

Panel Builder 3



**EFIS GPS
&
EFIS GPS Wide**

User Manual

BajuSoftware, LLC
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Introduction

The EFIS GPS for Panel Builder 3 provides an advanced GPS unit to match other EFIS Instruments in the Panel Builder 3 range. It has the following features:

- 26 Function Keys
- Touchscreen optimized
- Configurable features
- Configurable colors
- Configurable symbols
- Fully resizable
- Range Function
- Tuning of NAV Radios from GPS
- User configurable add-on feature layers
- World-wide Navigation Database
- Moving Map with 'North Up' or 'Track Up' Display
- Online maps (OpenStreetMaps) - North Up only
- Compass Rose with Heading/Groundspeed/True Airspeed display
- Autopilot link for Direct To and Active Flight Plan routes
- TCAS (Traffic) display (simplified - configurable)
- Nearest Airport/NDB/VOR/Waypoint
- Direct to Airport/NDB/VOR/Waypoint
- Airport Information
- Flight Planning with flight plan database - No Sids or Stars
- GPS database updateable via Navigraph subscription

The function keys can be assigned to the GPS unit using the *Map Buttons* function in Panel Builder 3 to use any game controller compatible hardware buttons.

Note: This Manual also applies to the EFIS GPS Wide version.

Exceptions:

- Only 3 sides on frame for the buttons - some buttons have moved to a different location.
- Functionality is the same as the EFIS GPS tall version.
- Space on left side for the placement of EFIS Instruments.
- Multi page capability of left side just like other EFIS Frames.

Technical Requirements

Hardware		
	Processor	Any Dual Core Processor or greater
	Memory	4GB (32 Bit), 8GB (64 Bit)
	Disk Space	1 GB (approx.)
Operating Software		
	Windows 7	32 or 64 Bit
	Windows 8	32 or 64 Bit
	Windows 10	32 or 64 Bit
Flight Simulator		
	MS Flight Simulator	2020 or greater
	Lockheed Martin Prepar3D	V5.X
	X-Plane 11	Any version
	Panel Builder 3	3.0.0 or greater

Installation Procedure

Step 1

Locate the Installation Package on your computer. If you have downloaded the package, check in your Downloads Folder.

Double click on the installation package, **GPSEFIS.exe**

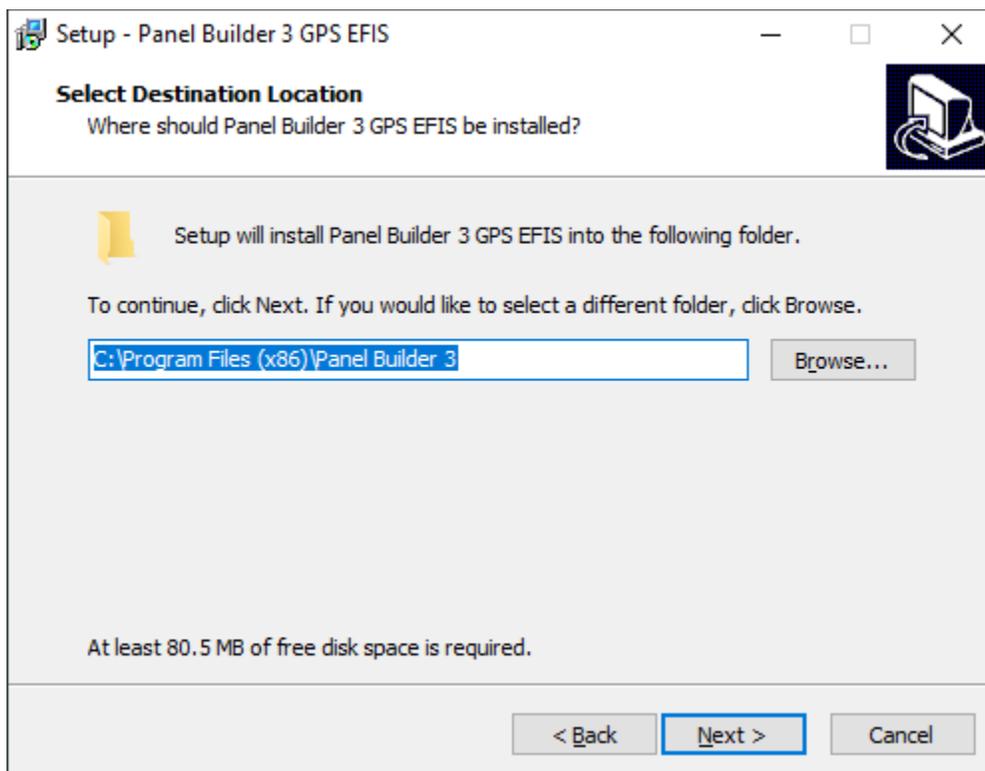
Step 2

When prompted for the Destination Location, browse to the installation folder of Panel Builder 3.

Or accept the default location

C:\Program Files (x86)\Panel Builder 3

By clicking on [Next >]

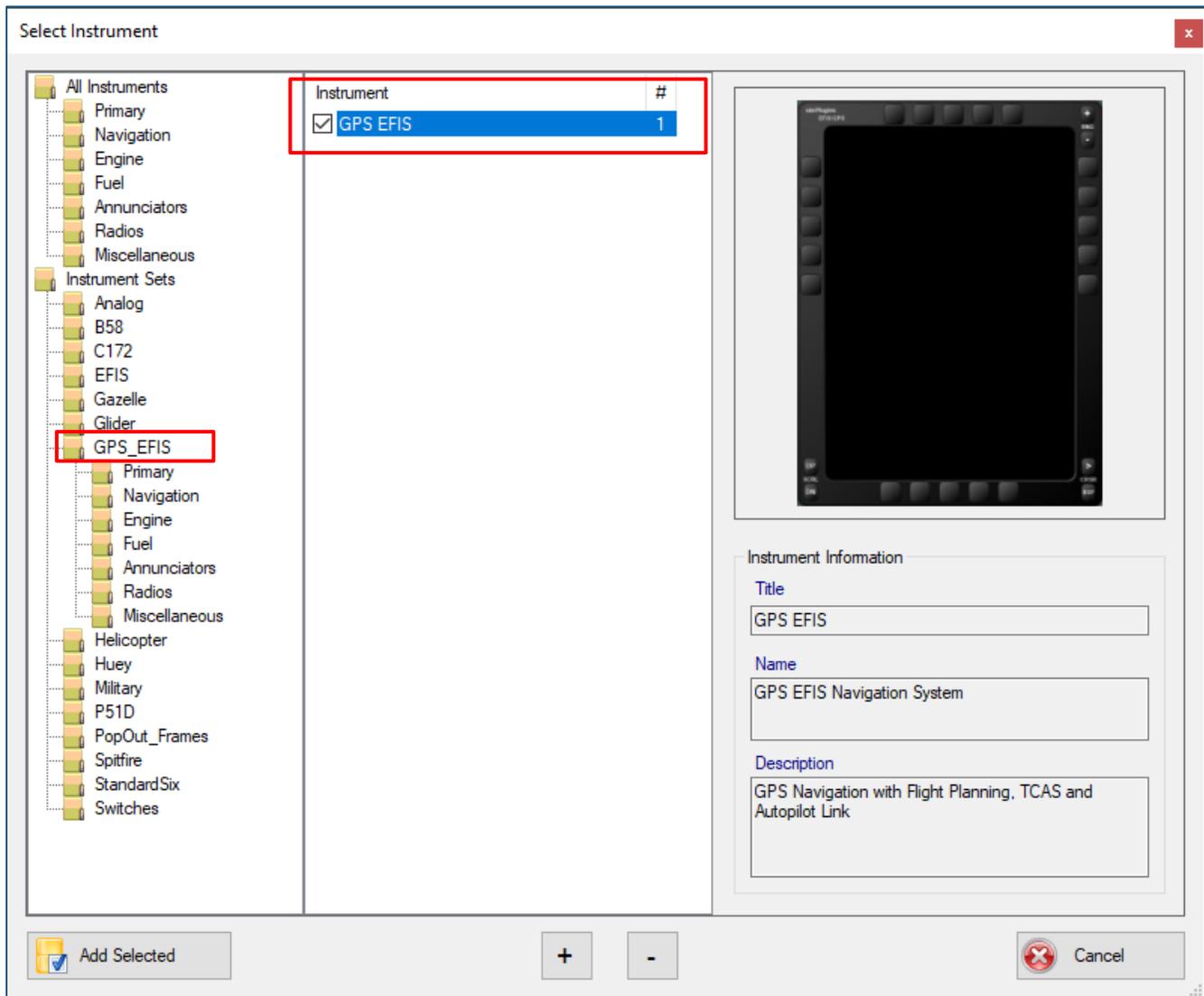


Step 3

Start Panel Builder 3 and load the panel you want to add the GPS to.

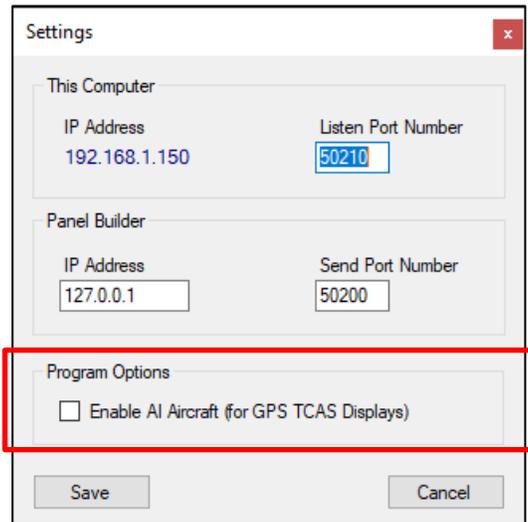
Click on *Building* and then *Add Instrument*.

The GPS unit will show under the GPS_EFIS Instrument group. Click on the checkbox and then click on 'Add Selected'.



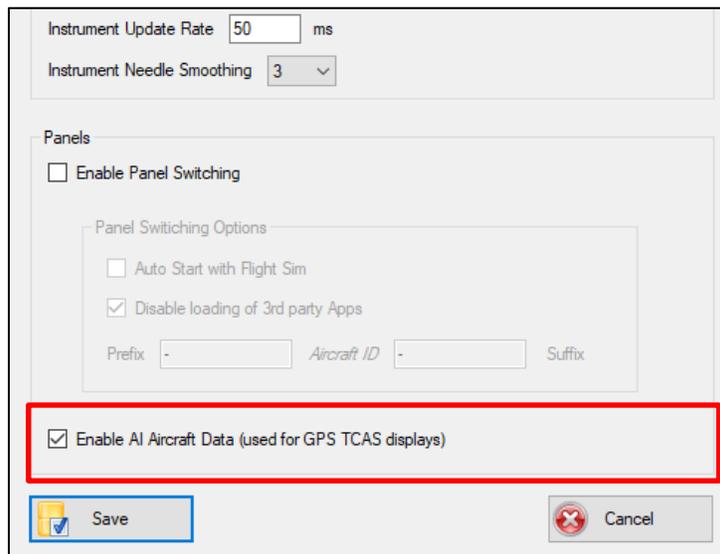
Enable AI traffic in Panel Builder 3 and Interfaces

When using Microsoft Flight Simulator or Prepar3D you need to enable the traffic options in the appropriate interface. They are located in the *Settings* for each Interface:



For X-Plane, the traffic option is enabled by default. No changes required.

Then in Panel Builder 3 under Configuration/Program Options, you also need to enable AI traffic:

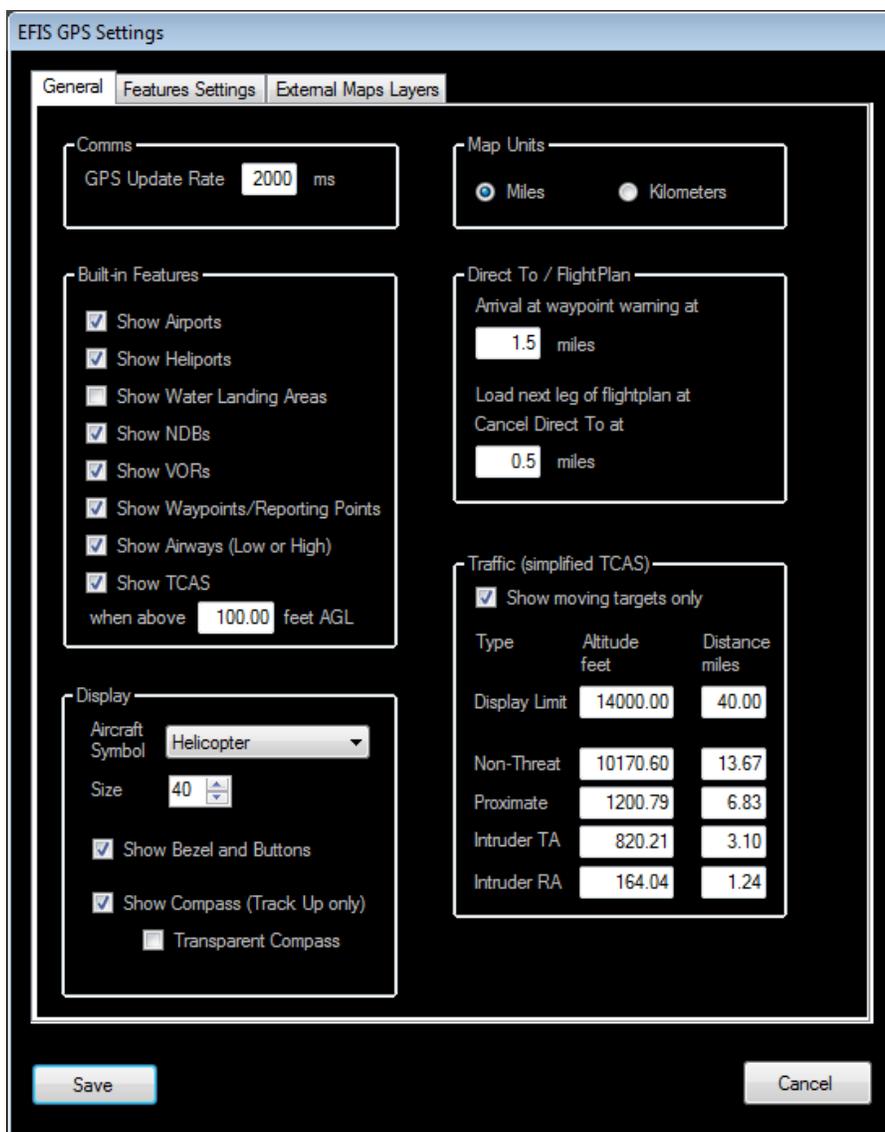


GPS Configuration

The GPS unit is fully configurable. Follow the instructions in this chapter to (re)-configure the unit to your liking. This is an optional step. The unit has default values that are used if you don't configure it.

Start the panel with the GPS unit, then right click on the GPS unit and choose 'Settings' from the pop-up menu.

General Options



GPS Update Rate

This specifies how often the Moving Map is updated. The fault value is 2000 milliseconds (every 2 seconds). If you don't have any additional map layers loaded or only have a few, this might be fast enough. For more complex add-on layers, you might have to reduce the update rate, try 2500 or even 3000 milliseconds (every 2.5 or 3 seconds) to slow it down.

Built-In Features

Built-In features refer to the Navigation Database that comes with the GPS unit. The following world-wide features are contained in the database:

- Airways (Low and High Altitude)
- Airports (Land, Heliports and Water Landing Areas)
- VORs (VOR, VORTAC, VOR-DME)
- NDBs
- Waypoints (Reporting Points)
- TCAS (Traffic Display)

Enabling/Disabling the features will make them available/un-available for display on the Map Screen. The top buttons on the Map Screen will be shown or hidden depending on configuration.



Note: There is only one button for Airports and Airways.

'Airports (APT)' will show all types of airports that have been checked in the configuration.

'Airways (AWY)' is a toggle button, first click shows high altitude airways high, second click shows low altitude airways low, third click turn airways off.

TCAS shows a button on the right side of the unit allowing to enable or disable displaying other traffic in the area. You can configure when the display should occur by specifying the elevation AGL (above ground level) when the system should be activated. Specify 0.00 if you want to see traffic while on the ground.



Map Units

This specifies what units the distances are shown at, visible in the 'Nearest Screen' and the 'Map Screen' when a Direct To or Flight Plan is active. The default is nautical miles.

Direct To / Flight Plan

When a 'Direct To' route or Flight Plan is active, there will be an 'Arriving At' message shown when you get close to the destination or flight plan waypoint.

'Arrival at Waypoint Warning at' specifies at what distance remaining this message will be shown. The message will disappear when the waypoint has been reached (see next setting).



'Load next leg of flight plan at'
'Cancel Direct To at'

This specifies at what distance remaining a direct to route will be cancelled or the next waypoint of an active flight plan will be loaded. If there is no next leg, the flight plan will be cancelled.

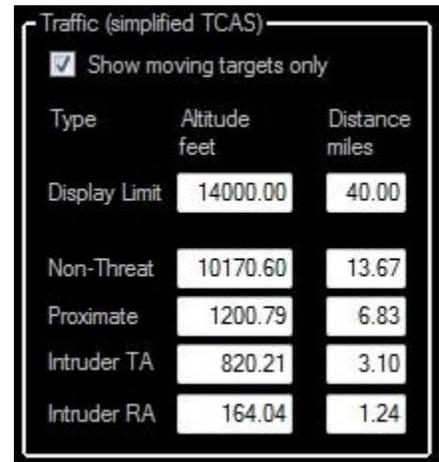
Traffic (simplified TCAS)

Here you can configure the different TCAS levels for display. The TCAS system is simplified by only considering distances from other aircraft. The different levels will change the color and symbol of other traffic shown on the map.

There is also a setting how far out to look for traffic (*Display Limit*). Any traffic outside of this range will not be shown.

If there is traffic within the Intruder RA area, the symbol changes to **red** and also the word **TRAFFIC** appears on the display in the Compass. (the Compass needs to be enabled and the map has to be in Track Up mode).

Show moving targets only specifies whether to show parked or stopped aircraft or not.



Aircraft Symbol and Size

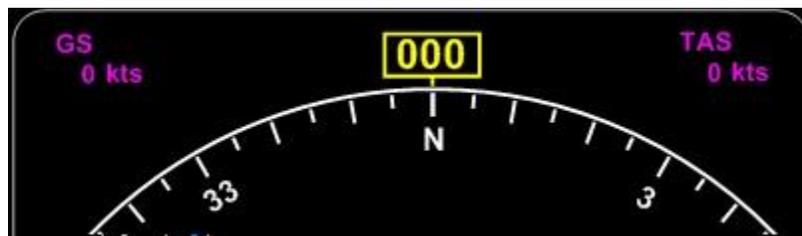
Decide between an Airplane and Helicopter to show your current position on the map. The size specifies the size of the symbol.

Show Bezels and Buttons

This allows you to show or hide the bezel and all buttons. Only the map display screen remains visible. This is useful when using the GPS behind a screen mask.

Show Compass

Selecting this will show a compass rose and other information when using the map in Track Up Mode. There is an option to make it transparent showing the underlying map, Otherwise the map size will be reduced to fit the compass.



Feature Settings

This screen allows you to modify feature colors, line widths and font sizes. The map background is always black, except when an add-on layer is loaded that has a background color specified other than black (see section Adding Layers).



All settings on this screen are self-explanatory. Colors are changed by clicking on the color link. This will open a color selection box. Colors are stored with a numeric value, but shown in the selected color.

For Heliports, Water Landing Areas, NDBs and VORs you can choose whether to use a marker or a map symbol.

External Map Layers

This section allows you to add additional feature layers. Online Maps and Shape Files (SHP - vector drawn features) are supported.

There are many sources in the Internet that provide shape files. Maps layers can typically downloaded in a variety of formats, included the shape format mentioned above. Two examples are:

<http://www.naturalearthdata.com>

<http://www.openstreetmap.org>

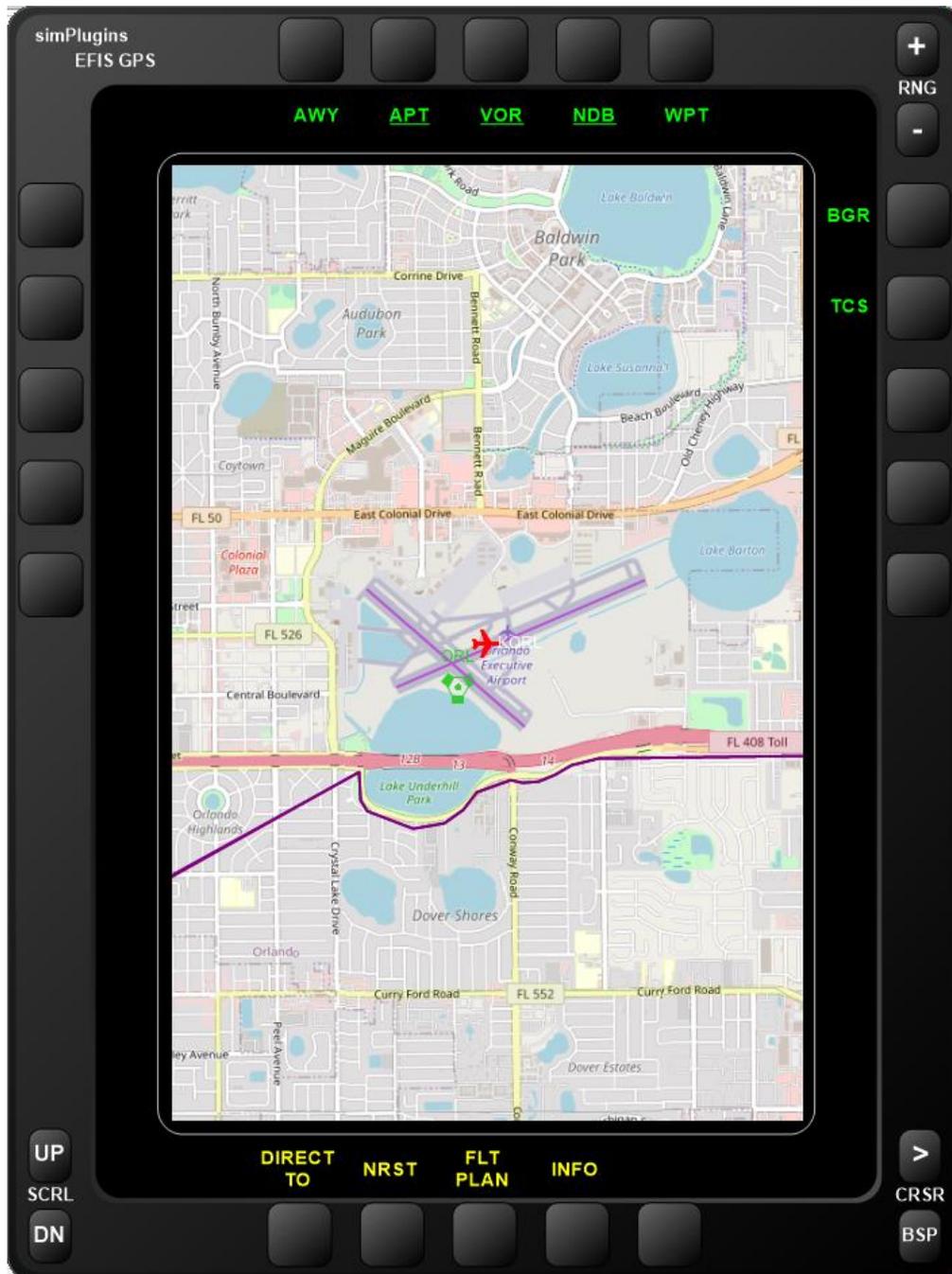
Remember to download any data you want in the correct format supported by the GPS unit.



Adding an Online Map.

Online maps are 'streamed' from the Internet and therefore require an Internet connection. We provide 2 preconfigured map services, both from OpenStreetMaps. Use the dropdown to select which one to use.

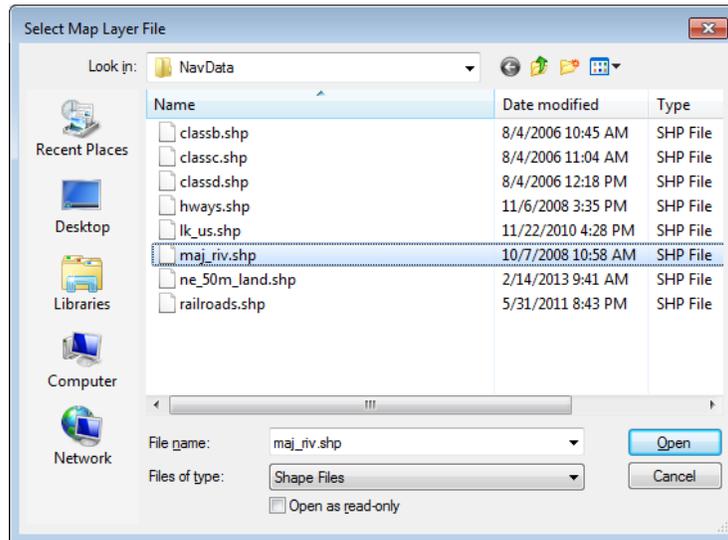
Note: any additional layers (SHP layers) you add are drawn on top of the Online map. This mean that the Online map will always be in the background.



Adding a shape file layer.

[Add]- Add a new map layer

Click on the [Add] button. A file open dialog will appear. Browse to your previously downloaded file. The click [Open]



The example above loads Major Rivers.

[Properties]- Display properties of layer (For shape file Layers only)

Select a previously loaded layer, then click on the [Properties] button.



Similar to the built-in features, this allows you to specify colors and line widths.

In addition you can specify at what *zoom levels* the layer is shown. This allows you for example to de-clutter the map display, especially for zoomed-out ranges. Click at with zoom levels the layer should be visible.

The *Transparency* setting specifies how transparent this layer is, i.e. how much of the other layers show through. This is important for layers that contain areas which might otherwise 'hide' any other features. '100' means - not transparent (solid), any lower values make the layer more or less transparent.

Don't show lines is recommended for filled objects, like lakes, rivers or roads.

Line Type allows you to specify solid, dashed or dotted lines - useful for airspace.

Don't fill areas means only an outline is drawn, but not filled - again, useful for airspace.

[Delete] - Deletes a layer

Select a previously added layer and then click the [Delete] button.

[UP]/[DN] - Move layer up/down

Feature layers are drawn in the order of the list. It can happen that one feature layer is hiding another layer due to the type of content. In this case re-sort the layers by using the UP/DN buttons. Typically large area style layers should be first, followed by smaller more detailed layers.

Note:

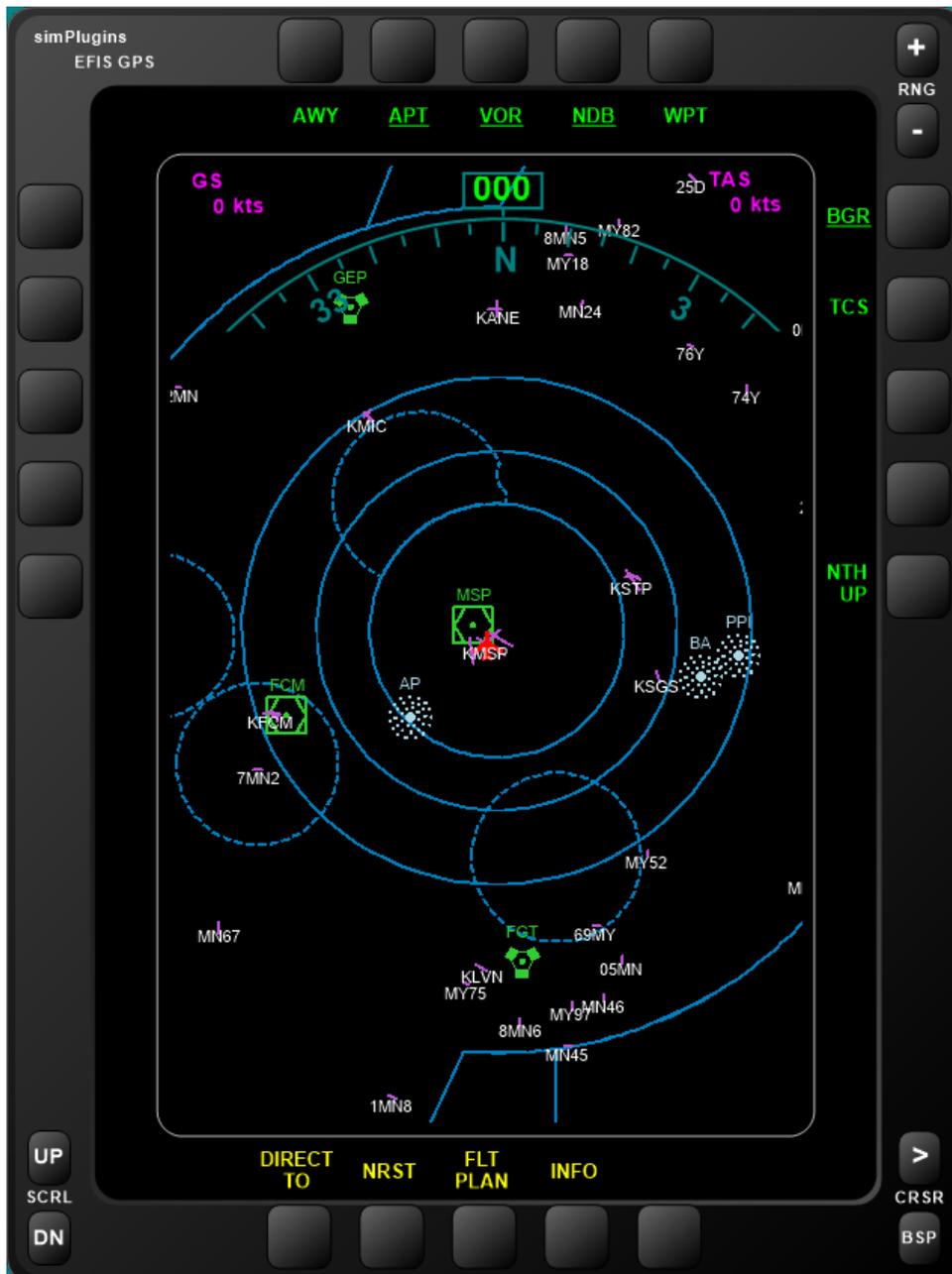
Rotating maps is very process intensive (used for 'Track Up' map display). Be aware how much you load.

Using the GPS

Moving Map

The moving map is the main screen of the GPS. It shows you your current location and the map data that has been configured in the previous section.

There are several buttons that provide different functions.





The top buttons allow you to show/hide features on the map (built-in only). When you switch the unit off (stop the panel or take avionics power off), any changes you made are remembered for the next run. When a feature is 'on', the label is underlined.

For Airways (AWY), press the AWY Button repeatedly to show, LOW Altitude and HIGH Altitude airways. The third press turns them off again.

The right buttons control the display.

- [RNG +] & [RNG -] zoom the map out or in.
- [NTH UP] changes the orientation of the map display to show the Map in a North Up orientation. In this mode the compass is disabled. The button changes to [TRK UP] to change the display back to show the map in Track Up orientation.
- [BGR] shows or hides any additional layers you have configured. This is used to de-clutter the display temporarily. If there are no additional layers loaded, the button will not be shown.
- [TCS] shows and hides other traffic in the area. If the button is not shown, make sure to enable the traffic system (see previous section).



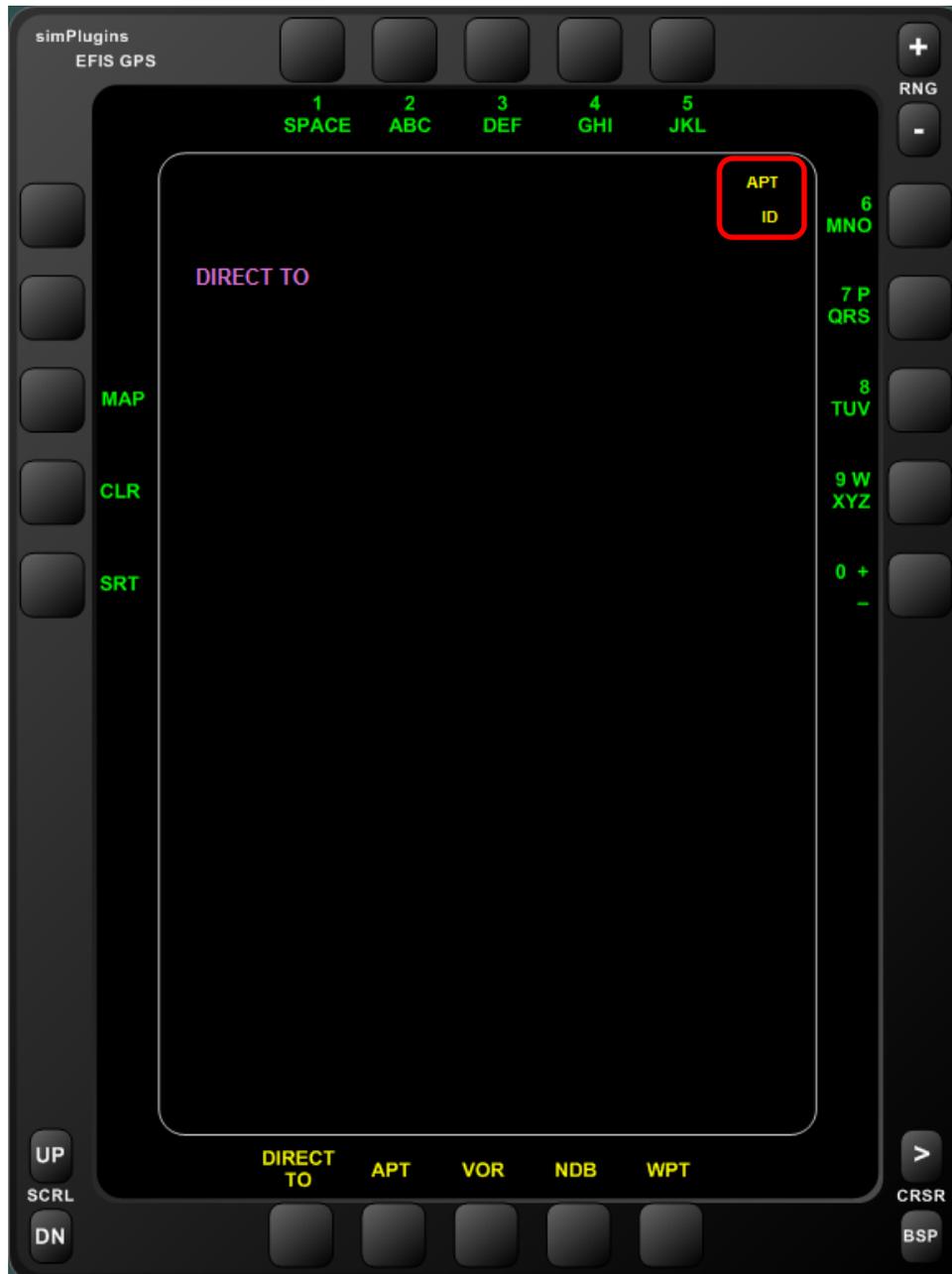
The buttons on the bottom are used to select the other functions of the GPS system. See the descriptions in the next chapters.



The buttons on the left change their functions depending on the function of the GPS selected.

Direct To Function

The 'Direct To' function allows you to plot a course from your current position to any Airport, VOR, NDB or Waypoint in the navigation database. Click on the [Direct To] Button.



An empty screen is displayed. On the top right it displays what feature is currently selected and what you want to search by. In our example above it is airport searching by ID.

To select a different feature, click on the buttons on the bottom [APT], [VOR], [NDB] or [WPT].

To change the sort order, click on [SRT].

To start searching, click the phone style buttons. The buttons have multiple assignments. Repeatedly press a button to get to all numbers/letters assigned to a button. It will show on the screen what has been currently selected.

Once you have the number/letter you want, press the Cursor Right button [CRSR >], the selected number/letter will be shown in the search box and a list of features that match the search will appear.

Keep entering letter/numbers until you found your feature. Don't forget you can also use the SCRL UP/DN rocker switch.

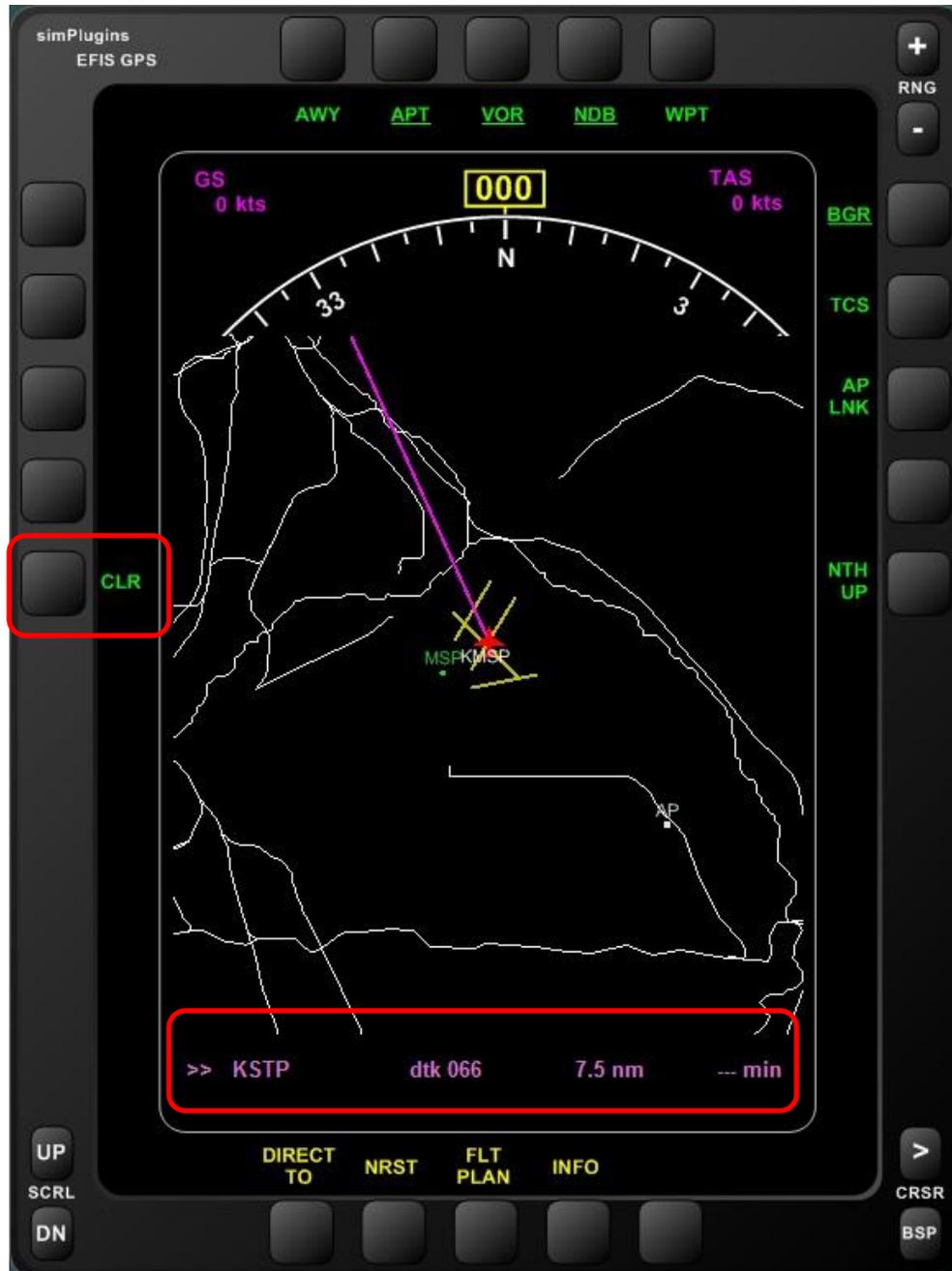
If you made a mistake while typing, click the [CRSR BSP] Button (backspace), the last character in the search is deleted.

If you want to clear the whole search criteria, click the [CLR] button.

If you want to exit this function without plotting the direct to course, click on [MAP].

To navigate to the currently selected feature that is highlighted, click on [DIRECT TO]. This will plot the course and active the map page.





Now start flying following the magenta line. You will also get information about your destination, like desired track (dtk), distance (nm or km) and time to destination calculated based on your groundspeed (min) once you get moving.

If you want to clear 'direct to', click on the [CLR] button.

Nearest Function

The nearest page shows features that are within a 100 nautical mile (160 km) range of the current position. You can select to show Airports, VORs, NDBs and Waypoints (Reporting Points). They are ordered by closest to farthest with the distance in the last column (nm or km depending on configuration).



Airports

NDBs



VORs

Waypoints

Select the *nearest* feature with the buttons on the top.

You can scroll up and down in the list with the [UP] and [DN] buttons on the left.

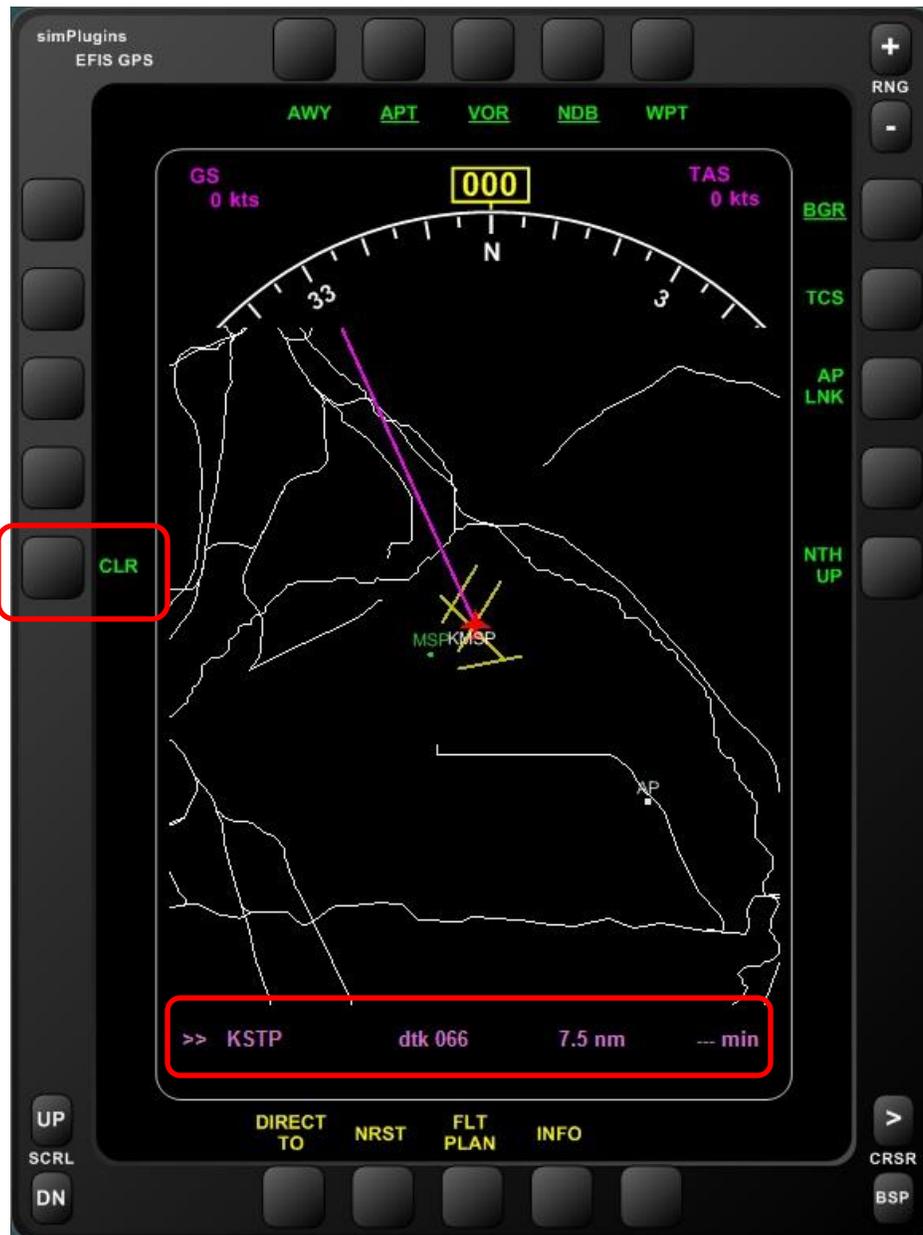
The buttons on the bottom select other GPS functions.

Special functions for

VORs: Tune your NAV1 or NAV2 Standby frequency by pressing the [NAV1] or [NAV2] button on the right with the highlighted VOR frequency.

NDBs: Tune your ADF radio by pressing the [ADF] button on the right with the highlighted NDB frequency.

[Direct To] button. The direct to button selects the currently highlighted feature as your next target. After pressing the button, the display will switch back to the map page and a magenta line will show the track to your target. Track, Distance and Time to Target will also be shown on the top of the map. Once you get close, you get a message 'Arriving at ...' and when you reach your target, the direct to function will be automatically cancelled.



You can also cancel the direct to function any time by pressing the [CLR] button on the map screen.

Information Page

The information page shows important airport frequencies. This is useful when you are departing from an airport and want to see any frequencies to obtain clearances. The closest airport will be automatically selected.



You can scroll up or down in the list with the [SCRL UP] and [SCRL DN] buttons.

The text entry buttons on top and the right side provide a search function. The search function is described in more detail in a separate chapter. Basically it works like a phone type entry by pressing the appropriate button multiple times until the number or character you want is displayed.

The list is sorted by ID, but you can change the sort order by pressing the [SRT] button to the airport name. This allows you to search by name or ID. The current sort order is indicated by a yellow bar above the columns. The [CLR] button clears the current search and you can start over.

Flight Planning

This section describes the flight planning capabilities of the GPS unit. Flight plans can be created, stored, recalled and modified. The flight plans are stored in an internal database.

Once you have a flight plan created, it can be activated. The complete flight plan route will be shown on the map display. You get messages when you arrive at your waypoints and updated routing information as you progress through your flight plan.

Select the flight plan function by pressing the [FLT PLAN] button.

All available flight plans will be shown. Each flight plan is identified by a number and a departure and destination location.

[SCRL UP] and [SCRL DN] allows you to scroll the list.

[CHG] changes the highlighted flight plan.

[NEW] creates a new flight plan.

[DEL] deletes the currently selected flight plan.

[ACVT] activates the currently selected flight plan and switches back to the map page.



Creating a new flight plan

Click on the [NEW] button. This will open the change flight plan page.

[SCRL UP] and [SCRL DN] scrolls through any existing waypoints in the flight plan.

[ADD] append multiple waypoints to the end of the list

[INS] insert a single waypoint above the currently selected waypoint

[DEL] delete the currently selected waypoint

[FLT PLAN] returns to the flight plan list.

The fastest way to enter waypoints for a new flight plan is to select the [ADD] function.

This allows you to add multiple waypoints in the order you want to fly them.

Click on [ADD].



An empty screen is displayed. On the top right it displays what feature is currently selected and what you want to search by. In our example above it is airport searching by ID.

To select a different feature, click on the buttons on the bottom [APT], [VOR], [NDB] or [WPT].

To change the sort order, click on [SRT].

To start searching, click the phone style buttons. The buttons have multiple assignments. Repeatedly press a button to get to all numbers/letters assigned to a button. It will show on the screen what has been currently selected.

Once you have the number/letter you want, click on the [CRSR >] button, the selected number/letter will be shown in the search box and a list of features that match the search will appear.

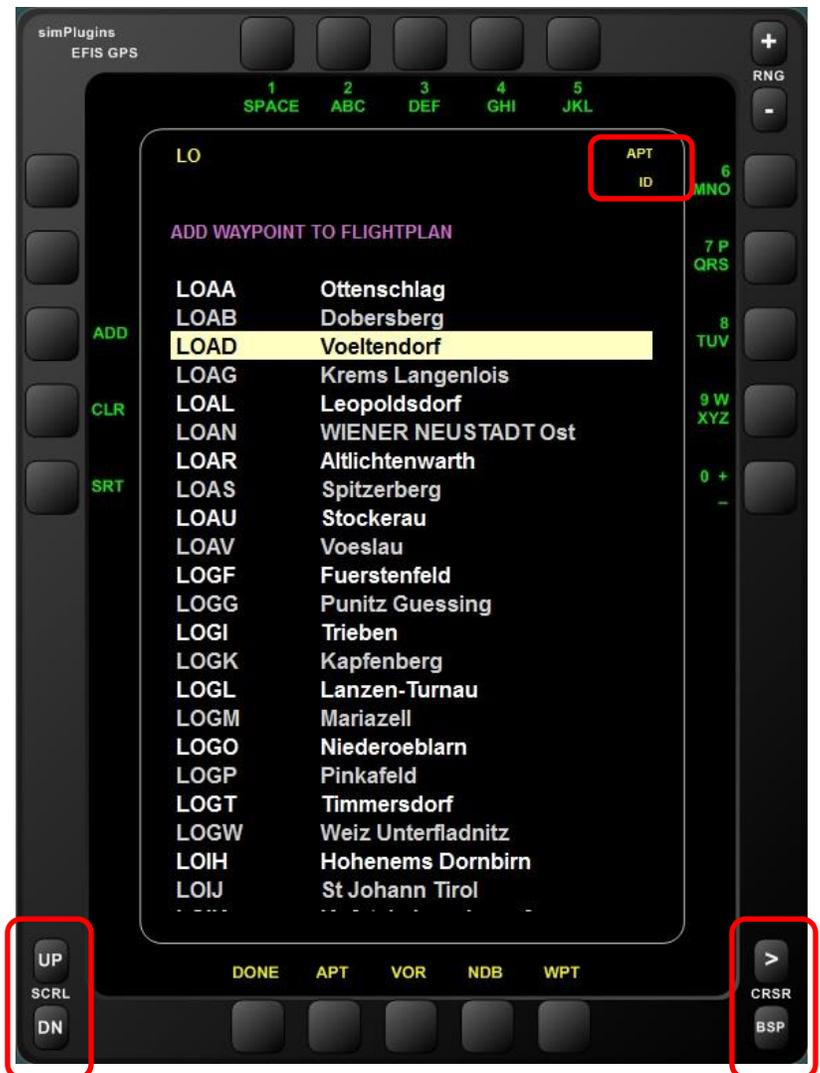
Keep entering letter/numbers until you found your feature.

Don't forget you can also use the [SCRL UP] and [SCRL DN] Buttons.

[ADD] will add the selected feature to the flight plan and clear the search.

[CLR] will clear the entire search criteria

[CRSR BSP] will clear the last character from the search.



Keep adding features until you have a complete flight plan. When you are finished click on [DONE]. This will close the entry screen and return you to the flight plan change screen.



The flight plan is displayed showing the selected features with a number indicating which order they are flown. Also show is the desired track (DTK), the distance to this feature/waypoint (DIS) and the cumulative distance (CUM).

The last line will show you the total miles/km for the flight plan under the CUM column.

Click in [FLT PLAN] to return to the flight plan list.

Alternatively you can make modifications if required using the [INS] insert, [ADD] or [DEL] buttons. See next chapters.

Modifying an existing flight plan

To modify an existing flight plan, click on the [FLT PLAN] button.

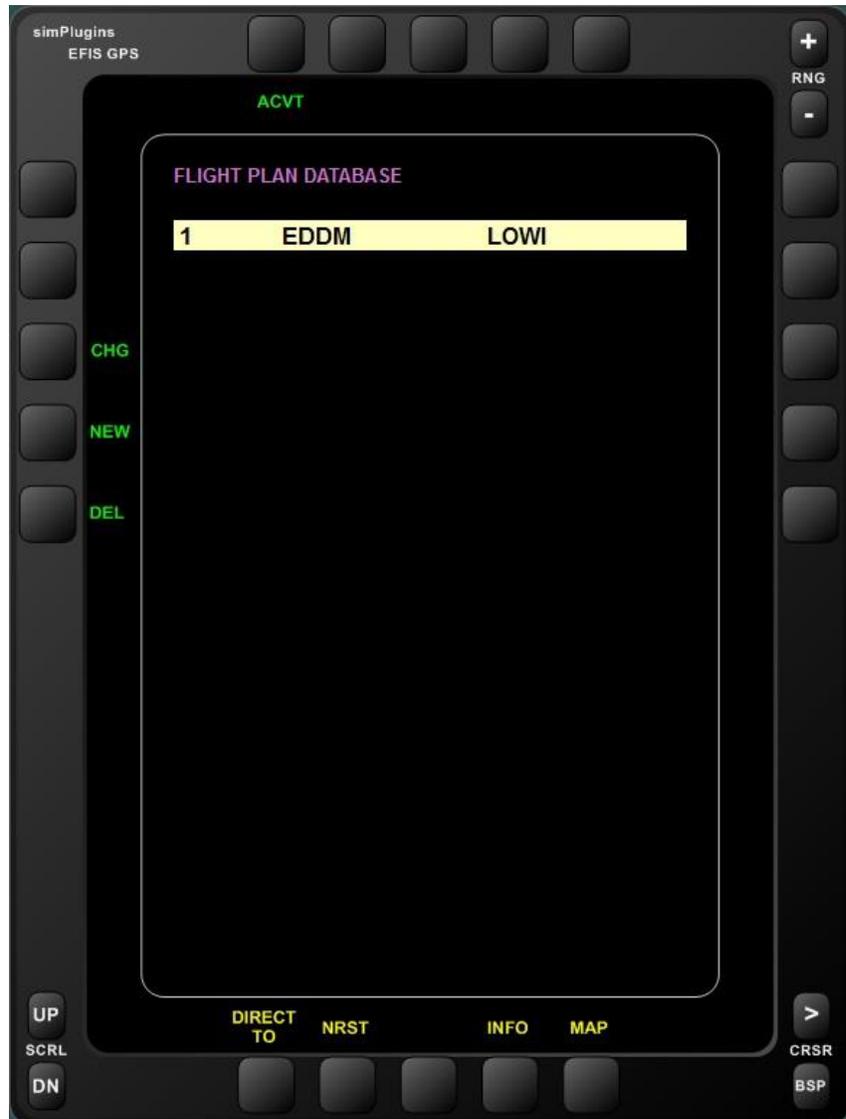
This will show you a list of available flight plans.

Use the [SCRL UP] and [SCRL DN] buttons to select a flight plan,

To delete a flight plan, click on [DEL].

To add a new flight plan, click on [NEW]. (See previous chapter)

To change the flight plan, click on [CHG]



The flight plan will be displayed.

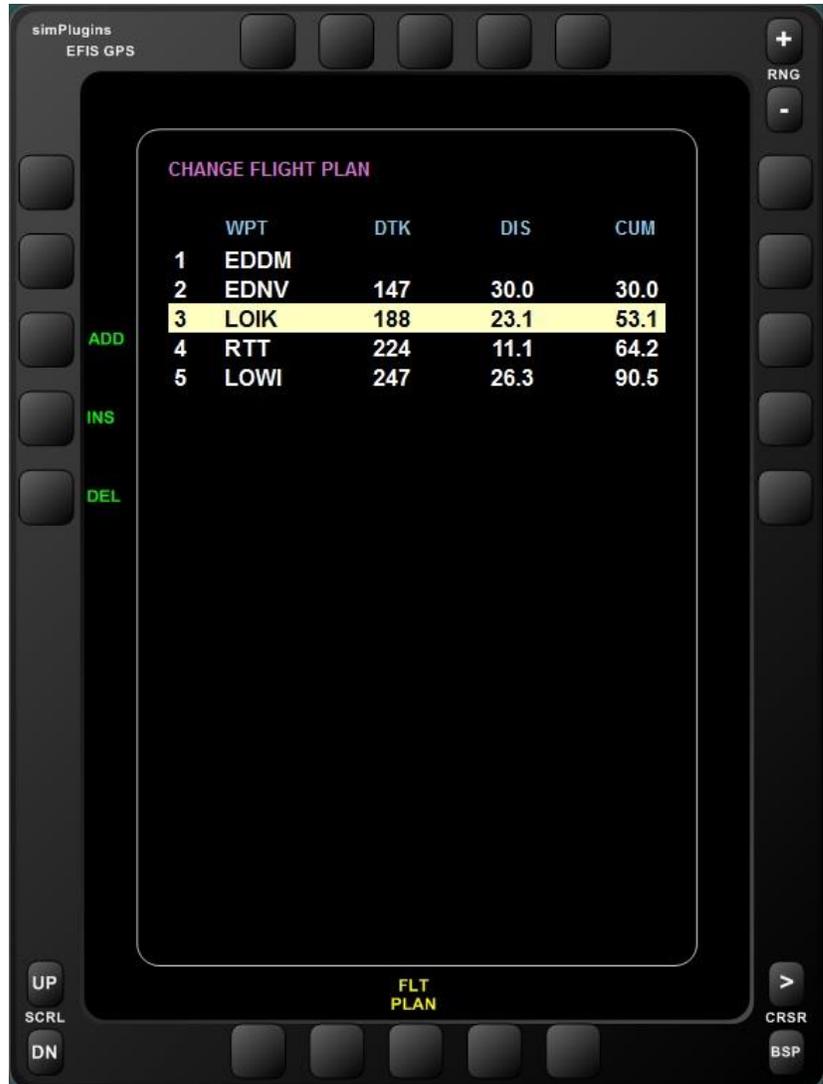
In our example it is a direct flight from Munich/Germany to Innsbruck/Austria.

To add more waypoints has been described in the previous chapter. In this example we are adding a waypoint between EDNV and LOIK.

The insert function inserts a new waypoint **before** the selected waypoint. In our case we need to select LOIK because we want to insert a waypoint before LOIK.

Use the [SCRL DN] button to move to the 3rd line.

Click on the [INS] button.

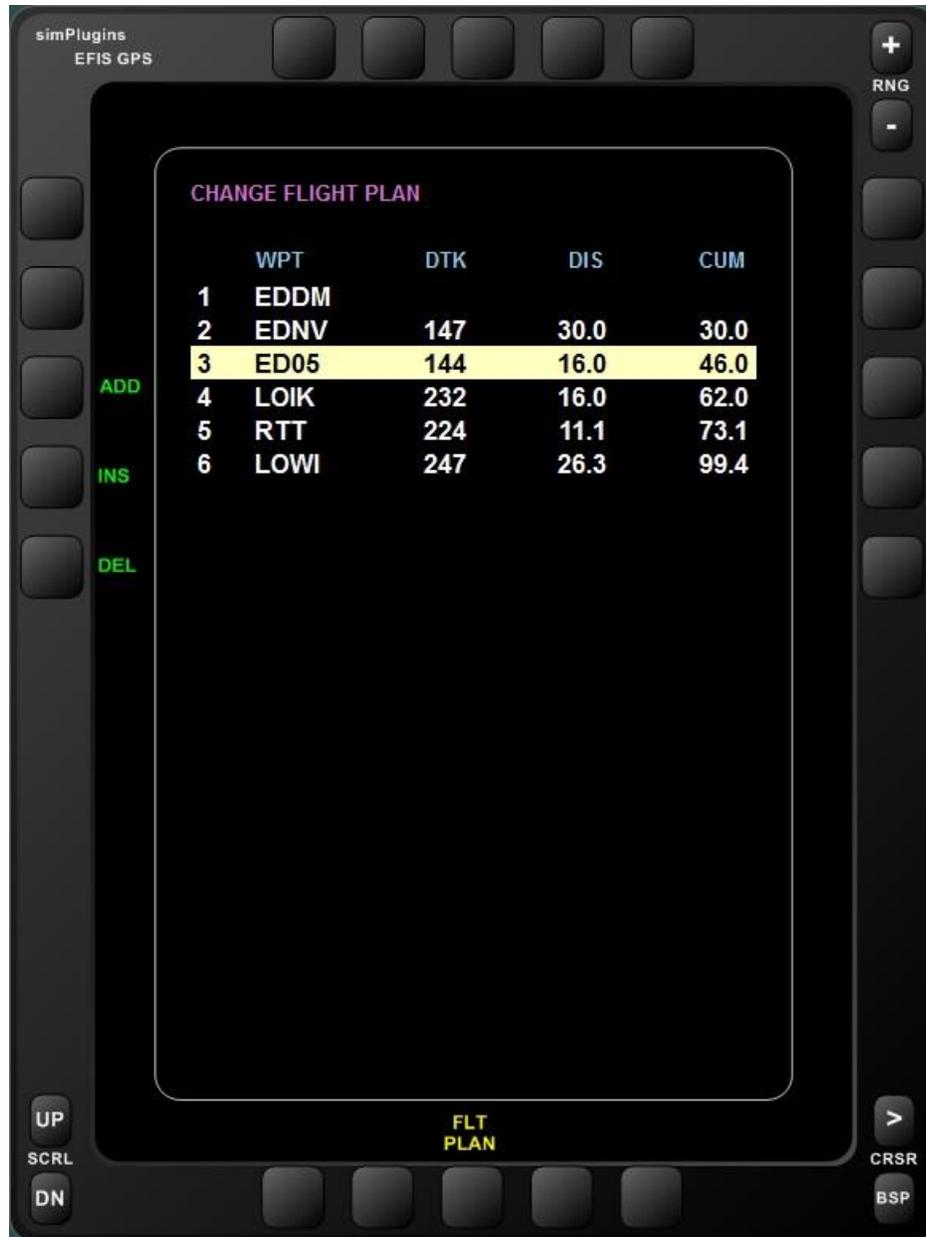


The insert waypoint screen will be displayed.



We want to add a waypoint Unterwoessen (ED05). Use the text search to locate the airport. This has been described under 'Adding a new flight plan'.

Once you have the airport selected, click on [INS] again. This will insert the waypoint just as indented. The distance calculations will be updated automatically and the flight plan will be shown again.



If the flight plan is as you intended, click on the [FLT PLAN] button to return to the list of flight plans.

If you need to make further modifications, use the [ADD], [INS] and [DEL] buttons.

Activating a flight plan

Once you have a flight plan available, you can activate the flight plan to show you routing guidance on the map screen via a magenta line.

Click on [FLT PLAN].

Use the [SCRL UP] and [SCRL DN] buttons to select a flight plan from the list.

[ACVT] on the top, will activate the flight plan and switch to the map screen.



Now you can take off and follow the magenta line.

The bottom of the screen will show you guidance information to your first waypoint. In our example below, the first waypoint is 'EDNV', a small airport in Germany.



We are seeing that we have about 2.1 miles left to reach the waypoint, also indicated by the 'ARRIVING AT EDNV' display.

We have passed our first waypoint. The GPS has automatically selected the next waypoint in the flight plan and updated the guidance information



Once we reach our last waypoint, the flight plan is cancelled automatically.

If you want to cancel the flight plan before reaching the destination or for any other reason, use the 'cancel flight plan' function, described next.

Autopilot Link

This function provides the Autopilot with the correct heading information to 'fly' the flight plan. (*The Autopilot needs to be switched on and in Heading Hold Mode!*).

Click on [AP LNK].



The heading information is constantly updated as the flight progresses through the flight plan.

The word 'AUTO' is displayed next to the current heading information to indicate this mode.

Clicking on [AP LNK] again disables the function.

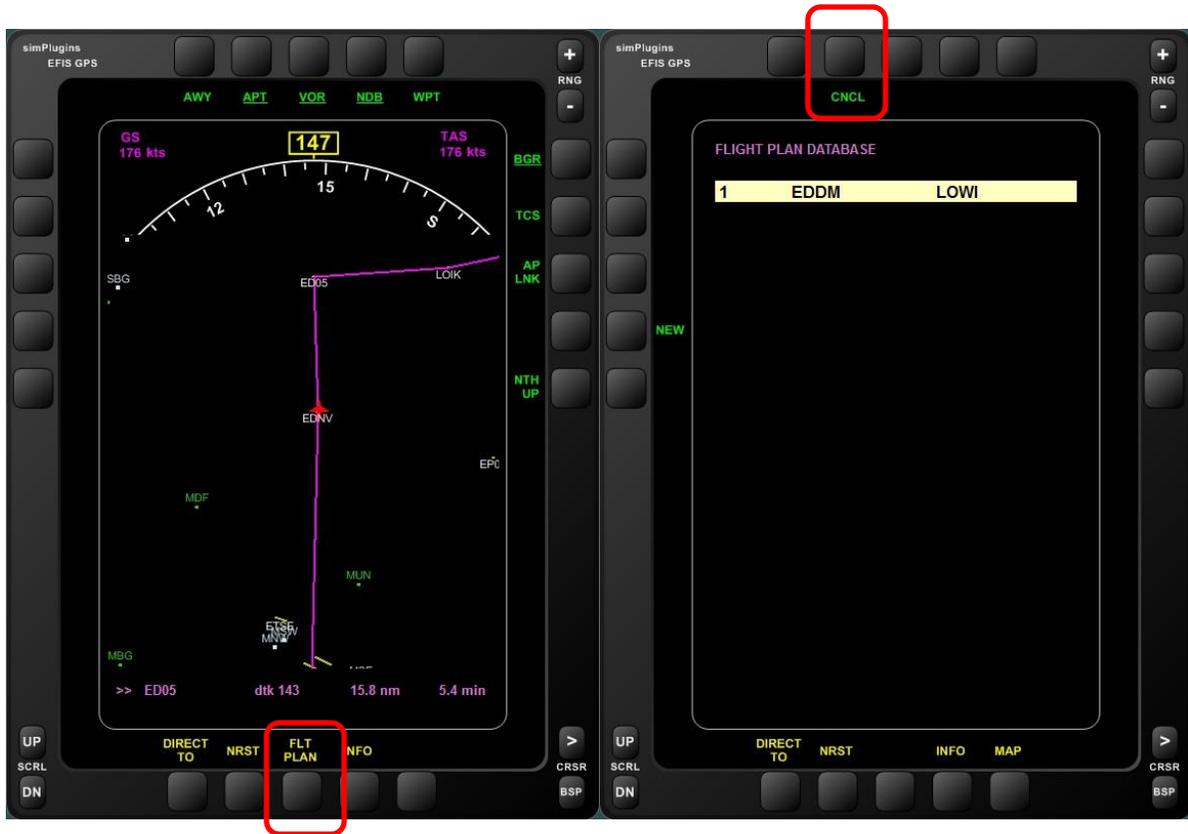
Note: The Autopilot link also works in 'DIRECT TO' mode.

Canceling a flight plan

If you need to cancel an active flight plan you can use the 'cancel flight plan' function.

From the map screen, click on the [FLT PLAN] button.

This will display the flight plan screen.



Click on the [CNCL] button to cancel it.

Traffic Display (TCAS)

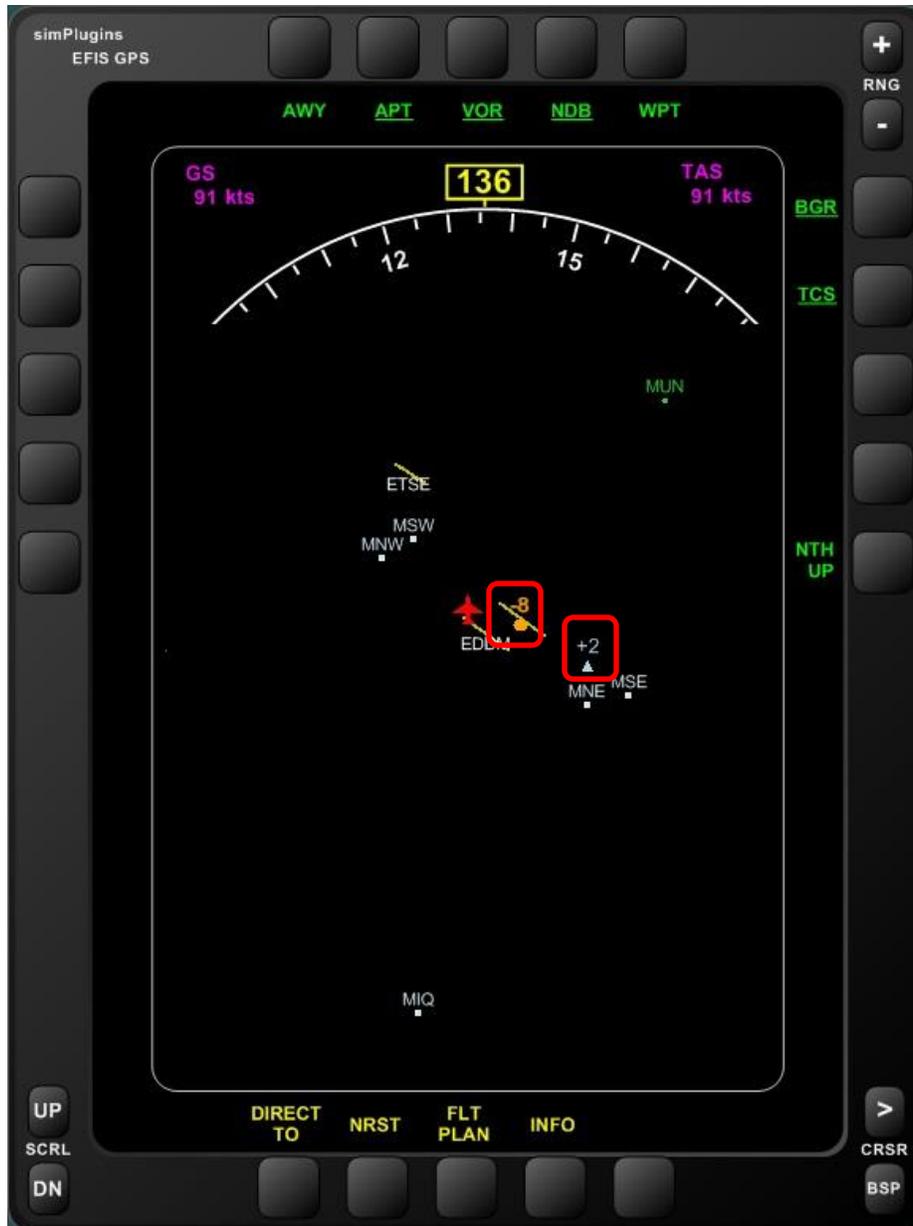
From the Map screen select [TCS]. If you don't see the TCS button, make sure that the traffic system has been enabled in the configuration options.

Depending on the configuration options, different symbols and colors are used to display surrounding traffic, triangles for further away traffic, circles for closer traffic. The relative altitude is also displayed in hundreds of feet.

Here are some examples:



Two other airplanes, both are 5100 feet above us.



Two other airplanes. One is 200 feet above us but further away, the other is 800 feet below but closer as indicated by the orange filled circle.



Two other airplanes. One is 900 feet below us, further away near the runway. The other is 100 feet below us but very close. This altitude and distance caused a traffic alert, indicated by the red square symbol and the word TRAFFIC in the compass display.

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User Manual Version 3.0.X

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