

# Editorial

## A Lidar Community Is Born

Last week, fully 102 companies were present at the 2<sup>nd</sup> DVN Lidar Conference. That's a new record; never before at a DVN Conference or Workshop have we had so many companies in attendance. Why such strong interest? Judging by the feedback we got at and after the Conference, it's mainly for two reasons:

- The exceptional docket of lectures by an exceptional roster of skilled, talented, informed VIPs from lidar developers and manufacturers, research outfits, automakers and suppliers
- Keen interest in lidar technologies. There is enormous investment in that sector right now, and it is crucial to understand the who-what-when-where-why of automotive lidar—the technologies and the applications, the prospects for integrating lidar in the car and for new business opportunities, the status of regulations and market development.

That's why, since the beginning of this year, we've been working with lidar and lighting experts on a study called **Automotive Lidar: Hype or Must-Have?** And now it's available for purchase.

Many uncertainties exist around lidar technology, primarily concerning what will be the winning technologies and who from among the dozens of lidar makers will make them. Whether you are a car maker, a Tier-1 or -2 lighting supplier, a lidar system or component provider, a practitioner, or a researcher, this study will help you to identify new business opportunities in the nascent automotive lidar market and to make smart, informed strategic decisions. For price and ordering information, just [click here](#).

I also direct your attention to the DVN website, where you can [see slides](#) from the lectures presented at the lidar conference (as released by speakers and their companies) and pictures taken during the two-day event. We'll soon be setting our sights on Conference N° 3!

Sincerely yours



DVN President

# In Depth Lighting Technology

## DVN Lidar Conference at Frankfurt

*by Ralf Schäfer and Leo Metzemaekers*

Last week the second DVN Lidar Conference took place at the Dorint Hotel in Frankfurt Sulzbach. An enormous diversity of companies attended and contributed to the event—automakers, tier-1 and -2 suppliers of lidar and lighting systems and components, materials, and equipment; and researchers from research institutes. Attendees came from Europe, North America, Japan, Korea, and China, reflecting the global interest in lidar for use in roadgoing vehicles.

All in all, over a hundred companies and institutions were represented—that's almost twice last year's figure. Every last seat in the conference room was taken.

In the extended expo booth area, 12 exhibitors showed their products and services. DVN President Hector Fratty opened the conference, then introduced keynoter Dr. Mircea Gradu, Velodyne Lidar's Senior VP for Product and Quality.



Dr. Gradu's speech was entitled "An ADAS Feature Rating System: Proposing a New Industry standard". It was well received by the audience, and touched off interesting discussions amongst participants during the conference.





• Presentations during the first day covered automotive lidar applications with talks from Valeo, Continental, and Blickfeld; talks on lidar technologies were presented by Cepton, Aeye, and Fraunhofer IMS. The day ended with a social hour followed by a grand dinner, so participants had ample time to exchange opinions and make contacts.

A keynote called "Evolution of the Lidar Industry Towards Driving Automation" opened the second day. This interesting speech was given by Pierrick Boulay, SSL and ADAS Business Unit Manager at Yole Developpement. Then came a session about lidar technology with presentations from LETI, Innoviz, Ibeo, and Osram.



• The next session was devoted to lidar optics and assembly and lidar cleaning. Talks from Jenoptik and Fraunhofer IPT covered the optical aspects; GXC coating, Xenomatix, and Koito discussed cleaning possibilities. The morning ended with a session about lidar testing—Liangdao, Vedecom, and Aachen University presented their views and news.

After lunch, the conference continued with a session about potential synergies between lidar and lighting. Contributions from Audi, Volvo, ZKW, and Marelli's Automotive Lighting unit provided insights into the state of the art.



The conference closed with two discussion panels kicking around the questions of how fast automotive lidar will be adopted, and whether lidar will impact vehicle lighting. On both questions there is not yet a consensus view. Because we are still in the early, emerging phases of lidar application in vehicles, a lot of variables are still uncertain. Nevertheless, clear progress toward consensus is developing—shepherded along by this type of conference, which can help the industry to coalesce around smart directions on automotive lidar application.

Looking with a helicopter view on the event, the quality of presentations and speakers, the highly interested audience as well as the lively discussions and networking during breaks, cocktails, and dinner encourages DVN to plan a third conference with a similar format. Stay tuned!

# Lighting News

## Another Roadblock for ADB in the USA



*Daniel Stern, Driving Vision News*

The U.S. Department of Transportation announced late last week that they have adopted the Trump Administration's de-regulatory agenda as an official operating principle. Transportation Secretary Elaine Chao, announced she has signed what she called a "rule on rules".

NHTSA is among the agencies affected by the new rule, which codifies a Trump requirement that in order to issue a new regulation, the issuing agency must scrap two existing regulations. The DOT say they have more than met that requirement lately, citing a 23:1 ratio of scrapped-versus-issued regulations in 2018.

The rule, announced last week, has been issued without any public comment period, and will take effect immediately. Chao told an audience in Florida that cutting regulations improves safety: "When we get rid of unnecessary, burdensome regulations, that helps safety because we're focused on what's really important", Chao said.

Consumer groups are alarmed at the new DOT direction.

- Consumer Reports Magazine says NHTSA's rate of investigations into safety-defective cars reached an all-time low in 2017.

- Amit Narang, a researcher at long-established consumer advocacy group Public Citizen, says the new policy effectively stops all DOT agencies from issuing regulations: "This new policy will largely prevent DOT from doing new safety rules. It will also make it harder for DOT to issue new regulations for new technologies like drones and automated vehicles".

The new rule relaxes enforcement by allowing more industry self-policing rather than government scrutiny, and has provisions that will make it more difficult for agencies to bring in new regulations to address new technologies and challenges. For example, any proposed rule expected to have an impact of \$100m or more on the economy will have to go through new extra steps in the rulemaking process, which is expected to delay regulations by months or years beyond the already-slow pace at which DOT issues regulations.

DOT agencies have largely held off from making any new rules on drone operations and AVs. Officials say that's so they don't stifle innovation, but the hands-off philosophy has been questioned by some in Congress, especially after a self-driving Uber SUV struck and killed a woman in Arizona last year.

## Interview Shammi on Jaguar F-Type

Shammika Wickramasinghe is the Technical Specialist for Exterior Lighting, responsible for the technical strategy at Jaguar Land Rover. He has been in the automotive industry since 1998 and was the Section Manager of the Electrical team at Honda UK in the past during the development of the famous 2006 Civic for its design of the lights.

He joined JLR in 2011 and was instrumental in delivering the F-Type lamps including the very popular Tail signature project. Thanks to his expertise in lighting and understanding of Electrical Systems and



the involvement of his management, Jaguar Land Rover presents new models with highest technologies in Exterior Lighting.

**DVN :** We introduce below the wonderful facelift of the F-Type. Could you present the headlight of this car?

**Shammika Wickramasinghe:** The F-Type offers the latest Technology PIXEL Lighting system with

enhancements to what JLR originally offered in 18MY on the Range Rover and Range Rover sports and has a range of dynamic features, including multi-shadow ADB system that provides the driver with maximum forward vision with minimum distraction to the driver and the other road users.

**DVN: and what about the rear light ?**

**SW :** The Rear lights are unique and have a 3D appearance further enhancing the Original signature of the F-Type and showing the evolution of the signature on the Tail lamps. The unique style and design makes the F-Type recognisable even at a distance due to the crisp and clear signature that does not get washed out by the glare.



**DVN: To make ADB, we have know of different technologies such as DMD,  $\mu$ LED, LCD, LCoS, laser scanning and others. What is your vision with these technologies. Do you think one of these technologies will dominate ?**

**SW :** ADB technology has evolved similar to mobile and other cosumer technologies and irrespective of the technology, the key thing that we need to focus on is that we don't cause a glare to other road uses by the high volume of light we put out. In terms of Technology, DMD in my view is the most

advanced with the ability to control the pixels very accurately and will be the high end technology for the high end market. I see  $\mu$ LED making its way in the mid segment vehicles and with current Pixel technology making its way into the lower segment vehicles and matrix becoming a standard fit going forward.

Laser scanning will play a significant role in future lighting as the laser technology efficiency / efficacy improves.

**DVN : After your experience at Honda and now your long experience in JLR, what is your vision on headlamps systems?**

**SW :** I see the headlamp system taking 2 different approaches:

1. Headlamp system becoming a full system with sensors and DSP's fully integrated
2. Headlamp system being just a system that is used for signaling and communication functions.

The decision on what is best is currently being evaluated by many OEM's and many OEM's are preparing for both options and we have to wait and see what will be the winner of the two.

**DVN: and on rear lamp systems ?**

**SW :** I see the same with the rear lamps, but in the interim I see the rear lamps becoming more complex and having matrix arrays with full width rear lamps becoming more and more popular in the next few years as a means of better communication to other road uses.

## New IntelliLux Headlamps on Opel Insignia



The newest Opel Insignia can only be had with full-LED lighting. It bears extremely slim headlamps, and can be equipped with the latest version of Opel's IntelliLux LED Pixel Lights—which now features 84 LED elements per headlamp, rather than just 16. The headlamps react faster, providing optimum vision for Insignia drivers without glare for oncoming or preceding traffic.

The beam is adjusted in just milliseconds by two control units, one connected to the front camera and the other in

the headlamp. The high number of continuously reacting LED elements results in a seamless adaptation of the light.

The range and direction of the light vary according to the driving situation and surroundings. The light functions range from curve and bad weather, to town, country roads and motorways, and there's even optimised light for parking. In left turns, the light beam reaches further to the left, so the driver can more easily see roadside signs. When turning right, the light beam shines further to the right.

The power of the new IntelliLux LED Pixel Light system has been significantly increased. The 84 LED elements are arranged in three rows, along with the curve light and dip beam module, as well as the characteristic chevron-shaped LED DRL-position-indicator light below.

## Osram: Event in Japan and Future Talks about the future



Last week, OSRAM organized a great customer event in Japan, with full focus on the latest innovations and roadmap for the OEM and Aftermarket.



Visitors could enjoy an excellent speech by Audi as a market trendsetter for adaptive and dynamic lighting in the automotive industry. More, the visible and invisible lighting opportunities especially with regards to autonomous driving were discussed.



Hans-Joachim Schwabe, CEO BU, Osram  
In the middle Hitoshi Nakagaki, lighting manager, Nissan

### ***Osram's Managing Board invites ams to talks about the future***

*Following the successful takeover offer from ams AG, Osram's Managing Board has invited the management of ams to make the journey together to becoming a global technology leader for sensor solutions and photonics on the basis of the Business Combination Agreement. Unchanged, management's focus is aligned with the shareholders, the company and its employees.*

*"What is important now is to create a world class photonics and sensor champion together with ams," said Olaf Berlien, CEO of OSRAM Licht AG.*

## **VW Group shakes up design leadership**

Volkswagen Group promoted Klaus Bischoff to oversee the automaker's design activities and named Rolls-Royce's former design chief, Jozef Kaban, to a similar role at the VW passenger cars brand.



Klaus Bischoff

Bischoff has been VW brand's chief designer since 2007. He has spent his entire career at VW Group, holding senior management roles in interior, exterior and complete vehicle design.



Jozef Kaban

Kaban had been head of BMW's design studio and he is returning to Volkswagen Group where he spent much of his career before joining BMW. He started his design career in 1999 at VW Group, where he created the exterior design for the Bugatti Veyron supercar. He became Audi's head of exterior design in 2003 before moving to Skoda in 2008. As Skoda's design chief he was credited with rejuvenating the Czech brand's design with cars such as the third-generation Superb midsize model.

Kaban will start as VW brand's design boss on July 1. Until then Bischoff will oversee VW brand design until Kaban takes up his new post.

Porsche's design chief, Michael Mauer, 57, who currently also heads VW Group design, will concentrate on his responsibilities at Porsche once the changes have come into effect. Mauer has been responsible for VW Group design since 2015.

## Design Award for ZKW's StripeZ



ZKW's "StripeZ" lighting module has received a German Design Award in the Automotive Parts and Accessories category. The juried German Design Award honours innovative products and their manufacturers and designers who are pioneers in the German and international design landscape. The decisive factor for the jury was the particularly compact design of the

lighting element, which allows for new design options for the main headlamps of a vehicle.

The StripeZ module consists of an LED-based product family with short lens height and an integrated cooling element. Compared to conventional LED elements, StripeZ has significantly smaller dimensions with the same light performance. ZKW CEO Oliver Schubert called the award "very important to us, as the topic of design is becoming increasingly important in automotive lighting and sensor systems. Car manufacturers have increasingly higher requirements with regards to appearance, which is why we have to develop trend-setting designs".

ZKW's designers wanted to use an LED module to turn the subject of light into the shape of an eye and thereby make it the center of attention. In addition, the technology also creates additional space in the headlamp housing due to the reduced space requirement, which can be used, for example, for the integration of sensors. "This aspect is particularly important for autonomous driving," says Schubert. The StripeZ light module is already being used in series-production headlamps for premium vehicles.

Depending on the version, the optical lens is only 22 to 30 mm high and thus considerably smaller than conventional systems with a height of around 50 mm. Various lighting functions can be split into several modules. Depending on the desired appearance, one can choose whether all headlamps are to light up simultaneously or not.

## Bill Grabowski Joins Adasky



Adasky have announced automotive product development expert Bill Grabowski has joined their team as a Senior Advisor.

Grabowski was recently VP of global innovation scouting and development for Marelli's Automotive Lighting division; before that he spent decades at FCA, Daimler, and Chrysler, where he held positions in product

development including Chief Engineer of the Jeep Wrangler and Grand Cherokee as well as Director & Executive Engineer of Body and Exterior Engineering, and advanced architecture. He says he's "excited about the strong potential of Adasky's thermal sensing technology" and looks forward to helping the company commercialise it.

*Adasky work in the far infrared realm with a high-resolution thermal sensor for the automotive market, enabling autonomous vehicles to see better and understand more. The company's founding team is made up of veterans from the semiconductor, thermal sensor, image-processing, and computer vision markets. They have been developing state-of-the-art FIR sensing solutions for the last decade.*

# Driver Assistance News

## SiLC, Varroc to Show Production Headlamp With Lidar at CES



SiLC Technologies and Varroc Lighting Systems will demonstrate seamless lidar integration into a production automotive headlamp at CES 2020.

The Varroc headlamp is based on a sophisticated production LED design and contains four of SiLC's silicon photonics FMCW vision chips providing a full 20° × 80° field of view for each headlamp.

SiLC's compact lidar chip architecture can be inconspicuously embedded anywhere on a vehicle for optimal vision and safety. Their 4D+ Vision chip integrates all required functionality, such as a coherent light source and optical signal processing, to enable significant additional information to be extracted from the returning photons before their conversion to electrons. The sensor can detect height, width, distance, reflectivity, velocity, and light polarisation of objects. The coherent interferometric sensing approach improves achievable accuracy by orders of magnitude over existing technologies. It can detect low-reflectance objects beyond 200 metres surrounding a vehicle, providing enough time for a vehicle to avoid an obstacle at highway speeds.

"Varroc Lighting Systems is proud to showcase a milestone in embedded automotive lidar with SiLC, a leader in lidar innovation," said Todd Morgan, Senior VP of Product Development for Varroc Lighting. "We believe automotive lamps provide the optimum integration point for sensors at the four corners of the vehicle."

SiLC also will demonstrate a 200+ metre lidar scan, showcasing the long range and accuracy of their 4D+ Vision Chip.

*SiLC are a supplier of highly integrated FMCW lidar solutions. They're located in Monrovia, Southern California. Founded by a group of highly experienced industry veterans, they have a proprietary silicon-based semiconductor fabrication process to manufacture their chips and standard, automated IC style assembly processes, enabling robust, cost-effective and compact solutions.*

## Progress from Global Lidar Companies in 2019



To push the development of autonomous driving technology, worldwide lidar developers continue to release new products and build partnerships with different industry players. For example:

- LeddarTech have offered their lidar solutions to autonomous shuttle bus service providers COAST and May Mobility. They also support autonomous machine operation with their collaboration with the Flodraulic Group. Meanwhile, the company's lidar product was

recently graced with a CES 2020 Innovation Award.



- Germany's Blickfeld announced a partnership with Koito to develop a lidar sensor that can be integrated into headlamps. According to Blickfeld, their silicon MEMS mirror enables small size and cost-effective lidars. They, too, won a CES 2020 Innovation Award for their lidar product, Blickfeld Cube.
- Innoviz began a partnership with Magna to provide lidar to the BMW Group in 2018, and expanded their business by opening offices in the U.S., Germany, Japan, and China. The company closed their Series C funding with USD \$170m last June.
- Pioneer, who also specialise in MEMS-based lidar, announced a partnership with Canon last April. Collaboration between the two companies aims to combine Pioneer's miniaturisation and digital signal processing technology with Canon's optical technologies for lidar sensor development. Series production is planned for next year.
- XenomatiX are working with glass supplier AGC to develop a windshield-mount lidar.

Solid state lidars are featured with smaller size and simple structure compared to mechanical lidars, enabling the manufacturers to integrate the sensors with other components such as lamps and windows.

## Mobileye-Equipped Car Drives Itself in Jerusalem Traffic



Mobileye are working to develop a ride-hailing business in Israel in partnership with Volkswagen and Champion Motors. It's to be a global beta testing project for the mobility-as-a-service (MaaS) business model for robotaxis. The company are looking to begin operations of the robotaxi service beginning in 2022.

Meanwhile, Mobileye have announced a new long-term coöperation agreement with France's state-owned public transport operator RATP to deploy autonomous

transportation solutions based on Mobileye's AV technology. The goal is to bring a joint offering for a robotaxi shuttle fleet globally with testing set to begin in Paris next year. Intel have estimated that the market for robotaxis will reach USD \$160bn by 2030.

Mobileye say they see new revenue streams coming from data mapping systems that can be used for ADAS, AD, and smart city management. Mobileye are already running automatic map creation projects for BMW, Volkswagen, Nissan and three other automakers to provide fresh maps of world data; they predict the European Union and the majority of the U.S. will be fully mapped by the end of next year.

In a [video posted online](#), an autonomous Ford equipped with Mobileye technology drives along a busy street with scanty roadway markings, many pedestrians crossing, complicated junctions, hesitant drivers, and oncoming vehicles.

## Survey: Chinese, western consumers divided on EV, AV



Automakers and technology companies plowing money into the development of electric, self-driving and shared car services will find more enthusiastic consumers in China than in Europe and the United States, according to a survey released on Thursday.

Consumers in some Western countries appear unconvinced as automakers overhaul their factories and supply chains to produce pricey electric cars and invest billions to develop self-driving technology, the survey by OC&C Strategy Consultants showed.

While more than 90% of Chinese residents said they would consider, were likely to or definitely would buy an EV, only about half of the surveyed consumers in US were eyeing an EV as their next purchase. In Europe, between 64% and 77% of said the same.

OC&C surveyed around 2,000 consumers in each the U.S., China, Germany, France and the UK between March and April 2019 in online polls.

Car buyers in US, Germany, France and UK also largely want to retain private ownership of their vehicle, while more than 90% of Chinese consumers are open to fully-shared mobility options, according to the survey.

But survey respondents in Western countries, including younger generations, said owning a car remained an important status symbol offering convenience and reliability not matched by car-sharing or taxi services.

Overall, around a third of Western consumers in the survey said they were distrustful of self-driving vehicles, while only 4% of the Chinese respondents said so.

OC&C's Evison said the results suggested the auto industry should invest more in electrification and services for individual car owners rather than "trying to create the next shared mobility revolution."

# General News

## BMW Sue Suppliers Over Price Fixing



BMW are suing two of their suppliers over price fixing on air conditioning components. The case was first reported in the German *Handelsblatt* newspaper, which said BMW are suing France's Valeo and Japan's Denso for damages of €141m.

The case relates to a decision in 2017 by the EC competition authority to fine several parts makers, including Valeo and Denso, a total of €155m for having operated cartels in a number of their markets.

The cartels identified by the European Commission related to air conditioning and engine cooling systems, from as early as 2004 until 2009. All the companies admitted wrongdoing in return for a 10 percent reduction in their fines. The cartels affected Volkswagen, BMW, Daimler, Volvo, Suzuki, Nissan, Renault, and Jaguar Land Rover.

## Marelli and AutoSport Present new Moment of the Year category at AutoSport Awards 2019



Marelli in collaboration with Autosport, will present a new award category at the 36<sup>th</sup> edition of the Autosport Awards 2019, that will take place on December 8<sup>th</sup> at the Grosvenor House Hotel in London. The new “Moment of the Year” award presented by Marelli will recognize the most spectacular moment of 2019 Motorsport’s season, selected by Autosport readers that voted over the past weeks.

The nominees include four of the most exciting moments from the last Formula 1, MotoGP™ and Formula E championships. Voters had the chance to crown their favourite moment choosing among Leclerc incredible victory on Ferrari’s home ground in Monza, Alex Rins’ triumph at Silverstone in a thrilling battle with world champion Marc Marquez, Max Verstappen’s race-winning move on Charles Leclerc at the Austrian Grand Prix, and the spectacular manner in which Jean-Eric Vergne won his second Formula E title.

*The **Autosport Awards** is the motorsport industry's most prestigious awards event, celebrating achievement across all the major series of the motorsport. Over the past 35 years, the event has hosted most of motor racing's biggest characters. The Awards are voted for by the readers of Autosport.com and Autosport magazine and the event is promoted in over thirty countries on Motorsport.TV, as well as being live streamed on Autosport.com and Motorsport.com.*

*The new “**Moment of the year**” award presented by Marelli perfectly celebrates the utmost passion and know-how in achieving top performance, which have always been key values of Marelli. The company’s support to Autosport Awards reflects Marelli commitment in powering progress and technology together with customers and partners, helping them to succeed in an unprecedentedly changing motorsport world, as well as in the automotive industry.*