

vLoc3 RTK-Pro Locator Quick Setup Guide

(English Edition)

Version 2.6



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1. Preparation

- SIM Card:** To use the correction data service, a nano SIM card is required. This is available from all mobile phone providers. We recommend a regular contract and not a pure data or prepaid tariff.
- Correction data service:** To use the vLoc3 RTK Locator with precision data, you need a correction data service with costs. This is offered by various providers such as **TOPCON** (www.topconpositioning.com), Axio-Net or Premium Positioning.

Please go to the last page of this Quick Guide and get your free trial of **Topnet Live**.

Note for correction data services: The correction data service must be booked with transformation services. Without these services reference systems like UTM, etc. cannot be used and the vLoc3 RTK Locator does not get precision data.

Please note:

- When installing for the first time, follow the procedure described in this manual to avoid problems
- The whole setup can be done without GPS reception. Only from point 6 on it is necessary to continue in front of the building with a valid GPS signal.

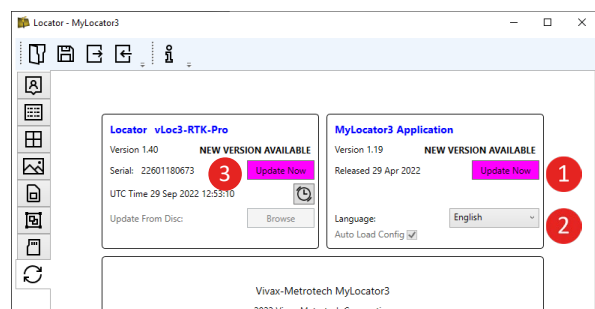
1.1. MyLocator3 App

Download the latest version of the free MyLocator 3 app from our website www.vivax-metrotech.com. You can find it in the section Support / Downloads / Software / MyLocator3 - Desktop App (at least v1.18).

1.2. Software Updates, Configuration, Adding new features

To unlock the new features, the free MyLocator3 Desktop App is required. MyLocator3 now also works in connection with proxy servers.

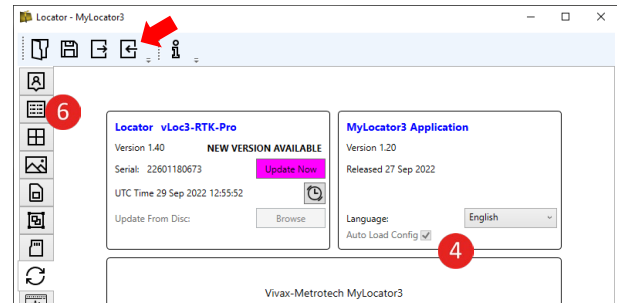
- Start the MyLocator3 Desktop App and install the latest update (1).
- Select your language as required (2).
- Connect the vLoc3 RTK-Pro receiver to the PC using the USB cable provided.
- Switch on the receiver. The PC will automatically recognize the device.
- To download the latest update to the receiver, click on the "Download" button (3). After downloading the software, the receiver must be restarted.



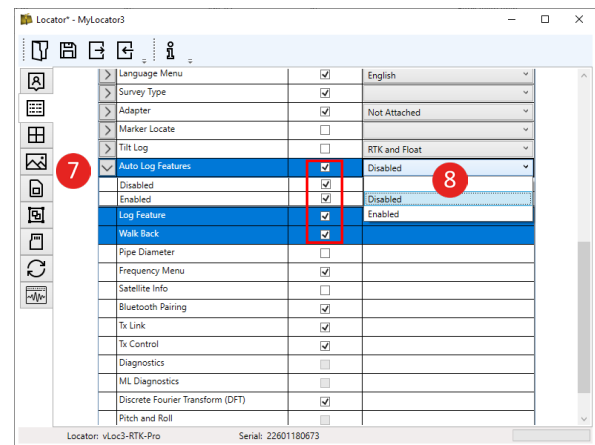
Note: With the OTA (Over the Air) firmware updates, vLoc3 RTK-Pro receivers deployed in the field will no longer require MyLocator3 to run the latest optimized features. This eliminates using a PC and USB cable while keeping your fleet of devices up to date. OTA updates will be applied with version release 2.1 and above. The vLoc3 RTK-Pro will first need version 2.0 installed via MyLocator3 and a USB. At power-up, the vLoc3 RTK-Pro will compare the current release to the one installed in the device. The

OTA update is downloaded in the background without interrupting the user's workflow if a new update is available. Once the update is downloaded at the next power-up, the vLoc3 will prompt you to install the update now or later. The device will continue its boot-up process and operation if you select "later". If the "now" option is selected, the update will automatically start and be completed within a few minutes.

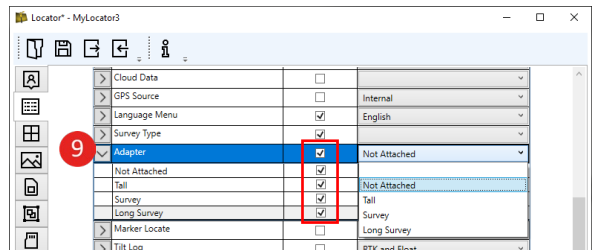
6. In the next step, as soon as the receiver is switched on again, the MyLocator3 app will automatically load the actual configuration from the receiver, provided that the check mark is set at "Auto-load config" (4). If this check mark is not set, then the configuration can be loaded manually by clicking the icon in the menu
7. As soon as the configuration is loaded, click on "Menu Settings" in the left selection bar (6). Open the window as full screen or scroll down in the menu settings.



8. **Object feature logging and Walk-Back function.** Open the drop-down list at the item "Auto Log Features" (7) and set the checkmarks at "Disabled" and "Enabled" as for "Log Feature" and "Walk Back". In the next step, open the drop-down list (8) on the right side and select for the preset "Disabled".



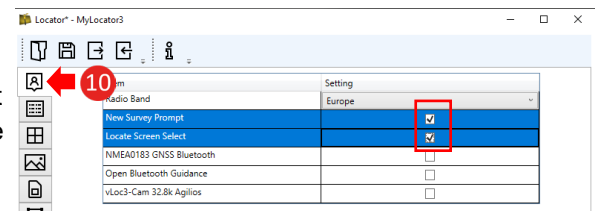
9. **Add the long and survey adapters.** Open the drop-down list "Adapter" (9) and set the checkmarks at "Not attached", "Tall", "Survey" and „Long Survey“. In the next step, got the beside drop-down list and set the checkmark for the preset at "not attached".



10. **Settings for „Start with new survey“ and „Selection of locate screens in a list“.** First open the menu "Options" (10). Then set the checkmarks as followed.

- **New Survey Prompt:** After switching on the receiver, the first query appearing is whether you want to start a new measurement. This is useful to separate the data sets for the export.

- **Locate Screen Select:** This speeds up the selection process of the different measurement methods (Classic View, Vector Mode, etc.) considerably. Instead of jumping through the individual screens, the preferred locating screen can be selected with a long press on the "Enter" key.



- Selection for NMEA0183 GNSS Bluetooth and open Bluetooth Guidance: In the "Options" menu, a permanent Bluetooth connection to an external device can be switched on. Currently only the coordinates are transmitted. If you have any questions about this, please contact us.

Further menu settings in MyLocator

Following further options can be selected in the menu settings:

- Coordinate format selection (11):**

You can choose between degrees, minutes and seconds (DMS), degrees and minutes (DM) or decimal degrees (DD). Please check the boxes accordingly if an alternative format is desired. DMS is displayed as the default without a check mark.

- Cloud Data Sending (12):**

With "Enable" the data communication to the VMMap Cloud is switched on. With "Disable" the data communication is interrupted. **Even a later restart does not transfer any data to the cloud.** In the delivery state the data transfer is always active (enabled).

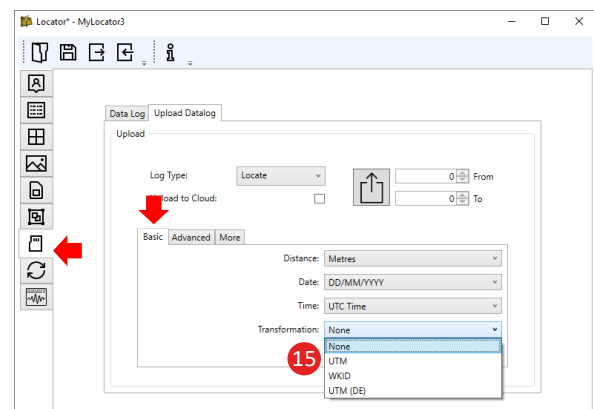
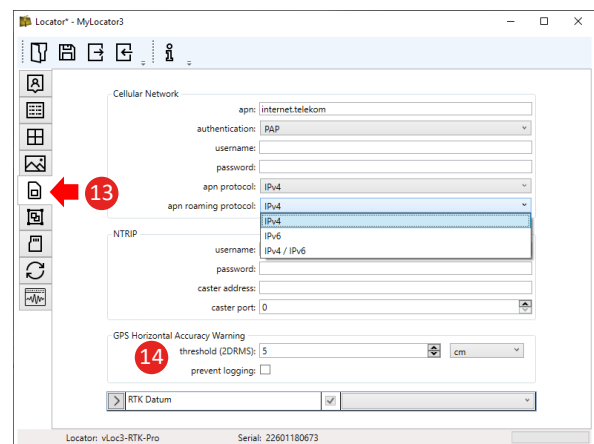
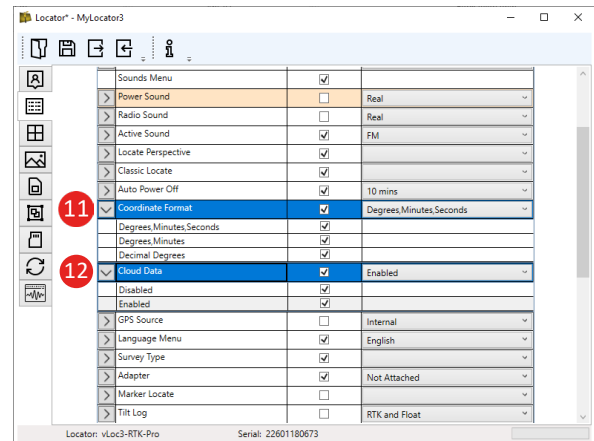
- Warning message for horizontal inaccuracy.**

Choose "Cloud Settings" (13). For the 2DRMS (14) there is now the possibility to set a threshold value. If the value is out of tolerance, a warning triangle and a red save button will appear in the info screen as a warning that this point is not accurate. As a default, the value for RTK should not be set higher than 5-10 cm before the warning appears. In addition, by selecting "prevent logging", the log data of the point will be blocked as soon as the tolerance limit is exceeded. **Attention! As soon as the threshold limit is exceeded, no logging is possible, also in areas where only GPS reception is available!**

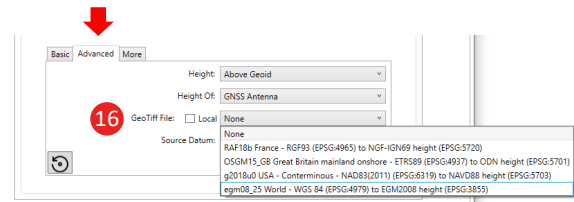
- Export options for log data / height correction with GeoTiff files**

UTM-DE was added as export option (15). In contrast to the pure "UTM", with UTM-DE the zone is prefixed with the easting.

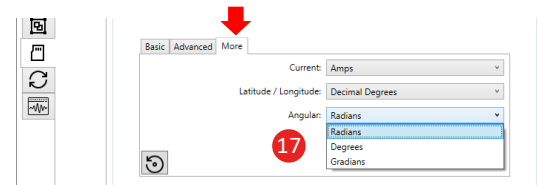
Reduced, respectively adjusted number of digits behind the decimal point for all evaluations.



Addition of GeoTiff files (16) for height correction (Height above sea level) when exporting the log data via the MyLocator app. The location of the desired correction file can be selected in the menu item "Log data" under "Advanced". The GeoTiff files can be downloaded free of charge at <https://cdn.proj.org>, for example.

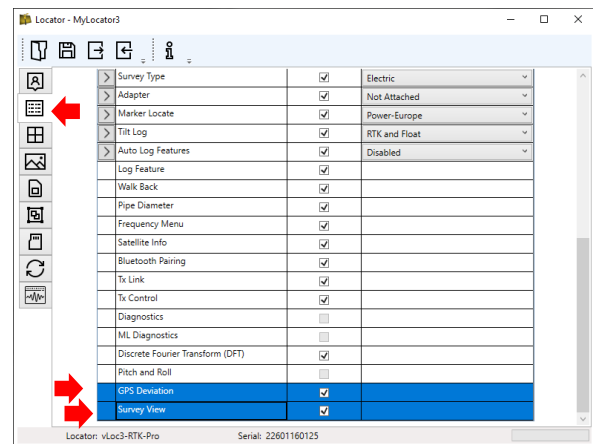


Gradians (gon) was added as an export option for angle displays (17) under the Cloud settings in the "More" tab.



16. Enable Survey View and GPS Deviation Screens (available since Update v1.41).

- This requires the firmware update v1.41.
- Connect the device via USB to your PC and start MyLocator3.
- Open the "Menu Settings"
- Set the checkmarks at "GPS Deviation" and "Survey View" to enable the additional views.

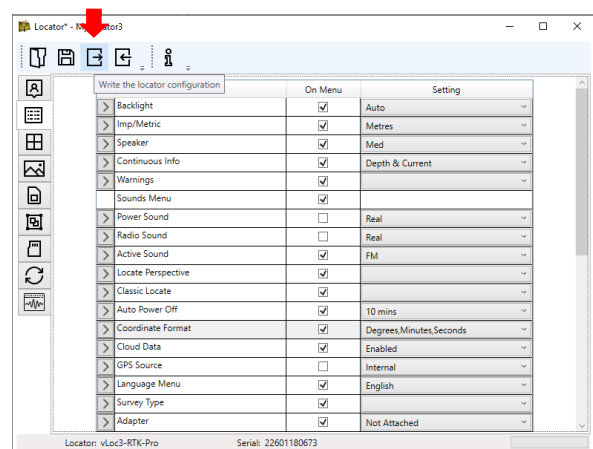


If you are still missing other checkmarks, for example for "Pipe diameter" or "Discrete Fourier Transform (DFT)", these can now also be enabled if required. Please remember that every change has a direct effect on the receiver menu and the functions in the device before you enable or disable checkmarks.

17. Transferring the configuration to the receiver.

Click on the icon shown in the upper taskbar of the MyLocator3 app.

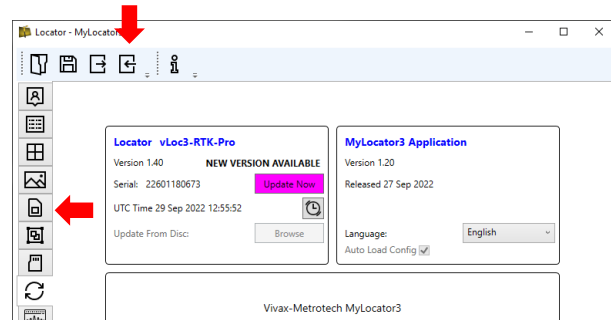
- After the configuration has been transmitted (approx. 5 seconds), switch off the receiver to save the configuration.
- Switch the receiver on and open the user menu (long press on the "i" key). Now scroll through the menu with the "+", or "-" key to the newly configured items and select them accordingly.



If you have any questions or problems configuring the receiver, please contact us.

1.3. Enter Cellular and NTRIP data

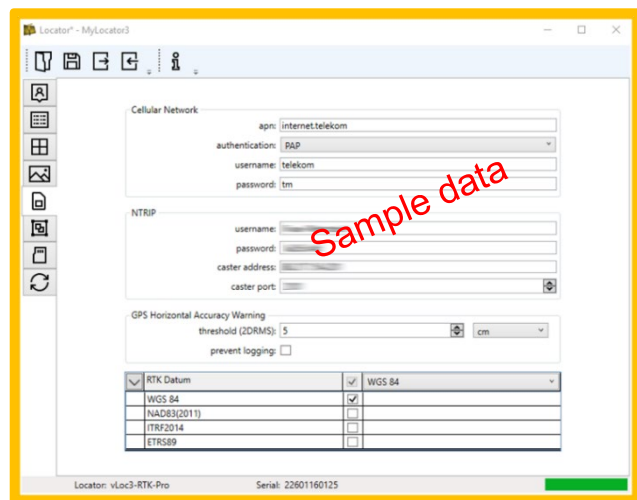
- a. Open the MyLocator3 App
- b. Connect the vLoc3 RTK Locator to your PC using the supplied USB cable
- c. Switch on the RTK Locator
- d. Once the locator is detected, it automatically downloads the current configuration from the device. If this is not the case, click on the icon with the left arrow in the upper status bar. (Load Configuration). Then click on the button shown in the left status bar (Cloud Settings)



- e. Enter your data in the respective lines below: Make sure that there is **no space before or after** the respective entry. This inevitably leads to the connection not being established!

For most providers it is sufficient to fill the field „Network“ with the respective apn (access point name). Some providers require additional authentication, a username and a password.

The apn, authentication, username and password can be found on the website of the respective provider.



APN providers:

Vodafone APN: web.vodafone.de

Telekom APN: internet.telekom

O2 APN: internet

1&1 APN: internet

Cellular Network

- **apn:** The APN of your network provider is entered in this field
- **Authentication:** Here you select the authentication for the mobile phone provider. *Example German Telekom: PAP*
- **Username:** This field is filled with the username provided by the mobile phone provider, if requested. *Example German Telekom: t-mobile*
- **Password:** The password is also provided by the mobile phone provider, if the latter requires it. *Example German Telekom: tm*

NTRIP (Username, password, caster address, caster port)

Enter the data assigned to you by your RTK provider in the respective field. (For the "caster address" you can enter the Internet address in letters or the IP address in numbers. The system recognizes both variants)

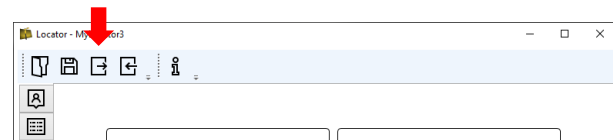
GPS Horizontal Accuracy Warning


- **Threshold (2DRMS)**
In this field you can define the threshold value for a warning message.
We recommend a value between 5cm and 10cm. If the RTK accuracy (2DRMS) comes above the set value, a red warning triangle will be displayed when saving.
- **Prevent saving**
If this checkmark is set, saving the point will be prevented if the threshold is exceeded.
(This also applies if you do not have an RTK connection. Saving is also not possible with pure GPS).

RTK Datum (Reference point)

In this field you can define the format of the RTK datum. If you do not specify anything, it is automatically WGS84. Most providers send WGS84 or ETRS89. The other two formats (NAD and ITRF) are only for America. If more than one format is clicked, you will be asked each time which format to use before saving. (Not recommended for EU)


- f. Transfer the settings to the vLoc3 RTK Locator.
Click on the icon shown below (Upload configuration)



-  g. **Important! Turn off the vLoc3 RTK Locator to back up the data and disconnect the USB cable. If this step is forgotten, no RTK sources can be selected afterwards!!**

1.4. SIM card (Nano-SIM) installation

Please do not use a prepaid SIM card. Prepaid cards must be charged monthly and the vLoc3 RTK Locator does not show you immediately if there is still data volume available. Since the SIM card must be taken out of the device and inserted into a mobile phone every time for recharging, this is not a workable solution for long-term operation.

-  a. It is recommended to use a SIM card (NanoSIM size) with voice and data traffic. A data-only SIM card will also work, but with some providers you might have difficulties with the setup.
- b. Check that your SIM card is PIN-free. If not, please change it using a mobile device (smartphone or tablet).
- c. Make sure that the data communication of the Sim card works. With some providers you must wait for a SMS with the data release. This may take up to 24 hours. Check the data connection as soon as the mobile bars and 4G (or LTE, 3G, H, 2G, E) are displayed. For example, search something in Google. The Locator will later show a connection and the possible data transfer, but it does not give a direct indication of whether data is flowing.
- d. Insert the NanoSIM card into the SIM card slot of the switched off RTK locator until it is firmly locked in place. When inserting the card, you will hear a soft "click" and the card only protrudes about 1mm over the slot. (Insert the nano-sized SIM card connection pads facing upwards towards the display. Make sure the SIM card is pushed fully into place!)

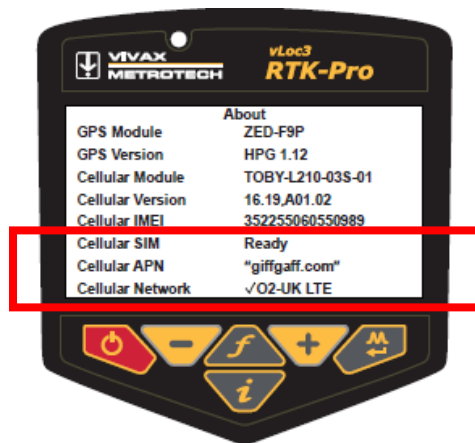
1.5. Completing the setup of the vLoc3 RTK-Pro

1.5.1. Check your mobile phone connection

- a. Switch on the vLoc3 RTK Locator
- b. Wait until the mobile phone bars and data connections are displayed in the status bar in the top right corner (e.g. 4G). This can take a few minutes at the first start. The mobile phone connection must first be recognized/registered by the nearest mobile phone tower.



- c. Press and hold the "i" button until the user menu appears
- d. Use the "Enter" key to select the menu item "About"
- e. Press the "+" key until you see the following (The Cellular APN and the Cellular Network differ depending on the provider)



- f. The message "Cellular Module searching" may be displayed for a few seconds. This is normal because the module needs a few seconds to boot. The two critical points on the info screen are:
- Cellular SIM: **Ready**
 - Cellular Network:
 - The **tick** indicates that a data connection has been established
 - Instead of "O2-UK" your mobile **phone provider** is displayed
 - "**LTE**" indicates that a 4G-LTE data connection has been established. (Alternatively, depending on the connection quality is indicated: 3G, HSDPA, 2G, Edge, or similar)

If these points are OK, you know that the data connection is established.
Press the "i" button once briefly to return to the main menu.

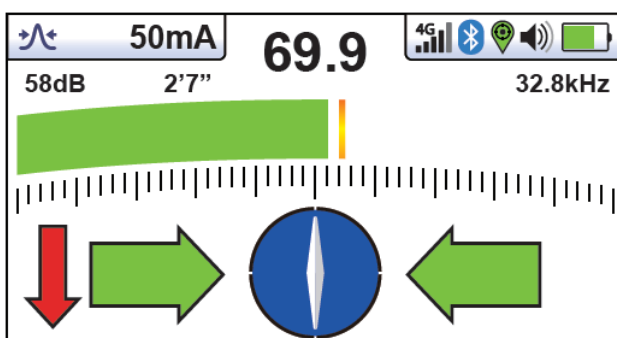
1.5.2. Select RTK source

First ask your RTK provider which RTK source is best for you, as there are always several to choose from. Usually, you should choose a virtual RTK source.

- a. Select "GPS RTK Source" in the user menu using the "+" or "-" buttons
- b. Press the "Enter" key
- c. Press the "Enter" button again at "Search RTK Source" to search for available RTK sources.
- d. Once the sources are displayed, use the "+" or "-" buttons to select the source specified by your RTK provider and press the „Enter“ button again.
- e. When the source is selected, the display will show the connection data to the source, RTCM counter, latitude/longitude, etc. after a few seconds.
- f. Now press the "i" key twice to return to the main screen.

2. Checking the Setup

The display should look like this, depending on the selected locating view (in this case: Classic view) when the setup is finished



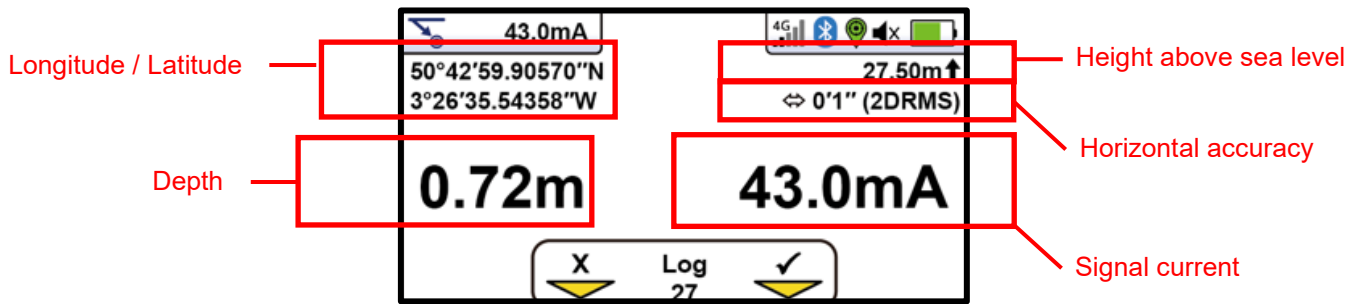
GPS status:

- No GPS module
- GPS module active, no data
- GPS signal (3-20 m)
- SBAS/DGPS (60-300 cm)
- RTK Float (20-40 cm)
- RTK Fix (~1 cm)

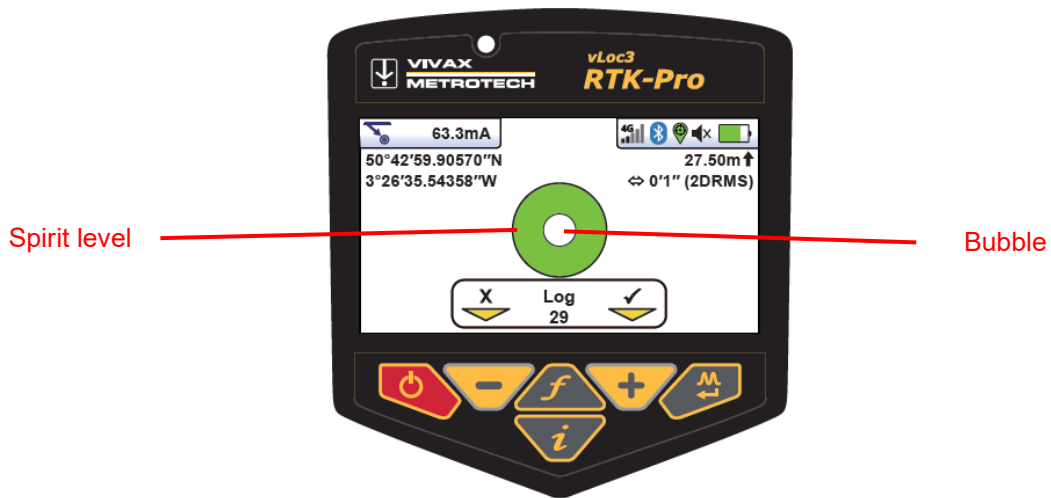


- a. Now go outside to check the setup. The GPS signal in the status bar in the upper right corner will not show anything, as long as there's no GPS signal. It will show "**Red**" until you receive a valid GPS signal. Then it will change to "**Orange**" or "**Green**". (If the symbol shows „**Blue**“ it means you have SBAS. That's a GPS signal with a higher accuracy, but without RTK data)

- b. If the GPS status initially shows "Orange", wait a few more minutes until it changes to "Green". If this is not the case, please check in the main menu in the submenu "GPS RTK Source" if your RTK source is too far away. (There is no correct distance indication. The displayed horizontal accuracy (2DRMS) is decisive. This should be in the cm range). Even with orange GPS, the data is accurate.
- c. Now briefly press the "i" key to switch to the information screen. This screen looks like this:



- d. Press the "+" button to save the result of the line locating and switch to the screen for saving the GPS precision data. This screen looks like this:



- e. Now tilt the vLoc3 RTK receiver in your direction until the "bubble" is in the centre of the spirit level (green field). Hold it there for 1-2 seconds. The result is automatically saved, and the screen will return to the start screen. The spirit level remains orange until the bubble is precisely in the centre and the point is automatically saved. Saving is confirmed with a short beep.
- f. All further measurements are performed according to the same principle.

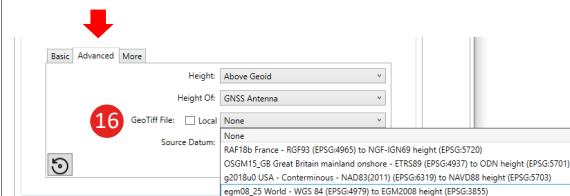
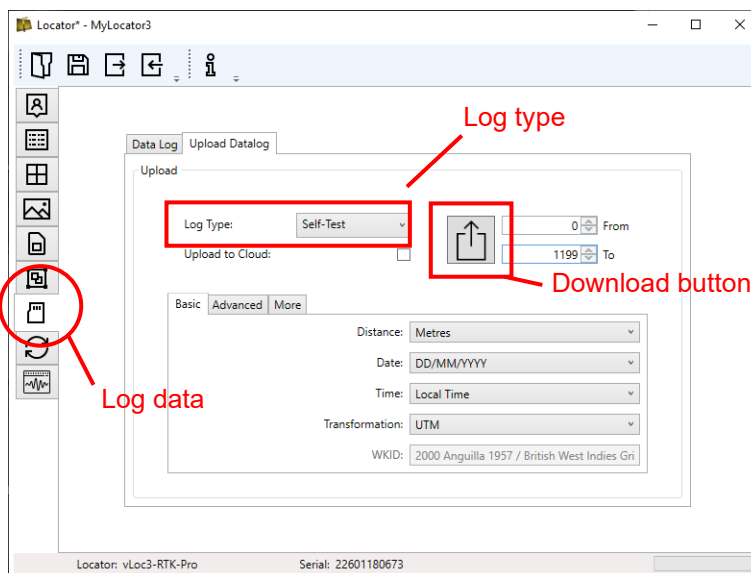
3. Data export and VMMap cloud setup

There are two ways to save the measurement and location data in the vLoc3 RTK Locator:

1. The data is always saved in the internal memory of the receiver.
2. The data is backed up in the cloud, if the vLoc3 RTK Locator is registered there. The registration is free of charge and without obligation.

3.1. Load data directly from vLoc3 RTK Locator (with height correction GeoTiff files)

- a. Connect vLoc3 RTK Locator to the PC using the supplied USB cable and switch it on
- b. Open MyLocator3 Desktop App
- c. Click on „Log data“ in the left status bar
- d. Select log type:
 - „Locate“ = Measurement & location data (line location & position data)
 - „A-Frame“ = Sheath fault location data (Location data with A-Frame)
 - „Marker“ = Marker location data
 - „Self-Test“ = Self-Test data
 - „Warnings“ = Data warning messages (swing alarm, overhead line, etc.)
 - „D.F.T.“ = Interfering field analysis
- e. Select log data (from – to) or select all. Select distance, date, and time accordingly
- f. Following items can be selected:
 - In the **"Standard"** tab: Distance, Date, Time, Coordinates Reference System, WKID.
 - In the **"Advanced"** tab: Altitude, Altitude from, set **GeoTiff File location (16)** for Height Correction (height above sea level), Reference Data
 - In the **"More"** tab: Current, Latitude / Longitude, Angle
- g. As soon as all settings are done, click on the **download button**



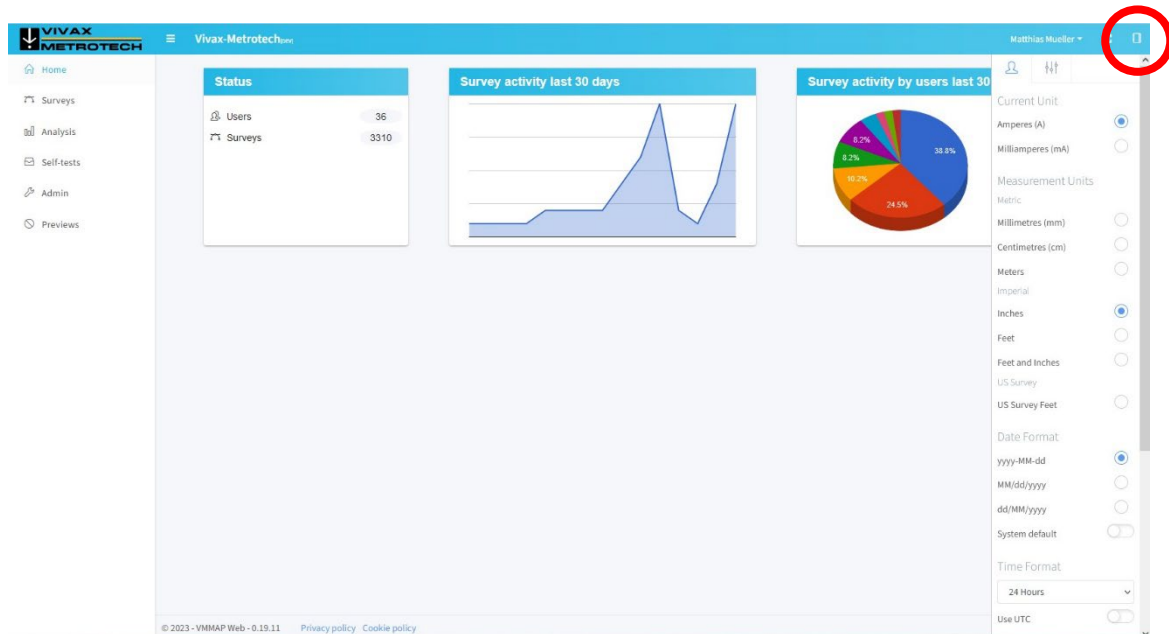
- h. Select storage location, assign file names and select file type
- i. Depending on the selected file type, the data can then be processed further

3.2. Data backup in the cloud

To automatically back up the data in the cloud, the vLoc3 RTK-Locator must be registered. The cloud and the registration are free of charge and without obligation.

3.2.1. Register vLoc3 RTK-Locator in the cloud for free

- Open the VMMap App in your web browser (Mozilla Firefox may cause problems, therefore Google Chrome or Microsoft Edge are recommended as browsers), using the following address:
<https://vmmmap.vxmt.com>
- If you have not already done so, register first by clicking on "No account yet? Create one"
- After entering your data, activate your account via the link sent to your email address
- Then enter your username and password and click on "Sign in"
- First select the correct units of measurement in the settings. To do this, click on the icon in the upper right corner to open the menu bar:



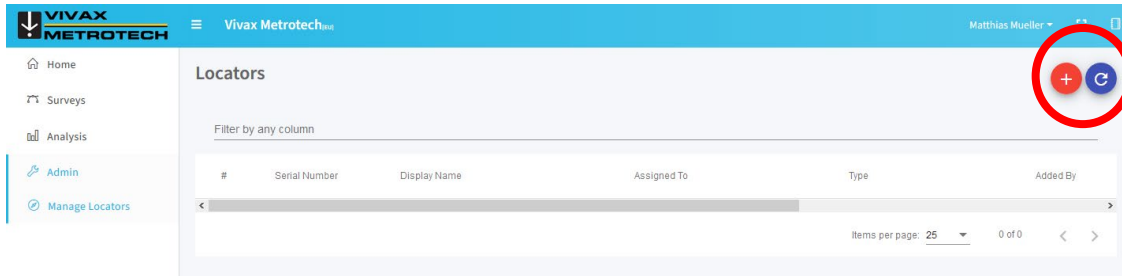
Recommended selection:

- Current Unit: Amperes (A)
- Measure Unit: Meters
- **!! Important setting!! The measure unit is also valid for the longitude and latitude. With a setting on "Imperial", these are exported wrongly.**
- Date Format: DD/MM/YYYY
- Time Format: 24h
- Coordinates Format: Degrees Minutes Seconds (DMS)
- Map settings: select "Show markers", "Show connecting lines" and "connect merged surveys"

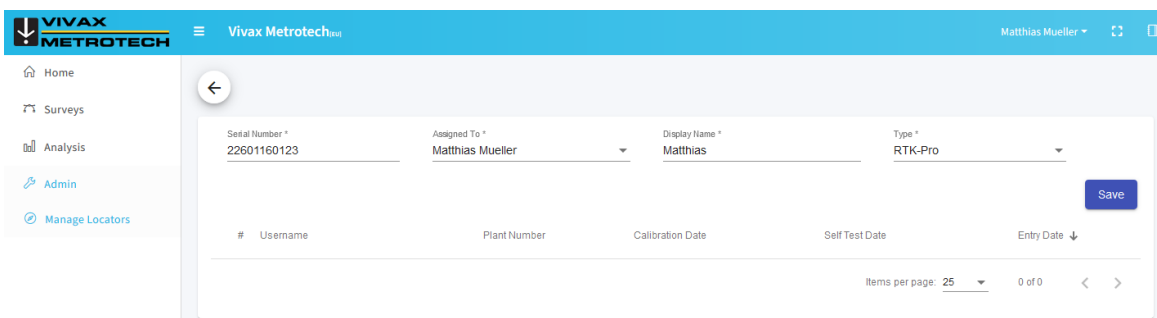
The selected settings are automatically retained until they are changed again.



- f. After you have made your selection, click on "Admin" in the left status bar and then on "Manage Locators"
- g. Now, click on the **red** button with the "+" in the upper right corner to enter the data of your vLoc3 RTK Locator. (If the Vloc3 RTK receiver has not been registered)



- h. Make sure that the serial number is entered correctly. Otherwise, the data will not be saved! As "Assigned to" select the user of the vLoc3-RTK and as "Display Name" select the desired name to be displayed during the analyses. The "Type" is automatically recognized by the serial number.
- i. Click on "Save".



The data stored in vLoc3 RTK Locator is automatically transferred to the cloud as soon as it has a data connection. (At the same time, the data will still be saved in the internal memory of the receiver)

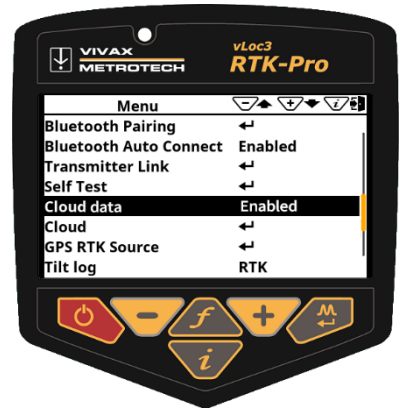
3.2.2. Load data from the cloud

- a. Open the VMMap App in your web browser: <https://vmmap.vxmt.com>
- b. Then enter your username and password and click on "Sign in"
- c. Click on "Surveys" and then select the desired measurement by mouse click
- d. Choose in the window that appears:
 - o Filters = Select filter criteria as required
 - o Export = select data format for saving

3.2.3. Disable cloud data transfer

In sensitive areas (e.g. military / airport) or critical infrastructure (e.g. gas supply), data transmission to the cloud can be deactivated in the receiver menu.

Caution: If disabled is selected, no data will be transmitted to the cloud. The data is stored only on the RTK-Pro receiver! Even after reactivation, this captured data is not uploaded to the cloud. The function must be reactivated manually.

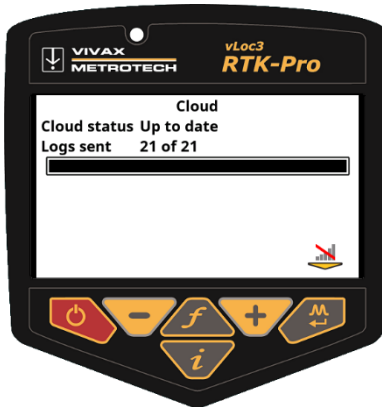
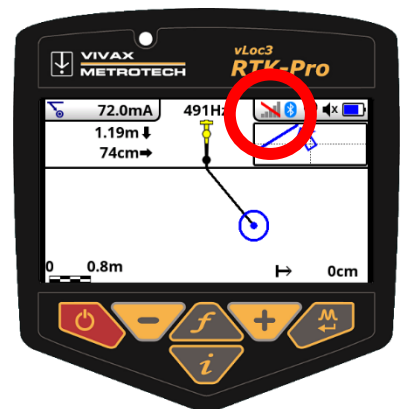
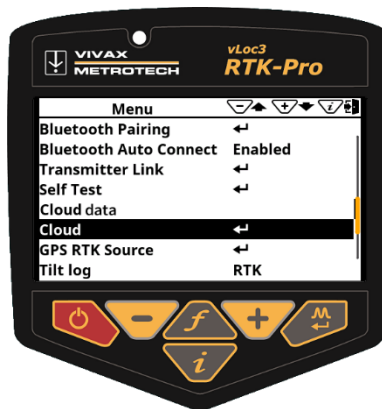


3.2.4. Disable mobile communication (flight mode)

The firmware update v1.41 is required. This function can be used to save data volume or to postpone the transmission. The deactivated cellular connection is also shown as an icon in the display.

Select the "Cloud" item in the receiver menu and then press the Enter key. In the "Cloud status" view, you can now deactivate or reactivate the cellular connection by pressing the Enter key.

Attention: If the mobile communication is switched off, no correction data is received (there is only a GPS/SBAS connection with reduced accuracy).



4. Object logging with features and attributes

Feature Logging is useful for collecting additional information pertaining to an underground utility or it is surrounding above ground point of interest. This means the direct entry of objects, object codes and attributes are now possible via the MyLocator3 desktop app. Furthermore Trimble® .fxl files can be imported.

4.1. Object list

To begin setup the object list to easily tag the data collected during the locating survey. Below describes the process of how to create and load the object list into the vLoc3 RTK-Pro using the MyLocator3 Software.

Necessary Software:

- Microsoft Excel® (from version 2008 with .xlsx format)
- MyLocator3 Desktop (Available on www.vivax-metrotech.com/support/downloads)

4.1.1. Setup and Import of the object list from Excel

The list can be created with Microsoft Excel® or a text editor. The formats .xlsx, .fxl, .xml, .txt or .vxj can be used. Excel® is used in this example.

Setup the data dictionary with assigned definitions and codes.

1. Start with a new document and single sheet.
2. Two columns are required one contain the "Definition" and the other a "Code" associated with that definition.
3. The first column "A" will contain the feature definition. The text entered here will be displayed on the vLoc3 RTK-Pro when the feature log list is presented to the user.

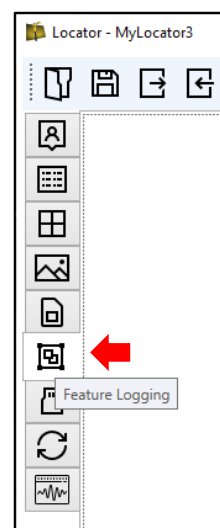
Note: A maximum of 48 characters can be entered.

4. In the second column "B" enter a code associated with the definition. Using codes will make sorting or parsing data easier after the data has been collected. The below contain a maximum of 7 characters.

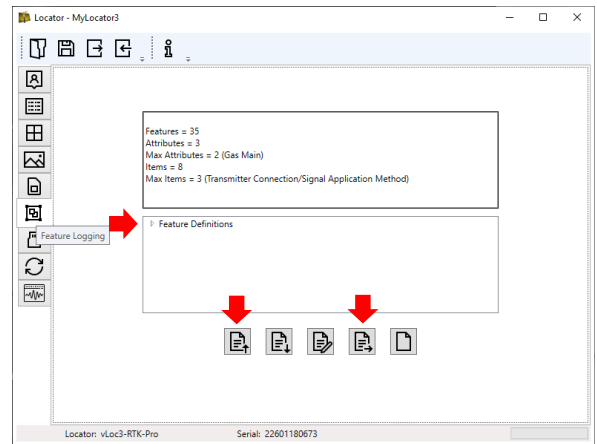
Note: A maximum of 9 characters can be entered.

5. Continue to add the necessary features. A maximum of 200 objects can be entered.
6. Save the file as Microsoft® Excel® Workbook (.xlsx) to your local storage drive. (**.xls will not work**)
7. Open MyLocator3 and connect the vLoc3 RTK-Pro using the USB cable.
8. Click on the tab on the left labelled "Feature Logging"

	A	B
1	Gas Line	GL
2	Gas Line Vent	GLV
3	Gas Meter	GME
4	Gas Manhole	GMH
5	Gas Service Valve	GSV
6	Gas Valve	GVALVE
7	Gas Well	WELLG
8	Electric Meter	EME
9	Electric Manhole	EMH
10	Power and Light Pole	PLP
11	Power Pole	PP
12	Electric Riser/Pedestal	UBOX
13	Water Line	WL
14	Water Line Vent	WLV
15	Water Meter	WME

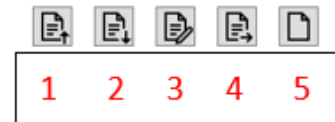


9. Once in the tab select the option “Open” to select the .xlsx file created in the previous steps.
10. Once the file has been selected a review on the containing features will be displayed, if you press the small triangle next to “Feature Definitions”. Now you may select “Download” to download the object list into the vLoc3 RTK-Pro.
11. Power off the unit so the changes take effect. At the next power up the object list will be available in the receiver.



Note: All information about each button is displayed when you move the mouse cursor over the buttons.

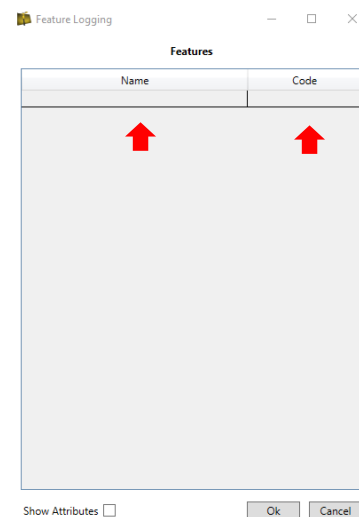
1. To import an already existing object lists in the formats .xlsx, .fxl, .xml, .txt or .vxj please click on the left button (1) and select the corresponding file
2. For later export, please click the button (2)
3. To edit or create the data, please click on the button (3)
4. Transferring the data to the receiver, click on button (4)
5. To delete the record, click on button (5)



4.1.2. Creating an object with the MyLocator3 app

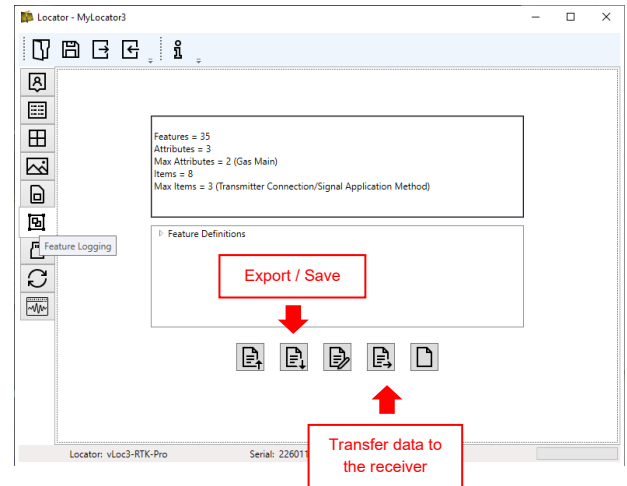
Important: Always export and save the data set before saving it on the receiver or closing MyLocator3!

1. As described in the previous section, click in the MyLocator3 app on the menu item "object feature" and then on the button "edit".
2. The following screen appears first, in which the characteristics, i.e. objects and, if necessary, their code can be entered. If you have already created an object list, you can import it beforehand, and the names or codes will be displayed directly. If you have not yet created a list, you can enter the object names and codes simply by clicking on the fields under "Name" or "Code".
3. If you want to move the names or codes, click, and hold the respective field and drag it to the desired position. Deleting fields is done with the "Del" key. Press "Enter" to open the next line.



4. Click "OK" to close the input mask.
5. Export and save your input now!
6. After successful saving, transfer the data to the vLoc3 RTK-Pro receiver.
7. Switch the receiver off and on again.

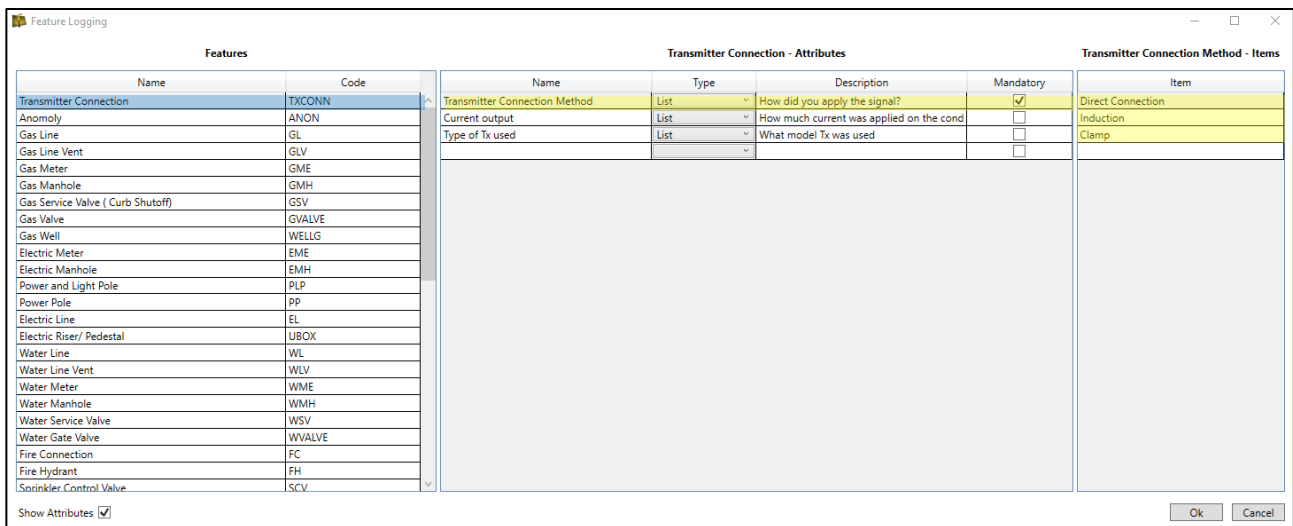
With this you have created and transferred a simple object list with codes.



4.1.3. Assigning attributes to objects

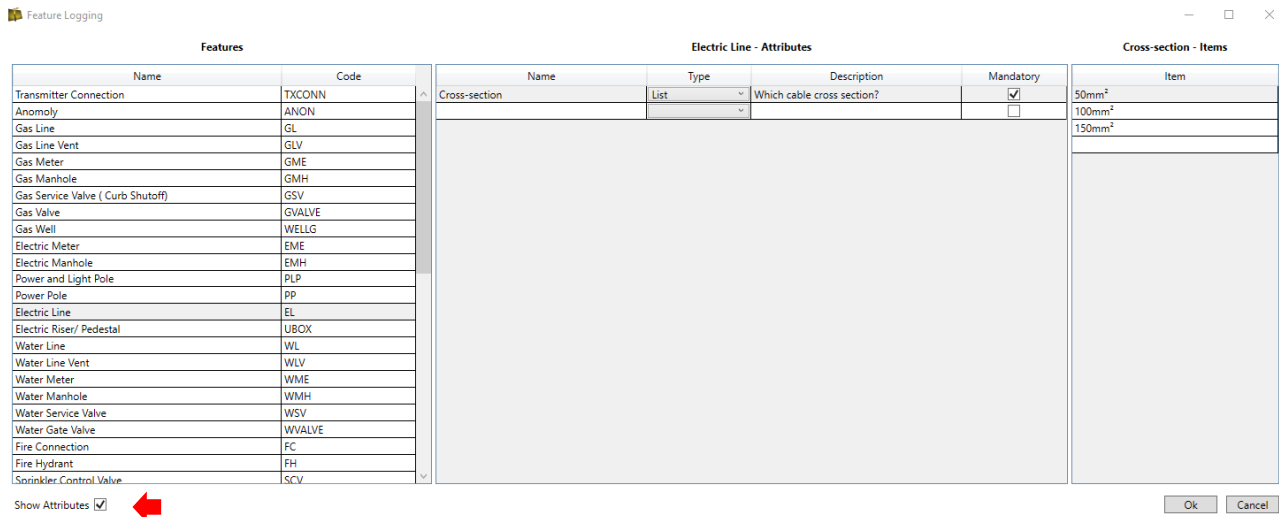
After you have created the list with the individual objects, one or more attributes can also be assigned to it. In the example shown, the previously entered object names or codes are displayed on the left under the heading "Features". If you click on an object (here "Transmitter connection"), the attributes assigned to the object will show besides. On the right under the "Transmitter Connection Method - Items" the answers to the attribute "Transmitter Connection" are listed. The fields can all be freely filled or moved.

Example:



Procedure:

1. Import or open your object list.
2. Check the "Show Attributes" option under the feature list.
3. Select the feature you want to give attributes to by clicking on it.
In the example, the feature "Electric line" is used.



Input fields under "Electric Line - Attributes" and "Cross Section - Items":

- a. **Name:** In the example image: "Cross section" is the name of the attribute.
- b. **Type:** This specifies the attribute as a word, or as a barcode.
- c. **Description:** Here the "question" for the attribute is asked.
In this example: "Which cable cross-section?"
- d. **Mandatory:** If the checkmark is set, this is a mandatory field. This means that the user in the field must necessarily answer the previously asked question to get to the next screen on the receiver.
- e. **Item:** These fields can contain the respective answers to the question.
In this example: 50mm², 100mm², etc.

In the same way, attributes can be assigned to all other features.
When you have assigned attributes to all objects, click "OK".

Important: Now export and save the file!

The export file ending will be: .vxj. This data format can be used only with the MyLocator3 desktop app.

After saving, transfer the file to the vLoc3 RTK-Pro receiver as described above.

To collect a feature start by entering the main menu and scroll to the "Feature Log" menu option.

4.2. Object / Feature logging

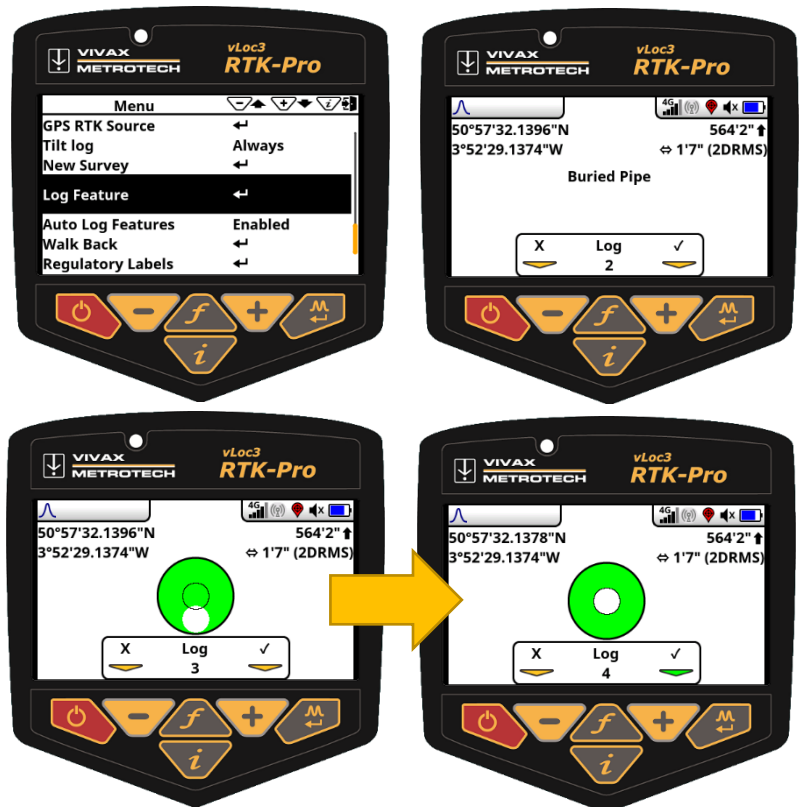
There are two ways to log objects/features:

- The first method is labelled as **“Log Feature”** in the main menu.
- The second method is labelled **“Auto Log Feature”** that is also found in the main menu.

4.2.1. Manually Log Feature

The “Log Feature” function is useful for collecting points of interest that do not carry a locating signal tone. For example, if a handhole cover is present but not directly part of the underground utility.

- Place the RTK-Pro on the point of interest.
- Long press on the “i” key to enter the main menu and scroll to Log Feature
- Once entered, the info-screen appears. Press the “f” pushbutton to open the data dictionary list with all the available definitions.
- Use the “+” and “-” key to scroll up and down the list. Once the required feature is reached press the “Return” pushbutton.
- The display will now display a quick review of the selected feature along with the logging screen.
- Press the “+” key to log now the receiver will display the spirit level and bubble to tilt the receiver to align the GNSS antenna.

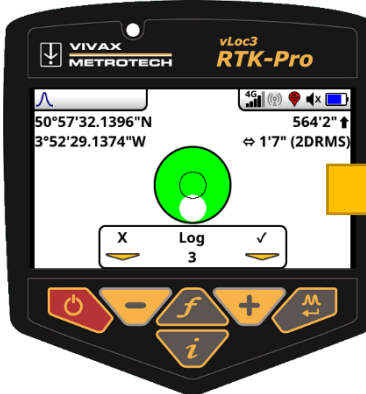
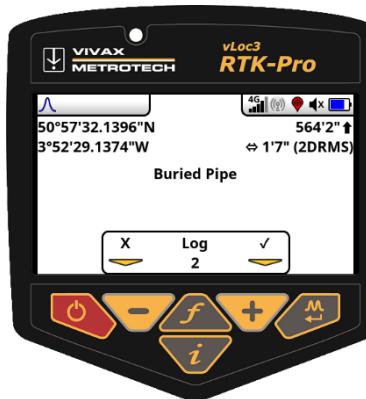


4.2.2.Auto Log Feature

The Auto Log Feature options helps with tagging data pertaining to the underground utility that will need to remain the same for more than one log.

Procedure:

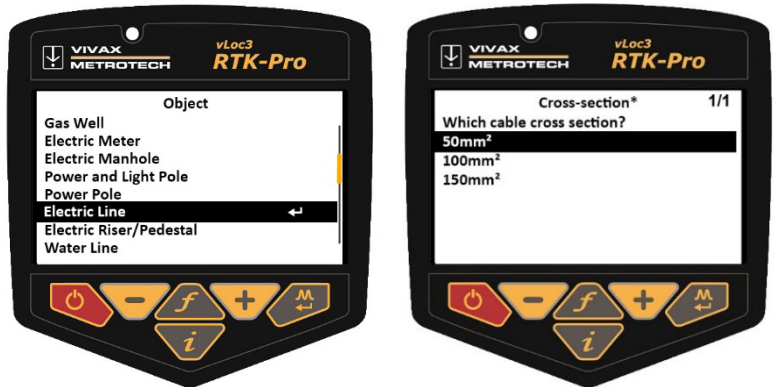
1. To enable the Auto Log Function, navigate to the main menu (push “i” key) and find “Auto Log Feature”. Two options are presented to the user Enabled or Disabled. Enabling this option will tag all the logs with a specified feature.
2. Press the "Enter" key to switch the setting from "disabled" to "enabled"
3. Leave the user menu by pressing the “i” pushbutton.
4. Locate the underground utility.
5. Enter the information screen by pressing the “i” key.
6. Press the “f” key to display the list of available features in the data dictionary. Use the “+” and “-” key to scroll up and down the list. Once the required feature is reached press the “Return” key.
7. The screen changes to the spirit level so that the point can be logged with cm precision. (If RTK signal is available). Bring the "bubble" to the centre of the spirit level and the point is automatically saved.
8. The screen will now revert to the locate screen and you can continue to locate the utility.
9. Continue to collect data as needed. If at any point the feature needs to be changed press the “f” pushbutton to open the data dictionary.



Note: From the moment when the automatic object recording is activated, every point that is recorded is provided with a feature. If you no longer want this, switch off the “Auto Log Features” recording in the main menu.

4.2.3. Manually Log Attribute manually

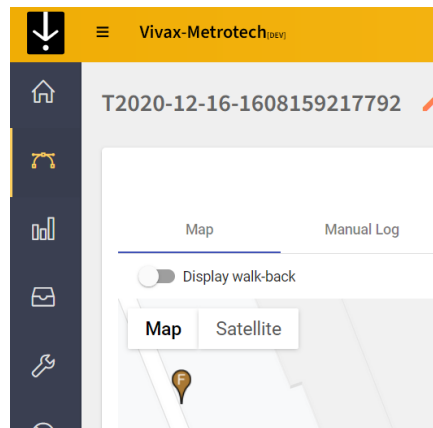
1. Long press on the "i" key
2. Select "Log Feature"
3. Press the "f" key and select the desired object:
4. Then select the respective attribute.
In the example, there is a "*" behind "Cross-section". This means that this is a mandatory field, and the user must answer the question.



4.3. Visualization data Logs in the VMMap Cloud

Once feature logs are synchronised with the utility survey in the cloud a unique pin is assigned. In the example below you can see the location pin is brown also the pin contains a "F" label.

When exporting the data to a .csv or .shp file the feature log data is also carried over. Below you can see the column labelled "Feature Code" and "Feature Description".

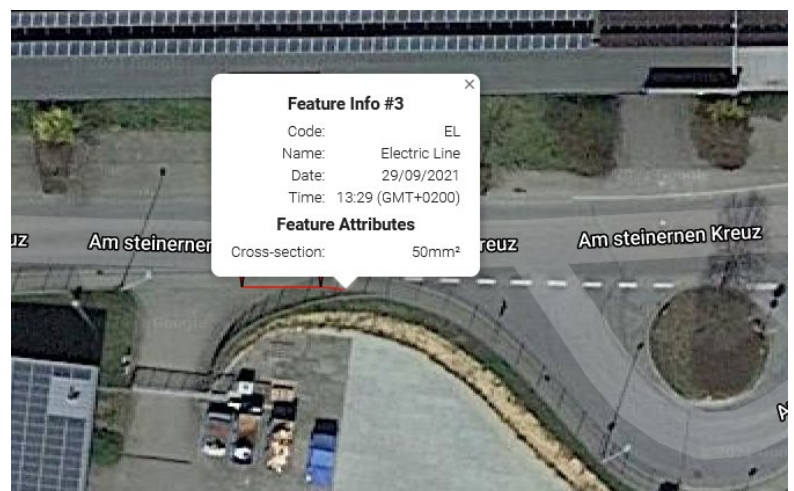


AS	AT
s	feature code
	feature description
GL	Gas Line
GL	Gas Line
GL	Gas Line
GL	Gas Line
GL	Gas Line
GL	Gas Line
GL	Gas Line
GL	Gas Line
GL	Gas Line
GL	Gas Line
GL	Gas Line

Visualization of the captured objects and attributes

Extract from the Excel file and map view with attributes in the cloud (click on the desired item and open "Feature Info")

AS	AT	AU	AV
ments	feature code	feature description	cross-section
	EL	Electric Line	50mm ²
	EL	Electric Line	50mm ²
	EL	Electric Line	50mm ²



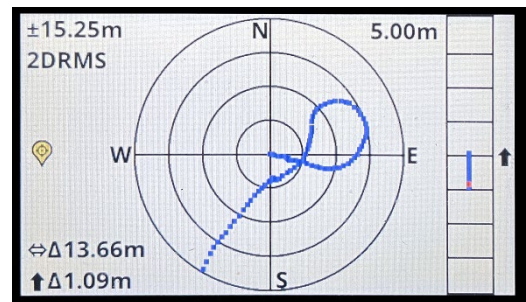
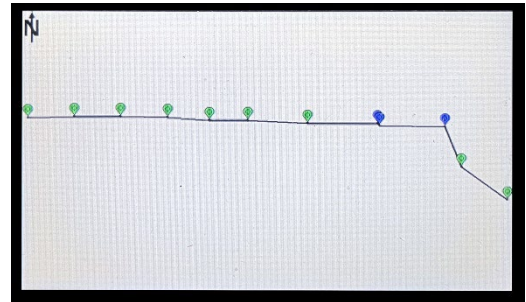
4.4. Additional Survey View and GPS Deviation screens (Receiver)

With the update v1.41 additional screens can be enabled via MyLocator3. The Survey View gives an overview and allows a quick check of the course of the track and the accuracy of the measured points.

With the GPS accuracy (GPS Deviation) the deviation in x-, y- and z-direction is displayed for a specific point.

Advantage: Deviations in float or GPS are displayed immediately (multipath). The view facilitates the decision in the field whether the recorded point is usable.

The two views can be activated up via the receiver menu after the function has been enabled via MyLocator3.



5. Walk Back Feature

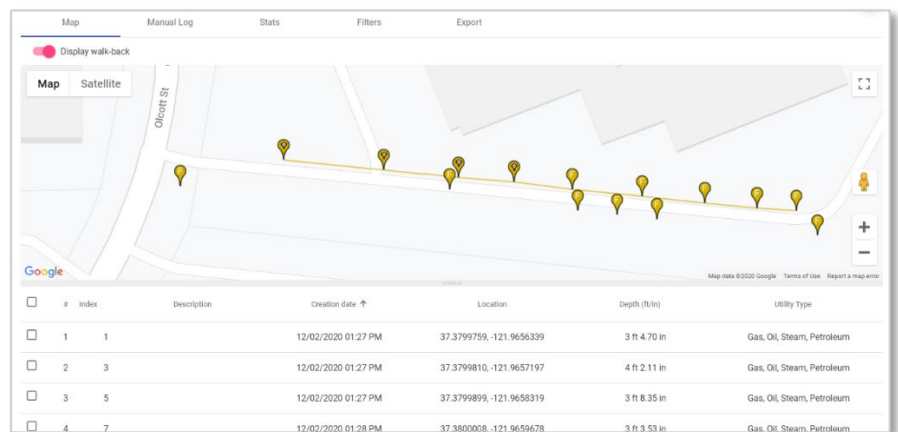
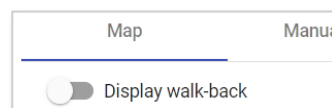
The RTK-Pro's walk back feature will lead the user to previously collected GNSS coordinates.

To use the walk back feature, update the RTK-Pro's software using the MyLocator3 desktop app and create an account in the VMMap Web Portal at <https://vmmap.vivax-metrotech.com/login>.

5.1. Add Walk Back Point via VMMap Cloud

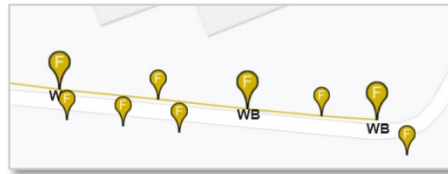
Add the list of desired points into the VMMap web portal. These desired points will come from surveys already stored in the VMMap cloud and collected with an RTK-Pro receiver.

1. The survey list opens a survey containing the desired point that would need to walk back to.
2. Once the survey is open start from the "Map" tab.
3. On the top left an option with a slider labelled "Display Walk Back" select this to toggle to view the map's points.
4. The list of points collected in the survey job are displayed on a map like the below.



- Note the check box next to the number of points contained in the survey. Identify the point to be added to the walk back list and click on the check box.
- When logs are selected, the letters "WB" will show beside them, and the map pins are temporally animated.

#	Index	Description	Creation date ↑	Location	Depth (ft/in)	Utility Type
<input checked="" type="checkbox"/>	1	1	WB-1	12/02/2020 01:27 PM	37.3799759, -121.9656339	3 ft 4.70 in Gas, Oil, Steam, Petroleum
<input type="checkbox"/>	2	3		12/02/2020 01:27 PM	37.3799810, -121.9657197	4 ft 2.11 in Gas, Oil, Steam, Petroleum
<input type="checkbox"/>	3	5		12/02/2020 01:27 PM	37.3799899, -121.9658319	3 ft 8.35 in Gas, Oil, Steam, Petroleum



- Once the desired points are selected an automatic description is assigned. These descriptions can be edited if so desired.

#	Index	Description	Creation date ↑	Location	Depth (ft/in)	Utility Type
<input checked="" type="checkbox"/>	1	1	Transmitter connection	12/02/2020 01:27 PM	37.3799759, -121.9656339	3 ft 4.70 in Gas, Oil, Steam, Petroleum
<input type="checkbox"/>	2	3		12/02/2020 01:27 PM	37.3799810, -121.9657197	4 ft 2.11 in Gas, Oil, Steam, Petroleum
<input checked="" type="checkbox"/>	3	5	POI near meter	12/02/2020 01:27 PM	37.3799899, -121.9658319	3 ft 8.35 in Gas, Oil, Steam, Petroleum
<input type="checkbox"/>	4	7		12/02/2020 01:28 PM	37.3800008, -121.9659678	3 ft 3.53 in Gas, Oil, Steam, Petroleum
<input checked="" type="checkbox"/>	5	9	POI near valve	12/02/2020 01:28 PM	37.3800138, -121.9661177	2 ft 8.85 in Gas, Oil, Steam, Petroleum

- When all the needed points are selected click on the "Add" option on the bottom left.

#	Index	Description	Creation date ↑	Location	Depth (ft/in)	Utility Type
<input checked="" type="checkbox"/>	1	1	Transmitter connection	12/02/2020 01:27 PM	37.3799759, -121.9656339	3 ft 4.70 in Gas, Oil, Steam, Petroleum
<input type="checkbox"/>	2	3		12/02/2020 01:27 PM	37.3799810, -121.9657197	4 ft 2.11 in Gas, Oil, Steam, Petroleum
<input checked="" type="checkbox"/>	3	5	POI near meter	12/02/2020 01:27 PM	37.3799899, -121.9658319	3 ft 8.35 in Gas, Oil, Steam, Petroleum
<input type="checkbox"/>	4	7		12/02/2020 01:28 PM	37.3800008, -121.9659678	3 ft 3.53 in Gas, Oil, Steam, Petroleum
<input checked="" type="checkbox"/>	9	9	POI near valve	12/02/2020 01:28 PM	37.3800138, -121.9661177	2 ft 8.85 in Gas, Oil, Steam, Petroleum

Items per page: 5 1 - 5 of 9

- A pop-up window will appear with the option of a drop-down with available RTK-Pro serial numbers. Select one or more serial numbers of receivers who would need the Walk Back points assigned. Click on the "Save" button.

Add to walk-back

Locators

Cancel Save

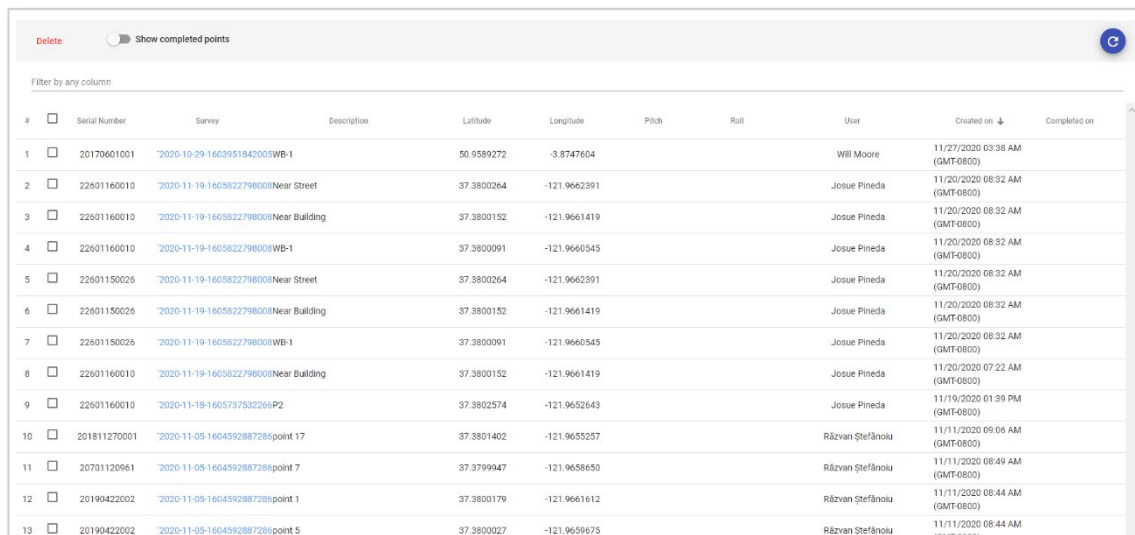
Add to walk-back

- 30701120493 - John Doe
- 22601888888 - L201
- 22601160126 - Luke demo RTK
- 20701120517 - Luke Smith
- 22601150026 - Matt Manning
- 20701131557 - R.Nicol

Walk back

- To edit and viewpoints added to the Walk Back list go to the Walk Back tab.

- Here an overview of the Walk Back points assigned to users within the company will be displayed with open or completed status.



#	Serial Number	Survey	Description	Latitude	Longitude	Pitch	Roll	User	Created on ↓	Completed on
1	20170601001	2020-10-29-1603951842005WB-1		50.9589272	-3.8747604			Will Moore	11/27/2020 03:38 AM (GMT+0800)	
2	22601160010	2020-11-19-1605822798008Near Street		37.3800264	-121.9662391			Josue Pineda	11/20/2020 08:32 AM (GMT+0800)	
3	22601160010	2020-11-19-1605822798008Near Building		37.3800152	-121.9661419			Josue Pineda	11/20/2020 08:32 AM (GMT+0800)	
4	22601160010	2020-11-19-1605822798008WB-1		37.3800091	-121.9660545			Josue Pineda	11/20/2020 08:32 AM (GMT+0800)	
5	22601150026	2020-11-19-1605822798008Near Street		37.3800264	-121.9662391			Josue Pineda	11/20/2020 08:32 AM (GMT+0800)	
6	22601150026	2020-11-19-1605822798008Near Building		37.3800152	-121.9661419			Josue Pineda	11/20/2020 08:32 AM (GMT+0800)	
7	22601150026	2020-11-19-1605822798008WB-1		37.3800091	-121.9660545			Josue Pineda	11/20/2020 08:32 AM (GMT+0800)	
8	22601160010	2020-11-19-1605822798008Near Building		37.3800152	-121.9661419			Josue Pineda	11/20/2020 07:22 AM (GMT+0800)	
9	22601160010	2020-11-18-160573753226P2		37.3802574	-121.9652643			Josue Pineda	11/19/2020 01:39 PM (GMT+0800)	
10	201811270001	2020-11-05-1604592887286point 17		37.3801402	-121.9655257			Răzvan Ștefănoiu	11/11/2020 09:06 AM (GMT+0800)	
11	20701120961	2020-11-05-1604592887286point 7		37.3799947	-121.9658650			Răzvan Ștefănoiu	11/11/2020 08:49 AM (GMT+0800)	
12	20190422002	2020-11-05-1604592887286point 1		37.3800179	-121.9661612			Răzvan Ștefănoiu	11/11/2020 08:44 AM (GMT+0800)	
13	20190422002	2020-11-05-1604592887286point 5		37.3800027	-121.9659675			Răzvan Ștefănoiu	11/11/2020 08:44 AM (GMT+0800)	

- To view completed Walk Back points toggle the "Show completed points" option.

5.2. Manually entry Walk Back point in the receiver

The advanced walk-back function allows direct input of coordinates in the vLoc3 RTK-Pro receiver.

Requirements:

This function requires that you have enabled the "Walk-Back" function in the MyLocator3 desktop application. If "Walk-Back" is displayed in the main menu of the receiver (open by long pressing the "i" key), the function is already enabled. Otherwise proceed as described in section 3 "Software update / Add new features".

Procedure:

For the direct input of coordinates, only the vLoc3 RTK-Pro receiver is required. Access to the VMMMap Cloud is not necessary.

- Switch on the vLoc3 RTK-Pro receiver
- Open the user menu with a long press on the "i" key
- Scroll with the "+" or "-" button to the item "Walk-Back" and press the "Enter" button to open the submenu
- Select the item "Manual Entry" with the "Enter" key
Key functions:
 - With a short press of the power button, the current location is entered as longitude and latitude when GPS is received. This makes the entry easier if you are already close to the point you are looking for.
 - With the "+" or "-" key, the first number can now be entered.
 - To enter the next number, briefly press the "f" key.
 - This will continue until the desired latitude and longitude are entered.
 - To save the point, press the "Enter" key.
- Now the vLoc3 RTK-Pro receiver will navigate you back to the desired point using the arrow.



5.3. Performing a Walk Back with the vLoc3 RTK-Pro

1. Now that the Walk Back points have been selected, the VMMMap cloud uses the RTK-Pro receiver containing the assigned receiver serial number and Walk Back points.
2. Navigate in the RTK-Pro menu to scroll to **Walk Back** and enter the sub-menu option.
3. At the **Get list** option and press the enter pushbutton to bring up the list of Walk Back points allocated to this receiver's serial number from the VMMMap Cloud.
4. Once the Walk Back points have been downloaded from the VMMMap Cloud, they are displayed in a list by the Walk Back point description. Scroll to the point needed to Walk Back to and click on the enter pushbutton.
5. Once the Walk Back point is selected a screen like the one shown on the right will be seen.



On this screen the following is displayed:

- Shows your current Latitude, Longitude and Altitude and horizontal accuracy in 2DRMS.
- Shows the horizontal distance from the locator GNSS antenna to the Walk Back point in the bottom right corner of the screen.
- When further from the Walk Back point and moving a guidance arrow points towards the Walk Back point.



Note:

- The Guidance arrow assumes you are walking with the locator in front of you with the bottom of the screen closest to your body in the usual way
 - When stationary, no guidance arrow is shown
6. Follow the guidance arrow to get near the Walk Back point. Once within 10-feet (3m) a crosshair icon will be displayed. A spirit level is shown. The centre of the spirit level represents the location of the GNSS antenna. You must maintain the locator's orientation and move forwards and backward, left and right, and not rotate the locator.
 7. As you walk toward the Walk Back point, you aim to get the red cross in the centre of the spirit level. Now the GNSS antenna is over the Walk Back point.
 8. As you tilt the locator to get the GNSS antenna over the locator's foot, you aim to get the spirit level bubble into the centre of the spirit level. When you have the locator's foot on the ground, and the Walk Back point the red cross and the spirit level bubble will be in the centre of the spirit level, as shown in the illustration to the right.



- Use the + key to log the Walk Back as complete. This records how accurately the Walk Back was performed and marks the Walk Back as complete in the VMap Cloud.



Delete Show completed points

Filter by any column

#	<input type="checkbox"/>	Serial Number	Survey	Description	Latitude	Longitude	Pitch	Roll	User	Created on	Completed on
9	<input type="checkbox"/>	22901160010	2020-11-18-1605737522964P3		37.3807233 37.3807231	-121.9652050 -121.9652055	0.3545702	0.0046726	Josue Pineda	11/19/2020 01:39 PM (GMT-0800)	11/19/2020 01:47 PM (GMT-0800)
10	<input type="checkbox"/>	22901160010	2020-11-18-1605737522964P2		37.3802574	-121.9652043			Josue Pineda	11/19/2020 01:39 PM (GMT-0800)	
11	<input type="checkbox"/>	22901160010	0loc3 monuments	Monument 2	37.3807265 37.3807265	-121.9652343 -121.9652342	0.3041711	-0.0099948	Josue Pineda	11/18/2020 12:30 PM (GMT-0800)	11/18/2020 02:12 PM (GMT-0800)
12	<input type="checkbox"/>	22901160010	0loc3 monuments	Monument 3	37.3802604 37.3802605	-121.9652825 -121.9652824	0.3451348	0.0003343	Josue Pineda	11/18/2020 12:30 PM (GMT-0800)	11/18/2020 02:13 PM (GMT-0800)



*Please note some screens and images have been simulated and do not represent the final product.

6. Possible Deviations and Interferences during measurement

As with all satellite connections, a clear view of the sky must be guaranteed. Trees, buildings or high-voltage power lines affect the accuracy and can interfere with the reception of the satellite signal.

Trees

Individual trees only have a minor effect on the signal, whereas a densely overgrown forest, especially a deciduous forest, can cause the satellite signal to be disturbed.

Bridges

Depending on the position and width of the bridge, the satellite connection may be interrupted.

Buildings

Most satellites are positioned around the equator. For example, in Germany, you therefore have a poorer "satellite view" if you are on the north side of a building. Buildings can also have metallic surfaces that reflect the satellite signal. These mirrored signals are called "multipath signals". The GNSS receiver also detects these mirrored signals, which can lead to a deviation. This also applies to buildings with a glass façade. Satellite signals do pass through glass, but the metallic frames reflect the signal.

Other deviations

The more the GNSS antenna on the receiver is covered, the poorer the reception. For example, if there are a lot of people standing around the antenna, the satellite view deteriorates and the deviation increases.

If there is no mobile phone connection and therefore no data transmission, it is not possible to receive correction data with the vLoc3 RTK-Pro. This means that the receiver only works with GPS and SBAS (DGPS) and can therefore achieve an accuracy of max. 60cm.

If the signal reception is disturbed by one of the deviations mentioned above, the accuracy deteriorates from RTK Fix (1-2 cm) to RTK Float (20-40 cm). RTK Float can also represent a higher deviation, as both the reception at the vLoc3 RTK-Pro GNSS antenna and the reception at the reference station can be disturbed. An exact deviation cannot be specified. This can only be determined when the data is analysed.

A 100% guarantee for centimetre-accurate position detection cannot be given, as the deviations and interferences mentioned can often not be avoided.

The localisation of the cables can always be recorded and evaluated independently of the RTK and GNSS connection. For points that lie outside the desired accuracy, it must be decided whether they should be deleted or, if necessary, corrected manually in a GIS software.

If a measurement based on a GNSS satellite connection is not possible, the only option is to use conventional surveying methods, e.g. total station measurement.

7. RTK Terms

2DRMS: Horizontal accuracy. Radius of the error circle in which one stands with 95% probability.

APN: Access Point Name – Is the name of the gateway between the mobile device and an external packet-based data network, often the public Internet. The APN of the respective mobile phone provider can be searched under Google. For example, for Deutsche Telekom it is internet.telekom

HDOP –Horizontal **Dilution of Precision**, see PDOP

NN: Normal Null - Is the designation of the reference surface for the specification of heights above sea level.

NTRIP: Networked Transport of RTCM via Internet Protocol
Transmission of correction data in RTCM format via Internet, usually via mobile phone

NTRIP-Caster: An NTRIP caster takes data from one or more data stream sources (base stations called NTRIP servers) and makes this data available to one or more end users (often called rovers), the NTRIP clients.

NTRIP-Client: Program for data exchange and further processing of correction data

PDOP – Positional Dilution of Precision: Is a dimensionless value that indicates the position accuracy in satellite navigation. This is directly dependent on the satellite positions in space and on the position of the satellites in relation to each other.

RTK – Real Time Kinematic: Method of geodesy for measuring or staking out points by means of satellite-based navigation systems such as GPS, GLONASS, Beidou or Galileo

RTK Sources: RTK sources are the available base stations or virtual base stations of the respective correction data service provider. Available RTK sources can be selected in the locator menu after logging in to the provider

RTCM – Radio Technical Commission for Maritime Services: Standard for transmitting corrections for GNSS applications. It contains data elements, time intervals between transmissions, data segment sizes, units and resolution of the parameters to be transmitted, the format of which is defined in different data types.

UTM System – Universal Transverse Mercator: The UTM system is a global coordinate system

VDOP – Vertical Dilution of Precision, see PDOP

	EPS (Real-time positioning service)	HEPS (High Precision Real-Time Positioning Service)	GPPS* (Geodetic Postprocessing Positioning Service)
Procedure	Realtime	Realtime	Postprocessing of data
Accuracy (position / height ²)	0,3-0,8m / 0,5 – 1,5m	1-2 cm / 2-3cm	<1cm / 1-2cm, depending on the evaluation software
Data format	RTCM 2.3 VRS-Code-corrections	RTCM 3.2 (VRS), RTCM 3.2 (MAC), RTCM 3.2 (FKP)	RINEX
System	GPS, GLONASS	GPS, GLONASS	GPS, GLONASS
Transmission medium	Internet, (NTRIP)	GSM, Internet (NTRIP)	Internet (Online, Download)
Clock rate	One second	One second	>1 second

* Not supported by our VMMap Cloud. A separate GIS program is required to post-process the data.



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