

LX Zeus

# LX Zeus 4.3 Users manual (Preliminary)







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# 1 System description

The system consists of minimum two units one of them is gliding computer and another unit is a 57 mm vario. As an option is available also 80 mm vario unit. Gliding computer has a sunshine readable 5.5 inch colour display and a high power Linux running computing device. Vario unit is a stand alone unit which electronics is based on high precision digital sensor transducers. Connection between vario and computer unit is via LX system bus. System extensions (second seat unit, remote control, compass ....) are also possible after using of LX system bus solution. All connections are plug and play that means no exacting works which needs specialists.

The manual for LX Zeus and for LX Zeus 4.3 is the same as the units uses the same software. Hardware is also nearly the same.

#### LX Zeus 4.3 highlights:

- layout: 82x103 mm
- graphic colour display (400x800 pixels)
- the same operation philosophy as LX Zeus

Note! Pictures used in this manual may slightly differ from the LX Zeus original screens.



#### **1.1 Hardware concept**

The system is designed to offer flexible solutions of system configurations, so the pilot is able to provide some kind of custom design. At the back side of the unit there are plenty of connectors which makes possible to connect (plug and play) a bright palette of GPS signal sources, as the unit doesn't have integral GPS receiver. Units as Colibri, LX 20, VL and any other GPS source which is capable to deliver NMEA at nearly any baud rate, are compatible.

A special plug is provided for **Colibri II** connection in that case is Colibri II also powered from Zeus. Using of Colibri II offers some important benefits for the pilot. The benefits are:

- automatic switch on of Colibri II as Zeus becomes power
- automatic power off after Zeus will be switched off and the system isn't in flying mode, if flight status is detected Colibri II will go on with its own battery
- downloading of flights via Zeus USB stick

When two GPS sources are connected at the same time, both signals are combined and loosing one of GPS source will not degrade system availability.

Colibri II is used as an IGC flight recorder in case of an IGC approved solution. In that case a high level of communication is established between Colibri II and Zeus and the pilot is able to operate the system, the same way as by integral Flight recorder.

The unit can operate in **portrait** and also in **landscape** orientation. Conversion from portrait and vice versa is simple and could be done by pilot.







#### Commercially available versions:

- LX Zeus IGC: package consists of LX Zeus Computer, Colibri II flight recorder and USB D 60 vario unit
- LX Zeus Flarm: LX Zeus computer with Flarm unit and USB D 60 (IGC Flarm optionally)
- LX Zeus Flarm IGC: Zeus Computer, Flarm Colibri II and USB D
- LX Zeus: Zeus Computer and USB 60
- •

#### 1.1.1 Rotary switches and push buttons

There are **8 push** buttons and **two rotary** switches provided on the front of the unit. Every rotary switch has also a push function. On one side there are five push buttons which are all double occupied and on the another side there are three push buttons. Short and long press can be used. Buttons are labeled and this makes unit manipulation very easy. Both rotary switches are multifunctional as follows:

#### **Default functions:**

audio volume adjustment function <sup>-</sup>
zoom selector \_\_\_\_\_\_

In edit:

- zoom: scrolling and press confirmation
- volume: bigger steps of scrolling and escape/cancel by pressing

#### 1.1.2 USB and SD port

An A size USB port is situated on the front panel. The port is exclusively used for data transfer and firmware updates. The firmware updates could be easily done also by customer. SD port is active only in case of Flarm option. This ensures direct communication with Flarm which means downloading of flights stored in Flarm), uploading of declaration and also Flarm update.

#### 1.1.3 Connections

At the back side of the unit there are following connectors:

- 4x 485 system bus\*
- 2x CAN bus\*\*
- Colibri II port (5V and data)\*\*\*
- Flarm port (12 V power and data)\*\*\*\*
- 2x Flarm display outputs
- 1x Flarm SD
- 1x OAT plug to connect OAT sensor

\* 485 connects LX Zeus to:

- USB D 60 Vario unit
- Remote control stick
- secondary vario indicators
- compass

\*\* CAN bus:

connects Second seat unit

\*\*\* Colibri II port:

 makes possible to arrange direct connection of LX Zeus to Colibri II only via cable (special cable necessary)

\*\*\*\* Flarm port can be also used to connect any GPS source which has an IGC standard connector.





For instance: Colibri LX 20, VL... If flarm is connected, two Flarm displays can be connected to the system after using of Displ 1 and Displ 2 plugs. SD plug connects SD card slot which is on the front panel with Flarm.

## 1.2 Software

SW package is completely developed by LX Navigation and is running under Linux operation system. The operation remained well known LX Navigation philosophy, but some new approaches have been involved. The SW is continuously developed and upgrades are regularly published. Upgrades of SW can be easily done by user without any passwords.

# 1.3 Technical data

navigation

Computer module:

- 5,5 inch sunshine readable anti glare display
- power requirements: typically 400 mA at 12 V (may vary regarding to backlight intensity)
- layout: max 106x146 mm, installation depth 52 mm, without Flarm
- 8 push buttons
- 2 rotary switches with press function
- USB size A port

#### •

- Computer module Zeus 4.3:
  4.3 inch sunshine readable anti glare display
  - power requirements: typically 300 mA at 12 V
  - layout: max 83x136 mm, installation depth 52 mm
  - 8 push buttons
  - 2 rotary switches with press function
  - USB size A port
  - •

#### Vario Module (USB D 60):

- 57 mm air norm (60x60 mm)
- optionally 80 mm
- mechanical needle with colour display
- power consumption: 120 mA at 12 V
- 485 bus compatible unit

# 1.4 Operation and controls

8 push buttons and two rotary switches are used as unit controls. LX Navigation Remote stick can be also used to control the unit.

Push buttons are divided into two groups. Group of 5 buttons situated near rotary switches are meant for system inputs. All five buttons support two functions; all depends on press, if long or short. Short press activate above labeled function and long press (apr. 2 seconds) activates secondary function. Next 3 push buttons are used during navigation to switch between navigation modes. Those 3 push buttons don't support long press.





#### 1.4.1 System push buttons (5)





#### 1<sup>st</sup> button (VARIO/FLARM)

- VARIO (short press): input of MC, Ballast and Bugs
- FLARM (long press): activation of Flarm radar screen



#### 2<sup>nd</sup> button (TSK/MOVE)

- TSK . task management, for next actions use press buttons near to the labels
- MOVE : executing of move function by AAT



#### 3<sup>rd</sup> button (STAT/EVENT)

- STATISTICS: flight and task statistics
- EVENT: activation of Event function in Colibri II See also part 8 (Flying with LX Zeus)





#### 4<sup>th</sup> button (SELECT/NEAR)

- SELECT: selection of APT, TP and TSK
- NEAR : activation of near function (Airport...)



#### 5<sup>th</sup> button (SETUP/INFO)

- SETUP: direct access to Setup menu
- INFO. information about system configuration





• 2<sup>nd</sup> sub page is in general 3D terrain display

A-P-T SUBP 3-4 AHRS



#### 3<sup>rd</sup> button (1- 4)

1-4: LX Zeus uses bottom row for nav boxes presentation. Up to 4 variants are fully custom programmable and selectable by 1-4 push button.
Bottom row configuration is a matter of custom design,

more see in **Setup Layout**. Actual bottom row variant Is shown by a number (1-4) which position is in the right lover corner.





#### 1.4.2.1 Custom creation of bottom rows

Any position can be custom designed. The procedure starts after a **long press** on Zoom button. A yellow marked window shows ready status. Rotate Zoom to find position of interest and Press Zoom. A list of possible nav box information will open, select with Zoom and confirm by press.



Note! To select next bottom row which is still empty simple position yellow window to the last position (full right) and press on 1-4 button.

Note! Edit of bottom row is also possible during flight.







#### 1.4.2.2 Bottom row layout

Bottom row can be positioned on the bottom of the display and as well on the top (in fact any position can be chosen). The info row can be used as single row, double or triple row. For more information see **Setup/Layout.** 



Examples of bottom row layouts

# 1.4.3 First navigation sub page

First navigation sub page is available after press on SUBP button and this is valid for all three navigation modes. The page is divided into two sections. Upper section is reserved for nav boxes. The lower part shows airport, turn point and terrain data. Nav box creation method is the same as described in 1.4.2.1. Turn point respectively airport data are shown in the lower section of the display. After press on **1-4 button** turn point respectively airport data will be replaced with graphic page which shows glider position regarding to the terrain and the airspace. Final glide profile for Mc 0 and actual MC is also visualized as a cone. Task mode doesn't show airport and turn point data, but changes immediately into profile section after press on SUBP. The whole task profile is available on on the display. Use Zoom knob to **adjust scale**.









#### LX Zeus

#### 1.4.4 Second navigation page

This page shows 3D terrain data regarding to glider present position. "Tunnel" in the middle means glider is on glide. The pilot should



#### 1.5 Rotary switches

Both rotary switches are multifunctional, their basic functions are audio volume adjustment and zoom adjustment. Both switches push function offer also some significant help connected with edit and selection.

#### 1.5.1.1 Zoom Rotary switch

Its direct function is selection of zoom factor (scale of the map) in graphic page. After every change a new scale factor will be selected, actual scale is shown as 1: xxxxxx and not in kilometers resp. Nm.

#### 1.5.1.1.1 Additionally functions of Zoom

After press has been activated the function of Zoom rotary switch will change and the switch will become most common used switch for LX Zeus operation during edit and selection processes. Any input and also scrolling can be done after using of Zoom switch.

Note! Push on Zoom should be used after any attempt to make inputs. After press immediate inputs are possible when rotating the knob.

#### Example 1: update of MC

- 1. press Vario button
- 2. select item (MC, Bal..) by Zoom knob (rotate)
- 3. press on Zoom knob
- 4. adjust new value, rotating Zoom

**Example 2:** selection of an airport

- 1. press Select button (short press)
- 2. press button near APT icon (Stat)
- 3. selection menu will open







- 4. now use **Zoom** knob to select item of interest, you can enable filtering by Countries and also by Name.
- 5. highlight airport of interest and close the procedure with press on Audio Volume button



#### 1.5.1.2 Audio volume rotary switch

a bar will show audio volume status after rotation.





#### 1.5.1.2.1 Additionally functions

The main secondary function of Volume rotary switch is its press function. When pressed in edit mode will execute jump out

of the menu. The push function isn't active in navigation

menus (APT, TP and TSK). After activation all already done edit inputs will remain, so the button isn't a cancel button.

During scrolling where Zoom rotary switch makes one step, using of Volume will increase steps by factor 5.

During input of numbers and letters, rotating will delete wrong input character and move cursor one position back.

# 1.6 Automatic jump out of edit

If you get lost in edit simple don't touch any command for apr. 8 seconds and the unit will change back to the last selected menu. Time out in seconds can be set in Setup/User interface/Auto close inactivity time out.

### 1.7 Display organisation and management

Additionally to geographic map there are also several extra indicators which make the display information much more effective than a fixed predetermined solution. How to create custom design see capture **Setup/Layout**. Customization of the display doesn't need any special tools; all can be done after using of rotary switches and push buttons.

#### 1.7.1 Display organisation

LX Zeus display consists of following:

- geographic map
- bottom row
- indicators (header is also indicator)



#### 1.7.1.1 Indicators

Indicators are elements of the display which can be edit (size and position) and



LX Zeus

also kept visible or not visible. See Setup/Layout for details.



#### Bottom row customization

Bottom row consists of nav boxes which are all custom specific, that means that the pilot is able to create his own configuration. The procedure is extremely simple and also executable during flight. The configuration may differ regarding to mode of operation. The procedure starts with long press on zoom. After long press the first nav box becomes a frame. The frame can be moved by rotating of zoom. As the right position is reached, next press on zoom will open a list of available nav boxes.







Terminate process with press on volume.

Three are **four variants** of bottom rows available, selectable with **1-4** push button. To create next row simple move the frame to the last position and press 1-4 and a new row will open.

The display configuration may consist of one row two rows or three bottom rows. See Setup/Layout for details.



#### Header customisation

Customisation of header should be done similar way as by bottom row. After a long press on volume the customisation can start. After press on zoom a list of will open.







# 2 Setup

Setup menu is available after short press on **SETUP** labelled push button. The menu is divided into two sections. **System settings** are settings which are valid for the whole system and couldn't be pilot specific data. Items connected to pilot may vary from pilot to pilot and depend on pilot individual requirements. Suitable symbols will accompanied with text will help you to find the menu of interest.



- use Zoom to find out menu of interest (selected menu size will increase)
- use push function of Zoom to enter menu

# 2.1 Pilot specific settings

The data stored in this part of Setup are pilot specific data. After pilot selection during booting the data are of individual pilot become active.





Pilots name and some personal data can be stored. All stored pilot names will be offered during booting and selection of one pilot is mandatory. The system offers one name called as **Unknown** and this can be used as a default pilot. Further are offered plenty Empty positions and this can be used for pilot names input. Additionally to the name some additional parameters can be entered. Limiting altitude means setting of altitude limit which will alert altitude warning.

Note! All settings active at the moment of new pilot creation under "Pilot" will be adopted.





#### 2.1.2 Audio settings



This menu defines audio configuration. Audio generator is a part of Vario unit (USB D 60) but settings are stored in LX Zeus.

#### Speed command mode:

-defines audio in SC, there are several variants The most common used setting is **Both** which means no piep,piep by positive deflections.

Use Test **vario** option to play the audio variant. It is important to change over to SC before test; otherwise vario audio variant will be reproduced.

#### Speed command volume:

-defines audio volume in SC, may be increased decreased.....

#### Vario tone:

-defines audio in vario mode, you can adjust frequencies and also types of audio, use **Test vario** after adjustment

The frequencies set are also valid for SC audio.

#### Alarm:

Vario unit is also capable to generate some alarms (warnings), combining two frequencies. Set frequencies and time intervals and use Test to check.





In case that LX Voice Module is a part of the system following settings can be arranged.

#### Volume:

- Voice volume: defines volume of expressed messages
- -Vario mixer: defined volume proportion Audio/Voice

#### LX Specific:

-enables or disables Zeus warning info

#### Flarm:

-enabling and disabling of Flarm info and warnings

udio Unknown	
General audio	
Speed command mode	Both
Speed command volume	High
Vario tone	Linear positive
Zero frequency	500Hz
Positive frequency	1500Hz
Negative frequency	200Hz
Test vario	
Alarm	
First frequency	200Hz
First frequency duration	300msec
Second frequency	2000Hz
Second frequency duration	300msec
Repetitions	10



Voice Unknown	
Volume	
Voice volume	50%
Vario mixer	40%
LX specific	
Warning	×
Information	×
Flarm	
Flarm traffic	×
Flarm warning	×
Flarm obstacles	×
Report horizontal distance	×
Report vertical position	×



# 2.1.4 Vario settings



Settings of this menu defines vario characteristics and some other important inputs connected to vario and speed command.

#### Vario:

- -*vario filter* defines dynamic of vario needle lover number means faster reaction and vice versa
- -smart vario\*
- -vario average time (display on vario unit)
- -*vario scale*, three options (2.5, 5 and 10 m/s) (5, 10 and 20 kts, if defined in Units)

#### Other:

-*Silence range*, defines no audio area around zero by speed command,

- -*SC switching threshold*, changeover speed which will change from Vario to SC in case of Auto setting
- -<u>ETA</u> (Estimate Time of Arrival) calculation, you can choose between several options
- -*Automatic SC switching*, defines way of automatic change over to SC
- -<u>External switch mode\*\*</u>, determinates external SC switch status which change over to SC
- <u>TE value\*\*\*</u>, set TE compensation style, 0% for tube compensation
- TE filter\*\*\* only valid by electronic TE compensation

<sup>^</sup> The LX system incorporates two configurable electronic filters in the circuitry. The first filter adjusts the time constant and is adjustable between 0.5 and 5 seconds. The 0.5 setting is the fastest while the 5 setting provides maximum damping.

The second filter, called the Smart Vario, is a dynamic filter and controls the rate at which the vario indication moves. When set to OFF, there is no restriction on the rate of movement of the vario indication other than the setting of the time constant filter. When set to 1, the vario indication will not move faster than 1 m/s (2 kts) per second, while when set to 4, the vario indication will not move faster than 4 m/s (8kts) per second. It should be noted that when set to 4, the vario indication will move four times faster than when set to 1.

#### Summary:

The Smart Vario should not be used in isolation but in conjunction with the setting of the time constant filter. When the Smart Vario is activated, the time constant filter may need further adjustment to provide optimum indications.



Vario SC Unknown			
Vario			
Vario filter	1.5s		
Smart vario	Off		
Integration time	20s		
Vario scale	5 m/s		
Other			
Silence range	1.0m/s		
SC switching threshold	100km/h		
ETA calculation	Average climbing		
Automatic SC switching	Disabled		
External switch mode	On		
TE value	0%		
TE filter	4		
	J		



<sup>^</sup>LX Zeus has a connection for an external speed command switch, which is **wired to** vario unit. Using an external switch it is possible to switch between SC and Vario manually. Setting the **SC Switch** to **ON** means that closing of the switch will cause SC mode, and setting **SC INPUT** to **OFF** means that closing the switch will select Vario mode. There is a third option by setting SC INPUT to **Toggle** and connecting a push button, now each press will toggle between SC and Vario (obligatory setting when using the LX Remote).



Wire	Shield	Open	Setting: ON	Staus: VAR
Wire	Shield	Closed	Setting: OFF	Staus: SC
Wire	Shield	Closed	Setting: ON	Staus: SC
Wire	Shield	Open	Setting: OFF	Staus: VAR



\*\*\* LX Zeus has the capability to offer variometer total energy compensation in two ways. Selection of compensation method is done after selection of the % figure. 000% means total energy compensation when **using a TE** tube. When using this solution the unit does not process compensation this depends entirely on the TE tube and its installation. After an input of a percentage which is other than zerothe special software routines will be activated and will provide an electronic compensation process. The default value is 100% but this can be varied following a test flight.

**Note!** Electronic and pneumatic TE compensation requires different connection of tubes.

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

- select 100 % and default TEF
- 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 (75 Knots) the vario will indicate about -2 m/s

(-4kts). 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, then the compensation is too low, increase the TE%; and vice versa. Repeat this procedure and make further adjustments if necessary.



The **TEF** (TE filter) is the compensation delay. Larger numbers will increase the delay and vice versa. During the first test is recommended to use TEF 4.

Electronic TE is only effective when the pitot 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 electronic TE compensation, then the most likely cause is the glider's static source. The static source can be checked by plumbing the pneumatic tubes for electronic compensation and then setting the **TE**: to 0%. In still air, accelerate to approximately 160 km/h (75 Knots) and reduce the speed. Observe the vario indicator. If the static source is good, then the vario should immediately start to move to show a climb. If the needle initially 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 TE compensation electronically. The use of a dedicated and accurate fin mounted pitot/static source such as a Prandtl tube might help.

There are two ways by which the vario units can be corrected for total energy; electronic TE compensation based on speed changes with time; and pneumatic compensation with a TE probe. When using pneumatic compensation by use of a TE probe. The quality of the TE compensation depends entirely on the location, size and dimension of the TE tube. The installation must be leak-proof.

**Note!** If electronic TE compensation is selected, then the TE(Pst) port should be connected to a good static pressure source. If pneumatic compensation is selected, then the TE(Pst) port should be connected to the TE probe.



Compensation with TE probe

Electronic compensation



# 2.1.5 Indicators

Indicator means vario indicator with its mechanical needle and colour graphic display. One indicator is incorporated into USB D 60 vario unit.

The system is also capable to drive secondary indicators. Secondary indicators may be simple repeaters or may also indicate different data sets, all depends on indicator address.

Vario unit is always addressed as Number 1, secondary indicators

can be addressed from 1 up to four.



In general every indicator consists of: mechanical needle, SC dot, needle status indicator, upper and lower digital indicator. It is important to point out that the settings should be done separately for vario and SC mode of operation.

A radial moving dot serves as a continuous speed to fly indicator, no setting is possible.

#### Some explanations of terms:

Vario needle : means needle function in vario mode, alternatives; vario, Netto\*, SC, Relativ\*\* SC needle: means needle function in SC mode......

Vario up nr.: upper numerical display indication in vario mode SC low nr.: lower numerical display in SC mode





\* vertical speed of air mass \*\* vertical speed – 0.8 m/s

Note! Setting **Altitude QNH** means altitude indication in ft, doesn't matter what is set in Units.



#### Secondary indicators

Secondary indicators should be connected via 485 system bus. There are three 9P connectors at the back of the unit

All contacts are absolutely parallel, so it doesn't matter which one is occupied. The unit can be also used as 485 system bus splitter. To define Ind number use **DIP switches** which you find at the back of the unit.

Note! Units having Adr1 will simply repeat whatis displayed on the vario. Higher addresses makes possible different sets.

Number	Switch
IND 1	хх
IND 2	x x
IND 3	x x
IND 4	хх



Note! Indicators which operate in second seat, should be connected to second seat 485

After indicator functions have been defined, switch the unit off and then on again, this procedure will memorize the settings.

#### 2.1.6 Flarm settings

Flarm parameters of pilot interest can be input via that menu.



### 2.1.7 Flight recorder settings

LX Zeus uses Colibri II as an IGC approved Flight recorder. Both units collaborate so far that all necessary settings can be sent to flight recorder (Colibri II) via Zeus and that means no actions on Cilibri II are necessary.

Note! Pilot and glider data are sent after task **Declaration** process has been executed. See section flying.







#### 2.1.8 Airspace management

All settings connected to AS management are available in this menu.

Note! Hide airspace above option will remove airspace sections which are higher than set. This will unload graphic page significant.





Show on zoom, defines appearance of particular airspace sections on the display. Appearance is connected to zoom. AS warning can be set as active or as not active  $(\boxtimes)$ .

Example of Hide airspace above



LX Zeus is able to measure wind under different methods. The method can be selected in Wind menu. Wind calculation results are shown as a stand alone indicator in main graphic page and also as nav boxes if set.

- Circling model: measures wind during circling Option sped difference bases on GS oscillation due to wind influence by circling. This a guite fast method which needs two full circles until result. Position drift calculates wind regarding to position offset during circling. Such a method needs more circles (4 up to 8). Number of circles should be in set Drift circles option. Combination combines also straight methods.
- Straight model: compass\* and Head/Tail can be selected
- Time for straight flight: time in seconds which will be taken for one measurement (valid for straight model)
- Compass assistant: is a special symbol which appears on the display and helps to keep flight parameters (speed and direction) stable during calculation.

#### 2.1.10 Graphics (User Interface)

Makes possible to adapt pallets of colours for different items.





\* Compass is a stand alone electronic device which can be connected to LX Zeus 485 bus. The unit's task is delivering of magnetic course to Zeus computer.





2.1.10.1 Map palette

To adapt map colours regarding to pilot personal requirements use this menu. There are six variants offered.

#### 2.1.10.2 Map Orientation

The map orientation of LX Zeus can be used in three different ways as follows:

- North up •
- Track up
- Combination of track up and north up regarding to flight status (climbing, straight away)

#### 2.1.10.3 Task colours

All possible colour sets can be preset for task start, task legs and the finish line. The same is also with sectors their outlines and fills.





#### 2.1.10.4 Airspaces

You can define colours of airspace sections which will meet your personal requirements.

#### 2.1.10.5 Tail settings

Track of last flown minutes can be defined in this setting.

#### 2.1.10.6 Track colour

This is in fact extension of track vector and shows the pilot where his flight will continue.

#### 2.1.10.7 Track (course) to destination colour

The line which connects actual position of the glider with destination point.

#### 2.1.10.8 Statistics colours

The colours of statistics page graphs can be custom designed.

#### 2.1.10.9 Show TP till Zoom

This setting defines appearance of turn points in the graphic page.









#### LX Zeus



Flarm object appearance can be adjusted, from always through different zooms until never.

#### 2.1.10.11 View 3D panel

Sub page nr. 3 can be enabled or disabled.

#### 2.1.10.12 Auto close inactivity time out

LX Zeus is monitoring push buttons and rotary switches during edit process. If no action will be detected in a predefined time slot, the program will change back to the last used navigation page. The time is flexible and can be adjusted from 6 up to 60 seconds and also disabled (off).

### 2.1.11 Back light adjustment

The display used in LX Zeus is high quality sunshine readable product and its back light will satisfy the pilot requirements during majority of the flight time. In case of a need, the pilot is able to increase the back light intensity for a limited time (30 minutes). After 30 minutes the back light will go back to default. After press (zoom) on Brightness a change will happen followed by a clear message.

> Note! Not valid for LX Zeus 4.3, Zeus 4.3 hasn't brightness adjustment option.





#### 2.2 System Setup

The parameters set in this section are valid for all pilots and are therefore global.

2.2.1 Units

A huge palette of units can be defined in this menu.



#### 2.2.2 Glider (glider polar selection)

There are nearly all glider poplars stored in the LX Zeus memory. Additionally to those polars Is also possible to use so called user polars After input of polar parameters.











The only solution to transfer data to LX Zeus and vice versa is via USB stick. One stick is also part of delivery. The stick should contain one LX Folder with following subfolders (APT, TP, AS,...). The stick which comes with the unit is already prepared. After enter on item of interest (press on Zoom) the procedure will start.



#### Transfer of Airport data 2.2.3.1

LX Zeus is capable to accept airport data in LX Navigation format (.af). The data is available on www.lxnavigation.si. The data base is free and no code is necessary. The airport files include regularly airport data of one continent.

#### The procedure:

- insert USB stick •
- choose Transfer menu
- press zoom •
- select item Airfields
- run Transfer from USB .
- all .af files stored on USB stick will be shown •
- select file of interest and press on zoom •
- transfer will follow
- activate file of interest (Select)

#### 2.2.3.2 Transfer of Turn Point data

Turn point data transfer uses the same philosophy as described in 2.2.5.1. The turn point data should be included in a file with extension .cup. LX Zeus can store nearly unlimited number of .cup files. Only three of them can be active at the same time. That means activation of maximal three files is possible. Turn points of all three files will be available for navigation without limitations.

#### 2.2.3.3 Transfer of Airspace files

Use Airspace option of Transfer menu. The files should be in .cub format. The actual airspace data are available for free on www.lxnavigation.si.

The airspace files cover regularly the whole continent. At the same time, only one airspace section can be active. Loading of airspace files created for events is also possible.



Only one .af file can be active at the same time, so activate the file after transfer, after using of Select function. A green check shows active file.







# Important!



#### 2.2.3.5 Transfer of Flarm net files

Files with extension **.fln** include Flarm customized IDs. That makes possible to identify gliders in the vicinity with their original IDs (usual comp. numbers). The data are available on <u>http://www.flarmnet.org</u>.

#### 2.2.3.6 Transfer Maps

This item makes possible to load terrain data. In fact every unit comes with preloaded data of the whole word.

#### 2.2.3.7 How to delete files (APT, TP, AS)

If there are some files stored in LX Zeus memory which are not any more actual, those files can be removed when using **Delete internal** file command. The command is executable for Airports, Turn points and Airspace.





The menu is mainly used for maintenance except:

- Compass calibration
- Level adjustment by units with AHRS



LX Zeus offers a very useable feature which makes possible to create main graphic page under pilot personal requirements. As mentioned in previous section the main display consists of:

- *map*
- bottom row
- indicators

The main difference between indicators and rest two options is, that indicators can be also **disabled** and not only moved respectively resized.









#### The procedure:

- select Layout option in Setup
- press zoom on Layout
- check one two or all three (TP,APT,TSK)
- highlight Edit and press zoom

After press a very significant screen will open; map with frame.





• select display element which you want to edit by rotating zoom (selection mean frame)

#### 2.2.5.1.1 Customisation process

#### Move of display element

- press zoom to start the procedure (a significant symbol will appear in the middle of the indicator)
- use **zoom** and **volume** to move the element

# 

Moved IAS indicator

# Resize (expand or compress)

- next press on zoom will open similar window but now without move symbol, but with cross
- use **zoom** and **volume** to resize







*terminate* the process after using of press on volume (a very significant message will accompany termination)



UTC offset to get local time, Date format, Time format and Position format can be adapted to local requirements. Language isn't active at the moment.





# 3 Navigation modes

LX Zeus offers three modes for navigation. The modes are:

- APT: navigation to Airports which are stored in APT memory
  - **TP** : navigation to turn points (TP)
  - TSK: task navigation after a task has been entered

Any of three modes is selectable after sequenced pressing on A-P-T push button.

## 3.1 APT mode (navigation to airports)

LX Zeus is capable to store more airport data files in **.af** format (LX Navigation airport format). At the same time only one file can be active. Selection of the file of interest should be carried out in Setup/Transfer section Airfields.

APT mode consists from three navigation pages. See also 2.2.

Any of them is directly selectable by **SUBP** button.

**Note:** the third sub page (3D terrain) can be disabled (see Setup User interface).

Airports are designated with a symbol: The RWY orientation match real situation. Extended Airport data are available in the lover section of second navigation page. After using of **1-4** button the supplemental information page in form of a vertical profile will open. The upper part of the display is custom designed,

the procedure is the same as for the Bottom Row.







Note! The profile respects airspace structure and also MC setting. By MC setting 0, the cone will be reduced to a line.

# 3.2 How to select an airport?

Airport selection is active from any mode of operation and also from any sub page. Use press on **Select** button (short press) and select menu will open. Use APT option and selection dialogue will start.







Now you can scroll with **Zoom** knob or you can use **County** and **Name** filters to reduce number of offered airports. After airport of interest is found terminate the process with short press on Zoom.

#### Note!

When using **Name** filter, input the first letters of the airport name. Use Zoom to scroll and press for confirmation. You don't need to input all characters just first two or three and after you can go on by pressing Zoom. More inputs makes offer more detailed and vice versa.

PT AACH	Select airfield		
240		AAJ	muts 5
220	Country		X
160	Airfields (785)		0.0
140 120mm	AACHEN ME		
100	AALEN-HEID		
o White	ACHMER (EI		-E
- C. T.C.	ACHTERSTE		-1610
12	AGATHAZEL		Th Gain
	AN ANALHOUSE	UL 1501	0

#### 3.2.1 APT selection from NEAR function

LX Zeus offers also so called NEAR function. After activation which can be done by a long press on SELECT/NEAR button nearest **Landable** points will be offered. The list includes airports from airport data base and also turn points declared as landable.

> Note! Selection is limited to 200 nearest points

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Note! Selection by distance is also offered as an option.



PT A CO

Select airfield

#### LX Zeus



## 3.3 Navigation in APT mode

There are three navigation pages possible all selectable by **SUBP** button.



The bottom row consists of **nav boxes**, there are four bottom row variants available that means maximal 24 nav boxes can be used. Bottom row variants are selectable by **1-4** push button. Any nav box content is custom programmable after using of a very simple procedure. How to create nav box structure see 2.3

Note! The number of nav boxes depends on layout variant.

#### 3.3.2 Second navigation page

Second navigation page is divided into two sections; the upper section consists of nav boxes, which are all custom created. (See 1.7.1.1)

Lower section shows airport data and after request (1-4) vertical profile will appear.







### 3.3.3 Third navigation page

The third navigation page shows terrain data in 3D configuration and AHRS if this is a part of the system

Note! This page can be disabled after command executed in Setup/User Interface.



LX Zeus

### 3.3.4 Map orientation

LX Zeus can work in different map orientation modes as follows:

- track up
- north up
- combination of north up and track up

Use Setup/User Interface to select appreciate solution.



# 3.4 Turn point mode

The structure of the mode is similar to APT, the only important difference is, that the navigation is towards turn points which are included in turn point files. The turn point files (.cup) should be uploaded by USB stick. See Setup Transfer for details. Practically unlimited number of .cup files can be uploaded. Turn points can have different attributes and therefore also symbols which represent turn points are different.



TP as grass airfield

#### Note!

Up to three turn point files can be active at the same time. The activation should be provided in Setup/Transfer. Turn points included in all three files will be available for navigation, without any priority.

Turn point mode has also three pages, which can be selected by SUBP key.



# 3.4.1 Creation of User Turn points

User turn points are turn points which are created by pilot after using commands of LX Zeus. Such a turn points are designated with **U** in front of its name.

#### 3.4.1.1 Creation of a Turn point by hand

Press on zoom button and following menu will open. Run Add TP after pressing on Setup/Info.

Following should be input:

- Name
- Details (not obligatory)
- Type
- Lat and Lon
- Elevation

Next three inputs may not be highlighted due to type.

Terminate the process with Add turn point.





#### Note!

Type option offers plenty turn point designators. The designator defines symbol which will appear on the display. Land able points will be also listed in Near function.



LX Zeus



#### 3.4.1.2 Storing of actual position during flight

The procedure is identical as described in 3.4.1.1, the only difference is that Lat and Lon input doesn't matter, as the actual position is already offered.

#### 3.4.2 Selection of a Turn Point

The selection process is similar to APT. Use **SELECT** button to start the process and press TP. Name and Country filter will expedite selection. Turn points are visualized by symbols (see 3.4).





km/h	Country	All	m/ 5
220 200 360°/(	Name filter		)
-180	Turnpoints (59)		0.0
140	Celje		1.2
100	Prebold UL		-3
0	15km 269°		-5
to many	Zice Loce		Brito C
-	19km 65*		1.1.2
	22km 242*		13
-	Velenje		
IAS	24km 316°		Alt QFE
0	🔤 Rogla		61

Important! Turn points without country designator are selectable only when using Country "All" option. This is also valid for user turn points.

#### 3.4.2.1 Selection from Near

LX Zeus Near function offers Turn point selection based on distance. Respect that there is also Country filter active, use **All** if you want to get all turn points listed.



#### 3.4.3 Navigation to a Turn Point

Navigation towards turn point doesn't differ to navigation to an airport, so refer 3.3 for details.



# 3.5 Task Mode

Task is a complex process which guides the pilot around the turn points of the task. Each task consists of turn points, start point and the finish point. Additionally take off and landing can be input, but those points don't have any influence on task execution.

#### 3.5.1 Task organisation

Zeus has a store for 101 tasks. 50 tasks can be imported in one **.cup** file and such tasks are called **imported** (IMP), next 50 can be created by **user** in LX Zeus (by hand) and those tasks are called User (USR). One task is called **DECLARED**. This task will be written after a **Declare** process will be executed in TSK Menu.



1x	50 x	50x
DECLARED	IMPORTED	USER

Note! Tasks which you want to upload to Zeus should be a part of a .cup file.

#### 3.5.1.1 Task declaration

LX Zeus uses external flight recorder and in case of Colibri II as a part of the system a flight declaration transfer from LX Zeus into Colibri II is managed. All what the pilot has to do is to execute declare procedure in TSK menu. The actual task data from Zeus will be automatically transferred to Colibri II.





#### 3.5.2 Task selection

To select task from LX Zeus active task store use **Select** button and go on with TSK option. Use Zoom knob to select task of interest. During selection process all task relevant data will be present.





### 3.5.3 Task creation by "hand"

The task can be created by hand after using of **NEW** or **EDIT** command, both commands are available after press on **TSK** button. Edit will make possible to edit an existing task and new will offer creation of a new task, which will be stored under USER. Insert turn points one by one.



Selection of take of and landing

Selection of turn points offer more options. Option **Zone** makes possible to adapt zone geometry to actual rules.

Note! Selection of turn points and airports correspond to procedures described in 4.2 and 4.4





Selection of Turn Points



#### 3.5.3.1 Creation of Zones

**ZONE** function makes possible to create any known geometry for turn points, start and finish. The creation consists of input of sector angles radius and orientation.

**Auto next** input defines change over philosophy over turn point. AUTO means automatic change over immediatelly after sector will be reached. This function is default active as sector radius is below 10 km. Bigger sectors offer a not automatic change over. If **Auto next no** is active, MOVE function will become active and that makes possible to modify the task distance even before flight.





Exsamples of typical zone geometries.

#### 3.5.4 Task Start, Restart and Next TP

Thre are two methodes of starting a task. Manual start is posible after using of **Next TP** function. Next TP command will change over to next TP every time when activated, doesn't matter if the glider is in the sector or not.

A more sophistic start method is **automatic** solution. In that case the pilot should **ARM** automatic start. Use ARM command which is offred after press on TSK button. Activation of ARM and also deactivation are clearly shown on the display. Disarmed means canceleratin of ARM status.







#### LX Zeus



#### 3.5.4.1 Task Restart function

After task has been started (method doesn't matter) a task restart can be executed at any time. Use **Restart** button of TSK menu.

**Restart button** will become active after task start. After restart all task statistics data will be zeroed and ARM status will become active, which makes possible to provide next automatic start.

#### 3.5.4.2 Over Turn point

Change over to next turn point may be automatic or manual. Automatic change over will happen when **Auto next** of individual zone is set to auto.

Default setting for Auto next:

-R1below 10 km Auto next active (automatic change over) -R1 above 10 km manual change over necessary

Note! Manual change over is possible exclusively by **Next TP** command.





#### 3.5.5 MOVE Function (during flight)

When flying an AAT big sectors are set and therefore the pilot has to decide where to turn to next point. Function Move helps the pilot to find optimal solution. After long pres on TSK / MOVE button so called move function will become active.

Use Zoom and Vol knobs to move the turn point. All task relevant data which are affected by move are shown at the bottom part of the display.







# 4 Airspace Management

The airspace used in LX Zeus can be managed by pilot to achieve optimal relation between loading of the display and readability of the display. Too much information will reduce display readability significant.

# 4.1 Basic airspace settings

Those settings are available in **Airspace** section of User Setup.

#### 4.1.1 Hide airspace above

The airspace sections which are much higher than actual glider position are not so important, but if disabled will reduce information density of the display significant. Use **Hide airspace above** to define altitude margin which you need for a still safe flight.

#### 4.1.2 Define appearance of airspaces regarding to zoom

After using of **Show on zoom** function you can define By which zoom the airspace will become visible on the display. Two extreme situations are described with **always** and **never**. Factory setting is always.

#### 4.1.2.1 Warnings

If set disabled  $(\boxtimes)$  the airspace warnings will not appear at all, setting checked  $(\checkmark)$  will produce airspace warning information. Warning box is an indicator of the display, so the pilot is able tp move the box and also to customize colours.







Airspace warning information consists of Airspace name, horizontal and vertical distance and is as default

positioned in the upper section of the display. The nearest point to enter the airspace becomes visible on the display as a numbered dot. Number 1 means more critical situation than number 2. As long as the warning isn't critical the dot and also the text will be **yellow**.







# 4.1.3 Disabling of airspace sections

After using of **Near** function is possible to disable individual airspace sections. The action may temporary disable one or more zones or disable zones of interest for ever.



# 5 GPS signal management

LX Zeus has two inputs for GPS signal which are available on the back of the unit. both solutions are realized by 6P telephone type connectors which are marked as:

- Colibri II
- Flarm

# 5.1 Colibri II plug

**Colibri II** plug can be used exclusively to connect Colibri II units. The plug delivers also power (5V) for Colibri and receives its data directly without any data interface. The communication way is bidirectional. Every unit equipped with Colibri II comes with suitable connection cable (USB mini/ 6P telephone).

# 5.2 Flarm plug

**Flarm** marked input makes possible to realize a plug and play solution to connect any unit which has an IGC standard compatible connector. Port delivers also 12V.

Following units can be connected plug and play:

• Colibri, LX 20 – 2000, VL, LX Flarm RB, LX Flarm MB, Flarm

# 5.3 GPS signal for navigation

Both GPS input connectors are wired to LX Zeus microcontroller module which prepares an integral GPS signal for the main computer. So, the computer will be supplied with valid GPS signal as long as one GPS receiver delivers valid data. Colibri II data have priority, to guaranty that navigation data will match flight recorder data. A symbol which is positioned in the right upper corner of the display shows GPS signal status:

- red GPS BAD
- green GPS OK
- white symbol with ⊠ means no GPS data present





Note! LX Zeus is able to adapt baud rate to any value between 4800 and 38400 automatically, so baud rate of GPS source connected to Flarm input doesn't matter.



# 5.4 Colibri II Zeus interaction

Colibri II will switch ON automatically when power from Zeus will be applied. In case that Zeus will go off during flight, Colibri will remain ON using its own internal battrey. In normal situation which means that Zeus will be switched OFF on ground after landing, Colibri II will go OFF **automatically** after no flying condition will be detected (this takes some minutes). Described philosophy prevents that Colibri will remain on after landing by pilot mistake. The solution makes possible to install Colibri II inside of the panel or in baggage department, where no visual and physical contact is possible.

#### 5.4.1 Colibri II - Zeus data exchange

Colibri II and Zeus build together a vario navigation system with high level approved flight recorder. The units exchange following data:

- LX zeus receives GPS data from Colibri II (automatic baud rate adjustment, no assistance necessary)
- after action on Zeus the actual LX Zeus task can be declared to Colibri II (DECLARE in TSK menu)
- flight recorder settings can be set after using of Logger section of Setup
- automatic transfer of Colibri II flights into LX Zeus
- downloading of flights via USB stick

See also section 8.1.



# 5.5 LX Zeus and Flarm

Flarm should be connected to FLARM marked plug of LX Zeus. Flarm will also receive power via that plug. If Flarm is also connected to aircraft power network via its power input wires, doesn't happen a short as there is a diode built in. This separates both power supplies. Up to two Flarm external displays can be connected to the plugs marked as Falrm external display. SD card slot on LX Zeus front is directly connected to Flarm SD interface (valid for RB), without Zeus interaction. The SD card may be used for:

- Flarm firmware update
- downloading of flights stored in Flarm
- uploading of declaration (via .cfg file stored on SD)

On the back side of LX Zeus there is enough space to install LX RB as an integral part of the system. All connections are plug\_and\_play. Non integral solutions can also used.

#### 5.5.1 Visualisation of Flarm objects

Flarm objects are visualised in two different ways. First one becomes active after activation of so called Flarm radar screen (long press on FLARM).

Flarm objects are also visible in all three graphic navigation pages.







LX Zeus HW makes possible to connect maximal 2 Flarm external displays, both plugs are driven from Flarm directly without any Zeus influence.



# 6 Remote control

LX Zeus can be also operated by remote control stick. The stick is standard LX Navigation product which differs from sticks used by LX 7000/7007 series only in labelling. Therefore is upgrade of existing stick very easy. Remote stick should be connected to one 485 plug, no special initialization is necessary.

# 6.1 Remote in second seat

Remote stick for second seat is the same as for the first seat (no different firmware as by LX 7000/7007). The unit should be connected to second seat unit 485 bus.

# 7 Second seat unit

Second seat device is connected to the master unit via CAN bus, the connection includes also power for second seat. This means that second seat unit doesn't need power supply. An external toggle switch makes possible to switch off the unit during single pilot operation period. Otherwise all commands are the same as by main unit. GPS inputs are inoperative, so there is no sense to connect GPS sources to that plugs, the same is valid for Flarm display plugs.

LX **Zeus 4.3** can be also used as a repeater in case panel space problems.

# 7.1 Connection of Vario and Remote

Vario indicator (not USB D unit) should be connected to 485 bus of second seat device (this is not the same as by LX 700077007). The same is valid for remote. Both vario indicators and remotes are compatible with existing units connected to LX 7000/7007. Remote doesn't require any setup.

### 7.1.1 Secondary Vario setup

Function of vario indicator connected to second seat unit, should be defined in Setup of second seat unit.





LX Zeus



# 8 Flying with LX Zeus

It is recommended to prepare the unit for every flight before take off to ensure a stresses and contentedly flight. This is especially important before any contest, record or badge flight.

# 8.1 Flight preparation on ground

It is suggested to check following:

- data base status
- prepare task (use new or edit options, or select from task store)

#### 8.1.1 Before take off

- switch the unit ON at least **3 minutes** before take off (this will ensure sufficient GPS reception and will create a base line of baro trace)
- select correct pilot (many setting belongs to pilot)
- check task if correct after using of Task edit
- if declaration is obligatory, provide declaration
- switch on second seat unit in case of double seated glider

#### 8.1.1.1 QNH setting

A long press on 1-4 button will open QNH input dialogue. The pilot should input actual QNH value of the airport where he will take off. This action should be carried out on ground, after take off the menu will not open any more. After input of QNH on ground the pilot will be able to adjust altitude during flight, if QNH will change.

Note! QNH setting doesn't replace setting of elevation during booting, this should be carried out under any conditions. QNH setting isn't obligatory and may be over jumped .



#### 8.1.1.2 Task declaration process

Task declaration means inscription of task relevant data into IGC approved flight recorder. As LX Zeus uses external units as flight recorders (Colibri II and Flarm IGC), the declaration data should be sent towards flight recorder from Zeus. A simple DECLARE procedure executed from Zeus TSK page will ensure task data transfer.

Declare command is available after pres on Zoom in TSK mode. After activation the task declaration data will be inscripted into Colibri II and also Flarm, if Flarm unit is an IGC version.

Note! Declaration process termination is visualized



# 8.2 During flight

The Zeus HW and SW concept is so far optimized that pilot doesn't spend too much time to operate the unit during flight. It is important to point out that there are many short cuts which enable direct and fast access to most important functions. The pilot isn't obliged to terminate edit process until end due to Auto close feature, which closes the process after some seconds of no active commands.



#### 8.2.1 After take off

A very significant signal that the unit has changed to flying mode is Log Book replacement with statistics page after pressing on **STAT** button.

#### 8.2.1.1 Statistics

As mentioned in previous chapter the statistics page will open after press on STAT button. Statistics page offers following statistics data:

- Thermal analysis (not active at the moment)
- OLC; calculation of OLC points (not active at the moment)
- Baro; shows baro trace from take off until present position
- *Task*; presents task statistics data distributed by legs

Note! By not started task the statistics data is limited to take off and flight duration.

The statistics page colour structure can be adapted under the pilot personal requirements after using of; Setup/User Interface/Statistics colours

Note! If task consists of more than three legs, use **zoom** to select legs of interest.

#### LX Zeus

15	8	, salar	~	
28.12.2012	UNKNOWN	12:27	17:33	×
22.12.2012	UNKNOWN	03:22	03:22	×
22.12.2012	UNKNOWN	13:52	14:27	×
22.12.2012	UNKNOWN	13:35	13:48	×
22.12.2012	UNKNOWN	13:17	13:33	×
18.12.2012	UNKNOWN	03:20	03:20	×



Thermals	Statistic: Flight: O Takeoff:	s 0:40:54 13:31:0	2			
mennub		Task	Leg 3	Leg 2	Leg 1	
	Speed	100.2 km/h	139.3 km/h	<b>144.1</b> km/h	63.0 km/h	End flight
	Dist	<b>46.4</b> km	21.8 km	8.6 km	15.5 km	
OLC	Dur	0:27 50	0:09 26	0:03 35	0:14 49	
Baro	V Avg	0.8 m/s	-1.3 m/s	0.0 m/s	<b>0.9</b> m/s	
	Circ	32 %	2 %	0 %	59 %	
Task						

#### 8.2.1.2 Event function activation

This function is active only if Colibri II is a part of the system. A long press on **EVENT** button will send a command to Colibri II flight recorder to activate so called event function; that is in fact recording in shorter intervals as default for a limited time. The conditions are to be set in Setup/Logger.

#### 8.2.1.3 Marker setting

If the pilot wants to mark appointed position (outlanding place, thermal....) this can easily be done after activation of Marker function. The process is very fast and doesn't occupy pilot. To mark a position pilot should do as follows; press **Zoom** and **Add marker** Marker is visualized as a yellow triangle positioned over graphic page. Only one marker can be active at the same time. To set a new one simple repeat the procedure. Marker will be stored as user turn point designated as **#MARKER**. If edit function has been used **#MARKER** can be converted into normal TP.



#MARKER can be also deleted after using Delete TP command. In case of navigation data necessity towards #MARKER point, simple select #MARKER after using of Select TP command.



Task start is a quite complex procedure, especially by high density of gliders who intend to start at nearly the same time.

As pilot intends to perform task start in a close proximity A very simple operation should be carried out;

-press on TSK button and after to ARM

A very significant message **ARM** will appear on the display. This message will remain until first line crossing, after first line crossing the task will start automatically without pilot assistance. Task start is accompanied with a very significant message:





In case that the pilot forgot to ARM start and has crossed the line, execution of **NEXT TP** will solve the problem.

#### 8.2.1.5 Task Restart

After a bad start and intention to provide a new start, the pilot is obliged to execute so called Restart function. After press on TSK button you will find **RESTART** option. After restart the task will be reset (doesn't matter on which leg) and a new start could happen.

Note! After RESTART, the unit will change immediately into ARM status.

#### 8.2.1.6 Task Finish

Task finish will be detected after the glider will finish the finish line. The situation will be accompanied with a very clear message.

#### 8.2.1.7 Flying AAT

AAT (Assigned Area Task) is a modern manner of task flying on competitions. The basic idea is to set relative big sectors over turn points and this makes possible that the pilot decides how deep into the sector will be entered. Usually a time limit is set which prevents to short tasks.

• set time limit: use Task/Edit



Note! If task time will not be set, many statistics data will lack, for instance: task delta time, task remaining time....

• set sector geometry: use Task/Edit/Zone

Note! If sector radius is bigger than **10km**, the unit will recognise this as an AAT and will set manual change over to next turn point. Using smaller sectors by AAT requests manual setting of **No** Auto next.





- over turn point: change to next turn point is exclusively executable after using of NEXT TP command.
- *move function:* makes possible to adapt AAT distance and also get informed about important task parameters as for instance: remaining distance, required speed....

Move function is available after long press on TSK/MOVE button. Use zoom and volume rotary switches.





#### 8.2.1.8 Final glide calculation

The final glide calculation is based on following inputs:

- actual MC setting
- wind
- polar
- bugs
- ballast
- safety altitude (reserve)

The final glide is indicated in graphic page. As the final glide box has nature of a display indicator, so this can be moved over the display and also custom colours could be assigned. (–) figures means below and (+) above final glide, both in meters resp. in ft.

The final glide situation is also present in the first navigation Sub page of all three navigation modes. In case of flying a task, final glide profile until finish will be displayed.

Note! Final glide may be also visualised as nav box.



Note!

In Task mode the final glide is calculated from actual position until

finish (over all not over flown turn

points).





#### 8.2.1.9 Thermal assistant

#### 8.2.1.10 Flarm management



# 8.3 After landing

🗙 navigation

It is recommended to keep the instrument ON for a few minutes after landing; this will ensure base line of baro trace. Simple wait until a very significant message on the display will appear; This shows that flight recorder is terminating the flight and data see

This shows that flight recorder is terminating the flight and data security operation is in progress. After calculation of security, statistics page will be replaced with **Log book** and the unit is now ready to be switched OFF, or flight download process can start.

#### 8.3.1 Downloading of flights

LX Zeus can full interact with Colibri II in case that Colibri is used as a flight recorder. That means that downloading of in fact Colibri flights is possible after operation on LX Zeus. The flights will be finally stored on USB stick. After no connection to Colibri II the unit (Zeus) will produce its own "flights", which are not IGC conform. The structure meets IGC standard and therefore such flights could be evaluated by any program which accepts .IGC data format.

In case of Flarm (RB IGC version) connected to LX Zeus, its flights will be stored to Flarm SD card, without any Zeus interaction.

#### 8.3.1.1 Downloading Colibri II flights

After termination of the process described in 8.3.1 downloading of flights can start. Downloading of flights stored in Colibri II is possible exclusively after using of USB stick. The procedure:

- insert USB stick
- press STAT button (log book will open)
- select flight of interest
- execute Save to USB command

The process will take a couple of seconds a very significant message will show termination

Flight copied



The flight is now available on USB stick in sub folder **Flights**. Flight data are stored in .IGC format and therefore immediately ready for evaluation.

#### 8.3.1.2 Downloading of flights recorded by Zeus

If Zeus will not recognize Colibri II as a GPS source will start its own recording. The procedure is the same as described in 8.3.1.1. Flights produced by Zeus are designated with  $\times$ .

15	- 👗	<u></u>	~				`
28.12.2012	UNKNOWN	12:27	17:33	×	$\leq$	× shows Zeus	
22.12.2012	UNKNOWN	03:22	03:22	×		flight	
22.12.2012	UNKNOWN	13:52	14:27	×			J
22.12.2012	UNKNOWN	13:35	13:48	×			
22.12.2012	UNKNOWN	13:17	13:33	×			
18.12.2012	UNKNOWN	03:20	03:20	×			





LX Zeus



#### 8.3.1.3 Downloading of flights stored in Flarm

If an IGC approved Flarm Red Box unit is connected to LX Zeus a direct flight downloading via SD card slot which is positioned on the front panel of LX Zeus is possible. The SD card slot is wired directly to Flarm without any Zeus assistance. General rule by Flarm is that flight will be stored to SD card after next power on of Flarm. So, power LX Zeus off and new on to download the flight.

#### 8.3.2 Colibri II power ON and OFF management

Colibri II will switch ON immediately after Zeus will receive power and will not switch immediately OFF after Zeus will loose power. Colibri II will switch OFF automatically after the unit will recognize not flying condition for about 15 minutes. Close before switching off, some audio alarms will be expressed.

Note!

Pilot doesn't need to take care about Colibri II switching OFF, as Colibri II to will switch OFF automatically after no flying status will be detected.



# 9 Installation9.1 Mechanical installation

As the unit dimensions doesn't match air norm standard, a new cut out in the panel should be made. There are two ways how to prepare the panel. First one is buying of a new panel and second solution is upgrade of existing panel. Upgrade can be done also by user; in that case some little experience in glass fibber technology would help. Instructions how to rebuild the panel you can obtain by LX Navigation. Every unit comes also with an iron template which makes possible to manufacture LX Zeus cut out by hand. In case of CNC solution, please ask for .dwg file.





Reinstallation after panel upgrade

#### 9.1.1 Installation of Vario unit

The unit occupies one 57 mm standard cut out. The maximal dimensions of the unit are 60x60 mm and don't exceed dimensions of classic pneumatic instruments. In case of space problems, the unit can be separated into two parts which are connected via cable.

Note! Respect labels near pneumatic connectors, during pneumatic tube connection process. See also 3.1.4 for details.

In case of panel space problems the vario unit can be spitted into two parts connected via cable.

# 9.2 Electrical installation

This part of installation is easy and doesn't need any specialists. The system receives its power via two power lines which should be connected to 12V glider power source and ground. Red wire is 12V and blue wire is Ground.

#### Important!

There is no **fuse** built in the system, obligatory use 3A external fuse. Never remove **Terminator** which occupied one CAN port (factory preset). Terminator should be removed in case of second seat configuration. In that case the terminator should be positioned on second seat unit.

A 2 pole plastic connector which is positioned approximately 20 cm from the unit casing ensures simple disassembling of the unit in case of repair.

#### 9.2.1 Installation of USB D 60 (vario unit)

USB D 60 unit comes with prefabricated cable set, which has two connectors. 15 pole type should be inserted into vario unit and arrested with appropriate springs.

The 9P connector should be inserted into any free 485 marked plug on Zeus back. The unit receives also its power from Zeus.



See 3.1.4 to learn how to connect SC external switch. Speaker output is terminated with one chinch female connector; a male connector is part of speaker.







# 9.3 Installation of second seat units

The second seat unit is the same size as master, so no difference by mechanical installation works.

#### 9.3.1 Electrical installation

The second set unit doesn't need external power, as it becomes power via system bus (CAN). For CAN connection two 8P connectors are provided on master and also on repeater. The interconnection of both units is extremely simple and easy, all what is necessary is to insert CAN marked cable in one of two CAN marked plugs. The same is valid for first and for second seat.

Second sat unit comes with two red wires which are terminated with a toggle switch. It is recommended to install the switch somewhere in the rear panel, as this will make possible to switch off second sat unit during single pilot operation.



Note! Newer remove CAN terminator which occupies one CAN plug of second seat unit.

Note! All interfaces as; remote control, vario indicators..... which interact with second seat, should also be connected to second seat 485 bus.



# 10 Explanation of terms 10.1 Text explanations of Nav boxes

Item	Description	Nav box designator
Indicated Air Speed	Airspeed not altitude corrected	IAS
True Air Speed	Airspeed corrected with altitude	TAS
Ground speed	Speed over ground	GS
Vario	Momentary variometer value	Vario
Average vario	Integrator (average of last x seconds)	V Avg
Altitude QFE	QFE altitude based on approaching point	Alt QFE
Altitude QNH	Altitude over sea level	Alt QNH
Altitude IGC	Altitude recorded by flight recorder (1013 based)	Alt IGC
Flight level	Actual flight level indication	FL
Thermal gain	Altitude gained during climbing	Th Gain
Thermal last 30	Altitude gain during last 30 seconds of climbing	Th L30
Thermal average	Average climbing during thermaling	Th Avg
Thermal all	Altitude gain during whole flight	Th All
Set Mc Cready	Actual MC setting	MC
Sink Speed	Estimated sink rate (polar, speed, bugs, MC)	Sink Sp
Final glide	Altitude difference regarding to f.g. line	FG
Time on task	Time spent on task	On Task
Time to go	Time	TTG
Required speed	Required speed to finish AAT in time	Req Sp
Task speed	Speed achieved on task	Task Sp
Task remaining distance	Distance to go until finish	Task RD
Task delta time	Early or late arrival on AAT	TDT
Empty	Nav box will remain empty	No designator
Wind speed	Wind speed calculated by Zeus	Wind Sp
Wind direction	Wind direction calculated by Zeus	Wind Dir
Air temperature	OAT	Temp
Dist. to sel. TP/APT	Distance to TP/APT	Dist
Off course distance	Off course indicator	Off co
Rem. T. to TP/APT/TSK		T to TP
Cour. eff. TP/APT/TSK	Efficiency calculated during last time period	E
Required eff. TP/APT	Required efficiency to reach TP/APT/TSK	Req E
Track TP/APT/TSK	Ground track to TP/APT or TP of task	TRK
Bearing TP/APT/T	Bearing to TP/APT or TP of task	BRG
Radial TP/APT	Radial from TP/APT to the glider position	QDR
Digital clock	Digital clock symbol	Time
Analog clock	Analog clock symbol	Clock symbol
Flying time	Time spent in the air	Flying
ETA (current speed)	Estimate time of arrival based on actual speed	ETA Sp
ETA (average speed)	ETA based on average sped reached	ETA Avg
ETA Mc Cready	ETA based on MC setting	ETA MC
GPS position	Indication of coordinates	Coordinates
Battery	Battrey symbol	Battrey symbol
GPS signal	GPS status symbol	GPS Symbol
Hardware	HW status connected to Zeus	Active HW



The units differ in general very little. The most important fact is that both units use the same SW package and that means that all new functions will be automatically implemented also in 4.3 version. It is important to point out that LX Zeus 4.3 uses a high resolution display which compensate smaller layout significant. Due to 100% compatibility with 5.5 inch variant, a mixed use in double seated gliders is possible. The main differences are as follows:

- display size
- display resolution
- layout
- slightly different push button organisation (2x4)
- no display backlight intensity adjustment