TeknolojiEkibi
www.teknolojiekibi.com

ANDROID MAGNETOMETER

USER GUIDE

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WARNING!

After working with this device for at least 200 hours, you will have the necessary experience and habit to use it at its maximum power. Without this experience, the success rate of shooting with the product will be low.

After the preparation of this manual, the TeknolojiEkibi has prepared a technological guide for you, our users, where it deems necessary, on the equipment, the function of the device and the details of its use.
May make changes due to developments.

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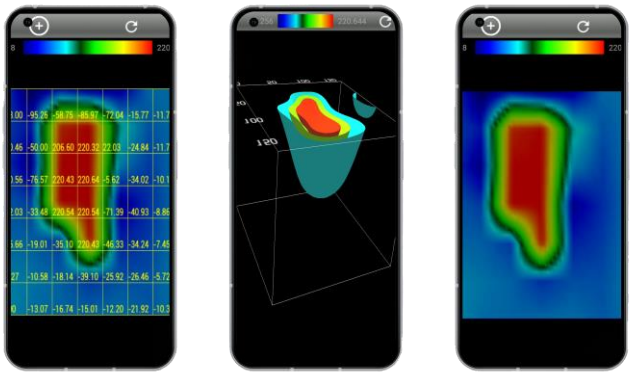
1 - Technicial Specifications

It is a product used to detect man-made objects such as underground graves, tunnels, rooms, ruins, cubes, etc. It is designed to provide easy and fast detection of underground objects by shooting 3D live. Due to the collection of all equipment on a single system, it provides confidentiality in the field, ease of transport, ease of storage. It offers long periods of use with its built-in long-lasting battery. Thanks to its software running on Android operating system, it can be used with mobile phones and tablets. It has real-time scanning, automatic scanning and manual scanning options. Thanks to its CSV file format, it can work integrated with Voxler.

Perceived Objects: This product detects man-made structures and magnetisable objects under the ground. These objects can be bricks, horasan, tiles, mortar, ashes, ash, living spaces with fire, etc. as well as cubes and cube shards. As metal, it can detect metals such as iron, steel, bronze, etc. with magnetising properties.. Non-magnetisable metals, i.e. gold silver etc. cannot detect metals.



Design Suitable for Use in Field Conditions: TeknolojiEkibi Magnetometer has a structure that makes it impossible to understand what you are doing when viewed from the outside thanks to its design. It is very difficult to understand that you are doing underground imaging with a product in your hand by other people during shooting in the field. It is resistant to field conditions thanks to its robust water and dust resistant design.

Android Operating System: TeknolojiEkibi Magnetometer provides the opportunity to use on tablets and phones at the same time thanks to its software running on Android tablets and phones. In this way, with the product, you can perform detailed studies on your tablet or on your mobile phone in a way that you cannot understand what you are doing when viewed from the outside.

Real-time Scanning, Live Shot and Auto Shot: TeknolojiEkibi Magnetometer is a product that combines real-time shooting, live shooting and automatic shooting features in a single product. With this feature, if desired, it is possible to check whether there is a detection in the field with real-time scanning without underground imaging, if desired, 3D shots can be taken easily with automatic shooting thanks to the step counting feature of the product, or detailed underground imaging analyses can be made with manual shooting.

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Easy to Use: TeknolojiEkibi Magnetometer offers a comfortable use to the user in field conditions thanks to its ergonomic structure. With its software that allows use via mobile phone and tablet, it enables both covert use and detailed analyses in the field. Battery level can be easily monitored thanks to the LED on it. It provides high ergonomics with its buttonless structure. Long-term field use is possible with its internal battery. Batteries can be charged without any problems and without the need for follow-up thanks to the charger that cuts off the electricity during charging and shows the charge level of the battery during charging.

Ability to Measure Depth with High Level Accuracy: Thanks to its newly developed software, the TeknolojiEkibi Magnetometer provides much higher accuracy in the depth display of detected anomalies in the shots taken compared to other equivalent products.

Voxlere Integrated Software: With the newly developed software running on Android system for TeknolojiEkibi Magnetometer, shooting data can be recorded in CSV format. In this way, the shots can be analysed via Voxler software.

2 - Components of The Android Magnetometer

Android Magnetometer

Charger
and
Charging Cable

License Certificate

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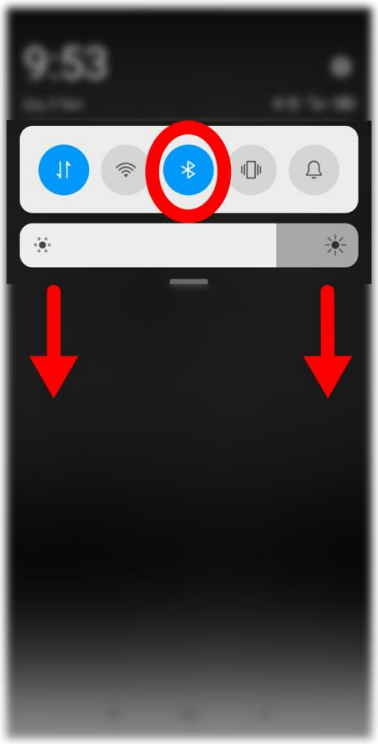
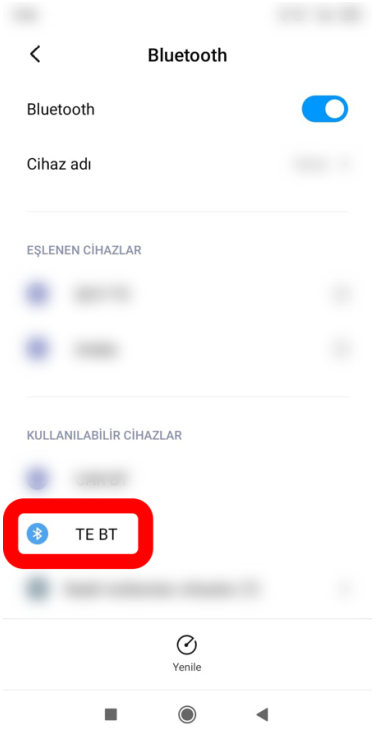
3 – Connecting The Android Magnetometer to Your Device



Firstly, switch on your phone or tablet you want to connect the Android Magnetometer to. We will connect it to Android Magnetometer using the bluetooth feature of the device.
The location of Bluetooth is different on each device, but usually when you lower the main screen from top to bottom, there is Bluetooth among the options that appear, and if it is coloured as in the picture on the side, it means that it is 'On'. If it is colourless, it means that it is 'Off'. If it is off, switch it on by pressing on it once. The system will automatically open the Bluetooth window, but if the window does not open, press and hold the Bluetooth button and open the Bluetooth window.



The bluetooth name of the Android Magnetometer is TE BT. Find TE BT among the options to connect and press once on it.

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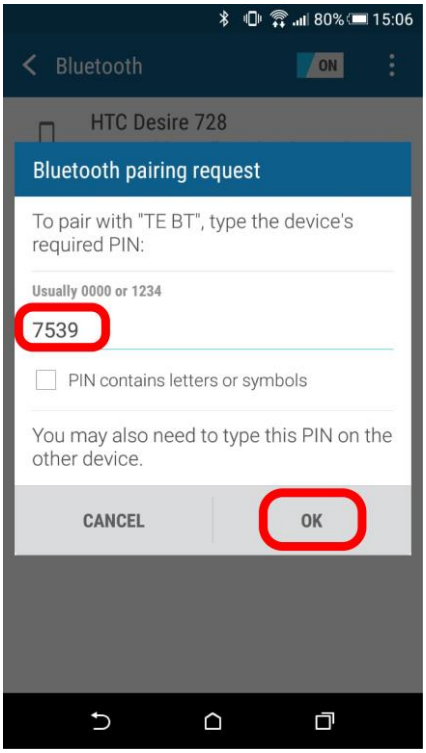
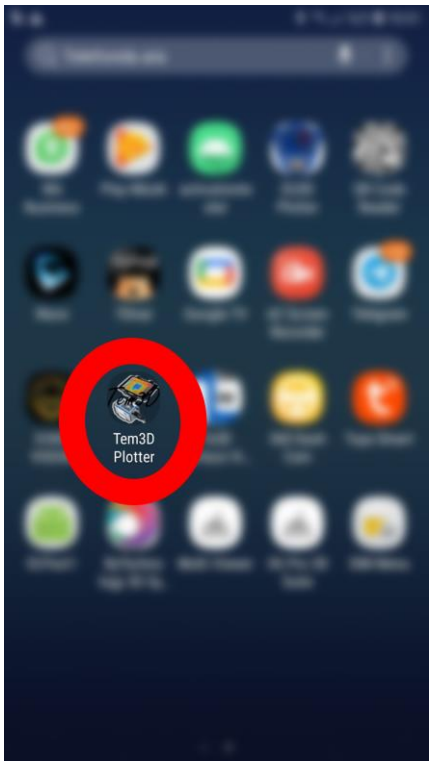


When you select TE BT in the Bluetooth window, it will ask you for the PIN code of the device. Enter 7539 in the PIN field and press OK once.



Open the Tem3D Plotter app on your phone or tablet.

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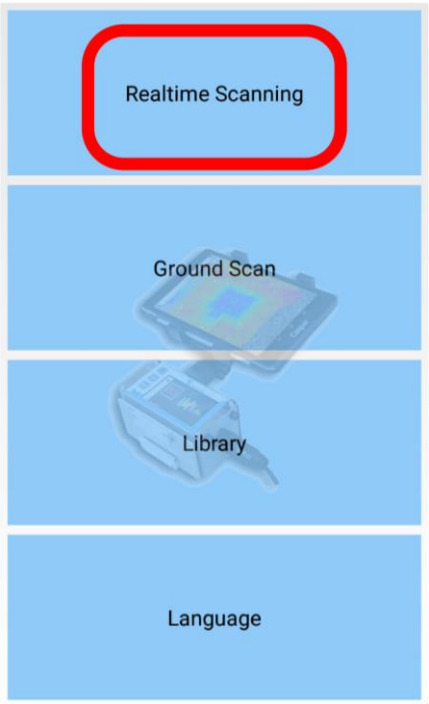
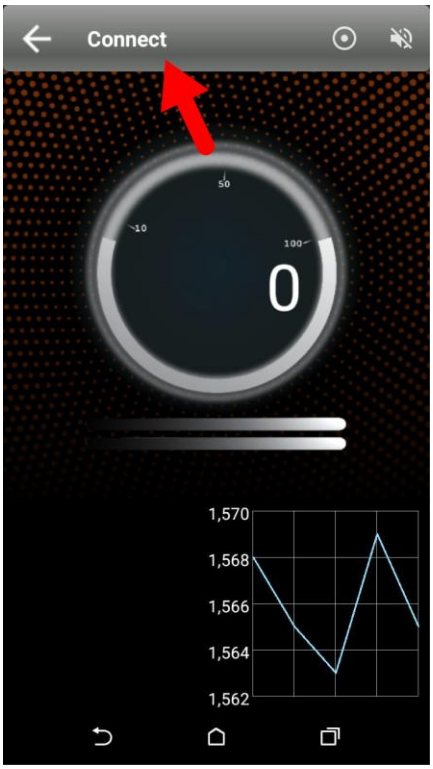


After opening the application, select the Real Time Scan button from the window that appears.



When you enter the Real Time Scan tab, a window like the one on the left will open. Click the CONNECT button in the window that opens.

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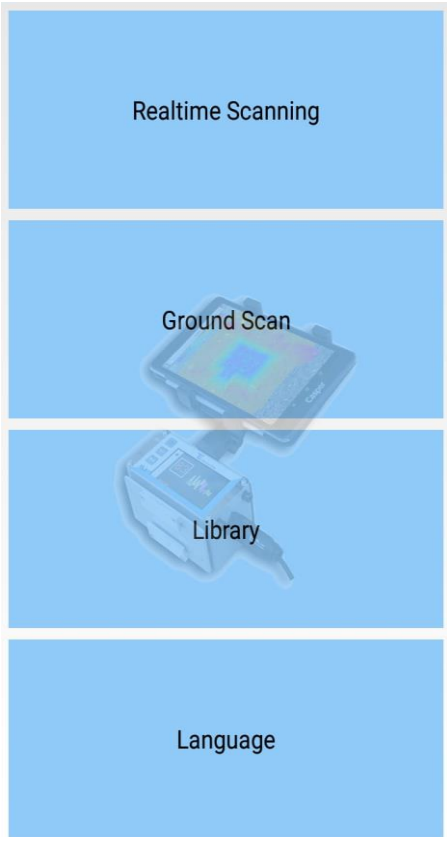
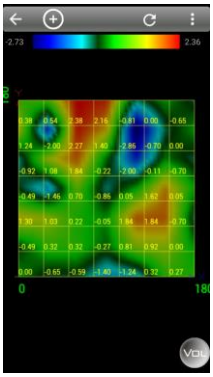
4 - Programme Main Menu



Real Time Scanning:
This section enables the Android Magnetometer detection to be followed numerically on the tablet or phone screen while walking in the field with the Android Magnetometer. In this way, detections can be understood and followed by following the numbers on the screen without shooting in 3D.

Ground Scan:
This section is the section where 3D underground imaging is performed with Android Magnetometer. 3D underground imaging can be performed automatically or manually in two ways. In addition, high capability depth measurement feature is also included in this section. Layered Imaging is switched from this page. The details of this transition process are explained separately below.



Library: This section contains the saved data. The programme automatically saves every shot taken here. The programme also supports CSV format.

Language: This is the part where the language selection of the programme is made.

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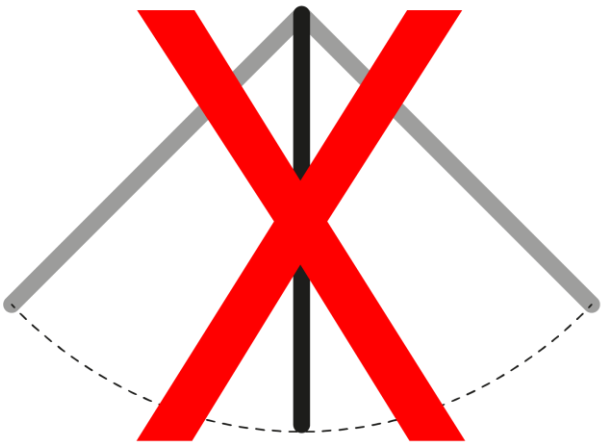
5 - Android Magnetometer Usage

Things to Know Before You Start Shooting



The most important thing to be considered here is that the face of the person making the call should be facing South or North. The red stripe on the sensor should also be in the same direction as the user. Whichever direction your face is facing when you start shooting, it should always remain facing that direction during shooting. In addition, the sensor direction should never be changed. It should also be ensured that the position of the sensor on the ground remains the same as much as possible during shooting**.**

Since the sensor is very sensitive, care must be taken when using it. It should always be kept at the same distance from the ground (approximately 10cm) and should not be moved too much during turns. During use, it must be kept perpendicular to the ground and the shooting must be completed without disturbing this posture.

During the search, materials with magnetic fields such as mobile phones and iron objects should never be on your person. Shooting should not be done on wet soil.
The shooting process should be done in the form of large areas as much as possible. It should not be forgotten that this product shows anomaly differences due to its working logic. In order to be able to see if there is a difference, it is an important condition that the shooting should cover that anomaly and be clearly larger than the anomaly. Example: If a grave shot is to be taken, it should be at least 300cmX300 cm to cover the grave.

The use of Android Magnetometer is explained below. However, there are also videos on the subject on our YouTube channel.

1- Android Magnetometer is switched on with the help of the on-off switch on it. After the button is switched on, the led on the Android Magnetometer lights up continuously within about 3 seconds and informs you that the system is working. If the led is flashing, it means that the product is not charged. In this case, the product should not be shot and should be charged.
2- Android Magnetometer connects to the device you will use with bluetooth.
3- Switch on your tablet or phone and run the TEM3D imaging programme on the screen of your tablet or phone.
4- If real-time scanning is to be performed, Section 1 is selected, if 3D underground imaging is to be performed, Section 2 is selected and the relevant screen is opened.

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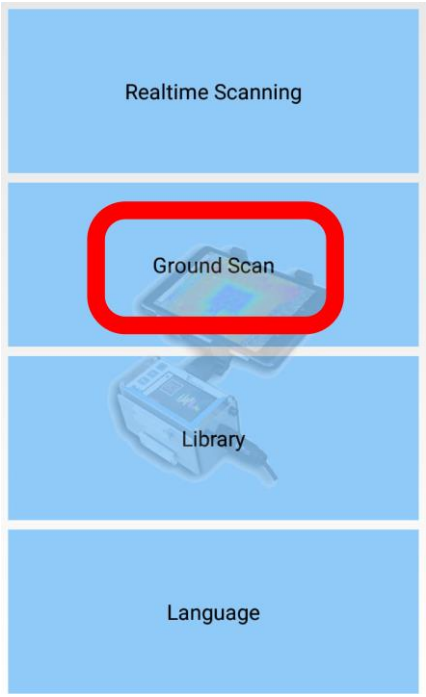
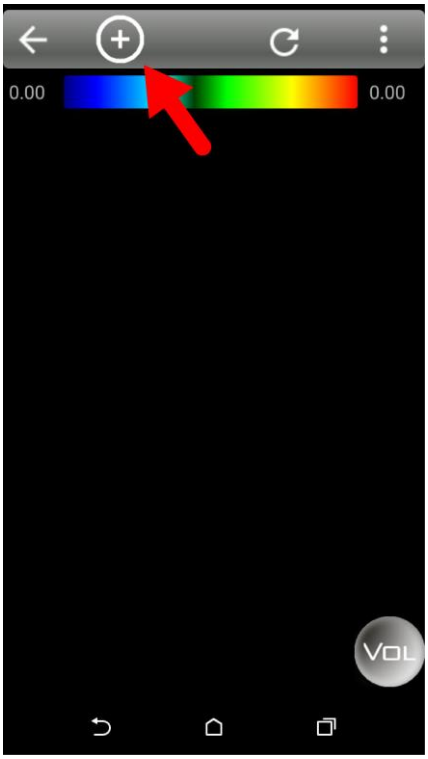
5- If real-time scanning is to be performed, the Real Time Scan window opens when you connect the Android Magnetometer to your device. Depending on the type of soil and the condition of your environment, the opening number of the signal count may vary. A drastic change in this number indicates that the sensor has detected something.

6- If 3D underground scanning will be performed;



Go to the main screen of the Tem3D Plotter application and enter the Underground Scanning tab.



In the window that opens, press the ADD button on the top left.

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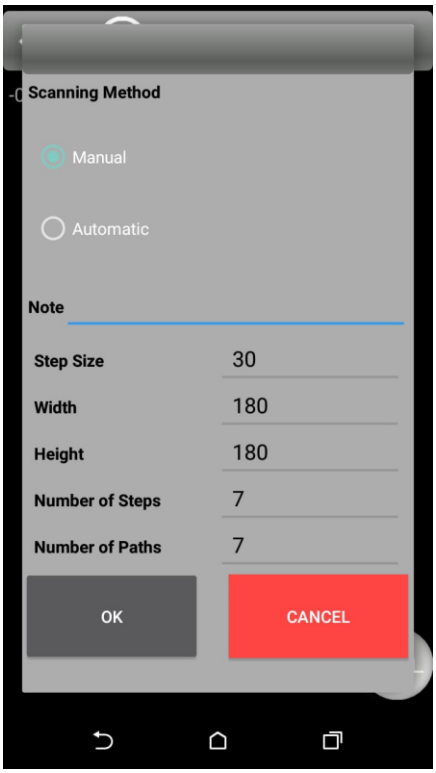
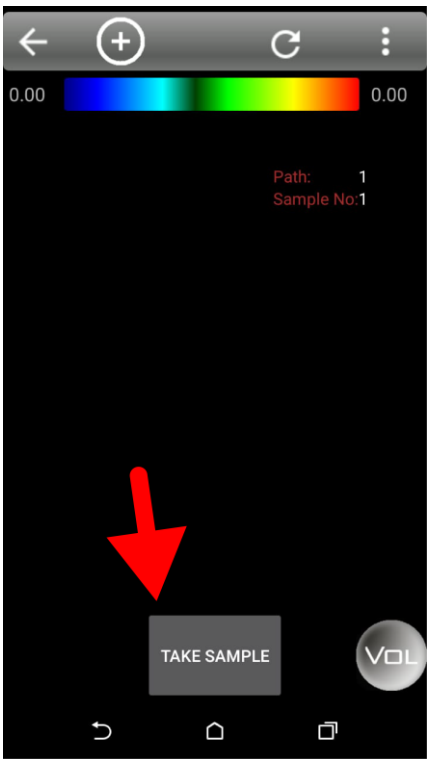
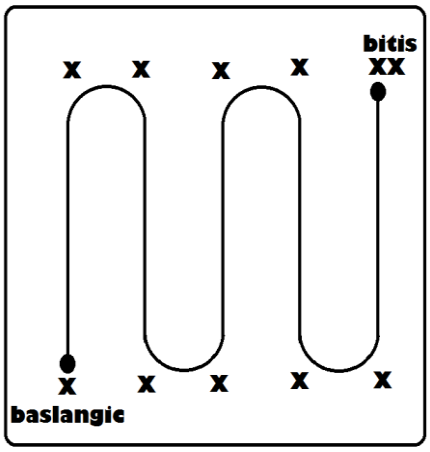


When you press the Add button, the Scan Settings window will open automatically and in this window, set the Scan Method as Manual. You can write any Note you want in the Note section. This note you will write will make it easier to find the image you will save later. Set the Step Distance in centimetres in a way that suits you. This is the distance of the step you will take while creating an image and you can keep it in the range of 30-50 as standard. Width and Height sections are the sections related to the area you will search. Enter the area information in centimetres in these fields. The system will automatically adjust the Number of Steps and Number of Paths according to the information you enter. After entering the settings correctly, press the OK button at the bottom left of the window.



Step the area whose dimensions you have determined as shown in Pictures 1 and at each step you will take, press the Take Sample button indicated by the arrow in the picture on the side.



Pictures 1

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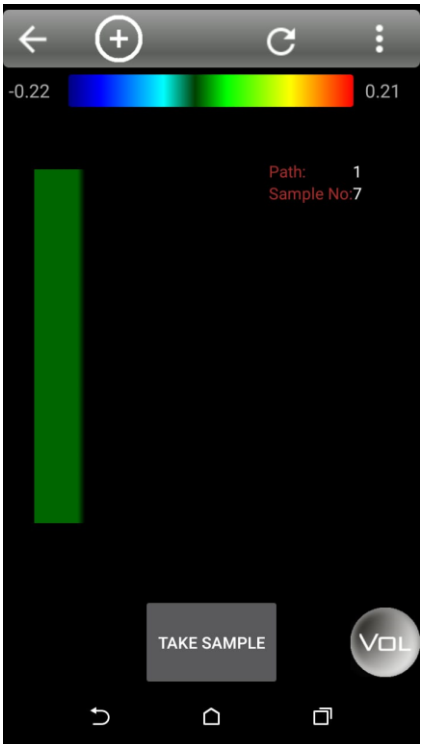
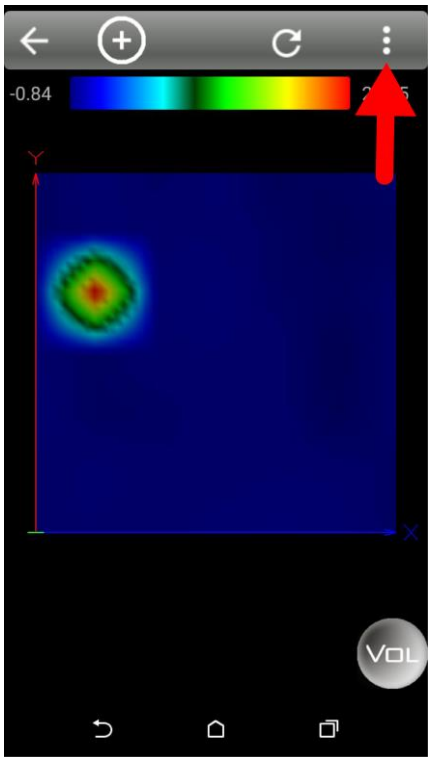


Press the Take Sample button again at each step. In this way, you will create an image of the area you are searching.



After the image is created, log in to the Settings section at the top right of your screen, indicated by the arrow in the next photo, to examine the image in more detail.

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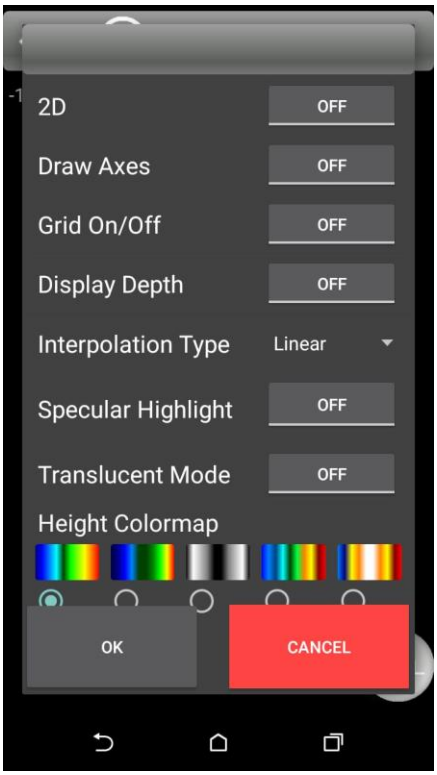

2D: This is the part where the image on the screen is selected to be 2D or 3D.

Draw Axes: It is the part used to open and close the X and Y axis lines on the 2D or 3D image.

Grid On/Off: It is the part where the grids are opened and closed on the 2D or 3D view. When the grid is opened together, the numerical detection value of the relevant region is also written in each square.

Display Depth: If this part is clicked after the grid is opened, the numbers in each frame will show the depth of detection in the relevant frame. The thing to note here is that the depth shown in the absence of perception should not be taken into account.

Interpolation Type: The form of creation of the image consisting of this part is selected. In this way, it is possible to examine the image in different forms.

Srecular Highlight: This part is the place where the brightness of the elevations is turned on and off so that the detection can be seen better in places where there is detection.

Translucent Mode: This part is the area where the transparency of the shooting image is turned on and off in the image formed when the camera is turned on.

You can make any settings you want in the settings window. When you press it once, the status that was in the Off state will become On. If you press it once again, you can turn this option Off. Turn Grid On/Off and Display Depth On to better analyze the image.

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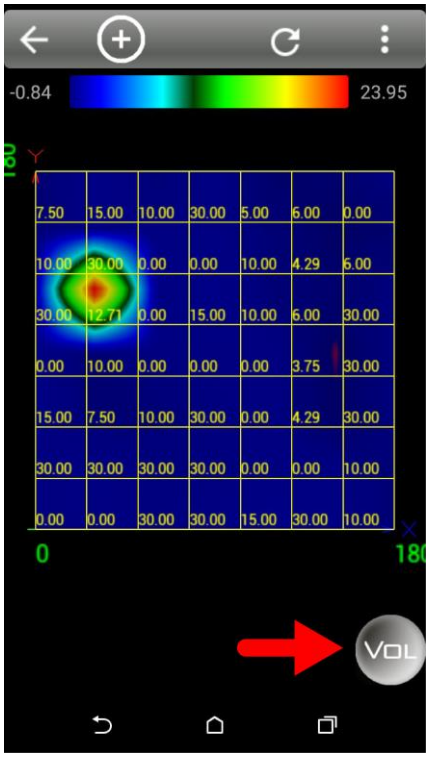
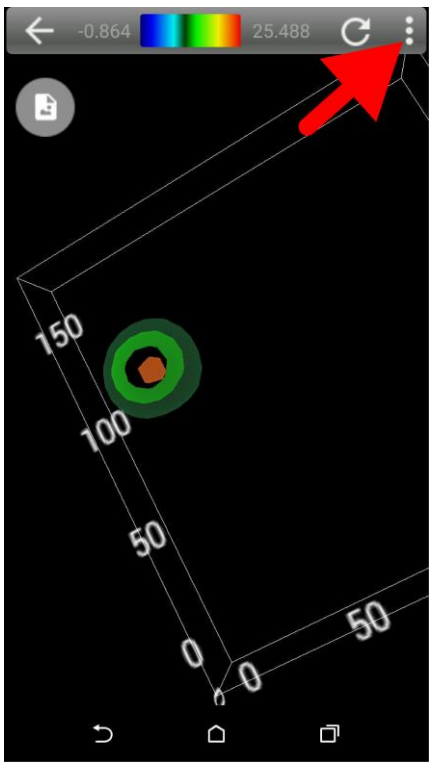


If you switch all settings to the on position, you will get an image like the image on the side. In order to see the data you have created as Layered Image, press the VOL button at the bottom right of your screen, which is also shown with the arrow sign in the next photo.



If you press the VOL button for Layered Image, you will see an image like the picture on the side and this will cause you to better interpret the data you have created. You can edit the Layered Image from the settings option at the top right.

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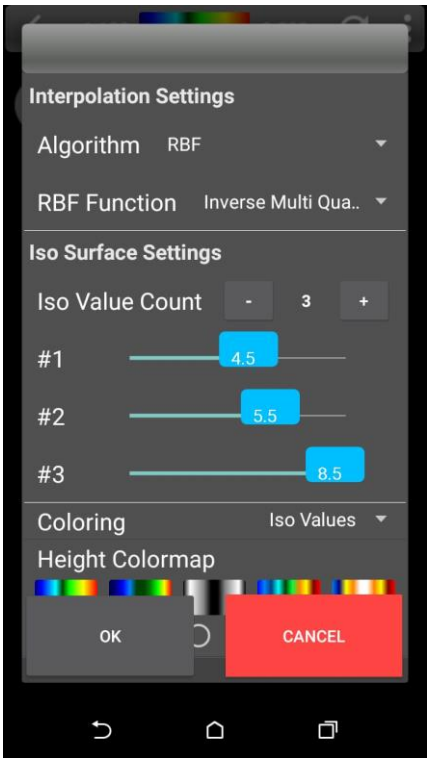

Interpolation Settings: These are the settings for how the raw data of the image to be formed on the screen will be processed.

A- Algorithm: It is the part where the processing style of the raw data of the image to be formed on the screen is selected. If this section is selected as RBF, RBF Function will be seen below, and if IDW is selected, additional settings named Floor Number will be seen below. The setting named RBF Function, which is seen when RBF is selected here, is the part where the layer drawing style is selected. When IDW is selected, the setting named Number of Layers is the part where the filtering rate of the layers to be formed is determined.

Iso Surface Settings: In this section, how many layers will be and which detection ranges these layers will represent are set.

Coloring: In this section, the coloration sequence of the layered image to be created is set.

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6 - Analyzing the Received Image (Data Interpretation)

The first thing to note in data interpretation is that any color does not represent anything. In general, there is a very wrong interpretation of the red structure, the blue space, but this is completely wrong information. Color differences in interpretation do not have a meaning on their own. Detections should be interpreted as positive and negative anomalies. Positive perceptions are ordered to the colors on the right side of the color scale, and negative perceptions are ordered to the colors on the left side of the color scale. They are linearly distributed to the color with the highest perception on the right, the color with the lowest perception on the left, and the parts in between are linearly distributed on the color scale. For this reason, it should not be forgotten that the purpose of coloring is to visually understand the anomaly.

In the detections, positive anomalies are the anomalies in which the magnetism increases compared to the first sample, and negative anomalies are the anomalies where the magnetism decreases compared to the first sample. The point to be noted here is what kind of things are perceived as positive and what kinds of things are perceived as negative anomalies. Brick Khorasan etc. Man-made structures made of materials, living areas with fire, magnetizable metals such as iron and steel bronze and magnetizable metal ores create positive anomalies. The important detail in this section is that if metals such as iron, steel and bronze are processed and are not structurally round, one end is perceived as positive and one end as negative anomaly. Excavated and closed soft soil, marble and water are also perceived as negative anomalies.

With this information, the numerical value of the detection is checked to understand whether the detected anomaly is a structure, a mineral or a metal. If the numerical value is between -4+4, it can be understood that it is a mineral or a very deep structure to be perceived, if it is between +4+10 and broad, it is a man-made structure, and if it is greater than +10, it can be understood as a metal. With these, if the detection is point and +4+10, it can be a brick, cube or a deeply perceived metal. If there are two anomalies in the detection + and - side by side and these anomalies are greater than 4, it can be considered that there may be a structurally non-round metal here.

The biggest parameter to increase the accuracy rate in the interpretation to be made with all this information is a properly made shot. It should not be forgotten that this product is a magnetic anomaly product and it is essential to have a proper shot in order to detect this anomaly.

For example, when we look at the images on the next page;

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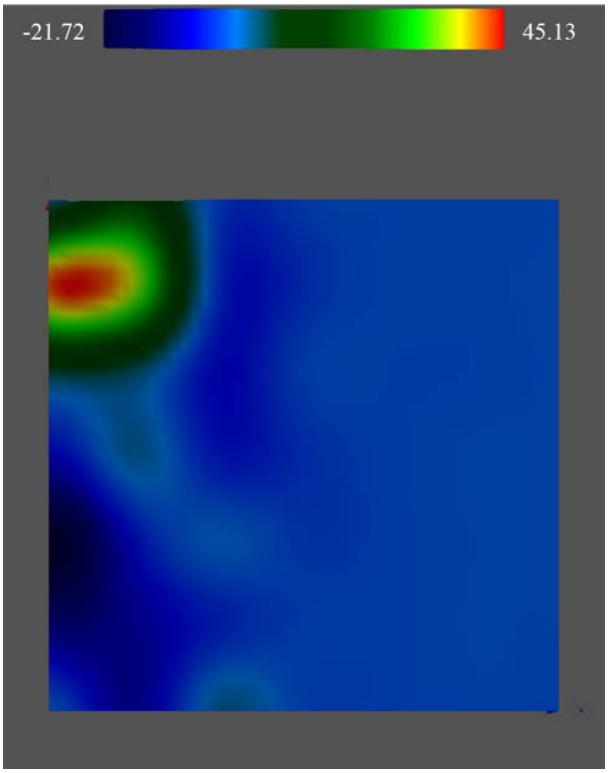
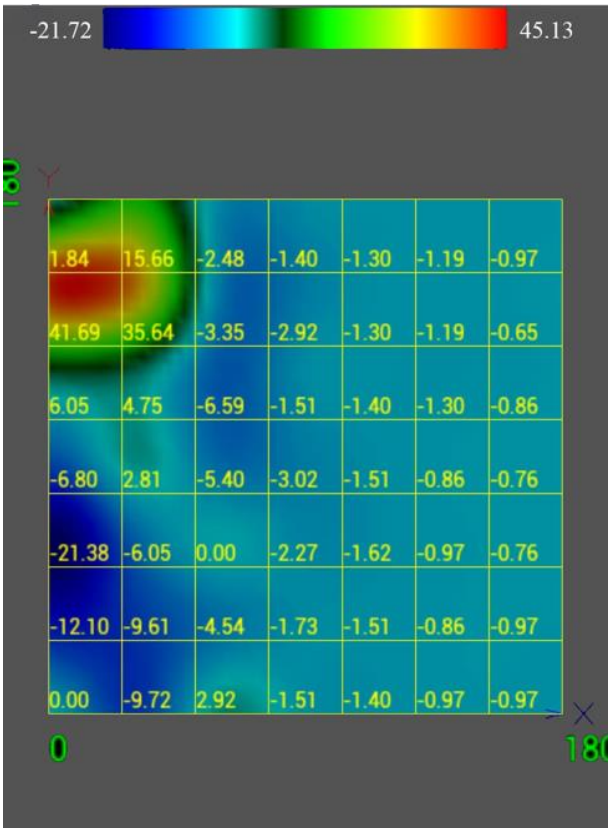


When we look at the image on the right, we see that a single region among the same colours is in a different colour. When the colour changes in the image are too frequent, a healthy signal cannot be received from the soil. However, if it is specific and simple as in the picture, the signal is received in a healthy way and data is generated.



We turn the Grid On/Off option On from the Settings Window and we see the data in the form of a grid on the image. As seen in the picture on the side, the image is basically on values close to each other. The device has received the ground signal in a healthy way. In the upper left part of the image, we see the data increase approximately to 42 value. **Usually** when the received data exceeds 8, it is a sign that it is metal. The value extending to -22 is seen under the object that we assume as metal. Negative value perceived at the same magnitude near the positive value shows us that the object is machined metal.

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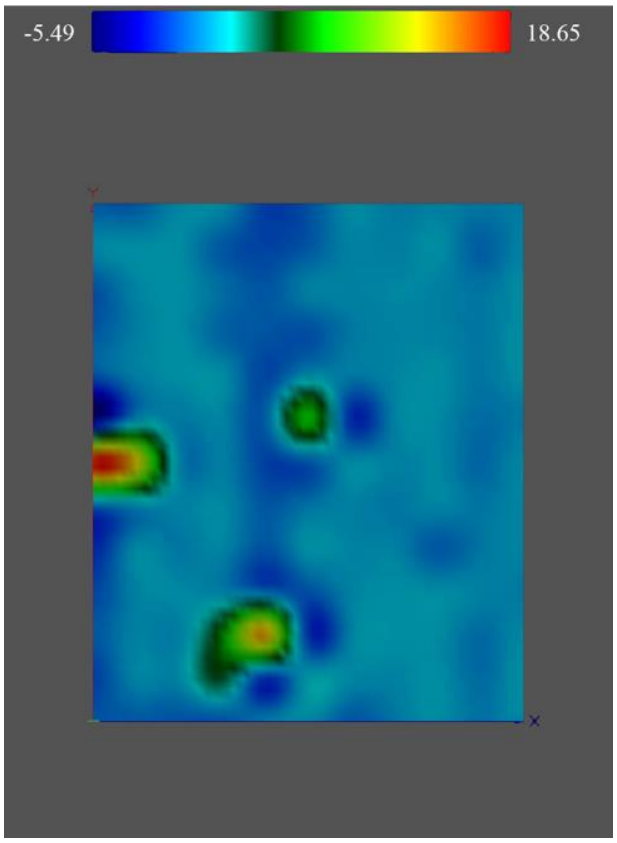
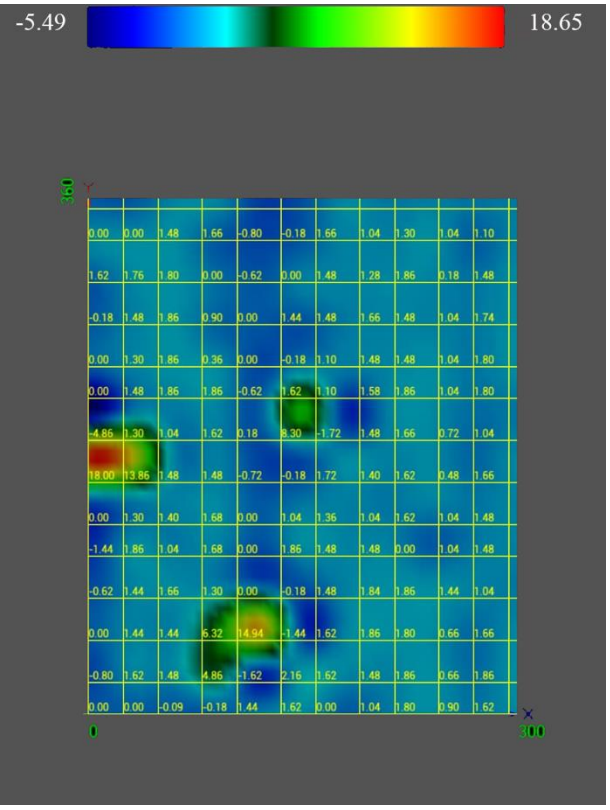


In the next image, we again see ground colours close to each other. In this image, the signals were detected in a healthy way and the image was created. There are 3 objects coloured differently from the ground colour. In order to interpret them, we switch the Grating On/Off option to On in the Settings window.



Soil has given values close to each other everywhere, that is, the signals of the area we are searching for reach our device correctly, so we can move on to our other interpretation. The 3 regions with color differences give us the values of 18/8/14, respectively, from left to right. With the **generalization** we made in the previous interpretation, we can call them metals. When we look around each of them, we see -5/-2/-2 values in the same order. This shows us that the objects we receive signals from are most likely processed metals. However, since the values are close to and on the border, it can be interpreted that their dimensions are smaller or their depths are higher.

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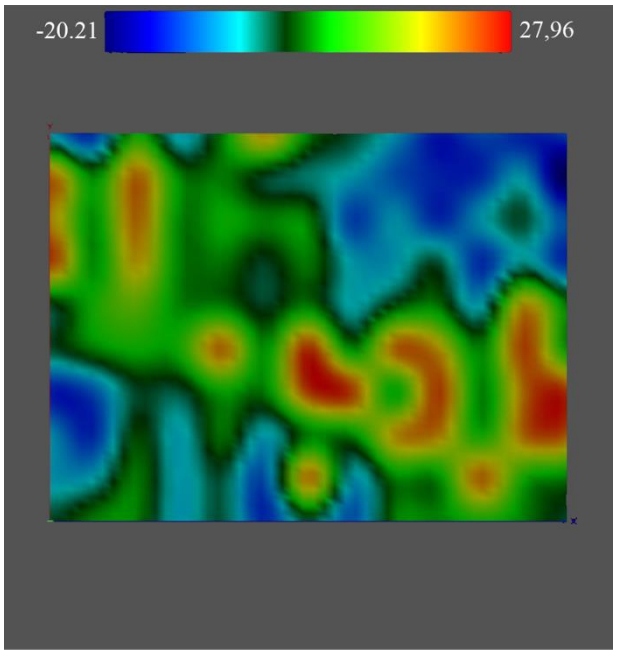
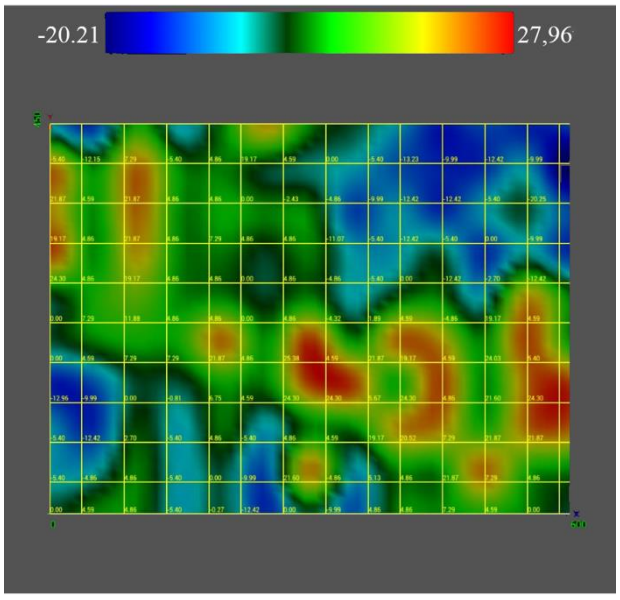


When we look at the picture on the side, we are faced with a complex situation, but when we look a little carefully, we approach it as an object starting from the bottom right and extending up to the top left, and we switch the Grid On / Off option from the Settings Window to On.



We see negative values in the range of -10/-15 and positive values in the range of 20/25. This leads us to conclude that what we are dealing with is a long length of wrought iron.

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THINGS TO CONSIDER WHEN USING

- Always start sampling at the bottom left corner of the location and finish at the top right corner.

- When making a call, the person making the call must face South or North .

- The direction of the sensor must face in the same direction with each movement, without ever changing the position from which you started the search .

- Since the sensor is very sensitive, care must be taken when using it. It should always be kept at the same distance from the ground and should not be moved too much in turns. During use, it must be kept perpendicular to the ground and the shooting must be completed without disturbing this posture.

- Since the Android Magnetometer has the ability to detect any magnetised material (magnet, speaker, etc.), there is a possibility of detecting materials with a speaker (phone, computer, tablet, shoe iron, etc. etc.) on you and giving an incorrect image. This situation should be taken into consideration when shooting.

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