



EOSCAN

Eoscan - User's manual

Common document for ground stations SR10, SR10-P, using radiosondes M10

To start using EOSCAN, make sure you have a SR10 station, and a M10 Sonde.

Note: Groundcheck is not necessary, but recommended for an optimal use.

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0. Preamble

0.1 Introduction

This manual contains information regarding the use of Meteomodem radiosonde with Eoscan, the new sounding Software.

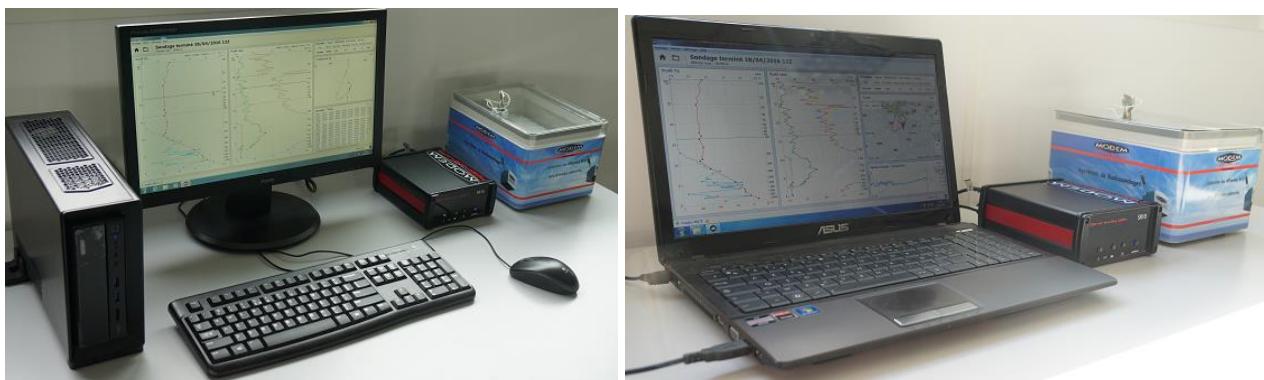
Pictures in this documents show M10 radiosondes used with SR10 ground station

0.2 SR10 ground station

SR10 ground station consists of:

- SR10 receiver
- Groundcheck for sensors calibration, automatic configuration of frequencies and GPS acquisition inside a premises.
- Computer (optional)
- GPS and Omnidirectional Antennas
- Turnstile Antenna (optional for some specific subtropical areas)
- Masts and cables for antennas

SR10 work station



SR10 Portable: delivered into a small and robust suit case.



Note: For more details, please refer to « SR10 Installation & Maintenance manual »

0.3 M10 radiosonde

The M10GPSonde is the Meteomodem latest generation of radiosonde.



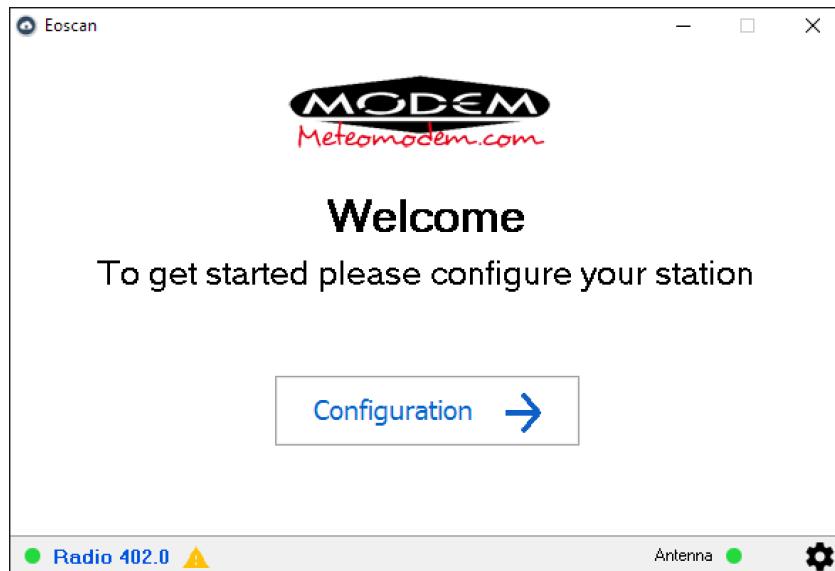
The M10 allows to transmit PTU (Pressure, Temperature, Humidity) and wind data (speed and direction) in real time by radio telemetry. The data are collected then processed and analyzed by our software suite allowing the automatic generation and transmission of WMO and Military Format messages.

Note: For more details, please refer to Section 7 « miscellaneous information about radiosondes

1. First start and configuration

To start Eoscan, open the Eoscan's file (« C:\Eoscan\ ») and then double click on this icon:

A configuration window will display on the screen. It helps you to set-up important steps to start a radiosounding.



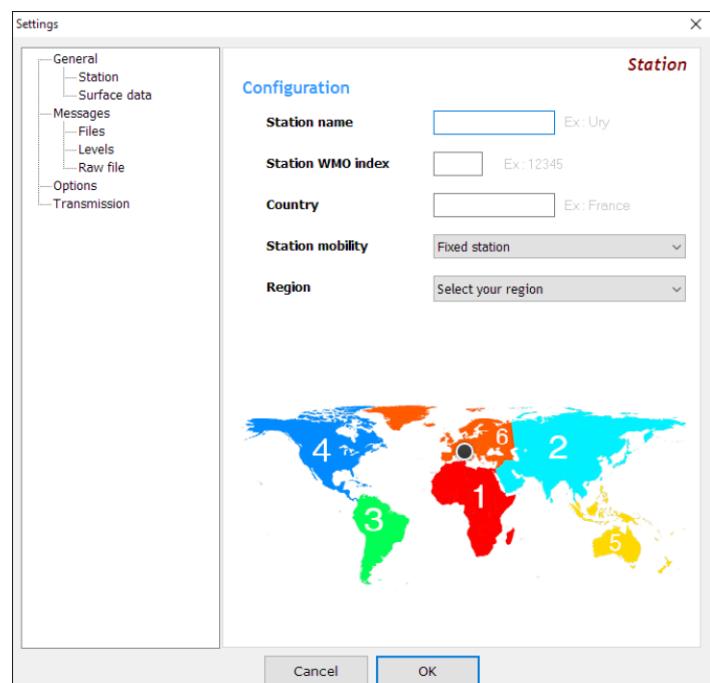
Tips: If you have an old configuration of IR2010 in your computer, Eoscan uploads automatically the required information for its configuration.

1.1 Station

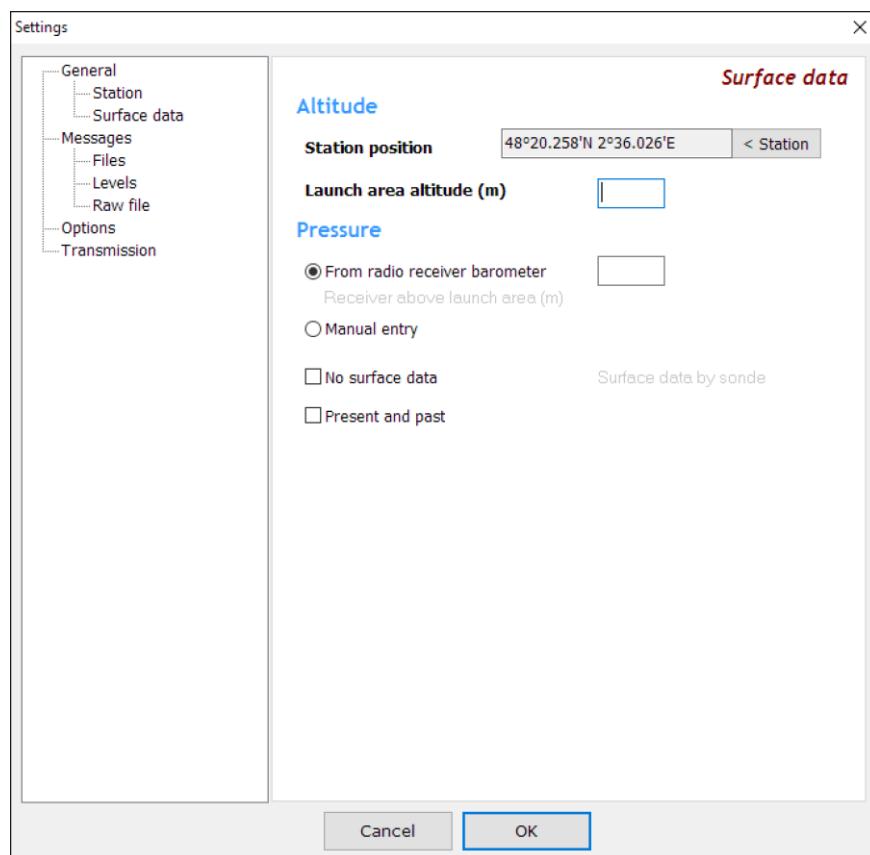
- **Station name**
- **WMO station index**
- **Country**
- **Station mobility**

Indicate whether the station is a fixe
Or a mobile one (ship)

- **Region**



1.2 Surface data



- **Altitude**

To use the position given by the GPS station, click on the « < Station » button.

Important: If you don't have a GPS antenna, « station position » is not displayed.

- **Pressure**

Indicate that the ground pressure is calculated from the pressure measured by the station's barometer. In this case, the user has to indicate the difference of height between the station (receiver) and the launch area.

If not, the user must, for each sounding, manually enter the ground pressure at the 'Enter ground data' step.

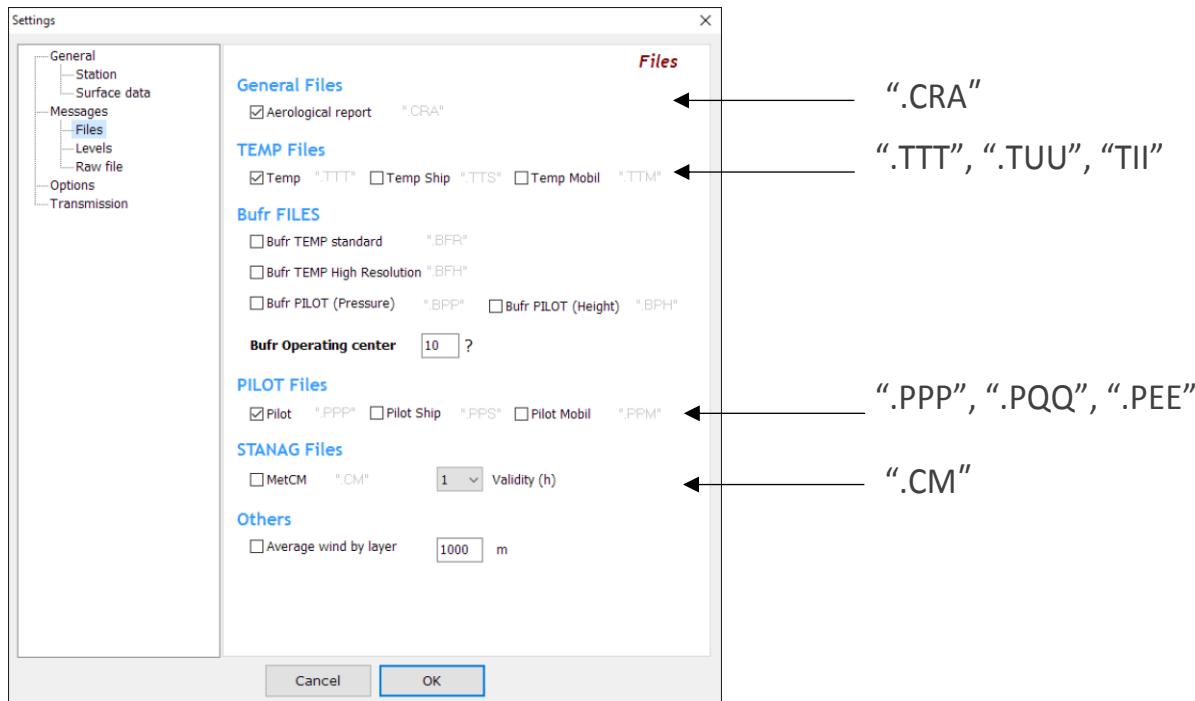
- **No surface data**

Surface data can be manually filled after the beginning of the sounding, if not the sonde data will be used instead.

- **Present and past**

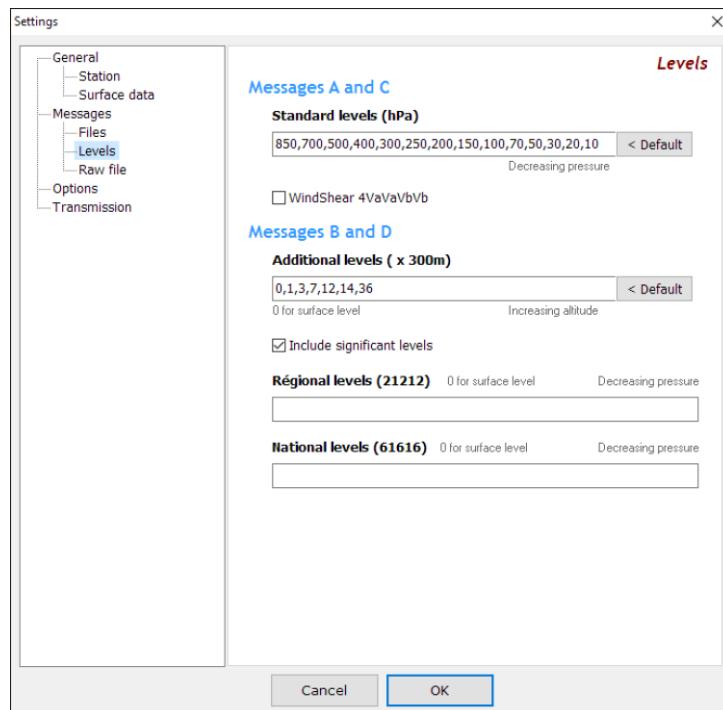
This field is not required; it will be automatically replaced by slashes.

1.3 Files



This menu contains all the Eoscan files that can be generated at the end of the sounding. Tick the checkbox to generate the files you need.

1.4 Levels

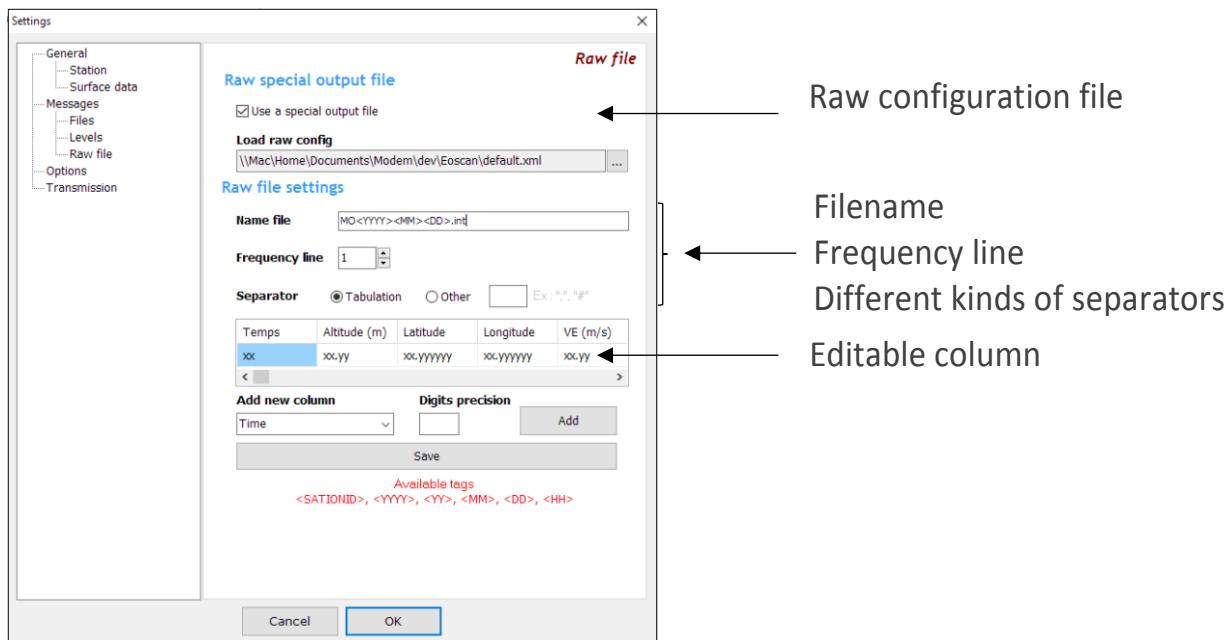


You can add, modify or delete different levels. These different level, will be considered taken into account during the meteorological files creation and significant point selection.

Tips: Click on the "default" button to return to a standard configuration.

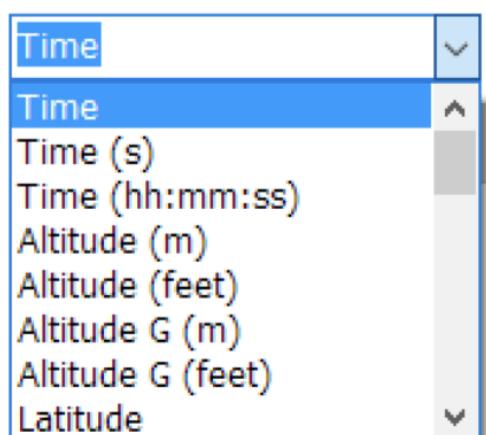
1.5 Raw file

Raw file is an additional file just like «.COR, .REF or .GPS ». Raw file can be modified.



Tips: The raw file of a previous sounding can be modified according to the selected columns.

Add new column



Multiple information can be added to the generated file.

Note: You can choose decimals digit number

1.6 Options

- Altitude and Wind
- Frequency plan
- Wind flag (*)
- Record Descent
- Force sounding end (km)

Warning: Sounding will be stopped at the limit altitude indicated if the checkbox is ticked.

- No calibration (*)

No calibration done even if you have a GroundCheck available.

- GPS station

GPS antenna is not required; it can be deactivated to avoid system failure. If activated; the difference of height between the antenna and the launch area has to be informed.

- Language

Automatically finds the translation file for Eoscan

- Web Eoscan

Allows to remotely control the software.

Warning: it's necessary to open 2 port to allow connection from outside of your network.

- Mode Eoscan

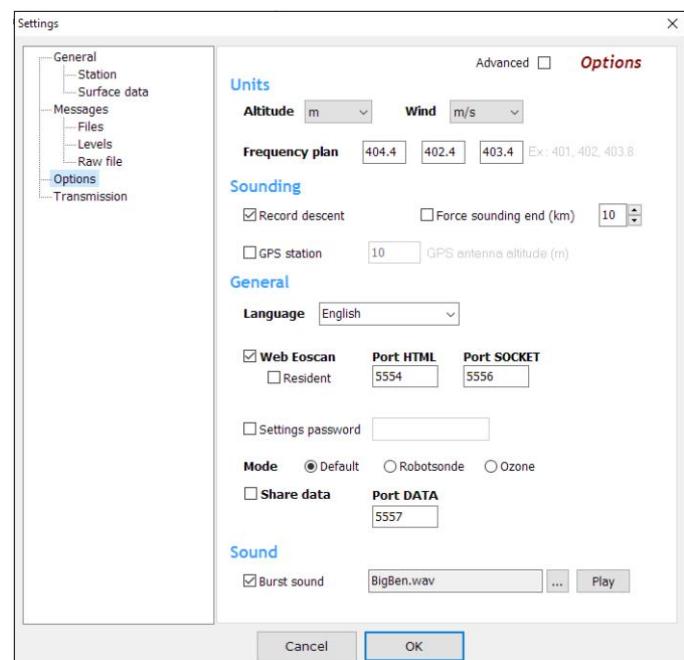
Eoscan can be used with a RobotSonde, a manual station or for ozone sounding, « share data » option allows to share data with third party software (LOAC).

- Settings password

allows to configure an administrator password, also used in « Web Eoscan ».

- Separator (*)

- Burst sound

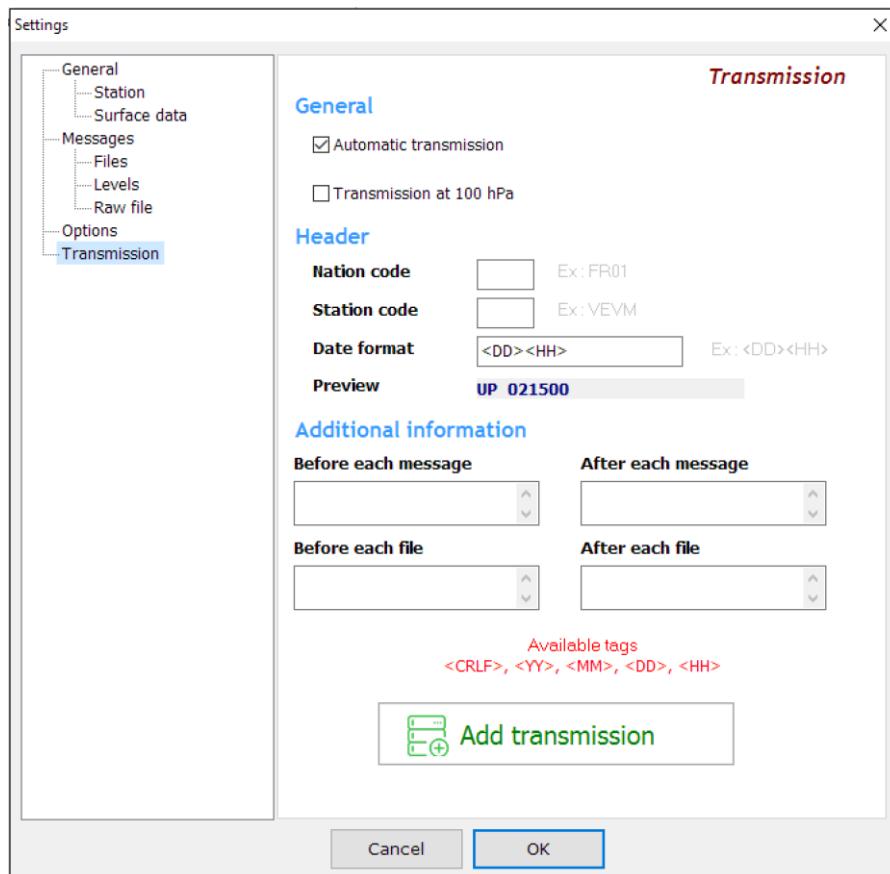


*Only if "Advanced" checked

1.7 Transmission

- **Automatic transmission**

Eoscan will automatically send data at the end of the sounding, in case of failure of sending, Eoscan will retry again, if it fails it has to be done manually.



- **Nation code**

- **Station code**

- **Date format**

« <DD> » and <HH> tags will be replaced by date and time.

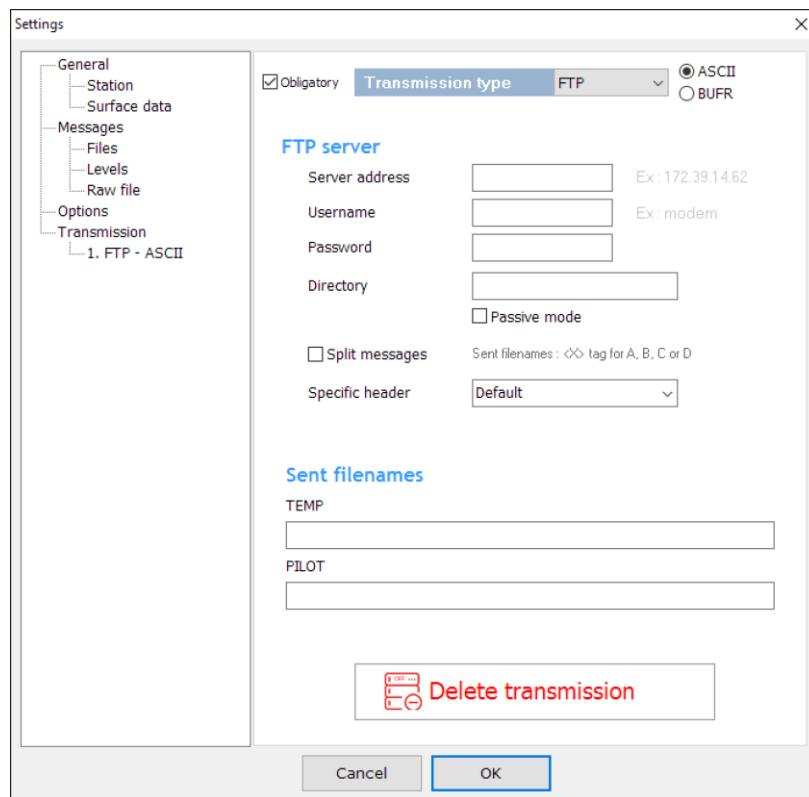
- **Additional information**

Additional information can be added before or after every parts/files.

Once the header configuration is done, click on « Add transmission » to add a transmission configuration.



The screen below appears:



This screen allows:

- **Obligatory transmit**

Warning: if the checkbox “Obigatory” is deselected, Eoscan will not send the messages automatically.

- **Select and set messages transmission mode:**

- FTP
- E-mail
- Sockets
- Files copy

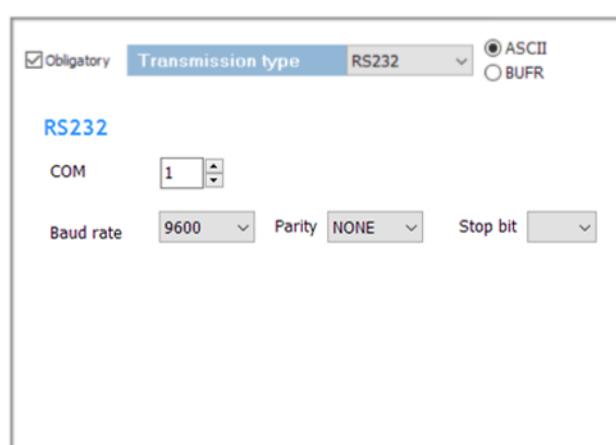
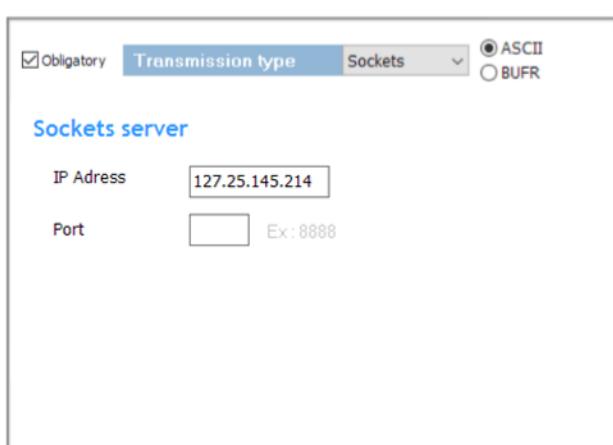
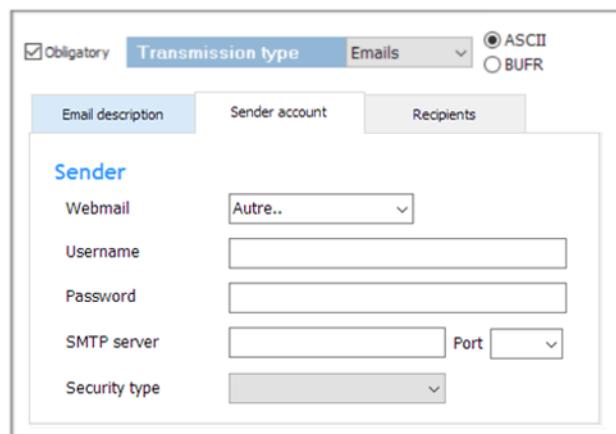
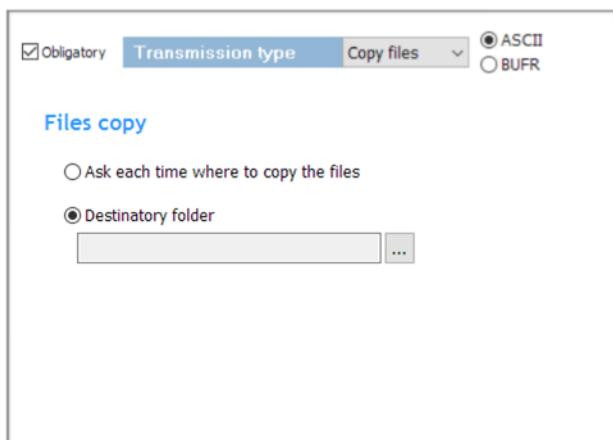
- **Select ASCII or Bufr type**

- **Sent filenames**

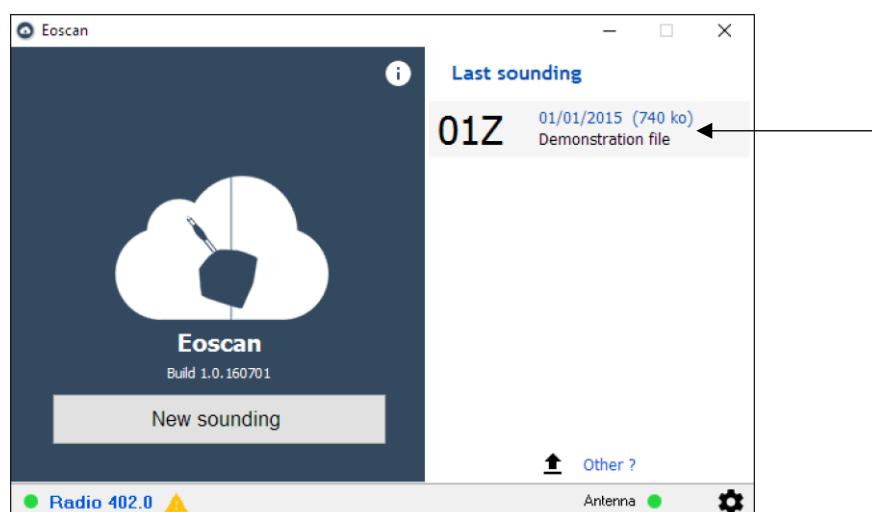
Change filename for different files.

Memo: You can create multiple transmission configurations with different information.

- Other transmissions:



After selecting the options, click on « OK ». the Eoscan's home window will display with a demonstration file to test the software options.

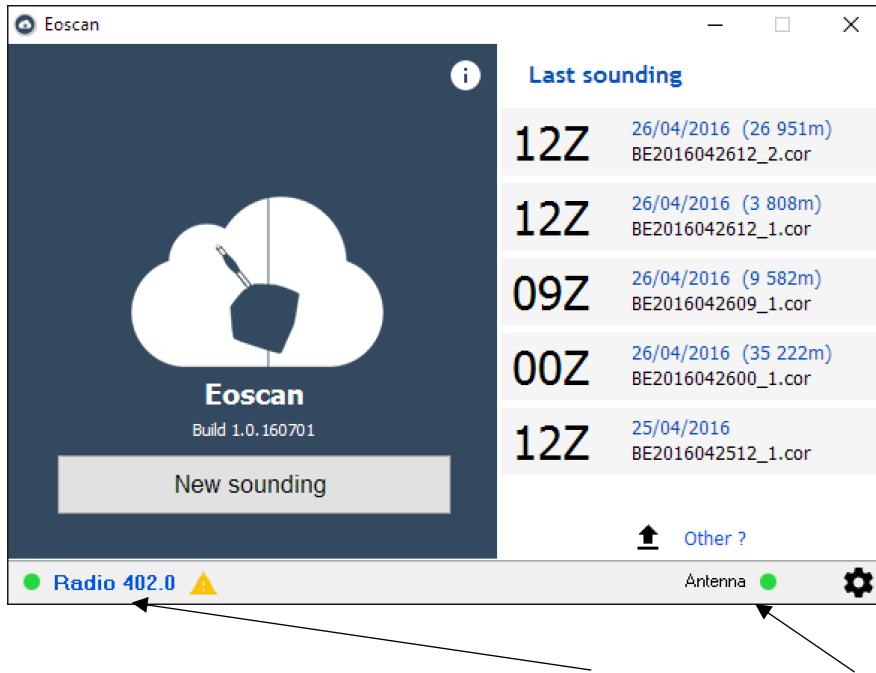


Radiosounding demonstration file

2. Perform a radiosounding

2.1 Software preparation

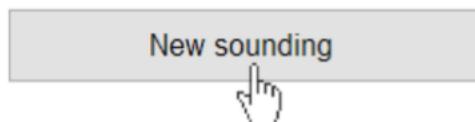
First, double click on the short-cut « Eoscan.exe », in your desktop. The below window opens. It allows you to perform a new sounding (left side) or re- open a sounding (right side)



Here, below can see the condition of your station, or your antenna

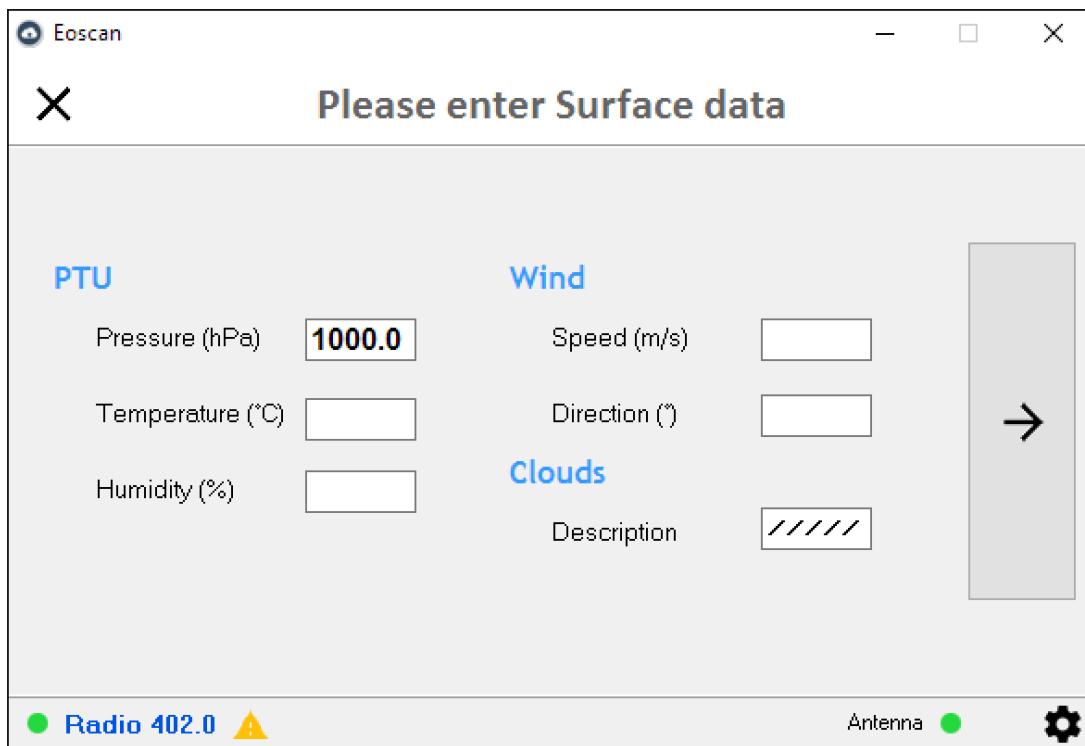
Information		Action
●	Equipment OK	None
●	Waiting for initialization	Wait
●	Error, equipment is not working	An intervention is required
●	No information	Wait

When the led light of your station is green you can start the preparation of a radiosounding by clicking on « new sounding »



Memo: If the station is not ready, you will not be able to click on « new sounding »

2.1 Surface data



Once all the fields are filled in, click on the « → » button to continue.

Memo: If the input is incorrect, the input field is highlighted in red and access to the next step is not allowed.

- **Ground Pressure**

Pressure can be automatically calculated using the Ground Station barometer. In this case, manual entry is not available.

However, it is possible to set up the software in order to manually enter the pressure (see 1.b).

- **Wind**

Wind speed value (m/s or knots) must be a whole number (no decimals). The wind direction must be within 0 to 359°.

- **Clouds**

5 digits required or five slashes if you don't know the cloud code number (see screen 8, Coding clouds).

- **Weather** (Optional in settings) See screen 1.b

Entering present and past weather is optional. (Use slashes instead)

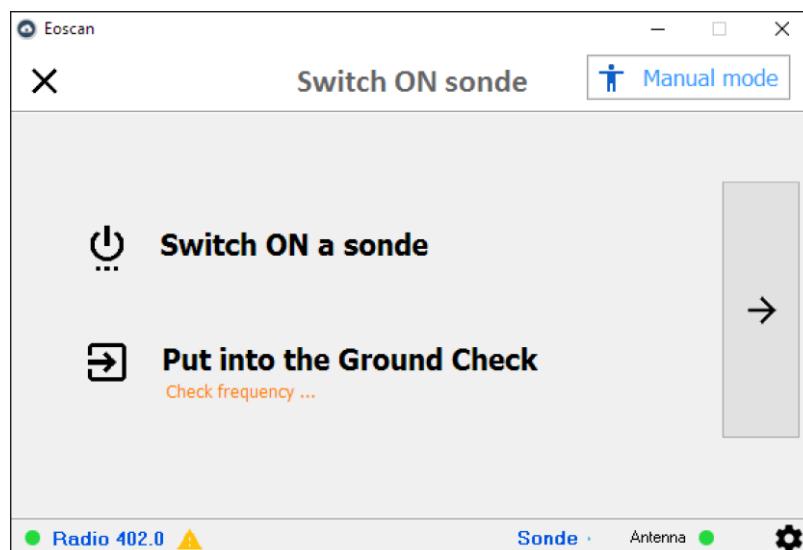
Tips: It is possible to modify the ground data until the end of the sounding, via the menu 'Radiosounding' – 'Change surface data'

2.2 Preparing the radiosonde before launch

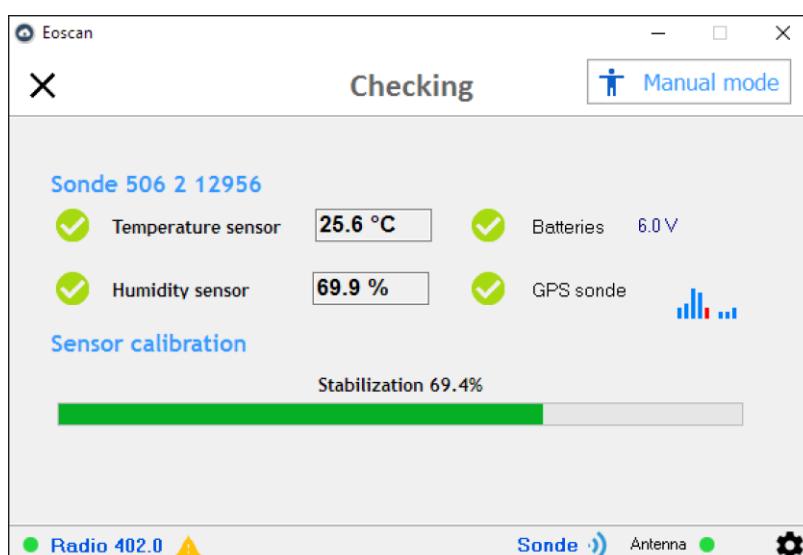
- Get the radiosonde out of its package
- Remove the Modem sticker protecting the sensor boom
- Remove the antenna scotch

having filled in all the surface data, two modes are possible:

- **With Groundcheck:** Switch on the sonde and put it in the ground- check, the frequency set/check will be done automatically depending on your frequency plan (See screen 1.f - frequency plan). Then, the sonde will be automatically checked and calibrated. Human intervention is not required.



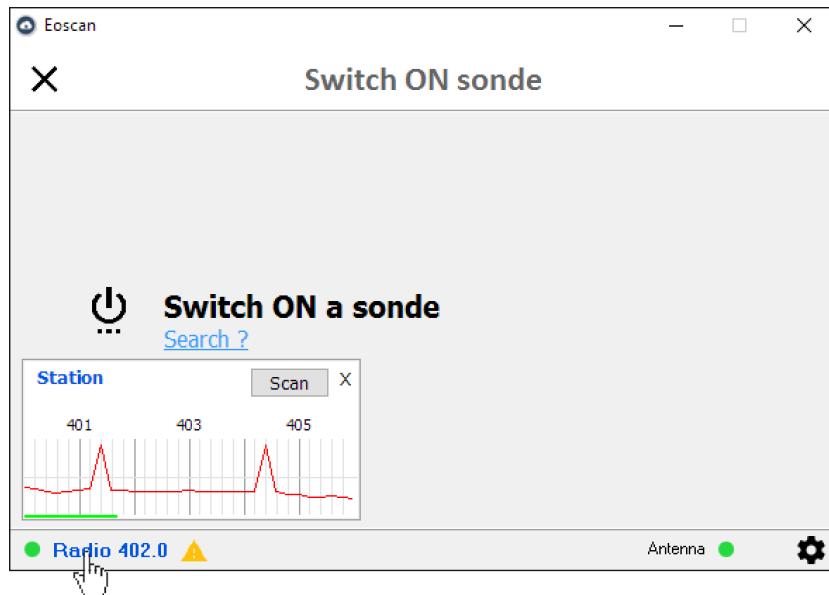
Check frequency with predefined plan.



After the calibration step, the difference between the sonde sensor value and the Groundcheck sensor value will be displayed. If values are too different, the software will ask you to replace the sonde.

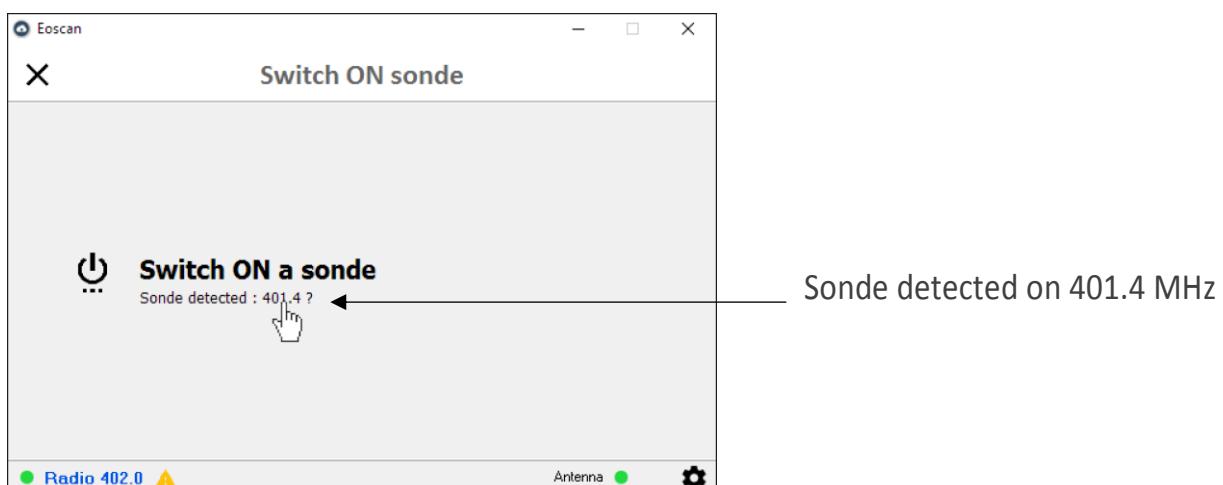
Manual mode: the manual mode allows to use the Groundcheck for sensor calibration only without the automatic frequency changes. The user will have to manually search the sonde as the « without Groundcheck » mode

- **Without Groundcheck:** Search your sonde by clicking on « radio », then click on « Scan ». Frequencies received will be indicated by a peak. Double click on the required frequency.



You can also click on “[Search?](#)”

Eoscan will find the frequencies associated with the available sonde. To modify this frequency, double click on it.



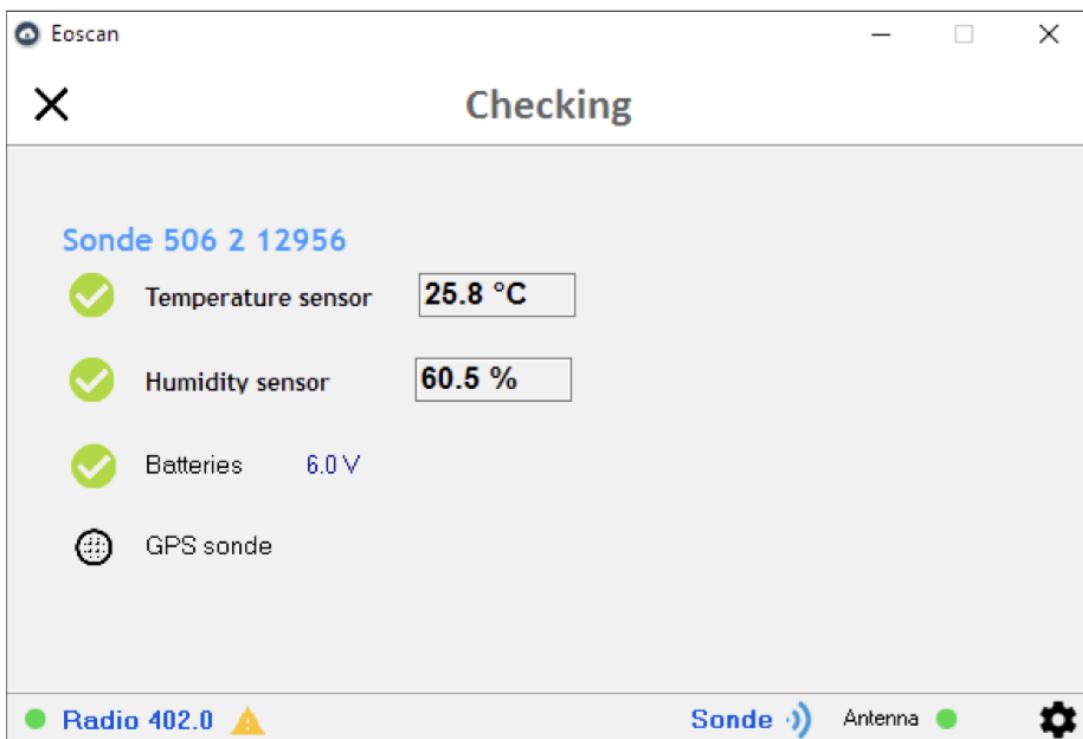
When the sonde is available, Eoscan checks it. Human intervention is not required during the checking of the sonde.



Check the serial number to make sure it's the sonde that you want to launch

If your sonde is OK, a green window appears with the message « you can launch! ».

Human intervention is not required to start a sounding with Eoscan. The software will automatically detect the launch.



Memo: The window will automatically close after detecting the launch.

Tips: you can have all the graphs and plots displayed with 'Time' as the scale instead of 'Altitude'. Once the launch is detected, the scale will go back to 'ALTITUDE' yet you'll be able to choose 'Time' as the scale by clicking on 'Display -> Scale Y -> Time'.

2.3 Balloon train preparation

a) Security rules when using Hydrogen

- Preparation must be done in a ventilated room
- Check that the gas tube fits securely to the gas cylinder or generator pipe and to the balloon inflation pipe.
- Smoking is forbidden
- No use of electronic devices (cell phones, cameras, etc.), likely to generate static electricity near to hydrogen.
- Avoid, if possible, wearing clothing made in synthetic fibers, likely to generate static electricity near to hydrogen.
- Do not touch the balloon with bare hands except if holding by the neck.

b) Inflation of balloon

- Determining the quantity of gas required

To determine the quantity of gas required, there are several methods:

- ✓ weighing (tare/unladen)
- ✓ diameter measurement
- ✓ volume measurement (flow meter)

In all the cases, the lift (upward force) required to raise the balloon must reach a speed of 4 to 6 m/s.

- Weighing method:

The total lift is determined by:

- ✓ The addition of different equipment weights (radiosonde, parachute, unwinder...) and the free lift given by the balloon manufacturer.

Example: for a KKS balloon of 350 g with only a M10 radiosonde (158g). The free lift for KS350 is 950g, it would require: The balloon to lift a weight of: $158\text{g} + 950\text{ g} = 1108\text{ g}$

- Inflation procedure

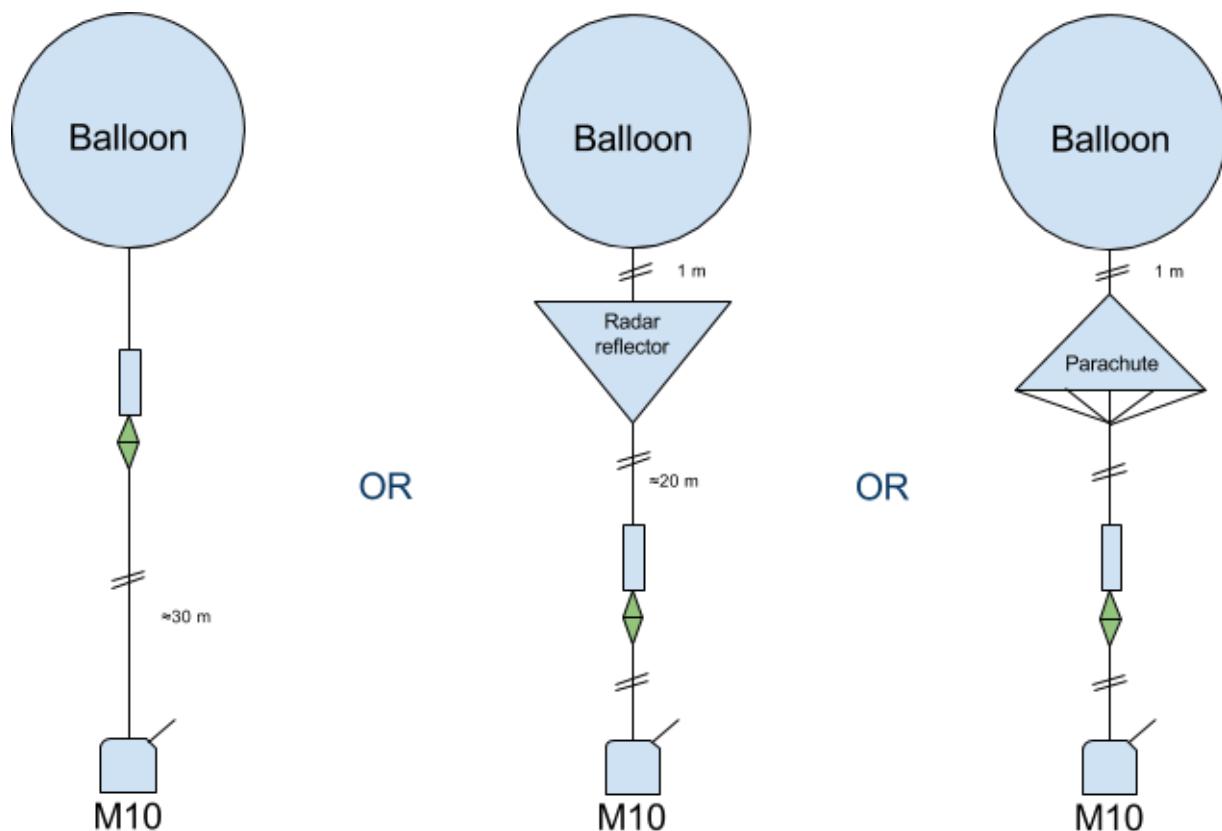
- ✓ Place the balloon on a non-abrasive surface,
- ✓ Handle the balloon with (great) care,
- ✓ Seal off the balloon over the gas entry
- ✓ Inflate the balloon according to your method
- ✓ At the end of inflation, tie a knot to the balloon neck



c) Install the unwinder

The reason of using an unwinder is to allow the string (approx. 30 m) to unwind sufficiently slowly to keep the radiosonde from hitting the ground when released in conditions of strong winds.

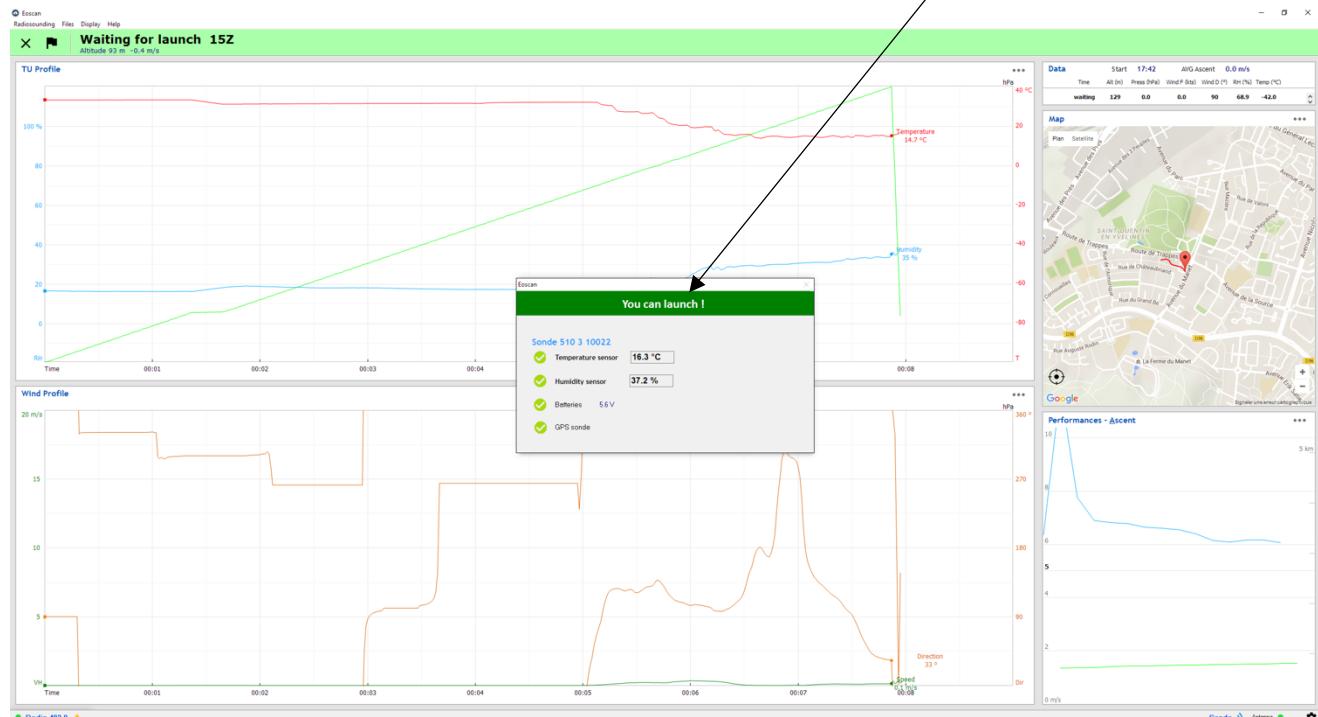
- Position the unwinder immediately above the radiosonde.
- Attach the parachute and the balloon as shown below:
- Extend the radiosonde antenna
- Extend the sensor boom at 45°



Important: Before launching, check that radiosonde is still receiving GPS signal!

The checking can be done directly on the radiosonde, thanks to the LED:

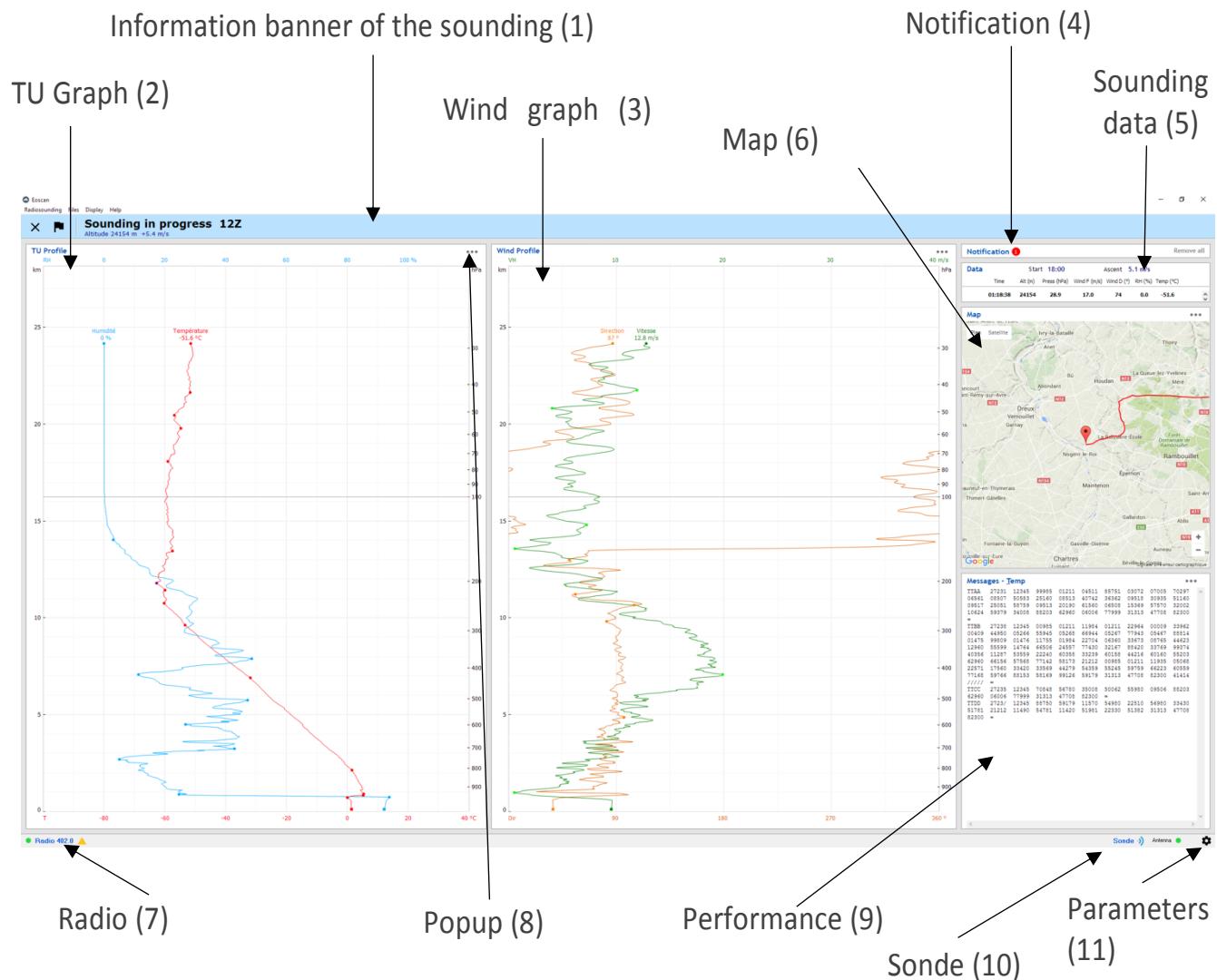
- If the LED is flashing once per second, it means that the radiosonde is waiting for the GPS position. The radiosonde shall not be released; the operator must wait for the cycle with 2 flashes per second before releasing the balloon train.
- If the LED is flashing twice per second, the radiosonde is receiving GPS signals and the radiosonde can be released, and the message “**you can launch**” appear on the software window.



2.4 Real time sounding information

After detecting the launch, Eoscan will display all the components on the principal window allowing the monitoring of the sounding. Each data box is modular and the layout can be modified according to the operator's preferences.

Tips: When you see this icon  , click on it, to display a pop up, giving you different options (print, 2D and 3D trajectory, wind 3D, maps)



Description of all the window's components.

(1) This banner has different colors depending on the sounding status. ([Waiting for the launch](#), [sounding in progress](#), descent, end of the sounding). It shows data such as altitude, ascent speed, sounding status, transmission etc... (Those components evolve according to the evolution of the sounding).

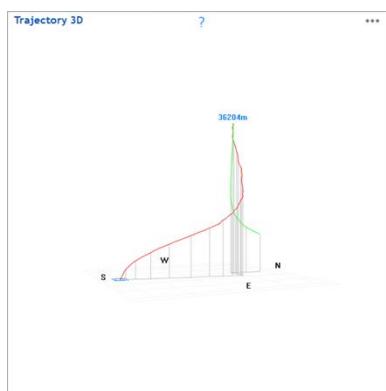
(2) [Humidity](#) and [temperature](#) graphics can be displayed depending on the Altitude, Time (Display → Scale Y) or Pressure.

(3) Wind velocity and direction graphics can be displayed depending on Altitude, Time (Display → Scale Y) or Pressure.

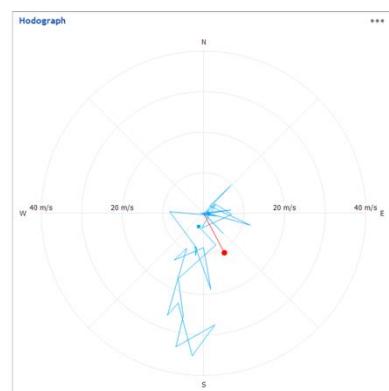
(4) Notification: Punctual notifications on important moments/phases of the soundings as for instance the release of the balloon train or the burst of the balloon. This window can be hidden, if so this icon:  will be displayed to inform users of a new notification.

(5) Sounding data, contains some values as for instance the ascent average or the release time. The last frame received from the sonde is displayed (click on the header for more information).

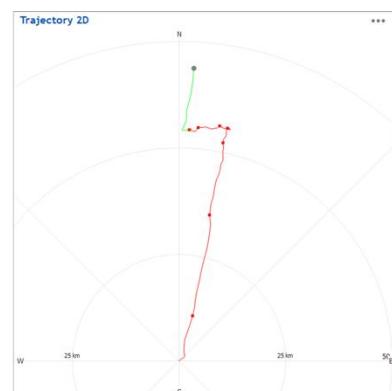
(6) There are 5 different and possible displays for this window, accessible via the menu: ...



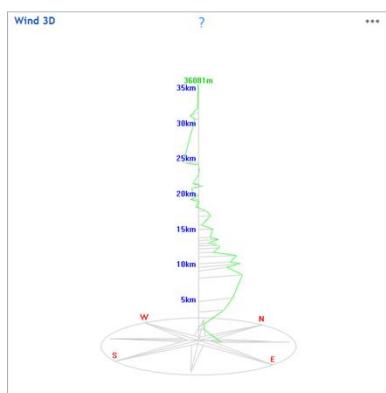
Trajectory 3D



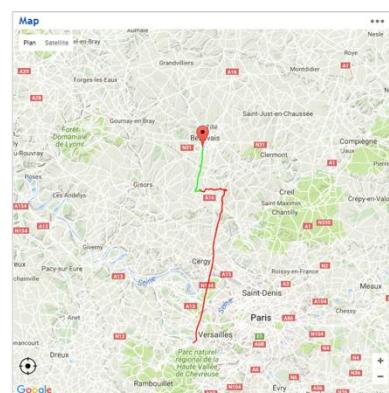
Hodograph



Trajectory 2D



Wind 3D

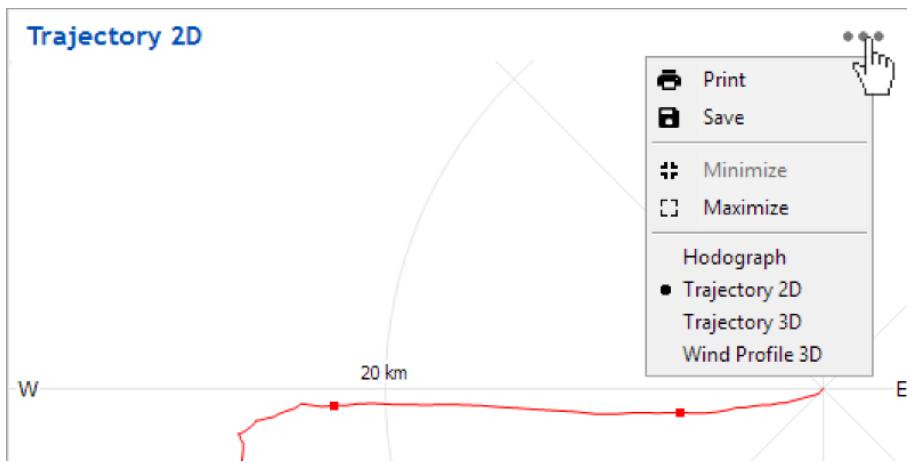


Map

(7) This option is not accessible during a sounding to avoid a frequency change. Yet you can identify the sonde frequency and the station state.

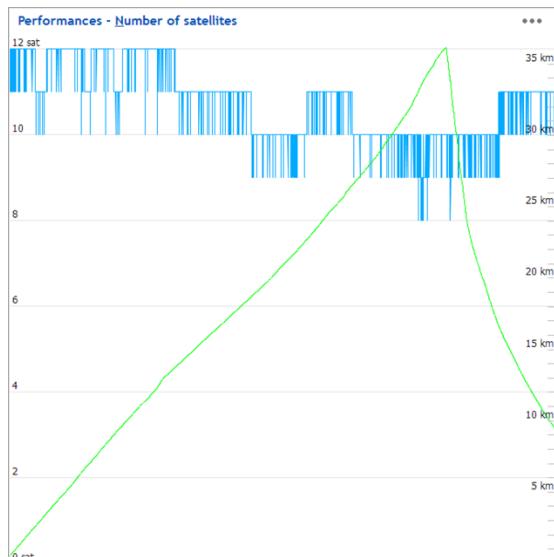
(8) Accessible by clicking on the title bar or on this icon:  it shows different options depending on the window.

- Print the window selected with a header
 - Save the window selected with a header
 - The Minimize/Maximize option allows to choose the format of visualization.
 - Other choice, enables to change the information in the window

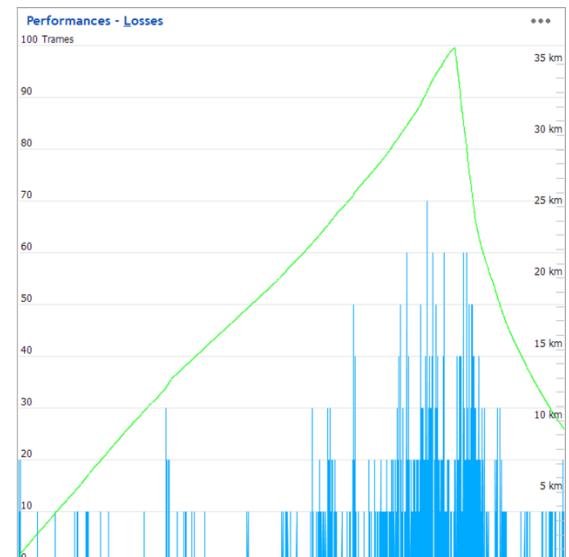


3 possible displays, with different display:

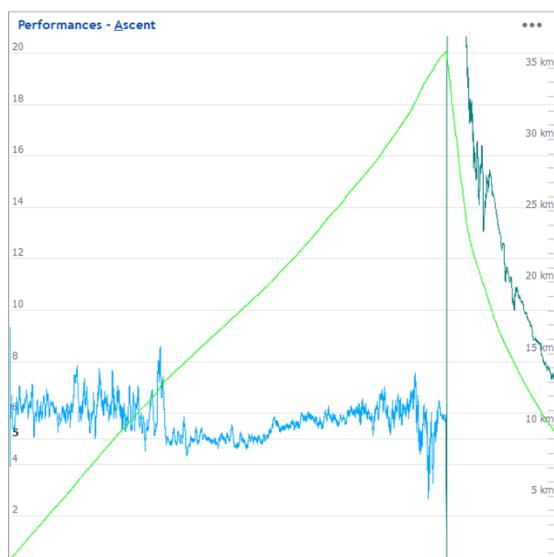
(9) Performances: Average of the sounding



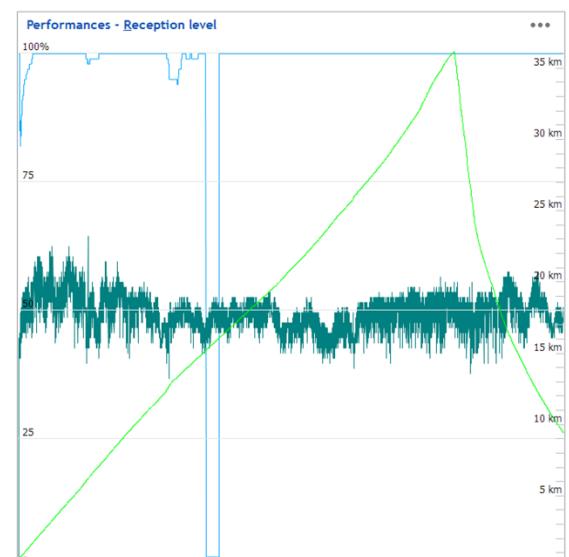
Data reception losses



Ascent speed of the sonde

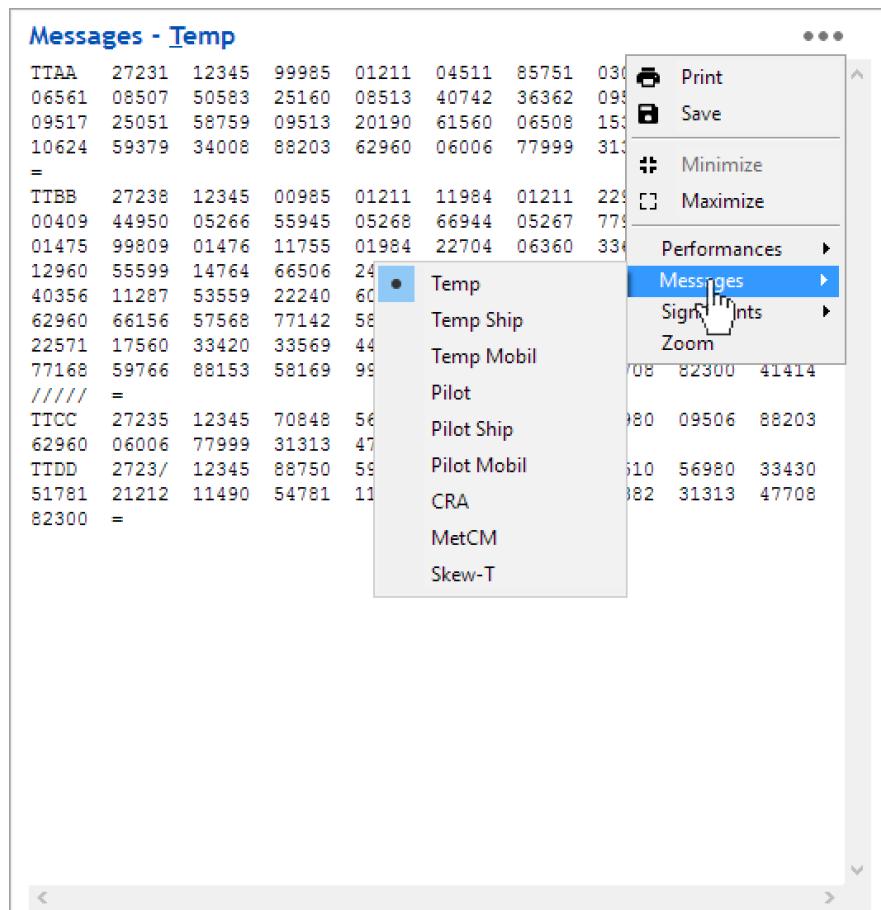


Number of GPS satellites



Sonde reception levels

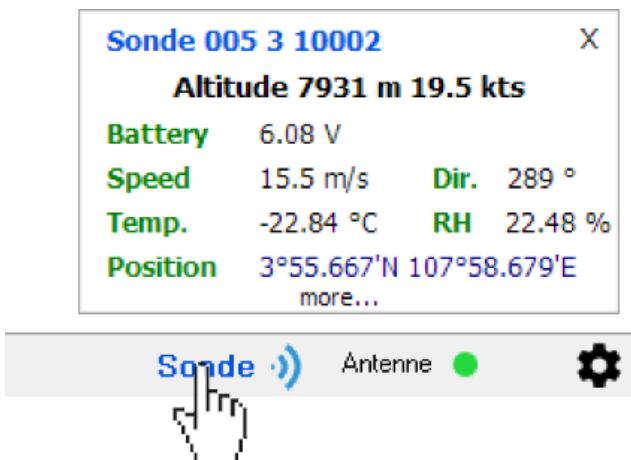
Messages: All of the METEO messages are visible in text (but not physically created), those messages can be copied but not modified



Characteristics: data board with significant points, sorted by humidity/temperature, wind speed / direction.

Memo: All the significant points are displayed on the TU graph and WIND graph with circles in different colors

(10) Clicking on the « Sonde » menu opens the information window, with the sonde data in real time.



Other important information during a sounding, the icon « sonde » will change depending on the quality of the sounding during the last 3 minutes.

Good reception: No problem with your sonde

Correct reception: Stay attentive

Low reception: There is probably something affecting your sounding. Check if your antenna is OK.

(11) the « Parameter » button, please refer to « Options », for a complete explanation of the menu.

At the end of the sounding, when Eoscan detects the burst or the end of the sounding, if a transmission has been set, the software will try to send the data automatically. If transmission fails, a light (**Transmission** ●) will display the transmission status, it will have to be done manually.

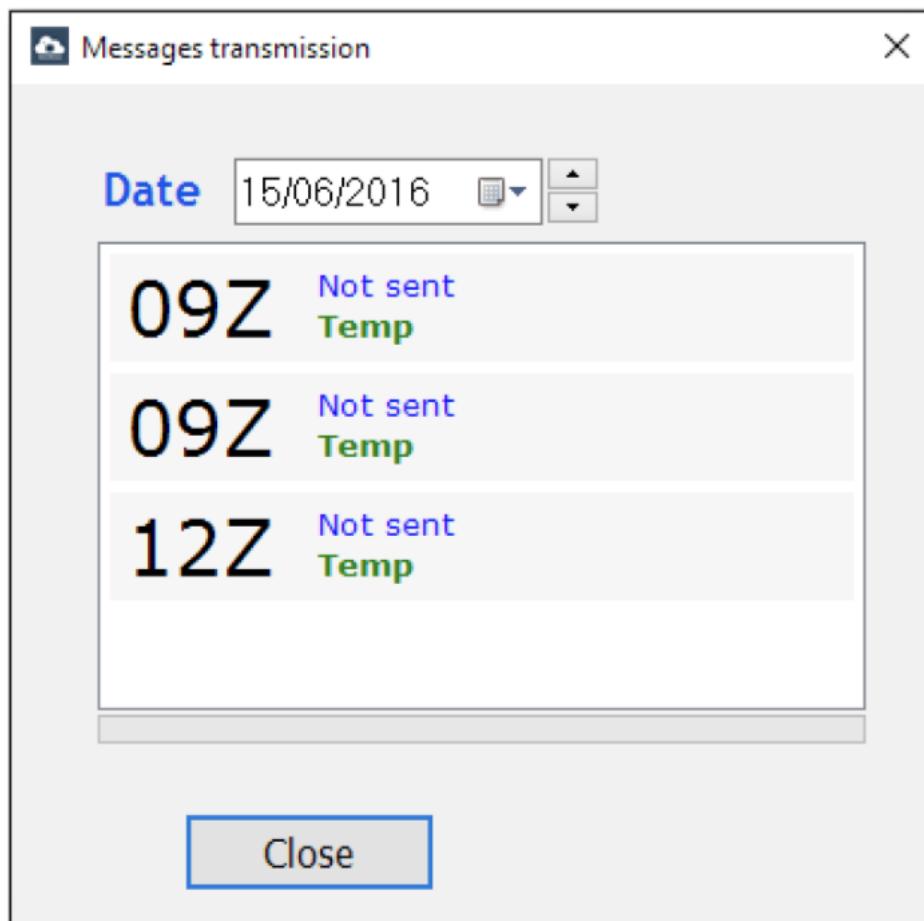
Information		Action
●	Transmission OK	None
●	Transmission error	Check transmission settings
●	No yet transmitted	Wait

Tips: Click on « transmission » to send data again.

Once it is finished close the software (Sounding → Quit) or go back to the main menu through the button: 

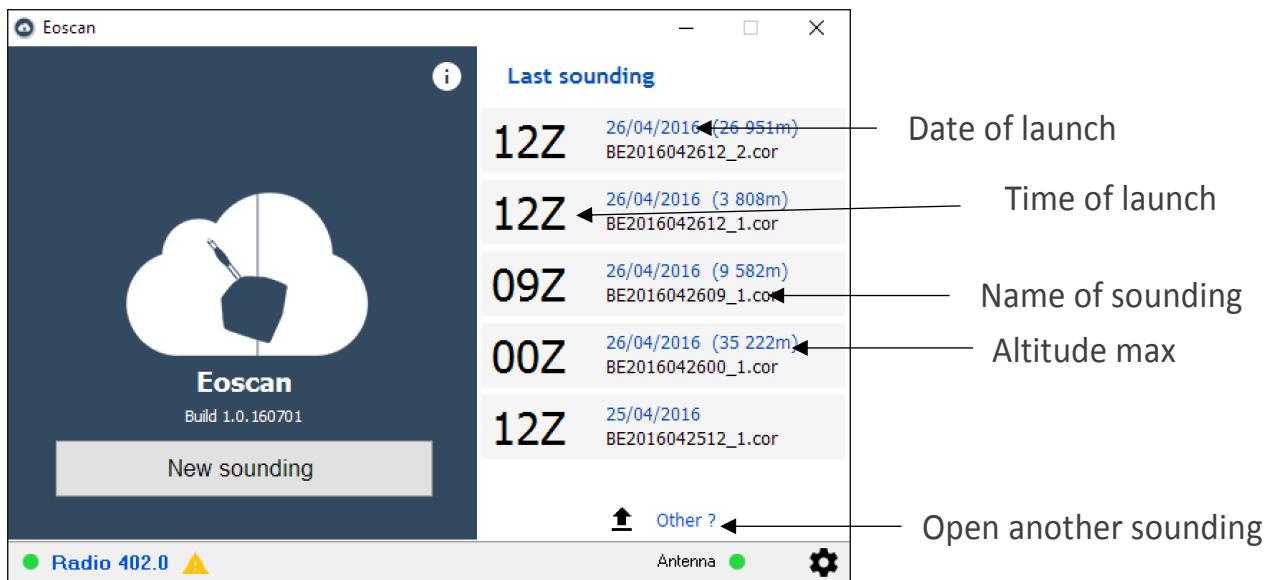
You can check the message transmission by executing the transmission software used by Eoscan, it is located in the same directory and named « Transmission.exe ».

Choose a sounding and click on « Send ».



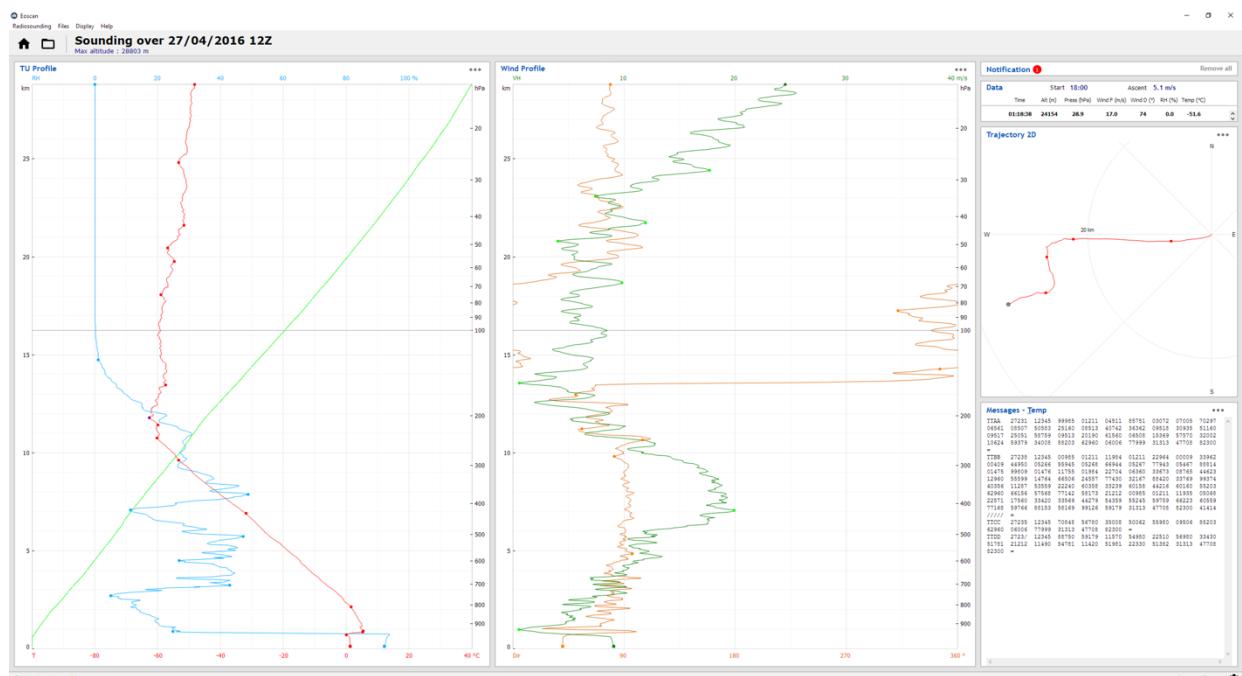
Memo: it's not necessary to execute this software, if Eoscan has been setup to automatically send messages at the end of the sounding.

3. Re open a sounding



If there is no sounding in progress, it is possible to re-open a sounding from the home window. You just have to double click on one of the sounding present in the list.

If your sounding is not on the list, you can click on the button “other” to manually search a “.COR” file in the computer.



Once the sounding is opened, it is considered as « finished », you can access the data, generate output files, create a COR file, send files, reports, messages etc ...

Tips: When your sounding is opened, you can open another sounding by clicking on this icon:

Page intentionally left blank

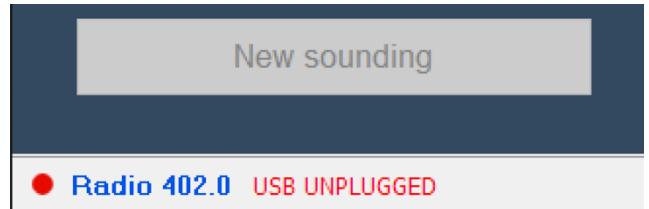
4. Solve a problem

4.1 Station initialization

All major defaults are indicated by a red LED .

If a red LED appears near the radio label, the launch procedure is not possible.

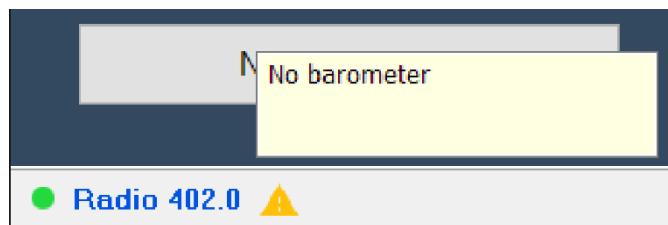
« New sounding » button is not active.



- Check that the station is powered on
- Check that the station is correctly connected to the PC (USB cable for SR10 station)
- Re-launch Eoscan.

Tips: you can hover your mouse on the warning sign to see the station issue.

System alerts are indicated by a yellow warning sign . The progression of the launch procedure is allowed but the system is not working in an optimal way.



a) A warning for « the Ground-Check »

Ground-check is not correctly connected to the PC. Ground calibration of the sensors cannot be done but continuation of the radiosounding procedure is still possible (Manuel mode activated).

- Verify the Ground-check connection to the PC through the USB cable

b) A warning for « the GPS Station »

- Check the connection of the GPS serial cable on the station
- Check the connection of the GPS coaxial cable on the GPS antenna
- Check that the LED is lighting

4.2 Switch ON the radiosonde

a) ‘the Busy frequency’ alert

All the preselected frequencies of the radiosounding are already used by other radiosondes or jammed by something else.

- If possible, switch off these radiosondes or any other origin of interference, then retry,
- If it is not possible to stop the interference, manually change the frequency: by clicking on « Sonde » → « Change the frequency ” » and select any available (interference-free) frequency
- The software detects the frequency change and moves to the next step

b) ‘the radiosonde not detected’ alert

According to additional information given by the message,

- Check that the radiosonde is powered On (Led is blinking)
- Check that the radiosonde is correctly positioned into the Ground-check
- Retry

Searching for a radiosonde

- If the radiosonde is powered OFF, switch it on
- If the radiosonde is detected by the system, it moves to the next step
- If not, the radiosonde may be transmitting in a different frequency than the receiver one (click on « Radio »)
- Press the “Scan” button on the radio screen to perform a scan of the bandwidth,
- A peak should indicate the current frequency of the radiosonde,
- If no peak appears, there is a possible problem with the radiosonde transmitter or on the receiver station.
 - ✓ Switch Off the radiosonde and try with a new radiosonde,
 - ✓ If the problem persists using several radiosondes, please refer to the “maintenance manual”.
- Double click on the peak to select the frequency,
- If the radiosonde is decoded by the system, the “->” button turns active. Click on it to move to the next step.

4.3 Radiosonde checking

a) A red icon in front of “Temperature sensor”

The temperature sensor is damaged.

- Switch off the faulty radiosonde
- Press « Change radiosonde »
- Choose a new radiosonde and start again

b) A red icon in front of ‘Humidity sensor’

The Humidity sensor is damaged.

- Switch off the faulty radiosonde
- Press « Change radiosonde »
- Choose a new radiosonde and start again

c) A red exclamation sign or a warning sign in front of « Batteries »

Memo: The Warning sign  means that: batteries are just good enough for a complete radiosounding

- Complete the preparation, as fast as possible
- Or
- You can save the batteries energy by switching OFF the radiosonde during the possible waiting time (balloon train preparation, ...)
- Once the balloon train is ready for launch, switch on the radiosonde and wait for GPS signal acquisition to release

Important: The red exclamation icon means that: batteries are too low for a complete radiosounding

- Replace the current batteries by new ones. Use only alkaline AA batteries
- Re-start the radiosonde.

d) No initialization of the GPS after few minutes into the Ground-check

- The Ground-check box shouldn't be placed close to a window (with direct view to outside).
- If no GPS initialization is achieved when the calibration is completed, remove the radiosonde from the Ground-check and put it outside in an open space (outside)
- Place the radiosonde vertically
- If after 3 minutes, the GPS cannot be initialized, the sonde is faulty
- Switch off the faulty radiosonde before starting the new one

e) « The Jamming » alert

Another radiosonde is transmitting on the same frequency and jams the radiosounding preparation.

- If possible, switch off the interfering radiosonde,
- Otherwise, change the frequency of the radiosonde. Click on « Sonde » —> « Change the frequency »
- Choose a new frequency.

4.4 Waiting for start

a) « the No GPS » alert

- Place the radiosonde vertically, in a clear area, near the launch area,
- Wait for a few seconds,

Radiosondes cannot receive GPS signal inside buildings except when they are placed into the Ground-check which is equipped with a GPS repeater. When the radiosonde is removed from the Ground-check, it may lose the GPS signal momentarily on the operator's way to the launch area.

Memo: Radiosonde needs approximately 20 seconds to receive GPS signal again.

b) « the Sonde OFF » alert

- Re-start the radiosonde,
- Wait for a few seconds for the receiver to detect it,
- « No GPS » is displayed while the radiosonde is acquiring GPS signal.

In order to save the energy of the battery, it might be useful to switch off the radiosonde during inflation and preparation of the balloon train.

4.5 Frequency change

a) « the Busy frequency » alert

The frequency is already used by another radiosonde.

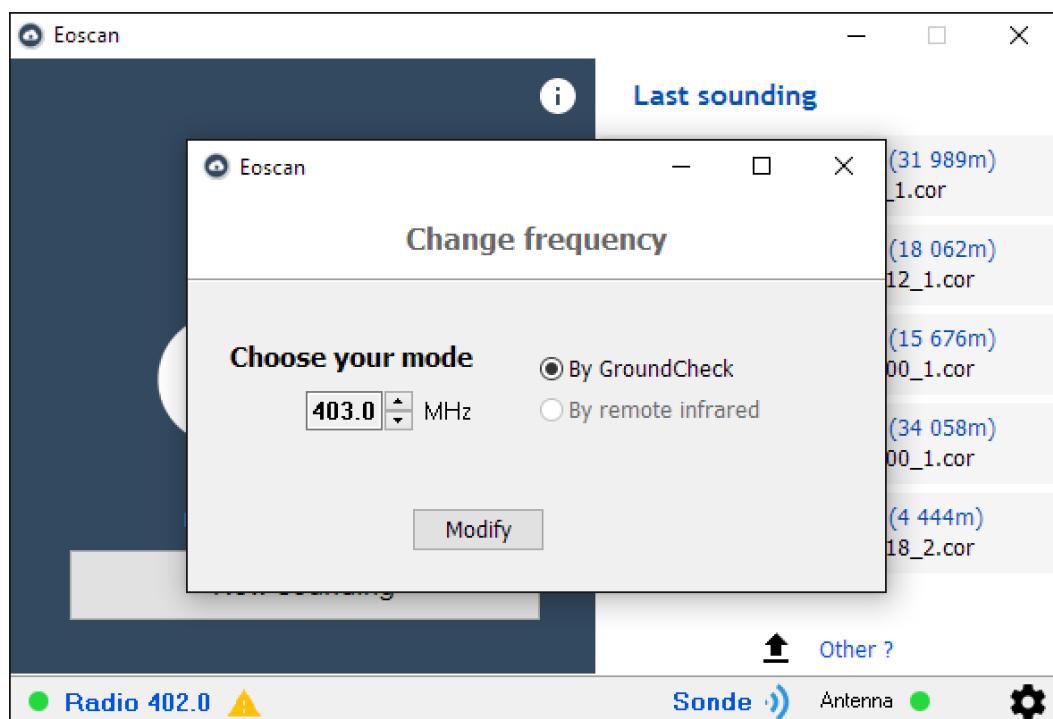
- If possible, stop the interfering radiosondes, then retry
- Otherwise, select another frequency
- Perform a scan of the bandwidth to choose an available frequency

b) « the Radiosonde not detected » alert

- If the radiosonde is OFF (green led is not flashing), switch it on
- Check that the radiosonde is correctly positioned into the Ground-check
- Perform a scan
- If no peak appears, the radiosonde is not transmitting
- Try with a new radiosonde

How to change the radiosonde frequency

Click on « Sonde » —> « Change radiosonde's frequency ». The screen below will appear:



On the left, the new frequency selector.

There are 2 ways to change the frequency of the radiosonde:

- With an infrared remote control (in option)
- With a GroundCheck

Changing frequency with GroundCheck or infrared remote

- Put the radiosonde in the Groundcheck or put the infrared remote control near the radiosonde
- Select the desired frequency then click on the 'Modify' button
- The software automatically changes the radiosonde and station frequency to the new one
- If the new frequency is already used by a radiosonde, the software refuses to change and warns the user

How to choose an unoccupied frequency?

The ‘Scan’ button allows a scan of frequencies from 400 to 406 MHz to make it easy for the user to select an unoccupied frequency.

Unoccupied frequencies have a low signal level indication. Occupied or jammed frequencies have a high signal level indication.

5. Radiosonde warranty & return process

5.1 Introduction

This chapter provides information about warranty and return process of faulty radiosondes.

5.2 Warranty

a) General conditions

Radiosondes declared faulty before launch and during warranty will be replaced or repaired after return to the factory.

- Radiosondes should be returned in good condition (including sensors, batteries...)
- Each radiosonde should be returned with its 'rejected radiosonde form' duly completed.
- Any inscription or note should not appear on the radiosonde itself
- Without any other agreement from MODEM, faulty radiosondes should be returned with the special packing (see §5.4)
- Please enter in contact with before organize the shipment of the faulty radiosondes

Will not be repaired or replaced, even under warranty, radiosondes with:

- Broken Sensor Boom
- Damaged box
- Missing batteries
- Missing or oxidized battery pack
- Oxidized electronic circuit

b) Storage conditions

Radiosondes must be stored in its original package, store in a dry and ventilated room with conditions below:

- Temperature between +5°C et +40°C
- Humidity under 85%

5.3 Return process

a) Rejected radiosonde form

Each radiosonde declared faulty should be returned with its 'rejected radiosonde form' duly completed:

REJECTED RADIOSONDE FORM TO BE JOINED WITH THE RETURNED RADIOSONDES

Customer	
Station	
Operator	
Date	



Radiosonde type.	<input type="checkbox"/> M10
	Serial number:

Meteorological condition at launch time	Surface PTU	T=
		U=

Reason of rejection:

<input type="checkbox"/> Not detected by the system	
<input type="checkbox"/> Temperature	T=
<input type="checkbox"/> Humidity	U=
<input type="checkbox"/> Radio transmitter	
<input type="checkbox"/> GPS *	Number of satellites : Satellites SNR levels : <input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
<input type="checkbox"/> Calibration	T: U :

Important: Reminder of the exchange conditions for rejected Radiosondes

Rejected radiosondes prior to launch will be exchanged or repaired after factory return along the following conditions:

- Each radiosonde should be returned with its “rejected radiosonde form” duly completed
- No inscription or note should appear on the radiosonde itself
- Radiosondes should be returned in good conditions including sensor boom, battery pack and batteries.
- Without any other agreement from MODEM, returned radiosondes should be assembled in Modem boxes (by parcels of 20 pieces for M10 radiosonde).

5.4 Packaging conditions

a) M10 radiosondes

Use the special packing, delivered into each parcel of radiosonde, for return process.

Warning: do not put any scotch on the sensor boom

Step n°1: Prepare the packing



Step n°2: Place the sonde into the packing



Step n°3: Place the sonde by two, head to tail



Step n°4:

While waiting for return to Modem office, please make sure radiosondes are stored, in a dry and ventilated room

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6. File organization system

Disque local (C:)			
Eoscan			
Eoscan.exe	22/08/2016 10:28	Application	7 456 Ko
libeay32.dll	03/11/2005 12:50	Extension de l'app...	1 040 Ko
ssleay32.dll	03/11/2005 12:50	Extension de l'app...	196 Ko
Transmission.exe	21/07/2016 11:56	Application	2 478 Ko
Eoscan.ini	05/08/2016 10:44	Paramètres de co...	3 Ko
Data			
2016			
DM20150101_1.BFH	02/09/2016 16:39	Fichier BFH	30 Ko
DM20150101_1.BFR	02/09/2016 16:39	Fichier BFR	1 Ko
DM20150101_1.BPH	02/09/2016 16:39	Fichier BPH	1 Ko
DM20150101_1.BPP	02/09/2016 16:39	Fichier BPP	1 Ko
DM20150101_1.CM	02/09/2016 16:39	Fichier CM	1 Ko
DM20150101_1.cor	02/09/2016 16:39	Fichier COR	205 Ko
DM20150101_1.CRA	02/09/2016 16:39	Fichier CRA	4 Ko
DM20150101_1.PPP	02/09/2016 16:39	Fichier PPP	1 Ko
DM20150101_1.PPS	02/09/2016 16:39	Fichier PPS	1 Ko
DM20150101_1.TTM	02/09/2016 16:39	Fichier TTM	1 Ko
DM20150101_1.TTS	02/09/2016 16:39	Fichier TTS	1 Ko
DM20150101_1.TTT	02/09/2016 16:39	Fichier TTT	1 Ko
DM20150101_1.cor	02/09/2016 16:39	Fichier COR	323 Ko
DM20150101_1.gps	02/09/2016 16:39	Fichier GPS	285 Ko
DM20150101_1.ref	02/09/2016 16:39	Fichier REF	1 Ko
Html			
Lgg			
Log			
USB_DRIVERS			

6.1 Files name

Stored files name: MOyyyymmddzz_index

- MO ground station code (2 characters). Visually the 2 first letters.
- yyyyymmddzz: year, month, day and hour

If you have multiple files at the same time, an index will be incremented.

6.2 Files type

Recorded files generated by Eoscan into the Eoscan\data\yyyy folder

- .gps : Binary file with all data of PTU, GPS, telemetry data and surface pressure
- .ref : Text file containing radiosounding parameters
- .cor : Text file containing GPS and PTU data of the radiosounding (one line per second).
- .ozo : Specific ozone sounding Text File.

Meteorological files generated by Eoscan into the Eoscan\data\yyyy folder

- .TTT : Temp file
- .TTS : Temp SHIP file
- .TTM : Temp MOBIL file

- .PPP : Pilot file
- .PPS : Pilot SHIP file
- .PPM : Pilot MOBIL file

- BFR : Bufr Temp file
- BFH : Bufr Temp high definition file
- BPP : Bufr Pilot file (pressure)

- CM : Stanag file

- .CRA : Aerological report

6.3 Software and associated files

- Eoscan.exe : Radiosounding software Eoscan
- Eoscan.ini : Eoscan config file
- Eoscan_fra.lgg : File containing the French translation of Eoscan software
- makeBufr.exe : Tool for generating bufr file
- Transmission.exe : Tool for the transmission of Pilot, Temp and Bufr messages

6.4 Description of the .cor file

- Temps : time in seconds from 00:00 of the day
- Altitude : geopotential altitude in meters from sea level
- Latitude : latitude of the sonde in radians from equator
- Longitude : longitude of the sonde in radians from Greenwich meridian
- VE : speed in m/s over west-east axis
- VN : speed in m/s over south – north axis
- VVert : vertical speed (ascent) in m/s
- VHor : wind speed in m/s
- VDir : wind direction in degrees from north
- DP : Dewpoint
- T : temperature with calibration correction and radiative effect
- U : relative humidity with calibration correction
- Press : pressure in hPa

7. Miscellaneous information about M10 GPS sonde

7.1 Data acquisition

a) Temperature

Temperature sensor consists in a thermistor chip wrapped into a glass ball. Its tiny size (0,9 x 2 mm) allows excellent response time around 1 sec. Temperature sensor is led on a layer processed against humidity and solar radiations.

Boom end undergoes a special vacuum metallization process reducing both solar and infrared radiation effects. Solar radiation correction is less than 1.5°C at 23 hPa

b) Humidity

Humidity sensor consists in a capacitor of which value is directly proportional to relative humidity. It is composed of 3 primary components:

- Basic layer as an electrode
- A dielectric of which characteristics vary along relative humidity
- A short response porous electrode as the second electrode of the capacitor

A protection reduces the risk of freezing during the ascent and prevents solar radiation effects.

c) Pressure

Pressure is calculated from GPS altitude, temperature and humidity according to a barometric equation (Laplace law)

d) GPS wind finding

3D GPS module provides the position of the radiosonde (latitude, longitude, and altitude) as well as speed components (North-South, East-West and Z). These data are correlated to time.

Position is calculated every second by triangulation method between 4 or more satellites. Velocity is not calculated from the difference between 2 positions but directly issued from Doppler.

On short time scales, velocity is more accurate than position when it becomes less accurate on large time scales.

Our system takes in account both measurement methods in order to provide the most accurate data

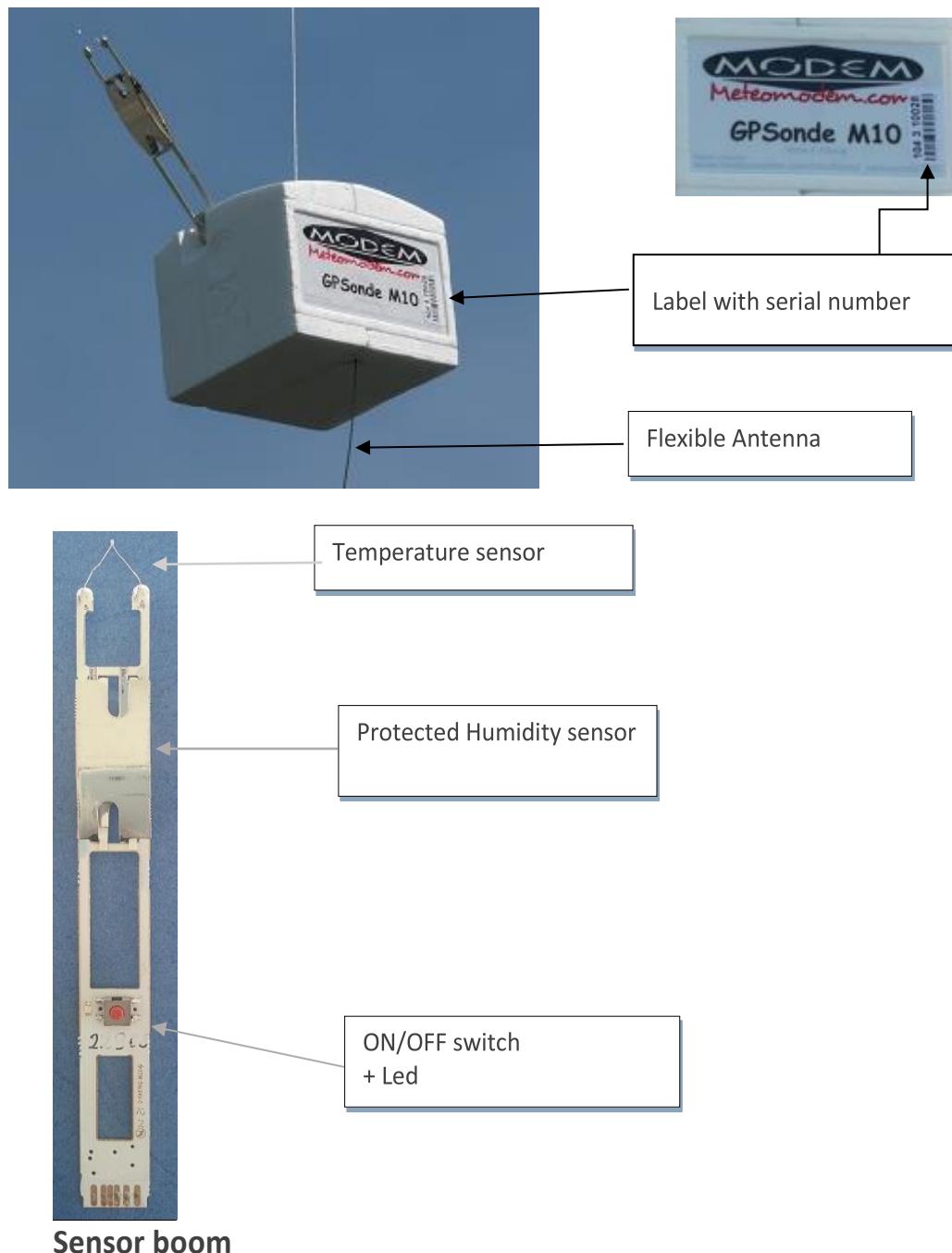
7.2 Description

a) Generality

M10 GPSonde is the latest generation of Modem's radiosondes

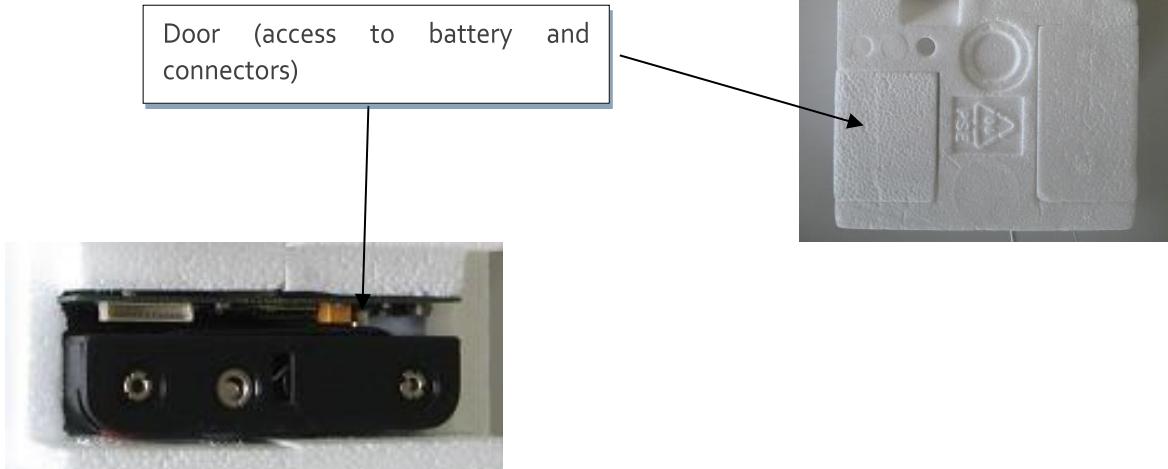
Among new features, development of enhanced performances of humidity measurement and protection against evaporation cooling effect represent the most significant improvements of the Modem's M10 radiosonde.

b) Detailed description



NB:

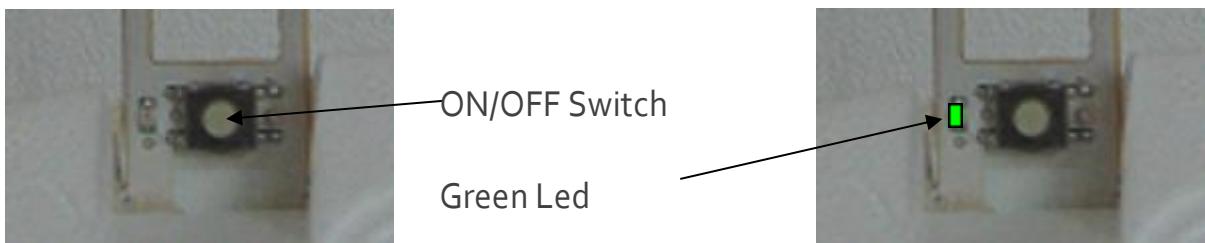
Boom end undergoes a special vacuum metallization process reducing both solar and infrared radiation effects at night and day



Inside view

Switch on the radiosonde:

- Press the ON/OFF switch during 5 pulses of the green Led
- Then release the switch.
- The radiosonde is ON when the Green Led is flashing.



Switch OFF the radiosonde

- Press on the ON/OFF switch. When the green Led turns fixed (approx.5 pulses)
- Release the switch.
- Radiosonde is OFF when the la led is switch off.

Operating cycle of the Led of MODEM radiosonde:

When the radiosonde is ON, the Led is flashing once to twice per second ■ :

- **1 flash/ second:** radiosonde is waiting for a GPS position. This means that the radiosonde must not be released immediately.
- **2 Flashes/ second:** GPS position is OK. The radiosonde can be released
- **1 flash each 3 seconds:** Radiosonde in standby mode.

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8. Coding clouds

When running Eoscan software, operator is requested to enter then ground meteorological conditions including clouds, Wind speed and direction, temperature and ground pressure data.

Among these parameters, cloud information is defined by a 5-digit code accordingly to WMO "Manual of codes" (Doc N° 306). Each digit represents one parameter specified hereafter and code with corresponding code table:

Digit	Definition		Code table
1 st	N _h	Amount of all C _L cloud present or, if no C _L cloud is present, the amount of all the C _M cloud present	2700
2 nd	C _L	Clouds of the genera Stratocumulus, Stratus, Cumulus and Cumulonimbus	0513
3 rd	h	Height above surface of the base of the lowest cloud seen	1600
4 th	C _M	Clouds of genera Altocumulus, Altostratus and Nimbostratus	0515
5 ^{eme}	C _H	Clouds of the genera Cirrus, Cirrocumulus and Cirrostratus	0509

Note: An extract WMO "Manual of codes" (Doc N° 306) is given hereafter for your information.

We invite you to report to the official document which is the only valid reference

2700

N Total cloud cover

N_h Amount of all the C_L cloud present or, if no C_L cloud is present, the amount of all the C_M cloud present

N_s Amount of individual cloud layer or mass whose genus is indicated by C

N' Amount of cloud whose base is below the level of the station

Code
figure

0	0	0
1	1 okta or less, but not zero	1/10 or less, but not zero
2	2 oktas	2/10 - 3/10
3	3 oktas	4/10
4	4 oktas	5/10
5	5 oktas	6/10
6	6 oktas	7/10 - 8/10
7	7 oktas or more, but not 8 oktas	9/10 or more, but not 10/10
8	8 oktas	10/10
9	Sky obscured by fog and/or other meteorological phenomena	
/	Cloud cover is indiscernible for reasons other than fog or other meteorological phenomena, or observation is not made	

Note : For use of (/), see Regulation 12.1.4.

C_L Clouds of the genera Stratocumulus, Stratus, Cumulus and Cumulonimbus

Code figure	Technical specifications	Code figure	Non-technical specifications
0	No C _L clouds	0	No Stratocumulus, Stratus, Cumulus or Cumulonimbus
1	Cumulus humilis or Cumulus fractus other than of bad weather,* or both	1	Cumulus with little vertical extent and seemingly flattened, or ragged Cumulus other than of bad weather,* or both
2	Cumulus mediocris or congestus, with or without Cumulus of species fractus or humilis or Stratocumulus, all having their bases at the same level	2	Cumulus of moderate or strong vertical extent, generally with protuberances in the form of domes or towers, either accompanied or not by other Cumulus or by Stratocumulus, all having their bases at the same level
3	Cumulonimbus calvus, with or without Cumulus, Stratocumulus or Stratus	3	Cumulonimbus the summits of which, at least partially, lack sharp outlines, but are neither clearly fibrous (cirriform) nor in the form of an anvil; Cumulus, Stratocumulus or Stratus may also be present
4	Stratocumulus cumulogenitus	4	Stratocumulus formed by the spreading out of Cumulus; Cumulus may also be present
5	Stratocumulus other than Stratocumulus cumulogenitus	5	Stratocumulus not resulting from the spreading out of Cumulus
6	Stratus nebulosus or Stratus fractus other than of bad weather,* or both	6	Stratus in a more or less continuous sheet or layer, or in ragged shreds, or both, but no Stratus fractus of bad weather*
7	Stratus fractus or Cumulus fractus of bad weather,* or both (pannus), usually below Altostratus or Nimbostratus	7	Stratus fractus of bad weather* or Cumulus fractus of bad weather,* or both (pannus), usually below Altostratus or Nimbostratus
8	Cumulus and Stratocumulus other than Stratocumulus cumulogenitus, with bases at different levels	8	Cumulus and Stratocumulus other than that formed from the spreading out of Cumulus; the base of the Cumulus is at a different level from that of the Stratocumulus
9	Cumulonimbus capillatus (often with an anvil), with or without Cumulonimbus calvus, Cumulus, Stratocumulus, Stratus or pannus	9	Cumulonimbus, the upper part of which is clearly fibrous (cirriform), often in the form of an anvil; either accompanied or not by Cumulonimbus without anvil or fibrous upper part, by Cumulus, Stratocumulus, Stratus or pannus
/	C _L clouds invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena	/	Stratocumulus, Stratus, Cumulus and Cumulonimbus invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena

* "Bad weather" denotes the conditions which generally exist during precipitation and a short time before and after.

1600

h Height above surface of the base of the lowest cloud seen

Code
figure

0	0 to	50 m
1	50 to	100 m
2	100 to	200 m
3	200 to	300 m
4	300 to	600 m
5	600 to	1000 m
6	1000 to	1500 m
7	1500 to	2000 m
8	2000 to	2500 m
9	2500 m or more, or no clouds	

/ Height of base of cloud not known or base of clouds at a level lower and tops at a level higher than that of the station

Notes:

- (1) A height exactly equal to one of the values at the ends of the ranges shall be coded in the higher range, e.g. a height of 600 m shall be reported by code figure 5.
- (2) Due to the limitation in range of the cloud-sensing equipment used by an automatic station, the code figures reported for h could have one of the three following meanings:
 - (a) The actual height of the base of the cloud is within the range indicated by the code figure; or
 - (b) The height of the base of the cloud is greater than the range indicated by the code figure but cannot be determined due to instrumental limitations; or
 - (c) There are no clouds vertically above the station.

C_M Clouds of the genera Altocumulus, Altostratus and Nimbostratus

Code figure	Technical specifications	Code figure	Non-technical specifications
0	No C _M clouds	0	No Altocumulus, Altostratus or Nimbostratus
1	Altostratus translucidus	1	Altostratus, the greater part of which is semi-transparent; through this part the sun or moon may be weakly visible, as through ground glass
2	Altostratus opacus or Nimbostratus	2	Altostratus, the greater part of which is sufficiently dense to hide the sun or moon, or Nimbostratus
3	Altocumulus translucidus at a single level	3	Altocumulus, the greater part of which is semi-transparent; the various elements of the cloud change only slowly and are all at a single level
4	Patches (often lenticular) of Altocumulus translucidus, continually changing and occurring at one or more levels	4	Patches (often in the form of almonds or fish) of Altocumulus, the greater part of which is semi-transparent; the clouds occur at one or more levels and the elements are continually changing in appearance
5	Altocumulus translucidus in bands, or one or more layers of Altocumulus translucidus or opacus, progressively invading the sky; these Altocumulus clouds generally thicken as a whole	5	Semi-transparent Altocumulus in bands, or Altocumulus, in one or more fairly continuous layer (semi-transparent or opaque), progressively invading the sky; these Altocumulus clouds generally thicken as a whole
6	Altocumulus cumulogenitus (or cumulonimbogenitus)	6	Altocumulus resulting from the spreading out of Cumulus (or Cumulonimbus)
7	Altocumulus translucidus or opacus in two or more layers, or Altocumulus opacus in a single layer, not progressively invading the sky, or Altocumulus with Altostratus or Nimbostratus	7	Altocumulus in two or more layers, usually opaque in places, and not progressively invading the sky; or opaque layer of Altocumulus, not progressively invading the sky; or Altocumulus together with Altostratus or Nimbostratus
8	Altocumulus castellanus or floccus	8	Altocumulus with sproutings in the form of small towers or battlements, or Altocumulus having the appearance of cumuliform tufts
9	Altocumulus of a chaotic sky, generally at several levels	9	Altocumulus of a chaotic sky, generally at several levels
/	C _M clouds invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena, or because of continuous layer of lower clouds	/	Altocumulus, Altostratus and Nimbostratus invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena, or more often because of the presence of a continuous layer of lower clouds

C_H Clouds of the genera Cirrus, Cirrocumulus and Cirrostratus

Code figure	Technical specifications	Code figure	Non-technical specifications
0	No C _H clouds	0	No Cirrus, Cirrocumulus or Cirrostratus
1	Cirrus fibratus, sometimes uncinus, not progressively invading the sky	1	Cirrus in the form of filaments, strands or hooks, not progressively invading the sky
2	Cirrus spissatus, in patches or entangled sheaves, which usually do not increase and sometimes seem to be the remains of the upper part of a Cumulonimbus; or Cirrus castellanus or floccus	2	Dense Cirrus, in patches or entangled sheaves, which usually do not increase and sometimes seem to be the remains of the upper part of a Cumulonimbus; or Cirrus with sproutings in the form of small turrets or battlements, or Cirrus having the appearance of cumuliform tufts
3	Cirrus spissatus cumulonimbogenitus	3	Dense Cirrus, often in the form of an anvil, being the remains of the upper parts of Cumulonimbus
4	Cirrus uncinus or fibratus, or both, progressively invading the sky; they generally thicken as a whole	4	Cirrus in the form of hooks or of filaments, or both, progressively invading the sky; they generally become denser as a whole
5	Cirrus (often in bands) and Cirrostratus, or Cirrostratus alone, progressively invading the sky; they generally thicken as a whole, but the continuous veil does not reach 45 degrees above the horizon	5	Cirrus (often in bands converging towards one point or two opposite points of the horizon) and Cirrostratus, or Cirrostratus alone; in either case, they are progressively invading the sky, and generally growing denser as a whole, but the continuous veil does not reach 45 degrees above the horizon
6	Cirrus (often in bands) and Cirrostratus, or Cirrostratus alone, progressively invading the sky; they generally thicken as a whole; the continuous veil extends more than 45 degrees above the horizon, without the sky being totally covered	6	Cirrus (often in bands converging towards one point or two opposite points of the horizon) and Cirrostratus, or Cirrostratus alone; in either case, they are progressively invading the sky, and generally growing denser as a whole; the continuous veil extends more than 45 degrees above the horizon, without the sky being totally covered
7	Cirrostratus covering the whole sky	7	Veil of Cirrostratus covering the celestial dome
8	Cirrostratus not progressively invading the sky and not entirely covering it	8	Cirrostratus not progressively invading the sky and not completely covering the celestial dome
9	Cirrocumulus alone, or Cirrocumulus predominant among the C _H clouds	9	Cirrocumulus alone, or Cirrocumulus accompanied by Cirrus or Cirrostratus, or both, but Cirrocumulus is predominant
/	C _H clouds invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena, or because of a continuous layer of lower clouds	/	Cirrus, Cirrocumulus and Cirrostratus invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena, or more often because of the presence of a continuous layer of lower clouds

9. Record of revisions

Nº	Date	Brief purpose of revision	Writing	Probate
1.0	08/06/16	Update	B.C	I.F
1.1	01/07/16	Update screen	B.C	I.F
1.2	02/09/16	Software update	B.C	I.F
1.2. a	20/09/16	Software update	B.C	I.F



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