DVN-I
Automotive Interior

Thu, 27 February 2020 Weekly Newsletter NEWSLETTER #22

Editorial

Finding And Placing Empathy In Seats And Interiors

Empathy is the capacity to understand or feel what another person is experiencing from within their frame of reference, that is, the capacity to place oneself in another's position. The discipline of product management is shifting from an external focus on the market, or an internal focus on technology, to an empathetic focus on people. Today's product designers must strive to put themselves in the users' shoes, as it were.

That's the nutshell conclusion of last week's IQPC seating conference, where most innovation centered around understanding occupant preferences—particular music, freedom to move, environmental light-treading, rear seat belt positioning, just to pick a few—which cover the whole spectrum of what is expectable. It doesn't mean that core goals like safety and comfort should be abandoned, but they've became a given, and now successful product differentiation is derived from understanding customer preferences at an empathetic level. This edition of DVN-I has in-depth coverage of the most relevant topics presented at IQPC in Köln last week.

Before the Geneva motor show, to be presented in our next edition, the world tour of auto shows continues to turn, and we'll give a glimpse of what was presented recently in Chicago and Dehli—important events, at least from a public attendance standpoint.

And this week's Design Lounge takes a look at the state of VW design, and how the strong EV strategy is influencing it.

We're humbly grateful to you, our readers, for your support. Our subscription campaign is still open, and if you appreciate what we are doing to inform you on automotive interior novelties, just click and **go for it**!

At your service and sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

Seating Innovation for User–Focused Benefits

The 15th IQPC International Seating Conference took place last week in Köln, Germany. It was a good opportunity to understand the status of automotive seating technology, and what we can thoughtfully anticipate for the next generation of seating systems.

Autonomous driving, sustainable development, electric vehicles, connected cars, computing power, 5G—the list of upcoming changes and challenges for automotive seating is quite impressive. Needless to say, they're all also new opportunities!

Major takeaway points from IQPC involve dynamic comfort, allowing maximum movement for occupants; wellbeing and correlation with temperature, smell, pressure distribution, and light; how to keep drivers awake and alert in increasingly automated vehicles, sustainability rebalances with new kinds of materials (including materials made from waste like plastic from the sea), new safety systems being developed for new use cases and regulations, and a thorough review of test dummies proving that none of them is 100% correct, but all of them are useful.

Megatrends like CASE vehicles, increasing computing and connectivity power, a new mobility mindset in urban areas (even if at the moment new mobility is in addition to/not yet replacing old mobility) …all of these are pushing interior design and specification in new directions. The idea of a car as a 3rd living space is difficult to realize without people and their stuff fitting the way they want to fit. And Level 3 autonomy will put the driver in more of a "captain" role, meaning they won't do much, but still need to be alert and on watch at all times.

Development methodologies like FCA's DFSS to address rear seat belt comfort, are a complex topic because of many different passengers' dimensions and perception. Clearly, several small innovations could be as valuable as a one radical one.

SEAT (the automaker, not the interior component) presented their safety regulation compliance validation process in all its complexity, opening to a future with more automated vehicles where regulation could evolve with simplification because of lower crash rates, though that's very unlikely if we remain stuck with today's media-hyped fear of automated vehicles.

Consult/design company Hyloh's co-founder Elodie Ternaux challenged the audience with the meaning of sustainability, reminding that there are many steps before getting to recycling (repair, reuse, rebuild, recall, redesign, even to *relax* meaning accepting a similar part (color, touch, etc) rather than re-creating something new. Their approach focuses around people, planet, profit and pleasure. As designers and brands struggle to integrate the call to change, efforts are often misguided by the myths and marketing of "sustainable" materials. In Hyloh's view, there are no sustainable materials, only good and bad material uses.

The SEAQUAL Initiative, from Girona Spain, challenges plastic pollution and helps to clean oceans of marine litter, helping society move towards a circular economy by dint of a collaborative model involving NGOs, fishermen, researchers, scientists, authorities, and private stakeholders to clean the ocean floor and surface, rivers and estuaries, beaches and coastlines.

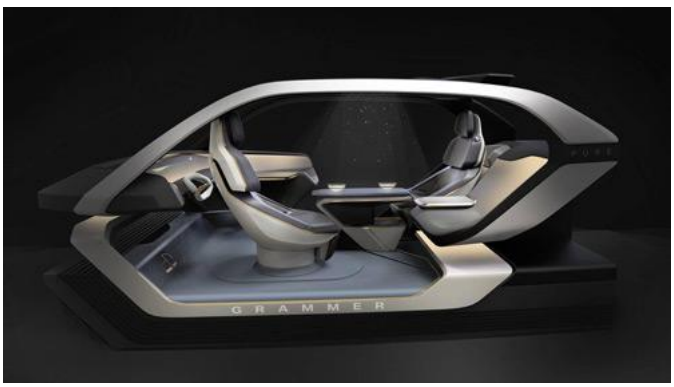
- 

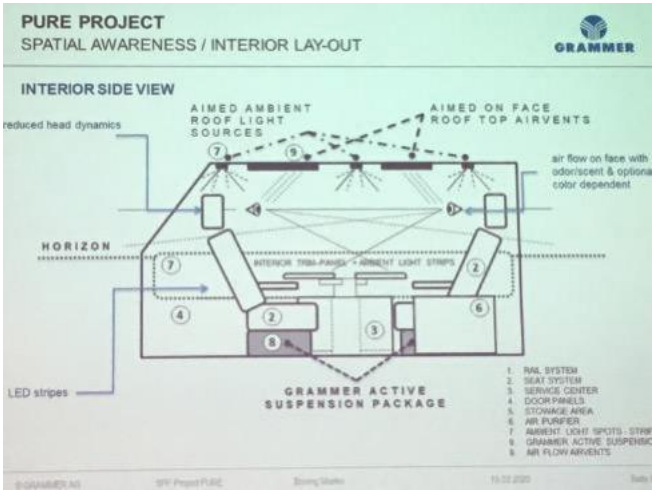
- 

FCA, together with their seat cover textile supplier (Aunde Group from Germany) presented a collaborative approach ending up with Fiat 500 and Panda Cross Mild Hybrid "Launch Editions" with seat covers made out of recycled polyester yarn made from recycled materials including post-consumer plastic bottles and plastic captured from the sea, through PET chips or pellets to get yarn to make fabrics.
Similar solutions are in development like Econyl® yarn from Aquafil, using nylon waste such as fishing nets that can no longer be used, or textile production scraps normally destined for disposal, which are recovered and transformed into a new yarn with the same characteristics as nylon made of virgin raw material.

FCA leather supplier Marco Levi Group from Italy developed "Feeltek" material for a vegan solution to premium interior. It's a PU impregnated textile material with no animal content, and a finishing layer to get a more than 80% recycled or Bio material.

First-time presenters Grammer spoke about their "PURE: the freedom to move" project.

- 



Working with an internationally renowned automobile design studio, Grammer will be unveiling their new interior concept for greater driving comfort in autonomous vehicles. Their goal is to stay ahead of the major megatrends such as autonomous driving, connectivity, and digitalization.

The project mainly concentrates on the core aspects of comfort, ergonomics and safety. Aspects such as motion sickness, the modularity of interior components, sustainable materials, new functions, and the mobile workplace are being explored in detail to prepare for interior of the future in 2035. Air purification is part of the features, as well as an "interior service center" console with multifunctional use in controlling seat position and usage.

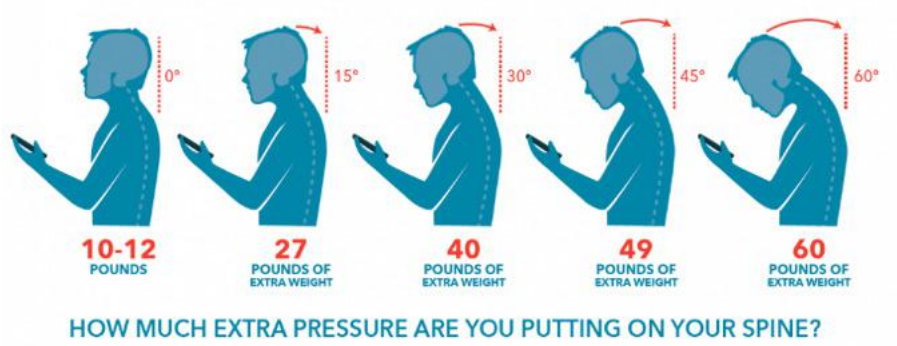
Toyota Boshoku's Advanced R&D Division General Manager Dr Klaus Philipp, presented their ACES (Active Comfort Engaging Space). When the system detects you getting drowsy, it will comfortably keep you engaged with nostalgic music and vibrations. Why nostalgic music? Neuroimaging has shown that songs, especially the ones we've been hearing over and over and so have attached to memorable events and formative periods in our lives, stimulate many different areas of the brain and give us a big hit of dopamine. Combined with seat vibration, it helps us stay awake for a longer period of time (on the order of 2 hours versus ten minutes!). Machine learning could help identify anyone's nostalgic songs through the programs they select. Vibrations, for their part, induce occupant's emotion to pleasure and anticipation.

Toyota Boshoku's interior also includes a personal air conditioner system for personalized thermal comfort, an intermittent uplifting system to react to your emotion, driving mood, and a physique & posture detection system to adjust automatically to driving and relaxing posture of an occupant. The system incorporates as well a camera and a seat sensor which can detect your eye position, size and posture. This way your seat and seatbelt positions can be optimized automatically.

Being encapsulated into a car for long doesn't help blood circulation nor muscle stimulation. When you watch TV, sleep, be sited in a restaurant you never stop having movements. How to do that in a car was a hot topic from several different presenters.

Pr Peter Vink, from TU Delft University in The Netherlands has done a lot of research on seat comfort (Book: Vehicle Seat Comfort and Design, 2016), with information on sensitivity of the back and buttocks, ideal back rest curvature, pressure distribution, how to measure comfort and what can go wrong in comfort research. Discomfort comes from physical aspects and comes with time, when comfort is coming from the unexpected, including new positions.

Best way to identify discomfort is HRV (Heart Rate Variability) and micromovements, known to most of us as fidgeting. But of course, fidgeting is much easier to measure via simple sensors, while HRV is more complex, and creates a kind of confusion with medical devices.



source: Chiropractor Association of Saskatchewan

Interiors should adapt to new usage, including smart phones and prevention of "text neck" issues (describe repeated stress injury and pain in the neck resulting from excessive watching or texting on handheld devices). Gaming, when possible, is a good countermeasure as it involves leg muscles involvement. At least it is known in many treatments to help patients cope with pain.

Peugeot 3008 optional Nappa leather seat

PSA's Laurent Bauvineau presented, together with Pascaline Lantoine (PhD from Institut des Sciences du Mouvement at Marseille) a thorough study on difference in comfort between regular and new suspended seats with textile or leather upholstery: groups of people assessed comfort in minimum 2-3 hours drives in different road conditions (city, traffic, countryside, hills). Conclusion so far is that long term driving forces occupants to adapt, mainly through repositioning micromovements, opening the future to what could be named "dynamic comfort".

Interior News

Chicago Auto Show, North America's Biggest

First staged in 1901, the Chicago Auto Show is the largest auto show in North America, covering over a million square feet. It has been held more times than any other auto exposition on the continent, and this year's show was the 113th.

While Chicago didn't have a lot of spectacular new-model and concept debuts, there was still quite a lot worth seeing and exploring.

Genesis GV80 three-row luxury SUV

- 
- 

The GV80's interior is both understated and elegant, much more that its platform-twin Hyundai Palisade. Genesis says it's developed around the concept of "white space", which is the design term for an intentionally empty part of a page or drawing. There certainly isn't much visual clutter, which gives an overall impression of simplicity—and simplicity means less driver distraction.

There's a two-spoke steering wheel, a 14.5" touch screen at the top of the center of the dashboard, and knobs and buttons for commonly used tasks. The volume knob is located between the seats, as is the case with many newer Audi and Mercedes vehicles, and the transmission range selector combines a pushbutton for park and a rotary control for gear selection. A touchpad with handwriting recognition is an alternate method of controlling the touch screen.

Heated and ventilated seats are available in the first two rows, and Genesis says the "active motion" driver's seat will inflate and deflate individual air compartments within the seat to reduce fatigue, and comfort is reinforced by quilted seat cover surfaces.

VW Atlas interior digital technology refresh

- 
- 

The Volkswagen Atlas midsize 3-row SUV (called the Teramont outside the U.S. and Canada) is the biggest vehicle produced on VW's MQB platform. For 2021, three-row crossover has new exterior styling, but our greater interest is inside: there's an upgraded infotainment system. The Car-Net system features many upgrades and new app-based functionality, such as the ability to use the vehicle as a safe place to receive and store delivered packages. In addition, the system will allow owners to contract directly with their mobile carrier to add 4G LTE service to the vehicle through their data plan, letting the vehicle serve as a mobile hotspot, and it eventually will allow streaming entertainment into the vehicle. Volkswagen has an initial agreement through Verizon Wireless to enable the feature, but the automaker is working with other carriers to broaden service in the U.S.

The infotainment system allows remote access to the vehicle via smartphone, enabling users to turn the engine on or off, lock or unlock the doors, honk the horn and flash the lights. The app also shows the vehicle's location when parked and can provide remote information on fuel level, odometer reading, and whether the doors and windows are open or closed.

Chrysler Pacifica Minivan, the new mobility carrier

- 

- 

The new Pacifica will be Chrysler's first all-wheel-drive minivan since 2004. The freshened Pacifica gets an appearance update with a restyled grille to go along with a new all-LED taillight that runs the entire width of the vehicle. It's also the launching pad for FCA's fifth-generation Uconnect infotainment platform. Its processing speed is 5× faster than before, and it integrates advanced connectivity entertainment, navigation, and communication. It's also available on Dodge, Ram, Jeep, and Fiat vehicles. The Pacifica's interior still has Chrysler's popular Stow-'n'-Go seating system, which helps suit it ideally for car sharing. Many Pacificas are upfitted as autonomous-driving test cars.

- 
  Dodge Durango interior
- 
  Honda Civic Type R Driver Seat

Many other US debuts and refreshes were presented, including Dodge Durango, Chevrolet Equinox, Honda Civic Type R, Jaguar F-Type, and various Jeeps, Nissans, and Toyotas.

India Auto Expo: Affordable Cars for Growth

The 15th Auto Expo was held at the India Expo Mart in Greater Noida, just outside of Dehli in the New Capital Region. Some major automakers skipped this show - Honda, BMW, Toyota, Ford, FCA, Jaguar Land Rover and Volvo—but those who participated this year had a lot to show. There were many concepts, future-ready products, global unveils, important launches, and some motorsport displays. We've just selected a few to focus on here—mostly automakers we don't see outside of India.

Force Motors Gurkha

- 
- 

The Gurkha has a tough, boxy, retro look but there are more than a few cosmetic changes. It also gets much more equipment and a renewed focus on cabin comfort, even while it keeps its rustic look with very solid plastics.

Mahindra's affordable and fun EVs

- 
  eKUV 100
- 
  eKUV 100 Interior

- 

Mahindra Funster Concept
- 

Mahindra Funster Concept, Interior

To present themselves as a future-ready company, Mahindra revealed prices for what is now the most affordable EV in India – the eKUV100. But the most intriguing model at Mahindra's stand, the Funster concept, is a hardtop convertible electric SUV with scissor doors. Mahindra says the Funster e-SUV concept demonstrates the fun side of EVs. It also previews the possibilities of MESMA, the Mahindra Electric Scalable Modular Architecture.

Maruti Suzuki

- 

- 

Maruti Suzuki revealed their Futuro-e concept SUV on the first day of the Expo. Far removed from the straight lines of existing Maruti SUVs like the Vitara Brezza, the model is a design study with flowing lines and a coupelike rear.

The interior image indicates a futuristic cabin with blue ambient lighting and a driver-focused cockpit area having a unique steering wheel as a gaming consoles, a wide touchscreen covering the width of the dashboard for infotainment, sat nav and other purposes. The AC

vents are pushed further into the dashboard accentuating a fighter jet styled design.

Tata EV with minimalist interior

- 
- 

Tata revived the iconic Sierra name for an electric SUV concept. The single-side sliding rear door and swivel seats for the cabin might not readily make it to production, but the concept signifies comfort more than anything else. The rear seat is finished in wood and there are intriguing white illuminated elements like the movable vanes on the lower sections of the door. Faux grass inserts on the dashboard and blue illumination below the Tata logo up front while charging are nods to the car's ecological credentials. The interior has a minimalistic approach to design and the lack of physical buttons makes it free of clutter. The multilayered dashboard has a chunky rectangular steering wheel and contrast-lit highlights. The seats are finished in white, matching the exterior body paint

Haval (Great Wall)–Haima (FAW) EV for India

- 

Great Wall Haval Concept H

- 
  Haval Concept H Interior
- 

  FAW Haima E1 EV
- 
  FAW Haima E1 EV Interior

Chinese automaker Great Wall's Haval brand had an extensive display. There were SUVs including the midsize Concept H. Its screen-rich interior was quite eye-catching. And FAW's Haima brand showed their EV1—pretty basic, but it does have a digital instrument cluster and a 10" touchscreen infotainment system. Bird Electric will be assembling it from CKD kits for the India market.

Polestar's Sustainable Interiors

Geely-Volvo's Electric performance car brand Polestar is using innovative materials to reduce the carbon footprint of its interiors. The new materials include the likes of Bcomp's natural fiber composite to reduce plastic content, cut weight, and improve crash safety of interior panels.

Bcomp's powerRibs and ampliTex technologies can turn natural fibers into lightweight interior panels. They are stronger and up to 50% lighter than traditional interior panels with an 80% reduction in plastic content.

A 3D knit material can be used for seating surfaces with a single thread used to produce a three-dimensional individual component. The base material is 100% recycled yarn from PET bottles, with Polestar saying waste is removed from production as the material is made to size with no offcuts.

Waste material from cork manufacturing can be integrated into PVC interior components. Recycled Nylon 6 from discarded fishing nets can be turned into woven carpets.

Polestar design boss Maximilian Missoni says design and luxury do not need to be sacrificed with the materials: "If anything, they enable even more premium, cutting-edge, modern and stylish executions which elevate our design-led products. It also presents a positive

challenge, giving new meaning to interior design. We are able to derive new aesthetics from new contexts and technologies, allowing society to move on".

Tesla 3 Gets Rear Hot Seats As Paid Upgrade

Tesla has started unlocking the rear heated seats on Model 3 Standard Range and Standard Range Plus as a new Over-The-Air (OTA) upgrade. When Tesla first started producing the "partial premium interior", Tesla didn't actually change anything and only deactivated features through software.

The rear-heated seats were actually working for the first few months of Model 3 Standard Range Plus deliveries. Tesla eventually deactivated them, and are now making them available as a $300 OTA upgrade. Partial Premium Interior Includes 12-way power adjustable heated front seats, Premium seat material and trim, upgraded audio with immersive sound, and premium connectivity (included for 30 days before "owners" must pay more to keep the feature—does this count as ownership?).

Last year Tesla introduced software upgrades available for sale through their app. The first feature available was Acceleration Boost. Tesla "owners" can now also buy Autopilot packages directly through the mobile app in just a few clicks.

This is quite a shift in philosophy, departing from the previous model where vehicle equipment content was determined by what was or wasn't actually installed and present on or in the vehicle. Is it ethical for a part of the car you bought and own to be disabled and blocked by the maker? Tesla thinks so. They say some people barely ever use the back seat and wouldn't spend the money, while others who have a family and live in a cold climate might consider it worth the $300. But the complete system is present on both of these theoretical owners' cars; the difference is one has and one hasn't paid more money to the automaker for the privilege of using the equipment installed on the car.

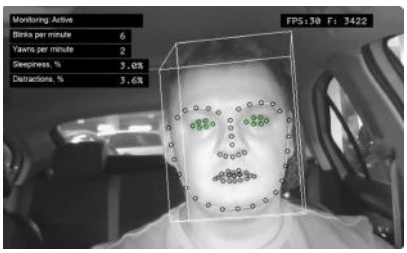
Geely to Launch Antibacterial Filters Against Coronavirus

Geely has announced that all of their new vehicles will be equipped starting next month with their "G-Clean" Intelligent Air Purification System (IAPS), a new system that can automatically filter out harmful particulates.

The IAPS was developed in just 20 days' time(!) in reaction to the 2019 coronavirus which has affected large areas of China. Geely engineers worked nonstop with suppliers to bring the concept from the drawing board to future production vehicles in record time, and it will be seen in production cars starting next month. Vehicles equipped with the new system will receive an advanced new active carbon chemical filter that can effectively absorb harmful gases such as formaldehyde as they enter the vehicle as well as irritating odor and harmful pollutants once they are detected by the automatic system. In addition, the IAPS has a negative ion generator that can sterilize and deodorize pollutants and aims to achieve the same level of air filter as an N95 respirator system.

News Mobility

Yandex Will Detect Drowsy, Dangerous Drivers



Since 2017, Yandex (the "Russian Google"), Amazon, Spotify, and Uber merged their operations in the region to launch a new joint venture targeting Eastern Europe. It's called Yandex.Taxi, and it now operates in Russia and CIS states with a scope similar to Uber with ride hailing, food delivery, and self-driving taxi services as a pilot service.

But safety has emerged as a focal point in the ride-hailing realm, with concerns around everything from fatigue to driver identity. So Yandex has been developing AI-infused proprietary hardware and software that monitors drivers' attention levels. While similar technology is being built into new cars such as the 2020 Subaru Legacy, Yandex's version can be easily retrofitted to any vehicle, and the company hopes to see ride-hailing drivers take advantage of the technology.

The company says its SignalQ1 camera looks at 68 points on a driver's face and, with the help of machine learning, detects when a driver is tired or distracted. The system looks at factors such as blinking and yawning to assign sleepiness and distraction scores.

Yandex is also in the early stages of developing a facial recognition system, similar to Uber's, that identifies who is really behind the wheel. Rather than requiring dedicated hardware, Yandex will simply use the camera on the driver's smartphone, similar to what Uber and Didi are already doing. But Yandex is going a step further, also testing voice-recognition smarts to match the active driver with a registered account.

- 
- 

- 

Potential Shuttle EV Interior, based on Canoo Microbus package

JLR Vector Self-Driving Car on the Road from Next Year

Jaguar Land Rover has revealed a new autonomous concept vehicle, Project Vector. It's a self-driving pod that the automaker hopes to have on roads from 2021. Rather than borrowing an existing vehicle's platform, Project Vector is based on a city-friendly new architecture.

Right around 4 meters long, it's scaled for urban streets, the battery and drivetrain components packaged under the floor. It keeps the cabin mostly free of intrusions, maximizing interior space. JLR imagines different layouts being possible for private transportation, shared services like a taxi, or commercial applications such as last-mile deliveries.

An on-road pilot program is expected to take shape in Coventry, UK, from 2021. JLR representatives say "Our vision shows the vehicle as a flexible part of the urban mobility network that can be adapted for different purposes. The intention is to collaborate with Coventry City Council and the West Midlands Combined Authority to plan a mobility service from late 2021, as a living laboratory for future mobility on the streets of Coventry."

The Design Lounge

Dongfeng Venucia: Innovation and Design

Donfeng is automaker hit hardest so far by the coronavirus, as it is headquartered in outbreak epicenter Wuhan. Its supplier ecosystem, too, is mostly in the hard-struck Hubei region. At the 2019 Guangzhou auto show, Dongfeng Venucia unveiled a newly designed car, the Xing ("Star" in Chinese), which utilizes the Venucia Design philosophy of Energetic Elegance. Let's use this opportunity to publish something positive about what is happening over there, local people deserve it and the outbreak will end sooner or later!

Dongfeng Venucia Xing

On the Xing, the new production car in the Venucia family, light and shadow are emphasized. A curved volume uses the whole surface and tension to express the sense of power. Energetic elegance emphasizes the harmony and unity of the body shape. With stretched structural lines, the plump surface highlights the visual effect, making the exterior look extremely dynamic and giving impressiveness.

The face features a V-Galaxy star grille, which is also the new family language design guidance. The headlight and grille are highly integrated. The new design is more recognizable than the previous models. There's a bar-style taillight design on a rounded rear with a three-dimensional visual sense.

High-gloss film on the B, C and D pillars and the small facia gap highlight the smooth sides, and such integration makes the cabin look clean and simple. From any angle, the bright and dark body surfaces transition naturally and rhythmically, with renewed textures in multiple dimensions.

The Xing's interior design develops the wraparound layout from The V concept. On opening the doors, the embracing cabin shape offers a spacious, light visual experience, creating a sense of vast space. In the T-type integrated center console design, the spectacular lines stretch to the sides like the horizon, and smoothly connect with the piano-black panel. This further highlights the spaciousness and comfort of the interior. The modern minimalist style highlights the sense of quality, technology and homeliness in the overall atmosphere.

All elements of the interior are connected and complement each other, with the details carefully thought-out in depth by the designers. Paying attention to actual needs of drivers and passengers, most physically operating parts are converted into intelligently controlled virtual buttons. These match the surrounding cockpit patterns. From the touch-sensitive steering wheel to the transparent decoration of the copilot display panel, the technologies are displayed and presented clearly and simply.

- 
- 

In this multi-functional cockpit concept, the futuristic, interactive steering wheel demonstrates the charm of technology. The copilot's digital display screen is decorated with a flowing light film, featuring silver matte plating strips and carbon fiber 3D metal-textured decorative parts. For high-quality, artistic aesthetics, the design team constantly optimized the light transmittance of the film, adjusted the gradient effect and arc of the lines, and created a fluid visual experience.

The center console, IP, steering wheel and seats are covered with a large area of soft and delicate leather. For top-level driving enjoyment, the driver's seat adopts a curved surface that fits the human body; and the front seats have individually-adjustable leg-rests. The aviation-inspired headrest provides passengers with a large contact area, improving the fit and support to the head. The open interior and flat floor also provide ample space for rear passengers, with extra-large knee space and horizontal shoulder space. A panoramic sunroof with a large light transmitting area gives a wide field of vision.

Three color schemes are available: all black, black-grey, and black-brown. The all-black is embellished with silver metallic textures, the delicate black cladding and high-quality silver metal lustres complementing each other and creating a calm, smart cockpit atmosphere. The black-grey color scheme heightens the sense of fashion and technology. The cold-toned grey, black and silver metallic lustre presents multi-level visual effects under the cockpit's ambient lighting, giving a technological, futuristic atmosphere. Brown symbolizes luxury and comfort: to explore this impression, the designers constantly adjusted the lightness, hue and saturation to create a new, youthful light brown with a sense of technology. Combining natural wood grain, high-grade leather and technical metal, this interior decoration expresses extraordinary elegance.

General News

Lincoln, Rivian to Co-Develop EV

Rivian Automotive, the electric-truck startup backed by Amazon and Ford Motor Co., will provide the underpinnings for a premium, high-performance EV to be badged as a Lincoln—the brand's first EV.

Rivian CEO R.J. Scaringe says "We provide the platform. They will provide the top hat, the body and the interior." Rivian's "skateboard" will include the motor, battery pack, computer systems and wheels. The design is modular and allows for different body types to be added on top.

Ford invested in Rivian in April and announced its intention to build a vehicle using Rivian's technology. Scaringe declined to comment on the vehicle class and design, and didn't confirm which party would assemble the vehicle or give a date for its release.

Lincoln MKZ Interior

EV Startup Nikola Sets Pickup Launch

Nikola has revealed their Badger electric pickup, which will be manufactured in partnership with an automaker that has not yet been announced. The Tesla-competitor, building fuel cell-powered semitrucks, has set an ambitious target to develop electric vehicle battery technology with an estimated range of 600 miles.

The truck will make its first public appearance at Nikola World at the company's Arizona headquarters in the fall and will be available as a fuel cell-electric or battery-electric vehicle. Production will begin, they say, in 2021. The company has not disclosed where it will be manufactured or production volume but expects the truck to be on the road by the end of next year. The location of 700 hydrogen stations in North America to refuel the Badger are being finalized and will be disclosed this quarter. The Phoenix-based startup said the truck can also drive 300 miles in battery-electric mode for those who do not have access to hydrogen.

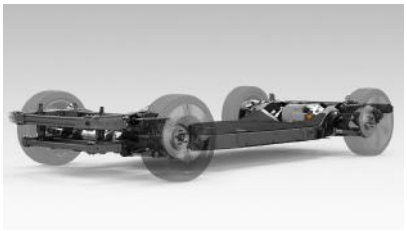
The interior pictures show a modern, sci-fi styled interior with two bunk beds, clever storage areas, and a black-and-white color scheme.

Limited reservations for the truck will be available this year. No other details were provided on reservations or the automaker manufacturing partnership.

In an interview with Automotive News in December, Milton said he welcomes the skepticism, "Because every time I prove them wrong, it drives them absolutely insane. And they have to go back and admit that they were wrong."

The Badger will arrive amidst a growing electric trucks market. Tesla says they are readying the Cybertruck, and GM plans to resurrect the Hummer name as a GMC electric supertruck. And of course, there's Rivian. Overall the US has long been a truck-centered market, and it seems that EV developments will make it survive as such.

Hyundai-Kia to Build EVs With Canoo



Hyundai and Kia will build new electric vehicles based on the technological platform developed by California EV startup Canoo. Terms of the deal have not been disclosed.

Canoo and Hyundai Motor Group will develop a new electric vehicle platform that's based on the one that powers Canoo's own vehicle, which was unveiled last year. This EV platform will power small, affordable EVs as well as purpose-built vehicles which would more closely resemble shuttles, autonomous or not; as presented by Hyundai at CES.

The deal is a significant one for Canoo, which has only existed for about two years and employs around 300 people. It seems that more and more deals are linking technology startups with automakers for their EV platforms, such as Rivian for Ford and Byton for FAW.

The deal with Hyundai will not impact Canoo's plans to release its own vehicle, company said. The company debuted a subscription-only EV in September 2019.

Like many other startups, and even some bigger automakers, Canoo developed a "skateboard" for this vehicle that houses the battery pack, electric motors, and other electronics. This neat packaging of all that technology makes it possible to power multiple vehicles using the same adaptable platform, thereby cutting costs.

Hyundai Motors' head of R&D Albert Biermann says "We were highly impressed by the speed and efficiency in which Canoo developed their innovative EV architecture, making them the perfect engineering partner for us as we transition to become a frontrunner in the future mobility industry. We will collaborate with Canoo engineers to develop a cost-effective Hyundai platform concept that is autonomous ready and suitable for mass adoption."