Editorial

Get Set For VISION Congress

The China DVN Workshop last week was a grand success, despite gathering only Chinee residents on account of that country's Covid-related lockdowns. Nevertheless, there were 250 attendees and 18 exhibitors! A report will be published next week with summary of lectures, feedback of the chairs, presentation of the exhibition booths, and a lot of pictures.

Now, it is time to focus our work on the VISION congress. As VISION President, I am now working very hard with the steering committee, to organize the event—location; lectures; exhibitions, and demo-cars.

Out of the 36 lectures, the four main points of the congress will be:

- three keynotes made by VIPs—Nicolas Morel, Deputy Chief Engineering Officer of Stellantis; Nikolai Setzer, CEO of Continental, and Laurent Favre, CEO of Plastic Omnium
- 30 exhibition booths packed with innovations
- round table panel discussion chaired by Volvo's Paul-Henri Matha
- 25 demo-cars presenting the latest new lighting and ADAS technologies.

In this week's DVNewsletter you'll find a summary of the docket as it stands now. It's rapidly taking shape, and I look forward to seeing you at the event!

Sincerely yours,

DVN CEO

In Depth Lighting Technology

VISION Congress Docket Preview

Conference Steering Committee · chair: Hector Fratty, Driving Vision News
Frédéric Charon, SIA
Martin Pierrelee, SIA

• For Lighting:
Benjamin Donette, Renault
Mathieu Collot, Stellantis
Paul-Henri Matha, Volvo Cars
Cedric Gesnouin, Plastic Omnium
Whilk Goncalves, Valeo
Jean-Paul Ravier, Driving Vision News

• For ADAS:
Christian Taffin, Renault
Matthieu Dabek, Stellantis
Sébastien Lefranc, Continental
Clément Nouvel, Valeo
Gabriel Clement, ZF

Three keynotes

Nicolas Morel, Stellantis deputy chief engineering officer
Nikolai Setzer, Continental CEO
Laurent Favre, Plastic Omnium CEO

One Round table panel discussion

Title: UNECE regulation for lighting and ADAS: status, future and stakesTarget: To better know and understand road light projections, autonomous vehicle signaling, new regulations on software and cybersecurity updatesParticipants :
Kärkkäinen, GRE chairman
François Guichard, GRVA Secretary
Pr Khanh, TU Darmstadt
Antoine Pamart, UTAC
Fabrice Herveleu, UTAC

30 exhibitions

• Tier-1s including Bosch; Forvia; Valeo; Varroc, and ZKW
• Light source suppliers including AMS Osram; Lumileds; Nichia; Seoul Semiconductor; Texas Instruments, and Evelight
• Tiers 2 and 3 including Ansys; Avisimulation; Bollhoff; Dspace; ETAS; Gore; Intempora; IPG; Luxor; Melexis; MicroOptics; Microrelleus; OLEDWorks; Synopsys, and TDK

36 lectures in 11 sessions

Innovative Lighting Systems (chair: Benjamin Donette)
New Styling Trend, New Functionalities (François Bedu, Renault)
Slim & Dual Function Optical System for Next Generation Headlamps (Hyun Soo Lee, Hyundai)
The Perfect Micro-Optical Headlight (Christopher Bremer, Suss)

New Trends in Lighting Design (chair: Jean-Paul Ravier)
Ultra-Thin Solutions for Front Lighting (Arnaud Perrotin, Valeo)
New Light Styling Approach in Headlamps: Challenges, Possibilities (Gerald Boehm, ZKW)
Light Emphasized Sensor Integration (Christian Buchberger, Marelli)

Improved Sensor Performance (chair: Sophie de Lambert)
Overview of Emerging Visual Sensors for Autonomous Driving (You Li, Renault)
Night & All-Weather Camera and Its Critical Role (David Ofer, Brightway Vision)
Investigation: Influence of Camera Parameters on Data Quality (D. Hoffman, TUD)
Detection of Road Lighting Using a Conventional Camera System (Simon Vogel, Hella)

Road Projection Stakes (chair: Ingolf Schneider)
Digital Projections: Distraction Potential for Other Traffic Participants (Michael Hamm, Audi)
Review of Users' Evaluation and the Needs for Road Projections (A. Stuckert, BMW)
Digital Projections: Next Level of Freedom (Michael Rosenauer, AMLS)

Validation and Adverse Weather Conditions (chair: G. Le Calvez)
Simulation Adverse Weather as Enabler for Developing AD Systems (W. Ritter, Mercedes)
Comparing Vehicle Safety Systems in Adverse Condition (JE Källhammer, Veoneer)
Use and Development of the PAVIN Fog and Rain Platform (presenter tbd)

Technologies and Communications (chair: Whilk Gonçalves)
The transition for ADB in the US Market and Lighting Strategy (Stellantis, presenter tbd)
Communication With Lighting Through HD Signal Functions (A. de Lamberterie, Valeo)
Low Profile ADB Headlamp With Efficient Light Guide Technology (Rainer Neumann, Varroc)

Advanced Light Sources (chair: Wolfgang Huhn)
Highest Luminance Colour LEDs for a Visual Safety Experience (W. Schrama, Lumileds)
Exploring the Challenges in µLED, µPLS, for High Resolution Headlamps (M. Schakel, Nichia)
Advancing OLED Lighting Technology (S. Hartmann, OLEDWorks)

Lighting and Sustainability (chair: Christophe Le Ligné)
Exterior Lighting Function and Better Understanding About Usage (P-H Matha, Volvo)
Analysis: Headlamp Energy Consumption Options for Reduction (E.O. Rosenhahn, Marelli)
Efficiency Enhancement Opportunities by Traffic Situation Analysis (Anil Erkan, TUD)

Innovative Concepts; Complementary Features (chair: Mathieu Dabek)
Challenges for Driver Assistance Projections (Philipp Roeckl, Stellantis)
Intelligent Speed Assist for EU GSR: New Cloud-Based Approach (A. Garnault, Valeo)
Reconstruction and Mapping of the Road Profile from Sensors (R. Guridis, Stellantis)
Pave the Way for Safe Automated Driving at Level Crossings (Richard Denis, Valeo)

Assessment for Safety Improvement (chair: Rainer Neumann)
Effectiveness, Conflict of Road Projection Lamp for Cyclists, using VR (K. Murata, Koito)
Survey for a Customer-Oriented Assessment of Headlamps (C. Hinterwälder, Audi)
Front Lighting Ratings and Latest Updates of Regulations (A. Austerschulte, Marelli)

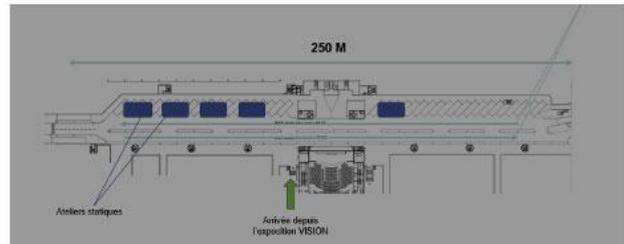**Simulation for ADAS Development (chair: Vanessa Antoine)**
Computer Graphics to Challenge Physical Process of Lighting (B. Deschamps, Renault)
Evaluation of Decision-Making by Simulation (M. Taha Boudali, IRT System X)
Virtual Modeling of an ADAS Radar (Vanessa Palmier, IRT System X)

<u>Night drive presentation</u>

The circuit (in the basement of the Conference Center):

The demo-cars

- **25 demo-cars, of which 17 in lighting…**• BMW 7 Series with Cristal light
  • BMW M4 with laser tail light
  • Nissan Qashqai
  • Renault Megane E-Tech
  • Renault Austral
  • Renault demo-car
  • Stellantis demo-car
  • AMS Osram demo-car
  • Forvia-Hella demo-car
  • Plastic Omnium demo-car
  • Valeo demo-cars
  • AML Systems LUMEMS
  • Melexis-Renault demo-car
  • Microvision demo-car
  • Rivian car
  • Ford F150e
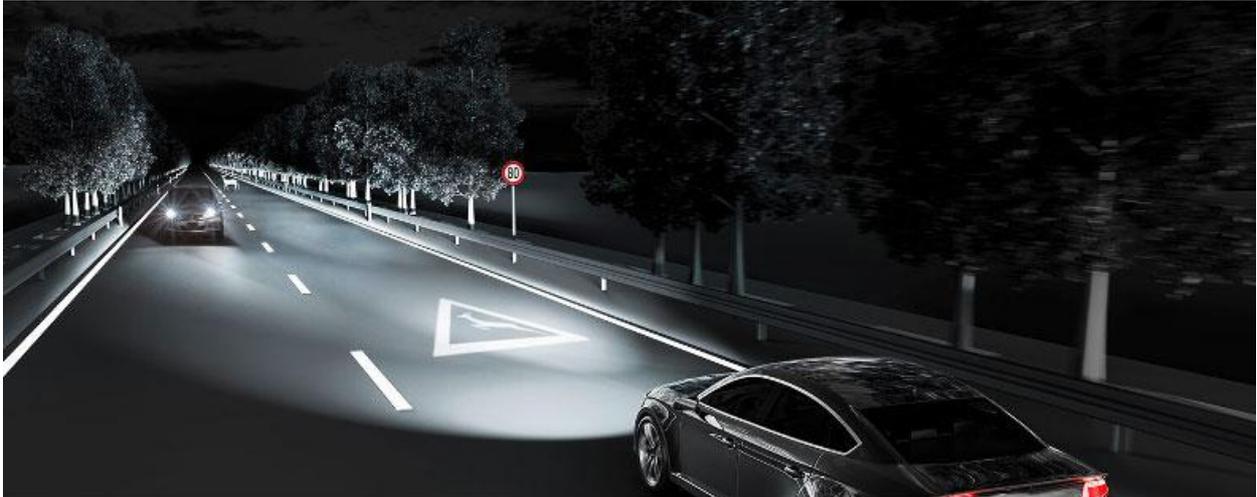 • 1 more demo-cars to be defined

  …and 8 demo-cars in ADAS:
  • Renault demo-car
  • Stellantis demo-car
  • Nexyad demo-car
  • Valeo demo-car
  • Valeo demo-car
  • ZF demo-car
  • Microvision demo-car
  • 1 additional demo-car to be defined

Lighting News

VISION Sneak Preview: Road Projections Aren't Distracting

At the VISION Congress, Michael Hamm will present research findings on digital lights, intended to figure out whether and how road projections are visible to other road traffic participants, and whether they're distracting.

Each test person saw in a light Tunnel a realistic (static) situation with low beams and a digital projection in about 20m in front of the car. From driver's view, the projection was about 0,5°, a size common in real traffic. 5-letter combinations had to be read in a 900 m2 road area in order to cover various traffic geometries

Distraction when being overtaken: There is a very small and limited area where digital projections are readable or detectable at all outside of the car. About 94 m2 for overtaking situations were visible to all test persons. The limited area for visibility in overtaking shrinks in oncoming situations by 95% to 5 m2.
Only from driver's view the grazing incidence is virtually compressed, and symbols are fully legible as an object 0.5° in size. The readability decay is very quick: 6 m aside of the projections, the readability approaches zero. The Luminance varies, due to the distorted projection, by a factor of 14.

Distraction when meeting other vehicles: The time window for visibility for oncoming vehicles is a negligible 0.4 second; no oncoming driver will realistically be able to read.

Pedestrians at the side of the lane will not be able to follow and read the projections. Even when they are close to the driving lane, the readability time of a moving pattern would be only 1.2 seconds.

So, all in all, there is not enough time to be distracted by digital projections. They are made and configured for the driver and produced so as to be really visible only for the driver and nobody else.
But that's just a quick summary; you won't want to miss the whole lecture at the VISION congress!

Car Content at Huawei Optical Tech Workshop
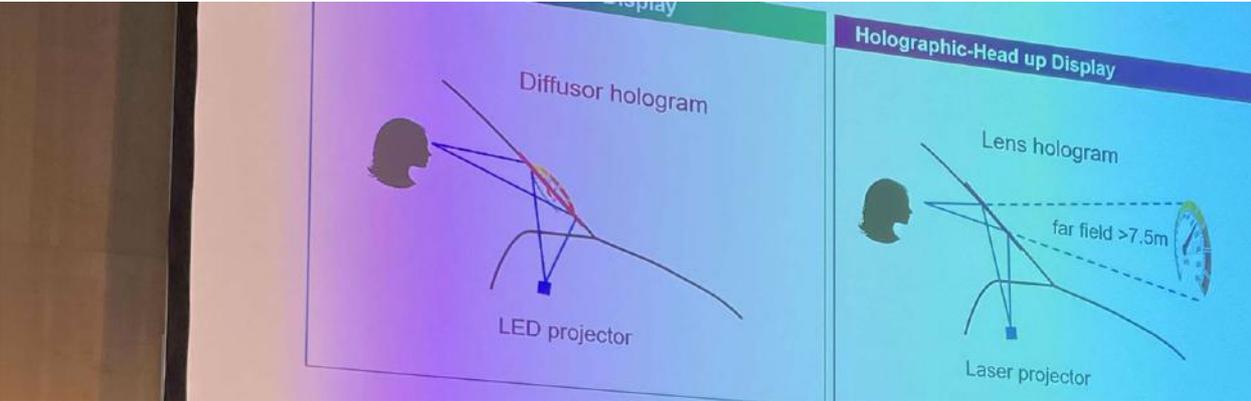
DVN's Wolfgang Huhn was invited to give a presentation at the Huawei European Optical Technologies Workshop in Basel, Switzerland. Ten high-level speakers, mainly University Professors from TU Berlin; Universidad de Alsala; University of Patras, and Tel Aviv University were invited, along with Huawei Speakers. Presentation topics included the evolution towards 6G; fibre optic Brillouin sensing and petabyte-per-second optical network switching. The docket included two automotive-technology presentations:

CHRISTEL MANECKE
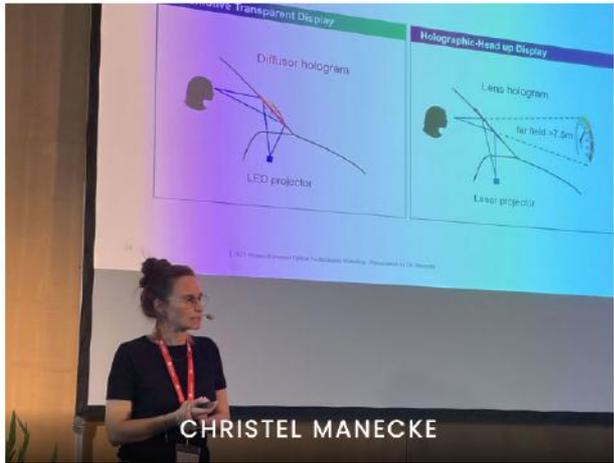
WOLFGANG HUHN

DVN's Wolfgang Huhn described headlamp technology and gave an overview of the technologies coming on the market in the next years. And Christel Manecke from Covestro gave a highly interesting speech about that company's new Bayfol HX photopolymer for volume holographic optical elements. The material's first automotive application will likely be as a transparent display or holographic HUD. Huhn said "If you think a bit further, holographic-foil based rear lamps could have the potential to become a disruptive rear lamp technology. I am curious who will pick this up and starts a pre-development rear lamp project.
Obviously Lighting Technology never stops innovating!"

At the end of the workshop, a dinner was put on by Huawei in a great historic environment In Basel's old town.

Headlamp Built into the Front Grill Reduce Glare

Renowned vehicle lighting researcher John Bullough has written a new eBook, _**Understanding Glare in Exterior Lighting, Display and Related Applications**_. It's a compendium of research and models for predicting disability glare; discomfort glare; glare recovery and reflected glare in many different applications. Bullough describes contributors to each type of glare, such as intensity; spectral and colour factors; luminance, and duration of exposure.

Bullough says "Like many things, lighting is something that is noticed mainly when it's doing something wrong. Glare is an unfortunate part of lighting that has given me an opportunity to do something to help make walking and driving at night safer and more comfortable by identifying glare's causes and countermeasures".

In addition to summarising metrics and tools to quantify glare, the volume also provides techniques and guidance for minimising the impacts of glare in a wide range of lighting applications, including vehicle headlighting; street lighting; interior illumination, and display screens.
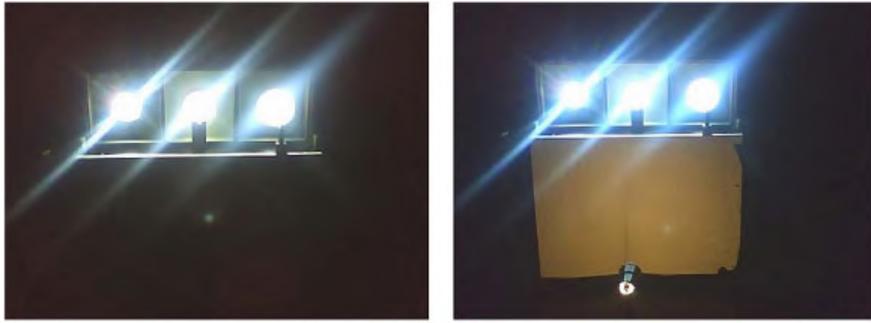
In response to a DVN prompt, Bullough provided an example of a glare-countermeasure for the vehicle context: the use of an illuminated background around or adjacent to the headlamps, to reduce the contrast of the headlamp against its immediate surrounding and increase the size of the total lit area. In these paired images, glare from the LED lights along the top is apparently reduced when the surface below is moderately illuminated to a moderate light level.

Plastic Omnium's New Bi-LED Headlamp Module

Plastic Omnium's new B91R projector module for static low and high beam features a particularly slim, space-saving design that allows for ultra-modern styling without compromising on performance.

The B91R is based on TIR primary optics, which allows for particularly slim headlamps. Thanks to two individual LED boards, the module can switch between low and high beam without a mechanical shutter. Standardised, compact design means these high/low beam projectors can be easily integrated into vehicles, and their reduced component count and passive cooling make them more affordable than other headlamp modules.

Hyundai Mobis Light the Grille at Detroit Auto Show

Hyundai Mobis exhibited for the first time at NAIAS, the Detroit auto show. The world's № 6 auto supplier exhibited more than 30 technologies including their EV platform; an illuminated grille; an integrated cockpit, and an AR HUD.

Mobis executive VP and head of global OE sales Axel Maschka explained the company "are discovering many new opportunities in the North American market, where competition for future mobility is fierce. It's important for us to meet our customers in Detroit, the heart of the U.S. automotive industry, to showcase our innovations and continue our expansion in the global market".

The Koreans showcased their illuminated grille technology at the show. It allows automakers to use the entire grille as a lighting element or to communicate with vehicles or pedestrians. This technology shows how the front-and-centre area of the car can evolve into a grilleboard on an EV that has no need of a radiator grille.

Driver Assistance News

LSLidar's New Image-Grade Automotive Solution
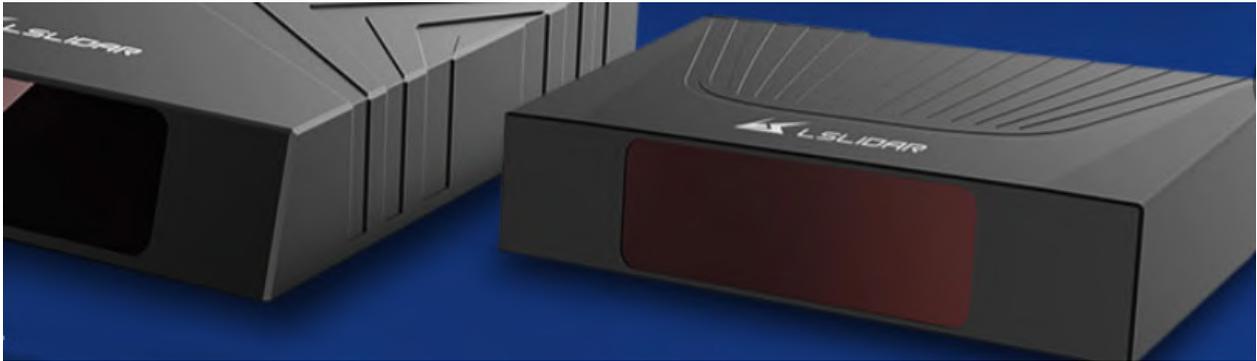
LSLidar, a Shenzhen-based business activity of LeiShen Intelligent System Company, have launched a new automotive-grade 1550-nm fibre laser lidar they're calling the LS Series. It's designed for long-range, high-resolution sensing in L3+ applications.

LeiShen say the LS lidar offers 500-metre capability for high-reflectivity targets; 250 metres for 10-per-cent reflectives, with much greater human-eye safety by dint of the 1550-nm wavelength compared to 905-nanometre lidars. This, the makers say, allows for greater peak pulse power to provide longer detection distances.

Furthermore, LSL say the new lidar provides an ultra-dense point cloud for image-grade resolution so vehicle systems can earlier identify potential road hazards. 128-; 256-, and 512-line configurations are possible, generating respectively 1.6; 3.2, and 6.4 megapoints per second.

The field of view is 12°V × 25°H, and the 128-line version has a standard resolution of 0.09°H × 0.2°V With the ROI (region of interest) feature enabled—equivalent to 512 lines—the angular resolution can reach as little as 0.05°.

The overall dimensions are 20 per cent smaller than other lidars, and the LS series lidar is now available to automakers. Additional configurations are available with detection range up to 2000m
Established in February 2015 by LeiShen Intelligent System Company, LSLidar have in-house R&D and manufacturing capabilities to serve the automotive; industrial, and smart city sectors in Asia; North America, and Europe.

Volvo set to unveil new lidar-equipped car

Volvo Cars has announced plans for the global unveiling of its EX90 car - the first to feature lidar as a standard safety feature - on November 9.

The Swedish auto maker, long associated with pioneering vehicle safety, claims that the software and sensors in its new all-electric SUV should help reduce accidents that result in serious injury or death by up to 20 per cent.

Those sensors include radar, in-cabin cameras to monitor driver attention, and lidar units provided by California-based Luminar Technologies..

"Our lidar senses the road in front of you, whether it's day or night, also at highway speeds," Volvo said in a release announcing the November 9 reveal. "It can see small objects hundreds of meters ahead, creating more time to inform, act and avoid."

The company estimates that the combination of lidar and other sensors will improve overall crash avoidance by up to 9 per cent, potentially translating to millions of accidents avoided in the longer term..

"The safety standard in our next car will be beyond any Volvo car before," Volvo CEO Jim Rowan said. "Our mission is to help protect you from all the risks.

"In just a few weeks, we will show you the new Volvo EX90, our first Volvo car in a new era - born electric, born with lidar."

Luminar's lidar system is based around a fiber laser emitting at 1550 nm, designed in-house from the chip level, that thanks to laser eye safety regulations is able to deploy much more power than shorter-wavelength lidar sensors that are more typical in the industry, thus improving range.

Hella's SHAKE Road Condition Sensor

Hella have announced an innovative Structural Health and Knock Emission (SHAKE) sensor for road condition detection, now supported on the Nvidia Drive Hyperion AV development platform. With the SHAKE sensor, vehicles can hear and feel the environmental noise spectrum; analyse those characteristics, and initiate actions for driver safety and comfort.

Hella are first to offer a solution for accurate, real-time measurement of the water level on roads; the SHAKE sensor detects vibrations and airborne sounds from water drops that have been stirred up, and uses them to determine the degree of wetness between the tire and the road. Previous solutions calculated the amount of water using high-powered cameras, which cannot offer enough information to drivers or self-driving systems to make critical driving decisions.

Hella developed the SHAKE sensor to improve vehicle awareness by detecting structural and airborne sounds via a piezoelectric film element. Its acute sensing capabilities give car systems the information they need to make critical driving decisions. For example, assistance systems can predict the braking distance depending on the wetness of the road; adjust the control systems of the longitudinal and lateral dynamics, and actively adapt a car's distance to the vehicle in front of it.

General News

Microchip Shortage: OEMs Cut Back in Every Region

Unrelenting microchip shortages have taken 96,700 more vehicles out of automaker production schedules around the industry.

According to the newest estimate by AutoForecast Solutions, plants in every region of the world are sharing the pinch at the moment, including China, which had largely managed to steer through the crisis earlier in the year.

Chinese plants trimmed 8,200 vehicles out of their schedules for the week, according to AFS, bringing their total lost production for the year so far to 167,600 vehicles. But in the same period of 2021, China had lost 10 times that number.

North American plants are cutting 54,000 vehicles out of their plans this week, while factories in Asia outside of China will lose 25,000.

AFS now forecasts that the industry will lose a worldwide total of 4.2 million vehicles from 2022 production plans because of the microchip problem by the end of this year.

Regions	2022 Projected
North America	1,388,700
Europe	1,450,400
Rest of Asia	881,800
South America	272,800
China	168,300
Middle East/Africa	53,600
Total	4,214,500

SOURCE: AUTOFORECAST SOLUTIONS