Add-on for Microsoft

Flight Simulator X

also compatible with FS2004 & Prepar3D

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PROFESSIONAL FLIGHT PLANNER

PFPX

Manual

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Content

Introduction

General

The PFPX program is for use with flight simulation software only. It shall not be used in any connection with real-world flying.

PFPX - Professional Flight Planner X - is a valuable and realistic addition to your flight simulation experiences. Given the inputs you provide for a flight, the pro-gram enables flight simulator pilots to create professional quality flight plans similar to those used by real-world airlines.
It is designed to supply all of the information that the dispatcher and the pilot in command require to enable successful flight dispatch release.

While we don't expect you to become an expert planner immediately, we hope that you can quickly understand the basics of what is involved. This User Guide is aimed at getting you up and flying with PFPX as soon as possible.

We hope that you will obtain many hours of enjoyable learning in gradually producing more efficient and safe flight plans. We recommend you to take some time to understand the capabilities of PFPX, in particular reading the chapters II, III and IV so that you gain an initial understanding of all functionions available. This will be a valuable investment of your time as you dig deeper into the tasks of creating effective flight plans.

If you develop a thirst for advancing your knowledge of the flight planning processes, PFPX can initially be used to produce relatively simple flight plans for your flights. As your expertise in flight planning improves, you may wish to challenge yourself to produce more complex flight plans like choosing varying departures and destinations, planning long range ETOPS flights via Oceanic Tracks and trying to apply the real world rules and procedures more and more strictly.

This User Guide contains 3 main elements:

- An Overview of PFPX program functions and workflows (Chapter II)
- The PFPX program interface (Chapter III)
- a description of the flight planning processes (Chapter IV)

System Requirements

- Microsoft® Windows® XP, Windows® Vista, Windows® 7, Windows® 8
- Pentium 4 Processor with 1 GB RAM or more
- OpenGL 1.1 or higher compatible video card supporting S3TC texture compression
- Screen resolution of 1024x768 pixel or more
- 250 MB hard disc space
- Internet Connection recommended (for product activation, online weather/NOTAMs, program updates)
- Operating system: Windows XP / VISTA / 7 / 8

In addition, PFPX is able to provide routes in formats compatible to numerous FSX, FS9, Prepar3D and X-Plane add-ons.

Support and Updates

- The latest news and program updates can be found at http://www.flightsimsoft.com
- A user forum is available at http://forum.aerosoft.com/
- Our online tutorials are available at: http://www.flightsimsoft.com/pfpx/tutorials
- For further questions contact support@flightsimsoft.com

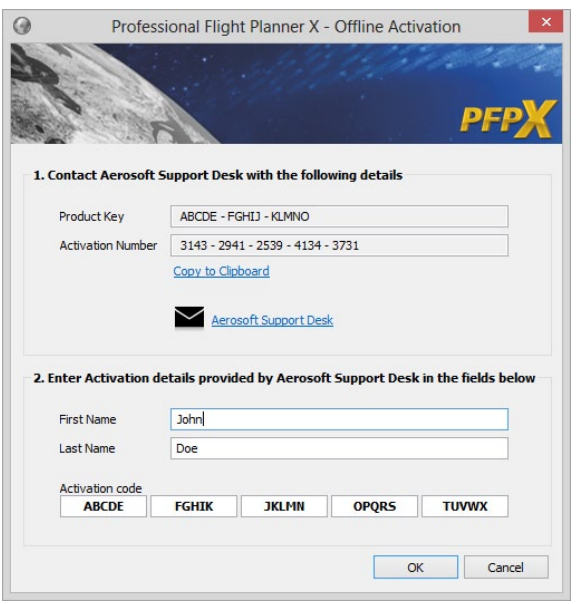
Installation

Before installing PFPX read the End User License Agreement (EULA) carefully. PFPX comes as a Microsoft® Windows® 32bit and 64bit executable installation package including an uninstall function. Execute the installer file and follow the instructions on the screen.

Product Activation

When starting PFPX for the first time a product activation is required to verify the validity of the licence key. An internet connection is recommended for product activation. Optionally activation via Email is available for devices without internet connection.

Note: During the initial activation process a user name is associated with your license key. The user name cannot be modified later!



PFPX Data Sources

PFPX has several external data input feeds, apart from user input. These data feeds provide real time information required for accurate flight planning.

Navigational Database

PFPX comes with an initial, world-wide navigation data set containing airports, navaids, waypoints and airways. Navigational Databases are updated every 28 days to incorporate changes in navigational facilities. These updates are called Navdata Cycles.

Cycles are designated by their year of release and sequential number (e.g.: Cycle 1309 would mean the 9th cycle in 2013).

Regular Nav-Database updates are available from third-party providers like Aerosoft (www.aerosoft.de) and Navigraph (www.navigraph.com).

Weather, Winds, NOTAMs and Tracks

Some data is accessible from the PFPX data server and therefore requires an active internet connection. This data consist of:

- Airport Weather (METAR) and Forecasts (TAF)
- Accurate Upper Wind Forecast Model
- Notices to Airman (NOTAMs)
- North Atlantic Tracks (NATs), Pacific Organised Tracks (PACOTs) and Australian Organised Tracks (AUSOTs)

As this produces a quite high amount of server load a subscription is required. When initially activating your PFPX license, a 365 day server subscription is automatically activated.

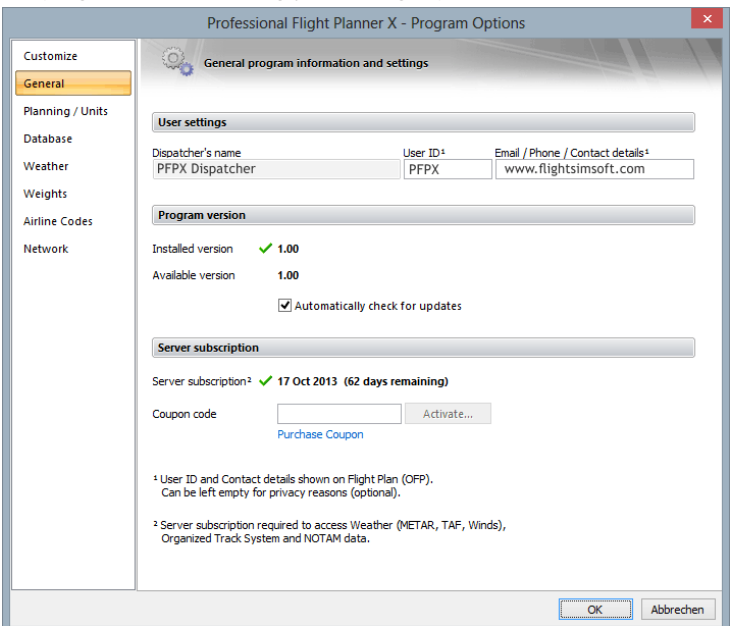
By obtaining a Coupon Code, a server subscription can be extended.

PFPX Program Options

Before using the program for your first time it is recommended to configure the program to meet your personal requirements.

Click onto the PFPX globe icon to open the main menu and choose program options at the bottom of the drop-down. The program options window shows eight tabs.

Press the Ok button validate the changes you made. To switch back to the program without saving your changes press the Cancel button.



Customize

The Customize tab lets you configure the Quick Access Toolbar (QAT) commands. These commands are normally shown on top of the Ribbon bar and act as shortcuts to popular program functions. The Application Style drop-down box allows selection of different colour schemes.

General

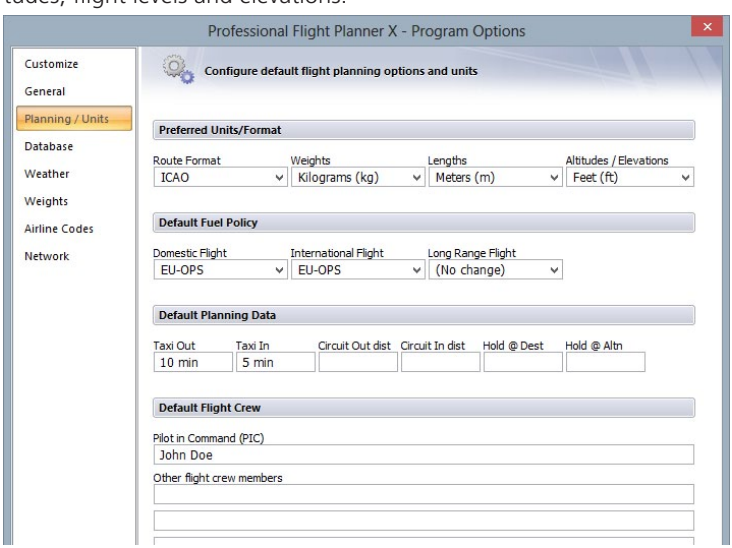
The General tab informs you about basic user details (Dispatcher´s name, User ID, Contact details) which are printed onto the Operational Flight Plan. The User ID and Email/Phone/Contact details fields are optional and not evaluated by PFPX and not transmitted to the server. These fields can be left empty for privacy reasons.

The next section shows information about the PFPX program version in use and the latest version available (requires internet connection). Check the "Automatically check for updates" box to regularly verify if a newer version is available.

Finally, the Server subscription section displays information about the online server subscription status (Server subscription is required to access METAR, TAF, Winds, NOTAMs and Track information).

Planning / Units

The Planning tab enables you to determine default fuel and flight planning principles. Choose your preferred notation of the Route string (ICAO or FAA format), measure of units for weights, lengths and altitudes, flight levels and elevations.



Configure your default fuel policy used for domestic, international and long range flights and set the default Taxi-out/Taxi-in and default Circuit out/Circuit in distances (refer to page 72 - Flight Planning). A default Hold Time value at the destination and the alternate can be set to cater for expected arrival delays.

These settings will be used as default when planning a new flight. If taxi times, circuit distances and/or a hold time value are configured for a specific airport (refer to page 36 - Airport properties), this data takes precedence. If desired, a standard flight crew (Pilot in Command, other flight crew members) can be appointed in the lower text fields.

Database

The Database tab summarizes details about the Navigation Database in use, the Aircraft Database and the Route Database.

Note: An expired database is indicated by an amber warning symbol (refer to page 10 - Navigational Database).

Weather

The Weather tab allows you to choose preferred weather source and settings. You can choose between the following options:

Online	will automatically download current winds, METARs and TAFs from weather server (Requires PFPX Server Subscription)
File	load weather from previously saved weather file
ActiveSky	Use ActiveSky weather (requires 'current_wx_ snapshot.txt' and 'wx_station_list.txt' files)
REX	Use Real Environment Extreme (REX) weather (requires 'metar_report.xml' file) Component allows filling in wind component and ISA Deviation in °C. + Tailwind, - Headwind
Fixed wind	allows filling in constant wind direction/speed and ISA Deviation in °C.
Wind profile	allows filling in wind direction/speed and ISA Deviation in °C for different altitudes.
None	clear all weather settings.

Weights

The Weights tab shows the standard weights of passenger for different types of flight: Scheduled, Non-Scheduled, General Aviation, Military and Other. Enter standard weights of baggage for different type of operation: Domestic, International, Long Range and Other.

Furthermore a flight is considered Long Range if the distance between origin and destination exceeds the desired nautical miles.

Use the Reset button to revert to PFPX standard values.

Airline Codes

A comprehensive list of airlines with their associated ICAO codes is implemented in PFPX. Adjustments can be made on this tab, if required.

Network

PFPX allows a graphical representation of online traffic and ATC stations of the IVAO and VATSIM network. Enter the online paths of the respective organization to access traffic data. The IVAO and VATSIM traffic server fields can be modified, if a change should occur.

The Proxy server settings allow you to configure your PFPX server connection properties. Depending on your network setup, in rare cases proxy server settings are required to connect to the PFPX server.

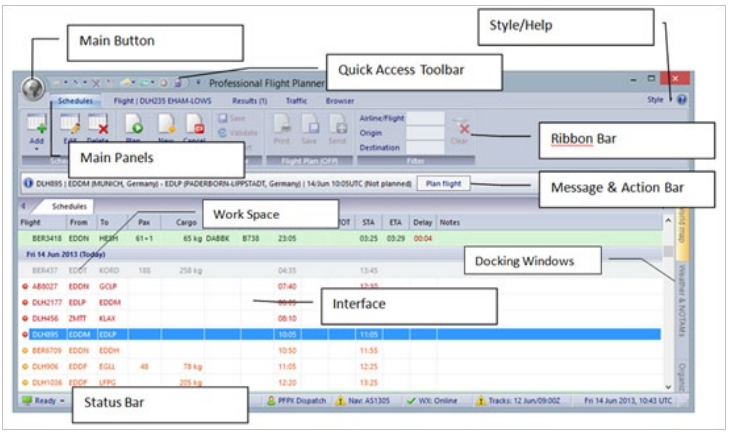
Ask your network administrator for login credentials.

By clicking the Test connection button a message appears showing if the connection test was successful.

The PFPX Program - Overview

This chapter will give you insight to the PFPX user interface and an overview of the options provided by PFPX.

Main Interface



Main Button (globe icon)

At the left top of the main window you can see the PFPX globe icon which produces – by clicking – a drop-down list of main program functions that you may wish to perform:

Aircraft Manager	Fuel Policy Editor
Route Manager	Weather
Airport properties	Tracks (Organized Track System)
Waypoint & Airway Editor	Program Options

The bottom of the Main menu drop-down features 3 additional buttons:

Website	transfers you to the official FlightSimSoft homepage (www.flightsimsoft.com) with details about PFPX and other products, customer support and access to the PFPX Forum.
About	shows the version of your product, copyright information and the EULA - End User License Agreement.
Exit	causes PFPX to close. Your work will automatically be saved when taking this action.

Quick Access Toolbar

The Quick Access Toolbar next to the PFPX globe icon at the left top of the main window allows choosing shortcuts to the main options of PFPX (like aircraft database, route database, airport properties, waypoint & airway editor and fuel policy editor). You can customize the Quick Access Toolbar in the Main/Program Options/Customize dialog.

Style

The Style option at the right top of the program allows you to choose your preferred window style and colours. To reset size and position of all windows press Reset windows.

Help

The Question Mark at the right top of the program leads to the PFPX User's Guide containing all relevant information to use the program (this document).

Main Panels

PFPX shows up to five main panels:

Schedule	A list of the next scheduled and released flights
Flight	The flight presently in work
Results	This panel is initially hidden and is only show once a flight has been calculated

Traffic	Graphical display of either IVAO, VATSIM or Microsoft Flight Simulator traffic and routes on the world map
Browser	A set of customizable online sources like weather charts, support and flight planning resources.

Ribbon Bar

Each main panel features its own Ribbon Bar containing a set of functions and options arranged in various categories. These options are described in more detail in chapter "Main Panels".

Message & Action Bar

For a simple and user-friendly PFPX operation an innovative Message & Action Bar informs you step-by-step about the next logical actions in the flight planning sequence. These may contain prompts for your input, warnings of invalid specifications or 'next action' buttons.

Note: The Message & Action Bar is meant to be an easy help for you if you are not familiar with flight planning (or PFPX). It is of course possible to plan your flight in a different order.

The Message & Action Bar normally shows an information icon with details of the planned flight.

- If there is information missing for your flight, aircraft or anything else, a yellow triangle with exclamation mark warns you in the Message & Action Bar.
- If there are errors of content (e.g. missing aircraft registration), a red stop sign with a white line will warn you. You should then check again the queried values.

Docking Windows

PFPX allows you to adjust the interface for your personal requirements. Depending on your screen resolution you might be able to dock further windows beside the work space window or drag it to a preferred docking position. If you are using multiple monitors you are even able to drag the preferred docking window to another screen.

Note: If you want to adapt the windows automatically for your screen resolution, click the Reset windows button on the right top at the Style drop-down button.

The four docking windows will now be described in more detail.

World Map

The World Map window displays the following toolbar:

- The Max/Min button allows maximizing to full-screen or minimizing the world map window.
- Press the Print button to get a printed map.
- The Zoom In/Out icons enables the map to be zoomed in and
- The Fit icon allows fitting the entire route so that the whole route is displayed.
- Choose whether you would like to display Airports (large, medium, small airports), Navaids or Intersections onto the world map.
- Choose whether you would like to display High airways, Low airways or Direct. Furthermore you can select North Atlantic Tracks (NATs), Pacific Tracks (PACOTS) or Australian Tracks (AUSOTS) to be displayed.
- Choose whether you would like to toggle the display of FIR (Flight Information Regions) or UIR (Upper Information Regions).

- Click the Wind button to enable the wind vectors at the flight planned altitudes for the shown height, date and time. When using online weather you are able to see a trend for the next hours by moving the control pusher.
- The Adequate Airports icon will display threshold distance and ETOPS circles if an ETOPS flight is planned.

Weather & NOTAMs

The Weather & NOTAMs window allows you either to enter, to search for or to display automatically airport and FIR information.

- Click onto the Weather tab to get weather details for the selected identifiers.
- Click onto the NOTAMs tab to get detailed NOTAMs information for the selected identifiers.
- You are now able to print and save your Weather & NOTAMs information.

Tracks (Organized Tracks System)

The Tracks window displays textual information about the following Organized Tracks Systems:

- North Atlantic Tracks (NATs)
- Pacific Tracks (PACOTs)
- Australian Tracks (AUSOTS)

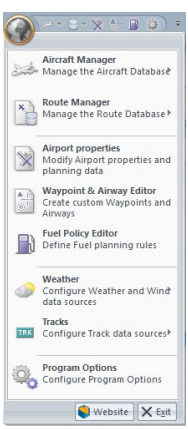
Scratchpad

The Scratchpad window enables you to take notes or save important information for the dispatchers use. You are able to print, save, copy, paste or delete the shown information.

Status Bar

The Status Bar at the foot of the main PFPX window contains:

- The Status Text field shows the actual program operation, normally displaying 'Ready' when waiting for user input. A green icon indicates that internet connection to the PFPX server has been established. A red icon indicates a connection problem or no internet connection available. An hourglass is shown during lengthy operations. During this time, user input is inhibited. To abort a lengthy operation, hit the 'ESC' (Escape) key on your keyboard.
- The Dispatcher´s Name field leads – by clicking – directly to the general program options window.
- The NavData field with the actual database leads – by clicking – directly to the database property window. If the database has expired, a yellow triangle with exclamation mark will warn you.
- Click the WX Status field to open up the weather configuration dialog and choose your weather data source.
- The Tracks status field indicates the current track data source.
- The right side of the status bar displays the current date and time expressed in universal time coordinated (UTC).



Main Menu

This part will describe the PFPX options in more detail. Let´s take a look at the main menu and how to use it for flight planning.

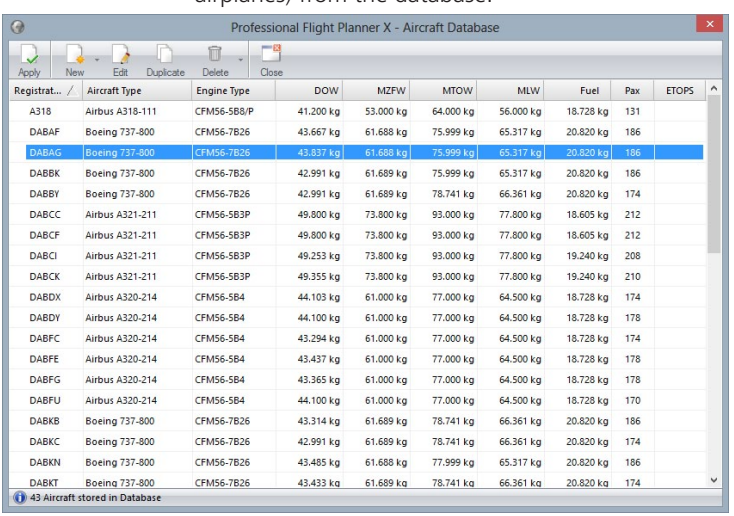
Aircraft Manager

PFPX allows you to document the records of all aircraft in a fleet, or to just record a notional aircraft of the type you wish to fly.

Aircraft Database

The Aircraft Database dialog shows a list of all your aircraft. Aircraft approved for Long Range operation (ETOPS) are indicated by a blue "E" icon.

Apply	The selected airplane will be used for flight planning the presently selected flight.
New	Add a new aircraft to the database
New from template	Creates a new aircraft based on a previously saved template. PFPX comes with a pre-defined set of templates (e.g. PMDG 747-400).
Edit	Modify properties of the presently selected aircraft.
Duplicate	Create a new aircraft with the same properties as the selected aircraft. This function is useful to add a complete fleet of airplanes with similar configurations.
Delete/Delete all	Permanently delete the selected airplane (or all airplanes) from the database.



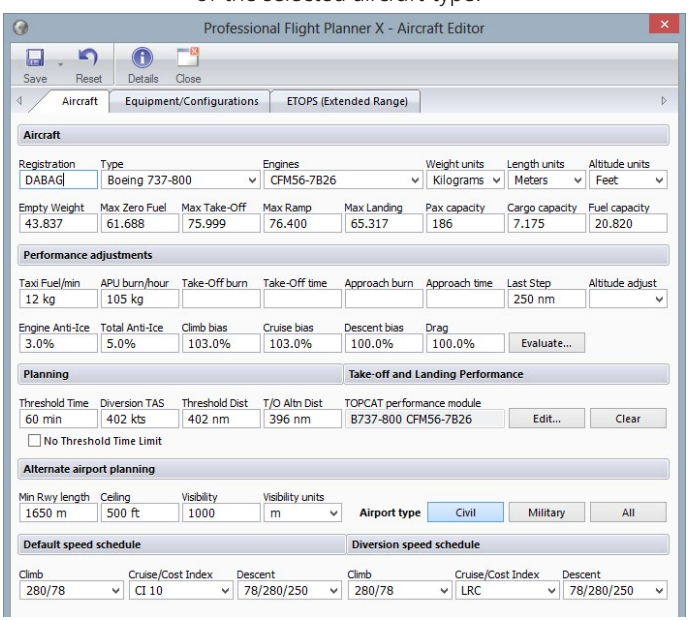
Registrat...	Aircraft Type	Engine Type	DOW	MZFW	MTOW	MLW	Fuel	Pax	ETOPS
A318	Airbus A318-111	CFM56-5B8/P	41.200 kg	53.000 kg	64.000 kg	56.000 kg	18.728 kg	131	
DABAF	Boeing 737-800	CFM56-7B26	43.667 kg	61.688 kg	75.999 kg	65.317 kg	20.820 kg	186	
DABAG	Boeing 737-800	CFM56-7B26	43.837 kg	61.688 kg	75.999 kg	65.317 kg	20.820 kg	186	
DABBK	Boeing 737-800	CFM56-7B26	42.991 kg	61.689 kg	75.999 kg	65.317 kg	20.820 kg	186	
DABBY	Boeing 737-800	CFM56-7B26	42.991 kg	61.689 kg	78.741 kg	66.361 kg	20.820 kg	174	
DABCC	Airbus A321-211	CFM56-5B3P	49.800 kg	73.800 kg	93.000 kg	77.800 kg	18.605 kg	212	
DABCF	Airbus A321-211	CFM56-5B3P	49.800 kg	73.800 kg	93.000 kg	77.800 kg	18.605 kg	212	
DABCI	Airbus A321-211	CFM56-5B3P	49.253 kg	73.800 kg	93.000 kg	77.800 kg	19.240 kg	208	
DABCK	Airbus A321-211	CFM56-5B3P	49.355 kg	73.800 kg	93.000 kg	77.800 kg	19.240 kg	210	
DABDX	Airbus A320-214	CFM56-5B4	44.103 kg	61.000 kg	77.000 kg	64.500 kg	18.728 kg	174	
DABDY	Airbus A320-214	CFM56-5B4	44.100 kg	61.000 kg	77.000 kg	64.500 kg	18.728 kg	178	
DABFC	Airbus A320-214	CFM56-5B4	43.294 kg	61.000 kg	77.000 kg	64.500 kg	18.728 kg	174	
DABFE	Airbus A320-214	CFM56-5B4	43.437 kg	61.000 kg	77.000 kg	64.500 kg	18.728 kg	178	
DABFG	Airbus A320-214	CFM56-5B4	43.365 kg	61.000 kg	77.000 kg	64.500 kg	18.728 kg	178	
DABFU	Airbus A320-214	CFM56-5B4	44.100 kg	61.000 kg	77.000 kg	64.500 kg	18.728 kg	170	
DABKB	Boeing 737-800	CFM56-7B26	43.314 kg	61.689 kg	78.741 kg	66.361 kg	20.820 kg	186	
DABKC	Boeing 737-800	CFM56-7B26	42.991 kg	61.689 kg	78.741 kg	66.361 kg	20.820 kg	174	
DABKN	Boeing 737-800	CFM56-7B26	43.485 kg	61.688 kg	77.999 kg	65.317 kg	20.820 kg	186	
DABKT	Boeing 737-800	CFM56-7B26	43.433 kg	61.689 kg	78.741 kg	66.361 kg	20.820 kg	174	

Aircraft Editor

The Aircraft editor enables the recording of new aircraft records and their modification. . For each aircraft, you may specify the aircraft type, its engines, units and weights used and aircraft specific parameters like fuel burn adjustments, default speed schedule, diversion speed schedule, equipment and configuration, extended range (ETOPS) operations scenarios, etc.

PFPX comes with a set of standard configurations (templates), tailored to specific Flight Simulator add-ons.

Save Aircraft	Add the aircraft to the aircraft database
Save as Template	Save aircraft characteristics as a new template. Templates can be used to quickly create new aircraft with similar characteristics.
Reset	Revert to aircraft defaults.
Details	Show relevant aircraft performance file information of the selected aircraft type.



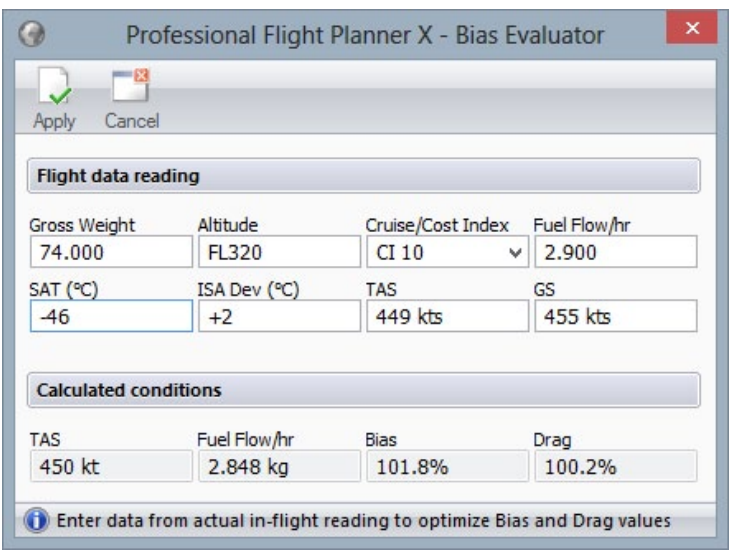
Aircraft

On the aircraft tab you are able to specify basic aircraft properties as described below.

- Registration: The registration consists of a prefix and up to six characters. The prefix is usually one or two characters and defines a country registration (for example N5678; N stands for United States). A registration uniquely identifies an aircraft.
- Type: Selecting an aircraft type defines aircraft basic characteristics used for flight planning.
- Engines: An aircraft type can be delivered with one or more different engine type(s). Different types have varying characteristics in fuel flow and performance.
- Weight, Length & Altitude Units: Select the appropriate units the aircraft is calibrated to. European airlines tend to use the metric system, the United States of America the avoirdupois (imperial) system.
- Empty Weight: Aircraft weight plus crew, oil, catering and galley equipment (but without fuel), passengers and cargo is referred to as Empty Weight. The Empty Weight is also sometimes referred to as Dry Operating Weight (DOW) or Basic Operating Weight (BOW).
- Max Zero Fuel: Maximum Aircraft Weight including payload (passengers, baggage and cargo) but without fuel.
- Max Ramp: Maximum Aircraft Weight during taxiing.
- Max Take-Off and Max Landing: Maximum structural Aircraft Weight for take-off and landing. Note: Performance limit may be lower than the structural limit (refer to TOPCAT – Take-off and Landing Performance Tool).
- Pax capacity: The maximum number of passengers certified for the type of operation. Note: infants (age below 2) are not considered to occupy a passenger seat.

- Cargo capacity: Cargo capacity incorporates the maximum weight of baggage and cargo the airplane is certified for. Note: field can be left blank, if no weight limit is defined.
- Fuel capacity: The maximum amount of fuel the aircraft can carry.
- Taxi Fuel/min: The amount of fuel used per minute with the aircraft on ground during taxiing. Note: Microsoft Flight Simulator airplanes usually use more fuel during idle/low power setting than real-world equivalents. Enter a higher value, if required.
- APU burn/hour: The amount of fuel used per hour by the Auxiliary Power Units (APU). Leave blank, if no APU is installed.
- Take-Off/Approach burn/time: Some aircraft types require a specific amount of fuel and time to be added for take-off and landing calculations. If performance tables do not include Take-off or Landing burn or time, enter the required values.
- •Last Step: To be used for flight planning optimization. PFPX will not plan a step-climb when within a specific distance in nautical miles (nm) from destination. Default is 250nm.
- Altitude Adjust: To be used for flight planning optimization. Determines, if a step-climb is planned earlier or later than normal. Values can reach from -2000 (Late step climb) to +2000 (Early step climb).
- Engine Anti-Ice: Increase of fuel burn in percent with Engine Anti-Ice equipment on. Leave blank if aircraft has no engine ice protection.
- Total Anti-Ice: Increase of fuel burn in percent with Total Anti-Icing equipment on. Leave blank if aircraft has no engine ice protection.
- Climb, Cruise and Descent Bias: Real-world airplanes tend to consume more fuel during airplane and engine ageing. In PFPX these bias values can be configured to adjust fuel burn variations for different add-ons. Note: A Bias value of 105% means a fuel burn of 5% above default aircraft performance values.

- Drag: In PFPX the Drag value can be configured to adjust performance variations for different add-ons. Note: A Drag value of 105% means that the True Airspeed (TAS) is reduced by 5% below aircraft performance values.
- Evaluate: The Evaluate dialog allows to quickly determine Bias and Drag values for a specific aircraft type by comparing PFPX values with in-flight readings of a specific Flight Simulator add-on. An in-flight data reading should be done at optimum altitude and common speed schedule/cost index of the airplane desired. Enter the airplane's gross weight, altitude, present speed schedule, fuel flow per hour (total of all operating engines), Static Air Temperature (SAT), True Air Speed (TAS) and Ground Speed (GS). PFPX will propose a Bias and a Drag value. Use the Apply button to accept these values.

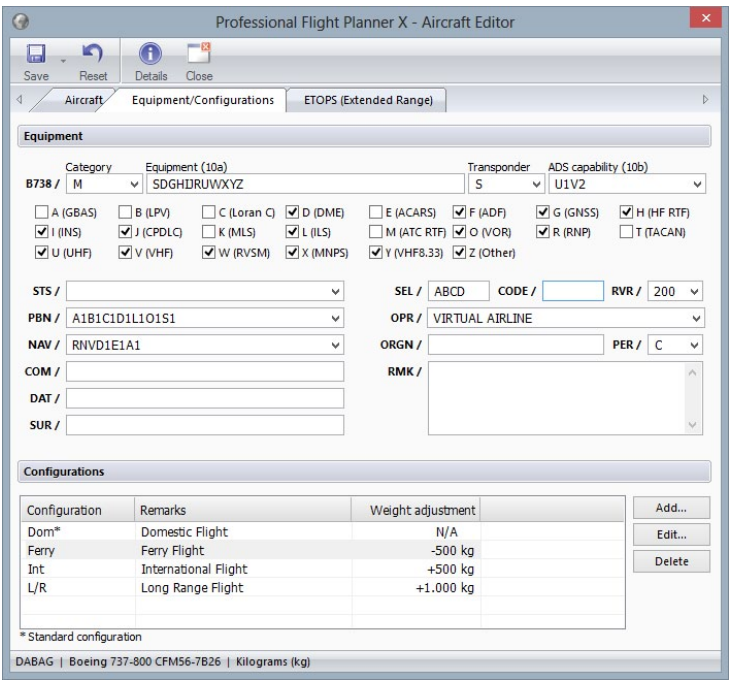


- Threshold Time: Regulations require an aeroplane not to operate on a route where the flight time at single engine cruise speed to an adequate en-route alternate aerodrome exceeds a Threshold Time established by the State (refer to page 62 – ETOPS). Note: When operating without Threshold Time limit, check the 'No Threshold Time Limit' option
- Diversion TAS: Single engine cruise speed based on one-engine-out cruise speed in standard atmospheric conditions. This value is calculated automatically, but can be adjusted if required.
- Threshold Dist: Given the Threshold Time and the Diversion TAS a Threshold Distance can be calculated. This is the maximum distance an airplane may operate from an adequate airport without ETOPS approval.
- T/O Altn Dist: A Take-Off Alternate aerodrome shall be selected if it would not be possible to return to the departure aerodrome for meteorological or performance reasons. The Take-off alternate aerodrome shall be located within one hour flight time at one-engine-out cruise speed in standard atmospheric conditions. For ETOPS approved airplanes, the distance may be extended to the Max Diversion Time, up to a maximum of two hours.
- TOPCAT Performance Module: PFPX allows performing Take-Off and Landing Performance Calculation by selecting the appropriate performance module. Note: This requires a full version of TOPCAT.
- Min Rwy Length, Ceiling, Visibility and Airport Type: Enter the minimum runway length, weather requirements and type for an aerodrome to be determined as Destination Alternate, Enroute Alternate or Adequate Airport.
- Default Climb, Cruise and Descent Speed schedule: The speed schedule used for flight operations has a great influence on operating costs. Obviously, the faster an airplane flies, the lower the flight time, but a higher amount of fuel is required.Adjust the settings for the default speed schedule used for climb, cruise and descent calculations from the Origin aerodrome to the Destination Aerodrome.

- Diversion Climb, Cruise and Descent Speed schedule: Adjust the settings for the default speed schedule used for climb, cruise and descent calculations from the Destination Aerodrome to an Alternate Aerodrome.

Equipment/Configurations

Airlines choose different aircraft configurations to suit their market-places. A wide variety of aircraft equipment and configurations can be entered on this tab.



- Equipment

Category	The appropriate ATC wake turbulence category of the selected aircraft depending on maximum take-off weight (MTOW). • Light (L): MTOW < 7.000 kg (15.500 lb) • Medium (M): MTOW 7.000 kg to 136.000 kg (15.500 lb to 300.000 lb) • Heavy (H): MTOW > 136.000 kg (300.000 lb) • Super (S): for Airbus A380-800
Equipment	A coded string of navigation and communication equipment installed. Checkboxes below can be used to adapt the aircraft equipment.
Transponder	Type of transponder installed.
ADS capacity	Type of Automatic Dependent Surveillance (ADS) broadcast equipment installed.

Other information to be included in the flight plan:

STS	Special Handling Information
PBN	Performance Based Navigation
NAV	Navigation Equipment
COM	Communication applications or capabilities
DAT	Data applications and capabilities
SUR	Surveillance applications and capabilities

SEL	Special Code, for aircraft so equipped
CODE	Aircraft address
RVR	Minimum Runway Visual Range required for landing
OPR	ICAO designator or name of the aircraft operating agency
ORGN	Originator´s 8-letter AFTN address or other appropriate contact details
PER	Aircraft Performance Data
RMK	Other Remarks

- Configurations

  PFPX allows defining different configurations for a single aircraft. This function can be used to reflect Dry Operating Weight (DOW) adjustments for different types of operations (like short flights, long range flights with additional catering or ferry flights).

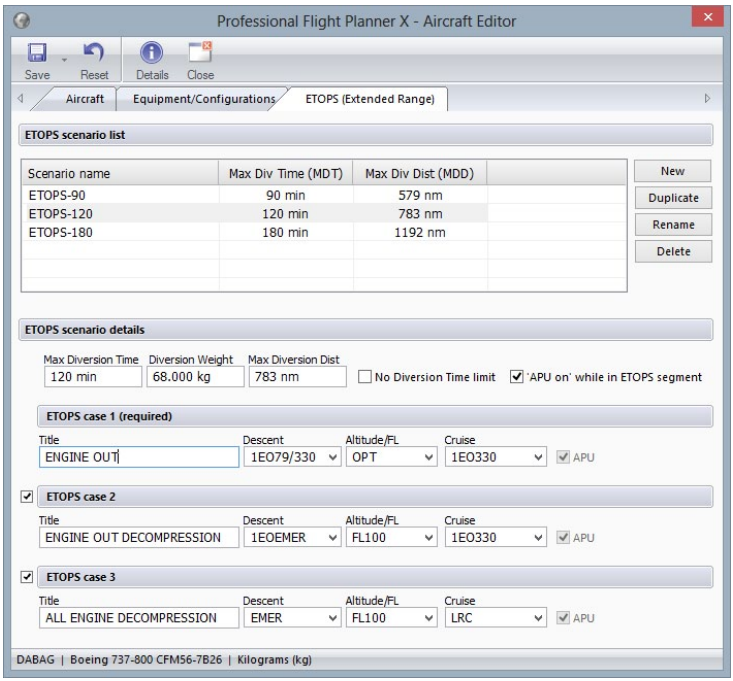
Add	Add a new configuration
Edit	Edit a selected configuration
Delete	Delete a selected configuration

ETOPS (Extended Range)

On this tab Extended Range (ETOPS) characteristics of an airplane can be defined. An unlimited amount of ETOPS scenarios can be added; with every scenario consisting of up to three ETOPS cases (refer to page 62- ETOPS).

- ETOPS scenario list

New	Add a new scenario
Duplicate	Duplicate an existing scenario
Rename	Rename an existing scenario
Delete	Delete an existing scenario



- ETOPS scenario details

Max Diversion Time	Maximum one-engine-out flight time to an ETOPS diversion airport in still air and ISA conditions.
Diversion Weight	Assumed weight at the beginning of the diversion.

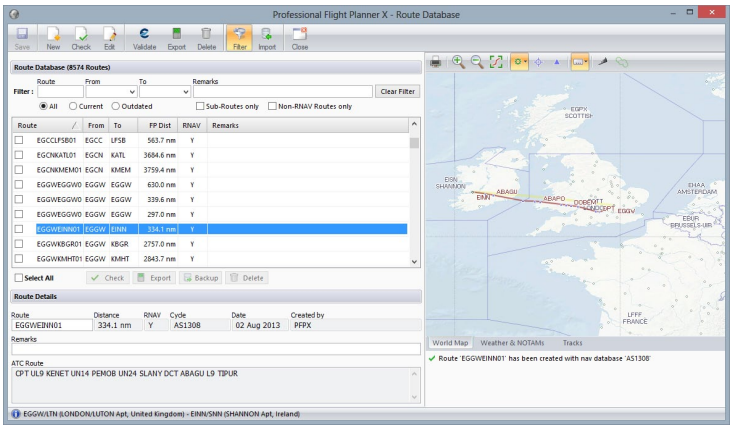
Max Diversion Dist	Maximum distance from an ETOPS diversion airport.
No Diversion Time limit	Some operations (e.g. cargo flights) may be conducted without distance limit from an ETOPS diversion airport.
APU on	Some aircraft types require the Auxiliary Power Unit (APU) to be running during operations within an ETOPS segment for redundancy reasons. Check the box accordingly.
ETOPS cases	Up to three cases can be defined per scenario. The first case is mandatory, additional cases can optionally be added. PFPX usually calculates three default cases: • Engine-out • Engine-out with decompression • All engine with decompression

Route Manager

PFPX allows to build your individual routes and to store them into a database.

Route Database

By clicking onto the Route Database button, a new window appears displaying a table with all your stored routes and sub-routes. Use this dialog to administrate and to validate your database, especially after a navigation database update.



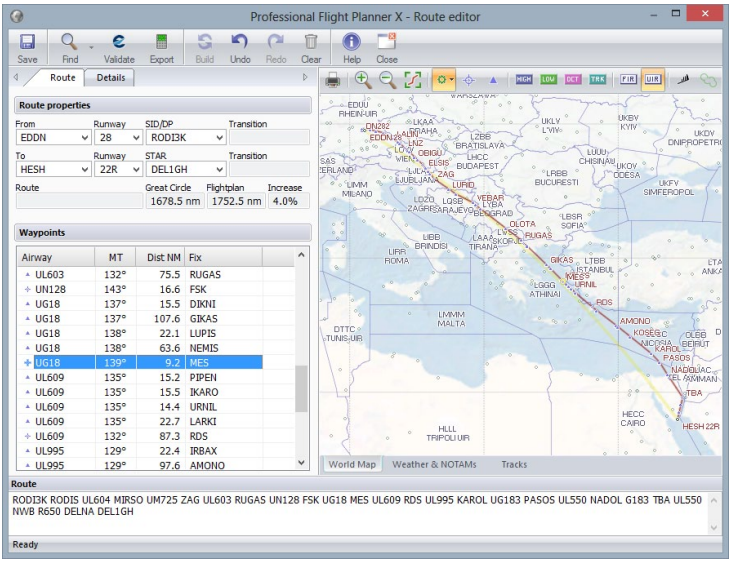
You are able to perform several functions with your routes:

Save	Save route property changes.
New	Create a new route or sub-route.
Check	Check, if the selected route is compliant with the present navigation database cycle installed.
Edit	Edit the selected route (refer to page 32 - Route Editor)
Validate	Verify, if the selected route is compliant with Central Flow Management Unit (CFMU) restrictions of Eurocontrol.
Export	Export the selected route to various flight simulator add-ons.
Delete	Delete the selected route.
Filter	Click the Filter button to toggle route filtering options.
Backup	Backup the present Route Database to a text file.
Import	Import routes from a previously created backup.

Route Editor

The Route Editor offers advanced tool for route building.

Combined with route finding features like wind and flight level optimizations, customized routes can be created in just a few steps.



Save — Save route to database.

Load — Load an existing route from the database.

Find — Pressing the Find button displays the following route finding options:

Upper Airspace	Find a route in upper airspace
Lower Airspace	Find a route in lower airspace
Advanced	Call up the advanced route finder (refer to page 35- Advanced Route Finder).

Validate — Verify, if the selected route is compliant with Central Flow M anagement Unit (CFMU) restrictions of Eurocontrol.

Export — Export the selected route to various flight simulator add-ons.

Clear	Clear the present route.
Build	Routes can be modified manually by altering the route string at the bottom of the dialog. If the route string has been modified its colour changes to magenta and the Build button is unlocked. Pressing this button causes PFPX to rebuild the route from this string. This function can also be used to build routes obtained from other sources (like online route finders).
Undo/ Redo	The Undo/Redo functions help to facilitate the route building process.
Help	Show a list of key words that can be entered in the route field at the bottom of the dialog.

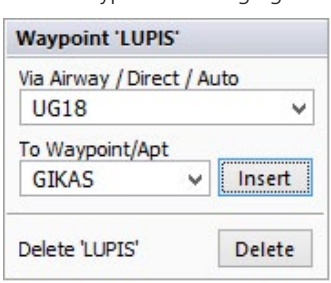
Details

This tab shows detailed information of your planned route like minimum and maximum altitudes, cruise tables, etc.

Route Builder

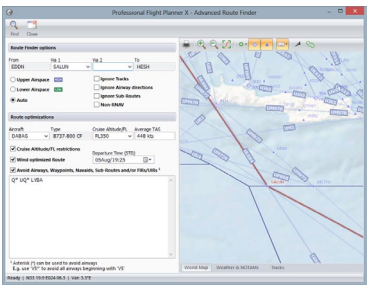
Right-clicking a waypoint in the waypoint list opens up the Route Builder pop-up window. Choose either Direct or select an airway to plan to a waypoint or airport. The delete button deletes the presently selected waypoint from the list.

Note: Waypoints belonging to SID/STAR procedures can't be modified.



Advanced Route Finder

Sometimes, the shortest route may not be the optimum route related to operational, weather and air traffic control (ATC) requirements. Therefore the advanced route finder can be used to optimize your routes on the basis of cruise Altitude restrictions or wind optimization.



- Route Finder Options

Via	Up to two ‚via' waypoints may be defined. The resulting route will be planned via these waypoints.
Upper Airspace	Select the High button to find airways automatically restricting the route to be found to upper airspace.
Lower Airspace	Select the Low button to find airways automatically restricting the route to be found to lower Airspace.
Auto	Automatically select upper or lower airspace depending on route distance.
Ignore Tracks	Normally the route finder prefers routes via an Organized Track System. Checking these box ignores track restrictions.

Ignore Airway directions	Some airways are unidirectional; i.e. the airway may only be flown in a certain direction. The route finder will usually adhere to these limitations. Check this box to ignore directional limitations.
Non-RNAV	Some airways may require area navigation (RNAV) equipment to be used to meet navigational requirements. If an aircraft is not RNAV equipped check this box to find routes allowing conventional navigation to be used.

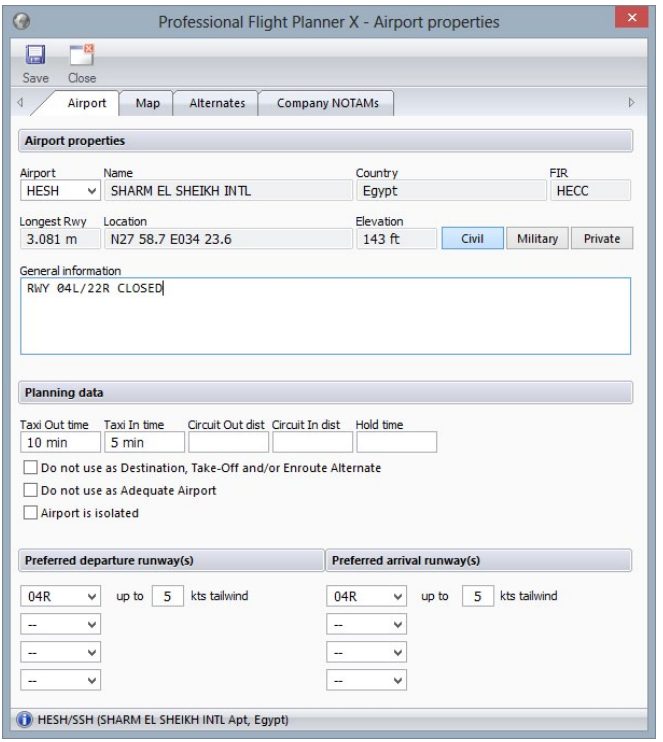
- Route Optimizations

  You are able to optimize your route and to state which airways, waypoints, flight information regions (FIRs) and/or upper information regions (UIRs) to avoid in calculating a route.

  Note: When planning in the European environment, Quebec and Upper-Quebec airways (e.g. Q200, UQ20) are usually only available on certain days or under certain circumstances only. To filter these airways in the route finder use 'UQ*' and 'Q*' in the avoidance list. The same applies for Zulu and Upper-Zulu airways (e.g. Z20 and UZ20).

Airport properties

PFPX Airport properties allow modifying airport characteristics and planning data, specifying preferred runways and destination alternate airports, average taxi times and Company NOTAMs.



Airport

Main planning characteristics of an airport can be defined on the airport tab. Enter the identifier of an airport to edit its properties. The General Information text field can be used to indicate important information of an airport.

Planning Data

Normally default Taxi Out/In, Circuit Out/In and Hold time values from the program settings are used for flight planning (refer to page 12 - Program Options: Planning / Units). The planning data section allows specifying values for an airport, if required.

Define if an airport should be used as a Destination, Take-off and/or Enroute Alternate, as an Adequate Airport or if it is isolated.

Preferred departure/arrival runways

PFPX automatically selects the most favourable departure/arrival runways, taking into account present wind conditions and runway length. Traffic or other operational reasons may require planning a different runway. Use the input mask to optimize automatic runway selection.

Map

The Map tab displays the airport location and its vicinity.

Alternates

PFPX is able to automatically determine destination alternates for a given airport depending on distance, runway length and airport type.

For operational reasons it may be advisable to define a list of up to 20 preferred alternates.

Airports on the top of the list have a higher priority than airports on the lower part of the list.

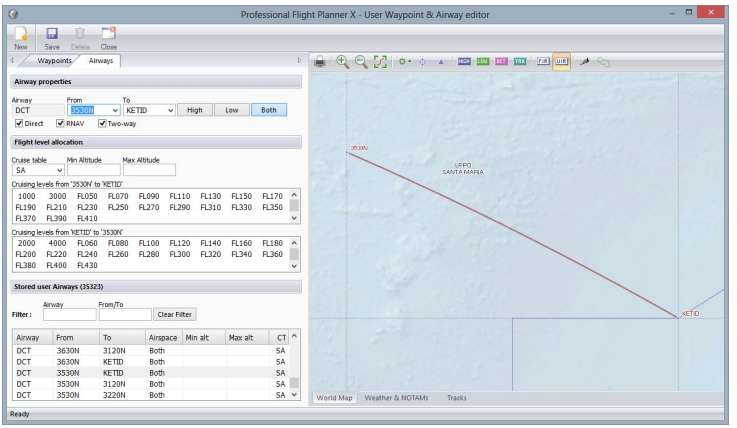
Company NOTAMs

Beyond airport NOTAMs, Company NOTAMs can be added for an airport. This usually is company internal information and can be added to the flight briefing package.

Waypoint & Airway Editor

PFPX allows you to add user-defined waypoints, airports and airways to the navigation database, and to delete existing user-defined waypoints, airports and airways. PFPX comes with an initial set of user defined direct routes (airways) to improve route finding capabilities.

User-defined data is stored in a separate file and therefore it is retained when a new navigation database is installed.



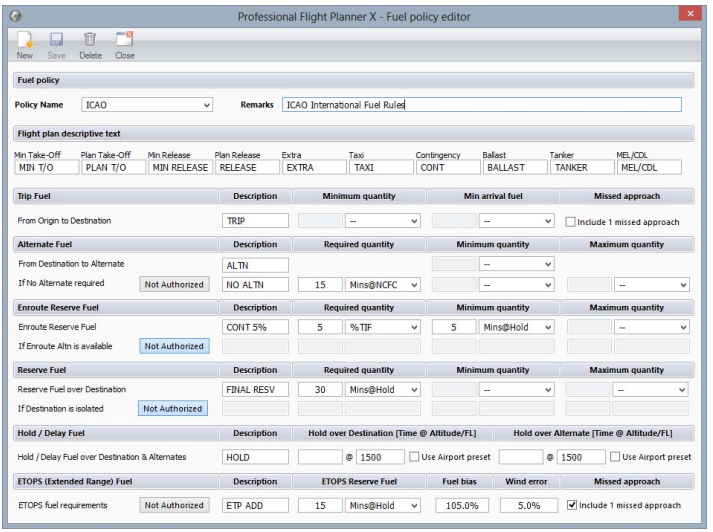
Fuel policy editor

Depending on the regulations used for flight planning, different fuel planning rules may apply.

As delivered, PFPX supports several fuel policies, like flights conducted under US Domestic operations, US Flag operations and EU-OPS. You may specify additional policies, especially if you fly for operators registered outside the United States and those countries regulated by EU-OPS.

The Fuel Policy Editor is a very sophisticated tool to configure fuel planning rules to satisfy a wide variety of legal planning requirements. As creating fuel policies requires more detailed knowledge of flight planning, the tool is designated for advanced users.

The fuel policies records support specification of trip fuel rules, alternate fuel rules, contingency/IFR reserves, final reserves/holding fuel and ETOPS fuel requirements for flight plans, using names that may vary by fuel policy (hence the description fields).



To add a fuel policy, provide a unique name and remarks for the record.

The minimum required fuel amount usually consists of Trip fuel (Fuel burn from origin to destination) plus reserves, if deviations should occur.

These reserves can be expressed as:

- minutes of normal cruise fuel consumption (NCFC)
- minutes holding 1500 feet above planned destination/destination alternate airport
- percentage of trip fuel
- percentage of trip time at normal cruise fuel consumption
- percentage of trip time holding 1500 feet above planned destination/destination alternate airport
- a fixed amount in kilograms
- a fixed amount in pounds (lbs)

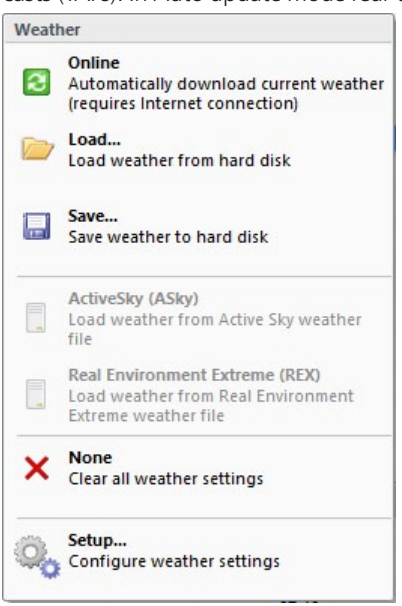
- no adjustment.

In addition to the trip fuel minimum amount, alternate fuel, contingency/IFR reserve and final reserve/holding fuel can also specify required fuel and minimum/maximum amount using the same choices.

For ETOPS (Extended Range), you have the ability to define whether the policy requires a bias percentage for flying to a diversion airport, the wind error percentage that should be used, whether a single missed approach at the landing airport should be included, and how the final reserve/holding fuel should be calculated.

Weather

The PFPX weather system records up-to-date worldwide wind data, aviation routine weather reports (METARs) and terminal aerodrome forecasts (TAFs). In Auto update mode real-time winds and weather data are provided regularly from the PFPX data server. You may allow PFPX to auto-update this information as it is published, load saved weather data from hard disk, save weather data to hard disk, and clear all weather settings from PFPX if you wish. Loading the data from hard disk will automatically suspend auto-updating of the data until you again choose the auto-update option.



- Click the Weather open-up button to open up the weather quick launch and choose

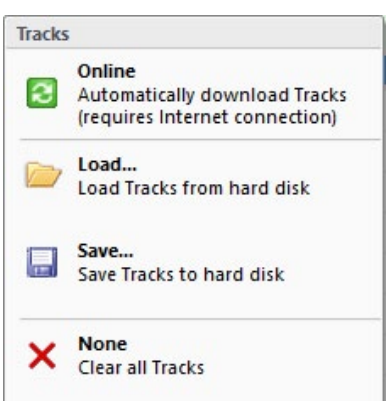
Online will automatically download current winds, METARs and TAFs from weather server (Requires PFPX Server Subscription)

Load	load weather from previously saved weather file
Save	to save weather data to hard disk
ActiveSky	Use ActiveSky weather (requires 'current_wx_snapshot.txt' and 'wx_station_list.txt' files)
REX	Use Real Environment Extreme (REX) weather (requires 'metar_report.xml' file)
None	clear all weather settings.
Config	to reach the program configuration window to configure weather data.

Organized Track System

Beside the static airways used for flight planning, the Organized Track System (OTS) records the current oceanic tracks, updated on a daily basis.

These tracks are normally optimized to avoid headwinds and to take advantage of tailwinds by circumnavigating bad weather conditions. They often require special flight planning procedures and considerations (refer to page 72 – Flight Planning).



These tracks are:

- North Atlantic Tracks (NATS) for crossing the Atlantic between Europe and the US East Coast/Canada.
- Pacific Tracks (PACOTS) for crossing the Northern Pacific Ocean between the US West Coast and Asia/Japan.

- Australian Tracks (AUSOTS) connecting Southeast Asia with Australia

You may allow PFPX to auto-update this information as it is published, load saved OTS data from your own disk, save OTS data to your own disk, and clear all organized tracks from PFPX if you wish. Loading the data from your own disk will automatically suspend auto-updating of the data until you again choose the auto-update option.

- Click the OTS open-up button to get to the Organized Track System quick launch and choose

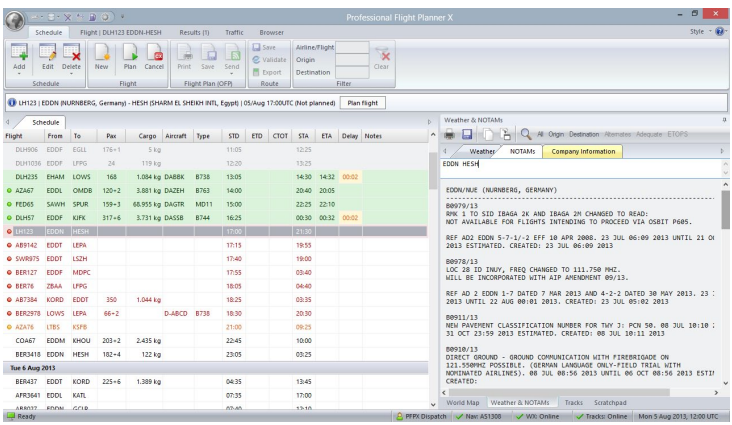
Online	to get OTS information from the server
Load	to load an existing OTS source from hard disk
Save	to save existing OTS data to hard disk
None	clear all OTS data

Note: Weather and OTS quick launch are status fields which show a green checkmark for online status, an orange checkmark for update status or a red cross for none chosen data source.

The PFPX Program Interface

Schedule Panel

The Schedule tab will display all current scheduled flights. After installing PFPX and using PFPX for the first time, there are no flights in your schedule table. The Schedule tab allows creating or modifying scheduled flights.



Schedule

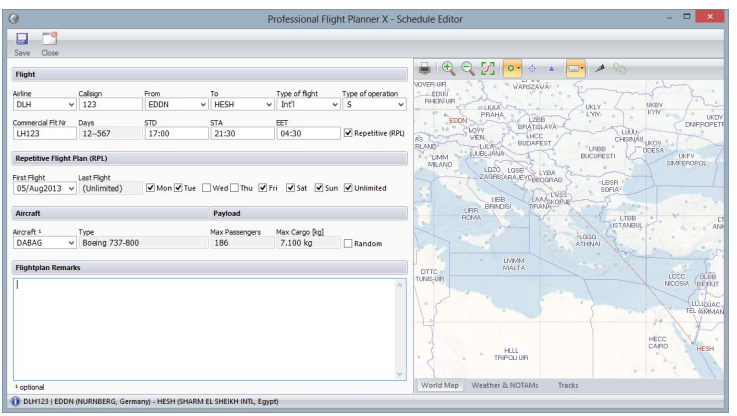
The schedule list displays all current scheduled flights. The form easily shows those flights which are due to be planned, those which are overdue, and those which have been planned and released. Only current scheduled flights may be planned. Scheduled flights are only considered to be current if they are scheduled between the beginning of today (local time) and the end of the same day next week.

Flights whose scheduled time of departure (STD) is more than 6 hours ago are shown in grey font, as are flights whose STD is more than 36 hours in the future. Flights whose STD is overdue are shown in red font and have a red button to their left. Flights whose STD is within the next 2 hours are shown in amber font and have an amber button to their left.

Note: You are able to change an aircraft, ETD, ETA and Notes for a flight easily on the Schedule tab by double-clicking into the specified field.

Estimated time of departure (ETD) and estimated time of Arrival (ETA) can be altered by yourself and you are able to add notes to the flight plan. If you want to alter other details of your flight, click on Edit button.

Add Press the Add button to create a new a single flight or a series of repetitive flights to your schedule.



The Airline Code drop-down enables you to choose an airline from a list. You can also enter your own virtual airline code, although this will not cause the airline list to be updated.

Fill in an individual Flight number.

The Origin/Departure and planned Destination airports are specified using their International Civil Aviation Organization (ICAO) airport codes. If you are unsure of a code for an airport, press the drop-down arrow on either field to display the Airport Lookup window. Specify the scheduled time of departure (STD), scheduled time of arrival (STA) and/or estimated en route time (EET). PFPX will provide estimates for each field if you specify values for the other two. Specify the date of first flight within the schedule from the drop-down calendar.

Enter the Type of Operation in the two fields provided. Into the first field enter the schedule as Scheduled Air Service (S), Non-scheduled Air Transport Operation (N), General Aviation (G), Military (M) or Other (X). Into the second field enter the schedule as Domestic Flight (Dom), International Flight (Int), Long Range Flight (L/R) or Other (Other).

Add any remarks that you wish to have displayed for each scheduled flight into the Remarks field.

Scheduled flights are specified as leaving on certain days of each week. If you wish to schedule repetitive flights, check the box labelled 'Repetitive (RPL)', enter the Begin date, either the End date or check the 'Unlimited' box, and specify the days of each week on which the schedule is to be flown. This can be achieved by either checking or un-checking the weekdays for the flights.

Furthermore you can choose the desired aircraft (if there is already an aircraft assigned to this flight) and determine the available seats or passenger and cargo amount, if known.

For the 'Random' function the maximum number of passengers and cargo must be entered in the respective fields. Random load data is then generated for the flight or a series of repetitive flights.

If there is any important information you might have for the flight crew you can note them into Remarks so they´re displayed onto the flight plan.

Press the Save button to record, or the Close button to avoid recording the schedule.

Pressing the lower part of the 'Add' button unveils the following options:

Return Flight	Add a Return Flight to selected flight
Import	Import Schedule from file
Export	Export Schedule to file

Edit — If you want to alter the scheduled flight, press the Edit button.

Delete/Delete all — Use the Delete or the Delete all buttons to clear the selected or all flights in your schedule.
Please note that it is not possible to delete just a single flight of a repetitive schedule. Use the Cancel function instead.

Choose a scheduled flight for which you wish to develop a flight plan.

Flight

New — Click the New button to switch to the Flight Panel to create an unscheduled flight

Plan — Click on the Plan button to plan the selected flight of your schedule and proceed to the Flight tab.

Cancel — Under some circumstances your flight might be cancelled by your virtual airline or for some other reasons. Press the Cancel button if you wish to cancel the selected flight.
You will see the characters ‚CX' in red next to the flight that you have cancelled. The flight strip also turns to red and is prevented from being planned.

Note: If you decide to cancel a flight which has already been released and a flight plan is already available, will result in deleting the flight plan.

Flight Plan (OFP)

Once a flight has been released you are returned to the Schedule tab, the flight turns green and the buttons in the Flight Plan (OFP) Ribbon category is enabled.

Print	Prints the flight briefing package for the selected flight
Save	Save the flight briefing as text file to hard disk
Send	The Send buttons allows to dispatch the result to external programs:
	TOPCAT Send results to TOPCAT (requires a full version of Take-Off and Landing Performance Calculation Tool)
	VATSIM Pre-fill the VATSIM flight plan form

Route

Save	Save the route of the selected flight to the database.
Validate	Verify, if the selected route is compliant with Central Flow Management Unit (CFMU) restrictions of Eurocontrol.
Export	Export the selected route to various flight simulator add-ons.

Filter

Use the Filter dialog to get help searching for a specific airline/flight number, origin or destination in your schedules. You may have a list of scheduled flights from which it is difficult to find the flight for you wish to create a flight plan.

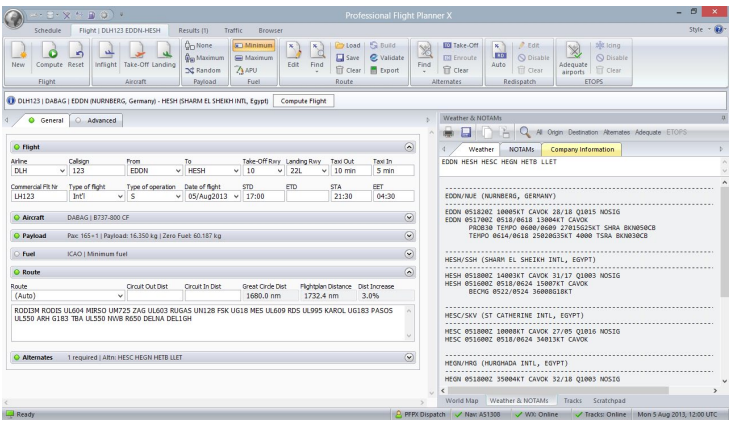
Flight Panel

Pressing the Plan button on the Schedule Panel will display the Flight Panel for the chosen scheduled flight. If you wish to plan a non-scheduled flight you can also go directly to the Flight Panel to start a new flight.

The Flight Panel is subdivided into two sub-tabs: The General tab and the Advanced tab. Basic flight planning options are grouped in the General tab, more sophisticated features required for special operations are summarized in the Advanced tab.

Note: The Advanced tab displays additional data that you may have to enter to specify a re-dispatch plan, extended range ETOPS and intermediate alternate airports, a custom altitude/ speed profile, and flight plan and air traffic control remarks.

These functions are intended for advanced users to refine the flight planning process.



In the main window on the top the program displays a ribbon bar with several category tabs. These categories are arranged in the same manner as the panes on the work space window. They will be described in more detail below:

Flight

To plan your flight, please ensure that the airline code, flight number, origin and destination airports are correctly specified. PFPX automatically selects the optimum runways based on reported wind conditions.

The Taxi In and Out fields are average times required to taxi from the parking position to the runway and vice versa. These values can be manually altered or configured in the Program configuration window (refer to page 11- Program Options).

Verify your Type of flight (Scheduled, Non-Scheduled, General Aviation, Military or Other), Type of operation (Domestic, International, Long Range or Other). These settings have effect on the standard passenger and cargo weights used for payload calculation.

Enter the date and time of your flight. If a delay occurs and the estimated time of departure (ETD) is different to the scheduled time of departure (STD), affirm that the ETD is correct.

The estimated en route time (EET) and estimated time of arrival (ETA) is calculated automatically and can be adjusted as required.

New:	Press the New button to start planning a new flight. This causes clearing all information written previously.
Compute:	Click Compute to let PFPX calculate your flight. Before pressing the Compute button make sure that all relevant information is correctly specified. If mandatory data is missing, the Compute button is disabled and a red light is shown on the relevant tab
Reset:	Press the Reset button to reset all flight data back to default values

Aircraft

The aircraft assigned to the flight must be specified. The drop-down arrow will display the aircraft available in your aircraft database.

An aircraft can have different configurations based on the planned type of operation (e.g. different catering for short and/or long flights or no catering at all for maintenance flights).

If different configurations have been defined in the aircraft record, these can be selected here. Selecting a configuration adjusts the empty weight (Weight of the aircraft).

A weight adjustment can be applied by the dispatcher in special circumstances by setting the configuration to Manual and entering an adjustment value (+/-).

The Maximum Take-Off Weight (MTOW) and Maximum Landing Weight (MLW) values are automatically set to the aircraft's structural limits.

If performance limits are lower than structural limits (Short runway, obstacles, etc.), they may be entered here.

Note: If you own a full version of TOPCAT – Take-Off and Landing Performance Calculation Tool the performance limit values can be calculated automatically by using the Take-Off and Landing functions.

The planned aircraft speed schedule can be adjusted in the Climb, Cruise and Descent section. Some aircraft types even allow for Cost Index based cruise schedules (noticeable on the 'Cost Index' header over the Cruise schedule field). Enter the desired cost index in the 'Cruise' field instead of selecting a fixed speed/mach schedule (refer to page 80- Cost Index).

Normally, PFPX plans an initial climb to the optimum flight level (OPT) based on the selected aircraft, cruising altitude restrictions, weight, temperature, cruise speed, etc. If the MAX value is selected, an initial climb to the maximum allowed altitude is scheduled.

As the optimum altitude usually increases when fuel is burnt, steps climbs are planned during the later stage of a flight.

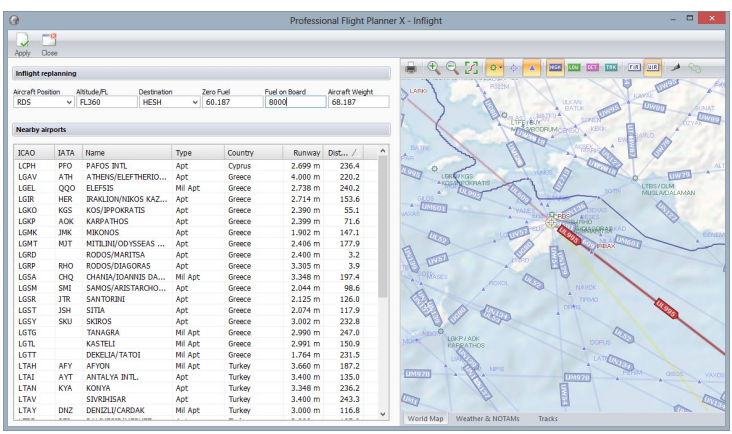
By default, this Step Size is set to the ICAO standard of 2.000ft (600m) and can be modified to 4.000ft (1.200m) if required. If no step-climbs are desired, select None.

Note: If a Cruise Altitude/FL is manually entered a climb to this altitude is scheduled, irrespective of any airway flight level restrictions and the Step Climb field will be disabled. Further level changes can be applied on the Advanced/Speed/Altitude tab.

The Altitude Cap value will normally not be modified. If you wish to specify it, the resulting vertical flight path will be restrained to the value entered. This can be useful on certain routes not allowing to be planned at a higher level or for technical reasons when an aircraft is not allowed to exceed a certain altitude.

Inflight

Under special circumstances, (re-)planning is required with an aircraft already in flight. This may be the case if a new destination is planned for operational reasons, for unplanned diversions or if the remaining amount of fuel is insufficient to reach the planned destination.

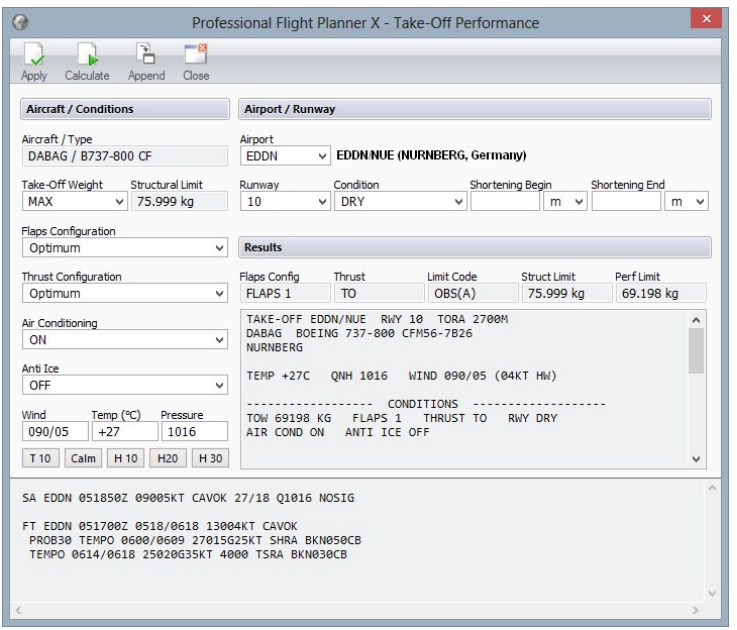


In this case you are able to use the Inflight method by pressing the respective button on the Ribbon. Complete the required data for Aircraft Position, Altitude/FL (Flight Level), Destination, Zero Fuel Weight, Fuel on Board and Aircraft Weight.

PFPX will automatically propose nearby diversion airfields. Press Apply to continue your flight planning as usually.

Take-off and Landing Calculation

The Take-off and Landing Performance Calculation module requires a licensed version of TOPCAT (Take-off and Landing Performance Tool).



Take-off and Landing performance is calculated based upon the current airport weather, a specified runway and a set of environmental conditions.

PFPX chooses, by default, an upwind runway, which may be altered if required. Shortening of the runway, notified by airport NOTAMs, may be achieved by specifying the shortening of either the beginning or end of the runway. The take-off and landing conditions that may be specified are the flaps configuration, the thrust configuration or the landing mode, and whether the air conditioning and anti-ice will be on or off.

The results of the take-off performance calculations are your performance limiting weights for take-off and/or landing. Pressing the Apply button will automatically transfer these weights to the planning window Max Take-Off and Max Landing fields.

Payload

Payload is the sum of the weights of passengers, their baggage and cargo. Passengers, of course, are not individually weighed. The standard weights of an adult, a child, an infant and their baggage are used to calculate the pay-load. Cargo, carried in the aircraft's hold is weighed separately.

Other items like crew, oil, catering and galley equipment do not count as Payload and are included in the Empty Weight.

Normally, airlines derive the planned passenger and cargo weight from their booking system. PFPX can simulate this by randomly generating passenger and cargo load.

Once the number of adults, children and infants is entered, a passenger and a baggage weight is calculated by using default weight values based on the type of flight and type of operation selected and the standard passenger weights defined in the configuration dialog.
Adding this weight value to the empty weight of the airplane gives the Zero Fuel Weight. If the maximum number of passengers or Zero Fuel Weight limits are exceeded, a warning is generated.

Payload values can be adjusted by the dispatcher as required. A special option is to calculate the maximum allowable payload by selecting the MAX option.

- Press the Empty button to clear all payload weights or
- Press the Max(imum) button to set maximum payload values or
- Use the Random button to randomize passenger, baggage and cargo values.

Fuel

There are many different fuel planning rules and regulations worldwide or even differences between various aircraft types or the kind of operation within the same authority.

For example, a European airline would normally use EU-OPS fuel policy as published by the EASA (European Aviation Safety Agency), whereas an airline based in the United States would use FAA Domestic rules (For domestic flights) or FAA Flag rules (For international flights).

Note: A European airline would always use EU-OPS planning rules even when doing a domestic flight within the United States. An airline based in the United States would always use FAA regulations, even when conducting flights within Europe.

PFPX comes with a pre-defined set of fuel policies. These policies can be adjusted as required with the fuel policy editor.

Normally, a dispatcher is looking for the minimum amount of fuel to be carried for a specific flight, taking into account all legal and operational requirements. In some circumstances it may be advisable to carry more than the minimum amount of fuel (E.g. if the fuel at destination is expensive or if no fuel is available).

PFPX allows setting up a wide variety of fuel options to cater for different scenarios:

- Fuel policy: The fuel planning rules used for calculation depending on the operator's legal requirements.
- MEL/CDL %: Missing or defective items may require increasing fuel burn according to the MEL (Minimum equipment list) or the CDL (Configuration deviation list). E.g. a value of 5% equals a fuel flow increase of 5%.

- MEL/CDL fuel: Same as above, but the increased fuel requirement is given in a fixed amount of fuel for the entire flight. A value of 1000 [kg/lb] means that the minimum required fuel is increased by 1000 [kg/lb].
- Ballast fuel: Ballast or unusable fuel may be required if not all of the fuel on board can be used. This may occur when fuel pumps are inoperative or to obtain a minimum airplane weight.
- Tankering fuel: Tankering fuel is usually carried for economical reasons, if fuel is expensive or if no fuel is available at the destination.
- APU inflight: Some (special) operations may require the auxiliary power unit (APU) to be running during the entire flight. Select Yes to included APU fuel burn in fuel calculations.
- Hold time: Add a hold time value to cater for expected or known delays over the destination. Some fuel policies require carrying a minimum amount of holding fuel.
- Extra time/fuel: Extra fuel may be required by the commander beyond the minimum legal requirements. The amount of extra fuel can be expressed in a time value or a fixed amount of fuel.
- Contingency fuel: Contingency fuel or additional fuel can be added by the dispatcher for operational reasons and is included in the minimum required fuel value.
- Remaining fuel: May be used to set a pre-defined amount of fuel remaining at destination. Overrides the Release fuel value. This function is very useful for fuel tankering operations. Note: For fuel tankering planning, calculate the second flight first. Enter the minimum required fuel as 'Remaining fuel' when calculating the first flight.
- •Release fuel: Normally set to Min[imum] to calculate minimum required fuel. Set to Max to calculate maximum allowable fuel or manually enter a specific amount of fuel.

Route

Initially there may be no route available for the flight, so you´d have to build one. There are several methods available for finding the optimum route for a flight.

Find	Pressing the Find button displays the following route finding options: Upper Airspace: Find a route in upper airspace Lower Airspace: Find a route in lower airspace Advanced:Call up the advanced route finder (refer to page 35 -Advanced Route Finder).

Note: On the Message & Action bar PFPX suggest the Quick Find Route option which enables you to find the shortest route between origin and destination, observing altitude and directional restrictions for the aircraft selected

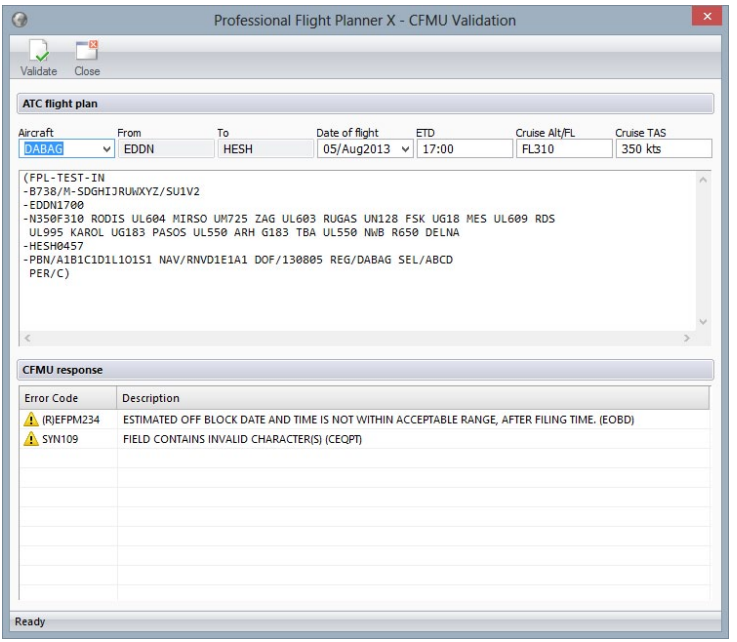
Edit	Use the Edit button to open the Route editor to build or optimize your individual route.
Load	The Load button enables you to load an existing route of your route database.
Save	Click the Save button as you may save the current route for future use.
Clear	Press the Clear button to start building a new route. It does not delete the copy from your disk if you have loaded a previously saved route.

Build	Routes can be modified manually by altering the route string at the bottom of the dialog. If the route string has been modified its colour changes to magenta and the Build button is unlocked. Pressing this button tells PFPX to rebuild the route from this string. This function can also be used to generate routes obtained from other sources (like online route finders).
Validate	Verify, if the selected route is compliant with Central Flow Management Unit (CFMU) restrictions of Eurocontrol.
Export	Export the selected route to various flight simulator add-ons.

- CFMU Flight Plan Validation

The CFMU Flight Plan Validation function can be found on the Schedule Panel, on the Flight Panel (Route database and Route editor) and on the Results Panel as well. By clicking the Validate button, a new window appears. The ATC flight plan is already filled in. Press Validate for PFPX to check if your ATC flight plan is in compliance with CFMU (Eurocontrol) planning restrictions.

At the CFMU response window below the CFMU response displays Error Code and the Description of the Error which allows you to correct your input. Refer to the Eurocontrol IFPS Users Manual (http://www.eurocontrol.int).



Alternates

Here we have to nominate the airports that are to be listed. Obviously, if the value of the ‚Altn Required' field is either ‚None' or ‚Isolated', there is no need to specify destination alternate airports at all. However, for numeric values we need to nominate either 1 or 2 airports (refer to page 80 -Alternate Airports).

For each destination alternate airport, PFPX will calculate a route from the planned destination airport to that airport. It will also identify the arrival procedure and up-wind runway that may be used, the distance to the destination alternate airport, and calculate the fuel required.

You may choose an appropriate Alt/FL. ‚OPT', the default, allows the aircraft to climb to the optimum flight level. ‚MAX' commands the aircraft to climb to the maximum achievable flight level. You may also enter any value of circuit distance, hold time and altitude or flight level required for the flight to the destination alternate airport.

PFPX calculates the nearest suitable destination alternate airports available from which you can choose. You may enter up to 4 airports. PFPX will take the most favourable, if 1 alternate destination is required, or the 2 most favourable, if 2 alternate destination are required, for its fuel calculation. Any additional airports remaining are listed for information on the operational flight plan. This enables the pilot to change to the remaining alternates if a nominated alternate closes or its weather falls below the minimums.

Find	Press the Find button to show the Destination Alternate dropdown • Click Quick Find to automatically determine destinations alternates for the planned flight • Click Advanced to call up a list of selectable nearby suitable airports
Take-Off	Automatically assigns a Take-Off Alternate, which is required if it would not be possible to return to the departure aerodrome for meteorological or performance reasons.
Enroute	Automatically assigns an Enroute Alternate. This option is used for EU-OPS fuel planning only and reduces the required amount of contingency fuel (usually from 5% to 3%).

The Airport must be located within a pre-defined circle centred at a certain distance from the destination. PFPX will automatically check this requirement.

Redispatch

A redispatch plan consists of specifying a redispatch fix and short release destination airport. Developing a redispatch plan may reduce your contingency fuel requirement, as you need to carry reserve fuel only for the part from the redispatch fix to the destination instead the entire route (refer to page 82 - Redispatch Planning).

The Redispatch Route button allows you to find a route for the redispatch portion of the flight, Clear the current re-release route and to identify candidate destination alternate airports.

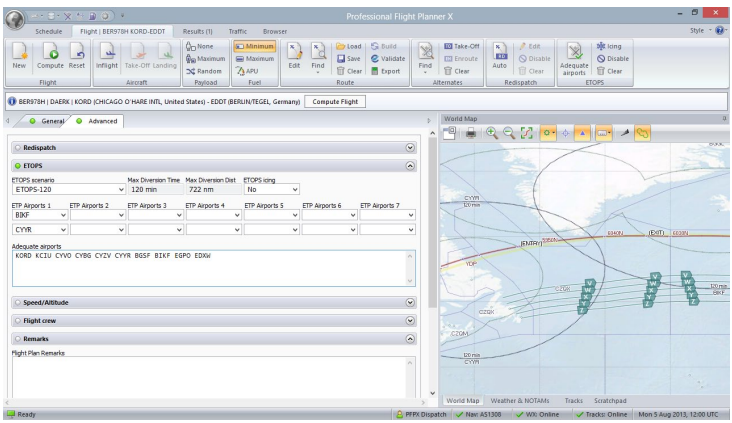
Auto	To automatically find a redispatch solution for the planned flight
Edit	Open the Route Editor to modify the redispatch part of a route (refer to page 34 – Route Builder)
Disable	Disable redispatch entries without clearing them
Clear	Clear all redispatch entries

ETOPS (Extended Range) Operations

If a flight is planed beyond an airplane's Threshold Distance (indicated by green arcs around Adequate Airports), Extended Range (ETOPS) planning is required (refer to page 62 – Extended Range / ETOPS). ETOPS scenarios must be available for the airplane selected and be allowed by the fuel policy in use to enable the ETOPS scenario drop-down box.

Selecting the desired scenario unlocks the ETP Airports edit fields. Up to seven airport pairs or single airports can be specified. Verify that the entire route is covered with either green circles (adequate airports) or black circles (ETOPS alternates).

- Choosing the Adequate airports icon will enable you to automatically search for suitable alternate airports. This is usually done automatically by PFPX.
- If icing conditions for the ETOPS diversion are expected, enable the Icing field to cater for increased fuel consumption required by anti-ice equipment.
- Clear all ETOPS entries



Speed/Altitude

The custom altitude and speed profile is used to specify up to 7 altitude and speed constraints that may be required to adjust the flight's vertical and speed profile. The constraints may be required for safety, economical or political reasons. These will be included in the flight plan and affect fuel consumption.

The waypoint drop-down presents a list of the waypoints in your current route. Choosing a waypoint will then allow you to specify a cruise Mach speed or cost index and an altitude or flight level constraint for the waypoint. In the Cruise/CI field, you can choose a speed profile or Cost Index used from this waypoint.

In the Altitude/FL field, you can choose the values optimum (OPT), maximum (MAX) or specify an altitude or flight level. The flight plan, when computed, will contain these constraints for the nominated waypoints.

Flight Crew/Remarks

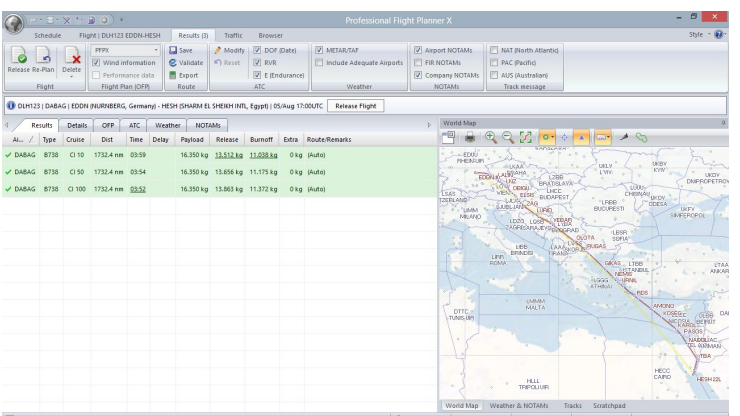
- Fill in your Flight Crew members if required.
- Type in important information at the ATC flight plan fields.

Finally your flight planning is completed and ready for calculation!

Results Panel

As your flight has been calculated by PFPX the Results panel opens automatically. The Results tab display a list of flights that have been calculated. Several flights can be calculated and compared (e.g. with different aircraft, routes, speed schedule, payloads, etc.) prior release.

If warnings have occurred during flight planning, a message is shown before a flight can be released. If an error has occurred, the error must be rectified before the flight can be released.



Flight

Release	If you are sure, that your results are ready for publication, press the Release button to let PFPX create your individual flight briefing package. Before releasing a flight, select all necessary information you would like to have added into your flight briefing package (e.g. Weather, NOTAMs or Track Messages). Once a flight is released, you are returned to the Schedule page, with the created flight in green colour.
Re-plan	Returns you to the Flight panel and fills all data from the selected flight.
Delete (All)	Delete the selected flight or all flights

Flight Plan (OFP)

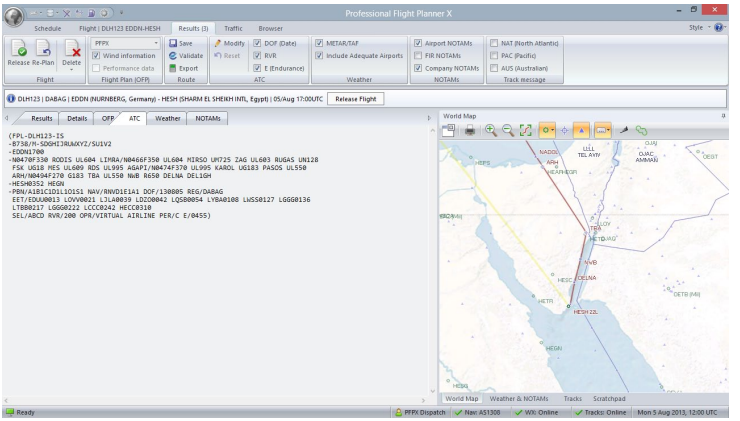
Layout	Select the desired flight plan format. Different flight plan (OFP) layouts may be available in the drop-down field. Custom formats can be created easily (refer to the Flight Plan Template guide).
Wind information	Include detailed waypoint wind information
Performance Data	Include take-off and landing performance limit data (performance has to be calculated earlier to enable this function).

Route

Save	Save your route to the database.
Validate	Verify, if the selected route is compliant with Central Flow Management Unit (CFMU) restrictions of Eurocontrol.
Export	Export the selected route to various flight simulator add-ons.

ATC

In real world, the ATC flight plan is sent to air traffic control prior to flight, where it is processed and dispatched to all ATC units concerned. Flight plans may be rejected if an incorrect format or invalid routes are used (refer to page 58 - CFMU Flight Plan Validation).



Modify	Manually modify the generated ATC flight plan.
Reset	Reset a modified ATC flight plan to initial value.
DOF (Date)	Toggle the Date of Flight (DOF) field in the ATC flight plan (required by some authorities, e.g. in Europe).
E (Endurance)	Toggle the Endurance (E) field in the ATC flight plan.
RVR	Toggle the Runway Visual Range (RVR) field in the ATC flight plan (required by some authorities, e.g. in Europe).

Weather

The weather briefing contains the available METARs and terminal aerodrome forecasts for the departure, departure alternate, en route alternate, planned destination and destination alternate airports.

NOTAMs

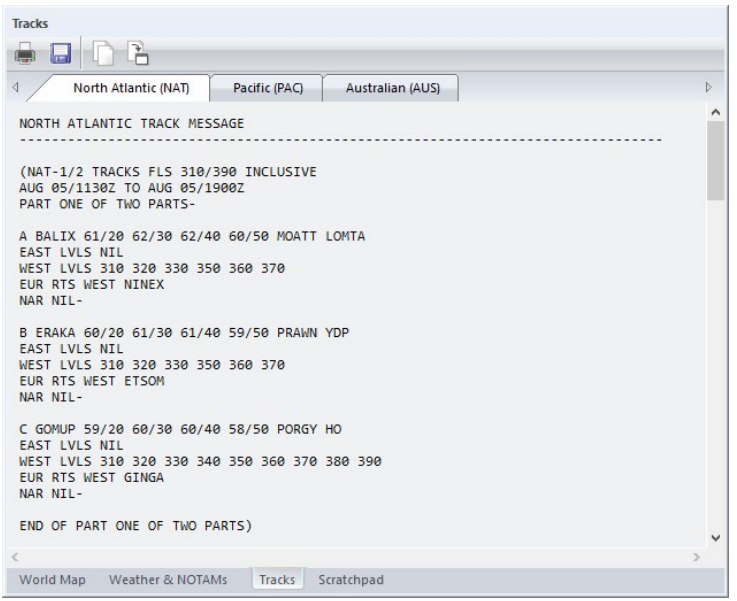
The NOTAMs are listed for the departure, departure alternate, en route alternate, planned destination and destination alternate airports. The following types of NOTAMs can be added to the flight briefing package:

- Airport NOTAMs
- Company NOTAMs
- FIR NOTAMs

Track Message

Select either one of the following track message to be added to the flight briefing package:

- North Atlantic (NATs)
- Pacific (PAC)
- Australian (AUS)



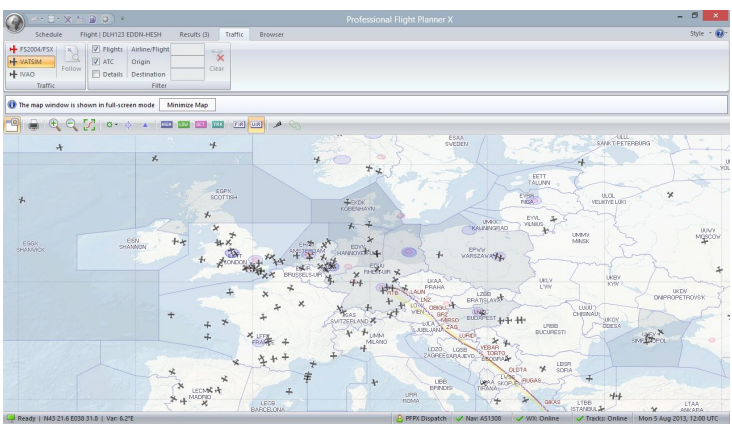
And finally, have a pleasant and safe flight!

Traffic Panel

The Traffic window displays a graphical presentation of online traffic and air traffic control stations of organizations such as IVAO and VATSIM. The actual aircraft position and altitude of your Microsoft Flight Simulator aircraft can also be displayed on the map window (requires FSUIPC/WideFS).

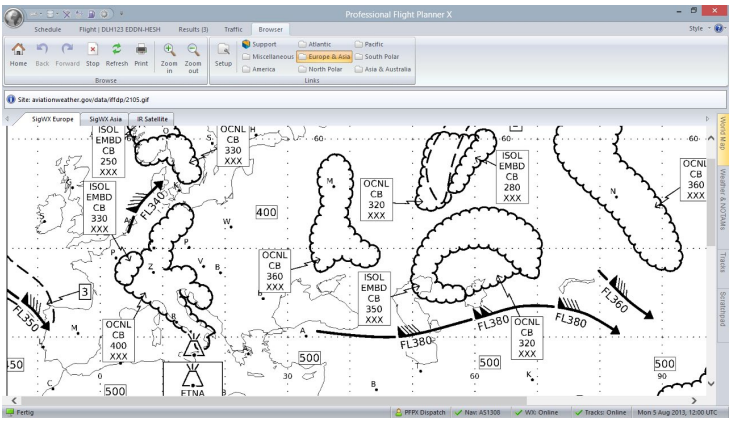
The Slew mode will keep the map automatically centered on the selected aircraft. Toggle the Aircraft, ATC and Details check boxes to adjust the detail level of information shown on the map.

Use the Filter text fields to limit the aircraft shown to a certain airline, flight number, origin or destination. The clear button removes all filters.



Browser Panel

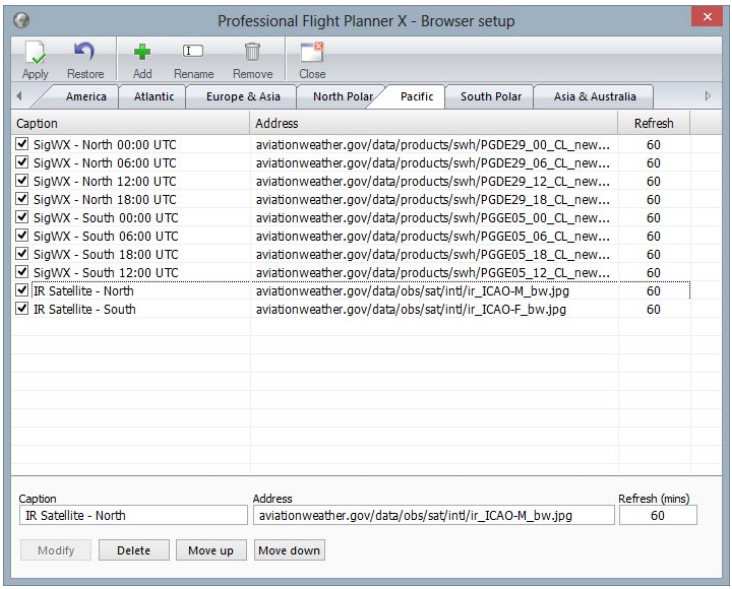
The Browser window is an integrated web browser displaying user-definable (flight simulator related) web resources. PFPX comes with predefined default groups, adjustable by the user.



Home	Pressing the Home button leads you back to the main site.
Back / Forward	The Back and Forward button allows you either to go one site back or one forward.
Stop	The Stop button aborts the current process.
Refresh	Pressing the Refresh button updates the actual site.
Print	The Print button allows you to select a printer to print the site.
Zoom In/Zoom Out	Use the Zoom in and Zoom out option to adjust the zoom level of the selected site

Setup

Use the Setup button to add, modify or delete your groups and sites.



Apply Save changes and close window

Restore Restore PFPX default groups

Add To add a new group. Fill in a name into the Caption field, then insert a link of the required homepage and choose the minutes of refreshing or leave the field blank to avoid auto-refreshing the site. Then click Add to save the new link into your table.

Remove Removes an entire group

Flight Planning

General

Flight planning, at its most basic, consists of defining a route to be flown, de-termining fuel requirements; take-off, en route and landing performance.

Longer flights may require consideration of special factors which govern the safety of oceanic flights, extended operations (ETOPS) away from available di-version airports, and the methods of redispatch.

The main purpose of the flight planning process is to produce a flight plan for a proposed flight. Therefore it is of great importance to take into account two safety-critical elements for the flight planning process:

- Fuel calculation, to ensure that the airplane can securely reach its destina-tion, and
- Compliance with the requirements of Air Traffic Control, to minimise the risk of airborne collision.

Flight planning requires accurate weather forecasts so that fuel consumption calculations can account for the fuel consumption effects of head or tail winds and air temperature.

Safety regulations require aircraft to carry fuel beyond the minimum needed to fly from origin to destination, allowing for unforeseen circumstances or for diversion to another airport if the planned destination becomes unavailable. Furthermore, under the supervision of air traffic control, aircraft flying in controlled airspace must follow predetermined airways usually separated vertically by 1000 or 2000 feet, depending on the route being flown and the direction of travel.

The role of the flight dispatcher

A flight dispatcher is required to carry out flight planning for an operator, and may also be required to flight watch. Although ICAO has a recommended practice on flight dispatchers, there is no internationally accepted license for dispatchers.

In the United States of America, the FAA issues an Aircraft Dispatcher License. The FAA Aircraft Dispatcher License has no ICAO element equivalent to the recommended practice. The FAA license is required in the USA and else-where if dispatching for a FAR 121 operator.

In the European Community, there is no requirement in the EU OPS for a dispatcher to be licensed. Instead, it is left to the contracting states to decide the level of training for dispatchers. To date, no member state of the Euro-pean Community has introduced a dispatcher license.

The flight's dispatcher has to determine:

- The route that will be flown
- The fuel required
- The weather forecasts for the departure, destination, take-off alter-nate, en route alternate and destination alternate airports
- The NOTAMs that are applicable to each of the airports

Beyond these aspects, dispatchers attempt to keep costs low by considering the optimization of the flown route, the loaded fuel amount, the weight, al-titude and the planned speed during flight.

Regulations

The International Civil Aviation Organization (ICAO), a specialised agency of the United Nations, codifies the principles and techniques of international air navi-gation and fosters the planning and development of international air transport to ensure safe and orderly growth.
ICAO members are 189 of the United Nations members and the Cook Islands. The non-member states are Dominica, Liechtenstein, Niue, Tuvalu, Vatican City and the states with limited recognition.

The smooth operations of international aviation are made possible by the exis-tence of universally accepted standards to cover all technical and operational aspects of international civil aviation, such as safety, personnel licensing, opera-tion of aircraft, aerodromes, air traffic services, accident investigation and the environment.

Each country has a national (or civil) aviation authority (NAA/CAA), a government statutory authority that oversees the approval and regulation of civil aviation. Some major CAAs are:

- Australia – Civil Aviation Safety Authority (CASA)
- Canada – Transport Canada (TC)
- France – Direction Générale de l'Aviation Civile (DGAC)
- Germany – Luftfahrt-Bundesamt (LBA)
- Italy – Ente Nazionale per l'Aviazione Civile (ENAC)
- Peoples Republic of China – Civil Aviation Administration of China (CAAC)
- Russia – Federal Air Transport Agency (Росавиация)
- Singapore – Civil Aviation Authority of Singapore (CAAS)
- South Africa – South African Civil Aviation Authority (SACAA)
- United Kingdom – Civil Aviation Authority (United Kingdom) (CAA)
- United States of America – Federal Aviation Administration (FAA)

Which authority should you use for flight planning?

The regulations used for a flight are always those written by the CAA of the country which holds the carrier's certificate, regardless of where the flight is flown. As examples:

- an European-registered carrier operating a flight always flies it as a EU-OPS rules flight;

- a US-registered carrier operating a flight within the continental US airspace flies it as a FAR 121 Domestic flight;
- a US-registered carrier operating a flight outside the continental US airspace flies it as a US Flag Operations flight;
- a US-registered carrier operating a flight between Germany and Italy flies it as a US Flag Operations flight;
- a US-registered carrier operating a flight within Germany flies it as a US Flag Operations flight;
- an Australian-registered carrier operating a flight within Germany flies it as a CASA rules flight.

Fuel policies

Operators are required to carry sufficient fuel on flights to ensure that they are operated to the highest safety standards. There are, though, a number of differ-ent fuel policies in effect that are applicable to operators with various Operating Certificates.

The four main types of fuel policy are:

EU-OPS

EU-OPS which prescribe European Commission requirements applicable to the operation of any civil aeroplane for the purposes of commercial air transport by an operator, holding a current Air Operators Certificate, whose principal place of business and, if any, registered office is in a Member State. Member States are all of the member states of the European Union plus a number of other countries who have opted in. Scheduled and unscheduled flights are subject to the same rules under EU-OPS. Extended range opera-tions (ETOPS) may be applicable to EU-OPS flights.

Under EU Operations (OPS 1.255), a flight is required to carry fuel that will enable the aircraft:

- Safe flight from the departure airport to the planned destination air-port (trip fuel)
- Contingency fuel that is the higher of:

  EITHER

  • 5% of the planned trip fuel or, in the event of in-flight re-planning, 5% of the trip fuel for the remainder of the flight; or

  • Not less than 3% of the planned trip fuel or, in the event of in-flight replanning, 3% of the trip fuel for the remainder of the flight, provided that an en-route alternate is available; or

  • An amount of fuel sufficient for 20 minutes flying time based upon the planned trip fuel consumption provided that the operator has established a fuel consumption monitoring programme for individual aeroplanes and uses valid data determined by means of such programme for fuel calculation;

  OR an amount to fly for 5 minutes at holding speed at 1500 feet above the planned destination aerodrome in standard conditions
- Final reserve fuel for an additional period of 30 minutes
- Alternate fuel to reach the destination alternate airport, if a destination alternate airport is required
- Extra fuel that the commander may require.

FAR 121

FAR 121 Domestic operations which is used for scheduled flight operations between two United States airports.
Under FAR 121 Domestic (14 FAR 121.639), a flight is required to carry fuel that will enable the aircraft:

- Safe flight from the departure airport to the planned destination air-port (trip fuel)
- Thereafter, to fly to the most distant destination alternate airport (alternate fuel)

- Thereafter, to fly for 45 minutes at normal cruising fuel consumption (holding fuel).
  Extended range operations (ETOPS) are not applicable to flights under 14 CFR 121 Domestic rules because of their restriction to flights within the 48 coterminous United States.

US FLAG operations

US Flag operations which is used for scheduled international flight operations by an operator registered in the United States Under US Flag operations (14 FAR 121.645), a flight is required to carry fuel that will enable the aircraft:

- Safe flight from the departure airport to the planned destination air-port (burn-off fuel)
- Thereafter, to fly for a period of 10% of the total time required to fly from the departure airport to the airport to which it was released (IFR reserve)
- Thereafter, to fly to the most distant destination alternate airport specified in the flight release, if an alternate is required (alternate fuel). If no destination alternate airport is specified under 121.621(a)(2) or 121.623(b)), then a turbojet aircraft must have suffi-cient fuel to fly for at least 2 hours at normal cruising fuel consump-tion after reaching the planned destination airport; and a turboprop aircraft must have sufficient fuel to fly for at least 3 hours at normal cruising fuel consumption after reaching the planned destination air-port.
- Thereafter, to fly for 30 minutes at holding speed at 1500 feet above the destination alternate airport (or the planned destination airport if no destination alternate airport is equired) (holding fuel).

  Extended range operations (ETOPS) may be applicable to US Flag opera-tions.

Supplemental operations

Supplemental operations which is used for unscheduled flight operations, for example chartered flights, by an operator registered in the United States under Supplemental operations, fuel rules are the same as FAR 121 Domestic and US Flag operations. A Supplemental operation must have a destination alternate airport nominated, regardless of weather, except when dispatching under island reserves.

Pilots flying for a single airline can expect all of their flights to be operated under a single fuel policy.

Route Planning

The route to be flown by an aircraft has two basic dimensions – a lateral dimen-sion and a vertical dimension. The lateral route is usually specified as a set of geographic coordinates (latitude and longitude). The vertical route is specified as a set of altitudes to be flown between geographic coordinates. Flying the lateral route is called lateral navigation (LNAV), and flying the vertical route is called vertical navigation (VNAV).

Lateral navigation

The shortest distance between any two points on Earth (say, departure and destination airports) is a line describing a great circle. Although a commercial aircraft is required to fly along airways, the shortest distance to be flown will be usually along those airways which are closest to the great circle line.
Airways are designated routes in the air. Sometimes an airway is designated as uni-directional, meaning it can only be flown in that direction. Intersec-tions, where two or more airways meet, are places where a route may re-quire an aircraft to leave one airway to follow another.

Taking off from an airport, an aircraft will either follow a standard instrument departure (SID) - sometimes referred to as a departure procedure (DP) - or be vectored by air traffic control to join an airway.

The runway that is designated the active runway for take-off depends on the wind vector (direc-tion and speed) at the time of take-off, traffic flow considerations and noise limitations. A SID may therefore be part of a route specification.

When leaving an airway in order to land the aircraft may be required to fol-low a standard terminal arrival route (STAR) and/or be vectored to the land-ing runway.

Many oceanic crossings are not flown along pre-defined airways because of variable, strong winds. Across the North Atlantic Ocean, for example, jet streams can be so strong at the altitudes typically flown by commercial air-craft that flying with them or against them can make a great difference to the length of the flight and therefore fuel consumption. Oceanic tracks, for example, North Atlantic tracks, are declared daily to take advantage of strong tailwinds and to avoid strong headwinds.

Occasionally, there will be a need to specify user-defined waypoints and to route the flight via those waypoints. This can occur because of airspace clearances due to diplomatic activity, volcanic eruptions, and general safety issues.

Planning a lateral route between a departure airport and a destination air-port has therefore to include the airways and, maybe, tracks to be flown and optionally, the SIDs and STARs to be used.

Depending on airway restrictions, airspace structure and wind conditions, the shortest route may not always be the optimum route.

Vertical navigation

Taking off from an airport, an aircraft is required to fly at certain altitudes to ensure safe separation from other aircraft. This will be specified in a standard instrument departure (SID), if used, and may be overridden by air traffic control. Climbing to an initial cruising altitude (top of climb), the aircraft are separated vertically by being required to fly at certain cruise levels, de-pending on the direction of travel. E.g. in the US you should usually fly even flight levels using westbound airways, and odd flight levels using eastbound airways.

As an aircraft burns fuel it loses weight. So, as a flight proceeds, the altitude at which it can fly efficiently increases. Air traffic control will permit the air-craft to step climb to the most efficient altitude if traffic permits. Planning a vertical route between a departure airport and a destination airport there-fore depends on the decreasing weight of the aircraft.

Forecasts of the weather to be encountered during the phases of flight have to be taken into account in order to minimise fuel burn. The weather effects may only mean an adjustment in cruise altitude, or may require re-routing around storm cells.

Approaching the planned destination airport, the aircraft will normally commence its descent for landing at the top of descent (TOD). The altitudes flown during descent are specified in a standard terminal arrival route (STAR), if used, and may be overridden by air traffic control.

Alternate Airports

Regulations require that a flight plan has a Take-off Alternate airport to which the aircraft can fly if the departure airport is no longer available for a flight which has to land shortly after take-off.

The flight plan also has to nominate appropriate Adequate Airports in case there is a need to land during the en route phase of flight.

And lastly, the flight plan has to nominate Destination Alternate airports in case the planned destination airport is not available for landing.

Usually one Destination Alternate airport is required when planning a flight under Instrument Flight Rules (IFR). Some operations may be planned without Destination Alternate; during certain (weather) conditions even two Destination Alternates may be required. Special rules apply when operating to isolated destinations where no Destination Alternate is available.

For Extended Range (ETOPS) operation additional ETOPS Alternates may be required.

Cruise Speed

Speed control during flight is both a requirement of air traffic control in parts of a flight, and of airlines in controlling fuel burn rates.

Constant speed

In some segments of flights, aircraft are required to fly at specific speeds. Particularly over oceans and remote territories, where radar coverage is ab-sent, air traffic control may only be able to ensure sufficient aircraft separa-tion if all aircraft in the sector are flying at the same speeds.

This speed is usually defined as a constant mach number (representing the ratio of aircraft speed and the local speed of sound). Mach 0.78 would mean an aircraft is travelling with 78% of the local speed of sound.

Cost index

A flight incurs time-related direct operating costs as well as fuel costs. Crew wages, aircraft, engines and auxiliary power units may have direct hourly costs or fixed costs over a period little related to flying time. Fuel costs, on the other hand, are very much related to flying time.

As the ratio of the costs of these two elements change, the airline can use the cost index feature of the aircraft's flight management computer to sig-nificantly reduce operating costs.

An airline will normally treat the calculation of the value of the elements as a commercial secret. The outcome of their calculations can, though, be ex-pressed as a set of cost index values used for flight planning.

A flight planning system will use the value of the cost index to deter-mine economy climb (ECON), cruise and descent speeds.

Cost index usually ranges from 0 to 99 or 999. A low cost index is used when fuel is expensive compared to operating costs. The aircraft would fly slower, benefiting from a lower fuel burn. This would of course incre-ase flight time.

A high cost index is used when operating costs are more expensive than fuel or to avoid additional costs due to delay (e.g. passengers missing connecting flights). The aircraft would then fly faster to reduce flight time, but would normally burn more fuel.

A control interval of zero results in maximum range airspeed and minimum trip fuel burn. Conversely, a maximum value results in the minimum time speed and ignores the cost of fuel.

Redispatch Planning

Designed to conserve fuel, the intent of redispatch is to lower the contingency fuel on board at the planned destination airport, thereby minimising the release fuel loaded at the departure airport.

Fuel is a major cost element for all airlines, representing around ⅛ of total op-erational costs. A reduction of 1% in fuel usage per year can save from $US 15.000 to $US135.000 per aircraft.

Contingency fuel planning is a function of trip length or trip fuel burn. It was originally implemented to cover errors in navigation and weather forecasting. These techniques have improved, though, decreasing the chance that contin-gency fuel will actually be burnt.

Contingency fuel can be minimised by careful selection of a redispatch fix.

Redispatch fix

Redispatch works because a flight can be planned between the departure airport and a short release destination airport (nearer the departure airport than the planned destination) by inserting a redispatch fix along the route by which a decision is made whether to:

- continue to the short release destination airport or,
- if possible within the fuel rules, to continue the flight onwards to the planned destination airport.

To fly to a planned destination usually requires a re-release by the airline dispatcher.

If the short release destination airport is a point along the original route, be-fore or after the redispatch fix, nearer to the redispatch fix than the planned destination, then a decision to route back to the short release destination airport or continue on to the planned destination airport can be made be-fore reaching the redispatch fix. The decision can only be made based on whether the fuel remaining at the redispatch fix will ensure sufficient con-tingency fuel on board at the planned destination airport.

Contingency fuel

With increasing flying distance, and therefore time, contingency fuel (called international reserve fuel in the United States) requirements consistently in-crease. At a redispatch fix, an agreement with dispatch that the flight can be re-released to the planned destination airport effectively resets the contin-gency fuel requirement to zero at that point.

The distance, and therefore time remaining between the redispatch fix and the planned destination is much lower than the distance/time from the de-parture airport to the planned destination airport.

Each calculation requires contingency fuel over its entire distance, but each is less than the total that would be required for the entire flight to the planned destination.

The actual flight must carry the greater of the contingency fuels for the two scenarios. This results in a contingency fuel requirement at the redispatch fix lower than at the departure airport without redispatch.

The reduction in contingency fuel between the released flight plan and the redispatch flight plan can now be used to:

- reduce the release fuel, decreasing the take-off weight and landing weight (see the example of take-off weight decrease with constant payload), and/or
- increase the payload (see the example of payload increase with con-stant take-off weight).

Either can produce significant cost benefits for the airline in operating the flight.
It is critical to the calculation, therefore, to choose a redispatch fix that minimises the contingency fuel element of the fuel plan. The optimal flight plan places the redispatch fix in a location where the contingency fuels for the two scenarios are exactly equal; moving it in either direction increases the fuel required for one scenario or the other.

The flight plan filed with ATC only nominates the planned destination. The ATC of the flight information region containing the redispatch fix will normally be unaware that redispatching is occurring.

The operational flight plan has therefore to include the re-release route from the redispatch fix to the planned destination. Short release destination airports also require destination alternate routes to be planned.

ETOPS (Extended Range) Operations

Extended Range Operations (ETOPS) was originally an ICAO Standard and Rec-ommended Practice (SARP) and has been defined as "extended twin-engine operations".

It has been established to permit two-engine airplanes it to fly routes that, at some points, are further than a distance of 60 minutes flying time (I.e. Threshold time) from a diversion airport.

Current regulations have redefined the acronym ETOPS to mean "extended operations". It is applicable to:

- all two-engine airplanes more than 60 minutes flying time from an adequate airport at a one-engine-inoperative cruise speed under standard conditions in still air.
- all passenger-carrying airplanes with more than two engines and more than 180 minutes flying time from an adequate airport at a one-engine-inoperative cruise speed under standard conditions in still air.
- Cargo airplanes with more than two engines may be dispatched without ETOPS limitations.

The Evolution of ETOPS

Starting from 1985 two-engine airplanes were allowed to operate on routes up to 120 minutes from an adequate airport after demonstration of specific levels of in-service experience and systems reliability.

It also allowed for an increase of up to 15% to the maximum diversion time of 120 minutes (i.e. to 138 minutes).

In 1988 two-engine airplanes were permitted to operate up to 180 minutes from an adequate airport. The ‚up to 15%' provision was eliminated with the release of guidance providing for operations up to 180 minutes. Recognising a need for ETOPS diversion authority between 120 and 180 minutes a provi-sion of 138 minutes was reinstated.

In 2000 a similar ‚up to 15%' increase in the 180 minute (i.e. 207 minutes) maximum diversion time was provided and gave limited relief to ETOPS cer-tificate holders in the specific case of North Atlantic operations.

By 2008, it had become clear that there was a need to reflect all of the in-dustry improvements by expanding two-engine operation authority to all passenger-carrying airplanes. At the same time, technology was bringing two-engine airplanes to the arena of long-range operations. Political and funding priorities also forced the closure or reduction in basic services of a number of airports in remote areas that historically had been used as diversion airports for routes over oceanic and/or desolate land areas.

ETOPS approval is a two-step process:

1. The airframe and engine combination must satisfy the basic ETOPS re-quirements during its type certification. This is called ETOPS type approval. For example, if an aircraft type is rated as ETOPS-180, it should be able to fly with full load and one engine inoperative for three hours (Maximum Diversion Time).
2. An operator who conducts ETOPS flights must satisfy its own authority (CAA) of its ability to conduct ETOPS flights. This is called ETOPS operational certification.

The operator's Civil Aviation Authority (CAA) may approve ETOPS Maximum Diversion times for various areas of operation in accordance with the re-quirements and limitations:

ETOPS type approval ratings have been awarded as ETOPS-90 (90 minutes maximum diversion time), ETOPS-120, ETOPS-138, ETOPS-180 and ETOPS-207.

ETOPS operational certification has been awarded to operators as:

- ETOPS-120 to cover twin-engine operations across the Atlantic Ocean
- ETOPS-138 to cover northern routes when an airfield is closed due to adverse weather
- ETOPS-180 to cover operations across the Pacific Ocean
- ETOPS-207 for Boeing 777 operations across the North Pacific.

Several commercial airline routes are still unavailable to two engine aircraft because of ETOPS regulations. They are routes traversing the South Pacific, southern Indian Ocean (such as Perth, Australia to Johannesburg, South Af-rica) and Antarctica (such as Auckland, New Zealand to Buenos Aires, Argentina).

Unsatisfactory airline ETOPS operations can lead to a downgrade of capabilities or even suspension of ETOPS operational certification by the CAA.

When is ETOPS required?

As mentioned above, an aircraft must stay within 60 minutes (two engines) or 180 minutes (more than two engines) of flying time (Threshold Time) from an Adequate Airport.

An adequate airport is an airport that meets landing limitations for a specific airplane type. Weather conditions are irrelevant for an airport to be used as adequate airport.

If a portion of a flight is planned beyond the Threshold Time limit (outside green circle on the map) additional ETOPS alternates must be designated.

Designating an ETOPS alternate airport

Operators of airplanes with two or more engines are required to designate the nearest available ETOPS alternate airport along the planned route of flight and must remain within a 240 minute diversion time, if possible.

Those areas not supported within 180 minute diversion authority tend to be routes over remote areas of the world that are uniquely challenging to the operation. These areas include:

- the South Polar region
- a small section in the South Pacific
- the southern South Atlantic Ocean between South America and Africa
- the southern Indian Ocean
- the North Polar region under certain winter weather conditions.

The additional operational challenges of these routes are equally demanding of all airplanes, regardless of the number of engines, and include such issues as extremes in terrain and meteorology, as well as limited navigation and communications infrastructure. Support of a necessary diversion and subse-quent recovery in such areas demands added training, expertise and dedica-tion from all certificate holders.

Because of the natural variability of weather conditions with time, as well as the need to determine the suitability of a particular en route alternate be-fore departure, such requirements are higher than the weather minimums required to initiate an instrument approach. This is necessary prior to the time that the instrument approach would be conducted, to provide for some deterioration in weather conditions after planning. This increases the prob-ability that the flight will land safely after a diversion to an alternate airport.

ETOPS Alternates are usually defined as pairs. The flying times to each route-sequential pair of ETOPS alternate airports are greatest when at the equal time point (ETP) between them. Equal time points are usually calculated for each of:

- all engines operative, cabin depressurisation
- one engine inoperative, no cabin depressurisation
- one engine inoperative, cabin depressurisation.

The ETP is therefore the point from which each flying time is measured. The flight time between pairs of ETOPS alternate airports is unimportant, so long as distance to reach from the ETP is not greater than that allowed by the ETOPS type approval, the ETOPS operational certification, and of the fuel be-ing carried.

PFPX also allows calculating an 'unbalanced' ETOPS solution using a single airport. Instead of an Equal Time Point (ETP) a Critical Point (CRP) is calculated. The CRP is the point requiring the highest diversion fuel.

Depending on the ETOPS scenario and the planned route either an ETOPS solution with ETPs or CRPs may be more favourable.

Acknowledgements and Thanks

We would like to acknowledge the help, advice and support of our beta testing group involved in the systems testing, without their hard work and co-operation our efforts to develop PFPX would not have borne fruit. Special thanks to:

Richard McDonald Woods for the development of this manual
Judith Blaschegg for adapting this manual
Douglas Snow, Gary McGinnis and Carsten Raum for his technical advice and support

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