



Editorial

Intense Activity At DVN: Achievements And Challenges

Despite the difficulties weighing heavily on everybody—COVID, social unrest, political instability—we've kept busy this year here at DVN, and here are some of the things we have to show for it:

- DVN Munich Workshop: over 300 attendees and 25 exhibitions
- Six full-length DVN Reports on CES; Lighting in America; Marelli AL; 50 Years of Lightstyling; ADAS and Lighting, and Evolution of LEDs
- The DVN Study on new lighting functions, the most important DVN work of this decade
- Online DVN-I workshop on Smart Interiors with 200 attendees and 14 exhibitors
- Valeo, Hella, Inova, and Texas Instruments are among the first advertisers on DrivingVisionNews.com.

We're proudest of all that 11 new DVN Gold members have joined the community, while nobody has unsubscribed even in these difficult times. We're delighted to welcome automakers **Ferrari** and **Mitsubishi Motors**; **Ansys**, the famous developer of simulation tools for optics, thermics, and electronics; **CEA-LETI** the preëminent French research institute, major rearview mirror and camera makers **SMR**; German semiconductor makers **Inova**; **Suss MicroOptics**, a producer of refractive and diffractive microoptics; versatile lighting solutions provider **L.E.S.S**; **Lite-on**, a specialist of automotive LED products and solutions like matrix lights; **Technoteam**, who offer luminous intensity distribution measuring systems, and **MD moldes**, a maker of molds and product solutions for vehicle lighting.

This quarter puts four main challenges in front of us:

- The third DVN Lidar Conference, 17 November 2020, our annual analysis of the evolution of the LiDAR industry for ADAS and robotic vehicles, usually taking place in Frankfurt and online this year. For more information and Registration click [HERE](#).

- The 21st DVN Workshop, an online replacement for the Tokyo event, 2 December 2020, focussed on the next generation of intelligent and digital lighting. For more information and Registration click [HERE](#).
- The worldwide promotion of our exceptional 2020 DVN Study "[New lighting functions 2020-2030](#)".
- The publication of our three next DVN Reports on new models worldwide, Audi profile, and lighting in developing countries.

To all our members and readers, new and veteran alike: we're glad you're here. We appreciate your investment in DVN and the trust it represents, and we're committed to working relentlessly to bring you top value.

Keep well and stay safe,

A handwritten signature in black ink, appearing to read "J. Frally". The signature is written in a cursive, slightly slanted style.

DVN PRESIDENT

In Depth Lighting Technology

This Autumn's Four DVN Challenges

Despite difficulties times rained down by 2020, the DVN team has been constantly engaged in intense activity, with great achievements to show for it. And now four steep challenges are in front of the team:

- **3rd DVN Lidar Conference**



The DVN Lidar Conference is normally organised as a face-to-face event in Frankfurt. This time it's to be held online with 25 lectures from the likes of Audi, PSA, Volvo; Continental, Koito, Marelli AL, ZF, ZKW, Valeo; Aixemtec, Cepton, IBEO, Innoviz, Jenoptik, Osram Opto, OQmented, Ouster, Velodyne, Xenomatix; Fraunhofer IMS, and Yole Development.

This online event will gather over 300 top worldwide experts in automotive lidar and lighting from over a hundred companies in Europe, Japan, Korea, China, and the Americas. Exhibitors will use virtual booths to present their newest innovations in lidar-based automotive technologies. For more information and Registration click [HERE](#).

- **21st DVN Workshop**



After the lidar Conference, we will hold a DVN Workshop—our 21st!—online in place of the DVN Tokyo Workshop. We'll publish information soon, but you'll want to save the date, the 2nd of December; it will surely be a top-flight event with active participation by the world's greatest experts in lighting.

The rubric will be "Digital Lighting Technologies, Lighting Communication, and

Regulation".

23 lectures with subtitled translation to English for Japanese and Chinese lecturers are expected from Audi, BMW, JLR, Honda, Nissan, Volvo; Koito, Stanley, Marelli-AL, Mobis, Varroc, ZKW; Dominant, LG Innotek, Everlight, Lumileds, Nichia, Osram, Seoul Semiconductor, and tier-2s specialising in electronics, simulation, condensation management, and other apposite topics. A special session, called "Innovation and Regulation—Time for a Reality Check!" and chaired by GTB President Geoff Draper, will explore the main challenges for the lighting community. Virtual exhibition booths will showcase and illustrate the most advanced cutting-edge technologies, trends, and innovations. For more information and Registration click [HERE](#).

• **Marketing the DVN Study "[New Lighting Functions 2020-2030](#)"**



This 125-page masterwork describes how safety, communication, comfort, and styling with light can be improved in context of today's and tomorrow's realities. The Study was put together by eight vehicle lighting experts, each with more than 30 years experience: Geoff Draper, Rainer Neumann, Ralf Schäfer, Jean-Paul Ravier, Carsten Befelein, Daniel Stern, Leo Metzemaekers, and Hector Fratty made interviews with 35 eminent experts from automakers, lighting suppliers, and research outfits. Here's an overview of the main chapters:

Market View and Business Opportunities

The car industry was already facing a big transformation due to the ACES trend and now has to cope with the Covid-19 crisis. In case of a 30% drop in global vehicle sales for 2020, we calculate a realistic value of the 2020 global vehicle lighting market, and we show our work.

Lighting and Traffic-Related Fatalities

Studies are suggesting that advanced lighting can help with crash avoidance by increasing visibility, car positional guidance and by alerting other drivers and VRUs.

New Lighting Functions to Improve Safety

Attractive new lighting functionalities will be significantly installed around 2025, particularly those prominently mentioned in our interviews like marking light for VRUs, projected lane guidelines, and rear projection signals.

Technologies for New Safety and Communication Functions

Many new functions for safety and communication will use technologies and techniques borrowed from other realms and specially adapted to the needs of automotive applications. Our detailed analysis of HD front road projection systems, for example, includes details on optimal resolution for various kinds of projections—kilopixels or hundreds of kilopixels. We assess and compare the various techniques for

realising these new kinds of projections, and present informed forecasts for how the various technologies will stack up in terms of market share

Importance of Styling for Exterior Lighting

Although the primary main function for lighting is safety, we explain how styling and design can create additional value. New technologies such as μ LEDs, RGB LEDs, new diffuser materials, new microoptics, segmented OLEDs, digitalisation, software control, and even laser light for the rear are analysed and discussed. For brand identification at night, illuminated logos and front grilles are becoming more and more popular and examples are presented and described, as are initiatives in GTB and GRE to adapt the regulations for these new kinds of lights.

New functions for Interior Lighting

Interior lighting will become smart, more complex, personalised, digitalised, and orchestrated with many other interior component functionalities. We explain how future interior lighting will be driven by safety, communication, comfort-convenience-styling demands, and welcome and farewell scenarios.

Regulatory Impacts and Considerations

Progress is being made with the update of the UN Regulations and Chinese GB standards; GTB is strongly providing expert input and support. GRE is supportive of the removal of unnecessary barriers to innovation and has drafted a future workplan. The USA continues to lag.

• Three DVN Reports



As usual, we publish every month a DVN Report. In this quarter, three coming reports will be very fruitful for the lighting community:

New worldwide models to be published in October. We will describe lighting of the main models launched round the world these latest months, including the Acura TLX, Audi Q2 and Q5, BMW ix3 and 4series, Cadillac XT6 and Lyriq concept, Ford Bronco, Gordon Murray T50, Geely Preface, GAC Enpulse, Hyundai Tucson, Kona and Elantra; Human Horizon HiPhi X, Infiniti QX60 Monograph concept, Jaguar F-PACE and XF, Jeep Grand Wagoneer Concept, Lucid Air, Maserati MC20, Mercedes S-Class, MG HS, Nissan Z-Proto concept, Opel Mokka, Peugeot 5008 and 3008, Porsche Panamera, Qoros 7, Rolls Royce Ghost, Seat Ateca, Suzuki Swift, Škoda Enyaq iV, Toyota Venza, and VW ID.3 and ID.4.

Audi profile to be published in November 2020. An Audi profile was one of our first-ever DVN Reports, published in 2008. This year's version will show and analyse Audi's huge progress in lighting over the last 12 years.

Lighting in Developing Countries to be published in December 2020. After analysing vehicle lighting in the US, Japan, India, Korea, and China, DVN will publish a study on how car lighting is done in developing countries in South America and Asia. These countries are not well enough known from the lighting perspective, and have particular needs, constraints, priorities, and preferences that must be known in order to serve them optimally.

Lighting News

ZKW's Project Dragonfly Enters a New Phase

LIGHTING NEWS



ZKW introduced their Dragonfly research and development project about a year ago. To launch the project, they integrated optical sensors into the headlamps of a test vehicle to facilitate automated driving functions. Now the system is being expanded with lidar capabilities. This provides precise distance measurement even at night, improves lighting control, and gives a key added boost to road safety. The headlamps are located at an ideal strategic position to create a 360° view—similar to what a dragonfly sees—all around the vehicle, using sensor systems. Gerald Böhm, head of pre-development at the ZKW Group, says "Thanks to artificial intelligence, the Dragonfly system can recognise other road users and road signs, calculate distances and speeds, and generate control commands for the vehicle. The autonomous driving sensors are supported by intelligent light from ZKW, with a resolution of up to 1.3 million pixels".

Last year, ZKW drove over 1,000 kilometres with the Dragonfly demo vehicle, and found the lidar significantly improved the interaction between light and sensors. Automatic light functions, in particular, like automatic headlight beam selection or shaping in response to oncoming traffic, or targeted de-glaring of pedestrians and animals, are much more precise thanks to exact distance measurements. Lidar

expands the view offered by sensors, and directs the light specifically to where it is needed for object detection. Obstacles like a deer or pedestrian on the road, or even difficult curves, can be detected earlier.

By the end of this year, the demo vehicle's headlamps will be upgraded with newly-developed digital light modules, and more infrared and radar sensors and additional cameras will provide an augmented 360° view. Depending on the manufacturer, 30 to 50 sensors will be required on the vehicle for L³ to L⁵ automated driving. The goal is to integrate the sensors in thoughtfully-designed headlamps to take advantage of synergies in power supply, data bus connection, electronic control units, decondensation/thawing, and cleaning.

New Audi Q2 Gains New Technology

LIGHTING NEWS



Audi's Q2 compact SUV has fancy new headlamps—all versions in LED technology, with matrix beams available as an option. Seven individual LEDs seated in a shared module produce an intelligently controlled glare-free high beam. 10 LEDs installed behind rhomboid optical components generate the DRL, and seven additional LEDs generate the sequential turn signal.

For the rear lights, customers can choose between two LED versions: with or without sequential turn signal—but if the matrix LED headlamps are selected, the sequential-turn tail lights come along with.

In addition, the headlights and rear lights draw attention to the new Q2 with light sequencing when the car is locked and unlocked.

The Q2's rear lights are unchanged from the previous version.

Aledia's New μ LED Display Technology

LIGHTING NEWS



Aledia, spun off from CEA-Leti in 2012, are pushing forward with a new technology for μ LED displays, and they plan to use the proceeds to complete their product development and create a first-of-its-kind high-volume 3D μ LED manufacturing facility in the Grenoble area.

Aledia say they are the only company targeting this market with a nanocrystal technology that uses very large silicon wafers, 200-300 mm in diameter, and with processes developed by the microelectronics industry, as opposed to the traditional technology of planar, 2D LEDs built on smaller, layered sapphire substrates of 100-150 mm diameter. Aledia's technology is protected by 197 patent families, making Aledia the leading French startup company in France in filed patents.

Cofounder and CEO Giorgio Anania says "There is a major turning point coming in the [USD] \$120bn-per-year display market as μ LED technology starts to replace the traditional LCD and OLED technologies". Bpifrance's SPI Fund Director Magali Joessel says the display industry looms large as a strategic market, and that Aledia are pushing ambitiously to become a leader in it: "With an investment of over €200m in equipment over the next five years and plans to grow to approximately 500 employees, Aledia's location in the Grenoble area signals a commitment to establish a world-scale industrial manufacturing facility in France".

TI's See-Thru Vision Technology

LIGHTING NEWS



TI engineers have created a millimetre-wave "mmWave" radar sensor that in the future could effectively see "through" obstructions and provide an audible alert to users based on what is perceived by 3D imaging. One of the TI innovators says mmWave works extremely well at penetrating smoke.

Similar technology is already in automotive use to see obstructions on the road and alert the driver. TI mmWave technology is also being designed into an application that will sense a child left unattended in a car and alert the parent, and is being considered for applications including detecting when an elderly person falls to alert a caregiver and enabling robots to navigate complex factory environments.

Many radar systems have been enormous and staggeringly expensive, and operated at low frequencies, which produces imprecise imaging. TI's mmWave radar sensors operate at 60 or 77 GHz for much higher precision. They are also extremely small, about the size of a coin, and produce images so detailed that object outlines can be seen and classified.

Andy Palmer Joins InoBat

LIGHTING NEWS



The former chief executive of Aston Martin Lagonda, always involved in Lighting, and helping our community, is joining a European developer of electric vehicle batteries amid an accelerating race to bring more EVs onto the world's roads.

Andy Palmer is to become vice-chairman of InoBat, a Slovak company he will be joining soon after a €10m fundraising from a consortium of investors. The company are said to be developing an AI-led battery research centre, with the first batteries scheduled for production next year and a large factory around 2024.

Palmer's move illustrates the automotive industry's efforts at reinvention by adopting and developing new technologies, with a focus on eliminating carbon emissions.

Andy Palmer's career up to now has been involved with vehicle lighting, and DVN had a strong working relationship with him when he was at Nissan, then at Aston Martin. We wish him all the best success with his new challenges!

Driver Assistance News

Veoneer Tech in Mercedes GLE

DRIVER ASSISTANCE NEWS



Last week we reported that the Mercedes GLE's ADAS suite received EuroNCAP's top rating of Very Good for driver engagement.

Veoneer supply the forward-looking stereo cameras, ADAS ECU, and front and rear corner radars for the GLE's Driving Assistance Package and Driving Assistance Package Plus, which earned the top score of 174 points out of a possible 200 (87%) versus nine competitors.

Veoneer President, CEO, and Chair Jan Carlson says "The way the EuroNCAP's AD scoring has been structured is truly a strong support to our Collaborative Driving concept, where the driver plays an active role even when the car is handling parts of the driving. Veoneer is a proud supplier and integrator of safety systems in the Mercedes GLE and these marks are a true proof-point of our technology".

Veoneer design and produce software, hardware, and systems for occupant protection, ADAS, and collaborative and automated driving for the world's automakers. Headquartered in Stockholm, Sweden, Veoneer have 7,100 employees in 13 countries. In 2019, sales amounted to USD \$1.9bn.

Suzuki Pick Hitachi Camera With Night Pedestrian Detection

DRIVER ASSISTANCE NEWS



HITACHI
Inspire the Next
Hitachi Automotive Systems

Hitachi Automotive Systems' stereo camera, with nighttime pedestrian detection features, has been adopted by Suzuki Motor Corporation for their Japan-market Spacia model range, launched this past August.



The Spacia's enhanced safety devices include a new dual camera braking support, which detects pedestrians even at night, and adaptive cruise control. In addition, the Spacia range has enhanced ADAS including improved recognition of road signs. These features are supported by Hitachi's camera, which applies Hitachi's unique machine learning technology, making it possible to detect pedestrians with a high level of precision.

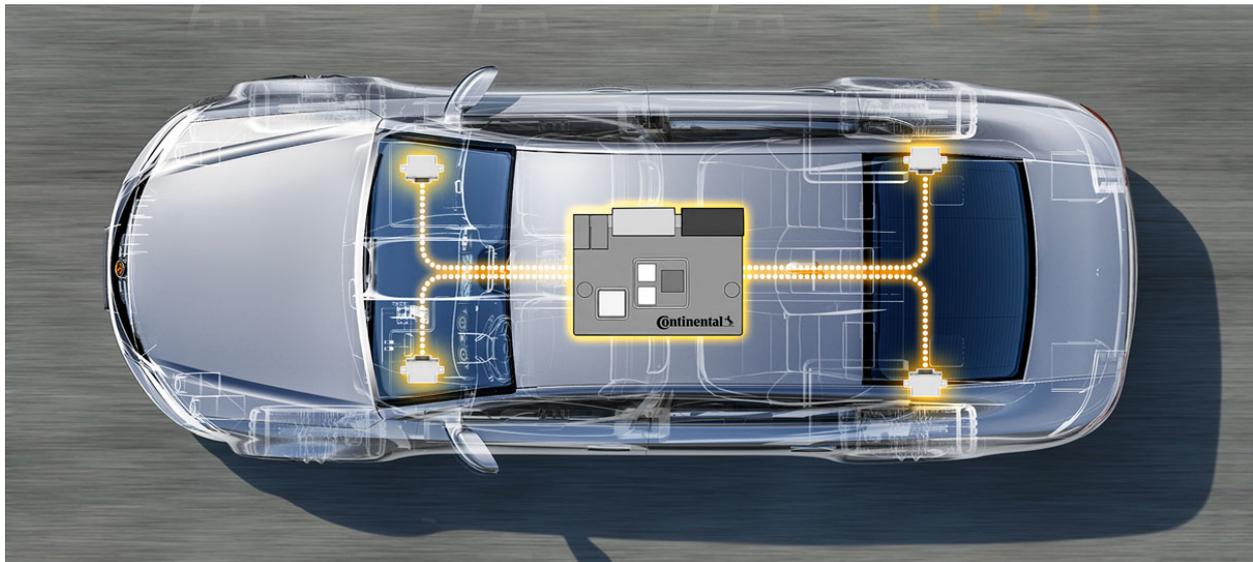
The Spacia is categorised in Japan as a "Support Car S Wide" vehicle, which means it has advanced automatic emergency braking to protect pedestrians, devices to control acceleration when the pedal is mistakenly applied, lane-departure warning, and advanced lights—and therefore are especially recommended for elderly drivers. It is also AEBS-certified, indicating the vehicle's automatic emergency braking with respect to other vehicles has certain level of performance.

Hitachi Automotive Systems, Ltd. is a wholly owned subsidiary of Hitachi, headquartered in Tokyo, Japan. The company develop, manufacture, sell, and service automotive components, transport-related components, industrial machines and systems, and offer a wide range of automotive systems including ADAS.

General News

Conti's Central Computer Collects Cash

GENERAL NEWS



Continental have scooped up orders worth billions of Euros for their new automotive central servers, which are first being installed in the VW ID.3.

The electronic architectures in the new vehicle models are changing: away from a three-digit number of decentralised control devices with various levels of "intelligence", to the use of central computers.

Continental won Volkswagen as a pilot customer for the in-vehicle server ICAS1. After the ID.3, the next application will be VW's ID.4.

In the past few months, Continental has also collected further orders for comparable high-performance computers with a total volume of more than €4bn from automakers in a list of countries. According to Continental, there will be "new starts every year".

Lexus Beats Mercedes, BMW in Q3 U.S. Sales

GENERAL NEWS



Lexus, which hasn't won the annual U.S. luxury sales race in a decade, grew 2% in the third quarter to 75,285 vehicles. Deliveries at Mercedes and BMW declined to 69,000 units.

Brand	Q3-2020
Mercedes	69,600
Tesla	64,000
Lexus	75,200
BMW	69,570
Audi	47,900
Acura	39,600
Cadillac	33,000
Lincoln	27,500
Volvo	30,300
Infiniti	17,400
Total	519,227

Lexus has weathered the pandemic better than the German brands, with the hot-selling Lexus RX (photo) seeing strong demand in the quarter. Both Mercedes and BMW have been hamstrung by tight inventory as the pandemic sidelined plants in Europe and the U.S. for weeks. Lexus saw a 31 percent jump in September alone, led by the RX and NX crossovers and ES sedan. That trimmed declines this year to 13 percent.

Audi's U.S. deliveries dropped 22% so far in 2020, following a 16% in Q3. Its top-selling Q5 crossover suffered a 34% decline in the quarter.