GUIDELINEGEO

MALÅ GeoDrone 80

User Guide

MALÅ

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 | MALÅ

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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

GPR Training	www.guidelinegeo.com/support-service-advice-training/
GPR Case Studies	www.guidelinegeo.com/solutions/case-stories/
GPR Downloads	www.guidelinegeo.com/support-service-advice-training/resource-center/

Feedback

Feedback regarding the contents of this manual or the product may be sent using any of the following channels.

Phone (Sweden)	+46 953 34550
Phone (USA)	+1 843 852 5021
Phone (China)	+86 108 225 0728
Phone (Malaysia)	+60 (0) 3 6250 7351
Phone (Australia)	+61 438 278 902
Web	www.guidelinegeo.com

Safety and Compliance User Notices

The MALÅ GeoDrone equipment, developed and produced by Guideline Geo, has currently not yet been certified according to FCC, ETSI or other localized UWB regulations. In order to purchase and operate the MALÅ GeoDrone 80 users need to apply for an exemption from local regulation if such are in place.

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 1 m 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.

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.

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.

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 www.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.

Repacking and Shipping

The Guideline Geo packing kit is specially designed for shipping MALÅ GeoDrone 80. 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 80mm 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 at:
www.guidelinegeo.com/Support/Service-Repairs.

Registering MALÅ GeoDrone 80

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.

Note: The serial numbers are found on the control unit and on the Controller.

MALÅ GeoDrone 80 hardware

MALÅ GeoDrone 80 is a lightweight, unshielded GPR antenna and control unit for GPR measurements from a drone.

Antennas

The Transmitter (Tx) and Receiver (Rx) antennas are placed in two removable tubes. The tubes are connected to the control unit with 2 screws for each tube. The Rx has two connectors to the control unit: N and P for Negative and Positive polarization. Depending on connection the polarization can thus be changed. The Rx antenna is marked with a label, for correct mounting. The Tx has one connector from the antenna tube to the control unit.

Connectors to connect the antenna elements are found underneath the GeoDrone 80 main unit. Use the black screws to securely attach the antennas to the GeoDrone 80 main unit.

GeoDrone 80 Main Unit

GX Controller

MALÅ GeoDrone 80 measurements are set, saved and carried out using Guideline Geo´s GX Controller. The GX Controller is the same as for any other GX antenna in the MALÅ sortiment.

Positioning

The GeoDrone 80 is provided with an external DGPS antenna to increase the reception from satellites. A GPS receiver circuit board is located inside the control unit. The DGPS antenna is connected to the side of the control unit. The DGPS will not work unless an external antenna is connected.

Connections for external GPS is found on the short side of the GeoDrone main unit.

External DPGS provided with the MALÅ GeoDrone 80.

Power

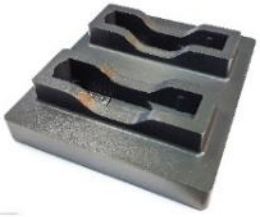
Antennas and GeoDrone main unit

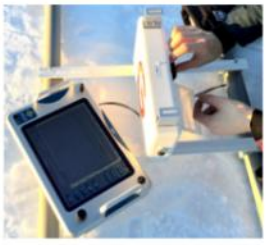
The batteries for the antenna and GeoDrone main unit are found under the hatch.

Use the supplied charger to charge the batteries.

One battery at time can be replaced while the unit is turned on.

The batteries give a measurement time of approximately 1 hour (depends on settings).





GX Controller

The GX Controller has an internal battery with an operating time of more than 6 hours if fully charged. To charge the GX Controller, connect the supplied power supply to the socket on the

righthand side of the GX Controller data/power connectors.

The battery indicator on the GX Controller will show the charging cycle.

 The red lightning bolt indicates the GX Controller is charging

 The green lightning bolt indicates the GX Controller is fully charged

Note: The bars on the top row indicates the battery level in the GX Controller, the bottom row indicates the battery level in the antenna battery.

Tip: The GX Controller can be charged without the need for the Controller to be switched on. The charge cycle will take 3 - 4 hours to complete if fully discharged.

System set up

Make sure batteries a charged. One battery at time can be changed even if the unit is on.

Assemble the two antenna bars, with 2 black screws for each bar underneath the control unit.

Assemble the antenna tubes to the bars and connect to the control unit.

Note: Tx has one connector and Rx two connectors. The Rx is marked with This side up.

The two antenna tubes assembled and connected to the radar unit.

Connect the DPGS antenna. Attach the antenna on top of the drone for best reception.

Attach the MALÅ GeoDrone 80 to the drone. To prevent damage to the equipment, make sure the MALÅ GeoDrone is securely attached prior to flight and do not use the GeoDrone as landing gear.

Please contact Guideline Geo for help on constructing a secure attachment of the equipment, and information on Extended Warranty if needed.

Ready to power up the MALÅ GeoDrone 80 and the GX Controller!

Note: The weight of the GPR system will affect the flight characteristics.

Note: Land the drone smooth and care-fully so you do not harm the equipment.

Data acquisition

The GeoDrone 80 communicates with the GX Controller by WiFi.

The  icon indicates the connection status to the antenna.

If the controller has been used with a different antenna, go to System- and WiFi settings  to pair the GeoDrone 80 with the GX Controller (WiFi Initiation via Wire). Also see section *WiFi Settings.*

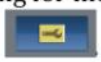
Controller main menu. Chose the option GeoDrone Project.

The main screen for GeoDrone measurements, have three filters to enhance the radargram

 *Background removal*

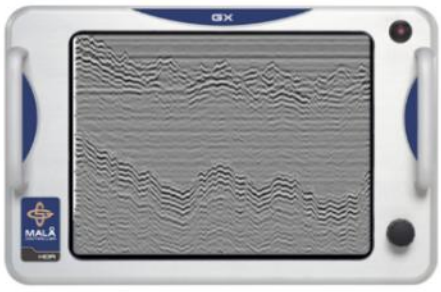
 *Contrast*

 *Time gain*

The default measurements settings are satisfying for most applications, but if necessary, adjust settings in the Settings menu  Also see section *Measurement Settings* below.

Start New Profile 

Ready for take off!

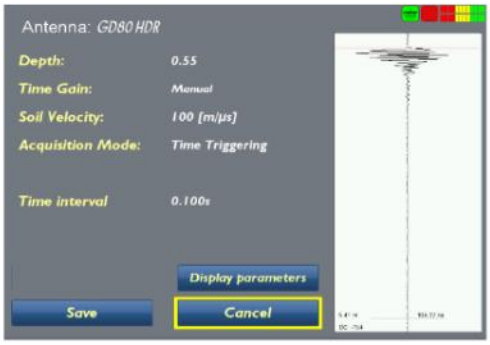


Note: The antenna has an in-build data storage module, which enables data to be stored whilst taking measurements. This enable a more secure way of data collection as data transmission can be interrupted when utilising Wi-Fi. Data is restored to the Controller when Wi-Fi connection is established again or by data-cable. Also see section *WiFi* below.

Measurement settings

In Measurement settings adjustments for depth, gain type, soil velocity and time interval can be changed.

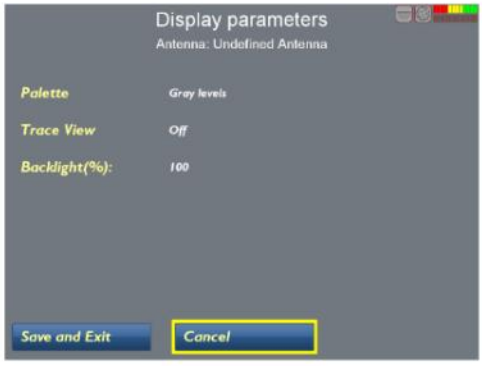
The settings for Acquisition and Display parameters are also find here.



The **Palette** refers to the display of the radargram, there are 3 options, a grey scale and 2 color options.

If **Trace View** is ON, a small window will appear on the right-hand side of the radargram during measurements, showing the actual measured trace.

The intensity of the screen light can be changed with the **Backlight** option.



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

WiFi settings

The GeoDrone control unit is paried with the GX Controller at purchase. If the GX Controller is used with another GX antenna, the pairing has to be redone before collecting data using the GeoDrone . The status of the pairing is indicated in the upper right corner of the Controller.

WiFi switched on and communications established

WiFi switched on but no communications established. Pairing is needed.

Wi-Fi Connection

System Menu (screen 2)

Rotate the **Navigator** and select the *Wi-Fi ON/OFF* option to activate the Wi-Fi.

When on, the Wifi Symbol should be seen upper right corner

Note: Wi-fi initialisation can take up to 60 seconds to complete, please be patient

Incorporated into the Wi-Fi system is an in-built 4GB data storage module in the antenna, this enables data to be stored independently whilst taking measurements to enable a more secure mode of data collection. Data transmission can be interrupted when utilising Wi-Fi and the in-built storage guarantees that data continue to be safely collected during the Wi-Fi drop out. This function is automatically activated when the Wi-Fi option is switched on.

Wire Wi-Fi Channel Selection

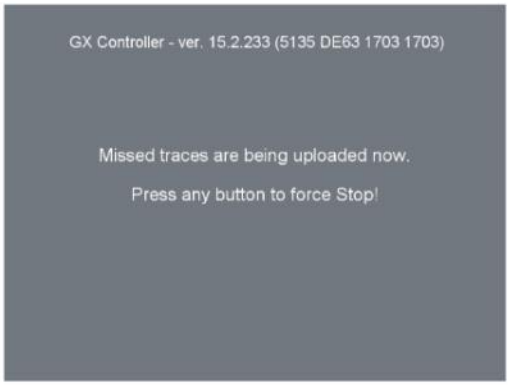
This option allows you to choose an alternative Wi-Fi channel; this may be necessary if the signal is poor during Wi-Fi measurement. The wireless communication maybe affected if many devices share the same channel with the GX HDR GPR. Choosing the best Wi-Fi channel on your GX helps to reduce

interference and improve your Wi-Fi signal. The best option would be to use a Wi-Fi analyzer app on your smart phone to ascertain the local Wi-Fi channels that are most congested. Choose and install a free app from the App Store or Google Play and launch it. Use the overview option to see the wireless networks in your area and which channels are the quietest. Some apps will inform you which Wi-Fi channels are better for a good connection.

Once you have chosen the new channel, it will take approximately 1 minute to finish the channel switching.

Restoring Missing Traces

It is possible to move the antenna away from the GX Controller once a measurement has commenced. During this remote operation, or if the Wi-Fi is disrupted when working locally, the in-built memory card in the antenna will store the GPR data thus enabling the measurement to continue. To stop the measurement, the GX antenna and Controller must come back into Wi-Fi range.

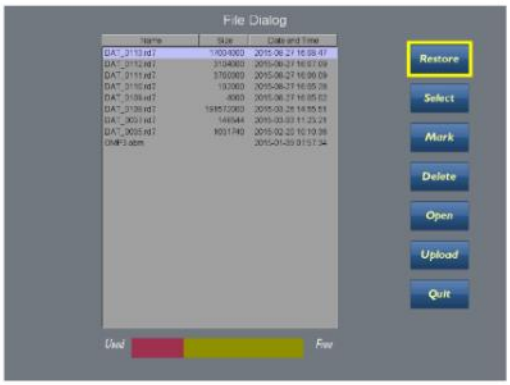


Once the measurement is stopped, and if there are missing traces, the controller will display this message.

Once the restoration process is successful, press the rotary **Navigator** button to close the window.

If the Controller experiences difficulty restoring the missing traces, it may be necessary to restore via wired connection.

If this **Restore Via Wire** message is displayed, press the **Navigator** button to close the widow, connect the data cable between the antenna and the Controller. Switch the Wi-Fi off and then proceed to the **Work With Files** option on the **Start Screen**.

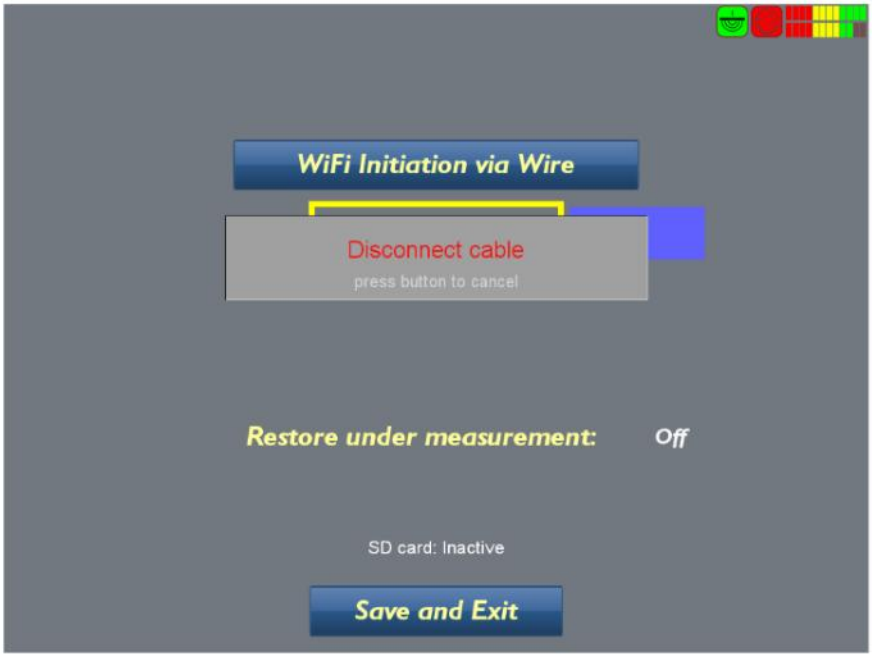


Choose the correct file and then select the **Restore** button

Wi-Fi Initiation via Wire

Users may experience occasions when the Controller does not automatically connect to the antenna when the Wi-Fi is activated or when the system is switched on.

If this occurs, select the "WiFi Initiation via Wire" in the WiFi settings menu, found in the second screen om the system settings.



Note: WiFi initialisation can take up to 90 seconds to complete, please be patient

Technical Specifications

Core Technology:	MALÅ HDR GPR
Control Unit:	MALÅ GX Controller
Dimension excl. drone:	W580 x L1040 x H240 mm (W23" x L41" x H9½")
Antenna separation:	530 mm (21")
Antenna weight incl. 2 batteries:	3.23 kg (7 lb 2 oz)
Antenna weight excl. 2 batteries:	2.31 kg (5 lb 1 oz)
Battery weight:	0.46 kg (1 lb)
Operating time:	Approximately 1 hour
Antenna Frequencies:	80 MHz
Communication:	Complies with IEEE802.11 b/g/n
Positioning input:	Standard GPS support (SBAS)