

Retraction

Retracted: Innovative Styling and Structural Design of New Duplex Wide-Body Passenger Aircraft Based on Mobile Edge Computing

Wireless Communications and Mobile Computing

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their

agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] L. Chen, L. Xu, Q. Yang, and X. Pan, "Innovative Styling and Structural Design of New Duplex Wide-Body Passenger Aircraft Based on Mobile Edge Computing," *Wireless Communications and Mobile Computing*, vol. 2021, Article ID 4628643, 10 pages, 2021.

Research Article

Innovative Styling and Structural Design of New Duplex Wide-Body Passenger Aircraft Based on Mobile Edge Computing

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The research is designed to explore wide-body aircraft that are more suitable in 2035-2040. The innovative design of the wide-body aircraft adopts the form of the main passenger compartment and wing separation, the passenger compartment in the form of a single engine car through the rail transit and transfer car travel together. The transfer car delivers the two engine cars in turn to the aircraft, which is tightly connected to the rail structure by mechanical claws. Engine cars can split up at the transfer station, thus assisting in the diversion of passengers. The interior of the engine car has been optimized. A visual mask can be used for isolation has been designed for the seats. And a device is designed to lighten passengers' legs to alleviate "economy class syndrome." The corresponding data analysis used the mobile edge computing technology.

1. Introduction

In the 20th century, civil aviation is providing the world with an efficient, convenient, and safe way of travel, and wide-body passenger aircraft carries the functions of long-distance aviation, promotes modern international trade, and promotes regional economic development and economic globalization. However, with the gradual improvement of the economic and environmental protection requirements of passenger aircraft and the challenges from other major industrial countries in the world, my country's aviation development is facing more and more severe challenges [1-3].

According to CADAS team statistical analysis, the first half of 2019, 20 major airports in front of the large amount of wide-body flights, scheduling, accounts for more than 12% of the total remained at about scheduling (as shown in Figure 1). Among them, the domestic routes operated by wide-body aircraft involve a total of 40 domestic destinations [4-6]. The number of wide-body aircraft flights at top 15 destinations has accounted for 92.09% of the total wide-body aircraft (as shown in Figure 2).

According to a research conducted by China's related magazine "Big Aircraft," there will be 9,300 wide-body aircraft in demand in the next 20 years, with a total value of approxi-

mately US \$ 2.5 trillion, accounting for 54% of the total value of passenger aircraft demanded, and operators in the Asia-Pacific region will deliver about 50%.

According to the "National Civil Aviation Airport Layout Plan" issued by the Civil Aviation Administration of the National Development and Reform Commission in 2017, my country is expected to increase the number of airports to about 2,300 in 2030, while improving North, Northeast, East China, Central South, Southwest, and Northwest China. The six major airport clusters have widened the coverage area, optimized the system structure, and enhanced support capabilities.

In 2017, US air passenger traffic reached 849 million passengers, a record high and an increase of 21% from the 704 million passengers in 2009 (the low period of the economic crisis). With nearly 20,000 airports, the aviation industry has been profitable for eight consecutive years. The FAA forecasts the US aviation industry from 2018 to 2038 (as shown in Figures 3 and 4). In the next 20 years, the average annual growth rate of US airline passenger traffic will be 1.9%, which will reach approximately 1.237 billion passengers by 2038. International passengers: the growth rate will exceed the growth rate of domestic passengers, while airline profits will remain stable or grow under the pressure of rising energy and labor costs.

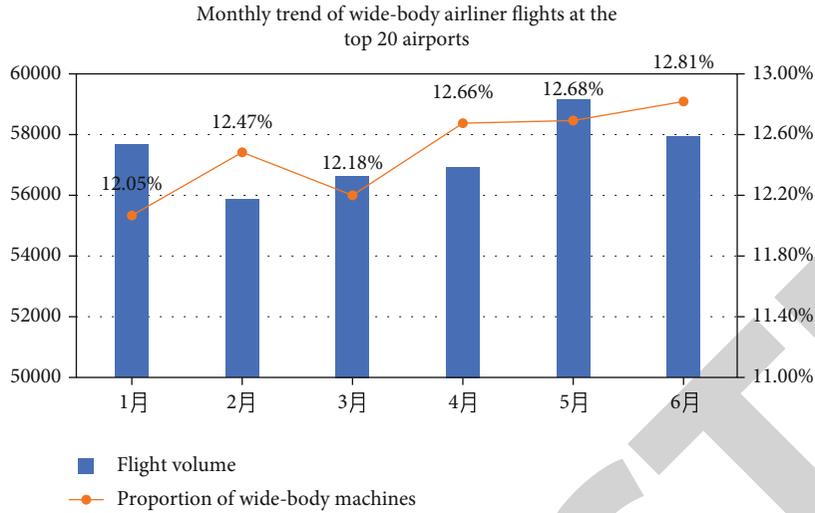


FIGURE 1: Monthly trend of wide-body passenger flights at the top 20 airports.

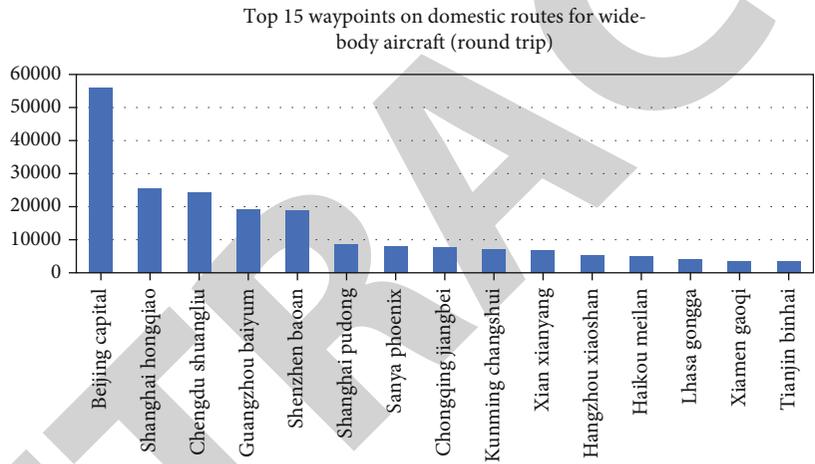


FIGURE 2: Top 15 waypoints on China routes for wide-body aircraft.

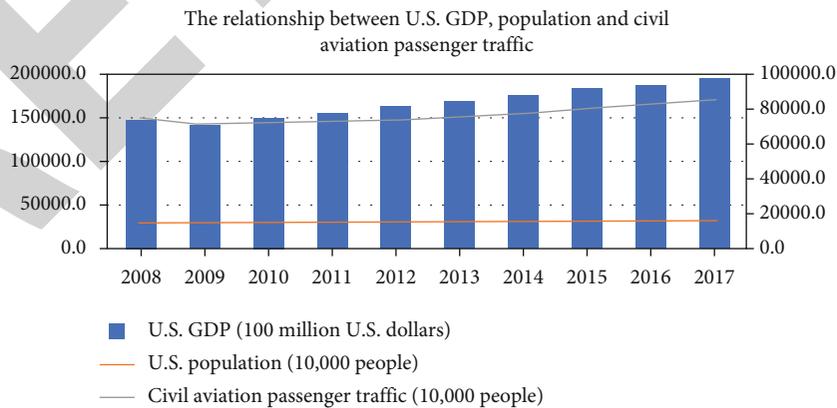


FIGURE 3: The relationship between US GDP, population, and civil aviation passenger traffic.

Based on the above analysis of domestic and foreign market development, it is expected that China's civil aviation industry will have a rapid development stage in the next 20 years, and after 2038, it will enter a mature stage of the industry. By 2040, the number of large and small airports and small

aircraft will increase significantly. In the future, the focus of my country's airport construction should be on increasing the number of small and medium-sized hub airports, increasing the density of small and medium-sized cities and the central and western regions, developing transportation airports

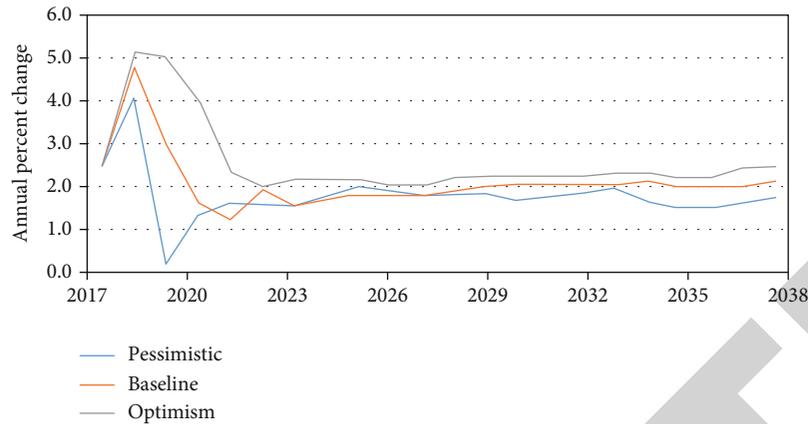


FIGURE 4: FAA's forecast of the US aviation industry from 2018 to 2038.

and general airports, paying equal attention to the construction of trunk and branch airports, and improving the national airport network structure and routes.

In sharp contrast with the rapid development of China's civil aviation industry and the sharp increase in demand for wide-body passenger aircraft, the current global wide-body passenger aircraft market is dominated by a duopoly of Boeing and Airbus, and aircraft types in service mainly include Airbus A330, A380, and A350XWB series and Boeing's 747, 777, and 787 series. It is urgent for China to develop the wide-body passenger aircraft manufacturing industry. At the same time, with the increase of China's small aircraft, the number of routes increases, which is easy to cause flight confusion; the turbulence generated by the aircraft itself will affect the flight of other aircraft and may cause flight accidents, including special periods of epidemics or other major disasters. The country urgently needs wide-body passenger aircraft to carry a large number of passengers back to the country, minimize transfers on the way, and manage them quickly and conveniently when they arrive at their destination. In view of the above two problems, wide-body passenger aircraft can solve its needs.

Passengers' requirements for passenger planes are nothing more than safety, speed, economy, and comfort. Among them, the main problems of wide-body passenger aircraft are high noise, inhumane design of aircraft seats, and small proportion of passenger unit space [7, 8]. Among them, aircraft will produce noise during take-off, flight, landing, and ground interviews, mainly including thruster noise, exhaust noise, jet noise, fan noise, and noise caused by pressure fluctuations in the boundary layer. In addition, domestic civil aviation aircraft and passenger aircraft seats are produced abroad, and most of the size reference models come from foreign human body sizes, which are different from China's human body sizes, which will cause discomfort for Chinese passengers when taking airplanes.

The competition between airlines is also reflected in the services provided during the flight of passenger aircraft. In the future, the design of wide-body passenger aircraft will improve the space problem of economy class and pay more attention to the privacy and comfort of passengers.

2. Overall Plan Description

2.1. General Layout Description and Its Characteristics. The overall layout of the wide-body passenger aircraft design is the main wing of the passenger aircraft and two cabin cars [9–11]. The main body of the wide-body passenger aircraft is double wings and the cockpit. Function: the cabin car can take off and sail after being tightly connected with the main body of the wide-body airliner through steel rails and mechanical claws.

2.2. Airliner Overall Design. The main design parameters of this design are as follows: 350 seats, commercial range 12000 km, initial cruising altitude 10688 m, cruising Mach number 0.82~0.95, maximum operating altitude 13100 m, transition time 80 min, stability characteristics in the flight bag, the line has horizontal and vertical stability, new research and innovative design of passenger and cargo cabins, cockpit not lower than the general level, fuel consumption 2.8 L/km/person, and environmental requirements not lower than the level of mainstream competitors, in the future advantages.

The objectives that this innovative design hopes to achieve are as follows: to achieve advanced aerodynamic layout design: high-comfort, high-flexibility cabin, and highly intelligent cargo carrying mechanism; good stable operation characteristics; low fuel consumption, low noise, and good adaptability; and feasibility study of new technology.

There are the three views of the New Duplex Wide-body Passenger Aircraft designed this time (as shown in Figure 5).

2.3. Overall Shape Layout. The main engine part of the wide-body airliner is a double-wing design and cockpit. Its double wings (as shown in Figure 6) are two wings arranged front and rear, which are connected by struts and tension wires to form a force-bearing whole to form a space truss structure. The structure is covered with steel rails, and the engine room car is closely connected with the steel rails through mechanical claws and traction sliders. The double wing has two wing surfaces, and the total area of the wing is large, so as to generate enough lift at low speed.

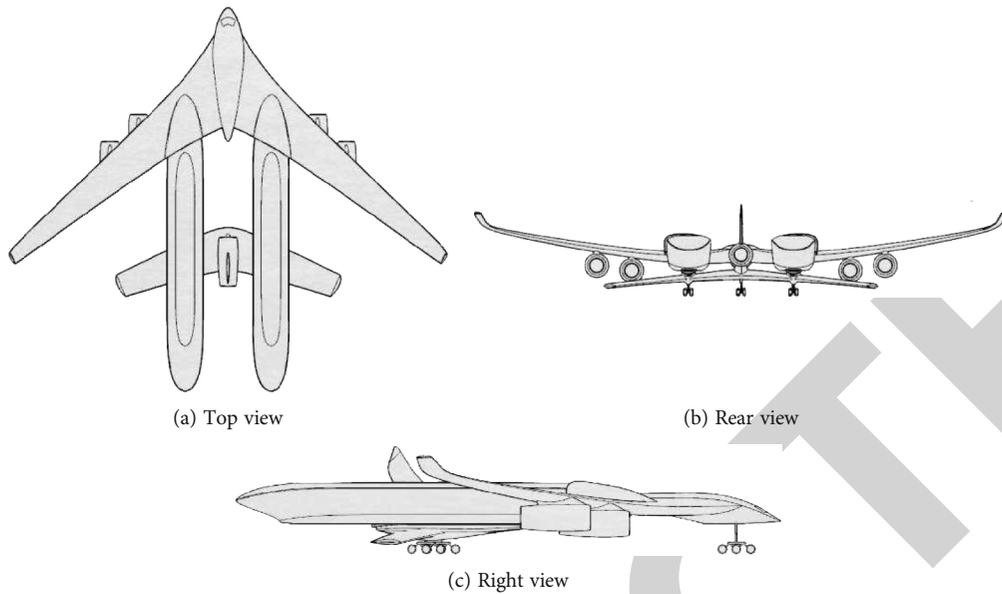


FIGURE 5: Three-view display.

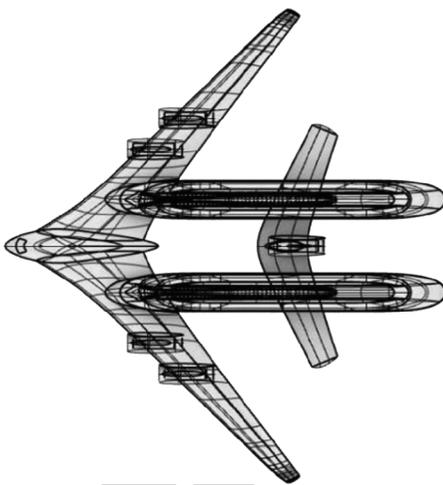


FIGURE 6: Airliner's double wings.

The cabin car can be separated from the passenger cabin. Its overall shape shrinks from top to bottom (as shown in Figure 7). It is mainly divided into two layers. The lower layer is the cargo compartment of the cabin car. The interior contains numbered containers, luggage racks, and luggage transfer devices. Passengers board the plane. Put your carry-on baggage into the cargo box on the baggage transfer device, the device can carry the passenger's baggage to the container corresponding to the boarding pass, and when leaving, the cargo handler can read the boarding pass number. Take out the corresponding luggage. The upper deck of the cabin car is the passenger cabin. A single cabin car can accommodate about 170 people. There are two boarding doors on one side of the cabin car and two emergency doors on the other side. When the cabin car is close to the cabin station, the boarding door inside the cabin car opens, and passengers can enter the upper cabin of the cabin car

through the stairs under the boarding gate. The top of the cabin car is equipped with solar panels, which provide energy for the operation of the internal facilities of the cabin car through solar energy.

2.4. Interior Passenger and Cargo Cabin Layout. The cabin designed this time is the upper part of a single cabin car, and its total number of seats is 170 (as shown in Figure 8). When the double wide-body passenger aircraft carries two cabin cars, its total number of passengers is 340, which basically meets the requirements of a 350-seat wide-body passenger aircraft. The front end of the seat layout is (3,3), and the middle part is (2,3,2). Inside, there are 2 toilets, 1 kitchen storage room, 2 emergency exits, and 4 luggage transfer devices. The relevant seat data are shown in Table 1.

The cargo compartment designed this time is the lower part of a single cabin car (as shown in Figure 9). There are 86 total shelves, that is, 172 total containers, which can meet the needs of passengers for storing luggage. The basic data of the internal equipment of the cargo hold is shown in Table 2.

2.5. Main Structure Design. The structural frame spacing of the nose section is 300 mm, the junction between the door and the fuselage is a reinforced frame, the rear wing section is a beam structure, and the rib spacing is 580 mm. A reinforcing rib is installed for every five wing ribs (as shown in Figure 10).

2.5.1. Connection Structure Design. The connecting structure between the cabin car and the main engine of the wide-body passenger aircraft is mainly steel rails, mechanical claws, and traction sliders. When the cabin car needs to be connected with the wide-body passenger aircraft, the cabin car transfer car will lift the cabin car to the end of the rail. At this time, the mechanical claws under the cabin car grab the traction block, and the traction block drives the cabin car to move on the rail (as shown in Figure 11), while the guide wheels

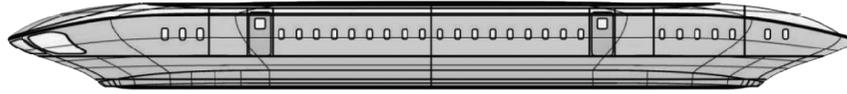


FIGURE 7: Side view of cabin car.

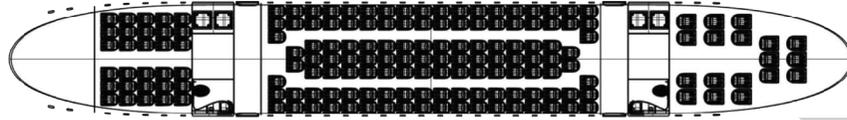


FIGURE 8: Cabin layout diagram.

TABLE 1: Cabin-related data.

	Business class	Economy class
Distance between handrails/cm	58	48
Distance between adjacent seats/cm	70	56
Seat pitch/cm	120	80
Aisle width/cm	121	44/70
Ceiling height/cm	240	225
Height of luggage rack/cm	185	185
Isolated visual mask up and down width/cm	26	24
Leg-lightening device up and down width/cm	22	20

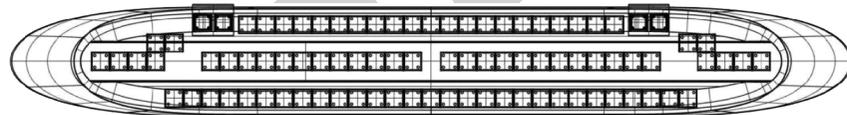


FIGURE 9: Cargo compartment layout drawing.

TABLE 2: Cargo hold-related data.

Storage frame length, width, and height/cm	75 * 75 * 46
Container row spacing/cm	80
Container aisle width/cm	8
Single container height/cm	47
Single shelf height/cm	105

under the engine room car adjust the position of the engine room car to keep the direction of the engine room car and the steel rail consistent.

When the cabin car moves to the designated position, the other mechanical claws on the bottom of the car stretch out and grip each rail tightly.

2.5.2. Landing Gear Design. Since the weight of this passenger plane is larger than other passenger planes, in order to ensure that the landing gear of the aircraft can withstand the impact force of the plane when it is landing, this wide-body passenger plane uses the landing gear arrangement with multiple pivots (“front, one and three”) and the layout and multiwheel trolley-style landing gear. Among them, the landing gear at the tail of the aircraft adopts a new structural design (as shown in Figure 12). The landing gear adopts a

“3 + 2” wheel layout, in which the upper three pairs of wheels and the lower two pairs of wheels pass through multiple layers. The strength spring steel sheet is connected with the cylindrical connecting member. When the plane takes off, the five pairs of wheels are arranged in a right triangle structure. After leaving the ground, the landing gear is retracted and the wheels are rotated as a whole to make them arranged in an inverted triangle structure. When landing, the wheels below the position preferentially touch the ground. At this time, the larger impact force is transmitted to the multilayer spring steel sheets through the wheels, and then, the three pairs of wheels above the original position touch the ground to complete the landing. This design allows the landing gear to not only have the shock absorption capacity of a general landing gear, but also to increase the force time of the wheels during landing and reduce the impact force on the main three pairs of wheels through the use of multilayer spring steel sheets to reduce the passengers.

3. Analysis of Check-In And Transfer Scenarios Overall Plan Description

The process of the wide-body passenger aircraft designed this time is different from that of the conventional passenger aircraft. As shown in Figure 13, the cabin car first waits for

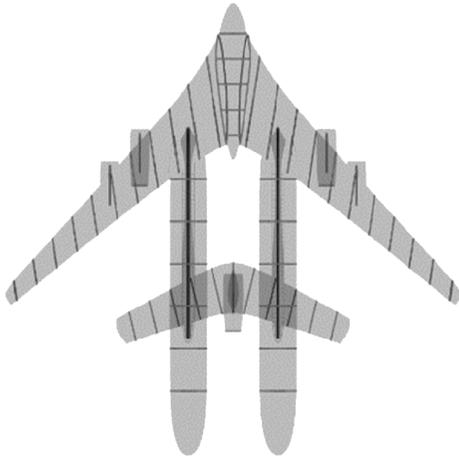


FIGURE 10: Airliner frame structure diagram.

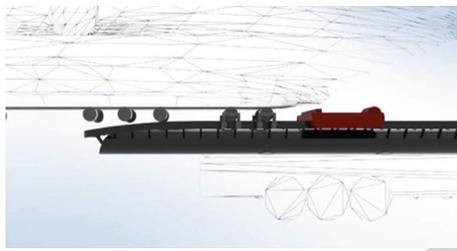


FIGURE 11: Passenger plane rail.



FIGURE 12: Airliner landing gear.

passengers at the cabin station, and then, the cabin car travels along the track to the airport waiting room and drove onto the transfer car for connection. And the cabin car is combined with the wide-body passenger aircraft through the elevated transfer car. After the wide-body passenger aircraft takes off and landed, the cabin cars are divided and recombined, waiting for the next wide-body passenger aircraft or finally taking the city rail to the cabin stations to drop off passengers.

As shown in Figure 14, the designed new double wide-body passenger has a corresponding client ticket purchase APP, and passengers can purchase tickets on the APP before traveling. Passengers arrive at the cabin station with relevant documents and luggage, pass through the gates for security check by scan-

ning their ID cards or purchasing QR codes, and wait at the corresponding waiting gates (as shown in Figure 14(a)).

Then, the cabin car drove into the cabin car waiting room, waiting for the host to be ready in the front of the waiting room (as shown in Figure 14(b)). The cabin transfer vehicle comes to the end of the waiting room track to take over the cabin vehicle (as shown in Figure 14(c)). It transfers the cabin vehicle to the main engine and at the same time lifts the cabin vehicle slightly (as shown in Figure 14(d)). The auxiliary cabin car enters the connecting track between the main engine and the cabin car. After the two cabin cars were closely connected to the main engine of the wide-body passenger aircraft, the new wide-body passenger aircraft was immediately ready to take off on the runway.

Wide-body airliners have long voyages, generally intercontinental flights. For reasons of economy and safety, direct flights among intercontinental flights are more expensive and have fewer flights. Therefore, wide-body airliners will inevitably require passengers to transfer during the voyage. Case: the wide-body passenger aircraft designed this time has a detachable cabin—a cabin car. The single-section cabin car can be closely connected with rail transit and cooperate with each other. As shown in Figure 15, after the new double wide-body passenger aircraft arrives at the intermediate station, the cabin car is separated from the main track of the wide-body passenger aircraft, and the cabin car is transferred to the waiting room track by the cabin transfer car.

Subsequently, the cabin car with the passenger whose destination is the intermediate station sends the group of passengers to each cabin station in turn along the track of the city. At the same time, the cabin car of the passenger who only needs to make a transfer in the city continues to wait in the cabin car waiting room, waiting for the cabin car to the same destination to be ready and the wide-body passenger plane to take off.

In this design, the new double wide-body passenger aircraft can carry two cabin cars, while an ordinary small passenger aircraft can carry a cabin car of the same specification. Under this setting, if there are fewer passengers going to a certain place, Small passenger planes can be selected to carry passengers, reducing the waste of resources and the inconvenience of passengers transferring.

4. Summary of Innovations and Advantages

4.1. Detachable Cabin Car Design. The detachable cabin car design is the boldest and most innovative design in the design of this new double wide-body passenger aircraft (as shown in Figure 16). We have separated the passenger cabin and cargo compartment of the wide-body passenger aircraft from its main engine to become two independent vehicles. Cabin car: the cabin car is sleek overall, and after connecting with the main engine of the wide-body passenger plane, the shape is complete and natural.

The main body of the cabin car is the combination of the cargo compartment and the passenger cabin, without wheels and driving position, and its energy source is only the solar panel on the top. The solar energy obtained provides energy

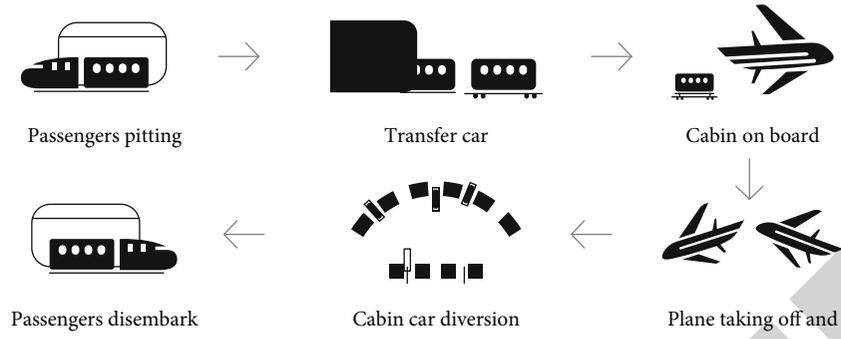


FIGURE 13: Flow chart.



FIGURE 14: Cabin car transfer scenet.

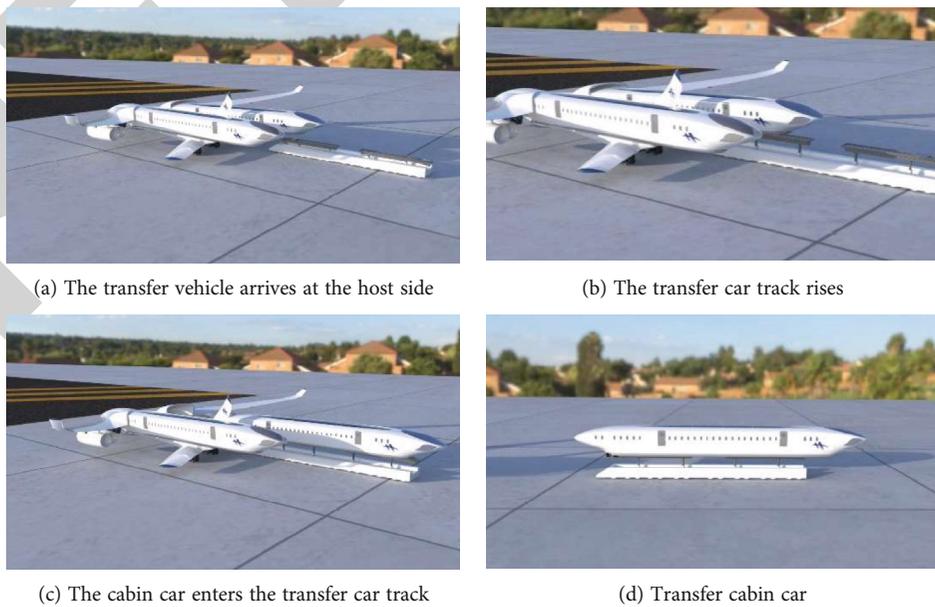


FIGURE 15: The scene of the cabin car leaving.

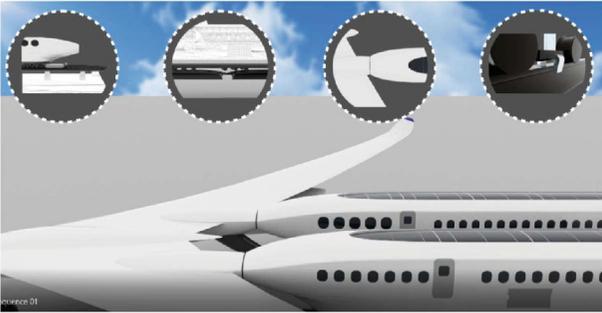


FIGURE 16: Engine cabin car and main body docking.

for the operation of the internal facilities of the passenger and cargo compartment.

When the cabin car is running on the track, the corresponding cabin car head is connected with the cabin car. The cabin car head is driven by a mixture of fuel and electric power to assist the cabin car to drive on the track. When the cabin car finally arrives at the cabin car waiting room, that is, at the end of the track, the cabin car head will pull the cabin car to the cabin transfer car and disengage it, and then, the cabin transfer car will transport the cabin car to the main engine of the new double wide-body passenger aircraft. Next, lift the cabin car and send it to the rail structure of the main engine. The mechanical claws and the rail structure at the bottom of the cabin car closely connect the cabin car and the main engine of the wide-body airliner. After that, the new double wide-body airliner can do ready to take off. After the passenger plane has landed, the cabin transfer car will still transport it to the cabin car waiting room, waiting for the next host to be ready, or the cabin car's head will still assist its track driving, and each passenger on the cabin car will be transported to each cabin station.

4.2. Isolated Visual Mask Device. Due to the impact of the epidemic era, future wide-body passenger aircraft still need to maintain attention to the isolation of passengers during travel and avoid direct transmission of the new crown virus caused by oral droplets and exhaled air. Therefore, our new double wide-body passenger aircraft uses a combination of an isolation mask and a transparent screen. When passengers are seated, the extension of the isolation visual mask is controlled through the panel on the inner side of the armrest. The isolated visual mask protrudes from one side behind the head of the passenger seat. When fully extended, the protruding end of the mask can be closely connected with the other side of the seat to avoid gaps between passengers.

As shown in Figure 17, the isolated visual mask is about 27 cm wide up and down, which can completely block the mouth and nose of normal adults and provide the best viewing angle. The material of the isolated visual mask is selected from the OLED flexible transparent display currently used in transparent TVs. The “self-luminous” nature of the OLED screen means that each red, green, or blue subpixel on the screen emits light by itself without relying on an additional backlight source. Therefore, OLED screens can eliminate



FIGURE 17: Isolated visual mask.

the common liquid crystal layer, backlight layer, and other modules in traditional LCD screens, achieve higher color contrast, and ensure sufficient lightness and thinness in form. This inherent structural feature makes the display screen thinner, even bending and folding.

At present, the concept of “transparent pixels” can be introduced into OLED screens. Based on the original four pixels of red, green, blue, and white, a new “transparent sub-pixel” has been added. This kind of pixel does not emit light, nor does it participate in image display, but it itself is made of highly transparent materials. In the end, when countless such pixels are evenly distributed on the panel, the screen will naturally obtain a certain transparency effect, but at the same time, it can take into account the display of color images. The isolated visual mask made of OLED screen can provide sufficient protection and viewing comfort for flight passengers.

4.3. Leg-Lightening Device Design. This innovatively designed leg relief device is mainly aimed at people with high blood sugar and high blood lipids, varicose veins, and blood circulation problems, as well as the elderly and pregnant women. Such people are prone to venous thrombosis of the lower limbs during a long flight of aircraft or after sailing. Embolism, ranging from lower extremity swelling, chest pain, and coughing, to severe, life-threatening, such symptoms, are called “economy class syndrome.” To this end, we designed a leg-lightening device for the passenger seat of the new double wide-body passenger aircraft.

As shown in Figure 18, this leg-lightening device consists of two leg U-shaped sleeves, about 30 cm long, with built-in mechanical movement components, and covered with a soft cloth material. The device can wrap the back of the human calf and most of the left and right sides. The leg-lightening device is placed under each seat. After the new double wide-body passenger aircraft gradually reaches a stable state, passengers can control the ejection of the leg-lightening device through the panel on the inner side of the armrest.

After the leg load reduction device pops up, it can wrap the passenger's calf and massage through the mechanical



FIGURE 18: Leg-lightening device.

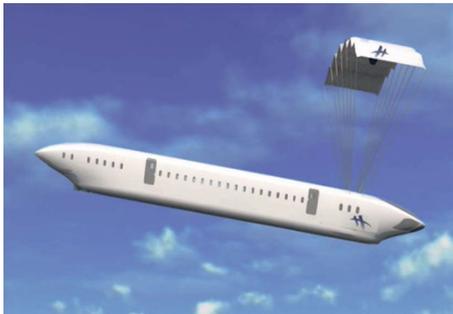


FIGURE 19: Parachute open.

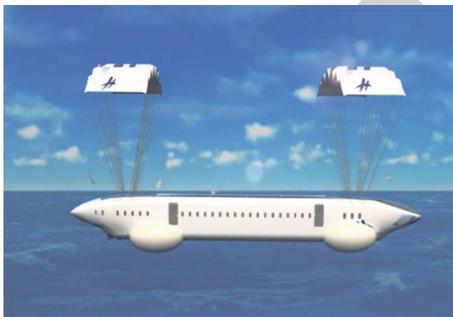


FIGURE 20: Airbag popped.

rolling force and squeeze inside the device. The acupoints massaged by the device are mainly Xuehai, Weizhong, and Chengjin points. These are massaged acupuncture points, and devices are squeezed and pressurized; passengers can relieve leg discomfort and alleviate the discomfort caused by weightlessness during wide-body aircraft sailing, and the possibility of venous thromboembolism in the lower limbs of passengers can be greatly reduced.

4.4. Emergency Escape Design. There are two movable cover plates on the top of the cabin car, respectively, on both sides of the solar panels. Inside the cover plate are two large parachutes. The parachute resistance can reduce the falling speed of the cabin car and ensure the safety of the people in the cabin car. There are also four safety modules on the bottom of the cabin car, that is, under the sides of the four doors.

When the cabin car drops abnormally, the safety module opens and the four airbags pop out.

When a passenger plane crashes (as shown in Figure 19), the cover panel's built-in monitor detects a change in wind speed and opens automatically or is activated by the driver of the passenger plane, the cabin car is separated from the main body of the passenger plane, and its top parachute opens. Slow down the landing speed; when the cabin car falls close to the ground (as shown in Figure 20), the airbag pops out, which can reduce the impact of the cabin car on the ground and protect the lives of passengers.

5. Conclusion

According to the domestic and international market trends and demands in recent years and the "National Civil Transport Airport Layout Plan," the number of airports in China is expected to increase to about 2,300 in 2030, and the construction of the six major domestic airport clusters will be improved at the same time. In response to the development of China's civil aviation and air transportation after major disasters, an innovative design idea of a dual wide-body passenger aircraft based on a new aviation model are proposed. The wide-body passenger aircraft adopts a mode in which the main passenger and cargo compartments are separated from the wings, and the passenger and cargo compartments are driven in a single cabin in the form of a single cabin car through rail transit and transfer vehicles, so as to achieve the purpose of "one-stop" transportation of passengers and flight diversion. The innovative design of the dual wide-body passenger aircraft "one-stop" solves the difficulties of passengers in boarding and transfer and at the same time makes good isolation improvements for navigation in the epidemic era. In addition, the corresponding data analysis used the novel mobile edge computing technology.

Data Availability

The dataset used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgments

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