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Automotive lighting and driver assistance technologies

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Editorial

A DVN Initiative To Remove Barriers To Innovation

In the 16 March 2021 DVNewsletter, I explained that my new role in DVN as Senior Regulatory Advisor could also provide me with a platform to engage with the worldwide lighting family by acting as an independent, impartial facilitator in the field of regulations. I believe that this approach will aid understanding and encourage communication between a large group of interested stakeholders.

I explained that this new approach will not conflict with the work of GTB or the other NGOs and government representatives working to harmonise vehicle regulations, mostly under the umbrella of the UNECE World Forum (WP.29). In particular, both GTB and DVN are unique organisations with a common interest, but with different roles: the two important pillars supporting the interests of the worldwide lighting family.

Since March, I have started to contact my worldwide network to explain how I plan to establish national and regional interest groups, and the response has been positive. This has convinced me to proceed to build groups, initially in China, India, and North America. I am excited that DVN has provided a perfect platform for me to operate independently and reach out to interested experts who may not be associated with DVN.

In this newsletter, I provide more detail about the way these DVN interest groups will operate, and I look forward to building these groups with you in the coming months.

I will launch my initiative, with a detailed presentation at the 16th Auto Lamp Industry Development Forum (ALE) in Shanghai, China, 3-4 June 2021. I have also produced a video giving a short introduction to this initiative that will be displayed in the DVN Booth at the ALE 7th exhibition associated with the forum.

My retirement hobby is becoming more interesting and challenging, minute by minute! I hope you will join me on this important journey.

Geoff Draper
DVN Senior Regulatory Advisor

In Depth Lighting Technology

DVN Interest Groups for Global Technical Harmonisation

By Geoff Draper—GTB President until 2020; DVN Senior Regulatory Advisor

Since 2012 I have focussed on actions to remove unnecessary regulatory barriers to innovation, and as President of GTB I argued at the UN World Forum in Geneva (WP.29) and its working party on lighting (GRE), that emphasis should be placed on the development of worldwide harmonised technical requirements.

There is no doubt that the pace of innovation continues to increase, and we all want a worldwide harmonised approach. However, there are many concerns expressed by industry and by regulators; these must be resolved before real progress can be made. The biggest hurdle is that NGOs and government representatives working to harmonise vehicle regulations, mostly under the umbrella of the UNECE World Forum (WP.29), can't agree on the way forward. Everyone is waiting for someone to make a first move!

At the 2018 Tokyo DVN Workshop, a panel of experts from China, India, Japan, and Korea and representatives of UN WP.29, GRE, the European Commission, and the American Automotive Policy Council agreed to support a new initiative to develop worldwide technical requirements. However, for many reasons including the stance of the US administration at that time and the pandemic, no progress was possible.
At the 2021 Shanghai DVN Workshop, the new China Automobile Standards Internationalization Centre (CASIC), based in Geneva was introduced. I believe this is an important factor in a new initiative to harmonise the technical requirements, and I expect that it will function in a similar way to that established by JASIC (Japan) and KICAS (Korea).

Having retired from my role as GTB President in December 2020, I now operate as an independent and impartial expert. I want to create **national and regional interest groups** to contribute to the development of a consensus to work on worldwide harmonised technical requirements. My vision is to develop this consensus and then approach the governmental regulatory authorities and the interested NGOs with information, to encourage the start of a new discussion at the UN World Forum (WP.29) in Geneva.

DVN provides a perfect platform for my new initiative. The key to success will be the ability to communicate freely and efficiently and to effectively support the work of the NGOs and governmental representatives.

I would like to emphasise that I am taking on a volunteer role; I will not receive payment for my involvement in these interest groups—to clearly demonstrate my independence and impartiality.

The Target

To kickstart a new initiative to harmonise and synchronise the technical requirements of lighting and light-signalling to be suitable for all kinds of national and regional legislation—reciprocal type-approval (UN 1958 Agreement), self-certification, and mandatory national standards.

The Means

- National and regional interest groups operating under the DVN umbrella
- I will provide independent and impartial leadership

Effective Communication

- Multiple platforms: the DVN Group communication platform, LinkedIn, WeChat (…)
- Not restricted to DVN members
- Groups can choose to work in their own language, providing there is a volunteer to translate

The Role

The interest groups will not be involved in the work of adapting the UN technical requirements to the progress of innovation. This is the role of NGOs including GTB and contracting parties at GRE.

The Approach

- survey opinions, develop consensus, and offer our conclusions to the interested NGOs, governmental regulatory authorities, and ultimately to the UN World Forum (WP.29) in Geneva.
- identify the priorities and the issues to be resolved to achieve harmonisation and synchronisation
- identify the issues concerning the synchronisation of the harmonised technical requirements as they are adopted into the national or regional legislation
- encourage the contracting parties to the 1958 and 1998 UN Agreements to:
    - actively participate in the UN World Forum (WP.29) and GRE to develop the harmonised technical requirements;
    - understand that the Global Technical Regulation (UN 1998 Agreement) approach is not appropriate;
    - find a new mechanism to synchronise the entry into force of the UN amendments (1958 Agreement) with the adoption into national legislation

The Safeguards

- No conflict with the interests of the stakeholders working to harmonise vehicle regulations under the umbrella of the UNECE World Forum (WP.29)
- No conflict with the work of GTB, automakers, lighting systems manufacturers, associations, standards organisations, etc.
- GTB and DVN are unique organisations with a common interest but with different roles. They are the two important pillars supporting the interests of the worldwide lighting family.

The Method

- Individual interest groups will operate during their working day in their time zones.
- Virtual plenary sessions, where the regional interest groups can come together and share ideas—an important part of the communication process.
- Any expert (supporters and opposers alike) wishing to contribute will be welcome to join these groups. This is important if we are to succeed to develop a worldwide consensus of all stakeholders.
- The interest groups will not develop detailed proposals for the text of regulations and standards; that is the work of GTB and other contributors to the UN World Forum (WP.29 and GRE).

Next Steps

June 2021 Send invitations to join the regional interest groups.

Sept. 2021 Review the responses to the invitation and launch the regional groups.

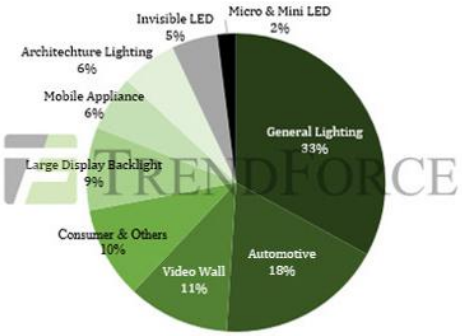
January 2022 First Plenary videoconference to review progress and agree the future programme

Lighting News

LED market 2021: Revenue forecast to $16.5bn

LIGHTING NEWS

Global LED market and change 2019-2023 (TrendForce)



LED market revenue share by application (TrendForce)

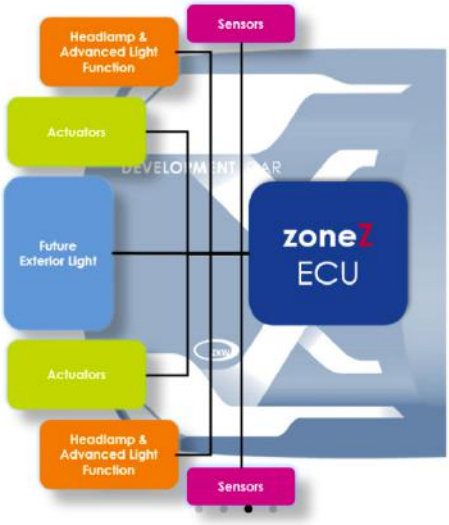
Data fromTrendForce

The Covid-19 pandemic caused LED revenue to trend downward in 2020, but this decline also reached a magnitude rarely seen in recent years, according to a new market analysis published by TrendForce. They say global LED market revenue will likely recover this year to a total of $16.53bn, which would represent an 8.1 per cent increase, YoY: "Most of this increase can be attributed to four major categories, including automotive LEDs, Mini/Micro LEDs, video wall LEDs, and UV/IR LEDs", says the report.

TrendForce expect soaring growth of new-energy vehicle sales and the accelerated adoption of LED lighting in new models of conventional vehicles during 2021 to generate "a persistently rising penetration rate of automotive LED" lighting. Automotive LED revenue for 2021 will likely reach $2.9bn, they predict, a 14% increase YoY, making it the fastest-growing sector among all LED applications.

ZKW: Control units of the future

LIGHTING NEWS



As part of the "zoneZ" research project, ZKW are working alongside the AIT Austrian Institute of Technology and the Mechatronics department of the Fachhochschule Wiener Neustadt to research an all new class of control units for motor vehicles..
The goal is to develop a zonal control unit that can control future vehicle sensors—radar, camera, and lidar—as well as actuators such as headlamps and displays. This will help ADAS activate spotlights for targeted illumination of hazardous objects, or activate the parking assistant or pedestrian protection to avoid accidents.

In the zoneZ project, ZKW are researching alongside their partners to identify requirements that can already be defined for the control unit and sensor systems, and what a suitable control unit architecture could look like. Their central focus is on interfaces to sensors, evaluation of sensor data and safety and security tasks. Statistical laboratory prototypes can be used to simulate a wide range of potential solutions and evaluate real world data. "Then, we will create a functional ECU prototype for a test vehicle that we can use to test out a real-life application, such as pedestrian protection" says zoneZ Project Manager Michael Stanschitz.

The three partners involved in the research project are handling different tasks. ZKW are heading up the architecture work package, and are responsible for requirements as well as for testing, verification, and the testing platform. Their objective is to show how to increase the computing power of embedded hardware by 100. The Mechatronics department at FH Wiener Neustadt is dealing with artificial intelligence. AI-based algorithms, for instance, can be used to efficiently evaluate sensor data. And the AIT researchers are focusing on 3D environmental detection, reconstruction and evaluation, as well as the development of robust sensors and sensor data fusion. The partners' common goal is to create a zonal, high-performing control unit with ultra-fast interfaces for controlling future vehicle sensors and actuators.

Ford's New Electric Lightning

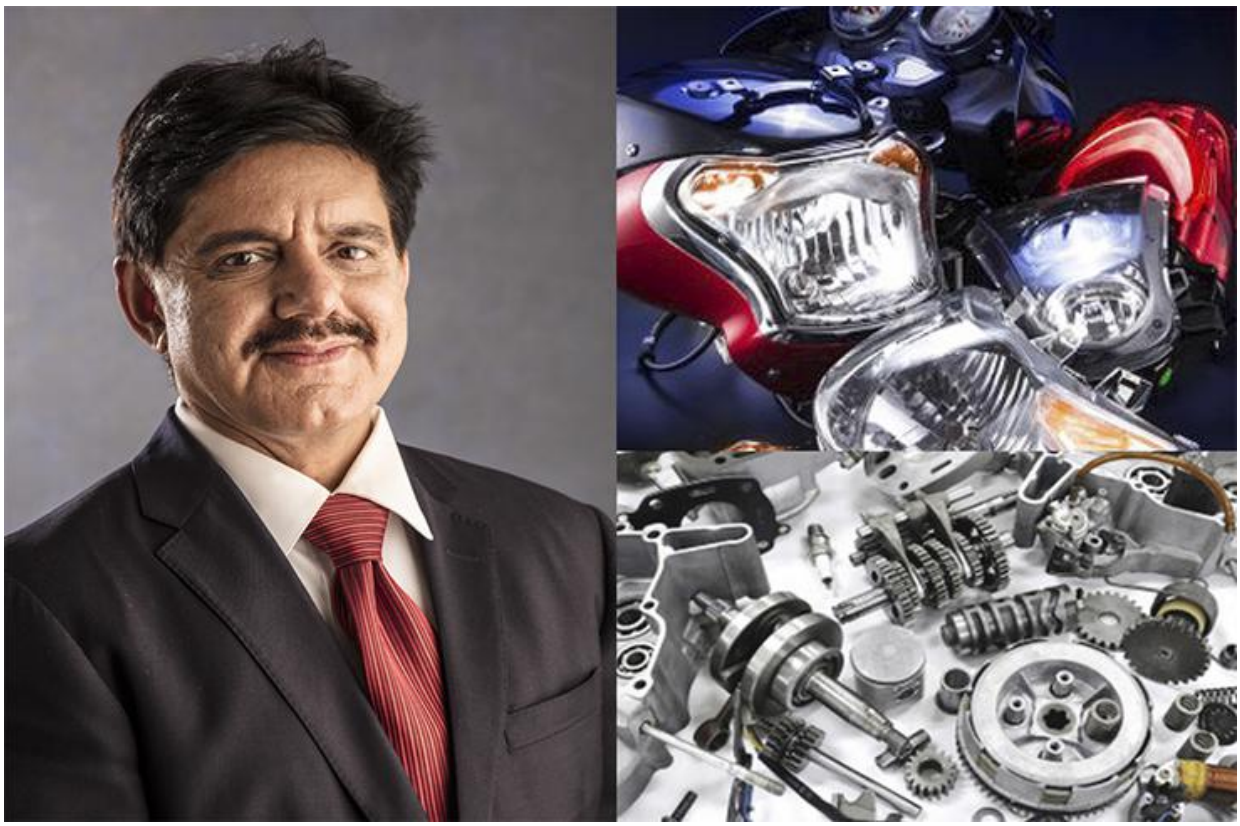
LIGHTING NEWS

Ford have unveiled the Lightning, an all-electric version of the best-selling vehicle in the U.S. market: their F-150 pickup truck. The Lightning is a crucial piece of the company's $22bn electrification investment, and one of three Ford EV debuts and launches in the past year.
The Lightning, which will be built at Ford's Rouge factory in Dearborn, Michigan, follows the introduction of the all-electric Mustang Mach-E and the E-Transit, a configurable all-electric cargo van focused on commercial customers.

The first F-Series pickup came in 1948, and electrification of this top-selling truck is a leap forward towards Ford's carbon neutrality, bringing electric transport into the middle of the American mainstream.

Lumax to Invest in Haryana and Gujarat

LIGHTING NEWS



Lumax Industries is investing on capacity expansion in Gujarat, commissioning a greenfield site in Bawal (Haryana) and putting money into augmenting its engineering capabilities in Europe.

The first part of investment is into a greenfield site in Bawal, Haryana, to set up a new electronics manufacturing plant to produce printed circuit boards (PCBs) to feed into its main lighting business. Vineet Sahni, Group CEO, Lumax Industries, said “The plant will be ready by Q2, we have ordered new machinery and we will be moving into it from our existing rented unit in the same industrial location,” Stanley Electric, Japan that holds a 37% stake in Lumax Industries, is going to be the guiding force behind the technology and manufacturing process for the aforementioned electronic components.

Lumax’s Gujarat facility is one of its key locations for the manufacturing of automotive lighting systems such as headlights and tail-lights for OEMs including Maruti Suzuki India, Tata Motors, Hero MotoCorp and Honda Motorcycle & Scooter India.
Set up in 2017, the plant had an initial capacity of producing 300,000 car sets annually and with the anticipated growth in the Indian automotive sector, the company is now looking to scale up to 500,000 car sets per annum by Q3 FY2022. Lumax Industries says it is also aggressively moving towards localisation of key components of these modern-day lighting systems, for instance, the projectors of the LED headlamps, as well as the PCBs, which are being produced at Haryana.

On January 2021, Lumax Industries announced the appointment of former Varroc senior executive Todd Morgan as its CTO. The move is part of a long-term strategy to set up a new design centre in Europe to cater to the growing penchant of Indian

customers towards vehicles bearing European design..

The company has also approved setting up another studio in the US, which was part of the FY2021 strategy, but has currently been put on hold. “We will be setting this up at the right time under the guidance of Todd Morgan,” concluded Sahni.

Driver Assistance News

Mobileye, ZF Team on ADAS for Toyota

DRIVER ASSISTANCE NEWS

Intel's Mobileye and German supplier ZF will jointly develop advanced safety systems for future Toyota vehicles.
Mobileye will provide their camera-based system-on-a-chip, which ZF will integrate with their latest automotive radar system.

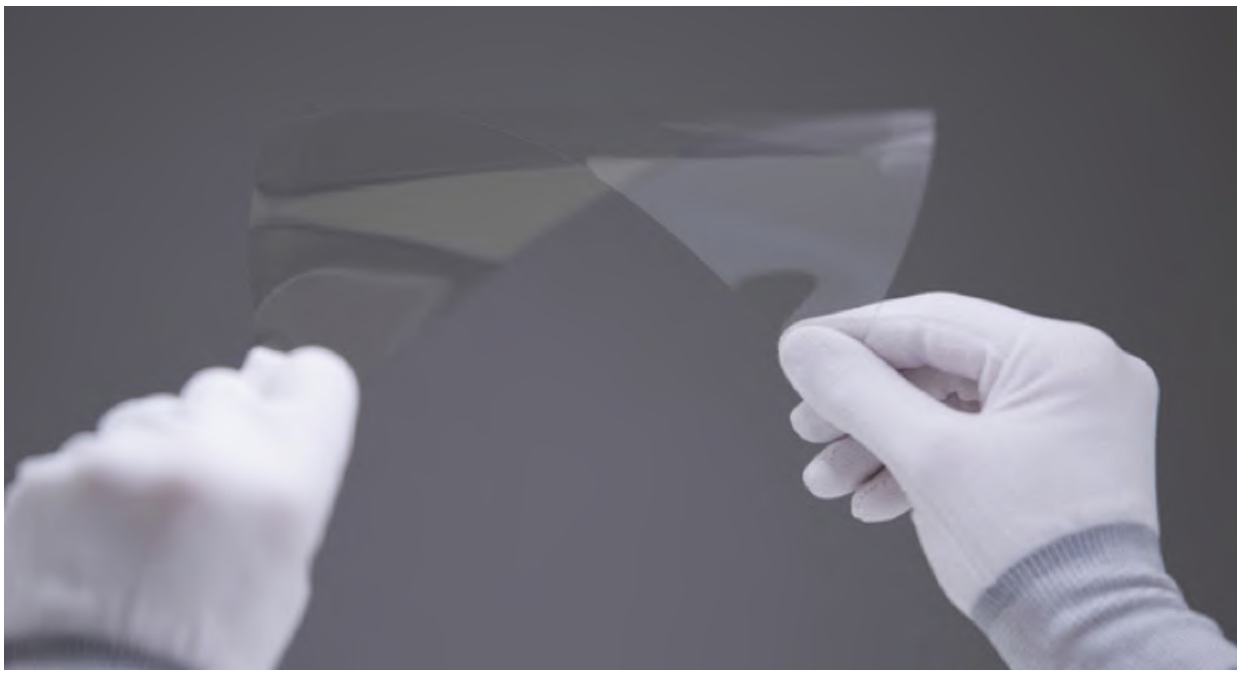
The technologies will enhance a range of automated safety functions, including automatic emergency braking, adaptive cruise control, and lane keeping on highways as well as some secondary roads. The new systems will be launched in a variety of Toyota cars, trucks, and utility vehicles over the next few years.

Mobileye supply camera-based vision systems, including their latest EyeQ4, to most of the world's leading automakers. ZF supply cameras and radar, including their new Gen 21 midrange radar.

Toyota are deeply involved in development of fully automated systems with a variety of partners including Pony.ai, Apex, Aurora, and Luminar.

Canatu's C-Thru Carbon Conductive Film

DRIVER ASSISTANCE NEWS



Carbon nanomaterial specialists Canatu have doubled the performance of their carbon nanobud (CNB) transparent conductive film. A multi-year research and development program has resulted in the best industrially applicable sheet resistance to optical transparency ratio ever seen in films of this general nature.

The CNB film boasts sheet resistance of 35 Ω/sq at 90% transmittance (Ohms per square is the unit of resistance for thin, uniform films; the unit name "ohms per square" comes from the fact that a square sheet of any size with sheet resistance of 10 Ω/sq has an actual resistance of 10 Ω). This makes it a high-performance material for ADAS, heater, and flexible capacitive touch applications that require high electrical conductivity and high optical transparency. It features ultra-low haze and low reflection, and can be formed to any 3D shape.

Increasing electrical conductivity without harming transmittance or adding cost is a key challenge of transparent conductive films. Constraints can be alleviated by optimising core factors affecting CNT network properties and performance, such as dimensions of individual tubes and tube bundles, tube chirality, distribution of wall numbers, and eliminating contamination and defects in CNT structures. Canatu's VP of Engineering Heikki Heinaro says "Our team possesses deep nanotechnology expertise, accumulated over years of systemic research and development. This allows us to control every aspect of the CNB synthesis process. We are able to create longer single or multi-wall tubes that are super clean, thereby enabling extremely thin, strong, and transparent CNB networks".

Canatu are a high-tech carbon nanomaterial company pioneering the future of automotive, consumer electronics and semiconductor industries with the proprietary breakthrough technology called Carbon NanoBud (CNB), a hybrid carbon nanomaterial combining carbon nanotubes and fullerenes.

NHTSA's New Safety Tech Videos

DRIVER ASSISTANCE NEWS

NHTSA have launched a series of videos intended to educate the public on the benefits of today's auto safety technology, and how to properly use ADAS features.

The five **videos** provide an overview of ADAS including blind-spot warning and forward-collision warning; rear automatic braking, blind-spot intervention, lanekeeping assistance, and automatic high beams.

"Understanding what ADAS technologies can and cannot do for the driver is critical to everyone's safety," said Steven Cliff, NHTSA's acting administrator. "We're providing the driving public with knowledge about the safety benefits of these technologies."

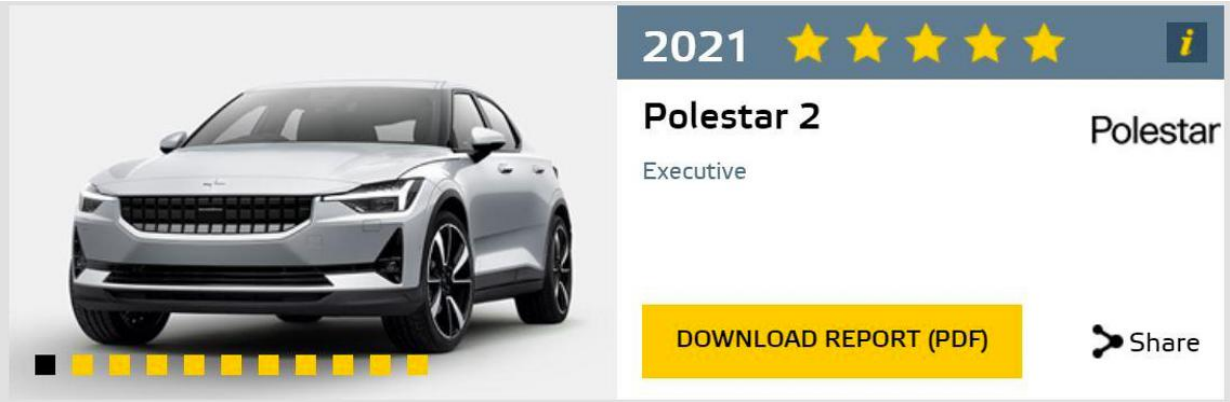
NHTSA say the campaign builds on their NCAP five-star rating system that provides comparative information on the safety and performance of new vehicles to help consumers with purchasing decisions. The videos will run through 29 September. "We communicate directly, indirectly, openly through various coalitions that education—public education—is very important in terms of understanding the limitations, capabilities and, honestly, use of these technologies," Cem Hatipoglu, NHTSA's associate administrator for vehicle safety research, told *Automotive News*. NHTSA clarified that the video campaign has been in development since last Autumn, and was not triggered by safety incidents with Tesla vehicles.

NHTSA say they are "pursuing a comprehensive safe system approach, which recognises that everyone—including those who design, build, operate, and use the road system—shares in the responsibility for road safety".

DVN Comment: *We're all for education about ADAS benefits, but this promotion of thoroughly outmoded automatic high/low beam switching as some kind of worthy new safety feature only rubs salt in the wound and aggravates the disappointment caused by the agency's decade-long regulatory malpractice with regard to ADB.*

Veoneer in 69% of Euro NCAP 5-Star Cars

DRIVER ASSISTANCE NEWS



VEONEER IN 9 OF 13 EURO NCAP 5-STAR VEHICLES

NCAP's independent testing of technologies show that Veoneer are a major contributor to traffic safety as nine of the 13 five-star vehicle models have Veoneer technology.

Euro NCAP's five-star safety rating system was created to help consumers identify the safest vehicle for their needs. The safety rating is determined from a series of vehicle tests, representing accident scenarios that could result in injured or killed car occupants or other road users. In the automotive industry, these rankings are considered important proof-points of the technologies provided to the vehicle manufacturers.

During 2020 and 2021, Euro NCAP rated 16 vehicle models, and Veoneer supplied to 11 of them. Veoneer's active safety sensors and software prevent traffic crashes; when a crash is unavoidable, their restraint control systems help mitigate the effects. The top-ranked Polestar 2 with Veoneer's active safety system was followed by eight vehicle models with Veoneer's restraint contol systems: the VW ID.4, Škoda Enyaq iV, VW ID.3, Cupra Formentor, SEAT Leon, Mazda MX-30, Land Rover Defender, and Kia Sorento.

A restraint control system consists of passive safety ECUs and remote crash sensors located around the vehicle, which detect the crash and signal to the ECU to deploy the airbags and seatbelt pretensioner system in a crash. Veoneer estimate their current RCS market share to be around 22 per cent, a figure estimated to grow during the coming year due to a large order intake.

Intel, Semtech Co-Develop Lidar Tech

DRIVER ASSISTANCE NEWS

Intel will collaborate with Semtech, a supplier of high performance analog and mixed-signal semiconductors and advanced algorithms, to develop optical semiconductor platforms for lidar.

Semtech say their laser drivers and programmable transimpedance amplifiers (TIAs) are being integrated into Intel's RealSense lidar Camera L515, "enabling the creation of a power-efficient, high resolution consumer lidar." The partners' announcement adds, "The collaboration between Intel RealSense technology and Semtech's Signal Integrity Products Group has focused on enabling the L515 camera to work in low signal-to-noise ratio environments. The TIAs feature low input referred noise, which allows the L515 to be a power-efficient, high-accuracy lidar system at a resolution of up to 23 million depth points per second."

Semtech, founded in 1960, develop and make high performance analog and mixed-signal semiconductors and advanced algorithms for infrastructure, high-end consumer and industrial equipment.

General News

Stellantis Set Key Buy Roles For Synergies

GENERAL NEWS

Stellantis have made key appointments to their global purchasing organisation as they seek to create synergies from the larger scale of the combined companies.

The purchasing organisation includes 120 executives who report to global purchasing head Michelle Wen. Purchasing is expected to generate 35 per cent of the €5bn annual synergies Stellantis expect to achieve from the integration of FCA and PSA, who sold about 6 million vehicles last year.

PSA veteran Yann Martin is head of purchasing for Stellantis in Europe, which includes the largest part of the former PSA's operations and FCA's former EMEA (Europe-Middle East- Africa) region. Martin has 25 years' experience with PSA, where he held multiple executive roles in manufacturing and quality. Before his latest appointment, he was PSA's head of vehicle and powertrain programs.

Global purchasing division heads include Serena Salame, head of direct purchasing for body and interiors; Cheryl Zula, who leads direct purchasing of electronics, electrical and components; and Monica Genovese, head of direct purchasing of chassis and adaptation. Francesca Gamboni is responsible for the global supply chain. Melanie Bulourde is responsible for supply chain in Enlarged Europe. Damien De Cacqueray is responsible for global new programs, and Michael Gorny for supply chain transformation projects.

Among the support functions at a global level, Patrick Faitout will be responsible for purchasing and supply chain synergy.

Hella's Electronics Innovations at JSAE 2021

GENERAL NEWS

JSAE, the Japanese Society of Automotive Engineers expo in Yokohama has been cancelled, but some of its events are being transferred to an **online Automotive Engineering Exposition** from 26 May to 20 July.

Hella are joining in for the first time. "Hella's core competencies in automotive electronics play an important role in electrification and autonomous driving," says Hella Japan's Managing Director Lonny Chick. "We are looking forward to presenting new innovations and making them experienceable within the framework of the event."

During the exposition, Hella will present innovative electronic solutions such as a 48-volt DC/DC converter specially designed for mild hybrid vehicles of higher performance classes. The 48V DC/DC converter enables vehicles with combustion engine to be electrified and offers great potential for CO_2 savings. To further strengthen electrification, Hella offer a comprehensive product range of battery sensors for micro hybrids, power electronics for 48V mild hybrid vehicles, battery electronics for high-voltage applications in full hybrids and all-electric vehicles, and more.

Another highlight of the presentation will be Hella's innovative interior monitoring system, which enables reliable child presence and seat occupancy detection to enable the likes of seat belt reminders. It records human beings inside the car anonymously and without contact. The sensor system warns of passengers left inside when the user gets out of the vehicle by customisable warning cascades.

Antolin's Low-Mass Panorama Roof Frames

GENERAL NEWS

Panoramic roofs are a clear upward trend in all markets. This trend coexists with the need to reduce the weight of all automotive components to minimize CO_2 emissions, which calls for lightweighting. Grupo Antolin, in partnership with BASF, have developed new technical plastic parts to respond to both needs.
The new Ultradur® material family is ideal for use in plastic frames of solar and panorama headliners. Antolin have made a clever novel design for these frames, including technical details that reduce the mass by up to 60 per cent compared to other traditional solutions on the market.

One of the main advantages of the design of the new plastic parts is the change in the process of attaching the frame to the headliner that allows to eliminate additional process steps, to improve tolerances assembly and, ultimately, improve perceived quality of the final part. In addition, this new process is completely sustainable by not involving solvents or generating emissions.

PBT-ASA-PET, a polyester material, is reinforced with fibreglass to increase the rigidity and stability of the part. The main advantages are high rigidity; ease of moulding and processing; low total shrinkage and high dimensional stability, and good resistance to high and low temperatures.