

Tue, 18 June 2024  
Weekly Newsletter



NEWSLETTER #860



## Editorial

### Focus On U.S ADB At DVN Workshop Night Drives



During the last 2 weeks, I travelled in the States. It was a great pleasure to meet the local lighting community, first in Charlotte for the GTB biannual session, and then for our DVN event in Michigan. More than 80 people gathered in Charlotte to work on lighting standards for use in the rest of the world, and then more than 400 attended the DVN event to listen, show, and tell about technology, innovation, and regulatory matters. It was a perfect time for networking in a very friendly atmosphere, with good food and beautiful weather.

The award for best lecture went to Colby Childress from Marelli, for his lecture about U.S ADB including dynamic levelling.

For the first time during a DVN event, we organized night drive demonstrations. There were 12 demo cars, including seven with ADB (Ford-ZKW, Ford-Marelli, GM-SL, Audi-

Marelli, Magna, Valeo, and Hella) with different technology: S-Matrix (12 segments), M-Matrix (48 and 84), HD (25 kpx) and UHD (1.3 mpx). Sapphire Technical Solutions brought one of their U.S ADB test trailers to evaluate the performance of the various systems and demonstrate that there is a real, viable test method despite the vagueness and contradictions in FMVSS 108. The demonstrations started at 9:30 pm (it doesn't get dark till late, this time of year). The queue was long for the vehicle testing, and the closed road was quite short, but it was for a lot of people the first time they experienced an ADB system and feedback was very positive.

The main takeaway I have from this night drive and the long, 13-lecture ADB session that afternoon is that lighting community is ready for ADB in the US. The test method is OK, technical constraints are known, solutions are identified, optical modules are developed. Camera systems need perhaps a final tuning to be able to detect all prescribed road-user stand-ins, including the pretend-motorcycle, to stave off annoying false detections.

Also last week, Rivian [announced](#) that their facelifted R1S and R1T are equipped for ADB in the U.S market (activable later via OTA update). And in your DVNewsletter this week, you'll read about the Government of Canada's request for comment on their intent to accept U.S ADB (along with the UNECE and SAE ADB specs already allowed in Canada).

All of the points above are good signs to have ADB on American roads very soon, at least on some very expensive cars.

Sincerely yours,

**Paul-Henri Matha**

*DVN Chief Operating Officer and Lighting General Editor*



# In Depth Lighting Technology

## Main Takeaways from Detroit DVN Event 2024



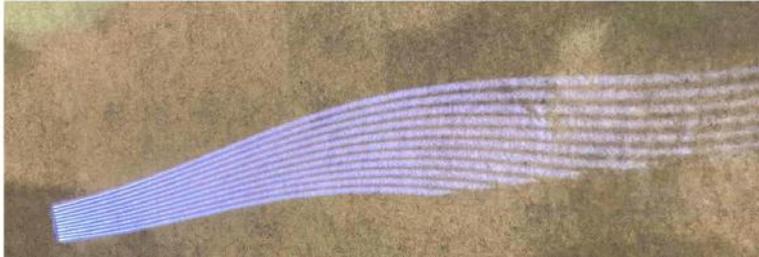
By Paul-Henri Matha, DVN COO & Lighting General Editor

Last week, 405 people gathered in Plymouth, Michigan for the 2-day, 1-night DVN event. That record-breaking participation count shows how dynamic the North American lighting market is, with strong and active interest by more and more companies.

A lot of innovative products caught my attention. Here, I highlight my top 10 takeaways.

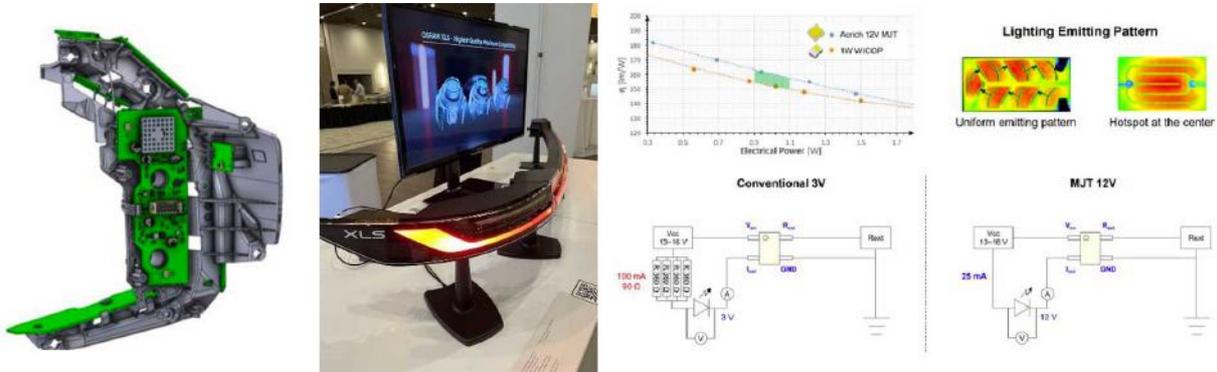
- **Laser light sources**

Laser research is still continuing, and startups like L.E.S.S and Maradin showed innovative solution like a 5-mm-high high beam, and projection systems including RGB laser + MEMS.



• **Led light sources**

Continuous innovation to reduce CO<sub>2</sub> footprint with modular approach to reduce complexity (Osram XLS or Lumiled Luxeon Go, for example) or higher voltage threshold (12V) for BEVs (no restart pic at 6 volts anymore) to reduce thermal dissipation (Seoul multijunction concept)



• **Mini- & microLEDs**

Mini- and microLEDs are clearly coming for rear lighting, with different application proposed by light source manufacturers. Magna did an interesting presentation about the difficult problem of repair and how to tackle it.

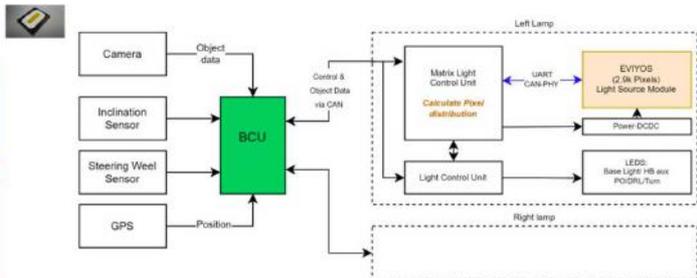
**Mini-LED Repair**

- ✓ Laser rework of mini-LEDs on Magna RGB pixel display requires 5 repairs/panel
- ✓ Complexity reduction of the mass transfer of RGB sub-pixels will improve cycle time and reduce the risks of repair/rework
- ✓ Die shear strength as strong as original placement

To reduce cost, Osram propose a reduced microLED resolution for front lights and grilleboards, to keep good functionalities (ADB, welcome), by moving from LVDS to UART over CAN with a maximum 5-Mbits per second bandwidth. MicroLED chips can be driven directly by lamp ECUs—no need for additional video ECUs, nor ethernet—and that may reduce complexity and cost drastically.

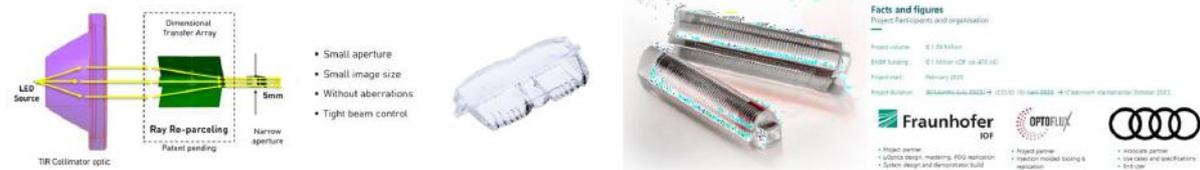
# Pixels vs Bandwidth based on 5 Mbit UART via CAN-FD Phys  
Bandwidth limit @ approximately 4000 pixels

# Pixels/Frame	Bits / Frame	Data Rate	Time /Frame	Idle Time	Frame Time	Busload @ 50%ps
25600	305760	5000000	0.061922	0.00025	0.062202	100%
20000	242000	5000000	0.0484	0.00025	0.04865	100%
15000	181500	5000000	0.0363	0.00025	0.03655	100%
10000	121000	5000000	0.0242	0.00025	0.02445	100%
9000	108900	5000000	0.02178	0.00025	0.02203	100%
8000	96800	5000000	0.01936	0.00025	0.01961	100%
7000	84700	5000000	0.01694	0.00025	0.01719	100%
6000	72600	5000000	0.01452	0.00025	0.01477	89%
5000	60500	5000000	0.0121	0.00025	0.01235	74%
4000	48400	5000000	0.00968	0.00025	0.00993	60%
3000	36300	5000000	0.00726	0.00025	0.00751	45%
2000	24200	5000000	0.00484	0.00025	0.00509	31%
1000	12100	5000000	0.00242	0.00025	0.00267	16%
700	8470	5000000	0.001694	0.00025	0.001944	12%
500	6050	5000000	0.00121	0.00025	0.00146	9%
300	3630	5000000	0.000726	0.00025	0.000976	6%
100	1210	5000000	0.000242	0.00025	0.000492	3%



- **Optical lens concepts**

A lot of presentation and demonstrations from tier-1 and -2 suppliers about optical design to develop new solutions, including MLA and projections (Optoflux, AG Optic, HJ optic, Auer, Docter Optics, Lumenflow, SL Corp)



- **LED IC to accurately drive more LEDs**

Innovative solution with 16-bit PWM (Brightek) and RGB matrix up to 396 LED channels (Lumissil)

**HMI RGB Matrix for Ride Share**

Ride Share services today are widely used. This issue is the concern that you are getting into right vehicle. One way to solve this is by the use of App controlled RGB Matrix controllers. It can display colors and images the you select so you know which vehicle is picking you up.

Lumissil has LED Matrix Drivers designed to serial-shift LED to reduce power consumption in these application ranging from 12 to 396 LED Channels.

**Reduce Stress**

± 2% Current Variation

with OTP, Pre-calibration

**EVO**

16 bits PWM / 8 bits Current Dim

4 Channels, 60 mA / Channel

Breakdown Voltage up to 12V

Temperature, Voltage Sensing

- **Innovative leveling & self-aiming solutions**



New mandates in ECE and new constraints for IIHS and U.S ADB are driving demand for cheaper and more accurate leveling. New proposals are coming on the market like AML's integration of a tiny gyroscope in the actuator to automatically *attain* correct headlamp aim (no more need for the fallible human with a screwdriver, even at the end of the car production line) and then maintain it on an ongoing dynamic basis.

- **Lit grilles and grilleboards** including films, painting, laser etching, Polycarbonate and PU coating

Toolmakers, film suppliers, roll material suppliers, and lighting/exterior tier-1s presented a lot of new technologies, including compression tools, laser etching, film integration, and PU coating.

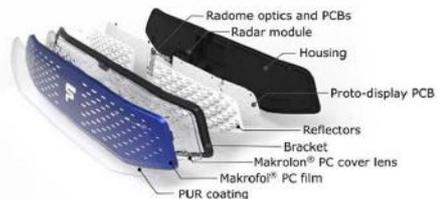
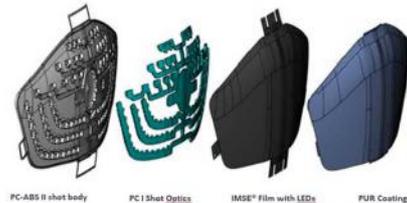
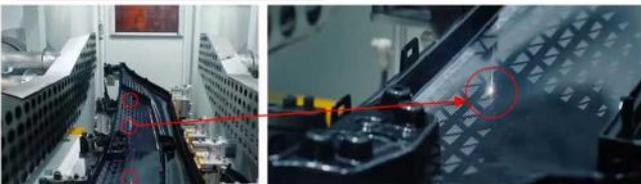
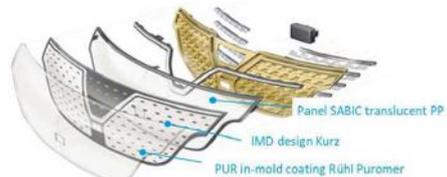
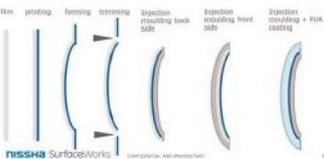
One of the first film applications was shown by Nissha on the Polestar 3 smart zone, including de-icing heating system.



During Q&A, a lot of questions came in about cost comparisons of film versus painting + laser etching and PU coating durability and auto healing process at 60°—there was an interesting video in the Forvia Hella presentation. Will PU coating replace traditional headlamp hardcoats in the coming years? the debate is open.



What is Film Insert Molding?





- **Replacement of headlamp glue by laser welding**

Headlamps are difficult to recycle, largely due to the glue between lens (PC) and housing (PP). Some solutions with a gasket have been introduced, especially in Japan, and Covestro showed laser welding with a PC lens and a PC housing. This would dramatically ease the recyclability of the lamp assembly.



- **My favourite item on display**

Polycontact and Optoflux showed a steering wheel lit logo. It is difficult due to airbag deployment (and driver distraction, maybe?). Polycontact confirmed it is ready for application. Interesting!



- **Another favourite**

Ben Diccio was not able to have a 2024 Dodge Charger for the event. But he came with the lamps at Hella booth. Really good design with commercial-grade affordability! It includes a light guide for the DRL/position light/turn signal, and reflector optics for low and high beam (2 low beam cavities and 1 high beam cavity).

This is one of the best examples of how designers, R&D people, and suppliers can work together to offer a really cool product!



# Lighting News

## Canada Moves to Allow U.S ADB; Public Comment Invited

### LIGHTING NEWS



Under the *Motor Vehicle Safety Act*, Transport Canada regulates the safety performance of motor vehicles and equipment in Canada. The act requires any company that imports or makes vehicles in one province and sells them in another province to certify that these new vehicles meet all applicable safety regulations and standards.

The Canada Motor Vehicle Safety Standard (CMVSS) 108 - *Lighting System and Retroreflective Devices*, contains provisions for lighting devices installed on road vehicles. CMVSS 108 incorporates Technical Standards Document (TSD) 108 – *Lamps, Reflective Devices, and Associated Equipment*, which specifies the requirements for original lamps, reflective devices, and associated devices. TSD 108 is a reproduction of the [United States’ National Highway Traffic Safety Administration’s lighting standard](#).

The United States updated their lighting standard on February 22, 2022. This update allows adaptive driving beam (ADB) headlamps to be installed on vehicles. ADB headlamps make it easier for drivers to see at night, without affecting the visibility of oncoming drivers. When ADB is installed on vehicles it will improve road safety by allowing more visibility for the driver.

As a result, TSD 108 is no longer aligned with the United States and needs to be updated. This proposal incorporates all changes the United States made to their lighting standard. As such, the ADB requirements in TSD 108 will be fully aligned with those of the United States.

Transport Canada is proposing to submit your comments by email to [RegulationsClerk-ASFB-Commisauxreglements@tc.gc.ca](mailto:RegulationsClerk-ASFB-Commisauxreglements@tc.gc.ca) by July 29, 2024, and include "Update to Technical Standards Document (TSD) 108" in the subject line.

“If you provide comments via a document submission or an e-mail, as set out in sections 19 and 20 of the Access to Information Act, be sure to identify any parts of your comments that we shouldn’t make public if they include personal information or third-party information. Explain why your comments should be kept private, and for how long. Unless you specify that a section is private, it may be included in any regulatory proposal that Transport Canada publishes in the Canada Gazette”

Link for detailed article and draft proposal : [Updated requirements for Technical Standards Document \(TSD\) 108 \(canada.ca\)](#)

# Alpine A290 Revealed

## LIGHTING NEWS



Renault subsidiary Alpine have revealed the A290, an electric hatchback based on the new Renault 5.

The styling is close to that of last year's concept car, retaining the X-graphic auxiliary lights mounted inboard of the headlamps. The X graphic also appears within the headlamps.

Zooming in for a closer look at the lamps, we see it is a totally new DRL, and the headlamps seem to have a similar shape, with a microstructure-grained surface area with an x-shape on the inner lens.



A290 (L) vs. Renault 5 (R) headlamp and DRL (image from DVN Munich Renault presentation)

# Lynk and Co Z10 Revealed

## LIGHTING NEWS



The Lynk & Co Z10 has just been revealed in Stockholm.

It's got four discrete longitudinal daytime running lights, slim low/high beam module (we estimate about 15 mm) and the brand's first front and rear full-width light bands; perhaps in future there will be a lit logo or two.

The car uses an 800-volt system, and the maker claims it has a range of 800 kilometres and can replenish 573 kilometers of range in just 15 minutes. It has dual silicon carbide motors, with 0-100 km/h acceleration in 3.5 seconds.

The Z10's SEA (Sustainable Experience Architecture) platform also is used in various models from Lotus, Smart, Zeekr, and Volvo, all in association with Geely.



# Fiat New Panda

## LIGHTING NEWS



Fiat has just new information about Fiat Panda (Grande Panda). Car will be revealed on July 11th, but we can already see the final design and especially final lamp design.

Fiat has kept the signature they have shown on the concept last year. Headlamp is divided into 2 parts:

- upper area: daytime running lamp with pixel design, in continuity with front grill
- lower area: low beam and high beam with led reflector solution (height estimation 60 mm)
- Front foglamps have disappeared

About rearlamp, rear foglamp is in bumper while rearlamp is only localized on body with a clear lens.



# DVN Interview: Nichia's Rouven Haberkorn

LIGHTING NEWS



**By Paul-Henri Matha**

When I learnt Rouven Haberkorn has joined Nichia Europe, I took time to talk with him to know a bit more about this unusual move from an automaker to a supplier. Here's our discussion:

**DVN: Congratulations on your new role! Can you tell me briefly about your lighting career?**

**Rouven Haberkorn:** It's my pleasure, Paul-Henri. My educational background was the study of optical technology and image processing. My diploma thesis brought me into the automotive industry, where I have been working for the past 13 years. I began my career with Bertrandt as an engineering provider for Opel projects before joining the in-house Opel lighting team in 2012, and later, Lotus in 2019. My work has always been focused on optical simulation topics, early concept feasibility studies and physical visualization of lighting systems. During the serial development process, I always maintain close collaboration with tier-1 suppliers and lighting component producers. Over the years, I have gained an extensive knowledge in the development of automotive lighting systems at the system, subsystem and component levels.

**DVN: Why Nichia?**

**R.H.:** While it may seem odd to some that I moved from an OEM to a light source supplier, this career move across the value chain of automotive lighting made perfect sense to me.

Firstly, innovation in automotive exterior lighting has always been driven by the light source itself. From halogen bulbs to HID lighting, the introduction of LED light sources and now HD LED light sources or even laser light sources, light sources have always been the enabler for new automotive lighting functions and improvements to vehicle design.

Secondly, the demand for new applications like ground projections, car body lighting, RGB lighting functions, hidden-until-lit effects and interactive signalling displays is evolving, along with the requirements for light sources. The opportunities presented by

Nichia with our first-in-market HD lighting system enabled  $\mu$ PLS (micro-Pixelated Light Solution) engine, demonstrate that digitalization and software-defined vehicles extend beyond the vehicle level to automotive lighting systems, subsystems, and components. With  $\mu$ PLS, Nichia have made it possible to not only design high-definition light sources, but also to drive each pixel, thanks to our partnership with Infineon.

This trend will continue and extend beyond pixel resolution.

Thirdly, what's better than working for an OEM? Contributing to a multitude of OEMs and their innovation and lighting road map simultaneously. With the light source as the starting point for each automotive lighting innovation, we can drive new ideas for sensational and diverse applications across different car brands. This is possible only with strong partners like tier-1 suppliers, with whom I have closely collaborated in the past from an OEM perspective. Although the discussions were sometimes related to light source characteristics, they were still relevant.

Imagine the lighting development value chain as a series of layers. I began my career uncovering the outer

layers, represented by the functional side of the lighting system (AFS, ADB). I then moved to the sub-system level in terms of their integration (package, interfaces, E/E). Finally, there is the core components (optical concepts, light shaping techniques and materials). Until now, I had not fully explored the very core of where the magic

begins: the light source. This transition is a fascinating aspect and a great chance for me to learn more about the essence of light, especially within a company like Nichia, who have revolutionized the lighting industry with the pioneering development of high-power blue and white LEDs, continues to innovate for a brighter world which adds new value to our lives and society.

It is deeply interesting to change perspectives and to dive deeper into semiconductor technology and view the automotive lighting world from a new angle. Additionally, my past experiences will enhance my understanding of customer needs and end-customer expectations.

**DVN: Where are you based and what is your role at Nichia in Europe?**

Rouven: I am located in Kronberg, which is the office in Germany where the company's European sales and marketing activities are centralized. As a Technical Marketing Engineer, my role is to support our customers to drive innovative new lighting solutions.

**DVN: I and the DVN team wish you the best for your new role! We hope to see you soon at a DVN event!**

# General News

## Red Dot Award for Geely Yinhe Starship

GENERAL NEWS



Geely's Yinhe Starship design concept has won a Red Dot design award. The concept car is presented as offering 'a unique layout of Water, Yacht, and Shore', bringing natural landscapes into the cabin. The wing doors can open wide. Have some AI! 'AI intelligent seats' and 'AI flying devices' can autonomously drive outside the cabin, further integrating interior and exterior spaces. Additionally, a series of intelligent interaction designs, such as AI digital assistants, AI spatial computing, satellite communication, and boundaryless AI intelligent audio, help the Galaxy Starship transcend virtual reality, allowing users to feel immersed in the vastness of the world, right inside the vehicle.

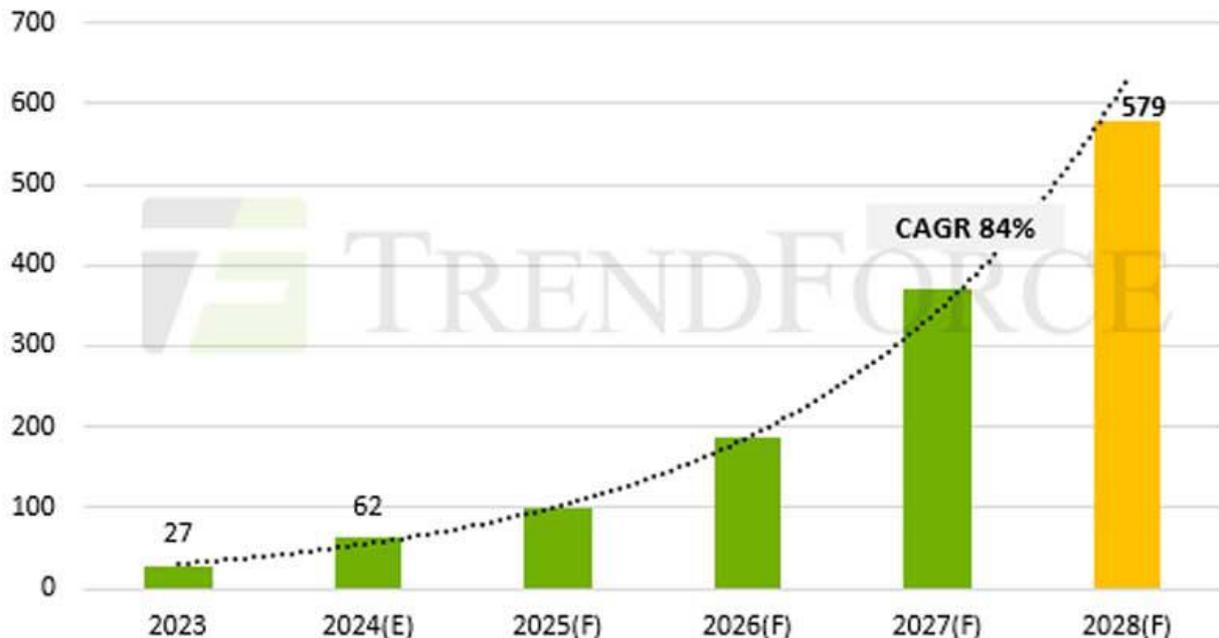


# MicroLED Chip Market Could Hit \$580m by '28

## GENERAL NEWS

Micro LED Chip Market Value Forecast from 2024 to 2028

(Unit: Million USD)



Source: TrendForce, Jun., 2024

Efforts to reduce the cost of microLED chips through miniaturization are ongoing. Companies like LGE, BOE, and Vistar continue to invest in large display applications, while AUO have focussed on developing smartwatch products. There is also growing demand for new display applications in head-mounted devices and for automotive uses. TrendForce's 2024 MicroLED Market Trend and Cost Analysis Report forecasts that the market value of microLED chips could reach \$580m by 2028, with a CAGR of 84 per cent from 2023 to 2028.

Continuous optimization of production processes remains critical for the development of the Micro LED industry; the inability to reduce costs and technical challenges are major factors behind the cancellation of Apple's microLED watch. The evolution of mass transfer technology is expected to shift from single to composite technique, such as combining laser transfer with stamp transfer.

Inspection and repair processes are critical for improving yield rates and reducing costs. Electrical testing methods are being upgraded, focusing on high-precision probe cards and contactless testing. These advancements are driving developments in electrical testing, while presenting major business opportunities for equipment manufacturers.

The cancellation of the Apple Watch has prompted chip supplier ams OSRAM to consider selling their Malaysian 8-inch plant. If the buyer is a company within the current microLED supply chain, this could positively impact the industry's technical development and cost structure optimization. Considering the shift in technology routes and target markets, Chinese compound semiconductor manufacturers developing 8-inch SiC power semiconductors are also potential buyers. This would allow them to expand into international markets, providing chip manufacturers with a means to increase profitability.

MicroLED still retains distinct advantages over competing technologies like Micro-OLED. In AR glasses, which require light engines and high brightness and small volume,

microLED light engines have now achieved sizes smaller than 0.2cc. With luminance levels rising toward 350,000 cd/m<sup>2</sup>, microLEDs are suited for high-brightness, all-weather, and all-scene recognition. The rapid development of AI-assisted tools is also expected to drive demand for AR glasses with microLED displays over the next two years.

In the automotive sector, displays do not require extremely high resolution, but need high contrast and reliability. MicroLED technology can enhance the driving experience by dint of high brightness and contrast, wide colour gamut, and fast response. It can be integrated into smart cockpit display solutions with unique shapes, curves, flexibility, and feedback. This expands the potential applications of microLED in automotive applications such as AR-HUDs, as well as innovative display technologies for car windows using transparent displays.