Tue, 26 November 2024
Weekly Newsletter

DVN Lighting

NEWSLETTER #881

Editorial

China DVN Workshop At Jiading, 4-5 December

By Paul-Henri Matha, DVN CEO & Lighting General Editor

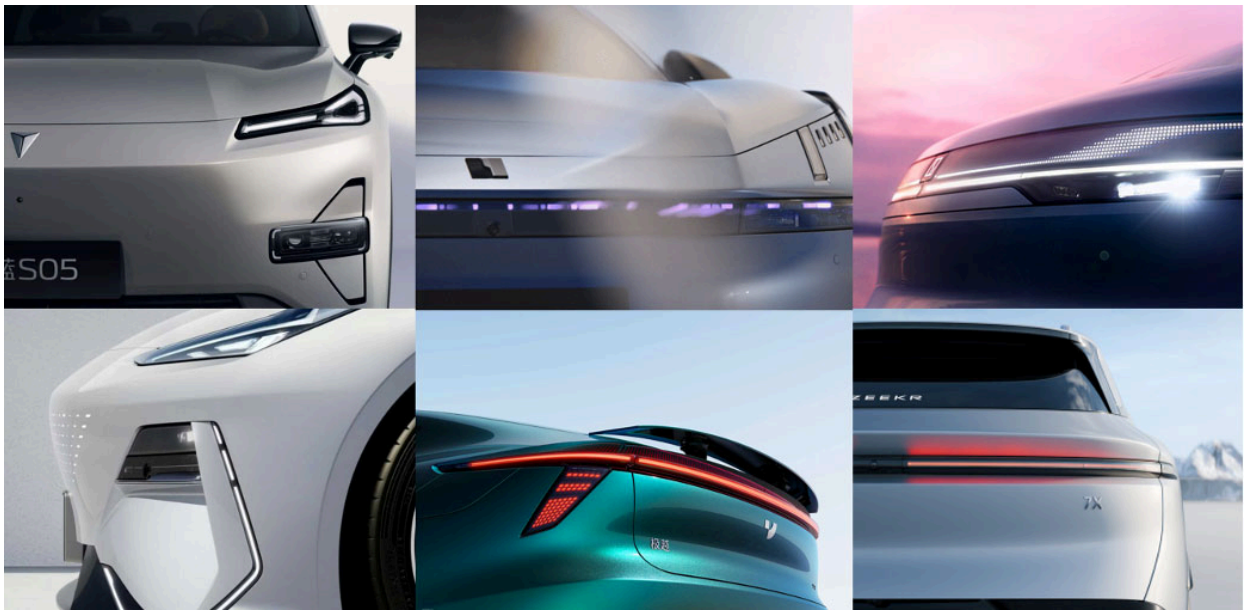
We are finalizing our 2024 Shanghai event that will open next week. For the first time we are going to Jiading in a totally new area. I know quite well Jiading district. Not only because it is just next to the Shanghai Formula 1 international circuit, but because it is where Volvo Cars R&D and design centre is located (and also other automakers like S-VW, Nio, IM Motors, Jidu, GM, Toyota, Dongfeng, Honda, Nissan, and Chinese lighting tier-1s like Hasco Vision). I was there every year during my last six years.

We have confirmed lectures from 14 Chinese automakers, all major Chinese and worldwide tier-1s, and strong participation from light source and LED IC manufacturers. A lot of newcomers will participate from consumer and display parts of the industry—that shows the strong interest in vehicle lighting for their exterior display technologies.

Our event includes three panel discussions:

- Regulation panel with Chinese legal officers from CATARC and SMVIC
- Leader round table including CTOs and CEOs from major Chinese tier-1s
- Design panel including lighting and exterior designers with a major role in exterior lighting trends in China

For the first time, we will include a vehicle exhibition with interesting vehicles including Interactive Social Displays, HD lamps, exterior RGB LEDs, and lit bumpers.



The DVN team—including myself, Wolfgang Huhn, and Anne Ai—are looking forward to meeting you there!

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

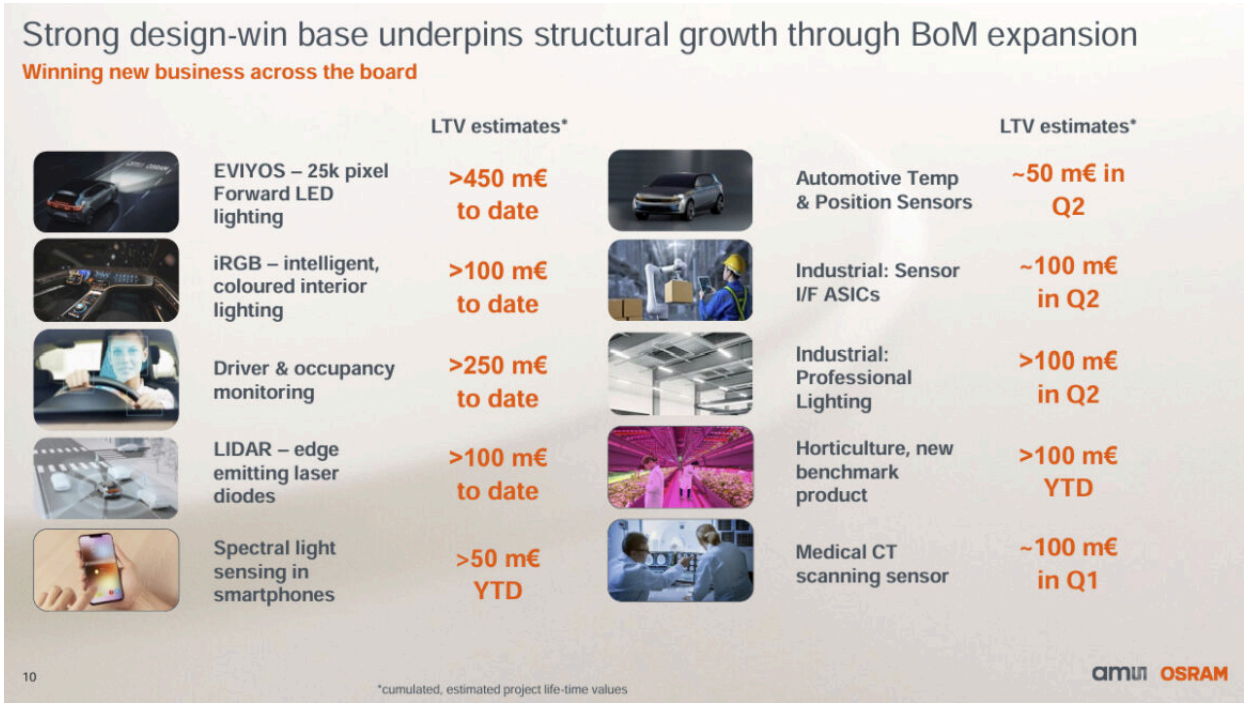
In Depth Lighting Technology

Paris Motorshow Part III: RGB interior lighting

By Paul-Henri Matha

Interior lighting was a bit less in my focus area during the last six years at Volvo Cars; I was focusing on exterior lighting. Previously during my time on the Renault lighting team, I did handle interior lighting. So, is interior lighting part of exterior lighting or part of the interior department at an automaker? From my current DVN perspective, I say it's 50/50.

What directly caught my eye is the importance of RGB light sources in interior vehicles. I thought of this as a feature only in China, but I was wrong. In ams OSRAM's Q3 financial report, they mention that interior intelligent RGB is a really fast-growing business for them with a market above €100m.



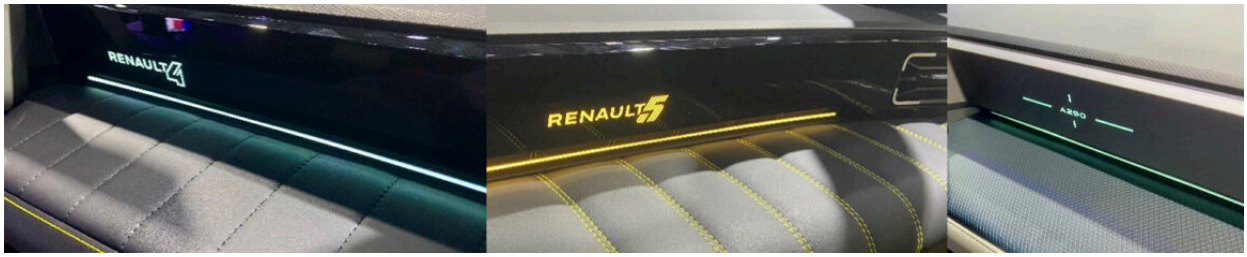
Most automakers are proposing RGB interior lighting with selectable colour on the central stack display, even on very affordable B-segment models. This is clearly now the standard, and here are some examples:

Renault 4, 5, Alpine A290

Multi Sense button on the steering wheel to activate / change ambient light

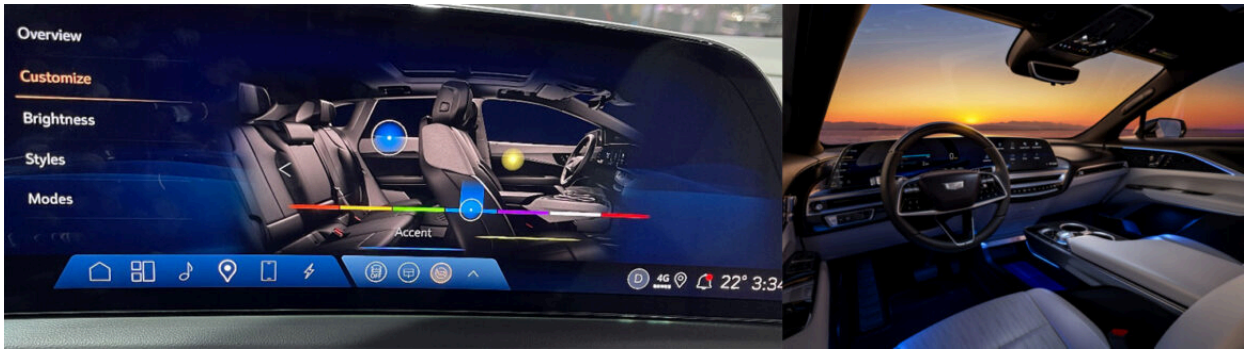
Possibility to change colour and ambiance on the central stack display

Renault 4, Renault 5, Alpine A290 logo with RGB LEDs in front of the passenger dashboard



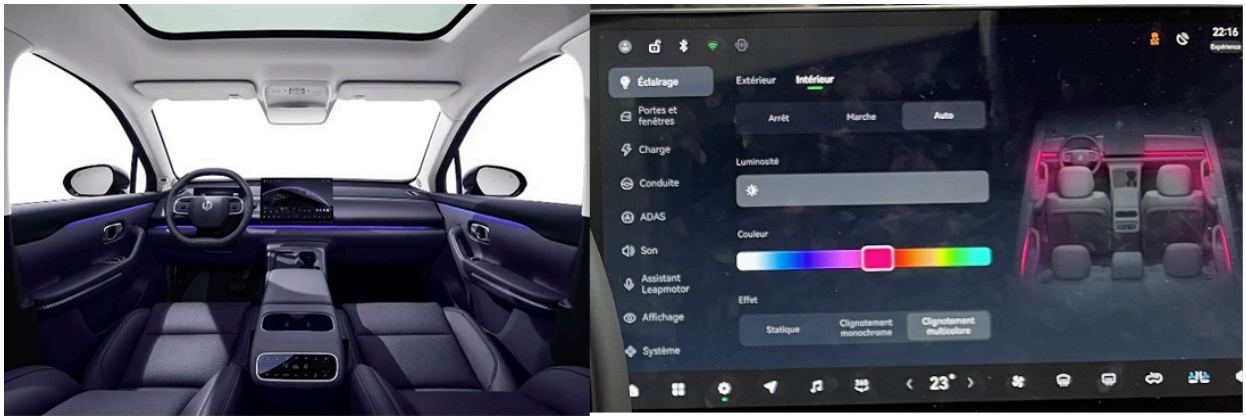
Cadillac Optiq

Possibility to change colour and ambiance on the central stack display



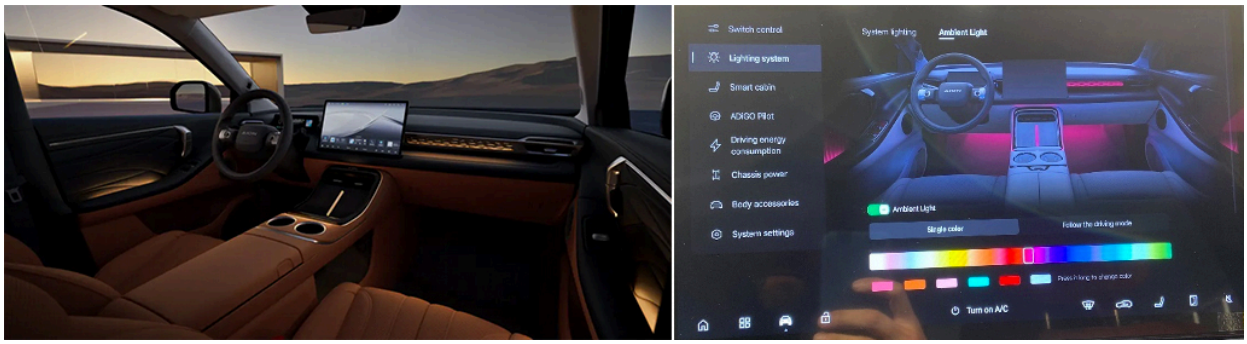
Leapmotor C16

Possibility to change colour and ambiance on the central stack display



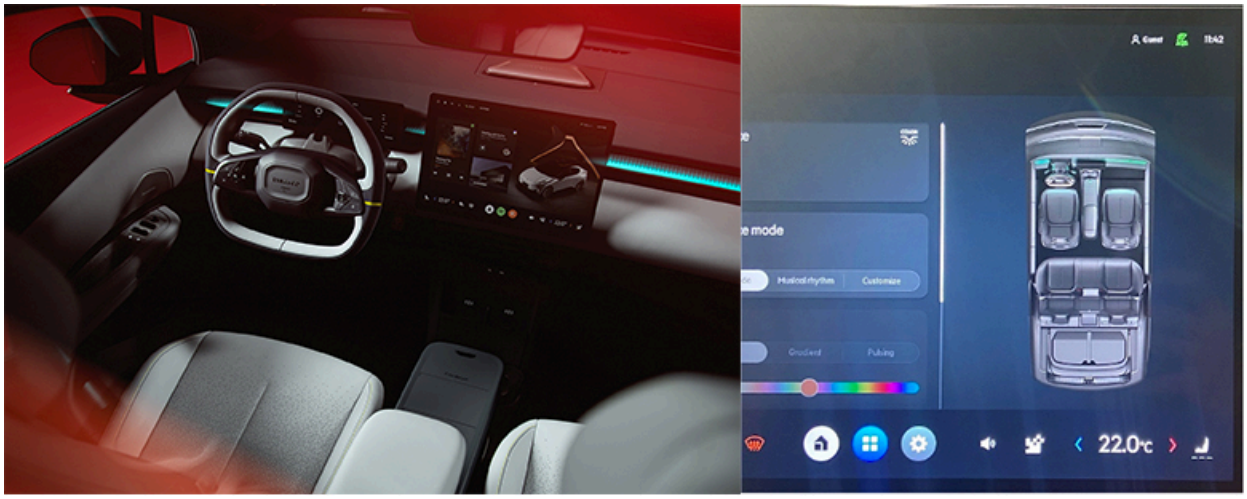
GAC Aion V

Possibility to change colour and ambiance on the central stack display



Lynk & Co 02

Possibility to change colour and ambiance on the central stack display



Hongqi EHS7

Possibility to change colour and ambiance on the central stack display

However, communication standards are not yet done. You can have LIN, CAN, UART over CAN, Ethernet, dedicated LED-IC or integrated IC into LEDs, and also different protocols from microcontroller to LED IC (IseLED, Melibu, Open-source Protocol from Osram or Nichia, etc). From a non-expert view, I think it is time to converge to a single solution to simplify, save cost, and reduce development time.

To go further ...

Details on new Renault R4 front lamps

Lighting News

DVN @ OPmobility Sigmatech in Lyon, France

LIGHTING NEWS

What a pleasure to be in my hometown, Lyon, for a DVN visit to OPmobility. For me, the Lyon area is the best French location with a lot of memories from when I was a student years ago.

LYCEE DU PARC, LYON

SAINT THOMAS D'AQUIN, OULLINS

ECOLE DES MINES SAINT-ETIENNE

I was invited by Bertrand Hache, Global Business Development Director, and Manuel Bretnacher, Sigmatech Site Director, both at OPmobility's Exterior Business Group, and Michael Rosenauer, Innovation Director at OPmobility's Lighting Business Group, to visit the Sigmatech site in Lyon and discuss lighting integration in plastic equipment (bumper, grills, tailgate).

OPmobility currently has 40,300 employees and a global turnover of €11.4bn (2023).

The Group's exterior activities represent almost half of the revenues, delivering 31 million bumpers, 1.5 million tailgates, and 6 million modules per year to 32 automakers. For bumpers, this represents 1/6 of the addressable market. With 500 employees from various areas including R&D, process and pre-production, the Sigmatech site plays a key role in these activities. Beyond this core business, OPmobility have developed considerable expertise in the field of decorative solutions, including lighting, as seen on the Cadillac Lyriq, among others.

Also in various technologies such as painting (A or B surface), typography, UV coating, laser etching and foils, the Group offers highly interesting possibilities.

With laser etching, different results can be achieved depending on when the laser etching is carried out in the various coating processes: Primer, base coat, clear coat, UV varnish.

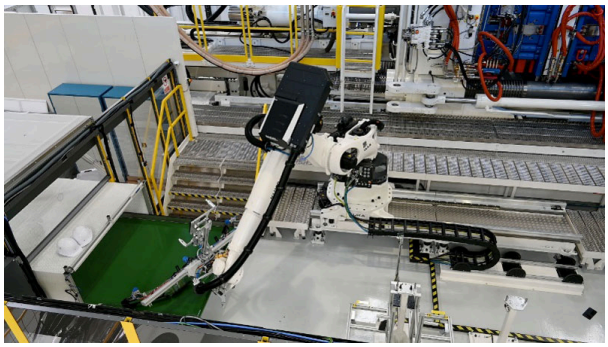
To get an invisibly illuminated coloured body panel, you need to compensate the primary colour (black or grey) to match the colour of the body. Not all body colours are possible in this case (grey ok, white ok for example) and the transmission value will be very low (about 5 per cent).

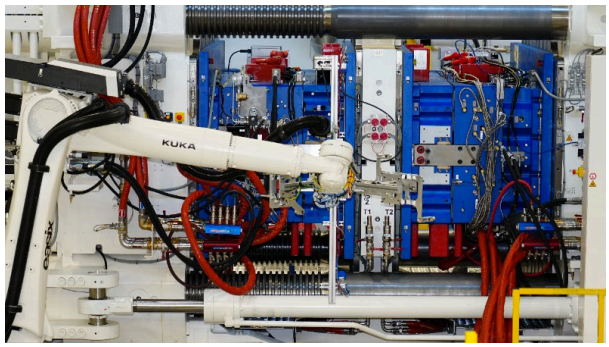
In the case of foils, OPmobility presented a surface film at this year's CES with size of 1.5 × 0.5 metre that allows a seamless light integration for increased design freedom in terms of patterns, colours and transparencies.

Dongfend epi 008 front bumper with transparent PP, body colour + laser etching

For component production and validation tests, especially ageing, Sigmatech use a 2K injection moulding machine with rotating tools and PUR layer possibility. The technologies tested include translucent PP, thermal and UV painting as well as tailgate bonding.

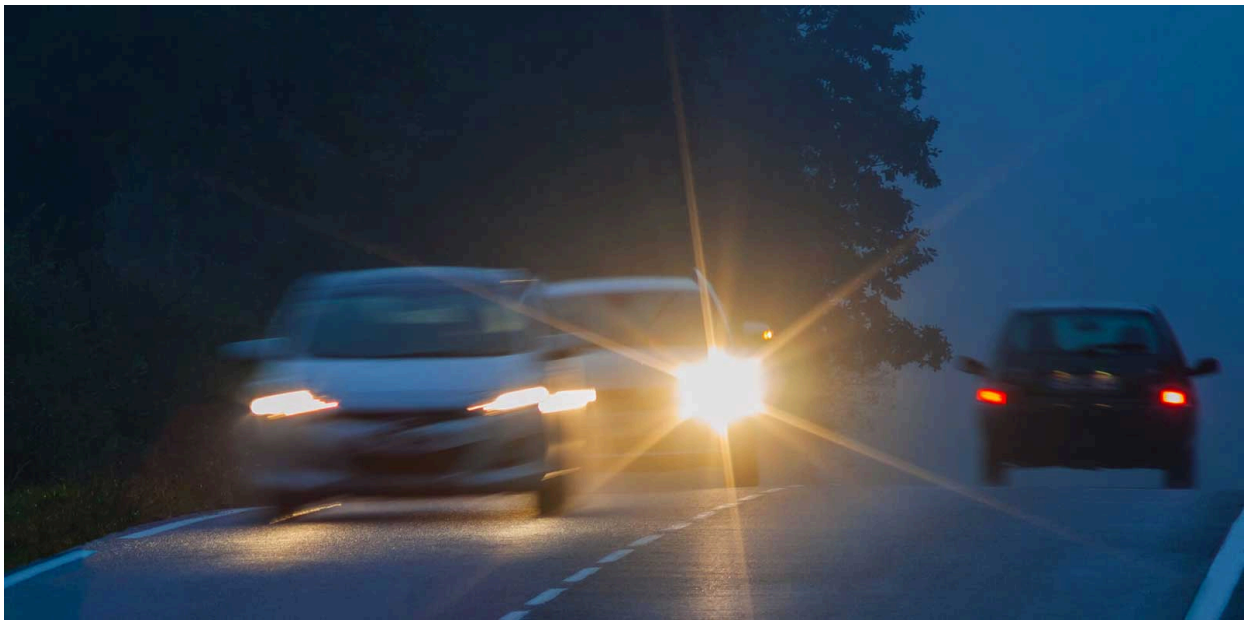
Sigmatech is also where product validations are done including climate aging, gap and flush analysis, material and paint performance and bonding performance.





Why are Complaints about Headlight Glare So Persistent?

LIGHTING NEWS



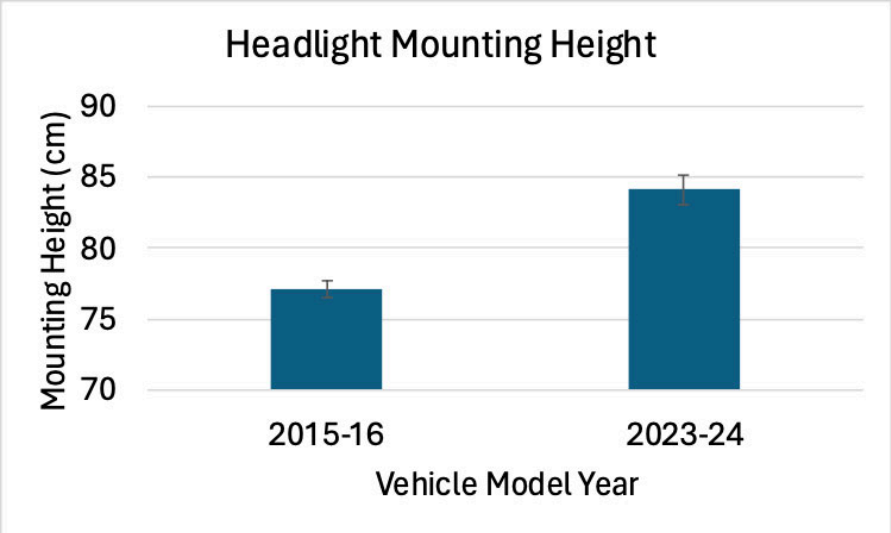
By John D. Bullough, Light and Health Research Center, Icahn School of Medicine at Mount Sinai

Talkin' Bout a Revolution: Automotive headlights have undergone nothing short of a revolution in the past several decades, as many of DVN's readers know and indeed helped make happen. Whereas forward lighting on vehicles was dominated by filament sources including sealed-beam and halogen bulbs in a few possible configurations, headlights today use LEDs and laser diodes arranged in a nearly infinite number of shapes and styles. Whereas headlights once directed one of two possible fixed beam patterns, low or high beams directly ahead of the vehicle, trading off visibility and glare at the driver's discretion, today's headlighting systems can adapt to curves, hills, vehicle speeds and indeed adaptive driving beam (ADB) systems have broken the "tradeoff" between glare and visibility.

Especially with these latest innovations, we may wonder why complaints about glare have persisted and perhaps even intensified? At the Transportation Research Board (TRB) 104th Annual Meeting, to be held 5-9 January 2025 in Washington, DC, I will present a paper addressing this question. In this essay I'd like to share a preview of that paper in the interest of stimulating questions, discussions, and solutions to this stubborn problem.

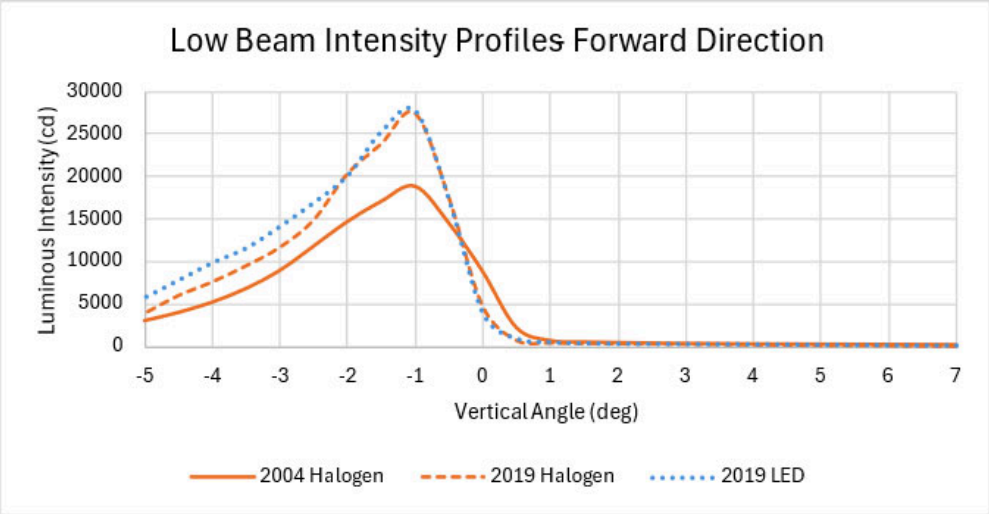
LED Blues: Just like xenon headlights from the 1990s-2000s, LED headlights are 'bluer' than their filament counterparts, and drivers have noticed. Most, if not all, LED headlights have correlated colour temperatures (CCTs) of at least 5000K, compared to the warm-white 3000K CCT of filament sources. Numerous studies have demonstrated that even when the luminous intensities of two lights differing in CCT are the same, the one with the higher CCT will be judged as more glaring, more uncomfortable. When phosphor-coated white InGaN LEDs were first manufactured, higher-CCT LEDs had substantially higher efficacy, but this isn't the case today. Do LED headlights have to have high CCTs?

Walking Tall: As an American I can attest to the growth of the average passenger vehicle in my country year after year, as pickup trucks and sport-utility vehicles (SUVs) have increased in market share, even if we seldom have loads larger than a week's worth of groceries. Below is a chart showing the increase in headlight mounting height just within the past decade in the U.S., based on Insurance Institute for Highway Safety data. This trend is not isolated to America, however. In Europe also, passenger vehicles also are growing taller. And taller vehicles generally mean higher headlight mounting heights, although the upper limits for height are lower in Europe than in the U.S. But do taller vehicles need to have higher-mounted headlights?



All the Small Things: The styling advantages of LEDs are very apparent. Headlights can serve as the 'eyes' of a vehicle in more ways than one, even expressing emotions through their array shapes. All else being equal, if two light source arrays produce the same luminous intensity toward an oncoming driver's eyes, but are different sizes, the smaller one will have a higher luminance and is more likely to be judged as more uncomfortable by that driver. Interestingly this effect seems to be affected by the distance at which the light is viewed. If the angular size of a light source is smaller than 0.3° (equivalent to a 15 cm diameter viewed 30 m away) the size/luminance effect may be negligible, but at closer distances more common in rear-view mirror situations this interaction could create uncomfortable waiting periods at red traffic lights. Could more novel, linear arrays of light overcome this effect?

Shape Shifting: Despite the benefits of ADB headlights and a regulation permitting them in the U.S. since 2022, these systems have yet to become commonplace. They aren't even rare. So, low-beam headlights remain the default situation for most headlights most of the time. The sharp cutoffs of low beam headlights can contribute to glare especially when many headlights are badly misaimed. And although downward misaim is more common than upward misaim, IIHS test data show that upward misaim is not exceptionally rare. It would be reasonable to ask if LEDs, in conjunction with precise optical systems, might have exacerbated the potential for misaimed headlights to contribute to visual discomfort. The chart below shows slices of intensity data for 2019-vintage market-weighted halogen and LED headlights alongside a slice for market-weighted 2004 halogen headlights, all as reported by the University of Michigan. The cutoff is sharper with higher contrast in 2019 than in 2004, but the LED and halogen distributions in 2019 are quite similar. Nonetheless, could this greater gradient, regardless of the technology used to create it, exacerbate sensations of glare?

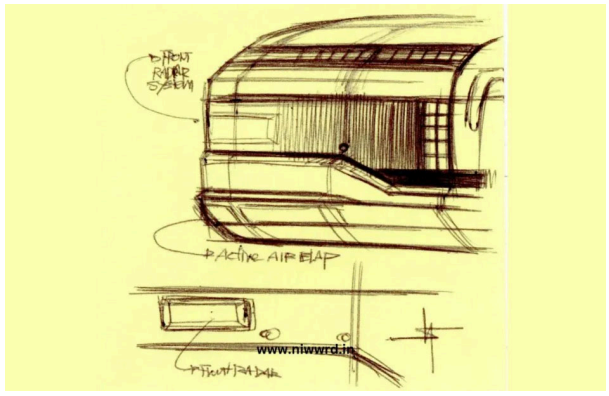


Scratching the Surface: Many organizations have studied, are studying, and will study glare. The issues and questions I share here touch on only a few of the many factors that might contribute to complaints about glare from headlights. The voices making the complaints may feel like nails scratching the chalkboard, but it's important for us to listen to them and try to understand what's behind them. I'm convinced that with a systematic approach, the automotive lighting community can soon make glare a nearly-forgotten memory. To make this new reality, we first need to ask ourselves: what should our next step be? I'll be at TRB in January, and reading the DVN newsletter in the coming year, looking forward to hearing some answers to these questions.

Hyundai Ioniq 9

LIGHTING NEWS

Hyundai have released their final design of the Ioniq 9. Already seen on Ioniq 5 and 6, the Ioniq 9 uses the maker's 'Pixelated design' theme to cover all lighting and signalling function (more than 400 hundred according to Hyundai), from low beam, high beam, DRL position lamp to even high mounted stop lamp, reversing lamp and fog lamps. Even reflex and charging status is pixelated; all except the side marker lamp. This creates the Ioniq signature:



Remarkable also is radar integration in a semi-transparent smart zone (already seen in Polestar 3) and side cameras instead of side mirrors.

GRE 91st session: Input from Japan, Part I

LIGHTING NEWS

By Paul-Henri Matha

During GRE 91st session in October, the Japanese delegation submitted two interesting research documents about ADS marker lamps (document GRE-91-16), and vehicle lighting in aging society (document GRE-91-17),

These documents are really interesting, and this week I summarize the ADS marker lamp document. ADS is allowed in Japanese national law, and some vehicle manufacturers already offer cars with these lamps, like Honda on some Acura models.

Research has been conducted by the National Traffic Safety and Environment Laboratory (NTSEL) in Japan. The goal of the study is to help to develop discussion for technical requirements for ADS marker lamps. The work was done with 20 participants to clarify the effects of various shapes, installation positions, luminous intensities, and modulation patterns of the ADS marker lamps on the visibility, annoyance, and perception of other lamps (the direction indicators and the stop lamps) to each participant.

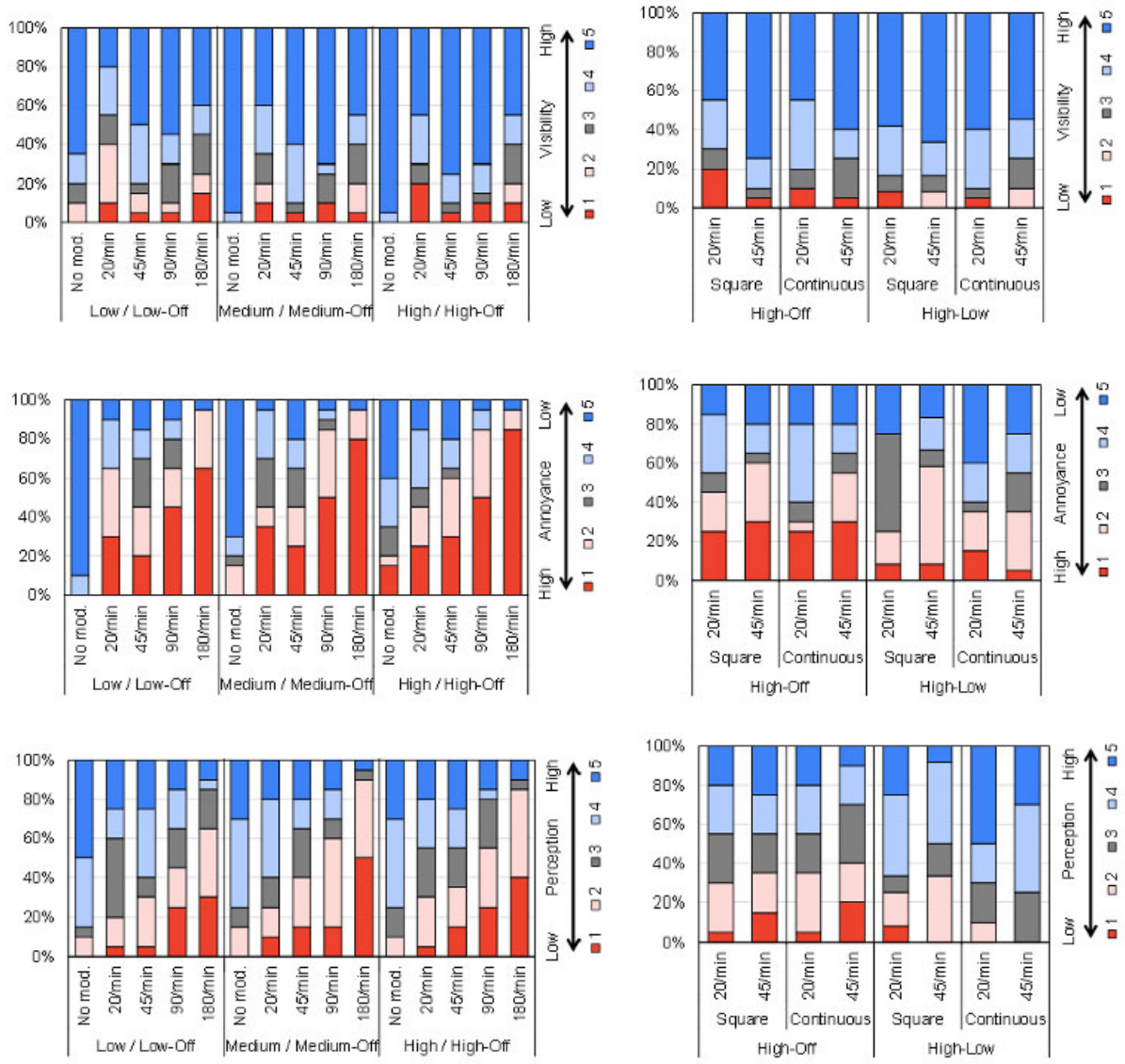
Two experiments were conducted:

Evaluation of perception of the ADS marker lamps

Evaluations were done in dark conditions with the turquoise colour specified by SAE standard J3134, with three intensities: 10, 49, and 87 candela (SAE spec for ADS lamps is 10 to 125 cd by night; 50 to 300 cd by day), and five different intensity modulations.

Evaluation criteria was based on visibility, annoyance, and perception of direction indicators.

Results confirmed that visibility, annoyance, and turn indicator perception is better when there's no modulation.



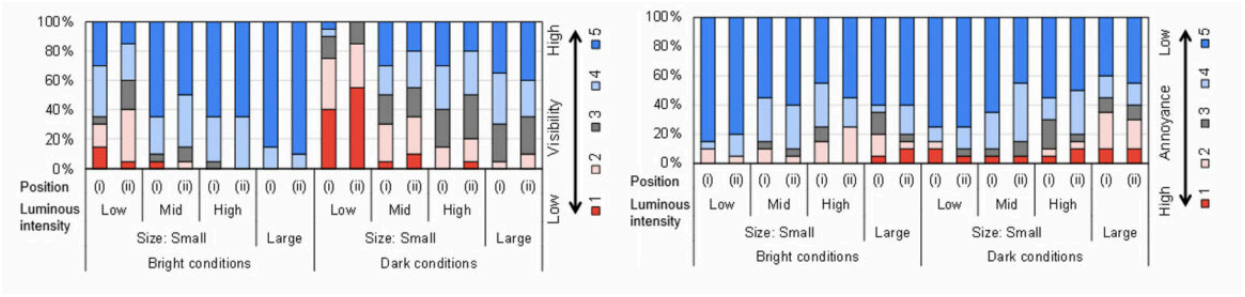
Evaluation of perception of small marker lamps

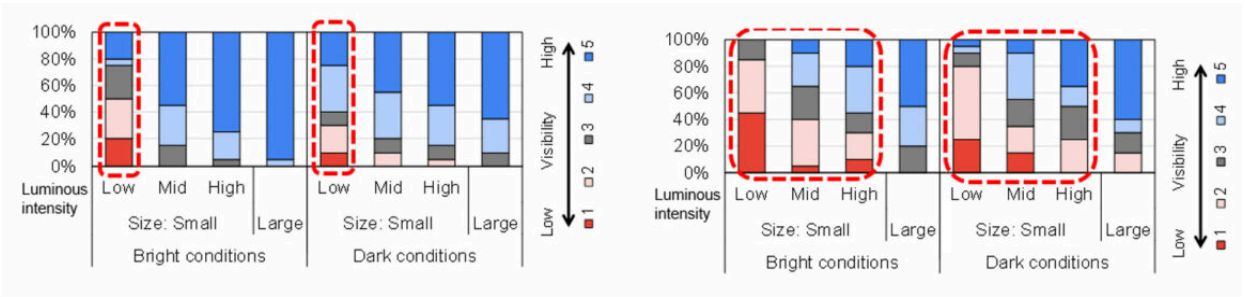
Evaluation was done in dark conditions, again with the SAE-turquoise colour and four intensities: 1.3, 5, 9, and 15 candela. There were two different lamp sizes: 47 and 69 mm, in dark and bright environment, and in different positions (near low beam, near turn indicator, near stop light).

Near the headlights | Near the direction indicators | Near the stop lamps

Evaluation criteria were visibility, annoyance, and perception of direction indicators.

Results confirmed that visibility is better with higher intensity and bigger size. And lights like this are not really visible next to low beam, turn indicator, or stop lights.





The conclusion mentions that further investigation is needed, in outdoor conditions and for small lamps with high intensity. Lamp installation will also be critical (distance to other lamps) and must be taken into account when crafting standards and regulations —perhaps something similar to the 2.5× turn signal intensity multiplier requirement in SAE and FMVSS if turn signal/low beam distance is less than 100 mm…? Further research is ongoing!

Car Design News Lighting Award

LIGHTING NEWS

By Paul-Henri Matha

The CDN award is coming soon—5 December—and Philippe Aumont from the DVN team will attend. Congratulations to the short listers for this prestigious Best Lighting Design Team Award:

- Zeekr Design Technology & Innovation Team
- Verne Design Team
- Mercedes-Benz Exterior Detail Design Team & Light Engineering Team
- Audi Light Design Team
- Hyundai Motor Lighting Design Team

This award is supported by Swarovski Mobility, known for doing the crystal headlight on the BMW i7.

It is always good to see known faces like the ones in the pictures below. For sure you know some of them:

End of the Lamp Post?

LIGHTING NEWS

Story by Daniel Hardacker, The Telegraph

Lamp posts could be removed from Britain's streets in an effort to reduce carbon emissions because modern car headlamps help to better light streets at night, experts have said.

A trial in Yorkshire, England will see lamp posts on sections of two busy A-roads switched off and replaced with solar-powered road studs and bollards with lighting.

If successful, it could lead to the removal of 1.5 million of Britain's 7.2 million lamp posts as they reach the end of their 40-year lifespan. Perry Hazell, the president of the Institution of Lighting Professionals, says, "Historically we've always been focused on the driver and the highway. Because headlights have now improved in cars, we need to think about cycle users and pedestrians and maybe light for them only."

East Riding of Yorkshire council will switch off and remove hundreds of lamp posts on sections of the A1079 and A164 roads from December as part of the trial. The project is part of a £30m UK-wide de-carbonisation drive funded by the Department for Transport.

Karl Rourke, the council's street lighting service manager, who is overseeing the trial, said that current street lighting for roads was designed on the principle that cars do not have headlamps and the entire road is left in complete darkness. "This is about common-sense lighting, not lighting removal at all costs," he said.

Lamp posts are set to be replaced with solar-powered road studs as part of the trial, alongside new layouts, road signs made from a more reflective material and signs activated when cars approach dangerous areas such as roundabouts and crossroads.

In the village of Hayton, located on the A1079 between York and Hull, 30 lamp posts will be replaced with footway lighting and bollards with lights attached in an effort to concentrate illumination on pedestrians instead of vehicles.

The areas will be closely monitored by safety risk assessments and thermal imaging cameras capable of seeing in total darkness as well as during the day.

The project, called Live Labs 2, is a three-year multimillion-pound endeavour that aims to support the transition to "net zero carbon local roads".

A similar scheme is being discussed for Derbyshire, as well as in nine other local authorities including Aberdeenshire, Cambridgeshire and Lancashire.

It follows similar moves by other councils in recent months. In August Norfolk County council revealed plans to turn off street lights on a road notorious for car crashes under plans to cut carbon emissions. The council said it had no safety concerns about the plans, which it said would significantly contribute towards a "net zero Norfolk".

In February a London council said it had no choice but to dim streetlights on its roads in an effort to cut costs. Havering borough council, which was near bankrupt at the time, said it would dim lights on main roads from midnight to 5am.

Councils in Bolton, Bracknell, Cornwall and Hampshire have also voted to dim streetlights.