

# FLYMASTER NAVC



## User Manual 1.1

# IMPORTANT

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## Tech Specs

Display Type.....	Reflective colour 640x480px
Battery Capacity (Lithium-Ion).....	6000mAh
Autonomy.....	Usually +24 hours (environment conditions may alter this value)
Pressure Sensor.....	High resolution barometric sensor 10 to 1200 mbar
Audio.....	Dual speaker system for separate vario and voice sound
Memory expansion.....	High speed 128 GB Micro SD card
GPS.....	72-channel BeiDou, Galileo, GLONASS, GPS / QZSS
Microprocessor.....	Flymaster Microprocessor with proprietary RTOS
FLARM.....	Flarm ready (optional Flarm Aware RX+TX mode)
Bluetooth.....	Bluetooth 5 low energy module
Native USB Type C Connection.....	Allows connection to the PC
Battery Charging.....	From wall adapter or usb port
Firmware update by USB (upgrades are free)	
Size.....	152x90x18 mm
Weight.....	Aprox.220g

## Overview



## FLARM ANTENNA (When you acquire a NAV C equipped with the FLARM module)

### **Warning:**

The Flymaster utilizes an external antenna that has been precisely tuned to the Flarm board circuit, specifically for the frequency band it operates on. While it may be perceived as a minor inconvenience during takeoff, this antenna plays a crucial role in ensuring the system functions optimally, allowing Flarm to operate effectively over the necessary distances. This capability is vital for promoting aircraft visibility and facilitating safe interactions with other flying vehicles.

To maintain the integrity of the Flarm system, it is imperative to use only the provided antenna engraved with the Flymaster branding. This measure is implemented to prevent any inadvertent swapping or confusion with other antennas. Using a different antenna can lead to significant malfunctions within the Flarm system, jeopardizing the pilot's ability to be detected by nearby aircraft and potentially increasing the risk of accidents.

In essence, the proper functioning of the Flarm system relies on the correct utilization of the designated antenna. By adhering to these guidelines and ensuring the use of the supplied antenna, pilots can enhance their visibility and contribute to a safer airspace for all.

**Installation** - Be sure to install the antenna, tightening it to the end of the thread securely. the tightening must be done in a clockwise direction.



## Recommended take-off position



**Antenna cap** - When the pilot does not want or does not need to fly with the Flarm antenna, must place the rubber cap (supplied) to cover the antenna socket.



## First Steps

**Do not delete or manipulate any files in the SD card directly. All SD card management tasks must be done through Flymaster Instrument Manager.**

**Not doing so, may cause the instrument to malfunction.**

**To copy some file from SD card to your computer, you must use your computer's file explorer using the USB connection with the instrument.**

### 1.

We recommend the reading of the following documents:

- Warranty terms and conditions.

To do that, please use the following links:

[https://dnl.flymaster.net/Flymaster\\_Standard\\_Limited\\_Warranty\\_EN.pdf](https://dnl.flymaster.net/Flymaster_Standard_Limited_Warranty_EN.pdf)

### 2.

Create a Flymaster Cloud account if you don't already have one.

After the account creation go to:

<https://NAVtrack360.com/login>

### 3.

Register and activate the instrument.

A valid Paypal account is needed to activate the NAV C.

Go to the following link and use the activation code.

<https://NAVtrack360.com/devices/register>

### 4.

Install "Flymaster Instrument Manager" to manage your NAV C.

Connect your instrument to the computer via USB. The instrument will appear as a mass storage.

Inside you will find a folder called "Flymaster Instrument Manager" where the installation files are located. Alternatively, you can and should download the latest version available on the Flymaster website in the "downloads" section.

5.

## OPTIONAL FLARM AWARE SERVICE ACTIVATION

**When you acquire a NAV C equipped with the FLARM module no extra service needed. This means that you will be visible to other instruments that are able to receive Flarm positions (RX).**

If you want to have FLARM AWARE service (also receive FLARM position from others and have potential collision warnings) in your instrument you need to activate the optional FLARM aware service. To do that, go to our website ([www.flymaster.net](http://www.flymaster.net)), and under “accessories” you can buy the product “Flarm Aware”.

You must fill in the “**Dev. ID**” (**Flarm Serial number**, which can be seen on the instrument, under “Device Info” option. **THIS IS NOT THE INSTRUMENT SERIAL NUMBER.**

After receiving a confirmation email with the activation code, you must enter it in Flymaster Instrument manager, with the instrument connected.

The cost is 50 Euros for a lifetime activation.

Date: 2023-07-24 Time: 13:48:55

UTC offset: +00:00

Serial Number: 15634

### FLARM

Dev ID: 00515

Expires: 2024-03-01

Version: 7.09

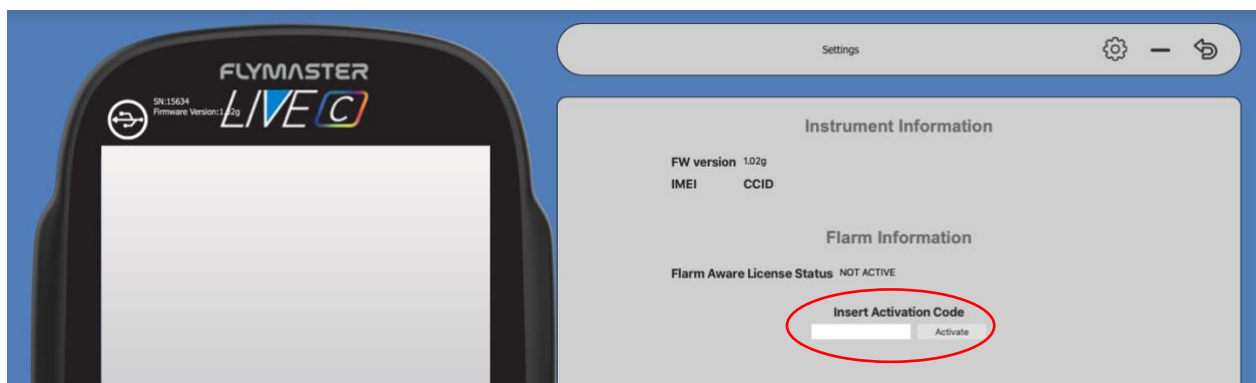
Global Id: 220203

### Battery

State Discharging

Level: 100%

Remaining battery time 25:34



## Reset and recovering instrument

### *Hardware Reset (force shutdown)*



3 seconds and release

If for some reason your instrument becomes unresponsive you can force a reset to force it to shutdown.

Press the power button together with Menu/Esc at the same time for 2 or 3 seconds and release.

After releasing the buttons, the instrument should switch off.

Turn the instrument back on normally.



## Force firmware install (recover the instrument)

If for some reason your instrument does not start and an error message appears on the colour display such as "invalid crc", missing font, etc, this means that somehow essential files for the recognition of the firmware version have been damaged on the SD card and it will not be possible to restore firmware.

This does not necessarily mean any hardware problem with the instrument itself.

### How to solve ?

You must have an SD card reader on your computer.

Have an Internet connection

Have the latest version of Flymaster Instrument Manager (downloads for this instrument are available on the Flymaster website under Products -> NAV C-> Downloads tab

First of all, force the instrument to shut down by pressing power button together with Menu/Esc at the same time for about 3 seconds and release.

After releasing the buttons, the instrument should switch off.

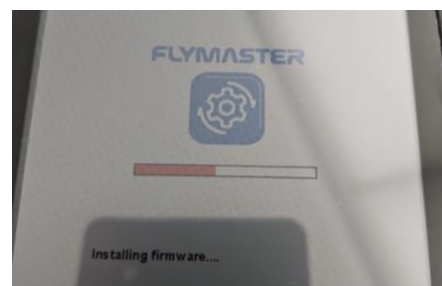
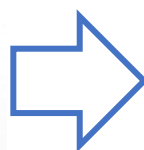
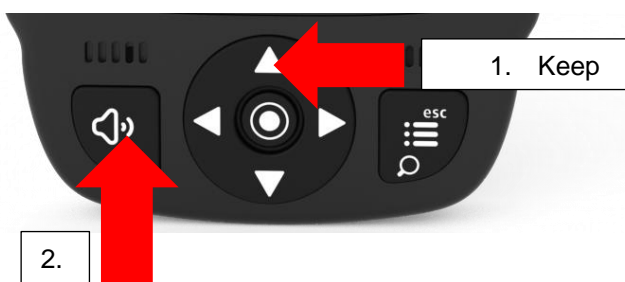
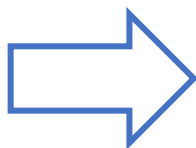
This process is not dependent on any software and is always successful in any situation.

**Method 1** - Use the SOS SD card tool, present in the latest versions of Flymaster Instrument Manager. When you click on the tool, you will follow a pop-up that will guide you through the procedure of ejecting the SD card from your NAV C and inserting it into your computer's card reader. After being detected by your computer, the process is automatic and the necessary files will be copied to the card.

After this first step, just force installation of the NAV C Firmware.

Insert the SD card into the NAV C.

Press the UP key and keep it pressed while pressing the "power" key. Keep the UP cursor key pressed until "installing firmware" appears on the display.

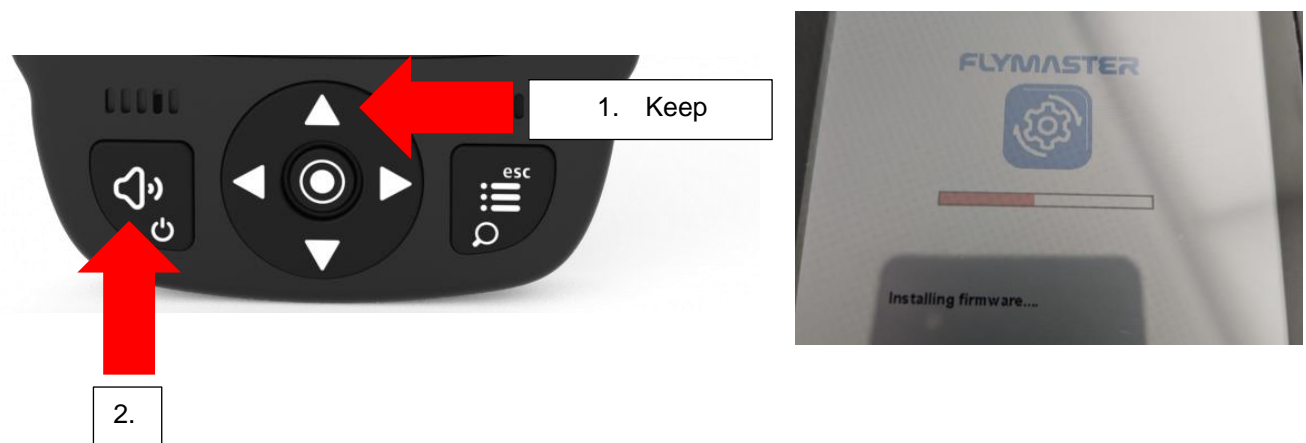


**Method 2** - Download "[NAVc-firmware.zip](#)" from the Flymaster website (downloads for this instrument are available on the Flymaster website under Products - > NAV C -> Downloads tab) to your computer. Unzip this zip file, to the SD card (its contents to the root directory of the card, extract the folder hierarchy and keep them in the SD card root, replacing files and folders when asked). Properly eject the SD card from your computer.

After this first step, just force installation of the NAV C Firmware.

Insert the SD card into the NAV C.

Press the UP key and keep it pressed while pressing the "power" key. Keep the UP cursor key pressed until "installing firmware" appears on the display.



## Charging and battery management

Flymaster NAV C has an advanced battery power management system, which gives the pilot accurate information about the battery state, as well as the charging time and battery remaining time.

To charge the Flymaster NAV C battery we recommend the usage of the supplied wall charger and USB cable via USB Type-C port.

Original Flymaster accessories are recommended in order to avoid damage to the power management system.

Charging, and battery status information is shown on both the power up screen and the settings info page.

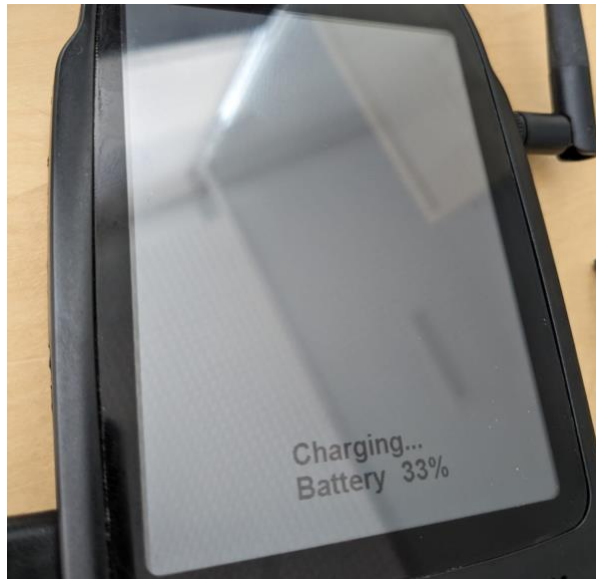
When Flymaster NAV C is connected to a power supply (wall charger or via USB cable), the instrument will show the time remaining to full charge.

Use the supplied wall power supply to fully charge the instrument.

Note: Charging the instrument with high ambient temperatures should be avoided. Such action can cause the battery to overheat and affect the battery health.



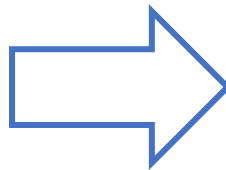
## Check battery status and time remaining:



Flymaster NAV C is charging turned off



Device Info



Date: 2023-07-24 Time: 08:39:13

UTC offset: +00:00

Serial Number: 15634

### FLARM

Dev ID: 00515

Expires: 2024-03-01

Version: 7.09

Global Id: 220203

### Battery

State Discharging

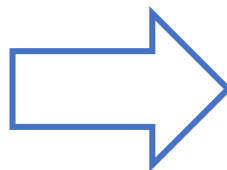
Level: 87%

Remaining battery time 25:07

Flymaster NAV C is off charging. The remaining time of usage can be seen in the display.



Device Info



Date: 2023-07-24 Time: 08:31:35

UTC offset: +00:00

Serial Number: 15634

#### FLARM

Dev ID: 00515

Expires: 2024-03-01

Version: 7.09

Global Id: 220203

#### Battery

State Charging...

Level: 87%

Full Charge in 00:36

Charging Current 2208 mA

Voltage: 4.0v

Flymaster NAV C is charging turned on. It's possible to check the time remaining to achieve full charge.

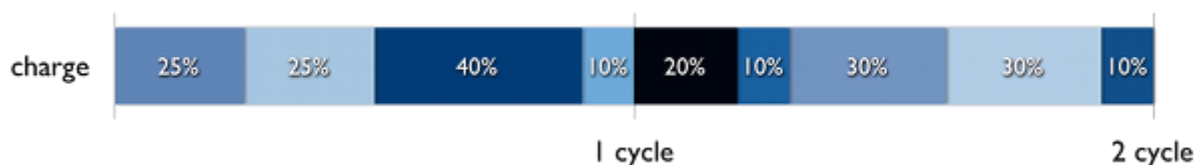
## ***How to preserve the battery lifespan***

All Flymaster instruments use Lithium-Ion batteries. Compared with traditional battery technology, lithium-ion batteries charge faster, last longer, and have a higher power density for more battery life in a lighter package.

The Flymaster lithium-ion battery uses fast charging to quickly reach 80% of its capacity, then switches to slower trickle charging. The amount of time it takes to reach that first 80% will vary depending on your settings and which instrument you're charging. This combined process not only lets you get out flying sooner, but it also extends the lifespan of your battery.

## ***Charging is easy***

Charge your Flymaster lithium-ion battery whenever you want. There's no need to let it discharge 100% before recharging. Flymaster lithium-ion batteries work in charge cycles. You complete one charge cycle when you've used (discharged) an amount that equals 100% of your battery's capacity - but not necessarily all from one charge. For instance, you might use 75% of your battery's capacity one day, then recharge it fully overnight. If you use 25% the next day, you will have discharged a total of 100%, and the two days will add up to one charge cycle. It could take several days to complete a cycle. The capacity of any type of battery will diminish after a certain amount of recharging. With lithium-ion batteries, the capacity diminishes slightly with each complete charge cycle. Flymaster lithium-ion batteries are designed to hold at least 80% of their original capacity for a high number of charge cycles, which varies depending on the instrument.



### ***Avoid extreme ambient temperatures***

Your instrument is designed to perform well in a wide range of ambient temperatures, with 5° to 25° C as the ideal comfort zone. It's especially important to avoid exposing your instrument to ambient temperatures higher than 35° C, which can permanently damage battery capacity. That is, your battery won't power your device as long on a given charge. Charging the device in high ambient temperatures can damage it further. Even storing a battery in a hot environment can damage it irreversibly. When using your device in a very cold environment, you may notice a decrease in battery life, but this condition is temporary. Once the battery's temperature returns to its normal operating range, its performance will return to normal as well. Store it half-charged when you store your instrument long term.

If you want to store your device long term, two key factors will affect the overall health of your battery: the environmental temperature and the percentage of charge on the battery when it's powered down for storage. Therefore, we recommend the following:

- Do not fully charge or fully discharge your instrument's battery - charge it to around 50%. If you store a device when its battery is fully discharged, the battery could fall into a deep discharge state, which renders it incapable of holding a charge. Conversely, if you store it fully charged for an extended period of time, the battery may lose some capacity, leading to shorter battery life.
- Place your instrument in a cool, moisture-free environment that's less than 32° C.
- If you plan to store your device for longer than six months, charge it to 50% every six months.

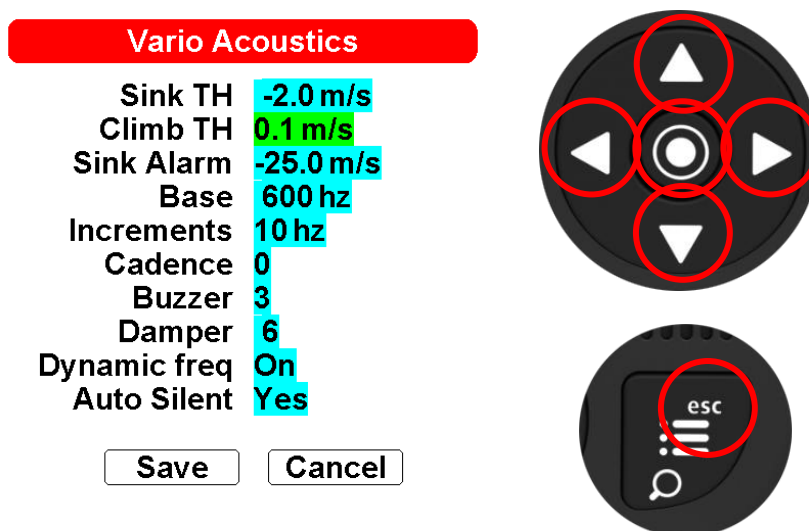
## Keys and User interface

### Main menu navigation keys



Use cursor/pan keys choose option. Push enter/mark key to select.

### List type menu



Use Map pan keys (up and down only) do choose option.

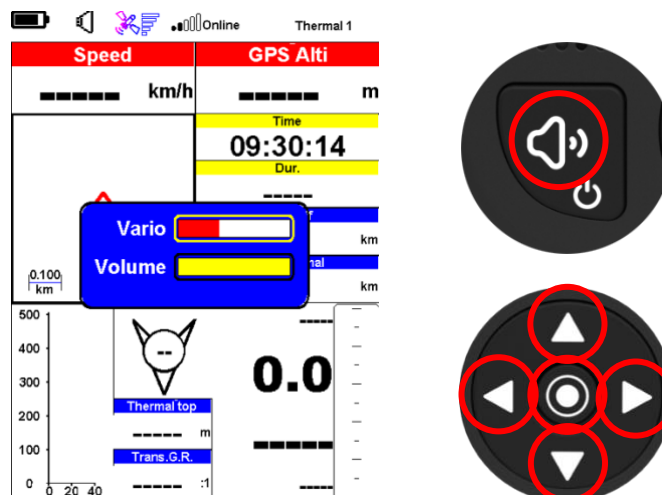
Push enter/mark key or to select.

When selected use up and down keys to change values, press Enter to confirm.

Press ESC to exit.

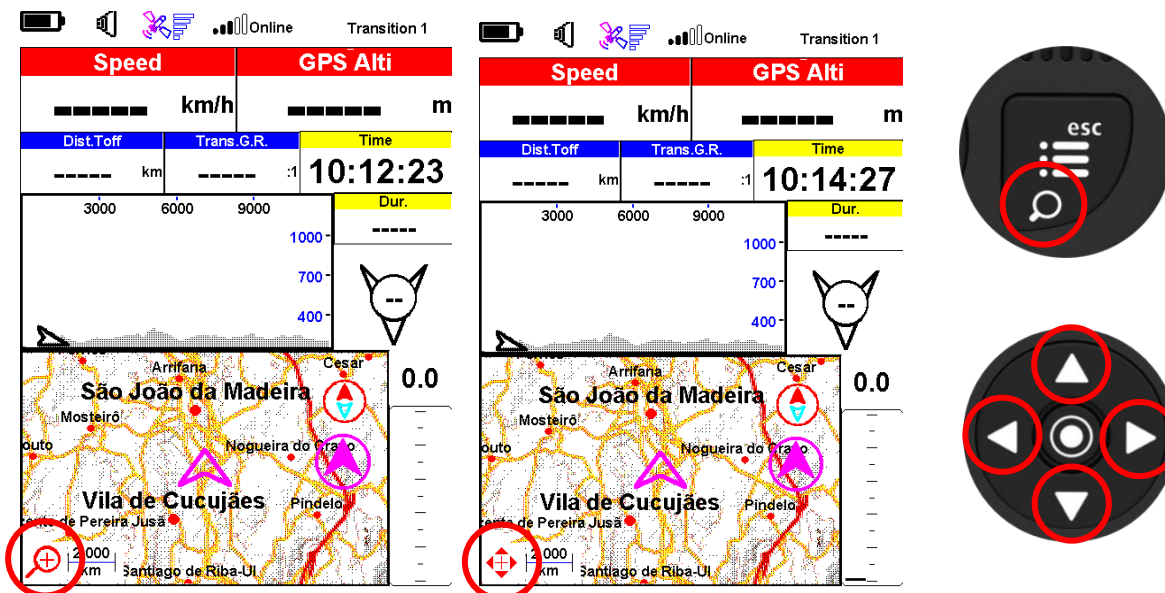


## Setting the volume



- 1- Long press volume/power key
- 2 – Use Up and Down key to change between Vario and Volume (voice assistance)
- 3 – Use left and right keys to change setting
- 4 – Press Enter to accept and exit setting volume mode

## Zoom and pan map object



- In any layout that contains a Map object is possible to Zoom or pan.
- 1 – Long press Power/menu key to change between zoom and pan mode.
  - 3 – Use up key to zoom in. Use Down key to zoom out.
- In pan mode use Up/down/left/right keys to pan (move) map.

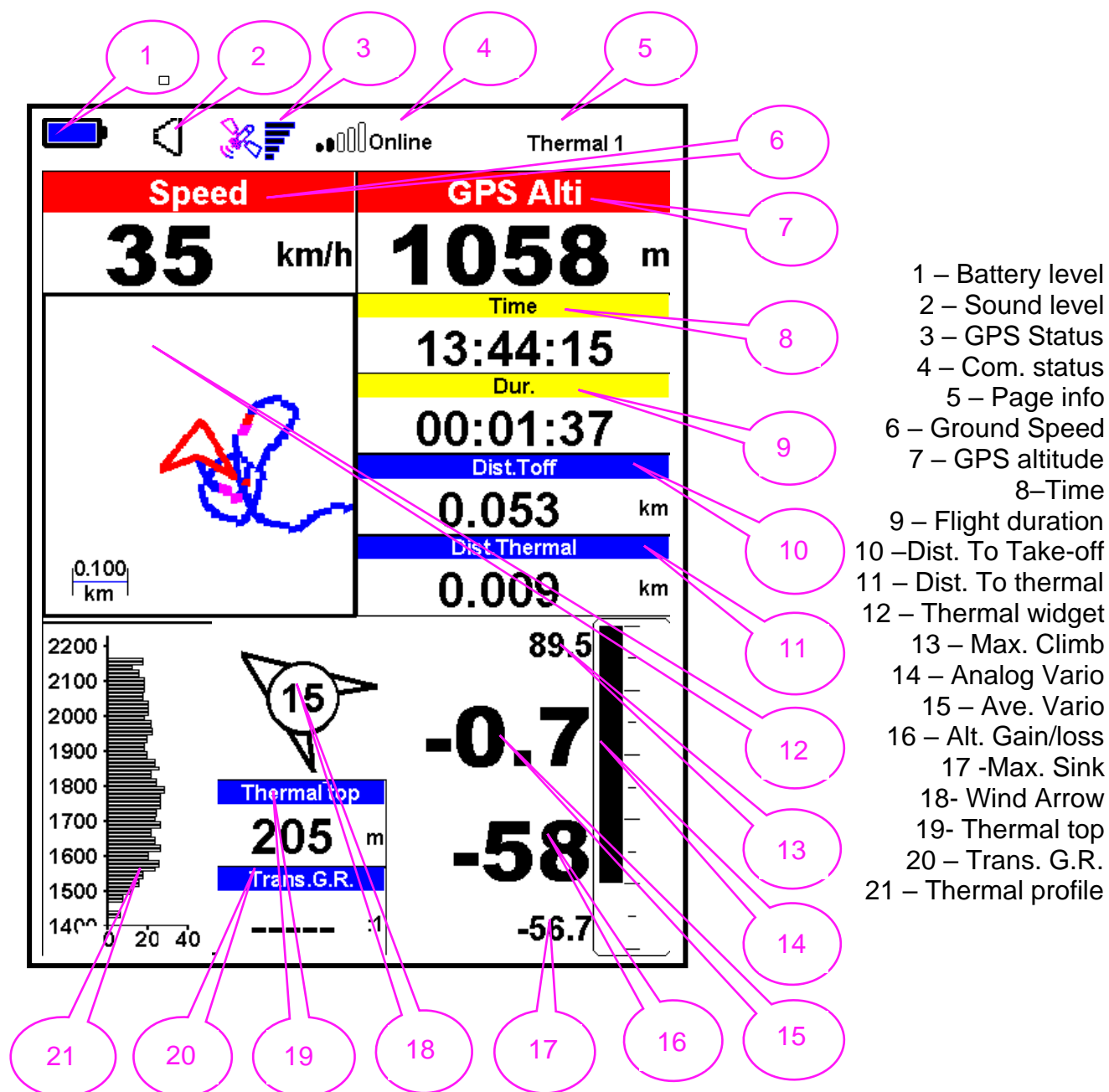
## Default Pages

Flymaster NAV C allows you to design up to 8 pages (portrait and landscape mode) using the Flymaster Instrument Manager. In flight mode you can change pages manually using the Enter key. In Flight mode long press Enter to show page shortcut menu. On the following pages we will show which pages Flymaster designed and which will be default to the instrument.

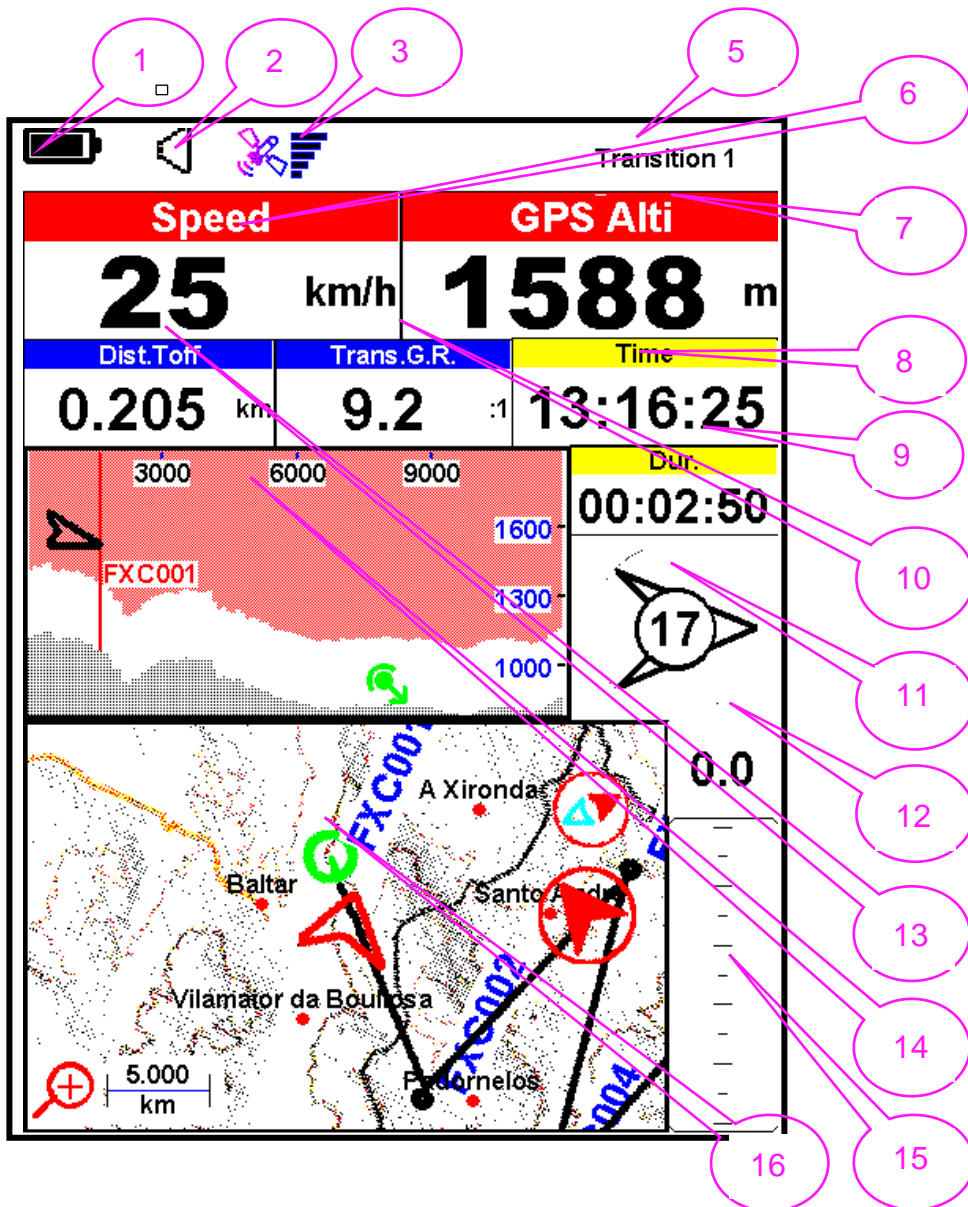
The description of each data field is available in this user manual in the section “available data fields”.

The description of each object is available in this user manual in the section “objects”.

### Page 1 - Thermal 1

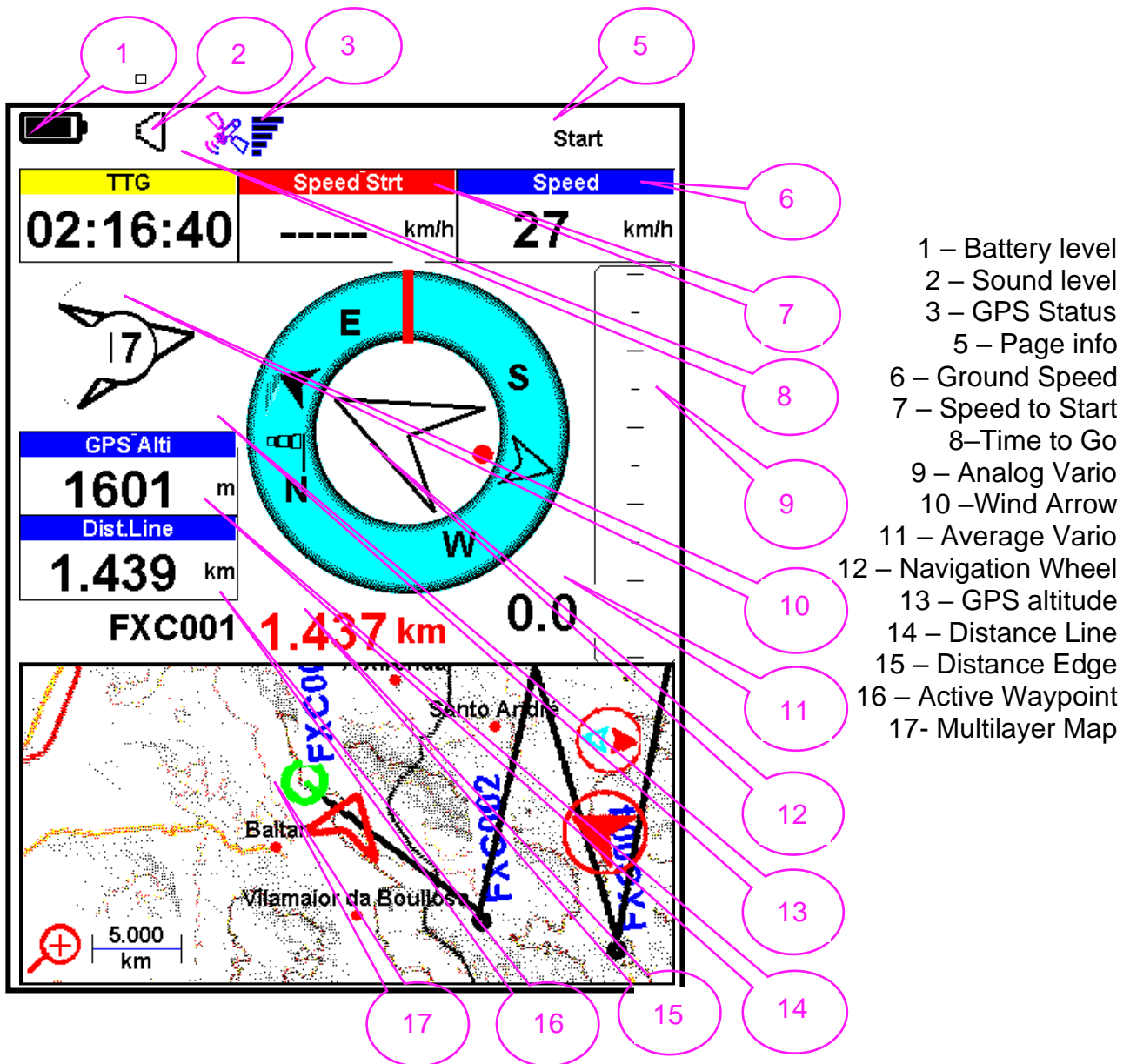


## Page 2 - Transition 1

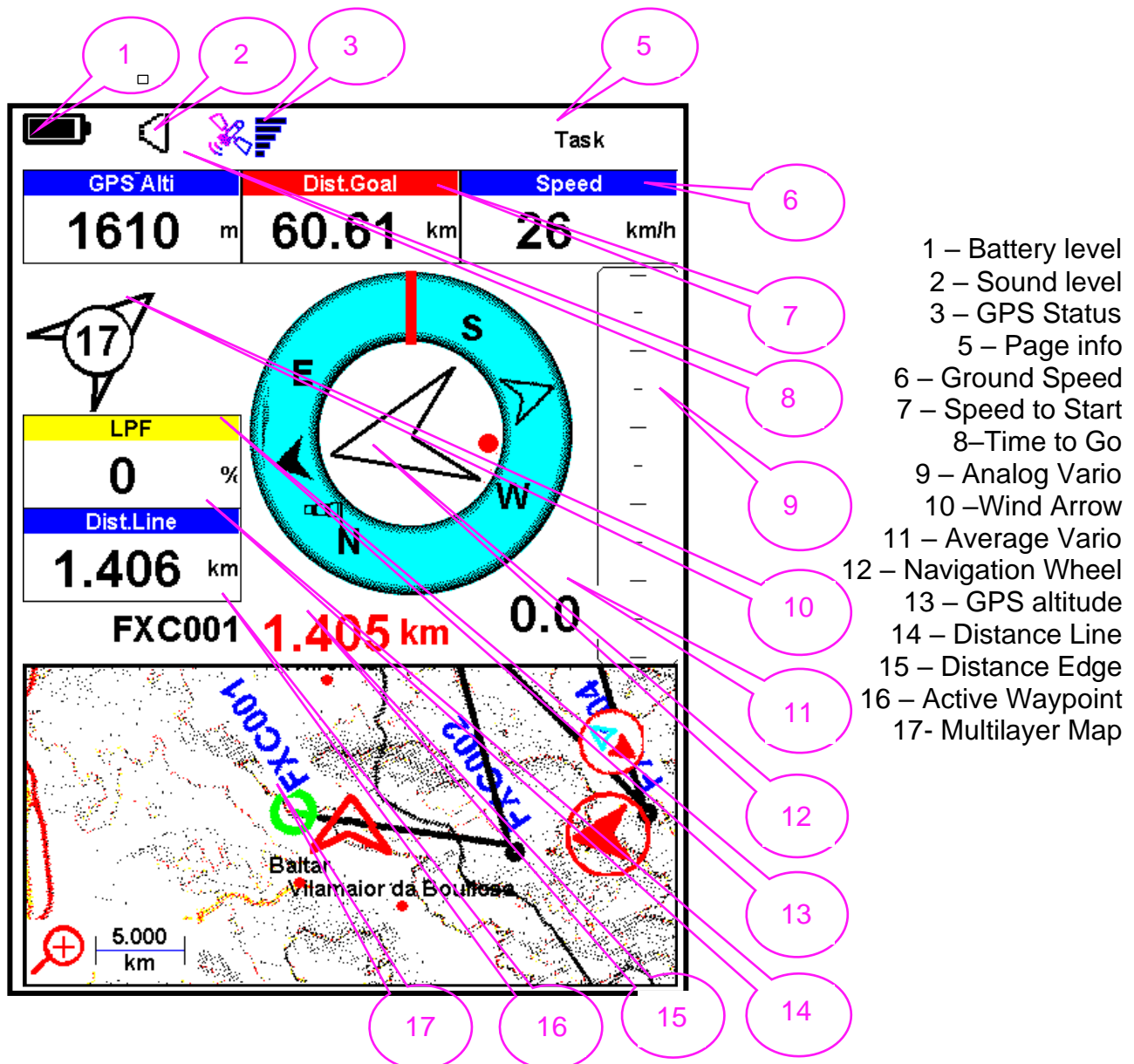


- 1 – Battery level
- 2 – Sound level
- 3 – GPS Status
- 5 – Page info
- 6 – Ground Speed
- 7 – GPS altitude
- 8 – Time
- 9 – Flight duration
- 10 – Transition G.R.
- 11 – Wind Arrow
- 12 – Average Vario
- 13 – Dist. Take-off
- 14 – Profile Map
- 15 – Analog vario
- 16 – Multilayer Map

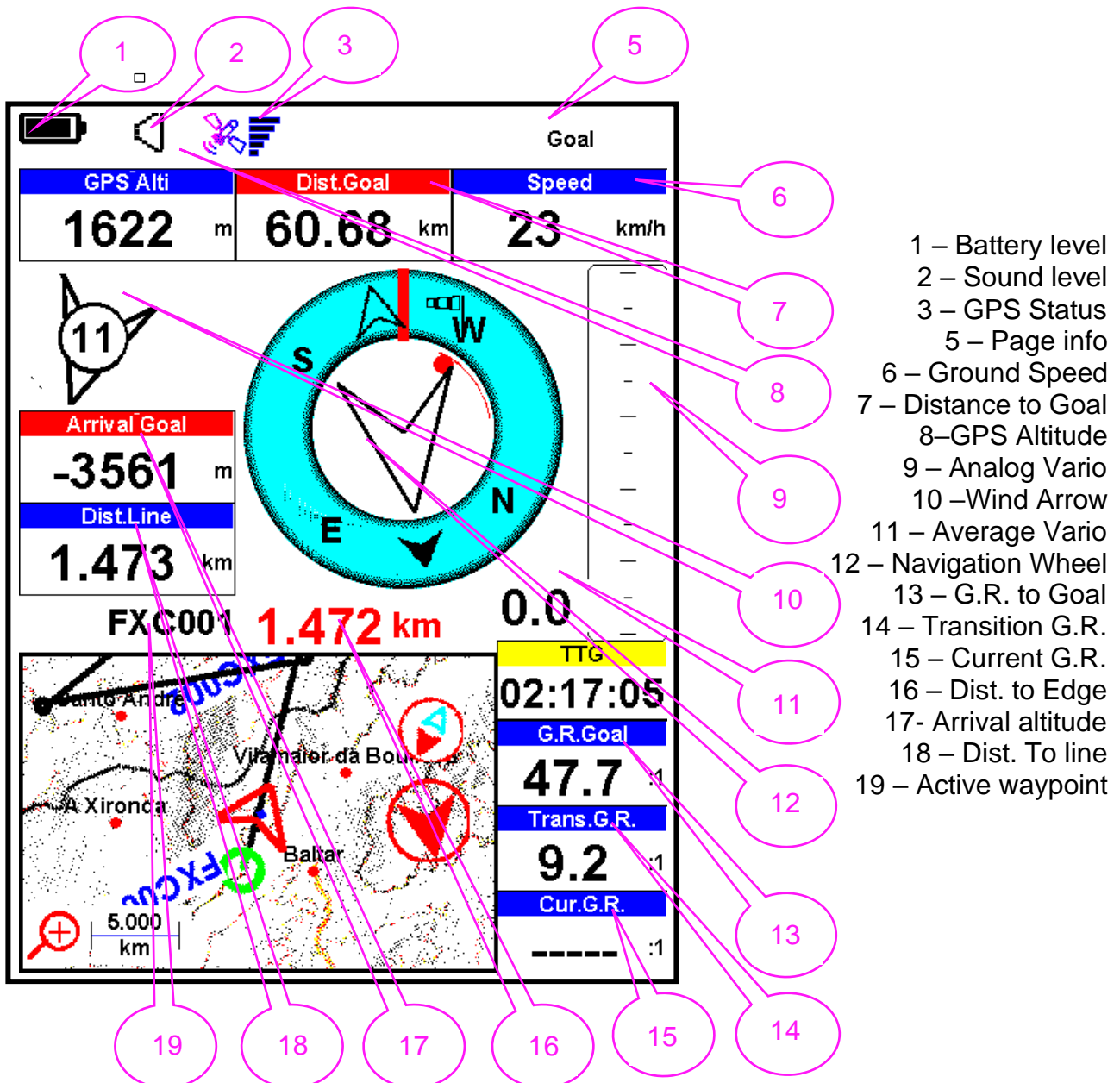
Page 3 - Start



Page 4 - Task

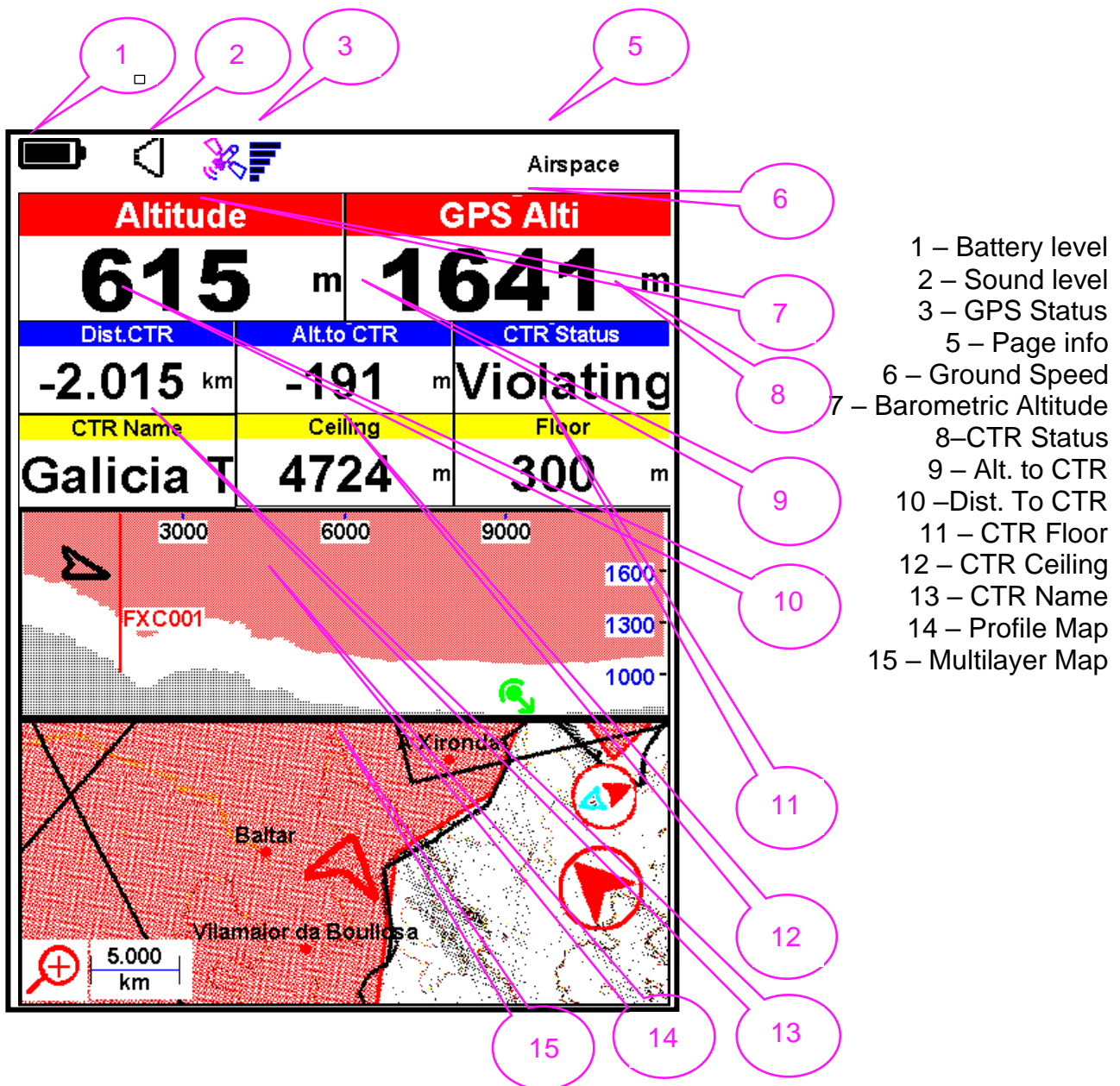


## Page 5 - Goal

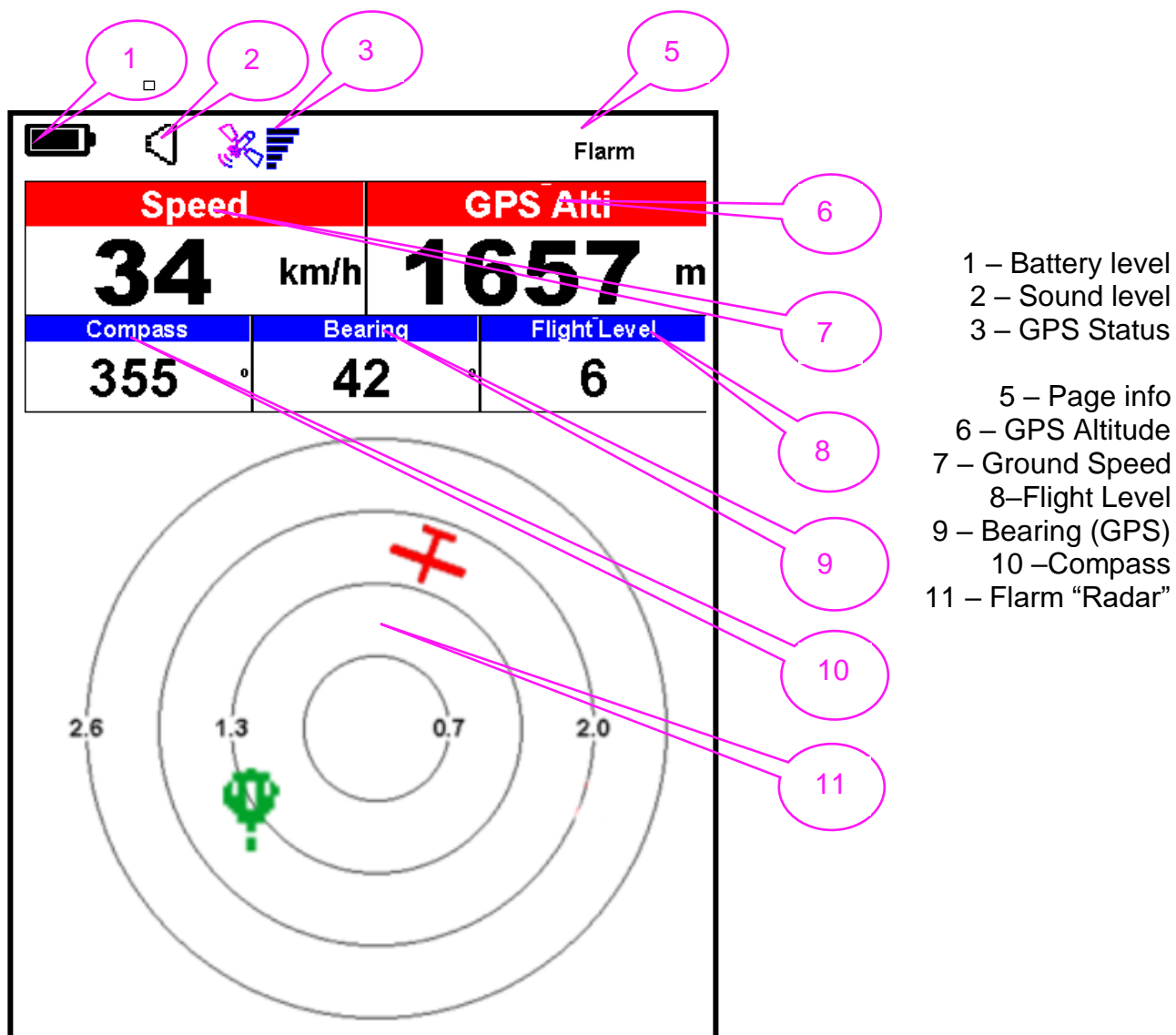




## Page 6 - Airspace



## Page 7 - Flarm





## Available data fields

**A.OverGoal** Altitude over goal is the difference between the current altitude and the goal's altitude based on barometric pressure values.

**Above Toff** Altitude above takeoff is the altitude over the flight starting point.

**Abs.Pressure** Absolute atmospheric pressure value in Pascals.

**Active waypoint** Active turnpoint name.

**AGL** Altitude above ground current location, using GPS altitude as reference.

**Alt.Gain** Altitude Gain. Altitude gained in current thermal.

**Alt.Gain/Loss** Altitude Gain/Loss. When at the top of the thermal displays the altitude gained from the base of the thermal, else displays the altitude lost since reaching the top of thermal.

**Alt.to CTR** Altitude to CTR shows altitude to controlled airspace, a negative number indicates we must sink to come out of controlled airspace.

**Altitude** Current altitude. This altitude is calculated based on the barometric pressure and depends on the QNH value.

**Altitude2** Second Altimeter which can be set independently to the main altimeter.

**Arrival Goal** Estimated arrival height above Goal. The height is calculated considering the average glide ratio that has being made. This means that wind, day quality and glider performance are used in the calculations.

**Arrival Next** Estimated arrival height above the next waypoint. This means that wind, day quality and glider performance are used in the calculations.

**Ave.Speed** Average ground speed calculated using a filter to show a smoothed speed, eliminating erratic speed changes due to glider pitching, etc.

**Ave.Vario** Average Vario calculated using an integration time constant in order to indicate smoother climbing rates.

**AveROT** Average rate of turn in degrees per second.

**Battery** Shows battery strength as a percentage of complete charge

**Bearing** Current bearing in degrees.

**Ceiling** Shows the upper altitude of the airspace causing the warning, i.e. airspace that you are violating or close to violating.

**Compass** Angle between the magnetic North and the instrument.

**CTR Name** Name of the airspace causing warning or violation.

**CTR Status** Status message of airspace, will show "Violating" when in controlled airspace, "Imminent Alt" when close to entering airspace vertically or "Pos.Imminent" when close to entering airspace horizontally.

**Cur.G.R.** Current glide ratio calculated using the average vario value, and average ground speed.

**Date** Current date. This value is automatic set when the device gets a valid GPS Signal

**Dist.CTR** Distance to controlled airspace. When more than one airspace area is in range the closest will be shown. When inside an airspace area the distance shown is to the closest edge.

**Dist.Edge** Dist.Edge

**Dist.Goal** Distance to goal is the total distance from the current position to the goal. The distance is calculated considering that the optimal route is made through all pending turnpoints.

**Dist.Line** Distance to Line. Shortest distance to the waypoint line circle. Distance line corresponds to the Distance Next minus the waypoint radius.

**Dist.Next** Distance to Next. Shortest distance to the waypoint center. Distance next corresponds to the Distance Line plus the waypoint radius.

**Dist.Start** Distance to start. Shortest distance to the start cylinder.

**Dist.Thermal** Shortest distance to last thermal core (thermal dot).

**Dist.Toff** Distance to take off is the distance between the current point and the flight starting point.

**Dur.** Flight Duration. Duration of the current flight.

**Flight Level** Current altitude in hundreds of feet, based on a fixed QNH of 1013.25hPa.

**Floor** Shows the lower altitude of the airspace causing the warning, i.e. airspace that you are violating or close to violating.

**G-Force** Current G-Force being experienced by the pilot when using the Heart-G sensor.

**G.R.Goal** Glide ratio to goal. Necessary glide ratio to reach the Goal considering that the optimal route through remaining waypoints is made.

**G.R.M.G.** Glide ratio made good. The actual glide ratio towards the active turn point. It is calculated using the integrated vario, and the VMG.

**G.R.Next** Glide Ratio to Next. Necessary glide ratio to reach the next turn point.

**G.R.Toff** Glide ratio to takeoff. Necessary glide ratio to reach the take off.

**Goal Close** Remaining time to goal close.

**GPS Alti** Altitude reported by the GPS.

**Ground** Height of the ground at current location.

**Heading** Heading in degrees returned by GPS.

**Land In** During competition tasks it is common, usually due to safety reasons, to have a "land by" time. The land by time is defined by adding a waypoint typically the goal to the already defined task, setting it as "Landing" and defining the time. "Land in" shows the amount of time remaining before having to be on the ground.

**Last Send** Time elapsed since the last data packet for position was sent to the NAV tracking server.

**Latitude** Current position latitude according to the format defined in the settings menu.

**Longitude** Current position longitude according to the format defined in the settings menu.

**LPF** Leading Points Factor (also available as a graphic element)  
Leading Points are awarded to encourage pilots to start early and to reward the risk involved in flying in the leading group. Pilots will get Leading Points even if they landed before goal or the End of Speed Section. The value of this data field varies between 0 and 100%. At 0%, leading the race scores no points, and at 100%, the points scored for leading the race are at their highest.

**Max. Altitude** Maximum altitude reached during current flight. This is based on barometric altitude.

**Max. Climb** Once a flight has started, it shows the maximum rate of climb encountered during the flight. This value uses the instantaneous rate of climb. This value is reset when the instrument is switched off.

**Max. Sink** Once a flight has started, it shows the maximum sink encountered during the flight. This value uses the instantaneous vario. This value is reset when the instrument is switched off.

**Max.G** Max Gforce reached during flight

**Max.Speed** Maximum Speed (returned by GPS) reached during the flight. When the instrument is switched off this value is reset back to zero.

**Min. Altitude** Minimum altitude reached during current flight. This is based on barometric altitude.

**Odometer** Distance travelled in the current flight

**Page Num.** Current layout active page number.

**Page** Page name

**Speed** Indicates ground speed. The speed is only available when the GPS receiver has a valid signal.

**Speed Strt** Speed to Start. The speed at which the pilot must fly in order to reach the start gate exactly at its opening.

**Thermal top** The highest point reached during the current thermal.

**ThrmI.Perfo.** Performance of the most recent thermal showing average rate of climb in most recent thermal.

**Time** Current local Time. This value is automatic revised when the device gets a valid Gps Signal.

**Trans.G.R.** Glide ratio during transition. Average glide ratio during transitions between thermals.

**Triangle Size** Size of possible triangle

**TTD** Time to destination

**TTG** The TTG field is dynamic and will vary according to the current flight status and type of task defined. It will show TTG (time to go) before start gate opening, and will then change to "SS" (Speed Section time) which is the time elapsed after the opening of the start. If no start gates are defined in the task, or no task is defined, then this field will show "Dur", which in this case is the time elapsed since takeoff. The takeoff event is triggered when

ground speed exceeds 5km/h and a 3D fix is available.

**Turnpoint size** Radius of the active turnpoint.

**Vario** Instant vario value.

**VMG** Velocity made good, is the speed at which the pilot is approaching the active turn point.

**Wind Dir.** Wind direction in degrees, calculated from gps when drifting.

**Wind Speed** Calculated wind speed using GPS speed.

## Objects (Graphical Elements)

Graphical elements are characterized by providing information in a graphical way. Most of the graphical elements have fixed dimensions, although their position can be altered. As the NAV C firmware evolves the list of Graphical Elements will likely grow. The current list includes the following graphical elements.

### ***Battery***



The Battery Element provides a graphical indication of the current battery level. This element has fixed dimensions.

### ***Volume indicator***



The volume indicator element provides a graphical indication of the current volume level. This element has fixed dimensions.

### GPS



The GPS Element provides graphical indication about the current GPS signal quality. Basically, the lower the PDOP value (position dilution of precision), the more accurate calculations are for determining position. Values below 3.0 are fairly accurate. The Pdp values can be seen in info page (select settings icon without pressing ENTER)

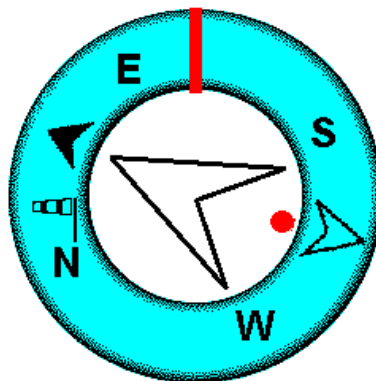
### Vario



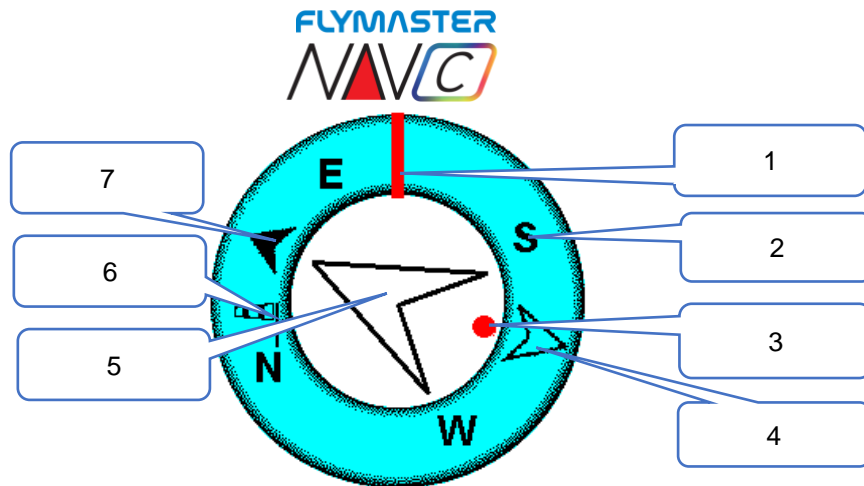
When the NAV C detects that the pilot is climbing, a black bar starts to grow on the left, from the bottom of the scale to the top, with 0.1 m/s increments. The same bar grows on the right, from the top of the scale to the bottom, if sinking is detected.

This element can be resized.

### Navigation wheel



The Navigation wheel multi-information element which shows graphically the bearing, wind direction and thermal core. Additionally, if a destination was defined (waypoint) the navigation element will also indicates the direction to the waypoint centre, and waypoint edge and. This element cannot be resized but can be re-positioned.



Navigation information is shown within the inner most circles. The external circle contains the cardinal points and the Wind Flag. The current traveling direction (bearing) corresponds to the point indicated in the top of the navigation circle. On the example shown in Figure, the bearing is approximately 110°.

- 1- Flight direction
- 2- Cardinal Points
- 3- Thermal Ball
- 4- Waypoint after the next
- 5- Next Waypoint
- 6- Wind Flag
- 7- Next Waypoint center

## Navigation Arrows

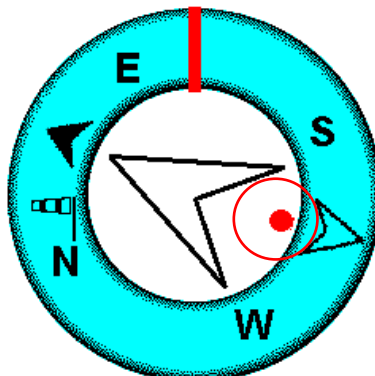
When a route is active the direction of next optimal point is pointed by an arrow (larger arrow 4). The optimal point corresponds to the unique point on the waypoint cylinder which lies along the optimal route .If no route is defined the arrow will start showing the direction to the take off', after the take Off' is detected (Take off)' is the point taken when the Flight Starts)

## Route Optimisation

During a competition task flight using the optimal tangent navigation saves a substantial amount of time. The smaller arrow 7 example points to the centre of next waypoint cylinder, and the BIG arrow 4 points to the optimized tangent of the next Waypoint. The small arrow 6 points to the Turnpoint after the next. The combination of all three arrows provides a spatial location of the pilot relative to the next 2 waypoints.

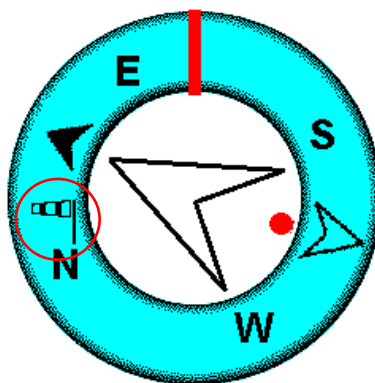


### Thermal Ball



Another useful feature of the Navigation Circle Element is the thermal core ball. This map corresponds to a black dot which is shown inside the inner navigation wheel (together with the navigation arrows). During a thermal climb the NAV C keeps track of the strongest climb values point for each 50m layer. The point of strongest lift is then graphically represented by the black ball in the inner Navigation Circle, showing where the thermal core is relative to the pilot's position. The position of the dot (thermal core) is constantly updated as the pilot moves. When the pilot is over 300m from the thermal core the dot will be at the edge of the circle. As the pilot moves closer to the thermal core the dot will move towards the centre.

### Wind Flag



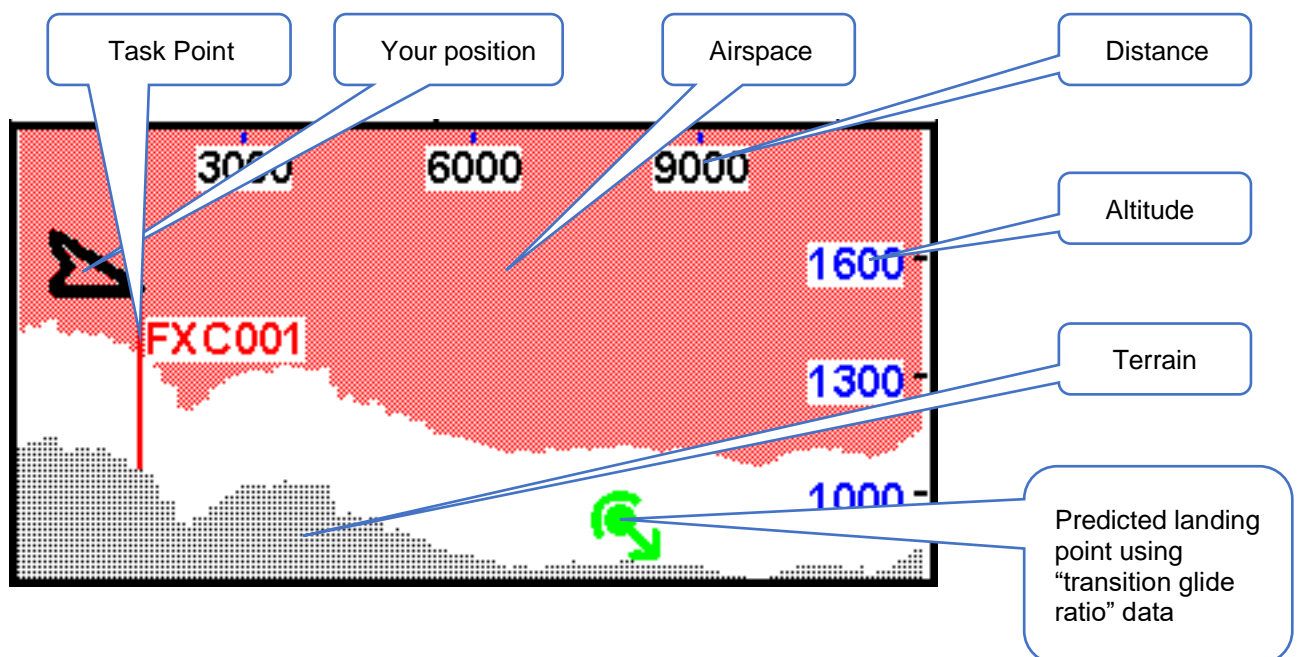
The external circle contains a small Flag which indicates the Wind Direction relative to the pilot direction (direction the wind is coming from). For example, if the pilot is facing the wind then the Flag is on the top of the circle. In the example of the figure above the wind is blowing from North slightly North-East.

## Profile Map

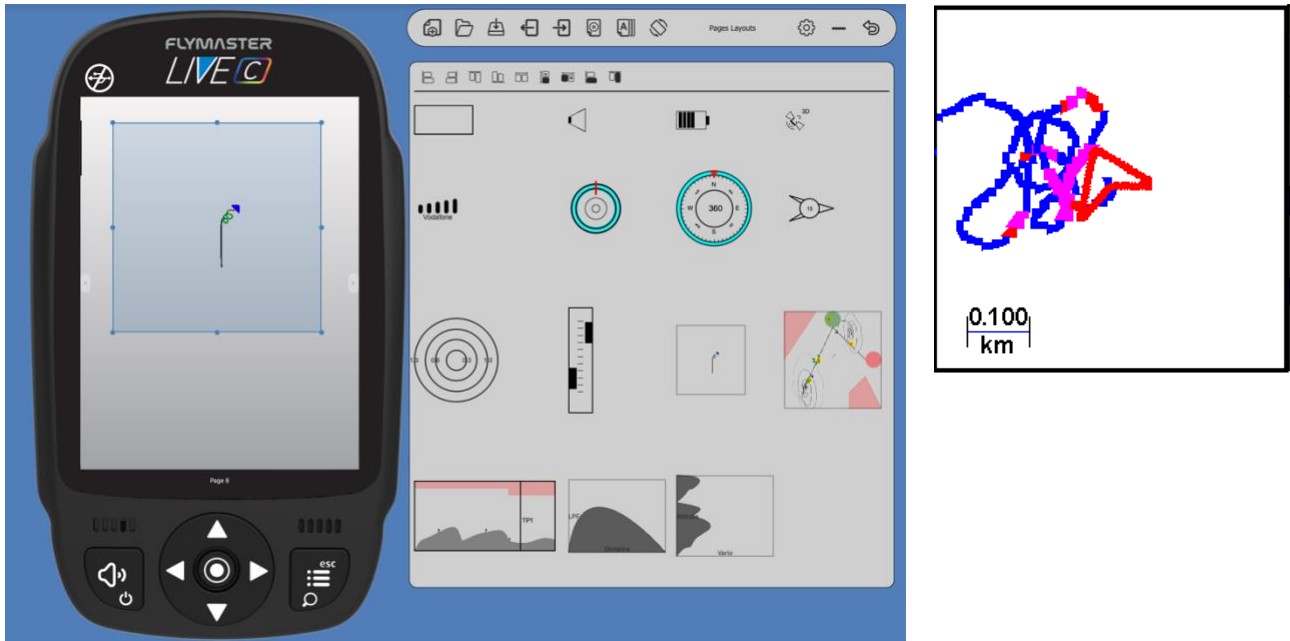
Using the Flymaster Instrument Manager, you can choose what is displayed on this graphical element among the various available layers. These layers are "Airspaces," "Task points or Task," or "Landings (waypoints must be defined as landings in waypoints list)."



Example:



## Thermal Trace Map ( “Thermal Widget”)



This map draws its track in a snake trail - like manner, increasing and decreasing the thickness of the line according to the values that go up or down. Additionally, the color changes, with warmer colors indicating higher climb values and cooler colors representing smaller climb values. This creates a visually perfect image of the thermal we are in.

## Multilayer Maps



The NAV C has [an object that can be configured through the Flymaster Instrument Manager called "Multilayer maps".](#)

This object is only available for use on the colour display. Various types of layers can be combined without any limitation between them.

All the available layers have two crucial small indicators of (North-South cardinal and Next Turn point direction)

As NAV C evolves in terms of firmware, more types of layers will emerge.

There are currently 4 available:

- Airspaces
- Task
- Thermal "snake trail"
- Topo/road maps

## Airspaces

Once the flight starts, the map is redrawn with an arrow (representing the pilot) which will move around the map, indicating the relative position of the pilot to each of the airspace areas. Note that being inside a airspace area (2D) does not mean that the airspace is being violated, since the pilot can be above, or below the defined 3D shape. In order to have more information about possible airspaces violation, some data fields should be added to the layout. This data fields [Distance to CTR](#), [Altitude to CTR](#), and [CTR Status](#)

The airspace areas change colour from none, full yellow or full red, depending the status. No colour to normal, yellow for eminent and red for violating.

The Dist. CTR data **field** shows the shortest horizontal distance to the nearest airspace line. This distance is always positive. Similarly, the Alt. To CTR shows the shortest vertical distance to nearest airspace line.

Unlike the horizontal distance, the vertical distance can be negative. A positive vertical distance indicates that you are outside the airspace, whereas a negative distance indicates that you are inside the airspace. Additionally, the CTR status **field** will indicate if an airspace is being violated by displaying Violating. If the pilot is not violating the airspace but it is inside a predefined margin then the messages Altitude Imminent, or Position Imminent will be shown.

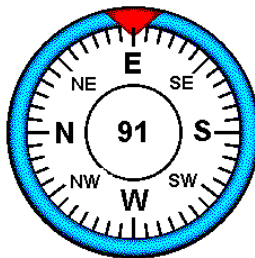
**All the airspace warnings may be also audible though audio settings either voice or alarm.**

## Wind Arrow



When used in a layout an arrow is draw showing the wind direction relative to the pilot direction (direction the wind is coming from). For example, if the pilot is facing the wind then the arrow points south (bottom of the screen). Cantered over the arrow is a circle in which a number is displayed showing the wind speed. In the example above the wind is blowing from South. Both, the wind speed, and direction, value can be seen in a data fields.

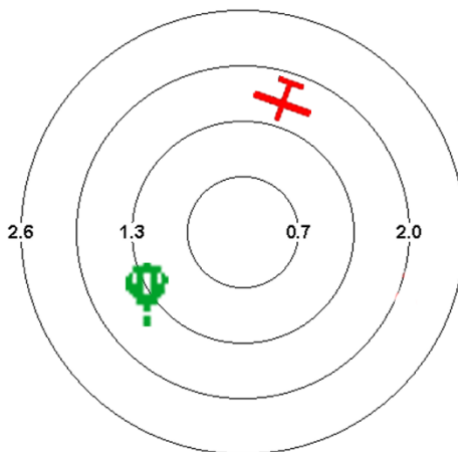
## Compass



The Compass element show all the data provided by the NAV C built in magnetic compass. The compass includes an red top arrow which is always aligned with the NAV C . If the NAV C is turned the cardinal points will also turn in order the arrow tip points the right cardinal point.

In the example of Figure the NAV C is pointing almost to East. The direction is represented by the arrow, and also indicated numerical (91°degrees).

### ***Flarm Aware Radar (optional paid service)***



The Flarm Aware radar is graphical element that can be resized and re-positioned.

This graphic element allows you to visualize in a "radar" style the aircraft around you, in the range defined by the zoom level, equipped with a FLARM beacon.

[This service is optional.](#)

There are several types of aircraft in Flarm system, identified with different icons, depending on their category: they are Helicopter, Aeroplane and glider, Balloon and Drone. If they are within the range defined by the zoom level, the aircraft will appear represented in different colours, depending on the threat level of a potential collision.

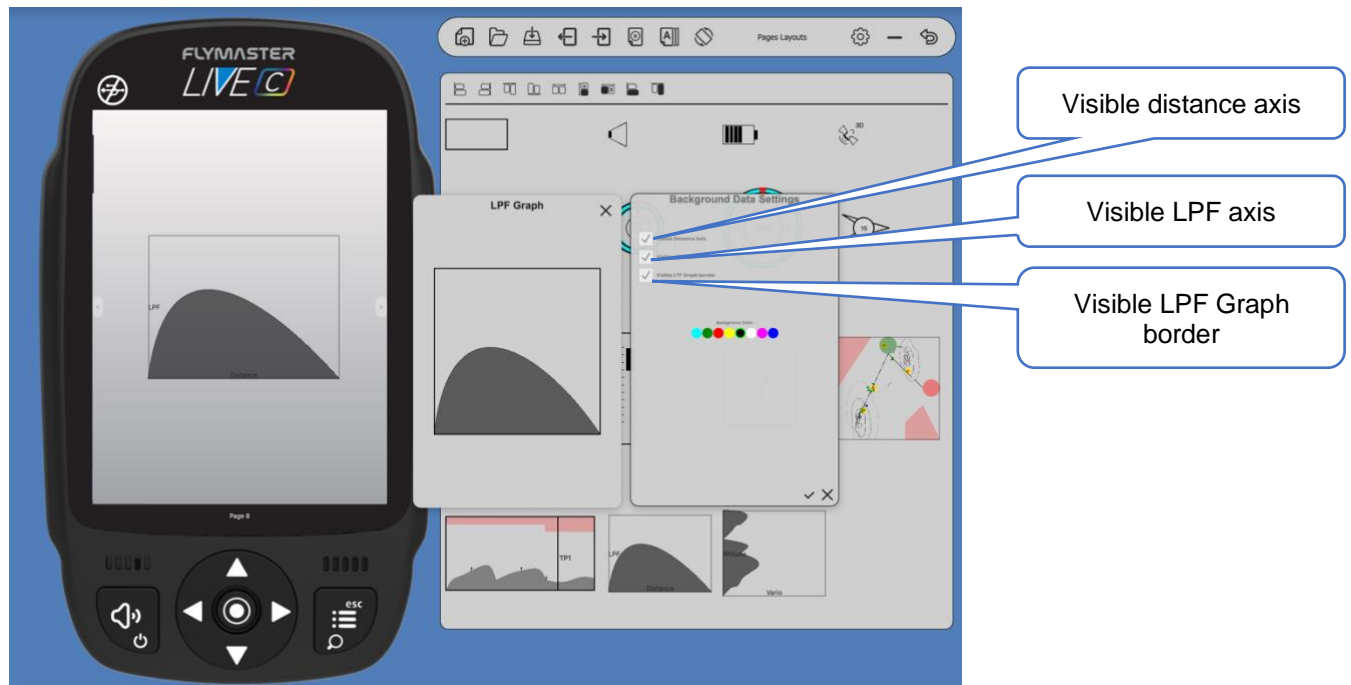
Green - Low risk of collision.

Yellow - Moderate risk of collision.

Red - High risk of collision.

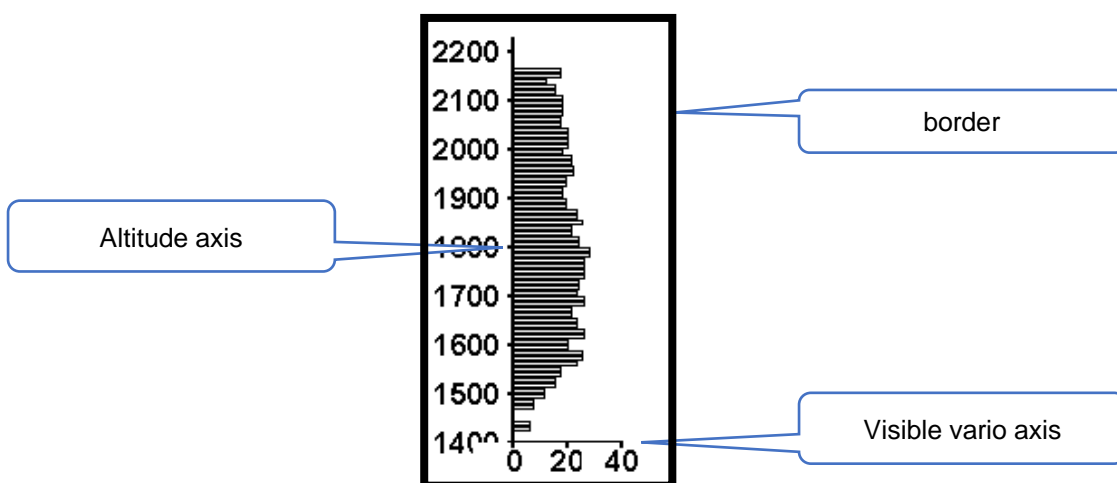
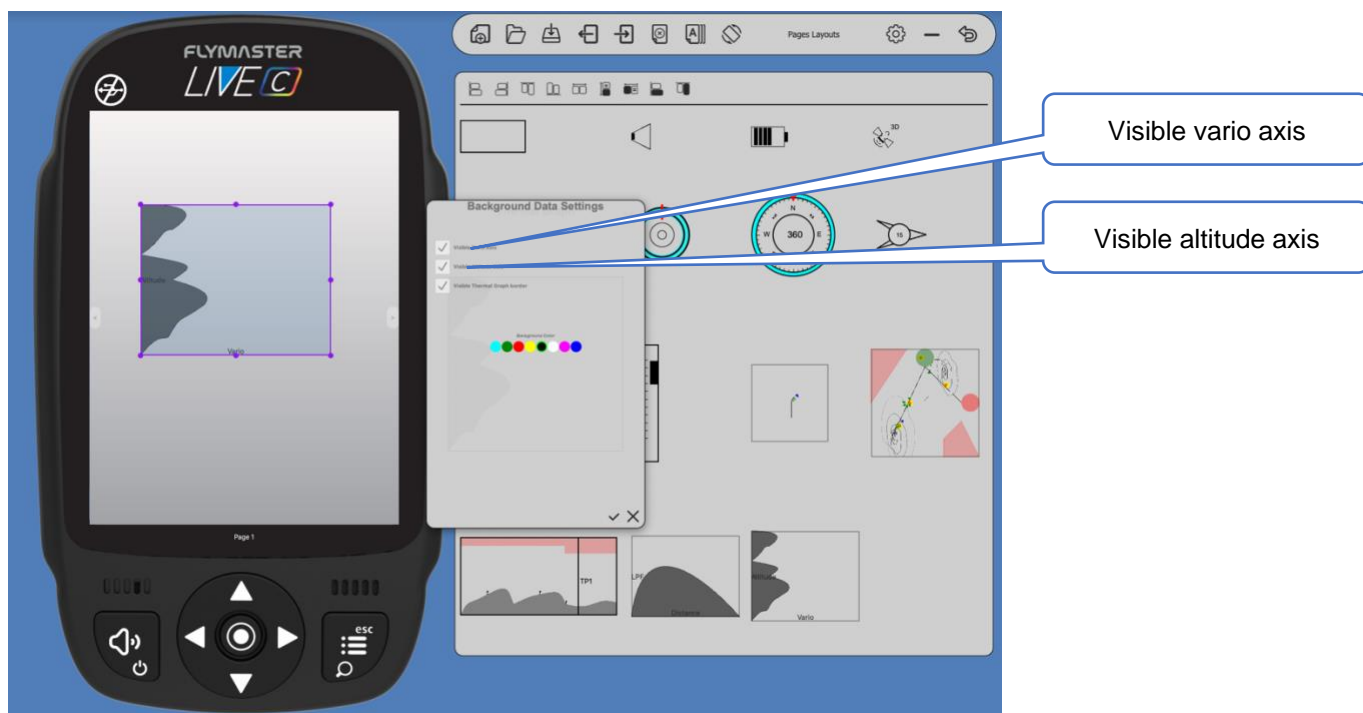
Paragliders and hang gliders will not be shown for obvious reasons. The close proximity that paragliders and hang gliders fly in would trigger constant alarms of potential collision.

## LPF Graph



The Compass element show all the data provided by the NAV C built in magnetic compass. The compass includes an red top arrow which is always aligned with the NAV C . If the NAV C is turned the cardinal points will also turn in order the arrow tip points the right cardinal point.

## Thermal Profiler



The thermal profiler is a scalable graphical element that allows visualizing thermal patterns in a lateral cut. Using an axis of ascent rate intensity and an axis of altitude, it represents graphically the behavior of thermal activity at various layers of altitude. This tool brings significant advantages for decision-making when having a visualization of thermal behavior during a flight day.





Waypoints

## Waypoints

### Waypoints in Memory (5)

#### Goto Waypoint

Create Waypoint  
Delete Waypoint  
Edit Waypoint  
Delete all waypoints  
Load Waypoints From File  
Delete waypoints file  
Sort Waypoints  
Get Waypoints from Group

**Go to waypoint** - Forces navigation to the selected waypoint. This overrides the task navigation.

### Waypoints in Memory (5)

#### Goto Waypoint

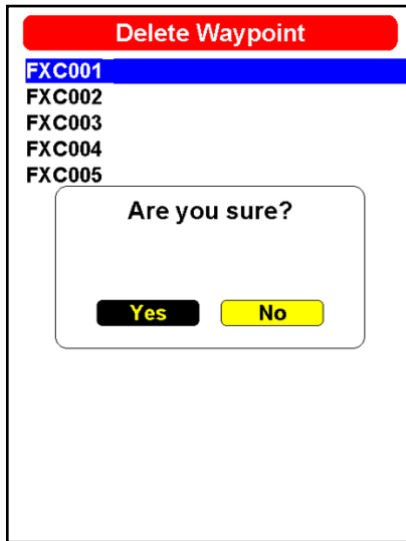
#### Create Waypoint

Name WPT01  
Description  
Altitude 1712 m  
Latitude N 41.91797°  
Longitude W 7.70597°  
Landing No

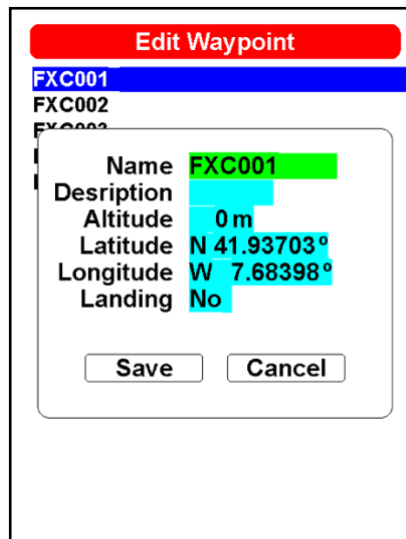
Save

Cancel

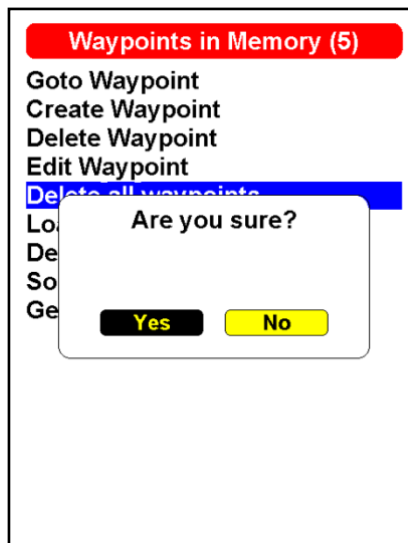
**Create Waypoint** - This menu allows the user to add a new waypoint to the waypoint list. If the GPS is fix, then the co-ordinates and altitude used for the waypoint are based on the current position. If "Landing" is set to YES, the waypoint will be considered as a landing place, and can be listed in "Nearby landings" feature.



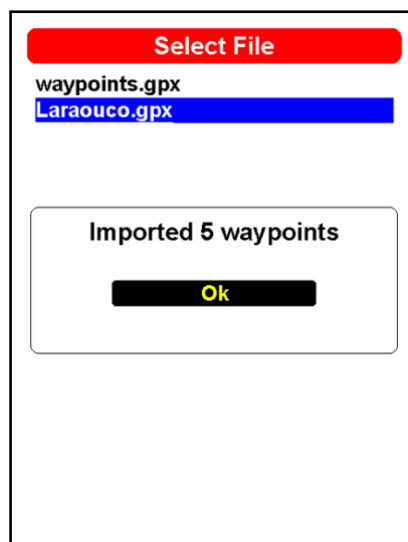
**Delete Waypoint** - It is possible to delete just a single waypoint on the NAV C from the waypoints list . Select the waypoint to be deleted. Once the waypoint is highlighted, press ENTER and press YES to confirm it's deletion. Waypoint will be removed from the waypoint list. If a waypoint is in use in the active Task, the task will be preserved. Also the waypoints file will not be changed.



**Edit Waypoint** - Entering this menu allows the properties of the selected waypoint to be changed. The name of the waypoint can be changed, along with the elevation, latitude, longitude and if the waypoint is to be designated as a landing filed. To change any of the properties of the waypoint, first select the waypoint in the screen using navigation wheel. Press ENTER pulls up the menu allowing the waypoint to be edited. Use cursor keys to edit. Press SAVE or CANCEL to quit editing.

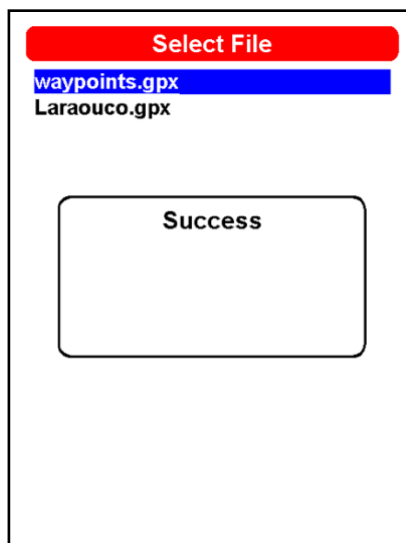


**Delete all waypoints** - It is possible to delete all waypoints on the NAV C from the waypoints list. All waypoint will be removed from the waypoint list. If a waypoint is in use in the active Task, the task will be preserved. Any saved task will be kept. Also the waypoints file will not be changed.

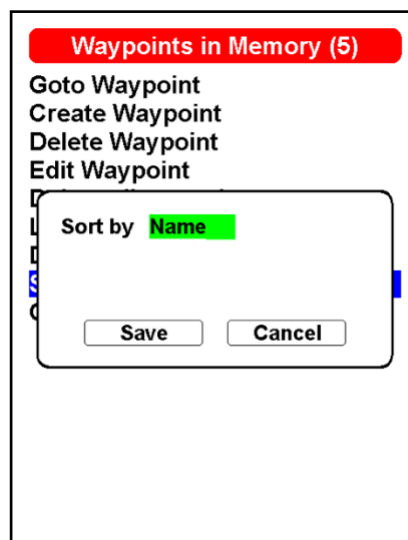


**Load waypoints from file** - You can load waypoints into the list from a file. Just copy a waypoints file to the SD card using Flymaster instrument Manager, of a known extension (GPX, GEO, WPT, CUP, etc). When selecting and pressing ENTER in the "Load Waypoints from file", the points will be loaded into the list.

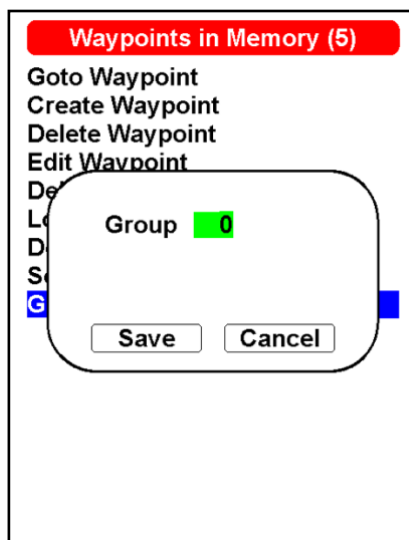
**If you try to import waypoints from a file with the same name as some that already exist in the instrument, they will not be imported. In case of doubt, it is important to always check that the names are not duplicated and that the waypoints do not already exist in the instrument.**



**Delete waypoints file-** It is possible to delete any waypoints file from the SD card , directly on the NAV C. If a waypoint is in use in the active Task, the task will be preserved. Any saved task will be kept.



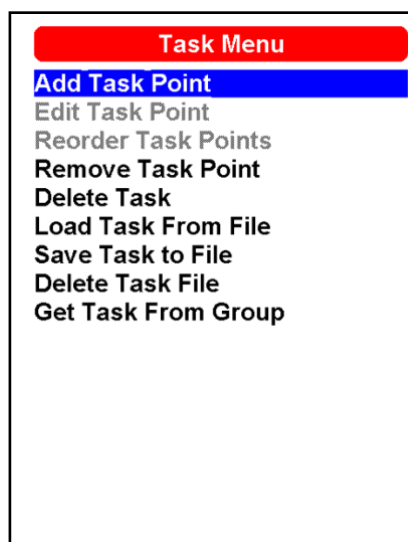
**Sort waypoints -** In NAV C, it is possible to sort the waypoints stored in memory by name or distance to facilitate their selection when introducing them into a task.



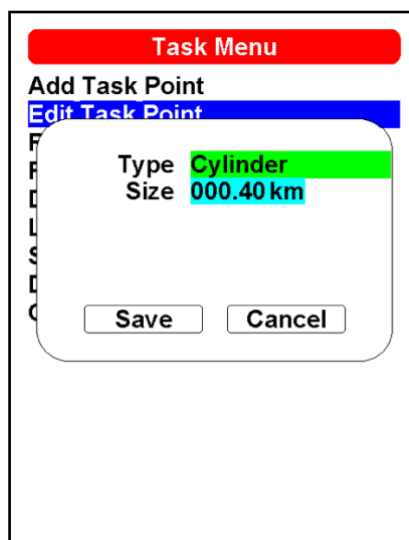
**Get Waypoints from group** - If your instrument (serial) belongs to a user's group on the platforms [It.flymaster.net](http://It.flymaster.net) or [NAVtrack360.com](http://NAVtrack360.com), you can import the waypoints from that group using this option. Simply put the group ID in this field, and the waypoints will be automatically imported using the data service (LTE).



## Task Task



**Add Task Point** - To add a waypoint to the Task, select the waypoint that is to be added by pressing either the scroll wheel until the desired waypoint is highlighted. Pressing the ENTER button will add the point onto the Task on the colour display, at this moment the task point options for the newly added waypoint will appear in the task area, allowing to set several aspects of the task point (these can also be edited later).



**Edit task point** - Entering this option, it is possible to choose the waypoint to edit from the active task on the colour display. You can change its characteristics for the Task when you select it.

Task				
	Type	Size	Dist.	Name
FXC001	toff	0.0	0.0	
FXC001	11:00	1.0	1.0	
FXC002		0.4	8.9	
FXC003		0.4	19.4	
FXC004		0.4	31.2	
FXC005	goal	1.4	58.8	
FXC005	line	0.4	60.2	

Optimized Distance: 60.2 km (62.5)  
Code: 5BE4

**Reorder Task Points** - Allows you to reorder any point of the active task. After selecting the waypoint using Enter, you can move it within the Task waypoint list. Press Enter to "pin" it to the desired location in the list.

**Remove Task point** - Allows you to remove any waypoint from the Task, simply by selecting the desired waypoint and pressing ENTER.

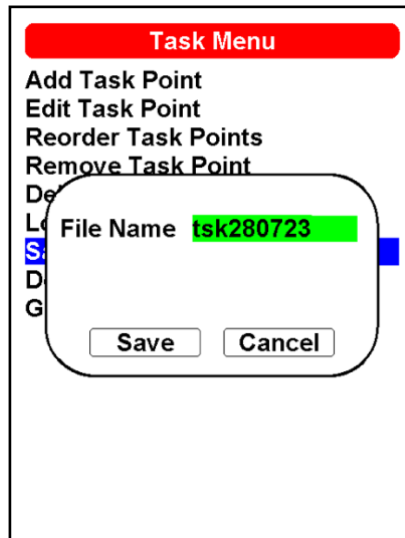
**Delete Task** - This feature allows you delete and clear the current active task. For free cross-country flying is recommended to erase any active task.

Task Menu

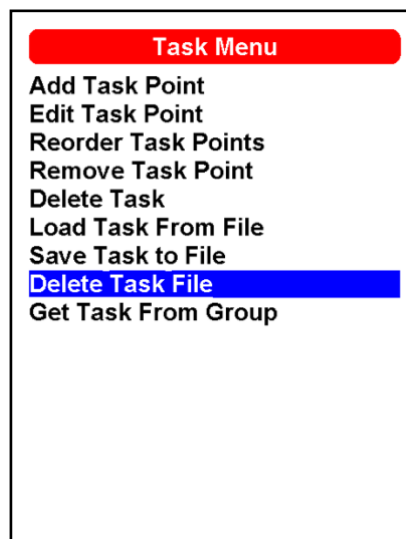
Add Task Point  
Edit Task Point  
Reorder Task Points  
Remove Task Point  
Delete Task  
Delete Current Task

Yes No

**Load Task from file** - This feature allows to load a saved task, and set it as the active task. Be aware that the current task will be erased. All the task files are stored in the SD card in the folder called "Waypoints".

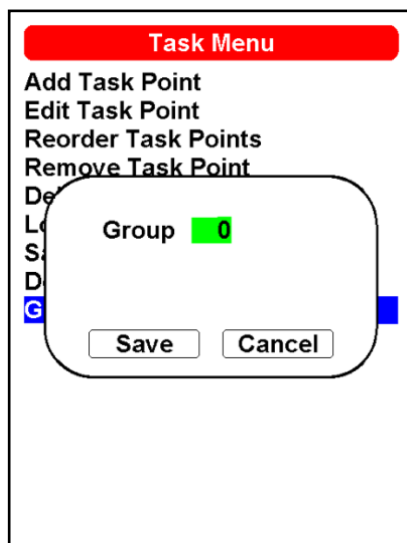


**Save Task to file** - This feature allows to save the active task to the SD card. Use scroll wheel to input the task file name, use Save or Cancel.



**Delete Task file** - This feature allows to delete a task from the SD card.



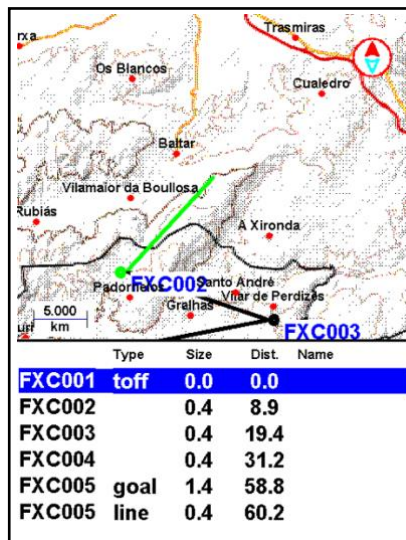


***Get Task from group*** - This feature allows to force a request of a task shared in a Flymaster group account.

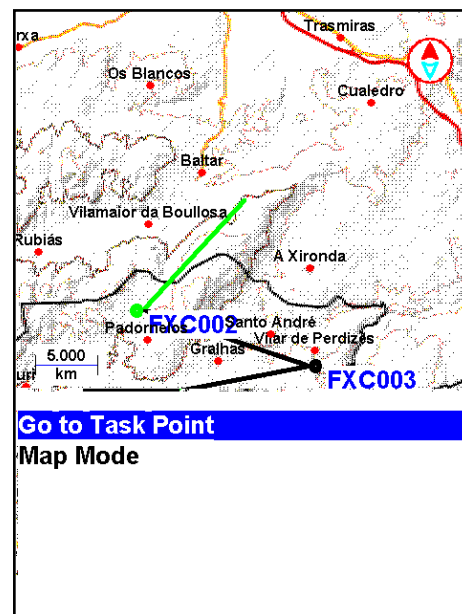
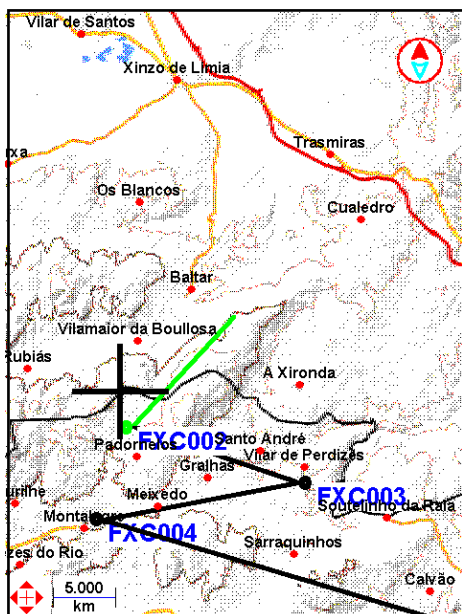


Task Navigator

## Task Navigator



**Task Navigator** - This feature allows you to preview your entire task on the display. Scrolling through the list using up and down cursor keys, the waypoints are being highlighted. You can select and press enter to “go to Task Point” or enter in Map mode. In map mode you can pan and zoom freely to explore the task.



During the flight, in the event of an error in the creation of the task or navigation error, you can access the task navigator, to "shortcut" to a certain turn point. Just access the "task navigator" use button up or down the cursor/pan and press enter at the desired point. The instrument starts navigating to the chosen turnpoint.

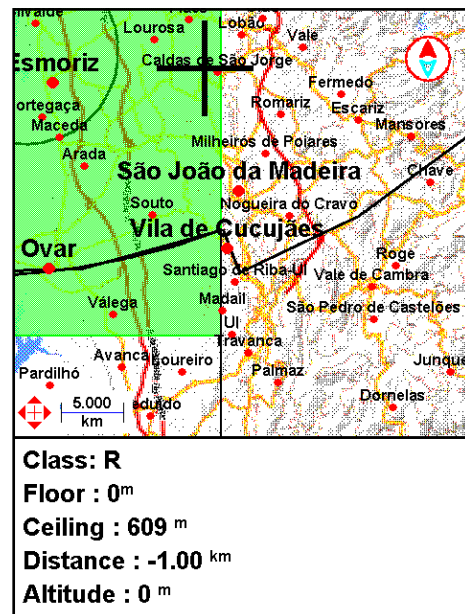
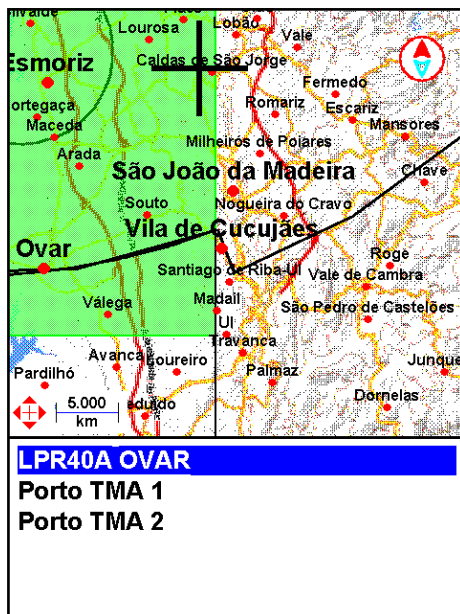


Airspace Browser

## Airspace Browser

**Airspace Browser** - This feature allows viewing and interacting with all the airspaces contained in the instrument.

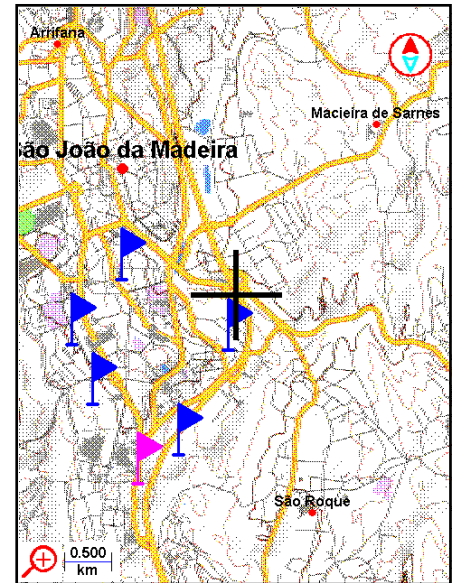
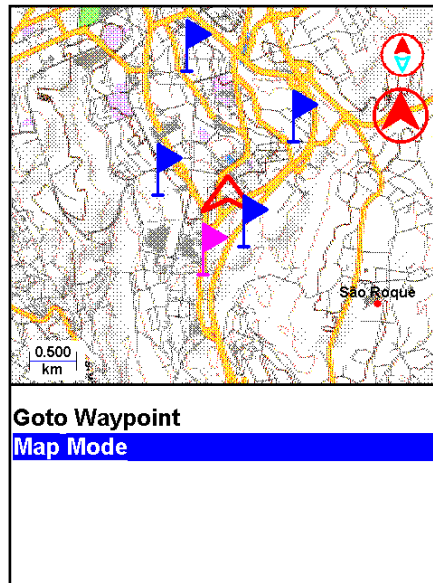
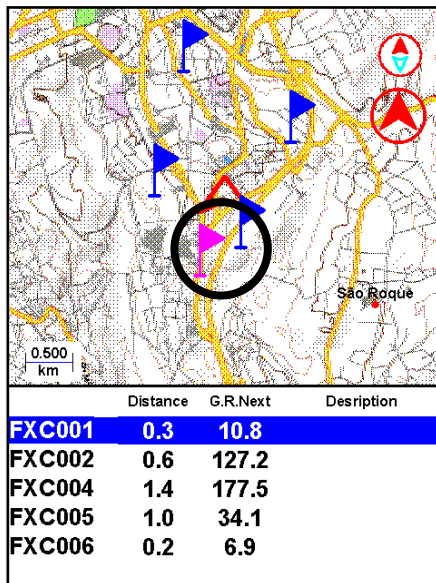
Using the zoom mode and pan keys, you can freely navigate the map, aiming the crosshairs, to the desired airspace. Pressing enter in the highlighted airspace, the details will be shown.





Nearby Landings

## Nearby Landings



**Nearby Landings** - This feature allows you to view waypoints marked as "landing zone". To be considered and listed, the Waypoint must have the "landing" field set to YES. The waypoint(s) will appear on the display with a flag. The display will show the landings that are reachable (I.E. are below your position), their distance from your current position. Pressing Enter on a "nearby landing" will allow you to navigate to it, or enter in map mode to explore the map, using zoom and pan resources.



Flight Log

## Flight Log

The Flight Log option allows the user to access information about previous saved flights. Using the up and down keys of cursor allows you to choose the operation to be performed for each flight. Press Enter to perform the desired operation. Press Esc to exit.

**Flight Log**

**View Flight Details**

Delete flight  
Delete all flights  
Generate Flight IGC  
Send to XC Server

## View Flight Details

**View Flight Details**

2058-05-12	13:13	00:04:48	ready
2058-05-12	12:02	06:28:15	ready
2038-09-26	12:13	00:37:44	ready
2038-09-26	12:02	06:28:15	ready
2038-09-26	13:01	00:56:17	ready
2038-09-26	12:01	06:28:15	ready
2038-09-26	12:01	06:28:15	ready
2023-07-06	15:40	00:34:16	ready
2023-07-05	16:07	02:07:28	ready
2023-07-04	13:43	01:55:05	ready
2023-06-22	12:00	05:28:30	ready
2023-06-06	10:56	00:03:34	ready

**Flight Details**

**Date:** 2058-05-12    **Time:** 13:13:35

**Duration:** 00:04:48

**Max. Altitude:** 615<sub>m</sub>

**Min. Altitude:** 611<sub>m</sub>

**Takeoff Altitude:** 594<sub>m</sub>

**Max. Climb (Avg):** 18.2 (0.1)<sub>m/s</sub>

**Max. Sink (Avg):** -23.0 (-1.7)<sub>m/s</sub>

**Max.Speed:** 60<sub>km/h</sub>

**Distance:** 0.4<sub>km</sub>

**Dist.Goal:** 0.0<sub>km</sub>

Flights can be selected using UP and DOWN keys. For the selected flight additional information is displayed when pressing ENTER.

## Delete Flight

Delete flight

2058-05-12	13:13	00:04:48	ready
2058-05-12	12:02	06:28:15	ready
2038-09-26	12:13	00:37:44	ready
2038-09-26	12:02	06:28:15	ready
2038-09-26	13:01	00:56:17	ready
203			
203			
202			
202			
202			
202			
202			
2023-06-06	10:56	00:03:34	ready

Are you sure?

Yes
No

Selecting the Delete Flight option will delete the selected flight from memory. Before deleting the flight, a message is displayed asking the user to confirm the action. **VERY IMPORTANT: THIS OPERATION CAN NOT BE REVERTED, AND THE ERASED LOG IS LOST FOREVER.**

## Generate Flight IGC

Generate Flight IGC

2058-05-12	13:13	00:04:48	ready
2058-05-12	12:02	06:28:15	ready
2038-09-26	12:13	00:37:44	ready
2038-09-26	12:02	06:28:15	ready
2038-09-26	13:01	00:56:17	ready
203			
203			
202			
202			
202			
202			
202			
2023-06-06	10:56	00:03:34	ready

Success

By choosing this option, and pressing Enter on the desired flight, an IGC file with its proper digital signature will be generated for the micro SD card. These flights are saved in a folder called "igcs" at the root of the card. You can access them by connecting the instrument to your computer using it as a mass storage device or alternatively by removing the micro SD card from its slot and using a card reader.



Settings

## Settings

**Settings**

**Set Altimeter**

Time

Vario Acoustics

Alerts

Maps

Screen

Language/Units

Device settings

Calibration

Navigation settings

Airspace Settings

Airspace Classes

Load Airspace

Flarm Settings

Pages

## Set Altimeter

**Set Altimeter**

QNH 1066.69

Altimeter 552 m

Altitude2 1407 m

Get from GPS No

Save

Cancel



The Set Altimeter page, allows the user to adjust the barometric altimeter. A barometric altimeter calculates altitude based on atmospheric pressure, and should not be confused with the GPS altitude, which is calculated based on satellite information. Since atmospheric pressure can vary substantially with meteorological conditions, and so with time, the barometric altitude also varies accordingly. In order to have the correct altitude for a certain place the altimeter should be calibrated.

**Altimeter** - Calibrating the altimeter can be achieved by entering the known altitude of the location. Entering an altitude automatically calculates the QNH, which is the local barometric pressure adjusted to sea level.

**QNH** - Alternatively, the altimeter can be calibrated by adjusting the QNH for the local, and time. Changing the QNH will adjust the barometric altitude.

Altitude can also be set from the GPS.

**Get from GPS** - Get from GPS field which can be set to Yes No or Auto. Adjusting this value to Yes will make the NAV C take the altitude from the GPS and adjust the altitude accordingly. The Yes is not stored in the setting, since it is a one time only operation. The Get from GPS can also be set to Auto, with this value being stored in the settings. When Auto is selected, after being turned On, the NAV C will automatically set the altimeter to the GPS altitude (once there is a valid GPS signal exists), or whenever the pdop value is lower than the previous one. Note that position dilution of precision (pdop) gives you an indication of how reliable the GPS altitude is at the moment. The lower the pdop value the more accurate the position fix.

## Time

Time

Vario Integr. 10 seconds

Track interval 1 seconds

UTC offset 1:00

The Time page allows the user to set the vario integration time, track log parameters, and the Universal Coordinated Time (UTC) offset.

**Vario integrator** - The Integrated vario is calculated by integrating the vertical speed during a period of X seconds defined by this value. In the example, the integration period is 5 seconds (default value).

**Track interval** - During a flight the NAV C stores a track log point every track interval seconds. Track recording starts automatically when the Flight Starts, or 30 seconds before if using FAI COMP mode. However, when a task is active the NAV C will store a track log point immediately as it enters a turn point cylinder, Goal, or Start.

**UTC offset** - Using GPS data, the NAV C automatically adjusts the internal clock to the Universal Coordinated Time (UTC). The user should adjust the UTC offset so that the time displayed by the NAV C matches the local time.

## Vario acoustics

Vario Acoustics

Sink TH	-2.0 m/s
Climb TH	0.1 m/s
Sink Alarm	-25.0 m/s
Base	600 hz
Increments	10 hz
Cadence	0
Buzzer	3
Damper	6
Dynamic freq	On
Auto Silent	Yes

The Vario Acoustics settings menu option allows the user to change vario sound related parameters. The user can change the climbing, and sinking rate sound through the respective threshold values. These thresholds correspond to the climbing and sinking rates at which the sound activates. The user can also define in the the Acoustic Thresholds option the sink alarm and the sound volume of is the NAV C.

**Sink Threshold** - The Sink Threshold is the rate of descent at which the vario will emit a low frequency sound. Contrary to the climb sound the sink sound is continuous. The deeper the sink rate the lower the sound frequency. Default value for this parameter is -2 m/s, we suggest setting a value lower than the natural sink rate of the glider when flying with speed bar in still air.

**Climb Threshold** - The Climb Threshold defines the rate of climb at which the vario will start beeping. The frequency of the first beep is defined trough the Base Frequency parameter, and steadily increases according the Increments parameter value. The default value for Climb Threshold is 0.1m/s. This means that beeping starts once the instantaneous vario value goes above 0.1m/s.

**Sink Alarm** - The Sink Alarm defines a vertical speed value at which a sound (alarm siren) starts to be produced. For example, if the Sink Alarm is set to -10m/s, then if the instantaneous vario goes below -10m/s, and alarm will be "red. This alarm can be used to identify high vertical speeds, as for example, in a spiral dive. The Sink Alarm parameter can vary from 0 to -25m/s. Set the Sink Alarm to OFF to disable the alarm.

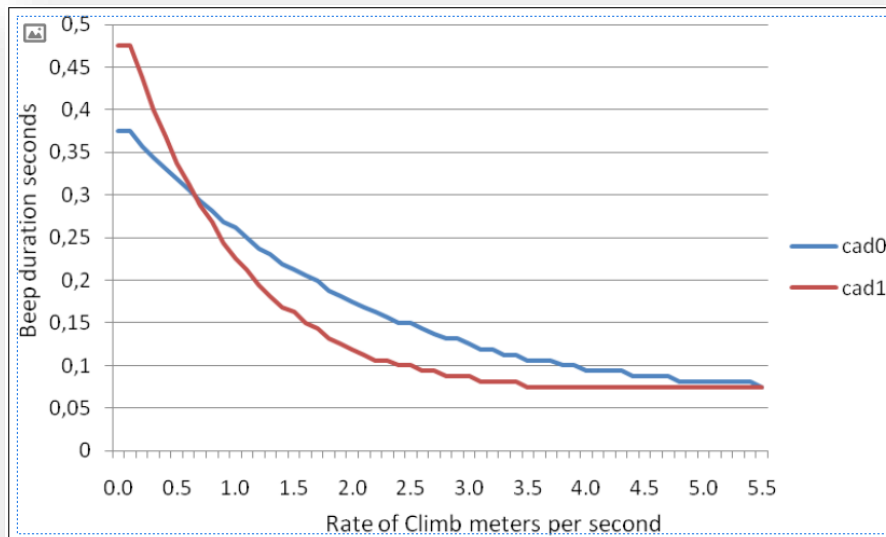
**Base Frequency**- The audio frequencies can be adjusted to match the user's preference, by setting the Base Frq and Increments.

The Base Frq is the first frequency used to produce the initial sound which corresponds to the climb threshold (by default 0.1 m/s). Later, as the climb rate increases, a bip, bip sound is produced for which the cadence, and frequency, also increase. The Base Frq can be set from 500 to 1500 Hz. The higher is the frequency value, the higher pitched the sound is.

In order to change the base frequency value press the ENTER key after the Audio Frequencies menu option is highlighted. This action will highlight the Base Frq value so it can be increased using the UP key, or decreased using the DOWN key. The ENTER key should then be pressed, thus confirming the Base Frq setting. The pre-set value for Base Frq is 700 Hz.

**Increments-** The Increments parameter sets the frequency increment for each 0.1 m/s climb rate increase. The increments can be set from 1 to 99 Hz. The pre-set value for Increments is 10 Hz. Considering an Increments value of 10, and Base Frq of 700 Hz, the vario frequency at 1 m/s is 800 Hz.

**Cadence -** When a rate of climb is higher than that specified by the Climb threshold the NAV C creates a beeping sound. The rate (cadence) of the beeps increases as the climb rate increases. This increase in rate is not linear. The cadence parameter specifies which cadence curve should be used. Current there are 2 possibilities represented in the graph of Figure below.



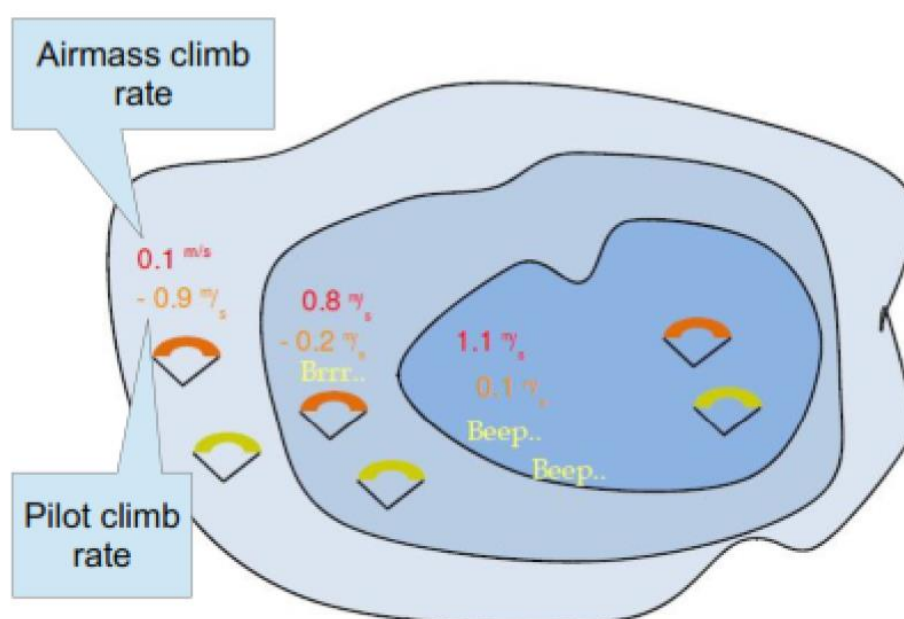
**Buzzer -** Is so called because of the sound it emits, which resembles a buzzing sound.

The buzzer sound is produced when the rate of climb is close to, but has not yet reached the specified Climb threshold. This value is set between 0 and 9 with each unit corresponding to be 0.1 m/s, ie. 3 is 0.3m/s. Subtracting this decimal value from the climb threshold will give us the value at which the NAV C will start buzzing. For example with the NAV C default values, Climb threshold=0.1m/s, and Buzzer=3 (0.3m/s) the buzzing will start at -0.2m/s because  $0.1 - 0.3 = -0.2$ . In this case at 0.1m/s directly below the Climb threshold the NAV C will emit a constant sound varying rapidly in pitch from around 100hz to the set base frequency at which the first beep is emitted. This is the buzzer sound and may resemble a growl noise. Setting the Buzzer value to 0 will disable the buzzer feature.

Although the Buzzer will sound very annoying on the ground it becomes an amazing companion in flight allowing the pilot to pick-up thermals he would have usually missed

A practical example of the advantages of the buzzer feature can be illustrated in Figure below. In this example both pilots are sinking at -1.0 m/s. The orange paraglider has a NAV C for which the climbing threshold is set to 0.1 m/s and the Buzzer parameter is set to 3 (0.3 m/s). The green paraglider has a typical vario for which the climbing threshold is set to 0.1 m/s.

As shown in the figure, when both pilots enter the thermal nothing is heard. The air is rising at 0.1 m/s but both pilots are descending at -0.9 m/s. In the second zone of the thermal the air is rising at 0.8 m/s, and so pilots are descending at -0.2 m/s. At this stage the orange pilot starts to hear the Buzzer brrrrr sound of his NAV SD, which helps him to centre the thermal, while the green pilot is still unaware of the thermal. Finally, in the 3 zone, the air is rising at 1.2 m/s, and so both pilots climb at 0.2 m/s. The NAV SD pilot starts to hear his vario beep... beep... sound, and it is only at this point the green pilot hears the first beep from his instrument.



**Damper** - The NAV SD 's vertical speed calculation is based on air pressure variations. It is very seldom to have air pressure absolutely stable. Turbulence caused by air moving near the sensor is sufficient to cause small variations in pressure. For this reason the NAV C filters (averages) the pressure data to prevent constantly detecting tiny pressure variations. The value that defines how much the pressure is filtered is the Damper. Setting a lower damper value caused the NAV C to become more responsive but harsher. Inversely a higher value causes the NAV C to be less responsive but smoother. The default value is 6.

**Dynamic Frequency**- The NAV C beeps at a specified pitch (frequency) when a certain rate of climb is encountered. When dynamic frequency is zero, the pitch (frequency) of that beep will remain constant if the rate of climb changes. With dynamic frequency on, the pitch of the beep may vary if the rate of climb varies during the individual beep.

**Auto Silent**- Setting Auto silent option ON will keep the NAV C 's vario quiet until a Start Flight has been detected. This function avoids listening the vario sound while waiting to take off. The audio will then be kept active until the NAV C is switched off. The default value for the auto silent parameter is ON.

## Alerts

Alerts	
Goal possible	Off
Turnpoint complete	Voice
Start open	Voice
Off Course	No
Traffic	Off
Airspace Alarm	Voice
Altitude Alarm	Voice
Altitude Limit	Off
Speed Strt	40 km/h
Voice Gender	Male
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

In this menu it is possible to set up the instrument to give you audio and voice (voice assistant) alerts when certain conditions have been met. There are 6 different possible alerts. Each of these alerts can be enabled by selecting the YES, NO or Both (voice and alarm) and press Enter to accept. Conversely, selecting NO will disable the respective alarm.

**Goal Possible-** A alarm (brrrr sound) and/or voice warning is made to indicate that it is possible to reach GOAL. This is based on having a positive number for Arrival Goal. This is calculated based on the average glide ratio and it takes into account wind.

**Turnpoint complete-** A alarm (brrrr sound) and/or voice warning is made indicating approaching or that the pilot has crossed a turnpoint.

**Start Open** - A siren type sound and/or voice is produced when the start time elapses. This tone or voice warning does not indicate that a successful start has been made just that the Start is open.

**Off Course** - Almost always when a pilot makes a throttle transition, his attention is focused 80% of the time on seeing the behaviour of the wing and looking at other focuses than the instrument. To help the pilot, the NAV C can warn with a voice assistant warning that the pilot is deviating from his ideal route. This warning is voice only whenever the heading is ideal or is deviating from it.

**Airspace alarm** - A siren type sound is produced and voice warnings indicating that the pilot has entered the buffer zone close to airspace.

**Altitude alarm** - A siren type sound is produced and/or voice warnings indicating that the pilot is approaching or has entered the altitude limit, described below.

**Altitude Limit** - It is possible to set a specific altitude alarm independently of the airspaces. In many occasions, in a competition, the airspaces can be ignored or they are reserved for the competition. But even so, there may be altitude limitations for the location, that can be set in this data field. Setting this value ([barometric altitude or GPS altitude, depending the settings in Ref. Altitude in airspace settings](#)), will set the altitude alarm.

**Voice gender** - It is possible to choose between Male and Female voice assistant.

## Maps

Maps	
Track up	Yes
Auto Zoom	No
Thermal Zoom	16
Trace Enable/Size	2
Arrow Colour	Red
Hide place names	No
Triangle Assistant	No
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

This options sets the behaviour of the traces drawn on the Thermal Trace map layer and you can modify the map appearance

**Track up** - Track up allows the trace to be displayed with either the track relative to North, or with the current heading to the top of the screen . When Track UP is set to YES you will see the map turning around the pilot, while the Track UP is set to NO you will see the pilot moving around the Map.

**Auto Zoom** - Setting Yes causes the system to automatically zoom into the trace when entering a thermal, making it easy to understand the location of the thermal.

**Thermal Zoom** – Here you can define the automatic zoom level you want on the ["thermal map" layer](#). This value ranges from level 1 to 16 with 16 higher or more "zoomed".

**Trace Enable/Size-** With this option you can define what thickness you want to see on the "thermal map" layer. The value ranges from 1 (finest) to 3 (thickest). You can turn off the "thermal map" by setting the value to "Off".

**Arrow Color-** You can choose the arrow colour.

**Hide place names** – You cand show or hide cities and villages names.

**Triangle Assistant** – In this option, you can enable or disable the "triangle assistant." This flight mode enables the prediction and calculation of the best possible optimized route for performing a navigation to complete a valid FAI Triangle flight. When the choice is set to **"YES," the instrument switches to triangle navigation mode, and all task navigation or waypoint destination navigation is cancelled in favour of the triangle assistant. (check page 87)**

## Screen

Screen

UDF 1	Dist.Thermal
UDF 2	Dist.Edge
UDF 3	Dist.Goal
UDF 4	GPS Alti
UDF 5	Altitude
UDF 6	G.R.M.G.
Disable triggers	Yes
Orientation	Portrait

**UDF 1 to 6** - UDFs, which stand for User Data Fields, represent customizable data fields within the Flymaster Instrument Manager design possibilities . The NAV C device offers the flexibility to incorporate up to six of these UDFs into its page layout. These data fields are easily configurable through the settings page, empowering users to assign specific data types to each field. This feature liberates users from the constraints of computer dependency, allowing them to define and modify data fields effortlessly from anywhere.

**Disable triggers** – This option will allow to disable all page triggers if needed.

**Orientation** – This will set the instrument to use portrait or landscape layout pages.



## Language/Units

Language/Units	
Language	English
Alti.Units	Meters
R.O.C.Units	m/s
Speed Units	km/h
Dist.Units	km
Int.Temperature	Celsius
Coords.	DD.DDDDD°
<div>Save Cancel</div>	

**Language** - Defines the interface language.

**Alti units** - Altitude Units. Altitude can be show in Meters, or Feet

**R.O.C. (Rate of climb)** - Rate of Climb Units. ROC can be show in m/s, or 10 x Feet/ min

**Speed Units** - Speed units can be in Km/h, Knots or Miles per hour.

**Dist. Units** - Distance units can be in Km, or Miles.

**Temperature** - Temperature units can be Celsius or Fahrenheit.

**Coords.** - Coordinates format. These can be either.

DD°MM'SS; DD°MM.mmm'; DD.dddd; UTM



## Device Settings

Device settings

Factory settings

No

Reset GPS

No

On Landing

Off

Pilot Name

Save

Cancel

**Factory settings** - Reset all parameters to the default factory values. This will not change the layout to the factory default layout. Care should be taken because all settings made by the user are lost.

**Reset GPS** – This will restart the GPS module and force a “cold start” from the module.

**On Landing** - In this data field you can choose the behaviour of the instrument after detecting an eventual landing. There are 3 options:

Off - Does not perform any operation or pop up any options window

Report Back - A window appears with choices for the type of "report back" you want to send (see the "report back" section).

Auto-off - **The instrument turns off automatically. This option must be used with the utmost care as a false detection of a landing can lead to the instrument dislodging in an undesired way.**

## Calibration



The NAV C include a magnetometer and accelerometer sensor. Using these sensors the NAV C can provide G-Force and magnetic compass heading. Even though the compass is digital there is a tilt compensation algorithm that ensures accurate compass heading even when the NAV C is inclined.

The Calibration menu option allows the user to calibrate the NAV C accelerometer and magnetometer sensors. Calibration is particularly important for the magnetometer since without it you will get inaccurate data from the compass. Despite all Flymaster instruments being factory calibrated errors can be introduced due to several external influences, such as the presence of strong magnetic fields or the time. In order to eliminate these errors a proper magnetometer calibration should be made. Calibration parameters are kept when the NAV C is turned off, reset or when a firmware update is done. The magnetometer calibration process is described below.



After pressing enter in the "calibration" option, the colour display shows the indications of all the axes that the instrument must rotate. You must rotate the instrument in the 4 main axes 360 degrees or more. As each axis is calibrated, the indicator arrows turn green. At the end of the process, if successful, there is a voice instruction indicating "calibration done". If unsuccessful, there is a voice prompt indicating "calibration failed". You must repeat the operation so that the magnetometer is properly calibrated.

## Navigation Settings

Navigation settings

Turnpoint size 00.400 km

Datum WGS84

Start Speed Off

FAI comp No

**Turnpoint Size** - The default turnpoint cylinder size is set in this menu. The size of the cylinder can be changed by scrolling through the numbers using the UP and DOWN keys. Pressing ENTER moves to the next digit. This value is used as the default cylinder size during task creation.

**Datum** - Two datum models can be set on the NAV C . Options available are WGS 84 and FAI sphere. At the start of any competition, be sure to check what Datum is used by the scoring system to ensure that the correct distances are being reported.

**Start Speed** - The start speed is one of the Start Flight conditions, and it is used to define the minimum GPS speed, in Km/h, that should be reached in order to initiate the flight. Note that the Start Flight event is important to many other functionalities, so care should be taken when setting this value. For example, if Auto Silent is on, the vario will only beep after the flight starts. The track data is also only saved after the flight starts. **If set to OFF the flight will start immediately after GPS fix position is acquired. This setting is only recommended in very exceptional occasions like walk-and-fly activities, because will produce a track log each time the instrument is turned on.**

**FAI comp** - Due to new FAI (CIVL) requirements regarding flight certification, when this setting is set to YES, the instrument is only ready to fly when there are at least 30 seconds of track log recorded with 3D GPS position before actually taking off . As long this requirement is not met, a message appears on the instrument with the message "WAIT" informing you not to take off. The same happens after landing, that the same 30 seconds of track log must be saved, and the instrument will only turn itself off after fulfilling this requirement.

## Airspace Settings

Airspace Settings

Enabled	Yes
Dist.CTR	2.0 km
Alt.to CTR	200 m
Ref.altitude	GPS Alti
Ignore above	Off
Margin Above	Off
Draw Solid	Yes

**Enabled** - If this parameter is set to YES, all the Airspaces functions will be ON, including warnings and map layer representations.

**Dist. CTR** - Minimum horizontal distance that a pilot can be from an airspace without triggering an airspace warning. If this thresh-old is passed a warning is emitted.

**Alt. to CTR** - Minimum vertical distance that a pilot can be from an airspace without triggering an airspace warning. If this threshold is passed a warning is emitted.

**Ref. altitude** - The Ref. Altitude parameter allows the user to define the altitude that is used to evaluate the airspace's proximity. The parameter can be set to:

GPS Altitude - Altitude given by the GPS

Altitude - Barometric altitude

Flight Level - Barometric altitude expressed in hundreds of feet and computed assuming an International standard sea-level pressure datum of 1013.25 hPa (QNH).

**Ignore Above** - Here you can set from which altitude you can ignore airspaces. After setting a value above which they will be ignored, they will not be drawn nor will any alert or alarm be generated in the airspaces that are located above this value.

### Margin Above

**Draw Solid** - With this option set to YES, in the map that contains an airspace layer, the violation (in red) or imminent violation (in yellow) will be filled.



## Airspace Classes

**Airspace Classes**

A	Enabled
B	Enabled
C	Enabled
D	Enabled
E	Enabled
F	Enabled
G	Enabled
AWY	Enabled
RMZ	Enabled
SRZ	Enabled
TMZ	Enabled

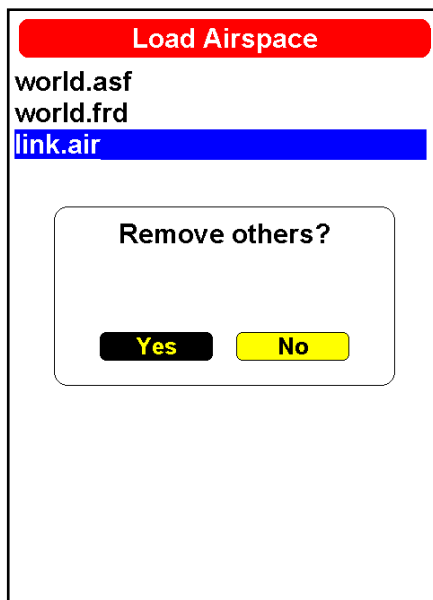
**Airspace Classes (A to TMZ)** - This option allows you to enable and disable processing by airspace classes individually.

## Load Airspace



On many occasions and due to various factors, it is necessary to load additional airspaces. This option allows you to load airspaces in Open Air or the Flymaster World.asf (world airspaces Flymaster proprietary file) into the instrument. The files can be saved to the memory card using the Flymaster Instrument Manager, or copied directly to the SD card into the “airspaces” folder.

**It's also possible to keep your Airspaces around your location up-to-date daily using the Bluetooth connection with the “Flymaster Link” app available for ios and Android. Check page 99 onwards.**



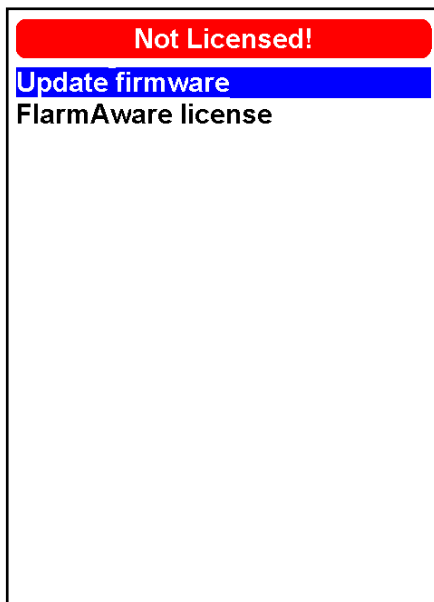
YES – All previously loaded airspaces (including the build-in World.asf) will be removed and only the .txt one will be considered.

NO – The instrument will keep working with the World.asf (world airspace file – Provided by Flymaster) and the loaded Open Air one, at same time.

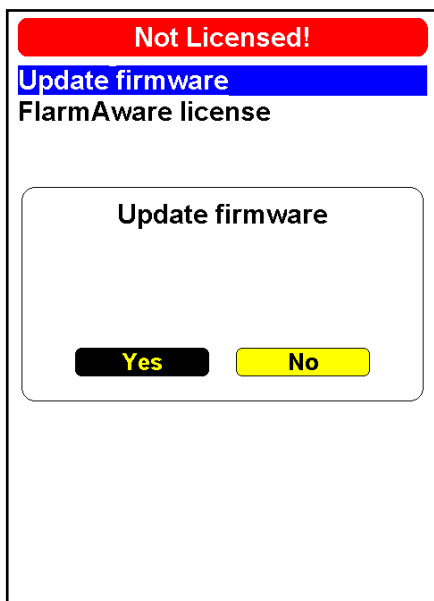


FlarmAware

## Flarm Aware



This option enables you to manage the additional service "Flarm Aware," which can be purchased through our online store. This service is optional and is not associated with the default Flarm beacon system present in instruments equipped with the Flarm system.



**Update firmware** - This option allows you to update the firmware of the Flarm module. This procedure should be performed when the validity period of the Flarm system has expired. You can check the status of the Flarm system under "device info."

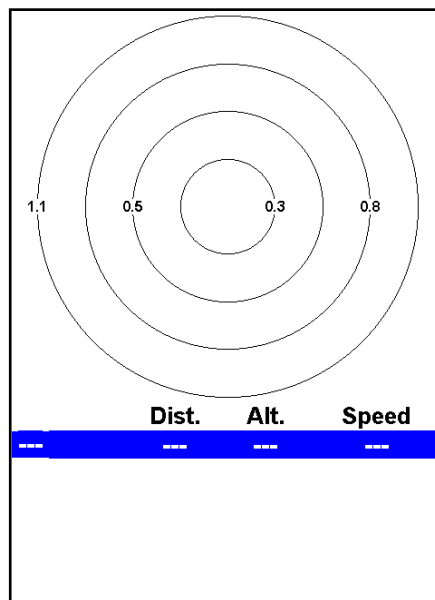
Not Licensed!

Update firmware

FlarmAware license

FlarmAware license ffffff

**FlarmAware licence** - In this option, it's possible to input the activation code for the additional FlarmAware service (which can be purchased through our online store). Alternatively, you can activate this through the Flymaster Instrument Manager (refer to page 15 of this manual).



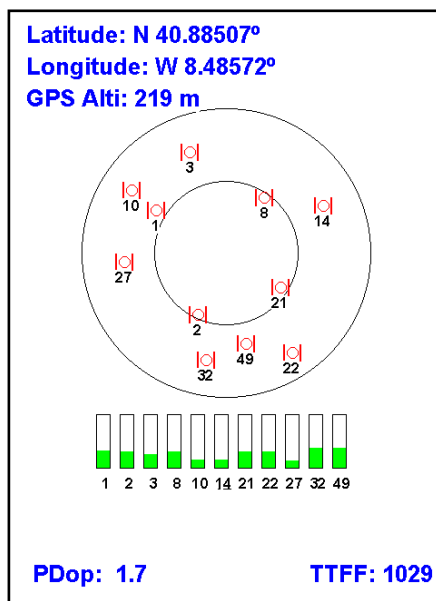
**FlarmAware** - After FlarmAware is active, in this option you can view the Flarm "radar," where aircraft equipped with Flarm are displayed. You can see their relative position to you, their identification, distance from your position, their altitude, and their speed. (check page 46 for more info)



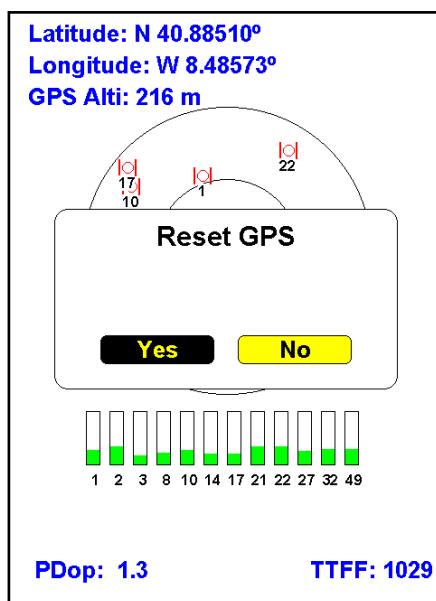


## GPS Status

## GPS Status



**GPS Status** - In this option, you can check the GPS status, including visible satellites and the signal strength of each one. You current position with latitude, longitude and Gps altitude is also shown. **Pressing Enter on this page allows you to reset the GPS module.**





## Device Info

### Device Info

Date: 2023-08-11 Time: 10:08:20

UTC offset: +01:00

Serial Number: 12651

Firmware: 1.02g

#### FLARM

Dev ID: 00642

Expires: 2024-03-01

Version: 7.09

Global Id: 220282

#### Battery

State Charging...

Level: 100%

Full Charge in 00:19

Charging Current 211 mA

Voltage: 4.2v

**Date** - Date

**Time** - Current Time

**UTC offset** - Current setting of the UTC offset

**Serial Number** - Instrument Serial Number

**Firmware** - Current firmware version

**Dev ID** - Flarm Device ID (Flarm serial number)

**Expires** - Flarm Firmware Expiration date

**Version** - Flarm Firmware version

**Global ID** - Flarm Global ID

**State** - Current battery state : Charging / Discharging

**Level** - Current Battery Level

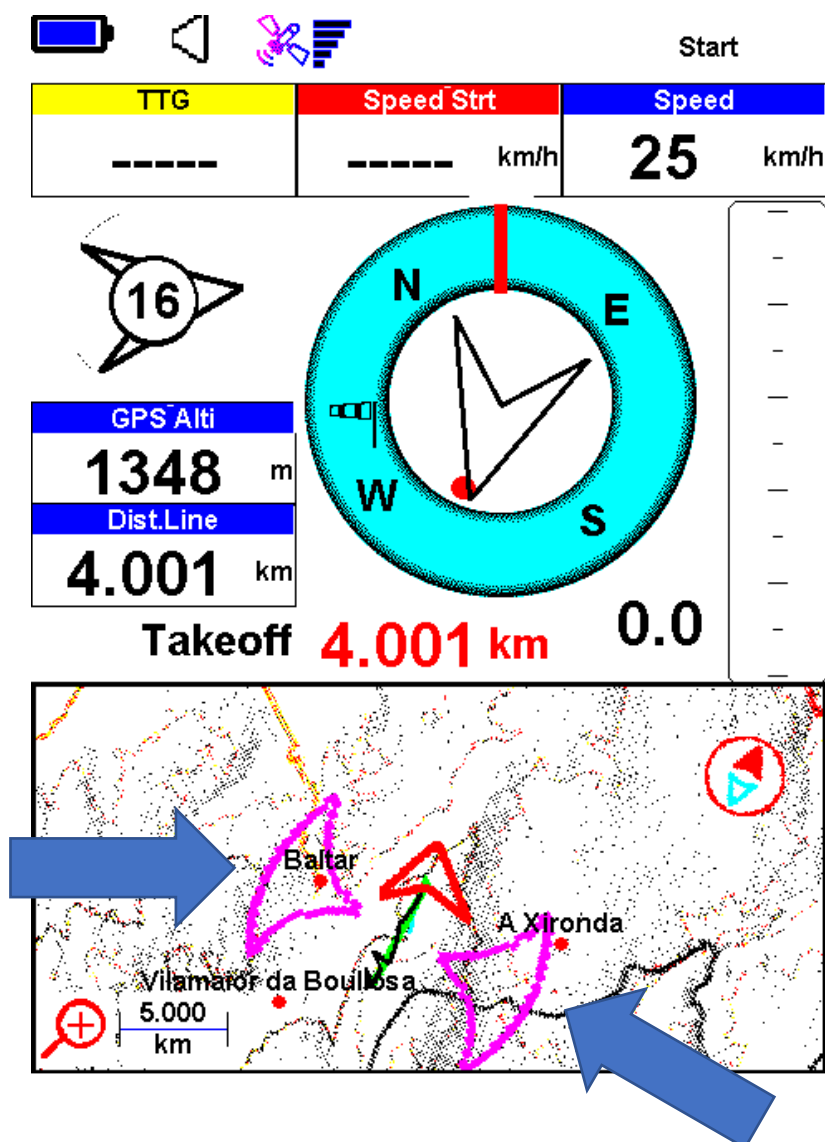
**Full Charge** - Estimate time to full charge

**Charging Current**

**Voltage**

## Triangle Assistant

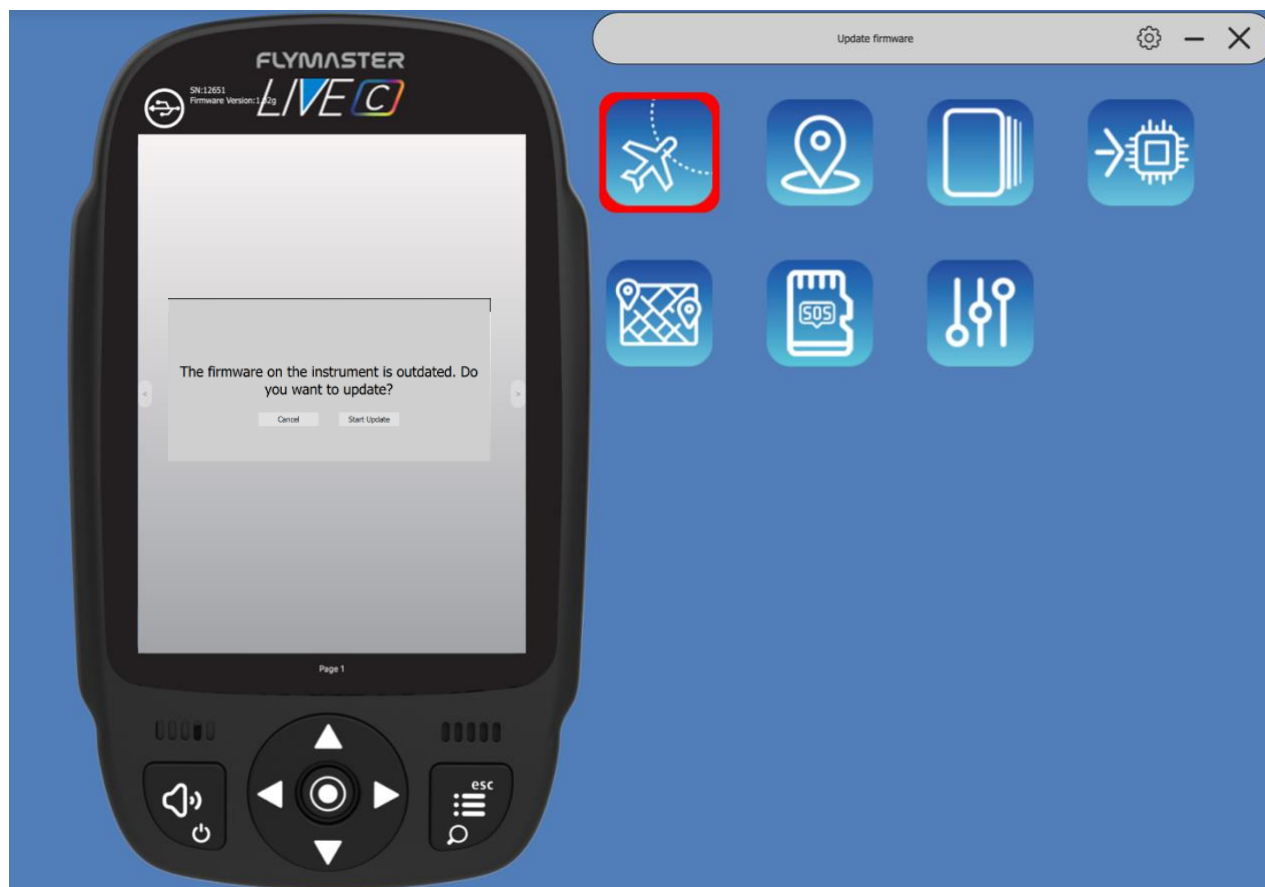
In this option, you can enable or disable the "triangle assistant." This flight mode enables the prediction and calculation of the best possible optimized route for performing a navigation to complete a valid FAI Triangle flight. When the choice is set to "YES," the instrument switches to triangle navigation mode, and all task navigation or waypoint destination navigation is cancelled in favour of the triangle assistant.



As your flight progresses, initially, two possible areas to complete an FAI triangle are displayed on the screen. The entire process is automatic and does not require the pilot to establish the point of the 1st or 2nd turn. The instrument will recognize when the pilot has made turns consistent with the FAI triangle specification and will continuously display the potential turn areas or, ultimately, the "triangle closure" area.

**If you are a pilot who frequently wishes to fly FAI triangles, we recommend creating a page layout that includes a larger-sized map and features the "Triangle Size" data field.**

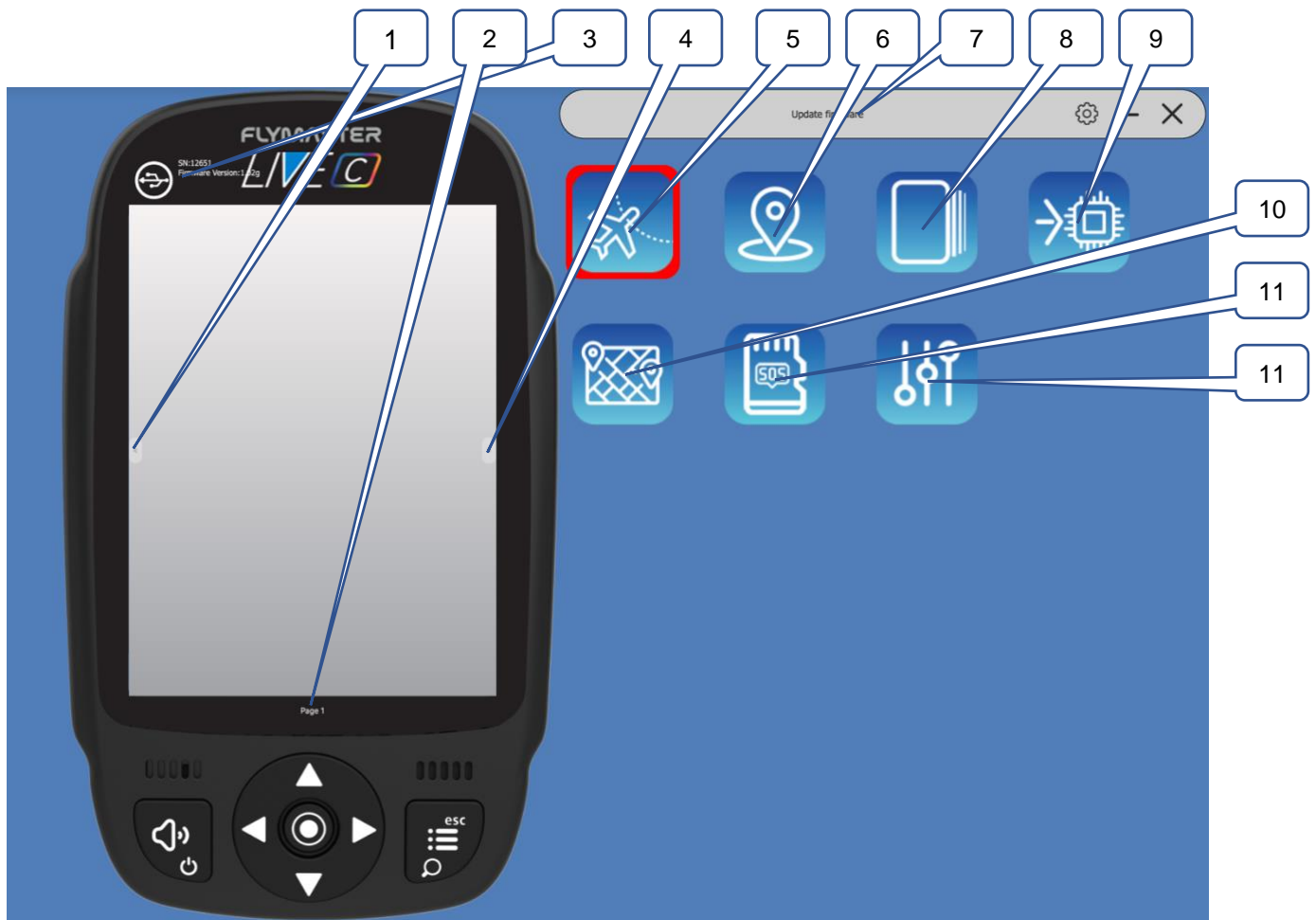
## Flymaster Instrument Manager



**Automatic firmware update** - After launching the "Flymaster Instrument Manager" application and if your instrument is connected to your computer's USB port, it may be possible that there is a new firmware version available for your instrument. If you want to update, just answer "start update" and the process will be automatic. Your instrument will restart, and a progress bar will appear on the colour screen with the indication "installing firmware".

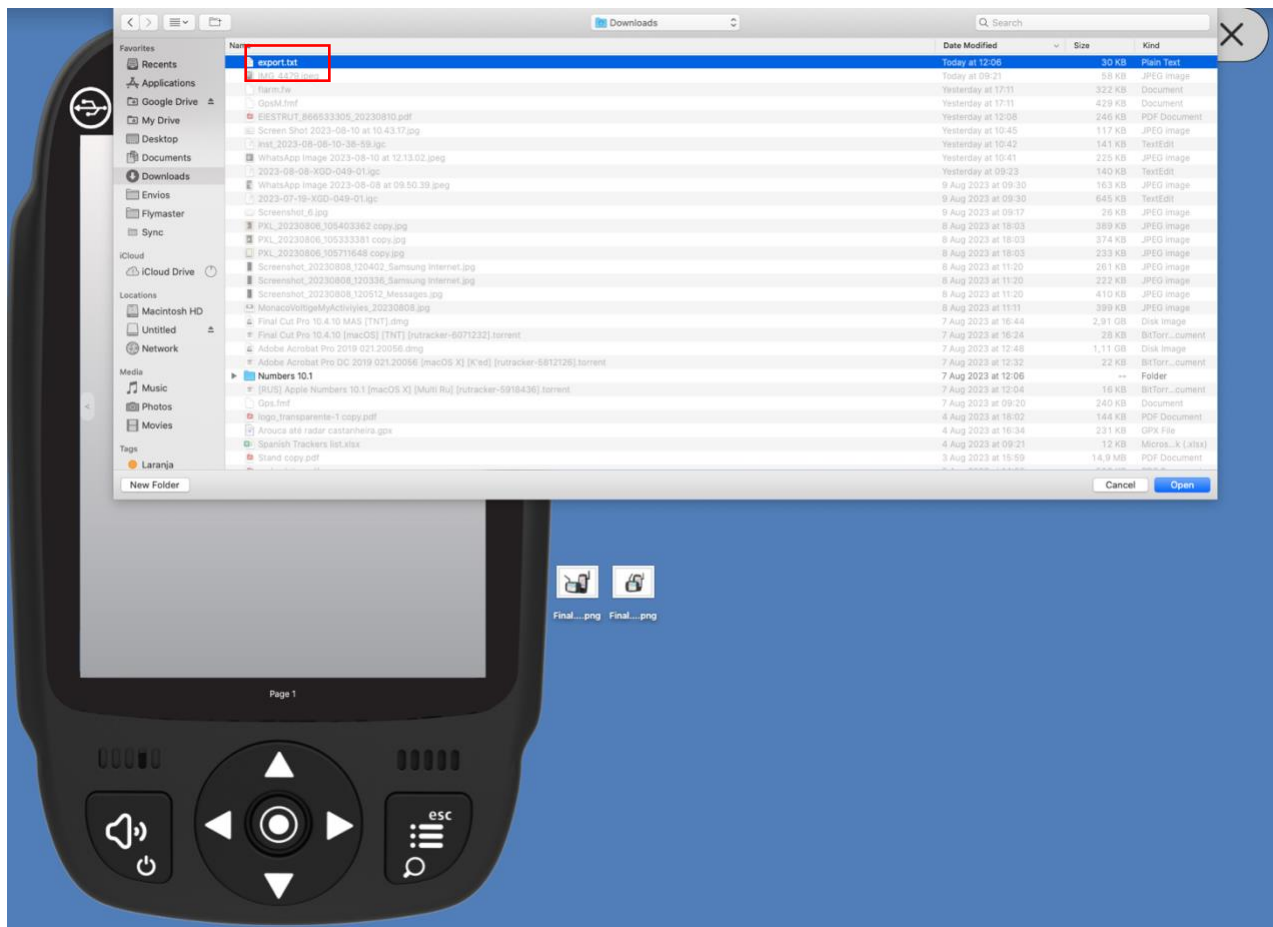


## Main Screen and tools



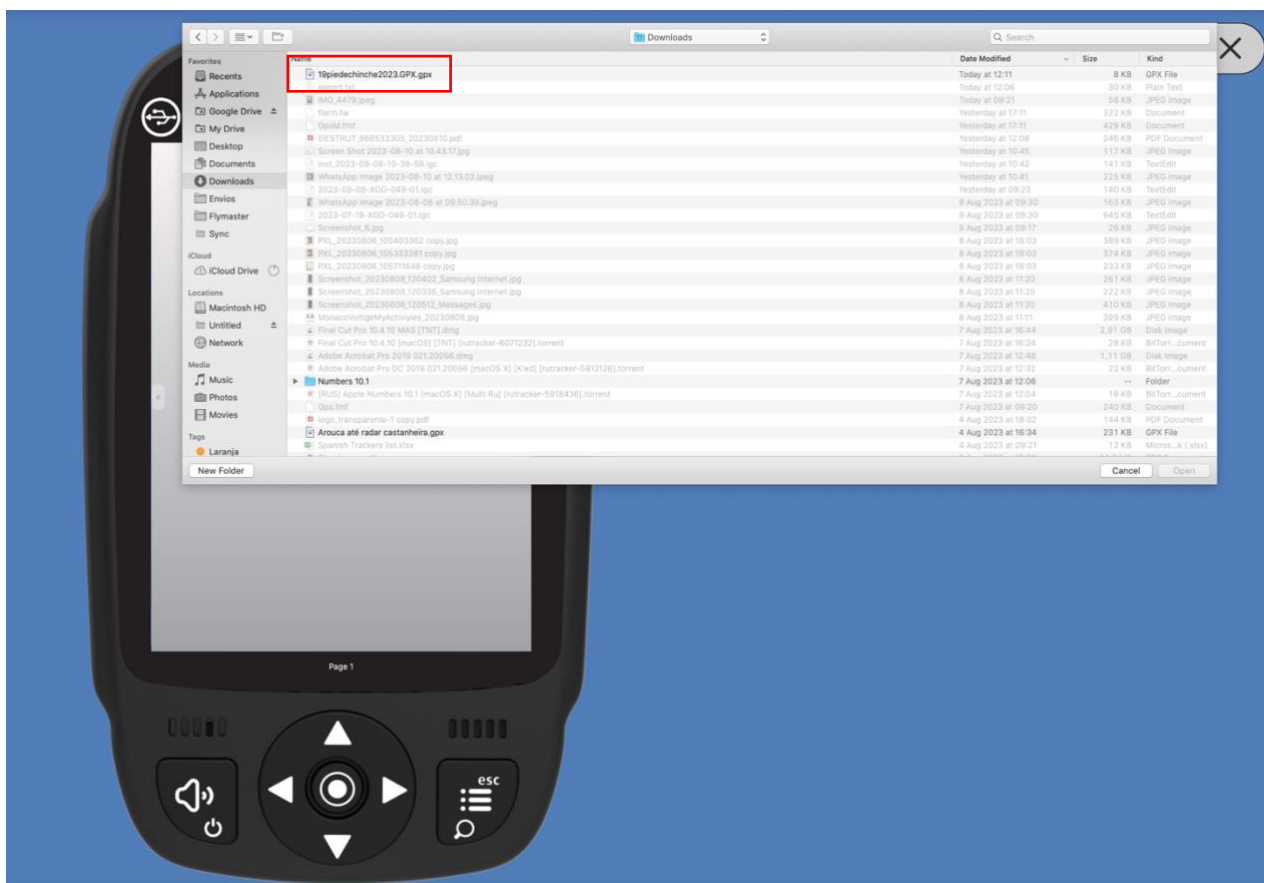
- 1 – Previous Page
- 2 – Page name (click to edit. [Can be visible in a data field](#))
- 3 – Connection state and info
- 4 – Next Page
- 5 – Copy Airspace file to instrument (open Air)
- 6 – Upload Waypoints file
- 7 – Current tool
- 8 - Pages Layouts
- 9 - Update firmware tool
- 10 – Maps tool (maps management)
- 11 – SOS SD card tool
- 12 – Settings

## Copy Airspaces File to instrument using F.I.M.(Open Air)



Here you can copy any Open Air file (txt) into the instrument (SD card).  
Later you can use it to activate it (load to memory) using the Airspace Settings.

## Copy Waypoints File to instrument (Open Air)



Here you can copy any waypoints file (GPX, WPT,CUP) into the instrument (SD card). Later you can use it to activate it (load to memory) using the Waypoints settings.

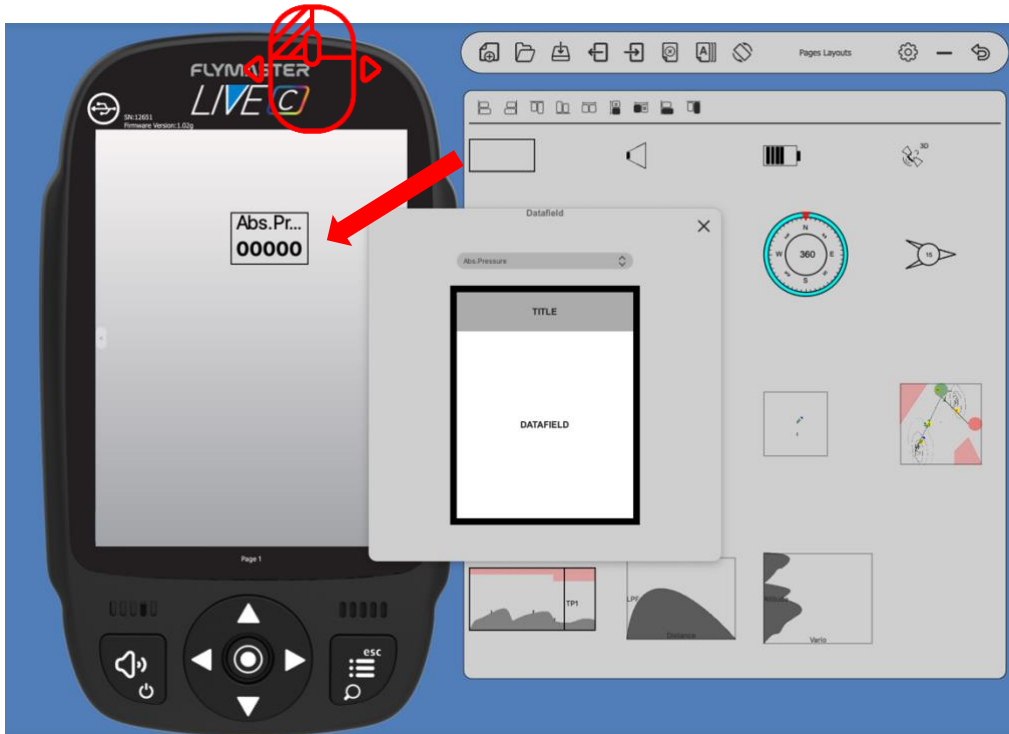
## Pages Layouts data fields and objects



- 1 – New layout page
- 2 – Open layout page
- 3 – Save pages layout as a file
- 4 – Import pages layout from instrument
- 5 – Send pages layout to instrument
- 6- Delete page
- 7 – Page Triggers (auto page switching behaviour)
- 8 – Rotate display
- 9 – F.I.M. settings
- 11 – GPS Status object
- 8 – Cut Side view object
- 9 – Vario object
- 11 - GPS Status object
- 12 – Wind arrow object
- 13 – Multilayer Map object
- 14 - Compass object
- 15 - Thermal widget object
- 16 – Thermal profile object
- 17 – LPF Graphic object
- 18- Battery status object
- 19 – Analog Vario object
- 20 – Profile Map object
- 21 – Navigation Wheel object
- 22 – Flarm Aware radar object
- 23 - Volume indicator object
- 24 – Communication status object
- 25 – Data Field
- 26 – Design and alignment tools



## Customizing data fields and objects



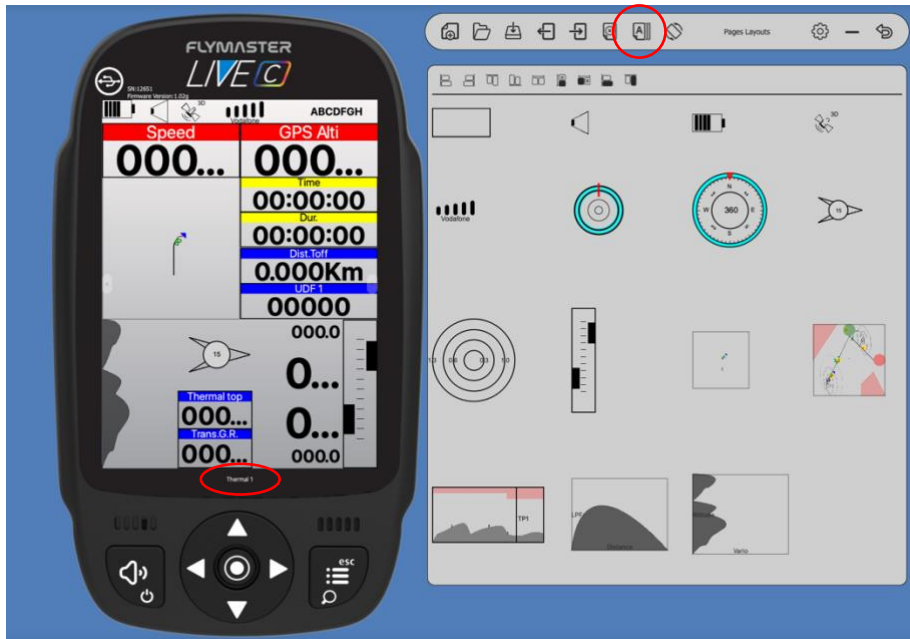
After dragging a data field or double click it will show the customization pop-up window of it.

It's possible to change :

- The data field (data you want to see)
  - The title colour and font size
  - The title background
  - The border colour
- The data field font and colour
- The data field background



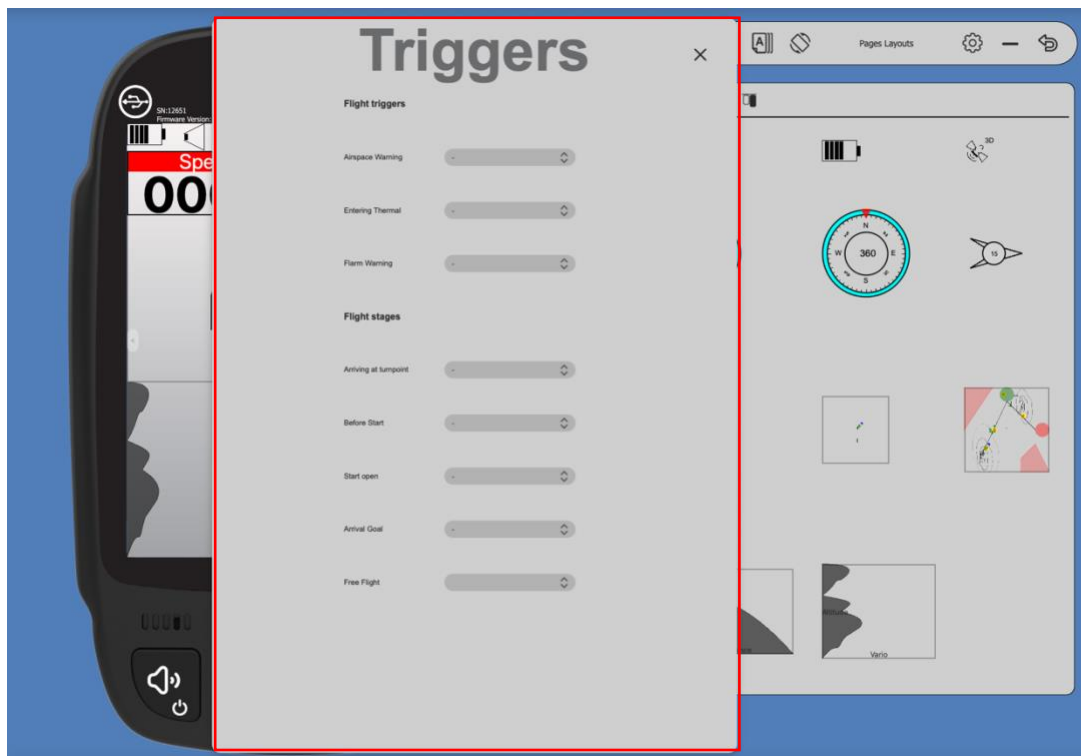
## Page Triggers



After you design or open a page layout you can configure the page trigger for each page. The page trigger it's a auto page switching when the instrument "understands" the pilot position of behaviour.

When that behaviour is achieved the page is automatically called.

- 1 – Create or open a Layout
- 2 – Click on "triggers" tool



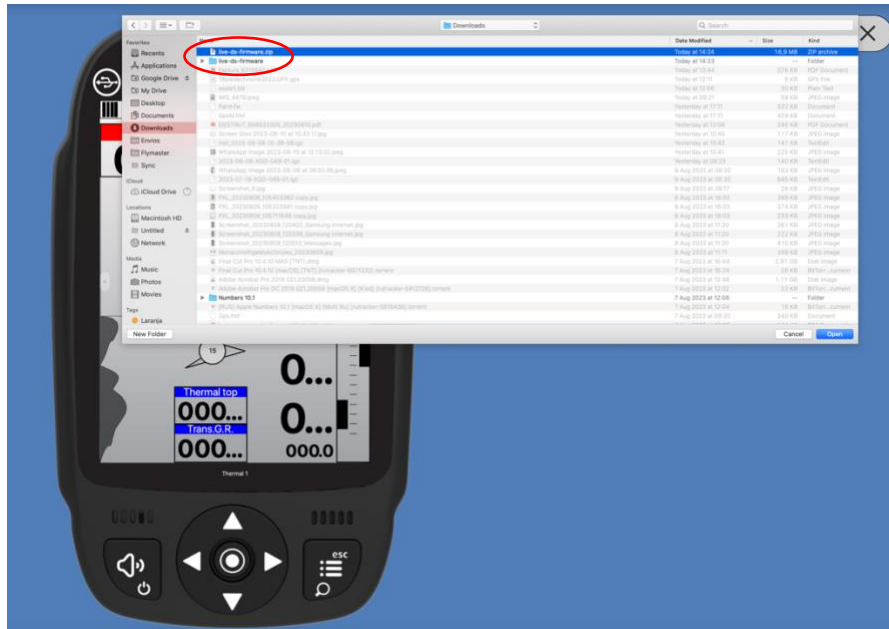
## Triggers and Flight Stages

Triggers on the C series and DS are slightly different from the SD series. In the new series, we have complemented the triggers with flight stages. Triggers are the result of certain events (such as entering airspace), which usually require a specific action to occur (such as deploying an alert or changing pages). Triggers are activated when certain conditions are met and deactivated when conditions are not met. Therefore, triggers always have two associated events: one when the trigger is enabled and another when it is disabled. In contrast, a flight stage does not have the concept of associated events. Flight stages are more like phases during flight that depend on different conditions (such as before start open, after start open, etc.). Both triggers and flight stages can have associated layout pages, but triggers have higher priority. This means that a change in a flight stage does not have consequences if a trigger is active.

### Example:

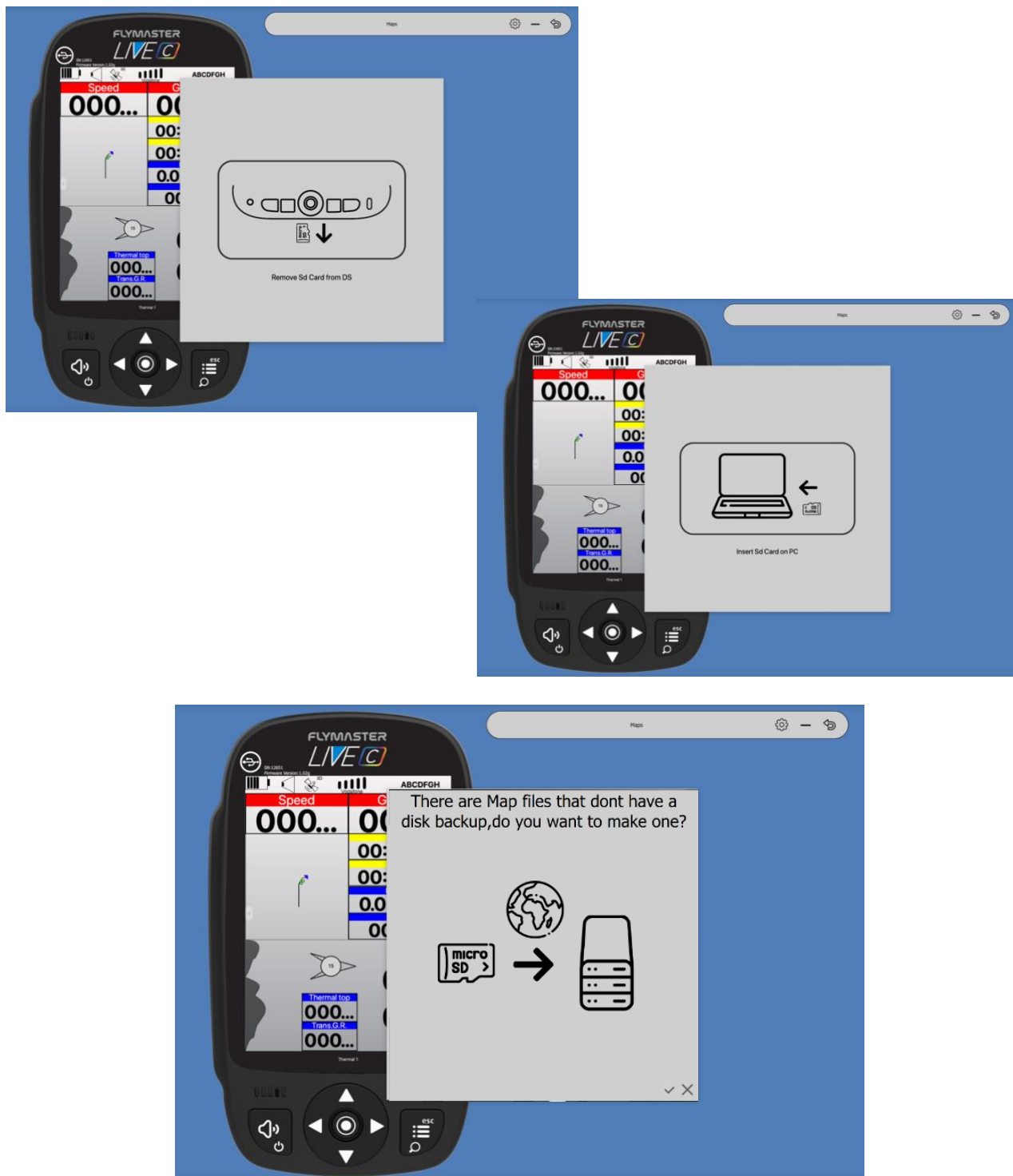
Let's say we have a layout with pages associated with the "Before Start," "Start Open," and "Arrival Goal" flight stages. The same layout also has pages associated with "thermal" and "airspace" triggers. Now imagine we are in a competition, no triggers are active, and the start has not yet occurred. The instrument will display the "Before Start" page. Shortly after, the pilot enters a thermal and starts climbing, so the instrument switches to the thermal page. While climbing, the start opens, but since the thermal trigger is active, nothing happens. After some time, the pilot initiates a transition, so the thermal trigger is disabled, and the instrument switches the page to the "Start Open" page because the start has occurred in the meantime. If the pilot manually switches the page, the associated flight stage page is ignored. Therefore, if another trigger occurs, the instrument will switch to the new trigger-associated page, but when the trigger is disabled, the instrument will switch to the page that was displayed before the trigger occurred.

## Manual firmware update

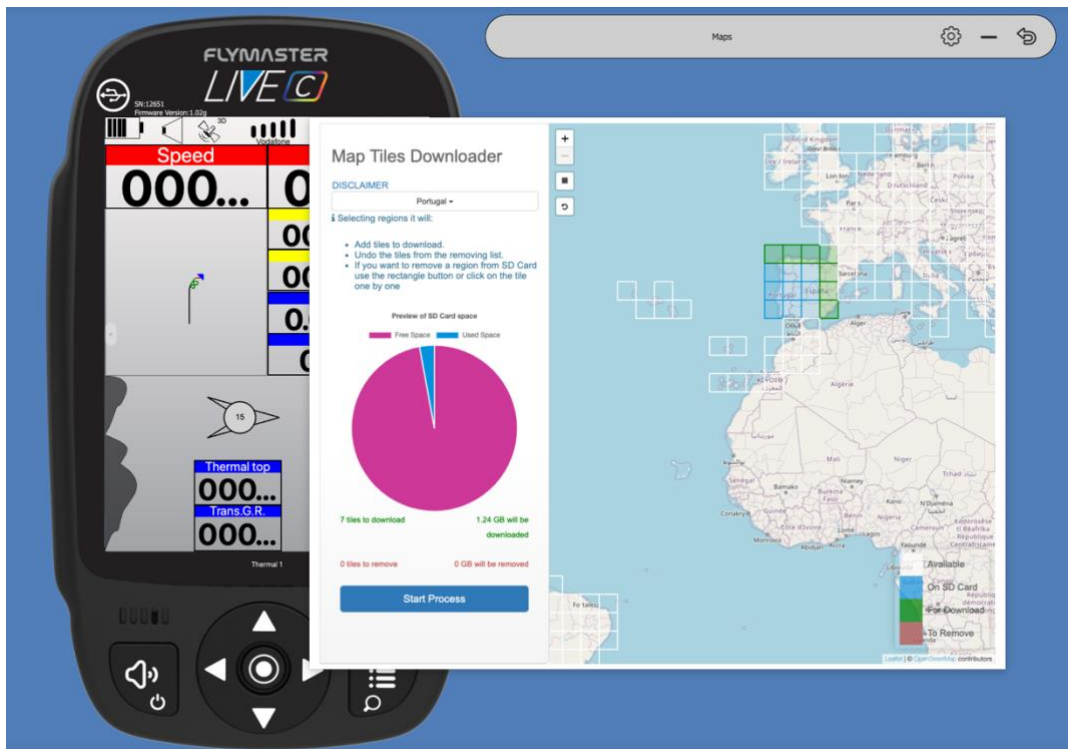


In this tool you can force manual firmware update. Just download the firmware package file, from the Flymaster website and save it to your hard drive. Then just point your location and the process will proceed normally. **Very important: Be sure you have the .zip file in your computer after download! Do not extract the Zip file.**

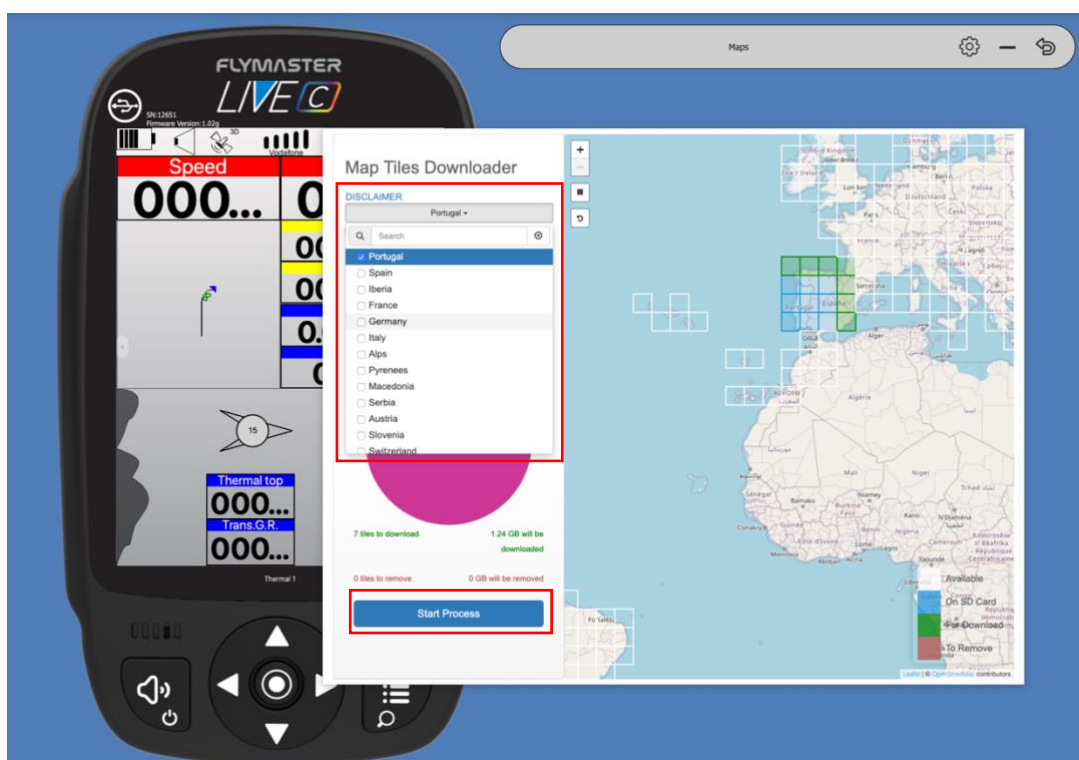
## Maps Management



When selecting the "maps" tool, the F.I.M. will give you instructions to eject the micro SD card from your instrument, and insert it into your SD card reader/writer. After this phase and if there are maps on your card that are not stored on your computer, F.I.M. will ask if you want to make a backup of them. **It is convenient to proceed using the check, and make the backup, because in the future, if you want to use the same maps, you no longer need to download them.**



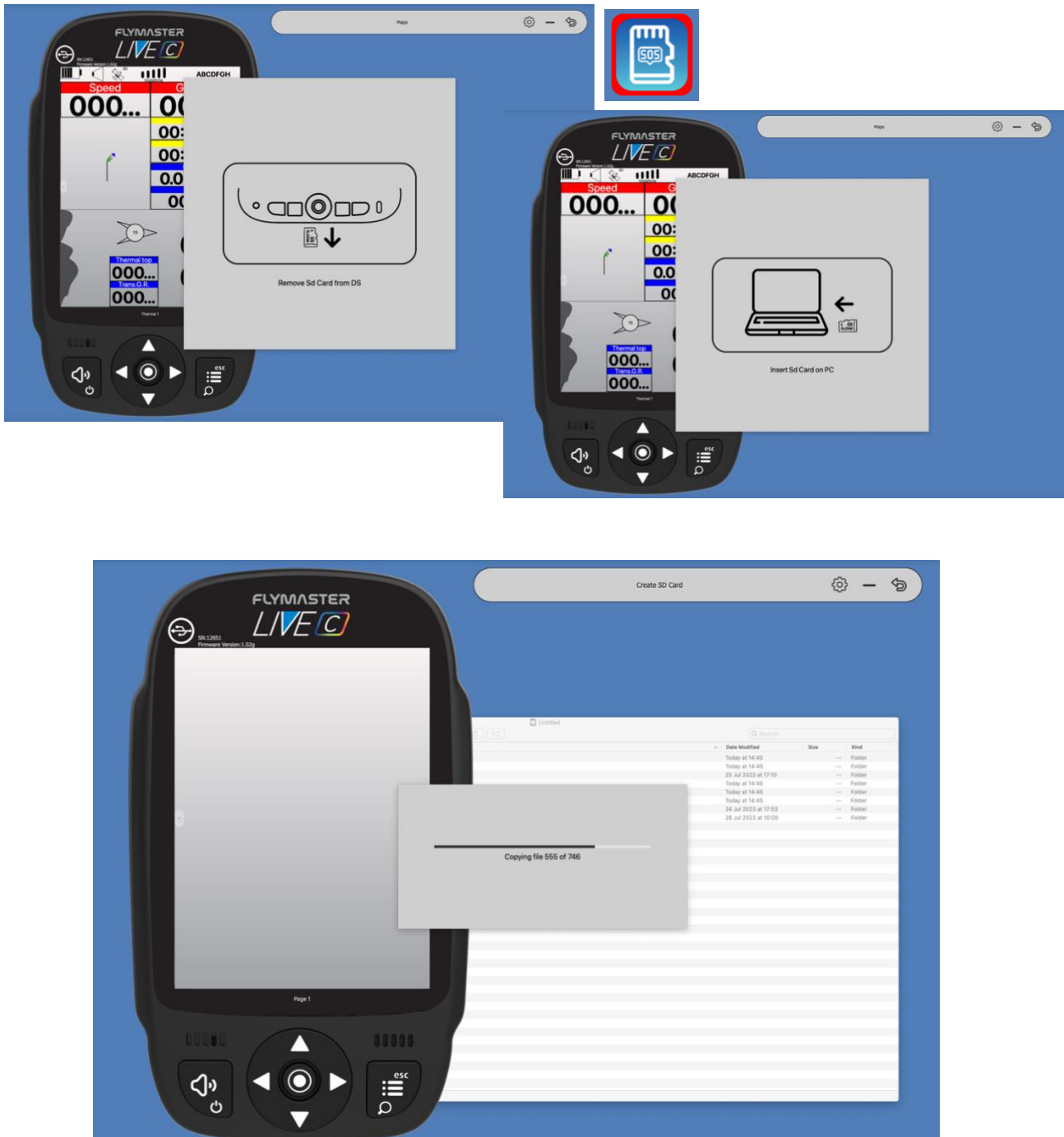
After the backup phase is finished, the SD card and Maps management window will appear. You can click on the available "tiles", you can add tiles, remove them, or check which ones you actually want to download. Is also possible to select automatically by regions.



After clicking on "start process", the entire sequence of copying and managing the maps is automatic. At the end of the process, you receive a message saying that you are ready to eject the card and insert NAV C.



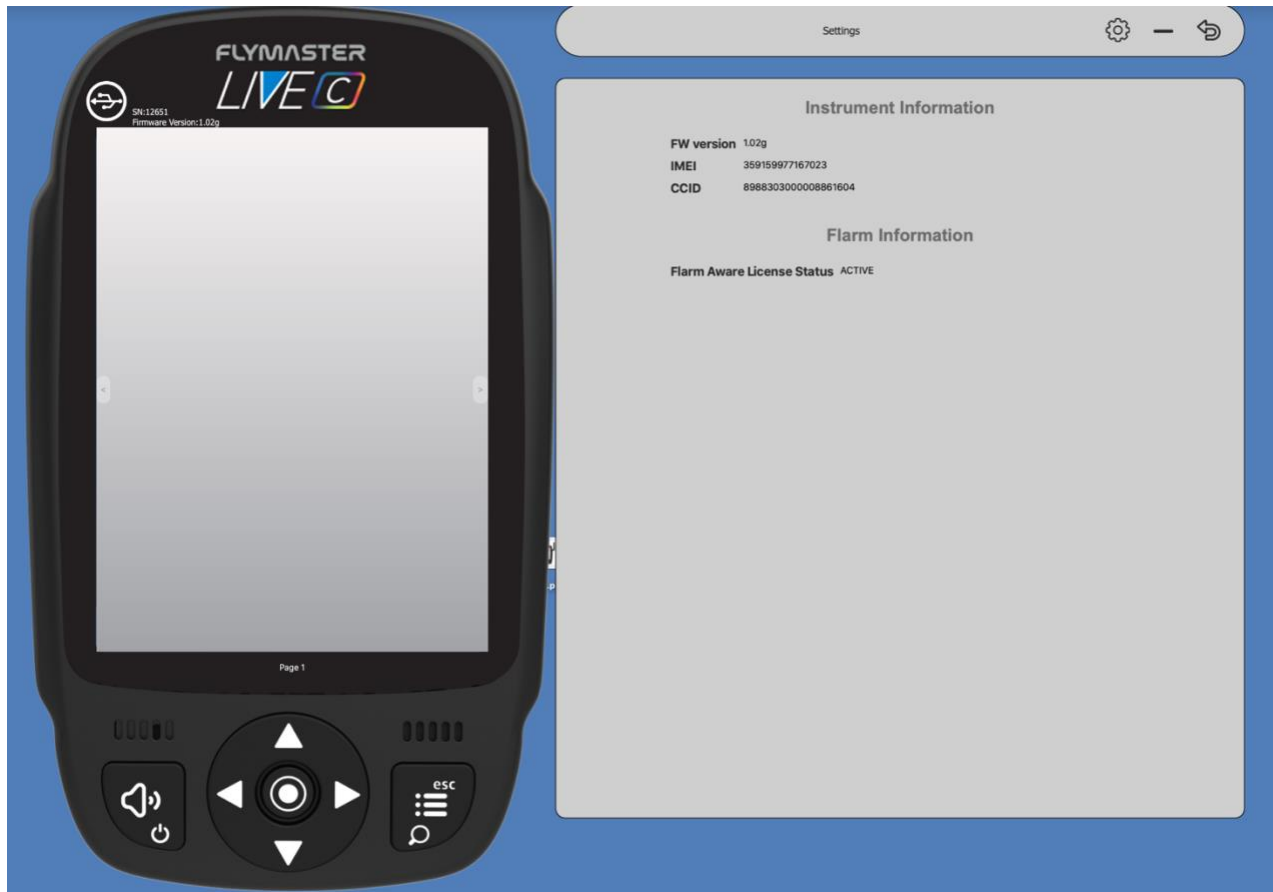
## SOS SD card tool



This tool allows you to restore the SD card with all the necessary data for the instrument to boot. Whenever you encounter an issue with instrument booting due to reasons such as a damaged card or potential stability problems, one of the initial steps is to utilize this tool.

**VERY IMPORTANT: Ensure that the SD card is formatted in FAT32.**

## Settings and instrument info



In this tool it is possible to see information about the instrument such as:

**IMEI**

**CCID**

**Status of the FLARM AWARE licence**

Is also possible to use this page to activate the Flarm Aware licence.



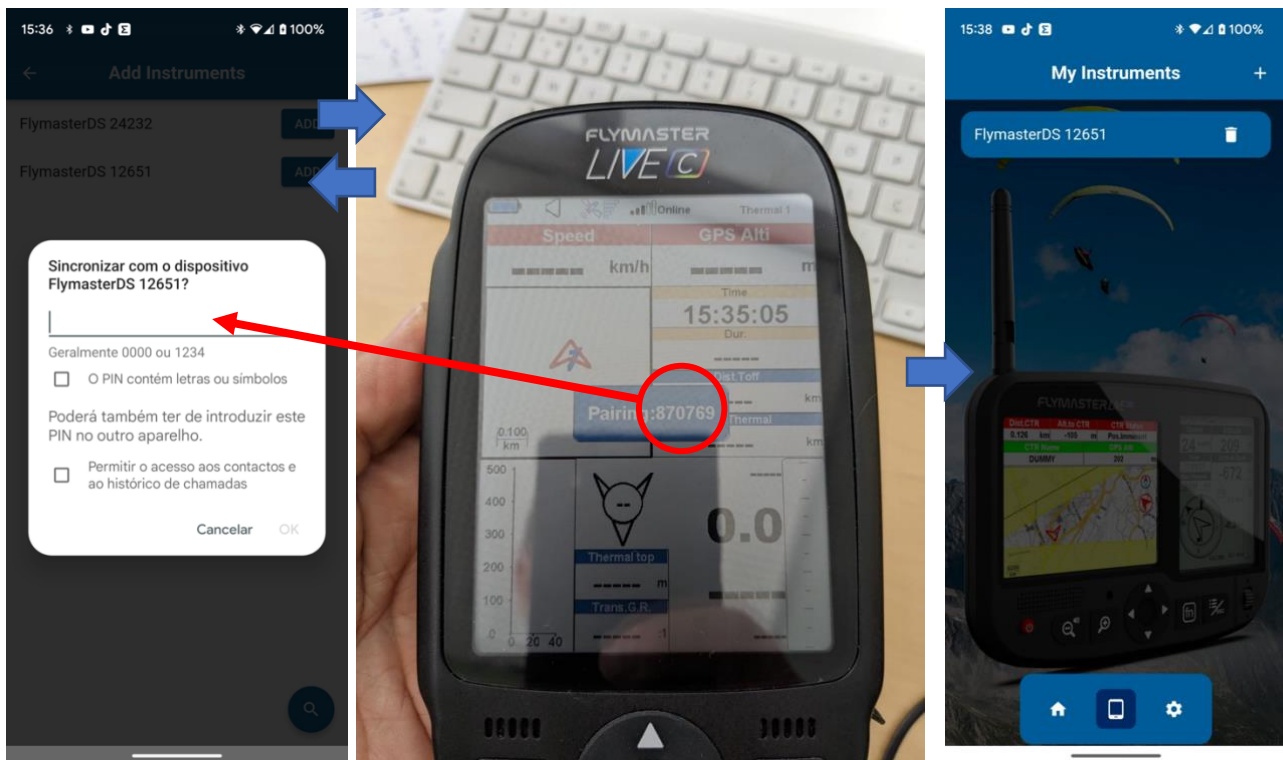
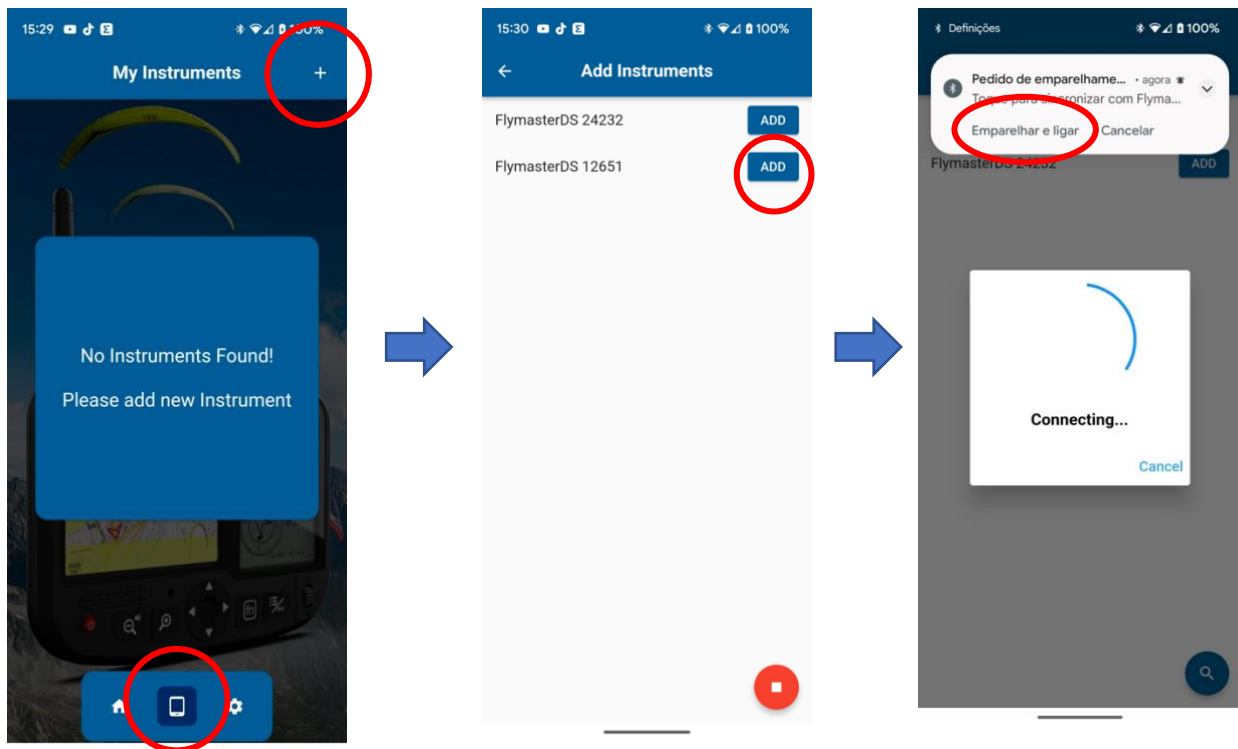
## Flymaster Link APP



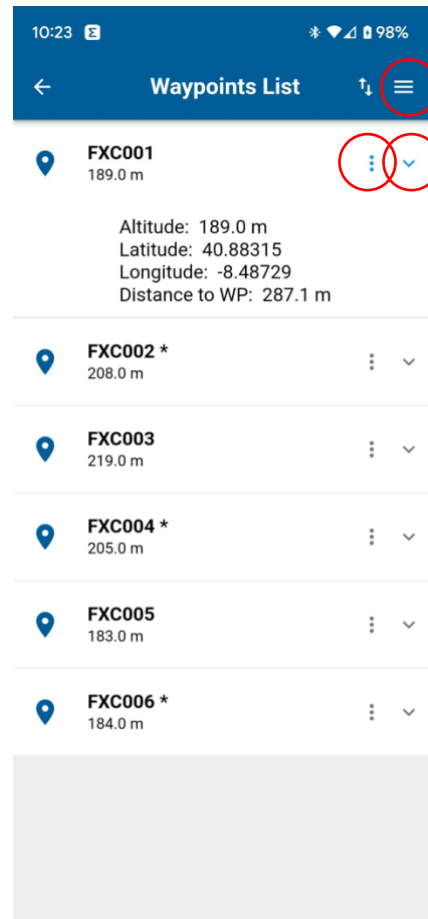
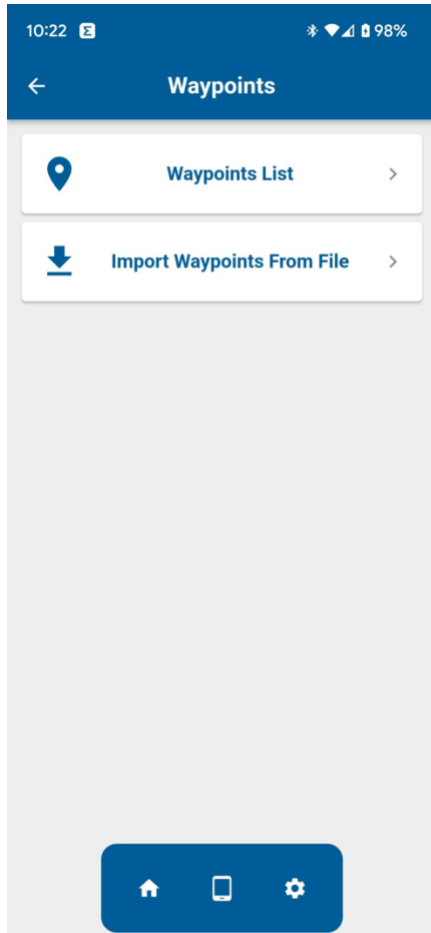
***Flymaster Link App*** - The Flymaster Link App is accessible on both Android and iOS platforms, harnessing the power of Bluetooth technology to facilitate communication and seamlessly expand the capabilities of your NAV C device. This translates into a more user-friendly experience, reducing the need for extensive reliance on a desktop computer for various routine tasks.

In its present iteration, the App empowers you to effortlessly generate and manage waypoints, tasks, and perform daily updates of airspace data within your location. As the App continues to evolve through updates, a myriad of additional tools are poised to be introduced and enhanced, further enriching your experience.

## Pairing Instrument



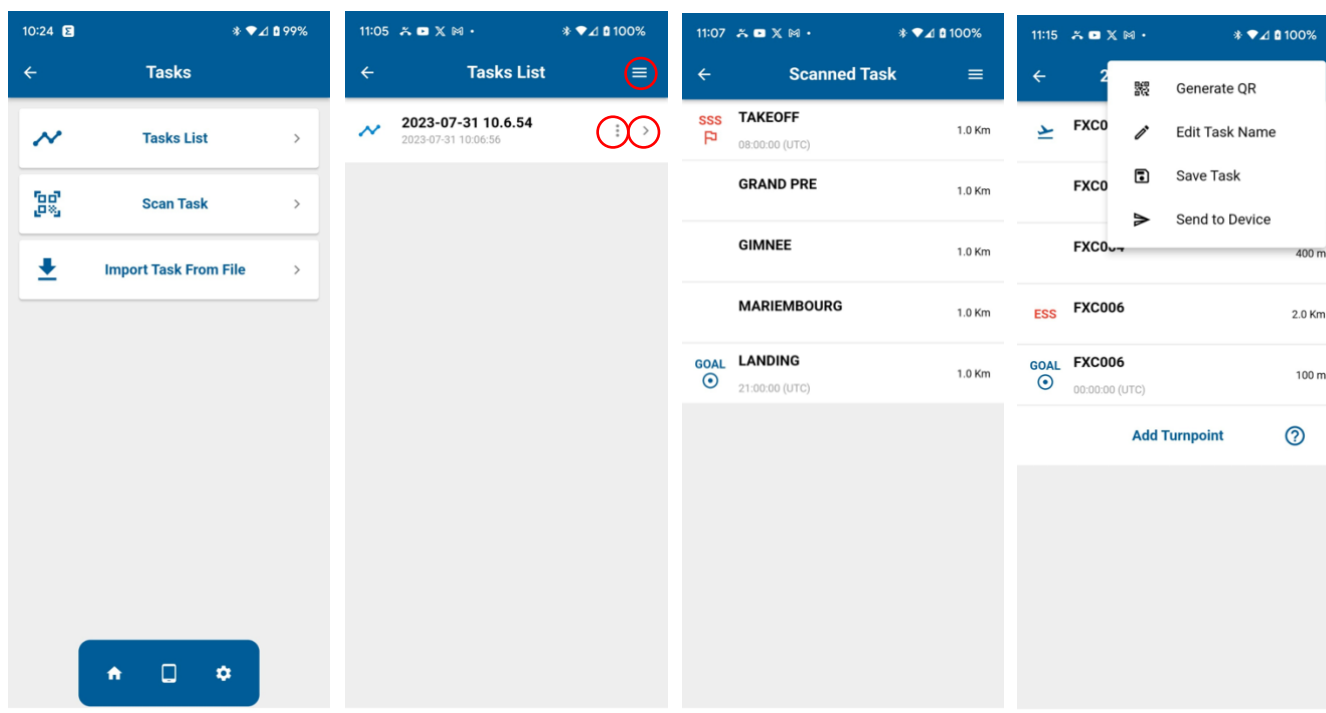
## Waypoints



**Waypoints list** - List of recorded waypoints from the Flymaster Link app. There are tools in the waypoint list. The "three horizontal lines" allow you to create a waypoint or delete all waypoints. The small downward arrow allows you to view waypoint details, such as coordinates, altitude, and current straight-line distance to the waypoint. The three vertical dots allow you to edit the waypoint or delete it.

**Import Waypoints from file** - It allows you to import a pre-created file of waypoints in .WPT or .GPX format.

## Tasks

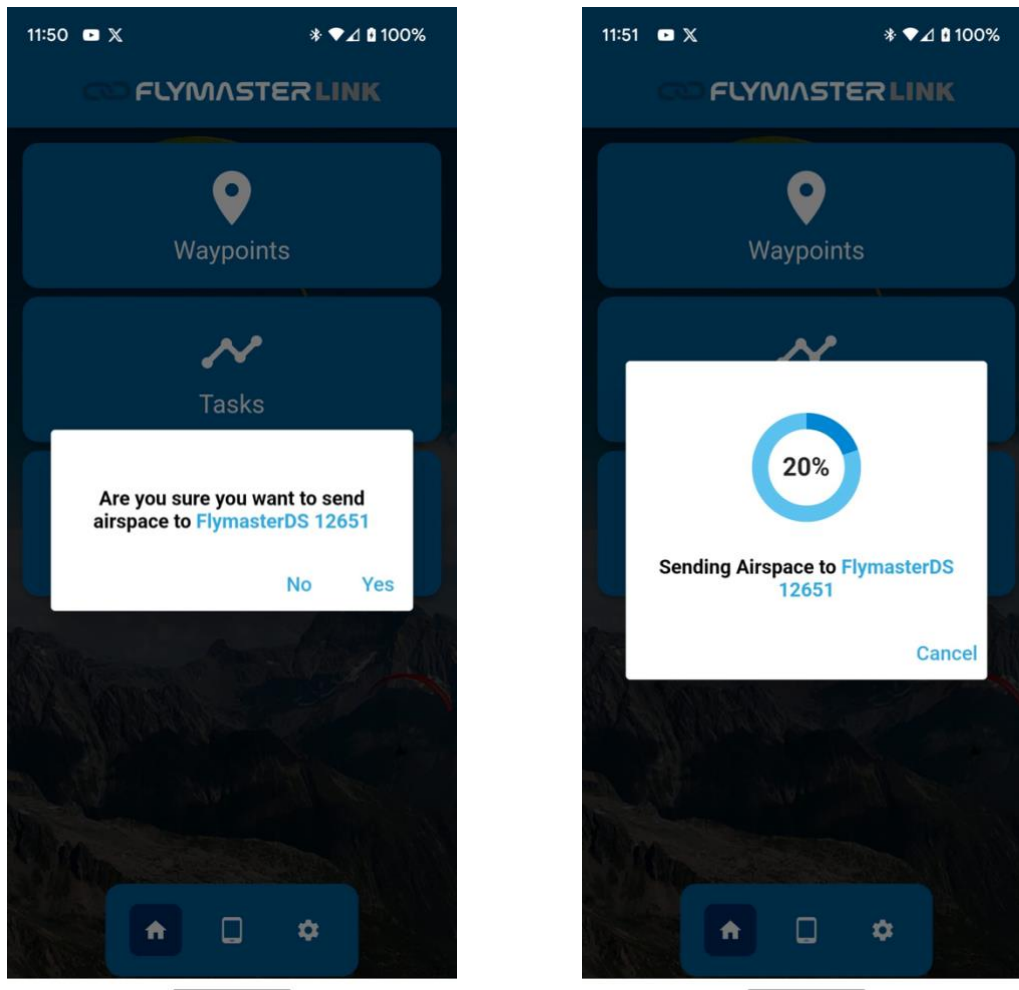


**Tasks list** - List of recorded tasks from the Flymaster Link app. There are tools in the tasks list. The "three horizontal lines" allow you to create a task or delete all tasks. The small downward arrow allows you to view task details and task configuration. Inside the task details the "three horizontal lines" will allow you to generate a QR code, Edit the task name, save the task or send it to your instrument. The three vertical dots allow you to edit the task or delete it.

**Scan Task** - It allows you to scan a Task using a QR code generated by another instrument or task planner app. After scanned you can save it to your app, so it can be added to your tasks list.

**Import Tasks From File** - It allows you to import a task from a file with extension .XCTSK. (XCTACK app)

## Update Airspaces



**Update Airspaces** - This tool allows you to automatically and easily update the Airspaces around your position within a radius of about 110 km. **Make sure that the operation Menu -> Settings -> Load Airspace -> link.air is performed after updating the airspaces.**