FlightPal

Manual

Version 2.0

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www.FlightPal.de

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SYSTEM REQUIREMENTS

FlightPal was developed to support pilots in planning and navigating flights with motor aircrafts and gliders. The following system requirements must be met:

> PalmPilot III or newer (IIIc, IIIx, V, Vx, ...) or compatible (IBM Workpad, Sony Clié, Handspring Visor)
>
> Palm OS 3.1 or higher
>
> 300 kB free memory for program, additional memory depending on the size of the installed databases

To find out whether your Palm meets these requirements just install and launch the program. If the OS version does not meet the requirements an appropriate error message will be displayed. If you see the startup screen of the program, FlightPal will run on your system.

FlightPal can be used without extensive study of lengthy manuals. However, because of it's complexity, the following pages may reveal some less obvious options and a variety of helpful tools that are not easily recognized during a brief inspection.

For legal reasons and your own safety we must emphasize our legal disclaimer. The authors of this program are not liable for any consequential damages whatsoever. If you do not agree to this you are not entitled to use FlightPal.

USER INTERFACE

The user interface was specifically developed to meet the desires of flying even under turbulent conditions. It is a bit different from common user interfaces and needs some comments.

All functions and numeric values must be selected or entered via large buttons on the touch screen. You can use the Palm-Stylo or your finger which is less likely to get lost in the plane. You can also enter the numeric values using the Graffiti® area.

The different functions are implemented in forms. You can select these via large menu buttons. We will demonstrate the operation of such forms using the Time/Descent form. All other forms follow the same principle. The form calculates climb or descent flights. The input parameters are entered from top to

bottom – the results are shown immediately after each input. E.g. you want to descend from 10.000 ft down to 2.000 ft. Your ground speed is 100 KTS and you like to follow the 3° IFR glide slope.

Entering numerical values

To enter a value, just tip on the number in the form and a numeric key pad is displayed. On the top line you can see which value and which unit (e.g. current alt in ft) are expected. When you type a number, the allowed range is checked. If a value is outside this range it will not be accepted and a warning sound occurs (you probably won't hear this in a motor plane). If you prefer you may also enter the numbers in the Graffiti® area. With 'Ret', the input is transferred to the form, with 'Back', their value in the form remains unchanged.
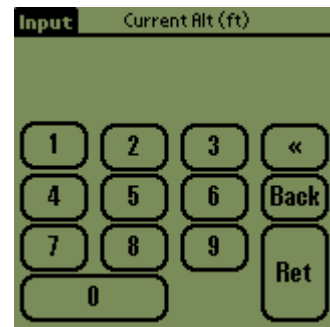
Changing units

Most values are bound to physical units. E.g. altitude in feet, flight level, or meters; speed in knots, miles per hour, or kilometers per hour. Units are displayed behind the numeric values on each form. To change a unit, just tip on it and it will change to the next supported unit. The numeric value is converted automatically to the new unit. To try, tip on 'ft' behind the current alt on the Time/Descent form and it will switch to FL and the value is converted in FL (10.000 ft = 100 FL, not too difficult to calculate). Repeat it and the altitude will be displayed in meters (more difficult to calculate in your head). Tipping a third time will return to a display in feet. This works for all units on the form: speeds, distances, descent rates, and glide slopes (the latter can be expressed in ft/NM and ° which might make IFR pilots happy).

Using timers

Some forms have implemented timer functions. The Time/Descent form can be used for timed descent. The timer starts by pressing the "down" button. A small lock displayed in the top right corner indicates that values cannot be changed when the timer is running. The timer can be reset with the clear button. You can switch to other forms or programs during the countdown – it will continue to run in the background, even if you switch off your Palm.

Reverse calculation

Values normally considered as input parameters are located at the top of the form, while results are displayed in the lower part of the screen. However, if you modify the 'results' in the forms FlightPal calculates backwards and thus changes the 'input' parameters. The forms work more or less in all directions. With this feature, a variety of calculations can be performed within the same form. Two examples in the Time/Descent form will illustrate this:

1. Engine failure in 10.000 ft. Next airfield at 1.000 ft altitude. After an engine restart was unsuccessful, you have configured the plane for 'best gliding' heading towards the next airfield. Now you have the time to calculate whether you will be able to reach this airfield. Enter your current altitude, the traffic pattern altitude (e.g. 2000 ft), and your ground speed (from your GPS system, which you hopefully have with you) as usual into the input area. After that, enter the descent rate form the vario in the 'result area' (e.g. 450 ft/min. FlightPal calculates the glide slope (3.4°) and the distance over ground (22.2 NM) until you reach the traffic pattern altitude of 2000 ft. If your distance to the airfield (shown on the same GPS system) is smaller than 22.2 NM you can reach the airfield – otherwise you should now watch out for some other place to land as you will be down in no more than 17 minutes. If you can reach the airfield, start the descent timer and you can monitor the altitude and distance. Cross check this with the indicated altitude and distance from GPS to monitor if the descent proceeds as planned.

2. Descent with a given distance: For example you are on 10.000 ft, your destination airfield is in 15 NM with a traffic pattern altitude (TPA) of 2.000 ft. You are a professional and would like to perform the whole descent with a constant descent rate reaching the TPA just at the airfield. Please enter your current altitude and TPA, as well as your ground speed during the descent (e.g. 120 KTS if your cruise speed was 100 KTS and you would like to convert altitude to speed to save money). If you enter the distance of 15 NM you will get a glide slope of 5° with a descent rate of 1066 ft/min. You should configure your aircraft by power setting and angle of attack to these values and start the timer. After 7 minutes you will reach the TPA right above the airfield. You should monitor your descent with the timer values.

These examples demonstrate the power of the reverse calculation capability of FlightPal. Although not featuring dozens of menu entries, there are not many questions left unanswered using the given forms.

Assigning forms to hard buttons

The four hardware buttons below the Graffiti® area can be assigned to any form of FlightPal. To assign a form to a hardware button, simply select the appropriate form and press the hardware button for about 3 seconds. FlightPal will prompt the successful assignment with the message "Key assigned!". From now on, every time you press this button, FlightPal will immediately jump to the assigned form.

A few forms depend on the context (e.g. selection of a location from the database). This context cannot be stored, thus the try to assign such a form will result in the message "Assignment not allowed!".

OVERVIEW OF FUNCTIONS

A complete documentation of all functions does not seem fit as most forms are hopefully self-explanatory. FlightPal offers all the essential functions of an E6B navigation computer and much more. FlightPal covers altitude, speed, and wind problems and offers an easy way to switch between US, imperial and metric units. Explicit conversions are possible with the conversion forms.

The Timer-Section offers you a variety of different timers, including an IFR holding pattern calculator with graphical output.

'GeoFunc' offers a calculator for sun- and moonrise and set in combination with a location database. This is very helpful to estimate the opening hours of airfields without permission for night operation and to check the illumination by the moon during night VFR flights. Additionally, you can calculate distance and heading between two locations. For details on this see "DISTANCE AND HEADING".

The Weight & Balance section includes a database to individually enter all your aircrafts. You can perform Weight & Balance (W&B) calculations with graphical and tabular output in a few seconds. This part of the program is more complex and will be illustrated in the following section.

WEIGHT AND BALANCE

An example will demonstrate the functions of the W&B form. We will use a C172 with the call sign D-EGTH (presuming we fly in Germany). First, you may want to enter this aircraft into the database. We will fly from Bonn (the former capital of Germany) to Texel (a nice dutch island) with four persons and some baggage. If you are familiar with the C172, you will know, that this is not possible with full tanks without being overloaded. A W&B calculation is strongly recommended.

Adding an aircraft to the database

Open the "W&B/Manage Aircrafts" form. A list of all aircrafts in your database will be displayed. Select an aircraft that is closest in comparison to the one you would like to add to the database. In the example, this would be the 'C172/Prototype'. Press the "Copy"-button and a copy of this entry is generated and selected. Pressing the Edit-button will show the first database form. First, you should enter the call sign next to 'Reg.-No.'.

Empty weight and arm

Obtain the empty weight and arm from the Pilot Operating Handbook (POH) of the D-EGTH. It is of utmost importance that you refer exactly to the POH of the D-EGTH and not to any training POH as the empty mass depends strongly on the specific equipment of the aircraft. Before you enter the values, select the appropriate units (cm or inch, kg or lbs respectively). In our example, the empty mass is 678 kg, the empty arm 99.6 cm.
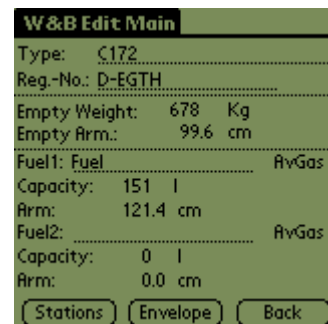
Conversion moment/arm

FlightPal completely operates in the arm/weight plane and not in the moment/weight plane. In most POH, both concepts are found. If you find only moments with corresponding weights, you will have to convert them by yourself (use the implemented pocket calculator of your Palm) The formula is:

$$Arm = Moment / Weight.$$

Be aware, that some POHs use moment/1000 as unit. In this case the formula is:

$$Arm = Moment * 1000 / Weight.$$

As the D-EGTH was based on the C172 prototype, you would now have finished updating your database having entered only two numbers. To make sure all is set up correctly, you should check all other figures. For education, we proceed as if we need to enter every single value.

Fuel system

Next, lets enter the capacity of the fuel system. FlightPal supports a maximum of two fuel systems. The C172 has two tanks (one in each wing) but they are at the same center of gravity (CG) and, therefore, count as one. You only need the second fuel system if you use special long range tanks e.g. for
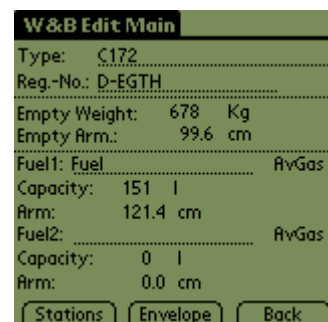
ferry flights from Europe to the US. Please enter only one system and name it 'Fuel' (enter 'Fuel' behind 'Fuel1:').

Next, choose the type of fuel (AVGAS in the example) and enter the capacity of the system. Make sure you select the right unit before entering the number. FlightPal supports liters, US-gallons, imperial gallons, kilograms and pounds. In the example, the capacity is 151 liters. After entering the arm (121.5 cm), we have finished configuring the fuel system.

Defining stations

Select the 'Stations'-button to enter different loading stations. The C172 has only two stations for passengers. For convenience, lets enter two stations for each seat row – resulting in an individual station for each seat. As an option, one station for each seat row would be sufficient. After naming each station, enter the arms from the POH and be careful to select the correct unit before entering the values.

Defining the envelope

The envelope is an area in the CG/weight plane which indicates the allowed loading range. Tip the 'Envelope'-button for the appropriate input form to be displayed. Find the envelope page in the POH and enter all edges clock wise or counter clock wise. The first point and the last point should not be the same. If the POH does not include a diagram in the CG/weight plane but a diagram in the moment/weight plane, you need to convert the moments to arms according to the formula above.

After entering the envelope data, your aircraft-dataset is complete. Although it might seem tedious work to enter an aircraft, in most cases, you only need to copy an existing aircraft from the database and modify a few numbers.

W&B-calculation

Having just entered the D-EGTH you may want to perform your first W&B calculation. Select the D-EGTH in the 'W&B/Manage Aircrafts'-form and press the 'Select'-button. Enter all necessary values in only one form. For example, pilot and copilot are 80 kg each. The passengers (our wives) claim to weigh 65 kg and 60 kg. Your baggage adds up to only 5 kg being in the first baggage compartment. Already upon entering
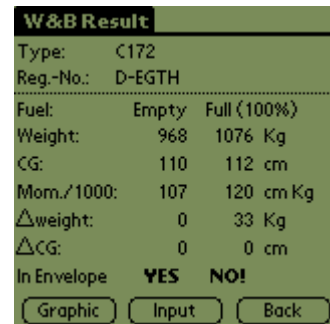
the 60 kg of the second passenger, a warning sign at the top right indicates that you are outside the envelope. When you press the 'Result'-Button, you will get the reason:

Results in tabular and graphical form

On the 'Result'-Page the W&B-calculation is performed for empty tanks and for loaded tanks as defined in the input form. You can now see that the aircraft is 33 kg too heavy. The planned cruise time from Bonn to Texel is 1:40 and, including some extra fuel, 100 liters would be enough.

Go back to the 'Input'-form and enter 100 liter at the fuel station. The warning sign to the top right is replaced by a tick showing that you are within the envelope. Select the 'Graphic'-page and you see two points connected with a line indicating the loading at full and empty tanks. Both are within the envelope.
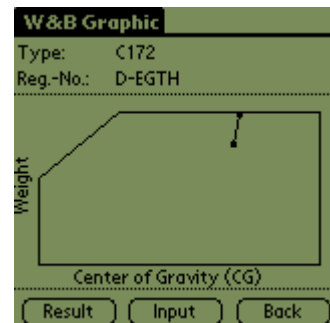
The above example shows that the W&B calculation takes only seconds to perform. You only need to enter the aircraft into the database once. After that W&B calculation can be performed easily before each flight. As a matter of fact, it is strongly suggested to be performed before each flight as most small planes are very easily overloaded.

Exchanging aircraft data

The addition of an aircraft to the database was described at the beginning of this chapter. However, FlightPal also supports the import and the export of aircraft data. Before you start to manually add your own aircraft data to FlightPal, you should take a look at the download area at www.FlightPal.de to check if your model or a comparable one was already posted by another FlightPal user. In this case, you can simply install this aircraft on your Palm as described in the following section.

On the other side, FlightPal users would certainly appreciate if you share your aircraft data with them. The procedure is described in the section 'Exporting aircraft data'.

Importing aircraft data

In the download area of www.FlightPal.de you will find W&B data for individual aircrafts. This data was supplied mainly by other FlightPal users and is not part of the software package. However, assuming all risk associated with using this data, you may download the files free of charge.

If you find the desired aircraft data, simply download the files (AC_*Typ*.pdb) and install them via HotSync on your Palm. After that, please start FlightPal and select the menu (tip the menu-item in the lower left corner of the Graffiti®-area). Choose 'Import Aircrafts' and FlightPal will report the number of aircrafts added to the database. If an aircraft with the same name already exists, FlightPal will ask you whether to overwrite or append the new aircraft to the database.

You will find the new aircrafts under 'W&B/Manage Aircrafts'. You should cross check the data with your POH and with the weight-report of your aircraft.

Exporting aircraft data

If you entered aircraft data which are not already available in our download area, we would appreciate if you would send us the data. To do this, you need to export them first. This might also be interesting for you, if you want to backup individual aircrafts on your PC or share them directly with other users, e.g. in your flying club. Aircraft data are exported with the following procedure:

1. Start FlightPal on your Palm
2. Choose „W&B/Manage Aircrafts"
3. Select the aircraft to be exported
4. Select the menu (tip the menu-item in the lower left corner of the Graffiti®-area).
5. Select 'Export Aircraft'
6. FlightPal will prompt the successful export of the data. If an export file with the same name already exists, FlightPal will ask to overwrite the existing file.
7. If you want to export further aircrafts, please repeat the steps 3 to 6.
8. HotSync your Palm

After the HotSync, you will find the aircraft data files (AC_*Type*.pdb) in the backup directory of the HotSync-Software on you hard disk. If you don't know the path of this subdirectory, it is a good idea to search for files named AC_*.pdb with the explorer. There is an individual file for each aircraft on your harddisk.

If you want to share the data with other users, please email these files together with a short description of the aircrafts (manufacturer, type, call sign, typical cruise speed, power, number of seats, comments) to Info@FlightPal.de. We will add the data to the download area at www.FlightPal.de.

GEOGRAPHIC CALCULATIONS

Sunrise and sunset are essential parameters for planning VFR-flights during daytime. For night VFR flights, not only moonrise and moonset, but also the illumination resulting from the moon phase is important. FlightPal calculates these values for any location on the surface at any date. These locations are stored in a database and, once entered, they remain available for future use. Additionally, you can calculate distance and heading between every couple of locations in the database, and, upon entering a ground speed, the duration of the flight is estimated.

Waypoint databases

For the geographic functions, you can store you own waypoints in a database. Waypoint databases are not part of the software package. However, you can download waypoint databases from our internet site (www.FlightPal.de) free of charge. You assume total risk of using these databases.

At the time we released version 1.9 two extensive waypoint databases, sorted by ICAO-codes were posted in the download area:

- American Waypoints   Over 6500 airfields in USA, Canada, Bahamas
- European Waypoints   Over 2500 airfields in Europe

After installing FlightPal, you should install *one* of these databases according to your requirements. You can add own locations at any time. However, if you decide to install any other of these databases at a later time, your own locations will be lost.

Due to the large number of entries in the databases, HotSync may take much longer than 10 minutes.

Sunrise and sunset

After selecting a waypoint from the database by tipping in the upper area of the Sunrise/set form and selecting the date, FlightPal calculates the time for sunrise and sunset in UTC and local time. The local time is based on the time zone of the waypoint stored in the database. For daylight saving time, the checkbox needs to be ticked. The times can be calculated according to four different definitions: official, civil, nautical and astronomical. For aviation purposes, usually the 'official' times apply. For the selected date, the UTC-Times are the correct ones. Depending on the time zone, the local times may shift by one day.

Moonrise and moonset

Moonrise and moonset are calculated analogous, however, there is only an ‚official' moonrise/set defined: the moon sets, when the upper limb disappears below the horizon. Additionally, the illumination of the moon and its tendency is shown. 100% illumination means full moon, inc. stands for increasing, dec. for decreasing illumination.

Distance and heading

With the distance/heading-function, you can calculate the great circle distance (shortest connection of two points on a sphere) between any two points in the waypoint database. Additionally, you get the initial true course and, by entering a ground speed, a first estimate for the duration of the flight.

Excel tool for database production

To produce the waypoint databases, we used an Excel 2000 tool. We offer this tool to our users to generate own databases, however, we do not supply any support for it. You can enter waypoints with coordinates and time zones in the table and assign these waypoints to up to four different databases. By pressing the control button above for the respective database, the pdb-file is generated. The name of the file including the path can be modified below the control buttons. The tool is available for download in the same area as the waypoint databases (www.FlightPal.de).

GPS

GPS has become a widely used tool in VFR aviation. Therefore from version 2.0 on FlightPal also supports GPS aided navigation. We would like to emphasize that FlightPal should only be used to support the pilot during navigation. It must not be used as a primary navigational instrument!

Hardware requirements

With an additional GPS receiver, FlightPal can be used for navigation during the flight. The waypoints are taken from the installed waypoint database already used for geographic caclulations. To utilize GPS navigation, an additional GPS receiver is necessary. The receiver must be connectable to the serial port (4800 baud) of your Palm and support the NMEA standard. Specially developed GPS Companions from Magellan are very handy. They will fit your Palm perfectly. Unfortunately these devices are not available for all brands of organizers or are partially sold out for older types. In the latter case you may be able to find suitable offers at www.ebay.com.

As an alternative we suggest the cheaper GPS mice offered by several vendors. Usually a suitable serial adapter is included in the offer. The power supply is normally an additional adapter for the cigarette lighter jack of your car. Unless you have not a specifically designed adapter, be careful not to connect this to the 24V net of an aircraft. Otherwise, the 12V voltage difference may damage the adapter (and your Palm!).

During the developement of FlightPals GPS functionality, we tried receivers from Garmin, Magellan, and several GPS mice. All these devices supported a minimal NMEA standard and caused no problems while running with FlightPal. However, due to the variety of different types on the market, we cannot guarantee this for every device claiming to be NMEA compatible..

Functions

FlightPals GPS functionality is still in developement. The navigation will always be based on the installed waypoint database already used for the geo functions. In the current version, your own position can be determined, and by using a preselected waypoint, a comfortable navigation similar to a VOR/DME receiver is possible. However, in contrast to real VOR navigation, it is your choice where to place the VOR/DME station and even for large distances and low altitudes the display will be correct. Future versions will support more waypoints and route planning. The current version supports the following functions:

1. **Data display:** The GPS data is displayed continuously. This form is used mainly to verify the correct operation of the receiver.
2. **HSI/VOR:** Simulation of a navigational instrument using a single waypoint and a heading. This is similar to the navigation with a VOR/DME receiver. A graphical HSI (horizontal situation indicator) was chosen as display.
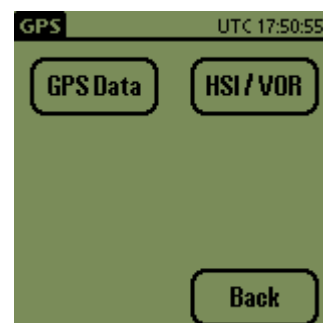
The following section explains the individual functions:

Data display

The data display is mainly used for testing the connected GPS receiver. The status line in the lower part of the screen always displays the current state of the receiver. If no GPS receiver is connected and/or no data can be received, the message 'No GPS data received' will be shown. After receiving some NMEA data sentences, this display switches to 'GPS found, invalid fix' to indicate that the receiver is working but has not been able to determine your position. After accumulating enough data and successfully calculating the position, the display will show 'Valid GPS fix'. This may take several minutes, depending on the type of receiver and initialisation method. Please consult the documentation of the GPS receiver for details.
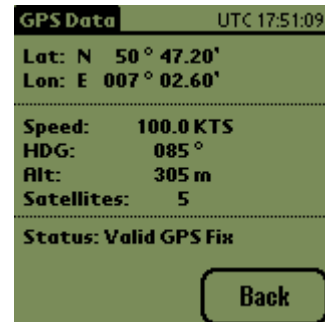
If there is a valid fix, the upper part of the screen will show the position as well as speed, heading, and altitude. 'Satellites' indicates the number of satellites received. To determine the horizontal position, at least 3 satellites are necessary. One more is needed to calculate the altitude. All values gain accuracy with an increasing number of satellites. However the altitude is always much less accurate than the horizontal position. Therefore GPS altitudes must not be used for navigation.

GPS/HSI form for VOR navigation

The form HSI/VOR is used for navigation using a single location and a direction originating from this location (radial). The next figure shows the setup of the form. Its individual elements are explained in the next section:
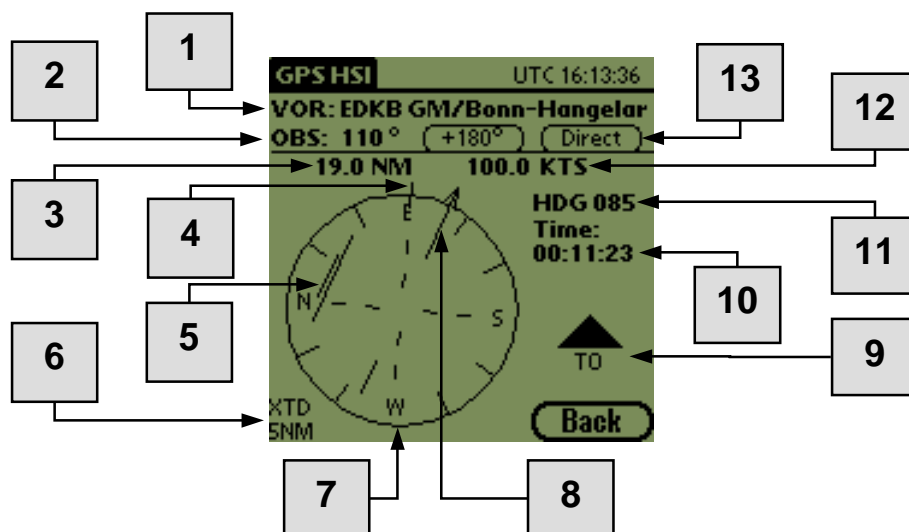
1. The VOR (the name of the selected waypoint from the database) is displayed here. By tapping on this line, another waypoint can be selected or defined.
2. Direction of the selected VOR (radial). The '+180°' button 'rotates' this value by 180°. This also changes the display ('from' => 'to') and resembles a 180° turn of the OBS knob of VOR receivers. By tapping the 'direct' button, the radial will be adjusted to the one the aircraft is currently on, according to the GPS data. This is equivalent to centering the deviation needle of a VOR receiver by turning the OBS knob. The radial is calculated in such a way that the direction flag (9) shows 'to'.
3. Distance to VOR. This roughly corresponds to the display of the DME. While the Palm always shows the distance above ground, the DME shows diagonal distances. This may cause a difference in the displayed distance. By tapping the field, the unit can be adjusted..
4. Independent of the radial selected, the small single mark outside the compass rose points directly towards the VOR. This indicates the direction to the chosen reference point.
5. The course deviation indicator (CDI) shows the position of the selected radial in relation to the current position of the aircraft. The distance between the needle and the center resembles the deviation. The full scale value for this is shown in the lower left corner (6). By tapping the value, it is switched back and forth between 2 NM and 5 NM. In the screenshot the deviation is larger than 5 NM, shown by a short line next to the CDI. This line always appears when the course deviation indicator reaches its limit.
6. XTD (cross track distance) indicates the full scale value of the CDI. By tapping it, the value changes between 2 NM and 5 NM. Also refer to (5).
7. The compass rose rotates according to the flight direction of the aircraft. The Heading is also shown numerically at (11).
8. The OBS needle displays the selected radial (2) in graphical form.
9. The 'from/to' flag shows, whether the selected direction (OBS, 2), starting at the current position of the aircraft, points away from the VOR or towards it. Also refer to (2).
10. The time field indicates the estimated time of flight on a straight line between the current position and the VOR at the current speed.
11. Numerical display of the heading; also refer to (7).
12. Speed above ground
13. Refer to (2)

With the data displayed, navigation is just as comfortable as with a VOR/DME receiver. To your benefit, there will be no reception problems at large distances or low flying altitudes.

ABBREVIATIONS

FlightPal uses the following , in aviation common abbreviations:

Δ	Difference
Δ TStd	Difference to standard temperature
Alt	Altitude
Alt. Set.	Altimeter setting
Appr.	Approach
CAS	Calibrated Air Speed
CG	Center of Gravity
CLR	CleaR
Dens. Alt.	Density Altitude
Dist	Distance
FL	Flight Level
ft	Feet
GC	Ground Course
GPS	Global Positioning System
GS	Ground Speed
HDG	HeaDinG
hr	Hour
HW	Head Wind
Imp Gal	Imperial Gallons
Inb.	Inbound
Ind. Alt	Indicated Altitude
IOAT	Indicated Outside Ambient Temperature
km	Kilometers
KPH	Kilometers Per Hour
KTS	KnoTS
L	Left
LCT	LoCal Time
LOC	LOCal time
m	Meter
min	Minute
MPH	Miles Per Hour
NM	Nautical Mile
OAT	Outside Ambient Temperature
Outb.	Outbound
POH	Pilot Operating Handbook
Press. Alt	Pressure Altitude
R	Right

Rfac	Recovery factor
sec	Second
SM	Statue Mile
Stat.Alt	Station Altitude
Std	Standard
STP	StoPp
TAS	True Air Speed
TC	True Course
True Alt	True Altitude
TW	Tail Wind
US Gal	US Gallons
UTC	Universal Time Coordinated
WCA	Wind Correction Angle

REGISTRATION

This program is not freeware and registration is required to use it. However, without registration the program can be launched in demo mode. In demo mode you can flip through the entire program and check the content of all forms. You can change the units (e.g. ft, FL, m) and enter numbers - however, two buttons are blocked in the numeric key pad. You will soon find out that most forms do not only calculate from top to bottom but also in reverse order: you can enter the result and FlightPal will calculate the required input parameters.

The registration is valid for your Palm-Pilot. For the registration we need the device ID shown in the startup form (XXXX-XXXX-XXXX-X). As payment we accecpt credit card via PayPal, bank transfer and cash via mail. For details, please refer to our internet site at

www.FlightPal.de

or contact us by email:

Info@FlightPal.de

After purchasing, we will send you the RegCode. Please enter this code in the registration page shown above and press the 'Register'-button. This registration remains valid independent of all future software updates. However, please keep the RegCode stored in a

safe place. It might be necessary to reenter it e.g. after a hard reset after a long low battery period.

The price of FlightPal is equivalent to a few minutes flying time only. You will probably save these when you perform your first descent with the Time/Descent-Timer from a high altitude reaching the traffic pattern altitude exactly where you wanted.

LEGAL DISCLAIMER

The software and any documentation are delivered "as is," and are not guaranteed to be free from errors or defects. Users must expect each single result from FlightPal to be wrong and the pilot remains solely responsible in all situations. Users assume total responsibility and risk associated with using this software.

It is our goal to supply error free software. In case you find any error in the application, please contact us by email. This enables us to correct FlightPal in the next update.

This product was developed using DAFIF, a product of the National Imagery and Mapping Agency. FlightPal, however, has not been endorsed or otherwise approved by the National Imagery and Mapping Agency, or the United States Department of Defense (10 U.S.C. 425)

Under 10 U.S.C. 456, no civil action may be brought against the United States on the basis of the content of a navigational aid prepared or disseminated by either the former Defense Mapping Agency (DMA) or the National Imagery and Mapping Agency (NIMA).

The authors are not liable for any consequential damages whatsoever (including without limitation, special, incidental, consequential or indirect damages for personal injury, loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use of or inability to use this product, even if the authors have been advised of the possibility of such damages. In any case, the authors´ entire liability under any provision of this agreement shall be limited to the amount actually paid by you for the software. Because some jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you.

Many happy landings,

Your FlightPal Team

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