ResearchInChina
www.researchinchina.com

Automotive DMS/OMS (Driver/Occupant Monitoring System) Research Report, 2023-2024

Jan. 2024

In-cabin Monitoring study: installation rate increases by 81.3% in first ten months of 2023, what are the driving factors?

ResearchInChina released "Automotive DMS/OMS (Driver/Occupant Monitoring System) Research Report, 2023-2024 ", mainly combing DMS, OMS-based in-cabin monitoring system market status, in-cabin monitoring solutions of main models, domestic and foreign monitoring system suppliers, industry chain suppliers, etc., and development trend of in-cabin monitoring.

The primary driver of in-cabin monitoring systems is regulations, and major automotive countries such as China, the United States, European Union, South Korea, and India have introduced relevant regulations or technical standards. One of the most leading one is Driver Drowsiness and Attention Warning systems (DDAWS) issued by the EU, which requires the mandatory implementation of DDAWS requirements for newly certified models in categories M and N with speeds exceeding 70 km/h from July 6, 2022, and the mandatory installation of DDAWS systems on all newly registered models from July 7, 2024.

In China, the 2024 exposure draft of "C-NCAP Management Rules" includes DMS in the project score for the first time, setting three scenario weights for DMS (including fatigue monitoring and attention monitoring), and the project score is 2 points, second only to AEB in the ADAS experimental score.

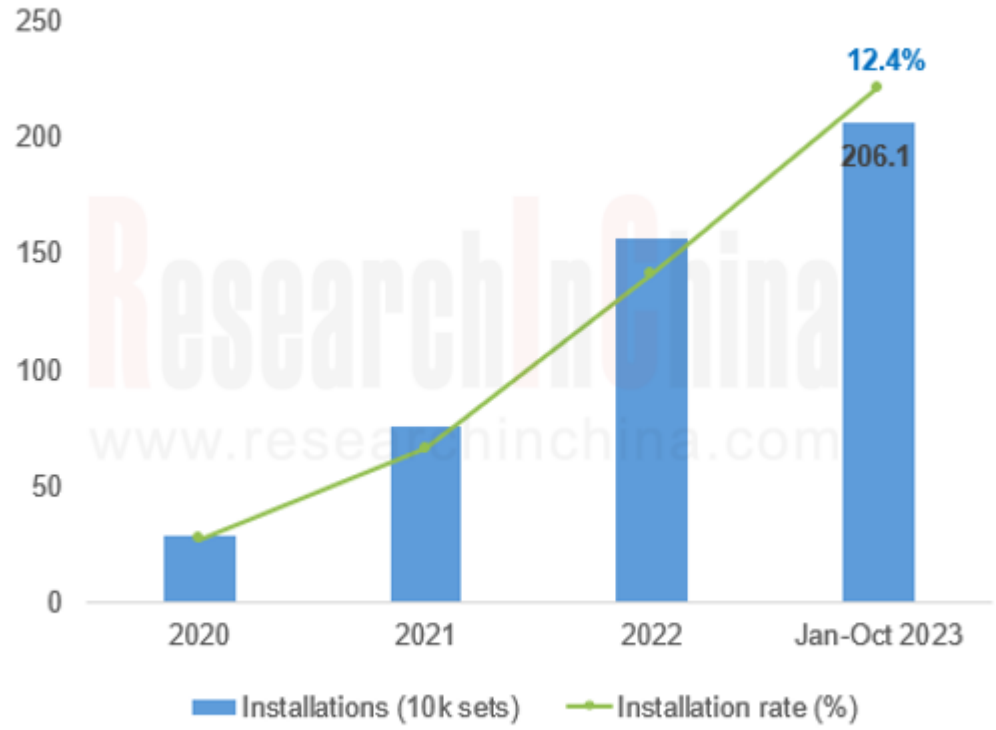
Overall, from the perspective of policy and regulatory environment, in-cabin monitoring is becoming one of the smart vehicle functional evaluation projects, and the market demand is expected to continue to grow.

The installation of passenger car in-cabin monitoring systems in China increased by 81.3% year-on-year

1. From January to October 2023, the installation of passenger car in-cabin monitoring systems in China increased by 81.3% year-on-year.

In recent years, the in-cabin monitoring market has entered the fast lane. From January to October 2023, the installation of China's passenger car cabin monitoring system reached 2.061 million sets, an increase of 81.3% year-on-year; the installation rate reached 12.4%, an increase of 4.5 percentage points over the same period last year.

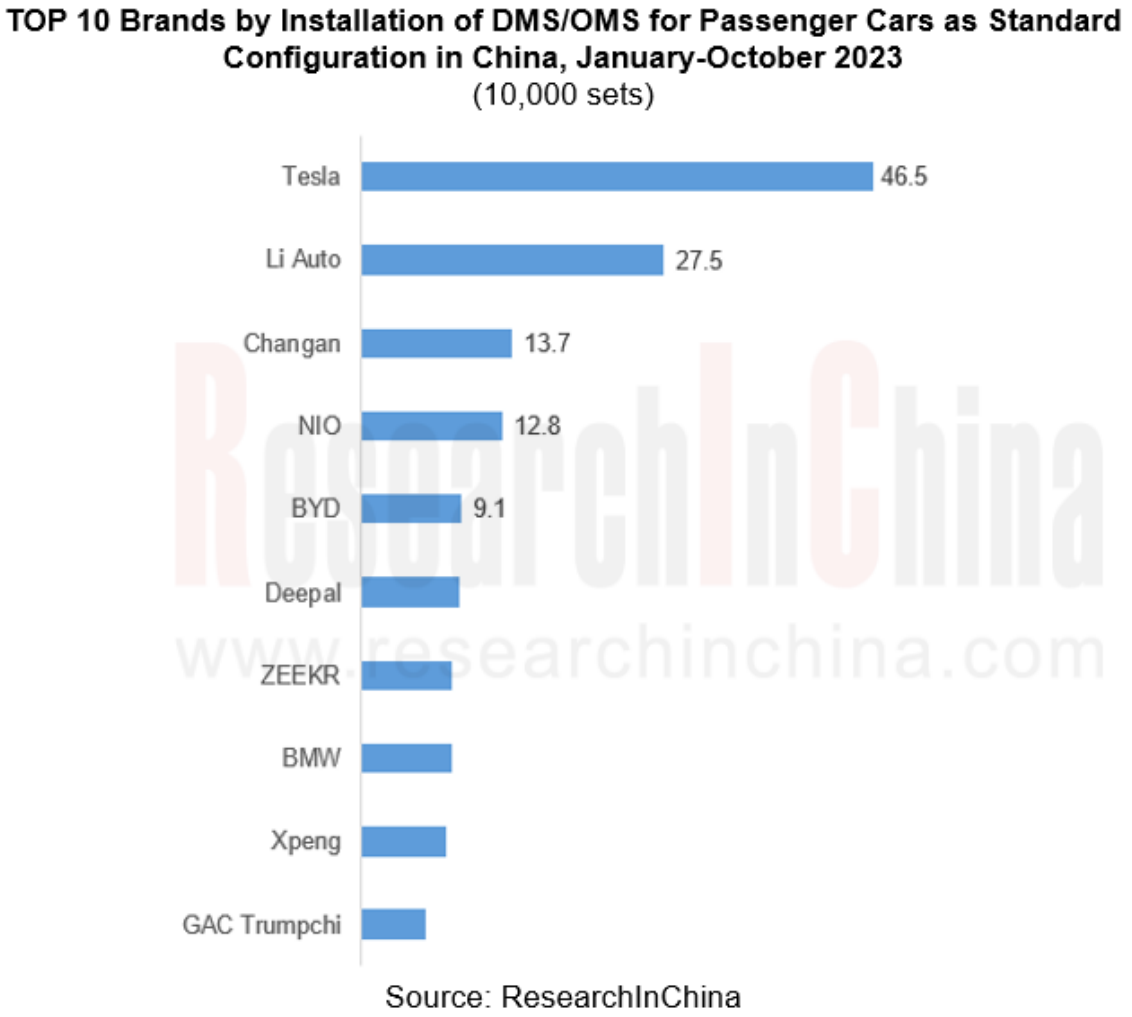
Installation and Installation Rate of DMS/OMS for Passenger Cars as Standard Configuration in China, 2020-2023



Source: ResearchInChina

TOP 10 Brands by Installation of DMS/OMs for Passenger Cars as Standard Configuration in China, January-October 2023

From the perspective of brand distribution, the brands with a large installation from January to October 2023 include Tesla, Li Auto, Changan, NIO, BYD, etc. The total installation of the TOP10 brands accounts for 72%.



ADAS will drive the growth in demand for DMS systems

2. ADAS will drive the growth in demand for DMS systems

In addition to regulations, the expansion of functions such as intelligent cockpit and high-level driver assistance on board also promotes in-cabin monitoring systems such as DMS and OMS. For example, in autonomous driving systems above L2, human-machine co-driving has become a difficult problem that needs to be solved, and DMS has become an indispensable redundancy solution. In addition, in different scenarios of high-level autonomous driving, the functional requirements and system strategies of in-cabin monitoring are different, and the functions and scenarios need to be defined according to the system requirements of autonomous driving.

		No autonomy 0	Driver assistance 1	Partial driving automation 2		Conditional driving automation 3		High driving automation 4	Full driving automation 5
		No autonomy. The driver needs to complete all driving tasks.	The vehicle will be controlled by the driver, but some driver assistance functions may be included in the vehicle design.	The vehicle has such autonomous driving functions as automatic acceleration and steering, but the driver must always participate in driving tasks and pay attention to the driving environment.		The driver must participate in driving tasks, but does not need to pay attention to the driving environment. The driver must always be ready to control the vehicle when prompted.		The vehicle can perform all driving functions in specific conditions. The driver can choose to control the vehicle.	The vehicle can perform all driving functions in all conditions. The driver can choose to control the vehicle.
Vehicle functions				2	2+	3	3+		
	Safe parking	N/A	N/A	Maybe available (slowdown in the lane)	Maybe available	Maybe available	Available	Available	Available
	Sensing	-	1-2	3-4	4-6	10-12	15-20	20+	20+
	System redundancy	N/A	N/A	N/A	N/A	N/A	N/A	Available	Available
	Driver monitoring	N/A	N/A	N/A	Touch/driver status	Driver readiness	Driver readiness	Driver readiness	N/A
Yes / No									
Driver involvement	Focus on driving tasks	Yes	Yes	Yes	Yes	Yes	No	No	No
	Eyes on driving tasks	Yes	Yes	Yes	Yes	Yes	No	No	No
	Hands on the steering wheel	Yes	Yes	Yes	No	No	No	No	No
	Foot on pedal	Yes	No	No	No	No	No	No	No

Source: Aptiv

In-cabin Monitoring Solutions for Urban NOA in TOP10 Models in China, Jan.-Sept. 2023

From the perspective of the top 10 models of urban NOA assembly, DMS + OMS has become the mainstream solution for in-cabin monitoring, mostly through 1-2 cameras to achieve all-round monitoring of drivers and occupants, meeting the high-level autonomous driving redundancy while also meeting intelligent requirements of cockpit.

In-cabin Monitoring Solutions for Urban NOA in TOP10 Models in China, Jan.-Sept. 2023

TOP 10 Model	Sales (10,000 Vehicles)	In-cabin Monitoring Solution	Sensor	Installation Location
Model Y	32.1	DMS+OMS	1*cab camera	Above the interior rearview mirror
Model 3	11.3	DMS+OMS	1*cab camera	Above the interior rearview mirror
Li L9	7.4	DMS+OMS	1*IR camera + 1*3D ToF camera	Above the interior rearview mirror + above the rear entertainment screen
ZEEKR 001	4.9	DMS+OMS	1*DMS camera +1*OMS camera	Steering wheel column + above the interior rearview mirror
NIO ET5	4.8	DMS+OMS	1*DMS camera +1*OMS camera	Steering wheel column + above the interior rearview mirror
Li L8		DMS+OMS	1*IR camera + 1*3D ToF camera	Above the interior rearview mirror + above the rear entertainment screen
Li L7		DMS+OMS	1*IR camera + 1*3D ToF camera	Above the interior rearview mirror + above the rear entertainment screen
ZEEKR 009		DMS+OMS	1*DMS camera + 1*vehicle video camera	Steering wheel column + right side of the second-row entertainment screen
NIO ES7		DMS+OMS	1*DMS camera +1*OMS camera	Steering wheel column + above the interior rearview mirror
Xpeng P5		DMS	1*DMS camera	A-pillar

Driver Sleepy Warning of Tesla Model Y

Tesla Model Y has a camera in the cab of the car. In October 2023, the version was upgraded to add a "Driver Sleepy Warning" function. This function uses camera to determine whether the driver is paying attention and sounds an alarm. It also allows users to remotely view the in-car camera when the vehicle's Sentinel mode or Pet mode functions are activated.

Source: Tesla

Radar sensors are widely used in OMS

3. Radar sensors are widely used in OMS

In some scenarios (such as legacy child monitoring), the monitoring range of camera is easily affected by conditions such as installation location and line of sight, making it difficult to achieve accurate monitoring and alerting. And radar sensors (including radar, ultrasonic radar, UWB radar) have ability to penetrate solid matter, which can more accurately detect unattended children, monitor the status of occupants, and estimate the vital signs of drivers. The application in cabin monitoring is expected to expand.

As a new system radar, UWB works in the frequency band of 6-8GHz. The UWB radar has robust and high-precision characteristics, which can penetrate solid materials inside the car, such as metal barriers, car seats and baby blankets. It can also accurately detect very small movements, such as the detection of small fluctuations in the chest when a baby breathes.

Among in-cabin monitoring suppliers, HARMAN upgraded the Ready Care product function in January 2023. After upgrade, the vital signs sensing and legacy child detection functions can be realized through 24 GHz living body radar sensor and 60 GHz occupancy radar sensor.

Among OEMs, GAC Trumpchi E9, which was launched in May 2023, has an OMS equipped with two OMS cameras, a vital signs monitoring radar (located above the inner rearview mirror) and an infrared monitor. Through this radar, the vital signs of drivers and passengers in the car can be detected.

Source: GAC Trumpchi E9

Further integration of in-cabin monitoring system and multi-modal interaction

4. Further integration of in-cabin monitoring system and multi-modal interaction

The in-cabin monitoring system, as the key ring of human-vehicle interaction, is being integrated with other multi-modal interactions such as voice/gesture/biometrics/smell in the cockpit.

Jingwei Hirain intelligent cockpit full cabin perception system SCSS has perception, presentation and processing capabilities, including camera modules, microphones, ambient lights, streaming media rearview mirrors, AR-HUD, smart seats, domain controllers and other components, which can deeply integrate ADAS, TBOX, body, HD maps and other information.

In mass-produced models, for example, the in-cabin monitoring system of Li Auto L7 supports interactive linkage with voice + gesture recognition; the DMS system of Changan Qiyuan A07, Lynk & Co 08, Rui Lan 7 and other models supports linkage with voice, eye tracking, and smell.

Linked Human-machine Interaction Mode	Model	Realizable Linkage Functions
In-cabin Monitoring System + Voice + Gesture	Li L7	• When issuing voice commands, extend your index finger: point to the left, right, and up to control the windows/sunroof/sunshade.
DMS + Voice + Eye Tracking	Changan Nevo A07	• Intelligent recognition of the driver's lip movement via the IR camera, the lip reading + voice feature recognition dual-mode wake-up-free voice, greatly improving the accuracy of wake-up recognition.
	Hycan A06 Hycan V09	• Support the driver's eyesight to wake up the voice recognition function.
DMS + Eye Tracking	Lynk & Co 08	• The driver monitoring system (DMS) supports driver fatigue monitoring and eye tracking, and adjusts the projection angle of the AR-HUD in real time.
DMS + Smell	Livan 7	• When the driver is drowsy in the driver's seat, the camera on the left front A-pillar will capture facial information and release the fragrance while providing a voice alert.
	NIO EC7	• When a drowsy driver is detected, the in-car fragrance system will automatically release a refreshing fragrance to ensure driving safety.
DMS + Biometrics	Hiphi X	• The biosensor can recognize the driver's expression, voice, heart rate, blood oxygen, blood pressure changes, respiratory rate, etc., and then automatically adjusts the music and temperature, or take over the vehicle in dangerous situations.

Table of Content (1)

Table of Content (2)

Table of Content (3)

Table of Content (4)

Table of Content (5)

Contact

Beijing Headquarters

TEL: 13718845418
Email: report@researchinchina.com

Chengdu Branch

TEL: 028-68738514
FAX: 028-86930659

Website: ResearchInChina

WeChat: Zuosiqiche

zuosiqiche