



*Please note that this document is only applicable to the Boeing 737-800 FAA ATD AATD simulator. For information regarding the Boeing 737-800 uncertified or Boeing 737 MAX FTD Level 5, please see the Volarent Boeing 737 FTD/UTD document.*

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## **1. Simulator Profile**

The Volarent Boeing 737-800 is a fully enclosed flight simulator with all panels, controls and systems fully functional. The simulator is delivered with coupled flight controls (control columns, yokes, rudder pedals) and a fully motorized throttle quadrant. The flight deck interior is highly detailed to replicate the real cockpit environment. Two real aircraft seats are included for the ultimate experience.

All Volarent Boeing 737-800 simulators are manufactured, built, and thoroughly tested by experienced engineers. When completed, the simulator is packaged and transported to the installation site with our team scheduled to perform final installation, configuration and testing together with the customer. This makes the entire process of setting up a simulator completely trouble-free for the customer while we take care of all aspects of the build from day one, and deliver a ready-to-fly fixed base flight simulator. On-site training is also provided and covers normal operating procedures and periodic maintenance.

Thanks to the intuitive user-friendly interface and our cutting-edge technologies, operating our simulators is hassle-free. This simulator has a developed communication protocol based on CANBUS. This reliable and industrial system is widely used in aviation, maritime, automotive and automation industries. Our devices are not toys or oversized game controllers but industrial-grade and robust machines, purpose-built to operate in extreme loads. Our hardware interface incorporates all drivers in only one single controller which guarantees perfect compatibility, incredible reliability records, robustness, and near-zero maintenance.

While other simulators might require multiple computers, complicated software configuration, and precise boot-up procedures, with Volarent all it takes to get the system ready for flight is 2 minutes and 3 switches. That being said, you can enjoy a flight whenever you have a free moment for it and do not have to worry about your business stability and downtimes but have your guests flying instead. We understand that in all business activities time is money and flight simulators are primarily required to fly. We use proprietary, purpose-designed control cards (PCB) with dedicated firmware/software – no generic in/out cards used as found elsewhere. This delivers full compatibility of parts/assemblies and high quality standards & control.



## **2. Key Features**

There are various key features that make the Volarent Boeing 737 stand out from any competitor products.

### **Key Simulator Features**

1. Highly realistic and fully working flight simulator
2. Best-on-the-market functionality with no non-functional parts fitted.
3. Cost-effective, low acquisition cost, and near zero maintenance time
4. Multiple configuration options (annunciators, instruments, modules)
5. Industrial-grade, heavy-duty components and materials
6. Unique Integrated Backlight technology
7. Reliable industrial communications system based on CANBUS
8. Software licenses included
9. 1 year included warranty for commercial use and free support
10. Immersive Visual System: 3xHD wraparound and seamless direct projection with a 220 degree Field of View

### **List of aircraft panels**

1. Front Panel (Main Instrument Panel)
2. Glareshield with Front Panel Background and Flood Lights
3. Mode Control Panel
4. Two independent Electronic Flight Instrument Panels
5. Systems Annunciator, Fire Warning and Master Caution switches
6. Forward Overhead Panel
7. Aft Overhead Panel
8. Two independent Control Display Units (CDU)
9. Fire Protection Panel with locking fire handles
10. Aft Electronic (Pedestal) Panel

All panels are properly backlit with dedicated controls to adjust intensity and aircraft power influences backlight (on/off) as per real aircraft. All panels are currently the most functional and the most accurate on the market.



### **List of flight controls**

1. Coupled Control Columns and Yokes
2. Coupled Rudder Pedals
3. Nose Wheel Steering Wheel
4. Throttle Quadrant with motorized:
  - Thrust levers
  - Speedbrake lever
  - Parking brake lever
  - Trim wheel
  - Trim indicators

### **Cockpit Structure and Interior:**

1. Robust, all-metal cockpit base platform assembly with elevated floor containing multiple access openings on all sides for easy maintenance and access.
2. Highly realistic cockpit interior parts and lining, "true cockpit environment"
3. Two airline seats (real, genuine Boeing 737 seats)

### **Other items and parts:**

1. Audio Surround System (110/230 V Compatible):
  - 5 speakers and subwoofers for environmental sounds
  - 2 speakers for aural warnings
2. Preconfigured control computers for avionics.

## **3. Technical Requirements**

- Single-phase 110-230; 50/60 Hz VAC mains
- 8.7 ft (2675 mm) x 6.9 ft (2115 mm) x 7.2 ft (2225 mm) space (W x L x H) – ex. Visual System
- 15.7 ft (4800 mm) x 10 ft (3050 mm) x 9 ft (2750 mm) space (W x L x H) – incl. Visual System



## **4. Computers and Software**

The system is delivered with a custom-built, preconfigured avionics computer to control hardware and display units (CHR/PFD/ND/EICAS/CDU).

A custom-built, preconfigured primary computer (called the Image Generator) is also available from Volarent (along with the professional Wraparound Seamless Visual System) and is highly recommended for guaranteed compatibility and performance. The image Generator software is Prepar3D™ by Lockheed Martin®. The Visual System and the Image Generator are optional items as well. Those parts are highly recommended for ultimate results, best performance/immersion, and guaranteed compatibility with the simulator hardware. It may also be a preferred solution for customers with little IT knowledge who want to avoid configuration and software maintenance.

Note that with the Visual System and the Image Generator, the flight simulator does not require any additional work (build or configuration) from the customer and is delivered as a ready-to-fly solution upon installation.

Otherwise, the Customer must provide a suitable computer in order to facilitate installation and integration with the Simulator. The computer must be ready for integration with Lockheed Martin® Prepar3D™ and FSUIPC software installed and configured before delivery.

### **Avionics Software**

Our primary area of specialization is hardware and electronics. Although all components are interfaced and capable of full functionality as per the real aircraft, the avionics software which simulates aircraft systems will determine final results.

Our Avionics software after years of development and close cooperation is ProSim737. Together with Volarent hardware ProSim737 provides the highest level of realism and functionality available on the market today. Not only is it intended for entertainment flight simulators but it is also utilized in numerous professional applications as well as aviation research and development. This defines the difference between ProSim737 and other software suites – it is designed particularly with professionals in mind, hence a more



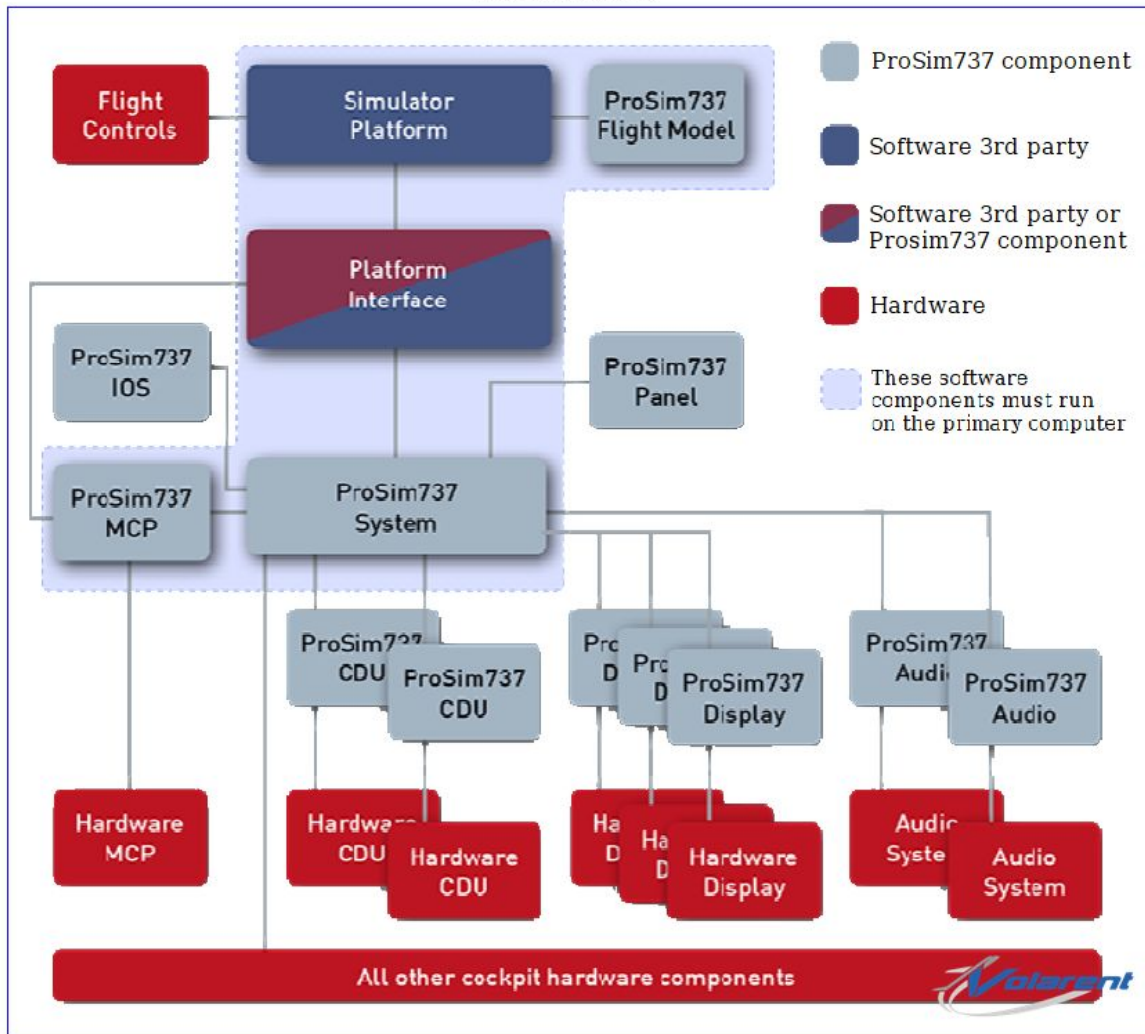
realistic and powerful tool than any other software available.  
Please note that ProSim737 is also a Boeing® Officially Licensed Product.

**Detailed description of ProSim737 system architecture (copyright to ProSim – AR).**

ProSim737 is a software company that produces the module software for enthusiasts and professional sim builders alike. The ProSim737 Suite consist of individual modules of which the ProSim737 System is the central component. The ProSim737 System and ProSim737 MCP modules interact with your Simulator Platform software (Microsoft® Flight Simulator™ 10, Lockheed Martin Prepar3D®) therefore, run on the primary computer. Distribution of all other modules is possible across multiple computers within your simulator configuration. To improve performance the suite architecture provides flexibility with regard to system load balancing, the number of monitor outputs, and cockpit environmental audio separation.



**ProSim737 Suite  
architecture:**



**ProSim737 Suite Modules brief summary**

The ProSim737 System is the multifunctional module that performs the following tasks:

- Performs as a central hub for all ProSim737 Suite modules.
- Manages the simulation of aircraft systems.
- Features a webserver for the Instructor Operating Station (IOS).
- Distributes audio and navigational data to relevant modules.
- Interacts with the back-end simulator platform.
- Manages geographical databases.
- Connectivity of cockpit hardware.
- Features a built in version manager for easy software updates.
- Extensive hardware and software debugging tools provided.



### **ProSim737 MCP:**

The ProSim737 MCP (Mode Control Panel) module contains the autoflight logic of the aircraft. The main purpose of this module is to calculate steering commands inputted by the MCP panel and Flight Instrumentation System (EFIS) panels in the cockpit. The steering commands are either fed directly to the aircraft (autopilot system) or sent as guidance information to the pilots through the Flight Director cues on the Primary Flight Displays.

### **ProSim737 Display:**

This system generates all graphical elements such as Primary Flight Display (PFD) and Navigation Display (ND) on the Main Instrument Panels (MIP) Display Units (DU). The ProSim737 Display module indicates functioning images on the Display Units in the cockpit. These sizeable images can be configured according to the preferred layout by drag and drop within minutes. Not only does the ProSim737 Display module support all cockpit displays, it also contains a number of realistic photographic standby instruments.

### **ProSim737 CDU:**

The ProSim737 CDU module simulates a Control Display Unit that comprises of a small display accompanied by a keypad used to interact with the Flight Management System (FMS). Each unit independently displays and controls data.

The ProSim737 CDU module does not include FMS logic, merely a device that communicates with the FMS contained in the ProSim737 System module. The module contains drivers to communicate directly with hardware CDU.

### **ProSim737 Audio:**

The ProSim737 Audio module is a network enabled audio player that is controlled by the ProSim737 System module. In connection with the ProSim737 Audio module, the ProSim737 System module contains a comprehensive list of sound files, in addition personalised sounds can be added and stored for playback. The ProSim737 Audio module provides selectable playback events related to radio and cockpit sounds that can be heard from either chosen device, headsets or cockpit speakers.





### **ProSim737 Flight Model:**

A unique flight model specifically developed for use with ProSim737. Based on true data, this model performs the most realistic behaviour of aircraft dynamics.

### **ProSim737 IOS:**

Designed for operator use, the Instructor Operating Station (IOS) allows normal and abnormal behavioural conditions within the simulation. ProSim737 IOS is a web based module that allows the user to create these conditions throughout the complete simulated flight.

Inclusive of these conditions, the IOS also features:

- Aircraft repositioning, visibility settings and pushback.
- Flight and performance parameters.
- Live position mapping including navigational data.
- Add and remove conditional failures.
- Extensive weather settings including real weather import and presets.
- Alter cargo, fuel and passenger quantities to adjust the weight and center of gravity.
- Pre flight route planning and storing capability in the FMS.
- Cockpit setup options and airliner specific preferences.

From a fixed position from behind the pilot's seats, the IOS can also run on any handheld device connected to the network.

### **Support**

Software configuration is provided on-site as part of simulator installation service. No additional calibration, configuration or adjustment is required from the Customer afterwards, besides periodic software updates.

In case of any interface (hardware and software integration) related issues, Volarent will provide free remote support at no extra charge and no support hours package required to be purchased by the customer.



## Avionics Software license

The Volarent Boeing 737-800 is delivered with the Avionics Software license for commercial use and with one year of updates. This license is included in the simulator price at no additional charge.

## 5. Flight Deck



### Front Panel (Main Instrument Panel)

The Main Instruments Panel is the centerpiece of the cockpit. It allows pilots to monitor multiple flight parameters & navigation data, control the Landing Gear, brakes, and other systems. Volarent delivers a fully functional unit with all annunciators, switches, gauges, ISFD, and RMI standby displays. We provide several customization options which include optional annunciators, different types of GPWS and Clock Panels as found on the real aircraft.

#### *Key features include:*

- 1:1 scale design – panels, knobs, hardware
- actual B738 fonts, accurate colors
- all-metal backplates and frame
- adjustable backlight (panels and gauges) – individual control for CPT/CTR and F/O sides - as per real aircraft; aircraft power influences backlight
- realistic annunciators with two levels of intensity (DIM/BRIGHT) as per real aircraft
- industrial-grade toggle switches with correct functionality and pull-to-switch (lever-lock) mechanism as per real aircraft



- all hardware interfaced – no fake parts (“mockup” / “realistic representation”)
- all mechanical gauges are included in the price, fully working and backlit; driven by a stepper motor (not servo or LED-based!) for superb accuracy and ultra smooth movement
- several customization options available on request

*Functionality and features overview:*

Nose Wheel Steering Panel

- switch interfaced and guarded

Clock Modules (Captain and First Officer)

- independent for two pilots
- all switches interfaced
- integrated color LCD display – 1:1 scale to the original unit
- two types available – unique feature of Volarent
- note that the bezel is not backlit and it is the same as per real aircraft

PFD/ND/EICAS Display Units and Selector Panels

- Primary Flight Display, Navigation Display and two EICAS (lower and upper) color LCD monitors installed with correct display area as per real aircraft
- displays' frames in scale and correct, realistic appearance
- all display units are dimmable and have switchable roles: PFD/ND/ENG/MFD; this is controlled with rotary display selector switches on Captain and First Officer panels and individually for each unit - all as per real aircraft

Engine Display and Autobrake Control Panel

- all switches and annunciators interfaced
- FUEL FLOW switch is locking-lever type
- N1 and SPD REF dual rotary switches, momentary and spring centered as per real aircraft included at no extra charge
- FLAPS POSITION mechanical gauge is included in the price, fully working, and backlit (not a fake /mockup /realistic representation part); gauge has two pointers

AFDS Panels (Captain and First Officer)

- independent for two pilots
- two-color (red/amber) indication for AP and AT, amber FMC light – as per real aircraft



- TEST switch interfaced with both positions functional

#### Landing Gear Lever and Brake Pressure gauge

- realistic replica of Landing Gear Lever with pull-to-switch mechanism and moving lock override “trigger”
- all annunciators interfaced
- BRAKE PRESSURE mechanical gauge is included in the price, fully working, and backlit (not a fake /mockup /realistic representation part); gauge has a colored faceplate

#### Standby Instruments

- default layout is Speed/Altimeter and RMI – two correctly-shaped bezels and functional display
- ISFD (ISIS) bezel and functional display available on request at no extra charge
- fully functional (display, all keys and rotary encoder), backlit module can be offered as an option (+ \$365)

#### Lower Panels

- Panels Brightness controls - individual control for CPT/CTR and F/O sides - as per real aircraft; aircraft power influences backlight! ▪ LED lighting controls: AFDS flood and glareshield background lights
- Ground Proximity (GPWS) Panel available with additional toggle switch for RAAS, as found on some B738s at no extra charge
- dual potentiometers to control WX Radar intensity on displays – unique to Volarent panel

#### Other items

- Light switch interfaced and fully functional: master lights test and setting two levels of intensity for all annunciators (DIM/BRIGHT) – as per real aircraft
- optional annunciators available: CABIN ALTITUDE, TAKEOFF CONFIG, FLAP LOAD RELIEF to match your favourite configuration

#### **Glareshield**

##### *Key features include:*

- realistic shape, robust design in fibreglass with built-in LED lighting
- Fire Warning switches (Captain and First Officer)
  
- Master Caution switches (Captain and First Officer)



- System Annunciators with recall function (Captain and First Officer)



### **Mode Control Panel (MCP)**

The Mode Control Panel is one of the most essential modules in the cockpit and allows autoflight management – selecting autopilot modes, commanding desired altitudes, speeds, and headings. Volarent delivers a fully working unit with all annunciators, switches, and displays.

#### *Key features include:*

- 1:1 scale design – panel, knobs, hardware
- actual B738 fonts, accurate color
- all-metal backplate and framework
- adjustable backlight (panel and displays) – controlled with a knob located on the Captain's Lower Main Instruments Panel - as per real aircraft; aircraft power influences backlight!
- F/D MA and mode status lights ('checkerboards') feature two levels of intensity (DIM/BRIGHT) as per real aircraft
- industrial-grade toggle switches with correct functionality
- mode pushbutton switches with accurate look and feel (tactile “click” and accurate travel)
- tactile (hard “click”) mil-grade encoders, high-speed capability; encoders do not miss inputs when rotated fast!
- accurately-shaped knobs
- solenoid toggle switch for A/T (automatically released to OFF position) as per real aircraft
- C/O, SPD INTV, ALT INTV switches interfaced



- functional Bank Angle selector
- Autopilot Disengage Bar
- Light sensor for realistic look (no actual functionality in the simulator)

*Important notice:*

Volarent does not use the ordinary 7 segment LED displays. All displays have been custom made to match the real design in terms of font type, size, and color as well as the special signs for under and overspeed on the IAS/MACH display and the „+” sign on the V/S display – everything as per the real thing. This functionality is not possible with the standard 7 segment displays. Displays are dimmable with panel's backlight as per real aircraft.

### **Electronic Flight Instrument System Control Panels (Captain & First Officer)**

EFIS Control Panels allow management of navigation data provided on the Display Units. Pilots can select/deselect data to be displayed, adjust the range of display or change display mode. Volarent delivers fully working units as per real aircraft.

*Key features include:*

- 1:1 scale design – panel, knobs, hardware
- actual B738 fonts, accurate color
- all-metal backplate and framework
- adjustable backlight (panel and keys) – controlled with a knob located on the Captain's Lower Main Instruments Panel - as per real aircraft; aircraft power influences backlight!
- all switches interfaced
- MINS and BARO rotary switches, momentary and spring-centered included at no extra charge; RST/STD pushbutton switches functional
- concentric MINS and BARO selectors
- concentric MODE and RANGE selectors with CTR / TFC pushbutton switches functional
- tactile, backlit push button switches





### Control Display Units (CDU)

The CDU (also called FMC or FMS), is the brain of the aircraft. It holds navigation database and computes aircraft's performance, route and fuel based on pilot's input. Two units are found in an airplane – each individual for every pilot. Volarent delivers fully working units with all annunciators, switches and dimmable displays.

#### *Key features include:*

- 1:1 scale design – panel, display, knob, keys, hardware



- actual B738 fonts, accurate colors
- all-metal design, CNC machined in one metal block for ultimate experience, look and feel
- accurate shape
- adjustable keys' backlight - aircraft power influences backlight!
- dimmable color LCD display – dimming via the BRT knob as per real aircraft
- all Lines Select, Function, Alphanumeric and EXEC keys are tactile and backlit
- all lights functional: FAIL, MSG, OFFST, CALL, EXEC
- movable handle



### Forward Overhead Panel

The Forward Overhead is one of the most interactive panels in the whole cockpit, which allows management of the most essential aircraft systems. Volarent delivers a fully working unit with all annunciators, switches and gauges.

*Key features include:*



- 1:1 scale design – panels, knobs, hardware
- actual B738 fonts, accurate colors
- all-metal backplates and hinged frame
- adjustable backlight (panels and gauges) as per real aircraft (aircraft power influences backlight!)
- realistic annunciators with two levels of intensity (DIM/BRIGHT) as per real aircraft
- realistic blue-legend annunciators with 2-state indication feature
- industrial-grade toggle switches with correct functionality and pull-to-switch (lever-lock) mechanism as per real aircraft
- all hardware interfaced – no fake parts (“mockup” / “realistic representation”)
- all mechanical gauges are included in the price, fully working and backlit; driven by a stepper motor (not servo or LED-based!) for superb accuracy and ultra smooth movement

*Functionality and features overview:*

**Fuel Control Panel**

- Fuel Crossfeed switch is a correct 90-degrees rotary selector
- Fuel Temperature mechanical gauge is included in the price, fully working, and backlit (not a fake /mockup /realistic representation part)
- all switches and annunciators interfaced, 2-state blue annunciators included
- switches where applicable are locking-lever type

**Navigation and Displays Panel**

- all switches interfaced
- switches where applicable are locking-lever type

**Flight Control Panel**

- all switches and annunciators interfaced
- solenoid toggle switch for Yaw Damper (automatically released to OFF position) as per real aircraft – included at no extra charge

**Ground Power Panel and Bus Switching Panel**

- EGT (APU) mechanical gauge is included in the price, fully working, and backlit (not a fake /mockup /realistic representation part)
- all switches and annunciators interfaced, blue annunciators included
- switches where applicable are locking-lever type



#### Generator Drive and Standby Power Panel

- all switches and annunciators interfaced
- DRIVE switches are ON-MOM type – as per real aircraft

#### AC and DC Metering Panel

- all switches and annunciators interfaced
- functional AC AMPS / AC VOLTS / DC AMPS / DC VOLTS / CPS FREQ green displays

#### Cabin Altitude Panel

- ALT HORN CUTOFF switch interfaced
- CABIN ALTITUDE/DIFFERENTIAL PRESSURE mechanical gauge is included in the price, fully working, and backlit (not a fake/mockup/realistic representation part); gauge has two pointers, a colored “3D” faceplate and accurately-shaped bezel as per real aircraft
- CABIN CLIMB mechanical gauge is included in the price, fully working, and backlit (not a fake /mockup /realistic representation part); gauge has an accurately-shaped bezel as per real aircraft

#### Cockpit voice recorder

- TEST switch and STATUS light interfaced
- realistic replica of a microphone (no actual functionality in the simulator)

#### Door Annunciator Panel

- all annunciators interfaced

#### Hydraulic Panel

- all switches interfaced
- switches where applicable are locking-lever type

#### Wing and Engine Anti-Ice Panel

- all switches and annunciators interfaced, 2-state blue annunciators included
- switches where applicable are locking-lever type
- solenoid toggle switch for Wing Anti-Ice (automatically released to OFF position) as per real aircraft – included at no extra charge



#### Window and Probe Heat Panel

- all switches and annunciators interfaced

#### Cabin Pressurization Panel

- realistic fonts and display windows' shape
- all switches, encoders and LAND ALT / FLT ALT displays interfaced
- OUTFLOW VALVE mechanical gauge is included in the price and fully working (not a fake /mockup /realistic representation part)

#### Bleed Air Controls and Indicators

- all switches and annunciators interfaced, 2-state blue annunciators included
- DUCT PRESSURE mechanical gauge is included in the price, fully working, and backlit (not a fake /mockup /realistic representation part); gauge has two pointers, a colored "3D" faceplate and accurately-shaped bezel as per real aircraft

#### Air Conditioning Panel

- all switches and annunciators interfaced (temperature control knobs have no actual functionality in the simulator)
- TEMP mechanical gauge is included in the price, fully working, and backlit (not a fake /mockup /realistic representation part)

#### Voice Recorder Panel

- VOICE RECORDER switch interfaced (no actual functionality in the simulator)

#### Emergency Lighting, Passenger Signs, Equipment Cooling Panel

- all switches and annunciators interfaced; blue CALL annunciator included
- PANEL and CIRCUIT BREAKER dimming knobs interfaced; PANEL knob controls backlight of Forward and Aft Overhead Panels – as per real aircraft

#### Exterior Lights & Engines Start Panel

- all switches interfaced
- solenoid engines start switches (push-to-switch type with actual travel, automatically released to GND position) – included at no extra charge
- realistic T-shaped two and three position LANDING LIGHTS toggle switches included





### **Aft Overhead Panel**

The Aft Overhead Panel allows management of navigation, warning, recording, emergency, and indication systems. Volarent delivers a fully functional unit with all annunciators, switches, and gauges. This also applies to the IRS Display Panel.

#### *Key features include:*

- 1:1 scale design – panels, knobs, hardware
- actual B738 fonts, accurate colors
- all-metal backplates and hinged frame
- adjustable backlight (panels and gauge) as per real aircraft (aircraft power influences backlight!)
- realistic annunciators with two levels of intensity (DIM/BRIGHT) as per real aircraft
- industrial-grade toggle switches with correct functionality and pull-to-switch (lever-lock) mechanism where applicable as per real aircraft
- all hardware interfaced – no fake parts (“mockup” / “realistic representation”)

#### Leading Edge Devices Annunciator Panel

- LE DEVICES and SLATS annunciator is colored and fully working
- TEST switch interfaced



Emergency Locator Transmitter Panel ▪ Emergency Locator Transmitter switch and annunciator interfaced

IRS Mode Selector Unit

- all switches and annunciators interfaced

IRS Display Unit

- all switches, annunciators and displays interfaced
- IRS display fully functional with accurate shape of N/S/W/E designators for latitude and longitude and even decimal dots above and below the displays – as per real aircraft; this feature is unique to Volarent and not available elsewhere
- working and backlit IRS keys with functional CUE lights: ENT and CLR – as per real aircraft; this feature is unique to Volarent and not available elsewhere

IRS Mode Selector Unit

- all switches and annunciators interfaced

Oxygen Panel

- PASS OXYGEN switch interfaced
- OXYGEN PRESSURE mechanical gauge is included in the price, fully working and backlit; driven by a stepper motor (not servo or LEDbased, not a fake /mockup /realistic representation part)

Engine Panel

- all switches and annunciators interfaced
- guarded EEC buttons

Audio Control Panel

- this panel has no actual functionality in the simulator hence interfacing is limited to some MIC selectors and RX switches

Other items

- Flight Recorder switch and annunciator interfaced
- Mach/Airspeed Warning switches interfaced
- Stall Warning Test switches interfaced



**Boeing 737-800 AATD Technical Specifications Document**

Created *September 2018* Revision 2.7 Last Updated *June 2019*

- Service Interphone and Dome White switches interfaced
- PSEU and LANDING GEAR annunciators interface



### Aft Electronic (Pedestal) Panel

The Aft Electronic (Pedestal) Panel located between pilots' seats is mostly used to handle communications and manage navigation systems. It also houses fire protection controls and several other panels responsible for various systems. Volarent delivers a fully working unit with coupled Captain and First Officer modules with all annunciators, switches, displays and gauges.



*Key features include:*

- 1:1 scale design – panels, knobs, hardware
- actual B738 fonts, accurate colors
- all-metal backplates and framework
- adjustable backlight (panels and displays) as per real aircraft (aircraft power influences backlight!)
- realistic annunciators with two levels of intensity (DIM/BRIGHT) as per real aircraft
- all hardware interfaced – no fake parts (“mockup” / “realistic representation”)

*Functionality and features overview:*

Radio Tuning Panel (Captain and First Officer)

- individual, independent units for both pilots
- multichannel module as found on latest B738s – included at no extra charge
- all switches and indicators interfaced
- mil-grade, dual-shaft, concentric encoder for frequency selection
- all keys backlit and dimmable with panel's backlight
- custom-made accurate, dimmable LCD displays – not ordinary 7 segment LED displays – read the notice at the end of this section

VHF Navigation Control Panel (Captain and First Officer)

- individual, independent units for both pilots
- all switches interfaced
- mil-grade, dual-shaft, concentric encoder for frequency selection
- TFR key backlit and dimmable with panel's backlight
- custom-made accurate, dimmable LCD displays – not ordinary 7 segment LED displays – read the notice at the end of this section

ADF Control Panel (single module, dual channel)

- individual, independent control of ADF1 and ADF2 receivers
- all switches interfaced
- custom triple-shaft, concentric encoder for frequency selection – as per real aircraft; this is unique to Volarent panel
- TFR key backlit and dimmable with panel's backlight



- custom-made accurate, dimmable LCD displays – not ordinary 7 segment LED displays – read the notice at the end of this section

#### Cargo Fire Panel

- all switches and annunciators interfaced
- genuine solution for Extinguisher Arming pushbutton switches (mechanical shutter on the legend) – as per real aircraft; this is unique to Volarent panel
- guarded DISCH pushbutton switch

#### Weather Radar Panel

- all switches interfaced
- TILT toggle switch is a locking type

#### Transponder Panel

- all switches interfaced
- mode selector switch with momentary TEST position – as per real aircraft
- dual-shaft, concentric switches for squawk code selection – not ordinary encoders but tactile rotary selectors! This is as per real aircraft.
- custom-made accurate, dimmable LCD display – not ordinary 7 segment LED displays – read the notice at the end of this section

#### Rudder and Aileron Trim Control Panel

- all switches interfaced
- mechanical Rudder Trim Indicator gauge included in the price, fully working and backlit; OFF flag indication simulated if not powered!

#### Light Control Panel

- PANEL and FLOOD dimming knobs interfaced; FLOOD Light is not installed

#### Flight Deck Door Panel

- all switches and indicators interfaced

Audio Control Panel (Captain and First Officer) – optional 550 EUR/pc.

- all switches and indicators interfaced



- individual, independent units for both pilots
- enhanced module with RX status lights and SELCAL functionality - as found on latest B738s
- backlit RX potentiometers with push-push switch mechanism – as per real aircraft
- note that this module is of little use in the simulator, it is not fitted; however it is available as an optional item should required

#### Fire Protection Panel



- all switches and annunciators interfaced (including BELL CUTOUT)
- switches where applicable are locking-lever type
- dimmable panel controlled together with Aft Electronic (Pedestal)
- highly realistic, robust Fire Handles with accurate travel, tactile feel, locking-in-position and electrically locked to protect accidental activation with manual unlock functionality; all as per real aircraft – most advanced design on the market

#### *Important notice:*

Volarent does not use the ordinary 7 segment LED displays. All displays were custom made to match the real design in terms of font type, size, and color as well as the special signs on the radio frequency displays - everything as per the real thing. This functionality is not achievable with the ordinary 7 segment displays! Displays are dimmable with panel's backlight as per real aircraft.



## Flight Controls

The flight controls are essential in manual flight to control airplane's position spatially. This includes elevator (pitch control) and aileron (roll control) as well as rudder (yaw control). Flight controls is what really allows you to feel that “you have controls” and you are flying this “heavy metal”.

On a B738 Flight Controls consist of the following items:

- coupled Control Columns and Yokes – for both pilots
- coupled Rudder Pedals – for both pilots
- Nose Wheel Steering Wheel - Captain side only

*Key features include (Control Columns and Yokes):*

- all-metal design for guaranteed robustness and “heavy-metal” feel
  - scale design to provide very realistic look
  - powder-coated industrial finishing
  - all switches interfaced
  - realistic clipboard with checklists and yellow reminder
- 
- linked, cooperating units – both elevator and aileron



- passive (static) loading based on springs and gas dampers; average in-flight forces are reproduced
- Sophisticated electric Active Controls Loading System available for professional applications. Please consult our sales department for more information.

*Key features include (Rudder Pedals):*

- all-metal design for guaranteed robustness and “heavy-metal” feel
- scale design to provide very realistic look
- powder-coated industrial finishing
- linked, cooperating units
- passive (static) loading based on springs and gas dampers; average in-flight forces are reproduced
- functional toe-brakes for both pilots • mechanical adjuster as per real aircraft available (optional)

*Key features include (Nose Wheel Steering Wheel):*

- all-metal mechanism for guaranteed robustness
- casted steering wheel with industrial paint finishing
- tactile feel



### **Throttle Quadrant**

The Throttle Quadrant provides control over engines' thrust, flaps position, speedbrake, and parking brake as well as fuel levers and stabilizer trim. Volarent provides a fully motorized unit at no extra charge.

#### *Key features include:*

- metal design for guaranteed robustness and “heavy-metal” feel
- scale design and backlit to provide very realistic look
- all switches and PARK BRAKE light interfaced
- motorized:
  - thrust levers (autothrottle commands move levers in autoflight)
  - speedbrake lever (auto deploys on touchdown)
  - parking brake lever
  - trim wheels
  - trim indicators



### **Flight Deck Interior & Pilots Seat**

Although the aircraft systems, flight controls, control panels, and other parts make up the immersion and overall flight experience, the reproduction level of the flight deck interior is equally important. Volarent delivers a highly realistic cockpit structure with





robust fibreglass liners in industrial finishing. This provides ultimate immersion and really makes you feel like you were sitting in an actual cockpit – a place normally reserved for FFS simulators only.

*Key features include:*

- metal main structure for guaranteed robustness
- hi-quality fibreglass liners
- highly realistic outer shell – aircraft nose look-alike • scale design with outstanding level of replicated details – as per real aircraft
- accurately-shaped windows provide same-as-real out the window view
- perfectly compatible with other cockpit parts
- real aircraft pilots seats! For ultimate look, feel, comfort and functionality, OEM (real) aircraft seats are employed. These are aftermarket parts removed from a retired airplane. All seats are always carefully selected, thoroughly tested and free of any damage.

## **6. Simulated Systems**

Systems simulated by the Volarent software suite include:

- Air System – Air conditioning and pressurisation
- Anti-ice, Rain
- Automatic Flight
- Communications
- Electrical
- Engines, APU
- Fire Protection
- Flight Controls
- Flight Instruments, Displays
- Flight Management, Navigation
- Fuel
- Hydraulics
- Landing Gear
- Warning Systems



## **7. Visual System and Image Generator**

The Visual System is one of the most important elements in every flight simulator. Perfectly blended, undistorted, HD image, wraparound the simulator provides you with the true immersion and correct visual cues.

### *Key features:*

- 3xHD Wraparound Direct Projection System
- 220° Field of View (widest on the market!) – all windows covered, no image edges visible from pilot's eyepoint = true immersion
- System resolution 5760 x 1080 pixels
- Professional seamless projection screen
- Same as on certified flight training flight simulators
- Warping software with configuration included for undistorted, geometrically correct and naturally looking image
- Robust and stable all-metal framework
- On-site installation by a qualified Volarent team: performed at the same time as the simulator results in no additional costs for labour or travel expenses

Visual System includes:

#### 1) System design:

- Screen design and hardware selection
- Consultation service + feasibility study basing on actual conditions on-site

#### 2) Hardware:

- Three High Definition (1920 x 1080 pixels) ST projectors; total system resolution of 5760 x 1080 pixels

#### 3) Adjustable ceiling mounting system

4) Warping software package. Warping software provides undistorted, seamless and geometrically correct image on wraparound (curved) screens.





5) Curved, seamless, professional projection screen with 1.0 gain. 220 Field of View (widest on the market!): all windows covered, no image edges visible from pilot's eyepoint = true immersion.

6) On-site installation (if performed together with the simulator).

Single Channel Image Generator includes:

1) Hardware:

- Custom built, high-performance i7 computer unit
- LCD monitor for easy system management
- Networking hardware

2) On-site installation and configuration of Visual System warping software.

### **Summary**

A complete flight simulation system consists of the B738 Base, Visual System, and Image Generator as a turnkey solution and does not require any additional work (build or configuration) from the customer. In other words it is a ready-to-fly solution: delivered, assembled, configured, and tested on-site. This solution is highly recommended for the best performance, immersion, and guaranteed compatibility of all hardware and software. It may also be a preferred solution for customers with little IT knowledge who want to avoid hardware selection, software installation, and configuration.

Please note that proper tools, knowledge, and experience are essential to achieve a seamless and geometrically correct image on a wraparound screen. Volarent gives you a choice to build your own system or buy a compatible, proprietary solution for your flight simulator. While it is definitely possible to develop your own solution with reasonable results - after a certain number of attempts and time and money employed, it is never easy if you have not done it before. For this reason, Volarent offers the bundle of the visual system, image generator, and base simulator including staff training, installation, delivery, and warranty.



## **8. Installation and shipping conditions**

### **Production**

The typical production time is approximately 2 months from the order (deposit) to completion. After acceptance the simulator will be prepared for shipping (packaging, customs clearance, dispatch) within 10 business days. Delivery and on-site installation dates will be coordinated and agreed with the customer at the time of shipping.

### **Shipping**

The Volarent Boeing 737 system can be shipped in parts or intact. This determines the available shipping methods (ground / air / sea) and costs. Shipping and packaging costs are calculated individually based on the customer's location and will be added to the price accordingly. Shipping is usually made DAP or CPT depending on the carrier and customer's preferences as to delivery place (to door / to port).

Volarent will offer the most affordable freight cost using its own agreements and special rates with numerous shipping companies worldwide. Customers can also arrange shipping with delivery terms EXW and at their own responsibility.

### **On-site installation and testing**

The Volarent Boeing 737 system requires qualified Volarent staff on-site to perform full assembly, installation, configuration of all systems, and testing. Typical staff dispatched are a two-man team. Typical installation time varies between 4-7 business days for intact / in-parts shipment accordingly.

### **Warranty and support**

The Volarent Boeing 737 system is delivered with a 12-month warranty on all parts and components (projectors' lamps in the Visual System are covered for 6 months). We offer warranty extension up to 24 months at an extra charge. This shall be discussed with the sales department and agreed not later than at the time of installation and acceptance.

Remote support is provided free of charge and is not limited to an amount of hours. Note that Volarent does not require any support hours package to be purchased



additionally or at extra expense. Our after-sale service and quality of support is one of our hallmarks and we always answer the phone going far beyond expectations.

## **Payment**

A deposit is required to confirm the order and secure production and delivery slots. The typical figure is 50% of the order value. This balance is due prior to shipping, usually after completion of the build and acceptance at Volarent's facility.

The sales Contract will be provided accordingly and signed upon acceptance of the offer, in order to confirm all specifications and secure all rights, responsibilities, and conditions set out in this document.

## **Optional items**

Our philosophy has always been to deliver a fully-functional realistic flight simulator with all the "bells and whistles". To this end, all panels & controls, by definition, are delivered without fake ("mockup" / "realistic representation") components such as levers, displays, switches, indicators, or gauges. An extensive package of associated services, reliable and dedicated customer support as well as unrivalled warranty conditions are also provided for your experience.

## **9. Final Summary**

Volarent has a passionate team, heavily focused on minute details, high realism and accuracy. We always strive to deliver top-notch quality and the best possible experience with every flight simulator. We value our customers and listen to their feedback, constantly improving our products and services.

Not every B737 simulator on the market today looks, feels, or works exactly the same or like the actual airplane. Budgetary and technical concerns often force manufacturers to employ low-cost solutions, further deviating from the B738's original design. With Volarent, robust, hi-tech, accurate, and professional flight simulators are now affordable both for aviation enthusiasts and small business. The power of realistic immersive simulation is no longer reserved exclusively for airlines.



## **Boeing 737-800 AATD Technical Specifications Document**

**Created September 2018 Revision 2.7 Last Updated June 2019**

We strongly believe in the quality, realism, and ability of our products to accurately and effectively recreate flight. Our systems are eligible to receive certifications for the FAA AATD and FTD Level 5, and also EASA equivalents.