

Tue, 5 September
2023
Weekly Newsletter



NEWSLETTER #819

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



Editorial

Terrific DVN US Workshop; Onward To Shanghai!

The DVN US Workshop was last week in San Francisco, with more than 300 attendees. We retain from the workshop the great participation; the high level of exhibitions, the quality of the lectures, and the two great panel discussions chaired by Wolfgang Huhn and Paul-Henri Matha.

We had a great deal of enthusiastic feedback, such as this from Lotus senior lighting engineer Rouven Haberkorn: *"I really enjoyed the San Francisco workshop a lot. I think it was a great opportunity for Lotus to show our lighting strategy and plans for the future. I made a lot of new contacts and am leaving SF with new ideas and inspirations. It was for sure something unique and fresh!"*

and from Lucid exterior designer Jenny Ha: *" I met few people that we'll definitely bring them over to talk about the third project. So, thank you. This event gave me so much inspiration; hope to attend again».*

Indeed, a great workshop! I thank the speakers, the session chairs, the exhibitors and the DVN team who all have done a wonderful job. Next week we'll publish our monthly report on this event, with lecture summaries; expo booth show-and-tell, and pictures with a link to the DVN website for more information.

We are now working very hard to make the next DVN Workshop—at Shanghai—productive and valuable with lectures from over 10 carmakers including Audi; BYD; Chery; Great Wall; IM Motors; Volvo, and top tier-1 suppliers including Hasco; Hella; Marelli; Mind; Valeo, and ZKW. It's to be on 7-8 November at the famous Marriott Shanghai Parkview hotel.

Keep reading this week's DVNNewsletter for more information.

Sincerely yours,

A handwritten signature in black ink that reads 'W. Frally'. Below the signature, the text 'DVN CEO' is printed in a small, sans-serif font.

In Depth Lighting Technology

29th DVN Workshop at Shanghai Get Ready for Greatness!

SAVE THE DATE!

07-08
NOV.
2023
SHANGHAI

DVN
Lighting

**2023 DVN SHANGHAI
INTERNATIONAL WORKSHOP**

2023年DVN国际汽车照明创新技术研讨会

NOVEMBER 7-8, 2023 • MARRIOTT SHANGHAI PARKVIEW HOTEL
2023年11月7-8日 • 上海宝华万豪酒店

November 7th: Full day Conference in parallel with Expo followed by Social Cocktail and Welcome Dinner
November 8th: Full day conference and Expo
11月7日：全天会议和展会，会后安排鸡尾酒会和欢迎晚宴
11月8日：全天会议和展会

The 29th DVN workshop will take place in-person in Shanghai this Autumn 7-8 November at the Marriott Shanghai Parkview Hotel. Conference and exhibition spaces will be laid out for more than 300 in-person attendees with the theme: **New Digital Functions Around the Car: 360° Lighting.**

Presentations at the event will highlight the recent trends in lighting and brand recognition. Discussion panels and exhibition booths will spur valuable interaction among attendees and participants.

Topics will include:

- New Lighting functions and designs: front-rear-side road projections; illuminated logos and grilles; light signatures; decorative illumination; animation, digitalisation
- New technologies: matrix; mini- and microLEDs; DLP-DMD, laser, OLEDs, and MLA
- Regulation, simulation, testing and measurement.

Among the keynotes and the 25 lectures on the docket, top-notch contributions are confirmed from:

- Automakers including **Audi, BYD, Volvo, Great Wall, Chery, IM Motors**, with presentations likely also from **BMW, Lynk & Co, Geely, Patac, Polestar**,

Changan, and Nio

- Lighting suppliers **Hasco Vision, Forvia Hella, Marelli, Mind, Valeo, ZKW,** and **Varroc**,with lectures also likely from **Xingyu, Plastic Omnium, Koito, and Magna.**
- Light source suppliers **Appotronics, ams OSRAM, Nichia, KSL, Lumileds, Seoul Semiconductor**
- Regulations with the participation of **SMVIC, CATARC,** and **GTB**
- Skills to help development of new functions: **Elmos, Idiada, Microchip, Analog Device**
- Two panel discussions, one chaired by Wolfgang Huhn on design trends and the other chaired by Paul-Henri Matha on ADB and light projection—both with top expert panellists.

Lighting News

First unveiled cars at IAA, This Week

LIGHTING NEWS



IAA Mobility starts this week. Most debuts are of vehicles intended for the European market. Below few unveiled models. More information in the next newsletter.

Audi Q6 E-tron



The headlamps are featuring an ultra-slim lighting who's offering adaptive matrix LED that can dim or brighten as they detect oncoming light. The rearlights are featuring OLED technology, the navigation system is able to detects traffic jam or accident and change the rear display to show a warning triangle to alert the drivers behind.

BMW Vision Neue Klasse



With a new design language and a distinct focus on e-mobility, digitalisation and circularity, the BMW Vision Neue Klasse embodies individual mobility of the future. The rear light design also incorporates innovative technology, with 3D printed light elements that span multiple levels and are individually controlled to create a unique impression of depth.

Mercedes Concept CLA



Mercedes-Benz previewed its new range of compact cars with the Concept CLA Class, an electric four-door coupe-style sedan which features a drivetrain derived from the EQXX concept. Mercedes describes the concept as a “close-to-production insight” into a coming family of compact cars that will be the “gateway to the brand.” Mercedes says the design of the Concept CLA transmits “athletic power,” with a shark-nose front end and a seamless grille panel.

Light bands that wrap around the front and rear are reflective chrome when not illuminated.

Opel Experimental



At the front, the new illuminated logo sits proudly in the center of the compass, the matrix that guides Opel design and constitutes its conceptual guiding element. It is flanked by a signature light stretched across the horizontal axis while the illuminated central crease adds even more character.

Same compass at the rear. This time it includes the brake light. The whole combines with the Opel lettering – in place of the traditional Blitz – to form the central element.

Tesla Freshens Model 3



Tesla displays a freshened version of its entry-level Model 3 that adds premium features including ventilated seats, ambient lighting and a rear-seat infotainment screen.

The Model 3 has not been significantly freshened since its launch in 2017. Deliveries are expected by the end of the year or the first quarter of 2024.

HIPHI



HiPhi Z sedan

The high-end EV startup entered the European market this year with the X large SUV and Z GT sedan. It will show the Z at the auto show grounds, while the X and the Y, a smaller midsize sedan with gullwing rear doors is on display at its new retail space, called the HiPhi Hub, at Munich airport. RINT

BYD



BYD Seal midsize sedan and Seal U midsize SUV

BYD is rolling out a full range of models for Europe that it will display in Munich, including the European launch of the Seal midsize sedan (entering the Europe market later this year) and the Seal U midsize SUV. Other, previously shown models include the Han large sedan and Tang large SUV; the Atto 3 compact SUV; and the Dolphin compact hatchback.

MG



MG Cyberster roadster

The leading Chinese brand in Europe -- just behind Tesla in total sales -- is a division of SAIC. It will show the MG Cyberster full-electric sports car, which had its public debut at the Goodwood Festival of Speed in July; the MG4 Electric XPOWER, a high-performance variant of the compact EV; and the MG Marvel R, an all-wheel-drive, high-performance version of the electric SUV.

POLESTAR



Polestar 3

The Geely brand started as Volvo's tuning division but became a stand-alone brand in 2017, and the EV maker went public last year. It will show the Polestar 2 midsize sedan and Polestar 3 SUV in the city center display area.

DVN Interview: TUD Professor Khanh on ISAL

LIGHTING NEWS



DVN: What are the main topics you can share with us with ISAL 2023 approaching?Prof.

Khanh: in recent years, there has been a shift towards lighting functionalities, for example by the realisation of glare-free high beams with up to 84 segments. Starting from ISAL 2023, the focus will shift towards innovating complex lighting systems and optimising light distributions.

To enhance energy efficiency across all lighting functions and elevate the intelligence of ADB systems, it is essential to consider cameras as central sensor components, working in conjunction with other sensor types like lidar and radar for comprehensive digital monitoring of the vehicle's surroundings. The precise and adaptive adjustment of pixels within new high-definition modules can only be achieved through camera imagery and AI-based algorithms designed for object detection. Moreover, road projection technologies have the potential to assist drivers and reduce traffic accidents, particularly in challenging scenarios commonly encountered in urban settings, such as turning situations, left and right turns.

In the context of modern vehicle lighting encompassing low beam, high beam, and ADB functionalities, our community is returning to the fundamental objective of enhancing safety through effective lighting. This objective revolves around two critical components: reducing glare and enhancing driving comfort. This comfort factor includes aspects such as object detection, road brightness, and the uniformity of road illumination.

The relevant questions to address are how we can optimise the most appropriate light distribution on the road, and how can vehicle users and lighting experts assess the lighting quality of the headlamps installed in their vehicles. Consequently, the upcoming ISAL 2023 conference will feature discussions on the Headlight Safety Performance Rating (HSPR) for low beam, high beam, and ADB systems.

DVN: What has TU Darmstadt been working on to present at ISAL this year?

Prof. Khanh: Over the past 18 months since the last ISAL 2021-'22 conference, we have been engaged in the following areas of research and exploration:

- Evaluating the quality of digital cameras and how camera characteristics such as resolution, dynamic range, exposure time, and signal-to-noise ratio affect the likelihood of detecting objects in the traffic environment, including pedestrians, animals, and cyclists.
- Investigate the effects of adaptive rear lamps on both nighttime glare reduction and minimisation of energy consumption.
- Analysing the gaze behaviour of drivers in different environments, including urban areas, highways, and rural roads, with the goal of optimising the distribution of light on the road.
- Conduct studies using VR simulations to explore potential communication methods between autonomous vehicles and other road users, focusing on the use of symbols and displays.
- Investigate the potential distractions of near-field projection systems with respect to interactions with other road users.

DVN: How about the keynote speeches and the podium discussions?

Prof. Kahn: We are pleased to announce the keynote speakers for our event. Professor Steven from TU Darmstadt will discuss the emerging trends in autonomous vehicle development, while Dr. Michael Hamm will discuss the latest innovations in lighting technology.

We have also organised two podium discussions. The first will focus on various aspects of the Headlight Safety Performance Rating (HSPR), a global rating method recently recommended by the GTB for evaluating headlight performance, covering low beam, high beam and ADB functions. The quality of these lighting functions is now a critical factor in the evaluation of entire vehicles, making it a key marketing point for automakers. As technical benchmark, HSPR will facilitate communication between automaker design teams and headlamp manufacturers. Therefore, our podium discussion on HSPR is a valuable opportunity for lighting experts and managers.

The second podium discussion will be on the subject of how homologation can be a driver of innovation.

DVN: How many attendees do you expect?

Prof. Khanh: In 2019, prior to the COVID-19 pandemic, we saw 930 registered participants at the ISAL conference. In 2022, for ISAL 2021, which took place just one week after the end of the pandemic-related lockdown period, we had approximately 600 attendees, with the majority coming from Germany and Europe, as Asian and American experts faced challenges attending due to visa issues and ongoing pandemic concerns. Now, as we approach ISAL 2023, we anticipate a different global economic and industrial landscape, with a higher representation from industrial regions in Asia, including China, Japan, and Korea. Our expected attendance ranges from 800 to 850 participants, but we will remain flexible until the opening day of ISAL 2023.

Get your Ticket for ISAL 2023 now; [online registration](#) is open!

Possible PO PACE Award: Digital Projections

LIGHTING NEWS



Plastic Omnium have technology to display animated images and video, increasing the personalisation potential of a vehicle's interior and exterior lighting.



The DMD modules allow the lighting to be perceived as an overall experience in the vehicle, such as a welcome scenario projected in front of the driver and on passenger doors and then extending to the entire dashboard and seats, with the projection synchronised with the ambient lighting and customisable depending on the mood of the passengers. Installed in the rear of the vehicle, the DMD projectors can display full-size images, graphics and videos on the headliner.

A primary application of DMD technology is in headlight systems. Here, DMD projectors are used to project high-resolution images onto the road in front of the car, such as warning symbols, navigation instructions, or even animations that can communicate with pedestrians. Another application is in the development of augmented-reality displays which can project information onto the windshield or other surfaces, such as speed, navigation instructions, and even obstacles in the road. By using DMD technology, these displays can be high resolution, bright, and customizable.

The digital projection systems meet the growing demands and requirements for personalisation and user experience. Especially in the vehicle interior, installation space and integration are important. The compact and efficient module units can be realised with a luminous flux of 25 to 200 lm, depending on the application and specification.

Thanks to a proof-of-concept module equipped with powerful RGB LEDs, the digital projections in combination with the DLP3031-Q1 chip achieved a system output of 150 lm. This enables the individual display of content over almost the entire headliner, including virtual outdoor environments, videos, patterns, logos or other images such as warning signals or supporting information. The projector itself can be integrated into the rear seats or directly into the headliner due to its thermal design (passive cooling) and compact design.

Possible Valeo PACE Award: Thinbilite Module

LIGHTING NEWS



Valeo's 15-mm **Thinbilite** dual-function headlight module is a new development based on the third generation of their thin lens platform, which decreased the lens height revolutionary from 45 to 15 mm, meanwhile keeping both high performance and cost competitiveness.



The new device combines two modules of 100 mm width into a single assembly of 120 mm width while ensuring worldwide regulations compatibility with good performance.

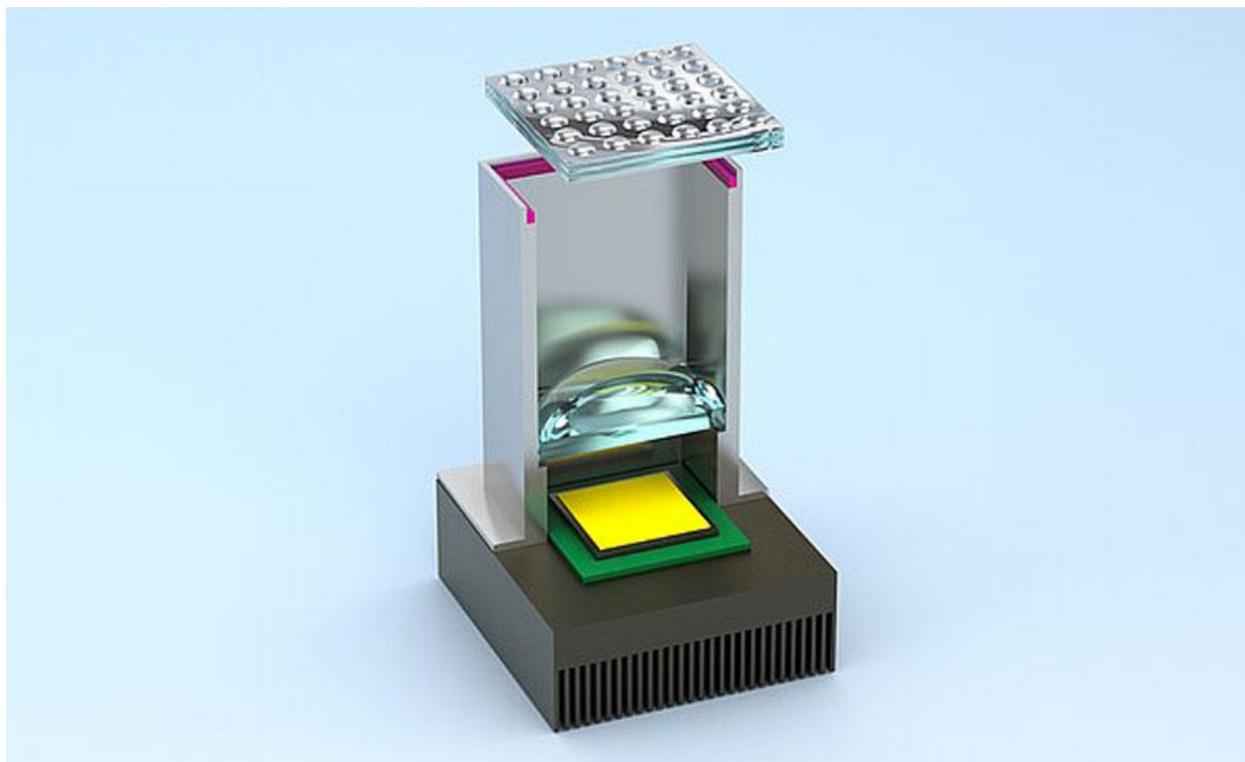
The 15 × 120 mm module provides low and high beam. It can be adapted to suit various body and lamp lens curvatures and can be an economical choice for global lamp mass and size reduction.

SOP of this innovative product took place in China around September 2022, and several different cars at many brands will be equipped all over the world, already confirming this product as a great business success for Valeo.

Valeo Teams are nevertheless very proud and thankful having been selected as Pace Award finalist for 2023, expecting later confirmation from the official votes.

DELO: New adhesive for Automotive Lighting

LIGHTING NEWS



Microlens arrays are a key player in lighting developments. They project LED light, which sits behind a very short focal length, providing sharp images and individual geometries. These systems are increasingly being used as optics in headlights and projection systems due to their low required installation depth.

For increased efficiency, such microlenses are fixed in a housing with adhesives. Thanks to a high viscosity of 75,000 mPa·s, DELO PHOTOBOND OB4189 enables a high enough aspect ratio for the bonding process. The adhesive thus retains its shape after dispensing and does not flow, which is important for bonding microlens arrays. It is also extremely resistant to yellowing, as shown by life cycle simulations of 500 hours at 140 °C. This is essential for such optically demanding applications.

The modified acrylate is solvent-free and developed for a temperature application range of -40 °C to +120 °C. It has a compressive shear strength of 30 MPa on polycarbonate and 25 MPa on PMMA. It can be cured with UV light (365 nm) and visible light (400 nm). The typical exposure time at 400 nm with a layer thickness of 100 µm is 5 seconds. This enables high-precision active alignment processes for optical components and low cycle times in automated production.

DELO is a manufacturer of industrial adhesives with its headquarters in Windach, Germany, and subsidiaries in US, China, Singapore and Japan. In the fiscal year 2023, 1,000 employees generated sales revenues of €205 million. DELO's customers include Bosch, Daimler, Huawei, Osram, Siemens and Sony.

LG Display Strengthen Display partnership with MB

LIGHTING NEWS



LG Display are strengthening their partnership and collaboration with Mercedes-Benz. The two companies started working together in 2004, and since then Mercedes have been equipping their cars with LG's advanced displays.

Given the existing installation history, it is not clear what will now change, but it is likely that we'll see more Mercedes models adopting high-end displays from LGD, mostly OLEDs. The Mercedes EQE 2022, for example, uses either a 12.8-inch AMOLED or (optionally) Mercedes' MBUX Hyperscreen, a 56-inch display, actually made from three different OLED units, embedded in a single glass display. There's a central 17.7-inch panel plus two 12.3-inch panels. The 56-inch glass also includes holes for the HVAC outlets, which are integrated into the display.

Driver Assistance News

Lidar Interview – Visit to Koito Lab in Sunnyvale

DRIVER ASSISTANCE NEWS



DVN had the opportunity to visit the Lab of Koito, located in Sunnyvale, in Silicon Valley. We met with Viren Merchant, General Manager for New Technology and with Ryosuke “Ro” Hara, Project Director in charge of the Silicon Valley Lab.

DVN: Could you give us the current position of Koito in the lighting business?

Koito is a Japanese company, the Worldwide leader for Headlamps (20% market share), with a revenue in 2022 of 864 billion Yen. The group company of Koito has also a significant activity in Japan for Lighting systems related to infrastructure like streetlights, traffic lights, traffic management systems.

DVN: what are the areas of interest of Koito and NAL in Silicon Valley?

Our focus is the technology contributing to the future mobility society. In particular, we are investigating technologies related to sensing support and communication support. Regarding sensing technologies, it includes radar, lidar and cameras (visible, IR, thermal). Regarding communication, it includes V2X, Lighting and display technologies.

DVN: can you talk about some projects you have released or some current projects?

Since 2017 we have aimed to collaborate with start-ups, including a joint development with Cepton and have done some demonstrations at CES.

DVN: Koito did a lot of presentation in DVN lidar workshop about lidar integration in the headlamp. Can you extrapolate a bit about your research?

OEMs and ADAS system suppliers would like to expand the ODD (Operational Driving Domain) using multiple sensing technologies. This will increase the variety of sensors, including LiDAR, and we assume that mounting locations will become an issue. The integration into lighting systems can be one of the solutions. Also, by integrating sensors with lamps, the risk to spoil the vehicle design can be minimized, and the lamp cleaner can be used to remove dirt. Koito has been doing cleaning systems since the 1970's and has demonstrated a few concepts. The headlight already has cleaning, and the real-estate is already there.

DVN: can you talk about the Koito investment in Cepton? What are you doing in Koito lab with Cepton?

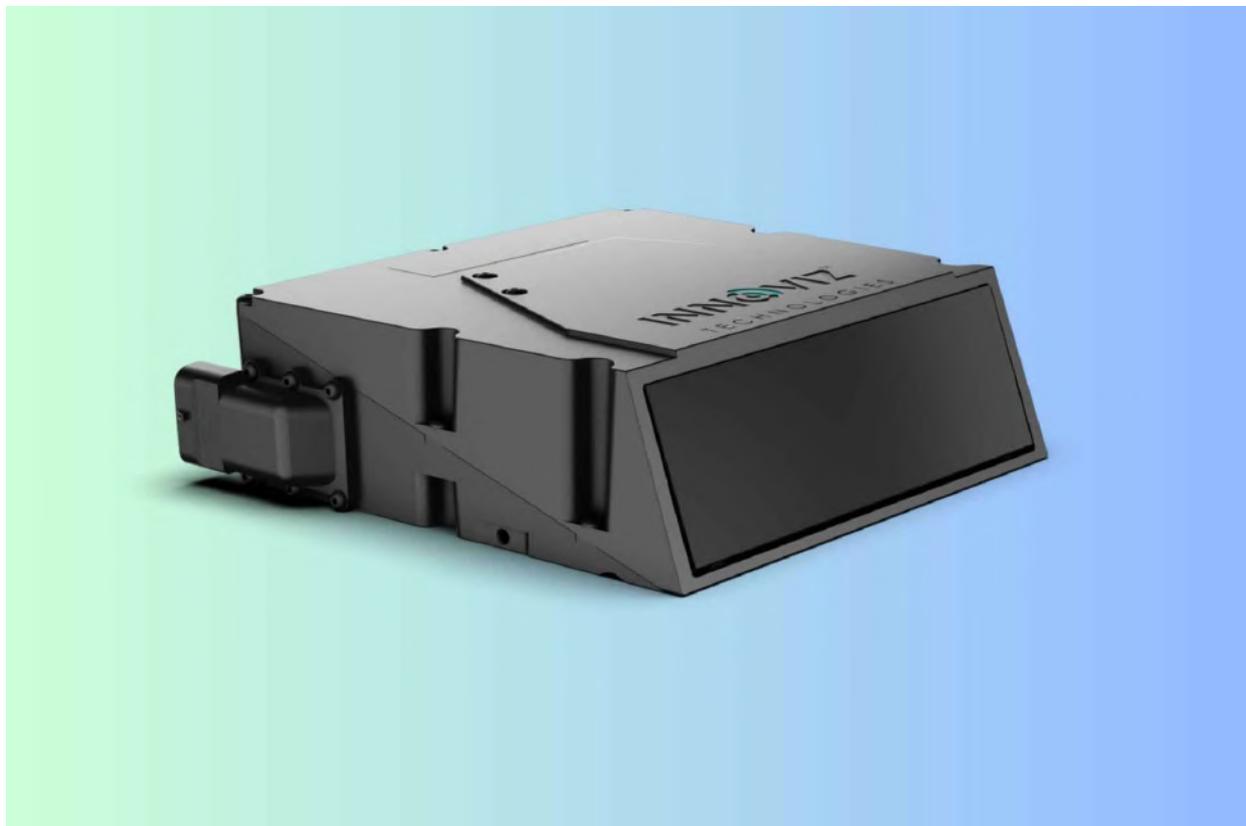
Koito has invested a total of \$200M in Cepton so far. Joint development started in 2018, and we are currently providing development support for the market launch and mass production. For mass production Koito is responsible for the final assembly and system validation including functional safety. Koito is the Tier1 dealing with the customer. Tier 1s play a big role in alignment and calibration also; many of the smaller LiDAR players do not have experience doing this.

DVN: What are the challenges to realize Lidar integration in lamps?

Mounting into the lamps is attractive from a real-estate – but the headlight design is different for each vehicle, so the LiDAR design has to be optimized for each vehicle. Heat is also a challenge for integration. Alignment for LiDAR is also more of a challenge than with headlights.

Innoviz: Collaboration with BMW to develop B-Samples

DRIVER ASSISTANCE NEWS



Innoviz Technologies, a global leader in LiDAR technology, has announced its collaboration with BMW Group to develop B-Samples of a new LiDAR platform. This development is aimed at the next generation of BMW's automated vehicles. In addition to the LiDAR solution for the 7 Series. The BMW Group and Innoviz have started this first phase to develop a LiDAR based Minimal Risk Maneuver (MRM) system in the future.

General News

BYD Among Top 10 automakers in the world

GENERAL NEWS



According to reports, BYD surpassed Mercedes-Benz Group and BMW for the first time to become one of the top 10 best-selling car companies in the world, indicating that electric vehicles are reshaping the automotive industry.

In the first half of 2023, BYD's global new car sales increased by 96 per cent year-on-year to 1.25 million units, ranking tenth, according to research institutes and automakers. In contrast, BYD ranked 16th in 2022 and didn't even make it into the top 20 in 2021.

BYD are actively entering overseas markets. In the first half of 2023, BYD exported more than 80,000 Chinese-made vehicles and expanded its presence in Thailand, other Southeast Asian countries, and Russia.

peng's Flying Car Takes First Flight

GENERAL NEWS



On 26 August, the signing ceremony of China's first flying car across the river and application scenario exploration was held in Changsha, a middle China city. The Xpeng Huitian flying car successfully completed the first cross-river flight from Hexi to Hedong in Changsha city, which took about 4 minutes. Zhao Deli, founder of Xpeng Huitian, said that the current range of the flying car is only 20 kilometers, but the version delivered in mass production in 2025 will have a longer battery life and can meet the various needs of users.