DrivingVisionNews.com
Automotive lighting and driver assistance technologies

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Editorial

All DVN Munich Workshop Presentations Released Today

DVN publishes today all the documents and presentations DVN members have been waiting for concerning the DVN Munich workshop held two weeks ago in Munich.
In the **downloadable report**, you will discover a summary of each lecture, information about the systems and components presented by the sponsors in their booths, a lot of pictures of the speakers, attendees and exhibition booths.
On the **DVN website** you will find most of the lectures slides (those missing were not released for publication), all the pictures, and a video summarising attendees' meeting, networking, and talking and listening with each other.
In the In-depth article below, we describe what we retain from the workshop. There is a lot of information from the messages of automakers, set makers, and lighting tier suppliers.

As I told you last week, we are now preparing the May 26-27 Tokyo workshop. Please note that almost all the 24 exhibition booths are already booked; only four are still available. Please hurry and reserve yours if you are interested. You also have the possibility to register at an early bird price of €1,000 before the end of March—after April 1st, the price will be €1,200 with a maximum of 300 entries in total.

I remind you also the call for papers for VISION which will be held 7-8 October 2020 at the Cité des Sciences in Paris. Deadline to send your abstract is 18 February.
More information is **available online**.

Sincerely yours,

DVN President

In Depth Lighting Technology

DVN Munich Workshop: Digital and Dynamics, ADB and Communications

This report now published, summarises the proceedings of the 2020 DVN Munich Workshop. It is not a substitute for having attended the event, but it conveys the main points of each lecture and describes the highlights of the expo booths.
All in all, there were a grand keynote address, 20 lectures, and a panel session on regulations. discussion. The most important points developed by all the speaker are:

From premium-brand automakers:

• OLED creates a new business model with segmented system and animation.
• Function-on-demand is rapidly developing.
• Laser contributes to full high beam and also to glare-free high beam systems.
• V2V connectivity could prevent many of the half-million crashes and could save over 1,000 lives a year in the US alone, and rear lighting will help to communicate by displaying messages to other road users about acceleration, deceleration, constant speed, and hazards ahead.
• If digital light is to follow the megatrends of automotive industry, it has to increase safety, be sustainable, and be easy to use.

From generalist automakers:

• Need for global regulatory harmonisation including the USA to cost-reduce developments,
• Need more standardisation for electronics & optics for lower deployment cost
• Need for more efficient ADB technology to compete with other high-customer-want features
• Areas of attention:
    - Brand differentiation
    - Optimisation of functionalities
    - Transversal modules

- High definition symbols

• Need for strategy toward new dynamic advanced LED lighting systems with:
- High value for end-customer
- Breakthrough engineering & architecture to reduce cost
- Software of supplier integrated in existing embedded ECU

From interior lighting companies:

• Prevalence of premium interior lighting is growing very fast
• Great potential for microprocessor-controlled IseLEDs
• Interior lighting tends to an optimised functional lighting, to more lighting support of colour and trim, night versus day design, and light projections
• Uniform and dynamic illuminated surfaces everywhere in the interior
• To avoid motion sickness, maximise optical flow and front & side view of outside
• Trend toward messaging: segmented taillights for dynamic light signals with simple symbols, or displays with addressable pixels for symbols, text, and pictures

From set makers

• The new generation of ADB modules deliver nice features for safety and comfort
• Need to simplify & standardise to reduce cost for their democratisation
• Slogans like "Smaller, Safer, Smarter, Sustainable, Style" reflect priorities of lighting
• Growing importance of signal lighting for style and communication (more digitalised)
• Integration of sensors in the four corners or in a front grille brings great interest from lighting set makers: better style, smaller packaging
• 4 kilopixel module is obvious choice for mass-market HD lights: big jump in safety performance
• Great attractivity of lighting displays particularly in China
• Interesting ADB technology using a mechanical principle, similar to a 10-kilopixel LED array with lower cost than other HD solutions, at least for awhile
• 3D lit image tail lamp is an interesting technology offering new styling with affordable cost

From light source suppliers:

• Osram say mainstream LED headlamps with reasonable performance can be had with about 15 watts, without heat sinks

• Lumileds' concepts for LED democratisation
• Fraunhofer's idea in competition with holography for signalling and interior lighting applications, and for "touch screens in free space"
• Dominant's concept for variable-colour, stable LED lighting at reduced cost especially for interior applications

From tier-2 suppliers:

• Features driven by ADAS and AVs drive fast transformation for exterior and interior lighting
• Mentor Graphics' new simulation tools for accurate thermal simulation of LED-based products
• NXP's process supports functional safety requirements
• New devices give reliable protection from condensation in real-world conditions

From regulators:


Geoff Draper

• There is wide agreement that lighting innovation speed is not matched by regulatory approval speed; we need to find solutions.
• The global lighting community must come together to identify priorities for regulatory change and alignment. The community has to present one responsible voice to the global regulators.
• This is an urgent matter to be followed up.

Where authorised by the speakers and their companies, links are provided to the lecture slides. Links are also provided to event photos and a short video presenting the event.

Lighting News

ITRI: Transparent Automotive Display with µLED

Taiwan's Industrial Technology Research Institute (ITRI) showed their ultra small pitch size µLED display module at CES last month. The µLED display was the world's first display manufactured by directly transfer micron size RGB chips on to PCB backplane.

According to Chih-I Wu, General Director of Electronics and Optoelectronic System Research Laboratories at ITRI, the µLED display marked the establishment of ITRI in µLED and mass transfer, particularly with red LEDs. Due to their material features, red LEDs often have problems in fragile structure and wavelength uniformity, leading to poor production yield. Weakened structure design and static electricity are also challenges for µLED companies.
ITRI have successfully overcome most of the technological bottlenecks in µLED with their blue and green LEDs achieving yield of over 99.9% when powered and red LED yield was increased to 99% with continuous improvement.
Electronic and Optoelectronic System Research Laboratories also teamed up with Material and Chemical Research Laboratories to develop full color µLED solutions. The integration of internal resources and professionals from different research fields formed the edge of ITRI in pushing µLED technology development.

Wu also addressed that the Micro LED display module was the result of the collaboration between ITRI, LED driver IC company Macroblock, PCB maker Unimicron, and chip producer PlayNitride.
In the future, ITRI will also turn to glass and flexible PI backplane development.
Wu was optimistic about automotive display and is currently working on adopting transparent µLED for automotive applications including windshield or display with signal function. Furthermore, with the development of autonomous cars and driverless cars, µLED display technology can also serve for entertainment uses with sunroof or side windows.
More new applications and potential market can also be included in the future by combining display and sensing components.

Complexities and Solutions in Aircraft Light Design

Three lighting systems are used in the aircraft, cockpit, interior and exterior.

Cockpit lighting systems

They need to offer pilots comfort, utility and safety. The difference is that these systems need to optimise how pilots perform.

For instance, the cockpit will be lit and coloured in a way to preserve vision in dark or dazzling situations. The lumens produced by instrumentation are optimised to help pilots see important data without obscuring other equipment. Engineers also need to test all these systems in various conditions to prevent glare, reflections and eyestrain. These assessments are often done late in the development cycle. By testing the illumination of the cockpit using simulation, engineers can analyse it at an earlier stage of development.

Interior lighting systems

Engineers can use simulation to optimise the comfort of cabin illuminating systems. They can do this by altering parameters like a system’s colour, intensity, and source as well as the materials being illuminated, like carpets or seat leather.
A typical airline feature is to set an ambient mood that comforts passengers. These moods also help passengers climatize to their destinations by mimicking sunrise, daytime, evenings and nighttime.

Exterior lighting systems

It can be dfficult to design, test and validate these systems, which are often tested and validated using physical prototypes. Sometimes, engineers need to test the equipment under conditions that are hard to schedule or predict. Simulation can help to eliminate much of the physical testing needed to validate the exterior aircraft's lights. Photometry, colourimetry, homogeneity, and overall performance can be tested in various configurations, weather conditions and operations like landing, takeoff or taxiing. As a result, engineers don’t have to wait for the perfect storm to test their designs.

Motorcycles: Yellow DRL and Vertical Configuration

The risk of fatal motorcycle accidents is 25 times higher than that for closed vehicles. 28% of road fatalities are bikers, though they represent just 1.6% of motorised traffic. Smaller and faster than cars, motorcycles are also disfavoured and frequently not properly seen by car and truck drivers. The proposed solution is to increase the lighting of the motorcycle.

In most cases, the accident is due to an error in the driver's perception. Either they don't detect the motorbike (or don't detect it in time), or they overestimate the time available to the approaching motorcyclist (and then might turn across the motorcyclist's path, for example). These errors are aggravated in nocturnal or twilight conditions, and in case of high traffic density. Since 2011 and the obligation for motorists to turn on their DRL, motorcycles have become less discernible in the flow of cars. They therefore need to increase their visual impact.

The AVIMOTO project has shown, through numerous tests, that the best way to improve the visibility of motorcyclists and the appreciation of their speed is to combine two lighting arrangements: Yellow DRLs to distinguished motorcycles from other motorised vehicles, and to arrange the lights in a vertical configuration. With two lights on the fork and one on the helmet, the biker enlarges his silhouette and thus becomes better detectable, day and night. Tests on the simulator and then on the circuit demonstrate the effectiveness of the device.

The efficiency of this lighting device is enhanced in night or twilight conditions, and in case of high traffic density.

Koito Acquires Shares of US Lidar Cepton

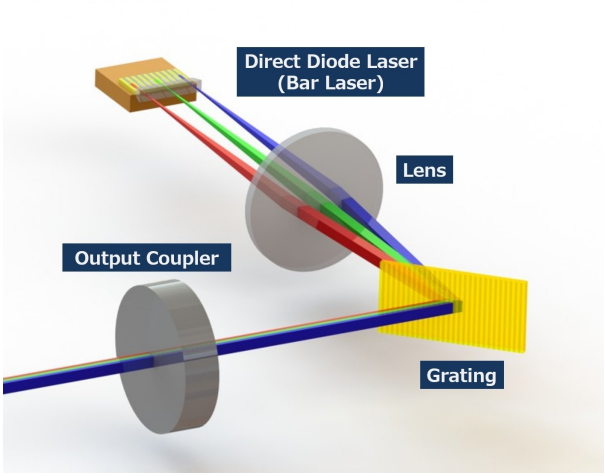
KOITO announces that it has acquired shares of Cepton Technologies, a US startup company which designs, manufactures and sells lidar for ADAS and AV.

Along with development of lighting technologies to support driver and mechanical visibility, KOITO is working to develop various sensors. As one of these strategies, KOITO has decided to invest $50m in Cepton, KOITO’s co-developer of automotive lidar, and strengthen relationship in order to accelerate commercialization of high-performance lidar.

Cepton’s high-resolution lidar can measure long distances, and enables wider range of view by its unique technology. Its scanning techniques are different from conventional ones, such as mechanical rotation and scanning mirrors. Its simplified and durable architecture enables a mirror-less, frictionless and rotation-free lidar solution to fulfill high-reliability, manufacturability, and affordable price which is required to automotive components.

Cepton’s lidar uses innovative and unique technology for laser scanning. Its scanning techniques are different from conventional ones, such as mechanical rotation and scanning mirrors.

Panasonic's New High-Power Blue Beam



Panasonic say they have succeeded in demonstrating "the world's highest brightness blue laser" by using wavelength beam combining technology on a direct diode laser to produce a high quality output beam.

With this technology, power scaling is enabled while maintaining the beam quality by simply increasing the number of laser sources. This demonstration opens the door to laser intensities that could be two orders of magnitude higher than conventional blue laser systems.

This technology will contribute to the emerging microfabrication processes, whose demand is expected to grow in industrial applications, such as in the automotive industry.

According to Panasonic, the automotive industry is "moving towards electrification and miniaturisation while requiring high rigidity, design flexibility and productivity". Against this background, the anticipation for the microfabrication lasers that can process various kinds of materials such as copper, gold and plastic is building up.

The company’s launch statement gives the following application example: "Blue lasers, especially, with a high optical absorption efficiency will have high demand in the field of copper fabrication for the automotive motors and batteries. Highly-productive processing requires a laser beam source that has both high output power and high beam quality".

Background SPD vs Perceived Discomfort

Report from John Bullough, Rensselaer Polytechnic Institute

The advent of LED technology for automotive lighting allows flexibility of the spectral distribution of forward headlighting systems, while meeting current requirements for "white" illumination.

As vehicle headlights have shifted toward more short-wavelength (blue) light output over the past several decades, their potential impacts on visual discomfort for oncoming and preceding drivers have been hotly debated.
It is known that a greater proportion of short-wavelength energy increases discomfort glare, and that increasing the background light level (e.g., through roadway lighting) will decrease perceptions of discomfort.

More recently it has been demonstrated that the visual system exhibits enhanced short-wavelength sensitivity for perceptions of scene brightness. As a result, roads illuminated by light sources with higher correlated colour temperatures (CCTs) will be judged as appearing to be brighter than those illuminated to the same light level by sources with lower CCTs. This laboratory study was conducted to identify whether the increased scene brightness of a road illuminated with greater short-wavelength light helps to mitigate discomfort glare more than the same scene illuminated to the same light level, but with less short-wavelength light.
The results indicate that the spectral distribution of the background plays little role in the degree to which it lessens discomfort glare. The implications of these results for vehicle and road lighting practices are discussed.

The report is to be published and presented at the SAE WCX this coming Spring.

Osram Reports a Robust Start for Fiscal 1Q20

After a year of ups and downs, Osram announced that it has kicked off its 2020 with slightly grown revenue and profit for the first quarter of its fiscal year.

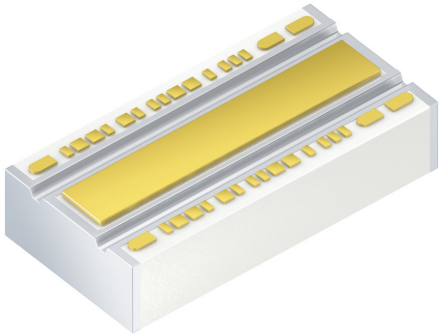
Osram posted a revenue of €873m with 0.5% on-year growth. Its Adjusted EBITDA increased by 22% YoY to €114m and 13% vs revenue. Business segment Opto Semiconductors performed stably with revenue amounted €359m.

Osram said that the important sales markets of the company developed economically as expected from October to the end of December in 2019. It was therefore essential for Osram's management to take timely and consistent countermeasures. These steps are clearly reflected in the figures of the individual business segments.

The German company closed the buyout and was sold to Austrian sensor maker AMS with €4.6 billion in December 2019. The two companies are still processing the merger and expect to finish it in the summer 0f 2020.

Driver Assistance News

Osram's 65W Laser for Lidar Photonics



With the SPL DP90–3, Osram Opto Semiconductors' portfolio gains a component specially developed for high-resolution, near-field detection in lidar systems.

Long-range lidar is used to detect objects up to approximately 250 metres away. The immediate surroundings of the car must also be reliably captured by short- or mid-range lidar, which covers a distance up to approximately 90 m from the vehicle. Short- or mid-range lidar covers classic traffic situations such as passing cars on highways or driving in urban traffic.

The new device is a single-channel pulsed laser that features improved beam quality and particularly compact dimensions. Thanks to its space-saving footprint of just 0.3 mm × 0.6 mm, system manufacturers can create extremely compact designs. An efficiency of around 30% helps reduce the overall cost of the system during operation. With an optical output of 65W at 20A, the component is also ideally suited for capturing the immediate vehicle surroundings, ensuring high-resolution images for subsequent systems.

General News

NHTSA Greenlights Driverless Delivery Vehicles

NHTSA has given permission for autonomous vehicle startup Nuro over the next two years to deploy up to 5,000 low-speed electric delivery vehicles without human controls like mirrors and steering wheels.

The rollout of the R2 vehicle will take place in Houston, Texas, with plans for it to deliver items like pizza and groceries. It is about half the width of a regular car, has no steering wheel or seating positions, and boasts gull-wing cargo doors.

Nuro, a privately held robotics company based in Mountain View, California, say they will begin public road testing to prepare deliveries in Houston in the coming weeks. Nuro called NHTSA's regulatory approval "a milestone for the industry."

The agency's approval of Nuro's petition will allow the company to deploy the R2, a vehicle designed to have no human occupants and operate exclusively with an automated driving system, as part of a delivery service for restaurants, grocery stores and others.

The R2, which Nuro describe as an "electric-powered delivery robot," is designed to make short trips and will be restricted to pre-mapped neighborhood streets. Nuro told NHTSA in its October 2018 petition that the R2 vehicles will at all times be monitored by remote human operators who can take over driving control if needed.

Automakers must meet about 75 auto safety standards to win such regulatory approval, many of which were put in place with the assumption that a licenced human driver would be in control. The approval followed three years of talks between the government and Nuro.

Hyundai Halts Korea Production Because Coronavirus

Hyundai Motor will suspend production in South Korea—their biggest manufacturing base, accounting for about 40% of their global output—becoming the first major automaker to do so outside of China due to disruption in the supply of parts resulting from the coronavirus outbreak.

The production suspension follows a shortage of wiring harnesses which Hyundai source mainly in China from companies like Kyungshin. "We are in an emergency," a Kyungshin official told Reuters. Hyundai and its affiliate Kia Motors do not keep large stocks of the affected parts, said Lee Hang-koo, senior researcher at Korea Institute for Industrial Economics & Trade. "Hyundai and Kia may be more affected as they tend to import more parts from China than other global automakers," Lee said.

Hyundai's reliance on China has grown sharply as they built a huge production capacity in the country several years ago when their business was booming there, he added. South Korea imported USD $1.56bn worth of auto parts from China in 2019. Manufacturers in China are struggling to get factory workers back to production lines due to extended holidays and suspension of public transport systems in some cities. Many global automakers, including Tesla, Ford, PSA Group, Nissan, and Honda have already suspended production in China this week in line with government guidelines.