TERO VIDO®
MADE IN GERMANY

# User's Manual
# **Tero Vido Expander**

## Operation and Software description

SHOP DETECTORS
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# 1 Preface

Roaming the forests, venture forward into unknown territories, looking for hidden treasures and unveil the secrets of the ground – who can say he never had this fantasy, to be a real treasure hunter and discover secret objects with the help of professional technical equipment?

This fantastic imagination held us, a team of young and ambitious engineers, in its grip and we never lost track of it.

To have this fantasy become a reality, we had to find the right equipment. All available detectors on the market were either bulky, difficult to use, or simply not functional. The techniques that were used to detect for example metallic objects in the ground required al lot of experience, expert knowledge and complicated technical equipment. And still you only uncovered only a fraction of what was really „down there “. In the end, only an excavation brought certainty.

But there had to be a way to get reliable information on the underground without the need of excavation.

This led us to the idea to starting to develop our own underground detectors. We developed an easy to use search method and an innovative graphical representation of the data, including a 3D size and depth determination. Until now it was not possible to get detailed images of the underground and repeatable results. We changed that and designed a new generation of 3D underground detectors, lightweight, easy to use, robust and small, operated only with a tablet and our proprietary software.

These new detectors are suitable for the search of metallic objects, tunnels and cavities, pipes, cables and other deep buried anomalies. They are of great interest, not only for amateur treasure hunters but also for professional archaeologists, engineers and anyone who needs to know what is hidden in the ground.

Our company, GmbH is an up-and-coming dynamic enterprise from the heart of Germany, and the object of our business is researching, developing and marketing geophysical measuring instruments and ground radar.

We are proud to help a growing number of clients worldwide to fulfil their goals.

We are always here for you; to assist you in finding the best machine or even develop custom made solutions for you. Our biggest concern is your success and our best advertisement is a satisfied customer.

# 2 General information

Please read these operating instructions carefully before using the Tero Vido Expander and its accessories. These instructions will help you to use the ground scanner and find out potential sources where precautions should be taken. As with any electronic device the Tero Vido Expander has to be treated with caution and care. Don't use it for any other purposes than the ones it is designed and observe the safety precautions given. Otherwise damage or destruction of the processing unit and/or its accessories or connected components can result.

## 2.1 Possible Health Risks

When used properly the device will not cause any health hazards under normal circumstances. Based on knowledge available today the high-frequency signals are not harmful to the human body due to their low power.

## 2.2 Environment and atmospheric conditions

**Condensation:** Watch out for condensation! Especially when you switch between a cold and warmer place. If any kind of condensation could have evaporated, do not use the device directly. The unit is not weather proof. Water or condensation can damage the device.

**Strong magnetic fields:** It is necessary to avoid strong magnetic fields. These can arise for example in places with large electric motors or unshielded loudspeakers. Try to keep about 50 meters from such places.

**Metallic objects:** Metallic objects on the ground such as cans, tin, nails, screws or debris can influence your scan data. Also, it is advisable to remove any metallic objects of your person like cellular telephones, keys, jewelry, etc. Do not wear steel toe boots.

## 2.3 Voltage

The electricity supply should not be outside the indicated range of values. Use only the approved chargers which are part of the Tero Vido package.

## 2.4 Data safety

To avoid Data errors:

- the electricity supply of the device is sufficient,
- do not scanning too close to devices which send out disturbances
- consider atmospheric conditions (electrical storms, lightning, etc...)

## 2.5 Maintenance and Warranty Conditions

Please use a slightly damp rag to clean your device. To avoid any damage, you should transport the device and accessories always in the appropriate carrying cases.

If there are any technical problems with the device, please contact our service.

We warrant our detectors to be free of defects for a period of 24 months after the original date of purchase. Showroom devices, as well as batteries are subject to a warranty of six months. This warranty covers instrument failures which are too due to defects in material or workmanship. In these cases, the device is repaired or replaced, at our option, without charge for parts or labor.

The warranty excludes:

• Damage caused by inappropriate use which in our opinion caused the failure of the instrument

• Damage caused by excessively strong mechanical effects or accidents

• Damage caused by exposure to corrosive compounds, seawater or extreme temperatures

• Damage caused by using accessories not specifically designed for the respective device

• Damage due to modifications or unauthorized servicing of the electronics or the search probes

• Normal wear and tear

If you want to return an instrument to us, please observe the following:

• You must include a copy of the purchase receipt and your warranty card

• Please include a detailed explanation of the technical problems

• The instrument must be sent freight prepaid or it will be refused and returned to sender

• We will return the instrument free of shipping costs within Germany. Any costs for shipping abroad are to be paid by the costumer.

• Please make sure that your address is complete and legible

Attention: Warranty claim is only for unopened devices!

# 3 Technical specifications

**Technical Data – Tero Vido Expander**

| | |
|---|---|
| Probes | |
| Sensors | 3-axis-digital-sensor |
| | |
| Built-in rechargeable battery | |
| Type | LiFePo4 |
| Performance parameters | 1100mAh |
| Internal operating voltage | 3.6 V |
| Battery run-time | 6h |
| Charging time | 6h |
| | |
| Charger | 5V/500mA |
| Input voltage | 5V |
| Charging current | 500mA |

Measurement and weight of probes

| Designation | Probe horizontal | Probe vertical |
|---|---|---|
| Length | | |
| Diameter | | |
| Weight | | |

| | |
|---|---|
| IT protection category | IP 00 (splash-proof) |
| Storage temperature | -10° |
| Working temperature | '-10°C - 50°C |
| Relative humidity | 90% non condensing! |
| | |
| Radio module for data-transfer | |
| Frequency band | 2.4GHz WLAN |
| Channels | 11 |
| Transmission rate (air) | 11Mbps |
| Programmable output | +10dbm |

| | |
|---|---|
| Sensitivity | -91dBm |

Processor

| | |
|---|---|
| Microcontroller | 8Bit RISC |
| Maximum working frequency | 3,6MHz |

Technical requirements for computer

| | |
|---|---|
| Operating system | Windows 10, Android, IOS |
| Disk drive | software download from company website |
| USB | no |
| Bluetooth | no |
| Processor speed | min 1GHz |
| Working memory | 1GB RAM |
| Disc space | 250MB |
| Graphic card | With OpenGL |

Certificates

Conformity with CE-guidelines

FCC certified; WEEE-Reg.-Nr.: DE 73865556

ICC Certificate of Origin

Made in Germany

# 4 Scope of delivery

In the following table you can see the complete delivery contents and all optional accessories. The used symbols have the following signification:

✓ = included

✗ = not included

★ = optional available, only for additional charge

## Tero Vido Expander

| | Tero Vido Expander | Tero Vido Expander Gold |
|---|---|---|
| 3D software with Universal-App (IOS, Android, Windows) | ✓ | ✓ |
| Control unit GPR-probe (50 to 90 cm, extendable) | ✓ | ✓ |
| User's manual | ✓ | ✓ |
| Infrared thermometer | ✓ | ✓ |
| Headphones | ✓ | ✓ |
| Travel Adapter and charging cable | ✓ | ✓ |
| Peli- case (waterproof) | ✓ | ✓ |
| Tablet 10 Zoll (IOS, Android, Windows) | ★ | ★ |
| Mobile Phone (IOS, Android, Windows) | ★ | ★ |

# 5 Software description

Before you start the program, you must download the Tero Vido Universal-App with the software from the Playstore (Android) or App Store (IOS). Please read through this manual in order to get an overview over the look and the features of TeroVido3D.

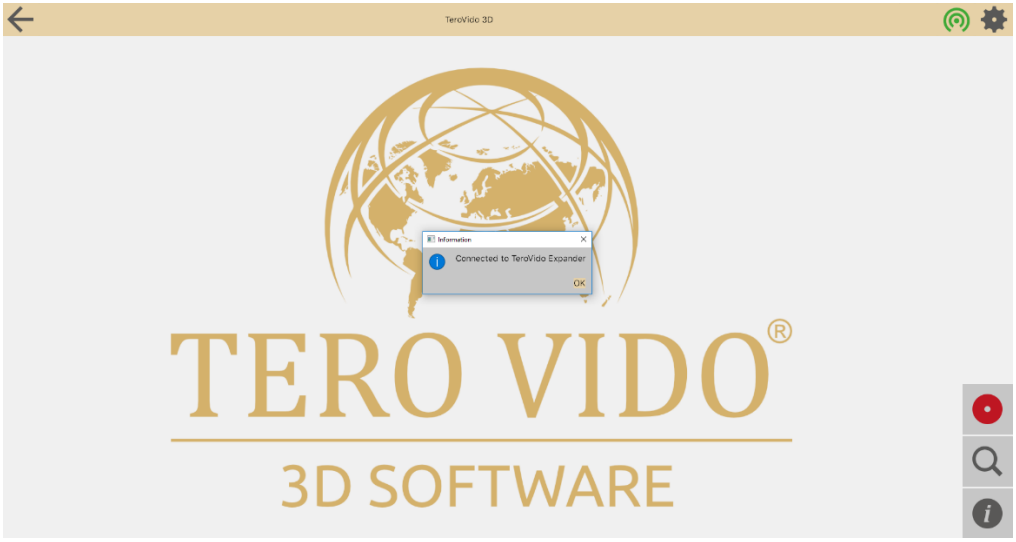
## 5.1 Connection to the device

To start a scan, the phone, tablet or PC must be connected to the probe. If this does not happen automatically, please connect the probe via the network and internet settings.




To repeat the connection process, click the Connect-button: 

If the connection was successful, you **get an information** that the device is connected, the **name of the device appears** in the top bar of the screen and the **Connect-Button lights green**.



## 5.2 Graphical User interface (GUI)

Here you can see the graphical user interface of the software.




Battery status

Connect-Button

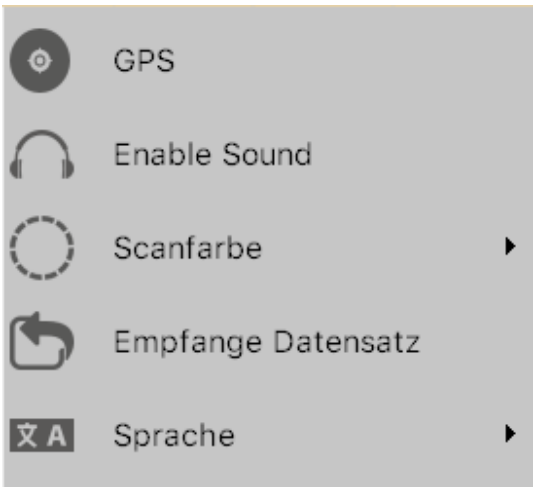
Settings

Record

Dataset manager

Help

**Einstellungsmenü:**




**GPS:** Use this feature to locate your current position through GPS signal search.

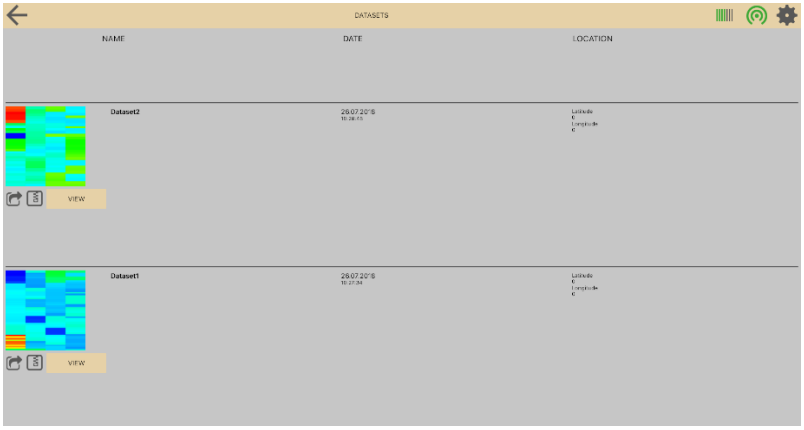
**Enable Sound:** By clicking this setting you turn on the sound. You can hear it via loudspeaker or headphone.

**Scan Color:** With this menu item you can change the color of your 3D- visualization.

**Receive Dataset:** Here you can receive datasets from another device.

**Language:** By selecting this setting item you can change the language of the program. After changing the system language, the program must be restarted.

## Dataset manager




You can find your stored data records in the dataset manager. Depending on your selection they are sorted by name, date or location. Please note that you must register the location by yourself. If you choose a dataset you can look at it for an analysis, delete it or send it to other devices.

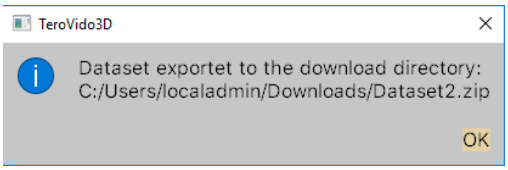
VIEW Load dataset for analyzing.

 Zip-Button: To export data into the download folder for sending datasets.

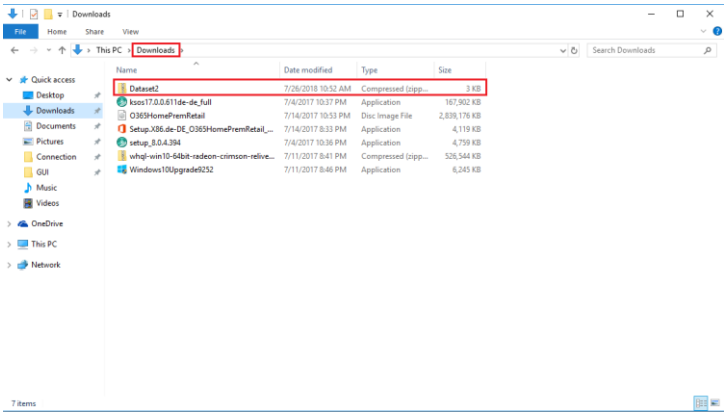
 Send a dataset.

## Export Data

By selecting this button () you get an information, that your dataset was exported to the download folder.

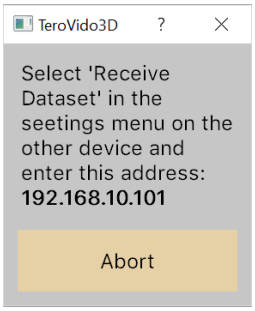



Now you can find the dataset in your downloads and you can save wherever you want on your PC to send your files.

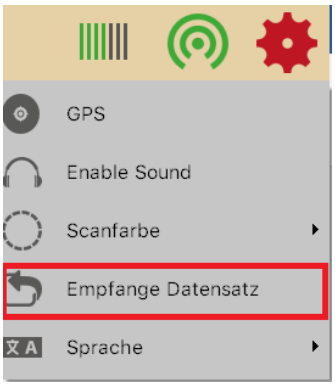


## Send Datasets

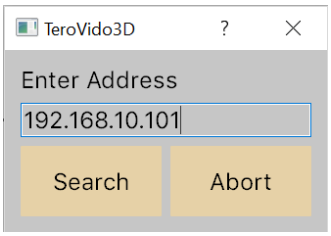
By selecting this button ( ), a window opens with an address-code. You need this number to receive the dataset on the other device.




With the device which should receive the dataset you have to click the settings-button and choose „Receive Dataset “.



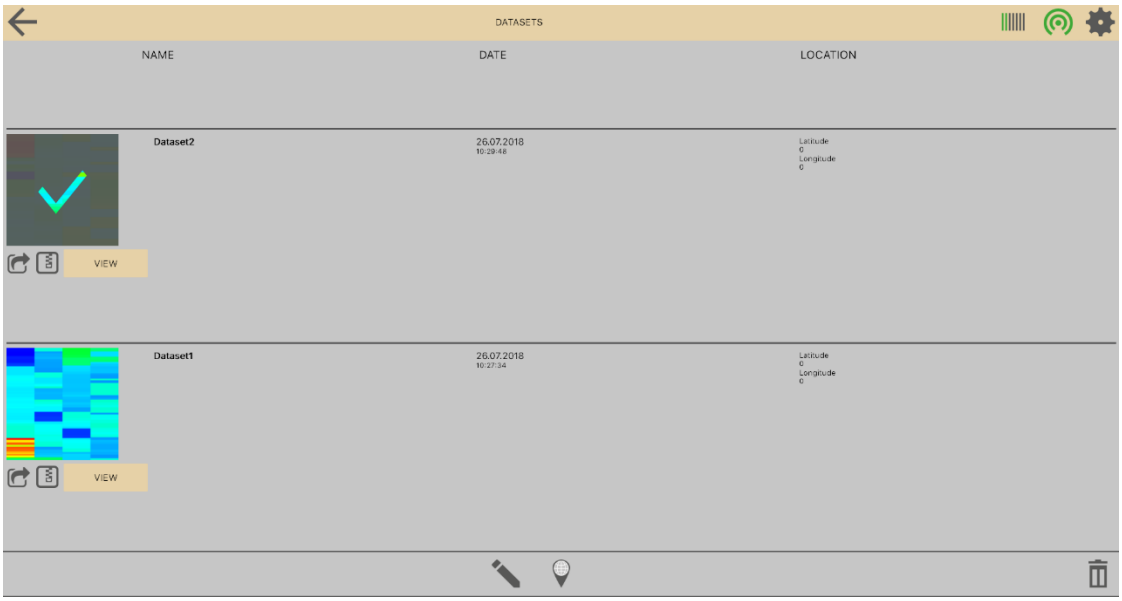

A window opens where you must enter the address-code.




It is important that both devices are in the same network. So, at home you must be in the same Wlan. Otherwise both devices can simply connect to the probe. Then you are also in the same network

## Edit datasets

By clicking the snapshot of your dataset, three buttons appear on the bar at the bottom of the screen.




Edit settings

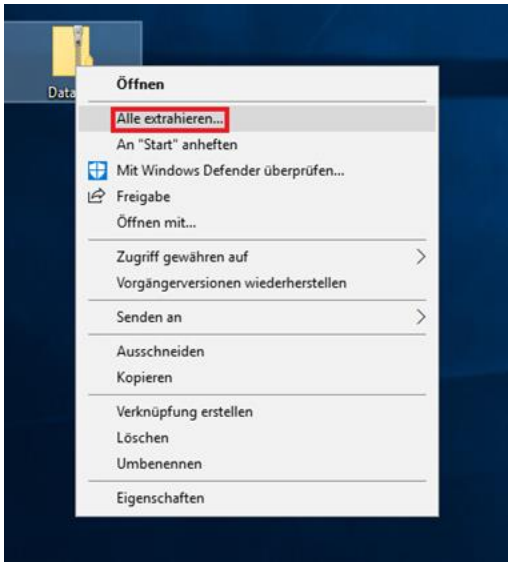
View position

Delete datasets.

In the edit settings, you can change data information such as the name, location or GPS-coordinates.

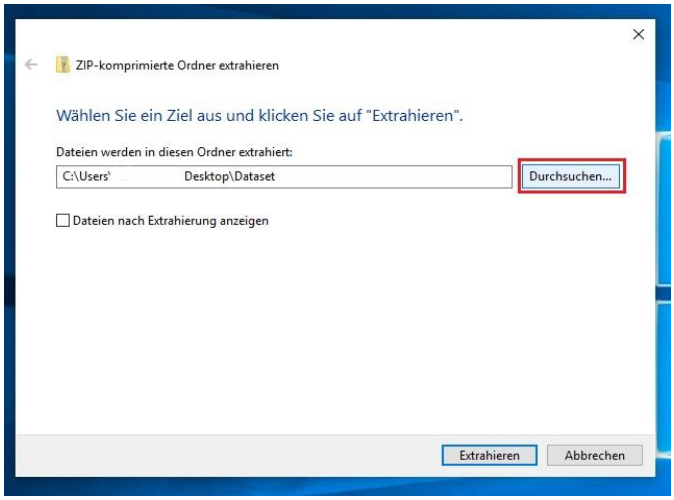
## Load external data records

If you want to load an external data record into the data manager, proceed as follows:

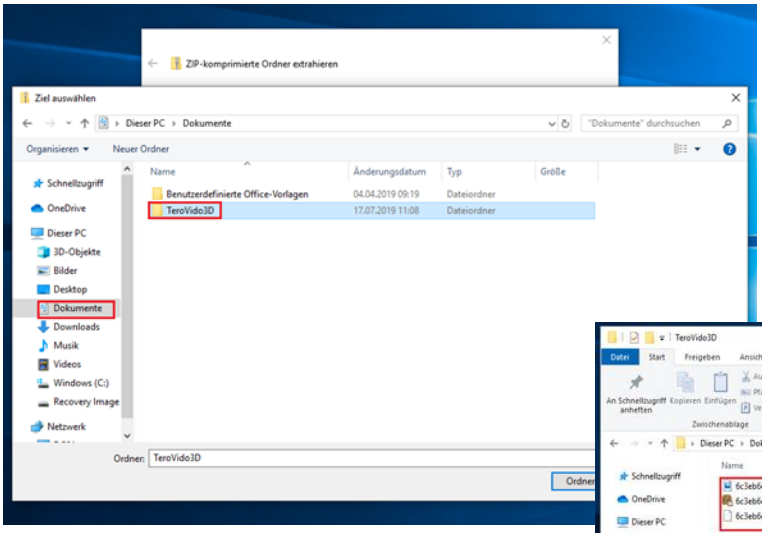



### For Windows

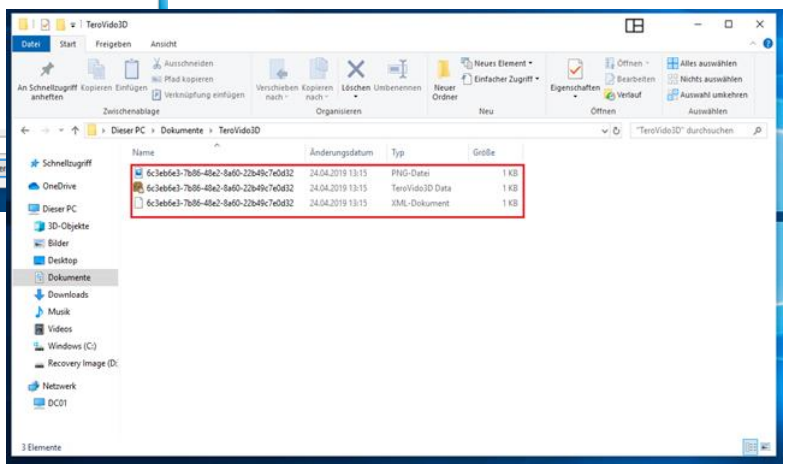
The data set is mostly available as a zip file. These must be unpacked first. To do this, right-click on the file folder and select "Extract All".




Click on "Browse" and choose the “Documents” folder, there is located the “TeroVido3D” folder, which you must choose. Then press "Extract".




In the "Tero Vido3D" folder now appear 3 new files: a PNG file, a TeroVido3D date and an XML document.




When this is done, the process was successful. The files are now in the Dataset Manager the next time you start the software.

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### For Android

If you use an Android device you should first search in the main directory from the SD-Card or the device for the “Documents” folder and the “TeroVido3D” folder, which is in it.

Now you can save the data set at the “TeroVido3D” folder and extract them. In the "Tero Vido3D" folder now appear 3 new files: a PNG file, a TeroVido3D date and an XML document.

When this is done, the process was successful. The files are now in the Dataset Manager the next time you start the software.

### For IOS

For IOS it isn´t possible to insert the files manually.

## GPS Position Data

In TeroVido3D it is possible to save the position of the recorded datasets. The position will be identified with the GPS sensor of your tablet, phone or PC.

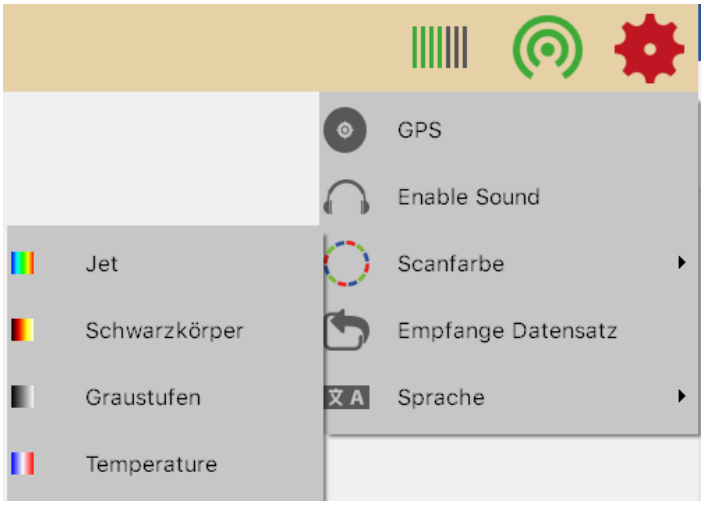
Please note: If your tablet/PC/phone does not have a GPS sensor, this feature will not be activated.

 GPS-Button: To **activate the GPS sensor**, hit the GPS-button in the settings menu. Please note that it can last up to several minutes until a GPS signal is found depending on your environment. You can still use TeroVido3D while it is searching for the GPS Signal. If you hit the button new, you can disconnect the GPS signal again.

 View position: To **view the position** data of a dataset, you must select a file in the dataset manager. If you hit the button to view the position data, a website will be opened which shows the position of the recording using Google Maps. Please note that you must be connected to the internet during this procedure. So you have to look for it, when the probe isn’t connected.

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## Scan Color




A colormap is a function, which turns the values of a dataset into colors. In TeroVido3D, the colormaps are represented by buttons depicting a color gradient. These color gradients correspond to the colormap. That means, the left color on the button corresponds to the smallest value which is shown.

There are four different colormaps:

Jet Schwarzkörper Temperature Graustufen

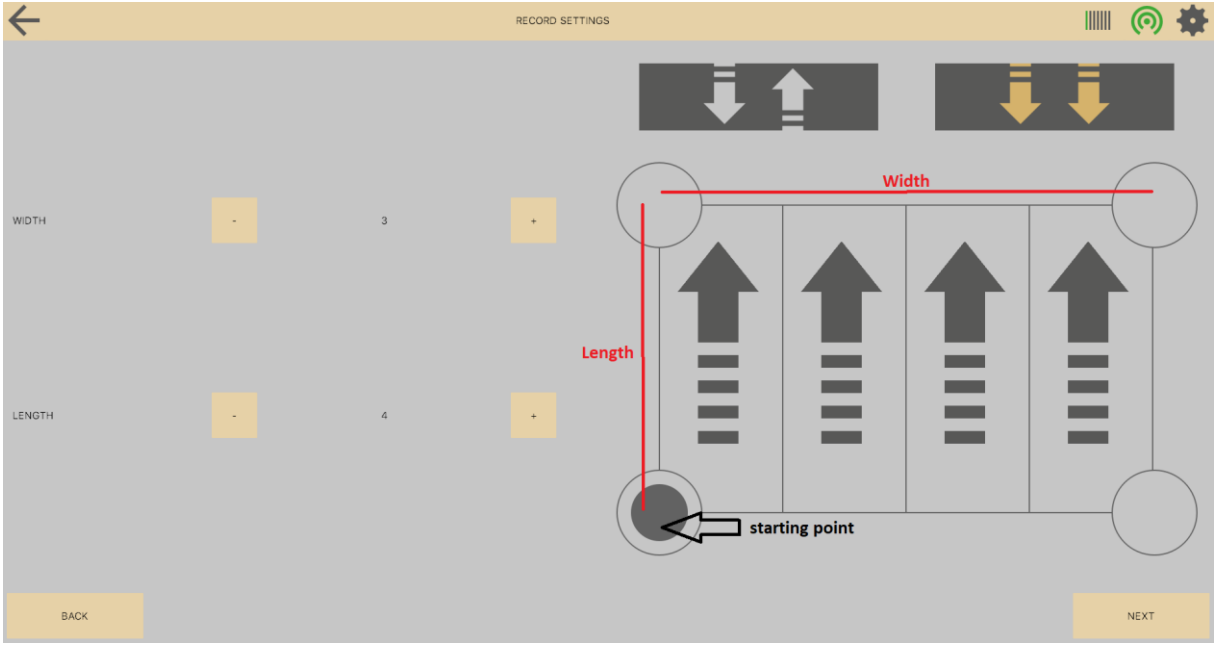
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## 5.3 Preparing the ground scan

To record a data set, press the record-button: 

The record settings open. At this point, enter the width and length of the field you want to measure. The unit (meters, centimeters, feet, etc.) does not matter. This menu item will later help you to look at the 3D terrain.

Next you must define the direction of movement. With the two buttons shown, you can enter whether you want to run the field in zig-zag mode (button: ⇵) or parallel (button: ⇊).
Beside that you can now set where you want to start (back or front) and in which direction the lanes should run (from left to right or vice versa). To do this you have to click on one of the circles in the corners of the window. The four arrows together with the starting point symbolize the final direction.



## 5.4 Conducting the ground scan

You work either with a vertical or horizontal probe. In the following section you can read how to do a scan with the devices.

Once you have entered all the parameters for your field to be measured, you can start the measurement by pressing this button: 


### Vertical Probe

Please note that there are two buttons on your probe: The white and the red button. 

If you have prepared everything as described in section 3, get ready to start the first lane. When you're ready, start recording the data by pressing and holding the red button. Now you walk the track slowly and in even steps. The recorded values and the current track are displayed on the screen. The recording can be interrupted at any time by the red button is released. Accordingly, the recording can be resumed by the red button is pressed and held again. To ensure that the current measurement is still valid despite occasional interruptions, the measurement should be continued from the same point at which it was interrupted. If the connection between transmitter and receiver is interrupted, this will be displayed on the right side of the window. If there are only short connection interruptions, the measurement can still be successfully continued. The measurement becomes invalid only after longer interruptions. In that case you should restart the measurement. When the track has walked off, release the red button to stop the measurement. Then get to the beginning of the next lane. Before the measurement continues with the next lane, you must press the white button to change the lane to signal that the measurement of a new lane now begins. The current row counter on the right side of the capture window should now have increased by one. It is very important that you leave all lanes at the same speed as possible for the recorded record to be valid.

If the whole area has run in lanes, the finished data record is added to the program with the stop button on the screen: 







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## Horizontal Probe

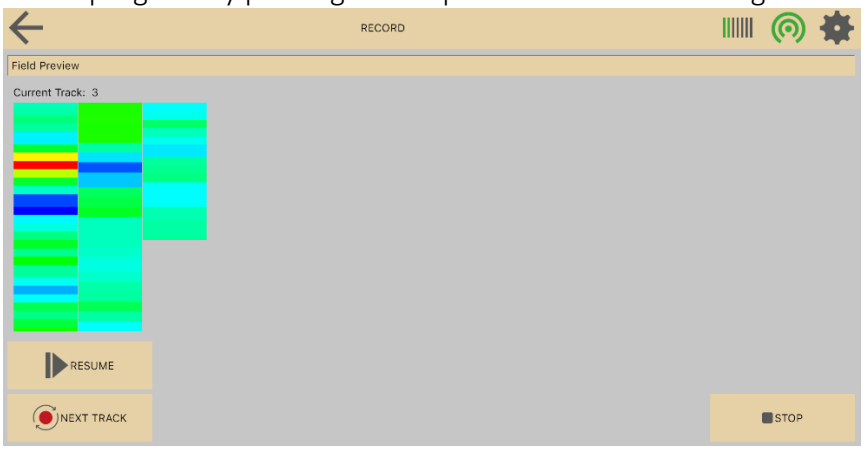
It is quite the same procedure as with the vertical probe. But you don't have to use buttons on the probe. You start and stop the recording with the software. After everything is prepared, move to the beginning of the first row.
When you are ready, start the recording by pressing the **start button** in the recording window: 


The start button will now turn into the **pause button**: 

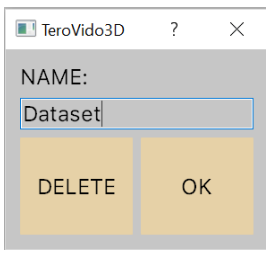

Now walk the row slowly using equally sized steps. The recorded data values as well as the current row are shown on the right side of the recording window. The recording (i.e. the recorded data) is visualized on the right hand side of the recording window. You can pause the recording anytime by pushing the pause button. If you push the pause button again, the recording process continues. In order to not corrupt the final visualization, it is essential that the recording continues right from the spot, where it was paused. If the connection between transmitter and receiver is interrupted, a message will appear on the right side of the recording window. If the interruption was of only short duration, the recording nevertheless can be continued. However, the recording becomes invalid when the interruption(s) will last long. In that case, it is recommended to start the recording from the beginning

If you finished walking the row, push the pause button, to pause the recording. Then move to the beginning of the next row. Before you continue the recording with the next row, you have to push the button for changing the rows to tell the program that the recording continues with a new row: 


The counter "Current Row" on the right-hand side of the recording window should increase by one It is very important that all rows are walked preferably in the same speed. Otherwise the recorded dataset may become invalid.
When you finished walking the complete scan path (all rows), you add the recorded dataset to the program by pushing the stop button in the recording window.




At the end you will now be asked to enter a name for the record. After you have entered the name, you can click OK. Then the record window closes and you can analyze the recorded record.



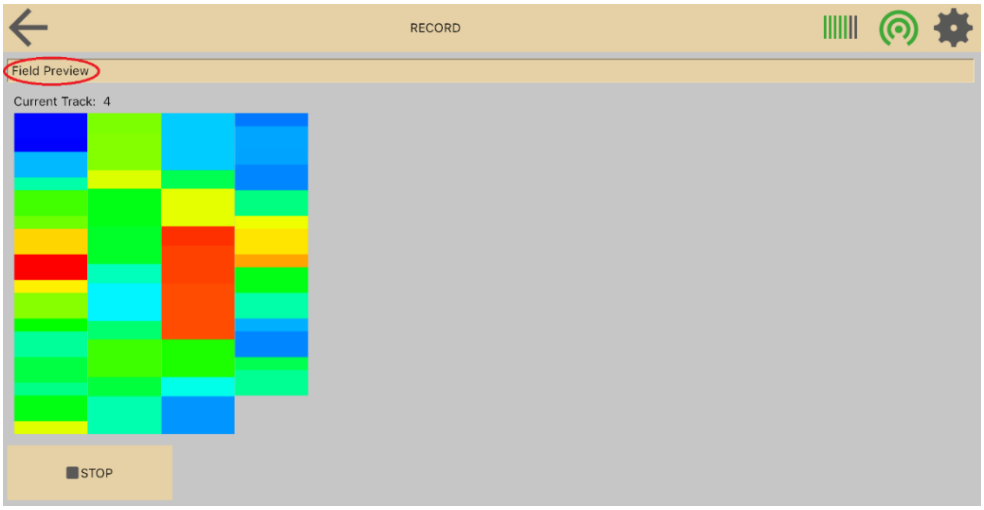
## 5.5 Visualization of the recording

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TeroVido3D provides different visualizations of the recorded data (field preview or frequency behavior) depending on which version of TeroVido3D you are using. You can switch between the visualizations by pressing the corresponding buttons on the top of the right side of the recording window

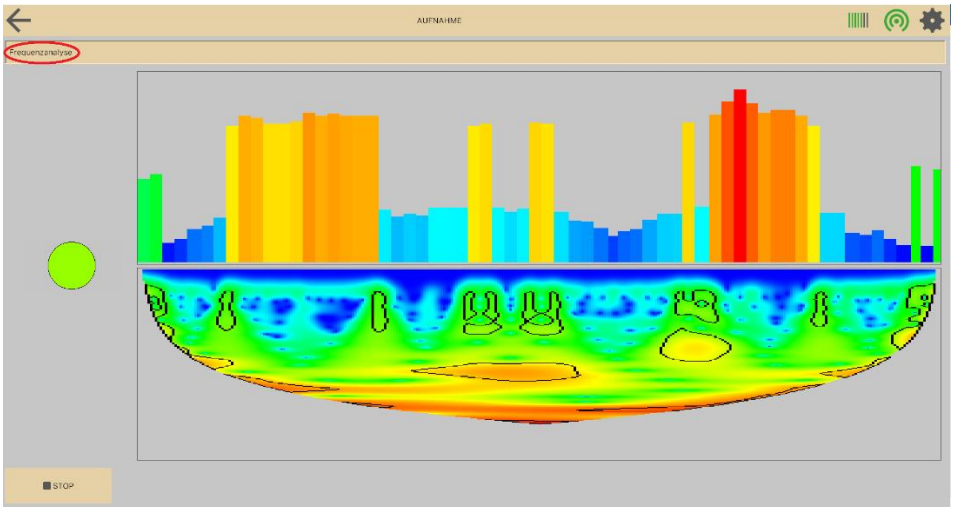
- Show Field Preview

The field preview is the standard view. It shows a preview of the recorded scan path(s) and the data which is recorded so far in a layout which corresponds to the previously entered field parameters.




- Show Frequency Behavior

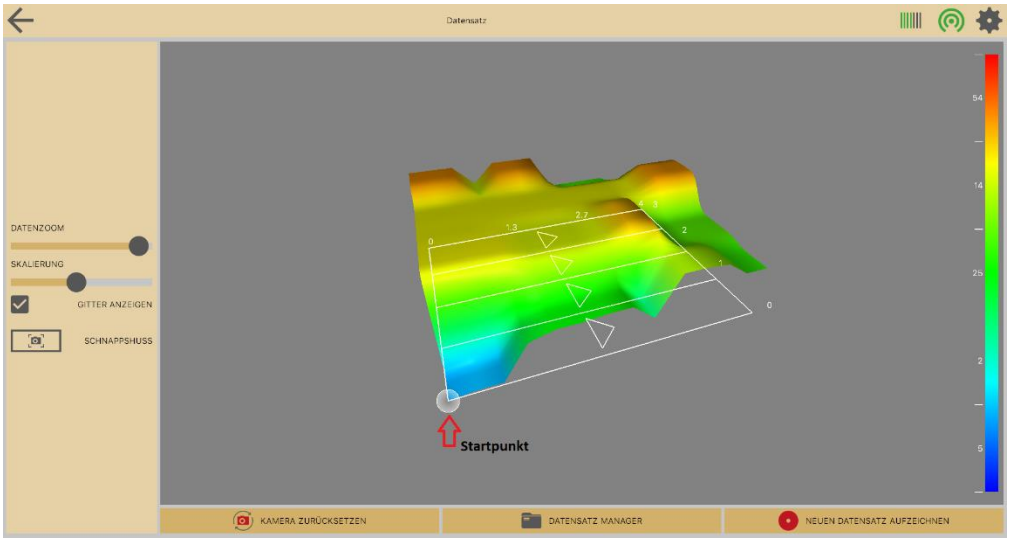
The frequency behaviour is a livescan-modus. It shows the spectral analysis of the current row. This mode is especially useful to identify edges of objects. It depicts the spatial and temporal progress of the frequencies of the current row.



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## 5.6 Analyzing the results

### Settings for analyzing




When you look at your data in the dataset manager, you have different options regarding the view.



: It is a filter that shows or hide small objects.



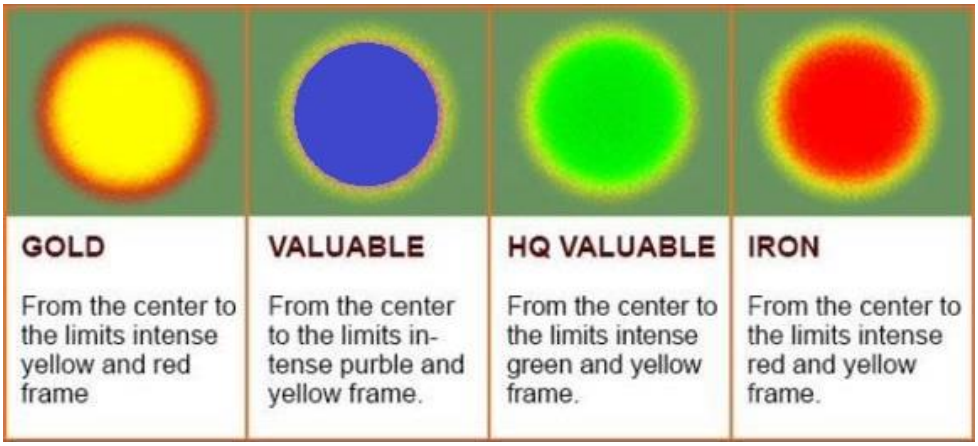
: It shows the height field.

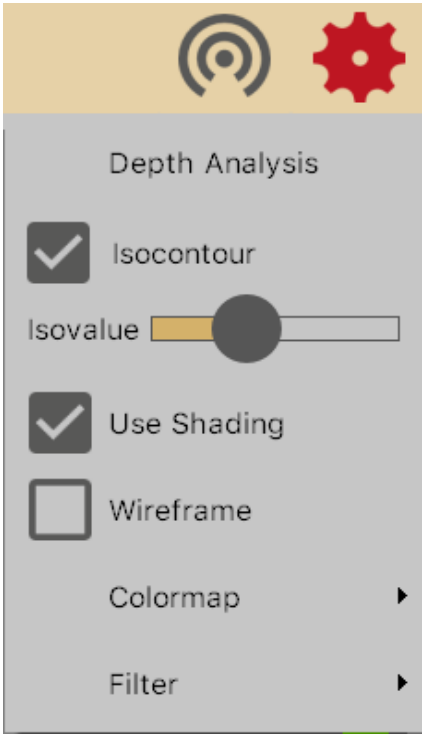


: to show and hide the grid.


: Make a snapshot for the dataset manager.

The software visualizes which kind of object you have found. Here you can see an explanation of the colors:





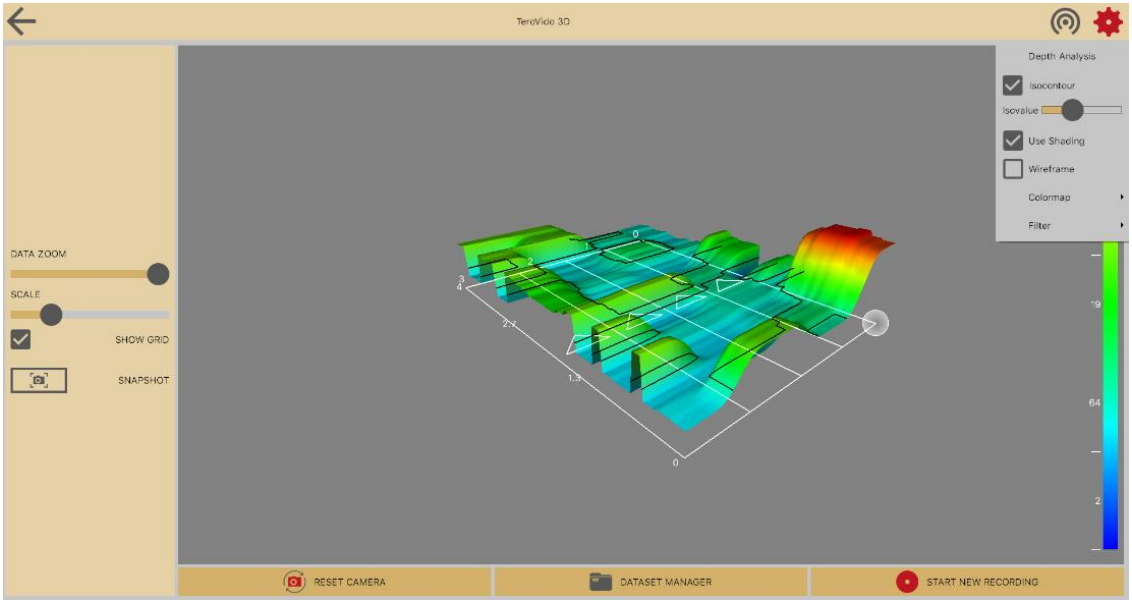

Use Shading: When clicking on the check box "Use Shading", you can specifiy, if the terrain is to be lit and shaded with a light source.

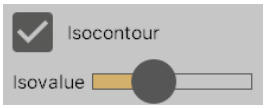
Wireframe: When clicking "Wireframe", you can specify, if the 3D terrain is visualized as a grid. When leaving unchecked, the 3D terrain will be shown as a solid surface.

Colormap: You can determine the colormap that is used to visualize the dataset.

Outlier Filter: Next you can determine, if you want to filter out the magnetic discontinuities that reside in the recordings. The magnetic field is in general not equally valued at every point where you will perform your recordings. That means they can distort the recording. Therefore, you have the option to filter them out.

## Isocontour



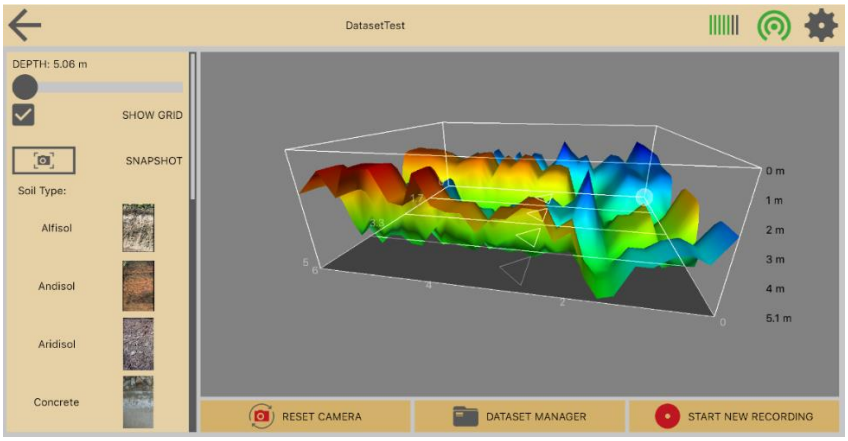




Use this slider to show isocontour. The isocontour lines help you to get a more detailed view of the peaks.

## Depth Analysis

Saisissez du texte ici

If your Tero Vido device can measure the depth component of a signal, you can perform a depth analysis on your recorded data by clicking this symbol in the settings menu:
Depth Analysis.




A new window opens. The window displays a 3D visualization of your currently chosen dataset. You can navigate the view (zoom, scroll, pane) just like in the 3D View. Your data set is now enclosed in a 3D box. On the right side of the box, you can see the measured depth of the recordings.

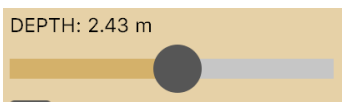
TeroVido3D must compute the depth individually for different soil types. Therefore, you have the option to choose from different soil types on the left hand of the screen. Next to each button, there is an example image of the soil type to ease the selection process.

Here you can see all soil types. Get information which soil type occurs in your region:




Source: Wikipedia

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EMAIL : contact@shopdetectors.com




To determine the depth of an object you can use a slider, that you can move from top to down.

Please note that a precise computation of the depth component is nearly impossible due to many factors regarding the soil types (for example the humidity of the soil or is there a mixture of different soil types etc.).