DVN-I
Automotive Interior

Thu, 17 December 2020 Weekly Newsletter NEWSLETTER #43

Editorial

Touch Skin Surface All Over Car Interior

IMAGE: BMW

The first in vehicle instrument was the speedometer. Later, gauges like radiator temperature, fuel gauge, and revolution counter were added, and then came instrument clusters combining several instruments in one housing. When navigation systems came, a larger graphic display was needed, and this screen took place in the center console. Then, touch screens got popular through video games around 2005.

Parallel evolution, some years later, for interior surfaces, switch and controls. Touch skins are combining an overall sleeker design with all upcoming sensor integration technology to create a natural extension of touch screens in any interior surface.

The Design Lounge is addressing this trend from a design and material combination perspective; many of Interior News are reporting lectures from the recent Automotive Interiors Expo Virtual Live 2020, about technology transforming plastic surfaces into sensing/functional surfaces.

This edition in-depth is coming back on our Dec 2 DVN Lighting Online Workshop, where a special session covered Future Car Interior Lighting.

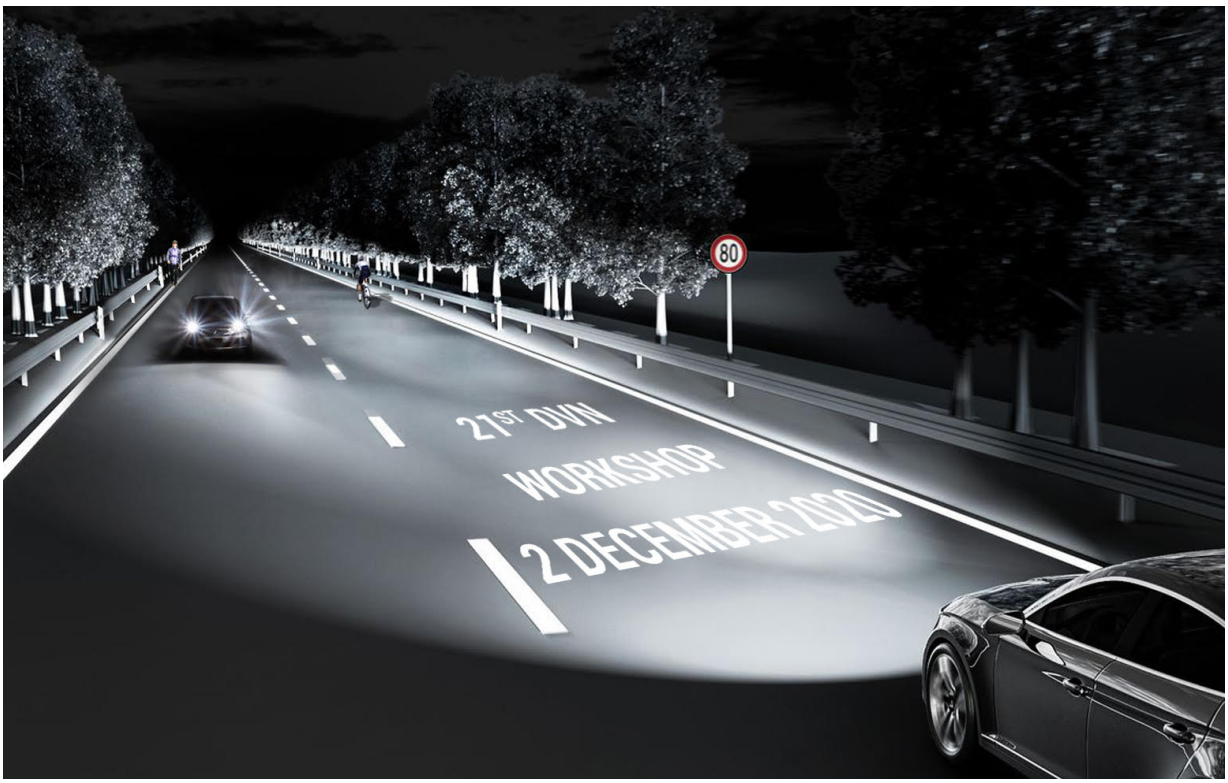
In short, there has been lot of exciting stuff happening these past couple weeks, where DVN Interior is attending on your behalf, and reporting here. That's the value to subscribe.

We hope you're staying safe and healthy

Merry Christmas!

In Depth Interior Technology

Future Interior Lighting at 21st DVN Workshop



At the 21st DVN Workshop, a livestreamed event on 2 December, about 250 attendees were present from 100 companies, including 20 automakers and 25 suppliers. 15 countries were represented from Europe, North America, Japan, China, Korea, and India. It was a very successful symposium with very interesting lectures and Q&A sessions, and you can watch **this short video** to get a glimpse of the spirit of the event.

The topic of Session 4 was **Future Car Interior Lighting**. In the introduction, session chairman Carsten Befelein from DVN & DVN-I emphasized that car interiors are becoming stronger product differentiators based on extensive software and electronics with artificial intelligence. New vehicles are facilitating new use cases and user experiences (UX) in the car interior—like relaxing, working, conferencing, watching movies, and other activities. Autonomous vehicles will transform the "driving" experience into a "passenging" experience. Lighting and displays for homes and offices will be seamlessly transmogrified into autonomously-rolling homes and offices. The interior is increasingly automakers' key to customer attraction, delightment, and retention, for it is the space where the customer experience happens.

In the first lecture of the session, **Smart Lighting Integration**, Grupo Antolin's Monica Ai (Lighting Director, China) and Julien Adillon (Corporate Manager, China) presented their company's very impressive solutions for future car interior components—

sustainable and natural materials, functional surfaces, smart interior lighting, and electronic solutions.

VIRTUAL DIGITAL INSTRUMENTS AND SMART FUNCTIONAL SURFACES (GRUPO ANTOLIN)

With 30,000 employees worldwide; 1,400 R&D staff, and over 150 manufacturing plants, Grupo Antolin is a global automotive interior system supplier. Their product range includes headliners, overhead consoles, door panels, cockpits, dashboards, center consoles, decor trims, smart and functional surfaces, camera-based driver monitoring systems, lighting and HMI elements, and numerous electronic components.

OPERATIONAL AND DYNAMIC SIGNALING FUNCTIONS IN SMART TRANSLUCENT SURFACES (GRUPO ANTOLIN)

Grupo Antolin engineers work with their extended software and electronic capabilities on interior lighting and component functions for an increasing number of use cases and greater passenger comfort in semi- and fully-autonomous vehicles.

INTERIOR SURFACE OPTIONS (GRUPO ANTOLIN)

Despite rapid technical progress, Grupo Antolin still works with natural materials like wood, stone and cork for interior components, because many customers insist on it.

In thesecond lecture, DesignLED CTOJames Gourlay explained his lighting technology for **Surface Backlighting for Future Automotive Interiors**. He gave an interesting view on the backlighting of light-transmissive surfaces, market and economic aspects, interior use cases, technology and emotions as a contribution to the technical trends to rolling living spaces, emotional personalization, wellbeing, and smooth, flat, designed smart surfaces in future car interiors.

IMAGES: DESIGNLED

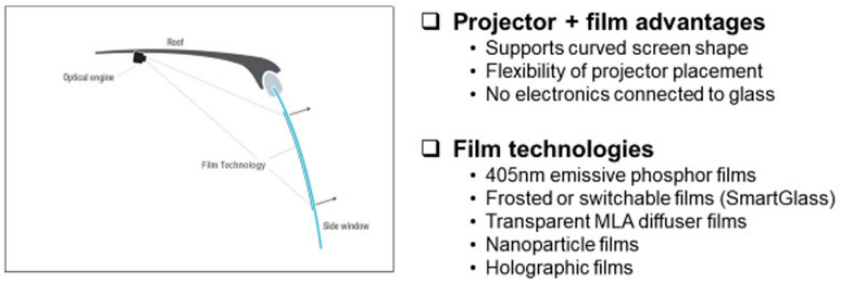
DesignLED is a small technology company with 15 employees for automotive engineering design and prototyping and dynamic, attractive backlighting of large areas and smart surfaces. They work, for example, on dynamic segmented lighting solutions with thin light guides behind light-transmissive smart surfaces and for component integrated HMI functions in tiny installation spaces. The structure for this technology includes a transparent substrate with printed optics and electric circuits with attached LEDs, encapsulated with transparent optical polymers to form a light guide system and packaged with reflectors and A-surface diffusers to achieve the automaker's specified homogeneity. With dynamically-backlit patterned trim, Mr. Gourley presented light solutions for provoking emotions, e.g. dynamically-controlled RGB LEDs to create emotional effects like fireworks, space and star fields, and other suchlike just by changing the software.

In the third lecture, **Turn Any Automotive Window Into an HMI Display With TI DLP**,Texas Instruments' DLP Product Marketing Engineer Brandon Seiser gave an overview of automotive macrotrends—the need for communication—and presented TI's DLP technology as a means to create HMI window displays on the basis of light projection and film architecture. It's done with compact RGB projectors putting out 1,000 lumens for window displays that work both during daylight and after dark.

WINDOW DISPLAYS (TI)

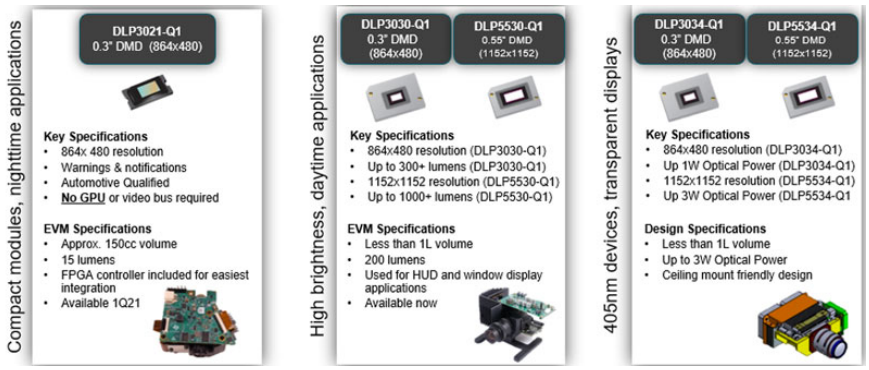
Window displays are an interesting light and touch screen solution for vehicle-pedestrian communications, in-car entertainment, advertisement, vehicle customization, orchestration, welcome and farewell scenarios, warnings and styling, car status information, etc.

The window display architecture consists of light projectors and different film technologies affixed to the windows. There are no electronics connected to the window. The projector has to support curved screen shapes (most auto glass is curved in at least one axis) and must accommodate flexible placement.



GLASS PROJECTION (TI)

Texas Instruments offers a variety of small, efficient light projectors using DLP technology with high-power LEDs for night and daytime applications and 405-nm devices for transparent displays.

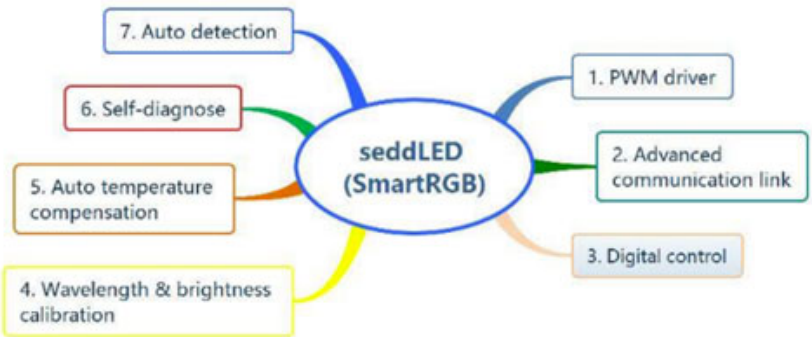


DLP PROJECTORS (TI)

DLP automotive technology provides solutions to turn any surface, inside and outside the vehicle, into a display.

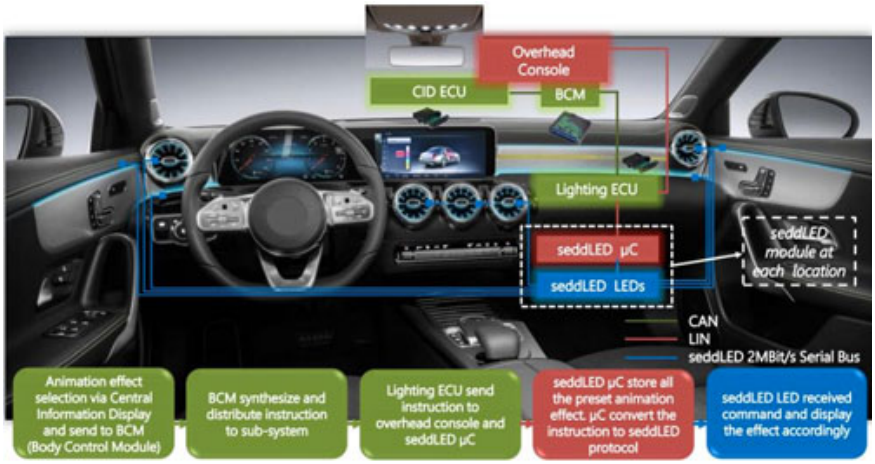
In the fourth lecture Dominant Opto Technologies Sales and Marketing Manager Eric Toh talked about **Accelerating Development of Ambient Lighting With SeddLED**, a lecture about **s**mart **e**mbedded **d**igital **d**river LEDs which integrate RGB LEDs, a driver, and advanced communication links into a single package well suited to new car interior lighting functions.

The general features of seddLED are shown in the picture below: they're calibrated on the production line, have an integrated 3-channel RGB driver with fully digital control of color and brightness by software command, half-duplex 2 Mbit/s differential control bus with a fast update rate of 5.25 ms for 100 LEDs, self-diagnostics, automatic temperature compensation, and other features.



SEDDLED FEATURES (DOMINANT OPTO)

The picture below shows the ambient light system architecture of seddLED for the illumination of different devices in the overhead console, dashboard and door panel.



SEDDLED INFORMATION FLOW (DOMINANT OPTO)

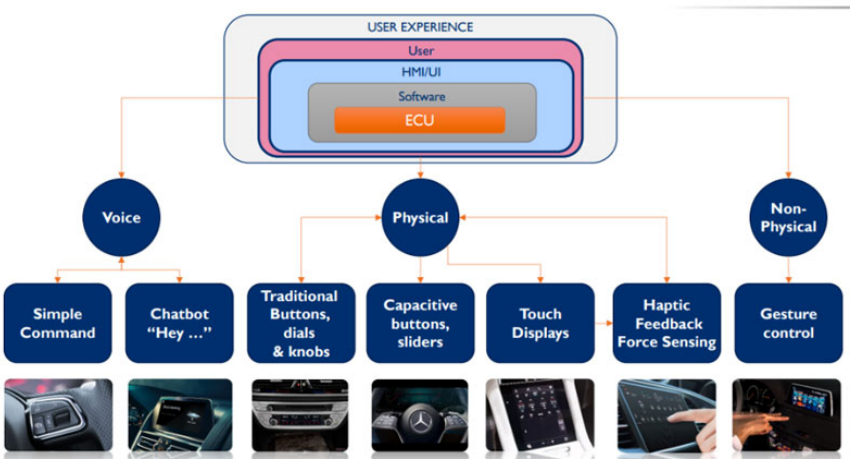
The Lighting ECU (Electronic Control Unit) is connected with the vehicle's BCM (Body Control Module) and the seddLEDs with the integrated microcontrollers via CAN, LIN, and the seddLED serial bus.

In comparison to ordinary RGB LEDs, the lighting system with seddLED has a simplified RGB module component, a cheaper LED calibration during production, lower LED binning costs, control capability up to 4,079 LEDs (LIN consists of only 16 nodes), and a much higher communication speed of 2 Mbit/s (versus 19 Kbit/s for normal RGB LEDs)

The fifth and final lecture of the session was given byMartin Vallo,a Technology and Market Analystat Yole Développement. He spoke on **Car Interior Highlighting—Lighting, Sensing and Display Synergies**, in a lecture about CASE, UX, HMI, system architecture, interior lighting, displays, sensing and market developments.

Displays have replaced analog instruments and physical buttons, in an effort to offer improved (or at least new) kinds of infotainment controls for vehicle passengers. HUDs are becoming more intelligent to interact with the driver. Interior lighting is no longer limited to aiding vision in darkness; new applications for new use cases like safety, communication and styling are being developed. In-cabin sensing was historically limited to a few scattered applications like ambient air temperature (in vehicles with automatic climate control), pressure sensors for seat occupancy, and seat belt switches to monitor belt usage. Today, driver distraction and drowsiness are monitored as well, and the fusion with advanced driver assistance systems improves safety. Sensing for comfort is becoming implemented with air quality monitoring and active noise cancellation.

Overview actual HMI options:

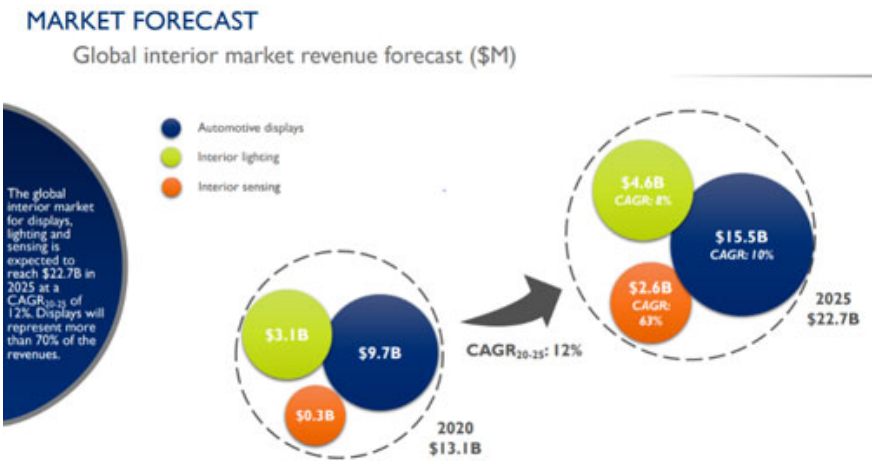


HMI FEEDBACK AND PROCESS CHART (YOLE DÉVELOPPEMENT)

HMI solutions in the next years will be dominated by virtual capacitive buttons and sliders, touch displays, and smart surfaces with haptic feedback, supplemented by voice and gestural control.

Today's vehicles tend to have one ECU per functional cluster, which means up to 150 ECUs all in all. Desire to reduce the resultant high complexity and costs is driving a push toward domain-centralized system architecture by around 2025 with an AI/sensing, safety, infotainment, comfort and powertrain controller. That, in turn, could lead by 2030 to a vehicle-centralized system architecture with one very powerful controller.

Martin Vallo presented in his lecture a global interior market revenue forecast. The market for lighting, displays and sensing systems is expected to reach USD $22.7bn by 2025. Displays will make more than 70% of the revenues. The picture below shows the market development for selected systems from 2020 to 2030:



INTERIOR LIGHTING, SENSING, AND DISPLAYS MARKET FORECAST (YOLE DÉVELOPPEMENT)

Yole's predictions forecast a very strong revenue increase from 2020 to 2025 for displays and sensing, but only a slight revenue increase for interior lighting.

The Q&A Session directly after the last lecture proved the great interest of the attendees in the presentations of all speakers. A lot of questions were about the new software and electronic capabilities of full system suppliers, the vision of the future interior lighting, advantages and disadvantages of backlighting and light projection, how totransform car windows into HMI displays, size and costs of projection systems with DLP technology, roadmaps for the development of smart seddLEDs for interior and exterior lighting, reasons for strong revenue increase for displays and sensing systems and only slight revenue increase for interior lighting, and other topics.

Interior News

Smart-Surface Controls Win Favor With Authenticity

INTERIOR NEWS

At the Auto Interior 2020 Virtual Expo, Continental presented an HMI proposal centered around smart surface technologies They add functionality to premium vehicle interiors through seamless symbol integration into the surface. With morphing controls, clean vehicle cockpit surfaces become intuitive user interfaces. The buttons of the dashboard stay invisible until demanded. Thanks to proximity sensors and actuators they take their shape as control elements only when needed. The smart surface material can be stretched reversibly and allows precise translucence for button symbols and display content. The topographic surface, in combination with force sensing and haptic feedback, significantly improves the intuitive operability in the vehicle.

This "disappearing controls" effect can be realized through classic materials like wood or high-value films that imitate real materials, such as aluminum.

They conducted a user study with drivers of upper-middle-class and upper-class cars, to understand how the technology influences user acceptance. They asked questions to their panel (32 people in one-hour face-to-face sessions) about perceived appearance, value of the disappearing effect, and perceptions about look and feel.

Ratings for look and feel were high, while "authenticity" was rated just above mean, and touching the material or prototype makes the difference compared to only looking. Shine-through effects raised doubts concerning material authenticity for most participants, even as others perceived added value.

Most participants (75%) could imagine to buy a car with shine-through effects; acceptance depends on kind, location, and number of functions. And imitation

materials can achieve high value appearance, under the condition that overall impression is consistent: it should look and feel authentic.

Tg0's Tactile Surfaces Hide Sensors

INTERIOR NEWS

INVISIBLE HIDDEN PROXIMITY SENSOR (TG0)

At Auto Interior 2020, TG0 presented their latest ideas. They're a startup in London specializing in touch and pressure sensing and its associated software and manufacturing, working on effortless, intuitive touch and pressure sensing controls for cars. They view this as a natural extension of touchscreen functionality onto any interior surface—dashboards, steering wheels, seats, and beyond.

TG0's magic is in their patented thermoplastics-based 3D sensing technology, enabling automakers and suppliers to provide waterproof, durable, seamless 3D surfaces that offer safer, more intuitive operation while driving. They also reduce a big

portion of the assembling process cost by eliminating the need for discrete printed metallic sensor networks.

TG0 partnered with Airbus for a pressure-mapping seat with their BizLab team in Hamburg, and with French interior supplier Novares on their 2019 Novacar, for a 3-function door handle integrating a trackpad for wing mirror adjustment; multimedia control; a push-pull node for window control, and a trigger for door opening.

Omniphobic Surfaces for Shared Vehicles

INTERIOR NEWS

GERMS ARE ALL OVER A CAR INTERIOR (BIOCOTE)

Cidetec, a tech company from San Sebastian, Spain, has developed omniphobic coatings for interior surfaces. Omniphobic means repellant of water, ice, fog, dirt, oil (as from fingerprints), grafiti, bacteria, viruses, insects, and presumably grape Kool-Aid. It's the sort of thing that is exactly what is needed in a car interior—especially if this car is shared among many people, all of whom are much more aware of cleanliness by dint of the pandemic.

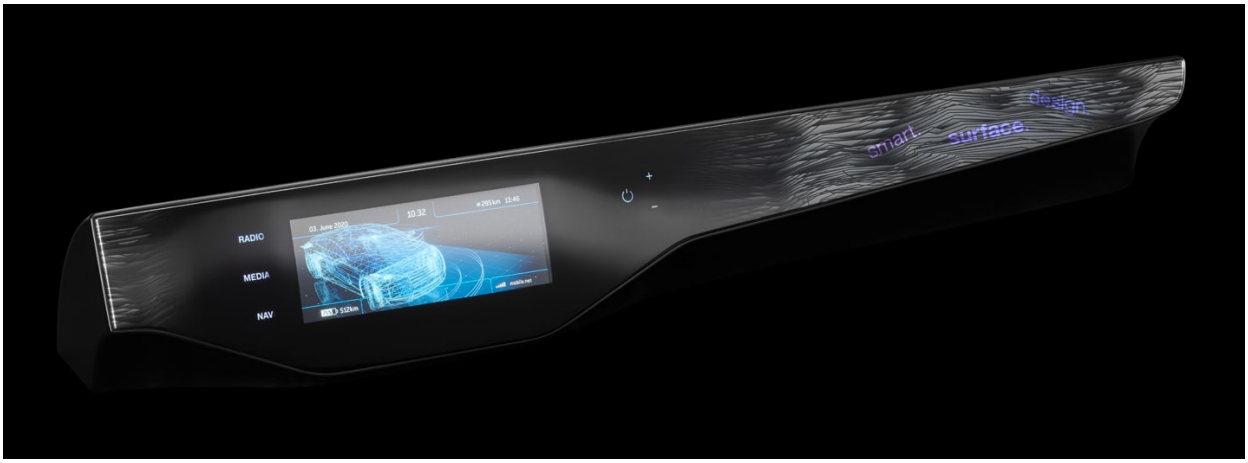
Their coatings repel water, oil, and organic solvents; greasy smudges, makeup, natural oils from textiles, plastic, glass surfaces, etc. Fingerprints are also a big issue in premium cars with increasing incorporation of touch panel displays and sweeping "piano black" glossy surfaces, where smudges could spoil the premium touch.

Cidetec's model came from nature. Specifically, the lotus leaf, whose surface is hydrophobic. They are using here their patented Ionogel technology with crosslinked polymers covalently grafted to the substrate, coated with an anti-static nonvolatile lubricant. It doesn’t spoil the look, feel, or durability of the surface, and viscous fluids such as mustard or ketchup are easy to peel off once they've dried.

These coatings demonstrate a key response to bacterial and virus inhibition—a property of obvious interest nowadays.

HMI Enhancement With Integral Metal-Mesh Sensors

INTERIOR NEWS



Kurz (Leonhard Kurz Stiftung & Co, of Fürth, Germany) is a global of thin film technology with over 5,500 employees; they develop and manufacture decorative and functional coatings for application to carrier foils for automotive components and many others—cell phones, TVs, furniture, books, bottle labels, bank cards and lots more. Now they have an idea to add functionality to plastic surface with metal-mesh sensor integration.

Their portfolio of processes includes IMD (in-mold decoration), FFB (functional foil bonding), and IML (in-mold labelling) to functionalize plastic surfaces with functions mainly focusing on sensing and lighting, display, and decoration.

The instrument panel surface pictured above, which got a Red Dot award for excellent product design last summer, was created as a single image using the IMD process during injection molding. The sensor for the multi-touch panel was integrated into the rear by IML during the same injection molding cycle. In addition, the instrument panel was equipped with a proximity sensor below the display that was applied by lamination. The sensor for the light-regulating touch controls was integrated by proprietary FFB (Functional Foil Bonding).

Sensors come from PolyIC, a Kurz division. These PolyTC® touch sensors are transparent, conductive and highly formable metal mesh touch sensors that can be individually adapted through integration options.

Sensor integration is also possible via mechanical clamping, pressure-sensitive adhesion, and lamination with optically clear adhesive.

These touch controls are only visible when the panel is backlit; when the illumination is deactivated, the surface appears solid and opaque.

Stretchable Printed Electronics to Follow 3D Surface

INTERIOR NEWS

Smart car interior surfaces mean complex 3D surfaces, so integrated electronics need to be stretchable *and* invisible. Stretchable printed electronics is the main product of Forciot, based in Tempere, Finland. They're a technology company started in 2015 by a group of researchers from the local University.

Forciot's innovative printed electronics can be utilized as HMI touch controllers responding to gestures or to replace buttons in elastic environments when integrated into car interiors. Forciot technology is based on electronics printed on elastic layers combined with other materials. Due to the advanced reading algorithms and related machine learning elements, the Forciot system self-calibrates to assure accurate measurements and functionality during the lifecycle of the product.

Their solution could apply, for example, to multi-finger grip detection on steering wheels, HMI anywhere in the interior with 3D shapes, replacing physical switches and buttons, occupant detection, and a bunch more. Benefits are touch and force in the same system, low mass, high spatial resolution, applicability to soft and rigid surfaces, and affordability built-in by using roll-to-roll manufacturing processes.

They announced last month a collaboration with HMETC (Hyundai Motor Europe Technical Center), Hyundai Motor Group's European R&D center, with focus on new intuitive ways to sense and operate functionalities in vehicle.

What Influences Carsickness?

INTERIOR NEWS

Carsickness is gaining more and more attention in the automotive research community. That's because there's much greater likelihood of its occurrence as a result of higher vehicle automation levels, absence of vehicle control, engagement in non-driving tasks, and non-front- facing seat arrangements.

Eike Schmidt, from Ford's Research and Innovation Center in Aachen, Germany, gave a talk about carsickness, its influencing factors, and how predictability may mitigate it. Schmidt said "Comfort is a huge focus for the way we design the cars of the future, and we want to do everything we can to reduce car sickness".

Surveys were conducted to get a basic understanding of today’s carsickness incidence, customers’ perception of influencing factors and individual differences. Lab experiments underlined the relevance of motion predictability and the mitigating potential of making motion more predictable. In this new research carried out by Ford, with the help of motion sickness experts, passengers who stared at screens for the duration of a short journey fell ill after an average of just 10 minutes. And those were all grownups.

Typical symptoms include nausea, sweating, dizziness, headache, salivation, palor, and apathy, all caused by mismatches between signals the brain receives from the eyes and from the organs of balance, in the ear. It is a natural reaction to an unnatural stimulus that cannot be cured as such, so must be mitigated preventively. Influencing factors are linked to occupants (genetic, gender, age, and temporary stage such as tiredness and hunger) and cabin environment (temperature, air quality).

But design factors are important as well, such as position of display. Anticipation is thought to play a role by reducing the discrepancy between sensed and expected sensory information. There could be several ways to create this expectation, either through audio or light, or even through inflatable bolster into the seat, countervailing

centripetal/centrifugal forces. However, both the exact role and potential magnitude of anticipation on motion sickness are still unknown.

BMW MINI Urbanaut, Make It Your Space

INTERIOR NEWS

BMW has unveiled a new concept vehicle under its MINI brand. It's the Urbanaut, that explores what vehicle design could look like in an electric and autonomous future. The rubric for this design exercise is "more interior space and versatility than ever before, but still on a minimal footprint".

BMW Group Design Head Adrian van Hooydonk says "The MINI brand has always stood for clever use of space. In the MINI Vision Urbanaut, we extend private space far into the public realm, creating completely new and enriching experiences".

The Urbanaut was designed from the inside out. Then EV and automated driving also create new interior opportunities. Unusually tall for a MINI, but only 4.46 m long, the car provides an interior space that can be used in many different ways with easy movements. When arriving at a destination, the car can transform into a living room in just a few simple steps. Occupants enter the innovative cabin through a large single sliding side door. The four-seat layout facilitates an open interior. The two front seats rotate, while the rear seats can be folded manually (left) and turned around (right). When not driving, the dashboard lowers and the driver’s area becomes a comfortable seating corner —a "daybed". The windscreen can open to create a kind of street balcony.

An integrated table opposite to the entry door is the car’s new center point. The "MINI Token" is the centerpiece of the Urbanaut’s UX. It activates the three preconfigured MINI moments—Chill, Wanderlust and Vibe—when placed in purpose-designed slots in the table at the center of the car. It can be enhanced by "My MINI moment", whereby users can configure their own preferred scenario of fragrance, ambient lighting, music, etc. The interior arrangement, including the seats, the form of the dashboard/daybed and the rear seat positions, can be adjusted manually according to the MINI moment selected.

Sustainability is addressed by use of recycled materials, and by enabling dual functions, such as the dashboard/daybed. It eschews chrome and leather; the dominant material is knitted textile, which combines coziness and quality with softness and comfort. Cork on the steering wheel and sections of the floor adds a natural touch. A textile covered loop extends over the seat bench and features the option of LED backlighting.

The Design Lounge

Switches: Evolution or Revolution?

THE DESIGN LOUNGE

Heading towards the end of the year, we've noticed a shift happening regarding switching and the UX/HMI interface. We have seen a focus on displays, touchscreens, and visual content, but recent introductions have also shown a new affinity with materials.

1960 CHRYSLER 300

Cars of the 1950s and '60s used purely mechanical switchgear with authentic and robust materials.

TESLA MODEL 3

Looking at the past few years, it seems that everyone was heading into the ‘smart tablet’ aesthetic that was further enhanced with the use of ‘piano black’ finished surfaces.

1961 PLYMOUTH

The material usage of vehicles in the sixties contrasted visual appearance, touch/temperature and feel (soft and hard) even though their functions were very simple.

LUCID AIR

The multitude of screens as an interface, took these attributes away from the tactile switch gear and moved them to an overall interior environment. The nature of this shift, based on the smart phone interface, removed the subtle interaction and quality feel away from the users touch points.

MERCEDES W126 1990

If we look back over the years, such as at Mercedes' efforts, the feel and variation of switches was a critical factor for the user. Even though made of plastic, there was a concentrated effort that the switch type (rotary, rocker, push button, etc.) was critical for the overall quality and interface through the 1990s.

MERCEDES ML 2008

Moving into the 2000s, the dramatic increase of the number of functions, lessened the switch type variations so that…

MERCEDES S-CLASS 2021

…the integration of a touchscreen solved all of the technical and visual interface problems. But what of the haptic and perceived quality of this type of control?

AUDI E-TRON

BENTLEY CONTINENTAL GT

Adding feedback into the screen interface, such as Audi does, addresses the technical haptic issues but are touch displays the only, or best solution?

MINI 2004

MINI 2020

The integration of smaller displays into the switchgear not only helped with the usability but also started to move away from the plasticky look of the latest switchgear.

LAND ROVER DEFENDER

AUDI R8

The introduction of aluminum materials, along with integrating higher definition configurable displays, have given these multi-functional switchgears a cold precision haptic and aesthetic that dramatically increases their perceived quality. The de-standardization of transmission controls, however, has caused driver frustration and safety problems; a lever is no longer required because mechanical linkages are no longer used, but it seems the optimal solution—the new "right way to do it" has not yet been arrived at.

HUMMER EV

FORD BRONCO 2021

These multiple integrated display/switches can also provide the haptic variations required to give more robust usage with a rubberized enclosed surface, as seen on the new Ford Bronco. Or the more traditionally oversize switches for easy gloved use as seen on the GMC Hummer.

VOLKSWAGEN ID.4

VOLKSWAGEN ID.4

These multi-integrated displays and switches have integrated gesture controls, such as the VW group uses for swiping, into these displays while also adding the capacitive touch technology into their traditional switching functions.

This has integrated the switching action into the primary surface. Also used for interior lighting actuation, the elimination of a separate switch, integrates it’s function with the lighting element itself.

NISSAN ARIYA

NISSAN ARIYA

These multi-integrated display/switches, now being integrated into other surfaces such as open-pore woods, have made them very discreet and refined compared to the bulky switchgear of the previous generations.

VOLVO XC 90

CADILLAC LYRIQ

Volvo introduced a newly focussed insight into material usage and detailed for the modern age. Their use of a crystal glass controller that added a visual depth into the switchgear's material portfolio with the addition of open-pore wood trim further highlighted not only their aesthetic value but also the haptic interaction.

This, along with the addition of knurling to the metal portions of the switchgear has created a jeweled appearance that greatly increases their perceived quality.

BMW IX

BMW IX

Most recently, BMW now incorporates these technologies and materials into their new iX BEV interior. With the use of warm-to-the-touch materials such as suede and open-pore woods as a background that contrasts in both the visual and haptic appearance to the knurled aluminum and crystal glass switches.

Gone are the black plastic switches and non-interactive displays that have dominated automotive interiors for so many years. The high-tech nature of today's touch switches and UX/HMI interface is now greatly enhanced by using these various materials and the technologies that enable them.

News Mobility

_Car interiors Unplugged

NEWS MOBILITY

1965 RAMBLER MARLIN

1. Who's driving?

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

The cognitive aspect of mobility is related to an ongoing physical comparison between surroundings and ourselves, a constant dialog between far and close. Travel experience is produced, controlled and orchestrated through elements that coexist and evolve within one extremely complex product: car interiors.

"…staring at the cockpit dials, concentrating to the next quarter mile turn, firmly griping the double-stitched leather steering wheel, touching with the fingertips the cold anodized texture of the gear paddles, ready to downshift and feel the force."

"…distracted, holding open a favorite book, looking out far away at the horizon, the sunset, the infinite landscape, slightly resting on the puffy yet firm headrest, scrolling through a playlist while enjoying a majestic surround sound orchestra performance…"

Oddly enough, those two quite contradicting depictions of mobile experience coexist within a centimeter from each other and interact in perfect harmony: Driver and passenger. It is so challenging to decode and translate car interiors in words that the approach has to be structured in many layers. Car interiors are flexible enough to include any individual or social experience between a fighter-plane cockpit and a public elevator. Typologies and compositions are as many that constitute a socioeconomic pantograph. However, the part that makes car interiors different from any other inhabited space is the controls; the general idea of being in command of motion and at the same time participating in many ways just by being present. A group dynamic shaped around the roles we assume by being together, in motion. The interaction between passengers and driver characterizes the era of modern interiors becoming the stage in which we performed our mobile lives for decades. Hence, the dream of motion joined the dream of social life.

In order to achieve that, we could imagine a moment at the origins of mechanical motion when a radical change took place. The coach-driver part of the horse carriage merged with the early travelers' train compartment, becoming one unit for the next 100 years. The outcome was stunning. In doing so, we embedded within our social interactions a 'service', a dedicated task, a passion, an individual skill. Curiously, this relationship was so strong and profound that we have never seen the two separated since. It may have to do with the trust on the common destiny of a journey or a basic tribal instinct.

The contrast between acting and observing has always nourished mobile mythology. Our childhood dreams are associated to steering wheels and gearshifts that became symbols of mastering, this otherwise blindfolded mechanical power. Car interiors accumulate an incredible diversity and density of human factors, hard to find in any other interior space; this is cockpit/habitat merging. It is the most up to date imprint of our habitat and mobile activity, all in one. Even though today we allude into systemic urban scale approach to tackle 'mobility issues' it is possible that solutions exist within a smaller scale environment, that contains all essential ingredients to rebuild mobility systems.

Car interiors hold the codes to solve complex mobility matters.

_To be continued…

*INDUSTRIOUS*_____

Pennsylvania Legalizes Delivery Robots as 'Pedestrians'

NEWS MOBILITY

Legislation that would legalize personal delivery devices to be used on Pennsylvania roadways cleared the state House of Representatives last week. The bill allows these robots to move around urban and suburban areas only if they weigh 550 lbs (249 kg) or under without cargo, and they can scoot at speeds of up to 12 mph (19 km/h). Pennsylvania is the 12th U.S state permitted to use autonomous devices for deliveries.

But here, these Personal Delivery Devices (PDD), are essentially now considered pedestrians, even if they have to give the right of way to real pedestrians and cyclists.

Bills regulating autonomous delivery robots have largely been pushed by delivery companies like Amazon and FedEx. An interesting next step is blurring the traffic separation between roads and sidewalks. It's obviously the case when there's crossing, but here it could become a complete free zone where pedestrians, scooters, delivery robots, and maybe landing drones could meet all the time.

Each of these mobility steps looks progressive, but it becomes very tricky as soon as you step back and have a holistic view on the whole system, really considering pedestrian safety.

Driverless Car Fleet Test, World First in China

NEWS MOBILITY

AUTOX DRIVERLESS VEHICLES

Multiple robotaxi projects have been launched in Chinese cities, but they've all still had a driver who can take over in emergencies or someone who can operate the car remotely. The Alibaba-backed company AutoX says theirs is the first completely autonomous fleet—no accompanying or remote human safety drivers—is on the roads in China. They started in the city of Shenzhen, with 25 fully autonomous Chrysler Pacifica minivans.

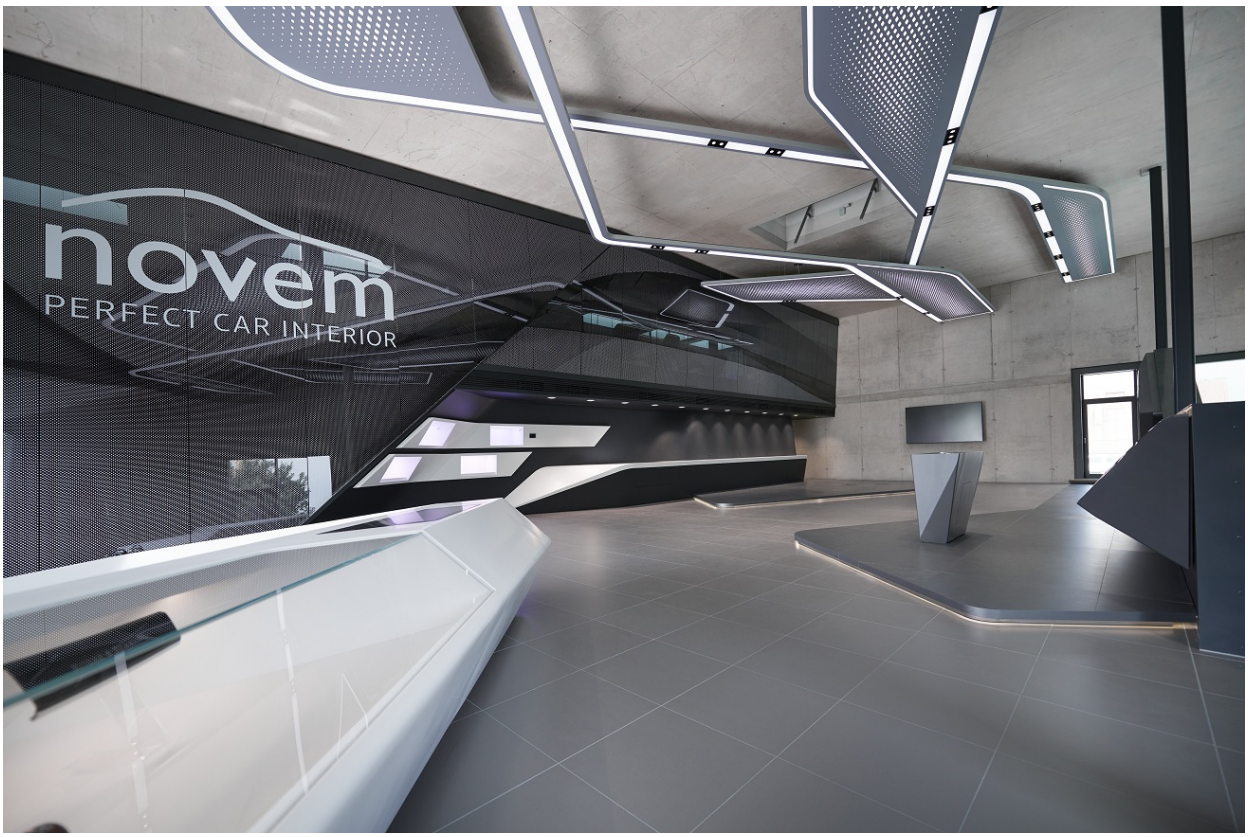
Driverless “stress tests” to see how the vehicle performs in various road situations were conducted over the past six months, the company says. Service is not open to the general public yet. They are only available to employees and private guests, such as media, business partners, investors and automakers.

The next step would be to increase the number of cars and the test area size, and to carry out tests in more cities. AutoX says they have a plan in the next six months to expand to 10 cities, noting they have an advantage in Southeast Asia compared to other autonomous driving systems developed and tested in the West, because streets in Asia are more similar to those in Chinese cities, even if AutoX has a permit to test in parts of San Jose, California.

General News

Car Design Harmony for New Novem Design Center

GENERAL NEWS



Thanks to an innovative architecture design by Pininfarina, German car interior suppliers Novem can now present a seamlessly responsive environment where visitors can gain an in-car experience shaped by light.

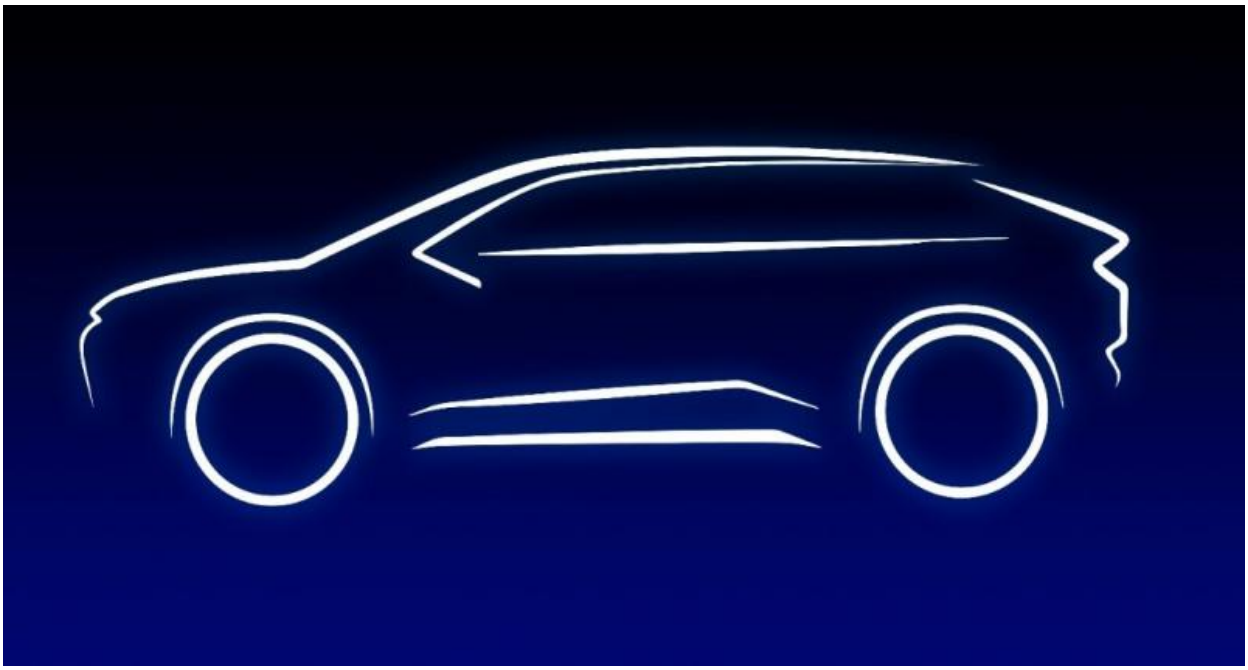
The new Novem design center in Vorbach, Bavaria, Germany, tries to answer questions of how light influences human beings. Novem's mission is to create unique car interior solution, combining surfaces and light to deliver trim elements and decorative functional elements for car interiors with high perceived quality.

Novem chose Pininfarina to translate their vision in the car interiors into an architectural language able to express the same values in the interiors of their new design center. Light is a key enabler of this vision and light is the element that shapes the in-car experience both from an aesthetic and from a functional point of view. The architectural concept is therefore based on light flows that guide the visitors inside the Novem Interior World. On the use of simple and essential materials like glass, the role of light is emphasized. Dynamic shapes take the visitor on a journey through six different areas.

They allow the discovery of the materials and its potential, strongly leveraging on new technologies to envision the future. Novem managerial board members Dr. Johannes Burtscher and Günter Brenner say "Pininfarina is known for creating elegant styling concepts with state-of-the art engineering solutions. The architecture, fittings and all materials used are unique and enable our customers to sense and feel the power of our innovations".

Toyota's First All-Electric Car

GENERAL NEWS



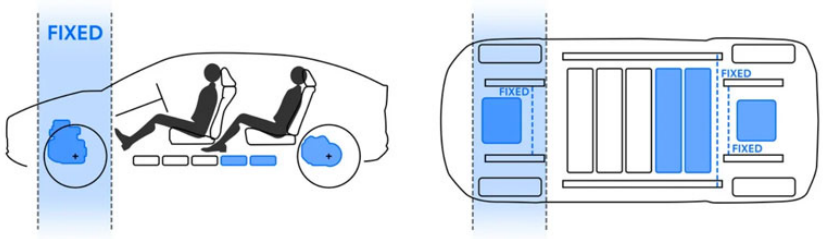
TOYOTA ELECTRIC SUV (TOYOTA)

Except for the electric C-HR crossover in China launched earlier this year and a Lexus SUV coming in 2021, Toyota has no plans so far to produce a BEV. That's changing, as Toyota's first "real" step in that direction has been announced recently to develop and to produce a battery-electric vehicle built from the ground up.

TOYOTA EV (LEAKED PICTURE)

Toyota has been focused so far on hybrid vehicles—since 1997, with their Prius and other hybrid models—and more recently on Hydrogen Electric vehicles with the Toyota Mirai. And now they say they will be unveiling a new all-electric SUV in the coming months.

Why the strategy shift? Well, there's competition as almost all brands are announcing BEVs. And BEVs are an easy way to be compliant with ever stiffening European CO_2 emission regulations. Too, Toyota has been hard at work on a revolutionary solid-electrolyte battery technology which stands to vastly improve EV battery energy density (therefore vehicle range), safety, lifespan, and charging speed.



TOYOTA EV ARCHITECTURE (TOYOTA)

This midsize SUV will be based on the forthcoming the e-TNGA platform. So far, only this architectural sketch has been released, showing a dual motor all-wheel-drive powertrain and modular battery pack, and giving a very rough idea of interior package.

Toyota says "The versatility and flexibility of e-TNGA technology allows us to design and create vehicles that are not just battery-electric, but also exciting to drive and beautiful to look at". Next question, what about interior experience? We'll see—probably soon!