DVN-I
Automotive Interior

Thu, 3 December 2020 Weekly Newsletter **NEWSLETTER #42**

Editorial

HMI Is The New Center Point

UNITY HMI DEMO

Thirty years ago, visitors to an auto show would have seen dashboards stacked up with dials, knobs, levers, and mechanical pushbuttons. That was how drivers and passengers interacted with their vehicle. No longer! Now this interaction is called the Human Machine Interface, in short HMI.

This week's in-depth article looks at the growing world of HMI electronics. HMI has become the true center of the interior, making the link between the vehicle's technology and its occupants—all of them, for control functions are no longer limited to the driver. There's also a great deal of design and style involved in today's and tomorrow's HMI configurations, helping to create the best user experience, and to fit with the maker's brand and model identity with sleek and elegant æsthetics.

You'll also find a first piece—stay tuned for more! —on light projection staged around the main screen(s), making the cabin into a sort of IMAX theater.

Following on our multi-chapter "Trajectories" series (final synthesis **here**), this week we start a new series introducing automotive interiors as an evolution of our habitat in a pandemic which

has reconfirmed the human need for freedom of mobility. We're calling it *Car interiors Unplugged*.

All these factors and more contribute to the immersive driving experience today's car buyers seek. Keep up to date with the galloping state of the art with a high-value **subscription** to DVN Interior.

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

HMI trends and Enabling Technologies

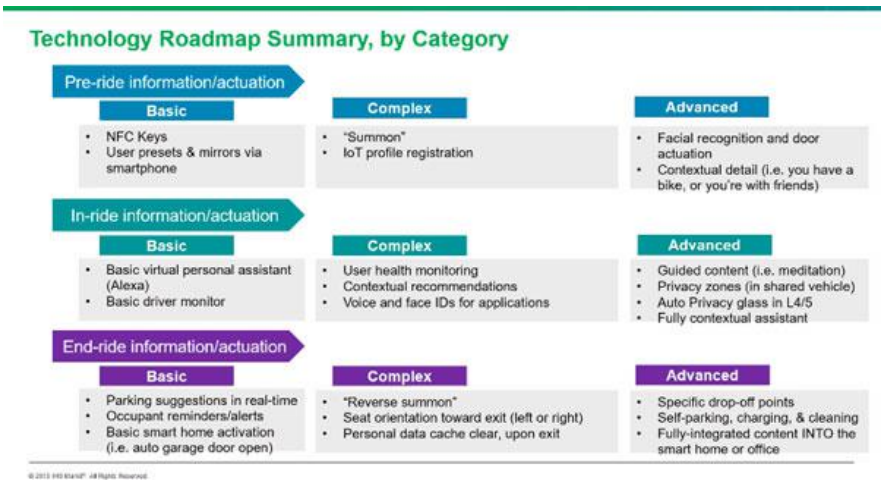
Car HMI USA, a digital event for automotive HMI & UX experts, took place a couple of weeks ago. It featured 4 days of virtual sessions and case studies by companies involved in HMI, UX design, driver distraction, voice control, UX personas, input interfaces, human factors, and control display architecture. It involved automakers and suppliers, who discussed innovative opportunities as well as challenges in HMI and UX development. The event was sectioned up like this:

Day 1: HMI, UX design and driving experience

Day 2: Driver distraction and active safety

Day 3: Voice and speech technologies, UX personas, devices and input interfaces

Day 4: Automation, autonomous driving, instrumentation, and human factors



PIC SOURCE: IHS MARKIT

IHS Markit's Mark Boyadjis presented what CASE and future mobility will drive in term of HMI, explaining that these trends are interdependent: automated vehicles will need connectivity to maintain millions lines of code; shared vehicles and MaaS will really grow when drivers are removed from the bill of costs; the high cost of a BEV will foster MaaS, electric powertrain data will leverage connected car platforms, and so on.

HMI has been developed originally for drivers; in future mobility it has to be developed with passenger as a priority, and directly connected to a mobility platform.

For many generations, the path to mobility was structured around getting a driver's license, then getting a first car, then a family car, then a premium one.

With Gen Z, urban mobility needs start earlier, while obtaining a driver's license and a first car are being put off later and later. MaaS is the solution, eventually leading to the possible purchase of an AV. Surveys show that consumers want to get digital technology in their new vehicle, as a kind of gateway to mobility services in the future. And that display size is way today to "premiumize" a vehicle.

So user experience expectations are evolving, Hospitality could become its new definition, including pre-ride, in-car, and post-ride pampering of passengers and catering for their needs and wants. Of couse, full realization of this idea will come once vehicles become truly autonomous.

The hospitality concept includes:

• Pre-ride: report vehicle condition, valet function to bring the car to the user, opening doors and adjusting the cabin to identified needs.

• In-ride: passenger interactions, monitoring passenger moods and needs and accordingly act to optimise comfort by massage, lighting, audio, etc.

• Post ride: manage destination, help to exit, valet parking.

While technology presently in development will help to make hospitality a reality—connectivity, AI, software, sensors, cameras, radars, etc—it has to be completed by identification technologies, including occupant recognition by face, fingerprint, voice, gesture, temperature, other biometrics.

The increasing amount of GUIs (graphical user interfaces) has led to an exponential growth of HMI development efforts and strained timelines for UI/UX development processes. As this trend most likely continues, an AI-assisted HMI development approach could significantly streamline this development process in terms of complexity as well as time required.

PIC SOURCE: CANDERA

Candera was founded in 2000 in Linz, Austria. They're a subsidiary of ArtSpark HD, based in Tokyo. Candera supports customers with a CGI Studio tool environment as well as provision of software services mainly in the areas of HMI development, User Interface design and embedded software.

Candera has developed a set of HMI tools including an AI-assisted HMI creation workflow. CGI studio is a scalable, and hardware independent soltware platform, enabling the creation of embedded GUI solutions in 2D and 3D. The tool, using AI, will suggest an element to import—a speedometer, for example, or another display or control, following a design engineer static input, offering different layers like backgrounds, scales, numbers, needles, and text. All in all, it's a kind of simple drag-and-drop construction kit.

As Android expands its reach as an IVI (in-vehicle infotainement) platform, automakers face the challenge of maintaining their unique brand identity while offering a unique user experience. Android offers a vast developer ecosystem and a solid technology foundation which Rightware, a Finnish software development company (see DVN Interior Oct 22, for Ford F-150 digital dash) complements with their advanced family of Kanzi UI tools and services.

HMI use cases are proliferating, covering more and more domains such as car controls, safety, ADAS, warnings, driver distraction, media, connectivity, and communication. Automakers are working to achieve best possible UX, as unique and as aligned as possible with their brand, including high end graphics and rapid prototyping.

Rightware Kanzi enables rapid UI design and development, and other embedded applications. Their software provides designers with visual tools for creating high-fidelity branded UIs. With its agile workflow and modular architecture Kanzi accelerates UI design by allowing designers and engineers to work independently and in parallel without disruptions, allowing to develop a car application in less than a single workday!

Software reliability is another challenge, especially functional safety. Hardware and software continue to evolve and become more efficient, handling more data faster. There will likely never be a one-size-fits-all development process for every system, so fast and efficient adaptation is crucial to success.

DiSTI provides software tools— GL Studio and VE Studio—for the development of GUI software and 3D virtual training solutions for simulators and embedded systems. GL Studio is a set of tools for graphical interface software to deliver digital automotive cockpit instruments, HUDs, controls and clusters, and fully-immersive HMI cockpit environments quickly and easily, including safety-critical HMI displays.

VE Studio is a development platform for creating 3D virtual training solutions. It is used to create complex and immersive commercial and military training applications around the globe. Over fifteen years of our experience and patented processes are integrated into VE Studio's features enabling rapid prototyping and scaling of training across an enterprise quickly and cost-effectively.

These tools allow to develop new architecture, for instance to handle multiple displays through a single SoC, even mixing criticality, ASIL or not. It goes from graphical HMI up through real-time operating systems (RTOS) certifiability.

Elektrobit, a subsidiary of Continental, serve as an embedded and connected software products supplier. They've been working with Unity, a San Francisco based real-time 3D (RT3D) content developer (and world leader for video game software development). The two companies presented their collaboration to streamline the design and development of automotive HMIs, leveraging real-time rendering to create next-generation user experiences.

The growing prevalence of high-performance computing platforms in cars and the increasing number and size f displays in vehicles are driving demand for more real-time and photorealistic 3D experiences, both for improved usability and enhanced customer delight. In order to make these experiences available, 3D designers and HMI development teams need integrated toolkits that facilitate the design process all the way through to implementation.

A recent study conducted for the AAA Foundation for Traffic Safety by Maryland-based research outfit Westat shows that information about partially automated driving systems can have a substantial impact on drivers' expectations of those systems' capabilities.

Westat recruited 90 drivers to learn about and drive a vehicle that can control its speed and lane position without the driver doing anything. Half of participants received training that emphasized the capabilities of the technology, while half received training that emphasized the limitations of the technology.

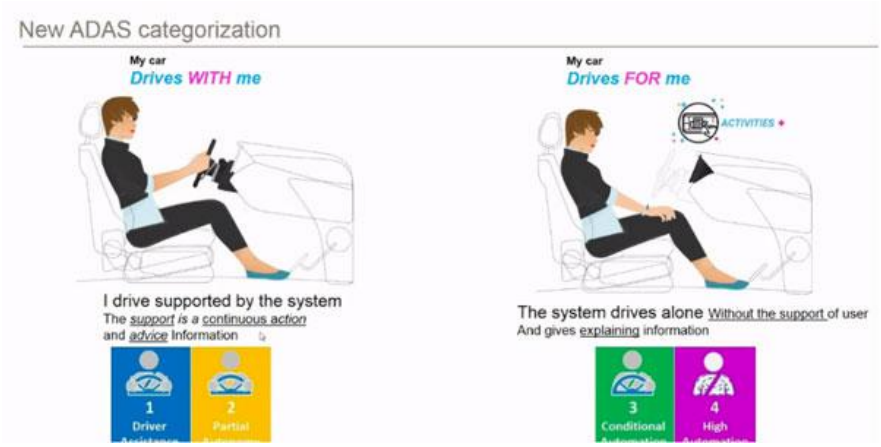
Results show that participants who received capability-emphasized training were much more likely to have unrealistically high expectations of the technology's ability to avoid collisions. Many of the differences between the two groups persisted even after they experienced the driving automation technology on a 35-minute freeway drive.

The results underscore the importance of providing consumer-oriented information about driving automation, including potentially distracting or risky behaviors (e.g., phoning or gaming or napping or watching TV) that is not only technically accurate but also balanced in terms of describing capabilities and limitations.

PSA HMI expert Stephane Feron presented UX challenges for autonomous and automated features in one vehicle; L^1 L^2 features discribed as "Drive *With* Me" features, while L^3 and L^4 features are defined as "Drive *For* Me" features.

This drive for me/drive with me line will be straddled and traversed often for the foreseeable future, as a single trip will most likely includes manual, assisted, and autonomous driving. Needless to say, this adds HMI system complexity.

This combination of driver and passenger state for the same user (the drassenger? The priver?) raises new questions. Mental representation of these vehicles control transitions can be illustrated with analogy of bungee jumping for activation of automation, or rappelling for full ADAS controls.



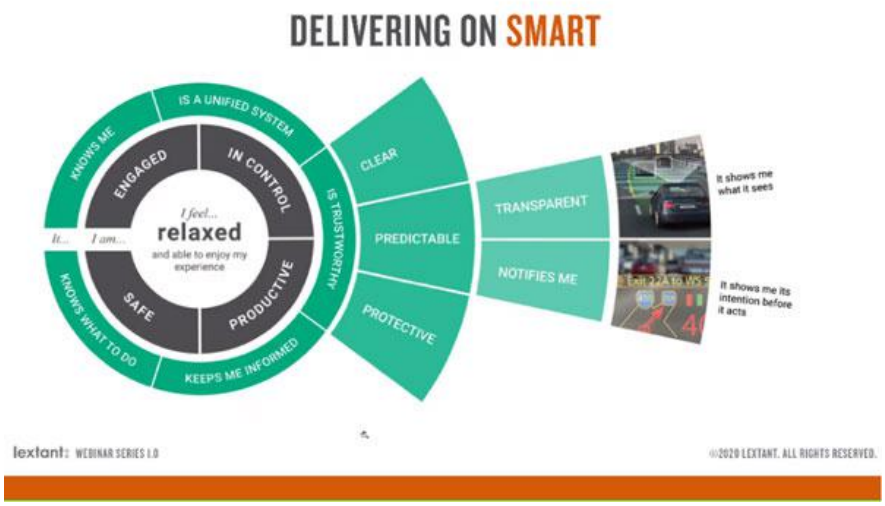
Human factor challenges happen when the HMI must help the user to transition between the different states. The study shows that users always released hands off the wheel before foot off the pedal. And they don't always understand when they need to keep hands on the wheel, exposing the need for the HMI to explicitly inform.

In the other direction, all users take control back in less than 6 seconds, before even the haptic alert. And users always take control with hands on the wheel first, before foot on the pedal.

It emphasized the importance of HMI, as key for the user to understand the vehicle, and vice versa.

Appen and Data Science presented how data and model pipeline supports AI for automotive, using machine learning. It includes in-cabin assistance, driver monitoring and in-car entertainment data.

Aggregation of these data per user, per car, and for multiple cars will generate individual and collective intelligence through cloud-based applications. Forthcoming car generations will look more at the driver than at the road!



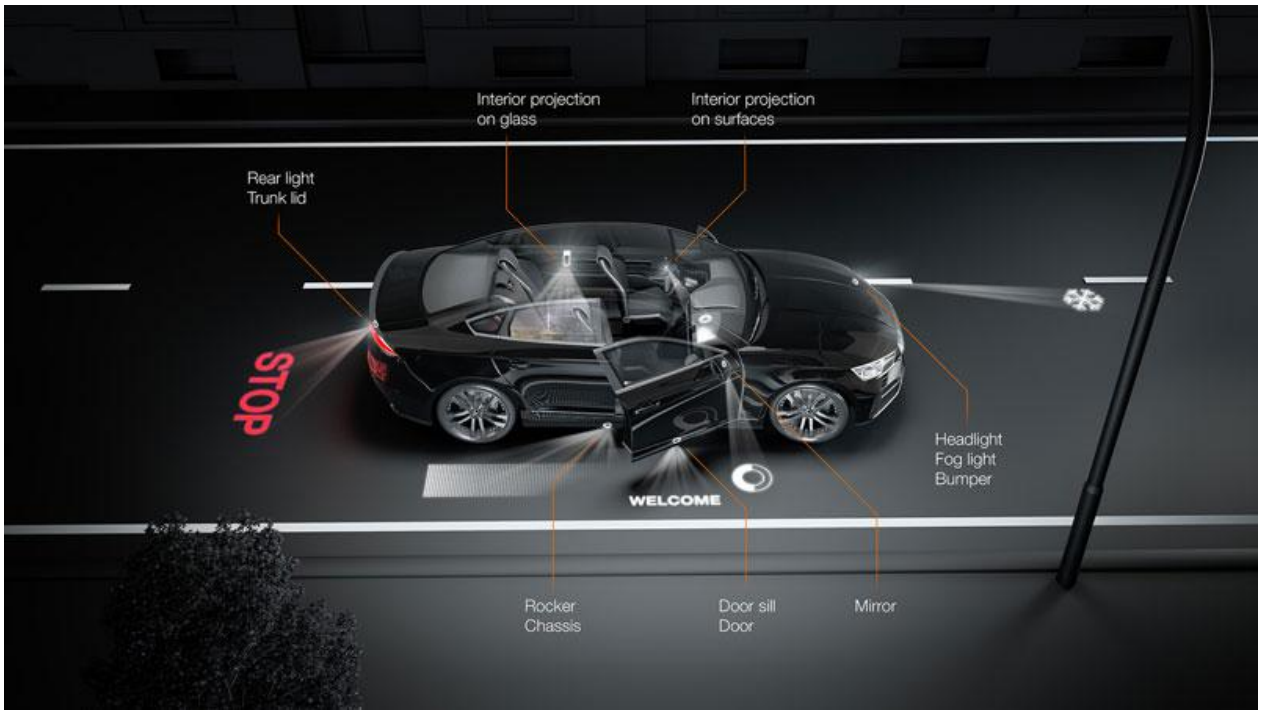
Lextant, a human experience firm based in Ohio, presented how the things we “make” affect how we work, live, and play. They Use generative research to identify innovation opportunities, leveraging behavioral insights to create, among others, meaningful HMI.

Fluid mobility needs to anticipate needs to generate efficiency, wellness, knowledge and personalized experience. Automation needs trust. Trust generates positive attention and engagement. Smart systems are transparent, showing what they sense and informing the driver of what they intend to do. Understanding intention through HMI is crucial to securing trust.

Interior News

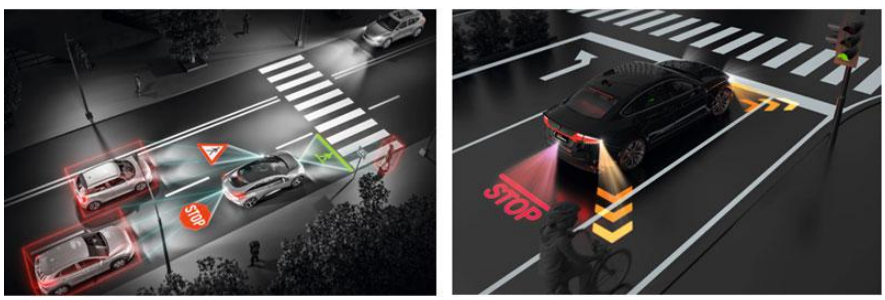
Light Projection Technologies

INTERIOR NEWS



Osram Continental has been developing innovative vehicle lighting to meet upcoming requirements of new mobility. One direction of these development efforts is projection systems. The use of light projections transforms the vehicle cabin and its surroundings into a screen for automakers and mobility providers. Light thus becomes not only a key to more safety and greater functionality, but also opens up a potential for customer-oriented design, individual driving experiences and a noticeable sense of wellbeing on board.

Compact symbol projectors can be easily installed outdoors for welcome scenarios and signal functions.



IMAGES: OSRAM CONTINENTAL

With the development towards autonomous driving, light is also becoming a key factor in the communication between driver, vehicle and environment. The advantages of projections for emotional staging are already widely used in other areas of our everyday life, such as the illumination of monument facades.

Small and powerful projectors in the interior allow the implementation of various ambient lighting scenarios and contribute to a feeling of safety, luxury and coming home.

IMAGE: OSRAM CONTINENTAL

In the event of a dangerous traffic situation or fatigue, the colors of the interior surfaces can change automatically to attract attention. Projections inside the car also provide display options for relevant information while driving without the need for an additional display.

Application and environmental parameters affect the performance and visibility of projected graphics on specific surfaces. Important factors for optimal visibility of the light projections include distance to the projection surface; projection angle; properties of the projection surface, and ambient/environmental illumination.

IMAGE: OSRAM CONTINENTAL

With silicone optics technology, Osram increases the efficiency of the whole system and can reduce the package size of the projectors. Typical installation points in the vehicle:

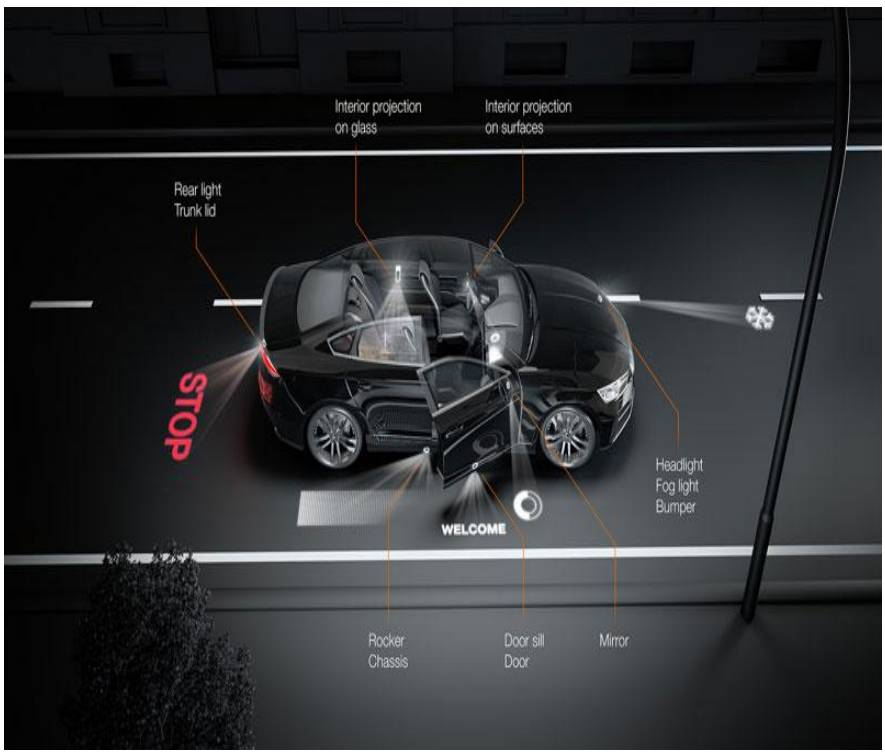


IMAGE: OSRAM CONTINENTAL

There are projection systems with high light output or packaged minimized for interior applications. The product family consists of static, semi-dynamic and dynamic light projectors. The structure is modular for open design possibilities—monochrome or color, low or high light output, narrow or wide angles, short or medium or long distances. Various lighting control units, modulation elements, projection units and electronic control units can be combined to create a perfect system for whatever application.

The goal is a seamless light orchestration that covers the exterior and interior of the vehicle. Light enables autonomous vehicles to communicate with their surroundings and will therefore make a decisive contribution to traffic safety. At the same time, personalization options and comfort while driving will become more and more important. Light projections can create a new sense of space inside the vehicle and cinematic effects in the interior on surfaces, which have not been thought of yet.

IMAGE: RENAULT

Modern lighting concepts have long been an essential part of a high-quality and attractive ambience. Light staging support comfort and well-being and create a feeling of security and orientation in the vehicle. Especially at dusk or night, a suitable illumination relieves the driver.

The new use cases brought by autonomous driving will further increase the demand for additional applications in interior lighting. The car is increasingly developing into a personal living and working space; the focus is on increasing comfort, individualization and entertainment.

Intelligent interior lighting, which can be networked and individually controlled, extends the range of applications. Ambient lighting adapts to the mood when passengers listen to music or watch a film. Warning notices in dangerous situations that can be projected into the cockpit area, increasing safety—light projections support the driver where his perceptive capabilities are limited.

Dynamic light projections with DLP technology from Texas Instruments

Another light projection system is based on DLP technology from Texas Instruments with a digital micro mirror device (DMD). The DMD is a programmable micro mirror array with up to 8.3 million microscopically small mirrors arranged at right angles. With the help of tiny electrodes under the mirrors they can be moved and create dynamic high-resolution light images and animations.

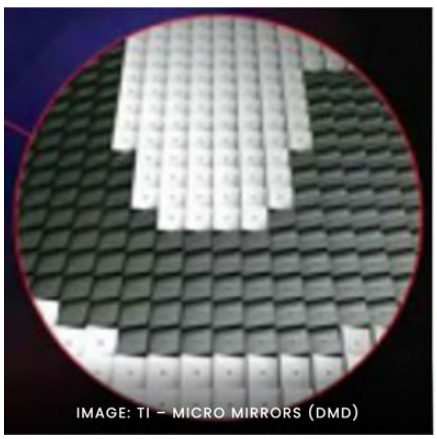


IMAGE: TI – MICRO MIRRORS (DMD)

IMAGE: TI – LIGHT PROJECTION OF THE INTENDED DRIVEWAY

DLP technology can dynamically change the content, without changing the connected optics. It is completely programmable and modifiable, so that several different images can be

projected at different times. For example, it is possible to create personalized lighting in the light base of the side mirror, which can also be used as a signal for the opening the door.

In DLP technology, colors are provided by adding a spinning RGB LED or laser color filter to the DMD. The DMD has switching speeds of a few microseconds and requires only one single image converter for all three colors to create unique images and videos.

DMDs, DMD controllers, and power management circuits for vehicles are approved for operating temperatures from -40 °C to 105 °C for vehicle applications. They are designed to meet the required standards for electrostatic discharge of integrated circuits in vehicles. The DLP system is also package-minimized and cost-efficient for versatile lighting applications.

BMW iX: Next-Gen EV Interior

INTERIOR NEWS

At their (virtual) NextGen 2020 event, BMW announced their new all-electric flagship, the iX, previously known as the iNext, with launch planned for the end of next year at their Dingolfing plant.

The dimensions are similar to the existing X5 or X6 SUVs, with the interior made all the more spacious because there's no need to accommodate a center tunnel. This adds extra legroom in the front and rear, alongside sufficient space for storage. A minimalistic design and clearly structured surfaces further aids a feeling of spaciousness inside the car.

The idea of “Shy Tech” guided its design with technology remaining in the background, and functions only apparent when being used. It is also built as personal living space extension, a sort of mobile loft. This Shy Tech approach for the interior can be seen in a number of features, including speakers integrated out of sight, intricately styled air vents, heated surfaces, and the discreet recessing of the HUD projector into the instrument panel, where it is almost invisible. The hexagonal steering wheel, a rocker switch for "gear" selection, and the curved display all play their part in this next-generation BMW Operating System. Though covered by a single piece of antireflective glass, the unit is effectively split up into a 12.3” instrument cluster and a 14.9” infotainment display. Switch count is reduced to the minimum, to make it easy to understand and to use.

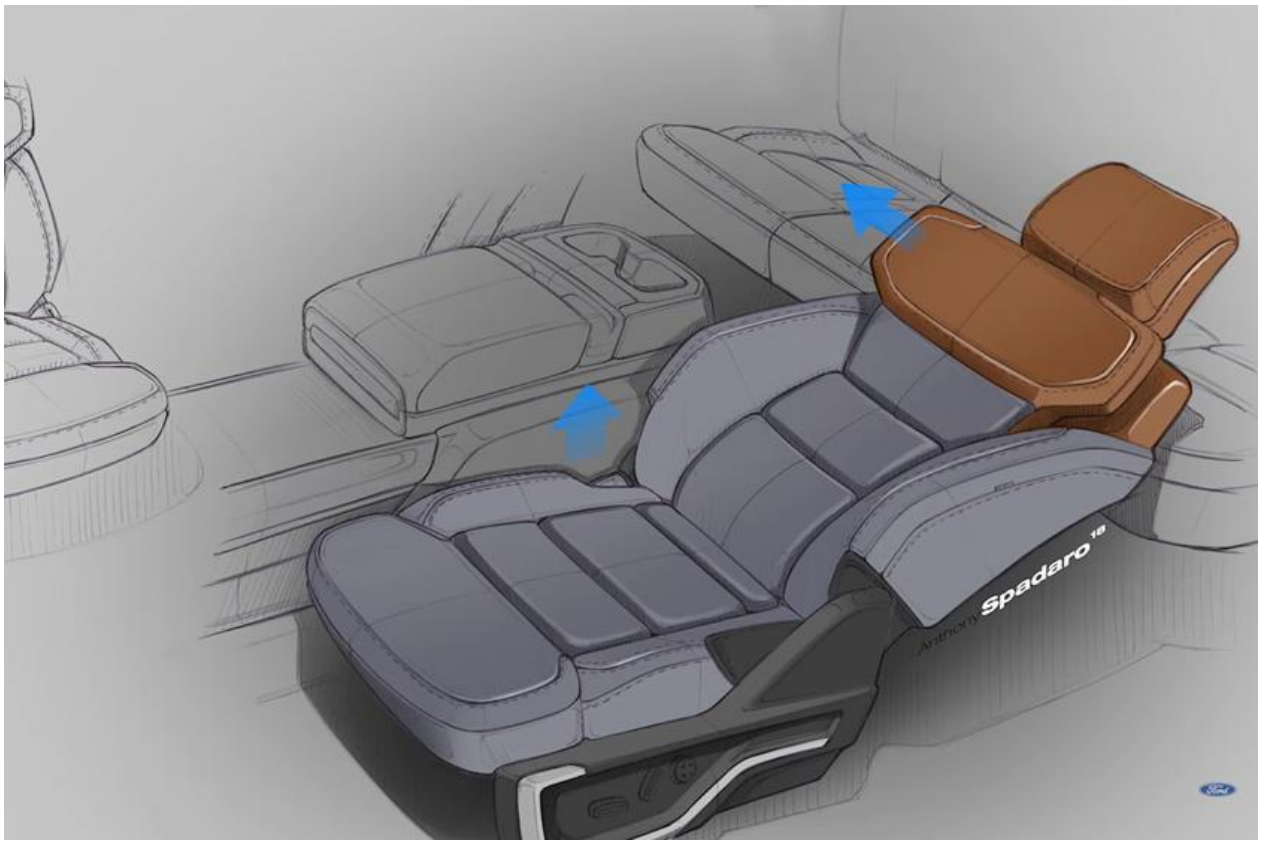
It has built-in 5G connectivity, with higher bandwidth and lower latency to connect to the cloud. It enables new C-V2X (Cellular Vehicle to Everything) solutions that will allow the car to

communicate with others and nearby smartphones—even without a mobile network.

Sustainable materials and unusual surfaces abound. Natural leather is treated with a natural olive leaf extract, leather stitching looks unique, knobs are crafted in crystal, buttons coated in ceramic, open-pore wood on the dash…beauty and luxury!

Ford F150 Nap Seat

INTERIOR NEWS



The new 2021 Ford F-150's Max Recline seat seems like a regular driver seat. But it folds all the way flat to become a realistically comfortable sleeping position, similar to a business-class seat on an airplane.

When folding flat a car seat, typically you get an uncomfortable gap between the seat back and seat bottom, as well as a gap between the backrest and the headrest.

The Ford's comfort team engineered that out of the seat—there's a video **here**—implementing a mechanism to raise the back edge of the seat bottom cushion by 9mm to take up the space, without any additional motors. Meanwhile, the upper part of the seatback can be tilted forward to support the neck.

It's only an option so far, for the de luxe King Ranch and Platinum trim level, but at an attractive price of $340.

Identification of the need came from following people working on construction or mining sites and how they use their truck cab for naps during downtime. It kept the rain off them, they said, but wasn't exactly comfortable.

The design that Ford came up with was awarded five different patents in the US. It portends a host of opportunities for future autonomous vehicle where this nap scenario could happen more often.

38” of OLED Screen in the Cadillac Escalade

INTERIOR NEWS

One of the key features of the 2021 Cadillac Escalade will be a giant 38-inch curved OLED screen blanketing from the left side of the steering wheel to the midpoint of the SUV's dashboard.

The display has what GM describes as "twice the pixel density of a 4k TV", and it's actually three separate panels. To the left is a 7.2” touchscreen presenting trip information. It's also where drivers will select what to display on the main instrument panel, which is a 14.2” screen front and center behind the steering wheel. To the right of that is a 16.9” touchscreen for interacting with the infotainment system and the car's settings.

The center display has a big virtual speedometer gauge, and a moving map. A night vision system is offered as an option, using a higher-resolution infrared camera to go with the better screens.

The AR camera shows the view of a forward-looking camera and overlays the navigation directions on top. Before entering into a turn, large blue arrows point the way to go, and the system also advises which lane to use, and so on. The overlays are visible in peripheral vision, and even when glancing down to look at them directly, one still sees everything on the road ahead.

Driving assistance includes GM's Super Cruise system, including front and rear pedestrian detection and automatic emergency braking, as well as 360-degree parking cameras, blind zone monitors, cross traffic assist, active video rear view mirror and head-up display.

The driver's seat is a 16-way adjustable power item with massage, heating, and cooling functions. It has also haptic alerts to "buzz" the left or right thigh in accord with the blind spot monitoring system.

Audio systems can go up to a 36-speaker AKG setup, and the cabin has a conversation enhancement system to ease talks between front and rear of the very large vehicle.

Renault Trafic Light Truck Interior Raised to Sedan Level

INTERIOR NEWS

The New Renault Trafic, in its Combi (Light Truck) and SpaceClass (Shuttle, up to 9-seater) versions, has an optimized interior. It is produced and marketed together with the Fiat Talento, Nissan NV300, and Mitsubishi Express, all built on the same platform.

The all-new dashboard, highlighted by a horizontal strip that blends into the door panels, gives the impression of more space on board. The interior incorporates new storage spaces. The new shift knob and the contours of the air conditioning controls are embellished with chrome for greater harmony. New colors and materials enhance the customization options available to customers. The New SpaceClass stands out with an exclusive dashboard in a special grey “Gris Météor” for more elegance.

The Renault Easy Link multimedia system, compatible with Android Auto and Apple CarPlay, is displayed on an 8” screen and comes with an induction smartphone charger.

There's storage volume of 86 liters in the cabin, simplified access to storage spaces, and the new Easy Life drawer: more than 6 liters of storage at fingertip access. Cargo volume affords up to 1.8 m^3 of stuff.

It is interesting to notice that even in light truck-based working-vehicle segments, interiors are getting technology almost at a sedan level. ADAS, screens, and connectivity, extending the seamless transition home/transportation/office to business transport.

The Design Lounge

BEV comparison: Cadillac Lyriq, Jeep Grand Wagoneer

THE DESIGN LOUNGE

As we have been discussing in the last few editions of the Design Lounge, the emergence of the BEV is making an impact on the overall marketplace, including design execution. Here we compare the upcoming offerings from Cadillac and Jeep in the highly competitive luxury SUV segment.

The Cadillac Lyriq exterior design enhances a front ‘grille’ shape using lighted elements showcasing the Cadillac brand.

The Jeep Grand Wagoneer on the other hand, has a traditional grill as it does require cooling for the engine. Both designs have minimized the use of plastic cladding to visualize ruggedness.

The Cadillac Lyriq’s overall interior look and feel is dominated by the large curved display used for the UX/HMI. This is further enhanced by minimizing the buttons and control surfaces used created a serene luxurious space.

The Jeep Grand Wagoneer, on the other hand, has a very trucklike interior architecture using high quality materials and finishes to emphasize its luxury upmarket appeal.

The Lyriq's dominating visual appearance is defined by the large, curved display that starts from the driver's side A-pillar to the outer edge of the center tunnel console. Surface offsets that are usually required from the display cluster hood and center screen are eliminated, creating an elegant overall surface.

The Grand Wagoneer is also clearly dominated by its screens, but in a much more traditional sense. Large displays are used for the cluster, upper and lower center console and in front of the passenger. Eschewing the latest floating-display trend, the Jeep uses a more traditional form factor for integration that includes a cluster cowl.

The Lyriq, like most modern luxury SUVs, is dominated by the use of screens again, for the rear passengers. A floating type display and flowing metal trim parts create a fluid, organic, elegant integration.

Although the Wagoneer also floats its rear displays, they aren't fully integrated physically, causing them to be a bit less harmonious than the Lyric’s execution.

Looking from the rear cargo area, the Lyriq has created a more upscale and sedanlike environment by incorporating large wooden panel on the rear of the seats, thus sacrificing a bit of practicality.

The Wagoneer goes the opposite direction, with robust functional seating and control surfaces.

CADILLAC LYRIQ

JEEP GRAND WAGONEER

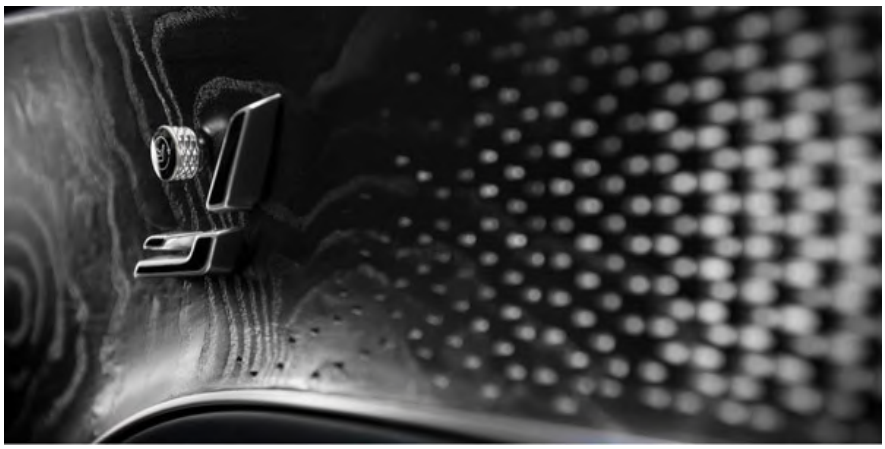
The use of fine metal detailing and textured materials for their touch points is in line with this SUV luxury segment thus enhancing these vehicles' tactile and perceived quality.

CADILLAC LYRIQ

JEEP GRAND WAGONEER

Knurling and fine detailing for the UX/HMI controls elegantly contrasts with the smooth and glossy surfaces used in the Lyriq's center console.

With the Wagoneer, knurling is also used for the UX/HMI control but in a more rugged purposeful manner as heavy texturing and surface offset switching is more in line with Jeep's off-road image.



CADILLAC LYRIQ

JEEP GRAND WAGONEER

Detailing and material usage on the door panels highlight the different goals of these vehicles. Cadillac is incorporating natural wood finishing with contrasting metallic knurled and textured controls while Jeep has again eschewed wood finishing altogether. Their use of highly textured inserts contrasts nicely with the metallic parts and smooth leather trimmed surfaces.

Of interest, the ICE vs. BEV comparison is completely lacking. Regarding these luxury SUV's, traditional design execution and attention to materials and detailing are their focus.

From inside, you wouldn't know the difference.

News Mobility

_Car interiors Unplugged

NEWS MOBILITY

0. Intro_

(this is the first in a series, a designer's take on automotive interiors as an evolution of our habitat)

This series acquired its title through the ongoing lockdown that established emerging trends, transforming our mobility-focused lives probably with no return. With the recent launching of the Apple M1 microprocessor and of the Space X mission, confinement looks like a form of protection vessel, entering a new world of immense and tiny at the same time. It is so difficult to capture both in one frame, constantly zooming in and out, that we lose sense of scale and proportion. Hence, we can only rely to our proximity, our reach, our living spaces, our interiors that evolve suitably by drill and compulsion. It is not about a form of an object but the settings of our closest circle.

This amazing shift implicates cognitive adjustments. We have launched ourselves into a never-ending exploration and conquest of the ‘far away’, as far as seeing our entire planet as a whole and perceive its physical limits. Social and economic institutions, along with our perceptions of governance, adjusted accordingly. Today we can observe pretty much everything from everywhere on the globe! However, in order to enjoy such panorama, there is a condition of distance and perception combined: far enough to see, close enough to enable.

This new era wants humans more conscientious of ‘themselves within their close proximity’. Distance is not measured in light years but rather in ‘about a meter’ from each other, a few inches off of surrounding surfaces, some pixels away from the next click and maybe in the next quantum computing stage, distance is subjective all together. However, the further we reach the more we secure our supporting system. In the spree of conquest, we simultaneously and inevitably built a sort of a travel bubble. This is our only physical sample

that we carry along on the endeavor to gain control over the unknown and its multiple dimensions, just like in a spaceship, a protective shell, a new kind of habitat.

We recently found ourselves partially excluded from our mobility ecosystem, behind a glass window or a computer screen, initially observers then remote pilots. Within a constellation of objects and vehicles that empower our mobile infrastructure, we can explore their new possibilities of motion. With the most advanced automotive tech keyboards, joysticks, controllers, ergonomic pads, bolsters, armrests in our houses, we realize that domestic comfort invaded automotive interiors like flat screens of all sizes and resolutions, lounge chairs, ambience mood lighting, sound-systems, and infinite choice of color and trim applications. Apparently, we enter a new niche, both static and itinerant. It is not just about pointing out similarities or one industry influencing another, but a new lifestyle as a whole. Hence, physically we can only rely to our reach, our surroundings, our living ‘car interior’ spaces. Perhaps it is time to reshape our immediate proximity.

*INDUSTRIOUS*_____

_to be continued…

Smart Traffic Lights "Understand" Users to Secure Crossings

NEWS MOBILITY

We've reported on Austria's Swarco and their traffic light experiment for vulnerable road users in Germany. This week we stay in Austria with smart traffic lights in Vienna to improve pedestrian crossing and traffic flow.

This is the solution chosen by the local traffic authorities to address the city's 200 pushbutton-triggered pedestrian crossing signals, as most people cross without pressing, while others press the buttons just for fun, causing unnecessary traffic delays.

The Institute of Computer Graphics and Vision of the Graz University of Technology stated it requires one second to estimate the pedestrian's intention to cross; and after two seconds, the estimate becomes reliable. And even the green light can be extended in the case of large groups of persons, who require more time to cross the street.

Hardware and software were developed with the intention to be as small as possible to be easily packaged into a pole, and to include machine learning engine, using global movement models and recorded data to progressively recognize pedestrians' intentions through learning algorithms.

The system functions exclusively with geometric information, from which it derives a possible intention to cross. There's no concern about pedestrian privacy; images are analyzed locally and do not leave the camera.

Other experiments are going on in parallel; in Helmond, Netherlands, in their Automotive Campus 5G field lab, cameras at traffic lights detect cyclists and pedestrians. 5G connectivity can improve traffic flow and road safety, mainly because the whole information chain will speed up, from sensing to actuating; from one second to ten milliseconds.

It's a must for safe autonomous vehicle in the future, where vulnerable road users are not always behaving as they should. Of course, it remains to be seen whether today's just-for-fun buttonpushers will adopt postures intended to fool the AI!

Uber to Partner for Self-Driving

NEWS MOBILITY

Uber Technologies' self-driving unit is looking to partner with other companies working on autonomous driving. They're in ongoing talks to sell their Advanced Technologies Group (ATG) unit to self-driving car startup Aurora, as Uber was seeking options for this expensive unit, with fully autonomous, human-unsupervised vehicles, which will still take another 10 to 15 years.

Uber could offer competitors, who have spent billions of dollars into the development of robotaxis, a large customer base and valuable data on profitable routes generated through their ride-hailing business.

The former CEO of Uber felt it was essential to own the self-driving technology, having in mind that the business of selling rides will be taken over by the robotaxi. But now the auto industry shifts to being more about mobility—selling rides rather than cars. Today Uber doesn’t own or operate their vehicles.

Aurora, founded in 2017 by three veterans of the autonomous vehicle industry who led programs at Google, Tesla and Uber, is focused on building full self-driving module. the underlying technology that will allow vehicles to navigate highways and city streets without a human driver behind the wheel.

General News

Bentley to Go All Electric

GENERAL NEWS

BENTLEY EXP 100 GT CONCEPT VEHICLE

Bentley, part of the VW Group since 1998, has become the latest automaker to lay out plans for an all-electric future, and one of the first in the luxury world.

By 2026, they say, all Bentley models will be partly or totally electric, whether in hybrid or battery-electric form. And four years later, in 2030, all Bentleys will be entirely electric.

Bentley's CEO stated “By 2030, no more combustion engines. The future of Bentley will be fully electric. We are not only working on one electric car but a full family of electric cars."

Bentley’s announcement comes amid an accelerating shift by the global auto industry, and it is consistent with the whole VW Group strategical shift. CEO Herbert Diess recently told the Financial Times that the Group's actual differentiators, capabilities, and knowledge will be not as important in future, and that he is acting to convince shareholders and unions to drive the company to the EV lead.

Targeted buyers looking for environmentally-friendly vehicles are often the same ones looking for—and able to afford—premium vehicles. At the same time, premium markets are mostly megacity markets, which are all in a move to ban at a certain point of time (between 2030-2040) ICE powered vehicles, because of air and noise quality.

GM Nikola Confirm Partnership Objectives

GENERAL NEWS

GM and Nikola initially announced a pending partnership last September. At that time GM's agreed-to equity stake in Nikola was 11%.

General Motors CEO Mary Barra said a few months later that talks with Nikola about a potential partnership deal with are still ongoing. GM set a December 3 deadline to close a deal, after previously postponing their $2bn partnership following claims of fraud and deception at Nikola by a short seller in September. These accusations of fraud against Nikola and founder Trevor Milton led to Milton's resignation as executive chairman.

NILOLA BADGER INTERIOR – HYDROGEN FUEL CELL ELECTRIC PICK UP

GM is looking for growth opportunities in broader markets with Hydrotec fuel cell technology and Ultium battery systems, and to engineer and build the Nikola Badger. Nikola, Honda and other companies are looking to GM's technology as a platform for their future products, as it is part of the GM overall EV strategy.

GM investment mainly targets to secure a new “customer" for batteries and fuel cells.

The future will tell us if Nikola is a solid partner to GM, or a popping dotcom bubble.