DrivingVisionNews.com
Automotive lighting and driver assistance technologies

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Editorial

Shift Work: Home Offices, Online Workshops

Covid-19 continues to make most of us work from home. Many in the lighting community have found their efficiency has actually improved: no time lost in transit and travel, less pressure, more availability, better sleep quality, and improved psychological health—but on the other side of the ledger, they (and we) miss the collegial conviviality of face-to-face discussions. Nevertheless, being made to stay home, we've discovered and built a new topography of work, and it's one that allows for greater happiness.

Lately this new topography has been much in mind here at Driving Vision News as we've wrestled with the decision of how to handle the **Car Smart Interior Workshop**, originally scheduled as an in-person event in Darmstadt, Fermany, on 24 September 2020. There's an ongoing, real risk to having people gather together for a day, and the world at large seems to have got the hang of holding all kinds of events online, so we decided to make it a livestream event instead. That way it will be accessible to the greatest possible number of community members.

There are great challenges here; in-person networking has long been crucial to the success of DVN Workshops, and we have figured out how to maintain and bolster that in the new reality through a pre-organized tour, and B2B chat/business meeting options open a few days before the event for all registered attendees.
Powered by ExpoWizard, the event will include a virtual expo remaining open 7 days after the event, as well as video recordings of all lectures accessible in V.O.D. from the moment they start until the end of the conference week.

Our priority is to avoid unnecessary risk to the health of Workshop participants. We are busily working on solutions to put on something close to a physical workshop. And as usual, we will make all our best to succeed.

Online registration is open; please go ahead and sign up!

Watch for more information in this Newsletter In-Depth article.

Keep well,

DVN PRESIDENT

In Depth Lighting Technology

Car Smart Interior Workshop Moves Online

"New Technologies for Car Interior and Mobility" will be the theme of the **Car Smart Interior Workshop**, the first DVN-Interior event. New use cases within more automated and connected vehicles, flexible interior and system perspectives, seating, interior lighting, traditionally passive surfaces becoming functional, HMI, design, and decoration are included in the topics to be discussed.

24 lectures are expected from Audi, BMW, Honda, PSA, Renault, DS, Faurecia, Valeo, Hella, Adient, Yanfeng, ZF, Brose, Recticel, Preh, NBHX, Sensata, Texas Instruments, Ansys, FLT, the ISELED Alliance, Inova, Osram, and EPIC (the European Photonics Industry Consorsium).

For this online event, we're planning an exceptional conference and expo. Within today's revolution of CASE (connected, autonomous, shared, and electric) vehicles, mobility use cases are changing drastically. Car interiors are becoming a new product differentiator, allowing drivers and occupants to pivot from actively driving or passively watching scenery to a diverse new range of timespending in a car: relaxing, working, phoning, reading, watching movies…the car becomes a mobile lounge, and these new usages are pulling new technology to realise this new reality.

The Workshop will be structured around five sessions in sequence with a keynote for each:

Session 1: Interior as a system
Car interiors will look like cockpits of the future meant to cocoon driver and passengers, create flexibility and allow all positions, purify cabin air, and become energy efficient, with the systems necessary to keep the safest level of protection. There'll be three lectures on interior architecture, the cockpit of the future, and the smart cocoon.

Session 2: Any surface becomes functional
This session will include presentations on the functionalisation of traditionally passive surfaces, intelligent multifunctional intuitive controls, sensor integration on IP skins, new functional plastic technology, and functional leather surfaces.

Session 3: Interior lighting
Here's where there'll be lectures on new interior lighting technologies, dynamic lighting enabling new functionalities, functional integration, and light and electronic control elements.

Session 4: Seating
Topics will include configurable seating for L^{2+} autonomy, intuitive seat comfort adjustment, lightweight adjustable seat structures, in-seat driver monitoring systems, and new roles for in-seat sensors.

Session 5: Interior design & simulation software & hardware
Presentations on configurable digital cockpits, HMI and 3D display, infotainment, cluster monitoring, and functional decoration

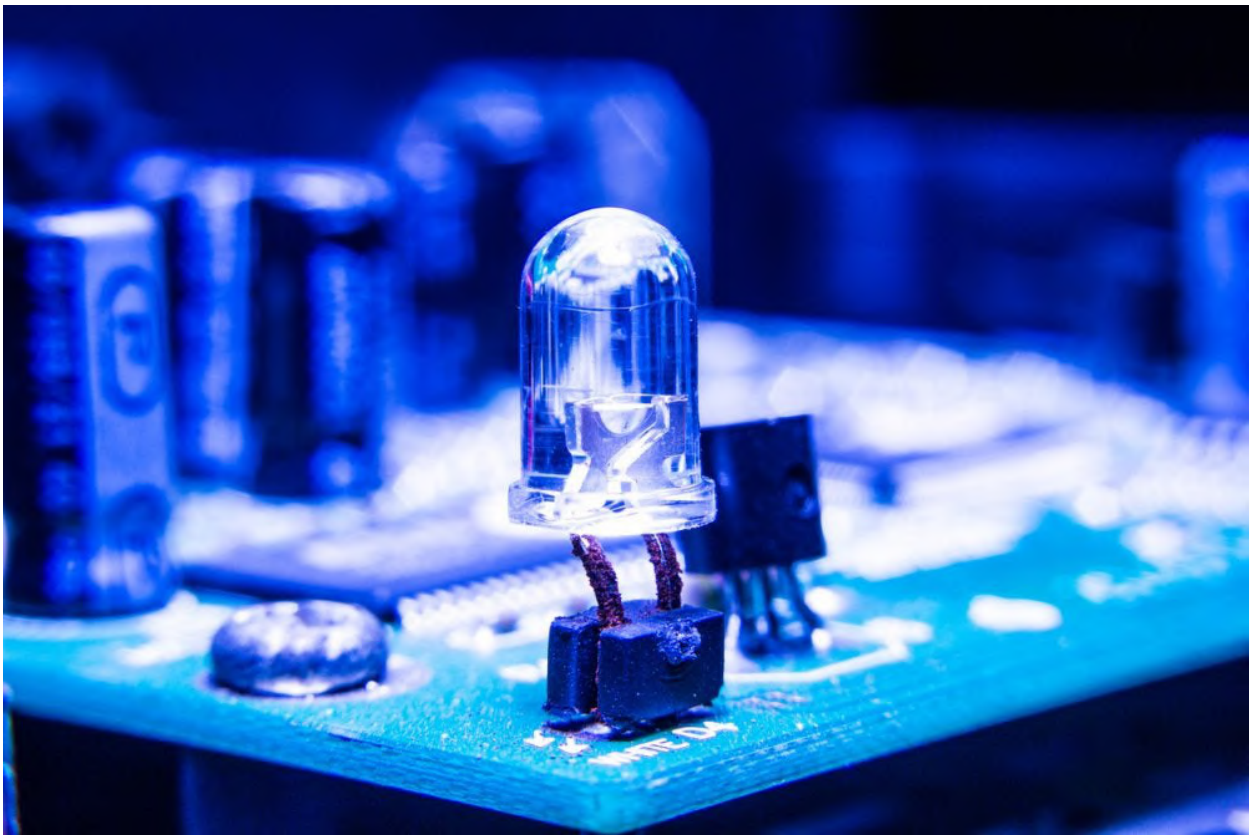
Powered by ExpoWizard, the event will include B2B face-to-face meetings and a virtual expo that will remain open seven days on from the event, as well as the video recordings of all lectures. Exhibitors will be able to enhance their exposure with text, photo galleries, company contact information, and presentation videos.

A special exhibition corner will gather all startup companies involved in driver and passenger safety, comfort & wellbeing, and new user experiences.

Online registration is open; please go ahead and sign up!

Lighting News

UCSB Team Push LEDs to Compete With Laser Light



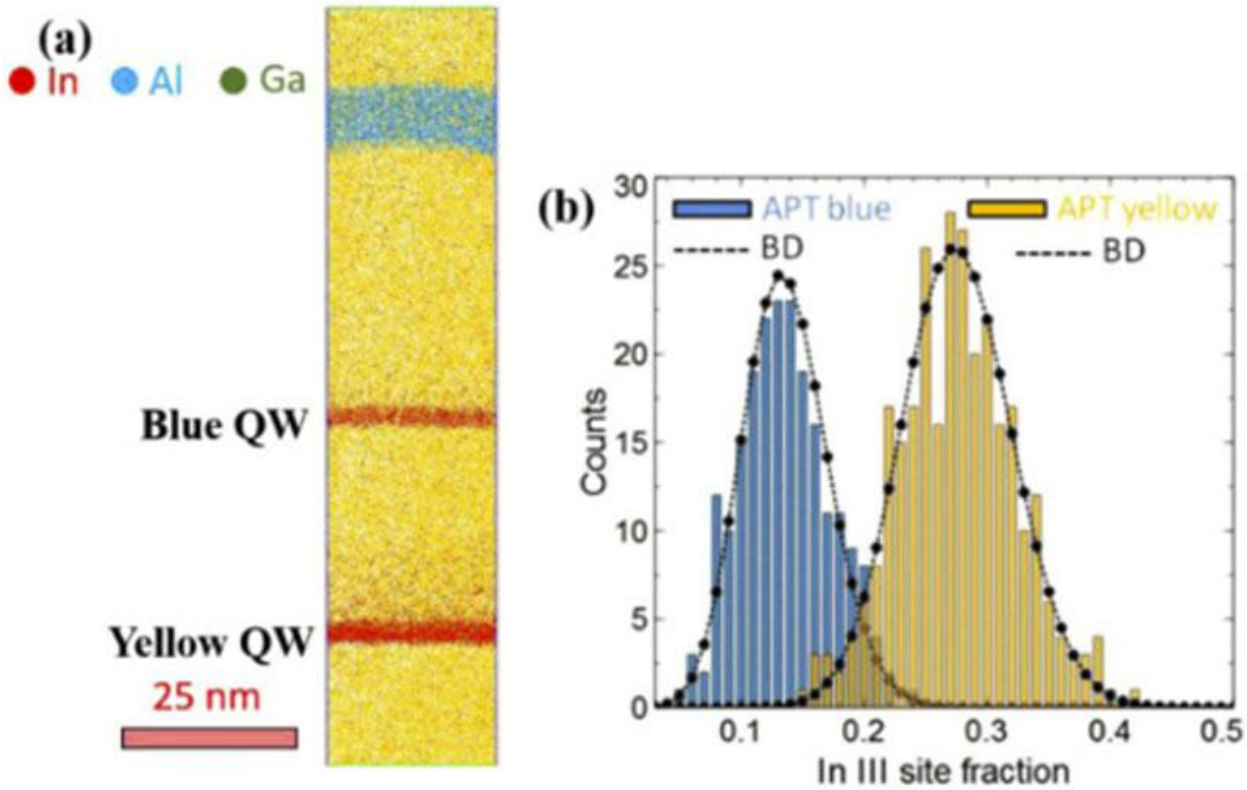
University of California Santa Barbara have been goosing LEDs with new techniques to wring more light from them. UCSB electrical and computer engineering professor Jonathan Schuller works with Claude Weisbuch and Nobel laureate Shuji Nakamura on the new technology.

Usually LEDs emit spontaneous light, versus a laser's stimulated, coherent light. The research team focused on metasurfaces—engineered surfaces with nanoscale features—that interact with light and manage and control the photons from the LED.

The design they arrived at consists of an array GaN nanorods, each 1.45 μm long, on a sapphire substrate. Quantum wells of InGaN are embedded in the nanorods to confine electrons and holes and thus emit light. In addition to allowing more light to leave the semiconductor structure, the design polarises the light. The work has been **published** in Nature Photonics.

With UC Santa Barbara's SSLEEC (Solid State Lighting and Energy Electronics Center) and the campus' nanofabrication facility, the researchers designed and patterned the semiconductor surface to adapt the metasurface concept for spontaneous light emission.

New Efficient Non-Phosphor White LEDs



A new way of making white LEDs without phosphor has been **published** by a research team at the University of California at Santa Barbara; Nobel laureate and blue/white LED pioneer Shuji Nakamura is a co-author.

White LEDs are usually made of blue LEDs with a yellow phosphor; the admixed light (blue from the chip and yellow from the phosphor) is white. But phosphor-converted white LEDs usually suffer energy loss and reduced thermal stability. Phosphor-free LEDs, on the other hand, have been hard to make. The UCSB team's innovation is an easier new method to achieve efficient and polarised white LEDs grown directly on a GaN substrate.

The team adopted a top blue QW (quantum well) and a bottom yellow QW on semipolar bulk GaN substrate to produce phosphor-free white InGaN LEDs with a peak wavelength of 427 nm in blue and 560 nm in yellow and an output power of 0.9mW.

The researchers believe the phosphor-free LEDs with advanced efficiency could be promising as backlight sources and offer possibility for µLEDs used in visible light communication.

Osram-Continental's New Lighting Functions

Osram-Continental are working on projection-based lighting functions for cars. The vehicle and its surroundings become a screen for automakers and mobility providers.

Clearer visibility of signals

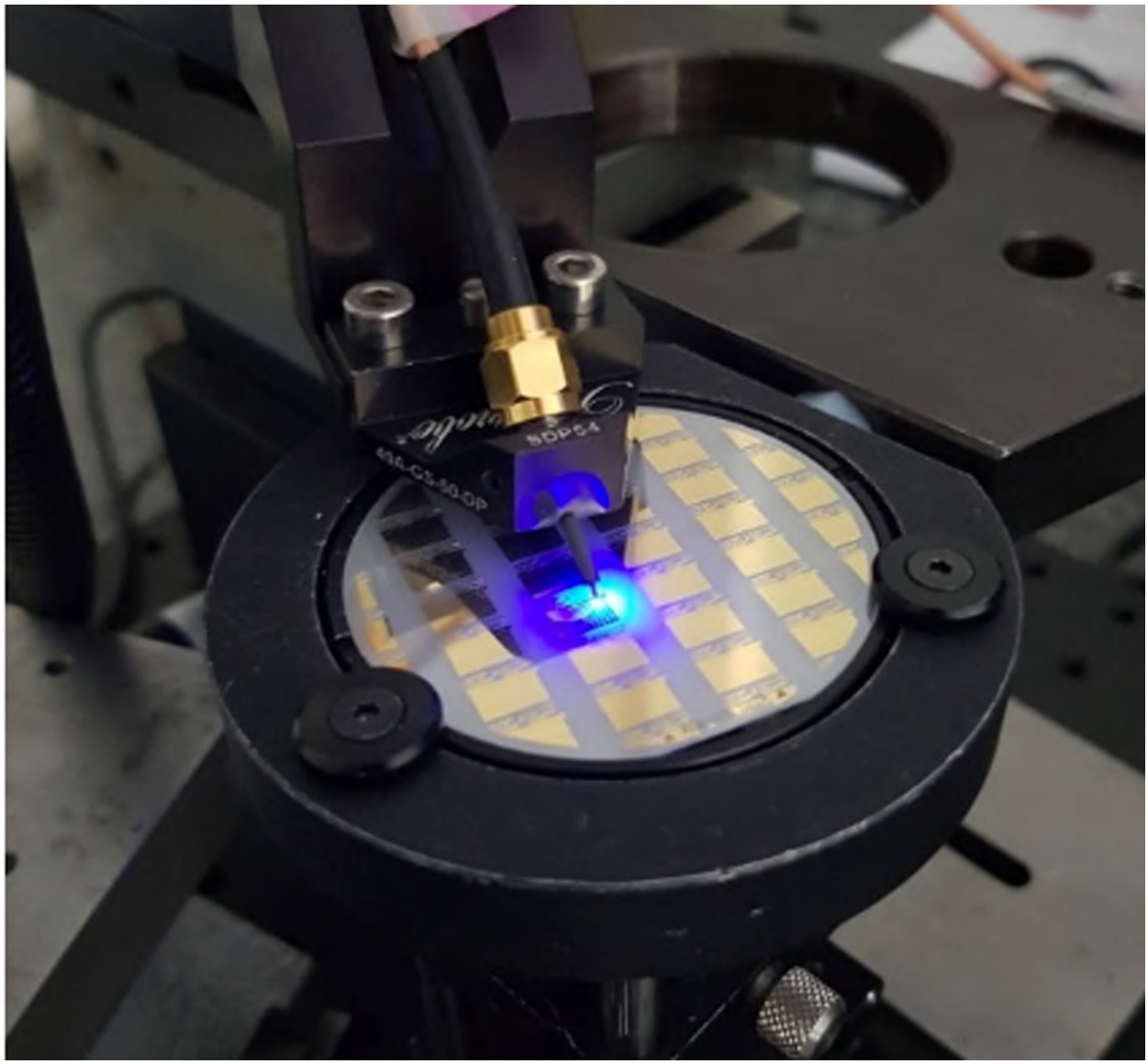
Displays to inform the driver

Osram-Continental CEO Dr. Dirk Linzmeier says his company "are pursuing the vision of offering our customers seamless and coördinated light orchestration in and around the vehicle. We want to transport the fascinating possibilities that this technology offers in the interaction with its environment".

Static projection solutions provide, for example, the representation of logos or complex structures such as light guide geometries. Semi-dynamic projectors combine a set of defined symbols and graphics and thus enable, among other things, an expanded display of the turn signal. Dynamic projections allow the content they display to be adjusted in real time. This makes them ideal for mixed traffic scenarios in which autonomous and person-controlled vehicles, pedestrians and cyclists share the road.

Exterior projection systems offer the option of making the turn signal or brake light and relevant driving information clearly visible by displaying them on the road, thus ensuring additional safety. Projections that signal stop signs, for example, support autonomous vehicles in their interaction with other road users. And individual greetings projected onto the driver's window from the inside ensure a good feeling even before the car is started.

GaN Blue µLEDs for LiFi Communications



French research institute CEA-Leti's researchers have broken the VLC (visible light communications) throughput world record of 5.1 Gbps, using a single GaN blue MicroLED. Their data transmission rate of 7.7 Gbps, achieved with a 10-µm µLED, marks another step toward commercialisation and widespread use of LiFi communication.

VLC, or LiFi is an emerging wireless communication system that offers an alternative or a complementary technology to radio frequency systems such as WiFi and 5G. It is considered to be a promising technology for security-related applications because light propagation can be confined to a room with no information leakage, as opposed to WiFi communication, which penetrates walls. LiFi also holds promise for ultra-highspeed data transmission in environments where RF emissions are controlled—hospitals, schools, and airplanes, for example.

Single-µLED communications offer an ultra-high data-transmission rate for a variety of opportunities for new applications. But their weak optical power limits their applications to short-range communications. In contrast, matrices of thousands of µLEDs contain higher optical powers than open mid- and long-range applications. However, preserving the bandwidth of each µLED within a matrix requires that each signal has to be brought as close as possible to the micro-optical source.

CEA-Leti scientists noted that LiFi application will still require a standardisation process and has a potential to be included in the downlink of 5G-NR to bring additional

bandwidth.

PlayNitride Aim to Slash µLED Cost

MicroLED technology supplier PlayNitride say they want to reduce the production cost of microLED chips by 95% in five years.

CEO Charles Li says the two major keys of microLEDs are to make them small and cheap, which is the current challenge for commercialisation. In order to achieve the goal, it is critical to connect the supply chain from wafer manufacture through chip process, transfer technology, display module, backplane driver and system tuning. Most of the processes already exist, but need more integration in resources and technology; equipment supply is also crucial.

PlayNitride continue to raise funds to push their technology advancement and mass production. Apart from the USD $86m raised last year for production expansion, PlayNitride are planning for another $50m to keep accelerating production and technology progress.

This past April, PlayNitride and AUO jointly developed a flexible µLED display which targets automotive display applications.

Audi CEO to also lead R&D at brand

Audi CEO Markus Duesmann will also head the Volkswagen Group subsidiary's R&D division, the company said last week.

MARKUS DUESMANN

Duesmann, a mechanical engineer who was BMW's purchasing chief and became Audi CEO in April, will "realign the premium brand’s development division with a special focus on process quality," Audi said in the release.
He is tasked with injecting new meaning into the brand's advertising slogan Vorsprung Durch Technik (Advancement Through Technology).

HANS-JOACHIM ROTHENPIELER

Hans-Joachim Rothenpieler came to Ingolstadt from Wolfsburg in November 2018. In the past one and a half years, Rothenpieler continued the evolvement of Technical Development that his predecessor had initiated. “Audi's Technical Development division is prepared for the necessary transition!” said Hans-Joachim Rothenpieler. He established new competencies in the areas of electric mobility and digitalization, including artificial intelligence. Born in Westphalia, Rothenpieler has worked for the Volkswagen Group since 1986, including as Head of Complete Vehicle Development at Škoda, as Member of the Board of Management for Technical Development at the Bentley brand, and as Member of the Board of Management for Development at Volkswagen Commercial Vehicles.

Lumileds debuts Philips LED integral beam upgrade

Lumileds has introduced the Philips LED integral beam as a DOT-compliant LED upgrade for conventional sealed beam headlamps.

Utilizing state-of-the-art LED technology, these replacement headlights feature a sharp cut-off point for legal beam performance with no glare to oncoming drivers. Philips LED integral beam headlights offer up to 6000K of cool white light and deliver better durability and a longer lifespan than conventional sealed beam headlights, the company says.

Designed to provide simple installation, Philips LED integral beam offer an easy plug and play replacement for halogen and incandescent sealed beams on vehicles with H6024, H6054, H4651 and H4656 headlight configurations. Philips LED integral beam headlights are compatible with both 12V and 24V systems, providing a wider versatility of use, the company says.

Philips LED integral beam are available for 7 in. round, 5 in. x 7 in. and 4 in. x 6 in. rectangular sealed beam applications.

Restyle Roundup: New-Look Lights

The new BMW M5 Competition has narrow L-shaped light guides, which point towards the double grille and undersling twin-blue-line eyelids; the LED and laser road illumination optics are in the dark spaces when the optional "Individual Shadow Line" finish is specified.

The M5 Competition's LED tail lights now boast a 3D design with a new expression of the fish hook shaped BMW tail light elements.


Meanwhile, Ford have given their best-selling F-150 pickup truck a facelift. The prominent new headlamps exhibit strong familial ties to Ford's larger F-250 (350, 450…) trucks, but aren't exactly alike. There's a homogeneously-lit 4-piece position/DRL array; the large upper part boxes in the headlamps, while the smaller lower part underslings the fog lamps. All lighting functions appear to be done with LED technology, and it seems possible there might be more than one version of the headlamp (or perhaps we're seeing different iterations of the design in these different spy shots). We'll know for sure next week; the truck gets officially launched this Thursday.

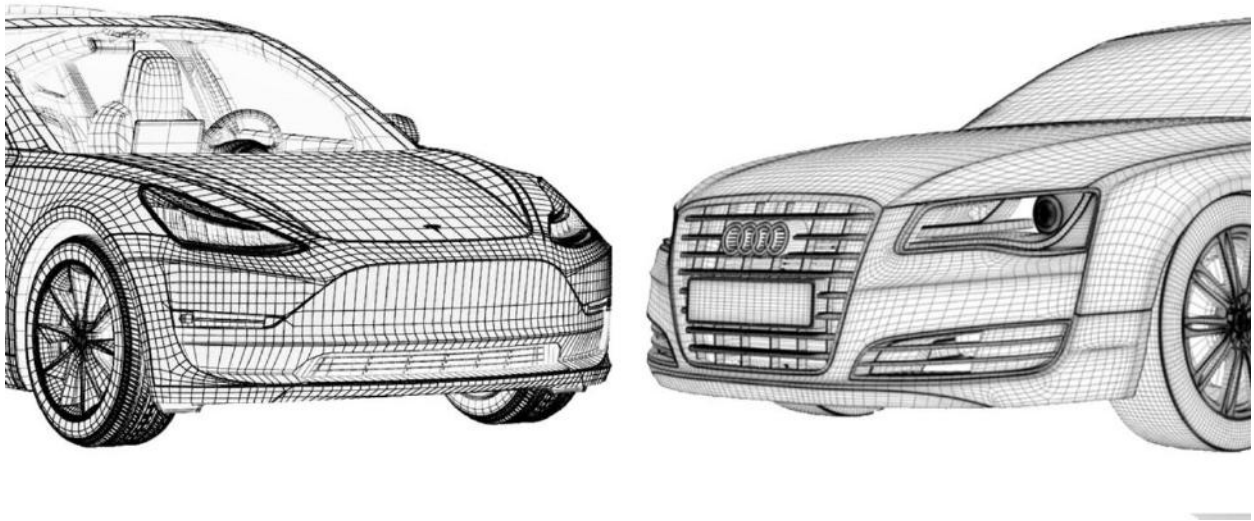

New Lexus Has New Lights

The newest Lexus IS has a new iteration of the brand's signature lightstyle. The checkmark-shaped DRLs are neatly counterbalanced by the side marker light at the outboard edge, while the road-lighting optics hide in the dark for a 3D, technological appearance.

In back, too, the shapes are familiar but newly refined. The checkmark-shaped tail lights now become the outer extremities of a curved, full-width light bar extending across the deck lid.

Driver Assistance News

Yole-System Plus Webcast: From ADAS to AV

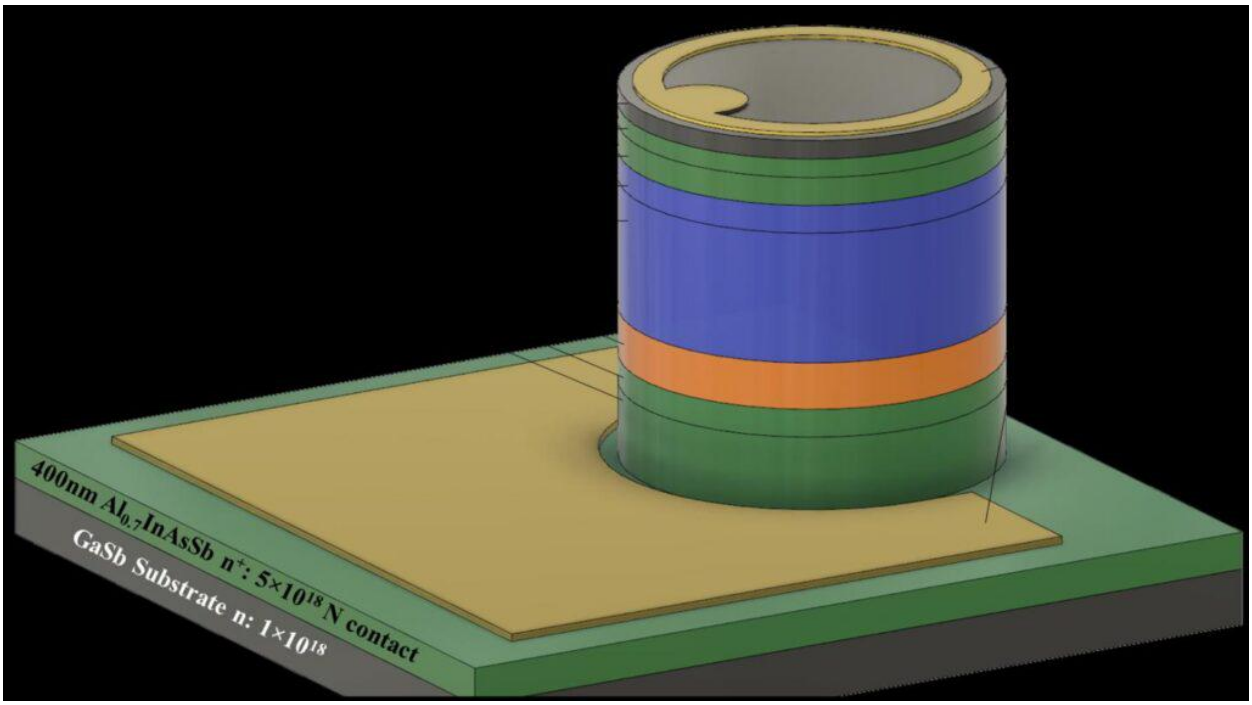


Yole Développement and System Plus Consulting are putting on a webcast this coming 30 June on the theme: "*From ADAS to Automated Driving*", presenting the evolution of sensing, computing, and architecture in the ADAS sector.

ADAS functionalities were initially developed for safety and are now increasingly used to enable some automated driving features. This requires more sensors and computing power, and a more complex E/E (electric and electronic) architecture.

This webcast will discuss the evolution of the main kinds of sensors used for ADAS: cameras, radars and lidars. They will also show the evolution of the E/E architecture and what is needed in terms of computing to enable automated driving features. An assessment of Audi and Tesla implementations will be performed. Attendance is open and free; Register online

New Avalanche Photodiode for Eye-Safe Lidar



EPITAXIAL CROSS SECTION OF THE AVALANCHE PHOTODIODE DESIGN.

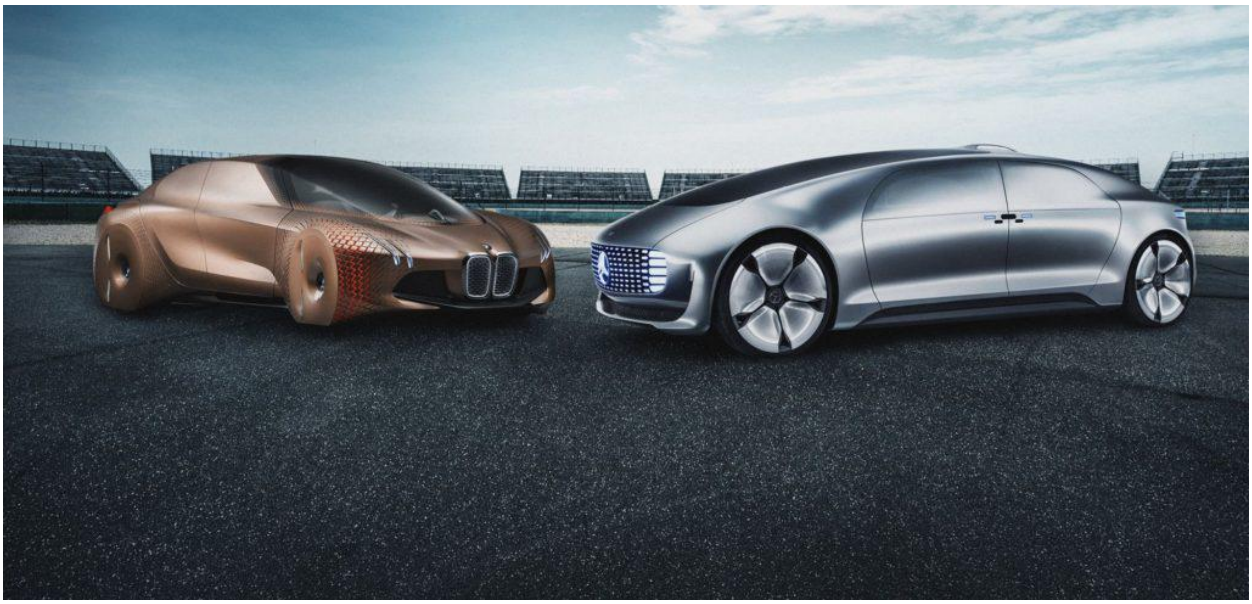
A research team of electrical and computer engineers at the University of Virginia and University of Texas-Austin have developed an avalanche photodiode, achieving record performance, that could transform receiver components for lidar. The innovation has been **published** in Nature Photonics.

The team used the novel optical and electrical characteristics of a digital alloy created at UT-Austin's Laboratory for Advanced Semiconductor Epitaxy. This breakthrough springs from a longtime collaboration between University of Virginia engineering professor Joe C. Campbell and UT-Austin professor Seth Bank, who used molecular beam epitaxy to grow the alloy of aluminum, indium, arsenic, and antimony. The alloy combines long-wavelength sensitivity, ultra-low noise, and the design flexibility to achieve low dark currents, which is not available with existing low-noise avalanche photodiode materials technologies.

The new avalanche photodiode is an ideal solution for compact, high-sensitivity lidar receivers. Many lidar applications—robotics, autonomous vehicles, wide-area surveillance and terrain mapping, for instance—require high-resolution sensors to detect greatly attenuated optical signals reflected from distant objects. Eye safety has limited the deployment of such systems, though, because the requisite high laser power poses an increased risk of eye damage.

Professor Campbell says "The 2μm window is ideal for lidar systems because it is considered eye-safe and extends the detection reach. I can envision our avalanche photodiode impacting numerous key technologies that benefit from high sensitivity detectors."

BMW, Daimler Pause AD Pact

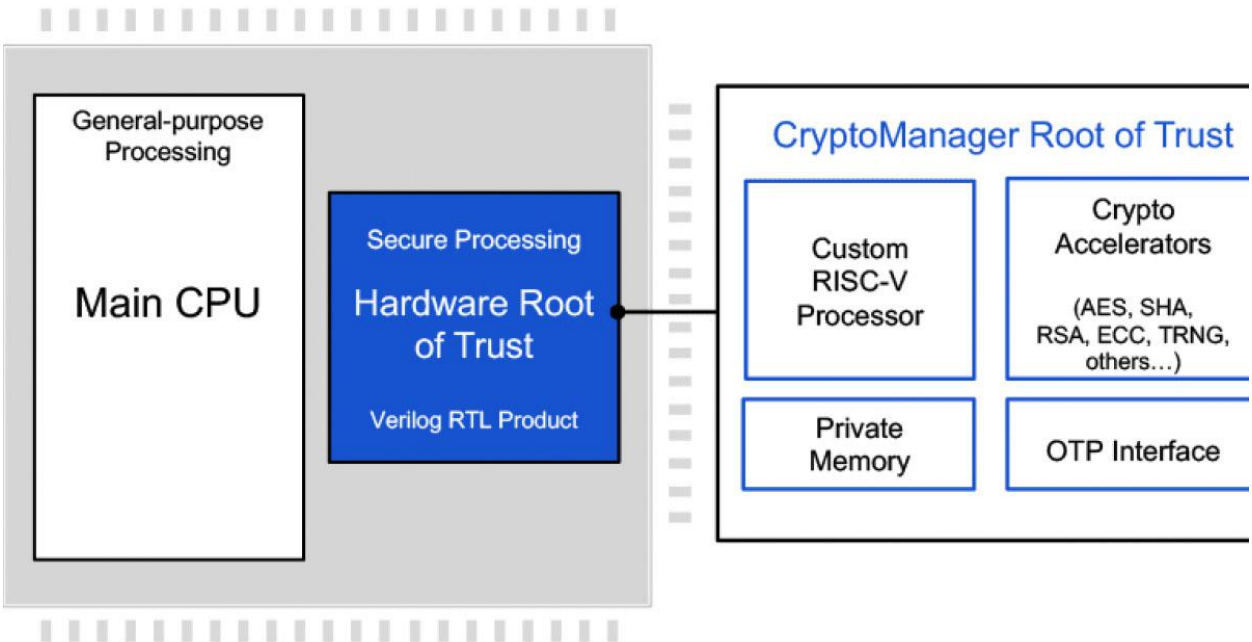


Mercedes-makers Daimler have shelved an automated-driving development alliance with BMW, and the two companies have agreed to see other people.

A Daimler statement says "Following extensive review, the two companies have arrived at a mutual and amicable agreement to concentrate on their existing development paths, which may also include working with new partners".

The joint statement added that the partnership could be resumed at a later date and that the firms' approach to "safety and customer benefits in the field of automated driving remains highly compatible".
"In these talks – and after extensive review – both sides concluded that, in view of the expense involved in creating a shared technology platform, as well as current business and economic conditions, the timing is not right for successful implementation of the cooperation."

Rambus RT-645 Crypto Sore Safeguards V2X, ADAS, ECU



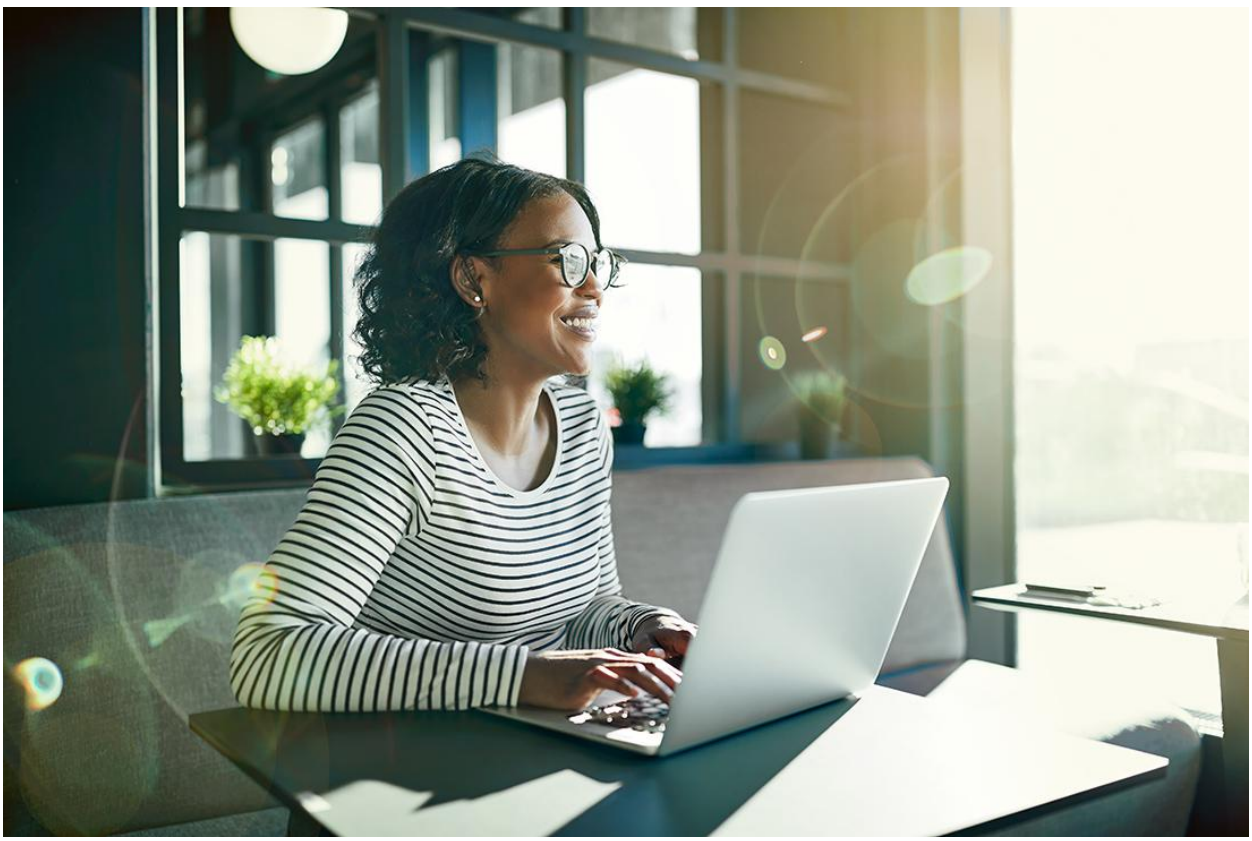
The Rambus RT-645 crypto core, based around a custom RISC-V processor, has been certified as ASIL-D ready by TÜV. The automotive-grade secure co-processor IP safeguards V2X communications, ADAS, ECU platform management, and other critical vehicle systems.

The CryptoManager Root of Trust RT-645 crypto core, along with its ASIL-B RT-640 version, includes secure boot, secure firmware updates, secure debug, attestation, device personalisation, key and data provisioning, secure feature and configuration management, cryptographic acceleration, and secure key and data storage. Both the RT-640 and RT-645 crypto core co-processors provide design integrity and reliability and have the collateral for an ISO-26262 design process.

"The increasing sophistication and complexity of automotive electronic systems brings a greater attack surface. This requires robust security solutions to safeguard these vital systems from a growing range of cyber threats", says Rambus Security VP and GM Neeraj Paliwal. "With our ASIL-ready CryptoManager secure co-processors, automotive chip makers can be assured of functional safety and have access to a rich set of security features that can be quickly implemented to accelerate the certification of their SoCs".

General News

More Daytime Light Brings Better Sleep, Mood



At Rensselaer Polytechnic Institute, the LRC (Lighting Research Center) is investigating the effects of working from home or quarantining indoors on individual daily light exposure, and how this may be affecting sleep quality and psychological health.

Last month the LRC invited people who had been staying home due to the pandemic to complete a short survey about their sleep, mood, and daily light exposure. A total of 708

people responded to the survey. LRC researchers analysed the data to understand how daily indoor light exposure, time spent outside, and time of day spent outside affected sleep quality, sleep-related impairment, anxiety, stress, depression, and mood.

The findings: daily indoor light exposure and time spent outside had a major impact on all survey outcomes including sleep disturbance, sleep-related impairment, anxiety, stress, depression, and mood. Compared to people with "somewhat dim" to "very dim" indoor lighting, people with "somewhat bright" to "very bright" lighting, including having windows without (or with open) curtains or shades, or having indoor lights turned on, reported fewer sleep disturbances, less anxiety and depression, happier and more positive feelings generally with less tiredness and irritability, and less sleep impairment.

Lead researcher Charles Jarboe says "Sleep quality and mood significantly improved when people spent the majority of their time in a brighter, compared to dimmer, location in their homes. If you can add a little more light to your space during the day—one extra lamp, or open your window shades, for example, it could help you feel better and improve your sleep".

VW, Ford Agree Global Alliance

Volkswagen and Ford have signed the contracts for their global alliance in the areas of electrification, light commercial vehicles, and autonomous driving. This paves the way for a Ford electric vehicle based on Volkswagen's Modular Electric Drive Box (MEB).

Discussions on the project have been public since last Summer, and both partners are now confirming the details: Ford will launch the MEB electric car in 2023, expecting within several years to deliver more than 600,000 units which they say will "combine generous space with the advantages of electric drive".

Ford electric cars are being developed in Cologne-Merkenich, Germany, and Ford is expanding their selection; in addition to the Mustang Mach-E, electric versions are in development of the Transit and F-150.

Both companies say it is more important than ever to form strong alliances between strong companies during the economic difficulty due to the Corona crisis; best way to

reduce development costs and enable greater global distribution of EVs and commercial vehicles.

In addition to cooperation in the field of e-mobility, the new alliance also targets a medium-sized pickup truck designed by Ford, which is to be included in the model range of Volkswagen Commercial Vehicles from 2022. Including two other commercial vehicle projects, the partners intend to develop and produce a total of around 8 million vehicles. In the field of autonomous driving, both groups rely on the SDS (Self-Driving System) from Argo AI. Volkswagen recently completed its announced investment in Argo AI, and Ford already holds ownership and development shares.

Europe Sales Show Signs of Life

European car sales showed the first signs of a recovery in May as showrooms reopened after a two-month shutdown because of the coronavirus pandemic, according to the industry association ACEA.

The industry is hoping that consumers will drive an improvement this summer by turning to cars for their holidays instead of flying to far-away destinations.

Another positive signal is coming from China, where car sales rose for the first time in almost a year last month. The region has become a focus for European automakers, who are hoping better business there will make up for muted registrations at home.

Despite the rebound, European sales through May have dropped 43 percent, in a sign that a recovery will take some time.

FCA Cancels Summer Shutdowns

Several of FCA's North American plants will not have summer shutdowns this year so they can meet what the maker describes as "strong consumer demand".

The plants that will remain open through the summer build vehicles such as the Ram 1500, Jeep Wrangler and Gladiator, and Dodge Challenger.

Those plants are Jefferson North Assembly in Detroit; Toledo Assembly Complex in Ohio; Sterling Heights Assembly in suburban Detroit; Brampton Assembly in Ontario; Saltillo Truck Assembly in Mexico; and Saltillo Van Assembly.