

GUIDELINEGEO | MALÅ

MALÅ Controller App
User manual

Our Thanks...

Thank you for choosing Guideline Geo and MALÅ! The very core of our philosophy is to provide our users with great products, support, and services. Our team is committed to providing you with the most efficient and easy-to-use solutions with the capability to meet your needs for efficiency and productivity.

Whether this is your first MALÅ product, or addition to the MALÅ collection, we believe that small investment of your time to familiarize yourself with the product by reading this manual will be rewarded with a significant increase in productivity and satisfaction.

Please let us know about your use and experience of our products as well as the contents and usefulness of this manual. We're excited to be part of your journey!



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Release Date:
Version:

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Items needed

- A compatible Android mobile device. Please contact your Guideline Geo representative for more information on recommended units.
- For some mobile devices, a power bank is recommended to extend the survey time.
- An App-Enabled antenna. Contact support@guidelinegeo.com with your antenna serial number for information on compatibility or required upgrade.
- The MALÅ Controller App package: **Scan the QR code for download**



Installation

Install MALÅ Controller App

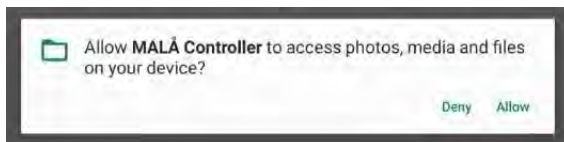
Copy the installation file (APK) to your mobile device storage and install the app.

Note: If installation fails, please uninstall any previous versions of MALÅ Controller App and try again.

Note: If you receive a security warning for unknown apps, enter SETTINGS and allow installation from this source.

When opening the MALÅ Controller App for the first time allow the app to access:

- Location
- Photos, media and files
- To record video, take photos and record sound



Set up a mobile hotspot

To set up the mobile hotspot (for communication between or MALÅ antenna and the mobile device), you will need the serial number (s/n 8 digits) from the MALÅ antenna to be used. This is found on a label, close to the battery (for GX antennas) or at the rear right corner (for EL Core).



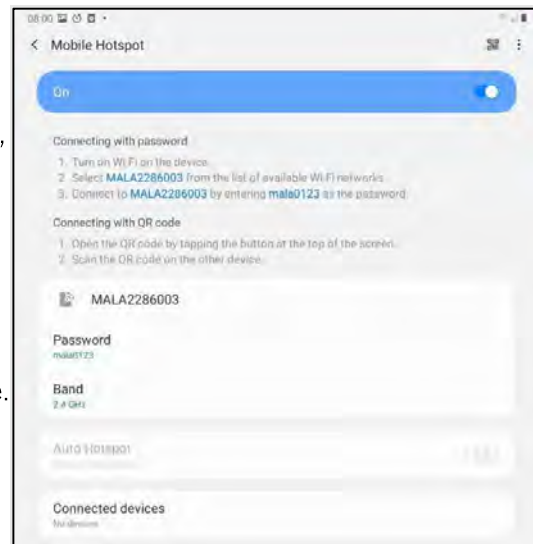
Settings for Android 10

On your mobile device, enter Settings -> Connections -> Hotspot or Tethering

Change the network name (SSID) to **MALAxxxxxxx**, where xxxxxxxx will be replaced with all 8 digits from the antenna serial number.

Change the password for the mobile hotspot to **mala0123**.

Finally, enable the mobile hotspot to allow this specific antenna to connect to your mobile device.

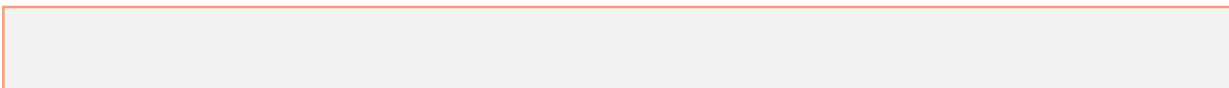
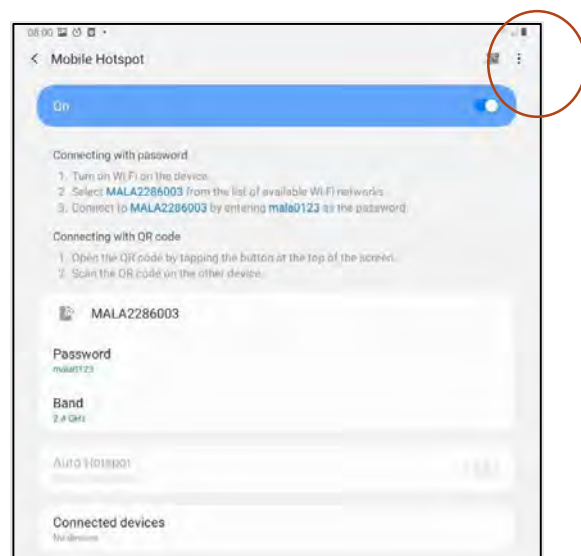


Change the Mobile hotspot timeout settings to **Never timeout**, to avoid corrupting the measurements, due to mobile hotspot deactivation by the android system.

To change this settings enter the Mobile hotspot settings (three dots, upper right corner) and then **Timeout settings**.

You can change the settings for Wi-Fi sharing in the Mobile Hotspot screen as well. Choose the three dots and then **Wi-Fi sharing**.

Enable sharing to have both Wi-Fi and Mobile hotspot running at the same time. If this is not available, use a Bluetooth pairing to another mobile device to enable data sharing.



Note: For some mobile devices without Internet connection, a sim card needs to be inserted. A dummy card may be used.

Note: While measuring, disable Wi-Fi on your mobile device, and only keep the mobile hotspot active (for communication between the MALÅ Controller App and the GPR antenna). This will minimize the risk for connectivity issues.

Settings for Android 11

On your mobile device, enter Settings -> Connections -> Hotspot or Tethering

Press Configure.

Change the network name (SSID) to **MALAXxxxxxxx**, where xxxxxxxx will be replaced with all 8 digits from the antenna serial number.

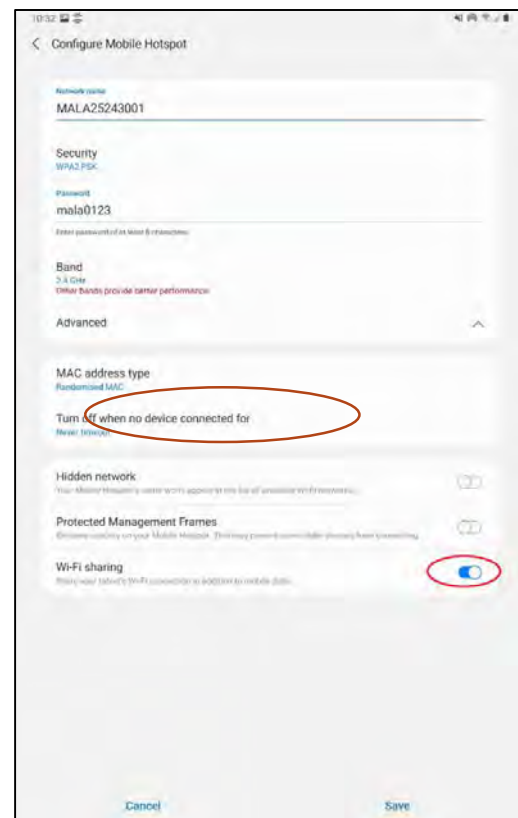
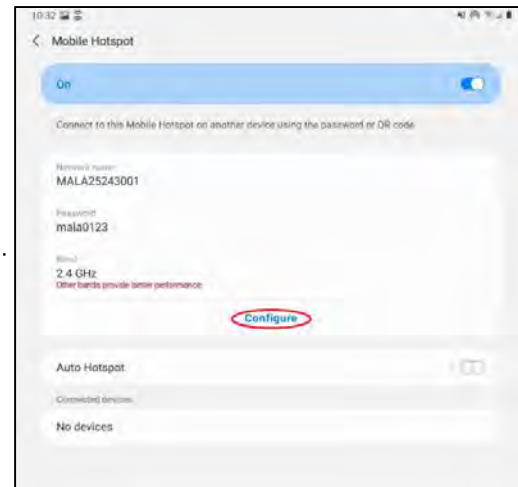
Change the password for the mobile hotspot to **mala0123**.

Press Advanced.

Now you can change the settings for Wi-Fi sharing. Enable sharing to have both Wi-Fi and Mobile hotspot running at the same time. If this is not available, use a Bluetooth pairing to another mobile device to enable data sharing.

Also change the change the Mobile hotspot timeout settings to Never timeout to avoid corrupting the measurements, due to mobile hotspot deactivation by the android system.

Finally, enable the mobile hotspot to allow this specific antenna to connect to your mobile device.



Note: For some mobile devices without Internet connection, a sim card needs to be inserted. A dummy card may be used.

Note: While measuring, disable Wi-Fi on your mobile device, and only keep the mobile hotspot active (for communication between the MALÅ Controller App and the GPR antenna). This will minimize the risk for connectivity issues.

Wireless connection

To communicate between the GPR antenna and MALÅ Controller App, Wi-Fi (mobile hotspot) is used. When communication is working, the antenna model is displayed to the left in the status bar in MALÅ Controller App together with battery and positioning status.

Successful connection:



No connection:



It is important to have a stable Wi-Fi connection between the mobile device and GPR antenna for effortless data collection. The MALÅ Controller App has advanced features to minimize the impact of difficult Wi-Fi conditions while you measure such as automatic sync to recover from interruptions.

Unstable Wi-Fi connections are typically caused by wireless interference. This can occur in apartment complexes or other dense areas, where several Wi-Fi networks are active nearby.

If you have issues with the wireless connection, please follow the troubles shooting guide in Chapter *Troubleshoot and Maintenance*.

Start a project and Main Menu

When starting the MALÅ Controller App, a new feature tour is provided to notify the user about the added functions in this version.

The feature tour can also be restarted from the About menu.

When pressing **GOT IT**, the tour finishes and the Start page is opened.



Here you have the option to:

- start a new 2D project (single profiles).
- start a new 3D project (grid measurements).
- enter the **Project manager** to continue or delete already created projects.
- export or open data in **MALÅ Vision**.



Here you also find the Main menu for navigation between:

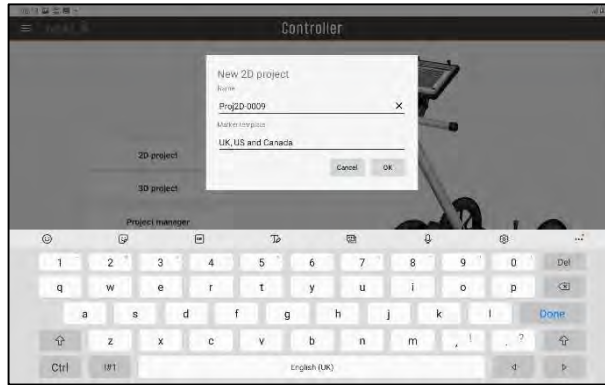
- Start page
- Measurement page
- **Settings page** (change antenna settings such as sample depth, trigger type, etc.)
- **About page**, giving information on the connected antenna and the app itself as well as a tour of new features.
- **Help and Support** where you directly can contact support and upload data.

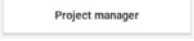


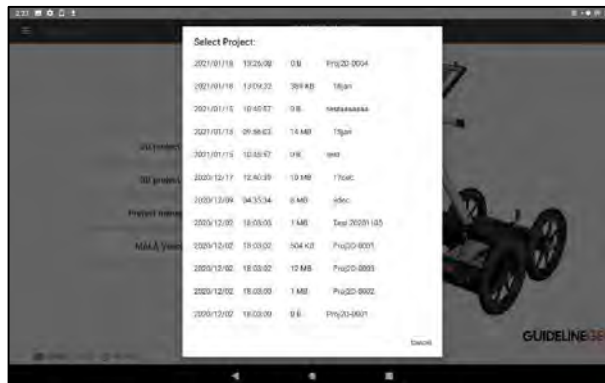
When choosing **New Project** (2D or 3D) you have the possibility to change the name or keep the automatically assigned name.

Here you also can choose between two marker templates for utilities, one for UK/US/Canada and one for Australia.

When done, the app opens the **Measurement** page. See Chapter *Measurements*.



If you select the **Project manager** icon , you can open and continue or delete previously made projects.



On the bottom bar of the app, the following information is displayed:

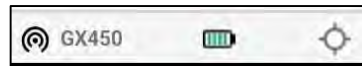
When the hotspot is not enabled, a red icon indicating no connection with the antenna and the text **NO HOTSPOT** is displayed.



If hotspot is enabled but the antenna is turned off, only the antenna icon is seen.



When contact is made with the antenna (this can take approx. 90 sec), a black antenna icon is shown with information regarding the connected antenna.



Note: If using an EL Core, two battery indicators are seen, one for each battery in the antenna.

The name of the current project and the profile number for the last recorded profile (if any) is also shown in the bottom bar. The total number of profiles in the current project is shown within the brackets [].



The positioning symbol, in the bottom bar, represents:



If no Bluetooth device (as GNSS or Total Station) is connected, the No Bluetooth device symbol is displayed.



User selected Positioning mode None (i.e., no positioning used).



Positioning device has no fix acquired.



GNSS device has fix quality but not RTK (Normal, DGPS, Float RTK).



GNSS device has fix quality RTK.



Total Station is used and connected.

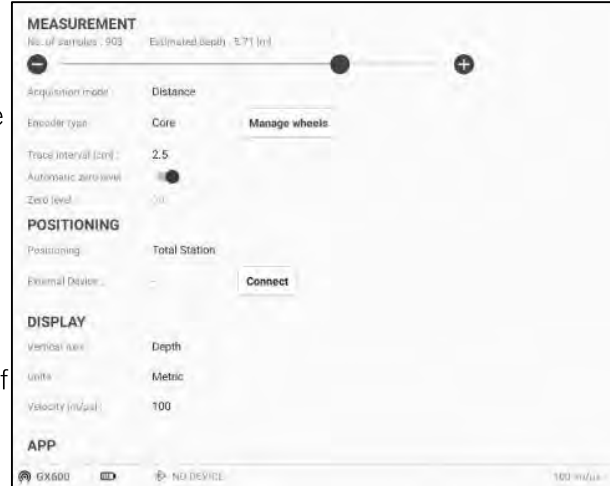
Note: In some cases (poor Wi-Fi connection, Wi-Fi disturbances, etc.) trace data will not be received from the antenna during the normal measurement procedure.

However, the antenna will continue to store all traces for the current profile and to ensure that all traces will be written to the profile file by the MALÅ Controller App, the app will request all missing traces during the sync function which will be executed after each measurement.

Measurement settings

Select **Settings** in the Main Menu . Here the following can be adjusted:

- Numbers of Samples to set the investigation depth. If the vertical scale is set to *Depth*, the estimated investigation depth will show as well. If the vertical scale is set to *Time*; the number of ns will be displayed.
- Time or Distance triggering.
- Encoder type and Manage wheels (add, recalibrate, reset and delete wheels).
- Trace or time interval.
- Automatic or manual zero level setting. If selecting manual, please set the number of samples for the zero level.
- Positioning, (see below).
- Vertical scale: Time or Distance.
- Measurement Units: Meters or Feet.



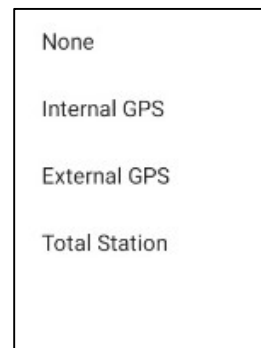
User mode (below the APP heading) is always left on Standard.

Note: The settings are automatically saved and if the application is restarted, the same settings will be used.

Positioning

In the Measurement settings you will also find the options for collection of positioning data:

- **None:** No positioning data is collected.
- **Internal GPS:** Positioning data is collected from internal GNSS in the antenna and data stored in a .cor-file.
- **External GPS:** Positioning data is collected from an external GNSS with Bluetooth connection and data stored in a .cor-file. When choosing External GPS, you will get a pop-up window with the available, paired GNSS antennas. See section *Positioning with external GNSS*.
- **Total Station:** Positioning data is collected from a Total Station with Bluetooth connection and data stored in a corc-file. See section *Positioning with Total Station*.



Note: When measuring a 3D project, the MALÅ Controller App creates temporary coordinates for relative positioning of the measured profiles in the grid, if no GNSS is in use. The grid will have the start coordinates as 0/0 and the local coordinate output will be stored in the .corc-file.

Positioning with external GNSS

The output from the external GNSS should be in NMEA0183 and GGA 5Hz. The positioning with an external GNSS can be carried out in two ways:

External GNSS with RTK-correction by base station



External GNSS with mobile RTK-correction.



If an external GNSS with mobile RTK-correction is used, carry out the following steps to connect between the MALÅ Controller App and the GNSS:

- 1) Use a mobile phone (with 4G/5G) and set up a hotspot to share internet with your GNSS antenna. Then the correction for the RTK-GNSS can be carried out through your mobile phone's internet connection.
- 2) Connect/pair your mobile device (tablet, with MALÅ Controller App installed) by Bluetooth to your GNSS antenna.
- 3) Set up a hotspot on your mobile device (tablet, with MALÅ Controller App installed), as explained in Chapter *Installation*, to connect the antenna with your mobile device.
- 4) When starting MALÅ Controller App, choose External GPS and select the GNSS antenna to connect.

Note: Depending on the mobile device and mobile phone used, it is good to make sure that any unnecessary connections as Wi-Fi and Bluetooth are turned off.

Positioning with Total Station

The output from a Total Station should be in pseudo-GGA and the positioning with Total Station can be made in two different ways:



- 1) Output of pseudo-GGA through Bluetooth. Connect the tablet with MALÅ Controller App installed to the Total Station hand unit, by Bluetooth. The first time, it is advisable to connect the hand unit to a PC by Bluetooth and verify the output by a terminal emulator (as TeraTerm or Putty). It should only be a pseudo-GGA message transferred.





- 2) Output by serial port on the hand unit. Use a Bluetooth-to-serial adapter and connect the serial cable from the hand unit to this adapter. The Bluetooth adapter is then connected (by Bluetooth) to the tablet with MALÅ Controller App. The following Bluetooth adapter is compatible with MALÅ Controller App: IOGEAR GBC232A. It needs power, which can easily be supplied by battery. Make sure that the hand unit is configured to output pseudo-GGA through serial interface.

Specifications on setting up Total Stations is not covered in this manual, see details from each manufacturer.

Measurements

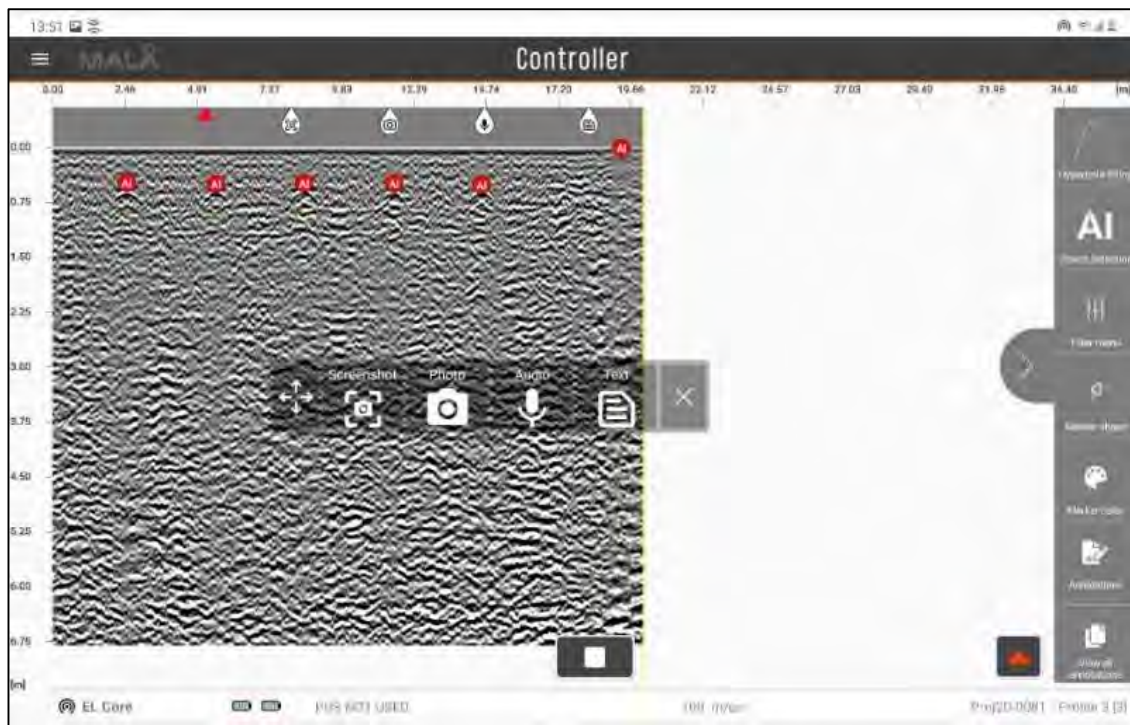
2D measurements

In the 2D Measurement page, press  to start a new profile. Press  to stop a profile. Data is automatically stored in the mobile device.

Note: If the red “start profile” dot is grey, there is no connection to the antenna, check the antenna and hotspot.

During a measurement you can:

- Use hyperbola fitting to set velocity or change velocity directly.
- Use MALÅ AI to aid in hyperbola identification.
- Apply filters such as background removal and gain etc.
- Add object markers anywhere in the radargram by tapping the screen.
- Add surface markers (at the location of the antenna) and annotations (screenshots, photos, audio annotations and text).



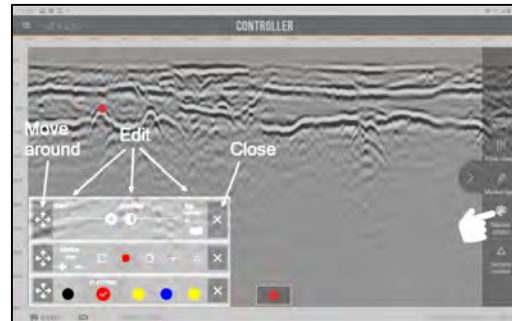
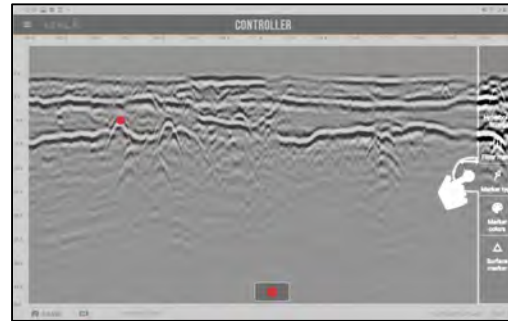
These options can be accessed by opening the slide-out menu:

- Slide out or click to open
- Slide in or click to close

Each dynamic menu in the slide-out menu, opens as a floating panel which can be placed anywhere in the MALÅ Controller App window.

Use  to move the panels around and close the panel with .

The functionality of the floating panels is described in detail below.



Note: You can also toggle between measured profiles in the project by tapping once on the project name (bottom right corner). This opens a Select Profile pop up where you can choose the profile to be opened.

When tapping on the profile name you see the present profile info and you can delete that single profile.

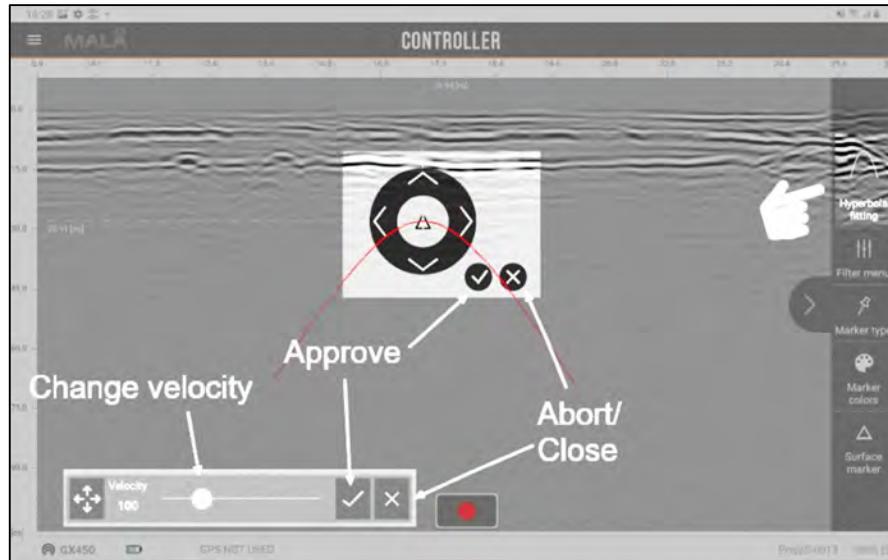
Note: The backtrack function, when going backwards with the measurement wheel, is the same as on any other MALÅ device. The current position of the antenna is indicated by a vertical yellow line.

Note: If the connection between the antenna and the MALÅ Controller App is lost during measurements, the collected data will be buffered in the internal memory of the antenna and retransmitted to the MALÅ Controller App once the connection is re-established.

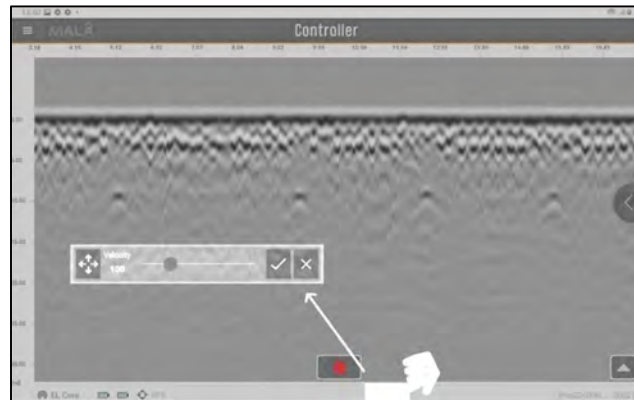
Hyperbola fitting

The global velocity can be set with the hyperbola fitting tool. Press Hyperbola fitting and place the hyperbola tool on top of your measured hyperbola. Fine adjustment of the location can be done with the arrows.

Change the velocity (and by that the shape of the hyperbola) using the slider.



During the measurement the selected velocity is visible in the status bar (below the radargram) and can also be changed directly. By pressing the velocity, a velocity slider appears for easy velocity adjustment.

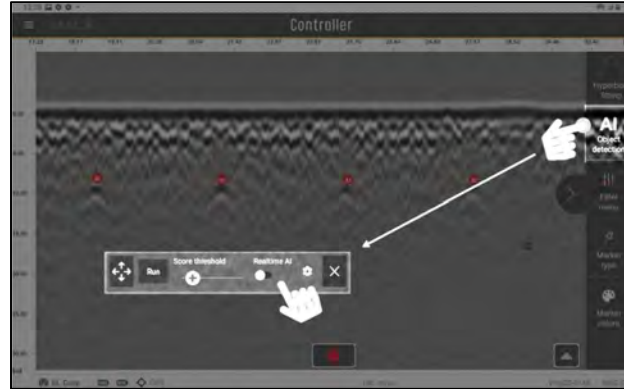


MALÅ AI

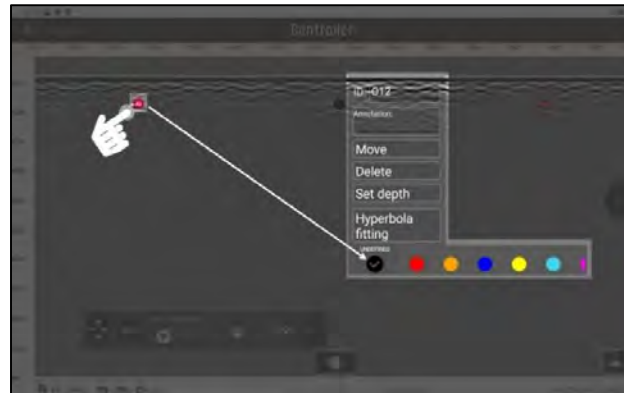
With MALÅ AI you get real-time assistance in identifying and marking hyperbolas in your data.

Activate the option in the *AI Object detection* floating panel and adjust the sensitivity using the score threshold slider.

In the settings menu , the search depth can be adjusted.

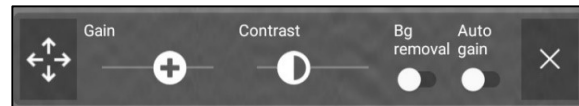


The AI markers are easily turned into object markers. Select the type and color in the floating panels and click on any AI marker. Now the marker can be edited in the same way as a manually placed marker.



Filters

In the filters panel you can adjust gain and contrast and apply background removal or auto gain.



Use the slider to increase or decrease the contrast or gain.

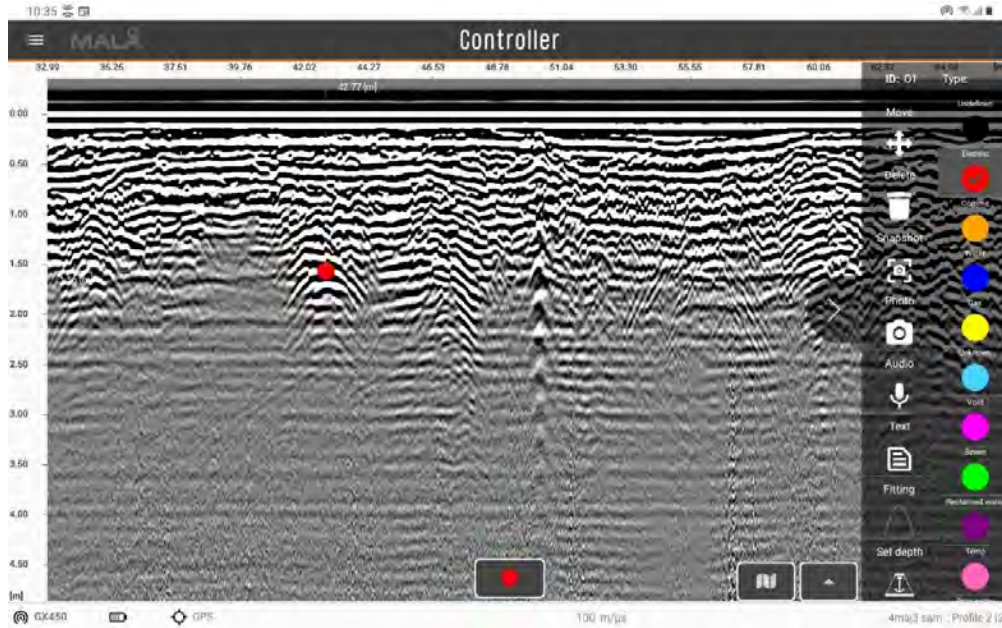
Marker type and colors

In the *Marker type* and *Marker colors* panels the type and color of marker can be set. The colors are based on a template, found in the measurement settings menu.

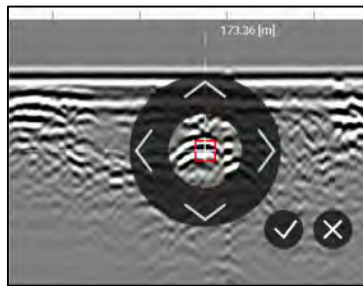


The set marker can be edited with a short press on the marker. In a slide out menu you can:

- Move the marker
- Delete the marker
- Take a Screenshot
- Take a Photo
- Record Audio
- Write a text annotation
- Carry out hyperbola fitting
- Set depth of the marker



Options for marker edit. With a short press on the marker the slide out menu will appear.



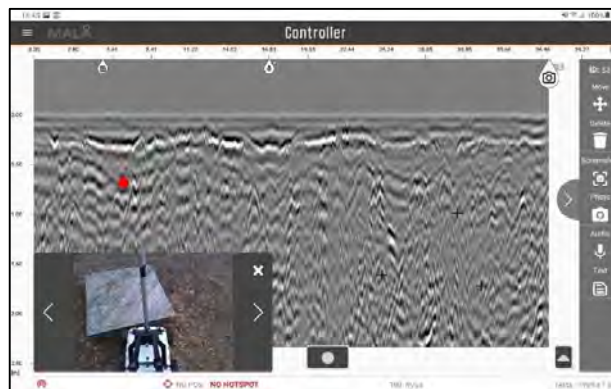
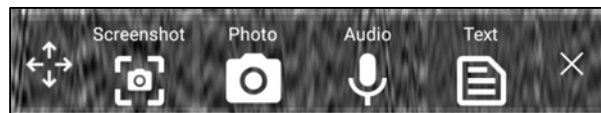
Whit the option Move, use the arrows for precise positioning or drag.

Annotations

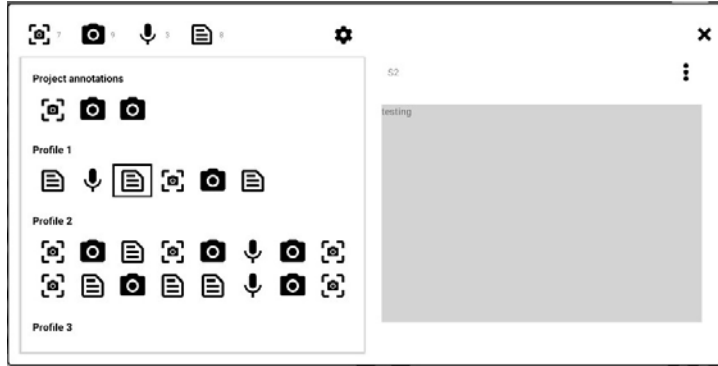
In the annotation menu you can add screenshots, photos, audio recordings and text and also tie them to specific markers in your profile. The annotation is placed at the last measured trace if you are in active measurement mode.

In the example to the right a photo annotation has been added and a preview of the collected photo is shown.

If you have stopped a profile and added an annotation it will be linked to the project instead of to a profile.



With the option *View all annotations* you see an overview of the added annotations for each profile and for the project. When clicking the annotation, it will open in the right-hand window.

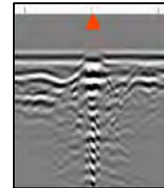


The annotations viewer can be sorted in different ways, and this can be controlled by tapping the cog wheel in the top middle part of the window. You can also sort the annotations by type. Simply click one (or several) of the annotation type icons in the top left row to view the selected type/s.

Surface marker

The option Surface marker places a marker on the surface at the last measured trace.

With a short press on the marker, a slide out menu appears where you can add text, photo, screenshot and audio annotations to the marker. You can also move or delete the surface marker.

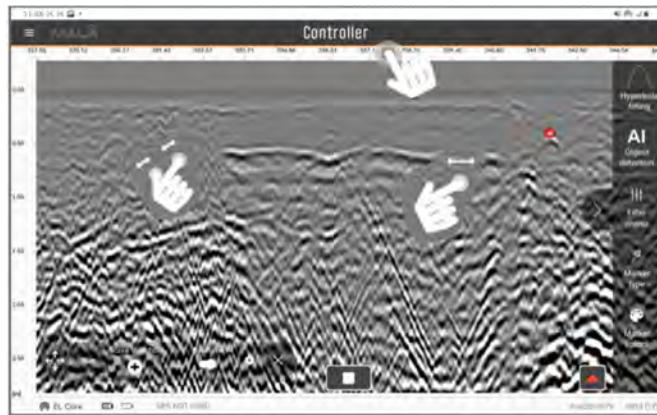


Pan, zoom and stretch

During measurement you also have the possibility to pan, zoom and stretch the data.

Pan Press one finger and move to pan in the profile left/right/up/down

Zoom Pinch and use two fingertips tip to zoom in and out in the data. The data will be zoomed proportionally for x and y.



Stretch Use two fingertips to zoom either vertically (down or up) or horizontally (left or right).

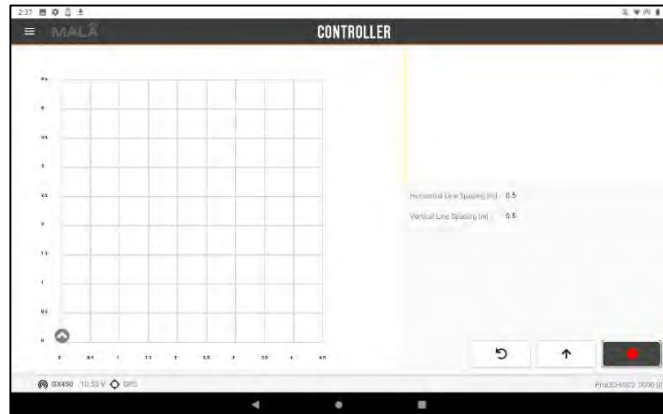
The set zoom will remain during your measurements.

To go back to the standard settings (normal aspect ratio), double-click either of the x- or y-axis.

3D Measurements

The project is started by defining the desired horizontal and vertical line spacing between your profiles in the grid.

Measure as many lines (in any length) as you wish. Data can be collected in either X or Y direction, but data collection needs to start from either the southern or western baseline for each profile. No zig zag data collection possible in the 3D measurement project at this time.



Data collection will be seen in the upper right corner and measured profiles are indicated with darker grey in the grid on the left side. See picture below.



Each line is started and stopped by  and .

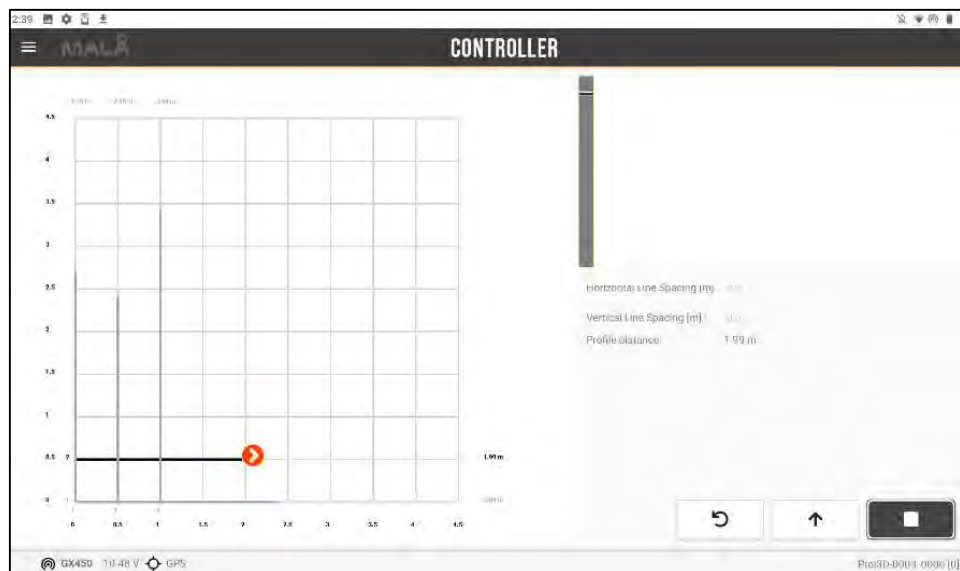
Note: You can zoom in and out in the radargram view during measurements.

Note: The grid is only a visualization and will not change if profiles are made longer. The profile length is seen above or on the right-hand side of the current profile, as well as underneath the radargram view.

When a line is completed, stop the line and press  to start a new line.

If you need to undo the last line, press .

If needed, change direction again to collect more data with  and .



Upload and data transfer

Export of data to MALÅ Vision is seamless and simple. Make sure your mobile device is connected to the Internet. This can be done by direct connection for the mobile device (Wi-Fi or 3G/4G) or sharing Internet to the mobile device from, for example, a mobile phone.

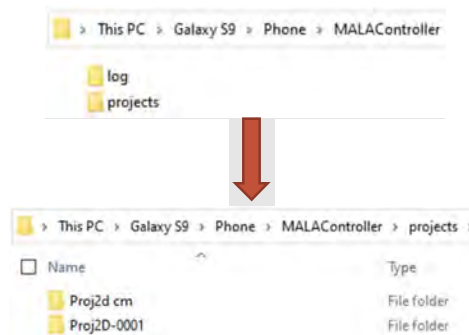


Simply press the MALÅ Vision button on the Main screen and choose if you want to Open or Export data.

Select the project to be uploaded.

Data can also be transferred by connecting the mobile device directly to a computer or by using the built-in sharing functionality in your Android device or through a third-party service such as Dropbox or OneDrive.

The MALÅ Controller App creates a MALÅ Controller folder, and in this folder, all created projects can be found.



The following data files are created:

- .rd7-files (raw data)
- .rad-files (header file)
- .mrkj-files (marker file with support for templates)
- .cor and .corc-files (positioning) .corc-files are created for 3D Grid projects collected without GNSS (or when collecting data with a total station) and can be opened and viewed in MALÅ Vision. There's currently no support for .corc-files in the MALÅ Object Mapper software.

Troubleshoot connectivity issues

Below is a troubleshooting guide for connectivity issues. Always check our website; guidelinegeo.com for the latest news and updates. If you can't find a solution to your connectivity issues, we recommend you to please contact Guideline Geo support (support@guidelinegeo.com) or your closest Guideline Geo sales representative. You can also contact support directly by going to the Help and Support page of the main menu. Add your name, your email, a description of your issues and, if you wish, your data and click send. Guideline Geo support will contact you as soon as possible in order to resolve your issue.

If you can't connect to the antenna at all, make sure you follow the workflow described in this trouble shooting workflow. **Make sure everything is configured exactly as described.**

1. Ideally set up your system in an **area with minimal Wi-Fi interference** to reduce potential problems.
2. Make sure that there are **no other hotspots** with the same network names (SSID) running on another mobile device in the vicinity. Do this by disabling the hotspot and by searching for Wi-Fi networks. Make sure there are no other Wi-Fi networks with the same SSID as you have set up.
3. Disable Wi-Fi on your mobile device and then turn off and turn on the hotspot again.
4. Make sure you're using the **correct SSID** for the hotspot (MALAxxxxxxx). The xxxxxxxx indicate the serial number of your GPR antenna. Also check the password, which should be **mala0123**
5. Make sure that the antenna **batteries are charged**. For Easy Locator Core, the indicator on the batteries should have at least two bars. The LED may be on even though there is not enough battery power to initiate connection to MALÅ Controller App.
6. If that doesn't work, **restart the MALÅ Controller App** on your mobile device and wait for at least 30 seconds. This is done by "Close all" or swipe off the app in the Recent view (button with three lines or a square).
7. If you still cannot get connection, or if you for some reason would lose connection to the antenna, press the **ON/OFF** button on the antenna **5 times** within 5 seconds. This will reinitialize the antenna and reset the connection. Please note that this reactivation process may take up to 2 minutes to complete.
8. If that doesn't work press and **hold the ON/OFF** button to turn the antenna off completely, then power it on again.