



Editorial

Shanghai Auto Show: First Feedback

During ten days in April, all eyes were on China. Last week we published our DVN Report on the Shanghai DVN Workshop, a fruitful event with 35 lectures presented to 240 attendees in Shanghai, plus remote participants tuned in from all over the world. If you were a registered attendee, either in person or online, you can still [access](#) the lectures and Q/A discussion VODs. It's a convenient way to review those sessions you saw, or catch up on those you missed.

Now we're preparing our report on the Shanghai Auto Show; watch for it to go live on 18 May. In this week's DVNewsletter we bring you a preview of that report, teasing the thinner and ever-thinner headlamps, delocalised front light sources, and linear lights with lit logos and grilles.

And we've got an interesting interview with MIND Electronics VP Hossein Nafari, who recapitulates his DVN Workshop presentation and shares his vision on lighting.

Mark your calendar! The U.S. DVN Workshop will be held on 21-22 September, during NAIAS, with the rubric **How to save lives in night-time traffic?**. We anticipate active participation and grand presentations of innovative solutions to improve night-traffic safety.

Sincerely yours


DVN CEO

In Depth Lighting Technology

Mind VP Nafari: 10-kpx μ LED Headlamps in '22



Hossein Nafari earned his degrees in mechanical engineering and electrical systems in France, three decades ago. After 10 years at Faurecia, he joined Valeo Lighting and Thermics, taking positions in Europe, South America, China, and Japan. Since 2018, he is Vice President of Lighting, Thermal and Electrical Systems at Mind Electronics. He presented a lecture at the recent DVN Shanghai Workshop, and kindly granted us an exclusive interview.

DVN: What do you retain of this huge experience and these 3 decades of engineering in automobile industry?

Hossein Nafari: First of all I would like to express my thankful thoughts to DVN for the fantastic information/communication platform you offer to us. Regarding some take away from my work experience I would like to start by sharing with you the importance of contact with the R&D and production teams. If a diploma is a proof of academic knowledge, the real expertise and competency are the outcomes from field hardship and efficient collaboration with the teams.

I was lucky to start my job as an R&D engineer which reinforced my product and process related to enthusiasm. And then further on I was naturally oriented to the functions of sales, quality, project management and production. If I surf back to all my working years what I can highlight is to have the privilege to have a nice working

environment, respectable company leadership and permanent learning opportunities both in technology and in management. Automotive industry is made of a very demanding culture and we must permanently engage ourselves in challenging targets. To work by passion and not by obligation is a key word that I would like to mention. Lighting system is by far one of the most passionate product lines in automotive and I feel very blessed to be a member of this family.

DVN: Tell us about MIND, do you mind?

H.N.: Mind Electrical Systems has three business units: optoelectronics, thermal systems, and harness systems. There are 10,000 employees, of whom more than 1,600 are engineers.

The lighting division has 4,500 employees including more than 700 engineers in the development activities, especially in innovation and advanced research. We have five lighting plants in China, with a total sales revenue of C¥2.7bn in 2020. Along with the business expansion of the company, new production bases in Chongqing and East China are in preparation. We have three R&D centres in Baoding, Xushui, and Shanghai, and development engineers also based in Europe.

With the mission of comfortable driving, connected world, and illuminated future, Mind Lighting devotes itself in developing trendy, intelligent, green, and safe products to be a company best in class of lighting system and automaker preferred partner. Our focus is on technology and innovation and we aim to be a reliable partner for our customers.

DVN: At the DVN Shanghai Workshop, you gave one of the best lectures. Can you confirm the SOP of 10-kilopixel μ LED headlamps in Q1-2022? That was surely one of the great stunners of the workshop.

Yes, we confirm it and we are preparing ourselves for this event. There are still several validations and supply chain related points to optimise. For us the main point to see the birth of this technology is very close future.



MIND'S 10-KPX MLED ADB MODULE

DVN: You said the 10-kilopixel lighting module suits the HD lighting trend. Is it Mind's trend you refer to, or a greater trend in China?

H.N.: We do not have yet any confirmed Chinese trend on pixel implementation, but we believe that in short and mid-term, 10-kilopixel will be the main trend driver both in cost and in market expectation, at least in the coming 4-5 years.

DVN: You forecast 100-kilopixel μ LEDS in 2025, by which time a range of resolutions will be fielded, perhaps up to 2-megapixel. Do you think the market will converge on a standard resolution?

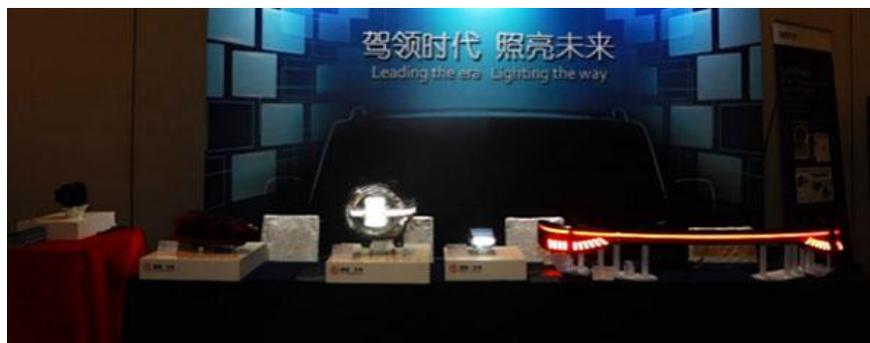
H.N.: We are still pending on the regulations status on pixel deployment in the automotive lighting systems. The market requirement (both the automaker and the user of the vehicle) is subject to grow and to become more mature in the coming years. Therefore we believe that there is no absolute answer to your question. Meanwhile we believe that we must propose to the market a high-end solution as well as a more affordable mass produced product.

DVN: You said lighting signatures will become more important and visible with the growth of electric cars. What's the status of Chinese regulation of lighting signatures, logos, grilles, and around the car?

H.N.: As of today, there are no updated rules on this matter and we endeavour to participate and to contribute to the setting up of proposals to the related administrations.

DVN: You proposed an interesting concept to use only one DLP module per car. Do you think this would be acceptable by Chinese regulations?

H.N.: It will be a very cost-efficient proposal as well as providing a satisfactory implementation of new technology for the end user. The Mind proposal is to use x1 μ LED module by car. It is something not crazy, some of the customers are including ideas like that in their Lastenhefts thinking about cost reduction and power consumption. The Chinese regulation is less conservative than others, so, always that we can guarantee the minimal regulation values for LB & HB with other optical components inside the HL. New functionalities for the safety improvement are welcome. As it can be our proposal, one single HD-module per car for projections and high resolution HB ADB in a reduced symmetrical FOV. The high technological evolution in China and Asia will be supported by the regulation always that we are talking about new functionalities to improve the safety of the road users.



DVN: At the Shanghai DVN Workshop, Mind exhibited ADB modules, thin headlamps, and large and thin rear lamps. What message did you wish to convey to the 240 attendees visiting your booth?

H.N.: MIND wanted to show to the DVN participants that we are ready to develop and produce all ranges of exterior lighting products. We presented 2 of our mainstream

products with SOP last year, Haval H6 RCL, with homogeneous side-to-side Tail. Wey Tank 300 HL was also presented, with good lighting performance using Narrow modules.

We are working on reducing dimensions of the light source both in front and rear lighting. The type, nature and dimensions of the lighting source is in big evolution. This volume optimization will give more style flexibility to the products.

In the other hand, MIND is ready to work in the high range lighting products level. The μ LED module 10K mock-up was introduced. An OLED-like RCL prototype was showing the MIND capabilities to understand the thin and floating new trends for RCL's keeping always in mind the cost.

As conclusion, due to the young team behind and the good network in China automotive industry, I can say, MIND is ready to compete in all the exterior lighting ranges in China and Europe.



DVN: With your three decades in the auto industry, what are your thoughts concerning lighting?

H.N.: This is the most fantastic product in the automotive industry. The new technologies and new concepts do not stop to appear constantly since many decades ago. Each time we have the marvelous innovations which appear and light the way to the future. It is both the technology mirror for the automakers in terms of marketing and is an important element in the driving comfort.

DVN: How might you encourage a young engineer to enter the automotive field, especially the lighting industry?

H.N.: Go for it. It is worth investing your enthusiasm on lighting. Permanent technology change, permanent innovative concepts with further mass production. You can experience how our ideas become reality and run on the roads.

Lighting News

Shanghai Autoshow: Three Takeaways. Report published 18 May

LIGHTING NEWS



On 18 May will come a full DVN Report on the Shanghai auto show, with ten takeaway points described and discussed. Here's a sneak preview of three of them:

1. Headlamps keep getting thinner and thinner!



2. Linear lights with lit logos and grilles are proliferating



3. Front light sources delocalised



Osram: Eviyos 25,600 pixels on a single chip

LIGHTING NEWS



Osram Opto Semiconductors says that its LEDs will provide a low-cost ability to create brighter pictures for some kinds of automotive displays. “It allows us to pixelate a lot of the same imagery as a display but with higher brightness,” explained Mike Godwin, Director of LED Automotive Marketing at Osram Opto Semiconductors. “It lends itself to symbology and messaging on the vehicle,” he said.

Messaging from the vehicle to pedestrians will be particularly important for eventual autonomous vehicles, as pedestrians will not have a driver to observe to gauge intentions, Godwin pointed out. A survey asking people about their concerns related to autonomous vehicles produced three responses in the top five that related to lighting issues, he said.

While smart lighting that conveys extra information through graphics sounds obviously beneficial, it only adds cost to an already-costly technology. Osram is aiming to contain that with its Eviyos LED products, which integrate the switching intelligence with the LED light source. “You are getting a monolithic light source, so you get some value in terms of [reduced] complexity,” said Godwin.

Osram’s earliest device incorporated 1,024 pixels for adaptive LED headlights. The second-generation version of Eviyos LEDs will put 25,600 pixels on a single chip to provide pinpoint lighting that eliminates blinding glare for oncoming drivers and pedestrians by blacking out those pixels aimed at them.

Jaguar debuted Osram's SmartMatrix pixelated LED headlights on its E-Pace SUV, according to Osram's Fritz Lorek. We sampled a version of it on Jaguar’s F-Type last year in the last media drive program before the pandemic and found the pixelated lights deliver impressively on their promise. We look forward to experiencing Eviyos 2.0.

The second-generation LED chip measures just 40 mm² with a pixel pitch of 40 μm and a 1:4 aspect ratio. It has high-resolution imaging capability, with a resolution of 0.1 to 0.05-degrees, depending on the optics. Version 2.0 also features increased contrast. The company is working to commercialize these chips now, with the Production Part Approval Process (PPAP) slated for 2023, according to Godwin.

Hella: Interior Lighting's Feel-Good Factor

LIGHTING NEWS



Hella have equipped the new Mercedes S-Class with complete ambient lighting that brings passengers a unique kind of comfort and wellbeing. "The vehicle interior is increasingly boosting its feel-good factor," says Dr Frank Huber, Hella's Lighting Managing Director. "The trend towards individualisation in combination with new technologies opens up a wide range of new possibilities."

Hella develop lighting scenarios tailored to individual preferences. One example of this is the way Hella's active ambient lighting offers 64 colours and ten colour worlds. A total of 41 light guides, such as the all-round ambient lighting of the wide-screen cockpit, provide highlights in the luxury vehicle and create decorative elements in the doors, the centre console, the seats, and the roof lining. Seven individual small LED lights illuminate the footwell, glove compartment and other storage areas throughout the vehicle. And also throughout all this, a Hella control unit ensures reliable control of the ambient lighting, and a flowing transition of colour. The overall impression, coördinated down to the last detail as a system solution, contributes significantly to the unique ambience of the interior.

But in addition to all this, Hella is also working intensively on new lighting concepts for vehicle interiors. With the advent of autonomous driving, the vehicle interior is being extensively reconceived. Developers are therefore focusing on high-performance LED RGB modules and intelligent lighting systems that enable a variety of new functions. For example, ambient lighting scenarios that can create either a feel-good atmosphere or a work atmosphere. At the same time, they can be used to communicate specifically with the driver. One such example would be the way in which illumination of a red light signal in the dashboard can visually warn of dangerous situations. This helps to avoid rear-end collisions and increases driving safety.

Valeo Up in Q1

LIGHTING NEWS



VALEO CEO JACQUES ASCHENBROICH

Valeo had an excellent first quarter this year compared to two years ago, up 14 percentage points over 1Q2019 adjusted for the geographic mix in all regions and activities. The Visibility Systems Business Group outperformed global automotive production by 7 percentage points, notably thanks to the robust performance of the lighting business in North America, sustained by the pickup truck activities of North American customers, and in Japan and Southeast Asia through subsidiary Ichikoh—as well as in China. Strong outperformance is expected in the second quarter of 2021 compared to 2019 and 2020.

Jacques Aschenbroich, Valeo's Chairman and CEO, says "In the first quarter, Valeo delivered a very strong outperformance in all regions worldwide and in all businesses compared to 2019 (the year before the Covid-19 crisis). This outperformance will continue in the second quarter. It clearly shows that, despite the semiconductor supply crisis, Valeo has confirmed its potential to deliver solid, market-beating growth. This performance is testament to the Group's unique positioning in electrification and ADAS, with high value-added technologies that bring it commercial success and strengthen its growth potential. In this context, we confirm our objectives for 2021".

Hella Modular LED Headlamps on Ford's Bronco

LIGHTING NEWS



Ford are reintroducing the iconic Bronco SUV nameplate for the first time since 1996. It comes as a 2-door SUV like before, as well as a first-ever four-door model and a Bronco Sport.

Hella crafted a high-performing full LED projector headlamp package. The Bronco Sport includes a sleek connection of the headlamp and grille by a signature DRL line, balancing the classic round-light look built in. Harpak Mozaffari Gilani, responsible for Hella's headlamp business in the Asia-Pacific region, says "We are very pleased to receive this award. Hella has been dedicated to innovative lighting solutions for more than 100 years. This award is further proof for our leading position in this field," says. "With our Light Design approach, we are able to meet the growing demand for complete lighting systems and add great value for our customers."

Driver Assistance News

3D Holographic HUD Could Improve Road Safety

DRIVER ASSISTANCE NEWS



Researchers have developed a lidar-based AR-HUD (augmented reality head-up display) for use in roadgoing vehicles. Tests on a prototype suggest that it could improve road safety by seeing 'through' objects to warn of potential hazards without distracting the driver.

The technology, developed by researchers from the Universities of Cambridge, Oxford and College London (UCL), uses lidar data to create ultra high-definition holographic representations of road objects which are beamed directly to the driver's eyes, instead of 2D windscreen projections used in most HUDs.

While the technology has not yet been tested in a car, early tests based on data collected from a busy street in central London, showed the holographic images appear in the driver's field of view according to their actual position, creating an augmented reality. This could be particularly useful where objects such as road signs are hidden by large trees or trucks, for example, allowing the driver to see 'through' visual obstructions. The results are [reported](#) in the journal Optics Express.

Lead author Jana Skirnewskaja, a PhD candidate from Cambridge's Department of Engineering, and her colleagues hope to refine their system by personalising the layout of the HUD and have created an algorithm capable of projecting several layers of different objects. These layered holograms can be freely arranged in the driver's vision

space. For example, in the first layer, a traffic sign at a further distance can be projected at a smaller size. In the second layer, a warning sign at a closer distance can be displayed at a larger size.

The researchers are now working to miniaturise the optical components used in their holographic setup so they can fit into a car. Once the setup is complete, vehicle tests on public roads in Cambridge will be carried out.

Faraday Future: Velodyne as Lidar Supplier

DRIVER ASSISTANCE NEWS



Faraday Future has selected Velodyne Lidar as an exclusive supplier for its flagship luxury electric car FF 91, which is due to be launched next year, the sensor maker said last week.

Velodyne, an early entrant into the lidar market, said Faraday's FF 91 cars would use the Velarray H800 lidar sensors to power their autonomous driving system. The deal comes days after the sensor maker signed a multi-year sales agreement with Silicon Valley self-driving startup Gatik, to use its lidar technology in on-road transportation networks.

Faraday Future, which agreed to be taken public by the blank-check firm Property Solutions Acquisition Corp in January, initially planned to launch its FF 91 car in 2019. However, it faced multiple production delays owing to financing issues.

The Los Angeles-based electric vehicle maker now plans to launch the FF 91 within 12 months of closing its merger with Property Solutions.

Luminar looks skyward for next lidar partnership

DRIVER ASSISTANCE NEWS



LUMINAR IRIS SENSOR

Luminar Technologies say they have entered a partnership with Airbus UpNext, the aviation company's branch that tests and evaluates new technologies. Together the companies will develop lidar sensors that can augment the sensing capabilities of both traditional and new aircraft, helping to detect obstacles that pose hazards in the takeoff and landing environments.

Bas du formulaire

Luminar, who went public in December, already have become a leading lidar technology company with automotive customers including Toyota, Daimler, Volvo Cars, and Mobileye. Expanding into aviation seemed like a natural next step, says Luminar CEO Austin Russell

His competitors have made similar conclusions. Ouster and Velodyne, for two examples, have made sensors for applications ranging from drones to delivery to warehouse robots.

The collaboration will occur within Airbus UpNext's Flightlab initiative, designed to test and mature new technologies for use across different aircraft types. Helicopters will be the first project between the two companies.

Velodyne in Sales Pact with Gatik

DRIVER ASSISTANCE NEWS



GATIK USES VELODYNE'S LIDAR SENSORS TO SUPPORT SHORT-HAUL LOGISTICS

Velodyne Lidar have announced a multi-year sales agreement with Gatik, who automate on-road transportation networks for B2B logistics. Gatik use Velodyne's lidar sensors as a key part of a fully redundant sensor suite to deliver goods safely and efficiently between micro-fulfillment centres, dark stores, and retail locations—a logistics flow known as the middle mile. Gatik fulfill revenue-generating autonomous orders daily for multiple Fortune 500 customers in the US and Canada, including Walmart, reducing customer costs and keeping delivery times short.

Gatik use Velodyne's Alpha Prime™ and Ultra Puck™ lidar sensors to support short-haul logistics with precise, reliable navigation for real-time autonomous operations. They use a fleet of class 3-6 trucks equipped with multi-temperature compartments, 7 days a week, 12 hours a day, on routes up to 500 km in multiple markets across North America. Gatik's services help retailers meet consumer demand for rapid delivery of goods driven by galloping e-commerce growth, increase road safety for all road users and help customers meet an unprecedented expectation for contactless delivery.

RoboSense LiDAR partners with Banma and AutoX

DRIVER ASSISTANCE NEWS



RoboSense, the smart lidar sensor provider announced a strategic partnership with Banma Network Technology, an intelligent automobile operating system and solution provider that cooperated with Alibaba and SAIC Motor, and AutoX, China's most advanced self-driving AI platform, to build a high-level autonomous driving platform for intelligent vehicles through in-depth cooperation in the 3D LiDAR sensor, AI algorithm, and intelligent automobile operating system, and create an advanced smart cockpit based on human-machine co-driving.

The cooperation will promote the integration of smart cockpits with autonomous driving systems through the fusion of hardware, software, and AI capabilities. RoboSense will provide the robust LiDAR sensor solution that not only meets the need for high-level autonomous driving systems, but also for Banma's advanced intelligent cockpit systems. RoboSense LiDAR provides accurate environmental perception data for the AutoX autonomous driving system "AI driver", and empowers the safety of Banma's intelligent automobile operating system.

In January 2021, RoboSense and Banma jointly established the Intelligent Perception Innovation Center. Three months later, the two parties formed a mass-production-ready solution based on the intelligent automobile operating system and automotive-grade solid-state RS-LiDAR-M1, which meets the requirements of both autonomous passenger cars and the RoboTaxi.

The Executive President and Co-Founder of RoboSense, Mark Qiu said, "With three parties' efforts on the integration of intelligent cockpit system, perception system, and AI autonomous driving solution, we are able to provide a new generation of intelligent vehicle solutions with more potential values to OEMs and other customers."

General News

Main Chinese OEM at Shanghai Autoshow

GENERAL NEWS



- **SAIC**, Shanghai Automotive Industry Corporation.

SAIC China's number one, sell cars under a variety of brands including Maxus, MG, Roewe, Yuejin, and cars sold under marques including Baojun, Buick, Chevrolet, Iveco, Škoda, Volkswagen, and Wuling.

- **Dongfeng**, Dongfeng Motor Corporation number 2 by production volume.

Owned brands are Dongfeng, Venucia, and Dongfen Fengshen. JVs include Cummins, Dana, Honda, Nissan, Infiniti, PSA Peugeot Citroën, Renault, Kia and Yulon..

- **FAW**

FAW Group Corporation number 3, sell under at least ten different brands including their own and Besturn/Bēnténg, Dario, Haima, Hongqi, Jiaxing, Jie Fang, Jilin, Oley, Jie Fang, Yuan Zheng, and Tianjin Xiali. FAW JV sell Audi, General Motors, Mazda, Toyota, and Volkswagen-branded vehicles.

- **Chang'an**.

Chang'an Automobile Group number 4 sell passenger cars under the Changan brand, and commercial vehicles under the Chana brand. Foreign JV companies include Suzuki, Ford, Mazda.

- **BAIC**, Beijing Automotive Industry Corporation Guangzhou Automotive

BAIC Group are a state-owned enterprise.. Principal subsidiaries include the passenger carmaker BAIC Motor; the military vehicle and SUV maker BAW, and the truck, bus and agricultural equipment maker Foton Motor.

- **GAC** (Guangzhou Automobile Group), state-owned automaker headquartered in Guangzhou. sell passenger cars under the Trumpchi brand, but in China they are more known for their JV with Fiat, Honda, Isuzu, Mitsubishi, and Toyota.

- **Geely**, the biggest privately-owned automobile manufacturer and 7th manufacturer overall in China.

Their main brand Geely Auto became the top Chinese car brand in 2017. Currently one

of the fastest-growing automotive groups in the world, Geely are known for their ownership of Volvo. In China, their passenger car brands include Geely, Volvo, and Lynk

- **Great Wall,**

The № 8 manufacturer and China's largest manufacturer of SUVs. Great Wall sell vehicles under the Haval and Wey brands.

- **Brilliance Auto** are another Chinese state-owned automaker, based in Shenyang. The China's number 9 has a foreign JV with BMW and also sells passenger vehicles under their own Brilliance brand.

- **Chery** number 10 is a Chinese state-owned automaker. It has a foreign JV with Jaguar Land Rover for the production of those brands in China, and they also sell under their own Chery and Qoros brands.

- **BYD** Auto were founded by BYD, known for their batteries and electric buses around the world. They were also the 7th best-selling Chinese car brand in 2017

Hella's Controlling Shareholders Consider Selling 60% Stake, report says

GENERAL NEWS



The family that controls German supplier Hella is considering selling its 60% stake in the company, Germany's *Manager Magazin* reported. The magazine cited one financial source as saying the process was at an early stage and may not result in a deal. The Hueck family may sell the shares worth about \$3.6 billion. The magazine said they have asked investment bank Rothschild to approach possible buyers for the stake, which has a market value of about €3 billion.

The family floated Hella on the stock exchange in 2014 but held on to the 60 percent stake via a pool agreement which is due to run until at least 2024.

The Hueck family is among the 50 richest in Germany with assets worth about €4b, according to data compiled by *Manager Magazin* earlier this year.

Hella has worldwide sales to automakers of €5.5 billion in its 2019 fiscal year.