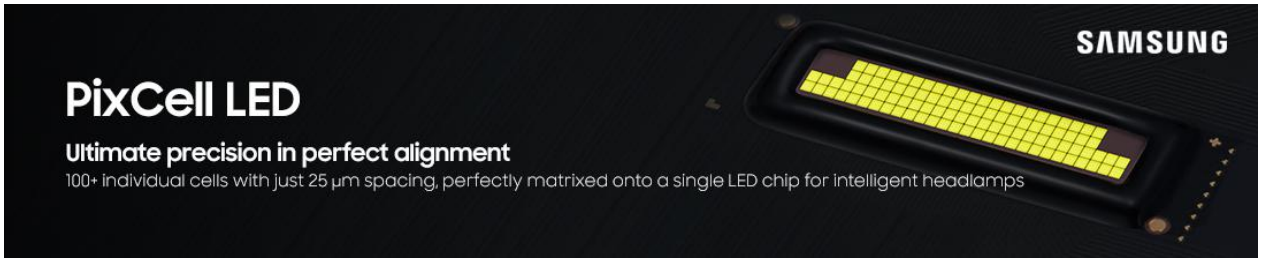
Tue, 5 July 2022
Weekly Newsletter

DVN
Lighting & ADAS

NEWSLETTER #758



Editorial

Rearview Look At DVN US Workshop; DVN Study Goes Live

I received a lot of positive feedbacks after the workshop in US. Attendees liked the quality of the lectures; the information concerning the regulations; the fruitful exhibitions, and the great networking. DVN members not present were impressed by the newsletter; the report of the workshop, and the possibility to get all the VOD concerning the lectures We are proud of it and we thank all the automakers and lighting suppliers who gave their feedbacks.
This week's DVNewsletter brings you ten key takeaways we retain from the event.

You will also find an interview with Docter Optics CEO Martin Enenkel, a great expert in optical componentry. He presents his strategy, continuing R&D on glass and at the same time investing in polymer to be able to propose each time the best quality/cost technology

And today we're proud to release the 2022 DVN Study. The lighting community will be able to get the electronic booklet and one week later, three samples for each order. The study, DVN Market Forecast on New Lighting System Technologies, presents the market perspective on new lighting elements like illuminated grilles and logos; signal projections; road projections; ADB; laser and OLED light sources; communication displays, and more. For each new function, it presents data on market forecasts.

We sincerely thank the automakers; suppliers, and research institutes who granted us interviews; without them, the study would not have been possible to construct.
See below, last information on Regulations developed in detail in the Study.

Sincerely yours

See the Wolfgang and Gerd's video about this study
For more info or to order the Study, please contact: carine@drivingvisionnews.com

In Depth Lighting Technology

DVN Interview: Docter CEO Martin Enenkel on Precision Optics for µLED

DOCTER® OPTICS
PRECISION IN VOLUME

After his apprenticeship as an electrician and the completion of his engineering studies in optoelectronics at Aalen University of Applied Sciences in 1996, Martin Enenkel consistently engaged himself in well-known German industrial companies in optoelectronics, sensor technology and lighting technology. This included almost 20 years' work for Phillips Technology, where he held strategic and management positions in R&D; product and innovation management; and marketing and sales, as well as a three-year stint as NAFTA product marketing manager in Detroit. Most recently, Enenkel contributed his in-depth expertise and acquired skills as Jenoptik Optical Systems' VP and head of the industrial solutions strategic business unit, where his responsibilities included industrial automation; safety and security, and automotive. He thus brings with him industry and management experience that is a perfect fit for Docter Optics.

DVN: Martin, you started about a year ago as CEO of Docter Optics. In our previous interview you said you are focused on new technologies as well as customised products. Can you give us an update?

Martin Enenkel: Besides the challenging global situation, a successful year with new products, new applications as well as new market entries lies behind us. This needs a highly motivated team of specialists that is eager for new challenges and driven by an open culture. The investment is now paying off and is beginning to bear fruits. One example for our latest success in the vehicle lighting market is the introduction of our new in-house technology process, DOCµTec®, where we already got the first programs awarded. This new technology

enables us to support highly accurate glass optics in volume for µLED applications in current markets, and also in new fast-growing lidar applications and markets like industrial sensors.

DVN: For vehicle lighting, we still recognise different trends—a shift from glass to polymer; more precision of optical systems as well as the drive toward slim lens designs for all kinds of components. How do these affect your business?

M.E.: We see a clear trend for high-end performance applications, which requires more and more compact and complex systems with higher efficiency. Therefore, the importance increases for high transmission, temperature resistance, and AR-coatings. Current and future customers require minimum colour shift and additional high temperature resistance for the primary optics to be close to the high-power LEDs for efficiency improvement. These new requirements lead to a revival of optics made from glass. This is a development contrary to the current trends, towards more and more attractively priced materials and systems.

NEW APPLICATIONS MEANS NEW REQUIREMENTS ON OPTICS: THINNER, LIGHTER, MORE EFFICIENT, MORE COMPACT AND HIGH TEMPERATURE RESISTANCE

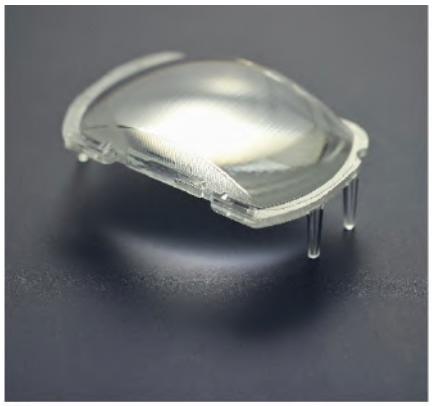
From this point of view there seems to be a turnaround in the trend of using polymer materials with limited performance. Glass, with all its advantages, seems to be highly interesting again. Latest R&D projects and requirements in design, photometric performance in efficiency and imaging performance can be realised with precision glass optics in high volume. Furthermore, glass is a sustainable material which can be recycled, and so it increases the green footprint of every product.

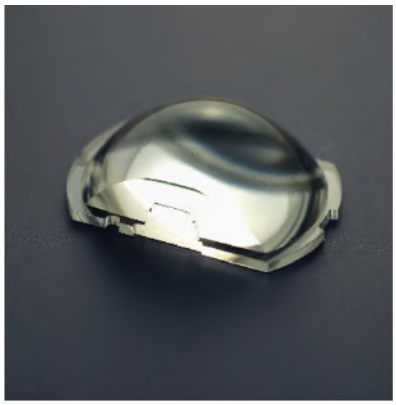
Therefore, Docter Optics worked hard on new technologies and processes to offer optics that meet exactly the future requirements. As an example, we are skilled to manufacture TIR (total internal reflection) optics in high volume. These optics meets the needs of multibeam applications not only, also follows economic and latest design aspects.

A SLIM MULTIBEAM PRIMARY OPTIC MADE FROM GLASS FOR HIGH PERFORMANCE LED APPLICATIONS

DVN: What are the latest developments in polymer optics?

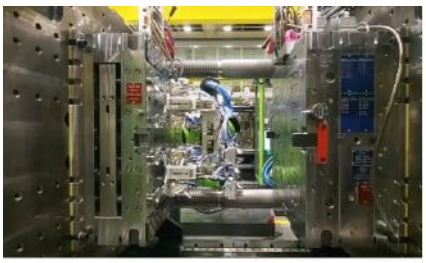
M.E.: We started large-scale production of polymer lenses just four years ago in our Czech location. With a fully-automated multilayer process, we address high-volume customer requirements on target costs. With a completely individual three-step industrial production process, we can meet latest trends, e.g., precision optics and slim lens designs with noticeable parallels to glass.





LATEST POLYMER COMPONENTS FOR AUTOMOTIVE APPLICATIONS—3 STEP APPROACH

FULLY AUTOMATED MULTILAYER PROCESS FOR POLYMER OPTICS AT DOCTER'S CZECH LOCATION



PRODUCTION MACHINERY

DVN: How are you responding to the increasing push for car-to-pedestrian communication within the field of autonomous driving? How about the other trends in lighting, like illuminated grilles, logos, and displays?

M.E.: Certainly, all vehicles will continue to require optical technologies in the future, not just static systems for street lighting, but also dynamic solutions for communication.

Pedestrian communication and digital displays around a vehicle are no longer a futuristic topic. In the wide field of autonomous driving, there are several channels for communication, information and safety. Examples are connected cars; messaging and communication to pedestrians; logo projections; door illumination, and extended stop lights or turn indicators. This kind of communication displays form an important basis for ground and environment projection (near-field projection) applicable in night light and twilight conditions. Within the public research project MAMEK (Maschine – Mensch – Kommunikation; that translates as Machine – Human – Communication), we developed a near-field day light projection system with a wide-angle image from a short throw projector mounted at the sill.

SHORT THROW NEAR-FIELD PROJECTION SYSTEM

DVN: How have you adjusted operations and strategic direction to deal with the global economic crises and the price increases in the cost-sensitive market that prevails in the automotive sector?

M.E.: Let's take energy as an example: The prices have literally exploded in the last quarters, increasing by a factor of up to 10. The manufacturing of glass is energy-intensive and uses a lot of electricity and natural gas. Glass melting tanks have to be kept at a temperature of around 1,500°C permanently, 24/7. You can't just switch it off. We react to this crisis in several ways to be prepared for the worst case. Additionally, we are in discussion with our customer base how to get through this crisis together as partners.

DVN: What opportunities do you see for your company in emerging business and technology fields like lidar, holography, and other parts of the photonic industry?

M.E.: Applications from the photonic industry are—and will remain—the possibility of another strong footprint for Docter Optics. Lidar is one of them, and the fastest growing markets in automotive and industrial applications at the moment. To meet the price expectations of modern lidar systems in serial production, you must reduce the number of components within the system. This is why economical dynamic solutions need high-precision lenses with factor 10 higher surface precision compared to components for static headlights. Furthermore, these components must withstand being completely exposed to the weather and the environment. Precision optics made from glass meet these needs with all its USPs. The latest Docter Optics free-form technology DocµTec® enables industrial volume production of this kind of precision lenses without any further rework (e.g., grinding or polishing).

Based on new program awards, we ramp up our production with complete and complex optical systems under controlled cleanliness conditions in a fully-automated mass production. This enables us to open up new markets like consumer electronics.

Lighting News

Ten Takeaways From the DVN US Workshop

LIGHTING NEWS

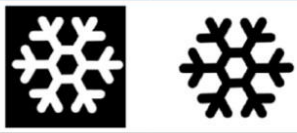
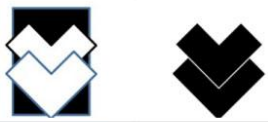
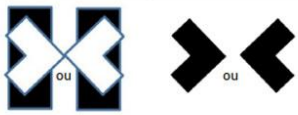
The 24th DVN Workshop, held near Detroit, was a grand success with its interesting lectures, pertinent keynotes, productive panel discussion, and fruitful networking opportunities. Here's our ten-point distillation of the event, looking back now from two weeks on:

- Confirmation of the trends in product with ongoing **height reductions** of front and rear lamps, as well as **full-width front and rear lamps**.
- Confirmation of the trends in functions to communicate with **road projections**; **illuminated grilles**, and **logos and displays.**
- **Multi-row arrays** with up to 100 LEDs on the market, in addition to the 84-LED multi-row arrays.
- **ADB** more and more widely used without any trouble, **only benefits**.
- **MLA** more and more developed, for many applications including to decrease headlamp height
- **Communication** by V2V, V2D, V2P…V2x everywhere, mainly for AVs.
- **Great progress on regulation overall**—approval of road markings, for example—except for the poorly conceived ADB rule in the USA. Regulatory developments about Lighting for AVs with many new stakeholders like the international federation of pedestrians; the European Transport Safety Council, and others.
- Great progress on adoption and deployment of a **rating method (HSPR) for headlamps including ADB**.
- **Much innovation from tier-2s**, including automatic aiming systems; glass module integrating functional optics to improve efficiency; flexible ICs for digitalised lighting products; new materials to integrate functions including the role of heatsink, and simulation-based validation.
- **Chinese lighting suppliers** are getting closer to their Western competitors.

Last Important Information on Regulations

LIGHTING NEWS

Symbols for use as Driver Assistance Projections

Symbols and Pattern	Meaning	Conditions and remarks
	Slippery road	
	Risk of collision	Triggered when the relative speed is larger than 30 km/h and Risk of Collision Time is less than 1.4 s. Flashing at 3–5 hz allowed
	Wrong way	Activated when the vehicle is entering a one-way road or a highway in opposite direction. Flashing at 3–5 hz allowed
	Lane keeping assist	Activated if the vehicle unintentionally exits its lane

Front road projections

The amendments to the UN Regulations were adopted by WP29 in June 2022 and will enter into force in early 2023. These amendments only allow a restricted list of symbols to be projected (see above). Further projections, such as speed limit or speed warning, road construction or traffic jam ahead, may be considered by GTB and GRE in the future and the Chinese GB standards may also be updated

Illuminated logo

Logos are only allowed to be installed inside the position light under conditions.
The UN Regulations, from early 2023, will allow a vehicle manufacturers logo to be installed on the front and rear of the vehicle, only when approved as part of the front or rear position lamp.
Stop lamps, direction indicator lamps, and reversing lamps shall not incorporate a logo. The light emitting surface of the logo shall not exceed 100 cm^2

Illuminated grilles

Currently permitted in the UN Regulations, only when approved as part of the front position light.

Work to define the requirements for front and rear displays

Work is not yet started in GTB or GRE. Displays are already being installed in China with special approvals, but regulatory requirements have not been established. This situation provides Chinese manufacturers with a sort of incubator for innovations.

More information in the DVN Study launched today

ZKW Headlamps on Electric Volvo C40

LIGHTING NEWS

The new Volvo C40 relies on LED lighting technology from Wieselburg-based ZKW. Each headlamp on the all-electric C40 has a pixel module with 84 individually-controllable LEDs to illuminate the road particularly efficiently, adapting dynamically to traffic without dazzling other road users. A front camera and radar continually scan the road, allowing up to five vehicles to be shadowed simultaneously. The design of the high-quality pixel LED light is unique: the hammer-shaped light arc sets visual accents that are distinctive for Volvo. ZKW CEO Dr. Wilhelm Steger says "For Volvo, we develop distinctive headlight designs that impress with their innovative technology and memorable appearance and increase road safety".

An adaptive lighting system with camera and radar sensor ensures a high level of road safety by optimally illuminating the road without dazzling oncoming traffic. This is achieved by individually-controllable LEDs combined in the pixel module. A front camera and the radar eye detect oncoming vehicles or vehicles in front and activate or deactivate the LED light in the headlamp's pixel module via the control unit. Despite the compact dimensions of the front headlamp, the system achieves a high light output. The unique LED light was developed in Wieselburg, where the lamp is also manufactured. The pixel module electronics come from the ZKW electronics plant in Wiener Neustadt.

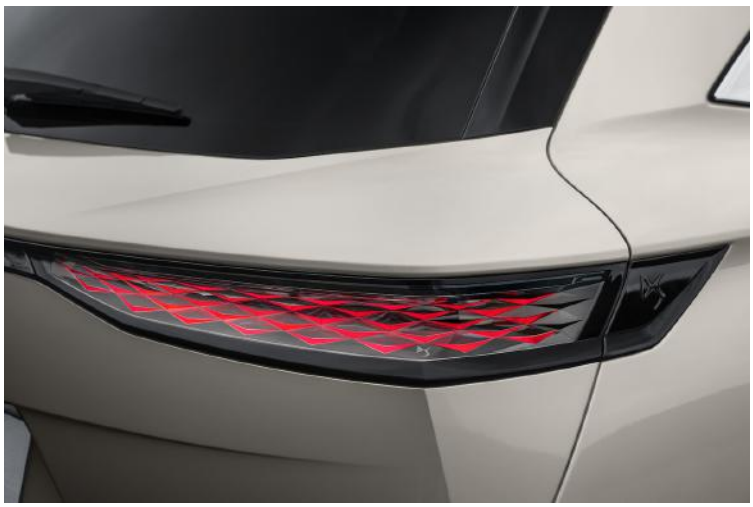
The powerful light output of the premium headlamp is achieved by the LED pixel module in combination with the innovative ForTIR elements. The "light finger" ForTIR elements use the apron to project part of the low beam onto the road. These projection modules are just 13 millimetres high and also serve as design elements in the main headlamps. The headlamp has the Volvo brand signature "Thor's Hammer" shape, in which special attention was paid to homogeneity, to provide the DRL; position light, and turn signal in a particularly compact form. This design element is formed via the light guides with thick-wall optics, and unmistakably presents the C40 as a Volvo. The Volvo XC40 model also has premium ZKW LED headlamps, using the same headlight module as a basis.

DS 7's Signature Light style

LIGHTING NEWS

The new DS 7's light signature evolves with an even more expressive look. The combination of new refined headlamps and DRL is fluid and produced in an haute-couture spirit.

The DRLs are inspired by the work carried out on the DS X E-Tense and DS Aero Sport Lounge; their light seems to pass *through* the body panels. This DS Light Veil comprises a DRL and four vertical accent lines of light made up of 33 LEDs. The magic is done in the manufacturing process: the laser-engraved polycarbonate surface is painted on the internal surface alone so as to give it an appearance that alternates between light and body-coloured painted areas. It creates an effect of depth and shine like a piece of jewelry. The whole array turns on and off in a lock and unlock game.



Thinner LED taillights with vortex-effect scale treatment are also redesigned, with dark metallisation. There's a subtle DS logotype in the wraparound portion of the taillight bezel (where the rear side marker might be located if this car were equipped…or if it were offered in North America).

DS Style Director Thierry Metroz says "We are presenting a new generation of light signature directly inspired by our recent concept cars. The new DS 7 is the fruit of a powerful collaboration between my teams, the experts of the various trades, in particular lighting who brought an avant-garde technology."

Driver Assistance News

New Valeo CEO Has Words to Say
Extract of Automotive News Europe interview

DRIVER ASSISTANCE NEWS

Christophe Perillat has been CEO of Valeo since this past January. He shared his thoughts recently with Automotive News Europe.

About his vision for Valeo
"I strongly believe that the transformation that we are seeing in the auto industry is huge, and it will also change the value chain. So, we looked very carefully at how we can not only prepare for that transformation but also be a leading actor in it. In our Move Up strategic plan, we are focusing on key areas where we have developed the right technologies, which are the acceleration of electrification and the acceleration of the ADAS business. And although these are the two main trends, they have consequences on the rest of the car, for example, what I call the "lighting everywhere" effect—everywhere around the car, inside the car -- and a reinvention of the interior experience because space has been freed by the combustion powertrain.

About the lidar market developing
We have the feedback from all these products that are on the road. They have been on cars that vibrate, in hot and cold temperature. We have more than 500 lidar patents. So, we have accumulated a tremendous knowledge, not just in design but also in manufacturing. Our third-generation Scala lidar isn't a totally different product, but we have improved some components that multiplied the resolution by a factor of 20 beyond the second generation. It will have a larger field of view and more resolution points. It's a much better product.

About autonomous/ADAS market developing
We are really seeing a dramatic increase of L^2. More than 50 per cent of the cars on the road in 2030 will be L^2, which is a tremendous growth opportunity. We have produced 1.5 billion sensors in the last 30 years. We are going to produce 1.5 billion sensors the next five years.

Alibaba's L4 Self-Driving Truck Gets Its Road Test Licence

DRIVER ASSISTANCE NEWS

According to Sina Technology, Deqing City in China's Zhejiang Province has become the first city in China to issue a public road test license for an L^4 autonomous truck with no human driver. Alibaba say they have obtained one of the first two licences. In the future, the unmanned "Damanlu" truck developed by the Alibaba Dharma Institute will carry out road tests in designated areas of Deqing, including some high-speed sections.

The road test is a necessary condition for the evolution of autonomous driving technology and the landing of products, and real-road testing without a human driver is an important steppingstone on the path toward high-level autonomous driving.

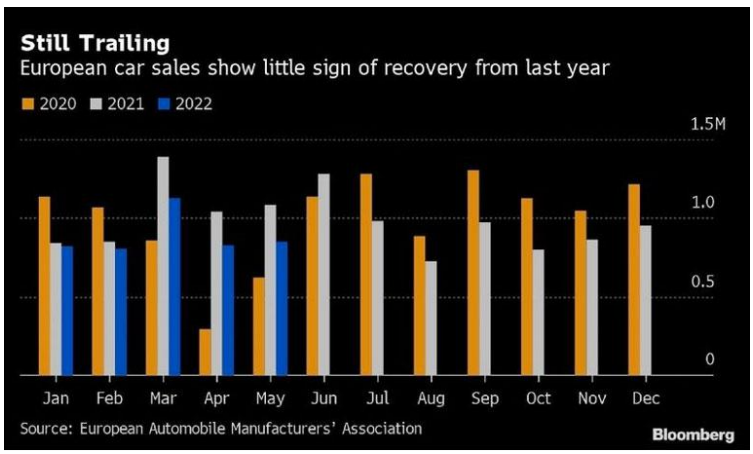
Alibaba have been exploring the R&D and application of autonomous driving in the logistics field since 2015. Combining the advanced technology of DAMO (the Academy for Discovery, Adventure, Momentum, and Outlook) and the logistics of Cainiao (Alibaba's global parcel tracking platform) Alibaba launched the autonomous driving product "Xiaomanlu" in 2020. It adopts L^4 technical solutions to provide express delivery; takeaway; fresh food, and other last-three-kilometres tasks. By the end of March 2022, the cumulative delivery logistics orders exceeded 10 million, setting a new record for unmanned delivery in the industry.

General News

European Sales Droop Drags On for 11th Month

GENERAL NEWS

European new car sales fell for the 11th consecutive month as record inflation and falling consumer confidence joined prolonged supply-chain disruptions. Registrations in the 27 EU members plus the UK and the EFTA countries fell 13 per cent to 948,000 vehicles in May, according to industry association ACEA.



EUROPEAN CAR SALES

Volkswagen Group took the biggest hit; their sales dropped by 22 per cent from the same month last year. Asian automakers fared well—Hyundai Group sales were up 10 per cent; Nissan sales rose 3 per cent, and Toyota Group edged up by 1 per cent. The shakeout: Hyundai Group increased their market share to 10.2 per cent and took the № 3 slot in group sales behind VW Group and Stellantis.

Among other major automakers, Stellantis sales were down 15 per cent; Renault lost 10 per cent; BMW (including Mini) was down 13 per cent, and Mercedes-Benz (including Smart) lost 8 per cent.

A Bloomberg Intelligence report predicts European car sales will pick up in the second half of this year. Forecasters at LMC Automotive now expect 9.8 million deliveries this year, a 7-per-cent decline from 2021.