

Tue, 20 June 2023
Weekly Newsletter


Lighting & ADAS

NEWSLETTER #808

PixCell LED

Ultimate precision in perfect alignment

100+ individual cells with just 25 µm spacing, perfectly matrixed onto a single LED chip for intelligent headlamps

SAMSUNG



Editorial

Lighting: A Great Lever For Automotive Design

Last month I met with Peugeot design chief Matthais Hossann, and I was again impressed by the messages he conveyed. The design of Peugeot cars is the main reason for the success of the brand, and exterior and interior lighting are a crucial, substantial part of this success-driver.

For Hossann, the automobile is an attractive product—probably the most complex technological object we think about—and it is exciting to create an aesthetic product, generating emotion, within a very regulated and constrained field. “Emotion with elements of surprise is what we are looking for, all along the car’s life”, he said. This week’s in-depth article will help you to better understand the centrality of design to Peugeot’s brand strategy.

Also, today the DVN Tokyo Workshop [Report goes live!](#) Below you’ll find a link to download your copy, and in it you’ll find summary and analysis of the keynotes and lectures presented at this latest highly successful DVN Workshop. Meanwhile, this issue of your DVNnewsletter brings you coverage of some of the highlights.

Sincerely yours,


DVN CEO

Access to [DVN Tokyo Workshop Report](#)

In Depth Lighting Technology



DVN Workshop
Lighting

29-30
AUGUST 2023

"Lighting the Future:
Safety, Communication & Emotions for EVs, Avs & Trucks"
San Francisco

[Click here for more information](#)

DVN Interview: Matthias Hossann, Peugeot Design Chief



Hector Fratty, DVN CEO, Matthias Hossann, Philippe Aumont, DVN Interior

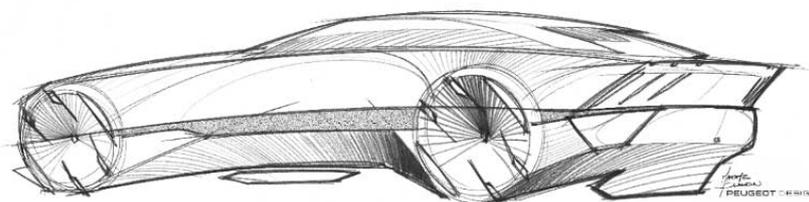
DVN had the opportunity to meet Matthias Hossann, Head of Peugeot Design at ADN (Advanced Design Network) in Velizy, close to Paris. Since 2004, the ADN has mainly brought together Peugeot; Citroën, and DS brands. The ADN centre also houses the research and innovation department.

Matthias Hossann on general design



DVN: Where does your passion for cars come from and how did you become a car designer?

MH: I started my university in Fine Arts, and I had always an appetite for automobiles, I was also fascinated by all the possibilities that plastic offers to build shapes; colours, and products. Then I went into design, through Strate Design School in Paris, where I had the chance to have a real automotive guy as a professor, M.Harmand. He worked on the Citroën SM and invented the 'comodo' control pod on the steering wheel. An automobile is a very attractive product, as it is probably the most complex technology object you can think about! And it is exciting to create an aesthetic product, generating emotion, within a very regulated and constrained field.



DVN: How would you define Peugeot design philosophy?

MH: The Peugeot logorepresents a lion, so feline stance and dynamic performance are heritage attributes of Peugeot design. The three vertical stripes are integral to this philosophy, as well as the i-cockpit in the interior. The occupant, being one with the car, warm visible materials, like textiles, re-invention of the cabin space, pushing back the walls: that's what we target to achieve. The Peugeot Inception, presented at CES 2023, was our newest expression of our design.

DVN: How is design evolving in terms of vehicle life?

MH: We need to rethink the whole life cycle with new materials, potential material refurbishment when functions will be easily updated through OTA updates. The concept of collections, as it exists in the fashion industry, would really fit with this trend. Emotion with elements of surprise is what we are looking for, all along the car's life.

DVN: How is the focus on sustainability affecting design?

MH: Sustainability is the next big thing! Steel, which is a part of the weight of the car, is already recyclable, and recycled. But sustainability applies to everything. The Peugeot Inception has a single-layer body paint; coloured glazing is creating new interior ambiance, 'forged' textile (from waste compression) creates new aesthetics. Renewability

must be understood also from an artistic perspective, from a styling perspective, in short from a design perspective. **Materials and surfaces play with their coloured lighting, redefining the idea of durability through these new techniques.**

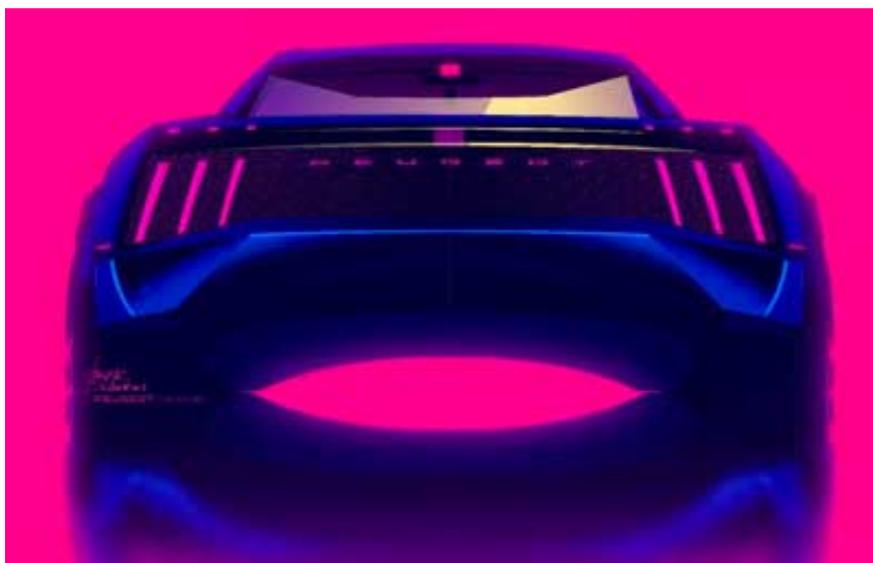
Matthias Hossann on exterior lighting design

DVN: How does the Inception highlight Peugeot's new stylistic directions?



MH: The Inception front bumper has adopted the Peugeot light signature, which incorporates the three emblematic claws. This highly distinctive front end merges the entire front grille and the signature part into a single object that also houses the sensors. It is made up of a single piece of glass with the logo in the center, magnified by the 3D luminescent effect. This mask is lined by three thin horizontal bars crossed by the three claws. The four optical modules are housed under the glass mask, which is itself treated with a mirror effect. We call it the Fusion Mask, and it gives an embodied gaze to the vehicle, clearly visible, night and day.

DVN: We see more and more vehicles with full-width front and rear light bands. What do you make of that?



MH: The Inception's rear end, reflects the new front-end signature; it has a very high-tech treatment, with also the three claws seeming to enter the car infinitely, thanks to the two layers of glass. It's a design to emphasize the subtle shape of the wings, marked by a simple line which unfolds in a nice curve.

DVN: What do you think of illuminated grilleboards and logos on EVs? How about using front grilleboards and rear displays to communicate to pedestrians?

MH: The Fusion Mask uses newly-vacated real estate in a front of a car. A logo is the signature of the brand; it has to be visible, but it shouldn't be too much of a 3D object. The idea is to make it unique as a 2D shape, enhanced by lights, within the limit of regulations. Yes, communication to pedestrians is possible, as well as other car users. Lighting is a way to communication, it could go up to a real display, if the cost of it would be affordable.

DVN: How does ADB factor into design decisions?

MH: Today we have ADB on the new 308 and 508. Other vehicles will of course be equipped with it in the future. The decision to use ADB or not depends on many parameters (positioning of the vehicle, cost arbitration, etc.). See below the different concept cars presented at motor shows in this last decade to better know the strategy of Peugeot concerning the styling design.



ONYX 2012, PARIS



EXALT 2014, SHANGHAI



ONYX 2012, PARIS



EXALT 2014, SHANGHAI



Instinct 2017, Geneva



E Legend 2018, Paris



Inception 2023, CES (with Mathias Hossann)

Lighting News

DVN Tokyo Workshop: Overview and Afterview

LIGHTING NEWS



By Dr. Wolfgang Huhn, DVN Senior Advisor

This latest DVN Workshop, the first in Japan since 2018, got off to a roaring start with a reception and a first visit of the sold-out exhibition. What a difference to the virtual events during the terrible Covid years! It is so much better to see in person, to talk, to touch the samples and experience the displays. International companies showed their great products.

The Japanese tier-1 lighting suppliers surprised with some unexpected innovations; at the Stanley booth we saw an RGB laser MEMS projector which created a super-fast, perfectly sharp and very bright image onto the ground out of a sideview mirror housing. They said the MEMS technology is fully scalable from ground projection to super-HD ADB. Koito—along with their products and processes for sustainability improvement—showed their unique Blade-Scan ADB technology which is already in serial production. Ichikoh, a Valeo company, concentrated on microLED solutions.

This first tour of the exhibition made us extra-curious as what is yet to come. As always, after the keynotes, the carmakers had the stage to present their visions and ideas for the future, followed by a question-and-answer session. The Slido app was used to collect questions, and audience participation rates were high. Dozens of questions came forth in English and in Japanese. The interpreters did a fantastic job, and greatly facilitated the moderator's handling of the questions.

On the second day of the event, the Slido app was used not only for collecting questions during the fascinating three sessions and two round tables, but also for a survey. During the round table about the new front grilleboard design for EVs, four questions were raised and put to vote. Nearly 100 attendees voted, and the result was visible in real time on the screen. These informed a very lively form of podium discussion with some unexpected results:

- Will the new illuminated grilleboard prevail? 74 per cent said **yes**.
- Should greeting animations be forbidden? An astonishing 32 per cent said **yes**.
- Are you in favour of the lit logo? 67 per cent said **yes**.
- Will direction-indicator ground projection be distracting? 38 per cent said **yes**.

DVN is looking forward to coming back to Tokyo in 2025!

Geely at DVN Tokyo WS

LIGHTING NEWS



USER'S MAIN POINTS AND COMPLAINTS



DIRECTION OF LIGHT EVOLUTION

Geely senior luminaire module development expert and leader Jiakai Xu made an interesting lecture on photoelectric application in lighting entertainment. The main takeaways:

- Future trends are intelligence, network, sharing, individuation, diversification, functional light projection interact with pedestrians and vehicles, and energy saving.
- Users demand change: fashion modeling the appearance, bright lighting further and safer, personalisation, private customisation, and ADB to avoid glare.
- Development of photoelectric technology is a process of experience, with upgrades guided by consumer demand.
- There are two main ways of car light interaction: short distance with screen display, and long distance with projection. Function superposition front and rear, signal lights interact through screen display and projection, forming a light language.
- Grilleboard lamp modeling detaches from the traditional grille shape of combustion cars.
- The design idea of lighting is 'people orientated' for convenience and safety, fully meeting people's night driving lighting, comfort, intelligent safety lighting, high-tech technology, experience and personalised-function needs.

Luxury brand examples

Mercedes-Benz use 1.3-megapixel ultrahigh-definition DLP module; Audi use OLED technology, and BMW use laser headlamps.

Chinese brand examples

Geely Boyue L uses a flat module saving Z-direction space; BYD Tang/Han EV uses matrix LED (24-32 segments), and Changcheng Moka/H6 has a 24-segment matrix LED arrangement.



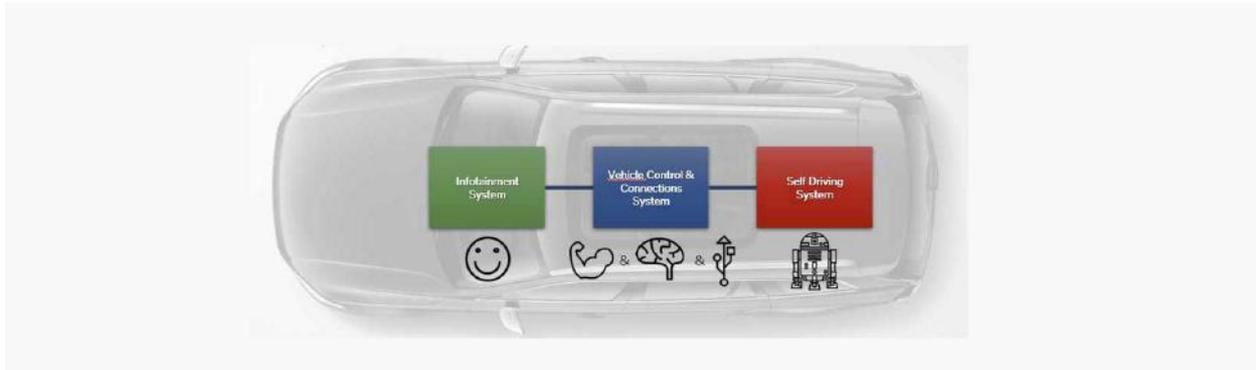
New Power examples

Lixiang L9 has ADS taillights; HiPhi Z has a high-pixel display and logical control of the program can achieve customized dynamic effect, Nio ES 8/EC6 has 84-100 pixels.



Volvo's Matha at DVN Tokyo WS: Next gen. of Electrical Architecture

LIGHTING NEWS



Number of ECUs has increased drastically during the last 25 years, from around 20 to more than 150. In parallel, software size (in megabytes), number of signal have followed the same trend, and nowadays all car makers are trying to reduce the amount of ECUs with simplified architecture, with main core computer for vehicle control, infotainment and self-driving system, with an ethernet backbone

Question for exterior lighting on the table is what the next electrical architecture for lamp should be. Ethernet is available at car level, and most of the car makers have a LIN communication bus for rearlamp with embedded software in the lamp, when they have most of the time CAN communication for Headlamp, especially due to ADB and larger bandwidth needs.

LIN interface has the advantage to be compatible with all semiconductors used in lamps (microcontroller, LED IC (integrated circuit), gateway) but the drawback to have a very poor bandwidth, software download limitation, and the need to have a gateway in a microcontroller, than generate hardware complexity and cost in the lamp. You can have a video or welcome sequence registered in the lamp, but you will never be able to update or change it.

Then, to be more flexible, and to transfer the software from the lamp to the car, new solutions are coming on the market, like UART over CAN, CAN FD, Ethernet 10B-T1S, Can FD light, but for each solution, choice of semiconductor is limited. For example, to do a lamp with a CAN FD communication without any gateway nor microcontroller, only Elmos company can propose a LED IC. If we want Ethernet 10B-T1S, only Analog device or Microchip can propose a solution.

Uart Over CAN seems to be a good solution because a lot of LED IC can support the protocol, but meanwhile it is not a standard protocol, and each LED IC has different rule and need different Software. That generate a nightmare for car maker and lamp supplier if you want to use different LED IC supplier on the same electrical platform Volvo cars proposal would be to define the need for different type of lamp:

- Lamp with less than 300 LEDs, software upload limitation (LIN is OK)
- Lamp with less than 1500 LEDs, software upload need (CAN is enough)
- Lamp with more than 1500 LEDs, video streaming (ethernet)

For each solution lighting community could define the needs and define the protocol to use. Goal is to push semiconductor industry to make the investments in gateway, bridges, LED IC to be compatible to these solutions.

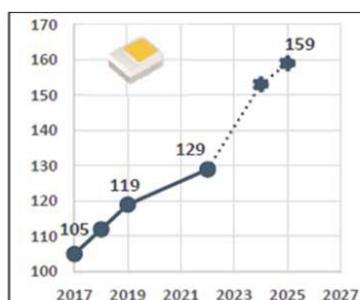
Currently too many possible solutions, too few technical semiconductor solutions when we select a protocol solution.

ams Osram at DVN Tokyo WS

LIGHTING NEWS



Christian Wittmann, AMS Osram's Senior Director for Japan, gave a presentation on Enabling Mobility with New Forward-Lighting Light Sources Efficiently and in a Sustainable Way. His company are involved mainly in light emitters, optical components, micro-modules, detectors, and integrated circuits and algorithms for automotive interior and exterior illumination, sensing, and visualization.



Efficacy development (Lm/W)

For front lighting, their range of products is split in five categories: Osleon Boost HM for high luminance, Osleon Compact PM/PL for ADB matrix or DRL, Osleon Black Flat for standard low and high beam, Osleon submount PL for low-cost headlamps, and Eviyos 2.0 for high-resolution ADB.

The improvement for brightness and efficacy is continuing, though the pace is slowed down compared to the beginning of LEDs. Taking the Osleon Compact as an example: 375 Lm and 119 Lm/W in 2019; 405 Lm and 129 Lm/W in 2022; and a forecast of 470 Lm with 159 Lm/W in 2025. As these values are obtained with the same dimensions for the chip, the luminance is improving in parallel—the Osleon Compact was giving 116 Mnits in 2019, and 147 Mnits is predicted for 2025.

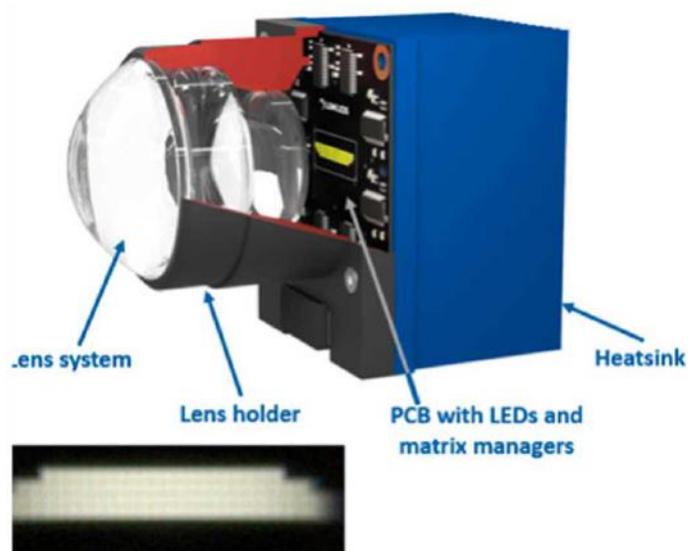
For static forward lighting, the trend is to reduce cost by dint of heatsinkless LEDs, while maintaining efficiency, contrast, colour homogeneity, and high luminance.

For dynamic forward lighting, the trend is to develop matrix beam and slim headlamps with small packages, minimal distance between LEDs, with good contrast and high luminance. For instance, Osleon Boost HM has a light emitting area of $730 \mu\text{m}^2$.

For high-definition matrix, the 25.6-megapixel Eviyos 2.0 is enabling illumination and visualisation with one device. Osram are confident about the development of HD matrix, anticipating a strong increase in uptake from 2025.

Lumileds at DVN Tokyo WS

LIGHTING NEWS



Lumileds demonstrator

Currently, ADB systems using several rows of LEDs use a silicone collimator and the corresponding bracket. Thanks to these primary optics, the LEDs can be placed with a relatively large gap between them, the silicone gathering the light and allowing a relatively homogeneous aspect when projected. The proposal of Lumileds is to avoid primary optics with their Luxeon NeoExact LEDs enabling direct imaging systems.

The LEDs in this solution are called TFSC, for thin film-side coating. They allow for the smallest possible package, barely larger than the light-emitting area (LEA) itself, and are available as 1.0 mm^2 or 0.5 mm^2 .



These thin film-side coatings allow reduced gaps of $60 \mu\text{m}$ between adjacent light-emitting areas, limiting the drawback of this direct imaging technique with (historically) black lines between segments.

The Lumileds demonstrator uses 96 0.5-mm² LEDs and a lens of 50mm diameter. It has a field of view of 36° × 6°, and an I_{max} of 95 kcd.

The main advantages of the direct imaging system are:

- Compactness: the lens could be reduced to 50mm diameter, and the distance from the tip of the lens to the back of the board is reduced to 55mm. This would enable the ADB and low-beam modules to be very close to each other.
- The position tolerance sensitivity can be reduced, for instance a displacement of 400 μm in a lateral or 150 μm in a frontal direction will not induce significant distortion, so passive assembly should be possible.
- The global efficiency is also improved, and could reach 34 per cent in high beam with this 96-pixel demonstrator, and even 45 per cent in a single-row system with lower pixel count.

Future μLED systems using novel technology—20,172 pixels as proposed by Lumileds, for example—will obviously be a direct-imaging system with a light emitting area of 9.84 × 3.28 mm, 50 Lm/W, 72 cd/mm², and contrast of 150:1.

With cost reductions allowed by solutions like direct imaging, Lumileds estimate the volume adoption of ADB could grow from 13 per cent in 2023 to 24 per cent in 2026, and to 40 per cent in 2030, perhaps divided up as 30 per cent for single- and 5 per cent for multi-row ADB, and 5 per cent for digital beam, with globally 40 per cent direct-imaging systems.

Driver Assistance News

Israeli Startups Vie to be the Next Auto-Tech Skyrocket

DRIVER ASSISTANCE NEWS



Ecomotion event last month

Israeli companies are pushing development of AV systems, ADAS, chips, software and cybersecurity.

Transportation technology is one of the nation's major industries, powered by more than 650 startups hoping to be the next Mobileye or Waze.

Israeli automotive technology startups have raised more than USD \$200m this year, and investors poured more than a billion dollars into mobility-sector startups last year.

Global automakers including Ford, GM, and Mercedes-Benz have opened R&D centres in Israel. GM maintain an automotive technical centre there with 830 employees working on ADAS, autonomy, and software development.

McKinsey automotive expert Ben Ellencweig says, "Despite the size of Israel's automotive market, and the fact it's a transportation island, everyone is opening a research centre". And Jerusalem-based Mobileye CEO Amnon Shashua says his company "showed that you can be a meaningful actor in the automotive industry without being a mammoth company with 100,000 employees; Israeli entrepreneurs learned they could claim a piece of the auto industry by developing chips, sensors, and software for vehicles".

Software, chips, and imaging sensors make up much of Israel's automotive industry. As software becomes integral to a vehicle's architecture, the industry's connectivity needs have snowballed, opening a vast new market. Israeli entrepreneurs will continue to look at the automotive sectors, said Mike Granoff, managing partner of Maniv Mobility, a venture capital fund in Tel Aviv and New York: "There is more and more need for software and innovation around automotive and mobility. Israeli entrepreneurs are looking for that kind of a challenge".

Tesla, Waymo Crashes Sully AV Safety Record

DRIVER ASSISTANCE NEWS



A Washington Post [article](#) describes the outcome of that news outlet's analysis of NHTSA data: Teslas on 'Autopilot' have been involved in a whole lot more crashes than Tesla CEO Elon Musk would like everyone to believe: at least 736 of them since 2019, with at least 17 fatalities—of which 11 have been just since May of 2022—as well as some severe injuries. Those figures are probably not a shock to anyone who's read the [DVN White Paper on Tesla's ADAS](#), but they are much worse than the ones NHTSA released last year, and they elevate questions already raised about the actual safety performance of Tesla's 'Autopilot' and 'Full Self Driving' L^2 ADAS suites. Those questions range from the broadly inclusive (just how badly unsafe are these systems going to show themselves to be before people start comparing them to, say, cigarettes?) to specific and detailed critiques of the actual versus claimed capabilities of Tesla hardware—such as Dan O'Dowd's recent [DVN Op-Ed](#) on the subject.

In a separate but related matter, a Waymo self-driving car hit and killed a dog in San Francisco last month. It was a Jaguar I-Pace operating in autonomous mode, and it correctly identified the dog, but neither the car nor the human safety driver avoided hitting it.

Revelations and events like this reflect the gap between where self-driving technology and technique are in the real world (immature and problematic in troublesome ways), versus where they are in the public imagination (flawless Star Trek-like 'computer, drive me to the store' performance).

General News

VW Board to Mull Savings Plan: Report

GENERAL NEWS



Volkswagen Group's supervisory board are discussing a planned savings program with cost cutbacks amounting to at least €3bn across brands including VW, Seat, Škoda, and Cupra—this according to Reuters.

Germany daily *Handelsblatt*, which first reported on the savings program, reported that CEO Oliver Blume wants to curb duplicate development work and to better use German plants, particularly at Audi and Volkswagen.

Core brand chief Thomas Schaefer said in an internal memo in May that there's a 6.5-per-cent return-on-sales target, compared to 3 per cent achieved in the first quarter of this year. "Pressure is mounting. Volkswagen brand must act", he wrote at the time.