

## Editorial

### Whistling While We Work

As you've seen in these last weeks, every Tuesday we bring you all the news about lighting, driver assistance, and human and machine driver vision—even over the summer holidays. The DVN team are hard at work to keep you informed, and to build forthcoming reports. Over the next four months you can anticipate:

- The IAA (Frankfurt motor show) report on 17 September—several DVN experts will go see the show to publish the report promptly before the end of the show;
- The ISAL report in October, wherein you will find summaries of the lectures, a great many pictures, and links to released lecture slide shows;
- A new report in November on vehicle lighting in America—DVN Chief Editor Daniel Stern is already working to make a best-in-class report covering what's doing on the island where the rest of the world's rules and practices don't apply;
- Our interior lighting report comes in December, and Jean-Paul Charret, former R&D director of R&D at Valeo Lighting, is visiting involved companies to make a high-quality report.

Our team is also working on improvements to the DVN website to integrate DVN-I and to have a more modern look.

And we're preparing for the lidar conference to be held in early December.

Dear readers, from all of us at Driving Vision News, we wish you happy holidays for those going and already on holiday, and a lot of pleasure reading our Driving Vision News productions for those who are present in their office this summer!

Sincerely yours,

*DVN President*



## In Depth Lighting Technology

### SeddLED: Dominant's New Integrated RGB LEDs

About a decade ago, RGB interior lighting began to offer adjustable ambience and brand identity in some premium cars. Then came dynamic lighting effects for different scenarios, like welcome light effects and driver alerts in emergency situations such as pre-collision and blind spot warning.

But RGB ambient lighting installations can be complicated and costly, needing large investments in measurement equipment for RGB calibration during the SMT process, high component counts, and complex designs for each lighting module. Moreover, it grows unwieldy and unfeasible for systems comprising more than 100 LEDs.

Now, automotive LED supplier Dominant are offering a new package family called seddLED (Smart Embedded Digital Driver LED), which they call the world's first true digital LED integrating RGB LEDs, drivers, and advanced communication links in a single package.



SeddLED 3.0 boasts outstanding features including fully digital colour and brightness control by software command, and pre-calibration to D65 white point with an accuracy within 3 SDCM steps at 1,400 mcd. It has fast communications, too: a half-duplex 2Mbit/s differential control bus with an update rate of 52.5  $\mu$ s per LED (5.25ms for 100 LEDs). This high level of integration promotes simplicity in RGB module designs, as no additional controller or communication device is needed. In production it helps pare down costs and simplify logistics, as no binning or calibration is required.

It is an EMI-robust design and with bus initialisation on startup and automatic detection of new or replaced LEDs, the SeddLED pushes towards vehicle digitalisation. Its inbuilt thermal sensor lets it perform real-time automatic temperature compensation, and it comes with self-diagnostics. The package also boasts superior corrosion robustness with a silver lead frame, and is qualified according to automotive standards AEC-Q100 and AEC-Q102.

For driverless vehicles, seddLED3.0 provides design freedom to simulate different atmospheres in the passenger's cabin such as "romantic sunset", "refreshing forest", and "breezy ocean".

The technology can also be extended to exterior applications such as high definition information and animated lighting panels for AVs and EVs. SeddLED3.1, with its small package outline of 3.2  $\times$  3.3  $\times$  1.35 mm and black package body, can achieve as small as 4mm fine pitch high contrast ratio matrix LED module requirements.



*V2Pedestrian Communication for AVs*

AV development calls for integration of multiple fast systems including sensors, cameras, radar, lidar, and artificial intelligence, which implies a need for fast communication and EMI-robust LEDs. The seddLED technological roadmap for the next five years is said to focus on miniaturisation, integration, and digitalisation.



*Dominant Opto Technologies describe themselves as one of the leading LED manufacturers in the world, offering innovative and performant LED solutions for world-renowned car makers. Their product portfolio ranges from low- to high-intensity LEDs with a wide colour spectrum for interior and exterior vehicle applications. Established in 2000, Dominant have expanded globally with six regional offices close to key design centres in Europe, the United States, China, Japan, Korea, and India to provide professional sales and technical support.*

# LIGHTING NEWS

## AMS Pitch Osram Takeover Bid



Sensor makers AMS have thrown their hat into the ring—or, more specifically, they've thrown €4.3bn into the bidding competition for Osram, which means they're now competing against Bain Capital and The Carlyle Group. Osram confirmed they will start negotiations with AMS.

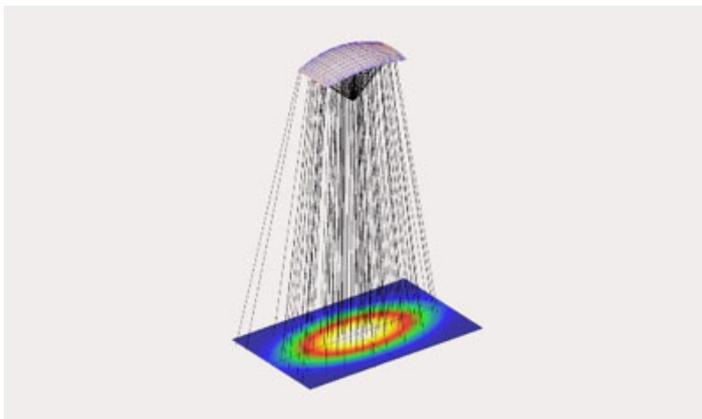
The offer from AMS, an Austria-based supplier of high-performance sensor solutions, values Osram at €38.50 a share. That compares with the €35 a-share offer from private equity firms Bain Capital and Carlyle Group, which was rejected as too low by Osram's major investor, Allianz Global Investors. The new offer is in line with an earlier bid that AMS tabled but then withdrew almost a month ago. AMS are in regular contact with investors including Allianz, who hold shares in both companies.

Osram became a takeover target after a series of profit warnings and a public spat over strategy with Siemens, who spun off Osram in 2013. Earnings have suffered because of the company's exposure to the automotive industry, which accounts for over half of its revenue. Automakers and suppliers are grappling with shrinking demand in China and Europe and the expensive transition to electric cars. Investors also lost confidence in the ability of CEO Olaf Berlien and management to turn around Osram.

If AMS will succeed in their takeover effort, they will sell off Osram's digital division that makes lighting controls for use in horticultural and medical systems, among others.

## Synopsys Introduces New LightTools Release

Synopsys last week announced the release of version 8.7 of its [LightTools® illumination design software](#) for the modeling, analysis, and optimization of illumination optics. LightTools 8.7 introduces advanced capabilities to help optical designers and to correct stray light issues, including ghost images and flare—early in the design process.



Designers can quickly prototype their opto-mechanical systems, explore the interactions of light with system components, and identify sources of unwanted surface interactions that impact system performance. LightTools stray light analysis is particularly useful for improving the design of next-generation illumination optics used in space-borne telescopes, infrared optical systems, consumer electronics, autonomous vehicles, and AR/VR/MR applications.

"The latest LightTools release represents a major advance in stray light analysis, with versatile features such as new scattering models to accurately simulate opto-mechanical surface characteristics and filters to identify sources of unanticipated stray light effects," said George Bayz, VP of Synopsys' Optical Solutions Group.

LightTools' unique modeling capabilities for freeform optics in illumination systems have been enhanced with design features to correct distortion caused by secondary optics, such as cover plates, turn mirrors, and projection assemblies.

*LightTools is a 3D optical engineering and design software product that supports virtual prototyping, simulation, optimization, tolerancing, and photorealistic renderings of illumination applications.*

*Synopsys, the world's 15th largest software company is the Silicon to Software™ partner for innovative companies developing*

## Lamps are Sensors' Natural Home: Varroc

### Extract of an interview with Varroc's Paul Lyon

Paul Lyon, ADAS Systems Manager for Varroc Lighting Systems, has over 2 decades' experience in the automotive industry, primarily in vehicle lighting and product development. Here's what he recently had to say:



"OEMs are using lighting for their design signatures during the night as well as during the day, and this design attraction is adding an increasing number of vehicle variants, with enhanced appearance and pedestrians."

ADB technologies have also advanced rapidly and [are] widely used in Europe as well as in Canada. We are seeing high-resolution lighting systems that utilise individually-controllable chips to generate a homogenous light pattern and create symbols, signs, and information on the road to communicate with other vehicles, road infrastructure, and pedestrians.

"The biggest change in automotive lighting has been the accelerated growth of electronics, sensors, and software. With increased requirements for functional safety, integration of ADAS components, we can expect the lighting industry to continue to move in this direction.

"From positions on the four corners of the car, lighting can enhance and support a variety of technologies. The integration of ADAS sensors has already begun to demonstrate how lighting technologies can optimise vehicle safety on roads of the future, and the location of lamps can provide sightlines for many ADAS features. Existing ECU and architecture for ADB can be used to illuminate objects and improve camera perception, aiming/leveling software and motors can be extended for maintaining ADAS system alignment, and driver modules can be used to power and monitor ADAS modules.

"Lighting performance is currently evaluated by NCAP, Consumer Reports, IIHS. Lighting is required to thread this needle on every program in order to satisfy the differing performance characteristics."

## Hella See Potential to Outperform Auto Market

Hella's fiscal year 2018/2019 ended with an increase in sales and earnings. Currency- and portfolio-adjusted sales have risen by 5% compared to the previous year. Reported sales decreased to €7bn (previous year: €7.1bn as a result of divestment from the wholesale business and taking the effects of exchange rates into consideration, and earnings increased by 5.9% to €585m.



The automotive segment in particular was the main driver for the companywide increase in sales in the fiscal year 2018/2019. This was due to high demand for lighting systems and electronic solutions, especially in the area of driver assistance systems and energy management.

Company outlook reflects major uncertainties in market environment and further declining industry development. In view of the continuing high uncertainties in the market environment and the further declining industry development, Hella expect for the current fiscal year 2019/2020 currency and portfolio-adjusted sales in the range of €6.5bn to €7bn. CEO Dr. Rolf Breidenbach says "The automotive industry will not recover in the short term. We assume instead that markets will continue to decline. Despite these challenges, our strategic orientation and our well-filled order books mean we have the potential to outperform the automotive market and to benefit from changes in the industry in the long term".

## Ansys Named as a Top Workplace for Innovators

Digital simulation software powerhouse Ansys have been declared an exceptionally good workplace for innovators.



Fast Company collaborated with Accenture to identify 50 organisations that actually cultivate good ideas and encourage experimentation. The Workplaces for Innovators list recognises the companies and organisations most committed to encouraging innovation at all levels.

Fast Company say they set out to find companies that empower all employees, not just top executives, scientists, or coders, to create new products, improve operations, and take risks—where innovation isn't just a slogan word but a part of the value system and culture. Fast Company journalists and Accenture researchers evaluated applications from 362 companies, and eight prominent judges reviewed and validated the top 50. This award highlights workplaces from around the world and 8 companies are based outside the United States.

Ansys are leaders in engineering simulation. With Pervasive Engineering Simulation strategy, they help the most successful companies innovating world to deliver highly performant products to their customers. By offering the best and the widest portfolio of technical simulation software, they say, they help solve the most complex design challenges and create an unlimited number of products.

Founded in 1970, Ansys are based in Pittsburgh, Pennsylvania, in the USA.

## Red Dot Design Award for OSRAM Continental

Red Dot announced last week, OSRAM Continental corporate design, created together with KMS TEAM, has won a Red Dot Design award in the category Brands & Communication Design!

The panel of judges at Red Dot recognized a project with the Brands & Communication Design Award. Brand identity for the OSRAM Continental joint venture won one Red Dot. It is based on the mission statement »Shaping the Future of Mobility Lighting with Seamless Connectivity«, which we condensed into three design principles that are also the characteristics of light: contrast, movement and focus.



**reddot** award 2019  
winner

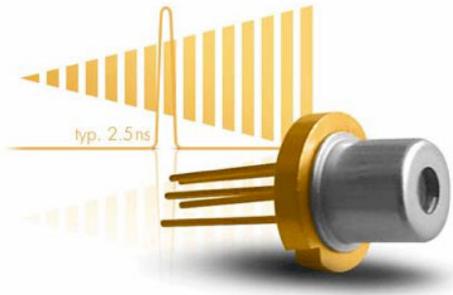
*The Red Dot Design Award is an international product design and communication design prize awarded by the Design Zentrum Nordrhein Westfalen in Essen.*

*There are prize categories for product design, design agencies, and design concepts. Since 1955, designers and producers can apply for the prizes with the winners being presented in an annual ceremony. Winning products are presented in the Red Dot Design Museum on the premises of the historical Zollverein Coal Mine Industrial Complex in Essen.*

## DRIVER ASSISTANCE NEWS

### QuickSwitch PLD Gives High Resolution for Lidar

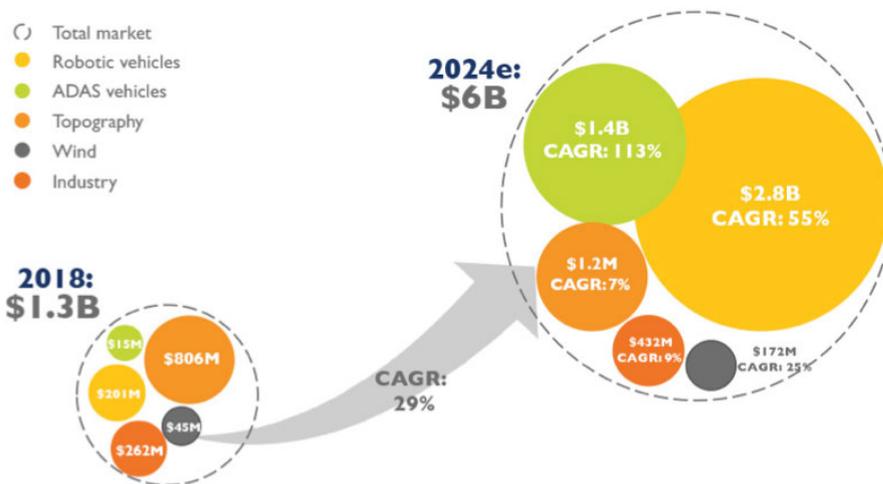
Laser Components got started in 1982 in Germany as a company for the sale and production of lasers and optoelectronics components and laser diodes for next-generation lidar. The group have five sales organisations and four production facilities, and have invested in important business partners and key suppliers. The company have been providing pulsed laser diodes and avalanche detectors for over two decades, and regularly announce cutting-edge advancements and achievements that propel the sensor industry forward.



Regarding laser diode requirements for the lidar market, discrete solutions available on the market usually have a pulse length of 5-10 ns. The QuickSwitch Pulsed Laser Diode with 2.5 ns pulse length is already a perfect match for the lidar market; the huge benefit of shorter pulses is to detect with a very high resolution at short and long distances. The other benefit is lidar can work with higher peak power which allows measurement of longer distances while still being as eye-safe as lower-power lasers. Laser Components also provide four-channel laser arrays and SMD packages for lidar and 3D imaging markets, depending on customer needs.

## Lidar Lines Up for Mass-Market Cars: Velodyne Interview

Yole Développement expect autonomous driving to have a huge impact on lidar technology and the related industries, as described in their report, "**Lidar for Automotive and Industrial Applications 2019**".



2018-2024 Lidar market forecast by application (Yole 2019)

Herewith, an extract of the interview by Yole's Patrick Boulay with Marta Hall, Velodyne's President of Business Development and Chief Creative Officer:

"A lidar sensor bounces laser pulses off an object, like a tree, at millions of laser pulses each second, and measures how long the light from the laser takes to reflect from the object to a light detector. The amazing thing about lidar technology is this process works for nonstationary objects in real-time, such as pedestrians, bicyclists, and other cars.. Lidar is able to accurately identify objects at up to 300m distance.

"The collaboration with Veoneer will result in millions of units produced and manufacturing cost coming down, along with a contract with a major automotive OEM. Veoneer is developing and commercializing the next generation of lidar systems for automotive applications using Velodyne's scalable auto-grade lidar sensor, core 3D software technology and proprietary lidar ASIC engine. Both companies will contribute key components, technologies, know-how and other intellectual property needed to optimize a next generation of affordable, high performance lidars for the automotive market.

"Our lidar sensors will improve ADAS features, including Lane Keep Assistance (LKA), Automatic Emergency Braking (AEB) and Adaptive Cruise Control (ACC), and Blind Spot Monitoring. Our lidar solutions will be applicable for all levels of ADAS and autonomy, advancing safety in the roadways. Velodyne's manufacturing operations include a 20,000m<sup>2</sup> megafactory in San Jose, California, where highly-automated robotic assembly techniques are utilized to build a range of sensors. Invented by Velodyne, these revolutionary manufacturing systems form the foundation of the company's mass production capabilities.

"Velodyne's real-time 3D lidar sensors are built with widely available 905nm lasers and avalanche photodiodes. The established breadth and scale of the supply base for Velodyne's 905nm lidar components are at least one order of magnitude larger than those utilized in other types of lidar technology. Many of the board- and chip-level electronic components are Commercial Off-the-Shelf (COTS) which helps to reduce price and lead-times on both new sensors and Return Merchandise Authorisation (RMA) repairs.

## Bosch Work Toward 3D Displays



Digital displays are becoming a key vehicle feature.

In the cockpits of the future, digital displays will play a key role in the interaction between drivers and their vehicles. With their new display products, Bosch are responding to this trend. The products use passive 3D technology to generate a realistic three-dimensional effect that allows visual information to be grasped faster than when displayed on conventional screens. "Displays are increasingly becoming interactive systems that can better anticipate drivers' individual needs," says Steffen Hoffmann, President of Bosch's UK operations. Forecasts suggest the global vehicle display market will double from €13bn to €26bn by 2025 (source: Global Market Insights).

## AVs' Long Road is Paved with Money

Autonomous cars are still as far as a decade away from general availability, despite the intense hype and USD \$35bn invested globally so far in their development. Zhong Hua, Senior VP of Engineering at Chinese startup WeRide, says the biggest challenges in developing fully autonomous driving is accounting for human behaviour:



"Some people violate the traffic rules, or sometimes unusual objects are placed in the road...you don't know all of these cases," Zhong told the Nikkei Asian Review last month. "Autonomous driving is just very difficult. As we road test in China, we know well there are very difficult scenarios...we don't think the technology will be able to handle that in a very short period of time."

WeRide plan to expand their fleet of autonomous cars to 100 from the current 50 by the end of this year and to 500 by next year, though they have delayed plans to launch a first autonomous taxi service in July. Zhong says "Our vision is that in the near future, it is still going to be a hybrid model, as we try to have humans [driving] in some areas or some time period". This could mean taxis could be fully autonomous at night when there is less traffic and transport goods rather than passengers, but require a human driver during the day.

The promise of self-driving technology has also drawn in massive amounts of money. There has been around \$35bn worth of investment, or between \$8bn and \$10bn annually in recent years, according to Egil Juliussen, a director at IHS Markit:

"Level-4 autonomous vehicles are coming later than originally forecasted," Juliussen said, predicting that they will only start to appear for personal use in the U.S., China, Europe and Japan in 2025. Level-5 driverless ride hailing and personal autonomous vehicles will appear around 2029 at the earliest, he added.

## Magna Open Michigan Factory to Focus on Cameras

Magna's electronics division opened a US\$50m factory in Canada, with 20,000 m<sup>2</sup> for manufacturing cameras and vision systems. The company now make about 12 million cameras a year for a dozen customers.



More than 600 employees will work at the plant, which consolidates work that had been done at three nearby locations and leaves room for growth. The factory is expected to be fully operational by fall 2020. Components will ship to more than 300 global locations. In addition to manufacturing cameras and driver-assist components, the plant will house Magna's advanced robotics R&D testing lab.

Overall, Magna has 24 factories in Michigan that employ about 10,000 workers. Magna has produced more than 46 million components for driver-assist systems.

## GENERAL NEWS

### ZF to Combat Motion Sickness

ZF says they are working with neuroscientists from Germany's Saarland region to put the human at the centre of its technology and avoid motion sickness, which can typically induce dizziness, headaches, and nausea on long journeys.



"What does it mean, human-centred, what does it mean for ZF?" said ZF human-centred development project head Florian Dauth at the supplier's recent Technology Day in the Eastern Germany city of Dresden. "We can't only deal with the vehicle itself or the components. We need to integrate the human and need to understand what is motion sickness or discomfort. With neural scientists we are gathering a lot of data and to make future function development in terms of AI. Our research said around 60% of passengers are feeling motion sick or have early symptoms. The issue will become more relevant for the whole automotive industry".

"Symptoms are pallor, cold sweating and nausea. ZF as a technology company takes this issue seriously—it is a sensory mismatch and conflict. We want to make our products and functions ready by using information within our algorithms. We use a dynamic driving map so the vehicle stays within boundaries, like manoeuvre or trajectory control.

The scientific basis for the concept is derived by test candidate studies conducted jointly by the Systems Neuroscience & Neurotechnology Unit (SNNU) at Saarland University and HTW Saar. In the studies, physiological reactions of test candidates were examined in a variety of driving situations.

"Our pioneering research incorporates the fields of neuro-technology, psycho-physiology, artificial intelligence and driving dynamics. The respective skill sets of the partners complement one another in the context of this collaborative project. The scientific results obtained to date have been very well received by the international specialist community." added SNNU director, Daniel Strauss.

### Magna in U.S. Big Biz Win

Magna has won seating business in North America and will supply structures from a new manufacturing facility in Lancaster, Ohio. The company held a groundbreaking ceremony at the site where construction has recently started on the 150,000-square-foot facility with an initial investment of around US\$60m.



The event was attended by Magna CEO Don Walker, US Representative Steve Stivers, and US Vice President Mike Pence. "As our customers expand their manufacturing footprints around the world, we will be there to support them with design, engineering and manufacturing. With this investment and job creation we are pleased to contribute to the strong automotive industry in Ohio and the US" said Walker

Magna's new seating plant is expected to be operational in the first quarter of next year, and to employ 300 people by 2021 with the possibility for future growth.

The facility represents Magna's first dedicated seat structure plant in the US and will feature robotic laser and MIG welding

capabilities.

The facility is located to provide seat structures to Magna's customers, starting with a new plug-in hybrid vehicle for an unnamed global automaker. The company currently have four manufacturing operations and employs around 2,700 people in Ohio.

The new seating facility in Lancaster will be Magna's fifth location in the State.

## **Bosch Open Digital Car Tech R&D Labs in Shanghai**



Bosch have opened an R&D centre in Shanghai to focus on the development of digital technologies for vehicle cockpits. The centre will mainly develop digital cabin products such as information domain computers, driver and passenger monitoring systems and 5G-V2X vehicle connectivity control units.

It is the third R&D site that Bosch's vehicle multimedia business unit has established in China, following car infotainment R&D centers in Suzhou and Wuhu in east China.

While enhancing software development capability to serve customers in China, the center will undertake advance research and innovation for the global auto market, Bosch said.