Tue, 18 February 2025
Weekly Newsletter

DVN
Lighting

NEWSLETTER #892

Editorial

DVN @ DS Design

It is always grand to spend time talking, looking, and listening with automotive designers about their work—whether it be centred on whole-car design, lighting design, lighting technology, or a mix of these. Lighting is playing a central role in interior and exterior design, very much occupying the niche held for decades by chrome.

Engineers tend to be conservative by nature, constrained by what is possible in the here-and-now (along with other limitations, such as cost targets and manufacturability). Designers, on the other hand, are more exuberantly creative, and feel less bound by the practicalities of the here-and-now. So it's a highly productive

symbiosis between the two professions' different kinds of imagination: designers are constantly generating pushes and pulls for engineers to expand the frontiers of lighting technology. Examples abound: smaller and smaller headlamps, 'shy' technology that lights up only when approached for use, 3D shapes, the list goes on. What was not even dreamable a short time ago is becoming feasible at a faster and faster pace.

Sometimes, an automaker's purchasing and project management people think the engineers are too close to designers: they should not listen to designers, so goes that line of thought; they should just respect their budgets and say *no* to designers' flights of fancy. Of course, you can do that if you want to be promoted. Respect the guidelines from upper management, don't rock the boat or buck for change, don't stray from the safe ruts of the tried-and-known. It's an okeh way to make cars that probably serve people's needs. But it usually won't yield cars customers *want*. And it's that wanting that opens wallets!

Of course, the best path is probably in between. Me, that's what I always tried to do in my work at car companies. It's why I think close collaboration is needed all together to find the right balance. This is exactly what all the new EV makers are doing: putting a lot of effort into lighting design, with close collaboration between designer and engineer. Look at Rivian, Lucid, Scout, Zeekr, IM Motors, and Avatr—this list of examples goes on, too!

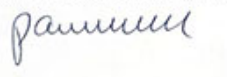
During SIA VISION I had great talks with Mathieu Collot from Stellantis Lighting R&D and Philippe Poilane from Stellantis Design. A few weeks later I was invited to meet Robert Mudie, Head of DS lighting design and Thierry Metroz, Head of DS design. It was a pleasure for me to reconnect with Thierry; I worked with him years ago when he was head of exterior design at Renault.

I hope you will enjoy this long discussion in the newsletter with designers about their job and importance of lighting in vehicle design. Let’s continue discussion about lamp design tomorrow at Munich Event at Designer round table.

I also got to talk and listen with Frank Huber, President of Marelli’s lighting and sensing business; he will open the DVN Munich event tomorrow with a keynote speech.

Sincerely yours,

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



In Depth Lighting Technology

DVN Field Trip: DS Studio

L-R: Gilles Moynier · Robert Mudie · Thierry Metroz · Paul-Henri Matha · Philippe Poilane
Thierry METROZ: SVP DS Design, heads DS design, which includes a lighting team composed of:
· Mathieu COLLOT : STELLANTIS Plateau Lighting Manager
· Philippe POILÂNE : Head of Lighting and Wheels Design Europe
· Bob MUDIE : DS Lighting Design Leader
· Nathalie LARRIBEAU and Gilles MOYNIER : Lighting specialists within Design Europe

DS Studio is in the Stellantis Creative Centre building.

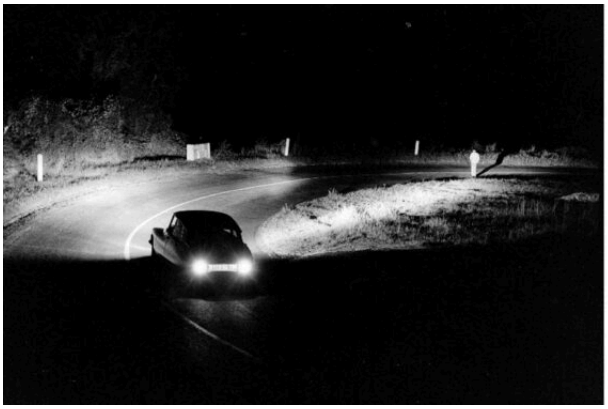
The ADN (Automotive Design Network) was inaugurated in 2004, and renamed Creative Centre in 2024. Located in Vélizy, near Paris, this building houses Stellantis' design studios for the automaker's French brands: Citroën, Peugeot, and DS Automobiles. The architect of the ADN building was Jacques Ripault ("I imagined a building made up of horizontal layers, integrated in the landscape, symbolizing kinetics and light, all features of an automotive building"), and the lighting animation was created by James Turrel.

1,000 employees work there. Designers collaborate with engineers, working on the platforms, engines, equipment, and with the brand product teams.

DS as a brand was created in 2014, drawing on a long heritage from classic and well-loved Citroëns like the DS (in French, 'DS' is pronounced the same as the word for 'Goddess') and the SM.

In 1955, the first DS made its appearance and caused a sensation at the Paris Motor Show. A model of innovation, grace, and prestige, it embodied French expertise, panache, and avant-garde spirit—all of which still define the DS brand philosophy and inspire all their creations.

DS teams work with the same thirst for distinction and elegance to apply modern technology to classic French perfections such as directional headlamps and hydraulic suspensions, and make them strong identity elements, adapted to new mobility expectations.

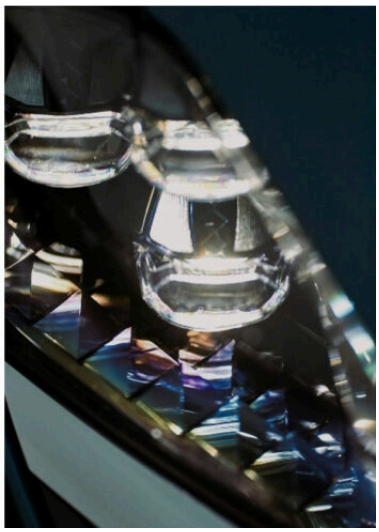


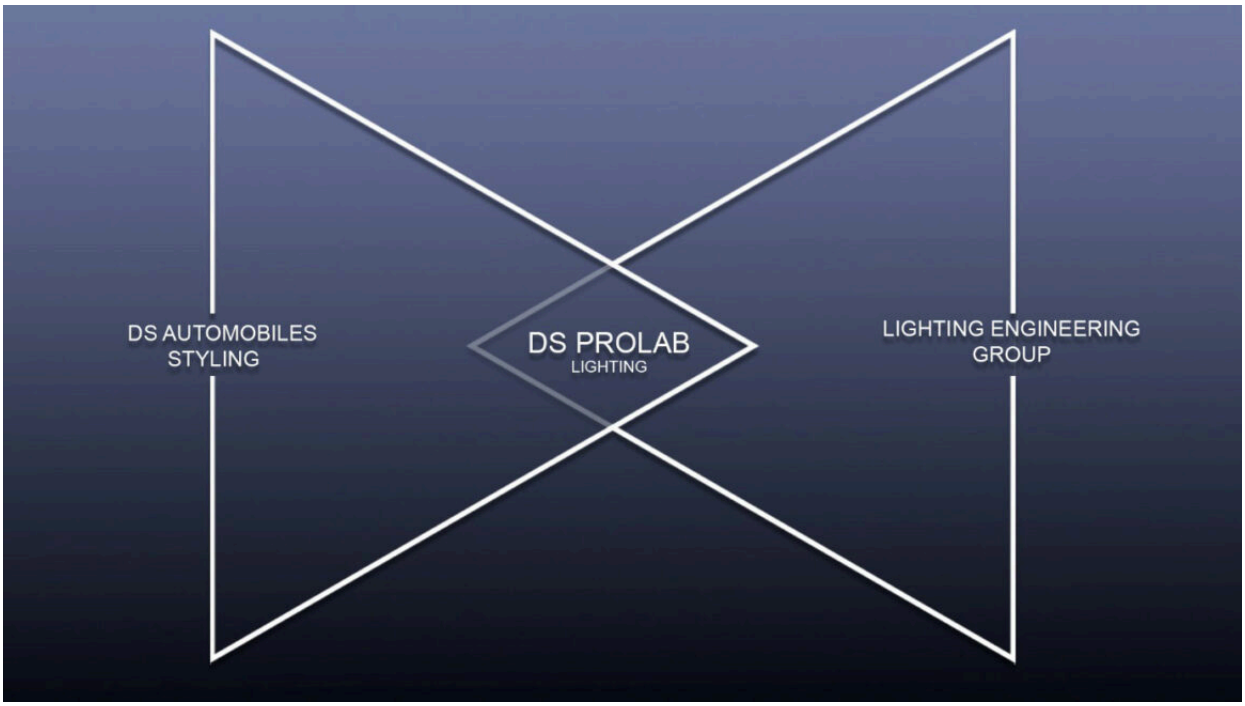
Continuing the tradition of innovative lighting in the Citroën DSs of last century, DS brand lighting is front-and-centre:

- 2009: LED DRL in the DS3
- 2014: Sequential turn signals, infinite-mirror rear lamps, high-tech xenon headlamps, and 3-diamond signals on the DS3 facelift

- 2017: Mechanical welcome sequence on the DS7 and DS9 (hit those links to see videos) choreographically paying homage to the DS-SM swivelling headlamps

Robert Mudie started the discussion with an introduction about the DS lighting design team at the junction of styling and R&D.



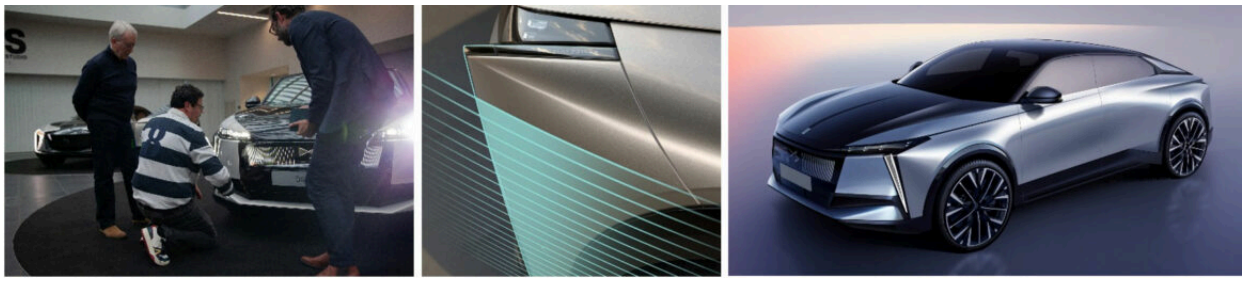


First words went directly to DS and SM DNA and the importance of its lighting design elements: the 3-module look started by the 1970s SM is always there in different interpretations. That's the car on the left here, with the three yellow headlamps on each side (France required yellow headlamps until 1993):

DS also introduced canted-vertical DRL signatures with a variety of evolving interpretations:

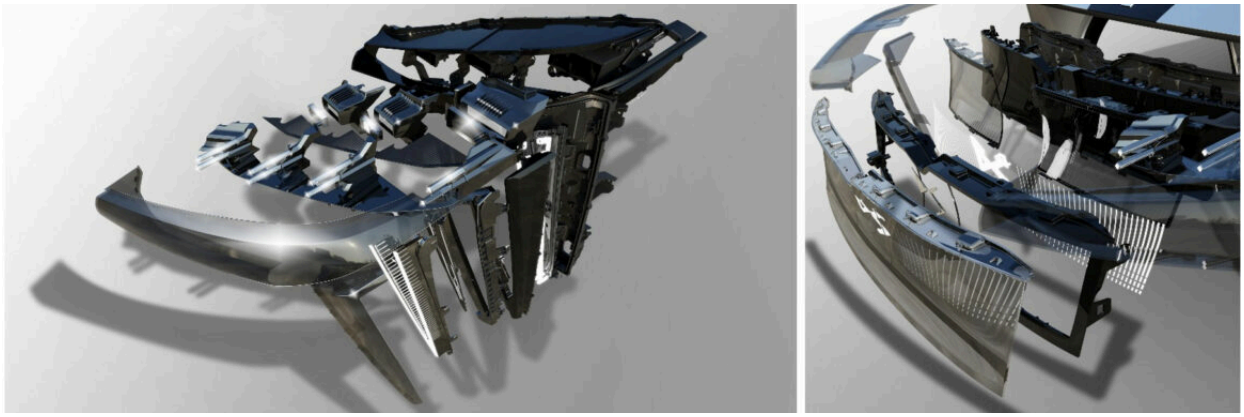
The DS team is not a one-trick shop doing the same thing again and again; they are constantly pushing the evolution not just of technique but also technology. Fresnel optics, light guides, shy tech, and edge light have been developed over the years, yet always respecting the grand design theme of verticality.

With the DS № 8 design, Mudie decided to go to a sharp-edged light design (called DS Lightblade), which helps lower the car's aerodynamic drag with 2 dm^2 (equivalent to 8 km of WLTP range).



This first design introduction in a vee shape was introduced on the DS E-Tense Performance concept in 2022, and now it has been put into production on the DS № 8.

On the № 8, lighting has totally replaced chrome on the exterior design. The car's front lamp design includes a 48-pixel ADB solution from supplier Mind, based on a 3-module concept and providing the various AFS beam classes, including digital bending light.

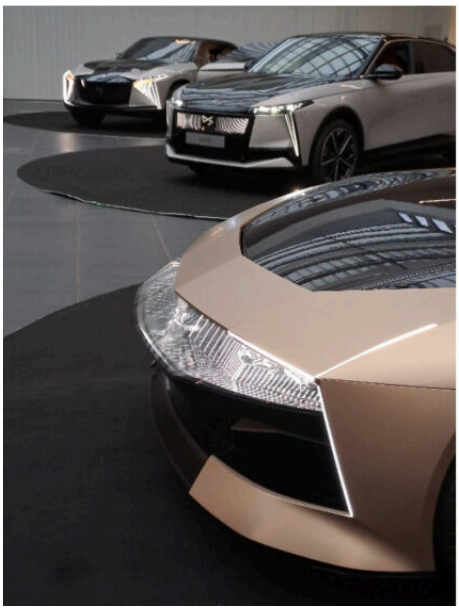


Exploded view: headlamp, bumper lamp, grilleboard

Thierry Metroz described the introduction of the DS Luminascreen front grilleboard, which features DS' first lit logo on the № 8. This was made possible by there being no combustion-engine version of the № 8; it is the brand's first electric-only vehicle, so there was no need to provide for a radiator grille. And with lit logos allowed in Europe starting from January 2023, that paved the way from the regulatory standpoint. The EU regulation limits lit logos to 100 cm^2, so the logo had to be downsized a bit compared to the proposal of 2020 on the DS Aero Sport Lounge and in 2022 on the E-Tense.

The logo is made by Flex-N-Gate with insert-moulding technology. It is embedded into a front panel with vertical lit lines. This optical design is composed on an interior optical blade with microöptics, illuminated with a horizontal flat PCB, and is part of the front position lamp.

There are two versions of this panel—with or without light. The lit version has admirably low power consumption of around 10 watts. The logo, which can be seen day and night, emphasizes the DS brand and sings visual harmony with the DRLs. It is also a reminder of first SM with its full-width glass cover lens over the complex-for-the-time headlight system—as well as the SM tribute just presented last year at the Chantilly Arts & Elegance Richard Mille event in France.



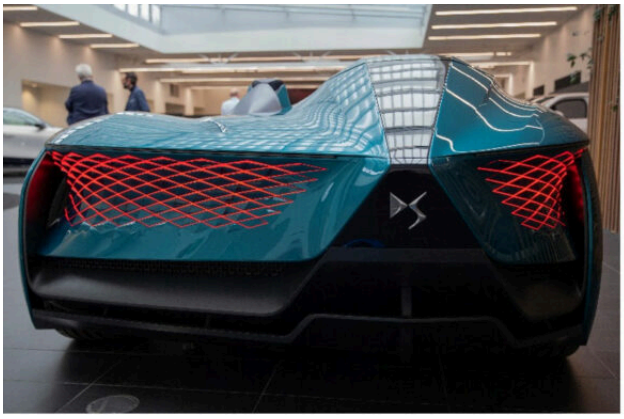
Moving from the front to the rear, DS Design also combines heritage and innovation.

- Rear turn signal at the upper outboard corners of the backglass of the DS9, as on the DS


- Covered rear wheel including a rear side marker lamp (unusual outside North America)


- Innovative first infinite-mirror rear lamp on the 2014 DS3

- Scale rear lamp design. Thierry explained the origin and evolution of this brand-identifying design on all DS models (DS3, DS4, DS7, DS9, and now № 8). First concepts were done with body-colour lamps on the X-Tense in 2018 and the Aero Sport Lounge in 2020.

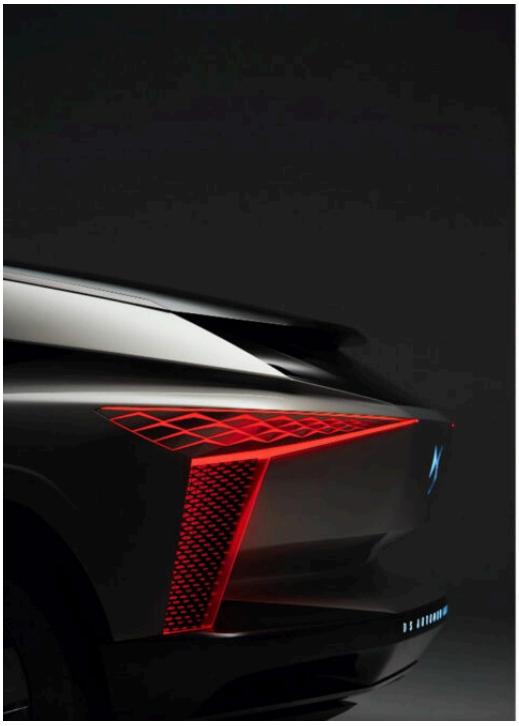


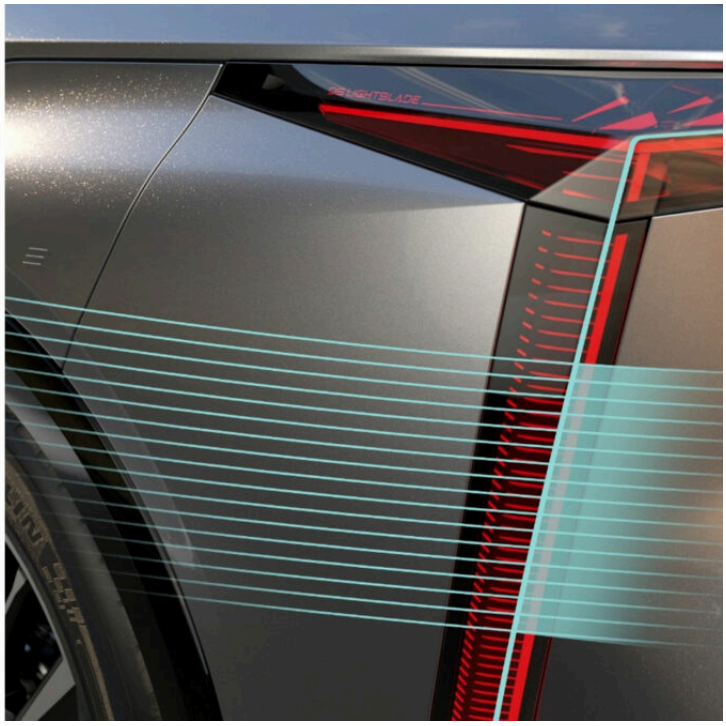

- From concept to mass production cars, the scale design was integrated into the rearlamp. Laser etching technology has been developed on a metalized foil covering a white box and indirect LED PCB.


On the DS № 8, the bezel is now a black-painted item. Virtually all chrome has been removed to keep a black appearance on all exterior components.

We can recognize the DS signature by the vee-shaped front signalling lights now also on the rear for the first time in production, after a first concept on the Aerolounge. Called the DS Lightblade, this technology, beautifully executed by Odelo, combines the rear position lamp function with the turn indicator on the vertical blade, and with the stop lamp on the horizontal blade. This blade is also efficient for aerodynamics: 1 dm^2 drag savings, equivalent to 4 km WLTP range.

As explained by Thierry Metroz, the main interest of this signature is to see and recognize the car from 100 metres. The fishscale design, for its part, can be seen from 3 metres. So the car presents fascinating lighting design to observers near and far!

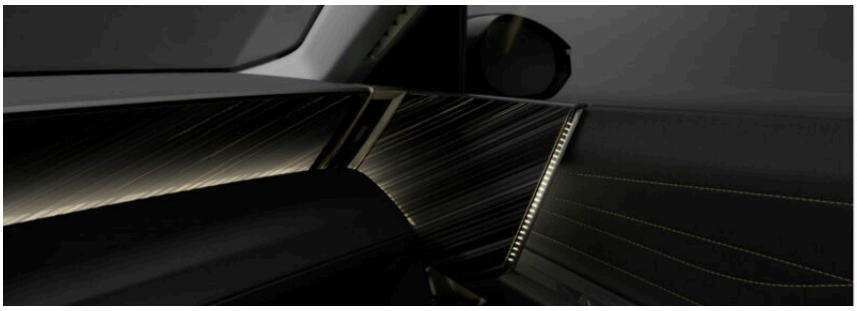




Thierry explained in detail how DS use lighting for interior design. There's a reprise of the vee-shaped DRL design in the door, for example.

Interesting central console with lit surface.

Truly, there is intriguing, inviting lighting design everywhere on, in, and around a DS. It is a primary main anchor point for the brand's familial design expression!



DVN Interview: Marelli's Frank Huber

LIGHTING NEWS

By Paul-Henri Matha

I took time to discuss with Frank Huber in January to exchange about challenges for automotive and automotive lighting market for the coming years. Frank Huber has been President of Marelli's Automotive Lighting and Sensing business since March 2024. He joined from Forvia, where he headed their automotive seating business for two years. Prior, he held leadership positions at Hella in China, the U.S., Mexico, and elsewhere in the world—including as CEO of the lighting business, which became part of Forvia in 2024. Frank also worked at McKinsey, Audi, Mercedes-AMG, and Liebherr Aerospace. He holds a PhD in automotive engineering and an Executive MBA from Harvard Business School.

DVN: You were out of the lighting biz during your time with Forvia Seating. Are you happy to be back in the lighting community?

Frank Huber: Absolutely; lighting is my passion. To me, it is one of the most exciting features of a vehicle. Lighting is emotional, defining the vehicle personality to a large extent, bringing the OEM's brand identity to life, and it is crucial to safety and comfort. It is key to creating a unique customer experience. Joining Marelli was a great opportunity to get back into this highly innovative, tech-driven and dynamic business. I really enjoy working with the great team here and with our partners on the lighting technologies of the future.

DVN: What changes do you see in the lighting world since your previous time in it?

F.H.: I have continuously been following what was going on in lighting, but yes, there have been remarkable advancements while I was away. The emphasis on integrating lighting with advanced sensing and computing technologies has become more pronounced, particularly with the increasing demand for intelligent and adaptive lighting solutions. Especially in combination with advanced optical systems. Additionally, developments in sustainability, such as energy-efficient LEDs and materials, continue to push the boundaries of what's possible and enable new use cases.

DVN: And what can you say about Marelli?

F.H.: Marelli is an exceptional company with a deep commitment to innovation, quality, and co-creation with our customers and partners. Our focus is on driving the development of technology and design, creating cutting-edge solutions that exceed the demands and needs of our customers. It is all about creating, end-to-end, a unique user experience and being highly competitive. The team at Marelli is very talented, passionate, flexible and committed. I am proud to be part of it.

DVN: How do you foresee the market's evolution?

F.H.: The automotive industry is in the midst of the largest transformation in its history. The key factors are not only electrification, the software-defined vehicle, and new brands, but also different market dynamics and a highly competitive landscape in each region. All this is challenging; I'd say automotive is facing the perfect storm. This does not only create challenges, but also huge opportunities for us as the desire for differentiation through new technologies and functionalities for a unique customer experience is massively increasing and competitors are struggling. Yes, there are new players in the market, and yes, the competition is getting harder. But we can make a difference through our operational excellence, high competitiveness, technological capabilities as well as our experience and global footprint.

DVN: Marelli have scored some wins in China, like the Nio ET9's new HD lamp. What do you think about the Chinese market?

F.H: China is not only the largest, but also the most competitive automotive market. A key success factor is leveraging the local differences to our advantage. For example, we embrace the speed in China. We've just demonstrated our capabilities with the launch of Marelli's first micro-LED headlights on the Chinese market for the impressive Nio ET9. Our team in China is highly autonomous, and we are able to drive innovations locally not only for our local customers but also for global applications.

DVN: Marelli were first with DLP technology for Audi and Mercedes, and now Huawei and BYD are promoting DLP technology. Do you still see a future for DLP in China?

F.H.: Lighting is a key enabler of brand identity. However, there are differences between Europe and China in the deployment of HD lighting. In Europe, the HD technology is primarily used to enhance the performance of main lighting functions, such as low beam, high beam, and adaptive driving beam, as well as selected ground projections. Chinese OEMs, in contrary, focus on what I'd call show and entertainment through HD technology. These variations in use cases result in different requirements for resolution, sharpness, and field of illumination. The DMD (digital mirror device) technology, particularly with the RGB option, aligns well with Chinese demands.

Marelli offers the full range of DMD options in both white and RGB light. We also recognize China's growing interest in microLED 25,000-pixel systems. We will thoroughly analyse HD take rates and market acceptance in China to define the mid-term HD strategy for different markets in order to continuously create a unique customer experience.

DVN: Marelli have a strong position in India and Brazil. How do you see these markets' tech evolutions?

F.H.: Both markets are growing with a focus on high-performance solutions that are affordable at the same time. With our platform and standardized solutions, we are well-positioned to serve these markets effectively. For us, it has been crucial to empower our regional teams to take the lead on region-specific technologies and processes. At the same time, clearly defining global standards and balancing them with the necessary regional flexibility is essential.

Our people are our greatest asset. In both countries, we are proud to have skilled, dynamic, and agile teams that have achieved leading positions in their lighting markets.

The priorities in both countries are safety and sustainability. Since driving at night is significantly more dangerous, high-quality headlights are essential. Additionally, energy consumption is a crucial consideration, even for lamps. Besides cost, there is an increasing focus on style and technology in these markets, which makes us the partner of choice in India and Brazil.

Adaptive driving beam (ADB) is currently the target for premium cars in the Indian and Brazilian markets, but it remains an expensive option due to the need for cameras and the according electrical/electronic architecture. Therefore, the lower market segments require an intermediate solution. The automatic high beam technology can be this in-between step in the coming years.

DVN: In today's software-defined vehicles, lighting is still conservative—LIN or CAN with embedded software. Do you think software will be removed from lamps to automakers' domain controllers or main controllers?

F.H.: We see the trend towards centralizing dedicated software functions and features in a light domain controller, particularly for high-resolution lighting and digital light applications. For less complex lamp systems, we are transitioning to completely removing embedded software from the lamps. This approach offers several advantages, such as enhanced system reliability, cost and energy reduction, easier integration into vehicle networks, increased security, and features on demand. Additional benefits include enabling software as a service (SaaS) and software as a product (SaaP) in the new age of software-defined vehicles, and a faster time to market. These trends align with Marelli's vision of lighting within zonal architectures, where the zonal computer serves as a powerful platform to host the software, and the lamp itself employs standardized hardware driver architectures. This clear separation of hardware from software ensures an affordable system concept.

DVN: European automakers want to accelerate development speed. Everybody is talking about AI. Will it come (or is it already there) for CAD development and simulation?

F.H.: The acceleration of development speed is a key priority for European OEMs, and artificial intelligence (AI) is indeed playing a crucial role in achieving this. AI is becoming more and more important in various areas of product development, including CAD (Computer-Aided Design) and simulation, and has the potential to significantly enhance these processes

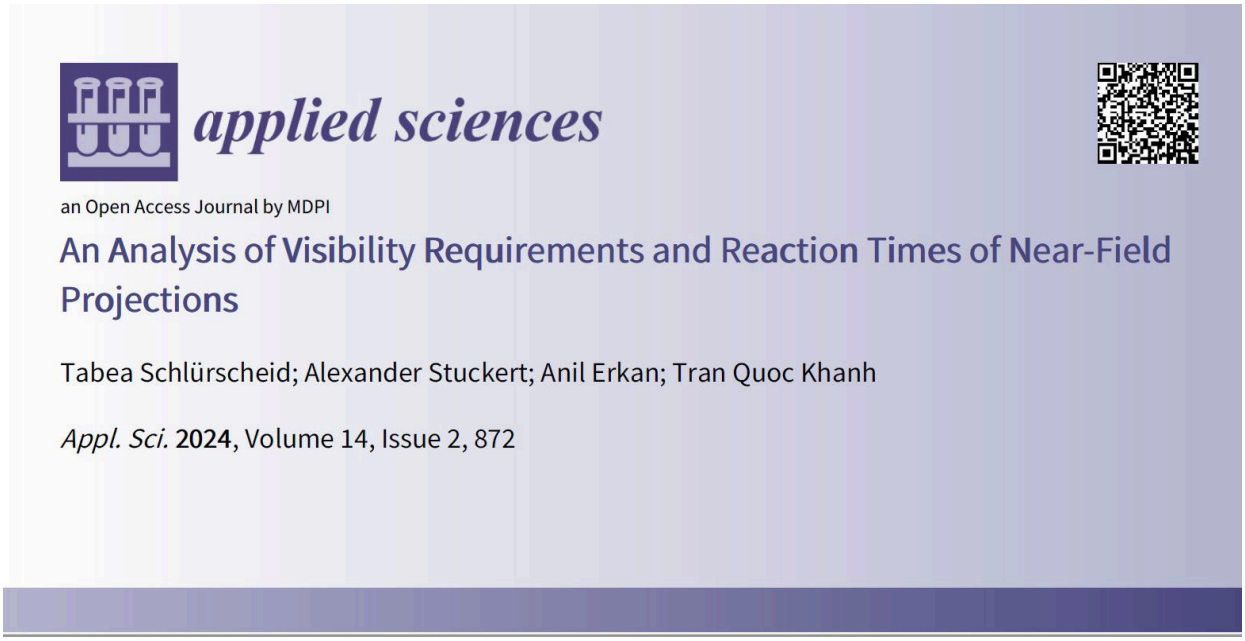
DVN: You will be the keynote speaker on the first day at DVN Munich. What is your message to the lighting community, and what do you expect from this Munich event?

F.H: I am honoured to be the keynote speaker on the first day, and I look forward to an inspiring and productive time with our lighting community. As I said before, light is a key enabler of brand identity and safety, and we all stand at the intersection of technology and design. Our collective efforts can lead to breakthroughs that enhance safety, efficiency, and sustainability in lighting solutions worldwide. Forward thinking, collaboration where possible and productive competition will lead to a bright future.

From this Munich event, I expect stimulating discussions, the exchange of ideas, and also new partnership. It is a unique opportunity to learn from and inspire one another, and I am excited to see how the insights gained here will translate into real-world innovations.

Headlamp Temperatures, ICE Versus EV

LIGHTING NEWS



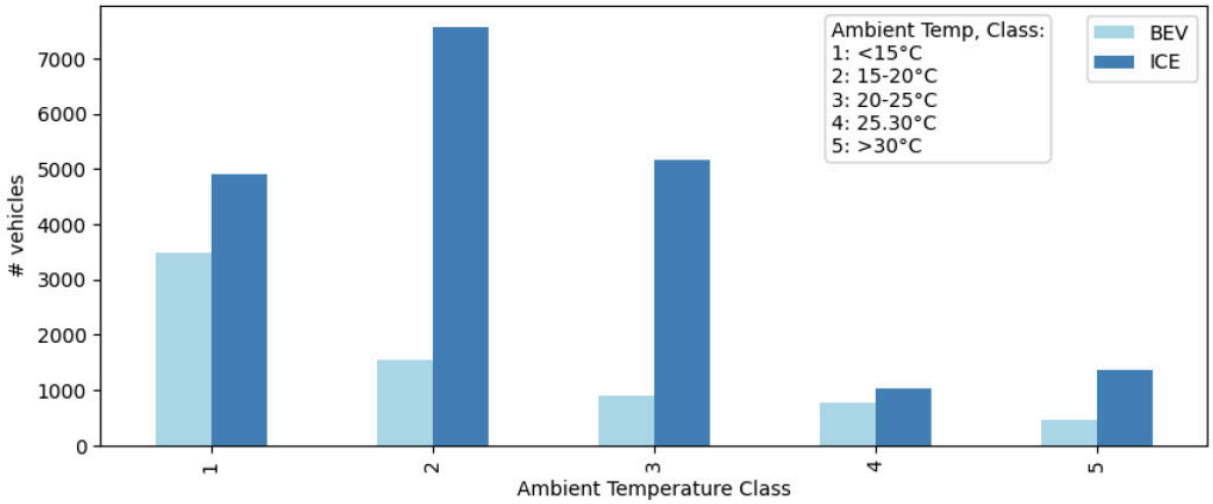
By Tabea Schlürscheid and Jean-Paul Ravier

Tabea Schlurscheid and Tran Quoc Khanh from Darmstadt University, and Alexander Buck and Stefan Weber from BMW, have jointly published an article in Applied Science. In it, they examine the temperatures in headlamps in electric and combustion-engine vehicles. The 14-page paper, entitled *Temperature Behavior in Headlights: A Comparative Analysis Between Battery Electric Vehicles and Internal Combustion Engine Vehicles*, is freely downloadable. Tabea will be on stage at the DVN Munich event to present the results of the study.

A key anchor for the research was the need to ensure that all light functions meet applicable regulatory and technical standards in all driving situations. Applicable standards include AEC-Q102 and ISO 16750 that dictate the thermal requirements and lifetime testing procedures for headlamps; these requirements influence the design of heat-dissipation solutions.

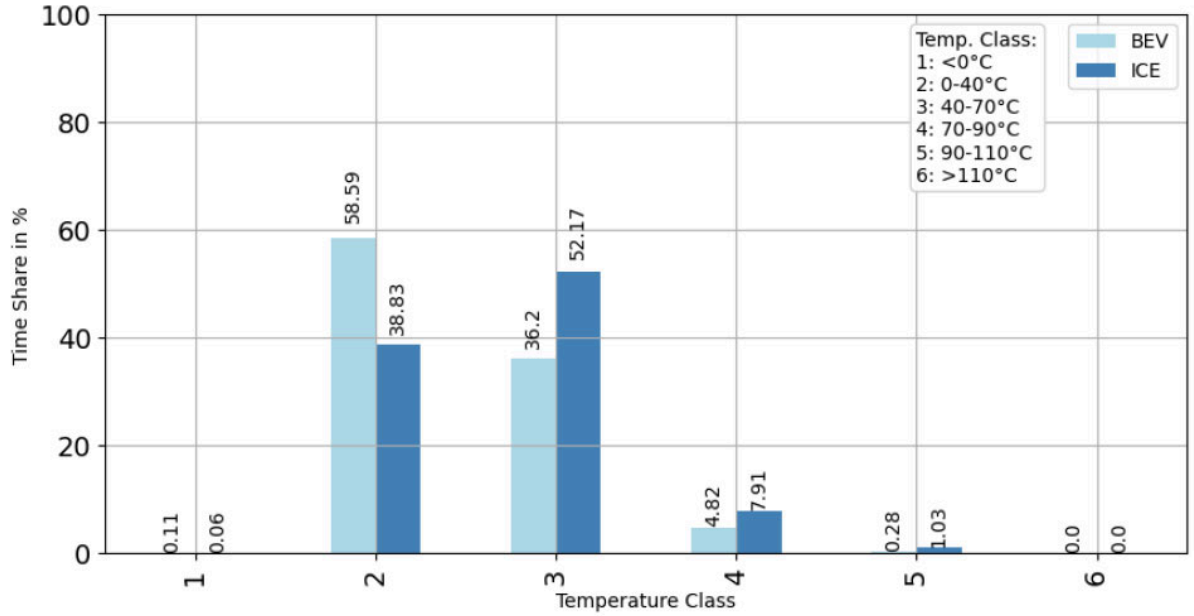
The analysis involved 158,304 measurements from 29,516 vehicles for one year, providing a substantial dataset for significant statistical inference. Temperature was measured with existing sensors located on the circuit board of each light function or combined light functions, close to the LED. The data come from vehicles in the field during driving.

The measurements were done in different ambient temperatures, based on the mean ambient temperature generally known in the country of the vehicles. The measured temperatures were grouped in six classes.



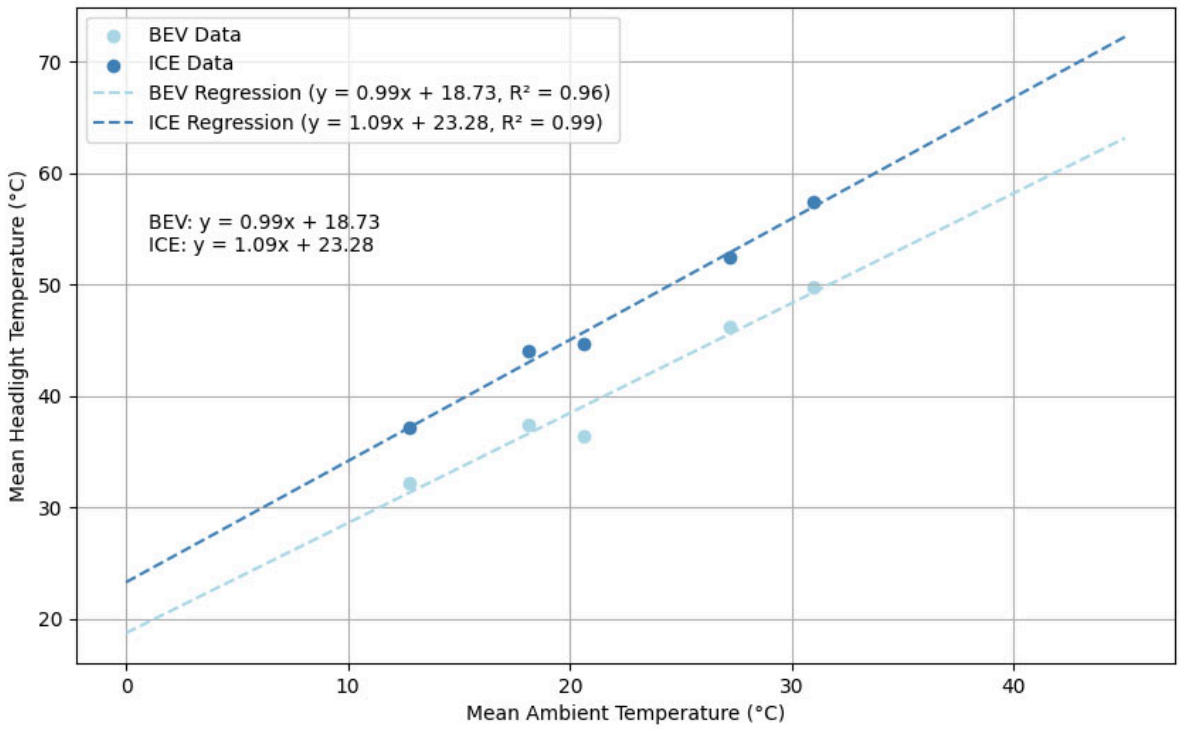
The results were presented with the percentage of time shared in each class of temperature.

Not surprisingly, BEVs show a lower temperature average than combustion-engine vehicles.



Analysis was also done with different classes of ambient temperature, showing a similar trend in each of them. A more detailed analysis demonstrated that the temperature class is directly impacted by the type of powertrain.

Another way to present the results was the use of regressions for both BEVs and ICEs headlight temperatures for the different classes of ambient temperatures, and naturally, BEVs headlight temperatures are lower by around 5 to 8 °C compared to ICEs.



These results show that BEVs are a good contributor to reduce the temperature constraints in headlamps, certainly helping to improve the performance and reliability of the headlamp systems while increasing the energy efficiency, and in some cases, allowing cheaper material costs.

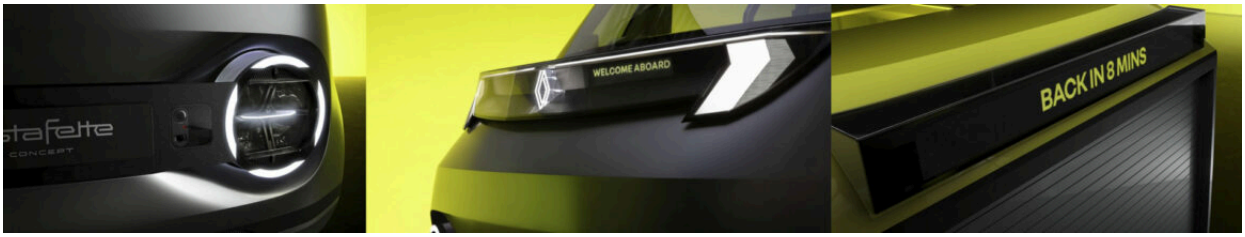
Naturally, these results are based on averages, and so for a particular model of vehicle, a specific study is still needed to check the real temperatures constraints.

Renault-Flexis Launch 3 New E-Tech LCVs

LIGHTING NEWS

Renault and their Flexis co-enterprise (including Volvo and CMA CGM) have just presented three new electric LCVs (light commercial vehicles): the Estafette, Trafic, and Goelette.

The Estafette was revealed last year during Paris auto show as a concept.



To go to mass production, Renault replaced some of the concept van's fancy features —displays, for example—by more realistic and affordable LED lamps. The Renault DRL signature has been fully revisited, and the front lamps are now divided into two

parts; signalling functions are just below the windshield (around 1.2 metres high) and the low and high beams are in the bumper area, around 65 cm above the road surface.

The DRL signature is different between the Estafette and Traffic/Goelette, but the headlamps seem similar among the three models. A front-and-centre lit logo is Renault's second, after the Renault 4. It's clearly traffic-feasible, with the horizontal light strip joining the lamps to the logo (75mm rule). We'll have to look more closely at the Estafette to see how design has been done to comply with regulations.

The rear lamps on the new models have similar vertical design and overall signature.

ams OSRAM Release Financial Results

LIGHTING NEWS

ams OSRAM have just published their 2024 Q4 and whole-year revenue figures.

Q4-24 revenues stayed essentially flat at €882m quarter-over-quarter, above the midpoint of the anticipated range of €810m to €910m. Strong seasonal auto lamps aftermarket sales and steady para-automotive business countervailed continued weakness in industrial and medical applications and the start of the seasonal decline in semiconductor products for consumer handheld devices. The stronger US Dollar also helped. Year-over-year, group revenues declined by 3 per cent due to cyclical weakness in the automotive and I&M semiconductor businesses, and some end-of-life of OEM modules business in Lamps & Systems.

Whole-year revenue of €3.43bn in FY24 was down somewhat from €3.59bn in FY23, due to a decline in the Lamps & Systems segment after divesting their Digital Systems business in 2023 and discontinuing some OEM module business.

For Q1-25, the company expect muted demand for their automotive semiconductor products, reflecting the persisting uncertainties and corrections in the global automotive supply chain. The demand from industrial and medical markets also remains muted, although first small signals might indicate that the weakness has reached its bottom. The business with its semiconductor products for consumer handheld devices will go into its typical strong seasonal decline. Looking at the L&S segment, the automotive aftermarket halogen lamps business will come in slightly lower, in accord with its typical, seasonal demand pattern. As a result, the group expect Q1-25 revenues to land in a range of €750m to €850m.

Zooming out to an overview outlook for FY25, the company expect a meaningfully stronger second half mainly due to product ramps and, to some extent, market normalization.

Lynway Break Ground for HQ

LIGHTING NEWS

A new headquarters for Lynway Auto Parts (Guangzhou) is now under construction—a major move by APT Electronics since their listing on the Hong Kong stock market.

The Guangdong–Hong Kong–Macao Greater Bay Area is a megalopolis comprising nine cities and two special administrative regions in South China. It is the largest and most populated urban area in the world, with a population of about 86 million people. The launch of the Lynway headquarters there marks the further deepening of the company's strategic layout in the field of automotive intelligent vision, and lays a foundation for the global development of their core automotive intelligent vision component business.

Chairman Xiao Guowei delivered a speech at the groundbreaking ceremony: "The construction of the headquarters of Lynway in the Greater Bay Area is an important strategic layout in the field of automotive intelligent vision, which further consolidates the company's technological leadership and market competitiveness in this field". The core products include intelligent ADB matrix adaptive headlights, intelligent dynamic interactive taillights, AR-HUDs, ECUs, etc, and at the same time deeply integrate the technology research and development of the whole industry chain such as system integration, software and hardware development and testing, module development, modelling and structural design".
The project represents a total investment of more than C¥2.4bn (€315+m). The headquarters will cover about 72 acres / 29 hectares. It will comprise an intelligent vision product research and development centre and digital production base. Once it comes fully onstream, it will be able to put out more than 700,000 sets of headlamp systems, 700,000 sets of taillight systems and 200,000 sets of on-board HUD equipment. It will be the company's hub for their automotive intelligent vision products and systems business segment.

Lynway is a wholly-owned subsidiary of APT Electronics. The new headquarters will join the existing Zhejiang Ninghai factory and Hangzhou Bay R&D centre.

Marelli, ams Osram Front Light Tech on Opel Grandland

LIGHTING NEWS

Opel image

The new Opel Grandland carries the brand's new Vizor frontal design, featuring lighting technology from Marelli. There's an illuminated 3D logo and light 'vizor', fancifying the presentation of the digital microLED headlamps, with over 50 kilopixels. Opel call them Intelli-Lux HD lamps, and they're built with Marelli's compact, energy-efficient h-Digi® microLED modules. These, in turn, are equipped with ams Osram's Eviyos® HD 25 light sources. The light distribution is precise and glare-free.

The magic is driven by Stellantis' standard lighting ECU (LDM) made by Marelli, and Marelli's novel electronic control unit called HD ECU (High-Definition Electronic Control Unit).

The Opel 3D 'vizor' integrates the Opel blitz logo—illuminated for the first time—and uses innovative 'edge light' technology, which extends across the entire width of the vehicle in a single flowing element. It is characterized by an outstanding depth effect and homogeneity. The sophisticated lighting system can display multiple welcome and farewell animations.

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TO GO FURTHER ...

Showy vehicle lighting is a major lever in China, and light shows with glitzy panache are increasingly possible thanks to software-defined systems and OTA updates. Take a look at this flashy Huawei performance: