

USER'S MANUAL ICARE2 V1.1



Icare2 has been specially designed to locate flying aircraft (aeromodelling, drones, etc.). It is completely autonomous, can be used everywhere and requires no network. Its use does not involve any financial cost.

Particular attention has been paid to locating the distant landing point. When the model descends, the Icare2 transmitter sends its position very frequently, before touching ground. The radio range, when the transmitter is in flight, is considerably longer than when it is on the ground. We thus know the position of the model just before the landing, even before going out to search for it.

All the parameters of the transmitter can be set from the receiver which allows you to configure Icare2 according to your own needs. It is possible simply to search for your model or follow the model in real time.

The Icare2 transmitter has no built-in battery, which allows you to choose your mode of supply. It is possible to connect it to a battery already in the model or add a specific battery.



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1 IMPORTANT SAFETY INSTRUCTIONS



Optimal Tracking cannot be held liable for any direct or indirect damage, for any injury, drowning, abduction, disappearance or death affecting a person, animal or object.

Do not operate the Icare2 system while driving.

Park your vehicle before using the system.

Turn off your Icare2 in aircraft.

Icare2 may cause interference with aircraft systems.

Turn off your Icare2 in close proximity to any electronic medical equipment.

Medical electrical equipment is sensitive to radio waves.

Specific regulations

Observe the special regulations in force in the place where you are. Check that the use of Icare2 is not prohibited.

Water tightness

Only the transmitter of Icare2 is waterproof (to short duration immersion at the surface of the water). Keep the receiver dry.

Charging the receiver

To recharge the receiver battery, connect the receiver to a USB port to international standards.

Opening the product

The receiver must not be opened because any incorrect handling could lead to the explosion of the battery or some other hazard. Therefore, only an authorized service technician may open the unit.

Do not dispose of the unit in a fire and do not use in areas with a risk of explosion.

The battery could explode.

Do not throw away the unit just anywhere.

If you want to dispose of the unit you must:

- return it to your dealer.
- entrust it to a proper waste dump.
- return it to **Optimal Tracking**.



2 DECLARATION OF CONFORMITY AND WARRANTY



Declaration of conformity

We, **Optimal Tracking**, hereby declare under our sole responsibility that the Icare2 product conforms to the following European standards:

| | |
|--------------------|-----------------------|
| Radio: | EN 300 220-2 (V2.1.2) |
| Radio: | EN 300 440-2 (V1.2.2) |
| E.M.C.: | EN 301 489-3 (V1.4.1) |
| Electrical safety: | EN 60950-1 (2006) |
| Health: | EN 50371 (2002) |



The receiver falls under **Class 2** according to the **EN 300 220-2** standard.

Guarantee

The term, "Product," refers to all products made by Optimal Tracking described in this document.

Optimal Tracking guarantees the Product against any material or construction defects under normal operating conditions, for a period of 1 year starting from the date of purchase. The original purchase invoice or register receipt, indicating the Product purchase date, constitutes proof of purchase date. All software supplied with the Product, including firmware, are supplied "as-is." Optimal Tracking does not guarantee that the function of these software programs will be uninterrupted or free from errors, or that these software programs will meet your needs.

If you make a claim under this Guarantee, Optimal Tracking may, at its discretion, repair or replace all or part of the defective Product covered by the Guarantee with new or refurbished products or parts. If Optimal Tracking decides to use refurbished parts or products, these will have the same characteristics or performance as new products.

All parts removed or products replaced under the Guarantee become the property of Optimal Tracking.

This Guarantee does not apply:

- if the Product was damaged or rendered defective following a use of the Product not compliant with the use for which it was designed, particularly including use not compliant with the user manual supplied with the Product, or any other misuse or negligence by the Product user.
- if the Product was modified, notably through the use of products not manufactured or sold by Optimal Tracking
- if the Product was repaired by someone not affiliated with Optimal Tracking, or a service provider approved by Optimal Tracking.
- in the event an inappropriate shipping method or packaging is used when returning the Product to Optimal Tracking or to a service provider approved by Optimal Tracking.
- to lost or damaged software, data, or removable storage media. Optimal Tracking may decide to replace the Product sent in under the guarantee with a refurbished product of the same quality, resulting in your inability to access the data stored in your original Product.

OPTIMAL TRACKING EXCLUDES ANY OTHER GUARANTEE, EXPRESS OR IMPLICIT, AND NOTABLY ANY IMPLICIT GUARANTEE OF MERCHANTABILITY OR SUITABILITY FOR A PARTICULAR USE. IN NO CASE MAY OPTIMAL TRACKING BE HELD LIABLE FOR PARTICULAR OR INDIRECT ANCILLARY DAMAGES, NOTABLY LOSS OF INCOME, PROFIT, OR DATA, OR PERIODS OF IMMOBILIZATION, REGARDLESS OF WHETHER THE REQUEST FOR LIABILITY IS CONTRACTUAL, CRIMINAL, OR FOUNDED ON A GUARANTEE, IF IT IS FOUNDED ON THE USE OF FUNCTION OF THE PRODUCT OR ANY SOFTWARE SUPPLIED BY OPTIMAL TRACKING WITH THE PRODUCT, EVEN IF OPTIMAL TRACKING HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES.

By making a claim under this Guarantee, you acknowledge that the distribution and, depending on availability, the replacement of the Product in accordance with and within the limits of this Guarantee, constitute your sole and unique recourse with regard to Optimal Tracking under this Guarantee in the event of a defect of the Product covered by this Guarantee.



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The brand names mentioned in this manual are the property of their owners.

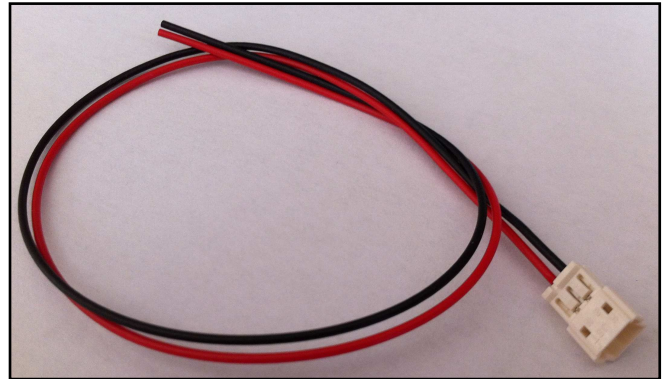
3 PRESENTATION



4 NECESSARY EQUIPMENT



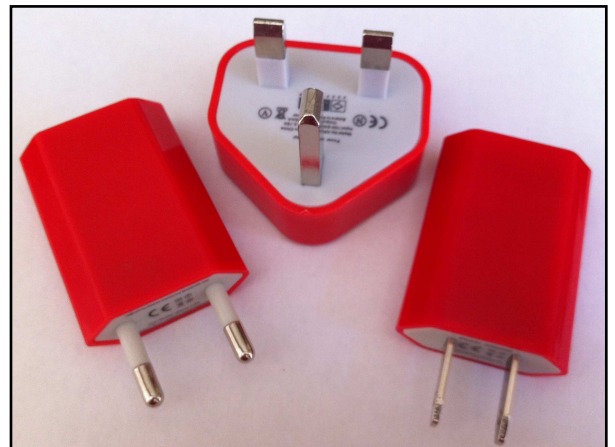
- JST-ZM-02 male connector
 - It is available on the Optimal Tracking site.



- Mini USB cable
 - It is supplied with the Icare2 receiver. It is for charging the battery in the receiver but also for connecting the receiver to a PC.



- USB charger
 - It is supplied with the Icare2 receiver and recharges the receiver. Any other USB connection can be used to recharge the receiver: PC, cigarette lighter adapter, etc.



- Battery
 - The Icare2 transmitter can be powered by any rechargeable or non-rechargeable battery of 3.3 to 5.5 volts that can deliver a peak of 500mA. The ideal is to connect the transmitter to a rechargeable lithium battery. Refer to the chapter **AUTONOMY OF THE TRANSMITTER page 22** for the choice of the battery.



- PC under Windows XP/Vista/Windows 7/Windows 8
 - Useful only to view the position of the transmitters on Google Earth, to transfer maps or back up trajectories. Refer to the chapter **CONNECTING TO A PC, ICARE2 MANAGER page 57** for more details.
- Icare2 Manager, viewing software on PC
 - It can be downloaded from the Optimal Tracking site.

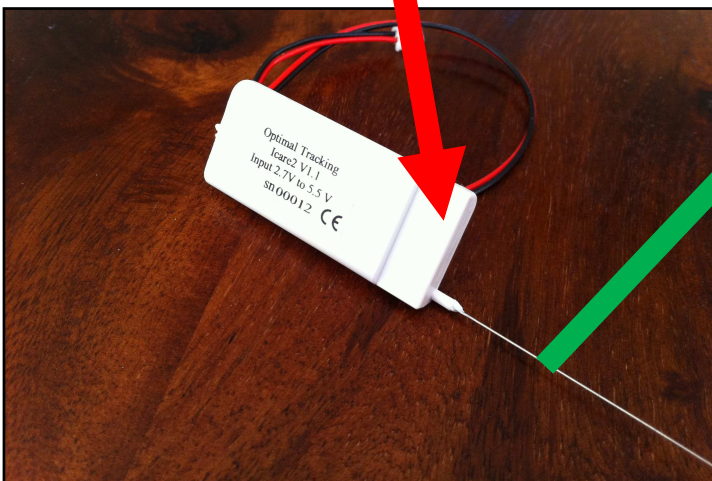
5 PRINCIPLE OF OPERATION



*Satellites
GPS/GLONASS*



*Position
sent
by radio*



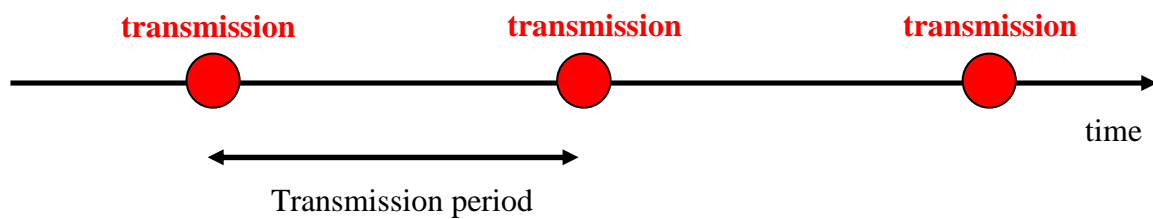
- The transmitter and receiver each compute their position based on the information received from the GPS and GLONASS satellites.
- The transmitter sends its position to the receiver by radio.
- The receiver calculates the course and the relative distance of the transmitter.

Periodicity of transmissions

The transmitter regularly sends its position to the receiver according to 3 criteria which can be set:

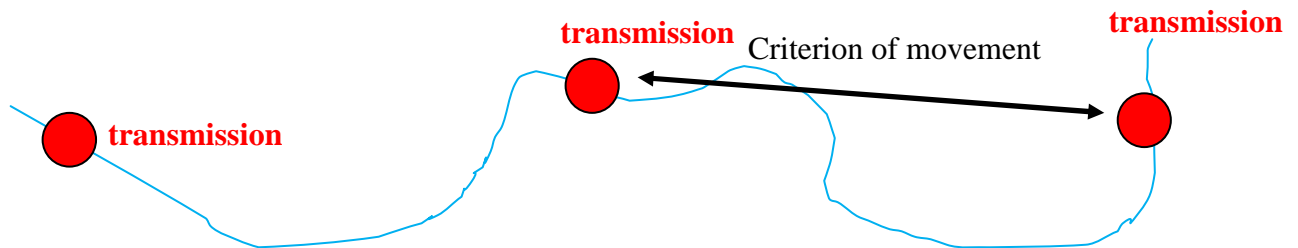
- Temporal periodicity.
- Movement since the last transmission.
- Altitude loss since the last transmission.

Temporal periodicity



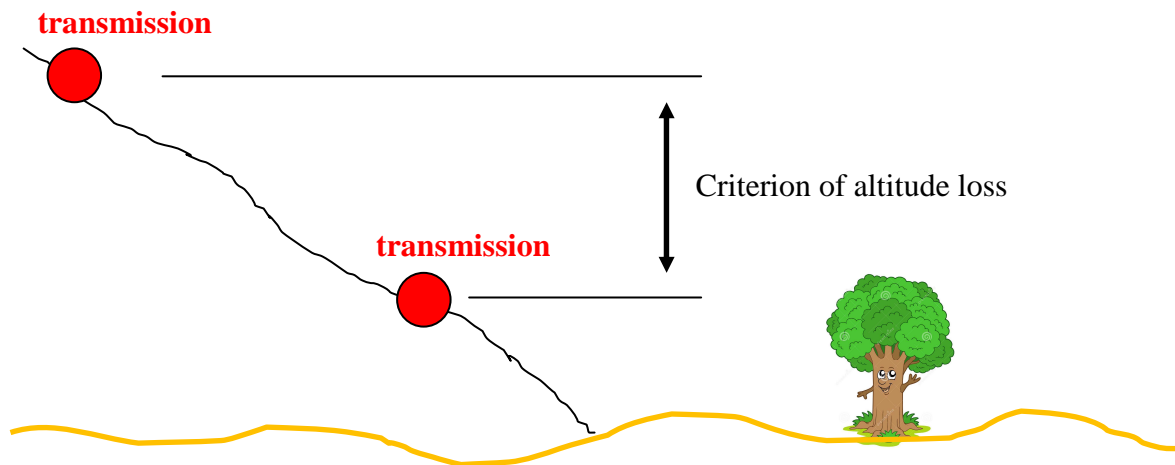
When the transmitter moves slowly, a position is sent to the receiver every N seconds (30 by default).

Criterion of movement



When the transmitter moves, a position is sent to the receiver as soon as the transmitter moves by N meters (50 by default) in relation with to the last position sent.

Criterion of altitude loss



When the transmitter descends, a position is sent to the receiver as soon as the transmitter has lost N meters of altitude (10 by default) in relation with to the last position sent. This enables you to know the landing point of the model precisely, even if it is out of radio range after landing. Indeed, when the transmitter is above ground level, the radio range is much greater.

Settings

All parameters related to the periodicity of transmission can be modified [\(see page 56\)](#).

It is also possible to choose the radio channel among a list of 10 channels. The receiver receives the positions of all the transmitters on its channel.

Viewing modes

There are several viewing modes [\(see page 27\)](#). The most used is the mode **search for transmitter**.

6 QUICKSTART



Recharging the receiver battery

Connect the receiver to the charger via the USB cable:

- Maximum charging time: **approximately 3 hours.**
- Charging: the LED flashes every 2 seconds.
- Charge done: the LED flashes twice per second.



Positioning and power of the transmitter

Be outdoors with a good view of the sky.

The upper part of the transmitter must be in the open air and not covered.
It is advisable to place the transmitter vertical.

Connect the transmitter to its supply.

A blue LED lights up for a few seconds.



Starting the receiver

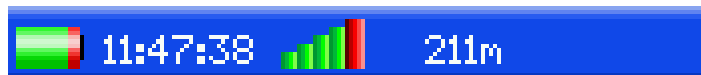
Press the thumb wheel for one second.

Choice of language

First use

- Click on the thumb wheel to display the main menu.
- Move the cursor onto **settings** and then click.
- Move the cursor on **language**.
- Click as many times as necessary to select the language.

Waiting for positioning of the receiver



- Be outdoors with a good view of the sky.
- Wait until you have at least 3 green bars. Your position is determined.

Calibration of the compass

First use

As soon as the receiver determines its position, the procedure for calibrating the compass starts.

Hold the receiver horizontal, click, turn around about 4 times for 20 seconds while holding the unit horizontally.

For a good calibration, it is important to stay away from objects that generate a magnetic field (vehicles, etc.) and keep the receiver horizontal.

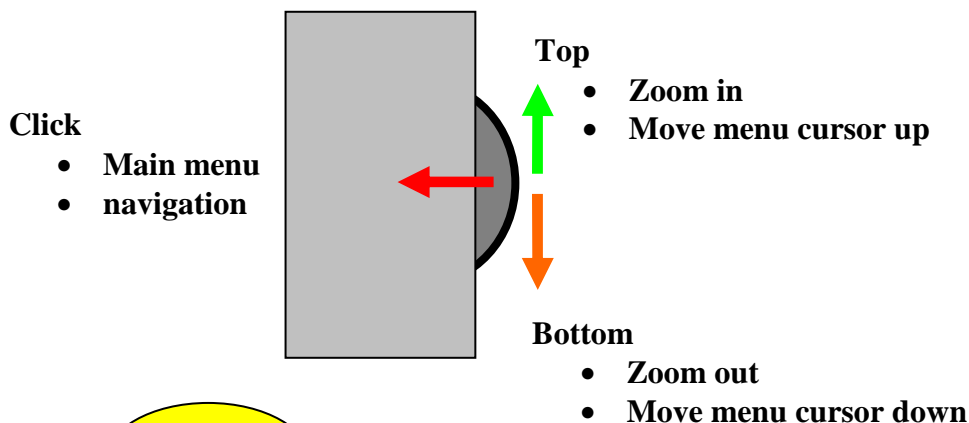


Handling the thumb wheel

To access the main menu, click the thumb wheel.

In the absence of the menu, turning the thumb wheel up or down activates the zoom on the screen.

In the presence of the menu, turning the thumb wheel up or down enables you to navigate in the menu.



Set the time

First use

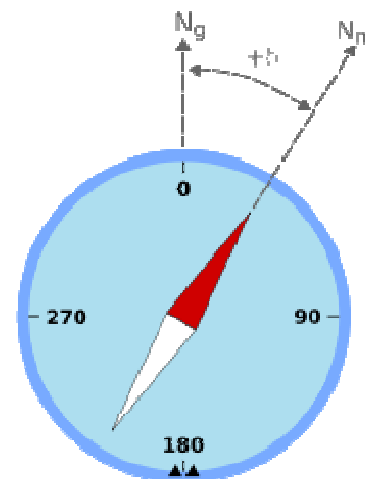
- Go to the menu **settings / UTC time diff.**
- Enter the time zone in hours and hundredths of hours in relation to the universal time (UTC) (In France, 2.00 in summer time and 1.00 in winter time).

Adjustment of the magnetic declination

First use

The magnetic declination is, at a given point on the surface of the earth, the angle formed between the direction of the geographic North Pole and the magnetic north pole. This angle is counted positively towards the east and negatively towards the west.

Click **settings / magn.declin.** and enter the value of the declination, positive towards the east and negative toward the west. The value can be found on the site www.magnetic-declination.com for each point of the globe.



It is possible simply to adjust the magnetic declination on the field, **see page 21.**

Choosing a transmitter name

First use

- Go to the **transmitters** menu.
- Click on the serial number of your transmitter.
- Click on **name**.
- Enter the name you want to assign to your transmitter.
- Validate.
- Click **save**.

Choice of display mode

The ideal mode to locate your transmitter is the mode **search for your transmitter**.

If you use your receiver for the first time, it will switch automatically into this mode as soon as a radio message is sent by your transmitter.

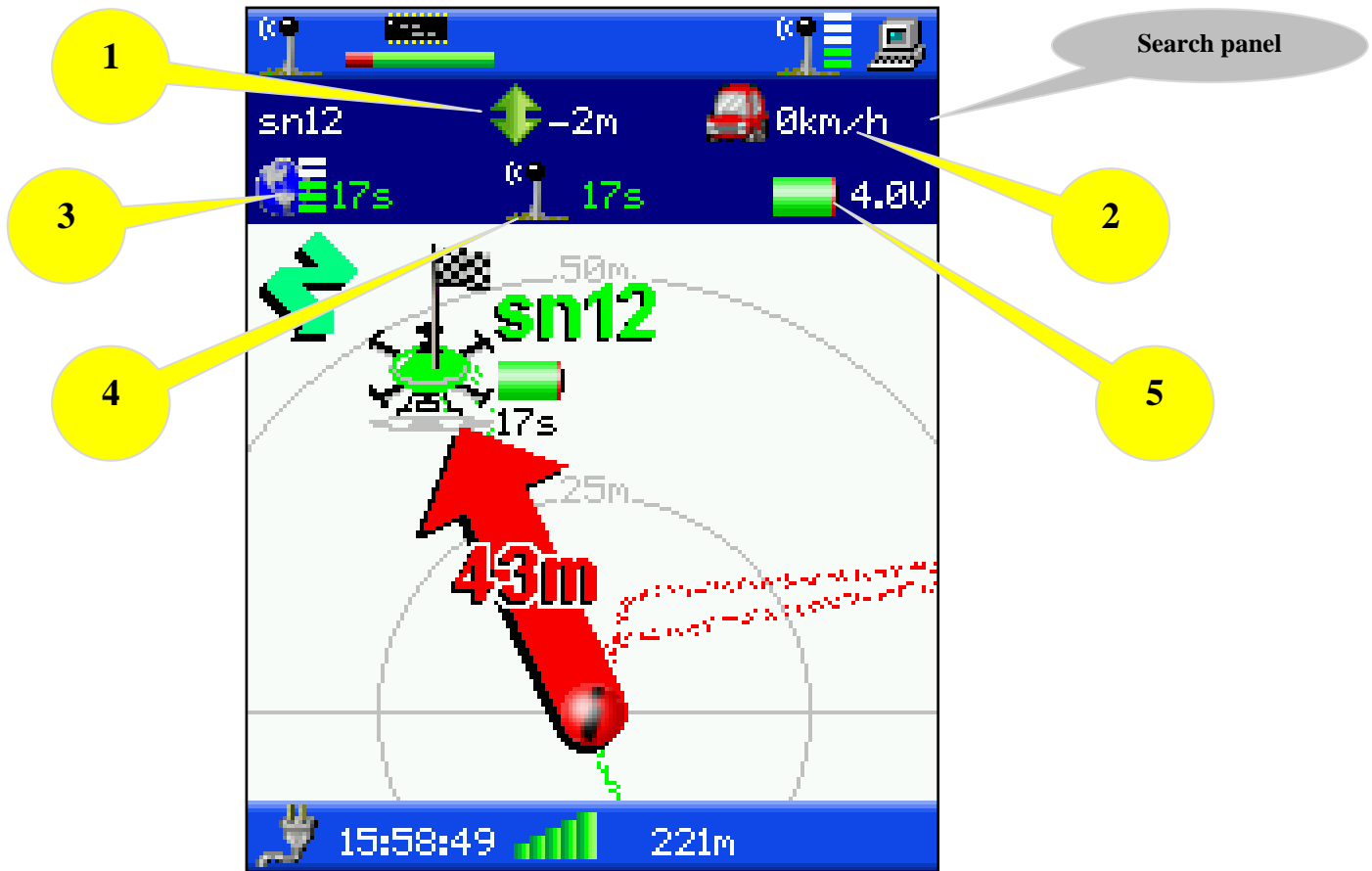
If this is not the case:

- Click on **mode / search for transmitter**.
- In the list of transmitters, click on the line corresponding with your transmitter.

Waiting for positioning of the transmitter



The search panel flashes for as long as the transmitter is not able to determine its position. The message **Transmitter positioning in progress** appears on the panel.



As soon as the transmitter has determined its position, the search panel displays the essential parameters of the transmitter:

- 1: Difference in altitude between transmitter and receiver.
- 2: Speed of the transmitter.
- 3: Age and quality of the GPS position of the transmitter.
- 4: Age of the last radio message from the transmitter.
- 5: Voltage of the battery of the transmitter in alternation with the strength of the radio signal.

Search for transmitter



Hold the receiver horizontal and follow the red arrow. The distance displayed on the arrow is the distance that separates you from the transmitter.



Improving radio reception

To improve radio reception when the transmitter is far away, you can take the receiver to a high place with the antenna vertical.

It is also wise to go onto a high and clear point, to better receive the transmitter position message.



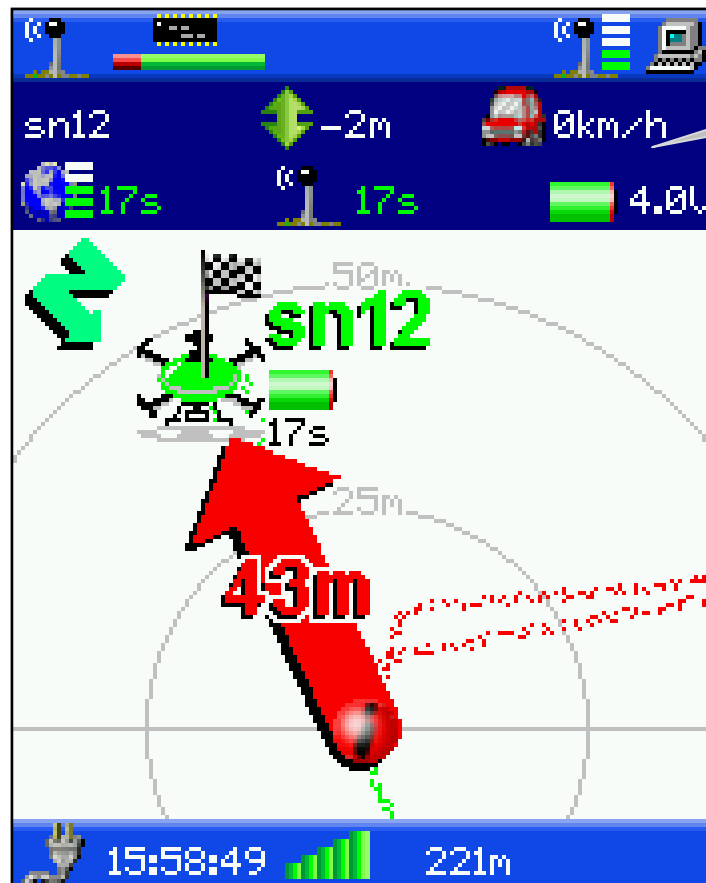
Shutdown of devices

The receiver shuts down by pressing the thumb wheel for 3 seconds.
The transmitter stops by disconnecting its power supply.

7 TIPS AND TRICKS FOR USE



Waiting for positioning of the transmitter and the receiver



It is possible to search for the transmitter only when transmitter and receiver have determined their position.



Wait for the search panel to stop flashing.

The positioning of the transmitter or receiver requires 1 to 3 minutes depending on the view of the sky they have.

When starting the receiver?

To take full advantage of the Icare2 capabilities, it is recommended to start the receiver before starting a flight. Thus, the receiver stores permanently the positions of the transmitter. If the receiver is not turned on and that your model land very far, you will have no recorded position of the transmitter.

How to hold the receiver?

During all the navigation operations, the receiver must be held horizontally so that the compass can accurately determine the direction of the receiver in relation to the north.

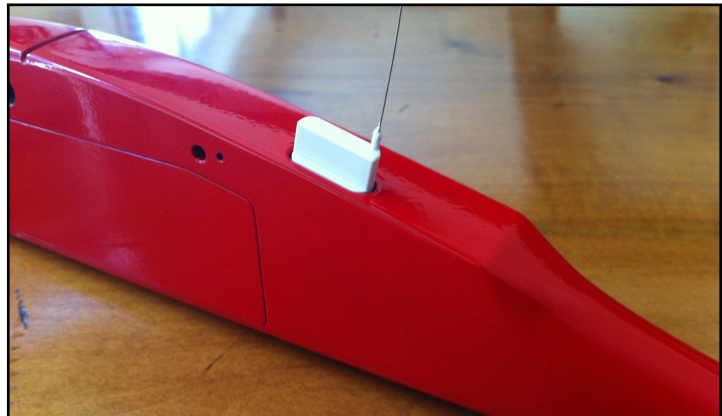


However, if the transmitter is located far away or is hidden by obstacles (buildings, hills, etc.), you are advised to keep the receiver as high as possible with the antenna vertical until you receive a position message from the transmitter (indicated by an audible message). The reception is thus improved.

Where to place the transmitter

The upper part of the transmitter must be in the open air and not covered.

It is advisable to place the transmitter vertical.



Increasing the range of the system

When the transmitter is far away, or the obstacles are located between the transmitter and receiver, it is advisable to go to a high and clear point, to get better reception of the transmitter position message.



Accuracy of positions

The accuracy of the positions calculated by GPS is generally 10 to 20 meters (it may degrade in difficult environments such as a forest, city, inside a building, etc.).

Therefore when you are about twenty meters from the transmitter, begin to look around you.

In dense vegetation, use of the radio power

If your model fell into an area of dense vegetation (maize, etc.), it may be that an accuracy of 10 to 20 meters is insufficient to find the model.



You can then use the power of the received radio signal that appears at the bottom right of the dark blue search panel.

When this power reaches 100%, you are 2 or 3 meters from the transmitter.

To get directionality, you can use your body to shield the antenna from the receiver.

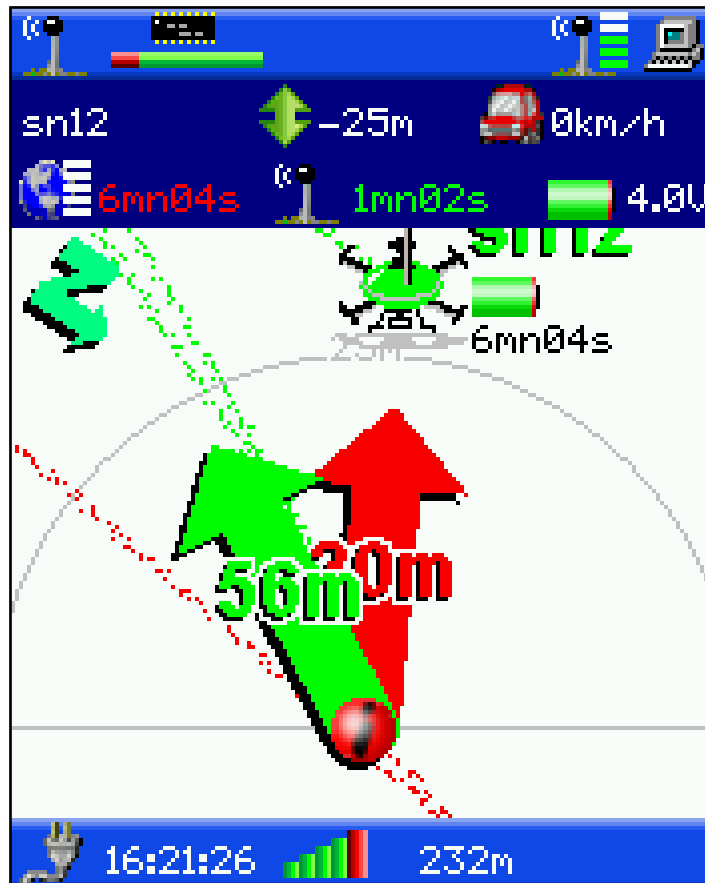
When the received power is weakened, this means that the transmitter is hidden by your body. Your model is therefore behind you.



Poor reception of GPS signals

At the time of landing, it may be that the transmitter does not receive the GPS signals well:

- Transmitter immersed in the water.
- Model turned over in the mud.
- Model stored indoors by a person.
- Etc...



In this case, in **search for transmitter** mode, you will see a double arrow on the screen:

- **The red arrow** indicates the current position of the transmitter, but with poor accuracy since the GPS signal is bad.
- **The green arrow** indicates the last precise position of the transmitter. It is therefore normally the landing point of the model. If the model has been stored indoors, this position is the point of entry into the building.

Using several transmitters simultaneously

Several transmitters can be used simultaneously and can even use the same radio channel thanks to the radio message collision detection system.

Each receiver receives the positions of all the transmitters on the same channel. The radio channel of the receiver and transmitter can be set **(see pages 47 and 55)**.

Recalibrating the compass

The earth's magnetic field varies depending on the place and the environment. It is therefore advisable to recalibrate the compass from time to time. A message is sent when the recalibration is desirable. To recalibrate, **see page 47**.

Defining the magnetic declination of your place

The magnetic declination is, at a given point on the surface of the earth, the angle formed between the direction of the geographic North Pole and the magnetic north pole. It may exceed 10 degrees in some regions.



When you change countries, it is advisable to check on the site www.magnetic-declination.com what the magnetic declination in this place is.

On the field, it is easy to have an approximate value for the declination:


- Be 100 or 200 m from the transmitter.
- Point the receiver towards the transmitter.
- The red arrow must point towards the transmitter.
- If this is not the case, the angular error of the red arrow represents the error committed on the declination.
- Correcting the declination:
 - Arrow too far to the right: increase the declination.
 - Arrow too far to the left: reduce the declination.
- Retest.



Behaviour of the compass according to the speed

At low speed (below 10 km/h), for all display modes using the compass, the display of the screen depends on the direction of the receiver. The top of the screen corresponds with what is on the front of the receiver. The icon of the compass course is . Beyond this speed, the display is turned according to your direction of travel. The top of the screen corresponds with the place where you are going. The icon of the compass course is .



At low speed, if the receiver is not horizontal, the icon  replaces the indication of the course in the bottom icon bar to advise you to keep the receiver horizontal.

Cleaning the trajectories

The trajectories of the receiver and the transmitters lengthen each time they are used. Remember to clean them from time to time.

8 AUTONOMY OF THE TRANSMITTER



The autonomy of the transmitter depends on many factors:

- The frequency of transmitting positions.
- The movement of the transmitter.
- The desired GPS accuracy of positions.

The transmitter consumes less when it does not move. Consequently, the consumption strongly depends on the movement of the transmitter.

Autonomy according to the capacity of the battery

| | Little movement (5 min per hour) | Slow permanent movement (< 10 km/h) | Fast permanent movement (> 10 km/h) |
|---|---|---|---|
| Default transmitter settings | 160 mAh: 9 hours | 160 mAh: 4 hours | 160 mAh: 2 to 4 hours |
| | 240 mAh: 14 hours | 240 mAh: 6 hours | 240 mAh: 3 to 6 hours |
| | 350 mAh: 20 hours | 350 mAh: 8 hours | 350 mAh: 4 to 8 hours |
| Default transmitter settings except 60 seconds send period | 160 mAh: 13 hours | Identical to the upper box | Identical to the upper box |
| | 240 mAh: 20 hours | | |
| | 350 mAh: 29 hours | | |

These measurements have been made with Lithium Polymer batteries:

- Battery 160 mAh: weight 1.5 grams.
- Battery 240 mAh: weight 4.6 grams.
- Battery 350 mAh: weight 6.9 grams.

The autonomy can be increased by slightly degrading the accuracy of the GPS positions. For example, going from 15 meters to 20 meters.

Recommendations

| | |
|-------------------------------|---|
| Battery of more than 1000 mAh | Everything is allowed. You can choose the period of sending you want. You have the possibility to obtain real time monitoring of the model. |
| Battery of 240 to 1000 mAh | The default settings are a good compromise. |
| Battery of less than 240 mAh | You can: - increase the sending period up to 60 seconds - reduce the GPS accuracy to 20 meters |

9 USE OF THE RECEIVER



Recharging the battery



Before using for the first time, fully charge the receiver.

Connect the receiver to the Mini-USB cable. Connect the Mini-USB cable to the supplied charger or any other USB socket.

Receiver on standby

- Maximum charging time: **approximately 3 hours.**
- Charging: the LED flashes every 2 seconds.
- Charge done: the LED flashes twice per second.



Receiver running

- Slower charge.
- Charge indicated by an icon to the left of the lower strip.

The autonomy of the fully charged receiver is about **14 hours** (at 20°C).



Because of the magnetic field created by the charger, the course calculated by the compass may be wrong during the charge.

First use

- Start the receiver (press **1 second** on the thumb wheel).
- Choose the language of the menus **(see page 25)**.
- Initialization of the position, the compass and time:
 - Place the receiver outdoors for a few minutes, with a good view of the sky, so that the receiver can determine its GPS position.
 - Once the position is determined, the calibration menu of the compass is displayed.
 - Hold the receiver horizontal, click, turn around about 4 times for 20 seconds while holding the unit horizontally. The compass is now calibrated **(see page 47)**.
 - Set the time in **settings / UTC time diff**, by defining the time offset from UTC (offset defined in hours and hundredths of an hour) **(see page 48)**.
 - Enter the magnetic declination of the place where you are **(see page 48)**.

Starting and stopping

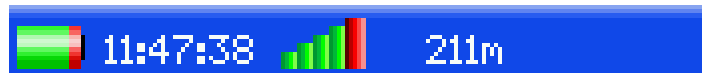
To start the receiver, press **1 second** on the thumb wheel.



Before using the receiver in navigation, place it outdoors, horizontally, with a good view of the sky for 1 to 3 minutes so that it can determine its position.

At least 3 green bars mean that the GPS position is determined.

- blue bars: number of satellites being acquired, position unknown.
- green bars: number of satellites used to calculate the position.
- 3 green bars: 3 satellites used, 2D position. The altitude is unknown and the position is inaccurate.
- 4 or 5 green bars: at least 4 satellites are used to calculate the position. The position is accurate.



The receiver can be used without GPS reception. In this case, the last known position is used. Some features are then deactivated.



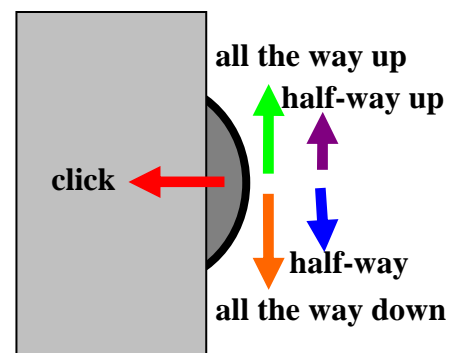
To search for a transmitter, reach a point or to follow a route, it is necessary to have GPS reception, namely at least 3 green bars.

To put the receiver on standby, press the thumb wheel for **3 seconds**.

Using the thumb wheel

There are 5 possible actions on the thumb wheel:

- **click:**
 - validates the choice under cursor.
 - displays the main menu.
- **all the way up:**
 - fast zoom-in.
 - moves the cursor upwards quickly.
- **half-way up:**
 - slow zoom-in.
 - moves the cursor upwards slowly.
- **all the way down:**
 - fast zoom-out.
 - moves the cursor downwards quickly.
- **half-way down:**
 - slow zoom-out.
 - moves the cursor downwards slowly.



Resetting the receiver

If the receiver no longer responds, press the reset button with a fine tip to reset it.



Warning, the reset clears the entire memory (maps, alarms, trajectories, etc.).



Choice of language

The receiver is factory configured in **English**. To change the language:

- Click to display the main menu in English (**Main menu**).
- Move the cursor onto **settings**.
- Click to display the **settings** menu.
- Move the cursor onto **language**.
- Click as many times as necessary to select the desired language.

Manipulations

Display of the main menu

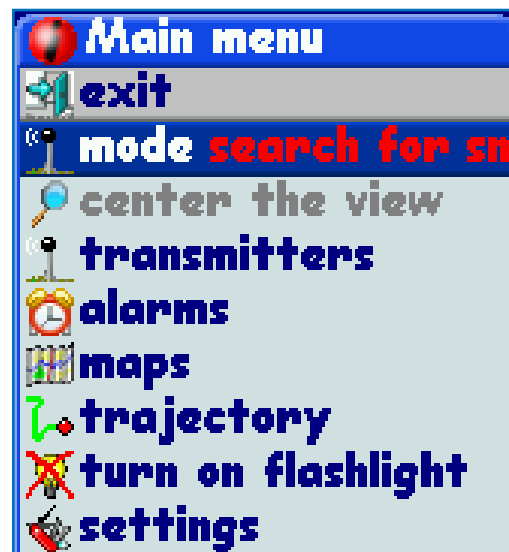
If there is no displayed menu, click to display the **main menu**.

Explore the menus

Move the thumb wheel up or down to move the cursor more or less quickly.

Click **previous** to return to the previous menu.

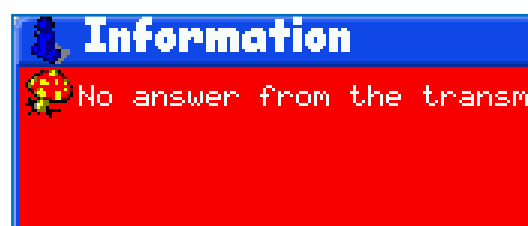
Click **exit** to close all menus.



Deleting the information messages

Information messages are displayed in small information windows:

Click to clear the oldest of all the messages. Clearing all messages clears the information window.



Stopping audio messages

Click to stop all audio messages.

Zoom

If there are no menus, use the thumb wheel to zoom the display:

- Thumb wheel upwards: zoom in onto the displayed area.
- Thumb wheel downwards: zoom out from the displayed area.

Receiving a message from a transmitter

Each time a position message is received from a transmitter, a short sound is emitted by the receiver.



The reception icon blinks for a few seconds and indicates the quality of the reception (from 0 to 5).

In **search for transmitter** mode, the receiver emits a sound only when the transmitter being searched for sends its position.

The 6 operating modes

The **mode** menu allows you to select one of 6 operating modes.

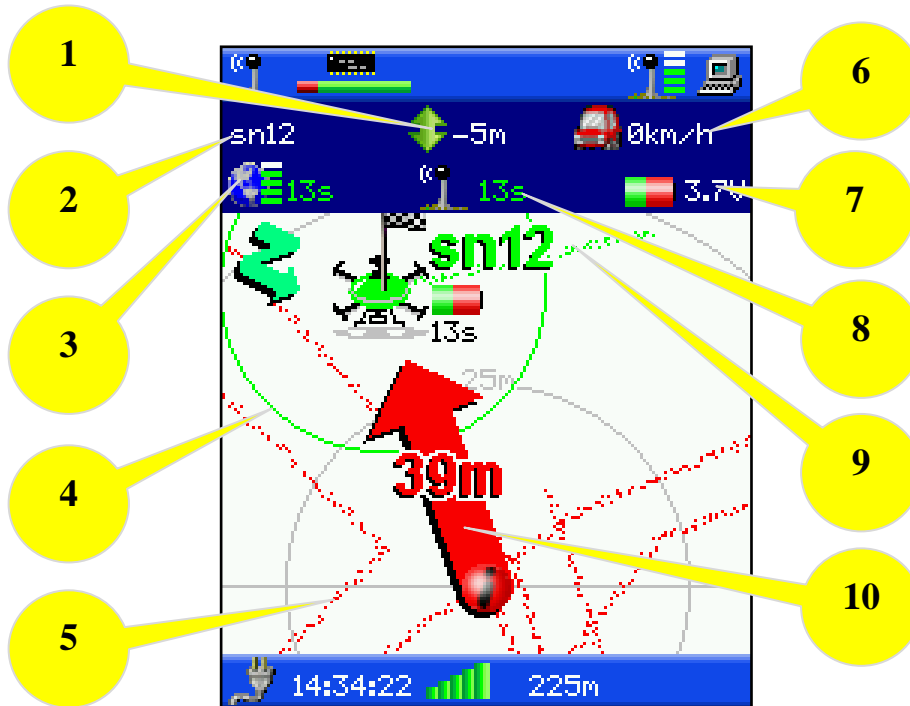


1-Mode search for transmitter

Select the transmitter to search. The search screen appears.



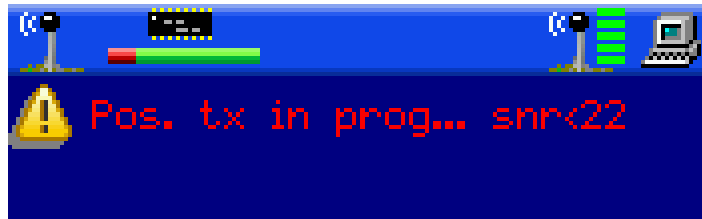
Place the receiver horizontally for good operation of the compass.



- **1: Relative Altitude:** altitude of the transmitter in relation to the receiver.
- **2: Name of the transmitter:** name of the transmitter being searched for.
- **3: Age and quality of the GPS position:** indicates the elapsed time since the transmitter went by this position and the quality (1 to 5) of the GPS signal during the calculation of this position.
- **4: Disk of uncertainty:** limit of the probable location area of the transmitter at the time of the reception of the position message. This area is larger in proportion to the weakness of GPS signal quality.
- **5: Your trajectory.**
- **6: Speed of the transmitter:** speed of the transmitter being searched for.
- **7: Battery voltage / Power of the radio signal from the transmitter:** alternating between the voltage of the transmitter battery and the radio signal strength from the transmitter.
- **8: Age of the radio reception:** indicates the elapsed time since the last time a transmitter position was received.
- **9: Trajectory of the transmitter.**
- **10: Arrow and distance:** indicate the direction and distance of the transmitter from you.



Always check the age of the GPS position. If it is too large, this means that the transmitter has not calculated the position for a long time.



If the receiver or the transmitter has not determined its position, the search panel flashes and indicates that positioning is in progress.



If the **automatic centring** option is enabled (menu **settings/centring**), the zoom is continuously adjusted so that the transmitter appears in the screen. This option can be deactivated.

In dense vegetation, use of the radio power

If your model fell into an area of dense vegetation (maize, etc.), it may be that an accuracy of 10 to 20 meters is insufficient to find the model.



You can then use the power of the received radio signal that appears at the bottom right of the dark blue search panel.

When this power reaches 100%, you are 2 or 3 meters from the transmitter.

To get directionality, you can use your body to shield the antenna from the receiver.

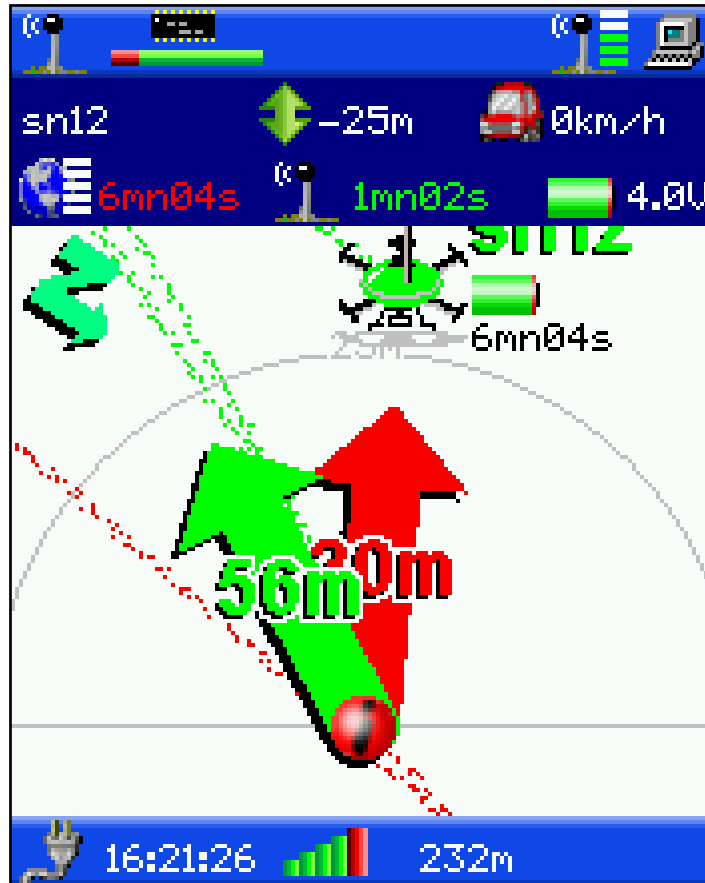
When the received power is weakened, this means that the transmitter is hidden by your body. Your model is therefore behind you.



Poor reception of GPS signals

At the time of landing, it may be that the transmitter does not receive the GPS signals well:

- Transmitter immersed in the water.
- Model turned over in the mud.
- Model stored indoors by a person.
- Etc...



In this case, in **search for transmitter** mode, you will see a double arrow on the screen:

- **The red arrow** indicates the current position of the transmitter, but with poor accuracy since the GPS signal is bad.
- **The green arrow** indicates the last precise position of the transmitter. It is therefore normally the landing point of the model. If the model has been stored indoors, this position is the point of entry into the building.

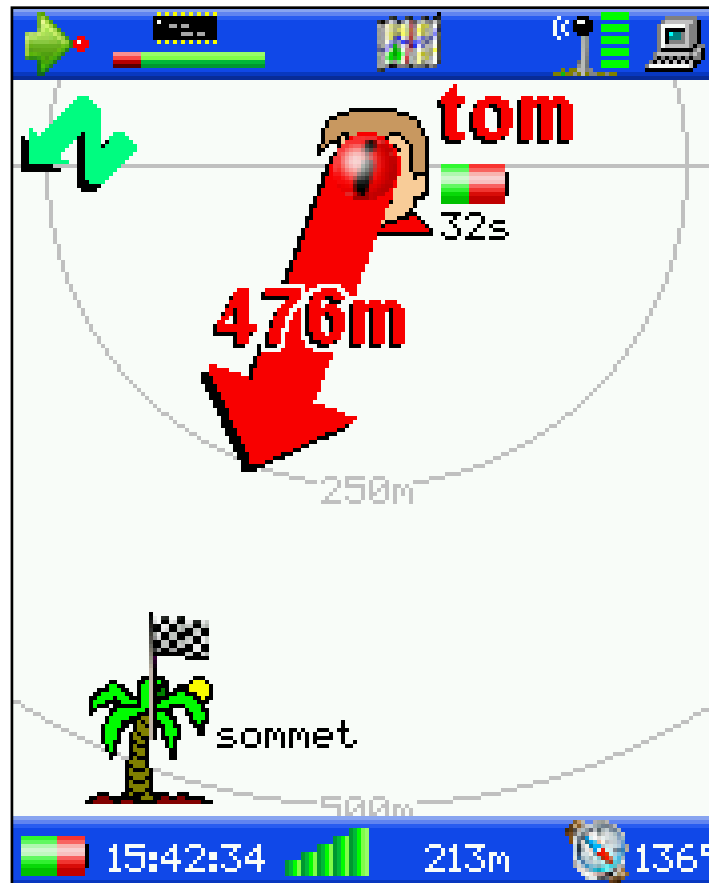
2-Mode reach a point

Select the map in which the point to reach is recorded.
Select the point to reach.

The search screen appears.



Place the receiver horizontally for good operation of the compass.



- **Arrow and distance:** indicate the direction and distance of the point to be reached from you.
- **Checkered Flag:** it points to the point to reach.



If the **automatic centring** option is enabled (menu **settings/centring**), the zoom is continuously adjusted so that the point to reach appears in the screen. This option can be deactivated.



3-Mode follow a route

Select the map in which the line to follow is recorded.
Select the line to follow.

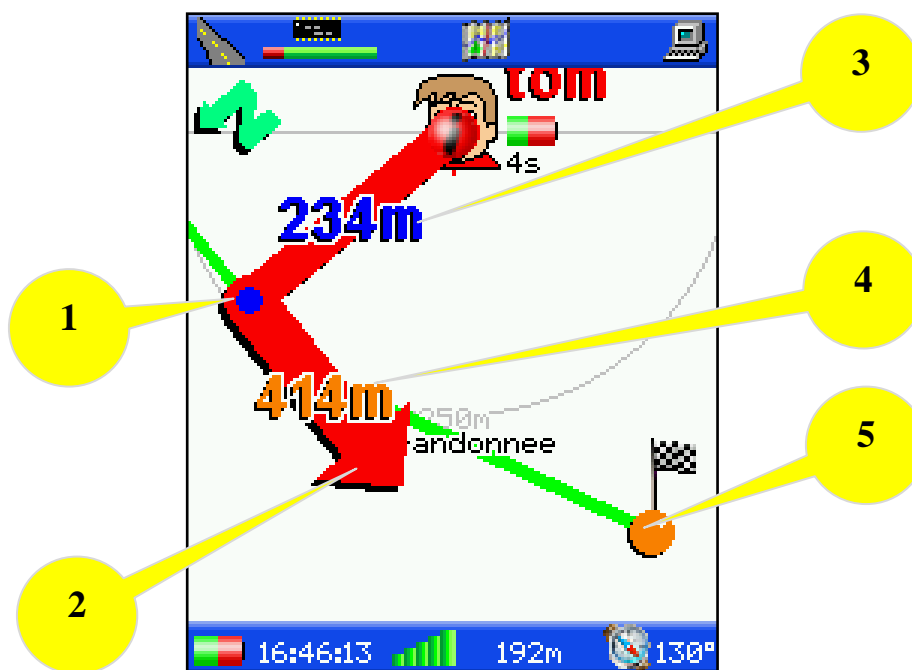
A glance of the line appears. Then choose in which direction you want to follow the line:

- **direct** or
- **opposite**

The following screen appears.



Place the receiver horizontally for good operation of the compass.



- **1: nearest point of the route to you.**
- **2: Arrow:** it shows your deviation in relation to the route and the direction to follow, once on the route.
- **3: Deviation from the route:** indicates the distance to the nearest point of the route.
- **4: Travel distance:** alternates between:
 - **distance to travel on the route until the end of the route.**
 - **distance to travel on the route until the next point of the route.**
- **5: Ball with a checkered flag on it:** indicates alternately:
 - **the end of the route.**
 - **the next point of the route.**



If the **automatic centring** option is enabled (menu **settings/centring**), the zoom is continuously adjusted so that the nearest point to you appears in the screen. This option can be deactivated.



4-Mode see and go

This mode enables you to:

- Aim at a remote point and reach it.
- Define a running course and not to deviate from it.

You need to define:

- **the use:**
 - **hiking:** only the course and the distance are required.
 - **free flight:** in addition to the course and the distance, the wind speed is required to scale the aiming axis depending on the time of flight of the model.
- **type of entry:**
 - **keyboard:** the value of the course must be entered.
 - **aiming:** the value of the course is defined by the internal compass by turning the receiver to the aiming direction.
- **the distance:** distance of the point to reach. If you do not seek to reach a particular point, enter a large distance value. The axis to follow will have a length that is equal to this distance.
- **the wind speed:** only for **free flight** use. It is used to scale the axis to follow depending on the flight time of the model. Thus, if you have aimed at the landing point of the model and its flight time is 3 minutes, it is enough to go to the graduation 3 minutes from the axis to find the model.

If you choose to enter the course by aiming, angle the antenna of the receiver in the chosen axis and click **validate**.

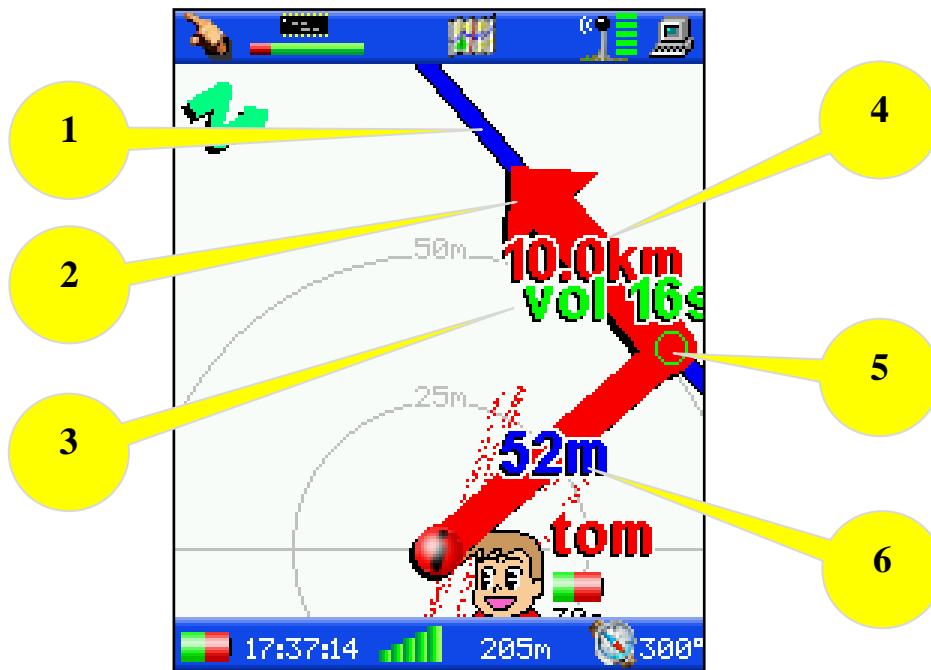


Otherwise, enter the course manually and then validate.

After validation, the next screen appears.




Place the receiver horizontally for good operation of the compass.



- **1: Axis to follow.**
- **2: Arrow:** it shows your deviation in relation to the axis and the direction of the axis.
- **3: Flight time and distance:** when used in free flight, indicate the flight time and the distance travelled by the model, whether it landed on the closest point of the axis to you.
- **4: Travel distance:** distance to travel on the axis up to the end of the axis.
- **5: Nearest point of the axis to you.**
- **6: Deviation from the axis:** indicates the distance to the nearest point of the axis.
- **Checkered flag:** indicates the end of the axis.

If you want to change the mode, then return to the **see and go** mode while retaining the same axis, select the **last see and go** mode.

In addition, if you want to change the settings of the **see and go** menu (wind speed, etc.) while keeping the same axis, go to the **settings/settings see and go** menu.

 If the **automatic centring** option is enabled (menu **settings/centring**), the zoom is continuously adjusted so that the nearest axis point to you appears in the screen. This option can be deactivated.



5-Mode **global fixed North**

In this mode, the compass has no further effect. The displayed view is turned with the north at the top.

The view can be moved by the thumb wheel or centred on any geographical entity.

For that, go to the **center the view** menu:

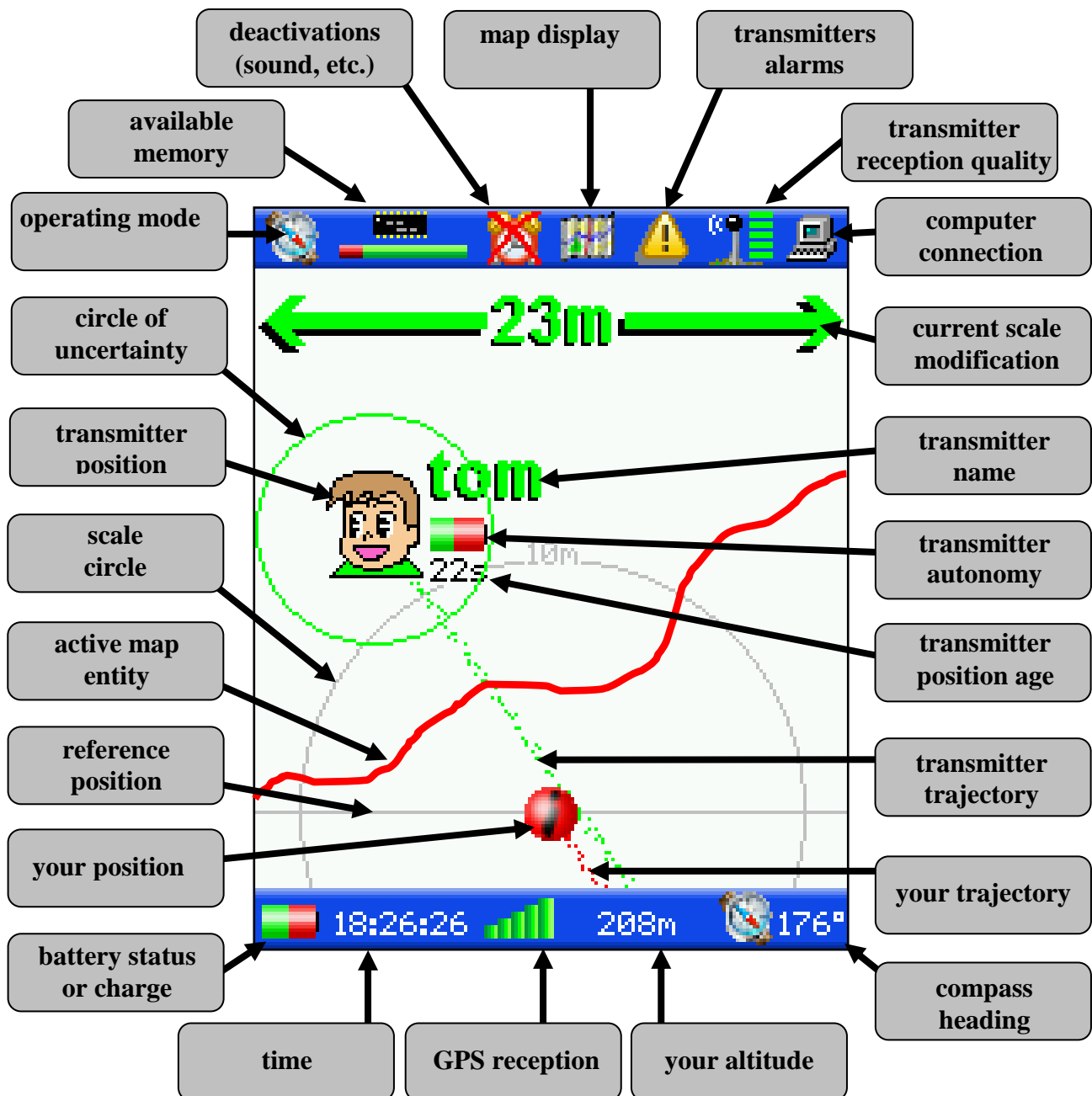
- **Full centring**: frames the view so that everything is displayed (trajectories, maps, transmitters, etc.).
- **horizontal move**: the view is moved to the right or left by rotation of the thumb wheel.
- **vertical move**: the view is moved downwards or upwards by rotation of the thumb wheel.
- **focus on ...**: centre the view on the chosen entity.



6-Mode **global compass**

The displayed view is centred on you. The compass is used to direct the display.




Description of the display



Upper icon bar

- **operating mode:** indicates in what mode the receiver is located.
- **available memory:** shows free memory space in green.
- **deactivations:** successively displays the deactivated functions among sound, vibrator and light alarm.
- **map display:** indicates whether a map is active.
- **transmitter alarms:** indicates that a transmitter has triggered an alarm.
- **transmitter reception quality:** indicates (0 to 5) the quality of reception of the last message from a transmitter. A single bar or no bars indicate that the signal is low, and that the transmitter may soon be out of range.
- **computer connection:** indicates that the receiver is connected to the USB port of a computer.

Lower icon bar

- **battery status or charge:** indicates the battery autonomy of the receiver. Under charge, a symbol of connection is displayed.
- **time:** indicates the time based on UTC and the user-defined offset from UTC time.
- **GPS reception quality:** the blue bars designate the number of satellites being acquired, and the green bars show the number of satellites used for the calculation of the position. Good accuracy requires at least 4 green bars (4 satellites used for the position calculation).
- **altitude:** designates the altitude of the receiver above sea level.
- **compass heading:**
 -  ○ below 10 km/h and horizontal receiver, designates the course pointed by the antenna.
 -  ○ above 10 km/h, designates the course in which you are moving.
 -  ○ below 10 km/h and unit not horizontal.

Central area

- **your position:**

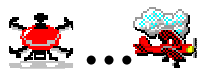


- **fixed:** your position is accurate.



- **alternately flashing:** your position is unknown.

- **your trajectory:** it is continuously saved. It is possible to change its characteristics (colour, thickness, distance between its points, frequency of recording, etc. **see page 49**).
- **reference position:** depending on the operating mode, the reference can be in the middle, at the top or at the bottom of the screen. For example, for all search modes, it is floating to widen the search space. It is possible to deactivate the floating character of the reference **(see page 49)**.
- **active map entities:** all points, lines and polygons of the active map are displayed. It is possible to deactivate the display of their name **(see page 50)**.
- **circles of uncertainties:** they limit the probable area of location of each transmitter.
- **transmitter position:**



- **fixed:** means that the position of the transmitter is known.



- **Alternately flashing:** transmitter position unknown.



- **flashing:** alarms from the transmitter.

- **transmitter name:** a name that you can define is associated with each transmitter. By default this name is defined by "sn" followed by the serial number of the transmitter.
- **autonomy of the transmitter:** this display allows you to watch the autonomy of the transmitter.
- **transmitter position age:** indicates the time elapsed since the transmitter went by this position.
- **transmitter trajectory:** it is continuously saved. It is possible to change its characteristics (colour, thickness, distance between its points, etc. **see page 50**).

- **current scale modification:** during the zoom, indicates the width of the displayed area.



When the transmitter moves, the position indicated on the screen is not the current position of the transmitter. It is the position the transmitter had N seconds ago. N is the age of the position (displayed to the right of the symbol representing the transmitter). In a few cases, this age may be great:

- the transmitter no longer has GPS reception (transmitter inside a building, a cave, etc.).
- the transmitter has been stopped.
- the transmitter is out of range.
- etc.

It is therefore important always to watch this age because the position can be very old.

Automatic centring



If the **automatic centring** option is enabled (menu **settings/centring**), the zoom is continuously adjusted in the search and follow modes (see page 49).

Keyboard

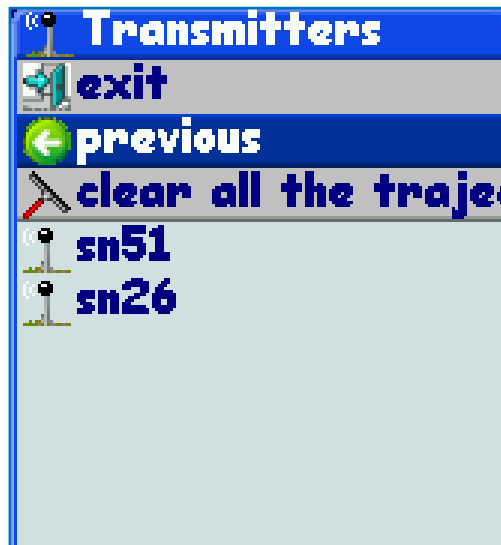
For entering, a keyboard emulation is displayed.

- The thumb wheel is used to move along the keys.
- **A** alternates between lowercase and uppercase letters.
- **←** deletes the last character.
- **✓** validates the entry.
- **✗** cancels the entry.



Transmitters

The **transmitters** menu allows you to change all the display settings of the transmitters, to erase their trajectories and display the information related to each transmitter.



The list of all transmitters having already sent a message to the receiver is displayed. Click on one of these transmitters to display or modify its settings.

Renaming the transmitter

In the transmitter page, click **name** and enter a new name. By default the name of each transmitter is defined by "sn" followed by the serial number of the transmitter.

Changing the symbol representing the transmitter

In the transmitter page, click **symbol** to scroll through all the choices.

Changing the colour of the transmitter

In the transmitter page, click **colour** to scroll through all the choices. Some symbols are of fixed colour. The trajectory of the transmitter uses the user-defined colour.

Saving the modifications concerning the name, symbol or the colour

In the transmitter page, click **save**.

Removing the transmitter from the list

In the transmitter page, click **remove**.

Clearing the transmitter trajectory

In the transmitter page, click **clear trajectory**.

Displaying all information concerning a transmitter



In the transmitter page, click **information**. Use the thumb wheel to explore the information table. **Click to return to the previous menu**. The following information is displayed:

- emergencies.
- reception and position age.
- battery energy.
- distance to the receiver.
- course.
- speeds.
- altitude (current, elevation, graph, overlapping, etc.).
- duration and length of the trajectory.
- GPS position and information.
- radio signal quality information.
- radio channel.

The image displays three overlapping screenshots of the transmitter information interface. The top-left screenshot shows the transmitter name 'sn26' and serial number '26'. The middle screenshot shows the oldness of reception '1s', remaining battery power '71%' with a battery icon, and distance '12m'. The bottom-right screenshot shows a compass reading 'W 292' and GPS data including latitude 'N 43°36'47.41"', longitude 'E 5°17'22.01"', horizontal accuracy '13m', and best snr '29'.

Maps

The **maps** menu is for creating, supplementing or modifying maps.

A map is a set of points, lines and polygons to be displayed simultaneously. Several maps can be defined but only one can be displayed at a time. This map will be called the **active** map. 💡

The points, lines and polygons of the maps can be used:

- simply to be displayed and find one's way better.
- to define area alarms.
- for navigation (point to reach or route to follow).

There are two ways to create a map:

- by moving on the ground and by saving the geometric entities. The advantage of this method is not needing any other equipment. The disadvantage is the time spent moving.
- by typing on the screen, on **Google Earth** or another software package, all the entities of the map and then download them into the receiver. However, this quick and pleasant method requires the use of a computer (see page 62).

Creating a new map

In the **maps** page, click **add a map**. Then enter its name and its possibly **active** character and then click **save**. The new map is empty.

Selecting a map

The list of all the maps saved in the receiver is displayed. One of these maps may be active. It is preceded by the symbol. 💡

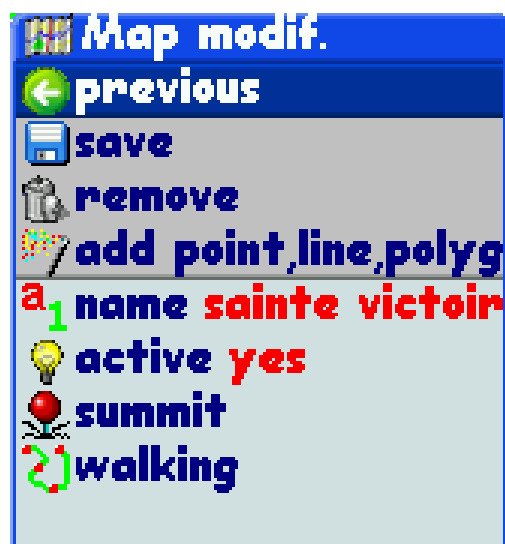
Click on one of these maps to display or modify its content.

Renaming the map

In the map page, click **name** and enter a new name.

Changing the visibility of the map

In the map page, click **active**. Only one map can be active, namely the one displayed on the screen.



Saving the changes of name or visibility


In the map page, click **save**.

Deleting the map

In the map page, click **remove**.

Adding a point corresponding with your position on the map

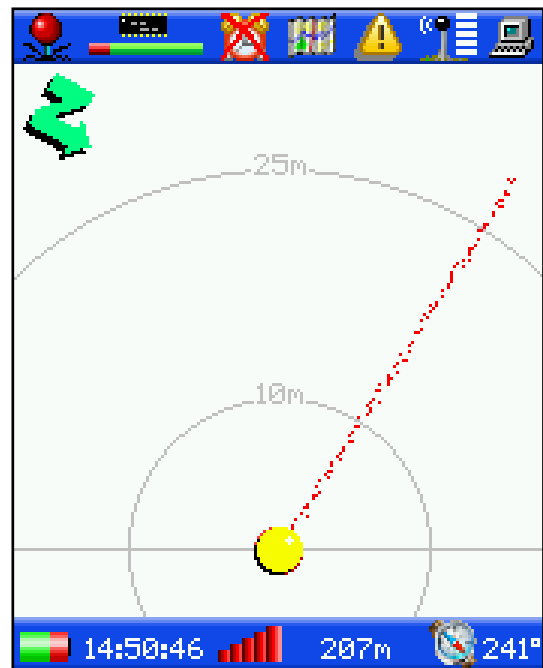
In the map page, click **add point.../add a point**.

The mode icon becomes  and the input screen appears.

- click when you are located on the point to enter. The entered point appears in yellow.
- If you click again, the new position overwrites the previous one.
- when you are sure of your entry, **double click** to save the point and its characteristics:




- map where the point is stored
- name
- symbol
- colour (some symbols are of fixed colour)
- colour (some symbols are of fixed size)



Add a line to the map whilst travelling along it on the ground

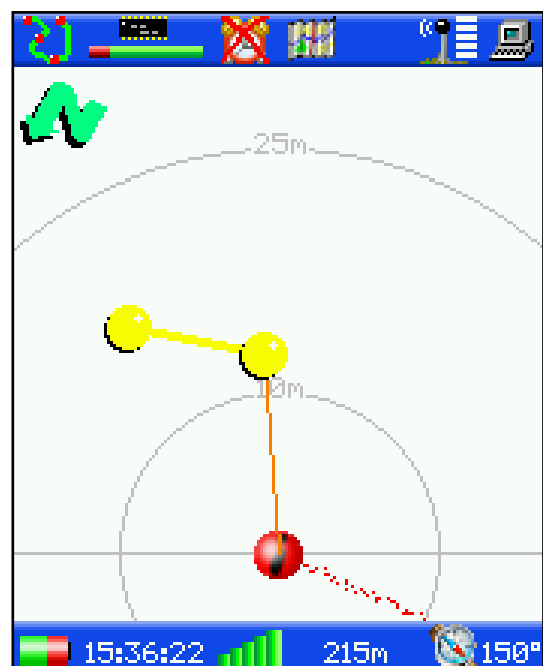
In the map page, click **add point.../add a line**.

The mode icon becomes  and the input screen appears.

- click each time you are located on a point of the line to enter. The entered point appears in yellow as well as the temporary line.
- when you have entered the last point of the line, **double click** to save the line and its characteristics:




- map where the line is stored
- name
- plot type
- colour
- thickness
- line closed or not

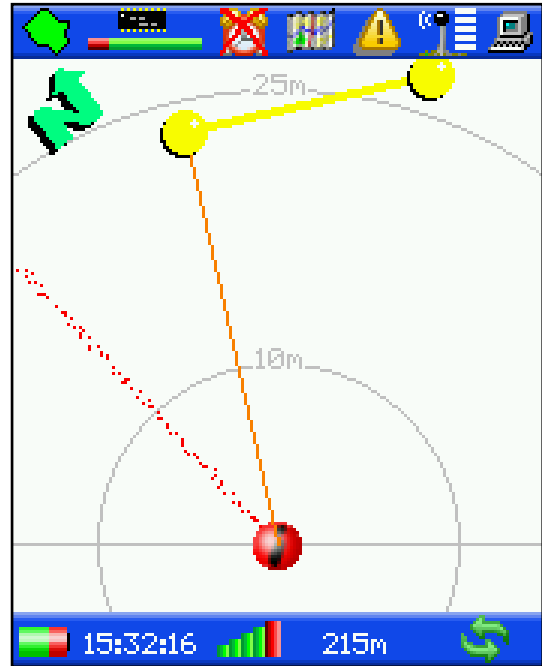


Add a polygon to the map whilst travelling on the ground

In the map page, click **add point.../add a polygon**.

The mode icon becomes  and the input screen appears.

- click each time you are located on a summit of the polygon to enter. The entered point appears in yellow as well as the temporary polygon.
- when you have entered the last point of the polygon, **double click to save the polygon** and its characteristics:
 - map where the polygon is stored
 - name
 - colour
 - display level from 0 to 8 (the low-level polygons are displayed first)



Editing or deleting an entity of the map

In the map page, click on the entity to be edited or deleted. The page that opens allows:

- editing the characteristics of the entity.
- moving the entity to another map.
- deleting the entity.



Warning, the position of the entities cannot be modified.

Alarms

The **alarms** menu enables you to create or modify alarms.

An alarm can detect abnormal behaviour of one or more transmitters.

There are 10 types of alarms that can be set by the user:

- no news from a transmitter for a certain time.
- transmitter too far away from the receiver.
- transmitter outside a polygon.
- transmitter in a polygon.
- transmitter too close to a point.
- transmitter too far away from a point.
- transmitter too close to a line.
- transmitter too far away from a line.
- transmitter too close to a polygon.
- transmitter too far away from a polygon.

The alarms can be defined on a transmitter or on all transmitters.

The combination of all these alarms allows an effective supervision of the transmitters:

- detection of excessive distance (risk of being out of range).
- detection of transmitter out of range (no news).
- detection of leaving a mandatory area.
- detection of entry into a prohibited area.
- detection of imminent hazard.
- etc.

Creating a new alarm

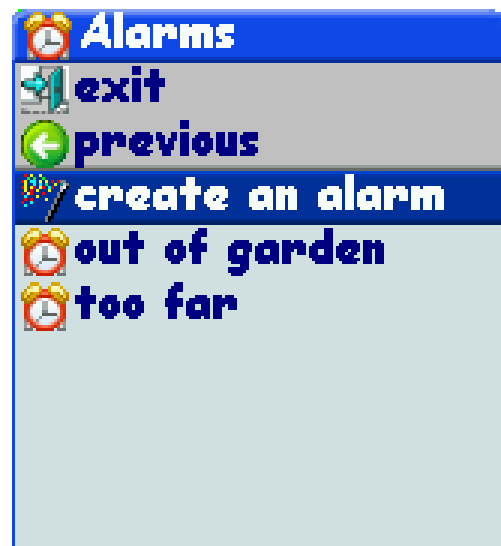
In the **alarms** page, click **create an alarm**. Then enter:

- its name.
- the transmitter which the alarm applies or the application to all transmitters.
- the type of alarm.
- depending on the type of alarm:
 - the maximum or minimum distances.
 - the maximum time without news.
 - the geographical entity and the map in which it is located.

Then click **save**.

Editing an alarm

In the list of alarms from the **alarms** page, click on the alarm you want to modify. The page that opens is identical to the page for creating a new alarm. You can modify all the settings of the alarm.



Deleting an alarm

In the list of alarms on the **alarms** page, click on the alarm you want to delete, then click on **remove**.

Reception of an alarm

Each time an alarm is triggered:

- an audible alarm is launched for 20 seconds.
- the vibrator is switched on for 20 seconds.
- the LED flashes for 20 seconds.
- an information message is displayed to explain the alarm.
- a symbol describing the type of alarm flashes in the upper icon bar.
- a symbol describing the alarm flashes on the position of the transmitter.

The symbols are:

- area alarm:



- no news:



To stop the sound alarm, vibrator and flashing lights, click a first time on the thumb wheel.
To clear the information message, click again.

If the receiver is connected to the USB port of a computer and the real-time following in **Google Earth** is activated, an audible alarm is triggered by the computer and an alarm symbol appears in **Google Earth** on the position of the transmitter.

Audible alarm, vibrator or flashing LED can be disabled **(see page 50)**.

Analysis of the trajectory

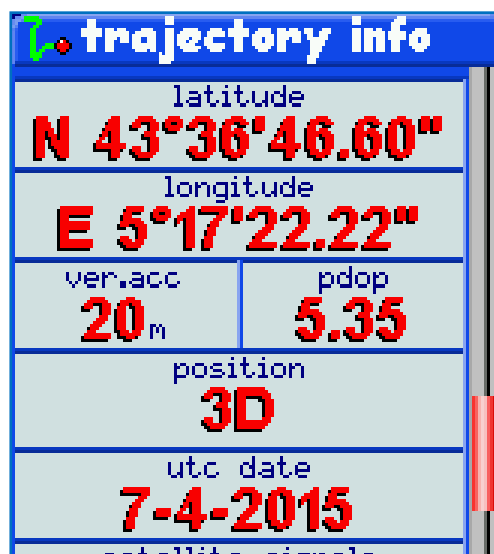
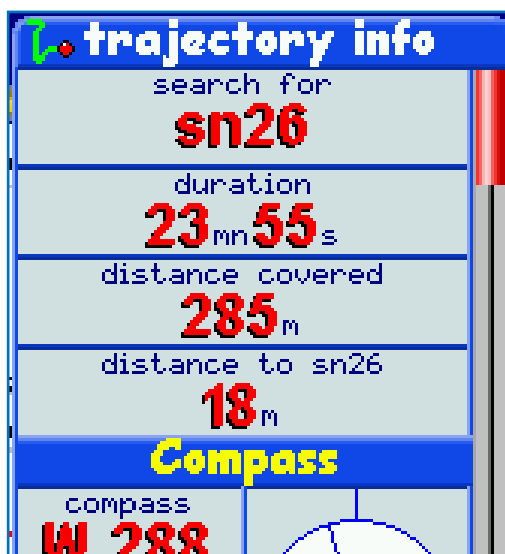
The **trajectory** menu allows you to display all the information related to your trajectory.

Displaying all information concerning your trajectory

In the **trajectory** page, click on **information**. Use the thumb wheel to explore the information table. **Click to return to the previous menu**. The following information is displayed:



- duration of the trip.
- distance travelled.
- distance to the transmitter being searched for (if the corresponding mode is active).
- distance of the point to be reached (if the corresponding mode is active).
- distance to travel on the route to be followed (if the corresponding mode is active).
- distance to travel on the axis to be followed (if the corresponding mode is active).
- compass.
- overlay of search symbols or fast following on the compass.
- current and average speeds.
- altitude.
- current and average vertical speeds.
- elevations.
- positive or negative altitude overlapping.
- altitude graph.
- GPS data
- UTC date.



Resetting the trajectory

In the **trajectory** page, click on **clear trajectory**. All the trajectory counters are then reset (times, distances travelled, averages, elevations, overlapping, etc.).

Saving the trajectory in a map

It is advantageous to record your trajectory in a map in several cases:

- before resetting the trajectory in order to keep a backup.
- to make a return on its path.
- for automatically creating a zone for the alarms.

Click **save in a map**, select the map and the display characteristics and then click **save**.

Torch

The torch lights up your way, which can be useful for a night search. It consumes little and can therefore stay lit for a long time.

Switching on the torch

In the main menu page, click on **turn on flashlight**.

Switching off the torch

In the main menu page, click on **turn off flashlight**.

Settings

The **settings** menu allows you:

- the choice of language.
- the choice of the radio channel.
- the setting of the transmitters.
- the choice of display settings.
- the calibration of the compass.
- to enter the magnetic declination.
- to set the time.
- the choice of the system of units.
- the deactivation of alarms.
- to enter the name of the unit.
- to view the contents of the memory.
- access to advanced settings.

Choice of language

Click **language** until the desired language is displayed.

Choosing the radio channel

It is possible to choose among 10 channels. The receiver receives the positions of all the transmitters on the same radio channel.

Setting the transmitters

The operating settings of a transmitter can be modified from a receiver **(see page 56)**.

Calibrating the compass

The compass must be recalibrated regularly (once a week) or for each long travel (over 1,000 km). A message is sent when a recalibration is necessary. However, if you think the compass is giving incorrect information, start a calibration.



Don't forget that the magnetic declination - the difference between true north and magnetic north, must be entered for correct operation of the compass.

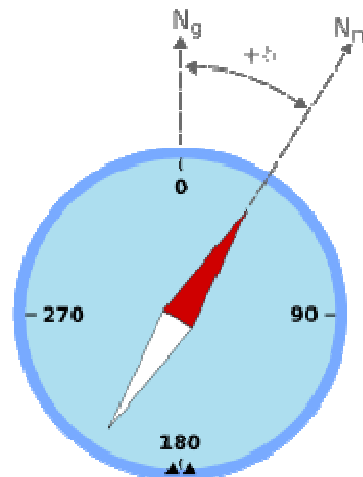
Click on **compass calibration** and follow the displayed instructions. Hold the receiver horizontal, click, turn around about 4 times for 20 seconds while holding the receiver horizontally.

For a good calibration, it is important to stay away from objects that generate a magnetic field (vehicles, etc.) and keep the receiver horizontal.



Magnetic declination

The magnetic declination is, at a given point on the surface of the earth, the angle formed between the direction of the geographic North Pole and the magnetic north pole. This angle is counted positively towards the east and negatively towards the west. The axis of rotation of the earth defines the geographic poles. The axis of the earth's magnetic field defines the magnetic poles. These two axes do not coincide and the magnetic north pole is distinct from the geographic North Pole. This explains that the magnetic declination varies from one point to another on the surface of the earth. It also varies in time because the axis of the earth's magnetic field changes over time due to movements of the earth's core.



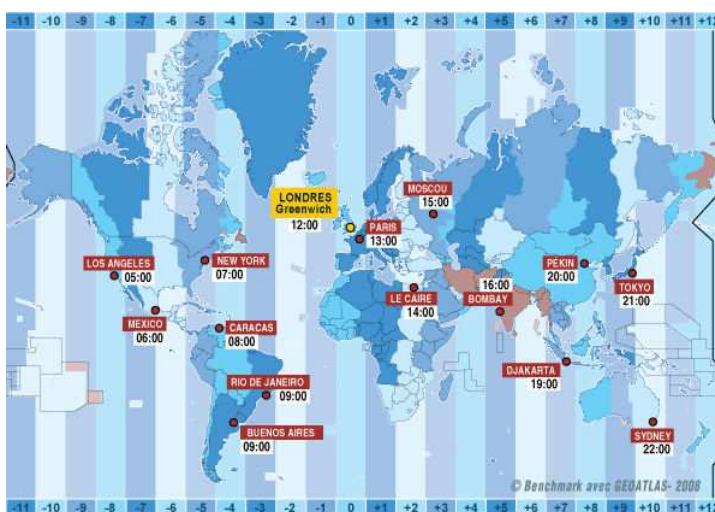
Click **magn.declin.** and enter the value of the declination, positive towards the east and negative towards the west. The value can be found on the site www.magnetic-declination.com for each point of the globe.

It is possible simply to adjust the magnetic declination on the field, **see page 21.**

Time zone

The GPS reception allows the receiver to determine the "coordinated universal time" (UTC) very accurately. The coordinated universal time is a time scale adopted as the basis of international civil time by most countries of the globe.

It is therefore necessary to enter your time zone in relation to this universal time.



Click **UTC time diff.** and enter the time zone expressed in **hours and hundredths of an hour** (1.50 means 1 hour and 30 minutes).



Automatic centring

When the **centring** is **automatic**, the zoom is continuously adjusted to keep some entities visible:

- in **search for transmitter** mode, the transmitter is always visible.
- in **reach a point** mode, the point is always visible.
- in **follow a route** mode, the nearest point of the route to you is always visible.
- in **see and go** mode, the nearest point of the axis to you is always visible.

If **manual centring** is selected, the zoom can be modified only by the user.

To modify the centring, click **centring**.

Floating or fixed reference

In all modes, except **global fixed north** and **global compass**, the reference moves from top to bottom in order to enlarge the space of most interest to you. The reference is said to be **floating**. The floating character of the reference can be deactivated. The reference is then **fixed**.

To modify the behaviour of the reference, click **reference**.

Backlight

Click **backlight** to adjust the light intensity of the screen from 1 to 9. Lowering the brightness increases the autonomy of the battery.

Backlight duration

If the thumb wheel is not turned or pressed for a certain time, the screen goes into very low-light intensity to lower the power consumption.

To adjust this time, click on **backlight duration** to obtain the desired time delay.

Displaying transmitters in search for transmitter mode

By default, only the transmitter being searched for is displayed in this mode to lighten the content on the screen. If you want to see all the other transmitters when you are in this mode, click **display all ... search mode**.

Displaying help messages

Help messages can be displayed to guide you in the use of Icare2. By default, they are deactivated. Click **help display** to activate or deactivate.

Displaying information messages

Information messages can be displayed to give you better information about the operation of Icare2. By default, they are deactivated. Click **info display** to activate or deactivate.

Choice of units

Three systems of units are available:

- the metric system.
- the English land system.
- the nautical system.

Click on **units** until you obtain the desired system of units.

Modifying the receiver trajectory

Click on **receiver trajectory** to modify the trajectory of the receiver.

You can then modify:

- **maximum points**: the maximum number of points forming the trajectory.
- **length of segments**: the distance between two consecutive points of the trajectory.
- **periodicity**: the delay between two consecutive savings in the trajectory.
- **type**: the type of line used to draw the trajectory.
- **colour**: the colour of the trajectory.
- **thickness**: the thickness of the trajectory.

Modifying the trajectories of the transmitters

Click **transmitters trajectories** to change the trajectories of the transmitters.

You can then modify:

- **maximum points**: the maximum number of points forming the trajectory.
- **length of segments**: the distance between two consecutive points of the trajectory.
- **type**: the type of line used to draw the trajectory.
- **thickness**: the thickness of the trajectory.

The colour of the trajectory of a transmitter is the colour defined in the **transmitters** menu.

Display the name of the entities of the maps

It is possible to deactivate the display of the names of the entities of the maps to clarify the display. To do this click **display the names of map entities**.

Deactivating the sound, the audible alarm, the vibrator and the light alarm

The sounds generated when starting, stopping, clicks, etc. can be deactivated by clicking on **sound**.

Audible alarms can be deactivated by clicking on **sound alarm**.

The vibrator can be deactivated by clicking on **vibrator**.

The light alarm (flashing LED) can be disabled by clicking on **flashlight alarm**.

These deactivations are viewed in the upper icon bar.

Modifying the settings of the see and go mode



By clicking on **settings "see and go"**, it is possible, **whilst maintaining the following axis**, to change some settings of **see and go mode** **(see page 32)**:

- **use.**
- **distance.**
- **wind speed.**

This makes it possible, for example, to correct the wind speed after having entered the axis to follow.

Defining the receiver name

It is possible to assign a name to the receiver. To change the name, click **name of the unit** and enter the desired name.

Viewing the used memory

By clicking on **memory used**, you have access to:

- the memory used by the system.
- the memory used by the data from the transmitters.
- the memory used by your trajectory.
- the memory used by the maps.
- the free memory.
- the numbers of transmitters, maps, points, lines, polygons and alarms.
- the name of the receiver.

This page allows good visibility of the occupation of the memory.



To **exit the page**, click.

Viewing advanced settings

By clicking on **advanced**, you have access to:

- The age and distance of the most recent calibration of the compass.
- Other useful parameters only for technical support.



To **exit the page**, click.

Returning to factory settings

It is possible to return to all the factory settings by clicking on **return to factory defaults**.

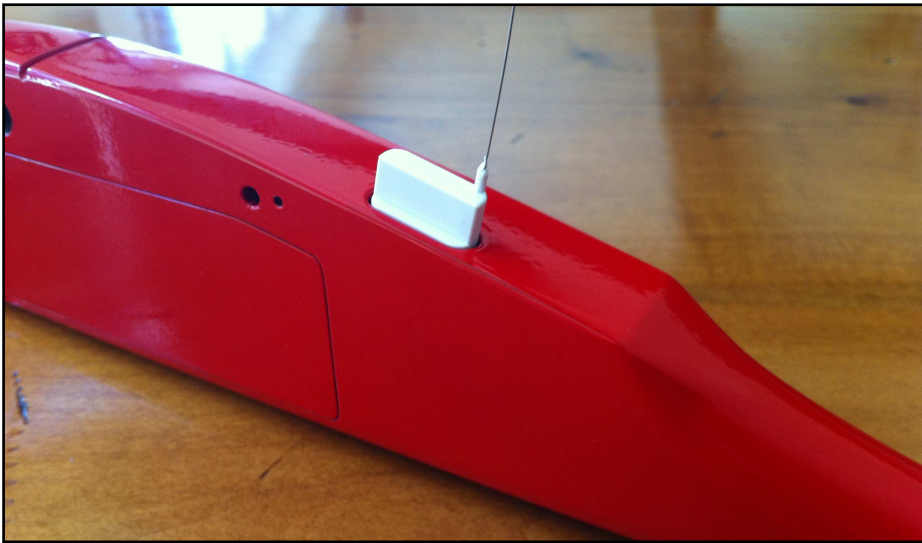
10 USE OF THE TRANSMITTER



Positioning



The upper part of the transmitter must be in the open air and not covered. It is advisable to place the transmitter vertical.



Power supply

The transmitter can be powered by any rechargeable or non-rechargeable battery of 3.3 to 5.5 volts that can deliver a peak of 500 mA.

The ideal is to connect the transmitter to a rechargeable lithium battery.

If your model already has a battery, you can connect to it. You can also use a specific battery.

To determine the potential autonomy, refer to the chapter **AUTONOMY OF THE TRANSMITTER** page 22.



Starting the transmitter

The transmitter starts as soon as it is connected and signals this by the blue LED.

Meaning of the LEDs

| LEDs lit up | Meaning | Duration/period |
|---------------------------|--|-----------------------------|
| Continuous blue | Starting the transmitter | 5 seconds |
| Quick flashing blue | Receiver possibly waiting for setting | 10 seconds |
| Flashing blue | Sending a position | 0.1 seconds |
| Flashing red | Battery voltage too low (< 3.5v) | 0.1 second every 10 seconds |
| Flashing yellow | GPS signal too low | 0.1 second every 10 seconds |
| Flashing green | Normal operation, everything is OK. | 0.1 second every 10 seconds |
| Slow flashing red | Radio error 1. Appears in the event of electronic failure. | 20 seconds |
| Slow flashing blue | GPS error 2. Appears in the event of electronic failure. | 20 seconds |
| Slow flashing yellow | Radio error 3. Appears in the event of electronic failure. | 20 seconds |
| Slow flashing yellow/red | Radio error 4. Appears in the event of electronic failure. | 20 seconds |
| Slow flashing yellow/blue | Radio error 5. Appears in the event of electronic failure. | 20 seconds |

Start period

As soon as it is connected, the transmitter seeks to determine its position on the basis of the information it receives from the satellites.

During this period, which may last for a few minutes, the period of sending messages is 1 minute.

If the receiver is in the search mode for your transmitter, the search panel flashes and indicates that the transmitter is being positioned.

The quality of the GPS signal (SNR = signal to noise ratio) is also indicated.

Once the transmitter has determined its position, the search panel stops flashing.



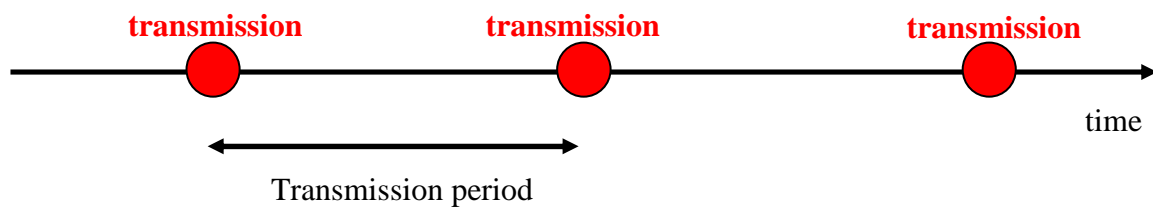
This research phase is energy-intensive. Therefore, do not connect the transmitter if you are not outdoors, otherwise you will drain the battery for nothing.

Periodicity of transmissions

The transmitter regularly sends its position to the receiver according to 3 criteria which can be set:

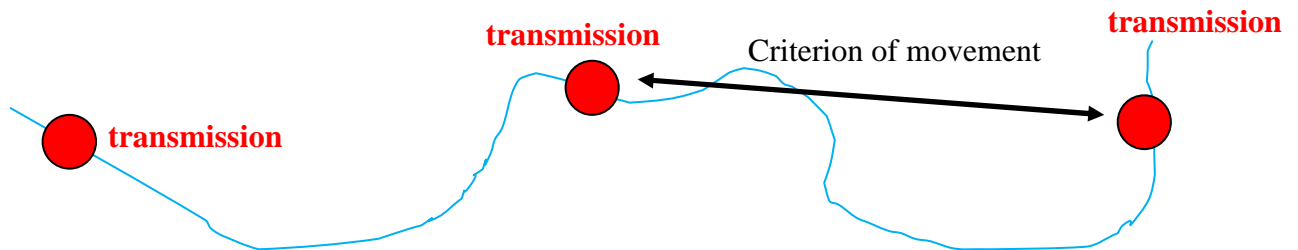
- Temporal periodicity.
- Movement since the last transmission.
- Altitude loss since the last transmission.

Temporal periodicity



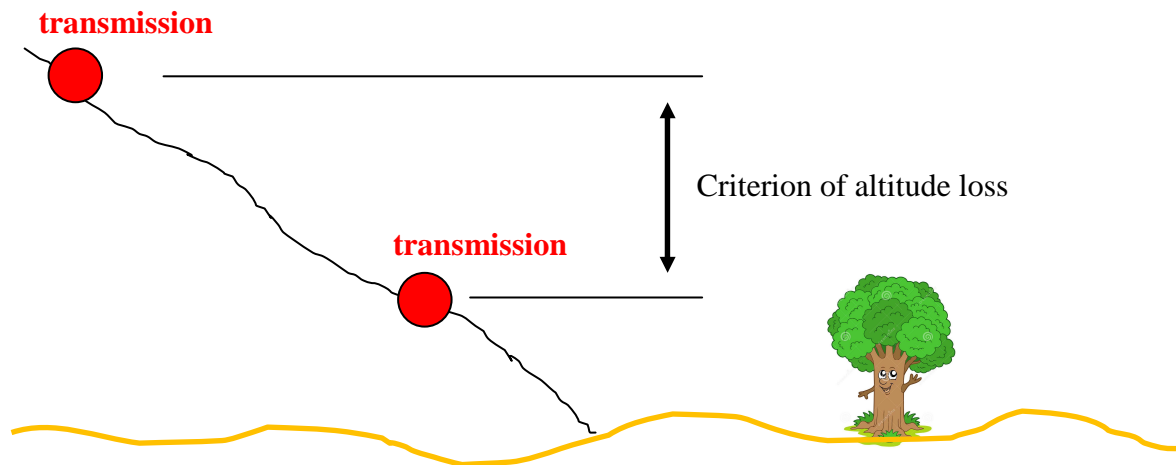
When the transmitter moves slowly, a position is sent to the receiver every N seconds (30 by default).

Criterion of movement



When the transmitter moves, a position is sent to the receiver as soon as the transmitter moves by N meters (50 by default) in relation with to the last position sent.

Criterion of altitude loss



When the transmitter descends, a position is sent to the receiver as soon as the transmitter has lost N meters of altitude (10 by default) in relation with to the last position sent. This enables you to know the landing point of the model precisely, even if it is out of radio range after landing. Indeed, when the transmitter is above ground level, the radio range is much greater.

Channels

It is possible to choose the radio channel of the transmitter among 10 channels **(see page 55)**. A receiver can receive only the positions from transmitters with the same channel.

Operating modes

| | |
|----------------------|--|
| Starting | - Not yet positioning. - A radio message sent every 1 minute. |
| Stationary mode | - The transmitter does not move and reduces its consumption. |
| Movement mode | - The transmitter moves. |
| Low consumption mode | Battery voltage low (< 3.3v) - One radio message per minute. - Position recalculated every 10 minutes. |
| Stopping | - Total stop (voltage < 3.0v). |

The transmitter automatically switches from one mode to the other depending on the context.



Note that below 3.3v, it goes into low consumption mode, and below 3.0v it shuts down.

Water tightness

The transmitter is waterproof to short duration immersion at the surface of the water.

Setting the transmitter

Many operating settings of the transmitter can be modified:

- Radio channel.
- Transmission period.
- Spacing between two successive positions sent.
- Loss of altitude between two successive transmissions.
- Horizontal accuracy desired.
- Maximum speed in stationary mode.

To modify these settings:

- Go to the **settings/transm.settings** menu.
- Select the serial number of the transmitter.
- Select the desired settings.
- Start the transmitter by connecting it to its power supply.
- When the transmitter flashes blue, click **send to transm.**
- The message **setting successful** is displayed.

If the setting was not successful, the causes can be:

- You have specified a wrong serial number.
- The transmitter does not flash in blue at the time of sending the request.

To reread the settings of a transmitter, follow the same procedure but, at the end, click **read the settings**.

The message **successful reading** appears and the various lines of the menu take the values of the read settings.

11 CONNECTING TO A PC, ICARE2 MANAGER



Connection to a PC is by the USB port and requires the installation of **Icare2 Manager**.

Icare2 Manager is free software for:

- following in real time on **Google Earth**:
 - the positions, trajectories and alarms of the transmitters.
 - the position and trajectory of the receiver.
- downloading maps into the receiver.
- backing up the contents of the receiver on the computer.

Icare2 Manager operates on XP, VISTA, Windows 7 and Windows 8.

In addition to **Icare2 Manager**, you can install for free:

- **Google Earth** for real-time monitoring and the creation of maps.
- **GpsBabel** for the conversion of any GPS format to or from **Google Earth**.

Installing Icare2 Manager



The computer must be connected to the Internet.

Step 1: downloading Icare2 Manager (essential)

- Download from the site www.optimaltracking.com the file "install_icare2_manager v1.1". It is a compressed file (ZIP file).
- Unzip the file with a utility such as WinZip.
- Go to the directory "install_icare2_manager v1.1".
- Run "setup.exe".
- Follow the usual installation instructions in Windows.
- The software will classify with the following parameters:
 - Editor: **Optimal Tracking**
 - Name: **Icare2 Manager**

Step 2: installing the USB driver (essential)

- **Windows 7 or 8 operating system:**
 - connect the receiver to the computer using the supplied USB cable.
 - The USB driver is installed automatically.
- **VISTA operating system:**
 - connect the receiver to the computer using the supplied USB cable.
 - a "New hardware detected" window appears.
 - select "**Locate and install driver software**".
 - Click "**Continue**" if Windows asks you an authorization to install the driver.
 - the driver is then automatically found by "**Windows Update**", and this may take a few minutes.

- again, a "**New hardware detected**" window appears.
- select "**Locate and install driver software**".
- Click "**Continue**" if Windows asks you an authorization to install the driver.
- "**Windows Update**" again searches for the driver, and this may take a few minutes.
- the message "**The device driver software has been installed correctly**" appears. The driver installation is complete.

- **XP operating system:**
 - download the USB driver for your operating system on <http://www.ftdichip.com/Drivers/VCP.htm>.
 - extract the downloaded directory with WinZip (if you do not have WinZip you can download one from the Internet).
 - connect the receiver to the computer using the supplied USB cable.
 - follow the instructions by requesting a manual installation and indicating that the USB driver is located in the downloaded directory.

Step 3: free installation of Google Earth (recommended)

- go to the site www.earth.google.com.
- click on "**download Google Earth**".
- follow the instructions provided by the site and run the installation programme.

Step 4: free installation of GpsBabel (optional)

- go to the website www.gpsbabel.org/download.html.
- download the most recent version of **GpsBabel**.
- follow the instructions provided by the site and run the installation programme.

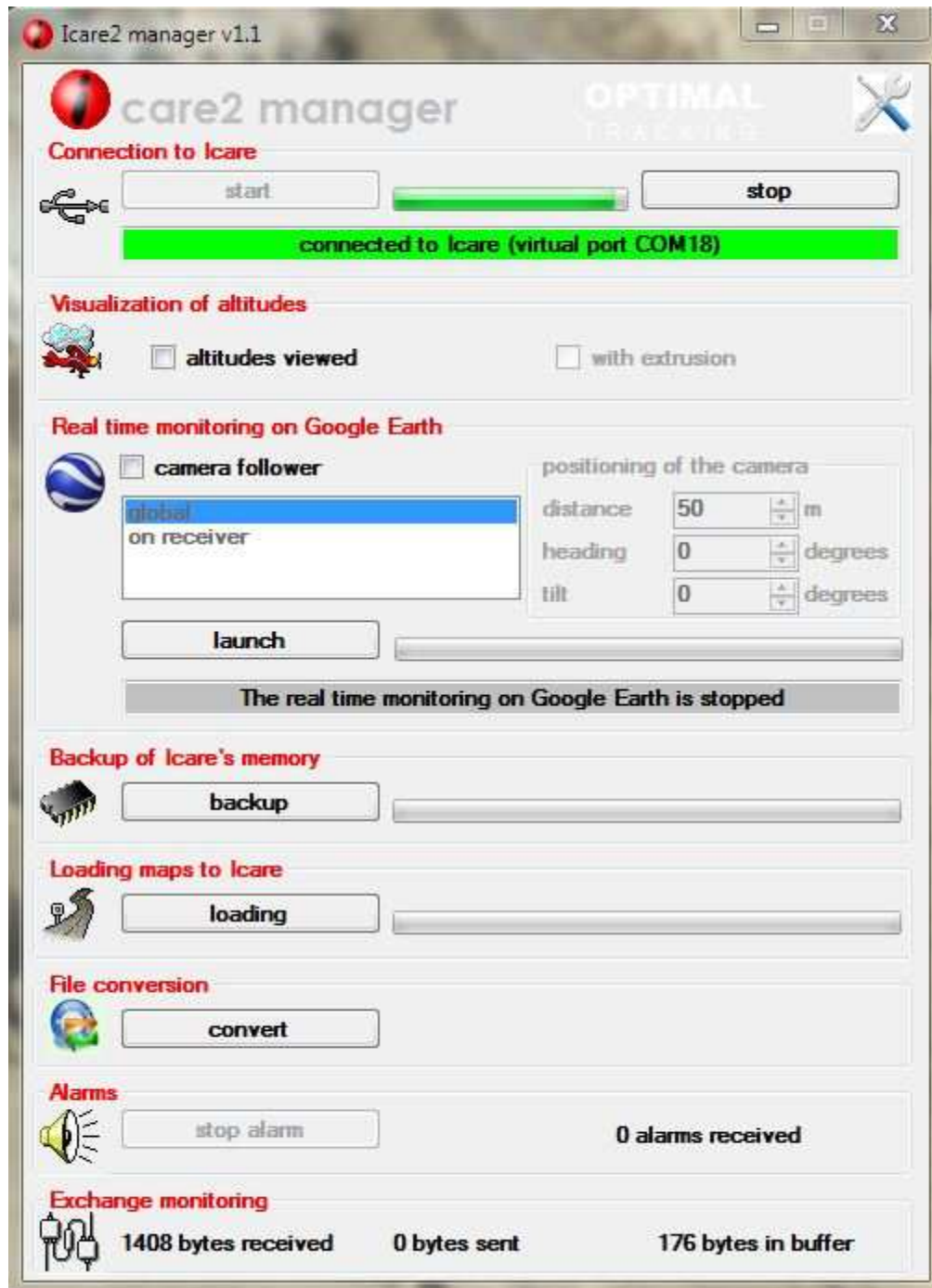
Step 5: configuration of Google Earth (essential)

- In **Google Earth** click "**Tools/Options/General**" and check in the frame "**Management of KML errors**" that the option "**Accept all data not recognized in silent mode**" is checked. If this is not the case, check the option and click on "**Apply**".

Using Icare2 Manager

Connecting the receiver

- Connect the receiver to a USB port of your computer using the supplied USB cable.
- If the receiver is off, switch it on.
- Launch **Icare2 Manager**.



Icare2 Manager automatically connects to the receiver. If this is not the case, disconnect and reconnect the USB cable and click **Start**. A message **connected to Icare (virtual port, etc.)** is displayed.

If you want to end the connection, click **Stop**.



Do not disconnect the receiver without having ended the connection in advance because it may disrupt any new connection. In this case, it is preferable to run **Icare2 Manager** again.

Configuring Icare2 Manager

Click the symbol



The settings window opens:



You can choose:

- The language.
- The full name of the command to run **GpsBabel**. For example, "C:\Program Files\GPSBabel\gpsbabelfe.exe" if **GPSBabel** is installed in C:\Program Files\GPSBabel and if the program is named gpsbabelfe.exe.
- The period for refreshing the real time following in **Google Earth** (2 seconds by default).
- The period separating the readings of the receiver in real time following (1 second by default).
- The period between running the real time following and displaying data in **Google Earth** (15 seconds by default).



- For slow computers, it may be useful to increase the refreshing period and the period between the readings. Put the values on about 3 to 5 seconds.

Viewing altitudes

If you are interested in 3D movement, click **altitudes viewed**. All the trajectories and positions are then 3D. Otherwise, trajectories and positions are projected at the level of the ground.

Click **with extrusion** to view the altitudes and the projections on the ground at the same time. Each 3D trace is then connected to the ground to view its altitude better.

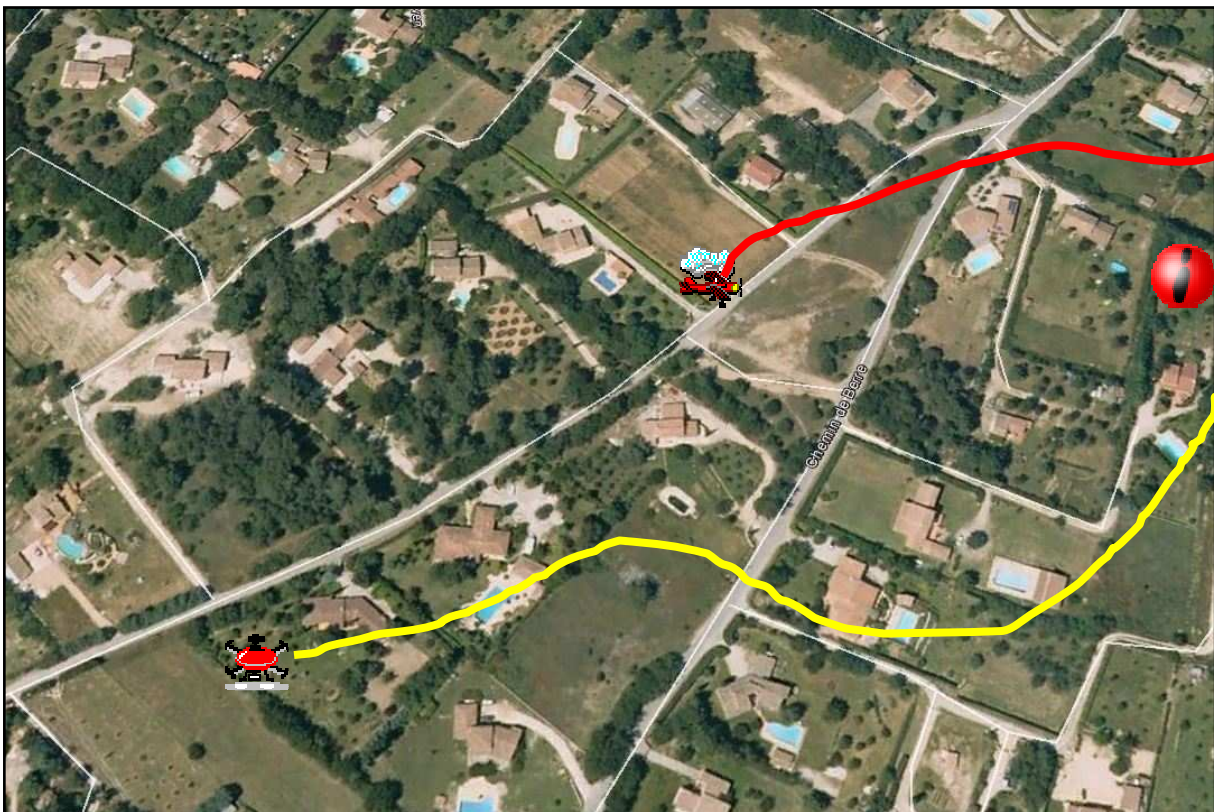
Following in real time on Google Earth

Before starting the real time following, you must decide if you want to use a **camera follower**. Almost all allow you to monitor a unit or all entities continuously displayed by holding them in the centre of the screen.

If you opt for a **camera follower**, click on **camera follower** before launching the real-time following. Subsequently, it will be possible for you, at any time during the real time following:

- To choose the entity to follow (**transmitter, receiver, global following**).
- To choose the distance and direction of the follow camera (**distance, course, tilt**).

Click **launch** to start the real-time following on **Google Earth**.



Google Earth starts and displays in real time:

- positions and trajectories of running transmitters.
- position and trajectory of the receiver.
- the entities of the active map.
- the time, altitude and speed of all the points of the trajectories.
- the status of the batteries of the various units.
- the alarm symbols of transmitters.

If an alarm is triggered, a symbol appears on the position of the transmitter that triggers the alarm. Simultaneously, a ringtone is triggered by **Icare2 Manager**. To stop it, click **stop alarm**.



During the real time following, you can change the viewing parameters with **Icare2 Manager**.

To end the real time following, exit **Google Earth**.

Backing up the contents of the receiver

- click **backup**.
- choose a directory where the backup is stored.
- click **OK**.

The receiver emits a succession of beeps, and then a file named "**Icare save (date and time)**" is created in the directory you chose.

Icare2 Manager then asks you if you want to view the content of the backup in **Google Earth**.

The backup file is in KML format (the format of **Google Earth**) and contains:

- the trajectories of all transmitters.
- the trajectory of the receiver.
- all the maps stored in the receiver..

Loading maps

In a **KML format** file (the format of **Google Earth**), assemble all points, lines, and polygons you want to load into the receiver. To do this, you can:

- build these entities in **Google Earth** very quickly using the mouse:
 - create a folder in **Google Earth** (right click on **temporary places**).
 - go into this folder (click on folder).
 - create points, lines and polygons.
 - save the folder in a KML format file (right click on the folder and **save the place under**).
 - specify that you want the the KML format and not the KMZ one.
- import maps from other software or another device and convert with **GpsBabel**.

When the KML format file containing the entities to transfer is ready:

- click **loading**.
- select the KML format file.
- click **open**.

The receiver emits a succession of beeps and then a new map is created in the receiver. It bears the name of the document contained in the KML file (almost all the name of the KML file if the file has been saved by **Google Earth**).

Conversion

To be able to communicate with almost all GPS software and devices, **Icare2 Manager** gives access to **GpsBabel**:

- Click **convert**.
- **GpsBabel** starts.
- you can then choose for the input and output:
 - the GPS device or the file format.
 - multiple options.

GpsBabel gives you access to most of the hiking software packages and most of the GPS devices on the market.

Alarms

Icare2 Manager displays the number of alarms received from the transmitters. At each alarm, a ringtone is launched. It can be stopped by clicking on **stop alarm**.

12 SPECIFICATIONS



Specifications

General

| | |
|---|-------------------------|
| Radio range (ground level, open terrain) | 3 kilometers |
| Radio range (transmitter in flight) | More than 10 kilometers |
| Operating temperature range | -10°C to 55°C |
| Charging temperature range | 0°C to 45°C |

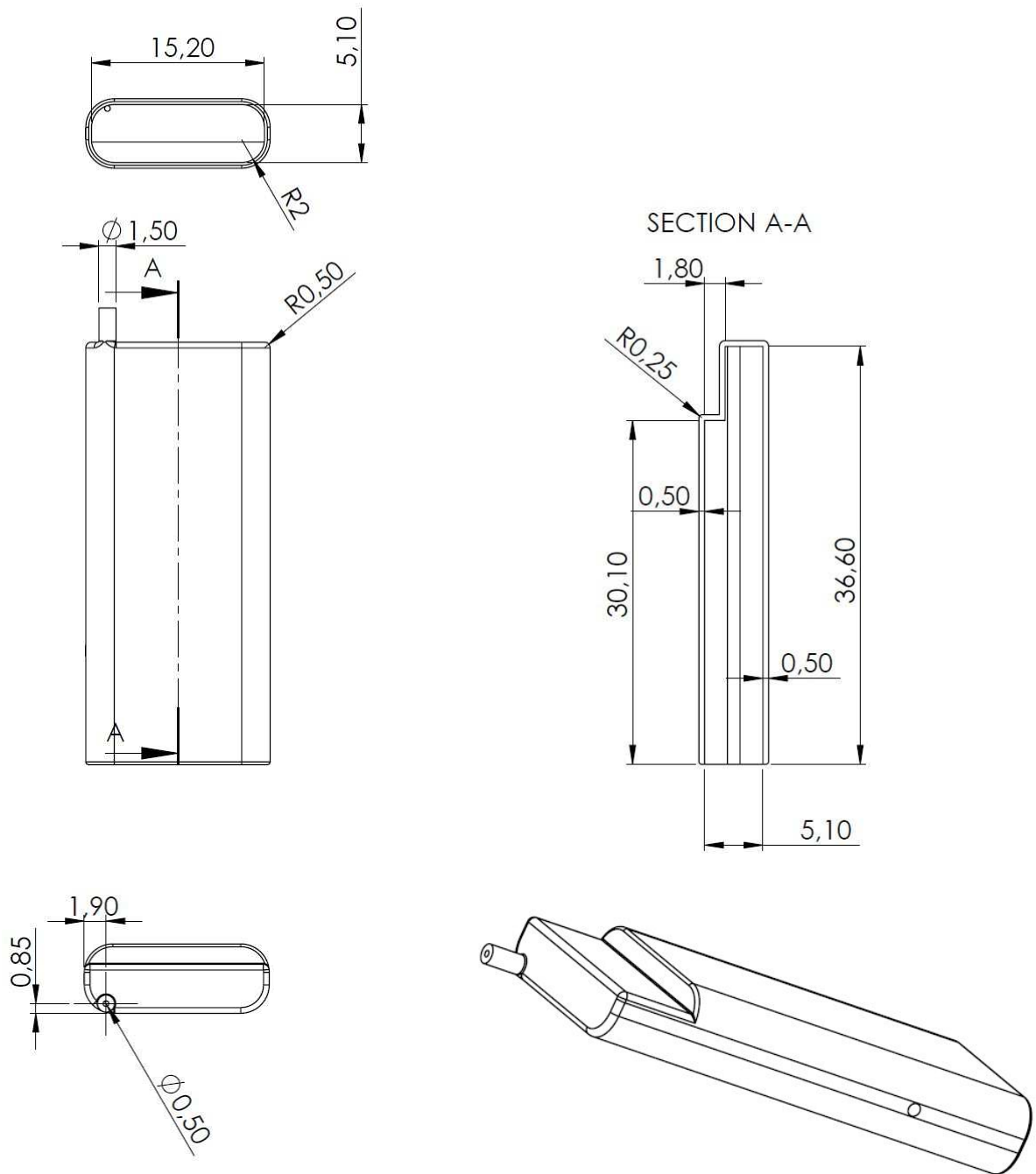
Receiver

| | |
|---|--|
| Dimensions not including antenna | 115 x 56 x 22 mm |
| Weight | 105 grams |
| Power supply | Battery Lithium Polymer 1250 mAh 3.7 Volts |
| Autonomy (at 20°C) | 14 hours |
| Duration of the charge (at 20°C) | 3 hours |
| GPS | Very high GPS/GLONASS sensitivity |
| Resolution of the electronic compass | ±1 degree |
| Accuracy of the electronic compass | ±5 degrees |
| Size of the screen | 32 x 40 mm |
| Resolution of the screen | 176 x 220 pixels |
| Type of screen | Transmissive TFT 65000 colours |
| Computer interface | USB 2.0 |
| Mapping memory | 512 kB |
| Sound | Magnetic transducer |
| Vibrator | Yes |
| Night torch | High brightness LED |
| Radio receiver sensitivity | -118 dBm |
| Water tightness | none |

Transmitter

| | |
|---|--|
| Dimensions not including antenna | 37 x 16 x 6 mm |
| Weight | 4.8 grams |
| Power supply | 2.7 to 5.5v 500 mA peak |
| GPS | Very high GPS/GLONASS sensitivity |
| Water tightness | Immersion at the surface of short duration |
| Radio transmission frequency | 867.9875 + n*0.025 MHz n = radio channel (from 57 to 66). |
| Radio transmission power | 500 mW |
| Occupation of the radio band | Less than 1% of the time |

Mechanical plan of the transmitter



Maintenance

- Clean the screen with a soft cloth or a glass cloth. Any other material may scratch the screen.