DVN-I
Automotive Interior

Thu, 23 April 2020 Weekly Newsletter **NEWSLETTER #26**

Editorial

Stay Safe In Car

The COVID-19 pandemic has had a severe, crushing impact on the global automotive industry, disrupting manufacturing, supply, and trade all over the planet. This is placing intense pressure on an industry already coping with reduced global demand, and likely will lead to increased merger and acquisition activity.

This global wave will have many consequences, and we're just guessing as we progressively resume, such as a new definition of safety and hygiene all along the value chain, including car usage, and to re-assess supply chain and risk management.

To rethink the definition of safety and hygiene, employee, customer and regulations will impose very demanding, exacting tasks especially for whatever creates physical contact. As far as product is concerned, we've talked already about interior air quality and surface cleanliness, and that's far from the extent of it. New ideas will pop up everywhere, as soon people are back to work.

As stricter safety and hygiene rules and practices become the norm at home and at work, so too must this apply during transportation, for the car is a very private family living room within our home/transportation/office lifeline! But as new mobility progresses, human interaction will have to be rethought in term of social distancing—a steep challenge given the interactive nature of car pooling and public transport.

Car interior use cases, materials, and technology must now evolve at an even faster pace, and DVN Interior is here to keep you informed and up to date about it. If you've not yet subscribed, **do it now!**

As the industry has been put under a kind of bell jar protection, there's less to report, and we take advantage of the situation to step back and take a snapshot of today's situation for interior lighting and to review the history of center/floor console space. Enjoy!

Our first 2020 report on Interior Trends will be published the end of next week, and if you've not yet signed for our 1st DVN Interior Workshop in Darmstadt on 23-24 September, you may **register here.**

Keep well and stay safe!

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

Trends in Interior Lighting

Mercedes EQC – IAA 2019

New forms of shared mobility, the electric vehicle, the autonomous car, digitalization, and connectivity come with new needs regarding car interior lighting. It must enable driving safely, relaxing comfortably, living, or working inside the vehicle. It must also be more personal and customizable, using different sensors and technologies. Let's take the opportunity to give you a first shot of today's status, we'll keep you updated along next releases.

1. Interior Lighting as Brand Identifier and Differentiator

For many years now, automakers have worked on distinctive marks to distinguish their cars from the cars of the competitors. Hitherto they have set the brand identifiers and differentiators mainly in the exterior design with special front grilles, logos, rims, body and window shapes, daytime running and rear lamps and the latest exterior lighting technologies with new light sources and assistant, sensor and electronic systems.

Some carmakers create a brand-specific "welcome" and "farewell" scenario, starting with exterior lighting animations, continuing with a logical light transition into the car interior, and finishing with interior lighting animations. This transition from the car exterior to the interior could be one reason, that the stylists wanted to create a matching styling language for the exterior and interior lighting with brand identifiers also in the car interior. A benchmark analysis shows that each car maker has their own philosophy for interior lighting. 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 and techniques with intelligent and automatic control for the increasing number of use cases.

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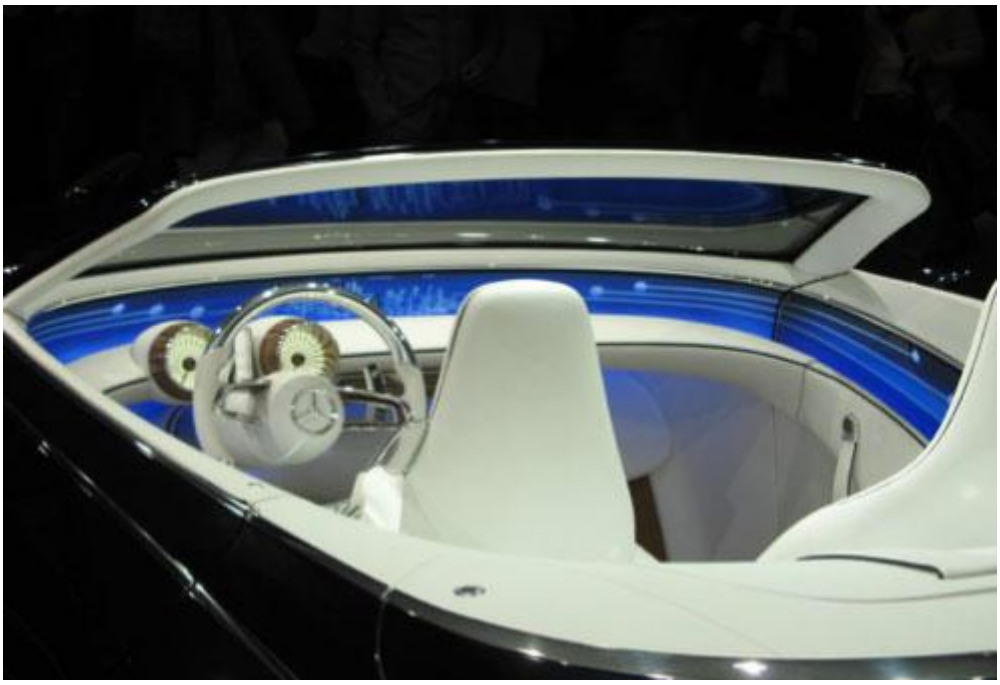
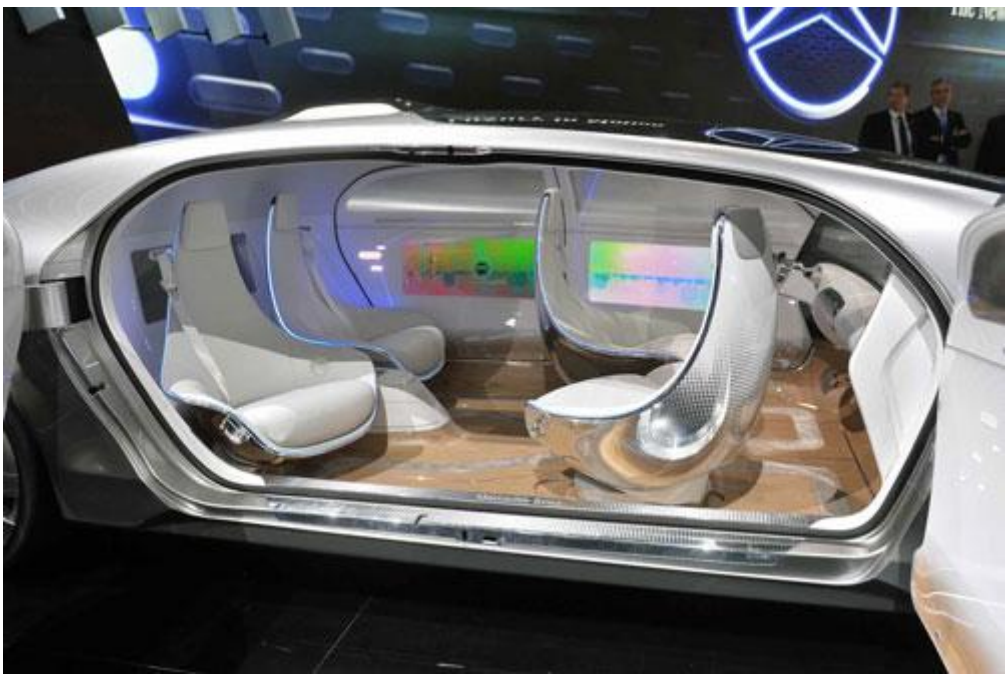
2. Interior Lighting for Safety, Information, Communication

Interior lighting changes from static lamps to dynamic lighting systems, integrated throughout; distributed among components and A-surfaces in the car interior, today visible mainly for the driver and in future for all vehicle passengers in the autonomous driving mode.

- 
- 

A complementary mix of displays and dynamic interior lighting functions increase the safety of the occupants by more information and communication and intuitive perceptible light warning signals. Interior lighting becomes more and more intelligent by connecting it to the cameras, sensors, and electronics of the vehicle to react and adapt with best solutions for a higher safety and better information.

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3. Personalization and Psychology of Interior Lighting

The automotive interior lighting market shows a demand for personalized driving experience. In this trend, consumer demand is developing for personalized light colors and automatic brightness adaption for a more distinctive and feel-good zone in the car interior. Personalization can start when boarding the car through an individual welcome by exterior and interior lighting scenarios in combination with messages from the displays. During driving the interior functional and ambient lighting work automatically adapted to saved personal preferences and environmental conditions. At the end of the trip comes a personal "farewell" by displays, sounds or music, and interior and exterior lighting animations with a "follow me home" light. Personalization has a strong psychological effect for the consumers—this is only one of many examples of leveraging that by dint of interior lighting. Extensive application areas of interior lighting at ambient and functional levels amplify the psychological and physiological effects, make the car interior feel more spacious, promote feeling of well-being by improved orientation and operational safety, and enable a lot of versatile light applications for an increasing number of use cases.

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Source: BMW
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4. Technology and Market Aspects for Interior Lighting

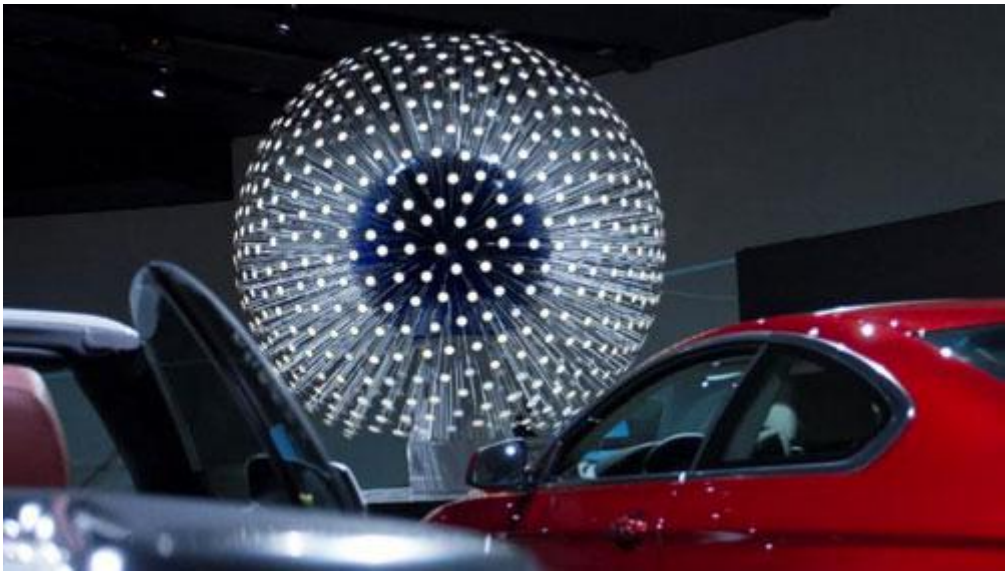
Package-minimized, multicolor-capable RGB LED light sources and modules have an extreme vibration resistance and robustness and make interior lighting applications more and more popular. LED lighting becomes digitized, has a very high power efficiency, and we're seeing rapid innovations in heat management with new technologies and materials and decreasing prices. Therefore, de luxe interior lighting is no longer restricted on high-end vehicles, but is increasingly conquering the mid- and low car segments and the aftermarket for all segments.

The number and complexity of light elements in the car interior will increase. BMW considers that the number of LEDs for interior lighting will increase from 100 LEDs today to 1000 LEDs in the near future, driven by topics like perception of the interior at night, daylight and night design, styling amplification, affordable LED-projection technology, the car as a living and office space, and finally by trends in consumer interests and demands.

Today, conventional and smart LEDs, LED arrays, luminous foils and textiles, light modules with LEDs, light guides and electronics for direct or indirect, static or dynamic lighting, illumination or backlighting of components and surfaces dominate the technical solutions for interior lighting.

Larger areas are illuminated by LEDs, coupled in light guiding materials with visible macro- or nearly invisible microstructures, to achieve a homogeneous light distribution or a light pattern on the demand of stylists. This provides the chance for OLEDs (organic LEDs) to ascend as a new technology step for future interior lighting. OLEDs are panel radiators; their homogeneous light surfaces offer completely new interior

lighting concepts compared to the point LED light sources which must be heavily "post-processed" to approximate homogeneous surface illumination. The production of the very energy efficient OLEDs for exterior lighting has already begun.

- 

Key participants in the competitive global automotive Interior Lighting market include Hella, Valeo, ZKW, Marelli, Yangfeng, Dräxlmaier, Groupo Antolin, Federal Mogul, Koito, Magna, Weidplas, Stanley, Osram, Lumileds, Nichia, and many Tier1-3 suppliers in this field. All key players are expanding their market positions, investments, product ranges, and manufacturing capabilities. The interior lighting market is segregated into North America, Europe, Latin America, Asia Pacific, Middle East, and Africa. Today the European carmakers are in lead in the field of interior lighting, but Asian makers could easily come to dominate the global market due to the increasing demand and the high-volume production of vehicles.

There's much more to be said on these topics—watch this space!

Interior News

3D Filament Winding for Low-Mass Seat

A multi-company collaboration is using xFK in 3D and additive manufacturing to develop an ultra-lightweight seat for hypercars and future mobility platforms, and to open technology for mass production vehicles.

The goal of the project was to completely rethink a car seat using cutting-edge generative techniques. The Ultraleichtbausitz (ULBS) ultra-lightweight seat feasibility study was developed through a collaboration between multiple companies using a combination of technologies. The project's vision was, in the group's words, "to create an ultra-lightweight-seating concept, outstanding in the market in terms of its weight optimization". Initiating companies, all based in Germany, include CSI Entwicklungstechnik (Neckarsulm); Alba Tooling & Engineering (Forstau, Salzburg), and Automotive Management Consulting (Penzberg) developed the prototype seating concept in collaboration with Covestro (Leverkusen), LBK Fertigung (Friedberg), Robert Hofmann (Lichtenfels) and 3D|CORE (Herford).

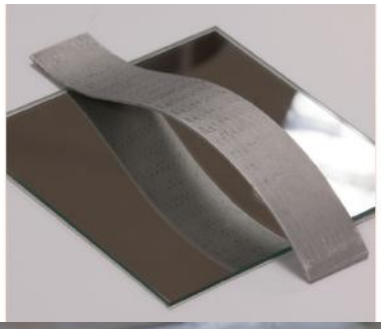
The collaborative project resulted in a seat prototype with a weight around 10 kg including the cushion, structural frame, functional inserts, and the seating base that allows it to be mounted to a vehicle, and typically *not* included in calculating a seat's overall weight. The seat is 20% lighter than comparable lightweight seats on the market, many of which are aftermarket items.

The ULBS features several innovative technologies, most prominent of which is the fiber roving skeleton structure based on xFK's 3D process technology. It relies on endless fiber roving deposition, and in the simulation-driven and material-optimized fiber placement exactly in load-direction as well as in the simple, cost-efficient, and waste-free application of fiber material. 3D-printed parts have been used for the load transfer in this framework structure. In areas with the highest loads, such as the backrest fitments, the seat uses 3D-printed structures made of stainless steel with high strength and high modulus. In lesser loaded areas, 3D-printed aluminum is used.

AMC's xFK in 3D, fiber composite technology for winding components..

ULBS with a back panel shell made of intralaminar reinforcing core (IRC) material, and 3D-printed seat backrest cushions made from thermoplastic polyurethane (TPU).
Source: csi entwicklungstechnik

Aluminum Metal Matrix Composite in Interior



Aluminum metal matrix composites (AMMCs) are aluminum combined with a high-performance secondary material providing products with enhanced capability and sustainable performance. They're a class of materials that have proven out well for applications requiring light weight, high stiffness, thermal stability, and fatigue and damage tolerance. These materials already are used in many powertrain and braking system applications, and in aerospace for parts such as landing gears.

For vehicle interiors, examples currently being investigated by UK-based Alvant include seat frames, rear seat back beams, dashboard structures, inner door module panels, and cross-car beams. They're using Advanced Liquid Pressure Forming, a patented manufacturing process based on metal infiltration techniques, to produce a variety of aluminum matrix composite materials. Components can be fully manufactured from AMMC or can have AMMC material selectively applied in a process known as hybrid-AMC. This can provide optimized performance at relatively low cost.

Honda Goes Back to Dials and Buttons

Screen size is the latest battleground for automakers, so it's interesting that Honda has reverted to using some manual controls in the 2020 Jazz, as customers get overburden with touchscreens.

In an interview with Autocar, Jazz project leader Takeki Tanaka said the company went back to using physical controls for the climate control system to "minimize driver disruption."

He went on to say, "We changed it from touchscreen to dial operation, as we received customer feedback that [the touchscreen] was difficult to operate intuitively." Tanaka

added the old setup forced people to look at the infotainment system, so they added manual controls to minimize distraction.

Earlier this month, Honda revealed the 2020 Jazz has a simplified menu interface that reduces the operation time for the most regularly used controls by 58%, compared with the previous model. The company noted part of this improvement can be attributed to reinstating physical controls for key functions such as the climate control system.

While the infotainment system has simplified menus, it's more high-tech than before as it comes equipped with the Honda Personal Assistant, billed as an artificial intelligence assistant which can understand multiple requests at one time. As an example, the company said users could say "Ok Honda, find me an Italian restaurant with free parking and Wi-Fi, that is open now." The system would then find suitable restaurants that meet the criteria and then display them on the infotainment system.

Cork: Mazda's Sustainable Interior Material

Cork is a sustainable material, historically part of the Mazda brand's past and future. The name "Mazda" was introduced to Japan in October 1931, after the company started its life as Toyo Kogyo—a cork manufacturer—back in 1920.

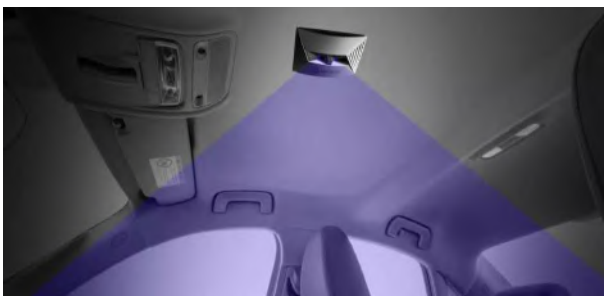
The new MX-30 winks to the company's roots with the use of cork in the cabin, to line the floating center console and inner door handle trim. MX-30 chief designer Youichi Matsuda says, "When Toyo Kogyo Cork was created, technologies in plastics and rubber had

not been developed as far as they are today, so cork was used as an alternative material for gaskets and walls back then. But after World War II, production of rubber and plastics on an industrial scale meant cork gradually took a back seat as a large-scale industrial material. But with it occupying such a significate place in Mazda's history it's only right we chose it for the MX-30 cabin."

The cork used in the MX-30 is formed with a high-quality coating and backing material to ensure durability and quality. The cabin can be a very harsh environment—for example UV rays infiltrating the cabin can degrade cork over time—so using it presented a whole new challenge for development. Use of cork as a sustainable material is consistent with the overall material strategy, as Mazda uses a material made from recycled plastic bottles to make the fabric in the door trims, and bio-engineered plastic in elements of the front and rear doors.

Mazda worked with Uchiyama Kogyo to make sure the finished cork product in the car has the texture, durability and style customers expect. That's another tie to Mazda's early roots; Uchiyama began as a cork stopper factory, too!

Seoul Viosys' Violeds Technology for Interior Disinfection



Seoul Viosys' Violeds technology has been adopted by Yanfeng for in-vehicle UV disinfection.
Violeds uses special LEDs that emit in the ultraviolet spectrum, and projected light, where energy transferred degrades bacteria and virus. With Violeds technology, the Yanfeng's in-vehicle UV sanitizer can detect for absence of occupants before activating lamps for a period of 10 minutes that can sterilize the cabin including cockpit, seating and steering wheel—especially important as steering wheels have been repeatedly found to be between

four and ten times germier than public toilets! The sterilization lamp is embedded in the headliner for maximum coverage.

Seoul Viosys is rapidly launching a portable disinfection product with SETi this month to target COVID-19 for preventing spread of the coronavirus infection. Seoul Viosys and SETi will take the lead in product promotion to provide consumers with quicker access to sterilization solutions until the urgent situation from the global spread of COVID-19 is stabilized. The goal for now is to help people control the spread quickly, but the company will continue to sell the products in cooperation with potential global automaker or tier partners in the future.

New Range Rover Velar & Jaguar F-Pace: Brothers or Cousins?

The new 2020 Range Rover Velar SV Autobiography Dynamic has just been revealed within the JLR SUV family. Is its interior the same as the Jaguar F-Pace? Similar…? Or very different?
Both are built on the same D7 platform, developed as the Premium Lightweight Architecture (PLA) aluminum platform for JLR's larger vehicles, and both share many hidden components. The Velar has the lowest roofline of any Land Rover in history, and with a drag coefficient of just 0.32, it's also the brand's most aerodynamic ever, while keeping acceptable spaciousness for rear passengers. As an expensive option, 8" displays can be ordered on the backs of the front headrests with HDMI video inputs behind the rear armrest.

The Velar interior looks stylish and futuristic, while the F-Pace is sportier and more British.

The Velar has a futuristic-looking dual-screen infotainment system surrounded by a minimalist dashboard with plenty of leather and soft-touch plastic trims. From SE level up, it gets an additional digital screen as a driver instrument cluster, instead of conventional analog dials. Unlike The Jaguar F-Pace, in contrast, comes with conventional buttons and dials for the heating and ventilation (result: easier adjustments for the cabin temperature when driving; see above in re Honda).

The Touch Pro system provides dual-view display, so the driver can follow sat-nav directions while the passenger watches a DVD on the same central screen.

The seats are very different: cozy & flat for the Velar; sporty and more curved for the F-Pace. But both have top-spec leather and extensive power adjustment for a high driving position.

F-Pace options include suede-effect headliner and a variety of wood trims including ash and ebony veneers.

Both cars have Meridian sound systems ranging from 380 to 825(!) watts' power.

The overall perception is different. Attention to details gives a much luxurious ambiance in the Range Rover, while the Jaguar cousin evinces a dynamic-power impression.

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Range Rover Velar

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Jaguar F-Pace

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Range Rover Velar

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Jaguar F-Pace

News Mobility

LEVC London Cab's New Plug-In Van

London's taxicabs have for many decades been remarkably good: they swallow up people and luggage as though bigger on the inside than on the outside, and they have such a tight turning radius it feels like they can spin about their own vertical axis. The newest generation of these wondermobiles is the LEVC TX5, a purpose-built carriage manufactured by the London EV Company (LEVC), a subsidiary of Chinese automaker Geely. It is the latest in a succession of purpose-built hackney black cabs produced by LEVC and various predecessor entities. The new LEVC TX, with plug-in hybrid range-extender electric powertrain, is designed to comply with Transport for London's Taxi Private Hire regulations, which from 1 January 2018 banned new diesel-powered taxis and require zero-emissions capability. It follows the EV version available for a couple of years now.

The new taxi boasts a "people mobility designed" interior, which actually foreshadows what a robo-taxi could be like. The TX's limousine-style coach doors create an easy access to full-size seating for up to six passengers. Once inside, passengers are also offered ample headroom thanks to a generous ceiling height. Body-length windows and a panoramic glass roof add to the spacious, light, and airy feel of the interior.

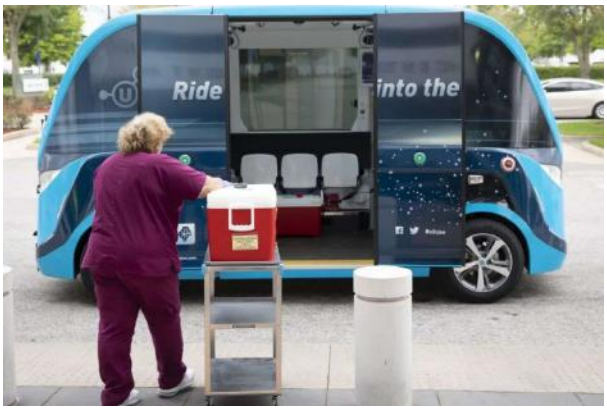
With on-board WiFi and power ports on board, the TX makes getting connected and working on the go easy. Air quality filtering system is present, as is more or less now

mandatory for almost 100% city driving. Climate controls and a payment terminal are directly usable by customers

Alongside the space, comfort and accessibility, the TX is underpinned by whisper-quiet, electric, "eCity" technology, adding quiet refinement and a smooth ride to further enhance the passenger experience.

The van, called VN5, uses the same platform and drivetrain as the TX5 taxi and will start sales later this year. The van will be built on the same production line as the taxis and will push the factory, opened in 2017, closer to its 24,000 capacity.

Navya Autonomous Shuttle: Medical Test Delivery



Since March 30, 2020, 4 Navya autonomous vehicles have been making daily trips return to the Mayo Clinic medical center in Jacksonville, Florida, to transport Covid-19 screening tests. Navya is a French company specialized in the design and construction of autonomous and electric vehicles, operating driverless shuttle in Las Vegas (AAA Self-Driving Shuttle), Singapore, Norway, and elsewhere.

The use of autonomous shuttles makes it possible to limit interactions with the samples to be tested and to transport them quickly through the hospital center without requisitioning medical personnel for this purpose. A person simply has to position the refrigerated compartment containing the tests inside the Navya vehicle. Then, once the shuttle arrives, another person collects these tests and positions an empty refrigerated compartment inside the shuttle which can leave in the other direction.

These shuttles run fully autonomously and no security operator is present on board. However, in the test period, each shuttle is followed by a car driven by a human in order to ensure that no other vehicle or pedestrian interferes with the autonomous shuttle, and although the journey be cut off from all other forms of traffic.

Drones are regularly tested or highlighted for the transport of medical equipment, while autonomous shuttles are rather targeting passengers transport. It's probably easier and safer to transport while remaining on the ground.

The Design Lounge

The Center Console/Floor Console Space—Part 1

As currently the industry is kind of paused due to the COVID-19 pandemic, we thought it'd be a good time to deep dive on a few topics within the automotive interior space, starting with the center console/floor console space.

2014 GMC Sierra

Currently this space is occupied with a wide variety of technologies, features and functions that are defined by three main elements:

• Overall occupant positioning and vehicle type, such as tall car, SUV, sports car, etc.

• Drivetrain layout. Specifically, the drivetrain/transmission location for rear wheel drive, front wheel drive and now electric drivetrains and how each intrudes into the interior space

• Identification of where each function, technology and feature should be located. Column shifter or floor shifter?

We will be focusing on the last item while also looking at how much the consumer/market/segment needs drive this space and how automaker and brand traditions are incorporated. Now lets take a look at some of the key elements/technologies and how they have define this space starting with…

Driving for Sport: Shifter and Handbrake

For years, the transmission shifter has been the defining element of this space, from both a design and functional perspective spanning manual and automatic transmissions and now EVs. The placement of the shifter told everyone what type of vehicle they were looking at. Sports or performance cars had a floor shifter—this meant the most direct linkage to the transmission, which allowed for quicker, shorter shift lever throws. Luxury, comfort and utility type vehicles favored column-mounted shifters which might have required longer throws, but allowed more seat and floor space.

1938 Cord

This was considered one of the sportiest cars of its generation with its column mounted manual shifter.

1955 DeSoto Fireflight with "Flite Control Lever" dashboard shifter

1962 Alfa Romeo Giulia Spider— No console required at all. Just a leather and rubber shift boot.

These delineations become very blurred as multiple technical platforms needed to incorporate these attributes into cross car platforms, yet the floor mounted shifter define the sports car and sports-oriented segments for generations. If it was performance you wanted, a floor mounted shifter was required.

1963 Jaguar E-Type

Some integration of the radio and ashtray (remember those?) but very clearly performance oriented, for 1963.

1959 Chevrolet Corvette

1963 Chevrolet Corvette

Clearly performance oriented, the integration of an armrest and metal trim plate, upgraded the Corvette from its previous carpet covering.

1967 Buick Riviera—note grab-frame shaped shift lever.

The floor console shifter, even with an automatic shifting transmission, identified it's sporty intentions by introducing bucket seats.

1970 Dodge Challenger 'pistol grip' shifter

Only pure performance required with no other items integrated, such as radios, armrests, or ashtrays.

1970 Chevrolet Chevelle

1982 Hurst Oldsmobile with "lightning rods" shifter

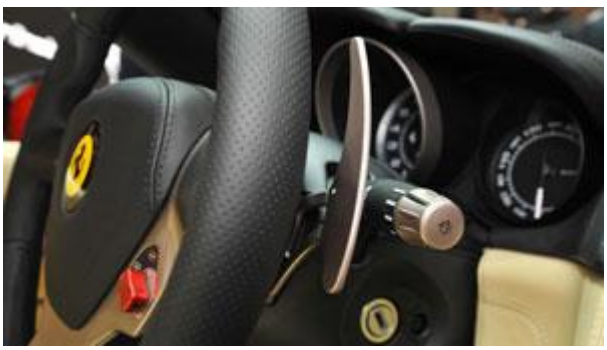
Although the HVAC and radio function are in the center stack, clearly this shifter solution was about performance. Specifically drag racing; the idea was to throw one lever for each shift, to avoid accidentally picking the wrong gear.

Ferrari 308 GTB

The 'gated' shifter differentiated and defined Ferrari and the high-performance sport car for decades. Notice the integration of not only the parking brake but also HVAC, the ashtray, and lighting into the console.

2002 Ferrari 550

The gated shifter remained an iconic item for Ferrari even as more comfort items needed to be integrated into the console area.

- 

  2013 Ferrari California

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  2007 Lamborghini Murcielago

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2007 Lamborghini Murcielago

With the introduction of electronic manual shifting from racing cars, paddles began to take over from gear sticks, and manual gear shifting with a lever and clutch pedal is moving into the past—thus freeing up the center space for other things.

As we enter this new era of performance and electric transmissions and drivetrains, the floor shifter is now only a nostalgic item. Performance or sporty vehicles, are no longer defined by their transmissions and therefore their interiors no longer need to signify the ability to shift.


2017 Ferrari 488—racetrack-focused and driver-oriented, with no shifter in sight!

1984 Toyota MR2

2014 Toyota FT concept

In the past 30 years, the driver's car cockpit has greatly evolved but…

2010 Ferrari FF

2020 Porsche Taycan

… oddly enough, even with a dominant floor/center console, the elimination of the floor shifter can greatly decrease the sports feeling of the interior. This leads us to how the column and button shifter has impacted, and will continue to impact automotive interiors.

More to come.

General News

Renault's New Strategy for China

Renault will focus in China on light commercial vehicles (LCV) and electric vehicles (EV).

Renault Brilliance Jinbei Automotive (RBJAC—the Chinese name means "gold cup"), launched in December 2017, is Renault's main channel for its LCV business in China. RBJAC is modernizing Jinbei models and extending the lineup with a total of five core models by 2023. Jinbei is 51% Brilliance, 49% Renault, based in Shenyang, and using the expertise and technology of both companies. RBJAC says sales of such vehicles in China are likely to reach 3 million units per year in coming years.

Increasing urbanization rate, e-commerce extension, inner-city transportation schemes and versatile customers usages are the key characteristics of a rapidly changing LCV market in China. It reached 3.3 million in 2019 and is forecasted to maintain a steady upwards path. Renault is leading the LCV market in Europe in terms of sales volumes for light commercial vehicles, as well as sales of electric light commercial vehicles.

EV business will be developed through the two existing joint ventures: eGT New Energy Automotive Co., Ltd (eGT) and Jiangxi Jiangling Group Electric Vehicle Co. Ltd (JMEV).

Renault will transfer its shares in Dongfeng Renault Automotive Company (DRAC) to Dongfeng Motor Corporation. DRAC will stop its Renault brand-related activities. Furthermore, Renault and Dongfeng will continue to cooperate with Nissan on new generation engines like components supply to DRAC and diesel license to Dongfeng. Renault and Dongfeng will also engage in innovative cooperation in the field of intelligent connected vehicles.

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Jinbei Haixing A9

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Renault City K-ZE (Dacia Spring in Europe)

SsangYong Motors Gets Higher Mahindra Support

Here's an exotic example of what is happening everywhere in the auto industry nowadays. SsangYong Motor Company is the fourth largest automobile manufacturer in Seoul, South Korea. They're owned by Indian multinational automotive company Mahindra & Mahindra. SsangYong started building jeeps for the US Army as well as trucks and buses after World War 2, and now specializes in SUVs; the model range includes the Rexton, Tivoli, and Korando.

Now SsangYong will use a 40-billion-Won (€30m) special fund raised by their biggest shareholder to help ease liquidity concern amid cooling demand due to the coronavirus.

SsangYong's board approved the use of the fund at a meeting held recently. Funds will be used to resolve imminent liquidity issues and to relieve market concern.

Last month, Mahindra and Mahindra scrapped a €390m investment plan in its struggling South Korean unit as automakers save cash to ride out the coronavirus crisis.

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Korando Turismo

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Tivoli, first new model under Mahindra ownership