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China Passenger Car Cockpit Multi/Dual Display Research Report, 2023-2024

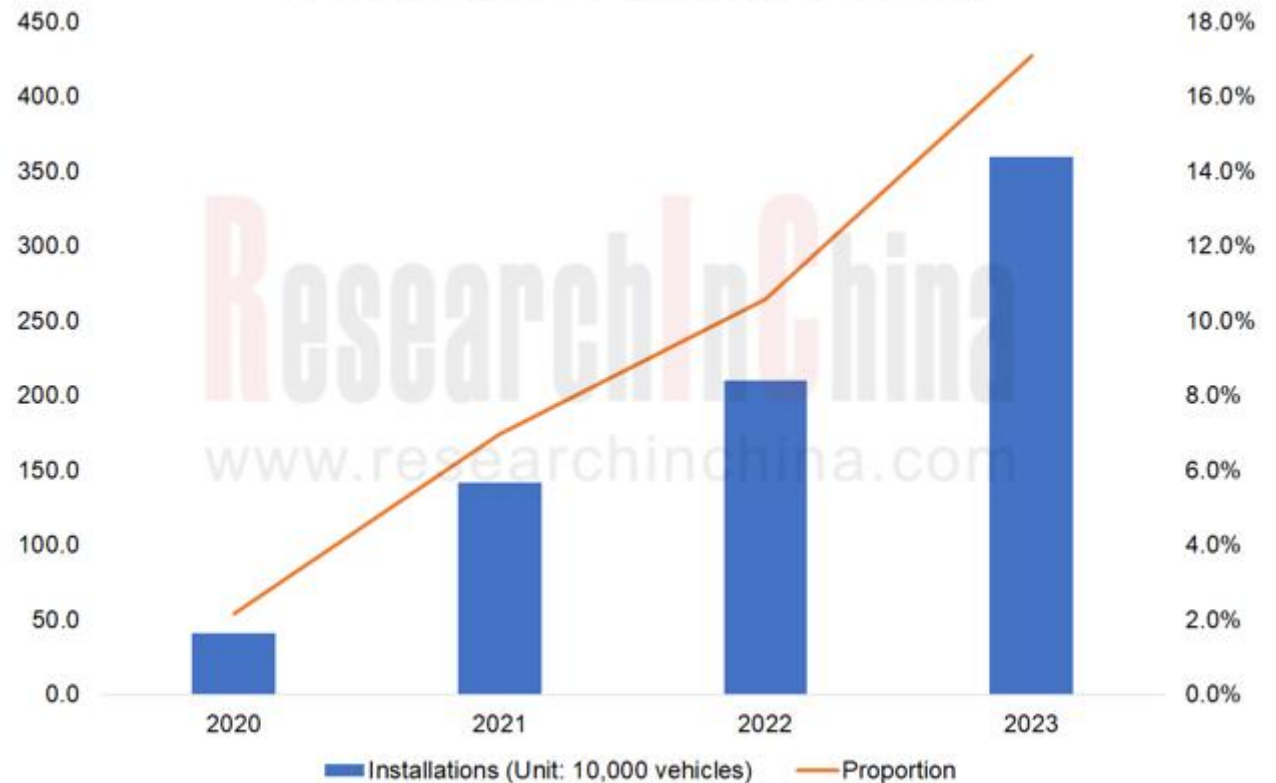
Apr. 2024

The trend towards multi and dual display solutions accelerates

In intelligent cockpit era, cockpit displays head in the direction of more screens, larger size, better looking, more convenient interaction and better experience. Simultaneously, the conventional “one-chip, one-display” solution has been gradually replaced by “one-chip, multi-display” and “multi-chip, multi-display” solutions. The trend towards multi and dual display solutions accelerates, with a share hitting a new high.

In 2023, China's passenger car multi and dual display solutions were installed on nearly 3.6 million vehicles, making up more than 17% of the total, up 6.5 percentage points on the previous year. In 2023, among brands with models on sale in China's passenger car market (excluding imported models), a total of 43 brands deployed multi-display models, and 52 brands deployed dual-display models. Much more brands chose multi and dual display solutions. (Comparably, the statistics in China Passenger Car Cockpit Multi/Dual Display Research Report, 2022 show there were 21 brands deploying multi-display models and 44 brands deploying dual-display models).

Installations and Proportion of Multi/Dual Display Solutions in Passenger Cars in China, 2020-2023 (Unit: 10,000 vehicles)



Source: ResearchInChina

Intelligent cockpit has entered the 10-screen era, and 12-screen solutions are expected to be installed in cars in 2024

1. More displays: intelligent cockpit has entered the 10-screen era, and 12-screen solutions are expected to be installed in cars in 2024.

In terms of multi and dual display solutions, auto companies and suppliers are innovating to provide consumers with diverse choices. Regarding multi-screen solutions, intelligent cockpit has stepped into the 10-screen era, and 12-screen solutions are expected to be installed in cars in 2024.

Typical model with 10-screen solution: AITO M9

The top configuration of AITO M9 is 10 screens, including front triple-display, one? AR-HUD, one? giant-scale laser projection screen, one? megapixel-level intelligent projection lighting system and four Huawei pads that can be connected to the IVI system to realize car control. AITO M9 uses distributed soft buses to enable cross-screen integration. Both driver and copilot seat passenger can control the content on rear screens, including laser projection, for example, choose what to see at will and all the people in car can see the same content across screens.



Source: AITO

AITO M9 first adopted front triple-display

On M9, AITO first adopted front triple-display, including 12.3-inch LTPS LCD dashboard screen at the driver's seat, 15.6-inch 2K LTPS LCD center console screen, and 16-inch 3K LTPS LCD entertainment screen at the copilot seat. The driver's and copilot seat screens support three-finger slide to circulate the content.

Meanwhile, AITO M9 is equipped with the automotive-grade projection system for the first time. The projection screen is hidden in the roof B-pillar beam, and features an X-type connecting structure on the back and motor locking mode, providing strong shock resistance.

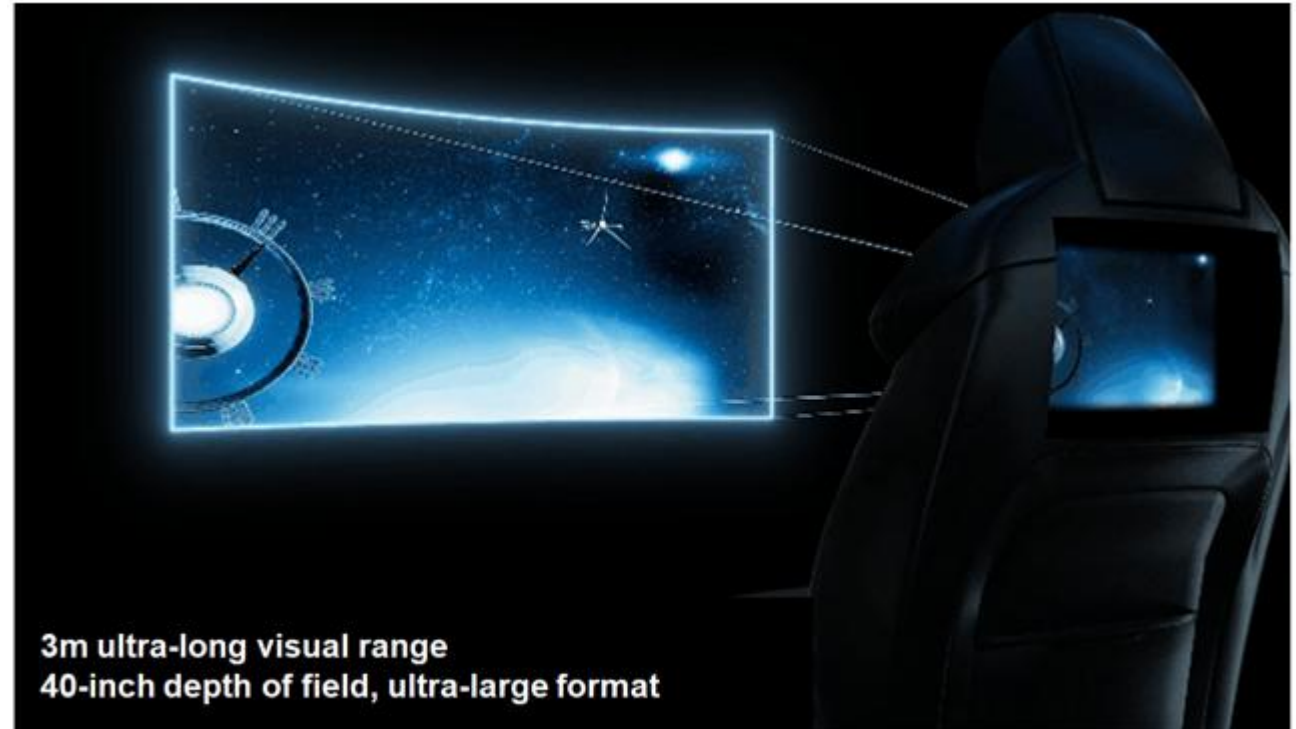


Source: AITO

The 32-inch laser projection screen in AITO M9 supports 100% P3 color gamut display

The 32-inch laser projection screen in AITO M9 supports 100% P3 color gamut display. Coupled with the second-row zero-gravity seats, it creates a one-click viewing mode. As for interaction, the projection screen supports voice, Huawei smartphone and Huawei Lingxi pointing remote control (similar to a remote control). As concerns displayed content, the projection product can display the content on the IVI or projected from a smartphone (via AITO APP).

In addition, when M9 was just rolled out, AITO had a pre-launch marketing of the first automotive light field screen (actually not mounted on the car), which may be optional in the future. HUAWEI xScene light field screen enables long-range imaging in 3 meters and 40 inches, and adopts multiple Huawei optical technologies such as 3D spatial optical system design, 20-level polarization medium design without phase errors, and collimated backlight design (see the report for details). According to Huawei, the next-generation facelifted AITO M7 will also support optional light field screens. Moreover, based on Avatr's brand positioning and Huawei's technical concentration, it is expected that Avatr will be very likely to pack the light field screen in the future.



3m ultra-long visual range
40-inch depth of field, ultra-large format

Source: Huawei

Typical model with 9-screen solution: Yangwang U8

As the first model of Yangwang brand, Yangwang U8 is quite different from BYD and Denza models in cockpit display solution. It adopts a combination of 9 screens, including cluster, center console, copilot seat screen, AR-HUD, interior streaming media rearview mirror, two second-row entertainment screens, second-row air-conditioning control screen and second-row center armrest control screen.

Yangwang U8 is equipped with a curved screen for the first time - 12.8-inch R800 curved center console screen, which is made of OLED, 2K resolution, and 50 times higher color contrast ratio than conventional LCD screens. Five-screen linkage can be achieved between center console screen, copilot screen, rear multimedia screen and AR-HUD.






In 2024, it is expected that electronic exterior rearview mirrors will be installed in cars on a small scale. By then, intelligent cockpits will have two more displays, and may enter the 12-screen era. As of the publication of this article, the statistics show that models equipped with electronic exterior rearview mirrors in China's passenger car market have included Lotus Eletre, Lotus Emeya, SAIC Maxus Mifa 7, and Avatr 12, of which the last three models were launched on market within the past six months.



Source: Yangwang Auto

Some Typical Models with Cockpit Multi-display Solutions

Some Typical Models with Cockpit Multi-display Solutions

Multi-display Solution	Typical Model	Time To Market	Cockpit Display Solution	Cockpit Picture
10 screens	AITO M9	Dec. 2023	<ul style="list-style-type: none"> ① 12.3-inch cluster screen ② 15.6-inch center console screen ③ 16-inch copilot seat screen ④ AR-HUD ⑤ Expandable Huawei pad *4 ⑥ Laser projection ⑩ Intelligent projection lighting system 	
9 screens	Yangwang U8	Sept. 2023	<ul style="list-style-type: none"> ① 23.6-inch cluster screen ② 23.6-inch copilot seat screen ③ 12.8-inch 2K center console screen ④ 12.8-inch rear multimedia screen *2 ⑥ 7-inch rear center armrest LCD screen ⑦ 70-inch AR-HUD ⑧ Interior streaming media rearview mirror ⑨ Rear air-conditioning touch screen 	
8 screens	Hongqi E-HS9	Mar. 2024	<ul style="list-style-type: none"> ① 16.2-inch cluster screen ② 16.2-inch center console screen ③ 16.2-inch copilot seat screen ④ Air-conditioning touch screen ⑤ Second-row entertainment screen *2 ⑦ Second-row center armrest control screen ⑧ HUD 	
7 screens	Lotus Emeya	Jan. 2024	<ul style="list-style-type: none"> ① 12.6-inch cluster screen ② 12.6-inch copilot seat screen ③ 15.1-inch center console screen ④ 55-inch AR-HUD ⑤ 8/9-inch rear control screen ⑥ Exterior streaming media rearview mirror *2 	
6 screens	SAIC Maxus Mifa 7	Nov. 2023	<ul style="list-style-type: none"> ① 12.3-inch cluster screen ② 12.3-inch center console screen ③ 12.3-inch copilot seat screen ④ AR-HUD ⑤ 6.92-inch exterior electronic rearview mirror screen *2 	




Source: ResearchInChina

Larger display: 1.3m 45-inch ultra-wide integrated display is available in cars.

Integrated Display Solution of Some Brands

2. Larger display: 1.3m 45-inch ultra-wide integrated display is available in cars.

When it comes to screen size expansion, integrated display is the first choice. Integrated display tends to be designed with larger size, higher resolution, more convenient interaction, touch and voice fusion control, and personalized settings. As of the publication of this article, three Chinese independent brands have used integrated triple-displays in their cars, namely, Geely Galaxy E8, Jiyue 01 and Avatr 12. Geely E8 has the widest through-type integrated display among current production models.

Model	Time to Market	Cockpit Display Solution	Cockpit Picture
Geely Galaxy E8	Jan. 2024	45-inch 8K through-type integrated display, with a screen-to-body ratio of 98%, and an effective display area of 1130mm*138mm	
Avatr 12	Nov. 2023	15.6-inch 2K center console screen, 35.4-inch 4K integrated remote screen, 6.7-inch electronic exterior rearview mirror screen, streaming media rearview mirror	
Jiyue 01	Oct. 2023	35.6-inch 6K through-type integrated display, using Mini-LED+ LTPS technology, with a screen contrast of 700000:1	

Source: ResearchInChina

As a mid-to-high-end new energy brand under Geely brand, Geely Galaxy differs greatly from GEOME and ZEEKR (Geely's other two new energy vehicle brands) in terms of cockpit display solution. Galaxy L7, its first model, uses a display combination of 10.25-inch digital cluster + 13.2-inch vertical center console screen + 16.2-inch copilot seat screen. It is the first time that Geely brand adopts a >12.3-inch copilot seat screen solution.

As the second model of Geely Galaxy, Galaxy E8 carries a more radical display solution. It is equipped with a 45-inch through-type integrated display that spans 1.3 meters and features 8K resolution, 1500-nit display effect, 89% ultra-high color gamut, and 98% ultra-high screen-to-body ratio. It is known that the display was created by Geely together with BOE and Skyworth. In terms of IVI system, Galaxy E8 is equipped with Neusoft's cockpit domain controller based on Qualcomm 8295, which cooperates with Geely's IVI system Galaxy N OS.



Source: Geely Galaxy

Avatr 12, available on market in November 2023, pioneers the use of a 35.4-inch integrated remote display that supports 4K resolution and can display information such as boot animation, basic cluster, ADAS scene reconstruction area, and map information. Users can self-define cards according to usage habits, integrated rest modes, charging scenarios, etc. In the IVI system, Avatr 12 uses the Kirin 9610A + Harmony OS 4 combination.



Source: Avatr

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9.17.3 Buick's Typical Models with Multi/Dual Display Solution

9.18 NIO

9.18.1 Typical Models with Console Single-screen Solution

9.18.2 New Cockpit Display

9.19 Other Brand of Console Single-screen Solution

9.19.1 Deepal's Typical Models with Console Single-screen Solution

9.19.2 ZEEKR's Typical Models with Console Single-screen Solution

9.19.3 BYD's Typical Models with Console Single-screen Solution

9.19.4 EXEED and Luxeed's Typical Models with Console Single-screen Solution

10 Summary and Future Development Forecast of Cockpit Displays

10.1 Application Trends of Cockpit Multi Display Solution (1)

10.2 Application Trends of Cockpit Multi Display Solution (2)

10.3 Application Trends of Cockpit Multi Display Solution (3)

10.4 Application Trends of Cockpit Multi Display Solution (4)

10.5 Application Trends of Cockpit Multi Display Solution (5)

10.6 Application Trends of Cockpit Multi Display Solution (6)

10.7 Impacts of Cockpit Display Changes on Cockpit Operating System

10.8 Non-entertainment Application Trends of Automotive AR/VR in Cockpit (1)

10.9 Non-entertainment Application Trends of Automotive AR/VR in Cockpit (2)

10.10 Non-entertainment Application Trends of Automotive AR/VR in Cockpit (3)

10.11 Application Trends of Optical Technology in Cockpit



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