



Editorial

Headlamps Get More Powerful & Functional, Less Visible

When I wrote a report on DRL more than 10 years ago, I explained how *“Audi have been quick to understand and employ the DRL safety lever with brand-wide DRL signature appearance. Shortly thereafter, BMW followed along similar lines. Then came other premium brands. This trend is clear: after premium, generalists will follow”*.

Where are we today about DRLs? I am working with DVN colleagues, through the greatest lighting experts, on a very important DVN Study, to be published in September about the relationships between engineering, design, and marketing. We've conducted great interviews with engineers and designers from worldwide automakers—generalist and premium alike. One point I retain is that the designers are working on thinner and thinner main headlamps, but are dreaming to hide more and more the main headlamps and maximise the design benefits of DRLs, easier to achieve any shape without the constraints of main lights.

When the DRL feature and function arrived in the beginning to improve safety, it was fought by design, marketing, and cost-control departments. But it has becoming a primary main front lighting design anchor, replacing headlamps in that role. Take a look at the teaser picture of the new Opel Astra to see just one example.

Be sure to plan for the next two DVN events on the docket:

- [the US DVN Workshop near Detroit on 21-22 September](#)
- [the DVN Lidar Conference in Frankfurt on 15-16 November](#).

We look forward to your participation!

Sincerely yours,


DVN CEO

In Depth Lighting Technology

Interview: JLR Lighting Strategist Shammika Wickramasinghe



SHAMMI PRESENTING A LECTURE AT THE DVN MUNICH WORKSHOP

DVN had the pleasure to talk with Shammika "Shammi" Wickramasinghe, the Technical Specialist for Exterior Lighting responsible for technical strategy at Jaguar-Land Rover. He has been in the automotive industry since 1998, and was Section Manager of the Electrical team at Honda UK. Guided by his expertise in lighting and electrical systems, JLR churn out model after new model with the highest technologies in exterior lighting.

DVN: JLR are known for nice vehicles, and the company also are involved in safety. Tell us about that, will you please?

Shammi: JLR vehicles are amongst the safest vehicles in the world to occupants and other road users. The new Defender won the Euro NCAP 5-star safety rating award. In JLR, *zero harm* is one of our pillars of vision; in lighting we continue to develop improvements in all weather comfort and vision to enhance the driver's experience and reduce the cognitive workload and improve safety.



LAND ROVER DEFENDER

DVN: What kinds of things are you doing to improve safety at night?

Shammi: We are continuing to develop our lighting *to see and be seen*, allowing our customers effortless, tireless night driving with minimum distractions due to constant changes in light (ADB) by making the transition seamless and refined. We ensure our signalling functions are well defined and clearly presented, making it easy for other road users to clearly understand what the intention of the vehicle and the driver is, thereby making the vehicle safer for its occupants as well as other road users.

DVN: During the development of a project, is there conflict with stylists to use ADB, a function not seen by the end-user?

Shammi: No, our design and styling teams understand the importance of safety enhancement features such as ADB, and are happy to work with the engineering team to package modules from the start.



JAGUAR F-PACE

DVN: What might you say about JLR's five new models launched these last 12 months?

Shammi: Yes, we released the Jaguar E-Pace, F-Pace, F-Type, and XF, and the Land Rover Discovery in the last 12 months. We have a combination of matrix and pixel technology that we released with enhanced operations, with seamless transitions between adaptive states, and we introduced some additional features to improve the night driving experience with lighting.



JAGUAR F-TYPE

DVN: Can you share more detail on the new F-Type equipped with pixel ADB?

Shammi: The F-Type uses the JLR pixel modules developed jointly by JLR and suppliers. Each module is multifunctional and delivers both low beam and high beam functions, together with ADB & AFS.



JAGUAR F-TYPE

DVN: You have a great signature in the rear lights. Could you present the strategy of Jaguar concerning rear light, about safety and design?

Shammi: The rear lamp signature has evolved to give a 3D visual effect without causing any distractions. We see lighting as a safety critical component and as such, we ensure the signaling functions are clearly visible even at a distance above and beyond the legal requirements. We have designed and engineered the rear lamps to be able to clearly identify that the vehicle in front is a Jaguar, providing clear visible signals to vehicles following the Jaguar products.



LAND ROVER DISCOVERY

DVN: At the same time, the Land Rover Discovery just launched with matrix ADB. Could you explain this difference between this and the pixel system?

Shammi: The Land Rover matrix technology is an evolution from the previous matrix technology that JLR used and was developed in cooperation with our supplier. The 2nd Generation Matrix technology in the Discovery offers superior performance and has a greater width and depth of the low and high beam. It seamlessly tracks and shadows oncoming and preceding vehicles to minimise the shadow and maximise the light on the road without glaring other road users.

DVN: To make ADB, we have now a wide palette of different technologies— DMD, μ LED, LCD, LCoS, laser scanning and others. What do you favour? What will come to dominate?

Shammi: In my opinion the next technology is DMD, closely followed by μ LED with more than 10 kilopixels to allow the functionality of the DMD while being more efficient.

DVN: About the performance of the light, what are your priorities? Quantity of light, homogeneity, features, functions, others?

Shammi: The most important aspects of lighting are the quality of light, the homogeneity, and the lighting signature. Quality of the light and functions are a priority. This reduces driver stress at night and keeps the focus of the driver on the road. AFS and ADB operations together with the embedded features and functions of the system needs to be seamless and refined so the driver is not distracted by the switching and operation of the system. When the light is not homogeneous, the cognitive load on the brain increases due to the constant focusing between the hot spots and dark patches, making the eyes work harder due to constant refocusing of the eyes, causing driver fatigue. Therefore, the quality of light and homogeneity must be the number

one priority for lighting.

The signature needs to be crisp and have the ability to showcase the vehicle before it is close to you and you are able to read its name. The signature is very important as you need to be able to identify the vehicle brand and type at a distance in the night and day.

These three things—quality, homogeneity, signature—are a *must* and everything else in my view is nice to have.

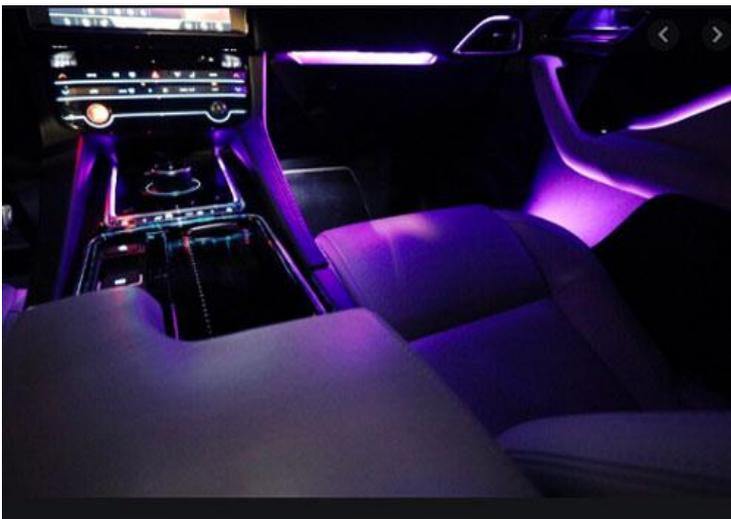
DVN : At the 2020 Munich DVN Workshop, you gave a very interesting talk on digital lighting and communication. How do you think digital lighting and road projections will boost safety?

Shammi: Digital lighting has enhanced the way we do things and the ability for us to give the customer a better experience and a pleasurable night driving experience minimising the stress on the driver and passenger. Digital lighting allows us to dynamically change the projections and point of focus without any mechanical parts, improving the reliability. Digital lighting also enables us to project useful information to the driver, such as speed limit changes, no entry signs, sharp corners or blind bend warnings in the driver's field of view so they can see the signs and react without having to change their viewing angle of the road to look at the speedometer or navigation and so forth—that keeps the focus clearly on the road.

The projections also help other road users as people [such as pedestrians] may not notice a vehicle is about to turn in front of them as they are focusing on a mobile phone or looking away from the oncoming or turning vehicle but a projection in front of the pedestrian will get their attention, thereby making pedestrians and other road users more aware of what is happening around them, thus improving nighttime safety.

DVN: You have done a great job in the interior lighting of the E-Pace. Could you present the strategy of JLR concerning the interior lighting in general?

Shammi: JLR have now developed the interior lighting to be as good as or better than some of the best products in the market. We have made the interior lighting selection user-friendly and intuitive. It is easy to select the desired comfort level of ambiance needed to have a relaxing journey inside the JLR products, removing stress and adding enjoyment and comfort to the drive, wherever your journey may take you to.



JAGUAR E-PACE

DVN: Finally, what is your vision on lighting, considering so many technologies are coming?

Shammi: We must deliver the basics well and not forget the basics and what lighting is useful for. We must improve safety at night by offering features and functions to support the driver at night to stay focused on the road in front of them. We must reduce and minimise distractions

from this lighting and use lighting to make the driver and passenger and the other road users feel safe at night.

Thank you Shammi! See you soon at a night drive in the UK and at the DVN Workshop in Novi, Michigan later this year.

Lighting News

ESS H.E.L.P. For Better, Smarter Hazard Lights

LIGHTING NEWS



An American startup—a new DVN member company called [Emergency Safety Solutions](#) have come gunning for what is surely the most neglected vehicle light signal, with a promising new idea to make hazard flashers visually distinct from turn signals and more effective at conveying the right message.

ESS' technology is called H.E.L.P, for Hazard Enhanced Lighting Package, and it offers multiple upgrades. It can be automatically deployed by airbag deployment, tire failure, or other such events. It can also be manually activated by the driver. The turn signals still flash to provide the hazard signal function, but as shown in an [online video](#), now much faster at 4.5 blinks per second—over twice the maximum speed of turn signals and ordinary hazard flashers; ESS have compiled a great deal of research showing faster flash rates do a better job of conveying urgency. There's also a V2x aspect: activation of the H.E.L.P sends notice to traffic data infrastructure, so drivers can be warned even without a line of sight to the disabled vehicle, and responders can have an easier time finding vehicles that have left the road.

H.E.L.P is meant to provide a highly conspicuous signal to accurately convey the urgency of the safety threat posed by a vehicle having difficulties, travelling unusually slowly, or stopped near traffic lanes. All without adding new lamps to the car and, at least in NHTSA's view, without causing much friction against existing regulations; the agency's opinion (which is the one that matters, in the States) is that there is no regulatory violation or abrasion—no functional impairment of required equipment—as long as the H.E.L.P system can be manually activated only while the car is in Park or the parking brake is applied.

It's yet another instance of new lighting technology freeing engineers and designers from longstanding limitations: just as automakers have leveraged the instantaneous on/off of LEDs to make modern dynamic turn signals not possible with incandescent bulbs' slow rise and fall, ESS aim to harness this characteristic of solid-state lighting to substantially upgrade the hazard flashers.

Functionally, the hazard warning signal is formally defined in the regulations as "simultaneous operation of all of a vehicle's direction-indicator lamps to show that the vehicle temporarily constitutes a special danger to other road-users". That's been the definition since the mid-late 1960s when they began to join the required-equipment list in Europe and America, and it hints at the way these signals were developed: *just provide some kind of signal cheaply, with minimal change and and without adding new lights.*

"Currently there is no signal to alert other drivers that your car presents a road hazard because it has broken down or for other reasons. The auto industry is aware of this and is currently considering how to define and provide such an alert." (from *Sportsmanlike Driving*, an American driver-education textbook published in 1964).

So cost constraints and technical limitations of the 1960s largely dictated the flash-all-the-turn-signals operation, without regard to whether this was an adequate or effective response to the safety need—let alone an optimal one. Then, along came the regulations and baked those constraints and limitations into concrete law.

The obvious problem: the hazard warning signal and the turn signal look alike despite carrying completely different messages, unless an observer can see both sides of the car (which is far from guaranteed), and then there's the question of whether the observer can and will identify and process the signal quickly and correctly. There have been efforts over the years, particularly in GRE, to visually differentiate the two functions. Germany, for example, 15 years ago floated the idea of a different flash pattern for the hazard signal; perhaps a double blink rather than the turn signal's 1 to 2 single blinks per second. But there were too many questions about (costly?) switching and controlling arrangements and too many competing ideas; no consensus was possible. Perhaps if amber had early been reserved strictly for lateral-presence or lateral-movement functions like side markers and turn signals, then the hazard signal could have been standardised at white at the front and red at the rear. But history contains no such colour stricture; red turn signals and amber front position lights are allowed in the American market. And anyhow, that solution would have required at least one new pair of lights years ago; today the idea could be implemented by flashing the DRLs and the brake lights or rear fog lights, but that ship sailed long ago to the same desert island as green taillights (a proven good idea, but red was already far too entrenched to change).

Is an upgrade like H.E.L.P needed? It certainly looks like it; ESS say over 70,000 people are involved in relevant types of crashes (disabled or stopped-near-traffic vehicle or its occupant struck by another vehicle) every year in the United States alone, with almost 15,000 resultant deaths and injuries. We'll be very keen to see how the H.E.L.P idea fares in GTB, GRE, SAE, and other standards-and-regulations bodies round the world. In the meantime, we look forward to a detailed lecture from ESS at the US DVN Workshop near Detroit later this year.

Magna's Affordable OLED-Look Tech

LIGHTING NEWS



Magna's new Surface Element Lighting brings new options into affordable reach for vehicle lighting designers and stylists. The technology's first commercialised application is on the all-electric 2021 Volkswagen ID.4, and its snazzy appearance is demonstrated in an [online video](#). Surface Element Lighting offers a compact package, homogeneous appearance, and customisable exterior lighting options.

John O'Hara, President of Magna Mechatronics, Mirrors, Lighting, and Electronics, says "With OLEDlike uniformity at a fraction of the cost, Surface Element Lighting is a game-changer in terms of design and customisation".

At a minimum thickness of just 4 mm, individual compact LED panels can be packaged into tight spaces and situated in nearly limitless configurations. The surrounding frame of the lit element can be modified to create unique 3D panels for even greater styling freedom.

Lighting animations are customisable and can be created within individual elements or in groups, including lock/unlock, welcome/farewell, and dynamic turn signals. In addition, automakers can offer a choice of different pre-programmed lighting animations, selectable by the end-user, to deliver an even greater level of personalisation.

Per Lux Ad Astra

LIGHTING NEWS



Opel-Vauxhall have released teaser pictures of their forthcoming new Astra's design details, including the grille with incorporated LED headlamps. The new Astra will be available as a hatchback and an estate (wagon), and is expected to be revealed in full this August.

The new car is to be based on the Stellantis EMP2 platform also used by the Peugeot 308 and will launch with gasoline, diesel, and plug-in hybrid models. Production will begin this year at Rüsselsheim, Germany.

You could see as mentioned in the editorial, the DRL is becoming more important than main light sources. While DRL is more and more visible, the main light sources are less and less visible.

Hella's New Full-LED Rear Lamp for Trucks

LIGHTING NEWS



Individualisation, safety and future viability characterise Hella's new modular full-LED rear lamp assemblies for 24 volt trucks and trailers.

The patented Hella LED light curtain, which creates the rear position (tail) light, can now be customised. Graphic structures such as dots, stripes, and shapes can be marked out for this purpose. "This makes the tail light the central eye-catcher and underpins the branding of the manufacturers on the road. Trucks and trailers thus become unique," says Georg Fink, Hella's Sales Manager for Trailers. "An individual light signature is ultimately becoming more and more important in order to stand out from the competition and this is true not only for car manufacturers, but also for those producing trucks and trailers".

In addition to the customisation options, Hella have also further developed, in-house, the light curtain technology. The result is a much more homogeneous appearance of the tail light as it does not require separate optics.

With an installation depth of only 5 mm, the new lamps have technical features to make it especially suitable for the future. With mechanical interfaces for sensor technology, ultrasonic sensors can be connected on both sides, for example, to implement a parking assistant. In addition, the control for the flashing side marker lamps, the direction indicator failure control, and the load simulation designed to monitor the stop and direction indicator lights are all integrated into the system.

The two-colour outer lens is made of polycarbonate, and bonded to the housing. Overall, the rear lamp achieves protection class IP 6K9K, which means it is dustproof and resistant to cleaning with water under high pressure.

Valeo: French Patent Applicant, all sectors combined

LIGHTING NEWS



According to the list published for the first time by France's INPI industrial property institute, Valeo have been ranked the world's leading French patent applicant, with 1,913 patents filed in a year, over half of them filed in France. Valeo also came out in third place in the 2020 ranking of patent applicants in France, with 819 patents filed. Their innovations are now protected by a portfolio of almost 35,000 patents worldwide.

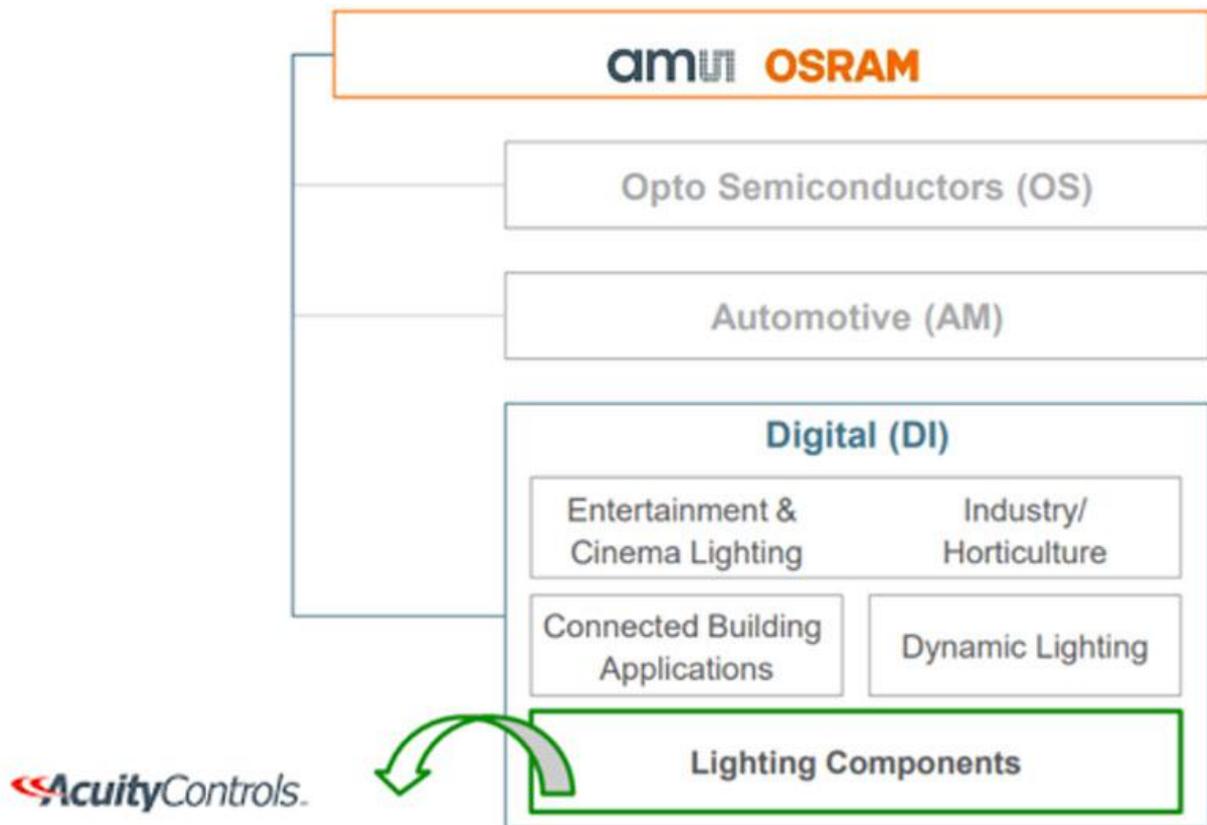
Valeo Chair and CEO Jacques Aschenbroich says "This ranking demonstrates Valeo's high capacity for innovation, the backbone of our strategy. All over the world, our teams create and design technologies that support cleaner, safer and smarter mobility, taking into account the specific features and requirements of local markets. France, which accounts for more than half of our patent filings, evidently remains the stronghold of our Research and Development activities".

Among the 1,913 patents filed, 53 per cent were filed in France, 21 per cent in Germany, 8 per cent in China, 5 per cent in Japan, 3 per cent in the United States, and 2 per cent in South Korea. Patents filed by Valeo in 2020 included those to do with new versions of the supplier's Scala lidar, already in series production smart lighting systems.

In 2020, Valeo's R&D expenditure amounted to €1.66bn, 12 per cent of the Group's original equipment sales. Valeo have 63 R&D centres worldwide and some 20,000 R&D engineers among more than 110,000 employees.

AMS-Osram to Sell Digital Systems Biz to Acuity

LIGHTING NEWS



AMS-Osram will sell their Digital Systems business to longtime customer and partner Acuity Brands. The business unit to be sold, based in North America, has about 1,100 employees in Canada, the States, and Mexico; they primarily manufacture lighting control systems, electronics, and drivers.

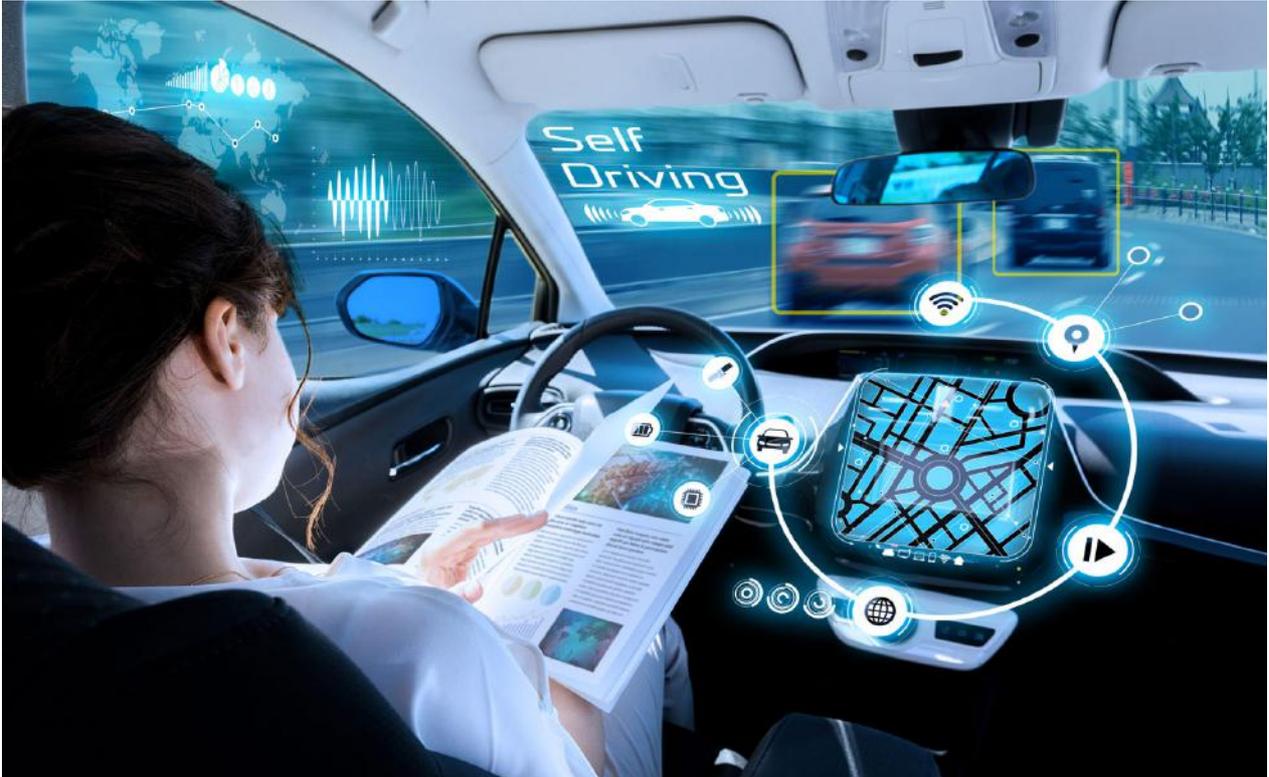
The acquisition of AMS-Osram's LED drivers and team expands Acuity Brands' capabilities and their advanced LED driver portfolio. Meanwhile, Acuity ownership will bring a strategic perspective and fit to the customers, employees, and business overall. Acuity and DS have a long history of working together, spanning decades. This close relationship and mutual understanding of each other's business is expected to enable a rapid integration. The company will take over the whole of the DS business, including the production facility in Monterrey, Mexico. The transaction is expected to close this summer; financial details are not being disclosed publicly.

AMS aim to leverage Osram Opto Semiconductors' technologies to expand their business in sensing and automotive application. AMS will be in charge of mobile business, and Osram will be fully responsible for automotive business, to leverage strengths from both parties. Osram's expertise in sensing components such as VCSELs, automotive LEDs, and lidar lasers will support AMS' plan to intensify their position in the automotive field and markets other than mobile devices.

Driver Assistance News

VW May Offer Pay-Per-Use Autonomous Driving

DRIVER ASSISTANCE NEWS



Klaus Zellmer is in charge of sales, marketing, and after-sales for the Volkswagen brand. He says VW are thinking about offering autonomous driving on a pay-per-use basis: "Regarding autonomous driving we can imagine offering it on an hourly basis. We assume a price of around €7 per hour. So if you do not want to drive yourself for three hours you can pay €21 to get it done" Zellmer said, reasoning that this way autonomous driving would become available for everyone.

LG Work Toward Future Mobility

DRIVER ASSISTANCE NEWS



The mobility landscape has been completely reshaped over the last few years, with landmark achievements being made in electrification, connectivity and autonomous driving.

Telematics and vehicle connectivity will proliferate as V2X technology evolves to transmit information at high speed via high-bandwidth, low-latency connections.

LG's in-vehicle infotainment system can seamlessly collect and transmit a wide variety of information such as driver status, door status, and app usage. LG also are actively developing components for driver assistance, such as ADAS which can recognise and respond to surrounding environments, even through busy junctions.

And LG are working closely with Magna, for example, to develop cutting-edge technologies for components of electric vehicles. Under a new JV to launch next month, LG Magna e-Powertrain will produce EV components that benefit from Magna's strength in electric powertrain systems and world-class automotive manufacturing, as well as LG's expertise in developing components for e-motors and inverters.

To respond to the rapidly changing automotive industry, LG are pursuing a strategy of strategic alliances and partnerships to develop industry-leading innovations for global automakers. In addition to LG Magna e-Powertain, LG and Luxoft created Alluto to drive the commercialisation of production-ready digital cockpit, infotainment, and ride-hailing systems based on LG's webOS Auto platform. And in 2018, LG brought on board leading automotive lighting and headlight systems provider ZKW Group in a deal worth more than €1.1bn.

General News

US Makers Speed Up New-Model Launches

GENERAL NEWS



The range of quickly competitors are introducing new vehicles is reaching its widest point in recent auto industry history. Honda and Toyota lead in model replacement rates while Stellantis and General Motors trail the pack, according to a study of the U.S. product pipeline contained in the newly released annual study "Car Wars."

Year	2010	2015	2020	2025
New model launches	35	48	42	63

At the same time, the arrival of new vehicle models across the industry is ramping up to its highest level of activity in at least two decades, says John Murphy, Senior Auto Analyst at Bank of America Merrill Lynch, who publish the annual Car Wars study.

Murphy says automakers will launch about 240 new models over the next four model years, averaging 60 a year. Over the past 20 years, new launches have averaged 40 a year. Between model years 2002 and 2021, the industry replaced about 16 percent of its volume each year with new models.

The study forecasts that over the next four model years, the annual replacement rate of industry volume will average about 21 per cent of the total; the average product age for the next three years will rise slightly, but then it will drop in model year 2025, averaging around 3.1 years.

Next Tokyo Motor Show Shifted to 2023

GENERAL NEWS



AKIO TOYODA, TOYOTA PRESIDENT, JAMA CHAIRMAN

The Tokyo Motor Show will return in 2023, after organisers canceled it this year for the first time because of the pandemic. Plans for the revived show were announced last week by Toyota President Akio Toyoda, who also is chairman of the Japan Automobile Manufacturers Association, which has hosted the fall auto-exhibition since its inception in 1954.

Toyoda, speaking in his role as head of the association, a position he has held since 2018, said the show will occur under the banner of "Green and Digital", a move to showcase the Japanese industry's push to reduce carbon dioxide emissions. "There is a long path toward achieving carbon neutrality by 2050," Toyoda said. "This theme will represent the beginning of that path and will be about sending a medium- to long-term message. "I think our will and action today will change what the future will look like," he said.

The decision to cancel this year's show was announced in April. At that time, Toyoda said the pandemic made it impossible to hold an in-person event where automakers could connect with customers. The 2023 gathering hopefully won't face such obstacles, he said.

"We will continue to study plans for the next show, with hopes of making it an all-industry show with participation from other industries." Toyoda said.

In 2019, the 12-day show finished with more than 1.3 million visitors, a 70 per cent surge over the 770,000 who attended in 2017.