DrivingVisionNews.com
Automotive lighting and driver assistance technologies

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# Editorial

## Picking Out 2021's Main Challenge

There are many challenges in front of the lighting community at the start of the new year. Which is the primary main one? That's what DVN set out to learn when we asked eight of the world's greatest experts to look into it. The answer was—and is—clear: it's the new lighting functions all over the exterior and interior of roadgoing vehicles. Our comprehensive DVN Study on the matter arose from that question. It's called **New Lighting Functions 2020-2030 - To improve Safety, Communication, Comfort, and Styling,** and to build it our expert authors interviewed 35 top experts from OEM, lighting suppliers, and research institutes. In 125 pages, this study explains how LED and ADB technologies have opened the way to all-new functions like projection-based lighting (front, rear, and side); welcome/farewell animated-light displays, branding and decorative illumination—as well as high-resolution ADB to drive all the time with a perfect high beam; smart lighting functions using sensor fusion and algorithms to use light in new ways to improve safety, comfort, and styling.
This week we bring you an extract of an article on the future of lighting, published by Osram Continental CEO Dr. Dirk Linzmeier, who confirms the DVN Study's conclusions: the Projection functions.will a key to new customer experiences with a market value of €2bn in 2027.

In DVN meta-news, we're happy to announce that we're increasing our resources in Europe, North America, China, Japan, Korea, and India to keep you fully informed and up to date on the needs of automakers and their suppliers, and on the innovative new technologies coming faster and faster.
Watch for our forthcoming presentation of the DVN team of passionate, dedicated people working tirelessly to build monthly reports and weekly DVNewsletters for you, to organise

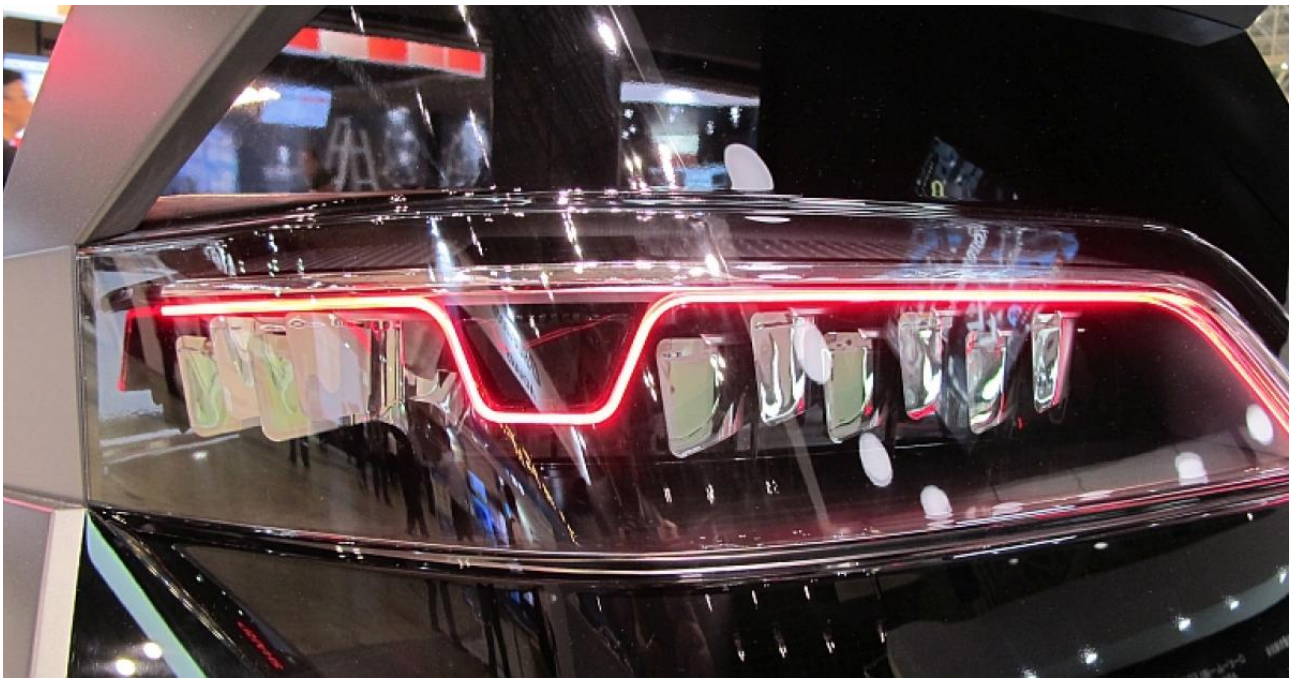
DVN Workshops and Conferences, and to build each year an indispensable, must-have DVN Study.

Let's all celebrate—we've escaped from 2020—and now we work to make 2021 a much better year.

Sincerely yours

# In Depth Lighting Technology

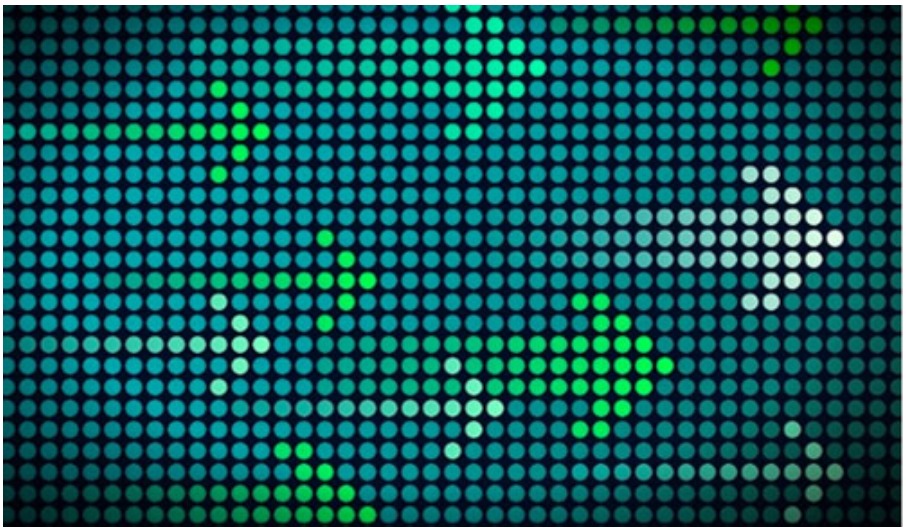
## Nothing More Exciting Than Vehicle Lighting: Osram Continental. CEO



Dr. Dirk Linzmeier is CEO of Osram Continental. He recently shared his thoughts on where we are and where we're headed in the vehicle lighting world:
"I'm passionate about all the possibilities vehicle lighting holds for us. Highly innovative products will shape the future of driving, and lighting will play its part in this interesting journey. We expect the automotive lighting market to reach an annual growth rate (CAGR) of about 5 per cent. But what drives this development, what are the trends exactly and how are they adopted in the different regions?

### LEDification is Driving Force Behind All Trends

"The basis for the further development of automotive lighting is the continuously increasing penetration of LED technology in all car segments.



LEDs not only provide significant efficiency benefits, they also enable better visibility and more functionalities as well as new design options. To make these benefits accessible for entry level cars and base options, cost efficient and standardised modules are in demand. With our eXchangeable Light Engine, Osram Continental will soon introduce an answer to this demand.

## Projection Solutions are Key to New Customer Experiences

"The market value for projection solutions will be nearly €2bn in 2027 with a CAGR of more than 100 per cent within the next 5 years. From static logo projections, which we already provide, we will move towards fully dynamic 360° content that can be adapted to one's wishes and transform a vehicle's surroundings into a customised light canvas.


## Interior Lighting Turns Vehiclse Into 3rd Living Space

**"**Another important area for innovative vehicle lighting is interior lighting, which is expected to have a market value of more than €2bn in 2025 and a CAGR of ~20 per cent within the next 5 years.

"Currently, available applications of illumination inside the car are welcome scenarios, ambient, functional and safety features. Furthermore, we are already testing projections on dashboards, seats, doors, roofs and windows.

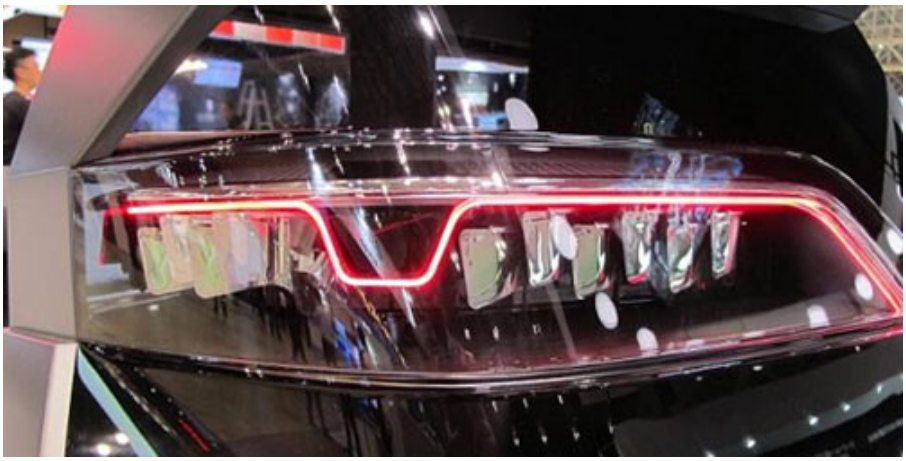
## Car Body Lighting: Light Beyond headlamps

"For luxury cars, car body lighting becomes more and more important as an aspect of the vehicle's design, branding and differentiation.

"The market value is expected to increase to more than €1bn in 2027 with a CAGR of around 100 per cent within the next 5 years. Light and exterior body parts fuse to create novel lighting systems shaping the perception of the car in a truly innovative way.

## Connectivity: Merging All Trends

"By connecting light sources with the vehicle's data and environment using sensor fusion and algorithms, smart lighting functionalities for increased safety become possible. Together with a partner, Osram Continental are already working on the next step for these features by merging them with Augmented Reality (AR) technology.



## What our teams in the different regions report

"In Europe, the LEDification is in full swing and the market is increasingly demanding cost-efficient solutions for the volume segment. In addition, we are noticing a very high level of interest in projection solutions for both the exterior and interior of a vehicle. Especially, our 360° solutions are being requested by more and more customers. This positive development is also reflected in the fact that the negotiations on standardising the extension of turn signals by means of projection are progressing. Discussions about the interior of a vehicle show that ambient lighting has arrived in all segments in Europe. Our customers are therefore looking for new ways to differentiate themselves by the illumination of larger surfaces or projection solutions.

"In Asia, too, the share of LED-based lighting solutions is steadily increasing. The Chinese, Japanese and Korean markets are in transition. India, which is still predominantly based on halogen, is also on the way to LEDification by skipping the step of HID technology. Indian automakers and tier-1s are working very determinedly on the introduction of LEDs, making India a highly attractive growth market. In addition, Asian automakers are very interested in new lighting technologies. Front and rear lights have developed from a pure lighting function to an important part of vehicle design. Chinese makers in particular are very open to the introduction of completely new functions and technologies.
"In North America, automakers are focused on finding innovative ways to integrate new lighting technologies, especially with regard to building brand recognition through light. Of particular relevance are animation and wow factors that can be achieved by light orchestration. At the same time, like in all regions, cost is a driving factor, which is why makers are looking for modular building block solutions that allow them to introduce new technologies across platforms without recurring high R&D investments.

## Proud to actively shape this development

"As you can see, the market for vehicle lighting has never been livelier. We have just started to explore the numerous possibilities for the design and functionalities of a vehicle and its journey. I'm proud that we at Osram Continental are part of this development and that we are actively shaping these trends together with our customers."

*Dr. Dirk Linzmeier is married, father of 3 kids living in Munich. He studied electrical engineering and information technology. PHD in driver assistance. Pedestrian detection with radar, laser scanners and infrared sensors.*
*After 4 years at DaimlerChrysler AG in Driver Assistance Systems, and 10 years at Robert Bosch taking various positions in Germany and China in the area of driver assistance, and electronics, he joined in 2018 Osram Continental as CEO, building up a company from the scratch transforming people from two corporates into one competitive, high-performing team, achieved an order-intake of €1.5bn and entered successfully into new lighting areas.*

*About the different technologies concerning HD lighting, he said:*
*“We need to differentiate between HD Lighting systems like DMD, µLED and LCD, and lighting technology used in sensors such as laser scanners.*
*I prefer to think out of a customer perspective. What benefits bring HD lighting systems for a driver? Which lighting functions and uses cases can be developed based on existing technologies? Lighting functions requiring pixels in the range of 30k (and later 100k) most likely will use µLED devices. DMD for now remains a niche product for uses cases which require a very high resolution.*
*Generally it has to be considered that in automotive industry single source devices such as the DMD are only interim solutions until there is either a second source or another technology available.*

# Lighting News

## Thank You, Mister Goutard!

LIGHTING NEWS

*By Hector Fratty, DVN CEO*

Last week we announced the death of Noël Goutard, who was Valeo's Chairman and Chief Executive Officer from 1987 to 2000.

I want to say a heartfelt thank you to Mr Goutard for being one of my main mentors. He trusted me, he supported my actions, he taught me management lessons that I am still applying now!

I have such vivid memories of almost every meeting and exchange we had together, as if they were yesterday. I remember words, places and emotions…no doubt the sign of a great leader.
I was honoured and proud to read such nice remarks about my work at Valeo in Goutard's book "L'outsider" wherein he described his life and his experience at Valeo.
Noël Goutard will always be in my memory. Thank you, sir!

# Two Makers' Fancy New Turn Signals

LIGHTING NEWS

At first, LEDs' main functional fame-claim was their instant-on, instant-off operation—LED turn signals made bulb-type signals look lazy by comparison, with their 250-millisecond rise and drop time, much the same as headlamps with window-clear lenses, when they arrived around 1990, instantly made headlamps with optical prisms in the lens look old-fashioned.
But design and styling trends are relentlessly accelerating, and so automakers and suppliers are finding new ways to play with the lights.

Mazda have turned things on their ear by deliberately *slowing down* the drop time of the LED turn signals on their new CX-30. A **video** shows that the car's front, side, and rear turn signals rise immediately to full intensity to start the lit phase of the turn signal cycle, then gradually dim down to the unlit phase. It's an interesting strategy to differentiate Mazda's turn signals and liven them up with some dynamic action, without sacrificing the instant-on aspect of LED signals.

Meanwhile, GM have been dropping hints about their 2022 Chevrolet Bolt EUV (Electric Utility Vehicle) in a drip-and-dribble fashion, teasing closely-cropped photos and bite-sized nuggets of information. One such nugget: the car will have dynamic turn signals. A four-second **video** shows the front turn signal/DRL unit providing a sweeping turn signal effect; slowing the video down to
0.25× speed (by clicking the gear in the lower-right corner of the video window and selecting "playback speed") allows a more detailed look at the signal's operation, and shows how they're getting around NHTSA's rigidity on the matter of EPLLA: it appears the Bolt EUV turn signal initially lights up a relatively large inboard chunk of the lamp's

apparent surface immediately in one go—we surmise this chunk alone meets the US requirement for lit area and intensity—and then the rest of the lamp unit illuminates in an outward sweep, in what looks like a more elegant rendition of a strategy similar to Toyota's **on their Avalon**.
No word yet on what the Chevy Bolt EUV's rear lights are like.

# New Lights for Safer Gran Canaria Highway

LIGHTING NEWS

Gran Canaria's most important highway, the GC-1, is being transmogrified into a smart motorway as its lighting system is being upgraded to LEDs. The new lighting has already resulted in positive reactions from road users, who report having a better driving experience.

The GC-1 connects the island's capital, Las Palmas de Gran Canaria, and its international airport to the tourist destinations on the south side of the island. The highway was illuminated in 1990 with Philips Traffic Vision streetlights, which have now reached the end of their service life and are being replaced with high-tech new equipment.

The new Philips DigiStreet LED luminaires avoid glare, improve visual comfort, offer greater uniformity of light distribution, and render colours accurately. Combining the Philips DigiStreet large LED lights with standardized Zhaga connectors and Signify's Interact City gives highway operators ultimate control, as the lighting can be monitored in real time; data can be collected and analysed, and maintenance tasks can be efficiently assigned and tracked. The system allows for point-by-point management, and enables real-time adjustment to deal with any situation on the highway—increasing light in an area where a crash has occurred, for example, or dimming the lights to 30 per cent when no vehicles are on the road.

# Four Design Awards for Hyundai

LIGHTING NEWS

Hyundai have won four of this year's Good Design Awards for the maker's two most progressive EV concepts, the 45 and the Prophecy, and the 2021 Hyundai Elantra and the Hyundai Hi-Charger, an ultra-fast EV charging system.

EV CONCEPT PROPHECY

EV CONCEPT 45

The 45 EV concept, first introduced at the Frankfurt Motor Show in 2019, is a futuristic homage to Hyundai's iconic Pony Coupé concept. The 45's styling is defined by its lightweight design inspired by aircraft and its diamond-shaped silhouette. Its award sharpens expectations for the upcoming release of Hyundai's Ioniq 5, the maker's first dedicated EV in their new Ioniq brand launching next year. The Prophecy, meanwhile, also

won Best of the Best in the 2020 Red Dot Awards' Design Concept group, and the concept was also named a finalist for 2020 International Design Excellence Awards.

Hyundai have been going from strength to strength in advanced design, as evidenced for example by the **Parametric Jewel Hidden Lamp** setup on the new Hyundai Tucson.

# Driver Assistance News

## Lidar Growth Expected in 2021

DRIVER ASSISTANCE NEWS


TrendForce say they expect the automotive lidar market to expand starting around the second semester of this year.

With the booming development of e-commerce, e-commerce and express companies have adopted technology such as unmanned delivery machines, bicycle messengers, and are looking forward to autonomous trucks to reduce the cost and increase the efficiency of last-mile delivery. For that reason, delivery robots with automatic navigation and autonomous decisionmaking functions are sure to be in increased demand. The pandemic caused most manufacturers to postpone their plans, so although the fist semester will be sluggish, increasing demand for industrial automation in developed markets will likely propel growth in the vehicular lidar markets as 2021 progresses.

# Osram, Chronoptics to Make 3D ToF Camera Kit

DRIVER ASSISTANCE NEWS

3D capture of surroundings is increasingly important in applications including vehicle lidar for autonomous driving. 3D sensing systems usually comprise different building blocks which need to be optimally matched and coordinated. Typically an infrared light source illuminates the defined field of view for a dedicated 3D camera; software then processes the recorded image to extract depth information and generate useful information about the surroundings.

Based on Chronoptics' depth-processing algorithms and Osram's infrared VCSEL hardware, the companies are together developing a new 3D ToF (time of flight) camera system which they say offers improved performance compared to existing ToF cameras.

Chronoptics' KEA 3D ToF camera system is being used for industrial and consumer applications as well as automotive ones. With its compact dimensions of only 100 × 40 × 35 mm, the camera is designed for an operating distance between 20 cm to 15 m, and has an ambient light immunity of up to 120,000 lux.

Osram's Bidos P2433Q VCSEL has been chosen for its compact size, optimal power output, and module efficiencies of 38 per cent (and upcoming modules with up to 50 per cent) as well as its high-volume manufacturing package concept.

Chronoptics CEO Richard Conroy says "During the project we appreciated the close technical support and intense exchange on the project with our partners at Osram. We simplify the design and integration of 3D camera solutions into tomorrow's intelligent products for our partners, leveraging our patented depth processing and deep ToF expertise."

# Ouster's Latest Lidar Logic

DRIVER ASSISTANCE NEWS

Much of the attention in the lidar sector has focused on the market opportunities in autonomous vehicles, Ouster are looking to serve a much broader set of applications. Co-founder and CEO Angus Pacala says his company "are building the eyes of autonomy. My co-founder Mark Frichtl and I share a vision that autonomy is a revolution that spans industries. Autonomy is not only for cars; it is much bigger than that."

Pacala says this ambition is driving an anticipated demand extending to tens of millions of units, and across some 14,000 prospective customers by 2025.
The Ouster team are focused on four key vertical markets: industrial automation, smart infrastructure, robotics, and automotive.

The current roster of 450 customers bought around 2,000 units in 2020, generating annual sales in the region of USD $19m. Revenues are expected to more than double year-on-year through 2025, reaching in excess of $1.5bn at that point as unit sales pass 700,000. Those figures imply that **the average cost of each lidar unit will fall by a factor of five over the next five years**.

Pacala says "Digital lidar is built on the idea that you can consolidate all of the important functionality of a lidar sensor into semiconductors fabricated in a standard CMOS process", and says this puts Ouster's products on an accelerated path towards cost-performance advances.

Central to that strategy is the use of VCSELs (vertical cavity surface-emitting lasers), thousands of which can fit onto Ouster's system-on-a-chip design. Ouster also are using

a unique microöptical system to improve lidar performance significantly, compared with conventional approaches.

# General News

## Fiat Chrysler–PSA Merger Wins EU Approval

GENERAL NEWS


Fiat Chrysler and PSA gained EU antitrust approval at the end of December for their USD $38bn merger to create the world's № 4 carmaker.

Stellantis will be the Dutch-based multinational automotive manufacturing corporation resulting of the merger of French automaker Groupe PSA and Italian-American automaker Fiat Chrysler Automobiles, following completion of a 50-50 merger agreement. The new group will include 14 brands: Abarth, Alfa Romeo, Chrysler, Citroën, Dodge, DS, Fiat, Jeep, Lancia, Maserati, Opel, Peugeot, Ram and Vauxhall. The name Stellantis will be used exclusively as a corporate brand, with automobile brand names and logos remaining unchanged. The company will be listed in the stock exchanges of Milan, New York, and Paris.

FCA's controlling shareholder is Exor, the holding company of Italy's Agnelli family, while PSA's main investors are the Peugeot family, the French government, and China's Dongfeng.

The creation of Stellantis has been submitted for voting by the shareholders of PSA and FCA at two general meetings held yesterday, Monday 4 January.

The deal also considers that Peugeot will progressively spin off their 46 per cent stake in Faurecia, while FCA will also spin off their automation unit Comau.

# World's Top Automaker Smackdown Challenge

GENERAL NEWS

| Maker | January-November | YoY |
|---|---|---|
| **Toyota** | 8,334000 | -16 per cent |
| **Volkswagen** | 8,307,000 | -16 per cent |
| **Renault-Nissan-Mitsubishi** | 6,638,000 | - 28 per cent |

With one month's time left in 2020's sales race, Toyota overtook the VW Group by 27,000 vehicles to gain the top spot. The pandemic's effects are quite visible; the world's № 1 and № 2 automakers are down by around 16 per cent year-on-year, matching the global total industry volume, which likewise was down 16 per cent January through November.

№ 3 Renault-Nissan-Mitsubishi Alliance is a different story; the French-Japanese group are down a whopping 28 per cent. Mitsubishi Motors, down nearly 39 per cent, is the most serious case of the three, but Nissan is down by nearly 30 per cent, and Renault by 22 per cent.

With Toyota and Volkswagen neck-and-neck, either of the two could be the winner when 2020's final results will be announced in a month.