T34c
TurboMentor
x-plane 9.55

Hello!

First and foremost, I would like extend my gratitude for your continued support with your purchase of my product(s)! By doing so, you are promoting the growth of X-Plane and enabling me to produce future products with the same quality as you see here, while also helping you get more enjoyment out of everything X-Plane has to offer.

The developement of the T34c Turbo Mentor began on April 1st, 2010, and took quite a bit more time than anticipated to complete (5 months in all). The main reason for the delay was due to my ongoing involvement with Laminar Research where I've been modeling aircraft for the release of version 10, and I still continue to do so to this day. In addition to this, work has still continued on the CRJ-200, keeping me quite busy!

Why the Mentor, you ask? Well, if you know me from the forums you'll know by now that I believe when flying virtually, the lower to the ground and VFR flying the better! Long ago, when I was learning how to correctly fly online (using MSFS 9), I followed the advice of the people on ClickAir-Va forums that suggested the T34a Mentor as the perfect plane to learn with while on VFR flights. It took a long time until I finished the training, but I felt very comfortable inside this aircraft. One of the things that really helped was the open cockpit, as it was perfect for VFR. Having this in mind, I decided to go searching for a new aircraft to build in the same way I do with all my previous projects. When I came across the "C" version of the Mentor I liked it so much that I knew this was the plane I was going to do next!
And so, with that, I began building this plane.

Building the geometry of the aircraft can be fast. The same can even be said for creating textures, but what really tends to eat up time is making everything work in harmony in X-Plane. I am not a flight dynamics engineer, but a 3D artist that doesn't know how to program. However, after looking at other planes I have learned the principles of virtual flight. Because I don't have real flight time in the Mentor I cannot specify how accurate this aircraft really flies in comparison, but I've tried my best to make it feel what I think would be very close to the real thing. Watching videos and reading information on the aircraft helped, and of course the flight dynamics engine that X-Plane uses have assisted in this as well. My main goal for this project was to make a nice looking aircraft that would provide an immersive flying experience while inside the cockpit.

I started building 3D cockpits as my first projects for X-Plane. The reason for this is because I feel they are the most important aspect of an aircraft visually when flying in X-Plane. Because of the detail that I provide in these cockpits, it is my suggestion that you utilize the aircraft with a product similar to TrackIR. I am confident that you will find my 3D cockpits to provide you with some of the best TrackIR experiences around.

The Mentor cockpit is made to carry two virtual pilots, with both seats having their own set of instruments. I hope to find a way to allow two pilots in one cockpit (at the moment of this re-reading I was able but copilot always sees the same pilot do. Stay tunned for more inverstigation results) with online flying, as the experience would be amazing, and I will be conducting tests on this soon, so stay tuned!

Best!
Javier Rollon

Walk around

S o you have bought the plane and just couldn't wait to open it before reading the manual...Do you know how long it takes to create a manual? One has to take the screenshots, clean them, and then put it all together while writing in English when my native language is Spanish! ARGG!!! Hahaha. Then I have corrections made by Cameron. Huge work!

This manual is not going to contain historical info on the Mentor, but it can be found here:

http://en.wikipedia.org/wiki/Beechcraft_T-34_Mentor

So just what am I going to talk about then? Simple! The virtual plane you have loaded and are about to fly!

1. INSTALATION

You may have already done it as it's not a difficult task, but we're going to cover all our bases here just in case you do need assistance with the install process!
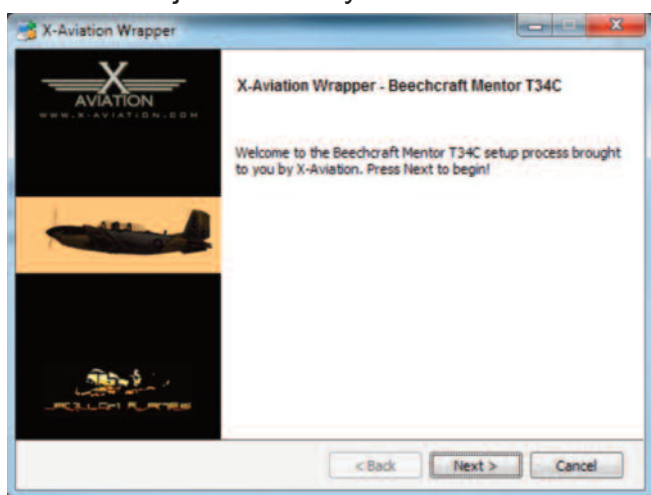
Okay, when you bought the Mentor, you did it with a customer account at X-Aviation. After paying, you will receive the link for downloading the instalation files. Just execute the installer (on Mac, Linux or Windows. These images are from the Windows version).

Once you press "next" on the welcome screen you will be asked to input your e-mail you used with your purchase, and the password that you personally chose for your customer account.

If you entered everything correctly you will be allowed to proceed to the next screen where it will ask you which folder you wish to install the plane to. Just type it or by clicking on the right icon you can navigate on your computer to search the desired location to install it to.
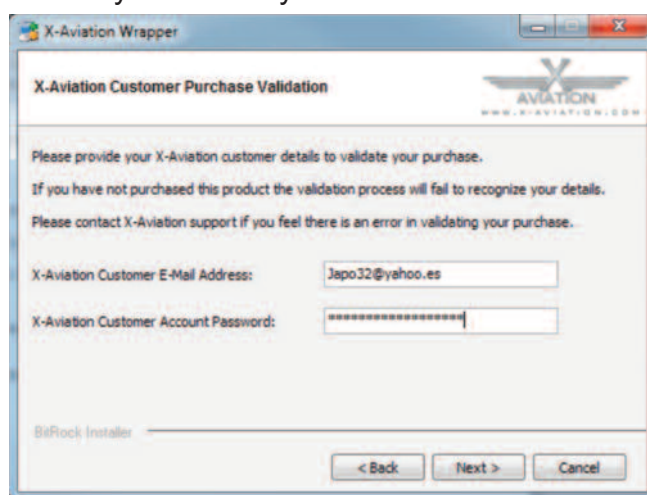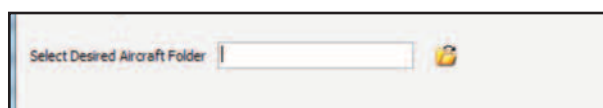
Just press next and then next again on the following screens. The plane will begin to be copied to your computer in your requested install location. For this process you'll need an internet connection for the download and verification of your purchase.

Once the installation is complete there will be a folder called "Beechcraft Mentor T34C" where you chose the installer to place the Mentor files and folders.

If you have any problems with installation and require assistance, please contact X-Aviation here: http://www.x-aviation.com/catalog/contact_us.php

Or on this forum page: http://forums.x-pilot.com/index.php?board=25.0

Only valid costumers will receive support!

Walk around

2. COPYRIGHT INFORMATION

3. LOADING

Ok, you have installed the Mentor and you are ready to load it. It's easy if you have loaded other planes before, but maybe this is the first time you have loaded X-Plane. Once X-Plane has loaded you have two options: Load the plane with the engine running or a Cold and Dark Situation. I always recommend the cold and dark one, but it is ultimately up to you. If you want to load it with engines already running, skip this first section and proceed to section 4:

3.1. Cold and Dark Situation:

Just go to the top menu bar and click Settings, then click "Operations & Warnings"
You will then see open a menu as shown below:
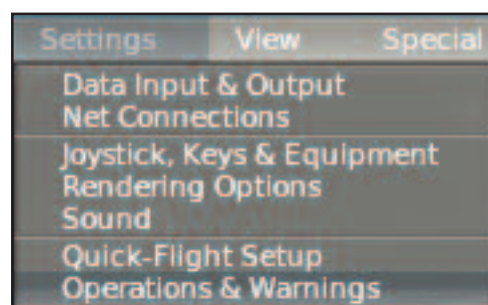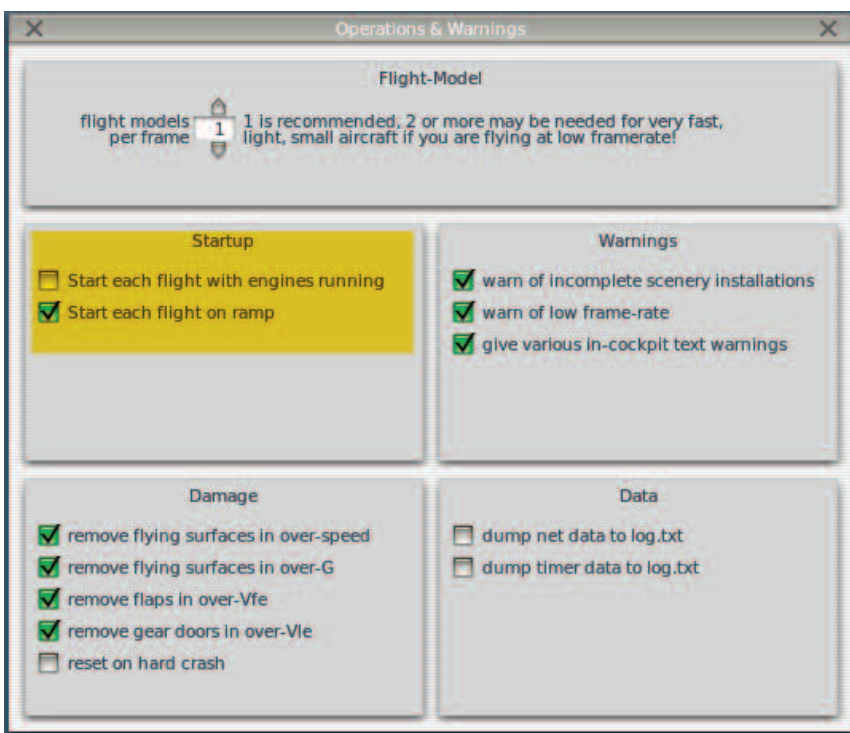
In the 'Startup' section you have to deselect "start each flight with engines running," and if you want to start on the ramp of your chosen airport then select the option to "Start each flight on ramp".

Note: At the top of the menu you can see a Flight-Model option. The default number is "1". This is a good setting to have smooth performance, but if you see that the flight dynamics are too jumpy (especially at high speeds) change that number to a value of "2" or "3".

3.2. Load the Airplane

Ok, it's time to check out the plane! Go to the top menu bar where you'll find the 'Aircraft'

Aircraft	Location	Environr
Open Aircraft		
Open Livery		
Weight and Fuel		
Equipment Failures		
Aircraft & Situations		
• Show Mouse-Click Regions		
• Show Instrument Descriptions		
• Toggle Puff Smoke		[x]
• Cycle 3-D Flight-Path		[o]
Reset 3-D Flight-Path		
Logbook		

submenu. Select to 'Open Aircraft' and this will open another window with the folders within your X-Plane Installation. Navigate to the folder where you installed the Mentor. Select the file "T34CMentor.acf", and click "open".
In a few seconds you will have the plane loaded!
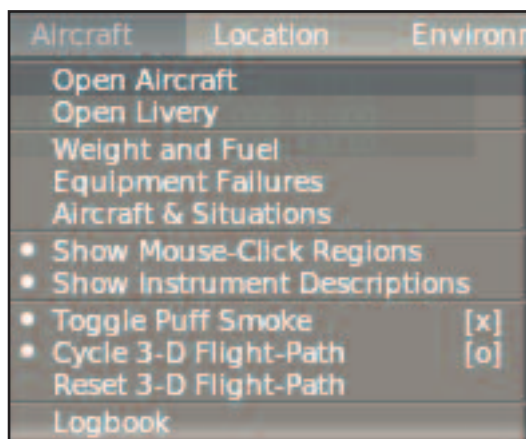
Of course, you should position your plane at your most desired airport. If you don't have one on mind, I would like to suggest to you this free one in Spain:

http://www.jrollon.com/Matacan.html

Once everything is loaded properly, the plane should be waiting for you on the platform or runway!

Walk around

4. TECHNICAL INFO.

Here we go with those numbers we all love and hate! These numbers are from the simulated aircraft and not the real one. You are flying a virtual machine after all!

4.1. Geometry, 3D, Minimun Computer Specification....
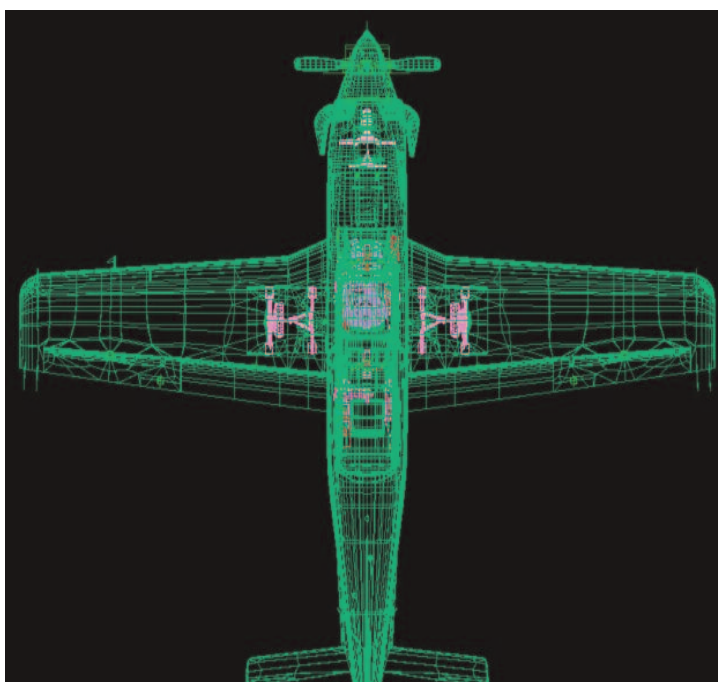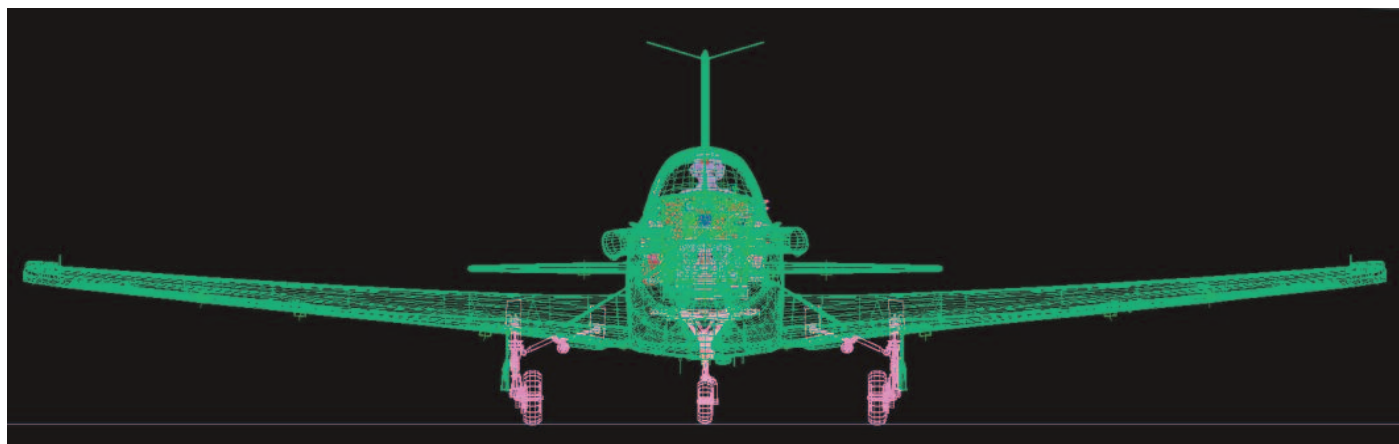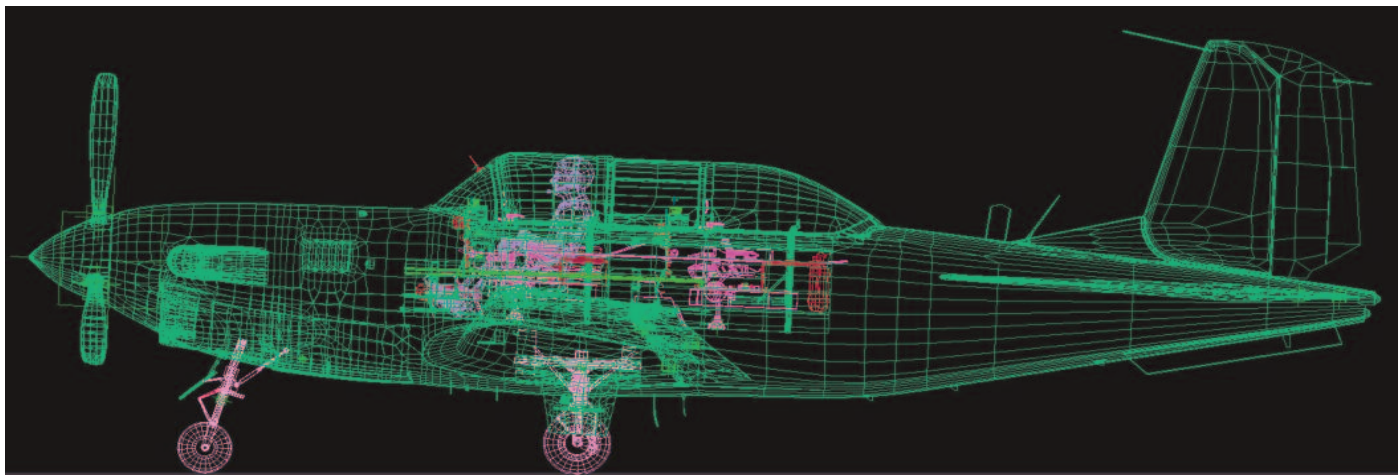
Ok, you have just loaded, 103,515 vertices in **71,042 polygons**, more or less, and that is only the aircraft alone!

Really, it's amazing how technology in real time rendering engines has grown these last 10 years!

To some it may be just a number, but I remember a time (just 5 or 7 years ago) where a character could only have 3,000 polygons maximum.

X-Plane not only loads these polygons, but also the geometry of landscapes, airports, FX etc.

For that reason you need a good computer to fly smoothly at a minimum of 25 frames per second.

But the problem is not usually the number of polygons to draw in real time. It is usually the limitations of memory within video cards.

Computers have two kinds of memory: RAM memory (we recommend a minimum of 2 GB) to load the simulator on your operating system, and VRAM, which is a faster memory to load textures so they appear smoothly once they are rendered on screen.

But..how many megabytes do the textures of the Mentor need to load properly? Well at full texture size it **needs 166 Megs of VRam.** *"Ahhhh!!!"* You let out a sigh of relief! You can load at full configuration! WAIT! You have to consider all the other stuff VRAM is used for by the simulator. Landscapes, FX (remember?), and also maybe the operating system that is running in the background.

So...how do you know the necessary memory to load the Mentor properly on your computer? Easy!

Go to the top menu bar and click 'Settings,' then click the option titled 'Rendering Options.' A big window will open.
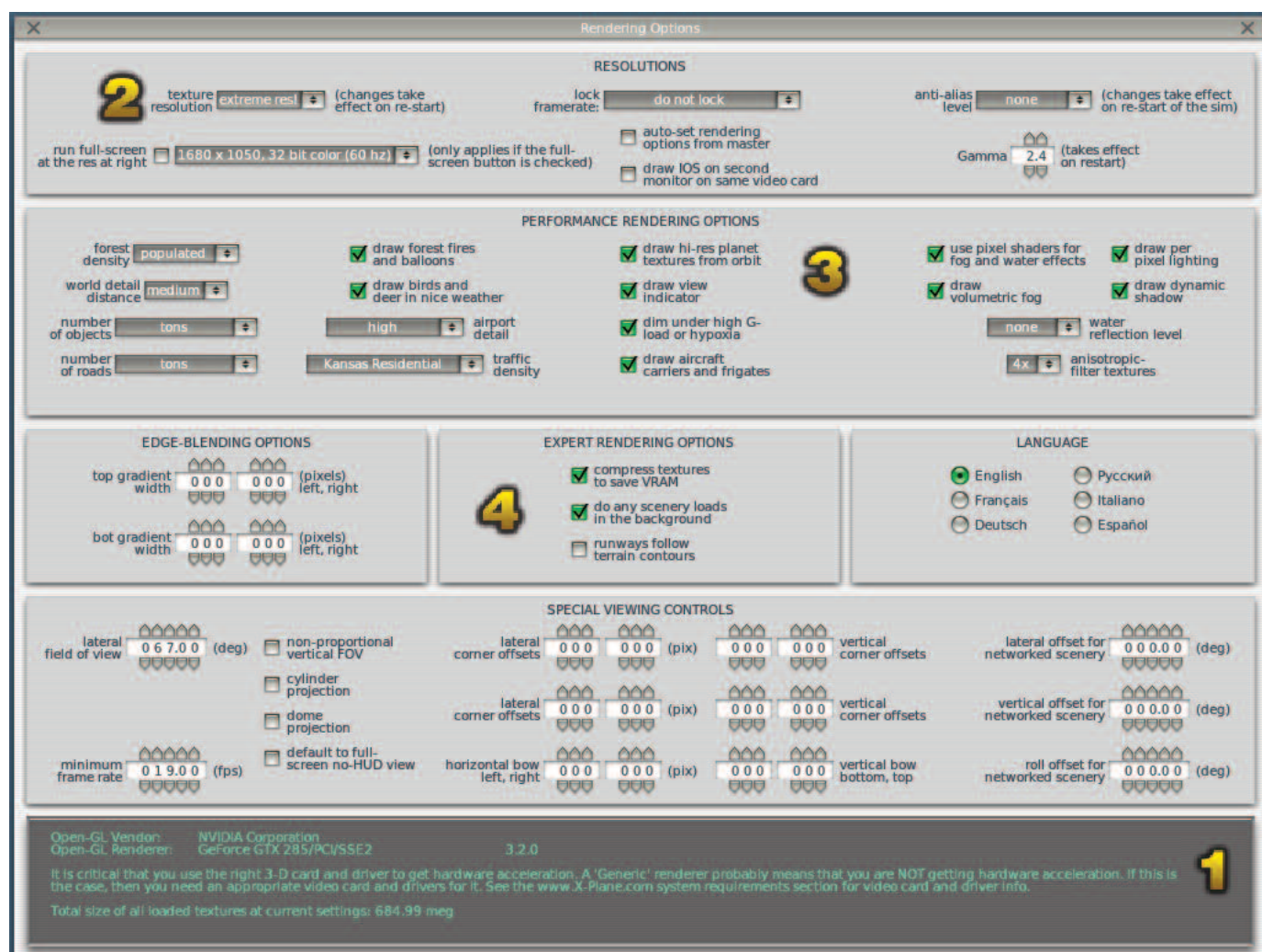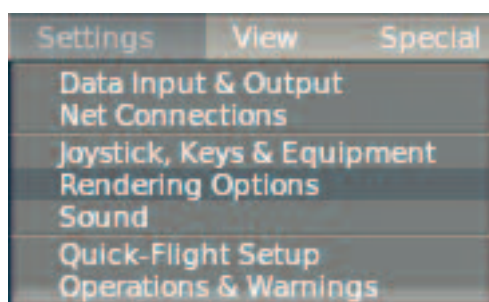
these are my rendering configuration values.

1 Starting at the botton of the Rendering options window we can see the information we were looking for. On the last line of all the green text you'll find:

"Total size of all loaded textures at current settings: .... Meg"

This is where you will find the video card requirements you need. Load the aircraft at your biggest object based airport. To have good performance that "meg" number should be less than your video cards memory. In my case it says almost 685 Megs at Salamanca - Matacan Airport. That's a lot of memory, but because I have a 1GB video card, I should not worry about it. However, the video memory is not the only piece to the puzzle that determines how well your sim will perform!

2 So what happens if you have problems with video memory? What if you have an old computer and you want to fly the Mentor and see it like you see on the images or videos posted. Well I have to tell you that the more differences you have in power (less) compared to my computer specifications, the worse your Mentor will perform or look in sim.

As you can see on my rendering options I have "Extreme Resolution" on textures and the top screen resolution my monitor can handle. Extreme resolution means to have the textures show just as they look when I created them in an image program, and as you see in videos and images online. I put a lot of noise in the specular reflections, so if you downgrade the texture resolution you will lose those details that makes the plane look best. Lets take a look to 3 configurations... to see how x-plane Render textures:

Extreme Resolution!

Normal

**Walk around**

Minimal

It may be difficult to see the differences between Extreme resolution and Normal in these screens-

hots but I can assure you there are. Externally, the 'Normal' setting may look okay, but on the gauges I use a texture for illuminating the clocks at night, so you'll start to see everything with more blur. More so, the 'Minimal' setting is an unflyable option. Yes, on that resolution the VRAM on my compu-ter will be excellent: 64 Megs. However, I cannot see any numbers on the gauges. Not for me!. Sorry. In the end, all that matters is that you're comfortable with whichever settings you choose!

Also on this part of the rendering options, you can see the antialiasing level. I have set it to

none, but as you can see on my screenshots I actually have it enabled. How do I do so?
Well, because my video card is made by NVIDIA, so I use a software called Nhancer:

http://www.nhancer.com/

I don't know if that solution works on Mac or Linux systems. Additionally, I'm not aware of what ATI of-fers, But for those that have NVIDIA and Windows, I recomend the use of Nhancer to have antialia-sing made by the video card and not the program (X-Plane). This will help to save some frame rates.
(*Sorry for the screens on spanish of Nhancer, but I think you will be able to understand it!*)
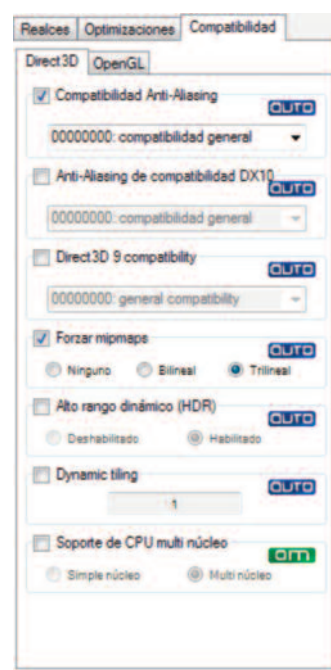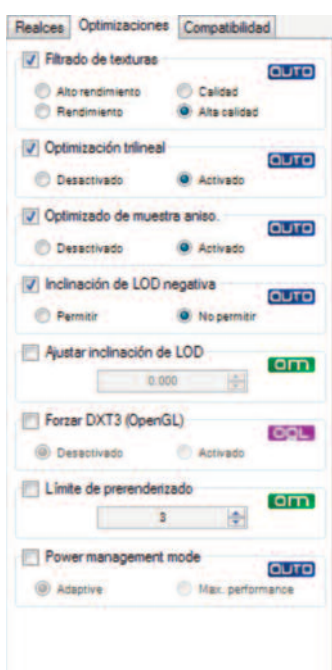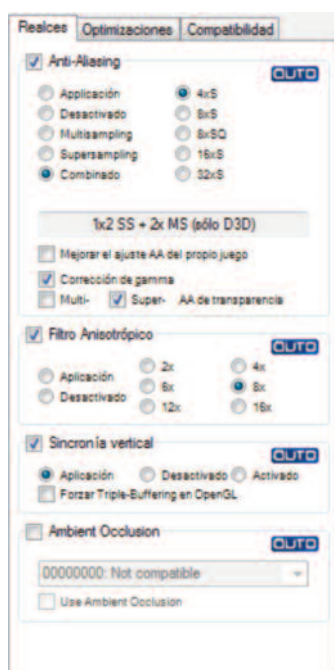
3 **N**ot much to say about the performance rendering options. You can gain a few more FPS modifying some of the options you have here, but I really only pay attention one option: "Draw per pixel Lightning". If you want to have the same rendering and gorgeus Mentor as the images you've seen then activate this option. Here you have two images with and without this option:
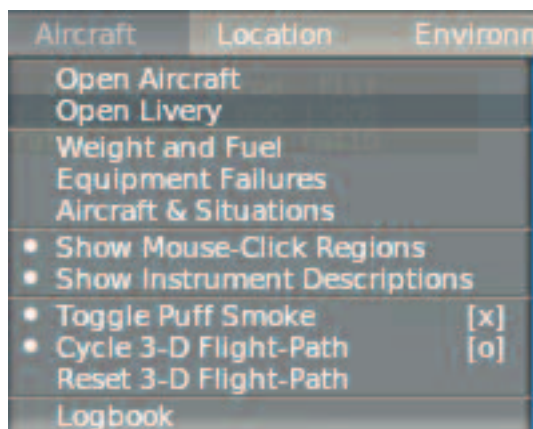

On the left you have the option of Pixel Shader on, and on the right it's turned off. You can see the differences, so I'll let that do the explaining. The only good thing about deactivating the pixel shader lighting option is that you will have more FPS, so I recommend having it turned off if you desire more FPS to speed up your sim fluidity. It's important to note that this is a hot option, so you can fly and activate or deactivate it without restarting the sim. This is good when you are in the middle of a flight and you need some extra frames or more detail!

4 Lastly, I want to talk a little about the "Compress Textures to save VRAM" option. If the textures I use were 1024 pixels in resolution I would recommend to deactivate this setting to see great textures, but since I am using 2048 pixels for the Mentor, I recomend to activate it to save VRAM! With 2048x2048 you won't notice a huge difference, and the setting will save VRAM!

4.2. Liveries.

You have loaded the plane, it's parked on the platform and maybe you miss something. You like the yellow and white paint but want something a little different. I have created five more liveries for the Mentor that hopefully will satisfy your wants for a different livery. To choose one of those liveries, you have to go (again) to the top menu in the "Aircraft" selection. Then navigate to 'Open Livery' and it will open another menu. Just select the one you want and click on the 'x.'

T34cMentor
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JROLLON PLANES

Default Paint

Mentor Black

Mentor Green

Walk around

Mentor Metal

Mentor Red

Mentor RedAll

Walk around

4.3. Cameras (Pilot View)

If you haven't heard of this plug-in...

http://www.xpluginsdk.org/pilot_view.htm

...I think you should give it a try!

Pilot view lets you pre-define several camera views in your plane. With the press of a key you can navigate through those views. Also you can define limits on the movement of a camera. For instance, if you're in the cockpit you can make it so the camera doesn't allow movement out of it. No more problems putting head through glass!

Usually people that move the camera with mouse don't have problems with camera views, but if you have any track head movement hardware (like TrackIR) you should test this plugin.

I have defined eight camera views, internal and external ones. Two of them for pilot and co-pilot positions, two more for instruments so you have better control over them, and the last four are external views.

View 1 (has limits)

View 2 (has limits)

View 3 (has limits)

View 4 (has limits)

Walk around

View 5

View 6

View 7

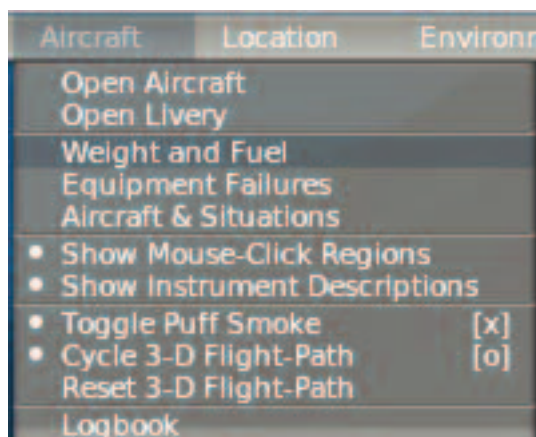View 8

4.4. Specifications. Limits.

I won't put hundreds of limits here, just the most important ones, so here we go!:

|	
Vfe-m (Maximun allowable speed with flaps full deployed)	130 Knots
Vfe-1 (Maximun allowable speed on first position of flaps)	160 Knots
Vle (Maximun allowable speed with gears down)	135 Knots
Vs (Stall speed with all flaps retracted)	85 Knots
Vso (Stall speed with full flaps deployed)	65 Knots
Vne (Maximun allowable speed)	275 Knots
PosG (g forces positive)	+ 6
NegG (g forces negative)	- 3
MTOW (Maximun take off weight)	4,300 lbs
Service ceiling:	25,000 ft
Maximun inverted flight time	6 seconds

Better stay below these numbers, if you don't want to pay again for the same plane because yours is broken! hehe.

Walk around

Now, what about fuel? You want to know where to fill it and how much, right?
Well, for filling the two tanks on the wings , you have to go to the top menu. There you can choose the "Weight and Fuel" option.

Aircraft	Location	Environn
Open Aircraft		
Open Livery		
Weight and Fuel		
Equipment Failures		
Aircraft & Situations		
• Show Mouse-Click Regions		
• Show Instrument Descriptions		
• Toggle Puff Smoke		[x]
• Cycle 3-D Flight-Path		[o]
Reset 3-D Flight-Path		
Logbook		

As you can see on the image below, you can choose 532lbs maximun per wing tank, and with full tanks you have more or less the equivelant of flying time that is displayed to the right of the Fuel TOTAL number. So in this case 5.0 hours flying at 160knots cruise speed.
This aircraft gets just around 950NM max range with full tanks.

fuel TOTAL		(lb) 0 0 5.0 (hr)
fuel LEFT	532	
fuel RIGHT	532	
fuel TANK	532	(lb)
fuel TANK	532	(lb)
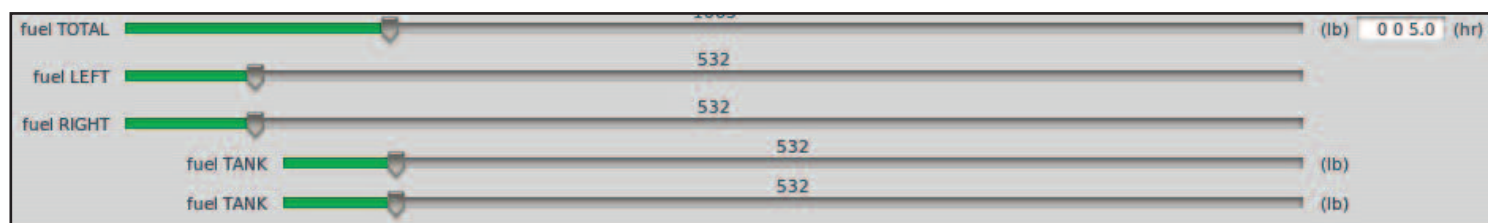
4.5. Manipulator technology.

The Mentor has a full on 3D cockpit that also displays in 2D mode. Because of this, I have done my best to create the best experience possible when it comes to flying. The best solution right now for X-Plane, I think, is manipulator technology. There are still some improvements to be made with manipulators in X-Plane, but even still it provides the greatest flying experience to date.
The Mentor has 167 manipulators. Not all switches can be manipulated, but a good number of them can. I will describe some of them, but I'd really like to discuss a *tricky one!*
There is a hidden trigger on the **thermostat** at the top-front of the forward pilot seat.

If you put your mouse over the thermostat, the cursor will change to a hand "ready to push a button". If you press it and it is not raining or there is not a broken glass because of a bird strike, then nothing will happen. However, if it is rainning, then you can hide the rain with this trigger, and also that disgusting blood over the window. (still the bird strike has to be fixed by laminar, because there is a bug on x-plane about it)
Why have I given the option to hide these features? Well, rain in 3D cockpits is still not well represented in X-Plane. You may like it, but when it is raining if you fly above the clouds and there is no rain around you, you will still see raindrops on the windshield. This is why the trigger is available! Pressing the trigger will continue to toggle the rain back and forth in 'on' and 'off' positions. The same applies to bird strikes (once Laminar fixes a minor bug in X-Plane).

Ok, enough technical stuff! Let's get inside the cockpit.

Cockpit

The cockpit of the Mentor as well as the other variants of the T34, are a dual cockpit ready to teach new pilots on their career to become a pilot with enough skills to fly on jet planes.
For that purpose I built the turbo version of the Mentor, and every control/instrument on the pilot and co-pilot panels are shared or different depending on the purpose of instruments or controls. The position of the pilot is always in the front seat. This is the only spot you can manipulate the parking brake and the short circuit panel (short circuit panel is not working in 1.0 version but in future versions I will implement some of the fuses).
Right now it is not easy to connect two people in the same cockpit online but there is a page which explains it:

http://home.earthlink.net/~x-plane/FAQ-Copilot.html

I have tested this possibility only recently but am still not having the desired results. My focus will soon be in this direction because I believe having another person to fly with in the same cockpit would be a lot of fun! Add to the fact that this aircraft is made to be flown in such a way and it's sure to be a blast! For now you can use the plane by yourself. I will always recommend flying online on IVAO or Vatsim to learn with others but it all comes down to a matter of preference in the end, so do whatever you are most comfortable with!

1. Landing Gear Lever
2. Landing Light Switches
3. Landing gear position indicator
4. KLN900 GPS unit
5. Flap Position Indicator
6. Warning lights console
7. Angle of Attack indicator
8. Indicated Air Speed gauge
9. KA41 Autopilot control unit
10. Altimeter
11. Vertical Speed Indicator
12. Artificial Horizon
13. RMI unit
14. Turn coordinator and Slip Gauge
15. COM Radio control Switch
16. NACWS unit

17. CDI Unit
18. Main warning Light console
19. Clock
20. Power load Indicator
21. Torque Indicator
22. ITT indicator
23. Prop. Tachometer
24. Fuel flow Indicator
25. Engine tachometer
26. Oil system Indicator
27. Left fuel tank indicator
28. Right fuel tank indicator
30. Ignition and Starters
31. Compass
32. Accelerometer

1. COM Radio panel
2. Aileron Trim wheel
3. Elevator trim wheel
4. Flap control lever

5. Rudder trim control
6. Throttle lever
7. Propeller pitch lever
8. Mixture lever

Cockpit

1. Electrical control panel
2. ADF radio panel
3. VOR Radio panel
4. Audio panel
5. KT67 Transponder

6. Avionics panel
7. Lighting control panel
8. External light heat and fuel pump switches
9. Oxygen and cabin pressure panel
10. Circuit breaker panel (not funtional on 1.0)

1

Landing Gear Lever.
You can map the control of the Landing Gear lever to a joystick or keyboard, but this one also has a manipulator where you only need to click to change its position up or down. One special feature it has is a red light that illuminates when the gear are in transit.

2

Landing Lights switches.
Manipulated with two toggle manipulators for switching on left and right landing lights.
Both lights are situated on the rear landing gears. Once the gear are up the light will continue to be on unless manually switched off, so it's always good practice to switch these off!

3

Landing Gear Indicators.
When the landing gear are in down position these indicators will show an icon of the landing gear.

Once the Landing gear start to be in transit the icon of the tires will be substituted by a black and white striped one...

...until the gear are locked in the retracted position where the "UP" word will appear instead.

4

The KLN900 GPS unit.
This GPS is self costumized version of the default X-Plane gps unit.
All buttons of the GPS unit are operative except the NRST one. Clicking them will let you navigate through the pages of the default GPS. The right rotary knobs change pages and chapters like the default one. The left rotaries let you zoom in and out.
I have added 2 more functions to this GPS. These are:

Default EFIS map
If you press one of the two EFIS buttons on the GPS unit, the screen will show the default X-Plane EFIS map, but this time the aircraft is in the center of the screen. In this case the function of the left rotaries change and the "fine tunning" rotary is for zooming. The bigger knob is for changing pages on the EFIS map.
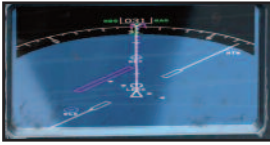
You will notice that the aspect ratio of the EFIS map is deformed to fit inside the GPS unit screen.
To leave the EFIS pages you have to press the EFIS button again.

Set Desired Altitude.
If you press the ALT button you will be changed to the Target Altitude page where you can set the desired altitude to be reached by the plane in autopilot mode.

Left and Right "fine tuning" rotaries will change their functions. The left one will allow you to set high number changes, and the right "fine tuning" one allows for small number changes. Just put the mouse over one of the rotaries and the icon will be changed to an open hand ready for "grabing." While pressing the left mouse button (or button on Mac) and moving it left or right, you will be able to set your desired number. To leave the Altitude screen mode press the "ALT" button again.

Note: due to manipulator technology on the right rotary increase will be moving the mouse to the left instead to the right. And to decrease, move to the right instead the left. That is because it depends on view position.
Note2: When you set an altitude, you are modifying a number. That number will always be rounded to the nearest 10.

Flap position Indicator.
Shows position of flaps in percentage value.

Warning Lights Console.
Four warning lights can be seen here:

A. Wheels. It will illuminate when...
    1. Flaps are extended but not the Landing Gears
    2. Throttle is at idle position with gears up.
B. Lh Rh Open. Left or Right Inboard gear door open. Not simulated in version 1.0.
C. Master Caution. Will illuminate when:
    1. Any system failure
    2. Bad plane configuration is found
    3. Stall situation
D. FIRE. When this lamp illuminates, it's best to land as soon as possible!

7

AoA indicator.
Displays current angle of attack of plane, **in units**. Not degrees!
A desired AoA for landing would be 20 units. 30 Units is stall.
When the engines are shut down, the needle will be on the off-orange position.
Just when you are above ground a meter (3 feet) or so, the needle will jump to the right position. Don't worry, it's normal.

8

Indicated AirSpeed Gauge.
It will display current airspeed in Knots. Remember this is an indicated speed, and not true.
The red needle indicates the "never exceed" speed. You may break the plane if you are above that mark!
If the speed needle is going back to zero but you have speed, you may have ice on the pitot tubes. Activate anti-ice.

9

KA41 Autopilot Control Unit. (Based on real unit, but self customized in some areas).
The autopilot of the Mentor is very basic. It has two lateral modes and two vertical modes.

If you press the test Lamp button (and hold it) you will be able to see all modes illuminated**.**
1. NAV GPS Source. As it's name indicates, this changes the source of the Nav signal for the autopilot. It can be Navigation (VOR radios) or GPS. To change between them just press the NAV GPS button.
2. GPS APR. This button toggles on/off the autopilot. When the Autopilot is on, an "ARM ACTV" white label will appear. If you press the same button again you will deactivate the autopilot and an aural warning will be heard.
3. LVL CHG. When you press this button and you had already set the desired altitude on the GPS ALT mode screen, you will start the process to change altitude.
   A. To climb. Set a higher altitude on the GPS ALT screen. Press the GPS APR button to engage autopilot. Press the LVL CHG button, and increase power. If your power was at full, just release a bit of power, let the plane automatically level itself, and increase power again.
   B. To Descend. set a lower altitude on the GPS ALT screen. Press the GPS APR button if it wasn't set before. Press LVL CHG button (an ALT ARM orange label will appear) and decrease throttle power. While the plane is trying to reach the desired altitude the label will be illuminated by an orange ALT ARM. Once the airplane is near the the desired altitude then a Green ALT label will appear.

To set a desired course:
As said before this plane has two sources of lateral navigation. Because the default GPS cannot set a number of waypoints at one time it can only be programmed point to point. To fly with the GPS you should set the GPS source on the autopilot to the NAV GPS button.
If you set the frequency of a VOR or VOR radio, you can navigate with the autopilot if you set NAV on the NAV GPS button.
Both lateral and vertical modes are linked together so every time you set the autopilot to 'on' you won't be able to control the plane with the joystick. Because of this it's better to control it with the joystick or trim wheel before you set autopilot, and when you reach your desired heading then you can set the autopilot to 'on.'

If GPS or VOR radio is not tuned to any in range radio station then when you press the GPS APR button the plane will be ruled by the pitch/roll autopilot mode. The plane will try to maintain the pitch and roll attitude it had before activating autopilot. As such, the best way to follow a course is:

1. Tune your VOR Radio and select the desired course rotating the knob of the CDI Unit (num.17) or select a desired waypoint on the GPS.

2. Select the source for the autopilot to be driven by; GPS or NAV.

3. Turn your plane to a heading to intercept the desired course. Never exceed 90° angle of your heading with the desired course. It's better to stay close to 45°. If you don't, the plane may not be able to "catch the track."
You can do this with a joystick and maintain the heading with trim controls.

4. Once you are stabilized, press the GPS APR button. The plane will maintain the pitch and roll.

5. If everything is correctly set, then the plane will start turning to the desired course as you approach it.

 IMPORTANT Note: If you move the flight controls too much you may deactivate the autopilot, BUT be careful. Labels may still be illuminated (you will hear an aural warning). It is very important to reset the autopilot when this happens. Press the "GPS APR" button until you see the label "ARM ACTV" disappear. Once this happens you will be able to use it again, pressing the same button as before!

10

Altimeter
Displays altitude in feet. To set the altitude pressure use the knob on the bottom left of the gauge (yellow square). You can set pressure in Hg by holding the left mouse button and moving it right or left.
For a quick reset of the standard 29.92 pressure, just click the knob.

11

Vertical Speed Indicator
Displays current vertical speed in feet per minute.

12

Artificial Horizon.
Displays bank and pitch of plane. You can calibrate pitch bar with the botton right knob.
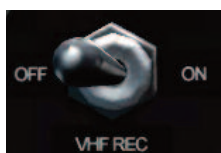
13

RMI Unit
This is a compass with two needles that point to ADF1 and ADF2 directions. ADF1 (yellow) is set by pilot and ADF2 (green) is set by co-pilot. To set the RMI Unit to 'on' you need to turn on the "RMI" switch on the right panel. If this is not set it will always point to the North direction.

14

Turn and Slip coordinator.
This one is a four minute mark turn coordinator.

15

COM Radio Control Switch
This switch is necesary to see the COM display. If you see on the COM panel that the power switch is on but you don't see any numbers, check this switch first.

16

NACWS
Is a screen where you can see the following information:

1. On top, you can see your current heading.
2. Below you can see distantce in NM to tuned VOR or GPS station.
3. Date and time in UTC
4. Distance to waypoint of GPS. If the VOR Radio is tuned "EN-ROUTE" word will be shown. If not, it will display IDLE.
5. Longitude and latitude aircraft position numbers.

If ADF radio is not powered on, then the 'FAIL' message will appear on the screen.

17

CDI Unit.
The CDI can set a desired course heading with the botton left knob.
Deflection to the left or right of the needle will indicate to us the relative position of the course respective to the plane.
A "TO" or "FROM" arrow will appear when the station is in front or rear of the plane for the selected course.

18
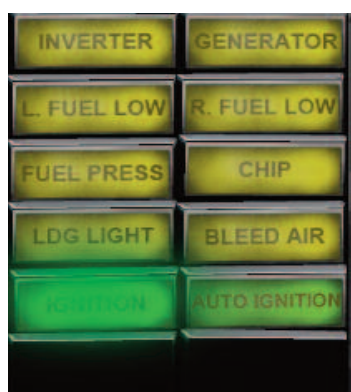
Main Warning Light Control
Will indicate status of the airplane:

1. Inverter: Turn on inverter to Inv2 position
2. Generator: Low voltage output or generator failed.
3 & 4. Low level of fuel. Aprox 80 lbs left.
5. Fuel Press. Low pressure from engine driven boost pump.
6. Chip. Particles of metal present in oil system
7. LDG Light. Landing lights are on.
8. Bleed Air. Air over temperature.
9. Ignition. Ignition on.
10. Auto Ignition. Auto Ignition armed.

19

Clock
Displays local time.

20
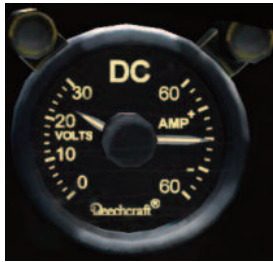
Power indicator
There are two indicators on this gauge.
On the left part we can read the current available voltage.
Amperemeter shows the load to or from the battery.

21

Torque Indicator
From 400 to 1015 Ft.Lb is the normal operating range

22

ITT Indicator
400 to 690º C is the normal range.
695º C is maximum continuous.
1090º C is maximum.

23

Propeller Tachometer
1800 to 2200 RPM is normal operating range.
2200 maximum.

24

Fuel Flow Gauge
Displays current fuel flow in Pounds per Hour x 100

25
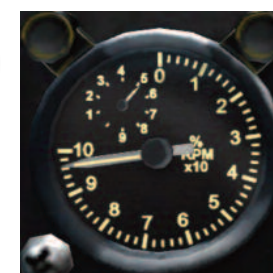
Engine Tachometer
Shows the Turbine N Speed 101.5% is maximum.

Oil Status
Upper gauge shows Oil Temperature.
Botton one shows pressure.

Fuel Quantity.
In Lbs x 100. Left and right tanks.

Accelerometer
Shows the G forces the plane has. Maximum and minimum are set on the upper and lower needles.

Electronic panel.
Here you can turn on the battery, generator and inverters. In the 1.0 version of the Mentor the #1 Inverter is like "off" position. #2 is like "on" position.

Transponder
Has several modes. Each mode will be illuminated when turned on. The Standby position is equal to "on". Transmision is on ALT mode, and Test on test.

Radios and audio panel.
ADF radios are necessary to be turned on (by default) to have AWCS functional.
ADF radios have test buttons, standby and Transmision Receiving modes (normal mode)
To tune ADF radios, due to limitatons on manipulators, you have to proceed by:
ADF radios can have four numbers. FIRST, choose the right pair of numbers with a click and drag mouse action. Then the other two left ones with clicking left or right on the left knob to increase or decrease them.

To tune VOR radios:
FIRST choose the number on the left of the decimal with the left knob. Once you have set the hundreds number, use the right knob to set the decimal part.

With the audio switches you can turn on or off the morse audio signal from the stations tuned.

Avionics and Light System
To set good cockpit lighting I made the avionics switch be auto-matically on when the battery is set to the 'on' position.

The RMI switch is necessary to be switched 'on', to see RMI compass working.
With the light knobs you can control lights of instruments, backlight panels and flood on cockpit.

On this panel you can control the external lights of the plane, pitot heat for icing conditions, and the fuel pump.
The oxygen regulator panel has a suppy on/off switch that will bleed air in the cockpit to maintain good pressure conditions.
Normally, by default, it's set to on.
The gauge will show the differential of pressure between the exterior and the cockpit.

For tuning the COM Radio use the same method as the VOR radio. Manipulation here can be used on any of the pairs of knobs.
Due to limitations in the manipulation system, to tune decimals you have to move the mouse to the left to increase and to the right to decrease.

COM radio won't show the frequency unless you turn on the VHF rec switch (#15)

Open Cockpit Handle.
You will be able to manipulate the cockpit door with this lever only between 0 and 12,000 feet AGL.
It is possible to open the cockpit on the pilot and copilot sides.
Loss of pressure is not simulated when opening cockpit door.

Checklists

Before Start.

Controls	Check movement
Trims	Set zero
Landing Gear Handle	Check down
Starter, Ignition and Auto-Ignition	Check off
Battery	Set On
Voltage	Check
Fuel Qty	Check
Gear position indicators	Check down
Air bleed	Check switch on
Parking brakes	Set
Condition lever and Mixture	Down
Landing Lights	Off
Inverters	num.1
Aft cockpit RMI	On
Nav and strobe lights	Off
Pitot heat	Off
Fuel Pump	Off
VHF Radio	Off
Instruments and console Lights	As desired
Navigation lights	As required
Pitot heat test	Turn switch on and see how Ampmeter drops. Turn it off
Canopy	Both closed and locked.
VHF Rec	On
COM Radio	Check on.

Engine Start

Propeller area	Clear
Condition Lever & Mixture	Full and rich mixture
Ignition switch	On
Auto Ignition	as desired
Starter switch	Maintain on until N1 reaches 20%
ITT	Monitor
Oil Pressure	Check more than 40 psi.
Generator	On. Light off.
Inverter	nu.2. Light off
ADF Radio	On
Vor Radio	On
NACWS	Not Fail screen
GPS	On

Checklists

Before Taxi

Brakes	Hold
Parking Brake	Release
Chocks (not simulated)	Removed
Brakes	Checked
Transponder	Standby (on position)
Nav Radios, GPS	Set as required
Altimeter and NACWS	Checked and SET
Landing Lights	As Required

Before Takeoff

Brakes	Hold
Propeller test	Check rpm between 1,950 and 2,150
Oil pressure	Checked (between 65 to 80 psi)
Trim	Set (at full power aileron Trim full to right)
Flaps	Checked
Controls	Free movement
Radios and GPS	Set
Instruments, Fuel Quantity	Checked
Pitot Heat	As required
Strobes and Navigation lights	As required
Transponder	On (ALT Mode)

Takeoff

Positive climb	Gears Up. Check.
Flaps	Up (90 Kias Minimum)

Cruise

Instruments	Checked
Fuel Quantity	Checked
Cabin Pressure	Checked

Checklists

Landing

Landing Gear	Down and Locked
Brakes	Parking brake off
Instruments	Checked
Landing Lights	As required
Flaps	As required

After Landing

Flaps	Up
Landing Lights	As required
Transponder	Off
Pitot Heat	Off
Navigation and Strobe Lights	As required

Engine Shutdown

Brakes	Hold
Parking Brake	Set
NACWS	Off (ADF Radios off)
Throttle	Idle
Auto Ignition	Off
Inverter	num.1
VHF Radio	Off
Landing Lights	Off
Condition Lever	Fuel Off
ITT	Monitor
Navigation Lights and Strobe lights	Off
Battery Switch	Off
Trims	Neutral

Thanks

First, I would like to give thanks to my girlfriend for all the support and patience she has with me. ¡Muchas gracias guapa, te quiero mucho! She gives me the patience to make this work allowable and continue on day by day.

My parents and friends, especially Oscar. He waits until I finish those hard periods of work to continue playing those games that we like most outside of simulators.

Austin Meyer for allowing me to continue making this a fun job, and for giving me the oportunity to share my work with all future buyers of X-Plane 10 for the same price of the simulator. I always wanted to give all people my work for just the price of the simulator.

Ben Supnik for the nice and fast responses to my questions. Really, thanks!

Anton Volkov for getting climbing aboard this crazy adventure of releasing the "best plane ever." One day we will finish it Anton (don't know if it will be the best.. but for sure will be the most entertaining and the most debated as well.. hehehe)! I am speaking of the CRJ-200.

Cameron for giving me his support and connecting me to a lot of people. Hope you've had a good vacation in geishas country! ;-) and also for the correction and translation of this manual.

Tom kyler for his help, and Simon for his support with the interview and videos.

Alexander - Pancir for his great plugin for Max!! BIG THANKS!!!!! :)

Ben Russel for his talks from the forests of Australia as well as his support and Goran for his interest and trusting me to help solve some problems, as well as his continued support....

And to those I have not mentioned, I also want to give you a big THANKS!!! Thanks for your continued trust in my products and continued purchases, and for the feedback to help make my products better! Last but not least, to you, my customer! You have given me the opportunity to share my art with you and I truly appreciated it! Thanks!

¡Gracias!