DrivingVisionNews.com
Automotive lighting and driver assistance technologies

DVN-I
Automotive Interior

Automotive Interior Trends: A Car and Concept Review

Automotive Interior Trends: A Car and Concept Review

This report presents highlights of 2020's automotive interior innovations so far, as shown at the main events of the first quarter of the year—most recent of which, the virtual Geneva Motor Show. That first quarter started out active with the usual events, like CES in early January, and then the pandemic happened, wrenching industry focus to coping with the drastic market volume drop and providing industrial support to make needed medical materiel.

What new ideas, features, field of development, have emerged through this interesting and unique period? We've identified six main directions, aggregating out of a wide array of new interior aspects in both production cars and concept previews of what transport might look like in the near (or far) future. This top-level trend list includes:

EV and Interior Consequences

- Architecture, New Design, Connectivity

New HMI

- Functional surfaces, screen size, voice activation

Driver Assistance Systems («Interior ADAS»)

- Driver Monitoring, alert, and feedback

Interior Lighting

- Alert, decoration, branding

New Materials

- Lightweight, eco-friendly, new touch and feel

Car Interior as protector and shield

- Interior air quality (IAQ), hygiene, acoustics

We have organized this report as a car-by-car review—kind of a virtual auto show, with marques presented in alphabetical order. After that, we elaborate on each identified main trend to help maximize the benefit of your visit to the virtual show.

Enjoy reading. DVN Interior will continue to inform you with our bi-monthly newsletter. Find subscription information here. And do sign up for the first DVN Interior Workshop this coming 24-25 September in Darmstadt, Germany. Information and registration are online.

Table of contents

4 • About the Authors

5 • Aston Martin

6 • Audi

7 • BMW

9 • Bugatti

10 • Citroën

11 • Cupra

12 • Dacia

13 • DS

16 • Ferrari

32 • Fiat

17 • Hyundai

22 • Kia

24 • Koenigsegg

25 • Mercedes-Benz

29 • Nissan

30 • Polestar

32 • Renault

36 • Seat

37 • Škoda

38 • Toyota

39 • Volkswagen

40 • Volvo

41 • **Main Takeaway**

48 • Roster of DVN Gold Members

49 • Selected DVN Reports

About the authors

Philippe Aumont is a highly experienced executive with almost 40 years in the automotive interior supplier industry. He's an engineering and business graduate, and has completed many general management programs. He acted as Chief Technology Officer at Faurecia Seating between 2011 and 2017. Previously he worked at Roth Frères, Johnson Controls, and Faurecia in various positions including R&D, marketing, strategy, new product development, open innovation, startups, university; his earlier experience was in JIT, production, program management, costing, and sales. He's had work assignments in France, Belgium, The Netherlands, and Germany, with frequent travels to the USA, Japan, China, and India.

Aston Martin DBx

In what Aston Martin is considering a landmark moment in the company's illustrious 106-year history, they've unveiled their first SUV model they've made to propel the brand to new heights worldwide: the DBX.

The luxuriously handcrafted interior of the DBX has been designed to provide equal space and comfort whether sitting in the front or rear of the car. Class-leading headroom and legroom under a full-length glass panoramic roof and frameless door glass all offer a fantastically light and spacious cabin environment.

Technology is a key part of the modern SUV, and from the keyless entry and startup on, the DBX provides all the features a customer would expect. It does so in an elegant, proven package. The most visually arresting pieces of hardware are the two high-definition TFT screens. One measures 12.3», and displays a digital instrument cluster. The unique graphics for the dials have been designed by Aston Martin and the elegant layout echoes some elements of past Aston Martin sports cars.

As standard, DBX can be trimmed in one of five colors of full grain animal Caithness leather from Aston Martin's longtime supplier, Bridge of Weir Leather in Scotland. Options include broguing, perforation, and quilting patterns on the seats. A choice of three colors splits can be applied to the leather in the cabin to customize the cabin color scheme.

Audi A3

The fourth generation of Audi's successful A3 premium compact model is sporty, digitalized, and fully connected.

Seat upholstery made from recycled PET bottles is available: up to 89% of the textile consists of recycled PET (polyethylene terephthalate) bottles transformed into yarn, with Audi promising the same quality standards as conventional materials. Approximatively forty-five 1.5-liter PET bottles are used per seating system, with an additional 62 for the carpet.

Germany has an efficient empty bottle recovery system: the bottle goes in a reverse vending machine, and the customer gets €0.25. Then, still in the shop, the disposable bottles are compressed to save space and facilitate truck transport. Once they have arrived at the recycling plant, they are sorted by color, size, and quality. Foreign matter such as the cap is separated. A mill then crushes the bottles into flakes which are washed, dried, and melted down. Nozzles shape continuous plastic strands out of the mass. Once they have cooled, a machine chops them into small bits called granulate or recyclate. This then is extruded to create threads. Wound onto coils, these are used in the final stage to manufacture materials.

Other components are being made from secondary raw materials and carry over from the VW group product and parts portfolio.

BMW I4 Concept

The BMW Group unveiled a new electric gran coupe, the i4 concept.

BMW, with this vehicle and the cancellation of the i8, has now officially moved away from the EV æsthetic used until to date. They now seem to follow the rest of the BMW range, stylingwise, with only details (blue line/lighting) distinguishing the EVs from the ICE cars.

The cockpit has been also simplified by only focusing on a cluster/UX/HMI display slightly angled towards the driver with a minimal use of auxiliary buttons on the center console.

The Concept i4 has a bespoke sound profile, as well. German film score composer and record producer Hans Zimmer composed the sound of the BMW Concept i4 together with BMW sound designer Renzo Vitale under the brand name BMW IconicSounds Electric. BMW IconicSounds Electric will help personalize BMW's electric models with extra emotional depth by connecting the driver with the vehicle's character on another level through individual tones and sounds.

The car's sound is designed to be classic, but surprising with a feeling of lightness with a repertoire going from a core brand environment to more intense tones of «sport». Acoustic accompaniments to a door opening, when starting the car, with start/stop are likewise part of its soundscape. Interior silence of electric vehicles is often cited as a major benefit of electric mobility. As the choice of electrified models increases, however, it also means some drivers are missing out on the emotional appeal of sound, and automakers are keen to differentiate their offerings.

The Concept i4 is the second BMW with drive sound developed with Hans Zimmer, following the presentation of the electric sound for the BMW Vision M NEXT at the #NEXTGen event in Munich last June.

Ambient lighting to help define specific driving modes are used throughout the IP and door panels.

As with Polestar, the seating material is also of a one piece knit construction, giving the seating surfaces a molded æsthetic. A very light colorway is used along with copper detail elements for touch points, and a large swath of natural finished (non-glossy) wood trim for the IP and center console.

The door panel to IP intersection shows off the fit and finish along with attention for fine details like the handles, speaker grilles, and switchgear.

Bugatti Chiron pur sport

Here we see a dynamic design with a spatulate front end and an impressive rear spoiler.

The vehicle interior is deliberately sporty and raw, and has been reduced to the absolute minimum. Large surfaces have been upholstered with Alcantara to save weight and give a more premium and Italian touch and feel. Dynamic patterns have been lasered into the Alcantara door trim panels featuring contrasting fabric highlights with a metal look. Alcantara guarantees an ideal grip on the steering wheel and improves the side support on seats, even in extreme lateral acceleration. All trim and controls are made exclusively of either black, anodized aluminum, or titanium. Contrasting cross-stitching adds color highlights, as do the steering wheel's 12 o'clock spoke and the blue center spine.

Citroen Ami-One

Citroën's Ami 6 sedan and Ami 8 wagon were four-door B-segment family cars offered from 1961 to 1978. Now comes the Ami, a new ~€6,000 mini electric car that can cost just €20 per month and can be legally driven by a 14-year-old in France.

A direct descendant of the 2019 Ami-One concept, this new Citroën Ami is a real EV. It is actually a quadricycle, a micro city car with two seating positions. It's just 2.4 m long, 1.39 m wide, and 1.52 m high.

For motive power there's a 6-kW (about 8 hp) motor allowing speeds up to 45 km/h. The battery has a capacity of 5.5 kWh for a range of 70 km, and a full recharge can be done in 3 hours on house current. This car will obviously be visible in some Citroën dealerships, but also in the FNAC and Darty stores, which are strong music and household retailers.

The first deliveries are scheduled for June. Citroën will also offer a car-sharing option via the PSA Free2Move App. The Citroën Ami can thus be used from €0.26/minute, after a non-binding subscription offered at €9.90/month.

Despite its small size, the Ami still provides a few interesting features like a glass roof and a heated interior cabin, which confirms that even the most basic interior should have a few frills to bring joy.

Cupra Formentor

Cupra's Formentor is the first model developed exclusively for the brand. Its exterior design is perfectly matched by its high-quality interior that provides a sense of modernity and sportiness that would be expected of a Cupra model.

As occupants enter the Formentor, the Cupra logo is projected on to the floor via the puddle lamp. Once inside, they will be cocooned by high-quality materials, with brushed dark aluminum and copper accents making the cabin feel modern and contemporary.

The bucket seats, available in blue or black leather, are mounted low in the cabin to maximize space, allow a more ergonomic seating position, and give a sense of the dynamic performance before a wheel has turned.

The dashboard appears to float, an impression created by the horizontal full-LED wraparound ambient lighting which runs the width of the dashboard and in both front doors. This light is not only an æsthetic feature, it also includes safety functions, flashing yellow when Blind Spot Detection or Exit Assist are activated.

The centerpiece of the dashboard is the 12» touchscreen which provides the functionality and connectivity to all occupants and reduces button count. The driver benefits from a fully-customizable digital binnacle (Digital Cockpit) as well as a flat-bottomed steering wheel that houses the engine start and Cupra driving mode buttons and the gearshift paddles.

Dacia Spring Concept

Renault Dacia presented the Dacia Spring in parallel with the Geneva auto show. It's Dacia's first fully electric city car. Consistent with Dacia positioning, this show car is conceived as an affordable EV.

What would be the interior of a frugal EV? Dacia strives to make simple, robust, reliable, and affordable vehicles mainly by using already-validated components. The Spring should help the brand achieve European CO2 targets—today that's not the case, showing a downside of using older component designs.

The Spring is a 100% all-electric 5-door 4-seater (five, in a pinch) with a range over 200 km, for urban and suburban usage. It is based on Renault's EV technology, with a price estimated between €15,000 and €20,000. It will be available next year.

The exterior design expresses modern SUV style with a pastel mouse-grey body enhanced with splashes of matte fluorescent orange, trim along the wings, roof bars, and lower door panel; extra high clearance, and skid plates built into the front and rear bumpers.

While images of the interior are not available yet, it's reasonable to suppose it will be inspired by the Renault City K-ZE all-electric city car (interior shown here) manufactured and sold in China since last year. There's a straightforward dashboard design with a large center screen and digital instrument cluster, refreshed to be consistent with the modern exterior.

DS9

PSA's luxury brand DS launched the new DS9 in parallel to Geneva, after several delays linked to the end of the Chang'an–PSA joint venture CAPSA, then sanitary issues at Auto Guangzhou in China. The DS9 is a plug-in hybrid with 50-km EV range. It's based on the longest version of PSA's EMP2 modular platform also used for the Peugeot 508, is produced in the Shenzhen Baoneng plant where China-market DS cars are built.

The DS9 has the same 4.93 × 1.85 m dimensions as the Citroën C6 (discontinued eight years ago) and the Audi A6. Its design language is characterized by some retro-inspired touches; the rear turn signal repeaters integral to the C-pillars are a notable tribute to the iconic Citroën DS.

The dashboard and interior are based on those of the DS7 Crossback, with the only real obvious differences being the door panels, interior vents, and a storage space beneath the standard central infotainment display. As on other DS models, buyers will have several interior 'inspiration' themes to choose from, each introducing different genuine leathers, materials and interior colors. These are based on the familiar lineup of Bastille and Rivoli themes using grained leather; the Performance Line, which uses black Alcantara; and Opera, which uses red Nappa leather with watch-strap style patterning on the seats. There's a nice BRM R180 clock on the dash.

The makers think of the DS9's interior as a lounge, a claim backed by the long wheelbase (2.9 m) freeing up a generous amount of space for the rear passengers. The dashboard is dominated by screens; there's a touchscreen for the infotainment, and a second driver-configurable screen behind the steering wheel. L2 driver-assistance technology, night vision, and active LED headlamps are available, while a camera tracks the driver's every move to detect signs of fatigue, like excessive blinking. If it senses a drowsy driver, it generates an audio alert with display on the screen.

DS Aero Sport Lounge Concept

DS' æsthetic signature, with their latest concept vehicles, incorporates an angular and dynamic look for exterior and interior designs.

The Aerolounge has an interior space with a high-cowl instrument panel like in cars of the 1960s.

The main cluster/UX/HMI displays are hidden underneath a 'bridge' between two door mounted displays—also used as sideview camera screens—while also creating visual surface interest with crisp origami-type forms.

This high-cowl proportion make a clearer separation from the interior vs. exterior of the vehicle that encompasses the occupants with large, crisp, soft forms.

The angular and planar surfacing also translates into metal and gloss black details.

The futuristic car's central armrest contains a revolutionary human-machine interface using gesture controls and haptic feedback which uses ultrasound focused on the user's hands to create the sense of touch in mid-air. The technology interprets hand gestures enabling the driver or passengers, to control a range of systems—managing the car's entertainment systems, for example, or the navigation system. This technology has been developed with Silicon Valley-based Ultraleap, formed when Leap Motion and Ultrahaptics came together last year.

Through selective, dynamic operation of miniature ultrasound speakers, ultrasonic waves converging on the same point in space (their «focal point»). Where the focal point is positioned in 3D space is programmable in real time, and a Leap Motion Controller tracks the exact position of the hand and positions the focal point at a spot on it. These waves have enough force to create a tiny dent in the skin. This pressure point is used to create a vibration that can give a wide range of tactile effects, effectively forming 3D controls in the air.

According to research by the University of Nottingham, this combination not only reduces driver distraction, but also improves driver experience and generates preference demand.

The DS Concept strives to remove the barrier separating real and virtual interactions, supporting simplification and elegance of the cockpit, mixing avant-garde and high tech.

Ferrari Roma

Ferrari's latest coupé features harmonious proportions and balanced volumes in line with Ferrari's front-engine grand touring tradition.

A new architectural concept for volumes and forms was developed for the Ferrari Roma's cabin. The idea was to create two separate spaces or cells—private rooms, if you like, for the driver and passenger, in an evolution of the Dual Cockpit concept introduced on other cars in the range. The strikingly innovative look of this dual cockpit was achieved by extending the philosophy applied to the dash to the entire cabin.

The look and feel of the cabin were driven by the complete redesign of the HMI, which marks a major leap forward starting from the new Ferrari range steering wheel designed using the «Eyes on the road, hands on the wheel» philosophy. The digital instrument cluster is protected by an elegant binnacle, which extends out naturally from the dash. The instrumentation is now entirely digital with all the screens going completely black when the car is not running, lending the cabin a very minimalist look.

Fiat 500e

Fiat chief Olivier Francois acknowledged that the new 500e was partly motivated by CO2 regulations. The new electric 500 is expected to be built on a new, bespoke electric-car platform, which could be shared with other small Fiat EVs. This new platform and its related architecture so far don't appear to show benefits in interior packaging, meaning, maybe, that EV package space benefit on an already tiny 3.5m × 1.6m vehicle is limited?

There are official pictures from the web showing a reworked dashboard with a larger infotainment screen and rotary gear selector. The overall feel could legitimately be called more grown-up, but it's still playful with a pattern of the word «Fiat» stitched into the seats.

Fiat will make 80,000 units a year, starting from the second quarter of 2020. The 500e literally goes to the next level by being the first car in its segment to offer level 2 autonomous driving, bringing all the associated benefits to urban mobility.

Inside, the electric 500 is completely new and elegant, with clear references to elements of the first generation. Like an interior designer, the Style Center has furnished the interior by distributing the bulk efficiently to achieve formal simplicity, trim æsthetics and visual clarity. This is exemplified by the wide and slender dashboard and the modular storage solutions between the two front seats where the gear shift console is no longer needed, significantly improving perceived comfort.

The result is a well-thought-out and cleaner environment, with fewer buttons and crisp, harmonious lines that are all about sustainability. As for the Hybrid Fiat 500, including the electric version, some trim levels also have seats made using «Seaqual» yarn, derived from plastic recovered from the sea, while others make considerable use of eco-leather rather than real animal leather.

Hyundai i30

The new Hyundai i30 will feature a new design, advanced connectivity features and offer an electrified 48-volt mild hybrid option, resulting in increased fuel efficiency.

The interior design of the new Hyundai i30 features updates such as more refined and modern air vents.

Three new interior garnish colors have been added: Pewter Gray, Ebony Brown and Charcoal Gray. This is in addition to the existing Black color.
The seats can be covered in cloth, leather, or a combination of both for a total of eight possible options.

For the first time, the new i30 arrives with Hyundai's full-featured Bluelink technology. It offers a wide range of connected-car services that provide significant customer benefits regarding live information and the control of the car via an app.

Customers who choose navigation receive a 5-year free subscription to Bluelink and Hyundai live services.

Hyundai i20

Hyundai's all-new i20 features a revolutionary and ambitious design that follows the company's new Sensuous Sportiness design language. With best-in-class connectivity features and the most comprehensive safety package in its class, Hyundai has aimed to set new standards for a B-segment car.

i20 occupants can enjoy quality time inside their vehicle, outfitted with a range of interior enhancements. Hyundai's designers sought innovative æsthetic and technical solutions to convey the car's stylish proportions, while creating a fresh and appealing look.

The interior space evokes an airy feeling inside the cockpit, while appearing sculptured and appealing. One design highlight is the horizontal blades that cover the high and prominent dashboard. This gives it a very un-conventional look by making the front fascia look slick and wide.

The doors embrace the dashboard in an elegant, sensual way, inspired as they are by shapes found in nature. The sculpture of the doors perfectly matches the instrument panel section.
The refined steering wheel is equipped with modern toggle switches, and color accents are also matched throughout the interior.

We think the i20 presents a good example of efficient LED interior lighting.

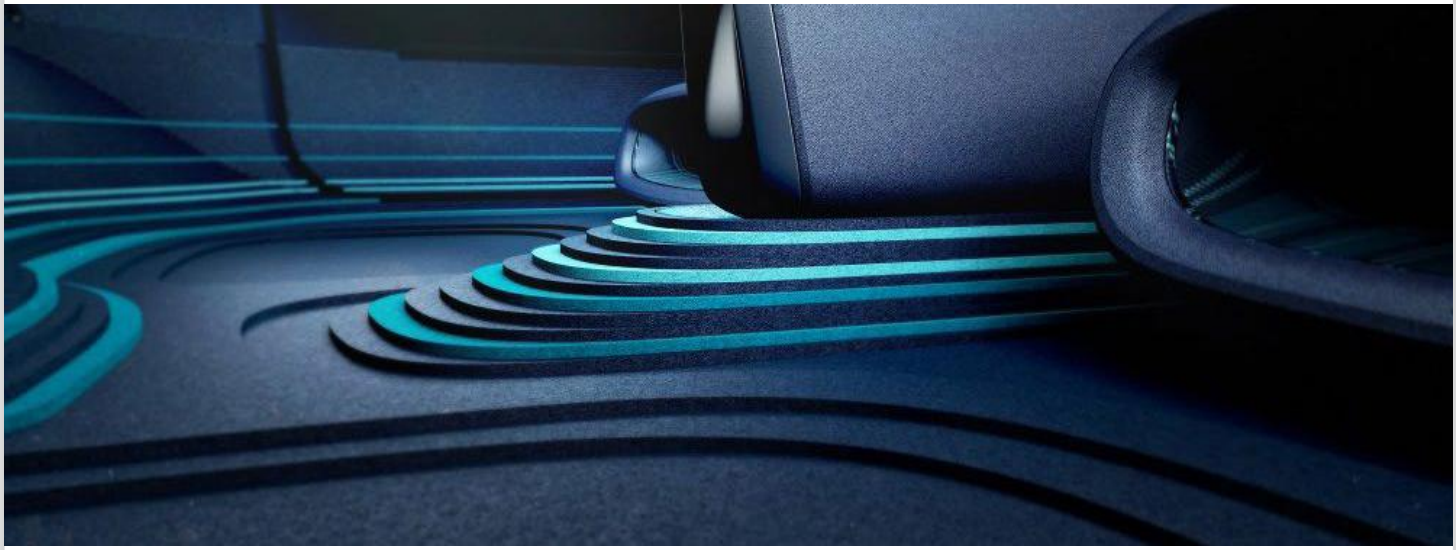
Hyundai Prophecy concept

Hyundai unveiled their new Prophecy EV concept, expressing the new design language they call «Sensuous Sportiness». The Prophecy expands on the example set by last year's «45» concept EV that stripped away complexity in favor of clean lines and minimalistic structures.

Inside, using a plaid fabric gives reference to old Porsches, and uses lighting integrated into the door inserts as a contrast for a more modern æsthetic.

Completely removing the steering wheel and providing joystick-type driving controls has freed up the cluster/ UX/HMI away from the floating-tablet æsthetic to a more cinematic view at the base of the windshield.

Using teals and blues for the colorway, a softer and friendlier æsthetic supports the rounded forms used throughout the interior.



This rounded form language is also used to visually split the seating surfaces and have the lower cushions integrate with the floor and carpet. This allows the teal colorway to form a contrasting 'racetrack' around the interior perimeter.

Kia Sorento

The new 4th-generation version is the first Kia Sorento available with hybrid power, and the first vehicle to be based on Kia's new-generation midsize SUV platform. New packaging caters for Kia's new «Smartstream» electrified powertrains, and offers progressive connectivity, driver assistance and infotainment technologies.

The upscale interior has a 12.3-inch digital driver instrument cluster is twinned with a 10.25-inch touchscreen infotainment and navigation system at the center of the dashboard. The car's many functions can also be controlled with new haptic buttons on either side of the screen, which also feature further down the dashboard for the climate control system. The focal point of the dashboard is the eye-catching vertical ventilation stack, with a chrome-effect surround that extends onto the centre console below.

The cabin of the Kia Sorento subtly integrates a range of other technologies including an available mood lighting system which emits soft ambient downlighting from beneath the dashboard and door trim, creating a lounge-like feeling and greater sense of space. A wireless smartphone charger also sits at the base of the centre console.

Material quality is enhanced, with a cabin that blends metallic trim, leather upholstery, and embossed satin-effect surfaces. Applied throughout the interior and across the dashboard, the cabin boasts a more sophisticated appearance and ambience as a result. In Europe, the Sorento interior will be offered in a choice of black cloth, leather (grey or black single-tone, or black-and-grey two-tone), or black quilted nappa leather.

Koenigsegg Gemera

Koenigsegg Automotive is a Swedish manufacturer of high-performance sports cars, founded in 1994 and based in Ängelholm, Skåne County, Sweden.

Koenigsegg presented at the time of Geneva show their new megacar: the Gemera, whose name is a combination of the two Swedish words «ge» (give) and «mera» (more) summing as «to give more».

All four adult-comfortable seats have the same shape and are optimized for comfort with integrated memory foam for ideal support, a technology pioneered in the original Koenigsegg CC carbon bucket seat and the Koenigsegg One:1 seat. Ingress and egress are easy through user-oriented architecture, and giant full-length Koenigsegg Automated Twisted Synchrohelix Actuation Doors (KATSAD) that open wide. The doors are cleared by the absence of B-pillars, thanks to a strong carbon monocoque shell. The audio system is built around 11 speakers, and each occupant has 2 cup holders, one hot and one cold.

It is a plug-in hybrid, it has all the best safety and assistance technologies, and it is designed for worldwide homologation.

The Gemera is limited to an edition of 300, at a price we can only imagine will also be «mega».

Mercedes AVTR Concept

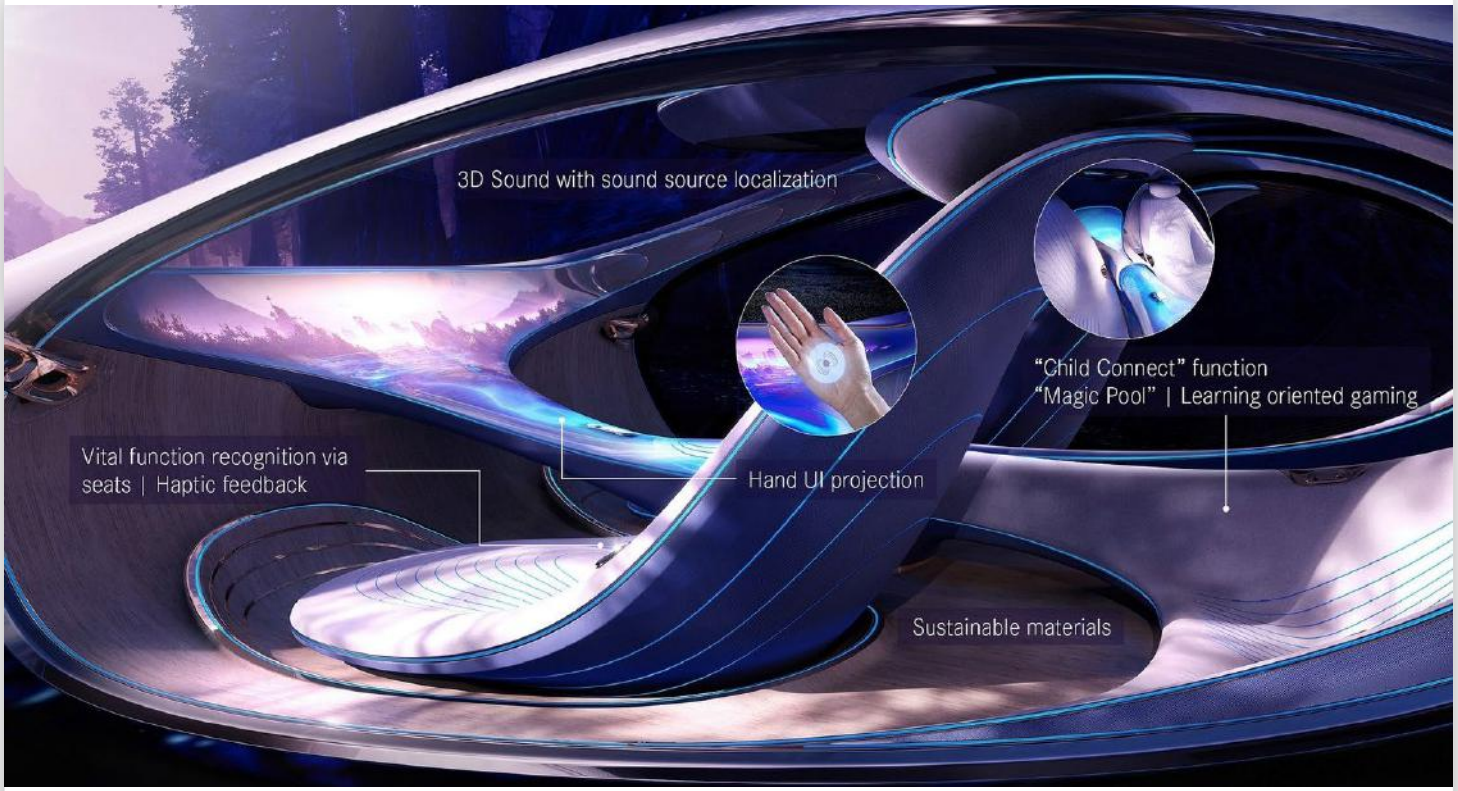
With the Vision AVTR, Daimler are demonstrating a sustainable vision of zero-emission mobility.

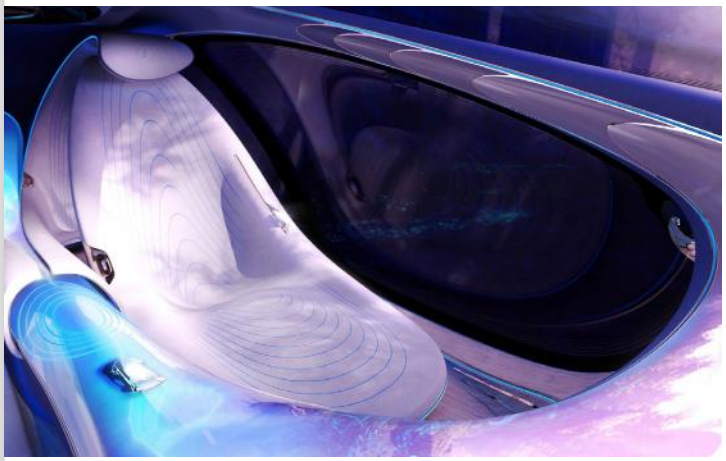
The Vision AVTR was designed in line with its innovative electric drive. This is based on a particularly powerful and compact high-voltage battery. For the first time, the revolutionary battery technology is based on graphene-based organic cell chemistry and thus completely eliminates rare, toxic and expensive earths and metals. Electromobility thus becomes independent of fossil resources. An absolute revolution is also the 100% recyclability by composting. As a result, Mercedes-Benz underlines the high relevance of a future circular economy in the raw materials sector.

Daimler conceived the car's interior as inspired by nature and leading the way toward new approaches to occupant/vehicle communication. Th AVTR is aligned with the other EQ Mercedes products to create a new range identity like BMW's i-family or Audi's e-tron.

The guiding principle was to define the vision of an electric Mercedes luxury interior by mixing their current interior design with new unexpected technologies to create a progressive luxurious space. This meant designing organic volumes and tension lines and encrusting them with technology. In a way the technological content can create the tension and fluid lines in the luxurious interior. For example, the seats are «fluid» because of the LED-stripes merging with the shape of the seats; they create a symbiosis.

The UX designers from Mercedes-Benz have worked to shape the relationship between human and machine. The focus is on the simplest and most intuitive operation by the user. An important motive is the self-determination of the user and the approach to use the entire interior for information. The goal is to display the right information at the right time, and only while it is relevant.





The interior, behind all-transparent doors, does away with the established form separation of seats, IP, floor console, and other usually-discrete components. The steering wheel is completely replaced by a rising circular tower to operate the motion of the vehicle while using sweeping forms that overlap and integrate the displays with the pillar trim and the headrest with the headliner.

Interior lighting is here a kind of profusion benchmark, controlled by the passengers' moods as sensed through their heartbeats, and can telegraph the moods of kids in the back seat to their parents through a pulse in the seat.

Mercedes E-Class

Mercedes introduced, through a streaming conference with CEO Ola Källenius and Development VP Markus Schäfer, the significantly refreshed E-class (E here being the longstanding model family, not meaning electric, though there is a plug-in hybrid E 350e version). The refresh includes the entire E-Class line up, with all body types and powertrains. It includes new interior trimmings, and a next step of digitalization and connectivity is included in the new release of the MBUX HMI, including OTA (over the air) capabilities.

The interior is intuitive and æsthetic, with new driving assistance including a steering wheel that uses capacitive sensing to check for hands on the wheel.

Mercedes' ambition is to be CO2-neutral by 2039, and they've also introduced the new CLA 250e Shooting Brake, with plug in hybrid version for both diesel and gasoline with minimum 60 km electric range (per WLTP). Drivers can force the system into a driving mode that prioritizes electric power unless the person depresses the accelerator enough that the computer decides the combustion engine is necessary. Mercedes says 90 percent of everyday driving can be done purely using electric power.

The Shooting Brake is a more spacious and more practical version of the CLA sedan. On paper it offers more boot space than a C-Class wagon, but the sloping roofline limits rear-seat headroom and compromises total load capacity.

The new E-Class was unveiled online through Geneva digital streaming. Like other cars in this premium segment, it comes equipped with a whole bunch of driver-assistance features. New on the list: a steering wheel with capacitive sensing to check whether the driver is paying enough attention.

Capacitance sensing may be a more direct and accurate method than measuring steering wheel angle or torque inputs. It works whether the wheel is the all-leather or the leather/wood version. Other driver assistance features on this vehicle are active steering assist (to remain lane centered), adaptive cruise control, active brake assist, and more.

Cadillac's Super Cruise already uses a touch-sensitive steering wheel, as well as eye-tracking cameras to ensure that drivers are paying attention. Audi's E-Tron also has a touch-sensitive capacitive steering wheel. Which driver monitoring system is the best? It's still difficult to say; all of these technologies are still relatively new.

A new issue is that as cars become filled with technology, there's a greater risk that humans will become overconfident. Robert Sumwalt, Chairman of the U.S. National Transportation Safety Board, recently warned that drivers should keep in mind: «If you own a partially automated car, you won't own a self-driving car. Don't pretend you do».

Nissan GT-R50 by Italdesign

Reflecting its modern high-performance pedigree, the interior to the GT-R50 features extensive use of different new surface materials, such as carbon fiber finishes across the center console, instrument panel and door linings, along with black Alcantara and genuine black Italian leather on the seats.

Gold accents echo the exterior treatment throughout the cockpit. The GT-R50 steering wheel is bespoke, made of carbon fiber and trimmed with Alcantara.

Polestar Precept

Polestar revealed their Polestar Precept, a vision of the brand's future direction and a clear expression of intent. It exhibits new, more sustainable interior materials and continued evolution of the digital user interface.

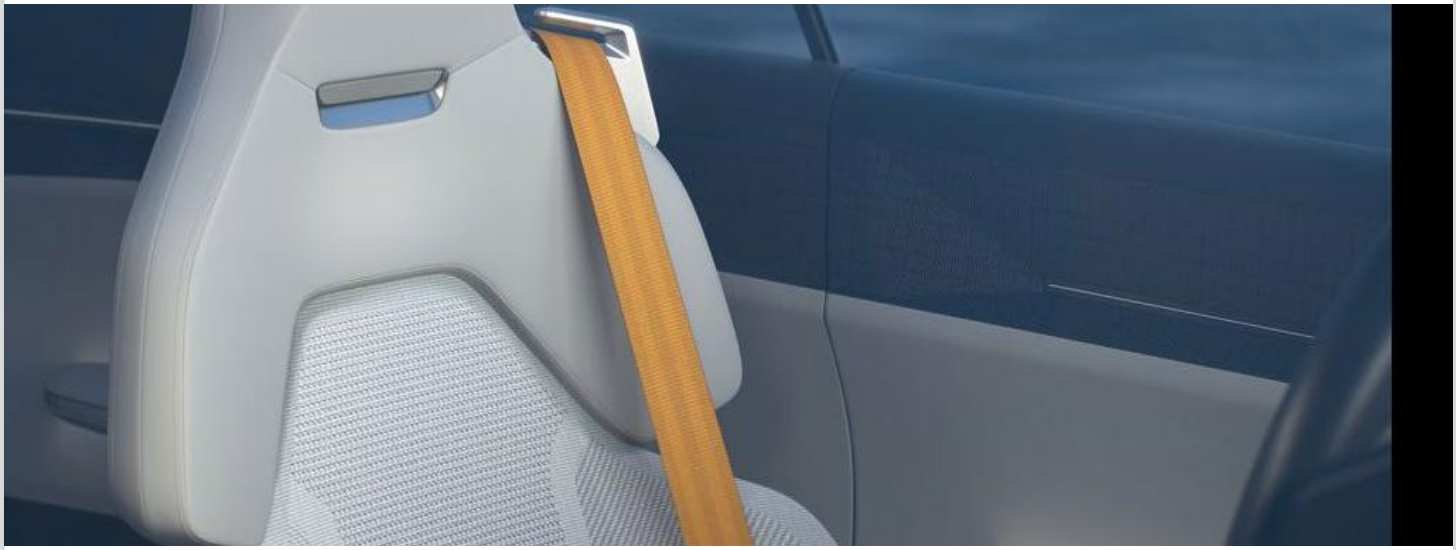
Showing a more radical departure from the Volvo æsthetic, the Precept shows Polestar moving their EV drive-trains in a more sporting direction. This can be seen by the elimination of the Volvo grill on the exterior and an overall aggressive proportion.

The car has pure 4-seater accommodations with bolstered individual seating for both front and rear passengers, along with a traditional sedan layout.

Strongly dominant seating forms are highlighted with high contrast color & material choices (black and white with orange accents), which allows the seats, center consoles, armrests and door panel insert to visually 'float' from the interior space.

In keeping with the floating theme, the cluster and UX/HMI display are thin gloss black surfaces without shrouds, that contrast elegantly with the thin aluminum horizontal decorative insert in the middle of the instrument panel.

As seen from above, simplicity in form and colors allows the Precept to have a very elegant, simple yet strong design theme without vents and buttons—which then further differentiate it from the Volvo parentage.

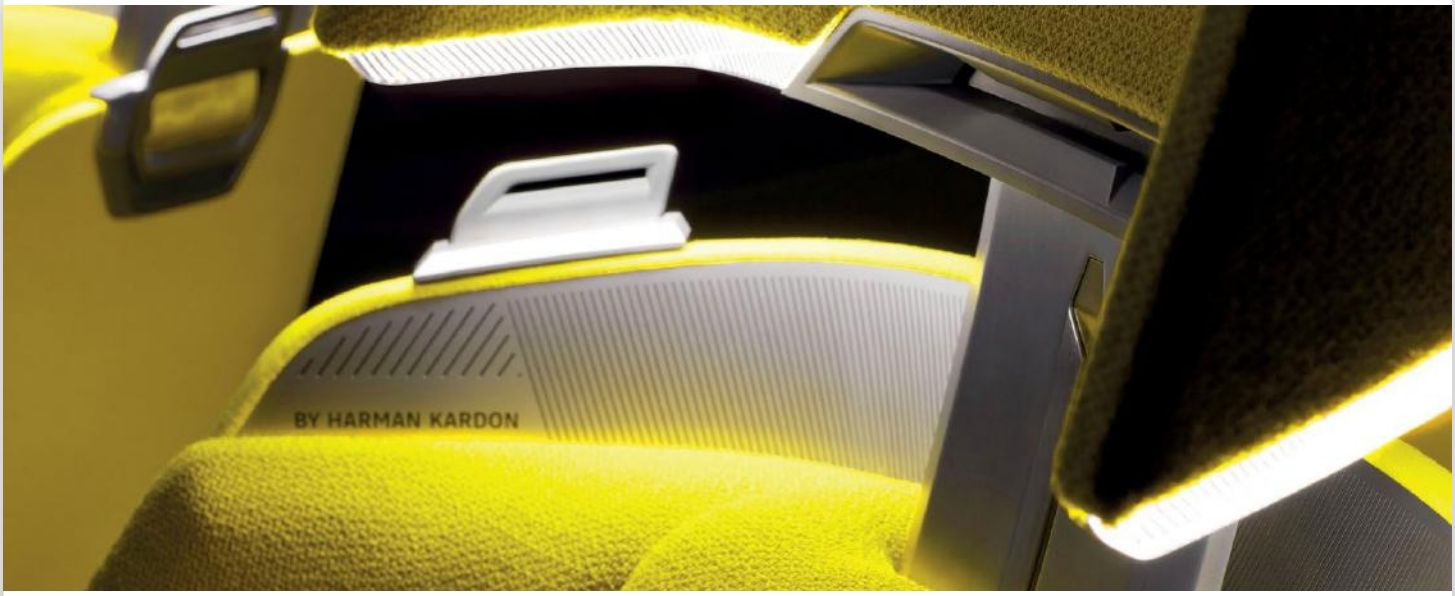


By using a one-piece woven material and recycled PET fibers, Polestar has a rich luxury æsthetic without relying on ordinary luxury materials.

Renault Morphoz Concept

The Morphoz concept is Renault's vision of personal, shareable, electric mobility of the future. The modular crossover can physically and technologically adapt whether it's being used for a short commute, a shopping trip, or a longer journey. It can recognize and welcome the driver, and a number of autonomous technologies bring improved convenience and safety.

The center tunnel lengthens the rear interior and cargo volume for more comfort and capacity while also allowing the large bucket seat the space to be reversible for long-distance travel.



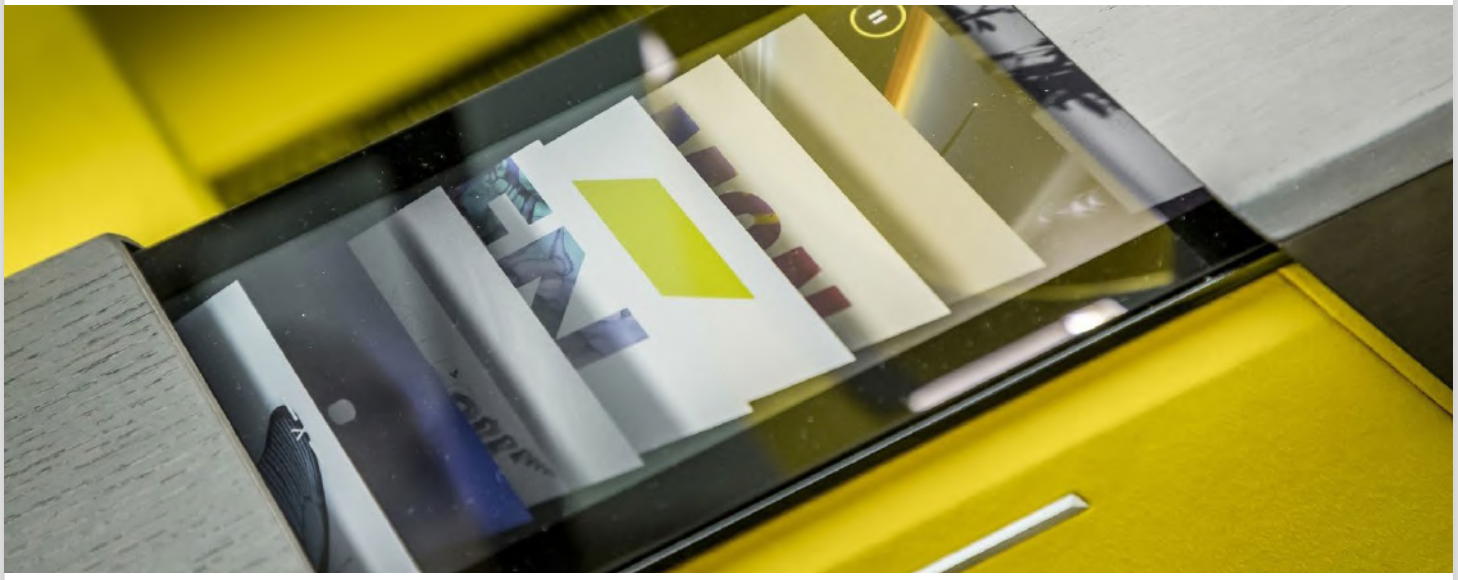
Each of these substantial buckets also incorporate speakers and ambient and task lighting between the headrests and seatback.

In theme with the morphing concept, the cluster/UX/HMI display folds into the instrument panel, creating a clean uncluttered look while the full-length center console also expands and contracts.

With the panel in use, edge lighting effects on the panel and steering wheel highlight the control interfaces.

Primary driving controls and displays are integrated into the oblong deep-dish steering wheel that also eliminated the switches on the wheel-spokes found today.

Matte wood on the center tunnel, instrument and door panels contrasts with the gloss black touch panels, adding a warmth to the interior environment.



Renault Twingo ZE

The combustion Twingo was introduced in 1993. Look for the ZE («Zero Emissions») badge to denote the electric version. Media sources indicate that it will share the same platform as the Smart EQ ForFour. The range could be around 180 km—not much, but still consistent with Europe's class of electric city cars. That said, the Renault Zoe, one of Europe's most popular EVs has much longer range.

There aren't many changes to the interior. Despite a bigger battery, Renault didn't give up any occupant or cargo space.

The EV includes specific and extraverted interior color scheme, overstitching on the seats, and a unique acoustic package to fully enjoy an electric drive. The pedal shaft is also trimmed with a «ZE» motif, like an invitation to try out the various driving modes.

Since 2019, the center console now includes a storage space designed to accommodate a smartphone in a vertical position. It is now the only model in its class to come with a high-definition 7» touch screen, with access to Renault's Easy Link multimedia system, which includes numerous connected services to make driving a car easier—especially an electric one.

Seat Leon

The new Leon is the latest vehicle to be designed and developed at SEAT's facilities in Martorell, as well as produced there, using VW component bank for the platform, screen and HMI. The Leon has been one of the core pillars in the brand's product range accumulating more than 2.2 million sales since its introduction in 1999, and made news in 2013 when LED headlamps became standard equipment—a big first.

The all-new Leon's interior is a paragon of functionality, minimalism and sleekness. The smooth-surfaced, slim-by-wide dashboard gives the impression of lightness, and a degree of floatability.

The effect is created with the help of the decorative moldings that surround the dashboard and continue through the front doors. Everything in the cabin has been designed to be ergonomically precise, increasing occupants' comfort. The cabin is developed to fit each occupant like a glove, providing the feeling of security.

The interior's main protagonist is its central 10» infotainment screen, which includes gesture recognition, delivering precise interaction with the occupants and reducing the number of physical buttons required. Its «diagonal» graphic design theme of the screen gets its inspiration from that prominent avenue in Barcelona, Avinguda Diagonal. It's the first time that the design interface has been created in the SEAT's pioneering new Digital Lab.

Škoda Octavia RS iV

The Octavia RS iV's predominantly black interior stands out. The three-spoke leather multifunction sports steering wheel bears a vRS logo and features paddles for operating the DSG. The front sports seats are upholstered in black fabric, while the optional Ergo seats come with Alcantara and leather upholstery as well as seat-depth adjustment.

The seats are adorned by an RS logo and colored decorative stitching in red or silver-grey, which can also be found on the leather steering wheel, on the armrests and on the Alcantara-covered dashboard. Decorative strips in an RS look and pedals with an aluminum design round off the sporty impression.

Toyota Yaris

Toyota revealed the Yaris, however according to Autonews Europe they decided to postpone its launch by ''weeks or months''. The interior design follows a less-is-more principle, creating an open and spacious area for the driver and front passenger. High-quality materials include an innovative felt trim finish for the door panels and, for the first time in a Yaris, a soft-touch instrument panel to deliver a warmer cabin ambience.

Throughout, sensory quality has been a key focus point, in terms of the touch, operation and sound of the controls, colors, illumination, shapes, patterns, graphics, and overall appearance.

The cockpit design has been developed around the concept of 'hands on the wheel, eyes on the road'. Information is presented clearly and directly to the driver from three interlinked sources: the central Toyota Touch screen, a TFT multi-information display in the instrument binnacle, and a 10-inch color head-up display. The larger size head-up display helps the driver focus on the business of driving with least distraction. It projects key driving data and warnings such as navigation prompts and speed limits onto the windscreen within the driver's field of view.

The new Yaris can be equipped with other high-tech convenience features such as a wireless charger large enough to accommodate the latest generation of smartphones, a heated steering wheel, and special ambient interior lighting around the driver's cockpit. The ergonomic design makes controls intuitive to locate and use, while the dashboard itself has been made slimmer and is set lower, with a wider and higher center console.

Volkswagen Golf GTE

Part of VW's big plan for electrification, The Golf GTE's predictive hybrid system uses artificial intelligence combining GPS data and road profile analysis to adapt the car's drive mode. Above 130 km/h, the car automatically switches to hybrid mode and also saves the battery on demand, so that you can drive electrically in the city, even after a long journey.

Specific to the GTE, the Digital Cockpit and its color scheme, and the 10-inch infotainment system screen display the efficiency and autonomy of the compact plug-in hybrid. The optional IQ.DRIVE package offers the possibility of assisted driving up to 210 km/h via Travel Assist (intervention on the steering wheel, accelerations and braking).

The GTE's cabin combines a classy, grown-up design with a sporty steering wheel and some tartan seats borrowed from the GTI. All the materials you'll touch regularly feel solid and supple, but traditional.

Volvo S90

Volvo has updated their S90 and V90 models with features including a new interior air filter to clear out tiny particles. The Advanced Air Cleaner, which was developed for the Chinese market and is now being rolled out globally, has a PM2.5 particle sensor.

The driver can monitor interior air quality via the center screen and the filter can clean the cabin air of almost all tiny particles within a few minutes.

Clean Zone is a fully automatic IAQ (interior air quality) system that separates gases and particles to reduce the levels of odors and contaminants in the passenger compartment. If the air quality sensor senses that the outside air is dirty, countermeasures are taken. For example, in case of driving through a tunnel, and its sensors detect high levels of exhaust fumes, the car automatically closes its air intakes and switches to air recirculation. All air, even if it is being recirculated, passes through a filter that reduces the level of dust, pollen and other particles. An active charcoal layer acts on chemical odors, and filters out harmful substances such as exhaust gas.

Inside, a comprehensively upgraded Bowers and Wilkins audio system introduces an even better in-car sound experience, thanks to new features like an upgraded amplifier, automatic vehicle noise cancellation and a new setting that mimics the sound of your favorite jazz club.
The interior are available with perforated nappa leather in charcoal interior with grey ash or pitched oack inlays.

Automotive Interior Trends

Here are the six main takeaway points we retain from our DVN analysis of the interiors:

INTERIOR2020

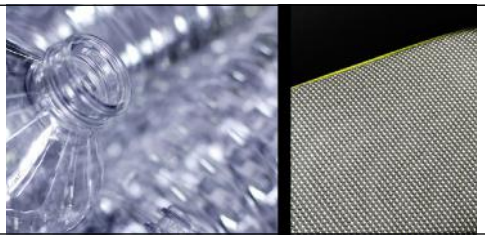
1.
EV and interior opportunities


2.
New generation HMI

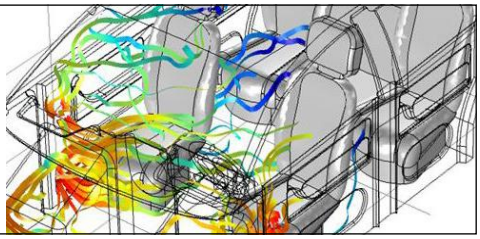
3.
"Interior ADAS"


4.
Light is the new chrome


5.
New materials




6.
Car interior as a shield



EV and Interior opportunities

This is a critical year for automakers in Europe, as 2020 is the base benchmark year of EU fleetwide average emission targets for new cars at 95 g/km CO2—down from the 2019 average of 121.8 g/km.

In that respect, automakers' product plans are all strongly focus on EV, as evidenced by the vehicles on display at CES, Geneva, and everywhere.

As cars need re-engineering for electric (or at least for more electrified) motive power, it's an opportunity to re-engineer, re-design, re-think, and re-work the interior. Interior architecture, connectivity, HMI, comfort, audio, climate, and all other aspects are up for reconsideration to cater for evolving use cases.

Because of this important shift in market expectations, automakers are developing EV strategies, mostly starting with a specific EV platform (VW MEB, GM,).

When using existing platforms, electric vehicle power is not a key discriminant from the interior perspective Clean-sheet designs of battery-native vehicles designed to accommodate battery and motor instead of fuel tank, engine, exhaust system, etc—alters the spaces available for the interior. New open body architecture on modular platforms could create much more opportunity for interior architecture, along with the tunnel-free underbody. Flat floor architecture is key to free up seat movement (swivel, rotation, etc), necessary to create flexibility in an autonomous vehicle.
It started with the Car of the Year 2020, Peugeot's e208, and podium second Porsche Taycan.

McKinsey recent research has shown that many EV customers are very tech savvy. At the same time, new technologies are largely getting mature enough to be commercialized. This creates a great testing field for the new technologies that automakers, suppliers, and all the digital world, hope to push into cars. But it also almost obligates EV manufacturers to equip their vehicles with the highest levels of technology around advanced driver-assistance systems (ADAS), connectivity, and other trends that are redefining the driver experience and travel strategies.

That's what we've seen in this period, in many cars presented to the world (and here in this report).

Tesla Model 3

Renault Morphoz Concept

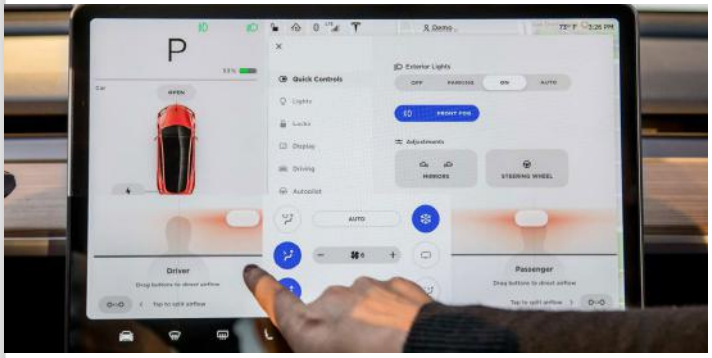
As the automotive industry is transitioning from hardware- to software-defined vehicles, the relevance of software for core technology trends is increasing. Not surprisingly, all across the digital automotive value chain are attempts to capitalize on innovations enabled through software and electronics. Software companies and other digital-technology players are leaving their current tier-two and -three positions to engage automakers as tier-one suppliers, or even to try their hand as automakers (as Google and Sony at CES). They're expanding their participation in the automotive technology «stack» by moving beyond features and apps into operating systems. At the same time, traditional tier-1 suppliers are boldly entering the tech giants' original feature-and-app turf, and premium automakers are moving into areas further up the value chain such as operating systems, hardware and signal processing in order to protect the essence of their technical distinction and differentiation.

New generation HMI

Yesterday's knobs, dials, buttons, switches, and other physical controls are rapidly giving way to touch screens, and futuristic further developments like holographic, gestural, and really good voice controls are in development to better integrate human/machine interactions into the occupant experience. More broadly, smart surfaces can integrate a variety of technology including coatings, films, multifunctional transparent surface treatments, OLEDs, backlighting, metal mesh touch sensors in plastic, integrated touchscreen film technology, haptics through polymer transducers, integrated heaters, and printed electronics. Functional surfaces are also an entry point for reconfigurable systems to ease customization by brand, model, and individual preference.

Byton M-Byte

HMI (the interaction chain) is also bigger and bigger screens, Tesla having shown the way to the market, with its tabletlike 17-inch screen being the center and unique interaction tool in the cockpit.



Tesla Model 3

Voice activation systems have been on the development task list of the industry for more than 20 years, but until such systems have had only limited facility with spoken commands. Through development of home assistant (Google Home, Amazon Alexa, Microsoft Cortana, Apple Siri), we are getting real and more reliable systems, responding to natural language, beginning to enter car HMI.

BMW personal assistant

Driver assistance system

HMI, typically communication from man to machine, is also going from machine to man, especially with machine watching the driver, through DMS (driver monitoring systems), which counts as an interior ADAS. As many crashes come from drowsy drivers, DMS is pivotal to improve safety, and will be necessary for easy handoffs between human and autonomous driving required in L3 vehicles. DMS could also offer other benefits in managing fatigue, cognitive load, personalization, and health monitoring.

Subaru Driver Monitoring System

Automakers and suppliers are expected to enter into more partnerships with medical companies, universities, and technology firms to identify new opportunities and technologies in the DMS space. Sensors in the seat, instrument panel, overhead system, and steering wheel will monitor changes in the physical movements of both the driver and the car to determine if an intervention is required. Cameras focused on the driver's facial features will sense changes to pupil dilatation and whether the eyes are open. Thermal cameras could be a relevant technology, as skin temperature can reflect additional information.

Flir Thermal Camera Detecting Elevated Face Temperature

As soon as we have a critical mass of data from sensors and cameras from a big number of cars and driving situations, AI will help building more accurate correlation between measured parameters. Then, once we can identify patterns around these data, sensors and cameras will help us to compare specific measured data with the model, and with the historic data of this specific driver (machine learning), AI will detect abnormal behavior, such as phone usage, smoking while driving, and blood alcohol level through erratic reactions.


Semantic Scholar

Light is the new chrome

Interior lighting is growing much more centrally important. Light is no longer in the car just to help find things in the dark, with a single dome light overhead; now it's central to creating ambiance, providing information, generating alerts (unbuckled belt, lane departure, car proximity warning…), personalizing the cabin according to vehicle occupants' choices, and so on. All in all, lighting is playing an increasingly important role in the comfort and safety of everyone inside the car. Much commercial attention is entering the field, including DVN Interior members such as Osram, DesignLED, and the ISELED Alliance (28 members, including Hella, Valeo, Magna…). They're developing intelligent RGB LED technology for automotive interiors and providing innovative solutions for interior lighting.

Mercedes E-Class and A-Class

Interior Lighting can be summarized in its main functions

1. Interior lighting as brand identifier and decoration

The ambient lighting amplifies the characteristic design language of the interior components and shapes in a recognizable way and the functional lighting uses more and more the latest lighting, sensor and electronic technologies with intelligent and automatic control for the increasing number of use cases.

2. Interior lighting for more safety, information and communication

Interior lighting changes from static to dynamic lighting systems, integrated in different car components or A surfaces in the car interior, today visible mainly for the driver and in future for all vehicle passengers in the autonomous driving mode

3. Personalization and psychological effects

The automotive interior lighting market shows a demand for personalized driving experience. In this trend, consumer demand cals for personalized light colors and automatic brightness adaption for a more distinctive and feel-good zone in the car interior.

4. Technology and Market Aspects for Interior Lighting

The vehicle life and package minimized and multicolored RGB-LED light sources and modules have an extreme vibration resistance and robustness and make interior lighting applications more and more popular.

New materials

Eco-friendly and with new touch and feel, lighter materials and materials allowing miniaturization of components to reduce package space, will continue to be a driving force of vehicle development. This, in turn, is creating opportunity for automakers increase interior space and/or reduce the exterior dimensions of the car for a given cabin volume. With CO2 reduction getting more and more important, these types of opportunities are crucial to fielding vehicles responsive to today's needs and wants.
Even if such efforts could arguably be called futile in context of the very heavy batteries uniformly found in EVs, we've seen thinner seat structures, IP skins, lighter energy absorbing material, new architecture, extended wheelbase, miniaturization of actuators and lights, and otherwise like that.

Volvo V90

Weight is not the only driver. There's demand for eco-friendly and ethical materials.

Audi PET seats

Tesla artificial leather, Volvo's Weave Tech coating in the Polestar 2, Aston Martin's cashmere in the Lagonda, the apple-based synthetic leather in VW's ID Space Vizzion concept, Audi's e-tron concepts with synthetic leather, Mercedes Artico, BMW Sensatek, Piñatex synthetic leather based on pineapple leaf fibers, and of course polyurethane leatherette and Alcantara suede.

BMW Sensatek

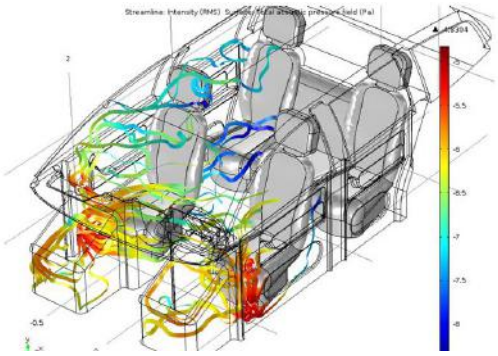
Car interior as a protecting shield

The car is becoming our only private living room within the home/transport/office lifeline; it's where we should be protected from the aggressiveness of the outside world.

The focus on IAQ (Interior Air Quality) has gained traction everywhere, starting in China because of heavy air pollution there—and high attention to children, who are more susceptible to poor air quality while their lungs are developing.

Overall hygiene will get much more attention, spurred by the coronavirus pandemic.
Acoustics, sound level and quality are key to occupant perception of car interior cocoon protection performance.

Clean zone technology by Volvo


Study on the acoustic interior and noise distribution

List of DVN Gold Members

Car makers

Aston Martin, UK
Audi, Germany
Bentley, UK
BMW, Germany
Daimler, Germany
FCA, USA
Ford, Germany
Geely, Germany
GM, USA
Honda, Japan, USA
Hyundai Motor, Korea, Europe
Jaguar-Land Rover, UK
Nio, China
Nissan, Japan, Europe, USA
Opel, Germany
Porsche, Germany
PSA, France
Renault, France
Shanghai-Volkswagen, China
Seat, Spain
Skoda, Czech Republic
Toyota, Japan, Europe, USA
Volkswagen, Germany
Volvo Cars, Sweden

DVN-Interior

Faurecia, France
Coindu, Portugal
Honda, Japan,
Marelli, Japan
Mitsubishi Motors, Japan
NBHX Trim, Germany
Novem, Germany
Osram, Germany
Preh, Germany
Recticel, Germany
Sensata, UK, Frane
Texas Instruments, USA
Valeo, France, Spain, China
ZKW, Austria

Set makers and Tier 1s

Bee Lighing, UK
Elba, Romania
Farba, Turkey
Flex'N'gate, USA
Grakon, USA,
Grote, USA
Hascovision, China
Hella, Germany
Ichikoh, Japan
J.W. Speaker, USA
Koito, Japan, Europe, USA
Lear, USA, Europe
Magna, USA, Austria, Italy
Marelli, Germany, USA
Mind Optoelectronics, China
Mobis, Korea
NAL, USA
Neolite ZKW, India
Nordic Lights, Finland
Odelo, Germany
Plastic Omnium, France
Peterson, USA
Rebo Lighting, China, Germany
SL Corporation, Korea
Stanley, Japan
Valeo, France, Spain, China
Varroc, Germany, Czech R.
Xingyu, China
ZKW, Austria
Zodiac, France

Light Source Suppliers

Anrui Opto, China
Cree, USA
Diodes Dynamics, USA
Dominant Opto Tech., Malaysia
Everlight Electronic, Taiwan, Germ.
Excellence Opto Inc., USA, Taiwan
LG Innotek, South Korea
Lumileds, Nederlands
Nichia, Japan
Osram, Germany
Samsung Electronics, Korea
Seoul Semiconductor, Korea
Soraa Laser Diode, USA
Tungsram, Hungary

Lighting Suppliers

3M, USA
A2Mac1, France
AML Systems, France
Aspöck Systems, Germany
ASYST Technologies, USA
Auer-Lighting, Germany
Bicomoptics, China
Bühler Alzenau, Germany
Covestro, US, China, Europe
Dajac, USA
DBM Reflex, Canada
Delvis, Germany
DesignLED, UK
Docter Optics, Germany
EcoGlass, Czech Republic
Elmos, Germany
Enmech-Mektec, Germany
GXC Coatings, Germany
Holophane, France
IMS, Netherland
Infineon, Germany
Inova Semiconductors, Germany
Instrument Systems, Germany
Jenoptik, Germany
Keboda, China
Less, Switzerland
LMT, Germany, China
Luminit, USA
Luminus, USA
Lumitex, USA
Maxell Joei Tech, Japan
Mentor Graphics, Europe, USA
Mitsubishi Electric, Germany, Jap.
Myotek Industries, USA
Nalux, Japan
NXP, UK
ON Semiconductor, Europe, Asia, US
Optoflux, Germany
Panasonic, Japan
Proper Group, USA
Red Spot, USA
Sabic, USA
Sapphire, USA
Sea Link International, USA
Synopsys, USA, Germany
TechnoTeam, Germany
Texas Instruments, USA
TQ Technology, Taiwan
Weidplas CH, Switzerland
WL Gore, USA
Zollner, Germany

Univ., labs, Consultants

Andaltec, Spain
CEA Leti, France
Darmstadt university, Germany
DEKRA laboratory, Nederland
FEP, Franhaufer, Germany
Fudan university, China
GranStudio, Italy
Hannover Leibniz Univ.(HOT), Germ.
Institut d'Optique, Fr.
Karlsruhe Lighting Institute, Germany
LAB, France
Light Sight Safety, Belgium
Nuremberg university, Germany
Pacific Insight, USA
Parma university, Italy
Rensselaer university, USA
SLD Laser—formerly SoraaLaser
UMTRI, USA
University of California, Santa Barbara
YoungNam University, South Korea
Mr Shunxing Wang, China

DVN Reports

All previously-published DVN reports are available for download at DrivingVisionNews.com

2008-2016 Reports

Hella company profile
Audi company profile
AL company profile
DRL, brand signature
Valeo company profile
Koito company profile
China lighting market
The Wonderful World of Passenger Car lighting Regulations
Tier 2and3 contribution on automotive lighting
ZKW company profile
Simulations in automotive lighting
Mercedes-Benz profile
LED technologies in Automotive Head lighting
LEDs Thermo-Electrics
Interior Lighting
BMW and lighting
Lighting and Driver Assistance
OLED technology
Materials in lighting
Laser Head lighting
Korea Lighting Market
SL Corp profile
ADB/Matrix Beam
J.W. Speaker Profile
2015 Geneva Auto Show
ADAS and Lighting
India Car Industry and Lighting Market
Advanced Motorcycle Lighting
IAA Auto Show 2015
ISAL 2015
Peterson Manufacturing
NAIAS Auto Show
Delhi Auto Expo 2016
DVN Delhi workshop
Geneva Auto Show 2016
Vision of lighting 2025-2030
DVN Tokyo workshop
Automotive lighting Regulations worldwide
New ADB technologies
Mondial Paris Auto Show
VISION Congress Vehicle Lighting in USA
Peterson Manufacturing
NAIAS Auto Show
Delhi Auto Expo 2016
DVN Delhi workshop
Geneva Auto Show 2016
Vision of lighting 2025-2030
DVN Tokyo workshop
Vehicle lighting Regulations worldwide
New ADB technologies
Mondial Paris Auto Show
VISION Congress Vehicle Lighting in USA

2017 Reports

NAIAS autoshow
DVN Rochester workshop
Geneva autoshow
Simulation Tools
Shanghai autoshow
DVN Shanghai workshop
Interior Lighting
Israeli Startups
IAA Frankfort autoshow
ISAL symposium
Jaguar Land Rover and lighting

2018 Reports

NAIAS and CES Auto Shows
DVN Munich Workshop
Geneva Auto Show
Engineering companies in lighting
Japanese lighting market
DVN Tokyo Workshop
Camera technologies
Varroc profile
Mondial Paris Auto Show
Vision congress
Volkswagen profile

2019 Reports

LA and CES
Geneva Motor Show
Volkswagen profile
Shanghai Auto Show
Materials in vehicle lighting
Status of Regulations
Integration of ADAS in Lights
IAA Frankfurt Auto Show
ISAL
Vehicle lighting in America
Interior lighting

2020 Reports

- 21 January – CES
- 11 February – DVN Munich Workshop
- 17 March - Geneva Virtual autoshow,
- 28 April - US automotive lighting industry
- 15 May - Marelli profile