

Tue, 9 May 2023  
Weekly Newsletter

  
Lighting & ADAS

NEWSLETTER #802

## 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

## Varroc: Still Making Delightful Lighting

At the end of 2022, Plastic Omnium bought Varroc Lighting Systems and AMLS to build their new Plastic Omnium Lighting division. It came to comprise a product portfolio crafting synergies with PO's existing bumper; front-end, and module products.

Very fine. And what of Varroc now? To find out, we spoke with Bogdan Cocian, Vice President of Varroc's European lighting business in Italy and Romania. You'll find that fascinating and wide-ranging interview in this week's DVNewsletter. In it, Cocian explains the logic behind Varroc's decision to sell their lighting business for passenger cars in the Americas and Europe, and the results of that decision.

Recently, I visited an automaker and a tier-1 supplier. In Ingolstadt, I discovered Audi's newest lighting paradigm. and in Belgium, I saw how Valeo have figured out how, as a European company, to compete with low-cost countries by cleverly leveraging their smart automated production techniques. You'll find details in forthcoming DVNewsletters.

**Don't forget** the Tokyo DVN Workshop coming soon on 6-7 June! That's less than a month away, so if you haven't yet signed up, come and [register](#). I'm looking forward to seeing you then and there.

Sincerely yours,

  
DVN CEO

# In Depth Lighting Technology



## DVN Interview: Bogdan Cocian, Varroc Lighting VP



Bogdan Cocian studied engineering at École Centrale Paris. With a background in strategy consulting roles with automakers and tier-1 suppliers across Europe; Asia, and the Americas, he joined Elba in 2012 and became that company's CEO three years later. In September 2021, he took new responsibilities by joining Varroc as Vice President of the European lighting business in Italy and Romania along with the ASEAN market based out of the company's plant in Vietnam. He graciously granted us this exclusive DVN interview.

### **DVN: What's changed at Varroc after the agreement with Plastic Omnium?**

**Bogdan Cocian:** In 2022, we took the strategic decision to sell our lighting business for passenger cars in the Americas and Europe, as we wanted to focus on several exciting new sectors. As a result, Varroc are a billion-Dollar company in terms of revenues with over \$350m coming from lighting. Tarang Jain is now Chairman & Managing Director; being also the most important shareholder, this allows for a swift decision making, therefore increasing even more our agility as a group.

Varroc is now involved:

- in India (76 per cent of operations) in lighting; polymers; electricals, and electronics...
- in Europe (13 per cent of operations) in lighting and electronics with ADAS...
- in China (11 per cent of operations) in lighting.

For passenger car lighting, we will focus on Asia, in the high-growth primary markets like China, India, and the ASEAN regions. In Europe, Varroc focus on the premium lighting sector based on our facilities in Turin (Italy) and Targu Mures (Romania). We also act as an EMS supplier for high-end electronics, including an offer of front lighting modules and advanced electronics from the Timisoara (Romania) plant.

In parallel, Varroc have repositioned ourselves as a high-tech company with a renewed focus on existing growth areas like ADAS; DMS; telematics, and EVs. We remain committed to our leadership position in the global 2-wheeler market, which will continue to be a key focus for us in the future.

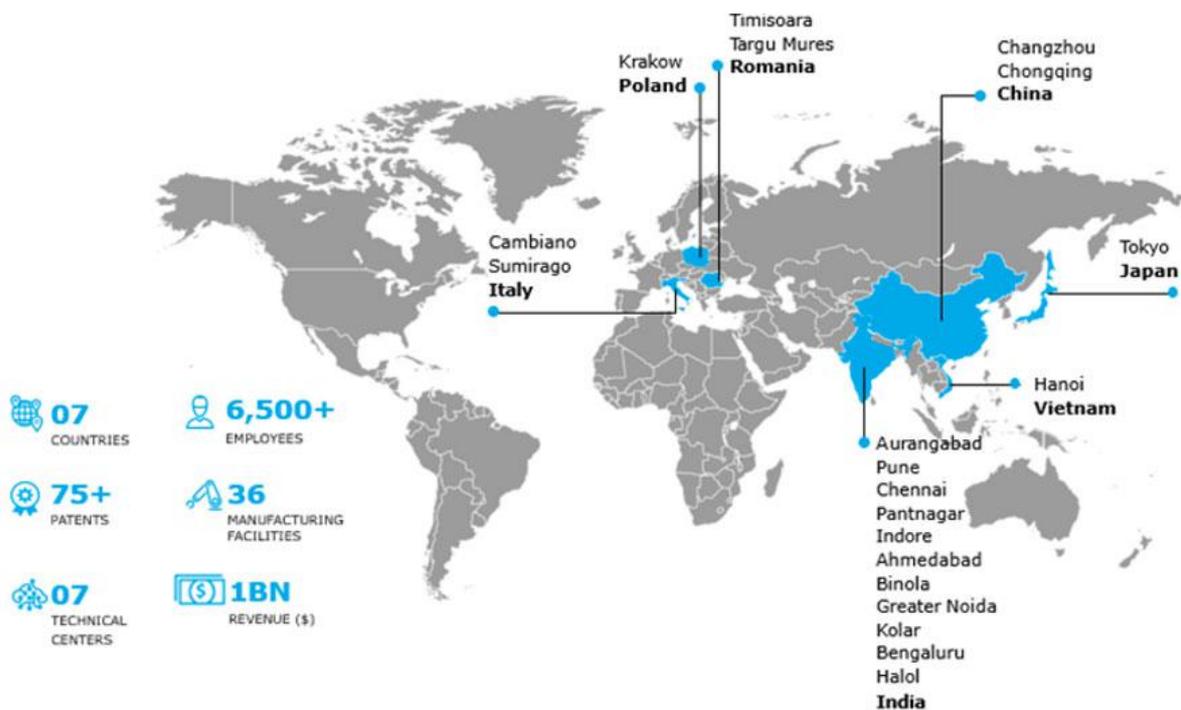
## DVN: How have the strengths and challenges realigned?

**B.C:** We repositioned ourselves as a high-tech company with a renewed focus on our existing growth areas, while expanding into new markets. The company's extensive R&D facilities and engineering capabilities enable us to design, manufacture, and supply high-quality products to our customers.

For the exterior lighting, Varroc's presence in the 4-wheel sector from low-manufacturing-cost locations, with a focus on primary markets and the 2-wheel sector globally, links with the growing demand for our products and services. With the changes in the sector, Varroc will have a competitive edge, allowing us to meet customer targets.

In terms of challenges, like most sectors, the overall geopolitical situation, along with higher inflation and semiconductor supply shortages, continue to impact supply and demand; as a result, we observe a prolonged market volatility along with higher purchasing prices that might continue to affect the supply chain for some time.

However, Varroc have become more agile alongside our supply-chain partners over the past two years. Keeping pace with the rapidly evolving technologies and changing customer preferences in the high-tech sector is another challenge that requires all market players to continuously dedicate significant resources. In this context, Varroc will continue investing in R&D and innovation, ensuring delivery of cutting-edge products and services that meet the changing needs of our customers.



Varroc's global footprint

## **DVN: Is edge-to-edge front and rear lighting just a fad, or is it here to stay?**

**B.C.:** The trend is common among many automakers, particularly with the rise of electrification. OEMs incorporate full-width light bars; illuminated logos, and grill illumination to create distinctive designs.



Varroc full-width lighting with charge indicator

Like in other technology clusters, we also notice a trend to reduce the ratio of non-lit surfaces on light sources. Clear and clean definitions of the active lit area will emphasise design and form, enabling a better balance of contours and adding more design freedom and flexibility.

Consequently, there will be a technology shift, combining new optical solutions to distribute miniature light sources evenly and almost edgelessly in a homogeneous appearance.

With the increased functionalities and added value for the user, I expect that edge-to-edge lighting with enhanced and meaningful functionalities will continue to grow, while automakers will also look at new different avenues to differentiate.

## **DVN: What are your thoughts on displays in the front and in the rear of the car to communicate?**

**BC:** Differentiating between market hype and a future technology standard is a challenging task. I believe that the user experience will be a differentiating factor in the evaluation. Car-to-environment communication, as well as animated signatures and personalisation, seem to be the biggest drivers of this technology. Since it has high visibility, the quality requirement to have a long, error-free service time is one key aspect. Technologies using discrete LED solutions might face challenges in finding new manufacturing processes to ensure the highest quality output during the service life. It will take several new technology iterations, market feedback, and standardisation until a reliable display technology is found in the demanding automotive body shell.



Varroc Jidu Mars One: 15 × 80 module with smart LCU

In addition to connectivity, I believe display technology could offer additional features, such as advertising parked cars based on their location. As this technology continues to evolve, it will be exciting to see how it transforms the user experience and provides new opportunities for automakers to differentiate themselves in the market.

### **DVN: What about illuminated grilles and logos?**

**B.C.:** We have made considerable progress in developing reliable illumination solutions. By leveraging established technologies, we can offer solutions that are both feasible to manufacture and cost-effective.

In my opinion, a more widespread adoption of illuminated grilles and logos for branding purposes is inevitable. The demand for these features has significantly increased in recent years, and I anticipate that it will continue to grow in the future, particularly in the context of the growing EV/AV market.

### **DVN: There's S-Matrix with 6 to 20 segments; M-Matrix with around 100-200 LED; HD-Matrix with thousands of $\mu$ LEDs, and UHD-Matrix with a million LEDs. What is the future of these technologies?**

**B.C.:** We don't have to rely solely on existing 4-segmented light source technologies. There is potential in exploring hybrid solutions, where we combine these technologies or even add already established technologies. For instance, a combination of HUD (Head Up Display) technology and M-Matrix has the potential to compete with HD Systems, especially since all FL projection systems face the same physical limitations. A HUD can deliver impressive performance regardless of environmental conditions.

This technology race is far from over, and a clear winner has yet to emerge. Furthermore, technical possibilities don't always translate into the best use case for the end-user. A balanced approach might be the key until certain technological improvements are completed.

In addition, different trim levels of vehicles can be distinguished based on varying levels of resolution and costs of technologies. Many base lamps on low-cost vehicles have already adopted LED lamps, while mid or high allow for additional features, typically leading to matrix-based ADB systems. All four technologies are safety enhancement features but come with different cost premiums. The S-Matrix through M-Matrix technologies have a firm and proven place in the market, with the costs of the systems being reduced over time. The HD-Matrix with  $\mu$ LED and UHD-Matrix are newer to the market, and many of the parts are still in their first or second generation, and thus, they're currently reserved for more premium segments. S-Matrix and M-Matrix will still have their place for a while to come, just like halogen is still being replaced by LEDs, even though they've been in the

market for decades. Adoption of HD and UHD, along with the multiple additional features they might enable, will depend on cost, output breakthroughs, and complementary technologies as time moves along.



Varroc Hippi Z: 650 LEDs with OTA and customized animation; 1,200-mm laser welding

### **DVN: How do you see the ADB matrix growth in the world's markets?**

**B.C:** Europe has a rich history of adopting ADB systems, while China is experiencing a surge in popularity for projectors and other emerging technologies. In contrast, the United States has been waiting for new regulations to enable the growth of ADB systems in the market. Currently, several platform vehicles in the US with ADB headlights are software-disabled until all regulations are approved. As the market for ADB systems grows, safety will undoubtedly remain a top priority. Studies presented also in DVN have shown that the use of ADB systems can significantly reduce night-time accidents caused by poor visibility or headlight glare.

**DVN: HD-Matrix has two major playgrounds: enhanced functional features where very precise matrix is possible as eDBL; adverse weather and motorway lighting; world headlamps; OTA updates, and even vertical e-aiming; and communication towards the driver and traffic participants. Which is more important to you?**

**B.C.:** At present, I think the first point is more important because it involves aspects that can be attained within existing regulations. For instance, the precision matrix, which comes in a single variant and incorporates solid-state levelling, eliminates the necessity of mechanical components. Moreover, this technology supports OTA updates, enabling the addition and enhancement of features over time. Furthermore, with the prevalence of telematics in modern cars, the potential for personalisation and displays is gradually becoming a reality.

**DVN: Will the likes of S-Matrix be standardised in the future...or even mandatory?**

**B.C.:** In my opinion, S-Matrix and other ADB systems may become necessary requirements to achieve top safety ratings in the future, just as amber turn signals became a requirement for top ratings in the past. This provides an incentive for OEMs to include them, but they may not be completely mandatory by regulation. There are several approaches to incorporating ADB functionality in this segment, each with its trade-offs, while new innovations may bring added value. I believe that ADB should be standardised as a requirement, rather than mandating a specific design standard.

# Lighting News

## BMW i5 EV: Illuminated kidney grille and Ambient Lighting

LIGHTING NEWS



BMW i5

BMW is all set to break the cover of the next-generation 5-Series sedan later this month. Ahead of its official unveiling, the German luxury car brand has teased the upcoming electric car in a teaser video posted on its social platform.

The latest teaser video released by BMW reveals the upcoming BMW i5 EV's illuminated kidney grille and ambient lighting. The teaser video also gives us a peek at the new EV's front profile design and sleek interior.

The exterior teaser shows the i5's silhouette and the front profile's lighting element. As it has been teased, the EV will come featuring sleek LED headlamps sitting high on the face, with an illuminated kidney grille.

# Taillight LED Controller Ensures Energy Distribution

## LIGHTING NEWS



In the Elmos E522.9x family, the power management system ensures constant light intensity. For this purpose, a variable part of the resulting power dissipation is shifted to external shunts, which enables an even and effective heat distribution without hot spots on the circuit board. The unique dual concept avoids an additional drop over the linear controller stage.

The ICs have two configurable modes of operation for error processing:

- a “Failure Feedback Mode” (when an error is detected, the affected channel is deactivated and the individual error signalled),
- a “Single Lamp Mode”, in which all connected LED strings behave like a single connected light source. In the event of a fault, all channels are deactivated, and in this case the IC only draws a small quiescent current from the supply; the feeding control unit can thus clearly and unambiguously detect a failure. Input voltage range is specified from 5V to 25V at a maximum value of 40V.

# Scott Runner is Cariad's New US CEO

## LIGHTING NEWS



Automotive software company Cariad, an independent automotive software company in the Volkswagen Group, have announced the appointment of Scott Runner as their CEO for the US. Runner will lead a team of about 250 software and engineering experts in California and Washington State, focusing on hardware development, cloud technologies, and connected infotainment for the automotive industry. Runner previously served as Capgemini's Vice President and Global Practice Leader of Embedded Software; EE, and Semiconductors for Autonomous, Connected, and Electric Vehicles.

Runner's appointment follows the establishment of Cariad's new US tech hub this past January. With presence in two major technology ecosystems—Silicon Valley and the greater Seattle area—Cariad are actively developing automotive technology solutions in the areas of hardware design, automotive cloud and connected infotainment.

US-born Scott Runner has more than 30 years' experience with software; hardware, and semiconductors in the global automotive and mobile communications industries. He has extensive leadership experience in digital and cultural transformation, as well.

He has a B.S. in applied physics and did graduate work in computer science and engineering management.

# Driver Assistance News

## Innoviz Named Cariad's Lidar Supplier

DRIVER ASSISTANCE NEWS



Cariad, the Volkswagen Group's software company, have chosen Innoviz as their direct lidar supplier for the automated vehicle segment within the Volkswagen brands. Innoviz will provide InnovizTwo lidar sensors and perception software, both of which are crucial elements of ADAS and AVs.

Innoviz have been working closely with Cariad to understand the unique engineering needs and optimize processes that will support the use of lidar-enabled ADAS and automated driving systems. Together, the two firms are evaluating concepts to accelerate the integration of lidar systems, with the aim of improving time to market and lowering overall system costs—and they're exploring the prospects for further expanding their partnership.

# V2x, Fine...Now How About Some x2V?

## DRIVER ASSISTANCE NEWS



It's not really a secret that AVs, for all their galloping progress, still have quite a way to go before they are as flexible and adaptable as human drivers.

A short [online video](#) shows a recent impasse between a self-driving car and an American traffic policeman valiantly trying to do his job directing traffic. It's a bit of an object reminder that 'communication' implies two-way transfer of queries; intent...and, in this case, directives.

# General News

## GM Leads, Tesla Lags Auto Industry R&D Investment *Extract from WardsAuto*

### GENERAL NEWS



Automakers are conspicuously stratified in terms of how much they spend on research and development. That's on backdrop of the accelerating CASE trends as automobiles become increasingly connected; autonomous; shared, and electric, with attendant needs for better levels and new kinds of security. Here's a look at some automakers' R&D spending as a percentage of revenue:

	Revenue \$bn	R&D Spend \$bn	R&D ÷ Revenue
GM	156	9.8	6.2%
Mercedes-Benz	165	9.4	5.7%
VW	308	15.8	5.1%
Ford	158	7.8	4.9%
Honda	128	6.3	4.9%
BMW	157	7.3	4.6%
Renault	51	2.3	4.6%
Tesla	81	3.1	3.8%
Toyota	296	8.9	3.0%
Stellantis	198	5.7	2.9%

The Volkswagen Group spend more money on research and development than any other automaker, but General Motors devoted the biggest share of their 2023 revenues to R&D: 6.25 per cent. Next was Mercedes-Benz at 5.7 per cent, and VW at 5.1 per cent. Below industry average were Tesla at 3.8 per cent; Toyota at 3 per cent, and Stellantis and Nissan each at 2.9 per cent.

# How the EV Maker Ranks are Shaping Up

## GENERAL NEWS



Tesla were the world's largest electric carmaker in 2022. With 1.35 million pure electric cars, the U.S. company grew by 45 per cent compared to the previous year. According to data from consulting firm Inovev, the Chinese BYD Group are in the number-two slot; they tripled output to 920,000 units, knocking General Motors into third place. GM, for their part, built 680,000 e-cars— mainly via their Chinese Wuling subsidiary.

The VW Group (520,000 units) also were surpassed by BYD yet remained ahead of Volvo parent Geely (360,000) and Renault-Nissan (340,000). If partially electrified plug-in hybrids are included, BYD dominates the electric car business with a total of 1.86 million vehicles built. Tesla (1.35 million), Volkswagen (750,000) and GM (690,000) follow at a great distance.

In the European market, BYD only started making inroads last year. In 2022, the Volkswagen Group were the market leader in the EU and the United Kingdom, with nearly 350,000 e-cars sold. VW positioned themselves ahead of Tesla with 232,000 and Stellantis with 230,000 new registrations. All Chinese brands together accounted for just under 62,000 units; however, they achieved the strongest growth with an increase of 129 per cent.