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Although there are several extensive manuals with this product there is only one manual that really matters and that is the **Step by Step** guide. In that manual, all the aspects of the product are explained in some detail. It is where your journey with the Aerosoft Airbus should start.

If you ever must contact support the first thing we will ask will be: *“Have you flown the Step by Step flight and where did it behave differently than expected?”* Please do this flight. It’s important.

One last tip. If you have no experience with flying an Airbus, it might be a good idea to read Volume 8 of the manuals. It describes some of the quirks that makes an Airbus an Airbus.

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INTRODUCTION

The Aerosoft Airbus A318/A319/A320/A321 is a follow up project on the previous Airbus Extended projects. In that project, we created an Airbus aimed at an audience that outgrew the simpler default aircraft and wanted a more complex simulation. Almost all code has been rewritten to give you the best experience. What has been kept is the strong focus on the left seat, the captains' seat. The whole project is designed to be flown from that location and you will find the controls at the right side of the cockpit simplified or simple copies of the left side. We figured that if you buy a project like this you want to be the captain and not the co-pilot!

THE MANUALS

There are 9 separate documents that make up the manual.

- **Readme.txt:** Contains the change log, version number information and last minute information.
- **Vol1_InFSX.pdf:** You are reading it now. Contains information on using the aircraft in FSX and more general information.
- **Vol2_Normal_Procedures.pdf:** Contains all the procedures used to fly the Airbus.
- **Vol3_Procedure_Guide.pdf:** Contains the information in the Normal_Procedures.pdf in a more condensed (checklist like) format.
- **Vol4_Systems.pdf:** Contains an in-detail description of all systems.
- **Vol5_Checklist.pdf:** Full checklist for use in the cockpit.
- **Vol6_Step_by_Step.pdf:** A flight described in detail for you to follow.
- **Vol7_Thrust Lever Setup.pdf:** Only to be read when you have problems with the Thrust levers in FSX.
- **Vol8_Airbus Weird and Wonderful Airbus Logic.pdf:** A document that describes some of logic of Airbus systems. Recommended reading if you come from non-FBW aircraft or have never flown and Airbus.
- **Vol9_Connected Flight Deck Flows** (some work still needs to be done on this one)

Also, note that the readme.txt always contains the information on the latest updates. Before contacting support do make sure you installed the latest version!

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Aerosoft GmbH
Lindberghring 12
D-33142 Büren
Germany
www.aerosoft.com

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CREDITS

Concept:	Aerosoft
Modeling/Texturing/Animation:	Stefan Hoffmann (Aerosoft), Holger Sobl
Project Management:	Mathijs Kok (Aerosoft), Joshua Che (Aerosoft), Fabian Boulegue (Aerosoft)
Manual, documentation:	Mathijs Kok (Aerosoft) & Finn Jacobsen (Aerosoft) Christoph Beck & Kyle Kline
Step by step guide:	Rolf Fritze & Steffen Froemter
MCDU programming:	Baylan Cannol (Aerosoft)
XML coding:	Finn Jacobsen (Aerosoft) & Joshua Che (Aerosoft)
PFD coding:	Scott Printz
ND coding, weather radar:	Frank Wiessman (Aerosoft)
Flight modeling:	John Cagle
Sounds:	Turbine Sound Studios , Aerosoft, Steffen Froemter Rolf Fritze Alex Ridge
Installer:	Andreas Mügge
Fuel/Load Planner:	Ross Carlson
Additional liveries:	Holger Sobl
Digital Flight Data Recorder add-in:	Thomas Molitor
Configurator:	Robert Miroszewski
RAAS add-in:	FS2CREW (see below)
Right MCDU + divers add-ins:	Steffen Froemter & Rolf Fritze
Project Advisor:	Frank Docter, Jaap Korteweg
Pictures:	Nick Churchill
Voices actors:	Rolf Fritze, Kathrin Schauer, Thomas Paganon, Jonathan Berthier, Werner Gass-Müller, Sylvia Schäfer, Bob Laylock, Adam Banks, Travis Guy, Lucy Guy, Dave Rodgers
Pushback gauge code:	Arjan Scheffel
Livery Manager:	Hauke Fehr (Fehrware.de)
WebServer tweaks:	Robert Steffens
ISIS & VC Night lighting tweaks:	Emanuel Hagen

The beta testers of this product deserve special mentioning. In this development we experimented extensively with involving them directly in the production, they often tested code minutes after it was written, gave feedback and got new code almost immediate. Without them the product would not be where it is now.

The RUNWAY AWARENESS AND ADVISORY SYSTEM (RAAS) was developed by FS2Crew (www.fs2crew.com) with additional technical support from Tebin Ulrich and Manuel Ambulo. To purchase an unrestricted version of RAAS Professional that works with every FS9, FSX and Prepar 3D aircraft (not just the Aerosoft Airbus), please click here: <http://www.fs2crew.com/cart/products/FS2Crew%3A-RAAS-Professional.html>

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SYSTEM REQUIREMENTS

- Intel Core 2 Duo E6850 CPU (Core 2 Quad recommended)
- 4 GB RAM (8 GB recommended)
- Direct X 9 compatible Graphics Card with minimal 1 Gb (2 Gb recommended)
- Microsoft FSX STEAM Edition
- Windows 7, Windows 8 (fully updated), Windows 10 64 bit versions recommended
note that Windows XP is specifically NOT supported
- Adobe Acrobat® Reader 8 minimal to read and print the manual ⁽¹⁾

⁽¹⁾ Available for free, download at: <http://www.adobe.com/prodindex/acrobat/readstep.html>

CONTACT SUPPORT

Support for this product is done by Aerosoft. We prefer to do support on the support forum for one simple reason, it is fast and efficient because customers help customers when we are sleeping. **It's also the difference between one support person reading the question and 500 people, some of why know a LOT about the aircraft.**

- Airbus A 318/A319 forums: <http://forum.aerosoft.com/index.php?/forum/664-aerosoft-airbus-a318a319/> (there are version in other languages as well)
There are FAQ in every section, please check those first
- If you prefer support by email: https://aerosoft.zendesk.com/anonymous_requests/new
Please note that email support can be slow when things are busy (shortly after a major release form example). We try to get back to you in 24 hours, but if you want an answer fast, got to the forums.

We feel strongly about support. Buying one of our products gives you the right to waste our time with questions you feel might be silly. They are not.

INSTALLATION AND REMOVAL

Installation is as with any STEAM add-on and fully automated.

At the end of the installation you are asked if RAASPro and the Aerosoft LAUNCHER should be installed. RAASPro is a fully functional version of the product with the same name released by FS2Crew (but it is locked to Aerosoft Airbus). Our LAUNCHER (fully optional) will help with updates, manuals etc.

Removal should **never** be done manually but only using the software removal applet you will find the Windows Control panel.

AFTER LOADING THE AIRCRAFT

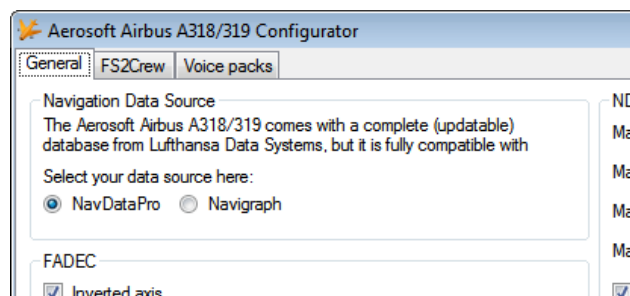
When you load the Airbus (or select another mode) it needs to configure systems and load files. This will take around 20 to 30 seconds. Just wait, don't do anything, don't click, and don't press any keys until all is stabilized. If this is your first start, make sure you got the Step By Step guide open!

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NAVIGATION DATABASE

With this Airbus comes a complete copy of the NavDataPro navigation database. This database contains the LIDO data and is the worlds most used navigation database in aircraft. The database is fully updatable; check its product page on our websites: www.aerosoft-shop.com/products/navdatapro/navdatapro.html

The Airbus is fully compatible with the well-known Navigraph database. You can use the configurator to select which database to use. Although these databases come from a different source and have some differences they are basically the same and you should not see any differences between the two.



DEBUG GAUGE

If you have a problem with the Airbus it helps us a lot to know exactly what the state of all the systems is. That is why there is a debug gauge ([shift]-[6]). We might ask you to make a screenshot with that gauge visible to understand exactly what is happening. It ALWAYS helps to see the FMA as well.

SUPPORT FORUMS, RELEASES AND UPDATES

No product is bug free and we don't claim this one be. What is important is how bugs are handled and we feel it is important that we explain how we intend to handle that.

Our main communication channel to customers is the forum system. There we can discuss the possible problems, get more information from customers when needed and provide quick fixes. We will always try to maintain forums in several languages but only the English one will be fully up to date.

If you prefer support via email use support@aerosoft.com, we can handle support there in English, German, French, Spanish, Portuguese and Dutch. Keep in mind however that support on the forums is always faster.

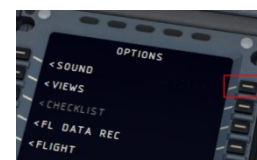
VERSION NUMBERS

- The release version number will be 1.00.
- A service pack will show in the tens, 1.10 (first service pack) -> new full build
- A hotfix will show in in the hundreds 1.11 (first hotfix to be put on service pack 1)

When there are many hotfixes we will also make full new builds. If you are ever in doubt which version you have, check the product.cfg that you can find in FSXMainFolder\Aerosoft\Airbus A318_A319.

MAKING VIDEOS

If you make video's you might see the FBW system show the flight control surfaces animate where they should not in replay mode (or when using a tool like FSRecorder. To avoid this you can disable the FWB system for reply using a hidden option. In the right MCDU, under Options, press the LSKR1 button to activate. The aircraft will hardly be flyable with this de-activated though!



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WEATHER RADAR

As the weather radar is a totally new development and not in this form in any other project it is good to discuss its virtues and limitations.

The weather radar in the Aerosoft Airbus products **works with any weather add-on or even without**. It actually reads the weather conditions in FSX and does not need to link to any weather add-on. However because it does just that it also shows some of the limitations of weather in FSX. For example it is always build up in square blocks. We choose to leave this effect visible because we believe a weather radar should show where the weather is, not how it should look in an ideal simulator. Because we simulate the actual working of the weather radar it also means a lot of calculations need to be done, this can have an effect on your frame rate. Because wind shear and turbulence cannot correctly be placed in FSX detection of that is currently not possible.

As stated, the weather radar works with any weather add-on we have tried. But only the weather they inserted in FSX is detected. If they have weather that is shown on their own display but that has not yet been send to FSX it cannot be shown. As this weather is not in FSX it is of course not part of the simulation at that moment. In other words, if you can't see the weather the weather radar can't see it. Compatibility with weather tools that do not adhere to SDK standards is considered but not guaranteed.



The display of the weather (and terrain) on the Navigation Display is controlled by the larger part of the ND control knob.

On a few systems the Weather Radar has shown to cause severe drop in frame rates combined with some advanced settings in weather tools. It is now possible to edit some functions via the AB_ND_GDI.ini (to be found in MyDocuments\Aerosoft\Airbus. The options are explained in the comments in that file.

TERRAIN DISPLAY

Just as the Weather Radar the Terrain Display is an overlay on the Navigation Display. The terrain is shown in colors depending on the height of the terrain in relation to the altitude of the aircraft.

A/C Altitude +2000	50% Red
A/C Altitude + 1000	50% Yellow
A/C Altitude -250 <> +500	25% Yellow
A/C Altitude -1000	50% green
A/C Altitude -2000	16% Green
A/C Altitude >2000	Black

Note that the terrain and weather cannot be displayed at the same time and that the same control it used as the weather display to set the transparency of the overlay.

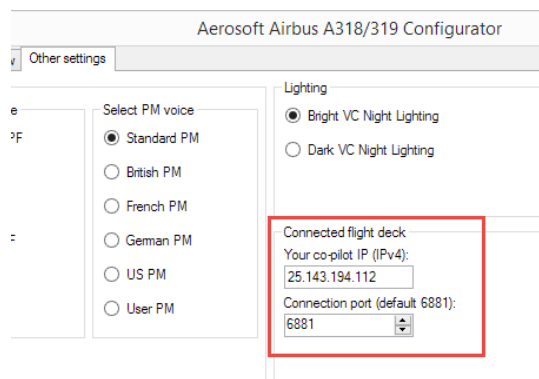
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CONNECTED FLIGHT DECK

Another special feature almost no other add-on has. Connected Flight Deck (CFD from now on) allows you to connect your computer running the Aerosoft Airbus to another computer running the same aircraft. Using CFD is not complex (not as complex as flying an Airbus anyway and following these steps should help you getting connected. On our forum you will find a specific support forum for CFD btw.

1. You will need a voice connection of course if you are not in the same room. You can use Skype or any other VOIP service. But for gaming we prefer TeamSpeak (<http://www.teamspeak.com/>). It's free, very reliable and most online pilots already use it.

2. While FS is NOT running edit the IP address of your friend's computer using the Configurator. Leave the port as it is, 6881 is a good default that will work almost always. If you have problems with firewall, routers or anything we recommend Hamachi. LogMeIn Hamachi is a free service that allows two computers to be linked at IP level without any firewalls or other details to be an issue. Do note this creates an IP connection on your system that is probably not protected by firewalls! You can find it here:



<https://secure.logmein.com/products/hamachi/download.aspx>. Note you only need the free unmanaged version.

3. When both pilots have done this you can start FSX.
4. When FSX is started move to the same location.
5. Load the same aircraft.
6. Make sure you got the same weather.
7. Select the same time (this is not highly critical)
8. Select the same Aircraft State (this will avoid problems with the initial synchronizing)
9. In the right MCDU select CONN FLTDC.
10. From this moment on the order of the steps is important!



- a. Captain selects [MASTER] and Connection [ON]
 - b. CoPilot selects [SLAVE] and Connection [ON]
11. Keep in mind that only the MASTER can fly the aircraft, though both parties can operate all other instruments.
 12. If you want to switch roles (so the other party becomes MASTER) only one party has to change his role, the other will be handled automatically.
 13. SYNC DISPLAYS will synchronize the ND range and mode.
 14. SYNC ND OVERLAY will synchronize the weather overlay. Best set to on even though the SLAVE might not have the exact same weather in front.

A few things to keep in mind when using CFD:

- Use the same weather engine is possible (otherwise make sure the weather is as similar as possible) as our weather radar will send the WX overlay from the master to the slave computer.
- Stability is more important than bandwidth in the connection, but still a broadband connection is needed.

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- You do not to be connected to any online flying service like IVAO or VATSIM but it most certainly is possible.
- You do not need any of FSX standard ways of connection, this is a fully stand-alone Peer to Peer connection.
- You can mix and match FSX, FSX:SE, P3D V3 in connection.
- Vol 9 of the manuals contains a complete procedural flow of what is done by each pilot. Unless you are very experienced it is a good idea to have this on hand.

SAVING AND LOADING MODES

There are so many systems in the Airbus that it is simply not possible to start up the sim and take-off. Many systems would simply not work. That's why we include an option to save AIRCRAFT STATES. In these saved states all the systems (except the MCDU) are stored. There are 4 predefined states that are most used: COLD & DARK, TURN AROUND TAXI and TAKE-OFF.

Note: when you used COLD & DARK you will need to activate the Batteries (or External Power) to be able to use the right MCDU.

After installation of SP3 it is now possible to save a complete flight (situation and aircraft state – including all MCDU2 settings) just with one click. Just use the FS-menu function to save the complete flight. It is not necessary anymore to save the aircraft state separately and therefore this MCDU2 menu option has been deleted.

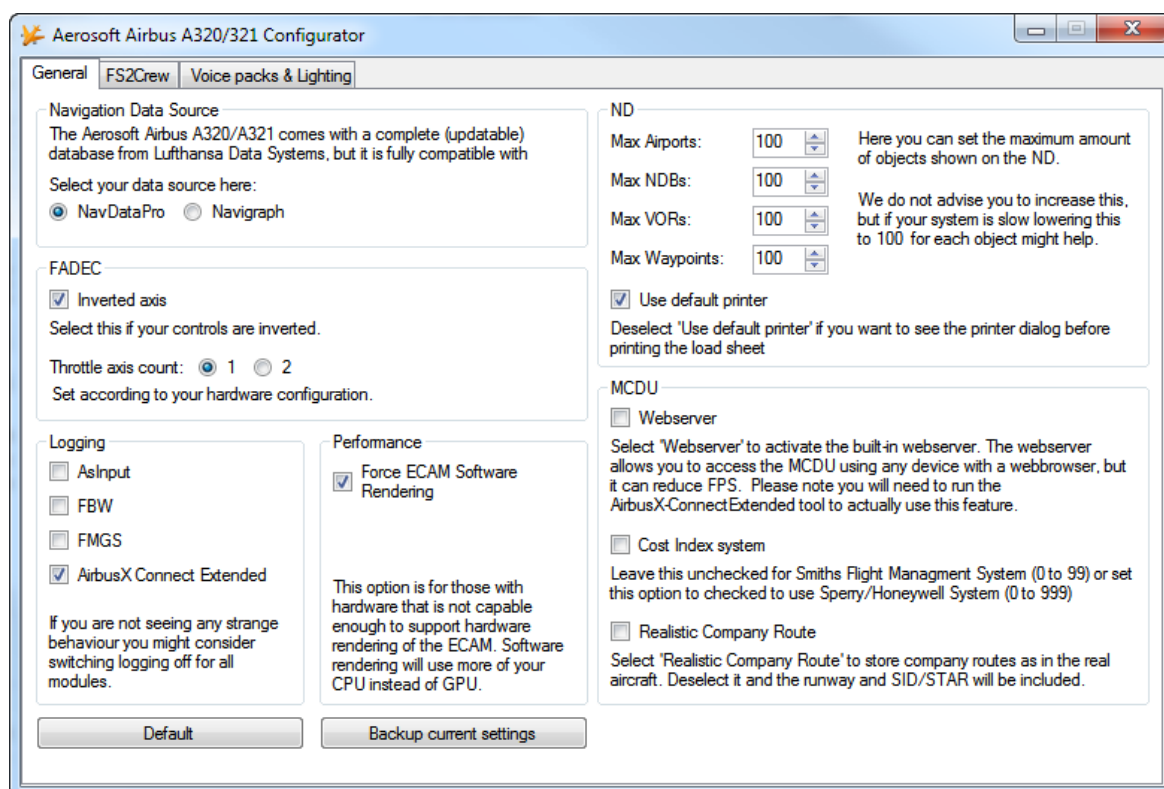
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TOOLS

There are several tools provide with the Airbus. The RAAS is configured from inside FSX (via the ADDON | RAAS dropdown menu) and the Fuel Planner and the Flight Data Recorder can be started from the Windows Start Menu | Aerosoft | Airbus A318_A319.

AIRBUS A320_A321 CONFIGURATOR

The configuration allows you to configure the product before starting it.



NAVIGATION DATA SOURCE: Allows you to select either NavDataPro (Lufthansa data) or Navigraph if that is installed.

FADEC: Please make sure you select the right configuration here.

LOGGING: While useful for debugging it can affect performance and we suggest to keep it all off unless requested.

Performance: On some hardware (laptops) the ECAMs will not show. Setting this option will move the drawing actions from the GPU to the CPU.

ND (Navigation Display): Offer opportunities to reduce the amount of drawn elements.

MCDU: Allows configuration of the MCDU options

FS2CREW: Allows you to activate or FS2Crew (assuming it is installed)

Voice Packs & Lighting: Allows you to select the voice for PF (Pilot Flying) and PM (Pilot Monitoring) and allows the user to change between two VC light levels. The brighter one (default) is easy on the eye and cheaper monitors, the darker one is a bit more realistic but might be hard to use on non-calibrated monitors.

Note: If you install a 3rd party livery you will have to remove the AIRBUSX_V2_VC_MAINPANEL_L file from it or it will overwrite the darker option!

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FLIGHT RECORDER

Included in the Airbus is a Flight Recorder. This is similar to the Quick Access (Data) Recorder that is part of most Airbus A320/321 aircraft. The Quick Access (Data) Recorder records flight parameters from the moment the aircraft is powered up to the moment it is shut down. This is not the same as Flight Data Recorder (aka Black Box) that is used by investigators after a crash!

The data in the QAR is used by the airline to study flights and to backtrack what caused problems or failures. The Airbus includes a QAR that will log many flight parameters and will save them on your hard disk. These data files can be read and displayed with a tool that is delivered with the Airbus. A far better tool to read these files is Flight Simulator Flight Keeper, a tool that is used by dozens of Virtual Airlines and thousands of serious enthusiasts. In the real aircraft there is no interface for the QAR but in the simulator you will find the option to activate and deactivate this recorder in the right MCDU.

Events the FDR module records:

- Block events OUT (Engine on), OFF (TO), ON (LA), IN (Engines off)
- Engines On/Off
- Flaps
- Spoiler
- Gear
- Lights
- Autopilot On/Off
- Autopilot Mode
- Autothrottle On/Armed/TOGA/Off
- Transponder Code
- Pressure
- Altimeter
- Taxi and Flight Path (invisible on the details dialog as it is only used for KML and FSFK export)
- Position (only if there has been no other event triggered - on a regular interval)
- Aircraft Crash
- FDR Test (after pressing the corresponding button)
- FDR Event (after pressing the corresponding button)

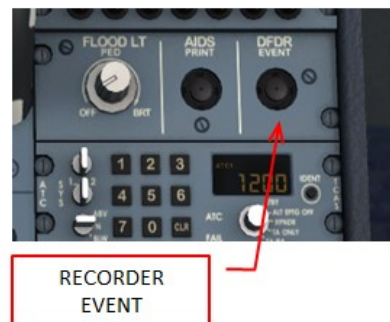
This data is recorded for all events

- Altitude
- GroundAltitude
- IAS
- TAS
- GroundSpeed
- WindHeading
- WindSpeed
- Fuel
- OAT
- TAT
- Latitude
- Longitude
- Heading
- TrueHeading
- FramesPerSecond
- GlideslopeNeedle
- LocalizerNeedle
- VerticalSpeed
- PitchAngle
- BankAngle
- GForce
- AileronTrim
- ElevatorTrim
- RuderTrim
- EventTime
- EventDate
- EventTimeZone
- EventTimeOfDay

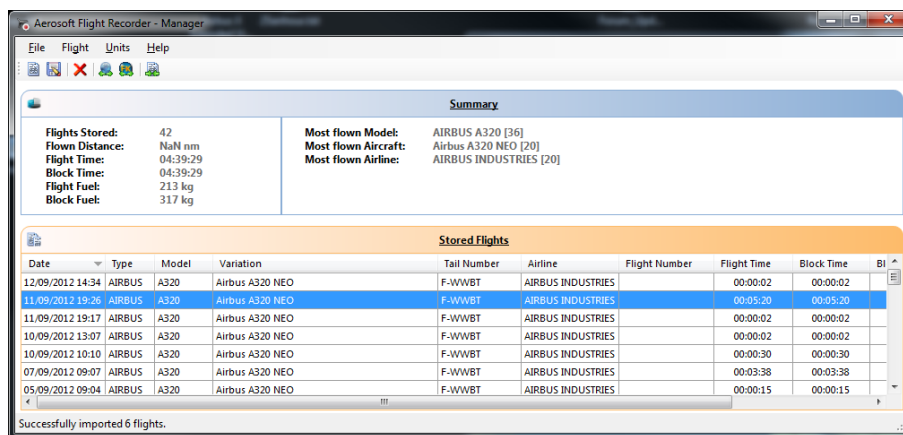
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With each event time, speed, heading, trim, fuel, glide slope, localizer, weather and some more data are recorded. This a powerful tool to see where you can increase your flying skills.

The recorder is normally always active, but if you would like to deactivate it (for example because you use a different data recorder you can do so in the right MCDU, under OPTIONS|FL DATA REC. On the right side of the center console you will find a DFDR EVENT button. If you press that button a DFDR Event is logged. You can use this to 'bookmark' the log file. This can be useful if have a problem and want to study that situation later.

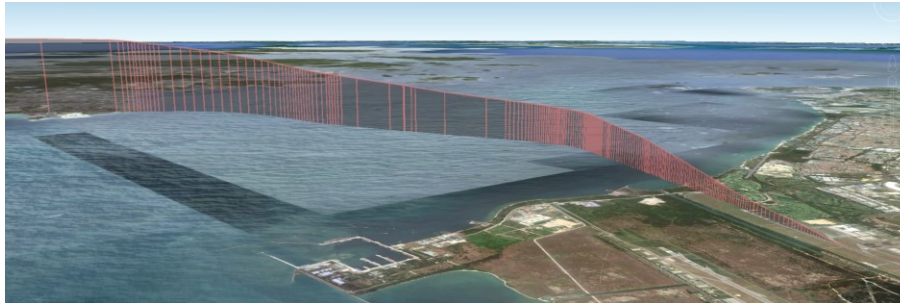


To see your flight log you use the AS_RecorderManager (you can find that in the FSXMainFolder\Aerosoft\Flight Recorder but also via the Windows Start menu). All your flights will be shown there. Double click one and all events will be displayed.



You will find buttons to see your flights in Google Earth (get that here: www.google.com/earth/index.html), to open it with FS Flight Keeper, delete a flight, import a flight or to save a flight. A saved file can be shared with other people, for example your Virtual Airline.

Flight Details						
Summary						
Aircraft Title: Airbus A320 NEO	Aircraft Type: AIRBUS A320	Airline: AIRBUS INDUSTRIES	Tail Number: F-WWBT	Flight Number: 15,453	Flight Level: FL360	Distance: 1,429.86 nm
Recorded On: 15/09/2012 15:40	ZFW: 52,525 kg	Payload: 15,127 kg	Time OFF: 14/09/2012 23:44	TOW: 67,978 kg	Fuel: 15,453 kg	TO IAS: 145 kts
Time OUT: 14/09/2012 23:40	TAW: 68,197 kg	Fuel: 15,672 kg	Time IN:	RAW:	Fuel:	LA IAS: 136 kts
Time ON: 15/09/2012 03:43	LAW: 60,238 kg	Fuel: 7,713 kg	Flight Time: 02:58:57	Flight Fuel: 7,739 kg		LA VS: : 256 ft/min
Block Time: 03:06:54	Block Fuel: 8,069 kg					
Flight Events						
Type	Event	Time	Fuel (kg)	IAS (kts)	Altitude (ft)	
92	Autopilot mode	IAS 135* HDG 258* ALT 0000*	03:42	7,740	138	2,395
93	Autothrottle	Off	03:43	7,714	135	1,061
94	ON	ON 03:43 /FOB 7,713 kg /LAW 60,238 kg	03:43	7,713	136	1,053
95	Spoilers	Fully Deployed	03:43	7,713	134	1,053
96	Autopilot mode	IAS 120* HDG 258* ALT 0000*	03:43	7,712	131	1,052
97	Lights	NAV BCN LAND TAXI WING LOGO	03:43	7,710	73	1,050
98	Spoilers	Down	03:43	7,708	40	1,050
99	Autopilot mode	IAS 119* HDG 258* ALT 0000*	03:43	7,708	34	1,050
100	Position	N18° 45.7284' / E98° 57.9012'	03:45	7,656	12	1,050
101	Flaps	Up	03:46	7,611	0	1,050
102	Autopilot mode	IAS 179* HDG 258* ALT 0000*	03:46	7,610	0	1,050
103	Lights	NAV BCN TAXI WING LOGO	03:47	7,602	0	1,050



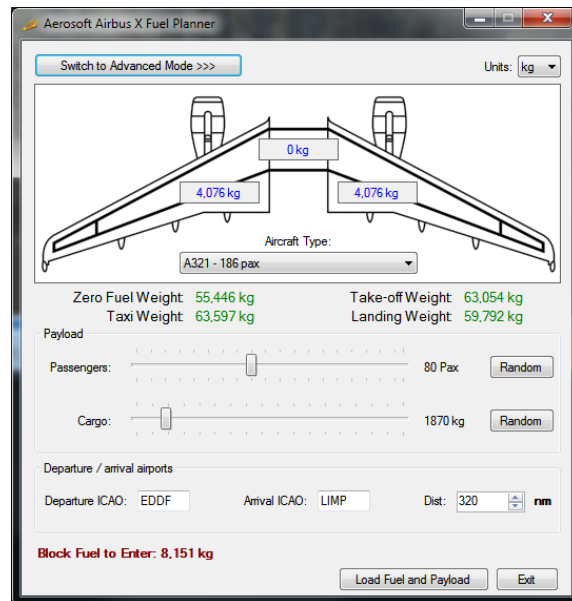
Please keep in mind that the display tool is just a weak dilution of what Flight Simulator Flight Keeper can do. Do check it out at: <http://www.aerosoft-shop.com/products/fsfk/fsfk.html>.

The recorded flights are stored in \Documents\AerosoftFlightRecorder. This path is chosen because we will add this module to more aircraft models.

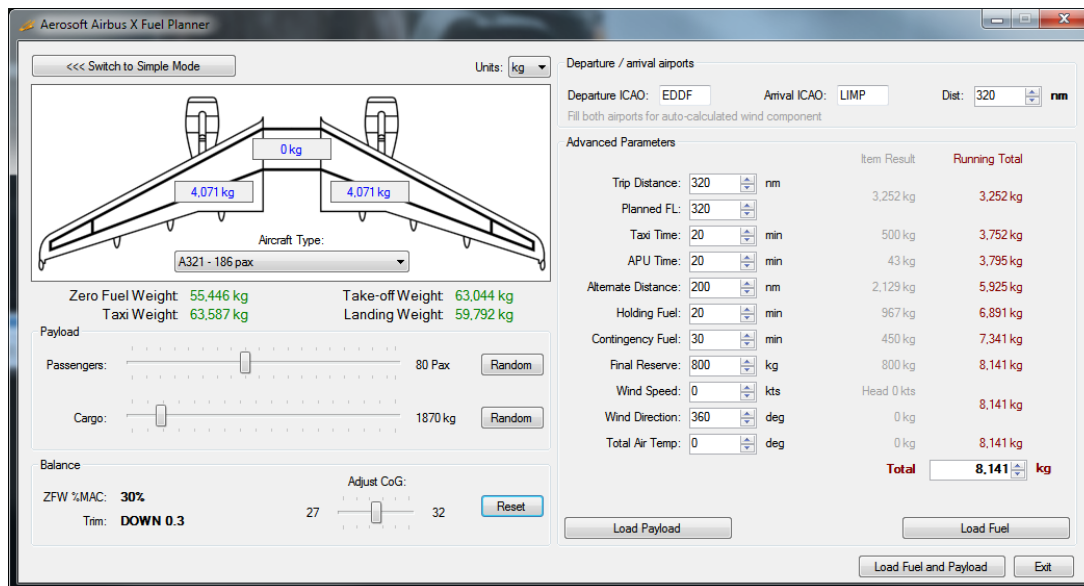
FUEL PLANNER

Included with the Airbus A318/A319 is a fuel planning tool. Actually it does a bit more as it also allows you to load passengers and cargo. The tool has two main modes, Simple and Advanced. In the simple mode you can move sliders and set the amount of passengers and cargo and set the departure and destination airports.

On normal passenger flights you would most likely not carry a lot of cargo (the luggage of the passengers is calculated in the weight of the passengers). When any of the weights is too high it will show in red meaning you cannot fly like that. You will have to loose passengers or cargo! Keep in mind that flying with a lighter aircraft is most likely to be more pleasant.



If you want to do a more detailed fuel planning use the Advanced Mode. Here you got control over far more variables but things are a lot more complex.



After setting the variables you have to push “Generate Loadsheet”. There are two ways to load the data (passengers, cargo and fuel) to the Airbus. Automatically if “Autoload with aircraft” is ticked or manually using the MCDU2 LOAD/FUEL menu. The fuel will be loaded correctly, so the center tank will only be used when the wing tanks are full and the balance of the aircraft will be set correctly.

Note that every airline has got its own layout of seats and additional equipment and every airline got its own specific rules about fuel load. Even simple things and the Zero Fuel Weight can vary far more than we expected. What we used is an average of many airlines and might not be spot on for your preferred airline.

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LIVERY MANAGER

There are hundreds of liveries available for the Airbus A318/A319 and there is a simple livery manager that will assist you in adding and removing them. You will find the livery manager (AirbusX Extended Livery Manager.exe) in FSXMainFolder\Aerosoft\Airbus A318/A319\AXE Livery Manager. After starting it will ask for the FSX folder.

Installing a livery is as simple as dragging the zip file you downloaded on top of the livery manager. For 90% of the additional liveries this will work. All other livery ZIP files that meet the following conditions will be handled automatic (*if this method does not work ask the livery designer to be compliant with our standards*):

- There must be a txt-file ("readme.txt" or different name as long as it's the only txt-file) with the code snippet for the aircraft.cfg included.
- The snippet starts with [FLTSIM.X] and ends with a blank line.
- In this snippet the line "ui-type=*aircraft_type*" must be contained, otherwise the manager doesn't know which plane the livery should be added to.
- Each ZIP-file can only contain **one** livery / alternative versions must be separated into two ZIP files.
- The whole file must be a proper ZIP-file containing the file and folder structure on the first level. So do not zip the folder with the files but only the files themselves.
- Beside the text file there needs to be the texture folder with its extension name, containing a "thumbnail.jpg"

COMPANY ROUTE EDITOR

This simple tool makes it possible to edit, create and save company routes that you can call up in the MCDU. It's faster than doing all that in the MCDU!

MCDU INTERFACES

The MCDU has two hidden click zones. One to toggle keyboard input and one to open the MCDU as a 2D panel. With the keyboard activated you can use your normal keyboard to enter data in the MCDU. Keep in mind that this disables any keyboard command to FSX!

The 2D MCDU panel can be undocked and moved to other displays.



MCDU WEB INTERFACE

Because the MCDU is arguably the most complex instrument in the cockpit it makes sense to allow it to be used as simply as possible. So by using a simple webserver that runs inside FSX (don't worry it hardly uses any resources) you are able to connect any device that has a web browser to the Airbus A318/A319 and use the MCDU on that device. Ideal are tablets because you will not need a mouse.

To use the web interface start Airbus_WebInterface.exe that is located in FSXMainFolder\Aerosoft\AirbusXConnectExtended.exe. You can do this before starting FSX or later. It will open a small window showing you the ip address and the port, something like this: 123.123.123.123:4040.

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You can enter this in the address bar of the browser on any device that is connected to the same network. It will open showing a simple information screen. This one is ideal to keep track of your long flights via your smartphone. Click on MCDU and you can use the left MCDU it as you would in the aircraft.

MCDU COMPANY ROUTES

The MCDU allows you to store flight plans as 'company routes'. The saving and loading of company routes is done via the left MCDU. Press the MCDU MENU button to access these options. These company routes are very useful when an aircraft flies the same route day after day. A company route consists of the departure and arrival airport plus the routing. It does not contain the runway and SID/STAR because those can differ (for example because of the wind). The route is made up of waypoints and the airway name between them: AIRPORT > WAYPOINT > ROUTE > WAYPOINT > ROUTE,....., WAYPOINT > AIRPORT

Now an actual flight starts on a runway, then follows a SID (Standard Instrument Departure) before following airways to the destination. Close to the destination you follow a STAR (Standard Terminal Arrival Route) to the runway: RUNWAY > SID > WAYPOINT > ROUTE > WAYPOINT > ROUTE,....., WAYPOINT > STAR > RUNWAY

The Airbus A318/A319 defaults to the realistic company route format, but if you prefer to save your company routes with the runways and SID/STAR it will allow you to do so by editing a configuration file. Look for the FMGS.ini file in the My Documents\Flight Simulator X Files\AerosoftAirbusExtended folder. You will find:

[CoRte]

FullRoute=0

Default this is [0] indicating it will save realistic company routes. Change it to [1] and it will save the complete but slightly less realistic flight routes.

PERFORMANCE SHEET PRINTING

There is a small printer on the center console that is used to print some reports and datasheets. The most important one is the performance sheet that contains the data needed for take-off. After you have completed inserting all the data in the MCDU (so before taxi), press the [AIDS PRINT] button. If you have a printer connected to your computer it will now print the performance sheet.



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RIGHT MCDU

For all the functions that are not part of the actual Airbus cockpit we use the right MCDU. This allows you to access all these functions inside the simulator without having to open menu's or pause the simulator. Spending some time here will be well worth the effort as it can unlock a lot of features you might now have expected!

Note: If the right MCDU is dark, click the two battery buttons on the overhead!

ACFT STATE (AIRCRAFT STATE)

Under this menu you can find several predefined 'states'. A state contains the setting for all the systems in the aircraft. Click the TAKE-OFF STATE and after a few seconds the aircraft is completely configured for take-off. If you like to change a state configure the aircraft as you want and use the SAVE USER STATE button.

ACFT DOORS (AIRCRAFT DOORS)

Here you will find the option to open the doors and hatches of the aircraft. Do note the parking brakes have to be set or chocks have to be put in place and the main engines off to be able to open the doors.

GND SERVICES (GROUND SERVICES)

Under this option you can toggle the display of cones under the wingtips and tail (to prevent vehicles driving under the aircraft) and wheel chocks. You can also toggle the display of an External Ground Power Unit and even toggle the external power option (so you can configure the aircraft without having to use batteries or APU). The display of these elements is not advised if you use Airport Enhancement Services or any other tool that shows external objects close to the aircraft.

The various options are only available if the following conditions are met:

- CHOCKS: Parking Brake is set to ON
- CONES: Only if CHOCKS are SET
- EXT POWER: Parking Brake is ON or Chocks are SET

OPTIONS

Many options are available under the subpages of the OPTION menu

SOUND

- CABIN CREW: With this option on you will hear the cabin crew communicating with you when that is necessary. We advise you to leave this on.
- FLIGHT CREW: You copilot does make noise. He coughs, opens charts etc. Activating this option will give you some audio feedback on all these things. We advise you to leave this on.
- ATC: Toggling ATC on will according to your flight status add random ATC to the sound environment. This will add some realism if you do not fly online.
- ENH GPWS (ENHANCED GROUND PROXIMITY WARNING SYSTEM): Enabling this feature you will hear various altitude callouts (p. e. 2500, 1000, 500 etc.) during your landing.

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- **VOLUME:** On the volume control page you can adjust your individual background noises and other audio elements. Keep in mind that the Airbus Cockpit is a noisy environment. In cruise you will hardly hear the engines and wind noise over the noise the cooling fans that keep the electronics cool! Changes made are kept for your next flight. If you like your own default settings ask us on the forums and we'll be glad to assist. **VIEWS**

VIEWS

- **VIEW SYSTEM:** There is a simple yet effective way to switch your views using small icons in the view bar. You open the view bar by clicking the grey triangle in the upper right (or left) corner. If you do not like this, or you are using another viewing add-on you can disable the whole viewing system here.
- **PANEL BAR:** Toggles the viewing selection of panel views.
- **WINGVIEW BAR:** Toggles the viewing selection of wing views.
- **VIEW MODE:** Here you can select if the panel views should be seen from a realistic angle or a straight on, not very realistic, viewpoint.
- **POSITION:** Toggles between a horizontal or vertical layout.
- **SOUND:** There is a small sound effect added to any view changes, you can disable it here.

CHECKLIST

- **CHECKLIST:** You can toggle the complete checklist system on or off here.
- **COPILOT:** In combination with the CHECKLIST function the "Copilot" works timely aligned with the checklist i.e. performs his duties when the task should be done according to the checklist
- **INFO BAR:** If you want you can get additional instructions at the top of the screen. Certainly for beginners we strongly advise this option activated.
- **HOTKEYS:** Many of the interactions with the checklists can be done with key command if you so desire.
- **AES PUSH:** If you own AES you want to use its advanced push back system. If not you can use the built in push back.
- **APP SPD LMTR (APPROACH SPEED LIMITER):** If you want the co-pilot to warn you about high speeds on approach activate this option.
- **250 KTS LMTR (250 KNOTS LIMITER):** If you like to be warned if you exceed 250 Knots IAS below FL100 activate this option.

FL DATA REC (FLIGHT DATA RECORDER)

Included in this product is an advanced Digital Flight Data Recorder that records all your flights (see the special chapter on that). You can toggle the activation of this module here.

FLIGHT

- **PAUSE AT TOP (PAUSE AT TOP OF DESCENT):** Pauses the simulator app. 10 NM before the point the MCDU switches from cruise to descent mode.
- **PAUSE AT NEXT WP (PAUSE AT NEXT WAYPOINT):** Will pause the simulator the moment you reach the next waypoint on your flight plan.

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AIRCRAFT

- **FLY BY WIRE:** Using this menu option it is possible to switch ON and OFF the "FLY BY WIRE" function – OFF maybe necessary for certain video recordings.
- **ACFT THRUST BUMP (AIRCRAFT THRUST BUMP):** This menu option (set to ON) enables an "unrealistic feature" where users can get additional thrust for takeoff p. e. for "high" airports, at hot temperatures or short runways.
- **TILLER:** If your system does not have a free axis you can disable the innovative tiller option.
- **AUTO RUDDER:** If you do not have a rudder control (which we **STRONGLY RECOMMEND**) you can achieve some of the functionality by setting this option

LOAD/FUEL

- **PAX (NUM) (PASSENGER NUMBER):** Allows you to set the amount of passengers you want to board and to start the boarding process.
- **CARGO (MT) (CARGO METRIC TON):** Allows you to set the weight of cargo and start loading it.
- **FUEL (MT) (FUEL METRIC TON):** Allows you to set the fuel amount and start transferring it to (or from) the aircraft.
- **TOW (MT) (TAKE OFF WEIGHT):** The calculated weight on take-off.
- **CG (PCT) (CENTER OF GRAVITY):** The center of gravity before or aft the aero dynamical center of the aircraft.
- **INIT LOADSHEET:** Push the LSK and the data from the Fuelplanner Loadsheets are automatically loaded.
- **INSTANT:** Loads all fuel, cargo and passengers instantaneously.
- **SETUP:** Allows you to set the weight per passenger (only if INIT LOADSHEET function is not used). Some airlines use different weights here as on average and American will weigh more than a Japanese person

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VIEW SYSTEM

As explained in the section on the right MCDU we included a rather clever view systems that makes it easy to switch your view to a certain part of the cockpit.



However there is a second way to navigate around the cockpit. We redefined the F9, F10, F11 and F12 keys to show different views of the cockpit (standard, upper mid console, lower console, and overhead). You will see that this often is the quickest way to navigate your view.

We did not add any 2D panels (except for the left MCDU) because we feel it is an outdated system and no longer needed. Using dedicated VC views allows you to get realistic views angles while getting realistic lighting and colors. And using the VC system it is not hard to create any view you want. You can even undock them and move it to another monitor.



ST.ELMO'S FIRE

St. Elmo's fire is a spectacular weather effect that is caused by electrostatic discharges that look like small lightning bolts. They can occur on many places (ships masts for example) but they are now best known by pilots. As an aircraft moves through the air it creates friction and that charges the aircraft. When the charge is too high (around 30,000 volts per centimeter of space) the charged object will discharge its electrical energy. In the case of an aircraft this is mostly in the form of a spark from the window frames. It's spectacular and totally harmless.

We have included this effect in the Airbus. You will not see it often but there are conditions that will cause it to appear more often. Being close to a thunderstorm is by far the most obvious, but also heavy rain and being in the tropics will make it more likely.



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ANIMATIONS

There are many animations in the Virtual cockpit. As with all elements in the cockpit they open with the left mouse button and close with the right mouse button. The areas where you can click are shown in the images. All animations have their own sound effects. Do not be surprised if some animations are driven by events in the cockpit.



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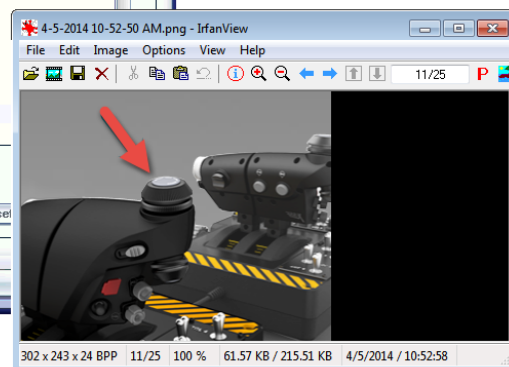
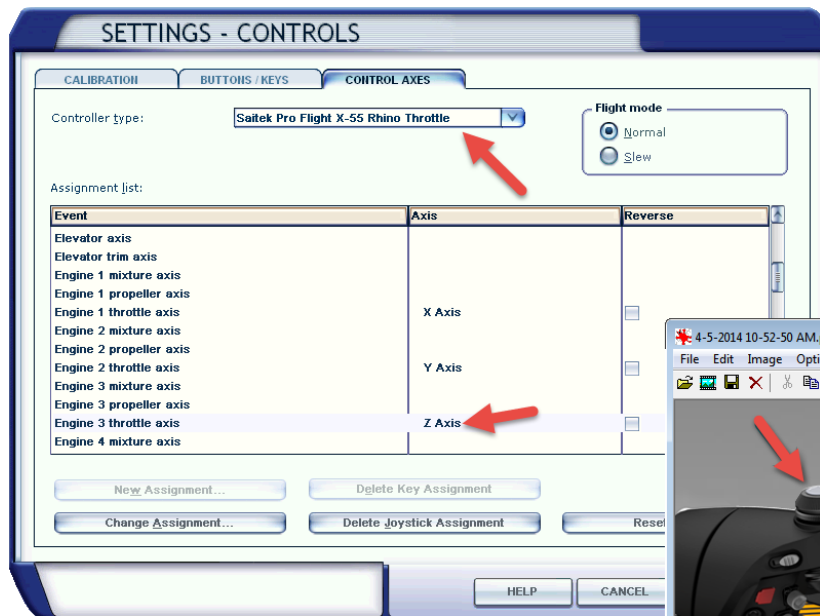


On the external model all the usual flight controls are animated but also smaller elements like the APU air inlet. The doors and cargo hatches can be opened using controls built into the right MCDU (see AIRCRAFT DOORS). A special animation will make the engines rotate in the wind when the aircraft is parked. Rotational heading and speed depends on the wind.

MAKING THE TILLER FUNCTIONAL

On the ground (at speeds under 60 knots) the Airbus is steered with the 'tiller'. This functions the same as a steering wheel in a car. We tried controlling this with the mouse for additional realism but were not happy with the results. So as with all aircraft you use the rudder to steer the aircraft. However it is now also possible to use a not used control axis (rotary control) on your steering hardware. The tiller axis is connected to the FSX Engine 3 Throttle axis. You can use the SETTINGS-CONTROLS of FSX to assign one of the controls on your hardware to this axis.

Pressing the center button (marked PEDAL DISC) will disconnect the rudder from the nose wheel. Press it again and the nose wheel will connect to the rudder again.



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FSX SETTINGS

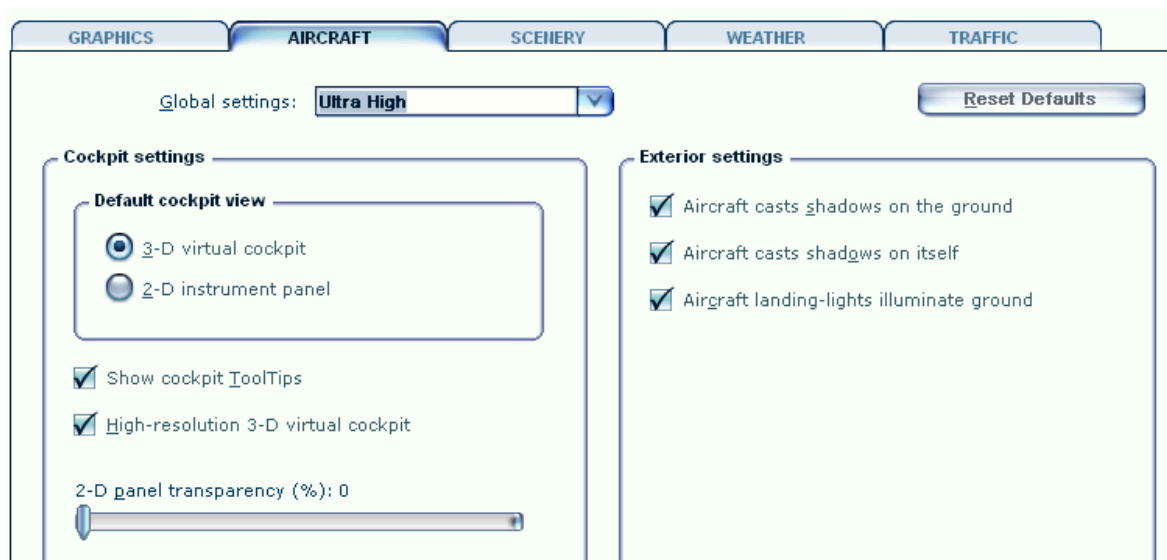
There are a few settings that influence this aircraft.

OPTIONS | SETTINGS | DISPLAY



- **Advanced animations** needs to be ON.
- **Preview DirectX 10** can be activate it, but to avoid problems we advise you to keep it OFF.

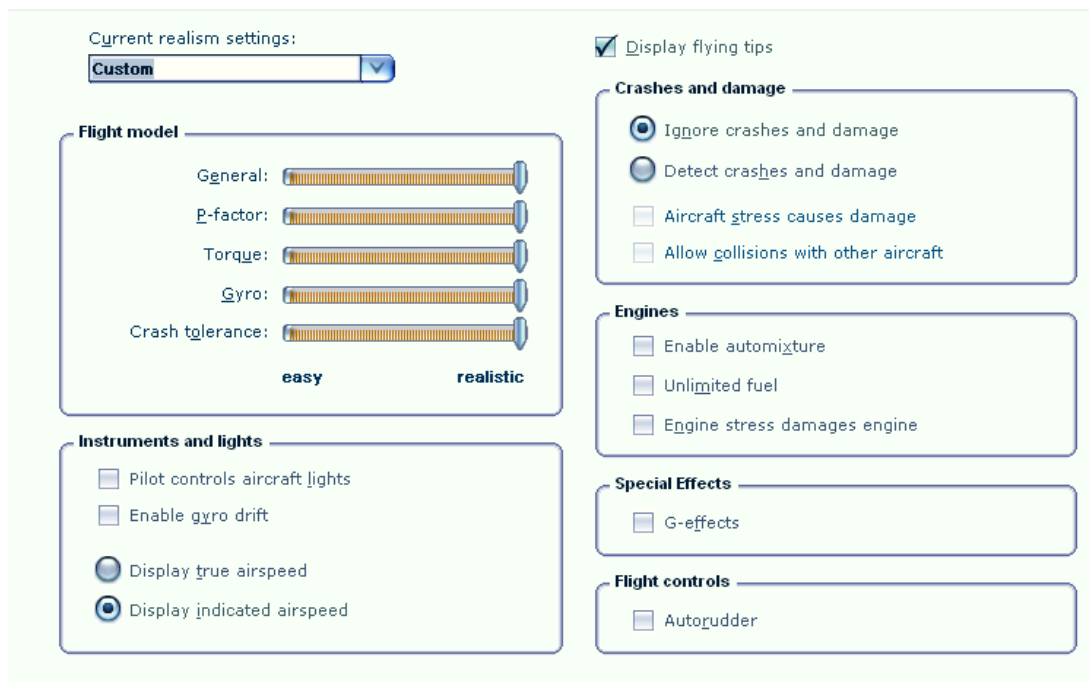
OPTIONS | SETTING | AIRCRAFT



- **Aircraft cast shadows on the ground** can be left ON as it will hardly affect frame rate.
- **Aircraft cast shadows on itself** can be ON when you got a fast machine, but it will hurt frame rate in external views.
- **High-resolution 3-D virtual cockpit** has to be ON.

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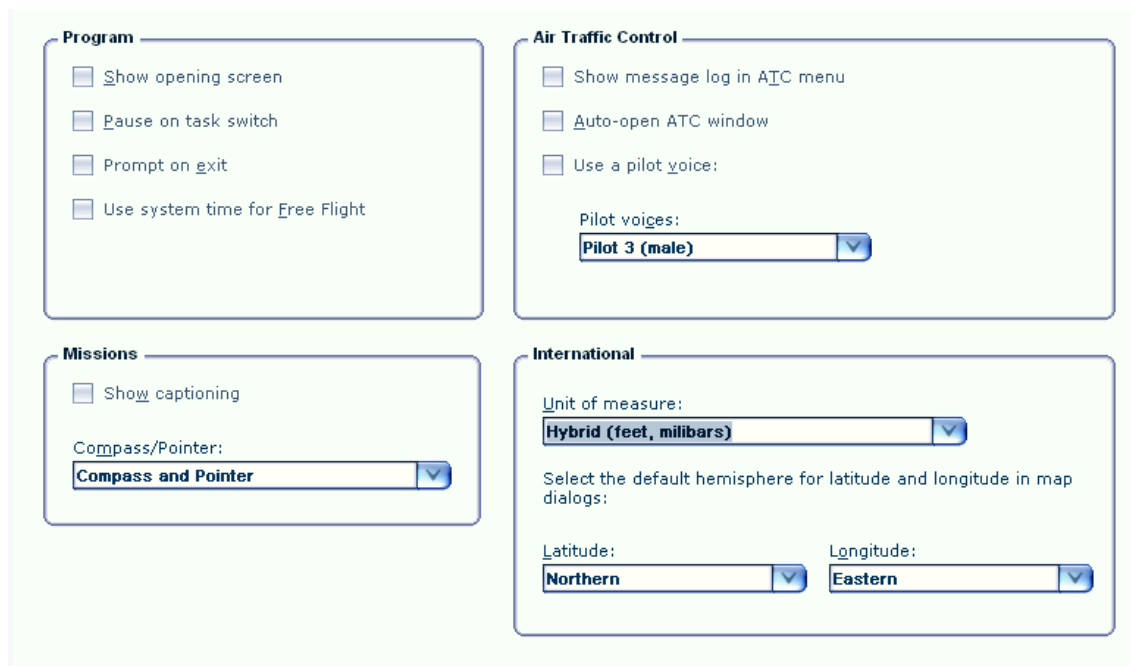
AIRCRAFT | REALISM SETTING



The most important settings are in the Aircraft settings: realism dialog.

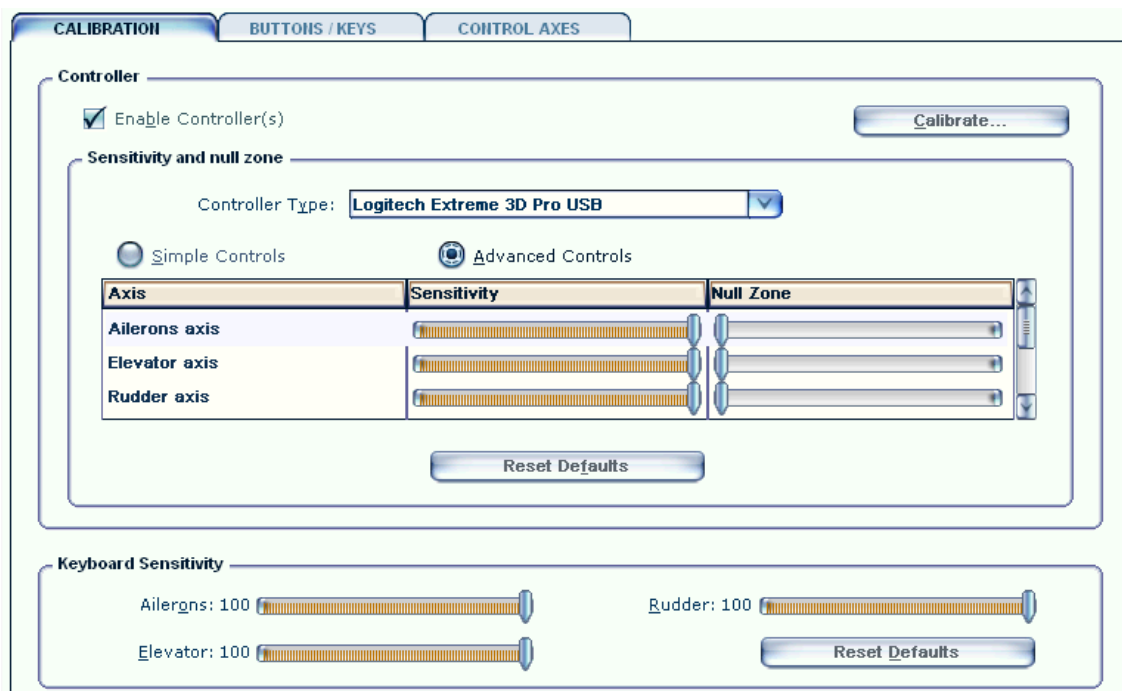
- **Flight model:** Set it to full realistic. Believe us; it will fly easier that way.
- **Instrument and lights:** You do want to control the lights and the gyro drift. Of course we want indicated airspeed, true airspeed is totally useless.
- **Crashes and damage:** Not to important. You might gain a bit of FPS setting this all **OFF**.
- **Engines:** Set as shown, but it does not really matter.
- **Special effects:** Yes, you do want special effects! But if all goes well you never see them in the Airbus because the Fly By Wire protection rules will prevent that. Keep it on though.
- **Flight Controls:** Well it's an Airbus and that has Auto Rudder build in, but to prevent FSX messing things up best keep this **OFF**.

OPTIONS | SETTING | GENERAL



- **International** is best set at hybrid as the MCDU weight and temperature settings are in kg and degree Celsius. To compare values the FSX should be set accordingly.

OPTIONS | SETTING | CONTROLS | CALIBRATION



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To fly the Aerosoft Airbus A318/A319 in an optimal way a joystick (like in the real aircraft the sidestick) should be used. The Aerosoft Airbus A318/A319 customized FSX settings (Options / Settings / Controls / Calibration) for the joystick in FSX should look as in the above image. Additionally the following „Buttons / Keys“ should be assigned to the joystick. This makes it much easier to handle certain functions such as the critical take off phase, without having to take your hands off the joystick. The functions that are recommended to be assigned to the joystick are brakes, views, flaps, spoilers and landing gear.

Switching the Autopilot to ON doesn't work with assigned buttons or keys (only OFF like on the real Airbus sidestick). The joystick settings can be changed in the FSX under Options / Settings / Controls / Buttons / Keys. Please see also Vol8_ThrottleSetup_EN.pdf for details.

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APPENDIX A: CHECKLIST WAVE NAMES AND CONTENT

Here is the complete text of the wav files that are included in the checklist system. If you like to create your own versions (in your own language) you can do so with this. Do share it with others!

PF = PILOT FLYING

NO	FILENAME	CONTENT - TEXT
1	ASC_PF_0	Zero
2	ASC_PF_0_sec	Zero
3	ASC_PF_1	One
4	ASC_PF_1_sec	One
5	ASC_PF_2	Two
6	ASC_PF_2_sec	Two
7	ASC_PF_3	Three
8	ASC_PF_3_sec	Three
9	ASC_PF_4	Four
10	ASC_PF_4_sec	Four
11	ASC_PF_5	Five
12	ASC_PF_5_sec	Five
13	ASC_PF_6	Six
14	ASC_PF_6_sec	Six
15	ASC_PF_7	Seven
16	ASC_PF_7_sec	Seven
17	ASC_PF_8	Eight
18	ASC_PF_8_sec	Eight
19	ASC_PF_9	Niner
20	ASC_PF_9_sec	Niner
21	ASC_PF_ADIRSaligned	ADIRS aligned!
22	ASC_PF_ADIRSset	Set to NAV!
23	ASC_PF_AFOff	Auto Flight Off!
24	ASC_PF_afterLanding	And the After Landing Checklist please
25	ASC_PF_afterStart	The After Start Checklist please
26	ASC_PF_afterTO	And the After Takeoff Checklist please
27	ASC_PF_AllOff	Off!
28	ASC_PF_AllOn	On!
29	ASC_PF_AP2On	Second Autopilot is on!
30	ASC_PF_APOff	Autoflight Off!
31	ASC_PF_APOn	Autopilot is going on!
32	ASC_PF_APOn2	Autopilot is on!
33	ASC_PF_Approach	Approach Checklist
34	ASC_PF_APUon	APU on!
35	ASC_PF_AreCheck	Are checked!
36	ASC_PF_Arm	Arm!
37	ASC_PF_AsRequired	And as required!
38	ACC_PF_ATCRecive	OK Ground – we have ATC clearance for push and start now– ah please confirm ground equipment and services are clear!
39	ASC_PF_ATCRecive2	OK Ground – we have ATC clearance for start and the taxi now – so please confirm ground equipment and services are clear!
40	ASC_PF_Auto	Ah Auto!
41	ASC_PF_BaroRefSet	Baro reference set – and cross check!
42	ASC_PF_beforeStart	OK let's do the Before Start Checklist
43	ASC_PF_beforeTO	Before Takeoff Checklist please

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44	ASC_PF_BothOff	Both off!
45	ASC_PF_BothOn	Ah Both on!
46	ASC_PF_BrakeFansOn	Brake fans on!
47	ASC_PF_Check	Checked!
48	ASC_PF_CheckArm	Checked and armed!
49	ASC_PF_CheckDown	Checked down!
50	ASC_PF_CheckNormal	Checked normal!
51	ASC_PF_CheckOff	Ah Checked off!
52	ASC_PF_CheckOn	Checked on!
53	ASC_PF_CheckPos	Checked position!
54	ASC_PF_CheckRetr	Checked retracted!
55	ASC_PF_CheckStby	Checked standby!
56	ASC_PF_CheckZero	Checked zero!
57	ASC_PF_ChkNoBlue	Checked and no blue!
58	ASC_PF_ChocksSet	And the chocks are set!
59	ASC_PF_ClimbThrust	Climb thrust!
60	ASC_PF_ClosedLocked	Closed and locked!
61	ASC_PF_CockpitPrep	OK let's start with the Cockpit Preparation Checklist
62	ASC_PF_DescentInit	Initiating descent!
63	ASC_PF_DescentPrep	OK let's go through the Descent Preparation Checklist
64	ASC_PF_Disarmed	Disarmed!
65	ASC_PF_DiscOff	Disconnected and off!
66	ASC_PF_DownLock3Gr	Down and locked – three green!
67	ASC_PF_Eng1Run	Engine one stabilized!
68	ASC_PF_Eng2Run	Engine two is stabilized!
69	ASC_PF_EXPon	And the External power is on!
70	ASC_PF_FaPrepLnd	Flight attendants – prepare for landing!
71	ASC_PF_FaPrepTo	Flight attendants – seats for takeoff please!
72	ASC_PF_FDtoGnd	Flight deck to ground
73	ASC_PF_Flaps1	Flaps one!
74	ASC_PF_Flaps2	Flaps two!
75	ASC_PF_Flaps3	Flaps three!
76	ASC_PF_FlapsFull	And Flaps full please!
77	ASC_PF_FlapsUp	And Flaps zero!
78	ASC_PF_Flex	MAN FLEX and SRS
79	ASC_PF_Flex_Rwy	MAN FLEX, SRS and RWY
80	ASC_PF_Full	Full!
81	ASC_PF_FullDown	Full down!
82	ASC_PF_FullLeft	Full left!
83	ASC_PF_FullRight	Full right!
84	ASC_PF_FullUp	Full up!
85	ASC_PF_GearDown	Gear down!
86	ASC_PF_GearUp	Gear up!
87	ASC_PF_GearUpLtOff	Gear up – lights off!
88	ASC_PF_GoAround	Go Around – Flaps please!
89	ASC_PF_Idle	Idle!
90	ASC_PF_IsCheck	Is checked!
91	ASC_PF_Landing	Landing Checklist please!
92	ASC_PF_LandingCall	Continue!
93	ASC_PF_LightsOff	Lights off!
94	ASC_PF_LightsOn	Lights on!
95	ASC_PF_Low	Low!
96	ASC_PF_ManBrake	Manual Brakes!

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97	ASC_PF_Max	Max!
98	ASC_PF_Medium	Medium!
99	ASC_PF_Nav	Navigation
100	ASC_PF_Neutral	Neutral!
101	ASC_PF_Off	Off!
102	ASC_PF_OK	Is OK!
103	ASC_PF_On	On!
104	ASC_PF_ParkBrakeRel	Parking brakes – released!
105	ASC_PF_ParkBrakeSet	Parking brakes – are set!
106	ASC_PF_Parking	It was a nice flight. So let's do the Parking Checklist and then we are done for the day.
107	ASC_PF_PressedPedal	Pedal Pressed!
108	ASC_PF_RadarTilt	Radar tilt!
109	ASC_PF_Recived	Received!
110	ASC_PF_Released	Released!
111	ASC_PF_Review	Reviewed!
112	ASC_PF_Rudder	Rudder!
113	ASC_PF_Set	Set!
114	ASC_PF_SetOff	Set off!
115	ASC_PF_SetOn	Set on!
116	ASC_PF_SetStdCrossChk	Baro reference set and cross check!
117	ASC_PF_Speedbrakes	Speedbrakes!
118	ASC_PF_StartCmpl	And that's a good start on both engines - all systems are normal. Thank you for your help and all clear - we see you for signal on the right please.
119	ASC_PF_StartPush	Start push back!
120	ASC_PF_Std	Standard!
121	ASC_PF_Stow	Stowed!
122	ASC_PF_TA_TiltAbove	TA and tilt above!
123	ASC_PF_TakeOff	Takeoff!
124	ASC_PF_TARA_TiltAbove	TA / RA – tilt above!
125	ASC_PF_Taxi	Taxi!
126	ASC_PF_Taxiing	And the Taxi Checklist
127	ASC_PF_Toga	MAN TOGA and SRS
128	ASC_PF_Toga_Rwy	MAN TOGA, SRS and RWY

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PnF = PILOT NON FLYING

NO	FILENAME	CONTENT – TEXT
1	ASC_PnF_0	Zero
2	ASC_PnF_0_sec	Zero
3	ASC_PnF_1	One
4	ASC_PnF_1_sec	One
5	ASC_PnF_2	Two
6	ASC_PnF_2_sec	Two
7	ASC_PnF_3	Three
8	ASC_PnF_3_sec	Three
9	ASC_PnF_4	Four
10	ASC_PnF_4_sec	Four
11	ASC_PnF_5	Five
12	ASC_PnF_5_sec	Five
13	ASC_PnF_6	Six
14	ASC_PnF_6_sec	Six
15	ASC_PnF_7	Seven
16	ASC_PnF_7_sec	Seven
17	ASC_PnF_8	Eight
18	ASC_PnF_8_sec	Eight
19	ASC_PnF_9	Niner
20	ASC_PnF_9_sec	Niner
21	ASC_PnF_70Knots	Seventy knots!
22	ASC_PnF_100Knots	One hundred knots!
23	ASC_PnF_250kt_Warning1	Captain – we have a speed limit of 250 knots!
24	ASC_PnF_250kt_Warning2	High speed – Captain!
25	ASC_PnF_10000ft	Passing ten thousand feet!
26	ASC_PnF_AccuBrakePress	Accu Brake Pressure?
27	ASC_PnF_ADIRS	A-DIRS?
28	ASC_PnF_AirCond	Air condition?
29	ASC_PnF_Altimeter	Altimeter?
30	ASC_PnF_Antilce	Anti ice?
31	ASC_PnF_AntiSkid	Anti skid?
32	ASC_PnF_APU	APU?
33	ACC_PnF_APUBleed	APU bleed?
34	ASC_PnF_APUMaster	APU master?
35	ASC_PnF_APUon	APU on!
36	ASC_PnF_AutoBrake	Auto brakes?
37	ASC_PnF_AutoBrakesOff	Auto brakes off!
38	ASC_PnF_BaroRef	Baro reference?
39	ASC_PnF_Battery	Batteries?
40	ASC_PnF_BeaconLights	Beacon lights?
41	ASC_PnF_BrakeChk	Brake check?
42	ASC_PnF_BrakeFans	Brake fans?
43	ASC_PnF_BrakeTemp	Brake temperature?
44	ASC_PnF_Check	Check!
45	ASC_PnF_Checked	Checked!
46	ASC_PnF_ChecklistCmpl	Checklist complete!
47	ASC_PnF_DH	Baro / Radio!
48	ASC_PnF_ECAMDoor	Ecamm door page?
49	ASC_PnF_ECAMRecall	Ecamm recall?
50	ASC_PnF_ECAMStat	Ecamm status?

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51	ASC_PnF_EFCS	Electronic flight control system?
52	ASC_PnF_ElecPower	Electrical power?
53	ASC_PnF_Electric	Electric panel?
54	ASC_PnF_EmergEquip	Emergency equipment?
55	ASC_PnF_EmergLight	Emergency lights?
56	ASC_PnF_EngMaster	Engine master?
57	ASC_PnF_EngModeSel	Engine mode selector?
58	ASC_PnF_ExtLights	Exterior lights?
59	ASC_PnF_ExtPwr	External power?
60	ASC_PnF_FCUCheck	FCU?
61	ASC_PnF_Flaps	Flaps?
62	ASC_PnF_Flaps1	Speed Check - Flaps one!
63	ASC_PnF_Flaps2	Speed Check - Flaps two!
64	ASC_PnF_Flaps3	Speed Check - Flaps three!
65	ASC_PnF_FlapsFull	Speed Check - Flaps full!
66	ASC_PnF_FlapsUp	Speed Check - Flaps zero!
67	ASC_PnF_Flare	Flare!
68	ASC_PnF_FlightCntr	Flight controls?
69	ASC_PnF_FlightDirector	Flight director?
70	ASC_PnF_FltInstrum	Flight instruments?
71	ASC_PnF_FMACheck	FMA check?
72	ASC_PnF_FuelPumps	Fuel pumps?
73	ASC_PnF_Full	Full!
74	ASC_PnF_GAAlt	Go around altitude?
75	ASC_PnF_GearDown	Gear down!
76	ASC_PnF_GearLever	Landing gear lever?
77	ASC_PnF_GearUp	Gear up!
78	ASC_PnF_GearUpLtOff	Gear is up – lights off!
79	ASC_PnF_GndSpoilers	Ground spoilers?
80	ASC_PnF_GPWSSys	Ground proximity warning system?
81	ASC_PnF_GSAlive	Glide scope alive!
82	ASC_PnF_GSCapt	Glide slope captured!
83	ASC_PnF_HandSig	Hand signal?
84	ASC_PnF_Hydraulics	Hydraulics?
85	ASC_PnF_LandElev	Landing elevation?
86	ASC_PnF_LandGear	Landing gear?
87	ASC_PnF_LandInfo	Landing information?
88	ASC_PnF_LndMemo	Landing memo?
89	ASC_PnF_LOCALive	Localizer alive!
90	ASC_PnF_LOCCapt	Localizer captured!
91	ASC_PnF_MinSafeAlt	Minimum safe altitude?
92	ASC_PnF_NAVAccur	Nav accuracy?
93	ASC_PnF_NavLights	Navigation lights?
94	ASC_PnF_NoseLight	Nose light?
95	ASC_PnF_NoSmoking	No smoking signs?
96	ASC_PnF_Off	Off!
97	ASC_PnF_On	On!
98	ASC_PnF_Packs	Packs?
99	ASC_PnF_ParkBrake	Parking brake?
100	ASC_PnF_ParkBrakeChocks	Parking brake and chocks?
101	ASC_PnF_PitchTrim	Pitch trim?
102	ASC_PnF_PosRate	Positive climb!
103	ASC_PnF_PowerSet	Power set!

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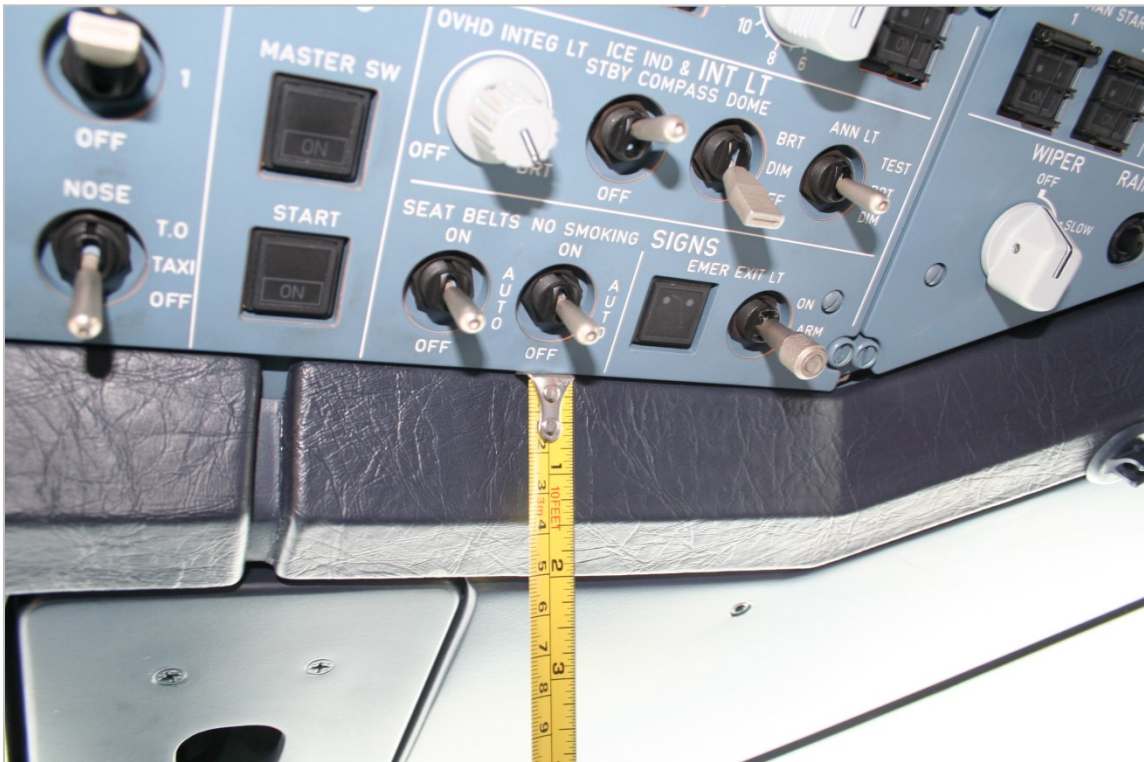
104	ASC_PnF_PressPedal	Press pedal!
105	ASC_PnF_ProbeWindowHeat	Probe window heat?
106	ASC_PnF_RadCntrPanel	Radio control panel?
107	ASC_PnF_ReverseGreen	Reverse green!
108	ASC_PnF_Rotate	Rotate!
109	ASC_PnF_RudTrim	Rudder trim?
110	ASC_PnF_SeatBelt	Seat belt signs?
111	ASC_PnF_SetBaroRefCpt	Set baro reference captain!
112	ASC_PnF_SetBelow	Set below!
113	ASC_PnF_Signs	Cabin signs?
114	ASC_PnF_SlideTable	Sliding tables?
115	ASC_PnF_SpeedBrakeLever	Speed brake lever?
116	ASC_PnF_Spoilers	Spoilers?
117	ASC_PnF_StartEng1	Starting number one!
118	ASC_PnF_StartEng2	Starting engine two!
119	ASC_PnF_Stow	Stowed!
120	ASC_PnF_TCAS	TCAS (sprich:T-cas) ?
121	ASC_PnF_ThrustLevers	Thrust levers?
122	ASC_PnF_TOConfig	TO Config?
123	ASC_PnF_ToData	Takeoff data?
124	ASC_PnF_TransAlt	Transition altitude!
125	ASC_PnF_TransponderMode	Transponder mode?
126	ASC_PnF_V1	V one!
127	ASC_PnF_V2	V two!
128	ASC_PnF_Vent	Ventilation panel?
129	ASC_PnF_WindowsDoors	Windows and doors?

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Ground Crew

NO	FILENAME	CONTENT – TEXT
1	ASC_GND_GoAhead	Go ahead Sir
2	ASC_GND_PushCmpl	And pushback is complete captain, please set your parking brakes
3	ASC_GND_RdyTaxi	OK then captain, tow bar is connected, your steering pin is removed, all clear signal on the right, have a good flight
4	ASC_GND_Readyfor Push	Ground equipment and stairs are clear, doors are closed, steering pin is position and we are ready when you are captain
5	ASC_GND_Readyfor Start	Ground equipment and stairs are clear, doors are closed and we are ready when you are captain
6	ASC_GND_RelParkBrake	Please release the parking brakes
7	ASC_GND_Roger	Roger
8	ASC_GND_StartCmpl	Roger, OK two good starts, all clear, signals on the right
9	ASC_GND_StartPush	Starting pushback, start both engines at your discretion captain

APPENDIX B: THE MAKING OFF



“THE MAKING OF”. Stefan Hoffmann measuring the A321 cockpit to make sure all details are as they should.

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COCKPIT SAFETY INSPECTION (PNF DUTY)

MASTER 1 and 2 OFF
MODE SELECTOR NORM
L/G LEVER DOWN
WIPERS OFF
BAT 1 and 2 CHECK OFF
BAT 1 and 2 VOLTAGE CHECK > 25 V
BAT 1 and 2 ON

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PRELIMINARY COCKPIT PREPARATION (PNF DUTY)

- EXT PWR (when AVAIL illuminated) ON**
- APU (when rqrd) START**
- ECAM ON**
- APU MASTER SW ON**
 - ON It illuminates.
 - APU page opens on ECAM.
- APU START ON**
 - FLAP OPEN indication shows.
 - N and EGT rise.
- AT 95%**
 - ECAM APU pages shows AVAIL.
 - On APU panel START ON It extinguishes, AVAIL It illuminates.
 - After 10 seconds ECAM DOORS page shows.
- EXT PWR AS RQRD**
 - May be kept on to reduce APU load.
- INT LT AS RQRD**
- DOCUMENTATION ABOARD & CHECK**
- PARKING BRAKE ON**
 - Check BRAKE PRESS indicator. When required use HYD YELLOW PUMP to recharge.
- FLAPS CHECK POSITION**
 - Confirm flap handle position and ECAM display in agreement.
- SPEED BRAKE CHECK RETRACTED**
 - Confirm speed brake handle position and ECAM display in agreement.
- ECAM RCL DEPRESS**
 - Depress recall button for 3 seconds to recall and clear all messages
- ECAM HYD CHECK**
 - Check for abnormal indications
- ECAM ENG..... CHECK**
 - Check for abnormal indications
- APU BLEED AS RQRD**
 - Select on when needed for air conditioning
- X-BLEED AUTO**
- ZONE TEMP SELECTORS AS RQRD**

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COCKPIT PREPARATION

PFD and ND ON PF/PNF

GPWS TEST PF/PNF

- Press GPWS pb and check the GPWS FAULT light is on and aural warnings are heard

PFD and ND CHECK PF/PNF

- Check for abnormal indications

BARO REFERENCE CHECK PF/PNF

Check barometer settings and compare altitude indications on PFD

FD CHECK ON PF/PNF

ILS AS RQRD PF/PNF

ND MODE and RANGE AS RQRD PF/PNF

- It is recommended to display ARC on ND if take off direction is close to departure direction, otherwise ROSE NAV is recommended.

VOR/ADF SELECTORS AS RQRD PF/PNF

FCU :

- SPD MACH DASHED PNF
- HDG-V/S / TRK-FPA HDG-V/S PNF
- ALT SET PFN
- Set initial expected clearance altitude.

ST BY ASI CHECK PNF

ST BY ALTI CHECK PNF

ST BY HORIZON CHECK PNF

CLOCK CHECK/ADJUST PNF

A/SKID & N/W STRG ON PNF

RADIO CONTROL PANEL ON PF/PNF

COMS FREQ SET PF/PNF

THRUST LEVERS CHECK IDLE PNF

ENG MASTER SWITCH OFF PNF

ENG MODE SELECTOR NORM PNF

XPNDR STB PNF

PARKING BRAKE ON PNF

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EXTERNAL LIGHTS:

- STROBE AUTO PNF
- BEACON OFF PNF
- WING, NAV, RWY TURN OFF, LAND NOSE AS RQRD PNF

SEATBELT SIGN ON PNF

NO SMOKING AUTO PNF

EMER EXIT LT ARM

CABIN PRESS LDG ELEV AUTO PNF

FUEL PUMPS ALL ON PNF

TAKE OFF INFORMATION RECEIVE PNF

- TAKE OFF DATA FORM..... START TO FILL PNF

FMGS PREPARATION

- INIT A DEPRESS INIT
 - Insert departure and arrival airport (FROM/TO)
 - Insert flight number (FLT NBR)
 - Press ALIGN to get location
 - Insert Cost Index (COST INDEX)
 - Insert Cruise Flight Level (CRZ FL)

- F-PLN DEPRESS F_PLN
- RADNAV DEPRESS RADNAV
 - Insert all relevant Navigational Aids

- INIT B ARROW RIGHT
 - Insert TAXI, RTE RSV, FINAL/TIME (optional)
 - Enter Block Fuel (BLOCK)
 - Insert Zero Fuel Weight (ZFW)

- PERF DEPRESS PERF
 - Enter take off flaps (FLAPS/THS)
 - Enter V1, Vr, V2 (entering no data and depressing the LSKs will insert pre-calculated numbers)
 - Insert take off flex (TO-FLEX)
 - Enter transition altitude(or leave at 18000)
- Check flight plan (assuming FSX flight plan is loaded)

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FUEL QTY CHECK PF/PNF

PREFLIGHT BRIEFING PERFORM PF/PNF

COCKPIT CREW CHECKLIST COMPLETE

- Read by PNF and answered accordingly

1. Preflight Briefing PERFORMED PF/PNF 2. Cabin SignsON/AUTO PF 3. Fuel Quantity _____KG PF/PNF 4. Take Off Data INSERTED PF/PNF 5. Altimeter CHECKED PF
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BEFORE START/PUSHBACK

ATC CLEARANCE OBTAIN PNF

WINDOWS and DOORS CLOSED PF/PNF

- Check the red circle on handle is fully visible
- Check on ECAM lower display that all doors are closed

START UP and PUSHBACK CLEARANCE OBTAIN PF/PNF

THR LEVERS IDLE PNF

- Engine will start regardless of thrust lever position.
- if IDLE is not selected thrust will increase rapidly after start.

PARKING BRAKE AS RQRD PF

- If no pushback rqr set ON, check ECAM "PARK BRK" memo displayed & BRAKE PRESS indication
- If pushback rqr coordinate parking brakes with ground crew

BEACON ON PNF

TRANSPONDER XNPDR PNF

APU BLEED ON PNF

BEFORE START CHECKLIST COMPLETE PF/PNF

- Read by PNF and answered accordingly

1. Windows/Doors CLOSED PNF/PF
2. Beacon..... .ON PF
3. Thrust Lever IDLE PNF
4. Parking Brake SET PF

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ENGINE START

CREW COORDINATION

Condition	PF	PNF
Before start CKL completed		Report " Before start CKL completed
Ready to start & Ground crew clearance obtained	ENG MODE to IGN START	
ENG MODE Sel - IGN START	Announce "Engine No #" ENG MASTER to ON	
Engine stabilized	Check N1, N2, EGT and FF on normal ground idle	

ENG MODE sel **IGN PF**

"ENG 2 START" **ANNOUNCE PF**

MASTER sw 2 **ON PF**

ENGINE PARAMETERS **MONITOR PF**

- Start valve open,
- Bleed pressure indicating green,
- Oil Pressure rise,
- N2 increase to 16%,
- Igniter A or B,
- N2 increase to 22%,
- Fuel flow increase,
- EGT rise,
- N1 increase,
- Start valve closing at 50% N2,
- Igniter off.

ENGINE IDLE PARAMETERS (ISA sea level) **CHECK PF/PNF**

- N1 19.5 %
- EGT 390° C
- N2 58.5 %
- FF 275 kg/h
- OIL..... steady green

"Parameters Stabilized" **ANNOUNCE PNF**

MASTER sw 1 **ON PF**

- as for Engine 2

ENG MODE sel **NORM PF**

- On lower ECAM the ENG page will be replaced with WHEEL page

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AFTER START

- APU BLEED** **OFF PNF**
- GROUND SPOILERS**..... **ARM PNF**
- RUDDER TRIM** **ZERO PNF**
- If not showing zero, press RESET.
- FLAPS LEVER** **SET PNF**
- Set FLAPS for take-off.
 - Check ECAM upper display.
- PITCH TRIM** **SET PNF**
- Set TO CG on pitch trim wheel.
- ECAM STATUS** **CHECK PNF**
- Check for remaining reminders.
- APU MASTER sw**..... **OFF PNF**
- ENG ANTI ICE** **AS RQRD PF**
- WING ANTI ICE** **AR RQRD PF**
- On ground the anti-ice valves will operate for 30 seconds then close, they will open automatically when a/c is airborne.
- ECAM DOOR** **SELECT PF**
- Check all slides armed & deselect door page on ECAM.
- GROUND CREW CLEARANCE** **RECEIVE PF/PNF**
- Captain acknowledges the clear to move signal from ground crew, Copilot crosschecks.
 - PF checks that NW STRG DICS memo message is NOT displayed.
- AFTER START CHECKLIST** **COMPLETE**
- Read by PNF and answered accordingly

1. APU AS RQRD PF
2. Anti-Ice AS RQRD PF
3. ECAM Status CHECKED PNF
4. Flaps FLAPS.... PF/PNF
5. SPOILER ARMED PF
6. Pitch/Rudder Trim ___/ZERO PF
7. Hand Signal RECEIVED CPT

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TAXIING

TAXI CLEARANCE OBTAIN PNF

- Always use VHF 1 because it is linked to the emergency bus.

EXT LT AR RQRD PF

TAXI AREA CLEAR PF/PNF

CLOCK ET START PNF

- To record block time move ET selector to Run to start Elapsed Time counter.

PARKING BRAKE CK/OFF PF

- Aircraft in motion:
 - PF calls “Brake Check”.
 - Gently apply brakes.
 - Check BRAKES pressure at zero.
 - PNF announces “No Pressure”.

TRUST LEVERS AS RQRD PF

- Little or no thrust above idle is needed to get in motion.
- Maximum speed in straight line below 30 knots and 10 knots in sharp turns.
- Do not ride brakes (brake wear is proportional to duration, not to applied pressure)

FLIGHT CONTROLS CHECK PF/PNF

- PF applies full deflection of the stick up, down, neutral, left, right, neutral.
Note full deflection needs to be kept for a moment to reach full movement.
PF/PNF checks on F/CTL page for full travel.
- PF presses PEDAL DISC PB on nosewheel tiller and applies full rudder and
PF/PNF monitor F/CTL page for full motion.

ATC CLEARANCE RECEIVE PF/PNF

TAKE OFF DATA/CONDITIONS REVIEW PF/PNF

FCU SET PNF

- Insert cleared altitude.
- Preset heading if turn is needed after take off (NAV will be disarmed and after takeoff, RWY TRAK mode will keep centerline heading until HDG/TRK selection knob is pulled.

ATC CODE CONFIRM/SET PNF

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AUTO BRK MAX PNF

- AUTO BRK can be 'on' while on parking brakes. MAX setting will help to stop the aircraft in case of an aborted takeoff by automatically applying maximum brake force when throttles are retarded to idle.

TO CONFIG pb PRESS PNF

- Check "T.O. CONFIG NORMAL" is shown on ECAM upper display.

FLIGHT INSTRUMENTS CHECK PF/PNF

- Check for any abnormal indication during the whole taxi period.

TAKE OFF BRIEFING COMPLETE PF

- Take off briefing is an abbreviated version of the preflight briefing done earlier. It should include runway to be used, runway condition, and configuration of aircraft, departure and weather. V1, VR, V2 should be memorized so they are available in case of any problem.

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BEFORE TAKE OFF

TAKE OFF LINE UP CLEARANCE OBTAIN PF/PNF
APPROACH PATH CLEAR OF TRAFFICCHECK PF/PNF
TRANSPONDER TA/TR
TAKEOFF IMMINENT ANNOUNCE PNF

- When take-off clearance has been obtained PNF will announce through PA system "Cabin crew, prepare for take off."

ENG MODE sel AS RQRD PNF

- Select IGN when runway has standing water, in heavy rain or when heavy turbulence is expected directly after takeoff.
- PACKS / APU BLEED AS RQRD PNF
- Deactivating packs and/or activating APU bleed ON can improve performance (only in TOGA thrust mode) and can reduce maintenance costs (only at lower power settings). APU BLEED is not possible when WING ANTI ICE is used.

EXTERNAL LIGHTS SET PF

SLIDING TABLE STOWED PF/PNF

BEFORE TAKE OFF CHECKLIST COMPLETE PF/PNF

- Read by PNF and answered accordingly

1. Engine Mode Selector AS RQRD PF
2. Packs ON PF
3. TO Memo ALL GREEN

"READY FOR TAKE OFF" ANNOUNCE PF/PNF

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TAKE OFF

Rolling and static take offs are possible and permitted. Do not apply brakes over 50% N1 on start.

THRUST LEVERS FLX or TO/GA PF

- PF advanced throttles from idle to 50% N1.
- PF releases brakes (in case of static take off).
- PF advances throttle to take off power.
- Stick half forward till 80 knots to prevent nose up effect (full forward stick in case of +10 crosswind of aft located CG).
- PF announces "Take-off thrust time".
- C/M 1 keeps hand on throttle until V1 is reached.
- C/M2 starts chrono timing.

PF/DND SCAN PF/PNF

- PF and PNF will check FMA on PFD and abnormal indication.

TAKE OFF N1 CHECK PNF

- Check that N1 is reached before 80 knots and announce "Take off trust set".

DIRECTIONAL DISPLAY BY RUDDER PF

- Do not use steering hand wheel above 30 knots.
- At 130 knots connection between nosewheel steering and rudders is removed, beware of this in case of strong crosswinds.

PF and ENG indications SCAN PNF

- Scan airspeed and engine parameters during whole procedure.

V SPEEDS ANNOUNCE PF/PNF

- PNF will announce 100 knots, V1 and VR
- PF will cross check and reply "checked" at 100 knots

ROTATION PERFORM PF

- At VR rotate smoothly to a pitch attitude of 15° with centralized stick, after takeoff follow SRS pitch command bar.

GEAR RETRACT PF/PNF

- PNF ensures that the aircraft is climbing and calls "Positive climb".
- PF cross checks and calls "Gear up".
- PNF confirms with a "Gear up" call and moves the gear lever to the UP position.
- PNF calls "Gear up, lights out" when gear is stowed.

TAXIWAY and TURNOFF LIGHTS OFF PF/PNF

A/P AS RQRD PF

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AT THRUST REDUCTION ALTITUDE

THRUST LEVERS CL PF

- The levers should be moved to the CL detent at thrust reduction altitude

AT ACCELERATION ALTITUDE

- Check FMA changes from SRS to CLB green & ALT blue
- Check target speed changes from V2+10 to CLB speed

PACK 1 & 2 (if applicable) ON PNF

- Check/Set PACK 1 ON after CLB trust reduction
- Check/Set PACK 2 ON after flap retraction

FLAPS RETRACT PF/PNF

- Retract flaps directly after acceleration altitude is reached
- Check acceleration to CLB speed
 - At F: PF order "*FLAPS 1*", PNF checks conditions, confirms with "*FLAPS 1*" and moves the flaps lever to 1
 - AT S: PF order "*FLAPS ZERO*", PNF checks conditions, confirms with "*FLAPS ZERO*" and moves the flaps lever to 0

GROUND SPOILERS..... DISARM PNF

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AFTER TAKE OFF

APU BLEED OFF PNF

- If the APU has been used to supply air conditioning during takeoff select APU BLEED to OFF. APU BLEED is not usable over 15,000 ft maximum.

APU MASTER AS RQRD PNF

ENG MODE SELECTOR AS RQRD PNF

- Set IGN in heavy rain or heavy turbulence.

ANTI ICE PROTECTION AS RQRD PF

- When ice conditions are expected or ICE DETECTED is shown on ECAM PF needs to activate the anti ice systems. Please note that ENG ANTI ICE will force the FADEC to switch ENG MODE to continuous ignition.

SEAT BELTS AR RQRD PF

BARO REF SET/X-CK PF/PNF

- At transition altitude (indicated by baro setting flashing on PFD) the PNF calls "*Transition altitude*".
- PF calls "*SET STD, cross check at FL****"
- PF will call "*Top*" at FL*** and PNF will crosscheck and confirms with "*Checked*"

AFTER TAKE OFF CHECKLIST COMPLETE PNF

- Checked by PNF silently and without cross check from PF with the Altimeter line. PF will respond with altimeter setting on PFD.

1. Engine Mode Selector AS RQRD PNF
2. Spoilers DISARMED PNF
3. Flaps RETRACTED PNF
4. Landing Gear UP/LTS OUT PNF
5. Exterior Lights RET/OUT PNF
6. Packs ON PNF
7. Altimeter STD PF/PNF

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CLIMB

MCDU PF to PERF CLB PF

CLIMB SPEED MODIFICATION ENTER PF

- When a speed change is required, select new speed with FCU SPD selector and pull, Speed target will show in Cyan.

AT 10.000 FEET (OR 18.000 FEET)

LANDING LIGHT OFF and RETRACT PF

CRZ FL SET PF

- When direct climb to CRZ FL set in INIT A page is not possible, set CRZ FL manually

ANTI ICE AS RQRD PF

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CRUISE

ECAM SYS PAGES..... REVIEW PNF

- Periodically review system pages
(ENG, BLEED, ELEC, HYD, FUEL, COND, FLT CTL)

CABIN TEMP MONITOR PNF

- Adjust when needed during climb.

FLIGHT PROGRESS MONITOR PF/PNF

- At any waypoint check ATO and ETO, track and distance and compare to printed flight plan.

NAV ACCY CHECK PF/PNF

- Periodically check accuracy of navigation systems by tuning a VOR, VOR/DME or ADF, select correct needles on ND and check that needles are in same position as blue navaid symbol.

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DESCENT PREPARATION

- LANDING INFORMATION** **RECEIVED PF/PNF**
- ALTIMETERS** **PRESET/SET PF/PNF**
- FMGS** **SET FOR LANDING PF**
- RAD NAV** **SET (ILS) PF/PNF**
- MIN SAFE ALTITUDES** **CHECK PF/PNF**
- Determine and cross-check from documents.
- APPROACH and LANDING BRIEFING** **PERFORM PF**
- During a low work load phase (but before start of descent) the captain will outline the planned procedures, weather, relevant NOTAMs and missed approach procedures.
- COMPANY MESSAGES** **AS REQUIRED PNF**
- Inform dispatcher of flight progress, aircraft status and services required.
- DESCENT CHECKLIST** **COMPLETE PF/PNF**
- Read by PNF and answered accordingly.

- | |
|--|
| <ol style="list-style-type: none"> 1. Approach and Landing Briefing PERFORMED PF 2. Minimum Safe Altitude CKD PF/PNF 3. LDG Elevation _____ FT PF 4. Altimeters _____ STD PF/PNF |
|--|

- DESCENT CLEARANCE** **OBTAIN PNF**
- On PF request the PNF will obtain descent clearance from ATC. PF will set FL on FCU.

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DESCENT / APPROACH

MCDU SET PF/PNF

ANTI ICE AS RQRD PF

- With ANTI ICE set to ON the FADEC will increase idle rpm to provide better protection against flame out. This will reduce the descent path angle, something that can be compensated for with half speed brakes.

SPEED BRAKESAS RQRD PF

- In idle descent the speed brakes can be used to increase the rate of descent. Avoid use above FL250 for passenger comfort.

NAV ACCY CHECK PF/PNF

- Before reaching the terminal area perform a check of accuracy of the navigation systems by comparing positioning of FMGC and VOR, VOR/DME, ADF.

POSITIONING:

- When not under ATC control (or following standard procedures) attempt to be at 9,000 ft and 250 kts at 30 NM from touchdown

BARO REF SET QNH/X-CK

- At transition altitude PNF will announce "Transition level" and PF will call for QNH setting and will announce "QNH, cross check at xxx ft." When passing xxx ft PNF will announce "Top". When the altimeters show. The same altitude the PF will reply "Checked".

AT 10.000 FEET (INITIAL APPROACH)

LANDING LIGHTS ON PF

CABIN SIGNS ON/AUTO PF

- Place SEAT BELTS switch to ON and check NO SMOKING is on AUTO.

CABIN SECURE FOR LANDING

- Inform cabin crew of landing and obtain confirmation. Cabin crew should not enter cockpit during the descent except for emergencies.

ENG MODE SEL AS RQRD PF

- Select IGN in case of standing water on runway, severe rain or severe turbulence.
- ECAM STATUS CHECK PNF
- Check for remaining status messages in upper ECAM.

LANDING DATA REVIEW PF/PNF

- Revise landing weight, landing configuration, landing speeds.

ND SEL ARC or ROSE NAV

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RAD NAVAIDS CHECK PF/PNF

- Ensure the correct radio navaids are tuned and identified.
- ILS pb sw PRESS PF/PNF
- When LOC and Glide Scales are shown on PFD a valid ILS signal is received.
Confirm identification, course, frequency and deviation.

APPROACH PHASE MONITOR PF

- In NAV check that APPR phase activates automatically.
- In HDG/TRK mode activate APPR phase 15 nm from touchdown.
- Set speed required by ATC when required.

APPROACH CHECKLIST COMPLETE PF/PNF

- Read by PNF and answered accordingly.

1. ECAM Status CKD PNF
2. Cabin SIGNS ON/AUTO PF
3. DH/MDA SET PNF
4. Altimeters ____STD PF/PNF
5. V Bugs SET PNF
6. Engine Mode Selector AS RQRD PF

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FINAL

APP PB PRESS PF

- Press the APP pb (for ILS) only when ATC clears the aircraft for approach. Check FMA for LOC and G/S indications. Note the LOC and/or G/S capture modes will engage at the earliest 3 sec after arming.

AP BOTH ENGAGED PF

- After selection of ILS APP mode, both AP should be engaged.

FLAPS 1 SELECT PF/PNF

- PF calls “*Flaps 1*” and PNF checks flap extension conditions, answer “*Flaps 1*” and move flaps lever to 1. When flaps indication shows the flaps are extended PNF will announce “*Flaps 1 green*”. To reduce flaps wear it is advised to extend flaps at VFE-15 kt.

ILS CAPTURE MONITOR PF/PNF

- X-check VOR/DME and ADF for proper ILS intercept. PNF will call “LOC alive” and “Glide slope alive” when the indicators start to move.

FLAPS 2 SELECT PF/PNF

- PF calls “*Flaps 2*” and PNF checks flap extension conditions, answer “*Flaps 2*” and move flaps lever to 2. When flaps indication shows the flaps are extended PNF will announce “*Flaps 2 green*”. Monitor deceleration towards F speed.

LANDING GEAR EXTEND PF/PNF

- PF calls “Gear down”. PNF will ensure conditions are correct, move the gear lever down and will acknowledge “Gear down”. When 3 green lights are on PNF will announce “Gear down, three green”.

ECAM WHEEL PAGE CHECK PNF

- The ECAM WHEEL page will show automatically when gear is extended (or below 800 ft AGL). PNF checks this page for irregularities.
- AUTO BRAKE AS RQRD PN/PNF
- When required the PF will call for autobrake mode. PNF selects the mode, checks green light and correct indication on the ECAM WHEEL page. Use of autobrake is recommended.

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TAXI LIGHTS and TURN OFF LIGHTS CHECK ON PF/PNF

FLAPS 3 /FULL SELECT PF/PNF

- PF call *"Flaps 3"* (or *"Flaps full"*). PNF checks flap extension conditions, answers *"Flaps 3(full)"* and moves flaps lever to 3 (full). When flaps indication shows the flaps are extended PNF will announce *"Flaps 3 (full) green"*. Monitor deceleration towards VAPP. Speed brakes should be retracted before flaps 3 or flaps full extension. FLAPS FULL must be used in possible wind shear conditions or turbulence.

GROUND SPOILERS..... ARM PF

A/THR CHECK PF

- Verify that A/THR mode (SPEED or OFF) and TARGET SPEED are in agreement with intentions.

GO AROUND ALT SET PF

- The GA altitude is set on FCU when G/S or FINAL APP is green or aircraft altitude is lower than Go Around altitude

FINAL CHECKLIST COMPLETE PF/PNF

AT "RETARD RETARD" CALL

THROTTLE TO IDLE PF

FLARE PERFORM PF

LANDING ROLL

DIRECTIONAL CONTROL MAINTAIN PF

- Use rudder pedals down to 30 kts.

BRAKES AS RQRD PF

- When autobrake is used monitor deceleration.

THRUST LEVERS REVERSE PF

- PF applies reverse thrust to decelerate to 70 knots. PNF calls *"70 knots"*.

THRUST LEVERS REV IDLE PF

- PF smoothly reduces reverse thrust to reverse idle.

THRUST LEVERS FWD IDLE PF

- PF sets thrust levers to forward idle when taxi speed is reached. PNF will call *"Reverse out"* when REV indication disappears.

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AFTER LANDING

- GROUND SPOILERS..... DISARM PNF**
- FLAPS FULL RETRACT PNF**
- ENG MODE SELECTORS NORM PNF**
- LANDING LIGHTS RETRACT PF/PNF**
- On PF request PNF switches off/retracts landing lights .TAXI and RUNWAY
TURN OFF LIGHTS remain on.
- ANTI ICE AS RQRD PNF**
- APU START IF RQRD PNF**
- BRAKE TEMPERATURE CHECK PF/PNF**
- Check brake temperature for high or irregular temperatures.
- CLOCK CHRONO STOP PNF**
- AFTER LANDING CHECKLIST COMPLETE PF/PNF**
- Read silently by PNF, upon completion PNF will inform PF.

- | | |
|-------------------------------|-----------|
| 1. Spoilers | DISARMED |
| 2. Flaps | RETRACTED |
| 3. Engine Mode Selector | NORM |
| 4. Radar | OFF |
| 5. APU | AS RQRD |

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SINGLE ENGINE TAXI

APUON

- Wait 3 minutes and check APU running

ENGINE MASTER 2OFF

YELLOW ELEC HYD PUMPON

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PARKING

PARKING BRAKE **SET PF**

- PARKING BRAKE handle to ON, check BRAKES PRESS indication before releasing brake pedals.

GROUND CONTACT **ESTABLISH PF**

ELECTRICAL POWER..... **ESTABLISH PNF**

- When possible use GPU or centralized distribution. When passenger on board use APU to provide air conditioning.

ENG MASTER 1 and 2 **OFF PF**

- When APU is OFF, set EXT PWR to ON before ENG MASTERS OFF
- Check engine parameters wind down
- DOORS page will show on lower ECAM

SEAT BELTS **OFF PF**

SLIDE DISARMING / DOORS OPENING **INSTRUCT CABIN PF**

BEACON **OFF PF**

- When N2 drops below 20% switch off BEACON.

PARKING BRAKES **OFF PF**

- When chocks are in place release parking brakes to allow cooling.

CLOCK **STOP PF/PNF**

- Captain determines on block time, co-pilot notes it in the operational documents.

ANTI ICE **OFF PNF**

APU BLEED **AS RQRD PNF**

- Do not start APU BLEED before engines are shutdown to avoid exhaust fumes being sucked in.

FUEL PUMPS **OFF PNF**

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LEAVING THE AIRCRAFT

To be done when aircraft is left unattended or in the hands of the ground crew.

APU BLEED **OFF PNF**

NO SMOKING **OFF PNF**

- When switched off the NO SMOKING allows the emergency batteries to be charged.

APU MASTER SW **OFF PNF**

EXT PWR **AS RQRD PNF**

BAT 1 and 2 **AS RQRD PNF**

- When no external power is available wait until APU intake is fully closed before switching off batteries.

BEFORE LEAVING CHECKLIST **COMPLETE PF/PNF**

- Read by PNF

<p>1. No Smoking OFF</p> <p>2. Lights OFF</p> <p>3. APU AS RQRD</p> <p>4. Batteries AS RQRD</p> <p>5. Beer COLD & DSRV</p>
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STEEP APPROACH

For specially equipped A318 aircraft a STEEP APPR(OACH) operation is permitted. This allows the aircraft to descend along -4.5° to -5.5° glide paths using:

- CAT1 approaches (LOC+G/S)
- LOC without G/S (LOC + FPA or V/S)
- Visual approaches (with PAPI or HUD)

In order to increase the descent capability and to cope with the -5.5° angle, the following aerodynamic configuration has been chosen:

- Gear down
- Flaps/Slats fully extended (CONF FULL)
- Speed Brake lever FULL (but only spoilers 3 and 4 are extended to 30°)

BEFORE DESCENT

- 8 KNOTS ADDED TO VAPP in PERF APPR PAGE DONE**
- STEEP APP PB PRESSED**
- STEEP APP indicated in green memo CHECKED**
- BRIEVING STEEP APPROACH..... DONE**
 - Landing configuration (STEPP APPR P/B pushed + Gear Down + CONF FULL + SPD BRKS lever position FULL)
 - VLSPFD=VREF+8Kt in steep approach configuration
 - Automatic call-outs "Standby / Standby / Flare"
 - PNF call-out "Flare" at 60ft RA for redundancy with automatic "Flare" call-out at 63ft
 - Retard thrust levers to IDLE at flare initiation

INTERMEDIATE APPROACH

- AEODYNAMIC CONFIGURATION..... SET**
 - STEEP APPR P/B pushed
 - Gear Down
 - CONF FULL
 - SPD BRKS lever FULL
- LANDING CHECKLIST DONE**

LANDING

- Flare initiated at 55 ft (automatic call-out at 63 ft)
- Retard thrust levers to IDLE at flare initiation

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SPEEDS GUIDE

Flaps/Slats Extended speed

FLAPS	1	1 + F	2	3	FULL
V _{FE}	230	215	200	185	177
V _{FE - 10}	220	205	190	175	167

Landing Gear Speeds V_{LO}/V_{LE}

RETRACTION (GEAR COMING UP)	220
EXTENTION (GEAR GOING DOWN)	250
EXTENDED (OPERATION WITH GEAR DOWN)	280 KIAS / .67 MACH

Maximum Operating Speed – V_{MM}/V_{MO}

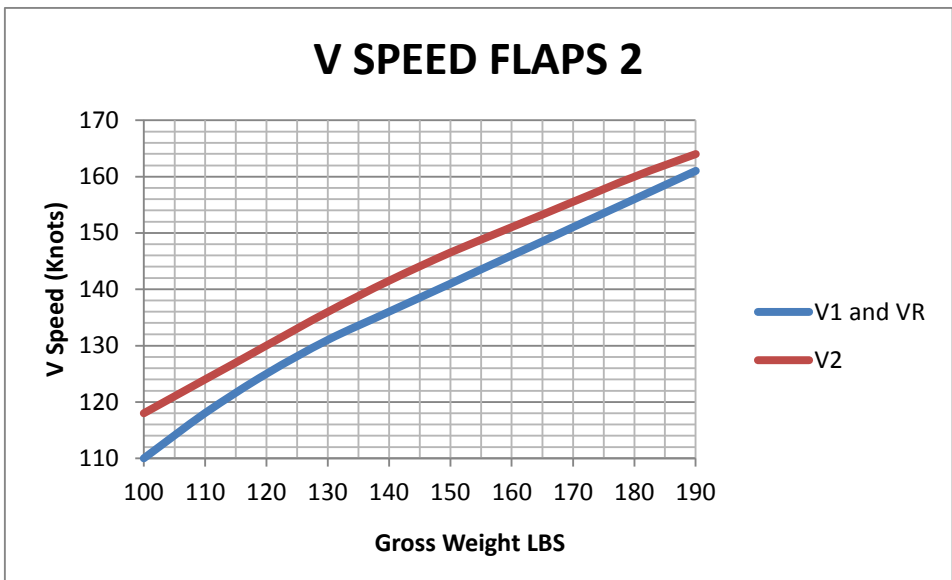
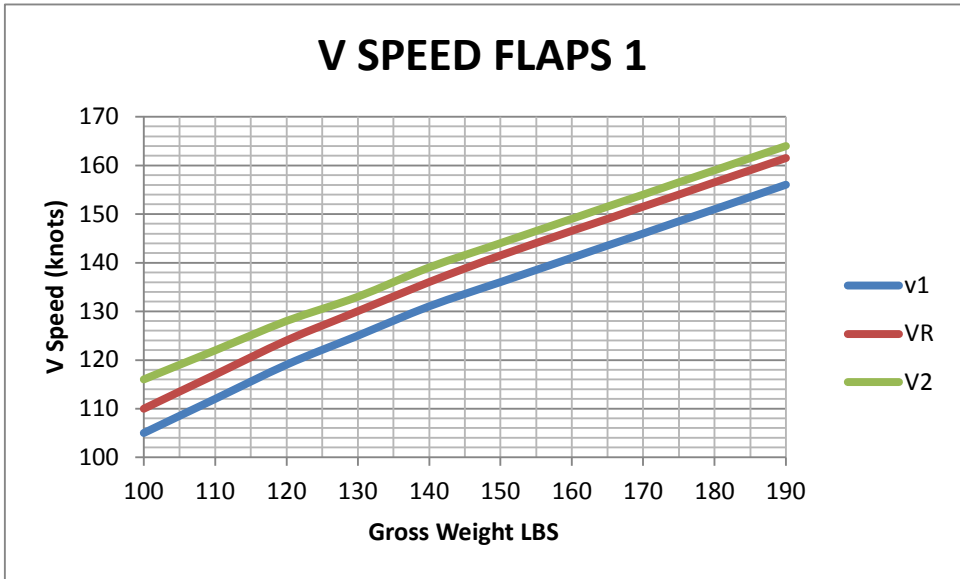
ABSOLUTE MAXIMUM OPERATING SPEED	350 KIAS / .82 MACH
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Maximum Altitude (Pressure)

TAKE OFF AND LANDING	9200 FEET
OPERATING	39,100 FEET

Maximum Operating Altitude

FLAPS	20,000 FEET
GEAR	25,000 FEET



COCKPIT PREPARATION	
CONSOLE/FLOOR lights	AS RQRD
PFD/ND.....	CHECK
GPWS	TEST
Baro REF	SET
FD	CHECK ON
ILS	AS RQRD
ND Mode/Range	AS RQRD
VOR/ADF Sel	AS RQRD
SPD MACH	DASHED
HDG V/S / TRK FPA	HDG V/S
ALT Window	SET EXPECTED
STBY ASI.....	CHECK
STBY ALTI	CHECK
STBY Horizon	CHECK
Clock	CHECK/ADJUST
A/SKID NOSE WHEEL	ON
Exterior Lights	OFF
SWTG Rotary Sels	ALL NORM
ECAM STS	DEPRESS
Thrust Levers	CHECK IDLE
ENG MASTER Sws	CHECK OFF
ENG MODE Del	CHECK NORM
ATC MODE Sel	XPNDR
PARK BRAKE	AS RQRD
STROBE Lt	AUTO
BEACON Lt	CHEC OFF
WING, NAV, RWY TURN OFF, LAND, NOSE Lts	AS RQRD
SEAT BELTS	ON
NO SMOKING	AUTO
Cab Press LDG ELEV	AUTO
Pack ECON FLOW	AS RQRD
BAT	CHECK CHARGING
Fuel PUMPS	ALL ON
TO DATA	FILL
FMGS Inputs	CHECK
F-PLN A and B Pages.....	CHECK

FINAL COCKPIT PREPARATION	
TO DATA	X-CHECK/SIGN
MCDU	TO CONFIG
Fuel QTY	CHECK
Preflight Briefing	PERFORM
Cockpit Crew Checklist	COMPLETE

BEFORE START/PUSHBACK	
ATC Clearance	OBTAIN
Windows/Doors	CLOSED
Start up/Pb clearance	OBTAIN
“N WHEEL STEERG DISC” ECAM Memo	CHECK ON
Parking Brake	AS RQRD
THR LEVERS	IDLE
APU BLEED	ON
Before Start Checklist	COMPLETE

ENGINE START	
Engine (eng 2 first)	START
ENG MODE Sel	IGN
“ENG START 2”	PF ANNOUNCE
MASTER Sw 2	ON
ENG Parameters	CHECK/MONITOR
ENG Idle Parameters	CHECK
“Parameters Stabilized”	PNF ANNOUNCE
“ENG START 1”	PF ANNOUNCE
MASTER Sw 1	ON
“Parameters Stabilized”	PNF ANNOUNCE
ENG MODE Sel	NORM

AFTER START	
APU BLEED	OFF
Ground Spoilers	ARM
RUD TRIM.....	ZERO
FLAPS Lever	SET
Pitch Trim	SET
ENG ANTI-ICE	AS RQRD
WING ANTI-ICE	AS RQRD
ECAM DOOR Page	DEPRESS
ECAM STATUS	CHECK
APU MASTER Sw	AS RQRD
Ground Crew Clearance	RECEIVE
After Start Checklist	COMPLETE

TAXIING	
Taxi Clearance	OBTAIN
Taxi Area	CLEAR
EXT LT	AS RQRD
Clock ET	START
THR LEVERS	AS RQRD
Brakes	CHECK
Flight Controls	CHECK
Flight Instruments	CHECK
ATC Clearance	RECEIVE
TO Data/Conditions	REVIEW
FCU	SET
ATC Code	CONFIRM/SET
TO CONFIG Pb	PRESS
AUTO BRK	MAX
Take Off Briefing	COMPLETE
Cabin Report	OBTAIN
Taxiing Checklist	COMPLETE

BEFORE TAKE OFF	
TO or Line UP Clearance	OBTAIN
Approach Path Clear	CHECK
“Take Off Imminent”	ANNOUNCE
EXT LT	AS RQRD
ENG MODE Sel	AS RQRD
PACK 1 and 2	AS RQRD
TO MEMO	CK NO BLUE LINE
Table	STOWED
Before TO Checklist	COMPLETE
“Ready for Take off”	ANNOUNCE

TAKE OFF	
THR LEVERS	FLX OR TO/GA
Clock CHRONO	START
Direction Control	MAINTAIN
TO N1	CHECK
PFD and ENG Indications	SCAN
V Speeds	ANNOUNCE
Rotation	PERFORM
Gear	RETRACT
EXT LT	RETRACT/OFF
A/P.....	AS RQRD
THR LEVERS	CL
PACK 1 and 2	ON
FLAPS	RETRACT
Ground Spoilers	DISARM

CLIMB	
MCDU	SET

CRUISE	
ECAM MEMO	REVIEW
ECAM Sys	REVIEW
Cabin Temp	MONITOR
Flight Progress	CHECK
NAV ACCY	CHECK

DESCENT PREPARATION	
Landing Information	RECEIVE
Altimeters	PRESET/SET
LDG ELEV	CHECK
FMGS	SET FOR LDG
Min Safe Altitude(s)	CHECK
Approach and Ldg Briefing ...	PERFORM
Descent Checklist	COMPLETE
Descent Clearance	OBTAIN

DESCENT / APPROACH	
MCDU	SET
ANTI ICE Protect.....	AS RQRD
SPEED BRAKES.....	AS RQRD
NAV ACCY	CK
BARO REF	SET QNH
EXT LTS	AS RQRD

INITIAL APPROACH	
Cabin SIGNS	ON/AUTO
Cabin	SECURE FOR LDG
Marker	AUDIO ON
ECAM STATUS	CHECK
Landing Data	REVIEW
ND	SELECT MODE
ENG MODE Sel	AS RQRD
RAD NAV AIDS	CHECK
NAV ACCY	CHECK
ILS Pb	PRESS
APPR Phase	MONITOR
Managed Speed	CHECK
APPROACH Checklist	COMPLETE

FINAL	
APP Pb On FCU	PRESS
A/P.....	BOTH ENGAGED
FLAPS 1	SELECT
ILS CAPTURE	MONITOR
FLAPS 2	SELECT
Landing Gear	EXTEND
ECAM WHEEL Page	CHECK
AUTO BRAKE	AS RQRD
EXT LTS	SET
FLAPS 3 / FULL	SELECT
Ground Spoilers	ARM
A/THR	CHECK
GO AROUND ALT	SET
LDG MEMO	CK NO BLUE LINE
Final Checklist	COMPLETE
Lctr/OM/DME Passage	MONITOR
Windshield Wipers	AS RQRD
A/P (if no AUTOLAND)	OFF

LANDING ROLL	
Flare	PERFORM
THR LEVERS	IDLE
REV	AS RQRD
Ground Spoilers	CHECK
Nosewheel Contact	ACHIEVE
Directional Control	MAINTAIN
Brakes	AS RQRD
THR LEVERS	REV IDLE
THR LEVERS	FWD IDLE

AFTER LANDING	
Ground Spoilers	DISARM
FLAPS	RETRACT
ENG MODE Sel	NORM
LAND Lights	RETRACT
ANTI ICE	AS RQRD
APU (if rqr)	START
Brake Temperature	CHECK
Clock CHRONO	STOP
After Landing Checklist	COMPLETE

PARKING	
PARKING BRAKE	ON
Ground Contact	ESTABLISH
Electrical Power	ESTABLISH
Clock ET	STOP
ENG MASTER 1 and 2	OFF
SEAT BELTS	OFF
Slides Disarm, Doors Open ...	ORDER
ANTI ICE	OFF
APU BLEED	AS RQRD
FUEL PUMPS	ALL OFF
ECAM STS	DEPRESS
Parking Checklist	COMPLETE
Debriefing	PERFORM

LEAVING THE AIRCRAFT	
ADIRS (1,2,3)	OFF
EXT LT	AS RQRD
APU BLEED	OFF
NO SMOKING	OFF
APU MASTER Sw	AS RQRD
EXT PWR.....	AS RQRD
BAT 1 and 2	AS RQRD
Leaving the Airplane Cklist ...	COMPLETE



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INTRODUCTION

It is very easy to find actual manuals for the A320 range of aircraft on the internet. For obvious reasons we cannot include them but even a quick source will lead you to a treasure-trove of information. Start your search with 'A320 FCOM' to find complete operation manuals. Almost all you find in there is applicable to this product.

AIRCRAFT GENERAL

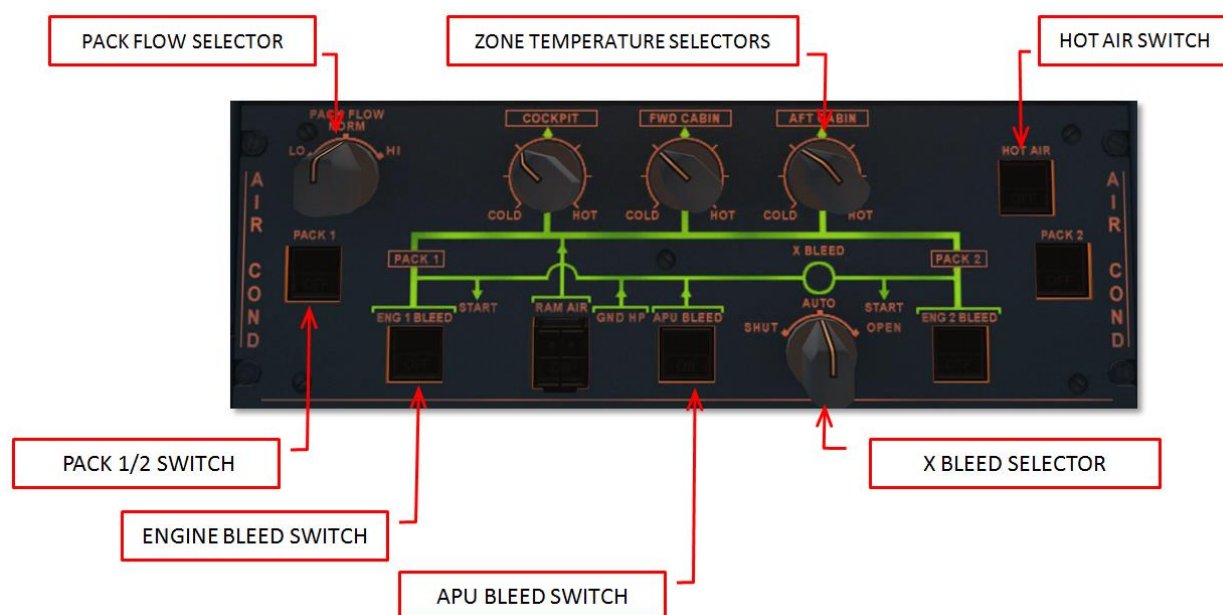
The Airbus A320 family includes the A318, A319, A320, and A321, all medium range, subsonic narrow body civil aviation aircraft. Powered by two high-powered by-pass turbofan engines they seat up to 220 passengers.

AIR CONDITIONING & PNEUMATICS

The air conditioning system is fully automatic and provides continuous renewal of conditioned air in three zones: COCKPIT, FWD CABIN and AFT CABIN. Temperatures in these three zones can be regulated independently. The air is supplied via the pneumatic systems using:

- two pack flow control valves
- two packs
- the mixing unit that combines air from the packs and the cabin

The cold air from the PACKs is mixed with the hot bleed air (taken from the engines or APU) by a mixing unit that is controlled by the zone regulator.

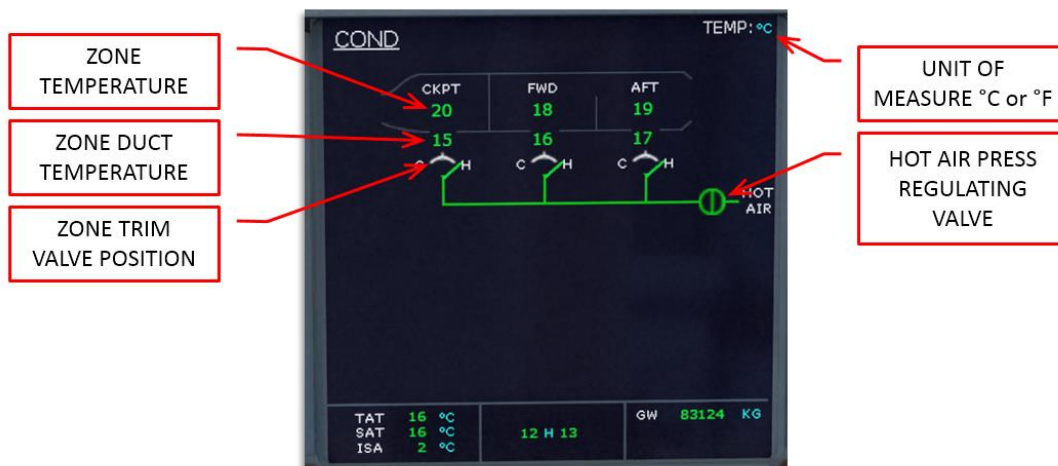


All control is done via the AIR COND panel on the overhead panel.

- Zone temperature control selectors
 - COLD = 18 °C
 - CENTER = 24 °C
 - HOT = 30° C
- HOT AIR pb switch
 - ON: hot air pressure is regulated

- OFF: valve closes + trim air valve closes and cabin temperature will drop to external temperature
- FAULT: (plus ECAM caution) when duct temperature is above 80°C, resets when temperature is below 70°C
- PACK pb switch
 - ON: pack flow control is automatically controlled (note the pack flow valve is closed during certain conditions like engine start etc.)
 - OFF: pack flow control valves close
 - FAULT: (plus ECAM caution) when valve position does not match the selected position
- PACK FLOW
 - LO: to be used with little or no passengers
 - NORM: to be used with (near to) maximum amount of passengers
 - HI: to be used to clear smoke or contaminants or in extreme temperatures (only available if both engines are running)
- ENG x BLEED pb
 - ON
 - OFF
 - FAULT

Feedback on the air conditioning system is given on the ECAM COND page and on the ECAM BLEED page.



PRESSURIZATION

Under normal operation conditions the complete pressurization is fully automatic. The system consists of:

- two Cabin Pressure Controllers
- outflow valve
- control panel
- two safety valves

In automatic operation pressurization is divided in 6 different modes

- **Ground:** before take-off and 1 minute after landing the outflow valve is fully open to equalize pressure with outside pressure.
- **Take-off:** just before take-off the system prepressurizes the cabin to avoid a sudden pressure increase
- **Climb:** cabin altitude is decreased to cruise level using input from vertical speed and other sensors
- **Cruise:** cabin pressure is maintained
- **Descent:** cabin altitude is increased to cruise level using input from vertical speed and other sensors
- **Abort:** in case of an aborted take-off the system will prevent the triggered climb mode from starting to decrease the pressure.



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VENTILATION

The ventilation of avionics is controlled by the Avionics Equipment Ventilation Controller (AEVC). It provides cooling of the avionics compartments using two fans, a heat exchanger that uses the outside skin of the aircraft to cool the air and an inlet and outlet valve. Only the automated mode is simulated and you can see the ventilation valve position on the CAB PRESS ECAM page. Battery, galley and toilet ventilation is provided by fans that draws air from the cabin and vents it overboard via a vent in the aircraft skin.

Do note that the AEVC is very loud and other sounds from the aircraft systems that are heard on other aircraft types are not heard on the Airbus A320 series.

APU

GENERAL

The Auxiliary Power Unit provides:

- Bleed air for engine starting
- Bleed air for air conditioning
- Electrical power for all the buses

The APU can be used on the ground and in flight with the following limitations:

- 100% generator load up to 25,000 feet
- Full pneumatic and hydraulic pressure up to 20,000 feet
- Can be started using the battery up to 25,000 feet.

SYSTEM COMPONENTS

The APU consists of a gas turbine engine with an APU computer that manages the system. The air intake uses a electrically operated inlet flap and the exhaust vents in the tail cone. The electrical starter will start the engine when the inlet flap is fully opened. The fuel is taken from the left wing tank using a separate fuel pump.

AIR BLEED SYSTEM

Bleed air from the APU is selectable from the overhead panel and has priority over main engine bleed air as long as the APU BLEED pb is ON. The bleed air can start engines and provide the air condition system.

CONTROLS AND DISPLAYS

The APU ECAM page displays the parameters of the APU. For the gas turbine engine N (in %) and EGT (in °C) are available. The APU generator shows load (in %), voltage (in V) and frequency (in HZ) plus the connection to the bus (arrow when connected, nothing when not connected). Bleed air shows pressure (in PSI) plus the position of the valve (open or closed). All system messages are shown in green while within correct parameters, or amber when outside correct parameters.

The APU MASTER SW pb on the overhead APU panel is pressed (ON will show) to power up the APU computer, the fuel pump is activated and the air inlet is opened. When ON is shown the APU is ready to start.

The APU START pb starts the APU. When pressed it will show ON and the APU computer will command and control the startup. Aircraft batteries must be selected ON, even when the engine generators are online. When

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the APU is running and bleed air and electrical power are available a green AVAIL will show and the ON will not be shown. Note the APU needs a 3 minute cool down period after it has shut down.

On the ELEC panel the APU GEN pb will be dark when the APU generator is ON, and when pressed it will show OFF as the APU generator is taken of line. When there is any problem an amber FAULT will show and the ECAM will show more information.

On the AIR COND panel the APU BLEED pb will show ON when APU N speed is sufficient. When pushed the pb will be dark and the bleed air valve will close. When there is any problem an amber FAULT will show and the ECAM will show more information.

AUTOFLIGHT

OVERVIEW

The following components are used by the pilot to interact with the autoflight system:

- Flight Control Unit (FCU)
- Multifunction Control and Display Units (MCDUs)
- Sidesticks
- Thrust levers
- Primary Flight Display (PFD)
- Navigation Display (ND)

The autoflight system is part of the Flight Management System (FMS). The FMS (including autopilots and autothrust system) is made up by two Flight Management Guidance Computers (FMGCs) and two Flight Augmentation Computers (FACs).



- Flight Management provides navigation, performance optimization and display management.
- Flight Guidance provides autopilot commands (sent to the flight control computers), flight director commands (sent to the PFD) and thrust commands (sent to the autothrust systems).
- Flight Augmentation provides flight envelope calculations, turn coordination and yaw damping.

PILOT INTERFACES

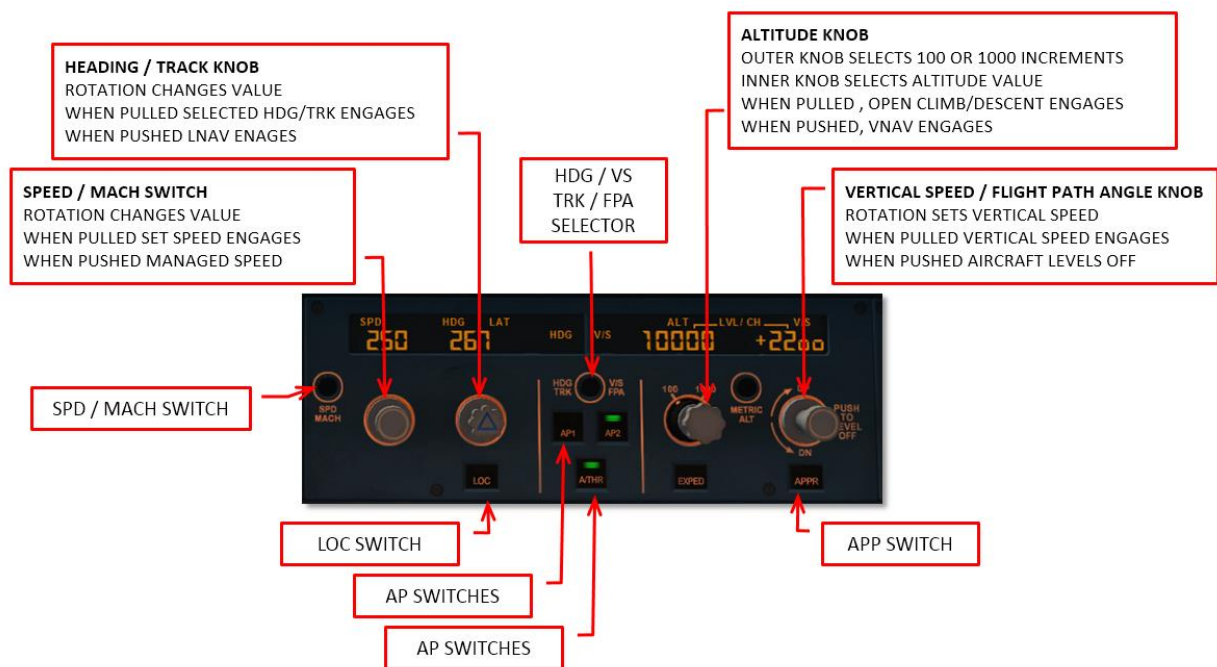
FLIGHT CONTROL UNIT

The FCU is located in the center of the glareshield and four knobs provide control for:

- Airspeed
- Heading (or track) or navigation modes
- Climb or descent modes and/or
- Vertical speed (or flight path angle)

There are two modes possible for airspeed, heading and vertical speed. Switching between modes is done by pulling (right click) the knob.

- Selected Functions
 - In selected mode the pilot controls speed and lateral/vertical navigation. After pulling the knob the pilot can rotate the knob to set the desired value. When the knob is pushed (left click) the current value for that function is inserted.
- Managed Functions
 - In managed mode the displays are dashed (note the FCU altitude windows is never dashed) and the control of speed and lateral/vertical navigation is managed by the FMS.



MULTIFUNCTION CONTROL AND DISPLAY UNIT

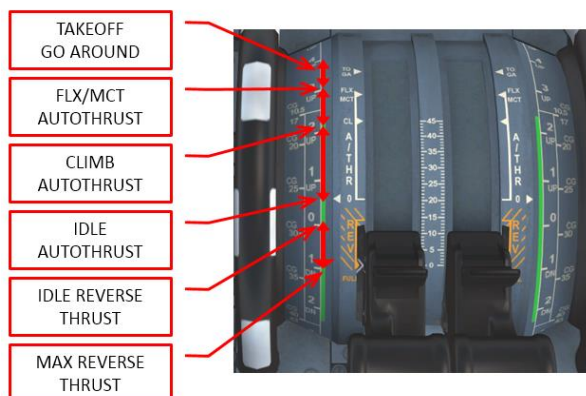
The MCDUs is the primary interface between pilot and FMS (and in our simulation it is also used to access some simulation functions).

SIDESTICK CONTROLLER

The sidestick controllers are used to fly the aircraft manually. Any strong input with these will deactivate the autopilot.

THRUST LEVERS

The thrust levers are used to manually control thrust or to select the desired autothrust mode. With both engines operating the autothrust range is between the idle and the FLX/MCT detents. With autothrust active the position of the thrust lever determines the maximum thrust level.



Normally the thrust levers are positioned in the climb (CL) detent at the thrust reduction altitude after takeoff and left there until the landing flare.

FLIGHT PHASES

The FMGC divides the complete flight into phases that normally will automatically switch to the next phase when certain conditions are met.

Flight Phase	Optimum Speed Profile	Switching conditions to next phase
Preflight	-	SRS take off mode engaged + N1 > 85% or Ground Speed > 90 kts
Take Off	V ₂ followed by V ₂ +10	At ACC ALT (or manually)
Climb	ECON CLB SPD/MACH	At reaching Cruise Flight Level
Cruise	ECON CRZ MACH	At reaching ToD
Descent	ECON DES MACH/SPD	Overflying Decel waypoint with NAV (or LOC/LOC*) engaged Manually activating APPR phase
Approach	VAPP (GS Min)	To Go Around: thrust levers to TOGA To Done: automatic 30 seconds after landing To Climb: inserting new CRZ FL
Go Around	VAPP or Current Speed	To Approach: manually select APPR phase To Climb: manually select CLMB phase
Done		At depressing INIT or PERF to Preflight

PERFORMANCE

The FMGC will minimize the flight cost through speed optimization. Depending on the Cost Index setting it will compute optimal targets for the following items:

- Take off, approach and go around speed are calculated as a function of the TOW and performance model. Note that V₁, V₂ and V_r have to be manually entered (in our aircraft these speeds are calculated but can be overwritten).
- CLB and DES speeds are computed as a function of the GW, Cost Index, environment (temperature, wind) and Cruise level. The speeds are NOT recalculated when the mode is active.
- Cruise Mach is computed as the optimal speed and is updated continuously update to the current weather condition and F-PLN modifications.
- Optimum Flight Level is calculated assuming a 5 minute minimum cruise flight. It is continuously update in flight.

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AUTOPILOTS

ENGAGEMENT

The autopilot (two identical systems) are engaged by the AP1 and AP2 pb on the FCU. When engaged a green bar will show on the pb and the appropriate FMA annunciation is displayed. When a flight director is on when the autopilot is engaged, the autopilot engages in appropriate mode (OP CLB and NAV) otherwise it will engage in the default guidance modes (HDG and V/S or TRK-FPA).

Either autopilot can be engaged seconds after takeoff.

DISENGAGEMENT

Disengage the autopilot by depressing the AP1 or AP2 button.

- The autopilot is automatically disengaged by moving the side stick (or rudder pedals) a certain amount. This will trigger a master warning.
- The autopilot is automatically disengaged when the throttles are set above FLX/MCT on ground.
- The autopilot is automatically disengaged when a normal law is exceeded or pitch or bank angle are excessive.
- The autopilot is automatically disengaged during a non-precision approach when the aircraft reaches MDA minus 50 feet .

AUTOPILOT & SPEED BRAKES

With the autopilot engaged the speed brakes are limited to ½ deflection. When autopilot is engaged with speed brakes extended beyond ½ they will retract to ½. Note this will cause a sudden pitch up.

AUTOTHRUST

The autothrust system reduces workload for the pilot, provides additional comfort for the passengers and reduces fuel use. Two main modes are included:

- Fixed Thrust Modes
 - Uses constant thrust; airspeed is controlled with pitch. Normally used for level changes when no specific vertical speed is required.
- Variable Thrust Modes
 - In variable thrust mode the airspeed remains constant by changing the amount of thrust. Normally used for level flight or when a certain airspeed is required during level change.

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AUTOTHRUST ARMING STATUS

When autothrust is OFF the thrust is controlled manually and corresponds to the position of the thrust levers. When autothrust is ARMED and the thrust levers are moved into the A/THR active the autothrust status changes to ACTIVE. The status is shown on the FMA (blue indicates armed mode and white indicates active mode). Autothrust is automatically armed during takeoff when thrust levers are in the TOGA or FLX detent.

AUTOTHRUST ACTIVE STATUS

The autothrust system controls thrust only in active status. Both fixed (MCT, CLB, IDLE, THR) and variable thrust (SPEED, MACH) modes are available in active status.

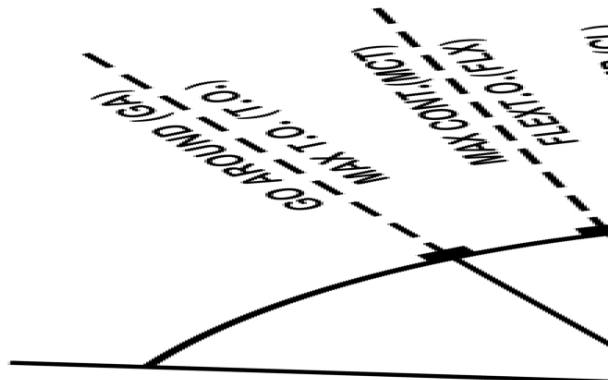
AUTOTHRUST DEACTIVATION

The autothrust system can be disabled by depressing the FCU A/THR pb or by retarding the throttles to the idle detent. A single chime and a short amber master caution illumination alerts the pilot.

AUTOTHRUST MODES

FIXED THRUST MODES

- TOGA: Provides fixed maximum thrust and is only available when autothrust status is armed.
- FLX: Flex thrust is used for reduced thrust takeoffs. Thrust is calculated using the assumed temperature as set in the MCDU.
- MCT: Provides Maximum Continuous Thrust at the current ambient conditions.
- CLB: Provides fixed thrust equal to the climb thrust rating at current ambient conditions.
- IDLE: Provides fixed idle thrust. Only available in active autothrust status. Note the thrust levers can be anywhere in the autothrust range!
- THR: When the thrust is not TOGA, FLX, MCT or CLB the fixed thrust is called THR.



VARIABLE THRUST MODES

- SPEED: The autothrust system will provide variable thrust to maintain a set speed or a managed speed in level flight or when the aircraft follows a programmed flight path. Only available when autothrust is active.
- MACH: Identical to speed mode but not available at low altitudes. The speed mode is automatically switched to Mach mode (and vice versa) at a preset altitude.

AUTOTHRUST/FLIGHT DIRECTOR/AUTOPILOT

The vertical guidance modes use pitch to maintain a target speed or a specific vertical path. If vertical guidance modes are used to control a target speed, autothrust uses a fixed thrust mode. If vertical guidance modes are

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used to control a specific vertical path, autothrust uses variable thrust to maintain target speed. When manually flown in fixed autothrust mode the flight director's pitch command bar indicates the pitch needed to fly the desired speed.

ALPHA FLOOR

The alpha floor protection assists the pilot in recovering from dangerous low speed and high angle of attack by automatically setting TOGA thrust when:

- Excessive angle of attack (alpha)
- Excessive high nose up attitude
- Windshear is detected

When the alpha floor conditions are no longer detected the autothrust system will stay in TOGA lock until the pilot disables auto throttle. It is recommended the pilot moves the throttle to the TOGA detent before depressing the FCU A/THR pb to avoid a power surge. After that the pilot can pull the throttle to the CL indent and engage the autothrust.

FLIGHT AUGMENTATION COMPUTERS

The FACs handle:

- Yaw damping and turn coordination
- Rudder trim
- Flight envelope and maneuvering speed computations
- Alpha floor protection
- Windshear detection
- Low energy detection

FLIGHT ENVELOPE

Many different speeds are calculated by the FACs are used by the autoflight system. These speeds include the minimum safe speed, maximum speed and never exceed speed. They also calculate the alpha floor speed. Most of these speeds are shown on the PFD airspeed indicator.

WINDSHEAR

The FACs will try to detect windshear and will warn the pilot of this dangerous condition. Windshear detection is only active below 1300 feet AGL in configuration 1 or greater. When detected the flight director will show an optimal pitch attitude and the aural warning "WINDSHEAR" will be heard.

LOW ENERGY WARNING

Between 2000 and 100 feet AGL the FACs will detect a low energy state (based on airspeed, descent angle and angle of attack) and will warn the pilot with an aural "SPEED SPEED SPEED" warning. Normally this warning will precede an alpha floor condition.

FLIGHT GUIDANCE

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Flight guidance is provided for speed control, lateral navigation and (limited in this project) vertical navigation. There are two types:

- **Selected Guidance:** In this mode the aircraft will fly on autopilot using the settings on the FCU. You switch from managed mode to selected mode by pulling (right mouse click) the SPD, HDG and ALT knobs.
- **Managed Guidance:** In this mode the airspeed is calculated by the FMS and differs per flight phase. The FMS also provides managed lateral and vertical flight plan guidance following the flight plan that has been inserted in the MCDU. The FCU will show dashes in managed guidance. You switch from selected guidance to managed mode by pushing (left mouse click) the SPD, HDG or ALT knobs. Please note the FCU altitude window will never be dashed.

When the autopilot is engaged or the flight director is activated the Flight Mode Annunciator (FMA) (at the top of the PFD) will also display the activated settings.

LATERAL GUIDANCE MODES

The lateral guidance modes keep the aircraft course to its destination.

SELECTED HEADING (OR TRACK) MODE

The heading (or track) mode will guide the aircraft on a heading (HDG) or track (TRK) and is the default lateral mode. The pilot activates it by pulling (right mouse click) the HDG button on the FCU. A digital display of the heading (track) will be shown on the FCU and HDG will be displayed on the FMA. Note this mode cannot be activated when LAND mode is activated.

- If the knob is turned to the desired HDG (TRK) and pulled the aircraft will make the shortest turn to the selected HDG (TRK)
- If the HDG knob is pulled but not turned the current HDG (TRK) is selected.
- If the HDG knob is pulled first and turned the aircraft will turn in the direction of the turn.
- If the HDG knob is turned but not pulled the selected value is cleared after a period that depends on the flight mode.

MANAGED NAVIGATION MODE

When a flight plan is available and activated the managed nav mode will guide the aircraft along the path stored in the FMS. It is activated by the pilot by pushing (left mouse click) the FCU HDG knob. The display will show dashes and the FMA will display NAV.

LOCALIZER LATERAL MODE

When the FCU LOC pb is pushed the loc lateral guidance mode is armed and the FGS will only use the localizer signal for lateral guidance. In the FMA LOC will be displayed and the LOC pb will illuminate. It can be used to intercept and track a localizer while maintaining a selected altitude. Note that a ILS frequency must be tuned and TAKEOFF and GO-AROUND mode are not selected. To disarm press the LOC pb again.

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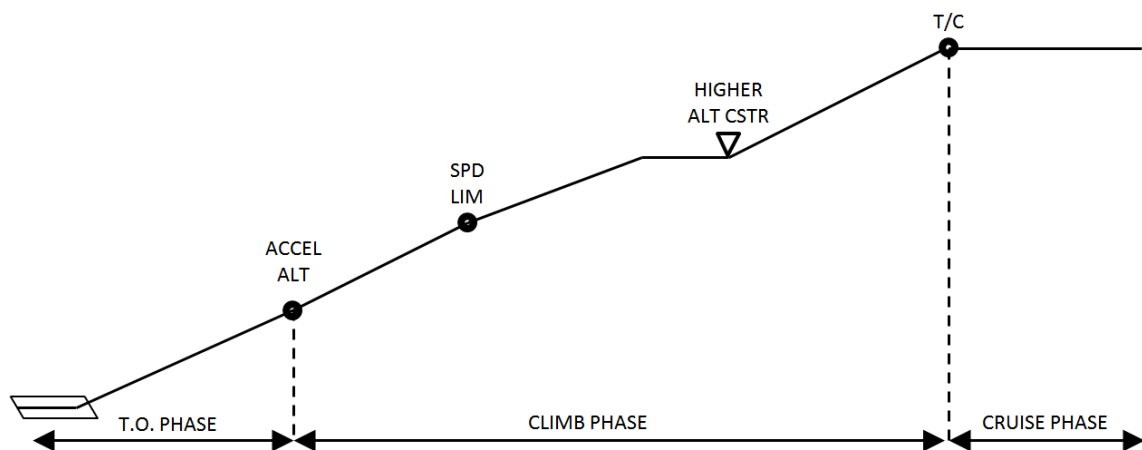
VERTICAL MODES

The vertical guidance modes will make the aircraft change altitude. To leave a FCU selected altitude a dual action sequence is needed:

- Turn the ALT selector to set the new altitude
- Pull the ALT selector to select OPEN CLB/DES mode or
Push the ALT selector to engage CLB/DES mode or
Select a target V/S and pull the V/S selector knob to engage V/S mode

CLIMB

CLB mode manages the vertical guidance towards the FCU selected altitude taking altitude and speed constraints into account.



ARMING CONDITIONS

- On ground or when TAKE OFF or GA mode are engaged as long as no other vertical modes are selected.
- In flight when lateral NAV mode is engaged, FCU selected altitude is higher than aircraft altitude or when aircraft meets a ALT CSTR

DISARMING CONDITIONS

- Engagement of any other vertical mode
- FCU selected mode lower than aircraft altitude
- Switching to DES or APP phase
- Loss of vertical flight path validity or loss of ANV mode

ENGAGEMENT CONDITIONS

- Aircraft more than 5 seconds in flight
- FCU selected altitude above current altitude
- Not in descent or approach mode
- NAV mode engaged
- Not in G/S mode
- CLB mode is automatically selected when

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- ACC ALT is reached
- ALT CSTR is reached with CLB mode armed
- CLB mode can be manually selected by pushing the ALT selector knob.

DISENGAGEMENT CONDITIONS

- NAV mode lost or disengaged
- Selecting another vertical mode
- Setting a lower altitude in FCU than current altitude

GUIDANCE

In standard CLB mode the engine stay at max climb thrust, the speed will be the one calculated by the FMGS and pitch will vary to keep that speed.

OPEN CLIMB

ENGAGEMENT CONDITIONS

- The aircraft must be in flight more than 5 seconds
- LAND mode is not engaged
- FCU selected altitude is higher than current altitude

OPEN CLIMB is engaged by:

- Pulling the ALT selector knob
- Acceleration altitude reached with armed CLM mode and NAV not engaged
- When an overspeed condition is detected (the aircraft will pitch up to loose speed)

DISENGAGEMENT CONDITIONS

- Selecting any other vertical mode
- Selecting a lower altitude then the current altitude

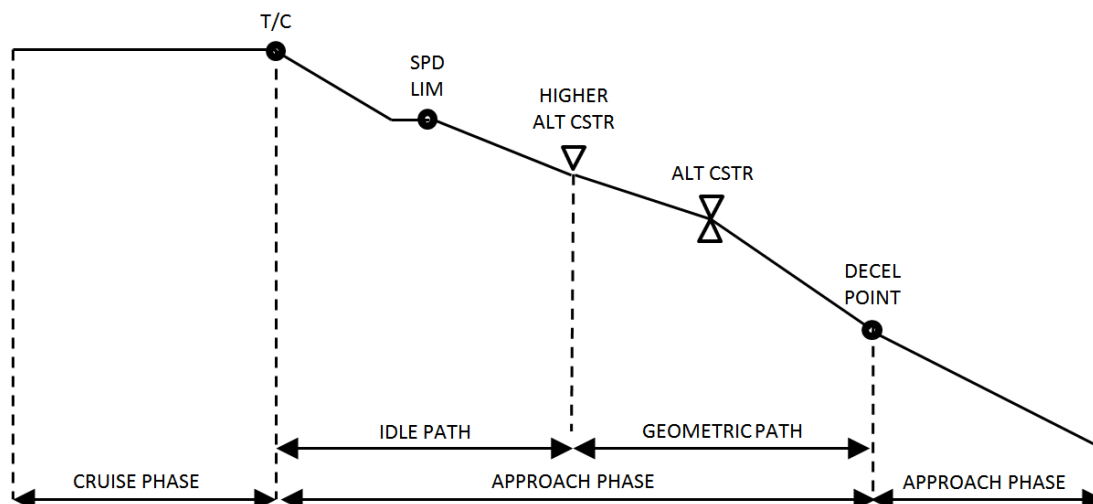
GUIDANCE

In OPEN CLB the target Speed / Mach is kept by varying the pitch, thrust is managed by the A / THR or manually, speed target can be selected or managed. All ALT CSTR are ignored in OPEN CLB.

DESCENT

DES mode provides vertical guidance following a computed descent profile between Top of Descent to the Deceleration point. It uses the data in the F-PLN and the available WIND data. It is divided into three sections:

- Repressurization segment (ignored in our simulation)
- Idle Path segment where the engines are at idle and AP / FD controls SPD
- Geometric path when the AP / FD controls vertical path and the A /THR controls the SPD



ARMING CONDITIONS

- FCU selected altitude is below current altitude
- TAKE OFF, GO AROUND or LAND mode is not engaged

DISARMING CONDITIONS

- Selecting any other vertical mode
- FCU selected altitude is above current altitude
- Loss of NAV, LOC or vertical path validity
- Selecting GO AROUND mode

ENGAGEMENT CONDITIONS

- FCU selected level is below current altitude
- NAV, LOC* or LOC is active
- TAKE OFF, GO AROUND, LAND, FINAL not active
- DES mode is engaged automatically when an altitude constraint is met with DES mode armed.
- DES mode is manually engaged by pushing the ALT selector knob

DISENGAGEMENT CONDITIONS

- Engagement of any other vertical mode
- Selecting a FCU altitude above current altitude

GUIDANCE

In DES mode the aircraft is guided along the DES PATH. The SPD target can be selected or managed (with the speed to vary around the calculated optimal nominal descent speed. SPD CSTR is taken into account in the speed profile.

If the aircraft is above the DES PATH it will pitch down until the upper limit of the MANAGED SPD RANGE is reached. That speed will be kept and the aircraft will differentiate from the DES PATH. Extending ½ speed brakes will allow the aircraft to get back on the calculated path.

If the aircraft is below the DES PATH the aircraft will maintain the target speed until the DES PATH is reached.

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OPEN DESCENT

In selected descend mode the autothrust system will be set to idle and the set speed will be kept using pitch. **This mode is not useful for final approaches.**

ENGAGEMENT CONDITIONS

- The aircraft must be in flight more than 5 seconds
- LAND mode is not engaged
- FCU selected altitude is lower than current altitude
- OPEN DESCENT is engaged by pulling the ALT selector knob

DISENGAGEMENT CONDITIONS

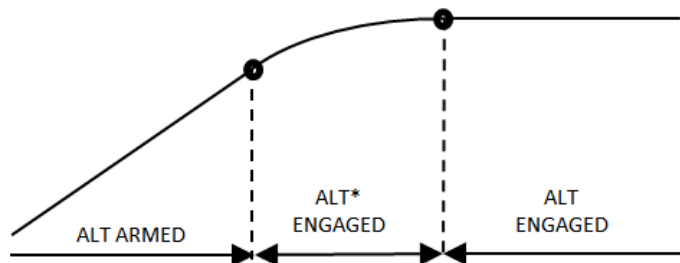
- Selecting any other vertical mode
- Selecting a higher altitude than the current altitude

GUIDANCE

In OPEN DES the target Speed / Mach is maintained by pitch controls and thrust is maintained by the A / THR or manually by the pilot. Speed target can be selected or managed.

ALTITUDE ACQUIRE

ALT* will guide the aircraft to the FCU selected altitude, ALT CST* guides the aircraft to an altitude constraint. Once the set altitude is reached the ALTITUDE HOLD (ALT or ALT CST) mode will engage.



GUIDANCE

In the ALT* and ALT CST* mode the vertical speed is managed to reduce vertical speed to ensure a smooth capture of the set FCU altitude.

ALTITUDE HOLD

ALT mode will keep the aircraft at a set altitude. The altitude can be a FCU set altitude (with ALT engaged) or an altitude constraint.

ARMING CONDITIONS

- ALT mode is automatically armed when the aircraft climbs or descends to a target altitude.

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ENGAGEMENT CONDITIONS

- ALT or ALT CST is automatically engaged when the aircraft is 20 feet from the target altitude.

DISENGAGEMENT CONDITIONS

- ALT or ALT CST is disengaged when any other vertical mode is selected.

GUIDANCE

- The level kept is the level memorized at engagement of the mode.

VERTICAL SPEED – FLIGHT PATH ANGLE

V/S–FPA is a selected mode, it captures and keeps the vertical speed or the flight path displayed in the V/S – FPA FCU window.

ENGAGEMENT CONDITIONS

V/S-FPA is automatically selected:

- 5 seconds after liftoff with no other vertical mode selected
- Loss of G/S, G/S*, FINAL, LOC. LOC*, NAV (with DES engaged)
- Automatic reversions

V/S-FPA is manually selected by:

- V/S-FPA selection knob pulled
- V/S-FPA selection knob pushed (will engage an immediate level off and set VS=0)
- AP engagement with no other vertical mode set
- Selection of an different altitude (at least 250 ft from current altitude) in ALT*
- Selection of an higher altitude in DES or OP DES
- Selection of an lower altitude in CLB or OP CLB

DISENGAGEMENT CONDITIONS

- Engagement of other vertical mode
 - Manually by pulling altitude selection knob or performing a go around
 - Automatically by reaching FCU altitude or G/S* engagement

GUIDANCE

FMGS pitch mode will guide the aircraft to the target V/S (FPA). A/THR mode is SPD or MACH.

V/S-FPA guidance has priority over speed guidance and when reaching the limit of the flight envelope will change to OPEN mode.

COMMON MODES

COMMON modes are combinations of vertical and lateral modes.

COMMON MODE	VERTICAL	LATERAL
TAKE OFF	Mode: Pitch Take off FMA: SRS	Mode: Runway LOC or Runway Track FMA: RWY or RWY TRK
ILS APPROACH	Mode: G/S* or G/S FMA: LAND or FLARE or ROLL OUT	Mode: LOC* or LOC FMA: LAND or FLARE or ROLL OUT
NON ILS APPROACH	Mode: Final Descent FMA: FINAL	Mode: Nav FMA: APP NAV
GO AROUND	Mode: Pitch Go Around FMA: SRS	Mode: Go Around track FMA: GA TRACK

TAKE OFF: SRS

This mode is available during take off and the first 5 seconds of flight. In SRS mode the aircraft will follow pitch guidance at speeds defined by the speed reference guidance law.

ENGAGEMENT CONDITIONS

- V₂ is inserted in MCDU
- Slats are extended

DISENGAGEMENT CONDITIONS

- Manually by engaging any other vertical mode
- Automatically at acceleration altitude

GUIDANCE

- The aircraft will keep V₂ + 10 knots
- An attitude protection will prevent a too high nose up during take off
- Flight path angle of minimum climb rate of 120 ft/min

TAKE OFF: RUNWAY

The RUNWAY mode will provide lateral guidance during take off and immediately thereafter using the LOC signal (when it is available). The RUNWAY TRK mode will provide lateral guidance on an extended runway center line.

ENGAGEMENT CONDITIONS

- SRS engagement conditions
- LOC signal received
- Aircraft heading within 20 degrees of runway heading

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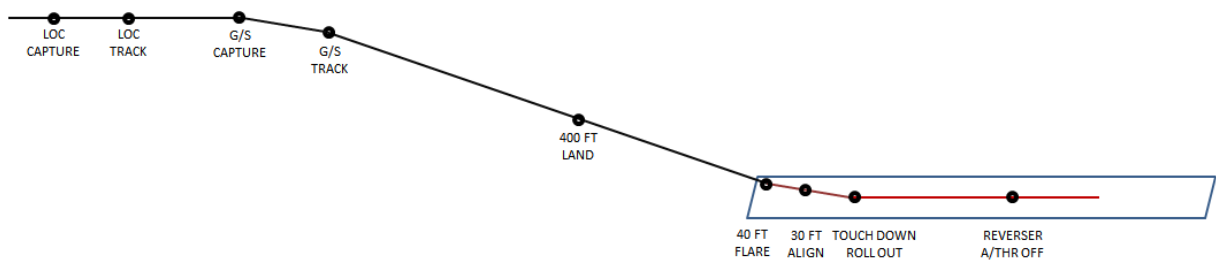
DISENGAGEMENT CONDITION

- Loss of LOC signal
- Any other lateral mode selected

GUIDANCE

The RWY mode will guide the aircraft as close as possible to the center runway line and on an extended runway line in flight in the RWY TRK mode.

APPROACH: ILS APPROACH



ARMING CONDITIONS

- Aircraft over 400 ft AGL
- ILS approach is selected
- ILS and RA are available
- GA or FINAL mode not selected

DISARMING CONDITIONS

- Depressing the APPR pb (both LOC and G/S mode will disarm)
- Depressing the LOC pb (only G/S will disarm)
- Go AROUND mode selected
- Disengaging AP

ENGAGEMENT CONDITIONS

- Radio Altimeter active
- LOC* and G/S* mode engage

DISENGAGEMENT CONDITIONS

- Depressing the APPR pb (both LOC and G/S mode will disarm)
- Depressing the LOC pb (only G/S will disarm)
- Pull action on the V/S/FPA button
- Pull action on the HDG/TRK button
- Go AROUND mode selected

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LAND MODE

LAND mode engages automatically when the LOC and G/S modes are engaged and aircraft is below 400 AGL.

FLARE MODE

At 40 ft RA the FLARE mode automatically engages. At 30 ft AGL the aircraft will align with the runway, will pitch up and when A/THR is active the thrust reduction (RETARD) will activate.

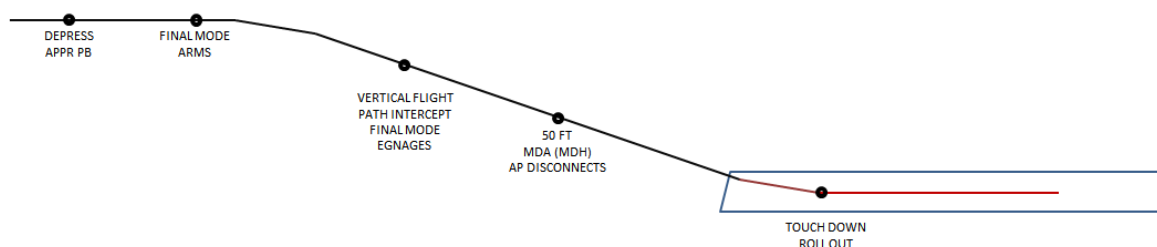
ROLL OUT MODE

When load is detected on the main gear the ROLL OUT mode will automatically be activated and centerline guidance is provided.

SPEED CONTROL

A/THR will provide speed control during and ILS approach when speed can be managed or selected.

APPROACH: NON ILS APPROACH



ARMING CONDITIONS

- Aircraft over 400 ft AGL
- NON ILS approach is selected
- GA or FINAL mode not selected

DISARMING CONDITIONS

- Depressing the APPR pb (both LOC and G/S mode will disarm)
- Depressing the LOC pbn (only G/S will disarm)
- Go AROUND mode selected
- Disengaging AP

ENGAGEMENT CONDITIONS

- Radio Altimeter active
- APP phase is active
- APP NAV mode engaged
- FINAL is armed

DISENGAGEMENT CONDITIONS

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- Depressing the APPR pb
- Depressing the LOC pb
- Automatically at MDA (MDH)
- Go AROUND mode selected

GUIDANCE

The aircraft is guide down to MDA/MDH where AP is automatically disconnected.

GO AROUND

This mode is a combination of the SRS vertical and the GA TRK lateral mode.

ENGAGEMENT CONDITIONS

Thrust levers in TOGA detent will engage SRS/GA TRK as long as slats/flaps lever is in position 1 and the aircraft is in flight.

DISENGAGEMENT CONDITIONS

- Manually engaging another mode
- Automatically at GA ACC ALT

GUIDANCE

SRS is similar to SRS take off. Speed will be kept on speed on engagement or V_{APP} if that is higher. GA TRK guides the aircraft along the track the aircraft was at engagement.

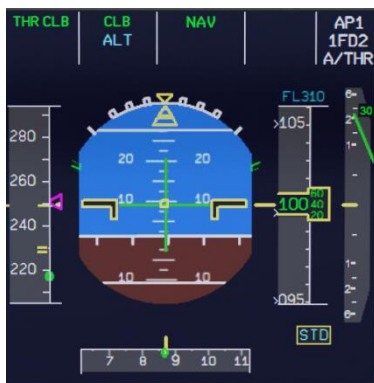
MANAGES MODE VERSUS SELECTED MODE

In Managed modes the Flight Management Guidance Computer sends information to the Autopilot systems so that it follows the programmed route. This route can include headings, altitudes and even speeds. The pilot selects this mode by pushing (left click) the appropriate selector knob on the Flight Control Unit (FCU).

In Selected modes the pilot inserts the information and the aircraft will follow his manual input. The pilot selects this mode by pulling (right click) the appropriate selector knob on the Flight Control Unit and turning it the required setting.

MANAGED SPEED

- On PFD the Target Airspeed shows in magenta
- On the FCU the Speed/Mach will show dashes and a white dot
- On the MCDU (PERF page) Managed mode is displayed with the target value



SELECTED SPEED

- On PFD the Target Airspeed shows in blue
- On the FCU the Speed/Mach will display the Target Airspeed



MANAGED LATERAL GUIDANCE

- On the PFD the FMA will display NAV
- On the FCU the Heading/Track window will show dashes and a white dot
- On the PFD/ND the actual (not selected) heading and actual track is displayed
- On the ND the flight plan track is displayed as a continuous green line



SELECTED LATERAL GUIDANCE HEADING OR TRACK

- On the PFD the FMA will display HDG (or TRK)
- On the PFD/ND the selected heading or Track Index (blue)
- On the ND the flight plan track is displayed as a dashed green line and the actual track by a continuous green line
- On the FCU the Heading/Track window will show the Target Heading (Track)

(NOTE: In HDG, if in a climb or descent, VNAV will change to OP CLB or OP DES. To reselect NAV and managed CLB/DES, push HDG FCU knob in [left click], then push in [left click] the FCU ALT knob)



MANAGED CLIMB

- On the PFD the FMA will display a green CLB, with a blue ALT beneath it
- On the FCU the altitude will show the dialed value with a white dot to the right of it
- On the MCDU (PERF page) will be displayed as the CLB page



OPEN CLIMB

- To activate OP CLB, pull (right click) the FCU ALT knob after dialing in a higher altitude. In OP CLB, the FMGS will disregard any altitude constraints and climb straight to the altitude in the FCU.
- On the PFD the FMA will show OP CLB
- On the FCU the selected altitude will show without a white dot next to it



SELECTED CLIMB

- For selected V/S climb, pull (right click) the FCU V/S knob.
- On the PFD the FMA will show in green VS and in blue the selected vertical speed, with a blue ALT beneath it.
- On the FCU you will read the selected V/S with a + sign to the right of it, and the dialed altitude without a white dot to the right of it.



MANAGED DESCENT

- On the PFD the FMA will display a green DES, with a blue ALT beneath it
- On the FCU the altitude will show the dialed value with a white dot to the right of it
- On the MCDU (PERF page) will be displayed as the DES page



OPEN DESCENT

- To activate OP DES pull (right click) the FCU ALT knob after dialing in a lower altitude. OP DES acts similar to OP CLB, in that it will descend in an idle descent to the altitude dialed in the FCU disregarding any altitude constraints.
- On the PFD the FMA will show OP DES
- On the FCU the selected altitude will show without a white dot next to it



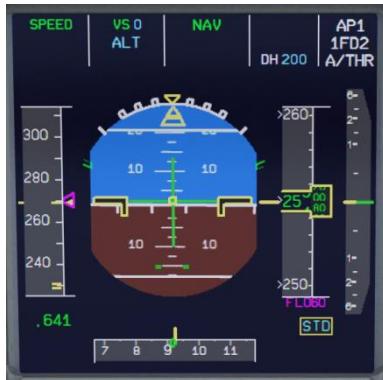
SELECTED DESCENT

- For selected V/S descent, pull (right click) the FCU V/S knob.
- On the PFD the FMA will show in green VS and in blue the selected vertical speed with a – sign in between, and a blue ALT beneath it
- On the FCU you will show the selected V/S with a – sign to the left of it, and the dialed altitude without a white dot to the right of it



VERTICAL GUIDANCE LEVEL OFF

- To immediately level off, push (left click) the FCU V/S knob.
- On the PFD the FMA will show in green VS and in blue 0, with a blue ALT beneath it.
- On the FCU you will read the selected V/S of 0000, and the dialed altitude will remain at the altitude dialed previously, without a white dot to the right of it



COMMUNICATIONS

Unfortunately FSX is not very strong with radios and we really wanted to stick to the default commands of FSX because a lot of people have hardware for these parts. So we went for practicality more than for getting the simulation exactly as the real aircraft. It's a small price to pay for compatibility and usability.

COMMUNICATION RADIOS

Communication radios (VHF) are set using the Radio Management Panel on the pedestal while Navigation radios are set on the MCDU system. The backup Radio navigation option on the RMP is not implemented. The communication radios VHF1 and VHF2 (*FSX calls that COMS 1 and COMS 2*) are set on the Radio Management Panel on the center console. VHF1 is set on the Captain side (left), VHF2 is set on the First Officer side (right).

1. ON / OFF sw: Toggles power to the panel
2. NAV key: Not implemented
3. STBY NAV keys: Not implemented
4. ROTATING KNOB: Outer wheel sets most significant digits, inner wheel sets least significant digits. When a frequency has a COURSE attached to it the inner wheel sets the COURSE
5. TRANSFER KEY: When pressed the ACTIVE and STBY frequencies are interchanged.
6. STBY / CRS window: Shows STBY frequency or COURSE
7. ACTIVE window: Shows the active frequency of the selected radio system
8. BFO key: Not implemented



AUDIO MANAGEMENT SYSTEM

The Audio Management System determines which sources you will hear. With the button depressed the source is not heard, with the button depressed and lit the corresponding source is heard. Please note that FSX does not have a separate ILS receiver and that is always linked to VOR 1.



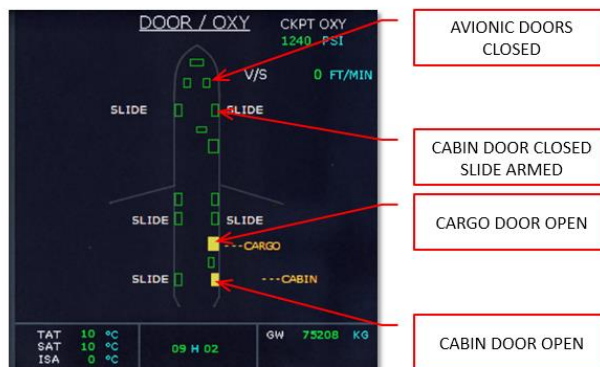
DOORS AND WINDOWS



The external doors and cargo hatches can be opened using a simulated page in the right MCDU under the ACFT DOORS page. When the aircraft is stopped, engines are off and the parking brakes (or chocks) are set, you can open the doors via this menu. The door identifier will blink when the door is being opened or closed. This menu is not available when the aircraft is not stationary, with engines off and on parking brakes (or with wheel chocks activated).

All external doors in the Airbus A32x are conventional in design and operation and all door operation can be monitored on the ECAM DOORS page. The ECAM DOOR/OXY page will appear automatically:

- as the default ECAM system display page with the engines shut down
- when any door is not closed and an engine is running.



It may also be selected by depressing the DOOR pb on the ECAM panel.

During taxiing it is allowed to open the cockpit windows.

The cargo doors should never be open with the right engine running. The cockpit door should stay locked in flight and a small video camera (with a display mounted above the door) allows the crew to see who is behind the door.



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The windshields consist of multi layered glass and are electrically heated to prevent icing. Two of the windows have sliding mechanisms. To open the windows left mouse click on the handle. The window will be opened by a rattle mechanism. To close the window, right mouse click on the handle. Make sure the red ring underneath the release button is shown to indicate the window is locked. The status of the windows is also shown in the ECAM DOORS page.



ELECTRICAL

GENERAL

In normal operation the generation and distribution of electrical power is fully automated and does not need any interaction. Even when there are failures the systems will almost always be able to correct or activate alternate systems when needed. As with all overhead panels a dark panel with all lights off indicates systems without fault and in automatic mode.

AC GENERATION

AC power is distributed via the two AS buses. Each engine generator supplies one of the two buses but a tie connection allows one of the generators to provide both buses. The APU generator can be used as the sole source for all systems, excluding the galleys. Note that at high altitude the APU generator load capacity is decreased. When available, Ground Power is able to provide all buses with electricity. The two batteries are connected to the buses via a static converter. An automated bus tie system interconnects all systems.

AC BUSES

There are 5 buses for AC power:

1. AC1 Bus
2. AC2 Bus
3. AC ESS Bus
4. AC ESS SHED Bus
5. AC Ground/Flight (the latter is ignored)

DC GENERATION

The DC system powers the DC components, and is needed to start the APU when no EXT PWR is available. The DC electrical system is the first backup for the AC system and will power essential components when all AC generators are offline. In normal operation three transformer rectifiers (TRs) convert AC to DC and AC1 is the first source for DC power.

Two NICAD batteries connect to their own hot battery bus that is always active. The batteries are charged using the DC BAT bus and disconnected from all buses when they are not needed and fully charged. The batteries use proprietary code so they will not lose power as fast as standard FSX batteries. Depending on your use you should be able to run the systems on battery for up to half an hour. Of course it is advised to either connect external power or power up the APU to avoid your aircraft going cold and dead unexpected.

PRIORITY LOGIC

The priority logic determines which source is used. When that source is lost the system will automatically switch to the next available source.

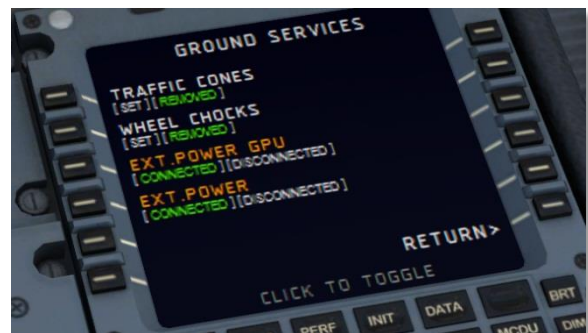
1. Engine Generators
2. External Power
3. APU Generator
4. Ram Air Turbine (not simulated)
5. Batteries

For example, if the aircraft is run from APU generator and EXT PWR comes online the system will automatically switch to EXT POWER but when engine generators come online they will be used.

GROUND POWER

Using the GROUND SERVICES menu on the right MCDU it is possible to display a Ground Power Unit and to actually let it supply the electrical power.

- EXT. POWER GPU: will activate ground power and will show a Ground Power Unit
- EXT. POWER: will activate ground power but will not show the Ground Power Unit (use this one in combination with AES)



ECAM ELEC SYSTEM DISPLAYS

The ECAM ELEC pages show the configuration of the electrical system and the relevant values of all systems.

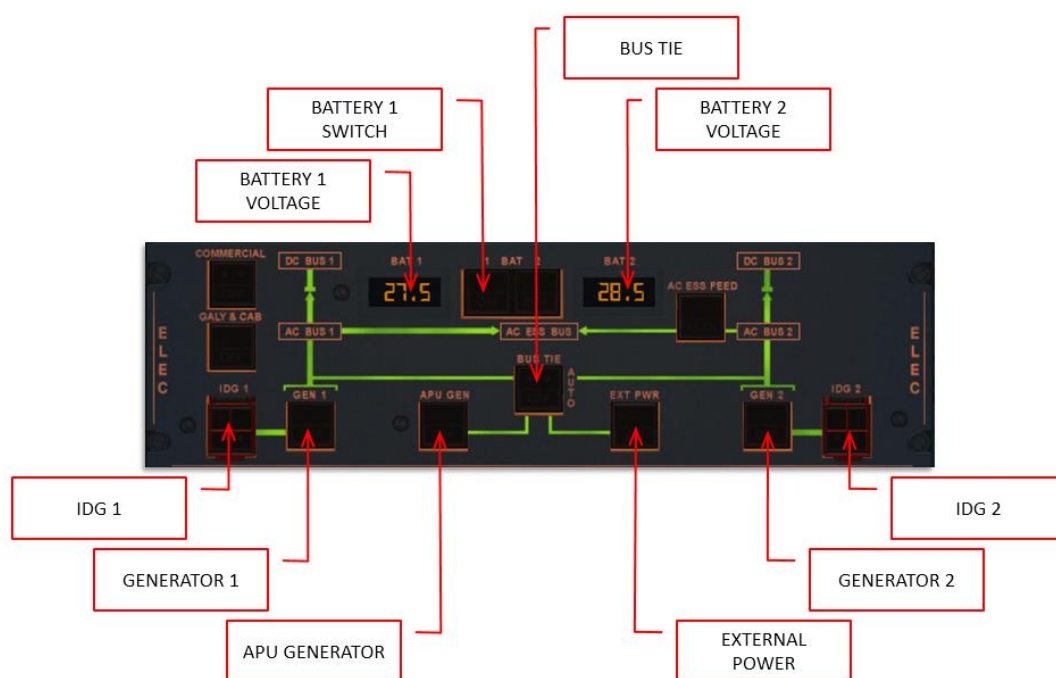


- The battery indications (BAT 1 & BAT 2) normally appear white but will show in amber if voltage drops below 25 volt. Voltage and Amperage is shown. Connection lines or arrows between the battery and the DC BUS icon show if the batteries are connected, discharging or charging.
- The TR indications (TR 1 & TR 2) display in green when the values are within normal limits and in amber when these are exceeded. Output voltage (V) and amperage (A) are shown.

- The generator indications (GEN 1 & GEN 2) show the load (%), voltage (V) and frequency (HZ) normally in green, for any abnormal value the same is shown in amber. Connection lines will show if the generator is online.
- The External Power indication will show voltage (V) and frequency (HZ) and connecting lines but only when external power is available.

ELEC OVERHEAD PANEL

All the normal operations for the electrical system are done via pushbuttons on the overhead ELEC panel.



- The battery voltage for both batteries is shown in the two small LCDs. These displays will always be on when the battery is installed.
- The BAT pbs (BAT 1 & BAT 2) are off when in AUTO mode. The batteries will automatically connect when the APU is started without EXT PWR, when voltage drops below 26.5 (to charge) or when the aircraft is on ground and no other electrical sources are available. They will show FAULT when the batteries are disconnected because of a fault. When the pb is clicked OFF will show and the battery will be disconnected.
- The IDG pb (IDG 1 & IDG 2) will disconnect the generator from the engine, only ground maintenance can reset this. The switch is protected by a switch guard.
- The EXT PWR pb will be off when no external power is available. It will show AVAIL when power is available. When pushed ON will show and the external power will be connected to the aircraft buses. It is recommended to deselect EXT PWR before the ground crew disconnects.
- The ACC ESS pb makes it possible to select a different source for the aircraft essential bus. When pushed ALTN will show and AC2 will be selected instead of AC1. Commercial and Galley are not simulated. They connect the cabin systems (galleys, toilets, entertainment system etc) to the buses.
-
- The GEN pbs (GEN 1 & GEN 2) are dark in AUTO mode. FAULT will show when the generator is inoperative or the engine is not running. When pushed OFF will show and the generator will be disconnected from the AC bus.

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- The APU GEN pb is normally in the ON position (lights off) and the generator will be available when the APU is running. When there is a problem FAULT will show. When pushed OFF will show and the APU generator will be taken offline.
- The BUS TIE pb is normally in the AUTO position (lights off) and will activate when needed. When pushed OFF will show and the buses will NOT interconnect.

EQUIPMENT

Most functions and systems are controlled by push-button switches with integrated (light) indications that follow the 'light out' principle:

- No light: system functioning normal
- Green: normal operation
- Blue: normal operation of temporary used system
- White: abnormal operation / test
- Red: failure, needs immediate action
- Amber: failure, needs attention

During normal operation only green lights can be illuminated permanently, blue lights are possible if not permanently lit.

Button positions:

- PRESSED IN: on, automatic, normal, open
- RELEASED OUT: off, manual, alternate, shut down

A push button that shows two dots is only partially used.

FLIGHT CONTROLS

GENERAL

The Sidesticks are used to control pitch and roll. The input from the pilot is interpreted by the flight computers and these move the flight controls. The flight computers however will ignore any input that would cause excessive maneuvers or would put the aircraft outside the safe flight envelope.

The flight control surfaces are electrically controlled and hydraulically activated.

COCKPIT CONTROLS

- Two side stick controllers for pitch and roll (these are not mechanically connected)
- Two pairs of pedals (interconnected) that mechanically control the rudder
- A speed brake control lever
- Two hand wheels to mechanically control Trimmable Horizontal Stabilizer (THS)
- A switch to control rudder trim
- A tiller that is used to steer the aircraft at low speed on the ground (note this is animated but cannot be used to steer.)

Note there is no aileron trim control.

COMPUTERS

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There seven flight control computers that process the pilot inputs:

- 2 ELAC's (Elevator Aileron Computer)
- 3 SEC's (Spoiler Elevator Computer)
- 2 FAC's (Flight Augmentation Computer)

PITCH CONTROL

The two elevators and THS control pitch. The pitch is normally controlled by ELAC 2 and uses the green and yellow hydraulic systems. The THS uses three electrical motors. Mechanical control using the THS always overrides the electrical controls, but has limited elevator travel.

ROLL CONTROL

One aileron and four spoilers on each wing control roll. Roll control is normally controlled by ELAC 1, using the blue and green hydraulic systems. Spoiler control uses SEC 3, using the green, yellow of blue hydraulic systems.

YAW CONTROL

In flight yaw control is fully automatic and the yaw orders are computed by the ELACs and handled by the FACs. One rudder surface is used. Mechanical control is always possible and overrides the electrical controls. The single rudder surface is moved by 3 hydraulic jacks using the green hydraulic system with a yellow hydraulic backup. Rudder deflection is limited as a function of speed.

Yaw trim is achieved by two electric motors. In automatic flight the FACs and FMCG controls the rudder. In manual mode the RUD TRIM rotary control on the pedestal can be used. The reset button will center the rudder. Rudder trim and reset is NOT active when A/P is used.

FLARE MODE

When passing 50 feet on landing the flight mode changes to flare mode and the attitude is maintained. At 30 feet the aircraft will start a pitch down maneuver to 2° nose down and gentle positive pilot action is required.

SPEED BRAKES AND GROUND SPOILER CONTROL

Spoiler 2, 3 and 4 are used as speed brakes and controlled by the speed brake lever. Speed brakes cannot be used in flaps configuration 3 and FULL or when angle of attack protection is active.

Ground spoilers are armed when the speed brakes control lever is pulled in to armed position. It uses spoiler 1 to 5. They will extend automatically:

- At landing when both main wheels touch down and throttle is at forward idle
- At take off when reverse is selected on at least one engine and speed is over 75 knots.

OVERHEAD PANEL CONTROLS

There are two FLT CTL panels on the overhead panel. When the corresponding system is ON and without fault the pb will be dark. When clicked OFF will show and the corresponding computer will be deactivated. When clicked again the computer will reset and restart. The two panels are mixed so each crew member will be able to control at least one ELAC, SEC and FAC.

ECAM F/CTL & WHEEL PAGE

The ECAM F/CTL page provides full feedback on all control surfaces. Please note the spoiler/speed brakes indication is also shown on the ECAM WHEEL page.



PROTECTIONS

The normal law provides complete flight envelope protection:

- Load Factor limitation
 - +2.5 g <-> -1.0 g flaps retracted
 - +2.0 <-> 0.0 g flaps extended
- Pitch Attitude protection
 - 30° nose up in configuration 0 to 3
 - 25° nose up in configuration full
 - 15° nose down
- Bank Angle protection
 - 33° bank angle
 - When the sidestick is kept full right or left the aircraft will bank to 67°, when sidestick is released it bank angle will go back to 30°
- High Angle of Attack protection
 - When angle of attack exceeds α protection the High Angle of Attach Protection kicks in. It will allow AoA to go to α max but not beyond. This protects against stall and windshear. A/P will disconnect in this mode.
- High speed protection
 - When the speed exceeds safe limits the engines will throttle down and when needed, speed brakes will be deployed.

FLAPS AND SLATS

Lift augmentation is achieved on each wing using:

- Two double-slotted flap surfaces
- Five slat surfaces

They are hydraulically moved and electrically signaled and operated using the FLAPS lever that has 5 positions. The upper ECAM always shows the flaps/slats position both in a small diagram and in position (with animation when the flaps/slats are moving).



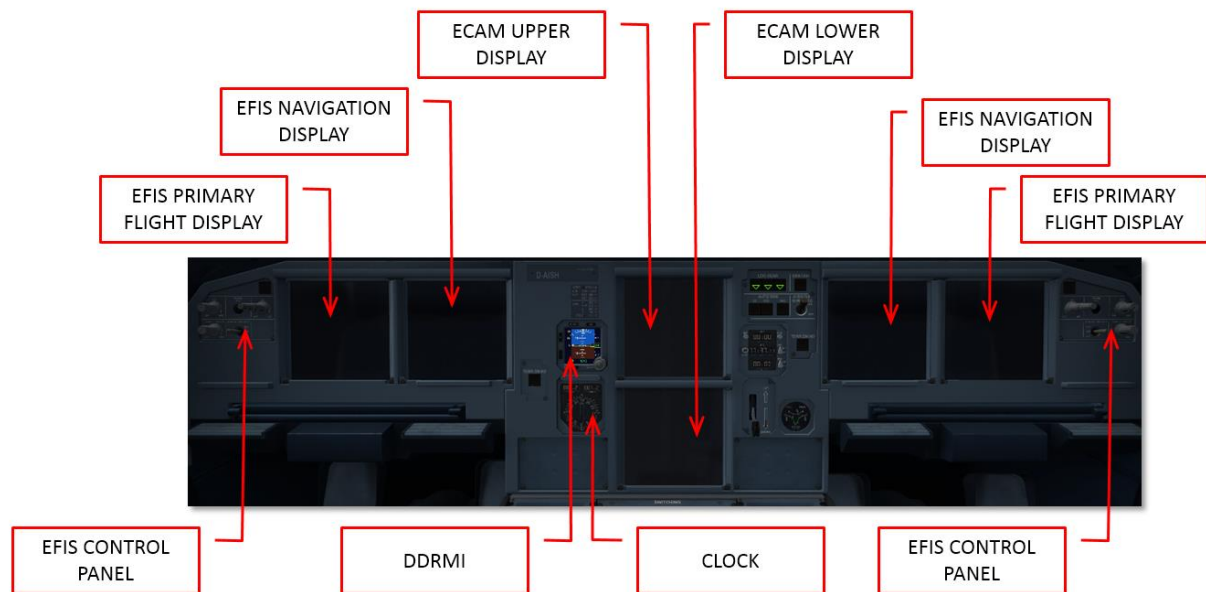
If configuration 0 is not selected after takeoff, the flaps will automatically retract at 210 Kts.

Position	SLATS	FLAPS	ECAM			
0	0	0			CRUISE	HOLD
1	18	0	1			
		10	1 + F	TAKE OFF		
2	22	14	2			APPR
3	22	21	3			
FULL	27	25	FULL		LDG	

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FLIGHT INSTRUMENTS

The flight instruments consist of the Electronic Instrument System (EIS) and several additional instruments. The EIS has six identical displays and is made up of two subsystem, the Electronics Flight Instrument System (EFIS) and the Centralized Aircraft Monitor System (ECAM).



ELECTRONIC FLIGHT INSTRUMENT SYSTEM

The EFIS has two displays on each side of the cockpit, Primary Flight Display (PFD) and Navigation Display (ND). The PFD consists of:

- Aircraft attitude
- Flight director command bars
- Aircraft heading and/or track
- Aircraft altitude both in MSL and AGL
- Aircraft vertical velocity and Vertical path indications
- Traffic Alert and Collision Avoidance System (TCAS)
- Indicated airspeed
- Flight Mode Annunciations (FMA)
- ILS information

The ND consists of:

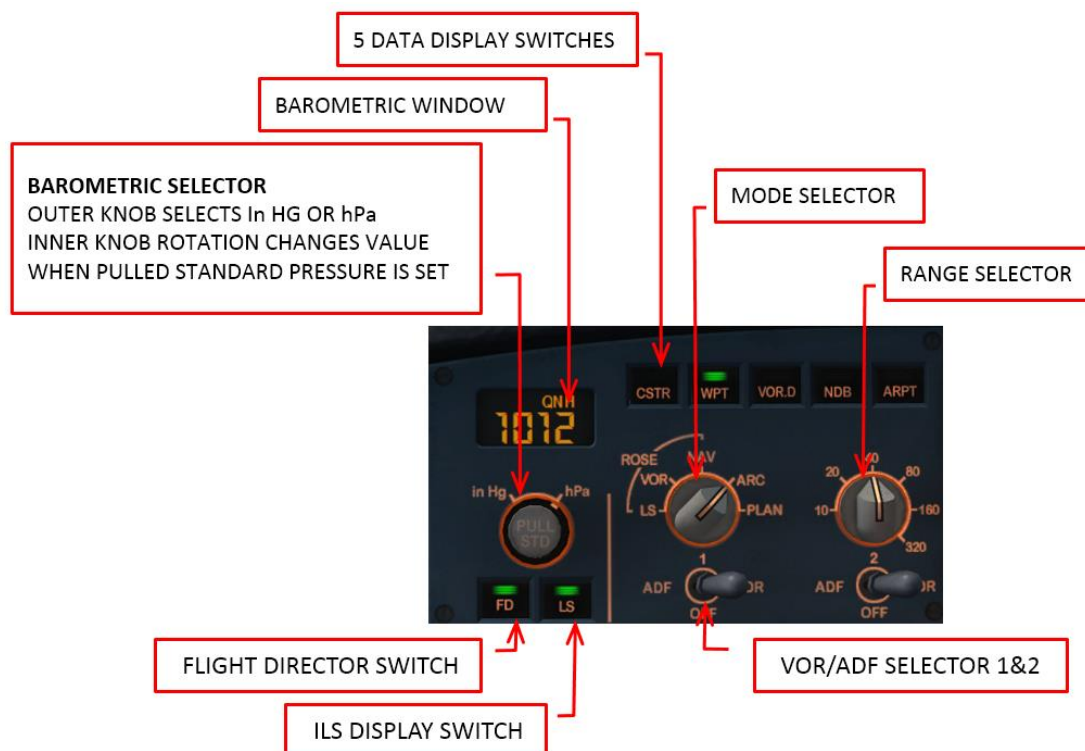
- Range markers
- Flight Plan
- Navigation Aids
- TCAS information
- Position
- Heading
- Speed

The colors on the EFIS show the importance of the information shown:

- RED: Failure requiring immediate action
- AMBER: Failure requiring action
- GREEN: Shows FMCG and NDB navigation information, flight director and engaged flight guidance modes
- WHITE: Used for titles, scales and VOR information
- BLUE: Used for armed flight modes, VOR, CDI and tuned nav aids
- MAGENTA: Used for ILS nav aids information.

EFIS CONTROL PANEL

The EFIS control panel is used to display or hide elements on the PFD and ND.



ELECTRONIC CENTRALIZED AIRCRAFT MONITOR

The ECAMs inform the pilot about aircraft systems and fault monitoring. The upper display shows engine and warning information while the lower display displays the System Display (SD) pages.

The colours on the ECAM show the relative importance of the information shown:

- RED: Failure requiring immediate action
- AMBER: Failure requiring action
- GREEN: For normal long time operation
- WHITE: Used for titles and remarks
- BLUE: Used for information about limitations
- MAGENTA: For additional information



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When neither caution nor warnings are present the page shown is controlled by flight phase.

- On the ground and engines off -> Doors page
- On the ground and engines on -> Wheels page
- Take-off run and until reaching 1500 ft AGL -> Engines page
- Above 1500 AGL -> Cruise page

If a caution or warning is triggered the ECAM will show the page for the affected system and CLR button will be lit. Pressing CLR will show to next affected systems page (if any) otherwise it will return to the page relevant for the flight phase. Pressing RCL will recall any existing warnings and cautions and again show the page for the affected systems.

ECAM CONTROL PANEL

- T.O. CONFIG: when pressed the aircraft will simulate a take-off power application to trigger warnings or cautions that might prevent a take-off.
- EMER CANC: not simulated
- System pages: when pressed the selected page is shown on the lower ECAM
 - ENG: engines
 - BLEED: bleed air systems
 - PRESS: cabin pressure systems
 - ELEC: electrical systems
 - HYD: hydraulic systems
 - FUEL: fuel systems
 - APU: auxiliary power unit
 - COND: air conditioning systems
 - DOOR: door and cargo hatches
 - WHEEL: gear and brake systems
 - F/CTL: flight controls.
- ALL: when pressed all the system pages are shown at short intervals
- CLR: when lit it can be pressed to remove ECAM caution or warnings
- STS: when pressed the STATUS page is shown on the lower ECAM
- RCL: when pressed the warnings and cautions statuses that have been suppressed by other warnings or cautions (or new flight phase) are recalled,

STANDBY COMPASS

The standby compass is displayed when the access panel is pushed upwards shortly. It can be stored by pushing it upwards. The standby compass should not be used for normal operation.

STANDBY HORIZON

The standby horizon is a backup for the IRU and EFIS system and shows attitude, altitude, speed and barometric pressure. The standby horizon should not be used for normal operation.

DDRMI

The digital distance and radio magnetic indicator provides a backup for the flight displays but is also useful in normal operation.

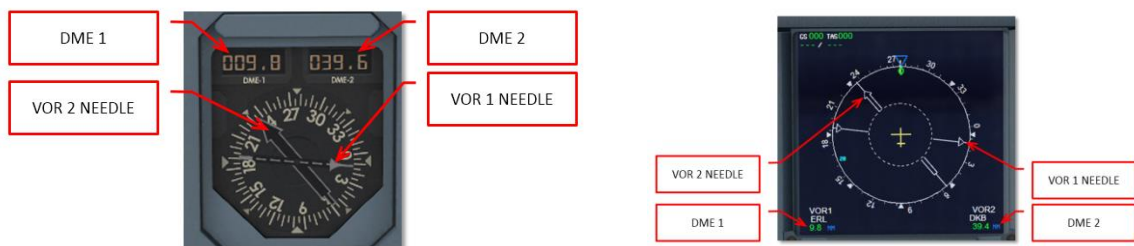
CLOCK

The clock provides time related information

- CHR: chronometer, start and stop with the CHR button, reset with the RST button
- UTC: shows UTC time
- ET: shows flight time (triggered by flight mode START)

VOR/DME RECEIVERS

There are two VOR/DME receivers and the information is supplied on the Digital Distance Radio Magnetic Indicator (DDRMI) and the Navigation Display (ND).



FLIGHT MODE ANNUNCIATOR

The Flight Mode Annunciator is shown at the top of the Pilot Flight Display and it perhaps the most important display of the whole cockpit. It shows in detail in what mode the systems are operation and what the pilot can expect to happen. Understanding what is shown here means understanding what the aircraft is doing. If a pilot enters the cockpit after a sanitary break it is the first thing he will check. There are five columns with 3 lines each.

AUTO THRUST OPERATIONS	AP/FD VERTICAL MODES	AP/FD LATERAL MODES	APPROACH CAPABILITIES DH/MDA	AP, FD. ENGAGEMENT STATUS
--	--	--		

AUTO THRUST OPERATIONS ANNUNCIATIONS

MAN TOGA	A/THR is armed, at least one thrust lever is in TOGA detent
MAN FLEX XX	A/THR is armed; at least one thrust lever is in MCT/FLX detent, with FLX TO temp set at XX°. The other thrust lever is at, or below, the MCT/FLX detent
MAN MCT	A/THR is armed; at least one thrust lever is in the MCT/FLX detent, the other is at, or below, this detent
MAN THR	A/THR is armed and the most advanced thrust lever is above CL detent (2 engines operative, or one above MCT/FLX (engine-out) and not in a detent
THR MCT	A/THR is active in thrust mode and the most advanced thrust lever is in the MCT/FLX detent (engine-out).
THR CLB	A/THR is active in thrust mode
THR IDLE	A/THR is active in thrust mode and commands idle thrust
THR LVR	A/THR is active in thrust mode with both thrust levers below CL detent
SPEED or MACH	A/THR active in SPEED or MACH mode
FLOOR	A/THR active and commands TOGA thrust, in alpha FLOOR condition
TOGA LK	A/THR active and TOGA thrust locked (not in alpha FLOOR condition)

Flashing White	Set the thrust levers in CL detent
Flashing White	Set the thrust levers in MCT/FLEX DETENT
LVR ASYM	Only one thrust lever is in CL or MCT/FLX detent

AP/FD VERTICAL MODE ANNUNCIATIONS

SRS	Takeoff or go around mode engaged
CLB	Climb mode engaged, FMGS target above, ALT CSTR used
OP CLB	Open Climb mode engaged FCU target above, ALT CSTR disregarded
ALT *	Altitude Capture engaged, FCU selected altitude
ALT CSTR *	Altitude Capture engaged, ALT CSTR set altitude
ALT	Altitude Hold mode engaged, FCU selected altitude
ALT CSTR	Altitude Hold mode engaged, CSTR set altitude
ALT CRZ	Altitude Hold mode engaged, CRS FL is held
DES	Descent mode engaged, FMGS target below, ALT CSTR used
OP DES	Descent mode engaged, FMGS target below
G/S *	Glide Slope Capture mode engaged
G/S	Glide Slope mode engaged
V/S	Vertical Speed Mode engaged, ALT RSTR disregarded
FPA	Flight Path Mode engaged, ALT RSTR disregarded

CLB	Climb mode armed
ALT	Altitude mode armed, FCU target
ALT	Altitude mode armed, ALT CSTR target
DES	Descent mode armed
G/S	Glide slope mode armed
ALT G/S	ALT and G/S mode armed
ALT G/S	ALT CSTR and G/S mode armed
ALT FINAL	ALT CSTR and FINAL mode armed

AP/FD A/THR ENGAGEMENT ANNUNCIATIONS

RWY	RWY mode engaged
HDG	HDG mode engaged
NAV	NAV mode engaged
LOC *	LOC capture mode engaged
LOC	LOC track mode engaged
APP NAV	NAV mode engaged for non ILS approach

NAV	NAV mode armed
LOC	LOC mode armed
APP NAV	NAV mode armed for non ILS approach

LAND	LAND mode engaged below 400 feet RA
FLARE	FLARE mode engaged
ROLL OUT	ROLL OUT mode engaged
FINAL APP	APP NAV and FINAL APP mode engaged during RNAV approach

APPROACH CAPABILITIES ANNUNCIATIONS

CAT 1	CAT 1 capability available
CAT 2	CAT 3 capability available
CAT 3	CAT 3 capability available

SINGLE	CAT 3 capability available with FAIL PASSIVE condition
DUAL	CAT 3 capability available with FAIL OPERATIONAL condition

MDA xxxxx	Minimum descent altitude inserted
DH xxxxx	Decision height inserted
NO DH	No Decision height inserted

APPROACH CAPABILITIES ANNUNCIATIONS

AP 1+2	Autopilot 1 and 2 engaged (LOC/GS, Roll-out or Go-around mode armed or engaged)
AP 1	Autopilot 1 engaged

AP 2	Autopilot 2 engaged
-------------	---------------------

XFDY	1FD2 indicates FD is activated on both PFD -FD- indicates FD is not activated on both PFD
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A/THR	A/THR is activated by: <ul style="list-style-type: none"> - Setting thrust levers between CL and IDLE, assuming previously armed - Setting thrust levers between MCT and IDLE, assuming previously armed - Depressing A/TRH pb on FCU with thrust levers in active range - With ALPAH FLOOR active
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A/THR	A/THR is armed <ul style="list-style-type: none"> - On ground by setting thrust levers at FLX or TOGA detent In flight by pushing A/THR pb with thrust levers out of active range or by engaging GA
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FUEL

GENERAL

The fuel system has the follow functions

- Store fuel in the tanks
- Supply the engines (and APU) with fuel
- Transfers fuel between tanks
- And, not simulated, cool the integrated drive generator and control the refueling operations.
- Note there is no fuel dumping possible on A320/321

TANKS

Two wing tanks and one center tank store the fuel, with a vent surge tank in each wing tip.

USABLE FUEL			
	WING TANKS	CENTRE TANK	TOTAL
VOLUME	2 X 7750 LITERS 2 X 2047 US GALLONS	8800 LITERS 2166 US GALLONS	23700 LITERS 6260 US GALLONS
WEIGHT	2 X 6048 KG 2 X 13,140 LB	6437 KG 14,190 LB	18605 KG 41,010 LB

ENGINE FEED

The main fuel pumps feed fuel from the wing tanks to the engines using two fuel pumps in each wing tank.

MAIN COMPONENTS

- **Tank pumps**, two in each wing tank, normally both activated.
- **Cross feed valve**, allows the left and right systems to be connected and to feed both engines from one wing tank, normally closed.
- **Engine low pressure valves**, when closed (by using the engine master switch or the ENG FIRE PUSH button) they cut the fuel flow to the engine, normally open.
- **Suction valves**, when open they allow the engines to be gravity-fed from the wing tanks. Normally the fuel pump action will close these valves.

FUEL FEED SEQUENCE

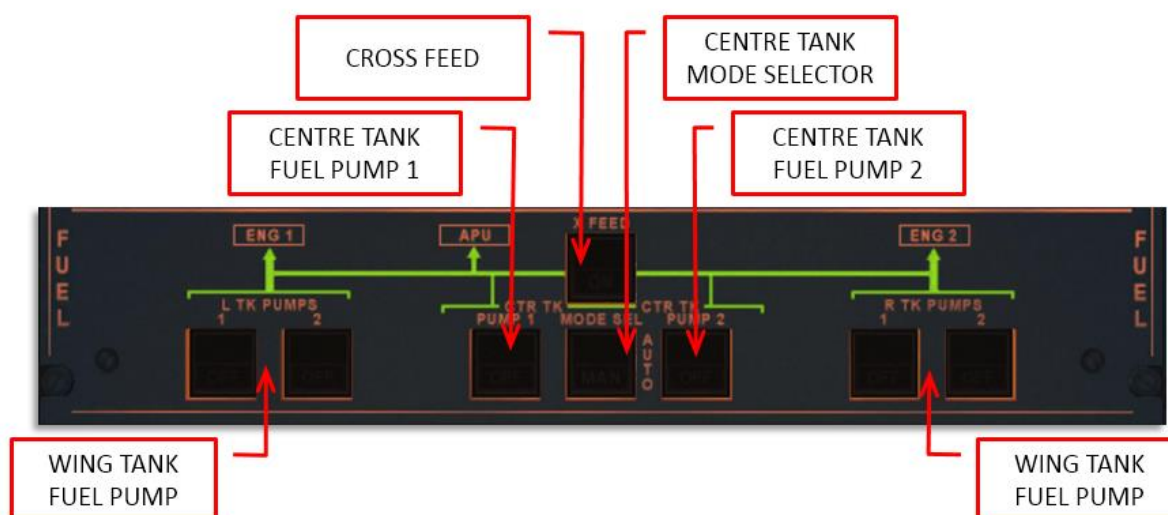
- During engine start (and for 2 minutes after engine start) engines are fueled from the wing tanks.
- When slats are extended engines are fueled from the wing tanks.
- When wing tanks are full engines are fueled from the wing tanks (to allow fuel expansion) until an 'under level' sensor is triggered. While engines are fueled from the wing tanks, fuel is transferred from the center tank to the wing tanks. When the inner wing tank reaches 750 kg of fuel, the outer wing tank fuel content will be transferred to the inner tanks.

CENTRE FUEL TANK TRANSFER

The Fuel Level Sensing Control Unit (FLSCU) controls the transfer of fuel from the centre tank to the wing tanks. When 500 KG of fuel has been used (from a wing tank) the FLSCU will start the transfer of fuel from the centre tank to the wing tank. When the FLSCU senses the wing tank is full the transfer is stopped. This system ensures that the wing tanks are always as full as possible and that the wing tanks fuel levels are always as equal as possible.

NOTE: to avoid an incorrect fuel load, always fill the wing tanks complete before adding fuel to the center tank. If you see the MODE SEL button light up with a amber FAULT the most obvious cause is that the center contains too much fuel and the wing tanks too little.

OVERHEAD PANEL



TK PUMPS (push button switch), pump the fuel from the wing tanks to the engines.

- ON Pump is energized
- OFF Pump is deactivated
- FAULT When the delivery pressure drops FAULT will be lit in amber, suppressed when OFF setting is selected

CTR TK XFR (push button switch), pump the fuel from the center tank to the wing tanks

- ON XFR valve is open when MODE selector is in MANual mode
- OFF XFR valve is closed
- FAULT Lit in amber in case of wing tank overflow

MODE SEL (push button switch),

- AUTO Center tank XFR is automatic, open when wing tanks are not full, closed when centre tank is empty
- MAN Center tank XFR is manually controlled with CTR TK XFR push button switches
- FAULT Lit in amber when:

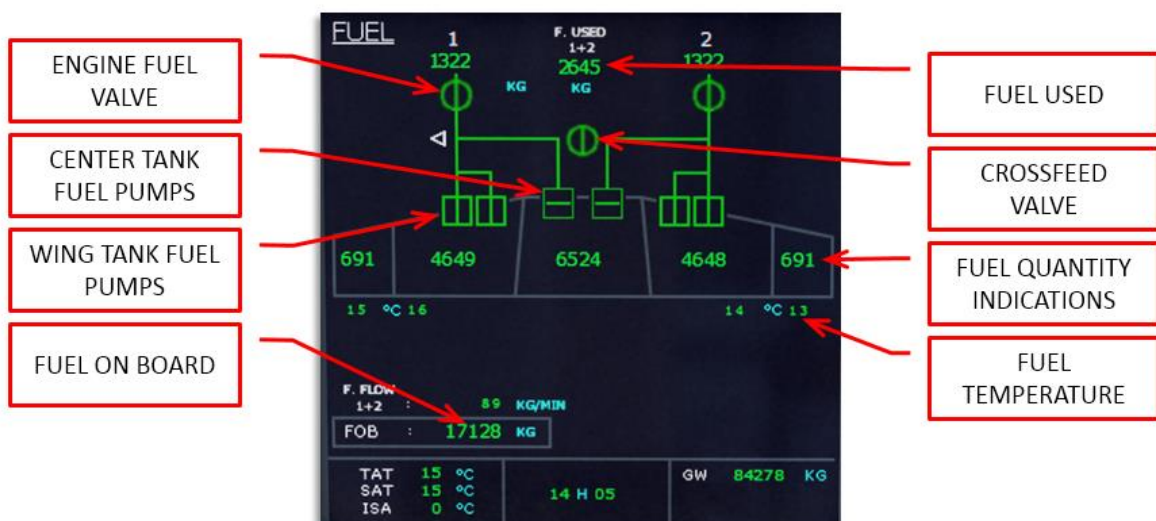
- Centre tank has more than 250 KG (550 LB) of fuel and the right or left wing tanks less than 5000 KG (11000LB). The fault indicates a problem with the fuel transfer or an incorrect fuel loading
- The MODE selector has been set to MANual

X FEED (push button switch)

- OFF Valve closed, no light
- ON Valve opens, white ON illuminated
 - OPEN Green OPEN illuminated

ECAM FUEL SYSTEM DISPLAY

The ECAM FUEL page is opened by depressing the ECAM FUEL button. This page is automatically opened if any of the fuel systems is abnormal.



HYDRAULIC SYSTEM

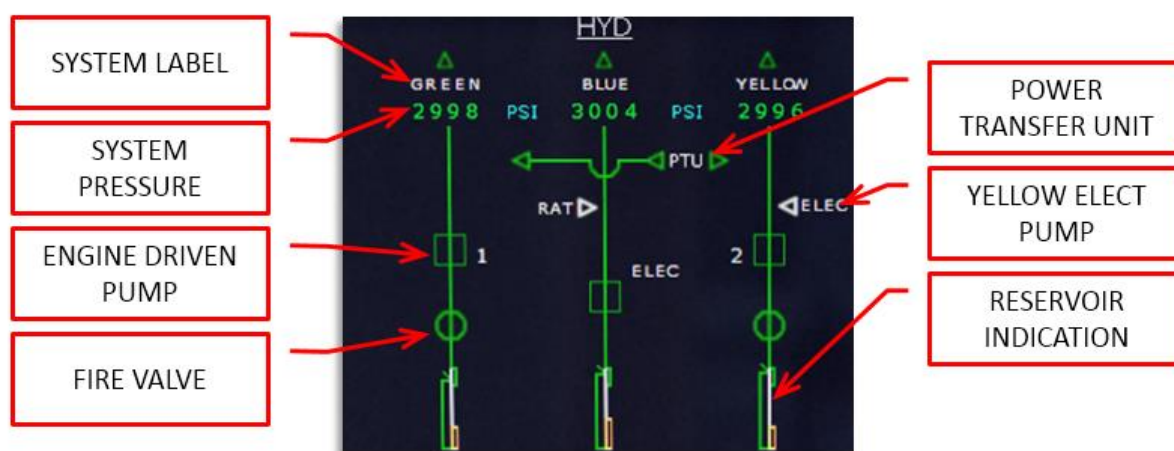
GENERAL

There are three separate and fully independent hydraulic systems, Green, Blue and Yellow, each with its own pump(s), reservoir and accumulator. In normal operation the system is fully automated and does not need any interaction.

- The Green system can be pressurized by an engine-driven pump and can use the Yellow system via the connection Power Transfer Unit (PTU).
- The Yellow system can be can be pressurized by an engine-driven pump and can use the Green system via the connecting PTU. Additionally an electric and a hand pump (not simulated) can be used.
- The Blue system is powered by an electric pump or the Ram Air Turbine (not simulated) and is mainly intended as a backup emergency system.
- The Power Transfer Unit is used to transfer pressure between the Green and Yellow systems when differential pressure exceeds a set limit.

ECAM HYD PAGE

All pumps are indicated by triangles on the ECAM. When the pump is off it is a white open triangle, when the pump is ON and pressure is normal a green triangle is shown. An amber triangle means the pump is on but pressure too low.

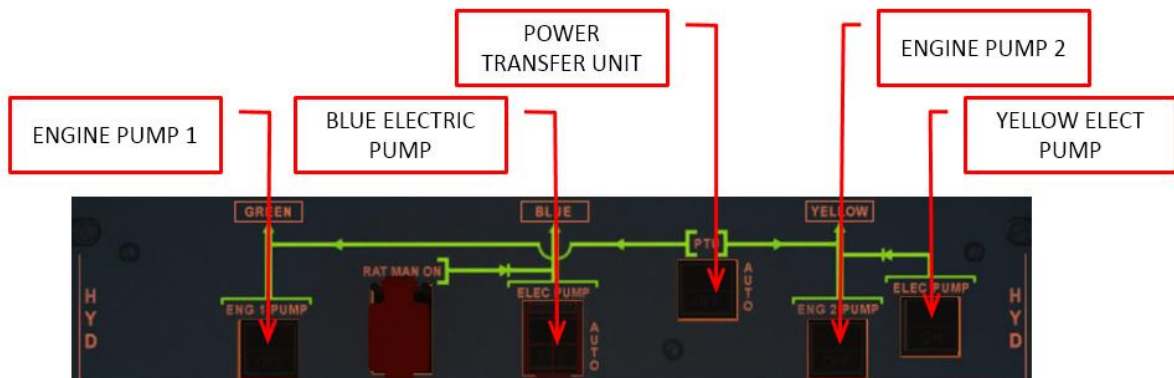


HYD OVERHEAD PANEL

The Hydraulic panel on the overhead panel allows the crew to interact with the system in case of failures. As with all overhead panels a completely dark panel indicates is in AUTO mode and there are no problems.

- The ENG PUMP pb (ENG 1 PUMP & ENG 2 PUMP) are dark in AUTO mode (ON and pressure within limits). When there is a problem FAULT will show. When pushed OFF will show and the pump will be offline and the system depressurize.
- The Blue Electric Pump pb (ELEC PUMP) is always active when one of the AC buses has power. When pushed (after lifting the switch guard) OFF will show and the system will depressurize. When the pump is on but pressure too low FAULT will show. The ECAM will show more details on that.

- The Yellow Electric Pump pb (ELEC PUMP) is dark by default, indicating it is not active. When pushed ON will show and the pump will energize. FAULT will show if there are problems, check the ECAM for more details. Note the Yellow system will pressurize the flight controls (via the PTU) when the main engines are off!
- The Power Transfer Unit (PTU) is default dark and in AUTO mode. When differential pressure is detected it will pressurize the low pressure system. When clicked OFF will show and the Green and Yellow systems will not be connected. FAULT will show if there is a problem, the ECAM will display the problems.



ICE AND RAIN PROTECTION

Using the ice and rain protection systems allow the unrestricted use of the aircraft in severe icing conditions and heavy rain fall. Electrical heating is provide for flight compartment windows, probes, pitot tubes, static ports and waste water drains (though the latter is not simulated). Hot bleed air heating is provided for the engines nacelle leading edges and outboard leading edge of each wing.

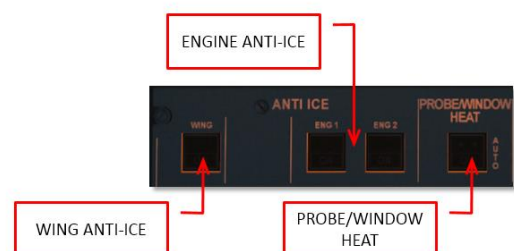
Rain protection comes in the form of wipers on the front windshields and an optional rain repellent system.

WING ANTI-ICE PROTECTION SYSTEM

To prevent ice buildup on the outboard wing slats, hot engine bleed air is sent into ducts on the wing leading edge. The WING pb on the ANTI ICE overhead panel controls the system and this is displayed by the wing anti-ice valve symbols on the ECAM BLEED system display.

PROBE / WINDOW ANTI-ICE PROTECTION SYSTEM

The probe heat computers provide automated protection using electrical heating coils against icing on the front windows, pitot tubes, static ports, TAT probe and AoA probes. It can be manually controlled (overriding the automated systems) using the PROBE/WINDOW HEAT pb. When the pb is not illuminated the system is running in automated mode.



ENGINE ANTI-ICE PROTECTION SYSTEM

To prevent ice buildup on the engine nacelle leading edges, hot engine bleed air is used. It is manually controlled by the PROBE/WINDOW HEAT pb. When engine anti-ice is selected engine idle speed will increase and continuous ignition is automatically selected.

RAIN REMOVAL

Both front windshields have individual windshield wipers controlled by three position switches on the overhead panel. Activating them on a dry windshield might cause damage to the windshield. Using the wipers at airspeed over 240 knots might result is not advised.



WINDSHIELD WIPER CONTROLS

LANDING GEAR AND BRAKES

GENERAL

The landing gear consists of a steerable nose gear with two wheels and two main landing gears with two wheels. The nose gear retracts forward and does not have any brakes. The main gear retracts inboard and is equipped with carbon disk brakes. An auto brake system and anti-skid systems are available to assist the crew in halting the aircraft under less favorable conditions. An interlock system prevents gear retraction when the aircraft is on the ground. In case of total hydraulic failure the gear can be extended with a manual crank handle. On retraction the main gear is automatically braked using the normal brakes. The nose gear is braked with a friction band on retraction.



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NOSEWHEEL STEERING

The nosewheel can be steered using the rudder pedals and the steering handwheels (not simulated). Nosewheel steering is available when:

- The A/SKID & N/W STRG controls are activated
- At least one engine is running
- Aircraft speed is under 130 knots
- Aircraft is on ground
- Green hydraulic pressure is available

MAIN WHEEL BRAKES

The brakes are operated by the brake pedals or the autobrake system via the Green hydraulic system. Temperature sensors in each main wheel display the temperature on the ECAM WHEELS page. Takeoff is not allowed before the brakes are below 300°C.

ANTI-SKID

The anti-skid system operates when wheel skid is detected and will provide maximum brake efficiency. The system is always active, when running from an alternate source it might not be available.

AUTOBRAKES

The autobrake system has three settings. LOW, MED or MAX selected by pbs. ON will show on the selected setting. When the aircraft is close to the selected rate a green DECEL will show. Pressing the illuminated pb deactivates the system. Green hydraulic pressure has to be available and the A/SKID & NW STRG needs to be active. The brakes are activated by spoiler extension.

BRAKE-FAN

The brake fans provide additional cooling when the brakes are overheating (amber temperature displayed). Activate them during taxi.

LANDING GEAR LEVER AND INDICATOR PANEL

The landing gear lever controls extension and retraction. The three indicator lights will be off when the gear is up and show red UNLK when the gear is in transit. Three green triangles will show the gear is down and locked. Next to the gear lever is a red arrow that will light when the gear is not extended and the aircraft is in landing configuration. When the two-position Gear Lever is moved and speed is below 260 knots

- Landing gear doors open,
- Gear will move to the new position
- All doors close

ECAM WHEEL PAGE

The ECAM WHEEL page shows indications for landing gear, brakes and anti-skid system. It is show automatic on the ground with engine running before takeoff and in flight when gear is commanded, in case of any abnormal indications.

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ACCU-PRESS/BRAKE GAUGE

The ACCU PRESS gauge shows the Yellow accumulator pressure (top indication) and the Yellow hydraulic pressure applied to the brakes (two lower indications). When brakes are applied the pressure increase will be shown here.

PARKING BRAKE

The parking brake is commanded with the PARK BRK handle. Verify the parking brake is on by checking the ACCU-PRESS gauge. Normally the aircraft is not parked with the parking brakes applied, but with chocks to keep it in place. However during icing conditions, refueling or with high winds parking brakes are used.

LIGHTING

COCKPIT LIGHTING

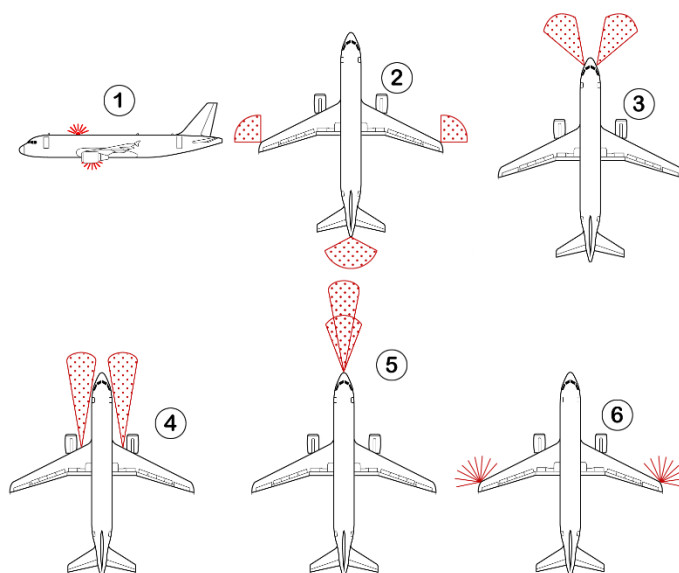
Compared to many other airliners the cockpit lighting is very simple and controlled by panels on the front console and overhead panel.

- INSTRUMENTS and PANEL LIGHTS: **ON / OFF** (all instruments and panels are integrally lit)
- ANNUNCIATOR LT TEST **BRT / TEST**.
Switch to TEST to test the functionality of all annunciator lights. Switch back to BRT for standard operation. DIM setting is ignored.

EXTERNAL LIGHTS

The external lights are controlled by switches on the overhead panel. Please note that some of the lights (most noticeably landing lights) are not created using the standard FSX lights and do not react to the standard FSX light commands.

1. BEACON: **ON / OFF**
2. NAVIGATION: **ON / OFF**
3. RWY TURN: **ON / OFF**
4. LANDING: **ON** (extended and on)/**OFF** (extended and off) / **RETRACT**
5. NOSE: **T.O.** (both lights on) / **TAXI** (taxi light on) / **OFF**
6. STROBE: **ON / AUTO** (off when gear on ground) / **OFF**



MASTER CAUTION, MASTER WARNING & AUTOLAND WARNING

The MASTER WARN pb and MASTER CAUT pb alert the pilot to a problem in one of the systems or an unsafe condition. The MASTER WARN pb is accompanied by a continuous chime while the MASTER CAUT pb only sounds a single chime. When pushed the caution and warning system is reset.

NAVIGATION

The navigation system has the following main components

- Navigation receivers
- Radar altimeter, transponders
- Two ADIRS
- Two FMGCs

Pilot interaction with these system uses:

- Multifunction Control and Display Units (MCDUs),
- Flight Control Unit (FCU)
- Transponder control panels
- ADIRS control panel
- Radio Management Panels (RMPs)

ADIRS

The Air Data Inertial Reference System supplies data such as baro altitude, speed, angle of attack, temperature, attitude, track, heading, acceleration and aircraft position. The Inertial Reference System uses three separate units to determine its position, and these have to be aligned before the aircraft is moved.



- The ON BAT light will be illuminated when one or more IRS is supplied only by the aircraft battery; it will also light up for a short while at the beginning of alignment.
- The IR pb sw will display OFF when the system is not connected to the other systems and FAULT when the when IRS alignment is lost.
- The three rotary mode selectors will switch between OFF, NAV (normal mode or operation) and ATT (not simulated).
- The ADR pb sw can be pushed to disconnect one or more of the systems (OFF) and will display FAULT when the ECAM systems detected a fault in the Air Data Reference data.

Note: There are differences in setup of ADIRS systems between Airbus models and even airlines, this also means there are slight differences in how the ADIRS is being used.

RADIO NAVIGATION

NAVIGATION RADIOS

The navigation radios are set in the MCDU on the RADIO NAV page. You enter this page by pressing the RADNAV key. Tuning to a station is as simple as entering the frequency (like 117.50) or the name (like SPA) on the scratchpad and then clicking the button next to the radio you want to tune. If there is more than one station with the same name or frequency the nearest is always selected.



GPWS

The Ground Proximity Warning System (GPWS) generates audio and visual warnings when the aircraft is in a dangerous condition;

- Mode 1: Excessive rate of descent
- Mode 2: Excessive ground closure rate
- Mode 3: Altitude loss after takeoff
- Mode 4: Unsafe terrain clearance
- Mode 5: Excessive deviation from glide path

Note that some airports have approaches that will trigger the GPWS warnings. Be prepared for this.

RUNWAY AWARENESS AND ADVISORY SYSTEM

The Runway Awareness and Advisory System (RAAS) is designed to provide to crews information about the aircraft's position relative to an airport's runway while operating at an airport. RAAS is a software upgrade to the later-model Enhanced Ground Proximity Warning Systems. It is designed to prevent runway incursion incidents. The RAAS is automatically triggered and does not have any user interface. See Vol1 for more information.

- Approaching Runway (on ground)
- Approaching Runway (in air)
- On Runway
- Runway End
- Taxiway Take-off
- Insufficient Runway Length

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- Extended Holding on Runway
- Approaching Short Runway (in air)
- Taxiway Landing
- Flaps Setting (Take-off and Landing)
- Landing Distance Remaining
- Distance Remaining (Rejected Take-off)
- Excessive Approach Speed
- Excessive Approach Angle
- Unstable Approach
- Altimeter settings (above and below Transition)

RADIO ALTIMETER / TCAS

Two radio altimeters (one for each side of the cockpit) provide the altitude above the ground and trigger the automatic call out in the final stages of the landing. The Traffic Collision and Avoidance System (TCAS) will warn of traffic that could cause danger to the aircraft. Transponder codes are set with the number keys.

TCAS / XPDR Selector:

- **OFF**: System deactivated
- **STBY**: TCAS and Transponder are in warm-up mode
- **ALT EPTG OFF**: Test mode
- **XPDR**: Transponder is ON, TCAS in warm-up mode
- **TA ONLY**: ATC/TCAS system is ON, advisories OFF
- **TA/RA**: ATC/TCAS system is ON, advisories ON

Above and Below Switch:

- Mode "N": $\geq - 2700$ ft and $\leq +2700$ ft
- Mode "ABV": $\geq - 2700$ ft and $\leq +7000$ ft
- Mode "BLW": $\geq - 7000$ ft and $\leq +2700$ ft

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POWER PLANT

The Airbus A320 and A321 are powered by two CFM56 or IAE V2500 turbofan engines. Though these engines have slightly different characteristics, these differences are hard to notice for the crew as they are controlled by FADEC systems. The type rating of an Airbus pilot does not even mention the engine type.

FADEC

The Full Authority Digital Engine Control system (also called the Electronic Control Unit ECU) performs these functions:

- Gas Generation Control (fuel flow, acceleration, idle settings)
- Engine Limit Protection (overspeed and EGT monitoring)
- Power Management (thrust rating)
- Automatic Starting Sequence
- Thrust Reverser Control
- Fuel Recirculation Control
- ECU Cooling
- Detection, Isolation and Recording of failures.

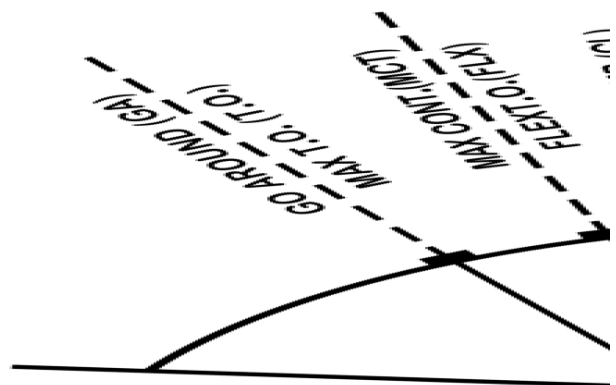
THRUST CONTROL SYSTEM

Thrust Control is managed by the FADEC on each engine. Thrust selection is done by means of the thrust levers when in manual mode or by the FMGS when in automatic mode. Thrust rating limit (maximum amount of power) is provided by the thrust lever position.

THRUST LEVERS

In automatic mode the thrust levers should be seen as mode selectors and in many flights the throttles are not touched in the complete flight (from shortly after take-off to shortly before landing) and stay in CLIMB mode the whole flight.

The thrust levers can only be moved manually between 5 detents (stops) over 4 operating segments. Auto throttle is only active in the range between idle and climb (including bit detents). Thrust Rating limit is computed from the thrust lever position, when between detents the FADEC will select the rating limit of the higher detent.



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MANUAL MODE

The engines are in manual mode when the thrust levers are outside the operating range and the ATS is not activated. In manual mode the pilot operates the engines by moving the thrust levers between idle and T.O./G.A. The FADEC will calculate the optimal N1 rating for each position.

When on ground and the thrust levers are in the FLEX detent the FADEC will select a thrust rating based on flex T.O temperature (set in MCDU) greater than the current TAT. If no flex temperature is set MCT thrust will be used. MAX TO power is always available by pushing the levers full forward.

AUOMATIC MODE

In autothrust mode (A/THR activated) the thrust is calculated by the FMGC but limited to the mode setting of the thrust levers. When an alpha-floor condition is detected the FMGC will automatically select alpha-floor mode and full power is available.

The FMA will flash white LVR CLB to remind the pilot to select climb mode above the thrust reduction altitude.

RADIO NAVIGATION

Radio Nav aids are used to display positional information and by the aircraft computer to calculate it's position. Tuning can be done automatically by the FMGC or manually using the MCDU RADNAV or PROG pages. When the FMGC fails the Radio Management Panel can be used. Manual tuning always has priority.

NAVAID SELECTION ON MCDU PAGES

The nav aids that are tuned by the FMGC can be seen on three MCDU pages:

- RADIO NAV page
Tuning can here be done by entering the frequency or name.
The nearest nav aid that matches will be used.
- PROG page
- SELECTED NAVAIDS page

AUTOTUNE VOR

The following priority rules are used for VOR tuning:

- Approach nav aid
- Radio position computation
- Nav aid specifically for the active leg

AUTOTUNE ADF/DME

The following priority rules are used for DME and ADF tuning:

- ADF in F-PLN and/or fix in the approach is a TO waypoint
- Radio position computation

AUTOTUNE ILS

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An ILS is autotuned when the departure runway has an ILS (during PREFLIGHT AND TAKE OFF mode) and when the F-PLN approach mode has an ILS in all other modes.

SEATBELT/NO SMOKING

The no smoking signs should be left ON during all operational flights. The seatbelt sign behavior is semi-automated when in AUTO and the seatbelts sign will be lit when the aircraft is below 10,000 feet. Any time the indication for the passengers changes a chime is played in the cabin.

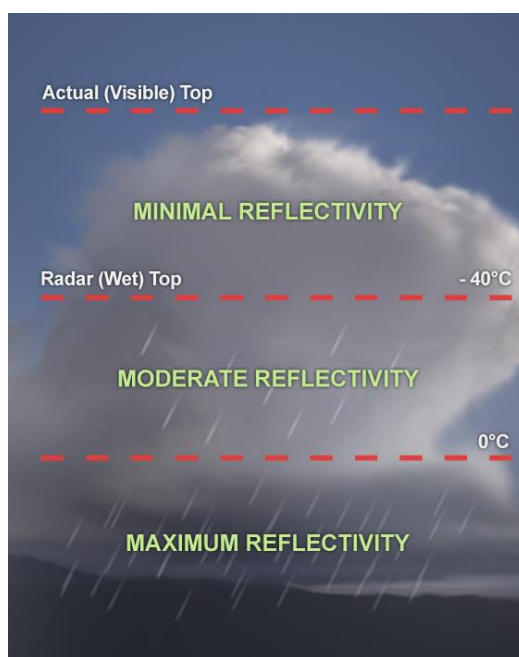
WEATHER RADAR

The Collins WXR (weather radar) detects precipitations by means of a high frequency radar. The radar beam reflects off rain drops or hail and is received by the system. The radar returns are then displayed in a calibrated gain color system. When the radar beam hits the ground (or other solid objects) it is also returned. The Collins WXR is able to eliminate ground clutter to provide a clearer image. However the Ground Mapping option does allow the user to scan the ground and pick up coastlines and other important ground features.

The fully automated multiscan mode sets the gain and tilt automatic to the ideal settings for each stage of the flight, reducing pilot workload. Multiscan operates the weather radar as a highly experienced would do manual.

The pilot is advised to keep in mind that at the cold top of clouds the water is mostly in ice crystals and super cooled water. These do not reflect the radar very effectively. Scanning a cloud from top to bottom using the manual scan will reflect that as reflections will increase near the bottom of the cloud where all the precipitation is in the form of liquid water and the density of droplets highest.

As radar beams travel in a straight line the curvature of the earth is important. Low clouds can be invisible at a distance because they are hidden by the curvature of the surface even though they are in range. In multiscan mode the radar is able to skim the radar horizon (tilting the beam so it remains just above the horizon). Keep in mind that over a distance of 320 NM the curvature of the earth causes the earth's surface to move down approximately 65,000 feet. So if the aircraft is at 25,000 feet the earth's surface is about 90,000 feet below the aircraft 320 NM in front of the aircraft. The antenna is stabilized up a 45 degree bank, meaning the radar sweep will be level with the horizon up to 45 degrees. It is also stabilized for pitch.



AUTO MULTISCAN MODE

In auto mode (MULTISCAN switch set to AUTO) the tilt is automatically controlled. Two beams (upper and lower) are merged together to become one picture representing weather in the possible vertical flight path of aircraft.

Also in MULTISCAN AUTO mode the GCS (ground clutter suspension) is usually in AUTO mode and so the ground clutter will be suppressed. Only when GCS switch is set to spring loaded OFF-Position the ground clutter would be visible but GCS is also only available in MULTISCAN AUTO mode, not in MAN mode!

MAN MULTISCAN MODE

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In manual mode (MULTISCAN switch to MAN) the radar beam is controlled via the TILT rotary knob. The flight crew uses the following three features to operate the Collins WXR2100 Weather Radar in the Airbus A318/319 family (if MULTISCAN MAN is selected):

- Gain control, which adjusts the sensitivity of the receiver (and should usually be set to AUTO).
- Antenna tilt, that controls the angle between the center of the beam and the horizon
- Range control of the ND, that has an essential influence on the optimum tilt setting

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The recommended TILT settings for the various FLIGHT PHASES based on ALTITUDE and ND-RANGE according to AIRBUS documentation (Flight Operations Briefing Notes) are:

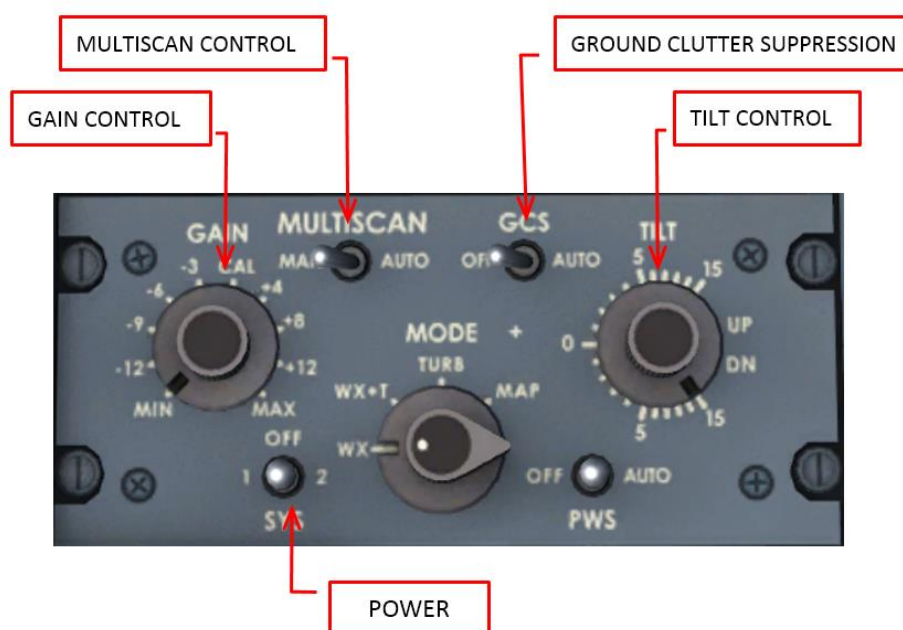
Flight Phase	Recommendations	Remarks																																																											
Taxi	Set ND to 10 NM range – Tilt down, then up: Check appearance / disappearance of ground returns	<i>Radar check must be performed away from people</i>																																																											
Takeoff	Scan up to 15° UP for weather return, if significant weather is suspected- Select tilt at +4° UP for takeoff	<i>Scan along the departure path</i>																																																											
Climb	Select negative tilt, maintain ground returns on top of ND as the aircraft climbs (suggestions): <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #0056b3; color: white;"> <th rowspan="2">Flight Level</th> <th colspan="5">ND-Range</th> </tr> <tr style="background-color: #0056b3; color: white;"> <th>10</th> <th>20</th> <th>40</th> <th>80</th> <th>160</th> </tr> <tr style="background-color: #0056b3; color: white;"> <th colspan="6">TILT SETTING</th> </tr> </thead> <tbody> <tr> <td>5.000</td> <td></td> <td>-0.9°DN</td> <td>-0.1°DN</td> <td></td> <td></td> </tr> <tr> <td>10.000</td> <td></td> <td>-2.7°DN</td> <td>-0.8°DN</td> <td>-0.5°DN</td> <td>-0.4°DN</td> </tr> <tr> <td>15.000</td> <td></td> <td>-4.5°DN</td> <td>-1.4°DN</td> <td>-1.0°DN</td> <td>-0.9°DN</td> </tr> <tr> <td>20.000</td> <td></td> <td>-6.3°DN</td> <td>-2.8°DN</td> <td>-1.6°DN</td> <td>-1.5°DN</td> </tr> <tr> <td>25.000</td> <td></td> <td>-8.8°DN</td> <td>-4.3°DN</td> <td>-2.4°DN</td> <td>-2.1°DN</td> </tr> <tr> <td>30.000</td> <td></td> <td>-10.8°DN</td> <td>-5.4°DN</td> <td>-2.8°DN</td> <td>-2.4°DN</td> </tr> </tbody> </table>	Flight Level	ND-Range					10	20	40	80	160	TILT SETTING						5.000		-0.9°DN	-0.1°DN			10.000		-2.7°DN	-0.8°DN	-0.5°DN	-0.4°DN	15.000		-4.5°DN	-1.4°DN	-1.0°DN	-0.9°DN	20.000		-6.3°DN	-2.8°DN	-1.6°DN	-1.5°DN	25.000		-8.8°DN	-4.3°DN	-2.4°DN	-2.1°DN	30.000		-10.8°DN	-5.4°DN	-2.8°DN	-2.4°DN	<i>Change TILT according to altitude and ND range</i>						
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Approach	Select tilt: +4° UP	<i>To avoid ground returns</i>																																																											

CONTROLS

The following features are modeled respectively can be operated in the Aerosoft A318/319 Airbus:

- **GAIN** (-15<>+15): Sets the sensitivity of the receiver.
- **MULTISCAN** (MAN and AUTO): Multiscan mode is in Auto, off in Man.
- **GCS** (OFF and AUTO): Ground Clutter Suppression.
- **TILT** (-15° <> +15°): Controls the pitch of the radar transmitter.
- Range control: Range control is set by the standard Navigation Display Range setting.

Whereas the range control is handled on the EFIS for the other settings the WXR panel is used. To get the maximum range / display it is necessary to have set FSX SETTINGS / WEATHER / CLOUD DRAW DISTANCE to the maximum (if a weather tool is used apply the same settings to it).



WEATHER RADAR DISPLAY

The weather radar display is depicted on the ND in any mode except PLAN. The selected ND range scale will control the weather radar range.

The radar returns will appear in black, green, yellow, red or magenta depending on the precipitation intensity. The antenna tilt angle will be displayed in the lower right-hand corner of the ND and is the angle between the horizon and the radar beam axis. When MULTISCAN manual calibration mode is selected, MAN and the setting appear in blue whereas in AUTO mode the setting appears in green.

If the TERR ON ND is selected on, the ND displays the surrounding terrain from the stored database, and the weather radar display will be suppressed.

OPERATION

In standard operation the weather radar is kept in automatic multiscan mode and will always use the most suitable tilt angle for the current flight stage. These optimized settings are a good reference for manual mode.

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Creating a mental image of the weather using the weather radar is a complex task where experience is very important. Areas to avoid are large areas with strong rain or smaller areas with tight color bands meaning there is only a small area where the rain increases in density.

Keep in mind that strong fronts hide whatever is behind them. Use the manual tilt and gain to look below the weather in front until ground clutter starts to appear. If the region directly behind the weather remains dark and ground clutter appears on either side it indicates a possible radar shadow.

A quick way to test operation of the weather radar on a clear day is to tilt it down and increase gain with Ground Clutter Suppression set to off. If you do not see ground returns the system is malfunctioning.

GLOSSARY

ABV	Above (TCAS)
ADF	Automatic Direction Finder
A/C	Aircraft
AGL	Above Ground Level
A.FLOOR	Alpha Floor
AMP	Audio Management Panel
ANN	Annunciator
A/THR	Autothrust
AC	Air Conditioning
ADIRS	Air Data Inertial Reference System
AIRAC	Aeronautical Information Circular
ALT	Altitude
AP	Autopilot
APPR	Approach (Key on FCU)
APU	Auxiliary Power Unit
ATC	Air Traffic Control
BLOCK	Fuel Weight (kg)
BLW	Below (TCAS)
BRG	Bearing
CFM	Engine Manufacturer GE + SNECMA
CL or CLB	Climb
CLR	CLEAR (Key on MCDU Keyboard)
CO RTE	Company Route
CRZ FL	Cruise Flight Level
DES	Descent
DH	Decision Height
DIR	Direct
DME	Distance Measuring Equipment
ECAM	Electronic Centralized Aircraft Monitoring
EFIS	Electronic Flight Instrument System
EFOB	Estimated Fuel On Board
ELAC	Elevator and Aileron Computer
ENG	Engine
ETD	Estimated Time of Departure
E/WD	Engine/Warning Display
EXPED	Expedite (FCU Key)
EXT PWR	External Power
EXT LT	External Lights
FAC	Flight Augmentation Computer
FADEC	Full Authority Digital Engine Control
FCU	Flight Control Unit
FD	Flight Director
FDR	Flight Data Recorder
FF	Fuel Flow
FL	Flight Level
FLEX	Flexible
FLX/MCT	Flexible/Maximum Continuous Thrust
FMA	Flight Mode Annunciator
FMGC	Flight Management and Guidance Computer
FO	First Officer
FOB	Fuel On Board
FPA	Flight Path Angle
F-PLAN	Flight Plan (MCDU Page)
FQ	Fuel Quantity

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GPU	Ground Power Unit
GPWS	Ground Proximity Warning System
GS	Glide Slope
GW	Gross Weight
HDG	Heading
hPa	Air Pressure Unit of Measurement (hector Pascal)
IAE	Int. Aero Engines = Engine Manufacturer RR, P&E, MTU + JAEC
ILS	Instrument Landing System
In Hg	Air Pressure Unit of Measurement (Inch Mercury)
INIT	Initiation (MCDU Page)
KG	Kilogram
IRS	Inertial Reference System
L/G	Landing Gear
LK	Lock
LOC	ILS Localizer
LSK	Line Select Key
MCDU	Multifunction Control and Display Unit
MDA	Minimum Descent Altitude
MKR	Marker
N/W	Nose Wheel
ND	Navigation Display
NDB (ADF)	Nondirectional Beacon (Automatic Direction Finder)
NM	Nautical Miles
PB	Push Button
PERF	Performance (MCDU Page)
PFD	Primary Flight Display
PPU	Power Push Unit
PROG	Progress (MCDU Page)
QNH	Barometric Pressure Reported By A Station
PSI	Pounds Per Square Inch
PTU	Power Transfer Unit
RAD/NV	Radio/Navigation (MCDU Page)
RAAS	Runway Awareness and Advisory System
RMP	Radio Management Panel
RTO	Rejected Takeoff
RWY	Runway
SD	System Display
SEC	Spoiler and Elevator Computer
SID	Standard Instrument Departure
SRS	Speed Reference System
STAR	Standard Terminal Arrival Route
STDBY	Standby (TCAS)
SW	Switch
TA	Traffic Advisory (TCAS)
TA/RA	Traffic Advisory & Resolution Advisory
TAS	True Airspeed
T/C	Top of Climb
TCAS	Traffic Alert and Collision Avoidance System
T/D	Top of Descent
TERR	Terrain Proximity Alert (GPWS)
THR	Thrust
THR RED	Thrust Reduction
THRT	TCAS Threat
THS	Trimmable Horizontal Stabilizer
TOGA	Takeoff Go-Around
TOW	Takeoff Weight
TRANS	Transition

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TRK	Track
UTC	Universal Coordinated Time
V1	Speed at which takeoff cannot be aborted
V2	Minimum Takeoff Safety Speed
V/S	Vertical Speed
Vfe	Maximum Flap Extended Speed
VHF	Very High Frequency
Vls	Minimum Safe Speed
Vmax	Maximum Operating Speed In Current Condition
Vmo/Mmo	Maximum Operating Limit Speed
VOR	Very High Frequency Omnidirectional Station
Vr	Rotation Speed
XFR	Transfer
ZFW	Zero Fuel Weight
ZFWCG	Zero Fuel Weight Centre of Gravity

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COCKPIT CREW CHECK

Preflight Briefing PERFORMED
ADIRS NAV
Cabin Signs ON/AUTO
Fuel Quantity _____KG
TO Data INSERTED
Altimeters CK

Cockpit Crew Checklist Completed

BEFORE START

Windows/Doors CLOSED
Beacon ON
Thrust Levers IDLE
Parking Brake AS RQRD

Before Start Checklist Completed

AFTER START

APU AS RQRD
Anti Ice AS RQRD
ECAM Status CKD
Flaps FLAPS _____
Spoilers ARMED
Pitch/Rudder Trim ____/ZERO
Hand Signal RECEIVED

After Start Checklist Completed

TAXIING

Flight Controls CKD
Flight Instruments CKD
V1 ,VR, V2, CLEAN CKD
Auto Brake MAX
TO Config SET/TESTED
Transponder AUTO/SET
TO Briefing PERFORMED
Cabin Report OBTAINED

Taxiing Checklist Completed

BEFORE TAKE OFF

Engine Mode Selector AS RQRD
Packs ON
TO Memo ALL GREEN

Before Take Off Checklist Completed

AFTER TAKE OFF

Engine Mode Selector AS RQRD
Spoilers DISARMED
Flaps RETRACTED
Landing Gear UP/LTS OUT
Exterior Lights RET/OFF
Packs ON
Altimeters STD

After Take Off Checklist Completed

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DESCENT
APP/DESC Briefing PERFORMED
Minimum Safe Alt CKD
LDG Elevation..... FT
Altimeters SET
After Descent Checklist Completed

APPROACH
ECAM Status CKD
Cabin Signs ON/AUTO
DH/MDA SET
Altimeters SET
Engine Mode Selectors AS RQRD
Approach Checklist Completed

FINAL
A/THR SPEED/OFF
Altimeters CK
Autobrake SET
LDG Memo ALL GREEN
After Start Checklist Completed

AFTER LANDING
Spoilers DISARMED
Flaps RETRACTED
Eng Mode Selectors NORM
APU AS RQRD
After Landing Checklist Completed

PARKING
Engine Master Switch OFF
Parking Brake AS RQRD
Exterior Lights AS RQRD
Anti Ice OFF
Fuel Pumps OFF
Parking Checklist Completed

LEAVING THE AIRCRAFT
Oxygen OFF
ADIRS OFF
No Smoking OFF
APU AS RQRD
Batteries AS RQRD
Leaving the Aircraft Checklist Completed



Aerosoft Airbus

A318/319/320/321

Volume 6
Step By Step Tutorial
Rolf Fritze
Version 06-01-09

RECORD OF REVISIONS

Revision n°	Issue date	Description
01-01	19/09/2014	First issue
01-07	07/04/2015	<ul style="list-style-type: none"> • WXR - Turbulences added (2.1.3) • Save and Load a flight (3.5) • MCDU – AIRCRAFT USER STATES: Deleted from MCDU2 menu (4.3) • Ground Crew Sound/Calls: Volume to menu added (4.6.1) • MCDU Menu – define FS - Infobar set lower (4.6.2) • CL Config Menü AES Pusback ON/OFF and Infobar: GSX added (4.6.3) • AES/GSX und AFTER START CL: Timing aligned (4.6.3) • Connected Flight Deck (4.9) • Pushback: Distance set to minimum value = 9m (5.7.1 #89) • ECAM Instruction – BRAKE TOO HOT: Values changed to 150/100° (5.10 #149) • Explanations for the use of speedbrakes (5.21 #253) • Use of 2nd Autopilot (5.21 - #256) • Appr. Speed Restr. FINAL CL – Landing Memo – <160 kts added as condition 5.21 #259a) • VECTOR APPROACH and use of DIR TO / RADIAL IN for tutorial flight (6.)
01-08	25/05/2016	<ul style="list-style-type: none"> • #55 F-PLAN DISCONTIUIITY (new page) • #284 Use of ATHR during landings without AP
01-09	25/10/2015	<ul style="list-style-type: none"> • (4.7) Trim from LOAD/FUEL PLANNER are displayed in LOAD FUEL MENU • (4.7) Modified pax weight is saved

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1. Start – FSX-Settings

1.1 Start FSX

Start the FSX with a “FREE FLIGHT” and use the following options:

Aircraft:	Aerosoft Airbus A319-112 CFM or IAE (any airline)
Weather:	Fair weather
Location:	Innsbruck/Austria (LOWI) at Parking 5 – RAMP GA LARGE
Time and Season:	Day – any season

The difference between **CFM** and **IAE** types are the engines built by different manufacturers.

Do **NOT** use default ATC and disable AI traffic. The reasons being are that ATC/AI can use different runways than we use in our tutorial. This might end up

- LOWI – Departure Airport: AI may use 26 for approaches, causing immediate TA's and RA's on takeoff.
- LFMN – Arrival Airport: Apparently default ATC and AI use the opposing runway 22R.

If the aircraft it is not in the “COLD DARK” state when you load it (maybe you already set a DEFAULT aircraft state – see chapter 4.3 for details), please set all knobs, switches and buttons to OFF so that no lights are ON (Batteries 1 + 2 should be set OFF last) - please see chapter 5.25: Overhead Panel –. But the **easiest** way to make those settings (and necessary for this tutorial flight) is to use the ACFT STATE function of the right MCDU and set the aircraft state to “COLD DARK” (please see chapter 4.3 for details).

1.2 General FSX Settings

Adjust the FSX settings according to the Volume 1 (Vol1-InFSX EN) of the Aerosoft Airbus A318/319/320/321 documentation (chapter FSX Settings) which you will find in the FSX-folder under Aerosoft /Airbus318_A319 / Documentation / or Aerosoft /Airbus320_A321 / Documentation /

1.3 Simulation Rate / Time Compression:

Especially during longer flights the simulation rate in the FSX Options Menu is often speeded up from normal in order to shorten the flight. We recommend that you do not do this, as it can cause problems. This is because the flight avionics of Airbus 318/319/320/321 are completely reprogrammed and do not use any FSX standard features. This means that the avionics are not compatible with the time compression features of FSX.

Additionally it is depending on the performance of your computer. In the meantime we got the experience that “time compression” works perfectly on some high-end machines.

2. Panels and Instruments:

In the following paragraph the various panel and cockpit views are explained together with the terms used in the tutorial, this will enable the user to find the knobs, switches and buttons that the tutorial refers to. They are the Glareshield, Main Panel, MCDU, ECAM, Pedestal/Radio and the Overhead Panel.

The Aerosoft Airbus A318/319/320/321 does not have a 2D panel - only a virtual cockpit, therefore to make it easier to use ,6 fixed virtual 2D cockpit views have been created. These views can be accessed using three different methods.

- FSX Menu: Views – View Mode – Cockpit –
- Keyboard: F9 = Glareshield – Main Panel, F10 = ECAM / left and right MCDU, F11 = Pedestal / Radio and F12 = Overhead.
- Keyboard: F9 = Glareshield – Main Panel and then use the [A] key to toggle between the various views like left MCDU, right MCDU, etc.



Picture 1: Default VC view, selected with the [S] key and where needed cycled to this view with the [A] key.



Picture 2: Main Panel and Glareshield View (similar to a 2D panel) selected with [F9]



Picture 3: ECAM and Upper Pedestal view, selected with [F10]



Picture 4: Pedestal view, selected with [F11]



Picture 5: Overhead view, selected with [F12]

There is also a Panelbar available which allows you to get fast access to a lot of other fixed predefined views – please see chapter 4.6 (OPTIONS).

Using the various keyboard combinations (please see details below) all views can be changed

- For all views the eye point can be changed except: 2 D Glareshield, 2D MCDU, Radio and TCAS
- For all views a "Pan Reset Function" is integrated e. g. after re-opening the view again the original view is reset. This is important so that for some very special views like the FCU, Pedestal, Overhead etc. the views do not end "somewhere" if opened again.

First open it e. g. to become the active window. Then the following key combinations are available:

- CTRL + Return - Left
- CTRL + Backspace - Right
- CTRL + SHIFT + Return - Forward
- CTRL + SHIFT + Backspace - Backwards
- SHIFT + Return - Higher
- SHIFT + Backspace - Lower
- SPACE BAR + Mouse wheel - Zoom in or out
- SPACE BAR + Mouse - Changing the view angle

2.1 Glareshield and Main Panel



Picture 6: Glareshield and Main Panel (F9)

- | | |
|---|--|
| 1 = PFD (Primary Flight Display) | 8 = Dimmer for PFD and ND |
| 2 = ND (Navigation Display) | 9 = Master Warning and Master Caution Lights |
| 3 = EFIS (Electronic Flight Information System) | 10 = A/Skid & Nose Wheel Steering |
| 4 = FCU (Flight Control Unit) | 11 = Brake Fan |
| 5 = E/WD (Engine- and Warning Display) | 12 = EGPWS – Terrain on ND switch |
| 6 = Brakes | 13 = ISIS – Standby Altimeter |
| 7 = Chronometer | |

2.1.1. PFD - Primary Flight Display



Integrated Standby Instruments System (ISIS)

Picture 7: PFD – Primary Flight Display












- 1= FMA – Flight Mode Annunciator
- 2 = Speed Indicator
- 3 = Attitude Indicator – Artificial Horizon - Flight-Director Indicator
- 4 = Lateral and Vertical ILS Glide Path
- 5 = Altitude Indicator
- 6 = Vertical Speed Indicator
- 7 = ILS Identification
- 8 = Heading and Track Indicator
- 9 = Air Pressure

2.1.2. ND – Navigation Display (Standard)



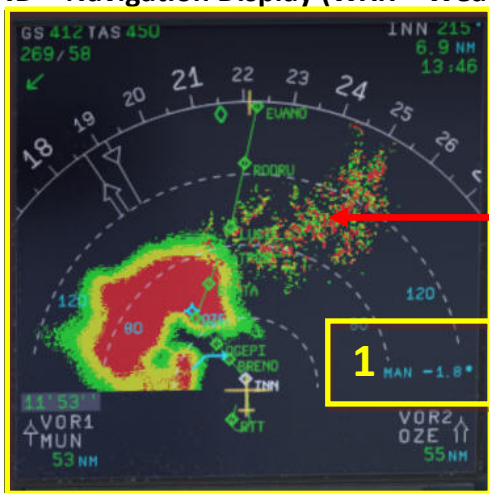
Picture 8: ND – Navigation Display (Standard)

- 1= Speed (Ground Speed / True Air Speed) and wind (direction / speed)
- 2 = Next waypoint, degree, distance, time of arrival
- 3 = Lateral flight path
- 4= Chronometer time

Indication	Description
	Speed Change: Indicates the point where the aircraft will initiate an automatic acceleration or deceleration from current speed to new computed speed in case of SPD LIM, SPD CSTR, or HOLDING SPD (including 250 knots below 10,000).
	Deceleration Point: Indicates where the aircraft will initiate an automatic deceleration toward VAPP. Managed NAV mode and managed speed must be engaged.
	Altitude Constraints: Constraint is predicted to be met when the aircraft is in managed lateral and vertical modes.
	Position where the aircraft will level-off at the FCU selected altitude. The same symbol will indicate a level-off from a managed climb (CLB) or selected climb (OP CLB).
	Position where the aircraft will level-off at the constrained altitude entered in the MCDU. The managed CLB mode must be engaged for the altitude constraint symbol to appear and be honored.
	Position where the aircraft will level-off at the FCU selected altitude. The same symbol will indicate a level-off from a managed decent (DES) or selected descent (OP DES).
	Position where the aircraft will level-off at the constrained altitude entered in the MCDU. The managed DES mode must be engaged for the altitude constraint symbol to appear and be honored.
	Start of climb with the CLB mode armed.
	Start of climb with the CLB mode not armed.
	Top of Descent or continue descent with DES armed.
	Top of Descent or continue descent with DES not armed.

Picture 9: ND – Symbols

2.1.3. ND – Navigation Display (WXR – Weather Radar)



Ground Clutter (only available in MAN mode)

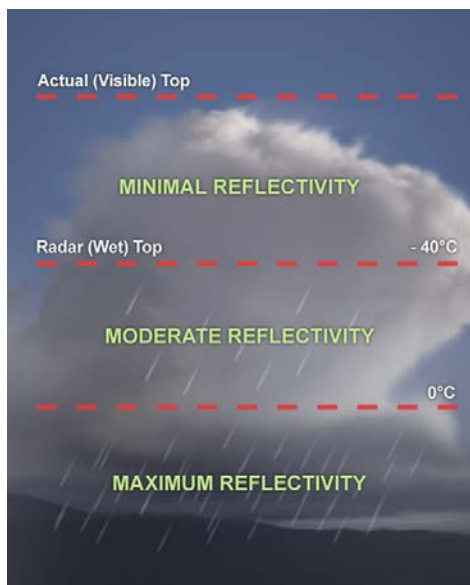
Picture 10: ND – Navigation Display (WXR)

1= TILT setting (green = MULTISCAN AUTO mode / blue = MAN mode)

The Airbus WXR works with FSX weather as well as with any weather add-on and displays what is “injected” into the FSX weather.

Weather Radar Display

- The weather radar display is depicted on the ND in any mode except PLAN. The selected ND range scale will control the weather radar range.
- The radar returns will appear in green, yellow and red depending on the precipitation intensity. Black means “no” perception or perception with very low intensity (below level). The antenna tilt angle will be displayed in the lower right-hand corner of the ND and is the angle between the horizon and the radar beam axis. When MULTISCAN manual calibration mode is selected, MAN and the setting appear in blue whereas in AUTO mode the setting appears in green.
- If the TERR ON ND is selected on, the ND displays the surrounding terrain from the stored database, and the weather radar display will be suppressed.



Picture 11: WXR - Reflectivity

WXR-Panel



Picture 12: WXR-Panel (Pedestal 2.5. # 11)

- 1= System = ON =1 or OFF – 2 is not modeled
- 2 = Gain control
- 3 = MULTISCAN (Manual and Auto)
- 4 = Ground clutter suspension (Off and Auto) – only in MAN mode
- 5 = TILT (UP and DOWN)
- 6 = MODE

The following features are modeled respectively can be operated in the Aerosoft A318/319/320/321 Airbus:

- GAIN control
- MULTISCAN (MAN and AUTO)
- GCS (OFF and AUTO)
- Antenna TILT
- Mode
- Range control of the ND (please see EFIS 2.1.5 #6)

Whereas the range control is handled on the EFIS for the other settings the WXR panel is used. To get the maximum range / display it is necessary to have set FSX SETTINGS / WEATHER / CLOUD DRAW DISTANCE to the maximum (if a weather tool is used apply the same settings to it).

AUTO MULTISCAN MODE

In auto mode (MULTISCAN switch set to AUTO) the tilt is automatically controlled. Two beams (upper and lower) are merged together to become one picture representing weather in the possible vertical flight path of aircraft.

Also in MULTISCAN AUTO mode the GCS (ground clutter suspension) is usually in AUTO mode and so the ground clutter will be suppressed. Ground clutter can be suppressed by GCS in MULTISCAN mode (AUTO), but not in manual mode (MAN) – using a lower tilt it will always be visible (except water surface, which will be displayed in black).

MAN MULTISCAN MODE

In manual mode (MULTISCAN switch to MAN) the radar beam is controlled via the TILT rotary knob.

The flight crew uses the following three features to operate the Collins WXR2100 Weather Radar in the Airbus A318/319/320/321 family (if MULTISCAN MAN is selected):

- **Gain control**, which adjusts the sensitivity of the receiver (and should usually be set to AUTO).
- **Antenna tilt**, that is the angle between the centre of the beam and the horizon
- **Range control of the ND**, which has an essential influence on the optimum tilt setting

The recommended TILT settings for the various FLIGHT PHASES based on ALTITUDE and ND-RANGE according to AIRBUS documentation (Flight Operations Briefing Notes) are:

Flight Phase	Recommendations	Remarks																																																					
Taxi	Set ND to 10 NM range – Tilt down, then up: Check appearance / disappearance of ground returns	<i>Radar check must be performed away from people</i>																																																					
Takeoff	Scan up to 15° UP for weather return, if significant weather is suspected- Select tilt at +4° UP for takeoff	<i>Scan along the departure path</i>																																																					
Climb	Select negative tilt, maintain ground returns on top of ND as the aircraft climbs (suggestions): <table border="1" style="margin-top: 10px; width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="background-color: #0070C0; color: white;">Flight Level</th> <th colspan="5" style="background-color: #0070C0; color: white;">ND-Range</th> </tr> <tr> <th style="background-color: #0070C0; color: white;">10</th> <th style="background-color: #0070C0; color: white;">20</th> <th style="background-color: #0070C0; color: white;">40</th> <th style="background-color: #0070C0; color: white;">80</th> <th style="background-color: #0070C0; color: white;">160</th> </tr> </thead> <tbody> <tr> <td></td> <td colspan="5" style="background-color: #0070C0; color: white; text-align: center;">TILT SETTING</td> </tr> <tr> <td style="text-align: center;">5.000</td> <td></td> <td style="text-align: center;">-0.9°DN</td> <td style="text-align: center;">-0.1°DN</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">10.000</td> <td></td> <td style="text-align: center;">-2.7°DN</td> <td style="text-align: center;">-0.8°DN</td> <td style="text-align: center;">-0.5°DN</td> <td style="text-align: center;">-0.4°DN</td> </tr> <tr> <td style="text-align: center;">15.000</td> <td></td> <td style="text-align: center;">-4.5°DN</td> <td style="text-align: center;">-1.4°DN</td> <td style="text-align: center;">-1.0°DN</td> <td style="text-align: center;">-0.9°DN</td> </tr> <tr> <td style="text-align: center;">20.000</td> <td></td> <td style="text-align: center;">-6.3°DN</td> <td style="text-align: center;">-2.8°DN</td> <td style="text-align: center;">-1.6°DN</td> <td style="text-align: center;">-1.5°DN</td> </tr> <tr> <td style="text-align: center;">25.000</td> <td></td> <td style="text-align: center;">-8.8°DN</td> <td style="text-align: center;">-4.3°DN</td> <td style="text-align: center;">-2.4°DN</td> <td style="text-align: center;">-2.1°DN</td> </tr> <tr> <td style="text-align: center;">30.000</td> <td></td> <td style="text-align: center;">-10.8°DN</td> <td style="text-align: center;">-5.4°DN</td> <td style="text-align: center;">-2.8°DN</td> <td style="text-align: center;">-2.4°DN</td> </tr> </tbody> </table>	Flight Level	ND-Range					10	20	40	80	160		TILT SETTING					5.000		-0.9°DN	-0.1°DN			10.000		-2.7°DN	-0.8°DN	-0.5°DN	-0.4°DN	15.000		-4.5°DN	-1.4°DN	-1.0°DN	-0.9°DN	20.000		-6.3°DN	-2.8°DN	-1.6°DN	-1.5°DN	25.000		-8.8°DN	-4.3°DN	-2.4°DN	-2.1°DN	30.000		-10.8°DN	-5.4°DN	-2.8°DN	-2.4°DN	<i>Change TILT according to altitude and ND range</i>
Flight Level	ND-Range																																																						
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30.000		-10.8°DN	-5.4°DN	-2.8°DN	-2.4°DN																																																		

Cruise	<p>Select negative tilt and maintain ground returns on top of ND. As a rule of thumb use the following suggestions:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #0070C0; color: white;"> <th rowspan="2">Flight Level</th> <th colspan="5">ND-Range</th> </tr> <tr style="background-color: #0070C0; color: white;"> <th>20</th> <th>40</th> <th>80</th> <th>160</th> <th>320</th> </tr> <tr style="background-color: #0070C0; color: white;"> <th colspan="6">TILT-Setting</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">31.000</td> <td style="text-align: center;">-12.1°DN</td> <td style="text-align: center;">-5.8°DN</td> <td style="text-align: center;">-3.1°DN</td> <td style="text-align: center;">-2.5°DN</td> <td style="text-align: center;">-2.5°DN</td> <td></td> </tr> </tbody> </table>	Flight Level	ND-Range					20	40	80	160	320	TILT-Setting						31.000	-12.1°DN	-5.8°DN	-3.1°DN	-2.5°DN	-2.5°DN		<p><i>No ground returns beyond line of sight:</i></p> <p>FL370 => 240 NM</p> <p>FL250 => 200 NM</p>																																			
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TILT-Setting																																																													
31.000	-12.1°DN	-5.8°DN	-3.1°DN	-2.5°DN	-2.5°DN																																																								
Descent	<p>Adjust tilt to maintain ground returns on top of ND. As a rule of thumb:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #0070C0; color: white;"> <th rowspan="2">Flight Level</th> <th colspan="5">ND-Range</th> </tr> <tr style="background-color: #0070C0; color: white;"> <th>10</th> <th>20</th> <th>40</th> <th>80</th> <th>160</th> </tr> <tr style="background-color: #0070C0; color: white;"> <th colspan="6">TILT SETTING</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">30.000</td> <td colspan="5" style="text-align: center;">~ +3.0 °UP</td> </tr> <tr> <td style="text-align: center;">25.000</td> <td colspan="5" style="text-align: center;">~ +2.5 °UP</td> </tr> <tr> <td style="text-align: center;">20.000</td> <td colspan="5" style="text-align: center;">~ +2.0 °UP</td> </tr> <tr> <td style="text-align: center;">15.000</td> <td colspan="5" style="text-align: center;">~ +3.0 °UP</td> </tr> <tr> <td style="text-align: center;">10.000</td> <td colspan="5" style="text-align: center;">~ +2.0 °UP</td> </tr> <tr> <td style="text-align: center;">5.000</td> <td colspan="5" style="text-align: center;">~ +1.0 °UP</td> </tr> <tr> <td style="text-align: center;">3.000</td> <td colspan="5" style="text-align: center;">~ +0.5 °UP</td> </tr> </tbody> </table>	Flight Level	ND-Range					10	20	40	80	160	TILT SETTING						30.000	~ +3.0 °UP					25.000	~ +2.5 °UP					20.000	~ +2.0 °UP					15.000	~ +3.0 °UP					10.000	~ +2.0 °UP					5.000	~ +1.0 °UP					3.000	~ +0.5 °UP					
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3.000	~ +0.5 °UP																																																												
Approach	Select tilt: +4° UP	<i>To avoid ground returns</i>																																																											

If you want to get more information on the WXR subject please have a look into the "Collins_WXR-2100_Operators_Guide.pdf" as well as into AIRBUS documentation "Flight Operations Briefing Notes – Adverse Weather Operations – Optimum Use of Weather Radar" which you can download from the Internet.

MODE

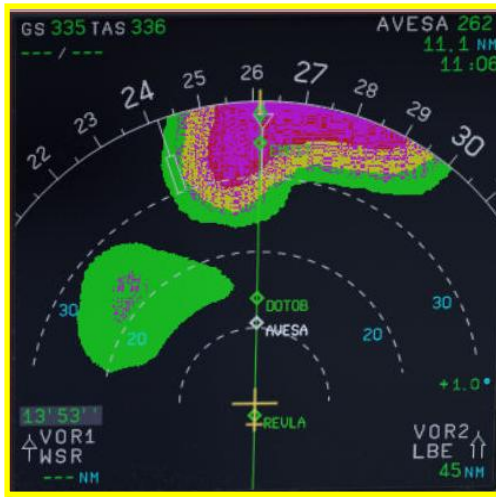
Turbulence is displayed in magenta out to maximal 40 nautical miles for all selected ranges (as in real Airbus). No detecting of clear-air turbulence as only areas of precipitation are evaluated.

WX: Normal WX Radar as it was implemented so far (precipitation targets).

WX+T: Precipitation targets with turbulence information overlaid.

TURB: Only turbulence information without precipitation targets.

MAP: Enables display of all radar echoes including terrain and precipitation information, but the receiver sensitivity for precipitation returns is decreased so that terrain characteristics are pointed out. No turbulence information is displayed.



Picture 13: ND – Navigation Display (Turbulences -magenta -)

2.1.4. ND – Navigation Display (EGPWS - Terrain on ND)



Picture 14: ND – Navigation Display (Takeoff at LOWI 08)

1= Lowest and highest elevation

EGPWS (Enhanced Ground Proximity Warning System) terrain picture

The ND displays the EGPWS terrain picture, when TERR ON ND switch is selected ON and the ND is not in PLAN mode. The terrain picture replaces the weather radar image.

The EGPWS is automatically switched in case of a threat but suppressed if the following conditions are met:






- **Departure:** During first 60 seconds after takeoff (after getting airborne). Therefore the FMA modes for thrust levers (TOGA, FLX, MAN TOGA, MAN MCT) and the SimOnGround flag are taken into account.
- **Approach:** Gear down + (Flaps 3 or 4 (full))
- **Approach:** ILS is tuned and successful received and glideslope and localizer have both a deviation of less than 2 dots
- **GoAround:** During first 60 seconds after GO AROUND. Therefore the FMA modes for thrust levers (TOGA, FLX, MAN TOGA, MAN MCT), flap position and flight status (GA) and the gear handle movement into up position are taken into account.

Lowest and highest elevation

Minimum and maximum elevations encountered with selected range, are respectively displayed in this square using the colors described below.

Terrain Display

The terrain appears in different colors and densities according to its relative height. The reference altitude is projected downward from the actual aircraft altitude to provide a 30 second advanced display of terrain when descending at more than 1000 FPM.

Indication	Description
	High density red: Terrain is at least 2000 ft. above aircraft altitude.
	High density yellow: Terrain is between 1000 ft. and 2000 ft. above aircraft altitude
	Low density green: Terrain is between -250 ft (gear down) or -500 ft (gear up) to 1000 ft above aircraft altitude.
	Medium density green: Terrain is between 250 ft. (gear down) or 500 ft. (gear up) to 1000 ft. below aircraft altitude.
	High density green: Terrain is between 1000 ft. to 2000 ft. below aircraft altitude.

2.1.5. EFIS – Electronic Flight Information System



Picture 15: EFIS – Electronic Flight Information System

- | | |
|--|---|
| 1 = Air Pressure Display
2 = AP (Hg or hPa selector and setting knob)
3 = Flight Director / ILS
4 = Flight Plan Information on ND | 5 = ND mode setting knob
6 = ND range setting knob
7 = ADF / VOR 1 and 2 switch |
|--|---|

2.1.6. FCU – Flight Control Unit



Picture 16: FCU – Flight Control Unit

- | | |
|--|--|
| 1 = Speed (display and setting knob)
2 = Heading (display and setting knob)
3 = Altitude (display and setting knob)
4 = Climb / Descent (display/setting knob)
5 = Autopilot 1 and 2 | 6 = ILS lateral localizer
7 = Auto throttle
8 = Expedite
9 = Approach ILS lateral / vertical localizer
10 = Heading Track / V/S Flight Path switch |
|--|--|

2.1.7. E/WD – Engine- and Warning Display

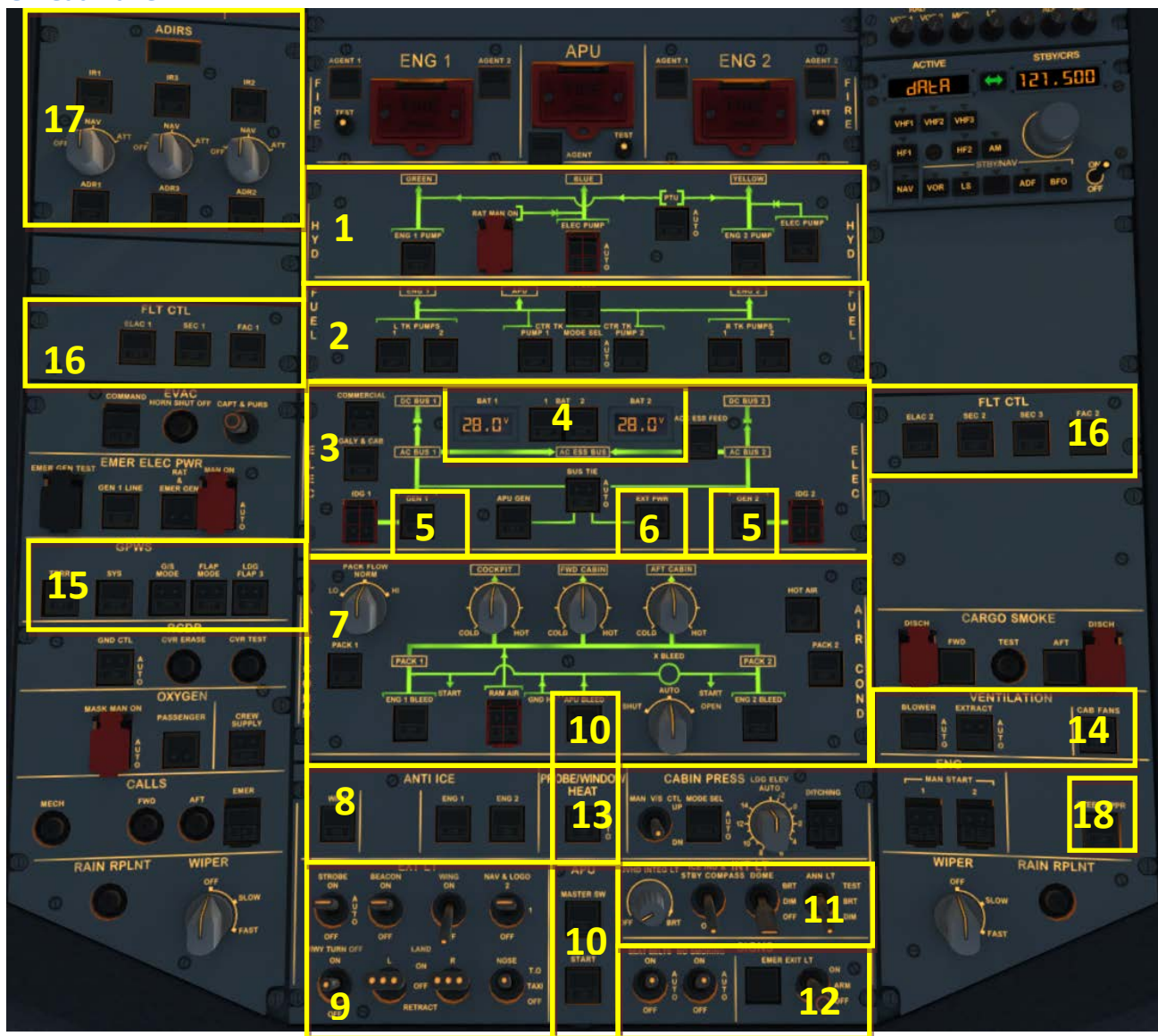


Picture 17: E/WD–Engine Warning Display with IAE resp. plane with CFM Engines

1= Engine Information
2 = FOB = Fuel on board

3= FLAPS Status
4 = Status Information, Takeoff- or Landing-Menu

2.2 Overhead Panel



Picture 18: Overhead Panel (F12)

1 = Hydraulic Panel

2 = Fuel Panel

3 = Electric Panel

4 = Batteries 1 and 2, Voltage

5 = Generators 1 and 2

6 = External Power

7 = Air Condition Panel

8 = Anti-Ice-Panel

9 = External Lights

10 = APU-Master / -Start & -Bleed

11 = Internal Lights (Cockpit – Test)

12 = Signs (No Smoking, Seat B. and Emergency)

13 = Probe Window Heat

14 = Ventilation

15 = GPWS (Ground Proximity Warning System)

16 = Emergency Flight Control System

17 = ADIRS

18 = STEEP APPR. Button (A318 only)

2.3 FMGC - MCDU – Multifunction Control and Display Unit



Picture 19: MCDU (SHIFT+2)

- 1 = Display
- 2 = LSK 1-6L = Line Select Key 1-6 left
- 3 = LSK 1-6R = Line Select Key 1-6 right
- 4 = Scratch pad
- 5 = Page keys
- 6 = Keyboard (numeric)
- 7 = Keyboard (alphabetic)
- 8 = Switch for input via PC keyboard

2.4 ECAM (Electronic Centralized Aircraft Monitoring)



Picture 20: ECAM (F10)

- 1 = ECAM (Electronic Centralized Aircraft Monitoring)
- 2 = Gear
- 3 = MCDU - Multifunction Control and Display Unit – left and right
- 4 = Dimmer for Upper and Lower ECAM Display
- 5 = ECAM Panel
- 6 = CPDLC = Controller Pilot Data Link Communication system

2.5 Pedestal



Picture 21: Pedestal (F11)

- 1 = Radio
- 2 = Audio
- 3 = Cockpit Panel Light
- 4 = Pitch Trim and Thrust Levers
- 5 = Engine Mode and Master
- 6 = Spoiler / Speed Brakes Lever
- 7 = Parking Brakes
- 8 = Flaps Lever
- 9 = Transponder
- 10 = TCAS - Traffic Alert and Collision Avoidance System
- 11 = WXR Panel

3. General Information / Tips:

3.1 Additional Information:

Users who want to get full and accurate information on this very complex product, its systems and function will find a lot of information in the various manuals which you will find in the main FSX-folder under Aerosoft/Airbus A318_A319/Documentation or Aerosoft/Airbus A320_A321/Documentation.

3.2 Pictures:

The following description of the tutorial flight and its steps refers to the previously mentioned pictures and terms so that it is easier to find the knobs, switches and buttons.

3.3 Procedure- and Checklist:

Based on the original Airbus A320 CFM procedure- and checklist, an in content and sequence modified procedure- and check list has been prepared for the Aerosoft Airbus A318/319/320 and 321. These lists are part of and used in this tutorial as well as in the checklist function (please see chapter 4.7 and chapter 5.1 for details).

3.4 Using the Switches and Knobs, and changing values

To switch a button, knob or switch to ON, please use the left mouse button – whereas to switch it to OFF please use the right mouse button. To change a “switch setting” or “values” just use the mouse wheel

- Switch setting: to the right = forward / to the left = backwards
- Value: increase = forward / decrease = backwards

3.5 Saving a certain flight and aircraft state

After installation of SP3 it is now possible to save a complete flight (situation and aircraft state – including all MCDU2 settings) just with one click. Just use the FS-menu function to save the complete flight. It is not necessary anymore to save the aircraft state separately and therefore this MCDU2 menu option has been deleted.

When saving a certain “flight” with “state” and the checklist- / copilot function is set to ON, one checklist must have been completely finished and the next one should be available. This means e.g. you can save a state “ENGINE START” after the “BEFORE PUSHBACK AND START” checklist has been finished. So as a good “point” for saving a flight we recommend are the above mentioned states or BEFORE TAKEOFF, DURING CLIMB, AT CRUISE LEVEL, BEFORE T/D, BEFORE TRANS ALT or BEFORE 10.000 feet (which one ever comes first). But also make sure that a certain FMA state is completely reached e. g. the FMA displays not ALT* anymore but just ALT.

The saved flight can be loaded only from within FSX (not possible from the Free Flight Menu).

After the flight has been completely loaded (takes some time based on your system) just move the thrust levers into the right position. On the INFOBAR the following message p. e. during CLIMB will be displayed:

Set Thrust Levers into CLIMB Position and Wait

This means on the FMA: THR CLB, SPEED or THR IDLE should be displayed after adjusting the thrust levers..

Saved flights can be completely deleted using the FS-option. But this is only valid for those files which are saved in User\Own Documents\Flight Simulator X Files. The MCDU settings file which is automatically saved in User\Own Documents\Aerosoft\Airbus has to be manually deleted.

3.6 Saving flight plans

The Aerosoft Airbus A318/319/320/321 defaults to the realistic company route format e. g. flight plans (except departure runway, SID, arrival runway and STAR / TRANS) can be saved and loaded. After entering the complete flight plan into the MCDU change to MCDU Menu and select a name for that flight plan like LOWILFMN01. The save will be confirmed (folder: C:\User\Your Name\Own Documents\Aerosoft\Airbus\FlightPlans).

If you want to use this flight plan just enter the given name into the scratchpad on the INIT A page and then press LSK1L (CO RTE = Company Route). The other way is (if you do not know the exact name) just enter the departure / destination airport (like LOWI/LFMN with LSK1R) and on the next page all saved company routes for this departure / destination airport are displayed. Using the respective LSK?L you can select the wanted route.

But if you prefer to save your company routes with runways and SID/STAR as well as TRANS use the

- Aerosoft.AirbusX.A318_19.Configurator (FSX Main Folder\Aerosoft\Airbus A318_A319)
- AirbusX.A320_21.Configurator (FSX Main Folder\Aerosoft\Airbus A320_A321)

to make you preferred settings.

3.7 Sound (background)

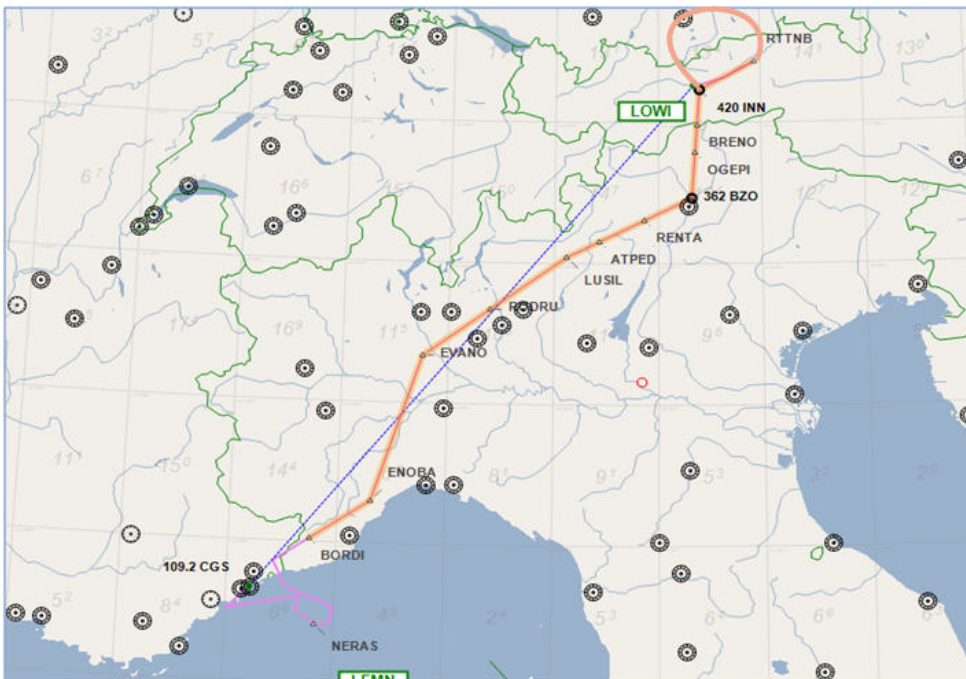
Using the right MCDU pages “MCDU2 MENU” and “SOUND” there are three background sounds available CABIN CREW, FLIGHT CREW and ATC. To use these sounds just click on the respective LSK and the description changes to green = ON.

3.8 Tutorial Flight with Aerosoft A319 CFM:

Even that this tutorial flight is originally written for the A319 it can also be used for flights with other models because the layout of all planes is identical. Only certain data like fuel and payload as well as performance and speed data may vary.

The flight goes from Innsbruck/Austria (ID: LOWI) to Nice/France (ID: LFMN) and the following original flight plan will be used:

LOWI – INN UM726 BZO UM984 EVANO UZ185 BORDI – LFMN



Picture 22: Flightpath Innsbruck (LOWI) to Nice (LFMN)

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It is a “real” one also used by commercial airlines. The terminology of the above flight plan is as follows: We are flying from Innsbruck (LOWI) to the first waypoint INN and then using the airway UM726 until the waypoint BZO. From there we are using the airway UM984 to EVANO and then the airway UZ185 to BORDI. From BORDI we are then flying to NICE (LFMN).

If you want to use such as the aforementioned “real” flight plan for further flights, those plans are available on various websites – e.g. <http://www.edi-gla.co.uk/fpl/search.php>. To find aeronautical charts a very good choice might be also www.skyvector.com.

To reach our first waypoint (INN) from Innsbruck (LOWI) we have to use a SID = RTT2J (Standard Instrument Departure). From all big airports there are such SIDs available depending on the takeoff-runway and first waypoint of the flight plan. The same is valid for our arrival in Nice (LFMN). There are various STARs (Standard Arrival Routes) as well as TRANS (Transitions) from the last STAR waypoint to the Final Approach Point - FAP in case of an ILS, or to the Final Approach Fix - FAF, in case of a Non Precision Approach available. FAP/FAF is the point where the instrument approach begins which is NI122 in this tutorial. The selection of the STAR / TRANS or VIA depends on the last waypoint of the flight plan (BORDI) and the landing runway (STAR = BORD6C and TRANS = NERAS).

How to enter this flightplan into the MCDU is explained in chapter 5.4. There are tools like FS Commander, EFB or PFPX available which you can use to prepare a flightplan and those tools also offer an export function of flightplans to the Aerosoft Airbus A 318/319. But currently only flightplans created with FS Commander and EFB are exported including runways, SID, STAR and TRANS/VIA. Those tools fully support the Aerosoft Airbus A318/319/320/321 flightplan functionality.

4. Flight Preparation:

4.1 Fuel and Payload Planning:

A planner for passengers, cargo and fuel is included in this package. After installation you should find the respective icon on your desktop (the installer will have added a shortcut on your desktop but you can also find the program in your FSX Main Folder under Aerosoft\Airbus_Fallback\Aerosoft.AirbusX.FuelPlanner.exe. Please start the Fuel- and Payload-Planner and it will open in "Simple Mode". The following assumptions are used in "Simple Mode":

- FL: 380
- Taxi time: 20 min
- APU time: 20 min
- Alt dist: 200 nm
- Holding time: 20 min
- Contingency time: 30 min

and no wind or temperature factor. If any of these values differs a considerable amount from your planned flight, then "Advanced Mode" should be used to alter the value. Because we will use for our tutorial flight a FL of 31.000 please change to the "Advanced Mode".

- Set the "UNIT" = **Kg**
- Please select in "Aircraft Type" = **A319**
- Set the passenger load to app. 80 Pax
- Set the cargo load to app. 2.000 kg
- Enter LOWI for "departure" and LFMN for "arrival"

Item	Result	Running Total
Trip Distance	277 nm	2.221 kg
Planned FL	310	2.221 kg
Taxi Time	20 min	2.721 kg
APU Time	20 min	2.764 kg
Alternate Distance	200 nm	4.646 kg
Holding Fuel	20 min	5.612 kg
Contingency Fuel	30 min	6.062 kg
Final Reserve	800 kg	6.862 kg
Wind Speed	0 kts	6.862 kg
Wind Direction	360 deg	6.862 kg
Total Air Temp	0 deg	6.862 kg
Total		6.862 kg

Picture 23: Airbus A318/319/320/321 Fuel Planner (advanced planning mode)

Please check if all of the "Weight" values are shown in "green" e. g. are within the limits for the Airbus.

If "Auto load with aircraft" is ticked and "Generate Loadsheet" is pushed afterwards those settings automatically will be loaded to the A318/319/320 or 321 if the plane itself is loaded in FSX. But if you want to do the loading manually by yourself, then just untick "Autoload with aircraft" and only push "Generate

Loadsheet” (details for this functions please see chapter 4.7). Please also note that there might be small differences between the values the “Fuel- and Payload-Planner” and FSX is stating after loading.

A319:		A320:	
Empty weight	39.725 kg	Empty weight	41.243 kg
Payload	8.921 kg	Payload	8.921 kg
Zero Fuel Weight	48.646 kg	Zero Fuel Weight	50.164 kg
Fuel	6.862 kg	Fuel	7.615 kg
Gross Weight	55.508 kg	Gross Weight	57.779 kg

Picture 24: Total weight settings in Load-Manager

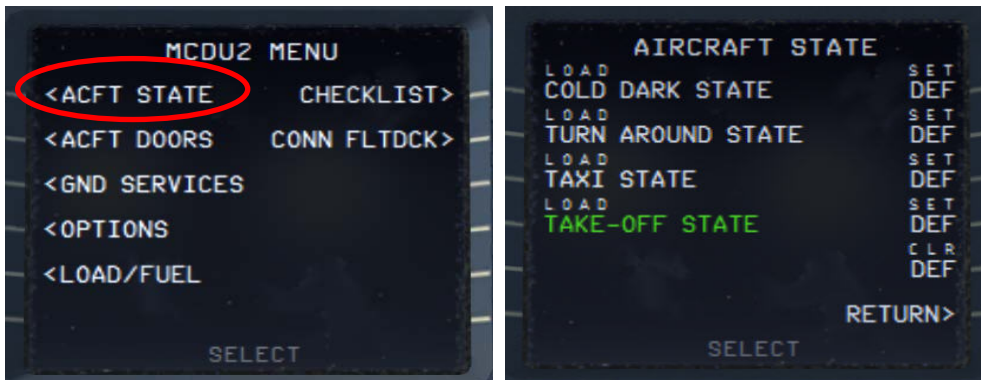
Please use the Aerosoft Airbus A318/319/320/321 Fuel- and Payload Planner only, not FSX to load the aircraft. This is because the method of filling the tanks is different and the Aerosoft Planner is adjusted to Airbus methodology.

4.2 Calculation of Takeoff Performance Data:

For programming the MCDU certain Takeoff Performance Data (ZFWCG, FLEX and THS, V1, VR and V2) are required. In the original Airbus MCDU those data have to be manually entered by the crew during flight preparation (based on various loading- and calculation sheets). In the Aerosoft Airbus A318/319/320/321 this data is automatically calculated by the MCDU and displayed in the respective fields. Please note that V1, VR and V2 can only be calculated after the takeoff flaps setting is entered into the MCDU.

If you want to use a more “sophisticated” way you have to calculate and manually enter those values yourself. There are various tools available to calculate the takeoff performance data. One is the easy to use freeware tool called TPC written by Roland Wukovits.

4.3 MCDU 2 MENU - ACFT STATE – Aircraft State Menu



Picture 25: Aircraft State Menu

To use the CHECKLIST and the COPILOT function it is necessary to load one of the menu – states. You access this menu via the MCDU 2 Main Menu by selecting ACFT STATE. Please load **COLD DARK STATE** and the aircraft is configured as you would find it on the first flight of the day, all systems are off.

After setting the aircraft to “COLD DARK STATE” also the screen for the MCDU 2 is dark (because of no power). To power the plane up (as well as the MCDU 2 screen):

- Overhead Panel [F12] switch both batteries to ON section 4 (chapter 2.2)
- Overhead Panel [F12] switch External Power to ON section 6 (chapter 2.2)

To power up the various screens (PFD, ND, upper and lower ECAM) please switch on the respective panel lights (Glareshield #8 and ECAM #4) as well as if necessary the “night” illumination using Pedestal #3.

It is possible every time an Aerosoft Airbus A318/319/320/321 is loaded that it is loaded already in a certain state e.g. if you want the plane always to be loaded as COLD DARK, please use the option DEF (LSK 1R). If the option is selected DEF will be marked in “green” (please see the picture above). To deselect the option just press LSK 5 R.

If you are loading the TAXI or TAKEOFF states please be aware that the engines are already running with a little bit of thrust i.e. app. 19-22 N1. This might be enough to make the plane already moving slowly. To program the MCDU when TAXI or TAKEOFF is selected, therefore in those states the parking brakes are set. Also using these aircraft states please first program the MCDU and set the Checklist- and Copilot function afterwards to ON.

After Installation of SP3 it is not possible anymore to save / load a defined “USER STATE” (please see chapter 3.5).

4.4 ACFT DORS – Aircraft Doors Menu

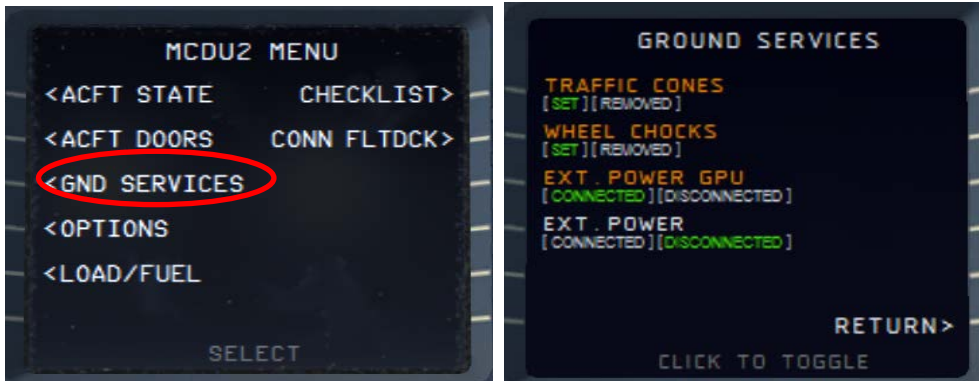


Picture 26: Aircraft Doors Menu

You access this menu via the MCDU 2 Main Menu by selecting ACFT DOORS. The DOORS option allows you to open the doors and cargo hatches. If a door is open the specific door is marked in “red” and the situation highlighted in “green”. To close / open a door just click on the specific LSK (line select key) in our case to close the FRONT LEFT door just use LSK 1 L. Check if the FRONT LEFT door is at least opened (should be opened automatically if you previously loaded the ACFT STATE “COLD DARK”). If you wish you can open the other doors.

Closing left side passenger doors as well as cargo doors are blocked when pax boarding and cargo loading (MCDU2 LOAD/FUEL menu) is ongoing. Doors can be closed only if pax boarding and cargo loading (MCDU2 LOAD/FUEL menu – PAX/FREIGHT/FUEL = are green).

4.5 GROUND SERVICES – Ground Services Menu



Picture 27: Ground Services

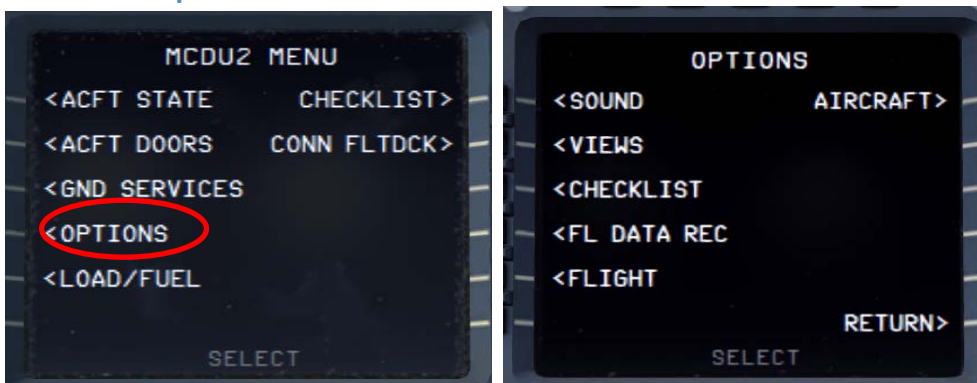
You access the menu via the MCDU 2 Main Menu by selecting GROUND SERVICES. The menu is available only if the Wheel Chocks are SET or if the Parking Brake is ON (e. g. the aircraft now can park without Parking Brakes set to ON).

The various options are only available if the following conditions are met:

- CHOCKS: Parking Brake is set to ON
- CONES: Only if CHOCKS are SET
- EXT POWER: Parking Brake is ON or Chocks are SET

The Ground Services menu allows you to select various options. If an option is used the specific option is marked in “orange” and the situation highlighted in “green”. To select an option just click on the specific LSK (line select key) in our case to disconnect the EXT POWER GPU just use LSK 3 L. Check if the EXTERNAL POWER GPU is at least available (should be available if you previously loaded the ACFT STATE “COLD DARK”). You may select the other options as you wish.

4.6 OPTIONS – Options Menu



Picture 28: Options Menu

4.6.1 OPTIONS - SOUND



Picture 29: Sounds Configuration Menu

CABIN CREW

Background sounds by the purser like "Captain, all passengers are on board and the cabin is secured"

FLIGHT CREW

Background sounds by the flight crew like browsing in manuals, sneezing etc.

ATC

Background sounds from Air Traffic Controllers – instructions to other planes. There are 5 different channels integrated (Ground, Tower, Departure, Center and Approach) playing according to the flight status.

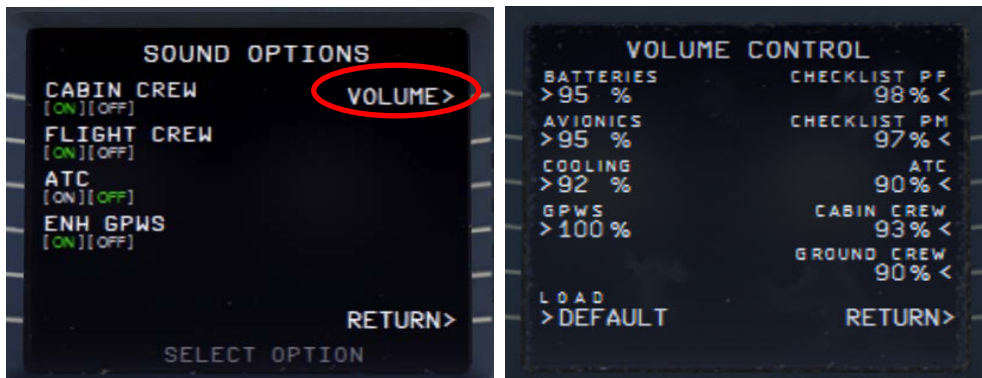
Those options can be selected by clicking on the relevant left "LSK - Line Selection Key". The relevant situation (ON or OFF) is highlighted in "green".

ENH GPWS – Enhanced Ground Proximity Warning System

If "ENH GPWS" is switched to ON the following sounds – callouts will be played:

- "2500"
- "1000"
- "500"
- "300"
- "70"
- "60"
- "10"
- "5"
- "RETARD" – on autoland = at 10 ft RA (sequence "20" "RETARD" "5") and on manual landing at 20 ft RA (sequence "RETARD" "10" "5")
- "100 Above" (100 feet above DH)

VOLUME



Picture 30: Volume Configuration Menu

Various sound volumes can be adjusted as required. Just enter the required value into the scratchpad and push the appropriate LSK. To set all values back to the original values please use “DEFAULT”.

4.6.2 OPTIONS - VIEWS



Picture 31: View Configuration Menu

VIEW SYSTEM

The VIEW OPTION can be completely disabled so that there are no interferences for users who use TrackIR and EZDOC.

PANEL BAR

There is also a Panelbar (can be customized using the right MCDU – MCDU MENU – OPTIONS - VIEWS) integrated in this version of Airbus A318/319/320/321. Those options can be selected by clicking on the second left “LSK - Line Selection Key”. If selected the ON respectively OFF is highlighted in “green”.

There are two different types of panel views available: The VC- and the 2D-mode and each with day and night views (nights views are automatically used depending on FSX “current time” setting).

VIEW MODE = VC (Virtual Cockpit Views)

16 views with pictures (day and night versions)



Picture 32: VC Panel Bar (day and night version)

The VC-mode bar can be closed or opened again clicking on the “grey” triangle left and right on the bar. The views 11 to 17 can be accessed using the mouse wheel. To access the ADIRS view just select the Overhead view and then use the right mouse button.

VIEW MODE = 2D (Two Dimensional Cockpit Views)

11 views with pictures (day and night versions)





Picture 33: 2D Panel Bar (day and night version)

The 2D-mode bar can be closed or opened again by clicking on the “grey” triangle on the left of the bar. The views 8 to 12 can be accessed using the mouse wheel. To access the upper overhead panel and ADIRS view just select the overhead view and then use the right mouse button.

POSITION (VERTICAL or HORIZONTAL)

The bar can be either displayed horizontal or vertical on the left upper corner of the screen.



VERTICAL

Picture 34: Vertical Panel Bar



HORIZONTAL

Picture 35: Horizontal Panel Bar

WINGVIEW BAR

The bar can be either displayed horizontal or vertical on the right upper corner of the screen. There are in total 10 different views available (1 to 6 please see below). The views 7 to 10 can be accessed by going with the mouse to the respective view then using the mouse wheel and clicking on it.



Picture 36: Wing View Bar

The bar can be closed or opened again by clicking on the “grey” triangle left and right on the bar.

4.6.3 OPTIONS - CHECKLIST



Picture 37: Checklists Configuration Menu

CHECKLIST

Also an automatic checklist (with sound) is included in this Airbus A318/319/320/321 version. This option can be selected by clicking on the first left “LSK - Line Selection Key”. If selected ON respectively OFF is highlighted in “green”. The detailed checklist items you will find in chapter 5.2. etc. (marked in “green”).

But before setting the status to ON an original Aerosoft Airbus A318/319/320/321 panel or a user state should be loaded, so that the system starts with right equivalent checklist state. In our case this should already have been done e. g. the aircraft is already set to “COLD DARK”.

The checklists are connected to the used aircraft state e. g. if the “Taxi State” is chosen (MCDU MENU – ACFT STATE) then after setting picture 4 LSK1L to “ON” the systems starts with the “Taxiing Checklist”. This is also valid for saved user states if those are saved after a checklist has been finished.

If a checklist item is constantly repeated it means that the Airbus item setting is not correct and cannot be handled by the copilot (if this function is used). Then please correct the settings manually and the checklist sequence will automatically be continued.

For our tutorial flight we will use the CHECKLIST function so please set it to ON (= green)

COPILOT

If the automatic checklist function is set to ON a copilot function (handling all actions performed by the PM – PILOT MONITORING) becomes available. This option can be selected by clicking on the first right “LSK - Line Selection Key”. If selected ON respectively OFF is highlighted in “green”. It also can be switched ON and OFF using “2” from the keyboard – but not if the ACFT DOORS MENU page is active.

There are 2 different possibilities / combinations possible to use the “Checklist” and “Copilot” option or just the “Checklist” option only.

- If only “Checklist” is chosen then the duties of the copilot have to be handled manually by the user. In this case the Copilot just reads the checklist items and waits until the correct settings are made - before passing on to the next item. If settings are not made or are not correct the item is constantly repeated. Certain items can also be skipped by using the SKIP ITEM function (see chapter 4.8).
- If the combination is chosen then the “Copilot” works timely aligned with the checklist i.e. performs his duties when the task should be done according to the checklist. Only certain items have to be handled manually by the user (in the checklist marked in “red”).

The detailed tasks performed by the Copilot you will find in chapter 5.2. etc. (marked in “yellow”).

For our tutorial flight we will use the COPILOT function so please set it to ON (= green).

<p style="text-align: center;">Aerosoft Airbus A318/319/320/321</p>	<p style="text-align: center;">The Airbus A318/319/320/321 in FSX Step-By-Step Tutorial</p>	<p style="text-align: center;">Vol 6</p>	<p style="text-align: right;">06-01-09 Page 33 25 October 2015</p>
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In case you want to use the Checklist- and Copilot function with TAXI and TAKEOFF states then please first program the MCDU and set the Checklist- and Copilot function afterwards to ON.

INFOBAR

If "CHECKLIST" is set to ON this option becomes available. And if "INFOBAR" is activated on top of the screen an info bar is displayed. This bar displays (based on the complete procedure list according to chapter 5.) the next manually to be set action.

MCDU: START CHECKLIST OR USE KEY '1'

Picture 38: Info bar

This information appears after you loaded the ACFT STATE "COLD DARK" and the checklist- as well as the copilot function has been set to ON. "MCDU: START CHECKLIST OR USE KEY '1' means you can start the "Cockpit Preparation Checklist" by clicking on the specific checklist in the menu or just press [1] on your PC-keyboard.

In such cases the content of the infobar also contains a hint which keypad key alternatively can be used to start the relevant checklist.

- Start "COCKPIT PREPARATION CL" using "1"
- Start "ENGINE START WITH PUSHBACK CL" using "1"
- Start "ENGINE START CL" using "2"

As we will use the CHECKLIST and COPILOT function for our tutorial flight you should set the INFOBAR to ON (= green).

HOTKEY

For certain selections or commands of the checklist- and copilot function we use the "1" and "2" from the keyboard. E.g. you can start the "Cockpit Preparation" checklist just using "1" instead of starting it from the right MCDU. But for certain other programs this might be a problem because those keys are already used for other function. If you are running such programs like EZDOC then please set the function to OFF. In this case if you want to start a checklist you always have to start it from the checklist menu.

AES/GSX PUSH

AES or GSX are separate programs and are not included in the Aerosoft Airbus package e. g. they have to be bought separately. If those programs are not installed then set the option to NO.

The Aerosoft Airbus A318/319/320/321 does not automatically detect an airport where AES can be used. If the AES / GSX pushback function should be used it is necessary to set this function to YES. Then during pushback the conversation between PF (pilot flying) and Ground is aligned, the AES / GSX pushback function will be used as well as the checklist and copilot function to start the engines.

If only the AES / GSX clearance procedure but no pushback shall be used, leave this function to NO. Then after the AES / GSX procedure has been finished the checklist "ENGINE START [2]" has to be used and started.

APP SPEED LIMITER – (only available if COPILOT is set to ON)

If selected the copilot checks the speed limit of 250 knots (below 10.000 feet) and if this limit is exceeded, the copilot automatically (using the speed brakes) reduces the speed to 250 knots. This function works without any calls and in "Managed" as well as in "Selected" speed mode.

250 Knots LIMITER

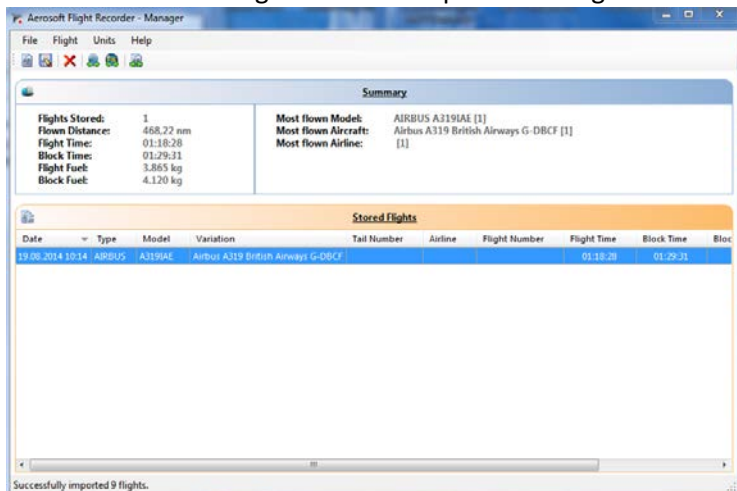
If selected the copilot checks the speed limit of 250 knots (below 10.000 feet) and if this limit is exceeded, the copilot gives a warning. No action is taken automatically.

4.6.4 OPTIONS – FLIGHT DATA RECORDER

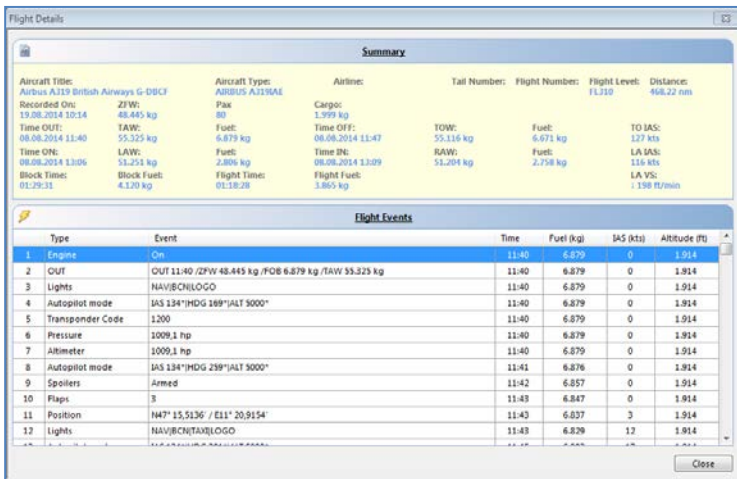


Picture 39: Flight Data Recorder

Using this menu it is possible to switch ON and OFF the Flight Data Recorder e. g. if set to ON the flight data will be automatically “recorded”. To see this recorded data please open the AS-Flightrecorder. The system is saved in the FSX Main Folder under Aerosoft \ Flight Recorder \ AS-FlightRecorderManager.exe. After starting the recorder the following main screen opens showing all saved flight records.



Picture 40: Flight Data Recorder Menu



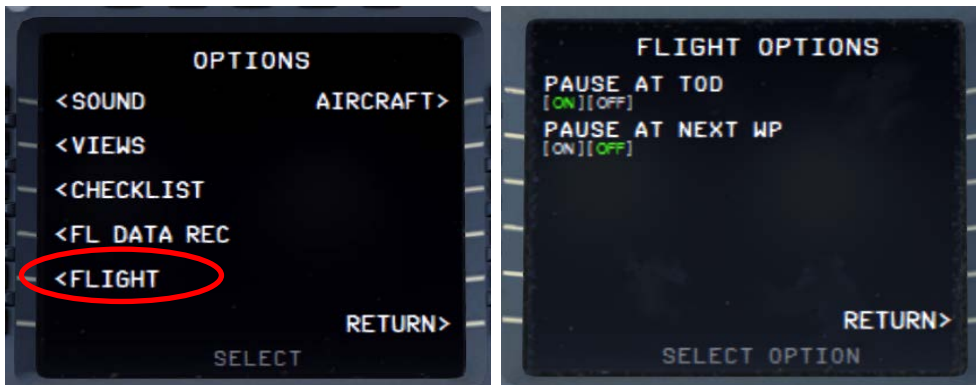
Picture 41: Flight Data Recorder – Details –

More details on the Flight Data Recorder (DFDR) you will find in the documentation Volume 4 “Systems” section “Indicating / Recording systems” e.g. that the data can also be exported to GOOGLE EARTH (result please see below)



Picture 42: Flight Data Recorder – Result in Google Earth –

4.6.5 OPTIONS – FLIGHT



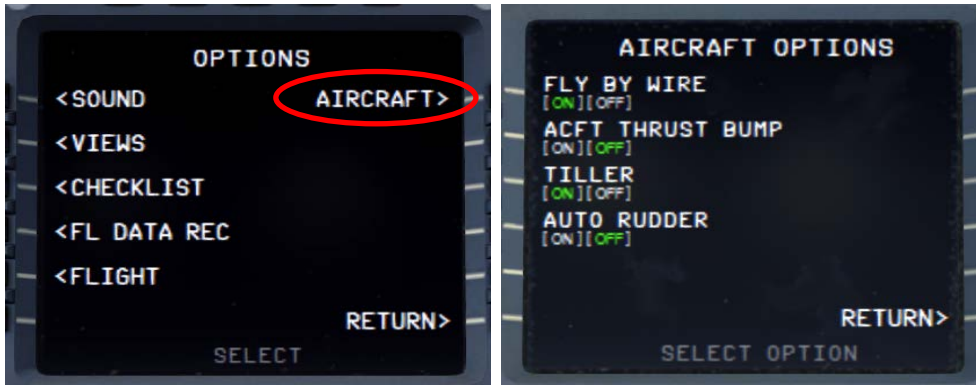
Picture 43: Flight Options

PAUSE AT

Using this menu it is possible to switch ON and OFF 2 different options to pause the FSX during a flight

- PAUSE AT T/D (app. 20 miles before T/D so that the DESCENT PREPARATION checklist can be completed before the descent really starts). FMA mode must be ALT CRZ or ALT CSTR
- At next waypoint

4.6.6 OPTIONS – AIRCRAFT



Picture 44: Aircraft Options

FLY BY WIRE

Using this menu option it is possible to switch ON and OFF the “FLY BY WIRE” function – OFF maybe necessary for certain video recordings.

ACFT THRUST BUMP

This menu option (set to ON) enables an "unrealistic feature" where users can get additional thrust for takeoff p. e. for “high” airports, at hot temperatures or short runways.

TILLER

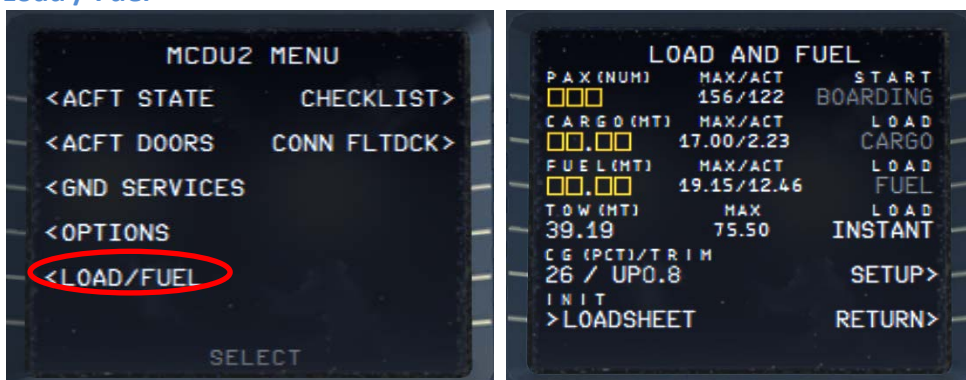
The Tiller option allows you to de-activate the use of a standard Throttle 3 axis to control the tiller. On some machines this axis is not available or already in use then set this option to OFF.

AUTO RUDDER

Setting Auto rudder in your FSX settings to ON you also need to set this in the right MCDU to ON. It disables the Airbus A318/319/320/321 fly by wire function on the ground. This makes steering the Airbus A318/319/320/321 on the ground possible without using rudder pedals or a joystick with a rudder.

If this function here is set to ON then there will be no “rudder check” during the “After Engine Start” checklist.

4.7 Load / Fuel



Picture 45: Load/Fuel Options

Conditions to use these functions (except LOAD INSTANT) are:

- All Load Requests: Engines = off and parking brakes or chocks are set
- Pax boarding: Front or aft door is open
- Cargo: Both cargo doors are open

Init Loadsheet

Please push LSK6L and the data from the Fuelplanner Loadsheet (see chapter 4.1 for details) are automatically loaded into the menu – **but not into the plane** (details you will find in the following paragraph “Load Process”). But it is also possible to enter the data for PAX, CARGO and FUEL manually (within the limits according to the model used –) please see table below:

		A318	A319	A320	A321
Max. Passengers (Standard)	No.	107	124	150	186
Max. Passengers (Special)	No.	132	156	180	220
Max. Cargo Weight	KG	17.00	17.00	17.00	17.00
Max. Fuel Weight	KG	19.15	19.15	19.15	19.15
Empty Weight	KG	39.50	40.80	41.24	46.85
Max. TOW	KG	68.00	75.50	77.40	89.00

If using the special seat configuration the pax weight should be adjusted accordingly. The defined weight per passenger can be changed (SETUP = LSK5R) only in case of manual input – modifications are saved for future flights. If the Fuelplanner Loadsheet data are used the weight is fixed with 84 kg/pax.

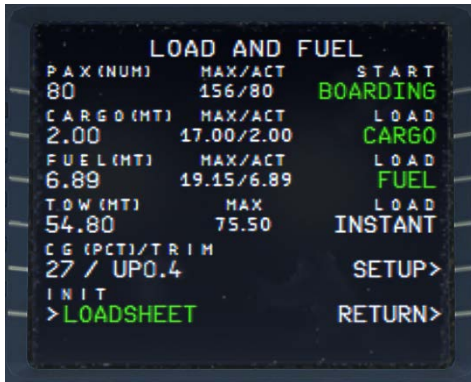


Picture 46: Load/Fuel Menu after INIT LOADSHEET

Load Process

If the loading process can be started the respective item is marked in “orange”. There are two ways to load pax, cargo and fuel to the plane. INSTANT = Just push LSK4R and pax, cargo and fuel are immediately loaded whereas using LSK1-3R the loading process takes some time like in the real world. The loading progress can be checked by looking at the ACT values. During the loading process the respective items are flashing in “green” and if loading is completed the flashing stops.

Using the TAXI or TAKEOFF aircraft state it is only possible to use LOAD INSTANT (if the parking brakes are set). But for the 319 IAE also using LOAD INSTANT it is not possible to “load” fuel (due to FF custom fuel flow simulation) if engines are running.



Picture 47: Load/Fuel Menu after loading completed

4.8 Checklist

The following Checklist Menu can be accessed via **right** MCDU – MCDU2 MENU.



Picture 48: Checklists Menu (page A)

This menu shows all available checklists and contains the following function:

- The COCKPIT PREP checklist should be started (if blinking in orange) by clicking on the respective line selection key = LSK3L. If it is marked in green (as on the picture above) it means it is already active.
- Additionally a solution to skip a checklist item (if the copilot is not used) has been implemented (MCDU CHECKLIST PAGE A LSK2L). The “white” message “SKIP ITEM” appears in future if there is a user action necessary. If you do not know what to do or how to handle the item and you want to skip this checklist item please just press LSK2L and the checklist jumps to the next item. But this facility is not available during the APPROACH CL for flaps setting as well as during the complete FINAL CL because it would make no sense.
- Normally a call = checklist item is repeated various times until the right settings are made by the user. But for “Barometric Check”, “Go-around-Altitude” and “Landing Memo” the call is repeated just three times and then the checklist automatically jumps to the next item.
- The blinking “info line” at the bottom of the screen shows what has to be done next and is identical with the text of the info-bar (please see chapter 4.6.3 for details).
- In such cases e. g. the checklist has to be started from the MCDU MENU – CHECKLIST the content of the info-bar also contains a hint which keypad key alternatively can be used to start the relevant checklist.
 - Start "COCKPIT PREPARATION CL" using "1"
 - Start "ENGINE START WITH PUSHBACK CL" using "1"
 - Start "ENGINE START CL" using "2"
- The checklist menu has two pages (A and B). To toggle between the two pages just push the MCDU arrow buttons showing left or right.

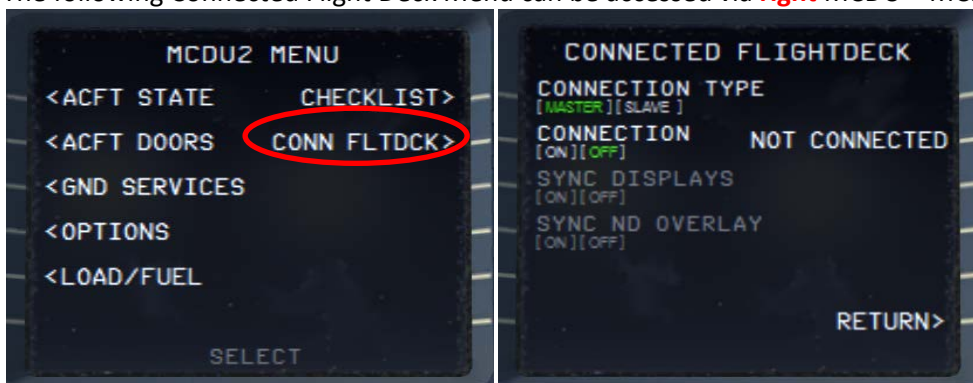
The following checklists are available and linked to the chosen Aerosoft standard ACFT STATE e. g. not to any saved user state.

- Cockpit Preparation
- Before Start
- Start with Pushback - or Start (w/O pushback)
- After Start
- Taxiing
- Before Takeoff
- Takeoff
- After Takeoff
- Climb
- Cruise
- Descent Preparation
- Descent
- Approach
- Final Landing
- After Landing
- Parking

The detailed content of the checklists you will find in chapter 5.1 etc. (marked in “green”).

4.9 Connected Flight Deck

The following Connected Flight Deck Menu can be accessed via **right** MCDU – MCDU2 MENU.



Picture 49: Connected Flight Deck Menu

The feature will make it possible for to people to connect to each other and act as Captain and FO’s (Or PF and PM). Details to this feature you will find in Vol 1 in chapter “Connected Flight Deck”.

CONNECTION TYPE

For the CFD to work, one of the users must be a master and the other a slave. This connection type must be selected before turning connection on. The master has to start to initiate the connection and only there after the slave can initiate his.

CONNECTION

Turning on will initiate connection, after turning on, turning it off have no effect.

SYNC DISPLAYS

With this option it is possible to synchronize the displays (ND range/mode etc and partially synchronized altimeters) but with certain limitations.

SYNC ND OVERLAYS

With this option it is possible to synchronize terrain on ND and the weather radar panel, but not to synchronize the weather itself.

4.10 Voice packs for PF and PM

For the checklists there are various voice packs for the Pilot Flying as well as the Pilot Monitoring available (Standard, British, French, German and US). Those voice packs you want to use for your flight can be selected

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using the Aerosoft Airbus A318/319/320/321 Configurator. More information on this you will find in the Vol1 InFSX document.

4.11 Saving all MCDU 2 settings

All in the MCDU2 made settings (except the use of the CHECKLIST- and the COPILOT-function) are saved e. g. next time an Aerosoft Airbus A318/319/320/321 is loaded again you will start with all the settings from the previous flight.

4.12 RAAS – Runway Awareness and Advisory System

Please see Vol 1 – InFSX EN (page 8) for details on this system. To adjust the RAAS settings with your FSX scenery settings we recommend using Peter Dawson “MakeRwys.exe”.

5. Tutorial Flight / Checklist and Procedures:

5.1 Basic Information - Setup

This tutorial flight describes all the phases of a flight from Innsbruck to Nice, from the “COLD DARK” situation in Innsbruck to the landing at Nice, parking and securing the aircraft.

During the tutorial flight we are using the Aerosoft A318/319/320/321 procedure- and checklist which is based on an original from Airbus. This list consists of a “running number” to identify the action to be performed and in which panel, sub-panel the necessary knobs, switches and buttons can be found. The various panels available and their terms are explained in chapter 2. If additional explanations for the actions are necessary the row is marked in light yellow and the explanations can be found below the respective procedure- and checklist using the “running number” as a reference.

Again using this tutorial the cockpit should be “COLD DARK”. After switching the batteries 1 +2 to ON it should look like in Picture 76. If there are still some lights ON switch off all those lights on the Overhead Panel. Another option (which is necessary to use the Checklist- and Copilot function) is to load the plane and then go to the right MCDU view, MCDU MENU / ACFT STATE and select “COLD DARK” state.

After setting the aircraft to “COLD DARK” also the screen for the MCDU 2 is dark (because of no power). To power the plane up (as well as the MCDU 2 screen):

- Overhead Panel [F12] switch both batteries to ON section 4 (chapter 2.2)
- Overhead Panel [F12] switch External Power to ON section 6 (chapter 2.2)

To power up the various screen (PFD, ND, upper and lower ECAM) please switch on the respective panel lights (Glareshield #8 and ECAM #4) as well as if necessary the “night” illumination using Pedestal #3.

Also the “CHECKLIST” and “COPILOT” function should already have been set to ON (=green). Please see chapter 4.7. Also certain “limiters” (for approach speed and 250 knots) are included in the copilot (PM) function please see chapter 4.6 for details.

The different colors used in the following lists symbolize and explain the function:

Detailed description available – please see below -						
				Not supported by “Checklist” or “Copilot” function		
Starting Conditions for Checklist				Starting Conditions for Checklist		
1	Checklist	– Check only		Checklist item	Copilot (announcement./ check)	Ground announcement
2	Checklist / Copilot	– Action done by Copilot -		Checklist item	Copilot (action)	CoP (if option “Copilot” is selected)
3	Checklist / Copilot	- Action to be done “manually” -		Checklist item	User (action) - necessary	
4	Checklist / Copilot	- Action to be done “manually” -		Checklist item	User (action)	

Now start this tutorial with the “Basic Preparation Procedure” as described in chapter 5.2.

5.2 Basic Preparation Procedure (aircraft in COLD DARK state)

BASIC PREPARATION PROCEDURE							
NO.	PANEL			ACTION			REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)		
1	FUEL PLANNER	ADV. METH.		PAX-, CARGO- and FUEL LOAD	SET and GEN. LOADSHEET		Please see chapter 4.1 for details
2	MCDU R	MAIN MENU	ACFT STATE	COLD DARK = LSKL1	PUSH		Should already been done
3	OVERHEAD	ELEC	3	BAT 1 + 2 (Batteries)	ON (BOTH)		Should already been done
4	OVERHEAD	ELEC	3	EXT POWER	ON		
5	OVERHEAD	EXT. LIGHTS	9	EXT. LIGHTS (= Nav Lights)	ON		
6	MAIN PANEL	PFD LIGHT	8	SWITCH	ON		
7	MAIN PANEL	ND LIGHT	8	SWITCH	ON		
8	ECAM	ECAM LIGHTS	4	SWITCH UPPER and LOWER	ON		
9	PEDESTAL	INT. LIGHT	3	OVHD INTEG LT	ON		
10	MCDU R	OPTIONS	SOUND	Cabin & Flight Crew, ATC	[ON] or [OFF]		As required – Color switches to green
11	MCDU R	OPTIONS	VIEWS	Panel & Wing View Bars and others	[ON] or [OFF]		As required – Color switches to green

12	MCDU R	OPTIONS	CHECKLISTS	CHECKL and COPILOT	ON (BOTH)		
13	MCDU R	OPTIONS	CHECKLISTS	INFOBAR	ON		
14	MCDU R	OPTIONS	CHECKLISTS	Various LIMITERS (APP & 250 KNOTS) & ILS	[ON] or [OFF]		As required – Color switches to green
15	MCDU R	OPTIONS	CHECKLISTS	AES	[ON] or [OFF]		As required – Color switches to green
16	MCDU R	LOAD/FUEL		INIT LOADSHEET or manually enter data			
16	MCDU R	LOAD/FUEL		LOAD TO PLANE			LOAD INSTANT or separately

9. **Cockpit Lights:** Because sometimes the panels are quite dark – depending on the position of the sun – please switch the cockpit light to BRT.
16. **Load to Plane:** Conditions to use these functions (except LOAD INSTANT) are:
- All Load Requests: Engines = off and parking brakes or chocks are set
 - Pax boarding: Front or aft door is open
 - Cargo: Both cargo doors are open
- For details please see chapter 4.7

5.3 Cockpit Preparation

COCKPIT PREPARATION							
NO.	PANEL			ACTION			REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	TA	
17	MCDU	MAIN MENU	CHECKLIST	A = PUSH LSK3L	PUSH		Start Checklist / Co-Pilot - if selected
18	OVERHEAD	ELEC	3	BAT 1 + 2 (Batteries)	CHECK ON (BOTH)	Cop	
19	OVERHEAD	ELEC	6	EXT PWR (External Power)	ON	CoP	(if available – see MCDU MENU / DOORS)
20	OVERHEAD	EXT. LIGHTS	9	NAV. LIGHTS	CHECK ON	CoP	
21	PEDESTAL	ENG	5	ENG MASTER 1 + 2	CHECK OFF	CoP	TA
22	PEDESTAL	ENG	5	ENG MODE SEL	CHECK NORM	CoP	TA
23	ECAM	LAND GEAR	2	LANDING GEAR LEVER	CHECK DOWN	CoP	
24	PEDESTAL	P. BRAKE	7	PARKING BRAKE	CHECKED = OFF	CoP	TA
25	PEDESTAL	FLAPS	8	FLAPS LEVER	CHECK POSITION = 0	CoP	
26	PEDESTAL	SP. BRAKE	6	SPEED BREAK LEVER	CHECK RETR. / DISARMED	CoP	
27	PEDESTAL	THR LEVER	4	THRUST LEVERS	CHECK IDLE		TA
28	PEDESTAL	RADIO	1	TRANSPONDER MODE	CHECKED STANDBY		
29	PEDESTAL	RADIO	1	RADIO CONTROL PANEL	ON	CoP	
30	ECAM	ECAM	5	ECAM RECALL (RCL) BUTTON	PRESS	CoP	TA
31	MAIN PANEL	ANTI SKID	10	ANTI SKID	CHECK ON	CoP	TA
32	MAIN PANEL	EFIS	3	FLIGHT DIRECTOR	CHECK ON	CoP	
33	OVERHEAD	SIGNS	12	EMERGENCY LIGHTS	ARM	CoP	TA
34	OVERHEAD	SIGNS	12	NO SMOKING SIGNS	ON	CoP	TA
35	OVERHEAD	SIGNS	8	WING & ENGINE ANTI ICE	CHECK OFF	Cop	
36	OVERHEAD	PR.WI. HEAT	13	PROBE WINDOW HEAT	AUTO/OFF		
37	OVERHEAD	AIR COND.	7	HOTAIR, ENG. BLEED L+R, PACKS L+R	CHECK ON	Cop	TA (no white signs)
38	OVERHEAD	VENTILATION	14	BLOWER, EXTRACT, CAB. FANS	CHECK ON		TA (no white signs – INOP not animated)
39	OVERHEAD	ELECTRIC	5	ENG. GENERATOR L+R	CHECK ON = FAULT	Cop	
40	OVERHEAD	ELETRIC	5	APU GENERATOR	CHECK ON		(only if EXT. POWER is ON)
41	OVERHEAD	FUEL	2	ALL FUEL PUMPS	PRESS	CoP	TA OFF should disappear
42	OVERHEAD	FUEL	2	ALL FUEL PUMPS = ON	CHECK		
43	OVERHEAD	HYDRAULICS	1	ACCU BREAK PRESS: ELEC. PUMP	(ON)		See explanation
44	OVERHEAD	GPWS	15	GPWS: ALL SWITCHES	CHECK ON	Cop	(no white signs)
45	OVERHEAD	EFCS	16	EFCS: ALL SWITCHES	CHECK ON	Cop	(no white signs)
46	OVERHEAD	ADIRS	17	ADIRS (3x)	ON	CoP	TA
47	COCKPIT	EM.EQUIPMENT		ALL EQUIPEMT AVAILABLE AND OK	CHECK ON		Checklist complete
48	PEDESTAL	RADIO	1	SET FREQUENCIES	SET		If ATC is used
49	PEDESTAL	RADIO	1	ATC CLEARANCE	OBTAIN		If ATC is used

In the Cockpit Preparation CL after a Turnaround only the “blue” marked actions / procedures (TA) are used.

17. **Start Checklist:** Alternatively you can also use “1” from the keyboard to start the checklist.
41. **Fuel Pumps:** If **no** external power is used – in our tutorial we use external power # 19 - even after switching the fuel pumps to ON the warning FAULT will remain, because they are not yet running. FAULT will automatically disappear when the engines are running up. All “white” lights should be extinguished.
43. **HYDR. PUMPS:** Only if accumulator pressure is below 500 PSI. The indication of the brake pressure normally remains at zero.

46. **ADIRS:** All three switches have to be set to NAV
48. **RADIO – SET FREQUENCIES** – As the ATIS frequency for Innsbruck is 126.020 set the VHF1 frequency in STBY/CRS to 126.025 (using the mouse wheel you can select on the outside knob the figures from 118. to 136. and with the inside knob between .000 and .975). Then press on the green arrow to switch the previously entered value from STBY into ACTIVE. After a short period you will hear the ATIS information (weather, winds, pressure and runways in use etc.). After all necessary information has been obtained press the switch again.

AES The loaded “COLD DARK” aircraft state is with parking brakes = OFF and chocks = SET (parking brakes are normally OFF to cool down the brakes). AES since version 2.26 recognizes “chocks = SET” and does not require “parking brakes = ON” anymore. Open the AES window (CTRL+SHIFT+W) or GSX (CTRL+F12) In AES just select the option “F5 – Request Boarding now” or in GSX “ 4 – Request Boarding”.

5.4 FMGS / MCDU – Data Insertion

Always use the following sequence for the data insertion into the MCDU: INIT A page, F-PLN, RAD NAV, INIT B page, PERF = IFRIP.

COCKPIT PREPARATION – FMGS/MCDU DATA INSERTION						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
50	MCDU	INIT 1		DEP and DEST AIRPORT	ENTER	LOWI/LFMN
51	MCDU	INIT 1		ALIGN IRS	PRESS	
52	MCDU	INIT 1		FLT NBR (Flight Number)	ENTER	Par example =LH319
53	MCDU	INIT 1		COST INDEX	ENTER	30
54	MCDU	INIT 1		CRZ FL (Cruise Flight Level)	ENTER	=310 (31.000 feet)
55	MCDU	F-PLAN		FLIGHTPLAN	ENTER	
56	MCDU	RAD NAV		ENTER ADF1 FREQUENCY	ENTER	RTT
57	MCDU	INIT 2		BLOCK	ENTER	6.8
58	MCDU	INIT 2		ZFWCG/ZFW	CHECK	25.0/49.5 – speeds and altitude are calculated
59	MCDU	PERF-TO		FLAPS / THS	ENTER	2/
60	MCDU	PERF-TO		FLEX TO TEMP	CHECK	
61	MCDU	PERF-TO		V1, VR and V2	CHECK	89/120/124
62	MCDU	PERF-CLIMB		DATA	CHECK	
63	MCDU	PERF-CZR		DATA	CHECK	
64	MCDU	PERF-DES/APPR		DATA	CHECK	
65	MCDU	PERF-GO ARD		DATA	CHECK	

Open the MCDU. If the data or menu page is displayed; use the INIT button so that page INIT A opens (INIT B only can be opened if the engines are not running). The data input can either be done using the scratchpad or the PC keyboard. To use the PC keyboard please just “left” click on the grey field beside ‘1’ on the scratchpad. The change will be confirmed “KEYBOARD INPUT ON”. To change back to the MCDU scratchpad “right” click on the same spot again.

50. **FROM/TO:** Enter **LOWI/LFMN** into the scratchpad and then press LSK1R. You will see that another page automatically opens displaying the available company routes (LOWILFMN01). As we want to get acquainted entering a flightplan ourselves we will not use this function. So just press the respective LSK for RETURN.
- XX. **ALTN:** Enter LFML as an alternative airport for Nice.
51. **ALIGN IRS:** Please press LSK 3R to start the IRS (Inertial Reference System). Aligning the IRS will take 6 minutes and the status is displayed on the E/WD in the status section. If the IRS is aligned the PFD and ND change to the standard view.
- XX. **CO RTE – ALT/CO RTE:** Leave CO RTE empty and ALT/CO RTE with NONE because we will currently not use this function e. g. to use a predefined flight plan from Nice to an alternative airport for it. Please see chapter 7.1and 7.2 for details on this function.
52. **FLT NBR:** Please enter the flight number using the MCDU keyboard – in our case DLH319 (for Lufthansa)

– into the scratchpad and then use LSK 3L to cut and paste the data into the field FLT NBR.

53. **COST INDEX:** The Cost Index determines the speed used for climb, cruise and descent if managed speed is used. Please enter using the MCDU keyboard a value of 30 and then use LSK 5L to cut and past the value into the field COST INDEX. The cost index for fuel and maintenance of 30 is a low time cost and medium fuel cost value (please see table below).

Table 2. A319/A321 cost index
(kg/min)

TIME COST (US\$/min) FUEL COST (US\$/USG)	LOW	MEDIUM	HIGH
	< 10	10 < to < 15	> 15
LOW < 0.7	40	60	80
MEDIUM 0.7 < < 0.9	30	45	60
HIGH > 0.9	25	40	50

Picture 50: Table Cost Index

54. **CRZ FL:** In our case it is 31.000 feet (so enter 310) and the outside temperature for this flight level then automatically will be calculated = -47 degrees.
55. **F-PLAN:** We will use the flight plan as explained in chapter 3.9 (LOWI – INN UM726 BZO UM984 EVANO UZ185 BORDI – LFMN). Please use the F-PLAN button of the left MCDU to change to the F-PLAN page.
- Push LSK1L (next to LOWI)
 - Push LSK1L (next to DEPARTURE)
 - Select takeoff runway: In our case we will use 08
 - Select SID = RTT2J by browsing (use the button with arrow showing up) and then push the respective LSK L)
 - Insert SID into temporary flightplan = LSK6R
 - Browse (using the button with arrow showing up) to RTT and push the respective LSK L next to RTT
 - Enter INN into the scratchpad and push the respective LSK 3R next to NEXT WPT
 - Select INN = LSK1L
 - Browse (using the button with arrow showing up or down) to INN and push the respective LSK L next to INN
 - Select AIRWAYS = LSK5R
 - Enter UM726 into the scratchpad and push LSK1L
 - Enter BZO into the scratchpad and push LSK1R
 - Enter UM984 into the scratchpad and push LSK2L
 - Enter EVANO into the scratchpad and push LSK2R
 - Enter UZ185 into the scratchpad and push LSK3L
 - Enter BORDI into the scratchpad and push LSK3R
 - Insert flightplan into temporary flightplan = LSK6R
 - Browse (using the button with the arrow showing up) until you see BORDI and F-PLAN-DISCONTINUITY
 - Push the CLR button – CLR will appear on the scratchpad
 - Push the respective LSK L to F-PLAN DISCONTINUITY
 - Confirm the “yellow” TMPY page (showing the new changed F-PLAN) with INSERT (LSK6R)
 - Select LFMN = Push LSK6L
 - Select ARRIVAL = Push LSK1R
 - Select landing runway: In our case we will use ILS04L. Browse (using the button with arrow showing up) to ILS04L
 - Select STAR = BORD6C by browsing (use the button with arrow showing up) and push the respective LSK L)
 - Select VIA (LSK2L) = NERAS (LSK4L)
 - Enter STAR into temporary flightplan = LSK6L
 - Enter Temporary Flightplan = LSK6R
 - Browse (use the button with arrow showing up) and look lines showing F-PLAN-DISCONTINUITY
 - If there are one, push the button CLR on the scratchpad and then the LSK L beside F-PLAN-DISCONTINUITY

The complete flightplan then should look approximately as follows (speed and flight level are the actual flight values):

NO.	ID	NAME	VIA	DIST. (NM) to next WP	Actual SPEED	Actual ALT. (FT)	CSTR
1	LOWI08	INNSBRUCK	C079°	5	124	1.900	
2	INTCPT		C066°	2	250	5.700	
3	AB	ABSAMS	RTT2J	4	250	7.600	
4	(LIM)			1	250	10.000	
5	DOEJ		RTT2J	6	250	10.800	+4.800 feet
6	OEJ07		RTT2J	4	294	13.500	+6.700 feet
7	9500		RTT2J	5	294	17.300	+9.500 feet
8	RTT	RATTENBURG	RTT2J	25	294	17.300	
9	INN	INNSBRUCK	UM726	15	294	31.000	
10	T/C		UM726	0	294	31.000	
11	BRENO	BRENNER	UM726	12	294	31.000	
12	OGEPI		UM726	20	294	31.000	
13	BZO	BOLZANO	UM726	21	294	31.000	
14	RENTA		UM984	20	294	31.000	
15	ATPED		UM984	15	294	31.000	
16	LUSIL		UM984	38	294	31.000	
17	RODRU		UM984	33	294	31.000	
18	EVANO		UM984	65	294	31.000	
19	ENOBA		UZ185	21	294	31.000	
20	T/D		UZ185	8	294	31.000	
21	BORDI		BORDI237°	17	294	28.800	
22	NIZ/09		C143°	12	294	21.500	
23	MIKRU		BORD6C	21	294	16.600	
24	PIRAM		BORD6C	1	250	9.100	
25	INTCPT		C112°	7	250	8.800	
26	AZR35		35AZR	4	250	6.200	
27	NERAS		NERAS	4	250	4.000	4.000 feet
28	AZR26		NERAS	2	250	4.000	
29	INTCPT		C298°	35	250	4.000	
30	(DECEL)			3	200	4.000	
31	NIZ27		27NIZ	4	179	4.000	200 knots
32	NI17		C043°	5	179	4.000	
33	NI122		NERAS	4	179	4.000	4.000 feet
34	NI77			3	141	2.500	2.500 feet
35	NI51			5	134	1.600	1.600 feet
36	LFMN04L					0	
Total :				448 NM			

Picture 51: Detailed Flight Plan LOWI – LFMN

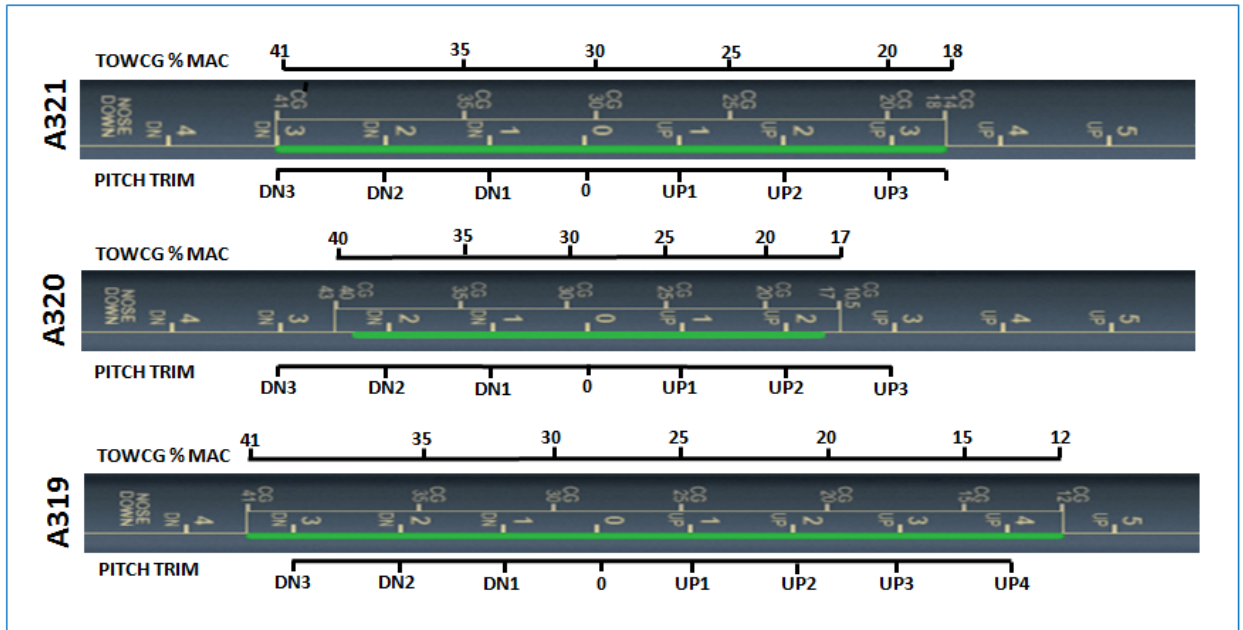
Waypoints like 4 (LIM), 10 (T/C), 20 (T/D), 25 (INTCPT) and 30 (DECEL) are at this stage not yet calculated by the MCDU – will be inserted automatically after the MCDU programming is complete.

The waypoints after #36 LFMN04L are automatically inserted because in case of “landing abort” those are the next waypoints you should head to and to await new instructions by the ATC.

The flight plan itself i.e. departure airport LOWI, complete route and arrival airport LFMN (but except departure runway, SID, STAR/TRANS and arrival runway) is already previously saved as a company route. You can load it using the MCDU and the INIT A page entering into the scratchpad LOWILFMN01 and then using LSK1L. Please note that the loading will take some time because the whole navigation DB has to be searched for the respective data. If you use this option then after loading just add departure runway, SID, arrival runway and STAR/TRANS.

- 56. **RAD NAV:** Optional and not necessary because we are using “Managed Mode” for our flight: Enter RTT into the scratchpad and then press LSK5L. To activate ADF please go to the 2.1.5 EFIS CONTROL PANEL #7 and set the left switch to ADF.
- XX. **INIT PAGE B or 2:** Please press INIT and then use the button with the arrow showing right to change to the INIT page 2 (INIT page 2 or B only can be opened if the engines are not running)
- 57. **BLOCK:** Please enter 6.8 in the scratchpad and then press LSK 2R
- 58. **ZFWCG/ZFW:** ZFWCG and ZFW are automatically calculated and displayed. If you want to change the first value ZFWCG all you have to do is enter the new value and press the appropriate line select key, to overwrite the leftmost value. The relation / calculation between TOW, Centre of Gravity in % of the MAC (mean aerodynamic chord) and THS are content of the Load- and Fuelplanner (Advanced Mode).
- XX. **PERF PAGE:** Please change to the Performance Page by pressing the respective button on the MCDU.

59. **FLAPS/THS** = Trimmable Horizontal Stabilizer: Please see below a picture showing the relation between CG and THS.



Picture 52: CG (centre of gravity)/ THS

Make the necessary load- and fuel-calculations using the Fuelplanner. For our flight this would be a value of 28 TOW %MAC (also content of the LOADSHEET) and a proposed trim of UP0.1.

As in our case we will use FLAPS 2 for the takeoff please enter "2/UP0.1" into the scratchpad and then press LSK 3R so that the value is cut and pasted into the field FLAPS/THS (if the proposed THS value is 0.0 then please enter /UP0.0). But please remember the input of those values does not mean that at the same time the real flaps- and trim setting are automatically made (only in case the Copilot- function is set to ON). Otherwise you have to set the flaps position and trim manually. The exact trimming value is displayed on the lower ECAM F/CTL page = PITCH TRIM.

60. **FLEX TO:** The value is automatically calculated and displayed based on the selected flaps setting for takeoff. If you want to change the value, just overwrite the content of this field. Because we will use Flaps 2 and the runway at LOWI is quite short no value for FLEX takeoff is automatically calculated e. g. MAN TOGA is proposed.
- XX. **ENG OUT ACC:** We leave the engine out / acceleration altitude as proposed by the MCDU (Ground level plus 1500 = 3407 Feet).
61. **V1, V2 and VR:** The values are automatically calculated and displayed. If you want to change those values, just overwrite the content of the fields. Please note that those various speeds are only calculated after FLAPS are entered (#57)
- XX. **TRANS ALT:** The transition altitude for Innsbruck is 11000 feet - so manually enter this value.
- XX. **THR RED / ACC:** We leave the thrust reduction / acceleration altitude as proposed by the MCDU (Ground level plus 1500 Feet).
- XX. **Performance Pages:** Please also check the other PERF pages (CLB, CRZ, DES and APPR) by using LSK6R or LSK6L. Make sure all parameters are OK. Especially the Cost Index should be checked, which determines the speed used for climb, cruise and descent if managed speed is used

5.5 Cockpit Preparation – Part 2

COCKPIT PREPARATION – Part 2							
NO.	PANEL			ACTION		REMARK	
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)		
66	EFIS	FD / ILS	3	Button: LS	OFF		
67	EFIS	ND MOD/RGE	5 & 6	ND mode and range	SET	Mode: ARC / Range 10	
68	EFIS	ADF/VOR	7	VOR / ADF select	AS REQUIRED		

69	FCU	ALTITUDE	3	First Altitude	SET TO 12.000 Feet	>than THR RED altitude
70	FCU	FCU	1 to 4	DASH-BALL-DASH-BALL-ALT-BALL-DASH	CHECK	
71	ECAM	ECAM	1	STATUS	CHECK	
72	PEDESTAL	RADIO	1	ATC - FREQUENCY	SET	If ATC is used
73	PEDESTAL	RADIO	1	ATC CLEARANCE	OBTAIN	If ATC is used
74	GLARESHIELD	ND-DISPL	2	IRS ALIGN	CHECK	
75	MCDU	F-PLAN		F-PLAN PAGE	SET	

67. **ND mode and range:** Set ND mode during takeoff to ARC and range to 10.
69. **First Altitude:** On the FCU (Flight Control Unit) – Altitude – using the respective knob please set the 1st to be reached altitude at 12.000 Feet. This value has to be in any case higher than the Thrust Acceleration Altitude (in our example 3407 Feet). If this is the case then a ball appears to the right of the altitude entered which means that the aircraft will fly in “managed mode” until this altitude is reached. **Please confirm the entry by pushing the knob.** Then it is “confirmed” and can be seen as a “blue” value on top of the “Altitude Indicator” on the PFD.
If you forgot to enter a “First Altitude” or if you started with the TAXI or TAKEOFF aircraft state the copilot (if used) automatically sets the first altitude to 7.000 feet during TAXI or before TAKEOFF.
70. **FCU-Mode:** Push FCU SPD and HDG knob so that the displays show SPD=“----●” HDG=“----●” ALT=12000●” and “-----” e.g. SPD and HDG are in “managed mode”
- AES** Open the AES (CTRL+SHIFT+W) or GSX window (CTRL + F12). In AES select the option “F6 – Prepare for Departure” and then select the option “F1 – Yes, I need Pushback please, prepare now, wait for start request” In GSX select: “4 – Prepare for Pushback and Departure”.

5.6 Before Pushback and Start

BEFORE PUSHBACK OR START							
NO.	PANEL			ACTION			REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)		
76	MCDUw	MAIN MENU	ACFT DOORS	CLOSE ALL DOORS	PUSH		Start Checklist / Co-Pilot - if selected
77	MCDU R	MAIN MENU	ACFT DOORS	ALL WINDOWS AND DOORS CLOSED	CHECK	CoP	
78	OVERHEAD	APU	10	APU MASTER and START	ON	CoP	START= available 10 sec after MASTER
79	OVERHEAD	APU	10	APU BLEED = ON	ON	CoP	
80	MCDU	ELEC	6	EXT PWR	OFF	CoP	
81	OVERHEAD	SIGNS	12	SEAT BELT SIGNS / NO SMOKING = ON	ON	CoP	For Seat Belts also AUTO is OK
82	PEDESTAL	THR LEVER	4	LEVERS	CHECK IDLE		
83	PEDESTAL	P. BRAKE	7	PARKING BRAKE	SET to ON	CoP	FSX: CTRL + . (period)
84	MCDU2	MAIN MENU	GND SERV.	TRAFFIC CONES	REMOVE	CoP	
85	MCDU2	MAIN MENU	GND SERV.	WHEEL CHOCKS	REMOVE	CoP	
86	EFIS	AP SETTING	2	BARO REF	SET / X CHECK (Read out)	CoP	
87	OVERHEAD	EXT. LIGHTS	9	BEACON	ON	CoP	Checklist complete

76. **DOORS / START CL:** Closing left side passenger doors as well as cargo doors are blocked when pax boarding and cargo loading (MCDU2 LOAD/FUEL MENU) is ongoing. Checklist only starts if pax boarding and cargo loading (MCDU2 LOAD/FUEL MENU) is completed = are green.
83. **PARKING BRAKE:** The parking brakes were OFF when the “COLD DARK” aircraft state was loaded. Now they are set to ON.
84. **TRAFFIC CONES:** Are automatically removed without call.
85. **WHEEL CHOCKS:** Are automatically removed without call
86. **BARO REF:** As we are flying with “Fair Weather” it means that in Innsbruck there will be no surface winds and for takeoff the runway 08 is in use. The air pressure currently is 1013 hPa and we have a temperature of 15 degrees C. As this is the “standard value” nothing has to done. If the air pressure is different the Copilot will automatically set the right value.

5.7 Engine Start

- AES:** Open the AES window (CTRL+SHIFT+W) or GSX (CTRL+F12). In AES select the option “F2 – Start Pushback now – Nose to Right” or in GSX = 1 – Nose right / Tail left.
During pushback you can start the engines according to #97 - #101. The settings will be confirmed by

the Pilot and the Copilot. When pushback has been finished set parking brake to ON and proceed with chapter 5.9 .

If no pushback is required then please use the respective AES / GSX function and set the checklist AES / GSX PUSH function (please see 4.6.3) to NO. After AES / GSX has finished its procedure continue and select the “Engine Start w/o Pushback” checklist and start it (5.7.2.). The reason is that AES / GSX are closed programs and we cannot get any information when to start the Engine Start checklist if there is no “moving” aircraft.

Engines can either be started during or after pushback (if necessary). Therefore also 2 different checklists are available in the MCDU MENU – Checklists. Please select the one you want to use by clicking on the respective LSK.

5.7.1 Engine Start with Pushback

ENGINE START – with pushback						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
88	MCDU	MAIN MENU	CHECKLIST	SELECT: “START WITH PUSH” = LSK5L		Starts next Checklist / Co-Pilot - if selected
89	MCDU right			SELECT TAXIWAY DIST and PB DIRECTION	SET	
90	MCDU right			START PUSHBACK	START	
91				„Flight Deck to Ground“		GROUND: „Go ahead“
92				„We have ATC clearance“		GROUND: „Roger“
93				„Confirm ground equipment = clear“		GROUND: “Clear”
94				“Starting pushback“		GROUND: “Roger”
95	PEDESTAL	P. BRAKE	7	PARKING BRAKE = OFF	SET to OFF	FSX: . (period)
96						GROUND: “OK. Starting Pushback”
97	PEDESTAL	ENGINE	5	ENG MODE SEL	IGN START	
98	PEDESTAL	ENGINE	5	MASTER SW 2	ON	
99	MAIN PANEL	E/WD	5a	No. 2 RUNNING UP	CHECK	
100	PEDESTAL	ENGINE	5	MASTER SW 1	ON	Engine 2 N1 > 20%
101	MAIN PANEL	E/WD	5a	No. 1 RUNNING UP	CHECK	
102				When in Position: Stop Pushback	STOP (SHIFT + P)	
103						GROUND: „Pushback complete“
104	PEDESTAL	P. BRAKE	7	PARKING BRAKE	ON	FSX: CRTL +.(period)
105						GROUND: “Have a good flight” – CL complete

89. **Taxiway Distance and Pushback Direction:** After the checklist has been started automatically the following right MCDU menu opens



Picture 53: Pushback Gauge

Please set the distance to the taxiway (using LSK 3L or LSK 4L) as well as the pushback direction (using LSK 3R or LSK 4R) in our case (S Parking 8 in LOWI) = 9 m and 90 degrees left. To set the correct value you also can use the mouse scroll wheel.

The feature uses the FSX basic pushback function and is it a little bit "enhanced". The FSX function consists of a time part "straight" and the turn part. The minimum time FSX uses / needs for "straight" is app. 7-9m (based on aircraft model used) e. g. time is converted into distance. Additionally to that the distance for the turn itself comes on top - a medium value for a 90° turn is app. 50m. But this distance varies based on angle used and size of the plane e. g. for the A318 it is much smaller than for the A321. But if needed you can always stop the pushback by using SHIFT+P.

- 90. **Start Pushback:** Push "START" (LSK 6R) and the pushback starts..... There is no need to stop the pushback – it automatically will stop when the previously set position is reached.
- 93. **Parking Brakes:** Do not touch the parking brakes earlier than asked by the ground service crew! Only then release the brakes.
- 98. **Engine Start:** After setting the Engine Mode Selector to IGN START as well setting the Engine Master Switch to ON, you can check on the EWD that the FADEC (Full Authority Digital Engine Control) have turned on because the amber information is replaced by active displays.
CFM engines spool up to around N2 24% and then light up and produce an EGT rise. Normally this takes some 15 sec max. But if IAE engines are installed it takes another 15 sec before the engine lights up because IAE implemented an 30 sec "blow through" / dry crank sequence to get rid of any remaining fuel/oil before starting the actual engine start sequence.
- 99. **Engine stabilized:** The set limits are
- 101. **CFM:** N1: 18.5 % N2: 64.0% and EGT: 350°C
IAE: EPR 1.010, N1: 21.0%, N2: 57.0% and EGT: 410°C
- 102. **Stop Pushback:** To stop the pushback it is not necessary to do anything. The pushback will stop and the defined position (see settings # 89). If needed you can always stop pushback by using SHIFT+P.

5.7.2 Engine Start without Pushback

ENGINE START						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
106	MCDU	MAIN MENU	CHECKLIST	SELECT: "START" = LSK6L		Starts next Checklist / Co-Pilot - if selected
107				„Flight Deck to Ground“		GROUND: „Go ahead“
108				„We have ATC clearance“		GROUND: „Roger“
109				„Confirm ground equipment = clear“		GROUND: "Clear"
110				„Starting engines“		GROUND: „Roger“
111	PEDESTAL	ENGINE	5	ENG MODE SEL	IGN START	
112	PEDESTAL	ENGINE	5	MASTER SW 2	ON	
113	MAIN PANEL	E/W/D	5a	No. 2 RUNNING UP	CHECK	
114	PEDESTAL	ENGINE	5	MASTER SW 1	ON	Engine 2 N1 > 20%
115	MAIN PANEL	E/W/D	5a	No. 1 RUNNING UP	CHECK	
116				"Both Engines running"		GROUND: „Roger“
117						GROUND: "Have a good flight" – CL complete

- 112. **Engine Start:** After setting the Engine Mode Selector to IGN START you can check on the EWD that the FADEC (Full Authority Digital Engine Control) have turned on. The amber crosses will disappear when setting the Engine Mode Selector to IGN/START. Only the N1 and N2 will have amber crosses now which will disappear when you select the Engine Master to one.
CFM engines spool up to around N" 22% and then light up and produce an EGT rise. But if IAE engines are installed observe the EGT after 30 sec. because IAE implemented an 30 sec "blow through" / dry crank sequence to get rid of any remaining fuel/oil before starting the actual engine start sequence.

5.8 After Engine Start

AFTER ENGINE START			
NO.	PANEL	ACTION	REMARK

	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
118				ENGINE 1 & 2 are running for 15 sec		Start Checklist / Co-Pilot - if selected
119	PEDESTAL	ENGINE	5	ENG MODE SEL	NORM	CoP
120	OVERHEAD	APU	10	APU BLEED	OFF	CoP
121	OVERHEAD	APU	10	APU MASTER SW	OFF	CoP
122	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS	ARM	CoP
123	PEDESTAL	RUDDER	4	RUDDER TRIM	SET to 0 degree	CoP
124	PEDESTAL	PITCH	4	PITCH TRIM	SET to THS Value	
125				AILERON, ELEVATOR and RUDDER	CHECK ALL 6 POSITIONS	
126	PEDESTAL	FLAPS	8	FLAPS	SET to 2	CoP
127	OVERHEAD	ANTI-ICE	8	ENG ANTI ICE (1 & 2)	ON / OFF	
128	OVERHEAD	ANTI-ICE	8	WING ANTI ICE	ON / OFF	
129	ECAM	ECAM	1	ECAM STATUS	CHECK	
130	ECAM	ECAM	1	ECAM DOOR PAGE	CHECK	CoP
131				HAND SIGNAL RECEIVED		Checklist complete

- 122. **GRD SPOILERS:** In order to be able to arm the spoilers without extending them, please move the thrs slightly out of idle. The problem is that FSX uses Boeing style spoilers, which extend when armed and the thrust levers are in idle position. **Another option is to click on the spoiler arm using the right mouse button.**
- 124. **PITCH TRIM:** Copilot sets value according to the THS value (MCDU – PERF page)
- 125. **FLIGHT CONTROLS:** Turn the sidestick to all positions e. g. FULL LEFT, FULL RIGHT, NEUTRAL, FULL UP, FULL DOWN, NEUTRAL, RUDDER FULL LEFT and RUDDER FULL RIGHT (only if “AUTORUDDER” i. e. the option in the right MCDU – FLIGHT OPTIONS is not set to ON). Each required position / check is mentioned in the INFOBAR and the various checks are orally confirmed.
- 129. **ECAM STATUS:** If the CLR button is ON it is necessary previously to confirm a “warning message”.

5.9 TAXI

TAXI						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
132	PEDESTAL	RADIO	1	TAXI CLEARENCE	OBTAINED	If ATC is used
133	PEDESTAL	P. BRAKE	7	PARKING BRAKE	OFF	FSX: . (period)
134				GS> 10 Knots		Start Checklist / Co-Pilot - if selected
135	OVERHEAD	EXT. LIGHTS	9	NOSE LIGHT	TAXI	CoP
136	PEDESTAL	THR LEVER	4	LEVERS	AS REQUIRED	
137				PRESS BRAKES to listen for PM CALL	PRESS PEDAL / RELEASE	
138	MAIN PANEL	AUTO BRAKE	6	SET TO	MAX	CoP
139	MCDU			TAKEOFF DATA	REVIEW	CoP
140	FCU	HDG / ALT	2 & 3	FCU HDG/ALT = DASH-BALL-DASH-BALL	SET or CHECK	If ALT NOT SET CoP sets it to 7000ft
141				ALL DISPLAYS ARE ON	CHECK	
142	ECAM	PANEL	5	TO CONFIG	PRESS	CoP
143	MAIN PANEL	E/WD	5a	TO MEMO	CHECK NO BLUE	CoP
144	PEDESTAL	WXR	11	SET system to 1 (ON) and knob to WX-T	SET	CoP
145	EFIS	FD / ILS	3	FD	CHECK ON	
146	PEDESTAL	TRANSPOND.	9	ATC CODE	CONFIRM / SET	If ATC is used

- 136. **THRUST LEVERS:** Set thrust levers to the manual range. Around 35 % N1 (EWD) should be enough to start the aircraft moving. Then set the thrust levers back to ZERO. Taxiing should be operated at 20 knots, with 10 knots during turns. If you are getting too fast just use the brakes to reduce speed.
- 137. **BRAKES:** Just use the brakes for a moment.
- 139. **Takeoff Data:** Check data (– V1 – VR – V2 – Flaps – Flex Temperature – Destination Fuel on Board –) which are available on the PERF TAKEOFF as well FUEL PRED page.
- 140. **Altitude:** The FCU ALT target value will be entered by the copilot in visible steps (with sound) and also considering the 100 and 1000 switch.
- 142. **ECAM PANEL – TO CONFIG:** Just push the button on the ECAM panel.
- 144. **WXR:** Set the main switch to 1 (ON) and the WXR knob to WX-T. More information you will find in chapter 2.1.3.

5.10 Before Takeoff

BEFORE TAKEOFF						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
147				INFORMATION TO CABIN CREW		"Please prepare for Takeoff"
148	OVERHEAD	EXT. LIGHTS	9	TAXI TO RUNWAY HOLDING POINT		Start Checklist / Co-Pilot please see below
149	ECAM	WHEEL PAGE	1	BRAKE TEMP = below 150	CHECK	Cop set Brake Fans On if Brake Temp >150
150	MAIN PANEL	BRAKE FAN	11	BRAKE FANS	OFF	Cop
151	PEDESTAL	ENGINE	5	ENG MODE SEL = NORMAL	CHECK	
152	PEDESTAL	TCAS	10	TCAS TA/RA plus TILT ABOVE	SET	CoP
153	OVERHEAD	EXT. LIGHTS	9	EXT. LIGHTS	SET	CoP Strobes, Land. and Nose Lights
154				PF SLIDING TABLE	STOWED	Cop Checklist complete
155	PEDESTAL	WXR	11	TILT: UP and select 4 degrees up	SET	
156	MAIN PANEL	N/SKID NW	10	A/SKID & NW STRG	CHECK = ON	
157	PEDESTAL	RADIO	1	TAKEOFF / LINE UP CLEAR	OBTAIN	If ATC is used
158	PEDESTAL	RADIO	1	ATC (if no AUTO position)	ON	If ATC is used

148. **Start Before Takeoff CL:** After the TAXI CL has been finished a message on the INFOBAR will pop up displaying the options to manually start the checklist.
- You can start the CL manually using the MCDU 2 CHECKLIST menu option
 - Just use "1" on the keyboard
- For several reasons the automatic start of this checklist has been removed completely.
149. **Brake Temperature:** BRAKE TOO HOT: Values changed to 150/100°. Before Takeoff CL also accepts brake temperature of >150° and proceeds if brake fans are ON.
152. **TCAS:** Use the ring of the knob to set the mode to TA/RA. But below 1000 ft the ND will display TA ONLY.
153. **Ext. Lights:** STROBE=ON – BEACON=ON – WING=OFF – NAV&LOGO=2 – RWY TURN OFF=ON – LAND=ON – NOSE = TO. If light is OFF the copilot sets the switch to ON.
157. **Approach Path Clear:** Look left and right and assure that the runway is clear. Then enter the runway 08 for takeoff.

5.11 Takeoff (Part 1)

TAKEOFF – Part 1						
NO	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
158	PEDESTAL	THR LEVER	4	SET LEVERS TO	MAN TOGA	
159	GLARESHIELD	CHRONO	7	CHRONO	START	CoP Push upper right button

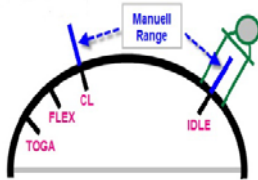
158. **Takeoff:**



Picture 54: ND - On the runway – ready for TAKEOFF

At this time the IRS are now automatically aligned with the GPS position and the aircraft should be displayed on the ND at the beginning of runway 08 (please see picture above).

If cleared for takeoff push the thrust levers to 60 – 70 % N1 (EWD) and monitor the EWD to make sure thrust is available. If everything is OK, you can push the thrust levers to the TOGA detent (you will hear three clicks) and it will be confirmed on the FMA. You can also use the FLEX detent (if the runway is not short or not wet). But for this flight based on the short runway at LOWI we decide to use MAN TOGA thrust takeoff.



Picture 55: Thrust Lever Positions

159. **Start Chronometer:** If takeoff thrust has been set (>50% N1) the copilot automatically starts the chronometer (time is displayed in the lower left corner of the ND).

5.12 Takeoff Abort

ABORT TAKEOFF						
PANEL			ACTION		REMARK	
TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)		
PEDESTAL	THR LEVER	6	THRUST LEVERS	IDLE	FSX: F1	
PEDESTAL	THR LEVER	6	REV	MAX	FSX: F2 (hold some time)	
PEDESTAL	THR LEVER	6	REV	OFF	At 70 knots = FSX: 1	
MAIN PANEL	BRAKES	6	AUTOBRAKES	OFF	At 35 knots	
PEDESTAL	FLAPS	10	FLAPS	UP	>12 knots	
PEDESTAL	SPEED-BR.	8	GRD SPOILERS	DISARM	>12 knots	
OVERHEAD	EXT. LIGHTS	9	STROBES	OFF	>12 knots	
OVERHEAD	EXT. LIGHTS	9	LANDING LIGHTS	OFF	>12 knots	
PEDESTAL	TCAS	10	TCAS	STANBY	>12 knots	
PEDESTAL	FLAPS	10	FLAPS	TO POSITION		
PEDESTAL	SPEED-BR.	8	GRD SPOILERS	ARM		
Please follow procedure again from # 132						

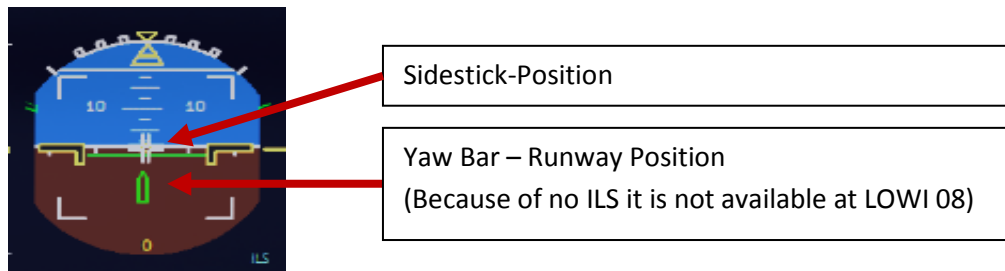
If it is necessary to abort takeoff please just draw the thrust levers back to IDLE and set the reversers to MAX (by using F2 from the keyboard).

Currently there is no special CL after "Takeoff Abort". In such cases please load the TAXI STATE (chapter 4.3 of this manual) and start from there.

5.13 Takeoff (Part 2)

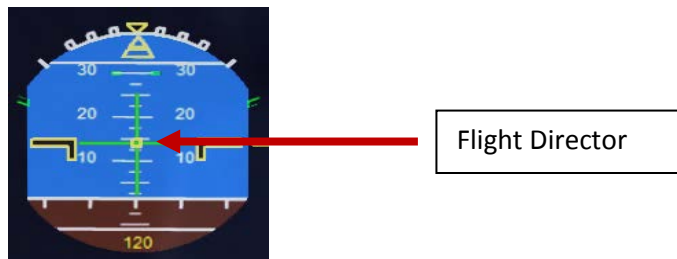
TAKEOFF – Part 2						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
160				Takeoff thrust is set		Start Checklist / Co-Pilot - if selected
161				"Takeoff"		
162				"MAN" „TOGA" and „SRS"	„Power set"	
163					"100 Knots"	At 100
164				"Checked"		
165					"V1"	At GS = V1
166					"Rotate"	At GS = VR
167					"Positive climb"	Radio Alt >50 ft, VS > 100 ft/min
168	MAIN PANEL	GEAR	7	"Gear up"	GEAR UP	CoP FSX: G
169	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS	DISARM	CoP FSX: /
170	MAIN PANEL	GEAR	7	GEAR STOWED	"Gear is up , lights off"	Radio Alt >50 ft, VS > 100 ft/min
171				At Thrust Red. / Acceleration Alt.		
172	PEDESTAL	THR LEVER	4	SET LEVERS TO	"CLIMB THRUST"	Blinking announcement in FMA
173	FCU	AP	5	AUTOPILOT	"AUTOPILOT ON"	
174				At "Green Dot Speed" / "S-Speed"		
175	PEDESTAL	FLAPS	8	"Flaps zero"	SELECT	CoP FSX: F6
176				"Flaps zero"		Checklist complete
177	FCU	ALTITUDE	3	Cruise Altitude	SET TO 31.000 feet	

163. **100 knots:** There is no “100 knots” call if V1 is lower than 105 knots
166. **Rotate:**
- During the takeoff roll, the stick should be pressed half way forward until the speed reaches 80 knots. The stick position can be monitored on the PFD (please see picture 54).
 - As soon as the runway has been entered and if it has an ILS, the yaw bar appears on the PFD to help guiding the aircraft along the runway centerline (please also see picture 54). But this not the case at LOWI Rwy 08.



Picture 56: Joystick: On the runway (attitude indicator)

- When the speed is over 80 knots, the stick can be released to come back to a neutral position.
- When VR = 120 knots is reached (indicated by a magenta circle on the PFD speed tape), the Copilot will announce “ROTATE” – then pull the stick for the rotation. If the FD (showing max. 18° pitch angle) is not perfectly stable at this time, take a 15° pitch angle.



Picture 57: Flight Director: During takeoff

- Shortly after takeoff the joystick position indicator and the runway yaw bar on the Attitude Indicator will disappear and Flight Director Indicator will show up (please see picture above).
- xxx. **A.FLOOR:** If you are flying with a too high pitch automatically the Alpha Floor mode (Display = A.FLOOR in PFD / FMA section) will be switched on i.e. full thrust automatically will be set - not considering the position of the thrust levers. As soon as the pitch is back to normal the thrust levers will be automatically set back to TOGA LK (displayed on the FMA). This is a “locked” = fixed mode and can only be switched off using the following procedure:
- Set the thrust levers into the TOGA position
 - Switch off auto thrust using the FCU button
 - Now bring back the thrust lever to the CL position
 - Activate auto thrust again using the FCU button
 - If already activated the Autopilot has to be switched to ON again
170. **Landing Gear – Autobrake:** The autobrake will automatically turn off 10 seconds after the Landing Gear is retracted
171. **Thrust Reduction Altitude:** When the THR RED altitude is reached (3407 feet in our example – airport elevation plus 1500 feet) a flashing LVR CLB message appears on the FMA (1st column). Move the thrust levers back to the CL detent (two clicks back). As the thrust reduces when the levers are moved back to the CL detent, you should anticipate the pitch reduction caused by this thrust reduction. Take a 10° pitch angle.
- XXX. **Acceleration Altitude** (normally = Thrust Reduction Altitude): At this altitude the CLB modus becomes

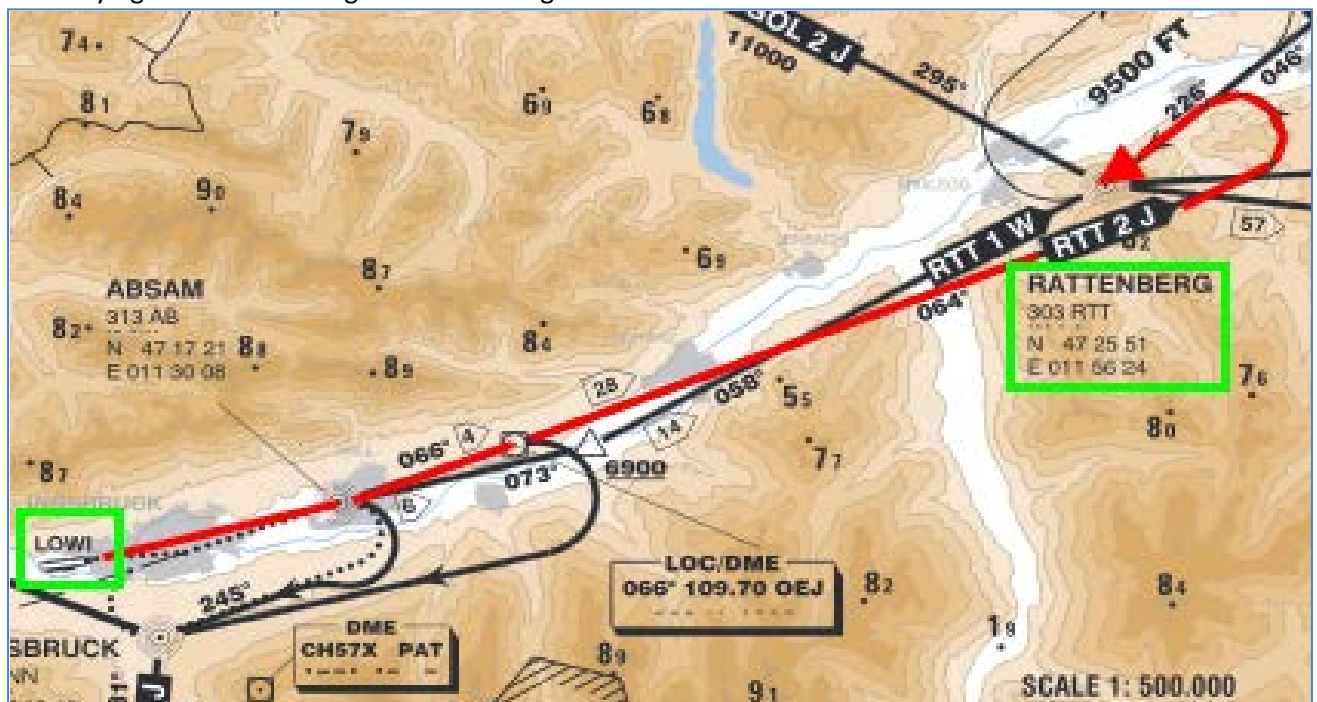
active on the FMA (2nd column). The aircraft will now accelerate to the target speed of 250 knots (below 10.000 feet) if there are no speed restrictions.

- 175. **FLAPS UP:** If Flaps 2 are used for takeoff then at F-speed flaps will be set to "1".
- 177. **CLIMB / Altitude:** Before the first set altitude of 12.000 feet will be reached (see # 69) please enter the chosen cruise altitude from the MCDU = 31.000 feet into the FCU. If they plane already leveled off at 12.000 feet (no point after 12.000 on the ALT display) then press the ALT button again i.e. managed mode is selected.

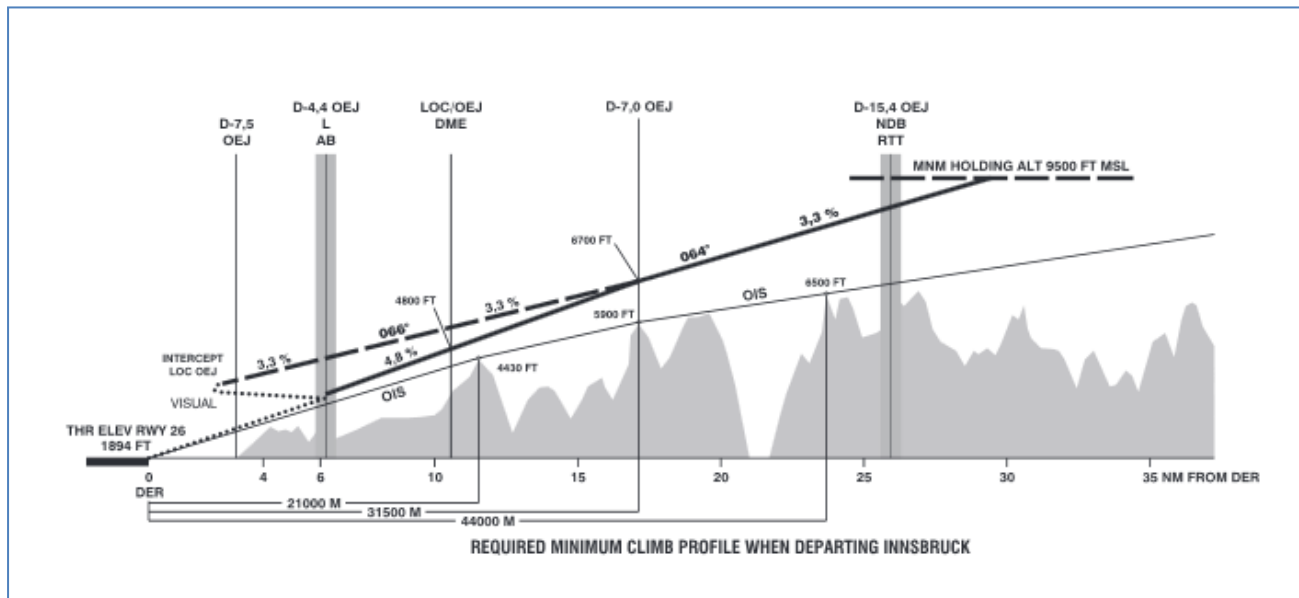
5.14 After Takeoff

TAKEOFF – Part 2							
NO.	PANEL			ACTION			REMARK
178	PEDESTAL	WXR	11	TILT: DOWN	SET		
179	EFIS	INFOR.	4	EFIS OPTION	ARPT		
180	PEDESTAL	RADIO	1	RADIO NAV	CHECK		
181	PEDESTAL	ECAM	1	ECAM MENU	REVIEW		
182	MCDU	PROG		OPT / MAX ALTITUDE	CHECK		
183				FLAPS UP and RETRACTED			Start Checklist / Co-Pilot - if selected
184	PEDESTAL	ENGINE	5	ENG MODE SEL = NORMAL	CHECK	Cop	
185	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS	DISARMED		FSX: /
186	PEDESTAL	FLAPS	8	FLAPS UP and RETRACTED	CHECK	CoP	FSX: F6
187	ECAM	GEAR	2	GEAR IS UP and STOWED	„Gear is up, Lights off“	CoP	
188	OVERHEAD	EXT. LIGHTS	9	RUNWAY / NOSE = OFF	OFF	CoP	
189	OVERHEAD	AIR COND	7	1 st and 2 nd PACK are ON	CHECK	Cop	
190	OVERHEAD	ANTI-ICE	8	ANTI ICE (1 & 2)	AS REQUIRED		=OFF
191	PEDESTAL	TCAS	10	TCAS = TA/RA and TILT = ABV or N	CHECK and set to ABV		
192	EFIS	A PRESSURE	2	BARO REF	X-CHECK (Read out)		Checklist complete

We are flying the SID according to the following chart:



Picture 58: LOWI - Runway 08 – SID RTT2J



Picture 59: LOWI - Runway 08 – Climb Profile

5.15 Climb

CLIMB						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
193				CLIMB CHECKLIST		Start Checklist / Co-Pilot - if selected
194				At 10.000 feet		
195					"Passing 10.000"	
196	OVERHEAD	EXT. LIGHTS	9	LANDING LIGHTS	LIGHTS OFF	CoP
197	FCU	ALTITUDE	3	Cruise Altitude	CHECK	=31.000 feet
198				At Transition Altitude		= Checklist completed
199	GLSH /EFIS	A PRESSURE	13 / 2	BARO REF to STD	SET / X CHECK	CoP

193. **Start Climb Checklist:** The checklist starts under the following conditions:

- "After TO" CL is no longer active
- Thrust levers are in Climb mode
- FMA State = CLB

195. **At 10.000 feet:** As soon as the altitude of 10.000 feet is reached it means that the speed restriction of 250 knots is no longer valid. Therefore the aircraft speeds up to the calculated value of 296 knots (FMGC or MCDU) based on the COST INDEX used for this flight.



Picture 60: 10.000 Feet

196. **Landing Lights:** For high altitude airports (> 5.000 feet) the function has been changed as follows:

- During the CLIMB CL the 10.000 feet call is omitted and the landing lights are switched off by the copilot after the Baro Check at the transition level.

- During the DESCENT also already at the transition level (> 10.000 feet) the Landing Lights as well as Landing System are set to ON by the copilot.

199. **Transition Altitude:** Setting up the MCDU we changed the proposed transition altitude (set to 11.000 feet for Innsbruck) i.e. now reaching this value of 11.000 feet the system has to be set to “STD = Standard”. When the value starts blinking in the PFD please pull the “BARO” button. Please also check the ISIS (Glareshield #13) e. g. the value is set to STD (right click on the knob at the bottom right)

5.16 Cruise

CRUISE						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
200				FMA “ALT / ALT CRZ”		Start Checklist / Co-Pilot - if selected
201	PEDESTAL	TCAS	10	TCAS TA or TA/RA plus TILT NORMAL	SET	CoP
202	OVERHEAD	SIGNS	11	SEAT BELTS = OFF or AUTO	CHECK and set to OFF	CoP
203				SLIDING TABLE - COPILOT	EXTENDED	CoP
204	PEDESTAL	ECAM	1	ECAM MEMO / SYS PAGES	REVIEW	
205	MCDU	Var.PAGES		FLIGHT PROGRESS	CHECK	
206	MCDU	FUEL PRED		FUEL	MONITOR	
207	MCDU	PROG		NAV ACCURANCY	CHECK	
208	OVERHEAD	AIR COND	7	CABIN TEMP	MONITOR	

200. **Cruise Altitude:** As soon as the cruise altitude of 31.000 feet has been reached (before passing the waypoint INN and marked on the ND with a blue arrow showing up) the FMA data on the PFD should change to MACH, ALT CRZ and NAV. The CRUISE procedure (#201 to #203) will automatically start if the MCDU is fully programmed. But there are no “calls” for this procedure.



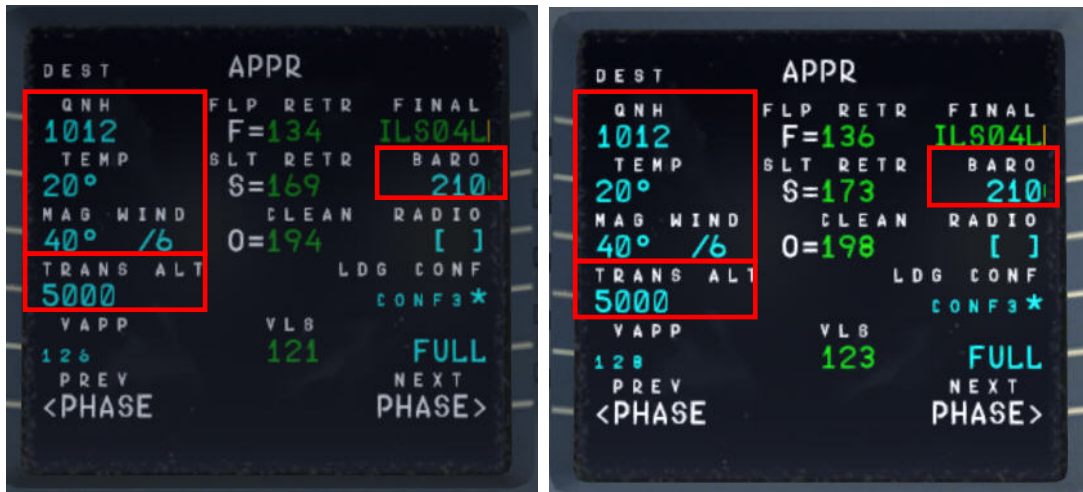
Picture 61: T/C – Top of Climb = 31.000 Feet

203. **Sliding Table:** The Copilot’s sliding table will automatically be extended after reaching the cruise level.

5.17 MCDU PERF APPR PAGE

Before starting the Descent Preparation CL and before initiating Descent the **MCDU PERF APPR page** should be checked respectively missing data added.

MCDU PERF APPR PAGE						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
209	MCDU	PERF	APPR	QNH, TEMP, MAG WIND	ENTER DATA	
210	MCDU	PERF	APPR	TRANS ALT	ENTER DATA	= 5000
211	MCDU	PERF	APPR	BARO / RADIO	ENTER DATA	= BARO 210
212	MCDU	PERF	APPR	VAPP	CHECK	
213	MCDU	PERF	APPR	LDG CONF	CHECK	



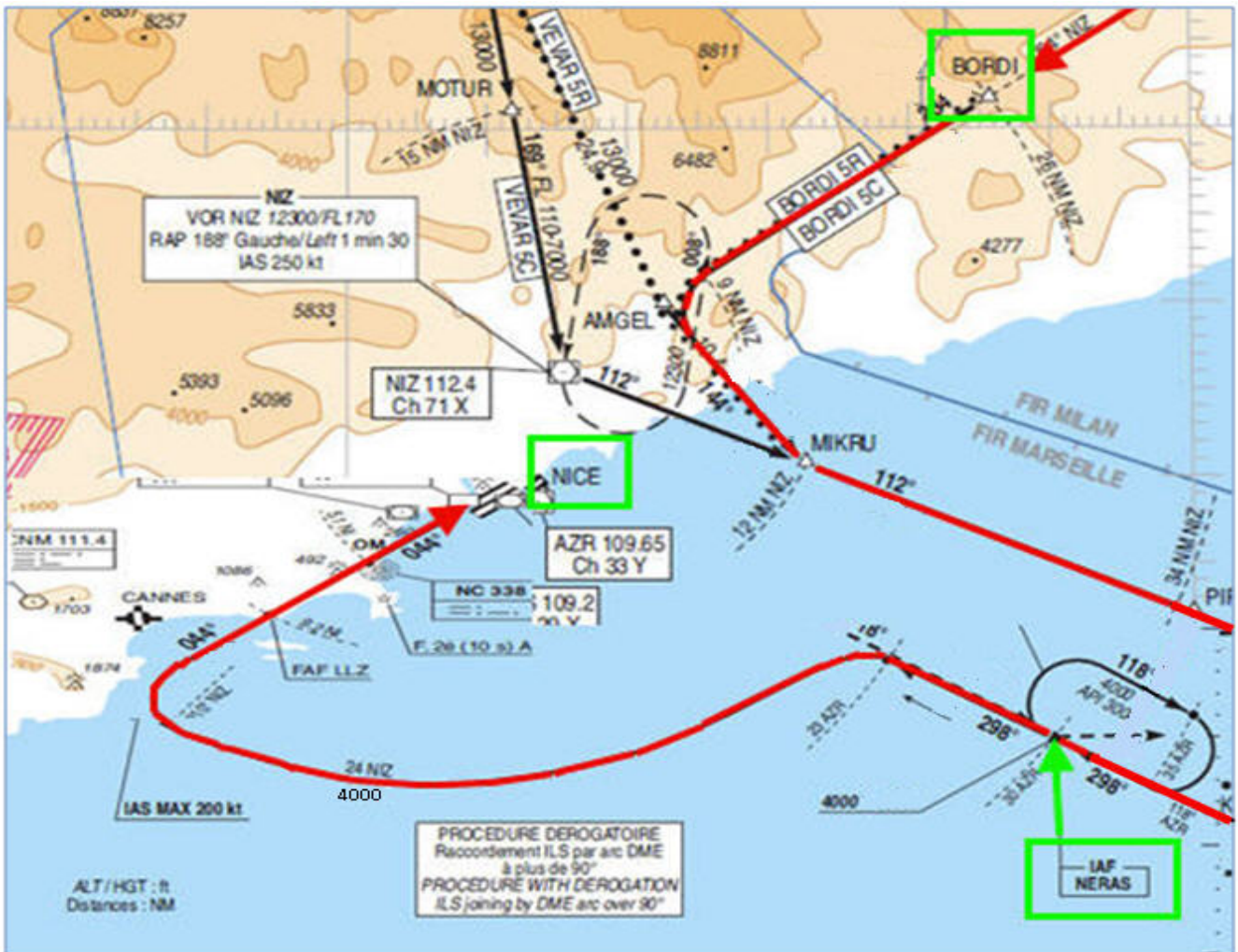
Picture 62: MCDU – PERF – APPR page (A319 and A320)

- 209. **QNH; TEMP; MAG WIND:** Enter data (for arrival airport LFMN)
- 210. **TRANSITION LEVEL:** (TRANS ALT) for LFMN = 5000 feet (because it is different from transition altitude of departure airport = 11.000)
- 211. **BARO – DA (decision altitude):** According to the chart for LFMN ILS04L it is a CAT1 ILS approach. Do not get confused by the CAT 3 FMA on the PFD. This FMA only tells you what the airplane is capable of, not what the airport is offering. You can only fly a CAT 3 approach if both the FMA says CAT3 and the airport has a CAT3 ILS.
 So as we are flying an ILS CAT1 landing at LFMN we have to enter a Barometric-altimeter DA (decision altitude). Barometric-altimeter MDA/DA is used for NPA, RNAV as well as ILS CAT1 whereas RADIO-altimeter DH (decision height) is used for ILS CAT2 and 3 landings. If there is no manual input a standard BARO value of 200 will automatically be entered by the Copilot. But as the actual BARO-DA value for our arrival airport LFMN (Nice) Runway 04L and ILS approach is according to the charts = 210 please enter this value.
 The information about the available ILS CAT you can get from the charts. The category certification entails a lot of things. The most important one for CAT2 and CAT3 is a monitoring of the validity of the ILS signal and a backup power source. For charts there are a few different formats available but on every ILS chart you will see the capability of the ILS by looking at the minimums. In LIDO charts it is even spelled out CAT 1, Cat 2 etc. On Jeppesen/AIP charts you sometimes have an extra ILS CAT2/3 charts besides the ILS CAT 1 chart.
- 212. **VAPP:** It is the final approach speed, will automatically be calculated / inserted by the system and calculated in the following way: VLS plus 1/3 of the tower headwind component. The value of VAPP is limited so that it is never less than VLS + 5 or more than VLS +15. As a result, VAPP is increased above its minimum value for runway headwinds above 15 knots. VAPP correction is not increased further for headwinds exceeding 45 knots.
 Additionally the “**groundspeed mini function**” (GS mini) has been implemented, but it does not change VAPP, instead, it increases the target (bug) speed when the headwind is greater than the expected landing headwind - the wind that VAPP was based on. This is done in case the greater headwind disappeared all at once (wind shear), the airplane would be at VAPP not VAPP minus the loss of wind. The speed bug moves in response to the wind. For more information on “GS mini” look at <http://www.pprune.org/archive/index.php/t-408276.html>.
- 213. **LDG CONF :** (Landing Configuration) If no value is entered manually it defaults to FULL.

5.18 Descent Preparation

DESCENT PREPARATION						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
214				1 min after CRZ level has been reached		Start Checklist / Co-Pilot - if selected
215				SEAT BELTS = ON or AUTO	CHECK and set to ON	Cop
216	OVERHEAD	ANTI-ICE	8	ANTI ICE = OFF	CHECK	
217	PEDESTAL	RADIO	1	LANDING INFORMATION	RECEIVED	If ATC is used
218	EFIS	A.PRESSURE	2	BARO REF = STANDARD	CHECK	Cop
219	MCDU	PERF.	APPR	AIR PRESSURE ARRIVAL AIRPORT	"Checked" and readout	Cop QNH= 1013
220	MCDU	PERF.	APPR	DECISION ALTITUDE	"Checked"	Cop BARO = 210
221	MCDU	PERF.	APPR	LDG CONF (Flaps)	"Checked"	CoP Checklist complete

- 214. **DESCENT PREP. CL:** It now can be manually started 1 min after reaching CRZ LVL. 40 NM before T/D (CRUISE CL still active) – a specific information on the INFOBAR pops up also showing the distance to the automatic start at 10 NM before the T/D. After the checklist has been finished a message on the infobar pops up "INITIATE DESCENT". Initiate descent when the T/D marker on the ND has been reached.
- 215. **SEAT BELT SIGN :** It is also OK if the switch is set to AUTO
- 216. **ANTI ICE:** Should be OFF but if ANTI ICE is ON it is also accepted – condition then will be confirmed
- 218. **BARO REF:** As we are flying higher than the "transition altitude" it should already be set to "Standard" i.e. nothing has to be done.



Picture 63: LFMN ILS04L - Chart STAR „BORDI“ / TRANS „NERAS“

5.19 Descent

DESCENT						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
222	FCU	ALT	3	INSERT NEW HEIGHT	INSERT	= 4.000
223	FCU	ALT	3	INITIATE DESCENT	PUSH KNOB	
224	MAIN PANEL	PFD	1	DESCENT	MONITOR	
225	PEDESTAL	SP BRAKES	6	SET	AS REQUIRED	
226				Vert. Mode = DES / Desc.Prepl.CL = compl.		Starts next Checklist / Co-Pilot - if selected
227	MAIN PANEL	PFD	1	FMA	CHECK	
228	PEDESTAL	TCAS	10	TCAS = TILT BELOW	CHECK and SET	CoP
229				At 10.000 feet:		
230	OVERHEAD	EXT. LIGHTS	9	LANDING LIGHTS	ON	CoP
231	EFIS	FD / ILS	3	ILS LOCALIZER (LS)	PUSH	CoP EFIS
232				At Transition Altitude		= 5000
233	EFIS	A PRESSURE	2	BARO REF to actual pressure value	SET / X CHECK	CoP Checklist complete

- 222. **Descent to Altitude:** Before the T/D (Top of Descent) point (near BORDI) is reached (marked on the ND flight path by a white arrow showing down), **the altitude should be set to 4.000 feet.** But do not push the knob before T/D is not reached
- 223. **Initiating Descent:** There are various methods for descent but we will use:
 - Managed Mode:** Reaching T/D or if the T/D marker disappears or DECELERATE is displayed on the PFD (whatever happens first): Just push the knob. The aircraft will now start to descend automatically according to the flight path calculated in the MCDU – F-PLN.



T/D = 31.000 Feet

Picture 64: Top of Descent – Initiate descent

- 229. **At 10.000 feet:** As soon as the altitude of 10.000 feet is reached the speed restriction of 250 knots becomes valid. Therefore the aircraft automatically reduces the target speed to 250 knots already at 11.000 feet app. before PIRAM.



10.000 feet Deceleration Point

Picture 65: ND: Deceleration Point

- 231. **LS Pushbutton:** If the button is used the “Vertical Glideslope” as well as the “Lateral Localizer” shows up on the PFD. The ND display shows ILS04L on top as soon as the remaining distance to destination is 250 NM or less. This normally happens at transition level or at 10.000 feet and depends on which of

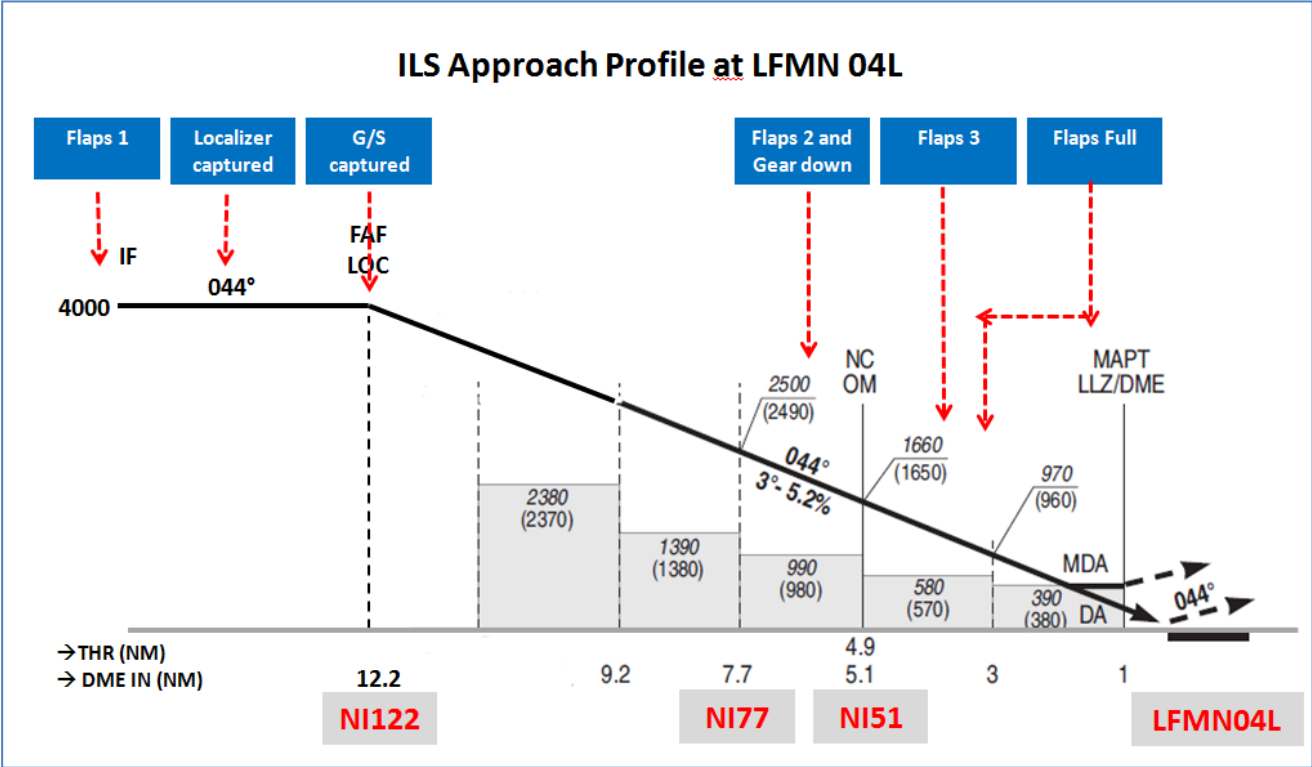
the two value is higher.

232. **Transition Altitude:** Setting up the MCDU PERF APPR page we set it to 5.000 feet for the approach (#210). So at this altitude the Barometric Reference Value will be set (as well as on ISIS) .
233. **Baro Ref Cross Check:** The QNH value entered in the MCDU PERF APPR page is used by the copilot. If no value has been entered there then the current ambient pressure value will be used (= keyboard [B]). It is not mandatory to fill the QNH-field in the MCDU – PERF – APPR page. But if a value is entered the unit used (inHg or hPa) must be identical with the settings the FCU – QNH display. If the unit is later changed the value in MCDU PERF APPR page automatically will be adjusted. The FSX standard conversion ratio of 1.013 = 29.92 is used for this baro function.
Like in reality the copilot enters those figures in visible steps and not at once. Then there is a pause of 2 seconds - during which the user can enter a different value – before the checklists continues.

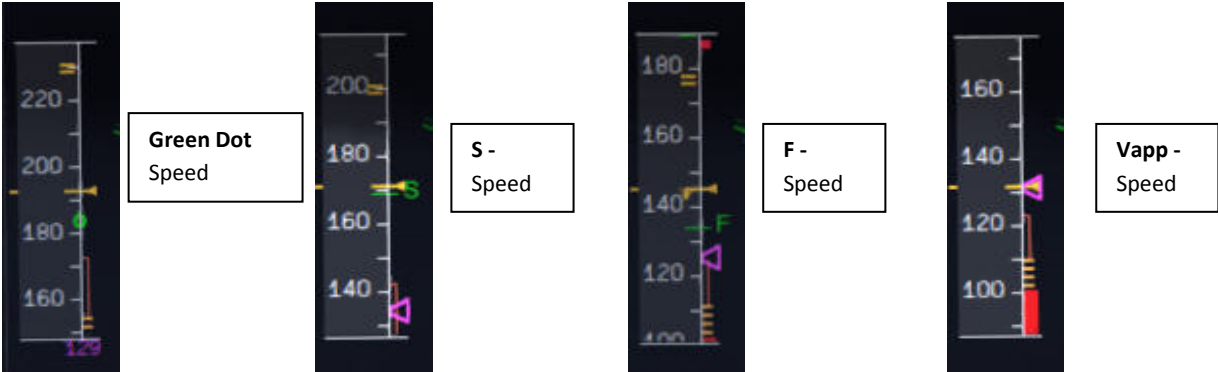
5.20 Approach

APPROACH						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
234				5 NM before DECEL pseudo waypoint		Starts next Checklist / Co-Pilot - if selected
235	ECAM	ECAM	1	ECAM MESSAGE	CHECK	
236				SLIDING TABLE S - STOWED	STOWED	CoP
237	OVERHEAD	SIGNS	11	CABIN SIGNS = ON	CHECK or set to ON	
238	MCDU	PROG		NAV ACCURANCY	CHECK	
239	EFIS	A.PRESSURE	2	BARO REF CROSS CHECK	SET and Read out	CoP Checklist complete
240				Initial approach:		
241	OVERHEAD	SIGNS	11	SEAT BELTS	CHECK ON	AUTO is also OK
242	PEDESTAL	ENGINE	5	ENG MODE	CHECK NORM	
243				Approx. 15 NM from touchdown:		
244	MCDU	PROG		NAV ACCURANCY	MONITOR	
245	MAIN PANEL	PFD	1	POSITIONING	MONITOR	

234. **Approach CL:** The APPROACH CL now is available for manually start (MCDU2 CHECKLIST MENU = marked in orange) app. 10 NM before the DECEL pseudo waypoint and a message pops up on the INFOBAR showing the distance and explains the start options. It starts automatically app. 5 NM before DECEL pseudo waypoint.
For the start of the APPROACH CL it is not necessary anymore that the DESCENT CL has been finished. Even if the BARO CHECK has not yet been completed the APPROACH CL can be started. As a reminder in such a case “DESCENT CL” blinks on the right MCDU.
235. **ECAM Message:** There is a very important difference between caution (amber) and warning (red). If the CLR button is ON it is necessary previously to confirm a “warning” or “caution” message.
236. **Sliding Table:** If the copilots sliding table had been extended at cruise level. Even if the copilots function is set to OFF now the captains and copilots sliding tables will automatically be retracted.
237. **Cabin Signs:** SEAT BELTS=ON or AUTO (if OFF Cop sets to ON), NO SMOKING=ON
239. **Baro Ref Cross Check:** The QNH value entered in the MCDU PERF APPR page is used by the copilot. If no value has been entered there then the current ambient pressure value will be used (= keyboard [B]). It is not mandatory to fill the QNH-field in the MCDU – PERF – APPR page. But if a value is entered the unit used (inHg or hPa) must be identical with the settings the FCU – QNH display. If the unit is later changed the value in MCDU PERF APPR page will be automatically adjusted.
Like in reality the copilot enters those figures in visible steps and not at once. Then there is a pause of 2 seconds - during which the user can enter a different value – before the checklists continues. The FSX standard conversion rate of 1.013 = 29.92) is used for this baro function.



Picture 68: Final Procedure - ILS Approach Profile LFMN04L



Picture 69: Speeds “Green Dot”, S, F and Vapp on PFD

5.21 Final

There are two main modes for the approach: Using “Managed Speed” or “Selected Speed (manually)”. Our Checklist- and Copilot-Function uses the “**Managed Speed**” mode. This means that the speed is automatically set by the MCDU and the flaps are manually deployed by the Copilot (based on the situation).

The Final CL activation is “independent” from the activation of the MCDU – PERF – APPR mode activation. The FINAL checklist will be automatically started after the APPR CL has been completed.

FINAL						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
246				Appr. CL has been completed		Starts next Checklist / Co-Pilot - if selected
247	MCDU	PERF		APPR PHASE	ACTIVATE	CoP
248	MAIN PANEL	PFD	1	CALL: LOCALIZER ALIVE		CoP
249	FCU	APPR	6	APPR	PUSH	
250	MAIN PANEL	PFD	1	LOCALIZER CAPTURED	CHECK	241 MAIN PANEL
251				Green Dot Speed		
252	PEDESTAL	FLAPS	8	FLAPS 1	SELECT	CoP FSX: F7

253				S-Speed			
254	PEDESTAL	FLAPS	8	FLAP 2	SET		FSX: F7 OPTIONAL
255				Glidescope becomes alive			
256	FCU	AP	5	Second AP	ON		
257				Glidescope captured			
258	MAIN PANEL	PFD	1	G/S CAPTURE	CHECK		
259				Rad. Alt. > 2.000 ft = LANDING MEMO			
260	PEDESTAL	FLAPS	8	FLAPS 2	SELECT	CoP	FSX: F7
261	FCU	ALT	4	GO AROUND ALT	SET TO 2.000 FEET	CoP	Just enter - do not push knob
262	MAIN PANEL	GEAR	7	L/G DOWN	SELECT	CoP	FSX: G
263	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS	ARM	CoP	Mouse click: right
264	OVERHEAD	EXT. LIGHTS	9	NOSE LIGHT (if not TAXI) = TO	ON	CoP	
265				When L/G down, below REF SPEED			
266	PEDESTAL	FLAPS	8	FLAPS 3	SELECT	CoP	FSX: F7
267				Next REF SPEED:			
268	PEDESTAL	FLAPS	8	FLAPS FULL	SELECT	CoP	FSX: F7 / Checklist complete
269	MAIN PANEL	EWD	5	LANDING MEMO	CHECK NO BLUE		
270	FCU	SPD	1	Set speed to VApp	SET		= 126 (MCDU – PERF – APPR page)
271	PEDESTAL	TCAS	10	TCAS	SET TO „TA ONLY“		
272	MAIN PANEL	PFD	1	FMA	CHECK		
273	MAIN PANEL	PFD	1	LOC CAPTURE	MONITOR		
274	ECAM	ECAM	1	ECAM WHEEL PAGE	CHECK		
275	FCU	ATHR	7	A/THR	CHECK SPD		
276	OVERHEAD	ANTI-ICE	8	WING ANTI ICE	CHECK OFF		

247. **Initiate Approach Phase:**

After the APPROACH CL has been finished the APPR PHASE in the MCDU PERF APPR page immediately should be manually activated (RW procedure).

If the MCDU F-PLAN DECEL pseudo waypoint (calculated by the FMGC to initiate deceleration in order to be stabilized at VAPP at a specified point on the approach profile, normally at 1000 feet AGL) is different from the point at which the APPR PHASE automatically will be initiated (7.200 feet radar altitude), it is ILS or NPA approach and distance to the airport less than 30 NM) a warning will appear on the INFOBAR “MCDU: Manually activate APPR PHASE”.

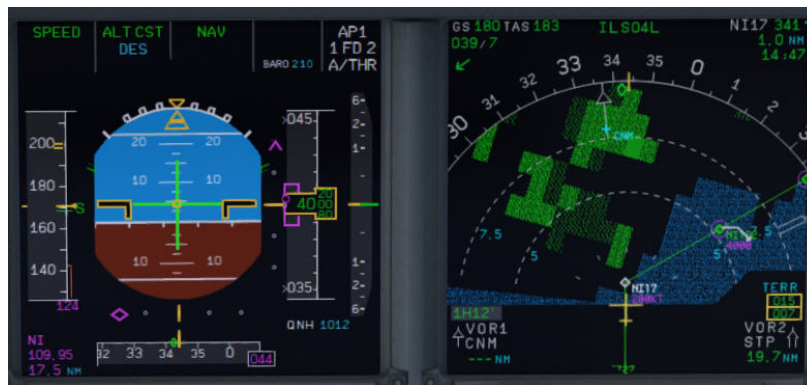
- **Manually** activated by the user (MCDU – PERF - APPR page) if warning appears on the INFOBAR “MCDU: Manually activate APPR PHASE”. In the “real world” the APPR PHASE is always activated manually and **never** automatically.
- **Automatically** at the Deceleration Pseudo Waypoint (please see picture below) if the APPROACH CL has been finished; the flight level is below 7.200 feet radar altitude, the RNAV mode is active and the distance to the airport is less than 30 NM. The (DECEL) pseudo waypoint is calculated by the FMGC to initiate deceleration in order to be stabilized at VAPP at a specified point on the approach profile, normally at 1000 feet AGL.



Deceleration Pseudo Waypoint

Picture 70: Deceleration Point

248. • **LOC Alive:** Before NI17 the localizer becomes “alive” and this will be confirmed by a PM call “LOCALIZER ALIVE”. The conditions for this call are: The angle to the runway must be smaller than 90 ° and the Approach, Landing as well as BaroCheck are not active.



Picture 71: LOC initiated near NI17

249. **APPR Button:** Before passing NI17 (you are already flying at NI122) and after hearing the call "LOCALIZER ALIVE" = press the APPR button on the FCU.
250. **LOC Capture:** The "capture" will be confirmed i.e. lateral path has been caught. Please note: If you are pushing the APPR button too early (before turning to NI17/NI122) it might happen that the plane captures the localizer in the wrong direction. Please see also chapter 6.4 for details. First the lateral path will be caught (LOC* or LOC displayed on the PFD -FMA)



Picture 72: LOC captured

251. **Green Dot Speed / CLEAN:** After initiating the APPR Phase (#242) automatically the MCDU reduces the speed to "Green Dot Speed" (195 knots). But if the plane is already on the glidescope it is not going to change its pitch to reduce to "Green Dot Speed".
252. **Flaps:** During the approach the flaps will be slowly step by step extended from 1 (after reaching "Green Dot Speed") to FULL based on aircraft speed – The flaps will be extended to 1 at least automatically 10 NM before the runway threshold if IAS is below VFE.
253. **S Speed:** After the flaps are deployed by the Copilot to 1 the MCDU automatically reduces the speed to S-Speed (172 knots). If the plane does not slow down to S-Speed then just use the speed brakes until S-Speed is reached.

Some general information on the use of speed brakes:

Normally you can use them whenever wanted. But there are some SOP things which have to be considered. The first one has to do with high altitude flying (FL300 and higher). You cannot yank them to their full position at once. You have to be smooth as to not disrupt the airflow to sudden. When on auto pilot the speed brake will not even fully open even if you put the lever at full. The Airbus is limiting the deployment a bit.

The second thing is that you may not use the speed brakes with flaps three or full. This will cause a roll moment that could impair controllability. Some models even have an autoretract when having the speed brakes out at Flaps three/full.

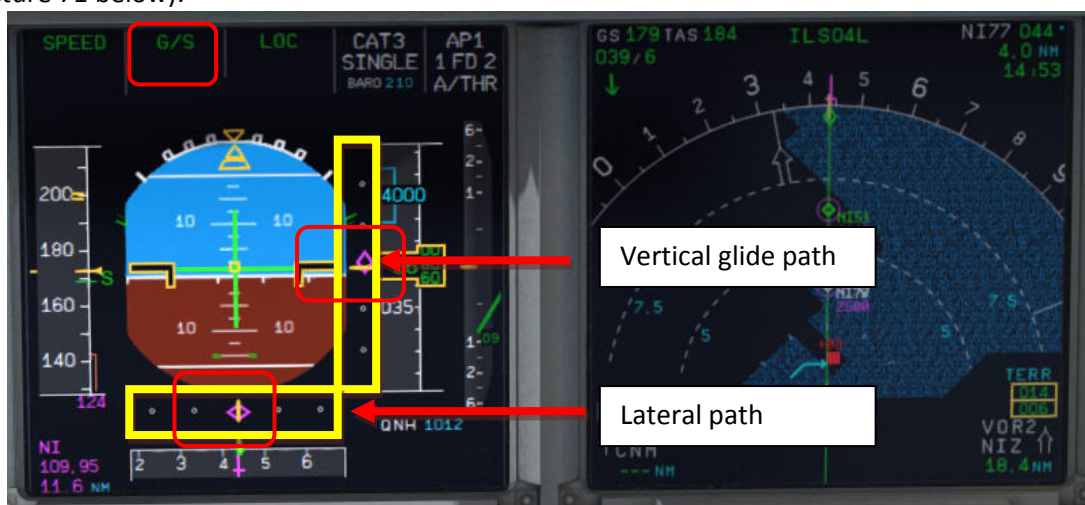
The whole point of the speed brakes is to slowdown the aircraft or to make it descent faster. If the autothrust is on and in SPEED mode it could be that the engine needs more thrust than idle to keep the managed/selected speed and this will give a warning. Having the speed brakes out and throttling

up is a no-no. It just does not make sense.

254. **FLAPS 2 (OPTIONAL):** Another method to reduce to S-Speed is to manually deploy the flaps to 2 already just after setting the flaps to 1 but keep in mind the VFE limits. This method is also supported by the Checklist- and Copilot-Function.
255. **Glideslope "alive":** When the Localizer has been captured (please see picture #70 above) soon after the vertical glide slope becomes "alive" (magenta rhombus fully appears) which will be confirmed by a call.
256. **Autopilot:**
- Only with an ILS approach programmed in the FMGC, the approach phase activated and the APPR button pushed on the FCU you do have the possibility to select both AP's at the same time. This will show as AP 1+2 in the PFD FMA.
 - It is normal Airbus procedure to also select the second AP during an ILS approach. It does not matter if this approach is a CAT 1, 2 or 3. The main reason for this is that if one AP goes offline the other can take over. This is a principle that is called fail operational. Meaning that when one AP disconnects for whatever reason the second one will take over immediately - without any interference/action by the pilot. But in reality only one AP is doing the flying and the other one is just standing by to take over if needed. To have both AP's active is a requirement for CAT 3 approaches but it gives an added safety with CAT 1 and 2. So why not selected both during all ILS approaches Airbus must have thought.
 - Autoland goes hand in hand with CAT 2 and 3 approaches but as a system it is separate. Autoland is technically possible with 1 AP but certification of the airline, airport, and airplane must all be met.
 - An ILS CAT 1 may be landed manual at all times. A CAT 2 may be landed manual but this is also up to certification rules for the airline, airport and airplane - but normally an autoland is the norm here. A CAT 3 must be made with an auto land system.
 - If autoland is used it means that there is no manual flight path interference of the pilots until after touchdown and the aircraft is landing fully automatic.
 - In our case because LFMN ILS 04L allows only CAT 1 landings we will use both autopilots but will make no "autoland".

Additional information on the various CAT you will also find in #211.

258. **Glideslope "captured":** When the glideslope has been captured it will be confirmed by a call. After the vertical glide path has been caught the display on the PFD-FMA looks as follows (please see picture 71 below):



Picture 73: PFD – Glideslope captured - Vertical and lateral glide path

The middle of both fields shows the vertical and lateral position of the aircraft where as the magenta rhombus shows the actual position on the glide path. This means that during the approach

both rhombuses are moving to the center. The picture above shows a position at which the aircraft is on the nearly ideal position for landing.

On the EFIS control panel please change the knob for the various views to LS. This view also shows the glide path and the position of the aircraft to it.



Picture 74: ND – ILS view LFMN Rwy 04L

259. **Landing Memo:** The conditions for the Landing Memo are:

- < 2000 feet RA above runway altitude
- Flight mode: Cruise or Approach
- Both thrust levers at or below CL detent

The “LANDING” checklist is “interrupted” until the “Landing Memo” becomes available in the Upper ECAM. The Copilot then continues with the settings i. e. flaps 2, gear down etc.

259a. **Speed Restriction 160 knots:** On certain airports like p. e. EGLL speed restrictions apply like 160 kts before till 4 NM before the runway. This is a bit difficult because on the other hand SOP states the plane has to be fully established at 1000 feet RA. So Flaps 2, speed brakes and sometimes even gear down is used to keep the 160 knots. If the Checklist, the Copilot and SPD SEL = 160 knots is used the gear will not automatically be deployed at <2000 feet RA as well as the flaps not set to 3 and full – only after SPD SEL is <160 knots or in MNGD mode.

260. **Flaps 2:** At calculated speed (but must be lower than VFE = 200 knots) the flaps are automatically extended to 2 by the copilot (if = ON). If the calculated flaps 2 extension speed is higher than VFE the plane must be near MLW or even above. This means it is an emergency situation. In such a case do not use “Managed Speed”, but set the speed manually to a value below VFE = 200 knots (e.g. 195 knots). The flaps then will be automatically extended by the copilot (if = ON). After the flaps have been extended to 2 you can again use “Managed Speed” for landing.

261. **GoAround ALT:** This is the altitude a plane has to fly to when using the GO AROUND procedure (MCDU FPLAN waypoints in blue) in case a landing has to be aborted. Set the GoAround Altitude according to the FPLAN e.g. change the set altitude on the FCU to the first altitude to be reached after a “Go Around”. Please just change the altitude and do **not** press or pull the knob at this point. In case the Copilot function is enabled it is automatically set by the copilot under following conditions:

- FAF passed - plus 0.5 NM added
- Actual flight level below GA ALT
- Actual flight level below FCU set ALT
- Vertical speed below 250 knots

If the copilot function is set to ON the highest value is automatically inserted using the MCDU FPLAN data. The value will be entered by the copilot in visible steps (with sound) and also considering the 100 and 1000 switch. Some values like 3.490 feet cannot be entered so the next possible higher value which means for 3.490 = 3.500 has to be or are entered.

If no values are available in the F-PLAN or there is no GA flight path available in the NAV DB the copilot sets the value to a value of (airport altitude rounded to next full 1.000) plus 4.000 feet e. g.

normally to 5.000 feet.

269. **Landing Memo / blue entries -** : Please check if there are no “blue” entries in the Landing Memo. If for some reasons there are still “blue” entries (you might have forgotten to make certain settings) then please make those settings now.
270. **Set VAPP:** After the flaps are set to FULL and the landing gear is down the speed now should be changed to Vapp speed in our example to 126 as calculated by the FMGC – MCDU (PERF APP). As we are flying in “Managed Mode” the speed automatically is reduced to Vapp after the flaps are set to FULL – i.e. nothing has to be done as we are using the “Managed Mode”. It is the final approach speed and automatically be calculated / inserted by the system. It is calculated in the following way: VLS plus 1/3 of the tower headwind component. The value of VAPP is limited so that it is never less than VLS + 5 or more than VLS +15. As a result, VAPP is increased above its minimum value for runway headwinds above 15 knots. VAPP correction is not increased further for headwinds exceeding 45 knots. No additions are made for gusts.
275. **Auto Throttle:** Leave the A/THR on.....
276. **Wing Anti Ice:** Leave the Wing Anti Ice OFF

There are also various other approach procedures used depending on airline and weather condition (ILS- and non-ILS-approaches).

5.22 Landing

LANDING						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
277				Flaps in Landing Config. (MCDU Settings)		Start next Checklist / Co-Pilot - if selected
278	MAIN PANEL	GEAR	7	LAND. GEAR = FULL EXTRACTED	CHECK	CoP
279	PEDESTAL	SP. BRAKES	6	GROUND SPOILERS = ARMED	CHECK	CoP FSX: Right mouse click
280	MAIN PANEL	AUTO BRAKE	6	AUTO BRAKES = MEDIUM	SET	CoP
281	OVERHEAD	EXT. LIGHTS	9	NOSE = TO or TAXI / LANDING L. = ON	CHECK	CoP
282	FCU	ALT	3	GO AROUND ALT	CHECK	CoP
283				AT DECISION ALTITUDE		
284	FCU	AP	5	AP	OFF	CoP FSX: Z
285				At 20 feet:		
286				FLARE	PERFORM	
287	MAIN PANEL	PDF	1	ALTITUDE	MONITOR	
288	PEDESTAL	THR LEVER	4	THRUST LEVERS	IDLE	FSX: F1
289				At touchdown:		
290	PEDESTAL	THR LEVER	4	REV	MAX	FSX: F2
291				BRAKES	AS REQUIRED	
292				At 70 knots:		
293	PEDESTAL	THR LEVER	4	REV	IDLE	FSX: F1
294				At taxi speed:		
295	PEDESTAL	THR LEVER	4	REV	STOW	CoP
296				Before 30 knots:		
297	MAIN PANEL	AUTO BRAKE	6	AUTOBRK	DISENGAGE	CoP Checklist complete
298	FCU	AP	5	AP (if applicable)	OFF	CoP FSX: Z

280. **Auto Brake:** Set to MED (medium)
281. **Exterior Lights:** Just check if all Exterior Lights are on: Strobe, Beacon, Nav & Logo as well as Landing Lights.
282. **Go Around Altitude:** Check if the GA has been set correctly according to #262.
283. **BARO – DA (decision altitude):** Please also see #211 – for LFMN ILS 04L according to the charts = 210 feet. At an altitude of 310 feet there will be a call “100 ABOVE”.
284. **Autopilot:** Because LFMN ILS 04L is ILS CAT1 we are not allowed to use “AUTOLAND” and have to disconnect the autopilot at latest at the decision altitude of 210 feet. Some airlines require that if no AP is used also the ATHR has to be switched off.
286. **LAND and FLARE mode:** As the aircraft gets closer to the ground the LAND mode engages, then the FLARE mode. The actual modes are shown on the FMA.
288. **Thrust Levers: IDLE:** There is a callout: RETARD. A single callout if thrust levers are retarded in time,

multiple callouts if not (auto landing = callout at 10 ft, manual landing = at 20 ft). Pull the thrust levers back to IDLE and let the aircraft gently touch the ground.

290. **Trust Levers: REV:** After touchdown the thrust reversers (by using F2 from the keyboard) might be activated but not necessarily if noise abatement procedures prohibits it.
291. **BRAKES:** The autobrake makes the aircraft decelerate on the ground. You can also take the control at any time by using the brakes. Any manual action on the brakes automatically disconnects the autobrake system.
295. **REV THRUST:** If REV THRUST is used (#284 and #287) the levers are automatically stowed by the Copilot.
298. **AUTOPILOT:** We switched the autopilot OFF because at LFMN ILS04L = ILS CAT1 we are not allowed to make an "AUTOLAND". But for ILS CAT2 and 3 landing (if the AP is ON) shortly after landing e. g. the plane is still on the centerline the autopilot is automatically switched off and the warning signal goes on. The signal will automatically be switched off by the Copilot.

5.23 Go Around

The GO AROUND flight path is displayed on the ND (in blue) if:

- A missed approach waypoint (MAP in blue) is displayed on the MCDU F-PLAN page (in line 2, 3, 4 and/or 5), while ND is in ROSE or ARC mode or
- Displayed on the MCDU F-PLAN page in line 2, while ND is in PLAN mode.

The GO AROUND procedure is as described below:

- After initialization of the GA „GO AROUND ACTIVE“ is displayed on the INFOBAR.
- After reaching GA ALT and the AFTER TO CHECKLIST has been finished "CLIMB OR CONTINUE FOR NEW APPROACH“ is displayed on the INFOBAR.
- If additionally to the GA ALT a higher altitude is selected:
 - **Up to 10.000 ft:** Nothing has to be done and there is no INFOBAR display.
 - **Higher than 10.000 ft:** The checklist function changes into CLIMB- and after that as usual into CRUISE-, and DESCENT PREP-mode (initialization maybe without delay because no T/D is available). The remaining procedure is according to a normal approach.
- Generally the Approach CL will be initialized after a GA 30 NM and automatically started 25 NM before the destination airport. A message is displayed on the INFOBAR: APPR. CL STARTS IN x MILES OR MANUALLY START CL E. g. it can be manually started using „1“ from the keyboard or from the MCDU2 menu itself.
- When the APPR. CL has been finished manually start the MCDU PERF APPR. PHASE (also a respective message appears on the INFOBAR)

GO AROUND						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
A	PEDESTAL	THR LEVER	4	GA thrust is set	SET	Start Checklist / Co-Pilot - if selected
B	PEDESTAL	FLAPS	8	"GO AROUND FLAPS"	FLAPS ONE STEP BACK = 3	CoP FSX: F6
C					"Positive climb"	Radio Alt >50 ft, VS > 100 ft/min
D	MAIN PANEL	GEAR	7	"Gear up"	GEAR UP	CoP FSX: G
E	MAIN PANEL	GEAR	7	GEAR STOWED	"Gear up , Flaps 3"	
F	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS	DISARM	CoP FSX: /
G	OVERHEAD	EXT. LIGHTS	9	RUNWAY / NOSE = OFF	„Off“	CoP
H	MAIN PANEL	BRAKES	6	AUTOBRAKES	„Off“	CoP
I				At Thrust Red. / Acceleration Alt.		
J	PEDESTAL	FLAPS	8	"Flaps 1"	SELECT	CoP FSX: F6
K	PEDESTAL	THR LEVER	4	SET LEVERS TO	"CLIMB THRUST"	Blinking announcement in FMA
L	FCU	AP	5	AUTOPILOT	ON	
M				At "Green Dot Speed" / "S-Speed"		
N	PEDESTAL	FLAPS	8	"Flaps up"	SELECT	CoP FSX: F6
O					"Flaps up"	Checklist complete
P	FCU	AP	5	AUTOPILOT 2	„Off“	CoP

- A. **Thrust Levers: TOGA:** If there is an emergency situation and “Go-around” should be performed e.g. the runway is blocked by another aircraft or if there is a problem with the aircraft itself just set the thrust levers to the most forward position = MAN TOGA and this GO AROUND procedure- and checklist will start automatically. Please fly using the procedure and checklist as in the table above.
- B. **“Go Around Flaps”:** After this PF call the copilot automatically sets the flaps one position back e. g. in our case as we used FULL: From FULL to 3.
- I. **Thrust Reduction Altitude:** When the THR RED altitude is reached (1.512 feet in our example) a flashing LVR CLB message appears on the FMA (1st column).
- J. **Flaps:** The copilot sets the flaps back to 1. In our case from 3 to 1.
- K. **Thrust Levers:** Move the thrust levers back to the CL detent = THR CLB (FMA displays SPEED because the speed is limited to 200 kts). As the thrust reduces when the levers are moved back to the CL detent, you should anticipate the pitch reduction caused by this thrust reduction. Take a 10° pitch angle.
- L. **Autopilot:** Because for an ILS CAT 1 landing at LFMN LIS04L we switched the autopilot OFF now the autopilot has be engaged again. If in connection with other landings the autopilot is still set to ON then the PF just confirms the setting.
- M. **Green Dot / S-Speed:** At “Green Dot / S-Speed the PF calls “Flaps up”
- O. **Flaps UP:** The copilot sets the flaps to UP.
- P. **2nd Autopilot:** Automatically set to OFF after the Thrust Reduction Altitude has been reached (if applicable).

Setting the Thrust Levers to MAN TOGA the GA flight path on the ND changes to “green” (in the MCDU too) and becomes active. The plane will climb to 2.000 feet which is the GA altitude for the last GA waypoint = NERAS and automatically follow the GA flight path (for LFMN ILS04L those are the waypoints 320, INTCPT and NERAS). Also automatically the flight path for another approach (including GA) at the same runway is entered into the MCDU on the FPLAN pages. This another approach flight plan is divided from the active flight plan by a F-PLAN DISCONTINUITY and only consists of the final waypoints for ILS04L and does not include any TRANS or VIA waypoints.

As ATC advises us to fly a holding at NERAS at an altitude of 4.000 feet we have to climb from 2.000 (set GA ALT) to 4.000 feet. So change the altitude on FCU ALT to 4000 and push the knob. Then the plane will climb to FL40.

Descent or Climb-to-Altitude On the Infobar you will see the following message: CHANGE FCU ALT FOR NEW APPROACH OR START APPROACH CL (MCDU OR KEY 1).

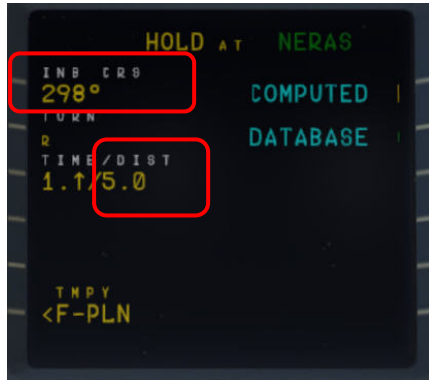


Picture 75: ND – G/A flight path for LFMN ILS04L

Before reaching NERAS we will enter a holding into the F-PLAN to wait for further instructions from ATC.

- **MCDU FPLAN:** Scroll to NERAS (should be at the beginning e. g. before the FPLAN DISCONTINUITY) and push the respective LSK L.
- **HOLD:** Push LSK 3L

- **INBOUND COURSE:** Enter 298 according to the aeronautical charts (LSK 1L)
- **DISTANCE:** Enter “/5.0” as distance of the holding (LSK 3L)



Picture 76: MCDU – F-PLAN – Entering a holding at NERAS

- **TEMPORARY F-PLAN:** Push LSK 6L
- **TEMPORARY INSERT:** Insert the TEMPORARY F-PLAN - Push LSK 6R

A “HOLD R” is entered into the FPLAN after NERAS (please see picture below).



Picture 77: After entering a holding at NERAS

Now there are two options to continue the flight:

A. Another attempt to land at LFMN ILS04L

- Only the FINAL waypoints for LFMN ILS04L (NI77 and NI51) have automatically been added to the FPLAN.
- But we are advised to use TRANS/VIA “NERAS” again for our approach. So please push LSK6L, then ARRIVAL LSK1R and using LSK2L (VIA) select NERAS. Between F-PLAN DISCONTINUITY and NI77 now the waypoint for the NERAS approach are inserted.



Picture 81: ND – After activating flight path for another attempt

If there is no ALT change to your next waypoint please start the APPR CL manually (MCDU 2 or from the keyboard using “1”). As in our case there is no ALT change between NERAS and AZR26 (= 4.000 feet) so after leaving HOLD R start the APPR CL manually.

B. Diversion to another Airport

Please see chapter 7.2 – Alternate Destinations – for details.

5.24 After Landing

AFTER LANDING						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
299				Ground Speed >35 / Dir. to runway > 15 °		Start Checklist / Co-Pilot - if selected
300	GLARESHIELD	CHRONO	7	CHRONO	STOP	Push upper right button
301	OVERHEAD	EXT. LIGHTS	9	NOSE LIGHTS	ON	CoP
302	OVERHEAD	EXT. LIGHTS	9	LANDING LIGHTS	OFF	CoP
303	OVERHEAD	EXT. LIGHTS	9	STROBE LIGHT = OFF or AUTO	IF ON = OFF	CoP
304	PEDESTAL	TCAS	10	TCAS MODE SEL	STBY	CoP
305	PEDESTAL	FLAPS	8	FLAPS	RETRACT	CoP FSX: F6
306	PEDESTAL	ENGINE	5	ENG MODE SEL	NORM	Cop
307	PEDESTAL	WXR	11	WXR: SET system to OFF	SET	Cop
308	EFIS	FD / ILS	3	ILS LOCALIZER (LS)	OFF	CoP EFIS
309	OVERHEAD	APU	10	APU MASTER and APU START	ON	
310	PEDESTAL	SP. BRAKES	6	GRND SPLRS	DISARM	CoP FSX: /
311	ECAM	WHEEL PAGE	1	BRAKE TEMP all wheels = > 300 degrees	CHECK	Checklist complete

301. **Exterior Lights:** Set “NOSE” light to „ON“.

309. **APU START:** Becomes available 10 seconds after starting APU MASTER

AES: Open the AES (CTRL+SHIFT+W) or GSX (CTRL + F12) window. In AES / GSX select the option “F2 – Increment Position” until you see the gate position: A14 and then select “F3 – Request Follow-Me to selected Position”. Follow the car. When you are at the gate and have set the parking brakes to ON you will hear “Blocks in position” i.e. you have reached the right position.

5.25 Parking

PARKING						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
312	PEDESTAL	RADIO	1	ATC (if no AUTO position)	STBY / OFF	
313	OVERHEAD	ANTI-ICE	8	ANTI ICE (WING and ENGINES 1&2)	CHECK = OFF	
314	PEDESTAL	RADIO	1	GROUND CONTACT	ESTABLISH	If ATC is used
315	PEDESTAL	P. BRAKE	7	PARKING BRAKE ON	SET ON	FSX: CTRL + . (period)
316	PEDESTAL	ENGINE	5	ENG MASTER 1 & 2	OFF	Start Checklist / Co-Pilot - if selected
317	MCDU R	GRND SERV		CHOCKS	SET	CoP
318	PEDESTAL	P. BRAKE	7	PARKING BRAKE	OFF	CoP FSX: . (period)
319	OVERHEAD	SIGNS	11	SEAT BELTS	OFF	CoP
320	OVERHEAD	EXT. LIGHTS	9	BEACON LIGHT	OFF	CoP
321	OVERHEAD	EXT. LIGHTS	9	TAXI LIGHT.	OFF	CoP

322	OVERHEAD	ANTI-ICE	8	WING & ENGINE ANTI ICE = OFF	CHECK	Cop	
323	OVERHEAD	FUEL	2	FUEL PUMPS	OFF	CoP	OFF should appear / Checklist complete
324	MCDU R	GRND SERV		CONES	SET		
325	MCDU R	GRND SERV		ESTABLISH EXTERNAL POWER	CONNECT		
326	OVERHEAD	EXT POWER	6	EXT. POWER = AVAILABLE	SET TO ON		
327	OVERHEAD	APU	10	APU MASTER	SET TO OFF		
328	MCDU	MENU	ACFT DOORS	DOORS	OPEN (AS REQUIRED)		

318. **CHOCKS / PARKING BRAKE:** Because the brakes have to cool off after landing, the parking brake can be released after the chocks have been set. The plane is then just held by the chocks only.
325. **EXT POWER:** Depending on the situation at the airport direct external power or delivered by a GPU is used to deliver the power needed. Please select the equivalent. For Vienna we just use EXTERNAL POWER (no GPU).
327. **APU:** After the connection to external power is established the APU can be set to OFF.
- AES** Open the AES (CTRL+SHIFT+W) or GSX window (CTRL + F12) and select your options.
- GSX:**

5 Minutes after the "Parking CL" has been finished the complete system (incl. MCDU) is automatically reset and you are able to prepare for a "turnaround" e. g. starting again with the "Cockpit Preparation CL". A specific information is available in the infobar.

5.26 Securing Aircraft

SECURING AIRCRAFT							
NO.	PANEL			ACTION		REMARK	
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)		
329	OVERHEAD	ADIRS		ADIRS (1 + 2 + 3)	OFF		
330	OVERHEAD	EXT. LIGHTS	9	NAV. LIGHTS	OFF		
331	OVERHEAD	SIGNS	11	NO SMOKING & EMERGENCY LIGHT	OFF		
332	MCDU	MENU	ACFT DOORS	DOORS	CLOSE (AS REQUIRED)		
333	OVERHEAD	EXT. PWR	6	EXT PWR	AS REQUIRED		
334	OVERHEAD	ELEC	5	GEN 1 + 2 (Electric Generators)	PRESS		OFF should appear
335	PEDESTAL	INT. LIGHT	3	INTEG LT	OFF		
336	MAIN PANEL	PF D LIGHT	8	SWITCH	OFF		
337	MAIN PANEL	ND LIGHT	8	SWITCH	OFF		
338	ECAM	DIMMER	4	SWITCH UPPER and LOWER	OFF		
339	PEDESTAL	RADIO	1	RADIO CONTROL PANEL	OFF		
340	PEDESTAL	TCAS	10	TCAS = STBY	SET		
341	OVERHEAD	BATTERIES	4	BAT 1 + 2	OFF		

330. **Exterior Lights:** Switch off all exterior lights.
- XXX. **Cockpit „COLD DARK“:** Now the status of the cockpit should be "COLD DARK". All systems and switches should be "OFF". Before switching the batteries to OFF the panel should look like in the following picture:

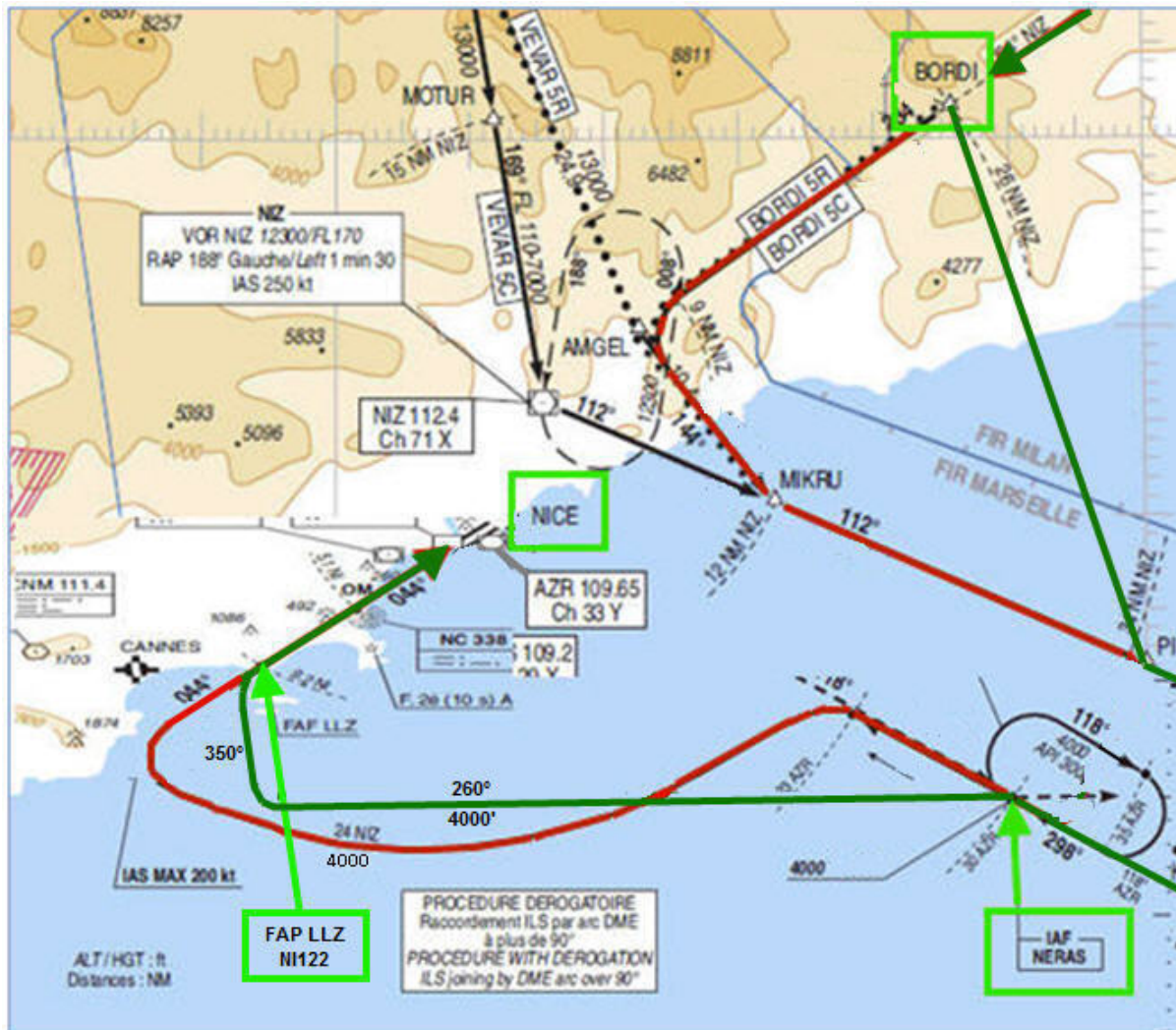


Picture 82: Overhead Panel before switching OFF both batteries

6. Vector Approach using DIR TO and RADIAL IN

This part of the tutorial uses also the flightplan LOWILFMN01 (Innsbruck to Nice) but covers only the descent from cruise level and the vector approach into Nice = LFMN 04L. It is mainly based on input from Frank "The Dude" (a RW-pilot) how a RW vector approach is flown into LFMN ILS 04L.

FLIGHTPATH APPROACH LFMN ILS04L



Picture 83: Vector approach flight path into LFMN

- ➔ MCDU F-PLAN
- ➔ Actual flight path

ATC only makes us leave our cruising altitude when they have some sort of ATC competence boundary where they have to hand us over to somebody else. On our flight to Nice that would be BORDI. This is the ATC border between Italy and France. The French want us in FL170 when entering their airspace. The reason is that Nice outbound planes go towards Italian airspace. So the Italian ATC would clear us well ahead of BORDI.

After passing EVANO we will receive ATC instructions for descent::

- *ATC – AUA319 Cleared FL170 - reach latest at BORDI. Call me leaving*
- *PM – AUA319 Cleared FL170 - reach latest at BORDI. Will call you when leaving*

Because we are at FL310 this means a descent of 14000' equivalent to app. 42 NM (1000' descent every 3 miles at a V/S of -2500). Adding some "reserve" we should therefore start our descent app. 15 NM before ENOBA.

6.1 Prepare the MCDU PERF APPR page



Picture 84: MCDU PERF APPR page

6.2 20 NM before ENOBA manually start the DESCENT PREPARATION CL



Picture 85: Start of DESC PREP CL

6.3 Set the FCU ALT to 17000'.

6.4 15 NM before ENOBA initiate descent to 17000': Push the V/S knob and set the V/S rate to -2500 (FMA = VS -2500)

Inform ATC that you are leaving your cruise altitude:

- *PM – AUA319 left FL310 - descend FL170 at BORDI*
- *ATC - AUA319 leaving FL310 descend FL170 at BORDI*

6.5 We will reach FL170 app. 5 NM before BORDI



Picture 86: Reaching new FL170 before BORDI

Reaching BORDI we get further ATC instructions

- ATC – AUA319 Fly DIR TO PIRAM, descend FL080 - reach latest at PIRAM
- PM – AUA319 DIR TO PIRAM, descend FL080 - reach latest at PIRAM

6.6 Set the FCU ALT to 8000’.

6.7 Initiate descent to 8000’: Push the V/S knob and set the V/S rate to -2000 (FMA = VS -2000)

6.8 MCDU / DIR TO select PIRAM and INSERT



Picture 87: ND after entering PIRAM as DIR TO

App. before PIRAM (below 10000 feet)

- PM - Nice approach, AUA319 requesting radar vectors ILS04L
- ATC - Roger AUA319 expect radar vectors
- PM - AUA319, expecting radar vectors

Reaching PIRAM we get further ATC instructions

- ATC – AUA319 - direct NERAS, FL040 reach at NERAS
- PM – AUA319 - direct NERAS, FL040 reach at NERAS

6.9 Enter FL040 into FCU and push the knob (no VS rate necessary because 4000’ is already an ALT CSTR for NERAS in the F-PLAN (FMA = DES).



Picture 88: ND after passing PIRAM

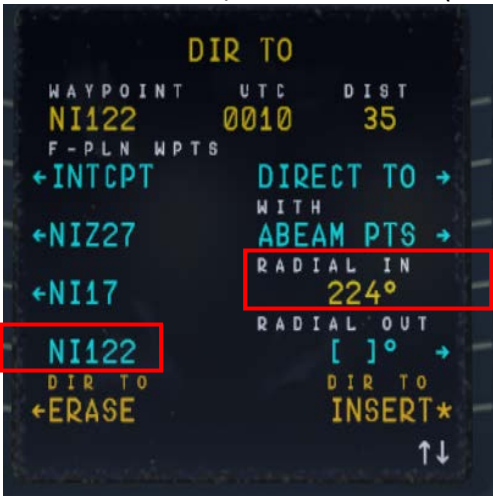
6.10 Transition Altitude = 5.000'

At NERAS

- ATC - AUA319 turn right HDG 260 remain FLO40, radar vectors ILS runway 04L
- PM - AUA319, turning right HDG 260 FLO40

6.11 PF pulls HDG knob on FCU and selects HDG 260

6.12 PF selects MCDU / DIR TO= NI122 (= FAP) and RADIAL IN 224 (044° plus 180°)



Picture 89: Selecting DIR TO and RADIAL IN



Picture 90: ND flight path after DIR TO and RADIAL IN

6.13 PF pulls HDG knob again to disarm the blue NAV mode in the PFD

At app. 18 NM ND distance to VOR 2 STP = St. Tropez

- ATC - AUA319 turn right HDG 350 - intercept localizer - cleared ILS 04L
- PM - AUA319 turning right HDG 350 - intercept localizer - cleared ILS 04L

6.18 The plane turns into the RADIAL IN course



Picture 94: Approaching RADIAL IN

6.19 When near the RADIAL IN course the final approach flight path becomes active



Picture 95: Final Approach Flight Path

7. Non Precision Approach (NPA)

7.1 Introduction

This part is meant to serve as a simple Non-Precision Approach Guide to pilots, unfamiliar with all the tools the airbus provides for such an approach. This part of the guide is written by Joshua (developer) and a real world Airbus A 320 pilot. But still there might be some deviations from Real World Procedures.

There are 3 different procedures to fly an NPA with an Airbus, but for all NPAs the „Bird“ is set to ON and used.

SELECTED MODE

- **Selected Selected Mode**
(Vertical and lateral path are selected in the FCU)
- **Selected Managed Mode**
(Vertical path is selected and lateral path in the FCU is „managed“)

MANAGED MODE

(Everything is in „managed“ mode e. g. FCU, FMGC and GPS should be „primary“, as well as the „accuracy“ = set to high)

Additionally it is important, if a **Stabilized Approach** is flown, like Airbus recommends it for an NPA or if a **Decelerated Approach** is used. Both procedures are explained below:

- **Stabilized Approach:**
VAPP is set as a „speed constraint“ for the FAF (*in our tutorial flight = GAR09*)- if this is not happened automatically – and the plane then is „fully configured“ at this point. This means the procedure to configure the plane for landing starts quite early. Even that Airbus recommends this procedure, most ATC-Controllers do not accept if the plane flies so early already with app. 140kt. This is the reason why in reality the **Decelerated Approach** is the “normal” procedure.
- **Decelerated Approach:**
 - a. Lateral stabilized,
 - b. “APPR PHASE” activated – e. g. flying with “green dot” speed - ,
 - c. 3 NM before FAF (*in our tutorial flight = GAR09*) = Flaps set to 1,
 - d. 2000 ft AGL = (*in our tutorial flight = MAPT / DMH*), flaps set to 2, landing gear = down, spoilers armed, taxi- and landing lights are switched on,
 - e. Below VFE = flaps are set to 3,
 - f. Next below VFE = flaps are set to FULL
 - g. Landing Checklist

If the Checklist- and Copilot- functions are switched on the necessary settings for points c to g are automatically made by the PM.

7.1.2 Selected Mode:

As the name describes the PF is responsible to „select“ the right settings on the FCU. As soon as the plane is “stabilized” (at latest 1nm before FAF = GAR09) the FPA is set to the chosen flight path angle (-3.4°) and activated 0.2 - 0.3 NM before FAF.

7.1.3. Managed Mode:

After receiving the „clearance“ for the approach, push the APPR and the TRK/FPA pushbuttons on the FCU. The FMA now should display APP NAV and FINAL in cyan = „armed“. Also the V/DEV („brick“) should appear. But this happens only if the LS pushbutton is not set to ON. In case LS is ON the V/DEV

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should blink in amber.

To change now to the Final APP Mode the following must be given:

- Before the VIP (vertical interception point) the plane must be vertical as well as lateral stabilized (*in our tutorial flight at GAR09*).
- The Approach Phase should be activated (happens automatically when passing the „Deceleration Points“ which is app. 15nm before the landing or has to be activated manually in the FMGC)
- APP NAV must be engaged and FINAL APP “armed” (see FCU)

How to select the „managed“ or „selected“ mode, you know already e. g. to draw or push the required buttons (drawing = „selected“ and pushing = „managed“).

Of course the PM assists the PF during the approach by calling the distances as well as altitudes so that it is possible for the PF to check the “glide path”. But this is a brief check of the raw data only. At “Minimum” the autopilot is switched off (happens automatically – 50 feet below “Minimum”) and the flight is continued visually. If a landing is not possible under those conditions then a GOAROUND has to be performed.

The following short tutorial for a flight from Vienna to Corfu is an NPA in **Managed Mode** and using an **Decelerated Approach**.

7.2 Settings / Flightplan used for the Tutorial

We are using the A319 for this flight with a ZFW of app. 48.445 kg (80 passengers and 2.000 kg cargo) as well as a fuel load of 8.575 kg (according to the Load-/Fuel-Planner – in Advanced Mode -).

The flight plan will be as follows:

Departure: LOWW (Vienna/Austria) – **Runway:** 16 – **SID:** SASA2B

Flight: SASAL – UZ21 – BABIT – UT23 – TADAM – UM127 – VAL – UN732 – PITAS

Arrival: LGKR (Corfu/Greece) – **Runway:** 35 = VOR 35-Y – **STAR:** PITAS2J – **TRANS:** DIREX

You can manually enter the flight plan or use the existing one LOWWLGKR01. **But after loading there is a F-PLAN DISCONTINUITY between BETAK (end of STAR PITAS2J) and DIREX. Please CLR it.**

7.3 Weather LGKR

The expected METAR data for our approach at LGKR are as follows:

Temperature: 25 degrees C

Wind: At 344 degrees at 4 knots

QNH: 1010 HPa

Please adjust the FSX weather settings accordingly.

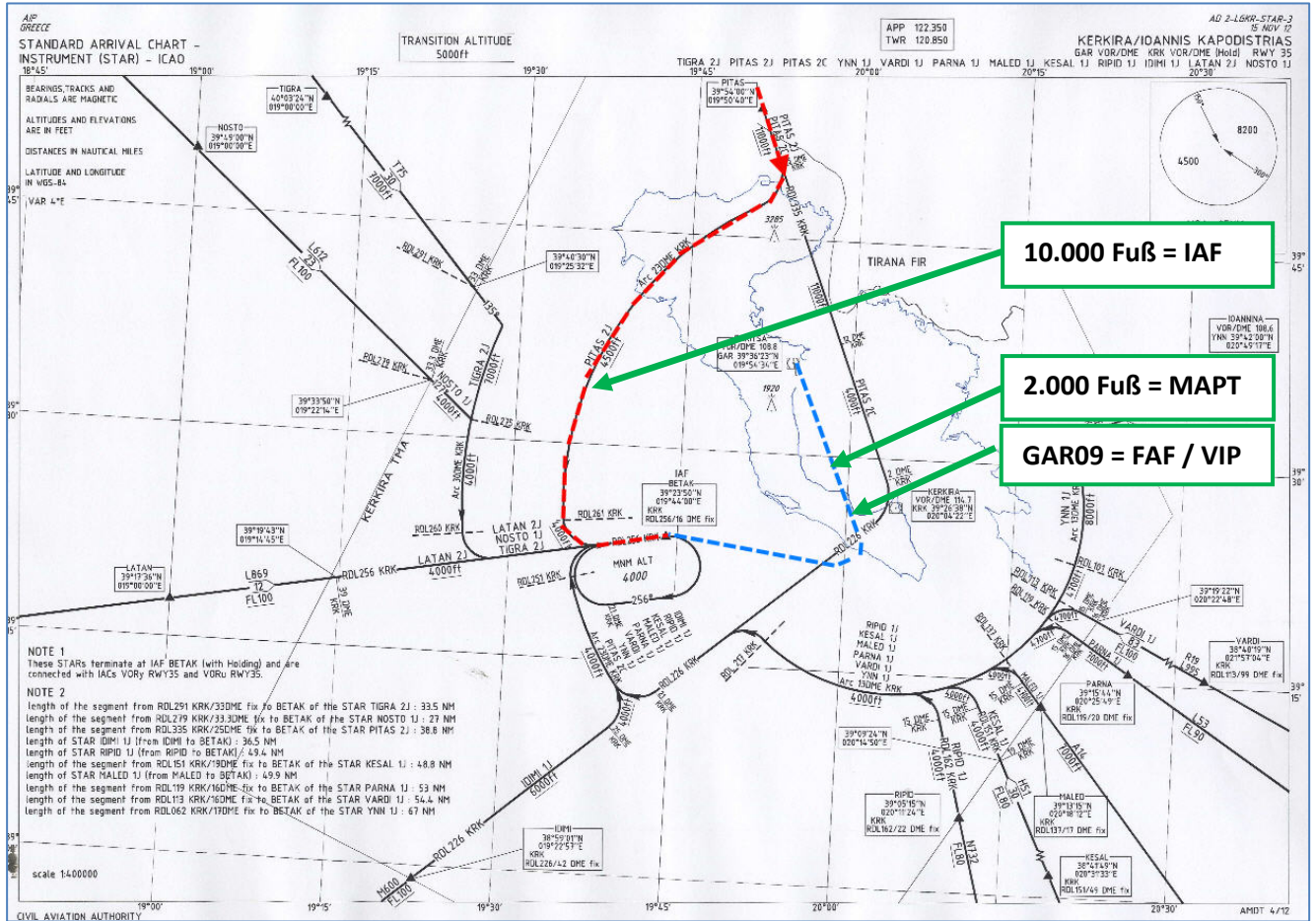
This weather is perfect for using any approach, so we will use VOR35-Y and **STAR** PITA2J (marked in red on the charts you will find in 6.5) and **TRANS** DIREX (marked in blue).

7.4 Checklist- and Copilot Function

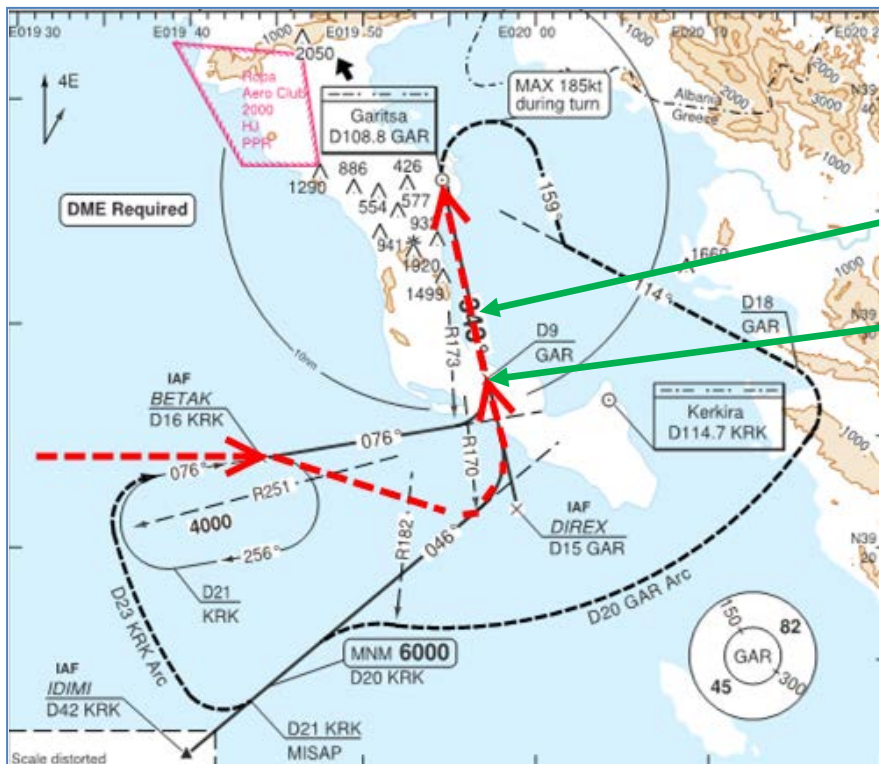
We suggest using the Checklist as well as Copilot Function for this flight because then you are fully able to concentrate on this NPA procedure.

7.5 Charts used for this NPA at LGKR Rwy35

The charts we need for this approach you will find below. Additional charts for this approach can be found here <http://www.hvacc.org/site/en/pilots/downloads/charts/category/33-corfu-lgkr>

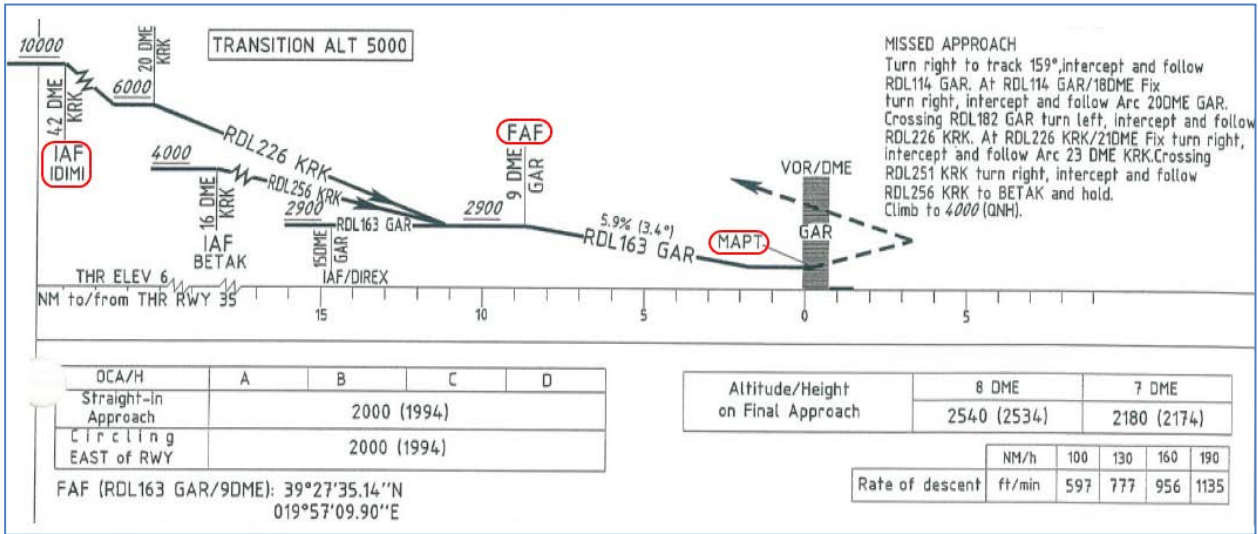


Picture 96: STAR chart (PITAS2J) for LGKR



Picture 97: Rwy35-y VOR chart for LGKR

7.6 Approach Brief



Picture 98: Vertical information for Rwy35-y for LGKR

This is the vertical information of the IAC Chart. Take note of the three things circled on the chart, namely **IAF**, **FAF** or **VIP**, and **MAPT**.

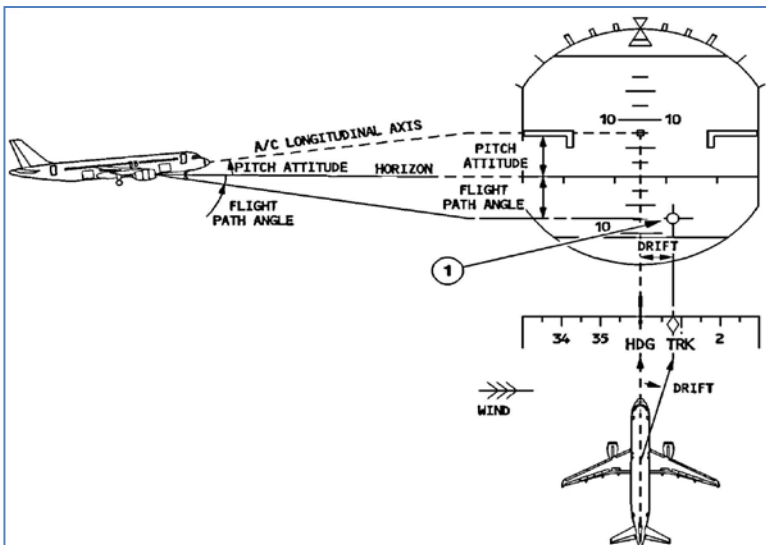
The approach is divided into three following sections:

1. **IAF** is the Initial Approach Fix, which denotes the start of *Initial Approach*.
2. **FAF** is the Final Approach Fix and **VIP** (vertical Interception Point), which denotes the start of Final Approach.
3. **MAPT** is the Missed Approach Point. At this point, the pilot must GO AROUND if he doesn't have visual with the runway or if the approach is not stable at that point.

Note: DECEL point is usually in-between IAF and FAF.

7.7 Required PFD Symbology Knowledge

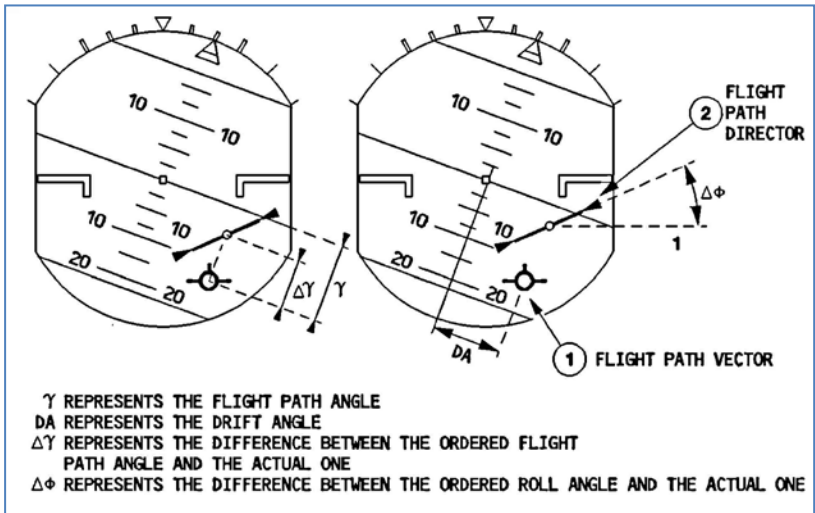
Before we begin the actual tutorial, you should know the basic PFD symbology that will be used on this approach.



Picture 99: Flight Path Vector and Flight Path Director 1

The illustration here on the left hand side of the page explains the Flight Path Vector and Flight Path Director, also known as the FPV/FPD or Birdie. This symbology appears when the pilot selects TRK/FPA on the FCU.

It is important to be able to read, understand and interpret the FPV/FPD in a timely fashion as workload during a NPA can be quite high.



Picture 100: Flight Path Vector and Flight Path Director 2

7.8 Descent Preparation and Descent

- Fill in the MCDU PERF Approach Page as follows:



Picture 101: MCDU PERF APPR page

QNH, TEMP and MAG/WIND are according to the expected METAR data (6.3). The transition altitude for LGKR is 5.000 feet and the BARO = MDA (minimum descent altitude) according to the chart = 2.000 feet.

- Set the “to descent to altitude” on the FCU to 2.900 feet = GAR09 where we will start our final approach – but do not yet push the ALT knob.
- You will reach T/D app. a few miles before GRIBA.



Top of Descent (T/D)

Picture 102: Top of Descent

- Reaching T/D start descent by pushing the FCU ALT knob.



Picture 103: Descent Flight Path

7.9 Initial Approach Fix (IAF)

The IAF for LGKR VOR RWY 35-y is below 10.000 feet (please see chart – picture 67).

At IAF you should already have:

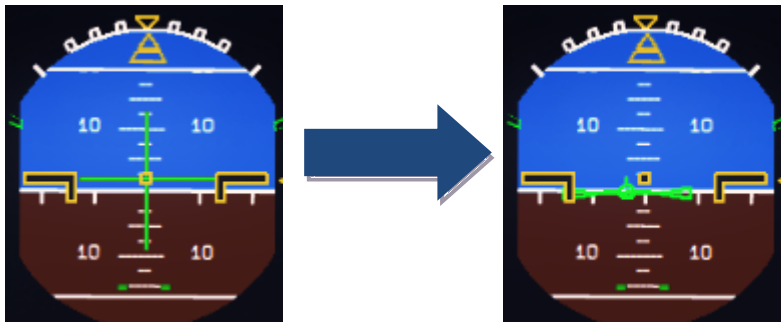
1. Filled in the MCDU Approach Page (6.8).
2. Already briefed on the Missed Approach Procedures.
3. Be cleared by ATC for the approach

When passing the IAF, you should begin to setup your displays to give you the necessary information for your approach. You should (in no particular order):

- ARM the APPR as well as the TRK/FPA button on the FCU.



- Pressing the TRK/FPA button on the FCU gets the birdie on the PFD.



- Switch the ND to Rose Mode = Rose VOR or to Arc Mode and set range to an appropriate range.



Pressing the APPR button will arm the FINAL Mode on the MCDU which will provide FINAL APP vertical and lateral guidance.



Picture 104: After passing 10.000 feet = IAF

7.10 Deceleration Point

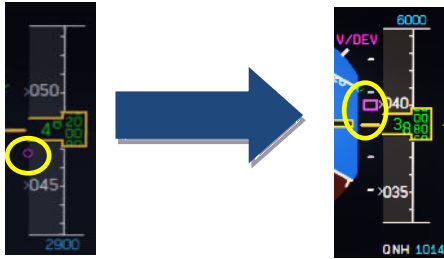
You will reach the DECEL point app. 3 NM before DIREX



Picture 105: Deceleration Point

After Passing DECEL,

- APPR Phase activates on the MCDU and the VDEV Scale replaces the VDEV magenta dot.



- We highly recommend using the speed brakes after activating the APPR PHASE until the magenta square on the VDEV scale is in the middle of the scale as shown in the picture above.
- ALT and NAV FMA replaced by FINAL APP FMA.



Picture 106: FINAL APP activated after passing DECEL Point



Picture 107: Passing DIREX – Direction GAR09 and LGKR VOR 35-y

- The Copilot should have prepared the plane for the final approach i. e. you are flying already with FLAPS 1. Don't hesitate to use speed brake where deemed necessary.

7.11 Final Approach Fix (FAF)

The FAF for LGKR VOR RWY 35-y is at GAR09 (please see chart – picture 80).



Picture 108: Before FAF = GAR09



Picture 109: Passing GAR09 = FAF

After Passing FAF the plane should start to descent following the V/DEV flight path.

- Check that FINAL APP is green on the FMA.
- Check A/THR Mode is SPEED Mode.
- Monitor Position and Flight Path is within acceptable limits.
- ECAM LDG Memo should be green.
- Set GA Altitude. (4000 is set according to the Missed Approach Instructions)



7.12 Minimum Decision Altitude (MDA)

At MAP/MDA (which is set to 2.000 feet)

- Check LDG MEMO is all green.
- Approach is stable.
- Visual with runway.

If those conditions are met the captain will announce "LANDING".

- Disconnect AP and proceed to fly manually
- Turn FD off
- Set TRK on the FCU to runway track (=345).

Failure to disconnect AP by MDA will result in automatic AP disconnection at MDA-50 ft. The PFD altitude display after passing the MDA will change to "yellow".



Picture 110: Manual Approach after passing MDA (ND = ARC mode)

If decision is to GO AROUND, announce "GO AROUND".

- Set the thrust levers to MAN TOGA
- Set the AP to ON
- Fly the Missed Approach path

If the checklist- and copilot functions are set ON just follow the checklist.....

7.13 Summary

AT	Position	Action
IAF	< 10.000 feet / 11.5 NM -> R256W	Arm APPR and TRK/FPA
D-Point	app. 7.5 NM before DIREX	V/DEV replaces "magenta dot" and FMA = FINAL APP
FAF/VIP	At GAR09	Plane starts to descent automatically
MDA	At 2.000 feet	Set AP and FD = OFF

Remember:

- If you are flying a GA-procedure in connection with an NPA please remember that compared to a normal ILS-Approach below the Minimum Altitude the AUTOPILOT is OFF. So initiating the Go-Around you have to set the AUTOPILOT again to ON.
- The same is valid in case of a new approach for the APPR. Set it to ON when clearing the F-PLAN DISCONTINUITY between the last waypoint of the GA flightpath and the first waypoint of the new FINAL.
- During GA-procedure and in case of a new approach the automatic activation of the MCDU APPR PHASE does not work. It has to be manually activated. There is also no DECEL-point displayed on the ND.

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8. A318 - Steep Approach

8.1 Introduction

This part is meant to serve as a simple A318 Steep Approach Guide to pilots, unfamiliar with all the tools the airbus provides for such an approach. This part of the guide is edited by a real world Airbus A 320 pilot. But still there might be some deviations from Real World Procedures.

MANAGED MODE

We are using for this “Managed Mode”.

8.2 Settings / Flightplan used for the Tutorial

We are using the A318 for this flight with a ZFW of app. 48.228 kg (80 passengers and 2.000 kg cargo) as well as a fuel load of 7.419 kg (according to the Load-/Fuel-Planner – in Advanced Mode -).

The flight plan (using FL 310) will be as follows:

Departure: EDDH (Hamburg/Germany) – **Runway:** 23 – **SID:** WSR9B
Flight: WSR N125 DOBAK UN125 EEL UN872 PAM UL980 XAMAN L980 LOGAN
Arrival: EGLC (London-City/ Great Britain) **Runway:** 27 = ILS27 – **STAR:** SPEA1B

You can manually enter the flight plan or use the existing one EDDHEGLC01. **But after loading there is a F-PLAN DISCONTINUITY between SPEAR (end of STAR SPEA1B) and LSR06 (FINAL). Please CLR it.**

8.3 Weather EGLC

The expected METAR data for our approach at EGLC are as follows:

QNH: 1021 hPa
Temperature: 20 degrees C
Wind: At 270 degrees at 7 knots

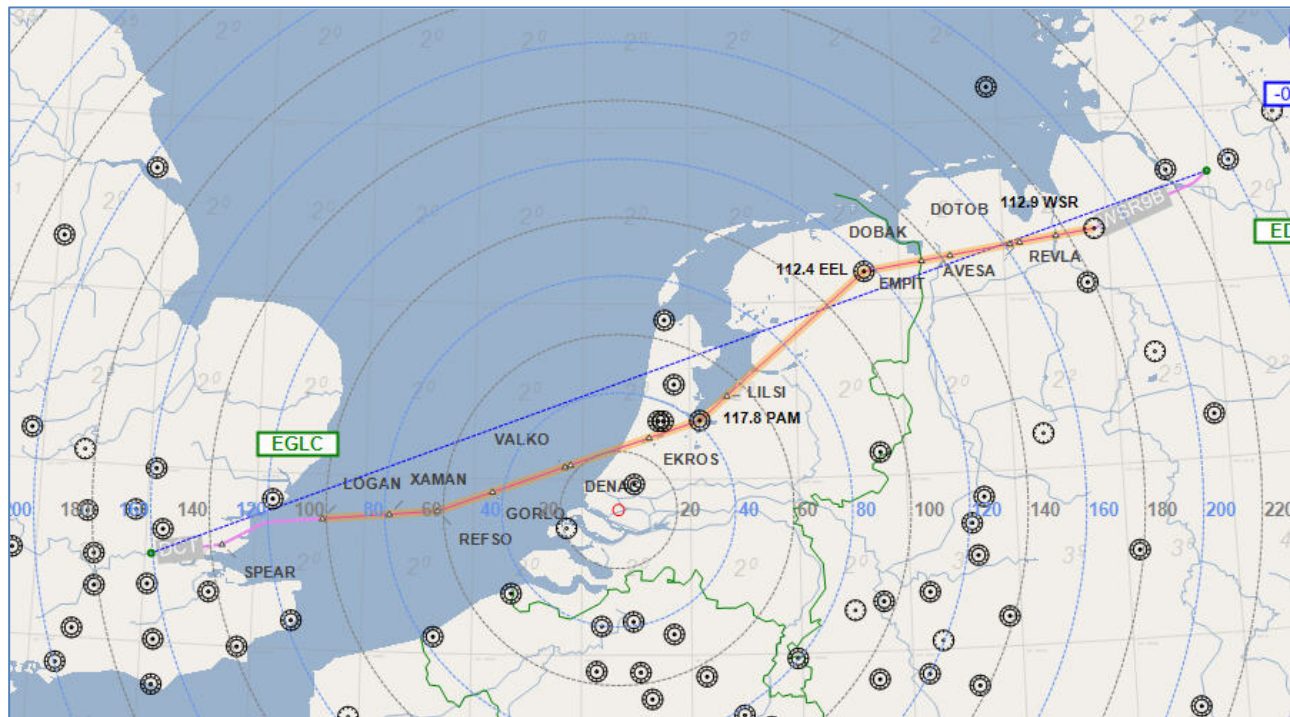
Please adjust the FSX weather or add-on settings accordingly. If you do not know how to do this then just select “Fair Weather” in FSX. This weather is perfect for using runway 27, so we will use ILS27 and **STAR** SPEA1B (marked in red on the charts you will find in 7.5).

8.4 Checklist- and Copilot Function

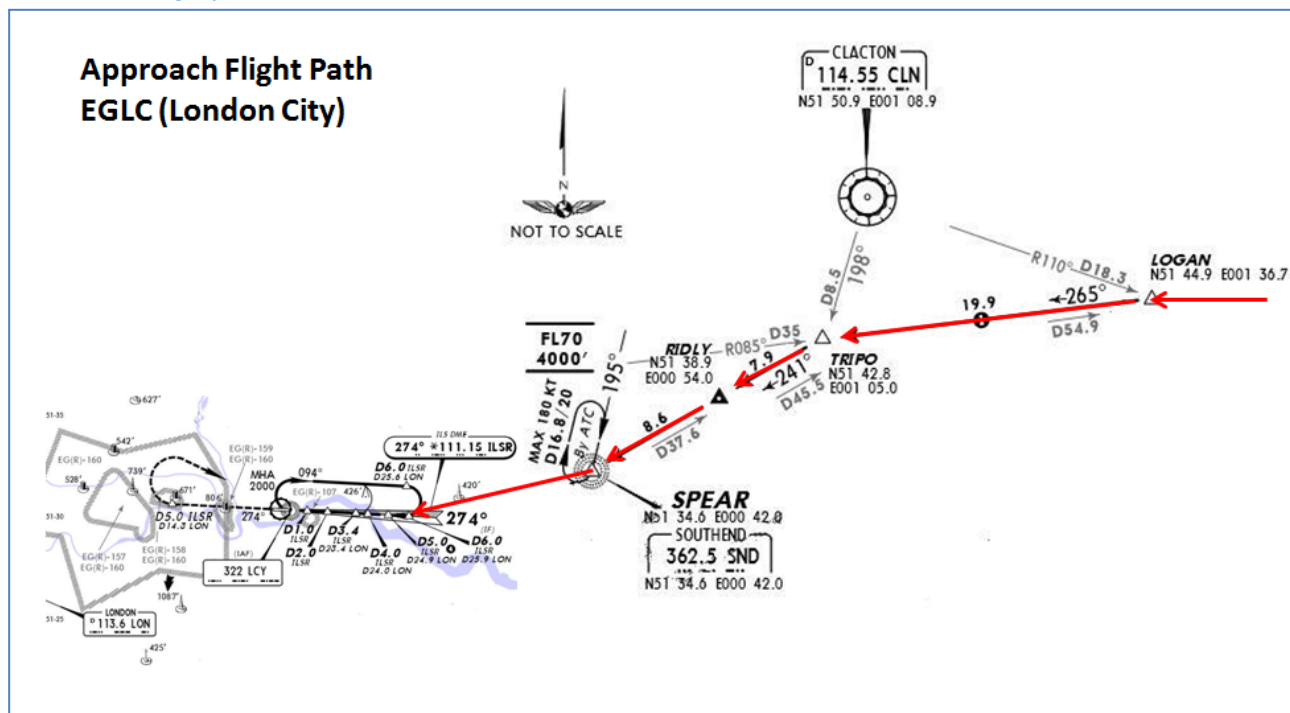
We suggest using the Checklist as well as Copilot Function for this flight because then you are fully able to concentrate on this Steep Approach procedure.

8.5 Flight path and Charts used for this Steep Approach at EGLC Rwy27

The flight path and charts we need for this approach you will find below. Additional charts for this approach can be found here <http://www.ukvirtual.co.uk/dl/charts/eglc.pdf>.



Picture 111: Flight path EDDH - EGLC



Picture 112: STAR chart (SPEA1B) for EGLC

The approach is divided into three following sections:

- **IAF** is the Initial Approach Fix, which denotes the start of *Initial Approach*.
- **FAP** is the Final Approach Point (for ILS landings) and **VIP** (Vertical Interception Point), which denotes the start of *Final Approach*.
- **DA** is the Decision Altitude at which the pilot must **GO AROUND** if he doesn't have visual with the runway or if the approach is not stable at that point.

Note: DECEL point is usually in-between IAF and FAP.

8.6 MCDU PERF APPR PAGE

MCDU PERF APPR PAGE						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
1	MCDU	PERF	APPR	QNH, TEMP, MAG WIND	ENTER DATA	
2	MCDU	PERF	APPR	TRANS ALT	ENTER DATA	= 6000
3	MCDU	PERF	APPR	BARO / RADIO	ENTER DATA	= BARO 550
4	MCDU	PERF	APPR	VAPP	ENTER DATA	
5	MCDU	PERF	APPR	LDG CONF	CHECK	



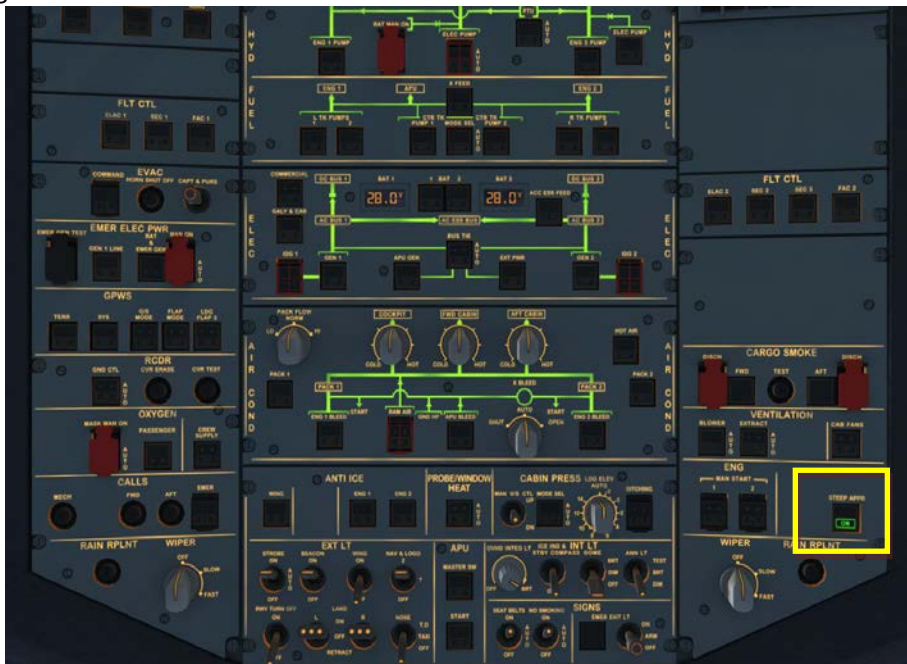
Picture 113: MCDU PERF APPR page

- QNH; TEMP; MAG WIND:** Enter data (for arrival airport EGLC) according to expected METAR data 7.3. But if you use FSX "Fair Weather" then just enter QNH=1013/TEMP=20/and MAG/WIND=270/0.
- TRANSITION LEVEL:** (TRANS ALT) for EGLC = 6000 feet (because it is different from transition altitude of departure airport EDDH = 5.000) it has to be entered.
- BARO – DA (decision altitude):** According to the chart for EGLC it is a CAT1 ILS approach. Do not get confused by the CAT 3 FMA on the PFD. This FMA only tells you what the airplane is capable of, not what the airport is offering. You can only fly a CAT 3 approach if both the FMA says CAT3 and the airport has a CAT3 ILS.
As we are flying an ILS CAT1 landing at EGLC we have to enter a Barometric-altimeter DA (decision altitude). Barometric-altimeter MDA/DA is used for NPA, RNAV as well as ILS CAT1 whereas RADIO-altimeter DH (decision height) is used for ILS CAT2 and 3 landings. If there is no manual input a standard BARO value of 200 will automatically be entered by the Copilot. But as the actual BARO-DA value for our arrival airport EGLC (London City) Runway 27 and ILS approach is according to the charts = 550 so please enter this value.
The information about the available ILS CAT you can get from the charts. The category certification entails a lot of things. The most important one for CAT2 and CAT3 is a monitoring of the validity of the ILS signal and a backup power source. For charts there are a few different formats available but on every ILS chart you will see the capability of the ILS by looking at the minimums. In LIDO charts it is even spelled out CAT 1, Cat 2 etc. On Jeppesen/AIP charts you sometimes have an extra ILS CAT2/3 charts besides the ILS CAT 1 chart.
- VAPP:** It is the final approach speed, will automatically be calculated / inserted by the system and calculated in the following way: VLS plus 1/3 of the tower headwind component. The value of VAPP is limited so that it is never less than VLS + 5 or more than VLS +15. As a result, VAPP is increased above its minimum value for runway headwinds above 15 knots. VAPP correction is not increased further for headwinds exceeding 45 knots.
For STEEP APPROACH into EGLC it is necessary to add another 3 KTS to the calculated VAPP.
- LDG CONF:** (Landing Configuration) If no value is entered manually it defaults to FULL. For STEEP APPROACH = FULL is required.

8.7 Descent Preparation

DESCENT PREPARATION						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
6				1 min after CRZ level has been reached		Start Checklist / Co-Pilot - if selected
7				SEAT BELTS = ON or AUTO	CHECK and set to ON	Cop
8	OVERHEAD	ANTI-ICE	8	ANTI ICE = OFF	CHECK	
9	PEDESTAL	RADIO	1	LANDING INFORMATION	RECEIVED	If ATC is used
10	EFIS	A.PRESSURE	2	BARO REF = STANDARD	CHECK	Cop
11	OVERHEAD	STEEP APPR	18	STEEP APPROACH BUTTON	PUSH	
12				BRIEFING "STEEP APPROACH"	PERFORM	
13	MCDU	PERF.	APPR	AIR PRESSURE ARRIVAL AIRPORT	"Checked" and readout	Cop QNH= 1021
14	MCDU	PERF.	APPR	DECISION ALTITUDE	"Checked"	Cop BARO = 550
15	MCDU	PERF.	APPR	LDG CONF (Flaps)	"Checked"	CoP Checklist complete

6. **DESCENT PREP. CL:** It now can be manually started 1 min after reaching CRZ LVL. 40 NM before T/D (CRUISE CL still active) – a specific information on the INFOBAR pops up also showing the distance to the automatic start at 10 NM before the T/D. After the checklist has been finished a message on the infobar pops up "INITIATE DESCENT". Initiate descent when the T/D marker on the ND has been reached.
7. **SEAT BELT SIGN :** It is also OK if the switch is set to AUTO
8. **ANTI ICE:** Should be OFF but if ANTI ICE is ON it is also accepted – condition then will be confirmed
10. **BARO REF:** As we are flying higher than the "transition altitude" it should already be set to "Standard" i.e. nothing has to be done.
11. **STEEP APPROACH button:** Push the button on the Overhead so that it lights up and show ON in green.



Picture 114: Overhead Panel and STEEP APPR button

When this P/B is pressed in, all concerned computers (ELAC, SEC, FCDC, FAC, FMGC, FWC, EGPWS/T2CAS) check if the STEEP APPR function is available. If yes, the P/B 'ON' light illuminates in green, and the green memo 'STEAP APPR' appears on ECAM



Picture 115: UPPER ECAM – Steep Approach Button = ON

12. **Briefing “Steep Approach”:** with the following key points:
- Landing configuration (STEEP APPR P/B pushed + Gear Down + CONF FULL + SPD BRKS lever position FULL)
 - VLSPPD=VREF+8Kt in steep approach configuration
 - Automatic call-outs “Standby / Standby / Flare”
 - PM call-out “Flare” at 60ft RA for redundancy with automatic “Flare” call-out at 63ft
 - Retard thrust levers to IDLE at flare initiation
 - Below 2000ft, Final Approach interrupted for Amber or Red warning except if immediate landing is safer (fire or smoke)
 - In case of Go Around, SPD BRKS lever must be retracted by PF (redundant action with automatic retraction)

8.8 Descent

DESCENT						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
16	FCU	ALT	3	INSERT NEW HEIGHT	INSERT	= 4.000
17	FCU	ALT	3	INITIATE DESCENT	PUSH KNOB	
18	MAIN PANEL	PFD	1	DESCENT	MONITOR	
19	PEDESTAL	SP BRAKES	6	SET	AS REQUIRED	
20				Vert. Mode = DES / Desc.Prepare.CL = compl.		Starts next Checklist / Co-Pilot - if selected
21	MAIN PANEL	PFD	1	FMA	CHECK	
22	PEDESTAL	TCAS	10	TCAS = TILT BELOW	CHECK and SET	CoP
23				At 10.000 feet:		
24	OVERHEAD	EXT. LIGHTS	9	LANDING LIGHTS	ON	CoP
25	EFIS	FD / ILS	3	ILS LOCALIZER (LS)	PUSH	CoP EFIS
26				At Transition Altitude		= 5000
27	EFIS	A PRESSURE	2	BARO REF to actual pressure value	SET / X CHECK	CoP Checklist complete

16. **Descent to Altitude:** Before the T/D (Top of Descent) point (near REFSO) is reached (marked on the ND flight path by a white arrow showing down), **the altitude should be set to 2.000 feet.** But do not push the knob before T/D is not reached
17. **Initiating Descent:** There are various methods for descent but we will use:
Managed Mode: Reaching T/D or if the T/D marker disappears or DECELERATE is displayed on the PFD (whatever happens first): Just push the knob. The aircraft will now start to descend automatically according to the flight path calculated in the MCDU – F-PLN.



T/D = 31.000 Feet

Picture 116: Top of Descent – Initiate descent

23. **At 10.000 feet:** As soon as the altitude of 10.000 feet is reached the speed restriction of 250 knots becomes valid. Therefore the aircraft automatically reduces the target speed to 250 knots already at 11.000 feet app. 9 NM before TRIPO.



10.000 feet Deceleration Point

Picture 117: ND: Deceleration Point

The IAF (Initial Approach Fix) for EGLC RWY ILS27 is below 5.000 feet e. g. at the waypoint SPEAR. At this point = IAF you should already have:

4. Filled in the MCDU Approach Page (7.6).
5. Already briefed on the Missed Approach Procedures.
6. Be cleared by ATC for the approach

When passing the IAF, you should begin to setup your displays to give you the necessary information for your approach. You should (in no particular order):

- Switch the ND to Rose Mode = Rose NAV or to Arc Mode and set range to an appropriate range.

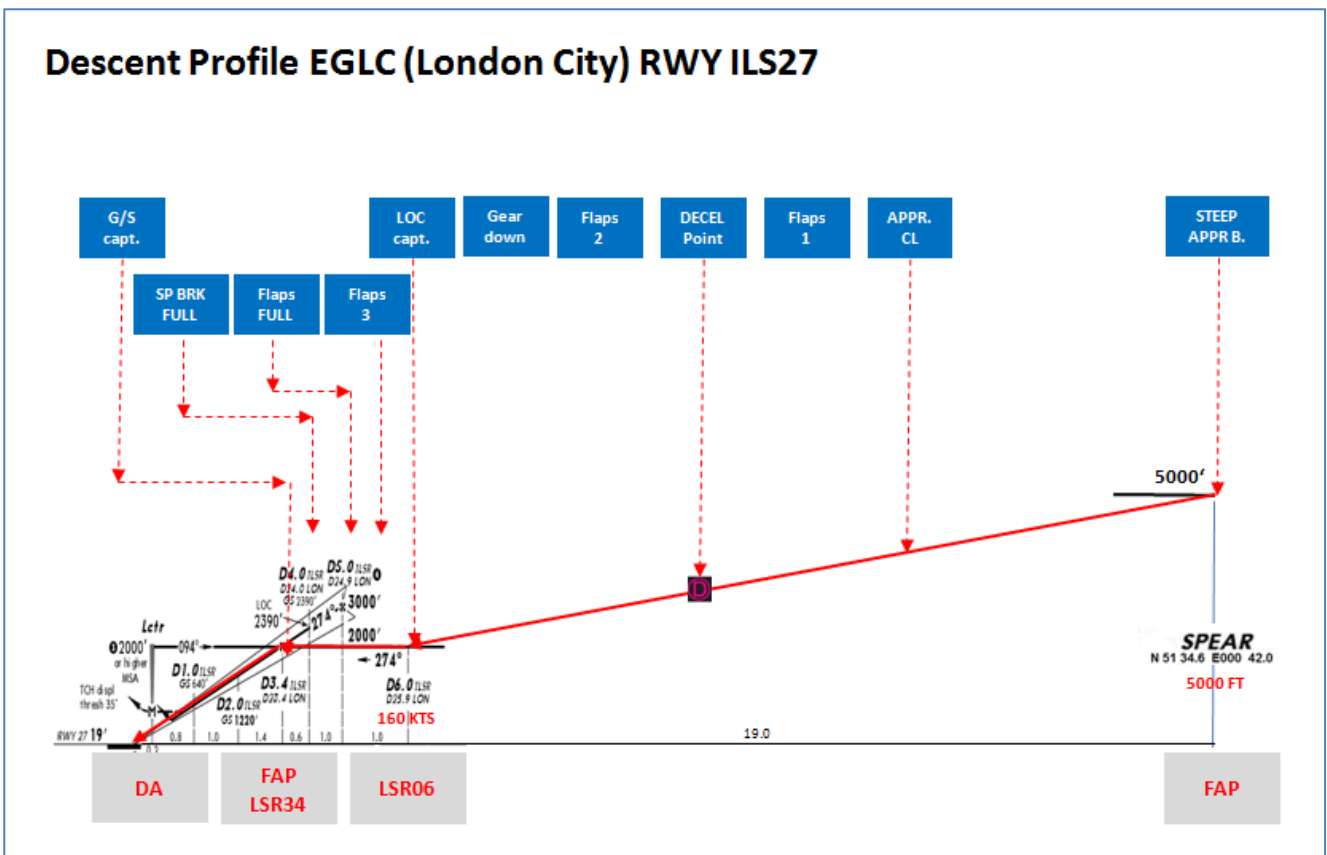


Picture 118: Settings for ND mode and range

24. **LS Pushbutton:** If the button is used (normally when passing 10.000 feet) the “Vertical Glideslope” as well as the “Lateral Localizer” shows up on the PFD. The ND display shows ILS27 on top as soon as the

remaining distance to destination is 250 NM or less.

25. **Transition Altitude:** Setting up the MCDU PERF APPR page we set it to 6.000 feet for the approach (#2). So at this altitude the Barometric Reference Value will be set (as well as on ISIS) .
27. **Baro Ref Cross Check:** The QNH value entered in the MCDU PERF APPR page is used by the copilot. If no value has been entered there then the current ambient pressure value will be used (= keyboard [B]). It is not mandatory to fill the QNH-field in the MCDU – PERF – APPR page. But if a value is entered the unit used (inHg or hPa) must be identical with the settings the FCU – QNH display. If the unit is later changed the value in MCDU PERF APPR page automatically will be adjusted. The FSX standard conversion ratio of 1.013 = 29.92 is used for this baro function.
 Like in reality the copilot enters those figures in visible steps and not at once. Then there is a pause of 2 seconds - during which the user can enter a different value – before the checklists continues.



Picture 119: Descent Profile for RWY ILS27 into LGLC

8.9 Approach

APPROACH						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
28				5 NM before DECEL pseudo waypoint		Starts next Checklist / Co-Pilot - if selected
29	ECAM	ECAM	1	ECAM MESSAGE	CHECK	
30				SLIDING TABLE S - STOWED	STOWED	CoP
31	OVERHEAD	SIGNS	11	CABIN SIGNS = ON	CHECK or set to ON	
32	MCDU	PROG		NAV ACCURANCY	CHECK	
33	EFIS	A.PRESSURE	2	BARO REF CROSS CHECK	SET and Read out	CoP Checklist complete
34				Initial approach:		
35	OVERHEAD	SIGNS	11	SEAT BELTS	CHECK ON	AUTO is also OK
36	PEDESTAL	ENGINE	5	ENG MODE	CHECK NORM	
37				Approx. 15 NM from touchdown:		
38	MCDU	PROG		NAV ACCURANCY	MONITOR	
39	MAIN PANEL	PFD	1	POSITIONING	MONITOR	

28. **Approach CL:** The APPROACH CL now is available for manually start (MCDU2 CHECKLIST MENU = marked in orange) app. 10 NM before the DECEL pseudo waypoint and a message pops up on the INFOBAR showing the distance and explains the start options. It starts automatically app. 5 NM before DECEL pseudo waypoint.



Deceleration Pseudo Waypoint Point

Picture 120: Decel Point

For the start of the APPROACH CL it is not necessary anymore that the DESCENT CL has been finished. Even if the BARO CHECK has not yet been completed the APPROACH CL can be started. As a reminder in such a case “DESCENT CL” blinks on the right MCDU.

- 29. **ECAM Message:** There is a very important difference between caution (amber) and warning (red). If the CLR button is ON it is necessary previously to confirm a “warning” or “caution” message.
- 30. **Sliding Table:** If the copilots sliding table had been extended at cruise level. Even if the copilots function is set to OFF now the captains and copilots sliding tables will automatically be retracted.
- 31. **Cabin Signs:** SEAT BELTS=ON or AUTO (if OFF Cop sets to ON), NO SMOKING=ON
- 33. **Baro Ref Cross Check:** The QNH value entered in the MCDU PERF APPR page is used by the copilot. If no value has been entered there then the current ambient pressure value will be used (= keyboard [B]). It is not mandatory to fill the QNH-field in the MCDU – PERF – APPR page. But if a value is entered the unit used (inHg or hPa) must be identical with the settings the FCU – QNH display. If the unit is later changed the value in MCDU PERF APPR page will be automatically adjusted.

Like in reality the copilot enters those figures in visible steps and not at once. Then there is a pause of 2 seconds - during which the user can enter a different value – before the checklists continues. The FSX standard conversion rate of 1.013 = 29.92) is used for this baro function.

8.10 Final

There are two main modes for the approach: Using “Managed Speed” or “Selected Speed (manually)”. Our Checklist- and Copilot-Function uses the “**Managed Speed**” mode. This means that the speed is automatically set by the MCDU and the flaps are manually deployed by the Copilot (based on the situation). The Final CL activation is “independent” from the activation of the MCDU – PERF – APPR mode activation. The FINAL checklist will be automatically started after the APPR CL has been completed.

FINAL						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
40				Appr. CL has been completed		Starts next Checklist / Co-Pilot - if selected
41	MCDU	PERF		APPR PHASE	ACTIVATE	CoP
42				Green Dot Speed		
43	PEDESTAL	FLAPS	8	FLAPS 1	SELECT	CoP FSX: F7
44				S-Speed		
45	EWD	STATUS	4	Rad. Alt. > 2.100 ft = LANDING MEMO		
46	PEDESTAL	FLAPS	8	FLAPS 2	SELECT	CoP FSX: F7
47	MAIN PANEL	GEAR	7	L/G DOWN	SELECT	CoP FSX: G
48	MAIN PANEL	PFD	1	CALL: LOCALIZER ALIVE		

49	FCU	APPR	6	APPR	PUSH		
50	MAIN PANEL	PFD	1	CALL: LOCALIZER CAPTURED	CHECK		
51				When L/G down, below REF SPEED			
52	PEDESTAL	FLAPS	8	FLAPS 3	SELECT	CoP	FSX: F7
53				Next REF SPEED:			
54	PEDESTAL	FLAPS	8	FLAPS FULL	SELECT	CoP	FSX: F7 / Checklist complete
55	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS / SPEED BRAKE	FULL	CoP	
56	FCU	ALT	4	GO AROUND ALT	SET TO 2.000 FEET	CoP	Just enter - do not push knob
57	OVERHEAD	EXT. LIGHTS	9	NOSE LIGHT (if not TAXI)	ON	CoP	
58	MAIN PANEL	EWD	5	LANDING MEMO	CHECK NO BLUE		
59	FCU	SPD	1	Set speed to VApp	SET		= 135 (MCDU – PERF – APPR page)
60	PEDESTAL	TCAS	10	TCAS	SET TO „TA ONLY“		
61	MAIN PANEL	PFD	1	CALL: GLIDESLOPE ALIVE			
62	MAIN PANEL	PFD	1	CALL: GLIDESLOPE CAPTURED	CHECK		
63	MAIN PANEL	PFD	1	FMA	CHECK		
64	MAIN PANEL	PFD	1	LOC / GS CAPTURE	MONITOR		
65	ECAM	ECAM	1	ECAM WHEEL PAGE	CHECK		
66	FCU	ATHR	7	A/THR	CHECK SPD		
67	OVERHEAD	ANTI-ICE	8	WING ANTI ICE	CHECK OFF		

For the first waypoint (LSR06) of the FINAL waypoints into EGLC ILS RWY27 there is a speed constraint of 160 KTS. To comply with this constraint the speed just after passing SPEAR and before activation of the approach phase is already reduced to “Green Dot” speed (197 KTS). After “Green Dot” has been reached the flaps are set to 1 and the speed is reduced to S-Speed of 172 KTS. To further reduce the speed Flaps 2 are set and the plane starts to decelerates again to F-speed =136 knots. But because of the speed constraint at LSR06 of 160 knots we use “Selected Speed” e. g. draw the FCU SPD knob and set it to 160. After passing LSR06 please change the speed to 135 knots VAPP (please see #59 for details). This procedure is different from the normal procedure as stated below.

41. **Initiate Approach Phase:**

After the APPROACH CL has been finished the APPR PHASE in the MCDU PERF APPR page immediately should be manually activated (RW procedure).

If the MCDU F-PLAN DECEL pseudo waypoint (calculated by the FMGC to initiate deceleration in order to be stabilized at VAPP at a specified point on the approach profile, normally at 1000 feet AGL) is different from the point at which the APPR PHASE automatically will be initiated (7.200 feet radar altitude), it is ILS or NPA approach and distance to the airport less than 30 NM) a warning will appear on the INFOBAR “MCDU: Manually activate APPR PHASE”.

- **Manually** activated by the user (MCDU – PERF - APPR page) if warning appears on the INFOBAR “MCDU: Manually activate APPR PHASE”. In the “real world” the APPR PHASE is always activated manually and **never** automatically.
- **Automatically** at the Deceleration Pseudo Waypoint (please see picture below) if the APPROACH CL has been finished; the flight level is below 7.200 feet radar altitude, the RNAV mode is active and the distance to the airport is less than 30 NM. The (DECEL) pseudo waypoint is calculated by the FMGC to initiate deceleration in order to be stabilized at VAPP at a specified point on the approach profile, normally at 1000 feet AGL.



Deceleration Pseudo Waypoint

Picture 121: Deceleration Point

42. **Green Dot Speed / CLEAN:** After initiating the APPR Phase (#41) automatically the MCDU reduces the speed to “Green Dot Speed” (197 knots).
43. **Flaps:** During the approach the flaps will be slowly step by step extended from 1 (after reaching “Green Dot Speed”) to FULL based on aircraft speed – The flaps will be extended to 1 at least automatically 10 NM before the runway threshold if IAS is below VFE.
44. **S-Speed:** After the flaps are deployed by the Copilot to 1 the MCDU automatically reduces the speed to S-Speed (172 knots). If the plane does not slow down to S-Speed then just use the speed brakes until S-Speed is reached.
45. **Landing Memo:** The conditions for the Landing Memo are:
 - < 2100 feet RA above runway altitude for STEEP APPROACH
 - Flight mode: Cruise or Approach
 - Both thrust levers at or below CL detent

The “LANDING” checklist is “interrupted” until the “Landing Memo” becomes available in the Upper ECAM. The Copilot then continues with the settings i. e. flaps 2, gear down etc.

46. **Flaps 2:** At calculated speed (but must be lower than VFE = 200 knots) the flaps are automatically extended to 2 by the copilot (if = ON). If the calculated flaps 2 extension speed is higher than VFE the plane must be near MLW or even above. This means it is an emergency situation. In such a case do not use “Managed Speed”, but set the speed manually to a value below VFE = 200 knots (e.g. 195 knots). The flaps then will be automatically extended by the copilot (if = ON). After the flaps have been extended to 2 you can again use “Managed Speed” for landing.
48. **LOC Alive:** Before LSR06 the localizer becomes “alive” and this will be confirmed by a PM call “LOCALIZER ALIVE”. The conditions for this call are: The angle to the runway must be smaller than 90 ° and the Approach, Landing as well as BaroCheck are not active.



Picture 122: FINAL Flight Path

49. **APPR Button:** Before passing LSR06 (you are already flying at LSR34) and after hearing the call "LOCALIZER ALIVE" = press the APPR button on the FCU.
50. **LOC Capture:** The "capture" will be confirmed i.e. lateral path has been caught. Please note: If you are pushing the APPR button too early (before turning to LSR06/LSR34) it might happen that the plane captures the localizer in the wrong direction. Please see also chapter 9.4 for details. First the lateral path will be caught (LOC* or LOC displayed on the PFD -FMA)
55. **GROUND SPOILERS:** For STEEP APPROACH it is necessary to set the Ground Spoilers (Speed Brakes) to FULL.
56. **GoAround ALT:** This is the altitude a plane has to fly to when using the GO AROUND procedure (MCDU FPLAN waypoints in blue) in case a landing has to be aborted. Set the GoAround Altitude according to the FPLAN e.g. change the set altitude on the FCU to the altitude to be reached after a "Go Around". Please just change the altitude and do **not** press or pull the knob at this point. In case the Copilot function is enabled it is automatically set by the copilot under following conditions:
- FAF passed - plus 0.5 NM added
 - Actual flight level below GA ALT
 - Actual flight level below FCU set ALT
 - Vertical speed below 250 knots

If the copilot function is set to ON the highest value is automatically inserted using the MCDU FPLAN data. The value will be entered by the copilot in visible steps (with sound) and also considering the 100 and 1000 switch. Some values like 3.490 feet cannot be entered so the next possible higher value which means for 3.490 = 3.500 has to be or are entered.

If no values are available in the F-PLAN or there is no GA flight path available in the NAV DB the copilot sets the value to a value of (airport altitude rounded to next full 1.000) plus 4.000 feet e. g. normally to 5.000 feet.

58. **Landing Memo / blue entries - :** Please check if there are no "blue" entries in the Landing Memo. If for some reasons there are still "blue" entries (you might have forgotten to make certain settings) then please make those settings now.



Picture 123: Landing Memo – Steep Approach

59. **Set VAPP:** After the flaps are set to FULL and the landing gear is down the speed now should be changed to Vapp speed in our example to 130 as calculated by the FMGC – MCDU (PERF APPR) or manually adjusted like in our case for a STEEP APPROACH (please also see #4). As we are flying in "Managed Mode" the speed automatically is reduced to Vapp after the flaps are set to FULL – i.e. nothing has to be done in "Managed Mode".

But using this speed of 130 knots we would be very near Alpha Protection and PFD VLS. We therefore suggest (like it would be done in "real life") to use "selected speed" mode e.g. draw the FCU SPD knob and set it to 135 knots instead.

It is the final approach speed and automatically be calculated / inserted by the system. It is calculated in the following way: VLS plus 1/3 of the tower headwind component. The value of VAPP

is limited so that it is never less than VLS + 5 or more than VLS +15. As a result, VAPP is increased above its minimum value for runway headwinds above 15 knots. VAPP correction is not increased further for headwinds exceeding 45 knots. No additions are made for gusts.

61. **Glideslope "alive"**: When the Localizer has been captured (please see picture #70 above) soon after the vertical glide slope becomes "alive" (magenta rhombus fully appears) which will be confirmed by a call.
62. **Glideslope "captured"**: When the glideslope has been captured it will be confirmed by a call. The middle of both PFD fields shows the vertical and lateral position of the aircraft where as the magenta rhombus shows the actual position on the glide path. This means that during the approach both rhombuses are moving to the center. On the EFIS control panel please change the knob for the various views to LS. This view also shows the glide path and the position of the aircraft to it.



Picture 124: G/S captured – LS view

66. **Auto Throttle**: Leave the A/THR on.....
67. **Wing Anti Ice**: Leave the Wing Anti Ice OFF

8.11 Landing

LANDING						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
68				Flaps in Landing Config. (MCDU Settings)		Start next Checklist / Co-Pilot - if selected
69	MAIN PANEL	GEAR	7	LAND. GEAR = FULL EXTTRACTED	CHECK	CoP
70	PEDESTAL	SP. BRAKES	6	GROUND SPOILERS = FULL	CHECK	CoP FSX: Right mouse click
71	MAIN PANEL	AUTO BRAKE	6	AUTO BRAKES = MEDIUM	SET	CoP
72	OVERHEAD	EXT. LIGHTS	9	NOSE = TO or TAXI / LANDING L. = ON	CHECK	CoP
73	FCU	ALT	3	GO AROUND ALT	CHECK	CoP
74				BEFORE OR AT DECISION ALTITUDE		
75	FCU	AP	5	AP	OFF	CoP FSX: Z
76				CALL: STANDBY – STANDBY - FLARE		
77				At 60 feet: (PM CALL = FLARE")		
78				FLARE	PERFORM	
79	PEDESTAL	THR LEVER	4	THRUST LEVERS	IDLE	FSX: F1
80				At touchdown:		
81	PEDESTAL	THR LEVER	4	REV	MAX	FSX: F2
82				BRAKES	AS REQUIRED	
83				At 70 knots:		
84	PEDESTAL	THR LEVER	4	REV	IDLE	FSX: F1
85				At taxi speed:		
86	PEDESTAL	THR LEVER	4	REV	STOW	CoP
87				Before 30 knots:		
88	MAIN PANEL	AUTO BRAKE	6	AUTOBRK	DISENGAGE	CoP Checklist complete

70. **Ground Spoilers**: Speed Brakes should already be set to FULL (see #55)
71. **Auto Brake**: Set to MED (medium)
72. **Exterior Lights**: Just check if all Exterior Lights are on: Strobe, Beacon, Nav & Logo as well as Landing Lights.

<p style="text-align: center;">Aerosoft Airbus A318/319/320/321</p>	<p style="text-align: center;">The Airbus A318/319/320/321 in FSX Step-By-Step Tutorial</p>	<p style="text-align: center;">Vol 6</p>	<p style="text-align: right;">06-01-09 Page 103 25 October 2015</p>
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73. **Go Around Altitude:** Check if the GA has been set correctly according to #56.
74. **BARO – DA (decision altitude):** Please also see #3 – for EGLC ILS 27 according to the charts = 550 feet. At an altitude of 650 feet there will be a call “100 ABOVE”.
75. **Autopilot:** Because EGLC ILS27 is ILS CAT1 we are not allowed to use “AUTOLAND” and have to disconnect the autopilot at latest at the decision altitude of 550 feet.
76. **Standby – Standby – Flare:** Beginning at 130 feet start automatic call-outs “Standby / Standby / Flare” confirmed by the PM at 60 feet. Initiate FLARE at those calls e. g. at 55 feet.
77. **PM CALL “Flare”:** At 60 feet redundant to the automatic call at 63 feet the PM confirms with “Flare”.
78. **LAND and FLARE mode:** As the aircraft gets closer to the ground the LAND mode engages. The actual modes are shown on the FMA. Flare has to be initiated manually at 55 feet.
79. **Thrust Levers: IDLE:** There is a callout: RETARD (for SPEED APPROACH at 60 feet). A single callout if thrust levers are retarded in time, multiple callouts if not. Pull the trust levers back to IDLE at flare initialization and let the aircraft gently touch the ground.
81. **Trust Levers: REV:** After touchdown the thrust reversers (by using F2 from the keyboard) might be activated but not necessarily if a noise abatement procedure prohibits it.
82. **BRAKES:** The autobrake makes the aircraft decelerate on the ground. You can also take the control at any time by using the brakes. Any manual action on the brakes automatically disconnects the autobrake system.
86. **Thrust Levers: STOW:** If REV THRUST is used (#81 and #84) the levers are automatically stowed by the Copilot.

9. Alternate Company Routes and Destinations

9.1 Alternate Company Routes

An alternate company route is a flightplan (company route) from the primary destination to an alternate destination. The format and the location where those flightplans are saved are identical with those of primary flightplans.

For our tutorial we use as a primary flightplan EDDFLOWG01 e.g. from EDDF (Frankfurt/Germany) to LOWG (Graz/Austria). As alternate flightplan we will use LOWGLOWW01 e. g. from LOWG (Graz/Austria) to LOWW (Vienna/Austria).

Load the primary flight plan EDDFLOWG01 and then on the MCDU INIT A page enter LOWW into the scratchpad and then push LSK 2R.



Picture 125: Entering ALTN destination – step 1

This following page displays all the existing flightplans from LOWG to LOWW. Please select LSK 1L.



Picture 126: Entering ALTN destination – step 2

The MCDU INIT A page then looks as follows:



Picture 127: Entering ALTN destination – step 3

Now the two flightplans are loaded and can be reviewed on the F-PLAN pages. The primary flightplan is displayed in “green” whereas the GA waypoints and the alternate flightplan are displayed in “blue”. Both flightplans are separated by ----- END OF F-PLAN -----.

If for any reason ATC informs you that the airport in Graz is closed and you receive the ATC-permission to divert at the revise point of ALMER to LOWW = Vienna. The information could be like “Cleared to divert to LOWW, from ALMER direct to NERDU and use approach transition NER5L for runway 16”. Then do the following: Scroll in the primary flightplan to the waypoint of ALMER and push the LSK L (in following screenshot = LSK 3L).



Picture 128: Enabling ALTN DEST – step 1

Enable the alternate destination by pushing LSK 4L.



Picture 129: Enabling ALTN DEST – step 2

Then the following screen opens:



Picture 130: Enabling ALTN DEST – step 3

Enter NERDU into “NEXT WPT” and push LSK3R



Picture 131: Entering NERDU as NEXT WPT after the revise point ALMER

Automatically you are then back to the temporary flightplan page.

If at any enroute waypoint of the active flightplan (except FROM) the alternate flightplan is enabled (please see the picture #89) – the flightplan shrinks to:

- Active route until the revise point = ALMER in our example
- Waypoint entered as next waypoint = NERDU in our example
- **F-PLAN DISCONTINUITY**
- Complete alternate company route



Picture 132: Temporary flight plan after enabling ALTN

If another waypoint is entered after the revise point = ALMER and before the F-PLAN DISCONTINUITY (in our example = NERDU) and this waypoint is also part of the alternative company route then the flightplan

collapses. E. g. all waypoint of the alternate company route until this waypoint (= NERDU) are automatically deleted.



Picture 133: Temporary F-PLAN after matching with ALT RTE

Clear the F-PLAN DISCONTINUITY (LSK 3L) and insert this temporary flightplan (LSK 6R). The alternate flightplan now becomes the active primary flightplan.



Picture 134: Primary F-PLAN

9.2 Alternate Destinations

If no ALT CO RTE is available (or we do not want to use it) we just work with ALTN destination.

- Load the primary flightplan EDDFLOWG01
- Enter "LOWW" into the MCDU INIT A page as ALTN = LSK 2R



Picture 135: Entering ALTN DEST = LOWW

- As we will not use the existing ALTN CO RTE “LOWGLOWW01” please just go back to the INIT A page (=RETURN LSK 6L).



Picture 136: Not using existing CO RTE

- The INIT A page then looks as follows



Picture 137: INIT A page with ALTN destination

Now the two flightplans are loaded and can be reviewed on the F-PLAN pages. The primary flightplan is displayed in “green” whereas the GA waypoints and the alternate flightplan (or just destination) are displayed in “blue. Both flightplans are separated by ----- END OF F-PLAN -----. The alternate flightplan LOWG to LOWW is also separated by a -----F-PLAN DISCONTINUITY ----- because no waypoints etc. are yet defined.

If for any reason ATC informs you that the airport in Graz is closed and you receive the ATC-permission to divert at the revise point of ALMER to LOWW (Vienna) the information will be like “Cleared to divert to LOWW, from ALMER direct to NERDU and then use transition NER5L for runway 16”. Then do the following: Scroll in the primary flightplan to the waypoint of ALMER and push the LSK L (in following screenshot = LSK 3L).



Picture 138: Enabling ALTN DEST – step 1

Enable the alternate destination by pushing LSK 4L.



Picture 139: Enabling ALTN DEST – step 2

Then the following screen opens:



Picture 140: Enabling ALTN DEST – step 3

Go back to the F-Plan and use TMPY INSERT = LSK 6R. The alternate flightplan now becomes the active primary flightplan.

If at any enroute waypoint of the active flightplan (except FROM) the alternate flightplan is enabled (please see the picture #98) – the flightplan shrinks to:

- Active route until the revise point = ALMER in our example
- **F-PLAN DISCONTINUITY**
- Alternate destination = LOWW



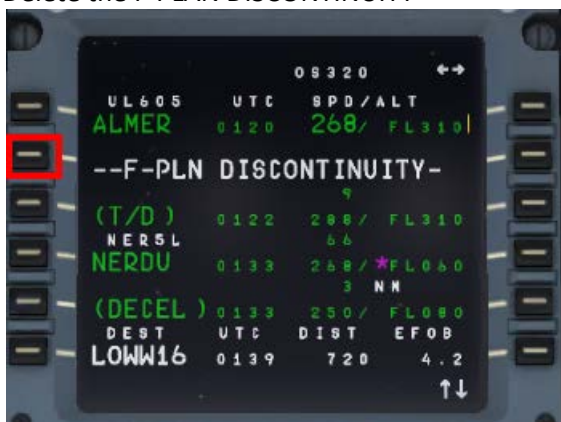
Picture 141: Active flight plan after enabling ALTN

Select the ARRIVAL for LOWW (LSK 6L) = ILS16 – no STAR – but just transition for runway 16 = NER5L and insert the temporary flightplan (LSK 6R).



Picture 142: LOWW ARRIVAL

Delete the F-PLAN DISCONTINUITY



Picture 143: Active F-PLAN (before CLR)

Final active flightplan EDDF (primary departure) – LOWW (alternate destination)



Picture 144: Active F-PLAN EDDF - LOWW

10. Tips and Tricks:

10.1 Adjusting views:

If you want to adjust one of the various available views first open it e. g. it becomes the active window. Then the following key combinations are available:

- CTRL + Return - Forward
- CTRL + Backspace - Backwards
- CTRL + SHIFT + Return - Left
- CTRL + SHIFT + Backspace - Right
- SHIFT + Return - Higher
- SHIFT + Backspace - Lower
- SPACE BAR + Mouse wheel - Zoom in or out
- SPACE BAR + Mouse - Changing the view angle

10.2 Keeping / saving adjusted views

After you adjusted the views (using the aforementioned key combinations) during the whole flight e. g. until you close the FSX respectively change to another aircraft, those adjustments will be kept.

10.3 Working with real Flight Plans:

On the Internet there are several pages where “real” flight plans (like the one we used in this tutorial) are available. Two of the addresses are

- <http://vatroute.net> or at
- <http://rfinder.asalink.net/free/>

On those pages you will find a lot of plans but you should know the airport codes (like in our example EDDF for Frankfurt or LOWW for Vienna). But those codes can be found also using the Microsoft FS Flight Planner. Those plans like in our example can be used for all Aerosoft Airbus A318/319/320/321 types.

10.4 „Capturing“ the ILS-Glide Path:

Sometimes the chosen flight path reaches the last waypoint before capturing the ILS glide path (130EZ) in a way that the angle would be too big to capture it. The ideal angle should not be greater than 45 degrees and in such cases you then should fly a manually set course (see yellow dotted line) to catch the glide path the right way.

In the following example – Picture 65: Angle „capturing“ a glide path - (before we reach WW671) please press LOC so that the lateral glide path will be caught. After catching the lateral glide and the vertical glide path starts moving (please see Picture 60) press APPR (to also catch the vertical glide path) and prepare for a smooth landing.



Picture 145: Angle „capturing“ a glide path

10.5 Transfer this document to the iPad

If you do not want to print out this document (and have an iPad in your possession), another way to have it always available during the flight is: Transfer it to your iPad. The easiest way to do this is:

- Download the ACROBAT Reader for the iPad from the Apple Store (it is for free) and install it on your iPad. An ACROBAT icon will be created on your iPad.
- Connect / synchronize your iPad with the PC using iTunes.
- In iTunes select the iPad and change to the APPS page.
- At the bottom of the page you will see the ACROBAT icon and the list of documents which are already available in ACROBAT. Use "ADD" to select this document (saved in your FSX folder under Aerosoft / Airbus A318_A319 (or Airbus A320_321) / Documentation) and it will be transferred to your iPad.
- Open ACROBAT and select "Documents". Now this tutorial should be available and can be opened and used on your iPad.

10.6 MCDU (left only) on an external device

To use the web interface start AirbusXConnectExtended.exe that is located in FSX Main Folder\Aerosoft\Airbus A318_A319 (or Airbus A320_321). You can do this before starting FSX or later. It will open a small window showing you the ip address and the port, something like this: 123.123.123.123:4040. You can enter this address into the address bar of the browser on any device that is connected to the same network. It will open showing the MCDU and you can use it as you would in the aircraft.

10.7 Use of the Procedure and Checklist

After using this tutorial and flying the Aerosoft Airbus A318/319/320 or 321 several times you will not need the explanations anymore. Then you can just use the complete procedure and checklist and fly the Airbus as a pilot and nearly as in the real life. Just the procedure- and checklist you will find as Appendix 11.

10.8 Manually entered waypoints

It is possible to manually enter waypoints (FIXES) which are not available in the Navigation DB. If you enter a waypoint which is not available in the DB a new MCDU window opens. Enter the values for latitude and longitude into the scratchpad and then push LSK 2L.



Picture 146: Manually entered waypoints

The following formats are possible to enter:

54.14.19N 002.58.51W	=	5414.2N/00258.5W	
54.235333,-2.971667	=	54.2N/2.9W	+ LAT=N/-LAT=S/+LONG=E/-LONG=W
n54 14.2 w002 58.5	=	N5414.2/W00258.5	

11. Appendix / Glossary:

Abbreviation	Description
ABV	Above (TCAS)
ADF	Automatic Direction Finder
A/C	Aircraft
AGL	Above Ground Level
A.FLOOR	Alpha Floor
AMP	Audio Management Panel
ANN	Annunciator
A/THR	Autothrust
AC	Air Conditioning
ADIRS	Air Data Inertial Reference System
AIRAC	Aeronautical Information Circular
ALT	Altitude
AP	Autopilot
APPR	Approach (Key on FCU)
APU	Auxiliary Power Unit
ATC	Air Traffic Control
BLOCK	Fuel Weight (kg)
BLW	Below (TCAS)
BRG	Bearing
CFM	Engine Manufacturer GE + SNECMA
CL or CLB	Climb
CLR	CLEAR (Key on MCDU Keyboard)
CO RTE	Company Route
CRZ FL	Cruise Flight Level
DES	Descent
DH	Decision Height
DIR	Direct
DME	Distance Measuring Equipment
ECAM	Electronic Centralized Aircraft Monitoring
EFIS	Electronic Flight Instrument System
EFOB	Estimated Fuel On Board
ELAC	Elevator and Aileron Computer
ENG	Engine
ETD	Estimated Time of Departure
E/WD	Engine/Warning Display
EXPED	Expedite (FCU Key)
EXT PWR	External Power
EXT LT	External Lights
FAC	Flight Augmentation Computer
FADEC	Full Authority Digital Engine Control
FCU	Flight Control Unit
FD	Flight Director
FDR	Flight Data Recorder
FF	Fuel Flow
FL	Flight Level
FLEX	Flexible
FLX/MCT	Flexible/Maximum Continuous Thrust
FMA	Flight Mode Annunciator
FMGC	Flight Management and Guidance Computer
FO	First Officer
FOB	Fuel On Board
FPA	Flight Path Angle
F-PLAN	Flight Plan (MCDU Page)

FQ	Fuel Quantity
GPU	Ground Power Unit
GPWS	Ground Proximity Warning System
GS	Glide Slope
GW	Gross Weight
HDG	Heading
hPa	Air Pressure Unit of Measurement (hector Pascal)
IAE	Int. Aero Engines = Engine Manufacturer RR, P&E, MTU + JAEC
ILS	Instrument Landing System
In Hg	Air Pressure Unit of Measurement (Inch Mercury)
INIT	Initiation (MCDU Page)
KG	Kilogram
IRS	Inertial Reference System
L/G	Landing Gear
LK	Lock
LOC	ILS Localizer
LSK	Line Select Key
MCDU	Multifunction Control and Display Unit
MDA	Minimum Descent Altitude
MKR	Marker
N/W	Nose Wheel
ND	Navigation Display
NDB (ADF)	Nondirectional Beacon (Automatic Direction Finder)
NM	Nautical Miles
PERF	Performance (MCDU Page)
PFD	Primary Flight Display
PPU	Power Push Unit
PROG	Progress (MCDU Page)
QNH	Barometric Pressure Reported By A Station
PSI	Pounds Per Square Inch
PTU	Power Transfer Unit
RAD/NV	Radio/Navigation (MCDU Page)
RAAS	Runway Awareness and Advisory System
RMP	Radio Management Panel
RTO	Rejected Takeoff
RWY	Runway
SD	System Display
SEC	Spoiler and Elevator Computer
SID	Standard Instrument Departure
SRS	Speed Reference System
STAR	Standard Terminal Arrival Route
STDBY	Standby (TCAS)
SW	Switch
TA	Traffic Advisory (TCAS)
TA/RA	Traffic Advisory & Resolution Advisory
TAS	True Airspeed
T/C	Top of Climb
TCAS	Traffic Alert and Collision Avoidance System
T/D	Top of Descent
TERR	Terrain Proximity Alert (GPWS)
THR	Thrust
THR RED	Thrust Reduction
THRT	TCAS Threat
THS	Trimmable Horizontal Stabilizer
TOGA	Takeoff Go-Around
TOW	Takeoff Weight
TRANS	Transition
TRK	Track
UTC	Universal Coordinated Time
V1	Speed at which takeoff cannot be aborted

V2	Minimum Takeoff Safety Speed
V/S	Vertical Speed
Vfe	Maximum Flap Extended Speed
VHF	Very High Frequency
Vls	Minimum Safe Speed
Vmax	Maximum Operating Speed In Current Condition
Vmo/Mmo	Maximum Operating Limit Speed
VOR	Very High Frequency Omnidirectional Station
Vr	Rotation Speed
XFR	Transfer
ZFW	Zero Fuel Weight
ZFWCG	Zero Fuel Weight Centre of Gravity

12. Checklists and Procedures A 319 CFM

12.1 Basic Preparation Procedure (aircraft in COLD DARK state)

BASIC PREPARATION PROCEDURE						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
1	FUEL PLANNER	ADV. METH.		PAX-, CARGO- and FUEL LOAD	SET and GEN. LOADSHEET	Please see chapter 4.1 for details
2	MCDU R	MAIN MENU	ACFT STATE	COLD DARK = LSKL1	PUSH	Should already been done
3	OVERHEAD	ELEC	3	BAT 1 + 2 (Batteries)	ON (BOTH)	Should already been done
4	OVERHEAD	ELEC	3	EXT POWER	ON	
5	OVERHEAD	EXT. LIGHTS	9	EXT. LIGHTS (= Nav Lights)	ON	
6	MAIN PANEL	PF D LIGHT	8	SWITCH	ON	
7	MAIN PANEL	ND LIGHT	8	SWITCH	ON	
8	ECAM	ECAM LIGHTS	4	SWITCH UPPER and LOWER	ON	
9	PEDESTAL	INT. LIGHT	3	OVHD INTEG LT	ON	
10	MCDU R	OPTIONS	SOUND	Cabin & Flight Crew, ATC	[ON] or [OFF]	As required – Color switches to green
11	MCDU R	OPTIONS	VIEWS	Panel & Wing View Bars and others	[ON] or [OFF]	As required – Color switches to green
12	MCDU R	OPTIONS	CHECKLISTS	CHECKL and COPILOT	ON (BOTH)	
13	MCDU R	OPTIONS	CHECKLISTS	INFOBAR	ON	
14	MCDU R	OPTIONS	CHECKLISTS	Various LIMITERS (APP & 250 KNOTS) & ILS	[ON] or [OFF]	As required – Color switches to green
15	MCDU R	OPTIONS	CHECKLISTS	AES	[ON] or [OFF]	As required – Color switches to green
16	MCDU R	LOAD/FUEL		INIT LOADSHEET or manually enter data		
16	MCDU R	LOAD/FUEL		LOAD TO PLANE		LOAD INSTANT or separately

12.2 Cockpit Preparation

COCKPIT PREPARATION							
NO.	PANEL			ACTION			REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	TA	
17	MCDU	MAIN MENU	CHECKLIST	A = PUSH LSK3L	PUSH		Start Checklist / Co-Pilot - if selected
18	OVERHEAD	ELEC	3	BAT 1 + 2 (Batteries)	CHECK ON (BOTH)	Cop	
19	OVERHEAD	ELEC	6	EXT PWR (External Power)	ON	CoP	(if available – see MCDU MENU / DOORS)
20	OVERHEAD	EXT. LIGHTS	9	NAV. LIGHTS	CHECK ON	CoP	
21	PEDESTAL	ENG	5	ENG MASTER 1 + 2	CHECK OFF	CoP	TA
22	PEDESTAL	ENG	5	ENG MODE SEL	CHECK NORM	CoP	TA
23	ECAM	LAND GEAR	2	LANDING GEAR LEVER	CHECK DOWN	CoP	
24	PEDESTAL	P. BRAKE	7	PARKING BRAKE	CHECKED = OFF	CoP	TA
25	PEDESTAL	FLAPS	8	FLAPS LEVER	CHECK POSITION = 0	CoP	
26	PEDESTAL	SP. BRAKE	6	SPEED BREAK LEVER	CHECK RETR. / DISARMED	CoP	
27	PEDESTAL	THR LEVER	4	THRUST LEVERS	CHECK IDLE		TA
28	PEDESTAL	RADIO	1	TRANSPONDER MODE	CHECKED STANDBY		
29	PEDESTAL	RADIO	1	RADIO CONTROL PANEL	ON	CoP	
30	ECAM	ECAM	5	ECAM RECALL (RCL) BUTTON	PRESS	CoP	TA
31	MAIN PANEL	ANTI SKID	10	ANTI SKID	CHECK ON	CoP	TA
32	MAIN PANEL	EFIS	3	FLIGHT DIRECTOR	CHECK ON	CoP	
33	OVERHEAD	SIGNS	12	EMERGENCY LIGHTS	ARM	CoP	TA
34	OVERHEAD	SIGNS	12	NO SMOKING SIGNS	ON	CoP	TA
35	OVERHEAD	SIGNS	8	WING & ENGINE ANTI ICE	CHECK OFF	Cop	
36	OVERHEAD	PR. WI. HEAT	13	PROBE WINDOW HEAT	AUTO/OFF		
37	OVERHEAD	AIR COND.	7	HOTAIR, ENG. BLEED L+R, PACKS L+R	CHECK ON	Cop	TA (no white signs)
38	OVERHEAD	VENTILATION	14	BLOWER, EXTRACT, CAB. FANS	CHECK ON		TA (no white signs – INOP not animated)
39	OVERHEAD	ELECTRIC	5	ENG. GENERATOR L+R	CHECK ON = FAULT	Cop	
40	OVERHEAD	ELETRIC	5	APU GENERATOR	CHECK ON		(only if EXT. POWER is ON)
41	OVERHEAD	FUEL	2	ALL FUEL PUMPS	PRESS	CoP	TA OFF should disappear
42	OVERHEAD	FUEL	2	ALL FUEL PUMPS = ON	CHECK		
43	OVERHEAD	HYDRAULICS	1	ACCU BREAK PRESS: ELEC. PUMP	(ON)		See explanation
44	OVERHEAD	GPWS	15	GPWS: ALL SWITCHES	CHECK ON	Cop	(no white signs)
45	OVERHEAD	EFCS	16	EFCS: ALL SWITCHES	CHECK ON	Cop	(no white signs)
46	OVERHEAD	ADIRS	17	ADIRS (3x)	ON	CoP	TA
47	COCKPIT	EM.EQUIPMENT		ALL EQUIPEMT AVAILABLE AND OK	CHECK ON		Checklist complete
48	PEDESTAL	RADIO	1	SET FREQUENCIES	SET		If ATC is used
49	PEDESTAL	RADIO	1	ATC CLEARANCE	OBTAIN		If ATC is used

12.3 FMGS / MCDU – Data Insertion

COCKPIT PREPARATION – FMGS/MCDU DATA INSERTION						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
50	MCDU	INIT 1		DEP and DEST AIRPORT	ENTER	
51	MCDU	INIT 1		ALIGN IRS	PRESS	
52	MCDU	INIT 1		FLT NBR (Flight Number)	ENTER	Par example =LH319
53	MCDU	INIT 1		COST INDEX	ENTER	40
54	MCDU	INIT 1		CRZ FL (Cruise Flight Level)	ENTER	=310 (31.000 feet)
55	MCDU	F-PLAN		FLIGHTPLAN	ENTER	Speeds and altitudes are now calculated
56	MCDU	RAD NAV		ENTER ADF1 FREQUENCY	ENTER	RTT
57	MCDU	INIT 2		BLOCK	ENTER	6.8
58	MCDU	INIT 2		ZFWCG/ZFW	CHECK	25.0/49.5 – speeds and altitude are calculated
59	MCDU	PERF-TO		FLAPS / THS	ENTER	2/
60	MCDU	PERF-TO		FLEX TO TEMP	CHECK	
61	MCDU	PERF-TO		V1, VR and V2	CHECK	89/120/124
62	MCDU	PERF-CLIMB		DATA	CHECK	
63	MCDU	PERF-CZR		DATA	CHECK	
64	MCDU	PERF-DES/APPR		DATA	CHECK	
65	MCDU	PERF-GO ARD		DATA	CHECK	

12.4 Cockpit Preparation – Part 2

COCKPIT PREPARATION – Part 2						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
66	EFIS	FD / ILS	3	Button: LS	OFF	
67	EFIS	ND MOD/RGE	5 & 6	ND mode and range	SET	Mode: ARC / Range 10
68	EFIS	ADF/VOR	7	VOR / ADF select	AS REQUIRED	
69	FCU	ALTITUDE	3	First Altitude	SET TO 12.000 Feet	>than THR RED altitude
70	FCU	FCU	1 to 4	DASH-BALL-DASH-BALL-ALT-BALL-DASH	CHECK	
71	ECAM	ECAM	1	STATUS	CHECK	
72	PEDESTAL	RADIO	1	ATC - FREQUENCY	SET	If ATC is used
73	PEDESTAL	RADIO	1	ATC CLEARANCE	OBTAIN	If ATC is used
74	GLARESHIELD	ND-DISPL.	2	IRS ALIGN	CHECK	
75	MCDU	F-PLAN		F-PLAN PAGE	SET	

12.5 Before Pushback and Start

BEFORE PUSHBACK OR START						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
76	MCDUw	MAIN MENU	ACFT DOORS	CLOSE ALL DOORS	PUSH	Start Checklist / Co-Pilot - if selected
77	MCDU R	MAIN MENU	ACFT DOORS	ALL WINDOWS AND DOORS CLOSED	CHECK	CoP
78	OVERHEAD	APU	10	APU MASTER and START	ON	CoP
79	OVERHEAD	APU	10	APU BLEED = ON	ON	CoP
80	MCDU	ELEC	6	EXT PWR	OFF	CoP
81	OVERHEAD	SIGNS	12	SEAT BELT SIGNS / NO SMOKING = ON	ON	CoP
82	PEDESTAL	THR LEVER	4	LEVERS	CHECK IDLE	For Seat Belts also AUTO is OK
83	PEDESTAL	P. BRAKE	7	PARKING BRAKE	SET to ON	CoP
84	MCDU2	MAIN MENU	GND SERV.	TRAFFIC CONES	REMOVE	CoP
85	MCDU2	MAIN MENU	GND SERV.	WHEEL CHOCKS	REMOVE	CoP
86	EFIS	AP SETTING	2	BARO REF	SET / X CHECK (Read out)	CoP
87	OVERHEAD	EXT. LIGHTS	9	BEACON	ON	CoP

12.6 Engine Start

12.6.1 Engine Start with Pushback

ENGINE START – with pushback						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
88	MCDU	MAIN MENU	CHECKLIST	SELECT: "START WITH PUSH" = LSK5L		Starts next Checklist / Co-Pilot - if selected
89	MCDU right			SELECT TAXI/WAX DIST and PB DIRECTION	SET	
90	MCDU right			START PUSHBACK	START	
91				„Flight Deck to Ground“		GROUND: „Go ahead“
92				„We have ATC clearance“		GROUND: „Roger“
93				„Confirm ground equipment = clear“		GROUND: "Clear"
94				"Starting pushback"		GROUND: "Roger"
95	PEDESTAL	P. BRAKE	7	PARKING BRAKE = OFF	SET to OFF	FSX: . (period)
96						GROUND: "OK. Starting Pushback"
97	PEDESTAL	ENGINE	5	ENG MODE SEL	IGN START	
98	PEDESTAL	ENGINE	5	MASTER SW 2	ON	
99	MAIN PANEL	E/WD	5a	No. 2 RUNNING UP	CHECK	
100	PEDESTAL	ENGINE	5	MASTER SW 1	ON	Engine 2 N1 > 20%
101	MAIN PANEL	E/WD	5a	No. 1 RUNNING UP	CHECK	
102				When in Position: Stop Pushback	STOP (SHIFT + P)	
103						GROUND: „Pushback complete“
104	PEDESTAL	P. BRAKE	7	PARKING BRAKE	ON	FSX: CRTL +.(period)
105						GROUND: "Have a good flight" – CL complete

12.6.2 Engine Start without Pushback

ENGINE START						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
106	MCDU	MAIN MENU	CHECKLIST	SELECT: "START" = LSK6L		Starts next Checklist / Co-Pilot - if selected
107				„Flight Deck to Ground“		GROUND: „Go ahead“
108				„We have ATC clearance“		GROUND: „Roger“
109				„Confirm ground equipment = clear“		GROUND: "Clear"
110				„Starting engines“		GROUND: „Roger“
111	PEDESTAL	ENGINE	5	ENG MODE SEL	IGN START	
112	PEDESTAL	ENGINE	5	MASTER SW 2	ON	
113	MAIN PANEL	E/WD	5a	No. 2 RUNNING UP	CHECK	
114	PEDESTAL	ENGINE	5	MASTER SW 1	ON	Engine 2 N1 > 20%
115	MAIN PANEL	E/WD	5a	No. 1 RUNNING UP	CHECK	
116				"Both Engines running"		GROUND: „Roger“
117						GROUND: "Have a good flight" – CL complete

12.7 After Engine Start

AFTER ENGINE START						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
118				ENGINE 1 & 2 are running for 15 sec		Start Checklist / Co-Pilot - if selected
119	PEDESTAL	ENGINE	5	ENG MODE SEL	NORM	CoP
120	OVERHEAD	APU	10	APU BLEED	OFF	CoP
121	OVERHEAD	APU	10	APU MASTER SW	OFF	CoP
122	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS	ARM	CoP
123	PEDESTAL	RUDDER	4	RUDDER TRIM	SET to 0 degree	CoP
124	PEDESTAL	PITCH	4	PITCH TRIM	SET to THS Value	
125				AILERON, ELEVATOR and RUDDER	CHECK ALL 6 POSITIONS	
126	PEDESTAL	FLAPS	8	FLAPS	SET to 2	CoP
127	OVERHEAD	ANTI-ICE	8	ENG ANTI ICE (1 & 2)	ON / OFF	FSX: F7
128	OVERHEAD	ANTI-ICE	8	WING ANTI ICE	ON / OFF	
129	ECAM	ECAM	1	ECAM STATUS	CHECK	
130	ECAM	ECAM	1	ECAM DOOR PAGE	CHECK	CoP
131				HAND SIGNAL RECEIVED		Checklist complete

12.8 TAXI

TAXI						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
132	PEDESTAL	RADIO	1	TAXI CLEARANCE	OBTAINED	If ATC is used
133	PEDESTAL	P. BRAKE	7	PARKING BRAKE	OFF	FSX: . (period)
134				GS> 10 Knots		Start Checklist / Co-Pilot - if selected
135	OVERHEAD	EXT. LIGHTS	9	NOSE LIGHT	TAXI	CoP
136	PEDESTAL	THR LEVER	4	LEVERS	AS REQUIRED	
137				PRESS BRAKES to listen for PM CALL	PRESS PEDAL / RELEASE	
138	MAIN PANEL	AUTO BRAKE	6	SET TO	MAX	CoP
139	MCDU			TAKEOFF DATA	REVIEW	CoP
140	FCU	HDG / ALT	2 & 3	FCU HDG/ALT = DASH-BALL-DASH-BALL	SET or CHECK	If ALT NOT SET CoP sets it to 7000ft
141				ALL DISPLAYS ARE ON	CHECK	
142	ECAM	PANEL	5	TO CONFIG	PRESS	CoP
143	MAIN PANEL	E/WD	5a	TO MEMO	CHECK NO BLUE	CoP
144	PEDESTAL	WXR	11	SET system to 1 (ON) and knob to WX-T	SET	CoP Checklist complete
145	EFIS	FD / ILS	3	FD	CHECK ON	
146	PEDESTAL	TRANSPOND.	9	ATC CODE	CONFIRM / SET	If ATC is used

12.9 Before Takeoff

BEFORE TAKEOFF						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
147				INFORMATION TO CABIN CREW		"Please prepare for Takeoff"
148	OVERHEAD	EXT. LIGHTS	9	TAXI TO RUNWAY HOLDING POINT		Start Checklist / Co-Pilot please see below
149	ECAM	WHEEL PAGE	1	BRAKE TEMP = below 150	CHECK	CoP
150	MAIN PANEL	BRAKE FAN	11	BRAKE FANS	OFF	CoP
151	PEDESTAL	ENGINE	5	ENG MODE SEL = NORMAL	CHECK	
152	PEDESTAL	TCAS	10	TCAS TA/RA plus TILT ABOVE	SET	CoP
153	OVERHEAD	EXT. LIGHTS	9	EXT. LIGHTS	SET	CoP
154				PF SLIDING TABLE	STOWED	CoP Checklist complete
155	PEDESTAL	WXR	11	TILT: UP and select 4 degrees up	SET	
156	MAIN PANEL	N/SKID NW	10	A/SKID & NW STRG	CHECK = ON	
157	PEDESTAL	RADIO	1	TAKEOFF / LINE UP CLEAR	OBTAIN	If ATC is used
158	PEDESTAL	RADIO	1	ATC (if no AUTO position)	ON	If ATC is used

12.10 Takeoff (Part 1)

TAKEOFF – Part 1						
NO	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
158	PEDESTAL	THR LEVER	4	SET LEVERS TO	MAN TOGA	
159	GLARESHIELD	CHRONO	7	CHRONO	START	CoP Push upper right button

12.11 Takeoff Abort

ABORT TAKEOFF						
TYP	PANEL			ACTION		REMARK
	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)		
PEDESTAL	THR LEVER	6	THRUST LEVERS	IDLE		FSX: F1
PEDESTAL	THR LEVER	6	REV	MAX		FSX: F2 (hold some time)
PEDESTAL	THR LEVER	6	REV	OFF		At 70 knots = FSX: 1
MAIN PANEL	BRAKES	6	AUTOBRAKES	OFF		At 35 knots
PEDESTAL	FLAPS	10	FLAPS	UP		>12 knots
PEDESTAL	SPEED-BR.	8	GRD SPOILERS	DISARM		>12 knots
OVERHEAD	EXT. LIGHTS	9	STROBES	OFF		>12 knots
OVERHEAD	EXT. LIGHTS	9	LANDING LIGHTS	OFF		>12 knots
PEDESTAL	TCAS	10	TCAS	STANBY		>12 knots
PEDESTAL	FLAPS	10	FLAPS	TO POSITION		
PEDESTAL	SPEED-BR.	8	GRD SPOILERS	ARM		

Please follow procedure again from # 128

12.12 Takeoff (Part 2)

TAKEOFF – Part 2						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
160				Takeoff thrust is set		Start Checklist / Co-Pilot - if selected
161				"Takeoff"		
162				"MAN" „TOGA" and „SRS"	„ Power set"	
163					"100 Knots"	At 100
164				"Checked"		
165					"V1"	At GS = V1
166					"Rotate"	At GS = VR
167					"Positive climb"	Radio Alt >50 ft, VS > 100 ft/min
168	MAIN PANEL	GEAR	7	"Gear up"	GEAR UP	CoP FSX: G
169	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS	DISARM	CoP FSX: /
170	MAIN PANEL	GEAR	7	GEAR STOWED	"Gear is up , lights off"	Radio Alt >50 ft, VS > 100 ft/min
171				At Thrust Red. / Acceleration Alt.		
172	PEDESTAL	THR LEVER	4	SET LEVERS TO	"CLIMB THRUST"	Blinking announcement in FMA
173	FCU	AP	5	AUTOPILOT	"AUTOPILOT ON"	
174				At "Green Dot Speed" / "S-Speed"		
175	PEDESTAL	FLAPS	8	"Flaps zero"	SELECT	CoP FSX: F6
176					"Flaps zero"	Checklist complete
177	FCU	ALTITUDE	3	Cruise Altitude	SET TO 31.000 feet	

12.13 After Takeoff

TAKEOFF – Part 2						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
178	PEDESTAL	WXR	11	TILT: DOWN	SET	
179	EFIS	INFOR.	4	EFIS OPTION	ARPT	
180	PEDESTAL	RADIO	1	RADIO NAV	CHECK	
181	PEDESTAL	ECAM	1	ECAM MENU	REVIEW	
182	MCDU	PROG		OPT / MAX ALTITUDE	CHECK	
183				FLAPS UP and RETRACTED		Start Checklist / Co-Pilot - if selected
184	PEDESTAL	ENGINE	5	ENG MODE SEL = NORMAL	CHECK	CoP
185	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS	DISARMED	CoP FSX: /
186	PEDESTAL	FLAPS	8	FLAPS UP and RETRACTED	CHECK	CoP FSX: F6
187	ECAM	GEAR	2	GEAR IS UP and STOWED	„Gear is up, Lights off"	CoP
188	OVERHEAD	EXT. LIGHTS	9	RUNWAY / NOSE = OFF	OFF	CoP
189	OVERHEAD	AIR COND	7	1 st and 2 nd PACK are ON	CHECK	CoP
190	OVERHEAD	ANTI-ICE	8	ANTI ICE (1 & 2)	AS REQUIRED	=OFF
191	PEDESTAL	TCAS	10	TCAS = TA/RA and TILT = ABV or N	CHECK and set to ABV	
192	EFIS	A PRESSURE	2	BARO REF	X-CHECK (Read out)	Checklist complete

12.14 Climb

CLIMB						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
193				CLIMB CHECKLIST		Start Checklist / Co-Pilot - if selected
194				At 10.000 feet		
195					"Passing 10.000"	
196	OVERHEAD	EXT. LIGHTS	9	LANDING LIGHTS	LIGHTS OFF	CoP
197	FCU	ALTITUDE	3	Cruise Altitude	CHECK	=31.000 feet
198				At Transition Altitude		= Checklist completed
199	GL.SH./EFIS	A PRESSURE	13 / 2	BARO REF to STD	SET / X CHECK	CoP

12.15 Cruise

CRUISE						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
200				FMA "ALT / ALT CRZ"		Start Checklist / Co-Pilot - if selected
201	PEDESTAL	TCAS	10	TCAS TA or TA/RA plus TILT NORMAL	SET	CoP
202	OVERHEAD	SIGNS	11	SEAT BELTS = OFF or AUTO	CHECK and set to OFF	CoP
203				SLIDING TABLE - COPILOT	EXTENDED	CoP Procedure complete
204	PEDESTAL	ECAM	1	ECAM MEMO / SYS PAGES	REVIEW	
205	MCDU	Var.PAGES		FLIGHT PROGRESS	CHECK	
206	MCDU	FUEL PRED		FUEL	MONITOR	
207	MCDU	PROG		NAV ACCURANCY	CHECK	
208	OVERHEAD	AIR COND	7	CABIN TEMP	MONITOR	

12.16 MCDU PERF APPR page

MCDU PERF APPR PAGE						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
209	MCDU	PERF	APPR	QNH, TEMP, MAG WIND	ENTER DATA	
210	MCDU	PERF	APPR	TRANS ALT	ENTER DATA	= 5000
211	MCDU	PERF	APPR	BARO / RADIO	ENTER DATA	= BARO 210
212	MCDU	PERF	APPR	VAPP	CHECK	
213	MCDU	PERF	APPR	LDG CONF	CHECK	

12.17 Descent Preparation

DESCENT PREPARATION						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
214				1 min after CRZ level has been reached		Start Checklist / Co-Pilot - if selected
215				SEAT BELTS = ON or AUTO	CHECK and set to ON	Cop
216	OVERHEAD	ANTI-ICE	8	ANTI ICE = OFF	CHECK	
217	PEDESTAL	RADIO	1	LANDING INFORMATION	RECEIVED	If ATC is used
218	EFIS	A.PRESSURE	2	BARO REF = STANDARD	CHECK	Cop
219	MCDU	PERF.	APPR	AIR PRESSURE ARRIVAL AIRPORT	"Checked" and readout	Cop QNH= 1013
220	MCDU	PERF.	APPR	DECISION ALTITUDE	"Checked"	Cop BARO = 210
221	MCDU	PERF.	APPR	LDG CONF (Flaps)	"Checked"	CoP Checklist complete

12.18 Descent

DESCENT						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
222	FCU	ALT	3	INSERT NEW HEIGHT	INSERT	= 4.000
223	FCU	ALT	3	INITIATE DESCENT	PUSH KNOB	
224	MAIN PANEL	PFD	1	DESCENT	MONITOR	
225	PEDESTAL	SP BRAKES	6	SET	AS REQUIRED	
226				Vert. Mode = DES / Desc.Prepare.CL = compl.		Starts next Checklist / Co-Pilot - if selected
227	MAIN PANEL	PFD	1	FMA	CHECK	
228	PEDESTAL	TCAS	10	TCAS = TILT BELOW	CHECK and SET	CoP
229				At 10.000 feet:		
230	OVERHEAD	EXT. LIGHTS	9	LANDING LIGHTS	ON	CoP
231	EFIS	FD / ILS	3	ILS LOCALIZER (LS)	PUSH	CoP EFIS
232				At Transition Altitude		= 5000
233	EFIS	A PRESSURE	2	BARO REF to actual pressure value	SET / X CHECK	CoP Checklist complete

12.19 Approach

APPROACH						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
234				5 NM before DECEL pseudo waypoint		Starts next Checklist / Co-Pilot - if selected
235	ECAM	ECAM	1	ECAM MESSAGE	CHECK	
236				SLIDING TABLE S - STOWED	STOWED	CoP
237	OVERHEAD	SIGNS	11	CABIN SIGNS = ON	CHECK or set to ON	
238	MCDU	PROG		NAV ACCURANCY	CHECK	
239	EFIS	A.PRESSURE	2	BARO REF CROSS CHECK	SET and Read out	CoP Checklist complete
240				Initial approach:		
241	OVERHEAD	SIGNS	11	SEAT BELTS	CHECK ON	AUTO is also OK
242	PEDESTAL	ENGINE	5	ENG MODE	CHECK NORM	
243				Approx. 15 NM from touchdown:		
244	MCDU	PROG		NAV ACCURANCY	MONITOR	
245	MAIN PANEL	PFD	1	POSITIONING	MONITOR	

12.20 Final

FINAL						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
246				Appr. CL has been completed		Starts next Checklist / Co-Pilot - if selected
247	MCDU	PERF		APPR PHASE	ACTIVATE	CoP
248	MAIN PANEL	PFD	1	CALL: LOCALIZER ALIVE		CoP
249	FCU	APPR	6	APPR	PUSH	
250	MAIN PANEL	PFD	1	LOCALIZER CAPTURED	CHECK	241 MAIN PANEL
251				Green Dot Speed		
252	PEDESTAL	FLAPS	8	FLAPS 1	SELECT	CoP FSX: F7
253				S-Speed		
254	PEDESTAL	FLAPS	8	FLAP 2	SET	FSX: F7 OPTIONAL
255				Glidescope becomes alive		
256	FCU	AP	5	SECOND AP	ON	
257				Glidescope captured		
258	MAIN PANEL	PFD	1	G/S CAPTURE	CHECK	
259				Rad. Alt. > 2.000 ft = LANDING MEMO		
260	MAIN PANEL	EWD	5	LANDING MEMO	CHECK NO BLUE	
261	PEDESTAL	FLAPS	8	FLAPS 2	SELECT	CoP FSX: F7
262	FCU	ALT	4	GO AROUND ALT	SET TO 2.000 FEET	CoP Just enter - do not push knob
263	MAIN PANEL	GEAR	7	L/G DOWN	SELECT	CoP FSX: G
264	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS	ARM	CoP Mouse click: right
265	OVERHEAD	EXT. LIGHTS	9	NOSE LIGHT (if not TAXI) = TO	ON	CoP
266				When L/G down, below REF SPEED		
267	PEDESTAL	FLAPS	8	FLAPS 3	SELECT	CoP FSX: F7
268				Next REF SPEED:		
269	PEDESTAL	FLAPS	8	FLAPS FULL	SELECT	CoP FSX: F7 / Checklist complete
270	FCU	SPD	1	Set speed to VApp	SET	= 126 (MCDU – PERF – APPR page)
271	PEDESTAL	TCAS	10	TCAS	SET TO „TA ONLY“	
272	MAIN PANEL	PFD	1	FMA	CHECK	
273	MAIN PANEL	PFD	1	LOC CAPTURE	MONITOR	
274	ECAM	ECAM	1	ECAM WHEEL PAGE	CHECK	
275	FCU	ATHR	7	A/THR	CHECK SPD	
276	OVERHEAD	ANTI-ICE	8	WING ANTI ICE	CHECK OFF	

12.21 Landing

LANDING						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
277				Flaps in Landing Config. (MCDU Settings)		Start next Checklist / Co-Pilot - if selected
278	MAIN PANEL	GEAR	7	LAND. GEAR = FULL EXTRACTED	CHECK	CoP
279	PEDESTAL	SP. BRAKES	6	GROUND SPOILERS = ARMED	CHECK	CoP FSX: Right mouse click
280	MAIN PANEL	AUTO BRAKE	6	AUTO BRAKES = MEDIUM	SET	CoP
281	OVERHEAD	EXT. LIGHTS	9	NOSE = TO or TAXI / LANDING L. = ON	CHECK	CoP
282	FCU	ALT	3	GO AROUND ALT	CHECK	CoP
283				AT DECISION ALTITUDE		
284	FCU	AP	5	AP	OFF	CoP FSX: Z
285				At 20 feet:		
286				FLARE	PERFORM	
287	MAIN PANEL	PDF	1	ALTITUDE	MONITOR	
288	PEDESTAL	THR LEVER	4	THRUST LEVERS	IDLE	FSX: F1
289				At touchdown:		
290	PEDESTAL	THR LEVER	4	REV	MAX	FSX: F2
291				BRAKES	AS REQUIRED	
292				At 70 knots:		
293	PEDESTAL	THR LEVER	4	REV	IDLE	FSX: F1
294				At taxi speed:		
295	PEDESTAL	THR LEVER	4	REV	STOW	CoP
296				Before 30 knots:		
297	MAIN PANEL	AUTO BRAKE	6	AUTOBRK	DISENGAGE	CoP Checklist complete
298	FCU	AP	5	AP (if applicable)	OFF	CoP FSX: Z

12.22 Go Around

GO AROUND						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
A	PEDESTAL	THR LEVER	4	GA thrust is set	SET	Start Checklist / Co-Pilot - if selected
B	PEDESTAL	FLAPS	8	"GO AROUND FLAPS"	FLAPS ONE STEP BACK = 3	CoP FSX: F6
C					"Positive climb"	Radio Alt >50 ft, VS > 100 ft/min
D	MAIN PANEL	GEAR	7	"Gear up"	GEAR UP	CoP FSX: G
E	MAIN PANEL	GEAR	7	GEAR STOWED	"Gear up , Flaps 3"	
F	PEDESTAL	SPEED-BR.	6	GROUND SPOILERS	DISARM	CoP FSX: /
G	OVERHEAD	EXT. LIGHTS	9	RUNWAY / NOSE = OFF	„Off“	CoP
H	MAIN PANEL	BRAKES	6	AUTOBRAKES	„Off“	CoP
I				At Thrust Red. / Acceleration Alt.		
J	PEDESTAL	FLAPS	8	"Flaps 1"	SELECT	CoP FSX: F6
K	PEDESTAL	THR LEVER	4	SET LEVERS TO	"CLIMB THRUST"	Blinking announcement in FMA
L	FCU	AP	5	AUTOPILOT	ON	
M				At "Green Dot Speed" / "S-Speed"		
N	PEDESTAL	FLAPS	8	"Flaps up"	SELECT	CoP FSX: F6
O					"Flaps up"	Checklist complete
P	FCU	AP	5	AUTOPILOT 2	„Off“	CoP

12.23 After Landing

AFTER LANDING						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
299				Ground Speed >35 / Dir. to runway > 15 °		Start Checklist / Co-Pilot - if selected
300	GLARESHIELD	CHRONO	7	CHRONO	STOP	Push upper right button
301	OVERHEAD	EXT. LIGHTS	9	NOSE LIGHTS	ON	CoP
302	OVERHEAD	EXT. LIGHTS	9	LANDING LIGHTS	OFF	CoP
303	OVERHEAD	EXT. LIGHTS	9	STROBE LIGHT = OFF or AUTO	IF ON = OFF	CoP
304	PEDESTAL	TCAS	10	TCAS MODE SEL	STBY	CoP
305	PEDESTAL	FLAPS	8	FLAPS	RETRACT	CoP FSX: F6
306	PEDESTAL	ENGINE	5	ENG MODE SEL	NORM	Cop
307	PEDESTAL	WXR	11	WXR: SET system to OFF	SET	Cop
308	EFIS	FD / ILS	3	ILS LOCALIZER (LS)	OFF	CoP EFIS
309	OVERHEAD	APU	10	APU MASTER and APU START	ON	
310	PEDESTAL	SP.BRAKES	6	GRND SPLRS	DISARM	CoP FSX: /
311	ECAM	WHEEL PAGE	1	BRAKE TEMP all wheels = > 300 degrees	CHECK	Checklist complete

12.24 Parking

PARKING						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
312	PEDESTAL	RADIO	1	ATC (if no AUTO position)	STBY / OFF	
313	OVERHEAD	ANTI-ICE	8	ANTI ICE (WING and ENGINES 1&2)	CHECK = OFF	
314	PEDESTAL	RADIO	1	GROUND CONTACT	ESTABLISH	If ATC is used
315	PEDESTAL	P.BRAKE	7	PARKING BRAKE ON	SET ON	FSX: CTRL + . (period)
316	PEDESTAL	ENGINE	5	ENG MASTER 1 & 2	OFF	Start Checklist / Co-Pilot - if selected
317	MCDU R	GRND SERV		CHOCKS	SET	CoP
318	PEDESTAL	P.BRAKE	7	PARKING BRAKE	OFF	CoP FSX: . (period)
319	OVERHEAD	SIGNS	11	SEAT BELTS	OFF	CoP
320	OVERHEAD	EXT. LIGHTS	9	BEACON LIGHT	OFF	CoP
321	OVERHEAD	EXT. LIGHTS	9	TAXI LIGHT.	OFF	CoP
322	OVERHEAD	ANTI-ICE	8	WING & ENGINE ANTI ICE = OFF	CHECK	CoP
323	OVERHEAD	FUEL	2	FUEL PUMPS	OFF	CoP OFF should appear / Checklist complete
324	MCDU R	GRND SERV		CONES	SET	
325	MCDU R	GRND SERV		ESTABLISH EXTERNAL POWER	CONNECT	
326	OVERHEAD	EXT POWER	6	EXT. POWER = AVAILABLE	SET TO ON	
327	OVERHEAD	APU	10	APU MASTER	SET TO OFF	
328	MCDU	MENU	ACFT DOORS	DOORS	OPEN (AS REQUIRED)	

12.25 Securing Aircraft

SECURING AIRCRAFT						
NO.	PANEL			ACTION		REMARK
	TYP	PART (Name)	PART (No.)	PF (PILOT FLYING)	PM (PILOT MONITORING)	
329	OVERHEAD	ADIRS		ADIRS (1 + 2 + 3)	OFF	
330	OVERHEAD	EXT. LIGHTS	9	NAV. LIGHTS	OFF	
331	OVERHEAD	SIGNS	11	NO SMOKING & EMERGENCY LIGHT	OFF	
332	MCDU	MENU	ACFT DOORS	DOORS	CLOSE (AS REQUIRED)	
333	OVERHEAD	EXT. PWR	6	EXT PWR	AS REQUIRED	
334	OVERHEAD	ELEC	5	GEN 1 + 2 (Electric Generators)	PRESS	OFF should appear
335	PEDESTAL	INT. LIGHT	3	INTEG LT	OFF	
336	MAIN PANEL	PF D LIGHT	8	SWITCH	OFF	
337	MAIN PANEL	ND LIGHT	8	SWITCH	OFF	
338	ECAM	DIMMER	4	SWITCH UPPER and LOWER	OFF	
339	PEDESTAL	RADIO	1	RADIO CONTROL PANEL	OFF	
340	PEDESTAL	TCAS	10	TCAS = STBY	SET	
341	OVERHEAD	BATTERIES	4	BAT 1 + 2	OFF	

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INTRODUCTION

STOP, if you got no problems with the throttles in the Aerosoft Airbus, stop reading and go and fly. This document is really only needed for people whose setup is none standard.

The throttles of the real Airbus A320 series are not mechanical connected to the engines like seen on most other aircraft. Instead electrical signals are send from the thrust levers to the FADEC (Full Authority Digital Engine Control) and this computer will control the thrust the engine provide. Please note the throttles of an Airbus are called thrust levers but we use both terms in this document.

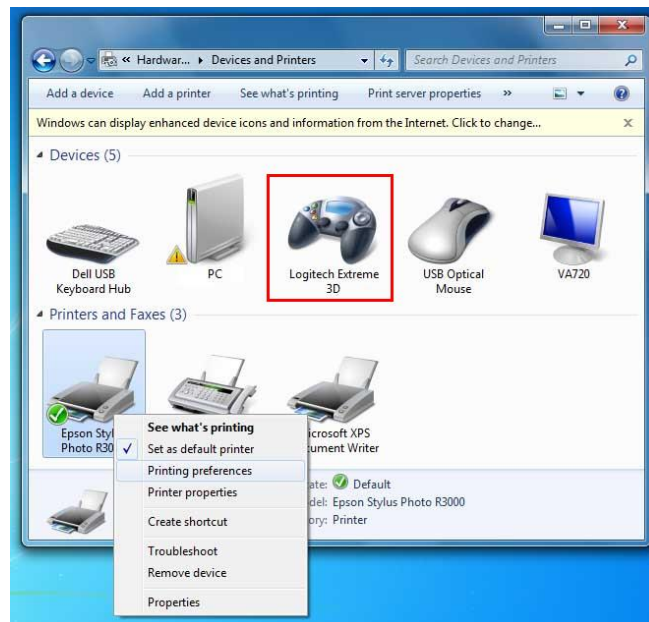
Normally FSX will use your hardware throttles to set thrust directly. Therefore it was necessary to develop a special module that detaches the hardware throttles from the FSX throttles and then control them outside FSX. For this to work it is VERY important that your hardware throttles are setup correctly in both Windows and FSX. Most users will not have to do anything special as it will work fine with a standard FSX.

For the Aerosoft Airbus products you MUST have at least one analog throttle axis available – keys won't work.

Please follow the sequence below and don't skip any step, also if you think you are sure that it is correct, often it reveals that it's not!

CALIBRATE, ALWAYS CALIBRATE

The first thing you should do is to test and calibrate all your controllers in the [Windows Control Panel / Hardware and Sound/Devices and Printer](#) menu:

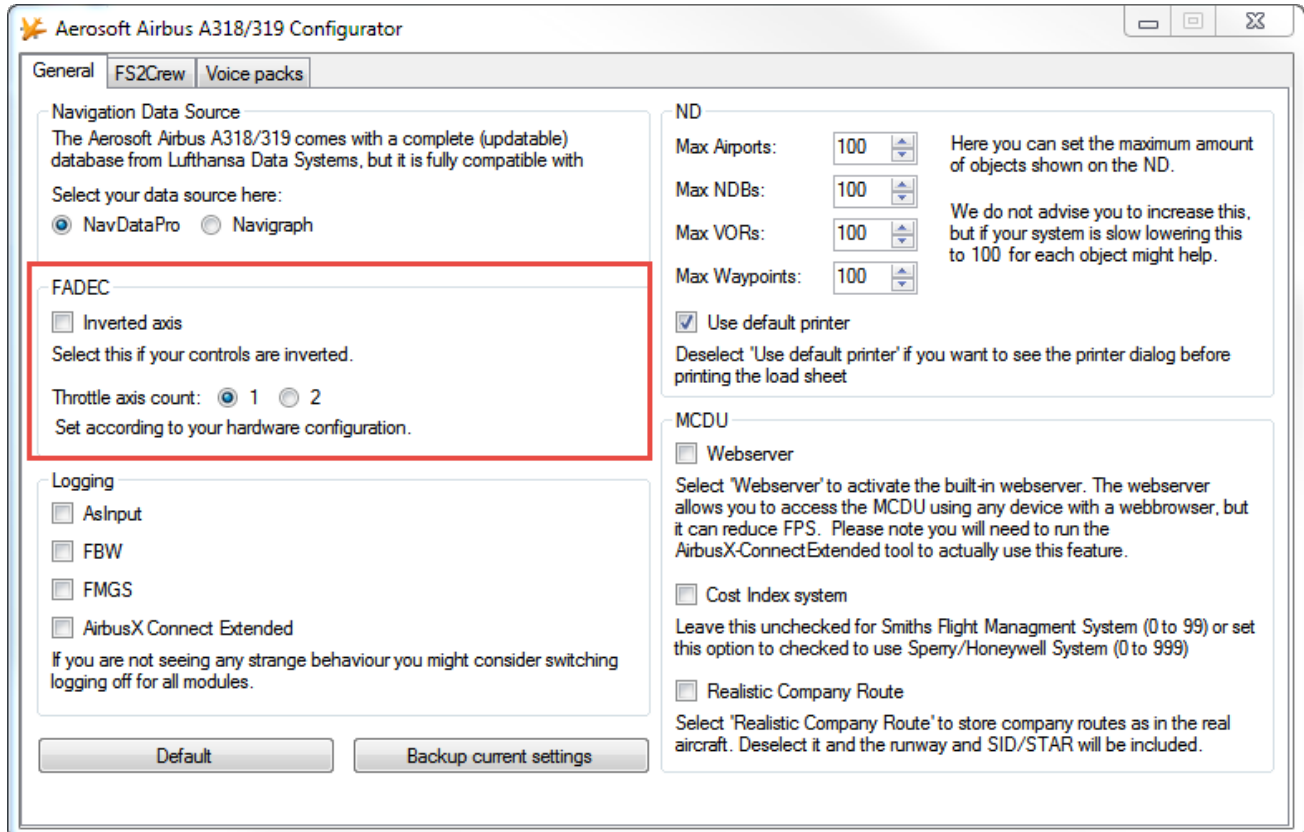


Right click with the mouse on the Gaming device and select “[Game Controller Setup](#)” – a new menu box opens, then select the controller you want to calibrate and select “[Properties](#)” - yet another menu box opens. On that menu box you will see a “[Test](#)” tab at the top as well as a testing area where all the axis’ and buttons are shown. You can test but it is better to calibrate. Select Settings/Calibrate and follow the instructions. Take your time, this really is important. If you ever get problems again, always calibrate first before doing anything else!

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CHECK THE CONFIGURATION

The next thing we are going to check is the setting in the configuration files of the Aerosoft Airbus. Start the Aerosoft Airbus A318/A319 Configurator (it's in the Windows Startmenu or what Microsoft decided to call that this month). You are looking at the FADEC section here.



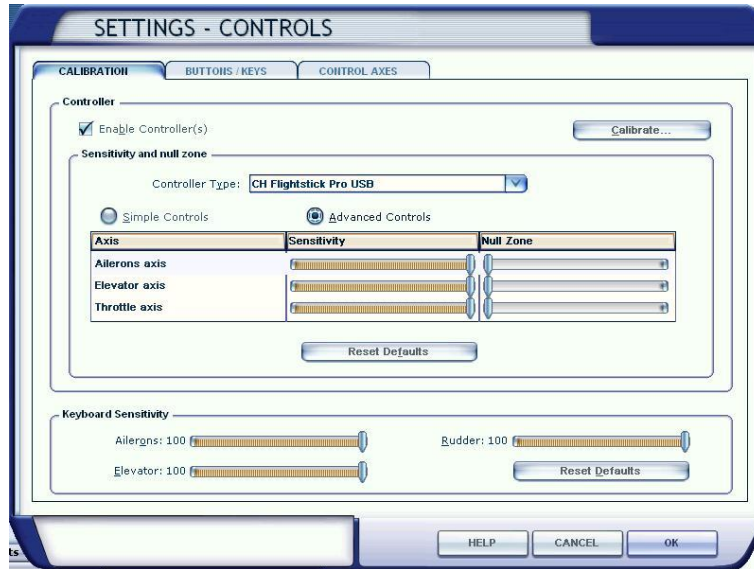
If you found the throttles to work inverted you now know what to click. Make sure you select the right number of Throttle axis, if you got a dual controller make sure 2 is selected. It is not a bad idea to activate logging of AsInput because it can help to debug things. Just close the configurator, the new settings will be stored.

Now let's start FSX.

SETTINGS INSIDE FSX

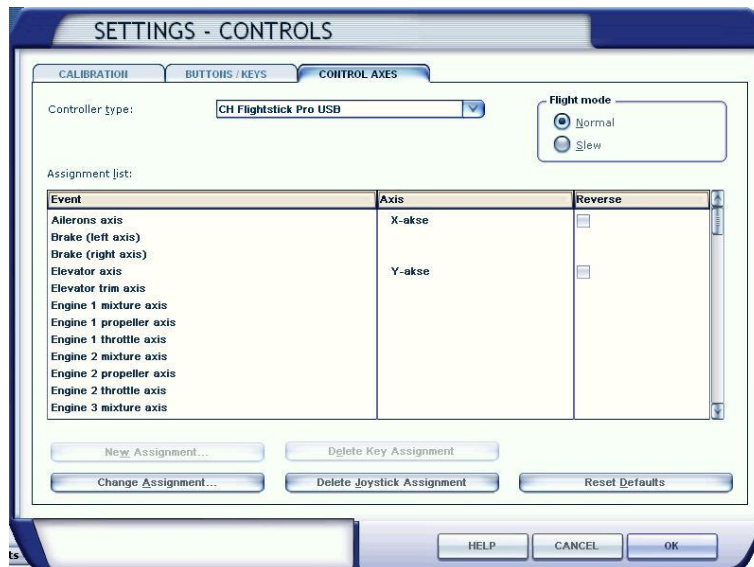
Go slow, make sure you check the images thoroughly so you do not miss any of the settings!

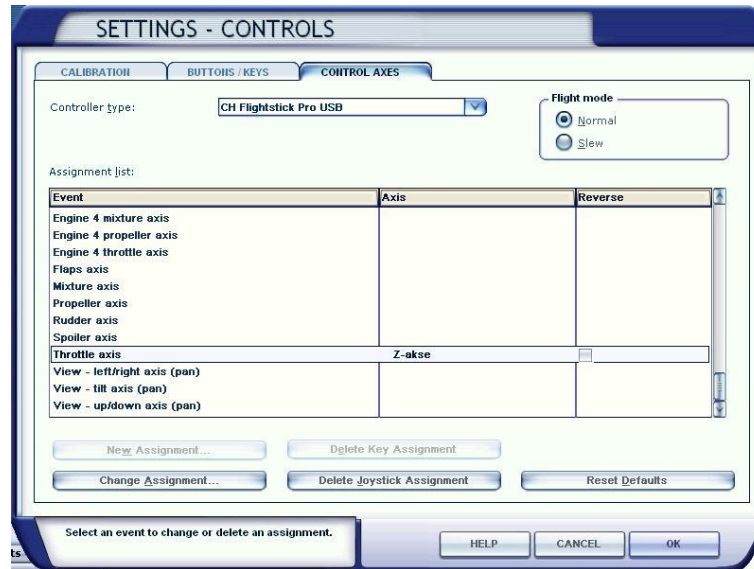
In FSX select "Settings", then "Controls...". We'll look at the CALIBRATION tab first



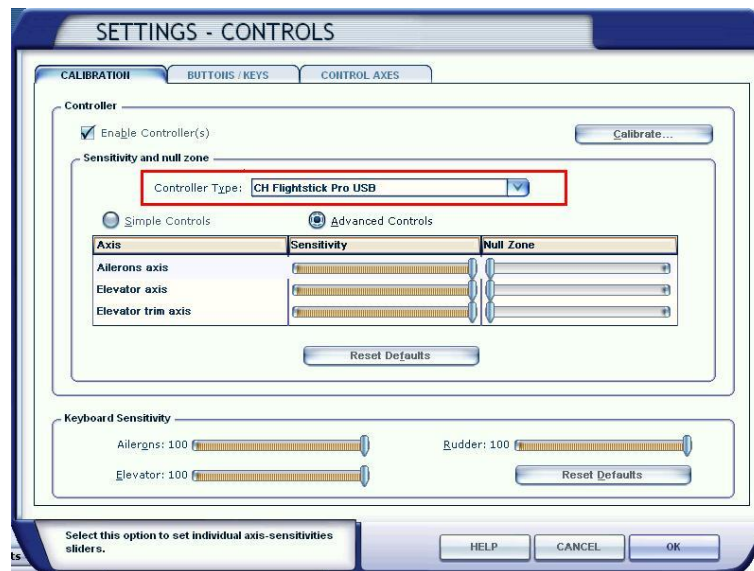
Note that preferably the **Null Zones** should be set to minimum and **Sensitivity** set to Maximum.

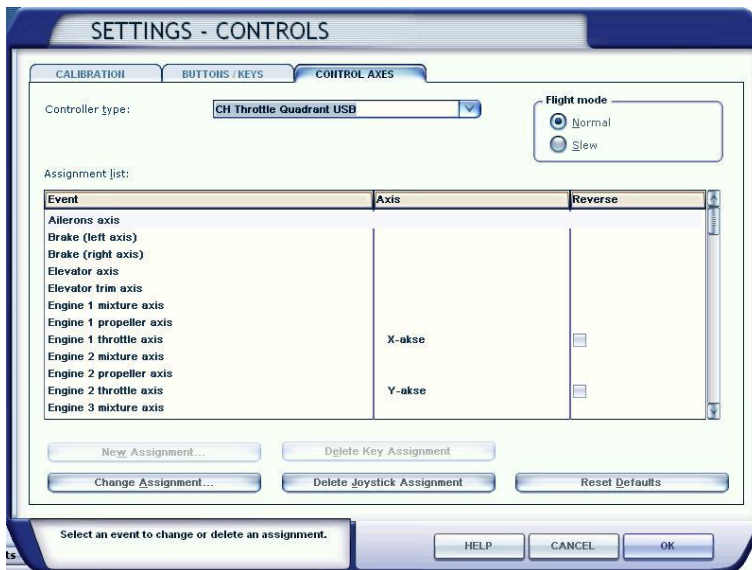
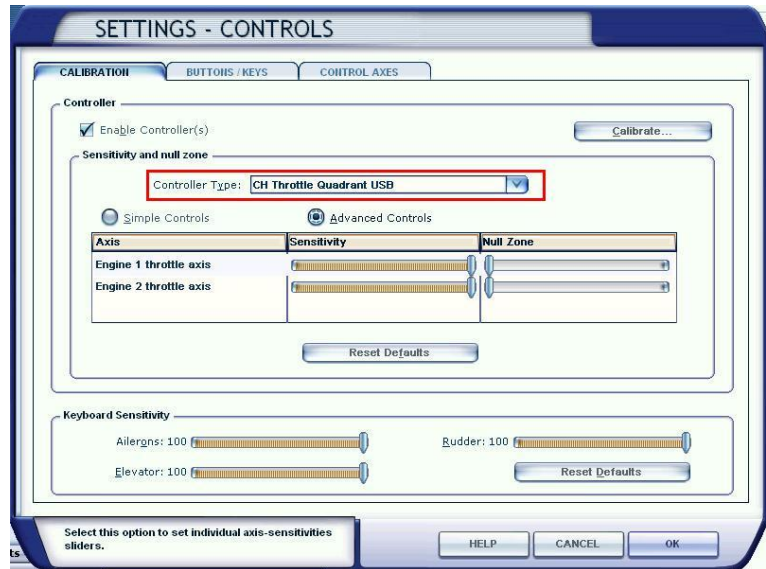
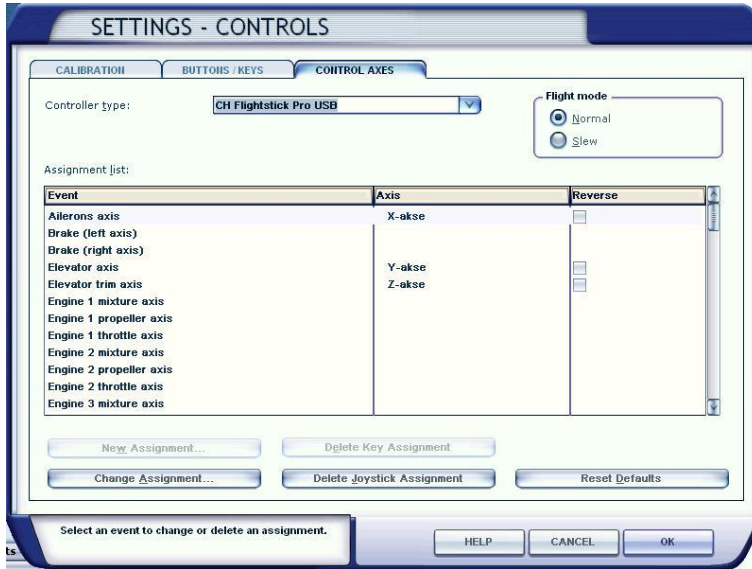
Now click the CONTROL AXES tab. If you only have a single joystick with one throttle axis, the FSX controller menus should look like this:

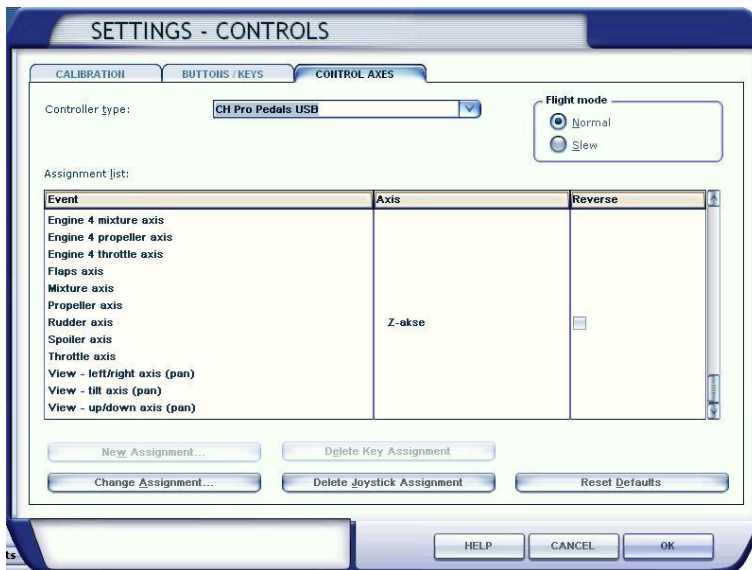
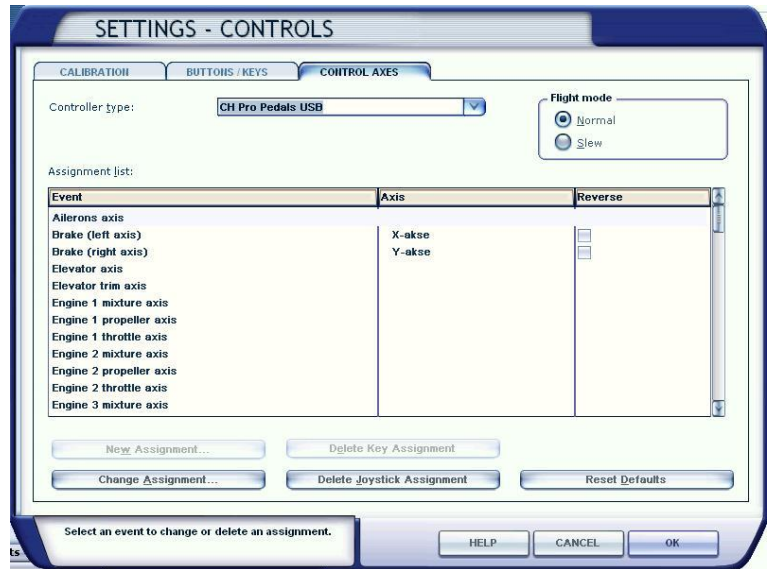
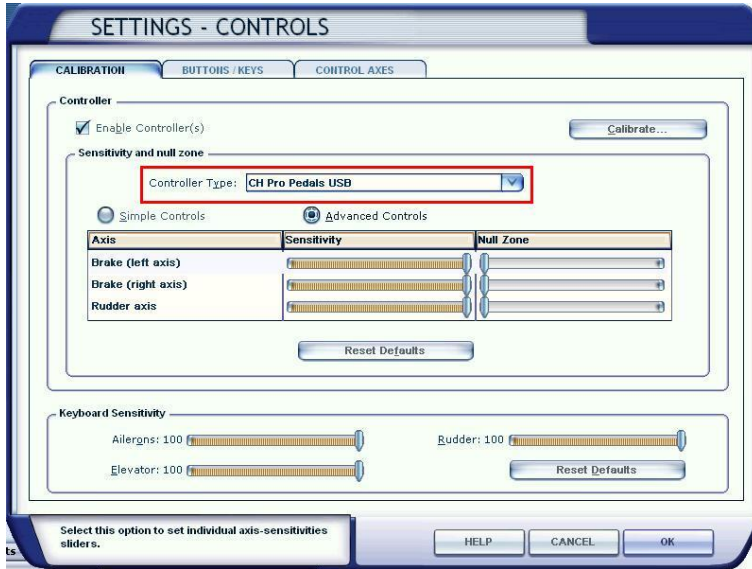




If you got an advanced setup with joystick/yoke, throttle quadrant and pedals, then it could look like this:







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Please go through each and every controller you have attached to your system in the FSX controller menu and verify that all axes for the various controllers are setup correctly, and more important, that there are **no double assignments**, like "ENGINE 1 THROTTLE SET" assigned to both Your Throttle quadrant and Pedals.

If more than one hardware axis is setup for the same engine in FSX, the throttle(s) will simply **NOT** work with the Airbus. We have seen quite a few customers where this had happened.

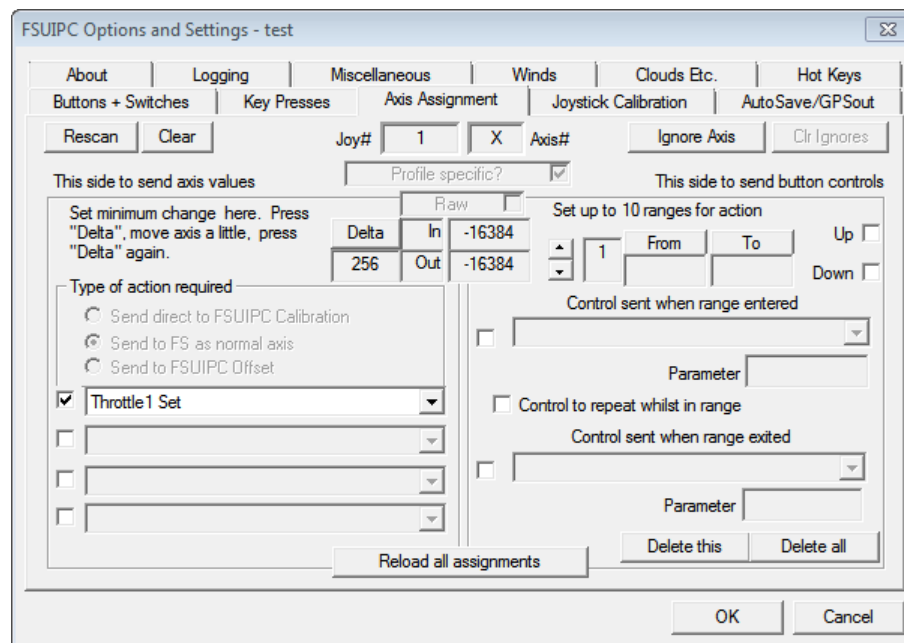
After assigning the various controllers and their axes, you should close down FSX and restart it, otherwise the new settings might not be saved correctly.

USING FSUIPC WITH AXES NOT ASSIGNED IN FSXCONTROLLER MENU

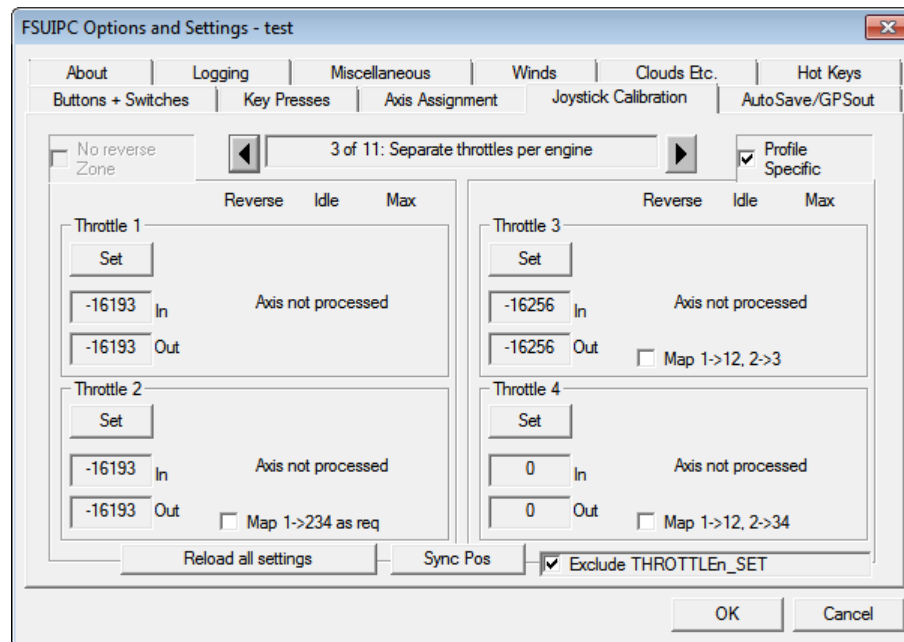
We have seen a lot of users who define the axes not via the standard FSX routines but via FSUIPC. Often this is simply not needed!

You do NOT need FSUIPC for the Aerosoft Airbus models, you will only need FSX.

If using you are using FSUIPC assignment, make sure that the throttles are not assigned in the FSX controller menu. Open the FSUIPC menu and go to [Axis assignment](#) and set a checkmark in [Aircraft specific?](#) Checkbox. Setup **each** throttle axis to read like this:



Then select the [Joystick calibration](#) tab and check it look like this:



You will need to repeat this for each of the Airbus models you fly.

With the above setup you won't have reverse thrust with your hardware levers, but will need to use F2 to engage revers thrust.

Another solution can be found here:

<http://forum.aerosoft.com/index.php?/topic/60794-ch-throttle-quadrant-idle-thrust-woes/#entry432569>

If you followed this instruction, the throttles should work correctly for the Aerosoft Airbus aircraft!

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THE WEIRD AND WONDERFUL AIRBUS LOGIC

In the last few years we have seen that many pilot who were used to Boeing (and more 'standard' logic) have problems understanding the logic of Airbus. We'll try to discuss the most confusing and often illogical aspect in this document.

This is not a highly technical document and people accustomed to Airbus logic will not need it. In fact they might find it lacking in detail or inconsistent. But if you are a real Airbus virgin you will appreciate the information.

AUTOMATION

Almost everything that can be automated is automated and handled without any need for operator intervention. You just tell the aircraft what you want and it will try to do it. This seems logical these days but when Airbus started with this it was a strange concept. A fine example is the window anti-icing systems. As they are fully automatic and we do not spend a lot of time on failures (as far as I could see a serious problem resulting of a failure of the anti-icing system has never occurred in millions of flight hours) we simply do not model them in our simulation. There is no need to. As far as a real pilot is aware they simply take care of the icing issues without bothering the crew.

Airbus pilots call it 'automagically'. You should not always try to understand the logic of the systems (certainly not when you are busy), just accept that the aircraft will try to assist you in every stage of the flight.

FLY BY WIRE

Of course this is the big one and the thing that set Airbus Aircraft apart from others for a long time. It's a simple concept, the pilot talks to the computer and the computer talks to the aircraft, but it has a profound effect on every aspect of the flight. It is best explained by a comparison. As the pilot in a Boeing 737 pulls hard on the yoke the aircraft will pitch up and it will keep pitching up until thing go horribly wrong. If you do the same in an Airbus the computers would try to figure out what you actually wanted and then try to get it done for you. As it will understand you want to go up fast it will allow you to pitch up to a maximum (but still safe) angle and when you are running out of airspeed it will increase thrust to TOGO (Go Around, the maximum amount of thrust possible). When even that does not keep enough air going over the wings it will lower the nose to increase speed. The FBW systems also prevent the pilot from doing silly things like stalling the aircraft or doing barrel rolls.

The controversy between FBW pilots and non FBW pilots will probably never end. There is a lot to be said for each philosophy. While FBW will make flying inherently safer by preventing mistakes it also limits the option a pilot has to get out of a bad situation. There is one fine example of a situation where the automation helped. During the US Airways crash in the Hudson the pilot had to ditch with minimal ground speed and minimal vertical speed. To do this he simply had to pull the control fully back. The aircraft knew the weight of the aircraft and the environmental conditions so it knew the stall speed. It sensed the stick being pulled back fully but as it had no running engines it simple selected the best option and that was to slowly descend at a speed just above stall. In a Boeing the pilot would have to very carefully maintain that minimal speed until touch down. That is difficult in a normal situation and neigh impossible in an emergency.

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Another very important aspect of FBW is that when the pilot does not give any input the aircraft will stay on its current flight path. Best explained with an example. Take an Airbus up to 5000 feet, bank it a bit and let go of the side stick. Then go have dinner. When you come back the aircraft will still be at the same bank and making large circles in the sky. A non FBW aircraft would be flying a straight course and it would level out. This may sound not too important, but consider what happens when you extend the gear. That increases drag and because they are positioned below the CoG they will cause a pitch down movement the pilot has to correct. In an FBW aircraft this would happen automatically and the aircraft would not pitch down.

In very simple terms: When you point a FBW aircraft somewhere it will go there as long as it has enough energy.

DARK COCKPIT CONCEPT

Airbus understood that the modern cockpit crew has a huge amount of information to process. To help with that the cockpit is designed with the 'dark cockpit concept'. Basically it means that if a system is running normal there is no indication. No green light, no pressure indication, just nothing. Only when there is an abnormality will the system try to draw your attention. Even when there is a problem and the systems were able to sort things out it might not be shown until the flight is over! These days Boeing also adheres to this concept in the 777 and to some degree in the MD11.

Of course some control do need to give some feedback and this is done in green (all okay) and blue (still okay).

THRUST LEVERS THAT ARE MODE SELECTORS

The thrust levers might be big and obvious things in the Airbus cockpit but they are hardly used. In a standard flight the pilot only touches them a few times:

- TAXI: the thrust levers behave like normal Thrust Levers.
- TAKE-OFF: Pilot advances the thrust levers to the FLEX or TOGA indent.
- AFTER TAKE-OFF: Pilot puts Thrust Lever on CLIMB indent.

And now comes the funny part. It stays in climb setting the whole flight until a few seconds before landing! To remind the pilot he need to do something with those levers the aircraft even tells him exactly what to do with the 'retard...retard' call. So the Airbus cruises, descends and lands with the Thrust Lever set in the CLB (Climb) setting.

- AFTER LANDING: Pilot closes Thrust Lever and activates reverse thrust.

So in the air the thrust Levers are used to select the FADEC (the computer that controls the thrust output of the engines) mode and not the amount of thrust they provide.

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THOSE PESKY FCU BUTTONS

The buttons on the FCU (the Flight Control Unit, on the glare shield) can be pushed or pulled and this leads to endless confusion for new pilots. Yet there is a great way to remember what is what:

- **PUSH:** you push control from you to the aircraft and go into MANAGED MODE. The aircraft will now fly the route (with altitudes and speed etc) programmed in.
- **PULL:** you pull control from the aircraft to yourself and go into SELECTED MODE. You now have to tell the aircraft what to do.

You'll never be confused again.

LAWS AND PROTECTIONS

Our airbus project is built to be used as 99.9% of all flights are flown. Without serious failures and without the need for the systems to leave NORMAL law mode. However it is good to know about the modes!

There are 5 laws (but each has a ground and flight mode):

1. NORMAL LAW
2. ALTERNATE LAW
3. ALTERNATE LAW (without speed stability)
4. DIRECT LAW
5. MECHANICAL BACK-UP

And you can now forget about that list because when the shit hits the fan and the systems degrade into 'lower' modes even extremely well trained pilots will not know in what modes they are. That's fine as long as you keep flying the aircraft. The laws are there to make sure you get as much help from the systems as possible.

NORMAL LAW

In normal law the aircrafts computers will provide as much protection as possible. When the aircraft threatens to go into an abnormal flight condition (in other words, gets too close the edge of the flight envelope) the systems will try to prevent it. When the aircraft gets into an abnormal flight condition the systems will try to correct it. Here is what it does:

- **LOAD FACTOR LIMITATION:** prevents high G-loads that are unpleasant for the passengers and potentially dangerous for the airframe. The system will try to stay between +2.5G and -1.0G. A serious rollercoaster will be designed with these same limits in mind btw.
- **PITCH ATTITUDE PROTECTION:** if there is one thing that your passengers will not like is going steeply up or down (they might be more bothered by the latter and so should you). The system will try to stay between 30° nose up and 15° nose down. At low speed and extended flaps the nose up limitation will lower to 20°)
- **HIGH ANGLE OF ATTACK PROTECTION:** as we all know your wings will stall when your angle of attack (the angle between the wing and the oncoming air) is too great. That's why the systems will try to prevent the aircraft getting into this situation.
- **HIGH SPEED PROTECTION:** going too slow is dangerous but going too fast as well. Your Airbus will prevent you from racing other aircraft to the airport.

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- **BANK ANGLE PROTECTION:** another things your passengers will not like is to look out of the window and stare direct at the ground. But also at high bank angles you will lose a lot of lift and speed and G-loads will increase rapidly. That's why the Airbus systems will prevent a very steep bank. It will let you bank up to 67° and when you let go of the stick will return to 33°.

ALPHA FLOOR PROTECTION

A good example (and perhaps the most important) of the protections is the alpha floor protection. It's something every airbus pilot has to demonstrate on check flights and you can do the same. It's safe and its fun.

1. Disengage Auto-Pilot and Auto-Thrust Lever
2. Switch off the Flight Director
3. Retard Thrust Lever and let the speed go down to 'green dot' (the lowest safe speed at that moment).
4. Now imagine an aircraft popping up and you have to avoid hitting it. Initiate a move UP and RIGHT (forcefully!) to avoid a midair collision and observe what happens.

Clearly the aircraft will rapidly run out of airspeed and something needs to happen. Thankfully the Airbus systems will detect this problem and it will initiate the alpha floor protection. The trust will go into TOGA (the maximum available) mode and will stay there until the pilot tells it otherwise. The other protection will prevent you from starting a loop or a roll. Although very close to the edge of the flight envelope the aircraft will stay controllable during the whole procedure!

Oh, you want to know how to get back to stabilized flight?

1. Push forwards on the stick to reduce the angle of attack
2. Level the wings and let the aircraft 'fly out of' the problem. But you are about to face a new problem as speed will increase rapidly and you could go from too slow to too fast in seconds!
3. Disengage Auto-thrust again by pushing the side button on the Thrust lever.
4. Select a safe speed on the FCU (for example 250 Knots).
5. Select both Flight Directors on again.
6. Re-engage Auto-thrust with the FCU A/THR button.
7. Set Thrust lever in CLIMB detent.
8. Re-engage Auto-pilot and establish normal flight.
9. Might not be a bad idea to talk to the passengers and to tell the cabin crew to distribute drinks for the adults and toys for the kids.

PHASES

In Airbus logic every flight is divided into stages and stages are very important to understand the logic of the Airbus systems. Consider a stage to be a combination of system settings and parameters. There are 8 phases:

- PREFLIGHT
- TAKE_OFF
- CLIMB (CLB)
- CRUISE (CRZ)
- DESCENT (DES)

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- APPROACH (APPR)
- LANDING
- GO AROUND

In a flight, even a very short one, all these stages will follow each other (or course expect the Go Around).
When this chain of phase is not completed some of the automation of the aircraft systems will not be available!

PHASE TRIGGERS

A phase trigger switches one phase into the next phase. These triggers (events) can be complex but can be simplified like this:

- PREFLIGHT
 - Thrust levers to FLX or TOGA
- TAKE_OFF
 - Reaching ACCEL altitude that was set in the MCDU PERF page
- CLIMB (CLB)
 - Reaching cruise altitude that was set in the MCDU PERF page
- CRUISE (CRZ)
 - **Manual** activation of descent and leaving cruise altitude (keep in mind that in most settings the Airbus will not start to descent without pilot interaction!)
- DESCENT (DES)
 - Manually activate and confirm APPR in the MCDU PERF page
- APPROACH to LANDING
 - Touchdown or Autopilot disconnected
- APPROACH to DONE
 - 30 seconds after landing and INIT or PERF pb is pressed

Alternative from APPROACH to LANDING:

- APPROACH to GO AROUND
 - Thrust Levers to TOGA while in APPROACH phase

MODES

Next to phases you got to understand Modes. They are not as complex as Phases as there are only three (I copied this from airbusdrivers.net, a great resource for any Airbus enthusiast) but as they change the way controls work they are important.

- Ground Mode
 - Active when aircraft is on the ground.
 - Direct proportional relationship between sidestick deflection and flight control movement
 - Direct proportional relationship between the Thrust Lever levers control setting and thrust.
 - Is active until shortly after liftoff.
 - At touchdown, ground mode is reactivated and resets the stabilizer trim to zero.
- Flight Mode
 - Active shortly after takeoff and remains active until shortly before touchdown.

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- Sidestick deflection and load factor imposed on the aircraft are directly proportional, regardless of airspeed.
- With sidestick neutral and wings level, system maintains a 1 g load in pitch.
- No requirement to change pitch trim for changes in airspeed, configuration, or bank up to 33 degrees.
- At full aft/fwd sidestick deflection system maintains maximum load factor for flap position.
- Sidestick roll input commands a roll rate request.
- Roll rate is independent of airspeed.
- A given sidestick deflection always results in the same roll rate response.
- Turn coordination and yaw damping are computed by the ELACs and transmitted to the FACs.
- No rudder pedal feedback for the yaw damping and turn coordination functions.
- Flare Mode
 - Transition to flare mode occurs at 50' RA during landing.
 - System memorizes pitch attitude at 50' and begins to progressively reduce pitch, forcing pilot to flare the aircraft
 - In the event of a go-around, transition to flight mode occurs again at 50' RA.

MINIMUM GROUND SPEED

Minimum Ground Speed (or MINI GS) is rather clever system that protects the aircraft from the dangers of microburst related windshear. A microburst is a downwards moving pocket of air that can be highly dangerous to aircraft on approach. Not only because it will 'push' the aircraft down but even more because the aircraft can get in a sudden tail wind situation that will reduce lift or cause a sudden and unexpected stalls.

MINI GS functions by increasing the Final Operating Airspeed thus enhancing the protection against stall. The increase is based on the wind speed (taken from ATIS) inserted by the crew in the MAG WIND item of the PERF/APPR page and will only function in MANAGED speed mode.

On the Professional Pilots Rumour Network it was explained by Chris Scott like this: *"GS-MINI is, as the name implies, based on a minimum ground speed. Before the approach, once the crew can predict with reasonable confidence what the surface-wind is likely to be at the landing threshold, they enter the figure into the approach Performance page. The FMS works out the correct Vapp, which is a threshold IAS based on weight and headwind component.*

Now: let's take the sea-level ISA case, where IAS=TAS; a Vapp of 130kts; and a predicted headwind of 10kts entered into the Performance page. On a conventional airplane stabilised at Vapp (130kts) at a height of 500ft, if the headwind is 30 kts the GS will be 100kts. But when it comes over the threshold, where the headwind is only 10kts, it will need to have accelerated to a GS of 120kts to maintain the required Vapp of 130. This will require a lot of extra energy (from the engines), which may cause problems, particularly if the loss of headwind happens suddenly (like at night).

It makes sense, therefore, to ensure that the GS remains at or above 120kts throughout the approach, even though this initially results in a higher IAS (150kts at 500ft in this case). The "managed" speed (IAS) target on the ASI (used by the pilot and the auto throttle) goes up and down with the headwind, but never below Vapp. Reaching the threshold, provided the actual headwind equals the predicted figure, the speed target

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will be Vapp. If the wind is higher, the speed target will be above Vapp. This should not be a problem for stopping in the runway length, because the GS will be no higher than originally planned.

In practice? Works very well, particularly using manual Thrust Lever, provided the pilot uses the "managed" speed as a target speed; not a minimum speed. The power changes required in windshear are far less than on a conventional aeroplane, because the GS (kinetic energy) is steady."

Using MINI GS is not without drawbacks. You might see that your managed speed (and thus ground speed) fluctuates and in a busy environment this could cause problem in the traffic flows.

SPEED REFERENCE SYSTEM

The Speed Reference System (SRS) will guide the aircraft along the vertical path during the take-off phase (and go around stage). It prevents the aircraft from climbing too steep and loosing airspeed.

It is armed when V2 is entered on the PERF page of the MCDU and flaps/slats not fully retracted.

It is triggered by the thrust levers placed in the take-off position and will control pitch after rotation and it will maintain an airspeed between V2+10 knots and V2+15 knots and at minimum a 120 FPM climb. When vertical speed drops below 120 FPM the system allows the speed to decrease to V2.

FLAPS 1

Another fine example of Airbus logic. If you move the flaps lever from 0 to 1 airborne, the flaps will not move! Only the slat (at the front of the wing) will deploy. Of course that would be too easy so on the ground flaps 1 WILL extend the flaps and when you retract them from 2 to 1 they will stay out. Don't even try to get your head around this, accept that the engineers thought about this and that it is best for the aircraft.



Aerosoft Airbus

A318/A319/A320/A321

Volume 9

Connected Flight Deck Flows

Robert Miroszewski & Emanuel Hagen

Version 09-002

RECORD OF REVISIONS

revision n°	Issue date	Release	Description
001	Mar 12, 2015	1.30	First issue
002	Apr 8, 2015	1.30	Added Introduction text & minor flow changes

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Welcome to your Multi Crew introduction course!

At the beginning let us discuss some of the details of multi crew operations you may not be used to from your previous operation in single pilot cockpits. Even if you already have previous experience in a multi crew cockpit you should read this section to get comfortable with the way the Airbus should be operated to ensure you and your crew member will fly it safely!

First of all you will notice the most obvious: There is someone else sitting next to you, including all the advantages, but also all the weaknesses of humans. This is especially true concerning we are untrained simmers, who, unlike professional pilots, do not have a type rating.

As you might already know from your previous flight experience there are a few golden rules of operating an Airbus, which are especially important when flying it with two crew members.

You can find those in a very nice document by Airbus and the FAA here:

<http://lessonslearned.faa.gov/IndianAir605/AirbusSafetyLib -FLT OPS-SOP-SEQ03%20-%20Ops%20Golden%20Rules.pdf>

Take your time to read and fully understand them. Always be aware of the Golden Rules when flying the Airbus!

Now let's continue with some specific aspects of operating with another crew member. You may have flown, or when no second pilot is available will still fly, with addons providing a simulation of a first officer. It will not take long for you to notice that these are, as long as they understand your commands, more or less "perfect" in doing their flows, etc.

This is not the case any longer!

Flying with a real person means he is going to make mistakes, not doing what you want him to do and misunderstanding each other. This is normal and we have to deal with it. Over the last decades procedures have been developed to counteract the human factors while flying. They can't prevent all kind of mistakes, but they will help managing them!

Crew Resource Management (CRM)

What I'm outlining here is basically just a very small part of what real pilots learn in a CRM course. The real course lasts several days and includes in depth discussions of how to react in certain situations, etc. Some people tend to put a CRM course on par with an actor training.

We're just doing a brief summary on this here, however once you have read and understood it, it will greatly enhance your experience flying the Airbus in a multi crew environment.

All of the following sort of belongs to CRM, but for a better readability I'll split it in several parts combined with the most important information you need to fly the Airbus with a real person as your captain or first officer:

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Know what your Crew member is doing

Probably the most important lesson to be learned is to check each other.

Just like a real crew that keeps watching each other you should also have a look at your crew member! As we are all doing this in our free time, sitting at home and probably having our Wife/Husband/girlfriend/boyfriend/mistress/children around us we will do mistakes. This is normal and there is nothing wrong with it.

Talk about it with your other crew member and let him know about mistakes you made. If he knows about your mistakes he can watch you.

Flying is a constant learning experience and as such it is good to know which mistakes others make as you may also make them without knowing about it!

My flight instructor always told me: *“You should stop flying when you say you don't learn something new any longer!”*

So, keep watching your crew member and correct him when necessary. Doing mistakes is human and there is nothing wrong with it as long as you acknowledge and correct them.

Sterile Cockpit

During high workload communication should be kept to a minimum necessary to operate the Airbus safely. Such situations are taxi, takeoff, climb out, approach and landing.

This not only includes communication, but also entering data into the systems (particularly the FMGS), etc.

As a rule of thumb the Sterile Cockpit concept should be applied below FL100/10.000ft, but also at any other times of high workload.

Callouts

Just like in ATC communication there are certain standard phrases that are used for communication between the crew in an Airbus (and in any other aircraft).

In the following document you can find some more information on this topic:

http://www.airbus.com/fileadmin/media_gallery/files/safety_library_items/AirbusSafetyLib - FLT OPS SOP_SEQ04.pdf

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I will list the most important callouts and some standard calls for procedures you should be familiar with which are not listed in the doc above:

- I have control/You have control
- Set Heading/Speed/Altitude xxx
 - If a change in FCU altitude is made always check it on the PFD and reply Altitude/FL xxxx to make sure the correct value is set and „seen“ by the System! When flying in managed modes keep in mind the FMGS may overwrite your set altitude due to a CSTR.
- [Insert System name] ON/OFF
- Gear UP/DOWN
- Altimeter reset:
 - PF: „altimeters“
 - PM: „standard, passing FLxxx“
 - PF: „standard, passing FLxxx“
- Approaching FCU altitude
 - PM: „1000“
 - The PM has to call 1000 if the aircraft is 1000ft before the assigned altitude. Some airlines also have a 2000 or a 500 call, but 1000 is the most common one.

FMA Callouts

I'm making this as a separate section as it is very important you are aware of these!

As you already know from the Golden Rules both pilots should **always** be aware of the FMA, regardless of who the PF is and who is the PM. Therefore it is important that each change in the FMA is announced.

Announcements are to be made by the PF, however the PM shall announce the new mode if the PF does not make a timely announcement. Give him a short time to notice the change though. Nothing can be more annoying than someone always doing your announcements if you miss them by half a second!

A missing announcement may indicate an incapacitation of the other crew member!

Task sharing/SOP

A proper sharing of tasks is needed in order to operate the aircraft in a professional and safe manner.

Following a Standard Operating Procedures (SOP) is the only way to operate the aircraft time and fuel efficient and to create the base for proper CRM.

In the real world each operator creates their own SOP which tells exactly which tasks are to be performed by which pilot. We have included a detailed SOP in this manual, which you should use to fly the Airbus.

If every pilot of our Airbus operates it according to the SOP we included you will have no problems, even when flying with someone whom you have never seen or talked to before, so you could basically fly with each and every pilot who has our Airbus!

Do not worry if you see something done differently in some video. Keep in mind each airline may do things different than another.

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Briefing

The briefing is one of the parts most of us will not be very familiar with.

Even worse, many of us may have already adapted a wrong way of conducting a briefing as there are several addons out there which include briefings, but to be honest, so far I haven't seen a single addon doing a briefing correctly and as it would be done in real life.

Only a good briefing can lead to a good flight with both crewmembers knowing what will be done.

Knowing what the other pilot plans to do is the key element of flying with each other and to remain ahead of the aircraft. In fact there is a lot more behind a briefing than most of us would think seeing a video of a real crew conducting a briefing.

A detailed guide how to conduct a proper briefing is published by Airbus here:

[http://www.airbus.com/fileadmin/media_gallery/files/safety_library_items/AirbusSafetyLib - FLT OPS-SOP-SEQ06.pdf](http://www.airbus.com/fileadmin/media_gallery/files/safety_library_items/AirbusSafetyLib_-_FLT_OPS-SOP-SEQ06.pdf)

You should follow this guide at all times when briefing your other crew member.

Make sure to plan with enough time to prepare and conduct the briefing.

Equally important is the usage of the same charts by both crew members, in order for both to get the same information. Of course it's ideal if the charts even comply with the database. If they are not up to date make sure to check the procedure entered in the FMGS with your charts to make sure no sudden surprise happens during the approach!

Below you will find the flows for our SOP divided into Captain/First Officer and Pilot Flying/Pilot Monitoring sections.

We recommend always to fly according to these flows, even when flying the Airbus in a single pilot operations in order to get used to them.

I'm looking forward to see you in the air and wish you always three greens!

Emanuel Hagen

COCKPIT PREPARATION FLOWS

PF	PM / PNF
PFD/ND BRT	ECAMS BRT
FLOOD LT AS RQRD	
INTEG LT AS RQRD	
OVERHEAD PANEL	PEDESTAL
BATTERY 1+2 ON	PARKING BRAKE SET
EXT POWER ON	FLAPS VERIFY O
RCDR GND CTL ON	SPEEDBRAKE RET/DISARM
ADIRS NAV	ENG MASTER 1+2 OFF
ELEC HYD PUMP ON	ENG MODE SEL NORM
FUEL PUMPS ON	THRUST LEVERS IDLE
ENG GEN ON/FAULT	TRANSPONDER STBY
PACK 1+2 ON	RADIO PANEL ON
ENG BLEED 1+2 ON	FREQ SET
HOT AIR ON	
ENG ANTI ICE OFF	ECAM / MAIN PANEL
PROBE HEAT AUTO	ECAM RECALL SELECT
EMER EXIT LT ARM	L/G LEVER DOWN
CABIN SIGNS ON	DOORS OPEN/AS RQRD
NAV LT ON	ANTI SKID ON
GPWS ON	
MCDU SET	ATIS/ATC CLRN OBTAIN
	SQUAWK SET
----- TAKEOFF BRIEFING -----	
TAKEOFF BRIEFING PERFORM	
GLARESHIELD	GLARESHIELD
BARO REF SET	BARO REF SET
FD ON	
LS AS RQRD	
ND MODE/RANGE SET	
VOR/ADF SELECT	
FCU SET	FCU VERIFY AND COMPLETE
	PEDESTAL
	MCDU CHECK IRS ALIGN

BEFORE PUSHBACK / START FLOWS	
PF	PM / PNF
TO DATA	CHECK/REVISE BOARDING
MCDU	PERF TO FUELING.....
APU	VERIFY COMPLETE DOORS
APU BLEED	CLOSE PARKING BRAKE
EXT POWER	ON CHOCKS
APU BLEED	REMOVE TRAFFIC CONES
EXT POWER	OFF EXT POWER
	DISCONNECT
----- BEFORE START C/L TO THE LINE -----	
WINDOWS/DOORS	CHECK PUSHBACK/START CLEAR
THRUST LEVERS	OBTAIN WINDOWS/DOORS
PARKING BRAKE	CHECK BEACON
	ON
----- BEFORE START C/L BELOW THE LINE -----	

BEFORE START/PUSHBACK CHECKLIST	
COCKPIT PREP	COMPLETED
WHEEL CHOCKS	REMOVED PM
CABIN SIGNS	ON/AUTO
ADIRS	NAV
FUEL QUANTITY	___KG
TO DATA	SET
BARO REF	___SET B

WINDOWS/DOORS	CLOSE B
BEACON	ON
THRUST LEVERS	IDLE
PARKING BRAKE	AS RQRD

TAXI FLOWS	
CAPT	FO
NOSE LT TAXI RWY TURN OFF ON	TAXI CLEARANCE OBTAIN
TAXI CLEARANCE OBTAINED: PARKING BRAKE OFF THRUST LEVERS AS RQRD BRAKES CHECK	ELAPSED TIME AS RQRD BRAKE PRESS CHECK ZERO AUTO BRAKE MAX
FLT INSTR/FMA CHECK	FLT INSTR/FMA CHECK RADAR AS RQRD
TO BRIEFING CONFIRM	TO CONFIG PRESS TO MEMO CHECK NO BLUE
----- BEFORE TAKEOFF C/L TO THE LINE -----	

BEFORE TAKEOFF FLOWS	
CAPT	FO
APPR PATH CLEAR OF TFC CHECK	BRAKE TEMP CHECK BRAKE FANS OFF TO/LU CLEARANCE OBTAIN CABIN CREW ADVISE ENG MODE SEL AS RQRD TCAS TA OR TA/RA
THRUST BUMP AS RQRD SLIDING TABLE STOW	EXT LT SET PACK 1+2 AS RQRD SLIDING TABLE STOW
----- BEFORE TAKEOFF C/L BELOW THE LINE -----	
WHEN LINED UP: CONTROLS HAND TO PF	

BEFORE TAKEOFF CHECKLIST	
FLT CTL	CKD B
FLT INSTR	CKD B
TAKEOFF BRIEFING	CONFIRMED
FLAPS CONF	FLAPS B
V1, VR, V2, FLX TEMP .	____/____ B
ATC	SET
ECAM MEMO	TAKEOFF NO BLUE

CABIN CREW	ADVISED
TCAS	TA OR TA/RA
ENG MODE SEL	AS RQRD
PACK 1+2	AS RQRD

TAKEOFF FLOWS	
PF	PM / PNF
ANNOUNCE "TAKEOFF" BRAKES RELEASE THRUST LEVERS FLEX/TOGA	
CHRONO START	
BELOW 80 KT:	PFD/ND SCAN N1 (EPR) CHECK
	ANNOUNCE "POWER SET" PFD/ENG PARAMS SCAN
AT 100 KT:	ANNOUNCE "100 KT"
ANNOUNCE "CHECKED"	
AT V1:	ANNOUNCE "V1"
AT VR:	ANNOUNCE "ROTATE"
WHEN V/S POSITIVE:	ANNOUNCE "POSITIVE CLIMB"
ORDER "GEAR UP"	L/G UP GRND SPLRS DISARM NOSE LT OFF RWY TURN OFF LT OFF
AP AS RQRD	ANNOUNCE "GEAR UP"
AT THRUST REDUCTION ALT:	ONE PACK ON
THRUST LEVERS CL	
AT F SPEED:	FLAPS 1 SELECT ANNOUNCE "SPD CKD FLAPS 1"
ORDER "FLAPS 1"	
AT S SPEED:	FLAPS 0 SELECT ANNOUNCE "SPD CKD FLAPS 0"
ORDER "FLAPS 0"	2ND PACK ON

AFTER TAKEOFF AND CLIMB FLOWS	
PF	PM / PNF
	APU MASTER AS RQRD ENG MODE SEL AS RQRD TCAS TA/RA ANTI ICE AS RQRD
----- AFTER TAKEOFF C/L TO THE LINE -----	
FCU/FMGS SET IF AP ON	MCDU PERF CLB
AT TRANSITION ALT:	
BARO REF STD	BARO REF STD
----- AFTER TAKEOFF C/L BELOW THE LINE -----	
AT 10000 FT: EFIS OPTION ARPT RADIO NAV CHECK	ENG ANTI ICE AS RQRD LAND LT OFF SEAT BELTS AS RQRD ECAM MEMO REVIEW OPT/MAX ALT CHECK SEC F-PLN AS RQRD

AFTER TAKEOFF CHECKLIST	
L/G	UP
FLAPS	RETRACTED
PACKS	ON

BARO REF	STANDARD SET B

CRUISE FLOWS	
PF	PM / PNF
MONITOR FLIGHTPATH	EVERY 30 MINS: FUEL CHECK ECAM (ALL PAGES) CHECK

DESCENT PREP AND DESCENT FLOWS	
PF	PM / PNF
LDG ELEV CHECK	ATIS OBTAIN LANDING DATA PREPARE GPWS LDG FLAP 3 AS RQRD
----- APPROACH BRIEFING -----	
APPR BRIEFING PERFORM	DESCENT CLEARANCE OBTAIN ANTI ICE AS RQRD
DESCENT INITIATE MCDU PROG/PERF DES DESCENT MONITOR SPEEDBRAKES AS RQRD	
WHEN CLEARED TO ALTITUDE:	
BARO REF SET	BARO REF SET ECAM STATUS CHECK
AT 10000 FT:	
EFIS OPTION CSTR LS PUSHBUTTON AS RQRD RADIO NAV SELECT/IDENT NAV ACCURACY CHECK	LAND LT ON SEAT BELTS AS RQRD

APPROACH FLOWS	
PF	PM / PNF
15 NM FROM TOUCHDOWN: APPR PHASE ACTIVATE OR SET GREEN DOT SPEED ----- APPROACH C/L -----	ENG MODE SEL AS RQRD SEAT BELTS ON/AUTO NAV ACCURACY MONITOR

APPROACH CHECKLIST
APPROACH BRIEFING CONFIRMED
ECAM STATUS CKD
SEAT BELTS ON
BARO REF SET B
MDA/DH..... SET B
ENG MODE SEL AS RQRD

FINAL FLOWS	
PF	PM / PNF
AT GREEN DOT SPEED : ORDER "FLAPS 1"	FLAPS 1 SELECT ANNOUNCE "SPD CKD FLAPS 1"
CHECK OR SET S SPEED	
WHEN ESTABLISHED ON APPROACH :	TCAS TA OR TA/RA
AT 2000 FT AGL	GO AROUND ALT SET
ORDER "FLAPS 2"	FLAPS 2 SELECT ANNOUNCE "SPD CKD FLAPS 1"
CHECK OR SET F SPEED	
WHEN FLAPS 2	L/G DOWN
ORDER "GEAR DOWN"	GRND SPLRS ARM AUTO BRAKE AS RQRD CONFIRM/ANNOUNCE "GEAR DOWN"
WHEN L/G DOWN, BELOW VFE	FLAPS 3 SELECT
ORDER "FLAPS 3"	ANNOUNCE "SPD CKD FLAPS 3"
WHEN FLAPS 3, BELOW VFE	FLAPS FULL SELECT
ORDER "FLAPS FULL"	ANNOUNCE "SPD CKD FLAPS FULL"
CHECK OR SET VAPP	
SLIDING TABLE STOWED	A/THR CHECK SPD OR OFF WING ANTI ICE AS RQRD EXT LT SET
SLIDING TABLE STOWED	CABIN REPORT OBTAIN
SLIDING TABLE STOWED	CABIN CREW ADVISE
----- LANDING C/L -----	

LANDING CHECKLIST	
CABIN CREW	ADVISED
A/THR	SPEED/OFF
ECAM MEMO	LANDING NO BLUE B

SHORT FINAL FLOWS	
PF	PM / PNF
AT DH/MDA + 100 FT : AT DH/MDA : ANNOUNCE“LANDING” OR “GA/FLAPS”	FLT PARAMS CHECK Announce any deviation in excess of: V/S: 1000 ft/min IAS: speed target + 10 KT; VAPP – 5 KT ANNOUNCE “HUNDRED ABOVE” ANNOUNCE “MINIMUM”

LANDING FLOWS	
PF	PM / PNF
AT 20 FEET : FLARE PERFORM THRUST LEVERS IDLE AT TOUCHDOWN : REV MAX BRAKES AS RQRD AT 70 KT : REV CHECK IDLE AT TAXI SPEED : REV STOW BEFORE 20 KT : AUTO BRAKE DISENGAGE	ATTITUDE MONITOR ANNOUNCE“GRND SPLRS” ANNOUNCE “REVERSE GREEN” IF DECELERATING : ANNOUNCE “DECEL” ANNOUNCE “70 KT”

GO AROUND FLOWS	
PF	PM / PNF
THRUST LEVERS TOGA ANNOUNCE “GO AROUND” ROTATION PERFORM ORDER “GEAR UP” AT GA THRUST RED. ALTITUDE : THRUST LEVERS CL AT GA ACCEL ALTITUDE : SPEED MONITOR	FLAPS RETRACT ONE STEP ANNOUNCE NEW FLAPS SETTING ANNOUNCE“POSITIVE CLIMB L/G UP ANNOUNCE “GEAR UP” NAV/HDG SELECT FLAPS RETRACT ON SCHEDULE

AFTER LANDING FLOWS	
CAPT	FO
AT NIGHT TIME: LAND LT RETRACT GRND SPLRS DISARM SIGNAL FOR PM/PNF TO COMENCE CLEAN-UP ----- AFTER LANDING C/L -----	AT DAY TIME: LAND LT RETRACT CLEAN-UP: FLAPS RETRACT ENG MODE SEL NORM TRANSPONDER STBY ANTI ICE AS RQRD APU START RADAR OFF/STBY BRAKE TEMP CHECK

AFTER LANDING CHECKLIST (FO SILENTLY)
GRND SPLRS DISARMED FLAPS RETRACTED ENG MODE SEL NORM APU AS RQRD

PARKING FLOWS	
PF	PM / PNF
PARKING BRAKE	ANTI ICE OFF
ENG MASTER 1+2	APU BLEED ON
FUEL PUMPS	
GRND CONTACT	ELAPSED TIME STOP
BEACON LT	WHEEL CHOCKS SET
EXT LT	EXT POWER CONNECT
SEATBELTS	E CAM STATUS CHECK
PARKING BRAKE	BRAKE FAN OFF
	DUs DIM
----- PARKING C/L -----	

PARKING CHECKLIST	
APU BLEED	ON
ENG MASTER 1+2	OFF
ANTI ICE	OFF
SEAT BELTS	OFF
EXT LT	AS RQRD
FUEL PUMPS	OFF
PARKING BRAKE	AS RQRD

SECURING THE AIRCRAFT FLOWS	
PF	PM / PNF
PARKING BRAKE	CHECK ON
ADIRS (1+2+3)	OFF
	EXT LT OFF
	APU BLEED OFF
	APU MASTER OFF
	EMER EXIT LT OFF
	NO SMOKING OFF
	EXT POWER AS RQRD
	BATTERY 1+2 OFF
----- SECURING THE AIRCRAFT C/L -----	

SECURING THE AIRCRAFT CHECKLIST	
ADIRS	OFF
NO SMOKING	OFF
APU	OFF
BATTERY 1+2	OFF

CHECKLISTS

BEFORE START/PUSHBACK CHECKLIST

COCKPIT PREP COMPLETED
 WHEEL CHOCKS REMOVED **PM**
 CABIN SIGNS ON/AUTO
 ADIRS NAV
 FUEL QUANTITY ___ KG
 TO DATA SET
 BARO REF ___ SET **B**

 WINDOWS/DOORS CLOSED **B**
 BEACON ON
 THRUST LEVERS IDLE
 PARKING BRAKE AS RQRD

APPROACH CHECKLIST

APPROACH BRIEFING CONFIRMED
 ECAM STATUS CKD
 SEAT BELTS ON
 BARO REF ___ SET **B**
 MDA/DH ___ SET **B**
 ENG MODE SEL AS RQRD

LANDING CHECKLIST

CABIN CREW ADVISED
 A/THR SPEED/OFF
 ECAM MEMO LANDING NO BLUE **B**

AFTER START CHECKLIST

ANTI ICE AS RQRD
 ECAM STATUS CKD
 PITCH/RUD TRIM ___/ZERO
 HAND SIGNAL RECEIVED

AFTER LANDING CHECKLIST (FO SILENTLY)

GRND SPLRS DISARMED
 FLAPS RETRACTED
 ENG MODE SEL NORM
 APU AS RQRD

BEFORE TAKEOFF CHECKLIST

FLT CTL CKD **B**
 FLT INSTR CKD **B**
 TAKEOFF BRIEFING CONFIRMED
 FLAPS CONF FLAPS ___ **B**
 V1, VR, V2, FLX TEMP ___/___/___ **B**
 ATC SET
 ECAM MEMO TAKEOFF NO BLUE

 CABIN CREW ADVISED
 TCAS TA OR TA/RA
 ENG MODE SEL AS RQRD
 PACK 1+2 AS RQRD

PARKING CHECKLIST

APU BLEED ON
 ENG MASTER 1+2 OFF
 ANTI ICE OFF
 SEAT BELTS OFF
 EXT LT AS RQRD
 FUEL PUMPS OFF
 PARKING BRAKE AS RQRD

AFTER TAKEOFF CHECKLIST

L/G UP
 FLAPS RETRACTED
 PACKS ON

 BARO REF STANDARD SET **B**

SECURING THE AIRCRAFT CHECKLIST

ADIRS OFF
 NO SMOKING OFF
 APU OFF
 BATTERY 1+2 OFF