GUIDELINEGEO | MALÅ

MALÅ Easy Locator WideRange

User Guide

Our Thanks...

Thank you for choosing Guideline Geo and MALÅ as your Ground Penetrating Radar solution provider. The very core of our corporate philosophy is to provide our users with the very best products, support and services. Our development team is committed to providing you with the most technologically advanced and easy-to-use GPR products with the capability to meet your needs for efficiency and productivity now, and into the future.

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.

At Guideline Geo, we welcome comments concerning the use and experience with our products, as well as the contents and usefulness of this manual.

Guideline Geo team

Guideline Geo AB

www. guidelinegeo.com

Table of Contents

Preface

About this Manual

This manual is written for the end user of the product and explains how to set up and configure the product, as well as providing detailed instruction on its use.

Additional Resources

Training:	www.guidelinegeo.com/training-gpr-resistivity-seismics-tem/
Downloads:	www.guidelinegeo.com/support-service-advice-training/resource-center/
Applications:	www.guidelinegeo.com/application-areas/

Feedback

Feedback regarding the contents of this manual or the product may be sent using any of the contact details found at www.guidelinegeo.com

Safety and Compliance User Notices

This GPR-device is certified according to FCC, subpart 15, IC RSS-220 and ETSI EN 302 066-1&2.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

According to the regulations stated in ETSI EN 302 066-1 (European Telecommunication Standards Institute):

The control unit should not be left ON when leaving the system unattended. It should always be turned OFF when not in use.

The antennas should point towards the ground, walls etc. during measurement and not towards the air.

The antennas should be kept in close proximity to the media under investigation.

Canadian and US regulations state that whenever GPR antennas are in use the following notes apply:

This Ground Penetrating Radar device shall be operated only when in contact with or within 1m of the ground.

Only law enforcement agencies, scientific research institutes, commercial mining companies, construction companies and emergency rescue or firefighting organizations shall use this Ground Penetrating Radar Device.

This device complies with Industry Canada license-exempt RSS standards. Operation is subject to the following two conditions: (1) This device may not cause interference and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

French translations:

Cet instrument de Géoradar se devra d'être opéré seulement en contact à même le sol ou en deça d'un mètre du sol.

Cet instrument de Géoradar se devra d'être utilisé seulement par les agences chargées de l'application de la loi, les instituts de recherches scientifiques, les compagnies minières à buts lucratifs, les compagnies de construction et les organisations responsables pour le sauvetage et la lutte contre les incendies.

Cet instrument répond aux exigences de la licence avec Industrie Canada- exempt des standards RSS. L 'opération est sujette aux deux conditions suivantes : (1) Cet instrument ne peut pas causer une interférence et (2) cet instrument se doit d'accepter quelque interférence que ce soit, incluant une interférence qui pourrait causer une opération non-souhaitable de l'instrument.

Radiation Exposure Statement

To comply with ISED RF exposure compliance requirements, a separation distance of at least 20cm should be maintained between the EUT and all persons during normal operation.

Pour se conformer aux exigences de conformité d'exposition ISDE RF, une distance de séparation d'au moins 20 cm doit être maintenue entre l'EST et toutes les personnes pendant le fonctionnement normal.

Unpack. Inspect. Register

Great care should be taken when unpacking the equipment. Be sure to verify the contents shown on the packing list and inspect the equipment and accessories for any loose parts or other damage.

Note: The packing list that is included with the shipment should be read careful and any discrepancy should be reported to our sales department at **sales@guidelinegeo.com**

Note: All packing material should be kept in the event that any damage occurred during shipping.

File any claim for shipping damage with the carrier immediately after discovery of the damage and before the equipment is put into use. Any claims for missing equipment or parts should be filed with Guideline Geo within fourteen (14) business days from the receipt of the equipment.

Note: Two serial numbers are attached to the equipment, (1) on the underside of the monitor and (2) on top of the antenna.

Repacking and Shipping

The Guideline Geo packing kit is specially designed for shipping MALÅ Easy Locator WideRange. The packing kit should be used whenever shipping is necessary. If original packing materials are unavailable, pack the instrument in a box that is large enough to allow at least 80 mm of shock absorbing material to be placed all around the instrument. This includes top, bottom, and all sides.

Warning: Never use shredded fibres, paper, or wood wool, as these materials tend to pack down and permit the instrument to move inside its packing box.

Please read our shipping instructions before returning instruments to Guideline Geo. These instructions can be found on our website: www.guidelinegeo.com

Registering MALÅ Easy Locator WideRange

By registering your equipment, you ensure that you receive up-to-date documentation, software upgrades and product information, which all helps to optimize the utilization of the equipment and realize the maximum return on your investment.

To register your equipment, simply visit – www.guidelinegeo.com/product-registration on our website and submit the registration form.

System Assembly

MALÅ Easy Locator WideRange system consists of the WideRange antenna box, the Easy Locator controller and the MALÅ Rough Terrain Cart (RTC).

Hardware Set Up

Mount the MALÅ RTC according to the instruction in the *MALÅ RTC User Guide* and place the antenna on the skid plate.

Place the controller on the controller holder and use the two knobs to secure it.

The battery bag is attached to the RTC handle, using the two twist lock fasteners.

Adjust the four straps to raise or lower the antenna to the required height.

Note: Under normal conditions, the antenna should be kept in contact with the ground where possible. Position the antenna on the surface to be surveyed and then adjust the straps so there is a small amount of slack. This will compensate for any undulations along the survey line.

Connecting it all up

The following cables are connected:

- Battery cable from the battery bag to the antenna
- Battery cable from the battery bag to the controller
- Communication cable between the antenna and the controller
- Encoder wheel cable to the antenna.

Note: Look for the countersinks on the cables and place this towards the mark on the connection. Push lightly. If you have it in the correct position it will go in its position smoothly. To disconnect, pull out holding the metal part of the connector.

Note: The precision of the encoder wheel depends on several factors, such as the condition of measurement surface, the pressure applied on the wheel and possible wear.

Note: Choose the correct wheel type in the Measurement Parameters menu in 2D Project.

Start the MALÅ Easy Locator WideRange by pressing the power button on both the antenna and the controller.

To turn the antenna and monitor off, first select *QUIT* from the Main Menu, confirm the action by selecting *Yes,* then push the power button on the monitor and release quickly.

Note: The antenna will automatically turn off when the monitor is powered down.

Note: If a power cable is accidentally pulled out, the MALÅ EL WideRange components will start automatically when reconnected.

Antenna LED Indicators

Data: Continuous flashing light indicates the unit is working properly and ready for data collection. Irregular flashing on this LED means erroneous antenna configuration or possible software version issue. The LED switches to continuous illumination when the unit enters data collection.

GPS: Flashing light means that the GPS option is installed and that the internal computers are successfully communicating with the GPS-unit. This LED switches to continuous light whenever there's 4 or more satellites available.

Info: This LED indicates a serious system error, whenever active. Please contact your local Guideline Geo representative.

Battery Maintenance and Charging

12V/8.7Ah Li-ion batteries packs are shipped with the MALÅ Easy Locator WideRange and is the recommended power source for the antenna. Under normal operating and handling conditions, this battery is capable of up to 3.5 hours of continuous operation. The antenna will automatically turn itself off when the battery voltage drops below 10V. A meter showing the remaining battery capacity is displayed on the Controller.

During charging the LEDs on the charger indicates:

- Red = Charging
- Green = Maintenance charging

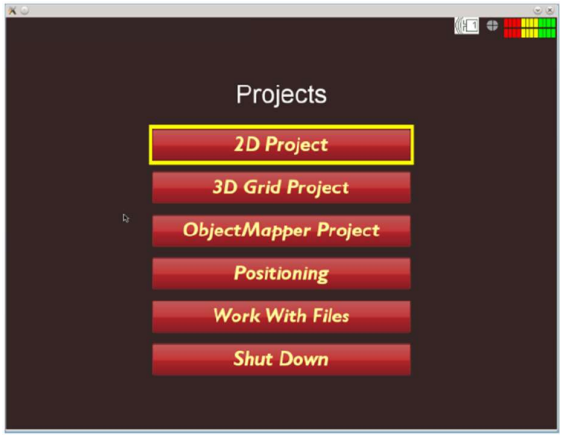
Charging time for the 8.7Ah batteries is approximately 3-5 hours (80%-100%). The temperature when charging should be within 0 °C to +45°C / 32 °F to 110°F. Do not charge the batteries in direct sunlight or when surrounding temperatures is below freezing point.

Tip: Though recharging up to 80% of the full capacity is typically very fast, it is recommended to keep the battery charging until it is fully charged to help extend the battery life.

Note: The battery charger can be left on after the battery has been fully charged where it will then automatically enter a maintenance-charging mode.

Tip: If storing the battery for long periods of time, discharge the battery to approximately 50%, this will maximise the life of the battery. Use the battery level indicator on the Controller to estimate 50%, wait until the indicator enters the yellow section, power down and remove the battery.

Main menu



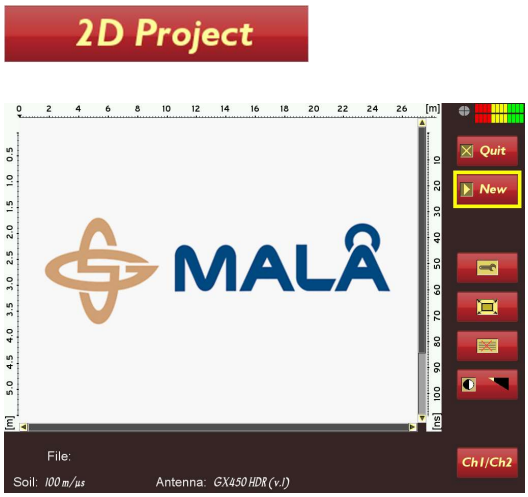
Note: The controller *Main Menu* appears about 20 seconds after turning on the controller and the antenna.

Navigating the menus and options

The controller is operated with a dual function navigator button for selecting options and functions. Menu items are selected by rotating the navigator button clockwise or anti-clockwise. The selected item is then executed by pushing the button.

The navigator button control works in a similar way to a computer mouse allowing the user to navigate menus and update data. Rotating the knob either allows sequential scrolling through menu options to make a menu selection or changes selected parameter values. Pressing the knob either executes the currently selected menu option or sets the value of the selected parameter.

Operating instructions 2D projects



Select *2D Project* from the main menu options to conduct a 2D profile measurement.

Select *New* to begin the measurement.

See section *Main Menu 2D Projects* section for a full description of the icons.

Note: Check measurement parameters before commencing a measurement.

Various markers can be inserted into the radargram by selecting the *Markers* icon.

Surface Marker allows a marker to be placed at zero depth level on the radargram. This is useful for marking a feature that is visible on the surface. It can be marked as you pass the feature or reverse the MALÅ Easy Locator WideRange over the feature and then select *Surface Marker*.

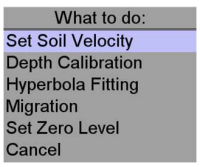
Object Marker allows a similar marker to the surface marker to be placed at a selected depth within the radargram. Reverse the MALÅ Easy Locator WideRange over the feature and select *Object*, a crosshair will appear on the vertical curser which can be positioned at the correct depth by using the navigator button.

Hide removes the markers from the display. This is not permanent; the markers can be made visible again by selecting *Show*, which is indicated after *Hide* is selected.

Select *Cancel* to exit the *Marker Menu.*

Select *Tools* to enter the Tools menu.

A dropdown menu appears when the Tools icon is selected.



Set Soil velocity. If the soil velocity has been determined, enter the value by selecting *Set Soil Velocity* icon and then use the navigator button to set the correct figure.

Depth Calibration. If the true depth of an item is known, place the antenna so the curser is positioned over the feature in the radargram, select *Depth Calibration* to activate the vertical curser/cross hair and use the navigator button to position vertical curser to the top of the reflector of the known depth. Press the navigator button and enter the value for the true depth. Finally, press the navigator button again to accept the value and the controller will automatically calculate the velocity based on the entered value.

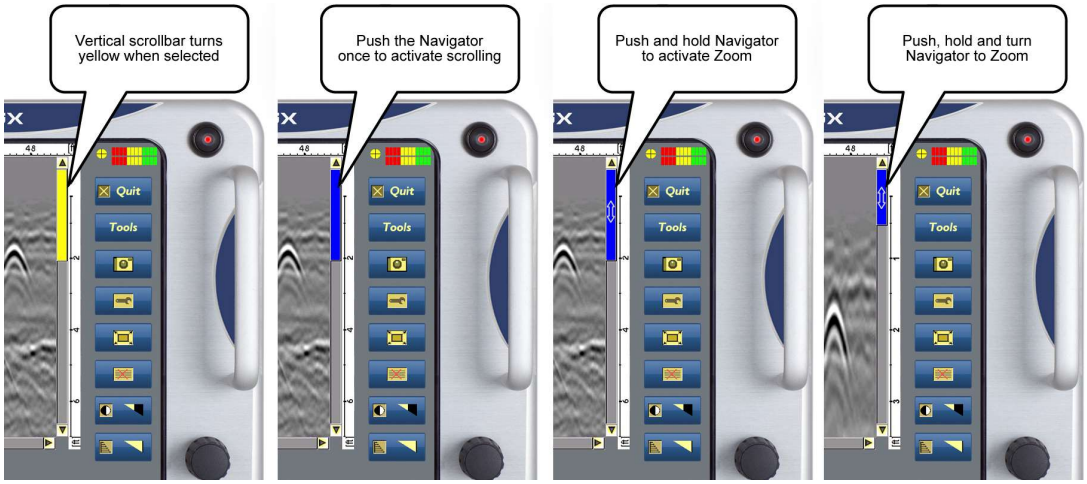
Hyperbola fitting. If there is a clear hyperbolic response in the radargram, utilise the *Hyperbola fitting* feature to calculate the velocity of the soil. Position the antenna so the vertical curser is over the hyperbola, press the navigator button to activate the horizontal crosshair and rotate the navigator button to place the cross hair on the top of the hyperbola. Press the navigator button reveal the simulated hyperbola, now rotate the navigator button to increase or decrease the simulated hyperbola so it "fits" the true hyperbola in the radargram. Press the navigator button to complete the process; the calculated velocity will be saved.

Migration. This option applies migration to the dataset, which will have the effect of removing the hyperbola to leave a point in the radargram. First, complete any of the above velocity calculations to determine the soil velocity and then select *Migration* to apply the process to the radargram.

Tip: Accurate calculation of the soil velocity is required for the migration to work effectively. Depth Calibration is often the most accurate and this should be the first option if available.

Zoom Function

Use the navigator button to select the vertical scrollbar. The vertical scrollbar turns yellow when selected. Push the navigator button once to activate scrolling. The vertical scrollbar will turn blue indicating that it has been activated. Push, hold and turn the navigator button to zoom in and out, the vertical scroll bar will be blue with arrows.

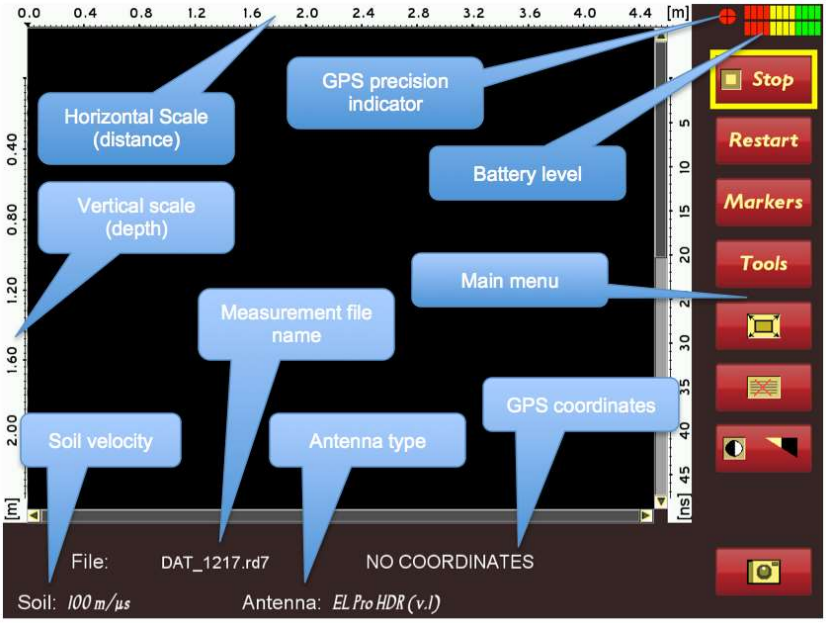


Main Menu 2D project

The items available in 2D project vary depending on whether the system is in stopped mode or started mode.

Stopped mode

Started mode



Started mode

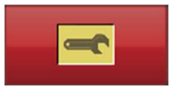
Main Menu Icons

Quit and shutdown the system after completing the radar measurements.

Note: If the *Quit* option is executed but the Controller is not turned off immediately, the unit has to be put through a power cycling sequence before it can be restarted. This is achieved by pressing the power switch on the Controller and then waiting for 5-10 seconds before pressing the power switch again. If this procedure is not followed, the unit will fail to turn on.

Select the *New* button to start scanning. The GPR data will begin to appear on the black screen as the unit is moved forward.

Select the *Continue)* button to resume the last stopped measurement.



Press the *Measurement Parameters* button to access the measurement parameters menu. See the *Measurement Parameters* section for more information on the use of this option.

The *Channel* button toggles the radargram between channel 1 (high frequency), channel 2 (low frequency) and both channel 1 & 2 in split the screen

The *Background removal* filter button is used to remove horizontal lines/reflections caused by noise from the GPR profile. By rotating the Navigator, various levels of background removal can be applied. The effect of the filtering can be seen when the button is deactivated, the level can be gradually adjusted to create the clearest and most interpretable image possible.

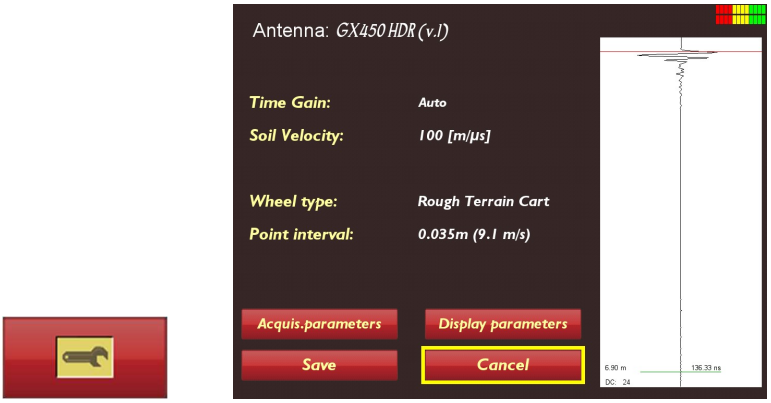
The *Contrast button* is used to set the contrast of the GPR profile. Rotating the navigator increases and decreases the contrast level.

The *Time gain* button is used to adjust the time gain for the GPR profile. Rotating the navigator increases and decreases the applied time gain.

Note: When the *Auto Gain* option in the *System Menu* is selected, the manual *Time gain* is deactivated and removed from the main screen.

Tip: Gain is very useful for making targets appear brighter in the GPR profile, this is especially important when searching for deeper targets.

Measurement Parameters Menu



Time Gain: Set to manual or auto (Automatic Gain Control).

Note: Manual gain activates the *Time Gain* button on the main screen and allows the user to manually adjust the gain. Selecting *Auto* deactivates the *Time Gain* button on the main screen and the Controller will apply the highest gain level for the signal to noise ratio.

Soil Velocity: Set the velocity based on soil type. Setting the velocity allows the adjustment of the depth scale for differing soil conditions.

Warning: This is a critical setting if accurate depth information is required. Soil conditions can vary rapidly with location and all depth information must be used with caution.

Tip: The velocity can be set during the post processing stage; it is not critical that this measurement is established during the data collection stages, unless marking the depth on site.

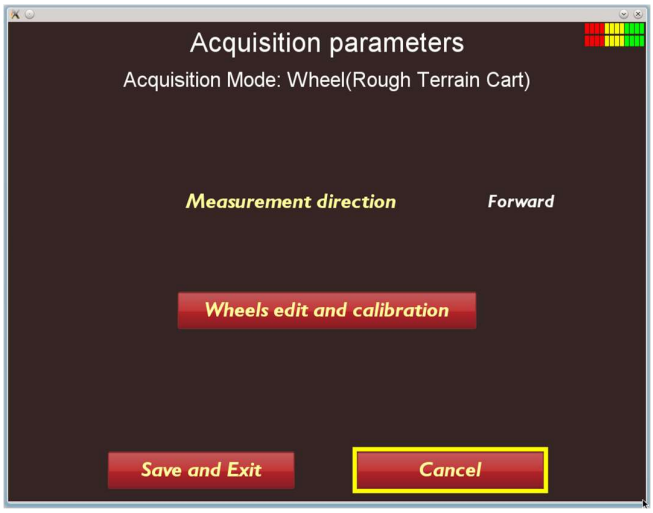
Wheel type: Selecting the *Wheel type, to* choose a selection of predefined wheels from a drop-down list.

Tip: Additional wheels and individual calibration can be added to the list by accessing the *Acquisition Parameters* menu.

Note: The precision of the encoder wheel is not infinite and depending on several factors as; the measurement surface, the pressure applied on the wheel and possible wear. If you are unsure of the encoder wheel precision a re-calibration should be made.

Point interval: *Point interval* sets the distance between the measured points/traces in the radargram.

Acquisition Parameters Menu

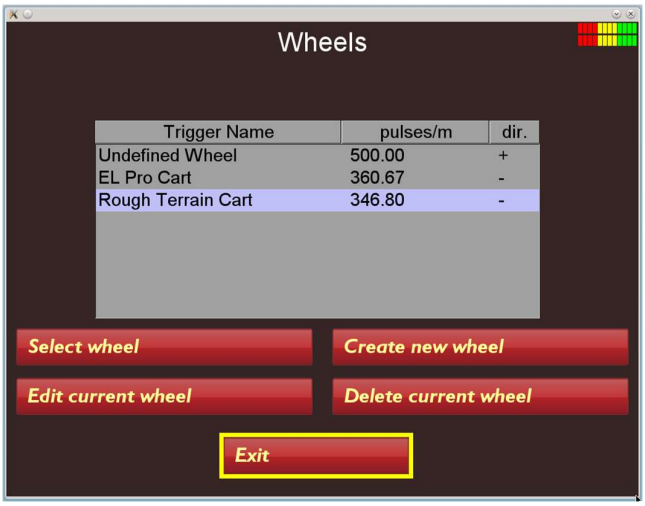


Measurement direction Choose *Forward* or *Backward* depending on the direction of the scan.

Note: This option will not be available when *Time* or *Keyboard Triggering* is selected on the *Measurement parameters* menu.

Wheels edit and calibration Select the *Wheels Edit and Calibration* to enter the wheels calibration menu.

Wheels Edit and Calibration Menu



Select wheel Choose the *Select Wheel* to highlight the wheel to be edited or deleted from the list.

Create new wheel The *Create New Wheel* option allows the user to select a new type of wheel in addition to the standard list. This is useful if the encoder is attached to a non-standard wheel.

Edit current wheel Select *Edit Current Wheel* calibrate the wheel, see *Wheel Edit Options* section for further details.

Note: First use the *Select Wheel* option to highlight the wheel to be edited.

Delete current wheel Choose the *Delete Current Wheel* option to remove a selected wheel from the list.

Note: First use the *Select Wheel* option to highlight the wheel to be deleted.

Wheels Edit Options

Wheel name

Select *Wheel Name* to create a name for the new wheel.

Direction of calibration

Select *Forward* or *Reverse* depending on the direction of the wheel during the calibration process.

Distance for calibration

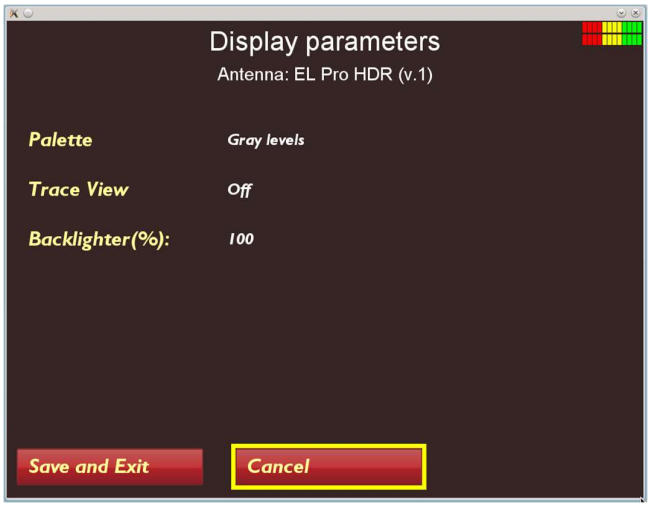
Measure a distance on the ground using a measuring wheel or tape. Enter this distance after selecting *Distance for Calibration*.

Tip: For a higher level of accuracy, measure a length over the surface where the GPR is being used. A longer distance will average out any surface variations.

Start calibration

Select *Start calibration* once the correct details are entered into the above options and when the GPR is positioned over the beginning of the measured length. Move the GPR towards the end of the measured length, when this process is complete, select *Stop Calibration.*

Display Parameters Menu



Palette — The *Palette* refers to the display of the radargram, in greay scale or color.

Trace View — If *Trace View* is ON, a small window will appear during measurements, showing the actual measured trace.

Backlighter(%): — The intensity of the screen light can be changed with the *back*lighter option.

Tip: Reducing the backlight will extend the battery life between charges.

Save and Exit — Saves changes and exits to previous screen

Cancel — Closes the menu without applying changes.

3D Grid Projects

Select *3D Grid Project* from the Start Menu.

In the New Grid Project screen, you set the relevant parameters before data collection begins:

- Size of the grid, spacing between lines (profiles) and point interval (trace interval). These parameters are not changeable afterwards.
- Customer, Operator, Site, Comments. These parameters can be changed afterwards.

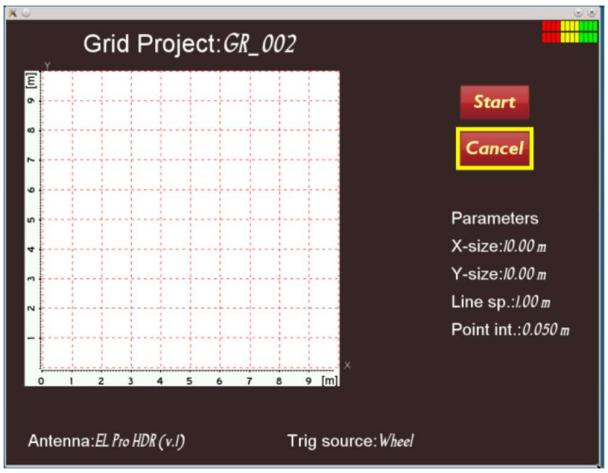
First enter the size of your grid. Using the navigator button, select and edit the *X-size* and *Y-size.*

Then set the *Point Interval* for the measurement between the traces.

Next set the *Line Spacing* for the measurement between each profile.

Customer, Operator and Site details can be set along with additional comments.

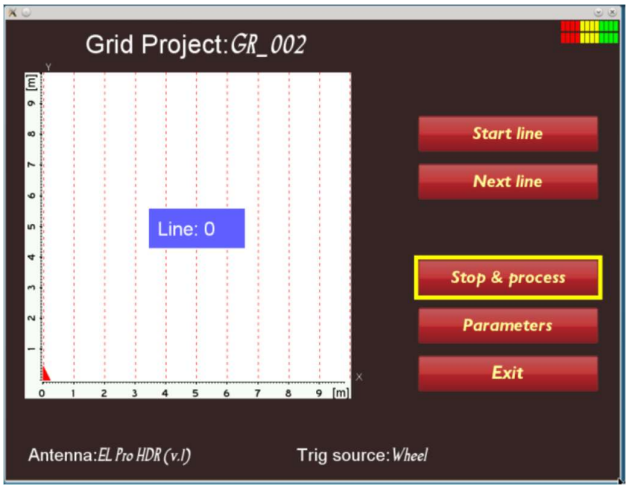
Finally, select *Start the Project*.



Before the project commences, a summary screen indicating the chosen settings can be reviewed.

A plan view of the grid and its size is also shown.

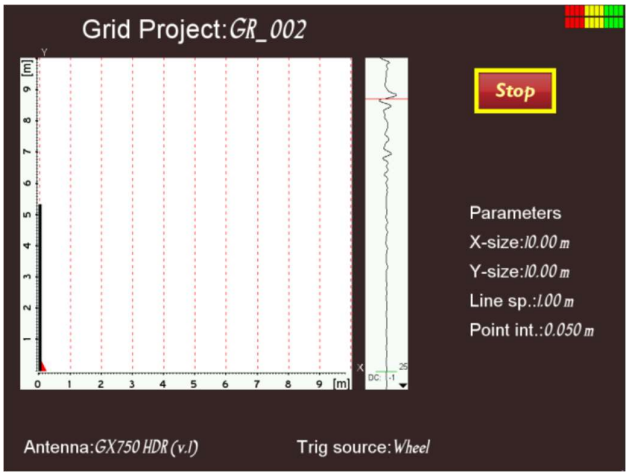
Select *Start* to move onto the next screen or *Cancel* to move to the previous screen.



Position the MALÅ Easy Locator WideRange antenna in the X=0 & Y=0 position, pointing the antenna in the direction of the Y-axis, as indicated by the small red triangle and dashed red line.

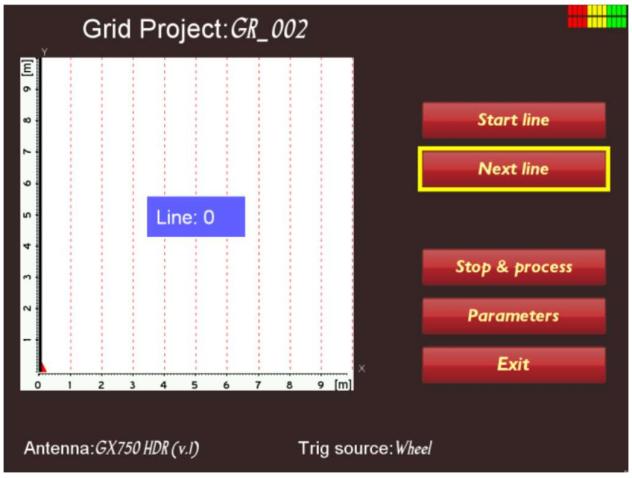
Select *Start Line.*

Move the antenna to the end of the line.



As the antenna is moved forward, a black line indicates the progressing along the grid line.

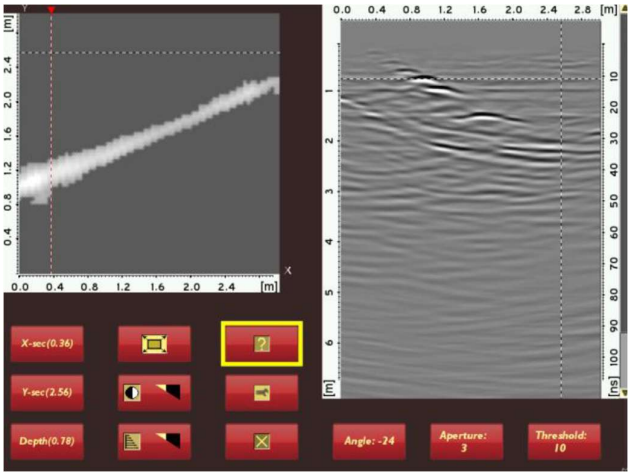
If a mistake is made during the measurement, or the line is not completed, select *Stop* and then *Start Line* again to redo that line.



When the line is completed, the controller will indicate the completed line by changing the screen ready for the next line.

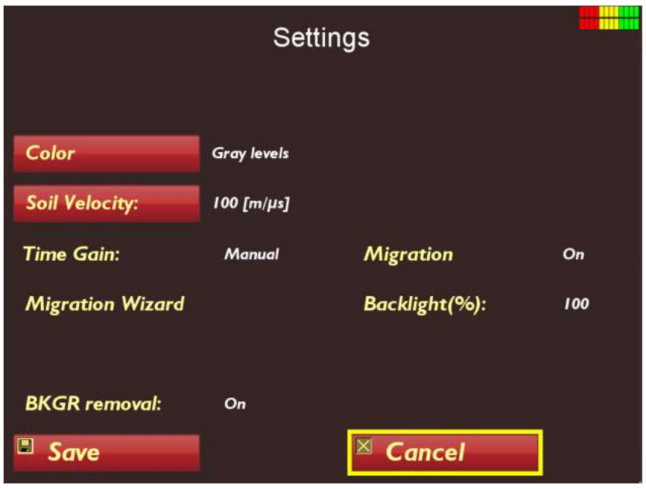
Move the antenna over to the next grid line and select *Next Line.* Repeat these steps until the X-axis is completed.

Move the antenna to the start of the Y-axis and continue the measurements along the Y-axis until the grid is completed. Next, select *Stop and Process* to complete the initial processing stage.



Once the processing is complete, the Grid Project screen shows the plan view and one cross sectional (side) view in the X or Y-axis.

Select the *Settings* Icon to proceed to the next step.



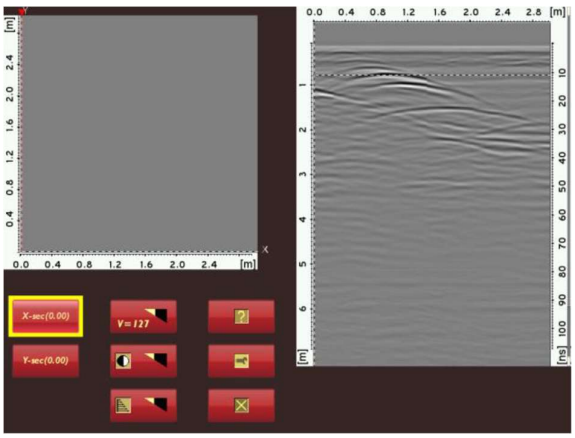
BKGR removal:

Select *Background Removal* option to *On* if removal of horizontal lines in the dataset is required.

Migration Wizard

Next, select *Migration Wizard*, this enables the correct velocity setting to obtain the best possible top view.

Next, choose an X or Y cross-section with a well-defined hyperbola.



Select the velocity button, Increase or decrease the velocity value until the hyperbola becomes a point.

Tip: Too high a velocity value will cause the hyperbola to invert, reduce the value until the desired response/reflector is achieved. The reflector should be in-between the inverted hyperbola and the standard hyperbola.

Finally, select the quit button to exit and apply the migration to the entire data set.

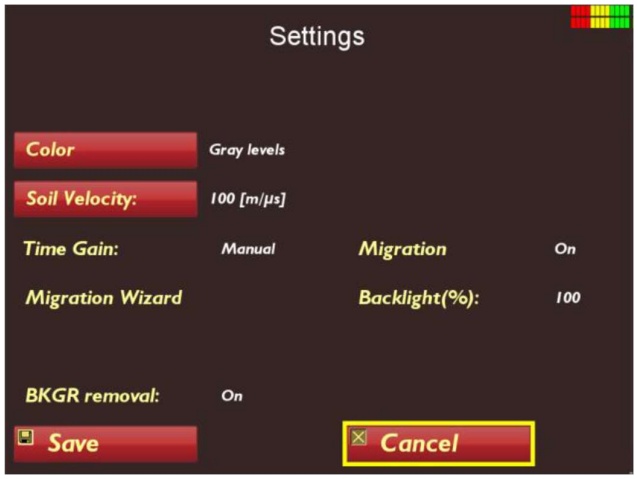
Select the *X-Section* to view the X-axis data in the side view. When activated, use the navigator button to scroll across the data set.

Select the *Y-Section* to view the Y axis data in the side view

Select the *Depth* and use the navigator button to scroll through the time slices in the top view window.

Select the *Full Screen* option. This enables access the screen capture options with 

3D Project Settings Menu



Change the color scheme for the GPR profiles. Three options are available, a grey scale and two different color schemes.

Soil Velocity:

Set the velocity based on soil type. Setting the velocity allows the adjustment of the depth scale for differing soil conditions.

Warning: This is a critical setting if accurate depth information is required. Soil conditions can vary rapidly with location and all depth information must be used with caution.

Time Gain:

Set to manual or automatic gain control.

Note: Manual gain activates the *Time Gain* button on the main screen and allows the user to manually adjust the gain. Selecting Auto deactivates the *Time Gain* button on the main screen and the controller will apply the highest gain level for the conditions.

Migration

Set *Migration* to *On*, this applies migration to the 3D Project.

Migration Wizard

Run the *Migration Wizard* to ensure the correct velocity value is applied to the radar dataset. See section *Operating Instructions 3D Grid projects.*

Backlight(%):

Select the correct level of backlight for the ambient light levels. This setting can be adjusted within the range of 0–100%.

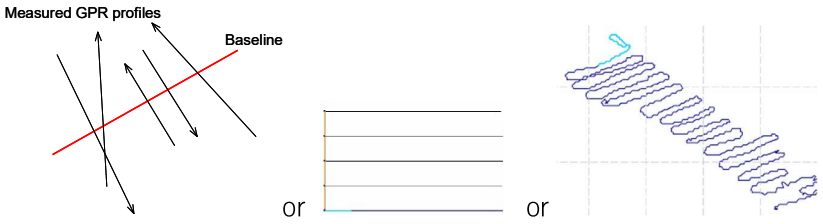
Tip: Reducing the backlight will extend the battery life between charges.

BKGR removal:

The Background removal filter button is used to remove horizontal lines/reflections from the GPR profile.

Object Mapper projects

An Object Mapper project is a tool to easily handle and interpret radar profiles acquired with the controller, where a number of radar profiles are linked to a common baseline or positioned with GPS. See the examples below.



Once an Object Mapper project is created with the controller, it can be directly opened in the MALÅ Vision or ObjectMapper software. For further information, see the *MALÅ Vision User Guide* or *ObjectMapper User Guide.*

Creating an Object Mapper Project

Start working with Object Mapper projects by selecting *ObjectMapper Project* on the Start Screen.

Select *Settings* to apply correct measurement values. See *Measurement Parameters* section for full details.

Select *New Project* to start the project and move onto the following screen:

Project Name: Select *Project Name* to tag a name to the project. Use the navigator button to enter the name, one character at a time.

GPS positioning To activate the GNSS positioning, set the GPS Positioning to *ON*.

Note: If the GPS option is ON, no baseline is needed, and the X-Y co-ordinates are deactivated.

Baseline/ Start/ X coord:
Baseline/ Start/ Y coord:
Baseline/ Stop/ X coord:
Baseline/ Stop/ Y coord:

The location of the baseline is given by setting the X and Y-coordinates of the start and stop positions of the line. If no coordinates are available, the baseline is defined as 0 m for X and Y start position and then the length of the line for X or Y stop position.

Tip: The coordinates for the baseline can be edited later in the MALÅ Vison or Object Mapper software.

Start the project When the baseline is defined, or GPS Positioning is on press *Start the project* to collect Object Mapper profiles.

Tip: In this screen, before pressing *Start the Project*, the MALÅ Easy Locator WideRange system´s measuring wheel can also be used as a measuring tape, showing the travelled distance at the bottom of the screen. To set the measuring tape function to zero, select the *Current Distance* option and press the navigator button once.

Object Mapper Measurements with Baseline

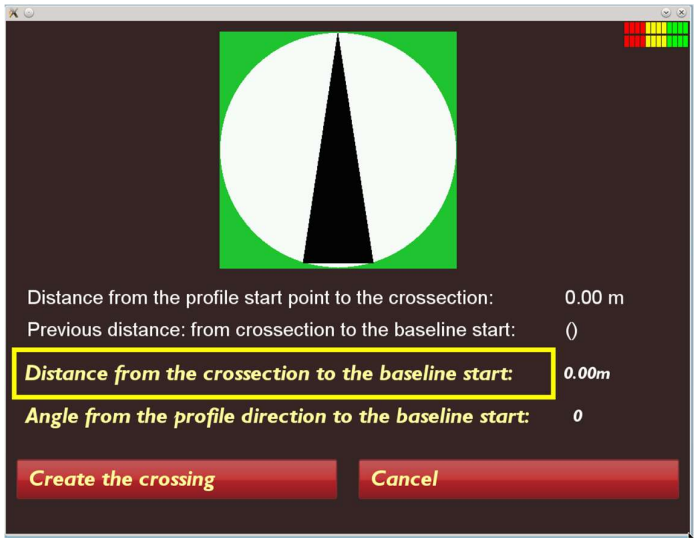
When the Start the project button is pressed, the Start Profile screen appears.

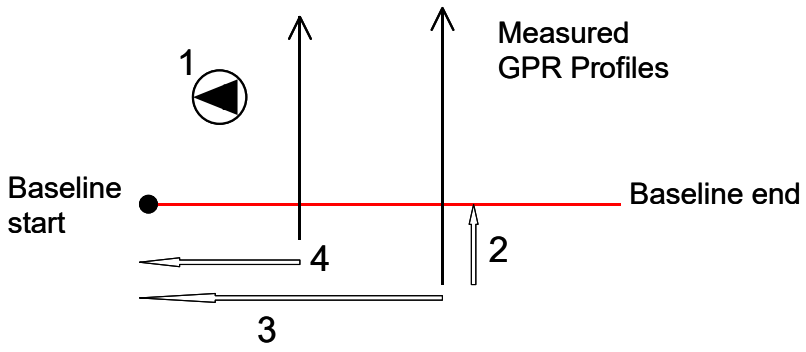
Once *Start Profile* is pressed, the user returns to the ordinary measurement screen. The additional *Baseline Crossing* icon will be active on this screen.

When passing the baseline, select the menu option *BL Crossing* to place a marker on the GPR profile. This marker will be used to connect the current profile to the defined baseline

Note: The baseline can be created anywhere along the GPR profiles e.g., at the beginning, middle or end and the baseline must cross through all the profiles. If starting the profile directly on the baseline, press *BL Crossing* immediately after pressing start, in other words, before moving the antenna.

After pressing *BL Crossing* the screen to the left is seen. Here the current profile is defined, in terms of distance from the baseline start point and the direction of the profile in relation to the baseline. See the illustration below.





Key:
1: Orientation to baseline start point. In this case it is 270 degrees.
2: Distance from the start of the current profile to the baseline
3: Distance from baseline start to the current profile
4: Previous distance

First set the distance from the baseline start point to the current profile. The select the angle of the profile to the baseline start point. Finally, select *Create the crossing*, the screen reverts back to the measurement screen and a blue marker dot is seen on the GPR profile. Continue the measurement along the current profile.

Once a profile is completed, select *Stop*, and the Start Profile screen will be seen and a new profile can be started as usual, again applying the BL Crossing option when passing the baseline.

Note: The controller and the Object Mapper project will automatically suggest the distance and the angle to the baseline start after 3 passes of the baseline.

Tip: Moving in the opposite direction after each profile is finished can optimise data collection. If measuring every second profile in the opposite direction and at a right angle to the baseline the angle from the profile direction to the baseline start will be 270, 90, 270, 90 and so on.

When all the Object Mapper profiles are measured, select *Stop ObjectMapper Project* on the Start Profile screen to close and save the Object Mapper Project.

This project is then easily uploaded to a computer; see the *Transferring Data* section, where it can be opened in the MALÅ Vision or Object Mapper software, for simple interpretation of underground features. For further information, see the *MALÅ Vision* or *Object Mapper User Guides.*

Tip: Separate files can be opened or uploaded from the project, enabling the user to view individual profiles if required.

Object Mapper measurements with GNSS

To create a project with GNSS positioning, start a new project and set the *GPS Positioning* to *On* and select *Start the Project.*

Next, select start profile and the screen will return to the main measurement screen.

Tip: With GNSS positioning activated, the user can complete one long profile in a zig-zag formation around the area to be surveyed or stop and start profiles to create a number of parallel profiles.

When the project is complete, select *Stop ObjectMapper Project.*

Continuing an Object Mapper measurements Project

To continue a previously started ObjectMapper Project select *Continue Project* in the Project Main screen. Use the navigator button to choose between the Object Mapper Projects and press the button to continue the selected Project.

System Menu

In the System Menu you found system settings as measurement units and upgrades as well as settings for external GNSS.

To enter the System Menu, select *Shut Down* from the start menu to enter the quit screen. When on the quit screen, rotate the navigator button 3 "clicks" clockwise, then 3 "clicks" counter-clockwise and finally, 3 "clicks" clockwise.

The controller will now enter the System Menu.

Select *Time and Date* to modify the internal clock settings.

Select *Battery max level* to set the battery level indicator. Enter 12 (Volts) if a generic external 12Volt battery is being used; select 11 for the MALÅ battery packs.

PowerSave Mode allows the user to activate or de-activate the backlight dimming option.
Select *Imperial* or *SI* for the appropriate localised requirements.

Hardware Tests

Select the Hardware Tests to enter the hardware test screen. Choose *Start Test* or *Start Ethernet Test* to start the self-test procedure. Each item of hardware will be tested sequentially with the results of each tested displayed on the screen and written to a file. Once the test is completed, select Upload "test_results.jpeg" to save the results to USB memory device.

Data Disk Format

Select the *Data Disk Format* and press the navigator button to initiate reformatting. This will reformat the SSD radar data storage device in the controller. A confirmation dialog is displayed before commencing the operation.

Tip: It is recommended that reformatting is performed periodically to maintain peak performance for data management.

Note: Reformatting does not affect the operating system or the controller software.

Software Upgrade

The controller software can be upgraded by downloading the latest software from the Guideline Geo website downloads page and installing onto a USB data storage device.

Copy the file ram10img.gz to the root of a USB data storage device.

Insert the USB data storage device into the controller USB port and select *Software Upgrade*. If a confirmation request is displayed, accept the request by selecting *Yes*.

The upgrade can take several minutes to install, and the controller will re-boot after installation.

Warning: Make sure the batteries are fully charged before starting the software upgrade and DO NOT turn off the controller while the upgrade is in progress.

Select the *Restore Predefined Settings* to perform a reset when experiencing problems or if you would like to reset the settings to a predefined state. A confirmation dialog is displayed before reset operation is performed.

Note: This restore is a low-level reset and should be performed as the first option before executing the *Restore Factory Settings* option.

Select the *Restore Factory Settings* to perform a reset when experiencing problems, or if you would like to reset the settings to the default factory settings. A confirmation dialog is displayed before reset operation is performed.

Select *Next Screen* to access additional system Menu options.

Default Zoom Depth value determines the depth window at start of a scan. The entered value has no effect on the total depth of the time widow.

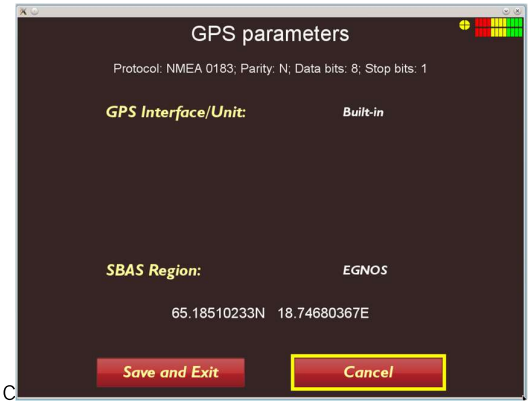
Select *GPS On/Off* to toggle the GPS function on or off depending on requirements.

See section *Positioning options and setting* section for further information on positioning parameters.

Positioning options and settings

Select *GPS Parameters* to enter the settings screen for the GPS options.

There are 3 options for the *GPS Interface/Unit* settings.



C

1. Built-in, this option selects the built-in DGPS module. Select the correct SBAS Region for your area. Currently available options are listed below.

COM Port, this option is selected for a RTK GNSS input via the COM port. An external RTK GNSS antenna can be mounted on the antenna. Once this option is activated, various parameters will be activated, see below.

2. USB, select this option if a simple USB-GPS antenna is attached to the USB port.

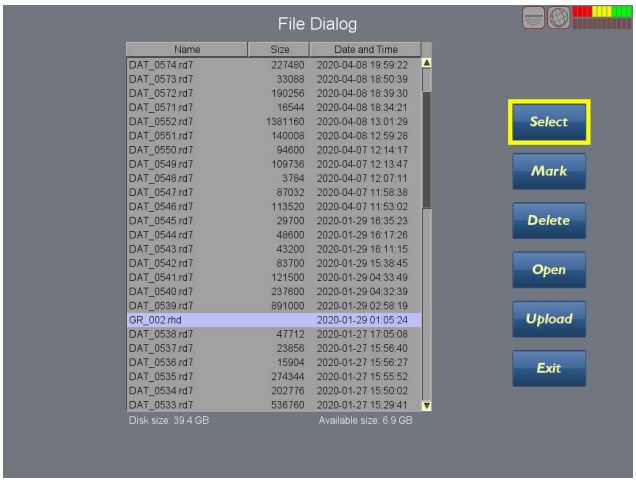
SBAS DGPS Differential correction service areas. Choose the right one for your region when using the built-in GPS. The chosen area will be displayed on the map.

COM Port settings for external RTK GPS

The *Select accuracy for green* option allows the user to set the tolerance for the GPS precision indicator that is displayed at the top right of the monitor's screen while in started mode. Use the *High* setting if utilising a RTK GNSS.

Select the correct values for the *COM Port Baud Rate* and *CheckSum Validation* to match the external RTK GNSS output.

File manager and File transfer



In the *Work with Files* menu (found in the start main menu) all measured files and projects are found.

To select a file, turn the turn-push button to the correct file name and press to select.

To mark and select several files at the same time, use the *Mark* option.

Now you can choose to open the file, delete or upload them to a USB-memory stick.

2D files has the file extension *.rd7 and ObjectMapper projects *.obm and 3D Grid Projects *.rhd.

Note: For the ObjectMapper and 3D Grid Projects all made files in one project are uploaded at the same time.

Troubleshoot

As with all electronic equipment it is important to handle the MALÅ Easy Locator WideRange with great care and to avoid harsh handling and bumps against the antenna box or the controller. During transport of the equipment the equipment should be packed properly and firmly. When finishing a survey, the equipment should be checked and packed properly before transport.

Always check our website www.guidelinegeo.com for latest news and updates and if needed, please contact Guideline Geo support (support@guidelinegeo.com) or your closest Guideline Geo sales representative.

Most problems are power/data communications or user settings related. Before contacting your local Guideline Geo office or authorized dealer please follow these simple steps.

Check user settings

Enter the Measurement Parameters menu and check the settings for Acquisition Mode, Wheel Type, Point interval etc.

Check battery capacity

Connect the battery to the charger and switch on the charger at the electrical outlet. The light on the battery charger should be either yellow or green indicating an operative charge. If the indicator light is red, continue charging until the charging cycle is complete, i.e., indicator light turns green.

Check connectors

Disconnect and reconnect the battery pack on the antenna. If using the external battery bag, disconnect and reconnect the battery connector in the battery bag.

Disconnect and reconnect both ends of the data cable between the antenna and the controller.

Check the pulse encoder connector (measurement wheel) on the rear of the antenna.

Restart Controller and Antenna

Turn off the antenna and controller, by first selecting QUIT from the Main menu options on the Controller, confirm the action by selecting YES then push the power button on the Controller and release quickly. The red light will then stop blinking and the unit will also emit a click when turning off. Wait 10 seconds before switching on the Controller and antenna.

Note: If the Controller is not responding, turn the unit off by pushing the power switch.

Service and Repairs

To maintain maximum performance, the MALÅ Easy Locator WideRange should be regularly serviced. Contact Guideline Geo www.guidelinegeo.com or your local Guideline Geo representative for more information on how to service your MALÅ Easy Locator WideRange.