USER MANUAL

eCopilot

Version 1.03

1 Important Notices

The LXNAV system is designed for VFR use only as an aid to prudent navigation. All information is presented for reference only. Terrain, airports and airspace data are provided only as an aid to situation awareness.

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A Yellow triangle is shown for parts of the manual which should be read very carefully and are important for operating the system.

Notes with a red triangle describe procedures which are critical and may result in loss of data or any other critical situation.

A bulb icon is shown when a useful hint is provided to the reader.

1.1 Limited Warranty

This LXNAV product is warranted to be free from defects in materials or workmanship for two years from the date of purchase. Within this period, LXNAV will, at its sole discretion, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour, provided that the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident, or unauthorised alterations or repairs.

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To obtain warranty service, contact your local LXNAV dealer or contact LXNAV directly.

2 Basics

2.1 The LX eCopilot at a glance

The system consists of of the main display unit, sensor box (optional) and EMS (optional). The main display unit has a high brightness colour display with Touch screen. An integrated SD card and USB interface is used for user friendly data exchange. The main display unit is equipped with a built-in flight recorder for an after flight analysis.

Main display unit comes in different forms:
* **eCopilot7** model with 7.0" screen and 800x480 pixels resolution.
* **eCopilot10** model with 10.0" screen and 1024x600 pixels resolution.

Optional accessories are available:
* Engine monitoring system (EMS)
* AD AHRS
* Remote control
* Compass Module
* Flarm ACL
* External Flarm display
* AHRS option
* ADSB receiver
* Radio and transponder connectivity
* Wi-fi Module

2.1.1 Display Unit Features

Extremely bright touch colour display readable in all sunlight conditions with backlight automatically adapted using an ambient light sensor (ALS).
* Using Linux operating system (not CE Windows) ensures fast and stable operation of the firmware.
* 6 or 8 push buttons and 2 rotary switches (knobs) are used for input, which comprise the well-known LX user interface. Optionally a remote stick is available for more comfort.
* Portrait or landscape orientation.
* Pre-loaded with worldwide terrain maps, airspace and airport databases.
* Unlimited number of waypoints.
* Unlimited number of routes.
* Comprehensive flight and task statistics.
* Display of nearest airports and out-landing fields.
* Unlimited number of pilots/profiles.
* Integrated flight recorder
* Flights stored in IGC format are downloadable using the integrated SD Card.
* Supported FLARM collision avoidance system with graphic, sound and voice (optional) presentation.

2.1.2 EMS features

EMS is measuring system for engine and other physical parameters. It is connected over CAN connector on side. EMS cannot be powered from CAN cable and requires an external power connection to provide enough stable power to itself and sensors. Power to unit is applied over headers on top of EMS which can be also used as analog or digital inputs from sensors. It has metal enclosure with tabs on side for mounting. On top side are labels for pins on all four ports and serial number.

2.1.3 Interfaces

- The RS232 interface has NMEA output for external devices.
- A SD Card interface.
- An USB slot for data transfer using USB memory stick or WI-FI connectivity

2.1.4 Internal Options

AHRS - Artificial horizon can be enabled on main display unit. For this functionality an AD AHRS module must be present.

2.1.5 External Options

By using a CAN bus system a wide range of optional interfaces can be easily connected to the basic configuration with minimal installation work. The LXNAV bus system can be extended easily by use of CAN Bus Y splitter, which allow plug and play connection of optional devices.

The following units can be connected to the main system:
- **Second Device:** This unit is powered and receives all necessary data from the main unit. The communication between both units is exclusively via the CAN bus system.
- **Remote Control:** An extremely ergonomic leather-coated handle which includes 8 push buttons to operate the main display unit and also two additional buttons with open wires. A second remote control can be installed to control second seat device or for side by side operation.
- **Compass module:** Compass comprises of a 32bit microcontroller combined with 9 sensors (3 axis, accelerometers, magnetometers), to generate a very accurate measurement of magnetic heading (compared with GPS calculation). The Magnetic heading is tilt compensated, calculations are performed 50 times per second and produce a stable reference heading for wind calculations and course change and direction information. The Compass automatically calibrates itself during flight.
- **232 Bridge for radio or transponder:** Most of 8.33kHZ radios and modern Transponders can be connected to eCopilot system, which will automatically set a stand by frequency of provide the GPS to transponder.
- **Wi-fi module:** For updating the system with the latest Software and Database version, real time rain radar picture during the flight and upload flight log to email.
- **EMS:** Engine monitoring system for monitoring engine parameters
- **Flarm module:** Anti-collision avoidance system used in most of glider planes.
- **Autopilot (under development)**

2.1.6 Simulator

There are two options to stay in condition and familiar with your system. LXSim is free of charge program, which you can download from www.lxnav.com .
These features are extremely useful for pilots who want to learn about the system and also wish to refresh their knowledge after a winter break.

⚠️ UNDER DEVELOPMENT.

2.1.7 eCopilot 7

- environmental limitations:

- Operating temperature: -20°C to +70°C
- Storage temperature: -30°C to +85°C
- Relative humidity: 0%-95%
- Vibration: +/- 50m/s^2 at 500Hz

- Power Supply:
  - Minimum 9V
  - Nominal 12V
  - Maximum 28V

- Consumption at 12 V:
  - 800 mA - maximum brightness without audio and options.

- Dimensions:
  - 182 x 136 x 56 mm

- Weight
  - 615g

2.1.8 eCopilot10

- environmental limitations:

  - Operating temperature: -20°C to +70°C
  - Storage temperature: -30°C to +85°C
  - Relative humidity: 0%-95%
  - Vibration: +/- 50m/s^2 at 500Hz

- Power Supply:
  - Minimum 9V
  - Nominal 12V
  - Maximum 28V
- Consumption at 12 V:
  - 800 mA - maximum brightness without audio and options.

- Dimensions:
  - 256 x 176 x 55,582 x 136 x 56 mm

- Weight
  - 917g

3 Packing Lists

3.1 eCopilot7 & eCopilot10

- Main display unit (7" or 10")
- Main power cable for main display unit
- SD card
- 2x CAN terminator
- USB stick with Manual

> ⚠ CAN cables for connectivity between external devices are not supplied and have to be specified when placing and order.

4 System Description

The main display unit can be mounted as portrait or landscape orientation. After installing the main display unit, the orientation can be defined in SETUP->DISPLAY menu.

> In this manual all screenshots are given for landscape orientation of the eCopilot7. However all functionality is the same in any other configuration of system. Small differences are going to be marked further in manual.

4.1 Rotary Switches and Buttons

The following controls are mounted on the front face of the main display unit:
- Two rotary selector knobs with push functions (each rotary selector has 2 functions by inner and outer button)
- Eight (eCopilot10) or six (eCopilot7) push-buttons
- SD card reader

4.1.1 Landscape orientation

SD Card reader

Inner button: **Volume** Outer

Inner button: **Mode selector** Outer button: **Page selector**

Ambient light sensor

4.1.2 Buttons

All buttons have a dynamic function; the first time one presses each button, it displays its function without executing any action. Not all buttons have a function on every page. In some cases buttons have a long press function. After a press on buttons a LED light is activated around the button (white). For Confirmation/OK functions the LED light will be green, for the cancel/delete the light will be red.

> These are proximity buttons, just a slight touch will activate them. Proximity can be switched off in SETUP->GRAPHICS->use proximity.

4.1.3 Rotary Switches (Knobs)

The main display unit has two rotary knobs with inner/outer and the push button functionality.

With the left inner rotary knob the volume can be adjusted. At the left outer is the zoom knob which is multifunctional. While its main function is to change the zoom level within graphic mode, it can also be used if an error is made during editing; it is possible to move the cursor back by rotating this knob. However this can only be done if 'editing' is active which is shown by the cursor blinking. The right inner rotary switch is the mode selector (it changes the mode of the operation). At the right outer is the up/down knob which is used for selecting sub-pages, sub-menus and editing menus.

4.1.4 Rotary Switches (push buttons)

Both rotary switches have push button functionalities. Left push button performs ESCAPE/CANCEL function while right push button performs SELECT/OK/CONFIRM function.

4.2 Switching on the Unit

After the master switch is turned on (12v is supplied), the eCopilot will be booted up automatically. The first screen shows the boot loader screen followed by the Linux kernel screen and then the file system screen.

The boot procedure normally takes up to 20 seconds but in the case of a firmware update or system check it can take more time. The final boot screen displays information about the eCopilot system firmware and the serial number. When the boot procedure is completed the profile selection dialogue is shown. Please refer to Chapter 7.1 for more details about starting up the system.

4.3 User Input

The main display unit user interface consists of many dialogues which have different input controls. They are designed to make input of names, parameters, etc., as easy as possible. Input controls can be summarised as:

- Text editor
- Masked text editor
- Spin controls
- Selection control
- Checkboxes
- Colour selector
- Line width selector

To move the function from one control to another, rotate the PAGE selector knob (page selector) as follows:
- Clockwise rotation will select the next control.

- Counter clockwise rotation will select the previous control. Press the SELECT button (usually lower-right) to enter control input.

4.3.1 Text Edit Control

The Text Editor is used to input an alphanumeric string of arbitrary length; the picture below shows typical options when editing text. Use the bottom-right knob to change the value at the current cursor position.
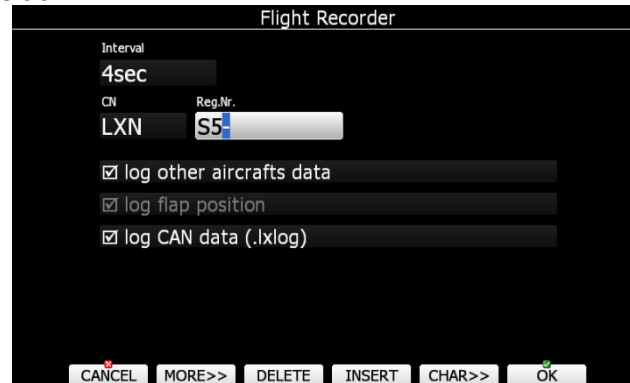
Press the **CHAR>>** button to advance the cursor to the next position. The cursor can also be moved to next position using the bottom-left knob. Rotate it clockwise to move forward.
The Abc button is a toggle button and will change the letter case. Press it to toggle modes.
- **Abc** mode will start every new word with a capital letter; subsequent letters will be lower case.
- **ABC** mode will enter only upper case letters.
- **abc** mode will enter only lower case letters.

Pressing the **DELETE** button will delete the character at current cursor position. Continually press the **DELETE** button to delete all characters after the current cursor position.
Press **OK** to confirm changes and leave control. Press **CANCEL** to abandon changes and revert back to the values before entering this screen.

Press the **KBD** to open the Keyboard. Select characters with the right outer rotary button and press **SELECT.** Once the text of interest is inserted, press **OK** to confirm the entered text.

4.3.2 Masked Text Edit Control

The masked editor is a similar control to the text editor but only limited characters can be entered at any particular position. It is designed to enter latitude, longitude and passwords.
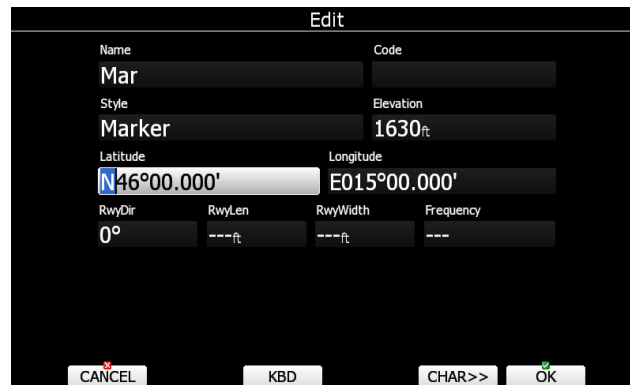
4.3.3 Spin Control

Spin controls are designed for numeric parameters. Rotate the bottom-right knob (page selector) to increase/decrease the selected value. The bottom-left (zoom) knob will increase/decrease the value with a different step compared to the page selector.
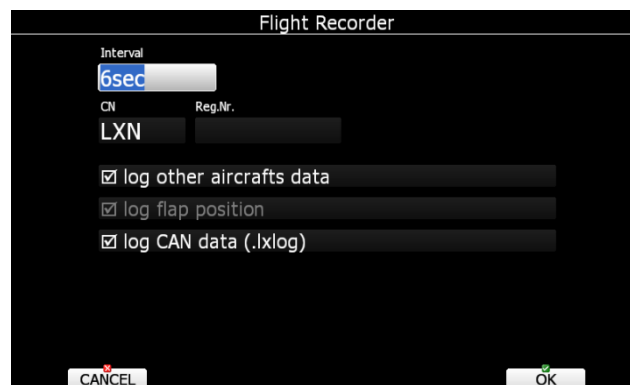
4.3.4 Selection Control

Selection boxes, also known as combo boxes on Windows operating system, are used to select a value from list of predefined values. Use the page selector to scroll through the list.

4.3.5 Checkbox and Checkbox List

A checkbox enables or disables a particular parameter. Press **SELECT** to toggle the value. If an option is enabled a check mark will be shown, otherwise an empty rectangle will be displayed.
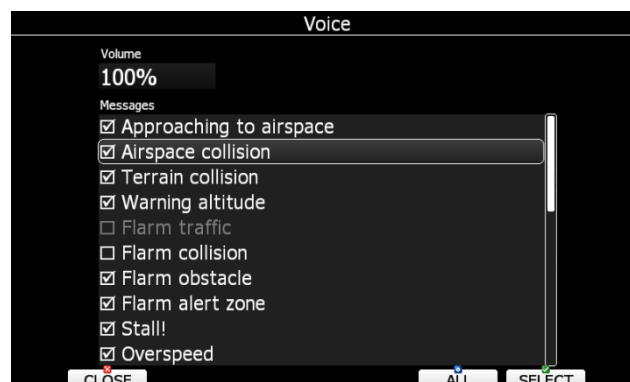
Use page selector to scroll through the checkbox list. Press the **ALL** to enable all options.

4.3.6 Colour Selector

Colours and fills are set via the colour selector control. Rotate the page selector to change a colour.
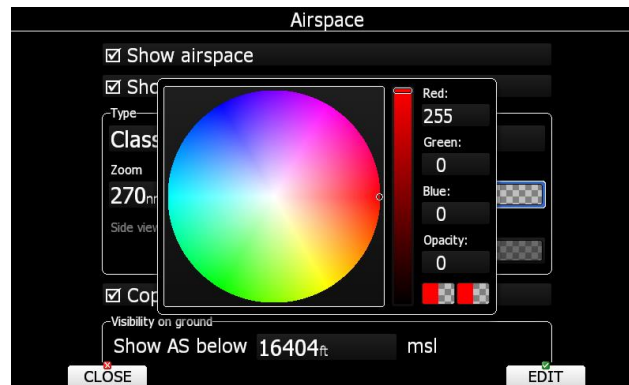
Rotating the zoom selector changes colour transparency. Transparency is very important for fill colours which are used for airspace zones, observation zones and FAI area. If fill colour is not transparent (0%), all other map items will not be seen through it. If fill colour is 100% only the solid border will be drawn.

Press PICK button to define colour more precisely. A colour dialog will open, where you can select colour from HSV circle or enter values for red, green and blue colour.

4.3.7 Font Selector

Using the font selector it is possible to define a font colour and style for a selected item.
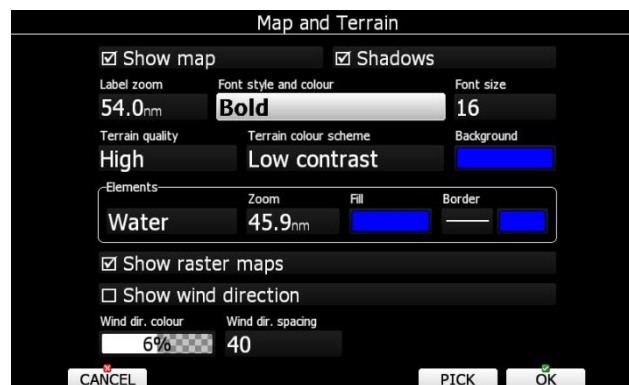
Turn the PAGE selector knob (page-selector) to change the font style. Text is also rendered in the selected font style. Turn the ZOOM selector knob (zoom-selector) to change the font colour.

Press PICK button to define colour more precisely. A colour dialog will open, where you can select colour from HSV circle or enter values for red, green and blue colour.

4.3.8 Line pattern Selector

Using line pattern selector it is possible to define width and pattern of line. Turn the PAGE selector knob (page-selector) to change the width of line. Turn the ZOOM selector knob (zoom-selector) to change the line pattern. Results are immediately visible on selected item.
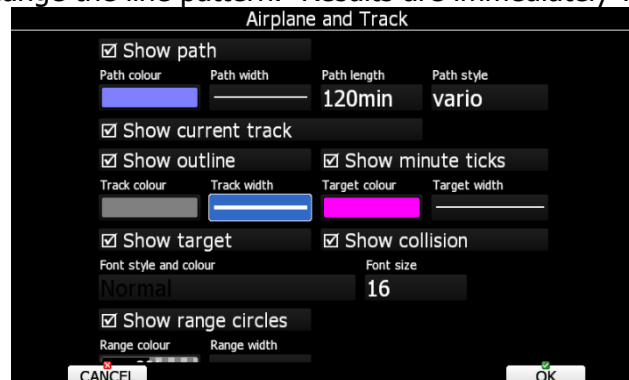
4.3.9 Pull down menu

Pull down menu is used to select one of the options. Press button several times to select appropriate item of turn PAGE selector knob. Pull down menu will automatically close after few seconds.

4.4 Switching off

Switch off the master power of the plane, which will automatically switch off the eCopilot system.

5 Operating Modes

The main display unit has seven **modes** or **main menus**. All of them are selectable by rotating the right inner rotary switch which is also called **MODE selector**. The diagram below shows the mode structure of the eCopilot running in portrait screen.
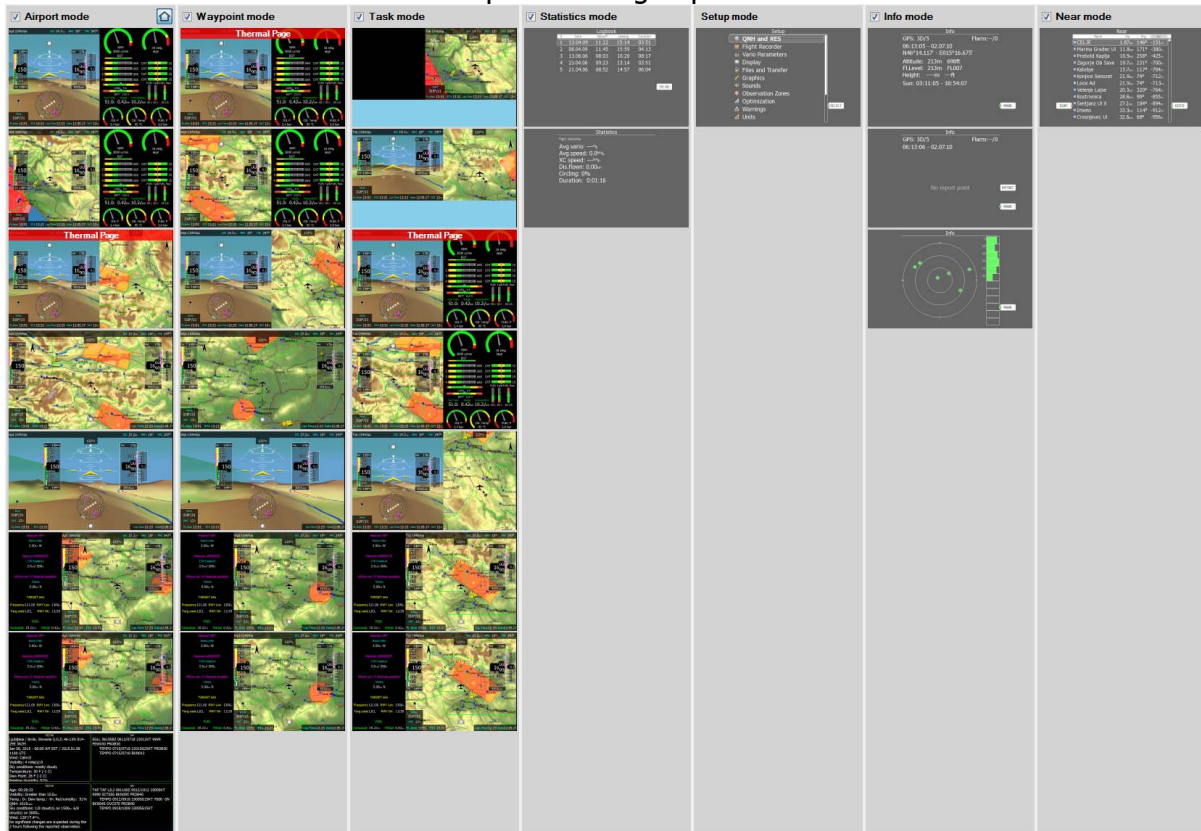
- **Airport Mode**, navigation and selection airports
- **Waypoint Mode**, navigation, selection and editing waypoints.
- **Flight Plan,** Navigation, selection and editing task.
- **Statistics Mode** shows statistical data for flight in progress or logbook.
- **Setup** mode is used to configure the whole system.
- **Information Mode** displays GPS status, altitude, flight level and height, sunrise and sunset or position report to selectable point or satellite sky view
- **Near Mode** displays a list of all landable waypoints and airports.

The Navigation modes and statistics modes have additional pages which are accessible by rotating the bottom-right knob also called the **PAGE selector**.

Main navigational modes **Airport, Waypoint** and **Flight Plan** are selected by rotating the right outer button. All three options are similar and have similar basic navigation data screens accessed by rotating the bottom-right knob.

It is possible to fully customise all 3 main navigational pages using the program LXStyler. This program can be downloaded from website www.lxnav.com.

It is also possible to customise selected navigational pages using LAYOUT menu option. Refer to Chapter 6 for more details.

In airport navigation mode the user can navigate only to airports stored in LXNAV's Airports database. This database cannot be edited on device itself and is available at no charge on our web pages. See Chapter 5.1.6.2 for more details how to obtain the latest databases.

Database can be modified using program LXAsapt editor. This program can be downloaded from our webpage www.lxnav.com

In Waypoint mode the user is navigating to Waypoints that were previously loaded and selected in the **Files and Transfer** menu (see Chapter 5.1.6).
Flight plan navigation mode is used for flight planning and manipulation. Navigation in this page is exclusively to flight plan points.

Setup Mode

In the setup menu users can configure the main display unit and connected devices. Turn the PAGE selector - or press the UP/DOWN arrow on the remote stick to select the appropriate setup item. Turn the ZOOM selector - or press the LEFT/RIGHT arrow on the remote stick to move faster over menu. Press the **SELECT** button or push middle multi-directional button on the remote stick to enter a menu. A dialogue or sub-menu will open.

5.1.1 QNH

Turn the right outer button to select the required entry field. Press the **EDIT** button and start editing the value.
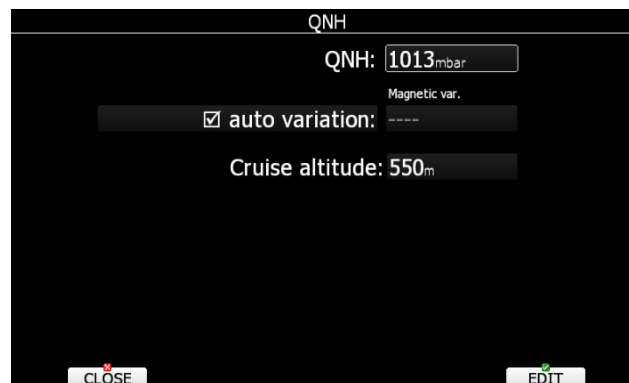
5.1.1.1   QNH

Using this feature it is possible to offset the altitude datum which could have changed due to pressure changes during the flight. Since changing the QNH influences the indicated altitude, care should be taken when changing the value as an incorrect setting can upset the final glide calculation.

5.1.1.2   Magnetic Variation

The main display unit has a built-in Earth magnetic field model. If Auto variation is checked the magnetic variation is derived from this model, otherwise the user can enter a custom value.

5.1.1.3   Cruise altitude

This is default cruise altitude, that will be used in flight planning. Cruise altitude for particualr leg can be changed in flight plan editor.

5.1.2 Flight Recorder

The main display unit has a built-in flight recorder, which is activated if the GPS source is supplied.

Select the recording interval and enter the pilot name.

> 💡 Main display unit will record all additional data such as wind, speed and vertical speed by default.

5.1.3 Data sources

In data sources menu user can set priority to each device on the list.
Eg. If you have two sensor boxes, unit will indicate air data from box with highest priority.
In case of failure of the first box, eCopilot will start showing air data from second box of the priority list. Setting of datasource property in lxstyler must be set to automatic.

5.1.4 Weight and Balance

In this section pilot can set the weight and balance. Pilot can enter Front seats / Rear seats and baggage compartment weights. Changing these parameters is clearly seen in the center of gravity – in the envelope.
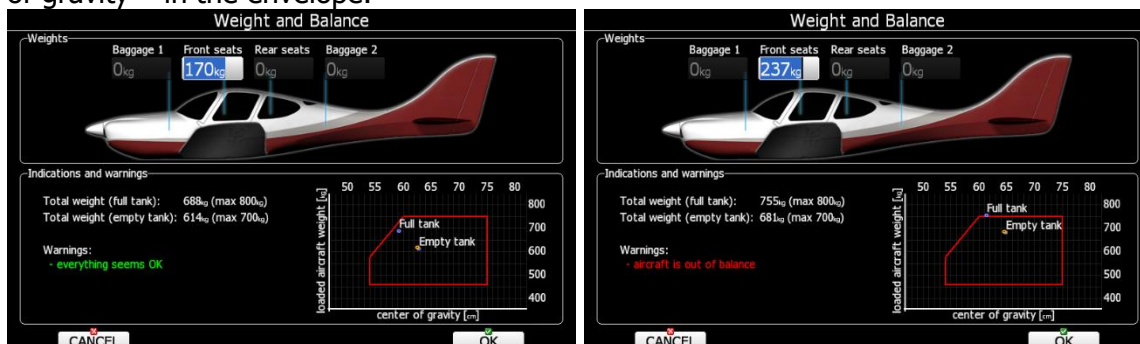
> 💡 If an aircraft is out of center of ballance a red message will appear.

Number of baggage compartments, aircraft weights, arms and center of gravity limits can be set in the SETUP->HARDWARE->Weight and Balance menu.

5.1.5 Display

The display menu controls screen brightness. The main display unit has an ambient light sensor which detects ambient light and automatically increases or reduces the brightness of the screen.
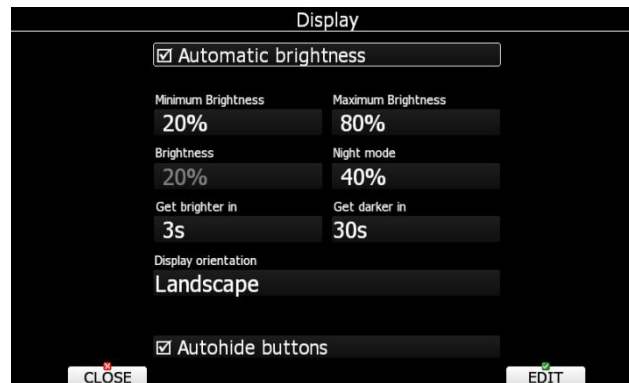
If the **Automatic brightness** checkbox is selected, the instrument will automatically adjust brightness according to current light conditions.

Minimum and **Maximum brightness** items control value limits. Use time values (**Get brighter in** ; **Get darker in**) to setup how fast adaptation to brighter conditions or darker conditions will occur. Default values are tuned to human eyes and do not require change.

Night mode brightness defines maximum brightness when instrument is operating in night mode. In night mode, brightness is reduced to very low value to reduce difference between ambient light and device backlit.

If you want to set the brightness manually uncheck the **Automatic brightness** control and set the brightness manually.

Change **Display orientation** if you would like to change the display unit screen orientation. The main display unit will restart and start with new screen orientation.

Checking **Autohide buttons** will enable automatic hide of buttons on the display. If this option is uncheck, all the screen buttons will be present all the time.

It is recommended that the automatic brightness control is always enabled. Reducing brightness will also reduce power consumption.

5.1.6 Files and Transfers

The Files and transfer menu is used to manage the waypoint, airspace and airport databases, data logs, recorded flights, flight declaration, PDF documents, Checklists and Dropbox account.

Within a profile user can selected different airport databases, airspace and waypoint files. Selected files can be stored inside main display unit or on inserted SD card or USB stick.
It is also possible to upload files from SD card or USB stick to main display unit.

5.1.6.1   Uploading User Airspace and Waypoints

Databases can be loaded from a SD card or USB stick. Select the type of database you wish to upload and press the LOAD button.
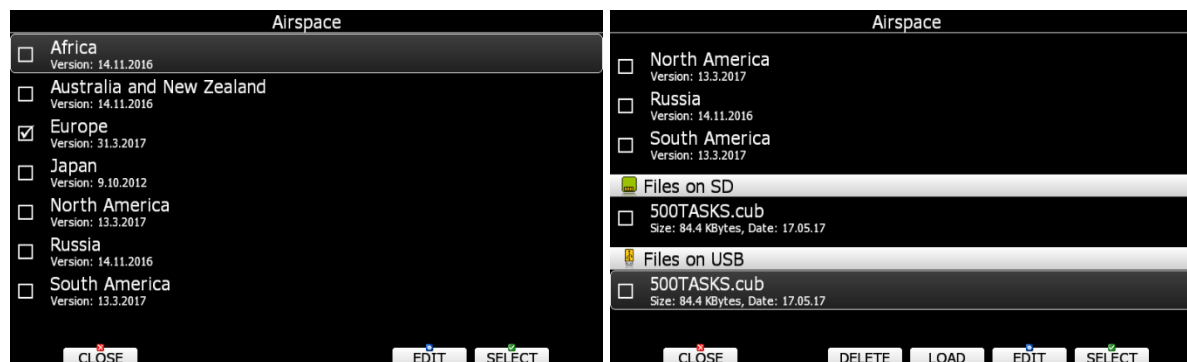
In next step the data source must be selected. Unavailable data source are going to be greyed out. A dialogue with a list of all available files will be opened. Press the **LOAD** button to copy the selected file to the main display unit. The main display unit will accept the following file formats:

- **Waypoints file:** SeeYou CUP files, CUPX files, which may include also images and Cambridge/Winpilot DAT files. When selecting DAT files, waypoints will be converted to CUP format which is the format used for internal storage of points. There is no limitation for the number of waypoints in a file and/or name length.
- **Airspace file:** All types of CUB files are accepted.

5.1.6.2   Uploading Airspace and Airports Database (ASAPT)

LXNAV distributes free of charge airport and airspace database for the whole world. The airport and airspace database is regularly maintained by LXNAV. The latest version of the database can be found on our webpage www.lxnav.com.

The database is distributed as single file with **.asapt** extension. Copy this file to a SD Card or USB stick. Plug the SD card or USB stick into the main display unit and select the **Update database** menu item. If multiple ASAPT files are found on a SD card a dialogue to select the appropriate one will be shown.

Databases are updated automatically and progress of the update will be shown on the screen.

5.1.6.3   Airspace

Select the **Airspace** menu item and press the **SELECT** button. A list of all available airspace databases/files will be shown on screen. The distributed airspace databases are shown first followed by user airspace files, followed by airspace file on SD card and at the end are shown airspace files on USB stick.
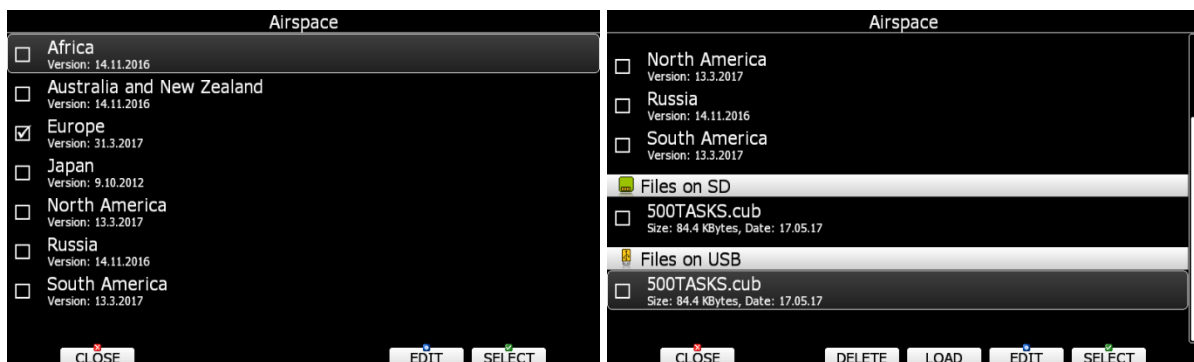

Select the required airspace and press **SELECT**. If a check mark is shown in front of an airspace item, this airspace file will be shown in the graphics and used for proximity calculation, when enabled.

Button labels vary depend on airspace location. For distributed airspace, only buttons SELECT and EDIT are available. For user airspace files stored on main display unit, button DELETE, TO USB and TO SD are added.

To delete airspace file select the airspace item and press the **DELETE** button. Delete action must be confirmed. Only user airspace files can be removed.

Press **TO USB** button to copy selected airspace to USB stick. Press **TO SD** button to copy selected airspace to SD card.

When airspace file from SD or USB is highlighted LOAD button is displayed. Press **LOAD** button to upload selected airspace to main display unit. Loading the airspace doesn't mean enabling it. If you wish to enable, please repeat the SELECT procedure written above.

> When an airspace file from USB or SD card is selected, it will be available only, if SD card or USB stick is inserted in main display unit.

> Selecting airspaces on SD card or USB allows you to create portable profiles, which can be transferred from one device to another device.

5.1.6.3.1 Edit Airspace

It is also possible to edit an airspace file. Select an airspace item and press the **EDIT** button. A list of all airspace zones in this database/file will be shown. Use the page selector to scroll through the items one by one or the zoom selector to move up or down for a whole page. At the bottom of page, a map with selected airspace zone is drawn.
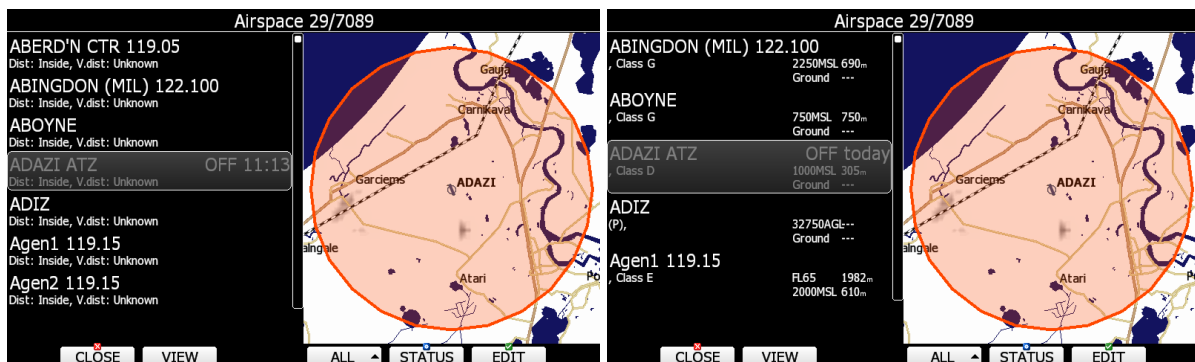
Pressing the **VIEW** button will toggle different views of the zone list.

Using the **STATUS** button the selected zone can be disabled for proximity warnings. Repeated presses will toggle the following options:

- **OFF always**: proximity warning is switched off for all the time.
- **OFF today**: proximity warning is switched off for today only.
- **OFF hh:mm**: proximity warning is switched off for 10 minutes.
- If **no label** is shown airspace is enabled for proximity warnings.

Pressing the ALL will disable all airspaces for TODAY or ALWAYS. To enable them press again ALL and select ENABLE.
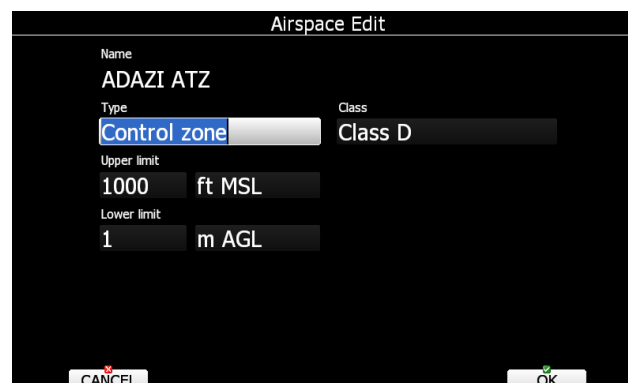
Press EDIT to edit data for the selected zone. Airspace type, class and altitude borders can be modified in this dialogue.

5.1.6.4   Airports

Select the **Airports** menu item and press the **SELECT** button. A list of all available airport databases will be shown. Only distributed airport databases are shown in this menu; the user

cannot modify contents of a database within the main display unit. If an error is suspected in our database please notify us via email info@lxnav.com.

If you wish to add additional airports to the system an ordinary waypoint file should be created and uploaded as a waypoint file or use the LXAsapt editor program to modify the airport database.

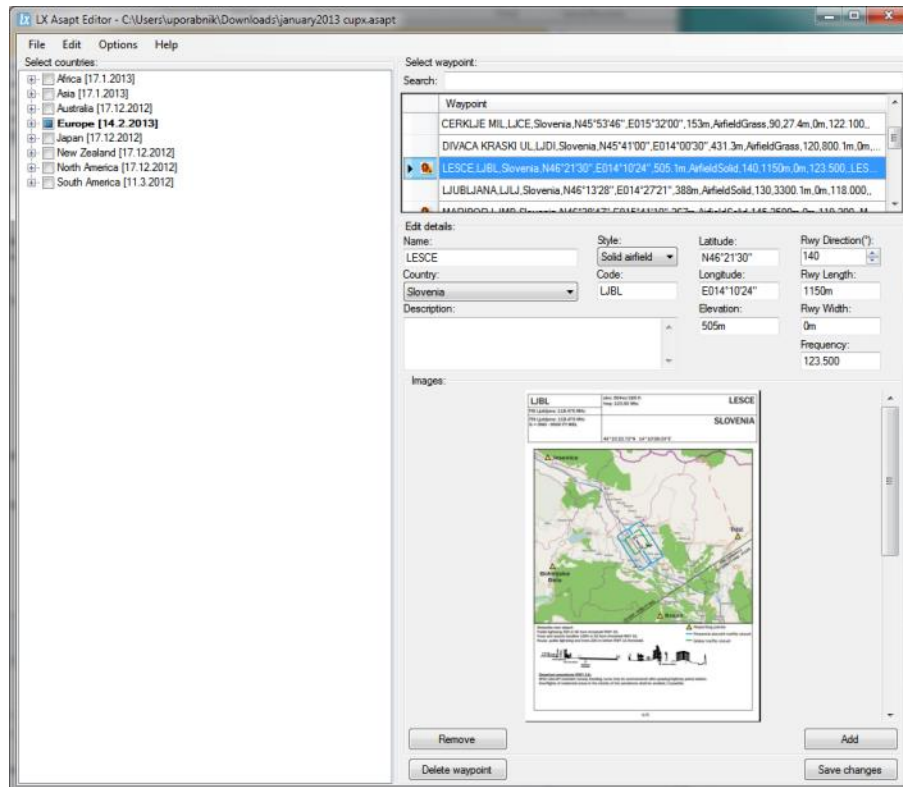### 5.1.6.4.1 Managing Airports Using the LX Asapt editor

LX Asapt Editor allows you to edit any LXNAV airport database distributed as asapt files. You can quickly filter the regions and find the airports you're interested in. View and edit all details of the airports, add charts, photos (from files or clipboard) and any other information you would like associated with them. You can also delete the regions you're not interested in and add any new or missing airports anywhere in the world (for supported regions). The application also monitors every change you make to the database, so you can simply apply changes to a new database when it is released by LXNAV.

Modified airport data can readily be exported to the system as a (asapt) file and imported to the main display unit using the standard procedure for database updates (see Chapter 5.1.6.2).

The original database can be restored only via the update database procedure using the original database file. All databases are published on www.lxnav.com .

5.1.6.5   Waypoints and Flight plans

Select the **Waypoints and Flight plans** menu item and press the **SELECT** button. A list of all available waypoint files will be shown on the screen.

Multiple files can be selected. All checked files will be shown on the graphics page and used in the near mode calculation, if the waypoint is of the proper type (airport or outlanding place). However, only one file can be the active file. The active file is primary used for Fligt planning. Flight plan can be loaded only from the active file.

> ⚠️ When a waypoint file from USB or SD card is selected, it will be available only, if SD card or USB stick is inserted in main display unit.

> 💡 Selecting waypoint files on SD card or USB allows you to create portable profiles, which can be transferred from one device to another device.

Press the **ACTIVE** button to mark the selected file as active.
Press the **DELETE** button to remove the selected file from the internal storage of main display unit.
If WiFi option is presented, button **TO MAIL** will be visible. Press this button to send selected file to email.
If waypoints files from the SD or USB are selectable, button LOAD is visible. Press the **LOAD** button to upload selected waypoint file to internal storage.
If waypoints file from internal storage is selected button SAVE is visible. Press the **SAVE** button to save waypoints to the SD Card or USB stick. The save dialogue will be opened.

Change the filename if required. Press **TO USB** for saving to the USB stick or press **TO SD** for saving to the SD card.

> ⚠️ CUP and CUPX files also stores flight plans. Flight plan will be also uploaded to the main display unit. This feature is very useful, if you wish to prepare flight plan on a computer using SeeYou or a similar program. You can subsequently easily select a flight plan via the Flight plan->Edit->Load option.

Some of CUPX waypoint files with images are password protected and a valid password must be obtained before using such a file. Please contact vendor to obtain password for your display unit.

5.1.6.6   Maps

Main display unit is preloaded with terrain and vector map data for complete Earth. However it is also possible to use scanned (rasterized) maps as background of navigational screen. Next two images are showing example of scanned ICAO map and satellite imagery.
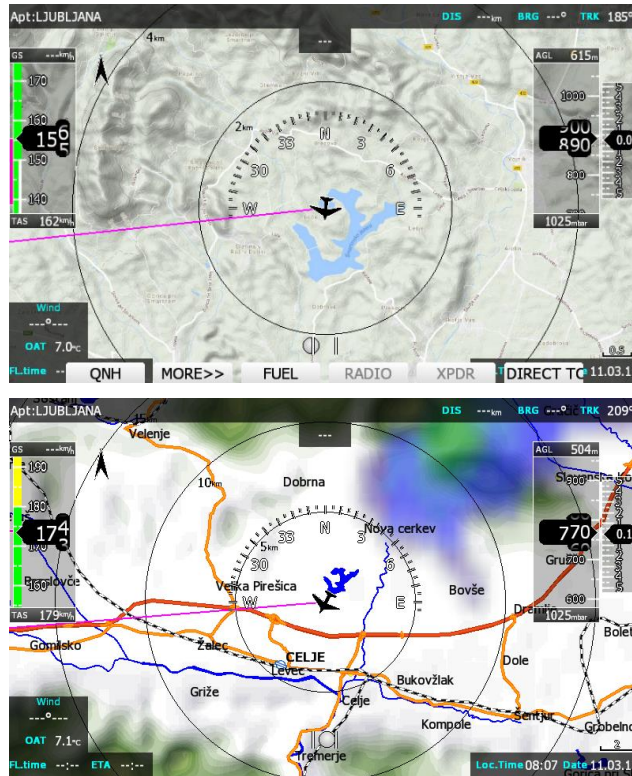
The system is supporting two file formats: CMR file format provided by SeeYou software from Naviter. There are available free of charge sectional maps of USA (www.soaringdata.info) and QMP file format provided by Ifos. Please contact Ifos (www.ifos.de) or (www.strepla.de) to purchase scanned maps.

Select the **Maps** menu item and press the **SELECT** button. A list of all available map files will be shown on the screen.
Multiple files can be selected. All checked files will be shown on navigational page depend on raster map setting.

Press **DELETE** button to remove selected map. Press **LOAD** button to upload selected map to internal memory.

> When a map file from USB or SD card is selected, it will be available only, if SD card or USB stick is inserted in main display unit.

> QMP maps are generated by IFOS and will work only on system with serial number is same as registered serial number on QMP map. If serial number will not comply, the map can not be displayed.

> Map files can be very big in size and can occupy a lot of space of internal storage of main display unit. Selecting maps directly from SD card or USB allows you to save space at no performance cost and create portable profiles, which can be transferred from one device to another device.

5.1.6.7   Flights

Select the **Flights** menu item and press the **SELECT** button. A list of all stored flights will be shown. The main display unit is capable of storing more than 1000 hours of flight logs.

Flights 1/22					
#	Date	Block Off	Takeoff	Landing	Block On	Duration
1	11.03.17	08:57	08:57	08:57	09:17	00:00
2	11.01.17	--:--	15:16	15:16	--:--	00:00
3	11.01.17	--:--	14:59	14:59	--:--	00:00
4	23.12.16	--:--	12:07	13:30	--:--	01:23
5	23.12.16	--:--	11:16	12:04	--:--	00:48
6	15.12.16	--:--	08:45	08:46	--:--	00:01
7	02.12.16	--:--	15:43	15:44	--:--	00:01
8	02.12.16	--:--	14:50	14:50	--:--	00:00
9	02.12.16	--:--	14:47	14:48	--:--	00:01
10	11.11.16	--:--	08:42	09:26	--:--	00:44
11	27.10.16	--:--	11:34	14:30	--:--	02:56
	CLOSE		DELETE			TO SD

If a SD card or USB stick is inserted into the main display unit, flights can be copied to it when the corresponded button is pressed. Flights can be removed from the main display unit using the **DELETE** button. Press **TO MAIL** button to send selected flight to email address.

5.1.6.8   Formatting a SD Card

Use this option if the main display unit cannot read SD card. The system uses the same card format as used by the MS-Windows operating system (FAT). However sometimes Windows does not format the SD card properly or a new card may not be formatted properly. It is recommended to format new SD cards before using them.

> Formatting a SD Card will erase the entire contents of the SD card.

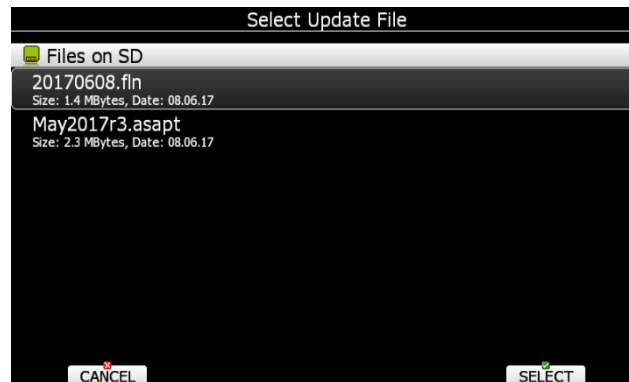### 5.1.6.9   Update databases

Under this section you can upload databases such as:
- .asapt extension (airspace and airport database file provided from LXNAV)
- .fln (flarmnet file)
- .obs (flarm obstacle file)

LXNAV distributes free of charge airport and airspace database for the whole world. The airport and airspace database is regularly maintained by LXNAV. The latest version of the database can be found on our webpage www.lxnav.com.

The database is distributed as single file with **.asapt** extension. Copy this file to a SD Card or USB stick. Plug the SD card or USB stick into the main display unit and select the **Update database** menu item. If multiple ASAPT files are found on a SD card a dialogue to select the appropriate one will be shown.

Plug the SD card or USB stick into the main display unit and select the **Update database** menu item. If multiple files are found on a SD card a dialogue to select the appropriate one will be shown.

Databases are updated automatically and progress of the update will be shown on the screen.

5.1.6.10   PDF reader

Main display unit can store almost unlimited number of PDF documents. User can store here flight manual, maintenance manual, scans of all gliding documents and also checklists.

Select the **PDF READER** menu item and press the **SELECT** button. A list of all available PDF documents will be shown on the screen. Select desired document using PAGE selector. Press **DELETE** button to delete selected document. Press **LOAD** button to upload selected document to internal memory.

> Documents can be very big in size and can occupy a lot of space of internal storage of main display unit. There it not necessary to copy documents to internal memory. Documents can be selected directly from SD card or USB at no performance cost.

Press SELECT button again to open selected document.
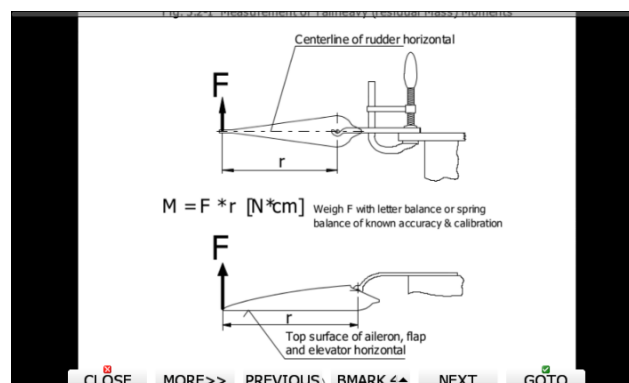
A document will load within few seconds. Use PAGE selector or **NEXT** and **PREVIOUS** button to move up/down through document. Use ZOOM selector to zoom current page. Use MODE selector to move left/right on the selected page. Press **GOTO** button to navigate to specific page. A goto dialog will be open. Use PAGE or ZOOM selector to select desired page
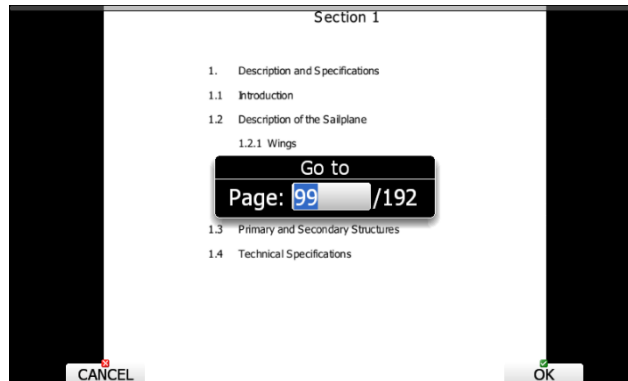
It is also possible to set four independ bookmarks. Press **BMARK1** to open bookmark drop down menu. Press **BMARK1** button once more to set a bookmark. A message will confirm that bookmark has been saved.

5.1.6.11 Checklists

Use this dialogue to load checklist, delete checklists, save checklists or edit an existing checklist file. The active checklist file is the profile which is currently being used. Select a checklists file using PAGE selector knob. Press SAVE, where you will have an option to **TO USB** or **TO SD** for the checklists file will be stored to a USB stick or SD card. A file is stored to a file with the **.checklists** extension. Press the **LOAD** button to load a file from a SD card or USB stick. A profile will be copied to the main display internal storage. Press the **EDIT** button to edit the checklists file name.

> ⚠️ When a profile file from USB or SD card is selected, it will be available only, if SD card or USB stick is inserted in main display unit.

> 💡 Selecting profiles on SD card or USB allows you to create portable profiles, which can be transferred from one device to another device.

Checklists can be found at the last page of APT/WPT and FPL page. Once the action of the checklist is performed press the **CHECK** button. To move through the actions on the checklist use the **NEXT** or **PREVIOUS** buttons.

> 💡 A checklist file can be made / opened and manipulated with the LXStyler program. LXStyler is a special program designed for customising layout navigational pages. It can be downloaded free of charge from our web page www.lxnav.com. For more information about LXStyler please refer to the LXStyler manual.

Creating a checklist file

- Open the latest version of LX Styler
- Click on FILE->NEW CHECKLISTS
- Select your instrument type
- Double click on the blank black page, which will open the customization menu
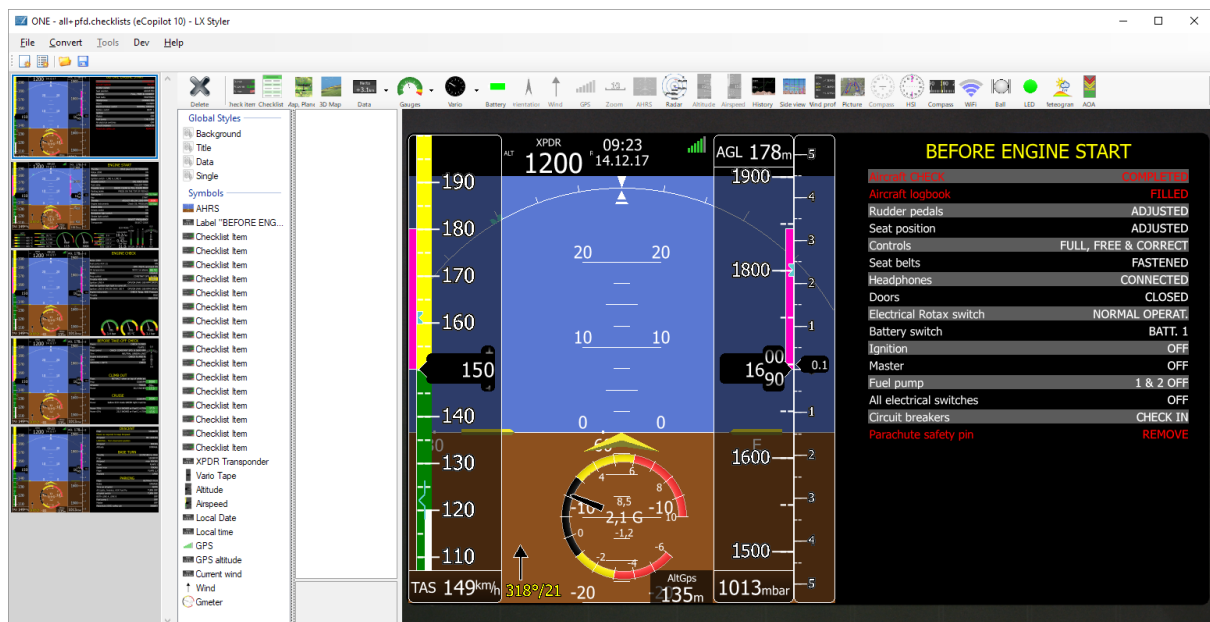
- Click on the icon Checklist
- A new window **create multiple labels** will open
- Now you can set gaps, vertical and horizontal space and text aligns
- Put the text in the table left and right
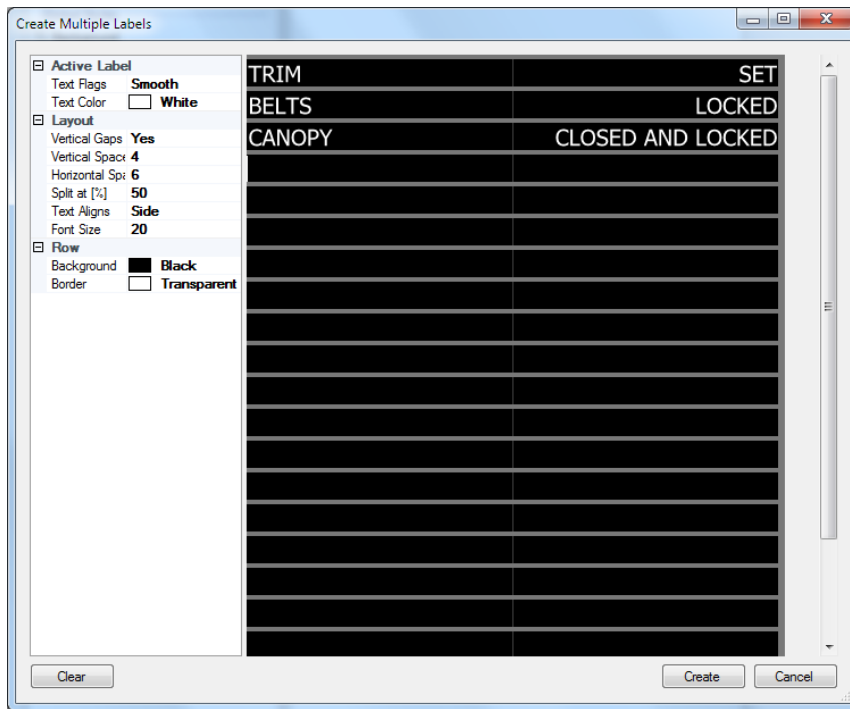
- Once finished, press **create** button

- Press **save** to save the checklist file on the PC/SD card or USB. File has the extension **.checklists**
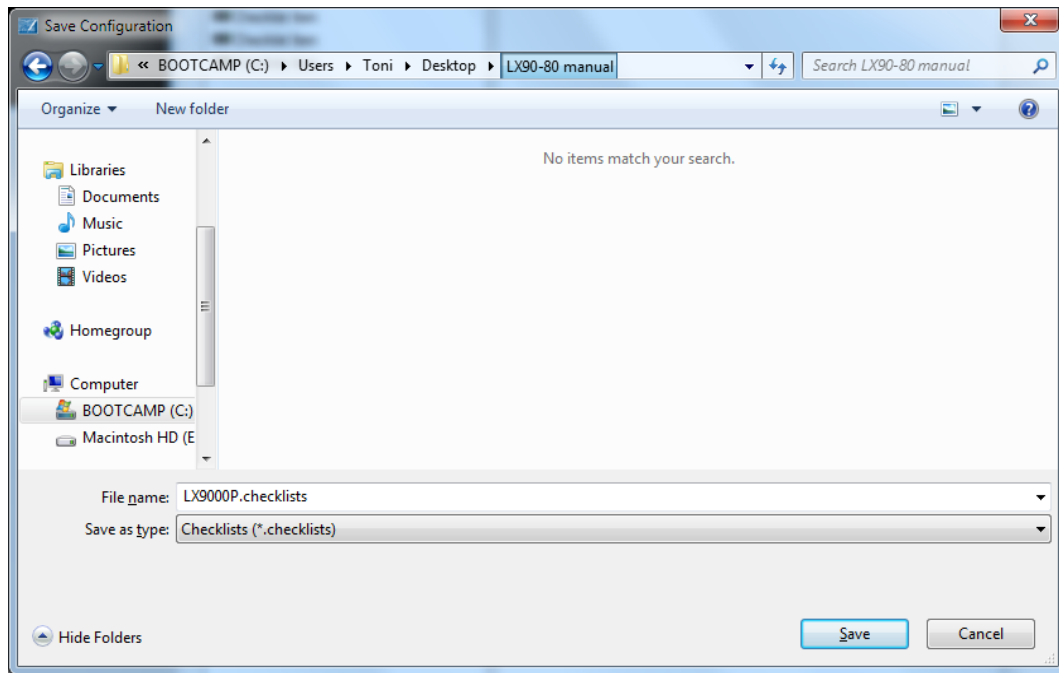
- Go to the eCopilot instrument Files and Transfer ->Checklists and load the file from the SD card/USB key
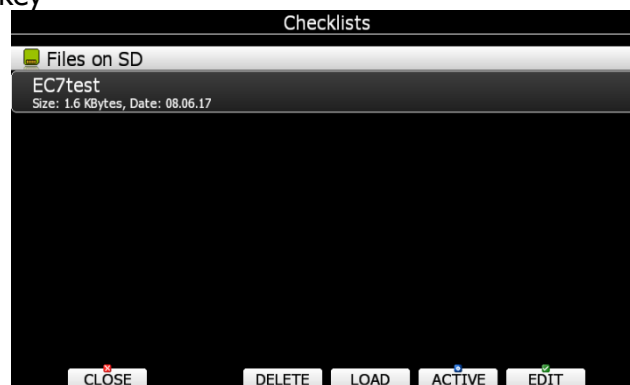
- Checklist is automatically added to the last page of the ATP/WPT and FPL page.

5.1.6.12   Dropbox

Will work only with WiFi option. To use DropBox, user must load credential file to SD card and copy it to Ecopilot.
Credential file can be created on LXstyler program under Tools->Connect drop box.
We need internet connection for that operation and registered dropbox account.
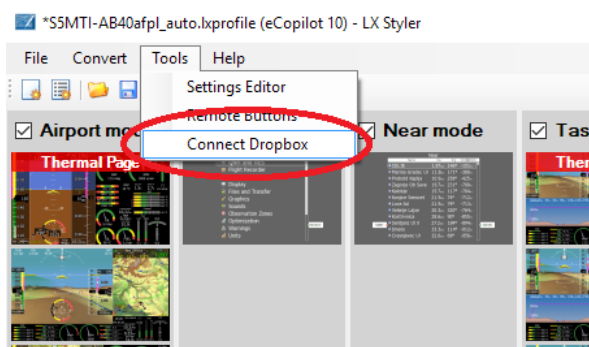
Following instructions, first we need to open drop box link. We will be redirected to internet browser program, where we will get a key.

Click on the keyword, then use right mouse click and select copy.
Then just click with mouse in empty area, where is necessary to enter access info.
Key will be copied, and you can make connection to your drop box.
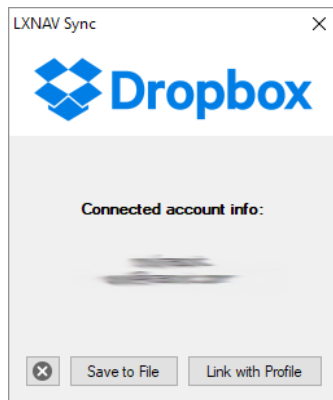
Now we have two options, to save credentials file to SD card or link dropbox account with particular profile. Go under Setup – Files and transfer – Dropbox and load or activate your DropBox credentials file.
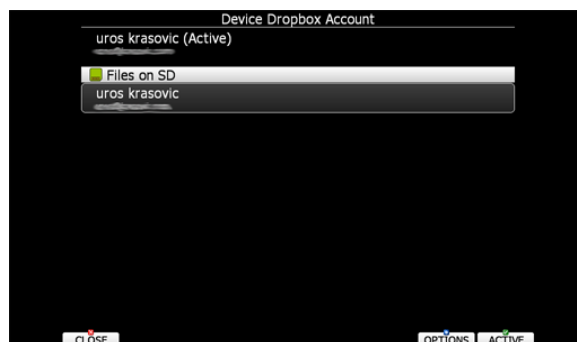
DropBox is ready to use
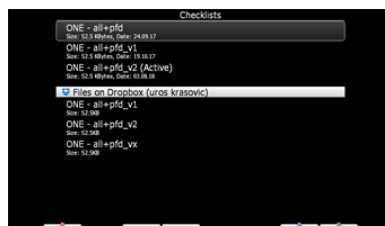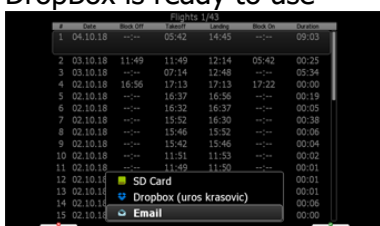
5.1.7 Graphics

This dialogue allows the user to define the appearance of the map in navigational mode. Select the **Graphics** menu item and press the **SELECT** button. A submenu will open.

5.1.7.1   Map and Terrain

The main display unit is pre-loaded with terrain and vector maps for the Earth. The database includes: elevation contour lines, water bodies, roads, highways, railways, big cities and a digital elevation model. The database is derived from the OSM free database. The database cannot be modified by the user.

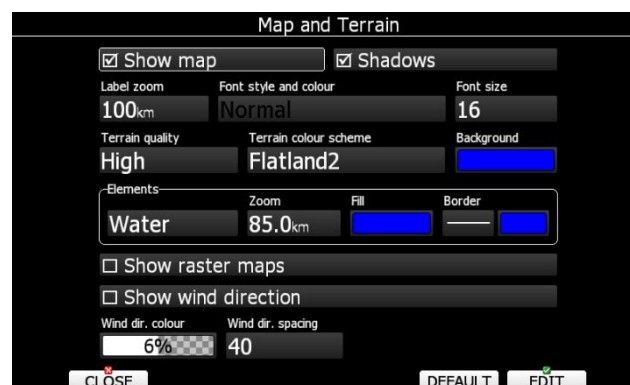Check the **Show map** item to enable map displays in the navigational pages. If this item is unchecked no map will be displayed. Check **Shadows,** if you terrain to be shaded. The **Label zoom** value defines up to which scale of zoom city names are visible. 100km means the whole width of the screen represents 100 km. The user can also modify size, font style and colour via the **Font style and colour** item. Use the ZOOM selector knob to modify the colour and the PAGE selector knob to modify the style. Press **PICK** button to define colour more precisely.

Terrain can be rendered in three different levels. A higher level means more details. The main display unit is optimised to work with high terrain quality. If the value **off** is selected no terrain will be shown; only water bodies, roads, railways and cities.

The background colour is defined by the **Background** item. The default background is black. **Colours of terrain** can be changed using different terrain colour schemes. The following colour schemes are available:

- **Mountain** is default setting with colours from green to white at 2000 m.
- **Flatland** is setting where colours are changing up to 1000 m.
- **Flatland2** is setting where in low terrain is white, otherwise normal colours are used.
- **Low contrast**: same as Mountain but colours are not so intensive.
- **High contrast**: same as Mountain but colours are more intensive and from 0-100 m, white colour is used.
- **Zebra** alternating colours are used.
- **Zebra 2**, less intensive alternating colours are used.

- **ICAO** colouring is similar to ICAO maps.
- **Cliffs** colours emphasis slopes and is similar to Google maps display
- **Atlas** colour scheme is approximation of Imhof colouring widely used in map books.
- **Grayscale**
- **OSM**
- **Himalaya**
- **Relative** colour scheme related to the current altitude (unreachable area is coloured from orange to red, opposite reachable is coloured to white)

In the **Elements** group land features are setup separately. **Zoom** defines up to which zoom level a selected land feature is visible. Also line width and colour can be setup.
Press the **DEFAULT** button to reset these settings back to default.

Following elements are available:
- Water
- Road
- Highway
- Railroad
- Town
- Track
- Airport
- Minor Water
- Forest
- Street
- Minor roads

⚠️ If you have checked shadows and you are flying on flat areas with elevation close to MSL or below, on terrain will be displayed black spots. Black spots will disappear, if you uncheck shadows.

Check **Show raster maps**, if you would like to see also scanned maps (See also chapter 5.1.6.6).

Check **Show wind direction**, if you would like to see lines indicating the direction of the wind.

5.1.7.2   Airspace

In this dialogue you can define the airspace map presentation. Check the **Show airspace** item to enable airspace displays in navigational pages. If this item is unchecked no airspace will be displayed.
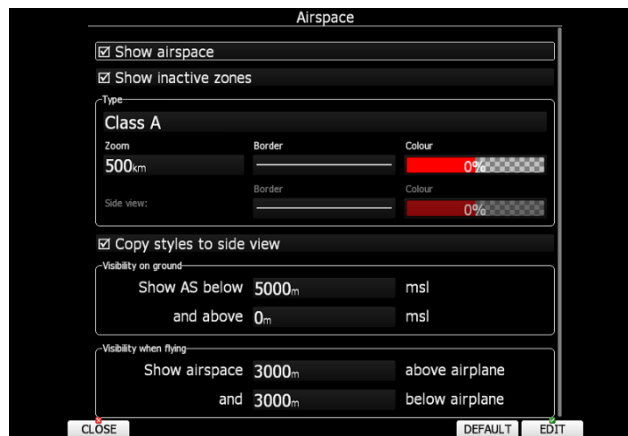
If the **Show inactive zones** option is checked then airspace zones with proximity warning switched off will be shown. Use **Show only airspace below** to eliminate airspace which is going to be too high for the day. For example, if the forecasted cloud base is to be 1500 m, set this value to 1600 m and your screen will be much more readable. In the **Type** panel you can specify how each airspace type is displayed. You should define each type of airspace zone separately. First choose an airspace type from the list. **Zoom** value defines to which zoom level this type is going to be visible. The **Colour** and **Width** items specify how selected airspace zone will be drawn. You can also modify transparency of the selected type. Turn the ZOOM selector knob to change the transparency value. 100% means completely transparent and only the airspace zone outline will be shown. 0% means completely solid (not recommended). Image below shows example of combinations of Width and Colour property and rendering of airspace zone.
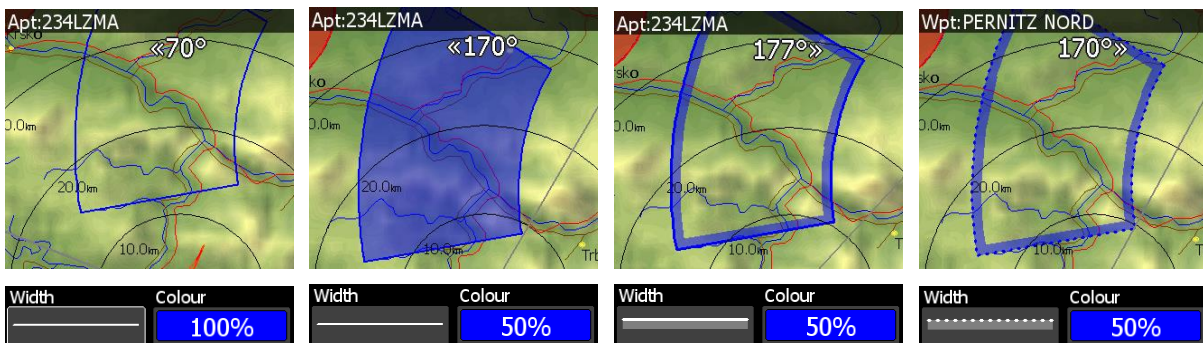

You can set separately airspace colour and border for side view and map view, if option **Copy styles to side view** is not checked. Press the **DEFAULT** button to reset these settings back to default.
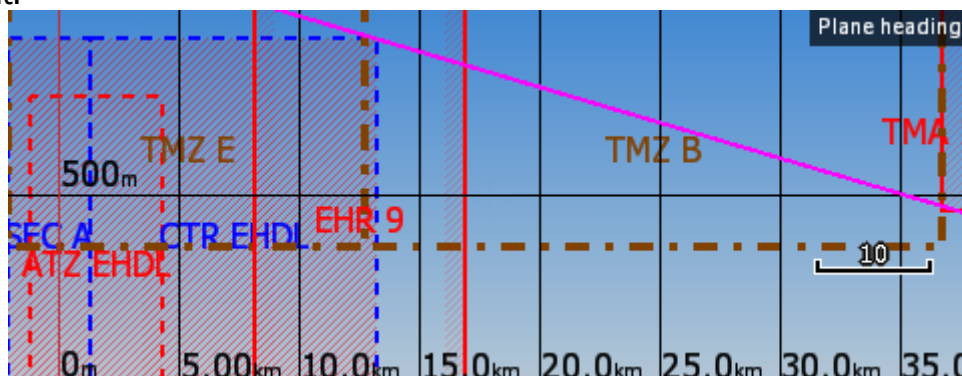
5.1.7.3   Waypoints and Airports

The waypoint and airport look and feel is defined in this dialogue. Check the **show waypoints** item to enable waypoints and airports display in navigational pages. If this item is unchecked no waypoints will be displayed. If **duplicates** is checked, duplicated points might be shown on map, when same waypoint (airfield) is defined in user file as in airport database. Use **show only airports from database** to display only airports from database on airport mode.
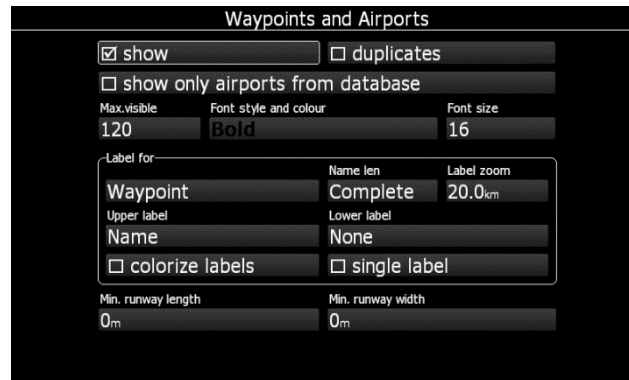
The **Max.visible** item defines how long waypoint labels and detailed symbols are shown. If the maximum number of waypoints on the current screen is more than the defined value only small blue dots will be shown for waypoints and no labels will be drawn.

Font style, colour and size can be defined using the **Font style and colour** item and the **Font size** item. When editing style, turning the ZOOM selector knob will change the font colour.

Waypoint labels can be setup to give even more detail. Label details can be defined for each individual waypoint type (all types,all landable, unknown, waypoint, mountain top, grass airfield, outlanding, glider site, solid airfield, mountain pass, sender, VOR, NDB, Cooling tower, Dam, Tunnel, Bridge, Power plant, Castle, Intersection, Marker).

A label consists of two selectable values: upper label and lower label. If you prefer to have labels in single line, the **single label** checkbox should be checked. A label can also be coloured. Check the **Colorize label** item. Coloured labels are drawn with a green background when the waypoint is within range with the current MacCready settings and with a yellow background when waypoint is within reach with MacCready setting zero. No background is shown if the waypoint is not reachable.

The label is selected from following options:

- **Name**: waypoint name is shown. The name length item controls how the name is displayed.
- **Code:** will display the ICAO code or short name.
- **Elevation:** shows waypoint elevation.
- **Team code:** show the code of your team partner
- **Frequency** will display the point frequency, if available.

Define **minimum runway length** and **minimum runway width** to filter our too short and too narrow runways. Such landing places will be shown in nearest list anyway, but they will be marked with red cross to indicate, they are not usable.

Press the **DEFAULT** button to reset these settings back to default.

5.1.7.4   Airplane and Track

Navigational screen can show the coloured path flown, current track vector and target vector with terrain collision warning.

Check the **Show path** item if you want to see the flown path. **Path length** defines how much of the flown path will be shown. The path can be coloured using:

- **Fixed** path style. Path colour is fixed and defined by path colour item.
- **Altitude** path style, where red colour means low altitude and blue means high altitude.
- **Ground speed** path style, where red colour means slow speed and blue colour means fast speed.

Check the **Show current track** item if you would like to see your current ground track vector. **Track colour** and **width** defines the colour and width of the current track vector.
Selected target and current position are connected with a magenta line.

Check **Show target** if you would like to see this line. In the target colour and target width you can select the **Colour** and **Width** of this line. You can also choose to show or hide the terrain collision point and the target line itself. The terrain collision marker is a red square which is only displayed when there is terrain between the navigational point and the current position and therefore not enough altitude to reach the target with the current glider settings. **Font Style**, **Colour** and **Size** define what font for terrain collision altitude and range circles.

Enable **Show range circles** to plot range circles around aircraft symbol. Having range circles on navigational screen, it is much easier to guess distance to nearest point of interest. **Range colour** and **range width** define the way circles are rendered. A built in engine noise level sensor detects, if engine is running or not. Use **Engine colour** and **width** properties to visualize part of path, where engine was running.

Press the **DEFAULT** button to reset these settings back to default.

5.1.7.5   Flight Plan

Use this dialogue to define how a Flight plan is drawn in task mode.
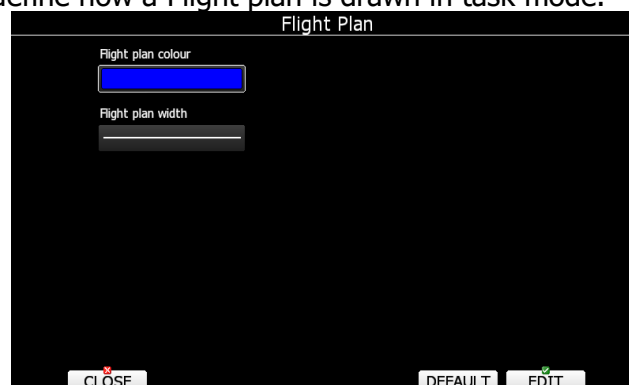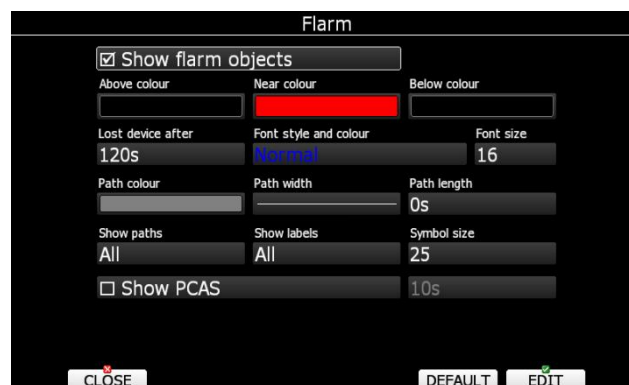

Flight plan colour and width line can be defines in this menu.

5.1.7.6   Flarm

The system can be equipped with the external FLARM module. If your device is equipped with FLARM this menu will let you to modify presentation of the Flarm radar display.

⚠️   Flarm radar is not available if competition or privacy modes are active. Refer to Chapter 5.1.11.2.

Checking **Show Flarm object** will enable display of aircraft detected by FLARM.
Colours are designed to present three values. The colour for aircraft more than 100 meters above your current altitude is defined by the **Above Colour** item. The colour for aircraft more than 100 meters below your current altitude is defined by the **Below Colour** item. The colour for aircraft that are less than 100 meters below or above your current altitude is defined by the **Near Colour** item.
When a signal from a particular aircraft is lost the aircraft remains blinking on the screen for the duration defined in the **Lost device after** item (default 120 seconds). After that time the aircraft symbol will not be displayed.
Show labels combo box defines for which Flarm objects altitude and vertical speed are displayed next to the aircraft symbol. The user can modify size, font style and colour. Select the **Font style and colour** item. Use the ZOOM selector knob to modify colour and the PAGE selector knob to modify style.
It is possible to display the flown path of tracked aircraft. **Path colour** and **Path width** define width and colour of paths. **Show paths** combo box defines for which Flarm object paths are going to be visible.
**Symbol size** defines size of symbol of Flarm object.
Check **Show PCAS** to see non-directional traffic on navigational screen. Non-directional traffic will be draw with dotted circle at received distance from aircraft position. PCAS timeout is setup separately in next time spin control.

5.1.7.7   Rain Radar

If the Wi-fi module is present, then this menu is also available. During the flight, there is a possibility to get the real time rain radar picture, if the Wi-fi module is connected to the 3g hotspot and if the hotspot has the mobile signal.

Show rain radar will automatically show the radar picture layer over the map. **Opacity** defines the layer transparency over the map and **zoom level** sets when the layer can be seen. **Max age** defines time since the last rain picture has been received. **Animation** is showing how the rain is moving over the map. Last picture can be also frozen, which is defined by **freeze latest frame** for a time set.
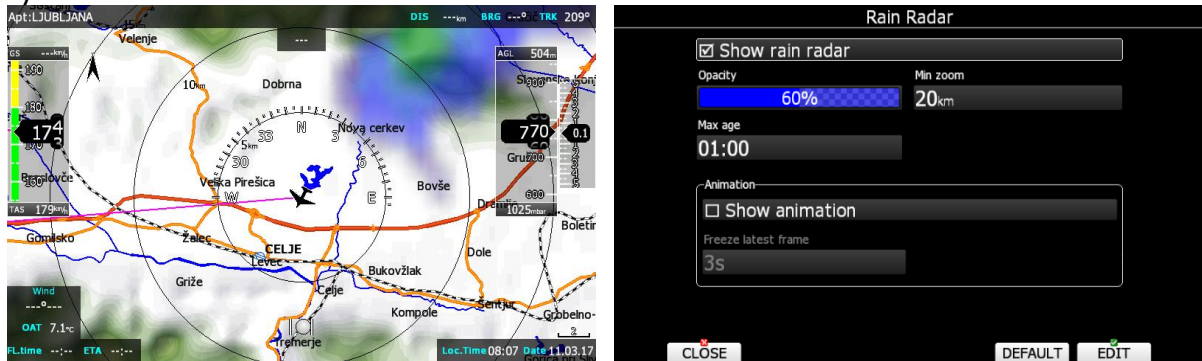
5.1.7.8   Misc

Button settings can be set here.
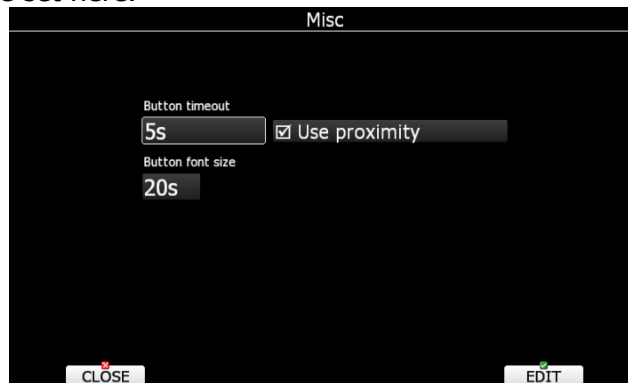
Screen button appearance can be set by **button timeout** time. Proximity will be detected after touch of a button if **Use proximity** is ticked. Also **button font size** can be set here.

5.1.8 Sounds

In the Sounds setup page voice settings and alarms settings can be modified.

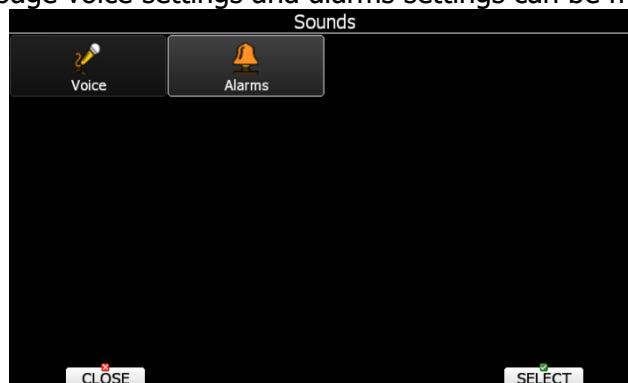Volume can be also controlled using big left rotary knob. Rotating it will directly change volume for sounds, which is currently being played. For example, if voice message is being played, voice message volume will be set. If alarm is beeping, alarm volume will be set.

When button **VOLUMES** is pressed a menu will appear, where it is possible to set up all volumes at same time.
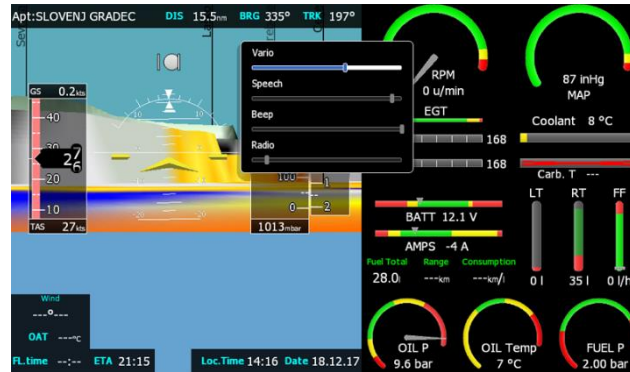
5.1.8.1   Voice
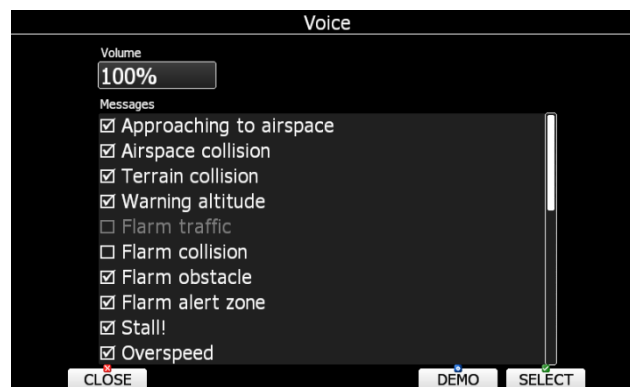
In the **Voice** menu volume level (loudness) of the voices can be adjusted. In the Messages window each item can be set separately. Only checked items will be played.

Volume level (loudness) can be also set with volume rotary knob, when messages are being played

5.1.8.2   Alarms

Beside of voices there are also available alarms, which sounds like a beep. The frequency and the period of the beep can be adjusted. This screen allows the parameters of the audio to be configured. If a particular message item is checked the main display unit will generate an alarm at the time of event.
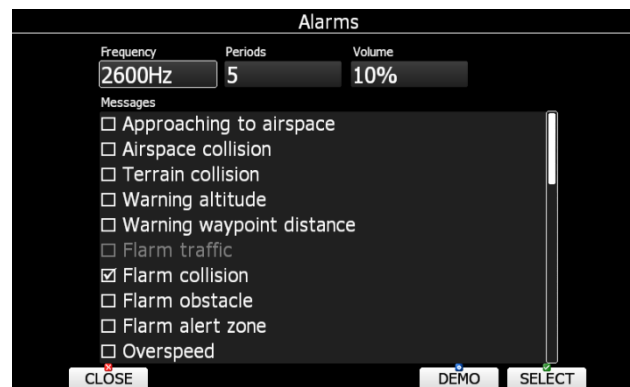
Frequency and **Periods** define the length and pitch of alarm. Press **DEMO** button to play alarm sound. Change volume to define loudness of alarm.

Volume level (loudness) can be also set with volume rotary knob, when alarm is being played

5.1.9 Warnings

There are 6 types of warnings available. Airspace warnings are shown when approaching a particular airspace zone, Altitude warnings are shown when approaching to a defined altitude, Terrain warnings are shown when approaching to a defined terrain buffer, Flarm warnings are triggered when conflicting traffic is in the vicinity, Time Alarms are raised at defined time interval to remind pilot to do specific task and Waypoints warning are triggered when approaching to a predefined waypoint distance.

Use this dialogue to setup the behaviour of warnings.
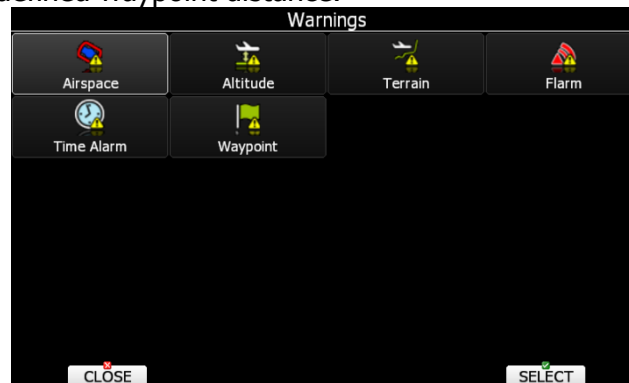
5.1.9.1   Airspace Warnings

Airspace warnings are the most complex ones. An airspace warning is activated by two triggers; First warning (orange) will be given when a projected position of flight for period, which is defined in the **Time** item, is computed to cross an airspace zone.

Second warning (red) will be raised when a projected position of flight is computed to cross airspace zone and the glider is already in the buffer zone in the vertical or horizontal directions. Buffer zones are defined in the **Horz.buffer** and **Vert.buffer** items. Default values are 1 km for horizontal buffer and 100 m for vertical buffer.

The first warning (orange) will also be given when you enter an airspace zone buffer but the projected flight is computed to cross it.

An Airspace warning will be raised in all modes and dialogues. A warning for an alarmed zone can be dismissed for a whole day, some minutes or just quit. **Quit** means that the message will disappear. Use **Dismiss for** spin to define dismiss time in minutes. This time will be

shown in the lower-middle button after which the warning will be raised again. However an alarmed zone will still be filled with transparent red colour and outlined with a thick line and also the distance to the nearest point of the airspace zone will be shown.

To prevent dismissing by mistake check the **Confirm dismiss** checkbox and you will be always prompted to confirm dismiss for a particular airspace zone.

The **RESET** button will reset the status for all airspace zones.

5.1.9.2 Altitude Warning

If the projected altitude is greater than the set altitude, an altitude warning will be raised. Projection is calculated based on the 20 second average vertical speed and time which is defined in the **Time** item. Altitude warnings will be raised in all modes and dialogues just as for airspace warnings.

Altitude warnings can be dismissed for 1 minute, 5 minutes or disabled.

5.1.9.3 Terrain

Terrain warning will be triggered at calculated time before the terrain hit. Time before collision can be adjusted.

5.1.9.4   Flarm Warnings

Flarm warnings will be raised only when system is receiving FLARM data from internal or external FLARM module. Using this dialogue the user can define which warnings will be shown and how they are going to be shown. There are three types of warnings:

- **Traffic** warnings will be raised once a new aircraft is detected by FLARM.
- **Obstacles** warnings will be displayed when a collision with a ground obstacle is predicted. Obstacles file should be loaded.
- **Alert zones** are marked by ground stations to notify pilots of active parachute dropzones, RC/RPAS/UAS flying areas or similar
- **Low alarms, Medium and High alarms** combo box defines alarm level at which system will display collision warning.

Explanation of alarms:

- **Low alarms:** For distant Flarm targets the main unit gives a short or long message, just a beep or be turned off. (19-25 seconds before possible collision).
- **Medium alarms:** For distant Flarm targets the main unit gives a short or long message, just a beep or be turned off. (14-18 seconds before possible collision).
-
- **High alarms:** For very close Flarm targets main unit gives a short or long message, just a beep or be turned off. (6-8 seconds before possible collision).
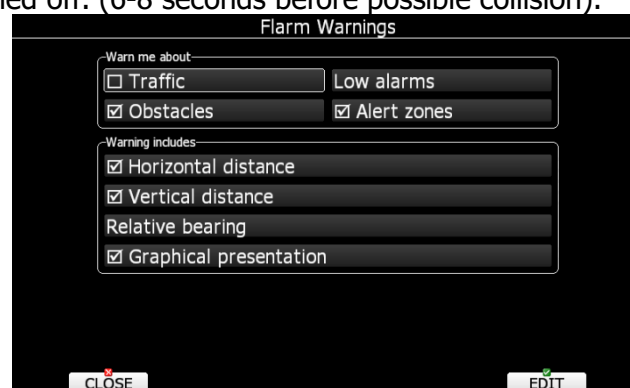
If the voice option is enabled it is also possible to hear the horizontal and vertical situation to the current object. Uncheck appropriate items if you want to disable this part of the message. You can also define the way direction to the Flarm object will be presented. There are three options:

- **Relative bearing:** In this option direction will be given relative to the glider's nose direction (e.g. *Traffic 3' o clock*, which means traffic, is on your right side).
- **True bearing:** Direction is give with absolute direction (e.g. *Traffic from 330°*)
- **Relative/True bearing** is a combination of both methods. Relative bearings will be given when flying straight and true bearings will be given when thermaling.
- **Graphical presentation**. When this item is check, also a graphical presentation of FLARM will be shown, when Flarm warning is displayed.
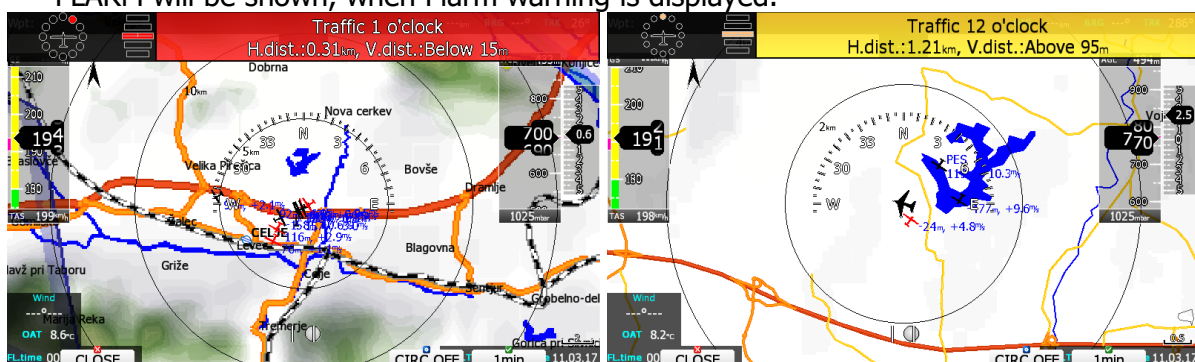
Picture above shows typical Flarm warning with graphical presentation and relative bearing of object. Press CLOSE to dismiss warning, CIRC.OFF to dismiss for time of circling and 1min to dismiss all Flarm warnings for one minute.

5.1.9.5   Time Alarm

Use this dialogue to define three independent time alarms that will be triggered at specified periods.

5.1.9.6   Waypoint warning

Ecopilot will give a waypoint warning at the pre-set distance.

5.1.10 Units

It is possible to toggle between imperial and metric units or custom setting of the unit for each type.

5.1.11 Hardware

Use this menu to define hardware properties such as: Compass calibration, FLARM module settings, AHRS settings, Wi-fi module, Flaps, Weight and Balance, Angle of Attack, Speed Limits, Battery Types, NMEA output and data which will be exchanged between the rear and front display units. Some items may be greyed out when the selected option is not available.

5.1.11.1   Sensor Box

All settings in this menu are related to the glider and thus they do not depend on profile selection.
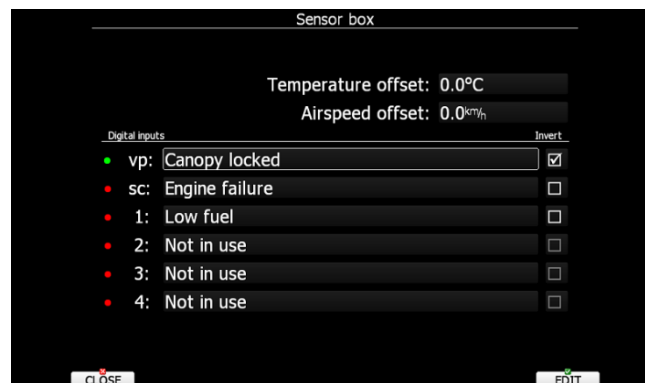
5.1.11.1.1 Temperature Offset

The system is supplied with an external outside air temperature (OAT) sensor. With the offset setting it will correct static errors of temperature measurement.

5.1.11.1.2 Airspeed Offset

Some airplanes are having quite big difference between calibrated airspeed and indicated because of imperfect static ports. An airspeed effects on wind calculation. It is possible to define an airspeed offset to improve wind calculation.

5.1.11.2   Engine monitoring Box

Ebox is a measuring system for an engine and other physical parameters. Sensors connected to the Engine box must be defined at the sensor type and sensor model. Some sensors need additional calibration which can be performed in this selection. **Period** defines the frequency of measured data.
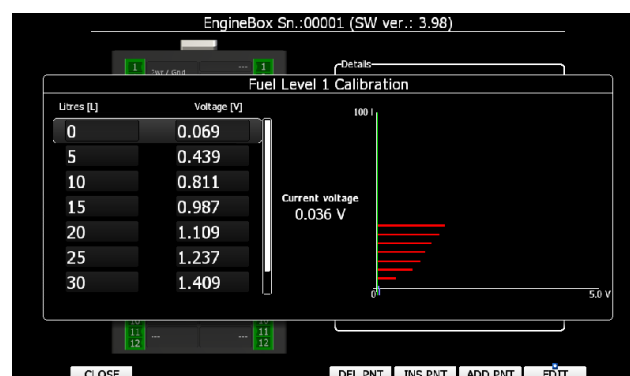
Ebox configuration can be transferred to new aircraft with same sensor configuration by saving configuration **TO SD** and loading it **FROM SD** card on another aircraft.

5.1.11.3   Bridge

Bridge is an external device which is sold separately and is used to connect radio or transponder to the eCopilot.

⚠️   See installation manual for details on wiring of Bridge.

Once bridge 232 is plugged into CAN bus, Bridge Sn.:SNxxxx will appear in Hardware menu. First functionality must be defined. Based on functionality, dialog will change and display related items for selected functionality.

Radio bridge is used to operate radio through main display unit. First type of connected radio must be selected. At the moment following types are supported: KRT2, Trig TY91/92, ATR833, Becker 620X. Support for other types is in progress. Please consult LXNAV for more details.
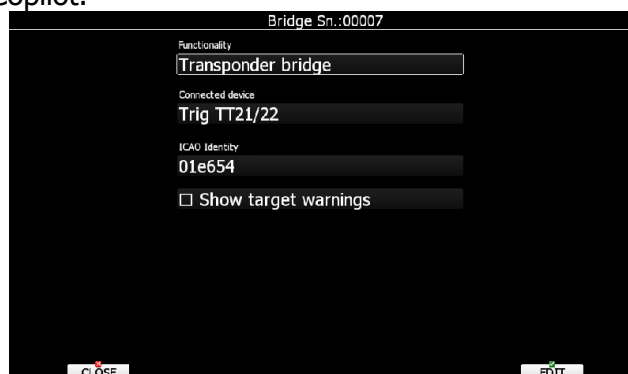
Check **Auto set target frequency**, if you want to automatically select frequency, when new target is selected in navigational mode. Check **show target warnings ???**

Transponder bridge can operate the transponder with the main unit. Supported transponders are: Becker BXP6402 and Trig TT21/22.

ICAO identity

5.1.11.4   Compass

When a compass is connected to the system use this menu to perform calibration of it. Before calibration, please make sure that compass is installed properly. Refer to compass and installation manual for more info about installation.

⚠️   It is very important that compass is installed away from power cables, other compasses, speakers and all other magnetic components in the aircraft. Keep maximum possible distance to such components (at least 30cm).
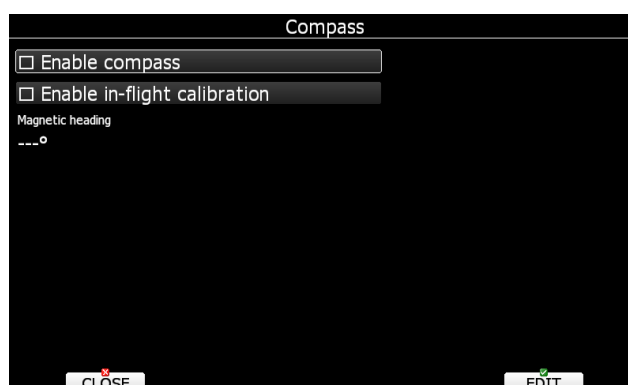
Compass will be enabled if check box **Enable compass** is ticked. If you would like to perform in-flight calibration, check **Enable in-flight calibration**. It is not recommended to do in-flight calibration in very turbulent conditions.

Press **ALIGN** button to align compass with AHRS, which is built-in the AHRS box. When installing compass, please make sure to align it as much as possible with AHRS box. Deviation of few degrees is tolerated. When aligning compass with AHRS it is important that cabin is closed and aircraft is not moving. Message will be displayed on screen, when aligned.

Press **CALIB** button to start calibration of compass on the ground. Calibration process is straightforward. Make sure airplane fuselage is levelled (use tail dolly), wings are levelled and canopy is closed with pilot inside. Switch on all the avionics, which is normally switched on while flying. Confirm calibration of compass to start calibration process. Assistant on the wing should slowly rotate aircraft with wings levelled.

Keep rotating aircraft until progress reaches 100%. Calibration will automatically exit and compass calibration is finished. Check compass directions afterwards, they should be within +/-2 degrees. Press PTT on radio to see if there is any deviation in magnetic heading.
If more error is observed, install compass in different place and repeat calibration procedure.

5.1.11.5   Remote stick

When a remote stick is connected to the system, it is possible to specify functionality of function button. There are several options available for function button:
- **Toggle map settings** will toggle between two stored map settings.
- **SELECT** will call airport select menu or waypoint select menu or task edit depending on current navigational page.
- **MAP** will open map properties dialog.
- **WIND** will open wind selection dialog.
- **AIRSPACE** will open airspace zones dialog.
- **MARK** will create a waypoint or marker at current position.
- **FLARM** will display a list with all Flarm objects in vicinity.
- **PAN** will set navigational screen into pan mode.
- **RADIO** will diplay radio menu.
- **TRANSPONDER** will display XPDR menu.

- **SCREENSHOT** will make copy of screen to SD card-

5.1.11.6   AHRS

When AHRS device is connected to the system, this menu is used to calibrate AHRS for installation error.

Place you aircraft in leveled position and press a LEVEL button. You can also modify pitch offset, if you rotate PAGE selector knob. More detailed can be pitch set using pitch offset spin control.

Mode defines modes of operation of AHRS. AHRS can be switched to **ON, OFF or AUTO**.

5.1.11.7   NMEA Input

eCopilot has one serial port, (RJ12) connector, where external GPS source can be connected. If "use as primary GPS source" is checked, this serial port will have highest priority. Means, that eCopilot will use GPS data from that port. If we want to use GPS data from other sources, this item must be unchecked.
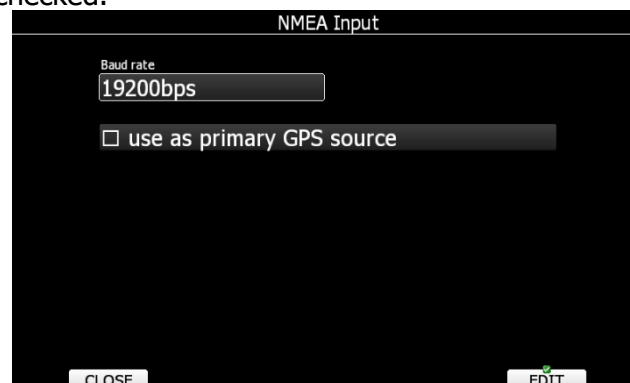
5.1.11.8   Network

When Wi-Fi option is available, this menu will setup all the parameters for network. Wi-Fi can be turned ON all the time, on ground only or off completely. Use Wi-Fi state to define state. SMTP Settings are used to configure server for sending email. It is recommended leaving it as LXNAV, however user server can be configured. More options will be displayed in case of other type of server.

Press **LIST** button to view list of all available networks. Use VIEW button to view more details about selected network.

Press **SCAN** to scan for new networks. Use **EDIT** to enter password for selected network and to connect to it.

Use prefered Wi-Fi network option, if you would like to connect to this network automatically, when network is available. Press **CONNECT** to connect to this network and press **FORGET** to forget this network.

5.1.11.9   Weight and Balance Initialization

Up to 4 arm distances can be calculated for weight and balance, including front seat, which cannot be unchecked. Two baggage compartments and rear seat arms can be selected and used for the weight and balance calculation.
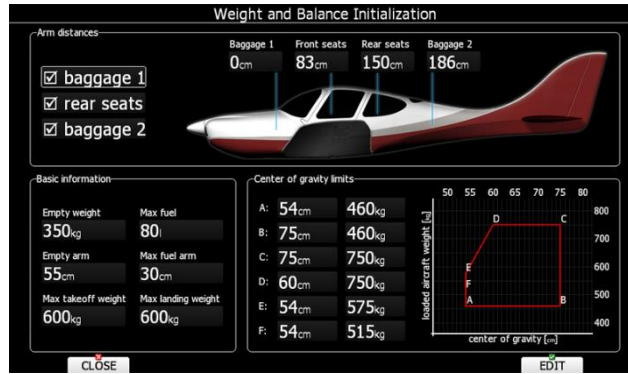
In the basic information - part of the menu following parameters can be set: empty weight, empty arm, max fuel, max fuel arm, max takeoff weight and max landing weight.
In the centre of gravity limits aircraft's envelope is defined.

5.1.11.10   Angle of Attack (AoA)

If AoA hardware is available (Special AoA sensor inside sensor box unit), eCopilot is capable to measure angle of attack. Before use, AoA must be configured. This can be done during straight flight.
Example: Fly plane with cruising speed set focus to Cruise line and press SET button. At this moment AoA for cruise will be saved to eCopilot. Same procedure is for BestLD (Best glide), Min sink and Stall speed.

⚠️   Please read Airplane user manual about flying your plane at stall speeds.

When AoA is configured, AoA Symbol must be placed to the screen layout

AoA symbol has three colours. Red colours indicates approaching to critical angles of attack (Stall), yellow indicates angles between minimum sink and best LD (lift over drag – gilde of the plane), green indicates angles of attack for cruise. Green circle indicates angle of attack, where aircraft has the best glide ratio.

5.1.11.11   Speeds

In this dialog all speed for glider and flap labels are set. Speeds should be given for a reference weight. **Stall speed** is used to generate stall warnings which are available only with the LX Voice module. For aircraft with flap, it is also recommended to enter flap position labels and speed range for corresponded flap position. Speed range shall be given for reference wing load or reference weight.

Once speed range is entered, the system will be able to display requested flap position based on current wing loading and g-factor.

5.1.11.12   Battery Types

This menu defines type of battery being used. Selecting type of battery is important in order to correctly show low battery warnings.
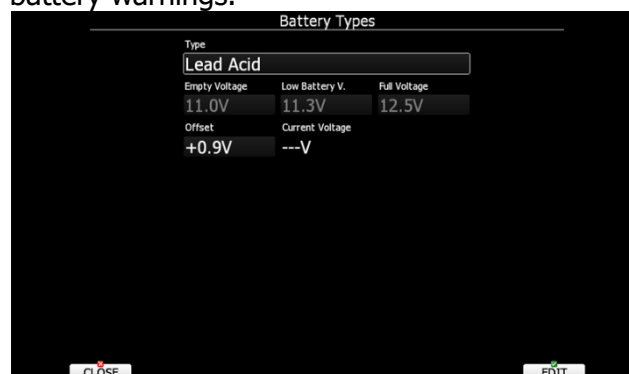
Use **Type** combo to select appropriate type of battery (Lead Acid, LiFe, LiPo, custom). You can see empty, low and full voltage for the selected type of battery. In case of voltage drop, because of cable lengths, you can set up voltage **offset** to adjust measurement of **current voltage**.

5.1.12 Profiles and Pilots

All settings and navigational page layouts are stored in a profile. Profiles can be used in different ways:

- For club operation or multiple pilots sharing the same aircraft. Each pilot can have his personal profile.

Profile consists of two parts:
- **Navigational page layout** defines which navboxes and symbols are visible on navigational page. It defines colour of navboxes, font sizes and colours, how many navigational pages are visible and which modes are enabled. Navigation page layout can be setup with LX Styler or on device itself (See chapter 6).
- **Device settings** includes glider polar, selected databases, selected airspace and waypoints file, map colours, vario indicator settings and flight computer properties. Device settings can be modified on device itself through setup menu (See chapter 0) or with LX Styler.

An active profile is selected when the system is powered on (see Chapter 7.1.2).

Use this dialogue to add a new profile, delete a profile, load/save a profile, copy device settings, change name for an existing profile and to activate a profile. The active profile is the profile which is currently being used. Select a profile using PAGE selector knob. Press **TO USB** or **TO SD** for the profile will be stored to a USB stick or SD card. Press **TO MAIL** to send the profile to email. A profile is stored to a file with the **.lxprofile** extension. Press the **LOAD** button to load a profile from a SD card or USB stick. A profile will be copied to the main display internal storage. Press the **EDIT** button to edit the profile name.

A profile can also be locked. This option is very useful for club operation where one does not want a global club profile to be changed. When a profile is locked all settings will be read-only. Press **LOCK** button to lock/unlock profile. When a profile is locked am message (locked) will be written below the profile name. Press **ACTIVE** to make selected profile as active one.

When a profile file from USB or SD card is selected, it will be available only, if SD card or USB stick is inserted in main display unit.

It is recommended, that profile is copied to eCopilot before activating

Selecting profiles on SD card or USB allows you to create portable profiles, which can be transferred from one device to another device.

A profile file can be opened and manipulated with the LXStyler program. LXStyler is a special program designed to customise layout navigational pages. It can be downloaded free of charge from our web pages www.lxnav.com. For more information about LXStyler please refer to the LXStyler manual.

If new profile is created with LX Styler, it will have default device settings. However, it is possible to copy device settings from profile to another profile. Select newly created profile as active profile. Select profile from which you would like to copy settings to active profile. Press **COPY** button. A confirmation dialog will open.
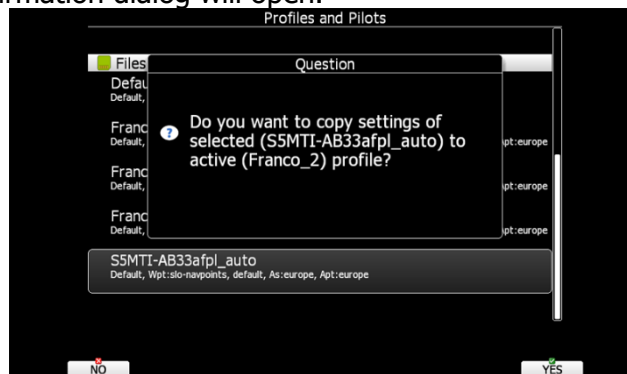
It is also possible to export profile including all the airspace files and waypoint files. Use **EXPORT** and **IMPORT** button to export/import profile with airspace and waypoint data.

Export saves a file in the LXPACK extension which includes active profile, with all checked waypoints, airspaces and airport databases.

5.1.13 Language

The system can run in different languages.

Select the desired language. The main display unit will reload and restart in the new language. If your language is not listed and you feel able to become a translator for the system please do not hesitate to contact us.

Currently available languages are: Czech, German, English, Spanish, French, Italian, Dutch, Polish, Slovenian, Finish and Russian.

5.1.14 Passwords
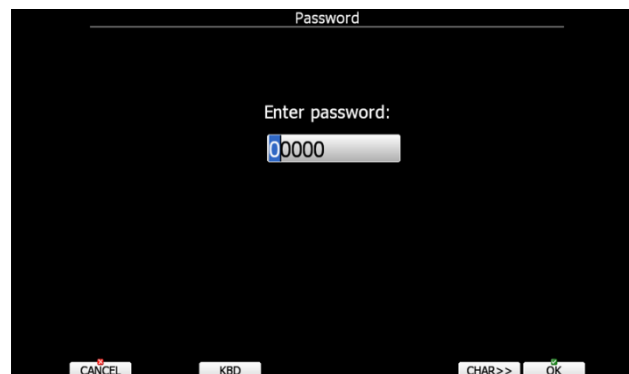
There are several passwords which run specific procedures as listed below:
- **00111** displays information about the system and its sensors.
- **00112** checks integrity of internal file system.
- **01043** will perform "Auto zero" and set indicated speed to zero.
- **30000** browse through installed files (use with caution).
- **74700** shows information about all connected devices on CAN bus.
- **89891** is used to initiate the firmware update procedure.
- **99999** will erase all flights stored on the main display unit.

5.1.15 Admin mode

Admin mode is very powerful tool to disable particular functionality of the system for normal users. It is designed for club usage, where one person is taking care of all instruments.
To enable Administration mode, check **Enable admin mode** check box. Next step is to enter and re-enter administration password. Once password is entered it si possible to define, which actions normal user can do.
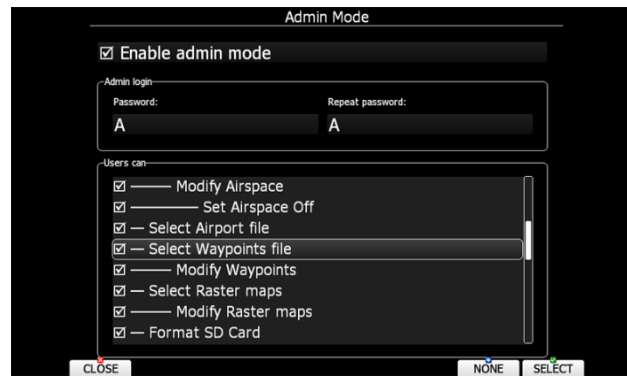
There are several actions, which can be disabled for normal user:
- **Change Report Point**, user will not be able to set report point, if is is already set.
- **Change Wind Methods**, user will not be able to change methods for wind calculation.
- **Change Page Style**, it is not possible to change page layout
- **Change Flarm Target**, user can not change flarm targets names and other data for it.
- **Use Flight Recorder menu,** user can not modify flight recorder properties.
- **Use Display menu**, user can not modify display properties.
- **Use Files and Transfer menu**, it is not possbile to use files and transfer menu completely.
- **Select Airspace file**, user can not select and modify airspaces at all.
- **Modify Airspace**, user can select different airspace file, but he can not edit or delete it.
- **Select Airport file**, user can not select and modify airports.
- **Select Waypoints file**, user can not select and modify waypoints files.
- **Modify Waypoints**, user can select, but can not delete waypoints file.
- **Select Raster maps**, user can not select and modify scanned maps.
- **Modify Raster maps**, user can select, but not modify scanned maps.
- **Format SD Card**, user can not format SD card.
- **Update Databases**, user can not update databses.
- **Modify PDFs**, user can not delete stored PDF documents.
- **Delete Flight**, user can not delete stored flight.
- **Use Graphics menu**, can not use this menu.
- **Use Sounds menu**, can not use this menu.
- **Use Warnings menu**, can not use this menu.
- **Use Units menu**, can not use this menu.
- **Use Hardware menu**, can not use this menu completely.
- **Use rear/front seat menu**, user can not use this menu.
- **Use NMEA input menu**, user can not use this menu.
- **Use Profiles menu**, user can not modify Profiles at all. He can change profile only by restarting the device.
- **Modify Profiles**, user can not delete, edit or lock profile.
- **Use Language menu**, user can not use this menu.
- **Use Passwords menu**, user can not use this menu.

Once actions are selected and admin mode is closed, user will un-selected items grayout.

5.1.16 About

About dialogs shown serial number, software version, installed terrain and update status (if wi-fi module is present). Use this menu, whenever you are experienced a problem with the system. If SD card is inserted into the main display unit, button **TO SD** will be shown. Press **TO SD** and a debug report will be saved to SD card. A report will have a name »debug_20140216_14_21_28.report«. Please email this report to us for further help. In case of network connection, you can also use the function **TO MAIL**, which will send the Debug report to email. **UPDATE** button will give an option to update the system to the latest version (if SD card with the file is inserted)
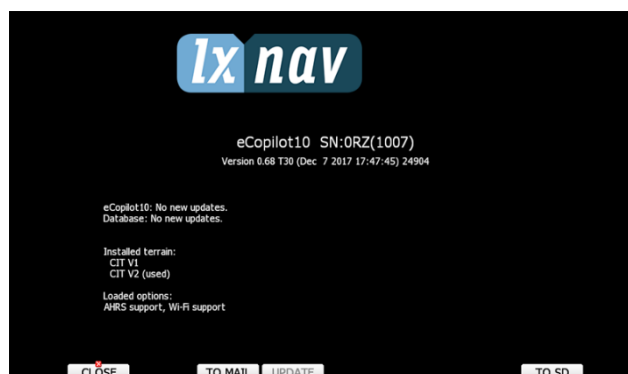

5.2 Information Mode

Information mode consists of four pages; GPS status page, position report page, satellite sky view page and network status page. Use the PAGE selector knob or the up/down arrow to toggle pages.

5.2.1 GPS Status Page

GPS status, altitude, flight level and height are shown on this page. Sunrise and sunset are calculated for the current position. In the upper-right corner the current FLARM status is shown. TX means FLARM is transmitting data to others and the number indicates how many other FLARM devices are within range.

Press **START** button to start running stopwatch. Press **STOP** button to stop running stopwatch. If you press the **MARK** button a new waypoint will be created with the current latitude, longitude and elevation based on the terrain database. The waypoint name is generated from the current date and time separated by the minus character and preceded by an underscore.
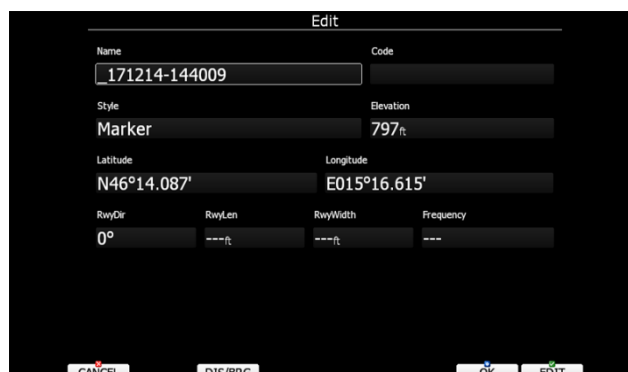
Waypoint data can be modified. Refer to Chapter 5.5.1 for more details. Press the **OK** button to save a marked waypoint or press **CANCEL** to exit without saving. Press **GOTO** button to navigate immediately to selected point.

5.2.2 Position Report

This page shows your position report relative to an arbitrary selectable point. Use this page when you are talking to ATC.
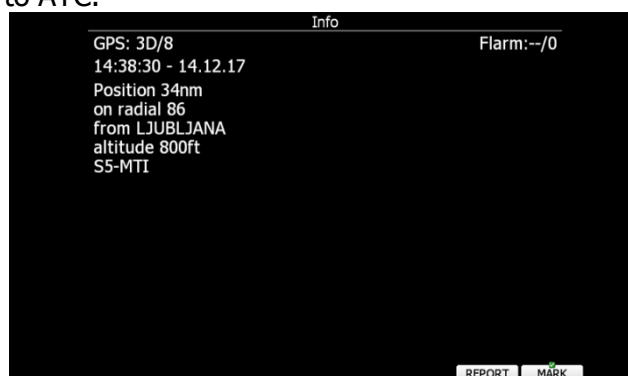
Press the **REPORT** button to select a report point. Radials will always be magnetic and distance will always be in nautical miles. If you press the **MARK** button a new waypoint will be created.

5.2.3 Satellite Sky View

Information about tracked satellites is given on this page. If no satellite information is available a message *"No satellite info"* is displayed.
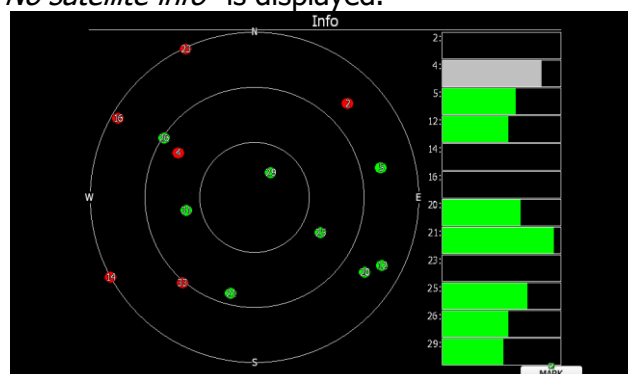
Green satellites are satellites currently being used for position determination. Three concentric circles represent satellite elevation (0, 30, 60 degrees above horizon). If a satellite is in the centre of the circles it is directly overhead.

When you are experiencing bad satellite reception, check this page. If the satellites are always red in a particular place, you should consider moving the GPS antenna to another position. If you press the **MARK** button a new waypoint will be created.

5.2.4 Network status

Network status information is given on this page. Press **LIST** button to list available networks. Press **SETTINGS** button to set up network properties. See also chapter 5.1.11.8.
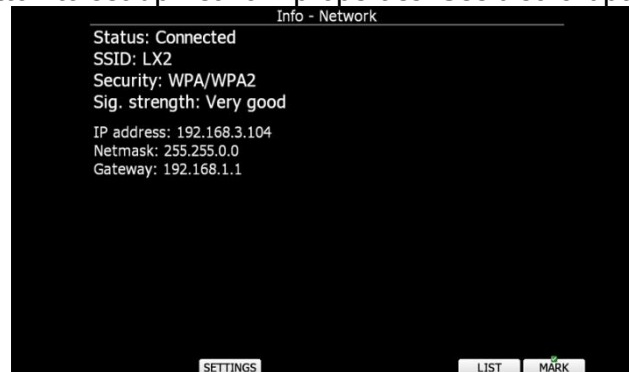
5.3 Near Mode

A list of all landable waypoints and airports is shown in this mode. The default sorting order of the items is by distance. Press the **SORT** button to toggle the sort method. The selected sort method is indicated by the grey background in the header.

Press **VIEW** button to change how much details are visible for selected item. Select the preferred landable place via the PAGE selector knob and press the **DIRECT TO** button. It will automatically change to airport mode and navigation will commence to selected point.

Duplicates are automatically removed. If a target with nearly the same latitude and longitude is found within both the distributed airports database and user waypoint file then only the target from the user waypoint file will be displayed. Press **FREQ** button to set standby frequency, if this option is available (if a radio bridge is present).

Small rectangle in bottom right corner of point icons indicates that selected point is having images.
Red cross is drawn over icon, when length or width of the landing point is small than one defined in Setup. See also chapter 5.1.7.3

5.3.1 Logbook

If a SD card or USB stick is inserted into the main display unit the user can copy a selected flight to it. Select the desired flight using the PAGE selector knob and then press the appropriate button. Press **TO MAIL** button to send flight via email. New dialogs will pop-up. Press **SEND** button to send email immediately. Press **HISTORY** to select different email address, which has been used before.


A flight is automatically copied to the SD card and/or USB stick if it has been inserted into the main display unit when the message *"Finishing flight"* is displayed. This message appears when landing conditions are met.

You can also delete a flight using the **Files and Transfer** menu (see Chapter 5.1.6.6).

Press **VIEW** button to reply the flight. When **VIEW** button is pressed flight viewer will open.
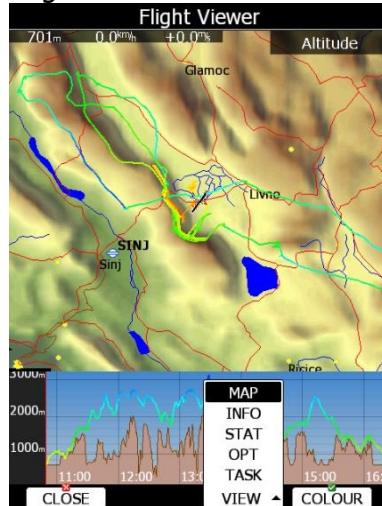
A map with flown path is shown and barogram. Use **ZOOM** selector knob to zoom in or zoom out flight. Use PAGE selector knob to move through flight. Press **VIEW** button again to toggle between different information about that flight.

5.4 Airport Mode

Using the PAGE selector knob you can scroll through the pages. There are several navigational pages available.

⚠️ Navigational pages can be customised using LXStyler. The description below applies to the default navigational pages.

5.4.1 Initial Navigation Page (default Navigation profile)

In the top row the GPS status is shown. Green colour represents GPS 3D, yellow colour means GPS 2D and red colour is GPS bad. The number of coloured bars indicates the number of visible satellites. Each bar represents two satellites.

Local time shows the local time, next to the time is a date. You can set a different time zone in the **Units** dialogue (see Chapter 5.1.10).

The battery symbol indicates status of the battery. When the battery is very low the symbol will turn red and also the **Low battery** warning will be displayed.

The airplane symbol in the middle of the screen is showing current position. The grey line indicates our current ground track and the magenta line is connecting the airplane position with selected goal.

The relative bearing (near the top) gives advice on which direction and how much to turn in order to fly towards the selected target. In the above example we should turn right 122°. **Wind** arrow indicates the wind direction relative to the map orientation. Wind direction and wind speed are numerically presented below the arrow.
Zoom scale is displayed in bottom right corner of screen. A distance of drawn zoom symbol is plotted above the scale.

On top in the middle a **Distance** to selected target is displayed.

Left side of the screen is a tape indicating IAS, right side of the screens is a tape indicating ALT.

In the middle of screen is also a Ball, which indicates non precise flying – drifting.

In the bottom row there are several navboxes showing the important information.

> Each page layout can be customized with LXstyler program or with pressing to LAYOUT button, dirrectly on eCopilot. Customizing layout on PC is much easier and user friendly than doing that on eCopilot.

5.4.2 Button Actions

When any of the eight buttons are pressed, the functions for the buttons are shown. If a selected button is pressed once more the selected action will take place.
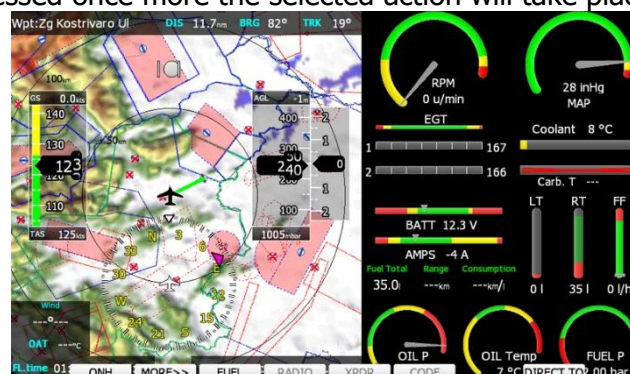
Press the **MORE>>** button to see more options. If the remote stick is available the behaviour is slightly different. When the check button is pressed on the remote stick a menu will appear instead of the button functions.

By using the UP/DOWN key the pilot may select between options.

> ⚠️ This pull down menu will not appear, in case if autohide button labels is disabled. See chapter. 5.1.5

> ⚠️ Button functions or the remote menu will disappear automatically after 10 seconds if no further action is taken.

In airport mode the following selections are available:
- **QNH** will change the qnh setting
- **Fuel** will open a dialogue to set the fuel quantity
- **Pan** will change main display unit into panning mode. In this mode user can move over map in all directions.
- **Flarm** will display a list with all visible Flarm objects. You can select one and use it for navigational purposes.
- **Airspace** shows a list of airspace zones in the vicinity of the current position.
- **Map** item is used to quickly modify map parameters.
- **Wind** will open a dialogue where wind changes with altitude are shown, wind can be set and methods for wind calculation are shown.
- **Select** option is used to select an airport as the new navigational target.
- **Mark** is used to mark the current position and create a waypoint (Marker).
- **Layout** will run page layout editor. In layout editor, it is possible to modify layout of current navigational page.
- **Night** will reduce backlight to level acceptable for flying in very dark conditions.
- **Notam** opens notam details for the selected airspace.
- **Xpdr** opens panel to setup transponder, when this 232 Bridge is installed.
- **Radio** opens dialog to setup radio, when this 232 Bridge option is installed.
- **FUEL** button opens fuel management menu, where pilot can switch between active fuel tanks and changes level of the fuel in each fuel tank.

5.4.2.1   Select an Airport

There are four different methods of selecting an airport. They are called **filter** mode, **icao** mode, **list** mode, **map** mode and **history** mode. You can toggle between these four modes after press on the **select** button and by pressing the **METHOD** button several times.
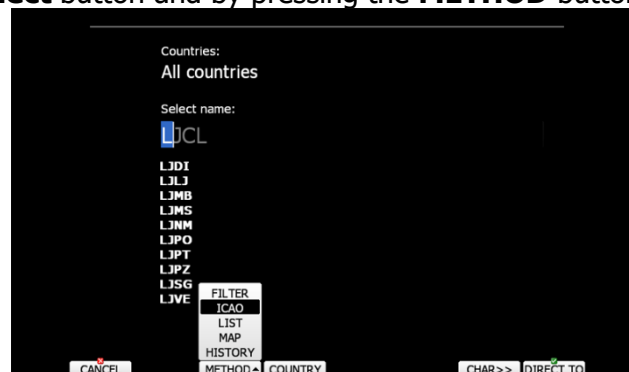
Filter mode

Selecting an airport in filter mode is straightforward. Enter the first letter of the airport name using the PAGE selector knob. The helper will show the first airport matching this letter and the next few airports will be displayed in lower part of screen.

Press the **CHAR>>** button and cursor will move to the second letter. Use the PAGE selector knob to select the second letter. If you wish to return to the first letter turn the ZOOM selector knob counter-clockwise.

You will note that part of the airport name is written in a darker colour. Once it becomes white it means this is the only selection. Pressing **DIRECT TO** will navigate directly to it. If there are more than one airports starting with the filtered letters and you press the **DIRECT TO** button the cursor will jump to the beginning of the airport name. The PAGE selector knob will select among the airports. Press **DIRECT TO** once more and you will navigate to it.

> If you do not know the exact name of an airport just select the first letter and press the **DIRECT TO** button. Now scroll to the desired airport using the PAGE selector knob. Press the **DIRECT TO** button once more and you will navigate to the selected airport.

By default the main display unit will search airports through all countries. It is possible to create a search only from selected countries. Press the **COUNTRY** button and a dialogue with a list of all available countries will be shown.
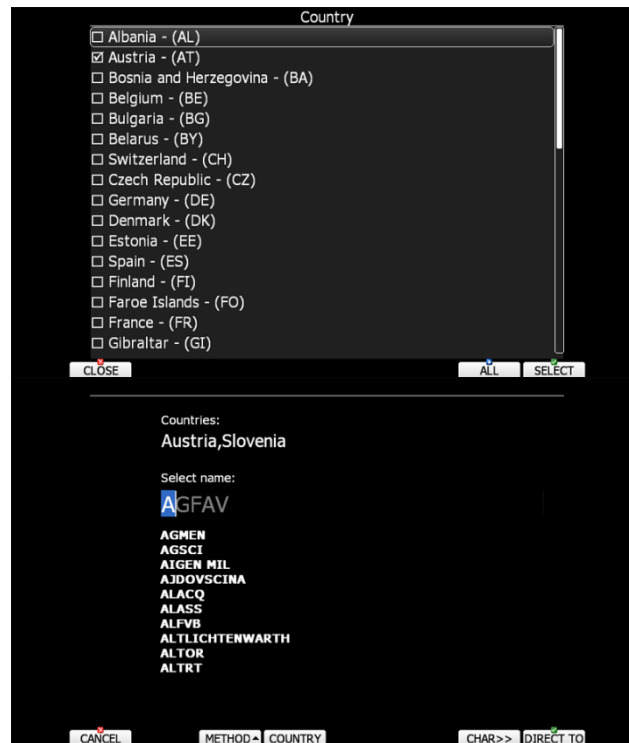
Select the desired countries and press **CLOSE**.

ICAO mode
In this mode airports are selected by ICAO identifier rather than by name. Operation is exactly the same as in filter mode.

List mode
In list mode airports are listed as in near mode.

Press the **VIEW** button to change details of selected airport. Press the **SORT** button to change the sort order of the airports. Select an airport using the PAGE selector knob. Press

DIRECT TO and you will navigate to it. Press the **COUNTRY** button and a dialogue with a list of all available countries will be shown.

Map mode
In map mode, airports are selected directly on the map. Rotate PAGE selector knob to select an airport.

Details of selected airport will be drawn next to it. In upper-left corner of screen current sort method is shown. There are two possibilities, distance sort or bearing sort. Press **SORT** button to change it.

History mode
History mode shows all previously selected airports and additional two points: take-off location and soaring begin location (not shown on picture below).

Use PAGE selector knob to select desired airport. Press **DIRECT TO** to start navigation to it.

5.4.2.2   Map Settings

Map can be quickly configured using this dialogue. Select map orientation in the orientation setup.

A map can have **north**, **east**, **west** or **south** orientation. These orientations are fixed and are not changed with glider position. Additionally to this orientation there are several more which will rotate the map as the glider position changes:

- **Track up** will always have the glider ground track in the up direction.
- **Heading up** will always have glider heading in the up direction. If the compass module is available the heading will be taken from the compass otherwise the heading is calculated from the wind and the ground speed vectors.
- **Goal up** will have target point in upper part of screen.

Map orientation is setup separately for straight flying or circling. If **Zoom to target** is checked the zoom will be automatically adjusted so that the target point is always visible. Maximum zoom is 200 km and minimum zoom is 1 km. The check boxes will turn on or off the following items:

- **Map** – complete map is turned on/off.
- **Terrain** – only terrain is turned on/off.
- **Raster** – scanned maps is turned on/off
- **Airspace** – toggle airspace display on/off.
- **Wpts** – waypoints drawing is turned on/off.
- **Flarm** – Flarm radar display is turned on/off.
- **Path** – flown path is switched on/off.
- **Cur.trk** – current track vector.
- **Rng.cir.** – range circles

> ⚠️ A Flarm object may also be hidden because competition mode is on or privacy mode is on. Please check these settings, if FLARM objects are not visible, even if the item is checked.

It is possible to store map settings for future use. There are two memory locations MEM 1 and MEM 2 for two different memory settings.

Press button **MEM 1** for a long time. A message *"Options stored to memory (1)"* will be displayed and the settings are stored. Change the settings a little bit. Press button **MEM 2** for long time. A message *"Options stored to memory (2)"* will be displayed and the settings are stored to memory location 2. Now short pressing of **MEM 1** will invoke the saved settings from memory 1.

5.4.2.3   Airspace

The Airspace dialogue shows a list of airspace zones in the vicinity of your position. Vertical and horizontal distances are calculated to all airspace zones in the list.
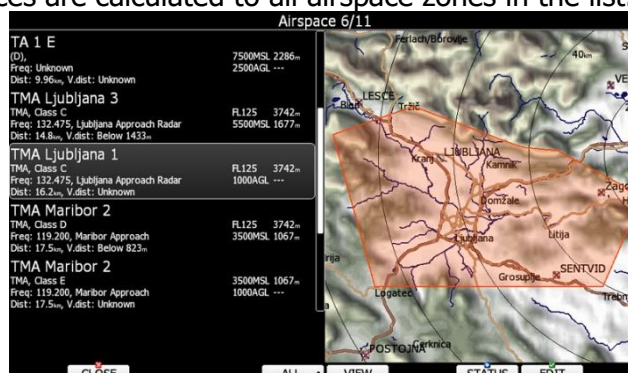
The **VIEW** button toggles the list views. When the **STATUS** button is pressed the status of the selected airspace zone will toggle between **OFF always**, **OFF today**, **OFF hh:mm** and enabled.

If the **EDIT** button is pressed a new dialogue will open where you can modify properties for the selected zone. Refer to Chapter 5.1.6.3 for more details.

When a zone is alarmed the distance will be coloured orange.

Pressing the ALL will disable all airspaces for TODAY or ALWAYS. To enable them press again ALL and select ENABLE.

Press EDIT to edit data for the selected zone. Airspace type, class and altitude borders can be modified in this dialogue.

5.4.2.4   Mark

If you press the **MARK** button a new waypoint will be created with the current latitude and longitude and elevation based on the terrain database. The waypoint name is generated from the current date and time separated by the minus character and preceded by an underscore.

Waypoint data can be modified. Refer to Chapter 5.5.1 for more details. Press the **OK** button to save a marked waypoint or press **CANCEL** to exit without saving. Press **GOTO** button to navigate immediately to selected point.

5.4.2.5   XPDR (Transponder)

This dialog will be available only when 232 Bridge is installed and used as a transponder bridge. In dialog current squawk, mode and flight level are displayed. Pilot can access to this dialog with pressing to XPDR button or touch to XPDR nav box.
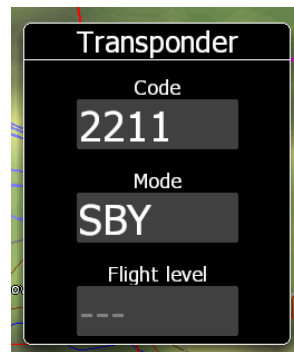
Use **MODE** to select mode of operation of connected transponder (**STBY, GND, ON, ALT**). Press **CODE** to enter squawk code. Press VFR to automatically set squawk code to 7000. Press **IDENT** to identify.

5.4.2.6 Radio

This dialog will be available only when 232 Bridge is installed and used as a radio bridge. In dialog active and standby frequency are shown, transmit status and volume control are shown.
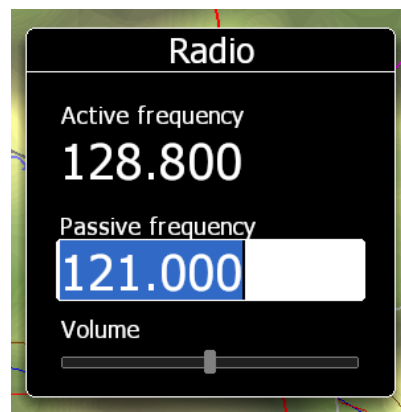

Press **SET FREQ** button to swap active and standby frequency. Press **SQ** to toggle volume control between **volume, squelch and vox**. Use upper left rotary knob to adjust it. In **HISTORY** pull down menu, a list of recently used frequencies is stored. Press **DUAL**, when available, to listen to active and standby frequency simultaneously. Press **8.33KHz** to toggle between **25KHz and 8.33KHz** channel spacing.

5.4.2.7 Fuel

With pressing to FUEL button or calculated fuel amount navbox, fuel management menu will appear. In this menu, pilot can select, which is active fuel tank. From active fuel tank the quantity will subtract every second depending on fuel flow. Pilot can also correct amount of fuel in each fuel tank (after refueling).
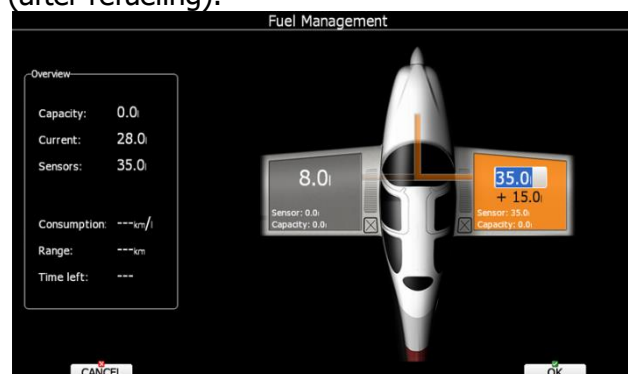
The calculated amount of fuel can be wrong due wrong entering of amount, wrong fuel flow or selecting wrong active fuel tank.

It is possible that fuel tank switch is connected to eCopilot system, then switching between tanks can be automatically.

5.4.2.8   QNH

QNH menu can be accessed with pressing of QNH button or pressing on ALT tape or under setup-QNH.

5.4.2.9   Pan

Pan mode is a special mode where you can freely move around the map; zoom in and zoom out the map to explore some details along the course. Press **PAN** button to active this mode.
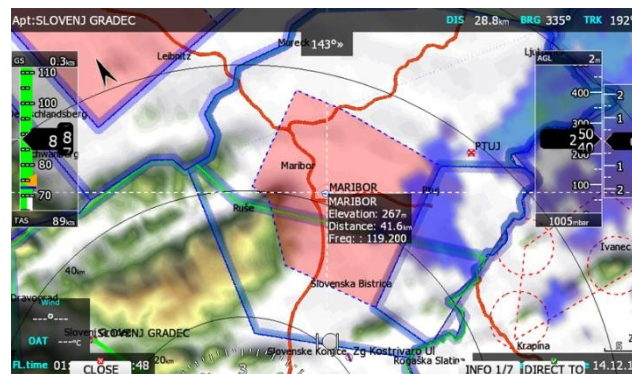
A blue cross will be plotted over the screen with info box for given cross position. Move cross up and down on map using PAGE selector knob. Move cross left and right using MODE selector knob. Turn ZOOM selector knob to zoom map.

If remote stick is being used move jogger to move map. Press **INFO** button to change information for given position of cursor.   There are three types of information possible: information about waypoint in the vicinity, airspace information and current position.

When airspace info is given, press **DISMISS** button to dismiss zone for selected time period.

When waypoint or position info is given, press **GOTO** button to navigate to this point.

Press **CLOSE** to leave pan mode.

5.4.2.10   Layout

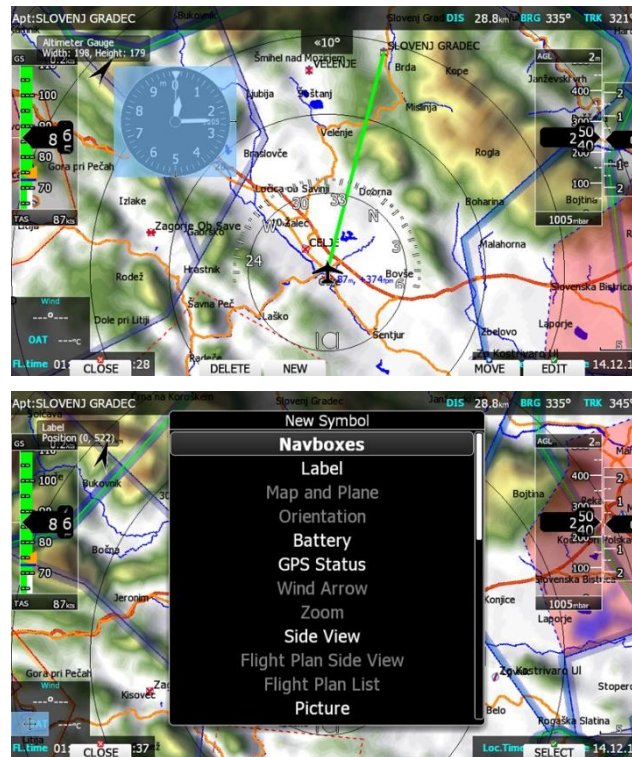Use this option to modify layout of navigational page. See chapter 6 for detailed explanation.
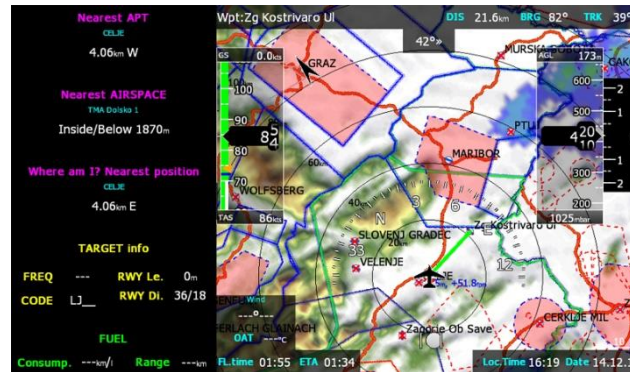

5.4.2.11   Night

Use this option to switch the display brightness to minimum visibility, which can be used for a night flying.

5.5 Waypoint Mode

Waypoint mode is very similar to airport mode. In this mode the user can navigate to waypoints from selected files. In addition to the options in airport mode there are three additional options: Edit waypoint, new waypoint and delete waypoint.

> ⚠ Navigational pages can be customised using LXStyler. The description below applies to the default navigational pages.


- **Pan** will change main display unit into panning mode. In this mode user can move over map in all directions.
- **Flarm** will display a list with all visible Flarm objects. You can select one and use it for navigational purposes.
- **Airspace** shows a list of airspace zones in the vicinity of the current position.
- **Map** item is used to quickly modify map parameters.
- **Wind** will open a dialogue where wind changes with altitude are shown, wind can be set and methods for wind calculation are shown.
- **Select** option is used to select an airport as the new navigational target.
- **Layout** will run page layout editor. In layout editor, it is possible to modify layout of current navigational page.
- **Night** will reduce backlight to level acceptable for flying in very dark conditions.
- **Notam** opens notam details for the selected airspace.
- **XPDR** opens panel to setup transponder, when this 232 Bridge is installed.
- **Radio** opens dialog to setup radio, when this 232 Bridge option is installed.
- **Edit** button will edit data for the selected point.
- **New** button will add new point. A new point can also be copied from the airports database.
- **Delete** button deletes the selected point.
- **FUEL** button opens fuel management menu, where pilot can switch between active fuel tanks and changes level of the fuel in each fuel tank.

5.5.1 Editing Waypoints

Press the **MORE>>** and **EDIT** button. The Edit dialogue will be open with details of the selected waypoint.

There are two possibilities to enter a position. You can modify latitude and longitude to define a position of the point or press the **DIS/BRG** button to enter the position as distance and bearing to a selectable point.
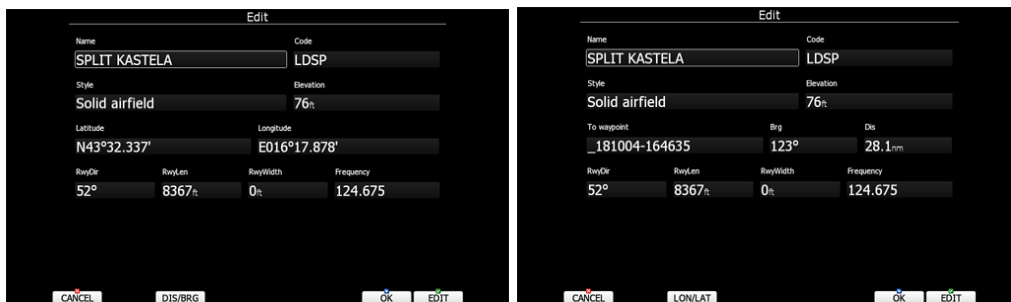
Press the **LON/LAT** button to toggle back to input of latitude and longitude. Modify other attributes at your discretion. When finished, press the **OK** button to confirm changes or press **CANCEL** to dismiss changes. The modified waypoint will be updated in the appropriate file automatically.

5.5.2 New Waypoint

Select this option if you want to add new a waypoint to the active waypoints file. If no waypoints file is selected a new waypoint file will be created with name **default.cup**. A message *"Do you want to copy from airport?"* is displayed first. Press **YES** if you would like to copy it from the Airports database. An airport select dialogue will be opened. Select the airport you wish to copy. If none is selected a blank edit dialogue is opened.

The minimum data that must be entered are name, latitude and longitude. Press the **OK** button to confirm changes and create the new waypoint. The new waypoint is added to active waypoint file. Press the **CANCEL** button to abandon creation of new point.

Elevation will be assigned automatically once the position is entered. Elevation is taken from digital elevation model which is stored in the main display unit for the entire world.

5.6 Flight plan (FPL) Mode

FPL navigation mode is used for FPL manipulation.

⚠️ A FPL can be created only from stored waypoints or airports. A FPL can also be loaded from flight plans tasks. A FPL can will be saved to an active waypoint file (see Chapter 5.1.6.4 for details how to set an active waypoint file).

⚠️ Navigational pages can be customised using LXStyler. The description below applies to the default navigational pages.

When any of the eight buttons are pressed functions for the buttons are shown. If the selected button is pressed once more the selected action will take place. Press the **MORE>>** button to see more options. If the remote stick is available the behaviour is slightly different. When the check button is pressed on the remote stick menu will appear instead of the button functions.
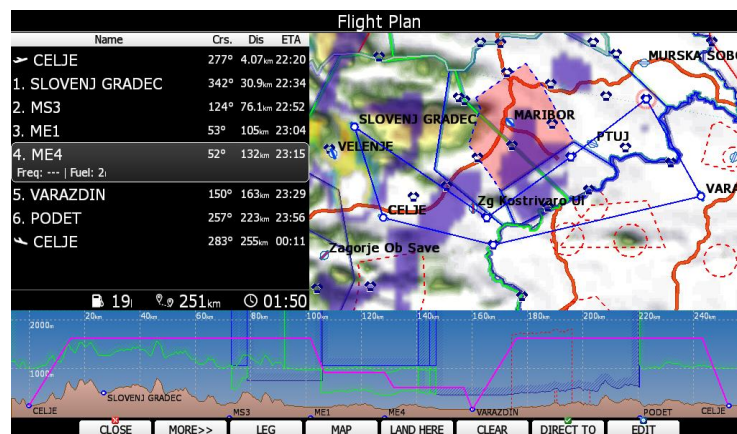
- **Pan** will change main display unit into panning mode. In this mode user can move over map in all directions.
- **Flarm** will display a list with all visible Flarm objects. You can select one and use it for navigational purposes.
- **Airspace** shows a list of airspace zones in the vicinity of the current position.
- **Map** item is used to quickly modify map parameters.
- **Wind** will open a dialogue where wind changes with altitude are shown, wind can be set and methods for wind calculation are shown. See Chapter **Error! Reference source not found.** for more details.
- **Mc/Bal** will set MacCready, ballast and bugs (see Chapter **Error! Reference source not found.** for more details).
- **Select** option is used to select an airport as the new navigational target.
- **Layout** will run page layout editor. In layout editor, it is possible to modify layout of current navigational page.
- **Night** will reduce backlight to level acceptable for flying in very dark conditions.
- **Notam** opens notam details for the selected airspace.
- **Xpdr** opens panel to setup transponder, when this 232 Bridge is installed.
- **Radio** opens dialog to setup radio, when this 232 Bridge option is installed.
- **Edit** action is used to edit the task. This is the one and only task that will be declared and will be available for navigation.
- **FUEL** button opens fuel management menu, where pilot can switch between active fuel tanks and changes level of the fuel in each fuel tank.

5.6.1 FPL Edit

Press the **EDIT** button and the FPL edit dialogue will open. A FPL is created and manipulated within this dialogue. FPL dialogue consist of three parts, list of FPL, map view of FPL, and side view of FPL.

User can edit FPL on the list with using buttons and rotary knobs for selecting waypoints, selecting waypoints on map using touch screen. On the bottom of the FPL list is status line, where is calculated needed fuel, time and distance for active FPL.

Waypoints can be added at the end of the list or inserted before selected waypoint.

To ADD new point, move focus to the end of the FPL list and press **EDIT**.

Press the **MORE>>** button to see more options. Available actions are:

- Press the **EDIT** button to edit existing selected waypoint
- Press **LEG** to edit cruising altitude for selected leg.
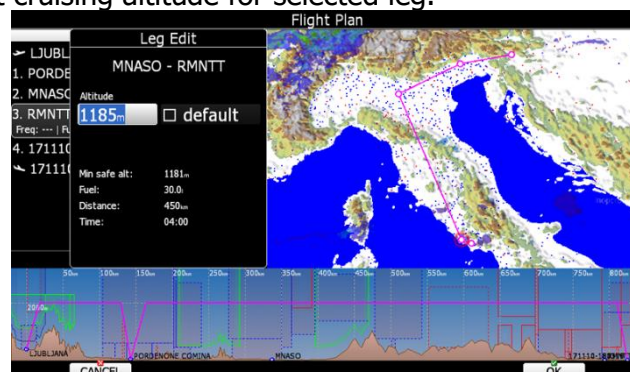
- **CLOSE** action will confirm changes to the task and return to the navigational page.
- **CANCEL** action will cancel all modifications of the task and return to the navigational page.
- **LAND** action will take waypoint on FPL as landing place.
- Press **LOAD** to load the task from the active waypoint file.
- Press **SAVE** button to store the task to the active waypoint file. This task can later be loaded from the active waypoint file.
- **INVERT** action will invert the complete FPl.
- **INS PNT** will insert a new waypoint above the current cursor position.
- **DEL PNT** will delete a waypoint at the current position.
- **CLEAR** will completely erase the FPL.
- **MOVE UP** is used to move selected point upwards within the FPL.
- **MOVE DN** is used to move selected point downwards within FPL.
- **DIRECT TO** can be used in flight operation, if pilot want to make direct navigation to one waypoint in FPL.

5.6.2 Task Creation

Make sure that at least one waypoint file is loaded into the main display unit and that it is checked and marked as an active waypoint file. Refer to Chapter 5.1.6.1 for details on how to upload waypoint files to the system.

Press the **EDIT** button and enter a waypoint name. Entering a point name is very straight-forward. Enter the first letter of the task point name using the PAGE selector knob. The "Helper" will show the first waypoint that matches this letter.


Press the **CHAR>>** button and the cursor will move to the second letter. Use the PAGE selector knob to select the second letter. If you want to return to the first letter turn the ZOOM selector knob anticlockwise.

Repeat this procedure until your desired point is selected. Press the **SELECT** button to complete this selection. If you do not know exact name of a point just select the first letter and press the **SELECT** button. Now scroll to the desired point using the PAGE selector knob. Press the **SELECT** button once more to complete this selection.

The task edit dialogue should now look like the screen below. The symbol for departure indicates you entered the start point, symbol for arrival indicates end point of FPL.

Move the cursor down to the next empty point and repeat the above procedure until the entire FPL is entered. Next to waypoint name bearing to point, distance and ETA from previous point are shown. On the bottom of the FPL list is status line, where is calculated needed fuel, time and distance for active FPL.
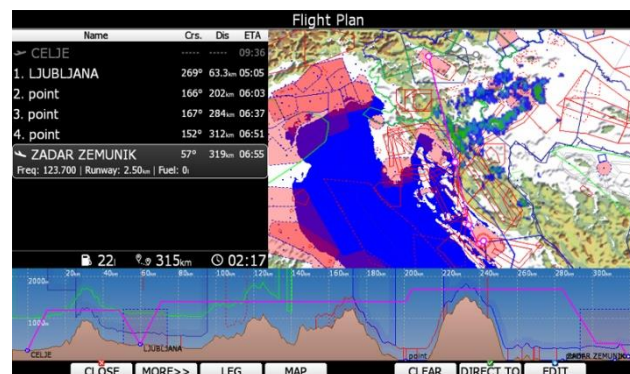
With pressing to particular Airspace zone on side view, that zone wil hilight with it's name.

Sometimes, it is easier to see list of all waypoints. Press **LIST** button to change selection method to list mode. Press **FILTER** button to go back to this mode. In list selection mode, it is possible to sort waypoints on name, distance or bearing. Distance and bearing are calculated to previous point in task. This is very useful, when you do not know exactly waypoint name, but just direction and distance, where to go.

Press **VIEW** button to change view from list to detailed list view. In detailed list view also latitude and longitude for selected task point are given. Press VIEW button once more to enter map edit mode.

5.6.2.1   Map mode

Just press with finger to the map and interactive editing of FPL on map is available.
For zooming you can use two fingers. Swype on map to move by map. Use buttons to ADD, INSERT or DELETE waypoint from the FPL.
Use MODE selector knob to move grey cross left or right and PAGE selector knob to move up and down. Turn ZOOM selector knob to zoom.
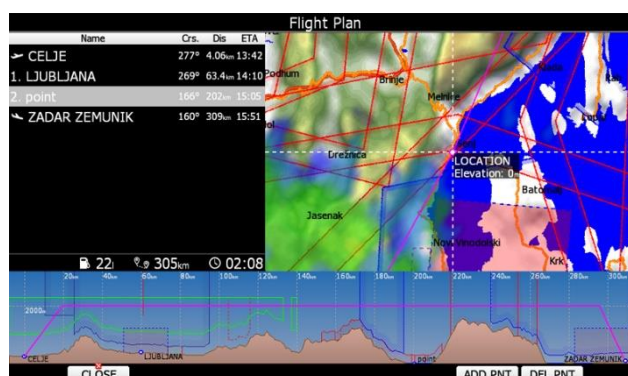
If you want to remove waypoint from the FPL, the cursor must be near waypoint, that you wish to be removed.

 On the map is also visible rainfall radar layer.

5.6.3 FPL leg edit

For each leg of the FPL, the cruise altitude can be selected. Adjustment of the cruise altitude will affect to the total fuel consumption. In leg edit is also available some useful data:
- Minimum safe altitude, to fly over terrain
- Necessary fuel for that leg
- Leg distance
- Leg time

Pilot can modify cruising altitude from default (Ch. 5.1.1.3), to custom value. It can be set also lower that minimum safe alt.
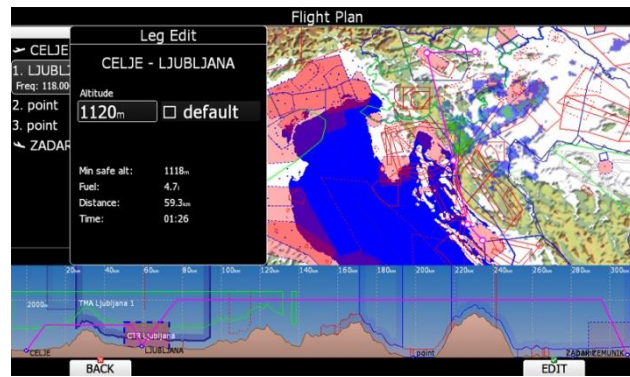
5.6.4 Saving a FPL

Once a FPL is completed it could be saved to the active waypoint file. Press **SAVE** and the message "*Task saved"* will appear on screen.

If the task already exists in the active waypoint file the message "*Task is already saved!"* is shown.

5.6.5 Loading a FPL

It is possible to load a FPL from the stored FPLs within the active waypoint file. Select the **LOAD** action within FPL edit mode. A dialogue with a list of all stored FPLs will be shown.
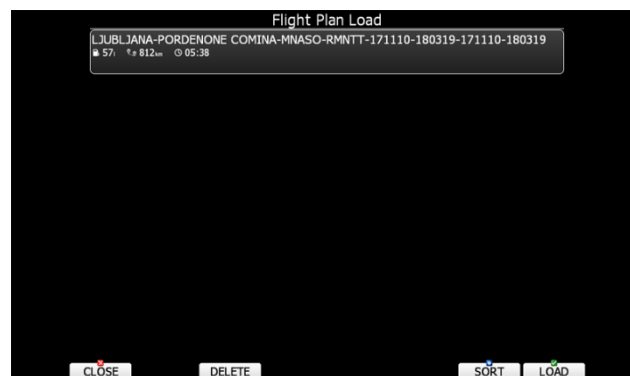
Total FPL distance, necessary fuel and required time are shown for each FPL stored. Select the desired FPL by rotating the PAGE selector knob and press **LOAD**. The FPL will be loaded into the active FPL and the FPL edit dialogue will be opened.

It is also possible to delete FPLs from the active waypoint file. Press the **DELETE** button to delete the selected task.

Tasks can be sorted by start point, task distance and task description. Press the **SORT** button to toggle the sort method.

6   Navigational page layout

On the main display unit navigational page layout can be completely modified and customized to match user preferences. There are two possibilities for page customization.

- **LX Styler program**, a free program for Windows operating system, which can be downloaded from our webpage www.lxnav.com. (See LX Styler manual for more details)
- **LAYOUT** option on main display unit, where you can modify selected navigational page.

> We highly recommend using LX Styler program instead of LAYOUT option.
> **LX Styler** can be used in comfort of your home during long winter period, when you have limited access to your glider.
> Use **LAYOUT** option to make quick changes to layout, just before going to fly.

In this chapter only customization on device will be explained. For more info about LX Styler please refer to its manual.

Navigational page consists of many symbols and navboxes, each of them if fully customizable. Press **LAYOUT** button on navigational screen and a dialog with several options will appear.

- **EDIT** option will enter page customization mode.
- **DELETE** will delete current page. A confirmation message will be displayed prior to this action.
- **COPY** options copy current page above or below it. Duplicated page will then enter in edit mode.
- **ADD** options create empty page and place it above or below current one. Newly created page will then enter in edit mode.
- **SETTINGS** will open dialog, where global properties of navigational page are set. Use this dialog, if you want to change font properites for all the symbols at once.


6.1   Edit page layout

When you are in edit mode, selected symbol will be drawn with light blue background. In top-left corner information about this symbol is given. In the middle of symbol there is cross with arrows drawn, which indicates that symbol is now in move mode. This is also indicated by position label in information text box in top-left corner.

Use PAGE selector knob to move symbol left and right and ZOOM selector knob to move symbol up and down. Rotate MODE selector knob to select other symbols.

There are several actions available via speed buttons:

- **NEW** will create new symbol. A dialog appears with list of avalible symbols.
- **DELETE** will delete selected symbol. A confirmation message will be displayed prior to erasing of symbol.
- **EDIT** action will launch edit dialog for selected symbol. All details for selected symbol are placed there.

- **RESIZE/MOVE** button will toggle between move mode and resize mode. When in move mode a cross with arrows will be drawn inside symbol and position is printed in information text-box. When in resize mode, two arrows are drawn on the edge of symbol. They are also showing direction of resizing. In information text-box height and width of symbol are given.
- **CLOSE** action will close page customization mode and return to normal navigational mode. Save conformation dialog will appear prior to exit.
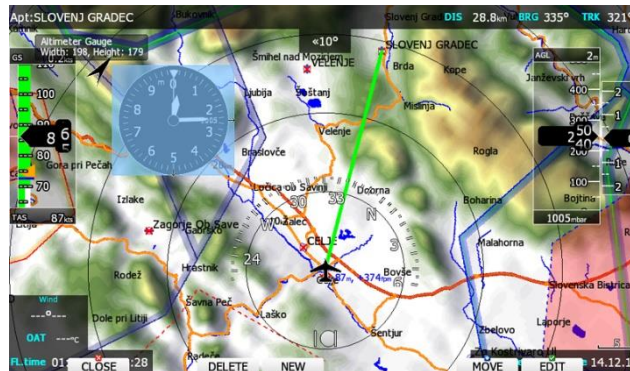
6.2 Creating new symbol

Press NEW button to add a symbol to navigational page. A pull down menu will open.


When symbol is already included on the page or unavailable, it will be greyed-out. There are several symbols available:

- **Navboxes** are symbols which have numeric value.
- **Label** is just a plane label with text. You can use it for checklists.
- **Map and Plane** will add map and aircraft symbol to the page.
- **Orientation** symbol is showing direction of north.
- **Battery** displays status of power supply.
- **GPS Status** indicates status of GPS signal.
- **Wind Arrow** shows direction of wind relative to map orientation.
- **Zoom** symbol defines scale of map.
- **Side View** enables lateral view of our position toward selected goal or plane bearing.
- **Picture** symbol will print images bind to selected waypoint or airport.
- **History** symbol shows aircraft altitude and terrain elevation over past time.
- **Flarm Radar** symbol will display a radar screen showing Flarm targets at predefined zoom.
- **Artificial Horizon** will show an artificial horizon symbol and optional compass points.
- **Altitude Tape** shows altitude with some additional features like on modern primary flight displays.
- **Airspeed Tape** shows airspeed with some additional features like on modern primary flight displays.

- **Flaps tape®** is unique display of current and required position of flaps. Scale of flap tape matches airspeed tape.
- **Compass Tape** shows magnetic heading of aircraft, if magnetic compass is not present heading is calculated.
- **Ball** symbol shows classic ball indicator
- **Vario Tape** and **Vario Indicator** symbols are displaying variometer value.
- **Magnetic Rose** and **HSI** symbols are displaying magnetic direction.
- **G-Meter** symbol displays current g-load and also minimum and maximum value.
- **Wind Profile** symbol is representing wind profile information very similar to Wind dialog.
- **Wi-Fi** symbol indicates current status of Wi-Fi signal.
- **3D map** enables display of synthetic 3D terrain.
- **AoA** symbol represents angle of attack
- **Meteogram** for selected location
- **Airspeed Gauge** represents classic altimeter indicator
- **Altimeter Gauge** represents classic airspeed indicator

6.2.1 Navboxes

Navbox is basic element used on navigational page to display numerical value for selected type. Press EDIT button to edit navbox properties.
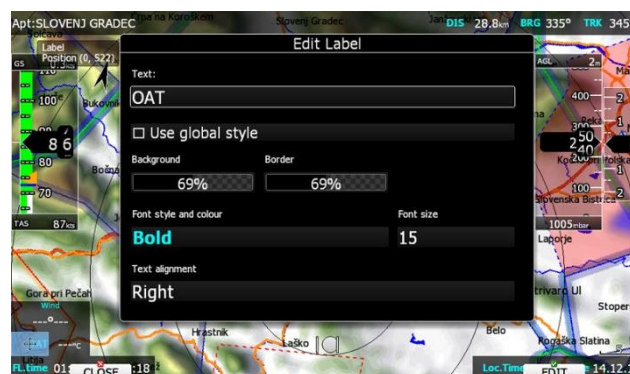
Navbox consists of title, numerical value and unit. Title can be changed or hidden. In this case navbox will use single global style if "Use global style" property is checked. You can change displayed units and also hide them. There is a lot of navboxes available. See following table for more details.

Title	Description	Title	Description
60'.Sp	Last 60 minutes speed	**Rwy.Dir**	Target runway direction
Agl	Height above ground	**Rwy.Len**	Target runway length
Airport	Nearest Airport	**sBrg**	Bearing to zone center
Airspace	Distance to nearest zone	**sDis**	Distance to zone center
Alt	Altitude above MSL	**STBY**	Passive Frequency
AltGps	GPS altitude	**TAS**	True airspeed
Avg.Sp.60'	Average speed in 60min	**Sunrise & Sunset**	Sunrise and sunset at target
Batt.Left	Battery left [min]	**TAF**	Target parsed TAF
Batt.Left	Battery left [%]	**TAF**	Target raw TAF
Battery	Battery voltage	**Target**	Target name
Brg	Bearing to target	**tDis**	Remaining task distance
Code	Target code	**tETA**	Task estimated time of arrival
COM	Active Frequency	**tETE**	Task estimated time enroute
cWind	Head/Tail wind component	**Time**	Local time
Date	Local date	**To**	Steering course to target

Description	Target description	**toWind**	Head/tail Wind to target
Dew.Temp	Dew point temperature	**Trk**	Groundtrack
Dis	Distance to target	**Tsk.Sp**	Task speed
Elevation	Target elevation	**UTC**	UTC time
ETA	Estimated time of arrival	**VarA**	Averaged vertical speed
ETE	Estimated time en route	**Vario**	Current vertical speed
FL	Flight level	**VarioFL**	Average vario for flight
Flarm	Flarm RXTX	***Waypoint***	Nearest Waypoint
FltTime	Flight Time	**Wind**	Current wind
Frequency	Target frequency	**WindX**	Side Wind Component
g-load	Current g-load	**XPDR**	XPDR Transponder
g-max	Max. g-load		
g-min	Min. g-load		
Gnd	Terrain elevation		
GS	Groundspeed		
Hdg	Heading		
Humidity	Relative humidity		
IAS	Indicated airspeed		
LON/LAT	Longitude and Latitude		
METAR	Target parsed METAR		
METAR	Target raw METAR		
OAT	Outside temperature		
Pot.Temp	Potential temperature		
Radial	Radial from target		
Rain age	Show the time of last received rain picture		
Rain time	Shows relative time of the rain picture		
RawIGC	Altitude raw (IGC)		

6.2.2 Aircraft symbol

The aircraft symbol shows the current position and direction on the map. It will always be automatically added and deleted together with the map.

Aircraft has two different position settings. Symbol is placed in one position when map orientation is North up, East up, South up or West up and in the other position when current orientation is Track up, Goal up or Heading up. Depending on settings, position of aircraft can automatically change when circling.

There are several representations of aircraft available. Change style to select different aircraft symbol. You can also add a wind vector, which will rotate around the symbol. Enable it by checking "Show wind" property.

6.2.3 Zoom

Zoom symbol shows current map zoom. It can be used only when the map symbol is already on the page. Zoom can be presented in two ways; number on symbol indicates the length of the zoom symbol or number indicates length of whole screen. You can toggle "Show full screen distance" property to change this setting. Displayed value is given in distance units (km, nm or mi).
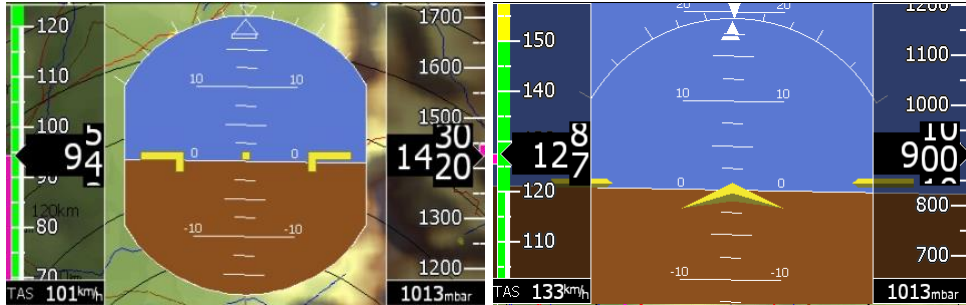
6.2.4 Wind Arrow

Wind symbol shows wind direction. Around wind symbol a thermal assistant can be shown during circling. Enable or disable this feature with "Has Thermal" property.

6.2.5 Artificial Horizon

Artificial horizon symbol together with speed tape and altitude tape make a very sophisticated primary flight display out your main display unit.


Shape of symbol can be customized as well. You can also enable to display sky directions with checking "Show compass" property.

6.2.6 Altitude Tape

Altitude tape shows altitude band with current altitude in the middle. Additional to that trend vector is displayed. You can also customize tape's top and bottom boxes to display current QNH setting, AGL altitude, flight level or MSL elevation.
Nearest airspace marker is also drawn on tape. In task mode instead of airspace elevation task finish point is shown. Finally, latest thermal is drawn on tape with appropriate color.
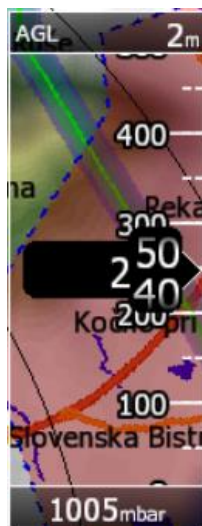
6.2.7 Airspeed Tape

Airspeed tape shows current indicated airspeed. Blue-green marker on tape represents speed to fly value. Band colours are fully customizable to match your aircraft speeds. Additional to that trend vector is displayed. You can customize tape to show current true airspeed, groundspeed or outside temperature inside top or bottom boxes.
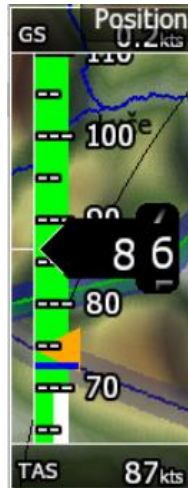
6.2.8 Flarm radar

Symbol will display a radar screen showing Flarm targets at predefined zoom. You can change zoom in edit layout dialog or you can rotate ZOOM knob to change it. This will work only if map symbol is not on current page.

6.2.9 Side view

This symbol shows lateral view of our position toward selected target or bearing of plane. It shows terrain and airspaces it that direction.
You can change appearance of airspaces in Setup > Graphics > Airspaces settings dialog.

6.2.10 GPS indicator

GPS shows current status of GPS signal. Green colour indicates that GPS is acquiring 3D position and yellow colour stands for 2D position fix. When red, no position is calculated by GPS. Each bar represents two visible satellites.

6.2.11 Battery indicator

Battery will visually display current level of battery. Green indicates that battery is ok. It will turn yellow and later red, when battery is empty.

6.2.12 Wi-Fi indicator

Show status of wireless network connection. If red cross is drawn over symbol that means that Wi-Fi adapter is not connected. Light blue circle means that wireless networks are available. If connected to network, indicator will display signal strength.

Magnetic rose and HSI symbols are displaying compass. Magnetic rose cannot be detached from plane symbol while HSI can be freely moved. HSI always points in heading direction. HSI also displays more information.
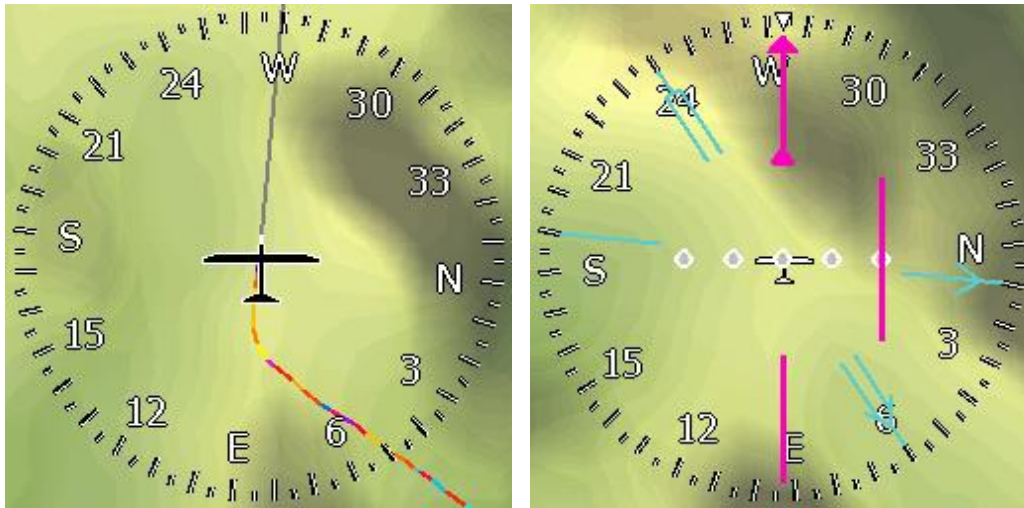
6.2.13 G-meter

G-meter symbol shows current g-load value. It also displays minimum and maximum g-load. At first, symbol is always visible, but it can be hidden automatically when bellow certain value. You can configure this behaviour with changing "Show above" property.

6.2.14 Wind profile

Wind tape symbol shows profile of wind. You can see wind direction and speed at different altitude bands. This information is depicted graphically with arrow on left side and with values on right side. Current aircraft altitude is indicated with yellow horizontal line. You can also see wind profile in Wind dialog. Here you can also manually change values.

6.3 Navigational page settings

Press SETTINGS option to open dialog for page global styles.

Dialog is splitted into four groups. First group defines colours and font properties for title of navbox. Second group defines colours and font properties for navboxes main value. Third group defines properties of navboxes, which have only a single line. In last group background on navigational page is defined.

7   Flying with the System

To get the best out of the system it is important that some preparation is done prior to take-off. Trying to configure the instrument or set a FPL while flying is very hazardous. Pre-flight preparation will ensure that the flight will be both safe and enjoyable.

7.1   On the Ground

7.1.1 Power on Procedure

Press Master switch to power on the device. The main display unit will turn on and few moments later welcome screen will appear. The first screen shows the version of the boot loader followed by the version of the Linux kernel operating system, then the version of the file system. The boot procedure normally takes 10 seconds. When completed the profile selection dialogue is shown.

⚠️ It is recommended to switch the unit ON some minutes prior to take-off to give the GPS receiver time enough to acquire satellites.

7.1.2 Profile Selection

Turn the PAGE selector knob to select the desired profile if more than one profile is available. First profiles stored in internal storage are displayed, next profiles on SD card are shown and at last profiles on USB stick are shown. You will note profile resides on SD card/USB stick with small SD card/USB stick symbol in lower right part of pilot icon.
For the selected profile the pilot name, loaded waypoint files, loaded airports databases and loaded airspace databases are shown.
If a file is stored on SD card or USB stick, label [SD] or [USB] will be in front of file name.
To learn more about profiles refer to Chapter **Error! Reference source not found.**. Press the **SELECT** button to confirm selection of the profile. Press **DEFAULT** button to start the system with default settings. The set elevation dialogue will be shown next.

7.1.3 Set Elevation and QNH

The instrument will offer elevation from the terrain database based on current latitude and longitude. Elevation will mostly be within few meters from the current elevation. Use the PAGE selector knob to fine-tune the elevation. If the elevation is unknown and the QNH pressure is known you should NOT press button **QNH**. Just keep turning the PAGE selector knob and observe the QNH value to adjust it to proper value. The **QNH** button should be pressed only when airfield elevation and QNH pressure are given. In most cases elevation should always match QNH pressure.
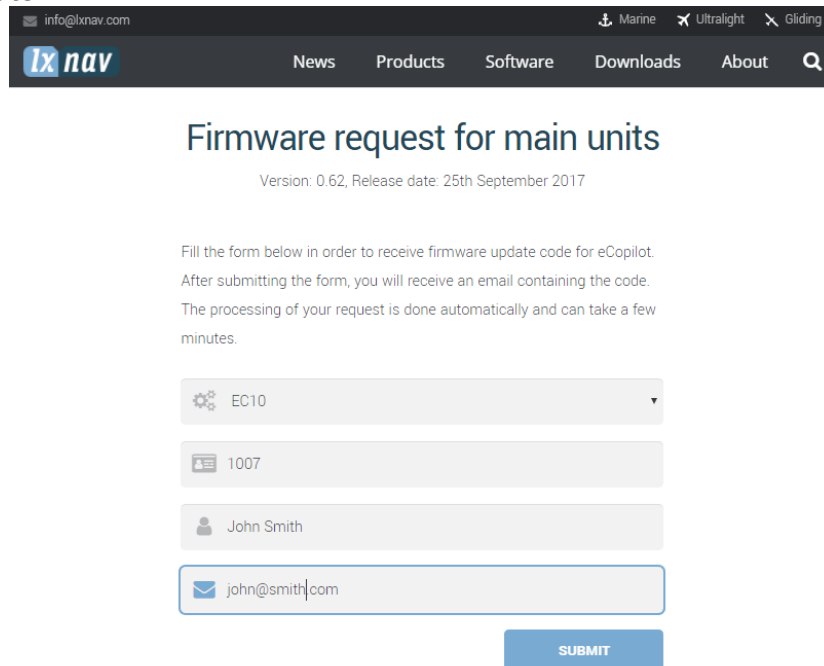
⚠️ The profile selection and Elevation dialogues are not shown if the system is switched off and on during flying.

7.1.4 Preflight Check

After elevation setup the system will switch to navigational mode. It will take few moments to draw the map screen for the first time. All waypoint files and databases are loaded at that time and therefore instrument might react somewhat slowly.

8 Firmware Update

Firmware updates of the main display unit and other peripheral units can be easily carried out using the SD Card. Please visit our webpage www.lxnav.com and send us a request for the firmware update.
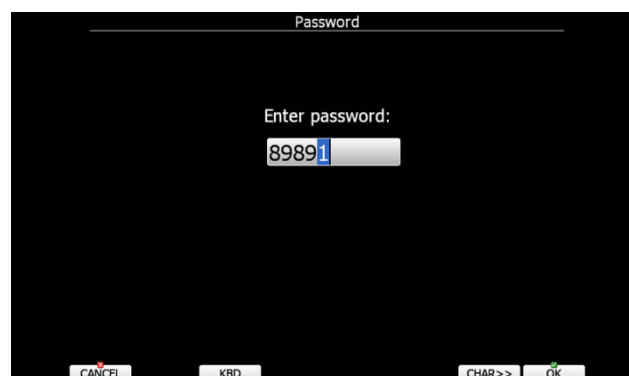

By email, you will get link for downloading firmware and an update code.

8.1 Updating main display firmware

We will send you an update file and update code. The update code is a string six letters long and the update file has the **.ec10 or .ec7** extension. To proceed with the firmware update copy the update file to a SD card or USB stick and insert it into the main display unit.
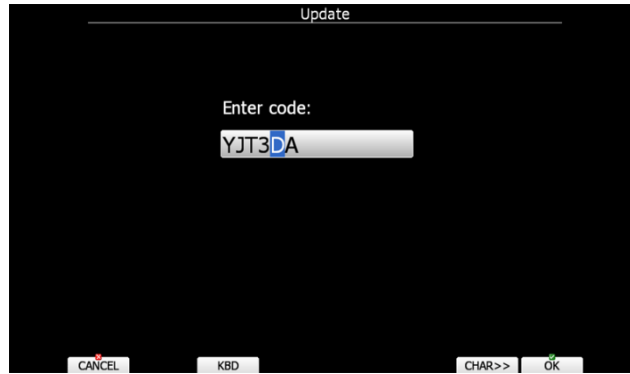

Start the main display unit and go to the Setup->Password menu option.
Enter password **89891** and press **ENTER**.
The system will automatically search for an update file. If more than one update file is found a selection dialogue will appear.
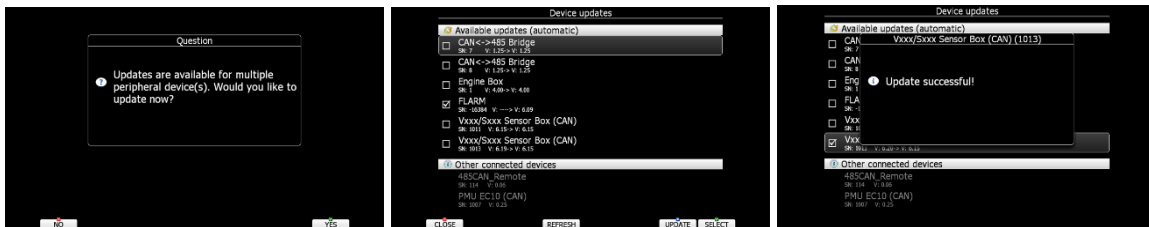After the update file is selected an update code must be entered.
Enter the update code which was sent to you.

⚠️ Please note that the update file and update code are a matching pair only applicable to a particular serial number.

Once the update file is verified the main display unit will reboot and the new firmware is ready for use.

On first run main display unit will also update all devices connected to CAN bus. This update will take approximately five minutes on average.

8.2 Separate firmware update of peripheral unit

Each peripheral unit can be updated separately. Procedure is same as for main display. Enter password 89891 and select appropriate firmware file.
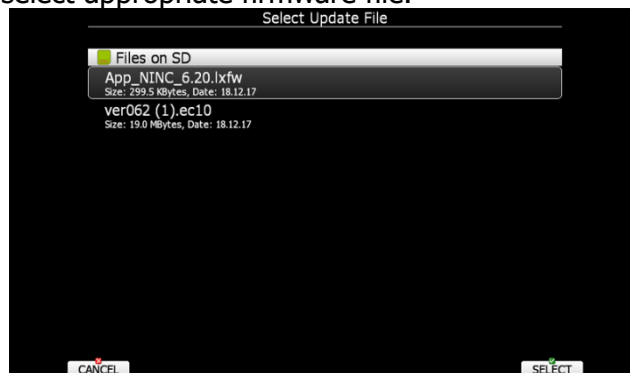
8.3 Firmware update via WiFi internet connection

When internet connection is established via WiFi, an automatic notification about new firmware or new databases will be displayed on screen.
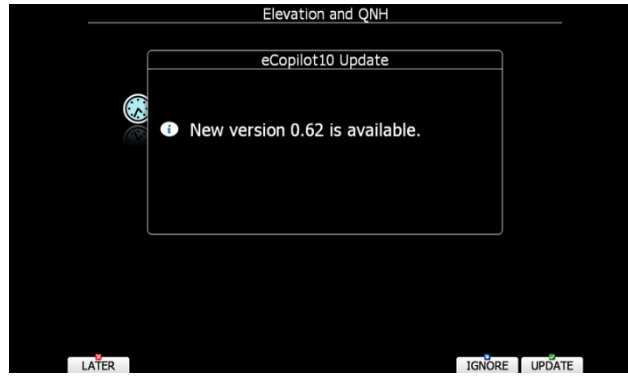
Just press UPDATE button and follow instructions. Firstly, the firmware must be downloaded from internet. Time needed for that depends on internet connection speed.

When firmware is downloaded, eCopilot will reboot, then procedure is same as in chapter 8.1

9 Options

9.1 Second Device

In two-seat planes it is possible to install the second device. The second seat device looks almost identical to the main display unit. The second seat device must be connected only to the CAN bus system. The basic idea of two-seat configuration is that both devices work independently from each other with the possibility to exchange various data on user request or automatically.

Here is no limit for number of eCopilots (screens) connected to CAN bus. Theoretically unlimited number of screens can be connected.

9.2 Remote Control

Remote stick is available in three different versions. Normal one, with red starter button or with trim switch

The stick is available also in various diameters: 18 mm, 19.3 mm, 20.3 mm, 24.4 mm and 25.4 mm. All necessary electronics is built into the top of the stick. The four coloured wires from the bottom must be connected to Remote CAN unit. Additionally one shielded cable is used for push to talk button.

9.2.1 Functions
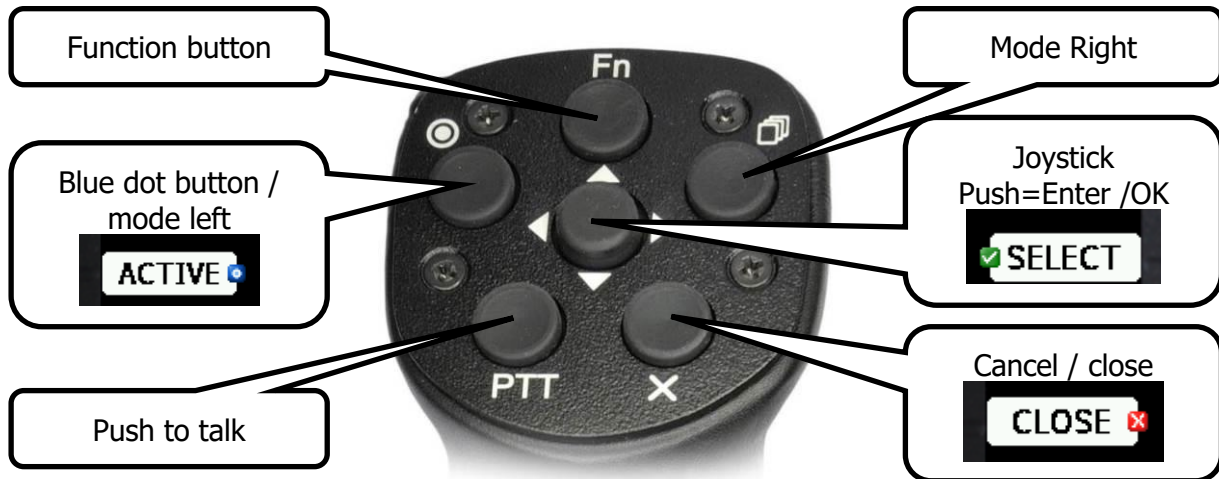
Remote stick has six push buttons and on multi-directional button in the middle. Move multi-directional button left and right to zoom in and out. Move it in up and down direction to select different page of to move on menu. Press it to select and item or to invoke a menu in navigational mode.

On main display unit some of the speed buttons are having small icon. There are three icons available: **red cross**, which correspond to X button on remote, **blue dot** which correspond to upper left button with dot and **green tick**, which is middle button.

Function button is custom button, which function can be set by user (See chapter 5.1.11.5).
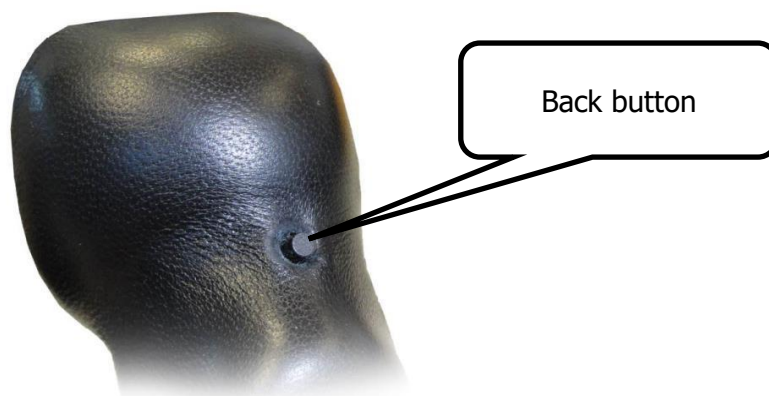
On the back side of remote stick there is additional button.

> To make remote stick operational in the system, it must be first registered. Please read chapter 5.1.11.5

9.2.2 Installation

For more detailed instructions on installation, please refer to installation manual.

Remote stick is connected to CAN bus through CAN Y splitter. Be careful to connect correct coloured wire to pin, which is marked with same colour.
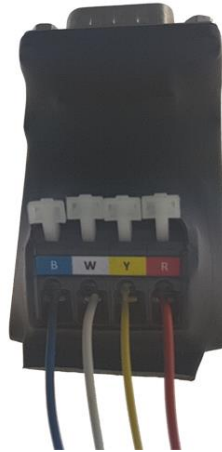
PTT wires are connected to radio push to talk input of radio.

10 Revision History

Rev	Date	Comments
1	December 2017	Initial release
2	October 2018	New chapter 5.1.6.12 and updated chapters 5.5.1, 5.5.2
3	February 2021	Style update
4	February 2024	Updated chapter 2.1.7,2.1.8

The pilot's choice