Better detection . Better mobility

data collection

TMS-SA4 – USER GUIDE

TMS-SA: above ground and portable traffic counter

User guide Version 2.0

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III. PRECAUTIONS FOR USE

This document is intended to help you to install and use the TMS-SA radar in an appropriate and safe manner. It is therefore essential that you read it carefully before using the equipment. This manual contains important instructions that will help you to avoid dangers and extend the life of your equipment and its accessories.

Closely follow the instructions in this manual to avoid danger to yourself and third parties as well as damage to the equipment.

Please contact your dealer for any questions that this manual does not answer.

1. USE OF THE TMS-SA

The TMS-SA is intended solely for the collection of traffic data (detection of vehicles for counting, classification and speed measurement). Do not use the TMS-SA for any other purpose or in an inappropriate manner.

2. IDENTIFICATION OF THE EQUIPMENT

The ultra-high frequency TMS-SA radar is equipped with a label bearing the serial number. Do not remove this label. You will be asked for this number for any after-sales or support activity. Please be prepared to quote this number when communicating with after-sales service.

3. SAFETY INSTRUCTIONS

- Before installation and first operation, please observe the instructions in this manual. The manual must be available at all times.
- Ensure that no liquid enters the equipment.
- If you notice any deterioration of any kind (damaged or stripped cable, damaged connector ...), disconnect the equipment and contact your supplier.
- Any malfunction of the equipment that reduces the safety of the users or third parties must be rectified immediately. Ensure that the identification labels and/or safety labels are complete and legible.
- The guarantee does not cover damage resulting from improper use. The manufacturer cannot be held responsible for damage caused by improper use of the equipment.
- The equipment cannot be used as a safety component in the sense of European Directive 98/37/EC ("Machinery Directive").
- The user of the equipment must ensure that the operating mode chosen does not cause any damage to material or third parties and that all safety measures and equipment are in place and functioning.
- No modification, whether mechanical or electrical, can be made without the permission of the manufacturer. Use only original parts and accessories, failure to do so can void the guarantee.
- During installation, be careful when using a ladder for securing the support on the post or the radar on its support. Check the stability of the ground before using any means for reaching the desired height of the installation.
- We recommend the use of a padlock for securing the radar on its support.

4. PACKAGING

The radar packaging has been designed and developed specifically for the TMS-SA in order to give it the best possible protection during transportation.

Please retain the packaging box for any return to the manufacturer. The guarantee only applies for radars sent in their original box.

A replacement box can be obtained from the manufacturer for a price of 20 EUR, plus shipping charges.

5. SAFETY PRECAUTIONS DURING USE

This equipment contains electronic components that require precautions to be taken for transportation and installation. Observe the following recommendations during use and storage:

- Do not apply any stickers to the front of the equipment (cover). This could interfere with the operation of the radar.
- Avoid shocks during transportation and handling.
- Never use cables, power supplies, chargers or other accessories other than those supplied with the equipment, failure to do so can void the guarantee.
- During storage, do not place any other materials on top of the equipment.
- In order to preserve the battery, do not store the equipment at a temperature lower than –10° C. If the temperature falls below this limit, leave the radar on permanent charge.
- To ensure the life of your batteries, make sure that they are not left longer than 60 days without charging. **Do not store the TMS-SA with discharged batteries.**
- **A defective battery may emit gas that is potentially explosive.**
    - **Charge you battery in an open environment:**
        - If your radar **has** an external connector on the housing: remove the safety screws and **open the top** while charging the batteries;
        - If your radar **hasn't** any external connector on the housing: remove the safety screws. You can then **open the top** and connect the charger to the battery pack. Leave the top open while charging the batteries;

          In both cases, **do not touch the antenna**: it is an Electrostatic-Sensitive Device;

        - Once your batteries are charged, close the top carefully:
            - do not touch the wiring;
            - fasten the safety screws without force.
    - **Check regularly your batteries:** inflated battery, white deposit on the connector plates, acid or gel leak, warm battery during the charging process, … are signs which

must alert the user on a potential default of the battery. If one of these phenomena occurs, replace your batteries.

- **Replace your batteries every 3 years.**

6. WARRANTY

The warranty, with a duration of 2 (two) years from the date of delivery, covers manufacturing defects and defective components, within the context of normal usage of the equipment. It does not cover the battery (6 months guarantee), vandalism, scratches or other damage resulting from normal use of the equipment. In order to maintain your rights under this guarantee, please follow scrupulously the instructions given in this manual.

IV. INTRODUCTION

1. CONCEPT

The TMS-SA is a compact, self-contained and portable traffic counter.
The battery, memory and sensor are contained in a single housing;

- It is installed alongside the road;
- It is discrete;
- It is not in direct contact with passing vehicles;
- It is silent
- The technology used makes the equipment impermeable to cold, heat, mist, surrounding pollution, variations in light, humidity, etc. Note however very heavy rainfall (sudden shower or flurry, combined with gusts of wind during a storm for example) can create false detections (parasitic measurements) in the receding direction (measurement of vehicles moving away). The Icoms Software automatically detects the false detections due to rain. It is then up to the user to decide to filter out the data to erase the undesirable measures. The function of this filter is explained further in this document, p. 23

2. FUNCTIONS

The equipment enables the counting of vehicles, speed measurement and classification of vehicles according to length, with a record of the date and time of passing of each vehicle. It saves the measured data for each vehicle.
The software supplied with the equipment enables a precise and complete analysis of the data.

3. TECHNOLOGY

This is a Doppler effect radar, using the same technology as enforcement radars.

V. PREFACE

The TMS-SA communicates with a PC via a Bluetooth® link. Before configuring your TMS-SA, it is necessary to install the Icoms Detections software (IcomSoft TMS-SA) and, if not already installed on your PC, the driver for the Bluetooth transmitter/receiver (dongle).

1. MINIMUM REQUIRED CONFIGURATION

- Operating system (OS): Windows 7 or later
- Configuration:
  - Disk space: 1 GB minimum
  - RAM memory: 1 GB
  - Processor min 1.5 GHz
  - Bluetooth 2.0 class 1 (100 m)

The use of Bluetooth equipment of a level earlier than 2.0 is strongly advised against, it may not provide the required data throughput needed for good communication with the radar. Furthermore, if there are nearby devices operating in the same frequency range such as internet routers, or other Wifi devices or GSM, Bluetooth version 1.1 manages the frequency plans very badly. Class 2 is equally strongly advised against (various pre-installed internal Bluetooth) in areas with interference (see also below, Bluetooth connection with the PC, Notes).

2. INSTALLATION OF THE ICOMSOFT TMS-SA

1. Close any running applications.
2. Place the USB key in the USB slot, navigate to 6_IcomSoft\TMS-SA\Windows\ and execute IcomSoft-TMS-SA-setup-x.y.z.exe (x.y.z refers to the version of the IcomSoft TMS-SA supplied by your distributor).
3. If you have downloaded the software via a website, double-click the ".exe" file to start the installation process.
4. Follow the instructions.
5. Your reseller will provide you with the password for installation of the software.
6. Accept the licence terms.
7. Start the program by clicking on the desktop icon.

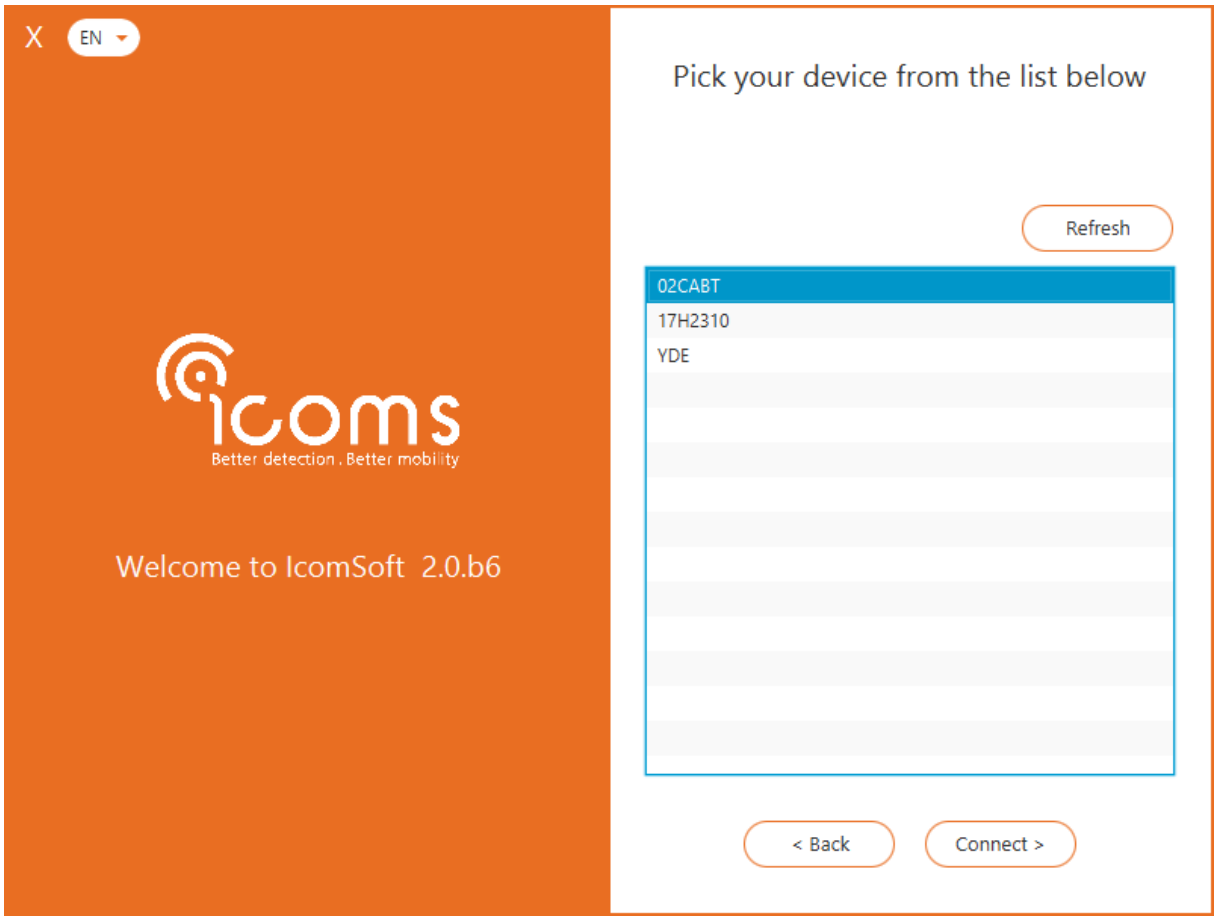
3. CONNECT TO RADAR OR READ AN EXISTING FILE

Once the software is launched, the user will have two options. Select the option that applies and the following steps

- Connect to a radar by clicking “Connect”
  - “Connect to a device” to connect to the device and configure it using RS-232 or Bluetooth and follow the steps on the screen. For Bluetooth connection details, please see section 4 Bluetooth connection with the PC.
  - “Visualize data” to download the data from the device and visualize the statistics
- Read a data file by clicking “Read file” and choose the file to be read for data analysis

4. BLUETOOTH CONNECTION WITH THE PC

1. If your PC does not have an embedded Bluetooth device, insert a USB Bluetooth device or “dongle” and follow the installation instructions.
2. Launch IcomSoft TMS-SA and choose “Connect” followed by “Connect to a device” and then “Connect via Bluetooth”. The software will search for Bluetooth devices and display the available Bluetooth devices on the screen. Choose the device to connect to and click “Connect” as shown in Screenshot 1.
3. If a pairing password is requested, please get the pairing password from your distributor
4. Follow the instructions



Screenshot 1: Connecting to a Bluetooth device

VI. INSTALLATION AND CONFIGURATION

The radar installation sequence is as follows:

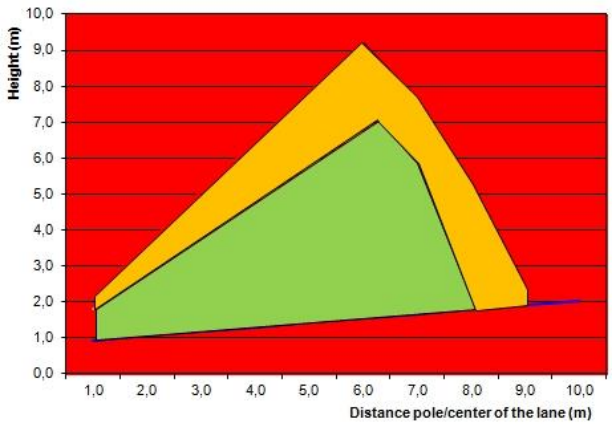
1. Choose the installation site;
2. Mount the support;
3. Place the radar on its support;
4. Connect the PC to the radar;
5. Send the configuration parameters;
6. Check the accuracy of the data.

An incorrect installation can change the precision on the data. See p. 36 for more information about the influence of the installation of the accuracy of the data.

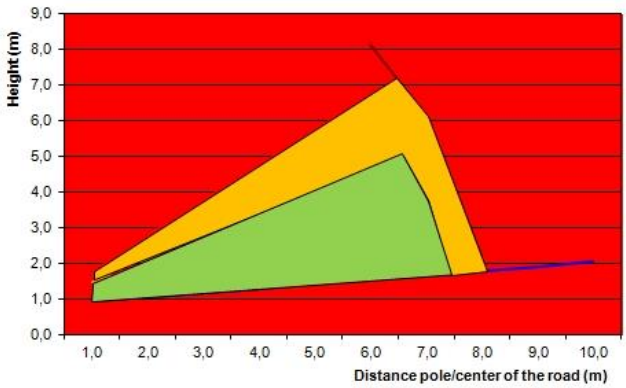
The best results are obtained with the following conditions:

- measure on a single traffic lane in only one direction. Please remember that very heavy rainfall (sudden shower or flurry, combined with gusts of wind during a storm for example) can create false detections (parasitic measurements) in the receding direction (measurement of vehicles moving away).
- mounting pole perpendicular to the road (a deviation in the post of 6 degrees can create a speed measurement error of 5 %. The software allows the road gradient or slope to be corrected for, see p. 16),
- measure outside braking, acceleration and congestion zones.

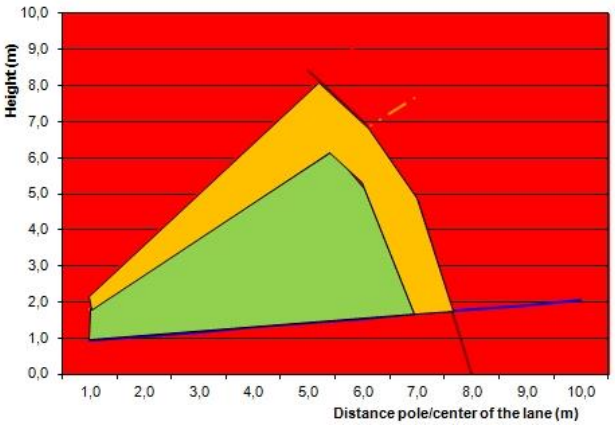
The green areas in the following diagrams indicate the best installation height and road distance combinations. It is possible to operate outside the zones concerned, but the measurements will be less accurate. This colour code also appears in the software during the selection of the installation parameters. We show hereunder the graphs related respectively to versions 8.56 and 8.60 (TMS-SA3B) and versions 8.80 and 8.90 (TMS-SA4). The versions 8.60 and 8.90 were released from December 11, 2012.



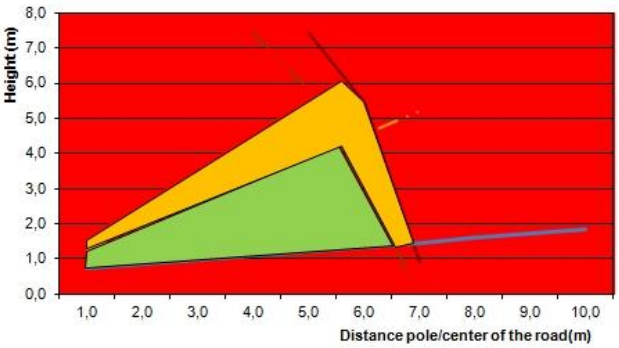
Graph 1: vers. 8.56 & 8.80, one direction



Graph 2: vers. 8.56 & 8.80, both directions



Graph 3: vers. 8.60 & 8.90, one direction



Graph 4: vers. 8.60 & 8.90, both directions

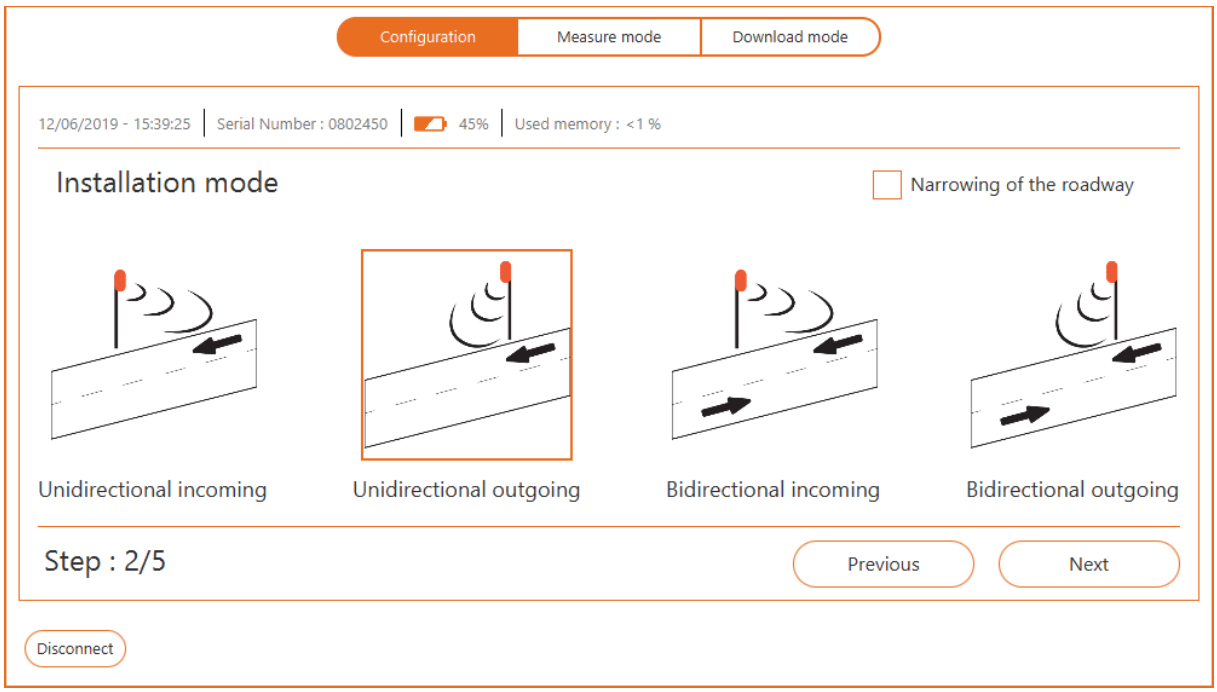
Example :

- For measurements in one direction, if the distance between the pole and the centre of the lane is 4 m, the recommended height is between 1.5 and 4.5 m.
- For measurements in both directions, if the distance between the pole and the centre of the road is 5 m, the recommended height is between 1.5 and 4 m.

1. PHYSICAL INSTALLATION OF THE RADAR

a. Choose the direction according to the detection direction

The equipment can measure vehicles that are moving towards or away from the radar. It is therefore possible to install the equipment behind a road sign (more discrete). The various possibilities are depicted in Screenshot 2 as shown in the IcomSoft:



Screenshot 2: Position of the radar and detection direction

Two important elements must be considered when choosing the installation site: the distance between the post and the centre of the traffic lane (or the separation between the lanes for bidirectional measurements, see Figure 1) and the height of the radar installation.

In general, the distance cannot be changed, it depends on the post or mast, which are often fixed.

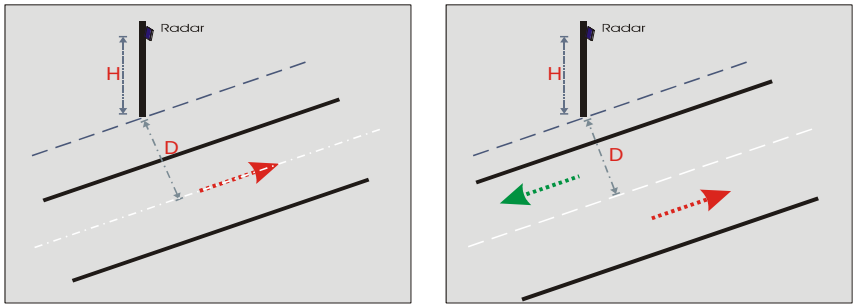


Figure 1: distance to the axis, unidirectional - bidirectional

The height is measured between the roadway and the base of the radar (bottom edge of the housing). It is chosen as a function of the distance, as indicated on page 11.

b. Positioning the mounting bracket

The movable bracket is mounted on a signpost or other vertical support.

Ensure that the support plate is well parallel to the road thanks to the alignment tool supplied with the equipment (for easily aligning the bracket). The spirit level enables you to check that post is vertical/parallel to the ground.

Figure 2: alignment tool

Place the viewfinder on the bracket and measure the distance between the post and the road. Record the same distance 15 m further away and place an object (a traffic cone with a marker, for example) that allows you to sight parallel to the road. Once the object is aligned in the viewfinder, firmly secure the bracket to the post and check the alignment again to make sure the bracket has not moved while it was being secured.

Figure 3: mounting bracket

Once the movable bracket has been mounted, the radar can be installed as shown in Figure 4 and Figure 5 :

Figure 4: pole bracket + rear bracket

Figure 5: radar installed on the pole bracket

c. The angles

2 angles determine the installation and accuracy of the measurements:

Horizontal (β, with reference to the vehicle movement axis): **ALWAYS 45°**, where the base of the radar is aligned with a point situated halfway between the parallel and perpendicular axis of the road. Position the mounting foot in parallel with the vehicle movement, as indicated above. When you position the radar on the bracket, it will be automatically positioned at 45° (see Figure 4 and Figure 5).

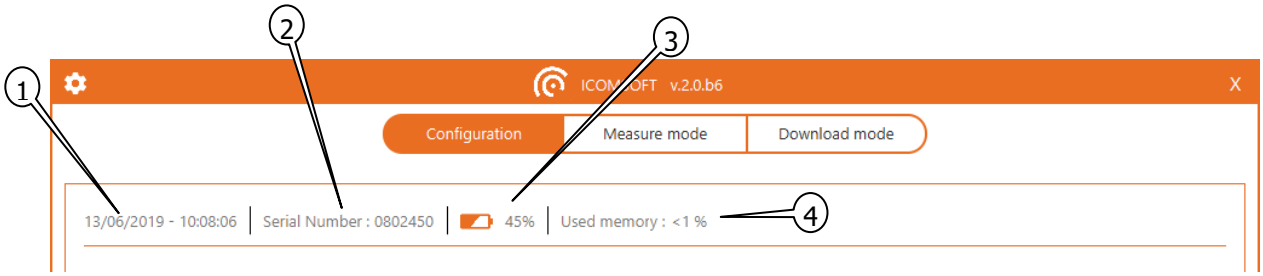
Vertical (ϕ): determined by the software according to the height of the installation and the distance to the vehicle movement axis. This angle will be adjusted automatically after you have sent the installation parameters to the radar and it has switched to "measurement" mode. The software makes it possible to fine tune this angle according to the slope of the road and/or the inclination of the post.

2. CONFIGURING THE RADAR

Launch the IcomSoft TMS-SA software and go through the following steps:

1. Choose “Connect” followed by “Connect to a device” and then “Connect via Bluetooth”. The software will search for Bluetooth devices and display the available Bluetooth devices on the screen.
2. Choose the device to connect to and click “Connect” as shown in **Erreur ! Source du renvoi introuvable.**.
3. Follow the instructions given by the assistant.

a. Step 0/5: basic parameters

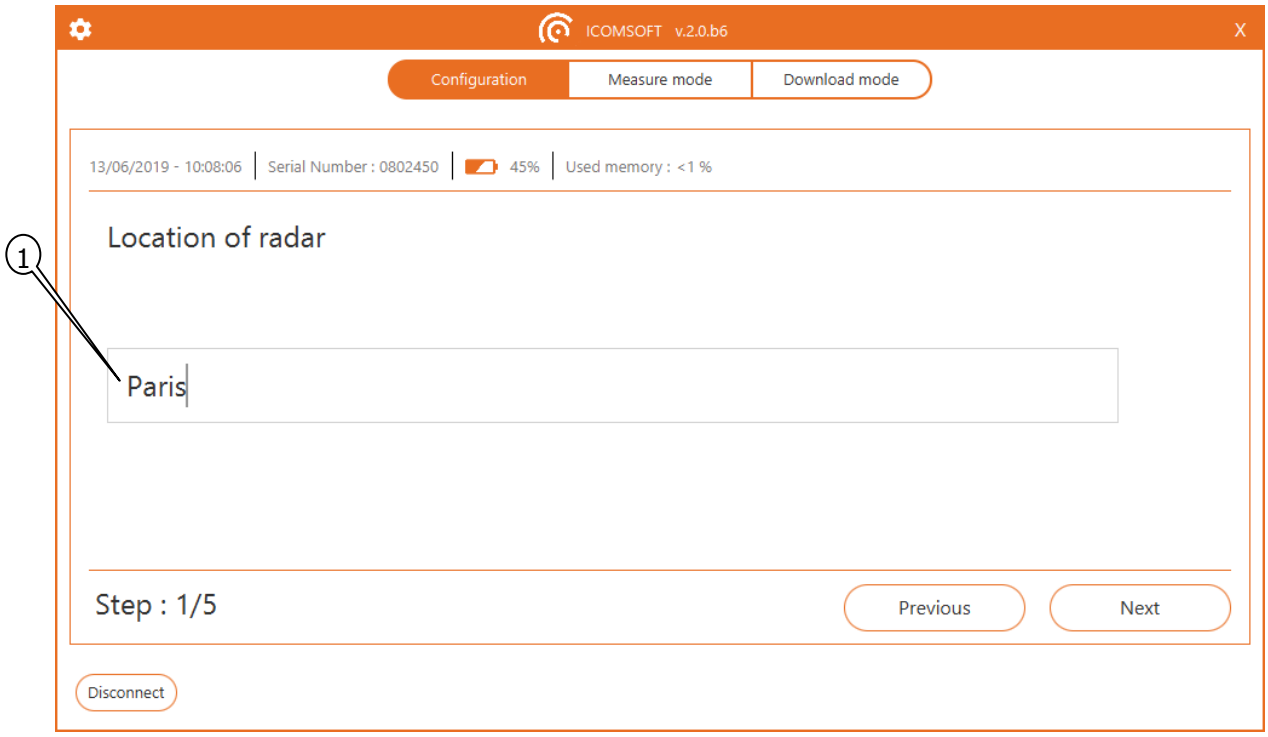


Screenshot 3: radar parameters/basic parameters

Indications:
①: Radar date and time
②: Serial number
③: battery charge level (measurements are impossible below 5.5 V, also see page 32)

④: percentage memory occupied by measurement data (100 % = 250 000 or 1 000 000 vehicles, according to version)

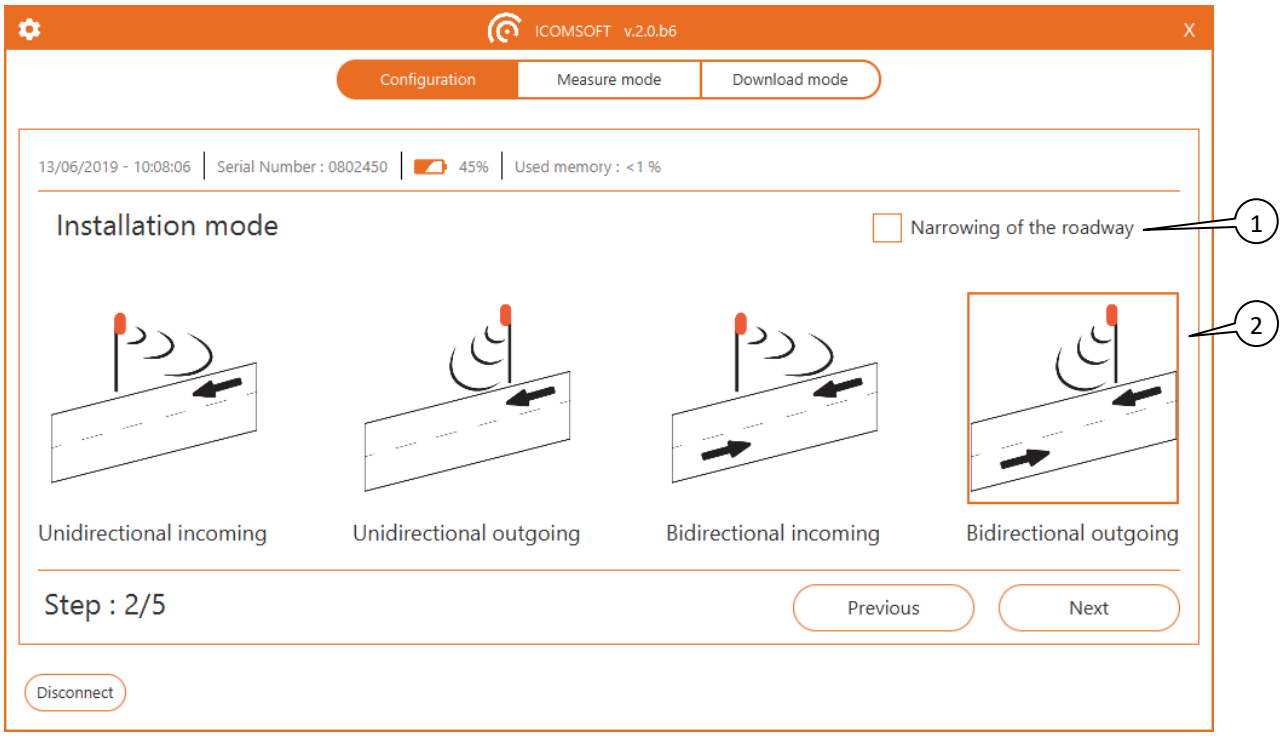
b. Step 1/5: Radar location



Screenshot 4: radar location

①: Key in the radar location in the field. You can key in up to 64 characters that can be used, for example, to indicate the road name and direction details.

c. Step 2/5: Installation mode



Screenshot 5: installation mode

①: When measuring on a narrow road, where traffic moves in alternate directions on one and the same traffic lane (roadworks with temporary traffic lights, residential area with a chicane, single lane bridge …), use the indicated checkbox.
②: detection direction (detection of vehicles that are moving towards and/or moving away from the radar, in 1 or 2 directions, see p. 12, as well as the note below).

Bidirectional measurements – Important note

The TMS-SA enables, in certain traffic conditions, measurements to be made on **two lanes in opposite directions**. This is only possible in the following **conditions**:

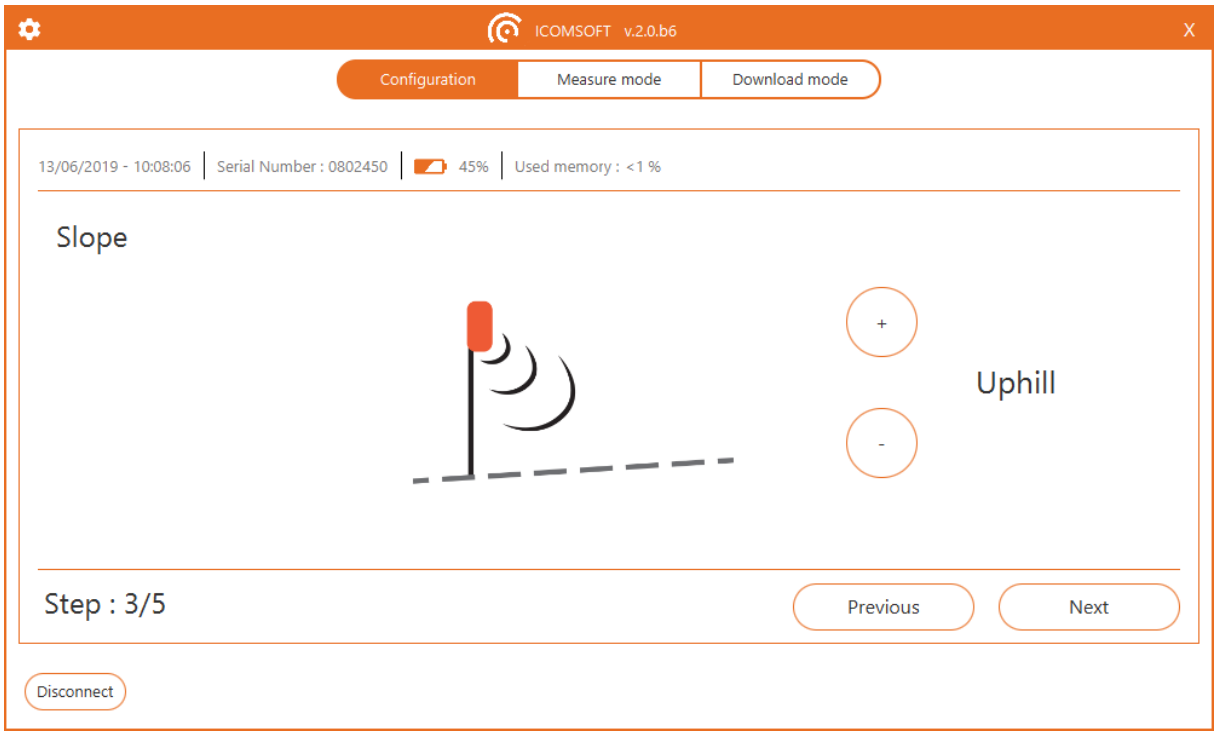
- ✓ light traffic flow,
- ✓ distance between the post and the centre of the road between 2 and 9 m,
- ✓ the direction moving away must be closest to the radar

In bidirectional mode, the accuracy of the counting and classification of the measurements decreases. If two vehicles cross in the radar detection lobe, the latter can validate:
- the measurements of the two vehicles,
- the measurement of one of the two vehicles,
- none of the measurements,
- a measurement whose length is the sum of the two lengths measured.

It is impossible to predict the behaviour of the radar.

Please remind that very heavy rainfall (sudden shower or flurry, combined with gusts of wind during a storm for example) can create false detections (parasitic measurements) in the receding direction (measurement of vehicles moving away). For further information, see p. 8 and 23.

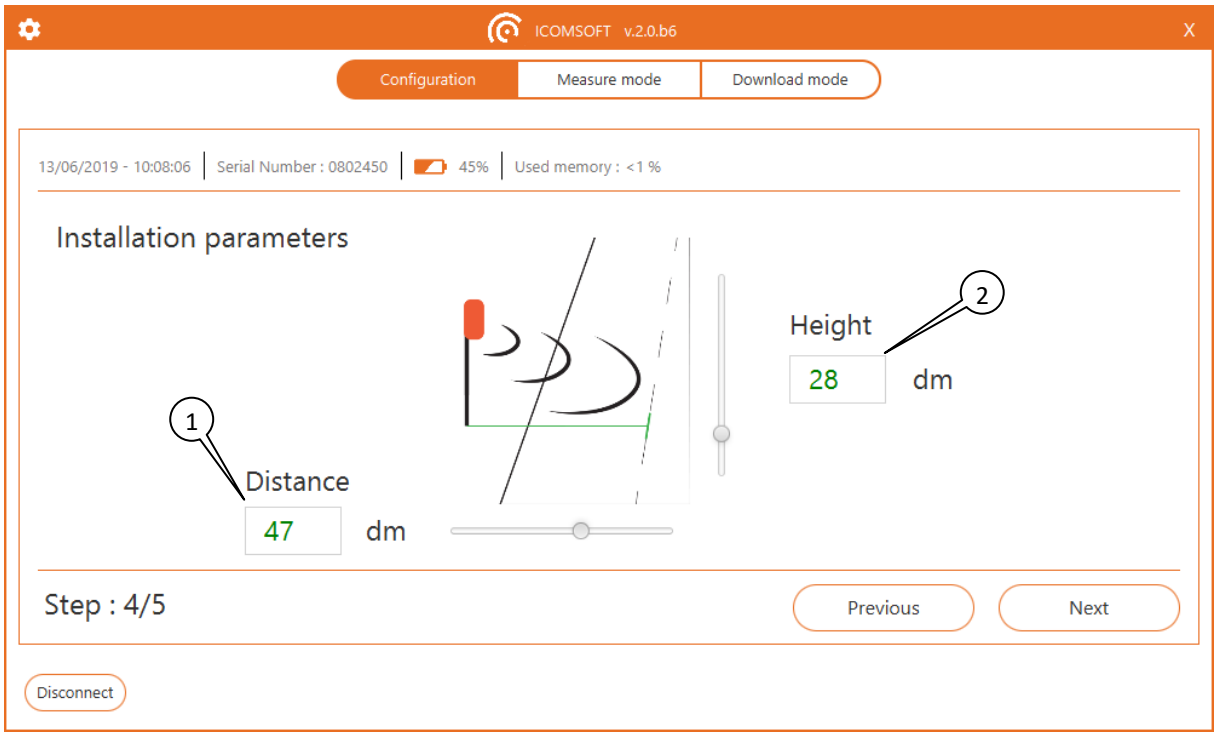
d. Step 3/5: Slope



Screenshot 6: Slope

Use the + and – sign to choose the slope of the road, i.e. flat, uphill or downhill.

e. Step 4/5: Radar installation parameters



Screenshot 7: Installation parameters

①: Key in the distance between the mounting mast and the centre of the vehicle movements. For bidirectional measurements, this is the distance between the mounting mast and the centre of the road (see above, Figure 1).
②: Key in the height of the installation of the radar

Using this information, the software calculates the angle of inclination and the measurement range. The software sends the inclination information to the antenna, which is adjusted automatically.

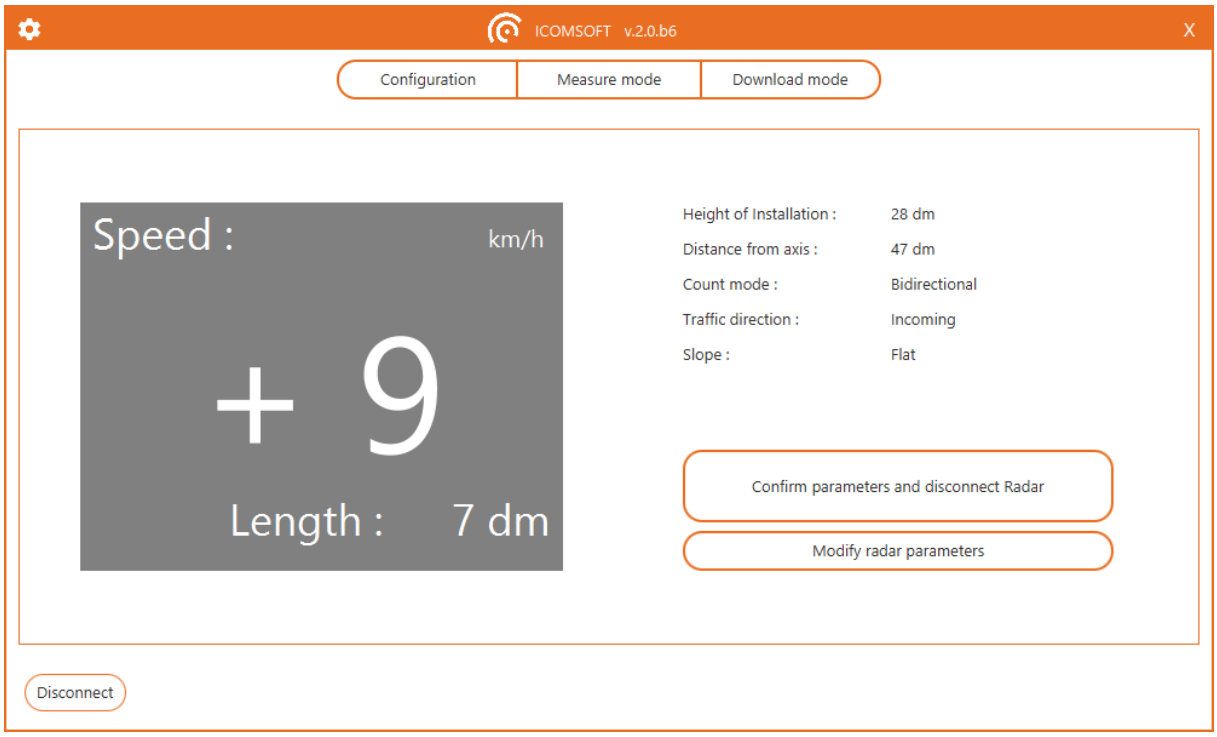
The calculation of the vertical angle is based on an angle of 90° between the mast and the road. If the post is leaning or the road is inclined, use the "road inclination" function as shown in the "Step 3/5: Slope" section (see p. 17).

f. Step 5/5: Summary

Review the radar configuration parameters and click on "Send to radar" to configure the radar.

VII. MEASUREMENT

Once the radar has been installed and configured, the software allows you to switch to "measurement" mode and the software displays the data related to the measured vehicles as they pass:



Screenshot 8: "live" speed display (measurement mode)

For the direction of movement in bidirectional mode, the " - " indicates movement away (the lane closest to the radar), the " + " indicates movement towards the radar.

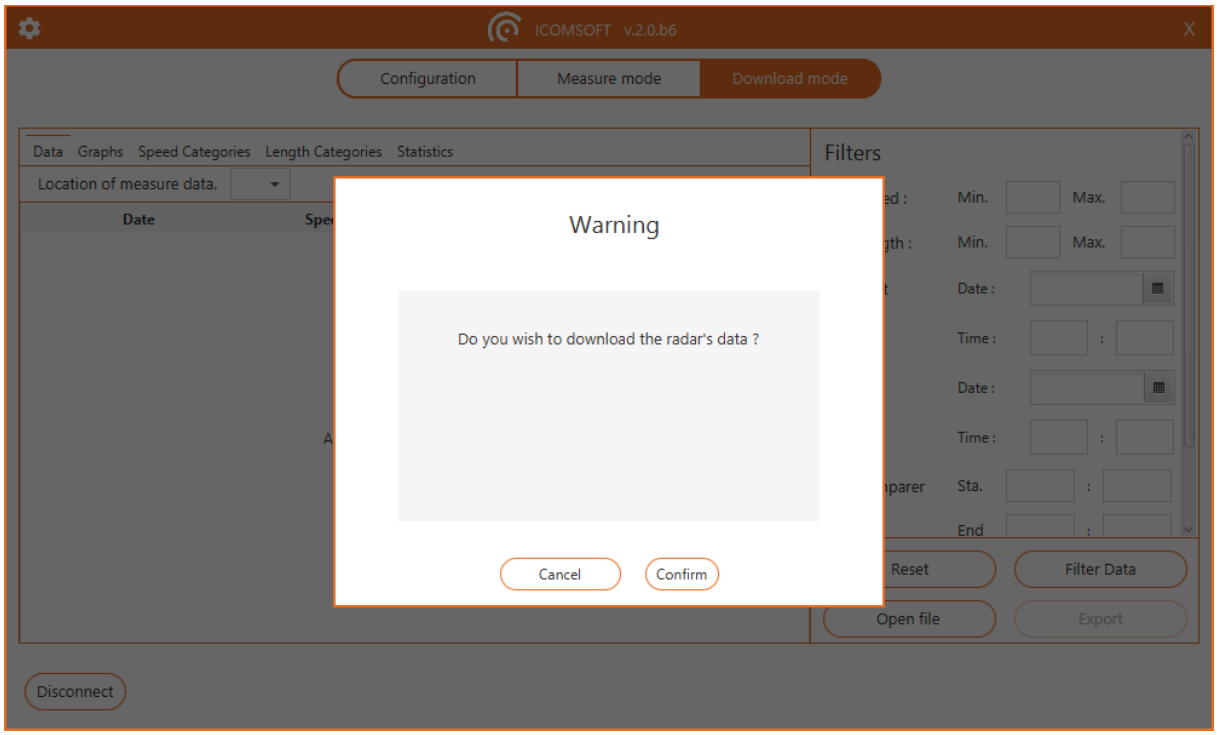
Check that the lengths are correct. A private car should be measured between 3 and 5.5 m, a truck should be longer than 6 m. Some differences can appear, mainly due to the slope of the road and/or the fact that the installation mast is not vertical. It is possible to adjust the inclination of the antenna to the installation conditions by clicking on “Modify radar parameters”.

Note

In order to verify the accuracy of the length measurement, we recommend you to carry out the configuration and commissioning on site with a laptop computer or a smartphone. However, if you do not have the required equipment, the configuration can always be done in advance. The commissioning then consists solely of pressing the power pushbutton. The radar will switch to measurement mode automatically after approximately five minutes. The counting can be checked using the indicator lamp. Verification of the accuracy of the speed and length measurements can only be done with a laptop computer or an Android smartphone with the TMS-SA App installed.

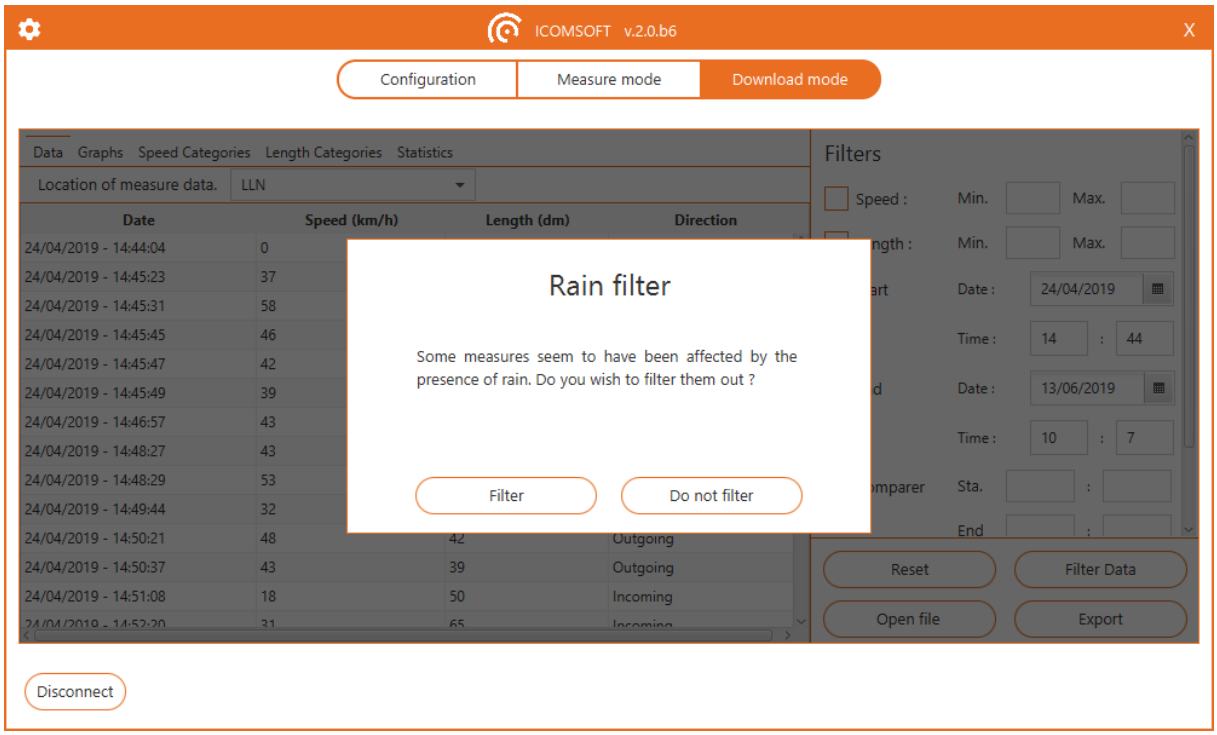
VIII. DOWNLOADING DATA

Once the series of measurements has been completed, the data can be transferred to the PC. To do this, click the "Download mode" button and proceed as suggested by the Assistant.



Screenshot 9: Confirm to download the data

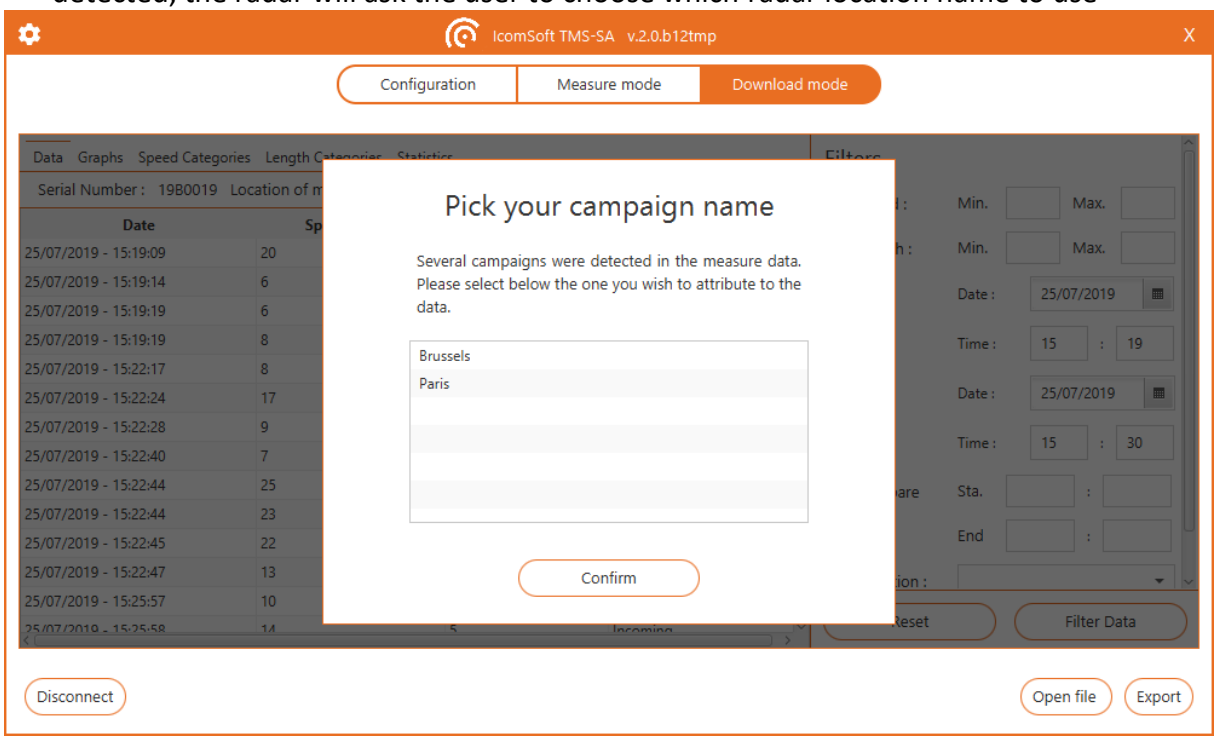
1. The software sets up the communication with the radar and downloads the data once the user confirms to download the data as shown in the Screenshot 9.
   The download time depends on the performance of your PC, the quality of the Bluetooth connection and the size of the file to be downloaded. The downloading of a full memory can take up to 20 minutes.
2. When the download is complete, the software will prompt you where to save the data file.
3. If data affected by the presence of rain, the software will prompt the user whether to apply a filter to remove the false detections, as shown in Screenshot 10 and described in details in section 1 Rain and/or parasitic measures filter.



Screenshot 10: Rain filter option

4. The software then asks if you want to process the data or erase it from the radar memory. **It is recommended to erase the memory before any new campaign to avoid having more than one campaign data in the radar**.

5. If more than one measurement campaign with different radar location names is detected, the radar will ask the user to choose which radar location name to use



Screenshot 11: Choose the campaign name if more than one

Note

You do not have to transfer the statistics immediately. The data will remain in memory until you explicitly delete it, even if the power is switched off or the battery is discharged.

In order not to extend the download time unnecessarily, you are however advised to clear the memory between two measurement ranges.

IX. ANALYSING THE DATA

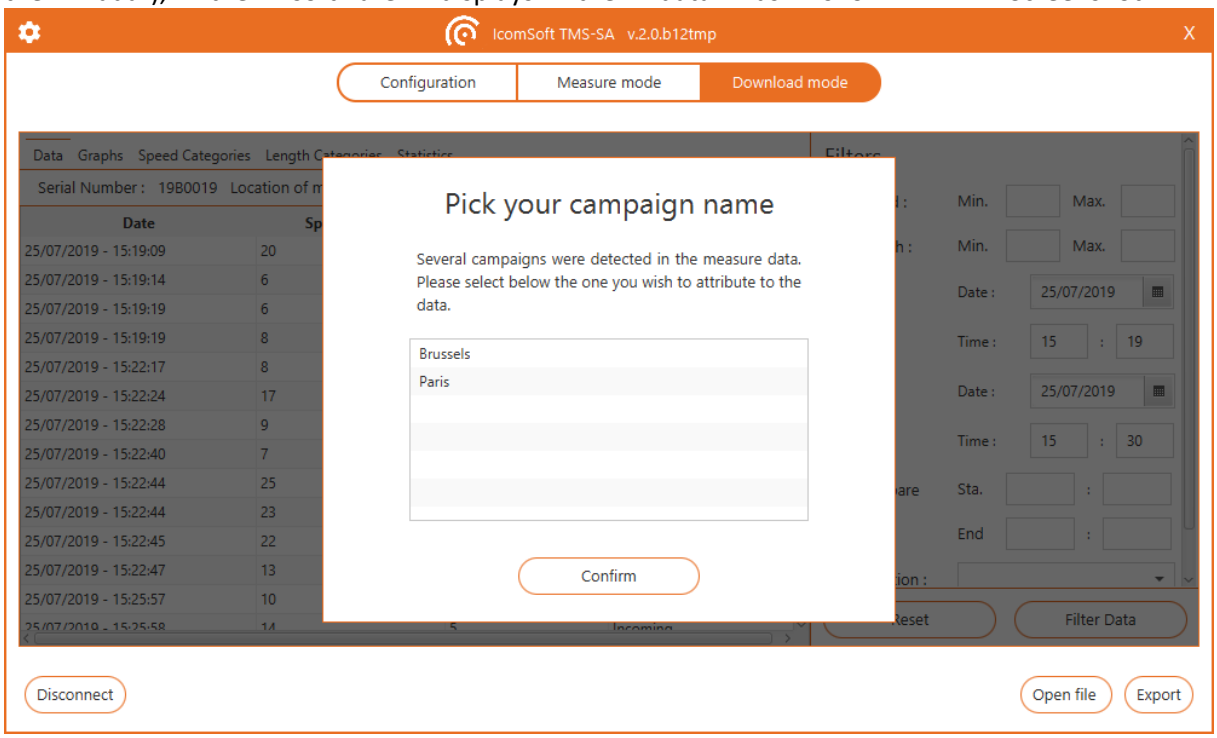
1. RAIN AND/OR PARASITIC MEASURES FILTER

The IcomSoft TMS-SA is provided with an automatic detection module for false measurements, mainly due to heavy rain in the "outgoing" direction.

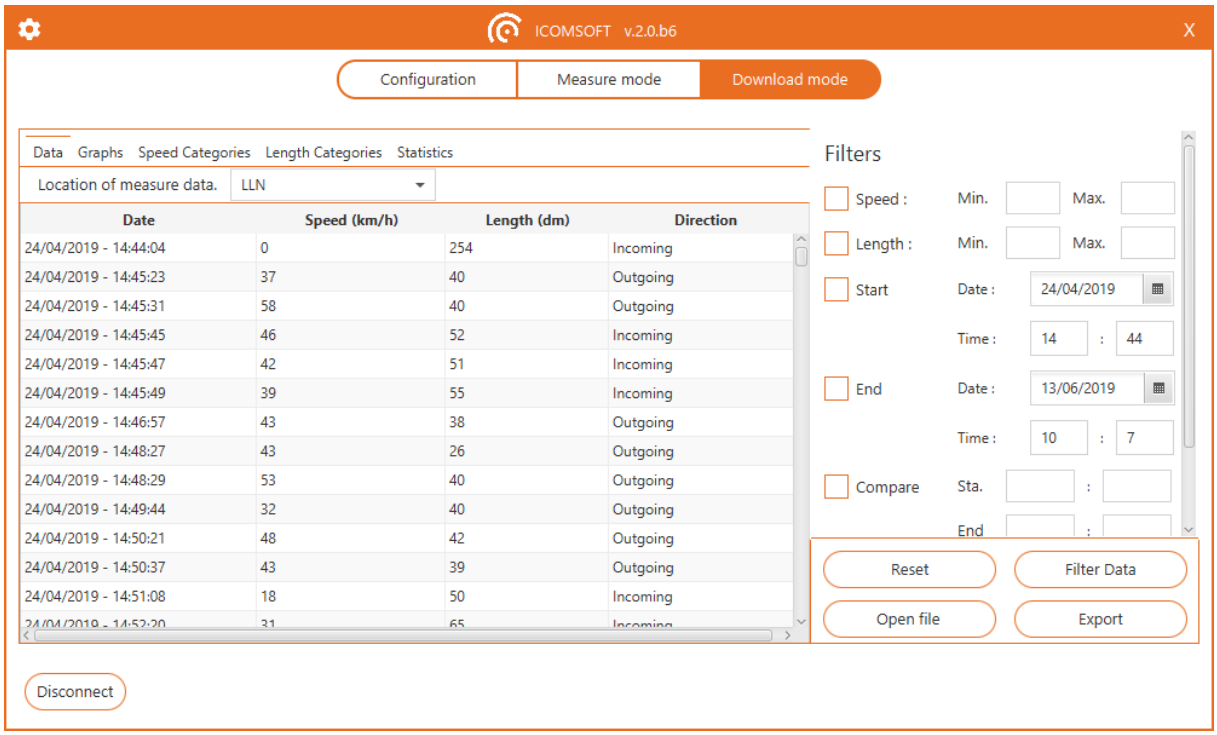
The filter evaluates potential rain for a single campaign. All data measurements are sampled into distinct time slots of one hour each. The volume of traffic during a time slot is computed for each day individually. Interquartile methods are then used to determine heavy volume outliers, indicating specific Day-time slot windows where it probably rained. Measurements corresponding to those time windows are then eliminated by means of vehicle length. As a rule of thumb for a particular time slot, one should record three (3) dry days of measurements for every rainy day.

2. DATA DISPLAY

Once the data loaded into the software (the data can be loaded from a data file or downloaded from the radar), the software displays the data as shown in Screenshot 12



Screenshot 11.



Screenshot 12: Data analysis

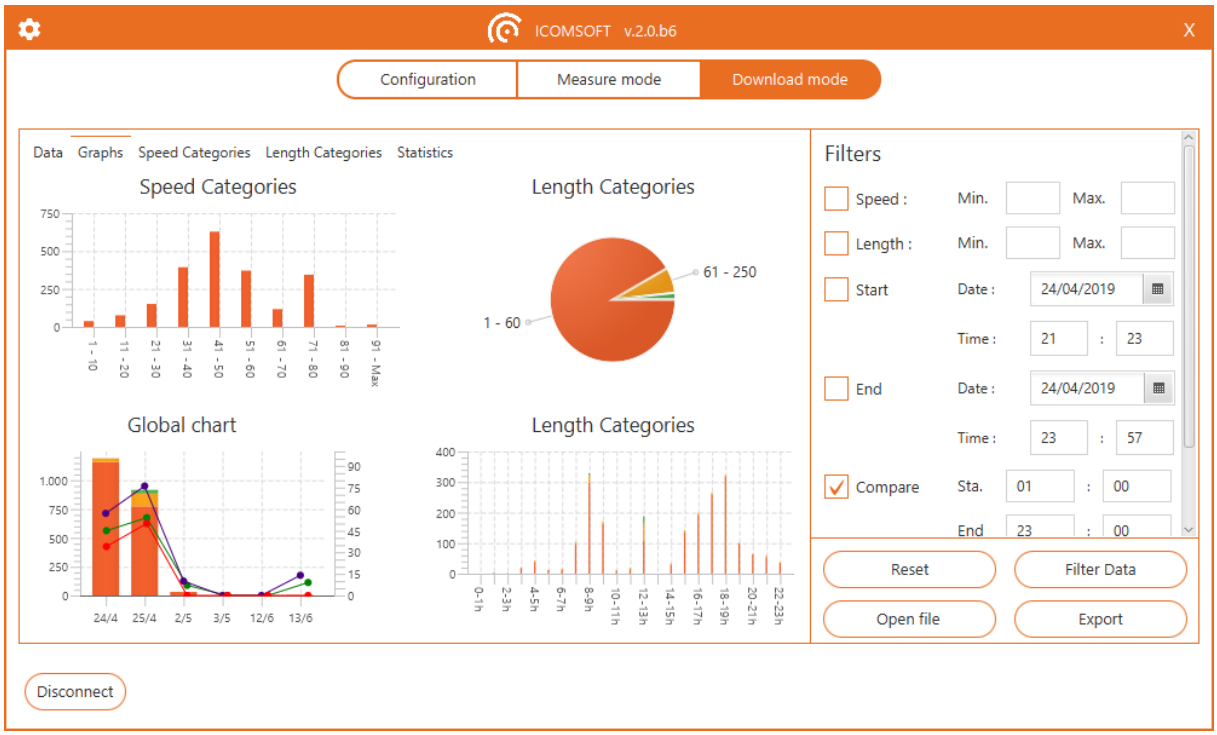
3. DATA FILTERS

If you want to work with a time period or speed class or vehicle length, various analysis criteria can be defined:

- The minimum and maximum speed to be taken into account
- The minimum and maximum vehicle lengths to be taken into account
- The start and end date of the data to be taken into account
- Compare: This feature allows to compare time slots across different days
- in bidirectional mode, direction of movement (all vehicles, only those coming towards the radar or only those moving away from it)

4. GRAPHS

Clicking on the “Graphs” tab will trigger the software to show the graphs as shown in Screenshot 13. Clicking on a particular graph will show the graph on the entire screen size of the software application, i.e. the graph will be maximized. To go back to the summary with all the graphs, click again on the maximized graph.



Screenshot 13: Graphs tab

a. Speed Categories

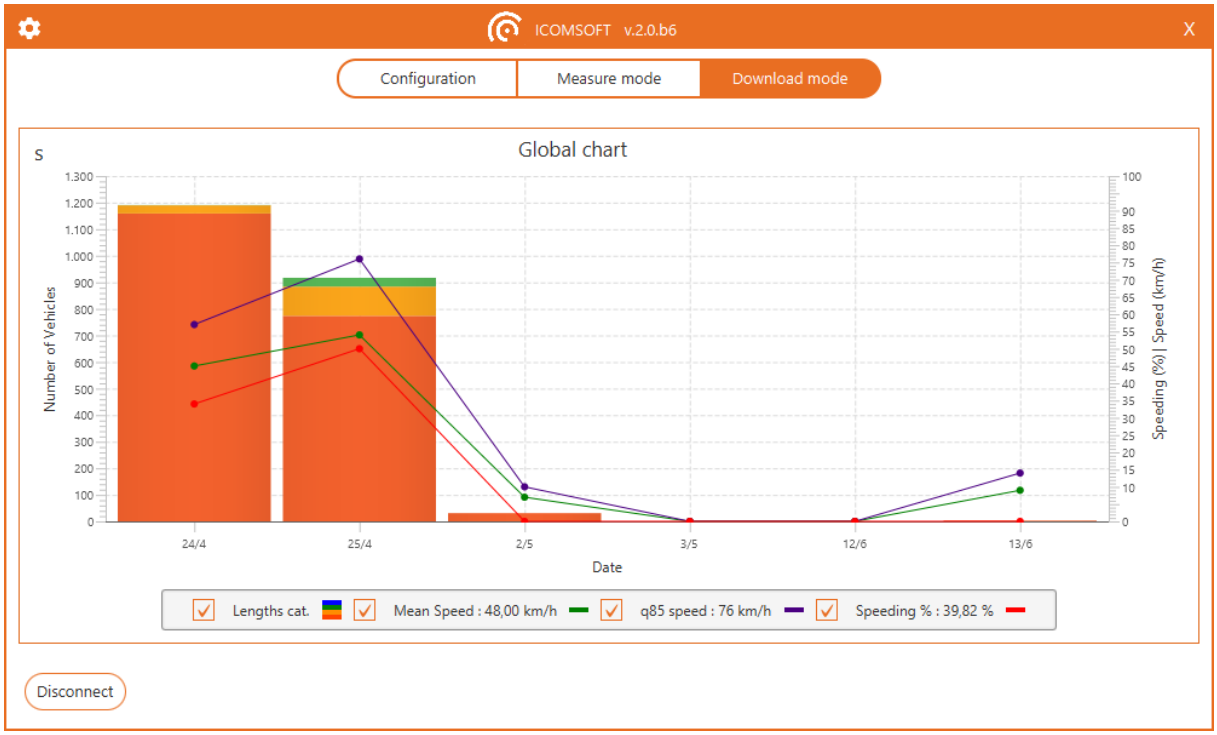
This graph shows the measured data classified according to the speed bins as defined in the “Speed Categories” tab, see section 5.

b. Length Categories

The graphic shows the measured data classified according to the vehicle lengths defined in the “Length Categories” tab, see section 0

c. Global chart

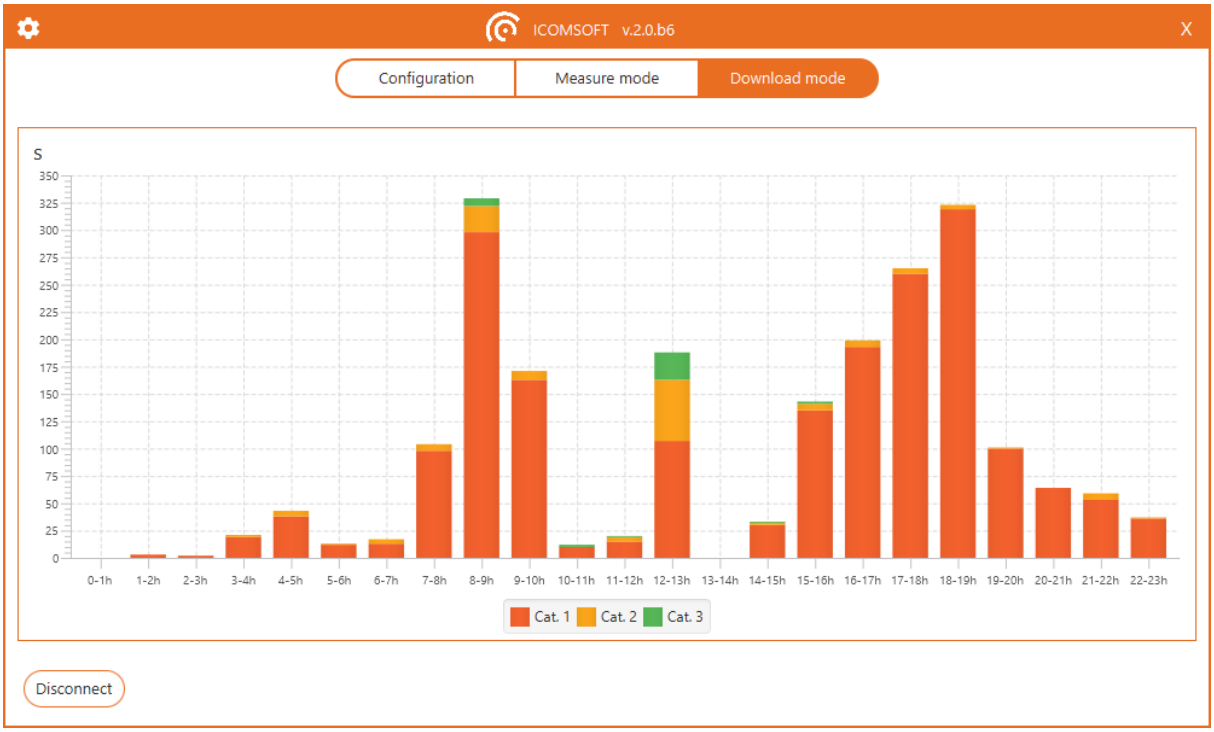
The graph shows the volume for each of the vehicle categories according to date time (1 column = 1 day). By checking the boxes under the graph, it is possible to make the graph parts appear or disappear.



Screenshot 14: Global chart

d. Hourly flow

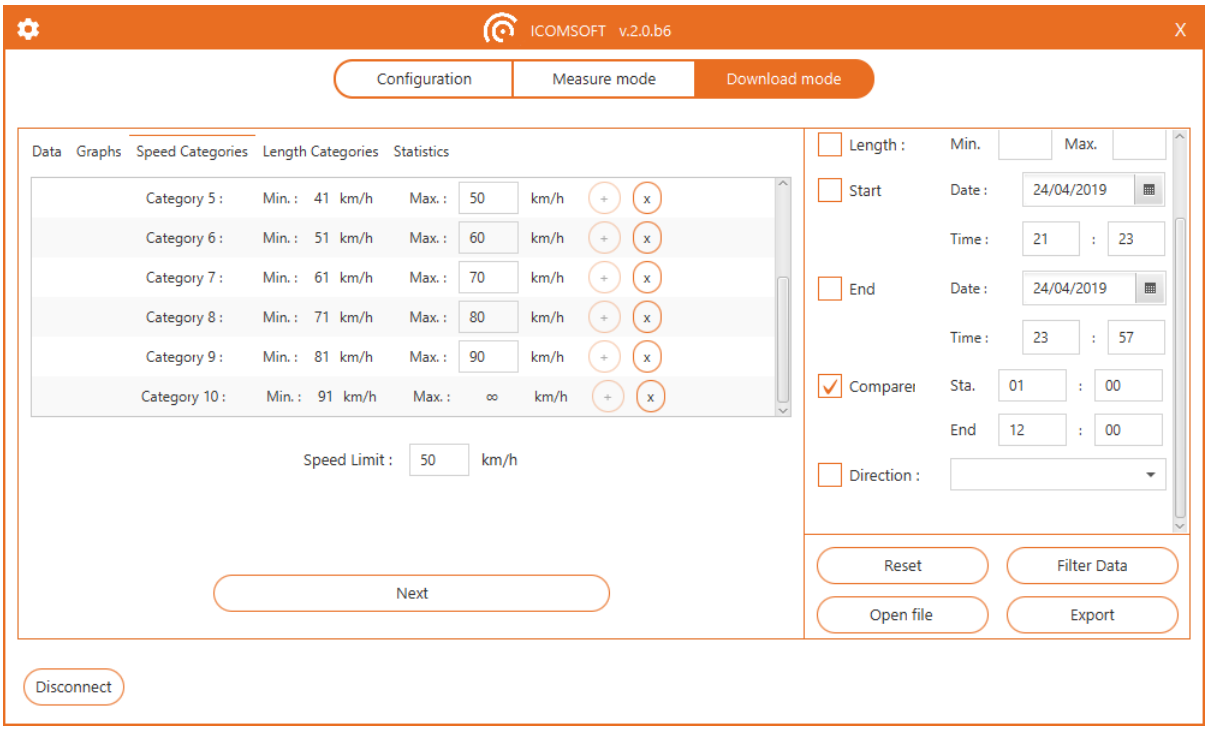
The graph combines the volumes per period into an average hourly volume.



Screenshot 15: hourly flow

5. SPEED CATEGORIES

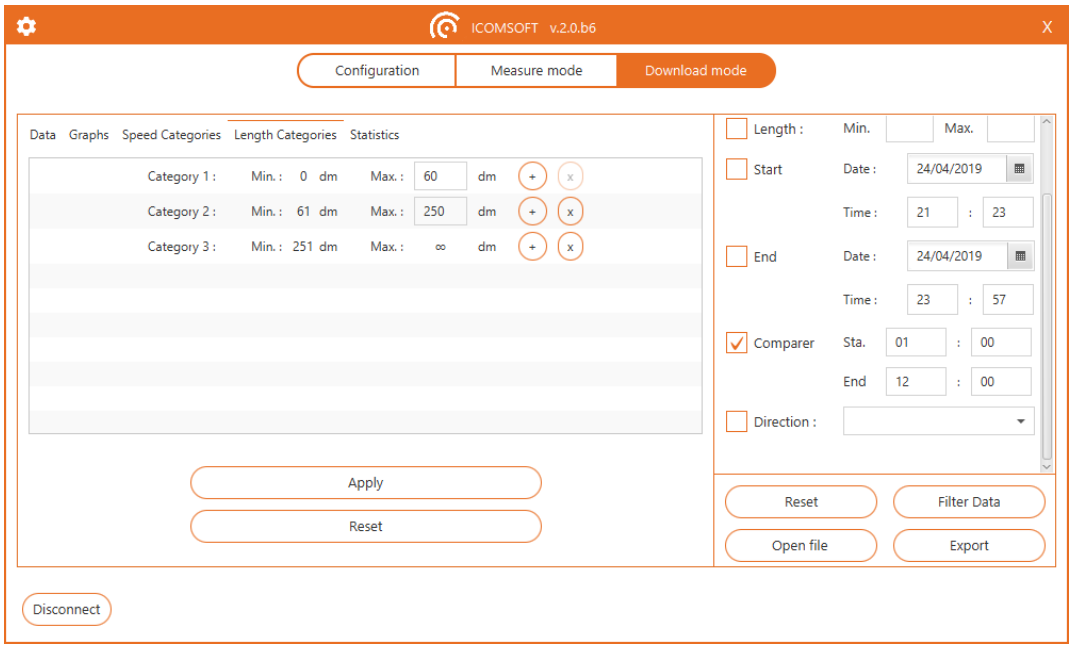
The Speed categories tab allows the user to define speed bins for classification, with an example shown in Screenshot 16: Speed Categories. This tab also allows the user to define the over-speeding threshold in the “Speed Limit” field.



Screenshot 16: Speed Categories

6. LENGTH CATEGORIES

The Length categories tab allows the user to define how to classify the vehicles according to vehicle length, with an example shown in Screenshot 17.

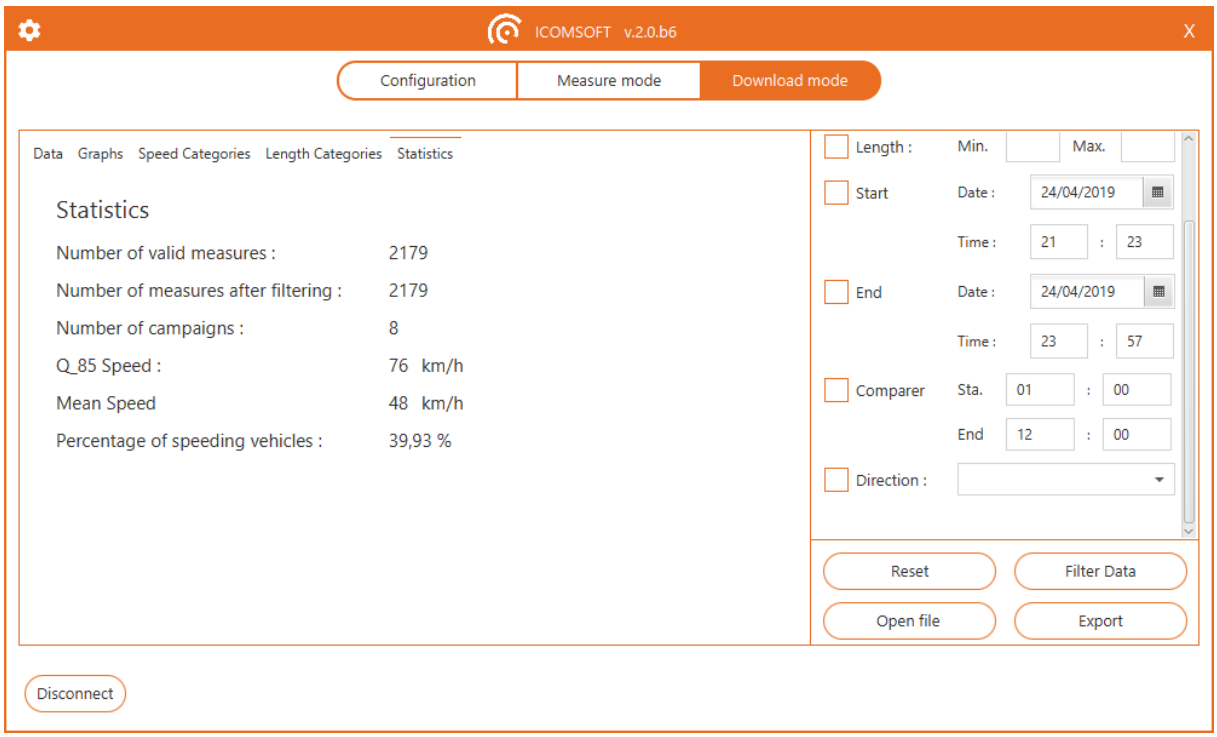


Screenshot 17: Length Categories

7. STATISTICS

The Statistics tab allows the user to consult the key statistics about the measurement campaign:

- Number of valid measures
- Number of measures after applying the filter
- Number of campaigns recorded
- 85% percentile
- Mean speed
- Percentage of vehicles above the defined speed limit



Screenshot 18: Statistics tab

8. EXPORT

It is also possible to save the files in the following formats:

- .isf: internal format used by the IcomSoft software, with all or part of the data in the original file.
- .csv: text format that can be used in Windows Notepad or any other text editor. Please note that when exporting in .CSV format, there will be one CSV file per campaign**.** One campaign is defined as the period between two different radar configurations.
- .xlsm: Microsoft ® Excel report format, see next sub-section

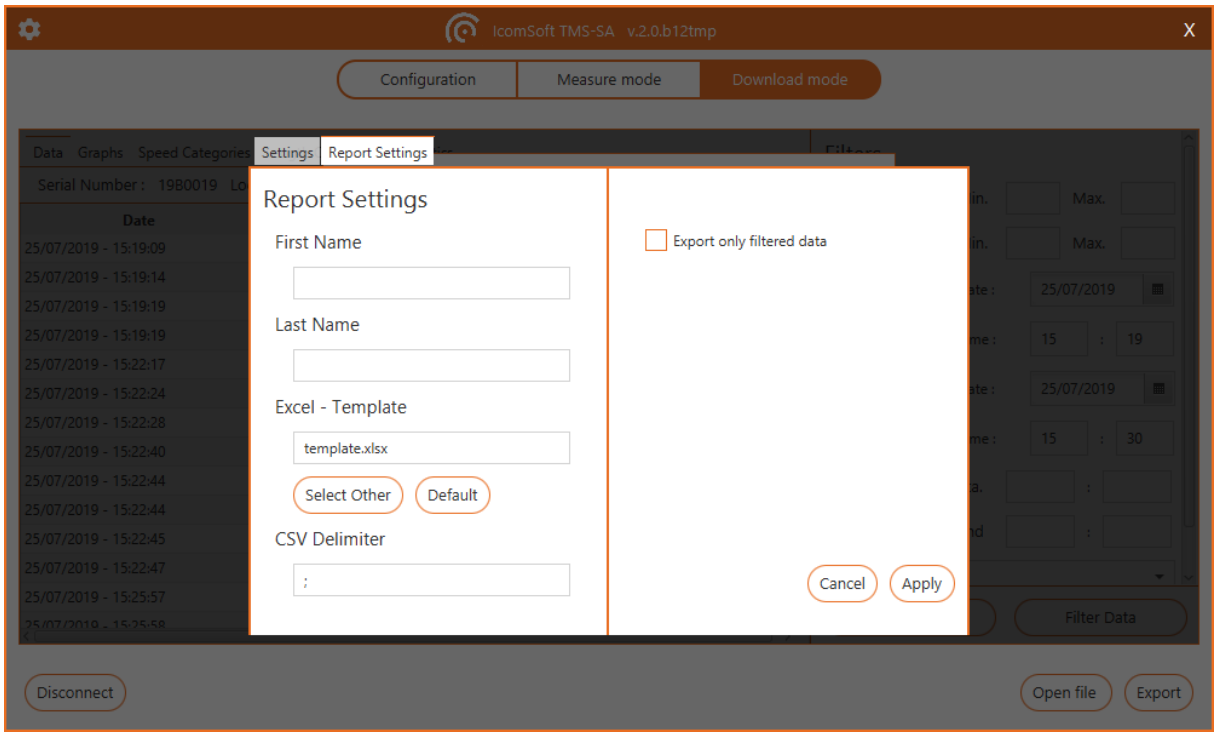
IMPORTANT NOTE ON CSV EXPORTS

When exporting in CSV files, the software will create one CSV file per campaign. One campaign is defined as the period between two different radar configurations. If more than one campaign is present in the radar memory, more than one CSV file will be created and saved on your PC.

a. Excel report and uploading a new template

By default, the IcomSoft TMS-SA exports an Excel report based on the Icoms template. The user can upload a new Excel report template, but the please ensure that the "data tab" is present in the new template. This "data" tab will be used by the IcomSoft TMS-SA software to fill in the data, no custom data, formulas or graphs should be present in this tab.

In order to upload a new Excel report template, click on "Export" in the "Download mode" tab and then choose "Click here to modify the report settings" and then click on "Select Other" as shown in Screenshot 19.

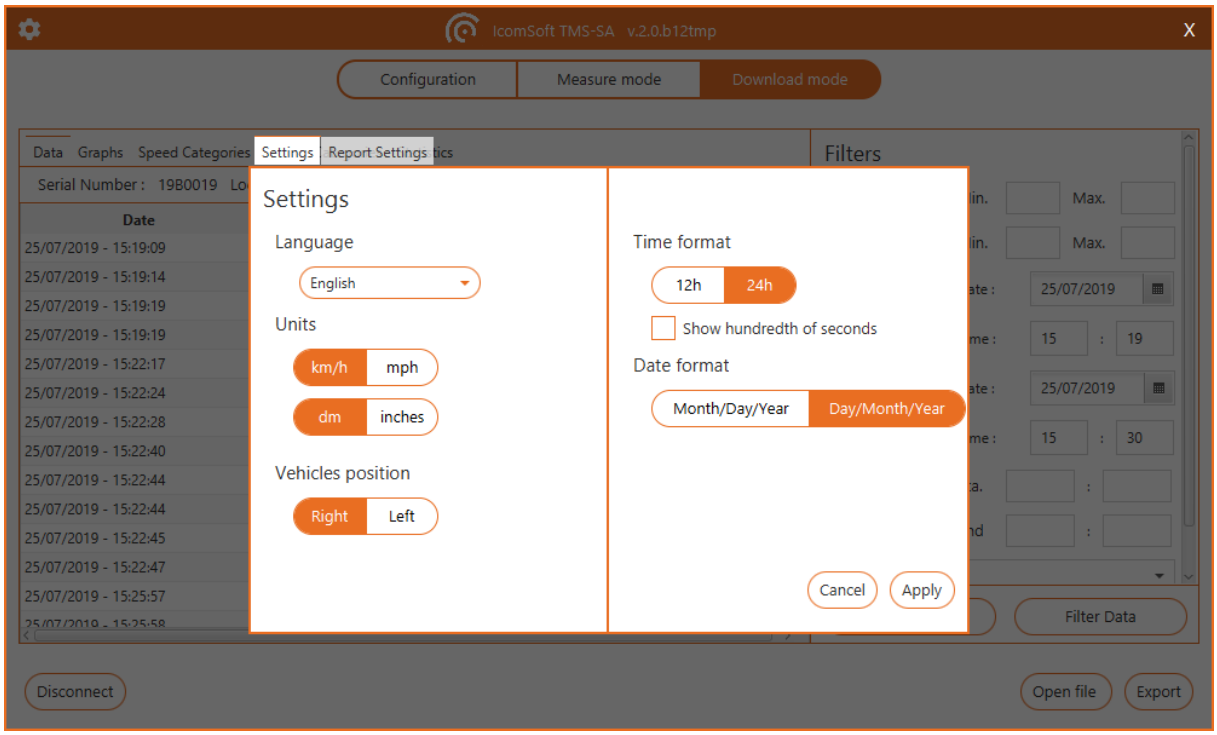


Screenshot 19: Uploading a customized Excel report template

9. SETTINGS

a. General settings

The user can choose the language, units, time format, driving style and date format.



Screenshot 20: Settings screen

b. Report settings

The user can choose whether to export only the filtered data, to upload a customized Excel report template and the CSV delimiters as shown in Screenshot 19 and Screenshot 20.

X. RADAR CHARACTERISTICS

1. PHYSICAL DESCRIPTION

The system is composed of a housing containing the radar and batteries as well as the accessories needed for its operation.

Black plastic box containing:

- Mounting bracket, secured in the box
- Microwave module (antenna and microwave source)
- Electronics board for signal processing and data storage
- Batteries (6 V/12 Ah)
- Switch
- Closing clips
- Display LED
- Mounting screw
- Connector for power supply and charging the battery
- Bluetooth wireless communication module

Accessories:

- Case
- Tape measure (8 m)
- Post mount
- External charger
- Viewfinder
- Software for processing the data and configuring the radar
- User manual

Dimensions of the box:

- Width: 245 mm
- Height: 300 mm
- Thickness: 281 mm,
- Total weight with lead-acid battery and bracket: approx. 8 kg

2. TECHNICAL CHARACTERISTICS

a. Power supply

The equipment is supplied by an internal battery with a nominal charge voltage of approximately 6.4 V. This value is reached after approximately 10 to 15 hours of battery charging. An external mains 110 or 220 V charger is supplied with the unit. When charging from the mains, a red indicator lamp is lit on the external charger. The battery is fully charged when the green lamp is lit. It is possible to use the radar while the batteries are charging. It is recommended to recharge the battery regularly even when you are not using the equipment to prevent battery wear.

Caution

- To prevent polarity reversal, never use a cable or charger other than those supplied with the equipment.

- Do not store the TMS-SA with discharged batteries.

The software supplied with the equipment enables you to check the battery charge (see above, page 15). When the battery charge is too low and does not allow the equipment to be used for measuring, the LED will flash twice in succession at regular intervals.
A warning is displayed on the radar status screen when the battery voltage reaches 5.9 V. It is no longer possible to switch to measurement mode below 5.5 V and the radar stops completely at 5 V.

b. Operating temperature

The system can operate in a temperature range from – 20°C to + 50°C. The battery capacity is however reduced at extreme temperatures.

c. Sealing

The system is rainproof. The housing is protected by a door fitted with a gasket. This can only be opened in a dry place by an approved technician or your distributor. To guarantee the seal, ensure that the housing locking clips are locked and that the protective cap is fitted on the connector while the equipment is in operation.

d. Detection direction

By default, the radar measures the speed of vehicles moving towards it. It is possible to measure vehicles moving away from it and, in certain conditions, bidirectional traffic (see above, page 18).

e. Accuracy of the measurements

The accuracy of speed measurement in laboratory conditions is greater than 98 %. The counting accuracy is approximately 98 %. The vehicle classification accuracy is approximately 90 %. These values are achieved in optimal installation conditions (see below), with a single lane of traffic.

The radar can measure speeds between 10 and 255 km/h.

REMINDER

- *To avoid any polarity issues, do not use other wiring, power or charger than those supplied with the traffic counter.*
- ***A defective battery may emit some gas potentially explosive.***
  - ***Charge you battery in an open environment:***
    - *If your radar has an external connector on the housing: remove the safety screws and **open the top while charging the batteries**;*
    - *If your radar **hasn't** any external connector on the housing: remove the safety screws. You can then **open the top** and connect the charger to the battery pack. Let the top open while charging the batteries;*
    - *In both cases, **do not touch the antenna**: it is an Electrostatic-Sensitive Device;*
    - *Once your batteries are loaded, close the top carefully:*
      - *do not catch the wiring;*
      - *screw slightly the safety screws.*
  - ***Check regularly your batteries:** inflated battery, white deposit on the battery's terminals, acid or gel leak, warm battery during the charging process are signs which must alert the user on a battery potential default. If one of these phenomena occurs, replace your batteries.*
  - ***Replace your batteries every 3 years.***

XI. ADDITIONAL INFORMATION

1. LEGAL DECLARATION

a. CE

Icoms Detections herewith declares that the TMS-SA complies with the essential requirements and other conditions of directive 1999/5/EC that apply to it.

You can obtain a copy of the "Declaration of Conformity" by sending a request to info@icomsdetections.com.

b. Industry Canada

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) L'appareil ne doit pas produire de brouillage;
(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ISED ICES-003 8 Labelling Requirements: CAN ICES-3 (B)/NMB-3(B)

c. FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

1. FCC 15.21 Information to user

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

2. FCC 15.19(a)(3) Labeling requirements

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

3. FCC 15.105 Information to user

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

2. CONTACT DETAILS

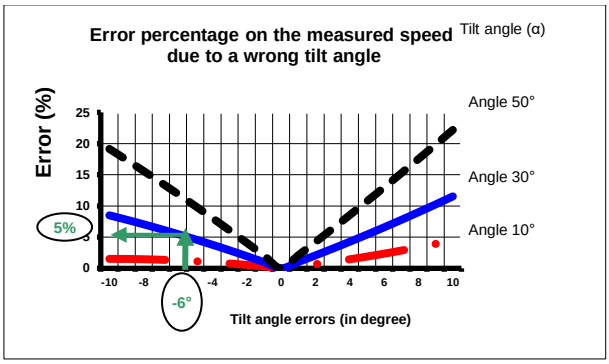
a. Manufacturer:

icoms Better detection . Better mobility	**Icoms Detections S.A.** Avenue Albert Einstein 11/b ▪ B-1348 Louvain-la-Neuve ▪ BELGIUM Tel.: +32 (0) 10 45 41 02 ▪ Fax: +32 (0) 10 45 04 61 info@icomsdetections.com ▪ www.icomsdetections.com

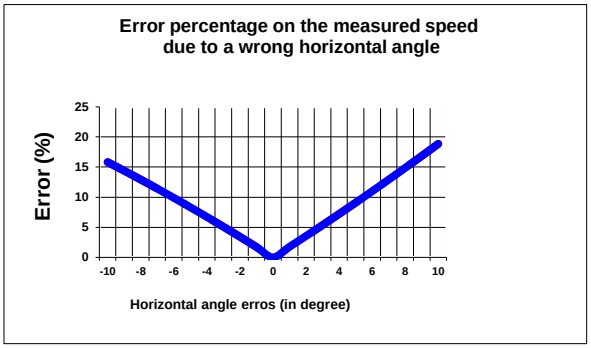
b. Your distributor:

XII. ANNEX 1: error according to installation angles

The accuracy of the installation is very important and can affect the quality of the data. The following diagram shows the effect of the installation angles on the error margin of the speed measurement:



Graphic 5: % error on speed as a function of a change in inclination angle



Graphic 6: % error in speed as a function of a change in transmission angle

XIII. ANNEX 2: quick user manual

⚠ READ THE SAFETY INSTRUCTIONS FIRST (USER MANUAL) ⚠

1. Mount the bracket on the post (the post must be perpendicular to the road and the bracket must be parallel with the vehicle movement axis). Use the viewfinder to check your installation.
2. Switch on the radar. The LED flashes 5 times at regular intervals.
3. Make sure that the Bluetooth is switched on or that the Bluetooth dongle is inserted in a USB port of your PC. Start the Icoms software and follow the instructions.
4. Adjust the radar parameters (name of the counting site and Installation parameters):
   - *Type* of installation :
     i. *Detection direction* (approaching, moving away or bidirectional)
     ii. *Characteristics of the roadway*: indicate any inclination of the road or the post
   - *Installation height*.
   - *Distance from the axis: distance from the post to the centre of the traffic lane* (or the road for bidirectional).

   ⇒ The software calculates the inclination angle of the radar. Once the parameters have been sent, this angle will be applied automatically to the antenna and the software will display the measurements.
5. Check the accuracy of the lengths (car between 3 and 5.5 m, truck > 6 m).

Figure 6: place the radar on its bracket

RESOLUTION OF COMMUNICATION PROBLEMS

- Check the battery charge: the LED should light in cycles of 5 flashes.
- Check the Bluetooth communication has been correctly established (Dongle in a USB port, configuration + connection). The Bluetooth logo should be displayed in the task bar.
- Avoid any port access conflicts, close any HotSync, PDA type applications, etc.
- If the problem persists, switch off the radar and switch it on again after a few seconds. Do the same with the software.