

LX90xx and LX80xx

GPS-Navigation System with Variometer

Version 6.03



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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. LXNAV Instrument displays damaged by direct or magnified sunlight are not covered under warranty.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

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

1.2 Sunburned display warranty

Any kind of display including LXNAV instrument display screens can be damaged / burned by strong sunlight magnified by canopies in certain positions. We suggest you to cover your device from the direct sunlight, especially if the canopy is open.

LXNAV Instrument displays damaged by direct or magnified sunlight are not covered under warranty

May 2017

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2 Basics

2.1 The LX9xx/LX80xx series at a glance

The system consists of two units; the main display unit and the vario unit. Within the main display unit an integral 50-channel GPS receiver and a high brightness colour display are fitted. An integrated SD card or USB interface is used for user friendly data exchange. Some of the models are featuring also PDA port for easy connection on external PDA device. The main display unit is equipped with a built-in flight recorder according to the most recent IGC specification for all flights. Optionally the FLARM collision avoidance system can be integrated into the main display unit.

Main display unit comes in different forms:

- **LX8080** model with 2.8" screen and 320x240 pixels resolution,
- **LX8000** model with 3.5" screen and 320x240 pixels resolution,
- **LX9050** model with 5.0" screen and 800x480 pixels resolution,
- **LX9000** model with 5.6" screen and 640x480 pixels resolution,
- **LX9070** model with 7.0" screen and 800x480 pixels resolution.

Standard part of system is also the V8 vario unit. It is a most modern variometer running on very powerful processor with inertial platform using 3 axis accelerometer, 4 gyroscopes (for inertial vario, AHRS and wind calculation), smooth audio output with audio equalizer and integrated synthesized speech output. The unit communicates with the main display unit over the RS485 system bus. V8 vario features 57 mm diameter (2¼") colour screen and three additional buttons.

Optional vario units are available:

- V80 vario features 80 mm diameter (3") colour screen and three additional buttons
- V9 vario with 57 mm diameter (2¼") indicator with mechanical needle and colour display for additional data.

Optionally additional vario indicators and a wide range of interface devices can be daisy-chained using the RS485 bus.

2.1.1 Display Unit Features



Extremely bright 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 4 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. (Portrait orientation is not available on LX80xx models)
- Pre-loaded with worldwide terrain maps, airspace and airport databases.
- Unlimited number of waypoints.
- Unlimited number of tasks (with assigned area support).
- Comprehensive flight and task statistics.
- Display of nearest airports and out-landing fields.
- Unlimited number of pilots/profiles.
- Integrated flight recorder according to high-level IGC specification.
- Real-time flight optimisation according to FAI and OLC rules.
- Flights stored in IGC format are downloadable using the integrated SD Card.
- Flight recorder functions include an integral pressure transducer based on 1013 mbar level for altitude recording, engine noise level sensor, memory to store more than 1000 hours of flights and digital and mechanical security devices to ensure high level of security.
- Integrated FLARM collision avoidance system with graphic, sound and voice (optional) presentation.

2.1.2 V9 Vario Unit Features



- ARM Cortex-M4 processor running on 160MHz
- Mechanical needle driven by stepper motor
- QVGA (320*240pixels) sunlight readable display

- Digital temperature compensated pressure sensors for altitude and airspeed
- inertial platform 3 axis digital +-6g accelerometer, 3 axis gyroscopes (for inertial vario, AHRS and wind calculation)
- Smooth audio output
- Audio equalizer
- integrated synthesized speech output
- audible thermal assistant
- 6 digital inputs - SC, VP + 4 custom defined
- Multilanguage user interface

2.1.3 V8 Vario Unit Features



- 2.5" QVGA sunlight readable screen with 1200nits
- QVGA (320*240pixels) sunlight readable display
- ARM Cortex-M4 processor running on 160MHz
- Digital temperature compensated pressure sensors for altitude and airspeed
- inertial platform 3 axis digital +-6g accelerometer, 4 gyroscopes (for inertial vario, AHRS and wind calculation)
- Smooth audio output with audio equalizer and many custom audio settings
- integrated synthesized speech output
- audible thermal assistant
- External SD card for configuration, FlarmNet and firmware update
- Push buttons for setting adjustments
- ALS (ambient light sensor)
- Additional Flarm radar screen and artificial horizon (optional).
- Three buttons for toggling between screen and target selection
- digital temperature compensated pressure sensors for altitude and airspeed
- 100Hz sampling rate for very fast response.
- Speed to fly indication.

TE compensation can be selected to be either pneumatic TE probe or digital compensation.

2.1.4 V80 Vario Unit Features



- 3.5" (8.8 cm) sunlight readable screen with 1200nits
- QVGA (320*240pixels) sunlight readable display
- ARM Cortex-M4 processor running on 160MHz
- Digital temperature compensated pressure sensors for altitude and airspeed
- inertial platform 3 axis digital +-6g accelerometer, 4 gyroscopes (for inertial vario, AHRS and wind calculation)
- Smooth audio output with audio equalizer and many custom audio settings
- integrated synthesized speech output
- audible thermal assistant
- External SD card for configuration, FlarmNet and firmware update
- Push buttons for setting adjustments
- ALS (ambient light sensor)
- Additional Flarm radar screen and artificial horizon (optional).
- Three buttons for toggling between screen and target selection
- digital temperature compensated pressure sensors for altitude and airspeed
- 100Hz sampling rate for very fast response.
- Speed to fly indication.

TE compensation can be selected to be either pneumatic TE probe or digital compensation.

2.1.5 Interfaces

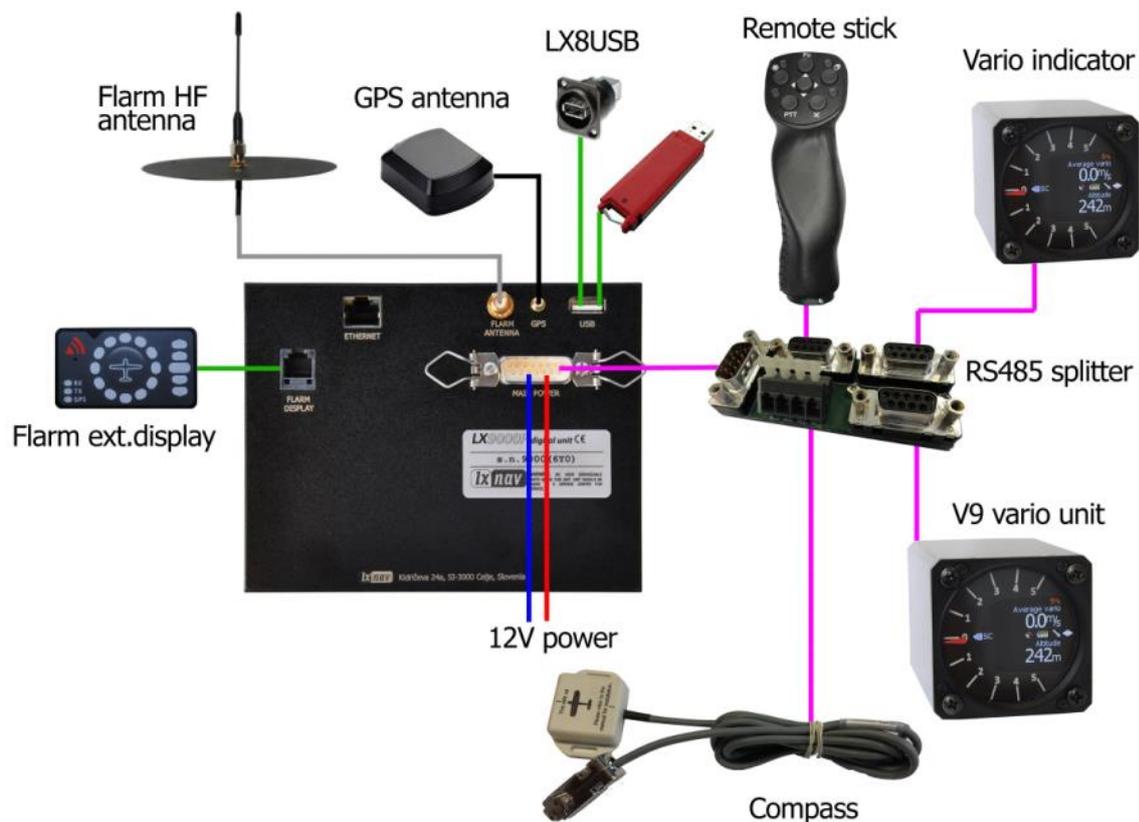
- The RS232 interface has NMEA output for external devices.
- An SD Card interface.
- A USB slot for data transfer using USB memory stick.

2.1.6 Internal Options

Flarm module can be built into the main display unit. All necessary connectors are available on the rear side of the unit (Flarm external indicator, Flarm antenna), which guaranties the same comfort as with the original Flarm devices. It is very important to point out that the whole system uses only one GPS receiver and therefore offers a low power solution.

Artificial horizon can be enabled on main display unit. Vario sensor box is constantly using data from inertial platform in order to make vario signal smoother, however if pilot would like to see artificial horizon and software option to do so must be purchased.

2.1.7 External Options



By using a RS485 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 RS485 splitting units, which allow plug and play connection of optional devices.

The following units can be connected to the main system:

- **Second Seat Device (LX9000D, LX9050D LX9070D LX8000D or LX8080D):** The unit installed in the rear seat of the glider is powered and receives all necessary data from the main unit. The communication between both units is exclusively via the RS485 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. These two buttons can be used for instance as PTT for radio and SC/Vario changeover command. A second remote control can be installed to control second seat device or for side by side operation.
- **Electrical Compass Device**
- **Secondary Vario Indicators (I8,I9 or I80 indicator)**
- **Flap sensor**
- **MOP box** for jet engines
- **232 Bridge** for radio or transponder
- **Wi-fi module**
- **External Flarm module**

2.1.8 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 or data from the Condor PC

flight simulator (www.condorsoaring.com) can be received via the RS232 port after entering suitable passwords (see Chapter 5.1.14).

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. Please note that altitude data will be sent from the simulator which means that real final glide training will be possible.

2.1.9 Technical Data

2.1.9.1 LX9000 System

- Power input 10-16 V DC
- Consumption at 12 V:
 - 250 mA - minimum brightness without audio and options.
 - 260 mA - minimum brightness without audio and with Flarm.
 - 470 mA - maximum brightness without audio and options.
 - 480 mA - maximum brightness without audio and with Flarm.
 - 160 mA – additional for V8 vario unit
- Cut-out dimensions of the LX9000 display unit are 109 x 143 mm; outline dimensions: 113 x 145 x 38 mm exclusive connector.
- 57 mm (2¼") standard aircraft cut-out for the V9 vario unit; length 92 mm (exclusive connector).
- 57 mm (2¼") standard aircraft cut-out for the V8 vario unit; length 95 mm (exclusive connector).
- 80 mm (3") standard aircraft cut-out for the V80 vario unit; length 130 mm (exclusive connector).

2.1.9.2 LX9050 System

- Power input 10-16 V DC
- Consumption at 12 V:
 - 250 mA - minimum brightness without audio and options.
 - 260 mA - minimum brightness without audio and with Flarm.
 - 470 mA - maximum brightness without audio and options.
 - 480 mA - maximum brightness without audio and with Flarm.
 - 160 mA – additional for V8 vario unit
- Cut-out dimensions of the LX9050 display unit are 134 x 79 mm; outline dimensions: 136 x 83 x 61 mm exclusive connector.
- 57 mm (2¼") standard aircraft cut-out for the V9 vario unit; length 92 mm (exclusive connector).
- 57 mm (2¼") standard aircraft cut-out for the V8 vario unit; length 95 mm (exclusive connector).
- 80 mm (3") standard aircraft cut-out for the V80 vario unit; length 130 mm (exclusive connector).

2.1.9.3 LX9070 System

- Power input 10-16 V DC
- Consumption at 12 V:
 - 250 mA - minimum brightness without audio and options.
 - 260 mA - minimum brightness without audio and with Flarm.
 - 470 mA - maximum brightness without audio and options.
 - 480 mA - maximum brightness without audio and with Flarm.
 - 160 mA – additional for V8 vario unit
- Cut-out dimensions of the LX9070 display unit are 109 x 179 mm; outline dimensions: 113 x 181 x 38 mm exclusive connector.
- 57 mm (2¼") standard aircraft cut-out for the V9 vario unit; length 92 mm (exclusive connector).
- 57 mm (2¼") standard aircraft cut-out for the V8 vario unit; length 95 mm (exclusive connector).
- 80 mm (3") standard aircraft cut-out for the V80 vario unit; length 130 mm (exclusive connector).

2.1.9.4 LX8000

- Power input 10-16 V DC
- Consumption at 12 V:
 - 290 mA - minimum brightness without audio and options.
 - 300 mA - minimum brightness without audio and with Flarm.
 - 380 mA - maximum brightness without audio and options.
 - 390 mA - maximum brightness without audio and with Flarm.
 - 160 mA – additional for V8 vario unit
- Cut-out dimensions of the LX8000 digital unit are 93.5 x 81.5 mm; outline dimensions: 98 x 88 x 115 mm exclusive connector.
- 57 mm (2¼") standard aircraft cut-out for the V9 vario unit; length 92 mm (exclusive connector).
- 57 mm (2¼") standard aircraft cut-out for the V8 vario unit; length 95 mm (exclusive connector).
- 80 mm (3") standard aircraft cut-out for the V80 vario unit; length 130 mm (exclusive connector).

2.1.9.5 LX8080

- Power input 10-16 V DC
- Consumption at 12 V:
 - 160mA at 50% LCD brightness (600nits still readable under sunlight)
 - 260mA with integrated Flarm at 100% LCD brightness (1200nits)
 - 160 mA – additional for V8 vario unit
- Cut-out dimension of the LX8080 digital unit is 80 mm (3") standard aircraft cut-out; outline dimensions are 81mm x 81mm x 65mm exclusive connector.
- 57 mm (2¼") standard aircraft cut-out for the V9 vario unit; length 92 mm (exclusive connector).
- 57 mm (2¼") standard aircraft cut-out for the V8 vario unit; length 95 mm (exclusive connector).
- 80 mm (3") standard aircraft cut-out for the V80 vario unit; length 130 mm (exclusive connector).

2.1.10 Weight

- LX9000 display unit: 650 g
- LX9050 display unit: 515 g
- LX9070 display unit: 650 g
- LX8000 digital unit: 580 g
- LX8080 digital unit: 400 g
- V8 vario unit: 300 g

3 Packing Lists

3.1 LX90xx with Flarm Option

- LX9000, LX9050 or LX9070 main display unit
- V8 vario unit (optional V80 or V9)
- Main power cable for main display unit
- Cable for vario unit
- SD card
- Barogram calibration chart
- GPS antenna
- Flarm Antenna
- Hex key "Inbus"
- USB key containing the digital version of the Manual

3.2 LX90xx

- LX9000, LX9050 or LX9070 main display unit
- V8 vario unit (optional V80 or V9)
- Main power cable for main display unit
- Cable for vario unit
- SD card
- Barograph calibration chart
- GPS antenna
- Hex key "Inbus"
- USB key containing the digital version of the Manual

3.3 LX90xxD

- LX9000D or LX9050 or LX9070D
- Main power cable
- RS485 cable – 4 meter
- RS485 splitting unit
- Vario indicator I8 (Optional I80 or I9)
- SD card
- Hex key "Inbus"

3.4 LX80xx with Flarm Option

- LX8000 or LX8080 main display unit
- V8 vario unit (optional V80 or V9)
- Main power cable for main display unit
- Cable for vario unit
- SD card
- Barogram calibration chart
- GPS antenna
- Flarm Antenna
- Hex key "Inbus"
- USB key containing the digital version of the Manual

3.5 LX80xx

- LX8000 or LX9080 main display unit
- V8 vario unit (optional V80 or V9)
- Main power cable for main display unit
- Cable for vario unit
- SD card
- Barograph calibration chart
- GPS antenna
- Hex key "Inbus"
- USB key containing the digital version of the Manual

3.6 LX80xxD

- LX8000D or LX8080
- Main power cable
- RS485 cable – 4 meter
- RS485 splitting unit
- Vario indicator I8 (Optional I80 or I9)
- SD card
- Hex key "Inbus"

4 System Description

The main display unit of LX90xx series can be mounted at portrait or landscape orientation. Only After installing the main display unit, the orientation must be defined via the Display menu (see Chapter 5.1.4).

The main display unit of LX80xx series can be mounted only in landscape mode.



In this manual all screenshots are given for portrait orientation of the LX9000 system, which is most commonly used. 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:

- Four rotary selector knobs
- Eight (lx90xx) or six (lx80xx) push-buttons
- SD card reader

4.1.1 Landscape orientation





4.1.2 Portrait orientation



The V9 vario unit is an indicator only and has no controls. Information displayed is controlled by the main display unit.



The V80/V8 vario unit is having three buttons to toggle between screens. More information is given in chapter 5.1.11.4.

4.1.3 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.

4.1.3.1 Power Button

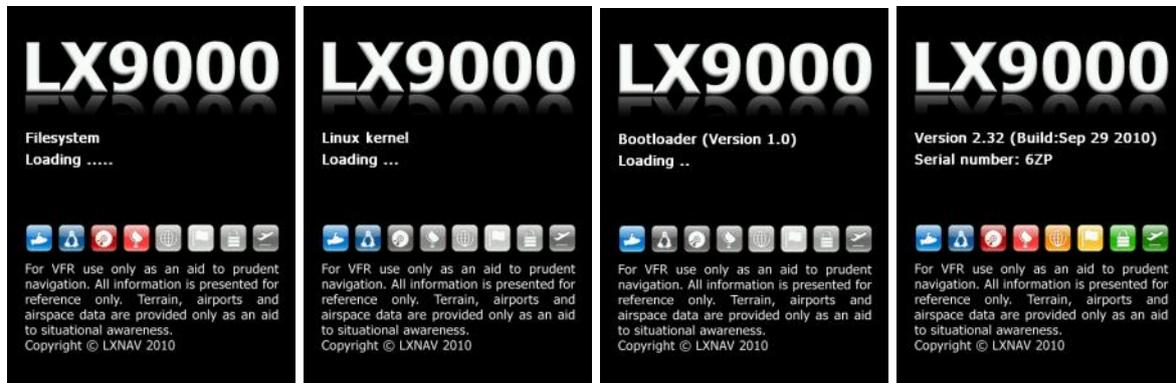
The power button is marked with the ON/OFF symbol. It has multiple functions. Primarily it is used to switch the system on and off.

4.1.4 Rotary Switches (Knobs)

The main display unit has four rotary knobs. Each has a single function with the exception of the zoom knob which has, in some cases, a function other than zoom. With the upper-left rotary knob the volume can be adjusted. The upper-right rotary switch is the mode selector (it changes the mode of the operation). At the lower-right is the up/down knob which is used for selecting sub-pages, sub-menus and editing menus. At the lower-left 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.

4.2 Switching on the Unit

After a short press of the power-on button the main display unit and vario unit will turn on and a welcome screen will appear. 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 LX90xx system firmware and the IGC 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.

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.

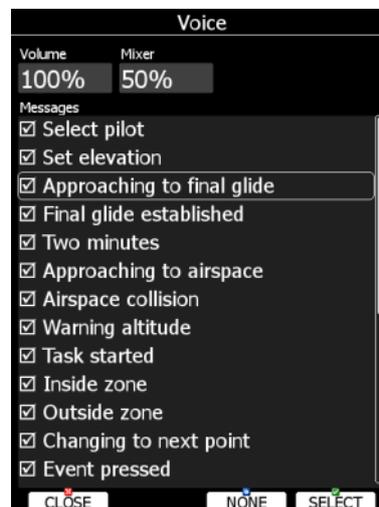


4.3.4 Selection Control

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

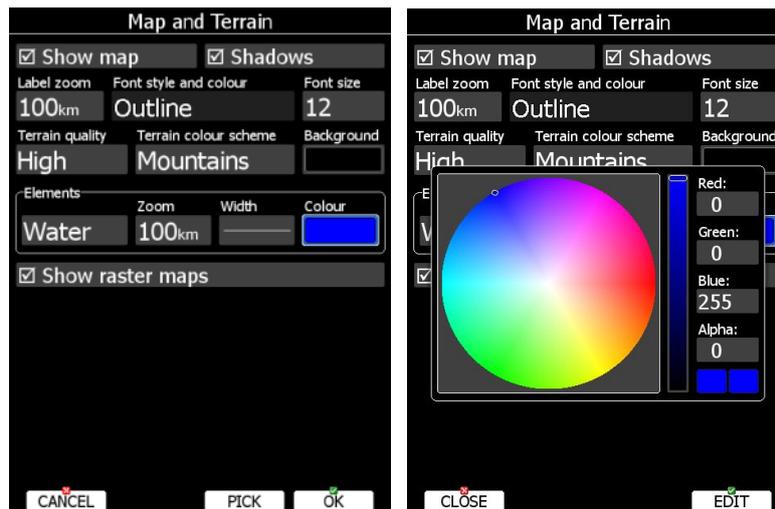
A checkbox enables or disables a particular parameter. Press **SELECT** to toggle the value. If an option is enabled a check mark will be shown, otherwise an empty rectangle will be displayed.



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 a fill colour is not transparent (0%), all other map items will not be seen through it. If a 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



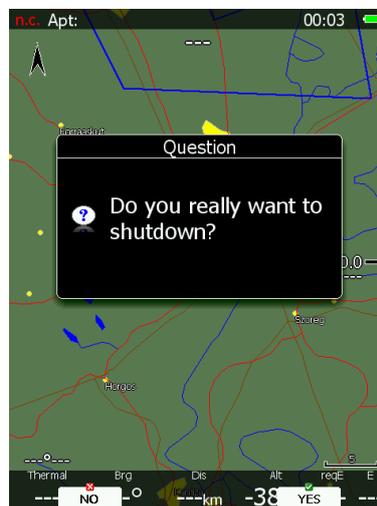
Pull down menu is used to select one of the options. Press button several times to select appropriate item of turn PAGE selector knob. Pull down menu will automatically close after few seconds.

4.4 Switching off

Please use one of the following recommended methods for shutting down the LX90xx system:

Method 1

Press the button with the **OFF** label which is displayed in navigational modes. See Chapter 5.5 for more details. A message to confirm shutdown will be shown.



Method 2

Press the button with the **OFF** symbol for approximately 4 seconds. The OFF message will be displayed and the instrument will shut down. When the message appears you must release the power button.



Method 3

When the button with the **OFF** symbol is pressed for more than 8 seconds the system will perform an unconditional shutdown. This method is recommended only in case that the program hangs and it is not possible to shutdown with methods 1 or 2.



If you are using method 2 to switch off the system it is necessary to release the button when you see the shutting down message. If you continue to press the off button the main display unit may shut down by method 3.

If the request for OFF is made during flight the instrument will ask for confirmation so that the system cannot be switched off by mistake.



It is important that the main display unit is switched off via software. Never power down the system using the main power switch. The main display unit is running the Linux operating system and sudden power loss may corrupt the file system.



If main power is lost for a few seconds during flight the flight recorder will not produce two flights. The most important flight parameter (altitude) will remain which means that the final glide calculations are not affected.

5 Operating Modes

The main display unit has seven **modes** or **main menus**. All of them are selectable by rotating the upper-right knob which is also called **MODE selector**. The diagram below shows the mode structure of the LX9000 running in portrait screen.



- **Airport Mode**, navigation and selection airports.
- **Waypoint Mode**, navigation, selection and editing waypoints.
- **Task Mode**, 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 (only if there is no internal flarm).
- **Near Mode** displays a list of all landable waypoints and airports.

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

Three main navigational modes **airport**, **waypoint** and **task mode** are selected by rotating the upper-right knob. 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 three main navigational pages using the program LXStyler. This program can be downloaded from our webpage www.lxnav.com.



It is also possible to customise selected navigational pages using STYLE 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 5.1.5.2 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 navigation mode the user is navigating to waypoints that were previously loaded and selected in the **Files and Transfer** menu (see Chapter 5.1.5.4). Task navigation mode is used for task creation and manipulation. Navigation in this page is exclusively to task points.

5.1 Setup Mode

In the setup menu users can configure the main display unit and connected devices. Turn the bottom-right knob - PAGE selector - or press the UP/DOWN arrow on the remote stick to select the appropriate setup item. Turn the bottom-left knob - 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.



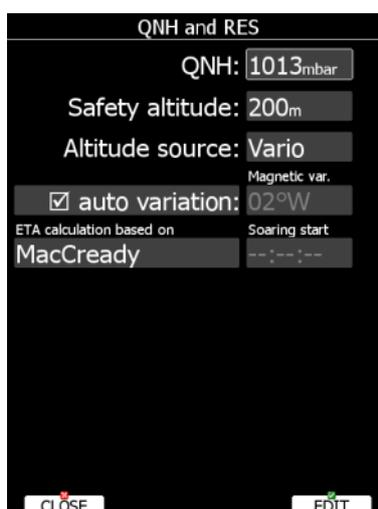
The setup menu is slightly different on the rear seat device as not all options are applicable.



Items which are marked with an asterisk (*) are available only in the front seat setup menu.

5.1.1 QNH and RES

Turn the bottom-right knob 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 Safety Altitude

This setting is the altitude reserve or safety altitude and is the height that the instrument adds to the final glide altitude required so that the glider arrives over the final glide destination at the selected safety altitude. Once the safety altitude has been specified, the pilot has to keep the final glide indicator on 0 to arrive at the safety altitude.

5.1.1.3 Altitude source

The system has two pressure altitude sensors. One is built into the main display unit and is used for the IGC recorder and the second one is built into the vario unit and is connected to the glider pitot-static system. Changing the altitude source defines which sensor is used for pressure altitude used in program.

5.1.1.4 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.

5.1.1.5 ETA/ETE Calculation

In changing this value you may choose from four different methods to calculate the estimated time of arrival to the navigational point. Calculation is always divided into straight flight and climb time calculations.

- **MacCready** uses the Polar data and MacCready setting to calculate speed to fly and climb rate.
- **Vario** uses the last four thermals average to compute climb rate and uses this value to calculate speed to fly.
- **Avg.Speed & Vario** uses the average ground speed over the last 5 minutes for distance and Vario statistics for climb rate.
- **Avg.Speed & MC** uses the average ground speed over the last 5 minutes for distance and MacCready.

All four methods of calculating ETA and ETE (Estimate Time of Arrival & Estimate Time Elapsed) take into account glider altitude, wind and safety (arrival) altitude thus ensuring that the calculation made is the best possible.



Suggested methods for competition pilots are **Avg.Speed & Vario** or **Avg.Speed & Mc**.

5.1.1.6 Soaring Start*

Soaring start is the time when the glider starts soaring (released from tow, engine switched off). A soaring start time is needed to start the flight optimization.

5.1.2 Flight Recorder

The main display unit has a built-in flight recorder fully approved by the IGC (a sub-committee of the FAI) and will produce secure flight records that are acceptable for all FAI requirements including world records.

Select the recording interval and enter the pilot name. **Pilot weight is important if ballast is specified in kilograms of water** (see Chapter 5.1.9.5). If the system is used in two-seat aircraft the name of the co-pilot may also be entered.



There is no setup for glider type. Glider type is defined in the Polar and Glider setup (see Chapter 0).



There are very few settings for the flight recorder compared to other instruments. This is because main display unit will record all additional data such as wind, speed and vertical speed by default.

If a new pilot is entered, upon exiting the dialogue the message *"Do you want to create new profile with this pilot?"* will be asked. Answer **YES** if you want to quickly add a new profile. For more information about profiles see Chapter . .

User can also enable options log other aircrafts data(Flarm data) and flap position.

5.1.3 Vario Parameters*

This option is used to set the vario parameters.

Vario Parameters		
Vario needle filter	Vario sound filter	Vario range
1.5sec	1.5sec	5m/s
SC tab	Integrator time	Auto SC
1.0m/s	20sec	OFF
Smart vario filter	Beep at max	Beep before max
OFF	OFF	3.0s
<input checked="" type="checkbox"/> Auto reset integrator		
Netto filter	SC filter	Relative filter
1.5sec	1.5sec	1.5sec
Netto time		
20sec		
CLOSE		EDIT

Following parameters are set:

Vario needle filter sets a time constant of the vario needle. The value can be adjusted between 0.1 and 5 s with step 1.0 s or 0.1 s. Default value is 1.5 s.

Vario sound filter sets a time constant of vario sound. The value can be adjusted between 0.1 and 5 s with step 1.0 s or 0.1 s. Default value is 1.5 s.

Vario range sets full scale range of the vario (2.5 m/s, 5 m/s or 10 m/s). Default value is 5 m/s (10 kts).

SC tab defines the width of the audio dead band in speed to fly mode. Default value is ± 1 m/s.

Integrator time defines the integration period for the average vario in seconds. The default is 20 seconds.

Auto SC defines the conditions when the instrument is switched automatically between vario and speed command.

- **OFF:** Switching is exclusively by an external switch connected to the vario unit.
- **GPS:** When the GPS detects that the glider is circling an automatic change over to vario will happen after approximately 10 seconds. Detection of straight flight will cause a changeover to speed command.
- **G-load:** When accelerometer detects increased g-load, because of circling, variometer will change from cruise to climb mode.
- **IAS:** When the IAS exceeds a pre-set value. The IAS at which switching occurs can be selected in 5 km/h steps from 100 up to 160 km/h (or the equivalent in knots or mph).

Using **Smart vario filter**, vertical speed can be further filtered. Smart vario filter defines maximum speed of vario needle. Higher the value is, slower will be the needle.

Beep at max will enable a short beep few seconds before a maximum in thermal is reached.

Beep before max defines how many seconds before a maximum in thermal a short beep will be heard.

Auto reset integrator resets the integrator to zero when the vario unit switches from cruise to climb mode. If this item is not checked the integrator will not be reset to zero.

Netto filter sets a time constant of the netto vertical speed filter. The value can be up to 20 times bigger than vario needle filter. Default value is same as vario needle filter.

SC filter sets a time constant of the speed to fly (SC) filter. The value can be up to 20 times bigger than vario needle filter. Default value is same as vario needle filter.

Relative filter sets a time constant of relative vertical speed filter (also known as supper netto vertical speed). The value can be up to 20 times bigger than vario needle filter. Default value is same as vario needle filter.

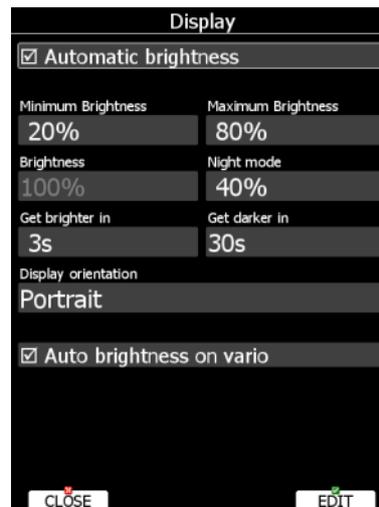
Netto time defines the integration period for the average netto vertical speed in seconds. The default is 20 seconds.



The external switch wired to the vario unit has absolute priority and will override all other switching methods.

5.1.4 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 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.

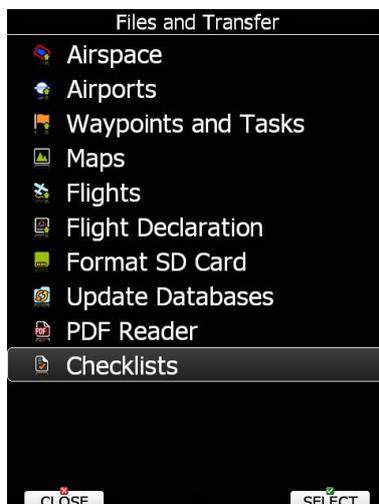
Checking **Auto brightness on vario** while enable automatic regulation of brightness on vario unit, if available. If this option is uncheck, vario unit will always run at full backlight.



It is recommended that the automatic brightness control is always enabled. Reducing brightness will also reduce power consumption. See technical data for more details (Chapter 2.1.9).

5.1.5 Files and Transfers

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



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.

Waypoints, Tasks and Flights can also be uploaded TO MAIL.

TO MAIL function:

After pressing **TO MAIL**, a window with required email details will pop up. User has to insert recipient's email address and press **SEND**. File can be sent as ZIP if option **Add attachment as zip** is ticked.

EMAILS button stores all past recipient's emails, it is a shortcut for faster sending to already known email addresses.

SETTINGS button allows you to change Wi-Fi settings.

5.1.5.1 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.



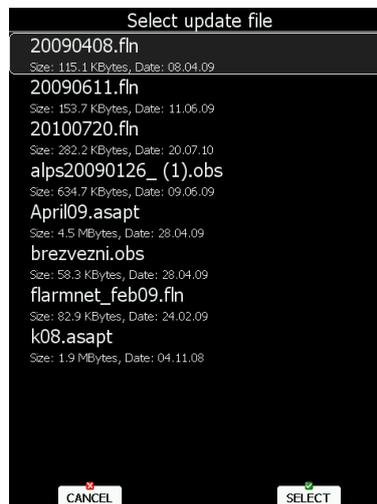
In next step the data source must be selected. Unavailable data source are going to be greyed out. A dialogue with a list of all available files will be opened. Press the **COPY** button to copy the selected file to the main display unit. The main display unit will accept the following file formats:

- **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.

5.1.5.2 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.

5.1.5.3 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 as written above.



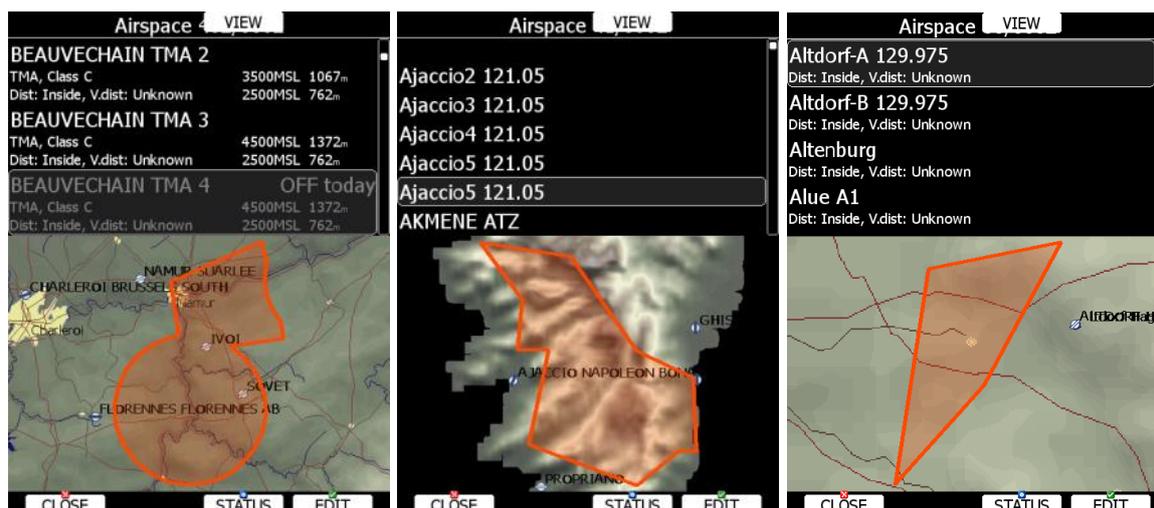
When an airspace file from USB or SD card is selected, it will be available only, if SD card or USB stick is inserted in main display unit.



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

5.1.5.3.1 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.



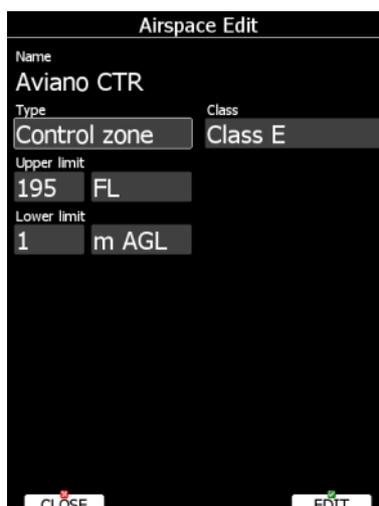
Pressing the **VIEW** button will toggle different views of the zone list.

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 option will disable all airspaces for TODAY or ALWAYS. To enable them again press ALL and choose ENABLE.



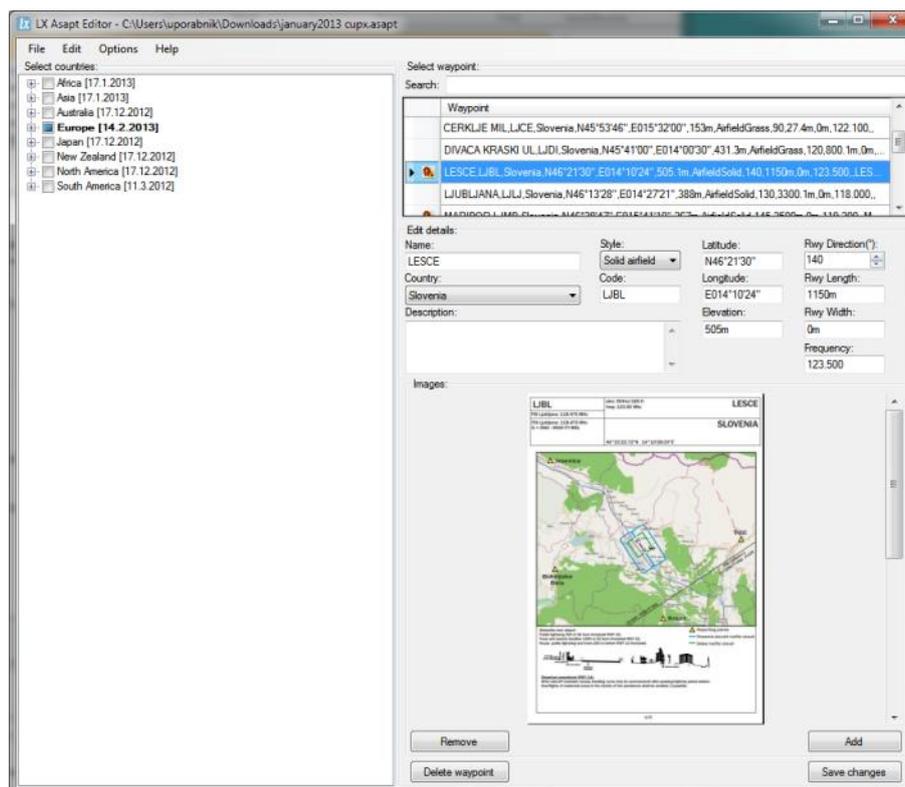
Press EDIT to edit data for the selected zone. Airspace type, class and altitude borders can be modified in this dialogue.

5.1.5.4 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.

5.1.5.4.1 Managing Airports Using the LX Asapt editor



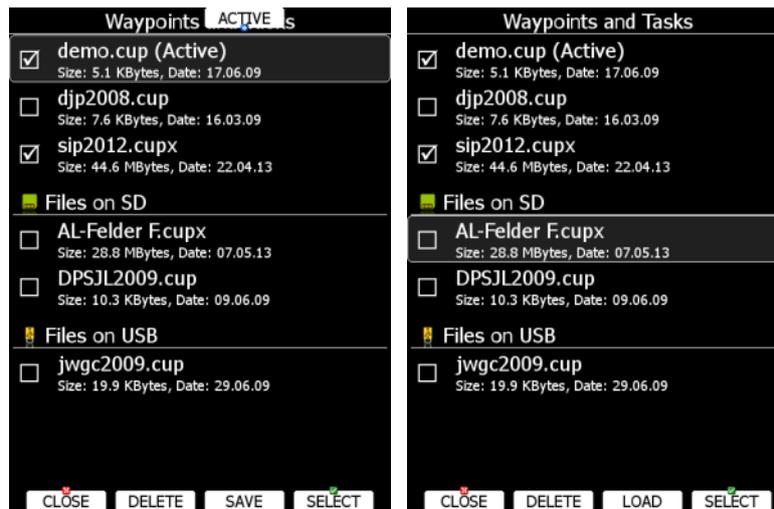
LX Asapt Editor allows you to edit any LXNAV airport database distributed as asapt files. You can quickly filter the regions and find the airports you're interested in. View and edit all details of the airports, add charts, photos (from files or clipboard) and any other information you would like associated 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 5.1.5.2).

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.

5.1.5.5 Waypoints and Tasks

Select the **Waypoints and Tasks** 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 task creation. Task 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.



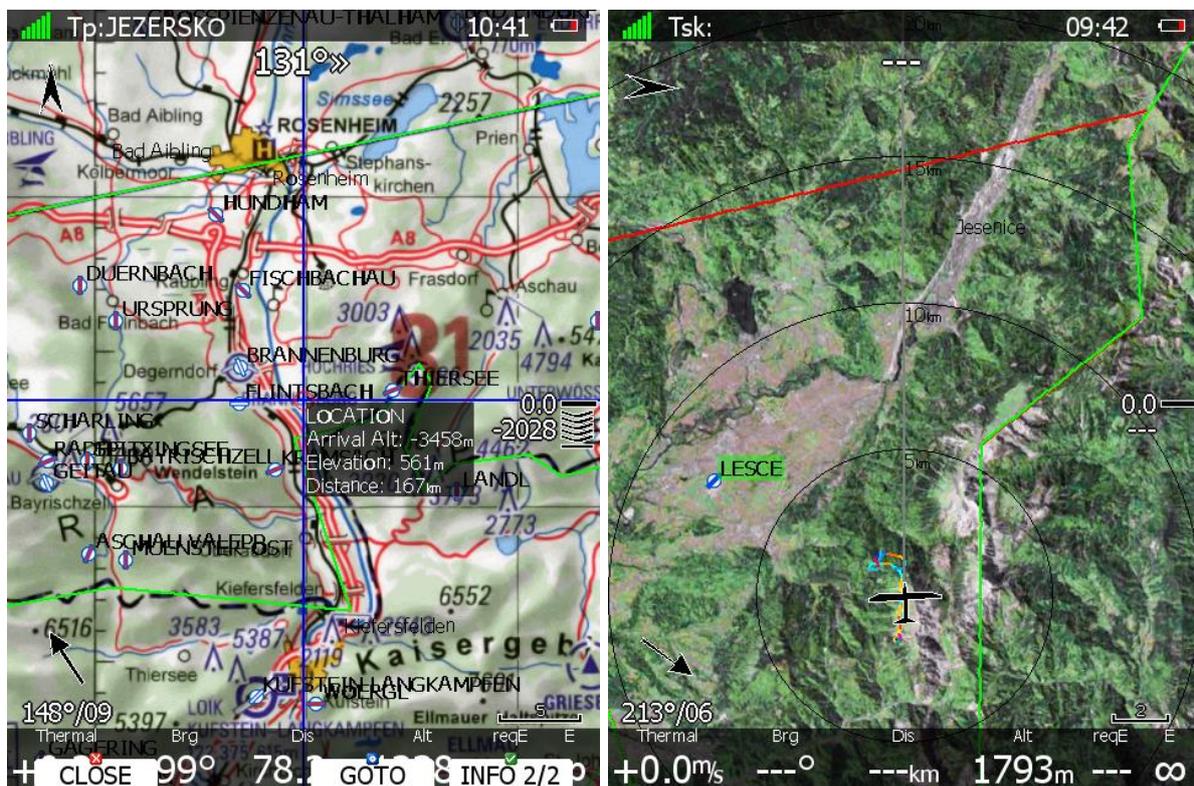
CUP and CUPX files also stores tasks. Tasks will also be uploaded to the main display unit. This feature is very useful, if you wish to prepare tasks on a computer using SeeYou or a similar program. You can subsequently easily select a task via the Task->Edit->Load option. See Chapter 5.7.4 for more details.



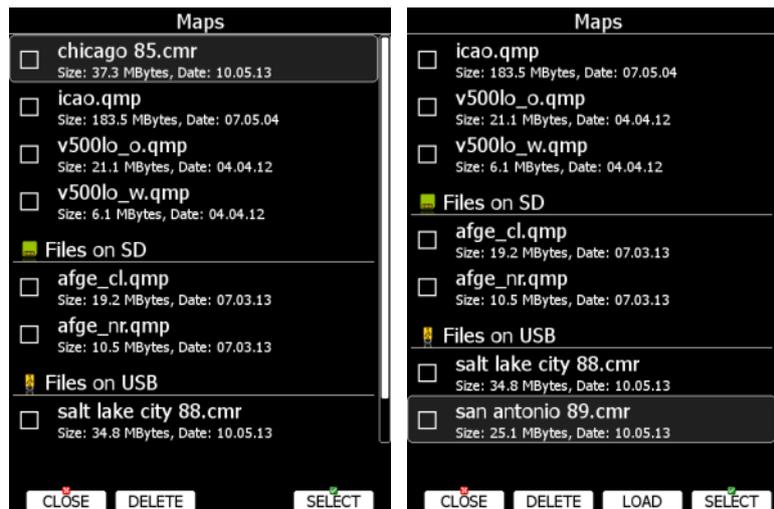
Some of CUPX waypoint files with images are password protected and a valid password must be obtained before using such a file. Please contact vendor to obtain password for your display unit.

5.1.5.6 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 cannot 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.

5.1.5.6.1 High resolution terrain HGL

High resolution terrain can be downloaded from Download->Maps section on www.lxnav.com.

After downloading selected HGL package you can install it using password 89891. When HGL package is installed, it can be enabled in Setup->Files and Transfer->Maps menu.



High resolution maps requires a lot of internal memory space. In case of insufficient memory, you must remove HGL packages from Setup->Files and Transfer->Maps menu, pressing DELETE button.

5.1.5.7 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 1/60				
#	Date	Takeoff	Landing	Duration
1	14.08.13	12:49	18:24	05:35
2	03.05.13	04:48	16:37	11:48
3	03.05.13	04:48	08:45	03:56
4	07.10.12	08:44	16:19	07:34
5	06.10.12	08:14	10:29	02:14
6	05.10.12	09:11	11:51	02:40
7	03.10.12	05:49	09:05	03:16
8	19.06.12	10:26	18:56	08:30
9	11.06.12	10:23	16:00	05:37
10	12.05.12	12:09	16:29	04:20
11	24.04.12	08:42	14:24	05:42
12	20.04.12	11:48	14:24	02:36
13	20.04.12	09:48	15:42	05:54
14	20.04.12	09:48	12:23	02:35
15	05.04.12	07:54	14:33	06:38

CLOSE DELETE TO USB 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.

If Wi-Fi option is enabled, buttons **TO OLC** and **TO MAIL** will be visible. Press the corresponding button to send selected file to email or to OLC.

OLC upload

TO OLC automatically uploads flight file to OLC. This function is supported also on Logbook page. First time user has to set parameters such as username and password. This can be done each time the upload is performed or at: SETUP->PROFILES AND PILOTS->select profile->press EDIT.

SeeYou Cloud upload:

Upload to SeeYou cloud is automatically performed. User has to insert SeeYou cloud KEY. This can be done at: SETUP->PROFILES AND PILOTS->select profile->press EDIT.

5.1.5.8 Flights declaration

In this menu point pilot can check the current declaration settings (Pilot, Glider and Task declared). Flight declaration can be SAVED and also LOADED (.hdr file).

5.1.5.9 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.

Maximum SD card size for old device (built before 2015) is 4gb.

5.1.5.10 Update databases

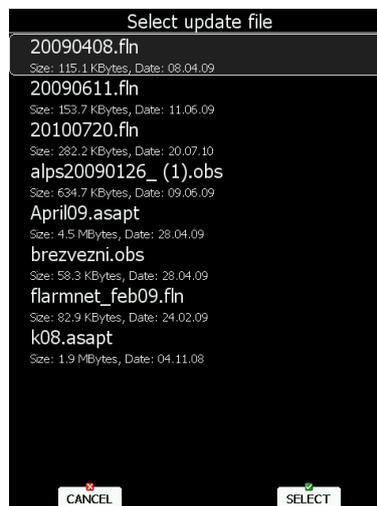
Under this section you can upload databases such as:

- .asapt extension (airspace and airport database file provided by LXNAV)
- .fln (flarmnet file)
- .obs (flarm obstacle file)

LXNAV distributes free of charge airport and airspace database throughout 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 an SD Card or USB stick. Plug the SD card or USB stick into the main display unit and select the **Update database** menu point. If multiple ASAPT files are found on a SD card a dialogue window to select the appropriate one will pop up.

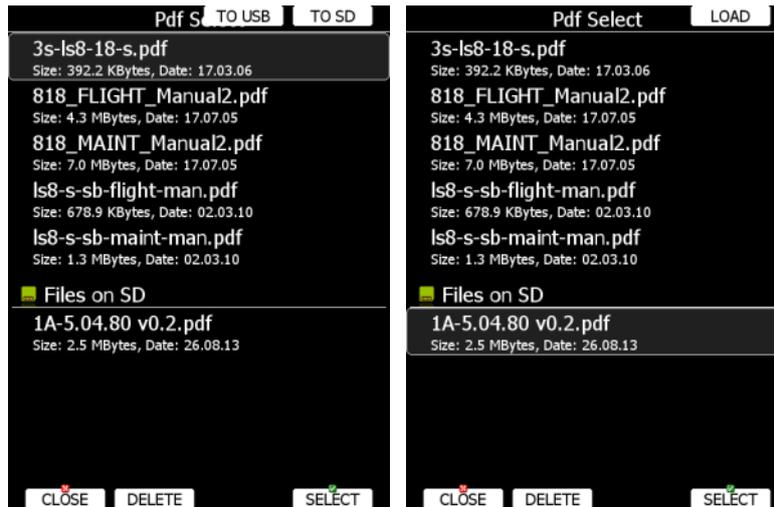
Plug the SD card or USB stick into the main display unit and select the **Update database** menu item. If multiple files are found on a SD card a dialogue to select the appropriate one will be shown.



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

5.1.5.11 PDF documents

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.

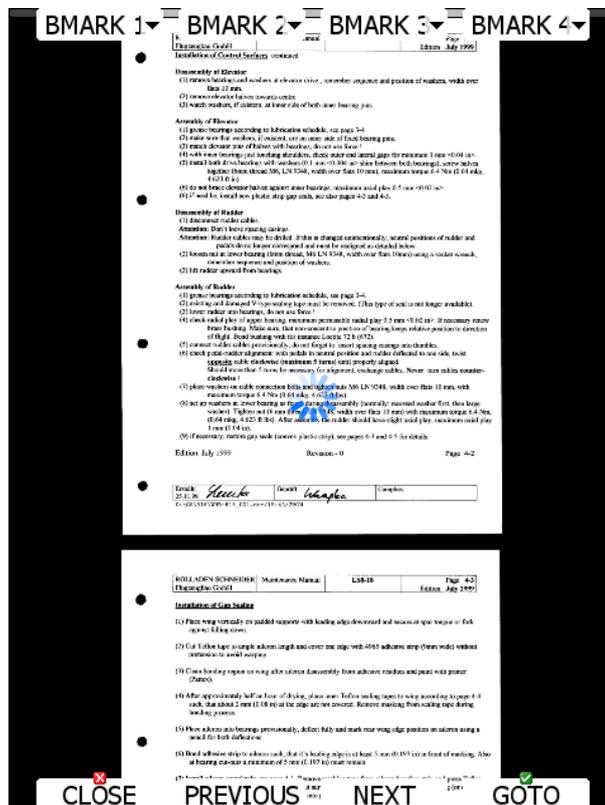


Select the **PDF READER** menu item and press the **SELECT** button. A list of all available PDF documents will be shown on the screen. Select desired document using PAGE selector. Press **DELETE** button to delete selected document. Press **LOAD** button to upload selected document to internal memory.

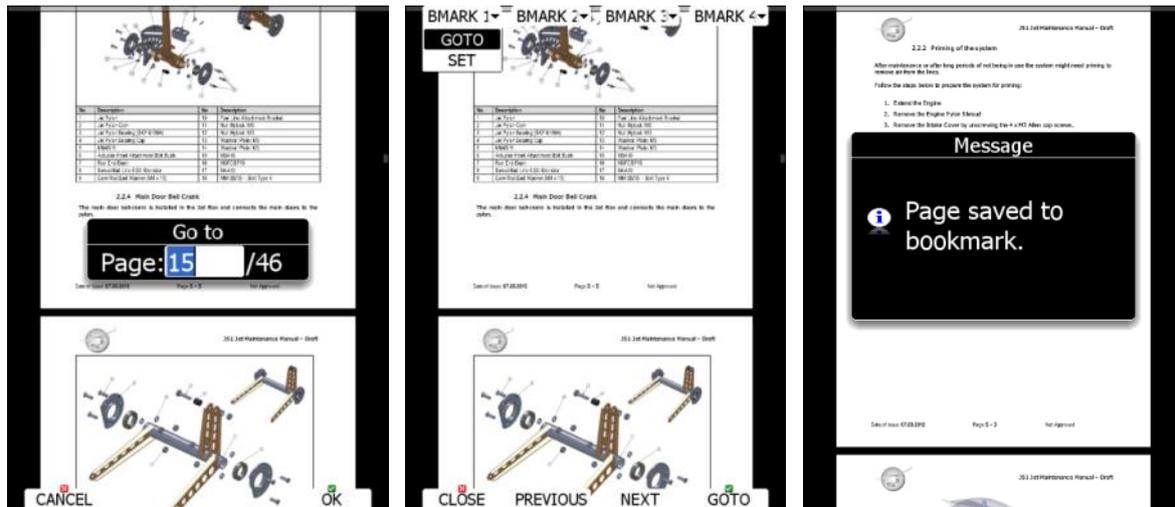


Documents can be very big in size and can occupy a lot of space of internal storage of main display unit. There it not necessary to copy documents to internal memory. Documents can be selected directly from SD card or USB at no performance cost.

Press **SELECT** button again to open selected document.



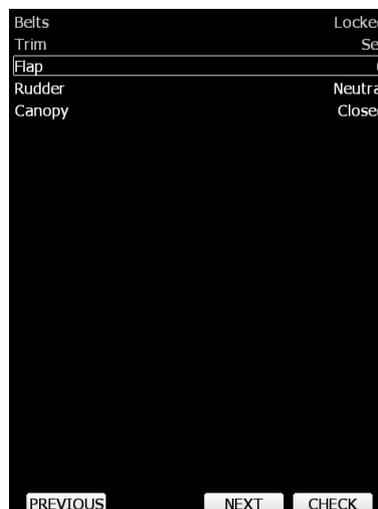
A document will load within few seconds. Use PAGE selector or **NEXT** and **PREVIOUS** button to move up/down through document. Use ZOOM selector to zoom current page. Use MODE selector to move left/right on the selected page. Press **GOTO** button to navigate to specific page. A goto dialog will be 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.

5.1.5.12 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 checklist file using PAGE selector knob. Press **SAVE**, where you will have an option to **TO USB** or **TO SD** for the checklists file to be stored on a USB stick or SD card. A file is stored in a file with the **.checklists** extension. Press the **LOAD** button to load a file from an 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.



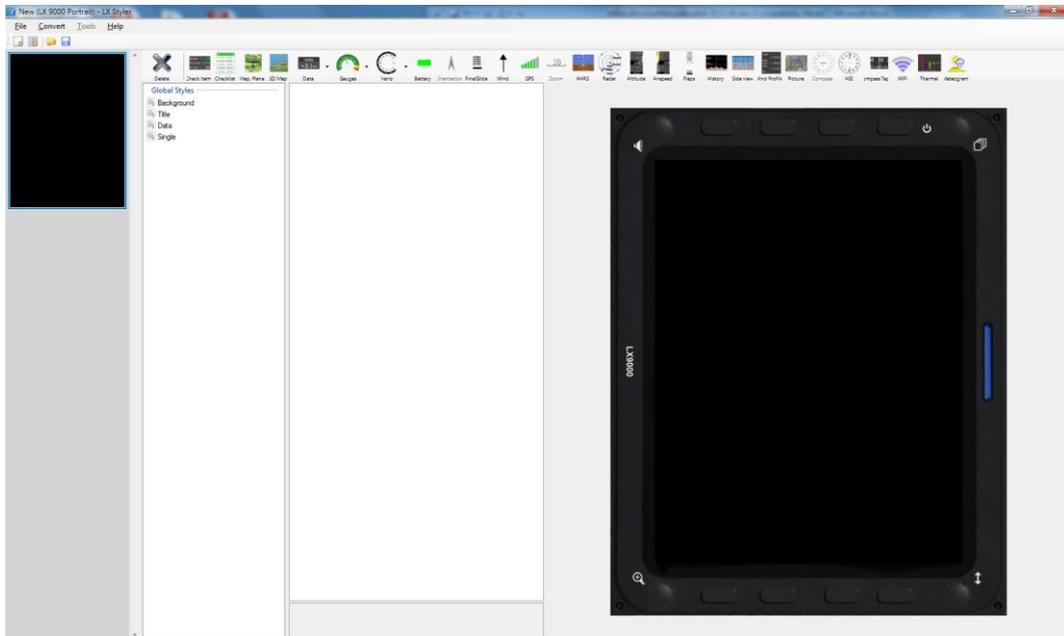
Checklists can be found at the last page of APT/WPT and TSK page. Once the action of the checklist is performed press the **CHECK** button. To move through the actions on the checklist use the **NEXT** or **PREVIOUS** buttons.



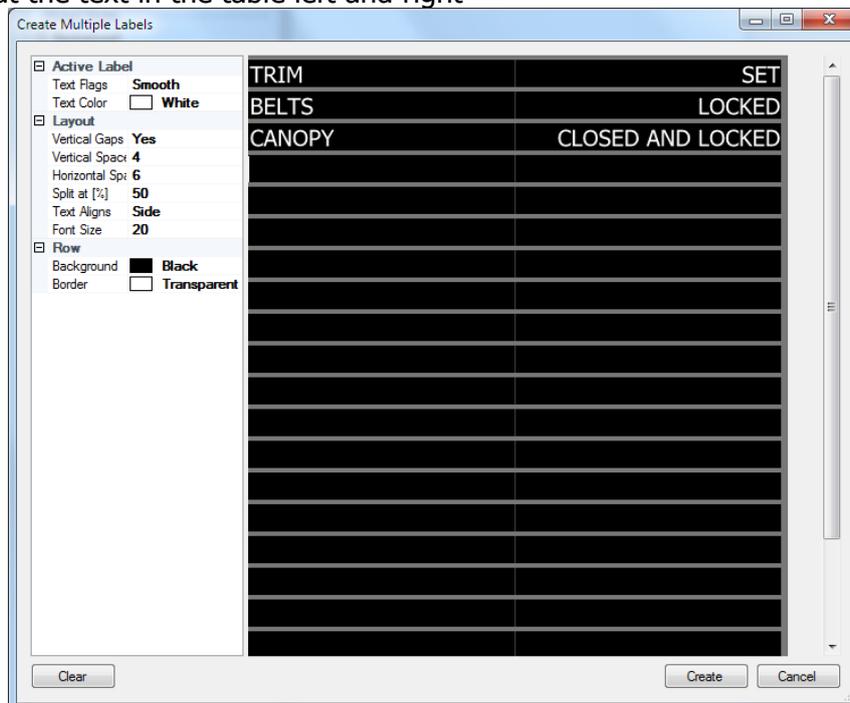
A checklist file can be made / opened and manipulated with the LXStyler program. LXStyler is a special program designed for customising layout navigational pages. It can be downloaded free of charge from our web page www.lxnav.com. For more information about LXStyler please refer to the LXStyler manual.

Creating a checklist file

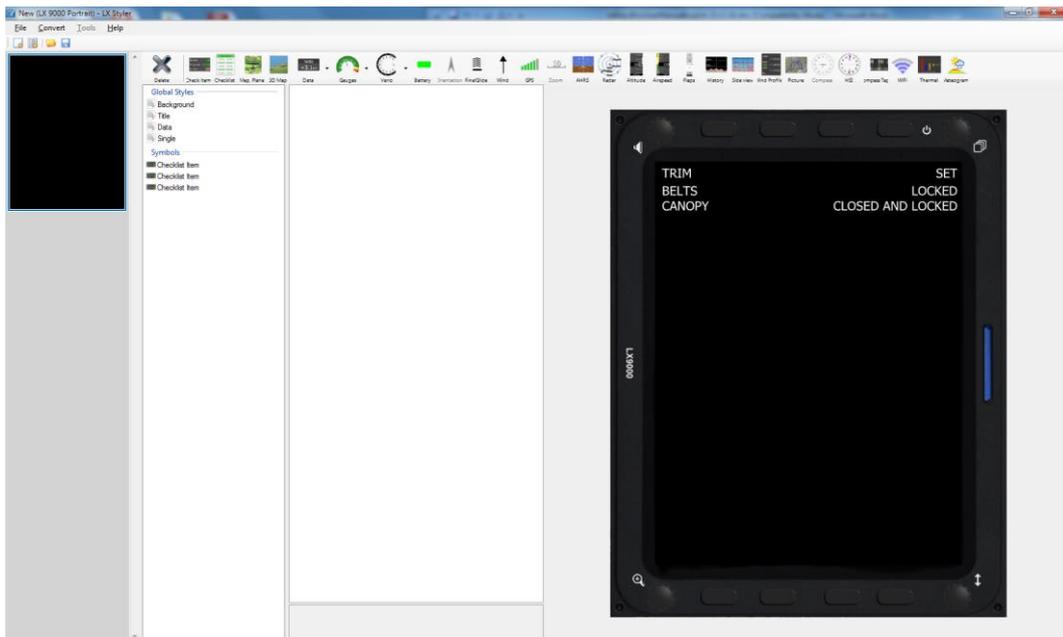
- Open the latest version of LX Styler
- Click on FILE->NEW CHECKLISTS
- Select your instrument size and orientation
- Double click on the blank black page, which will open the customization menu



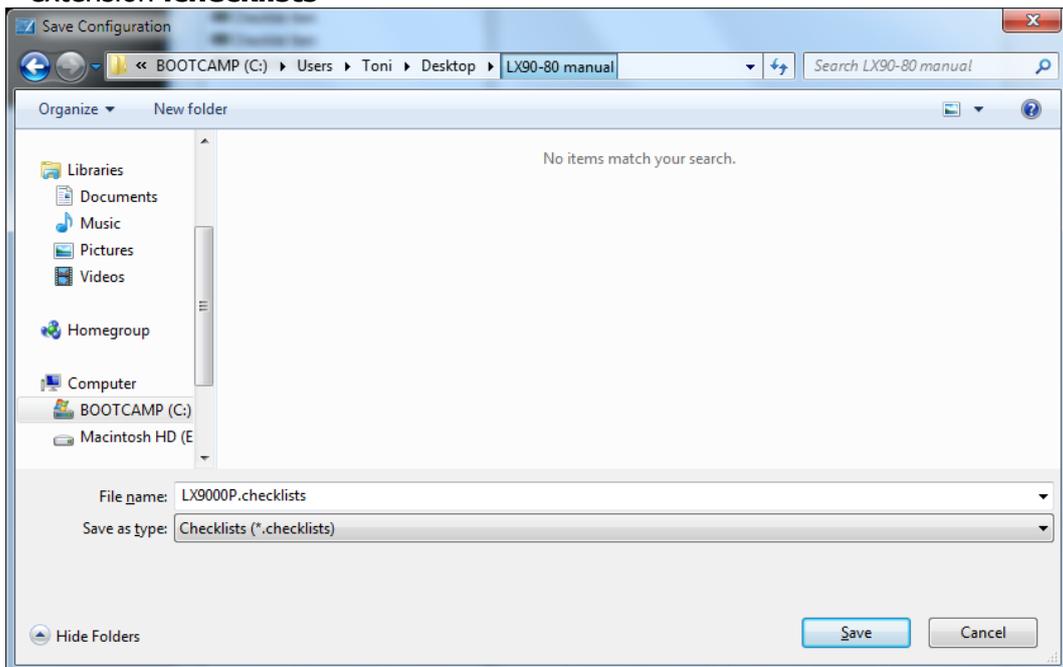
- Click on the icon Checklist
- A new window **create multiple labels** will open
- Now you can set gaps, vertical and horizontal space and text aligns
- Put the text in the table left and right



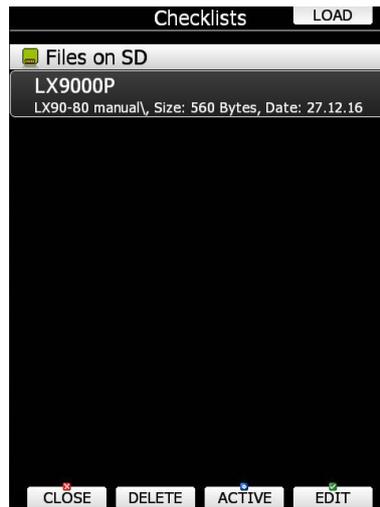
- Once finished, press **create** button



- Press **save** to save the checklist file on the PC/SD card or USB. File has the extension **.checklists**



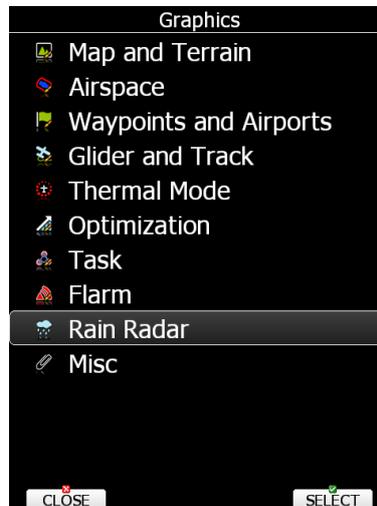
- Go to LXxxxx instrument Files and Transfer ->Checklists and load the file from the SD card/USB key



- Checklist is automatically added to the last page of the ATP/WPT and TSK screen.

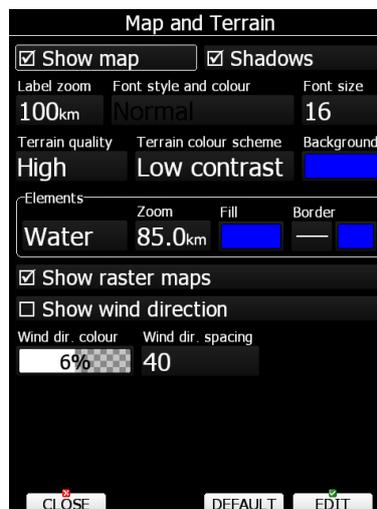
5.1.6 Graphics

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.



5.1.6.1 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** is a colour scheme related to the current altitude (unreachable area is coloured from orange to red, reachable area is white coloured)

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:

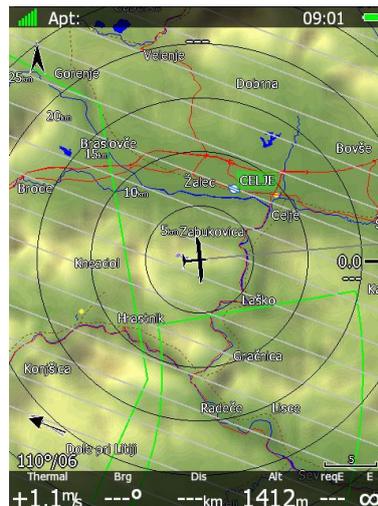
- Water
- Road
- Highway
- Railroad
- Town
- Track
- Airport
- Minor Water
- Forest
- Street
- Minor roads



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.

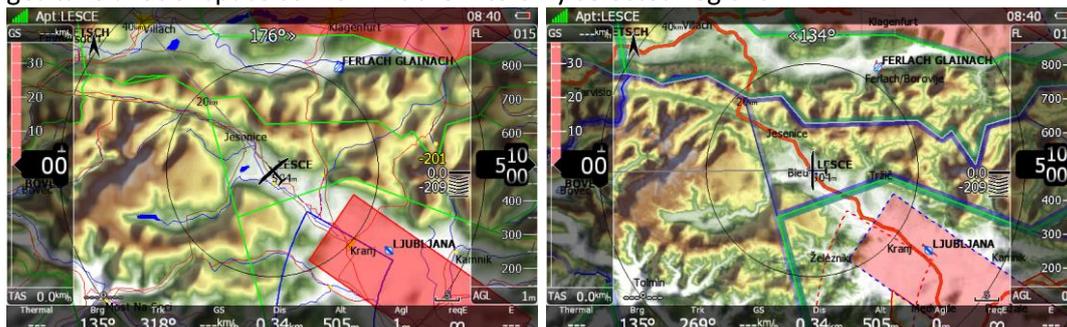
Check **Show raster maps**, if you would like to see also scanned maps (See also chapter 5.1.5.6).

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



5.1.6.1.1 HGL – high resolution elevation data

HGL – high resolution elevation data is an add-on package which does not come preinstalled on the device. It provides high resolution elevation data for better view of terrain, see images below. HGL packages take a lot of space so we limit them to only selected regions.



Left: terrain rendered using normal maps, right: terrain rendered using HGL.

5.1.6.1.1.1 HGL-install procedure

HGL terrain can be downloaded from www.lxnav.com. After downloading selected HGL package you can install it via Setup->Password->insert 89891. Package will be unpacked to internal memory and available for selection in Maps dialog.



Alternatively, if you're low on internal space, you can rename ".hglzip" extension of the package to ".zip" and extract it in a folder on a SD/USB. After inserting such SD/USB into the device your package will be immediately available for selection in Maps dialog and will not require loading the data onto internal memory. **WARNING:** Using this option you **MUST NEVER** remove the SD/USB before turning the device OFF.

5.1.6.1.2 Maps CITv1/CITv2

CITv1: regular maps containing vector and elevation data. Preinstalled on all devices.

CITv2: New maps containing vector and elevation data. Supported by firmware version > 5.06 and preinstalled on devices produced from 2014 onwards.

Depending on when your device was manufactured it may already contain the new maps (CITv2). Installed maps can be seen in "SETUP-ABOUT" dialog (after installing version 6.0+).

You will see "Installed maps: CITv1, CITv2 (used)", if you have newer maps installed. If not then it will state "CITv1 (used)".

5.1.6.1.2.1 CITv2-install procedure

If CITv2 is not preinstalled then you will need to verify that enough free space is available on your device before installing CITv2 maps.

Installation on device is as follows:

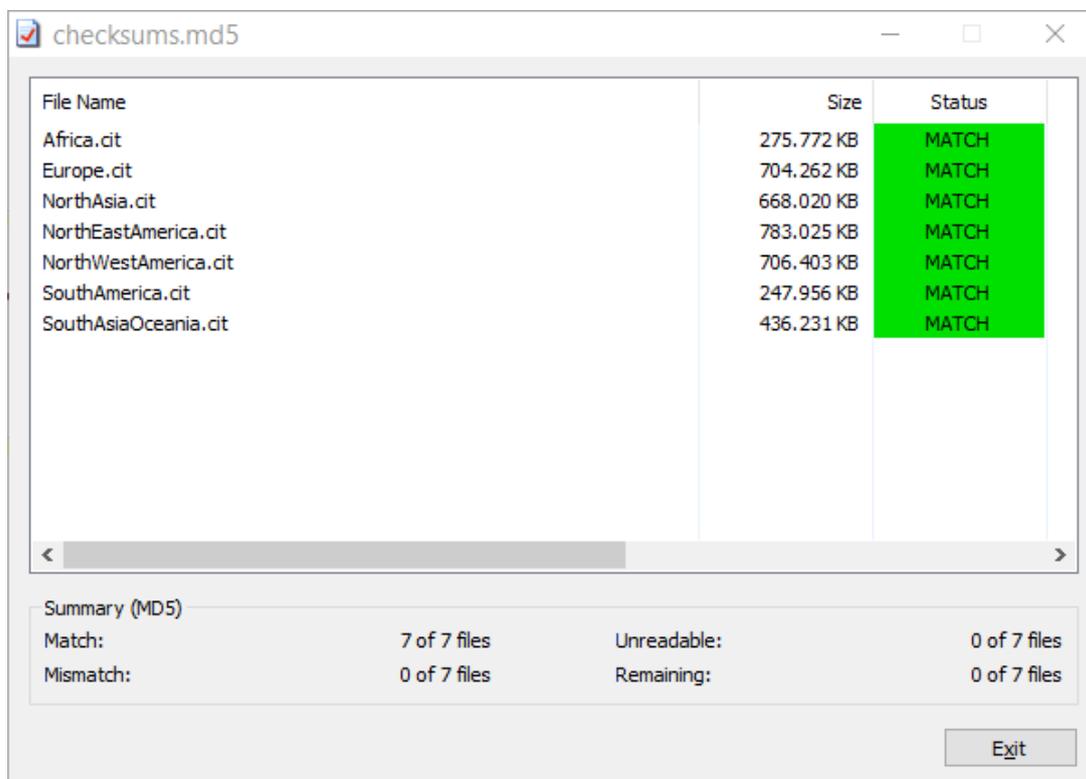
1. Verify that you have enough available free space on internal memory by going to Setup->Password and enter 00111. Verify that "FreeMem CF" value displayed is at least 3.8 GBytes.

2. Download CIT files from:

<https://my.pcloud.com/publink/show?code=kZiiy0ZzEanvinK8pQ0dYferQPHo4Htxu7V>

These files will also be automatically verified while being copied to your device. To prevent discovering a faulty download "on site" you can (optionally) verify downloaded files on your PC using a tool like HashCheck <http://code.kliu.org/hashcheck/>

After installing HashCheck you can double click on checksums.md5 file to automatically trigger verification of downloaded CIT files.



Verification of downloaded files with HashCheck tool.

3. Copy downloaded CIT files to USB or SD and use "Safely remove hardware or eject media" (**very important!**) before removing the SD or USB from the PC. This step prevents

accidental removal of the media before files are fully written to it. Removal while files are being written would result in corrupted files on the media.

4. Install latest version of the firmware on your device.

5. With SD/USB containing CIT files inserted into your device go to Setup->Password and enter 00112. You will now be asked "Map (CIT) file(s) have been detected on external media. Would you like to copy them to internal memory?" Press "Yes".

Copy procedure will begin and maps will be copied to internal memory. You will see an estimation of time to finish (ETA) on your device. It may take up to an hour, so prepare accordingly (enough battery, time).

After copying it should state 'OK' for all copied files. If it doesn't then it's likely that you have a faulty CIT file on the external SD/USB media (return to step 3 or 2, if you suspect a faulty download).

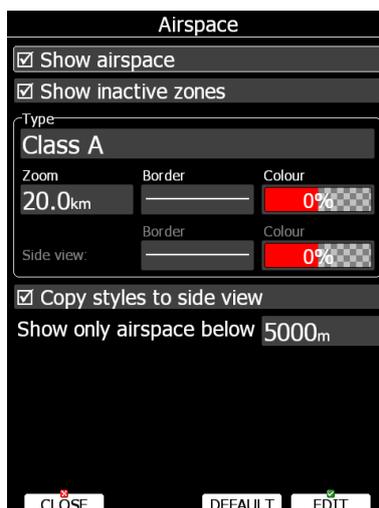
After exiting this dialog the device will automatically restart and when it starts again you can verify installed and used maps in "About" dialog.



If you don't have enough space available and if you wish to have the CITv2, you should contact LXNAV about the HW/memory upgrade.

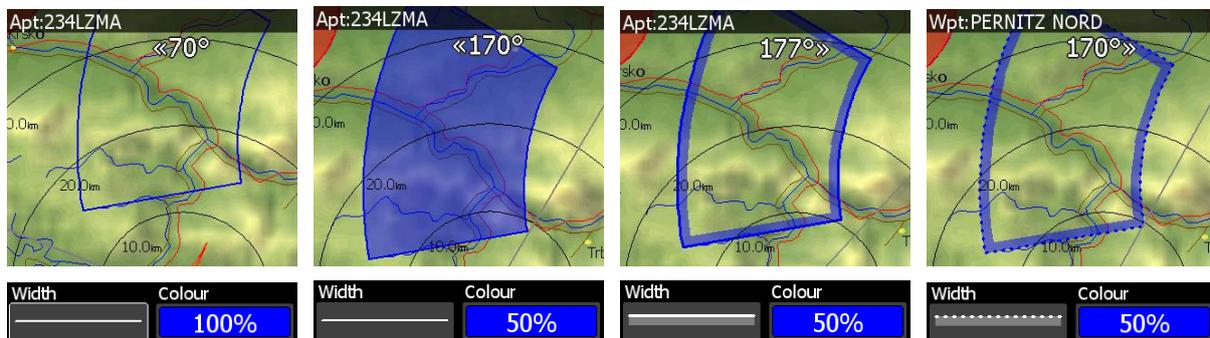
5.1.6.2 Airspace

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

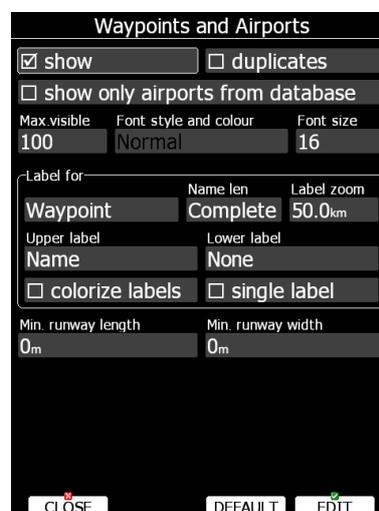
type. Turn the ZOOM selector knob to change the transparency value. 100% means completely transparent and only the airspace zone outline will be shown. 0% means completely solid (not recommended). Image below shows example of combinations of Width and Colour property and rendering of airspace zone.



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.

5.1.6.3 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.
- **Arrival altitude** shows arrival altitude taking into account current MacCready setting, safety altitude and current wind. Due to complexity of the calculation it will not take the wind profile into account.
- **Required altitude** shows how much height is needed to reach the point. Required altitude takes into account current MacCready setting, safety altitude and current wind. Due to complexity of the calculation it will not take the wind profile into account.
- **Required Mc** gives an estimate of the maximum MacCready value which we can use to reach the point.
- **Required L/D** shows the required glide ratio to the point taking into account the safety altitude.
- **Team code:** shows the team code for that waypoint.
- **Frequency** will display the point frequency, if available.

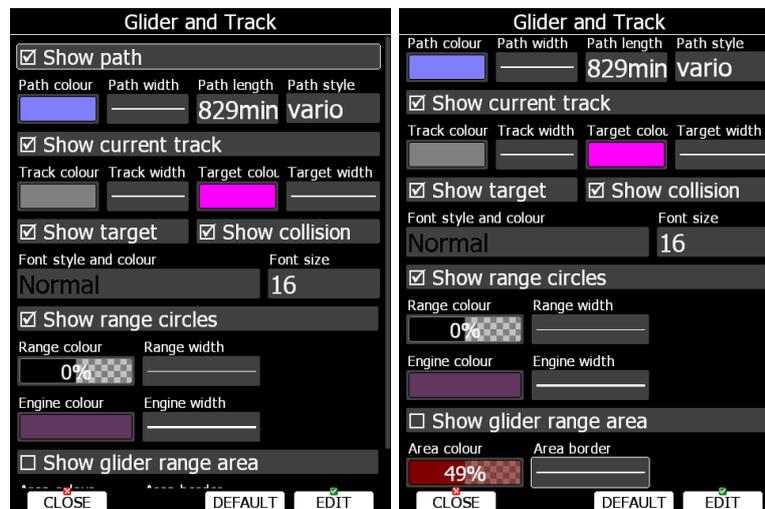
Define **minimum runway length** and **minimum runway width** to filter our too short and too narrow runways. Such landing places will be shown in nearest list anyway, but they will be marked with red cross to indicate, they are not usable.

Near			
Name	Dis	Brg	Arr
✘ BELLUNO	52.3km	165°	1214m
Rwy: 05/23-G-812-/0m Freq: 119.650 Elev: 378m			
Description:			
♦ BOLZANO	59.6km	252°	1164m
✘ LIENZ NIKOLSDO	65.0km	72°	731m
♦ Lienz	65.5km	72°	716m
✘ Enemonzo	67.0km	110°	878m
♦ AVIANO AVIANO	77.1km	147°	797m
♦ PORDENONE COM	83.1km	146°	695m
✘ Rivoli	88.3km	118°	500m
♦ INNSBRUCK	89.9km	322°	129m
✘ ZELL AM SEE	92.6km	36°	-60m
♦ ASIAGO	92.2km	207°	-585m
♦ TRENTO MATTAR	98.5km	227°	104m
✘ ST JOHANN/TIRO	104km	16°	-267m
♦ RIVOLTO RIVOLT	104km	132°	155m

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

5.1.6.4 Glider and Track

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



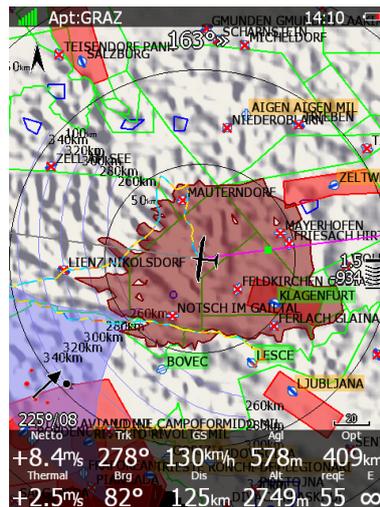
Check the **Show path** item if you want to see the flown path. **Path length** defines how much of the flown path will be shown. The path can be coloured using:

- **Fixed** path style. Path colour is fixed and defined by path colour item.
- **Mc** path style, which is based on current MacCready settings. Red colour indicates segments of the flight where we have vertical speed higher than the current MacCready setting. Orange colour shows vertical movements similar to the current MacCready setting and blue for vario values below the MacCready setting. Grey depicts sink areas.
- **Vario** path style, where red colour indicates positive vertical speed and blue colour negative vario values.
- **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.
- **Netto** path style, where red colour indicates positive netto vertical speed and blue colour negative netto values.

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.



Use **Show glider range area** to display reachable area from current altitude with current wind and MacCready settings. Use **area colour** and **area border** to define its properties. Area can be filled outside or inside. **Glide ratio** defines the past flown average efficiency which will be used for average efficiency calculation for glider range area. Press the **DEFAULT** button to reset these settings back to default.

5.1.6.5 Thermal mode

When entering thermal, display unit can enter special page, which is called thermal page. See chapter 6 or LX Styler manual how to define thermal page.

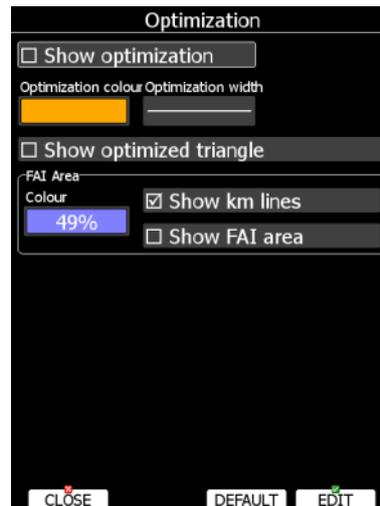


Check **Enabled** to enable thermal page option. Displayed path on thermal page can be different from the one defined in Glider and track dialog. Use **length**, **line** and **colouring** properties to define path display. Also page zoom is different and set to fixed value defined with **Page zoom** property. Switching to thermal mode can be done in 2 ways: Circling detection or Switching SC/Var. If you start circling the thermal mode will become active at the angle of turn (set switch angle), or if you switch from SC to Vario mode. Circles are coloured based on following methods: Auto span, MC or Average Vario.

5.1.6.6 Optimization

The main display unit calculates the optimised flown distance according to OLC or FAI rules in real-time during flight (see Chapter 5.1.8). It calculates the available FAI triangle area, which is also called the FAI triangle assistant. If you enter this area and return to the start

point your flight forms a triangle according to FAI rules. The Optimisation dialogue is used to define the look and feel.



Check the **Show optimization** item to enable display of the optimised track. **Optimization colour** and **width** defines the colour and width for these lines.

If **Show optimized triangle** is checked also lines for the largest optimised triangle are shown. Please note this might not be a triangle according to FAI rules.

The FAI Area group defines how the FAI area is drawn. Select the **Colour** item to change the colour of the FAI area. Use the ZOOM selector knob to change transparency of the area. 100% means completely transparent and only the outline will be drawn. 0% means completely solid (not recommended).

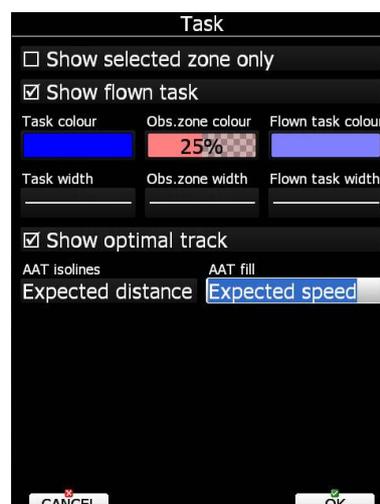
Check the **Show km lines** item to see lines which indicate what will be the size of the completed triangle.



These lines will always be plotted in kilometres scale regardless of the Units value.

5.1.6.7 Task

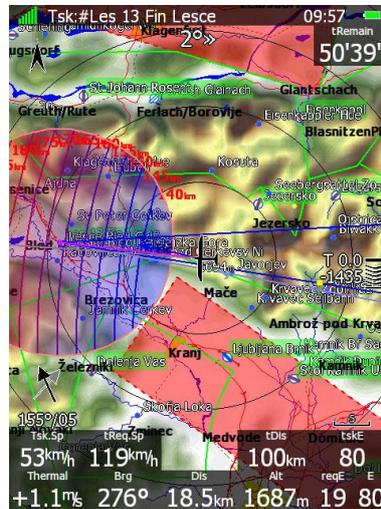
Use this dialogue to define how a task is drawn in task mode.



Task colour defines the colour of task lines. **Obs.zone colour** defines colours for observation zones. Use the ZOOM selector knob to change transparency of area. 100%

means completely transparent and only the outline will be drawn. 0% means completely solid (not recommended). When **Show flown task** is checked also the flown task will be drawn. This might be useful when flying assigned area tasks.

The **Show selected zone only** item controls whether all task observation zones are to be displayed or, if there is only one, then that alone will be shown.



When **Show optimal track** is enabled, small blue arrow is drawn next to aircraft. This arrow indicates most optimal direction to fly.

AAT isolines are showing expected speed, delta time or expected distance, which means if you turn to a next point at any of the lines, you will have the results indicated next to the line based on the calculation to the next turn point zone.

AAT fill is filling the zone. Zone becomes transparent if you are "too early, too short or task delta time is not 0", if the zone is solid colour, you are already "too late, flew too long in the zone or your task delta time is not achievable".

5.1.6.8 Flarm

The system can be equipped with the internal or 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 5.1.11.6.

Flarm

Show flarm objects

Above colour Near colour Below colour

Lost device after Font style and colour Font size

120s Normal 16

Path colour Path width Path length

300s

Show paths Show labels Symbol size

All All 25

Show PCAS 10s

CLOSE DEFAULT EDIT

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.

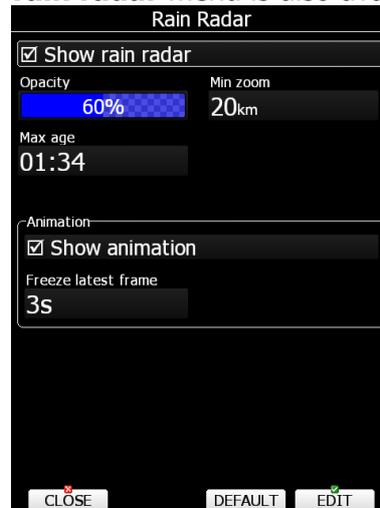
It is possible to display the flown path of tracked aircraft. **Path colour** and **Path width** define width and colour of paths. **Show paths** combo box defines for which Flarm object paths are going to be visible.

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.

5.1.6.9 Rain Radar

If the Wi-Fi module is installed, **rain radar** menu is also available.

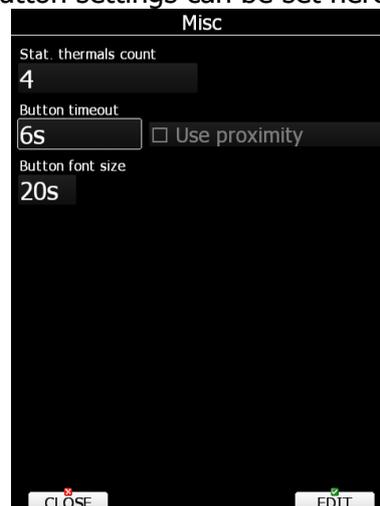


During flight, there is a possibility to get real time rain radar pictures, if Wi-fi module is connected to the 3g hotspot and if the hotspot has mobile signal.

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 was received. **Animation** is showing how the rain is moving over the map. Last picture can also be frozen and the duration can be set by **freeze latest frame**.

5.1.6.10 Misc

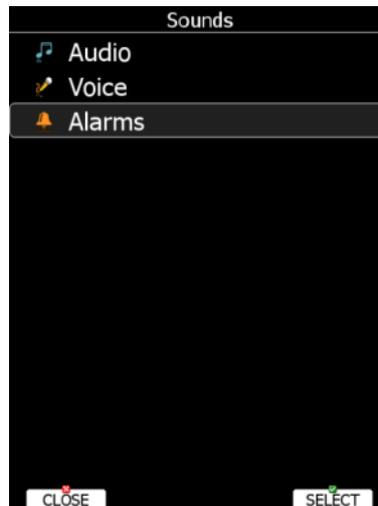
Statistics thermals count and button settings can be set here.



Screen button appearance can be set by **button timeout** time. For newest instruments proximity buttons can be used. Proximity will be detected after touch of a button if **Use proximity** is ticked. Also **button font size** can be set here.

5.1.7 Sounds*

In the Sounds setup page audio settings, voice settings and alarms settings for the vario unit can be modified.



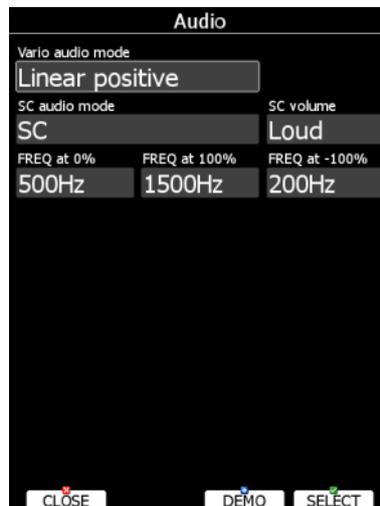
Volume can be also controlled using upper left rotary knob. Rotating it will directly change volume for sounds, which is currently being played. For example, if voice message is being played, voice message volume will be set. If alarm is beeping, alarm volume will be set. In speed to fly mode, speed to fly volume is set and in climb mode, vario volume is set.



When button **VOLUMES** is pressed a menu will appear, where it is possible to set up all volumes at same time.

5.1.7.1 Audio Settings*

Basically here we can set up two types of audio; audio sound for climb mode and another for cruise mode (SC).



Vario audio mode has the following options:

- **Linear positive:** sound is interrupted with silence every few milliseconds when the needle is positive; on negative side sound is linear (not interrupted).
- **Linear negative:** inverse function to **Linear positive**.
- **Linear:** sound is linear and non-interrupted in full scale range.
- **Digital positive:** similar to **Linear positive**, except frequency is not changing linearly but with larger steps.
- **Digital negative:** inverse function to **Digital positive**.
- **Linear positive only:** sound is present only at positive values, for negative values there is silence.
- **Digital positive only:** similar function to **Linear positive only**, except the sound is similar to the digital tone.

Press the **DEMO** button to hear the selected option.

SC audio mode has four modes:

- **SC positive:** sound is interrupted with silence every few milliseconds when the needle is positive; on negative side sound is linear (not interrupted).
- **SC negative:** inverse function to SC positive.
- **SC:** sound is linear and non-interrupted in full scale range.
- **SC Mixed:** for positive relative values the sound represents relative; for negative relative values the sound represents SC (for that setting it is recommended to set SC needle to relative).
- **Netto speed:** variometer will produce exactly the same sound as defined in Vario audio, except it will follow netto vertical speed.

Freq at 0% defines the tone frequency at 0 m/s.

Freq at +100% defines the tone frequency at full + deflection.

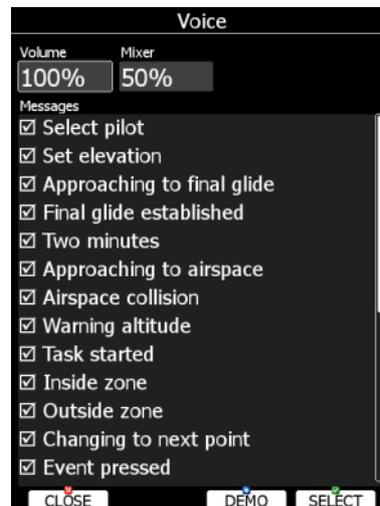
Freq at -100% defines the tone frequency at full – deflection.



SC volume item is visible only for variometer before V5 variometer, where it was not possible to separately set volume for speed to fly mode and for climb mode. It is highly recommended to upgrade variometer to newer one. Please contact info@lxnav.com for more details.

5.1.7.2 Voice*

Voice module is integrated part of V5, V9 or V80 variometer. The voice module is 100% controlled through the main display unit via the settings described in this menu.



In the **Voice** menu volume level (loudness) of the voice module can be adjusted. In the Messages window each item can be set separately. Only checked items will be played by the voice module.



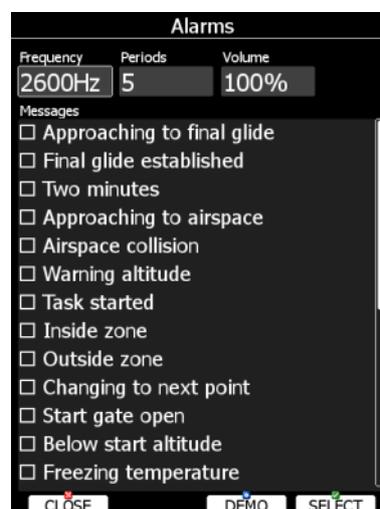
Mixed item is visible only for variometer before V5 variometer, where it was not possible to separately set volume for voice messages. It is highly recommended to upgrade variometer to newer one. Please contact info@lxnav.com for more details.



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

5.1.7.3 Alarms*

The vario unit produces an audio alarm on reaching certain confirmation points. 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

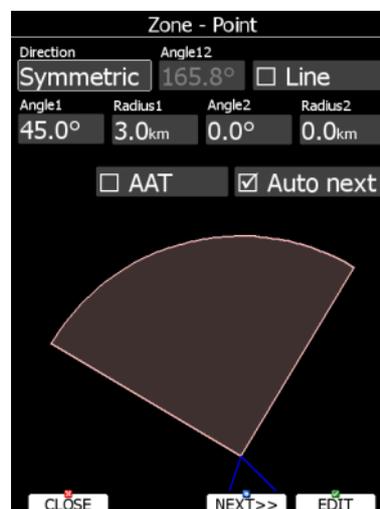
5.1.7.4 Observation Zones

This menu defines the default observation zone geometry. The following items can be chosen: start zone, turn point zone, finish zone and templates.



Each type of observation zone is defined with two angles, two radii and mean bearing (**Angle12**). These parameters enable the creation of any known zone geometry separately for start, turn point and finish.

All stored tasks will match this "global" setting except those where the zone was modified in the task edit menu (see Chapter 5.7.2).



Using parameters in the zone dialogue it is possible to describe all types of observation zones. **Angle12** defines the orientation of the observation zone. Available values for **Direction** are:

- **Symmetric:** This is the most common selection for turn point.
- **Fixed:** This is mostly used for assigned areas.
- **Next:** will orient the observation zone in direction of the outgoing leg. This is usually used for start.
- **Prev:** will orient the zone in direction of the incoming leg and is usually used for the finish.
- **Start:** orientates the sector always towards the start.

If the **Line** checkbox is checked the sector will become a line type of observation zone. The **Radius 1** parameter describes half of width of line length. Use the PAGE selector knob to increase the radius by 0.1 of the selected distance units and the ZOOM selector knob to increase the radius by 5.

If **Line** is not checked the **Angle1** parameter will define the basic shape of the observation zone. A value of 180° means that the zone is a cylinder and 45° is the classical FAI sector. Rotate the PAGE selector knob to increase the angle by 0.5° or use the ZOOM selector knob to choose values 22.5° , 45° , 90° or 180° .

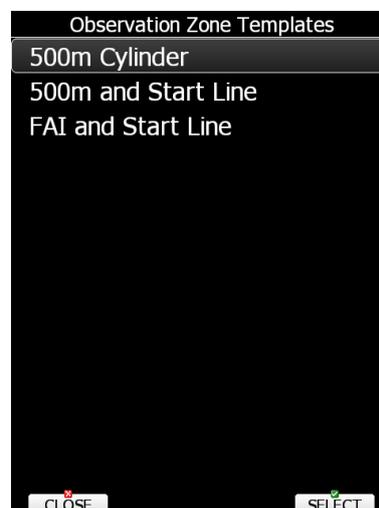
Angle2 and **Radius2** are used for more complex observation zone setups.

When changing observation zone parameters the screen is automatically updated to display the new zone.

Check the **AAT** checkbox, if you want to make the selected zone an assigned area. The **AAT** checkbox will be automatically checked when **Radius1** is greater than 10 km.

By default navigation to task points will be automatically advanced; uncheck **Auto next** if you do not want to change over to next point when reaching selected point. This option will be automatically unchecked when **Radius1** is greater than 10 km.

Use **Template** if you wish to modify start, point and finish zones at same time.

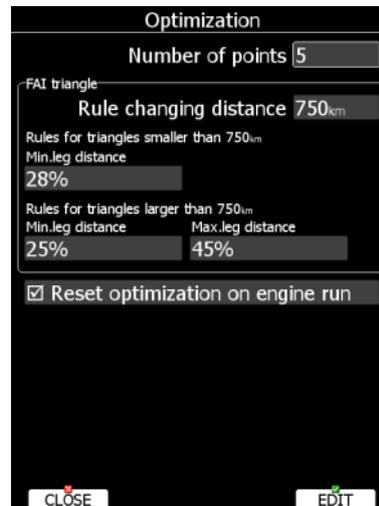


Available templates are:

- 500 m cylinders are used for start, points and finish.
- 500m and start line. The 500 m cylinder is used for turn points. A 1 km long line is used for start and finish.
- FAI and start line. 90° and 3 km long sector is used for turn points. A 1 km long line is used for start and finish.

5.1.8 Optimization

During flight the system optimises the flown path according to OLC or FAI rules. Use this dialogue to change the way instrument performs this optimisation.



Number of points defines the type of optimisation. Use five for OLC optimisation. Use the value three for FAI free flight optimisation.



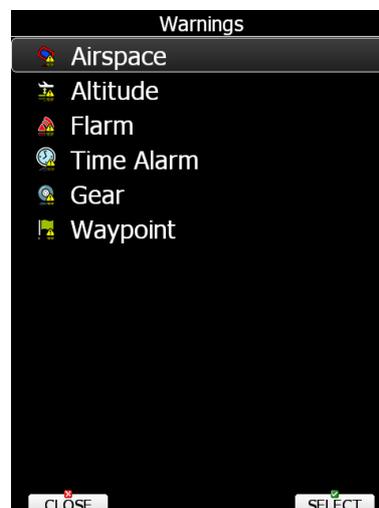
Optimisation will not take into account the 10 km distance between turn points which is required by FAI rules.

The FAI triangle group defines the rules for FAI triangles and these rules can bend a little if you do not want to fly marginal triangles.

Check **Reset optimization on engine run** to reset optimization counter each time engine is started.

5.1.9 Warnings

There are four types of warnings available. Airspace warnings are shown when approaching a particular airspace zone. Altitude warnings are shown when approaching to a defined altitude, 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, Gear warning is triggered at pre-defined above ground level altitude setting and Waypoint warning will be given at set distance to Waypoint.



Use this dialogue to setup the behaviour of warnings.

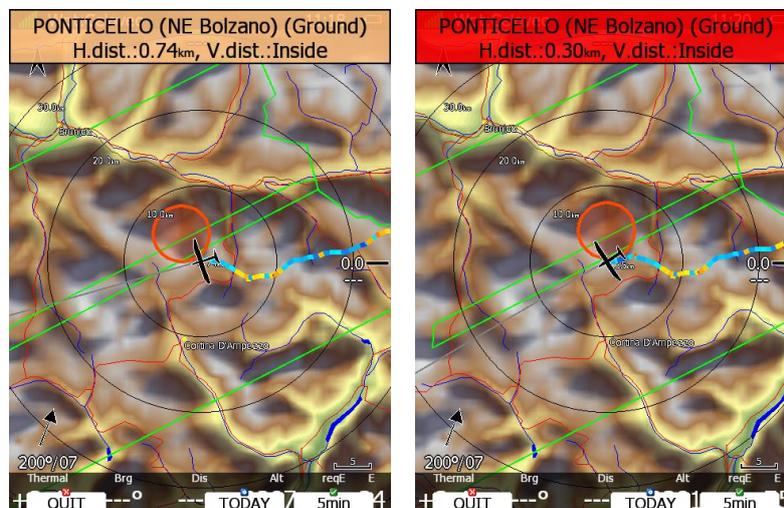
5.1.9.1 Airspace Warnings



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.



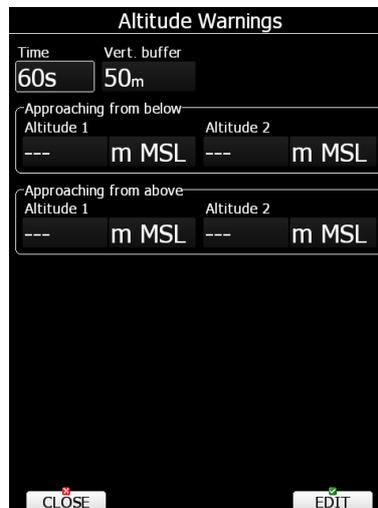
An Airspace warning will be raised in all modes and dialogues. A warning for an alarmed zone can be dismissed for a whole day, some minutes or just quit. **Quit** means that the message will disappear. Use **Dismiss for** spin to define dismiss time in minutes. This time will be shown in the lower-middle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

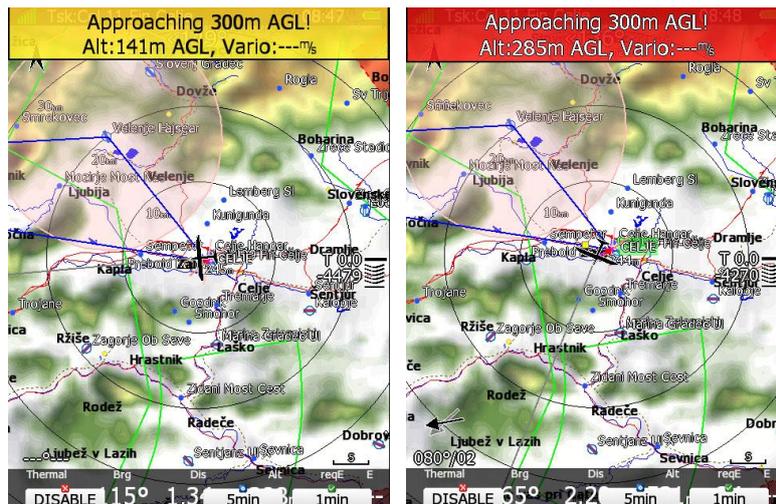
The **RESET** button will reset the status for all airspace zones.

5.1.9.2 Altitude Warning

Altitude warnings will be enabled if **Show warning** is checked. Altitude is given in MSL. Projection is calculated based on the 20 second average vertical speed and time which is defined in the **Time** item.



If the projected altitude is greater than the set altitude, an altitude warning will be raised. 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.

Altitude warnings can be set for approaching from below defined altitude or from above defined altitude.

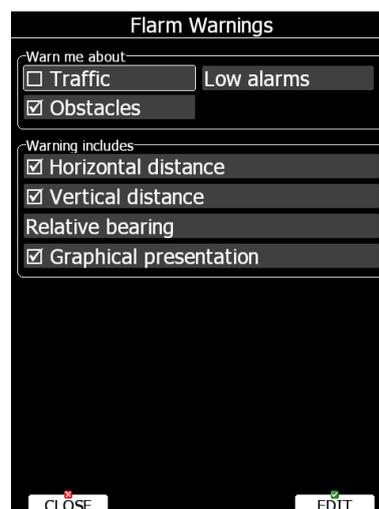
5.1.9.3 Flarm Warnings

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:

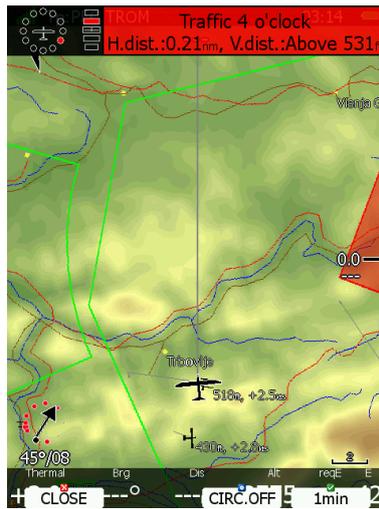
- **Low alarms:** For distant Flarm targets the main unit gives a short or long message, just a beep or be turned off. (19-25 seconds before possible collision).
- **Medium alarms:** For distant Flarm targets the main unit gives a short or long message, just a beep or be turned off. (14-18 seconds before 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).



On competition it is recommended to set to Medium or high alarms, otherwise too many warnings will be displayed. Medium or High, means only the most important alarms will be triggered.

If the voice option is installed 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:

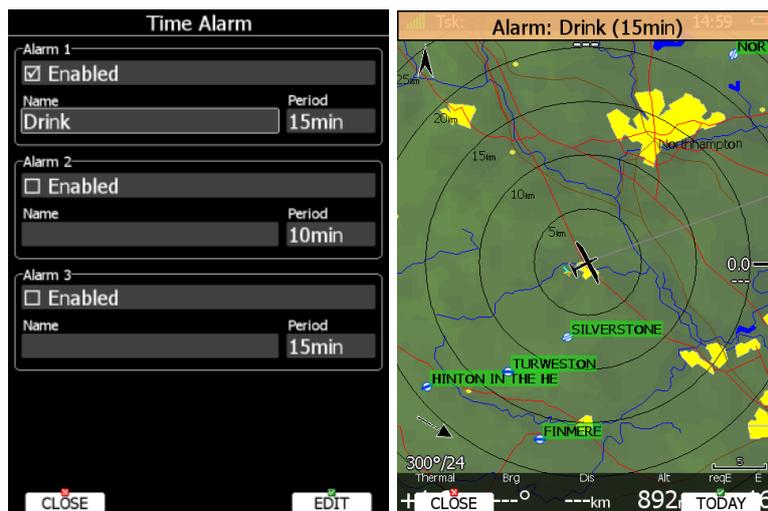
- **Relative bearing:** In this option direction will be given relative to the glider's nose direction (e.g. *Traffic 3' o clock*, which means traffic, is on your right side).
- **True bearing:** Direction is give with absolute direction (e.g. *Traffic from 330°*)
- **Relative/True bearing** is a combination 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.

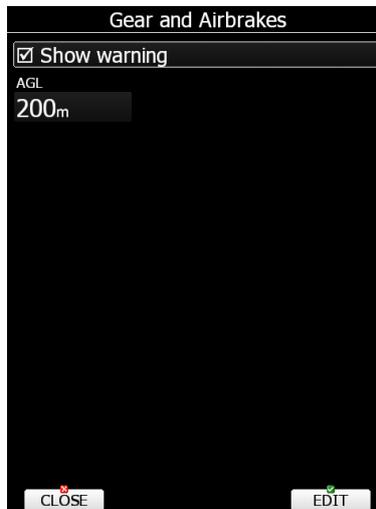
5.1.9.4 Time Alarm warning

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



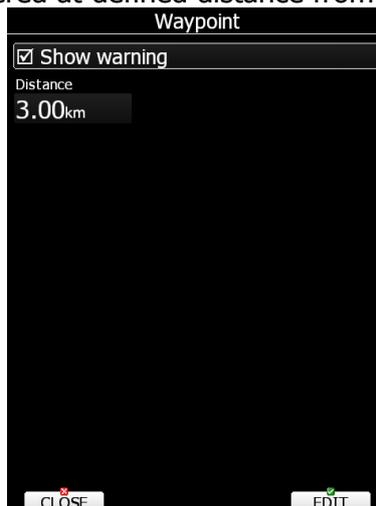
5.1.9.5 Gear warning

A gear warning can be set. The warning will be triggered by AGL altitude.



5.1.9.6 Waypoint warning

Waypoint warning will be triggered at defined distance from selected waypoint.



5.1.10 Units



The lower-middle button will toggle all units between imperial and metric units.

Glider ballast can be entered as:

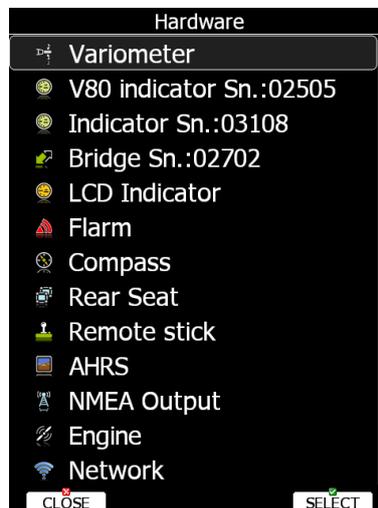
- overload factor, which is defined as:

$$overload = \frac{Empty.glider.weight + Pilot.weight + Water.ballast}{REFERENCE.glider.weight}$$

- **Load**, which is entered in kg/m² or lb/ft².
- **Weight of water ballast**. If this option is used the weights of the glider and pilot must be entered. Refer to Chapters 0 and 5.1.2 for more details of how to enter glider and pilot weights.

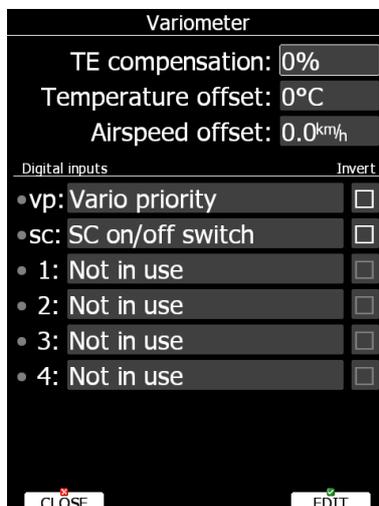
5.1.11 Hardware*

Use this menu to define hardware properties such as total energy compensation, vario indicators layout, compass calibration, FLARM module settings, AHRS settings, Wi-fi module, 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 Vario unit settings – TE compensation*

All settings in this menu are related to the glider and thus they do not depend on profile selection. In this manual dialog description is given for firmware version 5.0 or higher with V5, V8, V9, V80 variometer. In case older version or older variometer is being used, please refer to previous version of manual.

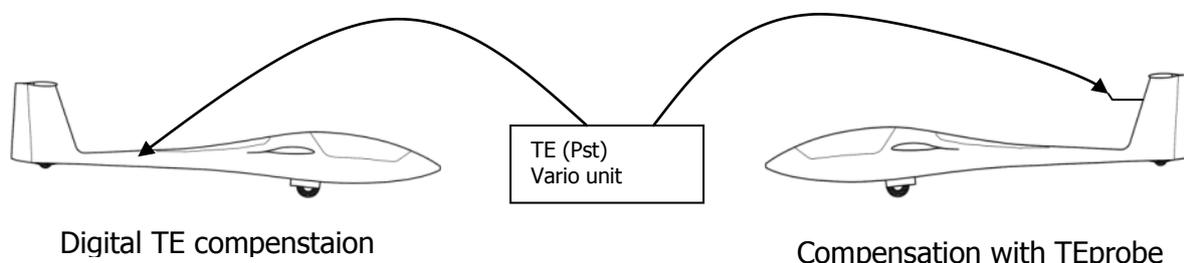


Total energy compensation, temperature offset, airspeed offset and digital inputs are setup in this menu.

5.1.11.1.1 TE compensation - Digital Total Energy Compensation

There are two ways by which the vertical speed can be corrected for total energy:

- digital TE compensation based on speed changes with time
- Pneumatic compensation with a total energy probe.



If the digital TE option has been used TE compensation should be set to 100%.



It is important to note that the method of TE compensation is set up when the instrument is installed by virtue of the pneumatic connections made to the TE and static ports. Changing the compensation type in the setup screen below WILL NOT change the method of compensation - the pneumatic plumbing has to be changed first.



If the TE tube has been connected TE compensation should be set to 0%. The quality of the TE compensation depends entirely on the location, size and dimension of the TE tube. The installation must be leak-proof.

The digital TE compensation can be fine-tuned during flight using the following procedure. It is essential that this is only done in smooth air; it is not possible to tune the TE accurately in turbulent air.

Set TE compensation to 100%. Accelerate up to approximately 160 km/h (75 kts) and keep the speed stable for a few seconds. Gently reduce the speed to 80 km/h (45 kts). Observe the vario indicator during the manoeuvre. At 160 km/h the vario will indicate about -2 m/s (-4 kts). During the speed reduction the vario should move towards zero and should never exceed zero (slightly positive indications are acceptable). If the vario shows a climb the compensation is too low; increase the TE%; and vice versa. Try another "zoom" to assess the change and make further adjustments if necessary.

Digital TE compensation is only effective when the Pitot tube and static sources are co-located and the pneumatic lines to the instrument are approximately the same length. The best sensor to use is the combined Pitot/static Prandtl tube. If problems are experienced with the digital TE compensation the most likely cause is the glider's static source. The static source can be checked by plumbing the pneumatic tubes for digital TE compensation and then setting the TE: to 0%. In still air accelerate to approximately 160 km/h and slowly reduce the speed. Observe the vario indicator. If the static source is good the vario should immediately start to move to show a climb. If the needle firstly shows increased sink and then moves to a climb, the static source of the glider is unsuitable and there is no way to provide successful digital TE compensation. The use of a dedicated and accurate fin-mounted Pitot/static source such as a Prandtl tube might help.

5.1.11.1.2 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.



There is another input called VARIO PRIORITY. When this input is activated by grounding the appropriate wire the unit will change over to Vario immediately. This input wire is set open (not grounded) as a factory default on delivery.

5.1.11.1.3 Airspeed Offset

Some gliders are having quite big difference between calibrated airspeed and indicated because of imperfect static ports (e.g.: Cirrus Standard). As airspeed effects wind calculation. It is possible to define an airspeed offset to improve wind calculation.



Vario indicator will ignore this setting and shows not corrected airspeed.

5.1.11.1.4 Digital inputs

V9 or V5 variometer is having six programmable digital inputs. Two of them a bit special and are labelled VP and SC (since August 2015 SC is no more wired via cable), others are labelled with IN1, IN2, IN3 and IN4 on V5/V9 cable-set. See Installation manual for more details on vario unit wiring diagram.

In current version digital input can represent the state of following actions:

- **SC on/off switch** is used to change between SC (cruise) and climb mode using on/off switch on remote stick of magnetic switches on flaps. Use **invert** check box to invert working of switch.
- **SC toggle button** is used to change between SC (cruise) and climb mode using push button on remote stick. Use **invert** check box to toggle when button is pressed down or released.
- **Vario priority** is used to instantly change from SC (cruise) to climb mode as long as push button is pressed.
- **Gear down and locked** should be connected to gear only.
- **Airbrakes locked** should be connected to airbrakes only.

- **Gear and airbrake** is used when you already have an old style of gear warning, where gear and airbrakes are connected together in one loop.
- **Water ballast open** is used to automatically calculate amount of dropped water. See also chapter 0.
- **Canopy locked**
- **Radio PTT active** should be wired parallel to PTT button and it will mute vario sound, when transmitting over radio.
- **Engine failure**
- **Low fuel**

Digital input shall be wired via switch to ground and it shall open or close, when selected action is performed. A green light will light.

If necessary, check **Invert** check box, to reverse the operation of digital input.

Once digital inputs are connected the system will warn pilot, if airbrakes are open on take-off and when gear is not locked prior to landing.



Instead of using magnetic switch on flaps to toggle between SC (cruise) and climb mode you can also use flap sensor for this operation. See chapter 5.1.11.14.



There is another input called VARIO PRIORITY. When this input is activated by grounding the appropriate wire the unit will change to Vario immediately. This input wire is set open (not grounded) as a factory default on delivery.

5.1.11.1.4.1 SC configuration with the NEW TYPE (from 2016) remote stick

The new LXNAV remote stick comes without the standard SC cable and VP cable, but the function is still available.

With the new stick, there is no more need to solder these wires to the vario wiring loom. The SC function is programmable through LX80/90xx (version 5.x)

Please make sure that none of the inputs is set to "SC on/off switch" or "SC toggle button".

Configuration table for all SC switch options for new and old sticks:

Remote stick type	SET: Input (SC) setting
LX NEW remote without SC cable	Not in use
Old LX remote with SC cable (before 8/2015)	»SC toggle button«
Old remote stick with SC switch	»SC on/off switch«
Using flap sensor	Not in use
Using magnetic flap sensor (AS style)	»SC on/off switch«

5.1.11.1.4.2 Conditions to trigger a GEAR warning

There are 3 options when the GEAR warning is triggered.

If both Inputs: GEAR and AIRBRAKES are connected to the system, then the warning will be triggered under following conditions:

- When altitude is below 200m
- When Airbrakes are opened

If only AIRBRAKES input is connected, then the warning will be triggered when:

- Altitude is below 100m

If no inputs are present, then following conditions have to meet to trigger the warning:

- Indicated speed below 126km/h
- AGL below the AGL setting (setup->warnings->gear)
- Negative Vario
- Flat terrain below

5.1.11.2 Vario Indicator Setup*

The vario indicator is always part of the vario unit. However an unlimited number of secondary vario indicators can be connected to the system using the RS485 system bus. There are three different types of vario indicators; **I9 vario indicator**, which is standard part of V5/V9 variometer, **I8 vario indicator** or **I80 vario indicator**, which is built-in part of V8/V80 variometer and old **LCD or USB-D vario indicator**.

LCD vario indicator and USB-D type of indicator are setup through menu **LCD Indicator**, whereas others, more modern vario indicators, are having its own menu item identified with serial number.



LXNAV is highly recommending upgrading old LCD or USB-D type of vario unit to latest technology vario unit. Please contact local dealer or LXNAV for more details.

5.1.11.3 Indicator I9*

I9 indicator is having mechanical needle and colour screen with 320x240 pixels resolution on which user selectable data are displayed.

Each I9 indicator is identified by a serial number, which is also displayed on hardware menu. Therefore literally unlimited number of vario indicators can be connected to RS485 bus and each of them can be setup separately.



Description of indicator is shown on next picture.



Mechanical needle displays vario, netto, relative or speed to fly value. It can be setup separately for climb mode or cruising mode. Printed scale can be chosen in range from -5 to 5 or from -10 to 10. Within software range can be set to 2.5, 5, 10m/s or 5, 10, 20kts or 500, 1000, 2000fpm.

Upper number and **Lower number** can be configured as average vario, time, flight time, task remaining time, netto value, outside temperature, thermal average, indicated airspeed, true airspeed, current altitude, distance to goal, arrival altitude, Last 60 minutes speed, altitude in feet, flight levels, voltage or average netto. It can be setup separately for climb mode or cruising mode.

Speed to fly bar symbol is indicating which speed you have to fly according to current MacCready setting, sink rate and speed. One arrow means 10units of speed faster or slower. Up red arrows mean fly slower and down blue arrows mean fly faster.

Red diamond symbol can show average vertical speed, netto or current g-load.

Blue arrow symbol shows current MacCready value.

Green T symbol represents last thermal average value ->**Thermal**

White bar displays arc between minimum and maximum vertical speed value in last 20 seconds in white colour or minimum and maximum g-load in red colour, depending on settings.

Flarm warnings can also be shown on the indicator if this box is ticked. By pressing **DEMO** you can see how the warning is displayed.

Press **RESET-G** button to reset g-meter.



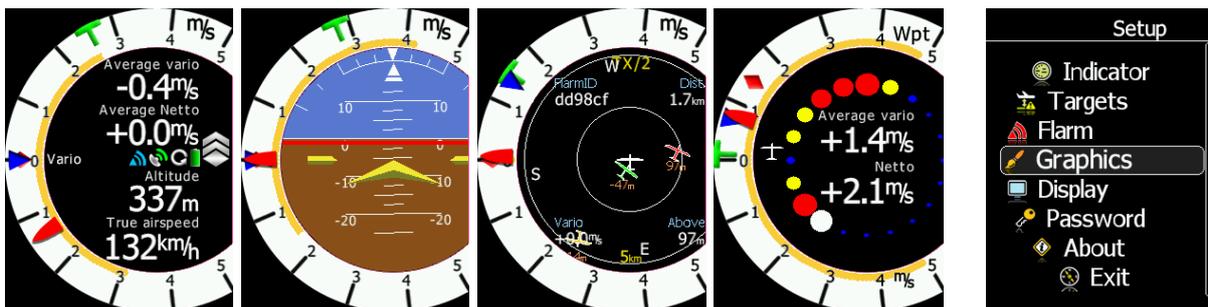
Most innovative feature of vario system is an upgrade. Firmware for vario unit can be easily upgraded by customer with SD card. See Chapter 8 for more details.

5.1.11.4 Indicator I8/I80/V8/V80

Indicator I8/I80 is without mechanical needle. I80 features 3.5" colour screen with 320x240 pixels resolution and I8 features 2.5" colour screen with 320x240 pixels resolution. User selectable data are displayed on screen and needle is drawn. Each indicator is identified by a serial number, which is also displayed on hardware menu. Therefore literally unlimited number of indicators can be connected to RS485 bus and each of them can be setup separately, however only one vario unit.

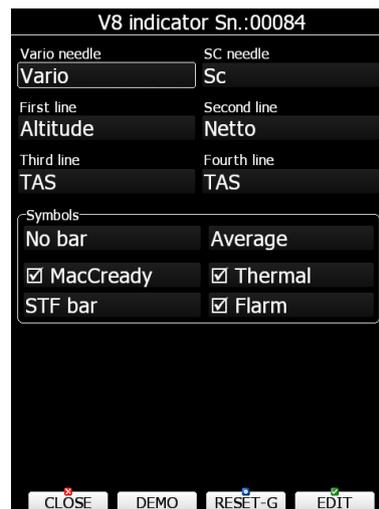


Indicator basic screen is split into two parts, white ring with needle and vario scale. Additionally to needle, blue MacCready triangle, green thermal average T and red diamond for 20 seconds average are shown. In the middle four user-customizable numbers are shown. When middle button on indicator is pressed display will toggle between numeric display, AHRS mode, Flarm radar display, Thermal assistant mode and after a long press on the middle button you can enter the SETUP menu.



5.1.11.4.1 Indicator setup on the LX80/90xx device

Numeric screen can be also set on the main display unit.



In setup you can define navboxes (four user customizable numbers) for each line separately.

They can be configured as:

Average vario, Time, Flight time, Task remaining time, Netto value, Outside temperature, Altitude, Distance to goal, Arrival altitude, TAS, last 60 seconds speed, Altitude in ft, Flight level, Thermal average, IAS, Voltage, Average netto, Height, Total altitude, Altitude IGC.



Navboxes set in the first and second line are also shown on the Thermal mode page.

Vario or SC needle can be set to: Vario, Sc, Netto or Relativ.

All settings can be tested by pressing **DEMO** button. G force can be reset by **RESET-G** button



V8/V80/I8/I80 are not changing screen when toggling between cruise and climb mode.



Number of navboxes can be set only on the vario indicator itself in the menu SETUP->INDICATOR.

5.1.11.4.2 Indicator setup on the indicator

All settings can be set on the vario/indicator device in the SETUP menu.



In setup menu it is possible to setup indicator settings, Flarm settings, Thermal assistant, Graphics, Display settings, load Flarm files and see the about screen.

5.1.11.4.2.1 Indicator

Number of navboxes on the numerical page can be set here. Minimum is 1, maximum are 4 navboxes.

5.1.11.4.2.2 Flarm

Flarm alarms can be enabled or disabled. The warning dismiss time can be set from 0 to 120 seconds.

5.1.11.4.2.3 Thermal Assistant Mode

There are three options for the thermal assistant, Auto Span, MacCready and Average Vario.



The colours in the thermal assistant indicate below average (blue), average (yellow), above average (red) and the strongest point of thermal (white).

- If Auto Span is selected then the Thermal Assistant will use the average performance of the last circle to calculate below, average and above average climb and indicate accordingly i.e. red bubbles for strongest lift and blue dots for weakest lift or sink.
- If MacCready is selected then the Thermal Assistant will use the current MacCready setting to show rate of climb below, MacCready and above the MacCready setting
- If Average Vario is selected then the Thermal Assistant will use the average vario for the flight to show the rate of climb below average vario, average vario and above average vario.

Switch to Thermal Assistant Mode

It will change to the Thermal Assistant mode by the 2 methods:

- SC to Vario mode switch
- In circling (auto – when you start circling)

It can be also disabled, in this case there will be only 2 navboxes.

5.1.11.4.2.4 Graphics

Map, Flarm and Theme graphics can be defined in this menu.

5.1.11.4.2.4.1 Map

Option to set Track Up or North Up.

5.1.11.4.2.4.2 Flarm

Traffic on Map

Check the dialogue box to display Flarm objects on the screen.

Select Target on Map Only

There will be only the selected target on the map.

Colours

Colours can be set for the following:

- Glider Above Colour
- Glider Below Colour
- Glider Near Colour
- Selected target Colour

Label Text

On the map it is possible to show additional, related text next to the Flarm object. This option can be set to None, Competition sign, Climb rate and Relative vertical.

Active Timeout

Adjusts the time a glider symbol remains on the map after it has last been seen by the Flarm.

Inactive Timeout

Adjusts the time for inactive gliders on the Flarm target list. Inactive gliders are gliders where the Flarm signal has been lost for a period longer than the Active timeout. The targets become inactive and remain only in the Flarm target list for this time.

Draw Line to Selected Target

Check this option to enable or disable a line drawn to a selected Flarm target.

Draw History

Select if a trail is to be drawn behind Flarm targets to show where the targets have been.

Plane Icon size

To adjust the pixel size of Flarm targets.

5.1.11.4.2.4.3 Theme

With this dialogue you can change the background colour of the vario gauge and the inner information circle, the user message transparency and NavBox transparency.

Colour style – Gauge: Inner

With this dialogue you can change the background colour for the vario gauge (Outer ring) and the background of the information circle within the gauge. You have the choice of the following:

Gauge	Inner
White	Black (default)
White	White
Black	White
Black	Black

5.1.11.4.2.5 Display

Automatic Brightness

If the Automatic Brightness is checked then the brightness will be automatically adjusted between the minimum and maximum parameters set. If the Automatic Brightness is unchecked then the brightness is controlled by the brightness setting.

Minimum Brightness

Use this slider to adjust the minimum brightness for the Automatic Brightness option.

Maximum Brightness

Use this slider to adjust the maximum brightness for the Automatic Brightness option.

Get Brighter In

The user can specify in which time period the brightness can reach the required brightness.

Get Darker In

The user can specify in which time period the brightness can reach the required brightness.

Brightness

With the Automatic Brightness unchecked you can set the brightness manually with this slider.

Night Mode Darkness

Set the percentage of the brightness to be used after a press on the NIGHT mode button.

5.1.11.4.2.6 Files

The Files menu allows you to upload FlarmNet database.

5.1.11.4.2.7 Password

There are several system passwords which run specific procedures as listed below:

RESET TO FACTORY DEFAULT	00666
AUTO ZERO	01043
REPORT TO SD CARD	00111
FORMAT INTERNAL MEMORY (all data will be lost)	32233

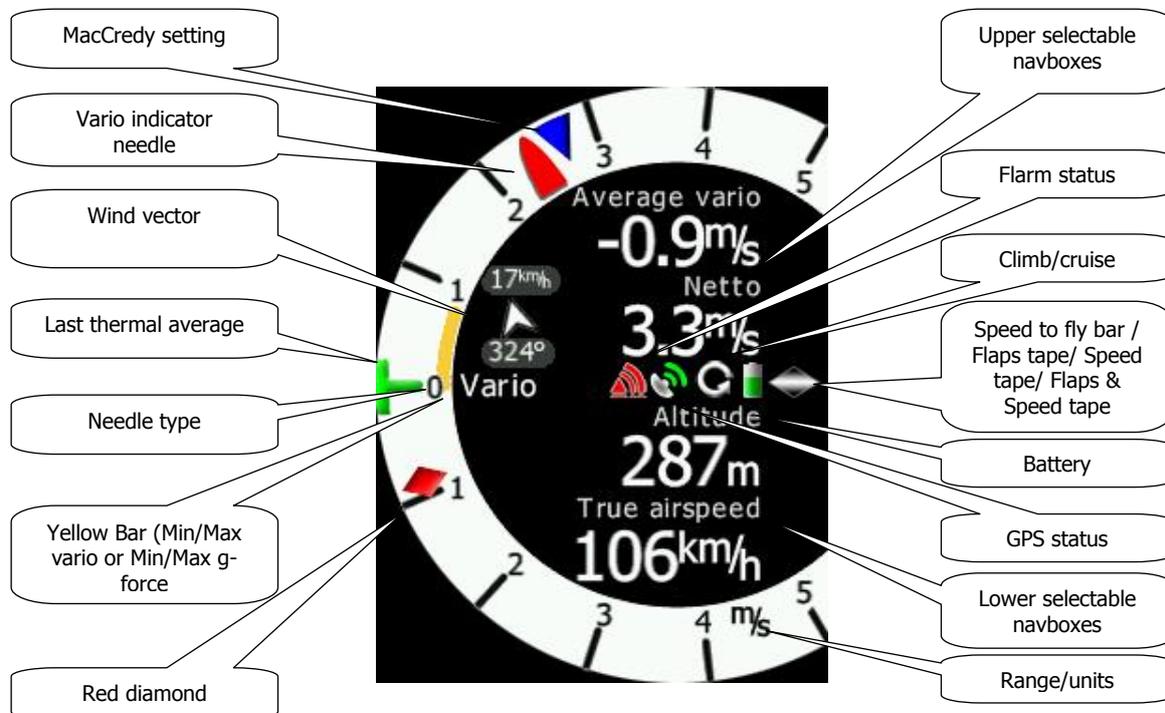
To enter the code, you have to select the number and long hold the lower push button. Repeat the procedure also after entering the last number.

5.1.11.4.2.8 ABOUT

Information about software versions of indicator's part and the sensor box.

5.1.11.4.3 Numerical (navbox) Mode

Defaults are 4 NavBoxes: Average Vario, Netto, Altitude and True Airspeed. In addition, the central line shows the status of the Flarm, GPS, Cruise/Climb and battery status.



- The Vario **Needle** can display: the Vario, Netto, Relative or Speed to fly value (Setup->Hardware->Indicator). The scale can be chosen in the range of +/- 5 +/-10 or +/-20 (in SETUP-> Vario Parameters). Within the software the range can be set to m/s, kts, km/h, mph or fpm (in Setup, Units, Vertical speed)
- The **Speed to fly bar symbol** indicates which speed you have to fly relative to the current MacCredy setting, sink rate and speed. One arrow means 10 units of speed faster or slower. Up red arrows mean fly slower and down blue arrows mean fly faster. It can be also set to **Flaps tape, / Speed tape / Flaps & Speed tape**
- The **Red diamond** symbol can show Netto, Average Netto, Average vertical speed or G-force.
- The **Blue arrow** symbol shows the current MacCredy value.
- The **Green T** symbol represents last thermal average value.
- The **Yellow Bar** can show Max and Min values of vario over defined time (average vario) or G meter (over whole flight).
- The **Flarm Status** symbol indicates the presence of a Flarm unit (grey), if the Flarm receives any data from other Flarm units, the symbol becomes red.
- The **GPS** symbol is green when GPS status is OK, and red when GPS status is bad. If GPS data is not detected, the symbol will disappear.

All these parameters can be set/adjusted on the LX80/90xx device at: SETUP->HARDWARE->"V8/V80/I8/I80" indicator SN:xxxxx.

5.1.11.4.4 AHRS Mode

To activate AHRS an activation code must be purchased.



The AHRS option can be activated on the LX80/90xx. For more information refer to: 5.1.11.11.



The Pitch offset can be adjusted in the AHRS menu on the LX80/90xx device.



For competitions the artificial horizon can be disabled on the LX80/90xx device in the AHRS menu. When the artificial horizon page is active a BFION event is written to recorded flight for verification purposes.

5.1.11.4.5 Flarm radar display

Flarm Mode will display a map of the relative positions of Flarm targets that are within range. When you press either the upper or the lower button, you can see focus on ID or zoom. Press on the middle button will move focus from one to the other.

Pressing up/down (upper/lower) buttons, when focus is active, will can change the zoom level or switch between the active targets.



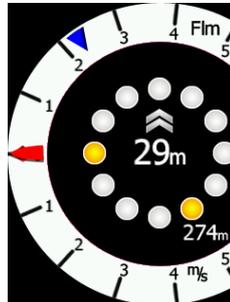
Data from a selected Flarm object can be seen in 4 corners, such as: Flarm Id, Distance, Vario and Relative altitude (Above / Below). There is also an indication of how many Flarm objects are present displayed as: TX/number.

5.1.11.4.5.1 Flarm Warnings

Regardless of which Mode you are in, if a Flarm target triggers an urgent (third warning level) or important (second warning level) warning then the screen will change to the Flarm warning mode automatically.

Extract from the Flarm manual:

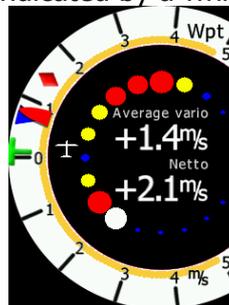
Warnings are given in order of the time remaining before a potential collision, not the geometrical distance. The first warning level for another aircraft or an obstacle is delivered at less than 19 - 25 seconds before the possible collision; the second warning level is delivered at less than 14 - 18 seconds before; the third level at less than 6 - 8 seconds before.



The central number and chevrons indicate if the Flarm target is below or above and by how many meters/feet. The number in the bottom right indicates the range in meters/feet. The numbers are related only to the closest or the most dangerous target.

5.1.11.4.6 Thermal assistant Mode

The Thermal Assistant mode displays a graphical representation of your location within the thermal. If you are thermaling to the left there will be an aircraft symbol on the right of the ring of bubbles and the bubbles will appear to rotate clockwise (towards the symbol of the glider). If you are in a right hand thermal there will be an aircraft symbol on the left and the ring of bubbles will appear to rotate anticlockwise (towards the symbol of the glider). Large red bubbles indicate the strongest lift within the thermal and small blue dots indicate the weakest lift or sink within the thermal. Yellow bubbles indicate lift equal to your MacCready setting, average thermal or average climb rate depending on your preferred setting. The point of strongest lift is indicated by a white large bubble.



You can use the thermal assistant to visually determine which part of the thermal has the strongest lift and adjust your turn accordingly to maneuver the glider in the direction of the strongest lift and away from the weakest lift or sink.

The two NavBoxes within the Thermal assistant Mode can be configured on the LX80/90xx, the first and second navbox lines.

5.1.11.5 LCD and USB-D Vario indicator*



This is type of the older vario indicator. An LCD vario indicator or USB-D vario indicator consists of:

- Needle
- Two numerical displays (upper and lower).
- Labels and indicators.

These following functions can be set (see next picture):

- **Needle:** vario needle (Vario, SC, Netto or Relative).
- **SC Ring:** Displays speed command at all times.
- **Upper Numeric Display:** Integrator, time, flight time, task remaining time. Upper line; the parameter displayed can be configured in both Vario and SC modes.
- **Vario Mode Indicator:** Shows current flight mode (vario or speed command).
- **Lower Numeric Display:** Altitude (NN altitude), Distance (distance to the navigation point), Glide diff. (final glide altitude difference), Speed (TAS), Leg speed (speed on leg), QNH (ft) (NN altitude in ft), Flight levels. Lower line; the parameter displayed can be configured in both Vario and SC modes.

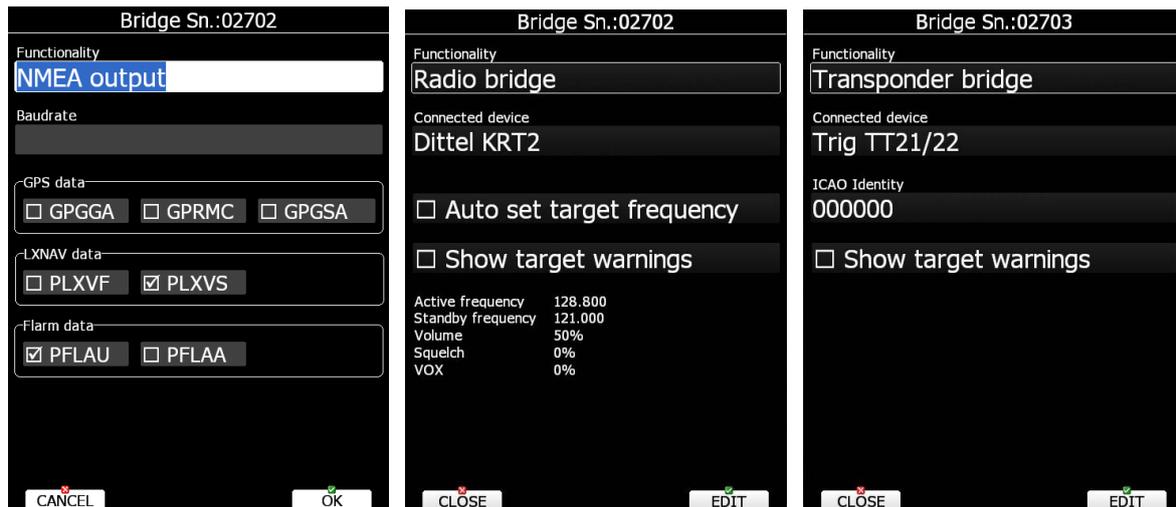
The labels will automatically be displayed depending on the current function. The BAT warning will be displayed when the supply voltage is below 11 volts.



LXNAV is highly recommending upgrading old LCD vario indicators to latest technology vario indicator unit. Please contact local dealer or LXNAV for more details.

5.1.11.6 Bridge 232*

Bridge 232 is an external device which is sold separately and is used to output NMEA data or to connect radio or transponder to the system.



See installation manual for details on wiring of Bridge 232.

Once bridge 232 is plugged into 485 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.

In **NMEA output** define baud rate at which NMEA sentences will be transmitted. Select desired NMEA sentences. NMEA data is exactly the same as described in chapter 5.1.12.12.

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.

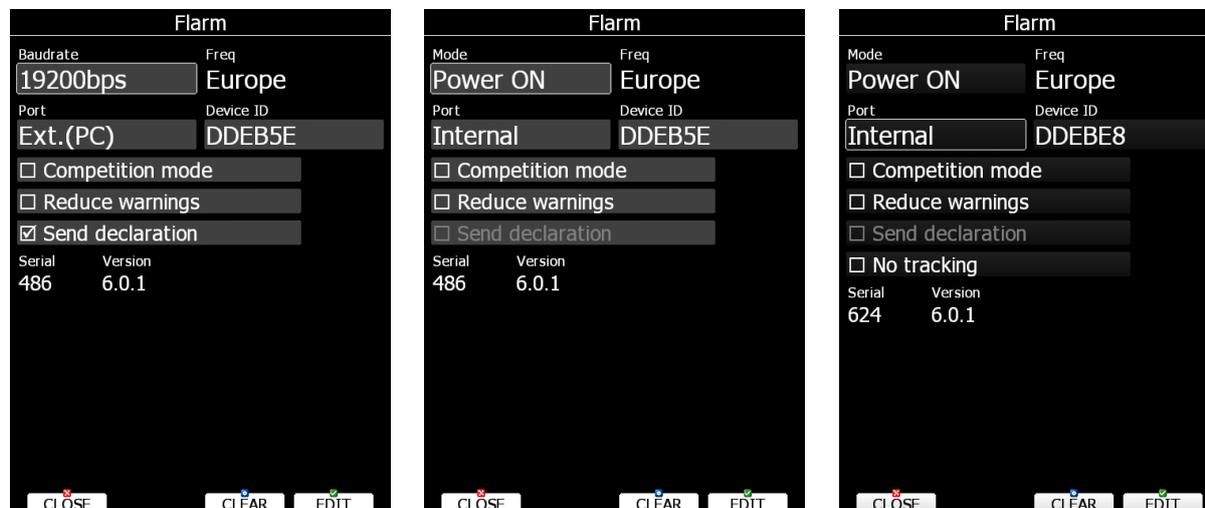
Check **Auto set target frequency**, if you want to automatically select frequency, when new target is selected in navigational mode. Ticking **show target warnings** will trigger warnings generated from the device (example: radio is too hot).

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

ICAO code, ID and SQUAWK could be set and send from LXxxxx device to the transponder. It can also show target warnings from transponder.

5.1.11.7 Flarm*

On the Flarm setup page, information about built in or external Flarm are visible. Information like serial number, selected frequency, firmware version and database versions are shown.



Press **CLEAR** button to delete all data on Flarm module. This will remove also obstacle database.

If Flarm module is built in user can select operation mode. There are three different operational modes available:

- **Power OFF** - Flarm unit is switched off.
- **Power ON** - Flarm unit is switched on.
- **Privacy ON** - Flarm unit works in stealth mode. Other Flarm units will not receive altitude and vario information concerning your glider. For collision warnings this mode has no influence.

If there is no Flarm module built into the main display unit, then instead of operation mode combo box, **Baudrate** selection will be displayed

Freq shows selected frequency depending on the continent, where system is located. Flarm Frequency is automatically updated based on the current continent.

Port defines serial interface through which Flarm data are being received.

- **Internal** is default setting and indicates that internal Flarm will be used, if installed this option.
- **Ext. (Colibri)** (only on LX8000 old model)– Use this mode, when you want to receive external Flarm data through Colibri port on back side. (For example, if TRX1090 is connected to LX8000.)
- **Ext. (PC)** – Use this mode, when you want to receive externally connected Flarm on PC port
- **Flarm** – port is available on selected devices only and means that Flarm input will be via port labelled Flarm.
- **GPS** – port is available on simple type of devices only and means that Flarm input will be via port labelled GPS.



Classical external flarm can be updated through the main device. Power flarm can be updated only via USB key.

See installation manual and Chapter 10.1 for more details.

Device ID shows the Flarm unique ID, which is transmitted to other FLARMS.

Competition mode is intended only for competitions. If this mode is enabled the pilot will not be able to see any Flarm data on the navigational screens. The competition mode status is recorded in the IGC file and can be checked during scoring.



If you are flying in a competition it is sufficient to turn on **Competition mode**. However if you do not want other aircraft to see you, you should switch mode to **Privacy ON**.

Reduce warnings will significantly reduce Flarm warnings. Use this option if you are flying in gaggles or areas with high density of other aircraft.



We recommend you sign in at FLARMNET.org. This is free of charge. Registering with FLARMNET allows others to see you not only with Device ID but also with your contest number and name. Refer to Chapter 6.2.1.9.

Send declaration check box is available only when external Flarm is connected. Check this option, if you want that task declaration is automatically transferred to Flarm.

No tracking will disable tracking mode. If set, receiving ground stations do not process or store position data of aircraft.

You can also see your flarm **serial** number, **version** and **obstacles** loaded (if they are loaded).



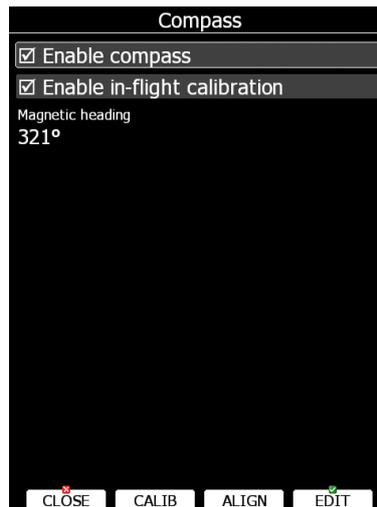
Flarm internal number can be seen in the last row, next to the current SW version. Internal number will not appear immediately after powering on the main device, it can take up to 5 minutes. Internal flarm number can be also seen from the IGC file.

5.1.11.8 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.

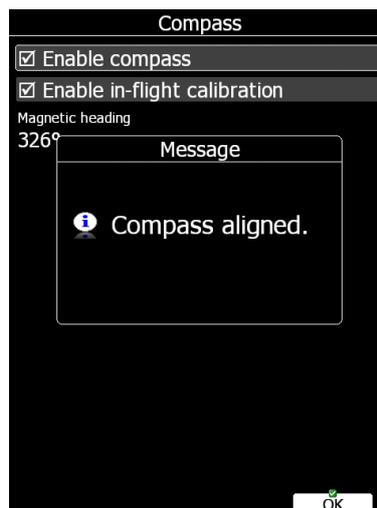


It is very important that compass is installed away from power cables, other compasses, speakers and all other magnetic components in the aircraft. Keep maximum possible distance to such components (at least 30cm).

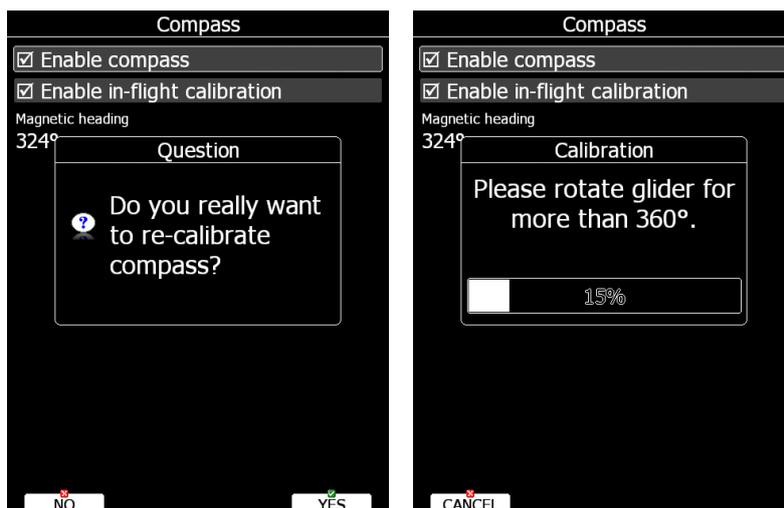


Compass will be enabled if check box **Enable compass** is ticked. If you would like to perform in-flight calibration, check **Enable in-flight calibration**. It is not recommended to do in-flight calibration in very turbulent conditions.

Press **ALIGN** button to align compass with AHRS, which is built-in V9/V8/V80 vario. When installing compass, please make sure to align it as much as possible with V9/V8/V80 variometer. Deviation of few degrees is tolerated. When aligning compass with AHRS it is important that cabin is closed and glider 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 very straightforward. Make sure glider 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 glider with wings levelled.



Keep rotating glider 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.



If compass is not calibrated, wrong wind calculation is made which also has an influence on final glider parameters.

5.1.11.9 Rear Seat or Front Seat

In a two-seat configuration with the rear seat device it is possible to transfer selected data between the front and rear seat device. Use this menu to define which data will be automatically received from the other device.



Data are divided into two groups; flight parameters and navigational data. If a specific value is checked this value will be automatically received from the other device.

Check **MacCready**, **Ballast** or **Bugs** to receive current MacCready value, current ballast setting or bugs from other device.

If the **Waypoint** checkbox is checked a new waypoint target will be automatically assigned when the user changes the waypoint target on other device. The message "*Waypoint target received*" will be displayed on the screen and you will be navigating to the same waypoint as

other device. Please note that it is not necessary to have this waypoint in your databases as the complete waypoint information is transferred.

If the **Waypoint** checkbox is not checked it is still possible to send a target to the other device using the SEND action in waypoint mode.

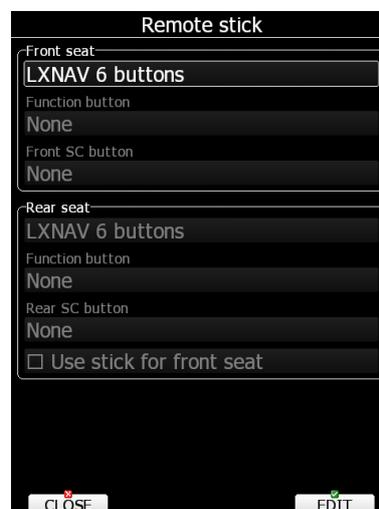
The same applies to the **Airport** checkbox. The message *"Airport target received"* is displayed.

If the **Task** checkbox is checked the task will be synchronised with the other device.



When flying an assigned area task it is worth not having the task checkbox checked. This will allow one pilot to play with "what if" scenarios. Once a proper direction is found you can send the task to the other device using the **SEND** action in task mode.

5.1.11.10 Remote stick*



When a remote stick is connected to the system, it is possible to define type of remote stick via this menu. In case LXNAV remote stick with six buttons is connected, user can specify functionality of function button. There are several options available for function button:

- **SC toggle button** will toggle variometer between speed to fly mode and vario mode.
- **Vario priority** will temporary put variometer in vario mode regardless of other setting for speed to fly.
- **Toggle vario range** will toggle between vario range 2.5m/s, 5m/s or 10m/s.
- **VOLUME** will call volume menu on screen.
- **Toggle map settings** will toggle between two stored map settings.
- **Toggle thermal mode** will enter thermal mode or exit thermal mode.
- **SELECT** will call airport select menu or waypoint select menu or task edit depending on current navigational page.
- **MC/BAL** will open MacCready and ballast dialog.
- **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.
- **EVENT** will mark an event into recorded IGC file
- **ROT.FAI** will rotate FAI triangle area, if shown on navigational screen.
- **TEAM** opens dialog to enter team partner code.

- **Radio** will call radio menu on screen.
- **Transponder** will call transponder menu instantly on screen.
- **Screenshot** will make a screenshot.

On remote sticks from 2016 and onward there are two function buttons available. Also SC button in front of stick is available for any of above functions.

Check **Use stick for front seat** if there are two remote sticks installed and system without rear seat device (e.g. Pipistrel Taurus, Stemme)



To activate Function button press FN on remote stick and the field in the menu will become active, same procedure is for the Front SC button.

5.1.11.11 AHRS*

When AHRS device is connected to the system or AHRS option on V9/V8/V80 is enabled, this menu is used to calibrate AHRS for installation error.



Place your glider in levelled position and press 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.

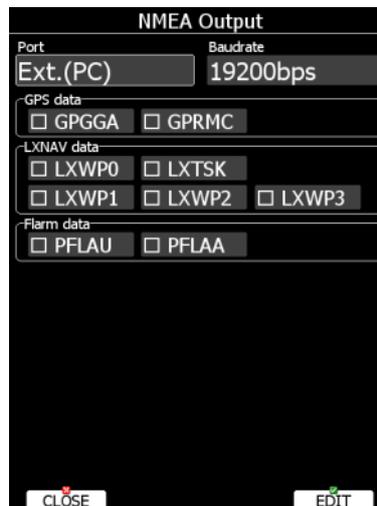
Mode defines modes of operation of AHRS. AHRS can be switched to OFF mode. This will be shown in the IGC file as a BFI sentence. If the AHRS is active there will be written **BFION**



AHRS option is not enabled in the regular order. Option must be additionally purchased.

5.1.11.12 NMEA Output

The main display unit is capable of transmitting position data sentences in NMEA format for use by other devices.



Port defines on which serial interface data will be transmitted. **Baud rate** defines transmission speed. Data is divided into three groups:

- **GPS data** will output all GPS-related data such as time, longitude and altitude.
- **LXNAV data** will output all variometer-related data such as vario, MacCready and ballast.
- **Flarm data** will output all Flarm-related data.



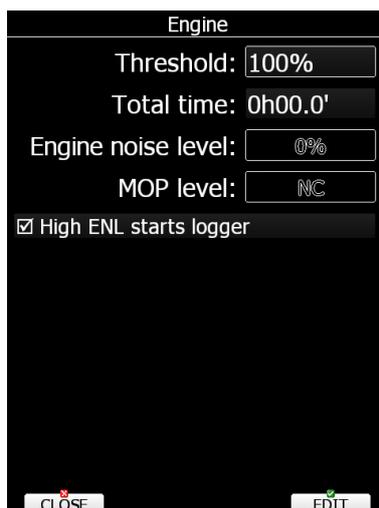
PDA can be connected to the LX80/90xx system through the NMEA bridge or on the EXT.(PC) port.



NMEA data is available also on Flarm display port on main display unit and rear display unit at 19200bps. However only Flarm data and GPS data.

5.1.11.13 Engine *

Use this menu, when the system is installed into glider with engine. The current engine noise level is shown as a progress bar. If external MOP sensor is installed also MOP level will be shown.



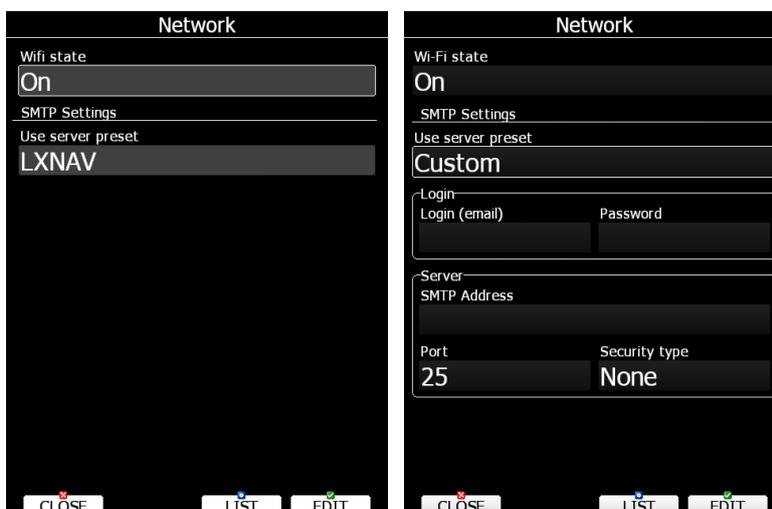
Set **Threshold** to define when engine is running. By default threshold is set to 100%, which means no engine run will be detected. Lower this value to approximately 80% to detect engine running. Engine total time will be accumulated and displayed in total time box. If necessary, total time can be adjusted, to match current engine total time. **High ENL starts logger** will start the flight recorder, if this option is enabled.



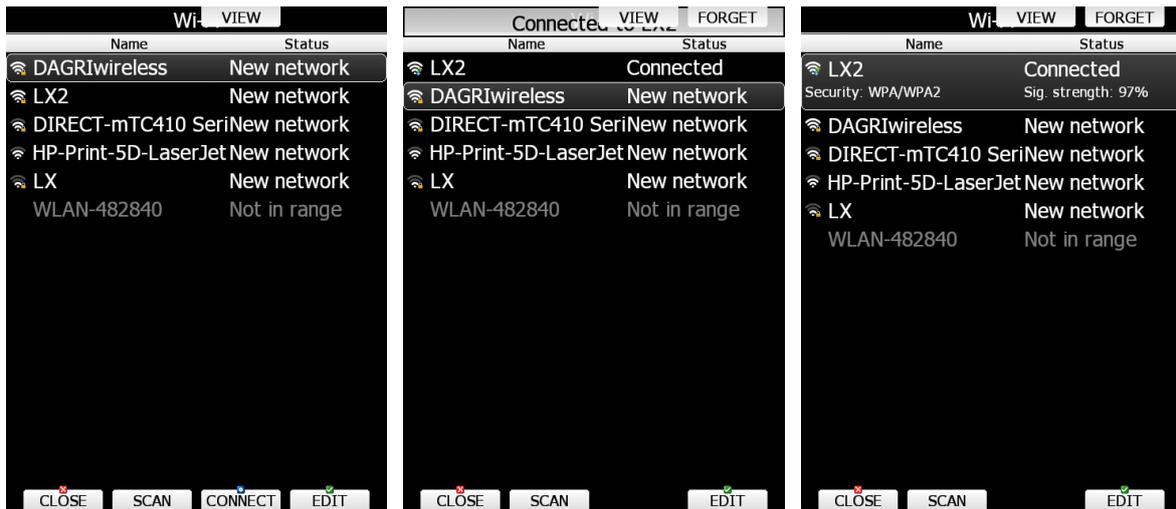
Threshold setting has no influence on the flight recorded file, it is only important for the statistics on the instrument, it sets when the engine is recognized, which resets statistics.

5.1.11.14 Network*

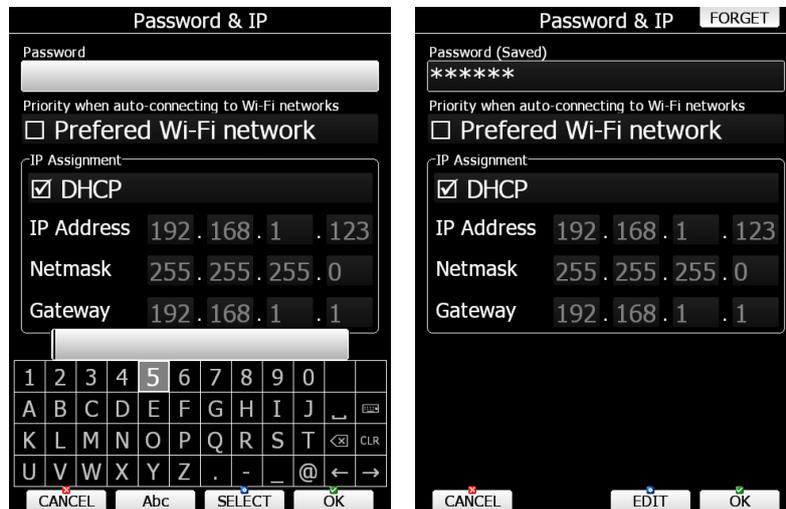
When Wi-Fi option is available, this menu will setup all the parameters for network. Wi-Fi can be turned ON all the time, on ground only or off completely. Use Wi-Fi state to define state. SMTP Settings are used to configure server for sending email. It is recommend to leave it as LXNAV, however user server can be configured. More options will be displayed in case of other type of server. Flights can also be stored to SeeYou Cloud for which you have to insert the key of the cloud. Auto upload will automatically upload flights to the SeeYou Cloud.



Press **LIST** button to view list of all available networks. Use **VIEW** button to view more details about selected network. When connected to a network, item will get blue color.



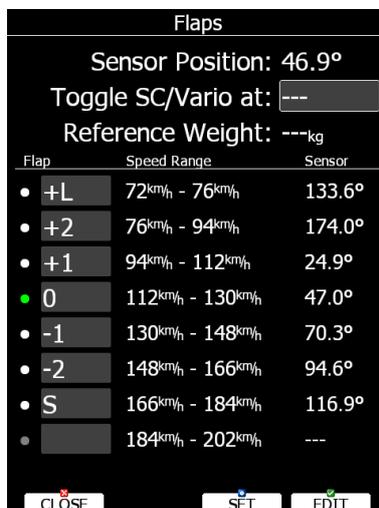
Press **SCAN** to scan for new networks. Use **EDIT** to enter password for selected network and to connect to it.



Use preferred Wi-Fi network option, if you would like to connect to this network only. Press **CONNECT** to connect to this network and press **FORGET** to forget this network.

5.1.11.15 Flaps*

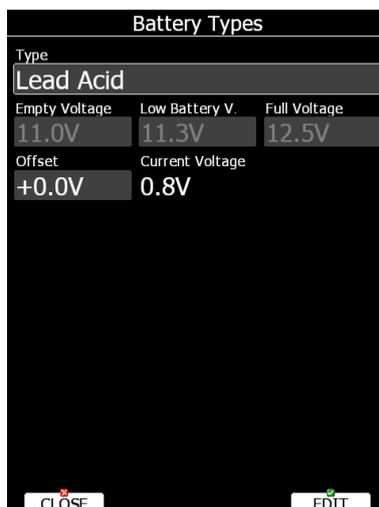
When flap sensor is installed, use this menu to set flaps position. Use page selector to select desired flap position. Press **SET** button to set position. Continue with procedure for all flap positions.



When all flap positions are set, a green dot will be displayed with current flap position. If flap labels are not set yet, press EDIT button to name flap label. Flap labels must be entered with increasing speed range. It is recommended that flap labels are set together with speed range in Polar and Glider setup. See Chapter 0 for more details. It is also possible to toggle between cruise and climb mode using flap sensor in this case there is no need to define digital input for SC.

5.1.11.16 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** there to the **current voltage** measured.

5.1.12 Polar and Glider*

Use this dialogue to enter glider polar and other properties of glider. As default polar a standard class glider is selected.

Polar and Glider			
Glider		Class	
JS-1-21m		Open	
Max Weight	Empty	Wing area	
720kg	320kg	12.3m ²	
Polar			
A	B	C	Ref. load
1.32	-2.24	1.39	36kg/m ²
Emax = 59		Wmin = 0.44m/s	
100kmh ... 120kmh ... 150kmh		Ref. Weight	
0.47m/s ... 0.60m/s ... 1.00m/s		442kg	
Ballast dump rate			
quantity	dump rate		
189l	119.4l/min		
187l	76.2l/min		
179l	43.8l/min		
159l	36.6l/min		

Polars for most modern gliders are already prepared. Press the **LIST** button and a dialogue with a list of all available gliders will be shown.

Select Glider			
Glider	Emax	Wmin	Class
Antares 18S	54	0.54m/s	18-meter
Antares 18T	51	0.49m/s	18-meter
Antares 20E	55	0.51m/s	Open
Antares 23T	59	0.40m/s	Open
Antares 23E	60	0.46m/s	Open
Apis 13m	38	0.60m/s	Ultralight
Arcus	47	0.56m/s	Doublese
Arcus T	47	0.56m/s	Doublese
Arcus M	47	0.56m/s	Doublese
ASG 29 18m	52	0.47m/s	18-meter
ASG 29E 18m	52	0.47m/s	18-meter
ASG 29 15m	45	0.57m/s	15-meter
ASG 29E 15m	45	0.62m/s	15-meter
ASW 22BLE	60	0.39m/s	Open
ASH 25	59	0.43m/s	Open

Select the required glider using the PAGE selector knob and press the **SELECT** button. All glider data will be copied from the chosen polar. You may quickly check the best glider ratio and minimum sink rate to see if the polar data matches the glider performance. You can modify the polar by changing coefficients **a**, **b** and **c**. A polar is defined as a quadratic equation with the parameters a, b, and c. Use the LX-Polar program to calculate coefficients a, b and c for a given glider's polar. The program requires at least three sink points entered at selected speeds (e.g.: 100 km/h, 130 km/h, and 150 km/h). The program will calculate the values of a, b and c, which should be noted and entered into the system.

You can download program free of charge from www.lxnav.com

Weights must be entered if user enters ballast in kilograms. There are three weights to enter. **Ref.weight** corresponds to the **Ref.load** value and represents the value at which the polar was measured or recalculated. Reference weight or reference wing load value will be automatically recalculated based on **Wing area** property. **Max.weight** is the maximum take-off weight allowed for a glider. It is not used in the calculation; it is just a reminder to the pilot of the maximum take-off weight. **Empty** weight is weight of the glider without pilot and ballast. The overload factor is calculated as:

$$\text{overload} = \frac{\text{Empty.glider.weight} + \text{Pilot.weight} + \text{Water.ballast}}{\text{REFERENCE.glider.weight}}$$

Pilot weight is set in the **Flight recorder** menu (see Chapter 5.1.2).

Ballast dump rate is used for calculation of water dump rate. If dump rate is specified and water dump input is installed, system can measure amount of dumped water and thus automatically adjust ballast. Use this table to specify dump rate for a selected amount of water. At least one point must be entered. If there is only one point, it means dump rate is constant all the time.

Press **SPEEDS** button to enter speeds dialog. 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.

Speeds		
Stall speed (Vs0)	60 ^{km/h}	
Stall speed (Vs1)	90 ^{km/h}	
App. speed (Vapp)	110 ^{km/h}	
Best climb (Vec)	100 ^{km/h}	
Max flaps (Vfe)	150 ^{km/h}	
Maneveour sp. (Va)	180 ^{km/h}	
Max speed (Vne)	280 ^{km/h}	
Flaps		
60 ^{km/h}	- 76 ^{km/h}	- L
76 ^{km/h}	- 90 ^{km/h}	- 5
90 ^{km/h}	- 110 ^{km/h}	- 4
110 ^{km/h}	- 130 ^{km/h}	- 3
130 ^{km/h}	- 200 ^{km/h}	- 2

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

5.1.13 Profiles and Pilots

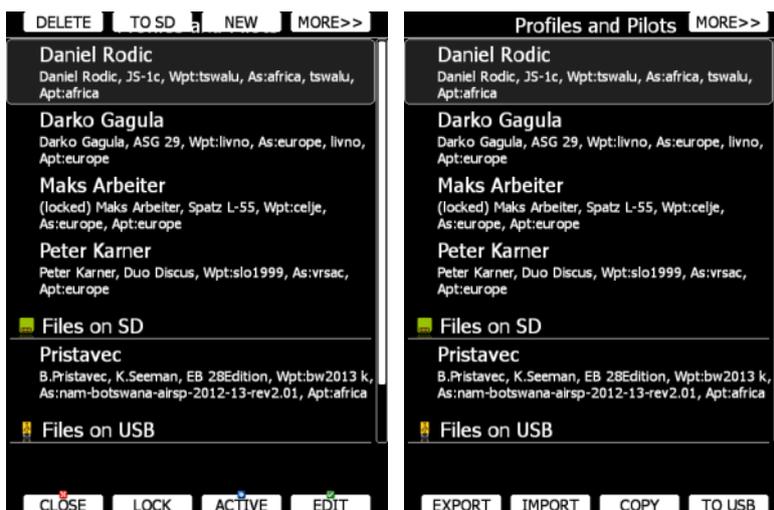
All settings and navigational page layouts are stored in a profile. Profiles can be used in different ways:

- For club operation or multiple pilots sharing the same glider. Each pilot can have his personal profile.
- When the user is flying a glider which can have a different wing spans. In this situation the pilot has two profiles, one for each configuration.
- When a pilot is flying in several different locations. A separate profile for each location can be created (examples: France, Spain, Namibia, WGC2014).

Profile consists of two parts:

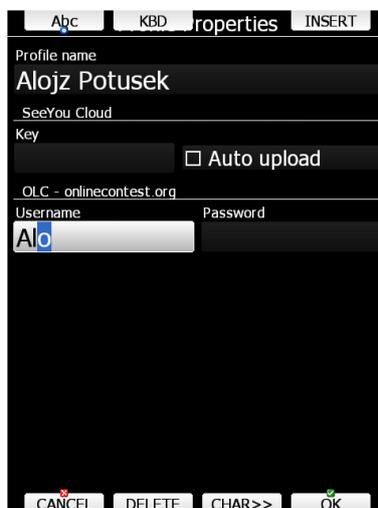
- **Navigational page layout** defines which navboxes and symbols are visible on navigational page. It defines colour of navboxes, font sizes and colours, how many navigational pages are visible and which modes are enabled. Navigation page layout can be setup with LX Styler or on device itself (See chapter 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 5.1) 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. **OLC** and **SeeYou Cloud** logins can be set here. **Auto upload** will automatically upload flight to SeeYou Cloud (when the flight is finished and internet connection is established)..



SeeYou cloud Key can be found at: <https://cloud.soaringspot.com/> at the top bar click on Application keys and generate a KEY (which is: xxxx-yyyy). It can be found also in SeeYou software ->SeeYou cloud.

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.

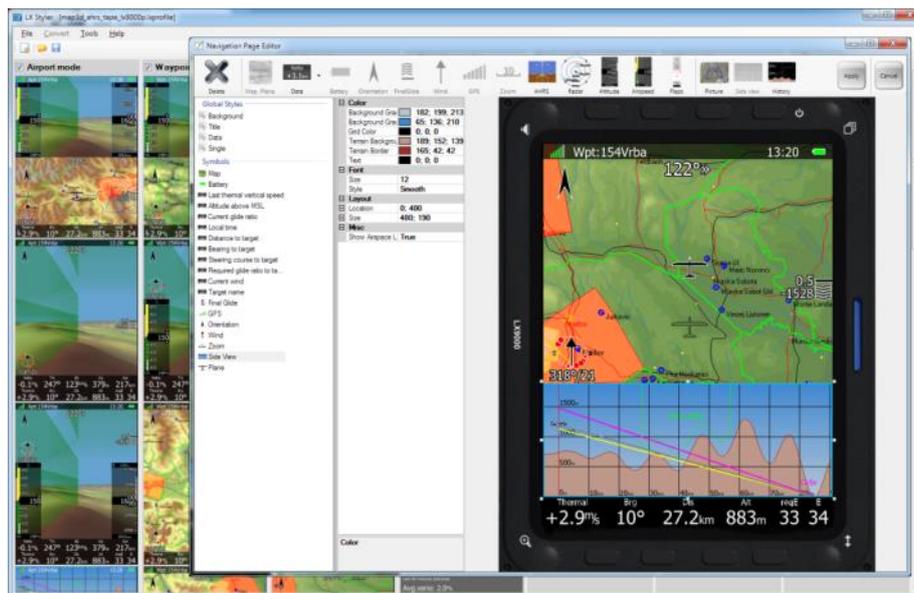


When a profile file from USB or SD card is selected, it will be available only, if SD card or USB stick is inserted in main display unit.



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: Airspace, Waypoints and LX profile.

5.1.14 Language

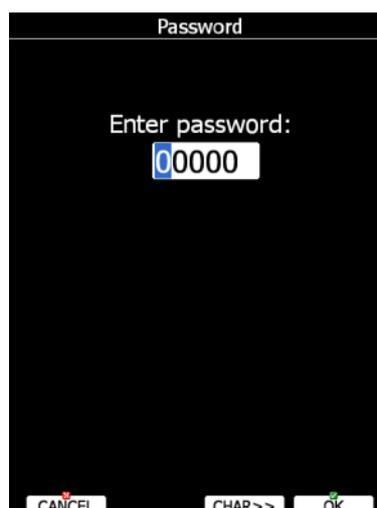
The system can run in different languages.



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, Finnish and Russian.

5.1.15 Passwords



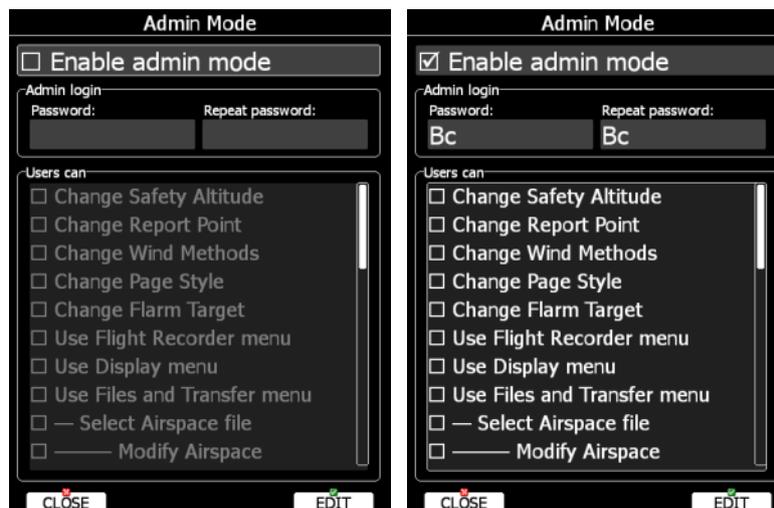
- **00111** displays information about the system and its sensors.
- **01043** will perform "Auto zero" and set indicated speed to zero.
- **01049** will perform "Auto zero" and set indicated speed to zero for OLD LCD variors
- **09908** compass calibration process (factory and user calibration)
- **30000** browse through installed files (use with caution).
- **41000** first or forced update of Flarm.

- **42000** update of Flarm through PC port (default).
- **44441** shows debug information.
- **55556** will enable Condor simulator input via the PC port.
- **89891** is used to initiate the firmware update procedure.
- **99999** will erase all flights stored on the main display unit.
- **09908** compass setup

5.1.16 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 is possible to define, which actions normal user can do.

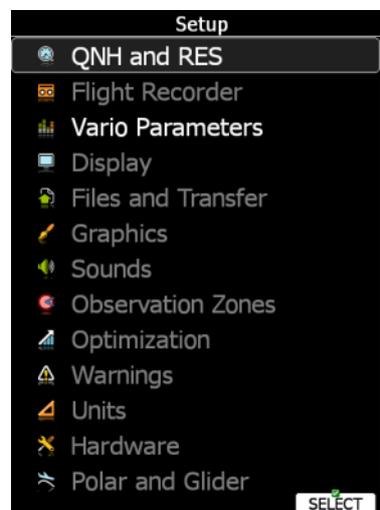


There are several actions, which can be disabled for normal user:

- **Change Safety Altitude**, user will not be able to set safety altitude.
- **Change Report Point**, user will not be able to set report point, if it 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 cannot change flarm targets names and other data for it.
- **Use Flight Recorder menu**, user cannot modify flight recorder properties.
- **Use Display menu**, user cannot modify display properties.
- **Use Files and Transfer menu**, it is not possible to use files and transfer menu completely.
- **Select Airspace file**, user cannot select and modify airspaces at all.
- **Modify Airspace**, user can select different airspace file, but he cannot edit or delete it.
- **Select Airport file**, user cannot select and modify airports.
- **Select Waypoints file**, user cannot select and modify waypoints files.
- **Modify Waypoints**, user can select, but cannot delete waypoints file.
- **Select Raster maps**, user cannot select and modify scanned maps.
- **Modify Raster maps**, user can select, but not modify scanned maps.
- **Format SD Card**, user cannot format SD card.
- **Update Databases**, user cannot update databases.
- **Modify PDFs**, user cannot delete stored PDF documents.
- **Delete Flight**, user cannot delete stored flight.
- **Use Graphics menu**, cannot use this menu.

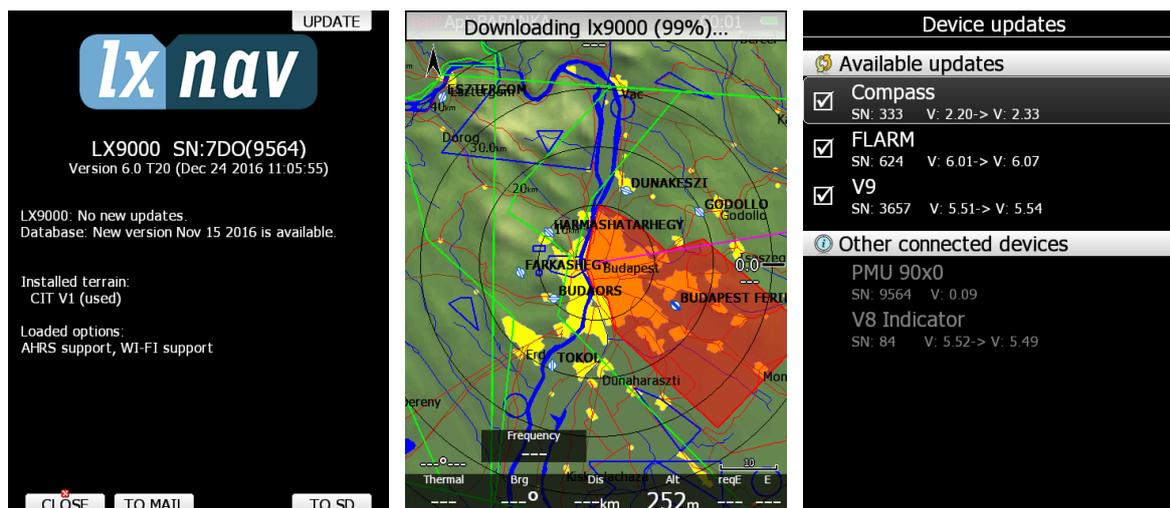
- **Use Sounds menu**, cannot use this menu.
- **Use Observation Zones menu**, cannot use this menu.
- **Use Optimization menu**, cannot use this menu.
- **Use Warnings menu**, cannot use this menu.
- **Use Units menu**, cannot use this menu.
- **Use Hardware menu**, cannot use this menu completely.
- **Use rear/front seat menu**, user cannot use this menu.
- **Use NMEA output menu**, user cannot use this menu.
- **Use Polar menu**, user cannot modify any glider parameters
- **Use Profiles menu**, user cannot modify Profiles at all. He can change profile only by restarting the device.
- **Modify Profiles**, user cannot delete, edit or lock profile.
- **Use Language menu**, user cannot use this menu.
- **Use Passwords menu**, user cannot use this menu.

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



5.1.17 About

About dialogs show serial number, software version, installed terrain, software options and update status (if Wi-Fi module is installed). 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.



5.2 Information Mode

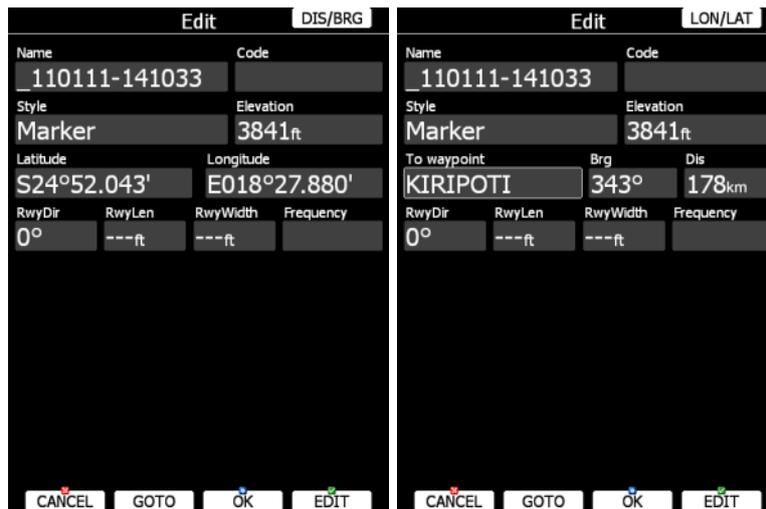
Information mode consists of four pages; GPS status page, position report page, satellite sky view page and network status page. Use the PAGE selector knob or the up/down arrow to toggle pages.

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 5.6.1 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

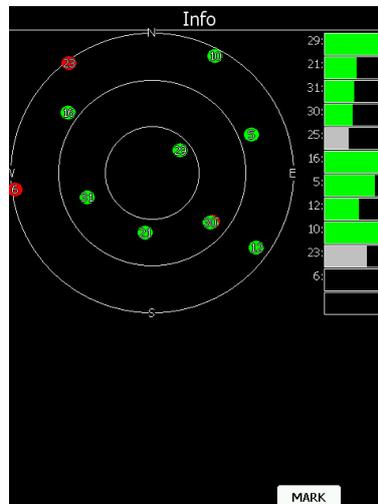
This page shows your position report relative to an arbitrary selectable point. Use this page when you are talking to ATC.



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.



At some instruments that page is not visible

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 5.1.11.14.



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 arrival altitude. Press the **SORT** button to toggle the sort method. The selected sort method is indicated by the grey background in the header.

Near				Near			
Name	Dis.	Brg	Arr	Name	Dis.	Brg	Arr
BUDAORS	9.49km	229°	-354m	Mayerhofen	62.7km	8°	-424m
DUNAKESZI	13.4km	22°	-455m	AJDOVSCINA	64.9km	205°	75m
HARMASHATARHE	9.52km	302°	-526m	SLOVENJ GRADEC	67.4km	84°	-494m
BUDAPEST FERIH	15.4km	118°	-534m	SENTVID	70.6km	137°	-374m
FARKASHEGY	13.1km	262°	-536m	POSTOJNA	74.0km	182°	-608m
TOKOL	19.3km	202°	-583m	GORIZIA	76.2km	221°	-133m
GODOLLO	19.7km	63°	-711m	CELJE	78.0km	104°	-530m
ESZTERGOM	38.7km	317°	-1093m	Rwy: 11/29-G-900-/0m	Freq: 128.800	Elev: 244m	
KECSKED	56.9km	271°	-1634m	Description: Tel. +386 3 5472030			
KECSKEMET	82.7km	141°	-2245m	xMurau	77.9km	358°	-934m
MATKOPUSZTA	88.8km	149°	-2400m	xLendorf	78.5km	306°	-692m
JAKABSZALLAS	93.1km	154°	-2512m	xJenig	79.5km	286°	-907m
SZOLNOK	97.1km	115°	-2595m	xMadlig	79.9km	334°	-1173m
GYOR-PER	96.4km	278°	-2614m	DIVACA KRASKI	83.7km	192°	-745m
SZENTKIRALYSZA	96.6km	240°	-2771m	xSchoeder	85.8km	353°	-1218m
SIOFOK KILTI-SA	104km	226°	-2814m	TRIESTE RONCHI	88.8km	222°	-398m

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 **GOTO** 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).

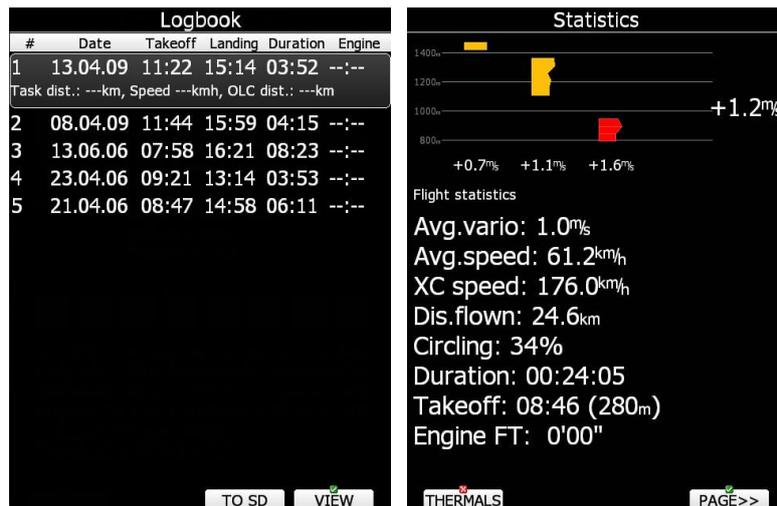
Near			
Name	Dis.	Brg	Arr
xFederaun	17.9km	302°	1038m
Rwy: 09/27-O-400m Elev: 500m			
Description: N Autobahn			
0Lesce	18.8km	135°	925m
Borovlje	25.9km	77°	836m
Feldkirchen	25.9km	12°	840m
Celovec	31.3km	55°	738m
Noetsch	30.7km	291°	670m
xPaternion	39.1km	314°	531m
Bovec	38.4km	244°	502m
xST.DONATH	42.4km	46°	388m
xEisenkappel	44.5km	86°	275m
Brnik	45.2km	129°	291m
xFeffernitz	33.9km	314°	165m
Friesach	59.4km	33°	-83m
xLendorf	59.4km	311°	-45m



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 5.1.6.3

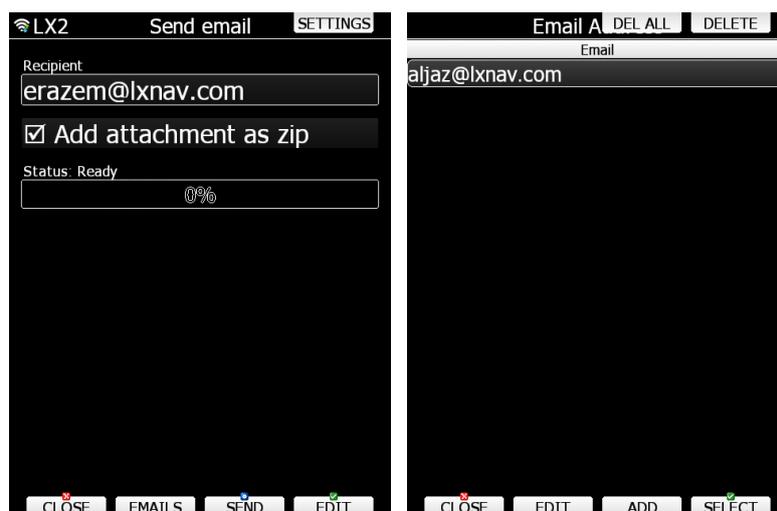
5.4 Statistics Mode

The Statistics mode operates in two different ways. During flight statistical data for the current flight is shown whilst on the ground the logbook for all stored flights is displayed.



5.4.1 Logbook

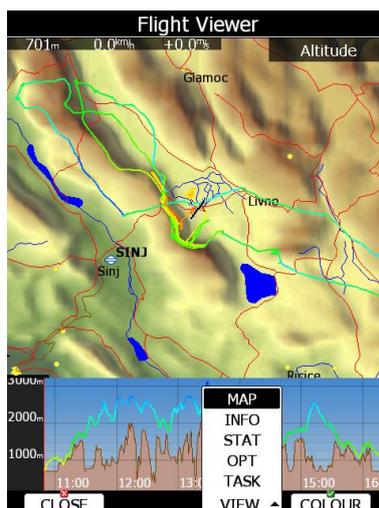
If a SD card or USB stick is inserted into the main display unit the user can copy a selected flight to it. Select the desired flight using the PAGE selector knob and then press the appropriate button. Press **TO MAIL** button to send flight via email. New dialogs will pop-up. Press **SEND** button to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



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 "Calculating security" is displayed. This message appears when landing conditions are met.

You can also delete a flight using the **Files and Transfer** menu (see Chapter 5.1.5.6).

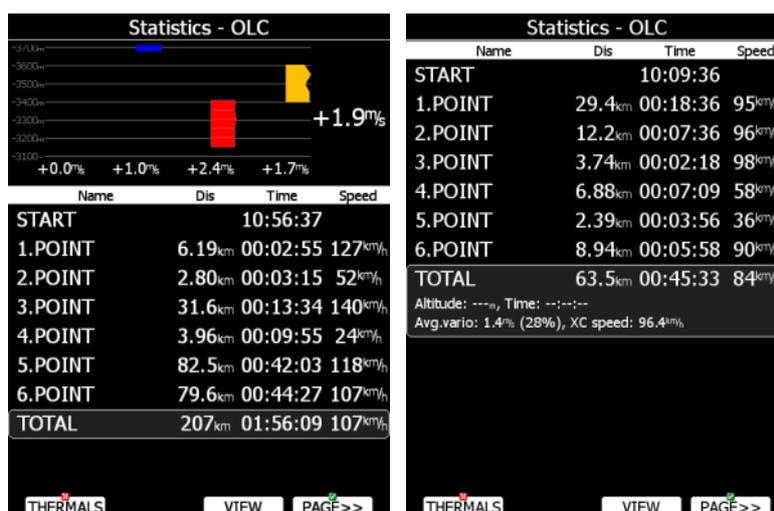
Press **VIEW** button to reply the flight. When **VIEW** button is pressed flight viewer will open.



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 map view (date, take off, duration, soaring started), statistics (average speed/vario/altitude, maximum speed, minimum/maximum vario), optimizations (legs and distance) and task (distance, speed, task duration). On the map view, you can also press **colour** to change flown path colours from altitude, ground speed to netto.

5.4.2 Statistics during flight

Main statistics page is split into two parts. In top part, last four thermals are shown. Thermal average is shown below each thermal column. Thermals are coloured based on MacCready value. Red colour means that thermal average was 0.5 m/s or more above current MacCready setting. Blue colour means that thermal average was 0.5 m/s or less below current MacCready setting. Orange colour is for matching thermal average. On the left side altitude scale is drawn. On right side average of last four thermals is printed. Shape of thermal column corresponds to strength of thermal at particular altitude. Press **THERMALS** button to disable or enable thermals view.



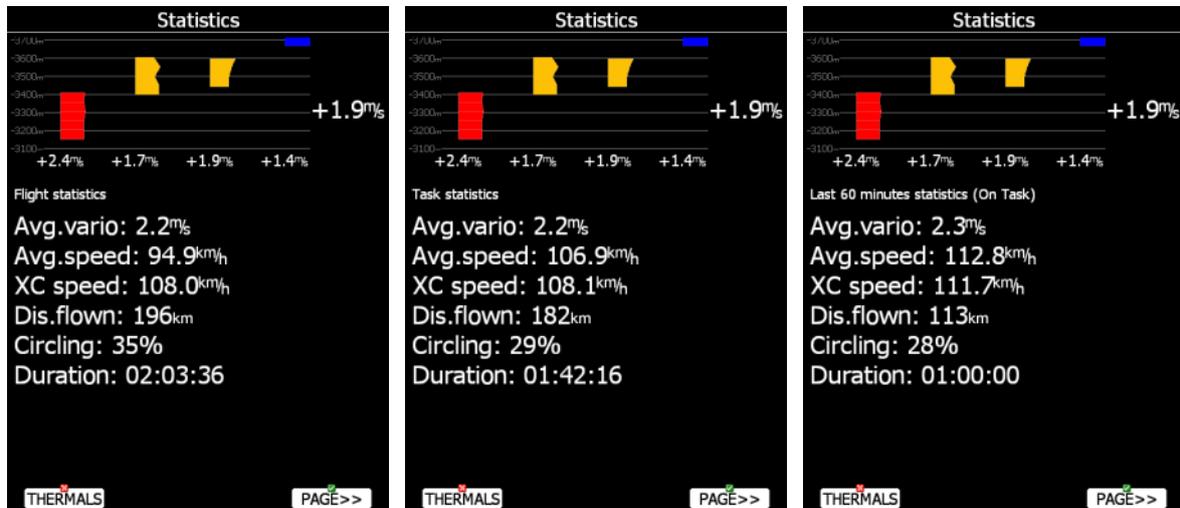
In bottom part selected statistics is shown. There are three different pages of statistics available:

- **General statistics**, which is divided further into flight statistics, task statistics and last 60 minutes statistics.
- **Detailed task statistics** displays detailed statistics for each task leg.
- **OLC statistic** shows statistics for optimized part of the flight according to the rules defined in Optimization menu.

Use **PAGE>>** button to toggle between different pages.

5.4.2.1 General statistics

Using the PAGE selector knob the user can change the statistics subpage.

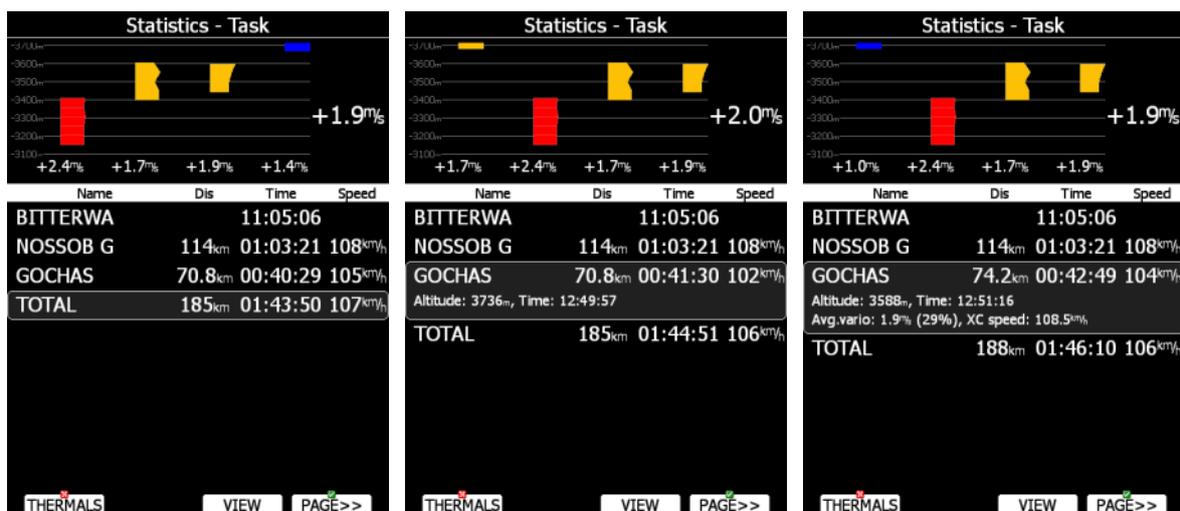


There are three subpages available:

- **Flight statistics** displays data for whole flight. **Dis.flown** is the optimised distance. XC speed is average speed corrected for altitude difference. **Average vario** is used in this calculation.
- **Task statistics** displays data for the started task. Distance flown is the distance that has already been flown on the task.
- The **last 60 minutes** statistics displays data for the last 60 minutes of flight. If the task was started then **Dis.flown** is the distance flown on the task for the last hour otherwise it is the optimised distance. If the task distance is used a remark (On Task) is displayed in the header.

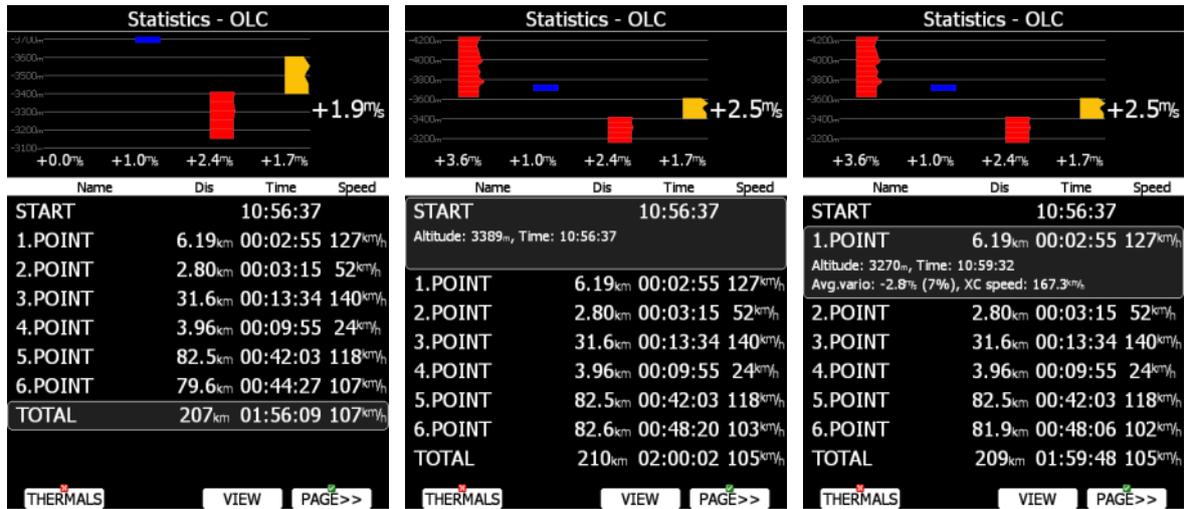
5.4.2.2 Detailed task statistics

Using the PAGE selector knob the user can select different task points. Press **VIEW** button to show more details for selected leg.



5.4.2.3 OLC statistics

Using the PAGE selector knob the user can select different optimized points. Press **VIEW** button to show more details for selected optimized leg.



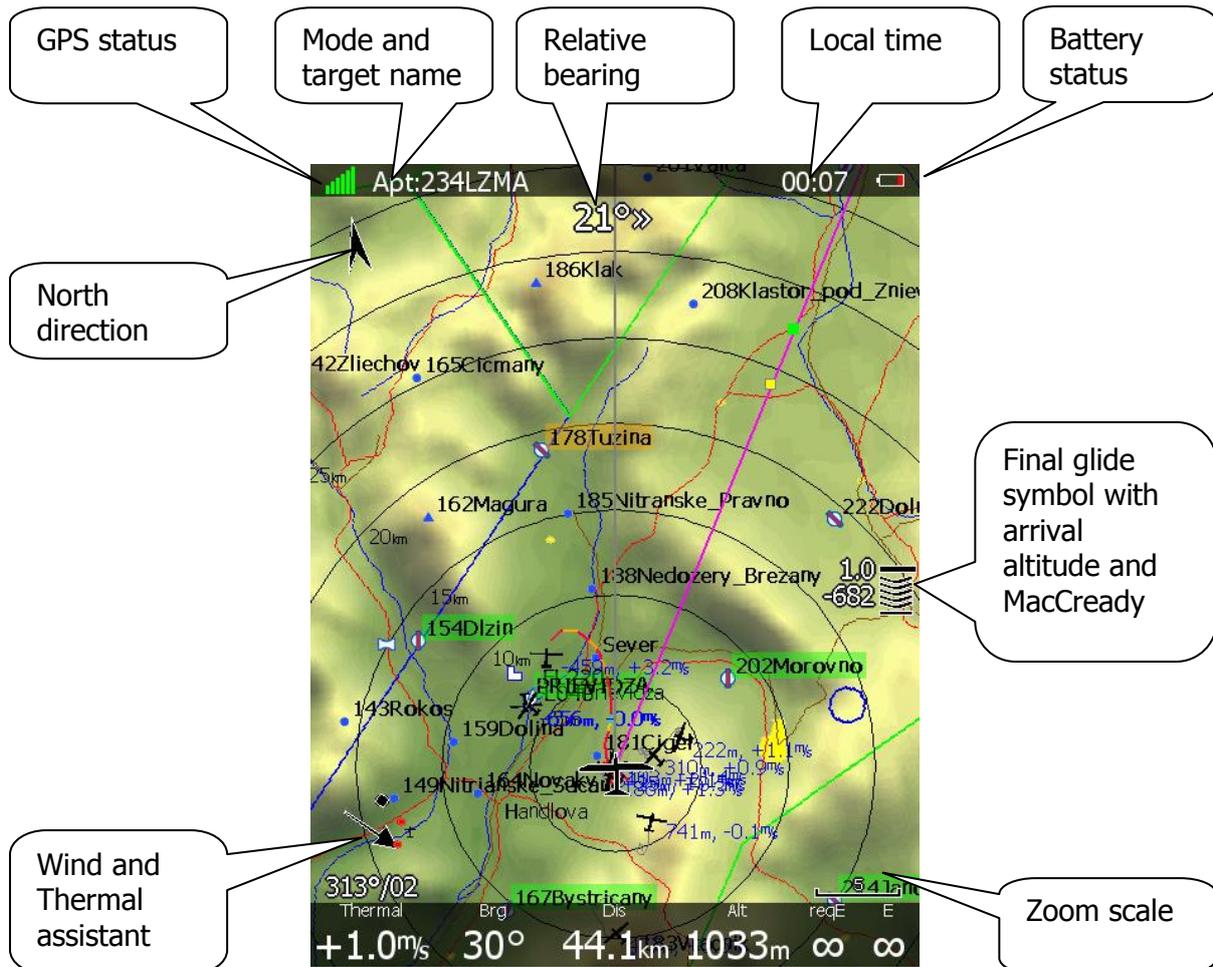
5.5 Airport Mode

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.

5.5.1 Initial Navigation Page



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. You can set a different time zone in the **Units** dialogue (see Chapter 5.1.9.5).

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.

North direction is pointing to true north. This is important if map orientation is not north up at the top.

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. When we are below the glide-path to current goal a green and a yellow rectangle will be displayed on the magenta line. The green rectangle represents the

position from where you will achieve the final glide with current altitude and current MacCready setting. The yellow rectangle represents the position from where you will achieve the final glide with current altitude and MacCready zero.

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 21°.

In the lower left corner of screen a **wind symbol with Thermal assistant** is displayed. The thermal assistant continuously analyses the thermal whilst circling. The sizes of the dots indicate the strength of the thermal. The arrow indicates the wind direction relative to the map orientation. Wind direction and wind speed are numerically presented below the arrow.

The final glide symbol is a complex symbol. The bottom number shows your predicted arrival altitude. Negative numbers indicate that you are below the glide path and positive numbers indicates you are above the glide path. The middle number is the current MacCready setting.

Zoom scale is displayed in bottom right corner of screen. A distance of drawn zoom symbol is plotted above the scale. If there is a letter "a" written next to distance scale, it means, scale of map will automatically adapt to goal.

In the bottom row several items are displayed. **Thermal** shows the last thermal average, **Brg** is the bearing to the selected target, **Dis** is the distance to the target and **Alt** is the current MSL altitude.

The last two numbers (**reqE** and **E**) show the required glide ratio to the target. In the above example the required glide ratio is infinitive and current glide ratio is also infinitive. The current glide ratio is calculated over the last three minutes of flight.

5.5.2 Second Navigation Page

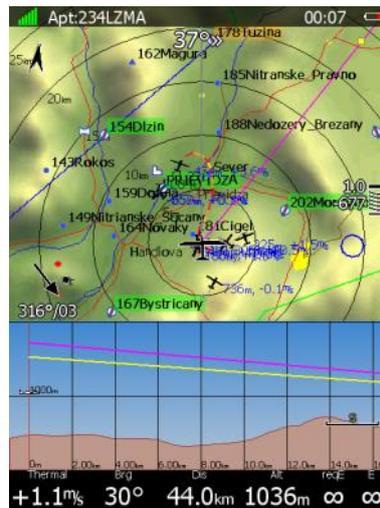
The second page is similar to the first page with additional data shown in the bottom line.



The additional items are the current net vertical speed, current track, ground speed, height above ground and optimised distance.

5.5.3 Third Navigation Page

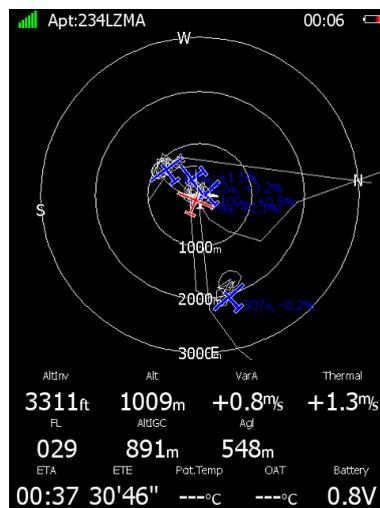
The third page is a combination of first navigational page and side view.



Side view is showing lateral view from glider towards selected goal. Terrain below glider is displayed including glider projected track based on glide ratio in grey colour. Yellow and magenta lines are showing requested glide ratio to goal based on zero MacCready setting and current MacCready setting.

5.5.4 Fourth Navigation Page

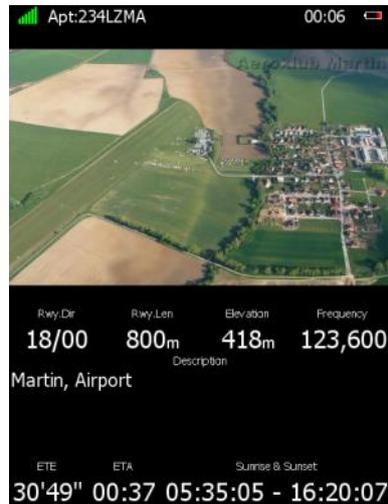
The fourth navigational page is combination of FLARM radar screen and some additional altitude data.



The internal pressure sensor altitude is shown as **AltIGC**. **AltInv** shows the altitude in opposite units to those defined in the **Units** setup. **OAT** is the outside temperature, **Pot.Temp** is the potential temperature and **Battery** displays the current voltage. The estimated time of arrival and estimated time established are displayed at the bottom part of page.

5.5.5 Fifth Navigation Page

On this page images of selected airport are shown, if available.



Also information for the selected airport is shown at the bottom part. This information includes airport frequency, runway info and description. The estimated time of arrival, estimated time established and sunrise/sunset times for the selected target are displayed in last row.

5.5.6 Button actions related only to APT page

5.5.6.1 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 by pressing the **select** button, then press the **METHOD** button several times to select the preferred mode.



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.



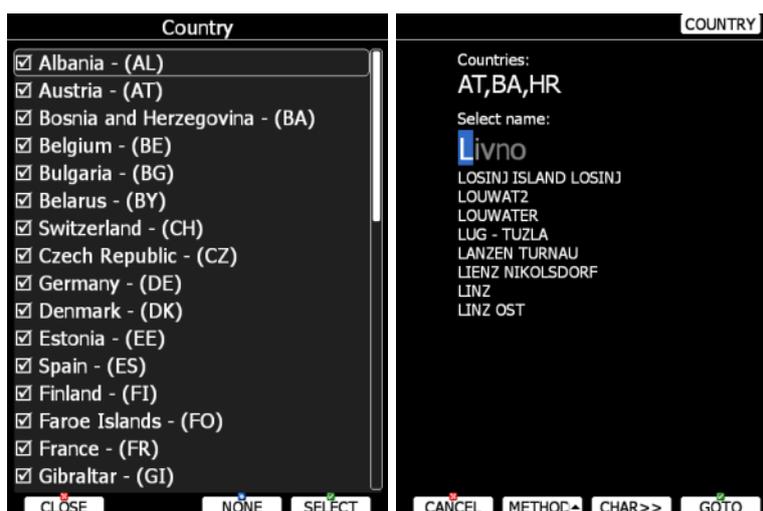
Press the **CHAR>>** button and cursor will move to the second letter. Use the PAGE selector knob to select the second letter. If you wish to return to the first letter turn the ZOOM selector knob counter-clockwise.

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 **GOTO** will navigate directly to it. If there are more than one airports starting with the filtered letters and you press the **GOTO** button the cursor will jump to the beginning of the airport name. The PAGE selector knob will select among the airports. Press **GOTO** 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 **GOTO** button. Now scroll to the desired airport using the PAGE selector knob. Press the **GOTO** 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

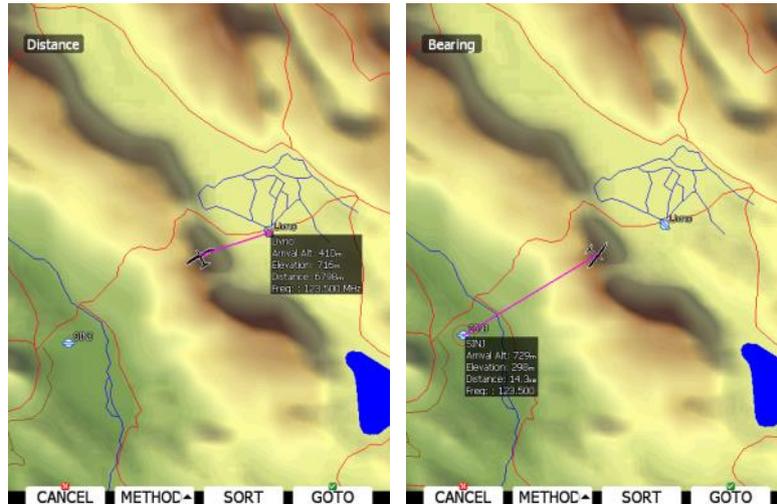
In list mode airports are listed as in near mode.



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 **GOTO** and you will navigate to it. Press **COUNTRY** button and a dialogue window with a list of all available countries will pop up.

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).

Name	Dis.	Brg	Arr
▶ DIVACA KRASKI UI311	11km	314°	-5688m
▶ PLOCE	92.6km	149°	-1108m
▶ UDBINA	123km	316°	-2427m
▶ Livno	5.95km	48°	-156m
▶ Take-off location	6.17km	42°	-152m

CANCEL METHOD GOTO

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



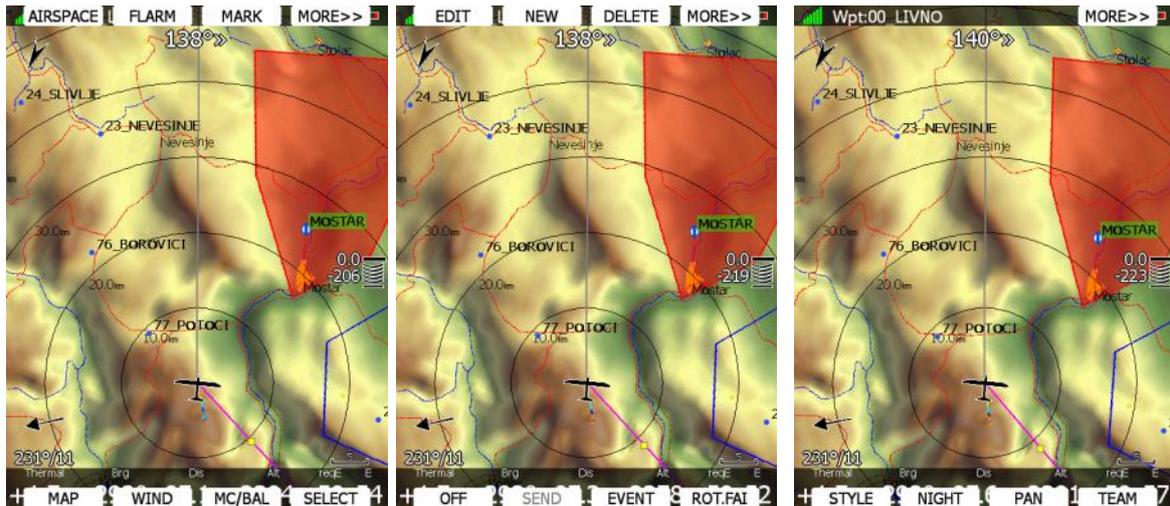
If you are flying a free cross-country flight and you wish to finish it under the OLC rules, you can select a waypoint called Soaring Start, which will show you where to finish the task.

5.6 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.



5.6.1 Button actions related only to WPT page

5.6.1.1 Editing Waypoints

Press the **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.

Edit				LON/LAT
Name	00 LIVNO		Code	00
Style	Grass airfield		Elevation	707m
To waypoint	Brg	Dis		
00 LIVNO	0°	0.00km		
RwyDir	RwyLen	RwyWidth	Frequency	
130°	800m	---m		

CANCEL GOTO OK EDIT

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.

5.6.1.2 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.

Edit				LON/LAT
Name	UDBINA		Code	LDZU
Style	Grass airfield		Elevation	750m
To waypoint	Brg	Dis		
00 LIVNO	133°	123km		
RwyDir	RwyLen	RwyWidth	Frequency	
125°	2750m	0m	118.200	

CANCEL GOTO OK EDIT

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.

5.6.1.3 Delete waypoint

Press **DELETE** if you wish to delete Waypoint from your list.



5.7 Task Mode

Task navigation mode is used for task manipulation. Navigation in this page is exclusively to the selected turn point of the declared task.



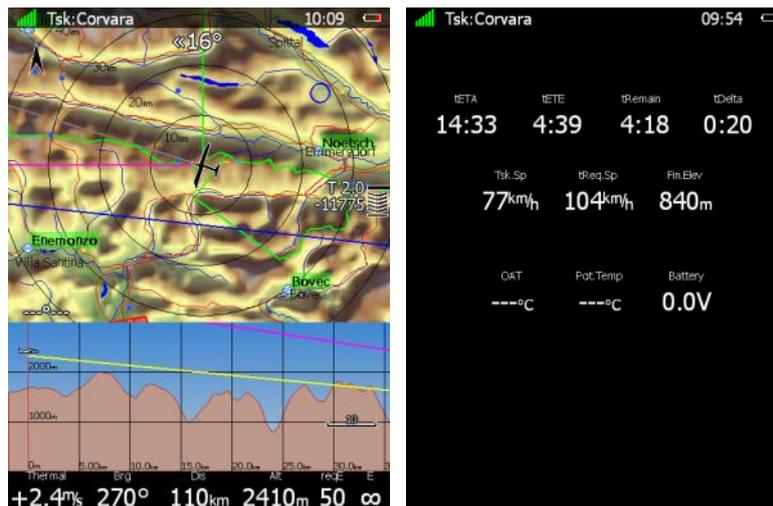
A task can be created only from stored waypoints or airports. A task can also be loaded from stored tasks. A task can will be saved to an active waypoint file (see Chapter 5.1.5.4 for details how to set an active waypoint file). A task used for navigation will also be declared in the IGC file.



Navigational pages can be customised by using LXStyler.

Task mode (valid for DEFAULT profile) has five pages. Use the PAGE selector knob to switch between pages. These pages are designed to suit needs for racing tasks as well as for assigned area tasks with minimum task time.





The first page is identical to first pages of the airport and waypoint modes. It shows navigational data to the current turn point. However the final glide indicator always shows the required altitude to complete the task.

On the **second page** additional data is shown:

- **current net vertical speed**
- **current track** and **groundspeed**
- **tDis** shows the remaining total task distance.
- **tskE** shows the required glide ratio to task finish.

The third page is designed for tasks with time limits which are in most cases going to be assigned area tasks.

Three new symbols are added:

- **Tsk.Sp** which is task speed achieved up to this moment.
- **tReq.Sp** which is the required speed to task completion. It is calculated as the remaining task distance divided by the remaining time.
- **tRemain:** indicates the remaining task time.

The fourth page is identical to the fourth page of the airport or waypoint mode. It shows side view.

The fifth page has no map and shows time values for the task being flown and the elevation of the finish point. In addition outside temperature, potential temperature and battery voltage are shown.

5.7.1 Button actions related only to TSK page

5.7.2 Task Edit

On the TSK page, press the **EDIT** button and the task edit dialogue will open. A task is created and manipulated within this dialogue. A list of task points is shown. In the upper-left corner the type and total distance is displayed. In the upper-right corner the task time is shown (for AAT tasks). Use the PAGE selector knob to select task points or task time control.

There are numerous actions available within the task edit dialogue to make creation of tasks as easy as possible.



Press the **MORE>>** button to see more options.

Available actions are:

- Press the **EDIT** button to enter a new task point, edit an existing one or to enter task time.
- **OK** 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.
- Use the **ZONE** button to modify the observation zone for selected point. The default zone style is defined in the Observation Zones menu in setup mode (see Chapter 5.1.7.4).
- **OPTIONS** action will open a new dialogue where additional properties for the task can be defined. The task name is set in this dialogue.
- There are three different methods of creating task. List mode, detailed list mode and map mode. Press **VIEW** button to change method.
- Press **LOAD** to load the task from the active waypoint file. You can load a task from SoaringSpot (**S.SPOT**), where you can select an actual contest.
- Press **SAVE** button to store the task to the active waypoint file. This task can later be loaded from the active waypoint file.
- **TO NANO** button will be available, if Nano flight recorder is connected to the main display unit. Press this button to send declaration to it.
- **INVERT** action will invert the complete task.
- **INS PNT** will insert a new point above the current cursor position.
- **STARTS** will open new dialogue, where user can enter multiple start points.
- **DEL PNT** will delete a point at the current position.

- **CLEAR** will completely erase the task.
- **MOVE UP** is used to move selected point upwards within the task.
- **MOVE DN** is used to move selected point downwards within task.

5.7.2.1 Starts (Multiple start points)

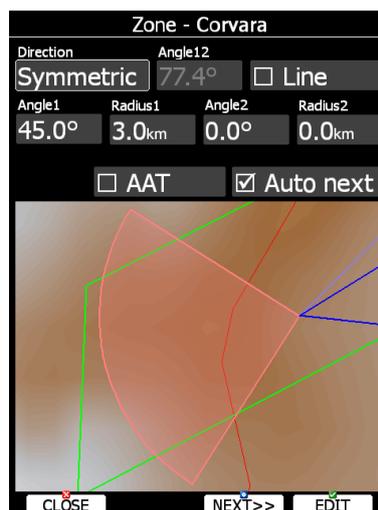
On some competitions, multiple start points are used for start. Press **STARTS** button to open multiple starts dialog.



First start point will be grey out. This is point, which is defined in task. Add as many start points as required. Later it is possible to cycle through start points with CYCLE button.

5.7.2.2 Zone (modifying zones)

Select a point and press the **ZONE** button. A new dialogue with the observation zone for the selected point will open.



Using parameters in the zone dialogue it is possible to describe all types of observation zones. **Angle12** defines the orientation of the observation zone. Available parameters for **Direction** are:

- **Symmetric:** the most common selection for a turn point.
- **Fixed:** mostly used for assigned areas.
- **Next:** orients the observation zone in direction of the outgoing leg. This is usually used for start.

- **Prev:** orients the zone in direction of the incoming leg and is usually used for the finish.
- **Start:** orients the sector always towards the start.

If the **Line** box is checked the sector will become a line type of observation zone. The **Radius1** parameter defines half the width of the line length. Use the PAGE selector knob to increase the radius by 0.1 of the selected distance units and the ZOOM selector knob to increase the radius by 5 units.

If **Line** is not checked the **Angle1** parameter will define the basic shape of the observation zone. A value of 180° means that the zone is a cylinder and 45° is the classic FAI sector. Rotate the PAGE selector knob to increase the angle by 0.5° or use the ZOOM selector knob to choose values 22.5°, 45°, 90° or 180°.

Angle2 and **Radius2** are used for more complex observation zone setups.

When changing observation zone parameters the screen is automatically updated to display the new zone.

Check the **AAT** checkbox, if you want to make the selected zone an assigned area. The **AAT** checkbox will be automatically checked when **Radius1** is greater than 10 km.

By default navigation to task points will be automatically advanced; uncheck **Auto next** if you do not want to change over to next point when reaching selected point. This option will be automatically unchecked when **Radius1** is greater than 10 km.

Press the **NEXT>>** button when you are happy with the changes and to continue with the next observation zone setup.



If the zone is for an assigned area turn point it will be marked with symbol '#' in front of the point name.

5.7.2.3 Task Options

Press the **OPTIONS** button. The options dialogue will be opened.

The screenshot shows a 'Task Options' dialog box with the following fields and options:

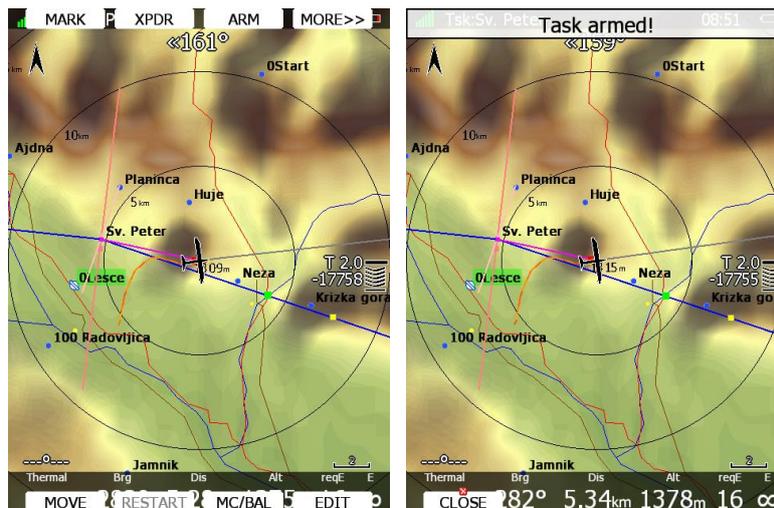
- Description:** A text input field.
- Gate time:** A numeric input field with a unit selector.
- Before start:** A sub-section containing:
 - Below time:** A numeric input field.
 - Below alt.:** A numeric input field with a unit selector.
- Start procedure:** A sub-section containing:
 - Start alt.:** A numeric input field with a unit selector.
 - Start gsp.:** A numeric input field with a unit selector.
- Checkboxes:**
 - Finish is 1000m below start
 - Navigate to nearest point
 - Start out of the top
 - Use start arm mode
- Buttons:** CLOSE and EDIT at the bottom.

Enter the task description. This is very useful during competitions where you are given more than one task per day. Some hints for names are **DAY1-B**, **Triangle1000km** etc. Check **Finish is 1000m below start** when you are making a badge or record flight. If this option is checked the system, will not navigate you to the finish point elevation, but to the altitude which is going to be 1000m below the start altitude. Check **Navigate to nearest point** and the system will navigate you to the nearest point on the start zone or start line and finish zone. **Start out the top** will enable detection of start, when leaving start sector from the top of it.



The **Navigate to nearest point** option is very useful and actually a must if a finish cylinder is used with a significantly large radius. Enabling this option will calculate the final glide to the edge of the cylinder rather than to the centre of the cylinder.

When finish line is crossed or start sector is exited, **use start arm mode** if you want to arm start rather than start manually. When using arm mode, pilot must press **ARM** button, which is displayed on main navigational screen instead of **START** button. When ARM button is pressed message "Task armed!" will be displayed. Pilot can now start on task. When start line is crossed or start sector is exited, system will automatically advance navigation to first turning point.



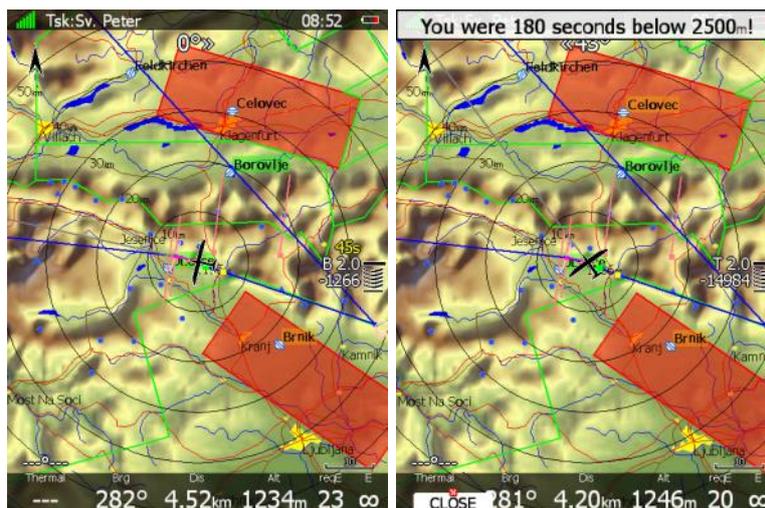
There are also several options in this menu which will help competition pilots to have a less stressful start.

5.7.2.3.1 Gate Time

Gate time is the time when the start gate is going to open. If this value is entered the instrument will not give you any message about starting a task before the gate time is reached. A notification will be given when the gate is opened.

5.7.2.3.2 Below Altitude Start Procedure

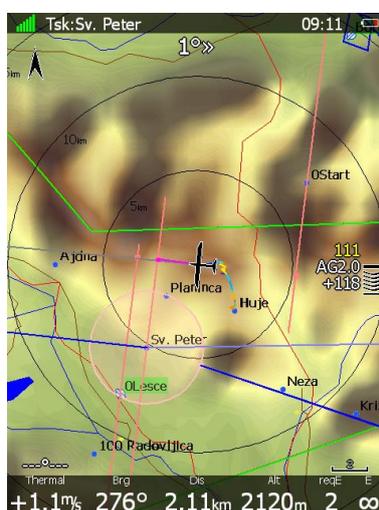
On some competitions there is a rule that a pilot must be below a defined altitude for a certain amount of time. Enter **Below alt.** and **Below time** to use this option. An indication will be given on the final glide symbol. Character "**B**" will be displayed before the MacCready value which indicates that the final glide is in below altitude mode.



The lower number shows the difference to the set altitude. Negative values mean altitudes below set altitude. The upper yellow number indicates the number of seconds left to be below the set altitude. Chevrons indicate meters below or above required altitude. Each line represents 10 m. A message "You were XX seconds below YYYY m!" is displayed once you fulfil the conditions.

5.7.2.3.3 Maximum Start Speed and/or Maximum Start Altitude

A lot of competitions are limiting the start altitude and/or start ground speed. The system helps pilots to cross the start line at the correct altitude with correct ground speed. Enter **Start alt.** and/or **Start gsp.** to use this option. An indication will be shown on the final glide symbol. Character "A" will be displayed before the MacCready value if a start altitude was entered and/or character "G" will be displayed if a start speed was specified. AG combines both **A** and **G**.



The lower number indicates at what altitude you will reach start altitude. A negative value indicates you are going to be there below the required start altitude.



The arrival altitude to start is not based on MacCready, the glider nor the wind settings. It is calculated based on energy difference during flying straight. This gives a very precise estimate at what altitude you will arrive at the start. Speeding up will result in greater energy loss and the arrival altitude will decrease; slowing down to best glider ratio will decrease energy loss and the arrival altitude will increase.

The upper yellow number shows the current ground speed and the chevrons indicate if you have to slow down or you may speed up.

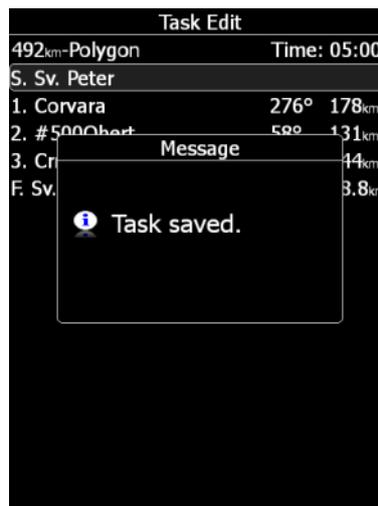
In the picture above we are 118 meters above the glide to start altitude. Our speed is 111 km/h and the chevrons show that we can speed up.



Start speed and start altitude mode is available only if the **Navigate to nearest point** is checked.

5.7.2.4 Saving a Task

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



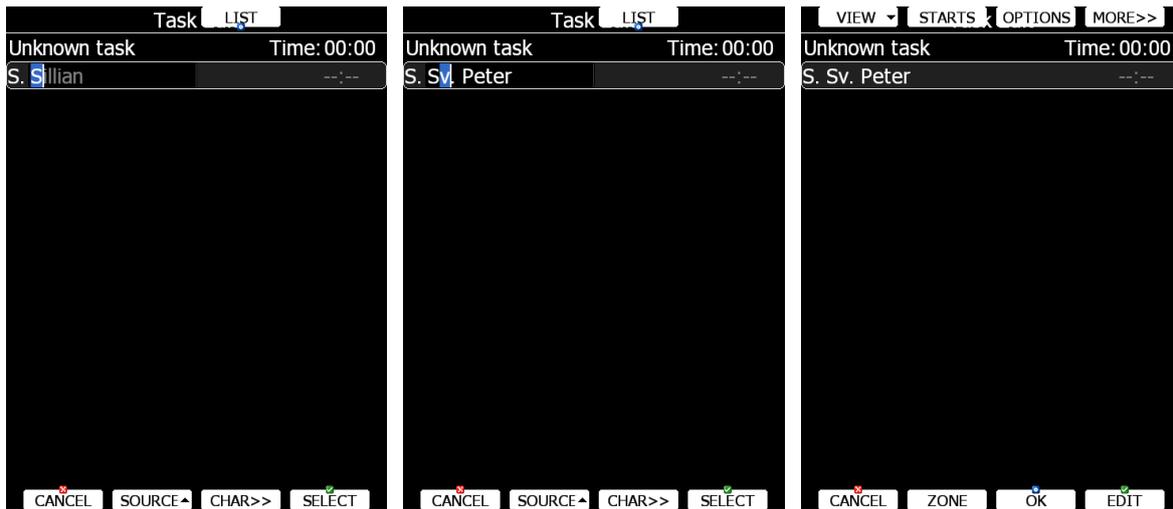
If the task already exists in the active waypoint file the message "Task is already saved!" is shown.

5.7.3 NEW task (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 5.1.5.1 for details on how to upload waypoint files to the system.

Select task time (if AAT taks) and press the **EDIT** button. Enter the task time if required (AAT). Rotate the PAGE selector knob to increase time in 15 minute steps and the ZOOM selector knob to increase task time in 1 minute steps. Close the task time edit and rotate the PAGE selector knob to select the **first empty point**.

Press the **EDIT** button and enter a turn point name. Entering a point name is very straightforward. 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.



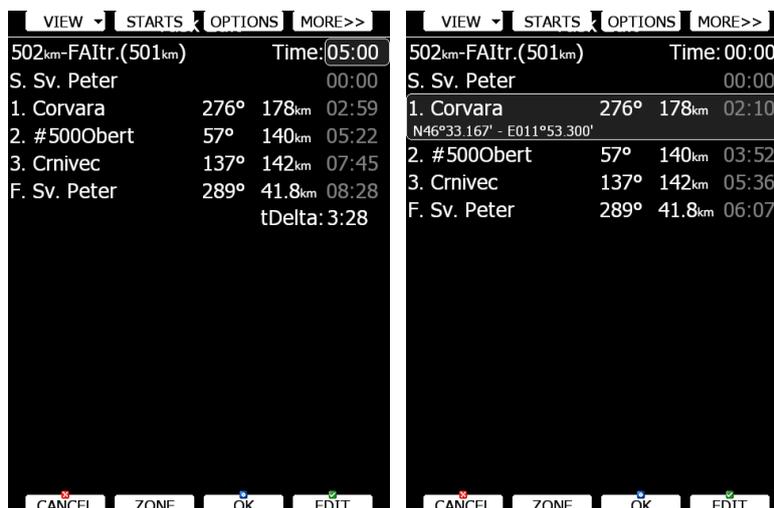
Press the **CHAR>>** button and the cursor will move to the second letter. Use the PAGE selector knob to select the second letter. If you want to return to the first letter turn the ZOOM selector knob anticlockwise.

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 letter "S" indicates you entered the start point and a letter "F" indicates you entered the finish point.

Move the cursor down to the next empty point and repeat the above procedure until the entire task is entered. Next to task name bearing to point and distance from previous point is shown. When on ground time needed from start is shown in last column. On ground calculation for time needed is based on MacCready theory only and it does not take into account wind. If task time is entered, delta time (tDelta) is displayed in last row.

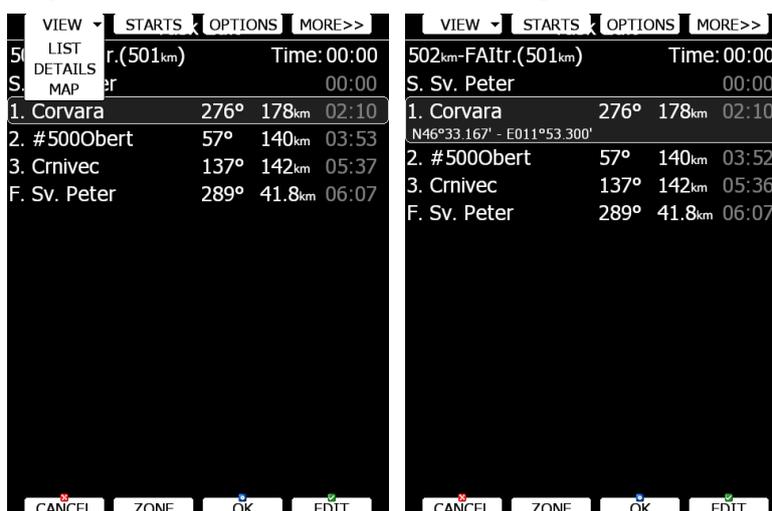
Once task is started, needed time will change to estimated time of arrival to point.



If you would like to change source for selection of waypoints, which are used to create task, press **SOURCE** button and select appropriate source. There are three options available: **active waypoint file**, **all selected waypoint files** or **waypoint files and airports**.



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.

5.7.4 Creating a task in SEEYOU

Tasks can be also created in SeeYou software and loaded into LX systems.



For more information about creating a task in SeeYou, please read the manual, which can be found here: www.naviter.com

For loading a task into LX system please refer to chapter: 5.7.5

5.7.5 Loading a Task

It is possible to load a task from the stored tasks within the active waypoint file. Select the **LOAD** action within task mode. A dialogue with a list of all stored tasks will be shown.



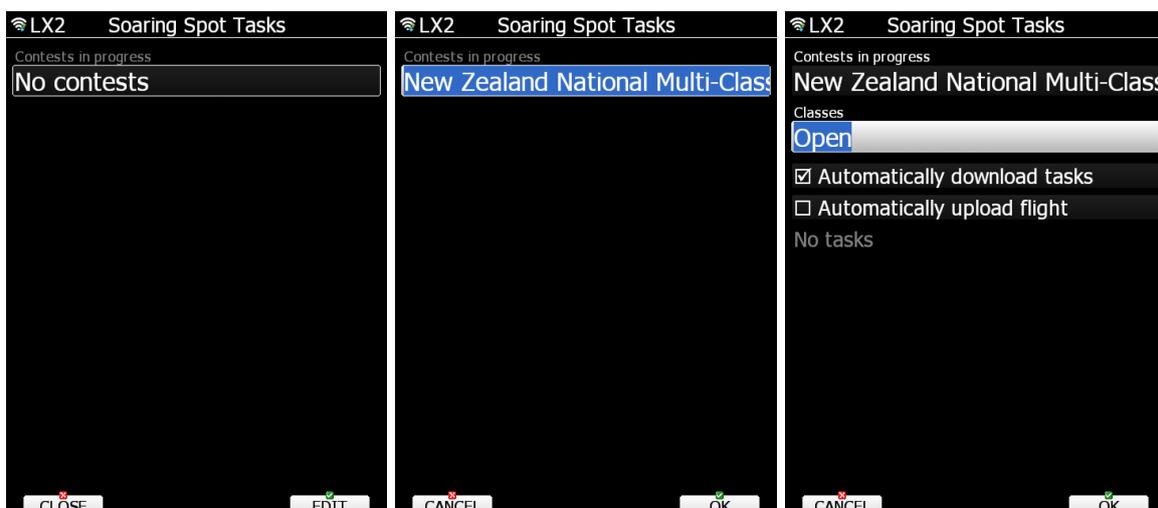
Total task distance, task description and task points are shown for each task stored. Select the desired task by rotating the PAGE selector knob and press **LOAD**. The task will be loaded into the active task and the task edit dialogue will be opened.

It is also possible to delete tasks 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.

5.7.5.1.1 Loading a Task from SoaringSpot (S.SPOT)

If LX has the Wi-fi option enabled and has an established internet connection then S.SPOT button is available. User should select the contest and racing classes. By enabling options "automatically download tasks and upload flight" everything will be done without any operation needed on the instrument (if tasks are available and if internet connection is established).



5.7.5.2 Map edit mode

In map mode, it is possible to create task on map. 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.



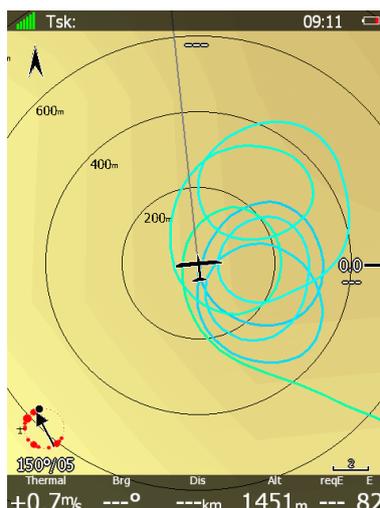
Move cross to task point to pick it and move it around. Move cross to task leg to insert point.

5.8 Thermal Mode

System can automatically switch to thermal mode. When glider enters thermal, device will switch to thermal page and zoom will adjust according to settings set in the following chapter: 5.1.6.5.

There can be only one page set as thermal for airport mode, waypoint mode and task mode. You can change current page to thermal mode in layout settings described in chapter 6.3.25.

In this dialog you can enable it and also change track length, colouring of line and zoom of map when in thermal mode.



Previous navigational page will be restored when your aircraft will stop circling. You can also manually exit thermal mode by rotating PAGE or ZOOM knobs.

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 is 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.
- **ADD (ABOVE/BELOW)** options create empty page and place it above or below current one. Newly created page will then enter in edit mode.
- **COPY (ABOVE/BELOW)** options copy current page above or below it. Duplicated 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.



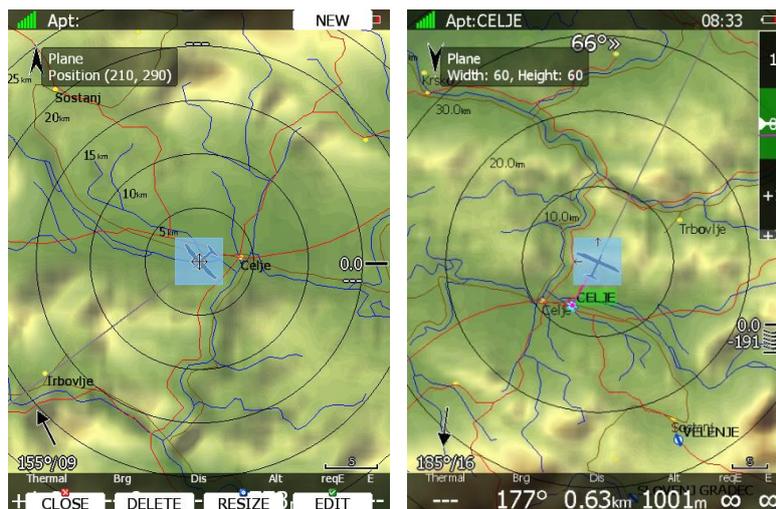
6.1 Edit page layout

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 available 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 confirmation dialog will appear prior to exit.



6.2 Button Actions

- **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 6.2.1.3 for more details.
- **Mc/Bal** will set MacCready, ballast and bugs (see Chapter 6.2.1.1 for more details).
- **Select** option is used to select an airport as the new navigational target.
- **Event** is used to log an event. The recording rate will be increased to 1 second for one minute. A message "Event marked" will be displayed on the screen.
- **Mark** is used to mark the current position and create a waypoint.
- **Rot.FAI** will rotate the FAI area if it is enabled. This option is not shown if it is not enabled.
- **Team** will open dialogue, where pilot can enter team code of his partner. Team code is compatible with SeeYou Mobile application.
- **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** Under development
- **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.
- **Send** is available only when we have a two-seat configuration with a rear-seat device. Press this button to send the current navigational point to the rear seat device. This action will force a change of navigational target for the selected navigation mode on the rear seat device.
- **Off** will switch off the instrument. The message *LX9000 is switching off. Please wait.* will be displayed.

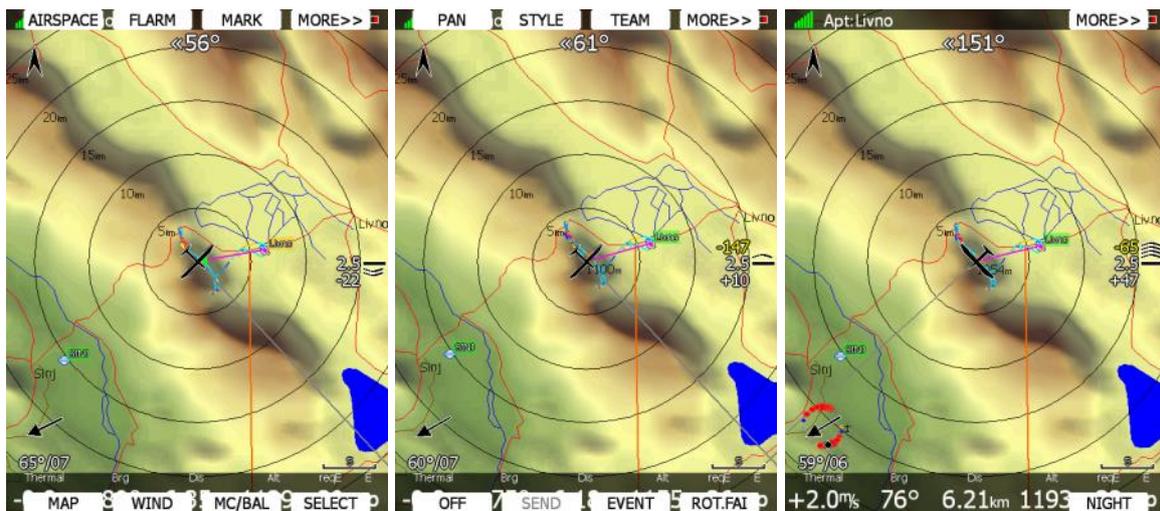


The main display unit can also be powered off by pressing the upper-left button until the message "switching off" appears.

- **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.

- **New** button will add new point. A new point can also be copied from the airports database.
- **Delete** button deletes the selected point.
- **Move** action is used in assigned area tasks to move the navigation point inside the selected assigned area.
- **Restart** is used to restart a task. This action is available only when flying.
- **Cycle** is available when multiple start points are defined and is used to change, cycle through start points.
- **Arm, Start** or **Next** option is used to start a task or to advance to the next turn point.

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.



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

6.2.1.1 MacCready, Ballast and Bugs Settings

These are probably the settings pilots use most often during flight. Press the **MC/BAL** button. The dialogue for MacCready, ballast and bugs will appear.



Use the PAGE selector knob to modify the MacCready setting. In the middle button there is a suggestion for the MacCready setting which is based on the last four thermals. Additionally to the selected MacCready value an wing loading is also shown together with the calculated glide ratio with corresponding speed.



You will notice that the MacCready value displayed on the final glide symbol is coloured yellow or red. The coloured value indicates that your MacCready value is too low corresponding to the current wind and selected target. Increase the MacCready value.

Pressing the **CLOSE** button will close the dialogue and return to the navigation page. Changes will be saved. The dialogue will automatically be closed after 10 seconds if no action is taken.

Pressing the **BAL** button will toggle the menu from MacCready setting to Ballast setting. Ballast is entered in values which are defined in the Units menu (see Chapter 5.1.9.5). You can set the load for an empty glider by pressing the **Empty** button. When parameters for water dump rate are given, **DUMP** button will appear. Press DUMP button, when you open water valve. System will automatically count down amount of water being released. Once you close water valve, press **STOP** button. This calculation is working only, when all weights are properly entered. (See also chapter 0).



You can also wire digital input to water valve. In this case count down will automatically start and stop. See also chapter 5.1.11.1.4 for more details, how to define digital input.

Pressing the **BUGS** button will toggle the menu again from Ballast setting to Bugs setting. A bug setting is used to set polar degradation due to a dirty wing. The input is in percentage degradation of glide ratio (5% means glide ratio degradation is 5%). Pressing **CLEAN** will set bugs instantly to zero. **MC** will return to the MacCready screen.

6.2.1.2 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.



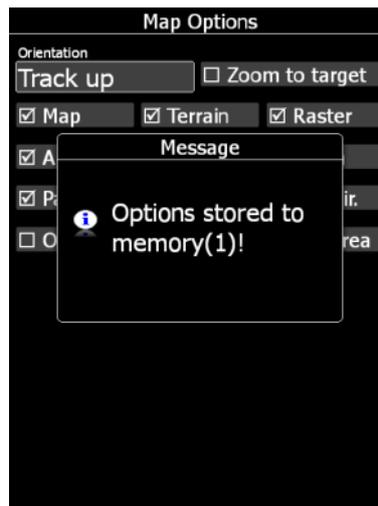
Map orientation is setup separately for straight flying or circling. If **Zoom to target** is checked the zoom will be automatically adjusted so that the target point is always visible. Maximum zoom is 200 km and minimum zoom is 1 km. The check boxes will turn on or off the following items:

- **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
- **Opt.dis.** – optimised distance.
- **Opt.tri.** – optimised triangle.
- **FAI area** – FAI triangle assistant is turned on/off.
- **Gld.rng.** – is gliding range and shows, which area is still reachable with current altitude, wind and MacCready setting.



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.

6.2.1.3 Wind

The main display unit constantly calculates winds using four different methods. **Speed difference** method is used during circling and is taking into account ground speed difference in a single circle. **Position drift** is calculating wind based on position drift during circling. A minimum of three circles must be completed to obtain the first wind measurements. The third method is **combination**, which takes into account also airspeed received from the vario unit.

If the **compass** module is available wind is also estimated using the wind triangle. Calculated wind is stored in layers. Layer height is 300 m or 1000 ft and cannot be modified by the user.



On rear seat device there is additional method called **front seat**. When **front seat** method is selected, device will use wind calculated by front seat only and all other methods will be disabled. This will ensure that both devices are using same wind for final glide calculations.

The wind profile is shown on the left side of the dialogue. Yellow coloured altitude indicates our current MSL altitude. Using the ZOOM selector knob you can scroll up and down through the wind layers.

Use the **EDIT** button to manually enter wind data. If a new wind direction is entered all wind directions in range from start altitude to end altitude will be modified. The same procedure is used for wind speed.

The user can also disable or enable a particular wind method. It is recommended to have all methods enabled.

Once the wind is modified to suit your needs press the **OK** button to accept the wind values. The dialogue will exit automatically.

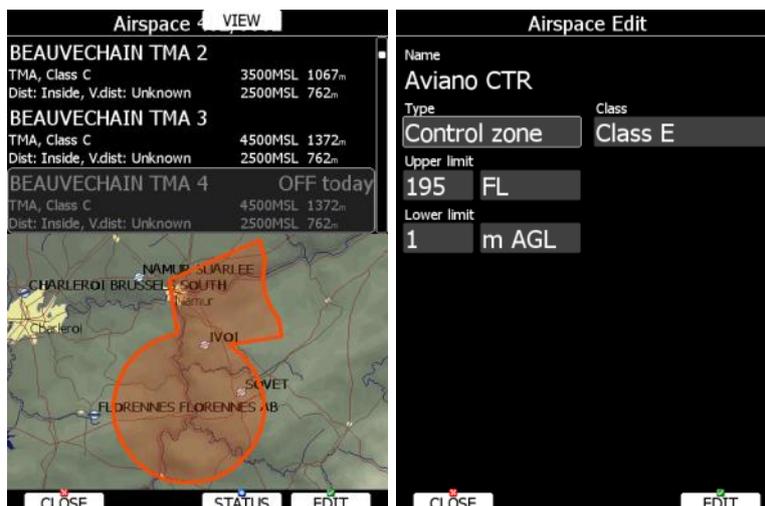
If the **CANCEL** button is pressed the wind dialogue will be closed without applying the changed values.



In double seater configuration, the second seat device can be set to receive wind information from the first seat by ticking the **FRONT SEAT** option.

6.2.1.4 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 5.1.5.3 for more details.

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



Map display of airspace is available only on LX90xx series. LX80xx series cannot show it due to display size limitations.

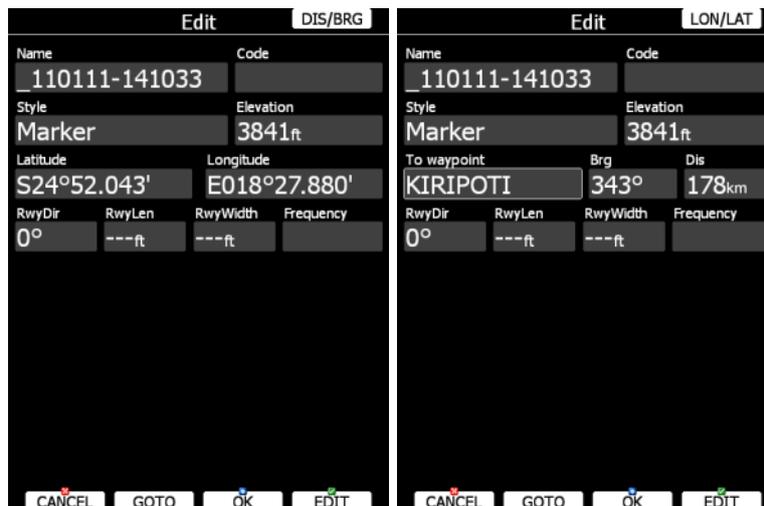
Pressing ALL will disable all airspaces for TODAY or ALWAYS. To enable them again press ALL and select ENABLE.



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

6.2.1.5 Mark

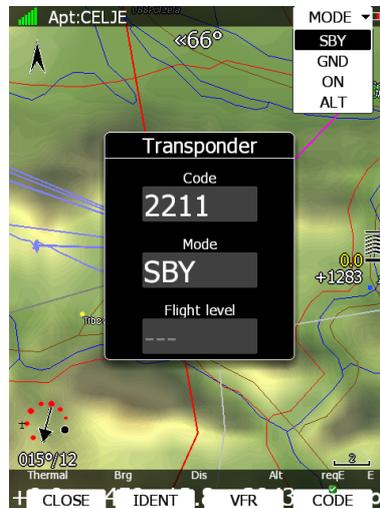
If you press the **MARK** button a new waypoint will be created with the current latitude and longitude and elevation based on the terrain database. The waypoint name is generated from the current date and time separated by the minus character and preceded by an underscore.



Waypoint data can be modified. Refer to Chapter 5.6.1 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.

6.2.1.6 Xpdr

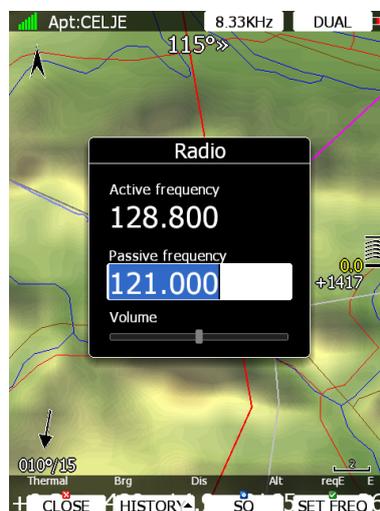
This dialog will be available only when 232 Bridge is installed and used as a transponder bridge. In dialog current squawk, mode and flight level are displayed.



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.

6.2.1.7 Radio

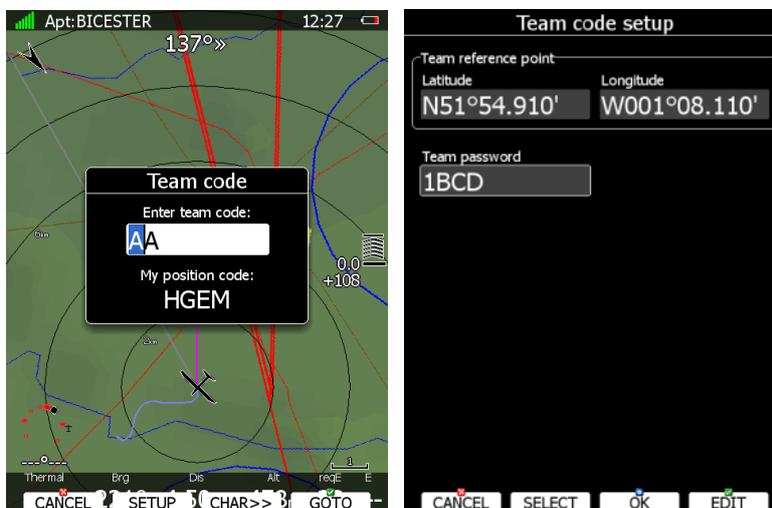
This dialog will be available only when 232 Bridge is installed and used as a radio bridge. In dialog active and standby frequency are shown, transmit status and volume control are shown.



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 **8.33 KHz** to toggle between **25 KHz** and **8.33 KHz** channel spacing.

6.2.1.8 Team

The Team feature will help you find or hide your teammate. It lets you share your position with other pilots and even encrypt this information so that your competitors won't be able to decode it.

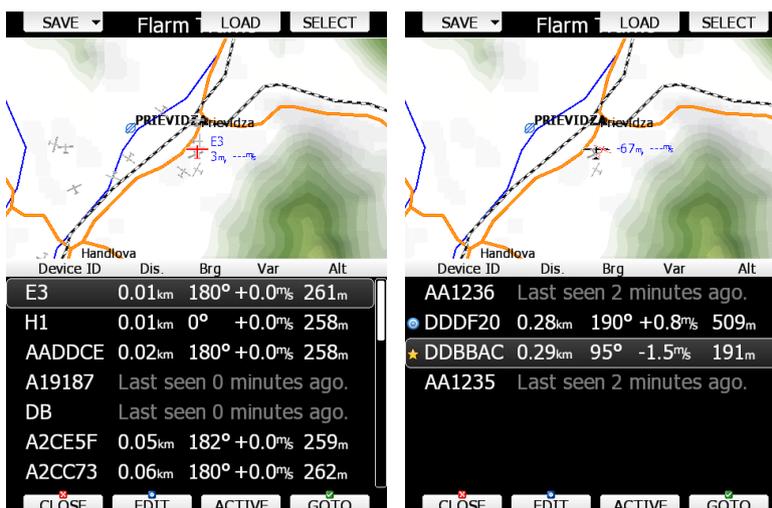


To use it press **TEAM** button. First you will have to enter team reference point. Press **Setup** to select a source waypoint for the calculation. It is imperative that your teammate does the same. If you would like to hide the information from others, enter the Team Password. Again, both or all pilots have to share the same key.

Go fly. When asked about your position, answer "Hotel-Golf-Echo-Mike". Your teammate will tap the Team button, enter the code and say "Thanks" while others won't have a clue unless they have the key.

6.2.1.9 Flarm

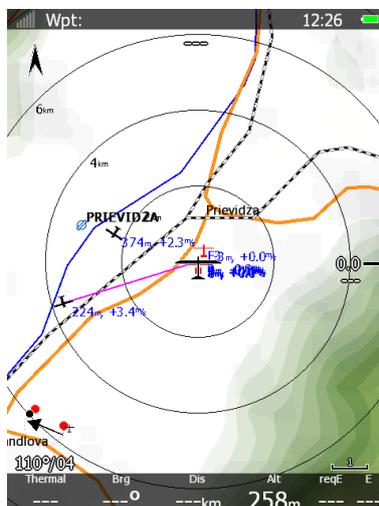
Press the **Flarm** button to view the list of other aircrafts received by Flarm. A split screen of map and list with all received aircraft since the last switch on is shown.



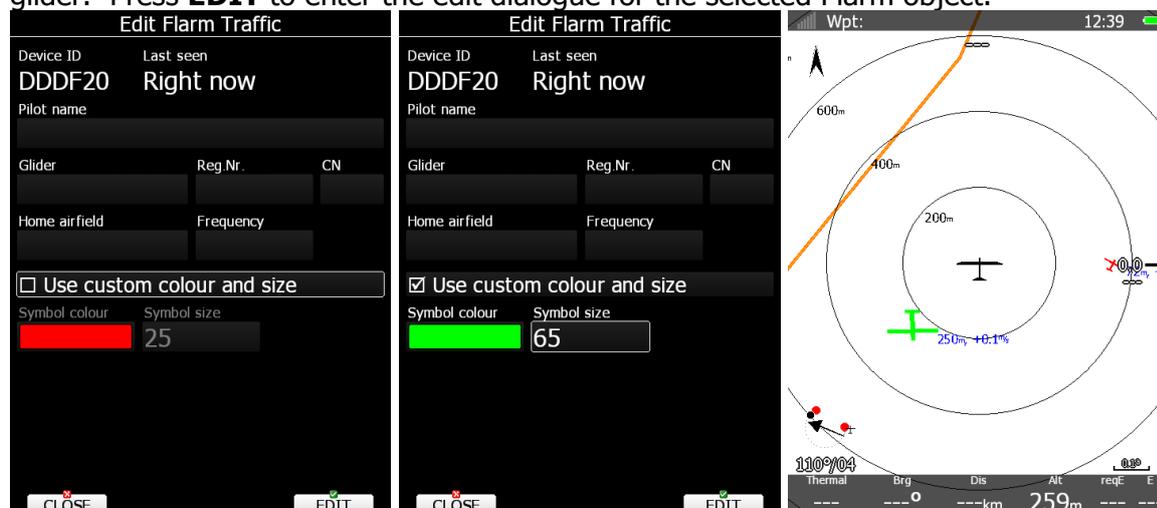
The list is sorted by distance. Device ID, distance, bearing, vario and altimeter parameters are displayed in the list. Lost target is still seen in the list showing when it was lost. Move through Flarm targets using PAGE selector button. Press **SELECT** button to mark selected target as favourite target. A yellow star will be drawn next to it. You can select as many favourites as you want.

One target can be selected as an active target. Press **ACTIVE** button to make target as active one. A blue bulls-eye will be plotted next to it. Team navboxes will show distance and bearing to this target.

Press the **GOTO** button to start navigation to this Flarm position.



Instead of Flarm device ID, you can also show the competition number for a particular glider. Press **EDIT** to enter the edit dialogue for the selected Flarm object.



Enter data about the Flarm glider and pilot. The colour and size of each target can be adjusted by ticking the custom box.

The main display unit is pre-loaded with the FlarmNet database to identify known FLARM Device IDs with plane and pilot data. You can upload the latest FlarmNet database after downloading it from <http://www.flarmnet.org>. The update procedure is similar to the update procedure for airport databases. See Chapter 5.1.5.2 for more details about updates.

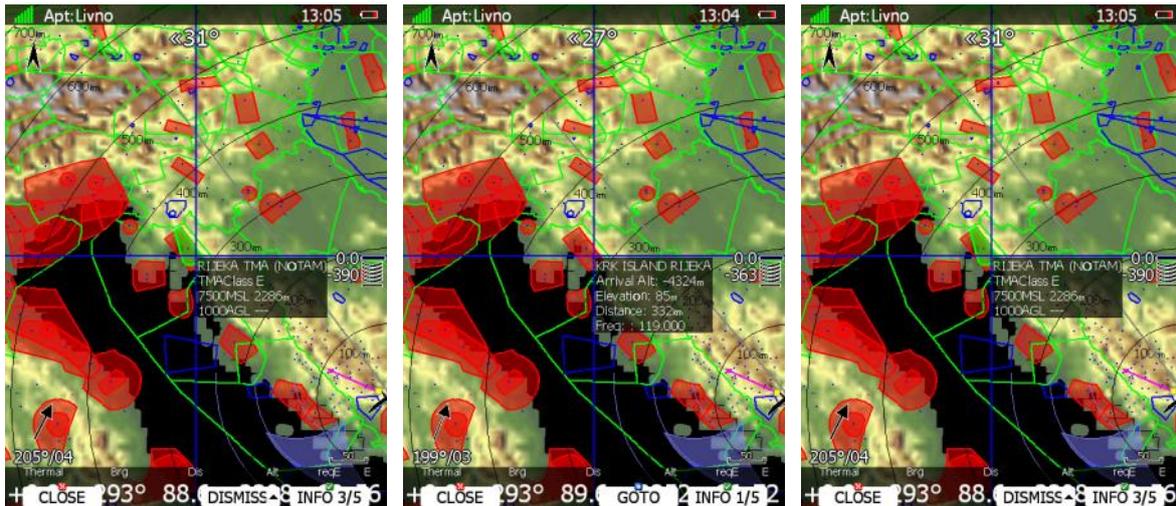
Edited flarm objects with custom settings can be **saved** to SD/USB key. Same file can be **loaded** on other LX80/90xx systems.



We encourage all users to upload their data to the FlarmNet web site. It is very easy. All you need is to determine your Flarm device ID which you will find in the Hardware->Flarm dialogue (see 10.1.6) and then register at FlarmNet.

6.2.1.10 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.

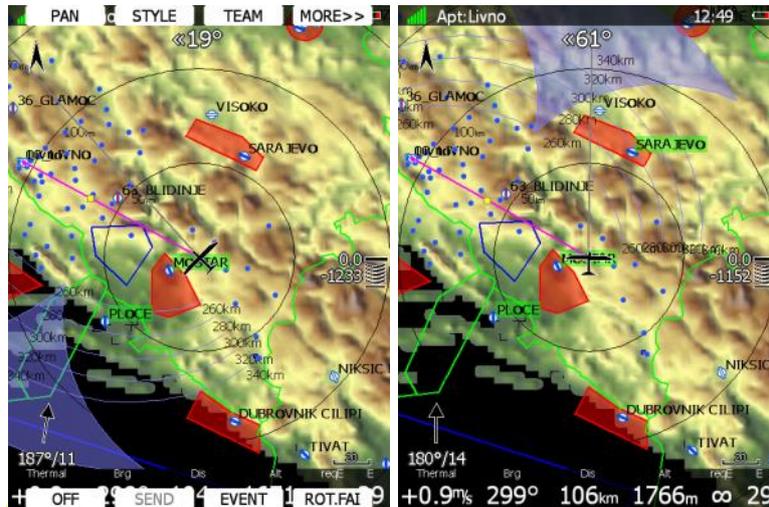
If remote stick is being used move jogger to move map. Press **INFO** button to change information for given position of cursor. There are three types of information possible: information about waypoint in the vicinity, airspace information and current position.

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.

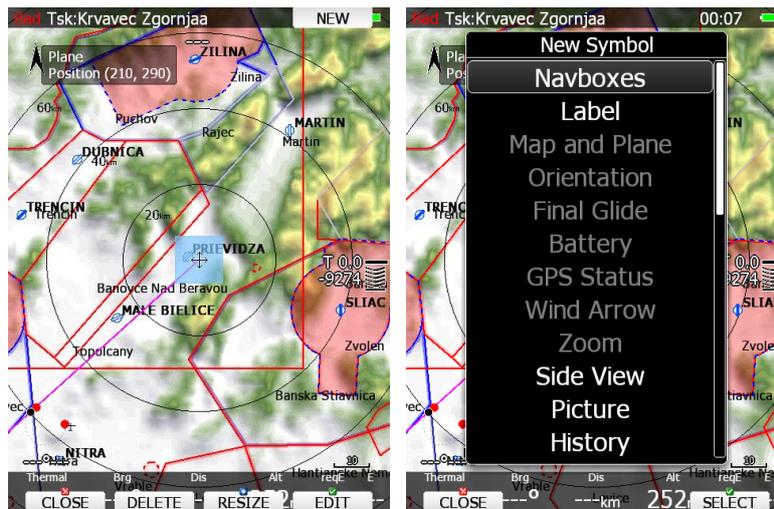
6.2.1.11 Rotate FAI Area

This option is used to rotate the FAI triangle assistant to match your suitable position. If FAI area is not enabled this option will be grey-out.



6.2.1.12 Layout

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



6.2.1.13 Night

Use this option to switch the display brightness to minimum visibility, which is suitable for night flying.

6.3 Creating new symbol

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



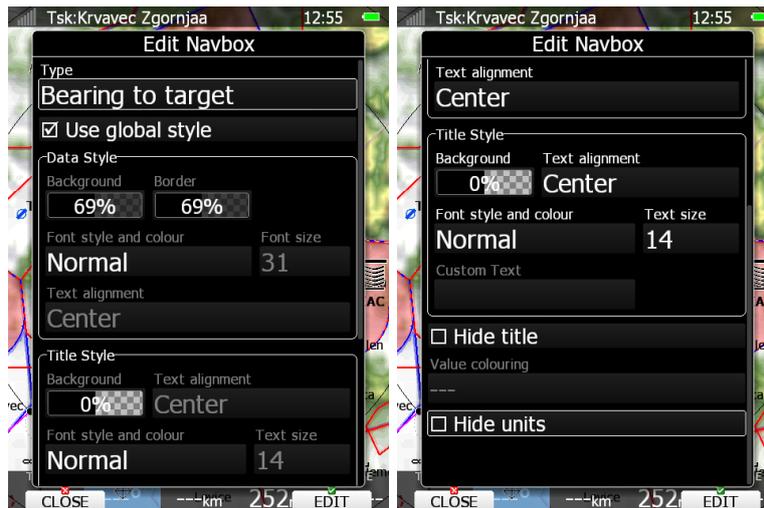
When symbol is already included on the page or unavailable, it will be greyed-out. There are several symbols available:

- **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.
- **Final glide** symbol shows current MacCready setting and information about required altitude. It is highly recommended to include this symbol on navigational page.
- **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.
- **Vario Tape** is displaying variometer value
- **Magnetic Rose** and **HSI** symbols are displaying magnetic direction.
- **Compass tape** shows magnetic direction
- **Flaps tape**[®] is unique display of current and required position of flaps. Scale of flap tape matches airspeed tape.
- **3D map** enables display of synthetic 3D terrain. This option is not available in version 4.0 of firmware.
- **Vario Indicator** symbol is displaying variometer value.
- **G-Meter** symbol displays current g-load and also minimum and maximum value.
- **Wi-Fi** symbol indicates current status of Wi-Fi signal.

- **Wind Profile** symbol is representing wind profile information very similar to Wind dialog.
- **Thermal Graph** shows thermals history which are coloured by the MC setting
- **Meteogram** shows a weather forecast in graphics from selected APT (if available)
- **SC Vario** is an indication of vario mode (speed command or vario mode)
- **Flarm** shows a flarm indicator on the navigation page

6.3.1 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	Req.Mc	Required MacCready to target
AgI	Height above ground	ReqAlt	Required altitude to target
Airport	Nearest Airport	reqE	Required glide ratio to target
Airspace	Distance to nearest zone	reqFlaps	Requested Flaps
Alt	Altitude above MSL	reqSTF	STF for required MacCready
AltGain	Gained altitude in thermal	Rwy.Dir	Target runway direction
AltGps	GPS altitude	Rwy.Len	Target runway length
AltIGC	Altitude above MSL(IGC)	sBrg	Bearing to zone center
Arrival	Arrival altitude on target	sDis	Distance to zone center
ArrMc0	Arrival altitude for Mc=0	STBY	Passive Frequency
Avg.Sp.60'	Average speed in 60min	STF	Speed to fly
Ballast	Current ballast	Sunrise & Sunset	Sunrise and sunset at target
Batt.Left	Battery left [min]	T.Start Alt	Task start altitude
Batt.Left	Battery left [%]	TAF	Target parsed TAF
Battery	Battery voltage	TAF	Target raw TAF
Brg	Bearing to target	Target	Target name
Circ.60'	Circling 60min	tArr	Arrival altitude for task
Circ.Fit	Circling Flight	tArrMc0	Task arrival alt. for Mc=0
Circ.Tsk	Circling Task	TAS	True airspeed
Code	Target code	tDelta	Task delta time
COM	Active Frequency	tDis	Remaining task distance

curFlaps	Current Flaps	tETA	Task estimated time of arrival
cWind	Head/Tail wind component	tETE	Task estimated time enroute
Date	Local date	Th.E	Thermal glide ratio
Description	Target description	thE	Theoretical glide ratio
Dew.Temp	Dew point temperature	Thermal	Last thermal vertical speed
Dis	Distance to target	Time	Local time
E	Current glide ratio	tmAlt	Team partner altitude
Elevation	Target elevation	tmBrg	Team partner bearing
Emc	MacCready glider ratio	tmCode	Team code of my position
ETA	Estimated time of arrival	tmDist	Team partner distance
ETE	Estimated time en route	tmName	Team partner name
Fin.Elev	Task finish elevation	tmRelAlt	Relative altitude of teammate
FL	Flight level	tmTo	Relative bearing of teammate
Flarm	Flarm RXTX	tmVario	Team partner vario
FIIGC	Flight level(IGC)	tmWptcode	Teamcode for waypoint
FltTime	Flight Time	To	Steering course to target
Frequency	Target frequency	toWind	Head/tail Wind to target
g-load	Current g-load	tRemain	Task remaining time
g-max	Max. g-load	tReq.Mc	Task required MacCready
g-min	Min. g-load	tReq.Sp	Task required speed
Gnd	Terrain elevation	Tri	Optimized FAI triangle or just largest triangle
GS	Groundspeed	Trk	Groundtrack
Hdg	Heading	trqSTF	Task STF for required MacCready
Humidity	Relative humidity	Tsk.Sp	Task speed
IAS	Indicated airspeed	tskE	Task required glide ratio
LON/LAT	Longitude and Latitude	tVario	Average vario for task
Mc	MacCready Value	UTC	UTC time
METAR	Target parsed METAR	VarA	Averaged vertical speed
METAR	Target raw METAR	Vario	Current vertical speed of a glider
Netto	Current Netto-vertical speed of the airmass	VarioFL	Average vario for flight
OAT	Outside temperature	Waypoint	Nearest Waypoint
OLC.Sp.60'	OLC 60' Speed	Wind	Current wind
Opt	Optimized distance	WindX	Side Wind Component
OptHome	Optimized distance to home	XPDR	XPDR Transponder
Pot.Temp	Potential temperature	xTrk	Task cross track distance
Radial	Radial from target		
Rain age	Shows the time of last received rain picture		
Rain time	Shows relative time of the rain picture		
RawIGC	Altitude raw (IGC)		

6.3.1.1 Detailed description of NAVBOXES

Title	Description
E	Current glide ratio calculated over 3 minutes. Total altitude is taken into account and distance is calculated over one point.
Emc	Best glide ratio for given MacCready, same as displayed in MacCready/Ballast/Bugs dialog
Req.Mc	Required MacCready to reach selected goal at safety altitude. If this value is negative, arrival altitude is shown.

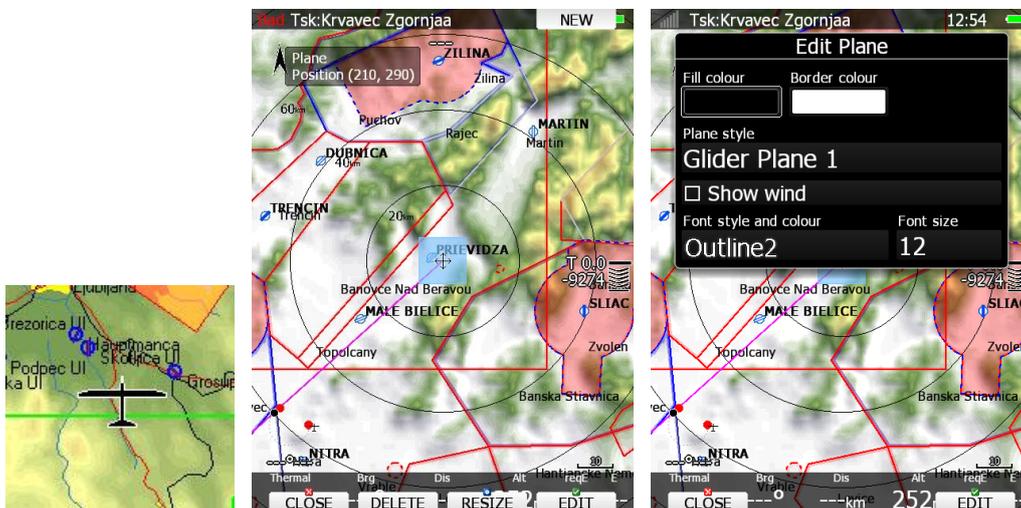
Th.E	Thermal to thermal glide ratio. Calculated from last thermal exit to current thermal entry altitude. Total altitude is taken into account and distance is calculated over one point.
thE	Theoretical glide ratio for given MacCready and head/tail wind

6.3.2 Map and Plane (Plane symbol)

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

Plane 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 plane can automatically change when circling.

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



6.3.3 Orientation symbol

Orientation symbol shows North direction.



6.3.4 Final glide symbol

The final glide symbol is a complex symbol. The bottom number shows your predicted arrival altitude. Negative numbers indicate that you are below the glide path and positive numbers indicates you are above the glide path. In the above example the glider is below the glide path. Chevrons show the position relative to the required glide path in percent. One arrow means 5% above or below final glide. The middle number is the current MacCready setting. In task mode it is prefixed with the letter **T**, **A**, **B**, **G**, **S** or **AG**. See chapter 7.2.1 for detailed explanation of this mode. Sometimes there will be another number above MacCready which is used for arrival over terrain. If we are on final glide to a

selected target but between it and the current position there is a terrain, which cannot be crossed without more height, then this number will give you an estimate, how much you have to climb, to pass over the terrain. A **red** rectangle will also be shown on the magenta line indicating the point of potential collision.

6.3.4.1 Final glide character explanation

Character "A" will be displayed before the MacCready value if a start altitude was entered and/or character "G" will be displayed if a start speed was specified. AG combines both A and G. On some competitions there is a rule that a pilot must be below a defined altitude for a certain amount of time. Enter **Below alt.** and **Below time** to use this option. An indication will be given on the final glide symbol. Character "B" will be displayed before the MacCready value which indicates that the final glide is in below altitude mode.

The Character "T" means TASK, which means final glide to finish on task. The Character "S" means START, which means final glide to the start line



6.3.5 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. Battery symbol colours are related to the battery voltage, which can be set in the following chapter: 5.1.11.16 .



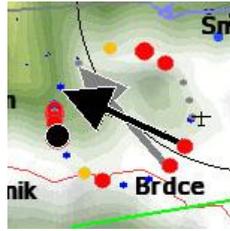
6.3.6 GPS indicator

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. If the symbol N.C. is present, there is no GPS connection/detected.



6.3.7 Wind Arrow and Thermal Assistant

Wind symbol shows wind direction. Black arrow shows combined wind information (position drift, speed difference and combination method). Grey arrow is a raw compass module measurement. Number represents the average wind measurement. Around wind symbol a thermal assistant can be shown during circling. Enable or disable this feature with "Has Thermal" property.



The thermal assistant continuously analyses the thermal whilst circling. The sizes of the dots indicate the strength of the thermal. Big dots mean stronger lift at that point. On the left or right side of the circle a small airplane symbol is shown. This airplane indicates your position. A black dot indicates the thermal maximum. The pilot should extend the circle when the black dot is about 60° away from glider. This value varies and depends on turn rate of the glider and type of thermal. All other dots are coloured based on the MacCready setting. Red colour means values above MacCready, blue values below MacCready and yellow dots represents lift about the same strength as the MacCready setting. This colour scheme gives us hints about a thermal at glance. If most of dots are red we should consider increasing the MacCready value; if most of dots are blue we should consider decreasing the MacCready setting.

6.3.8 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).

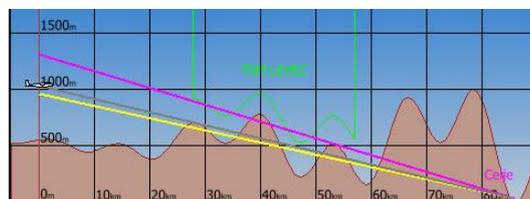


6.3.9 Side View

This symbol shows lateral view of our position toward selected target or bearing of plane. It shows terrain and airspaces in that direction.

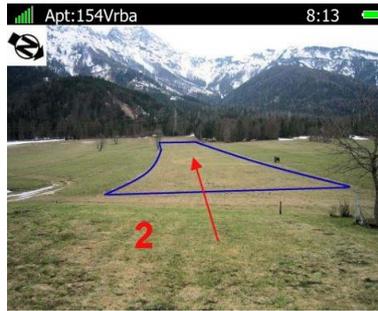
Grey line represents projected track based on glide ratio. Yellow line is showing requested glide ratio to goal based on zero MacCready setting and magenta line is showing current MacCready setting.

You can change appearance of airspaces in Setup > Graphics > Airspaces settings dialog.



6.3.10 Picture

Waypoint files with extension .cupx include also pictures for specific waypoints, which can be seen if this option is enabled.



6.3.11 History

With History symbol you can see flown path of whole flight or just some last minutes of it. By default it shows complete flight. Symbol displays altitude of aircraft and terrain.

By default circling in left direction is coloured in orange and circling in right is displayed in yellow colour.

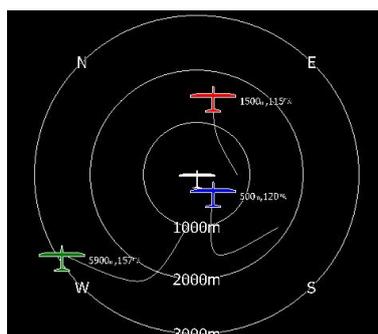
On the left side there is blue marker that indicates current position and change in position in last 20 seconds.



6.3.12 Flarm radar

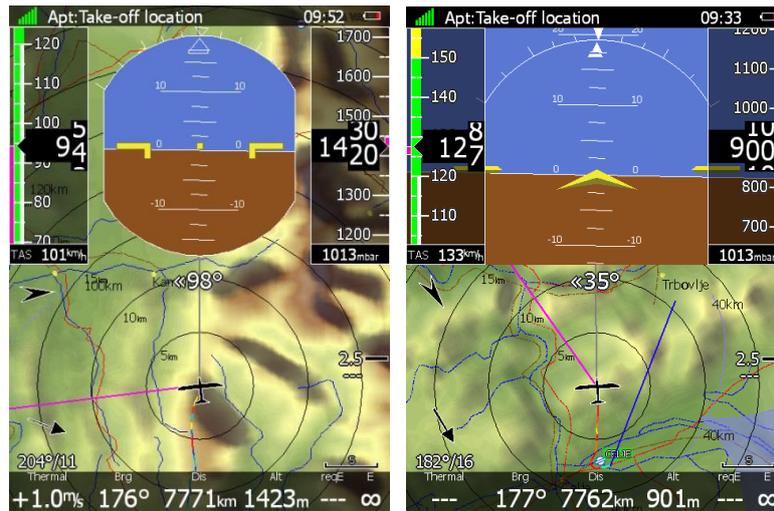
Symbol will display a radar screen showing Flarm (and ADSB) targets at predefined zoom. You can change zoom in edit layout dialog or you can rotate ZOOM knob to change it. This will work only if map symbol is not on current page.

There are also ascending slopes drawn with grey colour. This indicates MacCready value.



6.3.13 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.

6.3.14 Altitude Tape

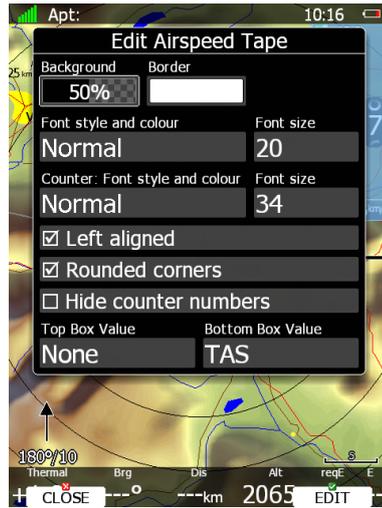
Altitude tape shows altitude band with current altitude in the middle. Additional to that trend vector is displayed. You can also customize tape's top and bottom boxes to display current QNH setting, AGL altitude, flight level or MSL elevation.

Nearest airspace marker is also drawn on tape. In task mode, instead of airspace elevation task finish point is shown. Latest thermal is drawn on tape with an appropriate colour.



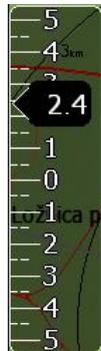
6.3.15 Airspeed Tape

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, see more in chapter 5.1.12. 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.



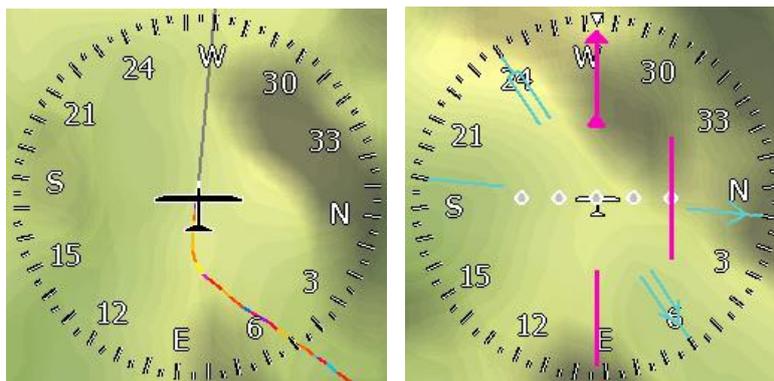
6.3.16 Vario Tape

Vario Tape is displaying variometer values. Font size, font style, text alignment and round corners can be adjusted.



6.3.17 Magnetic roses and HSI

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.



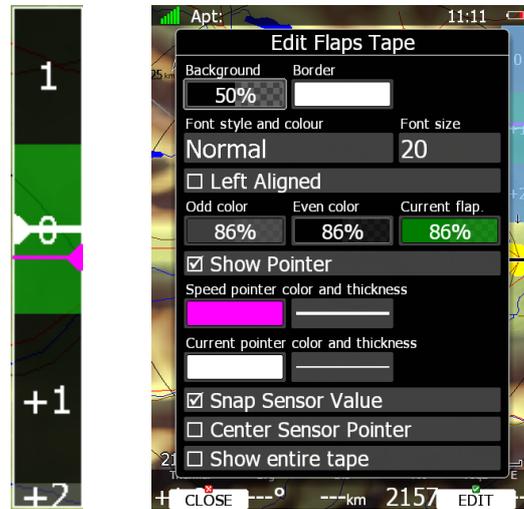
6.3.18 Compass Tape

Compass Tape is displaying magnetic direction. User can set pointer colour and compass scale.



6.3.19 Flap tape®

Flap tape displays current and required flap position. Scale of flap tape matches airspeed tape.



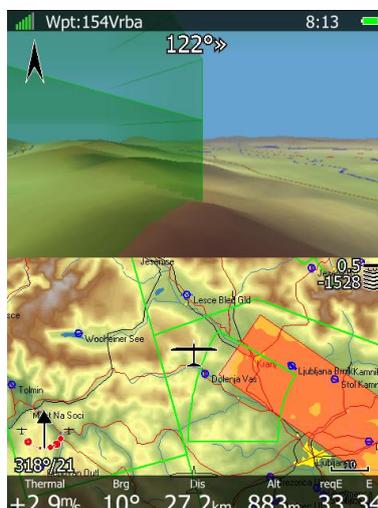
Magenta pointer shows required flap settings. White pointer shows selected flap position. Selected flap position band is coloured with green colour, when matching flaps are set. When wrong flaps are set, then selected flap band will be coloured red. When property "Show entire tape" is set, all bands are visible and have equal size regardless of their configured speed bounds.



If Snap Sensor Value is ticked, flaps will also show current flaps setting and required flaps setting. To calibrate flaps settings properly, refer to the following chapter: 5.1.11.15

6.3.20 3D Map – synthetic view

Synthetic view shows 3D terrain including rivers, streets, roads and airspaces. Flarm traces can also be seen in the 3D view.

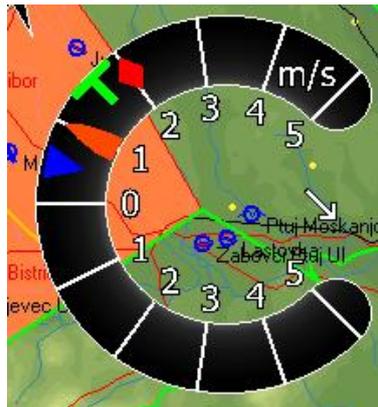


6.3.21 Vario Indicator

Vario Indicator symbol is displaying variometer values. While Vario Tape only shows speed trend value, indicator displays more information.

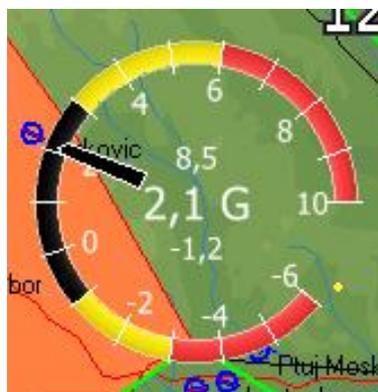
Orange needle pointer on meter can indicate vario, netto, relative or speed to fly value, depending on your settings and current mode. On the right side there is an icon that displays current mode. When in Vario mode a circular arrow will be drawn and in SC mode straight ascending line will be shown.

Red diamond shows average vertical speed. Blue arrow shows current MacCready value. Green T pointer shows last thermal average value.



6.3.22 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 below certain value. You can configure this behaviour with changing "Show above" property.



6.3.23 Wi-Fi indicator

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



6.3.24 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.



6.3.25 Thermal Graph

Thermal Graph shows thermals statistics during the flight. It shows the point of entering and leaving the thermal and where thermal was the strongest and the weakest. Numerical value below each thermal column shows thermal vario since the first and last circle of the thermal. Colours are related to MacCready settings. Thermals are coloured based on MacCready value. Red colour means that thermal average was 0.5 m/s or more above current MacCready setting. Blue colour means that thermal average was 0.5 m/s or less below current MacCready setting. Orange colour is for matching thermal average.

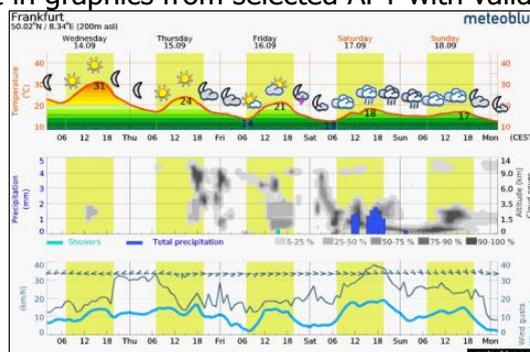
On the left side altitude scale is drawn. The right-hand side, big numerical value shows average thermal vario of all passed thermals.

Shape of thermal column corresponds to strength of thermal at particular altitude.



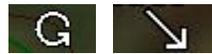
6.3.26 Meteogram

shows a weather forecast in graphics from selected APT with valid ICAO sign (if available).



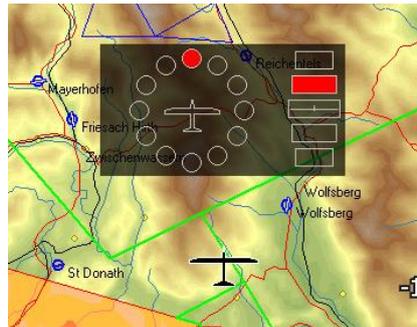
6.3.27 SC Vario

SC Vario is an indication of vario mode (speed command or vario mode).



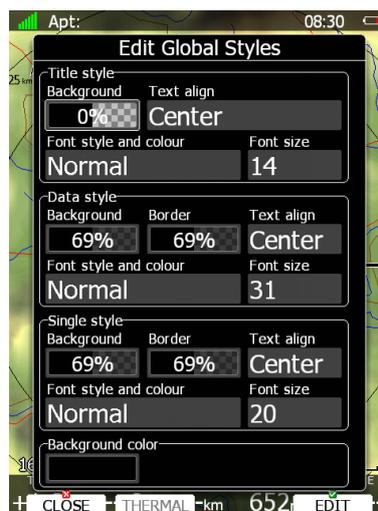
6.3.28 Flarm

Shows Flarm indicator on the navigation page.



6.4 Navigational page settings

Press SETTINGS option to open dialog for page global styles.



Dialog is split 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.

You can set current page in mode as thermal page by pressing **THERMAL** button. Button will become disabled which means that current page is already a thermal page.

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 task while flying is very hazardous especially in a competition. At least, it could spoil your whole day! 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 the power-on button. The main display unit and the vario 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. The flight recorder will also make a take-off baseline. Longer running on the ground will not reduce flight recorder capacity.

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.

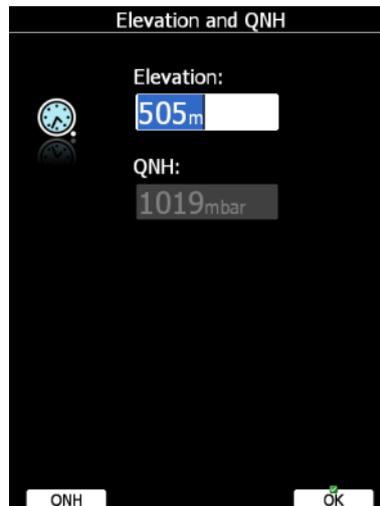
For the selected profile the pilot name, glider type, loaded waypoint files, loaded airports databases and loaded airspace databases are shown.

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 5.1.13. 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

This setting is crucial for final glide calculation: therefore pay careful attention to it.



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. This might happened on some competitions. In all other 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 Pre-flight Check

After elevation setup the system will switch to airport 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.

7.1.4.1 MacCready, Ballast, Bugs

It is recommended to check the MacCready, ballast and bugs settings to match the current glider configuration. Press the **MC/BAL** button. The dialogue for MacCready, Ballast and bugs will appear.



Use the PAGE selector knob to modify the MacCready setting. Refer to Chapter 6.2.1.1 for more details.

It is also highly recommended to check the safety altitude setting. Refer to Chapter 5.1.1 to find out how to define the safety altitude.

7.1.5 Preparing a Task

While it is advisable to prepare the task properly before taking off and thus avoid mistakes made in a haste, all the following actions, preparing, editing, loading and saving, can be done while in the air. But then, the task cannot be declared in the air.



There is only one task which can be declared. This task will be automatically declared in the IGC file on take-off. The task can also be modified during flight but any changes will not be written to the IGC file.

There are currently three methods to create a task.

- Read waypoint and task file from SD card and load a saved task.
- Load a similar task and modify it.
- Enter task manually.



It is very important to check the task prior to take-off. Check the turning points sequence, distance between points, bearings and total task distance. Visually check the task and observation zone geometry in the map view.

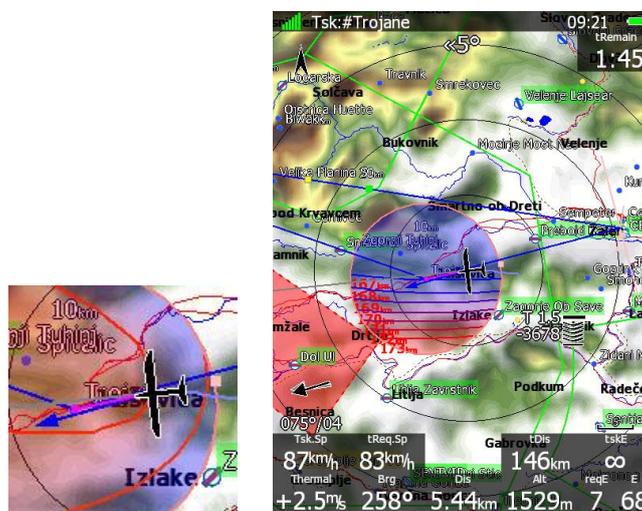
7.1.5.1 Assigned Area Tasks (AAT)

In fact an assigned area task is a speed task where the task distance is not exactly defined. The pilot has limited influence on the task geometry due to larger observation zones (assigned areas). The pilot decides how far he will fly into each individual area to reach best average task speed and not finishing the task earlier than the designated task time.

An assigned area task has the same structure as other tasks and all known methods to enter are the same as described. The only differences are larger observation zones having a specific geometry. Use the **ZONE** button (see chapter **Error! Reference source not found.**) to modify the individual observation zone.

It is also recommended to use the AAT assistant tools, such as optimal track and AAT isolines. Optimization is only shown for currently selected assigned area.

When **Show optimal track** is enabled, small blue arrow is drawn next to aircraft. This arrow indicates most optimal direction to fly.



19.07.2007

Type: Assigned area task with 4 areas

Task time: 02:30:00

Task distance: 163,5km/344,4km

Style	Code	Points	Latitude	Longitude	Dis.	Crs.
Take off		000SZEGE	N46,247500°	E020,091383°		
Start		004DOMAS	N46,252500°	E020,026950°		
1.Point		115MELYK	N46,213050°	E019,371383°	50,6km	265°
2.Point		088KISKO	N46,626383°	E019,299450°	46,3km	353°
3.Point		167SZEKU	N46,504167°	E020,542500°	96,0km	98°
4.Point		006SZATY	N46,329450°	E020,053617°	42,2km	243°
Finish		001SZEGE	N46,252783°	E020,090833°	9,0km	161°
Landing		000SZEGE	N46,247500°	E020,091383°		

Observation zone description:

Start 004DOMAS: To Next Point, Line 6,0km

[Style=To Next Point, A12=Auto, R1=3,0km, A1=45°, R2=0,0km, A2=0°, LineOnly]

1.Point 115MELYK: Cylinder R=20,0km

[Style=Symmetrical, A12=Auto, R1=20,0km, A1=180°, R2=0,0km, A2=0°, Assigned area]

2.Point 088KISKO: R=20,0km, Brg1=150°, Brg2=270°

[Style=Fixed Value, A12=30,1° R1=20,0km, A1=120°, R2=0,0km, A2=0°, Assigned area]

3.Point 167SZEKU: Rmin=10,0km, Rmax=20,0km, Brg1=100°, Brg2=180°, Cylinder R=10,0km

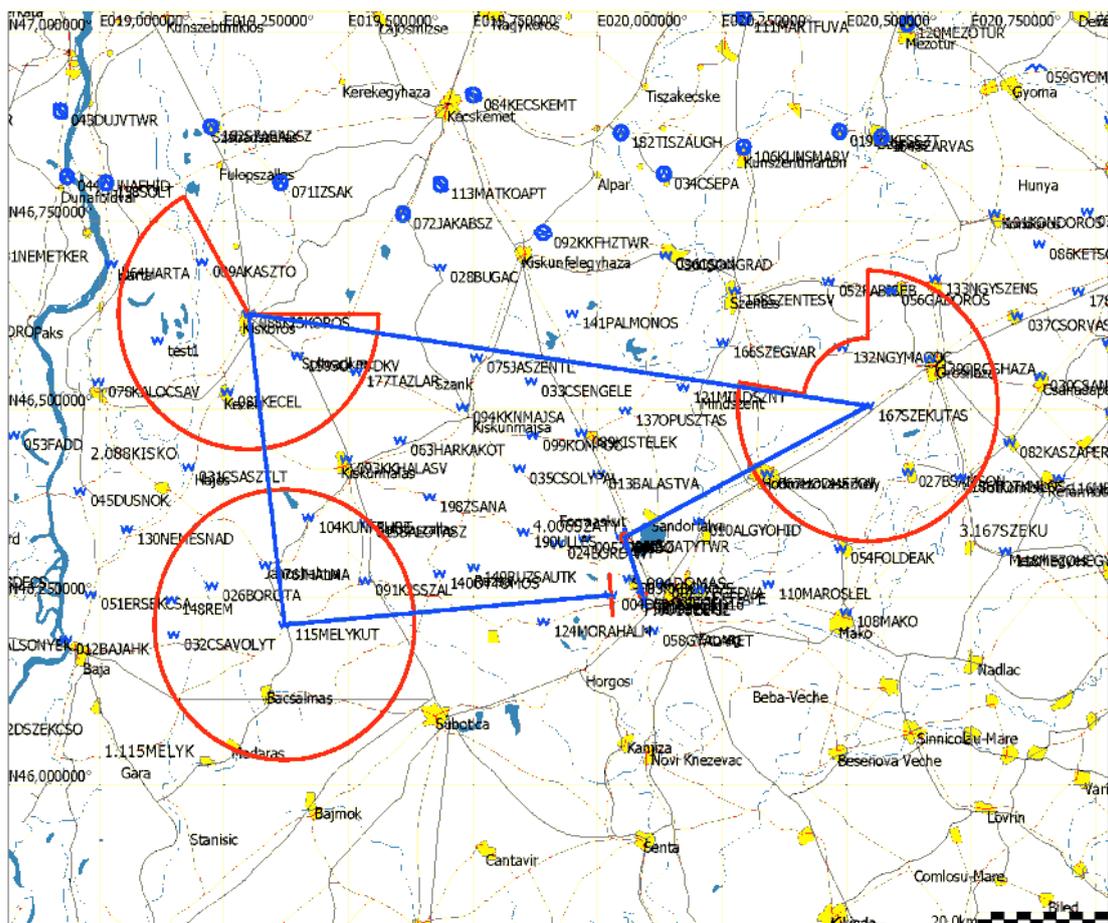
[Style=Fixed Value, A12=320° R1=20,0km, A1=140°, R2=10,0km, A2=180°, Assigned area]

4.Point 006SZATY: Cylinder R=500m

[Style=Symmetrical, A12=Auto, R1=0,5km, A1=180°, R2=0,0km, A2=0°, Assigned area]

Finish 001SZEGE: To Previous Point, Line 1000m

[Style=To Previous Point, A12=Auto, R1=0,5km, A1=45°, R2=0,0km, A2=0°, LineOnly]



Usually a task sheet with observation zone definitions matching the system observation zone definition will be given. An example of a task sheet is shown on the previous page.

However when an assigned area is defined only with two radials and two radii some calculation must be accomplished.

Let us assume an assigned area defined as:

Radial1=30°, Radial2=70°, Min.radius=50 km and Max.radius=200 km

To convert this description the following calculation must be performed:

- Direction set to FIXED.
- $\text{Angle12} = (\text{Radial2} + \text{Radial1}) / 2 + 180^\circ = 230^\circ$. Attention should be paid with northerly directions.
- $\text{Angle1} = (\text{Radial2} - \text{Radial1}) / 2 = 20^\circ$.
- $\text{Radius1} = \text{Max.radius} = 200 \text{ km}$.
- $\text{Radius2} = \text{Min.radius} = 50 \text{ km}$.

7.2 Flying a Task

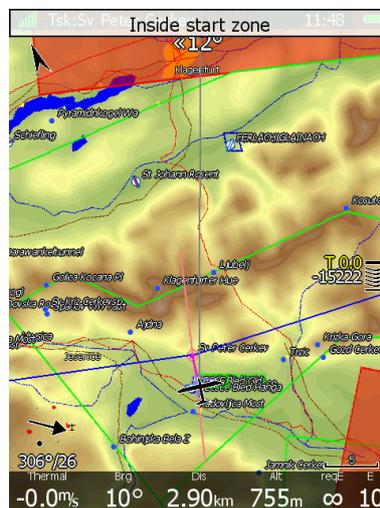
After take-off the unit will switch to flying mode. The pilot will notice this because the statistics page will change from logbook view to flight statistics.

7.2.1 Starting a Task

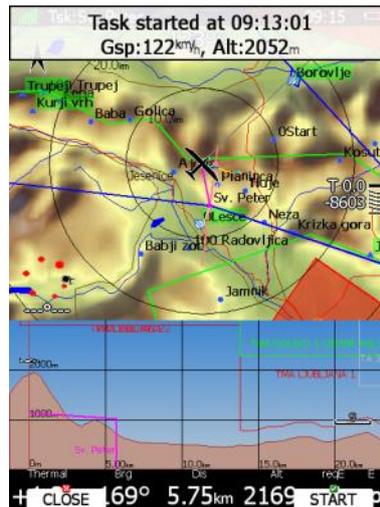
Before starting a task (in task mode) a character "S" will be displayed on the final glide symbol. This indicates that the task has not yet been started. The lower number tells you at what altitude you will start. For more advanced start options such as maximum start speed, maximum altitude and before start altitude see chapter **Error! Reference source not found..** There are two options to start a task.

START button

Once you decide to start the task and glider enters start observation zone, the message "Inside start zone" will be displayed.



You may now leave the start observation zone and fly towards the first turn point. When leaving the start observation zone the message "Task started" will be shown.

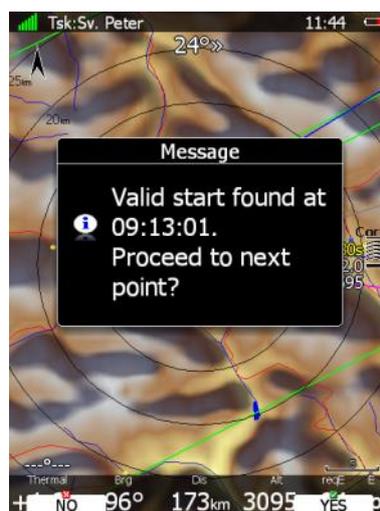


Ground speed and pressure altitude are also shown in the message. At the bottom two buttons are displayed. Use the **CLOSE** button if this was not a valid start and you want to remove the message from screen. If message is removed it will appear again next time you leave the start zone. If you press the **START** button navigation will be advanced to the first turning point.



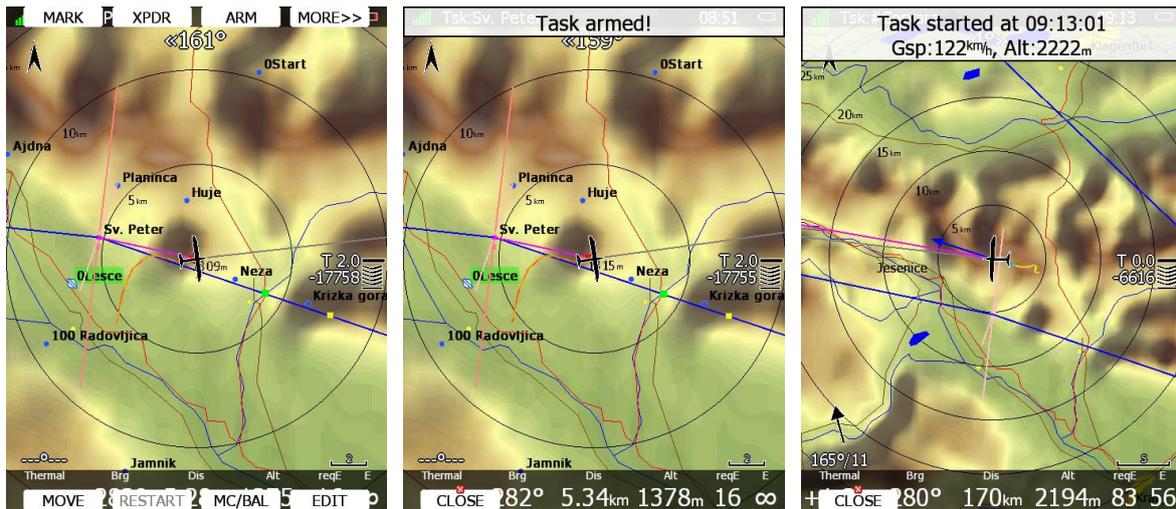
There is no need to press **START** inside the start observation zone. You may press it any time after leaving the start observation zone or crossing the start line. The system will always take the correct time as start time.

If for some reason you miss the start message you may always start the task by pressing the **START** button. Go to task mode and press any button. In the top row the **START** button is shown. Press this button and navigation will be advanced to the next turn point. In case you change the task in the air and you are already flying towards first turn point you will still be able to start a task. Press the **START** button and a message dialogue to confirm task start will be opened.



ARM button

You can enable this mode using Task Options dialog. In this mode you have to ARM start prior to start. Before crossing start line or leaving start zone, press ARM button. Message "Task armed!" will be displayed. ARM button will be changed to START button.



On next valid start, task will advance to first point automatically and message "Task started" will be displayed.

7.2.2 Restarting Task

If for some reason you decide to abandon the task and you would like to restart the task go to task mode and press any button. In top row the **RESTART** button is shown. Press it. You have to confirm restarting of the task. Once the task is restarted navigation will be changed back to start point.

7.2.3 Over Turn Point

When a turn point observation zone is reached the message "Inside zone" will be displayed and the task will auto advance to the next turn point if the **Auto next** option was selected (see Chapter **Error! Reference source not found.**).



When the **Auto next** option was not selected the message **NEXT** will be displayed. Press the associated button to advance to the next turn point. If for some reason you missed this message you can always advance the task to the next turn point by pressing the **NEXT** button. Go to task mode. In the upper row the **NEXT** button is shown. Press this button and navigation will be advanced to next turn point.

In case you did not reach turn point and you wish to continue navigation towards the next point anyway press the **NEXT** button.



A message will appear. If you confirm this with **YES** the task will be advanced to the next turn point and it will recalculate the task taking the optimal fix as the task point.

7.2.4 Entering Assigned Area

Most probably when entering an assigned area auto advance is going to be turned off. The message "Inside zone" will be shown and buttons **CLOSE** and **NEXT** will appear in the lower row. Pressing the **CLOSE** button will dismiss the inside zone message. The task will be auto advanced to the next point when leaving the assigned area. If you want to auto advance to the next turn point earlier you may always press the **NEXT** button in task mode (see 7.2.3).

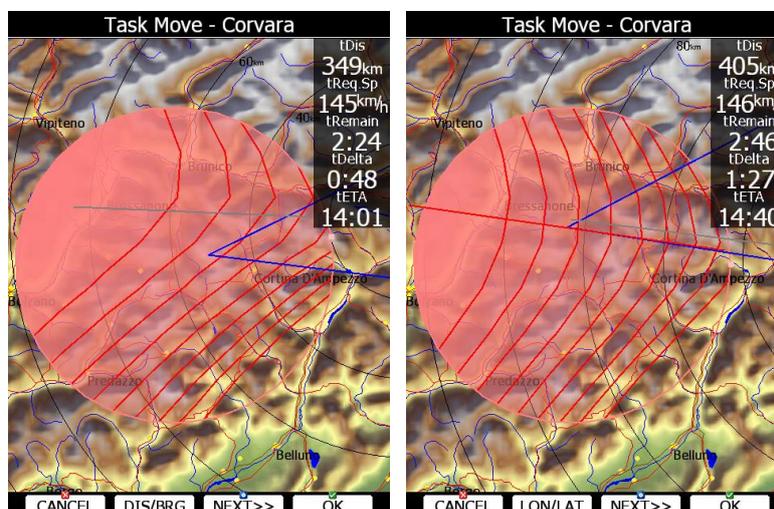
If **NEXT** is pressed the task is advanced to the next turn point.



When flying in an assigned area it is NOT important when you will advance to next turn point. The system is always taking into account the most optimal fix inside the assigned area for the total distance calculation.

7.2.5 Moving Point Inside Assigned Area

If at least one observation zone is defined as an assigned area, it is possible to move the point within this area. Moving the point will increase or decrease the total task length. Select the **MOVE** action within task mode. A dialogue with the current assigned area will be shown.



In the upper-right corner the remaining task distance is shown as well as the required task speed, remaining task time, delta time and estimated time of arrival.

Delta time is the difference between the remaining time and time of arrival. If it is negative you will arrive back too soon and if it is positive you will arrive too late.

Keep in mind that the time of arrival can be calculated using different methods which are found in the QNH and RES setup (see Chapter 5.1.1).

A point is moved using the lower two knobs.

Press the **DIS/BRG** or **LON/LAT** button to toggle between the two methods of moving the point.

When the **DIS/BRG** button is shown the point is moved in the x, y directions. Use the PAGE selector knob to move the point in north/south direction or rotate the ZOOM selector knob to move the point in east/west direction.

If the **LON/LAT** button is shown the point is moved in radial and azimuth direction. Radial direction is indicated with red line going through whole sector. Rotate the PAGE selector knob (page selector) to move the point in the radial direction from the area centre.

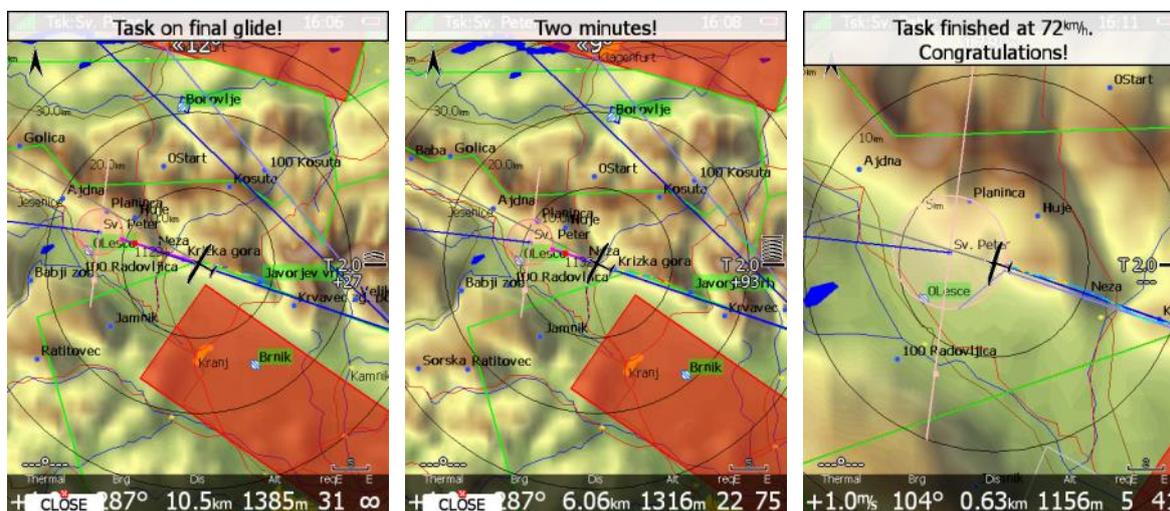
Use the ZOOM selector knob (zoom) to move point in the axial direction.

If more than one assigned area is set for a task the **NEXT>>** button is shown in the lower line. Press this button if you would like to move point into another assigned area.

When moving task point to which you are navigating and AAT optimization is enabled (See chapter 5.1.6.7) additional lines will be shown in zone. Line represents equal task speed, therefore pilot should fly always perpendicular to this lines in order to maximize performance.

7.2.6 Task Finish

When reaching final glide, a message task on final glide will be displayed. The main display unit will also warn you, when you are two minutes to finish. On entering the finish zone the task stops automatically and a message will be displayed.



If you want to fly a new task without landing, load the new task and press the **RESTART** button.



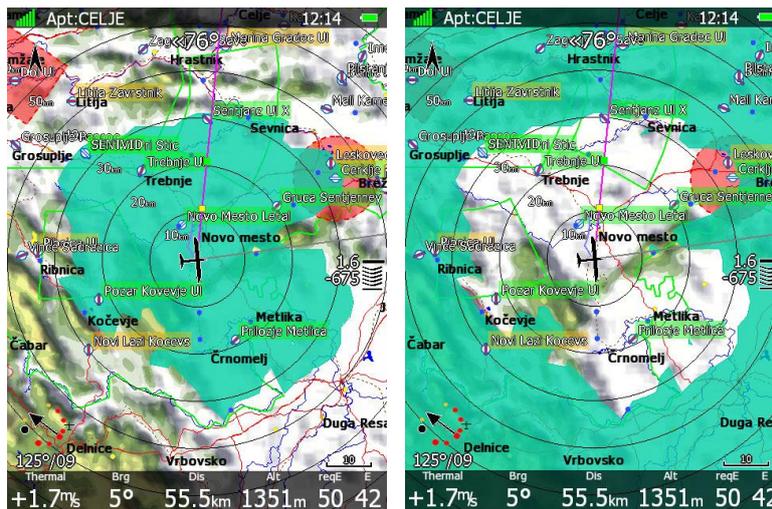
The **Navigate to nearest point** option is very useful and actually a must if a finish cylinder is used with significantly large radius. Enabling this option will calculate the final glide to the edge of the cylinder rather than to the centre of the cylinder.

7.2.7 Graphical Final Glide assistants

There are few graphical final glide assistants available:

- Glider range (outside/inside fill)
- Different colours of APTs in near mode list
- Different colours of APTs on the map
- Square symbols

Glider range can be filled outside or inside. Different fill type, colour and opacity can be set at 5.1.6.4 chapter.



In Near mode arrival altitude is coloured in white, yellow and red. White final glide shows APT in range at current MC setting. Yellow final glide shows reachable airports if you decrease your MC to zero. Red colour means these APTs cannot be reached. The same colour logic is used for the APTs appearance on the map.

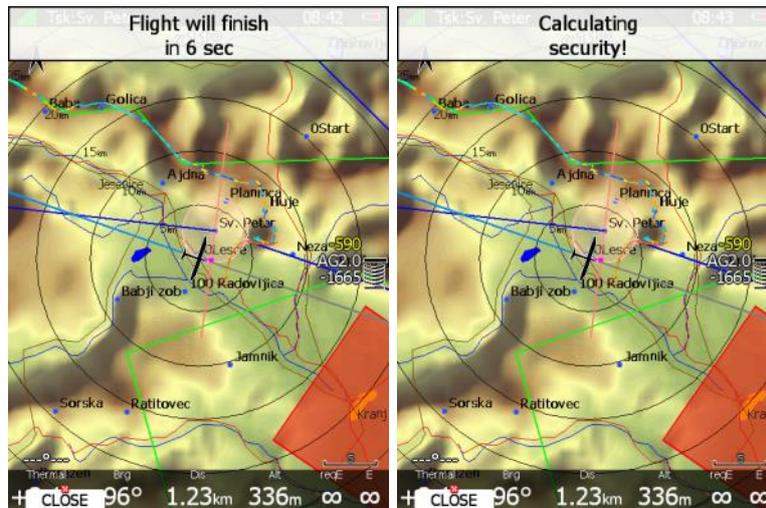
Near			
Name	Dis.	Brg	Arr
Novo Mesto Letal	8.00km	336°	549m
Prilozje Metlica	18.8km	154°	-158m
Gruca Sentjerney	20.3km	55°	-205m
Trebnje UI	22.1km	328°	-333m
Pozar Kovevje UI	22.5km	247°	-591m
Novi Lazi Kocevsi	29.8km	230°	-1109m
Sentjanz UI X	29.8km	4°	-856m
Sentvid Pri Stic	32.5km	313°	-950m
SENTVID	32.5km	313°	-953m
Ribnica UI	33.7km	273°	-1216m
Cerklje Mil	33.9km	59°	-1000m
Leskovec UI	34.8km	54°	-1097m
Vince Sadrazica	36.9km	271°	-1410m
Mihalo Dobova	41.8km	66°	-1469m
Mali Kamen Topol	42.0km	40°	-1589m
Litija Zavrstnik	42.6km	322°	-1476m

Yellow square indicates final glide at MC 0. Once you reach the **green square** LX will give you a message "Task on final glide" with current MC setting.



7.3 Procedure after Landing

IGC Regulations require a straight line (base line) in the barogram at the beginning and end of the flight. For this reason that it is essential **not to switch the unit OFF** immediately after landing, but to wait a few minutes. First the message *"Flight will finish in 10 seconds"* will appear and then the message *"Calculating security!"*



The flight is finished when the message Calculating security disappears. At that moment the statistics page will be changed back to logbook view. Now it is safe to switch off the instrument.

If a SD card or USB stick is currently inserted into the main display unit the flight will automatically be copied to it.

Please use regular methods to power down the system. See Chapter 4.4 for details.



It is important that the system is switched off via software. Never power down the system using the main power switch. The main display unit is running the Linux operating system and sudden power loss may corrupt the file system.

8 Firmware Update

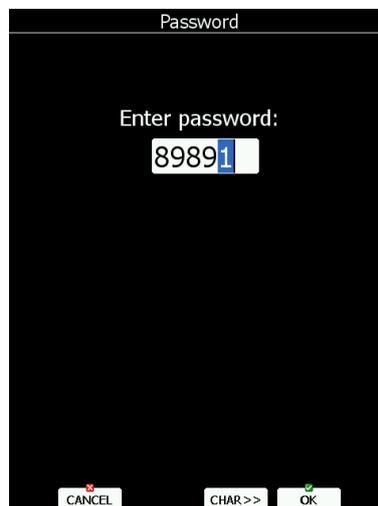
Firmware updates of the main display unit, vario unit or vario indicator can be easily carried out using the SD Card/USB key. Please visit our webpage www.lxnav.com and send us a request for the firmware update.

Update can be also done through Wi-Fi (if internet connection is established and Wi-fi module is enabled on the LX system).

You can also subscribe to a newsletter to receive news about the system automatically.

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 **.lx8000**, **.lx8080**, **.lx9000**, **.lx9050** or **.lx9070** 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.

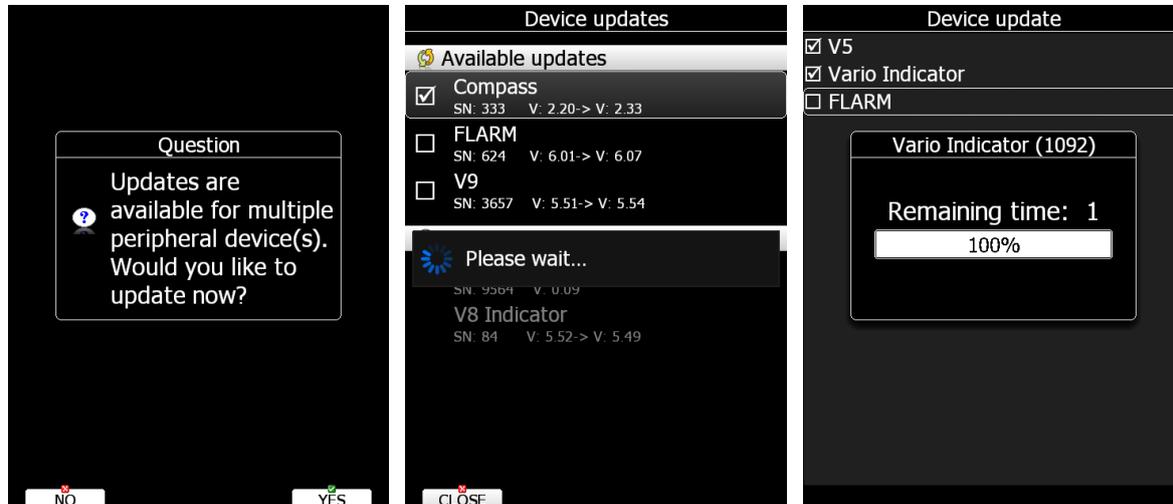
Enter the update code which was sent to you.





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.

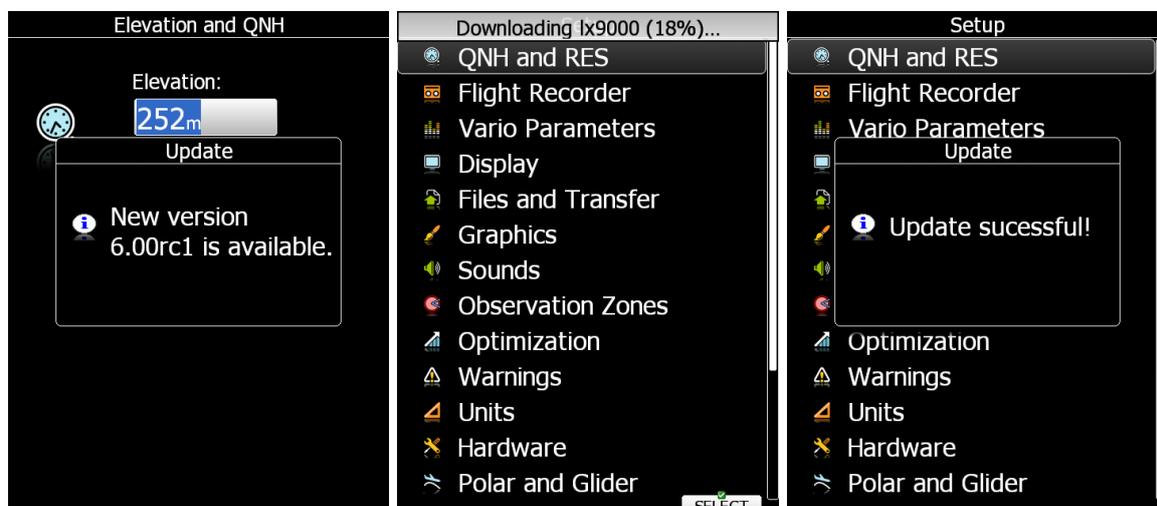


On first run main display unit will also update all devices connected to 485 bus. This update will take approximately five minutes on average.

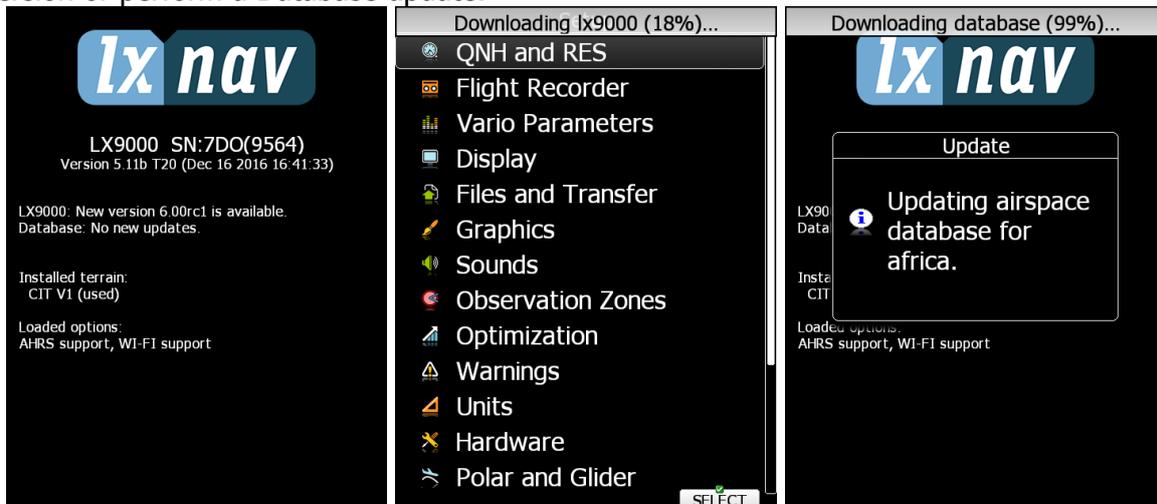
8.1.1 Updating via Wi-fi Module

With the SW version 6.0, it is also possible to make an update without the SD card or USB stick. Once the internet connection is established, system will automatically give you a notification that there is a new update available. User has 3 options available **update** – which will perform the update, **ignore** – this message will be ignored and it won't be shown anymore for this version and **later** option – which will notify you each time after restart.

Update button will download the version, make an update and give a message "update successful", after that the system will perform a restart. User will also be asked to make an update of peripheral devices. We suggest you to confirm it and update all devices.



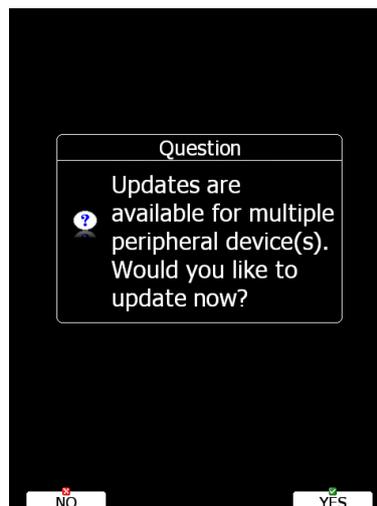
Update is also possible at SETUP->ABOUT page, where is the button UPDATE (button is grey if there are no new Updates available). User can update the LX system with the SW version or perform a Database update.



8.2 Updating Vario unit or Vario indicator

8.2.1 Automatic vario update

Once you update the main device, after the reboot you get the following message/question:



It is advised to select YES and update the vario unit (V8/V80).

All detected devices will be listed, including 2 vario parts:

- Sensor box (Automatic method)
- V8/V80 indicator (Manual method)

Select both and press UPDATE. Sensor box will be automatically updated in less than a minute. After that a manual update of the V8/V80 is needed. Please follow instructions displayed on the LX80/90xx.

Instructions are:

- You will be asked to prepare the micro SD card adapter, press OK
- Then you will be asked to take the micro SD card from the V8/V80 and insert it into LX80/90xx by using the SD card adapter (If your card inserted in the LX80/90xx

already consists from the SD card adapter and the micro SD card, then you can simply ignore this message), press OK.

- Copying of the firmware will be performed
- When you get a message with action, please take the micro SD card from the LX80/90xx and insert into the V8/V80
- V8/V80 will detect the micro SD card and will automatically ask you: UPDATE?... confirm it with the middle button on the V8/80 which will perform a restart and a SW update.
- Once the update is successfully booted, you can check your latest version in the SETUP->ABOUT menu in the V8/V80 vario unit.
- On the LX80/90xx you can terminate the message by clicking the OK button.



A micro SD card adapter is needed for a manual V8/V80 update.

8.2.2 Manual vario update

Download the vario file from www.lxnav.com and put it on the sd card.

Start the system, insert the SD card 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.

Select appropriate update file and wait until update will finish.

8.2.3 Manual V8/V80/I8/80 update

Download the file from the website, rename it to zip extension and unzipp the file.

Unzipped folder should contain 3 files:

- App_NINE_X.YY.lxfw
- V8x.fw
- V8x_init.bin

If some of these files are missing or are corrupt, the firmware update will not be successful. Transfer the firmware update files to the micro SD card and insert it into the V/I8x. The unit will ask you UPDATE? Confirm and reboot the S8x unit. The update will be performed automatically.

9 IGC Barograph Recalibration Procedure

The main display unit has an additional pressure sensor for altitude recording. To comply with IGC procedures this sensor has no external pneumatic connection. To carry out the barograph calibration procedure it is necessary to remove the instrument from the glider and place it in a vacuum chamber. The procedure is as follows:

- Switch the instrument ON and wait some minutes (straight line on the barogram beginning).
- Set the recording interval to 1 second (see Chapter 5.1.2).
- Place it in the chamber and carry out a short climb to about 100 m (to start the flight recorder).
- Bring the chamber pressure to exactly 1013.2 hPa.
- Decrease the pressure by 1000 m and hold for about 30 seconds.
- Continue the procedure to 9000 m.
- Increase the pressure in 1000 m steps back to 1013.2 hPa.
- After reaching ground wait about 3 minutes and then switch the instrument off.
- Leave the instrument off for at least 5 minutes.
- Download the last flight and print the barogram.
- Restore the flight recorder settings.

The barogram will be the last flight in the logbook.

10 Options

10.1 Flarm



Before using Flarm it is highly recommended to read the Flarm user manual which can be downloaded from www.flarm.com. Respect all limitations listed in this document.

Flarm is a collision avoidance system developed by Flarm Technologies from Switzerland. The Flarm module consists of following main parts: GPS receiver, microcontroller unit, radio transceiver pressure altimeter and optional an external indicator. All electronic parts are integrated into the main display unit cabinet. An exception is the radio communication antenna and the Flarm External Display. Some input is possible via the external display.



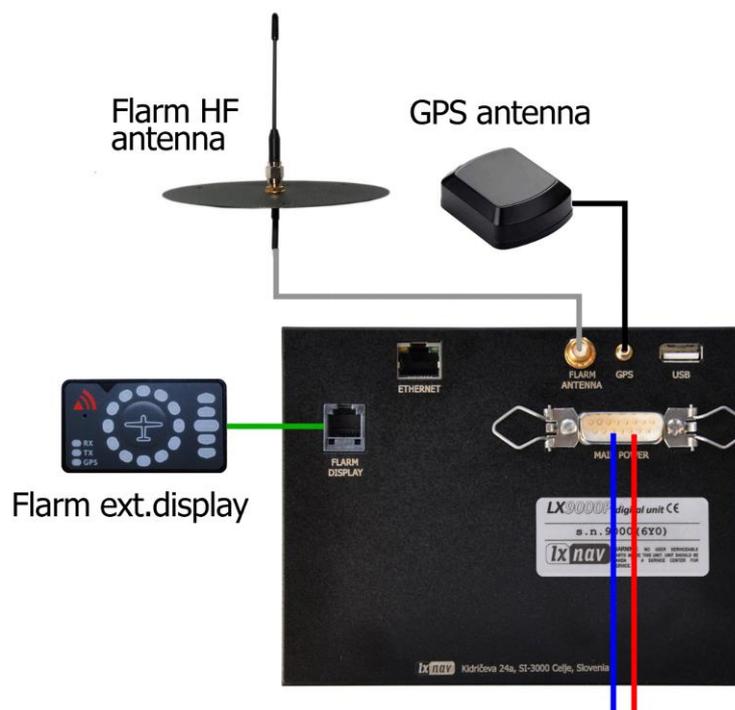
In case, that unit has no built Flarm, external Flarm connection is possible using LX5flarm or LX5PF cable for power Flarm.

10.1.1 Installation



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

The position of the radio communication antenna is extremely important as a bad installation will reduce the system range dramatically. It is highly recommended to install the antenna on the top of the instrument panel with a suitable aluminium round plate having a diameter of about 12 cm used as a back plane and an approximately 10 cm long rubber antenna used as the radiator. The metal plate may be mounted outside or inside of the instrument panel. If carbon is used, use only the top mounting variant.





The antenna position must be mounted as vertical as possible. Use only the original antenna which is always delivered with the unit. Use the original cable to connect the main display unit to the antenna. Never use an antenna without the original aluminium ground plane. If there is no space to install the metal ground plane a dipole variant of the antenna is available. The picture shows the connected GROUND PLANE antenna. With the system a DIPOLE antenna is included which has an even better performance than a ground plane antenna.

The Flarm external display is a small unit and can be placed anywhere on the instrument panel. To fix the device, use self-adhesive tape on the back of the device. For position on the top of the instrument panel a suitable box is available.

10.1.2 Flarm Update Procedure

The Flarm is updated via the SD card/USB key. From the Flarm webpage (www.flarm.com) download the appropriate file and copy to the SD card (e.g. flarm_407.fw). Enter password **89891** and select the Flarm update file. Wait until it is completed.



In case of a problem it is still possible to perform an update using FLARMtool and the serial connection. Please refer to an older LX8000 manual for the detailed procedure.

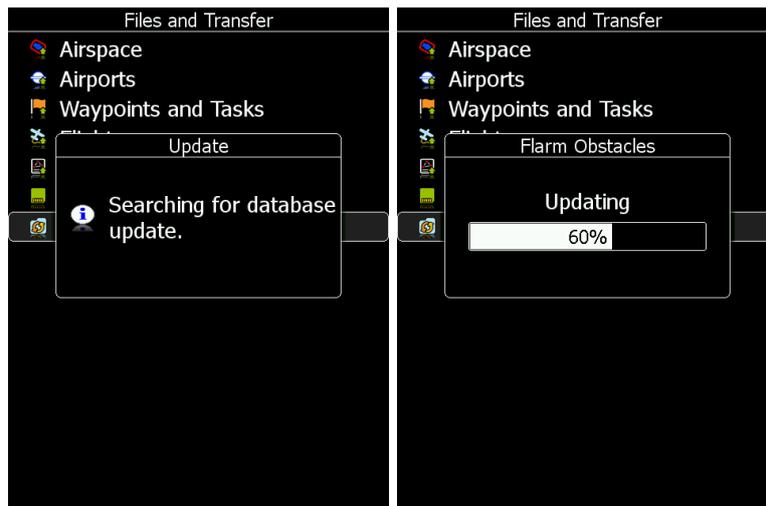


External Flarm modules can be also updated via LX system. PowerFlarm modules cannot be updated through LX systems.

10.1.3 Uploading Obstacles

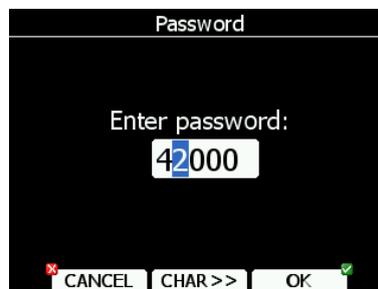
Obstacles are updated via the SD card/USB key too. Since version 6.0 obstacles are not free of charge and they are not preloaded on system. In order to purchase obstacle database, please write down FLARM serial number. Flarm serial number can be found in Flarm setup dialog (See chapter 5.1.11.7). Go to the Flarm webpage to get obstacle file and copy it to the SD card.

In the **Files and Transfer** menu select the **Update Databases** menu item. Select the obstacle file and wait until the update completes.

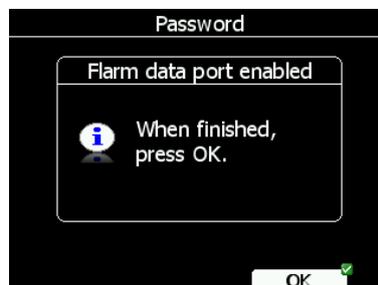


10.1.4 Flarm update procedure with FLARMtool from PC

Go into password menu and enter password 42000.



Following message will appear.



Run Flarm tool and select communication port.



Connect main display unit to your PC with LX5PC cable. In the same time Flarm tool will detect Flarm. Please follow the instructions.



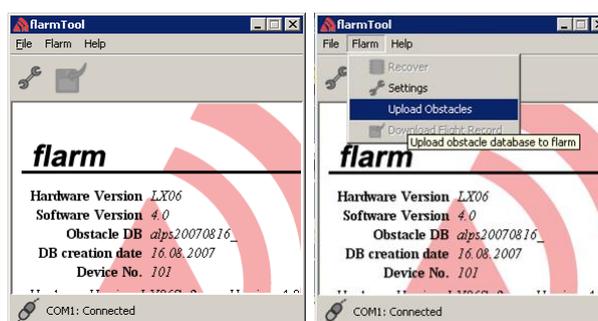
In case that Flarm stops working and update is not possible over described procedure with password 42000, use following recover procedure. In Flarm tool choose Recover and follow instructions. On LX8000 enter password 41000

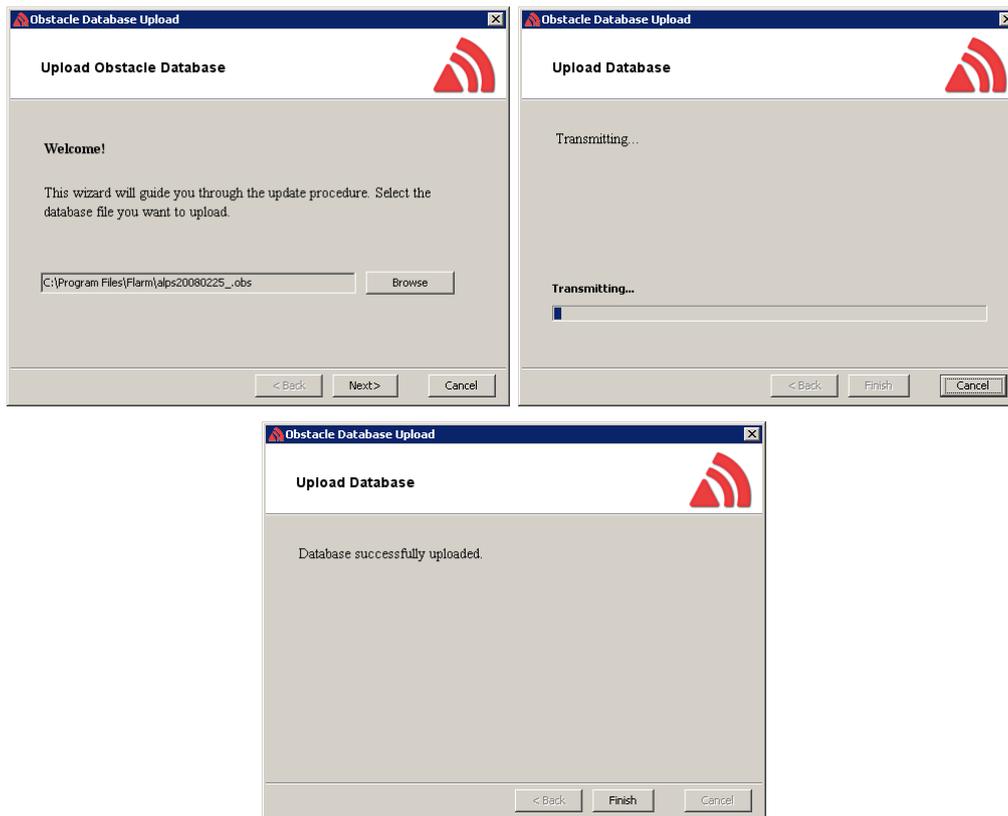


When recover is finished press OK button.

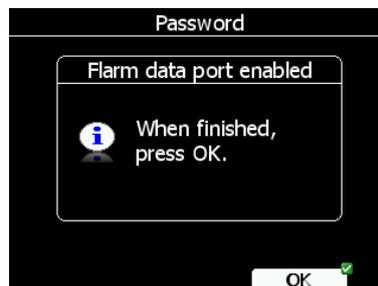
10.1.5 Uploading obstacles with FlarmTool from PC

Go into password menu and enter password 42000. Run Flarmtool and select communication port. Connect LX8000 via PC cable with your PC





When finished, press OK button on LX8000.



10.1.6 Uploading FlarmNet Files

The FlarmNet information is also updated via the SD card/USB key. Go to the FlarmNet site (www.flarmnet.org), select the **Download latest FlarmNet File** tab and download the file for the LX8000 (e.g. 20091208.fln). Copy this file to the SD card.

In the **Files and Transfer** menu select the **Update Databases** menu item. Select the FlarmNet file and wait until the update completes.

10.2 External Flarm or Power Flarm

If main display unit has no internal Flarm, user has a possibility to connect to it external Flarm or Power Flarm. All Flarm/Power Flarm items will be displayed on the navigation map, with same functionality as is with built-in Flarm.

The external Flarm/Power Flarm can be connected to the main display unit with a **LX5FLARM** cable.

On the main display unit side LX5FLARM is connected to a 5 pin rounded connector. On the other end of the LX5FLARM cable is a 6 pin standard IGC RJ12 plug connector which is plugged into the Flarm/Power Flarm port.

In case of a SIMPLE version, the Flarm should be connected to the GPS port.

External Flarm connection can be enabled at SETUP->HARDWARE->FLARM->PORT. Port should be set to EXT.(PC).

10.2.1 Installation



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

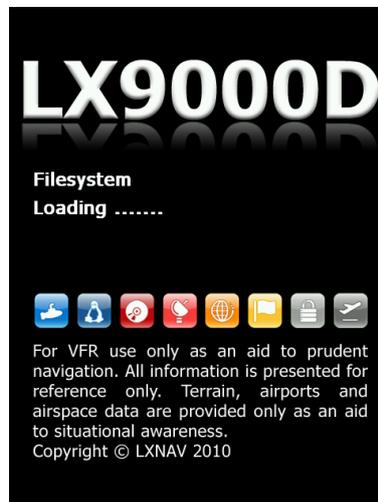
External Flarm/Power Flarm can be connected to the main display unit with **LX5FLARM** cable.

On main display unit side LX5FLARM is connected to 5 pin rounded connector. On the other side of LX5FLARM cable is 6 pin standard IGC RJ12 plug connector, which is plugged into Flarm/Power Flarm port.



Using improper type of cable may harm your display unit or Flarm/Power Flarm units.

10.3 Rear Seat Device



In two-seat gliders it is possible to install the rear seat device. The rear seat device looks almost identical to the main display unit. However inside the device there is no GPS or Flarm module. The rear seat device must be connected only to the main display unit via the RS485 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.

10.3.1 Data Exchange

Because the GPS and Flarm modules are not integrated in the rear seat device this data is received from the main display unit through RS485 bus.

After power on, the main display unit also sends polar data and pilot information to have them synchronised in both devices.

The user can define which data will be automatically synchronised between the devices.



Waypoint and task databases are not synchronised between the devices. In order to have databases synchronised, you have to use the SD card and copy files from the rear to front device or vice versa. See Chapter 5.1.5.4 for how to copy waypoint files.

To set up data which is going to be received from the rear seat device, enter the "Rear seat device" menu on Main display unit (see Chapter 5.1.11.9).

To define which data is going to be received from the main display unit go to "Front seat device" menu (see Chapter 5.1.11.9).

Data is divided into two groups; flight parameters and navigational data. If a specific value is checked this value will be automatically be received from the other device.

Check **MacCready**, **Ballast** and/or **Bugs** to receive the current MacCready value, current ballast setting or bugs from the other device.

If **Waypoint** is checked a new waypoint target will be automatically assigned when the user changes the waypoint target on the other device. A message "*Waypoint target received*" will be shown on the screen and you will be navigating to the same waypoint as other device. Please note that it is not necessary to have this waypoint in your databases as the complete waypoint information is sent. If **Waypoint** is not checked it is still possible to send a target to other device using the **SEND** action in waypoint mode. The same applies to the **Airport** checkbox. The message "*Airport target received*" is displayed. If the **Task** checkbox is checked the task will be synchronised with the other device.



When flying an assigned area task it is worth having **Task** unchecked. This will allow one pilot to play with "what if" scenarios. Once a proper direction is found you can send the task to the other device using the **SEND** action in task mode.

10.4 Remote Control

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

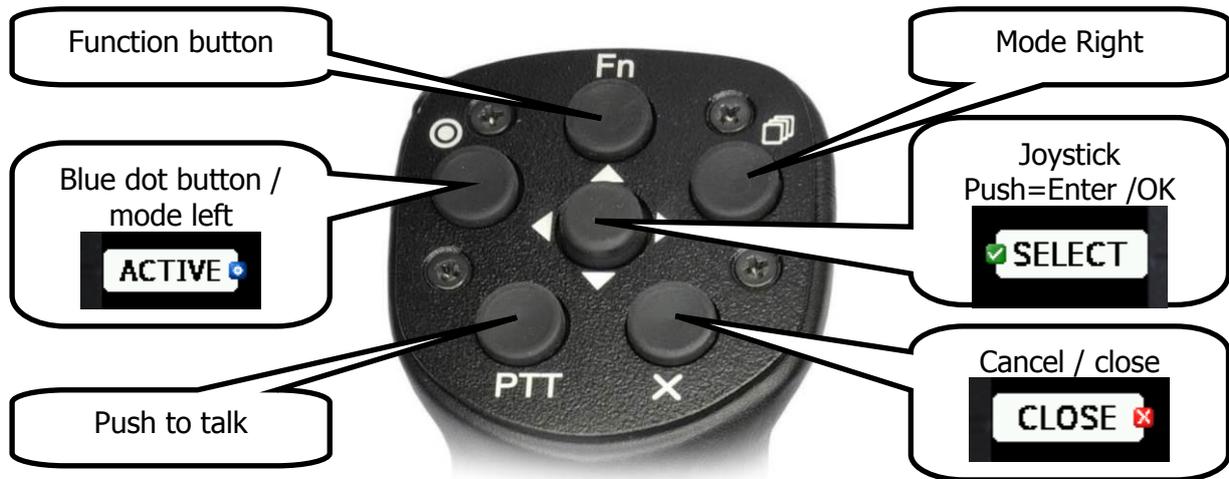


The stick is available also in various diameters: 18 mm, 19.3 mm, 20.3 mm, 24.4 mm and 25.4 mm. All necessary electronics is built into the top of the stick. The four coloured wires from the bottom must be connected to RS485 splitter. Additionally two shielded cables are used for speed to fly command and push to talk button (not valid for remote sticks delivered after 2016.)



Remote sticks produced after 2016 come without the SC and VP cables, they are programmable in the LX80/90xx menu.

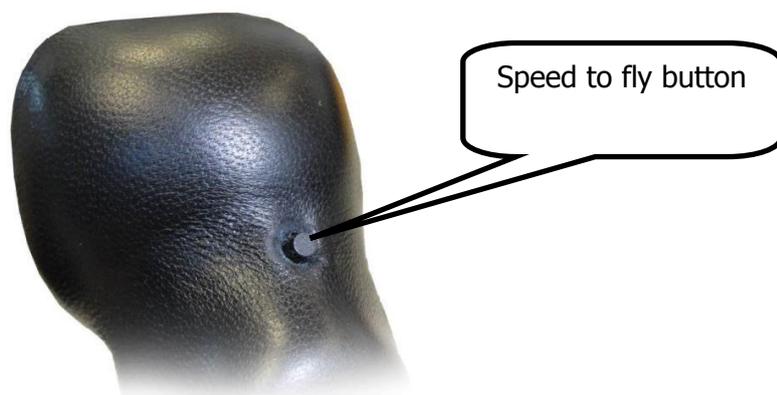
10.4.1 Functions



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 5.1.11.10).



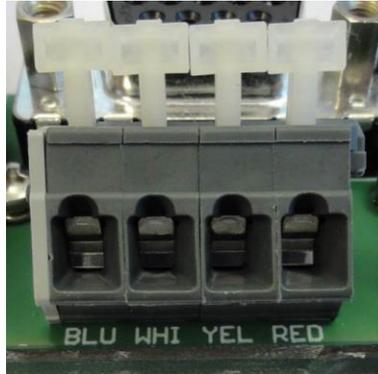
On the front side of remote stick there is speed to fly button.

10.4.2 Installation



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

Remote stick is connected to RS485 bus through RS485 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 and SC wire is connected to Speed to fly input of vario unit.



Do not forget to set the speed command input setting to TASTER (see Chapter 5.1.11.1).



After installation there is no special setting required on main display unit as the remote stick will be automatically detected.

10.5 Compass

Compass module must be connected to RS485 bus. It must be installed to the place where is no strong magnetic fields (Irons or ferromagnetic materials), cables with AC current or not constant DC currents.



When installing magnetic compass use screws made of non-ferromagnetic materials (plastic or brass)



Orientation of compass module marked on housing as on picture above.



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

10.6 Flap sensor®

The flap encoder is connected to the system via the RS485 bus. It is physically mounted near the flap mechanism. The flap encoder is very sensitive and accurate and can detect very small movements.



Please refer to flap sensor manual for details about installation. For configuration on the main display unit see Chapter 5.1.11.14.



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

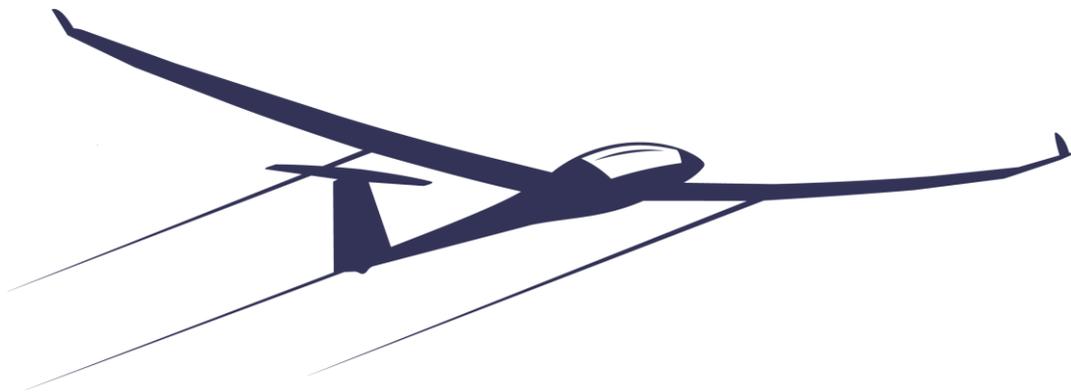
10.7 Secondary Vario Indicators

An unlimited number of secondary vario indicators can be connected to the system bus. RS485 splitting units should be used to extend the bus capacity. The functionality of secondary units depends on settings made in setup (see chapter 5.1.11.1.3).

Each unit has two female nine-pin connectors on the back side. Both connectors are 100% pin to pin compatible and it doesn't matter which will be used. Any other RS485 bus operated unit can be any time connected to a free connector port of the vario indicator.

11 Revision History

September 2010	Initial release of owner manual based on LX9000 manual version 2.3
April 2011	Corrections to English language text. V5 vario unit
September 2011	Updates for firmware version 2.6. Added AHRS section.
February 2014	Updates for firmware version 4.0.
December 2014	Added chapters for LX9050 simple
June 2015	Installation part of manual moved to separate document. Merged document with LX80xx manual. Updates for firmware version 5.0.
January 2015	Added chapter 6.2.2
January 2017	Reviewed/updated chapters: 5.1.2, 5.1.5, 5.1.9.3, 5.1.11.1.4.1, 5.1.11.6, 5.1.11.11, 5.1.17, 5.4.1, 5.1.6.5, 6.2.1.9, 6.3.25 New features/updated chapters: 1.1.1.1.1, 5.1.5.12, 5.1.6.1, 5.1.6.7, 5.1.6.9, 5.1.6.10, 5.1.9.5, 5.1.9.6, 5.7.5.1.1, 6.2.1.13, 6.3.1.1, 6.3.3, 6.3.4.1, 6.3.26, 7.2.7, 8.1.1
March 2017	New chapter 1.1.1.1.1
April 2017	Reviewed/updated chapters: 5.1.11.10, 8.2, 5.1.6.1, 5.1.11.4, 5.1.13
May 2017	Reviewed/updated chapters: 5.1.11.4.1, 5.1.11.4, 2.1.3, 2.1.4 5.1.11.1.4.2
June 2017	8.2.3



The Pilot's Choice

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