Addon for:
Microsoft® Flight Simulator 2004

aero*SOFT*™

Airbus Holiday Destinations
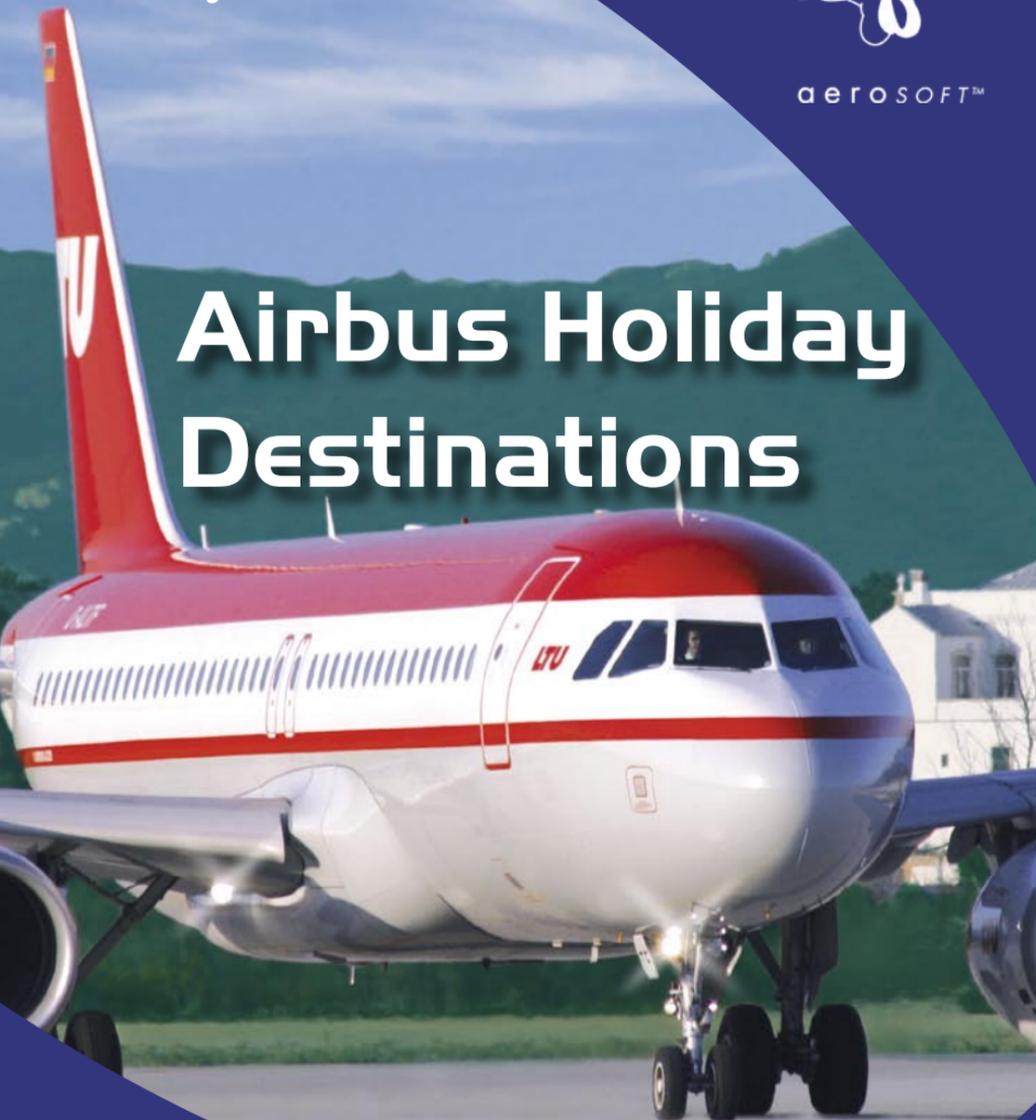
Manual

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Airbus-
Holiday Destinations

Manual

Add on for
Microsoft Flight Simulator 2004

Content

The Aircraft

In General

Ever since their foundation in 1955, LTU highly values to be a passenger friendly, reliable airline using only modern and economic equipment. Following this tradition LTU decided to switch to an Airbus only fleet by the year 2003. Their fleet in winter 2004/2005 comprised of 24 aircraft of which are 10 Airbus A320-200, 4 Airbus A321-200, 7 Airbus A330-200 and 3 Airbus A330-300.

In our package you´ll find the modern fleet of an:

Airbus A320-200 and
Airbus A321-200.

To select one of these aircraft go to „Select Aircraft". From the list „Aircraft manufacturer" choose the entry „AIRBUS BY AEROSOFT". The list „Aircraft model" will show the available Airbus models. You can select various liveries through the list „Variation".

All the aircraft have a 2D-Panel as well as a virtual cockpit (3D-panel). In order to use the instruments we recommend using the 2D-panel.

In the following we will describe all the instruments, systems and how to use them. In addition we have compiled a tutorial flight guiding you from start to finish. We strongly recommend to work through this tutorial flight to get used to the elementary functions of the Airbus panel.

LTU 2005 Airbus Panels

Since first arriving on the scene, Microsoft Flight Simulator has taken a rapid and vast development. The functionality of the aircraft, systems and especially the panels has more and more become like the real thing. Flight Management Computer have since taken command of the FS and therefore operating an aircraft in Flight Simulator has become more complex. Many new aircraft add-ons require an intensive study of the manuals before even trying to start up the aircraft.

This development has started a broad discussion in the Flightsim scene. There´s a group of virtual pilots who really enjoy flying a plane by numbers to have it as realistic as possible. The others would like a simple style cockpit, in order to hop in the plane and start flying without an intensive programming of the systems!

This time we have decided to develop an add-on which is easy to use but fun to fly even though not everything inside the cockpit is 100% realistic. Our Airbus panel and in particualr the Flight Management Computer is layed out for users who enjoy flying and do not want hours of stuying manuals.

Nevertheless you should take a couple of minutes and have a look at the following explanations and descriptions of the aircraft and their panels. And please do not forget to fly the tutorial, its the best and fastest way to get aquinted with this program.

Main panel layout

The main panel holds the main instruments of the aircraft:

- four main displays: Primary Flight Display (PFD),
  Navigation Display (ND), Engine/Warning Display (E/WD) and
  System Display (SD)

- the Flight Control Unit (FCU)

- the EFIS Control Panel

- the Standby-Instruments

- Gear lever, altimeter setting, warning lights

- Buttons for additional panels

Buttons for additional panels

Via these three buttons located beneath the Navigation Display you can call up the Lower panel, the Pedestal with the FMC and the Overhead panel.

Like seen on the picture of the Main panel, the System Display can only be viewed partially

 Click on the left button to call up or close the Lower panel.

The System Display can now be viewed at its full. In addition the lower Panel shows the Standby-instruments for VOR and ADF, the Clock, the Dimmer for the displays, the Gear Lever display and the Autobrake panel.

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The button in the center calls up the Pedestal and the Flight Management and Guidance Computer (FMGC).

A LEFT click on your mouse will call up or close the Pedestal:

A RIGHT click on your mouse will call up the FMGC:

NOTE: You can call up a zoomed FMGC with a left click on your mouse in the display area of the FMGC in the Pedestal.

 The left button calls up or closes the Overhead panel:

NOTE: The Overhaed panel can also be opend with a click on the upper Main panel.

Using the EFIS

The EFIS (PFD, ND, EWD, SD and FMGC) uses vectorgraphic technologie to display data. Because of this the System displays can be zoomed without quality loss. This also accounts for the dimming of the displays.

The displays all have two click zones. The following picture shows the zones on the ND:

If you click on the center (displayed in light grey), the display will be zoomed in a different window. You can position the display anywhere you want by by dragging the window outside of the here shown grey area. Another click on the middle will close the zoomed window and the EFIS will appear in its normal position on the main panel. You can also use this option in the virtual cockpit view.

NOTE: In zoomed view the EFIS window can be undocked and dragged to a second monitor.

Zoom your PFD, ND and E/WD at the same time, and you´ll get the following view:

This view can be very helpful in various phases of the flight such as take offs and landings when flying IFR.

The Main panel

This chapter will describe the main elements of the Main panel:

Warning lights

The Warning lights indicate a fault in one of the aircraft systems. As soon as such a fault is detected the Master Caution- and/or Master Warning light (depending on the importance of the fault) will light up. In addition you will hear a warning sound and a message in the Engine/Warning Display (E/WD). You should always take a look at the E/WD to find out the reason of the warning.

The Warning lights are switches. If you press these switches once, the Warning sound will terminate and the Warning lights will stay illuminated, meaning you have taken notice of the fault but haven´t established its reason yet. Pressing the Warning light for a second time will switch the warning off meaning you have confirmed the warning even you have not

yet taken action against it.

Clock in the ND

This switch is for the stop watch in the Navigation Display. You can start it via a mouse click. A second click will stop the clock and a third will set it back..

Altimeter setting

This instrument displays the pressure in Inches or in Millibar for the set barometric altimeter (equal to Hektopascal).

To switch between these options click on the equivalent symbol. The large outer knob switches the option.

To change the value, click to the left or right of the knob (you will see a „+" or „-"). Or you can use your mouse wheel, if you have one, to change the setting.

After take off you need to change the setting to the standard value when passing the transition altitude. Click on the center of the knob and you'll see "STD" in the display. Another click on the knob during descent (transition altitude) turns the value back to the required setting.

Switches for Flight Director and ILS-Displays in the PFD

These buttons can turn on/off the Flight Director and the ILS display on the ND. You should switch on these options especially during landing.

NOTE: As soon as you have switched on the Autopilot-Mode on the Flight Control Unit (FCU), the Flight Director will automatically be switched on.

EFIS Control Panel

You can configure various displays in the ND with these elements.

The upper buttons switch the displays of the navigation elements in the ND on or off. The following functions are available:

- CSTR for waypoints (no functions in FS)
- WPT for Waypoints / Intersections
- VORD for VOR/DME
- NDB for NDB
- ARPT for airports

Like in reality only one button can be activated at one time. This means that only one selected navigation element can be displayed in the ND.

The left knob selects the display mode:

- LS for Landing System: used during landing
- VOR shows the VOR-information in Rose-Mode
- NAV used for navigation in Rose-Mode
- ARC shows navigation information in Arc-Mode; this mode is the most commonly used.
- PLAN shows the flight planned route (with a northerly alignment)

The right knob selects the range of the ND. You can choose from 10 to 329 NM.

Both knobs can be set via the mouse as well as the mouse wheel, if you have one.

The switches beneath these knobs determine which functions the pointers in the ND should have. You can select between VOR- and ADF-display. Brought to a center position will turn the displays off.

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Flight Control Unit (FCU)

This part of the panel controls the Auto pilot modes.

NOTE: All knobs, used for setting various values, work in the following way: You can click either to the left or right of these knobs (the mouse curser will show a „-" or a „+") which changes the value up or down. Clicking with your LEFT mouse button, changes the value in small steps. Clicking with your RIGHT mouse button, changes the value in larger steps. In this way you can quickly change values. You can of course use your mouse wheel to change values if you have one.

From left to right you can change the following values:

Speed settings:

Click to the left or right to the knob (you will see a „+" or „-"), to change the speed setting. Clicking with your LEFT mouse button, changes the value in small steps. Clicking with your RIGHT mouse button, changes the value in larger steps. You can of course use your mouse wheel to change values if you have one.

A click to the center of the knob determines the speed mode of the Autopilot. A click with your LEFT mouse button activates the „Speed Selected Mode". The Autopilot will hold the speed set in the display. When activated, a yellow dot will appear to the right of the value. A click with your RIGHT mouse button activates the „Speed Managed Mode". Now the FMGC will take control over the speed depending on the aircrafts configuration. Three horizontal lines and a yellow dot will appear in the display when this mode is activated.

The SPD/MACH button to the left of the knob determines if the speed is shown in knots or in MACH.

The HEADING-settings:

Click to the left or right of the knob (you will see a „+" or „-"), to change the heading setting. Again, clicking with your LEFT mouse button, changes the value in small steps. Clicking with your RIGHT mouse button, changes the value in larger steps. You can of course use your mouse wheel to change values.

A click to the center of the knob determines the speed mode of the Autopilot. A click with your LEFT mouse button activates the „Heading Selected Mode". The Autopilot will hold the heading set in the display. When activated, a yellow dot will appear to the right of the value. A click with your RIGHT mouse button activates the „Heading Managed Mode". Now the aircraft will fly the route programmed in the FMGC. Three horizontal lines and a yellow dot will appear in the display when this mode is activated.

The button HDG TRK – V/S FPA on the middle part of the FCU allows switching between the HEADING- and COURSE display. If the COURSE-display is activated, COURSE-settings for the NAV1-radio can be set which is a very important issue for ILS approaches.

The button LOC right beneath the knob activates the Localizer-Mode of the Autopilot. The aircraft will now follow the Localizer during an ILS-approach.

The middle part:

The middle part of the FCU holds the buttons AP1, AP2, A/THR as well as HDG TRK – V/S FPA.

AP1 activates the Autopilot, AP2 has no function in this panel. The button A/THR activates the Auto-Throttle Mode. Please note, that the FADEC-System automatically activates the A/THR (see chapter about FADEC).

The button HDG TRK – V/S FPA has already been described above.

The ALTITUDE-settings:

The left knob is used for setting the altitude. For the outer knob click

with your left mouse button on the number 100 in the upper left or on the number 1000 in the upper right. You can hereby determine the steps in which to change the altitude settings which is very important when using the mouse wheel for changes. If you are only using the mouse buttons then you should set the outer knob to 100.

Now click to the left or right of the knob (you will see a „+" or „-"), to change the altitude setting. A click with your LEFT mouse button will change the value in steps of 100, a RIGHT click in steps of 1000.

A click to the center of the knob activates the Altitude-Mode of the Autopilot. This is also displayed by a yellow dot next to the set value.

The right knob sets the vertical speed. Click above or below the knob (you will see a „+" or „-"), to set the vertical speed. A click with your LEFT mouse button will change the value in steps of 100, a RIGHT click in steps of 1000.

By pressing the button LVL, the Autopilot will hold the actual altitude.

The button APPR activates the Approach-Mode of the Autopilot. The aircraft will automatically follow the Localizer and Glideslope during an ILS approach.

The Primary Flight Display (PFD)

The PFD displays all the information concerning the attitude and condition of the aircraft.

AP-Mode-Display

Attitude -Indicator

Set speed.

Airspeed -Indicator

Set Altitude

Altitude-Indicator

Vertical Speed.

Glideslope-Indicator
Localizer-Indicator

ILS-Code and Frequency   Course-Indicator and Heading Bug   Set Pressure
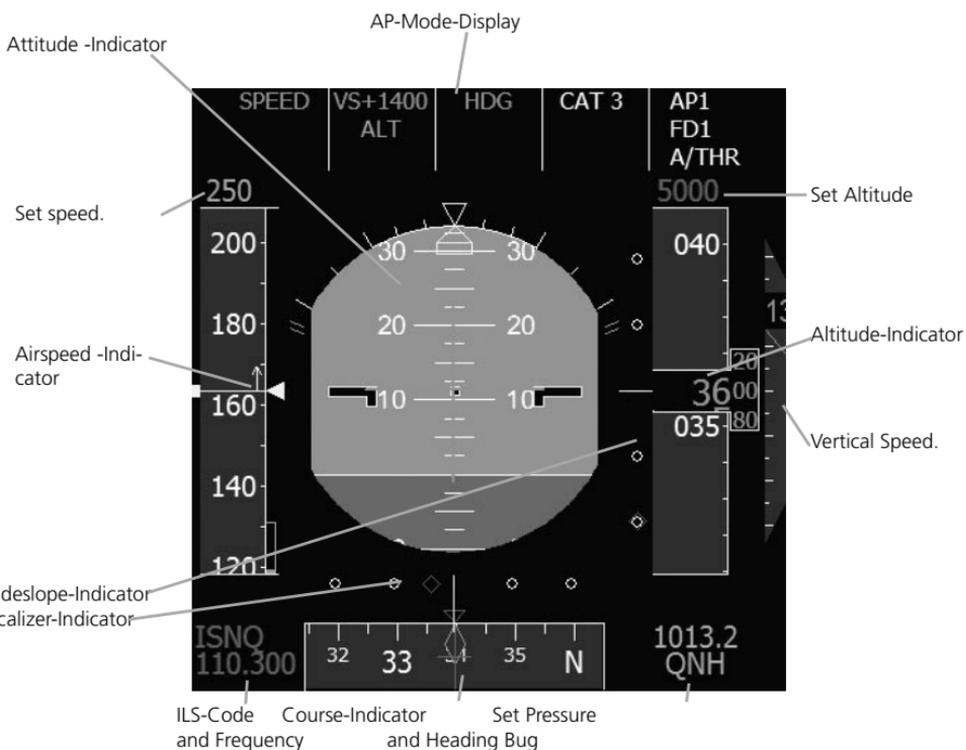
The Navigation Display (ND)

The Navigation Display is able to show all required navigational data. Various Display-Modes can be selected via the settings knob.

Our picture shows the most frequently used mode during a flight, the ARC-Mode.

Groundspeed

True Airspeed

Course, Distance to next Waypoint, estimated time to next Waypoint

Wind Speed and Direction

GS 253 TAS 273
270/20

TBS 264°
113.5NM
12:04Z

W

24 30

Indicator 1

BABOR

Indicator 2

CSO

Route according to FMGC

240 240

160 TBS 160

00'00

DTMB

VOR1
TBS
113.8 NM

VOR2
MON
18.8 NM

Set Navigational Display for Indicator 1

Set Navigational Display for Indicator 2
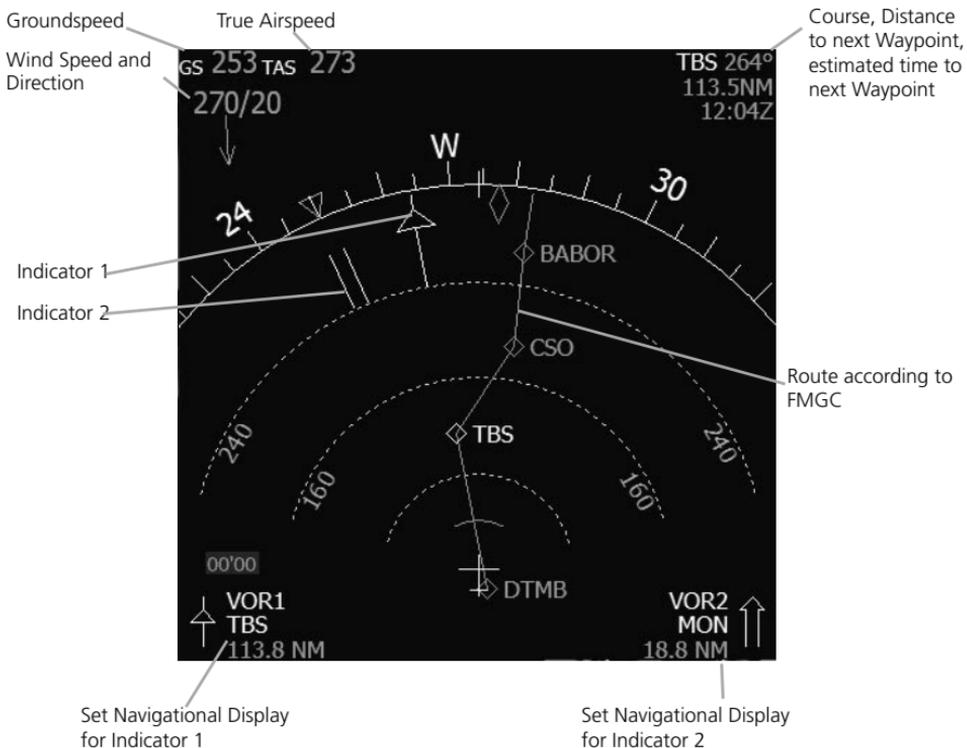
The Standby-Instruments

Besides the EFIS-Displays every aircraft has the so-called Standby-Instruments. In case of a failure of the EFIS Display these instruments back up all the required information.

Here you can find an airspeed indicator, an altimeter, an artificial horizon and a VOR- and ADF-Indicator. The standby-instrument for VOR- and ADF-indication has two switches, which can be operated with a mouse click. The left switch changes between VOR1 and ADF using the white indicator, the right switch changes between VOR2 and ADF using the green indicator.

The Engine / Warning Display (E/WD)

The E/WD holds 4 display areas.
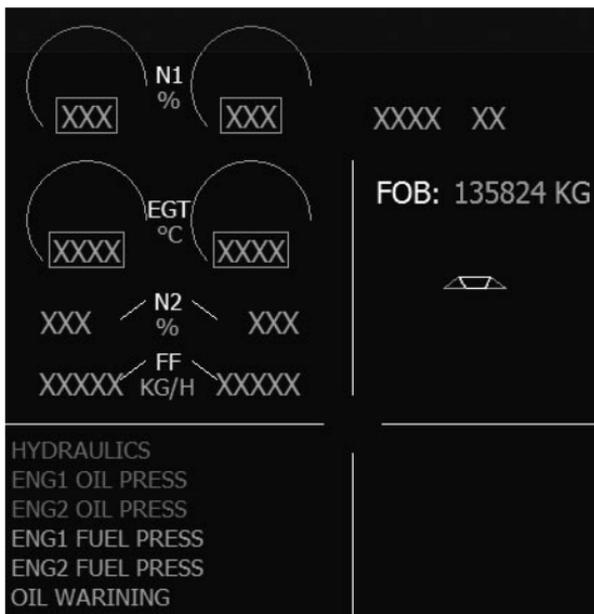
The upper left area shows all relevant engine parameters for both engines such as N1, EGT or fuel consumption.

To the right you can see the power setting, fuel on board and the flap settings.

Both of the lower areas display warning messages, checklists and aircraft status reports concerning the configuration.

The Gear Lever

To the right of the E/WD you´ll find the gear lever of the aircaft. The settings display can be seen on the lower panel and as a message at the bottom of the E/WD.

The Lower Panel

To call up the Lower Panel click on this symbol ![symbol].

Here you´ll find the complete System Display (SD). The SD displays Informationen for all the various aircraft systems. The displayed information changes automatically according to the actual flight situation.

You can also call up the SD via the Page Keys in the Pedestal. See the chapter „Pedestal".

To the left of the SD you´ll again find the Standby Instruments for VOR and ADF plus a clock. This clock can be started via a mouse click on to the white button on the lower left. Another click will stop the clock and a further will reset it.

Dimmer

Right below the SD you can see the dimmer for the EFIS. You can dim the four displays and the Flight Management and Guidance Computer (FMGC) with these knobs.

All the three knobs can be operated with the help of the mouse. The left knob dims the Primary Flight Displays (PFD). The center knob dims the Navigation Displays (ND). The right knob dims all four displays and the FMGC together.
Especially at night time it is neccessary to adjust the brightness of the displays.

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Gear & Auto-Brake

To the right of the SD you have the Gear Indicator and the buttons for Auto-Brake settings.

The Gear Indicator will show the actual position of the gear.

You can set the Auto-Brake intensity with the buttons. If the Auto-Brake-System is active, the information „DECEL" will light up.

The Pedestal

You can call up the Pedestal by clicking on this symbol 📺.

The Pedestal holds the following elements:

- Flight Management and Guidance Computer (FMGC). The FMGC will be described at a later stage.

- Radio Tuning Unit (RTU)

- Audio Selector

- Page Keys

- Thrust Lever

- Engine Starters

- Speed Brake Lever

- Flap Lever

- Parking Brake

Radio Tuning Unit (RTU)

Here you can set the frequencies for COM1, COM2, NAV1, NAV2 and ADF. All these units work with an active and a standby frequency. Press the button selecting the unit you would like to set a frequency in. Now click to the left or the right of the knob (you will see a „+" or „-"), to set the standby frequency. After having done this you can switch this setting to active by clicking on the button between the two displays.

Audio Selector

Via this unit you can select the audio output over the speakers. Please note that only the lower row of switches are active. By clicking on the desired selector you can listen to the various COM frequencies, COM1 or COM2 (or both at the same time), the codes of NAV1, NAV2, the ADF and the acoustic signal for the Marker.

Page Keys

These buttons determine which information is displayed on the System Display of the EFIS. Pressing the button will will activate the display. Press again and you have deactivated it again. If no page is activated (standard configuration), displayed information is dependant on the actual phase of the flight or if a fault has occured.

The button T/O CONFIG fulfills the following function: it simulates the TO/GA situation,to make sure that all systems are ready for take off. This test needs to be done during the Take-Off Checklist before the start.

Engine Starter

Both of the Engine Master switches control the engine start and shut down. As these switches are very sensitive you can only operate them in this cockpit by using a RIGHT mouse click. This is to make sure that the engines are not mistakingly shut off during flight. In the real aircraft these switches have to be pulled up to flick them over.

Starting engines:

First of all check if both engine starters are in the lower position. If not, flick them over. Due to technical reasons of the Microsoft Flight Simulator itself, this position is not saved when saving a flight.

1. Switch the Engine Selector (the white knob below the Engine Starters) into the position IGN, to activate ignition.

2. Switch the first Engine Starter into the upper position by clicking just above the switch with a right mouse click.

3. The FADEC will operate the start up procedure automatically. You can follow the procedure on the EWD or SD. As soon as N2 has reached 21%, fuel flow begins and the engines start up. If this does not happen, a system fault has occured and we will have to look for this fault.

4. Follow the same procedure for the second engine.

5. After both engines are running, bring the Engine Selector back to the NORM position. The only exception is, if there is extremely bad weather such as heavy rain or snowfalls.

NOTE: Due to technical reasons of the Microsoft Flight Simulator itself the engines might not start because the mixture setting is on „arm". Obviously a jet does not have a mixture setting. In this case press the keys „SHIFT" + „CTRL" + „F4",to set the mixture control to „very rich".

Engine Shut-Down:

Simply click below the Starters. The engines will then be shut down. After shut down the displays in the EFIS will appear in brown.

Speed Brakes, Parking Brake and Flaps

Each of these can be operated with the use of the mouse.

The Overhead-Panel

To open the Overhead Panel click on this symbol .

The Overhead Panel holds all switches and controls for the Fuel System, Electrical System, Anti-Ice System and Lighting.

Lights

This area holds all the switches for the aircraft lights such as Strobes, Beacon, Position Lights, Landing Lights.

Cabin Signals and Panel Lights

Here you´ll find the switches for the Cabin Signals „Seat Belts" and „No Smoking" as well as the switches for the Panel Lights.

Anti-Ice Switches

Do not forget to switch on the Anti-Ice System for the engines and Probe Heat.

Electrical System

This part of the panel holds the Battery Switches. In reality this aircraft has two independently working batteries. Flightsimulator though, only recognizes one battery.

You`ll also find the Generator Switches here.

Fuel Pump Switches

The aircraft has three fuel tanks (left, right and center). Each one has two fuel pumps, which can independantly be switched on. This is very helpful

in case you want one tank to be more empty than the other. For instance you discover that the left tank holds more fuel than the right. In this case you can configure to only use the left tank until the center of gravity is back in balance.

Inertial Navigation System

The INS always shows the actual position of the aircraft.

Flight Management and Guidance Computer FMGC

The Flight Management and Guidance Computer is the most important instrument for the navigation of the aircraft. It automatically guides the aircraft along the prgrammed route.

As already mentioned, our panel was built for those PC-Pilots, who enjoy an easy to use Cockpit without having to spend hours of reading manuals about handling the FMC. Our FMGC is designed to work with the Flight Plans created in the Flight Simulator. Before you start up the FMG, first call up the Flight Planner and create and load a route.

Call up the FMGC by either clicking on the displayed FMGC in the Pedestal or directly with a right mouse click on the Symbol for the Pedestal.

Main Menu

The Main Menu is displayed on the first page of the FMGC. Via this menu you can call up all other pages of the FMGC. To switch back to the Main Menu simply click on the key MAIN MENU to the lower right of the display.

Probably the most important function of the Main Menu is the key IMPORT FPL. Here you can import the flight plan from the FS into the FMGC. You can only fly a route if you have imported/loaded a flight plan. You can not program a route into this FMGC. Always create a route with FS´s own flight planner or with an external program such as Flight-Sim Commander. Load this Route into the flight planner of the FS and then click on the IMPORT FPL key to have this route ready in the FMGC. A complicated programming is no longer neccessary.

STATUS-Page

To call up the Status Page, click on the key STATUS in the Main Menu.

This page will show general information but which does not concern flight data or flight planning issues.

INIT-Page

To call up the Status Page, click on the key INIT in the Main Menu.

This page shows relevant information of your route. You can fill in information about the Company Route, Alternate Route, Flight Number and Alternate Destination. E.g. to type in the Company Route (airlines internal flight number) do the following: Type in DUS, by clicking on the alphanumerical keys of the FMGC. You will first see the written text in the scratchpad which is the bottom line in the FMGC display. If you want to delete a letter or number,

simply click on the key CLR. When you have completed your entry in the scratchpad, click on the key next to the line where you want this entry to be inserted. In this case it should be the key next to CO RTE, the second key on the left side. The entry will then be transfered from the scratchpad to the desired line.

Now complete all the entries. They are not really neccessary for the flight, but real pilots always fill these in.

You can not enter the departure- or destination airport into the FROM/TO line. These codes will automatically be inserted when a flight plan is loaded.

You will also find the coordinates of the aircrafts actual position here.

PERF-Page

You can call up the Performance Page directly via the Main Menu or via the Init Page with the key next to PERF> on the lower right. The Perfomance Page contains important data for your flight. The displayed standard values can be overwritten by values entered in the scratchpad.

The TRANS ALT (Transition Altitude) is the flight level in which the altimeter is set from local to standard pressure. The transition level varies from country to country. In the USA this level is at 18.000 ft, in Germany it is 5000 ft. Please insert the value which is valid for your country.

The ALT/SPD CONSTRAINT is the max. speed below a certain altitude. In general the speed restriction below 10.000ft is 250ktn. If the Autopilot is set to MANAGED MODE it will automatically consider this speed restriction.

REDUCTION HEIGHT is the altitude above ground in which the take off thrust is reduced to climb thrust.

For CRUISE ALT and CRUISE SPD please enter the desired flight level and cruise speed. When in MANAGED MODE the Autopilot will stick to these values.

FLIGHT PLAN-Page

The Flight Plan page can be accessed directly via the Perf Page. Click on the key next to FPLAN> or via the key F-PLAN below the display.

This page displays the programmed route. Most of the times the route will be longer than just this one page. In this case you can turn the pages with the keys NEXT PAGE and PREV PAGE. Our display shows the entry 1/8 on the upper right meaning this is the first page of a total of 8.

PROG-Page

The Progress-Page can be accessed via the key PROG below the display.

This page is continually being updated and will display the next waypoints as well as the distance and estimated time of arrival (ETA) for each waypoint.

Keep an eye on this page during flight to control your progress.

RADIO NAV-Page

The Radio Nav-Page can be accessed via the key RAD NAV below the display or via the Main Menu.

This page allows the setting of frequencies for COM1, COM2, NAV1, NAV2 and ADF just like on the above described Radio Tuning Unit (RTU), as well as the Transpondercodes.

The entries are made via the scratchpad by using the numeric keys on the FMGC. Click on the keys next to the line where you want the frequency transfered. Setting frequencies in this way is a little more comfortable than using the RTU.

Full Authority Digital Engine Control (FADEC)

This system is not visible in the panel, but it surely is there...

This automatic engine control system supports the pilots in selecting the best thrust for the various flight phases. In addition it is coupled to the Automative Thrust control in Airbus aircraft..

The FADEC is connected to the thrust levers. In reality the trottle qaudrant has five notches for the levers to activate five different thrust modes. As your throttle quadrant does not have these notches, each one of them is simulated by an audio sound in our cockpit. Each time the levers reach such a position an audio sound can be heard.

The following 5 thrust modes are possible:

- IDLE: Engines are running in idle, the automatic thrust control is deactivated in this position. This mode is very practible just before touchdown (approx. 50 ft AGL).

- CL: Climb thrust.

- FLEX/MCT: Flexible thrust for reduced thrust during take off (used in good weather conditions and on a long runway).

- TO/GA: Max. thrust (Take off, Go around or emergency situations)

- REV: Reverse thrust (can only be used on ground).

The thrust setting is shown on the E/WD in the upper right.

The FADEC is used in the following way:

- When starting the engines set the levers to IDLE.

- Increase the thrust for taxi by gently pushing the levers forward. As soon as the aircraft starts moving, reduce the thrust again. Taxi in IDLE position can also be achieved, when the aircraft is light and not fully loaded.

- At take off set the thrust to FLEX or TO/GA, depending on the take off weight, the weather conditions or the runway lenght.

- As soon as the FLEX or TO/GA Mode is set, the A/THR Mode is being prepared but not yet activated. The message „A/THR" appears in blue on the PFD.

- If the reduction height, set in the FMGC, is reached, the message "LVR CLB" will light up in the PFD. Bring the levers to the „CL" position. The PFD will read„CLB".

- The A/THR Mode will now be activated and the message will read "A/THR" and appear on the PFD in white. FADEC now controls the thrust to maintain the speed set in the FCU.

- The thrust levers should remain in this position for the rest of the flight.

- Just before touchdown (between 50 and 100 ft AGL), bring the levers back to IDLE. A/THR will automatically be disengaged and thrust will be set to idle.

- As soon as the gear touches the ground, pull back the levers for reverse thrust („F2" in FS).

Aircraft Data

Airbus A320

Weight

- max. Take off weight MTOW: 73500kg
- max. weight. KS MZFW: 61000kg
- max. landing weight MLW: 64500kg

Speeds

- Flap 1 max. 230kts
- Flap 2 max. 200kts
- Flap 3 max. 185kts
- Flap 4 max. 177kts
- Gear down max 250kts
- Gear up at max 220kts
- max. speed with gear down 280kts/M0.67
- normal climb speed 300kts/M0.78
- cruise speed M0.78/M0.79
- normal descend speed 300 kts/M0.78
- approach speed approx. 140kts.

Airbus A321

Weight

- max. take off weight MTOW: 85000kg
- max. weight KS MZFW: 71500kg
- max. landing weight MLW: 75500kg

Geschwindigkeiten

- Flap 1 max 230kts
- Flap 2 max 215kts
- Flap 3 max 195kts
- Flap 4 max 190kts
- Gear down at max 250kts
- Gear up at max 220kts
- max. speed with gear down 280kts/M0.67
- normal climb speed 300kts/M0.78
- cruise speed M0.78/M0.79
- normal descend speed 300 kts/M0.78s
- approach speed approx. 142kts.

The rotating speed depends on various factors and on the length of the runway. The following values are for orientation and to be used under normal conditions for the A320/321:

Take off weight (t)	45	50	55	60	65	70	75	80	85
Vr	121	121	124	130	134	140	146	150	155