Editorial

Priming The Pump: A Push To Get ADB In All Vehicles

It's certainly difficult and awkward to think and talk about car lights while COVID-19 is killing people all over the world, economies are slumping, governments and societies are showing signs of strain, and most of us are stuck working at home.
But it is also really important to strive for normality and maintain readiness by continuing to work on our projects and think about our technologies. Most of us aren't in a position to directly fight in the war effort beyond the personal level of maintaining distance and keeping our hands washed, but by keeping our minds actively engaged with our areas of expertise, we can be ready to get back at it quickly and efficiently when industry resumes.

With that in mind, today we present an in-depth report on the history and achievements of Cree, an American semiconductor company focused on silicon carbide and GaN technologies, who co-developed with Valeo the first complete ADB high definition LED array solution, called PictureBeam Monolithic. I recently drove a car equipped with this technology. Comparing to Koito's BladeScan and various DMD and Matrix systems with 4 to 16 segments, there are big differences among these various systems but the main thing is that any of them is better than any low beam.

For this reason, my conviction is that there's now a critical mass of ADB technology suitable and feasible for application in all segments, from premium cars with more than 50,000 µLEDs, DMD, or digital light, to low-range cars with 4-segment matrix beams and more besides. In our domain, ADB is the unique breakthrough which greatly increases safety and in a manner easily understood by car buyers and drivers.
30 metres' more seeing distance with no additional glare: think how many crashes would be avoided, how many pedestrians' lives could be saved if ADB were to become mandatory equipment, as it really should. Of course, there is still the regrettable problem that it's not even allowed yet in the USA. Even so, ADB has to be better known and understood amongst the general public. Before there's significant demand pulling ADB

towards universality, the demand-pump must be primed by a push towards knowledge. Let us do it together!

Also this week there is a [new chapter](#) in our onrunning saga "The Wonderful Story of Lighting", wherein Jean-Paul Ravier presents new technologies. Don't miss it, and be sure all your colleagues see it!
We also present the results of Audi investigations about a new lighting function *Road Projection of Turn Signals,* all cyclists as me are face with.Very interesting for safety. and two news showing that automotive lighting technologies could help health improvement.

Keep well and safe,

DVN President

In Depth Lighting Technology

Cree: LED Pioneers Make Innovative Vehicle Lighting

Since the formation of Cree Research in 1987, the makers and shakers who eventually became Cree have been producing groundbreaking LED technology and cutting-edge work in silicon carbide for power and RF (radio frequency) applications. In a little over three decades' time, Cree have grown from a modest group of researchers in a campus laboratory aiming to leverage the properties of SiC (silicon carbide) for commercial uses to a global presence with 5,300 employees and 3,700 patents so far. As part of that growth, they've established themselves as a pioneer in the automotive space with LED technology, as well as in other areas wherein silicon carbide can have a significant impact on performance, such as EV onboard/offboard chargers and inverters. Take a look at some of their milestones:
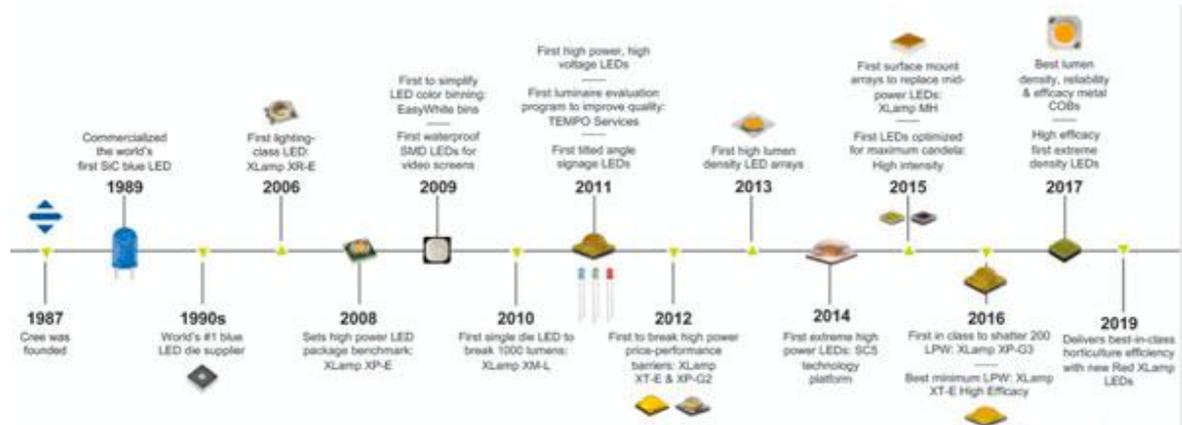
As an established and prominent manufacturer of automotive-qualified LED dies, Cree extended their efforts in the automotive sector in 2015, eventually collaborating with Valeo to develop new LED vehicle lighting systems.

Last year Valeo and Cree launched the world's first complete HD (high definition) LED array solution for automotive lighting systems, the Valeo PictureBeam Monolithic. As demonstrated in an online **video**, it offers versatile ADB and road marking capabilities along with high performance low and high beams. It was conceived as a new way to introduce a scalable LED array providing a pixelated and dynamically variable, shapeshifting beam of light. Last December, Valeo **won an R&D award** for the system.

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Cree's Director of Automotive LED Business Development Roland Normand says "The automotive industry is extremely process-driven and requires a lot of effort to maintain and perform against industry standards. While we've developed extensive experience in automotive qualification with LED dies, it has only been in the past few years we've decided to extend our capabilities into delivering automotive-qualified LED components".

Cree's work in the space has led to more modular, smaller and lighter systems able to integrate into more vehicle classes. The new LED array innovation also facilitates scaling from kilopixels to tens of kilopixels. A system integral controller allows pixel-by-pixel

control to deliver illumination profiles that can be adjusted based on driver needs and road conditions.

Normand says "For more than two decades, Cree has served as a leading LED die supplier. Our first automotive engagement began in 1995 with the development of the innovative blue-backlit Volkswagen Passat dashboard. We were the first company to commercialize blue LED die in 1989, which made Volkswagen's striking design possible".

In contrast to other solutions, Cree's first-generation LED headlighting solution can provide resolution up to 4 kilopixels for ADB and road marking applications. And they're already at work on a next-generation solution which will be even more scalable.

Lighting News

Road Projection of Turn Signals

Investigations from Audi's Michael Hamm, Christian Hinterwaelder

Audi have been scrutinising the potential for safety improvements by dint of a new lighting function: projections on the road surface from a vehicle making a nearside turn (a right turn in right-traffic countries, or a left turn in left-traffic countries) to inform cyclists their path is about to be intersected. About 63% of accidents are nearside-turn ones.
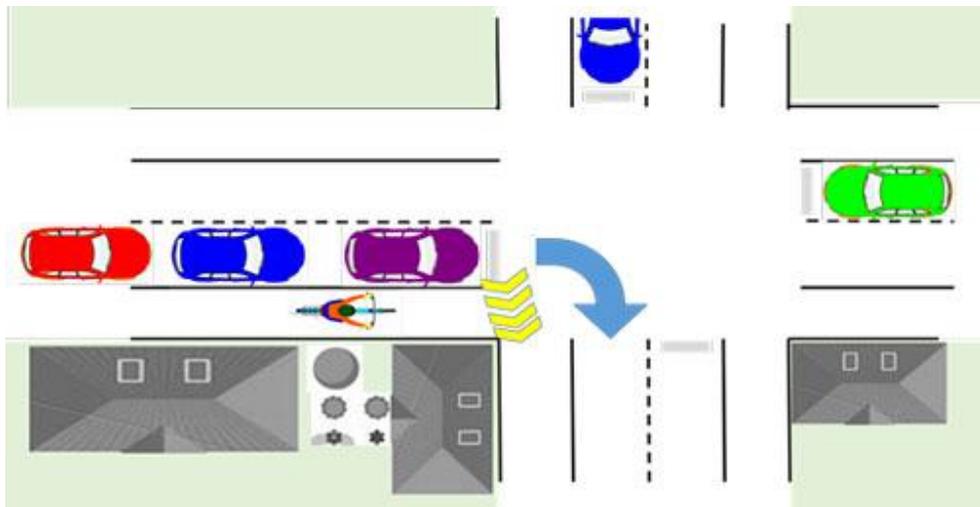
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Accident scenario between truck and cyclist

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 Accident scenario between car and cyclist

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How the projected turn signal could help avoid crashes

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Turn signal projections could enable bicyclists to react faster and more accurately. Even though passive safety structures are applied to trucks, and turn indicators and side repeaters are operating, accidents still occur—and it's been a problem for a very long time all over the world, as illustrated by **this 1975 movie**.

The idea is that projected turn signals' additional visual stimuli right in the driving path of cyclists, skaters, and e-scooter riders could effectively decrease the number of accidents in turning situations.

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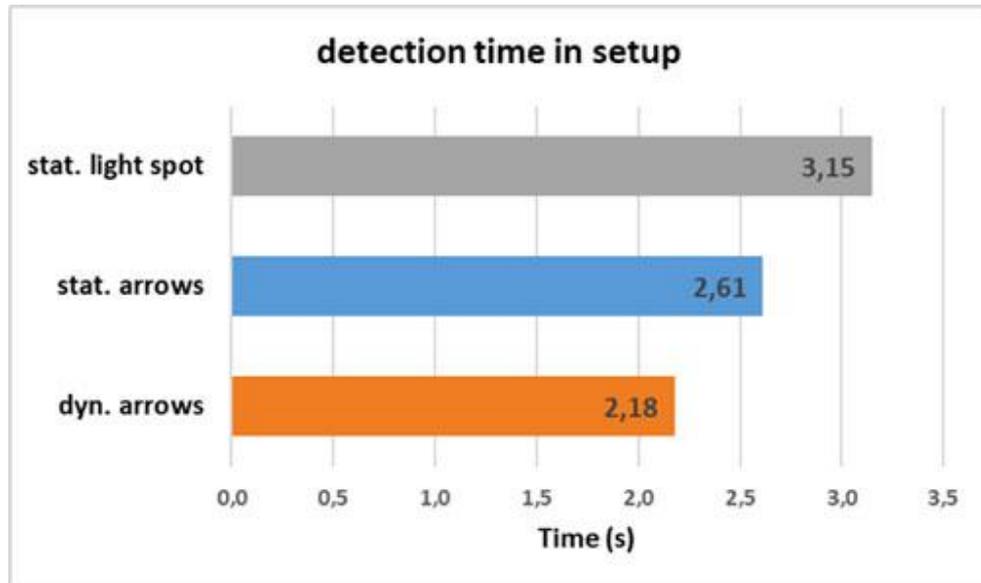
The investigation found that any projection was better than none at all. But presenation of arrows and animating the chevrons delivers about 1 second quicker reaction compared to a spot of light on the road. The results also show that high contrasts and dynamic effects are most effective. The presented solution could definitely increase the safety for vulnerable traffic participants.

In the meantime, here's a Q&A with Michael Hamm & Christian Hinterwaelder:

Dr. Michael Hamm joined Audi in May 2012 as manager of headlamp development.
During his professional work he contributed to 70 patent families and published more than 35 technical papers, interviews and publications.

Christian Hinterwaelder joined Audi in 2019 and works in headlamp development.
His tasks also cover accident research and headlamp rating.

DVN: I very much like this function because every day on my bicycle to go to work, I often find myself in this bad situation. Do you think this function will be easy and affordable enough to commercialise?
Michael Hamm: Easy?, No. There is limited geometrical position possible for such street projection. It must be somewhere around the corners of the car. In this area are usually the headlamps. Also there is limited space, but it is not impossible.
And your question implies there would be many persons feeling better if such technology exists. We think this could be an affordable functional enhancement.

DVN: Do you think possible to combine this new lighting function with the turn indicator?
Christian Hinterwaelder: Activation should be synchronised to avoid flickering effects. Whether it could use the same exit aperture, that depends on the implemented technology.

DVN: This function is rarely visible for the driver, but as you found, quite effective. How do you imagine promoting it?
Michael Hamm: This is a safety function predominantly for vulnerable traffic participants, right. But everybody outside the car will see this function. It will bring light to a normally unlit area and thus it creates awareness. So it is a safety and car2others communication function which is easily visible and understandable. This will contribute to a positive marketing push.

LRC: Uniformity, more Important than Illuminance in a Parking Lot

High uniformity (2:1) — Low uniformity (15:1) — High CCT (5800 K) — Low CCT (2800 K)
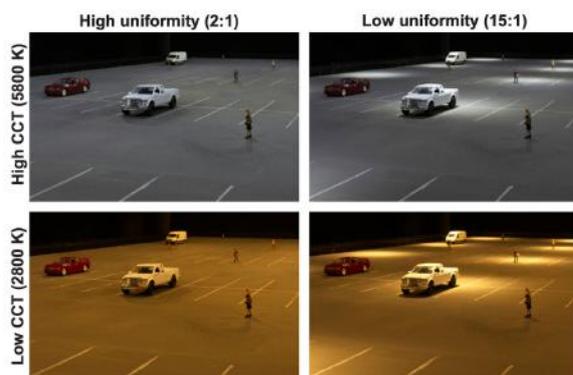
The Lighting Research Center (LRC) at Rensselaer Polytechnic Institute has published **new guide for car park lighting**,, which demonstrates how to promote safety while reducing power demand by lighting the parking lot area more uniformly.

"Exterior lighting in parking lots should support the visibility of hazards, and reinforce perceptions of safety so that people are not afraid to use the space at night," said Jennifer Brons, Director of Design Demonstrations.

Average light levels are important contributors to perceptions of safety in parking lots. But to minimize power demand, lighting designers and specifiers should strive to maximize uniformity. While sources with higher correlated color temperature (CCT) will be perceived as brighter than low CCT sources, this is limited in importance compared to uniformity. With better uniformity, much lower average illuminances can be provided while improving both perceived safety and brightness.

"By using perceived safety as a performance criterion, alternate lighting designs can be evaluated to minimize power demand while balancing other design criteria," said John Bullough, Director of Transportation and Safety Lighting Programs.

In the meantime, here's a Q&A with John Bullough:

DVN : Do you think, safety feeling is equivalent in automotive lighting with homogeneity so important ?
John Bullough : I think they have some similarities but are different perceptions. Pedestrians want to be able to see people who might try to hide in dark areas of a parking lot and they are mainly concerned with their own personal security. A driver wants to see down the road, and is less concerned about threats to their security. Both light level and uniformity matter for both perceptions but there is some evidence that drivers are more concerned with light level than with uniformity.

DVN : Do you think possible a launch of equivalent study in automotive lighting ?
**John Bullough :** Some of these studies have been undertaken. We presented a paper at the SAE World Congress in 2009 (paper # 2009-01-0336) describing a study for the Transportation Lighting Alliance that supports my statement about drivers mainly preferring high light levels in the foreground. Researchers from UMTRI and from industry have investigated how intensity and uniformity impact drivers' perceptions about their lighting. Interestingly, they sometimes prefer lighting conditions such as high foreground brightness, which does not have a real safety benefit. That counterintuitive finding may be worth exploring further because it suggests that «the customer might not always be right!»

Stanley: Deep ultraviolet LEDs for water sterilization

Water purification has conventionally been done with filters or chlorine, but these methods have not been effective against chlorine-resistant bacteria. Under these circumstances, water sterilization that uses deep ultraviolet LEDs, which are highly effective against resistant bacteria, is attracting attention.
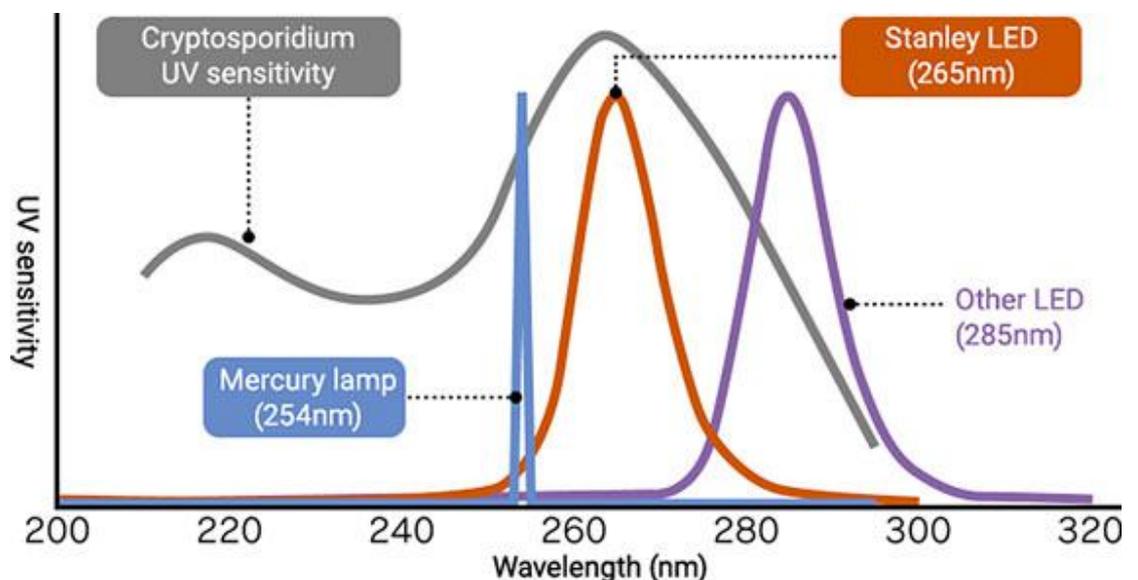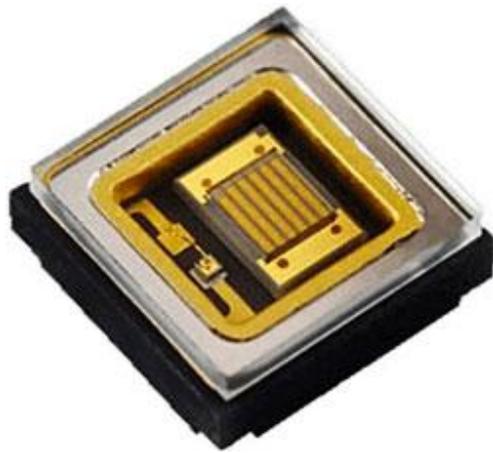
HIGH POWER DEEP UV-LED

Stanley has developed high-power deep-ultraviolet LEDs with a high sterilization capacity. This product is available as an alternative light source to replace mercury lamps, which have been the mainstream light source used in ultraviolet light application devices, such as sterilization devices.

Stanley achieved the world's highest light output level of 50 mW at a wavelength of 265 nm, which has the most powerful sterilization capability. An aluminum nitride substrate with a photonic structure behind the substrate helps realize light output of 50 mW, the highest level in the world. Its compact size compared with existing sterilization light sources allows greater freedom of device design, making it possible to roll out deep ultraviolet LEDs for new applications


The combination of proprietary water rectification mechanism and light distribution technologies cultivated in the manufacture of automobile headlamps has made it possible to irradiate water effectively with deep UV light.

Adasky Car Light Tech to Fight COVID-19

Vehicle tech startup Adasky have found a way to adapt their technology to help in the fight against the coronavirus: their thermal-imaging cameras can be put to work measuring multiple body temperatures quickly and simultaneously.

In regular times, Adasky develop thermal-imaging camera technology for ADAS and AV. But two weeks ago, company leaders and software engineers met to see how they could help in the war effort. They put together prototype systems centred on their camera
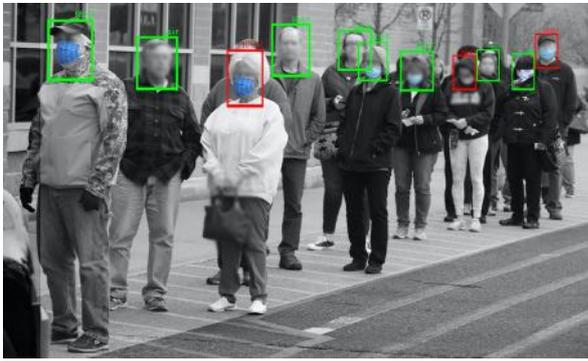
technology's ability to measure heat. Instead of detecting objects on a road, they've turned it to measuring the precise body temperature of numerous persons at a time. Could be prospective buyers at a car dealership, would-be grocery shoppers or transit riders, could be sports fans—anyone in public places.

The company is deploying cameras for temperature-taking applications in multiple Israeli hospitals. Those field tests will serve as an important validation tool, though internal testing has revealed accuracy down to 0.01°. Of course, the cameras cannot discern whether a person has the coronavirus; what they do is spot elevated body temperature, which is one consistent symptom.

The camera is the same one used in automotive to detect pedestrians. What's changed is the software. Normally it detects heat at ranges needed for automotive applications, but the camera was tweaked to work at short ranges and focus on taking temperatures from a specific body part, typically the head. The cameras can work passively from long distance, and they can gather temperature information simultaneously on anyone in their field of view, avoiding the need for queues of people waiting to be scanned. At mass scale, Adasky say the cameras could perhaps cost less than $100 each.
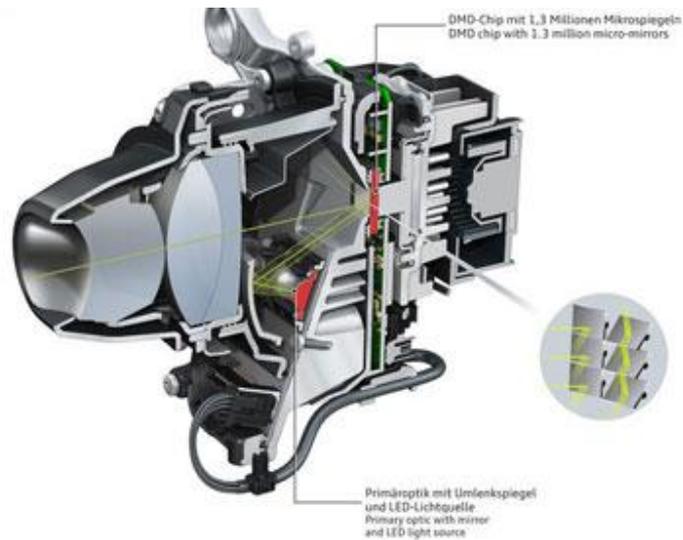
More New Digital Matrix Headlamps

With their digital matrix LED headlights, Audi presents a worldwide first in a production vehicle, specifically their e-Tron Sportback.

Audi's DMD headlamps are based on a small chip containing a million micromirrors, each of which measures just a few tens of micrometres on an edge. With the help of electrostatic fields, each individual micromirror can be tilted up to 5,000 times per second. Depending on the setting, the LED light is either directed via the lenses onto the road or is absorbed within the headlamp, to mask out areas of the light beam.

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DMD-Chip mit 1,3 Millionen Mikrospiegeln
DMD chip with 1.3 million micro-mirrors

Primäroptik mit Umlenkspiegel
und LED-Lichtquelle
Primary optic with mirror
and LED light source

In the Audi e-tron Sportback, the digital light performs multiple tasks. It can generate dynamic leaving and coming-home animations that appear as projections on a wall or on the ground. This presentation transforms the area in front of the car into a carefully illuminated stage. Not only does the digital light system deliver cornering, city, and highway lighting as versions of the low-beam light with exceptional precision, it also supplements the high beam by masking out other road users with even greater accuracy.

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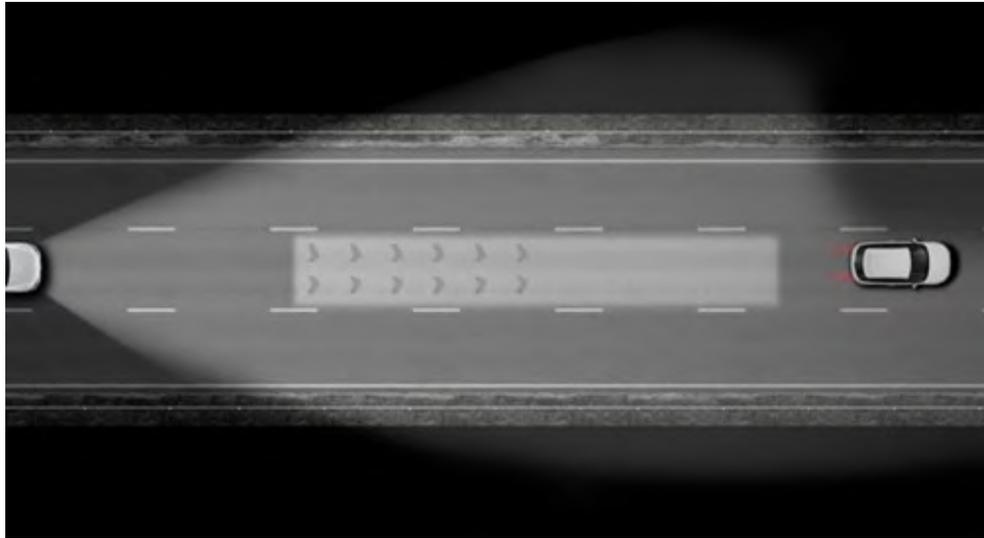
It also offers innovative functions such as lane light and orientation light. On freeways, the lane light creates a carpet of light that illuminates the driver's own lane brightly and adjusts dynamically when they change lane. This improves the driver's awareness of the relevant lane and contributes to improved road safety. The orientation light uses darkened areas masked out from the light beam to predictively show the vehicle's position in the lane, thereby supporting—especially on narrow roads or in highway construction zones—the safe lane centre assist.

The marking light function is also used in conjunction with the optional night vision assist. The light automatically draws attention to any pedestrians it detects, thereby reducing the danger of overlooking pedestrians in the immediate vicinity of the lane.

Audi have posted a **video on Instagram** showing highly relevant projection messages from the Audi e-tron DMD headlamps, and another on **YouTube** giving a different demonstration of the DMD lamps.

Marelli: Blockchain Tech in Supply Line Management

Marelli have put trendy blockchain technology to work enhancing the management of automotive supply chains, creating a distributed peer-to-peer network to connect suppliers' and carmakers' plants around the world. Based on the real-time exchange of "blocks" of immutable and verifiable data, this technology improves traceability of automotive components and raw materials, improving the efficiency and reliability of transactions and operations.

Blockchain has been implemented in a joint project between Marelli Automotive Lighting and the BMW Group, who together designed and developed the new PartChain application.

PartChain has been adopted, as a first step, for a pilot activity focused on the traceability of headlamps, rear lamps, and lighting modules supplied by Marelli for a number of BMW

Group vehicles. Three Marelli Automotive Lighting plants, located in Czechia, Italy, and Mexico, and two BMW Group plants in the U.S. and Germany were connected through PartChain. Within this first project, the platform is managing more than 100,000 data points directly referred to parts and vehicles.

Sylvain Dubois, CEO of Marelli Automotive Lighting, says "Ensuring transparency, authenticity, reliability, and efficiency in the management of supply chains are crucial goals for all the automotive players. The increasing complexity of products, in conjunction with globally diversified value chains, are in fact presenting the automotive industry with growing challenges and technologies like blockchain, which represents the forefront of innovation in this field, bring a crucial contribution to improve the system".

Valeo Abandon 2020 Targets, Get New Credit Lines

Valeo are abandoning their 2020 financial targets because of the business hit from the coronavirus outbreak, and they've secured €1bn in additional credit lines to shore up their finances.

Last December, Valeo said they would outperform the global auto market by more than five percentage points in 2020, with the overall market expected to drop by 2 percent. Now, though, "Given the drop in business activity, which began to impact Valeo's plants in Europe and North America in the last two weeks of March, and the lack of visibility regarding when the crisis will end, the 2020 financial objectives announced by Valeo in connection with its 2019 full-year results are no longer valid," Valeo said.

The company said last week that sales in March were 60% of the 2019 level but "should be back to normal in the coming months." They plan to conserve capital by sharply reducing nonessential investments and costs, and will monitor cash positions daily. They are also variabilising fixed costs across their plants through part-time work.

The steps announced by Valeo are similar to those taken by other suppliers and automakers to counter the effects of coronavirus restrictions. Demand has fallen sharply across Europe, and it is unclear when assembly plants will resume normal operations. Valeo said all 34 of their plants in China have gradually started to restart production since Feb 10. European plants have shut down except for those that are producing for export, Valeo said.

Driver Assistance News

New CEO at Sense Photonics

Shauna McIntyre is the new CEO of US lidar startup Sense Photonics. McIntyre, who holds joint UK/US nationality, is a 25-year automotive industry veteran who most recently led Google's automotive services program and Google Maps' automotive programs. She previously was Chief of Staff for Google's consumer electronics division, and has served on the Board of Directors of Lithia Motors since last April.

Sense Photonics last year opened a lidar technology design centre in Edinburgh, Scotland, with a $2.4m grant from Scottish Enterprise, building on expertise from Edinburgh University.
"The world needs autonomous delivery of goods and transportation of people today more than ever," said McIntyre. "Vehicles, whether they're robot delivery systems, cars, or trucks, require more effective data imaging systems. Sense's high-performance perception technology has inherent advantages for vehicle systems: Delivering high-quality data to customers in a cost-effective way. I think we're onto something big, and I'm thrilled to play a role in it."

Sense Photonics co-founder Scott Burroughs, an expert in semiconductor laser component engineering and manufacturing who served as CEO since the company started in 2016, has moved to be president and chief innovation officer.

General News

Volkswagen's Redesigned Logo

Volkswagen have simplified their logo, ditching the 3D effect and simulated lighting to arrive at what they describe as a "minimalist take on the classic logo". By reducing the logo to its essential elements, it presents as flat and two-dimensional.

It's the latest, most digital-friendly version of the logo that has identified the brand for more than 70 years.

"My personal drive in this redesign was to make the W float, bringing a new lightness to the Volkswagen brand," VW chief designer Klaus Bischoff said of the new logo. "Of course, this rebrand also brings Volkswagen into the digital era, transforming our classic logo into a trademark that is easily displayed digitally on devices and applications."

The new logo was reimagined to function on small scales like a smart watch or phone as well as those displayed at the automaker's sustainable factories and plants, VW says. The logo's blue and white colours incorporate a new deep blue tone, allowing for additional colour variants. The international rollout will see the logo used on more than 70,000 vehicles globally, including the 2020 Atlas Cross Sport in the U.S. By mid-2020, VW plans to complete the rollout of the rebrand across its 10,000 dealers in 171 markets spanning 154 countries.

Renault to Focus on LCV, EV in China

Renault Group will stop selling Renault-branded passenger cars in China and will focus on light commercial vehicles and electric vehicles instead. The automaker will transfer their shares in the Dongfeng Renault Automotive Company JV to Dongfeng Motor. Dongfeng will stop Renault brand-related activities, the companies said.

Renault's JV with Dongfeng in Wuhan builds the Captur, Kadjar and Koleos crossover. Renault will continue to provide aftersales service for 300,000 customers through Renault dealers and through their alliance with Nissan.

Volvo European Production Resumes

Volvo have restarted production on a limited basis in Olofstrom, Sweden, at their body components plant, which is currently supplying the automaker's vehicle assembly factories in China.

Operations in Olofstrom will ramp up even more this week to support the scheduled restart of production at Volvo's main European vehicle production plant in Torslanda, near Gothenburg. Volvo make the XC90 and XC60 SUVs and the V90 station wagon at the Swedish factory.

All three of the automaker's plants in Sweden closed on 26 March to help slow the spread of the coronavirus.

"We have a responsibility towards our employees and our suppliers to restart operations now that the situation allows it," said Håkan Samuelsson, chief executive. "The best thing we can do to help society is to find ways to restart the company in a safe way, thereby safeguarding people's health and their jobs."

German Dealerships Can Reopen

Dealerships in Germany will be allowed to resume selling cars as German government relaxes its coronavirus lockdown in Europe's biggest market.
Auto lobby groups welcomed the move. They had warned that many dealerships faced bankruptcy after building up high inventories that cannot be sold to customers.

The ZDK car retailers lobby group said that allowing sales will enable dealerships "to save some of the particularly crucial spring business that has largely been lost."
The VDA manufacturers lobby group said reopening dealerships is an "important and necessary step" on the way to enabling production to be ramped up again. "There is no production without sales," VDA President Hildegard Mueller said to the German dpa press agency.

The government did not set a date for when dealerships will reopen for new and used car sales because the timing will be up to individual states. But industry groups expect some showrooms could start opening as soon as Monday. They say dealerships will be able to quickly resume sales after they have implemented safety measures because many have remained open for servicing and repairs, which is allowed.