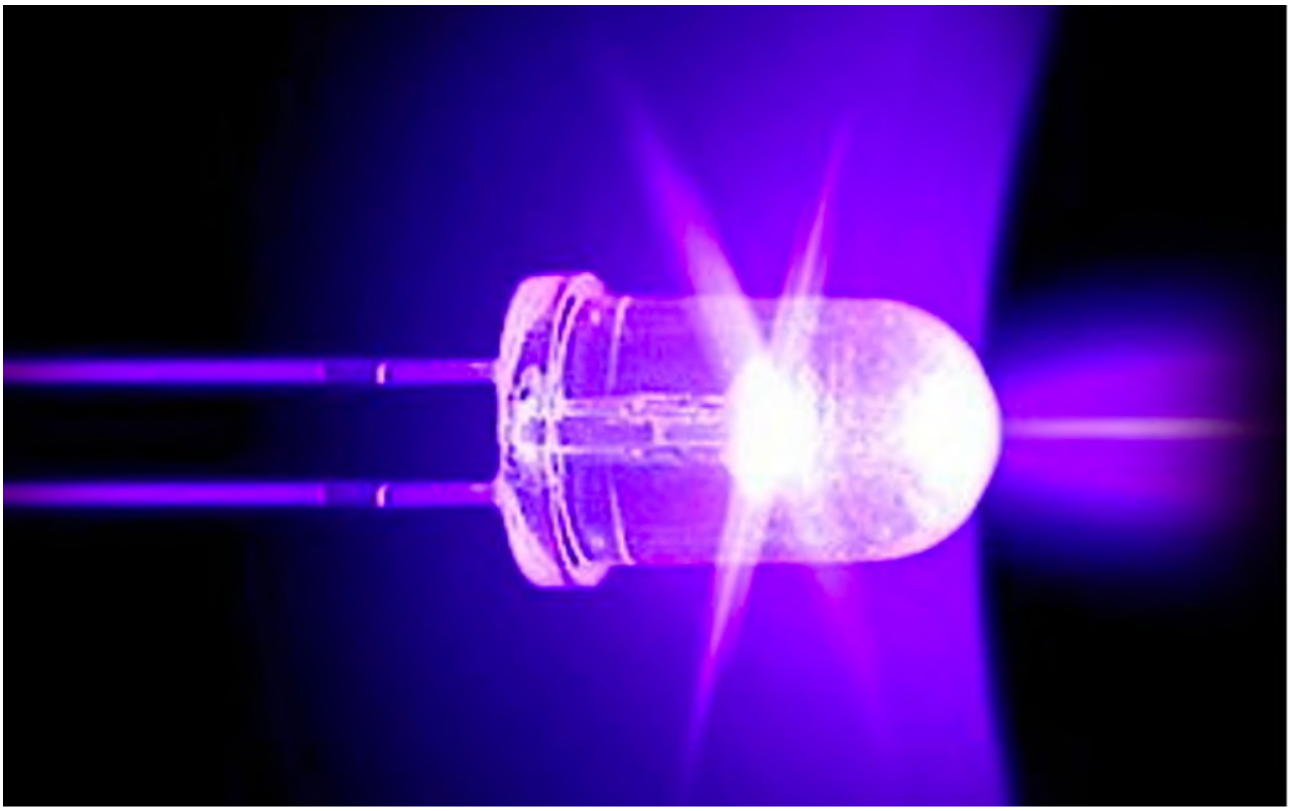
The Ace's simple—minimalist, even—interior architecture optimizes cabin space through a seamless and fluid construction that reduces components without compromising ergonomic comfort or ease of use. It looks like a 2-seater interior, with two compact rear seats for occasional storage. A central display, horizontally mounted, integrates user interface controls that can be synchronized or replaced with the user's own electronic device.

Surfaces combine leather with simply brushed metal parts, seats and console armrest area are wrapped with perforated leather—perhaps signifying a special heat/cool system?

Alpha says their development strategy prioritizes what they call the three R's: Renewability, Recyclability, and Replaceability. They also mention on their site that they plan to launch vehicle production in 2023.

UV-B Kills COVID-19 Virus Fast: New Research

INTERIOR NEWS



Ultraviolet radiation is a common method of killing bacteria and viruses. Now, researchers from Tel Aviv University have proven that the coronavirus presently causing such disruption and dismay can be killed efficiently, quickly, and cheaply using ultraviolet-B (UV-B), not just the more exotic, less affordable UV-C.

Professor Hadas Mamane, head of the Environmental Engineering Program at Tel Aviv University's School of Mechanical Engineering, led the research effort with Professor Yoram Gerchman and Dr. Michal Mandelboim. Mamane says "We discovered that it is quite simple to kill the coronavirus using [LEDs] that radiate ultraviolet light", adding that the UVEDs take less than half a minute to destroy more than 99.9 per cent of the coronavirus.

The study is the first of its kind in the world, and was published earlier this month in the Journal of Photochemistry and Photobiology.

UVEDs—that is, light-emitting diodes that produce ultraviolet radiation rather than visible light—are available in all three ultraviolet bands, UV-A, UV-B, and UV-C. But UV-C, with wavelengths of 200 to 280 nanometers, is still difficult and costly to produce with solid-state lighting technology. UV-B, in the 280-315 nm range, is easier and less expensive to get from LED technology, but until now hasn't been widely considered as suitable for sanitization applications.

Mamane explained the benefits: "We know, for example, that medical staff do not have time to manually disinfect, say, computer keyboards and other surfaces in hospitals—and the result is infection and quarantine", she said. "The disinfection systems [based on UVEDs], however, can be installed in the ventilation system and air conditioner, for

example, and sterilize the air sucked in and then emitted into the room". She noted that her research team are "also developing, together with a scientist at Northwestern University, a transparent coating that can be dipped or sprayed on surfaces and can kill viruses using visible-light LEDs that are not dangerous and are used everywhere, providing another application for regular LEDs".

In her team's research, they managed to kill the coronavirus using relatively cheap 285-nm UV-B UVEDs rather than the more costly 265-nm UV-C UVEDs. Mamane says the research "has commercial and societal implications" and applications; as the science develops, the industry will be able to make the necessary adjustments and install the bulbs in robotic systems, or air conditioning, vacuum and water systems, and thereby be able to efficiently disinfect large surfaces and spaces.

She said the 285 nm LED is 15 per cent to 30 per cent less expensive and requires only a little more time to be effective.

"Anything that can reduce cost could help implementation," she said, adding that she expects this technology to be commercially cost-effective by 2025.

Hand Tracking, Mid-Air Haptics in HMI Development Platform

INTERIOR NEWS

HMI developer CGI Studio has integrated specialist Ultraleap's hand tracking and mid-air haptics technologies into Incari, their automotive HMI development platform. They're saying the integration will allow new touchless interaction methods to be created in the platform and gives UI and UX designers the ability to define a more comprehensive user experience.

The company says Incari is increasingly being adopted by manufacturers as a part of the vehicle development workflow. It allows for cross-department collaboration so designers and engineers can work on the same basis in the HMI creation process. This allows UI and interaction designers to focus on content creation and quickly build a new HMI that is then compiled into a vehicle system where engineers can focus on implementation and logic development. This streamlines the entire workflow of HMI production, allowing for an agile development process, eliminating redundant manual tasks and reducing effort spent.

CGI Studio's CTO and cofounder Alexander Grasse says "Since we first experienced Ultraleap's technologies, it's been clear that they deliver real value in automotive HMI. We are very pleased to have built Ultraleap's technologies into our platform and to give our customers access to new and advanced methods of interaction. Together, we can help HMI designers and engineers leverage these new technologies for their upcoming HMI projects so that they get the best development experience from early design stages, up to series production."

The Ultraleap integration for Incari Studio is currently in beta release, with a prototype running in a driving simulator. In the future, customers will be able to access the integration via a plugin from the software.

The Design Lounge

Future Delivery Vehicles Will Be BEVs

THE DESIGN LOUNGE

Now that we are the end of a very difficult 2020, I would like to highlight a positive development happening right now within the industry that most of us have been only peripherally aware of, if that: the growing significance of BEV technology for delivery vehicles.

With the increase of deliver service items purchased over internet store accelerated by the Covid-19 pandemic this year, the need for a BEV delivery vehicle has accelerated.

Unsurprisingly, the latest to enter the delivery vehicle market is Bollinger Motors with their DeliverE vehicle. Although just a concept rendering so far, this vehicle will be based on the same BEV chassis as the Bollinger B1 and B2 models; 2021 should see the unveiling of a running prototype version.

CONCEPT MODELS OF THE DELIVERE FROM BOLLINGER MOTORS

Surprisingly, the concept of a BEV delivery vehicle was already realized in 2010 and successfully brought onto—and then removed from—the market. Namely, the Navistar eStar BEV that was produced and supplied to FedEx from 2010 through 2013.

The eStar had a 5,100 lb (2,300 kg) payload capacity available with a 14 to 16-foot cargo box. The vehicle was powered by a 70 kW 102 hp electric motor with an 80 kWhr lithium-ion battery pack supplied by A123 Systems.

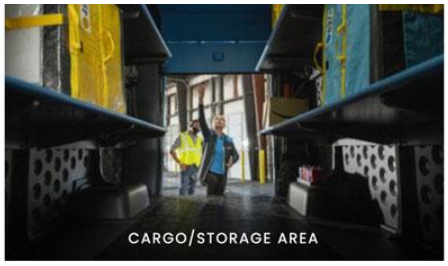
Although only 10 years ago, the very basic & plasticky interior with a central configurable display seems thoroughly outdated.

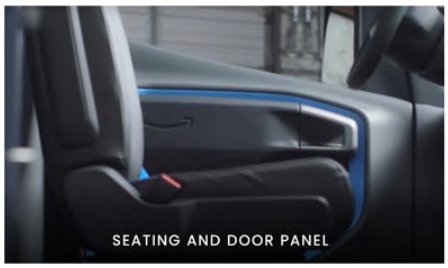
The high battery cell cost doomed this vehicle by costing $150,000. Since 2010, battery cell prices have dropped over 50 per cent, thus making these types of vehicles commercially viable.

RIVIAN AMAZON DELIVERY VEHICLE

Rivian is carrying over the displays used for their SUV and Pickup trucks in this new vehicle.

With a very publicized order of 100,000 vehicles form Amazon, Rivian seems to be the newest leader for this market.





Although no purpose-built BEV delivery vehicles are on the marketplace today, Rivian is not the only startup manufacturer that has chosen to enter the field. On the contrary, numerous startup manufacturers entered with ground-up new vehicles that will compete directly with the established automakers that are using ICE vehicles converted to a BEV.

Arrival is another startup vehicle manufacturer based in the United Kingdom. They have also received an order from UPS for 10,000 vehicles. In addition, Arrival is developing BEVs for the bus market.

Although still in the prototype phase, Arrivals' approach to manufacturing is using a decentralized assembly technique with localized regional manufacturing plants. This contrasts greatly with the large centralized manufacturing that the established automakers use.

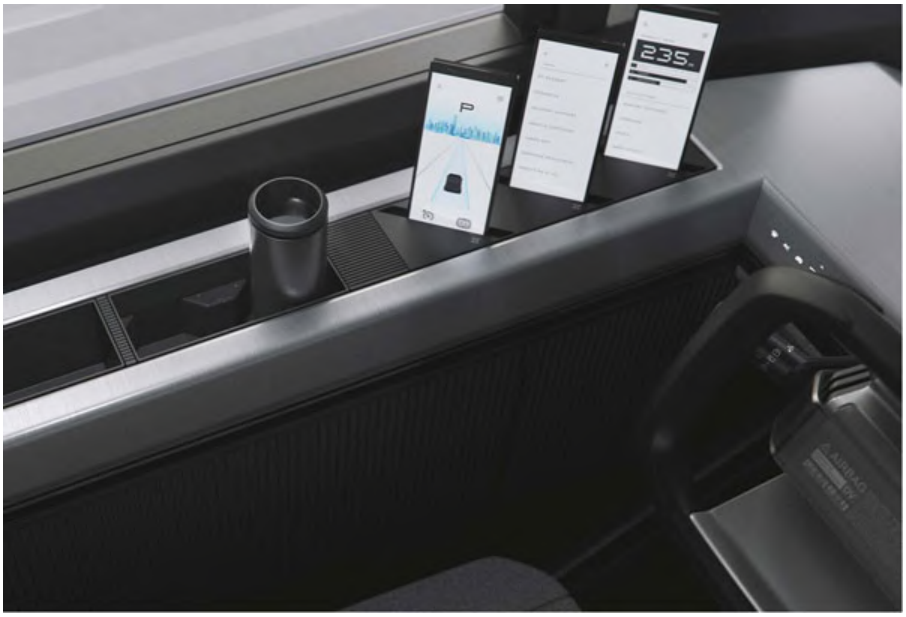
Canoo, meanwhile, plans to offer various heights for their Multi-Purpose Delivery Vehicle

The Canoo MPDV uses a very slab-sided and angular aesthetic.

The interior is really the star of the Canoo MPDV.

Unhindered by any conventional restraints, Canoo has eliminated the conventional cockpit displays and UX/HMI used by other manufacturers and focused on personal and professional smartphone devices placed in a non-traditional IP.

Placing these devices on the door panel next to the driver offers an unencumbered view forward and to the side that is enhanced by the extended windscreen below the traditional cowl line.



Multiple devices can then be simultaneously used by this placement.

The rear storage/cargo area is also more easily accessible.

And in Germany, another startup vehicle manufacturer is Electric Brands. They're developing a small 600-kg vehicle for Europe, limited to 100 km/h and focusing on modularity and utility; it's called the eBussy.

Still in concept form but planned for running prototypes in 2021, the interior of the eBussy highlights its configurability by allowing the driver to locate the steering/driving controls across the instrument panel based on their use situation: left, right or in the middle.

The eBussy has a cab-over design typically used for light commercial vehicles to allow multiple configurations and usages: flatbed, dump truck, small camping van, etc.

With a thoroughly renewed focus on these BEV delivery/utility type of vehicle, 2021 and beyond is starting to look quite promising for design and a renewed industry.

News Mobility

_Car interiors Unplugged

NEWS MOBILITY

NISSAN INTIMA CONCEPT – 2007

2 Materializing Time_

an ongoing series introducing automotive interiors as an evolution of our habitat

The evolution of our mobile needs enabled, a bit at the time and by practice, this basic notion of settling in a space while moving. A specific framework of features evolved from the very beginning of our automotive adventure and altogether grew into this peculiar self-contained 'object-from-far/world-from-inside' thing, that still has no name. Empowering both motion and observation, a specific relationship was established between the inner and the outer. Car interiors are like molds of our body and equally an imprint of our gestures, half transparent, engaging to an instinctive relationship with the surroundings. Composed and evolved according to our habits while in motion, it is a space that contains accumulated knowledge about us. This is beyond just transportation,

this is mobility meeting habitat, engraved into the complex relation between space and time.

Conceiving car interiors is a proper world-building process, with technology being inseparable from our figure. An augmented human is the up-to-date reference model, regulated by vast samples of populations around the globe. Proportions are defined around body posture and surrounding components are fitted accordingly. We can imagine a constellation of mechanisms and ergonomic features, framing digital human-figure mannequins and all corresponding functions and commands, virtually levitating in optimal positions within reach. When design is applied is just like a snapshot, a still image of the specific usage scenario, sealed by integrated surfaces that visually express the final creation and thus, a technical outfit is dialed into a custom profile. The more the profiles, the more the lay outs and configurations, in an ongoing race to provoke, adjust and satisfy latest trends.

The entire synthesis is like reduced scale urban planning, composed by infinite tubes and cables, electricity, water, lighting, airflow, wireless network systems and mobile parts; built by very complex consortiums of hundreds of suppliers, business agreements and real estate acquisitions per square inch of technology. Car Interiors are perceived and analyzed in many ways, by volume, form, texture, softness, opacity, temperature, arrangement, tech content and overall mood. The result is a surrounding, life enhancing setup that we experience even in complete darkness.

New modes of use paired with upcoming know-hows have always found prosperous ground in car interiors. From sophisticated safety systems to plug-n'play apps, the challenge is the coordination and harmonious coexistence between the multitude of functions and the human factor. The amount of complexity is such that fault-tolerant protocols are established in order to constantly achieve and deliver a seamless experience. Car interiors are similar to intricate clock mechanisms that divide and elaborate every function into tiny segments to minimize error. It is about a mechanical refinement that mitigates the effects of gravity, speed and acceleration on the task of inhabiting motion.

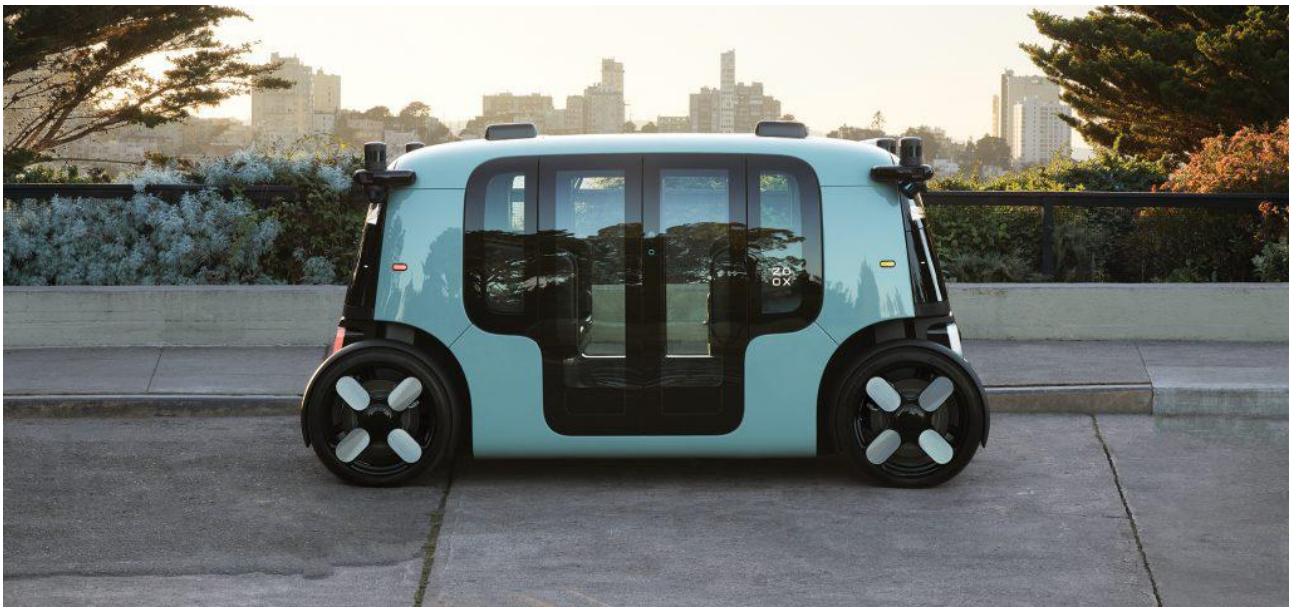
These are the most complex products ever built available to the public and their value relates to the experience in them. Hence, they act a bit like time machines: the perception of time/value while being mobile is the uniqueness that no other type of interior space can provide.

_to be continued…

*INDUSTRIOUS*_____

Zoox Robotaxi for Future Ride-Hailing Service

NEWS MOBILITY



Zoox, the self-driving startup owned by Amazon, has unveiled a fully-autonomous electric vehicle with no steering wheel that can drive day and night on a single charge.

The vehicle, which Zoox describes as a driverless carriage or robotaxi, can carry as many as four passengers. With a motor at each end, it travels in either direction at a maximum speed of 120 km/h. Two battery packs, one under each row of seats, store enough energy for 16 hours of runtime before recharging.

To commercialize the technology, Zoox plans to launch an app-based ride-hailing service in cities like San Francisco and Las Vegas. The company also plans to launch ride-hailing services in other countries with mobility operators such as Uber and Lyft.

Zoox is one of several companies working to put fully autonomous vehicles on the road. These vehicles are already being built at a facility in Fremont, California, with the capacity to eventually produce 10,000 to 15,000 units annually. Suppliers send the major

components—the drive unit, body, battery pack and so on—already assembled, and Zoox then does final assembly in stages, a process they liken to building a Lego set.

The vehicle's safety features include airbags that form a cocoon around each passenger in the event of a crash, which Zoox says is unlikely given their confidence in the driving technology.

The company can manually operate the vehicles remotely and communicate with passengers in real time. For those worried about privacy, Zoox says passengers will have the option to blur images captured by the onboard camera.

Motional to Get Onside With Lyft for Robotaxi Service

NEWS MOBILITY

Motional—the $4bn Hyundai-Aptiv autonomous-driving joint venture—will integrate, operationalize and deploy fully driverless vehicles in 2023 on the Lyft network in major U.S. cities, the two companies say.

The Hyundai-Aptiv JV, headquartered in Boston, was named Motional in August. It also has a partnership with on-demand shuttle provider Via to provide public shared robotaxi rides in the first half of next year in a to-be-announced market.

The service will use new vehicles based on a Hyundai vehicle platform. They'll be fully driverless, integrated with sensors, computers and software to enable driverless operation and remote vehicle assistance.

The announcement follows Motional's November release of plans to go fully driverless on public roads in Nevada after receiving approval from the state's Department of Motor Vehicles.

For years, Lyft has been building a business with numerous elements that will enable self-driving cars to scale. Lyft has created the technology behind a booking system, invested in fleet capabilities, collaborated with cities to offer more accessible transportation options to communities, and already has live AV pilots running on the Lyft network. By partnering with Lyft, multiple AV companies can focus on the development of the technology, while Lyft can introduce self-driving cars to its tens of millions of users. Motional and Lyft are already behind a self-driving taxi service operation in Las Vegas, which was paused this year because of the coronavirus pandemic but resumed in October.

General News

Fiat Chrysler–PSA Merger Wins EU Approval

GENERAL NEWS

Fiat Chrysler and PSA gained EU antitrust approval at the end of December for their USD $38bn merger to create the world's № 4 carmaker.

Stellantis will be the Dutch-based multinational automotive manufacturing corporation resulting of the merger of French automaker Groupe PSA and Italian-American automaker Fiat Chrysler Automobiles, following completion of a 50-50 merger agreement. The new group will include 14 brands: Abarth, Alfa Romeo, Chrysler, Citroën, Dodge, DS, Fiat, Jeep, Lancia, Maserati, Opel, Peugeot, Ram and Vauxhall. The name Stellantis will be used exclusively as a corporate brand, with automobile brand names and logos remaining unchanged. The company will be listed in the stock exchanges of Milan, New York, and Paris.

FCA's controlling shareholder is Exor, the holding company of Italy's Agnelli family, while PSA's main investors are the Peugeot family, the French government, and China's Dongfeng.

The creation of Stellantis has been submitted and approved by voting by the shareholders of PSA and FCA at two general meetings held on 4 January.

The deal also considers that Peugeot will progressively spin off their 46 per cent stake in Faurecia, while FCA will also spin off their automation unit Comau.

Bosch Vehicle Computers Order Intake Worth Billions

GENERAL NEWS

For more than a year now, Bosch vehicle computers have been controlling functions such as driver assistance systems and motion in production vehicles. And soon, they will be joined by central computers for cockpit functions and body electronics.

Bosch's portfolio in the space is broad, as the supplier of technology and services can offer production-ready computers for every aspect of modern vehicles. Bosch has now won orders worth billions for their vehicle computers; €2.5bn worth since last summer alone.

According to McKinsey, software's share in the value of a vehicle will rise from just 10 per cent today to 30 per cent in the future. "Vehicle computers have huge business potential for Bosch. Even now, our high-performance computers mean that automakers view us as one of their leading engineering and technology partners," said Harald Kroeger, who sits on the Bosch board of management.

Vehicle computers are central to Bosch's strategy to extend their leading role in software-intensive electronic systems. The market for these systems is worth some €20 billion ($24.4 billion), and is set to grow 15 per cent annually between now and 2030. To meet this demand, the new Cross-Domain Computing Solutions division and its 17,000 associates are starting operation this month. In this unit, Bosch is bringing together their hardware and software engineering for vehicle computers, sensors, and control units for all vehicle domains.

Bosch is developing computers for cockpit and connectivity functions, for driver assistance systems and automated driving, and for the powertrain and body electronics. This means it will be possible to concentrate control over all central vehicle functions in just a handful of high-performance central computers. Take the information domain

computer Bosch is developing. In the next vehicle generation, it will assume the tasks done by as many as ten control units. Some vehicles now feature more than 100 control units in total, and this development will allow automakers to significantly reduce this number, and thus reduce cost, weight, and package space.

These central computers are expected to controlling not only vehicle motion, but also body electronics, with a computing power of a control unit originally intended for navigation which has grown by a factor of 3,000, equivalent to 3 times the Moore's law over the past 20 years. The result is that a modern cockpit computer can control not only displays, infotainment, and voice commands, but also the tasks of other domains, such as certain assistance functions.

In the case of a premium vehicle, additional functions can be provided by adding extra software modules or special chips to the printed circuit boards. In the case of a compact vehicle, the structure of the vehicle computer can be modified so that it provides central control over basic safety-relevant functions.

LG, Magna in Restructure-Borne Joint Venture

GENERAL NEWS

LG Electronics will spin off part of their electric vehicle components business and set up a $1bn joint venture with Magna International, a deal that is aimed at capturing a bigger share of the growing global EV parts market.

LG will hold a 51 per cent stake in the JV, and Magna the rest. The venture will produce e-motors, inverters and onboard chargers in LG's factories in Incheon, South Korea and Nanjing, China.

This is LG's second major investment in the auto industry, following their $1.3bn purchase in 2018 of ZKW Group, a major vehicle lighting supplier. Earlier this month, the group's battery-making affiliate LG Chem spun off their EV battery and energy storage business into a standalone unit.

"The market for e-motors, inverters and electric-drive systems is expected to have significant growth between now and 2030 and the JV will target this fast-growing global market with a world-class portfolio," LG and Magna said in a joint press release.

LG has supplied EV components including motors and battery packs for GM's Bolt and Jaguar's I-Pace, while Magna makes EV gear for Volkswagen and other carmakers.

The LG-Magna deal will be completed in July next year pending LG shareholders' approval. The joint venture, tentatively named LG Magna e-Powertrain, will employ about 1,000 people in the US, Korea, and China and fill orders from Magna and their clients.