

FlightPlanner

Flight Planning Tool

Instructions

The spreadsheet consists of six sheets: The Outbound Flight, The Inbound Flight, the Pilots Log, An Aerodrome ICAO Code locator, a form for calculating instrument approach minima etc., and lastly the database. The Database sheet contains over 630 User waypoints, Visual Reference Points, Aerodromes and Radio Navigation Aids data used to calculate the bearings and distances for the Flight Plan.

In the “Outbound” and “Inbound” sheets only white cells will allow data to be entered, the others are protected as they contain formulae. In the Pilot’s log, the fuel calculation area,

Setting Up A Flight Plan

Load the spreadsheet and select the “Outbound” tab from the tabs at the bottom of the screen. Enter the aircraft registration, the pilot’s name and date of the flight in the labelled places. Enter the start point of the flight in the first “From” cell (top left), and in the second column, the “to” turning points of the flight. The other “from” entries are added automatically.

The spelling of each entry has to be exactly the same as used in the database, or #N/A will appear in the heading, track, distance, time and ETE fields. If a correct spelling produces this error, check the database sheet for possible spelling or Latitude/Longitude errors. A few airfields in the database have incomplete data.

When known before the flight, enter the forecast winds aloft in the two wind boxes (heading followed by velocity) for each leg, from whatever source you normally use. Entering a wind direction of 30 will display as 030. Entering a wind speed of 7 knots will display as 07. For each leg, the true track, magnetic track, heading to steer, groundspeed distance and estimated time en route (ETE) will now be calculated. **If the actual wind differs from the forecast wind, these values will not be accurate.**

Alternate

If for any reason the airfield you plan to land at is unavailable, then you cannot simply draw into the kerb and park. You have to go somewhere. So you find the nearest aerodrome to your destination at which you can land, and use that in your planning. It is a good idea if you can to use a large aerodrome which is likely to be open for long hours to maximise your options.

Fuel

In the top right hand corner of the Pilot’s log is a section labelled “Fuel”. FlightPlanner calculates the fuel required for a flight automatically, based on the values entered in some of the boxes in the section. The boxes which require user entry are described in the table below. To prevent problems with the calculation, the boxes where data entry is not possible are locked.

Useable Fuel	This figure is taken from the aircraft operating data. The useable fuel is the total fuel capacity, less what is left in the tanks when the engine(s) stops. For the Cessna 172, total fuel capacity is 155 litres, and useable fuel is 147 litres.
L.P.H	This is the number of litres per hour of fuel burned in the cruise. This information is also available from the aircraft operating data. For the Cessna

	172, it is 30 litres per hour at 105 knots.
T/O & Taxi	This is the time taken from startup to the end of the initial climb. It is most commonly estimated at 20 minutes. The programme converts this into a fuel quantity.
Reserve	It is a legal requirement to allow a reserve of 45 minutes fuel to allow for unexpected conditions en route or prior to landing, but not including the fuel required to fly to the alternate airfield. To be extra safe, one hour is often used, and that is the value used in Figure 5.

The minimum legal fuel which must be on board before you take off is then calculated, and in our example it is 72 litres, as shown in Figure 5. If you want to do the calculation manually, simply add together the airborne time, the take off and taxi time, the time to the alternate and the reserve, then multiply this time by the litres per hour figure.

$$\text{i.e. } 53\text{m}+20\text{m}+12\text{m}+1\text{h} = 2\text{h } 25\text{m} \times 30\text{lph} = 72 \text{ litres}$$

If the fuel required exceeds the useable fuel, you will have to break your flight and refuel en route. You would be amazed, however, how many pilots in the real world, fail to do this and simply run out of fuel whilst still in the air. That results in either death or an automatic prosecution by the CAA!

The Return, or Inbound Flight

Repeat this exercise for the “Inbound” flight if required. In the bottom row, enter the planned arrival and alternate aerodromes as shown in the example to calculate your diversion heading and distance. **Don’t forget to enter alternates.**

Save the spreadsheet. It is recommended that you keep the original spreadsheet as a master from which all others are copied, so save to a different filename. I use the format FP_<From>_<To>_<Date>, e.g. FP_EGPP-EGNS_020804.xls.

The Pilots Log

The track, heading and distance and time data is loaded into the Pilot’s log automatically from the “Outbound” and “Inbound” spreadsheets. Complete the Pilot’s log as follows. In the fuel calculation area, enter the useable fuel capacity of the aircraft in litres, in the box which currently holds the value 147 litres (the correct value for a Cessna 172). Now enter the approximate known safe average fuel burn in litres per hour in the box currently holding the value 30 (the correct value for a Cessna 172). Enter the time required for take off and taxi (currently set at 20 minutes), and your reserve in hours and minutes - I use 1 hour. (Hours in the first column, minutes in the second.) Time to your alternate is automatically entered from the “Outbound” and “Inbound” spreadsheets.

The pilots log will print on an A4 printer as a single landscape format sheet. The left hand half is an A5 pilots log for the outbound flight and the right hand half for the inbound flight.

Logging a Flight

In the upper left section, you can type in the departure, arrival and alternate Aerodromes before flight if you wish. The runway in use, surface wind, temperature, QNH and QFE are entered by hand as usual in the cockpit at the start of the flight. The two wind boxes are for direction and velocity separately.

In the **From: To:** section, enter the principal waypoints (VORs, NDBs Aerodromes you plan to pass overhead, turning points etc.) As you enter these, the hashed out cells will acquire values as the program takes your waypoints from the database

and calculates the distance and track etc. Leave the wind as zero for the time being.

Enter the minimum safe altitude (**MSA**) for the leg and the altitude you intend to fly at (**Alt**).

You will now have headings and distances and times for each leg, plus totals and fuel requirement. **Check these physically for reasonableness on the chart before flying.**

Add your en route and destination frequencies at the bottom of the page.

You can add other minor en route waypoints if required in the waypoints section, copying the magnetic heading and groundspeed from the section above. Calculate the times manually as usual in flight.

A Second Flight

Use one sheet for each flight, a flight comprising one take-off and one landing.

Adding to the Database

Select the database tab. The data is organised alphabetically, with user waypoints first, followed by aerodromes, then VORs, NDBs and (some only) promulgated Visual Reference Points (VRPs) last. There are no TACANs in this database, but they could be added. However, all official data is protected, only user waypoints can normally be added.

To add a waypoint, go to the appropriate alphabetical point and insert a row. Enter the waypoint name, its Latitude and longitude in the format used in Pooley's Flight Guide. Normally Excel automatically copies the conversion formula for you, but you may have to enter it manually. This is best done by copying down from cells in the row above. The conversion formula is simply the latitude or longitude in decimal degrees to 4 significant places. These values are used in the calculations.

Check your Flight Plan before Flight

Check that each leg is correct by checking its track and distance validity on the chart. Mis-entered latitudes and longitudes may give seriously erroneous headings and distances.

Spreadsheet Protection

Cells containing formulae are locked and each spreadsheet is protected. However, a null password is used, so that the sheets may be unprotected if required, or you can add a password. When the spreadsheets are protected, data entry can only be made in white coloured cells in every sheet except the Pilot's Log.

The IMC Data Page

This is simply a manually used proforma to speed up the calculation of instrument approach procedures, Minimum Descent Heights and holding pattern headings and times.

Feel free to distribute the spreadsheet to whomever you wish.

WARNING

The person solely responsible for appropriate flight planning is the pilot. Do not rely solely on the accuracy of the database or the calculations. Draw track lines on the chart and check them against the calculations for reasonableness before flight.