

# Flight Training Device ATS-B737 MAX 8

## Appendix B) Components Description

Reviewed: 26.02.2018

Model	Serial Number	Tail Number
ATS-B737 MAX 8		

Operator

Setup and instrument description of the Advanced Training System (ATS) B737 MAX 8, which includes the following sections, modules and instruments to simulate the B737 MAX 8 cockpit, on real dimensions, instruments and equipment.

### Sections

- 01.- PLATFORM
- 02.- CENTER PEDESTAL
- 03.- FLIGHT INSTRUMENTS PANEL
- 04.- EQUIPMENT
- 05.- OVERHEAD PANEL
- 06.- MASTER INSTRUCTOR DESK
- 07.- SHELL (fuselage)
- 08.- EXTERNAL VISUAL SYSTEM
- 09.- PC's and SOFTWARE

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### *Section 01.- PLATFORM*

#### 1.- Cockpit Platform PRO (Cockpit, instructor and cabinet section)

*Manufactured with a structure of 2" x 1" tubular metals, supported by 12 detachable legs (real B737 MAX external dimensions).*

*Set of hooks and wheels to move easily the structure.*

*Floor cover on detachable 16 caliber aluminum.*

*Floor finish in synthetic Pirelli style rubber, black color and aluminum molding.*

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### Section 02.- CENTER PEDESTAL

#### 1.- Central Console for Multifunction System

Framework manufactured in an aluminum layer, laser cut and finished on grey electrostatic oven painting and backlight system.

This console is used by:

#### 2.- Control Display Unit (CDU)

CDU B737 MAX type, synchronized for both CAP and FO, which controls the FMC's

#### 3.-Display Control Panel

The following information is displayed on screen:

- 1- Fuel Flow Indication
- 2- Autobrake Indication
- 3- MFD C/R
- 4- Antiskid Selector
- 5- Brake Pressure Indicator

#### 4.- Throttle Quadrant (motorized)

Motorized version intended for ruder use. Framework built in an inox and aluminum layer, laser cut and finished on grey electrostatic oven painting.

The system includes rivets and screws for fixing and assembly. Throttle levers, flaps, speed break and engine start switches.

Operative on the following functions:

- 1- Speed Brake Lever: DOWN, ARMED, UP and FLIGHT detent
- 2- Parking Brake
- 3- Reverse levers for every engine
- 4- Thrust levers for every engine
- 5- Flaps lever for positions 0° 1° 2° 5° 10° 15° 25° 30° and 40°
- 6- A/T Disengage Buttons (dual)
- 7- Engine Start Levers for every engine
- 8- Fuel Cutoff

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### 5. - Fire Control Panel

Module provided with aluminum fasteners, screws and nuts.

Included:

- 1- Warm White backlight
- 2- OVH LOOP Selector
- 3- Engine OVH Light
- 4- Fire Detection Test Switch
- 5- Engine Fire Handle
- 6- Lights Indicators (WHEEL WELL, FAULT, APU DET INOP, APU BOTTLE DISCH)
- 7- BELL CUTOFF Switch
- 8- APU Fire Handle
- 9- L/R BOTTLE DISCH LIGHTS
- 10- BOTTLE TEST SWITCH
- 11- Cargo Fire Panel Module

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### 6.- Module Radio Tuning Panel

Module including:

- 1- Radio Tuning RT (2)
- 2- Communication radios COM (2)
- 3- Navigation radios NAV (2)
- 4- Transponder XPNDR
- 5- ADF selector
- 6- COM/NAV Selector

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### 7.- AFT Electronic Panel

Module including:

- 1- Audio Control Panel ACP (2)
- 2- Weather Radar Control Panel
- 3- Trim Control Panel
- 4- Center Pedestal Light Control Panel
- 5- STABTRIM/CABIN DOOR PANEL
- 6- DATA Printer

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### Section 03.- MAIN INSTRUMENT PANEL

#### **1.- Main Instrument Panel Module (Cockpit & Glareshield)**

Framework built in aluminum laser cut. Set of lateral supports made of metallic edges. Finished on grey oven electrostatic paint and modules manufactured on "micro surface impact plexiglass" LASERMAX, on grey and black colors and backlight system. It includes the following modules:

#### **2.- Captain Brightness Control**

Operative module for bright OUTBD; UPPER and INBD Display Unit (DU)

#### **3.- Captain Light Control**

Controls the MIP lights (CAP section)

#### **4.- Ground Proximity Control**

Operative module for FLAP INHIBIT; GEAR INHIBIT; TERR INHIBIT; GPWS and SYS TEST

#### **5.- FO Brightness Control**

Operative module for bright OUTBD and INBD Display Unit (DU) FO section

#### **6.- MAX Display System (PFD) for CAP & FO sections**

Primary Flight Display (PFD) and the Electronic Attitude Director Indicator (EADI) are displayed, with the following information:

- 1- Airspeed Indications General. - Speed Tape; FMC/MCP Command Speed; Airspeed Trend Arrow; Rolling Speed Display; Max Operating Speed; High Speed Buffet Limit; Minimum Flap Retraction Speed; Flaps UP Maneuver Speed; V Speed; Minimum Maneuver Speed; Stick Shaker Speed; Next Flap Position Speed and Ref Speed
- 2- Altimeter Indication. -
- 3- Attitude Indication. - Flight Director Bars; Height Decision and Localizer and Glideslope Display
- 4- Altitude Indication. - Selected Altitude, Radio Altitude Dial; Radio Altitude; Current Altitude; Baro Indication; Baro Minimum Pointer; Landing Altitude Indication and Minimum Referent Altitude
- 5- Heading Indication. - Heading Indication; Heading Bug; Heading Mode Indication and Track Pointer
- 6- Compass displayed below
- 7- Aux display. - Flight number, Transponder Code, selcal, registration, clock HGS Annunciations

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### 7.- AP/AT Indicators for CAP & FO section

Module with the following functions:

- 1- Autopilot Disengage Light (light and sound)
- 2- Autothrottle Disengage Light (light)
- 3- FMC Alert Light (light)
- 4- Test Switch (light)

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### 8.- Instruments Panel Lights Test Switch

Module for lights system testing

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### 9.- Speed Brake Lights

Module Indicator:

- 1- Speed Brake Armed
- 2- Speed brake not armed

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### 10.- Clock (CAP and FO)

Module with the following functions:

- 1- Chronometer
- 2- Local Date/Time and UTC
- 3- Elapsed time counter

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### 11.- Nose Wheel Steering Switch

Module that controls the Steering Nose Wheel ON/OFF (inoperative)

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### 12.- Standby Instruments

Module indicator

- 1- Standby Horizon Indicator

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### 13.- Screen Display (EICAS) Primary Engine Indications and ND

It displays the Engine Indication and Crew Alerting System (EICAS), which contains the following information:

- 1- N1 RPM Readout
- 2- N2 RPM Readout
- 3- EGT Indication
- 4- Fuel Flow
- 5- Oil Press, Temp, QTY
- 6- VIB

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With the operation of the MAX Navigation Display (ND) and the Electronic Horizontal Situation Indicator (EHSI), the following information is displayed:

- 1- Heading Indication. - Heading Pointer; Heading Bug; Waypoint Information; Heading Indicator and Aircraft Symbol
- 2- Lateral Nav Route. - LVAV Route; Track Line and Trend Indicator
- 3- Vertical Nav Route. - Vertical Deviation Indicator
- 4- Other information. - Weather Radar Information; Weather Radar Annunciator; Map Options; Navaid Information and Map Source Information

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### 14.- Landing Gear Control Panel

Module with the following functions:

- 1- Landing Gear Level. - UP and DN
- 2- Landing Gear Light. - Red and Green

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### 20.- Speed Brake Light

Module with the following functions:

- 1- Speed Brakes Indication Light

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### 21.- Air Ventilation for CAP y FO section

Inoperative module

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### 22.- Frame for Display

Set frame for display (4 unit) fiber glass color grey

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### Section 03.- MAIN INSTRUMENT PANEL (Glareshield)

#### 23.- EFIS Control Panel (CAP & FO)

Module with the following functions:

- 1- FPV Button
- 2- MTRS Button
- 3- Baro Know
- 4- VOR/ADF Switch
- 5- EHSI mode selector
- 6- Range selector
- 7- Map Buttons with functions of WXR, STA, WPT, ARPT, DATA, POS and TERR
- 8- MINS Knobs

#### 24.- Mode Control Panel (MCP)

Module MCP737 MAX with the following functions:

- 1- Course Selector Know (CAP and FO)
- 2- Course Selector Display (CAP and FO)
- 3- Flight Director Switch (CAP and FO)
- 4- Autothrottle Switch A/T
- 5- Speed Select
- 6- Heading Select Button
- 7- Vertical Speed Button
- 8- Autopilot Engage Buttons (CMD A and CMD B)
- 9- A/P disengage Button

#### 25.- Master Warning/ Caution Light and System Annunciators (CAP & FO side)

Module containing the following devices:

- 1- Fire Warning Light
- 2- Master Caution Light
- 3- System Annunciator (CAP side)
  - 1) FLT CONT
  - 2) IRS
  - 3) Fuel
  - 4) Elec
  - 5) APU
  - 6) OVHT/DET
- 4- System Annunciator (FO side)
  - 1) Anti-Ice
  - 2) HYD
  - 3) Doors
  - 4) ENG
  - 5) Overhead
  - 6) Air Cond



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### Section 04.- EQUIPMENT

#### **1.- CAP & FO Rudder System Pedals (synchronized)**

Boeing style adjustable synchronized pedal system, manufactured on metal and aluminum intended for rude use, finished with electrostatic oven paint. Power switches, switches and electronic card for assembly

Operative on:

- 1- Rudder Control (Yaw)
- 2- Nose Wheel Control
- 3- Independent Left and Right Brakes

#### **2.- CAP & FO Column & Yoke (synchronized)**

Column and yoke motorized and synchronized system, manufactured on metallic materials intended for rude use, finished with electrostatic oven paint, spring system, potentiometers, Boeing type yokes manufactured on black color fiber glass, electric trim and column manufactured on grey color fiber glass.

Operative on:

- 1- Aileron control (bank)
- 2- Elevators control (pitch)
- 3- Electric trim (dual)
- 4- A/P disengage
- 5- PTT for communications
- 6- Stick Shaker

#### **3.-Cockpit Lighting system**

General lighting system composed by:

- 1- Adjustable cockpit lighting (Independent control for CAP&FO area)
- 2- General lighting with roof lamps, two available intensities (controlled from the overhead panel)
- 3- Instructor section lamp
- 4- Lighting for front section (used only for maintenance)

#### **4.- Audio system**

Audio system of 5.1 composed by 5 speakers, subwoofer

#### **5.- Crew Communications INTERCOM System**

Internal communication system composed by 4 headsets (CAP, FO, OBSERVER and INSTRUCTOR), TELEX models or similar and INTERCOM system

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### **6.- Seat Crew for CAP & FO**

*Boeing type seats for the resembled aircraft*

### **7.- Electrical set, Low voltage supplies & Internet**

*For electric power management and control, the following power sources are used:*

- 1- NO BREAK at 2000W (minimum), which allows the control and protection of the entire system. In case of an electric power shut down, the device grants 15 minutes to close session and turning off the equipment safely (its assembly is solely the responsibility of the operator)*
- 2- Power source for low voltage energy (5,6,12 and 28 volts) required for electronic cards, system and watches*

### **8.- Chart Holder Clip for CAP y FO section**

*Chart Holder Clip to hold charts, manufactured on Lasermax and laser system, with metallic clip on large size*

### **9.- Tiller Nosewheel Steering**

*System for directional control on land, manufactured on Black solid glass fiber and electrical system controls. Turn on L87° + R87°*

### **10.- Horometer**

*Suitable for effective control of flight training device hours*

### **11.- Light Map for CAP y FO section**

*Lighting system for the Chart Board composed by lights, potentiometer and module manufactured on Lasermax*

### **12.- Panel Mount Wet Compass**

*Module that includes Magnetic Compass, movable support and central post*

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### Section 05.- OVERHEAD PANEL

#### 1.- Upper, Lower & EXT Light & Engine Module

Modular system, manufactured on metal, finished on electrostatic oven paint and Allen screws for module fixing. Support system attached to the main structure (front and back support), case made of micro surface impact plexiglass LASERMAX on black and grey colors, aluminum handles finished on electrostatic oven paint, leds and indicators, switches of multiple positions, switch covers on black and red colors, backlight system, electronic cards for assembly and screws for fixing, containing:

#### UPPER OVERHEAD PANEL

#### 2.- IRS System Display Unit

Module for the control of IRS system, composed by:

- 1- System Display Switch L/R
- 2- System Display selector
- 3- IRS display screen (displays information generated by FMC's)
- 4- Keyboard

#### 3.- Audio Selector Panel

Inoperative module

#### 4.- LE Devices Annunciator Panel

Module of LE Devices Lights and Lights Test Button

#### 5.- IRS mode Selector Panel

Module containing the IRS panel

#### 6.- Service Interphone Switch

Inoperative module

#### 7.- EEC/OXYGEN panel

Module which contains:

- 1- Reverser Lights
- 2- Engine control Lights
- 3- EEC Buttons (inoperative)
- 4- Pass Oxygen Light (inoperative)
- 5- Pass Oxygen Switch (inoperative)
- 6- Crew Oxygen Pressure

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### 8.- Flight Recorder Panel

*Operative module for Test Switch and Mach Airspeed Warning Test*

### 9.- Stall Warning Test Panel

*Operative module*

### 10.- MAINT Light

*Operative module*

### 11.- Dome Light Switch

*Module that allows the control of the cockpit general lighting*

### 12.- Landing Gear Lights

*Operative module with the "Landing Gear Control Panel" module*

### 13.- Bay cover modules

*Set of blind covers (inoperative)*

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### LOWER OVERHEAD PANEL

#### 1.- Flight Control Panel

Module with the following functions:

- 1- Yaw Damper switch
- 2- Yaw Damper Light
- 3- Flight control Switches
- 4- Low pressure Lights
- 5- Standby HYD Quantity Pressure Lights
- 6- Alternate Flap Master Switch
- 7- Alternate Flap Toggle Switch
- 8- Feel Differential pressure Light
- 9- Speed Trim fail Light
- 10- Mach Trim fail Light
- 11- AutoSlat fail Light
- 12- Spoiler Fly by wire Switches

#### 2.- Electrical panel

Module for the control of the electric system, with the following functions:

- 1- DC Meters selector
- 2- Power Indication Display
- 3- AC Meter selector
- 4- Bat Discharge Light
- 5- TR Unit Light
- 6- ELEC Light
- 7- Main Push button
- 8- Battery switch
- 9- Galley Power switch

#### 3.- Windshield and Pitot Head Control Panel

Module with the following functions:

- 1- Windshield Heat switch
- 2- Side Window Heat switch
- 3- Window Heat L/R lights
- 4- Window Heat Test switch
- 5- Pitot static Head switch
- 6- Pitot Static/Probe Heat lights

#### 4.- Anti-Ice Control Panel

Module with the following functions:

- 1- Engine Anti-Ice switch
- 2- Cowl Valve Open light
- 3- Cowl Anti-Ice lights
- 4- Wing Anti-Ice switch
- 5- Wing Anti-Ice Valve open lights

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### **5.- Air Cond/Pneumatic Control Panel**

Module for the control of the Pneumatic and Air Conditioning systems, with the following functions:

- 1- Dual Bleed light
- 2- Ram Door full open light
- 3- Recirculation Fan switch L/R
- 4- Pneumatic Duct Pressure
- 5- Overhead Test switch (inoperative)
- 6- Pack switch
- 7- Isolation Valve switch
- 8- Engines Bleed switch
- 9- APU switch
- 10- Pack lights L/R
- 11- Trip reset button (inoperative)
- 12- Wing Body Overheat lights
- 13- Bleed Trip off lights

### **6.- Temperature Control Panel**

Module with the following functions:

- 1- Temperature selectors (inoperative)
- 2- Zone Temperature lights (inoperative)
- 3- Trim Air switch (inoperative)
- 4- Temperature Source selector (inoperative)
- 5- Gauge Temperature indicator

### **7.- Transfer Panel**

Operative module with following functions:

- 1- VHF NAV Switch
- 2- IRS NAV Switch
- 3- FMC Switch
- 4- Display Source Selector
- 5- Control Panel Selector

### **8.- Standby Power & CSD panel**

Module with the following electric functions:

- 1- Standby Power off Light
- 2- Standby Power switch
- 3- Gen Drive disconnect switches
- 4- Drive lights

### **9.- Hydraulic Control Panel**

Hydraulic system control module, with the following functions:

- 1- Overheat lights
- 2- Engine Hydraulic switches
- 3- Electric Hydraulic switches

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### **10.- Doors Annunciator Panel**

*Operative module. Considering that the flight training device is fixed, these functions are controlled through switches operated by the instructor*

### **11.- Fuel Control Panel**

*Fuel System control module with the following functions:*

- 1- Eng Valve closed lights
- 2- Spar Valve closed lights
- 3- Fuel Temperature Indicator
- 4- Fuel Temperature Indicator
- 5- Fuel Filter Bypass lights
- 6- Crossfeed Valve lights
- 7- Crossfeed selector
- 8- Center Tank low pressure lights
- 9- Main Tank low pressure lights
- 10- Fuel Pump selectors

### **12.- AC Electrical Power Panel**

*Electric Power control module with the following functions:*

- 1- Ground Power available light
- 2- Ground Power switch
- 3- Bus Transfer switch
- 4- Transfer Bus off lights
- 5- Source off lights
- 6- Gen off lights
- 7- APU Gen off Light
- 8- Engine Generator switches
- 9- APU Generator switches

### **13.- Cockpit Voice Recorder Panel**

*Inoperative module*

### **14.- APU Control Panel**

*APU control system module with the following functions:*

- 1- Maintenance Light
- 2- Low oil Pressure Light
- 3- Fault Light
- 4- Overspeed Light
- 5- APU EGT Indicator
- 6- Windshield wiper Control

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### 15.- Pressurization Indicator Panel

Module with the following functions:

- 1- Cabin Altimeter Indicator (simulated)
- 2- Cabin rate of Climb Indicator (simulated)
- 3- Altitude Horn Cutout button

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### 16.- Digital Pressurization Controller Panel

Pressurization control module with the following functions:

- 1- Flight Altitude selector
- 2- Landing Altitude selector
- 3- Digital Press Mode selector
- 4- Outflow Valve Switch
- 5- AUTO FAIL, OFF SCHED DESCENT, ALTN, MANUAL lights

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### 17.- Circuit Breaker & Panel Light Rheostats

Inoperative module

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### 18.- Equipment Cooling Control Panel

Operative module

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### 19.- Emergency Exit Light Panel

Module with the following functions:

- 1- Emergency lights switch
- 2- Not Armed light

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### 20.- Passenger Signs Panel

Operative module

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### EXT LIGHT & ENGINE MODULE

#### 1.- CAP Exterior Lights Panel

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Exterior Lights control module with the following functions:

- 1- Outboard Landing lights
- 2- Inboard Landing lights
- 3- Runway Turnoff lights
- 4- Taxi lights

#### 2.- Engine Start Panel

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Ignition control system module with the following functions:

- 1- Ignition selection switch
- 2- Engine Start switches

#### 3.- APU Start Panel

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Module with the following functions:

- 1- APU ON/OFF SWITCH

#### 4.- FO Exterior Light Panel

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Exterior Light control module for the following functions:

- 1- Logo lights
- 2- Strobe lights
- 3- Anti-Collision lights
- 4- Wing lights
- 5- Wheel Well lights

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### Section 06.- MASTER INSTRUCTOR DESK

#### 1.- Instructor cabin Section

Area designated for the instructor, composed of:

- 1- Exclusive section at the back of the cabin (interior)
- 2- Working table, superior cabinet and lighting
- 3- PC with minimal specifications established in section 09 PC's and SOFTWARE
- 4- Control and supervision of all simulation and induction operations
- 5- 19" LCD monitors for control and information display (2 units)
- 6- Printer for maneuvers graphics and procedures performed
- 7- Cabinet suite

#### 2.- Observer Section

Open section at the back of the cockpit, designated for the observer (jump seat), with a total vision of the Flight Deck and Visual

### Section 07.- SHELL (fuselage)

#### 1.- Structural steel system (cockpit & instructor station)

Structural system for the cockpit and instructor station, manufactured on a modular basis, metallic 1"x1/2" base, finished on electrostatic oven paint.

Outside shield made of fiber glass finished on smelted paint (diverse colors), folding plastic black sheets, SFT logo, tail number and flight training device model (in both sides of the cockpit) and easy front opening for maintenance.

#### 2.- Set Windows system & template glass (6 windows)

Set of window system, 6mm temperate glass, rubber for adjustment and screws for assembly (upon real B737NG aircraft dimensions)

#### 3.- Interior panel system (complete)

Cockpit interior cover through panels, simulating those of the B737 MAX 8 aircraft, manufactured on fiber glass on diverse colors, set of plastic sheets and screws for assembly

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### *Section 08.- EXTERNAL VISUAL SYSTEM*

#### 1.- Visual system

*Various visual system options, from large format LCD display to curved projection up to 210° x 45° viewable area*

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### Section 09.- PC's and SOFTWARE

#### 1.- Computer system (4 PC's)

Computer rack system integrated by 4 PC's with the following functions:

- a) Server PC, control Visual (PREPAR 3D), Networking and the software interface
- b) CAP PC , controls the PFD, ND, ECAM screen (upper) and MCDU from CAP , Networking and Overhead panel
- c) FO PC, controls the PFD, ND, ECAM screen (lower) and MCDU from FO, Networking and throttle console
- d) Instructor PC, controls the "Instructor station" (failure system control, meteorological conditions, position, fuel, flight freeze and control of main system) using Instructor software, LNAV system profile, Network connection to obtain real time weather conditions and update data bases for the ND, CDU's and instructor station. Sound generator software for acoustic sounds, even on alarms and diverse sound advices and total control of equipment by the instructor
- e) Software for remote technical control

\*\* In CAP and FO computers, important files will be backed up in case of failure

#### Minimum equipment specifications in ATS-B737 MAX 8:

##### 1. PC Server:

- Processor INTEL Quad-Core
- RAM Memory of 8 GB
- Video card of 4 Gb
- Hard Drive of 250 Gb Raid 1 (dual),
- Motherboard Ultra Durable
- Suitable cabinet and power source

##### 2. PC CAP, FO and Instructor:

- Processor INTEL Quad-Core
- RAM Memory of 4 GB
- Motherboard Ultra Durable
- Video Card of 2 Gb
- Hard disk of 250 Gb Raid 1 (dual)
- Suitable cabinet and power source

##### 3. Microsoft Windows 10

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### 2.- Systems Software

For the correct operation and management of the system, the following software is used:

- 1- FMGS PRO (Flight Management Guidance System) o similar emulator, logics and displays information for the PFD, ND and ECAM for CAP and FO (each computer has an independent professional user license)
- 2- FMGS PRO (Flight Management Guidance System) o similar, emulates and generates functions and capabilities of a MCDU
- 3- FMGS PRO (Flight Management Guidance System) o similar, emulates and generates functions and capabilities of a Flight Control Unit Panel (FCUP) synchronizing with aircraft systems
- 4- FMGS PRO (Flight Management Guidance System) o similar, emulates and generates functions and synchronizes FMGC of the FO with the CAP
- 5- FMGS PRO (Flight Management Guidance System) o similar, emulates and generates functions of the Overhead Panel
- 6- FMGS PRO (Flight Management Guidance System) o similar, emulates and generates functions if the instructor station
- 7- PREPAR 3D Professional visual generator and system motor integrator
- 8- Flight Simulator Universal Inter-Process Communication, software that allows synchronization between all installed software
- 9- Network Application Interface for FS software, which through Windows networking protocols, allows the interaction between installed applications and the 4 different PC`S
- 10- Software that configures and specifies the functions that should execute every module and component, as well as the interaction between them
- 11- Aerodynamic profile and general specifications for the simulated B737 MAX aircraft. This information is related to the Reference Data Report (RDR) of the real aircraft
- 12- Virtual Network Computing, allows the control of all applications installed on other computers from the instructor station, including the shut off and reset options
- 13- FMGS PRO (Flight Management Guidance System) o similar, emulates and generates all acoustic signs for alarms and notices
- 14- Software that presents NAV and VNAV flight profiles
- 15- Software that allows through Internet access data bases, real time meteorological information
- 16- Navdata (Navigraph) aeronautical navigation data base which is updated every 28 days, and installed in the MCDU, Glass Cockpit, Instructor's Station and QuickMap
- 17- Software base on the web that allows technical assistance by remote control on either of the equipment
- 18- Software PRO Instructor station, (fail system control, meteorological conditions, position, fuel, flight freeze and control of main system LNAV system profile, Network connection to update data bases for the ND, CDU's and instructor station, Sound generator software for acoustic sounds, even on alarms and diverse sound advices and total control of the equipment by the instructor