DrivingVisionNews.com
Automotive lighting and driver assistance technologies

Tue, 18 May 2021 Weekly Newsletter NEWSLETTER #699

Editorial

Lighting Trends Confirmed At Shanghai Auto Show

The latest quarterly DVN Report shows you relevant details of the Shanghai auto show as well as the models launched elsewise these four last months. Five trends are highlighted:
• The drive to innovate in front and rear lighting is hotting up
• Front light sources are delocalised
• Rear lights are morphing toward displays
• Linear lights with lit logos are proliferating in the front and in the rear
• Lights keep getting thinner and thinner in the front and in the rear

The first three of these trends can be developed within the engineering and designing realms without great consequence on safety, but not the last two trends. For linear lights with lit logos, front and rear, the regulations have to be clarified—or perhaps we should say they have to be written in the first place—and that's a great opportunity to have worldwide agreement, if we dare hope for it (and work toward it).

As for lights getting thinner and thinner, this is something of a worrisome trend. Smaller lights, front and rear, mean less performance and/or more glare. In headlamps, it also means higher power consumption relative to performance levels; in rear lamps it's already making problems with American lit area (EPLLA) requirements for the stop light and rear turn signal functions. Lights are first and foremost safety equipment. There is always a compromise between engineering, safety, and compliance on the one hand, and design and marketing on the other.

It is comparable: it is now technically possible to make micro-fineline and other extremely small lights that meet the photometric requirements, but let us be wise and responsible about it, and keep in mind that just because something can be done, doesn't necessarily mean it's a good idea that should be done. I suggest automakers and suppliers should avoid overdoing it on the thin mini-lights.

Sincerely yours

In Depth Lighting Technology

Lights at Shanghai Auto Show and Recent Launches

Here's a sneak peak at some of what you'll find in the latest quarterly DVN Report.

Five takeaway points are described from the Shanghai auto show:

• Linear lights with lit logos are proliferating in the front and in the rear
• Front and rear lights keep getting thinner and thinner
• Front light sources are being delocalised
• Rear lights are morphing toward displays• The drive to innovate in front and rear lighting is hotting up

New-car launches of the last four months are presented, as well.

1. **Linear lights with lit logos are proliferating**

rear


Audi A6 e-tron Concept


Ford Evos


GAC Aion


Geely Xingyue


Evergrande Hengchi 1


Xpeng P5 EV

.

front


Lincoln Zephyr Reflection


Xpeng P5 EV


Buick Envision Plus

2. Lights keep getting thinner and thinner

rear


Audi A6 e-tron Concept


Xpeng P5 EV


Ford Evos

front


Audi A6 e-tron Concept


Evergrande Hengchi 1


Lincoln Zephyr Reflection

3. Front light sources are being delocalised


Ford Evos


Nissan X-Trail


Roewe Whale

4. Rear lights are morphing toward displays


Audi A6 e-Tron Concept


Geely Xingyue

FAW Betsune T99

5. The drive to innovate in front and rear lighting is hotting up

- Exterior appearance of lights
- Interior appearance of the headlamp
- Segmented lights
- Lights everywhere around the car
- Welcome and Farewell lights

Hongqi L-Concept

Geely Xingyue

Hongqi L-Concept

Xpeng P5 EV

Xpeng P5 EV

Zhiji L7

Recent car launches

Audi Q4 e-tron (above); BMW i4 (below)

Genesis X concept (above), SEAT Arona (below)

Toyota Aygo (above)

GMC Hummer EV

Hyundai Santa Cruz

Škoda Enyaq

Volkswagen Polo

Lighting News

Better Reds For Better LEDs

LIGHTING NEWS

The King Abdullah University of Science and Technology (KAUST) is a private research university in Saudi Arabia. Founded in 2009, it is Saudi Arabia's first university where men and women study together. Zhe Zhuang is a postdoctoral researcher in In Kazuhiro Ohkawa's group at KAUST. His research focuses on III-nitride semiconductors—aluminum, indium, and gallium nitride—and their associated optoelectronic devices, especially MOVPE (metalorganic vapour-phase epitaxy) growth, nanofabrication, and novel III-nitride nanophotonics.

MicroLEDs are being looked at for the next generation of displays; they're energy efficient and very small, but each LED can emit light over only a narrow range of colours. One solution is to create devices that aggregate many different LEDs, each emitting a different colour; full-colour displays can be created by combining red, green and blue microLEDs. Zhuang's tea at KAUST have been working to develop more efficient red LEDs.

An LED's colour is determined by the material properties of the semiconductor. Nitride semiconductors can be used to make blue and green LEDs, while phosphide semiconductors are used for red light. But combining different semiconductors in this way makes construction of RGB microLEDs difficult and expensive, and the efficiency of phosphide (red) microLEDs drops significantly with shrinking chip size.

Red-emitting InGaN (indium gallium nitride) can be created by increasing the indium content, but this tends to lower the efficiency of the resulting LED because there is a mismatch between the

separation of atoms in the GaN and InGaN, which causes atomic-level imperfections. And sidewall damage to an InGaN microLED, induced during fabrication, makes the finished device less efficient. But Zhuang says "we have a chemical treatment to remove the damage and retain the high crystal quality of the InGaN and GaN sidewall interface".

Zhuang and his team created and characterised a series of square devices, each 47 or 98 μm on a side. Their 47 μm devices emitting light at a peak wavelength of 626 nanometres (a red-orange colour) were shown to have an external quantum efficiency—the number of photons emitted from the LED per electron injected into the device—of up to around 0.87 per cent.

Lamps are Brand, Engineering, Design Link For Lynk

LIGHTING NEWS

*Extract of Shanghai auto show interview with **Stefan Rosén,** Design SVP of Geely's Lynk & Co brand*

On the relationship between design and engineering:

"When two distinct disciplines meet there is always friction, but based on my experience it is ultimately a good thing because that means we are able to push each other to find the right balance. In the end, it’s not about who wins, but delivering what the customer wants. From our end, as a designer we provide an outsider’s view, not knowing the full ins and outs of the engineering side. We get excited, but then we need to calm ourselves down, talk to the engineers and meet them halfway about finding that balance. It creates a bit of friction but it’s the best way to create the best product.

On the identity of the brand:

The real challenge comes when you want to express something differently with the car or working under tougher demands, for example improved aerodynamics. From the beginning, we have always wanted a car with a fresh, new identity that makes us stand out from the crowd. We then asked ourselves what defines our identity and we've realised that 80 per cent of it resides on our face. In the end, we've managed to come up with a unique 'face' that no one else has in the market. When we meet people the first thing we look at is their eyes—that is how we recognise them and what helps define a personality. In a car, the eyes are represented by the lamps, so we deliberately pay extra attention to make the lamps as beautiful, detailed and the highest quality possible."

Lumax to set up design centre in Europe

LIGHTING NEWS

TODD MORGAN, LUMAX CTO

Few months ago, Lumax Industries announced the appointment of Todd Morgan as its new CTO. The company has now revealed that this appointment is part of a long-term strategy to set up two new design centres, one each in Europe and the US, under Morgan's leadership. The European design centre is to be commissioned in the third quarter of 2022, the US facility has temporarily been put on hold due to the existing Covid-induced challenges.

According to Morgan, "LED technology has allowed for a significant improvement in lighting performance and is rapidly becoming more common as the technology cost decreases, and systems increasingly become more efficient in terms of power consumption and weight".
"In lighting, safety continues to be first and foremost in our minds. Technology that improves the visibility for drivers is something that we are highly focused upon, You will see 'Matrix' headlamps that allow the driver to have unparalleled visibility, while not glaring the oncoming traffic," said Morgan.
"Lighting is the new chrome in automotive, so enhancing the look and style of a vehicle is something that we take very seriously. Creating amazing optical systems which allow the design studios to achieve an appearance-like-never-before is something that we are constantly striving for. Innovative lighting animations that welcome the driver to the vehicle are making for a popular trend. We are also working on ways for the vehicle to project images and the utilisation of lighting as a communication tool is definitely high on our priority list," Morgan signed off.

Volvo Has New Exterior Design Chief

LIGHTING NEWS

T. Jon Mayer has been appointed as Volvo Cars' new head of exterior design, effective 1 May. He succeeds Maximilian Missoni, who is now head of design at Polestar, Volvo's premium EV brand.

T. Jon Mayer first came to Volvo Cars in 2011, joining the exterior design team in Gothenburg, Sweden. In 2013 he was the lead exterior designer of the Concept Coupe, Concept XC Coupe and Concept Estate, a trio of concept cars to demonstrate the company’s new design language and the capabilities of its SPA (scalable product architecture).

Most recently, he was head of design at the Volvo Design & Concept Center in Camarillo, California. The Camarillo studio has grown considerably under his leadership and increased its role within the company’s global design operations by developing and advancing strategic and production design ideas from an American perspective.

Robin Page, Volvo's Head of Design, says of Mayer "His track record as an exterior designer speaks for itself and I am convinced he is the right person to lead us into a fully electric future".

For his part, Mayer says "I am extremely excited for the future of exterior design at Volvo Cars. We have one of the most talented teams of exterior designers in the world and I will rely heavily on the them to create a new vision for our electrified future. Electrification presents plenty of challenges for exterior design but also an open world of opportunities. I look forward to setting the exterior design direction for the road ahead".

Deceleration Lights, Distracting Lights: Hot Topics at TSEI

LIGHTING NEWS

At the recent meeting of TSEI, the US-based Transportation Safety Equipment Institute, two lighting-related topics spurred spirited discussion. First was a new kind of auxiliary signal lamp being trialled on large vehicles like tanker trucks and semi trailers. The general idea: a rear-facing lamp that pulsates—alternates between bright and dim—when the vehicle's brakes are applied. Ordinarily such lamps aren't allowed; FMCSA (the U.S. Federal Motor Carrier Safety Administration, which sets safety standards for commercial vehicles) requires that all lights and reflective devices comply with FMVSS № 108, which specifies steady-lit red stop lights. But FMCSA has granted a number of exemptions to this requirement, and they're not all alike.

The first exemption was **granted** in 2019 to Groendyke Transport, a tanker trucking company. Having installed such lights on their own—they received many noncompliance citations for it, but say they saw such a dramatic reduction in crashes that it was less costly to keep paying the tickets—they requested and received an exemption allowing them, for five years' time, to install an amber pulsating lamp mounted in an upper central location on the back of the tank, actuated by the brakes.

Another five-year exemption was **granted** in 2020 to National Tank Truck Carriers, a tanker truck industry safety-advocacy group, to allow motor carriers operating tank trailers to install a red or amber brake-activated pulsating lamp in an upper central position, or two such lamps in outboard positions on the rear of their trailers.

A third five-year exemption was **granted** at the end of 2020 to Grote, an American maker of lamps and reflective devices for commercial vehicles. They developed a lamp which, when the brakes are applied, through its colourless lens flashes amber five times in four seconds' time,

followed by steady red output. Grote's exemption temporarily legalises the new lamp: motor carriers operating trailers and van-body trucks can install the new lamp singly or in pairs.

There continues to be vigourous discussion of whether amber or red is the right colour for this new kind of lamp. Sturdy arguments are being made in favour and against amber and red: amber is distinct from the existing stop lights, but flashing lamps on tow trucks, service vehicles, and road work sites are also amber, as are some rear turn signals, so there could be confusion. Red is well accepted as the colour of lights that signal deceleration, but could be confused with red flashing lights on emergency vehicles—and red is already used for many different functions (tail, stop, rear turn, clearance, identification…), so there could be confusion. It will be interesting to see what data will come forth from the various lamps, colours, and mounting configurations. There was also interesting discussion of making these deceleration warning lamps radar- rather than brake-activated; perhaps we are witnessing the dawn of another new signal lighting function.

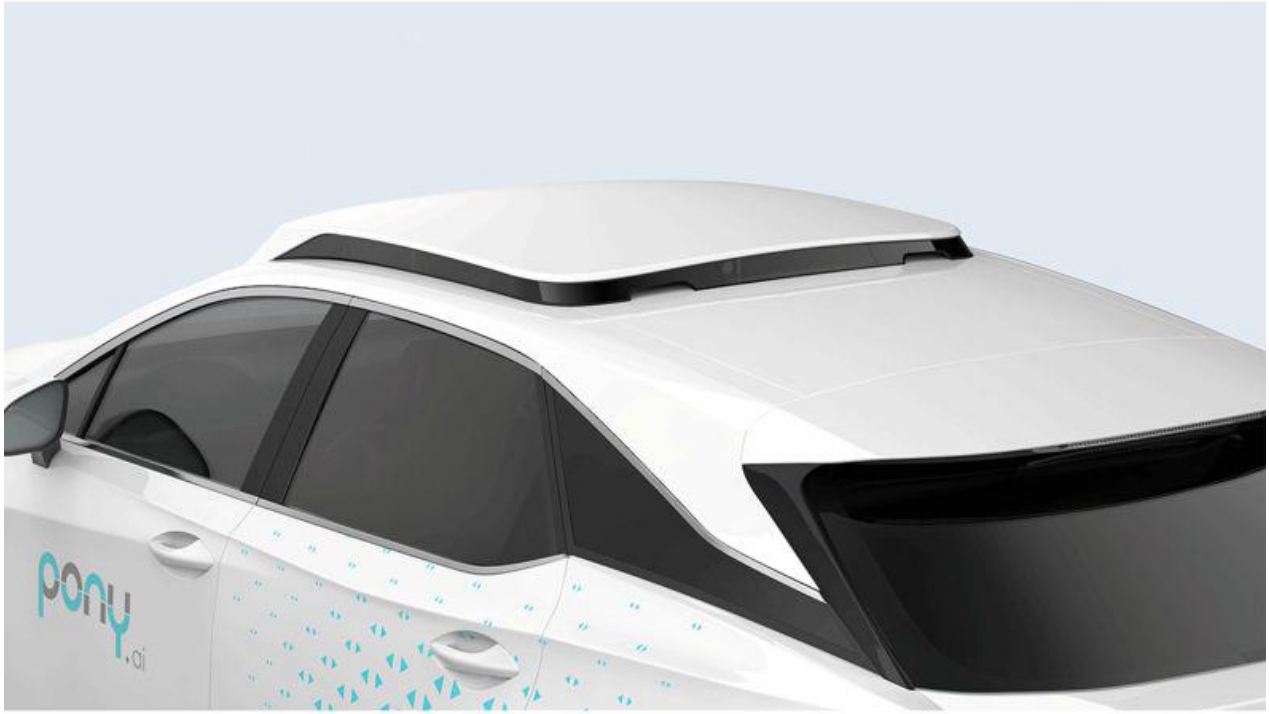
And TSEI Executive Director Paul Menig presented a compilation of 133 photo- and video-illustrated observations of questionable visual aspects of the American driving environment, many of which centre around the brightness, colour, and flash patterns of vehicle lights. His full presentation is **available online**. It's well worth watching; some of his "What's this light supposed to be?" questions are easily answered by a lighting expert, but that's exactly the point: the videos show the distracting and confusing elements of the road and traffic scene from a lighting non-expert's perspective.

There was also some discussion of governmental enforcement against the illegal import of noncompliant vehicle lighting equipment such as "HID kits" and LED retrofit bulbs for halogen headlamps, which remain easily available despite mechanisms in place for such items to be seized by US Customs agents.

Driver Assistance News

Pony.ai Partner With Luminar

DRIVER ASSISTANCE NEWS



Pony.ai, an autonomous driving technology company, have in collaboration with Luminar Technologies introduced a new sensing platform. Pony.ai also say they have driven more than five million kilometres across an area of over 850 km^2, and have provided more than 220,000 Robotaxi rides.

The goal of the partnership is to increase safe, autonomous driving in complex urban environments with an integrated sensor design that leads advanced development to production scale. Pony.ai are set to deploy automotive-grade production autonomous fleets in 2023 globally. The next-generation fleet will seamlessly integrate Luminar's Iris and feature a multi-sensor 360° configuration and an ultra-slim profile, just 10 cm above the vehicle roof.

The partnership followed Pony.ai's expansion of their Robotaxi service across five cities in China and the States, including Guangzhou, Shanghai, and Beijing; Irvine and Fremont, California. Pony.ai began testing China's first Robotaxi service, PonyPilot, in late 2018 in Guangzhou, and in 2019 became the first company to roll out a public-facing Robotaxi service in California. They are the only self-driving company with large-scale deployment across five cities internationally and a fleet of over 200 autonomous vehicles.

Pony.ai *aim to bring safe, sustainable, and accessible mobility to the entire world. They have formed partnerships with leading automakers including Toyota (a major Pony.ai investor), Hyundai, GAC, and FAW.*

Luminar *are an autonomous vehicle sensor and software company. They have rapidly gained over 50 industry partners, including 8 of the top 10 global automakers. Last year, Luminar and Volvo Cars signed the industry's first production deal for autonomous consumer vehicles.*

Every Volvo Aces IIHS Safety Scrutiny

DRIVER ASSISTANCE NEWS

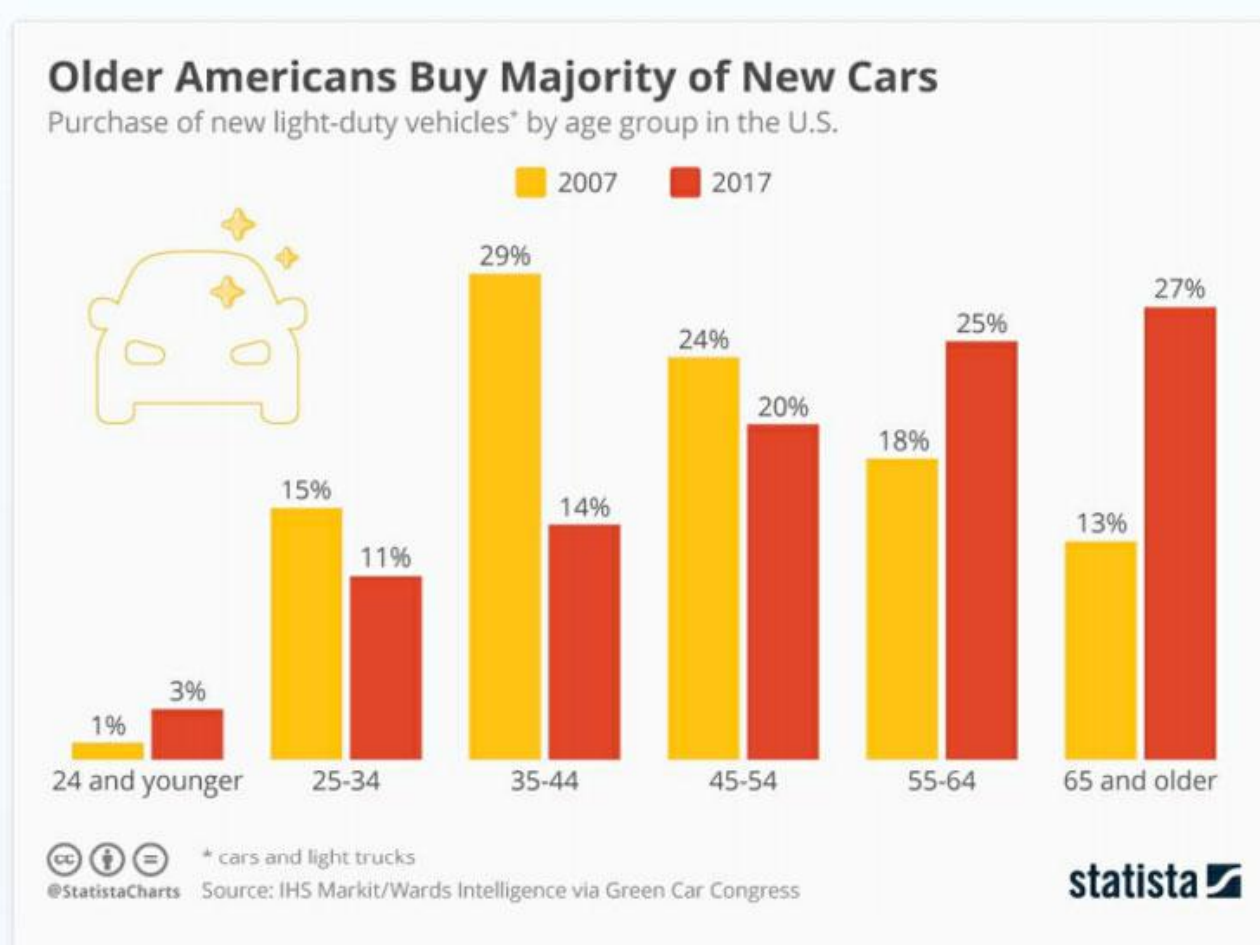
For the first time, a single automaker's every model has earned the IIHS' ultimate Top Safety Pick Plus score.

Volvo's safety innovations over the years include the three-point seat belt, rear-facing child seats, and side-impact airbags. The latest Volvo to win a TSP+ plaudit is the battery-electric XC40 Recharge P8. It's the first small electric utility vehicle to earn the award, and the 15th Volvo to get a Top Safety Pick Plus award this year, which is a record for any brand.

General News

Older Americans Are Main New-Car Buyers

GENERAL NEWS



By Michael Sivak, Managing Director of [Sivak Applied Research]

Between 2007 and 2017, there has been a major shift in who buys new cars in the U.S. According to data analysed by website Green Car Congress, older Americans are now in the majority when it comes to the purchase of new cars and light trucks. Half of those buying a new vehicle in 2017 were over 55 years old, compared with around 30 per cent in 2007. At the same time, new car purchases by 35 to 54-year-olds have decreased from 50 percent to 35 percent. The shift happened in connection with the price of new cars increasing and younger people growing less eager to purchase cars at all.

The main findings are as follows:
• Middle-agers purchased proportionally fewer vehicles in 2017 than in 2007 (down from 29 to 14 per cent for those 35 to 44, and from 24 to 20 per cent for those 45 to 54).
• Older persons purchased proportionally more vehicles in 2017 than in 2007 (up from 18 to 25 per cent for those 55 to 64, and from 13 to 27 per cent for those 65 and older).
• In 2007, a majority of buyers—53 per cent—were aged 35 to 54, while in 2017 a majority (52 per cent) were 55 or older.