

Tue, 3 January 2023  
Weekly Newsletter



NEWSLETTER #784

## PixCell LED

Ultimate precision in perfect alignment

100+ individual cells with just 25 µm spacing, perfectly matrixed onto a single LED chip for intelligent headlamps



# Editorial

## A New Year, A New Optimism

All of us on the DVN team wish you the happiest possible new year.

As you start to take a look at your 2023, save the date for the [DVN Paris Workshop](#) on 31 January-1 February at the famous Hyatt Regency Paris.

Sessions will include:

- Four top-notch keynotes from Valeo, Audi, TU Darmstadt, and Bentley
- 10 automaker lectures from Audi, Bentley, JLR, Mercedes-Benz, Porsche, Renault, Rivian, SEAT, Stellantis, and Volvo
- 10 lectures from tier-1s including DesignLED, Forvia Hella, Hasco Vision, Marelli AL, Mind, Mobis, Valeo, and ZKW
- a regulatory session followed by a panel discussion with GRE, GTB, CASIC, and SAE
- 15 lectures from tier-2s and research outfits a panel discussion with subject *Light is the new chrome—and what is the new front end?*
- It's a great docket, and we're looking forward to seeing you there.

This week, we bring you an interview of Mooryong Park, director of lighting solution development at LG Innotek. After presenting his company and the link with LG, he explains what the technologies developed by his company bring in terms of new lighting functions; illuminated grilles and logos; road projections, displays, and more.

Congratulations to everyone in this great DVN community—we made it through another difficult year! Let us hope and work together toward a 2023 which justifies our optimism.

Sincerely yours,

A handwritten signature in black ink that reads 'W. Frally'. Below the signature, the text 'DVN CEO' is printed in a small, sans-serif font.

# In Depth Lighting Technology



## DVN Interview: LG Innotek Lighting Dev. Chief Mooryong Park



LG Innotek, founded in 1970, is Korea's first comprehensive electronic component company. They have secured global leadership in areas including semiconductor substrates; autonomous driving sensing modules; automotive communication modules; motors; power; lighting; and display power/electronic components, as well as the № 1 position in the global camera module market. They achieved USD \$13bn in sales in 2021, a year-on-year growth of more than 60 per cent.

They're headquartered in Korea; have some 19,000 employees and have sales subsidiaries in Germany; the United States; China; Japan, and Taiwan and production subsidiaries in China; Vietnam; Indonesia; Mexico, and Poland.



Mooryong Park is the company's Director of Lighting Solution Development. After completing his master's degree in display chemical engineering in 2003, he joined LG and took charge of developing display materials and optical structures. In 2012 he began working on vehicle lamp module R&D, and his work has been commercialised for global customers. He graciously talked with us about his company, his work, and his perspectives:

### **DVN: What is the link of LG Innotek with LG?**

**Mooryong Park:** LG Group has 65 subsidiaries—including nine in electronics; nine in chemicals, and 47 in communication & services. LG Innotek is one of the electronics subsidiaries and is growing into a global material parts company.

### **DVN: Can you tell us about your products?**

**M.P.:** Among automotive components, Nexlide is a surface lighting module that is a differentiated product consisting of ultra-thin structure through precise optical design and highly-reliable material design.



### **DVN: What are LG Innotek's strengths?**

**M.P.:** It is based on various automotive components business and provides total engineering service. Based on our experience in display technology, we propose differentiated engineering solutions for customers' technical limitations with electronic circuit components, optical design and highly-reliable material design technology. In addition, based on analysis of lamp design trends, it is possible to respond to prior technology development and mass production within a short time of a year. With past experience in the display business, a delivery response system has been established, so we can respond quickly from development to mass production.

### **DVN: and the challenges?**

**M.P.:** Based on differentiated Nexlide technology, we are expanding from surface lighting module to pixels and displays, and growing into the global N° 1 lighting solution company that supplies multiple customers.

## **DVN: What do you see as the main challenges in the lighting industry?**

**M.P.:** With the trend of vehicle electrification, the energy efficiency of lamps is also becoming more and more important. Nexlide will bring differentiated surface and line lighting modules to market through the development of optical structures and materials that can increase light efficiency. We also want to add optical film technology for Dynamic images to increase design freedom. We will always prioritise what our customers want and pursue the task of collaborating and improving.

## **DVN: How do you balance CO<sub>2</sub> reduction (less power) and safety increase (more power)?**

**M.P.:** LG Innotek has declared 2030 RE100, 2040 carbon neutral. Vehicle lighting products also focus on maximising light efficiency by improving the module structure to minimize CO<sub>2</sub> emissions. In addition, we are improving performance with reliable products that can maintain brightness in accordance with unlit and legal regulations. Nexlide's quality can be testified to its excellent quality by the fact that there has not been a single claim from the customer since mass production started in 2013.

## **DVN: Are you working on new functions—road projections, illuminated grilleboards, lit logos...)?**

**M.P.:** New lamps (road projection, grille, logo) applied to vehicles require uniform light distribution in a small space. In order to meet the required performance, a lamp structure of 10mm or less is essential, and Nexlide's simple optical and mechanical structure can be designed, providing customers with design convenience.

## **DVN: And what about communication functions—V2drivers; V2pedestrians, etc?**

**M.P.:** We are leading the development of technologies and products that meet the evolution of vehicle communication technology to increase connectivity between vehicles, and V2X modules are expected to become our flagship products in the future. Also, we are examining concepts that can be applied to lamps for transmitting signals to drivers or pedestrians through automotive lamps (pixel composition, various colours, etc).

## **DVN : What do you think of the OLEDs Audi have presented recently?**

**M.P.:** I think OLED is a good enough solution for finished cars that value lamp design with the advantage of high-resolution displays. In order to be applied to automotive lamps that require various designs, the mass production of OLED is expected to continue to improve. However, since organic materials are less reliable than inorganic LEDs, it is expected that there will be limitations in their application to external lamps that require high reliability.

## **DVN: What can you tell us about the radar you developed for in-cabin safety?**

**Mooryong Park:** LG Innotek has an In-cabin radar solution for passenger safety. The RF antenna design can realise high resolution, so up to 1~5 people can be individually located with one radar, and the self-developed software can detect fine signals to quickly check whether an infant is on board.

**DVN: Your company sold their LED patents to Suzhou Lakin, a Chinese semiconductor and electronics company, and announced plans to exit the LED business. What about vehicle lighting?**

**M.P.:** It's true that we're going out of our LED package business. However, Nexlide's LED module for automotive lamps and LDM (LED Driver Module) business are continuously expanding. LEDs are supplied by specialised companies to design modules with differentiated structures and provide total engineering including LDM.

**DVN: Your Nexlide-E is a thin module that produces bright and uniform light. What else can you tell us about it?**

**M.P.:** Nexlide E can meet the luminosity requirements of stop and DRL functions by improving the luminosity by 40 per cent with a microoptical film (concentrating the direction of light to H-V) in Nexlide A, which integrates reflector, light guide, and hot spot control into a thin structure. Currently, it is being applied to many models of tail and stop and is in mass production, and DRL is scheduled for mass production in Q2-2023.

**DVN: Any closing comments on front and rear lights?**

**Mooryong Park:** Headlamp [work] will focus on developing new optical structures and high-efficiency materials for low power consumption, while [for] rear lamps [we] will continue to develop and mass-produce solutions with competitive cost. In addition, due to its ultra-thin structure, high efficiency and high degree of design freedom, it is expected that many solutions will be applied that can easily differentiate lamp designs.

# Lighting News

## Valeo Retiree Eric Blusseau Collects Plaudits

LIGHTING NEWS



After the announcement of his retirement, Eric Blusseau is receiving a lot of congratulations for his wonderful career:

**Hector Fratty**, his boss at Bobigny over decades, said: "I congratulate you, Eric for your wonderful job done in halogen projectors; in complex shape reflectors which was the greatest innovation of Valeo; in Xenon, and LED before leaving Bobigny to Angers. In Angers, you continued your endless great job in Valeo's regulation department".

**Geoff Draper**, GTB ex-president, said "I was working closely with Eric Blusseau at GTB since 2008. I congratulated him for his excellent contribution to the work of GTB as Chair of the GTB Front Lighting Working Group. At a human level, Eric fitted perfectly into the task of leading regulatory groups with his patient and friendly approach, ability to communicate at all levels, and his deep knowledge of the emerging technologies".

**Paul-Henri Matha**, who knows Eric very well from working at Renault then Volvo, said: "It was a real pleasure to work with Eric. We worked hard together in GTB for UNECE rule making. Eric was chairman of WG Front Lighting and I was in parallel chairman of WG Installation. Our groups were working well with a lot of interaction within the group members to be able to release regulation update like road projection last year".

**Christophe Le Ligné**, CTO Valeo Visibility Systems, his manager at Valeo said:

"Eric has deeply contributed to the success of Valeo Lighting. From Innovation to Regulation. His strong and always growing expertise was valuable at the GTB and GRE during active and decisive participation in the leading of regulatory sessions and working groups."

Eric is now leaving the place to Ana Isabel Munoz who has also a long lighting expertise and international experience at Valeo Lighting

I wish Eric a well-deserved, long and happy retirement.

The lighting community wishes you, Eric, a happy retirement inside your family and your friends and takes this opportunity to wish you a happy new year.

# Avatr Production Starts Up

## LIGHTING NEWS



The first production Avatr 11 (and limited-production 011) vehicles have left the factory and headed for their owners.

The Avatr 11 has a blank, body-coloured grilleboard. The daytime running lights and turn signals are separated, and the headlamp system is at the bottom. The F-shaped headlamp combination with slim lines result in contrasting visuals. At the rear, of course, is a slimline full-width red light band. Avatr is a global brand of high-end EVs, jointly created by Changan; Huawei, and CATL. Their stated mission is exploring future-orientated, humanised travel technology and creating a warm, intelligent travel experience.

With 600HP and a long range with battery pack till 117kwh, it is a new addition to the already long list of high-level electric cars.



# Preview: Mobis at CES

## LIGHTING NEWS



At CES this week in Las Vegas, Mobis will showcase their technologies for tomorrow's cars. These twenty new technologies represent six automotive categories—infotainment; ADAS; electrification; lighting; chassis, and modules—and reinforce Mobis' continuing commitment to their "Mobis Mobility Move" strategy.

In lighting, Mobis will unveil a new product called prism module. Thanks to new achievements in prism optics, this lighting product combines the low beam and the DRL into a single module just 12 mm thick, to give headlamp designers a much greater degree of freedom.

They also will present what they call lenticular grille lighting. Featuring Mobis' patented lenticular lens, this premium grille design creates a 3D look that appears to change depending on the viewing angle.

More information in the CES report to be published at the end of January and in the interview of Axel Maschka, MobisExecutive VP in charge of Global OE Business Division to be published on 10 January.

# Forvia Technologies to Shine at CES

## LIGHTING NEWS



Forvia, the 7<sup>th</sup>-largest global automotive supplier, will reveal several world premieres at CES this week, making a splash at the first CES with Forvia presenting the combined portfolio of their seminal companies Faurecia and Hella.

Forvia will showcase a series of groundbreaking technology and interactive experiences, demonstrating the group's leadership in sustainable materials, energy and weight saving, upgradability, recyclability, and circular economy design.

The technology to be revealed addresses megatrends in electrification, automated driving, and personalised cockpits. In exterior lighting, the company will present the world's first high-definition solid-state headlamp, called SSL | HD, which received a CES Innovation Award this year. It offers dynamic lighting with superior styling; up to 80-per-cent reduction of energy consumption compared to conventional lights, and digital, flexible integration options configurable for automaker-specific design needs.

Forvia CEO Patrick Koller says "CES is the ideal stage for us to present our transformed group poised for strong value creation and capitalisation of automotive growth trends in electrification, automated driving and cockpit personalization. The group is actively implementing new architectures and materials into the coming product generations, while helping our automakers partners achieve their net zero goals. Our innovation displays show the complementary technologies of Faurecia and Hella within our diversified, balanced portfolio, and emphasise our vision for sustainable future mobility that matter to people".

# Plastic Omnium's CES Showcase

LIGHTING NEWS



For their first time participating at CES in Las Vegas, Plastic Omnium will be displaying innovations to position themselves at the forefront of the mobility revolution. 2022 marked a turning point for the supplier, now organised into five divisions: exterior car body panels; fuel tanks; modules; hydrogen, and lighting. They have developed systems to project warning symbols on the ground outside the driver's and passengers' doors—a snowflake symbol, for example, in case of ice on the road.

Plastic Omnium also are taking major steps towards the software-defined vehicle, by transforming their product portfolio to significantly increase the role of software.

# Driver Assistance News

## Cepton will display a Ford F-150 with its Lidar at CES

### DRIVER ASSISTANCE NEWS



CEPTON WILL DISPLAY A FORD F-150 WITH LIDAR INSIDE HL

Lidar company Cepton is headed to CES in Las Vegas to demonstrate a company with technology and contracts that offer sustainable value.

Cepton's value proposition comes from the fact General Motors is a customer and will put lidar sensors in nine of the automaker's vehicles starting in 2023. The GM contract prompted the San Jose, Calif., company to open an office in suburban Detroit to serve as its automotive business hub.

Lidar, which stands for "light detection and ranging," is a sensor technology that creates a map of the environment around it. The technology is considered an important component for automated driving and fully autonomous vehicles.

"There was a great economic expansion in the past few years, so everybody was enthusiastic, and then whether it is inflation or the Ukraine war, all of these things happening have caused investors to change their mindset," Cepton CEO and co-founder Jun Pei told *Automotive News*. "And they really are looking at the value that you're creating in the business operation, and that's actually what's happening in the last six to nine months."

Cepton, founded in 2016, won a contract from GM in 2021 to supply the automaker with advanced driver-assist systems. The contract is expected to bring Cepton \$250 million in revenue. Japanese lighting supplier Koito, an early investor in Cepton, is licensing the company's technology for installation into GM's vehicles. Koito has the technical and manufacturing capability to install Cepton's lidar technology, which looks like a square with two lights that is embedded in the headlight.

At CES, Cepton will display a Ford F-150 outfitted with its lidar technology. It will be the first time a headlamp installed with Cepton's lidar technology by Koito will be publicly displayed. But the demonstration does not signal a Cepton deal with Ford, Pei said.

# Bosch Bringing Level 4 Autonomy-Ready Lidar at CES

DRIVER ASSISTANCE NEWS



Bosch will preview several cutting-edge safety innovations at the Consumer Electronics Show 2023 that aim to improve safety and autonomous vehicles.

Those betting big on the self-driving future will be interested to hear the company will showcase long-range lidar for Level 4 autonomous driving. The firm says lidar plays an essential role in developing safer self-driving cars and will demonstrate the long-range system's capabilities at CES 2023.

According to Bosch, it has been developed for high-volume production and can be used in a variety of driving situations.

# Benewake's New 512-Line Auto Lidar

DRIVER ASSISTANCE NEWS



Benewake have officially released the first 512-line automotive-grade lidar, the AD2. It's a 905-nanometre unit, scheduled to achieve mass production and delivery in 2023.

CEO Li Yuan says "Lidar can identify at 100m distance if it is a person or a car, but at 200m, the vehicle and the person's movements are no longer distinguishable". The 512-line vehicle-level lidar released by Benewake has a field of view of  $120^\circ \times 25.6^\circ$ , and a longitudinal resolution of  $0.05^\circ$ , which can detect targets of similar size at the height of flat tires from 120 metres away, or accurately restore the silhouette or even gait of a person at a distance of 200 metres.

In addition, the AD2 also realises high-definition detection in all angles and areas, and the high resolution in the entire viewing angle is coherent and smooth—without overlapping; interlacing; gaps, or other such crudities. To achieve such high resolution, Benewake leveraged many innovations in optical design; scanning accuracy; signal processing; automatic calibration and assembly, and more. Based on these innovations, the AD2 is just  $135 \times 195 \times 55$  mm.

By using semiconductor laser and sensor array transceiver technology, as well as proprietary innovative laser driver circuitry and receive signal processing circuitry, the AD2 greatly improves the dynamic range and reduces the noise in the signal.

# 28 February is Luminar Day

DRIVER ASSISTANCE NEWS



Luminar will host Luminar Day on 28 February at their headquarters. It's an event for investors, consumers, customers and suppliers, where Luminar will unveil their long-term product and technology roadmap for existing and new automaker customers. They also will detail their near-term and long-term financial plan among other news and updates, including full-year 2022 financials.

At Luminar Day, company executives and third-party industry leaders will be able to discuss Luminar's vision, execution and accelerating the industry's shift towards next-generation safety and autonomy with Luminar. The event will feature live product demonstrations, facility tours, and technology deep-dives.

*Luminar, a global automotive technology company, have built an advanced hardware and software platform to enable their more than 50 industry partners, including the majority of global automakers. They've positioned themselves to be the first automotive technology company to enable next-generation safety and autonomous capabilities for production vehicles.*

# General News

## Suppliers Bring New Visions for a New Era: CES

### GENERAL NEWS



CES provides a broad venue for suppliers to lay out their visions of what they'll look like moving forward. Here are a few of the displays the DVN team will be visiting later this week:

**Magna** will show off their latest innovations in driver assistance and electrification technology. Magna's CES booth will include the first public display of their "morphing surfaces" technology. The system, which will be displayed on the front of a vehicle, is said to be able to "change the exterior shape of a vehicle and adapt to improve efficiency and functionality".

**Hyundai Mobis** will have their largest-ever CES display, with concept vehicles that embody the supplier's vision for the future. The M.Vision TO vehicle shown here features an autonomous driving system comprising cameras; radar, and lidar, as well as seats that can be folded and rotated to take advantage of the absence of a driver. Hyundai's M.Vision HI is designed to signal how future cars can be used for "leisure, relaxation and outdoor activities," including by using the glass on the vehicle as a movie screen. The supplier will also show off 19 other technologies, including an LED grille lighting system.

**Forvia** will showcase 16 products related to electrification, automated driving and digital cockpit solutions, including their CES Innovation Award-winning SSL | HD headlamp system, which provides better illumination on the road while reducing the amount of space required for installation by up to 75 per cent. Hella management board member Yves Andres says his company "are driven by the ambition to keep pushing the boundaries of what is feasible in automotive lighting technology and thus ensure greater safety, efficiency and comfort in road traffic".

**Marelli** will use CES to showcase their Diorama Display technology, among other new products. According to Marelli, the head-up display "provides high-quality reflections on the bottom edge of the windshield" and "clear visibility and readability" for navigation indications or hazard warnings, with a much larger viewing angle than a typical head-up display, and can use the windshield to display information for passengers as well as the driver.