

## Editorial

### DVN-I Is Here!

With a persistent focus on innovation and new technology, DVN has been the driver and vehicle lighting and vision world's journal of reference for around 12 years now, over which time we've expanded its reach and scope to encompass ADAS.

Within today's revolution of ACES (autonomous, connected, electric, and shared) vehicles, mobility use cases are changing drastically. The car as a living space is gaining traction as an idea as vehicle autonomy steadily grows, while aerodynamic and crash-safety priorities have done away with yesterday's exterior flying buttresses and other suchlike. That's the context in which car interiors are becoming a foremost product differentiator, allowing vehicle occupants to enjoy a whole new range of activities during car trips: relaxing, working, phoning, reading, watching movies...the car becomes a mobile lounge. Thanks to all these new usages, car interiors are one of the strongest growing pieces of the vehicle, introducing scads of new technologies, apps, and features.

That's the impetus and scope for DVN-Interior, which has been getting its footing in a soft-launch mode for the last couple of months. Now it's fully live! With DVN-I we are creating a community of car interior experts, communicating through a bimonthly newsletter, Reports, and Workshops aimed at consolidating, analysing, and presenting information that would otherwise be scattered and difficult to access. The big idea with DVN-I is the same one that's been so successful with DVN: to help subscribed members access, absorb, and leverage relevant information quickly and efficiently.

DVN-I is also always linking the automotive market, new technology, and new mobility services to present and explain relevance in the car interior realm. Technology and services are the building blocks of today's and tomorrow's vehicle occupant experience, and that's where interior and mobility overlap. Mobility service providers will of course brand and promote their services, not least by creating a unique customer experience—from ordering with a smartphone tap to relaxing into a mobility tool. Here again, the interior is central to the experience, so new mobility will drive new interiors and vice versa.

Come join us in this exciting car interior world, and mention DVN-I to those in your circles whose work and interest touches on vehicle interiors in some way, won't you please? We look warmly forward to welcoming you to the community of DVN-I members.

Philippe Aumont,  
General Editor, DVN-Interior



*Two last points from Hector :*

*- I am at this time in the IAA in Frankfurt. Even some OEMs as Citroën, Ferrari, Nissan, Peugeot, and Toyota are not present, we could discover innovative technologies mainly from the German OEMs Audi, BMW, Mercedes-Benz, Porsche and VW. DVN will publish a lighting-centred DVN Report promptly—before the end of the show.*

*- Don't miss below the very fruitful interview of Christophe Le-Ligné, CTO of Valeo's Visibility Systems business group. I am sure that all of you, will be interesting reading this interview.*

## In Depth Lighting Technology

### ADB Education is Urgently Needed: Valeo's Le Ligné

**Interview, special to DVN**

Christophe Le-Ligné is the CTO of Valeo's Visibility Systems business group, and since this past July he directly lead the R&D activities of the Lighting Systems product group, replacing Laurent Evrard.



**DVN : You're working away in the lighting community, but your name might not be familiar to some of our readers. Will you tell us about yourself?**

**Christophe Le Ligné:** I hold an engineering degree in Electrical, Electronics and Communications Engineering from ENSEA, that is École Nationale Supérieure de l'Électronique et de Ses Applications, or National School of Electronics and its Applications— a graduate school near Paris.

I began my career in the Automotive industry at SAGEM (Société d'Applications Générales de l'Électricité et de la Mécanique, i.e., General Electricity and Mechanics Applications Company) in 1988, where I worked on instrument clusters and navigation systems. Then I joined Japanese consumer electronics company Kenwood in 1996 as an R&D manager in charge of car audio systems. In 1998 I became manager of electronics and advance engineering at Eaton Corporation, which became Delphi Mechatronics Systems in 2002. Until 2006 I was in charge of product engineering for Southern Europe. I also spent some time at Siemens VDO as a program manager on car audio and navigation systems.

I joined Valeo in November 2007 as branch R&D director for interior controls. Since 2011 I have been CTO of Valeo's Visibility Systems business group, and since this past July I directly lead the R&D activities of the Lighting Systems product group.



**DVN: What does your R&D organisation look like?**

**CLL :** Valeo Visibility Systems is one of the four business groups of Valeo and covers wiper systems and lighting systems. VVS generated €5.7bn worth of sales in 2018. From an R&D point of view, we are present in 18 countries through 20 R&D centres comprising more than 4,000 engineers in fields like mechanics, optics, simulations, hardware, software, cybersecurity, AI, and a growing list of others.

Amongst our many activities: our wiper product group is developing front and rear wiper systems including motors, as well as sensor cleaning systems which are crucial for AVs. We have a very large offer and some unique technologies. The lighting product group is obviously working on front and rear lighting, plus interior lighting and, more broadly, the interior experience as we combine our technologies with those from our colleagues from other business groups. Then there's our electronics product line, Vistronic, which is the fastest-growing team. All our products are embedding more and more complex electronics.

I am leading a very motivated and skilled team in a very exciting technical environment!

But now, let's focus on Lighting.

**DVN: The first semester was difficult for most of tier 1, with decreasing car volumes in major markets like China. How do you foresee the next 12 months for automotive suppliers?**

**CLL :** The environment is clearly not positive, which drives us to gain in efficiency in our developments. We consider it as an opportunity that will bear fruit in the near future, as soon as the automotive sector resumes growing. It also changes the approach of more and more clients who now consider using standard modules with reduced development costs instead of complex custom developments. In that perspective, Valeo—with our BiLED, for example—have pioneered this trend and continue to develop modules of which most of the design can be shared between different models and customers.

**DVN : ADB is a wonderful technology able to greatly improve the safety at night. What can lighting suppliers do to convince car buyers to get it?**

**CLL :** As said in some old advertising, "to try it is to love it". The point is that you hardly try a car in the countryside at night before you buy it. Therefore we must advertise the comfort of driving a car equipped with ADB. That's why I personally prefer to speak about Glare-free High Beam, which is really meaningful, rather than ADB. Nevertheless, as a lighting supplier Valeo have limited access to end-users. Therefore, I think the best place to advertise our lighting innovations remains car configurators for which Valeo are ready to support automakers for the content. That said, we need to do more. Many of my relatives don't know about glare-free high beam! We need to combine our efforts with carmakers to make it known.

**DVN : ADB is now expanding from premium cars to middle range cars. How can lighting suppliers persuade generalist car makers to accelerate this shift?**

**CLL :** Glare-free High Beam is already widely adopted by volume car makers for their next models. What needs to be accelerated is the willingness of consumers to pay for the equipment, the price of which is not negligible when compared to the price of the car. This brings us back to my answer: we must advertise the function at the time of the purchasing decision.

**DVN : We're in a new era of lighting communication functions and increased need for styling differentiation. Will you tell us about your work along those lines?**

**CLL :** Indeed, these two points will revolutionise the car communication, but at Valeo we do not stop here. Internally, we do not speak anymore about rear lighting; we now develop, more globally, communicating signalisation. We moved from known communication such as "I am here, I turn, I brake, I am going backwards" to complex messages to inform the car's intentions to its environment, without any ambiguity. This will require a common language for understandable messages while giving flexibility for the design. Therefore, we work on pictograms and displays to broadcast such pictograms; they could be for long distance observation with full car width displays as in our PixTail technology, or for short distance observation with high definition displays as in our Kinetic technology.

**DVN : Do you believe in cooperative work between automakers and suppliers to rapidly achieve a regulation about new functions (colour, position, shape/area, illuminance...)?**

**CLL :** I remember the title of your book: "Lighting, the Soul of Car Design". We could re-word by saying "Signalisation, the Soul of New Car Design". For sure we need to agree on rules, but we must adopt a new mindset in which we forbid what is detrimental instead of allowing only what has proven benefits. From a scientific perspective, car design is useless but this is what makes some cars best-selling models.

**DVN : Laser technology is used for long visibility distance, for ADB scanning, and for communication. Do you foresee a future for this last laser application in comparison with DMD, LCD, and LCoS?**

**CLL :** Laser technology is particularly well suited for long visibility distance. The question is more about the need for drivers to see 600 metres ahead. I am afraid this will keep the laser spot in its current niche position. For glare-free high beam, laser scanning is really exciting in terms of engineering concept but it comes after DMD and, above all, after highly pixelated LEDs which I see to be the winning technology for HD lighting. Valeo are putting a lot of effort into this technology, offering to the market a first generation of three modules with respectively about 4, 2.5, and 1 kilopixels. Our 4-kilopixel module is the only all-in-one solution on the market providing a full HD high beam. We also prepare for the future with >10-kilopixel chips which are under development by LED makers.

**DVN : OLED is not perceived as an established light source because of cost, durability, and reliability weaknesses. Do you see a future for it?**

**CLL :** No technology can compete with OLED concerning homogeneity and this has a real value in terms of perceived quality. But OLED remains expensive because it is a niche technology. I am convinced that the cost of OLEDs might drastically decrease if the volumes would raise. The question is clearly the reliability of the source. OLED makers are working hard on achieving a flawless process matching with our automotive standards. As soon as the reliability will not be questioned any more, I believe the virtuous cycle could run: bigger volumes, lower prices, bigger volumes. Now, there are emerging technologies such as microLEDs or quantum dots which could reshuffle the cards...!

## LIGHTING NEWS

### Correction: Escalade is CR Headlamp Performance Top Star



In a recent edition of DVN, I remarked that Consumer Reports considered the LED low beams on the 2014 Toyota Corolla the best they'd tested—which might have been true when that car launched, but GM's new-for-2015 Cadillac Escalade's full-LED headlamps won top marks in Consumer Reports' headlight tests, bumping the Corolla down to the № 2 slot. In fact, the

Escalade's were the first headlamps to get an Excellent grade from Consumer Reports, who shouted about it with a headline: **Cadillac Escalade LED Headlights Outshine All Others**. As of late 2017, the Escalade was still CR's headlighting champion (CR does not regularly publish ranked lists of headlight performance).



**Daniel Stern**  
*DVN Editor-in-Chief*

## Mini LEDs: Better Than OLEDs?

Mini LEDs has been put forth as the technology to confront OLED in display applications. Makers, notably from Taiwan, with expertise in LEDs and LCD see the opportunity and are accelerating their technology development, aiming to boost the LED industry.



Chip maker Epistar and vertically-integrated LED company Lextar, for example, have demonstrated a wide range of mini LED products including backlit displays for gaming notebooks, monitors, automotive panels, and large displays for outdoor signage. With high brightness, mini LEDs can deliver images and information even in bright sunlight, while also surpassing OLED with longer lifetime and greater reliability.

Seeing the opportunities brought by AVs, LED companies are pushing development for various automotive applications with mini LED technology. Everlight launched a tail light prototype this year, and are working toward actual applications in 2020. Display maker AUO also showed mini LED automotive displays at Touch Taiwan last week.

## SMARTRIX and Laser Light in the new Range Rover

Following on from the premiere of the innovative SMARTRIX modules in the Jaguar E-Pace, Jaguar Land Rover is now launching the next vehicles with smart headlight technology.



Compared with the Jaguar E-Pace, the Range Rover Sport come with additional modules which make the high beam even more defined and the low beam more dynamic. The matrix or pixel headlights provide optimum visibility and are capable of illuminating specific areas of the road with high beam without dazzling other road users.

In the the top version, the pixel laser LED option with 71 pixels and Laser High Beam Booster, with two first- generation OSRAM Continental  $\mu$ LARP modules, significantly increases the visual range for the driver. The SMARTRIX modules with their innovative silicone lens system open up entirely new possibilities for headlight designers and give the Range Rover and Range Rover Sport a modern look.

The distinctive pixel laser LED headlight is the premium option on the new Range Rover and Range Rover Sport. The 71-pixel system provides excellent illumination of the road ahead without dazzling oncoming drivers. At speeds above 50 mph, OSRAM Continental's laser technology automatically boosts the high beam, illuminating the road up to 600 meters ahead. The  $\mu$ LARP modules each deliver 200 lm and 450 cd/mm<sup>2</sup> and have a particularly high luminance. The attainable luminance of a laser light source is at least a factor of 3 higher than with LED light sources, which is especially advantageous for journeys on long country roads.

## Hella to Provide e.GO Mobile

Hella have integrated a selection of diverse lighting and electronics products in the new e.GO Life, including products which support braking function and which also play their part in creating an individual look and feel for the vehicle. The car has been on the road since the middle of the year and is Aachen-based e.GO Mobile's first electric car.



Together with e.GO Mobile, Hella developed a customised headlamp concept focused on utilising the headlamps to differentiate the vehicle and make it stand out from the crowd in sharp relief. BiLED headlighting is optional. Moreover, Hella will be supplying e.GO Life with fog lamps, reflex reflectors from the modular Shapeline series, the CHMSL, rear fog and reverse lamps, and a reading lamp for the interior of the vehicle. Hella electronics in and on the vehicle include the rain and light sensors and the horn.

Hella and e.GO will continue their collaboration. Series production of the electric e.GO Mover bus is planned to start in the middle of 2020. Two variants are on the agenda, one equipped with driver assistance systems and the other, aiming for the top level of expansion, has its sights set on a fully autonomous minibus.

*e.GO Mobile AG was founded in 2015 by Prof. Dr. Günther Schuh as a manufacturer of electric vehicles. On the RWTH Aachen campus, the 300 employees use the unique network of the campus with its research facilities and approx. 360 technology companies.*

## High-Current Power Inductors With Wide Temperature Range

TDK's SPM-VT family of wirewound power inductors were designed specifically for the high thermal and current demands of automotive LED headlamps. Mass production starts this month.



They boast a broad operating temperature range from -55 to 155 °C, and high rated currents from 4.7 to 36 amps. They're based on TDK's innovative metallic magnetic material technology that enables a high magnetic saturation density and robust structural design. These metal core power inductors offer superior DC superposition characteristics in a compact size with current ratings two to three times higher than comparable products based on ferrite core materials.

Modern adaptive LED headlamps typically use just one control circuit to drive all LED headlamp functions such as low and high beams, DRL, and curve lighting. The DC-DC converters in the power circuits of LED headlamps use power inductors, and the number of inductors needed grows with increasing headlamp functional versatility.

## Hella's New LED Auxiliary Lamps: Performance & Style



Hella are adding LED lamps to their established Luminator and Rallye 3003 series of auxiliary driving and spot lamps. Existing halogen lamps can also be easily converted to the new LED variants, because the lens-reflector units are modular.

The new LED Luminator and LED Rallye 3003 have a visually striking position light, the hexagonal contour of which, when the light is switched on, displays a characteristic lighting design during the day and at night. This is ensured by EdgeLight technology, which Hella have transferred from its automotive sector.

To ensure an optimum operating temperature of the LEDs, a horizontal cooling strip with an area of 230 cm<sup>2</sup> has been

seamlessly integrated into the design.

## DRIVER ASSISTANCE NEWS

### New AI-Camera Is Sharper Than Human Eyes: Bosch

Bosch say their new camera, which will appear on a vehicle this year, detects objects and their relevance better than the human eye. It's got artificial intelligence to enhance ADAS systems and help pave the way for self-driving cars.

Not only does the camera

with AI detect an object, such as a roadside cyclist or pedestrian, it also recognises the object's relevance to the equipped car and driver's strategy and quickly determines the appropriate action: brake, swerve, or continue on the intended path.

The new technology's great strength lies in its robust object recognition, enabled by Bosch's multi-path approach. This also makes use of artificial intelligence. For example, Bosch engineers have programmed the camera to reliably detect if the edge of the road is passable, even in the absence of road markings. This camera intelligence is based on Bosch know-how and integrated into a chip, known as V3H, made by the Japanese company Renesas. For instance, it could enhance automatic emergency braking systems to prevent vehicles hitting various types of animals. It could also make emergency braking more reliable, since the camera can recognise pedestrians even when they are partially concealed.

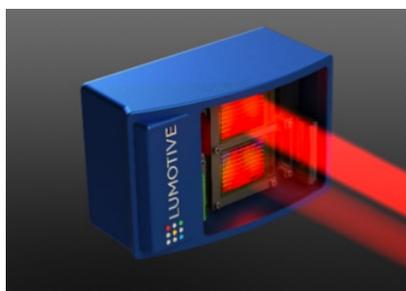


Bosch consider the system particularly helpful in avoiding crashes where the driver may have been looking in the correct direction but failed to see or recognise a potential hazard. The camera works in concert with other sensing technologies, but the AI helps determine, for example, if the edge of the road is passable despite the potential absence of lane markings. It also can improve legacy ADAS systems and extend their applicable range, as well as improve emergency braking manoeuvres by detecting semi-hidden objects. Road sign recognition also is improved with an optical character recognition feature to reliably read text and numbers and present them to the driver on a dashboard display.

### Lumotive and Himax in LCoS Lidar Pact

Lumotive, the Bill Gates-funded startup developing lidar systems for autonomous vehicles, and Himax Display, a subsidiary of Himax Technologies, will collaborate on beam steering technology in lidar systems that integrates Himax's LCoS (liquid crystal on silicon) technology with Lumotive's patented LCMs (Liquid Crystal Metasurfaces™). The two companies aim to improve the performance, reliability and cost of lidar systems for enabling ADAS and other automotive technologies.

Lumotive leverages Himax's LCoS process to convert semiconductor chips into dynamic displays that steer laser pulses based on the light-bending principles of metamaterials. Lumotive co-founder and CEO Dr. William Colleran says the companies' "combined approach is an innovative technological advance that lowers cost, improves performance and ultimately speeds time-to-market for reliable lidar systems that make self-driving cars viable and safe".



Lumotive's chips contain no moving parts and are fabricated using mature semiconductor manufacturing processes and Himax's tailor-made LCoS technology to enable commercially-viable lidar systems with low cost, high reliability, and small size. In addition to cost and performance advantages, Lumotive LCMs can be integrated into compact systems, which is always appealing for other applications in industrial and consumer sectors.

# GENERAL NEWS

## Nissan CEO Saikawa Resigns

Nissan CEO Hiroto Saikawa has resigned in the wake of a scandal over his compensation and over-payments. The Nissan Motor nominating committee met yesterday to discuss the matter after Saikawa privately indicated to some executives within the company his readiness to resign after admitting last week to having been "improperly" overpaid.



Hiroto Saikawa

An internal investigation found Saikawa and other executives had received improper compensation, raising doubts about Saikawa's pledge to improve corporate governance following the ouster of Ghosn. Pressure on Saikawa had been growing in recent months due to the company's poor performance and its increasingly strained ties with Renault.

Yasuhiro Yamauchi will become acting Nissan CEO on September 16. In a statement Nissan said its nomination committee will 'accelerate its efforts to select a successor for the CEO position, with the goal of concluding the search by the end of October'.

## Kia names Karim Habib to head vehicle design



Kia Motors named former Infiniti design chief Karim Habib as a senior VP, heading the Korean automaker's design center and presiding over the look of its vehicles.

Habib will join Kia at the start of October and will be based at Kia's global design headquarters in Namyang, Korea, and will report to Luc Donckerwolke, chief design officer for Hyundai Motor Group who also supervises Kia design.

Nissan Motor said last month that Habib who joined Infiniti in July 2017 from BMW, was leaving Infiniti, Taisuke Nakamura replacing him as Infiniti's global design chief.\*

## 2019 Eurostars are Named

19 Eurostars chosen by the editors of *Automotive News Europe*, will be honoured at an awards dinner on 9 September in Frankfurt. Here's the roster:



- Volkswagen Group CEO **Herbert Diess** changed the dialog on Europe's largest automaker by aggressively pushing into the electric era.
- Opel CEO **Michael Lohscheller** did what seemed impossible: making the German volume brand profitable after decades of losses.
- Kia Europe boss **Emilio Herrera** has the Korean automaker on pace to keep growing in a declining European market because of strong demand for models such as the Stonic and Sportage crossovers.
- Rolls-Royce CEO **Torsten Müller-Ötvös** led the launch of the ultraluxury brand's first SUV, the Cullinan, which has the company on track to set a new all-time sales high in 2019.

The other 15 Eurostars, who were chosen by the editors of *Automotive News Europe*, have achieved equally impressive results. They are:

CFO: **Nicolas Peter**, BMW Group Chief Financial Officer

Sales and Marketing: Wayne Anthony Griffiths, SEAT EVP Sales & Marketing  
Design: **Flavio Manzoni**, Ferrari Design Director  
Supplier CEO: **Volkmar Denner**, Robert Bosch CEO  
Supplier division head: **Helmut Matschi**, Continental Interiors Division President  
Product development executive: Henrik Green, Volvo Chief Technology Officer  
Project leader individual car: **Guillaume Clerc**, Peugeot 208 Marketing Executive  
Manufacturing executive: **Manfred Erlacher**, BMW Regensburg Plant Director  
EV project leader: **Thomas Ulbrich**, VW Brand Board Member for E-Mobility  
Design: **Michael Mauer**, Porsche Head of Style (Porsche 911)  
Connected car & AD executive: **Sajjad Khan**, Mercedes Board Member for CASE  
Electrification infrastructure: **Michael Hajesch**, Ionity CEO  
Mobility services: **Olivier Reppert**, ShareNow CEO  
Lifetime achievement: **Dieter Zetsche**, Former Daimler CEO  
Special recognition: **Satya Nadella**, Microsoft CEO

## Arnaud Deboeuf Hired by PSA



Arnaud Deboeuf has left his role as a senior executive of the Renault-Nissan Alliance and been appointed industrial strategy director at French rival PSA Group.

Deboeuf, 27 years at Renault, was a close ally of former alliance boss Carlos Ghosn, serving as alliance senior VP. *The Financial Times* reported that he was forced to leave by Renault CEO Thierry Bollere, because of his close relationships with Carlos Ghosn.

## Marelli in Strategic Partnership with Highly



Marelli have entered a strategic partnership with China-based Shanghai Highly. Under the terms of the deal, Marelli has agreed an equity transfer agreement with Johnson Controls-Hitachi Air Conditioning (JCH) to acquire equity interest in Shanghai Highly New Energy Technology Co., Ltd. (HNET), a joint venture between Highly and JCH. The transaction is projected to complete in Q3 2019.

This investment provides Marelli with greater access to the Chinese market and will facilitate even greater investment in electrification technologies, both of which form a key part of the company's future growth strategy. HNET are headquartered in Shanghai since first forming in 2016.

In addition to the investment in HNET, Marelli and Highly have agreed a memorandum of intent of coöperation to establish a joint venture to operate the business currently owned by Marelli for compressors and heating, ventilation & air conditioning. The memorandum is an intention agreement of the transaction, and the definitive final agreement is subject to further negotiation with the aim of signing in January 2020.

Marelli CEO Beda Bolzenius says the coöperation moves Marelli toward the goal of becoming a globally diversified tier one supplier: "The partnership will provide exciting new opportunities for employees and through achieving greater synergies, we can deliver even greater value to customers".

**Highly** work in R&D and manufacturing of core components for home appliances, new energy vehicles, and heating and cooling products. Highly's five core products are compressors, motors, automobile parts, drive controls, and heating and cooling. Their products have reached millions of families in 165 countries and regions around the world