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Editorial

The Difficulty To Define Regulatory Changes To Improve Safety In Night Driving

After the difficulty to introduce ADB in the US, you will discover below an important paper from Rainer Neumann on the difficulty to develop amendments to the UN Regulations to allow the latest lighting innovations to be operated in traffic. Rainer is Chairman of the GTB Scientific Working Group, co-chairman of GTB Strategy working group, Member of the Scientific Committee in VISION, and sits on the advisory boards of ISAL, ISOL, and IFAL. He is one of the greatest automotive lighting experts, with a deep understanding and knowledge of automotive lighting and the homologation processes around the world, and has around 100 patents filed worldwide.

In his paper published below, Rainer explains that everyone is searching to improve safety in night driving, but the process of amending the regulations slows the implementation of new technologies. In conclusion, he proposes a solution to speed the process to successfully introduce provisions for symbols and patterns operating under special well-defined conditions. Additionally he recommends that GTB takes the initiative to organise and lead night-drives for the GRE government representatives in in the Geneva area, to present the latest technologies and research findings in conjunction with the leading world-wide independent institutes. This is a very important suggestion; all of us must follow!

In Depth Lighting Technology

The dilemma in the Approval of Projection of Symbols

from Rainer Neumann, chaiman of GTB research group!

In trying to introduce the projection of symbols and patterns into the UN Regulations 48 and 149, we are facing an issue in the exchange of opinions between some contracting parties in GRE and experts of GTB. The intention is clearly to improve safety in road traffic using symbols and patterns under well-defined special conditions. To verify the safety benefits, research and studies, involving much effort, is underway in various regions around the world.

GTB MEMBERS AT ONE OF THEIR BIANNUAL MEETINGS

Meanwhile, a huge amount of time has already been devoted to discussions in GRE and GTB and we face a principal dilemma:

- On one side we have the results of the studies, with quantified numbers and objective arguments.
- On the other side, in GRE, there is a group of countries who are hesitating to allow the projection of symbols and patterns. GTB chose to focus on just two symbols to facilitate the discussions, but the outcome so far has been statements from the contracting parties in GRE such as “we have concerns”. But what does this really mean? Is this a quantified argument? Do these arguments have a similar scientific base to the studies which have been executed? Even taking into account that these concerns are expressed with the same target, namely, to maintain and improve safety on the road, it is in the context of an exchange of arguments that are apparently not based on the simple data and facts of a study. How can we solve this?

This expression of emotional feelings is in contrast with the results of research studies, that have been generated from a well-defined list of parameters and investigations and carried out by independent institutes. This is a very difficult situation to resolve!

Several contacting parties argue that their concerns are related to a potential distraction of other road users, and this presents the next dilemma: what is a distraction? There have been studies showing, with an eye-tracking system, that subjects are aware of a symbol being projected, but do not forget their driving tasks. The result for the vehicle driver is the task of recognising the information and not losing the focus on of driving, but this is not proven to be a distraction. If a vehicle driver is going to enter a motorway in the wrong lane direction then a projection of a pattern or symbol cannot be distracting, it will be essential and it needs to create awareness of this emergency situation. That means we do emphasise the need to create **awareness** with such a projected symbol or pattern!

There is also a big issue concerning the allowance of a flashing mode in emergency situations. In the case that there is an accident ahead, the projection of a symbol creating awareness of such a situation is essential for avoiding a potential additional accident. So again, this is not to a discussion about distraction, the system has to decide in short time with a flashing mode to increase safety as some studies have been proven.

I would like to emphasise that my comments are not intended to be a complaint; the issue is that GTB and the contracting parties in GRE face this major dilemma. The dilemma also intensifies as we notice that in China, the biggest market in vehicle production worldwide, there seems to be

more willingness to introduce new features and functions into their GB Standards (e.g. Illuminated front grille and illuminated logo as well as the projections of symbols and pattern on the road). This is a worrying situation because we have the target to harmonise our innovations and we have to achieve a competitive efficiency, especially with regard to timing of the launch of innovation.

So, how can we resolve this serious dilemma?

The best approach, as GTB has done in the past, is to demonstrate the intention and the execution of the projections, at certain important traffic situations, in a night drive with real vehicles, and in conjunction with a GRE session.

When this was done previously, initially to demonstrate the projections for lane guidance through road works, there was a very positive reaction from the contracting parties when they could understand the potential of this technical progress for traffic safety. Unfortunately, due to the pandemic, there has been no chance to repeat this with a dynamic drive to demonstrate other projection applications.

As the traffic is becoming more complex and will be more demanding for all drivers, we need to help with new means to ensure that the driver receives, and can easily understand, real-time information about the driving situation ahead. When introducing new features for the sake of safety improvement there are, of course, many arguments that need to be discussed and added to a work plan. Previously, this was successfully done with all GRE participants who provided helpful contributions. We should recall the introduction of AFS, where many night-drive opportunities were arranged to check and experience the individual driving modes, so that everyone had the chance to understand and practically see these proposals on the road.

When we have the possibility to meet again in person, I recommend that GTB takes the initiative to organise a forum where the new projection technologies and solutions can be presented to GRE contracting parties. The forum should consist of presentations of the technologies by the industry experts, presentations of the research findings by the world-wide independent institutes and an open discussion. This forum would also coincide with a night-drive in the Geneva area.

Lighting News

HELLA : Last Round of €8b Battle

LIGHTING NEWS

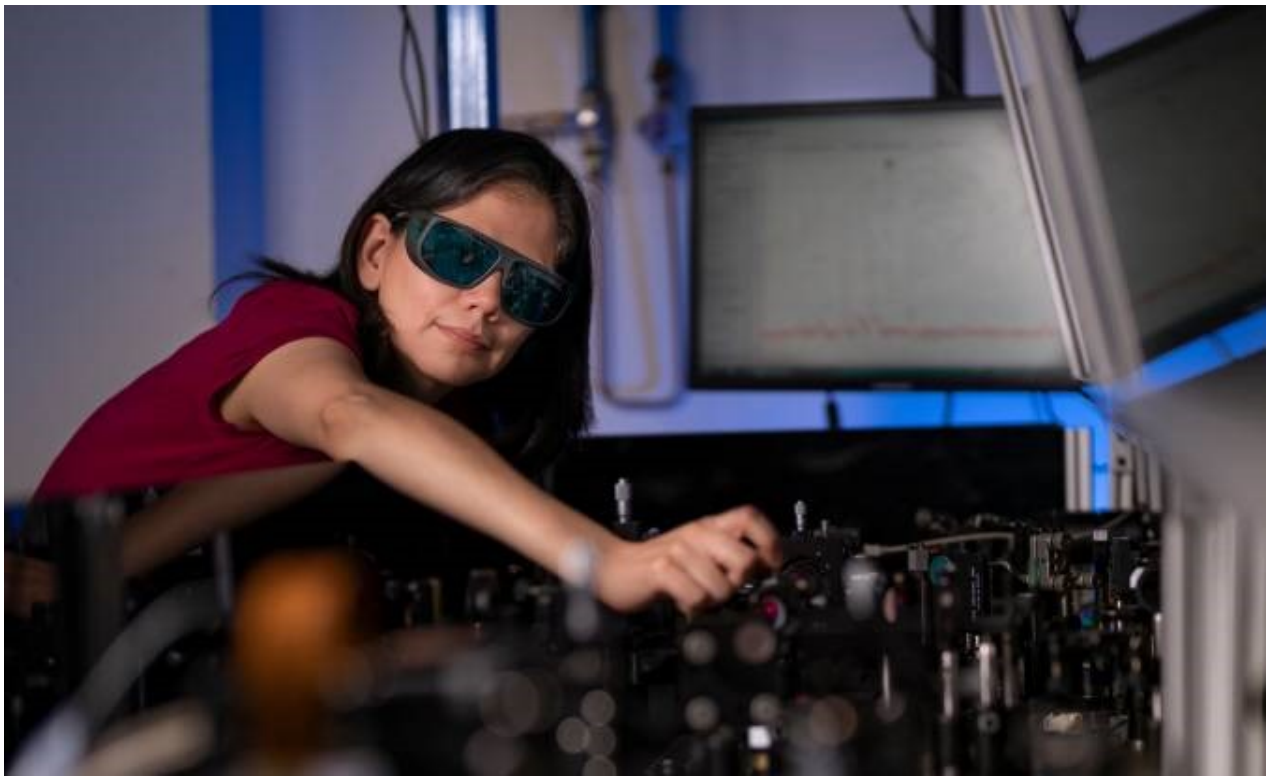
French automotive suppliers Faurecia and Plastic Omnium are competing in the final bidding for a majority stake in German rival HELLA, people with knowledge of the matter told Bloomberg.

HELLA's founding Hueck family has asked for binding offers by to-morrow and could make a decision on a winner in the following days. Any deal could value Hella at around €8b.
That could make it the second-largest takeover in Germany this year and one of the biggest ever acquisitions of a German company by a French suitor.
Faurecia and Plastic Omnium, which both have smaller market values than HELLA, are both planning capital increases to fund the potential acquisition if successful, the people said.

The Hueck family owns about 60% of HELLA, and HELLA has worldwide sales to automakers of around €4.5 billion during its 2020 fiscal year.

Night Vision: Coating with Crystals Makes IR Visible

LIGHTING NEWS



DR ROCIO MORALES SAYS THE TEAM HAVE MAGE THE «INVISIBLE VISIBLE»

Australian National Researcher University (ANU) and Nottingham Trent University (NTU) developped a coating film with Gallium crystals able to make the infrared light visible. Gallium crystals convert for Infrared light invisible to the human eye in visible light components around. Previous infrared night vision devices use thermal cameras and play games.

Dragomir Neshev, Director of the ARC Centre for Excellence in Transformative Meta-Optical Systems (TMOS) and ANU Professor in Physics, said the new tech used meta-surfaces, or thin films, to manipulate light in new ways.
"This is the first time anywhere in the world that infrared light has been successfully transformed into visible images in an ultra-thin screen," Professor Neshev said.
"It's a really exciting development and one that we know will change the landscape for night vision forever."

According to researchers from Professor Mohsen Rahmani, NTU team, it can be done in mass-produced on glasses, window glass, or even on flexible materials.
The transparent surface with a layer thickness of 400 nanometers allows that too Infrared image components can be seen clearly.
Rahmani hopes that this innovation is not just for the military but also for automotive.

Robots and AI : Smart Automation in Lighting Production

LIGHTING NEWS

HELLA is investing two-digit millions Euros to further automate the 15 production sites in its global lighting division. This involves implementing collaborative robots and artificial intelligence methods. The project is scheduled to run for a total of five years. There will be 1,000 robots used in total worldwide, roughly half of which are already in use.
“By further automating our plants more, we not only want to additionally increase our efficiency, but also improve our high level of quality even more,” says Dr. Frank Huber, Managing Director responsible for the Lighting division at HELLA. “By doing so, we want to further strengthen our position as one of the world's leading suppliers in the field of automotive lighting.”

Due to the high level of complexity involved, the production of headlamps and rear combination lamps is still characterised by a comparatively high proportion of manual activities.

Currently at HELLA, robots are primarily used in pre-production and in the final assembly of headlamps and rear combination lamps. At the HELLA plant in Bánovce, Slovakia, for example, they transport rear lamp modules between production and testing stations. In total, over 500 cobots have already been introduced to HELLA's lighting plants. Applications with 500 additional cobots are currently being implemented or prepared for installation in the second half of the project, which has now been launched. Completion is scheduled for May 2023.

In addition, HELLA also relies on using artificial intelligence as part of the “Smart Automation project” for quality testing, among other things. For example, the company's first AI-based decorative quality inspections for lenses have been introduced in the lighting plant in Lippstad. At the Lippstadt site, industrial robots are also programmed based on AI. Additional use cases with artificial intelligence are to be rolled out in other European production facilities from autumn this year.

Segula & ArcelorMittal Replace Cables with Conductive Ink

LIGHTING NEWS

Reducing its weight and consumption by replacing the cables with a conductive ink directly printed in the sheet metal. This innovation, signed by Segula Technologies and ArcelorMittal, could replace half of the wiring harnesses in a vehicle.

These strips printed in a car door replace traditional copper electrical cables.

In addition to flexibility, lower cost or 3D integration, printed electronics show off another advantage in tune with the times: that of green technology. Enough to broaden its potential applications and help manufacturers go green. But this path is not without challenges.

BMW Strongly Present at IAA in Munich.

LIGHTING NEWS

BMW IX

Of the new vehicles taking to the stage at the IAA Mobility 2021, the star of the show is the **BMW iX**. The BMW iX is a modern SUV which has been designed from the inside out and which redefines the idea of interior spaciousness and luxury. selection, raw materials extraction and manufacturing of the BMW iX.
The **BMW i4** brings fully electric mobility to the premium midsize class for the first time, to the core of the BMW brand. The BMW i4 combines a particularly sporting take on locally emission-free driving pleasure with the spaciousness and practicality of a four-door gran coupé. - The new **BMW 2 Series Coupé** sets new sporting standards in the premium compact segment with its dynamics-focused vehicle concept.
- Signature BMW driving pleasure, sporting elegance and modern functionality come together in the new **BMW 4 Series Gran Coupé**. Its vehicle concept brings a highly distinctive character profile to the premium reaches of the midsize class. The horizontal BMW kidney grille features vertically arranged air flaps in place of the classical bars. The standard full-LED headlights are positioned at the outer extremities of the front end. Inspired by the legendary BMW 02 models, they have an individual, circular design.The new **BMW 2 Series Coupé** enhances safety and comfort with a significantly expanded selection of driver assistance systems over the predecessor model. The BMW Head-Up Display is just one of the features available for this model for the first time.
- Around 40 assistance functions designed to facilitate comfortable and safe driving and parking are either fitted as standard in the new **BMW 4 Series Gran Coupé** or included on the options list. Highlights here include Active Cruise Control with automatic Speed Limit Assist, route monitoring and (in Germany) traffic light recognition, as well as the Steering and Lane Control Assistant
.- The headlights, around ten millimetres slimmer than previously, can now also be specified as an option with BMW Laserlight. The exclusive BMW mesh-style kidney grille brings a distinctive flourish to the front end of the new **BMW X4**.

More information on the new models these last 4 months, in the next DVN report.

HELLA Innovations at IAA 2021

LIGHTING NEWS

HELLA will be presenting a wide range of innovative solutions for the major future topics of electromobility, automated driving, digital light and software at the IAA Mobility 2021 in Munich. "The industry transformation continues to gain momentum. HELLA is actively shaping this transformation process by occupying the central mobility trends of tomorrow," says Dr. Rolf Breidenbach, Chairman of the HELLA Management Board. "Against this backdrop, we will specifically use the trade fair which is one of the world's leading mobility platforms to present our future-oriented product portfolio."

The 400m2 exhibition booth offers space for individual customer discussions and selected product presentations. In addition, HELLA is expanding the face-to-face event this year to also include a comprehensive digital platform to present selected product solutions in detail and to enter into conversation with business partners in a virtual manner.

Driver Assistance News

Lidar Fast Becoming the Future of Vehicle Safety
by Jun Pei, Cepton cofounder

DRIVER ASSISTANCE NEWS

DIRECT, BRIGHT LIGHT CAN SEVERELY BLIND CAMERAS BUT BARELY AFFECTS LIDAR PERFORMANCE.

Current sensor technologies, including camera and radar, have been supporting ADAS for several vehicle generations, proving to be potent in many scenarios. However, just by nature of how they work, they have several limitations that prevent them from delivering accurate, error-proof perception capabilities thereby leaving a significant risk of accidents.
- One of their biggest limitations of **cameras** is their reliance on good lighting. Their performance gets negatively impacted at night, in direct sunlight and in inclement weather. Another limitation is that they provide 2D imaging, making it difficult to determine the accurate 3D size, location and velocity of objects on the road.
This can be compensated with the development of computer vision, but current algorithms have many limitations.
- Radar is a 3D sensing technology and performs well under various lighting and environmental conditions, but lacks the spatial resolution needed for accurate object detection, tracking and classification. For instance, radars might be able to tell a driver that there is an object a few hundred feet down the road, but cannot provide data accurately enough to help determine what type of object it is, or whether it is in the same lane as the driver or, in fact, on the shoulder of the road.

Consequently, ADAS solely dependent on radars and cameras suffer from high false positives and false negatives, leaving the automotive industry a major gap for 24/7, accurate perception from near to long range.
Lidar, perceived as an additional pair of infallible “eyes” is a perfect technology to fill this gap. Instead of outperforming cameras or radars in every aspect, lidar complements a powerful sensor suite by addressing the specific challenges faced with cameras and radars.
Lidar serves as its own source of illumination, which enables them to perform in various lighting, weather and environmental conditions. Unlike the busy camera image, lidar data delivers a high

concentration of useful data to provide truly 3D information, including distance, dimensions and velocity.

Lidar can also detect the surface reflectivity of an object, helping determine what type of object it is. With high angular resolution even at long range, lidar offers the high-precision perception needed to really elevate ADAS to a whole new level of safe autonomy.
Lidar should work hand in hand with cameras and radars to safeguard every vehicle, regardless of its level of autonomy.

Cepton co-founder Jun Pei is an entrepreneur and technologist in optics and electronics. Previously, he led the engineering team at Velodyne developing the HDL-64 lidar.

Qualcomm offers to buy Veoneer for $4.6b, topping Magna bid

DRIVER ASSISTANCE NEWS

Magna had offered to buy rival Veoneer in July for about $3.8 billion in cash.

Chipmaker Qualcomm said last week it had offered to acquire Swedish auto technology supplier Veoneer Inc. for $4.6 billion, trumping an earlier bid by Canadian rival Magna. Qualcomm hopes to grow its automotive chips business by creating open and competitive platforms for automakers along with Veoneer.
Magna had offered to buy rival Veoneer in July for about $3.8b, looking to boost its efforts on building driver assistance tech geared toward autonomous vehicles.

Qualcomm has been trying to expand its reach beyond smartphones. Automotive products accounted for around 3 percent of chip sales last year and has been growing slowly in recent quarters.
Veoneer confirmed that it has received a non-binding proposal from Qualcomm Incorporated to acquire all of the outstanding shares of Veoneer at a price of $37.00 per share in cash. Veoneer's board of directors will evaluate the proposal from Qualcomm consistent with its legal duties and the terms of the Magna merger agreement.

Veoneer is a worldwide leader in automotive technology. Its purpose is to create trust in mobility. It designs, develops, and manufactures state-of-the-art software, hardware and systems for occupant protection, advanced driving assistance systems, and collaborative and automated driving to OEMs globally. Veoneer has 7,500 employees in 11 countries. In 2020, sales amounted to $1.37 billion.

ZF Accelerates Validation of ADAS Systems

DRIVER ASSISTANCE NEWS

With ADAS.ai, ZF aims to accelerate the development and validation of driver assistance systems. The solution uses real driving data that is transformed virtually.

The real-to-real transformation reduces costs and time for validating ADAS systems
With a suite of data and Artificial Intelligence (AI), ZF ADAS.ai aims to reduce costs and time to market for ADAS systems at SAE level 2+. To achieve this, complete L2+ scenarios are fed into the development and validation phases at several points. The scenarios have been derived from real driving operations and can be read in either in “virtual” or “full sensor” mode. The transfer of the real driving data and its subsequent validation in the virtual space is made possible by algorithms from the Israeli technology company Cognata.

The real-to-real transformation is expected to enable fully virtual engineering for ADAS from all tier-1 suppliers in the future, saving up to 20 % in time and costs. “With our approach, an OEM does not need a large number of test drivers or a multi-million budget to develop and validate in a safe framework. We bring the real and virtual worlds together because we use real data to drive both modalities,” says Christophe Marnat, Executive Vice President of ZF’s Electronics and Advanced Driver Assist Systems Division.

Robotic Vehicles Get a 360° View: ams OSRAM and Jabil

DRIVER ASSISTANCE NEWS

Labor shortages, a rapidly growing e-commerce industry and an increased focus on safety in the workplace are driving massive growth in the Autonomous Mobile Robot (AMR) and Automatic Guided Vehicle (AGV) markets. AMRs and AGVs use various navigation methods to move materials autonomously in warehouses, manufacturing facilities and even offices. Jabil and ams OSRAM are rapidly advancing the robotic vehicles' guidance systems by providing accurate and cost-effective 3D sensing and lidar technology. Jabil's Omnidirectional Sensor uses Time-of-Flight (ToF) to safely guide vehicles on their paths and around obstacles without the need to modify a facility with magnetic tape, tags, transponders or reflectors in facilities.

Jabil, a US-based manufacturing solutions provider with over 260,000 employees, built the world's first Omnidirectional Sensor based on ToF to see 360° around the robotic vehicle. In order to detect all obstacles both on the ground and in the air, Jabil needed to use high-power Vertical Cavity Surface Emitting Lasers (VCSELs) to appropriately illuminate the surroundings. The company selected ams OSRAM's Bidos VCSEL product.

ams OSRAM worked with Jabil to develop a customized Bidos 850nm VCSEL for the

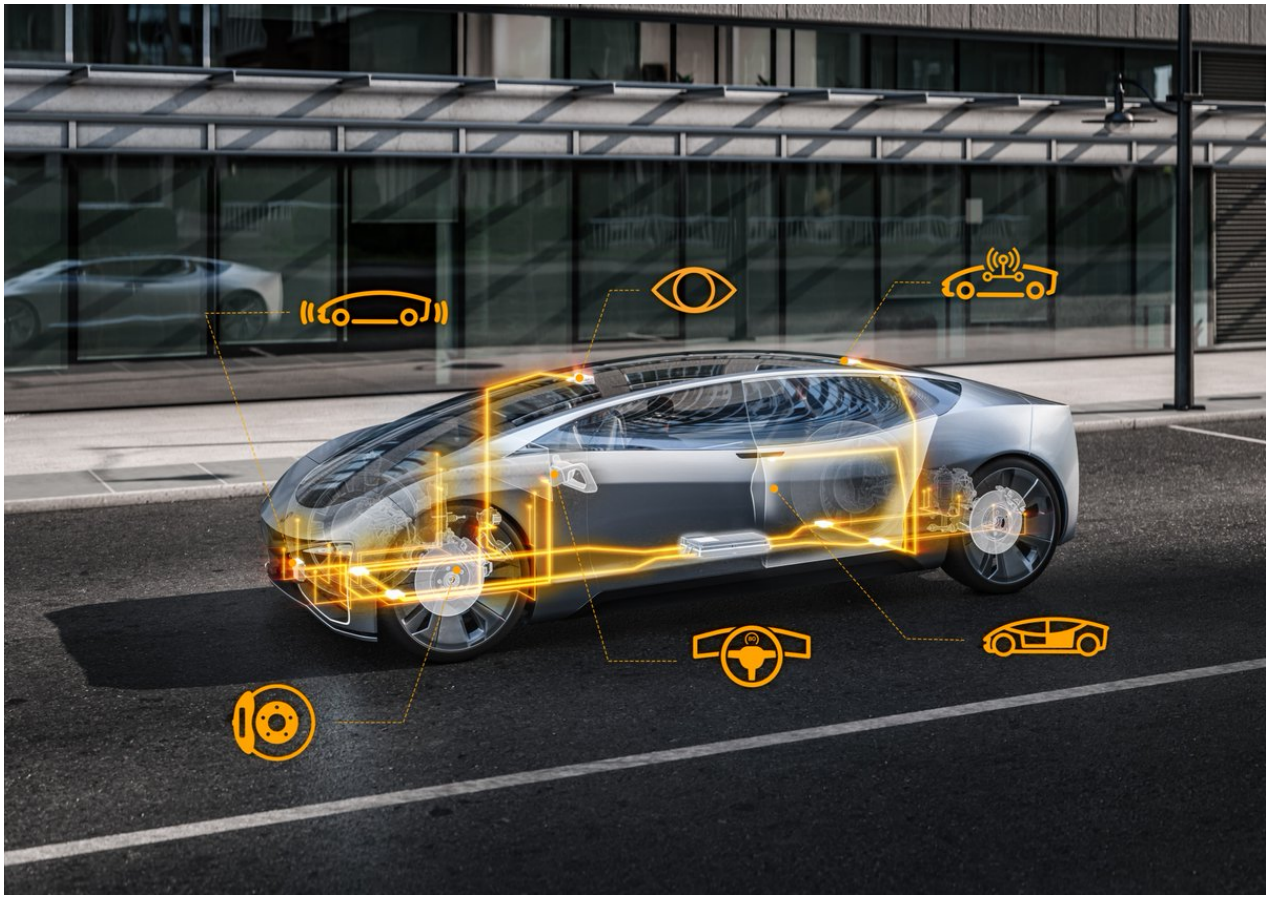
Omnidirectional Sensor.
“After reviewing offerings from several companies, we found that ams OSRAM’s solution was ideal based on its technical specs such as the wavelength and integrated diffusor with appropriate field of view,” said Blasch. “It was also the customer support, tech development, willingness to jump in and help do some thermal analysis. Because this was a first prototype, we wanted to work with a partner that could adapt the integrated diffusor or integrate a diode for eye safety.”

The innovative Omnidirectional Sensor was designed to reduce the number of independent sensors required for object detection and collision avoidance on robotics, autonomous vehicle, and drone platforms. This sensor is just the beginning for Jabil and ams OSRAM.

General News

Continental in 2022 CES: Automotive Rdge Server

GENERAL NEWS



Continental is planning to launch its modular automotive edge server technology at the CES consumer electronics show in January 2022. The company, already has over €5bn of orders for computer servers in over 20 vehicle models, starting with the In-Car Application Server 1 in Volkswagen's ID.3 and ID.4 electric vehicles.

The Continental Automotive Edge Platform is the basis for the next generation of vehicle computers and will be shown at CES for the first time. The aim is to create an integrated hardware and software platform that allows functions from a wide range of vehicle areas, such as driving safety or entertainment, to be combined in a single platform.

The development of cross-domain high-performance computers is about meeting the different requirements from the individual functional areas and enabling a holistic user experience. While infotainment in the vehicle cockpit focuses on user experience, connectivity and applications from consumer electronics, data management and vehicle connectivity are about mastering complexity and real-time requirements.

In contrast, driving safety and dynamics and automated driving systems focus on strict requirements for functional safety and latency-critical vehicle regulations in ISO26262 and ASIL-D.

The Automotive Edge Platform consists of high-performance computers, software and cloud platforms as well as services and applications. This connects the vehicle with the cloud with a modular architecture that simplifies the development, provision, and maintenance of software-intensive system functions from the various areas of the vehicle.

This will enable software updates to add new functions over the entire service life of the vehicle through a development environment for software-intensive vehicle architectures that handles software, sensor and big data solutions in a fraction of the previous development time. This allows vehicle software to be quickly and securely developed, tested and installed directly on vehicles, which allows or guarantees safety and expandability in the vehicle of the future.

Tesla tops BMW in key segment

GENERAL NEWS

Tesla has scored a victory over BMW as the Model 3 outsold the 3 Series, finishing the first half as Europe's No. 1-selling midsize premium vehicle.

Tesla Model 3	BMW 3-Series	Audi A4	Mercedes C-Class	Volvo V60	Audi A5
66,000	65,000	34,000	25,000	23,000	10,000

SOURCE: JATO DYNAMICS

The narrow win, however, could be short lived as BMW hits back with the launch of its direct rival to the Model 3 rival, the i4 electric sedan, in the autumn.
Sales of the Model 3 surged in June, making it Europe's No. 2-seller behind the Volkswagen Golf for the month, according to figures from JATO Dynamics.

For the half, the Model 3 was Europe's No. 25-seller with a volume that was more than double its result during the first six months of 2020.
Tesla's success in beating BMW, Audi and Mercedes-Benz in a stronghold segment for the German brands was partly attributable to its success in EV markets.

Along with the forthcoming arrival of the i4, however, the Model 3 will be at risk of having demand cannibalized once Tesla starts sales of the Model Y midsize SUV later this year, diluting demand for the smaller Model 3.
"Not even cars like the Model 3 can avoid the shift to SUVs," JATO Dynamics global analyst Felipe Munoz said.