Guideline Geo

MALÅ Vision Desktop

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

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Guideline Geo AB

www.guidelinegeo.com

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About MALÅ Vision Desktop

MALÅ Vision Desktop is the desktop version of MALÅ Vision Web, which enables offline data processing. MALÅ Vision Web and MALÅ Vision Desktop are two separate software solutions, and no data syncing is currently possible between the two. MALÅ Vision Desktop is optimized for handling larger datasets including 3D and array data.

Note: To use MALÅ Vision Desktop you need to have a MALÅ Vision Premium subscription.

Installation and Login

To install the software, download the installation file from www.guidelinegeo.com and double-click on the msi-file. Always make sure to use the latest version.

When downloading the software, note that depending on the browser used, different warnings may occur. For instance, for Microsoft Edge you need to press the *Keep* link, to be able to save and see the file in *My Downloads* folder.

The performance of the software will depend on the specifications of your computer. Most processing needs will be met with any modern Windows computer equipped with at least 8 GB of RAM and an i5 processor or higher.

When installation is ready you can open the software and login with the same email address and password you use for your MALÅ Vision Web account.

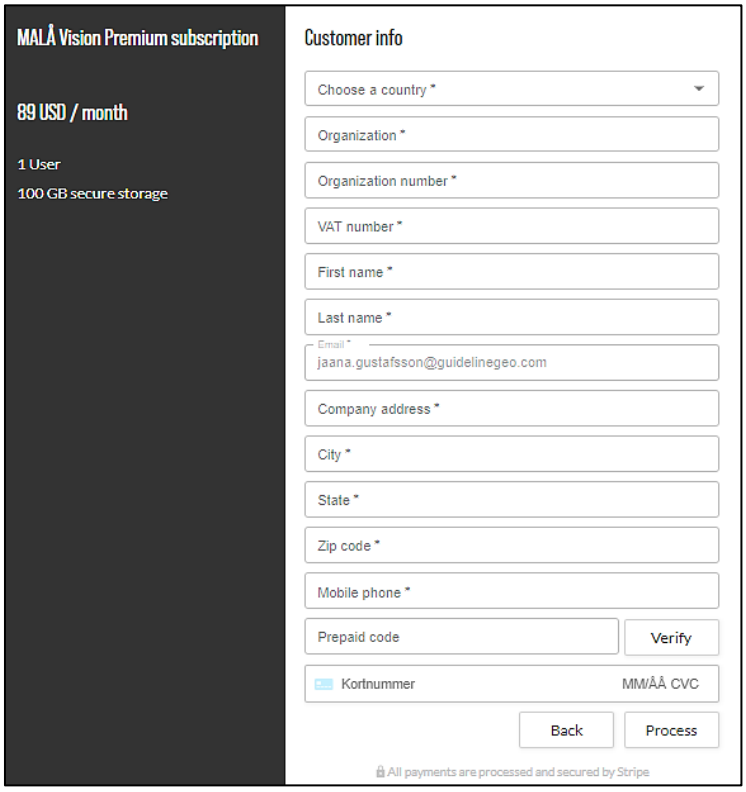
If you do not have any MALÅ Vision account with a Premium subscription, please visit malavision.guidelinegeo.com or press *Sign Up*.

Subscription

To be able to use MALÅ Vision Desktop you need a Premium subscription of MALÅ Vision Web. Go to the main menu option Subscription when logged in on MALÅ Vision Web.

Fill in all the personal details marked with an asterisk (required field).

For a monthly payment by card, fill in the card details in the last row and press *Process*.



Now you can download MALÅ Vision Desktop and log in with your user credentials.

Note: It is the responsibility of the customer to cancel the subscription and to remove the card details if you don't wish to continue your subscription.

If you have purchased a prepaid code, fill in the code number, press *Verify* and then *Process* (please note that the required fields in the rest of the form need to be filled in as well). In this case the card details can be left empty.

If card details are added when a pre-paid code subscription comes to an end, the monthly billing will be resumed (by card). Please remove the card details if you want to avoid this.

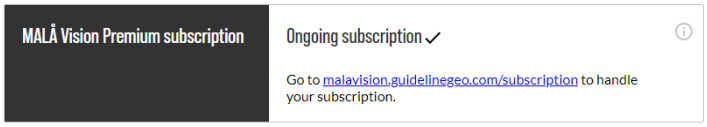
Note: You cannot activate more than one pre-paid code at a time. If you have several pre-paid codes, activate the next code when the first one has expired.

On the subscription page you can also cancel or update your subscription and find the receipt history.

Note: Make sure you have internet access when starting MALÅ Vision Desktop for the first time. You will be prompted to log in to your MALÅ Vision account to verify that you have an active premium subscription. After this initial login, your computer will remain verified for a period of 30 days, after which you will need to login to your account again.

Note: MALÅ Vision Desktop can be installed on two computers at the same time. If needed, you can remove access and add new ones. This option is found in the *Subscription* settings menu, when you log into your MALÅ Vision Web account (malavision.guidelinegeo.com).

To access your subscription settings, use the link found in MALÅ Vision Desktop´s Subscription settings.

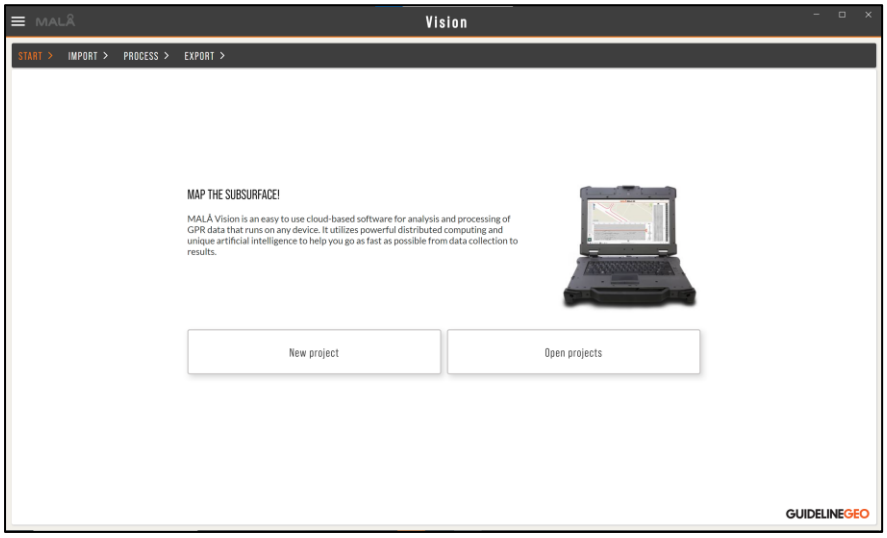


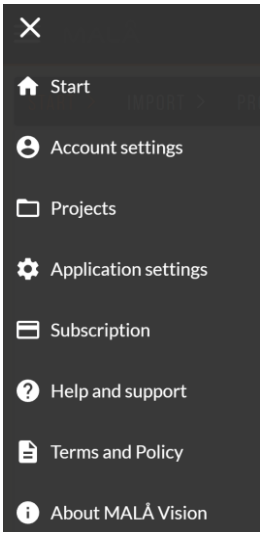
Getting started

When you start MALÅ Vision Desktop you can create a new project or open an existing project.

Account settings, application settings, subscription details etc. are found in the main menu, which is accessed by clicking the hamburger menu  at the top left corner. For more information see section *Software settings.*

For efficient workflow, go through the different tabs, *Start*, *Import*, *Process* and *Export*, from left to right.





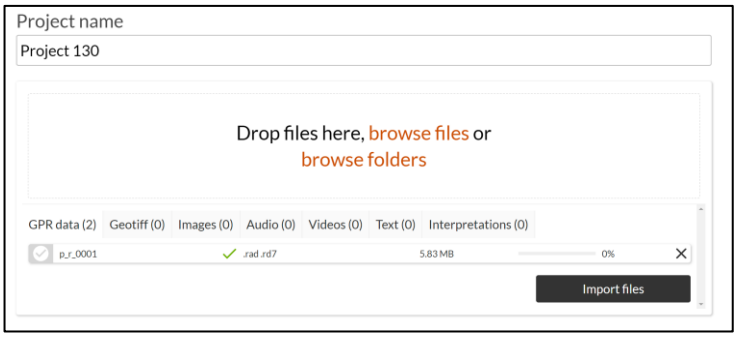
To create a new project, press *New project.*

Start by naming your project. Drag and drop your files or zipped or unzipped data folders onto the drop zone or use the browse function to upload files.

Note: If you drag and drop a complete project folder, MALÅ Vision will import all recognizable data and meta data formats automatically.

Note: The maximum size for a zipped folder is 2 GB. If the project is larger, unzip the folder first.

Press the *Import files* button to start the process. When import is started, the software switches to the Process tab, the main view of the software. For more information see the section *Process Tab*.



Note: You can also upload geotiffs, images and videos connected to your GPR project.

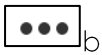
MALÅ Vision Desktop imports MIRA, MIRA HDR and MIRA Compact data (acquired with MIRA Controller) as well as MALÅ 2D files, Object Mapper and 3D Grid projects (acquired with MALÅ Controller App or some of MALÅ´s Monitors / Controllers). When uploading an Object Mapper Project, you will get the option to decide if X or Y should increase to the north.

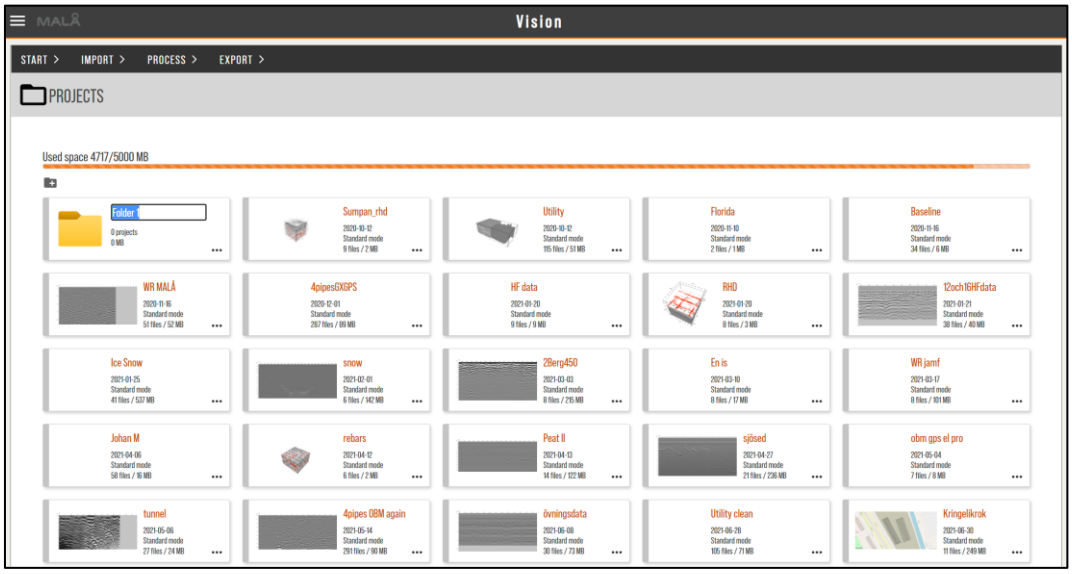
Note: If you have carried out measurements with a GPR antenna with PPS functionality (Pulse Per second, creating *.mtts or *.tts files) and have an external GPX positioning file, the GPR profile positions will automatically be synced, if importing the GPX file together with the GPR data.

This can be the case, for instance, when the measurements have been carried out with a MALÅ GeoDrone 600 with a DJI drone with a GNSS antenna.

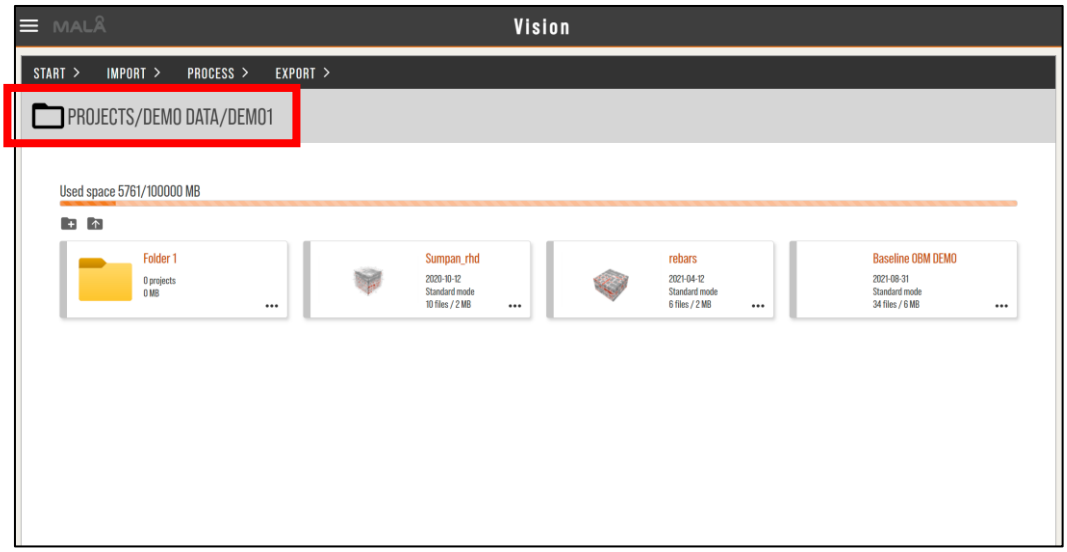
MALÅ Vision Desktop also imports GPR data from ImpulseRadar and GSSI as well as the SGY-format.

To open an existing project, choose *Open Projects* from the start menu. All available projects are listed with name and size. The amount of available disk space on your account is also displayed at the top of the window.

To organize your projects, you can create folders by clicking  and add projects to these folders by drag-and-drop. To delete and rename projects and folders click the  button.



In order to move projects and folders further up in the map structure, drag-and-drop the project or folder to the desired level (marked with red below). You can also click on these folder names (in the red marked area below) to move to the desired folder level or use  .



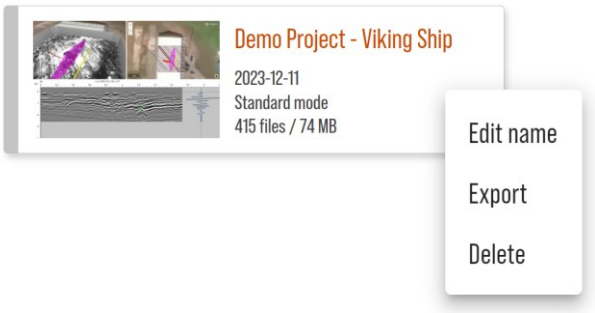
Keyboard shortcuts

To ease the processing and interpretation work with MALÅ Vision Desktop, the following keyboard short cuts can be used:

- Ctrl z = undo
- Ctrl y = redo
- Shift + mouse scroll wheel, in the 2D view = change aspect ratio
- Ctrl + mouse scroll wheel, in the 2D view = move along 2D profile
- Shift + mouse scroll wheel, in the 3D view = change time slice depth (fine)
- Shift + ctrl + mouse scroll wheel, in the 3D view = change time slice depth (coarse)
- Alt + mouse scroll wheel = adjust contrast control
- PageUp and PageDown (or fn + arrow up/down) navigates between profiles when the Profile navigator is open.

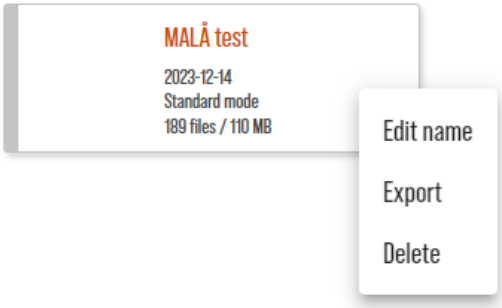
Data format and back-up

MALÅ Vision Desktop uses its own internal data format. To back up your data and interpretations use the Export option in the Project view. You reach this by Projects in the Main menu or by Open Projects at the start screen. Press ••• and choose *Export*. A zip file is created of the project content.



You can also use the Export Project button in the main view, the Process Tab.

If you want to delete projects, use the Delete option in the Project view. Press ••• and choose *Delete*.



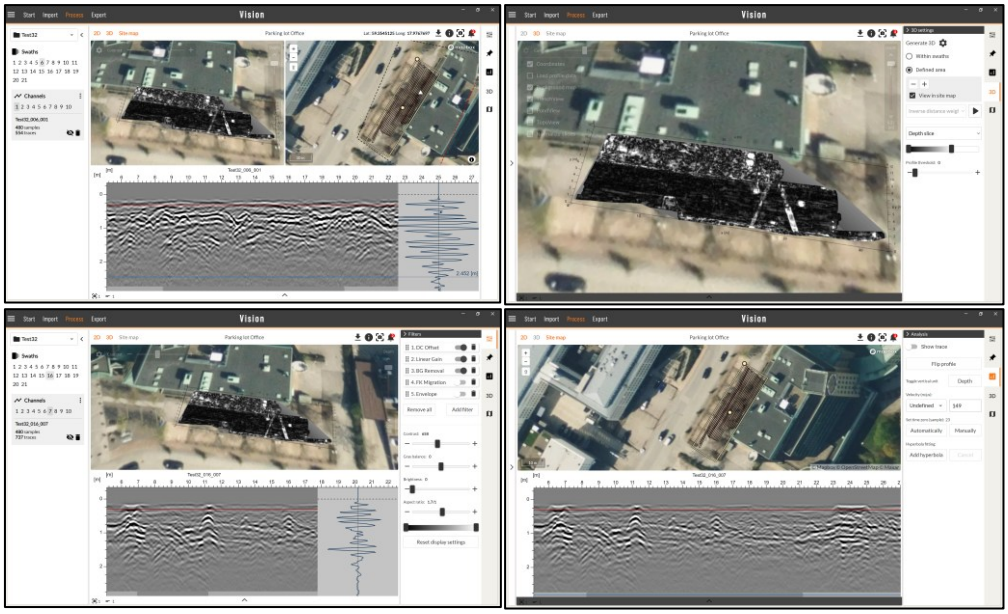
Process Tab

When the project is uploaded, the GPR data file is displayed in the main view, the Process Tab. If the *Interpolate on project start* box is ticked (found in the main menu *Application settings*, see section *Software Settings*), data is also automatically interpolated to a 3D volume. Imported array data is also automatically processed with suitable filters. These can freely be changed, see section *Filters* or the automatic function can be turned off, see section *Software settings*.

The list of all imported GPR profiles can be found on the left-hand side, in the Profile navigator. Press the arrow on the left-hand side to view and navigate between imported profiles. For MIRA data choose the swath and the channel to be viewed in the 2D window. Switch between profiles using PgUp and PgDn on the keyboard.

In the Process Tab, data is displayed in 2D, 3D or in a Site Map view. All three windows can be activated at the same time or just one or two of the views.

The main menus for processing, interpretation and tools related to the different views are found on the right-hand side. Separate toolboxes are available for Filter settings, Interpretation, Analysis, 3D settings and Site Map. These will be explained in the following sections.



Note: The dashed line in the Site Map view shows the corresponding area in the 3D view.

Note: When moving the mouse in the 2D view, the Lat/Long coordinates are displayed, in the upper right corner.

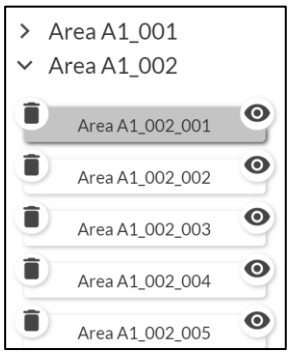
Note: The toolboxes and Profile list are dynamic and can be minimized or maximized by using the arrows on each side of the screen.

Note: Notifications from the software give information on upload status, interpolations, error messages etc. These can be deleted, one by one or all at once.

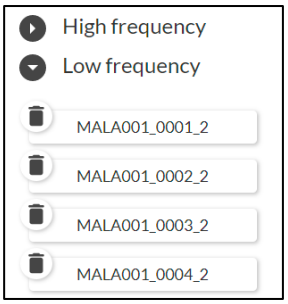
Note: Use the export button for easy export of the GPR data and interpretations to original format.

Note: The information button shows used measurement settings.

If you have MIRA, MIRA HDR or MIRA Compact data, the swaths are displayed separately and can be opened to toggle between the different channels.

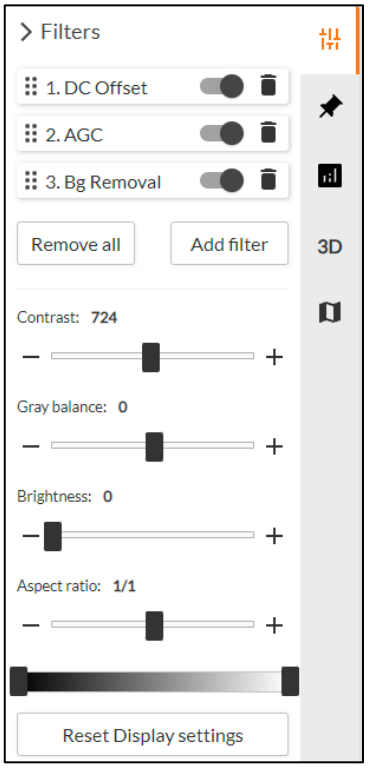


If you have Easy Locator WideRange data, the low and high frequency profiles are displayed separately on the left-hand side. To switch between the High and Low frequency just click on that row.



Filters

In order to add filters and process your data, choose the Filters toolbox and press *Add filter* to add the desired filters and processing steps.



Filters can easily be turned off and on with or deleted with .

Some filters have additional controls; for example, the velocity for the FK-migration is adjusted by using a slide-bar. The correct velocity is determined by adjusting the slide-bar until the legs of the hyperbola are minimized and only a point response remains in the data. See example in section *Migration settings*.

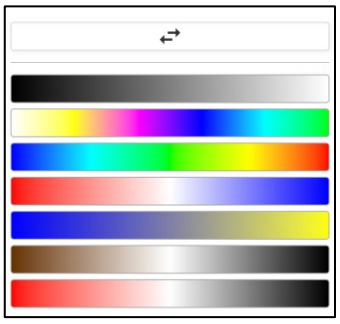
When working with GeoDrone data or data collected with an uneven distance between the GPR antenna and the ground surface you often need to use the filter *Flatten to surface*. This filter is intended to be used together with the *Find Surface* option in the Interpretation Toolbox or could be used with any interpreted layer. For more information, see section *Find surface layer and Flatten to surface*.

In the Filters toolbox display settings (contrast, grey balance, brightness) for the 2D and 3D views are made.
A contrast slide-bar is also found on the 3D View.

Use the aspect ratio and zoom (mouse wheel/stretch with two fingers on mouse pad/screen) to zoom in and out in the 2D data.

If you keep the left mouse-button down and move, the radargram with the present zoom and aspect ratio level will move.

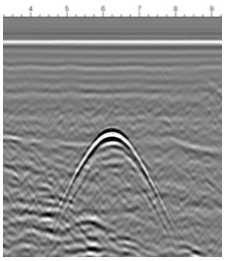
If you click on the color scale bar you can choose between seven different color schemes. The direction of these can be changed by pressing the arrows. Click somewhere on the screen to close the pop-up and now you can also use the nodes to change the strength of the colors.



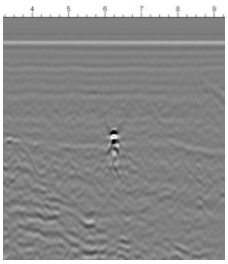
To reset the display settings, press *Reset Display settings*.

Note: The preferred color scheme can be set as the default color map in the *Application Settings*, found in the main menu  .

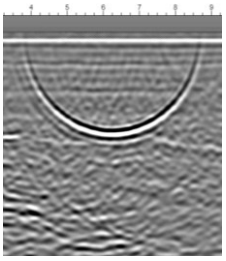
Migration settings



Too slow migration velocity



Correct migration velocity

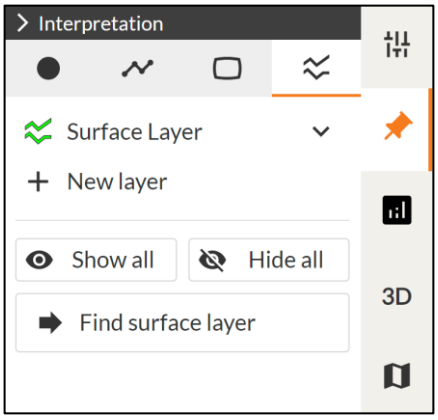


Too fast migration velocity

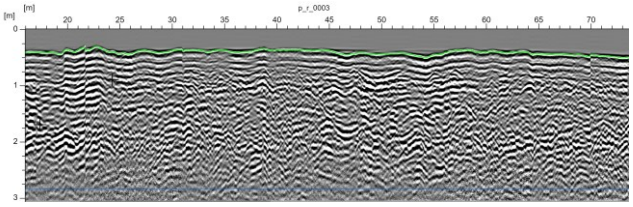
Find surface layer and Flatten to surface

When working with GeoDrone data, acquired with a drone, the flight height is most likely not even at all times. This can also be the case when doing road investigations, where the distance between the GPR antenna and the ground surface varies.

To take care of this, MALÅ Vision Desktop uses the option *Find surface layer*, in the Interpretation Toolbox.

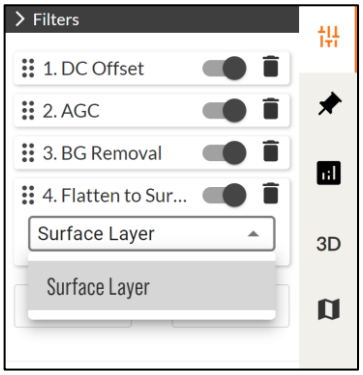


Press the *Find Surface layer* button to automatically pick a surface layer.

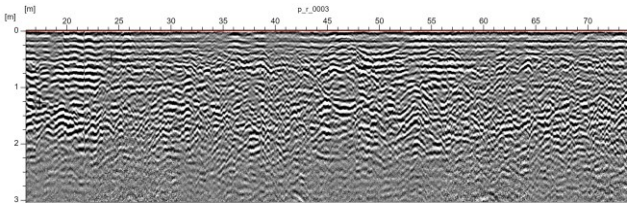


The green line that appears represents the picked surface, i.e. the ground.

In the *Filter Toolbox*, add a *Flatten to surface* filter and choose the correct layer to flatten. The layers are found in the drop-down menu.

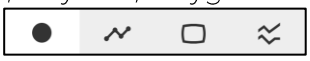


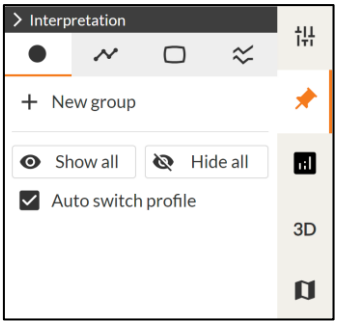
The green surface layer is now flattened and the underlying radar data adjusted.



Interpretation

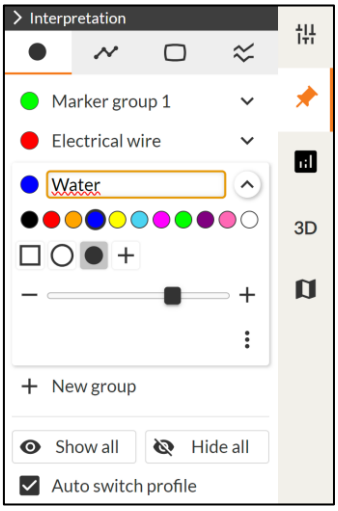
To add interpretations, use the Interpretation toolbox  .

Select the type of interpretation you want to make: Markers, Polylines, Polygons or Layers, in the tab menu: 



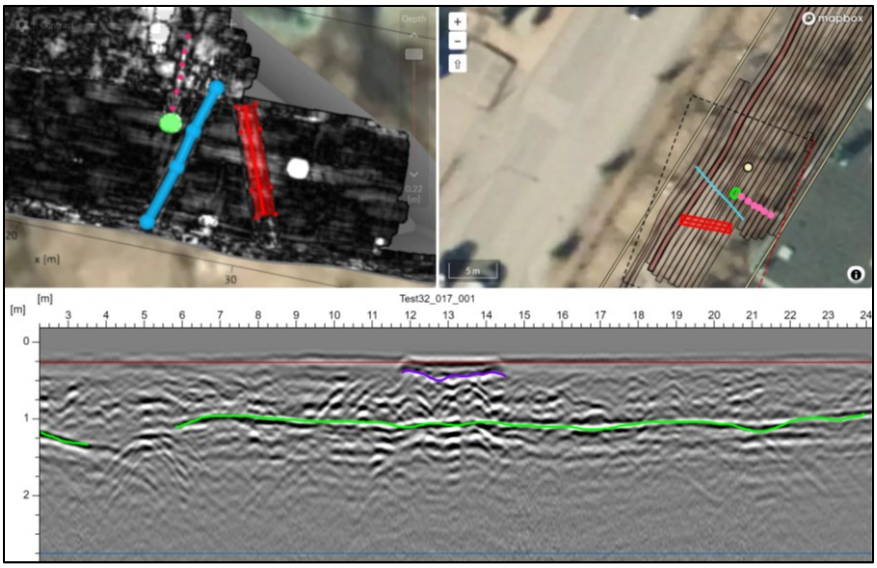
Add a *New group, polyline, polygon or layer* and choose the color, type and size of the interpretation.

You can add new items for each interpretation category, as well as view or delete these. Each item group can be renamed with a custom name.



All interpretations, by category, can be shown or hidden with: 

Use the Auto switch option to automatically jump to the next 2D radargram in your list (in the left-hand pane) when setting markers or polylines.



The different interpretation types: markers, polylines, polygons and layers.

Markers

To set markers:

- Left-click in the displayed profile (in the 2D view) to add a marker. To move or delete a marker, right-click on the marker in the profile and select the appropriate action. See picture below.
- Left-click in the displayed depth slice (in the 3D View) to add a marker. To delete a marker, right-click on the marker in the depth slice and select the appropriate action. See picture below.

Use the commands:

- Ctrl+z to undo
- Ctrl+y to redo when placing markers.

The group of markers that is open, and active, is also highlighted in both the 3D and 2D view.

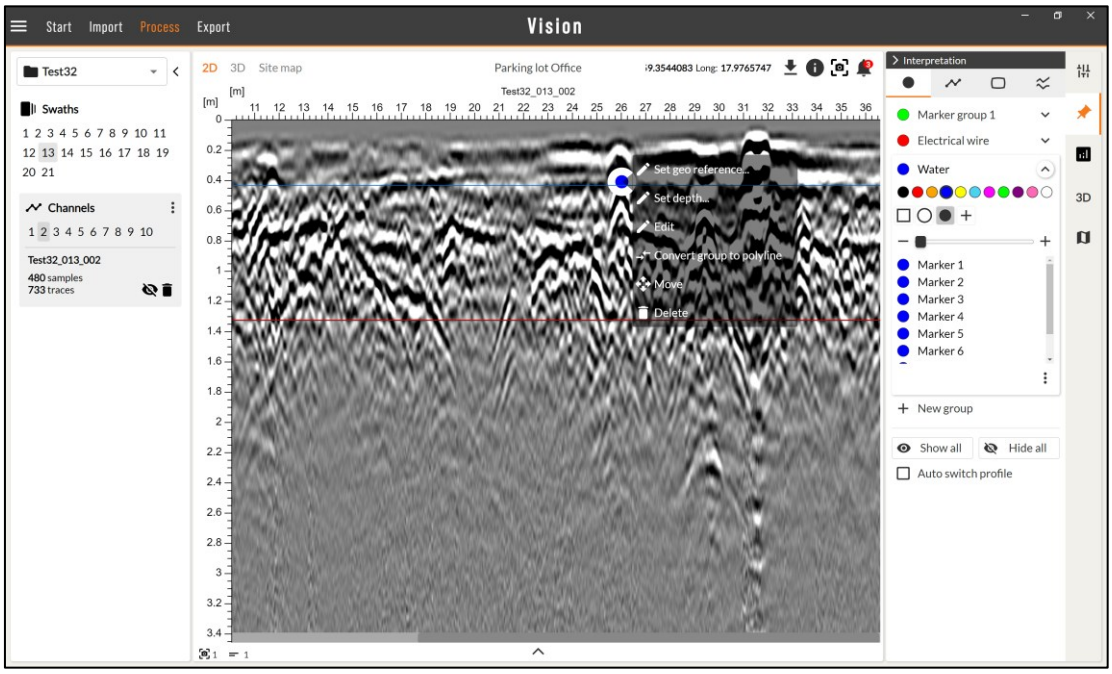
Note: Markers in the same Marker group can be set at different depths in the 3D volume.

When right-clicking on a marker in the view you get a menu with different actions (Set geo reference, Set depth (for markers, this action will change the velocity of the radargram accordingly), Edit, Convert, Move, Delete). When choosing Edit, this provides you with an option to edit the marker in form of color, shape and size in the Interpretation toolbox.

When right-clicking on a marker in the 3D or Site Map view you can set geo reference, convert markers to polylines or vice versa, edit and delete markers or nodes. With the edit option you can change size, color and shape of the marker.

Note: The colors of the markers are defined in the marker template, found in *Applications settings*, in the main menu.

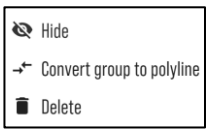
Note: Set markers can be converted to polylines and set polylines can be converted to single markers. Right-click on the marker or polyline and choose the option *Convert group to polyline* or *Convert polyline to markers* or use the convert button in the Interpretation toolbox.



Interpretation in 2D data with markers. Right-click view the interpretation menu. Note that you also have the positioning in Lat/Long on the screen (upper right corner on the main view).

Interpretation in 3D data with markers and edit possibilities when right-clicking on a marker.

For Markers you also have the following options, when pressing 



Polylines

To set polylines:

- Left-click in the displayed profile (in the 2D view) to add a polyline node. To move or delete a polyline node, right-click on the node in the profile and select the appropriate action.

- Left-click in the displayed depth slice (in the 3D View) to add a polyline nodes. To delete a node, right-click on the node in the depth slice and select the appropriate action.

You can also mark a connection point, a node, with the mouse and use the Delete button on the keyboard to remove it.

Use the commands:

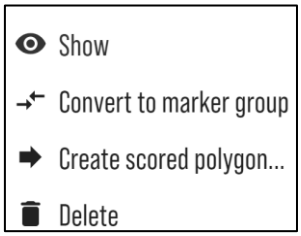
- Ctrl+z to undo
- Ctrl+y to redo when placing polyline nodes.

The polyline that is open, and active, is also highlighted in both the 3D and 2D view.

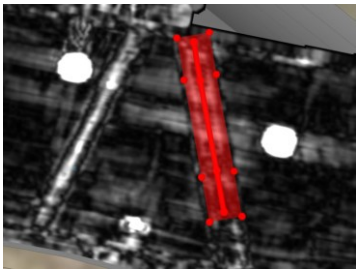
Note: Polylines in the 3D volume can be set at different depths.

Note: Set markers can be converted to polylines and set polylines can be converted to single markers. Right-click on the marker or polyline and choose the option *Convert group to polyline* or *Convert polyline to markers* or use the convert button in the Interpretation toolbox.

For Polylines you also have the following options, when pressing ⋮



The option *Create scored polygon...* can be used to create an area around the set polyline. This can be useful to mark, for instance, the certainty of the interpretation. The width sets the size of the area and the score value sets the transparency of the polygon.



These scored polygons can be exported as geotiffs. See Section *Export.*

Note: To delete or edit a scored polygon, this is made in the Polygon Tab.

Polygons

To set polygons:

- Left-click in the displayed depth slice (in the 3D View) to add a polygon node. When you have set three nodes, they will form an area. Each new set node will increase this area. To delete a node, right-click on the marker in the depth slice and select the appropriate action. See picture below.

You can also mark a connection point, a node, with the mouse and use the Delete button on the keyboard to remove it.

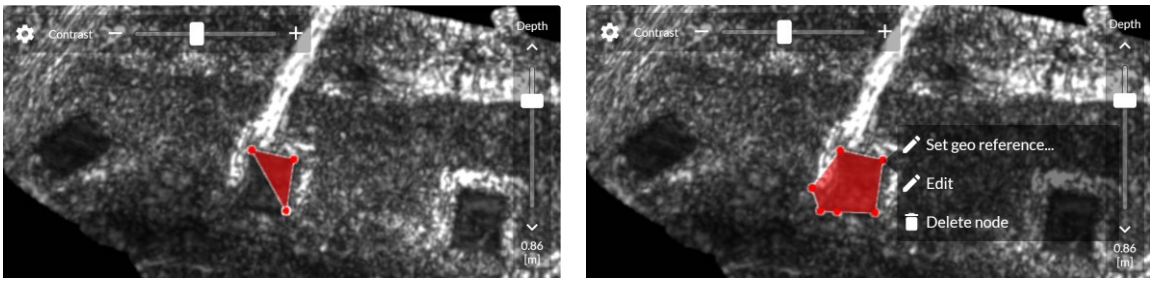
Use the commands:

- Ctrl+z to undo
- Ctrl+y to redo

when placing polygon nodes.

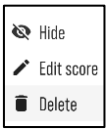
The polygon that is open, and active, is also highlighted in both the 3D and 2D view.

Note: Polygons can only be added in the 3D view.



Interpretation in 3D data with polygons and edit possibilities when right-clicking on a polygon node

For Polygons you also have the following options, when pressing ⋮



Layers

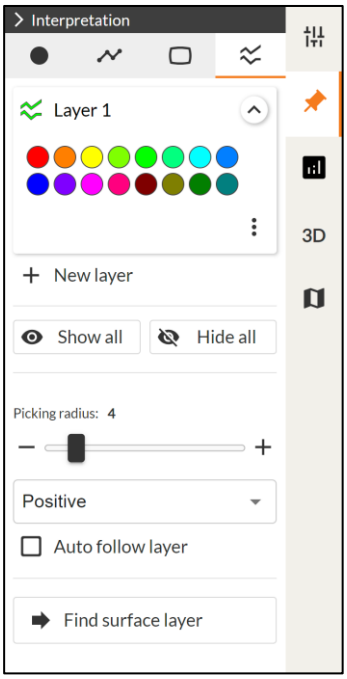
Layers can be set in the 2D view, and either by drawing the layer with the mouse pointer (click and hold) or by the option *Auto follow layer*.

When using the *Auto follow layer* option, click and draw a short distance in the 2D view and then the layer will be automatically picked.

You can change the *Picking radius* as well as the phase to follow (positive, negative or both)

If the set layer needs to be changed, just click and hold and re-draw.

For more information on *Find surface layer*, see section *Find surface layer and Flatten to surface*.



Use the commands:

- Ctrl+z to undo
- Ctrl+y to redo

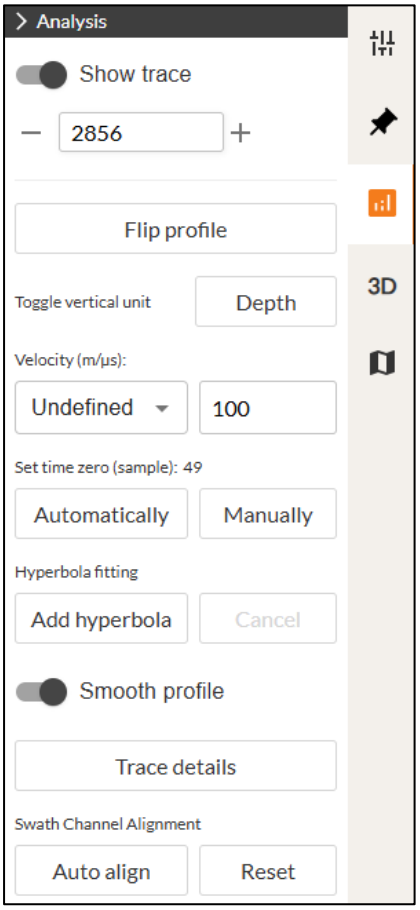
when drawing layers.

Note: Layers can be picked in both directions (forward and backward), so use the scrollbar (below the radargram) to move forward in the radargram.

Analysis

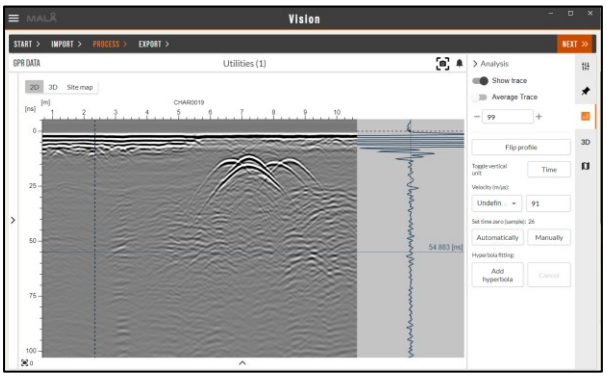
In the Analysis toolbox the following features are found:

- Turn on and off trace view
- Flip profiles
- Toggle between depth and time for the vertical unit
- Set velocity (manually or using pre-defined values)
- Adjust the time zero
- Hyperbola fitting to check the velocity of your radar data.
- Trace details (see Section *Trace details*).
- Auto align is used if you have misalignment between. Press Auto align to vertically align all channels across the entire project. Use Reset if you want to undo the alignment.

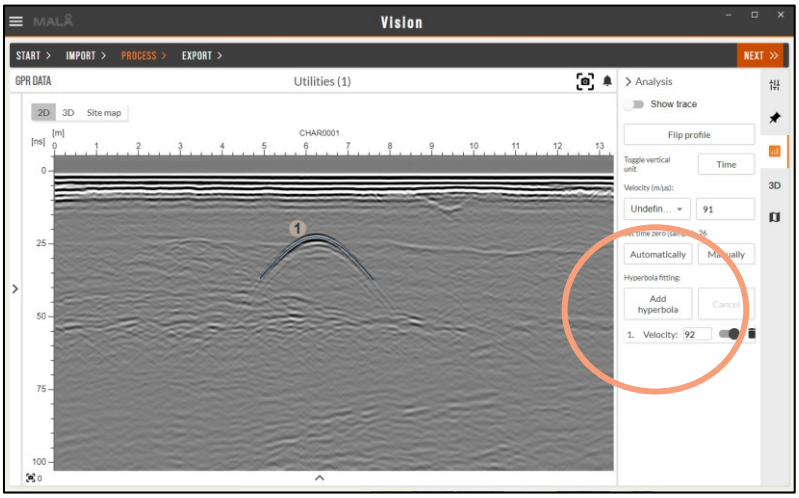


When trace view is on, you display a single trace or an average for the whole profile.

By using + and - or entering a number, the trace number to be displayed is set.



Hyperbolas can be used and added to displayed data for an easy verification of the velocity. Press *Add hyperbola* and place the hyperbola in the radargram in the 2D view with a left-click. Change the velocity in the Analysis toolbox to change the shape of the hyperbola. Right-clicking on the top of the hyperbola gives you the option to delete or move the same. To move, choose *Move*, and then use your mouse (hold down left button) and move the hyperbola.



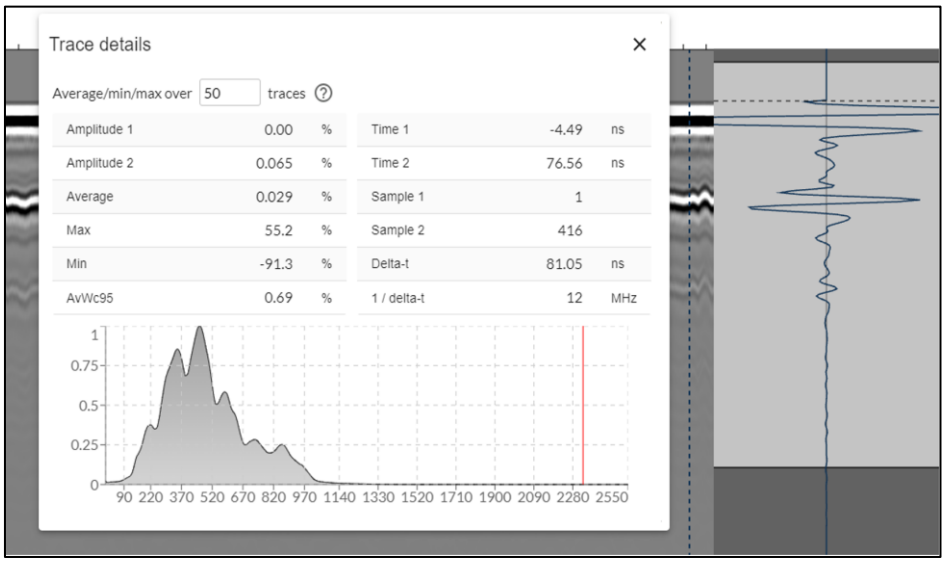
Trace details

The trace detail pop-up window gives you detailed information on the GPR data collected. You can see the information for the selected trace or average it over several traces. See ⓘ for more information.

Note: Activate the trace view in the Analysis Toolbox.

Note: No filter (except DC Offset) should be applied when looking at trace information.

The values that are presented as a percentage, goes from -100% +100% and depend on the chosen interval on the trace (defined by an upper and lower boundary, the light grey area in the picture below). This interval can be changed by adjusting the upper and lower boundary in the trace window (dragged and moved by left-click+hold).



Example of a set interval (with upper and lower boundary) of the trace.

The parameters in the Trace details pop-up shows:

- Amplitude 1 = amplitude in the GPR data at the upper boundary of the interval.
- Amplitude 2 = amplitude in the GPR data at the lower boundary of the interval.
- Average = the average amplitude for all samples.
- Max = maximum amplitude in-between upper and lower boundary.
- Min = minimum amplitude in-between upper and lower boundary.
- AvWc95 = amplitude value when the 5% most extreme values in between upper and lower boundary are removed.

- Time 1 = time position in the trace for upper boundary.
- Time 2 = time position in the trace for lower boundary.
- Sample 1 = sample number in the trace at the upper boundary.
- Sample 2 = sample number in the trace at the lower boundary.
- Delta-t = difference in time (ns) between upper and lower boundary.

3D settings

In the 3D tab you can view your data as single 2D files in a 3D volume, interpolate your data, and change the threshold of the 2D profiles.

By right-clicking on a profile in the 3D view, you can hide it. By left-clicking on a profile in the 3D view, you will open it in the 2D View (make sure this view is open). Keep the right mouse button down and move will move the 3D volume at the present zoom level.

Note: When viewing data as a 2D file in a 3D volume, the processing, display settings and color scheme follows from the 2D View.

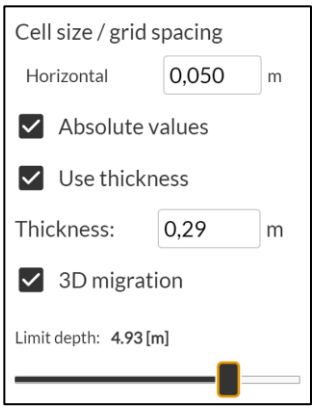
To create a 3D volume of your MIRA HDR and MIRA Compact data, as well as 2D lines, press ▶ to start the interpolation. MALÅ Vison Desktop decides the best interpolation scheme to use, depending on your data type. You can continue working as the interpolation is carried out.

Use the ⚙ to change the interpolation settings.

The thickness is used if a so-called PondView is wanted (see example below).

If the y-scale is set to time or depth in the Analysis toolbox, the thickness is defined in ns or m / feet.

The 3D interpolation can also be limited in depth.

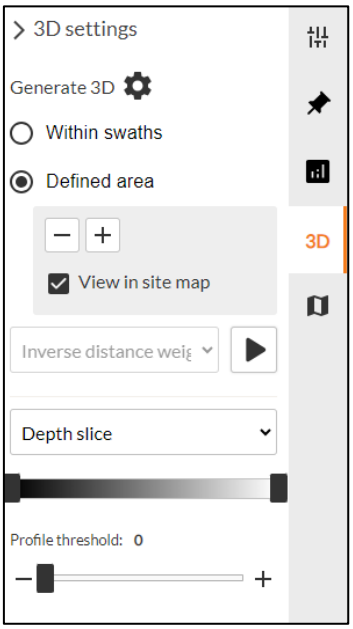


The different options for the interpolation settings are:

- Grid spacing. This can be kept around the trace distance for high resolution. If you want the interpolation to speed up, you can increase the spacing, but this will decrease the resolution.
- Absolute values. If ticked, calculations are made on the magnitude of the radar wave and ignoring the polarization. In other words, all negative values become positive. Often it is suitable to have this option ON when using thickness on the depth slices.
- Thickness. This is the thickness of the depth slice. If thickness is used, all depth slices get the same thickness, from top to bottom.
- 3D migration. Migration is made in all directions and not only along the profile as in 2D migration.

Note: It can be good to try some different settings on a small defined area, for fast results and then use the best settings for the compete project.

For MIRA, MIRA HDR and MIRA Compact data you can interpolate within swaths or a defined area. For 2D data you can interpolate in a defined area.

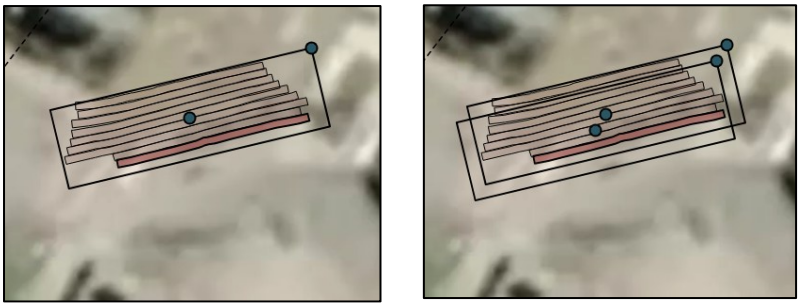


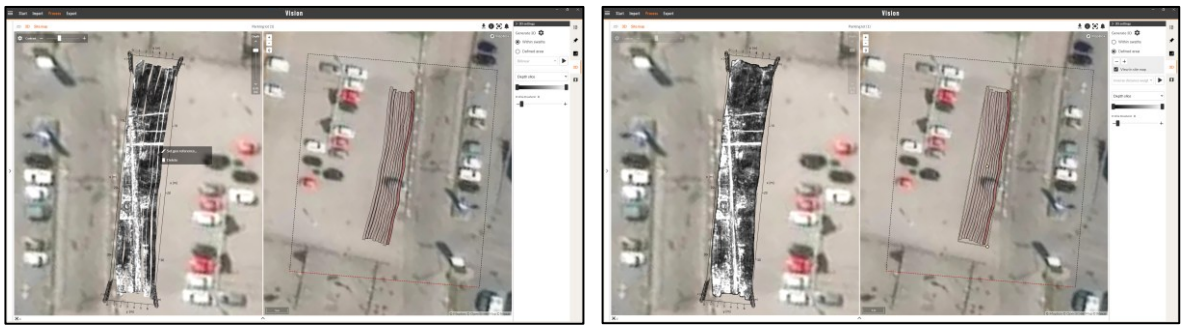
The option Within swaths will interpolate the data within the measured swaths but not in-between the same. With the option Defined area, MALÅ Vison Desktop by default selects all data on the Site Map view and interpolate within and between swaths in that area.

This area can be changed:

- Move by click and hold on the center point,
- Rotate by click and hold on the corner.
- Click and hold on any of the sides to change size.

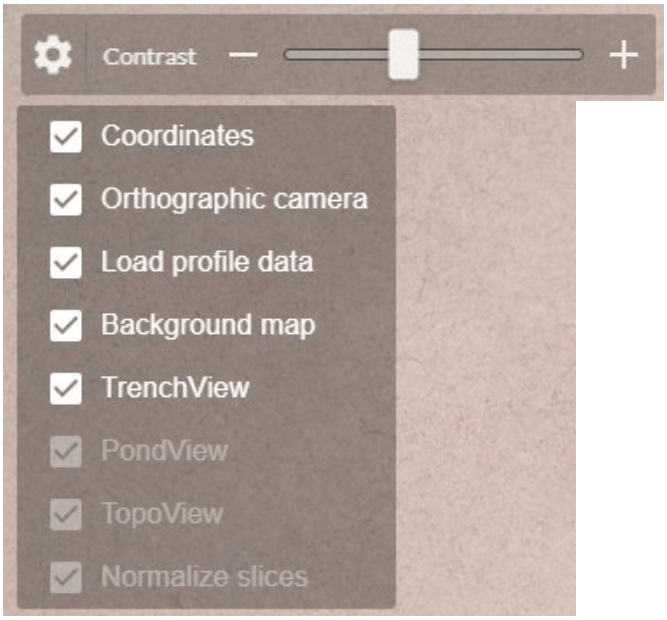
Areas for interpolation can also be added. When pressing + a new area of the same dimension and rotation is added to the center of the view. Press – to remove the previously set area.
Press Ctrl+D to duplicate the last placed area. When using Ctrl-D the area is placed overlapping the previously set area.





Example of interpolations; Within swath (left) and Defined area (right). Note that when interpolation is made Within swaths you can right-click on a swath to delete it or georeference the project.

When the interpolation is ready, press the cog wheel to change the 3D View settings.



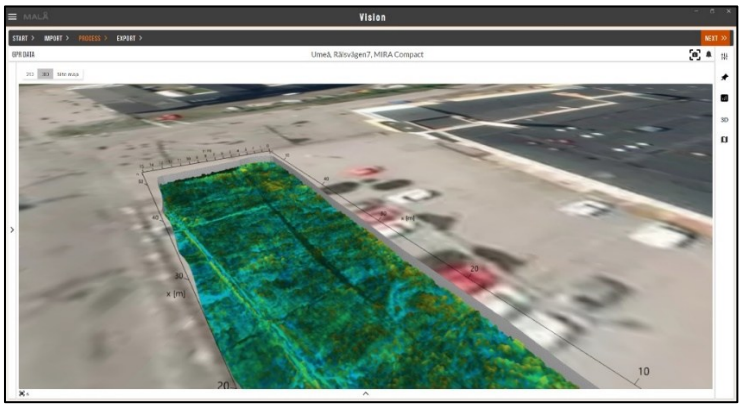
Data can be viewed as a time slice (in the 3D View) and with or without Trench view.

You can also activate an orthographic camera perspective in the 3D view.

There is also a PondView option (with or without topography) to enhance the 3D effect of your objects even more.

These options are found in the 3D view settings 

Note: The PondView options are disabled if interpolation is made without using thickness in the interpolation settings pop-up  .

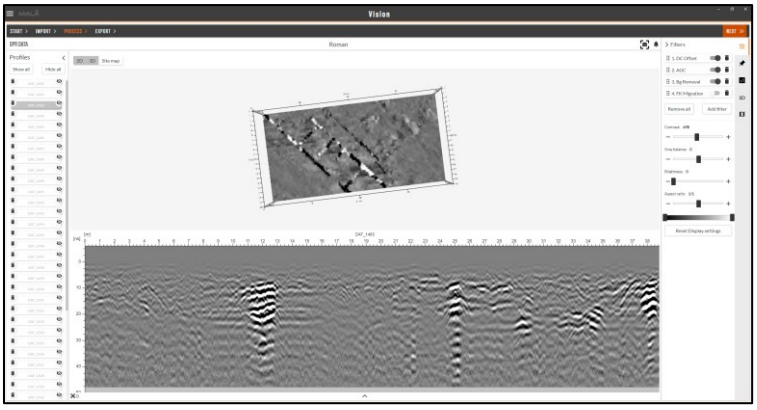


Example of PondView

The colors of the 3D View can be changed by clicking on the color scale bar. This will open a selection of seven different color maps. See Section *Filters*.

Profile threshold makes weak reflections in the 2D profiles below the given threshold transparent. This option is used for the 3D view, when 2D profiles are shown.

Note: The left-hand pane  can be used to view or hide all 2D profiles included in the 3D volume. Individual profiles can be hidden from the 3D view by clicking on the eye icon next to the specific profile, or with a right-click on the profile in the 3D view.

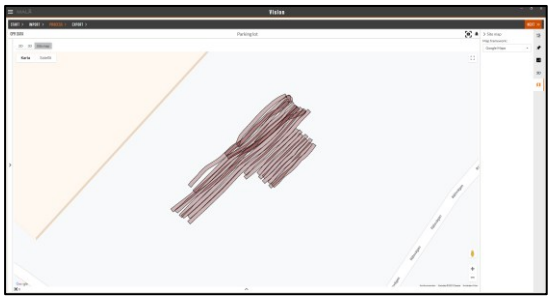


The profile list is visible on the left-hand side

Site map

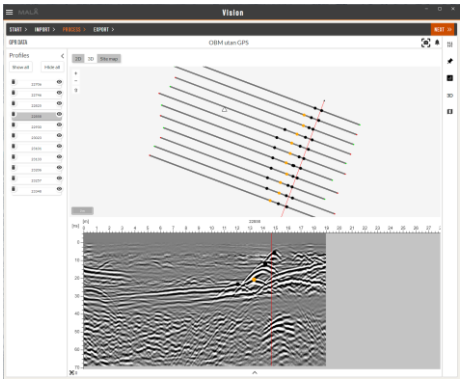
If your imported data contains positioning information (as cor-files of different types or obm-files created with GNSS) the Site map will display all GPR profiles onto a map or satellite image for cor-files and a layout for obm-files. The Site map will also display all interpretations, including polylines if these are enabled in the Interpretation toolbox.

Single 2D files



3D swaths

If you have 2D profiles without any positioning (cor- or obm-files created without GNSS) these will be displayed as defined in the obm-file or as evenly distributed parallel profiles, where the location can be edited. See section *Edit Geometry* below.



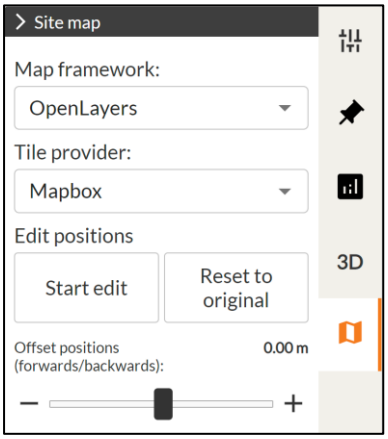
The color on the ends of 2D GPR profiles indicates the direction the data was collected. Green dot indicates the start and red the end of the profile.

When you hover above the profiles in the site map the correct profile is highlighted in the left-hand profile list. When right-clicking on one of the nodes (red or green dot) on a profile in the site map, this will provide you with an option to show the profile in the 2D view. Make sure the 2D view is open.

Note: When making changes to markers in the 2D view, these are automatically updated in the Site Map.

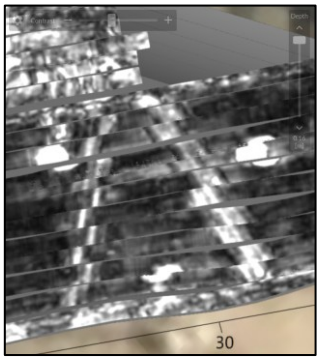
Offset

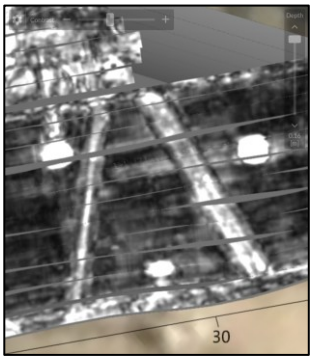
When you have gathered MIRA HDR or MIRA Compact data and made the 3D interpolation with the option *Within Swaths* (see section 3D settings) an offset for the positioning can be applied, if needed.



This is useful if your GNSS antenna has not been completely vertical during measurements.

Use the *Offset positions* slider, at the bottom of the Site Map toolbox and instantly see the result in the 3D view.





Left: Measurements made in two directions, GNSS antenna has not been vertical.
Right: An offset is applied, to adjust for the tilting GNSS:

Edit geometry

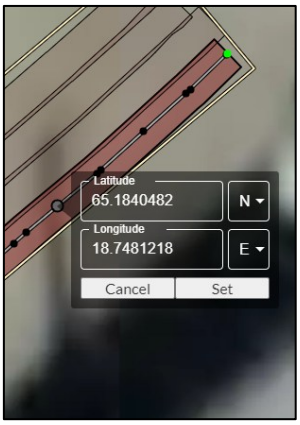
The geometry can be edited for all types of collected files. Depending on GNSS or non-GNSS data the edit differs. See the following sections below.

Note: To enable Edit of data acquired with GNSS, choose OpenLayers as map resource in the Site Map toolbox.

Edit geometry - Georeference

Data in Site Map can also be georeferenced. Right-click on the node that will be used for georeferencing and enter the corrected Lat and Long positions. Press *Set*.

If data is collected using GNSS positioning the current position is displayed, otherwise the Latitude and Longitude values are 0.



When georeferencing is done for two points, the data set will move and rotate to the new location. The first point set gives the rotation of the project and the second point the exact location. If setting a georeference point again, it will be point 2 for rotation and point 3 for the exact location.

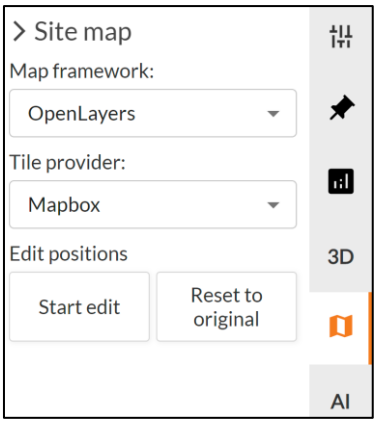
Note: *Reset to original* is only applied for edited relative positions of nodes, not for geo-referenced points.

Note: If you have collected data with a Total Station, data always needs to be georeferenced as MALÅ Vision Web does not read the projection used when setting up the Total Station to collect data with MALÅ Controller App or the MIRA Controller software.

Edit geometry – data with GNSS or 3D Grid Projects and OBM

If you have collected data with positioning (cor-files available) the following adjustments can be made, when pressing *Start edit*:

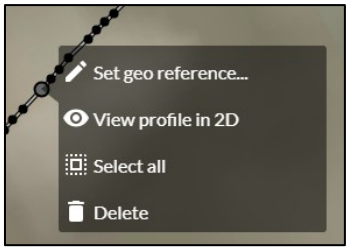
- Change position of single nodes.
- Change position of several or all nodes.
- Change position of several lines.



Use the following commands to mark and move:

- Mouse-click to mark a single node.
- Control+mouse-click to mark several nodes.
- Shift+mouse-click+hold to draw a square around nodes or profiles be marked.
- When the nodes are marked: Hold down left mouse button and move.

To mark all nodes, right-click and press *Select All*. When the nodes are marked: Hold down left mouse button and move.



For data sets with 2D data you will see all available nodes when choosing *Start edit*. For MIRA data you click on the swath to edit, to display the nodes.

Display of GNSS nodes for 2D and MIRA array data

When you are satisfied with your changes, press *Save positions* for saving or *Cancel* to return.

Example of marked and moved nodes

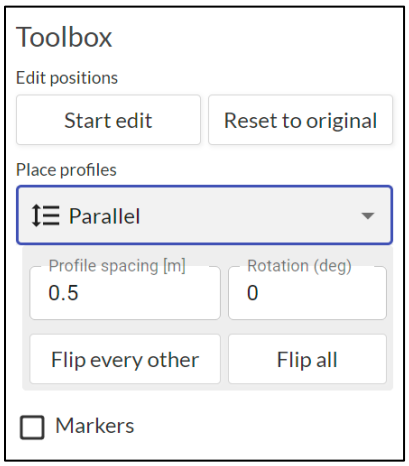
You can also georeference the data, by right-clicking on a GNSS-node and selecting the option Set geo reference. For more information see section *Edit Geometry*.

Edit geometry – Non-GNSS data

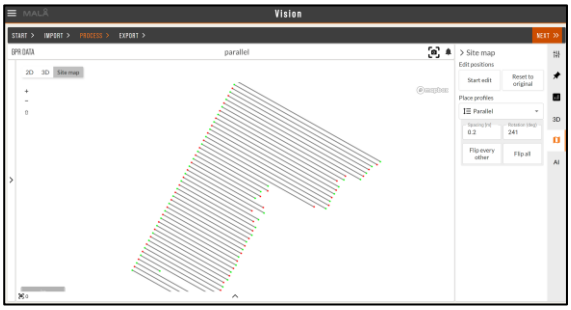
If you have collected data without positioning as single 2D files, MALÅ Vision Desktop will automatically place them in parallel, and you can easily adjust the following:

- Place profiles in parallel or in a grid
- Change profile spacing and rotation
- Flip profiles

When right-clicking on a profile point you can view the profile in 2D (make sure the 2D view is open), flip that single profile or georeference the project.



Note: When pressing *Start Edit* the nodes can be marked and moved as for GNSS and OBM data. See section *Edit Geometry – Data with GNSS or OMB projects*.



Data rotated and flipped

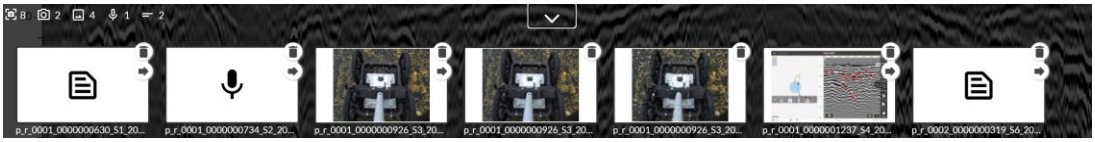
Data files sorted as a grid

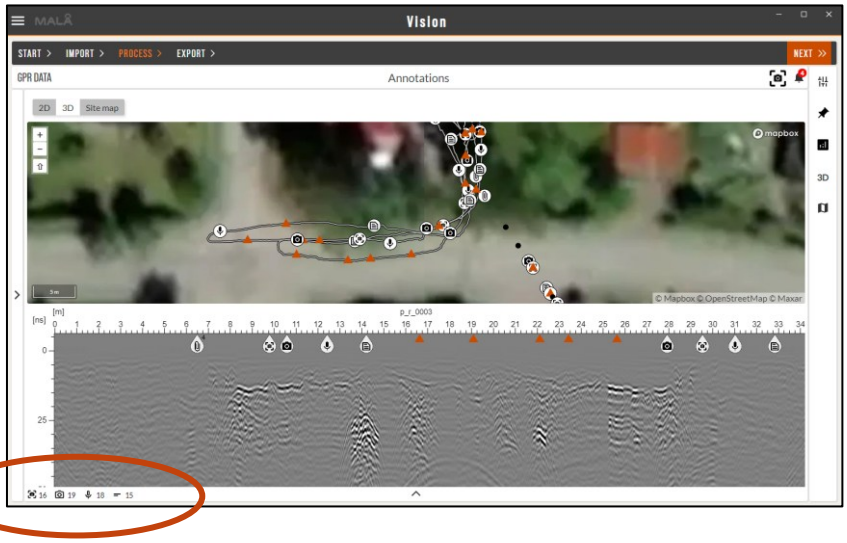
Other features

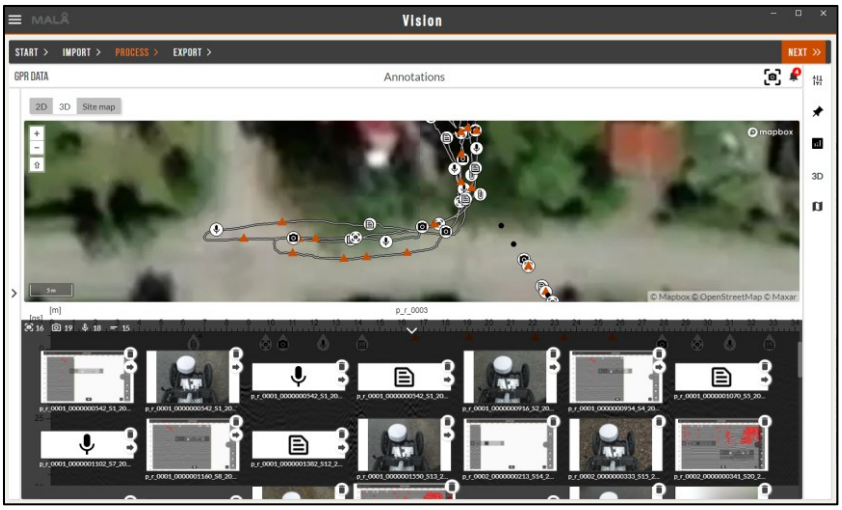
Annotations

All annotations added during a survey using the MALÅ Controller App (audio, photo, snapshot, text etc.) will be imported together with your project and will be available by clicking the annotations bar below the radargram view (see images below). The project plan created with MIRA Controller is also imported as a text annotation.

You can open and view/edit your annotation with a click, or you can press the arrow on top to the annotation thumbnail to move to the location of that specific annotation (in the 2D view or Site map if these are open).





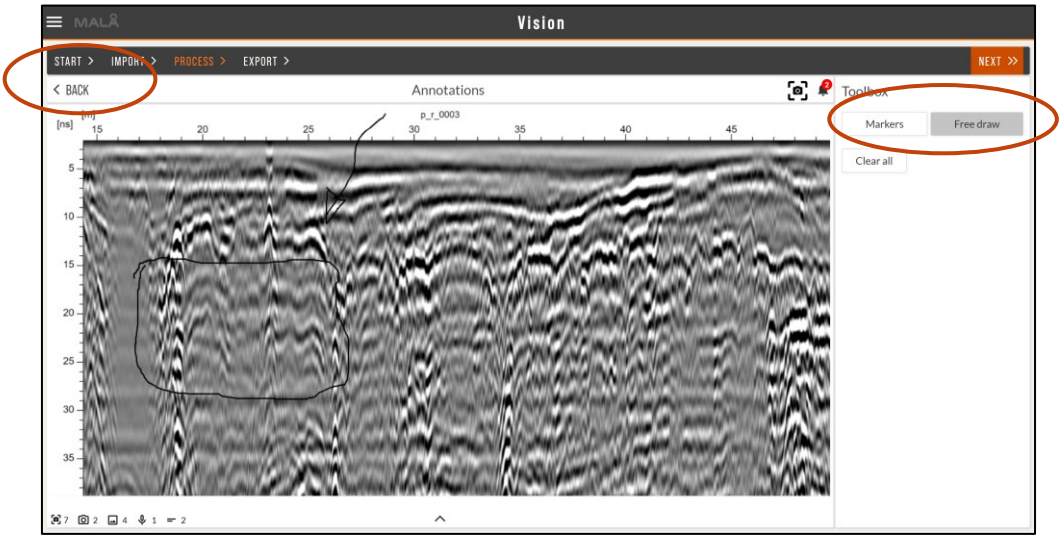


Screenshots

For both 2D, 3D and Site map a snapshot tool is available . When using this tool, the current workspace screen is saved as an image for easy use in a report or for export. All snapshots are viewed and retrieved in the lower part of the screen or in the Export/Report tab.
When changing to Snapshots or Images (in the drop-down menu in the upper-left corner) more markers can be set, and a Free draw option is available, which can be used to enhance and mark features in the data.

> **Note:** When you are finished adding markers and free drawings, remember to save another screenshot to keep the additions.

Use *Back* to go back to main view with 2D, 3D and Site Map views of radar data.



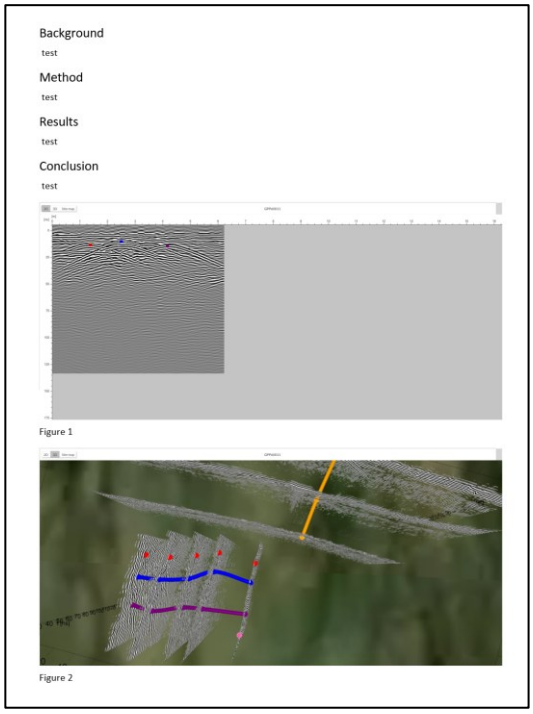
The snapshots are seen together with your annotations in the lower foldable menu.

Report and Export

When you are ready with your interpolation and snapshots of the data, proceed to the Export tab. From this tab you can choose to either create a report, or to export data, interpretations, and images.

Create report

With the Create report tool you can add both snapshots and text to a standardized report template, which are compiled into a document for easy sharing with a contractor or customer. The report can be exported to PDF or Microsoft Word format.



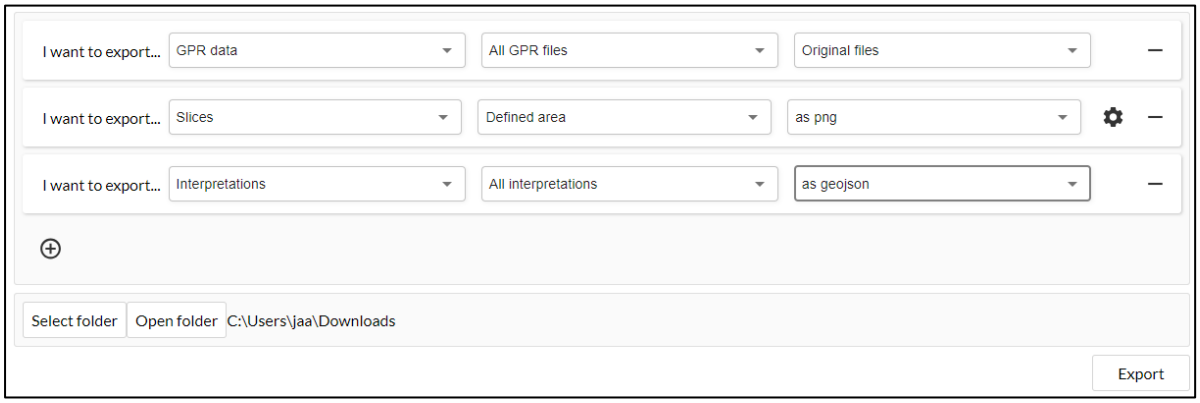
Note: When choosing snapshots for the report, these are included at the bottom of the text.

Export data

The Export data option includes dynamic export of GPR data, Slices, Profile location, Interpretations (as markers, polylines, polygons and layers), Snapshots, Images etc. The interpretation can be exported as .txt, .csv, .dxf or as .kmz-files (used in e.g., Google Earth). Some export options have the cog wheel where you find more options for the export .

MIRA swath GPR data can be exported to seg-y format, and you can choose to export processed (with filters) or non-processed data (raw data). Press to select type.

Use the + button to add additional exports items to the same zipped export folder. Select the folder where you want to save the export, by pressing *Select Folder*. You can also directly open that specific folder, by pressing *Open folder*.



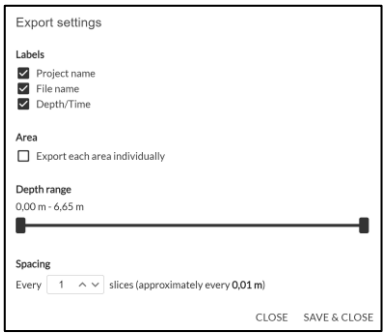
The exported data will be exported to a zip-file with the same name as your project. If you export several different categories, these are stored in different sub-folders in the zip-file.

Note: Export of All Interpretations in GeoJSON format enables reimport to MALÅ Vision Desktop, if you want to share your interpretations with another account or into another project.

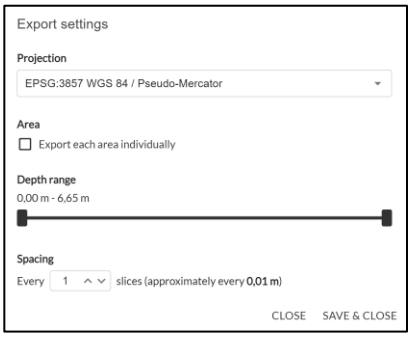
Slice export

Slice export can be made on both interpolation in a defined area or within swaths. The export is made in png for within swats and in png or geotiff format for defined area.

Press the cog wheel to open the Export settings pop-up. The export pop-up looks different depending on the chosen output format. Add the wanted features and format, press *Save&Close* and then *Export*.



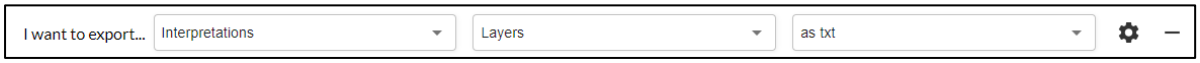
Png-format



Geotiff-format

Layer export

Layer export can be made in txt-format. Use the to set the projection.



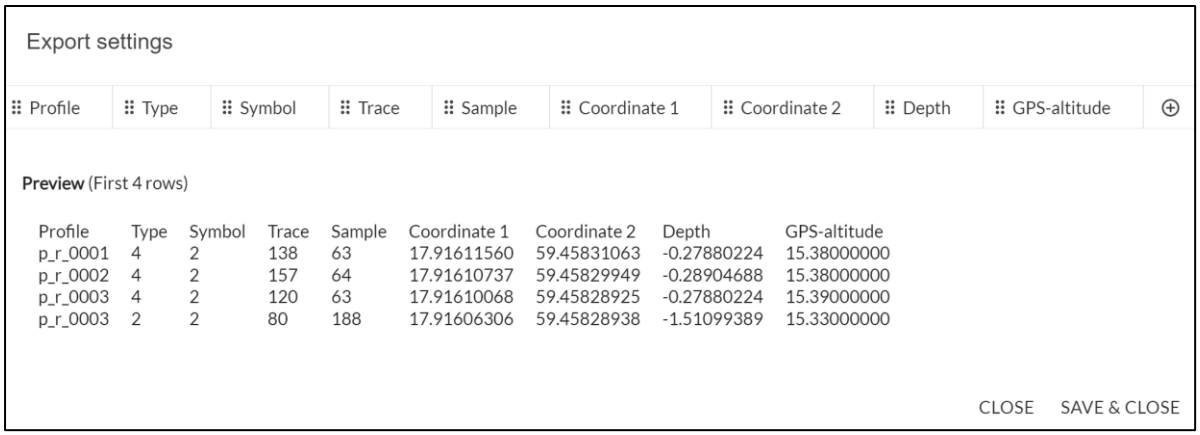
The export file, in e.g. Excel, gives the information on different layers in columns:

	A	B	C	D	E	F	G	H	I
1	Profile	Distance (m)	Easting	Northing	Elevation (m)	Layer 1 depth (ns)	Layer 1 depth (m)	Layer 2 depth (ns)	Layer 2 depth (m)
2	test_0001	3.59	15674425.741	-4556733.309	0.00	16.41	0.81	30.86	1.54
3	test_0001	3.64	15674425.764	-4556733.250	0.00	16.41	0.81	31.84	1.59
4	test_0001	3.69	15674425.788	-4556733.191	0.00	16.21	0.80	31.84	1.59
5	test_0001	3.74	15674425.812	-4556733.133	0.00	16.02	0.79	31.84	1.59
6	test_0001	3.79	15674425.836	-4556733.074	0.00	16.02	0.79	31.84	1.59
7	test_0001	3.84	15674425.859	-4556733.015	0.00	16.41	0.81	31.84	1.59
8	test_0001	3.89	15674425.883	-4556732.956	0.00	16.41	0.81	31.84	1.59
9	test_0001	3.94	15674425.907	-4556732.898	0.00	16.21	0.80	31.84	1.59
10	test_0001	3.99	15674425.930	-4556732.839	0.00	15.63	0.77	31.84	1.59

Txt- and csv-export

The dynamic txt- and csv-export of Interpretation and the option Markers&Polyline nodes contain information about the set markers. Press ⚙ to open the Export settings pop-up window. With ⊕ you can choose which parameters you wish to export; profile, type, symbol, longitude, latitude, depth (m), GPS-altitude (m), distance from start (m) and color. When clicking on each tab you can set a custom title and depending on the export type change parameters:

- For Coordinates you can choose the map projection to use in the drop-down menu. If you choose MALÅ Vision local, the interpretations will be exported into a local coordinate system (as displayed in the 3D view of MALÅ Vision).
- For Depth, GPS-altitude, and Distance from start you can set an offset.



Tabs (columns) are easily deleted by pressing ⊗ when you highlight the tab, as above.

Dxf-export

When exporting to dxf (choose Interpretation and option Markers&Polylines, Polylines, Markers/Polylines/Polygons or Profiles with gps altitude) the different marker types, polylines or profile lines will be exported into a single dxf-file with several different layers depending on type and color of the objects.

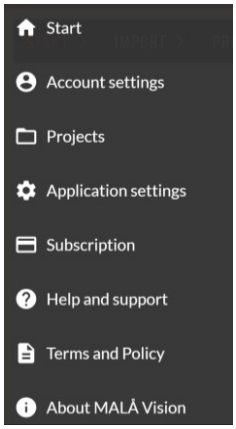
Note: Press ⚙ if you want to change the map projection used for export. By default, the dxf-export is made to WGS 84 /Pseudo-Mercator.

If you do not have any markers or polylines available, the dxf-export will only include the profile line location (without GPS altitude).

If you choose the option Interpretation and option Profiles with gps altitude, only the location of the profile is exported to a dxf-file, with the altitude (z-level).

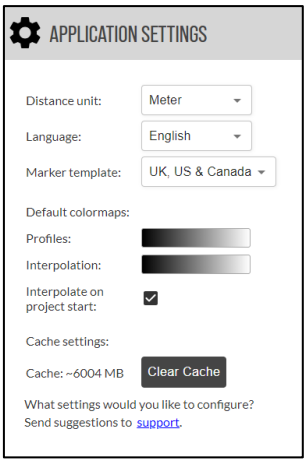
Software settings

Account settings, application settings, subscription details etc. are found in the main menu, which is accessed by clicking the hamburger menu  at the top left corner.



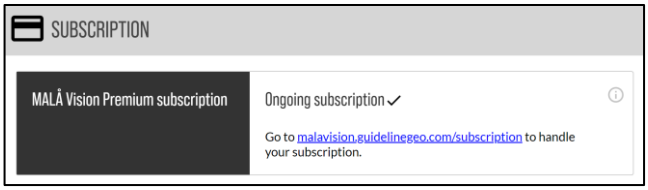
In the Application settings you can:

- Change *Distance unit*
- Set *Marker template*
- Set Default color maps for profiles or interpolated volumes
- Decide if interpolation on your data should be carried out automatically from start
- *Clear Cache*. Depending on the project, the cache in MALÅ Vision Desktop can grow quite large, so it is recommended to clear it periodically. When you click the *Clear Cache* button, you can choose to remove either *Temporary files*, *Interpolation data*, or both. Please note that selecting *Interpolation data* will delete **all interpolations** in MALÅ Vision Desktop (across all projects stored on the computer), and all project data will need to be re-interpolated.



Note: When the cache is cleared, interpolations for all projects are also removed. If you want to look at data in the 3D view, a new interpolation needs to be carried out.

In the Subscription settings you see the status of the subscription and find a link to handle the same.



Note: If you have larger projects you may want to uncheck the Interpolation box and check your processing and positioning information first.

The main menu also includes *Help and support*, with a form to communicate with Guideline Geo Support if needed and you are online. In the *About* menu, you find the software version number.