Please note that this document is only applicable to the ERJ-145 Aviation Training Device (ATD) Basic Aviation Training Device (BATD) professional basic procedural-trainer simulator. For information regarding the ERJ-145 AATD, FTD Level 5, FTD Level 6, or uncertified, please see the appropriate Volarent training document. (VT-E145-CO-BP).

Contents:

1. Simulator Profile

The Embraer ERJ family (or Embraer Regional Jet) is a series of twin-engine regional jet aircraft produced by Embraer, a Brazilian aerospace company. The ERJ-145 was designed for a new market for regional jet aircraft, where increased speed, comfort and passenger appeal outweighs the inherent fuel economy of the turboprop aircraft which were in service and in development. The largest member of the family, the ERJ-145 provides the versatility to build a regional network and right-size capacity. The aircraft has over 20 years in operation, over 26 million flight hours, and is in service with 36 airlines in 26 countries. Over a lifetime of experience, the ERJ-145 has become a proven runway legend.

The Volarent E-145 Commercial Basic Procedural Trainer (VT-E145-CO-BP) is the FAA Aviation Training Device (ATD) Basic Aviation Training Device (BATD) edition of the ERJ-145 build from Volarent Aerospace. The purpose of this aircraft is for training airline pilots on basic procedures and familiarizing them with the aircraft while in-flight, on arrival, and departure. The features included in the ERJ-145 exceed the requirements set by FAA BATD, and make it among the most capable BATD trainers in the industry for airlines and professional clients. The target for this product is airlines or charter services requiring a basic simulator to practice basic procedures and cockpit familiarization.

To view a list of all requirements and details listed in Parts 61/141 of the FAA Code of Federal Regulations, visit http://www.volarent.aero/ecfr.html.

2. Key Features

The Volarent E145 Commercial Basic Procedural Trainer (VT-E145-CO-BP) contains the following features as an accurate simulator replica.

The navigational simulation is a copy of that of a real ERJ-145 with functional nav data and jeppesen charts available for the local country of the client. The E-145 commercial basic procedural trainer provides an adequate training platform and design for both procedural and operational performance tasks specific to the ground and flight training requirements for PPC training and instrument ratings per Title 14 of the FAA Code of Federal Regulations.

**Please note that Part 141 certified flight schools & pilot training centers must obtain a specific authorization for the use of the BATD as part of that pilot school's approved training course outline (TCO). This authorization must come from the FAA Flight Standards District Office (FSDO) assigned to that pilot school.*

The E-145 simulator physical flight and associated control systems are recognizable as to their function and how they will be manipulated solely from their appearance. These physical flight control systems do not use interfaces such as keyboards, but all are actual components to the simulator.

Virtual controls exist within the simulator for aspects including aircraft configuration, location, weather conditions, training device pause functionality, and otherwise programmed effects in the instructor station computer system.

The pilot is able to operate the controls in the same manner as it would be in the actual ERJ-145 aircraft. These functions include landing gear, wing flaps, cowl flaps, carburetor heat, mixture, propeller, and throttle controls appropriate to the ERJ-145. The physical arrangements, appearance, operation of controls, instruments, and switches closely model the ERJ-145.

The simulator contains the appearance, arrangement, operation, and function of realistically placed physical switches and other required controls representative of the ERJ-145 instrument panel including but not limited to the:

- Master/battery
- Magnetos for each engine (2)
- Alternators or generators for each engine (2)
- Auxiliary power unit (APU)
- Fuel boost pumps/prime boost pumps for each engine (2)
- Avionics master
- Pitot heat
- Rotating beacon/strobe, navigation, taxi, and landing lights.

The simulator also contains a self-centering displacement yoke that allows continuous adjustment of pitch and bank. The self-centering rudder pedals allow continuous adjustment of yaw and corresponding reaction in both heading and roll. The throttle and power controls that allow continuous movement from idle to full-power settings and corresponding changes in pitch and yaw are also represented in this system.

Controls for the following items are represented in this simulator including but not limited to the:

- Wing flaps
- Pitch trim
- Communication and navigation radios
- Clock
- Gear handle
- Transponder

- Altimeter
- Carburetor heat
- Cowl flaps

The time from control input to recognizable and applicable systems response is without delay or lag in any way.

3. Technical Specifications & Requirements

The Volarent E145 Commercial Basic Procedural Trainer (VT-E145-CO-BP) contains a transponder that displays the current transponder code and a fuel quantity indicator that displays the fuel remaining in accordance with the standard or equipment selected by the client.

All instrument displays listed in the Code of Federal Regulations according to FAA BATD are visible during all flight operations. The only exceptions are multifunctional electronic displays that may not display all instruments simultaneously depending on the mode of flight or procedure in progress.

All of the displays included provide an image of the instrument that is clear and does not appear out of focus or illegible. There is also no lag, “jump”, or “step” during operation. No distracting jagged lines, edges, or lag relative to the action and use of the flight controls can be observed in the E-145 trainer either. Control inputs are reflected by the flight instruments in real time and without any delay in action while display updates show all changes (within the total range of the replicated instruments according to the Code of Federal Regulations) that are equal to or greater than the values stated below:

- Airspeed indicator: change of 5 knots
- Attitude indicator: change of 2 degrees in pitch and bank
- Altimeter: change of 10 feet
- Turn and bank: change of ¼ standard rate turn
- Heading indicator: change of 2 degrees
- VSI: change of 100 fpm
- Tachometer: change of 25 rpm or 2 percent of turbine speed
- VOR/ILS: change of 1 degree for VOR or ¼ of 1 degree for ILS
- ADF: change of 2 degrees
- GPS: change as appropriate for the model of GPS-based navigator represented as requested by the client to fit exact specifications
- Clock: change of 1 second

The E-145 displays reflect the dynamic behavior of the ERJ-145 (e.g. a VSI reading of 500 fpm would be reflected as a corresponding movement in altitude, and an increase in power would be reflected as an increase in the RPM indication or power indicator).

The flight dynamics of the ERJ-145 Basic Procedural Trainer are comparable to the way the represented ERJ-145 aircraft performs and handles. Aircraft performance parameters (such as maximum speed, cruise speed, stall speed, maximum climb rate, and hovering/sideward/foward/rearward flight) is comparable to the ERJ-145 configuration.

The aircraft vertical lift component changes as a function of bank comparable to the way the ERJ-145 performs and handles.

Changes in flap setting, slat setting, gear position, collective control, or cyclic control must be accompanied by changes in flight dynamics comparable to the way the M/M of the ERJ-145 performs and handles.

The presence and intensity of wind and turbulence is also reflected in the handling and performance qualities of the ERJ-145 and is comparable to the way the ERJ-145 performs and handles each given scenario or meteorological event.

The instructor is able to pause the simulation at any time from the instructor station for the purpose of administering instruction or procedural recommendations. If a training session begins with the aircraft in mid-flight and ready for the performance of a particular procedural task, the instructor is able to manipulate (including but not limited to) the following system parameters independently of the simulation:

- Aircraft geographic location
- Aircraft heading
- Aircraft airspeed
- Aircraft altitude
- Wind direction, speed, and turbulence
- Meteorology

The simulator is capable of recording both a horizontal and vertical track of aircraft movement during the entire training session for later playback and review. The instructor is also able to disable any of the instruments prior to or during a training session while still being able to simulate failures of any of the instruments without stopping or freezing the simulation in order to affect the failure. This includes simulated engine failures and including but not limited to the following aircraft failures:

- Alternator or generator
- Vacuum
- Pressure pumps
- Pitot static
- Electronic flight displays
- Landing gear
- Flaps

The simulator also has a navigational area database that is able to be customized to the local area of the client training facility in order to allow reinforcement of procedures learned during actual flight in the area. All navigational data is based on procedures as published per 14 CFR part 97.

4. Computers and Software

The Volarent E145 Commercial Basic Procedural Trainer (VT-E145-CO-BP) contains all software, drivers, servers, and required processing power to competently and efficiently run the system. In addition to inclusion of an instructor station with monitoring software for flight instructor usage, the simulator is also able to be modified after-market by the client. Generally, the customer is able to request their preferences for install prior to delivery if they so wish. Software options of both Prepar3D and X-Plane 11 are also available with no difference in final system price or maintenance restrictions. Integration with third party applications such as ForeFlight, X-Mapper, and FltPlan are also available as options for the client.

5. Flight Deck Layout

The Volarent E145 Commercial Basic Procedural Trainer (VT-E145-CO-BP) flight deck will be laid out to be including the main panels, overhead controls, and primary modules for flight. All necessary components as described in the Electronic Code of Federal Regulations Part 61.1-429 and Part 141.1-95 will be physical and represented in the flight deck to fit within the constraints pertaining to the Basic Aviation Training Device (BATD). Any additional components that are either non-essential, non-functional, or not represented as necessary in Part 61 or 141 of the FAA Electronic Code of Federal Regulations will be represented either in software or a monitor/screen showing the components.

6. Simulated Instruments, Indicators & Visual System

If you need a full summary of the AHRS, TCAS, and GPWS systems, audio alerts, and general information you can watch a full explanation here: www.youtube.com/watch?v=WJyo3lRZ3mw

The Volarent E145 Commercial Basic Procedural Trainer (VT-E145-CO-BP) contains the following instruments and indicators which are replicated and properly located as appropriate to the ERJ-145.

1. Flight instruments in a standard configuration representing the traditional round dial flight instruments or an electronic primary flight display (PFD) with reversionary and backup flight instruments depending on the exact navigational requirements of the client
2. A sensitive altimeter with incremental markings each 20 feet or less, operable throughout the normal operating range of the M/M of the ERJ-145.
3. A magnetic direction indicator
4. A heading indicator with incremental markings each 5 degrees or less, displayed on a 360 degree circle and arc segments of less than 360 degrees as applicable based on exact navigational and equipment requirements presented by the client
5. An airspeed indicator with incremental markings as shown for the M/M of the ERJ-145; airspeed markings of less than 20 knots generally are not displayed
6. A vertical speed indicator (VSI) with incremental markings each 100 feet per minute (FPM) for both climb and descent. For the first 1,000 fpm of climb and descent, and at each 500 fpm climb and descent for the remainder of a minimum +2,000 fpm total display or as applicable to exact navigational or equipment requirements given by the client.
7. A gyroscopic rate-of-turn indicator with appropriate markings for a rate of 3 degrees per second turn for left/right directions.
8. A slip and skid indicator with coordination information will be displayed in the conventional inclinometer format where a coordinated condition is indicated with the ball in the center position. A split image triangle indication can also be installed if the client's specific navigational/equipment requirements permit it (ex. PFD configurations).
9. An attitude indicator with incremental markings each 5 degrees of pitch or less, from 20 degree pitch up to 40 degree pitch down.
10. Engine instruments are included according to the ERJ-145
11. A suction gauge or instrument pressure gauge depending on configuration choosen by client with a display applicable to the aircraft represented.

12. A flap setting indicator that displays the current flap setting. Setting indications are that found in the ERJ-145.
13. A pitch trim indicator with a display that shows zero trim and appropriate indices of airplane nose down and airplane nose up trim as found in the ERJ-145.
14. Communication radios with a full range of selectable frequencies displaying the radio frequency in use.
15. Navigation radios with a full range of selectable frequencies displaying the frequency in use and capable of replicating both precision and non-precision instruments, including approach procedures (each with an aural identification feature), and a marker beacon receiver . (For example, an instrument landing system (ILS0, non-directional radio beacon (NDB), Global Positioning System (GPS), Localizer (LOC) or very high frequency omni-directional range (VOR). Graduated markings as indicated below are present on each course deviation indicator (CDI) as found in the ERJ-145. The markings include:
    - One-half dot or less for course/glideslope (GS) deviation (i.e. VOR, LOC, or ILS)
    - Five degrees or less for bearing deviation for automatic direction finder (ADF) and radio magnetic indicator (RMI)
    - A clock with incremental markings for each minute and second

The visual system included will be according to the FAA Electronic Code of Federal Regulations pertaining to the requirements ascribed to Basic Aviation Training Devices (BATD) within Part 61 and Part 141. This will denote either a series of TV systems or a three-way projection system according to the clients requirements in space or training specifications. The latency of such classifications and systems heretofore unmentioned when consistent with unequivocal requirements laid out by the client will be coordinated concurring to the FAA Electronic Code of Federal Regulations Part 61.1-429 and Part 141.1-95 in order to initiate type-specific visual systems conforming to the requirements of a client.

In such a case that a given client wishes to supply, purchase, or manufacture a third-party visual system hardware component outside of those delivered by Volarent Aerospace or in correspondence or compliance with the FAA Electronic Code of Federal Regulations Part 61.1-429 and Part 141.1-95, the warranty consociated to this system will be void and no facilitation with procurement to FAA/EASA certification will be administered by Volarent Aerospace. Debarment to the above include a Volarent Aerospace endorsed visual system arranged by a third-party propinquity to Volarent or one in which predication, frangibility, and pursuance is known to Volarent and no concernment or liability pertaining to pursuance, FAA/EASA Certification, or causatum will belong to Volarent.

7. Installation and shipping conditions

The final price of the Volarent E-145 Commercial Basic Procedural Trainer (VT-E145-CO-BP) includes shipping, delivery, installation on site, preparations of QTG, assistance at certification, staff training (operation & maintenance), and two years of warranty. In cases of sales outside of

the USA, provisions according to local regulation and local aviation administrations will be made by Volarent Aerospace in order to insure certification is recognized by local authorities.

50% of the payment is required upfront, with the remaining 50% of payment required upon delivery. The normal production time is four to five months. However, during peak production times (May-September) the production time can increase to as much as nine months. However, we work very hard to reduce the production time as much as possible and seek to complete them earlier.

The final sales contract will finalize all unanswered details according to the specific sale. Any further questions should be directed to Volarent Aerospace directly.