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OKM

GERMAN DETECTORS



OKM eXp 6000 MANUAL

INTRODUCTION

TECHNICAL SPECIFICATIONS

CONTROL ELEMENTS

ASSEMBLY & PREPARATION

OPERATING MODES

SCANNING TECHNIQUES

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INTRODUCTION

1 INTRODUCTION

1.1 PREFACE

Dear customer,

our engineers, sales, training and support staff at OKM GmbH would like to thank you for your purchase of the eXp 6000.

The eXp 6000 detector works on the principle of Electro-Magnetic Signature Reading (EMSR). Besides the detection of metallic objects this device is also capable of detecting natural features of the earth like formations of strata, cavities, voids, faults, ground water and other non-metallic objects. Then of course this equipment is best suited at detecting burials, graves, sepulchers, treasures, buried utilities, tanks and the like.

The eXp 6000 is able to locate, document and analyze buried objects within various structures and vessels non-intrusively without having to excavate the area. Using EMSR is particularly useful in areas where detection is a must and excavation is not possible. The facile and flexible handling of the eXp 6000 can easily and quickly give reproducible results.

With our team of specialists we guarantee that our products are under recurrent control. Our specialists try to implement new developments in terms of further quality improvements for you.

By purchasing or using one of our products, we cannot guarantee that you will be successful and have a find during your research. The recognition of hidden and buried objects depends on a huge number of factors. As you may know there are different soil types all over the world with different levels of natural attenuation. Variable soil properties can and will hamper and alter ultimate scan measurements. Areas where there is an extreme amount of ground water, varying clays, sands and wet soils making scanning more difficult and may reduce the maximum depth capabilities of any and all detection equipment, regardless of make or model.

For more information regarding where this equipment has been used and operated, please visit our website. Our equipment is constantly being tested and when improvements or upgrades are available, we will list them also on our website.

It is necessary for our company to protect our developments and all the information learned during the Research and Development stages in creating our technology. We strive to stay within the given framework of legislation, patents and trademark registration.

Please take your time to read this User Manual and familiarize yourself with the operation, functionality and how to utilize the eXp 6000. We also offer training for your equipment in our factory. We strive to maintain worldwide dealer network for assistance and support. Please visit our website for more information.

1.2 IMPORTANT NOTES

Prior to using the eXp 6000 and its accessories, please read these operating instructions carefully. These instructions give information on how to use the detector and potential sources where precautions should be taken.

The eXp 6000 and its accessories serve for the analysis, documentation and detection of sub-surface anomalies and ground disturbances. The recorded data of the ground structure will be transmitted to a PC to give a visual representation using our proprietary software program. Any additional notes to the software should be observed. Please refer to the Visualizer 3D Studio Documentation!

1.2.1 General Notes

Being an electronic device, the eXp 6000 has to be treated with caution and treated with care as with any electronic device. Any failure to observe the safety precautions given or any use for purposes other than the ones it is designed for may result in damage or destruction of the processing unit and/or its accessories or connected components.

The device has a built in anti-tampering module which will destroy the unit if it is improperly opened. There are no end user serviceable parts on the inside of the unit.

1.2.2 Possible Health Hazards

If used properly this device normally does not pose any health hazards. According to current scientific knowledge, the high-frequency signals are not harmful to the human body on account of their low power.

1.2.3 Surrounding Area

When moving this unit from a cold place to a warmer place, watch out for condensation. Do not immediately operate the unit until any possible condensation could have evaporated. The unit is not weather proof and water or condensation can destroy the unit.

Avoid strong magnetic fields, which may occur in places where there are large electric motors or unshielded loudspeakers. Try to avoid using this equipment within 50 meters (150 ft) of this type of equipment.

Metallic objects on the ground such as cans, tin, nails, screws or debris can influence your scan data and present negative results regarding your scan data. Also it is a good habit to remove any metallic objects off of your person like cellular telephones, keys, jewelry, etc... Do not wear steel toe boots.

1.2.4 Voltage

The power supply should not be outside the indicated range of values. Use only approved chargers, batteries and rechargeable batteries which are included in the scope of delivery.



Never use the 115/230 Volt mains supply.

1.2.5 Data Safety

Data errors can occur if:

- the range of the sender module has been exceeded,
- the power supply of the device or the batteries are too low,
- the unit is operating too close to devices which send out disturbances or
- atmospheric conditions (electrical storms, lightning, etc.).

1.3 MAINTENANCE AND SERVICES

In this section you will learn how to maintain your measuring instrument with all included accessories to keep it in good condition a long time and to get good measuring results.

The following list indicates what you absolutely should avoid:

- penetrating water
- strong dirt and dust deposits
- hard impacts
- strong magnetic fields
- high and long lasting heat effect

To clean your device please use a clean and dry soft rag or cloth. To avoid any damage you should transport the device and accessories always in an appropriate way.

Prior to using your eXp 6000 please be sure that all batteries and accumulators are fully charged.

To charge the external batteries use only the approved chargers which are part of the scope of delivery.

1.4 DANGER OF EXPLOSION DURING EXCAVATION

Unfortunately, the last two world wars also made the ground in many places of the world a potentially explosive scrap heap. A host of those lethal relics are still buried in the ground. Do not start digging and hacking for an object wildly when you receive a signal of a piece of metal from your device. Firstly, you might indeed cause irreparable damage to a truly rare find, and secondly, there is a chance that the object reacts in an insulted way and strikes back.

Note the color of the ground close to the surface. A red or reddish color of the ground is an indicator of rust traces. As regards to the finds themselves, you should definitely pay attention to their shape. Curved or round objects should be a sign of alarm, especially if buttons, rings or little pegs can be identified. The same applies to recognizable ammunition or bullets and shells. Leave ammunition where it is, do not touch it and, most importantly, do not take any of it home with you. The devices of war made use of rocker fuses, acid fuses and ball fuses. Those components have been rusting away in the course of time, and the slightest movement may cause parts of them to break and be triggered. Even seemingly harmless objects such as cartridges or large ammunition are anything but that.

Moving such an object may cause those crystals to produce friction, leading to an explosion. If you come across such relics, mark the place and do not fail to report the find to the police. Such objects always pose a danger to the life of hikers, walkers, farmers, children and animals.

1.5 CARE AND USE

The eXp 6000 and its components like the probes and sensors are sturdy equipment, but are not designed to withstand abuse. In caring for your professional ground scanner, there are several important DOs and DON'Ts to remember:

- DO NOT use to get rid of bushes, flatten area by swinging wildly or pry rocks loose.
- DO NOT drop the machine into water or use it while it is raining or wet.
- DO NOT leave it exposed at night where dew could form on it.
- DO NOT store it in places that could get extremely hot.
- DO NOT leave it in the trunk of a car where high temperatures could build up.
- DO NOT spray lubricants, or any type of cleaners, solvents, sealants or other chemicals into or onto the electronic parts, switches or controls.
- DO NOT attempt to modify or repair the detector's electronics as this will void your detector's warranty.
- DO clean your unit with a soft dry or slightly damp cloth to remove dust and residue from the previous use.
- DO use the device within the proper operating guidelines.
- DO use the detector with the proper OKM Power Pack as to not cause damage to the unit.

The warranty does not cover damage resulting from an accident, neglect or abuse.

1.6 PROTECTING YOUR INVESTMENT

Often detector users become disappointed when their new detector becomes less and less responsive and seems to have lost some of its original peak performance. You can help prevent this from happening to your detector by following these basic care and protection guidelines:

- Operate your detector exactly as recommended in this User Manual.
- Use only approved OKM Power Packs.
- Avoid hitting the probe against hard, solid objects and surfaces.
- Keep your probe slightly off of the ground, especially when using in gravel or hard, rocky dirt.
- If working in or near water, or if there is a possibility of rain, use a protective weather resistant pouch or plastic bag to cover the control housing. Make sure it can "breathe" in order to ensure against condensation buildup inside.
- After each use, clean the detector with a soft cloth to remove dust, moisture or other contaminants.
- When transporting the detector in a car during hot weather, store it on the floor of the passenger compartment if possible. Using the Peli case gives additional protection. In any case, never allow the detector to roll around unprotected in the trunk or back of a pickup truck.
- Protect your detector from dust, moisture, and extreme temperatures during storage.
- When shipping, use the original factory carton or similar heavy-duty container and provide sufficient padding around all parts.
- Treat your detector as you would treat any sensitive electronic instrument. Though it is designed to withstand the demands of normal treasure hunting, proper care is essential.

TECHNICAL SPECIFICATIONS

2 TECHNICAL SPECIFICATIONS

2.1 CONTROL UNIT

Dimensions (H x W x D)	120 x 210 x 280 mm
Weight	approx. 2.34 kg
Voltage	11.8 - 19V DC, 50W maximal
Safety Class	IP40
Operating Time	approx. 4 hours (fully charged, 25°C)
Operating Temperature	-10°C – 50°C
Display	6.5", 1024 x 768 Pixel TFT Color, 650 cd/qm
Processing Unit	QuadCore AMD @ 2GHz, OpenGL 4.2 HD Radeon GPU
Working Memory (RAM)	4 GB Kingston HyperX
Data Memory	8GB SDCard, Class 10
Feedback	acoustic, visual
Storage temperature	-20°C – 60°C
Air humidity	5% – 75%
Waterproof	No
Data Transmission Technology	WiFi 802.11n a/b/g, MIMO 2x2
Data Transmission Rate	11 Mbps – 54 Mbps
Operation Distance	max. 4 m (to Telescopic Rod)

2.2 TELESCOPIC ROD

Dimensions (H x W x L)	210 x 135 x 680 – 1340 mm
Weight	about 1.76 kg
Voltage	11.8 - 19V DC, 22W maximal
Safety Class	IP40
Operating Time	approx. 5 hours (fully charged, 25°C)
Operating Temperature	-10°C – 50°C
Processing Unit	ARM Cortex M0+ @ 48MHz
Working Memory (RAM)	32 KB
Data Memory	256 KB
Storage temperature	-20°C – 60°C
Air humidity	5% – 75%
Waterproof	No
Data Transmission Technology	WiFi 802.11n a/b/g
Data Transmission Rate	11 Mbps – 54 Mbps
Operation Distance	max. 4 m (to Control Unit)

2.3 SUPER SENSOR

Length	950 mm
Weight	approx. 1.0 kg
Receiver	Dual / Hi-Gain – Vertical Geophysical Phase Reader – EMSR
Sensor technology	SCMI-15-D

2.4 TELESCOPIC PROBE

Length	820 - 1240 mm
Weight	approx. 1.04 kg
Receiver	Dual Geophysical Phase Reader – EMSR
Sensor technology	SCMI-15-D

2.5 TUNNEL SENSOR

Length	500 mm
Weight	approx. 0.76 kg
Receiver	Dual Geophysical Phase Reader – EMSR
Sensor technology	SCMI-15-D

2.6 LIVE-STREAM SENSOR

Length	600 mm
Weight	about 0.92 kg
Receiver	Hexa Geophysical Phase Reader – EMSR
Sensor technology	SCMI-15-D

2.7 GPS RECEIVER

Dimensions (L x W x H)	50 x 55 x 27 mm
Weight	about 60g
Input voltage	5V DC
Input current (maximum)	450 mA
Input current (typical)	50 mA
Refresh rate	1 s
Cold start	< 40 s
Warm start	< 30 s
Horizontal Position Accuracy	2.7 m (most cases, outdoor)
Horizontal Position Accuracy	0.9 m (free view, clear sky)

The technical specifications are medial values. During operation slight variations are possible.

CONTROL ELEMENTS

3 CONTROL ELEMENTS

In this section you learn more about the fundamental use of all control elements for this measuring instrument. All connections, inputs and outputs are explained in detail.

3.1 EXP 6000 COMPONENTS



Via **Display** or **Video Glasses** you can see the navigation menu and all operating modes and recorded scans.

All available **Probes** (e.g. Telescopic Probe, Super Sensor etc.) have to be connected via **Telescopic Rod**.

The **Control Unit** is the main processing unit that receives data from the Probes (via Telescopic Rod), calculates, renders and saves the data.

The **GPS Receiver** can be used to record GPS coordinates along with your scan data. This allows additional navigation options later on. If you do not want to use GPS at all, just take it off or replace it with the Protective Cap to protect the electrical connections.

The wireless **Headphones** assist you in hearing the sound output, that helps to synchronize your walking procedure.

3.2 MEASURING PROBES AND SENSORS

Each measuring probe that you attach to the Telescopic Rod is optimized for its very special task. The eXp 6000 supports the following probes:

- **Telescopic Probe**

This horizontal probe is perfectly used to scan wide areas in short time. You can extend its length between 82 and 124 cm. The optimal length depends on the field dimensions and the size of the object you are looking for. This probe can be used for following operating modes:

3D Ground Scan, Magnetometer

- **Super Sensor**

This vertical probe is the most sensitive probe of all and thus perfectly used for finding small amounts of metal (prospecting, mining) as well as pinpointing. This probe can be used for following operating modes:

3D Ground Scan, Magnetometer, Pinpointer, Mineral Scan

- **Tunnel Sensor**

This vertical probe has been developed to find underground caves, tunnels, tombs and the like. It can be used for following operating modes:

3D Ground Scan, Tunnel Scan

- **Live-Stream Sensor**

This horizontal probe is a very special one that can be used to scan a high amount of data. Thus it is able to generate live images to visually pinpoint underground objects. This probe can be used for following operating modes:

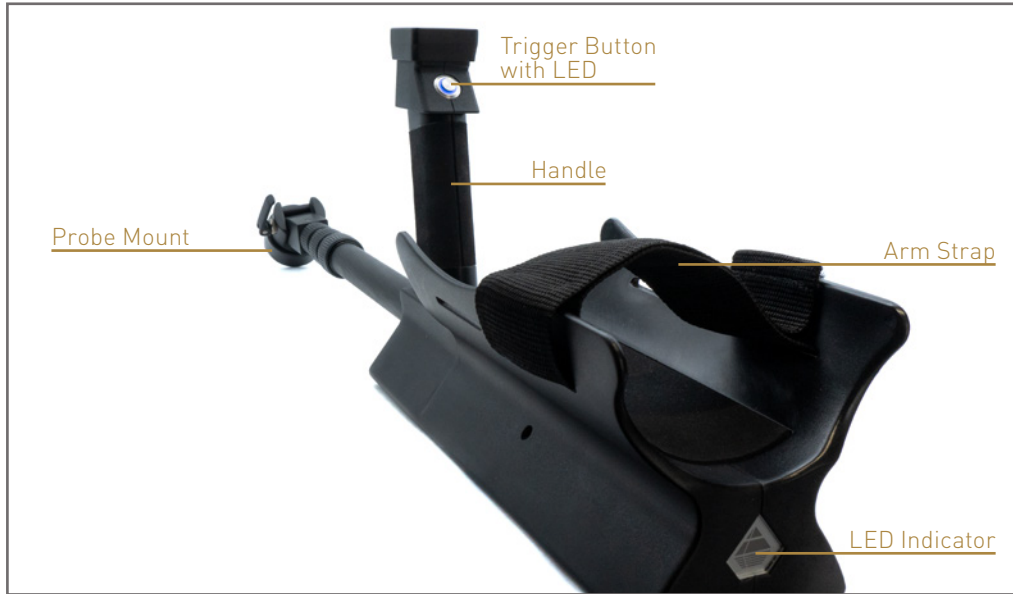
3D Ground Scan, Live Scan



All measuring probes are equipped with a **Probe Mount Connector** that mounts the probe to the Telescopic Rod. To mount the probe, simply push it onto the probe mount of the Telescopic Rod. Thanks to the magnetic connection, the probe gets attracted in only one specific orientation to the probe mount connector.

Additionally, each of the measuring probes is equipped with an internal gyroscope to get control of the probe orientation while scanning. Further details about the orientation information are explained in section „6.1 Probe Orientation“ on page 46.

3.3 TELESCOPIC ROD



The **Trigger Button with LED** is used to switch on and off the Telescopic Rod. Additionally, you start a new measurement, run the next scan line and stop the first scan line in automatic mode. The LED ring can indicate following states:

- **Green:** The LED shines permanently green if the Telescopic Rod has been switched on but no wireless connection to the Control Unit has been established.
- **Blue:** The LED shines permanently blue if the wireless connection to the Control Unit has been established.

When the Telescopic Rod is connected to the Control Unit, the **LED Indicator** warns if an invalid or no probe is connected (alternating blue and red colors). It furthermore indicates the charging state while recharging the internal battery (read chapter „4.3 Charging the Internal Batteries“ on page 18).

The **Probe Mount** is used to mount the probes to the Telescopic Rod. Please make sure that all connector pins are clean before assembly.

The **Arm Strap** of the Telescopic Rod can be used to fix the armrest to your arm for better hold.

The **Lock** can be used to adjust the length of the Telescopic Rod to your personal preferences, see „4.2.2 Adjusting the Length“ on page 17.

The **LED Lighting** can be switched on and off via Trigger Button as long as no operating mode is active.

The **Charger Socket** is used to plug in the charger to recharge the internal batteries. Please read chapter „4.3 Charging the Internal Batteries“ on page 18 for more information!

3.4 CONTROL UNIT

The Control Unit is the processing center of the eXp 6000. Via Control Unit, various functions and operating modes can be selected, all measured values can be recorded and stored.

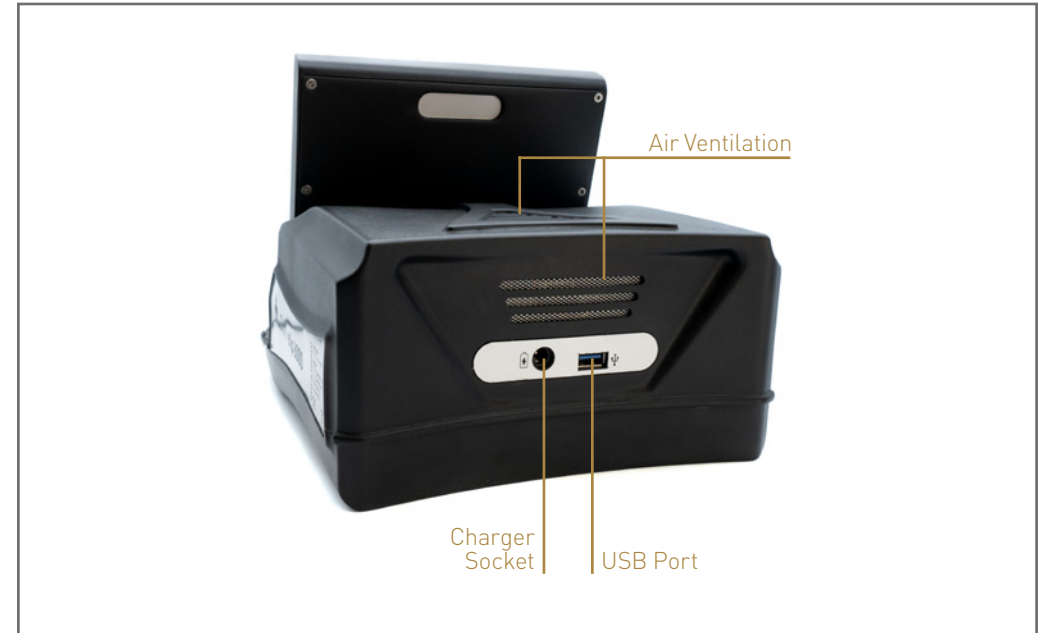


All functions are controlled by the **Multi-function Control Knob** or by using the touch capabilities of the display. To operate the device, rotate the knob to the desired function and push the knob to select it. Alternatively, simply tap with your finger onto an item on the screen.

If you do not want to use wireless headphones you can also hear any sounds directly through the internal **Speaker**, if not disabled.

The **Clips for the Carrying Strap** are used to mount the Carrying strap that is used to carry the Control Unit around your neck.

The **LED Indicator** indicates the charging state while recharging the internal battery (read chapter „4.3 Charging the Internal Batteries“ on page 18). Furthermore, it indicates the operating state of the Control Unit as well as Magnetometer measuring values.



Via **USB Port** a common USB flash drive can be plugged in into the Control Unit to copy the stored scan images to another computer for further evaluation with the *Visualizer 3D Studio* software or to update the internal firmware if necessary.

The **Charger Socket** is used to plug in the charger to recharge the internal battery. Please read chapter „4.3 Charging the Internal Batteries“ on page 18 for more information!



Please make sure, the air ventilation is not covered at any time while operating the eXp 6000. If the air can not circulate properly the Control Unit may overheat.

4 ASSEMBLY AND PREPARATION

Before using the eXp 6000 for a field measurement you should do some preparations. The eXp 6000 consists mainly of two separate main parts:

- **Control Unit**
This is the main controller of the eXp 6000 where you select your operating modes and view your current measurement data. Furthermore all your scans will be saved in its internal memory before transferring it to a computer for detailed analyses.
- **Telescopic Rod**
This is the handle for all your measuring probes and sensors. The integrated electronics take care that all measured data will be transferred wireless to the Control Unit.

4.1 CONTROL UNIT

Before using the eXp 6000 Control Unit make sure it is fully charged.



Plug the charger into the Charger Socket of the eXp 6000 Control Unit.

The LED Indicator shows the charging progress as described in section „4.3 Charging the Internal Batteries“ on page 18. As soon as the Control Unit is fully charged, remove the charger.



1

To unfold the display of the eXp 6000 Control Unit follow the following steps.



2

Pull the display out completely.



3

Turn the display into an appropriate angle ...



4

... according to your personal preferences.



5

Push the Multi-function Control Knob at least 2 seconds (until the LED Indicator stops flashing and starts fading in various colors) to power on the detector.



6

After a short moment the boot up screen will appear on the display of the Control Unit.



7

As soon as the home screen appears, you can select your desired operating mode.



8

Carry the eXp 6000 Control Unit around your neck by utilizing the Carrying Strap.

4.2 TELESCOPIC ROD

It is recommended to charge the internal batteries of the Telescopic Rod before conducting any measurement. Therefore, plug the charger into the Charger Socket of the Telescopic Rod.



The LED Indicator shows the charging progress as described in section „4.3 Charging the Internal Batteries“ on page 18.



As soon as the Telescopic Rod is fully charged, remove the charger and push the Trigger Button at least 2 seconds until the LED ring of the Trigger Button lights up **green**. If the Control Unit is switched on as well, the Telescopic Rod will try to establish a wireless connection to it and – by success – the LED ring will turn **blue**.

4.2.1 Connecting Probes

Depending on the task you want to fulfill, you have to attach one of your measuring probes to the probe mount of the Telescopic Rod.



Please note: Each measuring probe can only be attached in one way or direction according to the magnetic connector of the probe mount.

4.2.2 Adjusting the Length

For your personal comfort you should extend the Telescopic Rod to your preferred length.



Additionally you may use the arm strap to fix the arm rest to your arm. Thus working with the Telescopic Rod is more comfortable. You can also decide which strap slot to use. Try to make it as comfortable as possible to avoid any postural deformities.



1 Rotate the lock(s) approximately half a turn clockwise to unlock.



2 Pull the rod to adjust it to your preferred length.



3 Rotate the lock(s) counterclockwise to tighten them again.

4.2.3 Mounting the GPS Receiver

In case you want to record GPS information along with your scan data, you have to attach the GPS Receiver onto the Telescopic Rod.



1 Remove the Protective Cap on top of the handle of the Telescopic Rod.



2 Attach the GPS Receiver by connecting it with its magnetic connector on top of the handle of the Telescopic Rod.

Further details concerning GPS navigation is available in section „5.7.5 GPS Navigation“ on page 38.

If you don't want to utilize the GPS Receiver, cover the connector pins with the Protective Cap.

4.3 CHARGING THE INTERNAL BATTERIES

Before conducting any measurement, it is recommended to fully charge the internal batteries of the Control Unit and Telescopic Rod. To do so, please plug the chargers into the designated Charger Sockets.

It is also possible to attach the optional OKM Power Pack. This is a good option to recharge the batteries outdoors.



Control Unit with Power Pack.



Telescopic Rod with Power Pack.

The charging progress is indicated by the appropriate LED Indicator. As soon as the process starts, the LED Indicator flashes **green** (3 times). Then the LED Indicator shows different colors according to its charge state:

- **Red (pulsing)** = battery low, charging
- **Orange (pulsing)** = battery medium, charging
- **Green (pulsing)** = battery nearly full, charging
- **Green (static)** = battery full

Depending on the type of charger (Mains Supply or OKM Power Pack) and the power mode of the Control Unit (switched ON or OFF), the charge time may vary:

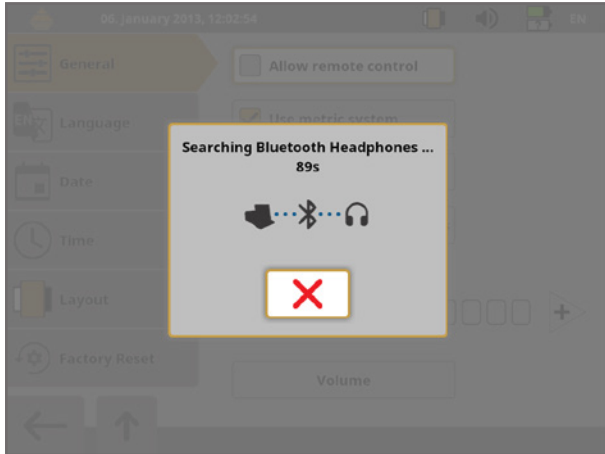
- Mains Supply, Switched OFF → full charge speed with approx. 2.5 A (100 %, max 2.5 h)
- Mains Supply, Switched ON → medium charge speed with approx. 1.6 A (64 %, max 3.5 h)
- OKM Power Pack, Switched OFF → full charge speed with approx. 1.7 A (68 %, max 3.5 h)
- OKM Power Pack, Switched ON → low charge speed with approx. 0.5 A (20 %, max 10 h)





If the eXp 6000 is not switched off by the user, the battery switches off itself (self protection mode). In that case the eXp 6000 won't turn on again and needs to be recharged first.

4.4 CONNECTING WIRELESS HEADPHONES

The eXp 6000 can be operated with any Bluetooth headphones available on the market. Your eXp 6000 comes with pre-paired Bluetooth headphones.



To operate the eXp 6000 with your wireless Bluetooth headphones, pair your headphones with the Control Unit. You can do this by following these steps:

1. Make sure, your Bluetooth headphones are powered on and in pairing mode. Entering the pairing mode depends on your Bluetooth headphones (please refer to the manual of the Bluetooth headphones).
2. Click the Speaker icon  in the top statusbar (alternatively enter the Settings menu and click "Volume") and select "Pair new Bluetooth Headphones".
3. A dialog appears with a countdown of 90 seconds in which the eXp 6000 Control Unit is searching for available Bluetooth headphones. Make sure that your Bluetooth headphones are still in pairing mode.
4. After a short time the Bluetooth headphones are paired and you can hear the sound signals via headphones. Now the Bluetooth headphones icon  should be visible in the top statusbar.

4.5 CONNECTING ANDROID DEVICES (VIDEO GLASSES OR TABLET)

You may also pair any Android device with your eXp 6000 Control Unit to stream the display information to an Android Tablet PC or Android Video Glasses. By doing so, another person (e.g. supervisor, trainer, etc.) can watch the operator's activities. The connection procedure is very simple.

1. Download and install the eXp 6000 application. If your Android device was purchased along with the eXp 6000, it may already pre-installed and configured.
2. Power on your eXp 6000 Control Unit
3. Start the Android application and wait for a connection

Then you can view the contents of the eXp 6000 Control Unit directly on your Android device and can also remote control the eXp 6000 if this option is allowed (see section „5.8 Settings“ on page 40).



Please make sure to disable "Smart network switch" in WiFi settings as well as "mobile data" in Mobile networks, otherwise a connection to the eXp 6000 may not be possible.

4.5.1 Download and Install the Android Application

If you want to install the application for the first time on a new Android device or you are going to reinstall the application after a factory reset, you have to download the application from Google Play first.

Therefore find the Play Store application on your Android device where you are going to install the eXp 6000 application and tap on it. You will find it in the applications menu of your Android device.

If you don't have any Google Account so far, you must create one to be able to download the eXp 6000 application. Simply follow the instructions on your Tablet PC to download and install the application. To find the application in the Google Play market, simply search for "eXp 6000".

After installation you have to first start the eXp 6000 Control Unit and then the Android application.

4.5.2 Run the Android Application

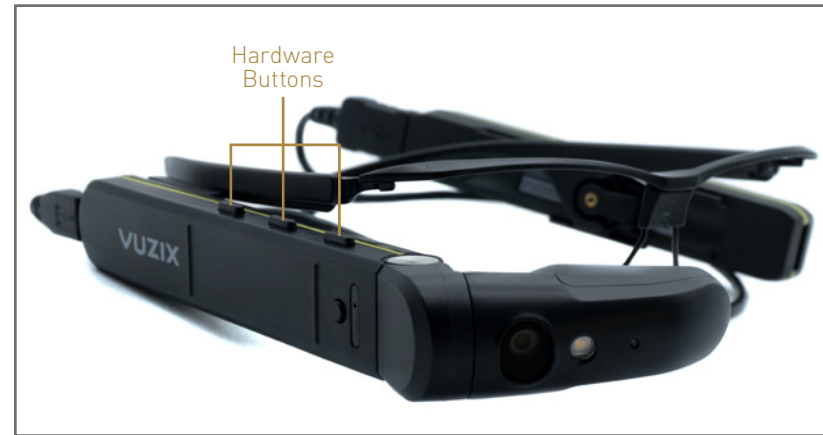
Running the application is very simple. Find the eXp 6000 application icon in the applications menu of your Android device and tap on it.

Please make sure the eXp 6000 Control Unit is powered on and running properly before tapping on the applications icon to start the application. After a short moment the application connects to the Control Unit and you will see the screen output of the eXp 6000 also on your Android device screen.

If you are using an Android Tablet PC with touchscreen itself, you can use this as a replacement of the eXp 6000 display. All touch events will be sent to the Control Unit if that option is enabled in the settings screen of the eXp 6000 according to section „5.8 Settings“ on page 40.

4.5.3 Using the Android Smart Glasses M300XL

The Android M300XL Smart Glasses are part of the Professional Plus edition.



Use the **hardware buttons** to navigate through all menus and operating modes. Alternatively you may also use the Multi-function Control Knob of the eXp 6000 Control Unit to select any of the functions.



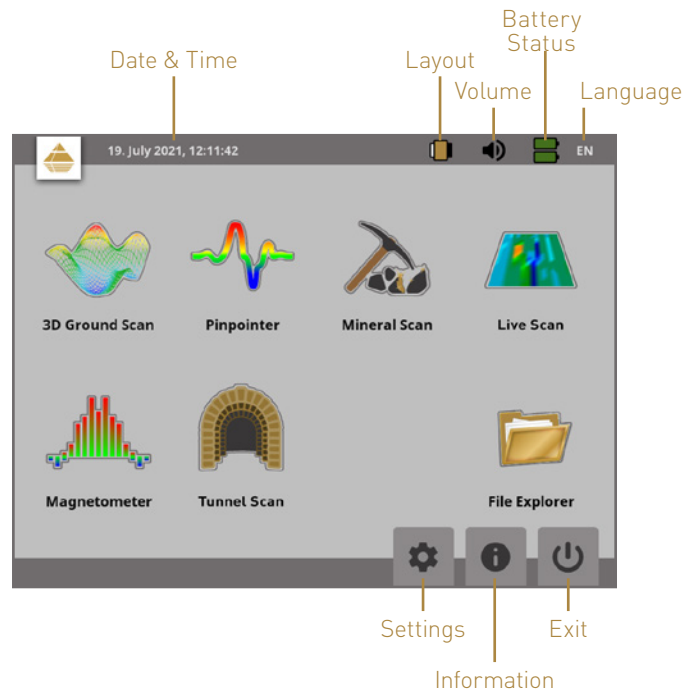
Press the Power On/Off Button on the side of the battery pod to switch on the Video Glasses. For further information please refer to the VUZIX M300XL User Guide.

OPERATING MODES

5 OPERATING MODES

Selecting the correct operating mode depends primarily on the desired project. There are functions which have to be used for an initial measurement in an unknown area to get a general overview, whereas others are rather suitable for a more detailed search and analysis with a special processing software program.

After starting the eXp 6000 you will see the main menu (home screen):



The home screen provides detailed information about the current status of your eXp 6000:

- **Date & Time**
Here you see the current time and date according to your settings. The time and date setting is very important because it will also be stored along with your measurements.

- **Layout**
This icon is only accessible via touchscreen and a shortcut to change the screen layout.
- **Volume**
This icon symbolizes your active sound device (mute, speaker or headphones).
- **Battery Status**
The battery icons are indicating the current charge conditions of the Control Unit (top icon) as well as the Telescopic Rod (bottom icon).
- **Language**
This icon shows the 2-letter-code of your active language according to ISO-639-1.

Starting from the main menu you can select one of the following primary operating modes:

- **3D Ground Scan**
Measurement with graphical evaluation, whereby measured data can be stored in the internal memory of the device for later review.
- **Pinpointer**
This scanning tool is used to give the exact position of the detected anomaly.
- **Mineral Scan**
Ground measurement for the detection of naturally occurring mineralization.
- **Live Scan**
Ground measurement as direct live data stream.
- **Magnetometer**
Search an area with the integrated magnetometer.
- **Tunnel Scan**
Ground measurement to detect tunnels, voids and other cavernous anomalies.
- **File Explorer**
Browse your recorded files or transfer it to some PC via USB flash drive.

In the bottom right corner of the main menu you can find basic navigation buttons:

- **Settings**
Change the language, date, time, volume, screen layout and other settings.
- **Information**
Display details on your eXp 6000 such as status as well as serial numbers.
- **Shutdown / Exit**
Power off the device and shut it down.

Via the Multi-function Control Knob or the touch capabilities of the display you can select and confirm your desired operating mode.

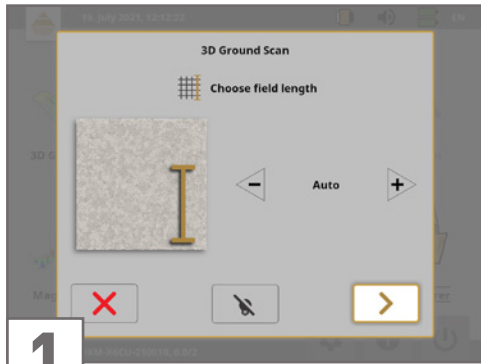
5.1 3D GROUND SCAN

The 3D Ground Scan mode is your primary function. This is the mode where you are going to find the targets and locate areas of disturbed soils. When something is buried, then whoever buried it had to dig a hole. Look for that disturbance in the soil first.

If a hole was created at 1.5 m (4.5 ft) deep, after a couple of seasons the hole will appear to be over 2 m (6 ft) in diameter at the surface. Start with a scan that has an impulse approximately every 30 to 60 cm (1 to 2 ft) forward and to the sides (distance between two single scan lines). Don't go too fine on the first scans until you have a possible anomaly. Look for the holes! Usually without a hole you could be looking at mineralization.

This operating mode allows you to do a measurement with a graphical representation whereby all measured values will be stored in the internal memory of the device. Also you have the possibility to recall and see previously stored graphics. This mode can be used with all probes.

After selecting the operating mode 3D Ground Scan you may adjust certain settings. There are different parameters which influence the measurement. You can modify the following parameters (the underlined values correspond to the factory settings, which are recommended for beginners).



1

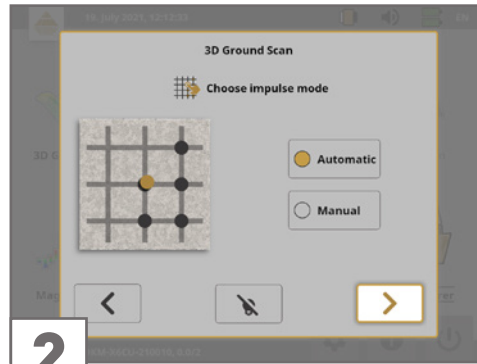
Field Length (Auto, 5 m, 10 m ..., 50 m)

Number of measured values per scan line.

If you select **Auto** the number of impulses can be adapted to the current length of your first scan line.

During the first line the device will read values continuously without stopping. As soon as you want to finish your first line, you have to depress either the Multi-function Control Knob or the Trigger Button of the Telescopic Rod to stop the measuring process of the current line. The device will store the number of impulses and use it for all further scan lines of the same scan.

By selecting the value **5 m, 10 m, 20 m ... or 50 m** you can preset the distance or the number of impulses you need in one measured line.

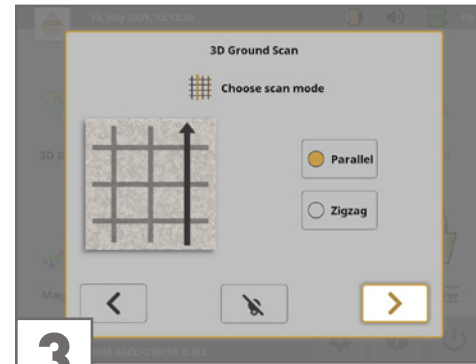


2

Impulse Mode (Automatic, Manual)

This is the mode that determines how the measurement values will be recorded: automatically or manually. For the smooth and flat terrain, use the automatic mode, for rough terrain the manual mode can be used.

- In **Automatic Mode**, the eXp 6000 will take the measurements automatically as predetermined in the "Field Length" selection.
- In **Manual Mode**, the eXp 6000 will record a measurement value only by pressing the Trigger Button of the Telescopic Rod. The eXp 6000 uses 40 impulses per meter.



3

Scan Mode (Parallel, Zigzag)

The scan mode defines the method of scanning an area.

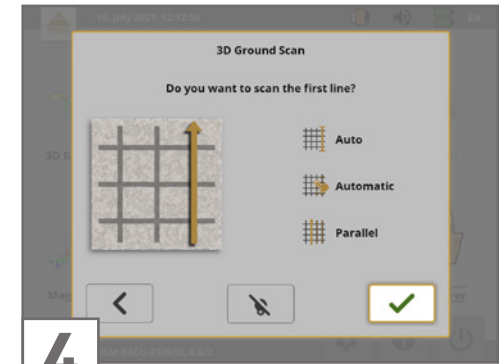
In **Parallel Mode** a measurement starts always from the starting line (recommended), whereas in Zigzag mode measurements start at the end of the line which was scanned before.

In **Zigzag Mode** you have to take care not to change the orientation of the probe, which means that you are not allowed to turn yourself and thus must walk backwards every second scan line. The measuring probe must remain in the same direction for every measured line. Rotating the probe will create rotational errors.

Further details about the scan modes can be found in the "3D Ground Scan Guide".



For 3D Ground Scan with connected Live-Stream Sensor please refer to section „5.4 Live Scan“ on page 32 for more information concerning probe calibration.



4

After adjusting all your scan settings, you get a summary and will be asked if you want to scan the first line.

Press **<** if you want to readjust your settings. Select **✓** to start scanning the first line right away.

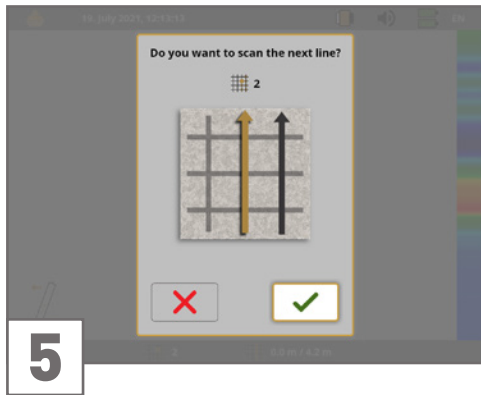
Alternatively, you can also use the Trigger Button on the Telescopic Rod to start the measurement, which is of more comfort, because now it is important to start walking immediately.

The eXp 6000 will start recording data as soon as you confirmed your settings.


As soon as your first scan line is finished, a new message will appear.

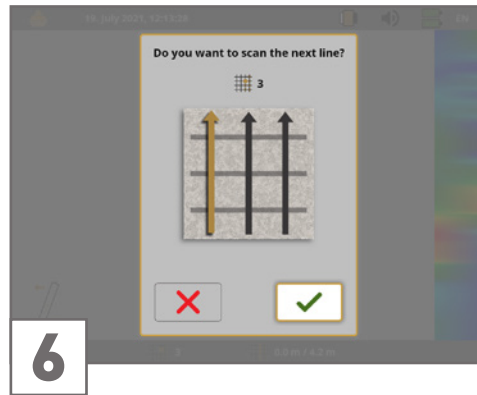


Keep in mind that in Automatic scan mode you have to stop the first scan by pushing the Trigger Button again at the end of the line!




5 Before you are going to scan the second line, go to the starting point of that line, which depends on your active scan mode (Parallel or Zigzag). Further details are provided in the "3D Ground Scan Guide".

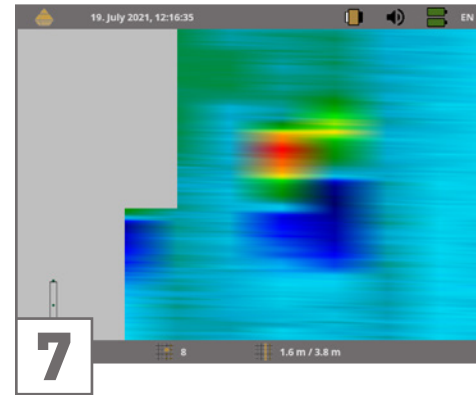
Confirm with  or push the Trigger Button of the Telescopic Rod to start scanning the second line of your field.



6 Before you are going to scan the next scan line, go to the starting point of the upcoming line, which depends on your active scan mode (parallel or zigzag). More details are provided in the "3D Ground Scan Guide".

Confirm with  or push the Trigger Button of the Telescopic Rod to start scanning another line of your field.

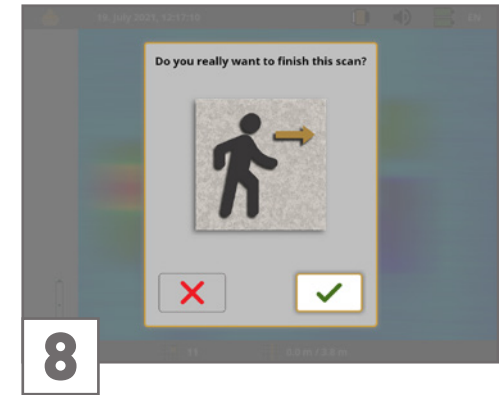
Repeat this procedure until you scanned your field completely. Step by step a graphical representation will appear on the screen of the eXp 6000.





7 The graphic with a detected target should primarily be green and have spots in dark blue and/or red/orange.

The blue area represents cavernous objects in the ground. The red/orange object (in this example) is a ferromagnetic object.

Metallic objects are normally represented in red for non-ferrous items, red and blue for ferrous items and blue for cavities, water reserves and earth interferences.



8 After each scan line you have the chance to finish your scan by selecting .

If you have scanned all lines and decided to finish your current scan you will be asked to confirm your decision with .



Decide if you want to save the scan on the hard disk of your Control Unit. You may also review the following options:

- **Length / Width**

Enter the length and width of your scan area. These values can also be changed later on in the Visualizer 3D Studio software after transferring the scan file to an USB flash drive (see section „5.7.6 Copying Files to USB Flash Drive“ on page 40).

- **Favorite**

Select ☆ if you want to highlight this scan as a favorite. If the star is highlighted, it will be very easy to find this file later on by activating the favorite filter in the file explorer (see section „5.7 File Explorer“ on page 36).

Select ✓ if you want to save this scan, otherwise select ✗.



Please make sure to keep the initial orientation of the probes during the entire scan. It is also very important to keep the measuring probes level to the ground.

The eXp 6000 will assist you in that task with its integrated Orientation Sensor. The indication in the bottom left corner of the screen shows you if the probe orientation is correct.

Further details about the orientation information are explained in section „6.1 Probe Orientation“ on page 46.

5.2 PINPOINTER

This operating mode is used to identify and give the location of buried treasures, metals and cavities. Therefore it is necessary to connect the Super Sensor. If you don't have the Super Sensor, contemplate very seriously on acquiring one. This is an extremely powerful and functional antenna that can assist you in verifying real targets. There are three basic modes in which you will use this function: pinpointing an object, discrimination of metals, tunnel recognition and then also estimating the size of the object.

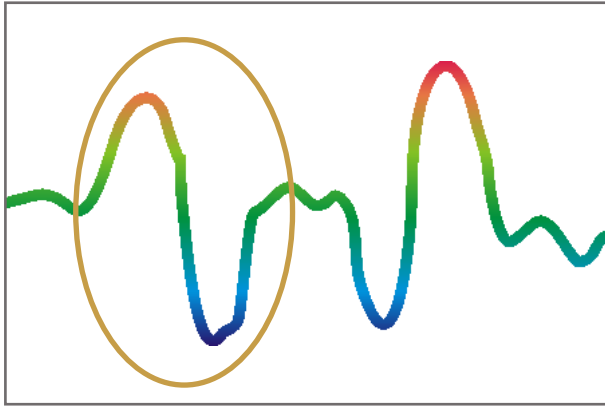
In this mode there is no given manner or direction you must maintain. You can walk as you wish in every direction. It is still important that the antenna must always remain in the same direction. This operating mode is most effective after you have already detected a potential object and now want to know more details about it.



**The Super Sensor should point vertically towards the ground.
It should not be rotated or pivoted.**

Now you can slowly move the Super Sensor from one side to the other above the potential object. The Super Sensor cannot swing, it must remain in the vertical orientation. Please try to capture the complete object, which means you should measure beyond the edges of the object. Repeat this measurement a few times to get a clear signature of the object.

While scanning in Pinpointer mode you might see one or more different signatures. There are 3 different signatures, from which you can recognize a specific characteristic of any target.

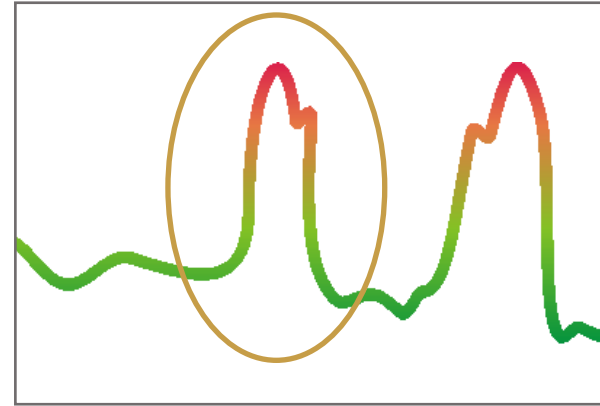


Ferromagnetic metals

Ferromagnetic targets have a positive-negative-signature.

The typical signature of a ferromagnetic metal like iron includes a positive (red) and a negative (blue) amplitude. When looking closely, you can see even 2 ferromagnetic signatures. The first signature starts with a positive amplitude and the second signature starts with a negative amplitude. The order is not important, it depends on the direction of movement of the Super Sensor. If you keep moving the probe from one side to another, these 2 signatures will change continuously.

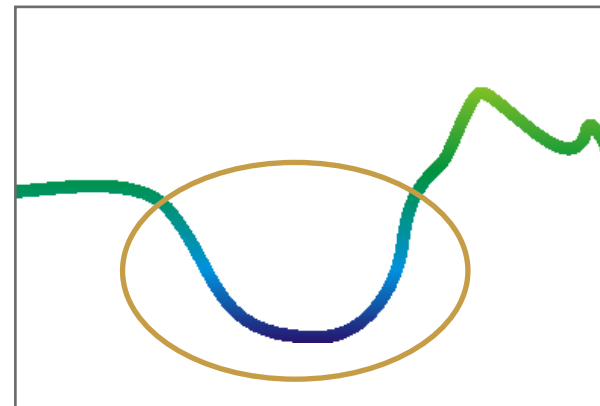
Take care to move the Super Sensor slowly and equal above the ground and above a detected object to get a clear signature.



Non-ferromagnetic metals

Non-ferrous targets have a pure positive signature.

In a signature of a non-ferrous target you can recognize that there is only a positive amplitude (red). In addition to the main amplitude there is another small peak, which is typical for precious metals. Also, here the order of amplitude and the small peak is not important and depends on the scan direction.



Non-metallic targets

All non-metallic items have a pure negative signature.

The signature of all non-metallic targets and structures such as voids, tunnels or buried plastic pipes or boxes are represented as negative amplitude (blue) only.

5.3 MINERAL SCAN

The following procedures do not apply to those who are looking for buried treasures or a cache of items. This is only for the purpose of prospecting and locating naturally occurring mineral fields and their deposits with the OKM eXp 6000.

If you are looking for buried items of great value or other man-made objects that have been placed into the ground, then this function is not correct for your application. Please choose a different function that will give you the desired results.

The examples contained within this section are actual scans from actual locations and the data is derived from actual field experience. Results from your particular area may differ. As with all equipment, relevant data is dependent on the soil type in your area which may alter the final reading. Scan measurements and examples used in this supplement are derived from users located in different parts of Africa, Asia, South America and North America.

When prospecting for mineral deposits or other naturally occurring minerals or formations located in the ground, it is important to work in a clean environment, free of debris and obstacles. Debris may contaminate the area and lower the probability of success. The presence of debris may also lead to false or misleading signals. Obstacles will most likely have to be avoided. Create a path where unnecessary movement of the Super Sensor can be avoided. Additional movement of the Super Sensor may result in inaccurate data. Be sure to always work with data that can be repeated. Find more information about control scans in the "3D Ground Scan Guide".

The Visualizer 3D Studio software or the OKM line of geophysical equipment can not identify element specific materials, minerals or items that occur naturally in the ground. It can identify and locate the presence of ferrous, non-ferrous, fracture zones and other naturally occurring anomalies. The actual detection of precious metals is based on results from various known mineral fields and mines. It is completely possible that other non-ferrous minerals may resemble or have a likeness similar to other naturally occurring minerals.

When conducting searches for fields of mineralization, it is important to identify areas of higher probability with the assistance or research of a geologist or a known geological location. Locating and prospecting in known fields or areas of higher probability will greatly increase your chances of success. Different geological formations may give different results in any particular area. If possible it is always best to start the training and/or field testing of the equipment in or on a known area to properly identify the mineral signature in the software. Different locations will have other geologic properties and may or may not be able to give an accurate reading or measurement. Varying ground features, mineralization and sub-straits may increase or decrease the receptibility of the Super Sensor.

The Visualizer 3D Studio software will identify patches of mineralization. When conducting scans with the OKM eXp 6000, it is presumed that the user or operator is familiar with the proper operating technique.

The operating mode Mineral Scan can only be used with the Super Sensor and allows to see also smaller mineral deposits.

5.3.1 Mineral Scan Technique

The following technique applies only to the Mineral Scan mode with the Super Sensor.

Preparation:

1. Ensure that all batteries are charged to be able to complete the scan.
2. For the area to be prospected, ensure that you can walk the desired path without any interruptions, pauses or large obstacles (see explanation below).

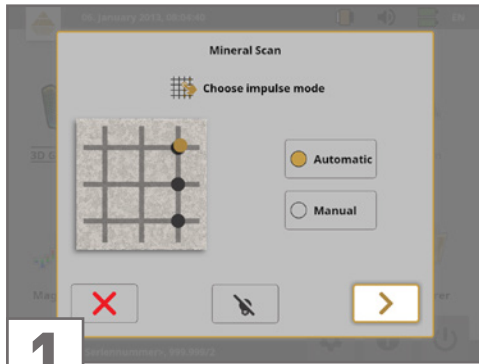
Create a path where a single line can be traversed. This path needs to be a longer path, usually greater than 20 meters in length. The normal length for areas of prospection may be between 50 and 100 meters; up to 200 m long. Areas of very rough terrain will certainly be shorter.

This measurement needs to be a single line only!

Mark your starting and stopping points. Pull a line from the beginning point to the ending point to ensure that you are traveling a STRAIGHT line! Not walking a straight line WILL give you a false reading.

Enable GPS to get better accuracy of your starting and stopping points. This is very important for locating the position after the data has been successfully analyzed.

3. Assemble the eXp 6000 and attach the Super Sensor to the Telescopic Rod. Switch on the Control Unit and the Telescopic Rod.



1

Start the eXp 6000 and select "Mineral Scan" from the main menu.

Select Impulse Mode **Automatic** or **Manual** depending on the terrain that you want to be prospected.

Push the Multi-function Control Knob or **>** on the display to proceed.

Please refer to section „6.3 Manual or Automatic“ on page 48 for further explanations concerning the Impulse Mode setting.

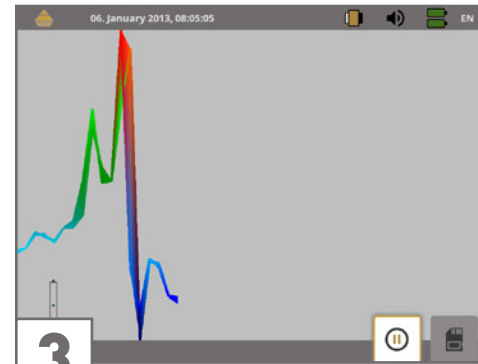


2

Go to your starting position and start the measurement by pressing the Trigger Button or clicking **✓**.



The eXp 6000 will immediately start recording data. Therefore, start walking immediately as soon as you confirm!



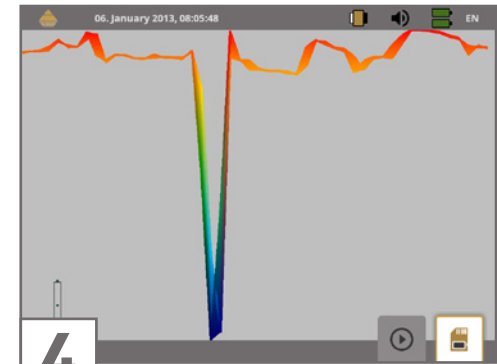
3

Make sure that your Super Sensor remains at the same height above the ground and that it remains vertical during the duration of the scan.

For areas of rough terrain or difficult to pass, be sure to use the Manual mode. Attempt to maintain the height between 5 cm and 10 cm (2" to 5") above the ground with no more than a ± 5 cm (2") variance during the scan to receive a good measurement.



Changing the height of the Super Sensor may give you a false reading and thus incorrect scan data.



4

You may pause and continue your scan as you like by pressing the Trigger Button or by clicking **▶** and **⏸**.

At the end of your scan press **⏹** to stop your scan (be careful to not pivot the Super Sensor when pushing the button to start or stop for it can have a negative effect on the scan).



5

The dialog window "Do you really want to finish this scan?" will appear. Select ✓ to finish the scan or ✗ to continue scanning.



6

Click ✗ to discard the current scan without saving or enter the correct scan line length and confirm with ✓ to save it.

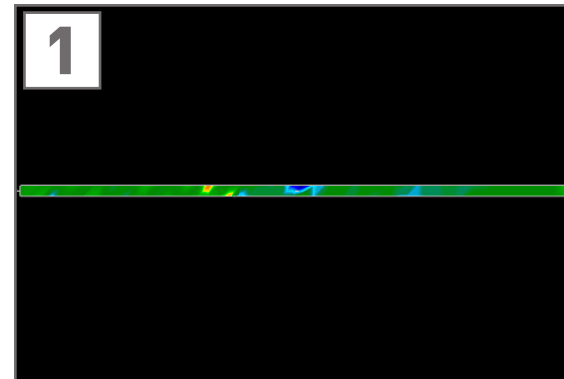
Afterwards you will be able to open and view the scan via the eXp 6000 File Explorer (see [„5.7 File Explorer“](#) on page 36).

Though you will be able to view the scan on the eXp 6000 display, it is recommended to complete the analysis on the PC. The Visualizer 3D Studio software provides further tools to better identify mineral deposits.



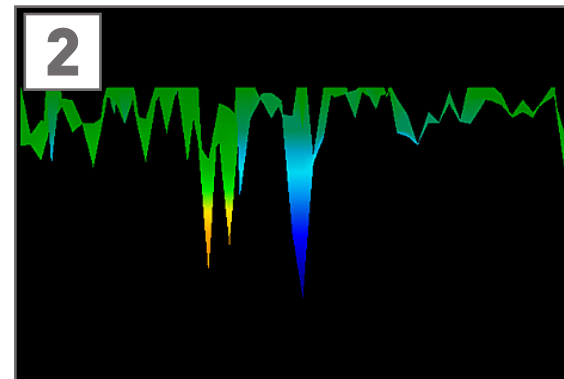
It is very important to perform Control Scans to verify your detected anomalies.

5.3.2 Analyzing a Mineral Scan



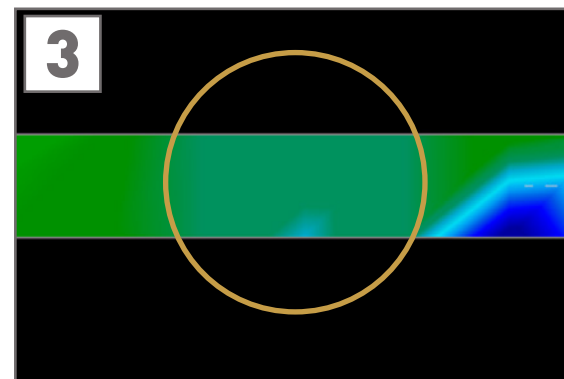
1

After transferring the scan data to the Visualizer 3D Studio software you will see a scan that is a straight line. This scan is now ready for analysis.



2

To see the differences within the scan, rotate it to the side.



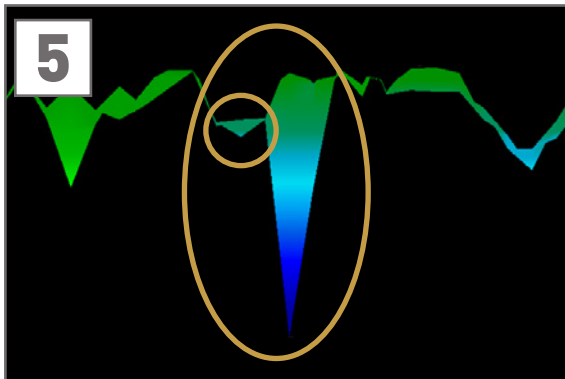
3

This scan shows the highlighted section of how a natural mineral field appears like. Please note the above colors, they are difficult to notice when in direct sun or bright light. Analyze your scan in an area where the computer can be shaded from most of the natural light to better recognize the colors.

The image is taken from practical experience in the field.

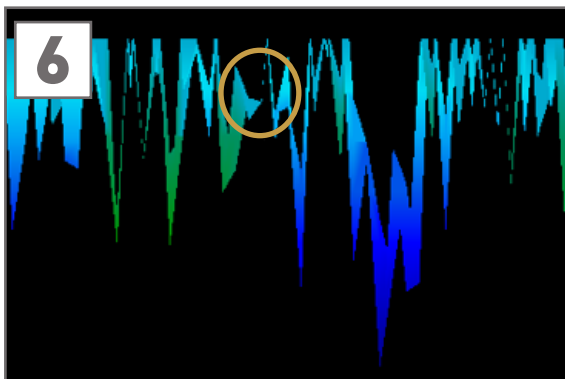


Practical experience and the repeatability factor from several locations world-wide have made this color the one to watch for within the scans. As stated previously, it is not an easy-to-recognize color.



Another signature to look for is the one that is also commonly referred to as a "hit within a hit". The scan image needs to be viewed from the side view and fitted onto the screen. If the values are too high, you won't be able to recognize the differences.

The smaller area is attached to the larger, this is very typical and occurs quite often when working with minerals in hard rock.

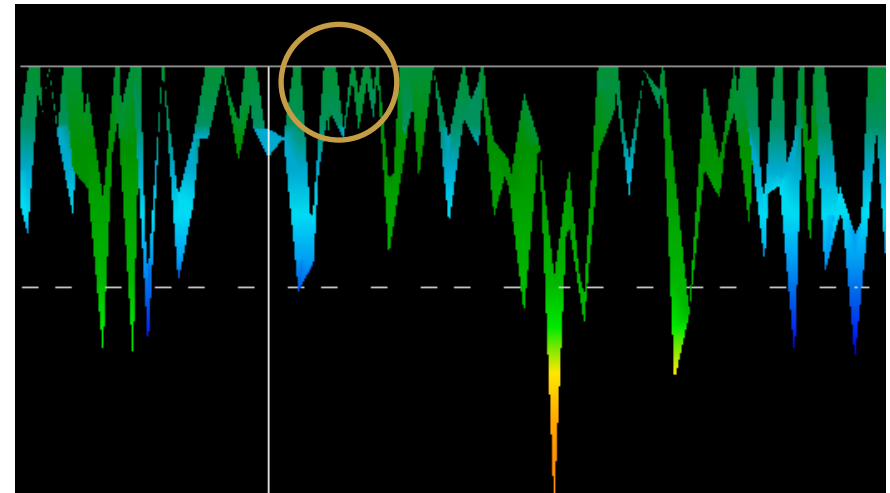


This example shows naturally occurring gold that has been detected by a user in North Sudan. The gold was embedded in the rock alongside with quartz and black sand.

5.3.3 Determining the Position of Anomalies

After an anomaly has been found it is very important to know how to find the location. This is done very simply by entering in the field length into the Characteristics (F9 key) in the Visualizer 3D Studio software.

After entering the length into the system, you can navigate to the desired position using the arrow keys on the keyboard.

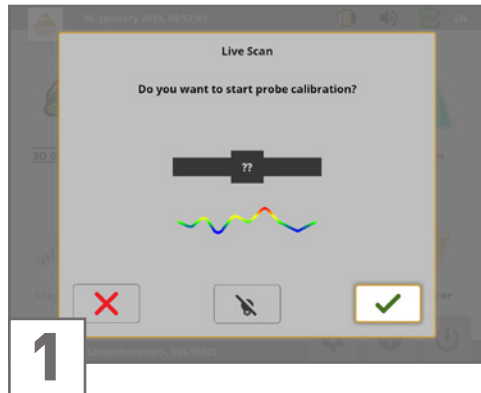


This example shows the position of a non-ferrous anomaly.

The beginning of a scan line is always displayed on the bottom right hand side of the software window. The positioning line was put into place using the arrow keys. Afterwards, the signal position can be found using simple distance measuring tools.

5.4 LIVE SCAN

To work in the operating mode Live Scan connect the Live-Stream Sensor to your eXp 6000. In this operating mode you do not have to keep a defined scan direction. You can walk forwards or backwards over your measured area. On the screen you will see immediately what is currently situated right under the measuring probe. The graphical representation is very similar to the operating mode 3D Ground Scan but many more data will be processed at once.



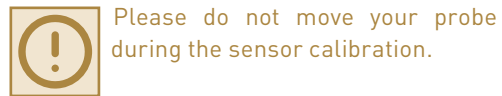
1 Hold your Live-Stream Sensor over neutral ground, which means normal underground without any potential objects.

Hold the measuring probe 5 to 15 cm [2 to 6"] above the ground and confirm with ✓.

Alternatively you can also push the Trigger Button on the Telescopic Rod or the Multi-function Control Knob on the Control Unit.



2 Now the eXp 6000 calibrates your measuring probe according to the current underground to receive optimal data afterwards.



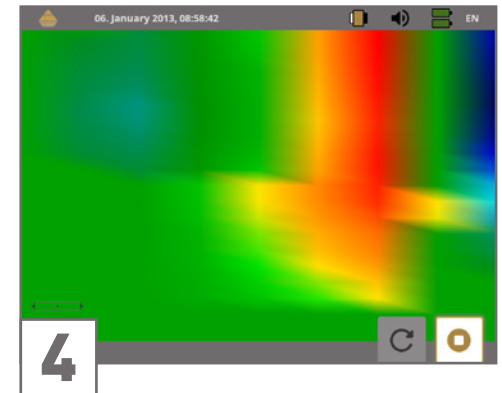
The progress indicator informs you about the process. Usually, it will just take some seconds to finish the calibration.



3 After the calibration has been processed the eXp 6000 ground scanner is ready to start the measurement.

Go to your starting point and start the measurement with ✓.

Alternatively you can also push the Trigger Button on the Telescopic Rod or the Multi-function Control Knob on the Control Unit.



4 Walk a straight line - no matter if forward, backward or even in both directions.

All measured data will flow over the screen (from top to bottom), even when you are not moving. The measured values are updated constantly. If you are right above a target, it will be visible on screen.


You can start all over and repeat the calibration by clicking ↺ or finish the Live Scan with ⏪. The latter button will lead you back to the main menu.

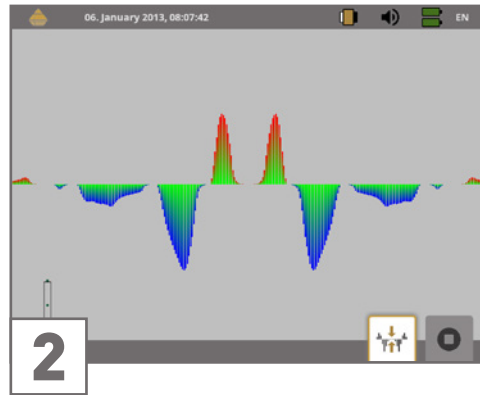
5.5 MAGNETOMETER

By selecting the Magnetometer operating mode from the main menu, you can scan the sub-surface for ferromagnetic targets and areas of the soil with a low iron content. Also, you may view the oscilloscope output on the monitor to be able to identify ferromagnetic materials in the ground.




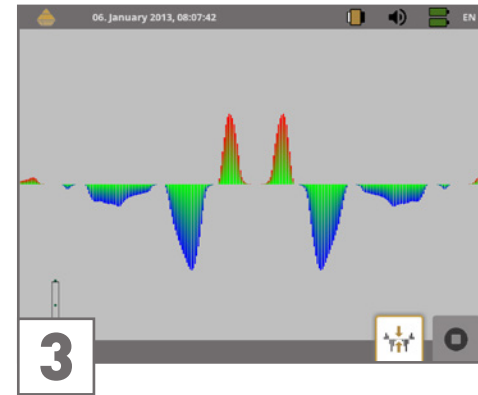
The Magnetometer mode can be used with all the antennas except the Tunnel Sensor.

As soon as you confirm the operating mode Magnetometer with , the integrated magnetometer will be adjusted to the current ground value of the probe location.



Activate the Magnetometer only above neutral soil. Be sure that you are not above a piece of iron or metallic object, because this can cause a false ground balance and produce erroneous results.

If you realize that the function was activated over a piece of metal, restart the process in a clear area or process an additional ground balance by clicking .



All signals that go in the upward direction (red) are the positive magnetic poles of a ferromagnetic object and all signals that go downward (blue) are negative magnetic poles.

Finish the measurement and exit the Magnetometer mode with .

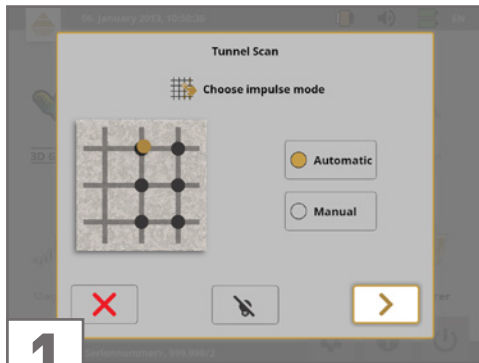
5.6 TUNNEL SCAN

This operating mode is used to identify tunnels, voids and caverns. To use this mode, it is necessary to connect the Tunnel Sensor. If you do not have the optional Tunnel Sensor, one must be obtained prior to using this mode. This is an extremely powerful function and can assist you in identifying tunnels, voids and caverns.

When looking for tunnels, voids or caverns below the surface, the procedure is basically the same as when looking for natural minerals. The primary difference is that the signal strength will be much stronger and the typical coloration will be a darker blue.

There are two possible scanning methods that can be used to find a tunnel:

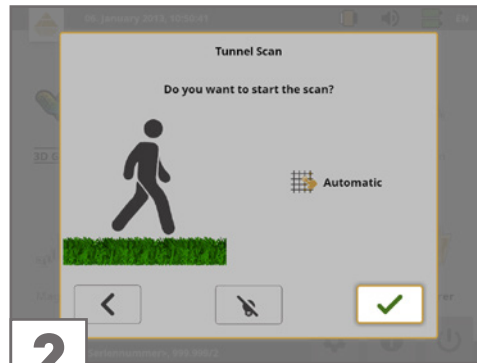
- **Parallel Mode in 3D Ground Scan** (as explained in section „5.1 3D GROUND SCAN“ on page 23).
- **Single Line in Tunnel Scan:** After finishing the scan line the scan can be saved into the internal memory. A multiple line scan is not possible.



1

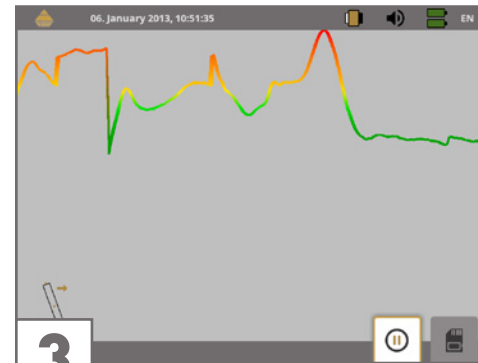
Select the operating mode Tunnel Scan and adjust the Impulse Mode.

Refer to section „6.3 Manual or Automatic“ on page 48 for further explanations concerning the impulse mode setting.



2

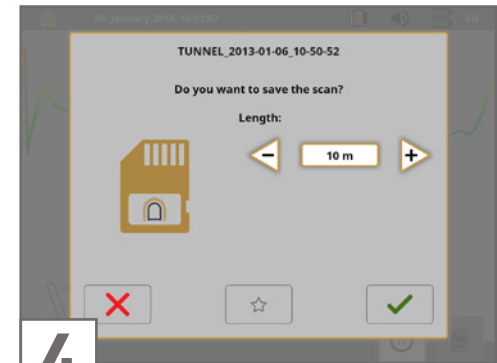
Go to your starting position and select ✓ to start the measurement. Start walking as soon as you press the Trigger Button because the eXp 6000 will record scan data immediately.



3

Walk a straight line. Don't change the height of the probe.

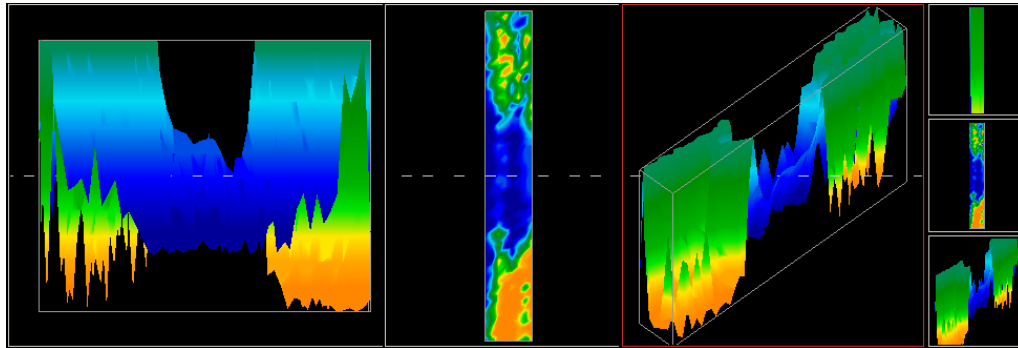
Since the Tunnel Sensor is shorter than the Super Sensor, the antenna has to be held in the vertical position. Do not bend over to bring the antenna closer to the ground. It is designed to be higher above the ground to eliminate some of the smaller signals that can create false anomalies within the scan.



4

After finishing your scan, enter the scan line length and confirm with ✓.

A tunnel signal in the Visualizer 3D Studio software is typically represented by a depression from the top of the scan. The software will show in many cases the curvature or the top of the tunnel, opening or void. The relative soil will still show the natural mineralization that is in the ground. Though a tunnel is usually much wider than a buried treasure, the signal strength is much lower for a void. The void is similar to an air pocket under the surface and other signals may mask a tunnel signal.

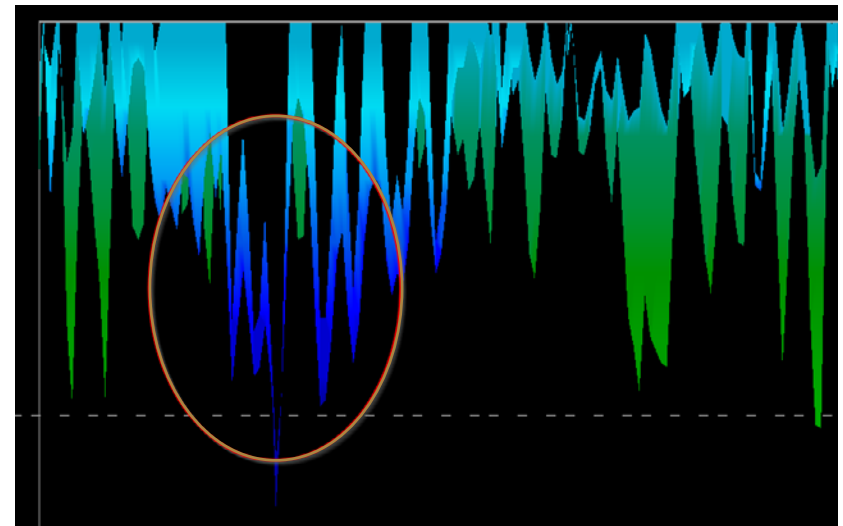


This scan was conducted using a normal 3D Ground Scan with multiple scan lines. When conducting a traditional ground scan, the parallel method of scanning must be used.

Preparation:

1. Create a path and be sure that it is clear of obstacles.
2. The path must be straight.
Pulling a line or rope from the beginning to the end of the path is recommended.
3. Be sure that during the scan the antenna is held at the same height.
4. The speed or distance between impulses needs to be the same.
Changing the speed will result in an inaccurate scan.
5. Perform a control scan.
A control scan is a repetition of a scan using the exact same parameters.

The single line method is a very accurate way of locating deeper voids and tunnels. This method is used for an initial investigation of an area and decreases the chances of making errors.



Example of a tunnel (single line): A scan may be repeated several times to ensure that the void is real and it does not move.

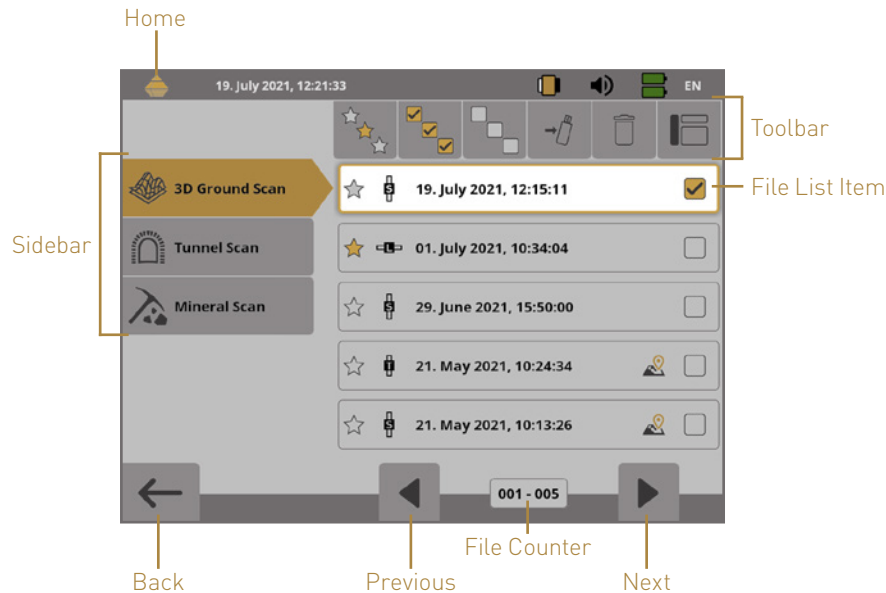


The bigger the tunnel opening, the deeper the tunnel can be detected. If the tunnel is very small, the maximum depth will be decreased and it may be difficult to find. The depth of a tunnel cannot be determined accurately. The Visualizer 3D Studio software is designed to measure depth starting from the surface to the object itself.

5.7 FILE EXPLORER

The file explorer is the place where all your previously saved scan files are organized. Here you have the possibility to reopen, transfer or delete your scan images.

5.7.1 Screen Overview



The **Sidebar** allows to switch between the operating modes.








The **Toolbar** provides several action buttons that are described in subsection „5.7.1.1 Toolbar“ on page 36.

The **File List Item** displays information concerning the selected scan file and is described in subsection „5.7.1.2 File List Item“ on page 37.

The **File Counter** shows the numbers of the File List Items on the current page.

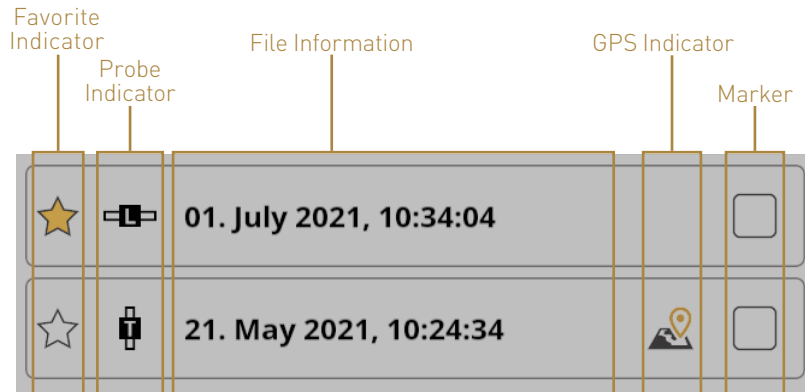
Select the **Home** icon in the upper left corner or press the **Back** button to return to the main menu ("home screen").



5.7.1.1 Toolbar

Button	Description
	Show Favorites Only View favorite files only. After selecting this button only files that have been marked as favorite will be listed.
	Show All Files List all files, not only favorites. After selecting this button all files will be listed.
	Select All Files This button is used to select all files at once. This might be useful if you are going to delete or copy all files.
	Unselect All Files This button is used to unselect all files at once.
	Copy to USB Flash Drive Use this button to copy all selected files to an external USB flash drive.
	Delete Selected Files Use this button to delete all selected files permanently from the eXp 6000 Control Unit.
	Jump to Sidebar If you are operating the eXp 6000 Control Unit exclusively with the Multi-function Control Knob, select this button to jump back to the left sidebar.





5.7.1.2 File List Item


One file list item represents one measurement that has been performed and saved.





The **Favorite Indicator** shows if the file is marked as a favorite  or not .

The **Probe Indicator** shows which probe or sensor has been used to perform this scan. The following probe indications are possible:

	Telescopic Probe
	Super Sensor
	Tunnel Sensor
	Live-Stream Sensor

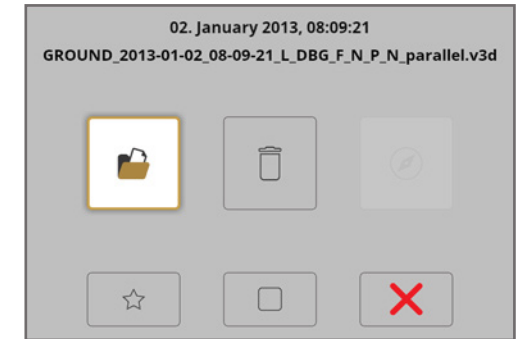
The **GPS Indicator** shows if the scan has been performed with GPS enabled  or not.







The **File Information** provide the date and time when the scan was performed.

The **Marker** is a checkbox that shows you if a file has already been selected  or not . You can select several files to delete or copy them in one step.


5.7.2 Browse Files

After selecting and activating a file entry by pushing the Multi-function Control Knob or by touching onto the file list item, you will be asked how you would like to proceed.



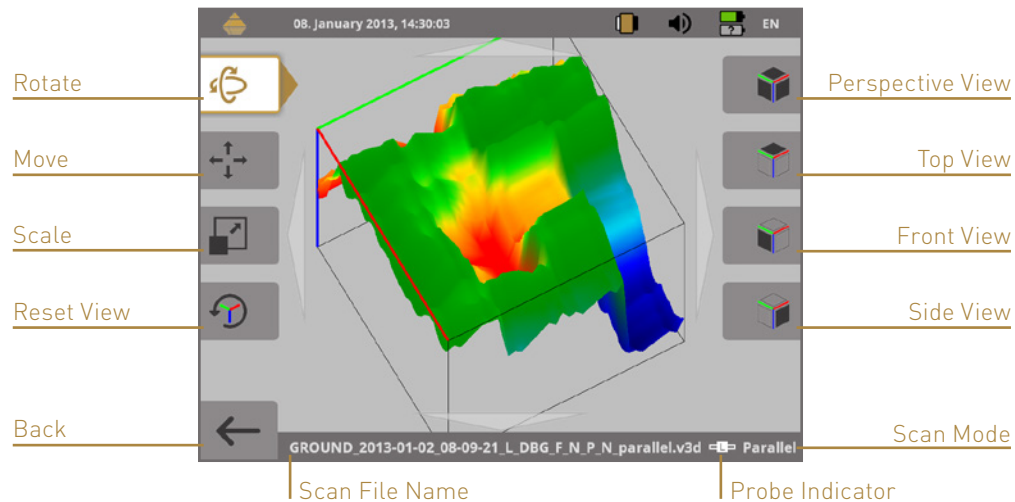
Button	Description
	Open File Open the file and view scan data directly on the eXp 6000 Control Unit screen.
	Delete File Select this action to delete the file permanently from the hard disk of the eXp 6000.
	Start GPS Navigation Navigate to the scan area where the selected file has been performed. This action is only available when the selected scan has been performed with GPS enabled. Read more about GPS navigation in section „5.7.5 GPS Navigation“ on page 38.
	Select/Unselect as Favorite Mark or unmark the file as a favorite. Alternatively click on the star icon left to the file list item.
	Select/Unselect Mark or unmark the file as "selected". Alternatively click on the checkbox icon right to the file list item. This allows to handle more files at once.
	Cancel Exit the dialog and return to the File Explorer without any further actions.

5.7.3 Open Files and View Scan Images

After selecting a file and pushing the Multi-function Control Knob or by simply touching the file name, the action dialog shows up on screen. Select the open button  to open the scan image.

The Control Unit starts reading the recorded data from the file and displays it simultaneously on the screen. By turning the Multi-function Control Knob to the right or left you can slow down or speed up this process. So you can follow the complete scanning process once more.


If you don't want to see this step-by-step procedure, push the Multi-function Control Knob to load all the data completely at once.




5.7.4 Delete Files

There are two possible ways to delete files from your eXp 6000:


- **Delete a single file**


After selecting a file and pushing the Multi-function Control Knob or by simply touching the file name, an action dialog shows up. Select the delete button  to delete this single file only.

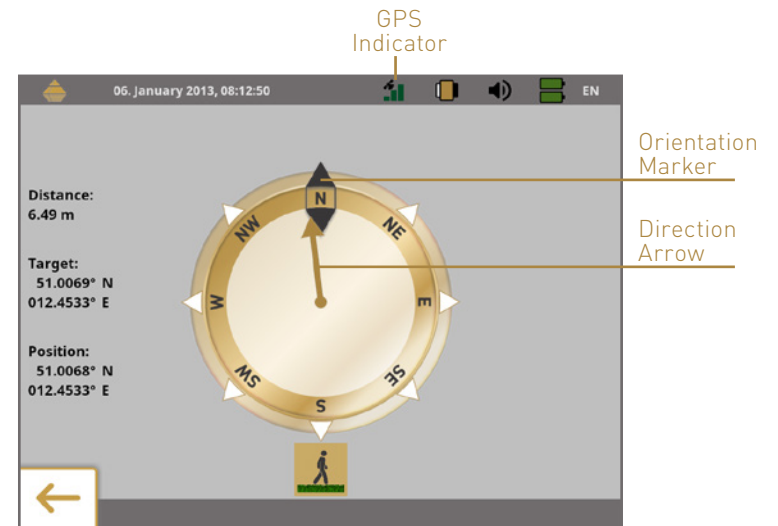
- **Delete all selected files**

Before you can delete more files at once you have to mark the files. Therefore, click the checkbox right to the file name. The easiest way to do that is by using the touch capabilities of the display. After all designated files have been marked, touch the delete button  in the toolbar on top of the screen.

5.7.5 GPS Navigation

For all scan images that have been scanned with enabled GPS you may use the internal navigation system to locate your scan area. Each GPS enabled file is indicated by the GPS navigation icon  right to the file name. Please make sure to mount the GPS Receiver on top of the Telescopic Rod as described in section „4.2.3 Mounting the GPS Receiver“ on page 18.

To start the navigation click on the file entry or select it by using the Multi-function Control Knob. Push the button  to initiate the GPS navigation screen:

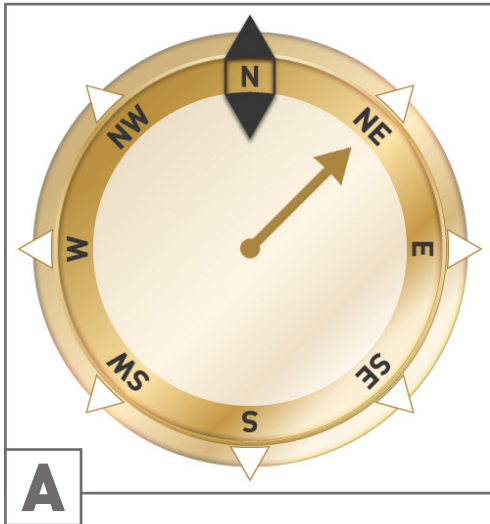


The **Position** indicates the GPS coordinates of your current position, while the **Target** is the place where you have performed your scan.

The **Distance** tells you how far you have to go to reach your target GPS position.

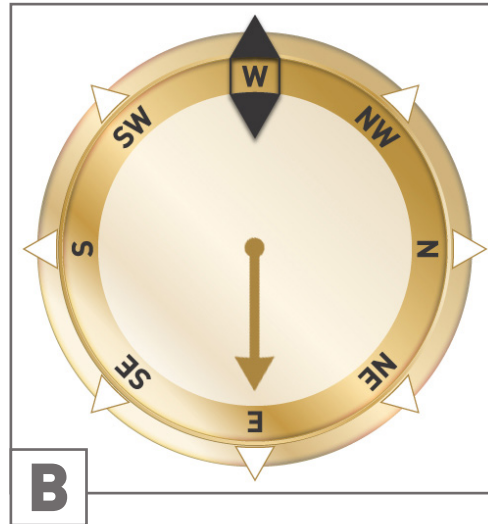
The **Direction Arrow** points into the direction where your scan area is located. If the arrow points directly to the **Orientation Marker** you are walking into the right direction. In any other case you have to correct your direction by turning yourself right or left, depending on the arrow angle.

Examples of how to correct your walking direction to find your target:



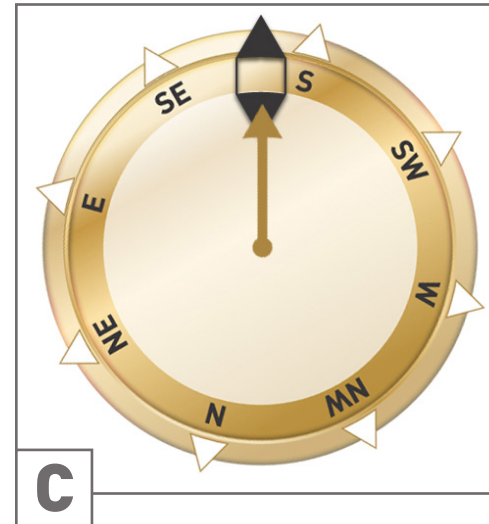
You are walking north but should go to the Northeast.

Turn 45° to the right.



You are walking west but should go to the East. So you are walking in the opposite direction.

Turn around by 180° and walk in the opposite direction (East).

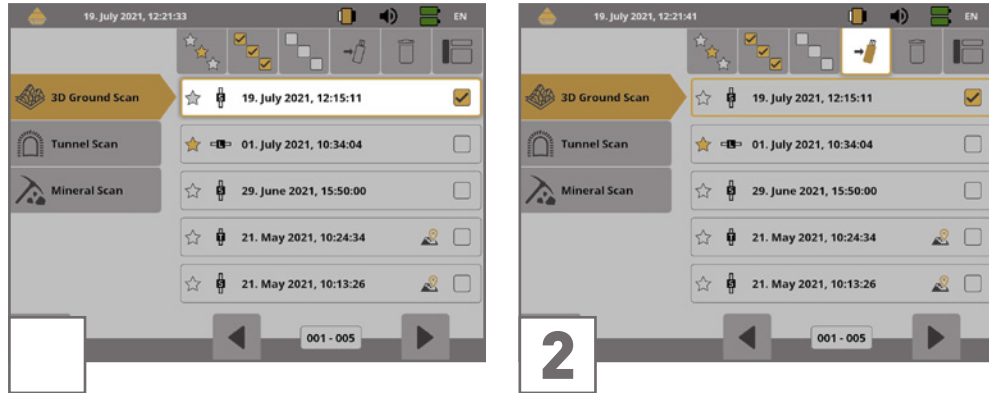


You are walking south which is exactly the right way to your scan area because the direction arrow and the orientation indicator are pointing to each other.


This is the correct direction, keep on walking.

5.7.6 Copying Files to USB Flash Drive

If you want to analyze your recorded scan images with the Visualizer 3D Studio software you must copy your files to an USB flash drive first.

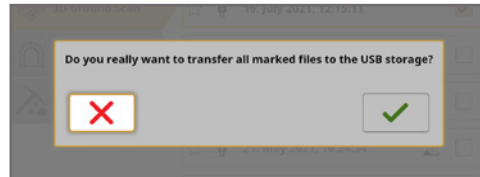



Plug in a USB flash drive to the USB port of your eXp 6000 Control Unit and start the eXp 6000 File Explorer.

Select all scan files that you would like to copy to the USB flash drive. If you are going to copy all existing files you may use the Select All button  to select all files at once.

Click  in the toolbar.

Afterwards you will be asked if you really want to start copying all selected files.




Confirm with  and wait until all files have been transferred to the USB flash drive.

Unplug the USB flash drive to unlock the screen and continue operating your eXp 6000.

After transferring your data to the storage device connect your USB flash drive to any Windows computer to open the files for detailed analysis with Visualizer 3D Studio software.

5.8 SETTINGS

The eXp 6000 offers many settings which can be configured. After selecting the settings icon  in the lower right corner you enter the settings menu.



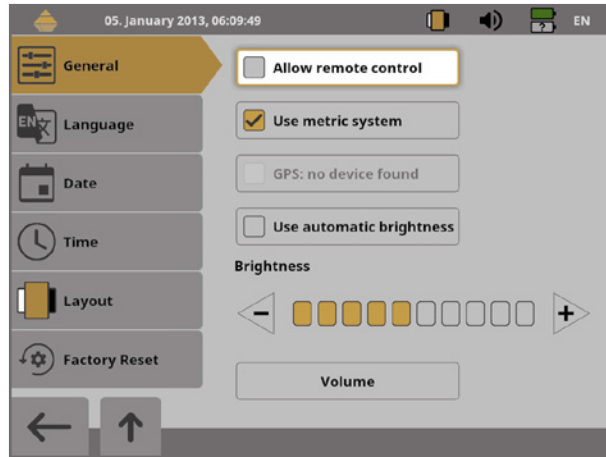
- **General**
Set general options like Brightness, Volume, GPS, System of measures etc.
- **Language**
Select your preferred language to operate your eXp 6000.
- **Date**
Set up all information concerning the date.
- **Time**
Set up all information concerning the time.
- **Layout**
Select the current layout (day, night, default).
- **Factory Reset**
Reset all settings to factory defaults.

Tap a category or use the Multi-function Control Knob to select a category and push the control knob to activate it. Now you can adjust specific settings.

5.8.1 General

- **Allow remote control**

You can allow remote control to connected Android devices like Tablets and Video Glasses. If this option is enabled you can control your eXp 6000 Control Unit by using an external Android device.



- **Use metric system**

At certain times you have to enter length or width of scan areas. This can be done in meters (metric system) or feet (imperial system). You have the choice between the two systems of measures:

If the box is checked, the metric system (meter) is enabled.

If the box is not checked, the imperial system (feet) is enabled.

- **GPS: no device found**

This option is only active and usable, if the GPS Receiver has been mounted on top of the Telescopic Rod as described in section „4.2.3 Mounting the GPS Receiver“ on page 18.

If the box is checked, GPS is enabled and GPS coordinates will be recorded. In that way you will be able to navigate to your scan field later on as described in section „5.7.5 GPS Navigation“ on page 38.

If the box is not checked, GPS is disabled.


- **Use automatic brightness**

If this box is checked, the brightness of the display will be regulated automatically according to the environment lighting. The brightness of the display will increase the brighter the surrounding light is and decrease in darker environment.

- **Brightness**

If the brightness is not regulated automatically, you can set it up by yourself manually: Select your preferred level of brightness.

- **Volume**

Adjust your preferred level of volume. Here you can also connect and pair Bluetooth headphones (see „4.4 Connecting Wireless Headphones“ on page 19). The volume menu can alternatively be entered via the speaker icon  in the top statusbar.

5.8.2 Language

The eXp 6000 Control Unit comes with a variety of different languages to make it as easy as possible to operate the device and its functions.

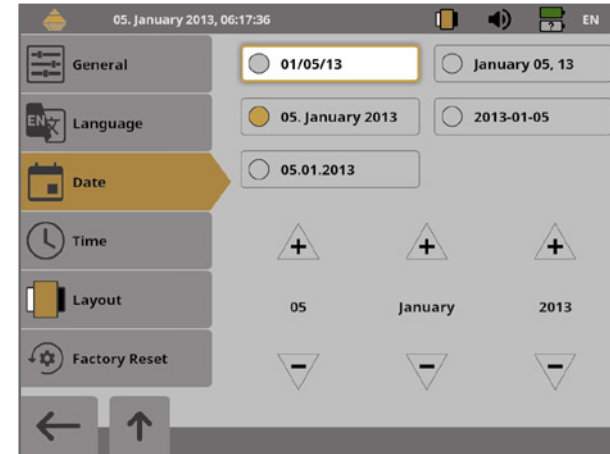


Select your preferred language from the list. The following languages were available at the time this manual was created:

- German (DE)
- English (EN)
- French (FR)
- Spanish (ES)
- Italian (IT)
- Polish (PL)
- Arabic (AR)
- Farsi (FA)
- Turkish (TR)
- Greek (EL)
- Russian (RU)
- Bulgarian (BG)
- Chinese (ZH)
- Japanese (JA)

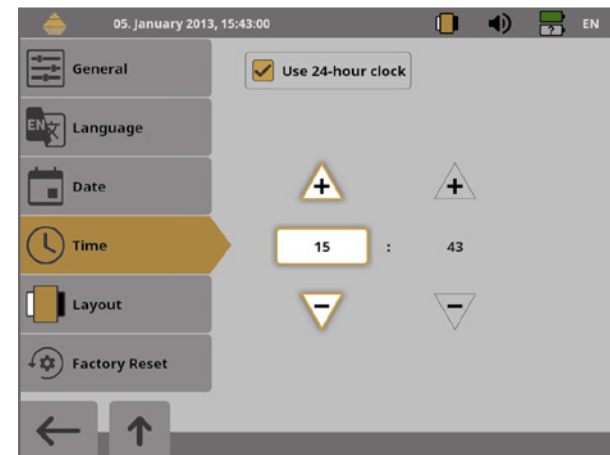
5.8.3 Date

Select one of the available date formats and adjust the day, month and year options to your local time. This date will be used for naming files when you save them.



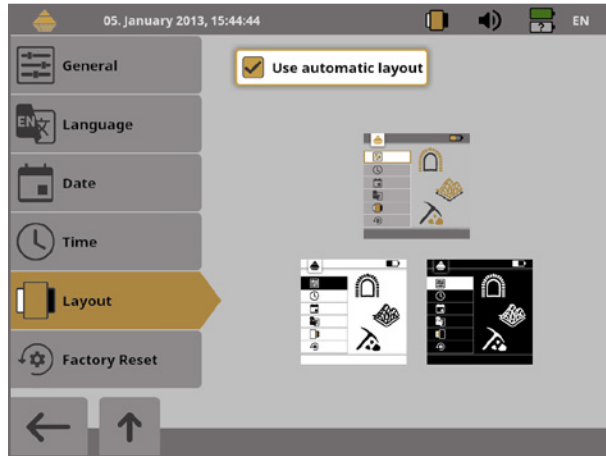
5.8.4 Time

Select one of the available time formats and adjust the hour and minute options to your local time. This time will be used for naming files when you save them.




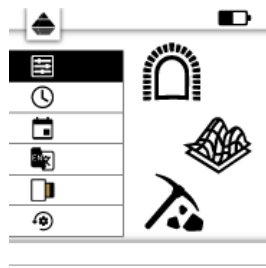

5.8.5 Layout

The eXp 6000 Control Unit provides different layout themes to support the operator with the best view experience, even under strange light conditions.

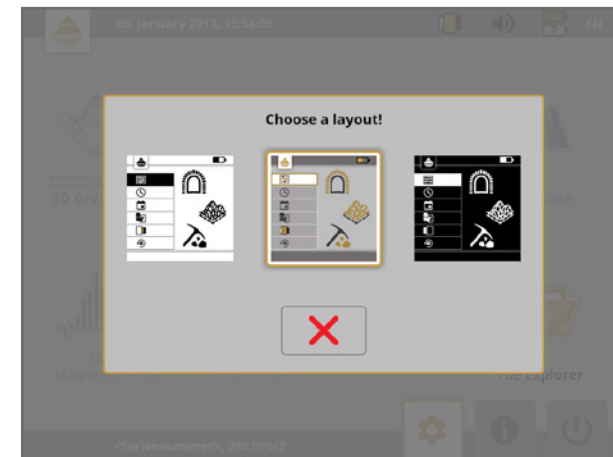


If you select the option "Use automatic layout", the eXp 6000 Control Unit selects the current layout automatically by measuring the light condition of the environment. If the light changes during operation the layout may change automatically.


You can also manually choose from the following layout themes:

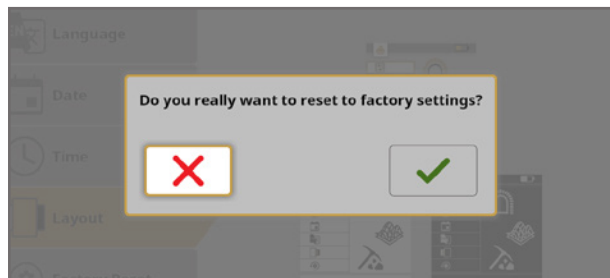
		
<p>Default</p> <p>This is the default layout with the best display quality concerning design. It may be hard to read in bright sunlight.</p>	<p>Day</p> <p>This layout has been optimized for the use in very bright conditions like sunlight. The high contrast between improves the readability.</p>	<p>Night</p> <p>This layout has been optimized for the use in very dark conditions. The high contrast improves the readability without emitting too much light.</p>

Anytime during the operation of the eXp 6000 you may click on the layout icon in the top status-bar to change the current theme immediately.



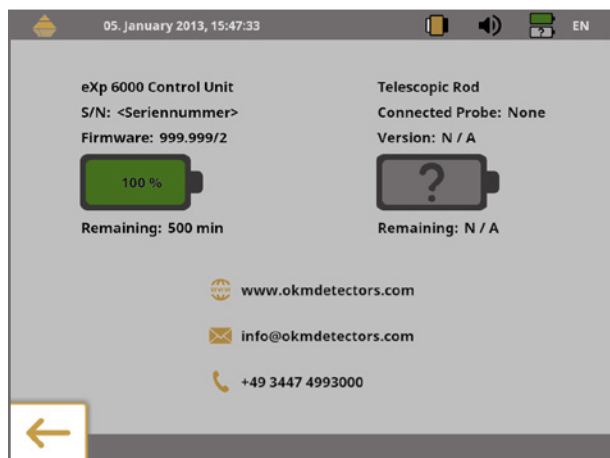
5.8.6 Factory Reset

Confirm with  to reset all settings in this menu to the factory defaults. All your personal settings will be lost after that.




5.9 INFORMATION

The information panel provides detailed information about the current firmware and software versions of your eXp 6000 as well as information about the current charge conditions of the batteries. The battery and status information of the probe or Telescopic Rod are only available if an active wireless connection has been established.



The firmware and serial information could be helpful in case of technical questions to OKM's support team.

5.10 SHUTDOWN / EXIT

Whenever you wish to shut down your device, it is important to use the "Exit" function by selecting the shutdown icon  in the right bottom corner of the screen.

5.11 SOFTWARE UPDATE

The eXp 6000 is able to update its software after changed or improved by OKM. For that you need to download a specific update file from the OKM website. As soon as a new update is available OKM is publishing the file on the website.

The process of updating the software is as follows:

1. Download the update file from the internet.
2. Copy the file to an external USB flash drive.
3. Plug the USB flash drive into the USB port of the eXp 6000.
4. The eXp 6000 Control Unit will detect the update file automatically. Just follow the instructions on your screen

The background features a large, abstract geometric pattern of overlapping, light gray trapezoidal shapes that create a sense of depth and movement, resembling a stylized architectural structure or a series of planes.

SCANNING TECHNIQUES

6 SCANNING TECHNIQUES

6.1 PROBE ORIENTATION

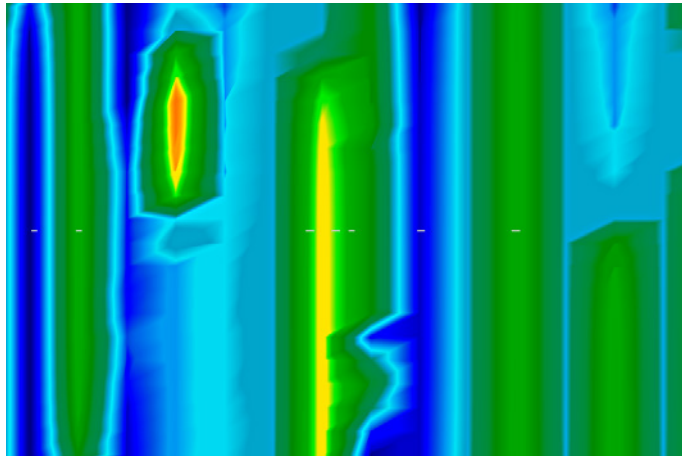
During a measurement the probe should always have the same distance to the ground. Generally we recommend a height of about 5 to 10 cm (2 to 6") from the surface of the ground if possible.

In the event that you are going to go over stones, wood or high grass that is higher, start your scan with the sensor higher right from the beginning. In circumstances like these, then perhaps you will need to start the scan with the probe at a height of 50 cm (2 ft) and keep it at that level for the entire scan.



Do not change the height during a scan for it may create errors.

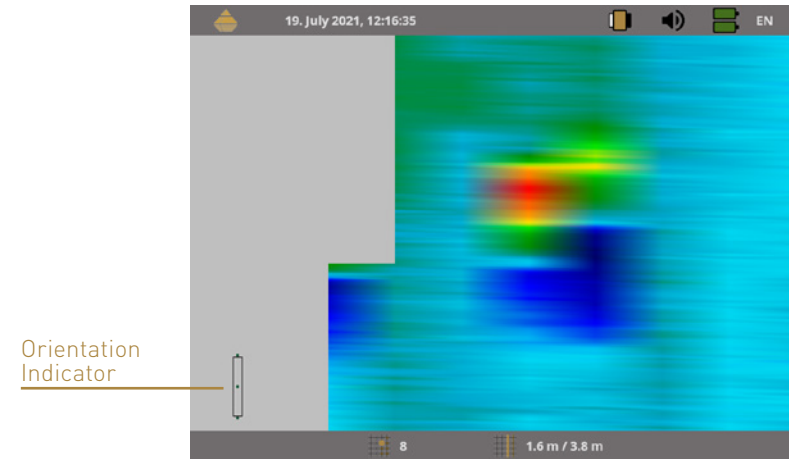
Another important aspect is the physical orientation of the probe. During the Parallel scan mode the orientation of the probe does not change because you are always measuring in the same direction.



Example of erroneous scan in Zigzag scan mode ("rotational errors").

Even in the Zigzag scan mode the orientation of the probe must not be changed. That means you are not allowed to turn yourself with the device and the probe at the end of the scanning path. Instead you should walk backwards and continue scanning. Otherwise your obtained graphic includes red or blue stripes. These stripes throughout a scan are commonly referred to as Rotational Errors.

The eXp 6000 will give you an indication of the probe's vertical or horizontal orientation at all times during a scan. Find this symbol in the left bottom corner:











Please keep in mind that the **orientation indication** does not avoid rotational errors but informs you about the inclination of the probe in relation to the ground surface.

The following sections describe the indications which assist you in performing scans of better quality. Just experiment with the deviation before conducting a scan to get a feeling for the appropriate level of correction.









6.1.1 Orientation of Super Sensor / Tunnel Sensor

The following table explains the symbols of all vertical probes.

Low inclination	High inclination	Correction
		Lower the probe (decrease the distance to the ground).
		Raise the probe (increase the distance to the ground).
		Turn the probe to the right side.
		Turn the probe to the left side.

6.1.2 Orientation of Telescopic Probe / Live-Stream Sensor

The following table explains the symbols of all horizontal probes.

Low inclination	High inclination	Correction
		Lower the probe (decrease the distance to the ground).
		Raise the probe (increase the distance to the ground).
		Turn the probe to the right side.
		Turn the probe to the left side.

6.2 PARALLEL OR ZIGZAG

For skilled users of the eXp 6000 both scan modes are suitable. According to experience the best graphics have been received in the Parallel mode, because you are starting at the same point and walking in the same direction. It is also easier to control your walking speed and direction.

Especially in uneven terrain like mountain sides or other inclines, the Parallel mode is preferred. When it comes to speed, the experienced user will very often use the Zigzag mode only for the initial scan to determine if there are anomalies in the area worth further research.

6.3 MANUAL OR AUTOMATIC

Large even or passable surfaces are commonly measured in the Automatic mode. The Manual impulse mode is mostly used for difficult uneven terrain, areas where there is quite a bit of growth and if the measurement result needs to be very accurate.

In terrains with difficult access like mountain cliffs and sides, slippery surfaces or overgrown areas, it is wise to use the Manual impulse mode. Because each impulse will be released manually, you have enough time to position the probe in the correct way and record the measured value. In this way, you can also measure accurately previously marked dots of a predefined grid.

6.4 SUPER SENSOR

The Super Sensor is a high resolution antenna, which is specially adjusted to detect metals. Yet it is also possible to recognize larger voids with this antenna. A particular characteristic is to distinguish ferrous metals from non-ferrous metals. This discrimination is possible in the operating mode Pinpointer. Compared to the Telescopic Probe the Super Sensor can find much smaller and deeper situated metal objects.

The Super Sensor can be used in the following operating modes:

- 3D Ground Scan
- Pinpointer
- Magnetometer
- Mineral Scan

To use the Super Sensor with eXp 6000, simply connect it to the Telescopic Rod and always hold the antenna vertical to the ground. Make sure the Super Sensor is oriented correctly.

Do not swing the Super Sensor or change its height, neither up nor down, during the measurement. The smoother the antenna is held, the better your scan results will be. The distance between the ground and lower part of the antenna should be about 10 cm (4"), but can be enlarged depending on the terrain conditions.

The eXp 6000 Control Unit assists you by indicating the proper orientation of the Super Sensor at all times during a scan. This behavior is explained in section „6.1 Probe Orientation“ on page 46.



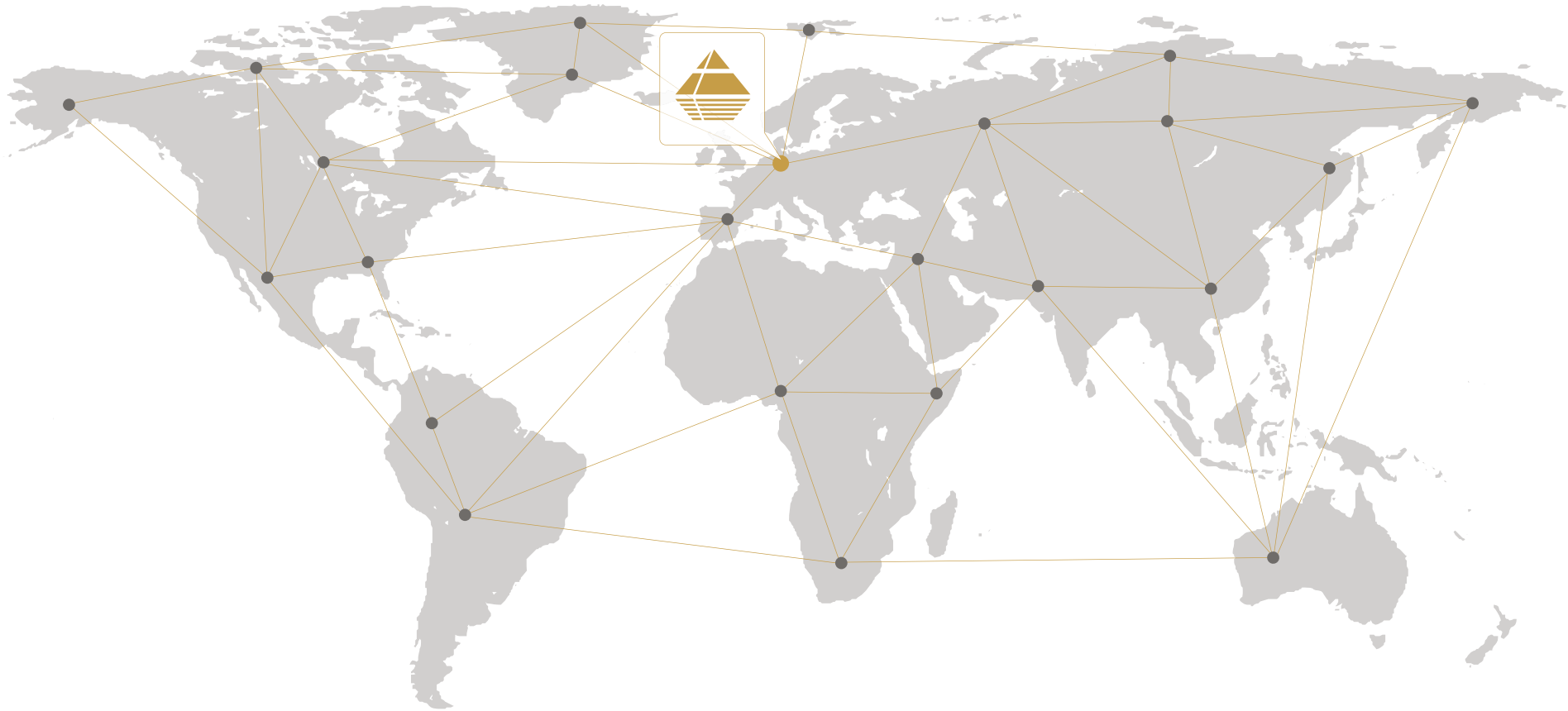
The orientation of the probe should not be changed during the complete measurement!

OKM GERMAN DETECTORS

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Based in Altenburg, Germany, we are developing and manufacturing geophysical detectors since 1998. Our unique detection technology helps to visualize buried objects and structures.

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