SBD

April 2023 3000c

2023 Shanghai Auto Show

The 20th Shanghai International Automobile Industry Exhibition

About SBD Automotive

Management & technology consultants to the automotive industry for over 20 years

Our expertise:

- Connected
- Autonomous
- Shared Mobility
- EV
- Cybersecurity
- Anti-theft

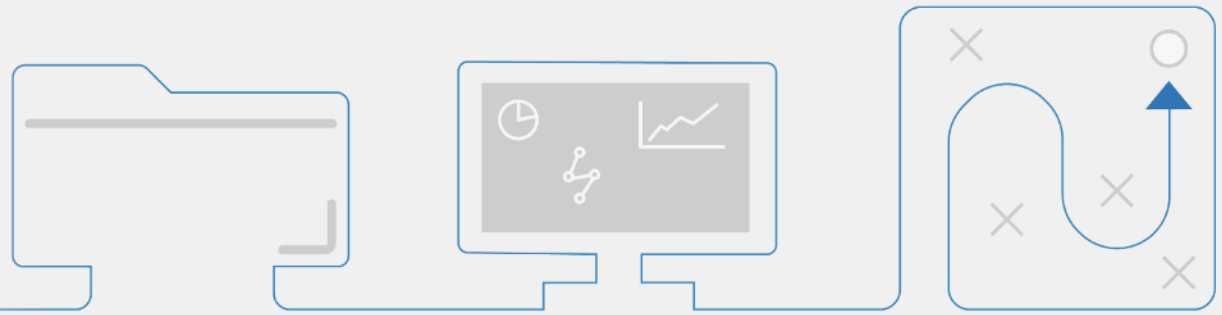
Our role:

As our industry faces...

Uncertainty ▶

We provide our clients with...

Data ▶ **Insight** ▶ **Advice**



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Introduction

A brief introduction to Shanghai Auto Show and this flash report

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The 20th Shanghai International Automobile Industry Exhibition

The 20th Shanghai International Automobile Industry Exhibition is the first international A-class auto show this year. With the theme of "Embracing the new era of the automobile industry", it focuses on the innovative development achievements of the world automobile industry, with a total exhibition area of over 360,000 square meters. The total exhibition area of this Shanghai Auto Show exceeds 360,000 square meters, and 1,200 models and 1,413 vehicles are displayed in the vehicle exhibition area. There are 93 new model debuts in the world (including 28 world-wide first releases by multinational companies) and 64 concept cars. There are 271 new energy vehicles (including 186 new energy vehicles of China automobile enterprises) and 513 new energy exhibition vehicles.

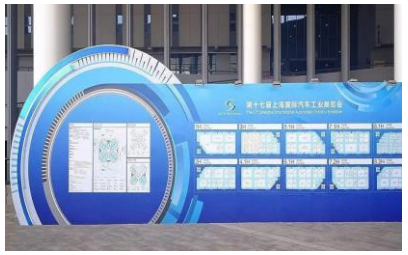
This year's auto show will deeply explore the implementation path of low-carbon transformation of the automobile industry, focus on building an exchange and cooperation platform to optimize the layout of the industrial chain and supply chain, intuitively show the sensory impact brought by the integration of automobile culture and fashion elements, and strive to build an automobile industry ecosystem driven by technological innovation and integration innovation, so that the world automobile industry will once again show its vitality on the stage of Shanghai Auto Show, depicting the infinite possibilities that cars will bring to people's lives in the future.

SBD China sent a total of 9 members to attend the exhibition, including China director, product experts and analysts.

Report focus

SBD's 2023 Shanghai Auto Show will focus on the new models, trends and technologies displayed at this auto show, and analyze how they will guide the development of the automobile industry.

Comparison between Shanghai Auto Show 2023 and previous ones

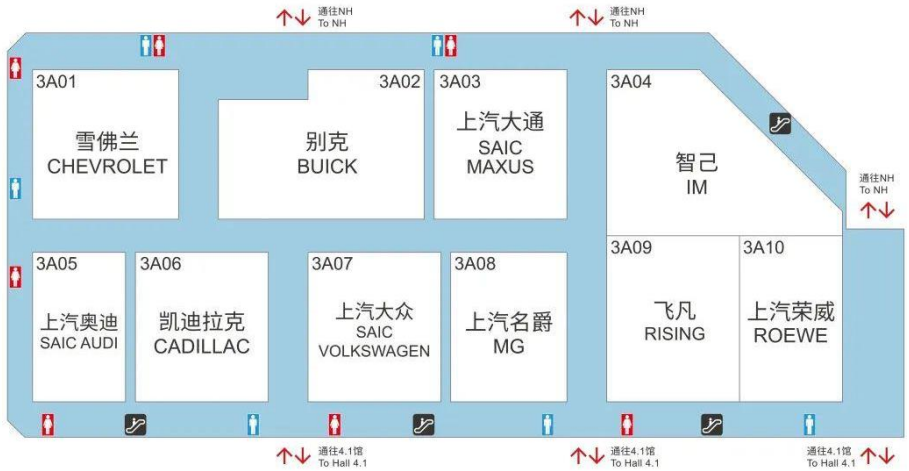


	2015	2017	2019	2021	2023*
Exhibition theme	Innovation and upgrading	Working towards a better life	Co-create a better life	Embrace change	Embrace the new era of automobile industry
Number of visitors	928k	1.01 million	993k	810k	To be announced
Number of automobile exhibitors	2000	1000+	1000+	1000	1000+
Exhibition highlights	• Platform concept • New energy vehicles began to heat up • Cooperation with Internet companies • Automated driving starting to emerge	• New energy becoming the main theme of auto show • 4G put into mass production • Smart home • Autopilot technology based on AI • AR technology • Application of voice assistant • Big central displays • Localized connected service • Baidu CarLife launched • Biometric technology	• Adoption rate of passenger displays on the rise • Traditional OEMs starting to electrify • Emerging start-up OEMs • Prepare for the coming 5G era • L2 ADAS put into mass production	• UWB technology is ready to be applied in cars • OTA update has gradually become mainstream • OEMs began to introduce AVP • AR HUD seen on cars • Technology companies strengthen cooperation with OEMs • Individual models began to carry LiDAR	• The application of light has emerged • The first year of mass production of electronic exterior rearview mirror • In-vehicle health becomes hot topic, and many solutions have landed • AI continues to penetrate (wallpaper, recommendation, intelligent dialogue system) • Layout competition of charging network • Urban pilot driving large-scale launch

*4.18-4.27, 2023

Participating OEMs (1/2)

Hall 3



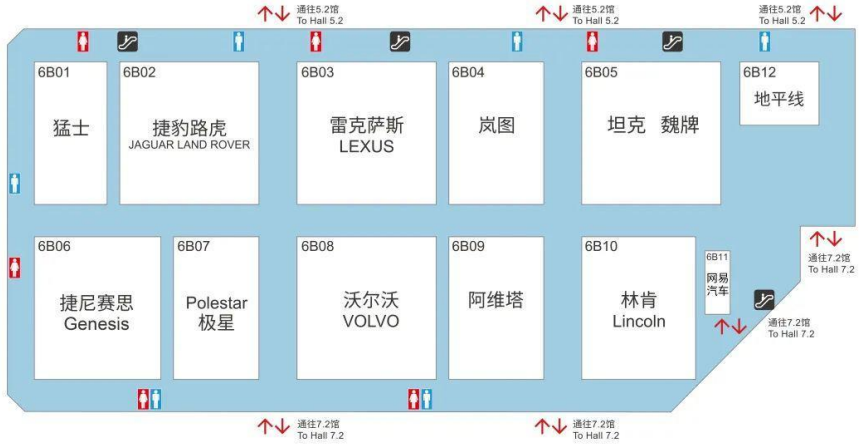
Hall 4.1

Hall 5.1

Hall 6.1

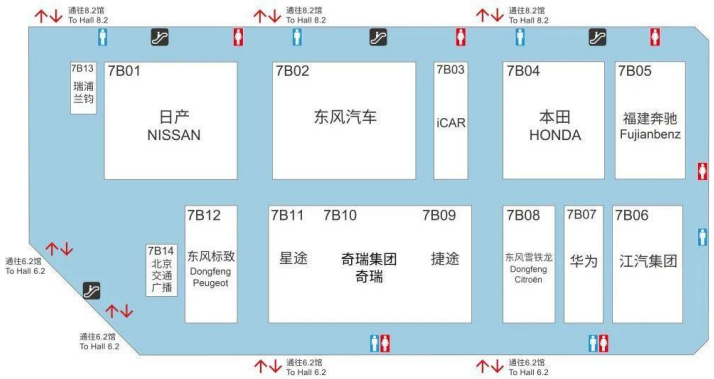
Participating OEMs (2/2)

Hall 6.2

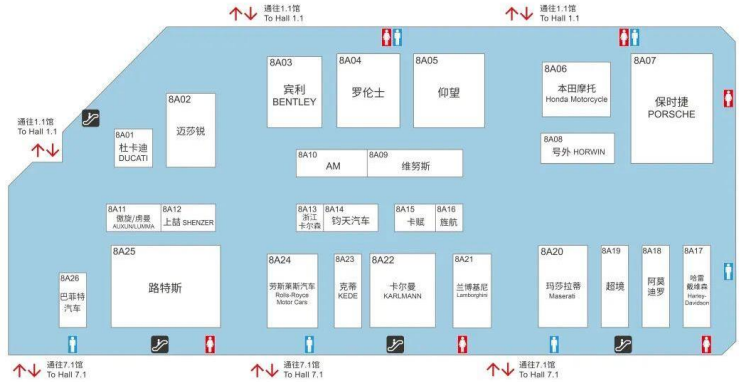


Hall 7.1

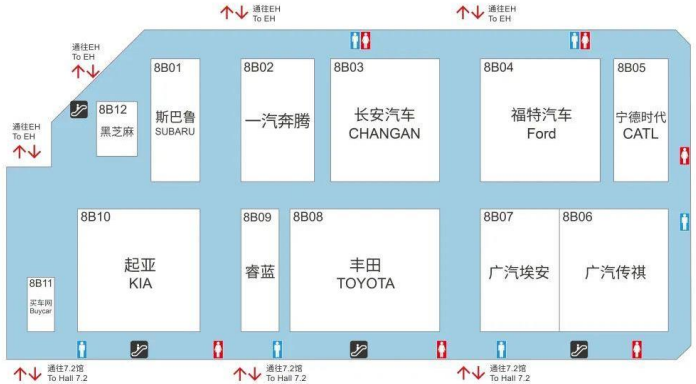
Hall 7.2



Hall 8.1



Hall 8.2



Participating suppliers

Hall 1.2

Hall 2.1

Hall 2.2

Key insight

Key Insights in 2023 Shanghai Auto Show

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Key insights (1/2)

Multinational auto companies/auto media regard China as a strong competitive market

BMW executives at Shanghai Auto Show

Lexus 'Rolls-Royce' 7-Seater - the £200,000 LM and all the best new cars at the Shangh...

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Overseas cars from the media CarWow

- In the past three years, China's automobile market has experienced large changes, and the successful transformation of local automobile enterprises (disruptors & traditional ones) under the background of new energy is gradually replacing the share of overseas brands in the ICE vehicle market. Under such a general trend, local OEMs have occupied the centre in this auto show. The leading disruptors like NIO, Xpeng and Li Auto, and traditional OEM like BYD, which successfully transformed into electricity, have attracted many domestic and foreign attention.
- Faced with the enormous pressure from local brands, most multinational auto companies have sent large-scale delegations and senior leaders to attend the Shanghai Auto Show, which is a platform for the intelligent and electric transformation of their brands, in the hope of reversing the poor impression of consumers on their transformation. At the same time, they also appeared on the booths of local brands to visit and communicate, so as to know the latest trends of local brands to the greatest extent.
- Many overseas auto media appeared in this auto show. Traditional media include The Wall Street Journal, Reuters, AutoCar, etc., and self-media include CarWow, Wheelsboy, MassAutoCar, etc. The participation of overseas media has further demonstrated the great changes in the China market, which is also in line with the theme of this auto show "Embracing the new era of the automobile industry".

The middle and high-end road of traditional domestic OEMs

- With the rapid development of new energy vehicles, the domestic electric market has begun to show differentiated demand. Traditional local OEMs have built mid-to high-end sub-brands, enhanced their brand image and opened new markets. With the slowdown in the sales growth of new energy vehicles, OEMs are pinning their hopes on the transformation from "quantity" to "quality", improving the gross profits through launching high-end brands.
- For the first time, BYD set up an independent booth for millions of new energy brands and shared it with a number of luxury brands such as Bentley, Rolls-Royce and Porsche in the 8.1 Pavilion. Yangwang U8, which is positioned as a new energy hard-core off-road vehicle, started the pre-sale at the auto show, and the official pre-sale price was 1.098 million yuan. It shows that BYD wants to tap the potential of subdividing the track with the help of new brands and new models after firmly establishing the mass market of new energy passenger cars.
- Other OEMs that have launched mid-to high-end brands include Dongfeng, Chery, AION, Geely and Hongqi.

Key insights (2/2)

Exportation has become a new track

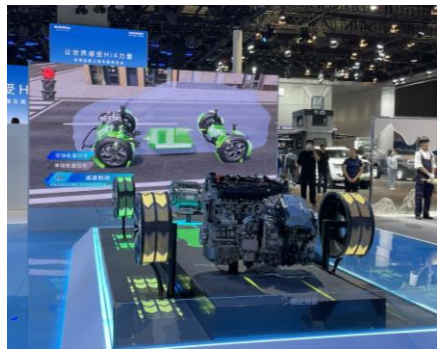
Zeekr European strategy

Chang'an automobile's "all rivers run into the sea" plan

- Local brands have released their future strategic plans in this auto show, and most of them mentioned "going overseas", such as Zeekr, HiPhi, Chang'an, etc., and their strategy is no longer to export low-priced products, but to rely on digitalization and electrification to enter overseas markets.
- Zeekr plans to open the first batch of stores in Stockholm and Amsterdam in 2023, selling Zeekr 001 and Zeekr X, and complete the delivery within this year, and will be able to enter most of Western European market by 2026.
- HiPhi plans to open the first batch of experience centers in Munich and Oslo. HiPhi X and HiPhi Z are expected to be delivered in Europe in the third quarter of this year, and the first batch will be delivered within 2023.
- Chang'an puts forward the plan of "All rivers run into the sea", which speeds up the layout of products and production capacity, promotes the simultaneous development of global products and regional differentiated development. Chang'an expects to enter 90% of the global market before 2030.
- However, there are still difficulties in export, such as establishing a global supply chain, reviewing overseas data security, and catering to users' habits in overseas markets, which are all urgent problems for local brands to solve when exporting.

Has the swan song of ICE vehicles arrived?

Mercedes-benz 'pure electric' projects



Great wall Hi-4 four-wheel drive electric hybrid architecture

- According to official data, the proportion of new energy vehicles in this auto show is 22%. Although it seems that ICE vehicles are still takes the leading role in this auto show, among the 93 new cars released at this auto show, new energy vehicles occupy most seats. Most OEMs have also demonstrated new technologies and plans of pure electric/hybrid.
- For local traditional car companies, hybrid has become a shortcut to pure electricity, in which Great Wall has launched a brand-new intelligent four-wheel drive hybrid Hi-4 architecture; Chery brought C-DM hybrid technology; Hongqi released a new generation hybrid platform HMP which is based on the FMEs "Flag" architecture. The continuous updating of hybrid technology can not only reduce the consumption of fossil fuels, but also alleviate the problem of difficult charging caused by the large-scale popularization of electric vehicles to some extent.
- For multinational OEMs, accelerating the electrification transformation is their top priority, not only for environmental protection considerations, but also for catching up with local brands. Among them, the new models of Mercedes-Benz after 2025 will be all based on pure electric platforms; Volvo plans to transform into a pure electric luxury car enterprise in 2030; Honda announced that all its vehicles will be electrified by 2040.

Key trends

Key Trends in 2023 Shanghai Auto Show

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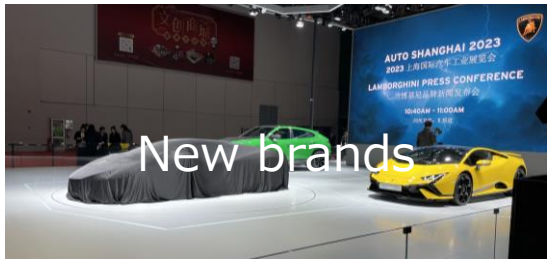
Main Trends of Shanghai Auto Show 2023

Major trends

2023

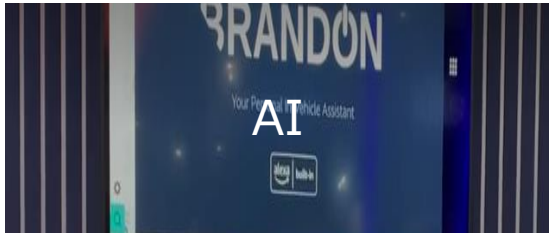


New brands

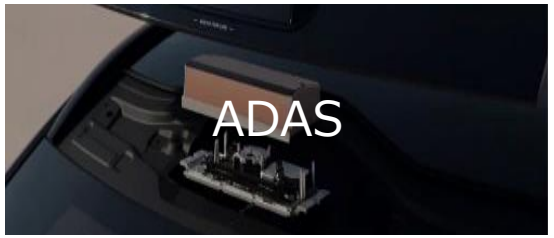
Software defined vehicle

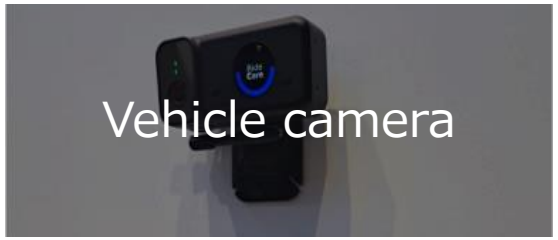

Screen display


Connected system



AI


ADAS


Vehicle camera


Electrification

New brands (1/2)

GEELY

- Geely's new brand, Galaxy, is positioned in the mid-to-high end, focusing on the price range of 150,000-300,000. In the future, Geely Galaxy will cover two product sequences: "Smart Hybrid" and "Smart BEV". In terms of channels, Geely Galaxy will have two modes: direct users and agent distribution, and will launch a brand-new APP and introduce brand-new experience and service standards.
- At this auto show, Galaxy released the first model L7, which is equipped with a new connected system, and will be delivered in the second quarter of this year, and the L6 sedan will be launched in the third quarter; The pure electric product E8 will be delivered in the fourth quarter of this year.

仰望 BYD

- Yangwang is a high-end new energy brand under BYD Group, and their models are positioned in the million range. The first two models are U8 and U9. U8 is positioned as a million-level new energy hard-core off-road vehicle, while U9 is a pure electric supercar, with an acceleration of 2 seconds. Its models are equipped with the “Yi Sifang" technology platform, which can be independently controlled by four motors.

iCAR CHERY

- iCar is a new energy sub-brand owned by Chery, mainly targeting the mainstream consumption range of 150,000-400,000, which is much higher than the main micro/small car price of Chery New Energy.
- Coincidentally, another sub-brand of Chery, EXEED, has gradually moved to a higher-end market. In this auto show, EXEED released E03, a high-end electric vehicle, to enter the higher-priced electric vehicle market.

AION

- Hyper GT, a subsidiary of AION, was unveiled at the Shanghai Auto Show. The pre-sale price range was 219,900-339,900 yuan, and the new car was positioned as a pure electric medium and large car. As a brand anchored in the luxury market, Hyper GT will provide users with high-end intelligent pure electric products with independent operation. The new brand uses the exclusive brand logo-AI Arrow to build an independent marketing service system, and 350 exclusive channels of Hyper will be built within 2023.

New brands (2/2)

睿蓝汽车 LIVAN GEELY

- Livan Automobile is a brand established by Geely and Lifan in January this year, focusing on the B-end travel market. The price of Livan entered the C-end this time, giving the brand positioning of “Popularizing battery swapping and light travel". Livan Automobile will aim at the battery swapping market, and plan to cover cars, SUVs, MPVs and even logistics vehicles and light trucks at the B-end and C-end at the same time, so as to fully meet the needs of different markets such as ride-hailing, private car, taxi and logistics vehicle.

红旗 让理想飞扬

- At the press conference, Hongqi identified three sub-brands: Hongqi Golden Sunflower, Hongqi New Energy and Hongqi Energy-saving Vehicle.
- The models of the “Hongqi Golden Sunflower" brand will continue the Chinese design and retain the traditional elements. The new model L5 launched at the auto show is a case in point.
- The model design of "Hongqi New Energy" is modern, quite scientific and technological, with the theme of innovation and green, and the representative models are E001 and E202.
- “Hongqi Energy-saving Vehicle" includes models like HS5 and H6 that are already on sale.

- The Mengshi brand was released by Dongfeng Motor in August last year, focusing on electric off-road vehicles. Its first model, the 917, was exhibited at this auto show.
- As the first model launched by Mengshi Technology, a luxury electric off-road brand built by Dongfeng Motor, Mengshi 917 is built based on the intelligent off-road architecture of M TECH Mengshi, and the price may reach more than 700,000 yuan.

Screen display (1/2)

The multi-screen strategy brought by in-car entertainment remains a trend

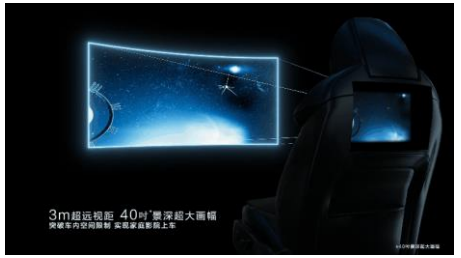
Marelli 6K 35-inch multi-screen scheme based on 8295 development.

BYD Five-Screen Solution

- The penetration rate of co-driver and rear screen in various models has been continuously improved, and both OEM and suppliers have provided corresponding innovative solutions.
- At this auto show, Marelli also demonstrated the 35-inch 6K multi-screen interaction based on Qualcomm 8295 chip. The physical cutting was removed before the main and passenger screens, and various functions can be dragged at will between the main and passenger screens.
- Thundersoft showed a multi-screen interactive system based on Qualcomm 8295, which is expected to be equipped with independent sound-zones and game functions.
- The HMI of Zeekr X can be moved to the passenger seat by gesture operation to provide entertainment content for the passenger side, and the car control function and entertainment do not interfere with each other.
- The HMI on the Deepal S7 provides the option of rotation, which can turn the car screen to the co-pilot, bringing the corresponding entertainment experience to the co-pilot users, and at the same time, the sun visor of the co-pilot also provides a 12.3-inch entertainment service screen.
- BYD also showed the five-screen plan for the future. Except instrumental cluster only provides driving-related contents, the other four screens all provide entertainment services.
- Other suppliers/OEMs, such as Bosch, Haval, Geely Galaxy and Denza, have demonstrated the latest multi-screen interactive solutions.

The application of light has emerged

BMW i Vision Dee holographic screen



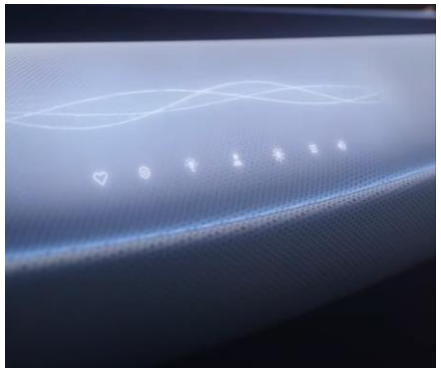
Huawei light field screen

- At the 2023 Shanghai Auto Show, the innovative application of light has become a new bright spot. As a new technology, holographic projection technology has many advantages, such as flexible size, high image definition, strong three-dimensional sense, and no dizziness caused by VR and other wearable devices. OEM brands BMW, Chery and technology giant Huawei have all demonstrated the cases of applying holographic technology. Another case of innovative application of light is Huawei's patented light field screen, which can easily break through the limitation of physical space in the car.
- BMW began to explore the screen-free era, the solution of removing physical keys, and put holographic projection technology on the agenda. On the concept car i Vision Dee, there is no traditional instrument panel and no physical display screen. Instead, a large-area holographic projection HUD display scheme is adopted, and the entire display is equivalent to the width of the windshield. Shy Tech sensor hidden on the dashboard can adjust the content of projection display and change the immersion.
- Huawei claimed that light field screen, a new patented technology, can avoid many disadvantages of traditional screens. For example, it can maintain clarity even if the light is too bright. In addition, because the imaging is far away, it can also effectively alleviate the dizziness caused by driving. Of course, the most noteworthy advantage is to break through the limitations of the physical space inside the car and display the content in a large format.
- Chery demonstrated the concept of interactive projection screen in the L4/L5 concept car. The screen image is located at the air outlet of the air conditioner, and the functions such as multimedia and vehicle control can be adjusted through touch interaction. This scheme can reuse the interior space, which is in line with the trend of simplified interior design.

Screen display (2/2)

Applications of smart surface – Light-permeable material

MARELLI Light-permeable material



Honda e:N2 Concept Light-permeable material

- With the continuous enrichment of digital functions in the intelligent cockpit, suppliers and OEMs have also begun to focus on smart materials and smart surface technology, integrating light-permeable materials into the interior surface, and integrating them with sensors and display technologies, bringing more interactive functions in digital cabins.
- MARELLI presents the solution of its intelligent light-permeable materials for displaying driving assistance information. This information is displayed in the position of the instrumental cluster (IC), and the original IC information is integrated into the front AR-HUD.
- Honda replaced the original central control panel with a light-permeable digital panel in its concept model e:N2. Based on the "driver-oriented" interior design concept, the display or control function will only be displayed on the interior surface when necessary, otherwise it is visually the same as the fabric surface.

Applications of smart surface – e-Paper material

"Electronic paper" is on the BMW concept car i Vision Dee

Huawei's rear ink screen

- Electronic paper display is based on electronic ink technology, which uses tiny ink microcapsules to change their visibility by rising or falling, and presents paper-like colors, patterns and designs. Compared with the conventional display scheme, electronic paper can be clearly seen under the condition of strong sun light, and the power consumption is low.
- The whole body of BMW i Vision Dee concept car is covered with electronic paper film. Through different electric pulses, the body even and the wheel hubs can show as many as 32 colors.
- Huawei previously launched an ink screen tablet on the mobile devices, and now it applies the same technology to the car body. Users can edit the text or use the template preset by the official on the central display, and the corresponding pictures and texts will be displayed at the rear of the car for easy interaction outside the car.

Connected system (1/4)

In-vehicle games have gradually gone mainstream

Yinhe L7 MiguPlay

Neta's MiguPlay

Hycan V09 RAZER Rear Screen

- In-car games are a new force in the development of in-car entertainment, from touch-screen games to game handles to cloud games. More and more OEMs have begun to introduce in-vehicle games. At present, the manifestations of in-vehicle games are mainly realized by the big screen of the co-driver and the rear screen, which has certain limitations. In the future, car games can also be presented in the form of VR, AR, XR, holography, metauniverse, etc., which is more flexible.
- MiguPlay has cooperated with many car companies, including Galaxy L7 and Neta S/GT exhibited at this auto show.
- Hycan V09 RAZER Edition is a cross-border cooperation between Hycan and Razer, a game equipment company. There is an oversized liftable screen in the back row to meet the needs of passengers to play games.
- Smart's app store has added Tianyi online games through OTA, and also supports external handle games and touch-screen games.

3D rendering driving HMI design

3D car model on Toyota's new system

3D car model on Trumpchi E9

Unity's real-time rendering navigation

- The convenience brought by the application of 3D rendering goes both ways. On the one hand, it can help HMI design and enhance the flexibility of product iteration in the design stage. On the other hand, information can be conveyed more effectively, so that users can understand the intention of the product at a glance. Since Xpeng G9 was equipped with 3D rendering of vehicle control and navigation developed in cooperation with Unity, more OEMs have cooperated with 3rd parties to add 3D rendering effect.
- Unity demonstrated the future real-time simulation of real-life navigation rendering at this auto show. Using the data of high-precision map to simulate and restore the scenery and buildings on both sides of the lane in real time can better solve the problem of turn-missing in current navigation software.
- Toyota's fifth-generation connected system has optimized the vehicle control display and upgraded it to 3D vehicle model design, which can see the real-time feedback of vehicle control.
- In addition, GAC Trumpchi has also added 3D rendering effects, which can observe the condition of vehicles in real time.

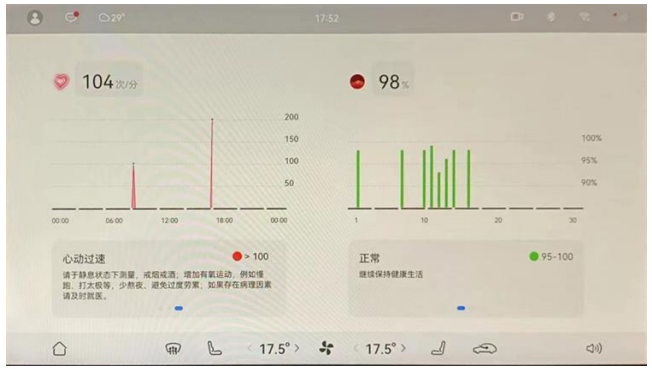
Connected system (2/4)

In-vehicle health becomes hot topic, and many solutions have landed.

Jetour JMK yihaoji

Contactless measurement

- Jetour demonstrated the health detection function at the auto show, which can measure heart rate, respiratory rate and other information in a non-contact way.
- By measuring the facial relaxation in a fixed period of time, the monitoring of heart rate, breathing and abnormal performance can be realized. However, this solution is easily affected by the light condition and signal state in the car.



Huawei Health Monitoring Vehicle Terminal Interface

Health monitoring through wearable devices

- The connected systems of Zeekr, Huawei and Toyota support the interconnection with the data of smart devices. Users monitor their health by wearing smart devices, and the data will be synchronized to the car after being uploaded to the cloud. After the mobile terminal and the car terminal are connected, Toyota's car system will make suggestions according to the user's health status. For example, when driving for too long, it will remind you to pay attention to safety, and it is recommended to play music to refresh yourself.
- This solution can be regarded as an extension of the intelligent product ecosystem. Huawei benefits from the Harmony OS system and may have certain advantages in product adaptability.

Autoliv biological detection steering wheel

Contact measurement

- Autoliv and Rising Auto R7 showcased the steering wheel for health monitoring. The steering wheel is equipped with a corresponding sensor, and the user's hands contact the sensor to form a closed loop to complete the collection of data such as heart rate.

Connected system (3/4)

More gesture control features and optimized recognition solution

WEY Lanshan Gesture Control-Rest/Silent Mode

Deepal S7 gesture control–taking photos/music, etc.

Voyah Gesture Control

- With the continuous innovation of traditional interaction methods such as physical buttons, virtual buttons and voice interaction are more common interaction methods in recent years. In addition, gesture interaction as a new HMI method has been adopted by more and more OEMs.
- At present, most gesture control solutions are based on camera recognition, and users can give instructions by making a specified gesture in front of the camera. However, this solution is easily influenced by light, gesture position, etc., and gesture recognition based on physiological signals (such as EMG signals) may become the optimised way of the recognition solution in the future.
- The Coffee OS 2.0 system on WEY Lanshan currently allows the recognition and control of four gestures, namely, taking photos, mute mode, confirmation and turning on the rest mode. In addition, Coffee OS 2.0 also enables head-pose interaction, nodding/shaking heads means YES/NO.
- Voyah introduced a gesture control solution based on human surface EMG signal on its new model "Zhuiguang". Users put on a specific smart wristband and make different actions, the sensor inside the wristband will receive EMG signals on the skin surface, thus giving control instructions. The solution can also use gestures to control the car control functions such as windows and trunk outside the car. Compared with the camera-based gesture recognition, the solution based on human surface EMG signal not only reduces the requirements for the position of the owner's gesture but also avoids the influence of light changes and other factors.

More innovative access solutions and a higher penetration rate of digital keys

Zeekr X Face Recognition

Denza N7 UWB digital key

LYNK&CO 08 UWB Digital key

- Compared with traditional key fobs, digital keys enable keyless entry and startup, remote key authorization, personalized settings and other functions. At present, the digital key solutions based on BLE and NFC have been provided as standard by many OEMs, and the ultra-wideband technology UWB with accurate ranging capability has also been adopted by more and more OEMs, from international OEMs such as BMW equipped with UWB keys to the domestic brands such as NIO, Zeekr and HiPhi.
- In addition to the solution of digital keys accessing the vehicle, Zeekr X and HiPhi Y also introduced the solution of face recognition and unlocking the vehicle through the camera on the B-pillar. Zeekr X has also integrated a display on B-pillar to show information such as charging information.
- Both Denza D9 and N7 provide BLE and NFC digital keys as standard and enable UWB digital keys on high variants.
- Meizu phones with NXP's UWB digital keys will be the first batch of phones to access to LYNK&CO 08. UWB digital key is becoming the key entrance of mobile phone ecosystem and smart car, and OEMs also tend to cooperate with mobile phone vendors and digital key developers.

Connected system (4/4)

On-demand payment and subscription payment gradually take hold in the automotive industry

Price of HUAWEI ADS

Li Auto announced that Li AD Max will be free for life.

VPA Avatar

- After Tesla first launched its AD packages, seat heating and other subscription services, more and more OEMs, such as BBA and the domestic aggressive movers, began to launch subscription services for self-driving, cockpit comfort, HMI and other functions to explore new business models.
- Huawei announced that its AD package can be paid by one-time and subscription. For example, HUAWEI ADS 2.0 can be purchased at a one-time price of 36000 RMB, or be subscribed at 7,200 RMB/year and 720 RMB/month.
- NIO plans to launch the official version of NOP+ in July and charge for it by subscription at 380 RMB/month.
- Smart not only provides subscriptions for seat heating/ventilation and steering wheel heating but also introduces VPA avatars and decorations for users to purchase as needed. More HMI-related subscription functions will be introduced in the future.
- VW ID.7 will provide different VPA avatars in VW OS 2.0 for users to purchase on demand.
- Mercedes-Benz has introduced on-demand features such as remote service, body control and connected service in its connected store, which enables individual options or subsequent subscriptions.
- Domestic brands such as HiPhi, IM and Zeekr also launched their AD function packages in a one-time payment mode.
- Different from the above OEMs, Li promises to provide NOA function free of charge for life, making it a high-value asset for users.

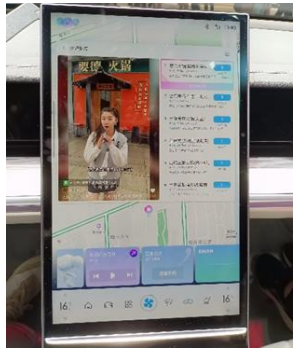
理想 smart HUAWEI TESLA

Mercedes-Benz HiPhi NIO BMW

AI continues to penetrate

Proactive recommendation

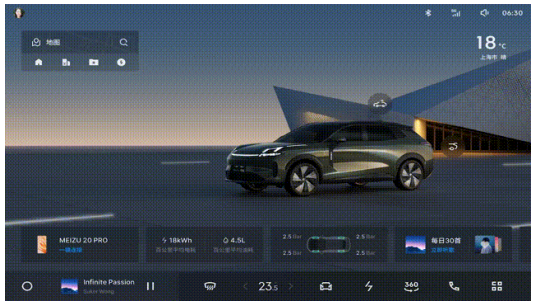
Toyota's fifth-generation system adds various recommendations



Neta GT Video-assisted (Tik Tok) Navigation Recommendation

- Toyota's fifth-generation system has been upgraded in many aspects, including proactive recommendation. Users can open and close recommendation message reminders, including but not limited to health, flights and trains, road books, scenic spots, food, movies, takeout, commodity recommendation reminders, etc.
- Neta GT and the new Neta S are equipped with a system to link Tik Tok, video and food recommendation. When searching for a restaurant, Tik Tok's corresponding food review video will be played to help users better understand the restaurant's specialties.

AI-generated wallpaper



Flyme Auto wallpaper reflecting weather changes

Galaxy L7 shows the original wallpaper on the left and the wallpaper generated by AI on the right.

- Flyme auto's live desktop can map the time, weather and car condition of the physical world in real time.
- Galaxy L7' s "Wow Wallpaper" App applies AI to generate similar wallpapers. Users can first choose their favorite wallpapers in the wallpaper library, and after selection, they can choose to create similar wallpapers, and AI will automatically generate wallpapers with similar styles.

Intelligent dialogue system in car

Tong yi qian wen

Voyah cooperates with Wen xin yi yan.

- Tong yi Qian wen is an AI dialogue model independently developed by Alibaba based on natural language understanding and generation. Based on the characteristics and trends of the new automobile, such as multi-interactive agents, multi-interactive modes, multi-computing parts and large-scale data, the automobile will become one of the largest interactive application scenarios of this kind of large model.
- Wen Xin Yi Yan is a generative dialogue product launched by Baidu based on Wen Xin big model technology. As a strategic partner of Baidu, Voyah will further cooperate with Baidu in intelligent AI technology and will jointly develop large-scale artificial intelligence interactive functions based on smart car scenes through Baidu Apollo's ability to integrate words and feelings. In the future, Voyah will also be introduced to Baidu AI Cloud, and the service of Wen xin Yi yan can be called through Baidu AI Cloud, and it will be gradually put into the user's actual car scene.

Camera

The First Year of Camera-monitor System

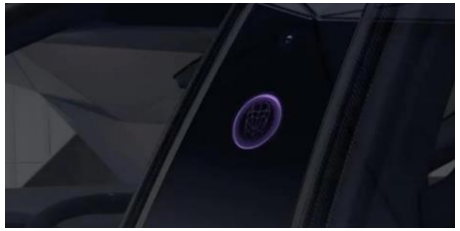
Lotus Eletre CMS

Hyundai IONIQ 6 CMS

- The new national standard GB 15084-2022 for automobile rearview mirrors in China will be officially implemented on July 1, 2023, which means that vehicles equipped with electronic exterior rearview mirrors in China will be legally mass-produced in 2023.
- Compared with the traditional glass rearview mirror, CMS has a wider field of vision and reduces the visual blind area. In bad weather such as rain and snow, it will not fog and blur the eyesight, and it is not easy to be affected by too strong and too weak external light. At the 2023 Shanghai Auto Show, many suppliers and OEMs have given their CMS solutions and mass production plans.
- Lotus Eletre provide CMS as an option, which can increase the lateral field of view by 50% compared with the traditional exterior rearview mirror, further reduce wind resistance, reduce wind noise and improve cruising range. The rearview mirror enables electric folding and heating functions, and the camera surface is made of water-repellent material, so the rain can't stay. Two LCD screens with 1280*720 resolution are used in the cabin, with a refresh rate of 60Hz and 15 brightness levels.
- The high variants of Hyundai's IONIQ 6 will also use CMS, and the traditional exterior rearview mirror position will be replaced by the camera. More details and parameters are to be announced by Hyundai officials.
- Huawei demonstrated its CMS solution in its concept cockpit.
- Forvia introduced the integration solution of electronic exterior rearview mirror, and integrated the display screen of electronic exterior rearview mirror on the door panel.

The penetration rate of vehicle-mounted cameras is increasing

Voyah travel filming mode

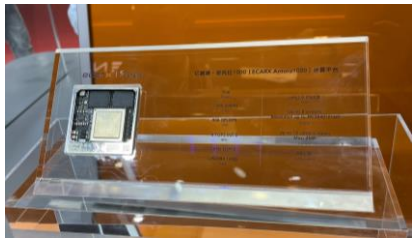


HiPhi camera on B-pillar

- A number of suppliers and OEMs have introduced different solutions for in-car cameras at Auto Show, including DMS, in-car photo taking, passenger monitoring and travel filming.
- Volvo introduced DUS binocular driver monitoring system on EX90, which provides three-level progressive prompts, and if necessary, the system will stop at the roadside autonomously.
- The camera in Voyah Zhuiguang provides the features of taking photos in the front seat, taking photos/monitoring in the rear seat, and filming of the front of the vehicle. In addition, the camera mode also provides filters and stickers for users to choose from.
- Deepal S7 also allows in-car/out-of-car shooting.
- ORA models enable in-car selfies, and filters and stickers can be selected as well.
- OEMs such as Zeekr, HiPhi and Genesis, have used the B-pillar camera to recognise faces and unlock vehicles.
- Antolin demonstrated the face recognition solution of B-pillar camera. At the same time, the B-pillar can also integrate display screen, touch control and other functions.

Software-defined vehicle SDV

The proportion of in-house solution has gradually increased



ECarX Antora 1000 Computing Platform

Black sesame Wudang series prototype

- At this auto show, a number of domestic suppliers provided self-developed domain control/chip/central computing platform solutions, which provided more cost reduction solutions for OEMs.
- ECarX has released the self-developed 7nm automotive-grade SoC "Longying No.1" and the computing platform Antora 1000 series, which will be launched on the Lynk & Co 08.
- Black Sesame Technology announced and displayed Wudang series cross-domain computing platform and Wudang series prototype at the auto show, which provided OEM with an integrated navigation scheme.
- Horizon Robotics announced the plan of a new generation of Nash architecture, which was specially designed for large parameter Transformer and large-scale interactive game, which significantly enhanced the overall computing power and provided a more powerful solution for car companies.
- Core Chi announced the SCCA2.0 central computing architecture, including six core units, and also introduced brand-new X9SP and V9P processors.
- The rest, such as SemiDrive, NavInfo, DiAS, Desay SV and Youjia Innovation, all brought corresponding self-developed products at this auto show.

Electrification (1/2)

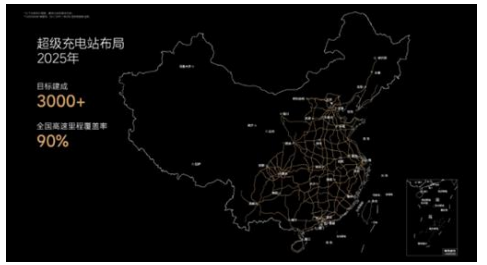
EV proportion on the rise

Mercedes-Benz Maybach EQS pure electric SUV

Lynk&Co 08 (Range extend electric vehicle)

- Under the wave of electrification, various OEMs are actively embracing the trend of change. Whether they are independent, joint ventures or luxury brands, they will either release their latest transformation strategies or disclose their latest transformation achievements at this Shanghai Auto Show. The route of electrification technology is diversified, including pure electricity, plug-in hybrid, hydrogen energy, extended range and so on.
- With the world premiere of the new Mercedes-Maybach EQS pure electric SUV, the China premiere of the new EQE pure electric SUV and EQG concept car, and the appearance of the new Mercedes -AMG pure electric EQE 53 4MATIC+, Mercedes-Benz announced at the Shanghai Auto Show that the whole brand has entered the era of electrification.
- Li Auto released the "dual-energy strategy" and started to lay out a new stage of two power forms: extended range and pure electricity. By 2025, Li Auto will form a product layout of "one super flagship + five extended-range electric vehicles + five high-voltage pure electric vehicles", which will be oriented to the market of more than 200,000 yuan. At the same time, at the press conference, Li and CATL signed a comprehensive strategic agreement, and Li Auto's first pure electric vehicle will become the first vehicle equipped with 4C Kirin battery in the world.

Charging network layout competition



Li auto charging network plan

AION charging station plan

- With the penetration rate of new energy vehicles further increasing, the demand for energy replenishment will further increase. At this auto show, many OEMs also launched their own charging network plans.
- Li Auto released a high-voltage pure electric solution at this auto show, adopting a two-step strategy of "extended range" and "pure electric". On this basis, it is ideal to launch the "ideal 4C super charging station" and the super charging network. It is expected that 25 stations will be put into trial operation before the end of May, and each station will be equipped with 3 fast charging piles and 1 4C super charging pile as standard. By the end of 2023, it is expected that more than 300 high-speed charging stations will be built, covering the four economic belts of Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta and Chengdu-Chongqing, and by the end of 2025, it is expected that more than 3,000 charging stations will be built, covering 90% of expressways.
- At this auto show, AION released the action plan of "Quick, Wide and Near Power Supply +V2G". In the "fast, wide and near" power supply, "fast" refers to the self-developed fast charging/fast changing technology provided by AION for users; "Wide" means that AION will connect five vertical and seven horizontal backbone networks around five core economic circles to realize trouble-free intercity traffic; "Near" means that AION will build a charging circle around users' work and life, 5 kilometers in the urban area and 10 kilometers in the main road, and there will be a AION charging pile within 10 minutes' ride. For V2G, AION provides a number of user rights, including free charging and the price difference between peak and off-peak time.

Electrification (2/2)

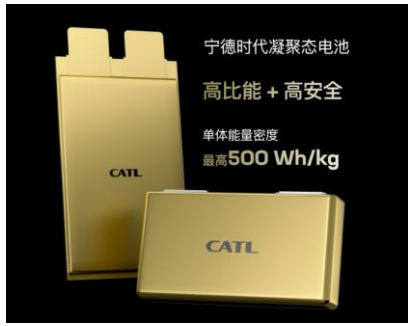
Continuous exploration of hydrogen energy

Toyota Corolla Cross H2 Concept hydrogen engine

Hyundai HTWO hydrogen fuel cell system

- Although hydrogen energy has not occupied the mainstream market at this stage, as a potential substitute to fuel the battery, various OEMs continue to explore hydrogen cell systems.
- As one of the pioneers of on-board hydrogen fuel cells, Toyota brought the second generation Mirai and the hydrogen version Corolla at this auto show. The former is hydrogenated for 3 minutes, and the cruising range can reach about 800 kilometers, while the latter is to increase the hydrogen combustion power by 24%.
- Hyundai exhibited the newly developed HTWO hydrogen cell system and the concept hydrogen fuel model N Vision 74, which has the highest hydrogen combustion efficiency at 64% and 600KM range.
- Chang'an Deepal also brought the hydrogen version of S7, equipped with a self-developed hydrogen fuel cell system, with a CLTC hydrogen consumption of 0.73kg/100km and a cruising range of 730KM.
- BMW and Dongfeng also demonstrated the corresponding hydrogen energy vehicles and the planned hydrogen fuel cell system respectively.

New battery technology



CATL Condensed Battery

- At this auto show, major battery suppliers and OEMs have brought a new generation of battery technology to improve safety, and at the same time, they are gradually moving towards 1000 KM range.
- CATL has introduced the condensed battery, and the energy density of single battery can reach 500 Wh/kg. It is expected that automotive-grade products can be mass-produced this year. This product is also expected to meet the requirements of aviation safety and quality.
- Sunwoda has released a "flash rechargeable battery", which supports 1000 KM range and can charge from 20% to 80% SoC in 10 minutes.
- As for OEM, GAC showed the version 2.0 of "Magazine battery" mounted on Hyper brand, which reduced the heating speed of battery core by 20%, improved the thermal insulation performance by 40%, and improved the comprehensive thermal management capability of battery by more than 5 times.
- BYD, EVE, Samsung SDI and Svolt Energy all demonstrated their new development in battery technology.

ADAS (1/2)

Urban pilot driving large-scale launch

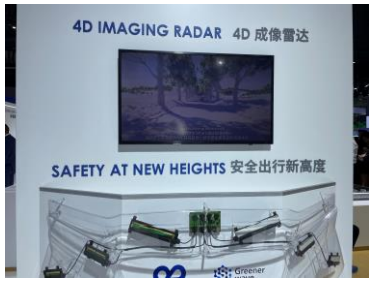
Li Auto AD Max 3.0 neural network algorithm

Baidu Apollo City Driving Max

- Although it has been more than two years since the first release of Arcfox's urban pilote driving on real vehicles, it was not until 2023 that urban piloted driving began to be widely used in actual daily driving. At the same time, some OEMs choose the way of light and high-precision map/heavy perception to launch their own products.
- The Li Auto urban pilot driving was finally unveiled at this auto show. Without relying on HD-maps, the Li Auto chooses to combine three neural network algorithms: static BEV, dynamic BEV and Occupancy network. The Li Auto urban NOA can summarize the perception results into the prediction model and output the action prediction of the surrounding traffic participants in real time.
- Baidu announced a brand-new matrix of autonomous driving products before the auto show, among which the highest level is Apollo City Driving Max. The system uses pure visual perception, supplemented by LiDAR, to realize the perceptual redundancy of "pure visual & LiDAR". At the same time, Apollo did not completely abandon the HD-map, but used the scheme of "lightweight HD-map".
- Huawei's ADS 2.0 also choses to give up HD-maps, providing users with a high-level intelligent driving experience through multi-sensor fusion, high-performance intelligent driving platform, anthropomorphic intelligent driving algorithm, cloud simulation and big data training.
- Disruptors such as IM and NIO and other self-driving suppliers also showed or launched the latest pilot driving plan/scheme at the auto show.

4D mm Wave radar

Fusion Ride Galileo series mmWave radar



Plastic Optimum 4D Imaging mmWave radar

- Given the current circumstance where the urban pilot driving is largely launched, the ability of perception system will directly affect the performance of pilot driving. With the continuous development of technology, 4D mmWave radar has also achieved certain development, and several suppliers have also displayed their current products at this auto show.
- Fusion Ride demonstrated its 4D mmWave radar Columbus series (4 Tx and 4 Rx), Picasso series (6 Tx and 8 Rx) and Galileo series (12 Tx and 16 Rx). The Columbus series is expected to achieve mass production in the third quarter of this year, and the Picasso series is expected to achieve mass production in the second quarter of 2024.
- Chuhang Technology demonstrated the innovative stealth radar ART for the first time at the auto show. It separated the radar antenna, PCB board and chip, and used high-precision printing and etching technology to mount ART on the glass in a seamless way, which not only realized all the detection functions of the mmWave radar of vehicle specifications, but also obtained a larger detection angle and more accurate detection data.
- Plastic Optimum Group and Greenerwave jointly developed a 4D millimeter wave radar. Greenerwave's system can create dense 3D point clouds, and Plastic Optimum can integrate the system into the body panel to create a "smart template".
- Traditional mmWave radar suppliers, such as APTIV, Continental, also brought corresponding products.

ADAS (2/2)

LiDAR capabilities continue to improve

Liangdao side-view LiDAR

- Compared with the early stage of LiDAR deployment in 2021, two years later, the penetration rate of LiDAR has been significantly improved, and its performance has been further improved.
- Innovusion showed the Falcon platform, with a wavelength of 1550nm and the longest detection distance of 500 meters. At this stage, it has been mounted on NIO ET7, ES7 and ET5 to realize mass production.
- Lieshen released the hybrid solid-state automotive-grade LiDAR "Terminator No.1", which uses a wavelength of 1550nm and the longest detection distance of 500 meters and uses a fiber laser as the emission light source.
- Liangdao Intelligent released the automotive-grade pure solid-state side-view LiDAR, which adopts chip design and electronic scanning technology and has no moving parts inside.
- Benewake released the vehicle-mounted 512 laser radar platform-"Benewake Ying Long" platform, adhering to the three design concepts of continuous enhancement of perception, modular design and controllable cost. The platform consists of three modules, namely, high-precision 2D scanning system, 905nm array transceiver and custom SoC.
- Tanway announced the release of the side-view LiDAR by the end of the year, which is expected to be released in pure solid form in 2024 or 2025.
- The Continental also demonstrated the HRL131 jointly developed with Aeye, which is the first software-defined LiDAR in the industry.

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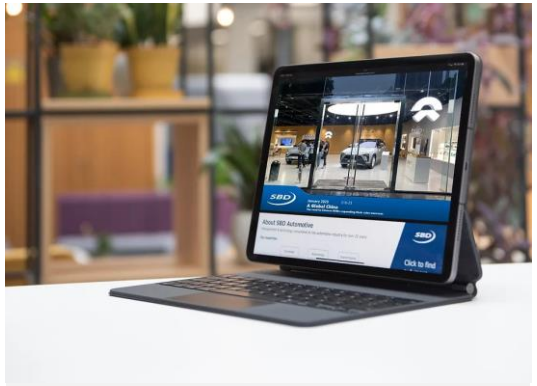

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