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Global and China Electronic Rearview Mirror Industry Report, 2021-2022

June 2022

Overview of Electronic rearview mirror

Electronic rearview mirror research: the streaming rearview mirror installations soared by 73% in 2021.
This report combs through and summarizes the global and Chinese electronic rearview mirror markets, including status quo (installations and installation rate), function applications, development trends, suppliers' products and market layout.

1. Overview of electronic rearview mirror
Before talking about electronic rearview mirrors, it first needs to state the classification of automotive indirect vision devices (providing the rear, side or front view of a vehicle). The new version of GB15084 explicitly divides the motor vehicle indirect vision devices into seven categories by view:

I: interior rearview devices

II/III: main exterior rearview devices

IV: wide FOV exterior view devices

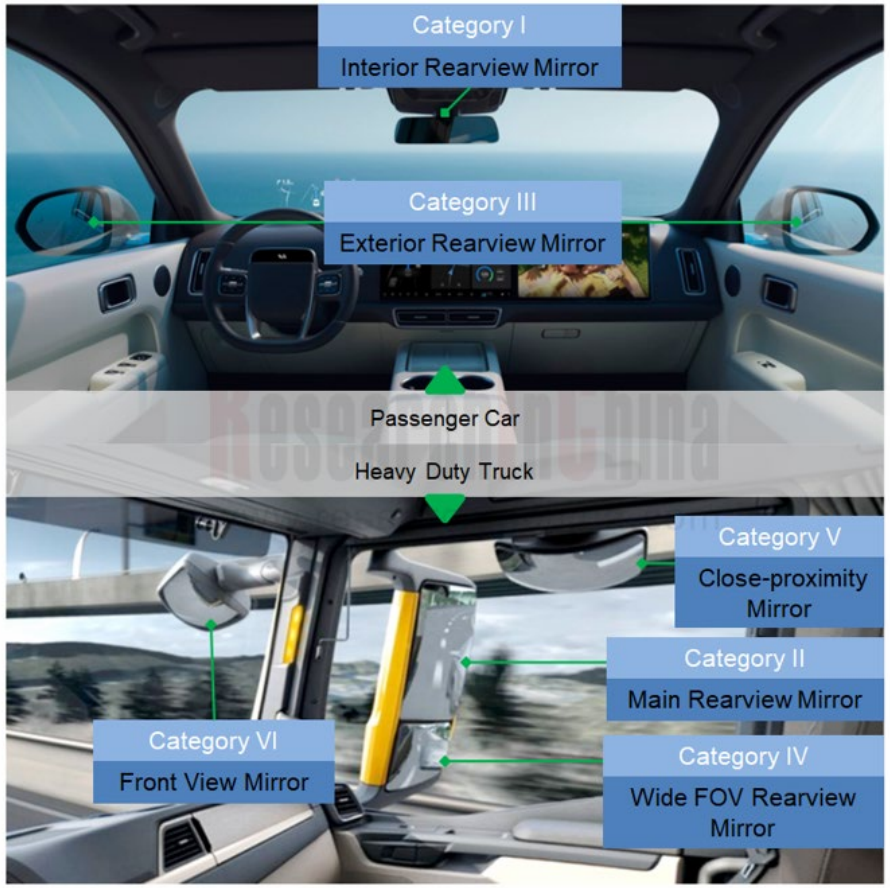
V: close-proximity exterior view devices

VI: front view devices

VII: mirrors for Category L motor vehicles with at least a partially enclosed cab

Specifically on a vehicle, the figure below shows the classification of indirect vision devices by view.

Classification of Indirect Vision Devices for Motor Vehicles by View
(Take A Passenger Car and A Heavy Truck as Examples)



Source: Li Auto, Internet

Overview of Electronic rearview mirror

So what is an electronic rearview mirror? The electronic rearview mirror is a new type of indirect vision device. In the new version of GB15084, it is described as a "camera-monitor system" (abbreviated to as CMS), that is, "indirect vision device, a system composed of a camera and a monitor, can clearly see the rear, side or front of the vehicle within the specified field of view".

In terms of function, an electronic rearview mirror is roughly similar to a conventional optical mirror, but presents an image on the display instead of glass, bringing in more possibilities of enriching image information. As an improvement on and an alternative to the conventional Category I-VII view devices, CMS can deliver a wider and clearer rear view to the driver, eliminating the obscuring effect of rain, snow and fog on windows and mirrors. Overlaying a variety of driving assistance information, it also allows the driver to know much more about road conditions behind, making driving safer.

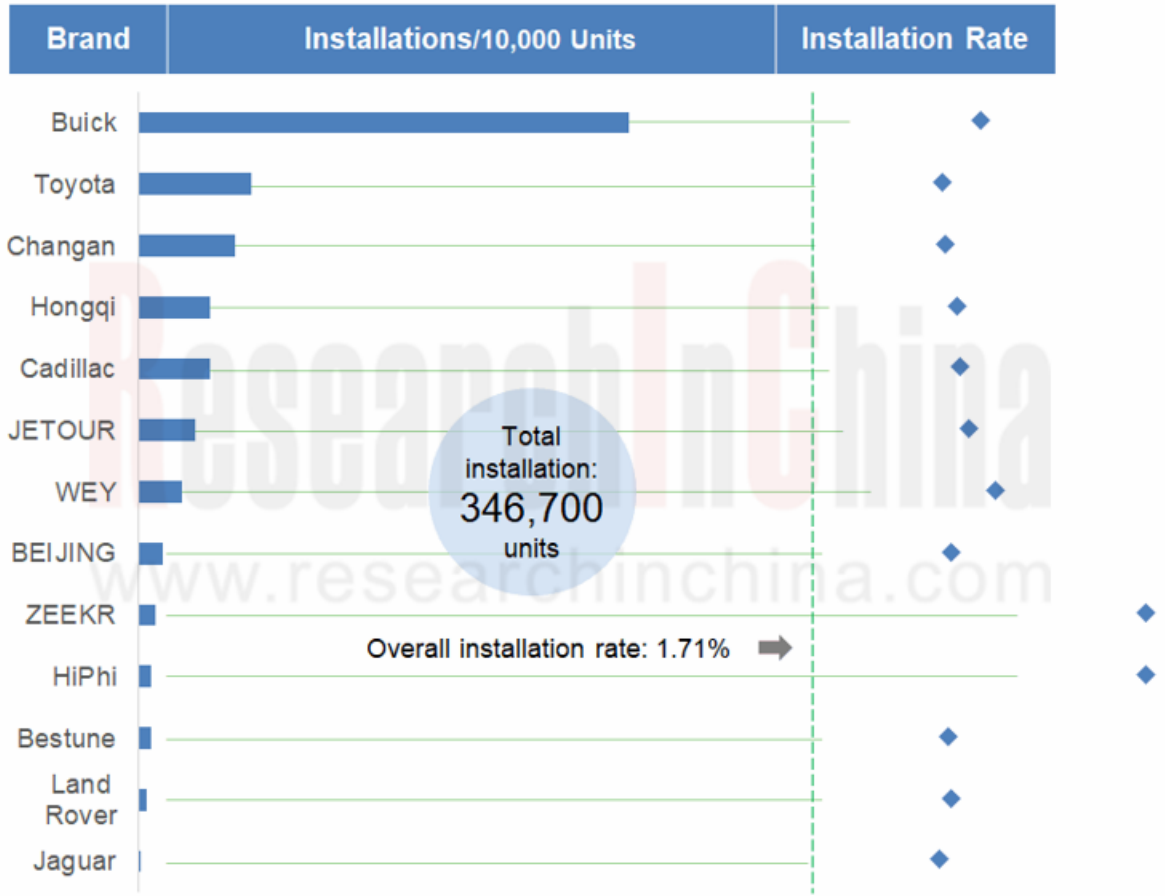
By installation position, electronic rearview mirrors are mainly split into interior and exterior types, of which interior electronic rearview mirrors are often called "streaming rearview mirrors".

Electronic Rearview Mirror Diagram (Take a Passenger Car as an Example)

Source: Cadillac, Audi

The electronic rearview mirror market is soaring, but still in its infancy.

Installations and Installation Rate of OEM Streaming Rearview Mirrors in China's Passenger Car Market, 2021



Source: ResearchInChina

In April 2016, the 2016 Cadillac XT5 equipped with a streaming rearview mirror was launched on market. It was the first time that an OEM streaming rearview mirror appeared in the Chinese passenger car market. And then, auto brands like WEY, Buick and FAW (Hongqi, Bestune) also unveiled models with streaming rearview mirrors. As of May 2022, a total of 13 auto brands in China have marketed models carrying streaming rearview mirrors and achieved certain sales.

The boom of intelligent cockpits and ADAS has favored the flourish of vehicle cameras in recent years, and streaming rearview mirror cameras are no exception. In 2021, there were 346,700 insured passenger cars (excluding imported ones) packing standard OEM streaming rearview mirrors in China, surging by 73.04% on the previous year. In 2021, the insured passenger cars in China totaled 20.328 million units, which meant the installation rate of streaming rearview mirrors in passenger cars was just 1.71%. The streaming rearview mirror market is still in its infancy.

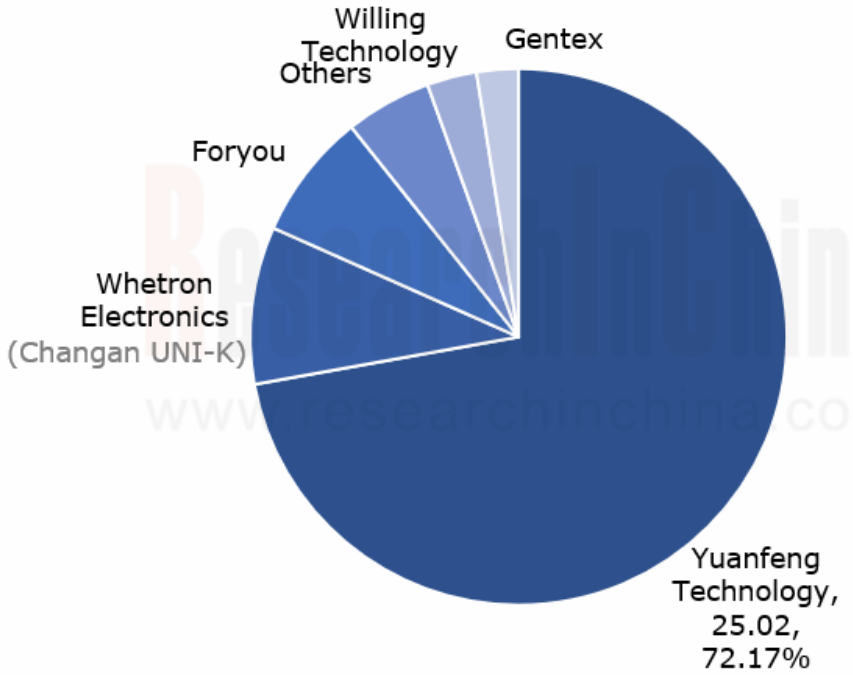
Market Share of Major Rearview Mirror Players

There are few streaming rearview mirror suppliers participating in the OEM market considering the current size, creating a relatively simple completive landscape. Our data show that Yuanfeng Technology is now the largest supplier of streaming rearview mirrors in the Chinese passenger car market, with an overwhelming market share of 72%.

Having undergone four iterations, Yuanfeng Technology's streaming rearview mirror products subject to the international standard ECE R46 perform well in video latency, system stability, screen highlighting, lightweight mirror body, heat dissipation and other technical parameters, and have supported car models of Cadillac, Buick, Chevrolet, Great Wall Motor and Toyota, among other auto brands.

Installations of OEM Streaming Rearview Mirrors in China's Passenger Car Market, 2021

(Supplier, Installations/10,000 Sets, Market Share)



Source: ResearchInChina

Streaming Rearview Mirror Solutions

As for solution implementation, mainstream solutions change Category I vision device from a conventional optical mirror to a display, so as to maximally adapt to the driver's habit of seeing the rear view. Some OEMs also carry out a compromise, a solution of separating the Category I vision device from the image, that is, still using the conventional optical mirror to present the image collected by the streaming camera on the cluster screen or the center console screen. Examples include Changan UNI-K and ZEEKR 001.

Streaming Rearview Mirror Solutions of Changan Automobile and ZEEKR

Electronic exterior mirrors: most automakers take a wait-and-see attitude

Differing from streaming rearview mirrors, exterior rearview mirrors that play a hugely important role in daily driving safety walk on a bumpy road to electronization. Since the United Nations issued the UN-R6 regulation in June 2016, Europe, Japan, South Korea and India among other regions/countries have started to sell models equipped with electronic exterior mirrors. Today, although policies and regulations have helped to open up the electronic rearview mirror market for 6 years, only a few auto brands and models provide mass-produced OEM electronic exterior mirrors solutions.

Global Typical Models with OEM CMS Solutions

Commercials Vehicles				
Brand/Model	Mercedes-Benz Actros/Arocs	DAF XF/XG/XG+	MAN TGX/TGM/TGS/TGL	SCANIA Super
Sales Region	Europe	Europe	Europe	Europe
CMS Optional/Standard	Optional	Optional	Optional	Optional
CMS Solution Provider	MEKRA Lang	Stoneridge	Ficosa	Stoneridge
Passenger Cars				
Brand/Model	Audi e-tron Series	Lexus ES 300h	Honda e	Hyundai IONIQ 5
Sales Region	Europe, Japan, South Korea, India, Australia	Europe, Japan	Europe, Japan	South Korea
CMS Optional/Standard	Optional	Optional	Standard	Optional
Optional Price	EUR1,540 (~RMB11,000)	JPY287,000 (~RMB15,000)	/	KRW1.3 million (~RMB7,000)
CMS Solution Provider	Ficosa	Tokai Rika	Ficosa	Mobis (Estimated)

Source: ResearchInChina

Electronic exterior mirrors: most automakers take a wait-and-see attitude

Commercial vehicles:

Take Mercedes-Benz for example. Mercedes-Benz Trucks first introduced MirrorCam, a mass-produced electronic exterior mirror solution that was first applied to the flagship heavy-duty truck Actros. Mercedes-Benz adopts a conservative rearview mirror replacement strategy where only the main rearview mirror (Category II) and wide FOV rearview mirror (Category IV) are electronic, and the front view mirror and close-proximity exterior view mirror are retained. The Mercedes-Benz MirrorCam system is composed of two cameras and two 15.2-inch displays. Above the MirrorCam display are three manually adjustable virtual distance lines (moving left, reversing, and overtaking) to assist the driver in estimating the distance with the rear vehicle. At the same time, the MirrorCam display also integrates the warning information of Mercedes-Benz Sideguard Assist.

Just this past May, Mercedes-Benz Trucks upgraded its electronic rearview mirror MirrorCam to the second generation. Still using the single-camera solution, the second-generation looks more compact than the first-generation for the camera arms on each side have been shortened by 10cm, and displays clearer images.

Electronic Exterior Mirror Solution (the First-generation MirrorCam) of Mercedes-Benz Trucks

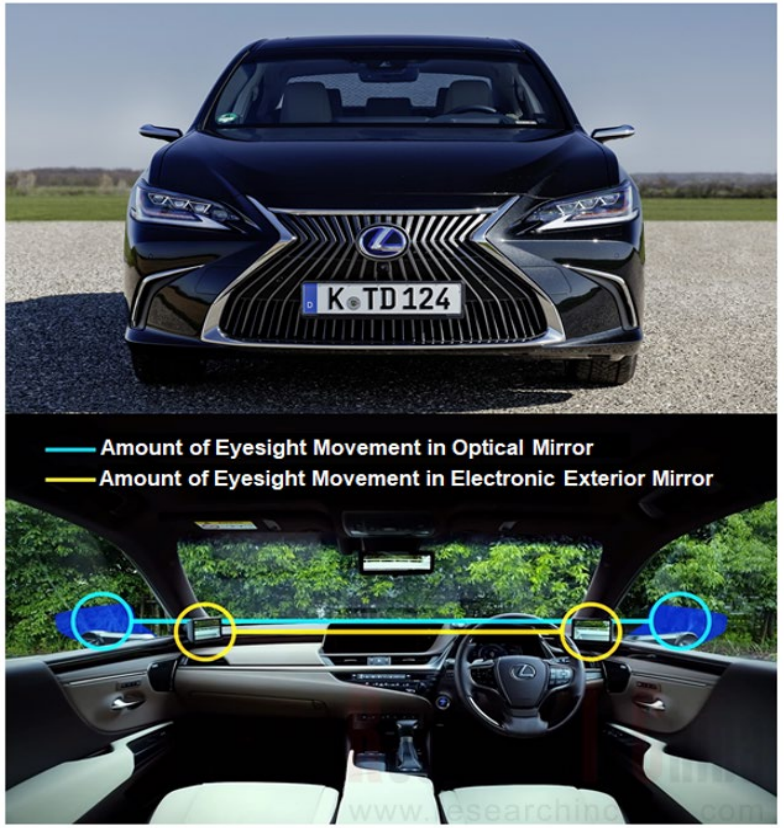
(The Technical Solution Provided by Germany's MEKRA Lang)

Source: Mercedes-Benz Trucks

Electronic exterior mirrors: most automakers take a wait-and-see attitude

Passenger cars:
In terms of appearance and structure, the cameras and displays of electronic rearview mirrors for passenger cars are more compact and smaller than those for commercial vehicles. For example, Lexus, a luxury brand, was the first one to mass-produce the passenger car electronic exterior mirror (DIGITAL SIDE-VIEW MONITORS), and applied it to ES300h.

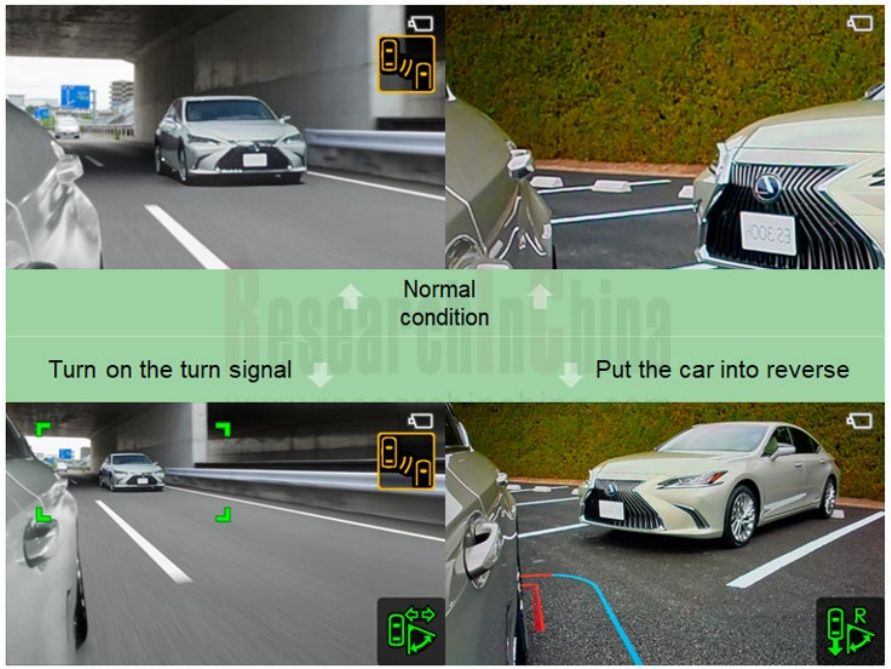
Electronic Rearview Mirror Solution (DIGITAL SIDE-VIEW MONITORS) for Lexus ES300h
(The Technical Solution Provided by Japan's Tokai Rika)



Source: Lexus

Lexus DIGITAL SIDE-VIEW MONITORS allows real-time switching of viewing angles in different driving conditions. For example, when the turn signal is on or the reverse gear is engaged, the viewing angle will automatically enlarge from an ordinary angle to a wide angle; ADAS warning capabilities, e.g., blind spot detection/blind spot monitoring are also integrated.

Viewing Angle Change of Exterior CMS of Lexus



Source: Lexus

Challenges exist, but the trend is unstoppable.

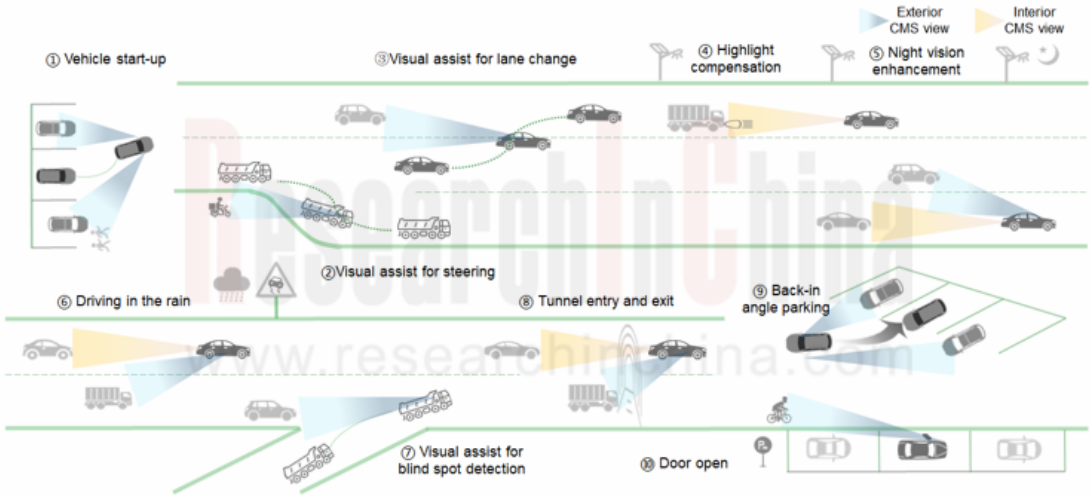
Electronic rearview mirrors remain far more superior to conventional optical mirrors, but face huge challenges such as high cost, low reliability and the driver's eyesight shift, which need companies to try hard to overcome. Moreover, the focal length of the camera and the depth of field of images make it easy for the driver to misjudge the distance with the rear vehicle.

In the long run, electronic rearview mirrors will act as an integral part of vehicle intelligence, but will not become a megatrend in the short term. Automakers can seize the initiative in capital investment and technology research and development. How to reduce product costs, how to improve stability and users' acceptance of electronic rearview mirror, and how to make them pay for and boldly accept this configuration are the knots companies need to undo.

Trend 1: the combination of CMS and ADAS/autonomous driving

The electronic rearview mirror camera is installed near the conventional exterior rearview mirror or at the rear of the vehicle, two positions where the ADS camera is often located. Some functions of CMS overlap the blind spot monitoring/blind spot detection/ADS camera, both of which aim to acquire or detect road traffic conditions at the side rear of the vehicle and provide driving decisions for the driver/vehicle. The two are expected to be integrated considering product cost, function realization and air resistance.

Driving Visual Assist Provided by Yuanfeng Technology's Electronic Rearview Mirrors



Source: Yuanfeng Technology

Challenges exist, but the trend is unstoppable.

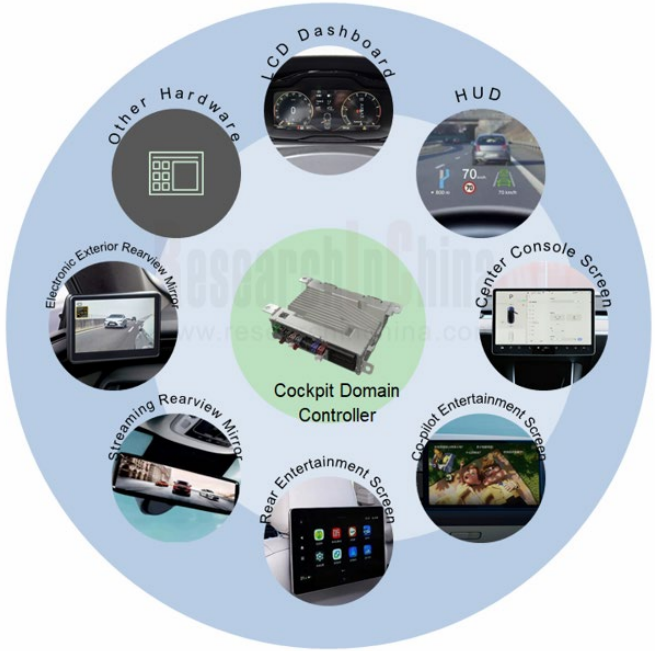
Trend 2: the fusion of CMS interior/exterior rearview mirror images

The way to display the side/rear view of the vehicle currently follows the conventional driving habits. The CMS screens are placed in the left, upper middle, and right in the front of the cockpit, with physical display splits. Technologically on the basis of retaining the traditional optical mirror, the images of the left rear, rear and right rear captured by the electronic exterior view mirror and the electronic interior mirror can be synthesized with algorithms, fused, and displayed on one screen.

Source: Tokai Rika

Trend 3: the combination of CMS and cockpit domain controller

As chip computing power improves and E/E architecture evolves, cockpits are integrating display solutions such as LCD cluster, HUD, center console screen, co-pilot entertainment screen and rear entertainment screen into intelligent cockpit domain controllers, in a bid to enable unified management in the same chip. The emergence of electronic rearview mirrors produces more data flows that need processing for the vehicle, and separate ECUs will further drive up the cost of the entire vehicle. Lower cost will be the key driving force to the adoption of cockpit domain controllers. Therefore, streaming interior rearview mirrors and electronic exterior rearview mirrors will also be no exception to such a management way.



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