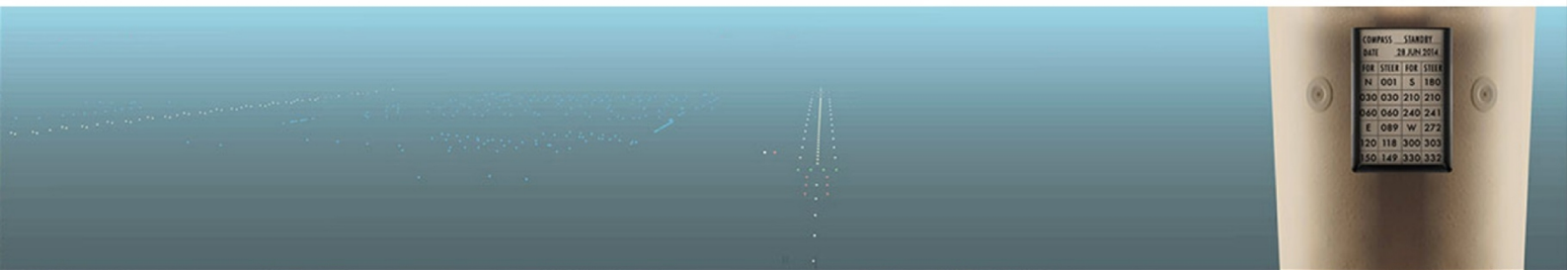


Getting Started with PSX



Part 3 — using both PSX and FSX (the summarised list, extended)



*by Brian Cowell
with additional material by Hardy Heinlin*



Summarised list of actions when using both PSX and FSX

a.k.a. The simmer's rough guide to using PSX with FSX — notably, from gate to gate

An approach to planning and executing a simulated Boeing 747-400 trip using Precision Simulator X, and FSX for the outside scenery via VisualPSX.

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Introductory discussion/explanation

Allow me to first of all try to explain why I found it necessary to write this outline guide for simmers. In fact I wrote the original version just for me, but I'm creating the final version in this more readable format just in case someone else might ever find it useful, too.

PSX is an utterly amazing sim, and is of course very firmly targeted at professional flyers (and indeed Hardy's never-ending (seemingly) search for perfection makes it ideal for such folks). 😊 But from its origins back in PS1, PSX has always generously supported a user base of dedicated simmers, too.

And I'm just a simmer. I've been simming ever since Bruce Artwick's wire-frame graphics on the Apple][in 1980, and 35 years on I still find simming fascinating, most especially in the Boeing 744 as extensively explored first of all in PS1 (and then briefly <*cough*> PMDG in the intervening years whilst awaiting PSX), and now most satisfyingly of all in PSX itself. I've never been lucky enough to receive any formal professional aviation training, although somehow or other I have managed to spend many hundreds of hours in the cockpit, everywhere from the Arctic Circle to the Caribbean. So I am certainly not anything remotely resembling a professional flyer — I love simming because I have always been an aviation enthusiast. It just happens that my preference is to simulate the whole airliner experience, from starting up cold and dark (if I've plenty of time, that is — otherwise from 'ready to start engines') through to shutting down at the gate at my destination.

But (to quote from Hamlet / Shakespeare / whoever you think wrote the play) — there's the rub! PSX (by definition, and in accordance with its design goals) is not too concerned with trivialities such as taxiing to the gate and back — it is aimed principally at what happens between take-off and landing. So whilst the professionals who are its natural target audience will be happy to omit the “boring” bits, as a simmer I *like* to try and get as close to the experience of the guy who is in the pointed end of my holiday flight as I possibly can — hence taxiing in the dark from an anonymous blue blob to the distant outline of the threshold of my take-off runway doesn't quite cut it for me, somehow.

So here I have to address the “purists”, as I term them, who seem to rather denigrate the notion that PSX needs any external graphics at all other than the ones that are provided with it (which are, I agree, superb as far as they go). Look guys, if that's what floats your boat, or, er, brains your plane (?) or whatever, and all you are interested in seeing is an outline of the runway at your origin and destination whilst you become immersed in the intricacies of the intervening activities, then I can perfectly well understand that, and I entirely respect your point of view. It's just that I'm a simpler soul, and would like to see some eye candy too, so

that whilst simming I can also semi-imagine that I'm doing a job that is surely a lot more fun than the stuff I actually ended up doing. :-)

As a simmer I therefore like to use PSX not only as a procedural trainer (superb though it is in that role) but also as a simming adjunct. My apologies if anyone reading this should perhaps think that's a little strange, but there it is; and so it is that this document is primarily written from the simmers' point of view — notably as regards the parts of the trip between gate and runway (and *vice versa*).

Problem, and two-part solution

When I began trying to use PSX with FSX as its scenery generator (via Garry's brilliant VisualPSX add-on) soon after PSX's release, I encountered some occasional snags.

The main problem was that PSX often seemed to differ from FSX as far as gates were concerned. Well, to be more accurate, not just from "FSX", but perhaps also from the charts — and also from various accurate FSX add-ons from respected developers (which agreed with the charts). In a worst case scenario, PSX seemed to have one opinion about what gates exist and where, whilst the charts and add-on airports had a totally different one — although if the airport was freeware then its layout could sometimes differ from both ¹ (which is why I try as far as possible to stick to airports from the better-known developers). OK, this isn't a disaster, obviously — but it does require a few work-arounds, from a simming point of view, and the work-arounds that I use are described in this document.

It turned out that some of the problems were of my own making. When I asked about the gates problem on the PSX forum, Hardy explained that the gate database was in fact not intended to be used for the purpose of positioning the aircraft at specific gates ² (which, of course, explained the problems which I had been encountering).

So.... The obvious alternative approach is to position the aircraft at the gate in your scenery within FSX (whilst not yet connected via VisualPSX, of course ³), read the position and True heading using Shift-Z, and then enter that FSX position and heading data into PSX. That way, when the VisualPSX connection is made, the aircraft won't move in the FSX view.

¹ See also "Worst case scenarios", below.

² Hardy's words were: "...the actual purpose of the gate database is to provide additional means to initialize the IRS position during IRS alignment on the FMC's POS INIT page. The official lat/lon format that can be entered on the POS INIT page has just this one format. That's why the official database is not more precise. In PSX the gate database is also used for scenery dots and raw aircraft positioning, but this usage is just a bonus feature. The primary, normal usage is for IRS alignment initialization."

³ Although these days there is the possibility of using the VisualPSX Slew facility — see Appendix 2.

Which was fine in theory, but there were two practical difficulties.

The main issue, of course, was that PSX originally allowed the “Aircraft position” box to accept only one place of decimal minutes (e.g. N53 25.6 W006 14.8), with the result that the lack of precision made it impossible to position the aircraft sufficiently accurately to avoid it appearing inside buildings or intersecting other aircraft when VisualFSX was started.

Happily, Hardy very kindly implemented my request for the ability to be able to specify the position in the “Aircraft position” box with greatly increased accuracy, which solved the problem. With effect from PSX v10.0.4 beta 13 (and, of course, the 10.0.4 official release onwards) the minutes field will now accept six digits after the decimal point — a degree of accuracy which is more than sufficient to place the aircraft where it needs to be. ⁴

Which brings me to the second difficulty alluded to above: by default FSX displays only two digits of minutes following the decimal point. Furthermore, PSX’s “Hdg” field requires the True heading, not the magnetic heading normally given in the FSX info. So how are we to get the information from FSX to enter our position into PSX?

Fortunately, although many simmers appear to be unaware of the fact, there are ways of tailoring the Shift-Z lines to give us exactly the output we need. To obtain exactly the format needed to enter the aircraft’s position into PSX, please follow this process:—

*(N.B. This involves making changes to your fsx.cfg file, so please take the precaution **first of all** of making a copy of your existing fsx.cfg so that you can go back it in the event that you wish to revert to your old display format, or (heaven forbid!) mess it up and need to try again).*

Step 1: edit your fsx.cfg file and and first add the following two lines to the [Main] section (or change the values following the equals signs if they already exist):

```
LatLonFormat=Minutes  
FractionalLatLonDigits=8
```

Step 2: still editing your fsx.cfg file, find the [TextInfo.1] section. By default, it looks like this:

```
[TextInfo.1]  
Latitude=1,1  
Longitude=1,2  
Altitude=1,3
```

⁴ You will notice that when the Enter key is pressed (or the focus is changed), the position *as displayed* reverts to the original ‘one decimal place of minutes’ format (which enables you to then copy and paste it into the “Map center” box, if desired). But the more accurate position is now used by PSX.

```
Heading=1,4
AirSpeed=1,5
WindDirectionAndSpeed=1,6
```

Edit that section (adding a new line and changing the rest) so that it looks like this:

```
[TextInfo.1]
Latitude=1,1
Longitude=1,2
HeadingTrue=1,3
Altitude=1,4
Heading=1,5
AirSpeed=1,6
WindDirectionAndSpeed=1,7
```

The result is that the FSX position display (as shown in red, when you press Shift-Z) is now given in exactly the format that you need to type in to the PSX “Aircraft position” box, and also the next figure is your True heading (the magnetic heading is also shown, in the next but one value). So you can place your aircraft at the gate at your desired FSX airport, read off the lat/lon and heading, and type that data into PSX: now, when VisualPSX is started, the aircraft won’t move from where you want it to be. Here (*this is purely an example*) is the original FSX default presentation when you position your aircraft at Terminal 5’s gate 534 of Aerosoft’s version of London Heathrow (only the first few fields are shown):



LAT: N51° 28.31' LON: W0° 28.94' ALT: 99.7 FT MSL Mag 91

However, this is the first three fields as you will see them *after* making the above changes:



LAT: N51° 28.308834' LON: W0° 28.939996' HDG 90

(Exactly as required for PSX). Be aware that when you transfer the information into PSX you will have to correct FSX’s irritating habit of suppressing leading zeros in the degree fields, and also be sure to omit the degree and minutes symbols that it includes — so you would enter FSX’s LAT: N51° 28.308834' LON: W 0° 28.939996' into PSX’s “Aircraft position” box as:

N51 28.308834 W000 28.939996

Having typed in the extended format as given above (the box is not big enough to allow you to see it all, but that’s OK) you would then press Enter — as was mentioned in the footnote on the previous page, the *displayed* position in the box would then revert to the shortened presentation of N51 28.3 W000 28.9, but the full precision is nonetheless retained internally.

When you also entered 090 into the Hdg box, PSX would then know your aircraft's position at gate 534 — and hence when you started VisualPSX that position would be synchronised. So much for the background, and preliminary explanations of the purpose of this document.

The ancestor of this document — the “summarised list”

Just before launching into the details of how to set up your flight when using both PSX and FSX, though, I should perhaps explain what I'm referring to when I mention “point 7”, or whatever.

In Part 2 (which turned out to be the final part) of my "Getting started with PSX" series, I attached a pdf clumsily entitled "Printable summarised list of actions when creating a new Situation file v1.02" (the list was also included in the document's text). However, from now on please use the version from Appendix 3 of this document, since it incorporates a few corrections and clarifications, as well as some additional material which will hopefully be helpful.

The previous “summarised list” basically covered the way in which you can set up a PSX situation from scratch and fly it. However, it didn't cover (a) taxiing between the gate and the runway (or vice versa), or (b) harmonising PSX's ideas of gate positions and aircraft headings with those of the charts and your add-on airports.

So what follows is more or less a superset of the “summarised list” from Part 2 of “Getting started”, but this newer version now attempts to deal specifically with the simmers' situation where you prefer to use the gates, and therefore synchronise PSX and FSX in a harmonious fashion (even when using pushback from PSX or even GSX).

Sequence of events

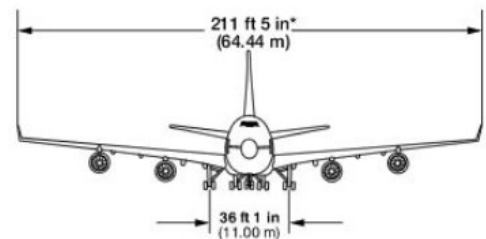
Before diving in to look at the detail, let's take a high level look at the order in which things need to be done. In view of Hardy's explanation we will not, when using the aircraft at a gate in FSX, be positioning our aircraft using the PSX gates database — so that means that the first thing we have to do after our preliminary flight planning is to start FSX, then use the FSX menu to position the aircraft at the gate we have chosen within whatever airport scenery we are using, and carefully note the lat/lon and true heading to enter into the PSX Situation | Position page. We can then start PSX and set up the situation we require — this process was broadly described in the previous “summarised list”, but I will now describe the procedures in a way which takes special care over two important elements in particular.

The first is weather: do you want to create a situation where the weather (and therefore the departure and arrival runways and so on) will always be the same, or one that will use the current weather at the time you fly it? And also: will you be using PSX's pushback, or some other method (I use GSX, for example)? I'll cover the differences as we go along.


Initial steps

Obviously, you will begin by preparing the route in whatever flight planner you prefer (I use PFPX) and then exporting the resulting route to PSX. For illustration purposes here, I generated a short charter flight from London Heathrow (EGLL) to Dublin (EIDW). Add a trailing underscore to the filename prefix of the resulting ".route" file if you wish — I generally do so, although for variety I occasionally opt to have to request it from the cockpit. So I now had a file called "EGLLEIDW01_.route" in my Aerowinx\Routes folder.

I then looked at the charts for London Heathrow (EGLL). There, flights to Dublin tend to originate from either terminal 2 (if they're Aer Lingus) or terminal 5 (if they're British Airways). A charter flight gives me considerable flexibility, of course, so being careful to choose a gate which seemed likely to accommodate the wingspan of a 744, I picked EGLL's terminal 2, gate 244, as the departure point for the trip to Dublin. For the arrival at Dublin I decided to use terminal 1 (since it's a short haul trip), where I opted for gate 302. I chose those gates entirely visually, using the charts, although in some sceneries gate positions are not always an exact science, as we shall see....



So I fired up FSX⁵ and placed the aircraft (I use a repainted version of the default 744 as the PSX puppet aircraft in FSX) at the stand — in this case, gate 244 at EGLL. But the result as seen within the scenery was unexpected —

FSX specified position: But actual location:  ?!

Hmm, that's odd. So to get to gate 244, I presumably need to specify gate 245? And so it proved:

FSX position: Actual location: 

Hey ho, no doubt that will be fixed in the next Aerosoft update — trust me to choose one like that... 😊 Anyway, by one means or another I have now succeeded in placing the

⁵ Please note that if you are using AS2012 or some other weather program(s) to provide textures for your trip those programs often need to be run first, *before* starting FSX. (See also later comments).

aircraft at gate 244 (even if FSX/Aerosoft seem to think it's gate 245 <sigh>) — and by pressing Shift-Z we can read the aircraft's position and True heading as needed by PSX:

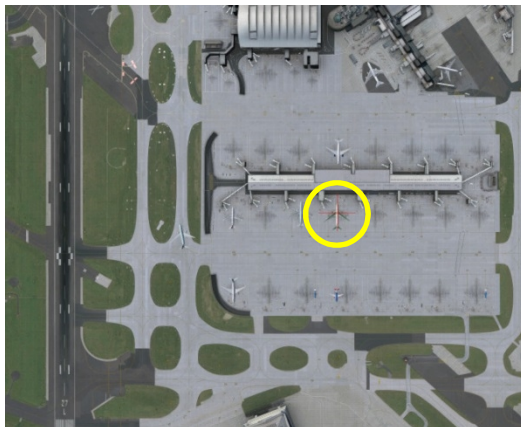
LAT: N51° 28.259853' LON: W0° 26.519675' HDG 270

So when it comes to step 7 in the summarised list sequence of events, I will need to type:

N51 28.259853 W000 26.519675

into the PSX "Aircraft position" box (and press Enter — whereupon the display reverts to the short-form default format ready to be copied into the "Map center" box, and shows N51 28.3 W000 26.5); and also enter **270** into the "Hdg" box.

In fact, consulting the chart tells us that the coordinates of stands 244 to 246R are N51 28.3 W000 26.5, so Aerosoft (and FSX) are as close to reality as you can get with that resolution.



Gate
244

OK, we can now abandon FSX for a while: start PSX (and power up the external CDU, and/or other hardware, if you use it). Also load whichever add-ons you use, e.g. —

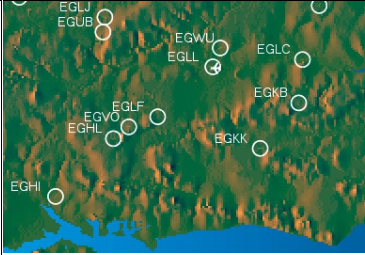
- AdaptPSX
- JoyToKey
- PSX (B)ACARS
- PSXperf
- FiFli
- RealTraffic / TrafficPSX

But before entering the position information into PSX in step 7, we need to accomplish a few other steps. Allow me to remind you of the first seven points on the (revised) list:

In PSX:

1	Get the full coordinates of your starting position from FSX, for inputting into PSX. Then collect together all you need for the trip (charts, QRH, Hardy's manual, Operational Flight Plan (OFP), Take-off and Landing Report (TLR), etc.), and check that your .route file is available in the Aerowinx\Routes directory. Also, if you use multiple fsx.cfg versions ensure that the appropriate version is current.
2	Start PSX, as well as any ancillary programs you may need (AdaptPSX, TrafficPSX, CMC-PSX, etc.)
3	In the PSX Instructor Station select Situation Load.
4	Load a situation appropriate for the state of the aircraft as you wish to find it. ⁶
5	Model Load — load your desired model, and, if needed, view the details on the next three tabs to refresh your memory concerning the configuration.

⁶ Typically, one of the following: Basic 000 (Cold and dark cockpit.situ), Basic 001 (On ground and IRS aligned.situ), Basic 002 (On ground and doors closing.situ), Basic 003 (On ground and cleared for engine start.situ), or perhaps if you're already on the runway (!) Basic 004 (Cleared for take-off.situ). Be aware, however, that loading one of these also loads its pre-set position and route etc.

6	Situation Time and set the daytime and season sliders (or press the “Copy real world UTC” button).	
7		<p>On the Situation Position page, stipulate the desired starting point of your aircraft in the “Aircraft position” box. Use the full six decimal places of minutes to position the aircraft as precisely as you can (and don’t forget to enter the True heading, too). If desired, you can then press the “Find Aircraft” button to copy and paste the (reduced-precision format) position into the “Map center” box.</p> <p>You may also wish to set the Map’s terrain type and initial zoom level, especially if you are going to take a peep at your progress as the flight progresses.</p>

OK: first let’s review where we are, currently. On the previous page we accomplished points 1 and 2 of the above List points, and so we now need to continue with points 3 and 4 (for speed, I opted to load the ‘Basic 003’ situation to be ready to start engines) and point 5 (loading whichever model you wish to use). Continue with point 6 (set the time and season).

We now arrive at point 7, where we set the position. Carefully type the position given to you by FSX into PSX’s “Aircraft position” box and press the Enter key (there won’t be room to see all of it but that’s OK): PSX will store the exact position internally and then revert to displaying the shorter version in the aircraft position box. Instead of copying that and pasting it into the “Map center” box at the top, Hardy points out that it is simpler to press the “Find Aircraft” button instead. Now enter the True heading into the “Hdg” box and check the information has been entered (if not, click in another field to move the focus).

If, like me, you are intending to use GSX’s pushback, you may be wondering why I suggest entering the gate position into the “Aircraft position” and “Hdg” boxes now, since you’ll need to re-enter it after the pushback is complete. The main reason for doing so is to enable you (if you wish) to also save a Situation file *prior* to pushback, so that on another occasion you could push back in the other direction, if needed, to use a different departure runway. I usually create both (they typically take up only about 25 – 30K each, so why not?).

Doors do matter

Before moving on, however, we also need to think about the question of whether our doors are open or shut (because we need to set them whilst completing the next item on the list).

At the gate, you may opt to begin with any one of a number of combinations of aircraft powered up or not and doors open or not and the engines started or not (depending on the situation you decided to use). But this is in fact a significant decision *because the door status is also an essential trigger condition for certain things to happen* — not only within PSX but also in various add-ons such as PSX (B)ACARS (to calculate an assumed temperature) FiFli (for cabin sound effects), GSX (for cabin service and pushback), and others too, no doubt.

```

1 OF 1
BC8624 14 APR 2015 14:04
G-BCBC
A/C PACKS ON
EGLL/09R
W/C 014/08 TEMP 021C
DRY RWY ANTI-ICE OFF
QNH 1027 MACTOW 19.0
DAY: CLG NIL
VIS 150M
NIGHT: CLG NIL
VIS 150M

```

```

PERF CORRS
NONE

```

```

-251.3- - - - - REQUESTED TOW
( . ) FMC CALC TOW

```

```

F/L - - - - - TOR 12008 - - - - -
*****

```

```

*FLAP 20* TOPL:421.1
*****

```

```

ATOW TEMP V1 VR V2
251.3 76 125 125 146
251.3 75 125 125 146
251.3 74 125 125 146

```

```

NOTES
ALL ENGINES USE FCOM 1 NOISE
ABATEMENT PROCEDURE TERMINATING
ALT 4000FT QNH. BETWEEN THE
HOURS OF 0700-2250 LT USE
NOISE ABATEMENT PROCEDURE
REDUCING THRUST WHERE POSSIBLE.
IF T/O IS ANTICIPATED BETWEEN
2251-0659 LT USE SAME NOISE
ABATEMENT PROCEDURE WITH
FULL T/O THRUST.

```

As an example: at the gate, a simmer will often start with the aircraft powered up and doors open, but the engines not yet started. This scenario is in fact required for PSX (B)ACARS to provide performance data (see left). Here are the instructions that come with that add-on — note especially the first point (in blue):

Start with Engines off and Doors Open

Use the MENU page on the Centre CDU to select < PERF REQ [LSK 6L]

Fill in the details of CARD Page 1: click Next Page

Fill in details on Page 2 (note if you go back to Page 1 some selections reset, as in the real aircraft)

Click SEND — ‘SEND’ will change to ‘SENT’, and after a minute or so you will receive a print out on the PSX Printer (as seen left).

So your decision about the doors (and engine status) needs to take into account the add-ons you are using.

OK, with the decision about the doors having been made, and our position and heading already entered into PSX, we can at last continue with the items on this latest version of our “summarised list”. Hopefully, we

will end up with some situation files for potential future use: one at the gate, another after pushback (which may affect the runways we can then readily taxi to, obviously), and perhaps one when we’re on the runway ready to take off, too. Here we go:

8	<p>Situation Service:</p> <ul style="list-style-type: none"> a) set the external supplies, and the doors, appropriately — i.e. to suit the starting point of your scenario. b) for long cold (e.g. trans-polar) trips, set the fuel type appropriately c) type the RELEASE fuel figure from the release page of your OFP into the “Total fuel qty” box d) type the (PLN, not MAX) ZERO FUEL WEIGHT figure from the release page of your OFP into the “Zero fuel weight” box (Check that the kg/lb units are aligned in both cases, naturally).
9	<p>Situation Weather Planet:</p> <p><i>(Unless you wish to tune all seven weather zones manually to set up a specific scenario)</i></p> <p>Ensure that the “Set zones...downloaded METARs” checkbox (lower left) has a tick in it, and also go to Preferences Basics and check that in the “Allow METAR file download from Internet” box also has a tick in it, so that by the time you reach point 16 the current weather will have had time to download. Return to the Situation tab to continue with the next point.</p>
10	<p>Situation Human Pilot: ensure that the “Makes call-outs”, “Performs silent tasks”, and “Sets S/C alt if VNAV PTH engaged” checkboxes are configured as you would like them to be.</p>

11	Situation Human Dispatcher: find your route file in the list and make sure that when it is selected the “Requires route uplink” box remains clear (which it will do, if you appended an underscore to the route name as suggested above). Alternatively, if you wish to practice requesting the route from the cockpit and subsequently downloading it, check the box to remove the underscore. <i>Don’t forget to click “Send to aircraft” (lower right)!</i>
12	Situation Human Traffic Select your PSX traffic options. Start up a RealTraffic or TrafficPSX add-on if you need it. Review the remaining Situation Human sub-tabs to ensure they are all configured appropriately.
13	Set up the various tabs on the Situation Malfunctions tabs to generate the frequency and severity of malfunctions that you feel you can handle. 😊
14	Analysis Airport: click on the “Show nearest airport” button and review the information presented, note <i>inter alia</i> the TA, frequency information, and runway information.
15	Layout Load: load your preferred 9pack, if not already in use.
16	Preferences Basics: check all settings, but especially — <i>To use the current weather from PSX and update it at regular intervals:</i> ensure that the “Allow METAR files download from Internet” box is checked. <i>To use just the currently loaded (static) PSX weather:</i> once PSX has been running for a couple of minutes so that the current weather has been downloaded, uncheck the “Allow METAR files download from Internet” box. For as long as the box remains unchecked, the weather will not change. And also, on the Network tab: Check that the Main and Boost servers are enabled as required.

If you are of a nervous disposition (like me) then you might like to save your partly-built Situation now, using a suitable name ⁷ — to preserve the work you have done so far. 😊

Hopefully, we will have done our flight planning previously, so that we already know our route and fuel, our alternate airport, our ZFW, and so on; hence we will soon be able to proceed straight on to the “In the cockpit” section (on page 13), and subsequently create a situation specifically for this flight. But before we climb into the cockpit, there are one or two other things that we also need to think about.

The first concerns the FSX weather presentation. If you wish to use textures from your favourite weather program to make your FSX visuals more appropriate to the conditions (hopefully, such weather programs will be using the same or similar sources to the ones used by PSX), then now is a good time to prime your combination of AS2012 / ASN / REX4 / REX Soft Clouds (or whatever) that you want to use for the trip. (I mention this in view of the fact that such programs often like to be run before FSX is started...).

FSX-W	Apply whatever weather textures you would like to see in FSX, then start FSX.
-------	---

Next, there’s also the delicate question of exactly when and at what stage VisualPSX should be started, since this will use your PSX position to locate your “puppet” aircraft within FSX.

⁷ Using a new name means there’s no danger of overwriting the Basic 00n situation you started with.

When should we start VisualPSX?

This is where we need to decide upon the method we will be using to push the aircraft back from the gate, since this also has to be taken into consideration when deciding at what point we will connect PSX to FSX (using VisualPSX). Are you pushing back within PSX, or FSX?

- If you are using PSX's pushback, then you will probably want to connect VisualPSX now, or soon, — or at any rate before leaving the gate.
- However, if like me you're using GSX for your pushback, obviously you can't allow PSX to control the FSX puppet aircraft until the GSX pushback is complete (since otherwise PSX and FSX won't know what GSX is doing and VisualPSX will prevent the pushback from taking place). So in such a case you'll need to delay your VisualPSX connection until you can determine the FSX coordinates *at the end of the pushback*, and then enter those into PSX as described above. At that point you can use VisualPSX to connect PSX with FSX to control the puppet aircraft from that point on.

Pushed
back
from
gate
244



We have already decided about the engines (started or not?) and the doors (open or closed?): however before we enter the cockpit we first need to think about how to synchronise things.

Synchronise doors and engines

Once again, this isn't simply a matter of mere "eye-candy". GSX, for example, is pretty picky about whether the doors need to be open or closed (it wants them closed) and the engines started (it wants them *not* running) before it will allow you to initiate pushback. But if you're using PSX (B)ACARS to give you an assumed temperature, that will require you to have the engines off and the doors *open*. FiFli, on the other hand, simply wants you to have the doors open (and the FLT DECK DOOR selector turned to UNLKD) for you to hear the boarding noises. And so on — this seems confusing: what are you to do?

It's not too hard — the answer is to begin by recollecting that *until you connect PSX to FSX by starting VisualPSX, the PSX aircraft and the FSX puppet aircraft are completely independent of each other*. So in particular:

- GSX is only interested in the FSX puppet aircraft, so you can run the catering, refuelling, boarding, and push-back simulations by adjusting the door and engine status (of the FSX puppet aircraft) purely within FSX, regardless of the status of the doors and engines in the PSX aircraft.
- However, **PSX** add-ons such as (B)ACARS and FiFli are only interested the status of the PSX aircraft.

Therefore, be sure to juggle the status of your two (still independent prior to running VisualPSX) FSX and PSX aircraft to suit the requirements of whatever add-ons you happen to be running with them: as long as you do this carefully, by the time VisualPSX is running and you are taxiing to the runway threshold (controlled by PSX) you'll be fine. 😊

For the sake of simplicity, in the list which follows I won't detail all the many differences which might result from your decisions to use various PSX or FSX add-ons, since that could quickly become confusing and counterproductive. I'll briefly mention the specific case of push-back later, but otherwise please be prepared to tailor the method appropriately to suit your own circumstances, in the light of the considerations mentioned above. 😊

(Incidentally, if you need a reminder of the door and engine and parking brake controls of the default FSX 747 — I did, the first few times — please see Appendix 1).

OK: depending upon which Basic Situation you originally loaded (Basic 000 – Basic 004) you may now have a lot of cockpit preparation work, or perhaps only a little: so please use the following steps whenever you are ready to enter information into the FMC via the CDU ⁸.

In the cockpit (CDU work):

	If you are using GSX or other FSX add-ons, please set the status of the FSX aircraft appropriately for the options (catering/refuelling/boarding/push-back) you have decided to use.
	Please bear in mind the requirements of any other PSX add-ons as you work your way through the following list. (e.g. If you are using PSX (B)ACARS, recall that this requires you to request the performance information when the engines are off and the doors open — and so on).

⁸ By which I mean — I have set out the “summarised list” as one continuous chunk, on the assumption that you are probably following this example in which my starting point was a loaded Basic 003 situation (ready to start engines). Obviously, however, if you are starting from a Cold and Dark scenario then you will very probably want to break the CDU work up into two or more sections with a pause to do other things between — for example, the Ident page to Legs and Nav Rad section, and then a little later on the Perf Init page to Take-off and VNAV Climb page section. But it's entirely up to you, and clearly much also depends on whatever Procedures you have decided to use, so please understand that this has to be a generic guide, and adapt it to suit your own circumstances.

17	Note and action any EICAS messages; also check and clear any in the CDU scratchpad.
18	Press the INIT REF button, then LSK 6L, then LSK 1L to get to the IDENT page.
19	(If your startup situation allows it) — click LSK 3R and then LSK 2R: this will clear the previous information from the FMC ⁹ . Use the CLR button to clear any messages which appear in the scratchpad following this process.
20	If needed, switch the FD switch off and on again to clear MCP settings.
21	Hardy reminded me that if the IRSs are already aligned, you could press the RTE key to go directly to the RTE 1 page and skip directly to step 23.
22	(Otherwise) — a) Press LSK 6R to get to the position initialization page b) Type your current airport ICAO code into the scratchpad c) Press LSK 2L to upselect it to the REF AIRPORT line Then press LSK 6R to get to the RTE 1 page.
23	Type the name of your saved route into the scratchpad, not forgetting the two-digit numeric suffix (but not including any appended underscore), and upload it to the Company Route prompt at LSK 3R. Wait for a couple of seconds while the information is processed, and until both departure and destination airports have been automatically entered for you.
24	(N.B. Please ignore the RUNWAY prompt here — you will enter that information in step 27).
25	Type the flight number (from your OFP) into the scratchpad, and upselect it to LSK 2R.
26	Click the LEGS button and verify that your route has loaded properly.
27	To enter the SID, click the DEP ARR button and then LSK 1L to view the SIDs for your departure airport. Click the right LSK adjacent to your departure runway (at large airports you may need to use the NEXT PAGE button to see them all): it will then appear as <SEL>ected, and the list of SIDs will be trimmed to include only those valid for that runway.
28	Click the left LSK adjacent to your chosen SID (again, use the NEXT PAGE button, if required).
29	If there are applicable TRANSitions, select the correct one in the same way. (TRANS NONE means exactly that, so move straight on to step 30).
30	If your trip is short enough for you to be able to make an educated guess at the runway and STAR that will be in use when you arrive, you could enter it now, by pressing DEP ARR and LSK 2R, and then using the same technique. (Although on most 744 trips you will have plenty of time to do this in the cruise as you get near to your TOD, so on such occasions you may prefer to wait until then...).
31	Press the LEGS button and scan through your route (using NEXT PAGE to see it all). You may find it necessary to heal any DISContinuities present, or perhaps simply make a note of them and defer doing so until step 34. Whilst looking through, also note any speed and altitude constraints that appear in large letters on the right and check them against the current charts, amending them if necessary, and inserting or deleting any that have changed. Add your missed approach information as required. If you normally use RTE2 to set up a route to your alternate airport, do so now.
32	Switch to a PSX layout where you can see these three items all on the same flightdeck frame or screen: <ul style="list-style-type: none"> • the Navigation Display (ND) • the EFIS panel to the left of the Mode Control Panel (MCP) • the Captain's CDU
33	Turn the left-hand of the two lower knobs on the EFIS panel from MAP to PLaN, and reset the range knob to the right to 20 nm. Click the LEGS key again to return to the top of the list of waypoints.
34	Click the STEP > prompt at LSK 6R to step through your route whilst also watching the ND as you do so. Look for any unexpected deviations to your path as shown on the ND, or unusually large distances between waypoints on the CDU: investigate and make any required changes.
35	When you're absolutely sure that this is the route you want the aircraft to follow, return the EFIS selector knob back to MAP, and the range knob to whatever you like to use for take-off — perhaps 10nm.
36	Press the LEGS key again to return to the start of your route, and then press LSK 6R to Activate it (if it's not already activated), and the EXECute key to confirm. (You will notice that the line on the ND now becomes magenta in colour, and the headings on the Route and Legs pages now read ACT ive RTE 1).

⁹ If the “Select valid FMC nav database” wasn't checked, the virtual engineer won't automatically reselect the current database for you, so you will have to revert to the previous situation yourself.

37	Press INIT REF and then LSK 6L for the index page: now select PERFormance (LSK 3L).
38	Enter into the scratchpad your cost index ¹⁰ and upselect it to LSK 5L.
39	Enter into the scratchpad your initial cruise altitude (shown on your PFPX OFF immediately below Cost Index as “INITIAL ALT”, since during a long cruise as you become lighter you may be able to step climb) and upselect it to LSK 1R.
40	Check the calculated Reserve figure from your OFF, convert to tonnes as required (so for example, 4,909 kg thus becomes 4.9), enter it into the scratchpad and upselect it to LSK 4L. ¹¹
41	Whilst on that page, sanity-check the displayed Gross Weight, Fuel, and ZFW figures).
42	Press the VNAV key and then enter the Transition Altitude (from the latest charts, or failing that from the PSX Analysis Airport page) into the scratchpad, and then upselect it to LSK 3R.
43	Press the INIT REF key followed by LSK 6L and LSK 4L to reach the THRUST LIMits page.
44	You may have used TOPCAT or PSX (B)ACARS to plan for an assumed temperature take-off: if so, type the temperature you intend to use into the scratchpad and upselect it to the SEL value using LSK 1L. (Providing your runway isn't contaminated, obviously). If the entered figure is outside the limits, it will be corrected to the nearest acceptable value. In any event, also check/set whatever combination of TO and CLB fixed derates you feel is most appropriate.
45	Press LSK 6R to get to the TAKEOFF page.
46	Check that the take-off flap setting at LSK 1L is the one you planned for, and if not type the setting to be used into the scratchpad and upselect it to 1L (append any applicable noise abatement or other height adjustment after the slash).
47	Also check the engine-out acceleration height at LSK 2L and amend if required (most airlines use 1,000 ft. — although some take-off profiles will require more).
48	At LSK 3L check (and if necessary, amend) the altitude or flap setting at which the thrust limit will be reduced from take-off to climb. ¹² At LSK 4L, enter any applicable wind/slope figures, and the FMC will adjust the V_1 speed accordingly. (e.g. “H20” indicates a headwind of 20 kts).
49	At LSK 5L check (and if necessary, amend) the runway condition — which defaults to dry. If it's <i>seriously</i> wet, type W into the scratchpad and upselect it. N.B. “W” for runway conditions means a <i>*lot*</i> of water on the runway, so the V_1 figure is considerably reduced to give more stopping distance.
50	Now confirm the FMC-calculated V-speeds by pressing LSKs 1R, 2R, and 3R. (Note that V_2 is the flap 30 V_{REF}).
51	If you included a Weight and Balance System in the options for your model of 744, then the CG computed by the system will be shown in small font adjacent to LSK 4R. If you're happy with the suggested figure, then click LSK 4R, or type the figure into the scratchpad and upselect it to LSK 4R.
52	If you are starting your take-off run from a position significantly different from the landing threshold, <i>and your GPS isn't working</i> , enter the runway position shift value at LSK 5R — the number of hundreds of feet (or meters, depending on your units) difference. (Relative to the landing threshold, you need to enter a positive number if a shorter runway is available, or a negative number for a longer runway). ¹³
53	Your departure details are now known to the FMC, so ensure that both Flight Director switches are ON and then arm LNAV and VNAV on the MCP.

¹⁰ I normally enter the CI into the Cruise/Cost Index field in the Aircraft section of PFPX, and it will then be shown on my PFPX OFF.

¹¹ Transition Level at the destination airport is often set by ATC depending on current atmospheric conditions, so we'll probably need to wait until we are close to our destination, in order to learn from them what to use as our TL.

¹² Providing that VNAV and AT are engaged, and the aircraft has accelerated to $V_{REF}+80$ kt.

¹³ For example — if you are using the full runway length for a departure from KEWR rwy 04L, the displaced threshold (your take-off position) is 2500 ft from the landing threshold (you may also notice: TORA 11000 ft, LDA 8460 ft). But this is irrelevant if your GPS system is working, of course.

And now continue with your cockpit preparation, not forgetting —

54	View the stab trim settings (just to the left of the speedbrake lever) and use the trim controls to adjust the stab trim until the end of the white bar is in the centre of the green band.
55	On the MCP, set the value in the IAS/MACH window to your V_2 speed, and the value in the ALT window to your first constraint.
56	Set the Captain's and F/O's CDUs to the most appropriate pages for take-off (e.g. VNAV for the PF and LEGS for the PNF).

You may perhaps wish to **save the situation** as it is at this point (i.e. with your aircraft at the gate), to preserve the work you have done so far, and perhaps form a basis for re-flying the route in the future with (potentially) different weather.

If you are using PSX's pushback, then you could now save a "ready for engine start" situation, once you have positioned the aircraft at the gate in both FSX and PSX. Having done so, you can then connect FSX to PSX via VisualPSX, and initiate the PSX pushback, starting engines as you go. (If you would also like to save a situation when the pushback is complete and you are ready to taxi, there will be a reminder to do so, below). But at this point please omit the following GSX stuff, and skip forward now to the "Start engines" section on the next page.

OK, so you want to use GSX's pushback facilities — here are some additional steps that you will need to complete. (This assumes that you have already positioned the aircraft at the gate in FSX and in PSX, and have perhaps already saved a situation for future use that will be unaffected by the weather).

GSX pushback

Once you reach the "ready to start engines" state (you may recall that, in my example flight, for simplicity I chose to use the Basic 003 situation so that my cockpit prep was already completed up to that point — but if you began at C&D or somewhere in between, please run through the checks until you are ready to start engines — then it's time to move to FSX and summon the GSX pushback with the appropriate options (i.e. in this particular case, tail right / nose left, to point towards the taxiway to rwy 09R).

Since we're not as yet connected to PSX, whilst the guys are strolling around the airport and pushing you back onto the yellow line and then disconnecting the tow truck (in FSX) you are also free to start the engines in PSX (see the section below, from S1 to S16). You'll need to be pretty alert to listen for the FSX cues about the parking brake whilst you are simultaneously starting the engines in PSX, but if you balance the sound levels there's no

real problem. Or else you could, if you wish, just enjoy watching the pushback, and then start the engines once you have set the parking brake at the end. I doubt whether your virtual passengers will complain about the slight additional delay. 😊

Start engines (PSX actions)

(This is simply a convenient reminder of the PSX actions needed to start the engines):

S1	Close all the doors (you can watch them closing and being set to Automatic using the DRS synoptic view).
S2	Set the seat belt selector switch to ON (if not ON already).
S3	Obtain start & push clearance.
S4	Set the hydraulic demand pump 4 selector to AUX.
S5	Set all packs off (or in hot climates allow pack 1 or 2 to remain on).
S6	Set the (red anti-collision) beacon to BOTH.
S7	Monitor the parking brake to be as required (during all the various phases of pushback).
S8	Set the ENG display on the secondary EICAS.
S9	Blank all caution and advisory messages using EICAS CANCEL.
S10	Check the Stab Trim indication: trim must be in the green area.
S11	Check/set the aileron and rudder trim to be zero.
S12	Perform the BEFORE START CHECKLIST.
S13	Announce start of engines 3 and 4: pull the 3 and 4 Engine Start selectors, and observe that they become illuminated.
S14	Set the control switches of both to RUN.
S15	Monitor N ₂ indications, as well as normal rise of oil pressure, N ₁ , and EGT. Check that the engine start switches cease to become illuminated at approximately 50% N ₂ .
S16	Repeat the last three action points for engines 1 and 2.

LAT: N51° 28.282787' LON: W0° 26.434317' HDG 180

The above was my position after pushback, and there follows a few additional steps to be followed by those who use GSX for pushback (so if you are not doing so, please ignore the following indented paragraph, and continue with the text below the following picture):

Once you are fully pushed back with GSX you need to read out the lat/lon coordinates and the heading from the FSX display, and enter them into the Situation | Position page in PSX as described above. After entering the aircraft's position don't forget to copy the shorter format position to the map centre box — and to enter the aircraft's True heading, of course. [N51 28.282787 W000 26.434317 and True hdg 180, in my case, using the coordinates displayed above.] Now start VisualPSX to synchronize your FSX puppet aircraft with your actions in PSX.

Pushed
back
from
gate
244



Because all four engines are started and you are now fully pushed back with PSX and FSX in harmony concerning your position and heading, you can now save this as your 'pushed back for rwy 09R with engines started' situation in PSX, if you wish.

Since VisualPSX has been started, from now on you will control the aircraft in PSX, and the FSX puppet will obediently show you the result in the FSX universe. At this point I also like to lock in the departure runway offset to VisualPSX: if you're unfamiliar with the procedure for doing this, I have included it as Appendix 2 — but Garry's manual is the best source (especially since a new version is imminent as I write this). Note also that to perform this procedure you will need to turn the beacon off (see the Appendix for more details)....

Worst case scenarios (hopefully, you will seldom have to consider these)

Mention has already been made of the possibility of problems occurring with freeware airports, whose layout may not correspond with the PSX database (and/or with the charts). Hopefully, this is a comparatively rare event; although if (as I do) you sometimes fly in a situation where your departure and destination are imposed on you, rather than having the choice of your favourite pre-installed airports, you may well be forced to use freeware airports. That scenario is usually the one in which there is a danger that you may encounter a situation where FSX, PSX, and your charts and navigation data differ, perhaps considerably, so that you simply have to try to optimise the situation as best you can.

Quite how you resolve such problems varies from case to case, but assuming that you want to use PSX for the take-off then here are a few suggestions —

- (The most drastic option) — dispense with taxiing altogether: simply use the VisualPSX Slew function (see Appendix 2) to position the aircraft on the FSX runway threshold, and then take off when ready. (A visual take-off).
- Or start VisualPSX but then use only the PSX windscreen view (ignoring the FSX presentation) until you are safely in the air (effectively, an instrument take-off).
- Or — and this is probably the preferred solution — you could create a situation with the aircraft parked at the gate, then use the VisualPSX Lock function (see Appendix 2, again) to assign the runway offset before the aircraft moves. Visually taxiing to the runway threshold with FSX should then put you there in PSX, too.

Whichever one of that trio of options is best for you in a given scenario depends very much on the nature of the terrain and the extent of the differences in the airport data between PSX and FSX. Personally, wherever possible (and it isn't always possible, of course) I try to only fly to and from good quality add-on airports, which usually means that problems such as these tend not to arise.

After start and before taxi

Again, this is simply a quick summary of what you need to do in PSX:

S17	When the GEN CONT OFF lights extinguish, shut down the APU.
S18	Return the hydraulic demand pump 4 selector to AUTO.
S19	Set the NAI (Nacelle anti-ice) switches as required by the conditions.
S20	Set all three pack selectors to NORM.
S21	Check/set the left and right ISLN switches to OPEN (visible horizontal lines).
S22	Push the EICAS RCL switch to review the known messages. Push the EICAS CANCEL button if no messages are shown, or the messages are no longer required.
S23	Perform the AFTER START CHECKLIST.
S24	Set take-off flap to the planned setting.
S25	Set the secondary EICAS to display STATus messages.
S26	Release parking brake and taxi.
S27	Perform the TAXY CHECKLIST. Perform take-off briefing, and rejected take-off briefing.

(Then, once you are turning onto the runway, and before take-off):

S28	Set all three packs OFF (pack 2 may be left at NORM if performance margin is sufficient).
S29	Set all landing lights ON and Strobes ON when entering the runway.
S30	Set the A/T switch to ARM.
S31	Set the TCAS switch to RA/TA, and the TFC range to 40 nm.
S32	Verify take-off data.
S33	Perform the TAKE-OFF CHECKLIST.

When you're ready, save a "ready for take-off" situation (if you like to do that), and then take off via the CPT5J SID. Enjoy your flight to Dublin! 😊

Having landed at your destination

Taking into account all the foregoing discussion, you will be relieved to hear that there will be no gate problem on landing, since you are still using PSX to guide the puppet FSX aircraft, via the taxiways visible at your destination airport in FSX, to the gate. So you can even use GSX's follow-me car to find the gate if you're not entirely sure where it is (something which I find to be especially useful in an unfamiliar airport at night). 😊


End of your flight

Congratulations! You have now successfully achieved a harmonious fusion of PSX and FSX, and enjoyed the benefits of a flight with all of PSX's phenomenal simulation of the 744, as well as the best that your FSX installation can offer by way of scenery, and with the benefit of the add-ons that you like to use. That's a great combination....

But clearly I cannot close this document without acknowledging the enormous debt that we owe to two gentlemen — to Hardy Heinlin, for creating the masterpiece of simulation software that is PSX (and for kindly checking the PSX aspects of this tutorial); and also of course to Garry Richards, who wrote the amazing VisualPSX program without which the use of FSX, FSX-SE, or Prepar3D with PSX would not be possible. Our huge thanks to them both! 😊

However, any errors and omissions in this document are entirely my own.

Cheers,

A handwritten signature in blue ink, appearing to read 'Brian', with a long horizontal stroke extending to the right.

Hampshire, England

July 2015

Appendix 1: FSX default 747's door, engine, and parking brake controls

Doors:

The required action to open the doors if they are currently closed will depend on which 744 aircraft you are using in FSX: for example, with the default 747 —

“Shift+E will open the main Exit”

(lower deck left two forward pax doors).

“Shift+E followed by 2 in rapid succession will open both Cargo doors together”

(right front and rear cargo doors).

“Shift+E followed by 3 in rapid succession will open all the doors on the right, for Catering”

(upper deck pax doors both left and right, and

lower deck left three aft pax doors, and

lower deck right all five pax doors).

(Repeat the relevant keystroke to close).

Engines:

Shut down all engines with: Ctrl Shift F1

Start all engines by Ctrl E (or Ctrl E 4 for engine 4, etc).

Parking brake:

Release the parking brake by tapping the . key (full stop — or “period”, for our American friends).

Set the parking brake by holding down the Ctrl key whilst tapping the full stop, so: Ctrl .

Appendix 2: VisualPSX locking and slewing

On page 14 of the current ¹⁴ VisualPSX manual, there is a section entitled “Setting departure runway offsets”, in which Garry says this:

“The FSX aircraft position will remain locked while ever PSX is ‘parked’. The PSX instructor can then be used to specify a departure runway. This will allow the correct offset to be applied. To use this feature follow this procedure....”

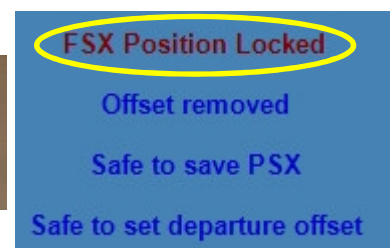
Garry has also said that the conditions for VisualPSX to enter lock mode are as follows:

- The aircraft must be stationary (in PSX);
- The park brake must be SET;
- The Nav lights must be ON;
- The beacons must be OFF;
- The runway turnoff lights be OFF.

Following that advice enabled me to lock the PSX position, so I then went on to specify a departure runway, again using the advice also on page 14 of the VisualPSX manual.

Garry’s manual (point 4) says:

“Click the Take-off button for the required runway. PSX will slew to that position and send that runway’s data to VisualPSX which will respond by moving PSX back to the FSX position then applying the runway offset in reverse to PSX, all while the FSX aircraft remains locked in position. The runway details will then be displayed on the VisualPSX status page in blue”



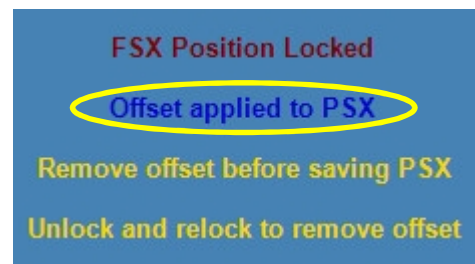
So let’s review Garry’s instructions to achieve locked status. In fact, all that I needed to do was to turn off the beacon (the nav lights were already on, and the parking brake set), and VisualPSX responded by locking the FSX position. But how does VisualPSX know which runway we will be departing from? We need to give it that information....

Following Garry’s manual, we need to type the airport code into PSX’s Aircraft Position box, and then select the departure runway. “PSX will slew to that position and send that

¹⁴ At the time that sentence was originally written I was using build 5634, whilst Garry has already released build 5668 — so please check this with the docs for whatever version you have!

runway's data to VisualPSX which will respond by moving PSX back to the FSX position then applying the runway offset in reverse to PSX, all while the FSX aircraft remains locked in position."

So I typed EGLL into the Aircraft position box in PSX (temporarily overwriting the aircraft position I entered so carefully a short while ago) and pressed Return. From the options that appeared I then selected the take-off button for runway 09R. VisualPSX responded as shown (right):



Sure enough, when I closed the PSX "EGLL" page, the Situation / Position page of PSX had returned to the previous coordinates, and back in FSX the aircraft had not moved — but VisualPSX was now primed to use the correct offset for runway 09R.

Should I have changed my mind about the runway, then all I needed to do was to turn the beacons on and then off again, and the offset would be removed.

Assuming that I don't change my mind, though, then as soon as the aircraft starts to move or the beacons are turned on then the runway display will show the Offset airport, Offset Runway, and Offset slope in green (to indicate that the offset is locked to that runway). The offset is gradually removed as the aircraft climbs away from the airport, and the VisualPSX runway display will then become blank.

But this is just a brief summary — please see the version of Garry's VisualPSX manual that comes with your version of his utility for the full details.

Slewing the aircraft to a gate position using VisualPSX

New since this document was first written is Garry's advice on page 16 "Matching a gate position", which details how to use the recently-introduced (at the time of writing) VisualPSX slewing facility to position the aircraft at the gate.

I somehow suspect that this will be of more help to those who use PSX from the outset, rather than people like me who position the aircraft in FSX using the gate position from the scenery, and/or those who use GSX pushback, and hence have to delay starting VisualPSX until we have informed PSX of our aircraft's post-pushback position and heading. Anyway, once I have had more opportunity to experiment with it, I will hopefully have something more useful to say about it in a future version of this document.

Appendix 3: Revised summary document

There follows a revised version of the previous “summarised list” which endeavours to include some of the advice given above. Please note, however, that the sequence in which things need to be done varies according to several factors, but notably whether you connect your PSX to FSX (using VisualPSX) *before* you push back *or afterwards*, as well as how you need the doors to be configured — and so this is necessarily a somewhat generic guide.

High level pushback overview (*i.e. not including considerations concerning doors*):

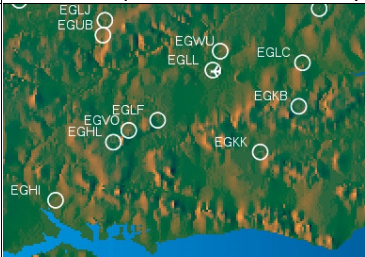
Pushback in PSX

1. Flight planning (including route, weights, cruise alt, etc.)
2. Weather program for textures (if used)
3. Start FSX and connect to PSX using VisualPSX
4. Use VisualPSX's slew mode to position the aircraft at the desired gate
5. Save gate Situation if/when desired
6. Complete gate preparations and push back
7. Save post-pushback Situation if desired
8. Continue the flight

Pushback in FSX, then connect to PSX

1. Flight planning (including route, weights, cruise alt, etc.)
2. Weather program for textures (if used)
3. Start FSX and use the FSX menu to position the aircraft at the desired gate
4. Shift-Z to display the aircraft's position and heading, and record it
5. Start PSX and type the aircraft's position and heading into the Position (Instructor) page
6. Save gate Situation if/when desired
7. Complete gate preparations, return to FSX, and push back using GSX or another alternative
8. Shift-Z to display the aircraft's position and heading in FSX, and record it
9. Type the aircraft's position and heading into the Position (Instructor) page
10. Save post-pushback Situation if desired
11. Start VisualPSX and continue the flight

In PSX:

1	Get the full coordinates of your starting position from FSX, for inputting into PSX. Then collect together all you need for the trip (charts, QRH, Hardy's manual, Operational Flight Plan (OFP), Take-off and Landing Report (TLR), etc.), and check that your .route file is available in the Aerowinx\Routes directory. Also, if you use multiple fsx.cfg versions ensure that the appropriate version is current.
2	Start PSX, as well as any ancillary programs you may need (AdaptPSX, TrafficPSX, CMC-PSX, etc.)
3	In the PSX Instructor Station select Situation Load.
4	Load a situation appropriate for the state of the aircraft as you wish to find it. ¹⁵
5	Model Load — load your desired model, and, if needed, view the details on the next three tabs to refresh your memory concerning the configuration.
6	Situation Time and set the daytime and season sliders (or press the “Copy real world UTC” button).
7	 <p>On the Situation Position page, stipulate the desired starting point of your aircraft in the “Aircraft position” box. Use the full six decimal places of minutes to position the aircraft as precisely as you can (and don't forget to enter the True heading, too). If desired, you can then press the “Find Aircraft” button to copy and paste the (reduced-precision format) position into the “Map center” box.</p> <p>You may also wish to set the Map's terrain type and initial zoom level, especially if you are going to take a peep at your progress as the flight progresses.</p>
8	Situation Service: <ol style="list-style-type: none"> set the external supplies, and the doors, appropriately — i.e. to suit the starting point of your scenario. for long cold (e.g. trans-polar) trips, set the fuel type appropriately type the RELEASE fuel figure from the release page of your OFP into the “Total fuel qty” box type the (PLN, not MAX) ZERO FUEL WEIGHT figure from the release page of your OFP into the “Zero fuel weight” box (Check that the kg/lb units are aligned in both cases, naturally).
9	Situation Weather Planet: <i>(Unless you wish to tune all seven weather zones manually to set up a specific scenario)</i> Ensure that the “Set zones...downloaded METARs” checkbox (lower left) has a tick in it, and also go to Preferences Basics and check that in the “Allow METAR file download from Internet” box also has a tick in it, so that by the time you reach point 16 the current weather will have had time to download. Return to the Situation tab to continue with the next point.
10	Situation Human Pilot: ensure that the “Makes call-outs”, “Performs silent tasks”, and “Sets S/C alt if VNAV PTH engaged” checkboxes are configured as you would like them to be.
11	Situation Human Dispatcher: find your route file in the list and make sure that when it is selected the “Requires route uplink” box remains clear (which it will do, if you appended an underscore to the route name as suggested above). Alternatively, if you wish to practice requesting the route from the cockpit and subsequently downloading it, check the box to remove the underscore. <i>Don't forget to click “Send to aircraft” (lower right)!</i>
12	Situation Human Traffic Select your PSX traffic options. Start up a RealTraffic or TrafficPSX add-on if you need it. Review the remaining Situation Human sub-tabs to ensure they are all configured appropriately.
13	Set up the various tabs on the Situation Malfunctions tabs to generate the frequency and severity of malfunctions that you feel you can handle. 😊
14	Analysis Airport: click on the “Show nearest airport” button and review the information presented,

¹⁵ Typically, one of the following: Basic 000 (Cold and dark cockpit.situ), Basic 001 (On ground and IRS aligned.situ), Basic 002 (On ground and doors closing.situ), Basic 003 (On ground and cleared for engine start.situ), or perhaps if you're already on the runway (!) Basic 004 (Cleared for take-off.situ). Be aware, however, that loading one of these also loads its pre-set position and route etc.

	note <i>inter alia</i> the TA, frequency information, and runway information.
15	Layout Load: load your preferred 9pack, if not already in use.
16	<p>Preferences Basics: check all settings, but especially —</p> <p><i>To use the current weather from PSX and update it at regular intervals:</i> ensure that the “Allow METAR files download from Internet” box is checked.</p> <p><i>To use just the currently loaded (static) PSX weather:</i> once PSX has been running for a couple of minutes so that the current weather has been downloaded, uncheck the “Allow METAR files download from Internet” box. For as long as the box remains unchecked, the weather will not change.</p> <p>And also, on the Network tab: Check that the Main and Boost servers are enabled as required.</p>

In the cockpit (CDU work):

	If you are using GSX or other FSX add-ons, please set the status of the FSX aircraft appropriately for the options (catering/refuelling/boarding/push-back) you have decided to use.
	Please bear in mind the requirements of any other PSX add-ons as you work your way through the following list. (e.g. If you are using PSX (B)ACARS, recall that this requires you to request the performance information when the engines are off and the doors open).
17	Note and action any EICAS messages; also check and clear any in the CDU scratchpad.
18	Press the INIT REF button, then LSK 6L, then LSK 1L to get to the IDENT page.
19	(If your startup situation allows it) — click LSK 3R and then LSK 2R: this will clear the previous information from the FMC ¹⁶ . Use the CLR button to clear any messages which appear in the scratchpad following this process.
20	If needed, switch the FD switch off and on again to clear MCP settings.
21	Hardy reminded me that if the IRSs are already aligned, you could press the RTE key to go directly to the RTE 1 page and skip directly to step 23.
22	<p>(Otherwise) —</p> <ul style="list-style-type: none"> a) Press LSK 6R to get to the position initialization page b) Type your current airport ICAO code into the scratchpad c) Press LSK 2L to upselect it to the REF AIRPORT line <p>Then press LSK 6R to get to the RTE 1 page.</p>
23	Type the name of your saved route into the scratchpad, not forgetting the two-digit numeric suffix (but not including any appended underscore), and upload it to the Company Route prompt at LSK 3R. Wait for a couple of seconds while the information is processed, and until both departure and destination airports have been automatically entered for you.
24	(N.B. Please ignore the RUNWAY prompt here — you will enter that information in step 27).
25	Type the flight number (from your OFP) into the scratchpad, and upselect it to LSK 2R.
26	Click the LEGS button and verify that your route has loaded properly.
27	To enter the SID, click the DEP ARR button and then LSK 1L to view the SIDs for your departure airport. Click the right LSK adjacent to your departure runway (at large airports you may need to use the NEXT PAGE button to see them all): it will then appear as <SEL>ected, and the list of SIDs will be trimmed to include only those valid for that runway.
28	Click the left LSK adjacent to your chosen SID (again, use the NEXT PAGE button, if required).
29	If there are applicable TRANSitions, select the correct one in the same way. (TRANS NONE means exactly that, so move straight on to step 30).

¹⁶ If the “Select valid FMC nav database” wasn’t checked, the virtual engineer won’t automatically reselect the current database for you, so you will have to revert to the previous situation yourself.

30	If your trip is short enough for you to be able to make an educated guess at the runway and STAR that will be in use when you arrive, you could enter it now, by pressing DEP ARR and LSK 2R, and then using the same technique. (Although on most 744 trips you will have plenty of time to do this in the cruise as you get near to your TOD, so on such occasions you may prefer to wait until then...).
31	Press the LEGS button and scan through your route (using NEXT PAGE to see it all). You may find it necessary to heal any DISCOntinuities present, or perhaps simply make a note of them and defer doing so until step 34. Whilst looking through, also note any speed and altitude constraints that appear in large letters on the right and check them against the current charts, amending them if necessary, and inserting or deleting any that have changed. Add your missed approach information as required. If you normally use RTE2 to set up a route to your alternate airport, do so now.
32	Switch to a PSX layout where you can see these three items all on the same flightdeck frame or screen: <ul style="list-style-type: none"> • the Navigation Display (ND) • the EFIS panel to the left of the Mode Control Panel (MCP) • the Captain's CDU
33	Turn the left-hand of the two lower knobs on the EFIS panel from MAP to PLaN, and reset the range knob to the right to 20 nm. Click the LEGS key again to return to the top of the list of waypoints.
34	Click the STEP > prompt at LSK 6R to step through your route whilst also watching the ND as you do so. Look for any unexpected deviations to your path as shown on the ND, or unusually large distances between waypoints on the CDU: investigate and make any required changes.
35	When you're absolutely sure that this is the route you want the aircraft to follow, return the EFIS selector knob back to MAP, and the range knob to whatever you like to use for take-off — perhaps 10nm.
36	Press the LEGS key again to return to the start of your route, and then press LSK 6R to Activate it (if it's not already activated), and the EXEC ute key to confirm. (You will notice that the line on the ND now becomes magenta in colour, and the headings on the Route and Legs pages now read ACT ive RTE 1).
37	Press INIT REF and then LSK 6L for the index page: now select PERFormance (LSK 3L).
38	Enter into the scratchpad your cost index ¹⁷ and upselect it to LSK 5L.
39	Enter into the scratchpad your initial cruise altitude (shown on your PFPX OFP immediately below Cost Index as "INITial ALT", since during a long cruise as you become lighter you may be able to step climb) and upselect it to LSK 1R.
40	Check the calculated Reserve figure from your OFP, convert to tonnes as required (so for example, 4,909 kg thus becomes 4.9), enter it into the scratchpad and upselect it to LSK 4L. ¹⁸
41	Whilst on that page, sanity-check the displayed Gross Weight, Fuel, and ZFW figures).
42	Press the VNAV key and then enter the Transition Altitude (from the latest charts, or failing that from the PSX Analysis Airport page) into the scratchpad, and then upselect it to LSK 3R.
43	Press the INIT REF key followed by LSK 6L and LSK 4L to reach the THRUST LIMits page.
44	You may have used TOPCAT or PSX (B)ACARS to plan for an assumed temperature take-off: if so, type the temperature you intend to use into the scratchpad and upselect it to the SEL value using LSK 1L. (Providing your runway isn't contaminated, obviously). If the entered figure is outside the limits, it will be corrected to the nearest acceptable value. In any event, also check/set whatever combination of TO and CLB fixed derates you feel is most appropriate.
45	Press LSK 6R to get to the TAKEOFF page.
46	Check that the take-off flap setting at LSK 1L is the one you planned for, and if not type the setting to be used into the scratchpad and upselect it to 1L (append any applicable noise abatement or other height adjustment after the slash).
47	Also check the engine-out acceleration height at LSK 2L and amend if required (most airlines use 1,000 ft. — although some take-off profiles will require more).

¹⁷ If you follow my normal routine in that you entered the CI into the Cruise/Cost Index field in the Aircraft section of PFPX, then it will be shown on your PFPX OFP.

¹⁸ Transition Level at the destination airport is often set by ATC depending on current atmospheric conditions, so we'll probably need to wait until we are close to our destination in order to learn from them what to use as our TL.

48	At LSK 3L check (and if necessary, amend) the altitude or flap setting at which the thrust limit will be reduced from take-off to climb. ¹⁹ At LSK 4L, enter any applicable wind/slope figures, and the FMC will adjust the V_1 speed accordingly. (e.g. "H20" indicates a headwind of 20 kts).
49	At LSK 5L check (and if necessary, amend) the runway condition — which defaults to dry. If it's <i>seriously</i> wet, type W into the scratchpad and upselect it. N.B. "W" for runway conditions means a <i>*lot*</i> of water on the runway, so the V_1 figure is considerably reduced to give more stopping distance.
50	Now confirm the FMC-calculated V-speeds by pressing LSKs 1R, 2R, and 3R. (Note that V_2 is the flap 30 V_{REF}).
51	If you included a Weight and Balance System in the options for your model of 744, then the CG computed by the system will be shown in small font adjacent to LSK 4R. If you're happy with the suggested figure, then click LSK 4R, or type the figure into the scratchpad and upselect it to LSK 4R.
52	If you are starting your take-off run from a position significantly different from the landing threshold, <i>and your GPS isn't working</i> , enter the runway position shift value at LSK 5R — the number of hundreds of feet (or meters, depending on your units) difference. (Relative to the landing threshold, you need to enter a positive number if a shorter runway is available, or a negative number for a longer runway). ²⁰
53	Your departure details are now known to the FMC, so ensure that both Flight Director switches are ON and then arm LNAV and VNAV on the MCP.

And now continue with your cockpit preparation, not forgetting —

54	View the stab trim settings (just to the left of the speedbrake lever) and use the trim controls to adjust the stab trim until the end of the white bar is in the centre of the green band.
55	On the MCP, set the value in the IAS/MACH window to your V_2 speed, and the value in the ALT window to your first constraint.
56	Set the Captain's and F/O's CDUs to the most appropriate pages for take-off (e.g. VNAV for the PF and LEGS for the PNF).

Start engines (PSX actions)

(This is simply a convenient reminder of the PSX actions needed to start the engines):

S1	Close all the doors (you can watch them closing and being set to Automatic using the DRS synoptic view).
S2	Set the seat belt selector switch to ON (if not ON already).
S3	Obtain start & push clearance.
S4	Set the hydraulic demand pump 4 selector to AUX.
S5	Set all packs off (or in hot climates allow pack 1 or 2 to remain on).
S6	Set the (red anti-collision) beacon to BOTH.
S7	Monitor the parking brake to be as required (during all the various phases of pushback).
S8	Set the ENG display on the secondary EICAS.
S9	Blank all caution and advisory messages using EICAS CANCEL.
S10	Check the Stab Trim indication: trim must be in the green area.
S11	Check/set the aileron and rudder trim to be zero.
S12	Perform the BEFORE START CHECKLIST.

¹⁹ Providing that VNAV and AT are engaged, and the aircraft has accelerated to $V_{REF}+80$ kt.

²⁰ For example — if you are using the full runway length for a departure from KEWR rwy 04L, the displaced threshold (your take-off position) is 2500 ft from the landing threshold (you may also notice: TORA 11000 ft, LDA 8460 ft). But this is irrelevant if your GPS system is working, of course.

S13	Announce start of engines 3 and 4: pull the 3 and 4 Engine Start selectors, and observe that they become illuminated.
S14	Set the control switches of both to RUN.
S15	Monitor N ₂ indications, as well as normal rise of oil pressure, N ₁ , and EGT. Check that the engine start switches cease to become illuminated at approximately 50% N ₂ .
S16	Repeat the last three action points for engines 1 and 2.

After start and before taxi

(Again, this is simply a quick summary of what you need to do in PSX):

S17	When the GEN CONT OFF lights extinguish, shut down the APU.
S18	Return the hydraulic demand pump 4 selector to AUTO.
S19	Set the NAI (Nacelle anti-ice) switches as required by the conditions.
S20	Set all three pack selectors to NORM.
S21	Check/set the left and right ISLN switches to OPEN (visible horizontal lines).
S22	Push the EICAS RCL switch to review the known messages. Push the EICAS CANCEL button if no messages are shown, or the messages are no longer required.
S23	Perform the AFTER START CHECKLIST.
S24	Set take-off flap to the planned setting.
S25	Set the secondary EICAS to display STATus messages.
S26	Release parking brake and taxi.
S27	Perform the TAXY CHECKLIST. Perform take-off briefing, and rejected take-off briefing.

(Then, once you are turning onto the runway, and before take-off):

S28	Set all three packs OFF (pack 2 may be left at NORM if performance margin is sufficient).
S29	Set all landing lights ON and Strobes ON when entering the runway.
S30	Set the A/T switch to ARM.
S31	Set the TCAS switch to RA/TA, and the TFC range to 40 nm.
S32	Verify take-off data.
S33	Perform the TAKE-OFF CHECKLIST.

When you're ready, save a "ready for take-off" situation (if you like to do that), then take off — and enjoy your flight! 😊