Tue, 25 October 2022
Weekly Newsletter

DVN
Lighting & ADAS

NEWSLETTER #774

Editorial

VISION: A Grand Event; A Crucial Message

The 11th biennial VISION Congress was last Wednesday-Thursday at La Cité des Sciences in Paris with 550 attendees.
It was a content-rich, fruitful event with:

- Three keynotes by VIPs Nicolas Morel (Stellantis deputy engineering chief and officer); Nikolau Setzer (Continental CEO), and Laurent Favre (Plastic Omnium CEO)
- 35 lectures
- A constructive panel discussion on the UN Regulations for lighting and ADAS chaired by Volvo Cars' Paul-Henri Matha
- 20 demonstration cars presenting the latest technologies—a longtime hallmark of VISION, and
- 36 expo booths showcasing the latest innovations; ideas, and products.

In this week's DVNewsletter, you'll find ten key takeaway points from VISION. A major overspanning theme was the urgent needs of cost reduction and improved sustainability. We make wonderful innovations in lighting and driver vision and assistance, and we must also mind the priorities of automakers as the world transitions to EVs and AVs, with the resultant new pressures and constraints they exert on suppliers and researchers to come up with solutions that meet a mix of new and old needs on an ever-shorter development scale.
These are exciting times, aren't they!

Sincerely yours

In Depth Lighting Technology

Ten Takeaways from VISION Congress '22

This year's VISION congress featured many interesting lectures showing all aspects of progress in design and safety for lighting, and the important steps being taken for ADAS to make way for safe L^3 and L^4 vehicles. Examples:

- **Progress on new lighting functions.** Digital projections are an important domain covered by several lectures, including demonstrations that they pose no significant distraction for other road users. The merit of projections is supported by many studies showing real driver-support value which can lead to real safety improvements. Their compatibility with HUDs can be ensured by optimal placement of them on the road so as to avoid positional clash with the HUD window.
- **Thinner and thinner headlamps.** The trend for slim headlamps is supported by remarkable new modules of down to 5mm high, yet with the performance of much taller traditional systems, and new solutions mixing low beam; turn indicator, and DRL in the same module with just 15mm height.
- **Endless new styling proposals.** Jewel-like solutions are now available in plastic, reducing the cost of these modules targeting luxury design and appearance.
- **Optic modules.** Another direction to boost slim and compact headlamps is based on microoptics becoming now available also for headlighting after their introduction in more simple applications like side projection.
- **Sensors** are becoming more and more performant in bad weather. Software is more and more the key-enabler for Advanced Lighting Functions. One

consequence is that the OEM has to take a bigger part of the job and of the responsibility in integration, homologation and OTA updates of regulation relevant lighting functions.

- **ADB technology carries on evolving.** µLED is the general direction with 15,000 to 25,000 µLEDs in production soon.
- **Headlight ratings** are still a hot topic, with rating systems being developed and adjusted for maximum benefit to all concerned parties from regulators to end-users.• **Sustainability** is increasingly crucial for compatibility with a finite planet and consumer-acceptability. Particularly salient is the need to reduce electric consumption; several lectures looked at the 'cost' of power consumption—each extra watt reducing the range of an EV by 0.1 to 0.2 km, to be compensated by added battery cost of €1 to €2. Obviously, there are hard limits!
- **Control of costs.** All this new technology costs money! Nicolas Morel stressed the need for cost decreases, stating that present EV incentives would amount to €50bn in 2035 if maintained at present levels—not possible for European governments or most others. So, incentives will phase out, obliging car makers to find around €6,000 of cost decrease per car from their suppliers.
- **20 sparkling demonstration cars.** Production and prototype cars in static and dynamic situations included the BMW 7-Series with Cristal Light and M4 with laser tail lamp; Renault with Melexis interior light, and also with SUV Austral; Rivian; Ford F150e; Jeep Grand Cherokee with 15mm-tall Valeo headlamps; IR lighting; MicroVision and Valeo Scala^{3} lidars, and a variety of projection solutions.

Lighting News

VISION Panel Discussion: How to Regulate New Functions

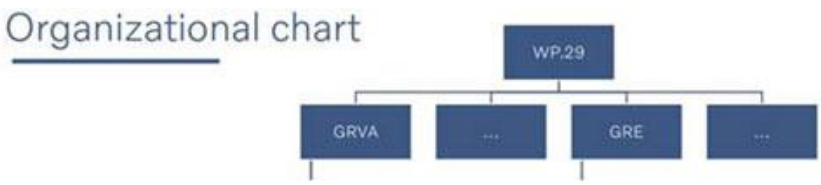
LIGHTING NEWS

L-R: P-H MATHA; F GUICHARD; T KÄRKKÄINEN; A PAMART, T-K KHANH

Key members from GRVA, GRE, test houses, and research institutes gathered to talk about ADAS; AD; OTA and cybersecurity regulation. These regulations are handled by different organisations under the umbrella of UNECE in Geneva. It was interesting to hear the views from Timo Kärkkäinen (GRE chairman); Francois Guichard (GRVA secretary); Antoine Pamart (UTAC test house), and Professor Khanh (TU Darmstadt.)

We can summarise the panel discussion with four main topics:

- GRVA position GRVA-14-15r3e.pdf (unece.org)) about the need for an additional light-signaling device when the car is in autonomous driving mode: they do not recommend any mandatory lamp. It is now up to WP29 to decide if GRE should make a proposal or not. The need for additional research about an AD signal is still real, and it is good that universities like TU Darmstadt are working on it.



- New regulation from GRVA: R155, R156 Software update regulations are mandatory in Europe since this past July. Test houses are ready for type approval as explained by UTAC. Test houses have developed new methods based on physical testing on a track and also on virtual simulation and virtual testing.
- GRE is working on the legal framework for new features like driver assistance road projections; signaling road projections; automatic levelling, and

welcome/farewell sequences.

- GRE is also investigating how to support the automotive industry and especially lighting about reduction of CO_2 footprint, by reducing power consumption in existing exterior lighting without reducing safety. They need support from organisations like GTB and research outfits. TU Darmstadt presented how they can support this topic, and explained that they are already working on this, especially with adaptive low beam and adaptive signaling functions.

Advanced Light Source Lectures at VISION

LIGHTING NEWS

DVN's Wolfgang Huhn chaired a lecture session comprising three presentations on advanced light sources.
Light sources have long been a key driver of innovations in vehicle lighting, each in its turn enabling new levels of performance and new functions. We can expect this trend to continue, supported by software as the newest enabler of automotive lighting innovations.

Benno Spinger from Lumileds started with a presentation entitled Highest Luminance Colour LEDs for a Next Level of Visual Safety Experience Around the Car. He showed LED solutions for the likes of turn signal ground projections with high luminance; reverse-light projections, and dynamic applications with LED matrices and microlens arrays. Some of these functions were shown in the demonstration cars at the event.

Nichia's Menno Schakel talked about Exploring the Challenges in Micro-LED Pixelated Light Sources for High Resolution Headlamps. He described the Nichia 16-kilopixel µLED device with integrated microelectronic controller. It has multiple video interfaces and 16 integrated temperature sensors for the thermal management of the high max power of 30 W. A real piece of high lighting technology we will see soon on the road.

Soeren Hartmann from OLEDWorks showed his company's state-of-the-art automotive OLED technology. He announced the introduction of bendable OLEDs in the near future. A wide array of light concepts and design studies with OLEDs were shown in their expo booth.

FROM LEFT: S HARTMANN; M SCHAKEL; B SPINGER, W HUHN

The session ended with a lively Q&A round as shown in the picture.

New Light Design Trends @ VISION '22

LIGHTING NEWS

The three lectures in this session explored how to achieve some important trends in lighting design: slimmer and slimmer headlamps; jewel-like modules, and sensor integration.

In the first lecture, Arnaud Perrotin from Valeo Lighting presented the evolution of the height of headlamps as we head toward astonishingly slim modules. Valeo have developed what an ultrathin lens with a height of 1.5 cm, with good efficiency and performance like taller lamps and without a massive lens. Moreover, a 5-mm-high prototype was developed with the same new technology and still with good efficiency!

In the second lecture, Alexander Buck from BMW and Gerald Boehm from ZKW presented crystal-like modules. On the current BMW 7, the DRL is partly realised with glass modules from Swarovski. The headlamp presented during the lecture had all the sparkly crystal effects but without heavy, costly glass; Boehm explained that to reduce the cost, ZKW have been developing a new solution using plastic modules. The difficulties they had to solve were to define a design with the sparkling effect, which also performs in accord with DRL and TI specifications.

In the last lecture, Christian Buchberger from Marelli Automotive Lighting explained the interest in integrating sensors in headlamps—and the corresponding challenges. Designers are pushing for the integration of sensors in headlamps as sensor count steadily increases; presently the realistic idea is about 38 different sensors for dependable L^4, with more and more design concerns. Sensors in headlamps could also improve the detection distance by 20m in some conditions, thanks to optimal positioning.

Valeo, SRG Global in Lit-Grilles Pact

LIGHTING NEWS

SRG GLOBAL PRESIDENT MIKE LEE (L); VALEO VISIBILITY SYSTEMS PRESIDENT MAURIZIO MARTINELLI (R)

Valeo and SRG Global have entered into a strategic alliance agreement to cooperate on exterior illuminated front panels to the automotive industry. The two companies' respective expertise will lead to new innovative solutions, enabling highly integrated and stylised exterior lighting systems for automakers in North America and Europe.

Grilles and emblems and nameplates; moldings and bezels and other trim pieces; injection moulding and painting and plating are specialities of SRG Global. Valeo Visibility Systems president Maurizio Martinelli eagerly anticipates the partnership, which he says "puts Valeo and SRG Global among the biggest players in the automotive exterior front central area that will grow with vehicle electrification".

SRG Global, headquartered in Troy, Michigan, are specialists in high-value coatings on plastic for the automotive and commercial truck industries. They have manufacturing presence in major world regions including North America, Europe, and Asia.

New Melexis Driver Supports Animated Light

LIGHTING NEWS

Car manufacturers continue to adopt animated lighting in the cabin to provide important information such as driver-assistance prompts and vehicle status updates. Changing colours and different blinking sequences enhance messages in need of driver attention. This presents engineering challenges, such as maintaining consistent colour across all of the LEDs and implementing simultaneous light changes.

The Melexis MLX81143 addresses these challenges by integrating the company's CAN-over-UART MeLiBu (patented license-free) solution. This high-speed communication interface controls individual LEDs to implement the lighting effects defined by the vehicle's systems. The intelligent RGB-LED controller also provides real-time compensation of any colour drift caused by environmental changes, and colour-mixing variance of less than 1 per cent to eliminate any distinguishable differences among LEDs.

MeLiBu technology is already being used by multiple automakers. Its communication interface employs a CAN-FD physical layer to deliver robust and reliable performance at up to 2 Mbit/s. Combining UART (universal asynchronous receiver-transmitter) with the MeLiBu protocol affords intelligent, high-resolution operation with minimal temperature-related colour drift, for a consistent and non-distracting user experience.

Alpine’s Future Starts with Alpenglow

LIGHTING NEWS

PRES. MACRON BETWEEN DI MEO AND ROSSI

Alpine say their Alpenglow conveys emotions; creativity, and elegance, and is opening the door to automotive and motorsport excellence with new sustainable approaches including hydrogen power. This concept is the starting point for all future Alpine car designs; technologies, and breakthroughs, all the while remaining true to the brand’s history.

The light stream starts at the front, symbolising a comet entering the atmosphere.
At the front, triangles of light form a sprinkling of stars rising from the four headlamps, mirroring Alpine’s emblematic signature.

Driver Assistance News

Baraja, Veoneer in Lidar Development Pact

DRIVER ASSISTANCE NEWS

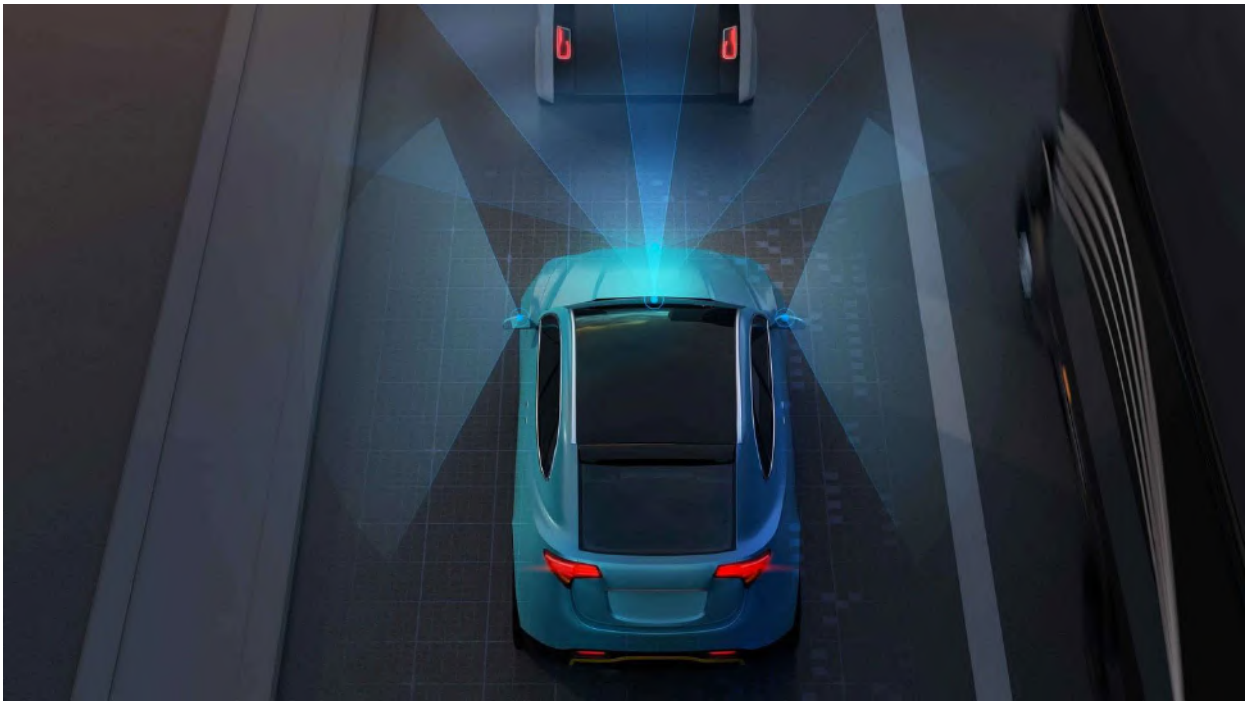
Baraja, with their Spectrum-Scan lidar technology for autonomous vehicles, have agreed alongside their partner Veoneer to accelerate development of the systems.

The pact is described as a major step forward for automotive integration of the Spectrum HD25 product, which Baraja call a 'generational leap' for automotive lidar. It's built on Baraja's proprietary Spectrum-Scan solid-state scanning platform. It's said to enable the range; resolution, and reliability required for true autonomy, without the tradeoffs imposed by other lidar technologies. Baraja say it's the world's first lidar system combining hardware-level pointwise Doppler capability with Spectrum-Scan™ and Random Modulation Continuous Wave (RMCW) ranging to deliver unparalleled performance and accuracy at range and speed.

***Baraja**'s Spectrum-Scan lidar technology gives automakers a solid-state system in the fast axis that sets a new benchmark in precision and reliability. **Veoneer** are a tier-1 hardware supplier and system integrator whose products are part of more than 125 scheduled vehicle launches for 2022. Headquartered in Stockholm, Sweden, Veoneer have 6,100 employees in 11 countries.*

Trumpf's Multi-Junction VCSEL is Small, Efficient

DRIVER ASSISTANCE NEWS



Trumpf Photonic Components, who specialise in VCSEL and photodiode solutions, are responding to the demand for miniaturisation in automotive electronics by expanding their VCSEL array portfolio with the multi-junction feature. Their tunnel function technology offers a highly efficient solution with compact form factor. With tunnel functions, the performance of a single VCSEL is increased, as multiple active zones are put into series in the same VCSEL component. Up to three times the output can be generated out of a single VCSEL device. Most illumination applications benefit from higher efficiency and increase in output power with the same VCSEL light source.

The multi-junction technology supports applications such as lidar, as this application in the automotive branch requires high-output power within limited space for the short and long-range identification of objects.

The VCSEL technology will remain a main light source for applications in automotive applications, as they are highly efficient and boast a long service life.

Zvision, Nvidia Team to Push Solid-State Lidar AI

DRIVER ASSISTANCE NEWS

Zvision are planning to enhance their technology and industrialisation cooperation with Nvidia, leveraging Nvidia's leading AI chip hardware and software toolchains to develop a range of solid-state lidar-based autonomous driving sensors and systems. Zvision say they also will commit to improving intelligence in the development of lidar sensing software and creating autonomous driving perception solutions to deeply integrate lidar sensors and AI computing platforms.

Powered by the Nvidia Jetson hardware platform, Zvision can significantly shorten the prototype testing time and R&D cycle for lidar products; enhance efficiency, to accelerate the commercialisation and safe implementation of lidar systems.

In a further step of the collaboration, Zvision will cooperate with Nvidia to develop a wide range of custom lidar sensing solutions for autonomous driving applications including vehicle-road coordination; low-speed unmanned intelligent logistics; high-speed logistics; robotaxis, and robotics—all with the goal of empowering the build-out of an autonomous driving infrastructure.

Volkswagen, Horizon in China JV

DRIVER ASSISTANCE NEWS

Horizon have announced the establishment of a joint venture with Cariad, VW Group's software company. VW Group, for their part, reportedly plan to invest about €2.4bn in the cooperation and hold a 60-per-cent stake in the joint venture, which is expected to be completed in the first half of next year.

Cariad will work with Horizon to develop optimised full-stack advanced driver assistance systems and autonomous driving solutions, integrating multiple functions on a single chip to improve system stability; save costs; and reduce energy consumption. The overspanning goal: to provide scalable, cost-effective advanced driver assistance systems and autonomous driving solutions for VW-group EVs in China.