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China Commercial Vehicle Intelligent Cockpit Industry Report, 2021 Apr.2022

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Intelligent Cockpits of Commercial Vehicle: Trend of Large Screens

Following AD/ADAS functions, the intelligent configuration of the cockpits has seen massive availability to commercial vehicles. At this stage, commercial vehicle cockpits mainly inherit the design concept of passenger cars, and are developing first towards *large screens, voice interaction, entertainment and life-oriented*, which can be considered as the migration of passenger car functions.

As the most mainstream display interfaces, center console screens and cluster screens feature large sizes and integration. The screen size has scaled up from the traditional 7 inches to 10 inches, and some brands are starting to use 12-inch or even 15-inch displays. What is displayed has covered more information like rest waiting time of front traffic lights and surrounding obstacle information in the LCD era instead of just showing velocity, fuel consumption in the past mechanical era.



For example, the 12.3-inch floating LCD cluster used by the SITRAK C9H tractor can display vehicle information such as speed, fuel quantity, mileage, gear position, rotation speed, and fault prompts.



The Tesla Semi truck is equipped with two 15-inch displays, of which the left one shows parameters of the vehicle in real time and the right one deals with navigation and entertainment. The side view of the truck continuously captured by the side-view cameras is displayed on a quarter of the two displays near the edge to prevent blind spots.



Intelligent Cockpits of Commercial Vehicle: Trend of Voice Interaction

The demanding attention of the driver in commercial vehicle driving scenarios makes voice interaction the most suitable HMI mode at present. Unlike such interaction modes as mechanical button and screen touch, voice interaction can free both hands and eyes, reduce operational risks in driving scenarios, and improve safety. Now, voice assistant can enable functions such as sound source localization, semantic understanding, and single-sentence multi-tasking besides a rise in accuracy of recognition.

The center console display of Sany Heavy Truck Jiangshan Edition features voice interaction consisting of more than 3,000 sentences, smart phone-based UI design, and "Kasheng" or "Saint Truck" (the avatar of Sany Heavy Truck).





With the growing number of drivers born in the 1980s and 1990s, there is a surging demand for entertainment in smart cockpits. Center console screen has been deeply integrated with commercial vehicle and evolves into a smart terminal. Whilst vehicle control, ADAS reminders and Internet of Vehicles are met, entertainment has also become a key feature, with the availability of contents offered by iQiyi, WeChat, Koowo Music, Ximalaya FM, Tuhu and the like successively onto vehicles to enrich recreation in the cabin of commercial vehicle.

The floating center console display of SAIC Hongyan GENLYON H6, for instance, integrates Tencent's powerful ecosystem, and installs nearly 50 APPs to satisfy truck drivers in terms of social life, entertainment, mobility, vehicle maintenance, refueling, etc. It not only provides convenient mobility, but also further improves the gameplay of the console screen.





Intelligent Cockpits of Commercial Vehicle: New Cockpit Design

From the perspective of application scenarios, however, there exists an essential distinction between commercial vehicle and passenger car. As a kind of production materials, commercial vehicle emphasizes cost and efficiency, and should be further added with functional practicability and convenience around the cockpit in the long run.

An increasing number of larger flexible displays and seating layout will be highlighted in future cockpit design, which can be seen from the configuration of concept models.



Hyundai HDC-6 Neptune employs a ring-shaped display (wherein eight screens are integrated), the driver side displays cluster-related information, navigation information and function applications on the right, Apillars on the left and right show blind spot images, and the top reveals surroundings. Also, the seats can be rotated to suit more scenarios. Mercedes-Benz Future Truck 2025 has new steering wheel buttons and rotatable seats, and replaces the legacy console screen with a detachable tablet computer.



IVECO Z TRUC is equipped with an LCD cluster, detachable center console screen, steering wheel control screen, LCD rear view display, etc., and its seats, steering wheel. pedals and can be adjustable console separately to ensure comfort and personalized services for drivers.





Intelligent Cockpits of Commercial Vehicle: Cockpit System Integration

The new domain centralized architecture will be applied to commercial vehicles amid the vigorous demand for cockpit platforms, and integration stands out.

Cookoo's AutoCabin-J3-Truck intelligent cockpit system solution, based on its "ACU203 centralized domain controller", leverages the automotive-grade chip i.MX8QM and supports multi-system software or hardware partition technology, with a single CPU driving the central control Multimedia system, LCD cluster information system, entertainment screen, etc.. Plus 6 surround view cameras, a forward camera, and a cargo compartment monitoring camera, peripheral units like T-BOX and vehicle signals, it provides a new generation of integrated intelligent cockpit system for trucks (heavy trucks, light trucks, cargo trucks, tractors, etc.)

Intelligent Cockpit Architecture

Based on domain controllers, Honorsun's smart cockpit architecture includes a full LCD cluster, a center console screen, drive module, a 360° panoramic view camera, a reversing camera, an active safety surveillance camera, a smart wristband and other hardware components.



HUD Full LCD cluster Center console Bunk Reversing monitoring screen screen Microphone (low configuration) Surround view monitoring Ų Cockpit domain controller (high configuration) AHD LVDS AHD LVDS Cockpit monitoring Subwoofe DMS/DVR video Speaker 4G antenna Reserved ethernet interface Source: COOKOO

Based on domain controllers, Honorsun's smart cockpit architecture includes a full LCD cluster, a center console screen, drive module, a 360° AVM, a reversing camera, an active safety surveillance camera, a smart wristband and other hardware components. The software renders a bottom-up layered design, encompassing CarNetOS-BIOS, CarNetOS-BSP, CarNetOS-APP and other layers, in order to standardize software interfaces in line with safety requirements of automotive regulations.



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Intelligent Cockpits of Commercial Vehicle: Deep Fusion of Driving and Living (I)

For truck drivers, trucks are their home, so the integration of the cockpit and the living cabin will greatly please them and make them feel happier.



Geely's Homtruck concept (to be launched in 2024) is designed with a shower room, toilet, single bed, refrigerator, tea maker, etc. There is also an external kitchen and washing-drying machine under the door, highlighting the "home" " concept.



Jiefang Yingtu is outfitted with a suite, bathroom, kitchen, home theater system, 1.4-meter bunk, WiFi, TV, large screen, etc., which improves the habitability of the cockpit significantly.



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Intelligent Cockpits of Commercial Vehicle: Deep Fusion of Driving and Living (II)

For truck drivers, trucks are their home, so the integration of the cockpit and the living cabin will greatly please them and make them feel happier.

room

Variable cockpit

Activities in the cockpit are increasingly related to productivity, with drivers driving less and working more. During auto cruise and rest, the cockpit space will be adjusted as per the driver's needs.

The side walls, ceiling and floor are integrated to form a self-supporting box-like sliding structure, increasing the internal length by 50 cm: the rear wall can be moved to provide additional living space when the truck is parked.



Urban driving mode

In high-traffic and slow-moving areas: the seats are close to the windshield for the best viewing angle, and the steering wheel and center console are in standard positions.

Rest mode

Set when the vehicle is parked. The driver can convert the interior of the cockpit into a living and working space.

IVECO's Z TRUCK features the concept of a variable cockpit. The driver can reconfigure the cockpit out of varied needs (manual driving, autonomous driving, office, rest) so as to secure higher work efficiency and comfort.

Innovation

Service: People looking for service "changes into" service searching people. Interaction: People and physical objects "change into" people and AI virtual intelligence

Integration The vehicle and home are merged, and the cockpit is also for living, meeting all the needs of truck drivers

Upgrade

Fully upgraded, always updated. Smart automotive OS for commercial vehicles



Smartlink, a commercial vehicle IoV company, is creating a 3-in-1 cockpit (intelligent driving, intelligent life and intelligent cargo) based on the compute of domain controllers to further provide innovative services around logistics demand.



As cockpit intelligence is growing mature, the data inside and outside the cockpit will be connected, and platforms for drivers, fleet management and cargo owners will be seamlessly linked, even service platforms concerning financial services, insurance, and maintenance will be tied with the cockpit system. Accordingly, new business models will constantly emerge.

In a word, as an emerging sector, the intelligent cockpit of commercial vehicle harbors ever more potentials in practical application scenarios under the blessing of various software and hardware technologies such as 5G, HMI, high computing power platforms, new E/E architectures, and OTA.





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