SteFly NAV

Installation Manual and Operating Instructions

Version 1.3

June 2024

info@stefly.aero   www.stefly.aero

SteFly is a registered trademark used by CoTexx GmbH, 86565 Gachenbach, Germany

Table of Contents

1 Preliminary Remarks

1.1 Important Notices

Before using any part of the system, please read and understand this manual. All information in this document is subject to change without notice. The latest version can be downloaded from https://www.stefly.aero/product/stefly_nav_57_70/.

CoTexx GmbH does not accept responsibility for damages which are the result of installation and operation of the device.

1.2 Limited Warranty

The SteFly NAV unit as well as its accessories are warranted to be free from defects in materials or workmanship for two years from the date of purchase. Within this period, CoTexx 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.

1.3 Conventions and Pictograph Definitions

The safety instructions in SteFly operating manuals are the result of risk evaluations and hazard analyses. In this document, the following hazard levels and information are considered:

⚠️	Pay special attention to critical notes marked with a yellow caution symbol, because non-observance may result in damage or any other critical situation.
🔺	A red caution symbol signalizes that non-observance may result in injuries.
🛈	Command to perform an action or task associated with a source of danger, the disregarding of which may result in serious accidents.
☁️	A blue cloud indicates useful information or tips.

2 Safety

2.1 Safety Precautions

Duty to inform

Each person involved in the installation or operation of SteFly NAV must read and observe the safety-related parts of these operating instructions.

2.2 Proper Use

This SteFly NAV device was designed as additional aid for navigation under VFR conditions. It shall be installed in the instrument panel of a glider / microlight. All information is presented for reference only. Terrain, airports and airspace data are provided only as an aid to situation awareness. You are not allowed to use this SteFly NAV device, if it irritates you or distracts you from piloting.

Security decisions must be made regardless of the data displayed on the system. CoTexx GmbH is not responsible for correctness and up-to-dateness of software and navigation data base. CoTexx GmbH does not accept responsibility for damages which are the result of operation of the device. Make sure, that the device can be legally operated with the laws in your country.

2.3 Improper Use

Improper use will cause all claims for liability and guarantees to be forfeited. Improper use is deemed to be all use for purposes deviating from those mentioned above, especially:

- Relying on data displayed on the device in non-VFR conditions or during night. This SteFly NAV device is not certified, has no internal backup battery and may shut down without warning in rare cases.
- Operating it outside the operation conditions defined in technical data section, e.g. input voltage, temperature and humidity.

3 Quick Start Manual (especially, if you replace a SteFly OpenVario)

For all who intend to replace a SteFly OpenVario with our new Android navigation device, we wanted to reduce the replacement effort as far as possible. Therefore, we designed the aluminum housings of SteFly NAV for the same panel cutouts as for the corresponding 5,7´´or 7´´ SteFly OpenVario. The pinout of the D-Sub 15 connector remained the same for easy plug and play.

For a quick start of your new SteFly NAV device, simply perform the following actions:

1. Check that the WiFi antenna is connected to the corresponding connector of the SteFly NAV device
2. Plug in either
    - the D-Sub 15 connector of your OpenVario installation in your glider
    - the SteFly wiring harness with D-Sub 15 connector and loudspeaker (see onlineshop)
    - your own soldered D-Sub 15 connector with power cables (for pinout see D-Sub 15 Connector (Male))
3. Connect the other end of the power cables to a battery or DC-power supply (9 – 15 VDC)
4. SteFly NAV will boot up automatically
5. Start XCSoar or install another navigation app

4   Product Description

4.1   Scope of Delivery

The scope of delivery contains the following:

- SteFly NAV device
- RJ45 cable
- D-SUB 15 connector for soldering with Quick Lock locking system
- 4 panel mounting screws (M 2,5 x 5 mm)
- WiFi antenna

> ⚠️ Please make sure that the WiFi antenna is connected to the corresponding connector of the SteFly NAV device before boot up.

4.2   Design and Function

SteFly NAV 57 & 70 are powerful devices, having the main purpose of serving as navigation computer or central display in gliders or microlights. Fast processors make SteFly NAV devices the ideal solution for pilots who want to use Android apps like XCSoar, OpenSoar or SkyDemon in the cockpit.

Both the 5.7´´ and the 7´´ version were designed for fixed installation in the instrument panel, either in portrait or in landscape orientation. Special attention during the design process was given to minimize outer dimensions of the housing, because space in the instrument panel is always limited. The black anodized aluminum housing made a lightweight construction possible and improves passive cooling characteristics.

Thanks to the touch screen, the bright display may be operated intuitively. Additional input units like SteFly Remote Control Stick or Rotary Module may be connected by USB. USB-A, USB-C, SD-card slot as well as WiFi and Bluetooth enable fast data exchange and easy update process. Three serial ports are available to connect external devices like FLARM or an electric variometer like LARUS.

> 💭 SteFly NAV needs to be connected to FLARM or another device receiving GPS signals, because no GPS receiver is installed internally.

4.3   Connectors, Ports and Connection Cables

SteFly NAV devices communicate with third party devices via RS232 with IGC pinout and NMEA protocol. The communication with additional input devices (e.g. SteFly remote control stick) is via USB.

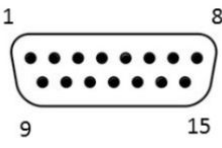The following images give an overview of the connectors and ports.

4.3.1 D-Sub 15 Connector (Male) for Power, Speaker and ttyS9

The D-Sub 15 connector offers the following possibilities:

- supplies SteFly NAV with electrical power
- enables communication with one external device via RS232 (ttyS9) or data exchange between two SteFly NAV
- connection of an external speaker (e.g. E-vario sound or alerts from the navigation app)

The following table shows the pin configuration of the D-Sub 15 connector (male).

PIN	Name	Description	View into the D-sub 15 connector of SteFly NAV device
1,9	GND	Ground	
2	ttyUSB0 TX	Optional: Serial RS232 TX (transmits data to external device)	
3	ttyS9 TX	Optional: Serial RS232 TX (transmits data to external device)	
4	Audio Out +	Speaker +	
5	nc		
6	nc		
7	+ 12 V RJ45	+ 12 V in for external devices on RJ45 port (e.g. needed, if LARUS or FLARM are connected by a patch cable)	
8, 15	VCC (9-15V DC)	+ Main power SteFly NAV	
10	ttyUSB0 RX	Optional: Serial RS232 RX (receives data from external device)	
11	ttyS9 RX	Optional: Serial RS232 RX (receives data from external device)	
12	Audio Out -	Speaker -	
13	nc		
14	nc		

Cables for power supply are typically red (or white) for +12 VDC and blue (or black) for the ground connection. Power supply cables need a minimum wire cross section of 0,5 mm².

The speaker should have an internal resistance of 4-8 Ω (max. output of 3 W @ 8 Ω).

The cables of "SteFly Wiring Harness with Loudspeaker" https://www.stefly.aero/en/product/wire-harness-openvario-loudspeaker/ have the following colours (ttyUSB0 may be added, if 4th serial connection is required):
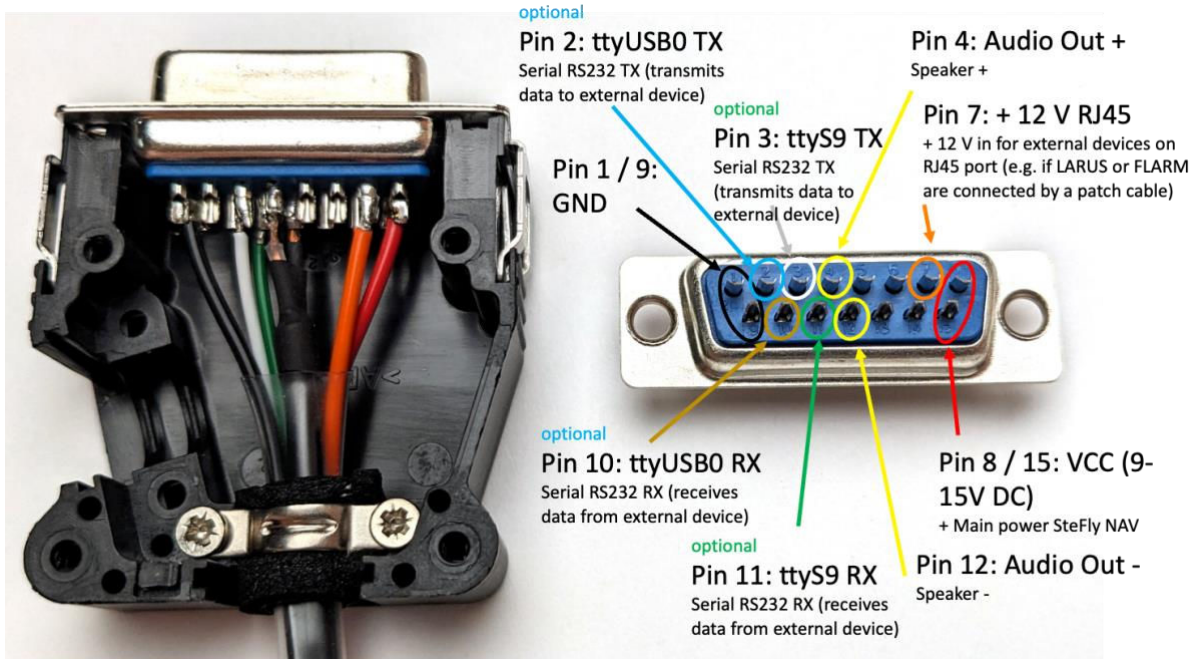
> Connect the orange cable, which is leading to Pin 7, to VCC (9-15 V DC), if external devices like Flarm or LARUS are connected to the RJ45 ports and need power from the SteFly NAV device.

To establish the serial connection between two SteFly NAV devices directly at the D-Sub 15 connector, see the following chapter.

4.3.2   RJ45 Ports "DATA ttyS3" and "DATA ttyS7"

SteFly NAV has two RJ45 ports positioned on the back side of the device, marked with "DATA ttyS3" and "DATA ttyS7".

| PIN	Port Name	Description	View into RJ45 ports "DATA ttyS3" and "DATA ttyS7" of SteFly NAV device
1	GND	Ground	
2	GND	Ground	
3	TX	TX to external device	
4	RX	RX from external device	
5	nc		
6	nc		
7	VCC (9-15 V DC)	Supply for external device	
8	VCC (9-15 V DC)	Supply for external device	

	Do only connect devices with IGC pin assignment (examples see below) with a standard 1:1 pin assigned RJ 45 / LAN cable. For other devices, special cables with an adapted pin configuration are necessary. If one or both ends of these special cables is marked e.g. with "SteFly NAV" (=OpenVario) or "LXNav", please make sure to connect the right end of the cable with the corresponding device. Non-observance could cause damages on both devices!

4.3.2.1 Connecting FLARM, LARUS and XCVario RJ45

Due to the standard IGC pinout of the SteFly NAV RJ45 ports, serial communication between SteFly NAV and many external devices is possible by just connecting both devices with a **standard patch cable with 1:1 pinout** (1 cable included in the scope of delivery of SteFly NAV).
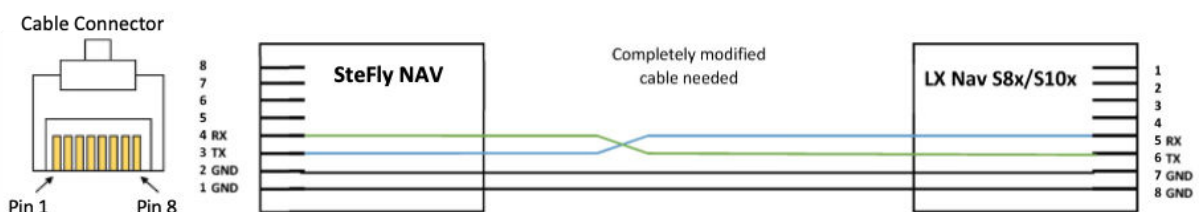
Examples are:

- Classic FLARM, PowerFLARM Core, PowerFLARM Fusion
- LARUS gliding sensor
- XCVario
- many loggers
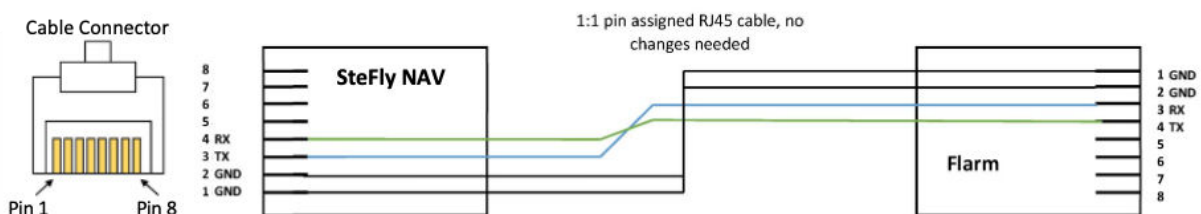
4.3.2.2 Connecting LX Nav S8x/S10x

For connecting a LX Nav S8x/S10x device, a **special cable** is needed, which is also available in our online shop https://www.stefly.aero/product/rj45-kabel-openvario-lxnav-s10-s8/:

4.3.2.3 Connecting a CNv Variometer

For connecting a CNv variometer, a **special cable** is needed, which is also available in our online shop https://www.stefly.aero/product/rj45-rj12-verbindungskabel-openvario-cnv/:

4.3.2.4 Connecting KRT 2
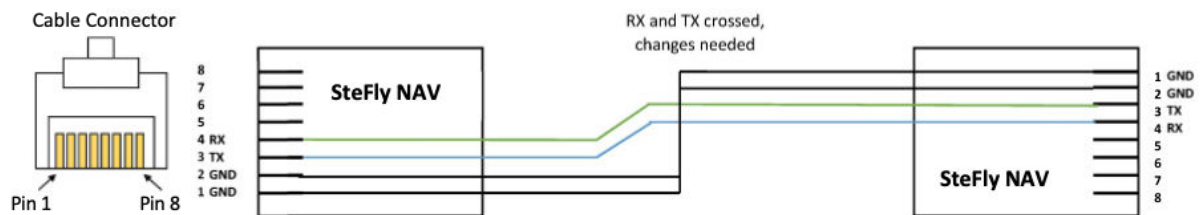
For connecting a KRT 2, a **special cable** is needed:
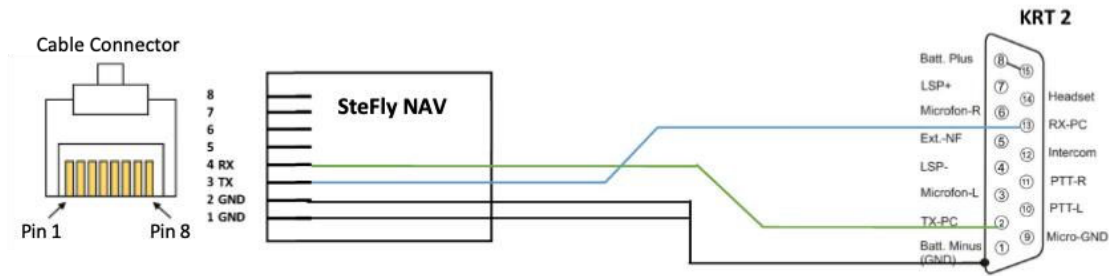
### 4.3.2.5   Connecting a second SteFly NAV (doubleseater)

For connecting a second SteFly NAV to exchange e.g. FLARM, GPS or LARUS data there are two possibilities:

Possibility A: special cable for RJ45 connectors (ttyS3 or ttyS7); RX and TX switched


Every SteFly NAV unit needs to be connected to the supply voltage via the D-Sub 15 connector.

Possibility B (recommended): establish the serial connection directly at the D-Sub 15 connectors (ttyS9); RX and TX switched
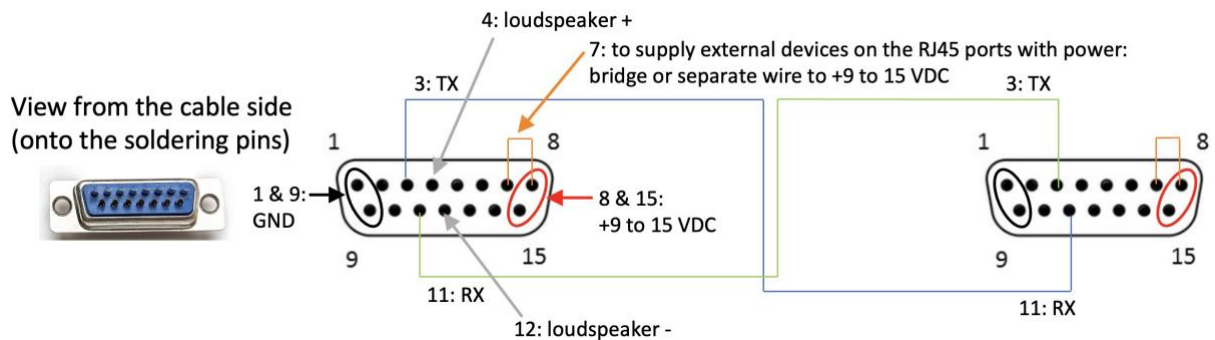

In all cases XCSoar / OpenSoar on both devices (front seat and back seat) must be configured like this to exchange data:

Step 1: Master (front seat) device, which receives data from e.g. LARUS / Flarm: "Configure" -> "Devices" -> select one of the lower lines, here line B and click "Edit"
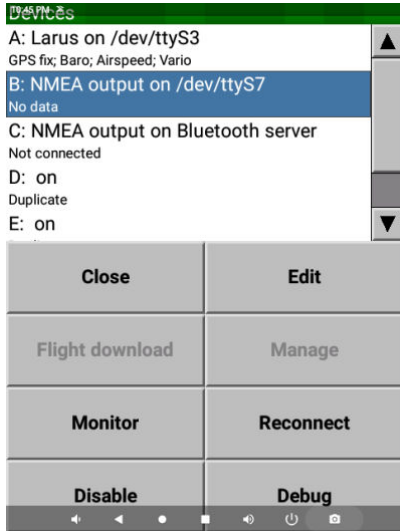
Step 2: Select the RJ45 port of the Master, which is connecting the Slave via the patch cable (either ttyS3 or ttyS7); select a baud rate of at least "38400" and the driver "NMEA output"
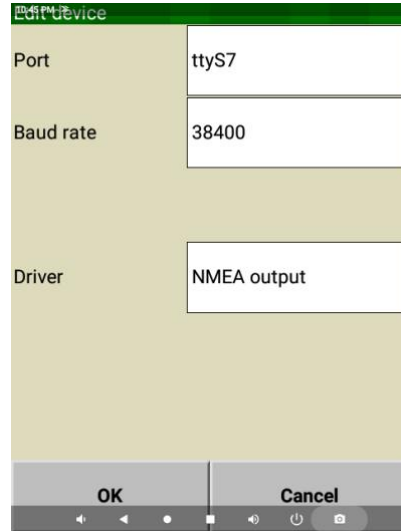
Step 3: Open XCSoar / OpenSoar on the Slave (rear seat) device: "Configure" -> "Devices" -> select one of the lower lines, here line B and click "Edit"; Select the RJ45 port of the patch cable which is connected to the Slave (either ttyS3 or ttyS7); select **the same baud rate as on the Master** and the driver of the data you want to exchange, here "LARUS"

Step 4: Repeat step 3 on the Slave and select e.g. line C to exchange data of a second external device, e.g. FLARM (therefore set driver to "Flarm")
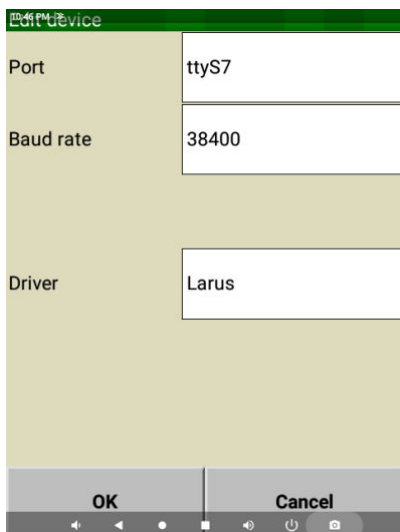
4.3.3 USB Ports

On the back side of SteFly NAV device you will find four USB-A 2.0 ports. Input devices like SteFly Remote Stick, Rotary Module or every other USB mouse or keypad can be plugged in

directly. The USB ports also allow exchanging data like software updates or maps by USB stick. The maximum current of each port is limited to 500 mA.

There is one USB-A 3.0 located on the upper side, which can deliver up to 900 mA. Therefore, it is better suitable for charging mobile devices and furthermore enables faster data transfer.

One USB-C port is located next to the USB-A 3.0 as further option for charging / data transfer.

4.3.4   SD-Card Terminal

To insert and remove the card, it must be locked/unlocked by pressing against the spring mechanism.

4.3.5   Audio out

The housing has a stereo audio socket for a 3,5 mm headphone plug. It is not recommended for connecting an external speaker because of limited power. Therefore, please use the D-Sub 15 connector (see chapter D-Sub 15 Connector (Male))

5   Installation

The first step is always planning the arrangement of all instruments on the panel and fix it in a drawing. Please note that the cut-outs for the SteFly NAV are slightly smaller than the total width of the SteFly NAV unit, because the device is installed from the backside of the panel. For the drawings with all the information about dimensions go to www.stefly.aero

⚠️ An automatic fuse is integrated on the main board SteFly NAV to prevent damage to the digital unit in case of a short circuit in the wiring or in any attached device. Nevertheless, an electrical fuse of 3 A and an on-off switch must be installed between the 12 V power supply and SteFly NAV. The switch must be accessible during the operation of the aircraft and should therefore typically be installed in the instrument panel.
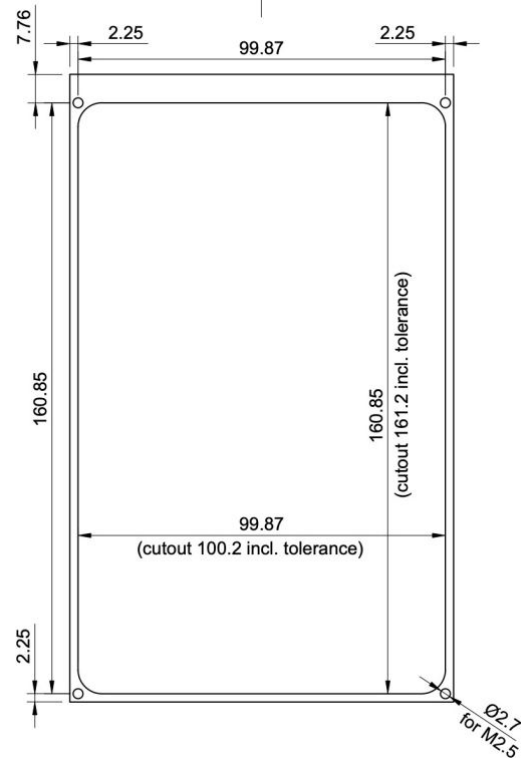
5.1   Cut-Outs

On www.stefly.aero you will find 1:1 cut-out templates. The following drawings are not true to scale!
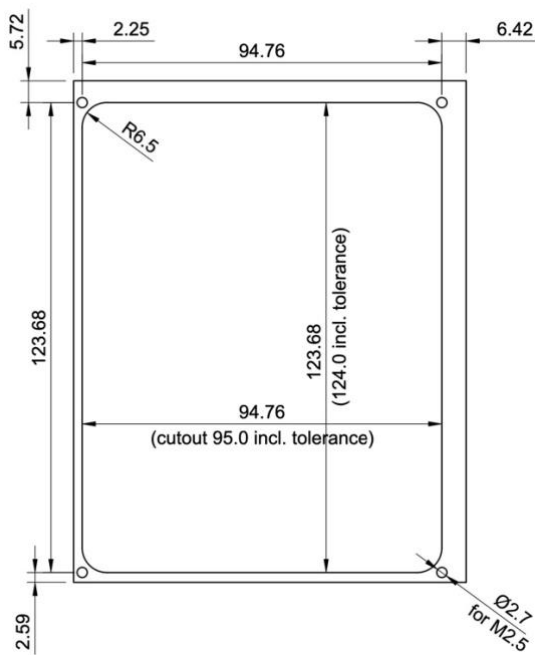
Cut-Out SteFly NAV 57   **Cut-Out SteFly NAV 70**

In case you have no CNC-machine available, you will find stainless steel templates in our online shop, which help to file the necessary cut-outs precisely into the panel material:

https://www.stefly.aero/product-category/openvario/schablonen-panelausschnitt/

5.2   Installation

SteFly NAV can be mounted in any of the 4 possible orientations, portrait or landscape. The unit is always installed from the backside of the panel and positioned in the cut-out. Afterwards it is secured with four M2,5 x 5 mm screws (included in the scope of delivery) positioned in the corners.

⚠️ Do not overtorque the screws (max. 0,8 Nm)! Otherwise, there is the risk of damaging the display frame or tearing off a screw.

The ideal panel thickness in the vicinity of the cut-out edge is 2 mm. A thinner panel lets the frame stick out of the panel surface, a thicker panel makes the edge of the cut out visible. If the panel thickness is above 4 mm, you will have to use longer screws to attach SteFly NAV (not included in scope of delivery).

The following picture shows a typical installation situation of SteFly NAV unit in the center of an instrument panel of a glider.
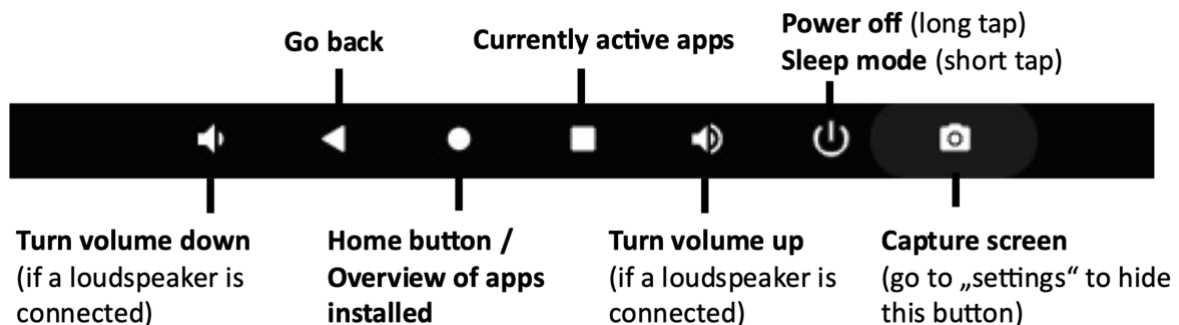
6 Operation

6.1 Boot up / Switching off

As soon as SteFly NAV is supplied with power at the D-Sub 15 connector, it will start booting up.

For switching off, press the "Power off" button of the status bar (see next chapter).

6.2 Status Bar

Once the boot up is completed, there will be displayed a status bar. It contains the following buttons:

| | In some apps like XCSoar or OpenSoar the status bar is not always visible. In this case swipe with one finger beginning from the top edge towards the screen center. |

To adjust the volume in XCSoar or OpenSoar there are at least two fast possibilities:

- Swipe **twice** with one finger beginning from the top edge towards the screen center. Then click on the "volume up" or "volume down" buttons of the status bar. In OpenSoar, it may be necessary to click on the rectangle in the status bar first.
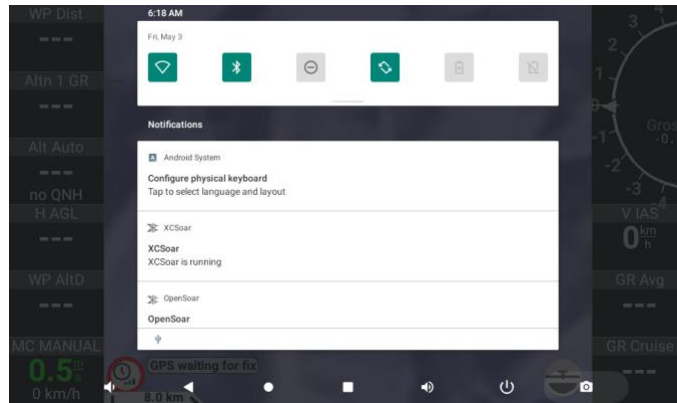
- If a SteFly Remote Control Stick is installed: For versions of OpenSoar v7.42.22 or newer or XCSoar just press the "M button" of the remote control for 2 seconds and adjust the volume with the joystick.

6.3   Settings

The settings menu ⚙ can be found by swiping from the upper edge of the screen down to the center with one finger
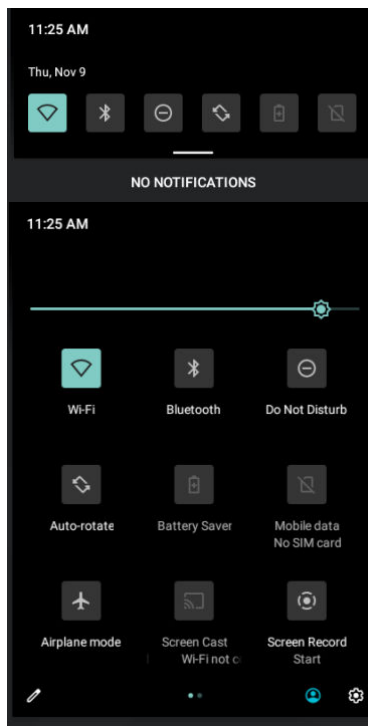
and then expanding the menu again by swiping down a second time

Some settings like adjusting the brightness can be quickly changed by clicking on the corresponding symbols. Here you can also connect your NAV device to a WiFi network. Click on the WiFi symbol for one second and select a network or mobile device offering a hotspot.

6.4   Installing Apps

SteFly NAV devices have already installed Play Store from Google, where you will find millions of Android apps. Click on the circle of the status bar (=the home button) and click on "Play Store". You need to sign in with a Google account. Afterwards you can search and install the required app.

Some apps are also available from other sources as "Android Package" with the file extension apk. One example is OpenSoar, an app based on XCSoar which has some features to show all the information LARUS gliding sensor generates (https://opensoar.de/releases/). After the download of an apk file has been completed click on the file in the download folder and install the app.

> It is always best to install apps directly from Google Play Store to minimize risk to the security and integrity of your device and your personal information. Please evaluate if you trust the source before downloading apk files.

6.5   Uninstalling / Deleting Apps

If an app is not further needed, hold your finger on the corresponding icon of the app for 1 second, then click "uninstall"

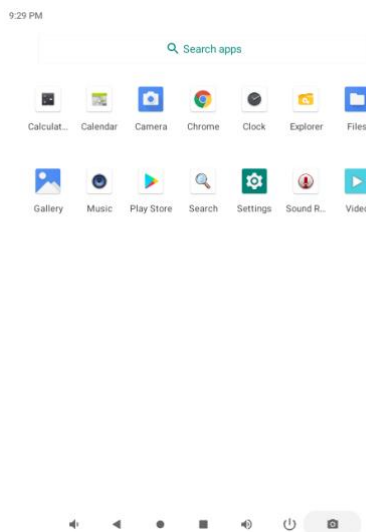## 6.6   Software Configuration

6.6.1   XCSoar Configuration

Before beginning with the XCSoar configuration, the app has to be installed on SteFly NAV (e.g. from Google Play Store, but your SteFly NAV device already comes with XCSoar).

Please find necessary data like maps, airports or waypoints here for download:
https://www.xcsoar.org/download/

All these files need to be copied to the XCSoar folder of your device. Therefore, follow these steps:

**Step 1:** Click on the circle of the status bar (=the home button) and then open the app "Files"

Step 2: Navigate to the directory, where the downloaded maps, airports, … are located.
Step 3: Mark these files (hold your finger about one second on the file and wait until it says "selected") and copy them (therefore click on the 3-dot-symbol in the upper right corner and click on "Copy to"; Multiple files can also be selected at the same time by keeping your finger touching the touchscreen and swiping over the corresponding files.

Step 4: Click on the symbol with the three lines ("Hamburger Menu") in the upper left corner, click on the "XCSoar" folder and paste the data there (therefore click on the button "COPY" in the lower part)
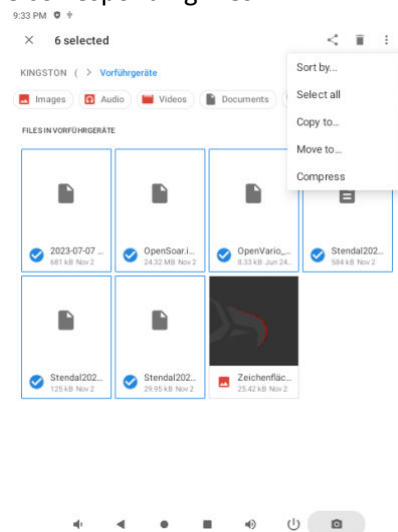
Step 5: Open the XCSoar app. Double click on the display center. Click on "Config", then "System", then "Site Files" and fill in the names of the corresponding files (e.g. GER_HighRes.xcm)
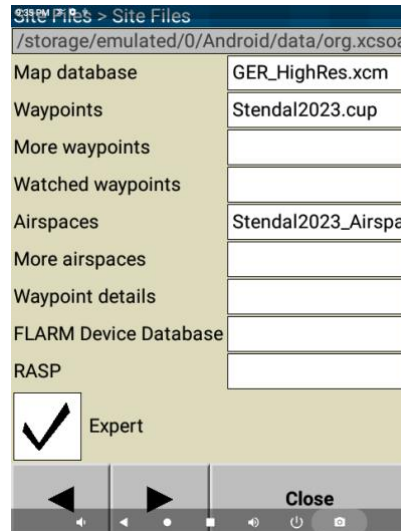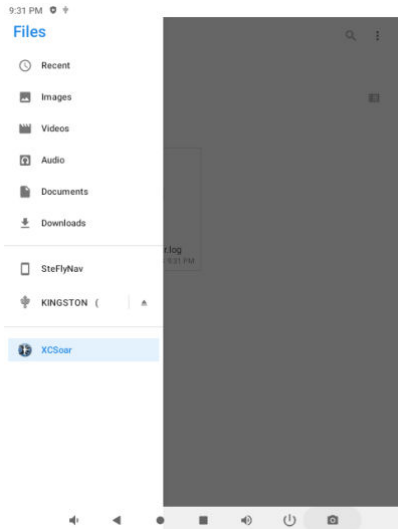
6.6.2   OpenSoar and LARUS Configuration

OpenSoar is a fork of the XCSoar software by the software developer Uwe Augustin. Therefore, OpenSoar and XCSoar are very similar in terms of operation and layout. However, OpenSoar has some additional functions and further developments (https://opensoar.de/releases/). The basic configuration is identical to XCSoar (see previous chapter).

For sending data from gliding sensor unit LARUS to OpenSoar connect LARUS and SteFly NAV with a standard patch cable (included in scope of delivery). Choose "RS232" port at LARUS and either "DATA ttyS3" or "DATA ttyS7" at SteFly NAV.

Step 1: Open the app OpenSoar; Click twice on the center of the screen, then click on "Config"
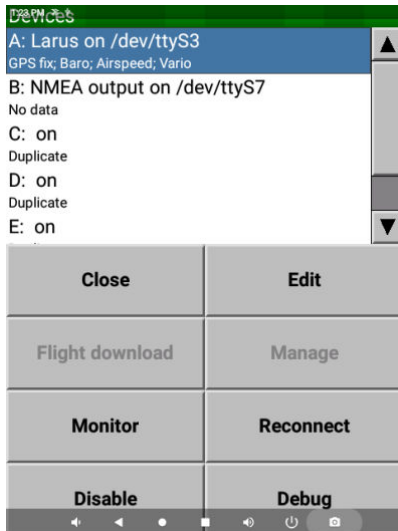
Step 2: Click on "Devices"
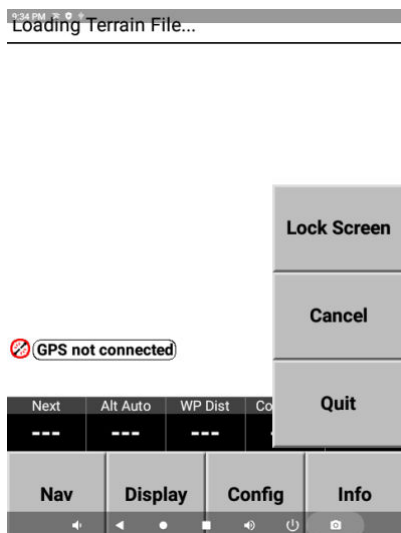
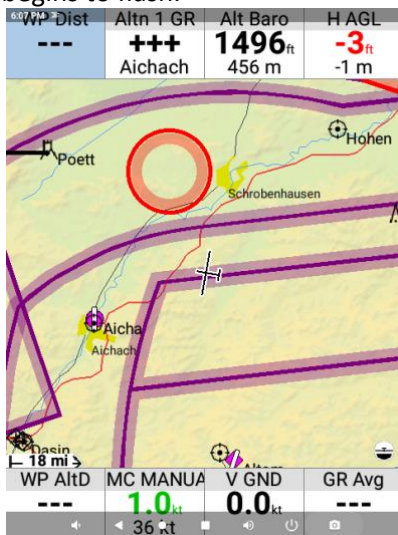**Step 3:** Select line A and click "Edit"
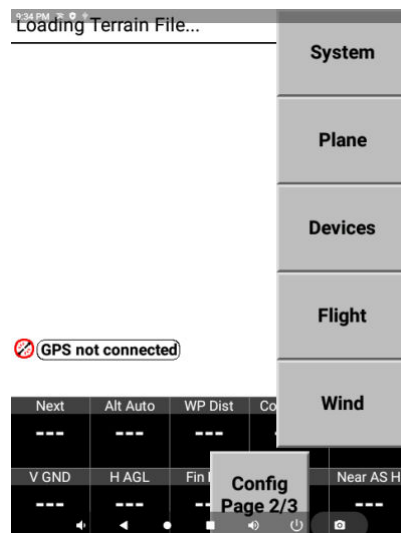
Step 4: Select the "Port" which is connected to LARUS (ttyS3 or ttyS7), set "Baud rate" to 38400 and the "Driver" Larus. Then click OK
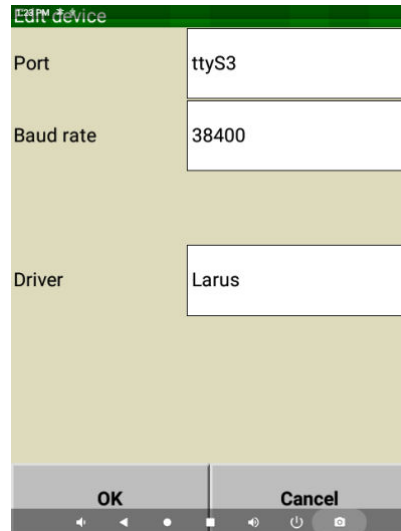
Step 5: Depending on the position of the GNSS antenna (put the fuselage out of the hangar, the antenna needs free line of sight to satellites) it may take some minutes until your position, speed and altitude is shown. At the same time, the blue "GNSS" control LED of LARUS begins to flash.

Step 6: Display the attitude indicator (artificial horizon) on a new page. Therefore, click twice on the middle of the screen, ->Config ->System -> Look -> Pages -> Add (and set "Main area" -> Horizon)

Step 7: The installation position of the LARUS can now be checked using the artificial horizon.
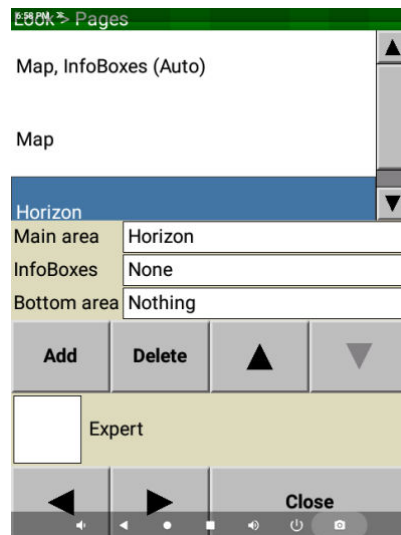
Step 8: If your glider is in flight position and corresponds to the artificial horizon, then you are finished. If not eject the Micro-SD Card of LARUS, insert it in a computer and open the file "sensor_config.txt". Change the numbers (unit is degrees) in lines 1-3. E.g. if the artificial horizon should roll to the right, increase the value in line 01, if it should nick down then increase the value in line 02. Save the file without changing the name. Insert the SD card back into LARUS and wait some seconds, until the artificial horizon has changed.
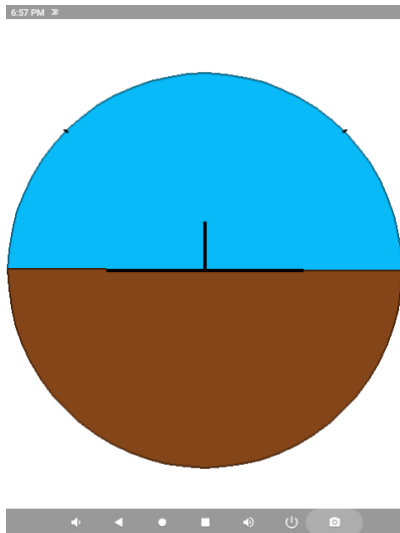
7 Maintenance

The whole system has no serviceable parts. If it is needed to clean the touchscreen, power off SteFly NAV first. Then gently clean the screen with a microfiber cloth or similar soft, lint-free cloth. If necessary, moisten the cloth with a very small amount of distilled water.

To obtain warranty service, please contact SteFly directly.

⚠️ Opening the housing of SteFly NAV device will void the warranty!

8   Technical Data

Size	Unit	Value
mass SteFly NAV 57	g	370 g
mass SteFly NAV 70	g	420 g
dimensions SteFly NAV 57	mm (length x width x height)	132 mm x 104 mm x 39 mm
dimensions SteFly NAV 70	mm (length x width x height)	171 mm x 105 mm x 37 mm
input voltage	V DC	9 – 15 (not compatible with non-aviation approved NMC batteries (e.g. LiNiMnCoO2))
amperage SteFly NAV 57	mA	80% brightness @ 13.5 V: 240 mA ; 100% brightness @ 13.5V: 400mA
amperage SteFly NAV 70	mA	80% brightness @ 13.5 V: 260 mA; 100% brightness @ 13.5V: 410mA
operating temperature	°C	-30 to +60
operating rel. humidity	%	0 - 95
material housing		black anodized aluminium
interfaces		4 x RS232 serial interface (2 RJ45 connector ttyS3 / ttyS7 and via the D-Sub connector ttyS9 / ttyUSB0), Bluetooth, WiFi
USB and SD		1 x USB Type-A 3.0, 4 x USB Type-A 2.0, 1 x USB Type-C, 1 x SD card slot
processor		Quad-core CPU with 1.8 GHz; 2 GB LPDDR4 RAM; 32 GB EMMC memory
display SteFly NAV 57		capacitve touchscreen optically bonded; 640 x 480 px, 1600 cd/m²
display SteFly NAV 70		capacitve touchscreen optically bonded; 1024 x 600 px 1200 cd/m²
operating system		Android 11 with Google Play Store