

EMBRAER ERJ-140 V2.0 FOR X-PLANE

Tip: use Ctrl+F (Cmd+F on a Mac) to find topics of interest in this manual

INTRODUCTION

Thank you so much for having purchased this ERJ-140 for X-Plane! This plane is the object lesson of a set of 35 video tutorials on my [YouTube channel](#). By purchasing it, you are enabling me to continue making tutorials.

The ERJ-140 started quite innocently as a way of providing the X-Plane community with video tutorials that would walk a beginner through the entire process of creating a plane, from start to finish. The [first 14 tutorials](#) showcase the SIMPLE stuff: How to build the plane of your dreams in Planemaker and test-fly it. Anybody who knows to browse the internet and use computers should be able to get a handle on plane-building by following these tutorials.

The [next set of tutorials](#) address the advanced X-Plane stuff. They show how to create highly detailed 3D virtual cockpits, with clickable knobs, switches, buttons, levers, faders and manipulators.

In order to keep the tutorials free, I decided to make the object lesson of these tutorials a payware aircraft. This leaves users with two options: Either invest time for building, or buy and fly immediately. That way I can foster X-Plane's development and growth by offering the tutorials, while the payware plane would help fund the creation of the tutorials.

I am planning on continuing developing this plane, as well as the tutorials. I have lots of ideas for future updates to this plane, and people have given good suggestions on the forums. Exterior modeling and animation is something I intend to cover in future tutorials as well, so you get intricate and wonderful looking 3D planes. The plan is to gradually add all the models of the ERJ-135, 140, and 145.

ABOUT THIS PLANE

[Embraer](#) is a Brazilian aeronautics company that has swept the regional jet market with its efficient, sleek, and affordable fleet of modern jets. In the real world, the ERJ-140s were pretty much custom-built for only two airlines: Chautauqua and American Eagle. This made it more difficult to find data for this specific plane in the aspects in which it differed from its siblings.



For the panels and cockpit interior I benefitted greatly from photos, posters, manuals, PDF files and advice sent to me by real-life ERJ pilot Gerhard Gotzmann, WombatBoy, Michael Waugh, Vonhinx, Dr. Coolgood, and many people who left helpful comments on the ERJ's [dedicated forum](#) on X-Plane.org. Also, check out the [checklister plug-in](#) by Tobz.

Valuable information was gathered from [airliners.net](#), [smartcockpit.com](#), the [EMB-145 online study guide](#), and thousands of pictures from more websites than I can list here.

Many, many thanks also go to my wife Ela, who not only supports my work on X-Plane aircraft, but also designs websites and does a lot of behind-the-scenes management that enables me to work on planes. She also provided her good looks for the co-pilot model.

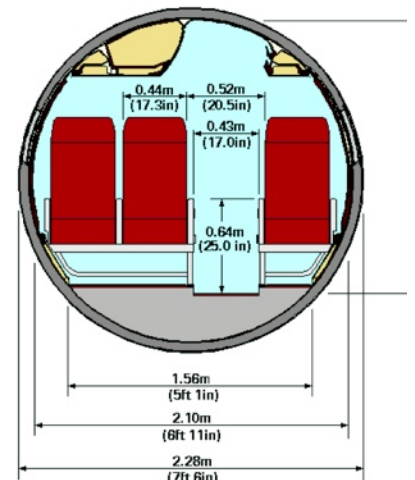
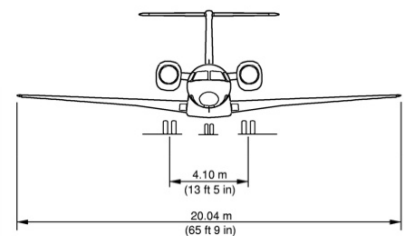
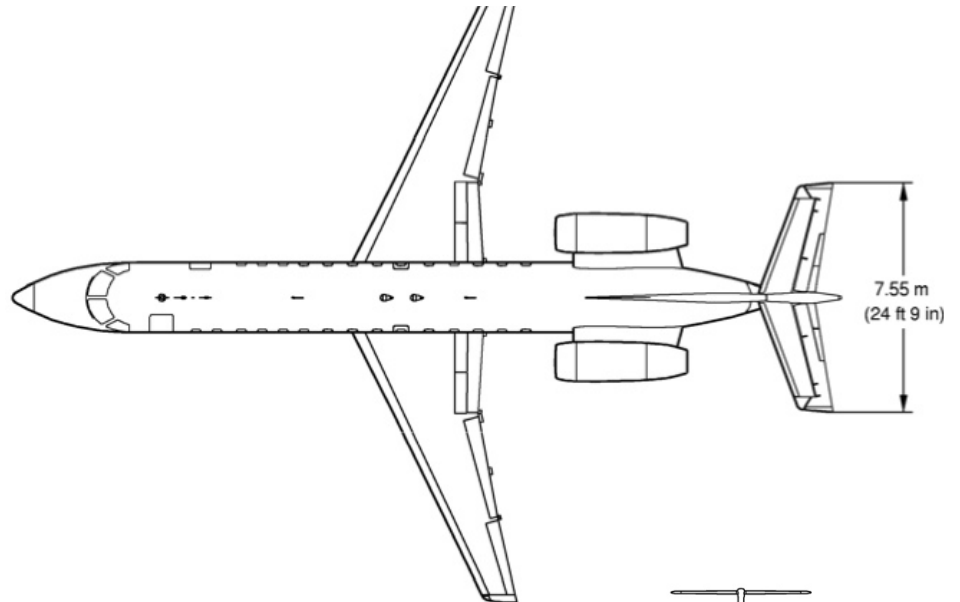
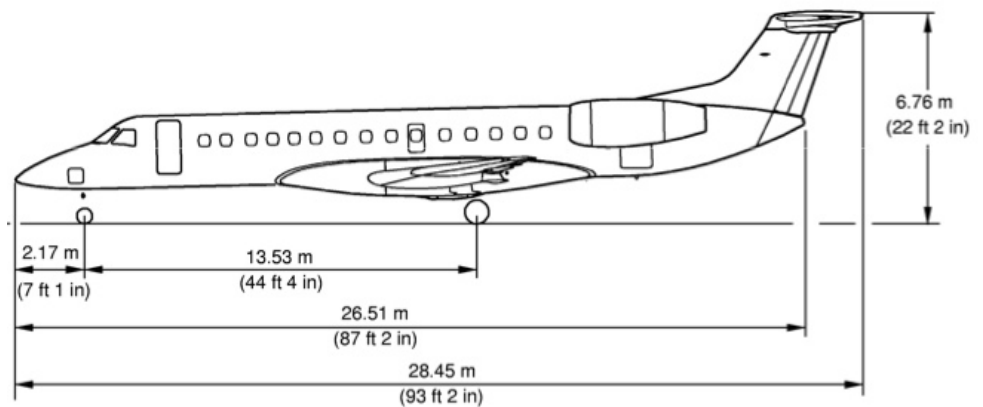
I hope you enjoy this plane, and I invite you to check into my YouTube channel for tutorials and other good stuff.

Legal notice: this plane is payware, and is not to be distributed for free. All rights, including copyright, of the content of the ERJ-140 package belongs to Daniel Klaue. By acquiring this product you agree not to redistribute or share its contents and to use it for personal purposes only.

ERJ-140 FEATURES IN X-PLANE

- Rich, feature-laden cockpit with partly-reflective instrument panels that look exquisite under many different lighting conditions
- Custom built glass displays with highly increased readability
- Ultra-high resolution, multi-page displays
- 3D instruments and 3D cockpit interior
- System logic provided by custom plugin
- Radio Management Unit features multi-page functionality to access different radios and their frequencies
- Windshield wipers are functional in 3D, featuring blades that hug the contours of the windshield
- Extremely detailed and fully animated pilot, featuring a head that follows the plane's curve, and a body that responds to G-forces
- Pilot's shades feature cool dynamic reflections, and are removed when it's dark out
- Pilot can be completely hidden
- Attractive co-pilot, also fully animated.
- Simulator can be sped up from the panel
- Field of View can be adjusted from the panel without having to access X-Plane's menus
- Preset camera angles, accessible via buttons on the panel
- Buttons, knobs, levers, and sliders are mouse-clickable using intelligent manipulators
- Rivets, panel lines, slightly wavy surfaces
- Revolutionary gloss effect
- Night textures with beautiful lighting effects
- Far over a hundred animated functions
- Opening doors
- Wing flex with multiple stations
- Engines with accurately rotating fan blades featuring 3 stages of animation
- Dynamic reflections on the spinner cones and engine intake rims
- Animated thrust reversers
- Elevators with realistic inner and outer tabs. Outer tabs feature airspeed-dependent deflection, just like the real plane.
- Animated AoA indicators
- Enhanced wing tip strobe lights
- Accurate airfoils
- Amazing performance, with no artificial stability implementation
- Enhanced engine sounds, with rumbling noise during full-throttle
- High resolution 2048x2048 textures
- 4 liveries and a plain livery kit to help users create their own liveries
- LITE version of aircraft, for better frame rates on older machines

ERJ-140LR 3-VIEW & DIMENSIONS



WEIGHT	KG	LBS
MTOW	21,100	46,517
MLW	18,700	41,226
MZW	17,100	37,698
MPLD	5,360	11,816
Fuel (wing)	5,187	11,435

PERFORMANCE		
Range (Max. Payload):	3000 KM	1619 NM
Cruise Speed:	830 km/h	Mach .78
Max. Oper. Altitude:	11,300 m	37,000 ft
T/O field length:	1,970 m	6,460 ft
Landing field length:	1,340 m	4,400 ft
Engines:	Rolls-Royce AE3007 A1/3	
Thrust: (x2)	3,367 kg	7,423 lbs.

GETTING STARTED

Beginners, please don't skip this segment!

SYSTEM REQUIREMENTS

Although this plane has been optimized to display its exquisite detail as efficiently as possible, it is quite graphics-intensive, and will make the simulator a bit choppy if your computer has an older video card. For best results, a video card with at least 512 MB of video memory is recommended.

The faster your computer is, and the more cores and RAM it has, the better your frame rate will be in X-Plane. As a general rule, systems purchased prior to 2 years ago will most likely have troubles with frame rates. However, should your system screech to "slide-show" frame rates, you have the option to load up the "lite" version of this plane, which has many of its visually appealing features removed or trimmed down, to run more smoothly on older machines.

INSTALLATION

In X-Plane, airplanes are installed by simply dragging their folder into the location of your choice under the X-Plane/Aircraft folder structure. Unzip your downloaded file, and drag the resulting "ERJ140" folder into your X-Plane/Aircraft folder, to the location of your choice.

NOTE: Please do NOT move the "Plug-ins" folder or its content out of the ERJ's folder. This used to be a common requirement for correct operation of plug-ins, but it is now problematic, as it can conflict with other planes' plug-ins.

While the ERJ-140 is a regional aircraft, it is qualified to reside under the Heavy Metal section.

PILOTING THE ERJ-140

As in real life, the ERJ-140 is not a beginners aircraft. It is an entry level jet for pilots coming from the flight academy. These pilots have learned aeronautics, navigation and flying through training on single and twin props. This is extended to the simulated ERJ-140 as well. You should have basic flying skills and an understanding of the simulator and its operation.

It is imperative that you have set up your joystick, knobs and commands beforehand, and you are proficient in their use.

If this is your first exposure to X-Plane, here are some useful links to get you started:

[X-Plane Manual](#) (index of all relevant topics)

[Navigation, Autopilots, and Instrument Flying](#)

These topics, in addition to this manual, should help you get the most out of both the simulator and this plane.

SET-UP

If you have a POV hat on your joystick, take some time to set it up, as it comes in very handy when accessing knobs and buttons in the 3D cockpit.

Since this plane's 3D cockpit also acts as the default 2D view, the difference between the two views can be confusing. The 2D mode (default) won't allow you to float around the cockpit. But you can still pan around by using the default X-Plane key commands. The pan in 2D cockpit mode has a resolution of 45°, so a "snapping" motion when using "Q" and "E" to pan around will usually be enough of an indicator that the current view is the 2D cockpit mode.

Pressing "Ctrl+O" will put you into 3D mouse look mode. Pressing the arrow keys will pan around your view smoothly, and the PgUp and PgDn buttons will move you forward and backward inside the cabin. **If you wish to set the view to 3D WITHOUT your mouse moving the view around, you need to assign a joystick command to that function.** This is essential for a cockpit like this, since aiming on a button is almost impossible in 3D mouse look mode.

TIP: To disconnect the camera's pan function from your mouse movements in 3D cockpit view, simply press the "Q" or "E" key briefly.

MANIPULATORS

The ERJ-140 uses manipulators for many operations. Manipulators behave different from the usual point-and-click:

Traditionally you had to effect many mouse-clicks on say a heading selector to move it by 120 degrees. Click-and-hold would start a repeated clicking, way too fast to get the exact course. So you had to click again in the other direction. Enter Manipulators:

Now you Click-and-hold and then start dragging the manipulator. Only the dragging changes the value. The further you drag, the bigger the change is. You can drag fast for big changes and slow down when you approach the desired value, fine-tuning it. When the desired value is reached, you release the

mouse - and voilà! This requires many more words to describe it than actually doing it, so I invite you to try your hand at it, for instance, on the barometer setting.

Having said all this, manipulators can still be set up to function the traditional "click-and-hold" way. It is becoming increasingly important to pay attention to the icon that comes up when hovering over a mouse-clickable region. In some instances, it seemed more prudent to use the traditional point-and-click interface for knobs, but overall the striving of this release was towards ergonomic and intuitive use. The ERJ has meticulously been tuned to use only logical icons that give the user a good idea of what to do with a given knob. There are also relevant descriptions and tool tips on the mouse-clickable regions of the plane, which can be enabled by going to X-Plane's "Aircraft>Show Instrument Descriptions" checkbox menu.

All mouse-click regions have been increased in size significantly, making it much easier to aim and actually activate a knob, switch, or button. Knobs have been tuned to function more predictably and intuitively, by creating dedicated, invisible overlays that don't rotate along with the knob. (The rotation caused drag directions to change around rather unpredictably). For knobs whose functionality was unsuitable for click-and-drag functionality, toggles or enumerations were used.

THE COCKPIT

The ERJ-140's cockpit is characterized by its predominant use of manipulators for most of the plane's functionality. The cockpit also features extensive use of tool tips throughout. For information on the functionality of buttons and knobs, please activate tool tip pop-ups in X-Plane's "Aircraft>Show Instrument Descriptions" dialog. Then simply hover the mouse over the buttons or knobs you need more information on, and wait for the pop-up window with explanations.

For the purposes of this manual, we will be looking at the cockpit in the following 4 sub-divisions;

1-Overhead Panel:



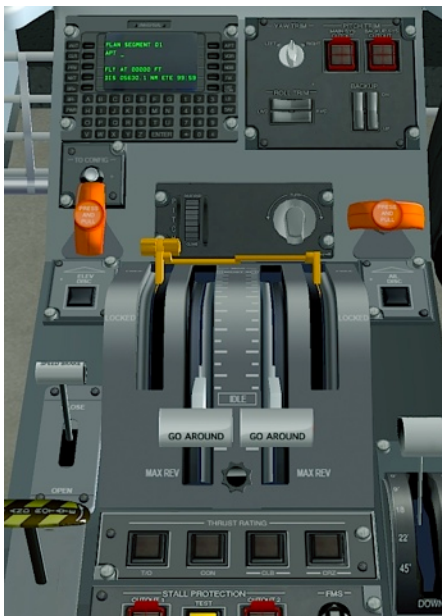
2-Glare Shield:



3-Main Panel:



4-Pedestal:



1- Overhead Panel

Electrical Panel



Each engine has one pair of generators, which you can turn on with the first row of switches. Each toggle button has a light that turns on when the generator is not switched on.

Ground Power Unit (GPU) and Auxiliary Power Unit (APU) switches function the same way.

The switches for battery 1 and battery 2 have click-and-drag functionality, and two positions. The "Off" position keeps them disconnected from the electrical bus, and the "Auto" position causes the batteries to kick in to power the busses when the generators are turned off.

The protected "Essential Power" button is used in case of emergency failures, to run only those systems essential for basic operation. For the purposes of simulation, this button is not implemented.

The "Bus Ties" knob has 3 positions: "Off", "Auto", and "Override." The "Auto" and "Override" position both simulate the situation that the two busses are connected together, so that power from one feeds the other.

The "Shed Buses" knob will drop non-essential items from the bus, and for purposes of simulation is implemented as a dummy switch.

Pressing the "AC Pwr" button will turn on the inverters, and the Backup button is hooked up to a second inverter.

Since X-Plane only models one Avionics master switch, only the first "Avionics Master"

switch is functional. The second one is implemented as a dummy.

Fuel



This plane has 2 tanks, and 3 pumps per tank. The "Tank 1" and "Tank 2" switches turn on the corresponding wing's fuel tank pump. Since X-Plane does not natively simulate multiple pumps per tank, the "pump sel" switches simply emulate an indicator on the MFD (under the "Sys>Fuel" menu) that show which pump (A, B, or C) is currently in use.

The "XFEED" knob allows for pumping from one tank to the other. Position the knob to the left to pump fuel from the right tank to the left, and position it to the right to pump fuel from the left tank to the right. Monitor the fuel quantities in both tanks on the MFD's "Fuel" menu.

ICU



The ICU lights consist of a set of 4 buttons that activate different lights in the passenger compartment of the plane:

-CABIN: this button turns on the indirect lighting on the ceiling of the plane, also lighting up the entire cabin for better visibility at night.

-CAB EMER: this button turns on the emergency lighting strips on the floor along the seats.

-BACKUP INPH: for the purposes of this simulation, this button turns on all the reading lights in the passenger compartment.

-ATDT CALL: for the purposes of this simulation, this button turns on all the attendant call lights in the passenger compartment.

Fire



The two overhead panel handles shut off the engines and activate the fire extinguisher for each engine individually. For the purposes of this simulation, both shutoff and extinguisher functions are activated simultaneously, but the handle can further be manipulated to the positions available in the real aircraft.

The ICU fire extinguisher is not modelled in X-Plane, so the covered button remains a dummy. The “Ext. Test” button is animated, and activates the extinguisher of an unused engine in X-Plane.

APU Control



The APU “Master” knob is like an ignition switch for the auxiliary power unit in the tail cone of the plane. Note that the main engines cannot be started without the APU running. The EICAS screen displays whether or not the APU is running and at what % of N1 it's running. To start the APU, crank the knob to the “Start” position, and leave it there for a few seconds, until the EICAS screen displays an N1 of 50% or higher. The switch can then be put back to the “ON” position.

The “stop” button will turn off the APU.

For the purposes of this simulation, the “Fuel Shutoff” switch is not implemented functionally.

Powerplant



The “Ignition” knobs have three positions: “Off”, “Auto”, “On.” In this simulation, the “Auto” and “On” position both mean that the igniters are on. Without the ignition knobs set to “On” or “Auto”, the engines cannot be

started.

The FADEC knobs simply switch on or off the “Full Authority Digital Engine Controls”.

The Take off Data section of the overhead panel is used to program the power plants for different take-off configurations. Since this is not implemented in this simulation, these knobs are used to control aspects of the camera. Press the “Store” button to get back into default pilot view, and turn the “Set” knob to increase or decrease the field of view. The LED indicator will reflect the currently set FOV. On a regular wide-screen display, a FOV setting of 50.0 should yield a maximized view of the overhead panel.

The starter knobs are covered by glass covers. The engines won't start if the covers are closed, not even with a keyboard or button shortcut.

Likewise, the actual knobs will only permit the “start” position to be activated if some conditions are met:

- Fuel has to flow to the engine
- the igniters have to be “on”
- the APU has to be running.

In case all these conditions are met, and the starter switch still doesn't allow for the “Start” position to be activated, turn the switch to the “Off” position briefly, before attempting the procedure again.

For normal in-flight operation, flip the protectors over the starter knobs, to avoid accidental shut-off of the engine(s).

-Note: The protectors are set up to disable the keyboard short cuts for engine start (Ctrl + 1 and Ctrl + 2). If pressing the keyboard short cuts or joystick buttons assigned to engine start doesn't work, please make sure the protectors are flipped open.

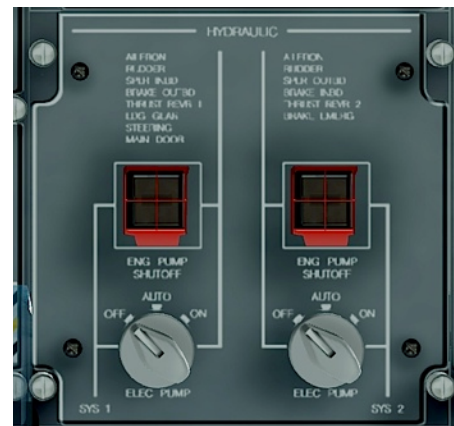
Flight Controls



These buttons allow the pilot to disconnect the control surfaces from their respective inputs. In this simulation, you can disconnect the yoke from the ailerons with the “Aileron Shutoff – Sys 1” button, and the “Aileron Shutoff – Sys 2” will disconnect the ailerons from the flight director.

Similarly, the rudder can be disconnected from the pedals with the “Rudder Shutoff – Sys 1” button, and from the flight director with the “Rudder Shutoff – Sys 2” button.

Hydraulic



The Electric hydraulic pump switches turn on the hydraulic pumps. For this simulation, the switches are linked, as there is only one hydraulic pump to turn on in X-Plane. Further, the “Auto” and “On” positions are both internally setting the pump to the “on” position.

Ice Protection



There are two engine inlet anti-ice systems that can be enabled with the first two switches of ice protection panel segment: “Engine Air Inlet 1 & 2.”

The “Wing” and “Stab” buttons work together, since separate stabilizer de-icing is not natively supported in X-Plane.

Similarly, the “Windshield 1 & 2” buttons are also synchronized with each other for similar reasons.

The Pitot and AOA de-icers are set up as follows in X-Plane:

- “Pitot 1/TAT 1/AOA 1” button activates the AOA de-icer.
- “Pitot 3” button activates the pilot's side pitot heat.
- “Pitot 2/TAT 2/AOA 2” button activates the co-pilot's side pitot heat.

The “Override” knob functions to activate different de-icing modes:

-ENG position: turns on the engine air inlet icing sub-system for speeds below 25 kts. If the speed is higher than that, wing and stabilizer systems also turn on.

-AUTO position: automatically controls bleed-air anti-icing system.

-ALL position: turns on the bleed air anti-icing system if the plane is at 25 kts or above. Below 25 kts, everything except engine anti-icing is off.

For the purposes of this simulation, the knob features 3 positions: “Off”, “On”, “On” for ice detection.

The “Test” button is set up to light up the “Ice” warning annunciator if it is flipped to the left or to the right.

Air Conditioning/Pneumatic



To regulate the cockpit temperature, turn the “CKPT” knob. The change you’ve made there will be reflected on the MFD’s “SYS>ECS A/I” display. Similarly, the passenger cabin’s temperature can be regulated with the “Pass Cabin” knob.

The “Recirc”, “Gasper”, “Xbleed”, “Pack 1” and “Pack 2” switches are clickable dummy buttons, since the functions they perform are not reflected in a simulated environment.

The three buttons at the bottom all control the same thing: bleed air mode. Here’s how they work:

-Bleed 1: draw air from the left engine to supply the A/C and Pneumatic systems with air.

-APU Bleed: draw air from the APU.

-Bleed 2: draw air from the right engine.

These buttons draw on the available positions for the Bleed Air functionality, internal to X-Plane. X-Plane’s available positions for Bleed Air are:

0: Off

1: Left engine Bleed air

2: Both engines Bleed air

3: Right engine Bleed air

4: APU

5: Auto

The button positions and lights will reflect these options. For instance, when the APU bleed is on, but the left and right engine bleed are both off, clicking on the left or right bleed button will result in the APU button “popping out,” since such a configuration is not supported in X-Plane. To achieve a setting of “Auto” (all buttons down, all lights off), a certain sequence must be followed: the two engine bleed buttons must be pressed first, and the APU bleed button must come last. Otherwise, one or the other engine button will pop out, since a configuration of APU + engine is not allowed.

Lights and windshield wipers



Most of the light switches do exactly what is described on their corresponding label:

-Emergency light

-Overhead panel light: this fader controls the brightness of the OH panel’s back-lit text.

-Nav lights (wing tip and tail)

-Red Bcn (Roof and belly of fuselage)

-Strobe (Wing tip flashing lights)

-Insp (inspection lights): lights on the side of wing boxes

-LDG 1: Turns on Left wing’s landing light

-NOSE: Turns on lights on the nose gear.

-LDG 2: Turns on right wing’s landing light

-Taxi: Turns on taxi light. (Upper port side light on nose gear).

-Logo: illuminates the tail of the aircraft for logo visibility.

-Dome: turns on in-cabin ceiling lighting.

-Fstn Belts: Turns on “Fasten Seat Belts sign. Check the passenger compartment for this function.

-No Smkg: Turns on “no Smoking” sign. Check the passenger compartment for this function.

Windshield wiper knobs are linked, since individually controlled wipers are not supported natively in X-Plane.

Glare Shield

Lighting Knobs



The knobs on the slanted portion of the glare shield control different aspects of cockpit lighting, as follows:

-The PTT button will mute all radio chatter.

-The knob labelled “Pilot” controls the back lit text on the pilot’s side of the panel.

-The knob labelled “Pedestal” controls the back lit text on the pedestal between the pilot and co-pilot.

-The knob labelled “PFD” controls the brightness of the Primary Flight Display

-The knob labelled “MFD” controls the brightness of the Multi-Function Display

-The knob labelled “Chart Hldr” controls the brightness of the pilot’s side 3D flood light (It also determines the brightness of the dome light texture on the pilot’s side).

-The knob labelled “FLOODLT” controls the brightness of the center 3D flood light

Similarly, on the co-pilot’s side, the knobs are used to control various lights, although in the current implementation of this plane, some switches are left as dummies, due to the fact that they are more accessibly controlled from the pilot’s side.

-The knob labelled “FLOODLT” controls the brightness of the co-pilot’s side 3D flood light. (It also determines the brightness of the dome light texture on the co-pilot’s side.)

-The knob labelled “Chart Hldr” will illuminate the chart held on the co-pilot’s lap.

-The knob labelled “EICAS” controls the brightness of the EICAS display in the center of the panel

-The knobs labelled “MFD” and “PFD” are dummies. The brightness of these displays is controlled via the pilot’s side knobs with the corresponding labels.

-The knob labelled “PANEL LT COPILOT” controls the brightness of the back-lit text on the co-pilot’s side.

Radar Panel



The panel which, in the real plane, controls various parameters of the weather radar. These parameters are not simulated in X-Plane, so this panel was modified to control various aspects of in-sim functions.

The buttons on this panel snap the camera to a certain position, to avoid having to do time-consuming and cumbersome manual positioning of frequently-used camera positions.

The camera snap positions are:

-PLT: the camera will snap to the default position, at eye-level with the pilot. (Note that when the camera is in this position, the pilot’s head is set to disappear. It re-appears when the camera view is moved out of the confines of the head’s geometry.

-OH: this button snaps the camera to a head-

on view of the overhead panel.

-PNL: depending on the FOV setting, this camera view is ideal to access an entire overview of all the plane’s buttons and displays. It is also a view perfectly aligned with the plane’s centerline.

-PDL: This button snaps the camera to the pedestal, for easy access to throttle, flaps, FMS, speed brake, and similar settings.

-TAIL: This view simulates the view from a tail-mounted video camera.

-GEAR: This view snaps the camera to a position along the plane’s centerline, underneath its belly. This is useful to check for extended landing gear, runway alignment, etc.

-PSGR: This button snaps the camera to a passenger-view position, overlooking the right wing. This is a useful view to see wing-flex in action, check on extended flaps and spoilers, etc.

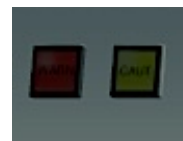
-RMU: This view is for better RMU and MFD operation. Note: by panning this view downwards, using the “S” key or designated POV-hat joystick function, you can easily access the FMS, using this preset as a starting point.

The easiest way to return into the pilot’s view after having accessed one of these camera presets is, via a keyboard short cut or pre-assigned joystick button. “W” will snap the view back into the pilot’s seat in X-Plane’s “2D Cockpit mode.”

The left knob on this panel allows users to set the FOV (Field of View) of the camera. A setting of 50.0 is recommended as a starting point for wide-screen use. To avoid having to use “S” to pan down to read the instruments, you can increase the FOV to a higher setting; however, to actually read some of the use of zoom may be required.

The right knob on this panel controls the simulator’s speed. 1x is the default, and it simply means that for ever minute that passes in the real world, one minute passes in the simulator as well. The setting goes up to 12x, which allows for the shortening of long, uneventful stretches of flight. Turning the knob all the way to 0 will pause the simulator. Please note: the faster the sim is set to go, the more resources it will use; at higher settings, the simulator may even crash, if it runs out of resources. Please use this feature with caution.

WARN and CAUT lights



The Embraer ERJ-140 is equipped with a warning and a caution light, which will light up in case of a malfunction or a situation that requires the pilot’s attention. These buttons are also clickable, and depending on the nature of the warning, pushing the button will override the warning light.

Display Control Panel - DCP



This panel has also been modified from the way it would work in the real world, to accommodate some functions that are needed in the simulator.

The buttons along the top will perform the following functions:

-HIDE PILOT: Clicking on this button will hide both the pilot and the co-pilot figure.

-PSGR DOOR: This button toggles the passenger door between the “closed” and “open” positions.

-OPEN MAP: Clicking on this button will open up X-Plane’s textured map.

-ET: This button would normally be used as an ‘elapsed time’ function for the FMS.

-NAV: This button toggles the NAV source of the PFD’s compass rose between Nav 1 and Nav 2. This also toggles the OBS knob between OBS 1 and OBS 2. The PFD displays the source, the graphic on the compass rose, and a numeric display of the selected heading.

-FMS: This button sets the PFD’s NAV source to the flight management system.

The knobs along the bottom will perform the following functions:

-BRG○: This knob switches the PFD’s DME displays between OFF, VOR1, and ADF1. Note: due to X-Plane’s internal dataref order, this knob is implemented as a push-button that advances one position with every click.

-RA: This knob sets the radio altimeter bug, which is a digital read-out on the PFD.

-BRG◇: This knob switches the PFD’s DME displays between OFF, VOR2, and ADF2. Note: due to X-Plane’s internal dataref order, this knob is implemented as a push-button that advances one position with every click.

Autopilot



The ERJ-140's Autopilot makes use of X-Plane's available internal autopilot logic; there is no plug-in component governing any aspect of this plane's autopilot behavior. Having said that, some functions may differ slightly from their expected functionality. Here is an overview of the autopilot panel.

BUTTONS:

-FD1: engages the flight director. An amber light on the FD1 button indicates that the flight director is on, but the autopilot is not engaged; Pressing the FD1 button again engages the autopilot. X-Plane only supports one flight director, so the FD2 button is a dummy.

-HDG: This button engages heading mode. Use the knob underneath the HDG button to dial in the autopilot's heading. (Purple bug on the PFD, purple dotted line and bug on the MFD.)

-NAV: This button engages the HNAV functionality (X-Plane's default button with this functionality would be labeled "LOC"). It has 3 positions: Off (no light), Armed (amber light), Captured (Green light).

-APR: This button engages the "Approach" functionality. (X-Plane's default button with this functionality would be labeled "APP"). It has 3 positions: Off (no light), Armed (amber light), Captured (Green light).

-BNK: This button toggles bank angle modes between position 0 and 2. When disengaged, the autopilot limits the plane's bank angle to around 30°. When engaged, the limit is only 10°.

-AP: This is the autopilot master switch. It is lit green when any autopilot function is engaged, and can be used to switch on or off the autopilot as a whole.

-CPL: This button determines the autopilot's source: Engaged = copilot, Disengaged = pilot. Please note that this mode is not fully supported. When the autopilot is in HDG mode, this mode is not displayed on the co-pilot's side, so engaging the CPL switch causes the plane to pursue the heading left on the co-pilot's side from the previously loaded plane.

-Y/D: This button engages the yaw damper. This function reduces oscillations about the yaw axis, providing more lateral smoothness in flight.

-SPD: This button engages "Hold Speed" mode. PLEASE NOTE: This plane is NOT

equipped with auto-throttle. Rather, this function is designed to maintain a certain speed during climbs or descents, and is one of several ways to control vertical velocity. The pilot uses the throttle to determine the rate of climb/descent.

-FLC: This button engages the "Flight Level Change" mode. This mode is very similar to the SPD mode, and the way X-Plane implements FLC and SPD is actually identical in the case of the ERJ-140, since it does not have auto-throttle. If it were equipped with auto-throttle, the FLC mode would push the throttles to full for a climb or cut them back to 0 for a descent, and regulate the plane's ascent/descent based on the autopilot's speed bug setting.

NOTE: the SPD and FLC buttons will also affect the functionality of the adjustment knob in the same section on the autopilot panel. With SPD and/or FLC buttons engaged, the adjustment knob will determine the target speed (blue numeric display and pink bug on PFD's ASI).

-V/S: This button engages the "Vertical Speed" mode of the autopilot. When the button is first pressed, the V/S bug will jump to the current VVI value; with the V/S mode engaged, the adjustment knob to the left of the button will change modes, and will allow for the adjustment of the VVI bug.

-ALT: This button engages the "Altitude Hold" mode. When it is first pressed, the autopilot will seek to maintain the CURRENT altitude. (You can tell by the fact that the altitude bug is placed at the current altitude on the PFD's altimeter strip.) If, however, the SPD, FLC, or V/S button is engaged first, the ALT button will light up amber, indicating that the target altitude has not been reached. It will only turn green after acquiring the altitude dialled in to the PFD's altitude preset indicator. (Directly above the altimeter).

-FD1: This button simply mirrors what the FD1 button does on the left side of the autopilot panel.

KNOBS:

-CRS1 knob: This knob can adjust both NAV1 and NAV2 headings, depending on which NAV is selected. (Use the NAV button on the glare shield to toggle between NAV1 and NAV2; The current mode will be displayed on the PFD, to the left of the HSI, along with the selected heading). The knob uses a manipulator-based click-and-drag-style implementation. Clicking-and-dragging vertically yields faster advance times, while clicking-and-dragging horizontally allows for more precise fine-tuning.

-HDG knob: This knob adjusts the heading bug on the HSI and the MFD's map. The knob uses a manipulator-based click-and-drag-style implementation. Clicking-and-dragging vertically yields faster advance times, while

clicking-and-dragging horizontally allows for more precise fine-tuning.

-SPD knob: This knob has 2 modes: if the SPD or FLC modes are engaged, it functions as a target air speed adjustment knob. If the V/S button is engaged, it functions as a target VVI adjustment knob. The knob uses both a manipulator-based click-and-drag-style implementation, as well as two "paddles" to the left and right of the knob, which are "click-hold" style implementations. Clicking-and-dragging ON the knob vertically yields faster advance times, while clicking-and-dragging ON the knob horizontally allows for more precise fine-tuning; Clicking beside the knob will increase or decrease the value by a pre-set amount. Hint: the cursor for "click-and-drag" mode shows two circular arrows, while the cursor for "Click and hold" mode shows only one circular arrow, either pointing left or pointing right, depending on where the mouse is.

-ASEL Knob: This knob is used to select the target altitude on the PFD. A numerical display above the altimeter strip indicates the current setting, while a pink bug along the altimeter strip gives a visual reference as to the current setting. The knob uses both a manipulator-based click-and-drag-style implementation, as well as two "paddles" to the left and right of the knob, which are "click-hold" style implementations. Clicking-and-dragging ON the knob vertically yields faster advance times, while clicking-and-dragging ON the knob horizontally allows for more precise fine-tuning; Clicking beside the knob will increase or decrease the value by a pre-set amount. Hint: the cursor for "click-and-drag" mode shows two circular arrows, while the cursor for "Click and hold" mode shows only one circular arrow, either pointing left or pointing right, depending on where the mouse is.

-CRS2 knob: This knob simply mirrors what the CRS1 knob does on the left side of the autopilot panel.



Main Panel



The main panel's most prominent features are, of course, the flight displays and the RMU. Before getting to those, let's cover the other panel's buttons and features, starting from the left side of the panel.

Feet Air, the AHRS switches, and the reversionary panel are implemented as dummies in this simulation.

AUDIO PANEL:

Above the reversionary panel is the audio panel. There are no discrete volume settings simulated in X-Plane for these different audio sources, but this panel does allow you to turn them on and off by clicking on the corresponding knobs. A knob whose source is turned on is characterised by a pointer that is at or past the 12:00 position.

CLOCK:

The clock has 3 clickable functions:

- Start/stop timer (top right corner button).
- Reset timer (bottom left button)
- Toggle GMT/Local time (bottom left pointer)

PEDAL ADJ:

In the real plane, this switch serves to move the pedal mechanism forward or backward, to adjust the distance to different pilot sizes. For the purpose of simulation, this function is disabled.

GEAR LEVER:

To retract the landing gear, click and drag the gear handle upwards; to extend the gear, click and drag the gear handle down. The status of the landing gear will be displayed on the EICAS display.

GPWS and LG WRN: The Terrain Sys Ovr button will illuminate when the ground proximity warning system goes off. The LG WRN button will illuminate to warn the pilot that the landing gear is not extended, if the flaps are out one notch and the throttle is below 70%. The pilot can press the button to override the warning, if he is sure about it.

PFD:



The Primary Flight Display contains the primary instruments used in flight:

-indicated air speed - displayed in tape format, featuring target speeds and respective speed bug, which can be adjusted using the autopilot (refer to autopilot section in this manual). The airspeed indicator also features a trend indicator, which tells the pilot how fast the plane is speeding up or slowing down, a visual speed bug cue, a digital speed bug read-out (both of which can be controlled via the autopilot's SPD knob), stall speeds at different flap positions, and maximum and minimum speeds that are dynamically adjusted, based on the plane's configuration. Beneath the ASI is also a digital mach readout, which displays the airspeed as a ratio to the speed of sound.

-altitude - displayed in tape format, featuring altitude bug, low altitude awareness (brown color band), barometric altitude correction display, which can be adjusted via the hardware baro knob at the bottom right corner of the PFD, and can be reset to standard with the hardware button beside the knob. The button opposite the hardware side-slip indicator can be used to toggle the units between metric and imperial (Inches of Mercury / Hectopascal).

-vertical speed indicator - shows the current climb rate of the plane, both in an analog-like layout, as well in a small, green digital display. It also features a bug, which is followed by the autopilot when in VVI mode, and can be adjusted via the knob beside the V/S button on the autopilot panel.

-Attitude: The artificial horizon can operate in 4 modes: single-cue, dual-cue, both, and none. These settings can be set using the switches on the module beside the Reversionary Panel (to the left of the pilot's PFD). The left switch will activate or de-activate single-cue mode, while the right switch activates or de-activates dual-cue mode. Single-cue mode draws the flight director bars over the attitude indicator, which tells the pilot how he must fly the plane when the flight director is enabled (amber light on FD button) on the autopilot control panel. Dual-cue mode is also linked to the flight director and draws a set of cross-hairs as a guide for navigation. If the flight director is on with servos (green light on FD button), then the

autopilot will follow the cues on this display, automatically flying the plane along the trajectory recommended by the Flight Director.

-Heading: The HSI (Horizontal Situation Indicator) is the instrument that looks like a compass rose. It shows the direction the plane is flying in. It also has indicators for the NAV 1 and NAV 2 modes, which can be toggled on the glare-shield's NAV button, and for the FMS mode, which can be enabled via the FMS button beside the NAV button. The NAV 1 and NAV 2 modes also feature a digital read-out of the selected heading to the left of the HSI. Around the HSI is also a heading bug, which can be adjusted via the HDG knob on the autopilot panel on the glare shield. A digital read-out of the selected heading is displayed in green at the top left of the HSI.

-Autopilot annunciators: The space above the attitude indicator features six annunciator texts, which light up indicating the mode in which the autopilot is currently engaged.

-Radio Altimeter: Located at the top right of the HSI, the RA features a digital read-out, as well as a digital bug right below it. The bug can be adjusted via the knob on the glare shield panel above the MFD, labeled "RA."

-DME VorADF: Located to the left of the HSI, these digital read-outs provide information on the distance to the navaid that the NAV or ADF receiver is tuned to, using the Radio Management Unit. There is one read-out for NAV 1 and ADF 1, and one for NAV 2 and ADF 2. The knobs on the glare shield above the MFD determine whether NAV or ADF information is displayed here.

-GS: Ground speed indicator, located between the HSI and the VVI, at the bottom of the PFD. This digital gauge shows at what speed the aircraft is covering ground.

MFD



The Multi-Function Display can be divided into 2 segments: the one occupies the upper 2/3 of the display, and the other one is a multi-page segment covering the lower third.

The upper 2/3 consists of:

- The moving map: Featuring several overlays,

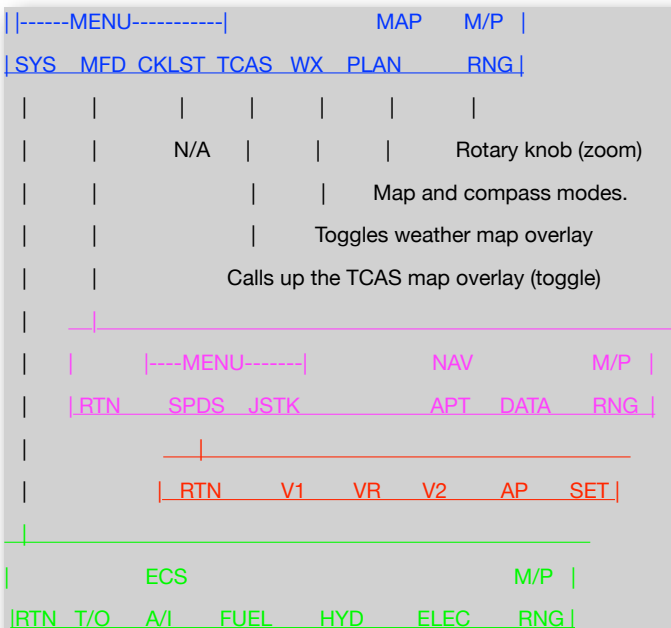
including compass rose arc display (with approximately 120° of range), a digital heading indicator and a magenta heading bug, weather, other air traffic in the area, airports and nav aids, as well as a display of the programmed flight path, this instrument can also operate in several modes, accessible via the right-most button in the default menu at the bottom of the MFD. Clicking the button underneath the “Map/Plan” label will cycle through 3 different map modes (VOR, Map, NAV) before switching to “Plan” mode. Clicking a fifth time returns the map to VOR mode. Default mode is “Map.” The button underneath the “WX” label will activate or deactivate the weather overlay. The knob in the bottom right corner of the MFD determines the zoom level of the map.

-DME Slave Source, with distance and time to source indicators are located to the left of the moving map. Switching between Nav 1 and Nav 2 source can be done by clicking on the word “Nav.”

-Wind speed/direction indicator, to the left of the moving map, digitally displays the compass direction that the wind is blowing from, and beside that is a digital display of the wind’s velocity. Below is a small arrow, depicting the direction the wind is blowing TO.

-Temperature indicators, to the right of the moving maps, depict outside air temperature (top) and leading edge temperature (bottom), in degrees Celsius.

The lower third of the MFD is a multi-page display with a series of 6 soft-keys depicting the available menu pages and functions along the bottom. The layout of the displayed content is as follows:



The Primary Menu lets you go deeper to access additional menu pages. (Color-coded in the diagram above). To return to the Primary Menu, click on the button underneath RTN.

Some things in these flight displays have been left for future development, as many of these features depend on plug-in based systems logic. This release of the ERJ has not been programmed with in-depth plug-in logic, so some functions have been omitted; However, the structure and displays remains largely intact, with the idea of filling the functionality as the systems logic is developed.

Primary Menu mode:

In this mode, the SYS and the MFD buttons take you to a new page, described in more depth in their dedicated segment below.

CKLST: This functionality is not yet available.

TCAS: This button calls up the Traffic Collision Avoidance System map overlay, which shows other air traffic in the area. It is a toggle button.

WX: This button toggles the weather information overlay on the moving map.

MAP/PLAN: This button controls the map mode. Clicking on it will cycle through 3 different map modes (VOR, Map, NAV) before switching to “Plan” mode. Clicking a fifth time returns the map to VOR mode. Default mode is “Map.”

M/P RNG: This is the label for the knob in this mode. Clicking and dragging the knob controls the zoom level of the map.

SYS Menu mode:

RTN: Returns to the Primary Menu.

T/O: Shows FADEC presets (not implemented yet), oil quantity, and an overview of the doors in the plane. A green square along the plane’s graphic outline represents a closed door; a red square represents an open door. Some doors can be opened by clicking on the corresponding square, for simplicity’s sake. Normally such tasks as closing doors would be performed by ground crew or flight attendants; therefore it was deemed appropriate to make an exception with these functions, allowing them to be directly clickable on the panel. However, not all doors are implemented, due to complexity and associated impact on frame rates.

ECS A/I: This menu indicates cabin and cockpit temperatures (actually adjustable via accordingly-named knobs on the far right of the overhead panel), the pressure in the emergency oxygen tanks, and the bleed air temperature.

FUEL: This menu page displays information on the amount of fuel in each tank, if fuel pumps are off or running, which of the three pumps per tank is running (via the overhead panel’s fuel pump knobs), the total and used fuel, as well as the fuel temperature.

HYD: This page displays information about the hydraulic quantity, the pressure, and whether the hydraulic pumps are running or not. There’s also a simple implementation of brake temperature.

ELEC: This menu page indicates the status of various electrical systems. Generators (2 per engine) have a Volt and Amp-meter display, the GPU displays only Amps, and the two batteries also have digital read-outs for Voltage and Amperage. The settings selected via the knobs in the electrical section of the overhead panel are reflected on this display.

MFD Menu mode:

RTN: Returns to the Primary Menu

-SPDS: takes you one level deeper to a page where speed presets will be programmable in future releases.

-JSTK: takes you one level deeper to a page where joystick options and other settings will be programmable in future releases. These functions will be used in combination with more complex FMS logic.

-NAV & APT: This soft-key cycles the display modes of the map: NAV & Airport data both shown, only NAV data shown, only Airport data shown, NAV & Airport data NOT shown.

-DATA: At this time implemented as a non-functioning button.

-MAINT: At this time implemented as a non-functioning button.

Backup Artificial Horizon



This instrument is located between the MFD and the EICAS, and is used in case of a PFD failure. It features brightness control via two buttons on the left bezel, and a barometer setting knob.

RMU - Radio Management Unit



The ERJ's display-based radio system features an all-in-one design that displays settings and modes for radios, transponder, and TCAS. A yellow box is displayed around the number which you can change via the "tune" knob at the bottom of the RMU. Please note that the Tune knob has been implemented not as a manipulator, like the ERJ v1, but rather, as an traditional-style, point-and-click region. The tuning is done separately for coarse numbers and for fine numbers (exterior and interior region of knob, respectively), and the frequency numbers snap to the nearest used unit.

The yellow box can be moved around the display using the buttons along the side of the display.

COM 1: Press the button beside the standby frequency (the lower of the two numbers in the COM1 box, with a light blue color). A yellow square around that number should indicate that the frequency can now be tuned using the "Tune" knob. Once the desired frequency is set in standby, press the top left button of the RMU to swap the standby frequency with the active frequency.

NAV 1: Press the button beside the standby frequency (the lower of the two numbers in the NAV1 box, with a light blue color). A yellow square around that number should indicate that the frequency can now be tuned using the "Tune" knob. Once the desired frequency is set in standby, press the top right button of the RMU to swap the standby frequency with the

active frequency.

ATC/TCAS: This is the transponder frequency. When the button beside this number is pressed, not only a yellow box appears around it, but there is also a small yellow line underneath the digit that can be controlled via the "Tune" knob. Repeated clicks on the button beside the number will advance the cursor towards the right, and will loop back to the first digit, after it has reached the end.

The fourth button from the top determines the transponder mode. The button can be pressed repeatedly, to cycle through all the available Transponder modes, which correspond to X-Plane's internal modes according to the following scheme:

-OFF	=	OFF
-1 TA only	=	Standby
-1 ATC ON	=	ON
-1 ATC ALT	=	ALT
-1 TA/RA	=	Test

ADF 1: When the button beside the ADF number is pressed, not only a yellow box appears around it, but there is also a small yellow line underneath the digit that can be controlled via the "Tune" knob. Repeated clicks on the button beside the number will advance the cursor towards the right, and will loop back to the first digit, after it has reached the end. The ADF mode, accessible via the fourth button from the top, is actually only an on-off switch; the additional data displayed on the RMU is "dummy data," since those functions are not tapped into in this simulation.

TCAS-DSPY 1: The range can be selected with the 5th button from the top (the one beside the word "Range"), and mirrors the functionality of the MFD's turn knob: it zooms the moving map by means of repeated clicks on the button, showing its range in the numeric display beside "Range." The green text display beneath the "Range" shows what evasive action will be taken in case of a potential collision course, as detected by the TCAS. For the purposes of this simulation, this is only a text display, and has no internal functionality.

RMU buttons:

SQ: This is tied internally to the Transponder's "Test" mode.

DIM: Pressing the DIM button will bring up a display brightness bar, which can be adjusted via the "Tune" knob. Pressing the DIM button a second time will hide the brightness bar, and un-link the "Tune" knob from the display's brightness functionality.

1/2: This button toggles the RMU between modes 1 and 2 for the COM, NAV, and ADF.

Pressing this button will switch COM 1 to Com 2, NAV 1 to NAV 2, and ADF 1 to ADF 2. As a quick visual cue, the color of the text identifying the radios changes from light blue for mode 1 to magenta for mode 2.

EICAS



The "Engine Indicating and Crew Alerting System" is a display that gives visual feedback on engine settings and performance, cabin environment, trim settings, as well as landing gear, flaps, and spoiler status.

N1: At the top left are two digital N1 gauges for engine 1 and engine 2. They consist of the following elements:

- a digital read-out of the N1 (gas generator section RPM) value in percent

- a needle that gives a visual display of the actual N1 value

- a triangle that travels along the outer perimeter of the needle's path, which indicates the actual throttle setting.

- a "REV" text that comes on when the thrust reversers are enabled.

ITT: This gauge displays the intake temperature of each engine. A digital display gives numerical data in degrees Celsius, while a needle gives a quick visual reference.

N2: Fan RPM, in percent

FF: digitally displays the fuel flow per tank, in pounds per hour.

WING: displays how much fuel is left in each tank, in pounds. This data directly mirrors the MFD's "Fuel" page data.

OIL: The oil indicators consist of one strip for oil pressure (left) and one for oil temperature (right). Each of these strips has two indicators: one on the left and one on the right, for the left and right engines respectively. In addition, there are digital displays of the oil pressure and temperature for each engine.

VIB: These gauges alert the pilot of potentially hazardous vibrations caused by the engines.

LDG GEAR: The three boxes underneath this text have 3 possible messages: “DN” (green), which means that the gear is extended and locked; “TR” (red), which means that the gear is in transition; “UP” (white), which means, the gear is retracted, with all the gear doors closed.

FLAPS: A digital read-out of the amount of degrees that the flaps are extended at. Beside that is a small visual indicator, to help with rapid assessment of the flaps’ position.

SPLRS: These are the speed brakes located on the top of the inner wings. There are 4 possible positions:

-CLD: Closed (default).

-ARM: Automatically deploy at touchdown. This mode can be set by pressing the “3” key.

-OPN: Spoilers half-way deployed.

-EXT: Spoilers fully deployed.

CAB ALT: This value indicates the pressure altitude equivalent that is felt inside the cabin, due to the pressurisation system.

CAB ΔP: This indicates the Cabin differential pressure in pounds per square inch.

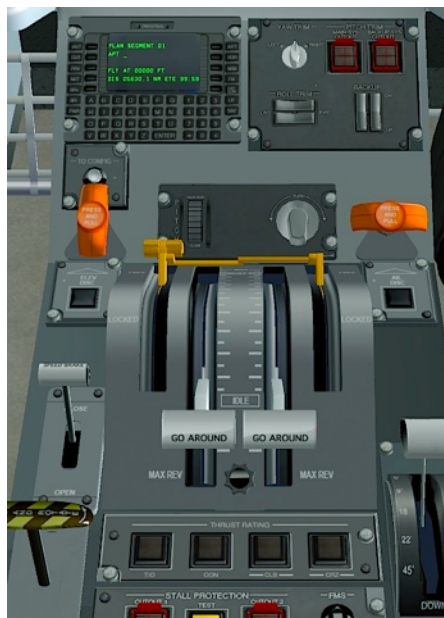
CAB RATE: This indicates the rate of change of the cabin pressure, in feet per minute.

APU: Provides information on whether or not the Auxiliary Power Unit is running, and what its N1 value is (in percent).

TRIM: This section displays the plane’s trim settings along the pitch, roll, and yaw axes. The Pitch trim’s needle travels up to indicate up-trim, and has a digital display that indicates the trim value. Besides having negative numbers when trimming down, there is a text display that ensures there is no confusion about whether the plane is trimmed up or down.



PEDESTAL



The pedestal contains the FMS, throttle, flap, speedbrake, ground brake, trim, autopilot pitch and turn, and lock mechanisms for yoke and throttle.

FMS: This implementation of the flight management system uses X-Plane’s internal FMS logic, and is adapted to this plane only in terms of its appearance. For more information about X-Plane’s FMS, please refer to [this section](#) on the X-Plane wiki.

TRIM: This panel features a slightly different approach to trim than one would normally encounter in X-Plane:

-Yaw: Hovering the mouse over the yaw trim knob will change the cursor to two circular arrows, pointing clockwise and counter-clockwise. Click-and-drag left or right, keeping an eye on the yaw trim indicator on the EICAS display (just above the trim panel). To re-set the yaw trim to 0, there is a tiny click region at the center of the knob. The cursor will change to a finger icon, and clicking the mouse button at that location will reset the yaw trim to 0.

-Roll: There are two roll trim switches. They work slightly differently. The top one is a click-and-drag style trim actuator, similar to the yaw one. This is good for when you want to quickly reach a certain trim setting, and prefer to have linear drag control. As long as the mouse button is pressed, you can use mouse movements to fine-tune the trim setting, once you’re in the vicinity of the desired trim position. The bottom trim switch is also click-and-drag based, but by dragging it, the trim actually crawls in the desired direction at a pre-determined speed; once the desired position has been reached, the switch can be released. To center the trim position back at 0, locate the narrow click-region in the middle of the switches, and confirm that the mouse cursor changes to a finger icon before

pressing the mouse button.

-Pitch: Like the roll trim switches, the pitch trim switches are two different styles of manipulators, implemented in a way that allows users to choose their preferred way to trim the plane. The left trim switch allows for click-and-drag with linear response; the response between mouse movement and trim setting is 1:1. The right trim switch requires a click-and-drag in the desired trim direction, and the trim crawl towards the desired setting at a pre-determined speed. Once the desired position has been reached, the mouse button can be released. To re-set pitch trim, locate the narrow click region in the middle of the switches, and confirm that the mouse cursor has changed to a finger icon before pressing it.

TO CONFIG:

This button is implemented as a dummy.

PITCH AND TURN KNOB PANEL: These knobs override the autopilot’s servo settings, provided the autopilot is not following some heading, altitude, nav preset, or FMS plan. They also have a reset mouse-click region, towards the middle of their overall click region. The change of the cursor icon will help locate this click region.

“PRESS AND PULL” orange handles: These handles lock the steering mechanism. The left handle locks the pitch axis of the steering column when you click and drag it upwards. The right handle locks the roll axis of the steering column when you click and drag it upwards. To release the lock, either click-and-drag those handles back down, or press the black “ELEV DISC” or “AIL DISC” buttons beneath these handles, to snap them out of their locked position.

YELLOW GUST LOCK LEVER: This lever locks the thrust levers, and keeps them secured in the “idle” position. Internally, it also overrides the throttle control, preventing its use via mouse wheel or joystick axis.

SPEED BRAKE: This lever has 4 positions, which are displayed on the EICAS panel, on the right side:

-ARM: This setting arms the spoilers for deployment at touch-down.

-CLOSED: This is the default setting, and simply keeps the spoilers in their closed position.

-OPEN: This setting opens the spoilers by one notch.

-EXTENDED: Spoilers fully deployed.

THRUST RATING BUTTONS: In the real ERJ, these buttons are used in combination with thrust rating settings that have to be programmed into the FADEC, depending on weight and weather conditions. For this simulation, the buttons represent throttle presets for different purposes:

- T/O: Take-off mode (95% throttle)
- CON: Continuous maximum thrust (93% throttle)
- CLB: Climb thrust (90% throttle)
- CRZ: Cruise thrust (80% throttle)

These are approximate generalized values that do not change with altitude, pressure, and weight, as they would in the real plane.

EMERG/PARK BRAKE: This handle can be pulled to engage the brakes, although it is normally easier to access brake functionality via a keyboard short cut ("V" or "B") or a pre-programmed joystick button.

FLAP: The flap lever has 4 positions:

- 0° (retracted)
- 9° (first notch)
- 18° (second notch)
- 22° (third notch)
- 45° (fully extended)

AUTO PRESS: This instrument has a read-out that mirrors the value of the Cab Alt display on the EICAS. The knob is hooked up to X-Plane's cabin altitude set function.



FLYING

TAKE-OFF

For better take-off performance, extend the flaps to the first or second detent. The flaps will help lift the nose up during take-off.

Once everything is set up, the take-off is as simple as advancing the throttle.

When airborne retract the gear and flaps accordingly.

Further fine-tuning during flight can be achieved using the elevator trim. You can also find mouse-clickable trim tabs located in the cockpit where the pedestal meets the main panel. The left trim tab can be dragged up and down to affect pitch trim directly. The right trim tab can be dragged up and down to initiate a “trim up” or “trim down” command. The same system applies to the roll trim.

Usually, roll and yaw trim are not used much, unless the plane has a fuel imbalance between the left and right wing, or if you’re fighting cross winds.

CRUISE

This plane’s service ceiling is 37,000 ft, and its cruising speed is Mach .78, or 472 kts GS.

This cruising speed requires a throttle setting of 75%.

In real life, the plane’s engines are not allowed to run full-throttle longer than 5 minutes.

There are 4 throttle presets, accessible via the 4 buttons behind the throttle levers. In this simulator, these are hard-coded to the following settings:

T/O = 95% (TakeOff)

CON = 90% (Continuous Maximum Thrust)

CLB = 85% (Climb)

CRZ = 75% (Cruise)

In real-life, the ERJ-140 uses these buttons to activate pre-programmed FADEC presets.

Of course, normally the autopilot is engaged during cruise, but since the ERJ-140 **does not feature Auto-Throttle**, these presets can come in handy nonetheless.

LANDING

Landing the plane manually is a matter of losing height and speed, lining yourself up with the runway, extending the landing gear, and flying the glide slope that will place you on the landing stripes on the runway. Once the plane slows to the point where the nose wants to drop down, extend the flaps by a notch at a time to help keep it up.

When flaps are extended, they will momentarily tend to push the nose up, until the plane loses enough airspeed to drop the nose again. Use some elevator to help settle the plane into the new “natural” glide slope effected by the current flap extension setting.

Use the throttle to control the glide slope, and use the elevator trim to take the load off pulling or pushing on the yoke. Landing speed should be approx. 135 KIAS.

Just before touchdown, flare until the plane gently sits on the runway. Activate thrust reversers and brakes.

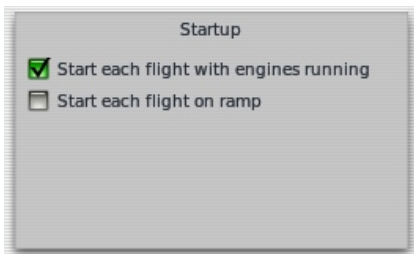


COLD AND DARK

By default X-Plane places your plane on a runway with engines running and ready for take off. While this is convenient to get into the air fast, it is also highly unrealistic. For flying online with virtual ATC it is even plain impossible.

In order to add to the realism I recommend going through the startup procedure real pilots have to complete before they can take this bird to the skies.

You need to change X-Plane to let you start from cold and dark in the first place. Go to the settings menu, and uncheck the option “Start each flight with engines running.” While you are at it, also check “Start each flight on ramp”.



START-UP PROCEDURE

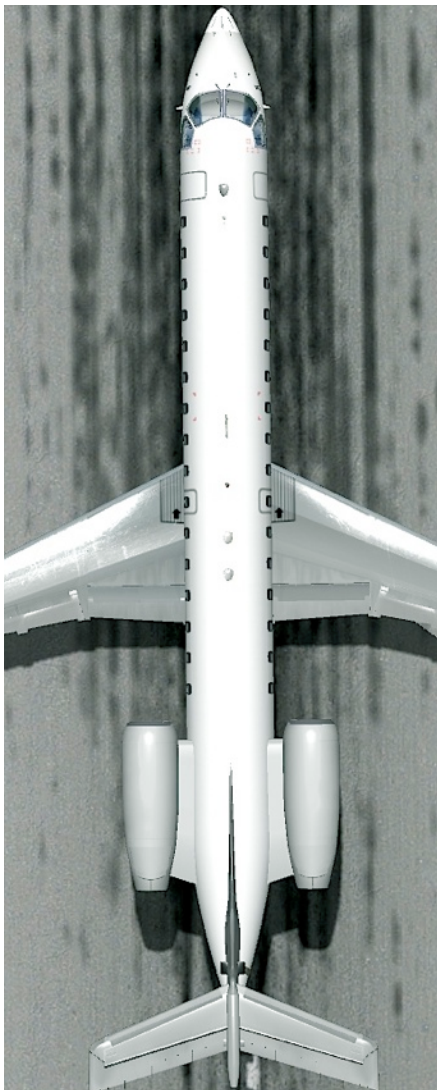
POWER-UP

1. Set the two battery switches labeled DC Bus 1 & 2 to “Auto” (click and drag)
2. Right tank fuel power “ON” (Number 2 tank)
3. APU knob to “START”
4. Press the “Avionics 1 & 2” buttons.
5. Click on the “Emergency Lights” switch.
6. Turn air conditioning on (far right, overhead panel)
7. Turn “No Smoking” and “Seatbelt Signs” on
8. Turn Navigation lights on.
9. Configure FMS.
10. Configure autopilot for departure: set initial altitude, climb speed (V/S), and activate the Flight Director, by hitting the FD1 button.

START ENGINES

1. Make sure door is closed.
2. Turn Beacons on
3. APU knob to “on”
4. Both “ignition” knobs to “on”
5. Left tank fuel power “ON” (Number 1 tank)
6. Flip open the cover over the Number 2 engine by click-dragging down.
7. Click-hold the right side of the “Start” knob for the Number 2 engine for a few seconds.
8. Uncover switch and start Number 1 engine (Left) following the same procedure.
9. Set electric pumps to “Auto” position.
10. Switch off Auxiliary Power Unit by clicking on the “Stop” button, and then moving the knob to the “off” position.

LIVERY KIT



Included with the download is a set of files that makes it easy for users to create liveries (paint schemes) for this plane.

Liveries are a fun and easy way to customize a plane, and to express yourself. In the last release (v1.0) I had included a transparent livery kit, but I've come to realize that it's enough to simply have a blank, white canvas for people to paint liveries on. I've included a plain, white livery in this release, which already has all the basic details etched in. This allows users to spend less time on those details, and more time on the painting that actually differentiates one airline from the other.

You may publish your liveries on X-Plane.org, as long as you credit me for the plane.

The livery kit is pretty straight forward to use, provided you have Photoshop or GIMP. You open the images contained in the aircraft "Liv-

eries" folder in Photoshop or GIMP. Then you just add layers on which you wish to paint your scheme.

The windows are only placeholders. Some liveries such as American Eagle have borders around the window frames. To get them right, it was necessary to leave some black markings where the windows go. Deleting or painting over them will actually make the edges of the windows look better.

In this version I've experimented with glossy materials. If you're making liveries, the rules are simple: the areas you want glossy need to be a little bit transparent. Not very much! For instance, I have found that a layer with less than 90% opacity starts to look weird already. As a general rule, for a very glossy plane, stay around 90%. For a duller plane, crank the opacity up to 97-99%. Try to use the included liveries as rough guidelines for levels of gloss.

To create LIT (night) textures of your livery, create a new layer on top of all the other layers, and paint it all black using the paint bucket tool in Photoshop or GIMP. Then, using the eraser tool, with a fairly large diameter (around 200 or so), and a very soft edge, simply delete the parts of the black layer, where you want the "light to shine on" in the night version of your texture. When you save this LIT texture, you need to make sure that there is NO transparency in the final file. Export the image with the option to discard transparency data. Otherwise the night textures won't look right.

If you wish to learn more about how to create liveries for X-Plane aircraft, please check out the following video tutorials I put together, which cover this topic:

[PLANEMAKER TUTORIAL 10: PAINTING THE PLANE WITH GIMP \(GIMP IS FREE\)](#)

[PLANEMAKER TUTORIAL 11: PHOTOGRAPHIC AND HI-RES TEXTURES, MULTIPLE LIVERIES](#)

[PLANEMAKER TUTORIAL 12: TEXTURE LAYERS, DAY/NIGHT TEXTURES, OVERFLOW REGIONS](#)

These tutorials go through the entire process visually, starting from scratch, so you'll get a much better understanding on how to use the tools, techniques, and references, than if I

were to repeat everything here in written/pictorial form.

Thanks again for your purchase, and I hope you also benefit from the tutorials, if it ever occurs to you that you want to try your own hand at building an airplane for X-Plane.

Please also visit the website of another project I've been part of: the [Verticopter](#). Since publishing the [Verticopter for X-Plane](#), I've had the privilege of designing a 20% scale drone of this Short-Takeoff and Vertical Landing plane, which has completed its initial round of testing. [Videos](#) of its test-flights at the NASA Dryden Research Center can be found on the [Verticopter.com](#) website.

Have fun!