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Weekly Newsletter

DVN
Lighting & ADAS

NEWSLETTER #852

Editorial

DVN OLED Report; Innovations At Beijing Auto Show

Next week, the biggest automotive event in China starts: the Beijing auto show. In your DVNewsletter this week, we present some of the new products to be showcased there—like the Honda 烨 (Ye), the Chery Exceed E8, and the LEVC L380. Suppliers will also be exhibiting their innovations. Among them: new kinds of OLED lighting.

Speaking of which, this week we publish our latest **DVN Report, about automotive OLEDs**. It's a comprehensive look at the technology, technique, applications, and market position and potential.

The stream continues unabated, of new vehicles with fascinating new lighting designs. This week, we take a look at the Nissan Qashqai facelift. Its lighting plays a central role in making the car look new-new-new, right from first glance. That's one of the main reasons why lighting is a design nexus on every car—quite a giant difference from not all that long ago when, particularly in the American market, lights were commodity items like lug nuts. Now the design possibilities are endless! Each design looks different.

That is why we need engineers and designers working together to create the unique design best suited for the project at hand: the one that will make the customer buy the car you have designed.

Sincerely yours,

Paul-Henri Matha
DVN Chief Operating Officer and Lighting General Editor

In Depth Lighting Technology

OLEDs Remain a Promising Tech For Car Lights

OLEDs—organic light emitting diodes—are light-emitting panels made from organic (carbon-based) materials which emit light when electricity is applied. This is the only technology able to create large lit areas, as opposed to LEDs which are more point-emitting.

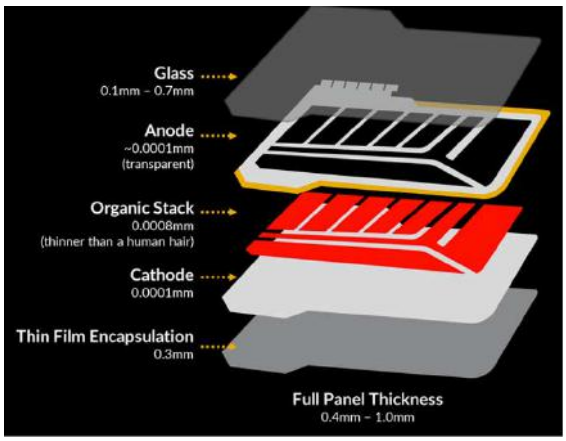
Organic materials to emit light have been used with great success since 2004 with passive matrix and since 2007 with active matrix for TVs, and more recently since 2010 for smartphones. But attaining the reliability and robustness needed for exterior vehicle lighting took a great deal of time and effort.

Many suppliers have worked to develop OLED lighting—GE, Philips, Osram, LG, Konica Minolta, Panasonic, NEC, and others. But almost all these companies stopped their OLED development, mainly because it would have required big investments with an uncertain market adoption due to stiff competition from less costly, more advanced LEDs.

Car OLEDs had a good start in 2016-2017 with the launch of the Audi TT RS and the BMW M3 CS, both with Osram OLEDs, and the Mercedes S-Class with LG OLEDs. But Osram stopped making OLEDs, BMW pivoted to laser light guide rear lamps, and Mercedes concentrates on microLED headlamps with projection. Audi alone continued with OLEDs, with LG panels until that company exited the OLED business, and then with OLEDWorks.

OLEDWorks was established in 2010 by former Kodak experts. Bolstered by buying Philips' OLED department in 2015, they delivered their first car OLEDs in 2022 for the Audi A8.

Around the same time, Yeolight—established in 2001 in China to develop PMOLED and AMOLED displays—developed OLEDs for lighting, including for cars. Their first such application was on the Hongqi H9 in 2020, and they are now working on other new projects.

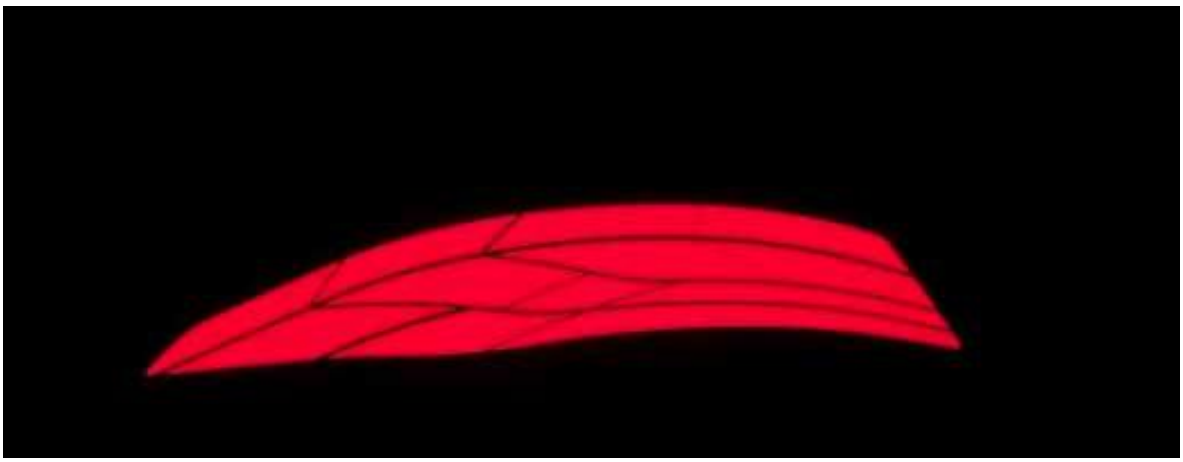


OLED panels are unanimously appreciated for their very nice homogeneity and the freedom they offer for the shapes of the illuminated panels. They are also very light and thin with less than 1mm thickness. They are power-efficient, particularly compared to 'OLED-like' LED setups which generally have very low efficiency of around 10 per cent. In parallel, from the initial orange-red colour, the trendy red-red colour is now available. From an initial brightness of 1,000 cd/m^2, they are now able to deliver 2,000 cd/m^2 as demonstrated by OLEDWorks on the Audi A8 in 2022, making them perfect for the likes of tail lights.

And OLEDs are perfectly adapted for digitalization. They can produce displays with a good definition done by six, 60-segment panels as seen in the latest Audi Q6 e-tron. So, specific light signatures chosen from a smartphone, more attractive welcome scenarios, and safety messages for following drivers are now possible with OLEDs, giving them a complementary attractiveness.

With all these qualities, one could expect a rush for OLED adoption, but that has not happened up to now. Of automakers selling vehicles around the world, only Audi equip significant numbers of cars with OLEDs, with a take rate at 100 per cent for the A8 and between 10 and 25 per cent for the other models. Certainly, the main reason for the low adoption rate in the past is that OLEDs had historically high costs—we estimate around €1/cm^2, and even that steep figure is down 60 per cent since the introduction in 2016. This means OLEDs were pretty much economically feasible only on premium cars, but as volumes have increased and continue to increase (for example from the TT to the A8 to the Q5), costs continue to decrease with very significant further cost decreases due to volume alone expected by 2027-2028. As with all new automotive technologies this will drive the adoption of OLED lighting from premium cars down to lower cost, higher volume cars during that time and beyond. There are other limitations as well, but they are gradually being broken through:

- Available output: 10,000 cd/m^2 is announced for red OLEDs and 20,000 cd/m^2 for amber ones, opening the door for OLED stop lights and turn signals.
- Curved panels: prototypes of flexible panels have been presented, that could be transparent in the future too, offering new styling possibilities.
- And for digital displays, OLEDs can reach a pitch of 10 µm, the limit of lithography to deliver high-definition displays, perhaps in the future with thin-film transistors (TFT) for the electronic controls to simplify the circuits and harnesses, which can be complex and expensive right now.



In addition, automotive manufacturers could be reluctant during the past period with the risks associated with a single source for OLEDs. Now with two players firmly committed to this provision, the disappearance of this risk can be a complementary factor in the adoption of the technology.

With all their technical qualities and with cost decreasing, with their new digital abilities to display information where they are there totally cost competitive, OLEDs could catch the trend to use more and more displays in and around cars. For the more traditional uses for tail, stop or turn indicator, it is possible to think realistically that the OLED cost penalty could ease off. Especially given the surge of interest for OLEDs now, particularly in China where several car makers are preparing new models with OLEDs.

So, there will be a future for OLEDs in exterior lighting. But what will that look like? How broadly will they proliferate, and how fast? Up to now, low volumes drove high prices, which put a brake on adoption, but now a virtuous circle is set in motion: price reduction will attract more applications, which will increase volumes and drive prices down. Most lighting suppliers expect OLEDs to increase their market share, but remain confined to high range cars for the foreseeable future. Today's figure is less than 1 per cent in the global car market, and growth by 2030 to 3 per cent of worldwide market share, mainly in Europe and China, could be expected. But if big cost reductions occur with the current evaporation process, as current OLED manufacturers anticipate by 2027-2028, or if a breakthrough like inkjet printing processes (as used in other OLED applications) could be adapted to the severe specifications of the vehicle lighting realm, that could greatly accelerate adoption especially after 2030.

In the detailed **DVN Report**, you will find interviews with OLEDWorks and Yeolight, and a detailed analysis of the Audi experience with OLEDs, and much more.

Lighting News

ams OSRAM's New Open System Protocol

LIGHTING NEWS

The Open System Protocol (OSP) is a simple, open network technology for connecting LEDs, sensors, actuators, and other devices in a car. Developed by ams OSRAM, the OSP is free for use, with no license or royalties, by any manufacturer of LEDs or other devices. It's particularly suitable for connecting hundreds of low- or mid-power LEDs in a dynamic lighting system, as in automotive interior ambient and exterior lighting.

The world's first OSP-compatible LED was ams OSRAM's own Osire E3731i, an intelligent RGB LED with integrated driver. Now ams OSRAM have introduced a standalone OSP LED driver which enables any other low- or mid-power LED to behave as though it were directly connected to an OSP network. This means vehicle lighting system makers can build OSP lighting networks without LEDs that have inbuilt OSP connectivity, and without a local microcontroller to provide the OSP functionality. By avoiding local microcontrollers, the standalone driver makes it easier to implement over-the-air (OTA) firmware updates, an important feature of new software-defined vehicle architectures.

The new AS1163 is called a Stand-Alone Intelligent Driver (SAID). It has nine output drivers, so a single SAID chip can drive three RGB LED channels. The chip's intelligence is in its OSP networking capability. The driver implements commands for dynamic lighting effects transmitted over the OSP network from the host controller; it can adjust brightness at 16-bit resolution (equivalent dynamic range or 500-Hz PWM), or 14-bit resolution (1,000-Hz PWM). The AS1163 driver can operate alongside Osire E3731i LEDs.

As well as driving RGB or single-colour/white LEDs, a SAID device can also provide a bridge to the OSP network for any component with an I2C interface. This means a complete OSP network can be built with just a single host microcontroller, and multiple SAID devices providing OSP connectivity for any low- or mid-power LEDs and for any

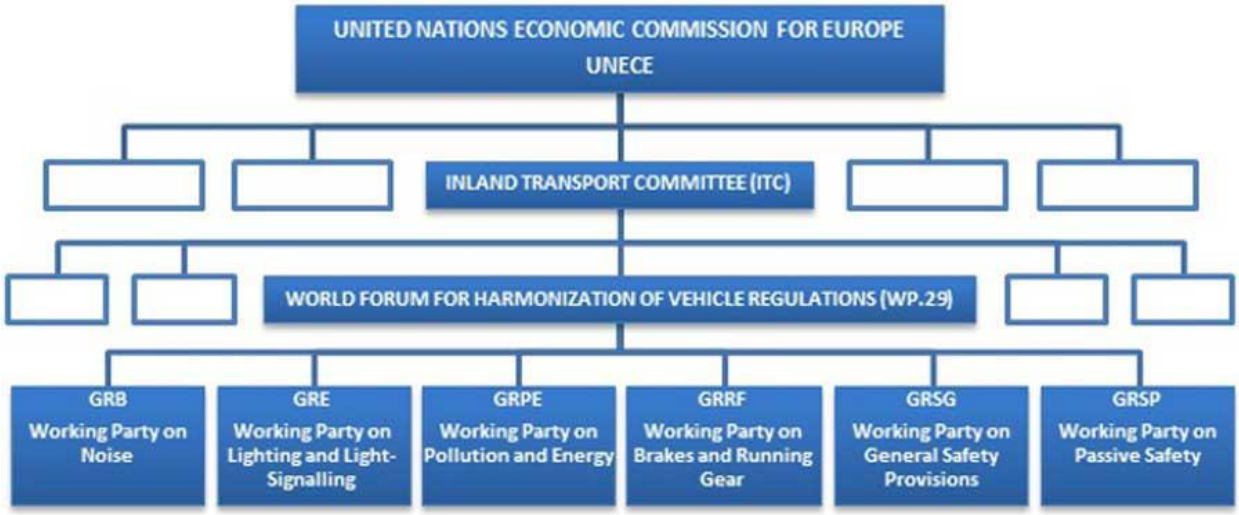
I2C devices such as sensors, actuators, and memories. An OSP network—compatible with a physical CAN bus—can connect up to 1,000 nodes at a maximum data rate of 2.4 Mbps in a two-wire daisy chain configuration.

The AS1163 is ideal for automotive interior lighting systems, which are typically assembled as long thin strips of LEDs. It is supplied in a slim 16-lead QFN package with a 3 × 3 mm footprint, ideal for instance in a lightbar assembled on a single-layer PCB. It has adjustable output current options from 1.5 to 24 or 48 mA per driver for low-power LEDs. Output clustering enables it to provide a single output of up to 288 mA for a mid-power LED, allowing it to support exterior lighting applications as well.

Vehicle lighting designers can evaluate the AS1163 intelligent driver with the SAID Demonstrator Board, available through authorized AMS Osram sales starting this June.

Agenda: GRE 90th Session, 29 April - 3 May

LIGHTING NEWS



The UNECE GRE meeting will occur in Geneva from 29 April to 3 May. There's quite a docket to be covered:

1. Adoption of the agenda.
2. 1998 Agreement – UN Global Technical Regulations: Development.
3. 1997 Agreement – Rules: Development.
4. Simplification of Lighting and Light-Signalling UN Regulations.
5. UN Regulations on Light Sources and the Consolidated Resolution on the Common Specification of Light Source Categories.
6. Installation UN Regulations:
(a) UN Regulation № 48 (Installation of Lighting and Light-Signalling Devices);
(b) UN Regulation № 74 (Installation of Lighting and Light-Signalling Devices for Mopeds);
(c) UN Regulation № 86 (Installation of Lighting and Light-Signalling Devices for Agricultural Vehicles).
7. Device UN Regulations
(a) UN Regulation № 148 (Light-Signalling Devices);
(b) UN Regulation № 149 (Road Illumination Devices).
8. UN Regulation № 10 (Electromagnetic Compatibility).
9. Other UN Regulations.
10. Pending Amendment Proposals.
11. Other Business
12. Direction of Future Work of GRE.
13. Provisional Agenda for the Next Session.

12 official documents are queued up for consideration; they can be viewed on the **GRE 90th session page**, and here are some highlights:

1. Task Force on Substitute and Retrofits : H11 bulb retrofit
2. GTB :
    a. R48 clarification about Headlamp cleaning system and headlamp objective luminous flux for all series
    b. R48 clarification about lamp aiming for N2G, M2G, M3G for 06, 07 and 08 serie
    c. R148 clarification about reduced intensity of DRL when turn indicator is ON
    d. R149 clarification about cut off sharpness measurement in 01 serie
    e. R149 headlamp marking clarification for 01 serie

3. Task force AVSR : R48 clarification about automated driving terms and definition

And 12 informal documents, available at the same link, have been submitted to open discussion with all contracting parties. Examples include:

- Terms of reference and rules of procedure of the task force on lamps under parked condition (TF LUPC), including energy indicator and lamp test mode. Chairmanship is held by Japan and Netherlands, and secretarial position is held by OICA. The target is to provide an informal document in April 2025, part of R48 09 series.
- Status from GTB about Automated Driving System marker lamp
- Status from IWG-SLR (apparent surface and improved visibility of the rear direction indicator)

General News

Marelli, Infineon Collaborate on Zone Control Unit

GENERAL NEWS

Marelli will showcase their latestZCU(zone control unit; they call them "Zones"), built in collaboration with Infineon, at the upcoming auto show in Beijing.

Leveraging Marelli's cross-domain expertise, ZCUs are placed in specific zones of the vehicle to manage various functions, consolidating electronic control units (ECUs) from domains including lighting, body, audio, power distribution, propulsion, thermal management, chassis control, and vehicle diagnostics. They form an integral part of the company's scalable hardware. Combined with service-oriented software and cloud virtualization, they enable new kinds of vehicle customization and personalization. By decoupling hardware and software, Marelli Zones offer flexibility, scalability, and compatibility with any automaker's architecture, while reducing hardware complexity and cost.

Infineon's Aurix TC4x microcontrollers in the Zones brings significant benefits. Their special data routing engine gives very low latency when connecting CAN and Ethernet, so the Zones can consolidate numerous electronic computing units into a single piece of hardware without compromising performance—a robust foundation for centralized architecture. Infineon's microcontrollers also support hardware virtualization to enable parallel execution of multiple virtual machines and therefore disparate domain and safety applications within the same Zone.

2025 Nissan Qashqai: New Lights, New Looks

GENERAL NEWS

The most obvious change is to the front end, with a bigger and nicer mesh grille inspired by the chainmail armor worn by ancient Japanese soldiers. The slim DRLs also provide the turn signal function.

The headlamps are hidden in plain sight, in blackout, upturned-saucer-shaped nacelles. There's a biLED module (no information so far about a possible matrix option) as well as a cornering module. We can also see, on the outboard side, a small Nissan lit logo as part of the position lamp. Maybe it will light up in amber to provide the sidemarker light function for North America?

Rear restyling is milder, but there's a new set of LED lights and a modified bumper.

Part of the front and rear position lamps are done by a very flat surface that looks similar to OLED but is lit by LEDs. This is the first time we see this concept in mass production after presentations at DVN Workshops.

LEVC L380 to Launch in UK

GENERAL NEWS

Geely-owned LEVC (London Electric Vehicle Company), best known for making the iconic London taxi, will launch their eight-seat minivan in the UK within the next two years as part of their plans to launch a range of electric cars and vans.

The L380 is a luxury electric people carrier based on Geely's latest EV platform. LEVC say it will offer an 'unprecedentedly spacious and luxurious experience, whether for families or business users'. They've released new showing a large glass roof and a suite of interior digital displays.

Chery Exeed 08 to Debut at Beijing Auto Show

GENERAL NEWS

Chery have shown pictures of their new Exeed E08, set to debut at next week's Beijing Auto Show. Speculation is that it will form part of the maker's Exlantix series.

The E08 is the first car jointly developed by Exeed's Europe and Shanghai design teams, and bears Exeed's 'Wind Aesthetics 2.0' design language. The one-box design is heavily streamlined and incorporates drag reducing features such as side-view cameras.

At the front, there's 'cyber butterfly design. The grille decoration is said to be inspired by chandeliers, and the headlight clusters take a shape similar to the letter F, with an integrated ISD (interactive social display). Boomerang-shaped taillight clusters are joined by additional lighting surrounding most of the hatchgate backglass, together also forming an impressionistic figure-F.

The car has a very straight beltline, and the side is relatively flat with a few crease lines. The rear doors are very wide and when open will allow direct access to the second and third rows.

It seems likely the E08 is meant to compete with the Li Mega and XPeng X9, but the E08 will probably be priced lower—starting at around the equivalent of USD $34,550. Deliveries will probably not begin before early next year.

New Honda EV for China

GENERAL NEWS

Honda have a new EV for China, called the 烨 ('Ye', pronounced, approximately, 'yeah'), and say they will launch six models in the series by 2027. Three of those cars were launched in Beijing: the Dongfeng Honda S7, the GAC Honda P7 due to launch later this year, and the Ye GT concept which should be produced next year.

The name means to 'shine brilliantly', and is said to represent 'Honda's desire to enable everyone who drives Ye Series models to unleash their innermost passions through the joy of driving, and let their individuality shine brilliantly'. The Ye series will join Honda's e:N EV models already on sale in China.

Visually setting the new series apart from other Honda models is a new illuminated H logo designed exclusively for Honda's EV models. Honda say the Ye series uses new 'pure EV' architecture exclusively developed for the series and based on the needs of Chinese users.

The Ye GT concept is a low, wide grand tourer designed by the Chinese R&D team. At the front there is a full-width light band. A number of mainstream Chinese suppliers contribute: CATL supply the battery, Huawei the intelligent cockpit, and iFlytek the voice control system.

Sales are slated to start by the end of 2025.

Before that, the Ye P7 and S7 are due to go on sale this year. They're all essentially the same car, but each has a different front design to give two nominally different cars for Honda's Chinese JV partners. The Dongfeng S7 gets more aggressive, three-pronged LED running lights, while the GAC P7 has an arrangement more in line with recent mainstream Honda models; there's a fineline LED running light defining the perimeter of the headlamps and joined by a straight line across the front of the hood. Both of these cars will have two variants, a one-motor rear wheel drive version and a dual-motor version.

Inside, ambient LED lights in the instrument panel and door panels are controlled by an AI-powered assistant. There's a dimming panoramic roof, headrest-mounted speakers, and a wireless charging pad. As to safety, there's the Honda Sensing 360 package. The cars have Honda Connect 4.0 for Android phone connectivity.

Opmobility's New Texas Plant

GENERAL NEWS

OPmobility inaugurated their new module assembly plant in Austin, Texas, to address a historic order from a key US electric mobility company. Built in only six months, the plant has already produced 100,000 modules since it started up last September. It will soon be the group's largest plant by revenue.

This Austin plant will have an annual assembly capacity of 2.5 million modules—1.5 million front-end modules and 1 million cockpit modules—and will employ over 400 people by 2025.

With the new plant onstream, all OPmobility's business groups (Exterior, C-Power, Modules, Lighting, and H2-Power) now have a presence in the USA, where OPmobility already generate close to 15 per cent of their revenue—a figure forecast to double over the next five years. The Texas plant is scheduled to expand its activities to the production of exterior body parts, such as tailgates.

OPmobility are experts in the development, assembly, and logistics required to assemble highly complex modules so automaker customers can simplify their production processes. Front-end modules include up to 140 separate components, as well as housing functions such as vehicle lighting systems and engine cooling.

Cockpit modules are complex assemblies incorporating all the components of a vehicle's dashboard (screens, finishing panels, etc.).

OPmobility CEO Laurent Favre says the new plant "means OPmobility now operates 13 plants, reflecting our growing order book in the country. The new plant is also a concrete example of our customer base diversification strategy to work with pure electric vehicle players".

The Modules business group generated 27 per cent of OPmobility's 2023 revenue; they assemble around 6 million modules every year worldwide.