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Editorial

Micro Optics: The Next Revolution In Vehicle Lighting

DVN was invited to SÜSS MicroOptics in scenic Neuchatel, Switzerland. CEO Reinhard Völkel with his team Christopher Bremer, Patrick Heissler, Wilfried Noell and Pascal Zwahlen gave DVN a very warm welcome; thank you!

Microoptics development and production is vastly different to classical car headlamp business. The production facility DVN had the opportunity to visit is wafer-based in class-1000 and -100 cleanrooms. The critical processes are metalising on glass; photolithography; plasma etching; lens imprinting; bonding; dicing; wafer-level testing, and other things exotic to the eyes of a car lighting guy. All the more surprising that nearly half of SÜSS' microoptics business is already automotive.

Micro lens arrays (MLA) are used in the car for a projection, sharp at any distance, of graphics, symbols, or light carpets beside the car, as a greeting and orientation function. First application was in a BMW 7 series.
Another even more interesting application is front lighting. MLAs are used, for example, in the headlamps of the Lucid Air and Genesis G90. MLA are one of a few solutions to create super slim headlamps down to 10 mm lens height. Advantages are the precise light, the tiny lit surface, and the small overall package. Disadvantages up to now were low efficiency and high price. Both are actively addressed by SÜSS MicroOptics' manufacturing roadmap.

We see a clear design trend in the direction of invisible or at least hidden headlamps. One solution is using a very "loud" DRL/position light and hiding the main functions below in a dark environment. Next radical design step is reducing the main functions to get rid of the hidden elements which are diminished, but of course still visible. Until now, tier-1 suppliers could reduce the size of their LED modules by better LEDs, more efficient thermal management, and smaller lenses to meet the designers' demands. But as the trend goes into the extreme, new concepts are unavoidable. MLAs are a solution for such extreme design. DVN thinks it is dangerous for any tier-1 to ignore this technology, even if the business cases of the car makers don't (yet) allow MLA.

Conclusion: No doubt, microoptics has the potential to become a revolution in vehicle lighting technology.

Wolfgang Huhn
DVN Senior Advisor

In Depth Lighting Technology

Micro Optics entering the car business

WILFRIED NOLL, PASCAL ZWAHLEN, CHRISTOFER BREMER

WILFRIED NOLL, W.HUHN, CHRISTOFER BREMER

As written in the editorial above, Micro Optics (MO) have the potential to change or even revolutionize the car lighting. The leading company in MO technology is clearly SUSS MO in Neuchatel, Switzerland. DVN wanted to know who are the people who create these things and how do they do that. What are their targets and visions? Their technical and commercial challenges? SUSS MO CEO Reinhard Völkel was answering very open a lot of DVN-questions to bring some light into this super interesting but widely unknown business.

The European ”PHABULOuS” Consortium is dealing with Free Form Micro Optics with 20 partners amongst others are SUSS, Zumtobel, Swarowski, Joanneum, Letti, Nonocom and Hella. One of 9 research fields is automotive lighting, please check the website https://phabulous.eu/

SUSS MO CEO REINHARD VÖLKEL

DVN: Please introduce yourself, your education and your professional experiences

RV: I graduated at the University of Erlangen-Nuremberg, Germany, with a PhD in Physics in 1994. The focus of my early career was on holographic optical elements, optical interconnections and optical GBit backplanes for Telecom. For the next 5 years I worked at the Institute of MicroTechnology (IMT) in Neuchâtel, Switzerland, on micro-optics for biosensors, optical interconnects, photolithography systems, miniaturized imaging and miniaturized vision systems.

In 1999 I co-founded a startup in Neuchâtel which was later renamed SUSS MicroOptics, with Martin Eisner and Franz Richter, the former CEO of SUSS MicroTec. The initial challenge was to upscale the microlens technology we had developed at the university, from 4-inch wafers to an 8-inch wafer

production line. The joint-venture with SUSS MicroTec was a perfect match for our startup. SUSS MicroTec was our partner, sponsor, venture capitalist, customer and equipment supplier and all we had to do was focus on the technology. After 2 years, SUSS MicroOptics had grown to seven people with a €1m turnover from a few pilot customers who had been interested in obtaining high quality micro-optics.

Today, SUSS MicroOptics has more than 180 employees who manufacture micro-optics in two cleanroom fabs for applications in telecom/datacom, medical, semiconductor equipment, photonics and automotive markets. The manufacturing of microlens arrays (MLA) for automotive lighting started in 2017 with light carpets (exterior lighting) and is growing fast with new applications for interior lighting and MLA based head lamps.

DVN: What is your vision for SUSS MicroOptics?

RV: Jose Pozo, the director of technology at EPIC, the European Photonics Industry Consortium, stated in May 2020 that there is a "micro-optics revolution in automotive lighting". He is right! When we started to manufacture MLAs for the first light carpets, I really had my doubts if this makes sense. Today, more than 5 million cars with light carpets are on the street and more and more OEMs want to have this feature. We also see that static and dynamic light carpets for safety applications gain much interest and might be a safety standard for all cars in some years. First microlens-based light projects for interior lighting are currently moving into serial production. The big advantage of this solution is the very small size of some 1 to 2 cm^3 only. Recently, also the first two cars with microlens head lamps were launched. Large head lamps are replaced with small, light and slim MLA based head lamps. The major advantage for the microlens solution is, that the illumination function is designed into the MLA and different illumination settings can be manufactured on one single array. The microlens head lamp offers full freedom of light shaping and size. Ultra-slim headlamps with unconstrained in formfactor will trigger a big change in car design.
We are currently the technology- and market leader for MLAs in automotive lighting and expect significant growth for the next years in this business segment.

DVN: What are the upcoming challenges?

RV: The upcoming challenges will be the scale-up of our production and cost-reduction of our solutions. We already have clear roadmaps for both challenges worked out and will execute them while further investing into innovative solutions for our customers.

DVN: How important is the automotive business now, in future?

RV: Automotive business is about half of our business today. In 2021, we were growing in all markets and regions. This will most likely continue like this. However, the big growth potential is clearly the MLA for headlamp business.

DVN: Who are your main partners, tier 1 and OEM?

RV: We are a tier 2 specialized in micro-optics solutions, e.g., MLAs for exterior and interior projections and microlens-based head lamps. As these MLAs are pretty much standardized, they can be used by any tier 1 for any OEM. Today we deliver in serial production to 3 major tier 1s, but are in discussion or prototyping with almost all tier 1.

DVN: Do you intend to become module or system supplier in the future?

RV: No! We focus on our core competences, which are the design, prototyping and serial production of micro-optics, i.e. MLAs and diffractive optical elements (DOEs). This is where we are strong and where we can deliver enabling and differentiating products to our customers.

DVN: How do you see the evolution of the supplier structure in the automotive lighting market?

RV: Today, automotive lighting is dominated by the big tier 1 suppliers. The OEM landscape is changing and the number of car manufacturers is very much increasing. EV technology allows a startup to enter into the car market and provide cars for niche markets. One major problem is to source appealing lighting solutions for these low-volume cars. The major tier 1s are not interested to supply or even develop lighting for niche markets. I clearly see a need for smaller tier 1s who are able to provide lighting for high-end or niche market cars.

1. Electric Vehicle is a big chance for our novel and innovative lighting solutions. The large volume of the battery pack in an EV significantly reduces the space in the car. The smaller and lighter MLA-

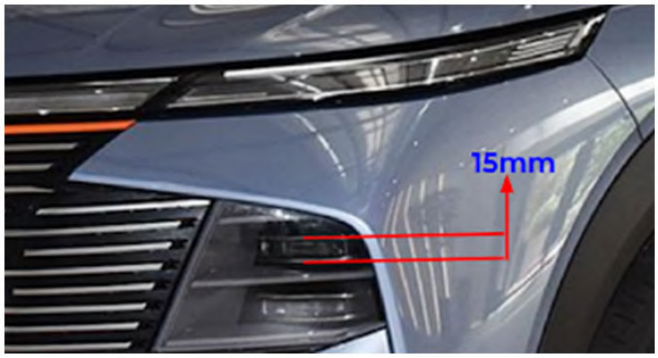
based headlamps will replace bulky and heavy standard head lamps in the future. Additionally, assisted driving asks for new means of road communication, like car to pedestrian or truck to cyclist. Lighting will play a major role in these new areas.

2. We supply micro-optics, i.e. MLAs and DOEs. We see a huge potential for these optics in interior and exterior, design and functional applications.
3. Microlens-based projection and illumination systems are used for exterior and interior lighting, for safety features, and for headlamps. We also see some interest for tail lamps as well as micro-optical solutions for sensing applications.
4. Micro-optics solutions for automotive lighting are strongly connected to the development of LED and micro-LED technology. A further reduction of the LED size will increase light collimation and thus further improve the efficiency of micro-optics lighting. The reduction in the weight and size of headlamps is already very significant for OEMs today. Due to the Etendue conservation extremely small and at the same time efficient systems can be realized with MLA systems.
5. We allow the car designers the full freedom for light carpets and headlamps. The big trend today is clearly the ultra-slim headlamps. Segmented MLAs and hybrid or freeform micro-optics are examples of new technologies we will provide to our customers in the future.
6. Lighting is visible innovation and an expression of brand but also customer identity. It will play a significant role for all OEMs for the next five years. We are convinced that this is only the beginning of the “micro-optics revolution in automotive lighting” and that we will see many more novel and beautiful lighting solutions soon.
7. New products enable semi-dynamic projections and customized light distributions. This gives our customers even more flexibility in the adoption of advanced lighting features.
8. Automotive reliability requirements like high working temperatures, temperature shock and high light intensities put a severe stress on our optics. Therefore, the selection of materials is very limited. Our teams are constantly sourcing for new materials, which can withstand these conditions.
9. All kind of LEDs and micro-LEDs will need lenses for collimation and light shaping. We expect a strong ramp-up for micro-LEDs within the next years. Here, a local collimation by MLAs will be a key to ultra-small projection units. Local collimation could be provided by mounting a MLA on the micro-LED array or even direct overmolding. Collimation could be done by refractive lenses or (parabolic) concentrators. Wafer-level optics (WLO) and wafer-level packaging (WLP) might be the new big thing for micro-LED arrays.
10. Our micro-optics works for a very broad wavelength spectrum. For interior lighting, the combination of MLA and RGB LED is ideal, as the MLA acts as a projector and perfect light mixer at the same time. In the exterior, red and amber security projections will become increasingly important in the future.
11. We see new light sources being developed every year. Market adoption in the automotive industry was rather slow in the past. With the advent of so many new players in the EV market, we expect this adoption rate to accelerate significantly in the next years.
12. We are a tier 2 and are only supplying micro-optical components. The modules are manufactured by the tier 1s, our customers. We have a close collaboration with the OEMs as well as the tier 1’s to fully understand their requirements, support them with customized micro-optics for their applications and thereby jointly develop solutions for the “micro-optics revolution in automotive lighting”.

Lighting News

Valeo Great Wall Headlamp is Just 15mm High

LIGHTING NEWS



The Shenshou—it's Chinese for ‘mythical beast’—is a new model from the Chinese Haval marque of Great Wall Motors. It's the series-production version of the XY concept that made its debut at the 2021 Shanghai motor show.

In front, the main appearance differentiation is the height of the headlamp lenses. Or, rather, the lack of height: only 15 mm. These headlamps were made possible by dint of Valeo's third-generation thin-lens technology. The previously-slimmest 30 mm headlamp height has been halved while ensuring high performance with efficient, cost-effective solutions.

This technology platform from Valeo is fully commercial, and is available for low beam, high beam, and matrix beam LED modules with facial dimensions of 15 ×100 mm.

HELLA: Panel Highly attractive day and night

LIGHTING NEWS

The HELLA panel enables an attractive appearance, whether by day or by night, with the possibility to make the design flexible to meet requirements, from different color variants or metallization. HELLA gives the panel an attractive appearance by using different manufacturing processes, as surface decoration via painting or foil inmoulding.
At night, decorated areas are becoming light outcoupling areas, so structures and animations are visible. By day, a metallic appearance comes into play and the light apertures are barely visible - light from nowhere.

Besides legal functions, a lot is possible in terms of design: "Welcome and Goodbye" functions, as well as large surface illumination, but also slim light lines and smaller geometries. In addition, the electronic concept allows the control of more than 200 individual LEDs, which enables personalization and future communication applications for autonomous vehicles.

Such panel concepts can be easily customized, for example for different model variants, by simply adapting the design or styling of the surface. This eliminates the need for costly tool adjustments, which means that the investment pays off more quickly for car manufacturers. One light source for different stylings!

In addition to the design aspect, the panel serves as protection for sensitive systems such as parking assistants or automatic distance control via radar and lidar. If desired, the panel can also be heated, which ensures reliable functionality even in bad weather. This aspect is becoming increasingly important, especially with regard to autonomous driving.

The plug-and-play approach allows car manufactures more easily assembly in the vehicle by integration of sensors like radar, lidar, camera. With the introduction of the multifunctional panel, the integration of sensors also allows fewer connection points, which reduces the tolerance chain of the product and gives us more reliable sensor performance.

Macroblock's New Smart Lighting Driver ICs

LIGHTING NEWS

Macroblock announced its new generation LED automotive lighting driver ICs, MBI6659Q and MBI6665Q. The two new products are suitable for the application of intelligent automotive lighting.

Macroblock LED automotive IC product line can be divided into two categories, the first is the automotive display, and the other is the automotive lighting.
Both MBI6659Q and MBI6665Q are categorized as automotive lighting.

- The applications of MBI6659Q include fog lights, tail lights, brake lights, ambient lights, position lamp and DRL. Its current rating is 2.5A. MBI6659Q is a high-current version, providing flexible design options to customers, and owns LDO (Low Dropout Regulator), which means that this driver IC can directly supply MCU voltage, so that the MCU does not need an additional power supply. This allows the layout of this automotive lighting power system is cleaner and neater.

- The applications of MBI6665Q include headlights, tail lights, brake lights and DRL. This driver IC supports multi-topology DC/DC power management to assist customers to design their products. Same as MBI6659Q, MBI6665Q owns LDO, which can supply MCU voltage and make the layout of the power system tidy. It also features EMI solution to eliminate EMI. MBI6665Q also has OTP (Over Temperature Protection) and OCP (Over Current Protection) to ensure adequate safety provision.

Motherson, Valeo Team Up for Car Interior of the Future

LIGHTING NEWS

Samvardhana Motherson Automotive Systems and Valeo have signed a Memorandum of Understanding to create the automotive vehicle interior of the future through the integration of lighting systems with advanced surface finishes.

Valeo's innovative lighting systems will be integrated with Motherson's new cabin interior modules and surfaces. Instrument panels, door panels, centre consoles, and other interior trims will be completely redesigned using these new technologies. By combining advanced interior surfaces and lighting solutions, the partnership will create new functionalities and give the materials new properties. The parties are joining forces to meet the future needs and demands of automakers who seek to deliver an enhanced illuminated and immersive interior experience.

Motherson Group chairman **Vivek Chaand Sehgal** says "Our entrepreneurial spirit pushes us to constantly innovate with our products. To do this, we recognise that we may need to seek new partnerships to add value for our customers. This exciting new collaboration, with our trusted partner Valeo, combines our modules and polymer products expertise with Valeo's extensive technology experience to offer our customers class-leading interior integrated lighting solutions that meet the high expectations and demands of the consumers".

Valeo Visibility Systems president **Maurizio Martinelli** says "Our partnership with Motherson is a concrete illustration of Valeo's DNA: developing innovations that make mobility smarter and safer, to provide both drivers and passengers a state-of-the-art traveling experience. As a global leader in visibility systems, Valeo's exterior and interior lighting know-how goes hand in hand with Motherson's expertise in interior automotive components".

Motherson Group are a diversified global manufacturing specialist and one of the world's largest and fastest-growing automotive suppliers. Motherson support their customers from more than 270 facilities across 41 countries, with a team of over 150,000 dedicated professionals. The group recorded revenues of $9.8bn for FY21. Samvardhana Motherson Automotive Systems, a Motherson company, have 72 manufacturing facilities spread across 25 countries.

Antolin + AMS Osram = Digital Projection for Car Interior

LIGHTING NEWS

Compact digital projection modules from AMS Osram and Grupo Antolin enable the flexible display of individual content on a wide variety of surfaces, which can be used for ambient lighting, enhanced entertainment, and passenger safety.

AMS Osram have partnered with Grupo Antolin, combining their expertise in lighting, electronics and integration, to further develop and integrate their digital projection solutions. The aim is to unlock new functionalities for digital projection systems and their application on various surfaces, such as the roof liner; dashboard; side panels, and panoramic roof.

Digital projection technology opens up a wide range of options for displaying customised content such as exterior environments; videos; visual patterns; logos, and other images like warning signals or supporting information for drivers. Another focus of the application is on greeting scenarios.

The digital projectors are based on the DMD (digital micromirror device) approach, and can be seamlessly integrated into the vehicle interior to display projections on different surfaces. The modules can be synchronised with the functional and ambient lighting and individually adapted to different driving scenarios and the mood of the passengers.

GM Must Recall SUVs to Fix Upward Stray Light: NHTSA

LIGHTING NEWS

The headlamps on 2010 through 2017-model GMC Terrain SUVs put out too much upward stray light on low beam, and NHTSA have denied GM's petition to consider the noncompliance inconsequential. That denial means GM will have to recall and repair the cars.

The headlamps are Stanley items, and the problem stems from light bouncing around in the space between the projector low beam's condenser lens and the headlamp housing's front cover lens. Some of this light hits a shiny spot on the bezel, and the reflection creates a streak of upward stray light with intensity of just under 500 candela, about 80 degrees outboard and 45 degrees above horizontal. The low beam intensity limit in FMVSS № 108 is 125 candela from 10 to 90 degrees above horizontal.

GM argued in 2019 that the stray light was inconsequential to safety because it was well outside the equipped driver's gaze field; its angle made it highly unlikely to affect other drivers; the lamps meet SAE J1383 and ECE R112 requirements for light in that angular region; only a single customer had mentioned noticing the stray light and GM wasn't aware of any resultant crashes or injuries, and revised replacement parts have a coarser texture to the part of the bezel reflecting the stray light. NHTSA swatted away these arguments, stating that the SAE and ECE standards are irrelevant to a question of compliance with FMVSS108; the over-limit stray light does have the potential to zap other drivers in bad weather; the lack of any crashes so far doesn't mean there won't be any in the future, and the availability of compliant replacement parts doesn't address the noncompliant parts on the road.

The agency noted that inconsequential noncompliance is most often a finding applied to fiducial aspects of compliance—labelling, marking, and other suchlike—rather than performance aspects, and last week denied GM's 2019 petition, so the automaker will have to recall about 725,000 Terrains in the United States and fix them so they comply, at no cost to owners.

Driver Assistance News

Valeo's L3 Tech Wins Honda Supplier Award

DRIVER ASSISTANCE NEWS

Honda have bestowed a Supplier Award in the Development category to Valeo, whose technology

equips the autonomous-drive system in the Honda Legend, the world's first L^3 automated driving system authorised for commercial use.

Valeo supply a high-performance on-board control unit as well as most of the sensors used to achieve L^3 functionality. Five Valeo Scala 3D lidars and two front cameras observe the car's surroundings. Sophisticated software running on Valeo's Data Fusion Controller recreates a detailed 360° representation of the vehicle's surroundings, using state-of-the-art algorithms for object detection, data fusion and safety-related functions such as self-diagnosis and failsafe operation.

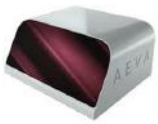
Honda are the first car manufacturer to receive type approval for an L^3 "Traffic Jam Pilot".

Lidar Firms Pour Cash Into Commercialisation Race

DRIVER ASSISTANCE NEWS

VELODYNE


LUMINAR


AEYE

AURORA


OUSTER

A variety of lidar companies have reported their financial results for 2021, and it's apparent they're spending heavily.
Luminar, Aeva, Aurora, and Ouster all posted sharp rises in sales but hefty operating losses, as they work to develop and commercialise ADAS and AV technology.

- Velodyne confirmed a 35% fall in annual sales to $62 million in 2021. For the closing quarter of 2021, Velodyne's revenues of $17.5 million were down only slightly on the equivalent period of 2020, but the San Jose firm also burned through $30 million in cash.
"Lidar is going to transform virtually every industry as we know it, creating a safer, more efficient, and sustainable world. Velodyne Lidar is well positioned to capitalize on this opportunity" said CEO Ted Tewksbury.

- Luminar Technologies CEO Austin Russell said "2022 will be our biggest year yet as we prepare for our breakthrough series production launch at year-end".
In terms of sales revenues, Luminar posted $12 million for the closing quarter of 2021, and $32 million for the full year respectively, both figures rising sharply on the 2020 totals, with Volvo and Daimler representing the firm's top two customers.

- Aeva, located close to Velodyne in Silicon Valley, said its 2021 revenues almost doubled on the 2020 figure, reaching $9 million. It gobbled up just over $80 million of its cash reserves. Aeva still has plenty of liquid assets on its balance sheet.
CEO and co-founder Soroush Salehian said: "Aeva delivered on all of our objectives in 2021 enabling us to accelerate our path to commercialization." The company, which is one of only a few lidar firms to have developed FMCW lidar technology, has just released its "Aeries II" product, claiming it to be "the world's first commercially available 4D lidar that offers automotive grade reliability".

- Aurora which is developing a full autonomous driving system based around its internal FMCW lidar - posting an annual operating loss of $731 million on "collaboration revenues" of $83 million. However, the company raised a colossal $1.8 billion on completing its SPAC listing in November, with its balance sheet showing $1.6 billion in cash and equivalent liquid assets as of December 31.

- Ouster which completed its SPAC almost exactly a year ago, and has since acquired Sense Photonics, reported $34 million in annual sales revenues for 2021, accompanied by a cash burn of $71 million.
The San Francisco company's CEO Angus Pacala described the past year as a "turning point", and predicted that sales will rise to between $65 million and $85 million in 2022.

Lidar Community is Gaining Traction

DRIVER ASSISTANCE NEWS

The first DVN Lidar Think Tank took place in Frankfurt in-person and online with 19 companies involved in lidar, 5 car makers and 14 lidar suppliers and integrators.

DVN CEO Hector Fratty opened the event: "I am happy to open the Think Tank dedicated to Lidar, because it is exactly what I did in lighting, 15 years ago, with around 15 companies, OEMs Audi, BMW, Ford, Opel; tier-1s Hella, AL, and Valeo; and few tier-2s and universities. At that time, I had just left Valeo Lighting as R&D director and my target was to create what it missed at that time: a lighting community. We are now keeping the same way with the Lidar Think Tank!"

The target of the Think Tank was to know how a lidar community could improve the lidar ecosystem. The groups answered to 3 questions:

• **What are the benefits and the needs of a cooperative lidar community?**
It should bring education, promotion, regulation, partnerships, align the chain of specifications.

• **How the community could support standardization, use case definition?**
Volume of production, shuttles deployment, where to invest, NCAP grades, pedestrian detection. Tesla accidents could inspire as a promotion of lidars.

• **How to promote safety and convenience benefits of lidar enabled functions**
Creation of a leading communication platform between the industry value chain, test houses, research institutes and regulators. Former GTB president Geoffrey Draper shared his experience of standardization and regulation concerning lighting. Very useful to follow the way.

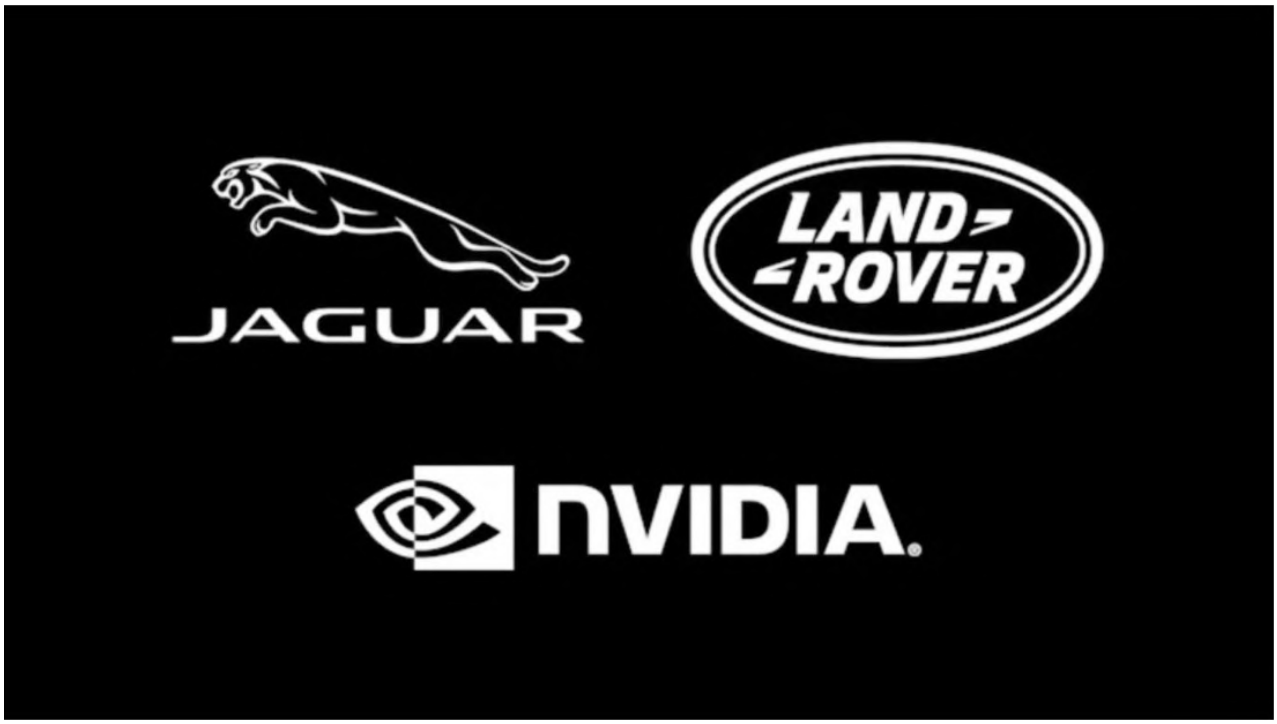
Global suggestions from participants about the tasks of a lighting community:
• to take into account needs from end-consumers and promote lidar towards end-consumers through associated members like Automobile Clubs (ADAC, AAA…).
• to be a platform to create or enhance synergies among lidar actors
• to be a platform for sharable information

After the success of this first event, plans are in the works for another this May.

JLR Chooses NVIDIA DRIVE Platform for all cars from 2025

credits to VSI

DRIVER ASSISTANCE NEWS



Jaguar Land Rover (JLR) announced that beginning 2025 its vehicles will use the full-stack NVIDIA DRIVE Hyperion 8 compute platform, with DRIVE Orin SoCs, and DRIVE AV software for a wide spectrum of active safety, automated driving and parking systems, as well as driver assistance systems. JLR vehicles will be developed with NVIDIA AI from end to end, including data center hardware, software and workflows needed to develop and validate autonomous driving technology, from raw data collection through validation.

General News

Honda, Sony to Field EVs by '25

GENERAL NEWS

SONY VISION-S 02 UNVEILED AT CES

Honda will team with Japanese electronics giant Sony on a new joint venture to develop and sell electric vehicles. Honda and Sony said they will form a new company this year for “high value-added” battery electrics and commercialize them in conjunction with mobility services. The partners want the new company to start sales in 2025.

Honda will contribute expertise in body manufacturing and after-sales service, while Sony will provide expertise in imaging, sensing, telecommunications, networking, and entertainment technologies.
The company will plan, design, develop and sell EVs but not operate an assembly plant. Honda will be responsible for manufacturing the first EV model. The vehicle will use a mobility service platform developed by Sony.

Sony’s automotive entry is expected to leverage their expertise in digital and software technology, while likely leaving the manufacturing of the car itself to an outside partner. It is a model often raised the best way for other technology companies, such as Apple, to crack the auto sector.

Stellantis Strategic Plan Targets High Margins

GENERAL NEWS

JEEP SUV

Stellantis want to maintain double-digit returns through 2030 as they speed up the electrification of their giant model lineup across brands including Jeep, Ram, Chrysler, Dodge, Peugeot, and Fiat. The automaker also means to double their net revenue to €300bn a year by the end of the decade by cutting costs and deriving extra revenue from new services.

Presenting their new strategic plan called Dare Forward 2030, Stellantis said they plan for 100 per cent of their sales in Europe and 50 per cent in the U.S. to be battery-electric vehicles by the end of the decade. The company plan to have 75 battery-electric vehicles on the market and sell 5 million electric models annually by 2030; they will launch Jeep's first full-electric SUV early next year.

Russian Invasion Halts Car Production by Nonexistent Wires

GENERAL NEWS

KABEL, LEONI AG

Automakers including Volkswagen, BMW, and Porsche are struggling to obtain crucial wire harnesses as suppliers in western Ukraine have been shuttered by the Russian invasion, forcing production stops at car factories in Germany. A wire harness of today bundles up to 5 km of wire in the average car.

Leoni have two Ukrainian plants, in Stryi and Kolomyja. UkraineInvest, the Ukrainian government's investment promotion office, says 22 automotive companies have invested more than $600m in 38 plants employing over 60,000 Ukrainians. Many, though not all, are producing wire harnesses. Those plants are close to car factories in Germany and the manufacturing hubs that international carmakers have built in central Europe. It could take months for suppliers to increase capacity at alternative locations in their networks—requiring factory space, machinery and tools, workers and financing. Delivery bottlenecks have already hit assembly plants of VW including their factory in Wolfsburg and their German EV plants; Porsche have suspended production at their Leipzig plant, and BMW have stopped production in Europe altogether.

Kia EV6, Proclaimed Car of the year 2022 in Geneva

GENERAL NEWS

The EV6 has obtained a first Car of the Year award for Kia. The innovative South Korean SUV has reached the glory in a ceremony in Geneva, with 279 points and 12 individual top votes after a close battle with the Renault Mégane E-Tech Electric, second with 265 points, and the Hyundai Ioniq 5, in the third position with 261 points.
Other finalists were **Cupra, Ford Mustang Mach-E, Peugeot 308, and Skoda Enyaq iV.**

The Kia brand reinvented itself at the beginning of last year with a new name, logo and distinctive design philosophy named ‘Opposites United’. The EV6 was the very first vehicle launched under this new direction, and also is the first dedicated battery electric Kia vehicle based on its all-new Electric-Global Modular Platform (E-GMP).