DVN-I
Automotive Interior

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Editorial

Lighting And Lightweighting In Auto Interiors

In this third issue of DVN-I, we present an in-depth look at the takeaway points we retain from this year's Automotive Interior Expo recently held in Stuttgart. The displays and exhibits at the show really confirmed the increasing trend of lightweighting, and the growing importance of interior lighting. Light is no longer in the car just to help find things in the dark; now it's central to creating ambiance, providing information, generating alerts, personalizing the cabin according to vehicle occupants' personal choices…all in all, lighting is playing an increasingly important role in the comfort and safety of everyone inside the car.

As for lightweighting, it was clearly visible through lighter materials, as well as materials allowing miniaturization of components so as to reduce package space. 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.

We also bring you news and views on interior surfaces, materials, and designs, as well as the most interesting topics presented at the recent WardsAuto Interiors conference in Detroit. You'll see previews of forthcoming cars including VW's 8th Golf and the Nio ES6.

DVN-I is still taking shape and finding its form. We'll be most grateful if you'll please take a quick minute to share your thoughts, feedback, and requests. Please shoot us an email or you may find us on LinkedIn.

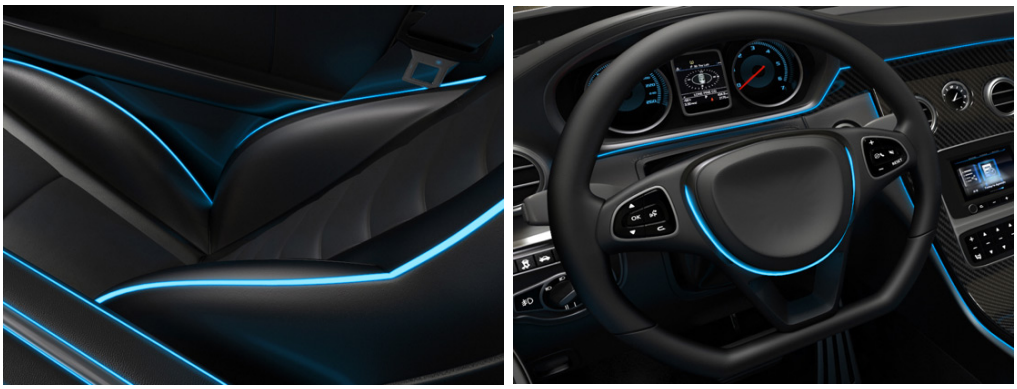
In the meantime, happy reading; we thank you for your support!

Philippe Aumont
General Editor, DVN-Interior

In Depth Automotive Interior

Lighting, Screens and Personalization: Trends at Stuttgart Expo

The Automotive Interiors Expo Europe 2019 saw visitors discovering the latest product launches and innovations from over 150 exhibitors specializing in everything from fabrics to leather, lighting to controls, foams to fasteners, veneers to laminates, seating to switches. The most prominently visible trends are in interior lighting, cockpit personalization technology, and user screen visibility through new technical films.



EFI light guide

Vehicle interior designer-specifiers have long had to work under very tight budget allotment, which historically reduced the offer to a dome light or two and maybe a couple of reading lights. But LED technology has opened new opportunities by dint of versatile lighting capabilities in small packaging at an affordable cost, while the functional role of lighting has evolved beyond just a glorified flashlight to help find things in the dark. Now lighting personalizes the interior, presents information, creates ambiance, conveys alerts, and more functions are being added to this list all the time.

EFI Lighting, for example, offers both light guides and luminous textiles which cover large areas with a luminance of uniform quality. The optical fibers are connected to an LED module integrating the LED sources, an optical coupler, a power controller and connectors. It can provide anything from ambient lighting to alert lighting. The light guide, meanwhile, is a flexible tube in which is inserted a network of optical fibers specially designed to diffuse a homogeneous light along its entire length.

Webasto, a longtime leader in sunroof technology, now presents its products as a platform for overhead lighting, showing various possibilities to highlight the sunroof perimeter, creating a light signature via light guides. Lighting effects create a new and individual atmosphere inside the cabin, as the roof offers a great big surface area for painting with light. The lighting elements are integrated into the guide rails of the roof system or roof element, while the panels remain transparent. Recently a panorama roof, featuring infrared absorption and integrated ambient lighting has been launched on the BMW 7 series, for instance.

Design Led Products, a Scottish company, proposes integration of functional light for seats, center consoles, and doors—with coupling to proximity sensors. They have profiled a new composite light guide technology that enables large-area uniformity for surface backlighting. The company's technical director Dr. James Gourlay says "Space constraints and complex curves make the backlighting of surfaces difficult. The joining or integration of surface materials, such as cloth, wood, decorative foils and metal, is challenging. This composite light guide technology allows LEDs and light intensity distribution optical features to be embedded inside and distributed throughout transparent films".

With modern car interiors full of bigger and bigger screens, reflection control becomes important to avoid distracting the driver. MacDermid Enthone Industrial Solutions showed a version if its XtraForm antiglare film well suited for displays. The films are specifically designed for deep-draw 3D film insert molding (FIM) applications and automatic processing, and are available in a range of different gloss levels from GU (Gloss Unit) 15 to 75. The film maintains full readability tactility despite adding an additional layer.

Screens project images from the environment, using cameras or radars positioned outside the cabin, and must maintain visibility whatever the weather conditions. Canatu, from Finland, developed its CNB system™ which provides an energy-efficient heater solution for lenses and sensors to keep them at their maximum performance in adverse conditions. These solutions, as well as Canatu's CNB films and touch sensors are based on Carbon NanoBud®, which offers deformability up to 200% and enables design freedom for touch and heater interfaces with 3D formed shapes. Carbon does not reflect any light, thus enabling touch displays with deep black and high contrast.

The optical properties and formability of the film enable sensors to be fully functional—even to a 360-degree or fisheye view.
The internal customization of the vehicle or the ability to change the appearance of a dashboard, for example, without investing in expensive tools is a longtime target of vehicle interior design; now comes Nakan offering a possibility to customize the vehicle interior with special Printsol™ vinyl inks for digital printing and the industrial means of affixing them to the chosen surfaces, with a suitable robotized pilot printer. A logo or pattern can be "printed" on the dashboard or a colored but imaginary seam can be superimposed on the real seam, with no modification of the part toolings. Thus, small runs of special editions and custom personalizations become feasible.

Materials and trim specialist TMG Automotive welcomed Portugal's Secretary of State for the Economy, who attended the show in recognition of a number of high-profile Portugese exhibitors. TMG's booth focused on translucent materials that allow seamless, functional surfaces with backlit controls; company R&D engineer Luis Filipe Silva said "When developing translucent materials, the challenge is to ensure they can resist the abrasion that results from constant touching and interaction with the driver or passengers".

INTERIOR NEWS

Citroën to Eliminate Motion Sickness

In a car or any other mode of transport, many people suffer from motion sickness due to mismatch between visual perception and the forces acting on the vestibular system of the inner ear.


Now Citroën has figured out how to resolve this conflict with glasses that present an artificial horizon. Developed by French startup Boarding Ring, the glasses have four rings containing a colored liquid that moves in the frontal direction (right-left) but also in the sagittal direction (front-back) following the movement of the head. The design was entrusted to 5.5, a Parisian collective design studio, who infused Citroën's values of freshness, simplicity, and ergonomics.

The result: a pair of high-tech looking spectacles made of soft-touch white plastic. As soon as a person starts to feel uneasy, they don the Citroën Boarding Ring™ glasses, which allow the mind to resynchronize with the movement perceived by the inner ear while the eyes were fixed on an immobile object such as a smartphone or a book.

A next step—yet to be invented—might be perhaps to create such a visual environment through a head-up display accessible to any occupant. Can it be done? We'll have to wait and see!

How to Build Driver-Vehicle Trust

With every upstep in vehicles' autonomous ability must come an increase in drivers' willingness to trust the technology; studies have robustly shown this to be a key bottleneck in the adoption of self-driving technology. That, as well as desire and necessity for

simplification and minimization of distraction, together with ever-increasing infotainment demands, are major forces shaping the evolution of the driving deck. At the same time, industry is trying out ideas for the interior layout of AVs.

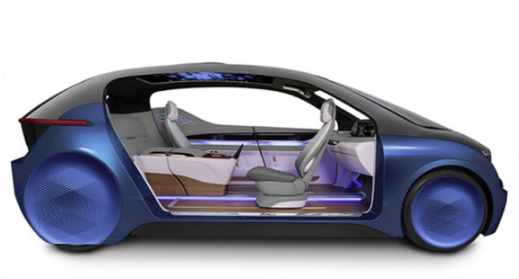
That topic was emphasized during a panel discussion at the WardsAuto Interiors Conference by Michael Schoenherr, Continental's head of North American Instrumentation and Driver HMI R&D. Consumers want vehicles to serve as an extension of their homes and offices, Schoenherr said, and providing a seamless experience will help them to trust the technology they experienced daily in the car.

With automakers jostling for unique selling points, display screens are getting larger, and the quantity of displayed information is increasing, leading to distraction and information overload. So, drivers need technology that can help them get the right information at the right time, in the right way—some kind of assisted information-triage to prioritize what matters on a dynamic basis. New approaches could include:

- Head-up displays that can present more information closer to the main act of driving (HUD sees what the vehicle sees)
- Smart surfaces offering controls that respond to a touch with active haptic feedback
- Function-on-demand controls shown only when needed
- Precise illumination, possibly embedded behind surface material
- 3D-shaped controls that can be operated without looking

Lighting Beautifies Car Interiors

A theater scene, a movie set, or a monument is transformed by thoughtfully-designed lighting. The Sistine Chapel's artwork, for example, is set off by vertical, well-placed, beautiful lighting. At the WardsAuto Interiors Conference, Osram Senior Application Engineering Manager Kimberly Peiler said "That can be brought to car interiors. Future vehicles will have lighting where it wasn't before".



Human-centric lighting is a question of light quantity and colors, position with respect to vehicle occupants, and controls. Light influences the human experience with physiological and psychological effects on activity, concentration, and relaxation. Light can re-energize occupants—it already is used to speed recovery from jet lag and to prepare before a sporting event.

Automotive applications could include low-resolution ambient lights and LED illumination throughout the car. But consumer research indicates people are put off by the sight of rows of exposed light points. So, the first objective is task lighting to help see what you're doing, when you're doing it. Then, depending on automation scenario realization, drivers and passengers could control the lighting to make the interior either a productive office or a homey living room on wheels.

Home…office…and the vehicle interior is the third living space. Now light is shaping it, as it has for many years with the other two.

Seat Versatility for New Mobility

Seat configurations have been more or less static for many years—some can be removed or folded flat, but that's about it. That's not good enough to support all the new use cases brought on by the advent of autonomous, connected, and shared vehicles.


Personalized mobility is becoming as important to people as their smartphones, says Magna advanced technical engineering VP Dino Nardicchio at Ward Auto Interior. His company studied 54 families in the U.S. and China and learned static seat configurations aren't meeting all their needs.

Magna already has experience with what Nardicchio calls "smart adaptability" with the Stow-and-Go seats available in FCA minivans. The supplier is extending a variation of that concept to car sharing by developing second- and third-row seats that fold up and slide to the front of the cabin, creating cargo room that could be shared with a package-delivery company renting the vehicle from its owner for the day (using peer-to-peer car rental services popping up everywhere, such as Drivy, as soon as insurance system will allow it). That, in turn, brings a need for easy cleanability of the car interior, from a material and architecture standpoint.

Magna has also determined there's a need for more complex seating arrangements, such as a "campfire configuration"—wherein all occupants can interact while sitting in a rough circle—and conference seating, in which the occupants sit across from each other in a mobile meeting room of sorts. Nardicchio says he expects to see demand increase for new arrangements like this, what he calls "mobile office features" in forthcoming vehicles.

Nio ES6 Launches in China

Following on the successful launch of the ES8 electric SUV, Nio has launched their second product on the Chinese market: a smaller, less expensive electric SUV called the ES6. It's a 5-seater roughly comparable in packaging to the BMW X3 or Audi Q5, and it's powered by a lithium-ion battery, packaged for quick and easy swappable as in the ES8.

Designed in Munich, the ES6 bears a clear familial resemblance to the 7-seater ES8, with strongly similar horizontal design and styling cues. The interior design is minimalist and elegant. There's a straight instrument panel with very few hard buttons for the various controls, a tablet-sized screen (à la Tesla), and a digital assistant named "Nomi" housed in a ball above the screen on the instrument panel.

Features and materials are deluxe: microfiber suede headliner, Nappa leather upholstery, lounge-type passenger seating, a trendy flat-bottom steering wheel, and an optional "intelligent fragrance system".

It's got Mobileye's system-on-chip EyeQ®4 with radar, ultrasonic sensors, and visual cameras capable of supporting level-3 autonomous driving, including adaptive cruise control, lane departure alert, emergency braking, traffic jam assist, parking assist, and blind spot detection. The system is set up for rapidly-enabled additional features in the future via over-the-air updates.

Nio says the ES6 will be available outside the Chinese market as soon as the "Nomi" natural language system is capable in English and other international languages.

Lightweighting Gains More Traction

Recent events covered by DVN-I confirm continuing efforts to reduce material usage and weight in cars, even though such efforts could arguably call futile compared to the very heavy batteries uniformly found in EVs.

At the Automotive Interiors Expo, we saw Recticel Automotive, the Belgian polyurethane skin supplier for automotive interior applications, and its new Colo-Sense X Lite high-performance material, which offers 20% weight savings as well as other benefits such as higher formability, up to 50% VOC emission reduction, and low temperature (< 65°C) operation allowing electronic and/or lighting integration. Recticel's proprietary PU (polyurethane) spray technology allows production in multi-tone and multi-grain designs and can apply for door panels, armrests, interior trims, convertible tops, load floors, rear shelves, and wheel arch paneling. It's worth noting that a European-funded project has recently started to improve PU thermoset's recycling process.

JSP gave a talk about their Arpro lightweight energy absorption material with structural strength and energy absorption capabilities. It has multi-chemical resistance, is recyclable, and has thermal, acoustic, and sound insulation capabilities. Manufactured worldwide, it can be used for safety

components (e.g., anti-submarining ramps as in the Volvo XC 60, child seats, and suchlike), HVAC housings, and more.

Toyota Boshoku Displays Japanese craftmanship

At the Stuttgart Automotive Interiors Expo, Toyota Boshoku showed off a door trim for the Lexus LS, which highlights its Japanese craftsmanship with ornamental cut glass and hand-folded satin detailing. TB R&D General Manager Shinji Tominaga described it: "This fabric is not sewn, it is more origami-like in its style…and this is actual cut glass, like a whisky tumbler".

The door trim also features lightweight Kenaf natural-fiber base material. Kenaf (hibiscus cannabinus) is a common wild plant of tropical and subtropical Africa and Asia grown for thousands of years for food and fiber. It has superior CO2-absorbing properties, and facilitates control of the whole product lifecycle, from production of raw materials through to the manufacture of the component, and eventually its disposal.

The company has also patented a unique method whereby heat-expandable microcapsules fill the gaps between the fibers during the molding of the material, which features a rigidity that corresponds to that of conventional materials, but offers up to a 20% reduction in weight. Tominaga says "We want to show new technology, but with traditional Japanese thinking, too".

Meanwhile at the Style & Technology Studio, TB's Prototype and Technology Center Advanced Development Manager Dr. Klaus Philipp presented a range of future innovations for automotive seating with excellent ride comfort. As part of his presentation, he revealed the company's latest seating concept, with a strong focus on the most important features of comfort: proper posture, appropriate support of the human body, efficient control of vibration transmission, and flexible fit considering the variety of human bodies and their individual differences.

Leather Sustainability: More Than Meets the Eye

Recent auto and supplier-industry shows have revealed—mainly on concept cars—the emergence of a willingness and desire to find an alternative to leather in premium vehicles. In the last DVN-I newsletter, for example, we reported on apple- and pineapple-based vegan leathers.

Not to be shoved aside, Italian leather interests like the Dani Group, UNIC (the Italian Tanners' Association) and ICEC (Institute of Quality Certification for the leather sector) are ramping up efforts to defend their products against criticism on environmental and animal-welfare grounds. Firstly, they stress that upholstery leather exists only as a byproduct of the meat industry, using a part of the cow that would otherwise just go to waste. And they hasten to point out that even with a significant decline in meat consumption, there would still be enough slaughtered cows to meet the needs of the leather industry.

Their second point is that leather production is a modern industrial process fully compliant to regulations, confirmed by certifications like ISO 14001, with calculated and published carbon footprint, emissions, raw materials and chemical consumption figures.

And finally, they point out the use of authentic leather labelling, including environmental and animal species to help consumers and car buyers understand what is real versus synthetic or simulated leather. If the leather industry—Italy has 20% of the world value market share—can calculate and publish its CO2 consumption per m2 of leather seat material, it would be interesting to be able to compare the reckoning to that of seat upholstery coming from the oil industry. It would also be interesting to know which industry comes closer to meeting sustainability objectives and constraints.

NEWS MOBILITY

Ford and Digit Partner for Deliveries

Ford imagines a collaboration between its autonomous vehicles and a walking robot for the delivery of parcels. A partnership between Ford and the Agility Robotics startup has been set up to develop delivery solutions for difficult "last mile" delivery—which has been estimated to account for up to 30% of urban traffic—combining autonomous vehicles and biped robots. The concept is intended to reduce the number of vehicles at peak hours and the traffic disruption associated with deliveries.

In a video posted online, Ford shows how the robot called Digit driven near a home by a specially equipped self-driving vehicle appears on the doorstep to deliver a package.
Digit has a lidar, stereoscopic cameras, and various sensors to allow it to move and navigate autonomously. In addition, the idea is also to take advantage of the advanced mapping capabilities of the autonomous vehicle environment to help Digit accomplish its task, and thus this notion of cooperation.

Unveiled earlier this year, the Digit robot, currently being trialed, can carry packages weighing up to 18 kg and can walk independently for 5 minutes. Agility Robotics anticipates availability in the first quarter of next year; they also say a third-party computer can enhance Digit's perception and learning capabilities. The idea would be that the autonomous vehicle shares its data with Digit well before it gets out of the vehicle, so it can find its way faster and more easily when it leaves the vehicle. And if it encounters problems, Digit will be able to communicate with the autonomous vehicle.

Renault AV for Last-Mile Postal Delivery

At the Viva Technology show in Paris, Groupe Renault announced the start of experiments being done with La Poste Group using Renault EZ-Flex light trucks to gain a better understanding of future urban delivery practices.

The EZ-Flex, revealed this past April, is a compact connected electric light commercial vehicle with a modular rear design. It boasts carrying capacity of 3 m3, easy access to the driver's cab, loading and unloading via side doors for optimal space usage and safety during delivery, a modular loading space (van, pickup truck, etc) and other features intended to maximize versatility. La Poste already uses about 40,000 EVs, including 16,000 lightweight utility vehicles, Quads and Stabys, and 24,000 bikes and trolleys.

Over the long run of the experiment, ten Renault EZ-Flexes will be loaned out in Europe to professionals, businesses, towns and communities for periods of up to two years. Analysis of vehicle data and feedback from postal staff will serve for a greater understanding of the day-to-day realities of last-mile deliveries.

Lyft Wants Customers Out of Personal Cars

Two years ago, Lyft President and co-founder John Zimmer predicted that car ownership would be nonexistent in major American cities by 2025. With five and a half years left on that ticking clock, Lyft is now giving things a bit of a shove by offering to pay people in select cities to park their cars for a month, with compensation coming in the form of up to USD $600 in credits for Lyft rides, for bike- and car-sharing services, and for public transit.

The move is a big marketing bet. Lyft will choose about 2,000 people to participate and hope they will be honest about not using their personal car. An initial pilot phase of the program will run for one month, with the possibility of longer-term trials afterward.

The conviction behind these moves is that the future of ride-hailing companies will become more generalized transportation providers. Last year's focus on autonomous vehicles has been displaced by enthusiasm for lower-tech forms of personal transport.

A similar experiment was carried out by Zipcar in 2009—probably too early, before people were ready to consider the idea and before services like Lyft had got off the ground. Both Lyft and Uber have been adding new types of transportation to their platforms; they each bought a bike-sharing company—Uber's choice was Jump; Lyft bought Motivate—and are developing their own scooter-sharing services. Lyft also redesigned its app to highlight its carpool service, as well as public transportation. "We're finally in a point of stability where we can double down on these efforts," Zimmer says.

Perhaps most importantly, though, a platform with multiple transportation options has a better chance of presenting a viable alternative to private vehicle ownership, which is a convenient but costly way for people to get around. The average cost of owning a car and driving it represents approximately 12% of household expenses.

Michigan Presents Planet M

Planet M is Michigan's mobility initiative representing the collective mobility efforts across the "Motown" state. Planet M connects people, places and resources dedicated to the evolution of transportation mobility to Michigan's mobility ecosystem.

Michigan is home to two world-class autonomous vehicle testing sites, leading the nation in testing and development of next-generation transportation technology. In addition, Planet M's network of industry leaders, universities, private and public organizations and government agencies has positioned the state to remain the leader in all things mobility for years to come.

It's a sign, after Waymo's announced expansion of their presence in Michigan, that the Google subsidiary is interested in hiring talents in the heart of the US auto industry., and to gaining more control over its production process as it seeks to grow its business of deploying autonomous vehicles.

Planet M startups are also on the radar, and the Planet M Landing Zone provides a physical entry point for global mobility startups interested in doing business in Michigan to access the vast network of automotive companies, testing infrastructure, talent and R&D centers.

Recently, The NAIAS 2020 Michigan Mobility Challenge was announced. Led by the Michigan Department of Transportation and Planet M, the project tasks companies with deploying technologies for automated and connected vehicles so they can transform how we drive, live, work, and play.

Planet M reflects efforts to maintain Michigan automotive leadership in the US, in context of the growing power of California's Silicon Valley.

GENERAL NEWS

Renault Mulls FCA Merger

Renault's Board of Directors recently scrutinized a proposal received from FCA (Fiat Chrysler Automobiles) regarding a potential 50/50 merger between the two companies.

After careful review of the terms of FCA's friendly proposal, the Board of Directors decided to study with interest the opportunity of such a business combination, augmenting Groupe Renault's manufacturing footprint and creating additional value for the Alliance.

The merger would bring FCA's brands—Jeep, Chrysler, Alfa Romeo and Fiat—under a common umbrella with Renault Group's Renault, Dacia and Lada brands. The deal could take more than a year to finalize, according to FCA CEO Mike Manley.

Exor, Fiat's founding Agnelli family holding, is set to become the single largest shareholder in the combined entity. The new company would be chaired by John Elkann, head of the Agnelli family that controls 29% of FCA, sources familiar with the deal talks told Reuters, and Renault Chairman Jean-Dominique Senard would likely become CEO.

The merger would give Renault access to the North American market, which it left 30 years ago in 1989, while FCA would gain clout in Russia, the French carmaker's second-biggest market with its AvtoVaz unit, which builds Ladas.

Daimler CEO Zetsche Passes the Reins

Daimler CEO Dieter Zetsche has given way to his successor after 13 years at the helm as the automaker face challenges in the transition to electric cars and digital transportation technologies.

Zetsche, 66, received prolonged applause from shareholders at the company's annual meeting in Berlin on Wednesday until he made the time-out sign with an embarrassed smile.
His successor Ola Kallenius, moves up from head of development at the company's Mercedes-Benz luxury brand. He will steer the Stuttgart-based automaker through the ramp-up of electric vehicle

production and competition with tech companies over new ways of getting around, such as ordering cars as a service through smartphone apps.

Shareholders were set to approve a new structure in which the car and van business and the truck and bus business would become legally independent, as the company's financial services division is now. The three divisions would be grouped under Daimler AG as a holding company responsible for overall strategy. Zetsche told shareholders that the new structure will let the divisions respond faster to changing customer demand and enable them to better engage in partnerships with other enterprises.