

SWR801: London Heathrow - Zürich

An introduction into flying...



MCDONNELL DOUGLAS 

swissair 

... the Douglas way

The purpose of this first tutorial is to give you a basic document to fly the MD-11 using real procedures, on a flight from A to B with "best use of equipment", meaning everything on autopilot and all systems in normal operation mode or automatic mode. There will be no information regarding manual flight procedures, real world operation specifics, hints for good airmanship and general ATPL knowledge as this will be covered in the advanced tutorial.

After you have completed this flight you'll be able to handle the MD-11 with all its systems on normal operations with the same workflows used on the real aircraft checked using the very same flight checklists. During cockpit preparation some less critical flow items - in other words system checking for systems which are good for flight already - will be skipped so as to not confuse you with too many details for this first flight. All skipped items will of course be dealt with in the second more advanced tutorial flight.

To cover as many systems as possible and to keep things easy at the same time for your first flight a standard instrument departure (SID) using the autopilot will be flown, as well as a full autoland on an ILS approach requiring no manual inputs on the controls until you decide to vacate the runway.

This flight takes you on a short trip from London Heathrow (EGLL) to Zurich, Switzerland (LSZH). This is the return leg of an early morning rotation done by Swissair for many years using the MD-11.

Due to its short flight duration this rotation was considered the best way for pilot route training and line check flights. You'd very often find this flight to be operated by three pilots, one of them being the check captain in the third seat. Now we will use this flight for your training. So have a seat, and prepare to learn to fly the Douglas way...

Information for beginners

Boxes like this one are present throughout the tutorial giving basic information about airliner flying in regard to its systems and the consequences of your actions.

These are aimed at those of you not yet familiar with glass cockpit airliners in general.

If you have flown other airliners of this type - real or on a PC based simulator - you may simply skip these boxes as they are not required for the work flow of this tutorial.

Preparation

In order to allow your simulator to show the exact same numbers when flying this leg you'll have to set up your aircraft with some specific settings and weights.

Setting up FSX and the PMDG menus

Start Flight Simulator X and on the opening screen go 'Free Flight' and select the PMDG passenger MD-11 with Pratt & Whitney (PW) engines, or if installed just select the Swissair (old colours) livery for maximum realism. For location choose London Heathrow airport or EGLL, make sure that you set 'GATE 212' at the 'Choose runway/starting position' drop-down menu. Then select daytime and the 'Fair Weather' theme in the weather menu. Press 'FLY NOW!' to load the simulation.

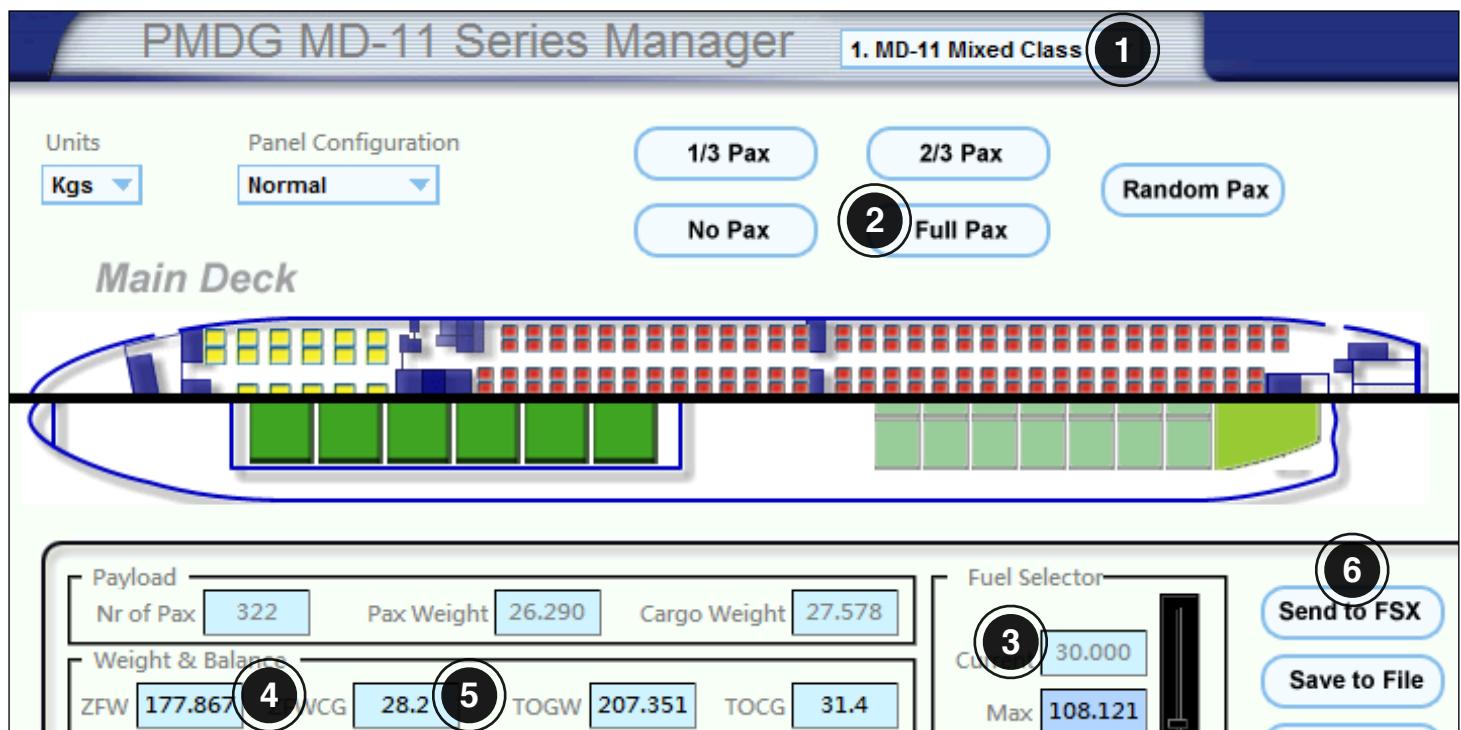
For this tutorial flight we're going to fly using the metric weights. Therefore the MD-11 needs to be set accordingly. In the menu bar choose 'Add-Ons' -> 'PMDG' -> 'Options' and in that menu go to 'Airline Options - Displays' to change 'Weight Indicators' to KGs. This is very important to load and fly the aircraft on the very same weights as in this tutorial.

Also to have the same indications as on the screenshots you should set 'ND Symbols' to 'European', 'Altitude, speed and heading indicators' to 'Line/Triangle', 'Wind display' to 'Cross' and 'Zone temperature units to ° C'. Press 'OK' when done.

In the same PMDG drop-down menu select 'Panel State - *Load...' to get a list of available panel states. Select 'PMDG MD-11 Tutorial 1' and press 'OK'.

Weights and Fuel

Open the MD-11 load manager tool via the Windows start menu and complete the following steps to load the aircraft:



- 1 Choose 'MD-11 Mixed Class' for the seat layout.
- 2 Press 'Full Pax' to load the aircraft.
- 3 Set fuel to '30.000' using the slider and then the arrow keys to adjust the value.
- 4 Note the zero fuel weight of 177.9 tonnes (ZFW) for later use.
- 5 Note the ZFW CG value 28.2 for later use.
- 6 Press 'Send to FSX' to finalise aircraft loading.

Weather

There's no significant weather to consider for this flight. We do have some light winds and they will not throw you off your descent profile... for now. So the weather briefing is a quick one:

London Heathrow:

- Temperature: 16° C
- Surface Wind: calm
- Clouds: FEW at 5600ft

Zurich Airport:

- Temperature: 16° C
- Surface Wind: calm
- Clouds:

- Average wind at CRZ level: 270° / 25kts

- Altimeters: 1013hPa at both airports

You might want to save this flight now in case you wish to repeat the tutorial flight.

(Transit) Cockpit Preparation

You now find yourself on the flight deck, the time of day being early morning. Loaded is a panel state representing the condition the pilots would normally find the aircraft in when boarding on a transit stop.

Take your seat and have a look at your flight documents stating the following details:

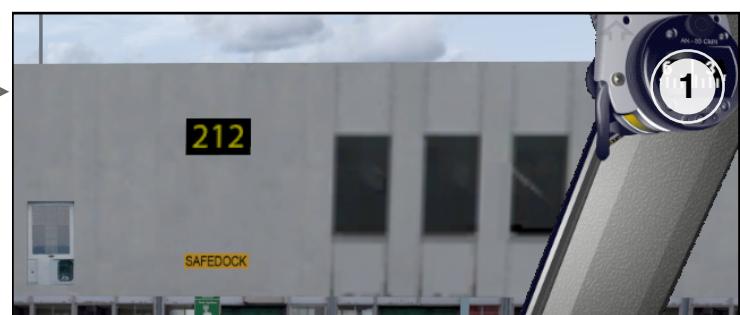
- | | | |
|--|---|--|
| • Route
EGLL to LSZH via:
DVR UL9 KONAN UL607 KOK UM150 DIK UN852 GTQ UT3 BLM | • Loadsheet
Zero Fuel Weight: 177'867kg
ZFW CG: 28.2% | • Flight Duration
69 minutes flying time |
| • Departing runway and SID
Runway 27L, SID DVR4G | • Fuel
30 metric tonnes | • Performance
Cruise Level: FL370
Cost Index: 80 |
| • STAR, Approach and landing runway
BLM1G, CAT1 ILS approach runway 14 | | |

Note that for this tutorial the airplane is not at a complete 'cold&dark' state as this is hardly ever the case in reality since maintenance will have set up the aircraft to a certain point already. Without any power on the aircraft you can't do anything. Doors will not open and refueling is also not possible. Some systems are on and set already, this will ease your work required to get the aircraft up and running on your first flight. The second tutorial will guide you through a complete start-up procedure including all check items necessary.

With this in mind have a look at all the panels to see in what condition the aircraft is.

Start at the overhead panel by right-clicking the standby-compass (1).

Note: If you are flying this in Virtual Cockpit mode just move your head accordingly and disregard all panel-switching instructions.



Looking at the electrics panel on the overhead (labelled with ELEC) you can see we already have battery power on (no OFF light illuminated - 1) and external power connected and activated. (2) The APU and its generator is still off (3), however emergency power is already set to 'armed' (4).



Looking at the top left of the overhead panel you can see all three inertial reference systems (IRS) being off.

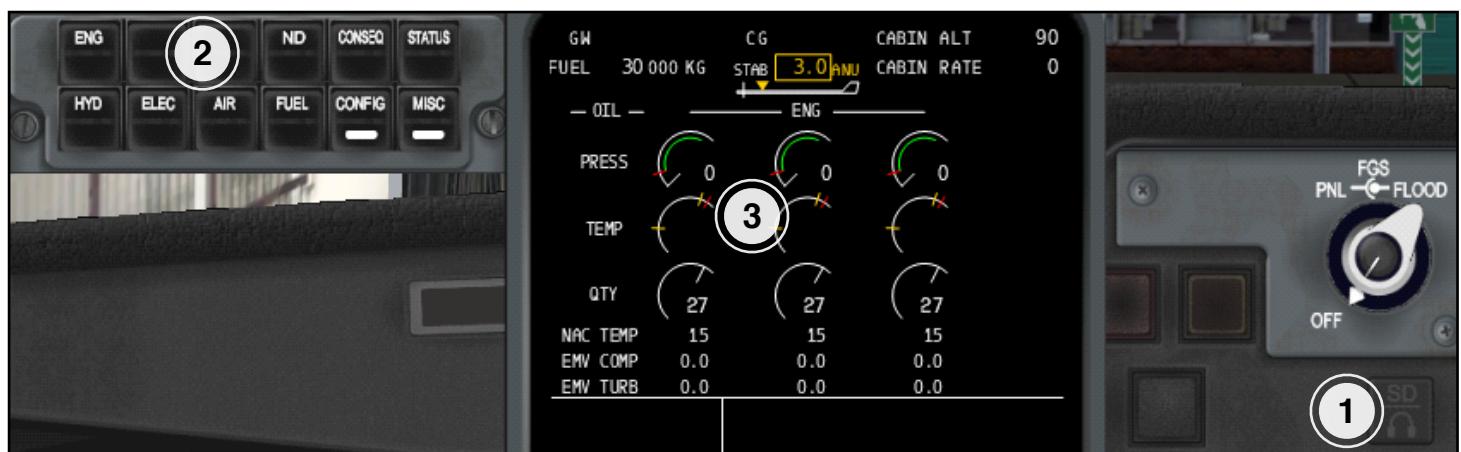
Going all the way down to the lighting panel you'll notice that emergency lighting (1) is already armed and the NAV lights (2) are on.

This is the state which the aircraft had been left in after shutdown when arriving from Zurich.

To close the overhead panel left-click any grey X-symbol in a corner of a sub-panel.

While the switches and lights on the overhead panel show many important system states you will have a much more detailed overview of the systems using the system display (SD) which is controlled by the system control panel located on the centre pedestal in front of the fuel levers. Using those pushbuttons you may cycle through the various system pages giving you an even better initial overview.

To access the system display (SD) on the 2D panel left-click on the button with the faint 'SD' letters on it (1). The system control panel (2) will pop up on the left side of the screen providing the possibility to cycle through the system pages on the SD (3). Note that selecting some system pages will also display the corresponding panel part of the overhead panel for easy access to the system's switches.



more... To learn more about switching through the 2D-Panel refer to the PMDG MD11 Introduction manual on page 0.00.40 .

Continuing Cockpit Preparation

The first action on your list to prepare the airplane for flight is the initialisation and alignment of the inertial reference system (IRS).

- IRS / CARGO FIRE TEST

- Rotate all three IRS selectors (1) from OFF to NAV.
- While turning on the first system an automatic cargo fire test might be initiated.
- If not you may do this test by pressing the 'MANUAL TEST' button (2).

The inertial reference system is needed as basis for key systems like autopilot, flight instruments and navigation. A proper set-up is essential.

NEVER move the aircraft while the three platforms are still in alignment.

Note that IRS alignment will take around 10 minutes to complete.



FMS

The next step is to prepare the flight management system (FMS) for flight. To do this we need to feed the flight management computer (FMC) with relevant data and for this input the crew uses the multifunction control display unit (MCDU), the interface between the pilots and the FMC (and other systems too). Three of these units are located on the centre pedestal between the pilots.

To insert data, execute functions or switch to pages the MCDU features keys left and right of each field. These line select keys (LSK) are referred to according to their position vertical and left or right of the display. As an example the key on top left is LSK 1L, the one on the bottom right is LSK 6R.

- MCDU

- Left-click on the small MCDU icon below the FCP (1) to display MCDU1.

more... If you wish to use your PC's keyboard instead of the virtual MCDU keypad, the PMDG MD11 Introduction manual on page 0.00.46 will show you how.



- MENU page

When powering up the aircraft you will be greeted by the MCDU's 'MENU' page or the 'A/C STATUS' page.

- If you see the 'MENU' page press the LSK 1L (1) to access the FMC1.
- If the 'A/C STATUS' page is displayed first you may skip the step above.



- A/C STATUS page

- On this first FMC page you might have several messages displayed in the scratch pad (1). Press the 'CLR' key on the MCDU's keyboard (2) to remove each message.
- Press the LSK 6R (3) to move to the 'F-PLN INIT' page.

- F-PLN INIT page

- At 'CO ROUTE' enter the name for the flight plan to Zurich. Enter 'EGLLLSZH001' into the scratch pad and press LSK 1L (1) to put it into the corresponding field.

CO ROUTE represents 'company route'. These are stored flightplans for the crew to use.

Normally pilots do not need to construct the route all by themselves but instead load a company route indicated on their documents. This is what we do for this flight.

If you want to know how to construct the route for the FMC manually, refer to the appendix at the end of this document on page 33.

ZFW CG:

Center of Gravity entry for the airplane without fuel (Zero Fuel Weight - ZFW). The ZFW CG value normally is coming from the loadsheet done by the load master.

Cost Index:

The cost index basically defines the relation between economics and duration of a flight. A higher cost index results in a shorter flight time - achieved by higher speeds - requiring more fuel - resulting in higher operating costs.

The CI can differ depending on the airline and/or the route. Some airlines even use different CIs for climb, cruise and descent.

- Enter 'LFSB' as the alternate using LSK 2R (2). Then press LSK 6R to return to the 'F-PLN INIT' page.
- At 'FLT NO' (3) enter this leg's flight number which is SWR801.
- For 'CRZ LEVELS' enter '370' and press LSK 5L (4).
- Enter '-56/T022' for the temperature and wind of the first enroute fix using LSK 6L (5).
- Set the cost index (CI) to 80 (6).
- Check the displayed coordinates for accuracy comparing it with the actual gate position, which is 512803.38N 0002709.70W. Correct if necessary by pressing the LSK next to the value for adjusting using the arrow keys (7).
- Confirm the INITIALIZE IRS* prompt using LSK 4R (8) to feed the aligning IRS systems with these coordinates. After that 'POS REF>' is displayed there.



- WEIGHT INIT page

Pressing the 'PAGE →' key (below the MENU key) will bring you to the 'WEIGHT INIT' page

- Left-click the LSK 1R to use the UFOB number as block fuel entry (1).
Block fuel is the total amount of usable fuel you will have on board when pushing back from the gate.
Note: For fuel planning purposes you may enter any other block fuel value and the computer will calculate using that fictive block fuel. For the actual flight however this value MUST reflect the real fuel amount used.
- Enter the zero fuel weight, ZFW - the first number noted from the load manager tool (177.9) (2).
- ZFWCG - the second number you noted from the load manager (28.2) (3).
- Using the system control panel display the SD ENG page (4).
- Wait a couple of seconds for the computer to calculate the CG (5) which will be used as the TOCG.
The TOCG is the airplane's centre of gravity taking the total fuel into account, minus the taxi fuel, resulting in the planned CG right before take-off roll.



This 'WEIGHT INIT' page is a very important one to fill out correctly. The flight management system (FMS) needs this data for a variety of calculations regarding the aircraft's performance. Calculations such as climb- and descent profiles, cruising altitudes and all speeds they all depend on that very information. If entered incorrectly this may result in a safety issue quite quickly. As an example if you tell the computer your aircraft is lighter than it really is the decision speed for take-off abortion will be higher than it should be, and if you abort at that very speed you will find yourself overshooting the runway as the stopping distance will not be sufficient. Another thing also critical during normal operation, should your slat retraction speed be calculated too low you might end up retracting the slats prematurely - on a heavy airplane around it's maximum take-off weight this can be hazardous. Or less critical for safety, if your climb profile, cruising altitude and speed is off this might very well ruin your entire fuel planning. So make sure that the weights you put in are indeed correct.

- Check the calculated CG on the SD ENG page on the main panel (should be 31.5 but do not worry if it is 0.1 more or less) and enter this value for 'TOCG' on the 'WEIGHT INIT' page (LSK 5R) (6).

- Alternatively you may also right-click the LSKs associated with ZFW, ZFWCG and TOCG to make sure you have the exact same numbers correct with the aircraft's actual load.

Do note that this is for your convenience only and can not be done on the real aircraft.

WEIGHT INIT 2 / 3 →			
TAXI	UF0B	BLOCK	
0 . 7		30 . 0	30 . 0
TRIP / TIME		TOGW	
9 . 7 / 0105			207 . 2
RTE RSV / %	BLST	IN ZFW	
1 . 0 / 10 . 0	0 . 0	177 . 9	
ALTN		LW	
1 . 8		197 . 5	
FINAL / TIME		TOCG	31 . 5
3 . 7 / 0030			
EXTRA / TIME		ZFWCG	28 . 2
13 . 2 / 0146			

6

FUEL INIT 3 / 3 →			
REFUEL QTY	DUMP	TO GW	
30 . 0		199 . 6	
BLST FUEL	DUMP	TIME	
[.]		0003	
	FUEL TYPE	JET A	
	FREEZE TEMP	- 40	

ACT F-PLN 1 / 2 →			
FROM EGLL	ETE 0000	SPD --- /	ALT 78
DVR	12 . 82 /	FL293	
KONAN	15 . 82 /	FL349	
(T/C)	17 . 82 /	FL370	
KOK	18 . 82 /	FL370	
DIK	37 . 82 /	"	

LAT REV FROM EGLL N5128 . 6 / W00027 . 7			
2 <SID		HOLD >	
NEXT WPT	[NEW CO RTE	*
* []			
OFFSET		NEW DEST	*
* []		[]	*
ENABLE ALTN		RETURN TO	
* TO LFSB		ACT F-PLN >	

- F-PLN page
Press the 'F-PLN' key to display your current flight plan. What you see there is the stored flight plan we loaded into the FMC by entering its name under 'CO ROUTE' earlier.

This flightplan contains only airway information and is missing everything regarding runways, SID, transition if applicable and STAR at the destination. For now enter the departure runway as well as the SID.

- press LSK 1L next to 'EGLL' (1), this will get you to the LAT REV page for EGLL.

The 'LAT REV' (Lateral Revision) page allows you to make all kinds of changes to the selected waypoint itself or the routing from the selected waypoint onwards. Here we add a runway and an SID to the waypoint 'EGLL'.

Press again LSK 1L next to 'SID' (2) to get to the runway and SID selection page.

- Choosing the runway first will shorten the list of available SIDs to those for the selected runway thus making it easier to find the one you want.
Select runway 27L by clicking LSK 3R (1). Checking our flight plan you might have noticed the first waypoint is the Dover VOR (DVR), therefore we want to select an SID that takes us there.
So after choosing the runway press the LSK next to the 'DVR4G' departure route to select it.



- By pressing the LSK next to the 'INSERT' prompt (2) the runway and SID are added to the flight plan. Your MCDU screen should look exactly like the one to the right before pressing the insert key.



- Looking at the flight plan on the 'ACT F-PLN' page you will notice that 'EGLL' got replaced by 'RW27L' (3) and all the fixes of the SID were added afterwards (4). Look for the same waypoints now displaying on the navigation display (ND).



- TAKE OFF page

Press the 'TO/APPR' key on the MCDU to get to the 'TAKE OFF' page. The numbers on this page will provide the FMC with information to calculate for the take-off phase.

- For this short flight to Zurich we don't want to depart using full take-off thrust as the aircraft is actually far from its maximum take-off weight. Derated thrust is the keyword here. Entering a temperature into the take-off page that is higher than ambient will cause the thrust to be reduced.

Enter '54' for 'FLEX' using LSK 1L (1).

- Enter '22' for flaps at LSK 3L (2), the take-off setting in degrees for the flaps.
- At the LSK 2R the runway slope and wind component is needed. Many runways in reality have a slope down- or uphill, however since Flight Simulator is not capable of reproducing this you may put in zero slope at all times. The wind at London Heathrow today is calm so enter '0/0' into the scratchpad and press LSK 2R (3).
- Enter the current outside air temperature one line below. Note that the computer wants to know whether this is degrees Celsius or Fahrenheit. Enter '16C' for this flight (4).

- You now get a message asking you to check and confirm the V-speeds (5). Confirm each by pressing the LSK to the left of each speed, LSK 4L, 5L and 6L (6).

Observe those speeds are now presented in large font (7) and are also indicated on the speed tape of the primary flight display (PFD).



The FMC set-up is now complete and ready for flight so you may close the MCDU using the 'X' symbol on the upper left corner. Other major systems like electrics, hydraulics, fuel and air still need the pilot's attention.

more... For more information about the different pages of the FMC check the PMDG MD11 FMS manual on page FMS.10.1

OVERHEAD PANEL

What you would do now is check various systems to confirm they are indeed set the way they should be. But none of these checks actually involve reconfiguring the systems as they were either left operational for flight from the previous leg, or are controlled automatically via a system controller, which means they will reconfigure themselves according the actual phase of flight.

And since this would be checking only at this stage and not setting up anything let's leave this out for the second tutorial flight. Again it is precisely according the real world procedure that the systems on the overhead panel are already set for this stage in cockpit preparation. We just leave out the checks confirming that.

The overhead panel is designed with an "all lights out" philosophy, meaning if the systems are configured or working as they should their respective warning- and button lights are all extinguished. This makes it very easy to discover any abnormal or temporary system state.

FCP (Flight Control Panel)

At this stage the FCP needs a few inputs for departure and navigation:

- FCP/ECP access

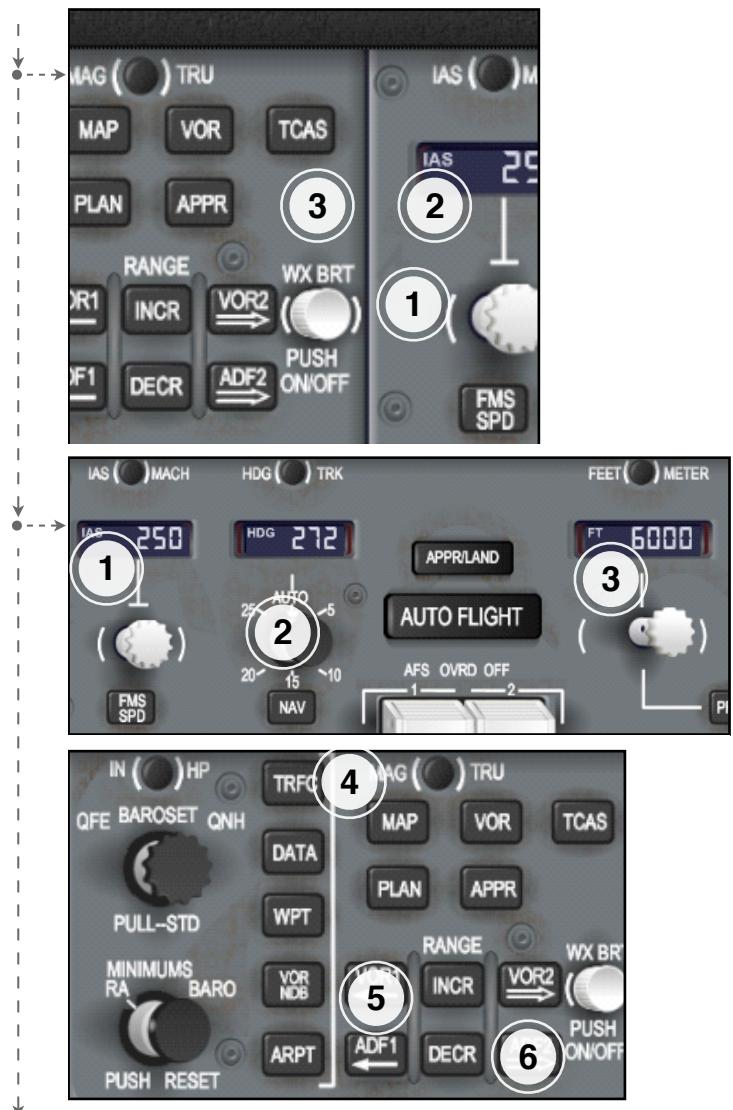
- To access the entire FCP left-click on the faint arrow symbol (1) to show the FCP (2) only or right-click to show FCP and EIS control panel (ECP - 3).

- FCP setup

- Check if the speed is set to the actual limit speed below 10'000ft, in this case 250 knots (1). If not then just dial in the speed, no pushing or pulling of the speed selector necessary.

Don't worry about any V2, climb-, flaps- or SID limit speed at this point, this will be taken care of by the FMS.

- Rotate the heading selector to set runway heading 272° (2).
- Set the altitude selector to the first altitude constraint, for this SID this is 6000ft (3). Dial in the altitude, do not push or pull the altitude selector.
- On the EIS control panel (ECP) push 'TRFC' (4) to get the TCAS targets on your ND (transponder not active yet).
- On the same panel push VOR1 (5) and ADF2 (6) to activate navaid information required for the departure route later on.



NAV Radios setup

This is a good time to set up your NAV radios for the DVR4G departure route. While the entire SID is pre-programmed in the FMC for RNAV flying a good radio navigation backup is still required. We will not look into a full departure route briefing and navigation setup for this flight, however here's a quick way on how to tune for VORs and NDBs:

- NAV RADIO page

Call up the MCDU and press the 'NAV RAD' key in the page selection area (1).

- Enter 'LON' at LSK 1L (2) and 'DET/273' at LSK 1R (3) for the necessary VORs.
- Enter '316' for ADF2 (4) for a bearing information after the left-turn.
- Enter '109.5' at LSK 4L (5) for the DME reading when to start the left turn.
The ILS DME reading is available on the bottom left corner of the PFD.
- At any time if you want to clear a frequency or go back to auto tune in case of VOR 1 and 2, hit the CLR button on the MCDU and press the corresponding LSK next to the frequency you want to delete.



What does SID and STAR stand for?

SID: This stands for standard instrument departure. The route given you by ATC taking you from the runway to your route (most of the time by joining an airway with or without a transition)

STAR: standard terminal arrival route. This is the route flown away from an airway (or transition) to the initial approach fix where the approach procedure starts. Usually there is a holding pattern defined at the end of a STAR.

ATC Transponder / TCAS

- ATC / TCAS panel

To access this panel right-click the throttle / COM symbol below the FCP (1). This will bring up the rear part of the centre pedestal containing the panels for navigation and communication.



- Rotate the mode selector (2) to RA/TA. In this mode the transponder is transmitting and the TCAS system is set to give traffic alerts (TA) as well as resolution advisory (RA) once the airplane is above the RA suppression altitude.
- Disregard the squawk code (3) as we will not be flying under Microsoft's ATC supervision on this flight.

This action completes the cockpit preparation procedures necessary to set up the aircraft which now is up and running, but not quite ready yet for start-up and pushback.

Crew at Stations

At this point before gate departure all tasks requiring the cockpit crew to get out of their seats (such as the outside check) should be completed.

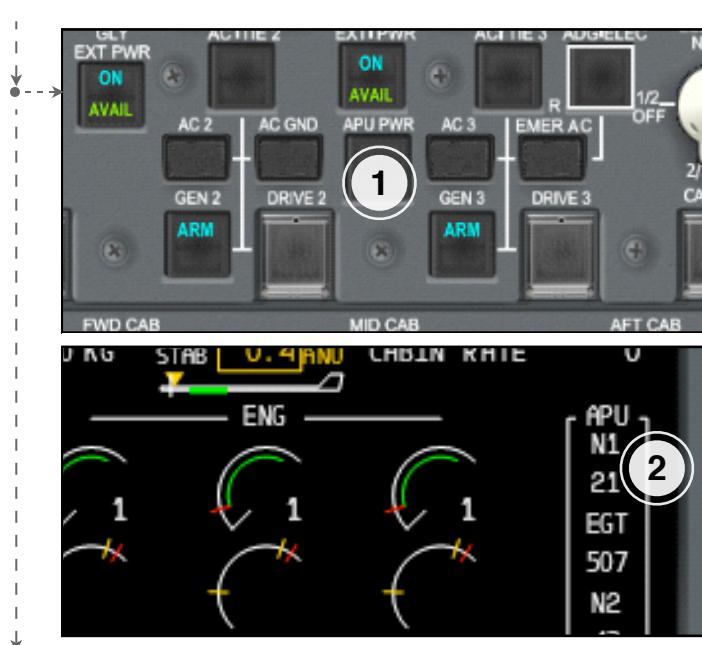
This is the perfect moment to start the APU as it needs some time to spool up and we need it later on to take care of the power supply, bleed air for engine start and air conditioning.

- APU start

Right-click again onto the standby compass to bring up the overhead panel (or bring up the SD ELEC page) to access the electrics panel.

- Click the button labeled 'APU PWR' (1). The green 'AVAIL' light will start flashing indicating the APU is starting up.

- As described on page 4 access the SD and select the 'ENG' page using the system control panel.
- The APU numbers are being displayed on the right-hand border of this page (2).



- A steady 'ON' and 'AVAIL' light (3) will indicate the APU is running and the generator has connected automatically.

- To get the packs and therefore air conditioning running you need to connect the APU air to the air system. On the 'AIR' panel push the button labeled 'APU' (4) so that the blue 'ON' light appears. The air system will then re-configure itself and you will be hearing the packs coming on.



Altimeters

- Altimeter setup

Barometric pressure needs to be set for the altimeter. You may obtain this value from ATC and/or the ATIS broadcast. Use the standard ATC key strokes to listen to Heathrow Information on 121.850 MHz.

- On the ECP rotate the 'BAROSET' knob (1) to set the QNH.
- The actual setting is displayed in the lower right corner of the PFD (2).
- With the pushbutton above (3) you may change between Inches of Mercury and Hectopascal.
- For today's flight check if QNH 29.92 / 1013 is set.



Transition Level / Transition Altitude

To ease this first flight we will not worry about both transition level and transition altitude. As we are not flying under ATC supervision this is not really needed.

The altimeter setting is standard anyway and should you want to change transition altitude you may do so on the 'PERF' pages in the FMC both at 'CLB' and 'DES' phase.

Before Engine Start

The following steps have to be taken before pushback and engine start:

- Seat belts

The seat belt sign has to be turned on (1) now as we'll be moving very shortly.

- To access this switch left-click the standby compass to display the lower part of the overhead panel only.

- Flap T.O. selector

To set the flaps setting for take-off rotate the black Dial-A-Flap wheel (1) so that the value is adjusted to 22° (2).

- The forward centre pedestal is accessed by left-clicking the thrust lever symbol below the FCP (see page 13).

- Stabiliser trim / parking brake

The horizontal stabiliser has to be trimmed nose-up for take-off.

- Note the necessary setting from the 'TO/APPR' page of the FMC, labeled with 'STAB' (1). Do not worry if the number you have there should be 0.1° lower or higher.

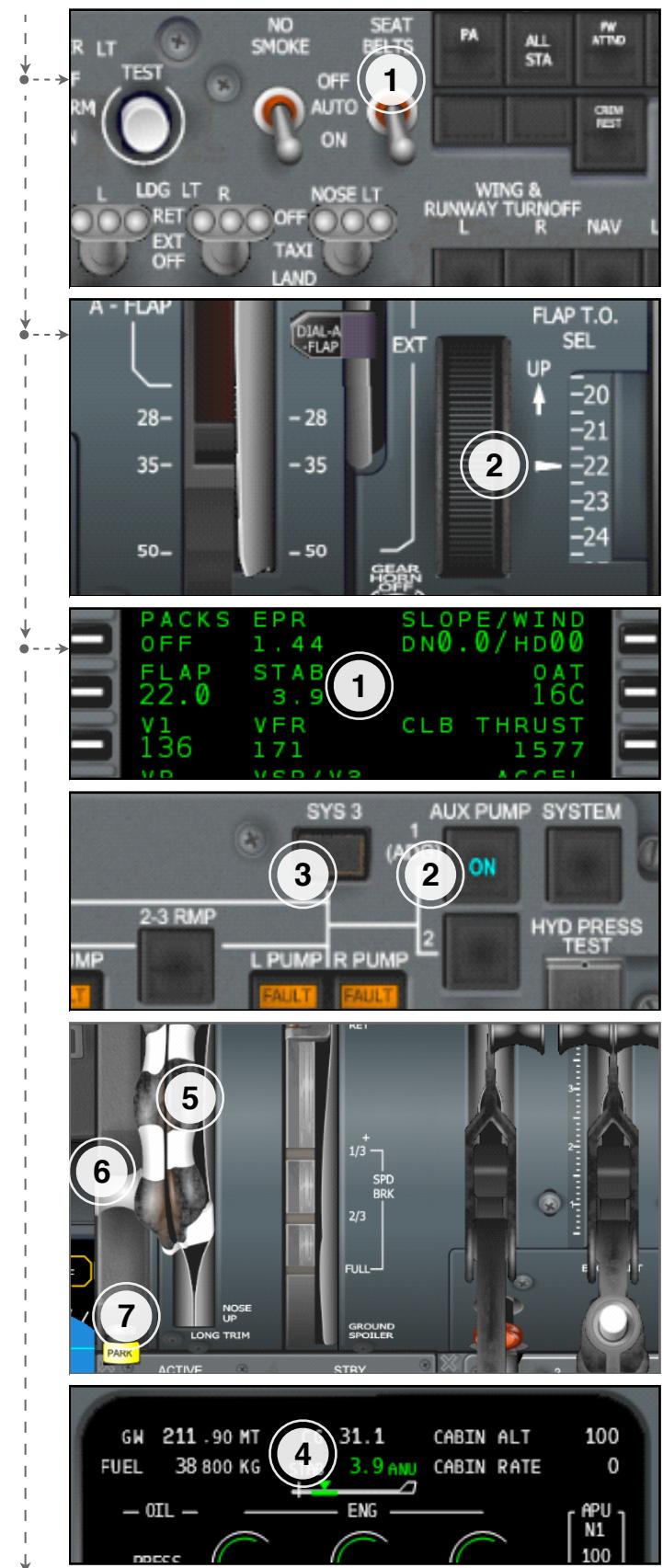
- Open the HYD panel (via overhead panel or the SD HYD page) and turn on 'AUX PUMP 1' (2).

Hydraulic system 3 will pressurise to provide stabiliser trimming and parking brake. The corresponding 'PRESS' light will extinguish (3).

- Open the SD ENG page and use the trim switches on your yoke/stick to move the stabiliser trim direction 'NOSE UP' until the stabiliser indication on the SD ENG page shows 3.9 ANU in green (4).

You may also use the default FSX keys 'Home' and 'End' or pull the long trim handle (5).

- Pull the parking brake lever via left-click (6) to set the parking brake. The yellow 'PARK' light will be lit (7).



- Exterior lights

For pushback and/or engine start the beacons have to be on. Push the 'BCN' button (1) on the lights panel to turn it on.



You are now ready for pushback.

Pushback

- Integrated pushback function

For this purpose there is a pushback function available allowing for a precise pushback including the conversation between ground and cockpit.

- Open the MCDU and press the 'MENU' button (1) to access the 'FS ACTIONS shortcuts' (2).
- Select 'PUSHBACK' from the available shortcuts using LSK 1L (3).
- Type '88' into the scratchpad and click LSK1L to change the distance (4) to 88 meters.
Change the turn angle to 50 degrees by typing 50 into LSK4L (5).
If the pushback page looks the same as on the left press '*START' (6) to activate the pushback sequence.
- The ground person will ask you to release the parking brake, so you press your pedals or the '.' key to do so. You'll hear a loud bang from the handle going to the released position.
Pushback will start and once the airplane comes to a stop again you will be asked to reset the parking brake. Do this as described on the previous page, check for the parking brake alert on the EAD and pushback is complete.



Engine Start

In most cases you'd commence engine start during pushback but it's also possible to do one thing at a time should the circumstances require that. So we did the latter as you're new on the type and are now going to start the engines.

- Engine ignition

The first step to start the engines is to activate engine ignition. By doing so the systems know that you're about to start the engines and turn off the packs automatically.

- Left-click the throttle quadrant icon (1).
- This will open the forward centre pedestal. Now left-click the engine start panel beneath the thrust levers (2).
- At the top left of your screen you will see the engine ignition panel displayed. To turn on one of the two ignition systems press the button labeled 'A' (3). This will extinguish the amber OFF light (4) and display a white 'A' on the button.



- Engine starting procedure

Note the engine start panel displaying at the bottom centre of your screen. The engine start sequence is 3-1-2, so engine 3 is started first.

- To open the engine starter valve right-click the orange knob (1) to pull it out. After a second it will get lit and engine parameters will start to appear on the EAD (2).
- Once N2 passes 15% (3) you may left-click the fuel lever (4) to move it up to ON.
- After a while the engine starter valve knob should pop in and extinguish (5) at which point the engine continues to accelerate to idle.
- Once the engine is stabilised, meaning the needles (6) don't move anymore, engine start is complete.
- Repeat all the steps below 'engine starting procedure' for engine 1 (7) and engine 2 (8).
- Open again the overhead panel by right-clicking the standby-compass and locate the 'AIR' panel.
- Press the APU bleed button (9) and note the blue 'ON' light extinguishing. After a cooling period the APU will shut down automatically.

After engine start

The following few items need to be completed before we are ready for taxi.

- Flaps / slats

Now that the engines are started and producing sufficient hydraulic power you can set the flaps for take-off which you have pre-selected to 22° previously.

- Left-click the throttle quadrant icon below the FCP.
- on the forward centre pedestal move the flaps lever to the 'DIAL-A-FLAP' detent by clicking on the detent (1). You may also press the F7-key twice.
- Note the flaps indication on the lower left part of the PFD (2).

- Flight controls

Although this is just another check (which we skip most for this first flight) this is an important one. If flight controls do not work properly then take-off will be very difficult. Once past V1 you MUST leave the ground and the autopilot can't help you should the flight controls not respond. And since PC hardware is not as precise as the real control column and rudder pedals let's do this check just to make sure your flight starts smoothly.

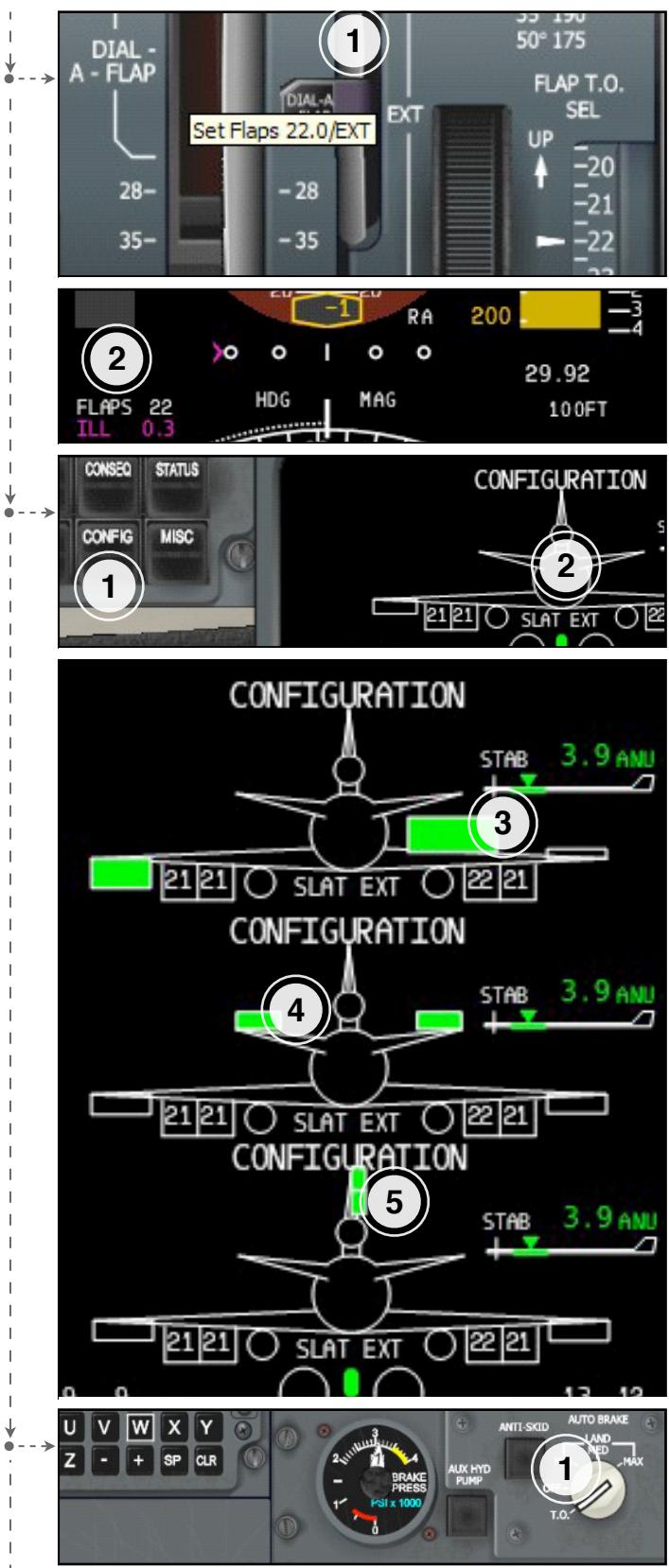
- Bring up the system display (SD) as described on page 4.
- Select the 'CONFIG' page (1) and note the aircraft representation (2) showing your aircraft from BEHIND.
- Rotate the control wheel (or move your stick) to full left and check for two green aileron boxes and one green spoiler box (3). Then rotate to full right and check for the same.
- Move the control column to full forward and check for two green elevator boxes (4). Move to full aft and check for the same.
- Move the rudder to full left and full right and check for the upper- and lower rudder green box in each case (5).

- Auto brake

Auto brake needs to be set for take-off.

- Open the forward centre pedestal and locate the brake panel forward of the thrust levers.
- Left-click the auto brake selector (1) to set it to the 'T.O.' position.

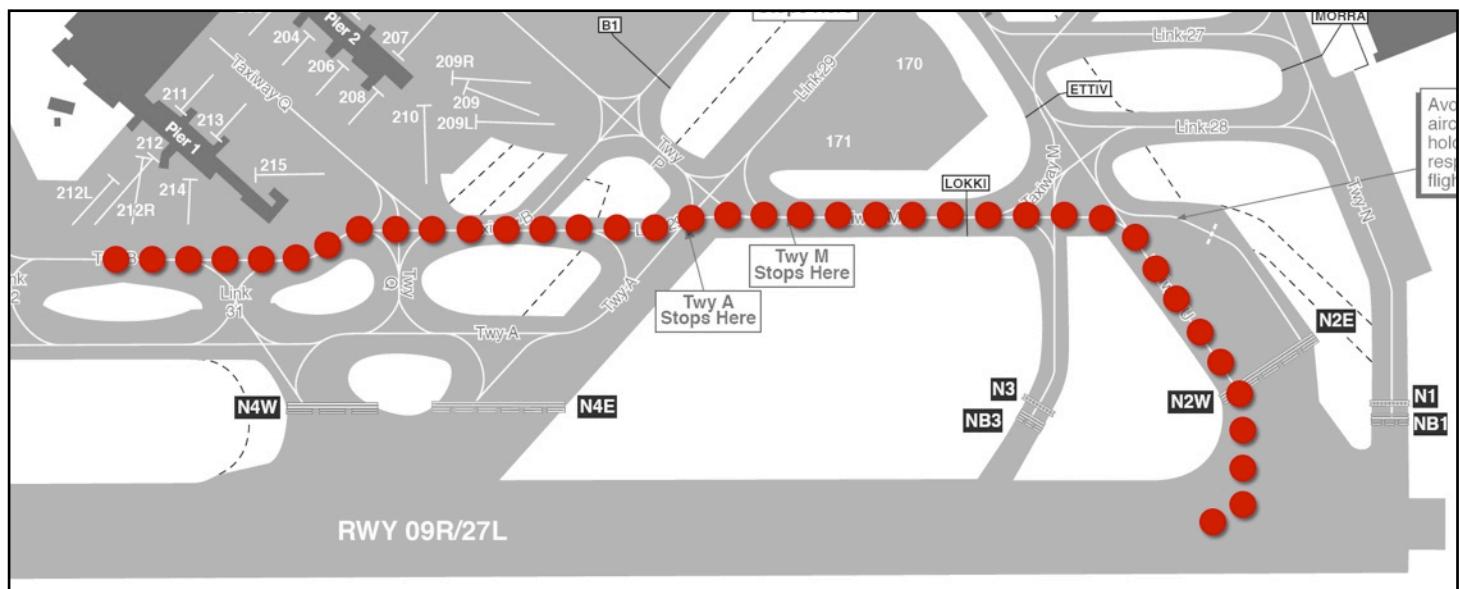
Now you're ready for taxi!



Taxi to the runway

From present position runway 27L is not far away. During that taxi a few additional items need to be taken care of before you are ready for departure.

Taxi Routing



Shortest way to RWY27L is via: Taxiway B -> Link 29 -> Taxiway M -> Taxiway U.

Before you move the aircraft, left-click the standby compass to open the lower overhead panel.

Left click the nose light switch (1) to set it to 'TAXI'. This will activate the taxi light.

A few important items regarding taxiing

- Do not taxi faster than 25kts
- 90° turns: max. 10kts
- Keep in mind the aircraft needs a couple of seconds to react to thrust changes
- The MD-11's nosewheel is located well behind the flight deck

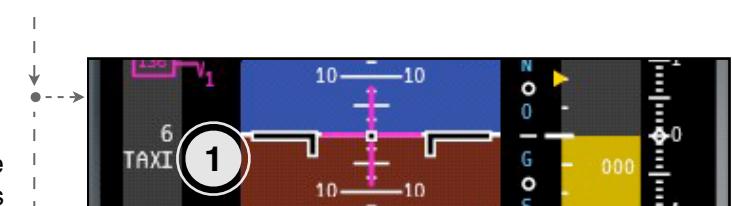


Taxiing

- Taxiing to runway 27L

Follow the taxi route above for runway 27L.

- Release the parking brake by pressing your brake pedals or any other key/button where you have brakes assigned to. You will hear the parking brake lever moving into the OFF position.
- Advance the throttles to 32% N1 and observe the airplane's ground speed (1) increasing.
- Adjust thrust to maintain no more than 15kts and keep the aircraft on the centreline.



- Taxi procedures flow

There are some last steps to take before you are ready for departure. These items are completed while taxiing. If you feel unsafe doing both at the same time you may taxi to the holding point first and deal with the items below at that point. Note that you have to set the parking brake whenever you need to hold position.

- Start the flow by pulling up the spoiler lever. To do this open the forward centre pedestal and right-click the spoiler lever (1) to pull it up into the 'armed' position (2). You may also use the default FSX key to arm ground spoilers.
- Open the FCP by left-clicking the arrow-symbol (3). This will bring up the FCP over the glareshield panel.
- Press the 'NAV' button (4) to arm the FMS' NAV-mode. NAV-mode will then engage after lift-off giving you guidance along the programmed route. The armed state should display as a magenta 'NAV ARMED' in the FMA.
- Press the 'AUTO FLIGHT' button (5) to arm the auto-thrust system. The 'ATS OFF' box on the FMA will be removed.
- CAUTION:** This will activate auto-thrust as soon as you move the throttle levers past approx. 65% N1! You never need that much thrust for taxi, but be aware.
- To close the FCP pop-up left-click the arrow-symbol (6) to the right of the vertical speed selector.
- Observe the 'Green Box' (7) appearing on the EAD indicating that take-off configuration is complete. Note that should you be at a stand-still with parking brake set this box would be white indicating 'BRAKE' and will get green as soon as you release the parking brake.

You are now ready for departure.

- Line-up

Since we disregard air traffic control for this tutorial flight you may taxi onto the runway at your own discretion.

- Before you release the parking brake to line up left-click the compass to open the lower overhead panel. Switch on the high intensity lights (strobes) by clicking the 'HI-INT' button (1).
- Move into position right onto the runway centreline and set the parking brake.



Take-Off

The following steps not only tell you what to set and when, they also mention important things you have to observe during take-off. All these events will happen pretty fast so it is strongly advisable to read the take-off part thoroughly once before attempting departure.

Because things will happen fast, and so will your tasks, we will engage the autopilot at the minimum height of 400ft. Climb thrust will be activated 1500ft above ground, acceleration and flap retraction will follow at an altitude of 3070 feet.

- Exterior lights

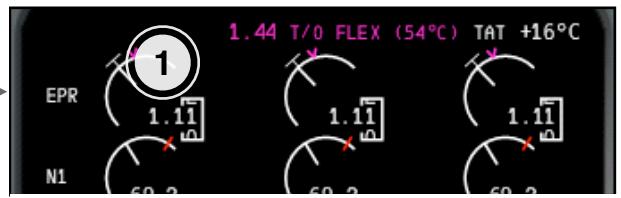
The following lights need to be turned on as soon as the take-off clearance is received, or in this case you decide to take-off:

- Move both landing light switches (1) to 'EXT ON'. You may also use CTRL + L.
- Move the taxi light switch (2) to 'LAND'.



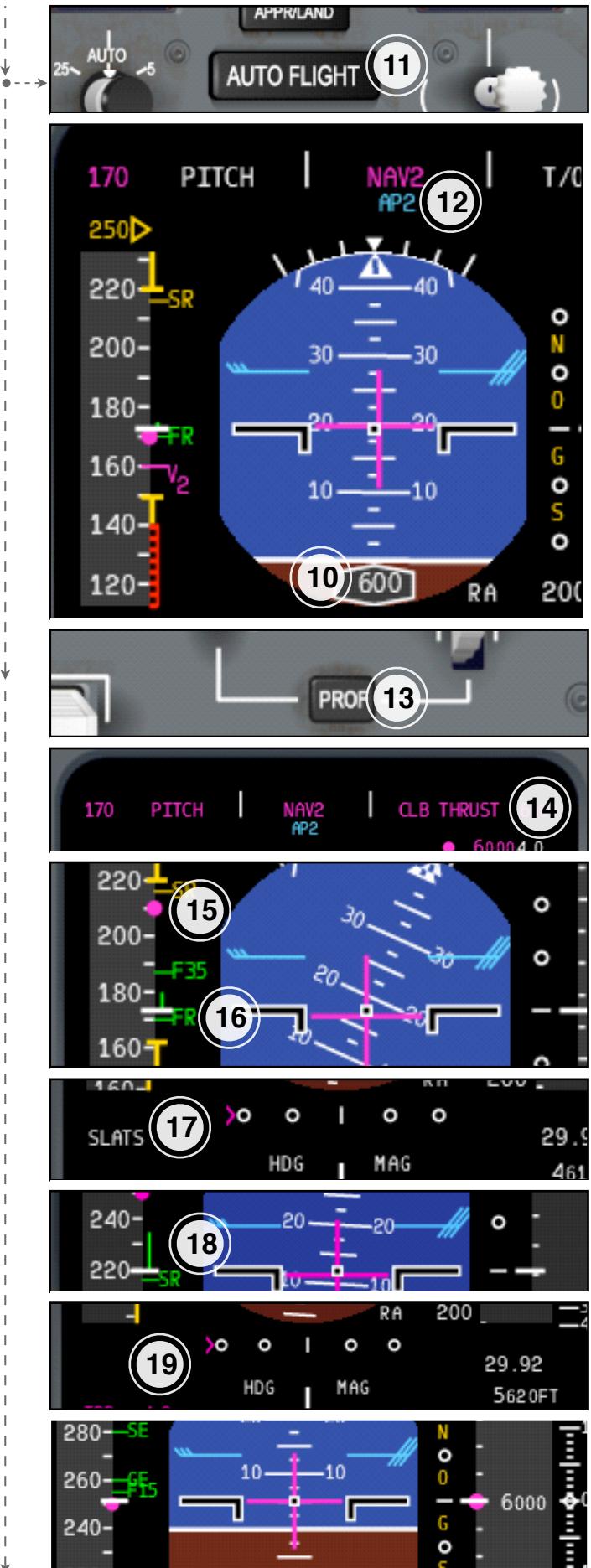
- Take-off

- Release the parking brake. Note the green box reappearing.
- Advance the throttle levers to approx. 1.1 EPR (1) and observe that all three engines accelerate to that setting.
- Then advance the throttle levers further until you hear a short clicking noise and the FMA is showing 'T/O THRUST' (2). At that point the take-off mode will engage and auto-thrust will move the thrust levers to the take-off thrust setting.
- When thrust is set you'll hear another clicking noise, the point where the thrust levers will 'clamp', which is indicated on the FMA (3).
- Don't forget to keep the aircraft on the centreline!
- Passing 100kts the three V-speeds (4) will start to move down.
- Passing V1 you will hear a callout, same for Vr. If you hear "rotate" start to pull the yoke firmly to achieve a rotation of approx. 2.5° a second and follow the magenta pitch bar (5) to get it centered.
- As soon as the altimeter is rising left-click the landing gear lever (6) or press the G key to retract the landing gear.



- Take-off (continued)

- Passing 400ft radio altitude (10) engage the autopilot by pressing the 'AUTO FLIGHT' button (11) on the FCP.
- A blue AP1 or AP2 (12) will indicate the autopilot engaged. Also notice the white 'AP OFF' box on the FMA disappeared.



- Passing 1500ft radio altitude press the 'PROF' button (13) on the FCP to activate the vertical profile mode.
- Thrust will be reduced to climb power, displaying as magenta 'CLB THRUST' on the FMA (14).
- Passing the acceleration altitude of 3070ft the FMS speed bug (15) moves up to start acceleration.
- As soon as the aircraft is accelerating away from the flap retraction speed (green -FR marking 16) you may retract the flaps by pressing the F6 key.
- After flap retraction the configuration will be shown as 'SLATS' on the PFD (17).
- Accelerating through the slat retraction speed (green -SR marking - 18) you may retract the slats by pressing the F6 key again.
- After slat retraction the corresponding indication (19) will disappear.
- The aircraft will level off at 6000ft. Due to an SID restriction further climb will be postponed for some miles. Giving you enough time for the after take-off- or climb-flow.

Climb

Flying along the SID at 6000ft there are some items to do. While most systems configure themselves for the actual flight phase there are some that need manual setup.

- After take-off flow

- Left-click the spoiler lever (1) to move it down to 'disarmed'.
- Set the auto brake selector (2) to 'OFF'.



- Rotate the dial-a-flap selector (3) back to 15°. This will be needed for approach since flaps 15° will be used as an approach setting.



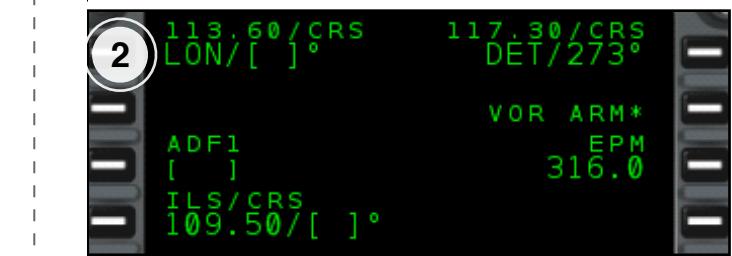
- NAV setting

Open the MCDU to clear the 'NAV RAD' page from the departure settings. For climb and cruise VOR auto-tuning normally is sufficient.

- Use the CLR-key (1) to remove all the custom entered VOR and NDB names and frequencies.
- Press the CLR-key followed by each LSK next to a custom setting (2).



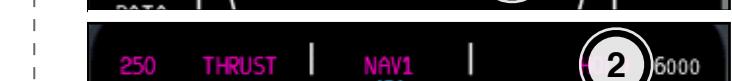
- Having the station name and frequency in small font (3) means both VOR receivers are tuning their stations automatically.
- Press the 'VOR2' button (4) on the ECP to get both VOR indications displayed on the ND.



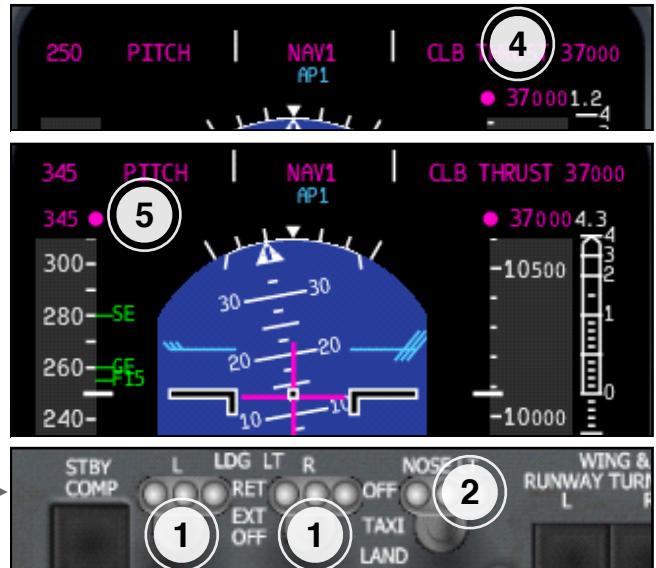
- Further climb

Passing the waypoint 'DET5' (1) the altitude restriction is no longer valid and we can continue to climb.

- As soon as the altitude restriction is cleared the FMA altitude of 6000ft is no longer magenta (2), indicating this altitude is no longer consistent with the vertical profile.
- On the FCP rotate the altitude selector (3) to 37'000ft. Do not push or pull the selector.



- The aircraft will start climbing in profile mode.
- The magenta altitude on the FMA means that 37'000ft (4) is part of the vertical profile, in this case the specified cruise level.
- Passing FL100 the speed restriction is removed and the FMS changes to ECON climb speed (5).
The rate of climb will reduce to accelerate to this speed.



- Exterior lights

- Above FL100 the landing light is no longer required. Place both switches (1) to the 'RET' position.
- Switch the nose wheel light to 'OFF' (2) since the gear is retracted anyway.

- Seat belt signs

Now that we are in a steady climb, and there's no significant weather ahead or above us we can switch off the seat belt signs.

- Open the lower overhead panel and switch the 'seat belts' switch to OFF.

- Reaching cruise level

Approx. 24 minutes into the flight you'll reach your cruise altitude. The estimated point of level-off is indicated by a blue arrow (1).



Cruise

The aircraft will level off at FL370. There's not much to do at this point, but a lot of information to look at. Let's check a few examples of those information resources.

- FMS cruise information

- Flying at cruise level press the 'PERF' key on the MCDU (1).
- As this is a short cruise phase only the FMC displays time and distance to the descent point already (2).



- FMS cruise information (continued)

- Press the PROG key (1).
- The time to touchdown is indicated as 'ETA' - estimated time of arrival - next to the destination LSZH (2).
- EFOB - estimated fuel on board - gives you the estimated amount of fuel at touchdown (3).



Entering approach data

There's one major item to be done before starting the descent towards Switzerland. So far our route ends right at the airport reference fix, not something the FMS can do any approaches with.

Entering the desired arrival-, approach- and ILS-procedures is a quick thing to do.

- Adding STAR and approach data to the flight plan
 - On the MCDU press the 'F-PLN' key (1) to display the flight plan.
 - Use the up-arrow (2) to scroll to your last route fix, in this case this is 'BLM'.
 - Press the LSK next to BLM (3) to proceed to the 'LAT REV' page.

Caution: ALWAYS add the STAR using the 'LAT REV' page of the last enroute waypoint (on this flight 'BLM').
Do NOT add this to the destination waypoint.

- On the 'LAT REV' page press LSK 1R (4) to go to the STAR and approach selection page.



- Adding STAR and approach data to the flight plan (continued)

- On the STAR page select in the left column 'BLM1G' (5) and in the right column 'ILS14' (6).

STAR to LSZH	
STARS	APPRS
BERSIG	VORD16
BLM1G	VORD28
BLM1Z	VORD34
DOP1IG	ILS14
WINDS	---

5

6

- After you selected both the STAR page will look like this.
- Press the LSK 6L (7) to insert this data into the flight plan.

STARS	APPRS
BLM1G <SEL> <SEL>	ILS14
TRANS	ADDL APPRS
NONE	VORD16
ADDL STARS	---
BERSIG	VORD28
BLM1Z	VORD34
DOP1IG	ILS16
*INSERT	RETURN TO LAT REV

7

8

- In the case of ILS14 to LSZH there are various approach transitions to choose from. For this flight select the 'GIPOL' transition (8) by pressing LSK 3R.

APPR TRANS to LSZH	
STARS	APPRS
BLM1G <SEL> <SEL>	ILS14
TRANS	TRANS
NONE	AMIKI*
	GIPOL*
	RILAX*

9

- Back on the flight plan page you may scroll down using the up-arrow to have a look at all the waypoints for the selected STAR and approach.
- 'RW14' (9) has replaced 'LSZH' as the last active route fix.
- The waypoints you see below 'RW14' with the dashed predictions belong to the missed approach and would activate should you enter the go-around phase.

BLM1G	ETO	SPD	ALT
FF14	1128	189/	4000
BLM1G			
RW14	30	159/	1402
C136	----	----	-----
RW14/04	----	----	-----
78ZUE	----	210/	4000
ZUE	----	----	+ 6000
AMIKI	----	----	/ 7000
			↑

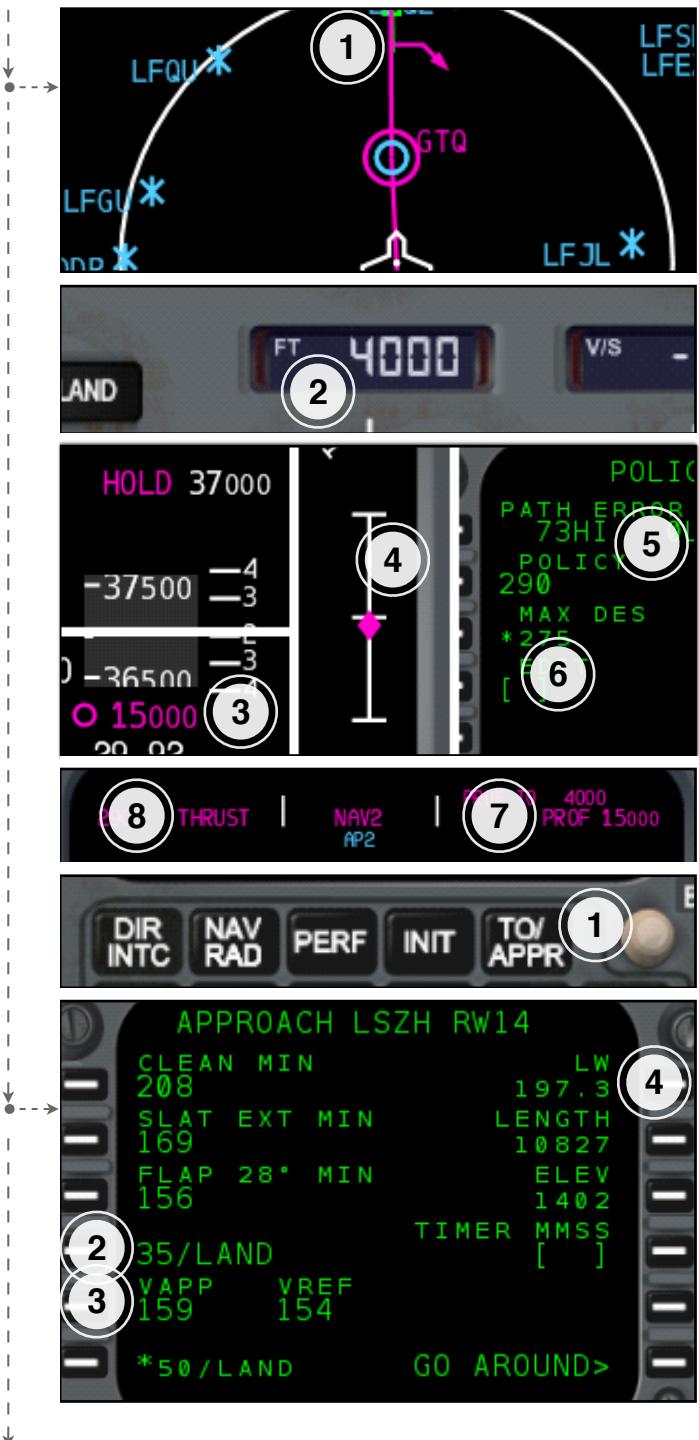
Descent

After a short cruise phase you will be seeing the top of descent point appearing on your ND. Time to go into the descent phase.

- Starting the descent

About 48 minutes into the flight you will see the top of descent point approaching on the ND (1).

- Turn on the seat belt sign.
- On the FCP lower the altitude to 4000ft (2), this is the altitude we will be capturing the glideslope later on. Do NOT push or pull the altitude selector. If you do so by accident, hit 'PROF' again.
- The aircraft will start to descend once overflying the arrow, this is where the descent path starts.
- Below the altitude tape the next profile altitude will display (3), in this case 15'000ft, an altitude restriction on the selected STAR.
- The ND will display a path deviation indication (4).
- The FMC PERF page will show the deviation in numbers at the 'PATH ERROR' field (5) should there be any.
- The FMA will change to 'PROF' (7) once the airplane is back on the calculated profile. 'THRUST' (8) indicates that speed is controlled by thrust.



- FMS approach page

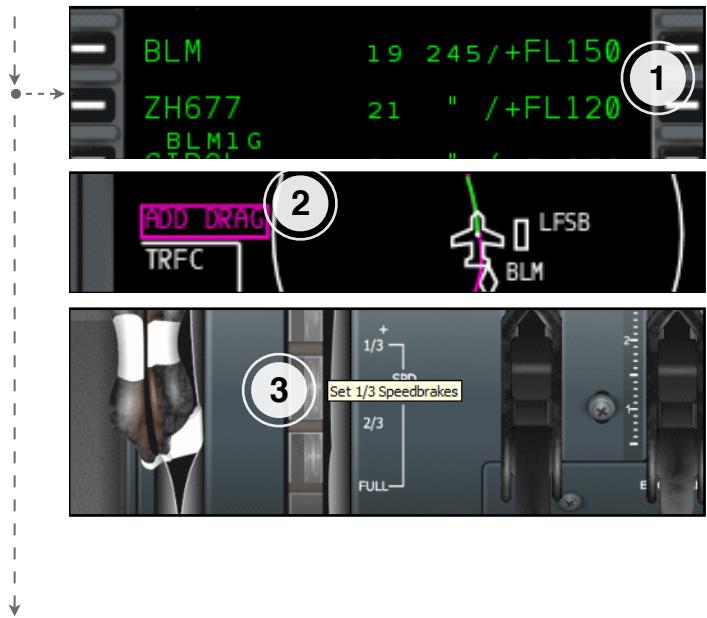
This page displays vital information for the approach.

- Press the 'TO/APPR'-key (1) on the MCDU to get to the approach page.
- Default landing flaps is 35°, indicated at line 4 (2).
- Final approach speed is displayed at line 5 (3). Speed will however be maintained by the FMS until touchdown.
- The predicted landing weight is shown in the right column at line 1 (4). Note that you'll be very close to the maximum landing weight.

- Flying the STAR

- This STAR has two altitude restrictions (1). Should you reach these altitudes before overflying the corresponding waypoint the aircraft will level off and continue the descent after passing the waypoint.
- The magenta 'ADD DRAG' message (2) appears whenever the actual speed is higher than the one commanded by the FMS.
- Should you deem it necessary to reduce the speed to the commanded value you may at your discretion use speedbrakes to do so. To activate click on one of the three available detents (3).
- For this flight this is not necessary. The STAR leaves enough room for the airplane to decelerate.

Note that the autopilot will level off at FL100 should you be above 250kts at this time. Once reaching that speed descent will continue automatically.

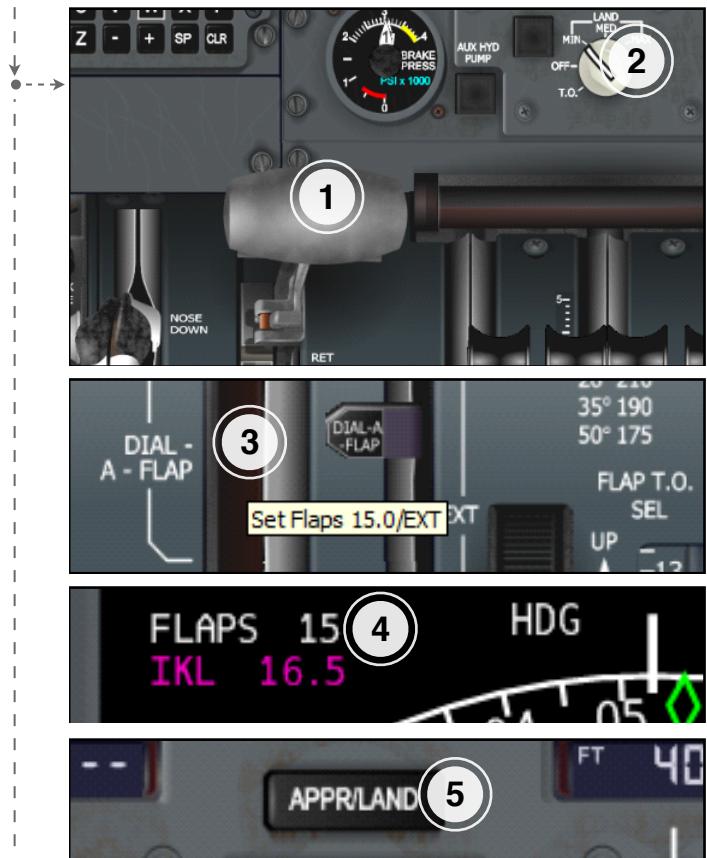


Approach and landing

Passing the waypoint 'GIPOL' you are entering the approach for the ILS runway 14. We'll be doing a standard autoland to make use of all the automation there is.

- Flying the approach

- Time to arm the ground spoilers by pulling up (right-click) the spoiler handle (1).
- Set auto brake to MIN by right-clicking the auto brake selector (2).
- Reaching FL100 turn on the landing lights.
- Half-way between GIOPOL and TRA/10 extend slats and flaps to 15° by opening the forward centre pedestal and clicking the 'dial-a-flap' detent (3). You may also press the F7-key twice.
- Note that the FMS speed is now being reduced to approx. 180kts.
- Check the flaps indication on the lower-left corner of the PFD (4).
- Arm the approach and land mode by pressing 'APPR/LAND' on the FCP (5).
- 'LAND ARMED' will be indicated on the FMA.



- ILS runway 14

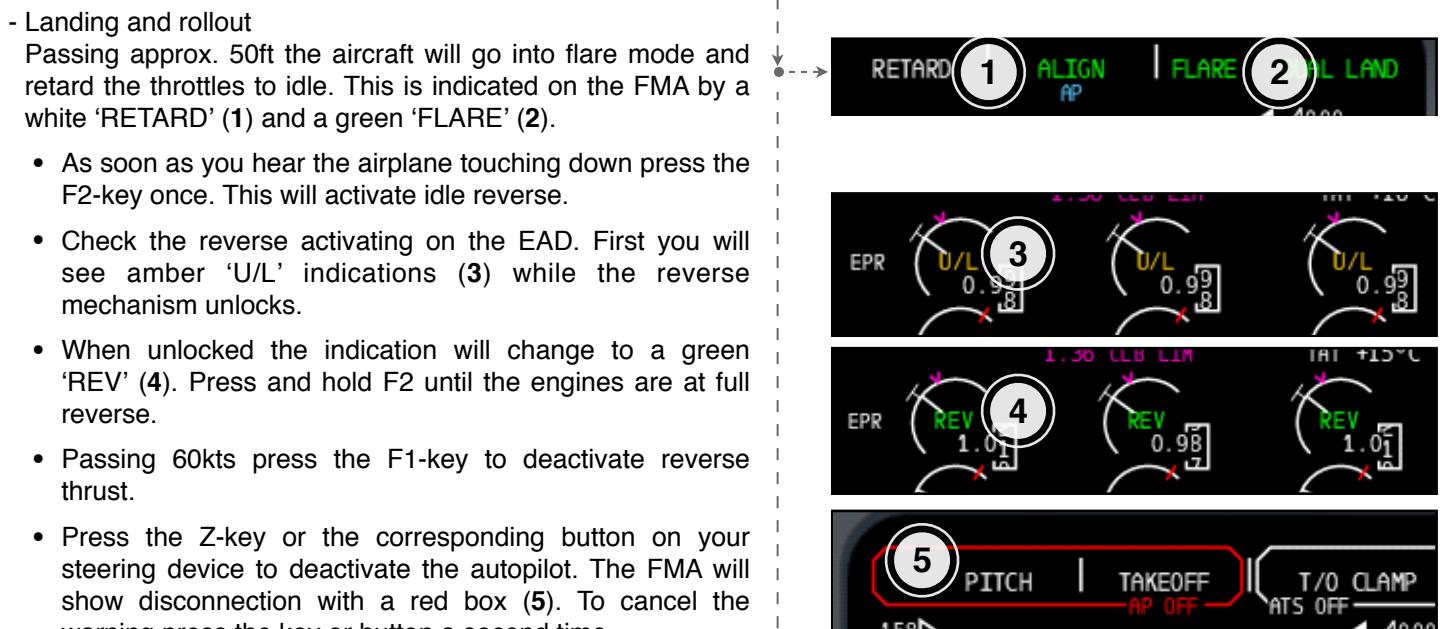
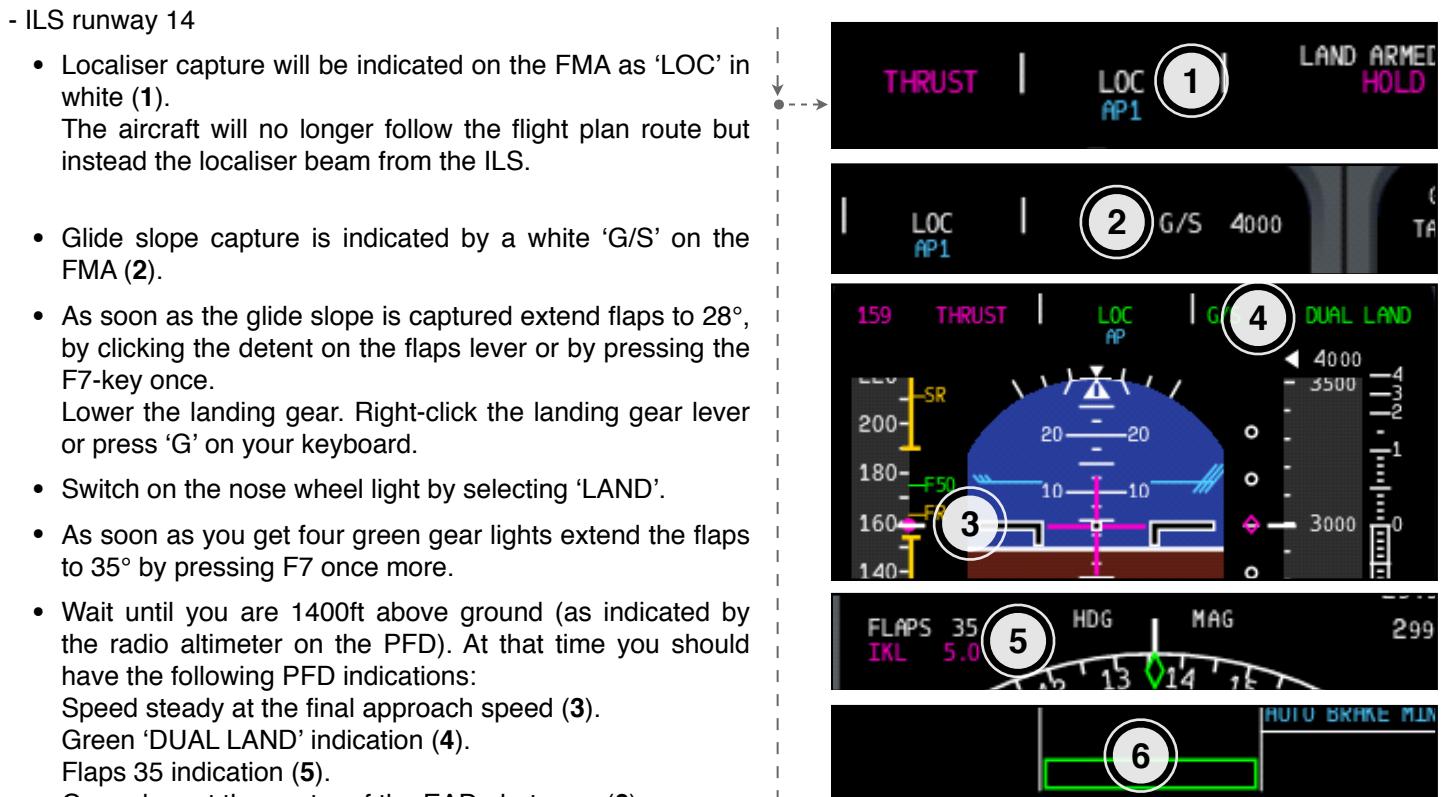
- Localiser capture will be indicated on the FMA as 'LOC' in white (1).
The aircraft will no longer follow the flight plan route but instead the localiser beam from the ILS.
- Glide slope capture is indicated by a white 'G/S' on the FMA (2).
- As soon as the glide slope is captured extend flaps to 28°, by clicking the detent on the flaps lever or by pressing the F7-key once.
Lower the landing gear. Right-click the landing gear lever or press 'G' on your keyboard.
- Switch on the nose wheel light by selecting 'LAND'.
- As soon as you get four green gear lights extend the flaps to 35° by pressing F7 once more.
- Wait until you are 1400ft above ground (as indicated by the radio altimeter on the PFD). At that time you should have the following PFD indications:
Speed steady at the final approach speed (3).
Green 'DUAL LAND' indication (4).
Flaps 35 indication (5).
Green box at the centre of the EAD alert area (6).
- IMPORTANT:** If you are using a hardware throttle device with your yoke or joystick you must move its lever(s) to idle now. Otherwise your aircraft may go full thrust when flaring!

- Landing and rollout

Passing approx. 50ft the aircraft will go into flare mode and retard the throttles to idle. This is indicated on the FMA by a white 'RETARD' (1) and a green 'FLARE' (2).

- As soon as you hear the airplane touching down press the F2-key once. This will activate idle reverse.
- Check the reverse activating on the EAD. First you will see amber 'U/L' indications (3) while the reverse mechanism unlocks.
- When unlocked the indication will change to a green 'REV' (4). Press and hold F2 until the engines are at full reverse.
- Passing 60kts press the F1-key to deactivate reverse thrust.
- Press the Z-key or the corresponding button on your steering device to deactivate the autopilot. The FMA will show disconnection with a red box (5). To cancel the warning press the key or button a second time.

Note: If you are flying without any hardware control for rudder and therefore have auto-coordination engaged you may need to return the rudder to neutral by pressing the numpad 5-key with 'NumLock' off.



- Taxiing

- As soon as you reach 25kts shortly tip the brakes to deactivate autobrake (brake pedals or .-key).
Steer the airplane into the next available taxiway following the centreline.

After landing

After the runway is vacated while you taxi to the terminal there is an after landing flow to complete. Again if you don't want to do this while you are rolling you may stop the aircraft once you have left the runway.

Taxi routing:

Leaving runway 14 you will see Zurich's Terminal 3 to your right. You may taxi to any gate as most of them are suitable for heavies. The closest suitable gate is E23.

- After landing flow

- Retract and disarm ground spoilers by pushing the spoiler lever (1).
Note: If you've used some thrust already for taxiing the spoiler lever will be up already.
- Retract flaps by left-clicking the UP/RET detent (2).
You may also use the F5-key.



- Set auto brake to 'OFF' (3).
- Turn off the landing lights (4), switch the nose wheel light to 'TAXI' (5) and switch off the high intensity lights, note the blue 'OFF' light (6).
- Turn on the APU by pressing the 'APU PWR' button on the overhead ELEC panel (7). The 'AVAIL' will flash to indicate start-up.
- Turn on APU bleed on the AIR panel (8). This will provide air conditioning after engine shutdown.

If you are not already doing so continue taxi to the gate. Remember to turn the nose wheel light to OFF when turning into the gate, the waiting ground crew will thank you for that. And do not forget to set the parking brake upon reaching your final parking position. Do this either by clicking on the parking brake lever on the forward pedestal or by pressing CTRL + . on your keyboard.

When the parking brake is set continue with the 'Parking' flow on the next page.

Parking

When parking an airplane at the gate you do not shut it down completely. There will be various people working on the plane long after you have left. They need the aircraft to be powered. The following flow is keeping that in mind.

- Engine shutdown

- Shut down engine 1 and 3 by right-clicking their fuel levers (1).
- Check for the blue 'APU AIR/ELEC ON' alert on the EAD (2).
- Switch off engine 2 (3).

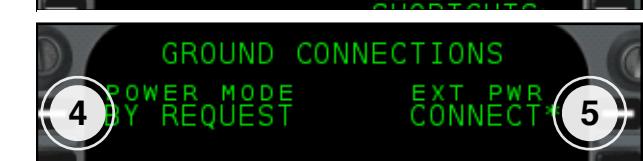


- System shutdown

- Switch off all three IRS systems by moving their mode selectors to 'OFF'.
- Turn off the seat belt sign (1).
- Make sure that all exterior lights including the beacon (2) are OFF, except the NAV lights.



- To let the flight attendants know they can disarm the doors, open the MCDU and via the 'MENU' key and the 'FS ACTIONS Shortcut' prompt proceed to the 'CABIN DOORS' page.
- Press the LSK next to 'DISARM ALL' (3). This will do a simulated call into the cabin to disarm.
- Note the amber 'DOOR OPEN' alert appearing on the EAD.
- Press the LSK 6R to return to the action selection page, and choose 'GROUND CONNECTIONS' this time.
- Make sure that it says 'BY REQUEST' (4), if not press the LSK 1L. Then press the LSK 1R (5) to get the ground crew to connect external power.
- On the ELEC panel turn on EXT PWR (6) and GLY EXT PWR (7).
- Turn off the APU by pressing the START/STOP switch (8) on the APU panel, located at the top right on the overhead panel. The blue OFF light will appear when the APU is shutting down.



- Open the aft centre pedestal.
- Turn off the transponder by rotating the mode selector to 'STBY' (9).
- Assuming that the chocks are in place you may release the parking brake.



Debriefing

You have now completed a flight according to real procedures with the maximum automation available. All parameters like speed, altitude and routing were controlled by the FMS.

If you want to fly this tutorial again you may want to experiment with the other available autopilot modes like V/S selection, FPA (flight path angle) or an idle clamp descent.

Should you wish to add real weather keep in mind that with real winds descent planning might be unpredictable and you will need to enter wind information into the F-PLN page. You might even be forced to use another runway due to wind.

Ultimately when using real weather and ATC you will discover that it is not always possible to use the maximum automation the FMS can give you like we did in this tutorial.

Another important task you need to learn is manual flight. Once you get familiar with the take-off procedure it is a good idea to keep the autopilot disengaged after departure until the first level-off. And when landing the aircraft you might want to disengage the autopilot when established on the ILS. Keep in mind that an autoland is avoided as much as possible in real flight operations to get as much manual flight experience you can get, this is especially important for pilots flying longrange aircraft like the MD-11 where they won't get many landings a month. You would only do an autoland if weather or your CATIII license requires it.

Sooner or later you will want to experiment with the extensive failures menu to simulate or train real non-normal operations. It will be at that moment where part of your equipment will fail and the only instrument approach available on your diversion airport will be an NDB-approach. Then there's only one system remaining to get you onto the runway... you.

If you have not already done so you should now read the PMDG MD11 Introduction document which came with the PDF documentation. This will help you to use this aircraft as it is intended.

For your upcoming flights make sure that you always have all the other manuals (Systems, FCOM, FMS and QRH) ready. You need them if you want to learn to fly this aircraft using its full potential.

Available scenery add-ons for FSX

Should you want to make this tutorial flight more real regarding the scenery you might want to look for the following two airport products:

London Heathrow

Mega Airport London-Heathrow X by Simwings / Aerosoft - www.aerosoft.com

Zürich

Zürich Airport LSZH by FSDreamTeam - www.fsdreamteam.com

Charts

There would be no aviation without charts. Yet many users of MS Flight Simulator fly without them.

You should have the appropriate charts with you on every flight. A possible way to get them is via Navigraph:

<http://ndac.navigraph.com>

Manual flight plan / route construction

If you wish to build your flightplan or route without loading a saved route you may do so by following the procedure below.

- Entering departure and destination information

First you have to provide the FMC with the departure and destination airport.

- Enter 'EGLL/LSZH' into the scratch pad (1) and press LSK 1R (2) to insert the data.



- Because the FMC will find the stored company route it will ask you whether you want to insert it for this flight. Since you want to do this manually you will skip this by returning to the F-PLN INIT page by pressing LSK 6R (3).



- For the remaining empty fields of the F-PLN INIT page proceed as described on page 6 and 7.
- When done your F-PLN INIT page will look like the one pictured on the right.



- Flight plan creation

The flight plan or route is created on the 'ACT F-PLN' page.

- Press the 'F-PLN' key on the MCDU (1). You will see your departure and destination airports only.
- The first step is to enter your departure runway and SID. Press the LSK next to 'EGLL' (2) to enter the 'LAT REV' page.
- To enter these use the same steps as described on page 8 and 9 at the point 'F-PLN page'.
(enter the LAT REV page, select 'SID', choose runway and SID and insert them into the flight plan)



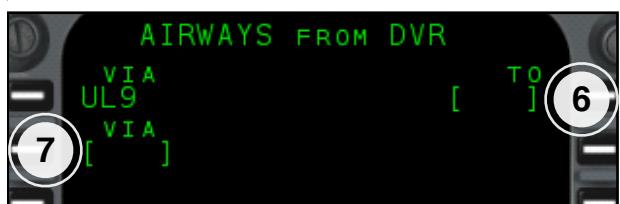
- Back on the 'ACT F-PLN' page scroll down using the up arrow (3) until the waypoint 'DVR' is displayed (4).
- Press the LSK left of 'DVR' (4) to enter the LAT REV page for this waypoint. From there you will be able to enter an airway.



- Press LSK 2L to select the airways insertion page (4).



- Enter the first airway which is 'UL9'. Type this into the scratch pad and enter this into the 'VIA' brackets using LSK 1L (5).



- You will not have to specify an "exit fix" in each 'TO'-field (6) since the FMC is able to connect the airways segments on its own. By entering the next airway name into the the second 'VIA' field the exit fix at LSK 1R will be inserted automatically.
- Enter 'UL607' into the empty 'VIA' brackets below using LSK 2L (7)
- Repeat the above step using the next lower LSK with the following airway segments:

via UM150
via UN852
via UT3

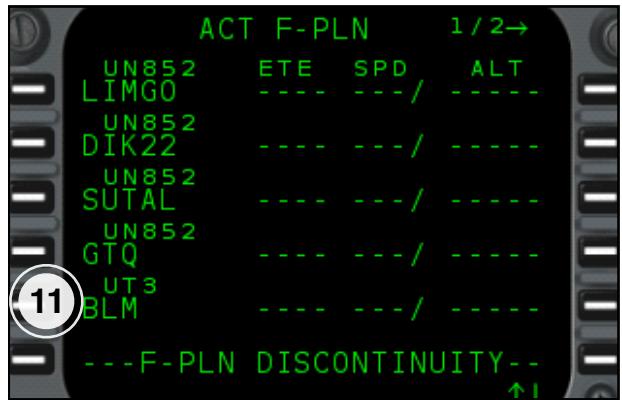
Your 'AIRWAYS' page will look like the one on the right. As the last step you will need to specify the exit fix for 'UT3' (8) since this is the last airway segment for this flight plan and the computer has no way to know where you want to exit this airway.



- Enter 'BLM' using LSK 5R (9).
- When done press LSK 6L (10) to insert this data into the flight plan.



- You will see the SID and the entire enroute part with 'BLM' VOR as the last waypoint (11). This is the waypoint where the STAR will be added. On this flight we do this once in cruise. However normally the STAR and the arrival runway is added before departure as well to get more accurate fuel and time predictions.
- If you wish you may do this now using the steps described on page 25 at 'Entering approach data'.



- Continue the tutorial flight with filling in the data for the 'WEIGHT INIT' page as described on page 7.