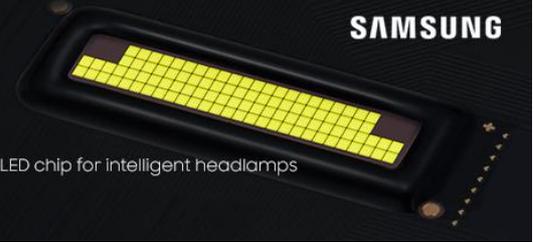


PixCell LED

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

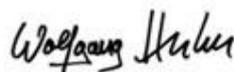
Spectacular HiPhi X Lighting

Recently DVN had the opportunity to drive the fully electric Chinese HiPhiX car with a spectacular lighting system made by Hasco Vision. The HiPhi X is somewhere between an SUV, van, and luxury sedan. The rear doors are half gull-wing, half rear-hinged. The front doors open if you approach the car with the key in your pocket, and they close if you touch the brake pedal. The seats can even move left-right. The passenger display is positioned down in the legroom and has midsize TV format. The B-pillar is equipped with a face recognition camera. This incomplete list of functions and equipment may show how unusual this car really is. In Europe it seems like a view to a possible future, but in China it has been in traffic for a year now.

The car's HMI was in Chinese only, so we used a mobile phone translation app to operate it. This worked well, but needed a co-pilot, of course. The night drive and even more the animations while parked were more than surprising. I am in lighting business for 35 years, but I have never seen something like this.

Below each front and rear lamp, an RGB LED matrix display shows the direction indicator, reversing lamp, and many fun-functions. My personal fun-favorite out of about 20 different ones was the "fireworks" which consists of fireworks on the displays together with fireworks sound—really an eye catcher. We "fireworked" at the parking site of a restaurant before entering. Later the waitress asked if it was our car which was making firework effects.

Another special function was the U-turn indicator. After two times pushing the indicator lever at the steering wheel, a U-turn indicator appears on the display, with dynamic animation. Not allowed by UN Regulations, but really cool. This car shows what Chinese car makers are able to launch on the Chinese market. I don't think the car's lighting system is ready for Europe or the US but it shows what you can do with an LED communication matrix. For the GTB it is for sure worth a look. Find the details in this week's in-depth report.



Wolfgang Huhn
DVN Senior Advisor

In Depth Lighting Technology

Amazing Lights from Hasco on HH Hiphi X



Chinese startup Human Horizons unveiled their radical concept car in 2020, and production of the Hiphi X started last year at Dongfeng's plant at Yancheng. The price of the car as tested by DVN: C¥800,000 (€116,000). It has 4-wheel steering and a combined output of 536 hp. Claimed range is up to 550 km with a 97-kWh battery. The car is 5.2 m long, 2 m wide, and 1.6 m high.



The car's spectacularly innovative lighting system, comprising 1,716 LEDs, was developed by Chinese supplier Hasco Vision in only nine months' time, and it's promoted as the "Customisable Matrix Lighting System". The most visible elements of this system are the four "Intelligent Signal Displays" below each front and rear lamp. Each Front ISD has 178 RGB LEDs; each rear one 242. The ISDs are fully controllable by the centre touchscreen in the car. Three menu pages offer about 20 different animations and communication elements, including a thumbs-up sign shown at lower left in the picture. DMD Video Animations are also fully selectable; right and left can show different animations, and there are additional projectors in the doorsills for playing ground-movies to the sides of the car.



Some imaginative symbols are available, like the dynamic U-turn indicator shown here. To activate it, the driver swats twice at the turn signal stalk, not just once. Other nonstandard symbols include a turn signal in the form of a heart, and many animated signals.

In the headlamps, a DMD and an LED matrix both contribute to the high beam. The slim-lens low beam elements are aesthetically connected with an eyebrow of white light. The rear lamps echo the front design with a red-light strip.

Night Drive Impressions

In the city, the driver sees numerous road projections purporting to be of assistance: a box marks the vehicle's lane and flashing light on the ground when pedestrians and bicyclists are detected, even if they are not in danger at all. Still others appear only briefly (what was that?).



Most interesting is the AR-HUD, which constantly shows speed and range and puts up a chain of traffic cones if you are about to leave your lane. Cross traffic warnings, front and rear distance warnings, and others are virtually projected into the traffic around you. The DMD-ADB shadows out other cars exactly around their outline, whether they're moving or parked. When you leave the city and drive on dark country roads, the AR-HUD box appears light grey with excessive luminance—while driving in the city it wasn't visible. Oncoming and leading cars were detected early but not fully shadowed out over the whole angle of encounter; some reactions did happen. The software needs some improvement, specially the DMD-ADB. Obviously, the development time was too short for a sufficient testing phase. This should be improved eventually by an OTA software update, which the car is equipped for.



All in all, the lighting system is the highlight of the car. The HiPhi X has a really brave and imaginative lighting system with a lot of unusual functions and symbols, which would be tolerated nowhere else in the world other than China—a lighting player's sweet dream, perhaps, but a human factors researcher's nightmare and a highway safety regulator's horror movie; whose view will prevail? Speaking of movies, see the [online video](#) that goes with this report.

Does this sort of system portend China becoming a lighting test field? If some of these innovations are proved beneficial (or at least not dangerous) in Chinese traffic, perhaps they could be expanded to other regions, assuming the regulations will change to allow them. In fact, Hasco Vision and international regulatory experts are constantly trying and iterating. After the launch of the HiPhi X concept in 2020, another model equipped with DLP headlamps and ISC digital signal technology, SAIC IM L7, was launched this past March. It is reportedly equipped with the newest Hasco DLP headlamp module: smaller, more energy-efficient, and giving clearer projections. And the digital signal lamp has reached more than 3 kilopixels' resolution, making more interesting functions and exquisite effects possible. It is worth noting that the price of the model has dropped to C¥400,000 (€58,000), which is expected to accelerate the popularity of digital lighting.

Thank you, Hasco Vision for this exciting experience.

Lighting News

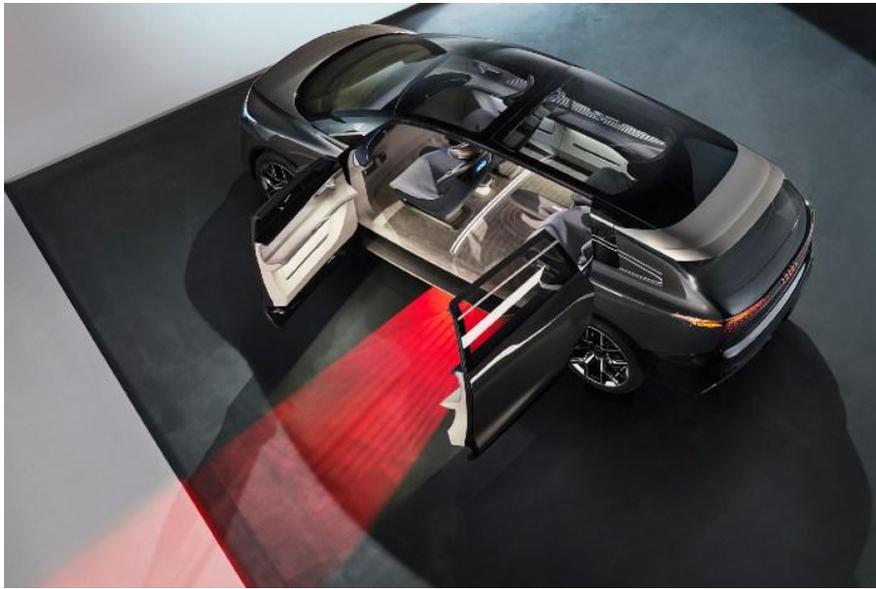
Audi's Urbansphere Concept for Megacities

LIGHTING NEWS



Audi says their Urbansphere electric concept was developed around the needs and wants of those living in Chinese megacities. It offers the largest interior space of any Audi ever built and puts a focus on the loungelike attributes and luxury touches that make it a living room on wheels or a mobile office during time spent in traffic. The car can offer personalized suggestions for relaxation; for example, a meditation app can be used via the personal screen and the headrests are equipped to provide each passenger with their own private sound zone.

Audi concentrated on realising dynamic lighting effects to clearly signal to other road users. Low and high beams are implemented via light segments in the outer sections of the vehicle, complimented by a matrix LED surface located in the rear. A digital eyebrow also functions as a dynamic turn signal, and the illuminated surfaces can be adapted to the traffic situation, environment, or the mood of the passengers.



An additional luxury touch is the “digital red carpet” that activates when the doors are opened, to welcome vehicle owners. Red is considered an auspicious colour in China.

Matrix Front + 3D Rear Lamps on New DS4

LIGHTING NEWS



The new DS4 bristles with advanced lighting; its matrix LED headlamps and 3D rear lamps, both from Marelli AL, adorn the car with unique day and night designs. The headlamps each have three modules including a dedicated matrix module and a central rotating one; the front lighting system has five lighting modes to adapt to different driving conditions.



The rear lights follow the DS brand's signature styling; special laser technology provides the distinctive diamond design of the DS brand as well as 3D effects, and the sequential turn signal emphasises the vehicle's dynamic nature. Marelli have posted a [video](#) showcasing the DS4's lighting system.

Lincoln Star concept: Lighting to Set the Stage

LIGHTING NEWS



The Star is a new concept from Ford's Lincoln brand—a preview of coming attractions in Lincoln's future EV model range. The concept is designed to show off how a flexible electrical architecture lets designers create new experiences for customers, using light for staging the vehicle. The design was done by Lincoln's global design director Kemal Curic and Ford's chief design officer Anthony Lo.



ZKW's Smart Digital Lights for New Range Rover

LIGHTING NEWS



The ZKW LED headlamps on the new Range Rover are equipped with digital light processing to generate stepless, glare-free high beam that automatically shadows out other road users, and also projects animated images onto the road. The light modules are unusually small, but with the same performance as larger ones—this enables a particularly slim design and a large number of new functional options.



The lights were developed and are manufactured by ZKW in Austria. For the first time, a three-component injection molding technique is used, which allows the implementation of a new type of DRL concept.

ZKW also equips the Jaguar Land Rover models with fog lights, the new Land Rover Defender with main headlights and the Land Rover Discovery Sport with vertical and black rear light.

Driver Assistance News

AEye Opens Munich Office

DRIVER ASSISTANCE NEWS



Aeye, who supply high-performance lidar components and systems, have opened a new office in Munich, Germany to support current and prospective automotive; mobility; trucking; logistics, and smart infrastructure customers.



At the same time, the company also announced their appointment of veteran automotive engineering leader Andreas Prinz (photo) as technical sales director for AEye in Europe. Prinz comes to AEye with more than two decades' experience in automotive software. He most recently served as the director of customer programs for TTTech Auto in Munich, where Prinz led a software task force of 180 people. Prior to that, he held director roles at both Magna Electronics and Harman, as well as various engineering roles at companies such as Continental Automotive Systems and Motorola.

Over the past year, AEye have positioned themselves for growth at scale through technology validation, product advancements, the attainment of manufacturing milestones with key partners, and company expansion to advance their mission to drive the future of safe vehicular autonomy.

AEye's software-defined lidar systems enable advanced driver-assistance; vehicle autonomy; smart infrastructure; logistics, and off-highway applications to save lives and propel the future of transport and mobility. AEye's 4Sight™ intelligent sensing platform, with its adaptive

sensor-based operating system, focuses on delivering faster; more accurate, more reliable information Aeye recently filed their 100th patent globally, and last year became a publicly-traded company listed on the Nasdaq stock exchange; doubled in size, and opened offices in Korea and Japan.

Quanergy, Mirasys Partner for Insights, Analytics

DRIVER ASSISTANCE NEWS



Quanergy Systems, a major provider of lidar sensors, are pursuing a technology integration with open video management system (VMS) provider Mirasys. The integration of Quanergy's platform with Mirasys' deep vision data platform will deliver advanced insights and analytics for physical security applications in the government, retail, and gaming industries.

By integrating Quanergy's 3D lidar platform, customers can optimise business operations with real-time data including location, direction, speed and type of objects. The Qortex DTC™ platform enables the classification of vehicles and people, ensuring high accuracy and efficiency when integrated with VMS. In addition, the lidar sensors are accurate and reliable in all weather and lighting conditions, including very bright and very low light, making them ideal for both indoor and outdoor security applications.

Quanergy's mission is to create powerful, affordable smart lidars for automotive and IoT applications. They have what they describe as the only true 100 per cent solid-state CMOS lidar sensor built on optical phased array (OPA) technology to enable the mass production of low-cost, highly reliable 3D lidar systems.

Mirasys are a "deep vision data" company enabling customers around the world to extract maximum information from old and new cameras and sensors. Their intelligent VMS is based on openness; easily installed and used software, and data security.

General News

Musk Claims Tesla Will Sell 1.5m+ Cars in '22

GENERAL NEWS



Tesla CEO Elon Musk said he might boost vehicle production more than expected this year despite supply-chain bottlenecks and disruptions in China.

Musk—who is currently [under investigation](#) by at least one national government for making false statements to manipulate stock prices—said Tesla likely will produce more than 1.5 million vehicles in 2022, up some 60 per cent over last year. The company's long-term goal is to increase vehicle deliveries by an average of 50 per cent annually.

Tesla delivered around 310,000 vehicles globally in the first quarter, up from 185,000 a year earlier.

Tesla are recovering from a shutdown at their Shanghai factory, where work was suspended on 28 March because of a Covid lockdown; this cost Tesla about a month's worth of production.

“Shanghai is coming back with a vengeance,” Mr. Musk said as the company reported that sales in the first three months of the year jumped roughly 80 per cent from a year earlier to more than \$18bn, generating a record profit of \$3.3bn. That topped the previous high of \$2.3bn set in the preceding quarter.

Tesla sell emissions credits to other companies—in fact, these credit sales are one of Tesla's main revenue streams, which the automaker [finally admitted](#) under pressure from regulators to do so. Emissions credit sales brought in \$679m in the most recent quarter, up from \$518m a year earlier. Credit sales have long been critical to Tesla's bottom line, though Musk claims the company will become less reliant on them.

Horizon, BYD Officially Announce Cooperation

GENERAL NEWS



BYD CHAIRMAN AND PRESIDENT WANG CHUANFU (LEFT); HORIZON FOUNDER AND CHIEF SCIENTIST YU KAI (RIGHT)

On 21 April, BYD and Horizon officially announced that they have reached a fixed-point cooperation. BYD will equip some of their cars with Horizon's high-performance, large-computing Journey 5 autonomous driving chip to create a more competitive integrated solution for traveling and parking, and to achieve high-level automatic driving functions. The equipped BYD models will be launched in mid-2023 at the earliest.

Last year, BYD achieved a global sales volume of nearly 600,000 new-energy passenger vehicles—the ninth time as № 1 in China's new-energy passenger vehicle sales—and the cumulative production and sales of new energy vehicles will exceed 1.5 million units.

Horizon are the first technology company in China to launch production of automotive-grade AI chips, and have already passed the pre-loading and shipping mark of one million chips. Horizon's third-generation vehicle-grade product, Journey 5, has both large computing power and high performance.

Voyah, Baidu in Strategic Pact

GENERAL NEWS



Eleven days ago, Voyah Auto and Baidu signed a strategic cooperation agreement around automotive intelligence.

The two companies will cooperate on intelligent driving; intelligent cockpits; automobile safety; intelligent maps, and other business fields.

Voyah Auto, as a high-end smart electric brand, was established in 2018 as an affiliate of Dongfeng Motor.

Since Baidu Apollo developed autonomous driving in 2013, they say they have become the most active open platform for autonomous driving in the world.