Introduction to B737NG Simulation Cockpit

CJ-Information Co., Ltd.

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1 Overview of the Program

The CJ-Information B737NG simulation cockpit will be replicated in a 1:1 ratio according to a real aircraft cockpit. The simulated equipment works similarly to the devices and systems on the B737NG aircraft, with correct cockpit environment and instrument layout. It can simulate instrument displays and flight control functions from takeoff to landing, as well as simulate responses in the aircraft systems. It also uses a control loading system to simulate real rudder operations. The equipment has been widely equipped in more than seventy flight experience venues in over seventy cities for more than ten years. The equipment operates stably, is sturdy and durable, and has mature manufacturing and processing technology.

The main configuration of the system is as follows:

B737NG cockpit simulation system: exterior cabin, cockpit cabin, interior, avionics panel;

B737NG simulation software system: including simulation host, cabinet;

Visual simulation system: including visual simulation software, visual host, five-screen LCD TV imaging;

Instructor operating system: including instructor monitor and operating equipment, instructor operating software.

2 B737NG Cockpit Simulation System

By conducting on-site mapping of the actual aircraft cockpit, precise data on the cabin structure, spatial layout, panel positions, and dimensions are obtained. The equipment composition table of the B737NG simulated cockpit is shown in Table 2.1.

Table 2.1 Equipment Composition Table of B737NG Simulated Cockpit

Equipment Name	Component Name	Description	Quantity
	Cabin Base	Structural Component	1
	Cockpit Body	Structural Component	1
	Cockpit Simulation Interior	Simulation Component	1
	Forward Overhead Panel	Simulation Component	1
	Aft Overhead Panel	Simulation Component	1
	Glareshield	Simulation Component	1

	Main Instrument Panel	Simulation Component	1
	Central Control Console	Simulation Component	1
	Control Column/Wheel	Simulation Component	2
	Rudder	Simulation Component	2
	Pilot seat	Simulation Component	2

The computer simulation system includes:

One simulation host running instructor operation software and flight simulation software

One visual host running visual simulation software

One power controller for managing automatic power supply to various systems, enabling one-click startup

One network switch for data communication between various systems.

Cockpit Base

The Cockpit base is welded with steel profiles, with aluminum plates on the top surface and cover plates installed around it to provide installation base for equipment. Components connected to the base include outer fuselage, cockpit body, flight seats, all control panels, instrument panel structure, and five-screen bracket. The base is divided

into four frames, connected in the middle by bolts, which is convenient for disassembly and transportation of the base, and also beneficial for force absorption and distribution. The effect diagram is shown in Figure 2.4:

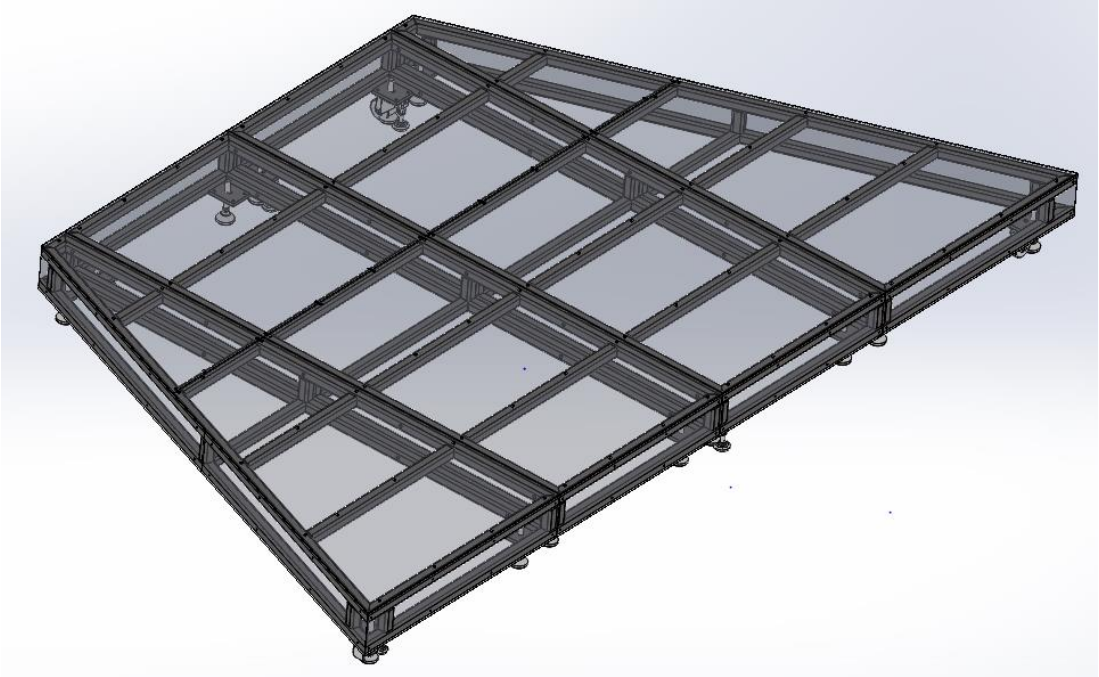


Figure 2. 4 WB B737NG Base

2.1. Cockpit Body

The scale data of the cabin and internal space should come from the 3D scanning and mapping of the real aircraft. The cockpit structure consists of the shell and interior decoration. The shell is processed by bending and splicing aluminum plates to build a cockpit layout consistent with the B737NG aircraft. To create the most realistic experience for the pilots. The physical diagram is shown in Figure 2.5:

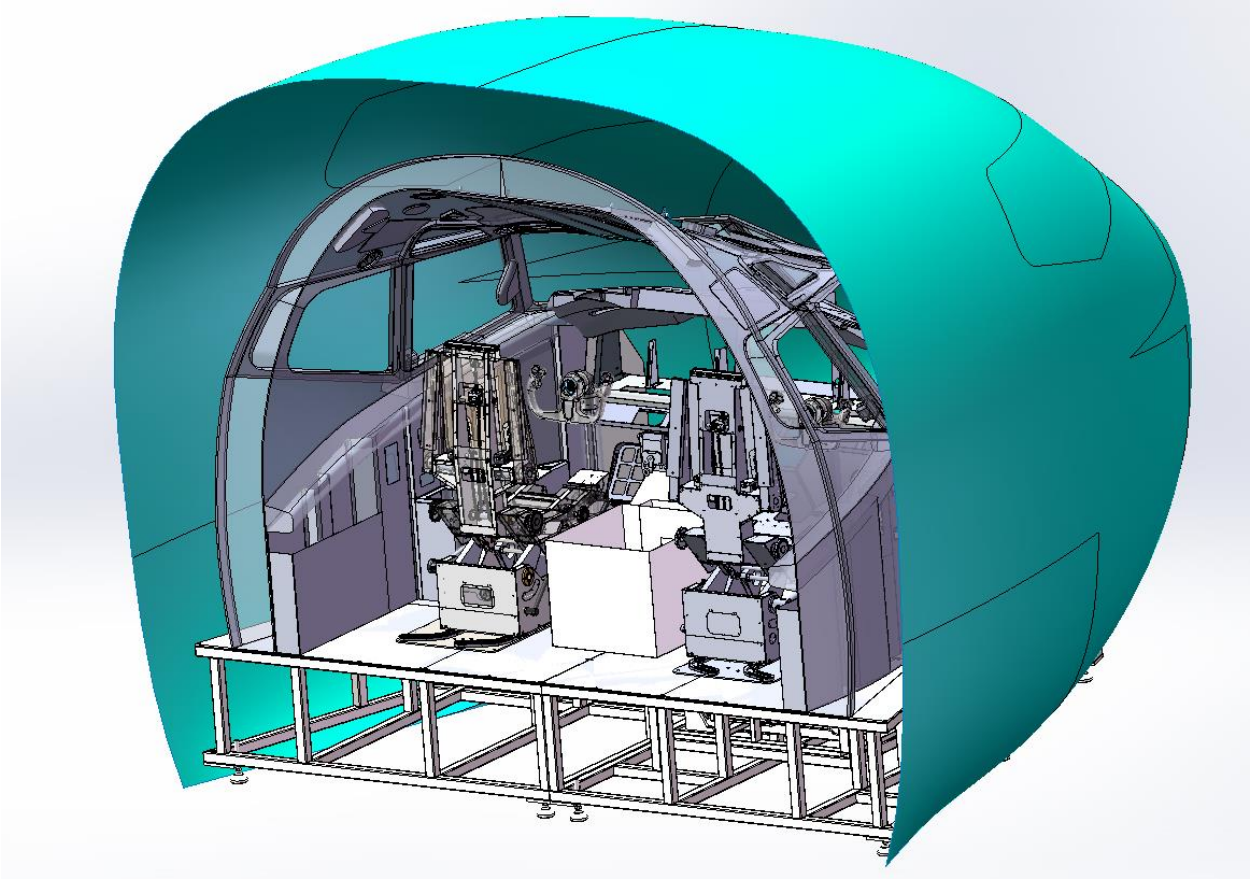


Figure 2. 5 WB B737NG Cockpit Structure

2.2. Cockpit Simulation Interior

Figure 2.6 WB B737NG Flight Simulator Cockpit Interior Scene

The exterior shape, size, position, and color of the cockpit (including all interior decorative panels) are based on actual aircraft surveying, simulating the real interior appearance of the B737NG aircraft. (The cockpit and interior unit diagram are shown in Figure 2.6, and the actual photo is shown in Figure 2.7)

2.2.1. **Overhead Panel** :

The overhead panel is a one-piece molded unit. The simulated appearance includes: side windows, speakers, Escape Strap Stowage, Spare Bulb Stowage, side air vents, and other decorations. Equipped with navigation

map lights, side folding handles, and other components. The surface adopts a baking paint process, presenting a close-to-real appearance and texture. (As shown in the effect in Figure 2. 7)

2.2.2. **Windows:**

Including simulated windshield glass, glass sealing strips, window frame ,Flight Compartment Windows and Handle and Latch Trigger, chart holders, etc. The above modules are modeled after the real aircraft style, reasonably simplified in structure, molded in fiberglass, and simulated production. The surface adopts a baking paint process to present a close-to-real appearance and texture.

Figure 2.7 WB B737NG Interior Physical map Window detail

2.2.3. Side walls and control panel

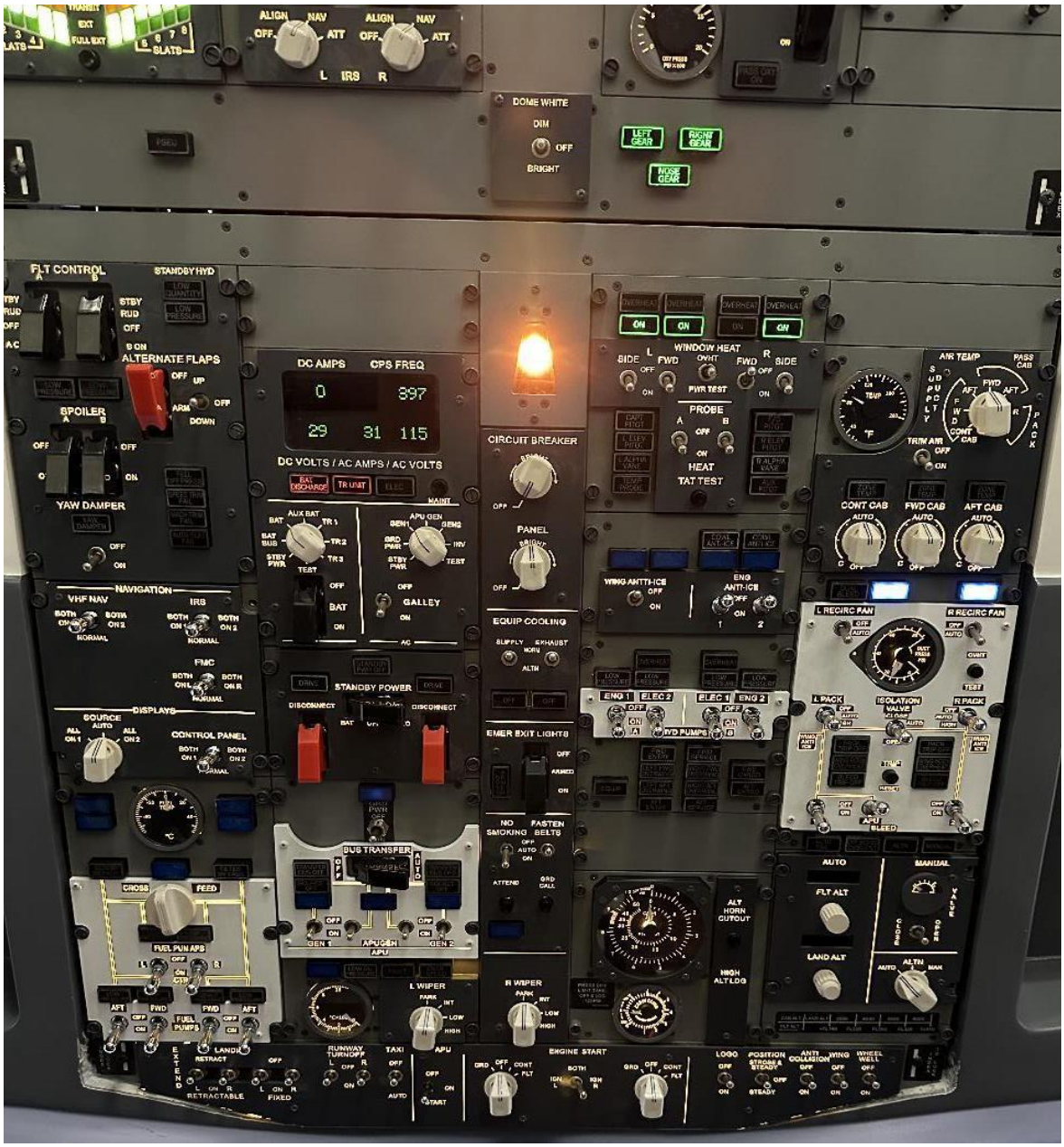
Figure 2. 8 WB B737NG Interior Physical diagram Partial side control panel

Including left and right side wall interior surfaces, side walls with side control panel lights, adjustable lights. The side control panel includes left and right sides, equipped with oxygen panel simulation parts, hand microphone hangers and hand mike, nose steering wheel, designed

according to the appearance of the real aircraft. The control panel is made of aluminum plate bending process, the surface is electrostatic spray paint process, providing realistic colors and a similar texture. The control panel surface is covered with simulated leather, with extremely high realism. (As shown in Figure 2. 8)

Overhead panel

The overhead panel is composed of the forward overhead panel and the aft overhead panel, using simulated parts, and the front and rear overhead panels are designed with a flip-hanging design. During maintenance, simply unscrew two fixed screws to flip down the overhead panel, making operation convenient.Figure 2.9 Right B737NG forward overhead panel




ELT
ARM
ON
ELT
LE DEVICES
FLAPS
1 2
3 4
TRANSIT
EXT
FULL EXT
1 2 3 4
SLATS
5 6 7 8
SLATS
ALIGN
NAV
ATT
OFF
ALIGN
FAULT
DC FAIL
TO LOCK
INDEX
FLT CONTROL
STANDBY HYD


FLT CONTROL
A
B
STBY
RUD
OFF
A ON
STANDBY HYD
LOW QUANTITY
LOW PRESSURE
STBY
RUD
OFF
B ON
ALTERNATE FLAPS
OFF
UP
OFF
ON
OFF
ON
DC AMPS
CPS FREQ
DC VOLTS / AC AMPS / AC VOLTS
CIRCUIT BREAKER
NAVIGATION

2.3. Glearshield

The glearshield section includes mode control panel, system annunciator panelelectronic, electronic flight instrument system, instrument control panel, etc.


COURSE
062
CMDB
CWSB
F/L
ON
OFF
RADIO
MINS
BARO
FPV
MTRS
IN
BARO
HPA
RST
STD
VOR
MAP
APP
PLN
OFF
ADF1
CTR
TFC
VOR2
OFF
ADF2
10
20
40
80
160
5
320
640
WXR
STA
WPT
ARPT
DATA
POS
TERR
HYD
DOORS
OVERHEAD
AIR COND


FIRE
WARN
BELL CUT
MASTER
CAUTION
PUSH TO RESET
FLT CONT
IRS
FUEL
ELEC
APU
OVHT/DET
FPV
MTRS
RST
WPT
ARPT
DATA
POS

2.4. Main Instrument Panel

The main instrument panel provides installation structure for display components, standby instruments, landing gear handle, and other equipment. The internal structure of the main instrument panel uses steel profiles, and the surface of the instrument panel is processed from aluminum sheet. The surface of the instrument panel is coated with static electricity spraying process, which is beautiful and rust-proof. The main instrument panel includes display components (PFD, ND, 6 upper and lower DUs), two side clocks, two side display control panels, two side knee panels, two side autopilot autothrottle indicators, standby instruments (ISFD and HSI), engine information and auto brake control panel, landing gear control panel and various instruments and indicator lights.

Figure 2.26 Physical diagram of the WB B737NG instrument panel

Figure 2.27 Physical diagram of the WB B737NG display components

2.5. Control stand, forward and aft electronic panel

The control stand is a box-type structure that provides framework support for the electronic panel. Each panel uses simulated parts, with the appearance, function, and feel consistent with the actual aircraft. The control stant consists of the throttle stand, forward electronic panel, and aft electronic panel. The forward electronic panel includes: the Flight Management Display System (CDU), Lower Display Unit (LDU); The throttle panel and aft electronic panel include:overheat/fire protection panel, radio tuning panel, navigation panel, audio control panel, cargo fire panel, ATC panel, WXT panel, AFD panel, rudder

trim panel, lighting control panel, cockpit door panel, etc.

2.5.1. Flight Management Control and Display System (CDU)

The CDU components are located on the lower display units (lower DU) on both sides of the front electronic panel. The shell is made of aviation aluminum and machined 1:1 CNC to mimic the real aircraft. The surface is coated with electrostatic spray paint to reproduce the real appearance. The main structure consists of an 800X600 LCD display, keyboard, indicator lights, and knobs.

Two identical, independent CDUs provide a means for the crew to communicate with the FMC. The crew can use either CDU to input data to the FMC. Both CDUs have the same FMC data and calculations, but each pilot controls the display of their respective CDU. The WB B737NG simulation software system has a built-in FMC system function module, which interacts with the CDU interface software module for data exchange. The CDU interface software controls the page display information and content of the CDU.

2.5.2. Throttle

The WB B737NG throttle is made of steel and aluminum processed by CNC, finely replicating the appearance, feel, and operational logic of the actual aircraft throttle quadrant. The structure consists of brackets and fixed structures, thrust levers, reverse thrust levers, speedbrake lever, flap handle, starter handle, parking brake, trim wheel, and other mechanisms. The main thrust lever has automatic throttle follow-up logic. The reverse thrust lever has a logic that limits unlocking in the non-idle position.


AUTO TAKE OFF & GO AROUND
PARKING BRAKE PULL
CUT-OFF
STAB TRIM
MAIN SELECT
NORMAL
AUTO PILOT
CUT OUT
ENGINES
TAKE-OFF
APL NOSE DOWN
APL NOSE UP

2.5.3. Aft electronic panel

Figure 2.35 Physical diagram of the Boeing 737NG fire panel

2.6. Pilot seats

The pilot seats are simulated parts, developed by the CJ-Information. They are divided into captain's seat and co-pilot's seat. The appearance and operation of the seats are consistent with the real aircraft seats, with a skin treatment on the surface, providing comfortable seating and stable installation structure. The adjustable height range of the flight seats is greater than that of the real aircraft seats, and the seat height can meet the height requirements of 6-year-old children to adults. The moving mechanism includes sliders and locking mechanisms. The pilot seats provide conditions such as front-back, height, and backrest angle adjustments. The adjustment positions are precise, and the eye point position is controllable. The effect is

as shown in Figure 24:

Figure 2.37 Physical Seat Diagram of the Boeing B737NG

2.7. Installation and Operational Requirements of the Cockpit System

2.7.1. Temperature and Humidity

The simulation platform can operate for a long time in general working conditions, suitable for the following environments:

Operating Temperature: -10℃~+40℃, optimal at 20℃±5℃

Operating Humidity: 0%~95%

Storage Temperature: -20℃~70℃

2.7.2. Lighting Illumination

There is sufficient ambient lighting for instrument and panel illumination.

2.7.3. Power Supply

The simulation platform is equipped with a comprehensive power distribution management system, providing alternating and direct current stabilized power to each subsystem. Users need to separately provide 220V AC power to meet the load requirements:

(1) The maximum power of 220V AC power supply for cockpit equipment operation is 3KW

- Space Requirement

Equipment (Length x Width x Height): 4000mm x 3400mm x 3000mm

Minimum reserved space required: 6000mm x 5000mm x 3300mm

5.5 Ground Load

(1) Maximum single unit weight ≤ 100KG;

(2) Total weight ≤ 3000KG.

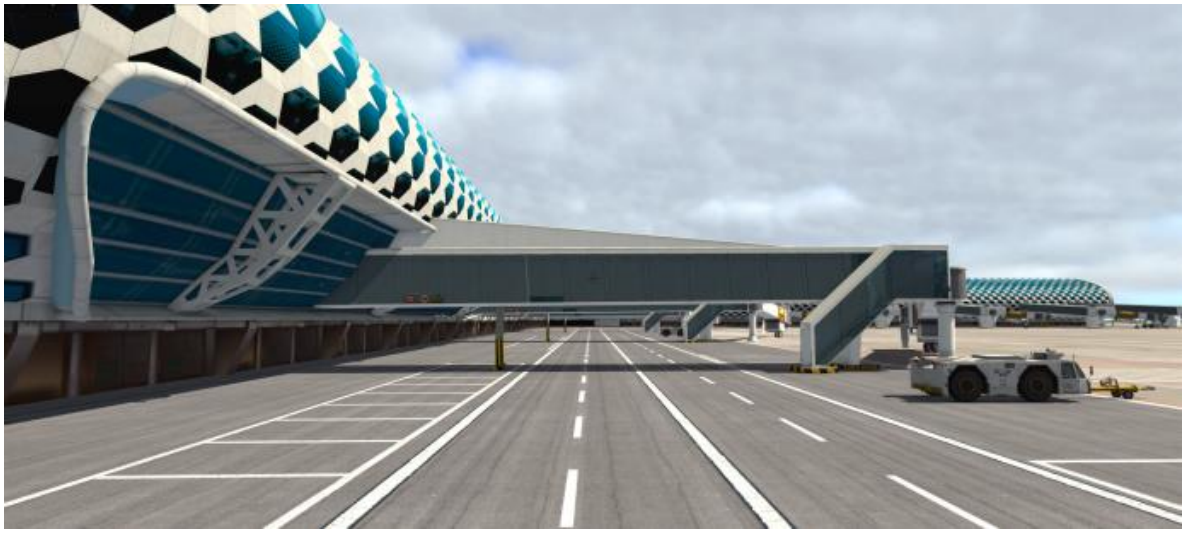
3 Visual Simulation Software

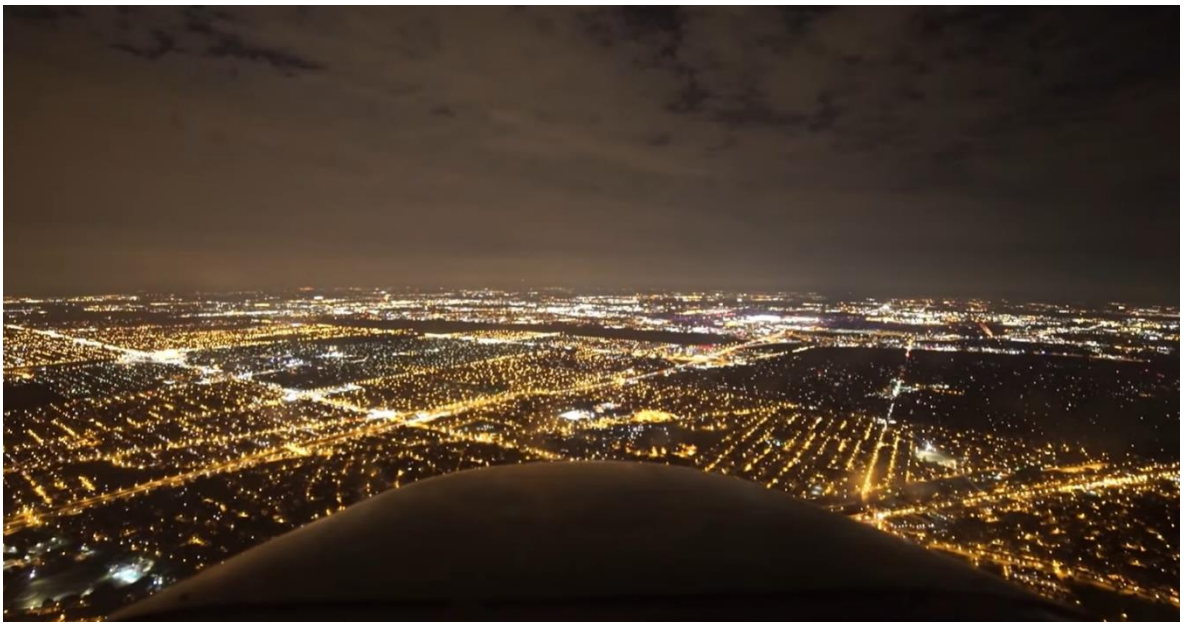
The WB B737NG visual simulation software uses X-plane as the scene rendering engine, and is based on the global coordinate system module built into X-plane for positioning coordinates for all visual objects such as terrain and weather environment. The image renderer calls the simulation software to obtain the spatial coordinates of our aircraft, then reads the data of terrain, scenery, surface buildings, vehicles, AI traffic models, cloud clusters, and other objects within the visibility range of our aircraft from various modules.

Through the optical energy calculation module, it calculates the angle of sunlight incidence and light transmission amount based on time and weather factors, respectively calculates the spatial energy calculation of the reflection light amount, projection range, and angle of each visible object within the visibility range of our aircraft, provides the calculation results to the image renderer for processing. The image renderer, based on the optical energy calculation results of each object, substitutes them into the viewpoint, viewing angle, and focal plane calculation equations, comprehensively calculates the imaging effects of the shapes, materials, and colors of each object under the light source, and finally generates a raster image, which is then transmitted to the television to generate a realistic visual image.

Visual simulation images can provide pilots with a realistic flight environment and visual references, with a strong sense of immersion. Visual simulation can present the following effects: time, weather, terrain, and landscape. It can provide different sky effects for daytime, dawn, dusk, and night. Using a gentle transition algorithm between two adjacent time periods, it reproduces the real changes in daylight. It can simulate natural weather processes such as clear skies, overcast, and rain, while also presenting weather phenomena such as clouds, fog, and smoke that affect visibility.

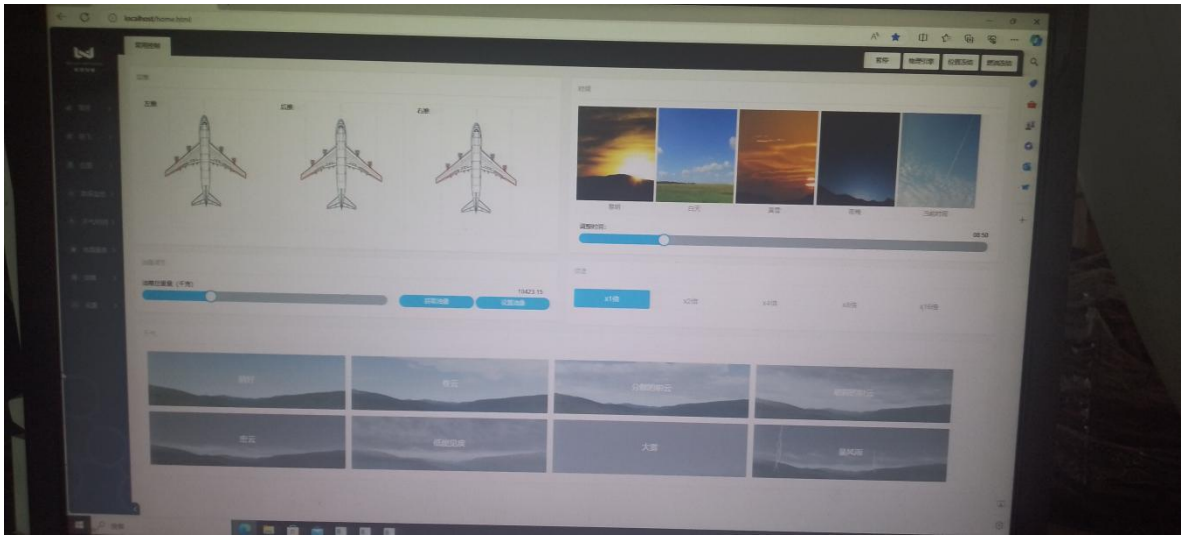
The visual simulation system includes a global high-precision terrain and satellite image database. It can present real global terrain features and allow for takeoff and landing training at airports with realistic appearances.



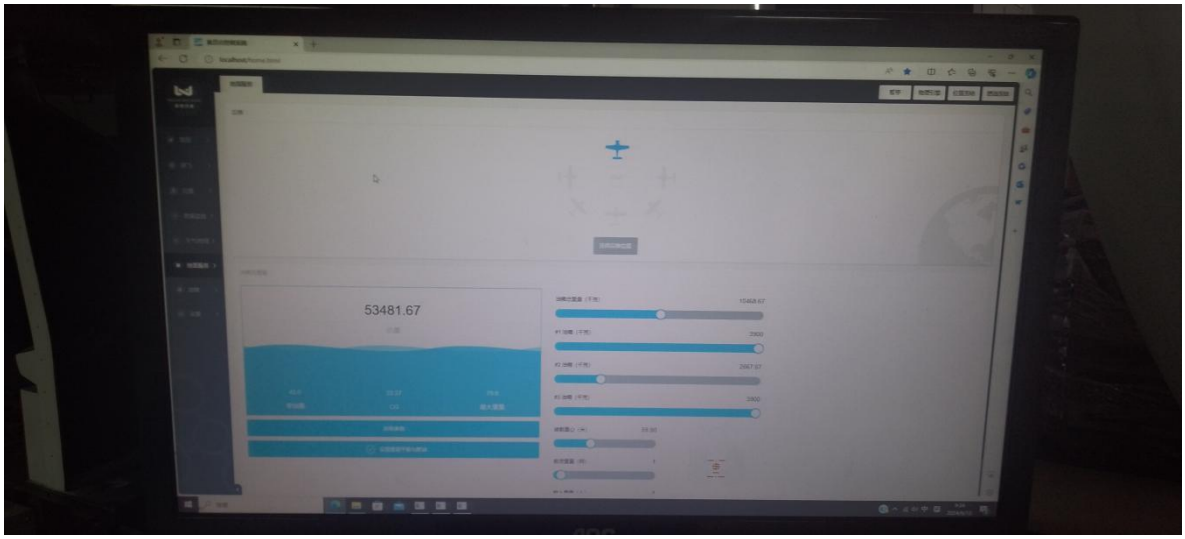


4 Instructor Operating System Software

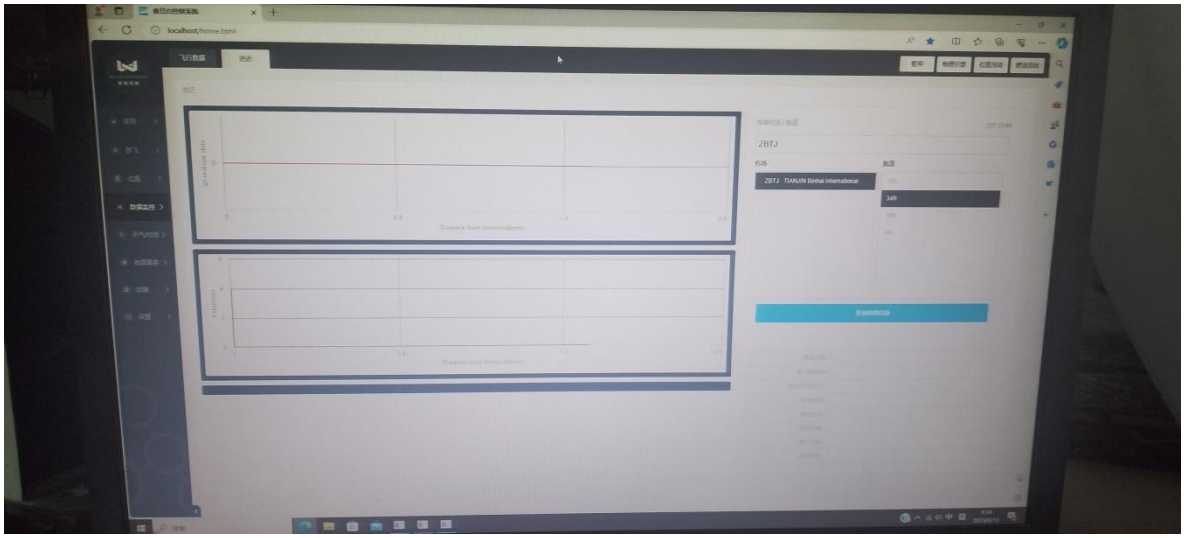
The WB B737NG Instructor Operating System (referred to as the "IOS" or "Instructor Station") includes control command settings, initialization condition settings,malfunction settings, weather settings, flight map display, etc. The instructor' s monitor uses touch operation, click on various selectable buttons to enter functional subpages. (See Figure 44, IOS Main Interface)



Control Section: Refers to controlling the operation of the aircraft model calculation and the actions that need to be taken during the



operation, mainly including start, freeze, reset, alarm, etc.



Configuration section: Mainly includes flight condition settings, flight parameter settings, flight environment settings, etc.

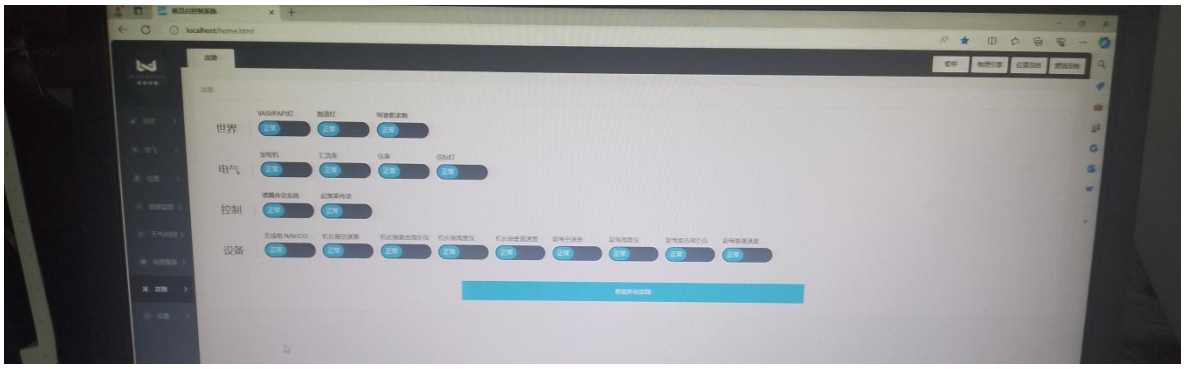
Monitoring section: Used to monitor and view the status of the platform during the simulation process. The content that can be viewed includes network status, maps, flight trajectory, etc.

According to the content characteristics of the IOS, its functions can be divided into flight monitoring and

flight training condition setting modules.

Flight system malfunction setting

The IOS has functions for selecting, pre-positioning, activating, and clearing flight system failures. When a failure occurs, the simulation software



simulates panel lights, warning messages, and audio warnings related to equipment failures based on logical operations. It also simulates the real-time response of equipment under failure conditions according to the pilot's operations.

The hardware of IOS consists of a touch screen monitor, keyboard and mouse input devices, and a vertical stand.

5 Project implementation plan

5.1. Quality objectives

Our product equipment development is carried out in accordance with the requirements and descriptions and commitments made by us in this plan. The simulation software must strictly follow the software engineering methods in the National Standard for Computer Software Engineering, ensuring that the equipment quality meets the excellent standards and guaranteeing quality objectives such as product stability, reliability, ease of use, and maintainability.

5.2. Various quality control measures

- Pre-sales service

  Responsible for analyzing user needs and matching corresponding products, providing product or project proposals, communicating the provided site by the user, and providing specific and reasonable installation and after-sales solutions according to the site.

- Product processing and production

- Production inspection: mainly carried out by after-sales engineers and quality inspection engineers to inspect the quality of each module in the production process;

- Factory inspection/test flight: mainly inspect the electronic circuits and systems of the equipment, inspected by module engineers; Establishment of product file information: establish product information files, which is beneficial for comprehensive tracking of product after-sales service in the later period.

- Product assembly stage

  During the production and assembly process, quality inspection

engineers inspect the quality of each component in the production and assembly process. Unqualified parts should be promptly reprocessed to ensure that the quality of the parts meets the design requirements.

- Documents

Our company provides the following documents upon equipment delivery, and should strictly follow the relevant technical specifications, and timely perform necessary maintenance and version updates to ensure that the documents are consistent with reality.

System user manual (including: operator manual and system maintenance manual, etc.); Equipment delivery list.

- Supply plan

We will complete the equipment production according to the contract, notify the user to come to the factory for acceptance. After Party B makes the payment as agreed in the contract, we will arrange FOB delivery. That is, the user is responsible for arranging the shipment of goods, and we will load the goods onto the buyer's designated ship at designated Port within the specified period and notify the user promptly. Once the cargo is lifted over the ship's rail, the user bears the cargo ship fees and all expenses, procedures, and risks after departure.

5.3. Packaging, transportation, and installation

(一) Packaging plan

The packaging of 737 project components includes packaging of large equipment, electromechanical equipment, electronic equipment, visual equipment, and cable packaging, etc. The basic packaging requirements are carried out according to national or departmental standards; If there are no packaging standards, the basic requirements for packaging of goods for

waterway and highway transportation issued by the Ministry of Transport shall be followed.

Large equipment is packaged with heat shrink film, while equipment of general size is packaged in wooden boxes. The wooden boxes have two types of cushioning forms: support frame and top and bottom covers. Plastic film, foam paper (such as PEP material, etc.) , and polyethylene blow-molded film are used as inner packaging materials that do not react chemically with the product's surface. Polystyrene foam plastic is used as cushioning material between the outer packaging and inner packaging. The shape and size of the outer packaging should be coordinated with the specifications and dimensions of the expected pallets, transport tools, and containers to be used.

1. Large equipment packaging

The outer dimensions of the cockpit, cabin, and base reach the level of large objects, and will be packaged and transported as a whole, using heat shrink film for overall packaging. The packaging scheme for the simulated cockpit and base is as follows:

(1) Use pads, blocks, and pads at protruding positions in the cabin and base for protection.

(2) Place chemical agents such as desiccants, deoxidizers, and comprehensive indicator agents in the cabin. Carry out moisture-proof and rust-proof treatments.

(3) Loosely wrap the cabin and base with heat shrink film, and then seal with hot air flow.

2 Avionics Equipment Packaging

Avionics equipment includes: racks, control load cabinets, cabin components and other large components. These large components are packaged in wooden crates, and accessories and spare parts are also

packaged in wooden crates.

(1) Ensure that the wooden crates are clean, dry, and free of foreign objects.

(2) Waterproof, moisture-proof, rust-proof, dust-proof, and anti-static packaging treatment for large components.

(3) Large components are hoisted and placed on wooden pallets using lifting equipment, and wooden support frames and tight ropes are used for secure protection.

(4) When packing the products, try to keep the center of gravity low and centered. Components with a high center of gravity should be packaged horizontally as much as possible. For components with a significant deviation of the center of gravity from the center, corresponding balance measures should be taken.

(5) The accessory box and spare parts box are fixed in the appropriate position inside the main box, and the accessories and spare parts inside the box are fixed with corresponding measures.

(6) The packaging box is filled with foam plastic as cushioning packaging material, without leaving gaps, reducing shaking, and improving moisture-proof and shock-proof effects.

(7) Random documents are placed in the packaging box, including user manuals, certificates of conformity, packing lists (including general packing lists and sub-packing lists, etc. Documents related to packaging and unpacking precautions can be placed in plastic bags and pasted on the packaging box.

(8) Reinforce the wooden box.

(9) When components are packaged in multiple boxes, the box number is represented by a fraction, with the numerator as the box number and the

denominator as the total number of boxes.

(10) Draw or paste signs and labels on the packaging box, the signs and labels should be clear and eye-catching, the size should be coordinated with the size of the packaging, and should remain in good condition in foreseeable conditions and within the specified validity period.

3. Electronic Equipment Packaging

Electronic equipment includes: computer equipment, printed circuit boards, and electronic devices. After electronic equipment is packaged in corrugated boxes, they are uniformly placed in wooden boxes. The packaging scheme for electronic equipment is as follows:

(1) Ensure that the wooden crates are clean, dry, and free of foreign objects.

(2) Protective packaging for electronic equipment, with padding strips, blocks, pads, etc. at the corners and edges for protection.

(3) Waterproof, moisture-proof, rust-proof, dust-proof, and anti-static packaging for electronic equipment. Select materials such as organic plastic film, organic plastic bags, foam plastic paper (such as PEP materials), or polyethylene blow-molded film that do not react chemically with the product's outer surface for overall dust prevention. The dust-proof bag should be sealed. To prevent temporary rain or moisture in the atmosphere from affecting the product during transportation, desiccants such as silica gel can be used inside the packaging.

(4) Place the packaged electronic equipment into a corrugated cardboard box.

(5) Fill the corrugated cardboard box with foam plastic as cushioning material, leaving no gaps to reduce shaking, which can improve moisture and vibration resistance.

(6) Random files are placed in the corrugated box, with user manual, certificate of conformity, packing list (including general packing list and sub-packing list, etc. Documents related to packaging and unpacking precautions can be placed in plastic bags and pasted on the packaging box.

(7) When parts are packaged in multiple boxes, the box number is represented by a fraction, with the numerator as the box number and the denominator as the total number of boxes.

(8) After counting the quantity, they are uniformly placed in wooden boxes.

(9) Symbols and markings are drawn or pasted on the wooden box, which should be clear and prominent, coordinated in size with the packaging, and should remain in good condition in foreseeable usage environment and within the specified validity period.

4. Cable packaging

(1) Small cable products can be packaged in corrugated boxes.

(2) Large cables are coiled with reel, surrounded by thick protective board packaging, outer board is strapped with steel strip to prevent disintegration during long-distance transportation, and finally the reel is fixed on the pallet.

(3) Cable packaging should include: product certificate, packing list (spare parts), user manual (DC resistance, withstand voltage level, laying temperature, bending radius, short-circuit current, etc.)

(4) The outer packaging of the cable should have markings and signs, which should be clear and prominent, coordinated in size with the packaging, and should remain in good condition in foreseeable usage environment and within the specified validity period.

1. Transportation plan

The cargo loading and transportation plan for equipment components is as follows: using a 7.6m flying wing vehicle. Based on the actual value of the goods, choose either insurance or declared value, and accurately fill in the declared value of the insured goods on the waybill.

The cargo loading and transportation plan is as follows:

1. Cargo loading plan

(1) When loading goods into the carriage, ensure light lifting, proper loading, no stacking of large on small, no stacking of heavy on light, with labels facing outwards and arrows pointing upwards.

(2) Ensure stable loading of goods with no gaps and balanced weight distribution between goods.

(3) Stack the goods neatly inside the carriage, after loading, securely fasten with wooden blocks, lead wires, or steel cables to prevent sliding, then close the carriage.

(4) When unloading goods, first loosen the fixed cables and wooden blocks, and then use a forklift to transport the goods to the designated location.

2. Transportation Requirements

(1) When transporting goods, approval must be obtained from public security, highway management departments, etc., a transport permit must be issued, and the goods must be transported according to the specified route and time.

(2) Drivers, loading and unloading managers, and escort personnel should carry their qualifications with them when they go on duty.

(3) Hang obvious signs during transportation to attract the attention of

other vehicles and pedestrians. The sign is hung at the end of the over-limit cargo, with a red flag during the day and a red light at night.

(4) During the transportation process, in order to ensure the safety of goods, express delivery should be implemented as much as possible. For long-distance transportation, dual drivers should be equipped, and continuous driving day and night. Regular inspections of the carriage should be conducted during the journey, and emergency braking should not be applied casually.

(5) All types of transportation vehicles must be kept intact, with no leaks in the carriage.

(6) From receiving, loading, departure, unloading to delivery, strict handover procedures must be followed between each stage.

(7) When the vehicle arrives at the loading site, it must be loaded according to the requirements of the driving route sheet, and the shipper must sign on the receipt or issue a delivery note. In case of damaged packages or items, it should be noted on the receipt to clarify responsibility.

2. Installation plan

The installation process of the 737 project requires lifting equipment or forklifts, tow tractors. The installation sequence is as follows: first install the cockpit and base, then install the dome visual, and finally install the accessory section. The specific steps are as follows:

1. Clean up the site and prepare

(1) Plan the specific installation position according to the site conditions.

(2) Place items according to the area division.

(3) Check the quantity according to the packing list.

2. Install the cockpit and base

(1) Use a forklift to move the cockpit and base to the designated area.

(2) Check the appearance, interior, and interior equipment of the cockpit for any damage.

3. Install the dome section

(1) Remove the dome visual box, remove the ropes, fasteners, and packaging .

(2) Count the dome components and place them in the designated positions according to the numbers.

(3) Install the dome in numerical order, this process requires a set of gantry scaffolding and a ladder.

4. Install the accessories section

(1) Remove the accessory wooden box, remove the ropes, fasteners, and packaging .

(2) Check for any damage to the accessories.

(3) Install computer equipment and other electronic devices.

5. Installation of cable section

(1) Unpack the wooden box containing the cables and count the quantity according to the packing list .

(2) Check the output and input terminal numbers of each cable according to the disassembly record card.

(3) Connect the cables according to the information on the record card.

6. Power on inspection

(1) Inspect the overall installation of the equipment .

(2) Check the connection of the cables.

(3) Coordinate with the management department for the power on inspection.

(ア) Equipment acceptance

After the equipment is transported by the user to the installation site, our personnel will go to the site to install and commission the equipment according to the installation and commissioning plan mentioned earlier. The user will sign an acceptance form to confirm.

Maintenance tools

Each product will come with a set of maintenance tools to meet the daily maintenance needs of the equipment.

Common equipment failures and maintenance:

1. If the knob cap is loose or falls off, you can use the corresponding hex key to tighten it.

2. In case of a computer crash, simply restart the computer to restore its normal function.

3. If some functions of the equipment are not working properly, you need to power off the entire device and restart it to restore its normal function.

If the above maintenance methods cannot solve the equipment failure, please contact the customer service staff of CJ-Information Co., Ltd. for equipment repair. We will arrange for maintenance personnel to conduct on-site equipment maintenance as soon as possible.

3 After-sales service plan

(ア) Service standards

1) Quality assurance period and warranty period: One year quality assurance period;

3) During the warranty period, our company guarantees to remotely respond to user requests within 8 hours after receiving a fault call.

(イ) Service process

When users encounter technical issues and need assistance, our company requires cooperation from the user before, during, and after contacting us. The following process outlines the user's cooperation and steps when our company provides technical support services to the user:

Process description is as follows:

Collect information on the problem

When the user's system encounters a problem, gather all diagnostic information, including files, error message reports, or any other information that may help solve the problem. Collecting information is the most important link in the entire problem-solving process. It can help the user determine the problem, focus on studying the most likely parts causing the problem, and when the user is unable to solve it, our engineers will also need this information.

・Preliminary problem identification

When the user collects all the information related to the problem, check the collected information and try to identify the problem. Contact our engineers by phone and fax.

・Propose solutions to the problem

When our engineers receive information from the user, they propose solutions to the problem after consultation.

・Test the proposed solutions

When the user receives information about our proposed solution, they test the solution for system issues and provide feedback on the testing.

・Establish user profile

After the user's system issues are completely resolved, our company will collect and organize all relevant information from the entire problem-solving process to establish a user profile.

Our company records every user service work, generating user maintenance reports and repair reports. The user maintenance report points out the performance and handling methods of each system failure, and the maintenance report indicates the maintenance situation of the system failure equipment each time. Through years of data accumulation, our company can conduct fault analysis on user systems and propose system improvement suggestions based on this.

(ウ) Post-warranty service phase

When the equipment approaches the warranty period, a 'Paid Service Agreement' will be signed after negotiation between both parties. If the equipment has problems or the user needs to upgrade the software and hardware, our company will charge maintenance and upgrades according to the 'Agreement' fee standards.

4 Training program

(ア) Training plan

In this project, our company will provide a comprehensive system training arrangement.

After the equipment delivery acceptance, our engineers will conduct centralized training for the designated personnel (usually three people) of the user. Training will be provided for operators and system maintenance personnel.

Based on the relevant experience of the equipment in operation and maintenance processes in this plan, our company's training content includes three aspects: equipment system installation, equipment operation and use, and equipment maintenance management. We will provide professional system usage and maintenance manuals to provide ongoing reference for operators and maintenance personnel.

Training location: the equipment installation location designated by the user

Assessment criteria:

Operational assessment - independently and proficiently complete the steps of powering on, starting, running, shutting down, and powering off the simulator system.

Maintenance assessment - independently and proficiently complete steps such as software fault code query, restart, hardware replacement, etc.

(イ) Training method:

In the training, the theoretical part adopts a concentrated training method, provided by our company's training instructors to provide comprehensive training for the technical personnel of the users based on the technical

characteristics of this system. The training content covers the main technical theories and practical contents of the entire system during the use process. For the practical part, different training courses with different focuses will be provided for each system module. Our company's training methods mainly consist of on-site training and centralized training during equipment testing phase.

(ウ) Training content

Simulator usage training (explanation and on-site demonstration)

Simulator maintenance training (explanation based on operation manual and on-site practical training)

Outline of operator training plan:

3.1 System Overview and Introduction

System overview

Structure composition and assembly system

System data link architecture

All functions and principles of the system

Startup and shutdown procedures

Normal operation management of equipment

Daily checks

Server checks

Instructor station system checks

Instrument startup checks

Central control panel startup checks

Visual system check

Flight control range check

3.2 Instructor station system operation

Detailed function usage introduction

Use of preset scenarios

Methods for monitoring aircraft operation and parameters

Setting the airborne traffic environment

User interface development methods

Technical specifications for user hardware development

The outline of the system maintenance personnel training plan is as follows:

System maintenance

Display device maintenance

Simulator maintenance

Computer maintenance

3.4 Fault analysis and resolution methods

Handling steps and methods for mechanical issues

Handling steps and methods for electronic issues

Handling steps and methods for software issues

3.5 Master the processing flow and processing methods

Follow our company's after-sales service process for handling relevant faults and explaining fault handling methods

(エ) Training follows principles

4.1 Standardization and knowledge coexist: In training for system users,

special emphasis should be placed on introducing standards to lay a necessary foundation for the system's later maintenance.

4.2 Mandatory and voluntary training combined: In the entire training system, training content that has a critical impact on the system must be attended by trainees mandatorily; While some training content can be flexibly chosen by trainees according to their own needs.

4.3 Clear hierarchy, strong pertinence: adopt the method of 'learning what is needed', design different training outlines for different trainees, select targeted teaching materials, use targeted teaching methods, so that each training session achieves the best results, and the training content and process can reflect the needs of the aircraft type training.

4.4 System training objectives: proficient in mastering equipment manuals; proficient in using systems, familiar with system operation processes.

Looking forward to your patronage!