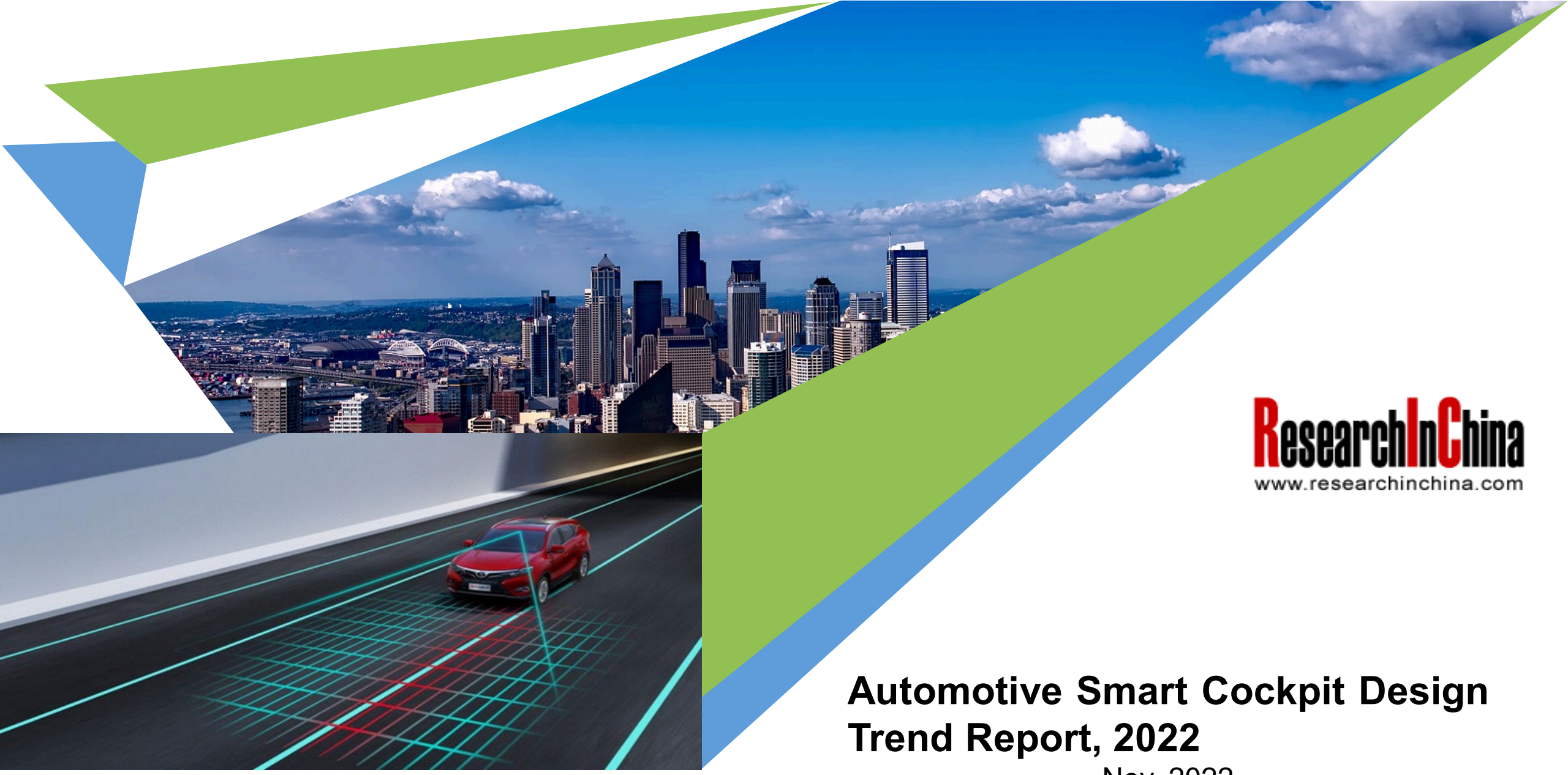


ResearchInChina
www.researchinchina.com

Automotive Smart Cockpit Design Trend Report, 2022

Nov. 2022

Research on design trends of intelligent cockpits: explore 3D, integrated interaction

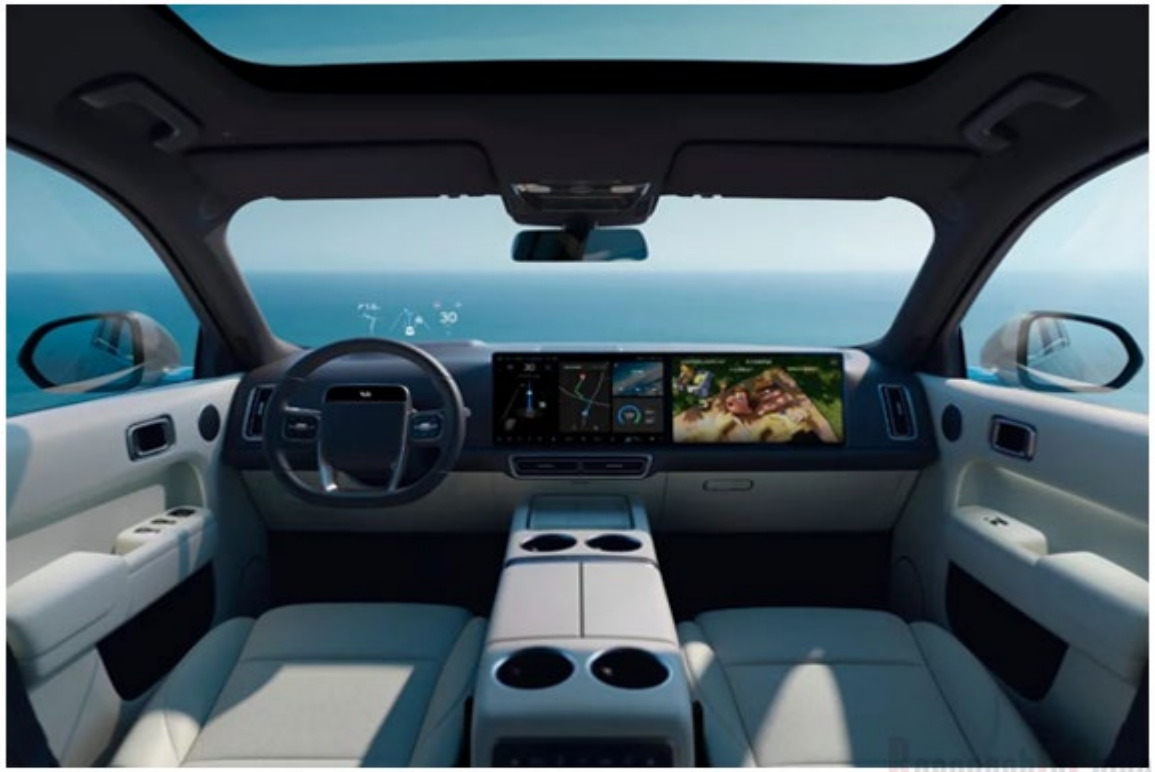
In 2022, multiple automakers have released new concept car models, showing their vision and understanding of future smart cars and providing innovative ideas for the development of future intelligent cockpits. For example, in early 2022, Mercedes-Benz unveiled ISION EQXX, a new concept car that displays a new interior cockpit concept. As well as lightweight, sustainable materials, this car packs a 47.5-inch completely seamless ultrathin one-piece display (with an 8K resolution and the backlight consisting of more than 3000 local dimming zones) and introduces game engines and fully optimized user interfaces. As concerns HMI design, the system mounted on the car is structured along neuromorphic principles and adopts an intuitive working method that mimics the workings of the human brain.

In November 2022, Yanfeng introduced XiM23, a new concept car that interprets the company's understanding of future luxury cockpits: a through-type extended curved display (dashboard + 2 center console screens) that can be hidden and lifted + a lifting multi-functional Phygital controller (display + knob, with gesture control and interactive smart surface features). In terms of driving modes, this car (with L2 driving assistance functions) offers two default manual driving modes, Calm and Rich, and the L4 autonomous driving mode.

In addition to concept cars, there are also a number of innovative models launched on market in 2022. In particular, the cars from emerging carmakers, such as Li Auto L9, AITO M7, Avatr 11 and Jidu ROBO-01 Lunar Edition, bear new products and technologies including human-computer interaction, displays, seats, sound effects, ambient lights, and smart surfaces. New technologies, new scenarios and new modes are springing up.

Research on design trends of intelligent cockpits: explore 3D, integrated interaction

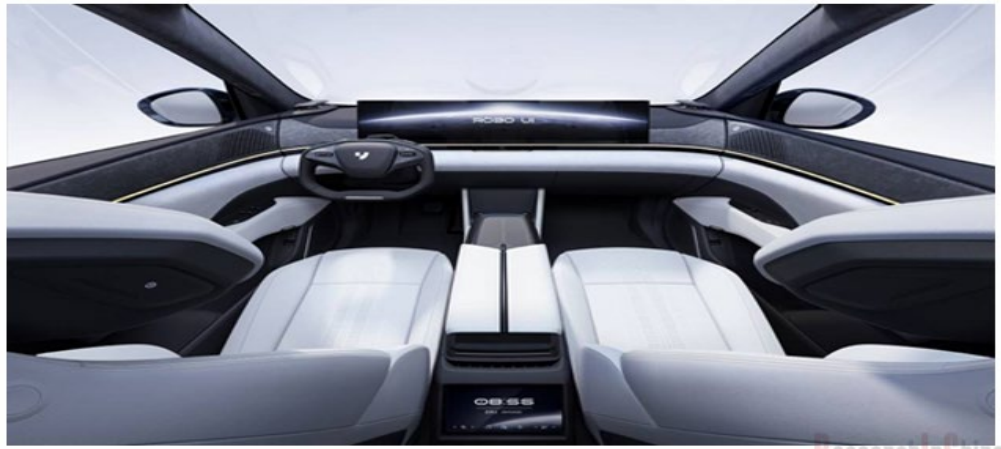
Li Auto's second model, L9, was rolled out in June 2022. With interiors laid out with new technological thinking, this car enables five-screen three-dimensional space interaction. The second-row central screen cancels the conventional instrument panel design, and the information content of the dashboard is distributed to the small-sized display in the center of the steering wheel, and HUD, offering intuitive, simple and direct experience.



Intelligent Cockpit of Li Auto L9

Jidu ROBO-01 Lunar Edition released in November 2022 packs a 35.6-inch integrated display with a high color gamut of 95% NTSC and an ultrahigh contrast ratio of 10,000:1, as well as a 3D immersive cockpit with voice and user emotion recognition capabilities. This car can interact with the outside world about its own state and emotions. Its robotized front face design integrates interactive AI pixel headlights and an AI voice interaction system with a high recognition rate. The external voice recognition function enables the natural communication between people, vehicle and environment.

The intelligent cockpit is a space that provides users with human, vehicle and environment needs and information interaction. The intelligent vehicle consumption upgrade favors the interaction mode switching from the conventional flat, relatively independent interaction mode to the three-dimensional integrated interaction mode. Continuous efforts will be made to explore the demand for emotional interaction and human-vehicle "resonance". Moreover users have ever greater demand for personalized car services and emotional interaction. The development of intelligent cockpits lays more stress on personalized space, and friendly interaction and services.



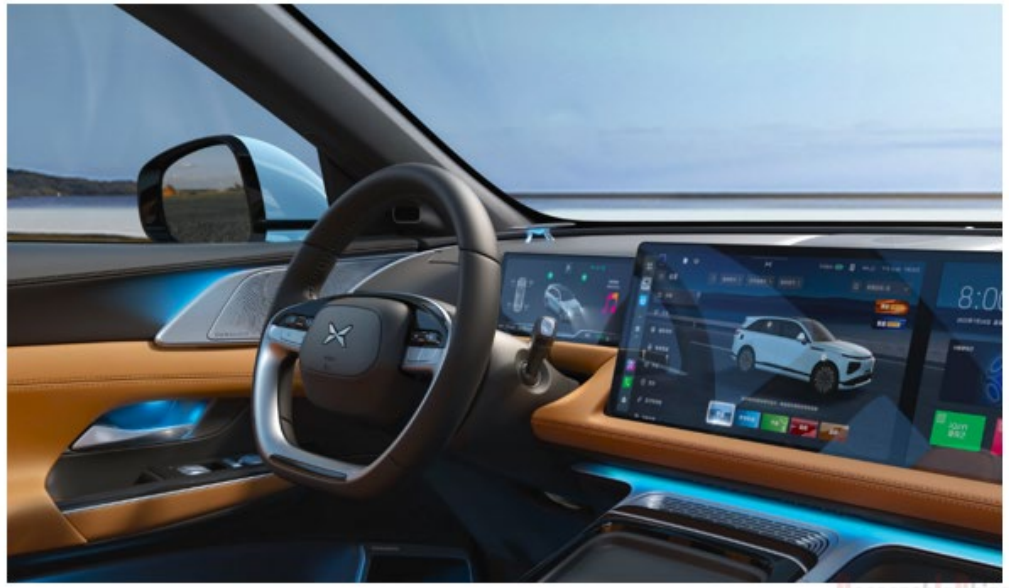
Intelligent Cockpit of Jidu ROBO-01 Lunar Edition

3D Unreal Engine is applied, and human-machine interface offers more three-dimensional, intuitive and convenient interaction

As an open real-time 3D creation platform, Unreal Engine has found broad application in automotive design and engineering, especially in human-computer interaction. An increasing number of automakers have partaken in the joint development with Unreal Engine. The likes of Mercedes-Benz, Nissan, GM, SAIC IM Motors, and Xpeng Motors all use Unreal Engine in their intelligent cockpits to make the interaction more intuitive and three-dimensional and improve cockpit immersive experience and driving safety.

IM L7, launched on market in 2022, bears a 3D user interface (UI) co-created by Banma Zhixing and Unity. It supports multi-screen streaming and cross-screen display of 3D applications, 3D visualization of the car control interface, and 3D particle dynamic effects on the air-conditioner interface, intelligent driving HD map display, and immersive games that combine vehicle information and multi-mode interaction.

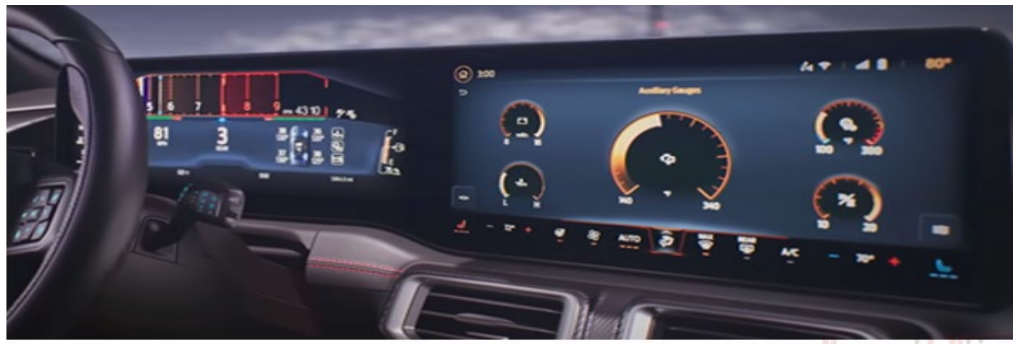
Xpeng G9, marketed in 2022, carries 3D UI for human-computer interaction. Developed with Unity 3D rendering engine, this feature enables control on suspension, air conditioners, windows, trunk and ambient lights via the 3D car model touch screen in the car control display. Moreover the new interaction system can render 3D maps in real time to improve navigation accuracy, and also allows users to control car details such as windows and suspension through the large display, a visible way.



Xpeng G9 3D UI for Human-computer Interaction

The intelligent cockpit design of the new 7th-generation Ford Mustang launched in 2022 is inspired by fighter jets. The car is equipped with two displays developed with the 3D Unreal Engine platform, and supports customizable functions such as animation design and new driving mode display interface.

The future Unreal Engine is likely to become a general-purpose next-generation engine that empowers the automotive industry, and provides creation teams with efficient cooperative productivity and better interaction experience to bring the creativity of designers into full play.



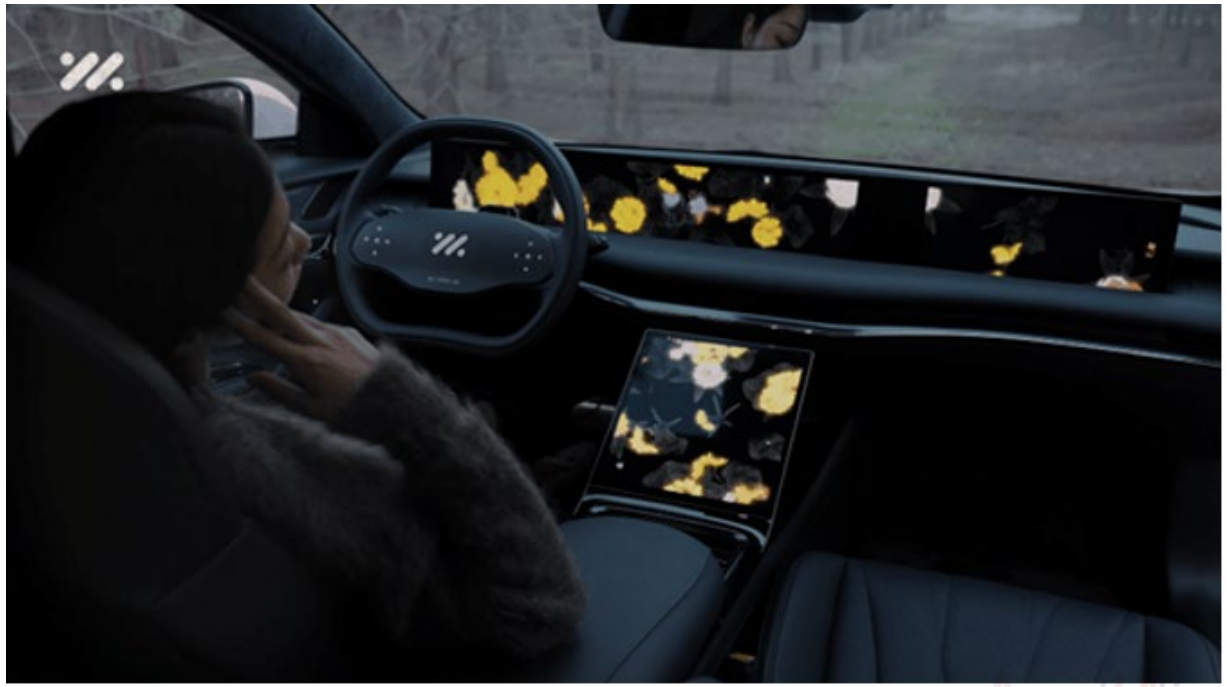
Intelligent Cockpit User Interface (UI) of 7th-generation Ford Mustang

The cockpit scenario mode design tends to be personalized, user-defined and all-scenario integrated

Scenario mode is a major development trend of future intelligent cockpits. There are mainly two types of modes: interior scenario, and interior and exterior combined scenario. In terms of interior scenario mode, currently new car models enable simple scenario interaction through intelligent configurations such as voice, ambient lights, and multi-functional seats. For instance, when the nap mode available in most car models is turned on, the driver's seat will automatically "lay flat", the air conditioner will automatically open and the lights, windows, sunroof, and visors will all be closed; after the timing ends, there will be a music alarm, and the seat will return to its original state after clicking the end.

In the trend for software-defined vehicles and service-oriented architecture (SOA) design, this mode supports editing of intelligent scenarios on the intelligent cockpit screens. Many new car functions are not always developed from scratch, but as for a number of simple functions based on intelligent scenario combination, the SOA software architecture allows OEMs to abstract each minimum function into atomic services, and freely combine them into a more intelligent scenario-based function by way of service calling. The trend for user-defined, personalized intelligent cockpit scenarios becomes ever more obvious.

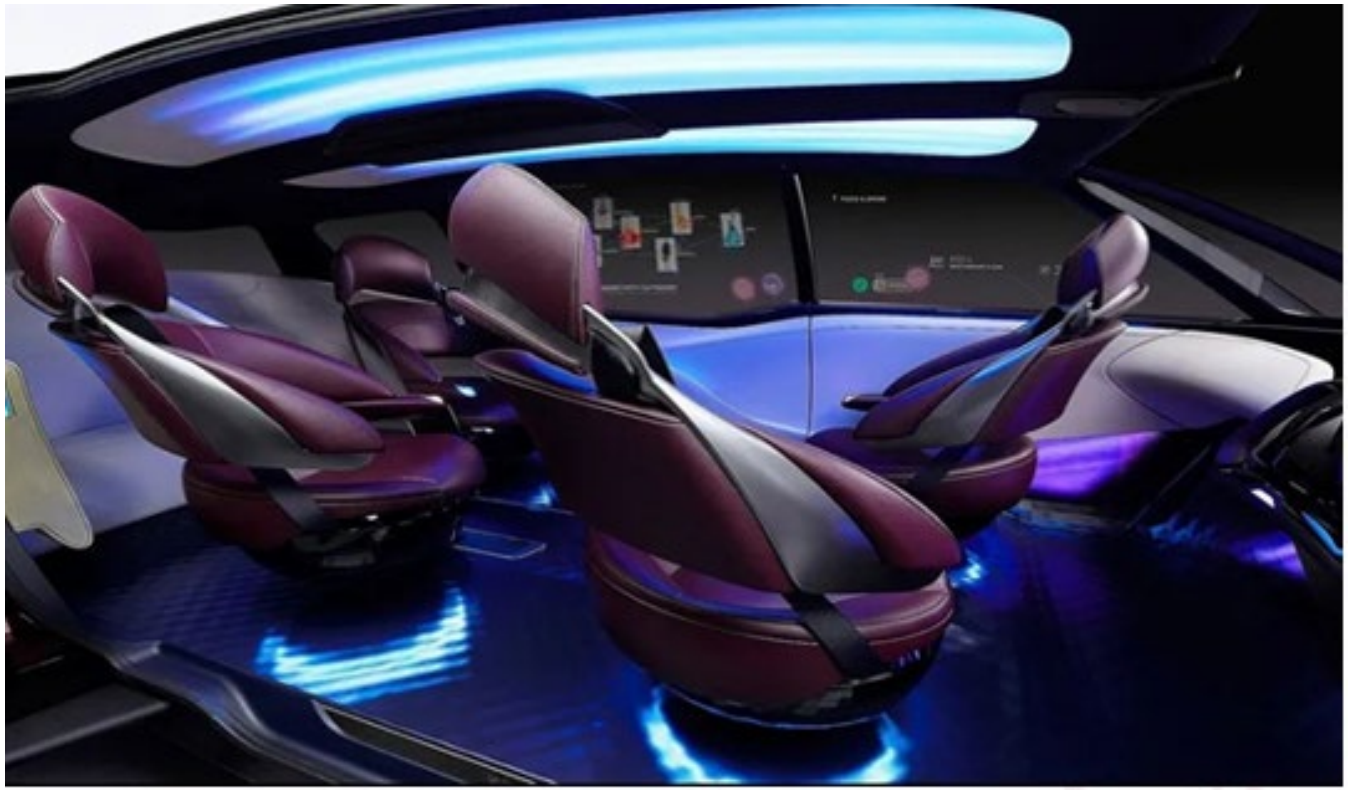
IM L7 that features IMOS and Onehit scenario-based experience design allows car owners to combine vehicle control items into their own exclusive modes. For example, it enables one-button definition of the female owner welcoming and built-in nap mode that supports one-button control on seats, air conditioner and fragrance, and display of the teamLab-customized flowering dynamic effect on the screen, so as to offer immersive relaxation experience, while in the pet mode, the system automatically adjusts the air conditioner ventilation to create a comfortable environment for the pet. Furthermore, the ISC at the front and rear of the car can express the state of the pet in the car in a warmly manner, so as not to worry passersby.



IM L7 teamLab Flowering Mode

The cockpit scenario mode design tends to be personalized, user-defined and all-scenario integrated

In addition, as new technologies are adopted and autonomous driving matures, in the future cockpit scenarios will evolve from single scenarios to multi-scenario integration to meet user needs. In different scenarios, the changing interior space facilitates the expansion of the interior modes, which can be converted according to different scenarios of driving, rest, and office. When the user needs a rest, the steering wheel can be retracted, and the seat can be folded down or even become a bed; when the user needs to communicate with other occupants or entertain, the seat can be rotated; when the user needs to watch a movie, the entire window or windshield can turn into a large display.



Toyota Fine-Comfort Ride Concept Car Cockpit Mode

The vehicle cockpit game market is flourishing, and the market demand is waiting to be unleashed

As intelligent driving advances, the entertainment functions of intelligent cockpits are being developed. In recent years, multiple automakers like Tesla, Audi, Mercedes-Benz, GAC, Great Wall Motor, BYD and Li Auto have begun to deploy vehicle games. Among them, Tesla is a pioneer. In June 2019, Tesla introduced the Arcade Game Platform in which users can access a variety of Atari games via the center console screen, and then the real-time game OTA updates are available. In June 2021, Tesla demonstrated the 3A masterpiece game "Cyberpunk 2077" at the Model S Plaid Launch. In July 2022, Tesla announced that it would integrate the Steam game platform into the car, allowing users to experience a mass of Steam games in the car.

Status Quo of Vehicle Cockpit Game Layout of Some OEMs

OEM	Launch Time	SOP Status	Layout
Tesla	2018	SOP	Add pixel games like Missile Command and Asteroids to Tesla's IVI system via OTA updates. Most of games can be played with on-screen virtual controls, while such games as Beach Buggy developed by Vector Unit can be controlled using the steering wheel and brake.
	2019		Tesla launched t Arcade Game Platform where users can access a variety of Atari games via the center console screen.
	2021		Introduce the 3A masterpiece "Cyberpunk 2077" into the IVI system of Tesla Model S.
	2022		Tesla even announced that it will integrate the Steam Game Platform into the car, so that users can experience a large number of Steam games in the car.
Audi	2022	SOP	Announced that the Audi models with the latest upgrade of the modular infotainment toolkit (MIB 3) would fully support Holoride VR occupant entertainment in June 2022, which means that Pico Neo 3 and Vive Flow are available. This feature offers Holoride's XR holographic entertainment content and experience, and connects with vehicle motion and position awareness data in real time.
Daimler	2019	SOP	Operate the go-kart in the SuperTuxKart game through the steering wheel, adjust the driving speed of the go-kart via the accelerator and brake, and also in real time feed the driving status back through the airflow from the ventilation nozzle, the seat and the seat belt.
BMW	2023	SOP in 2023	BMW announced that it is partnering with the gaming platform AirConsole to bring a collection of single- and multi-player games to into new BMW vehicles, starting launch in BMW Series 7 in 2023.
Lexus	2021	Concept	Lexus unveiled the Gamers' IS, the first vehicle designed by and for the Twitch community. The LED panel project programmable content onto the car's rear window, and a custom-built gaming PC is installed in the vehicle's trunk. In the passenger's side is a fully integrated gaming system complete with haptic feedback in the seat and a high-definition curved monitor. The system features a retractable keyboard and mouse platform, and a 3D printed game controller.
NIO	2021	Concept	Cooperated with NOLO to launch a vehicle VR headset, and with Nreal to unveiled vehicle VR eyes, focusing on immersive infotainment and content interaction.
Xpeng	2022	SOP	The mobile game "Talking Tom Gold Run" are ported to P5, G3i, and G3 models; a range of existing games can be downloaded from the App Store, and some games can also be played using the steering wheel and handle.
Li Auto	2022	SOP	Li Auto L9 can connect the Switch, the center console screen, co-pilot seat entertainment screen, and rear row entertainment screen via the Type-C interface, enabling a "mobile game space for the whole family" in the rear row of the car.
GAC Aion	2022	SOP	GAC Aion S Plus teamed up with Migufun to launch a "cross-dimension dreamy e-sports cockpit" game package priced at 199 yuan. It includes a physical game controller, more than 1,000 game installation packages, and monthly game membership.
BYD	2021	SOP	BYD DiLink system will be equipped with Migufun. The two parties will jointly create a customized super game library for BYD car owners, making it easy for players to experience more than a hundred 3A host masterpieces and starfish mobile games.
Great Wall Motor	2022	SOP	WEY Macchiato sets the G-gear smart space, namely, the game mode with two built-in games called Iron Valkyrie and Star City Fishing, which are played through the steering wheel, accelerator and brake, cooperating with the IVI system.
Mecha Dragon	2023	SOP	The multi-screen feature and brand-customized game handle enable the interactive experience of multiplayer games in the car. The sensory immersion design featuring internet of everything realizes the linkage and cooperation of the steering wheel, pedals, audio system, and game handle. There is a game mode in which the steering wheel is equivalent to a game handle.
AITO	2022	SOP	"My Talking Tom Friends" is available to AITO cars, becoming the first Huawei HarmonyOS-based game logged in by face.

Source: ResearchInChina

The vehicle cockpit game market is flourishing, and the market demand is waiting to be unleashed

The entertainment system of Li Auto L9, a new model launched in 2022, supports connection and mirroring of Switch and other game console devices, turning the car into a "mobile game space for the whole family" and bringing consumers better ride experience. The 220V power supply of Li Auto L9, equipped with the HDMI-Type-C adapter cable, allows users to play all kinds of game consoles and 3A masterpieces in the car.

At present, the demand for vehicle games has yet to be unleashed, but when the maturing autonomous driving technologies enable hands-free driving, the demand for vehicle games will usher in a boom period. It is expected that the penetration rate of vehicle games will be higher than 20% after L4 autonomous driving comes into service.

In the future, the maturing intelligent and autonomous driving technologies will help to make vehicles large mobile intelligent terminals; vehicle games will trend to provide more spatial and immersive experience; the forms and types of games will also become more diversified.

Table of Content (1)

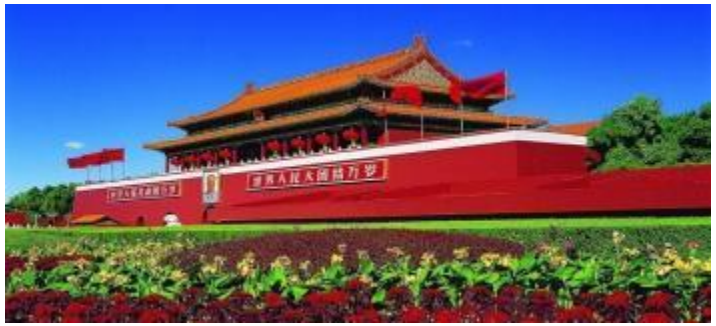
Table of Content (2)

Table of Content (3)

Table of Content (4)

Table of Content (5)

Contact

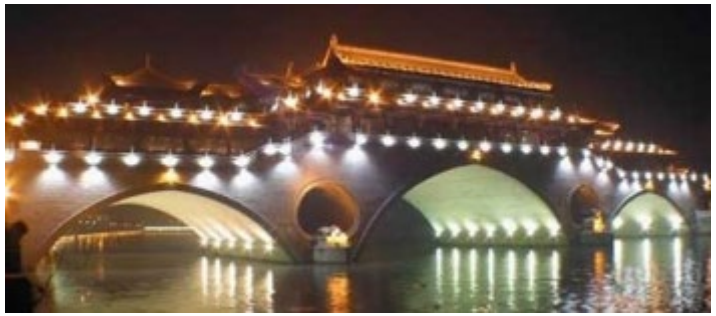


Beijing Headquarters
TEL: 010-82601561, 82863481
Mobile: 137 1884 5418
Email: report@researchinchina.com

Website:
www.researchinchina.com

WeChat: zuosiqiche

zuosiqiche



Chengdu Branch

TEL: 028-68738514
FAX: 028-86930659