DrivingVisionNews.com
Automotive lighting and driver assistance technologies

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Editorial

Industry Changes Will Stay After COVID-19

Along came a pandemic and forced the automotive industry—among most others—to shut everything down and send employees home for months. But something interesting happened; companies were amazed by how much work was getting done. So many companies—PSA, for example—are thinking about offering employees the option of working at home even once the pandemic will be over. They're already dreaming of reducing the amount of office space they need to spend for.

Some jobs, of course, have to be done on site—nobody's got an assembly line in their living room at home—but a surprising amount of deskwork can efficiently be done remotely. What's more, sudden necessity has quickly increased the acceptance of online meetings, and that seems likely to persist past the pandemic. People who never before used video conferencing are now becoming proficient at connecting over Skype, Zoom, FaceTime, or another such service. We're learning how to connect reliably, how to adjust the camera and get the lighting right. The resultant face-to-face interaction is sufficiently good and productive that executives want to see this continue even once the lockdowns will be lifted. They foresee big increases in productivity and great cost savings by eliminating a lot of travel and commuting.

And what about congresses and workshops? With virtual conferences like Ecomotion and EPIC, there's not so much conviviality as we're accustomed to in live events—but an online event is surely better than a cancelled one. The EPIC online technology conference was fascinating. We couldn’t have face to face meetings or networking, and we couldn't visit expo booths, but even minus the in-person perks it was a fruitful event. This week we bring you summaries of some of the lectures—take a look at the high-level contentl; the benefits of coöperation between the lighting and photonics communities is plain to see: the lighting industry offers big markets for new technologies from the photonics industry. Let's see how we can facilitate the connections!

I would like to apologize about the postpone to next week, the report of Marelli Automotive Lighting. We needed one week more to polish this report, adding more information.

Sincerely yours

DVN PRESIDENT

In Depth Lighting Technology

EPIC: An Online Meeting Vehicle Lighting Meeting

EPIC is an organisation assembling around 550 companies involved in photonics. At DVN, we are convinced of the mutual benefit for the vehicle lighting and photonics communities to work together: the lighting industry offers a high-volume market of eager customers for a wide array of new technologies coming from the photonics community.

And so last week, with DVN's help, EPIC held an online technology meeting—their first dedicated to vehicle lighting. There's a 2½-hour **video** of the meeting, and everyone really ought to see it.

Of course, there were things missing by dint of the meeting's online venue. No in-person networking, no dinner or coffee break conversation, and no visits to expo booths, but it was nevertheless quite productive.

S. Berlitz
Audi

P.H. Matha
Volvo

F. Bedu
Renault

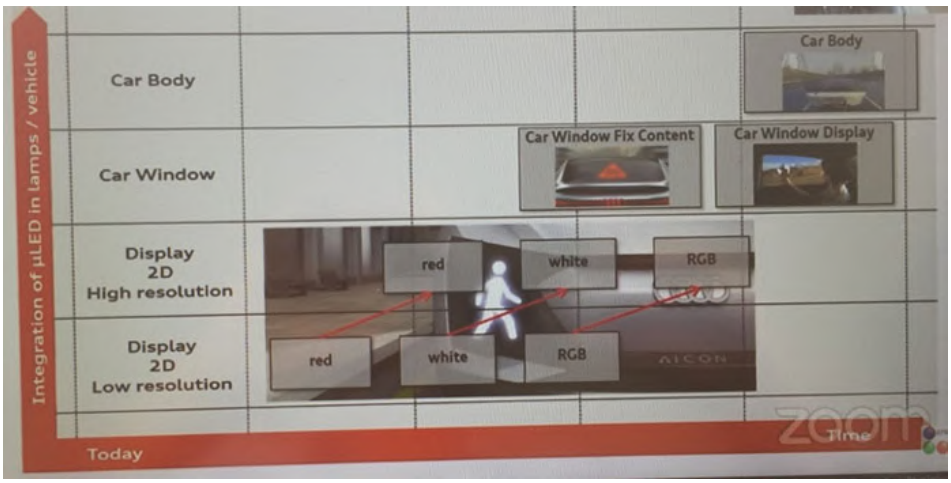
A.Stella
Marelli AL

C.Allgeier
OSRAM Conti

Though each lecture was only 10 minutes long, they were all packed with high-level content. Here we present summaries of the presentations by speakers DVN invited to the event, along with an interview with each speaker.

Audi's Berlitz: µLEDs for Light Communication

In the first part of his lecture, Audi head of lighting innovation Stephan Berlitz presented the use cases in front, side, and rear vehicle lighting communication:
• In the front: Communication with VRU (pedestrians and cyclists) mainly in crosswalk situations; communication with other cars (warnings, planning information, etc)
• In the Interior: Security advantages through higher visibility from the side, like design integration of side markers; communications as described for the front, and special displays
• In the Rear: Display of symbols for warning other road users.

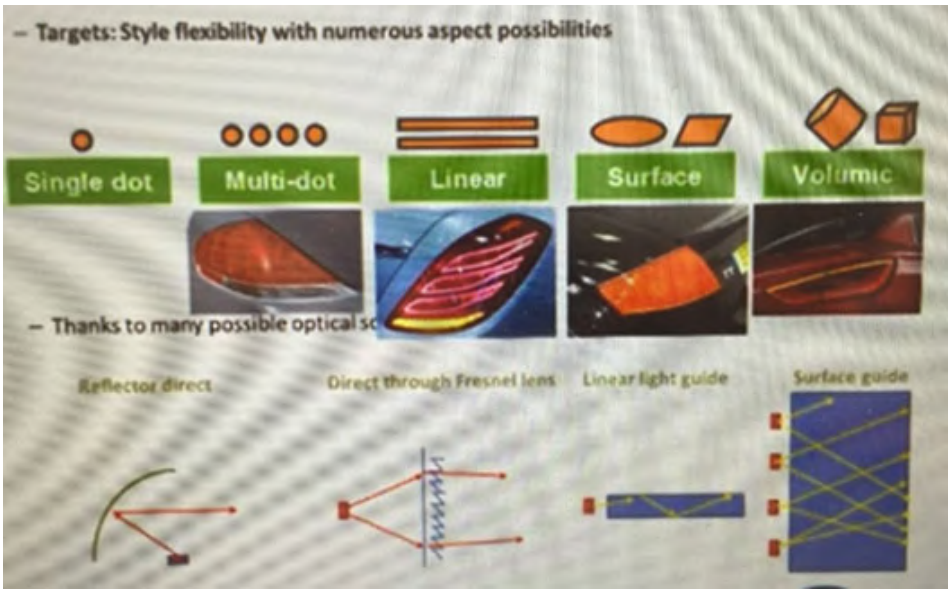


Then Berlitz talked about the possible roadmap for integration of µLEDs starting now with 2D display with different colours of LEDs and low resolution, to RGB, car window pictures/video, then the same in car body installations.

Volvo's Matha: Lighting and Sustainability

Carmakers are focusing on sustainability, as climate realities and regulations are making it one of the main pivotal axes for the coming years. There are new challenges in Europe from this year with the new WLTP homologation cycle's tough 95 $^{g}/_{km}$ CO_2 limit, with steep €100 per car per gram above the limit. The WLTP cycle integrates only the DRL mode (daytime) which has a large range of consumption: as few as 10 watts for an LED reflector; as many as 60 watts for a

multipart light guide. Higher wattage drives higher CO_2 and lower autonomy—with a combustion engine, 1 g of CO_2 is equivalent to 50 watts' power consumption. And with a hybrid powertrain, the battery size is for 10-15 kW/h while in EV, size is for 50-80 kW/h. Styling increases consumption, and so we need efficient optical systems to reduce consumption.

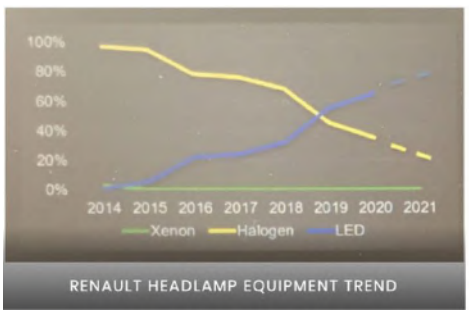


OPTICAL SYSTEMS FOR LED SIGNALING

The great opportunity for the photonic community is to find optical, electronic, and software solutions to increase the lumens per watt and decrease the cost per watt. So automakers could use slim headlamps and very homogeneous lighting signatures.

Renault's Bedu: Progress in Deployment of LED, ADB

Renault achieved an economical breakthrough to achieve the full adoption of LED technologies with simplification, integration, and standardisation.



RENAULT HEADLAMP EQUIPMENT TREND

INTELLIGENT LIGHTING FOR ALL

Now Renault want to do the same with ADB systems which have huge value for motorists and everyone in traffic with them. For that they need a cost reduction for large adoption of the system, developping a standard µLED solution for full application with 20 to 100 kilopixels.

François Bedu concluded his presentation by naming two actions he considers mandatory to succeed, including interior lighting and signalling: simplification, integration, and standardisation of all components, from drivers to primary optics; and new architecture with software, development of µLEDs able to

address the full horizontal field of view with good resolution, and low power consumption.

Marelli AL's Stella: Trends to Technology

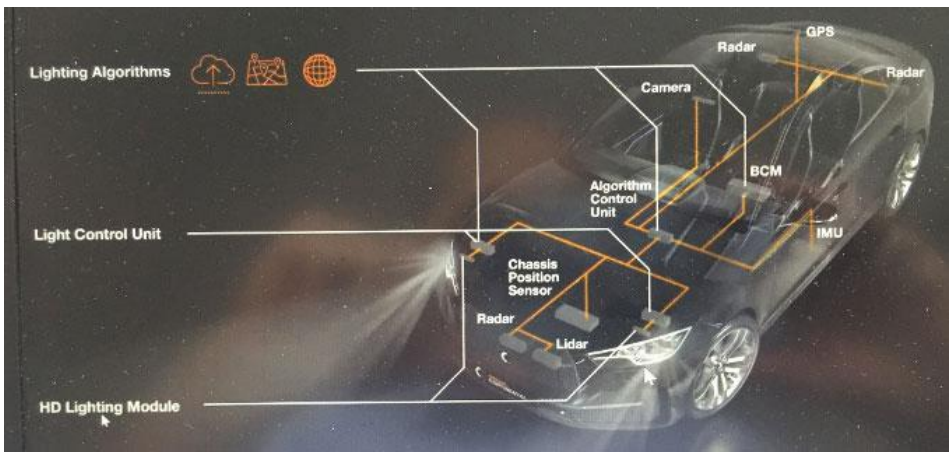
Andrea Stella, Marelli AL's R&D Vice-President, talked about two important items: the company's portfolio, and trends in exterior vehicle lighting.

About Marelli AL Portfolio:
• In headlamps: full LED, ADB with matrix and pixels, laser light, digital light
• In rear lamps: full LED, adaptive and dynamic rear lamp systems, OLED, LED
• In electronics: standard LED drivers to control full LED headlamps, tailored drivers for matrix and laser solutions, drivers for HD DLP and multi chips LED modules, LED printed circuit board assembly and electronic control units

About trends in exterior automotive lighting
• Style vs performance: front and rear lights are heavily styling driven but performance is an important safety feature with legal specification
• New functions
• Sensors for ADAS and sensor integration in lighting systems
• Smaller and lighter, more efficient and more complex
• Digitalization with heavy increase in software content

Osram Continental's Allgeier: Intelligent Lighting

Intelligent lighting integrates front and interior lighting, light control units, projection solutions, and sensor fusion.



FUNCTIONAL ELEMENTS FOR INTELLIGENT LIGHTING

The 10 fields of intelligent lighting are hardware, software and algorithms, thermal management, optical design, sensor fusion, system integration, testing and validation, advanced surface mount technology, and Studio design.

What do Osram Continental look for?:
• General interests: new technologies with new solutions, improved performance, and reduced cost; high quality with zero failures, environmental robustness, and affordable cost.
• Technology-specific interests: light modulators for HD ADB and projections;

µLED for HD and for µlens arrays; smart RGB LEDs, and extension to mid-high power.

DVN asked three questions to the speakers. See below the main answers*:*

Question 1: How do you think of technical session by video? were you able to follow all the 2.5h virtual meeting?

- Technical session was very well organized. We can follow the presentation and understand. - For Q&A I think it would be better to have every 3-4 presentation and not after each one. And also a small coffee break every hour could be great.
- The only weak point is that there is no break during the 2.5h
- I have followed the whole time and I liked a lot the way the meeting was moderated. What is missing is the collateral interaction that in physical meeting events like DVN is possible in between the different sessions.
- I think technical sessions by video are an interesting concept and helpful, not only in the "COVID-19 days". It does allow to get a quick overview and exchange about many potentially interesting topics, with a limited effort and saves cost. It is possible to get easy and fast answers to questions, and connect afterwards further, if one looks for a deeper understanding. I could follow the whole 2.5 h meeting without any problems.
- As 6 minutes speaking time is quite short, every speaker seems to talk quite fast to get the information across, which would probably make a meeting more than 2.5h exhausting.

Question 2: Did you know EPIC and do you think possible to have a win-win relationship between automotive lighting and EPIC community ?

- *I didn't know EPIC before but I know photonic 21. EPIC community is quite far from OEM.*
- It is always good to have meeting with some tier 3 suppliers to explain our OEM visions and needs. For example I am quite sure that they were aware of our problems about power consumption in lighting.
- No, I didn't know EPIC before. Some opportunities can be done. One limitation of the meeting was link to the companies connected directly to the meeting. There were mainly known by automotive lighting industries. I expected more innovative companies, start-ups. Some companies have contacted me in private. We will see in the following weeks the opportunities.
- I did not know EPIC before, but I think it will be beneficial to link the 2 communities. Many technologies we apply in our automotive lighting devices today are originally coming from other industry fields and so it will be in the future.

Question 3: What are the fields: optics, thermics, electronics, systems, software, materials where suppliers or start-ups could help you ?

- *LEDs are in the middle of the triangle optic, thermic and electronic. And it is the core business of photonic. System and SW are also needed but it seems to be another field of skills.*
- Advanced optics, electronics, software and system integration are the most important areas.
- The 3 main topics where challenges are important to solve are: Optics for better efficiency and better homogeneity, Electronics for µLEDs and integrated

circuit with cost reduction, Software for suppliers able to propose coded functionalities.
- We are looking for new technologies helping to improve performance and cost.
- In the area of photonics we are interested in light modulators or µmatrix LEDs generating high resolution, µoptics like MLAs and the extension of Smart RGB LEDs to the mid and high power range.

Lighting News

DVN highlighted by the Magazine Electro Optics

Editorial from EPIC by Carlos Lee, director general

« In this month's editorial, I would like to introduce a very active network: Driving Vision News. I talked with Hector Fratty, CEO and general editor. Hector has dedicated his entire career to automotive lighting. From 1995 to 2006, he was Valeo Lighting Systems' chief of R&D, managing a staff of 650 engineers and technicians..

What is DVN – Driving Vision News?
DVN is the automotive lighting and ADAS industry's journal of record, dedicated to keeping the community informed and communicating about the latest progress and developments.
What is the purpose of DVN?
There are three main objectives :
1. Technological watch on emerging technologies through the weekly

electronic newsletter, and monthly technical reports focused on lighting and ADAS, company profiles, motor show reports, and so on;
2. Networking with high level decision-makers to forge new business through two workshops per year held in the USA, Europe, China, Japan, India and Korea, gathering more than 300 participants.
3. Promotion of innovations towards the 150 member companies of DVN, getting in touch through our personal intervention, enabling the building of new relationships through 'DVN Community' to forge new business worldwide.

EPIC NEWS

EPIC NEWS

News from EPIC
By Carlos Lee, director general
www.epic-assoc.com

Linking the automotive lighting and ADAS industries with photonics

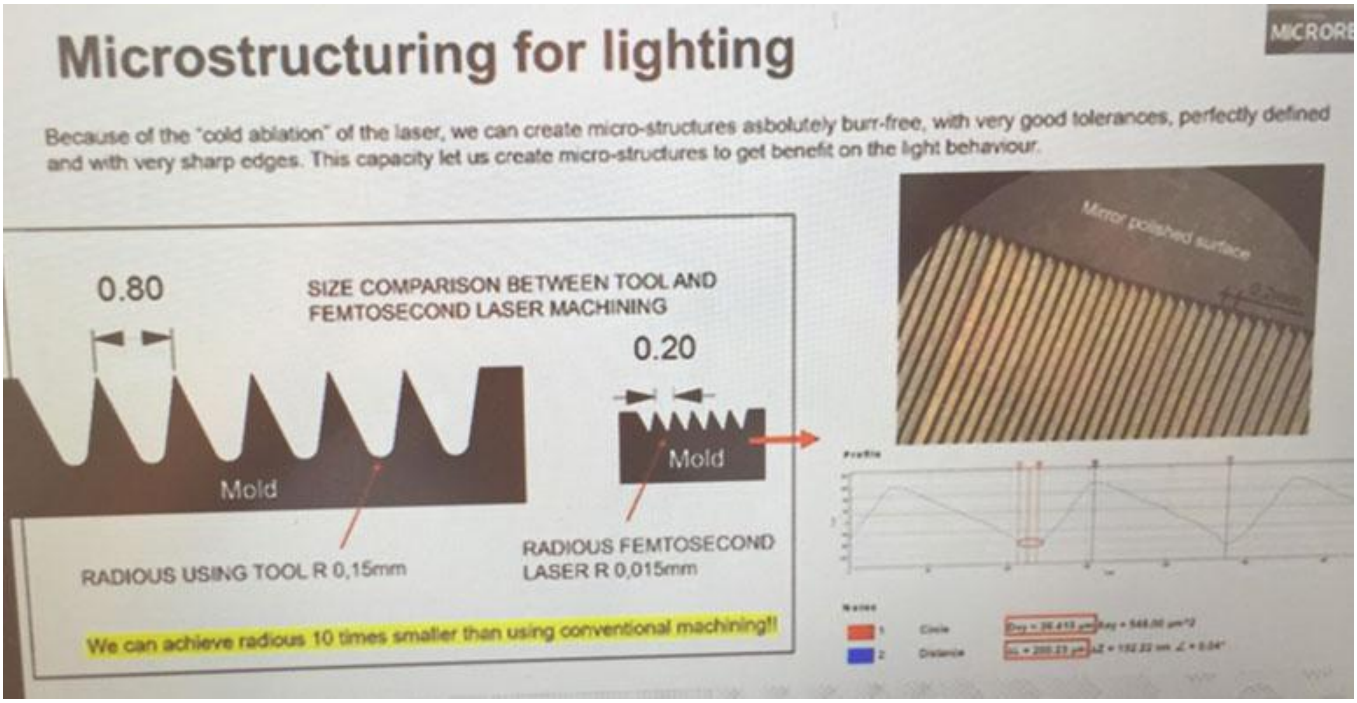
"Photonics is a key enabling technology with numerous relevant applications for the automotive industry"

Who are your members/ stakeholders?
DVN has worldwide 150 Gold company members: 25 car makers, 30 lighting and ADAS Tier 1 suppliers, 15 light source suppliers, 50 Tier 2/3 suppliers and 25 universities. We have 1,000 individual DVN Gold members and 2,500 individual standard members.

What opportunities do you see for collaboration with EPIC and its members? Photonics is a key enabling technology with numerous relevant applications for the automotive industry. As both organisations are leaders in

their field, I look forward to greater collaboration facilitating interaction among our members.

Microrelleus: Femtosecond Laser for Microstructure Moulding



In a lecture at the EPIC event, Micorelleus explained their achievements in high-quality industrial engraving, focusing on micro engraving for moulds and tools.

They are world pioneers offering a femtosecond five-axis laser service called cold laser ablation. It involves ultra-short laser pulses—a femtosecond is 10^{-15} second, that is one quadrillionth of a second, or 0.000,000,000,000,001 second.

So, what impact does femtosecond laser have in vehicle lighting?
The characteristics of cold laser ablation enable Microrelleus to offer new possibilities in prototyping: microstructuring, texturing or engraving over any material, and mold microstructuring absolutely burr-free, with very sharp edges and high-quality surface finishing on PMMA and PC prototypes, both for functional and design purposes. Before, with conventional technology, it was not possible to obtain such high quality detail in prototypes.

Microrelleus can create microstructuring for light purposes such as changing light direction, broadening light angle, amplifying light intensity, creating new texturing possibilities for light diffusion or even micro-optics. All these possibilities are applied by Microrelleus in an industrial manner because they work on moulds and tools in five axes, so all these new possibilities are applicable over any 3D shape.

A Facelift For the Fiver: BMW's New 5-Series

The newest BMW 5-Series has a dapper new look. The grille is now wider and taller, and naturally the lights are new as well.

In front there are new LED headlamps with thinner contours, same area for turn indicator and position light, optional LED spotlights with matrix technology available as an option, and BMW's laser projectors now available as an option for all variants of the model.

In the rear are trim new lights sculpted in three dimensions with an attractive, sharp-tipped J-hook lit appearance.

New-Look E-Class

The updated E-Class Sport presents a new look.

The headlamps are slimmer, and they shine with full-LED technology standard on all trims.
E-Multibeam and Ultra Range high beam are options.

Out back, redesigned two piece full-LED tail lights give a unique light signature with backlit edge-light blocks.

Hella's Expectations in Revenue and Profit

Customer demand, production volumes, supply chains, and employment are all significantly affected by the pandemic. To successfully meet these challenges, Hella put in a comprehensive set of measures in mid-March, included (inter alia)

a significant reduction of staff and material costs as well as already-planned investments.

Based on current information and circumstances, Hella are forecasting for fiscal year 2019-20 (June 2019 to May 2020), group sales of abou €5.7bn and an adjusted operating profit margin of about four per cent.

In the fourth quarter of FY 2019-20, Hella will recognise non-cash impairments of about €500m. The expected impairments mainly result from the considerably reduced market volume due to the COVID-19 pandemic and the assumption that the worldwide production volume of passenger cars and light commercial vehicles will remain significantly below the planning assumptions and market expectations made prior to the crisis. The impairments will affect certain financial performance indicators such as the reported EBIT, the group net income attributable to shareholders and the equity ratio but will have no impact on the adjusted EBIT margin.

Koito: Consolidated Earnings for Fiscal 2020 Down

The Koito consolidated results for fiscal 2020 (April 1, 2019 to March 31, 2020) decreased. Global automobile production volume decreased year on year due

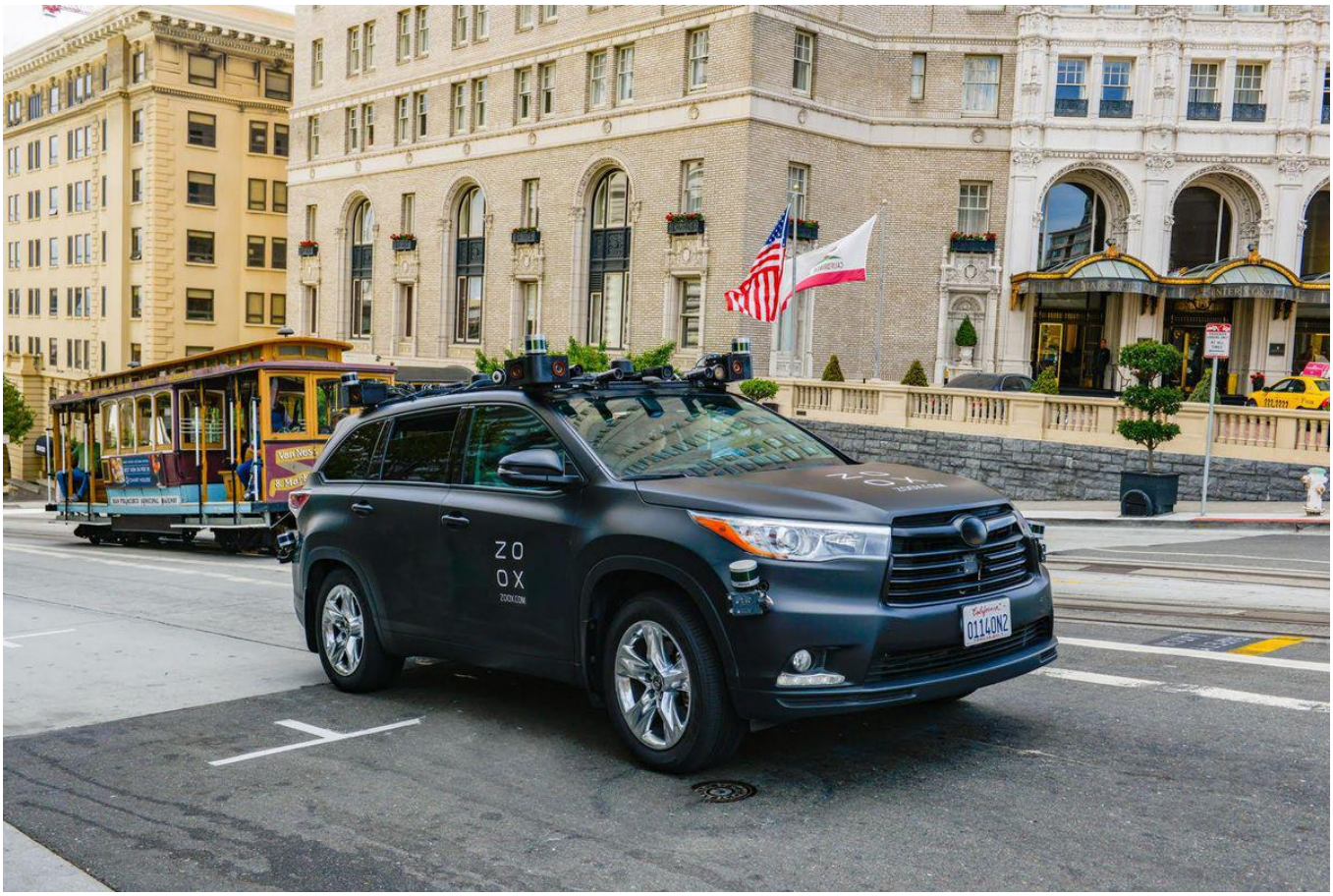
to the decreased production volume in North America, China, Asia, Europe, ASEAN countries and India.

In this climate, despite an increase in new orders in the mainstay automotive lighting equipment segment and a shift in automobile lamps to LED, the KOITO Group's net sales for the fiscal 2020 decreased 3.1% year on year with anoperating income decreased 18.8% year on year
This was attributable to a decrease in sales caused by a decrease in automobile production volume and increased R&D expenses,

It is difficult to see the future such as normalization of economic situation and the timing of economic recovery. In the automobile industry, there is also undergoing tremendous impacts, such as a slump of demand for automobiles. At present, the business climate surrounding KOITO is extremely severe and unclear, due to the suspension of automobile production to prevent infections in various regions of the World.

Driver Assistance News

Amazon May Buy Zoox



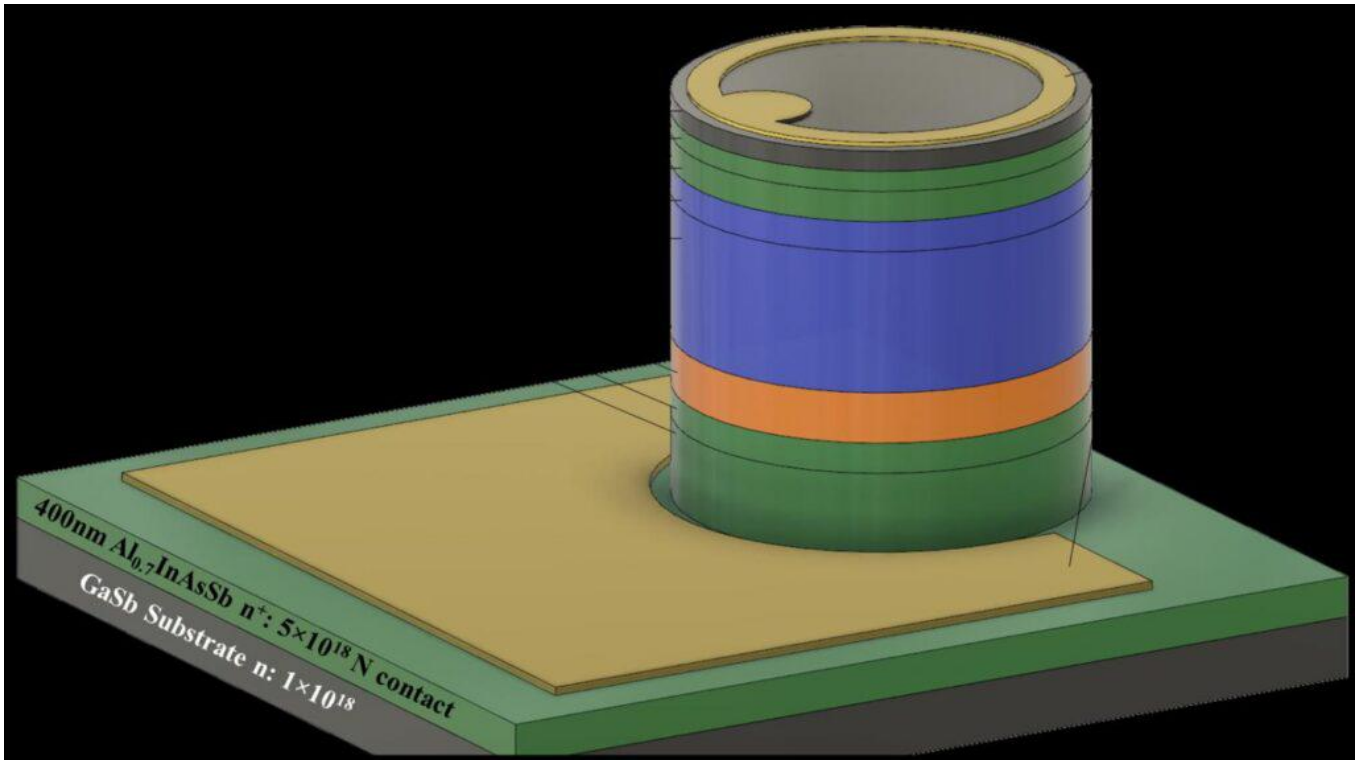
Amazon might be preparing to dive into the AV sphere by buying robotaxi developer Zoox, according to the *Wall Street Journal*.

If the deal goes through, the purchase terms would value Zoox below its estimated market value of $3.2 billion, a level attained after its last funding round, the Journal said, citing people familiar with the matter. Some Zoox investors hope Zoox—who seek to build both their own fleet of robotaxis and the technology that operates them, can remain independent.

Cofounded by Australian artist and designer Tim Kentley-Klay and Stanford computer scientist Jesse Levinson in 2014, Zoox have sought to build a business of on-demand robotaxis and delivery vehicles that blend the most advanced aspects of autonomous driving tech with cutting-edge electric powertrains to serve customers in dense urban markets. Its purpose-built vehicle is designed for use in a company-branded fleet, not individual ownership, with a goal to begin operation late this year.

Although Zoox have raised nearly $1bn since founding, the company's cost-intensive plans require significantly more capital for vehicle development and production; their inability to secure it are said to have likely led them to consider a potential acquisition.

Photodiode Breaks Lidar Performance Record



EPITAXIAL CROSS SECTION OF THE AVALANCHE PHOTODIODE DESIGN.

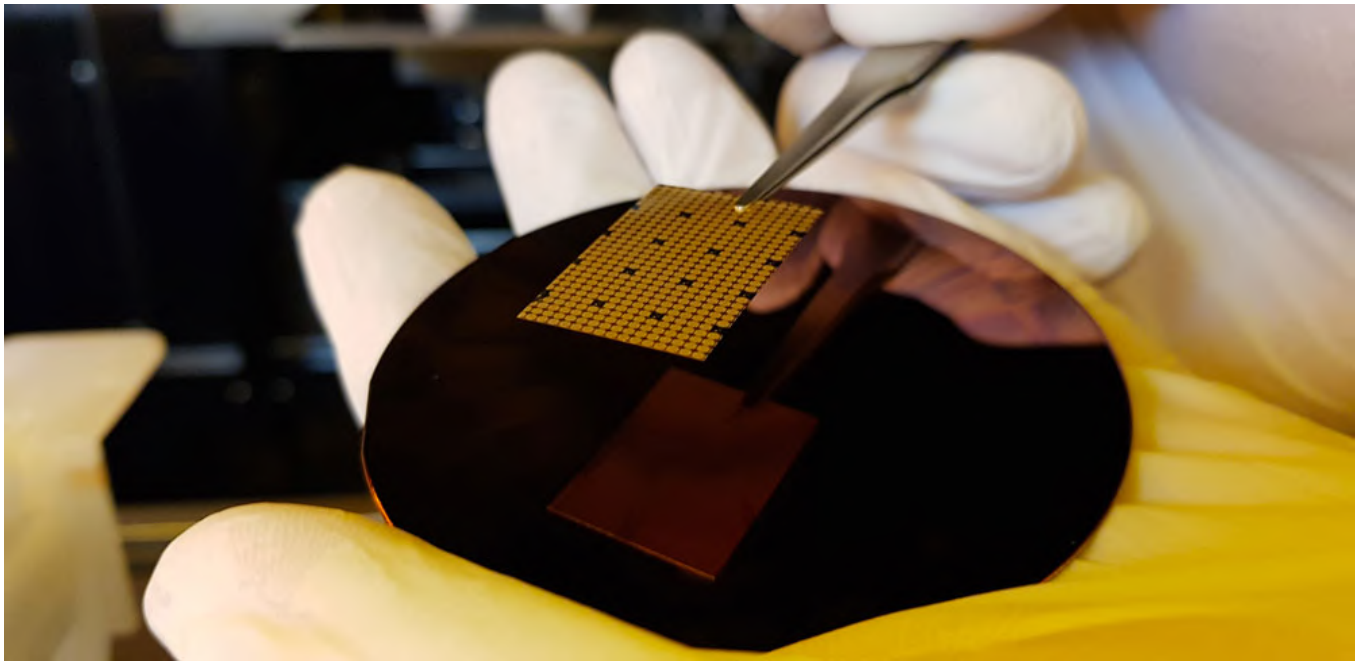
Electrical and computer engineers at the University of Virginia and University of Texas-Austin have developed an avalanche photodiode that achieved record performance and has the potential to transform next generation night-vision imaging and lidar receivers. For lidar, the team's low-noise, two-micrometer avalanche photodiode enables eye-safe higher-power operation.

The peer reviewed paper, "Low-noise high-temperature AlInAsSb/GaSb avalanche photodiodes for 2-μm applications," was published on 18 May in ***Nature Photonics***, a monthly journal of the best research from all areas of light generation, manipulation and detection.

This breakthrough comes from the team's work, funded by DARPA (the U.S. Defense Advanced Research Projects Agency) and the Army Research Office. The team's avalanche photodiode is an ideal solution for compact, high-sensitivity lidar receivers. Many lidar applications, such as robotics, autonomous vehicles, wide-area surveillance and terrain mapping, require high-resolution sensors that can detect greatly attenuated optical signals reflected from distant objects. Eye safety has limited the adoption of these next-

generation lidar systems, however, because the requisite higher laser power poses an increased risk of eye damage.

SOS Lab Aims to Commercialize low-cost Lidar



Korean lidar sensor startup SOS LAB have outlined new funding and plans to commercialise a low-cost lidar sensor for vehicles based on VCSELs (vertical-cavity surface-emitting lasers).

SOS Lab are targeting the autonomous vehicle sector, seeing their products taking a place in the ecosystem of sensors that will work in tandem to ensure the safety of future vehicles offering a high degree of autonomy.
CEO Jiseong Jeong says "To commercialise autonomous driving technology above level 3, the technology readiness level must be elevated so that the technology is safe enough for customers to use."

SOS Lab, along with many of their rivals in the sector, are working on a solid-state approach compatible with mass production and, ultimately, much lower in cost than the mechanical scanning lidar sensors that have dominated the scene in early versions of autonomous vehicles.

Unveiled at CES this past January, SOS' ML-1 solid-state lidar is claimed to offer a range of 50 m. The company also offer an SL-1 model, described as a hybrid technology and with a claimed range of 230 m.

General News

"It's a Question of Ethics": CLEPA Chief on Crisis Strategy

Thorsten Muschal, Executive VP of Sales and Program Management at Faurecia, was elected to lead the European suppliers association CLEPA in January. Two months later…pandemic! Here is an excerpt from his interview with Automotive News Europe:

"What we are experiencing with COVID-19 shows that a European voice and aligned behavior joined in a shared policy approach is more needed than ever. The big members, Bosch, ZF, Continental have put task forces in place to manage social systems and protect their people in different countries. They are looking for coordinated political and financing support. For smaller companies it’s more a question of survival.

"It’s key to make sure that everybody pays to keep the supply chain up and running so the smaller companies don’t fall into bankruptcy. The first thing we say is that nobody should take advantage of this situation. We need to push this discipline. It’s a question of ethics.

"We have a lot to learn in this crisis. We are all learning the lesson that globalisation is a challenging topic, and we see how difficult it is to keep our supply chain working. We also need to think about how we start up again.

"The auto industry is under a lot of pressure, and it's facing its biggest transformation ever. It started several years ago with Dieselgate, and now we have digitalisation, carbon neutrality and autonomous vehicles. We need to build Europe into an automotive industry powerhouse. To do that, to build on our strengths, we need to make Europe an attractive marketplace.

"Innovation is a key differentiator for Europe. We have all the ingredients. We have strong European customers, which are leading automakers, and we have the strongest supply base in the world. This is a position we need to defend and make even stronger. But we are undergoing a huge transformation."

U.S. Sales Outlook—Tough to Say

Where are vehicle sales trends heading in 2020? The answer is murky, and it's also difficult to know at this point whether it will be a smooth trend or more of a turbulent one.

Latest Wards predictions suggest 2020 and '21 might look a lot like 2009 and '10 might have looked if not for the global financial crash.

2008	2009	2010	1012	2014	2016	2018	2019+	2020+	2021+
13.2	10.4	11.6	14.4	16.5	17.5	17.2	17.0	13.4	15.2