

FS Future Serie®

Visualizer 3D Software

User's manual

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1 Licence Agreement and Limited Warranty

Read carefully all terms of this agreement before using the software program of the *Future Series*. By using the software you give your accordance to the conditions of this Licence agreement.

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Concerning the terms mentioned above you need to register your software before utilisation. You will get a special security code to unlock your software. The program can only be used with your proper personal unlock code on your computer. There are only 4 free registrations possible. Every further registration package is at the owner's expenses. Further information about the installation and registration of your software you can find in section 2 on page 6. Your registration code is only valid for your computer or computer terminal. If you want to use the program on another PC you need a new security code. These program codes you cannot modify, process or change by yourself in any way.

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2 Installation, Start and Activation

By using the software you give your accordance to the terms of this contract and the conditions of this agreement. Read again carefully all terms before starting to use the software.

The utilisation of this program requires an activation. Therefore you will get a personal activation code. This code can only be used in one operating system. Every installation in a new operating system requires a different activation code. This code is fee required beginning from the fifth activation. The first 4 activations are included in the purchase price.

The following description of the installation and activation requires that the user have access to internet and own a proper email address. If these conditions are not given, please contact your dealer to obtain your activation code.

This section describes how to install and activate the software. After installation is finished you have to obtain a personal activation code which has to be entered in the program to start working with the software.

2.1 Installation

To install the software on your PC please go the following instructions:

1. Insert the CD into your CD-ROM drive of your computer. The CD will start by itself. If not, please go on to step 2 otherwise to step 3.
2. (a) Double click on **Desktop** and then click twice on your CD-ROM drive. Now you see the contents of the CD. Start the file `start.exe` or `autorun.exe` with a double click.

or

- (b) Click on **Start** → **Run...** and insert `d:\start.exe` or `d:\autorun.exe` whereby `d:` notes your CD-ROM drive. Confirm your input with a click on **OK**.
3. Select *Install 3d software* in the installation dialog to start the installation.
4. Follow the instructions on the screen to finish the installation!

2.2 Execute program

2.2.1 Windows XP, 2000, ME and 98SE

Be sure that you are logged in as administrator in your Windows system and click on the program icon inside the start menu!

2.2.2 Windows Vista

In Windows Vista you have to execute the program as administrator. It is not enough only to log in to the system as administrator. You have to open the program explicitly in the administrator mode. Therefore two different ways are possible:

- You can open the program explicitly in the administrator mode every time.
- You can configure the program that every time the administrator mode will be executed automatically.

2.2.2.1 Start program one time as administrator

Open the start menu and search for the entry of your software. Now click with the *right* mouse button on it to open the menu from figure 1.

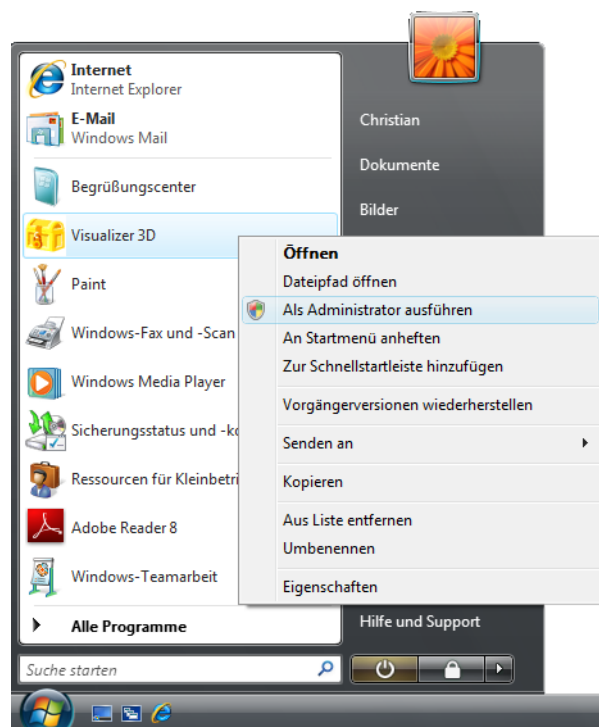


Figure 1: Open program as administrator

In this menu you have to select the entry *Execute as administrator* and click on it with the left mouse button. Confirm the following questions to execute the program in the administrator mode.

2.2.2.2 Always start program as administrator

If the program should always be started automatically in the administrator mode open the start menu and search for the entry of your software. Now click on it with the *right* mouse button to open the menu like represented in figure 2.

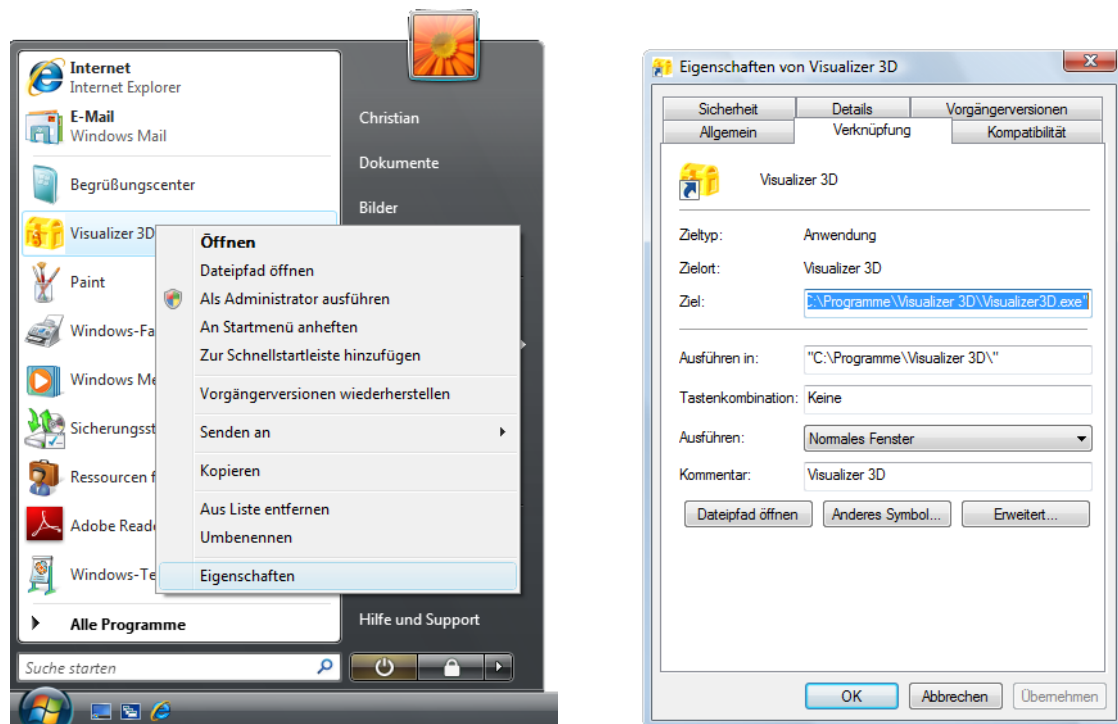


Figure 2: Open program properties

In this menu you have to select the entry *Properties* and click on it with the left mouse button. A dialog window like in figure 2 will appear. Click there on the button *Enhanced*, to open the dialog window from figure 3.



Figure 3: Configure program as administrator

Mark the entry *Execute as administrator* and confirm the selection by a click on the button *OK*.

Confirm the following questions to execute the program in the administrator mode.

2.3 Activation

After installation of the software on your PC you can start the program for the first time. Therefore click on the created icon in start menu.

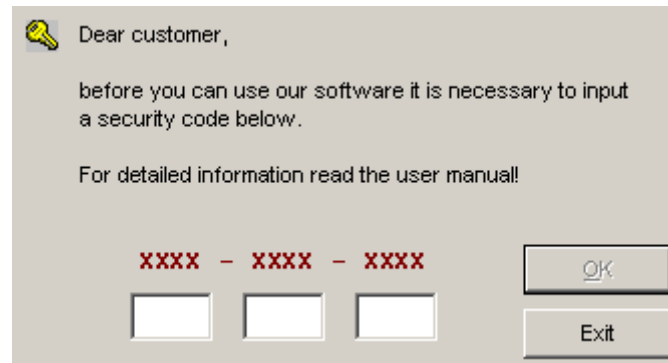


Figure 4: Window to enter your activation code

A dialog like in figure 4 will open itself, where you have to enter your activation code. This code you can get yourself via internet under www.okm-gmbh.de/register¹. Figure 5 shows the internet activation form where you can ask for your activation code.

In this dialog you have to enter the following information:

- a the CD-key which is printed onto your CD (e.g. X0X0X – X0X0X – X0X0X – X0X0X – X0X0X)
- b the numeric software code from the dialog on your computer screen (e.g. XXXX – XXXX – XXXX)
- c your email address, where your activation code will be sent to. So be sure you do not make any typing errors. Also keep in mind that you need exactly the same email address for any further activation.

If there are any activation problems please contact your dealer for assistance!

Insert now the activation code into the dialog from figure 4. To confirm the correct numeric code press *OK*. The software is now activated and ready for use.

¹You can only use the online registration, if there is an alphanumeric key printed on your CD (e.g. X0X0X – X0X0X – X0X0X – X0X0X – X0X0X). If this is not your case or you do not have any connection to internet please contact your dealer to obtain the activation code!

1. Enter CD-Key



The CD-Key is printed directly on your software-CD.

- - - -

2. Enter software code



The software code is displayed as soon as you run your software for the first time.

- -

3. Enter e-mail

The activation code will be send to your e-mail. Enter it here!

Figure 5: Internet activation form to obtain the activation code

3 Utilisation and Structure

In figure 6 the complete screen representation of the software is shown. The following section describes all control elements and icons in detail.

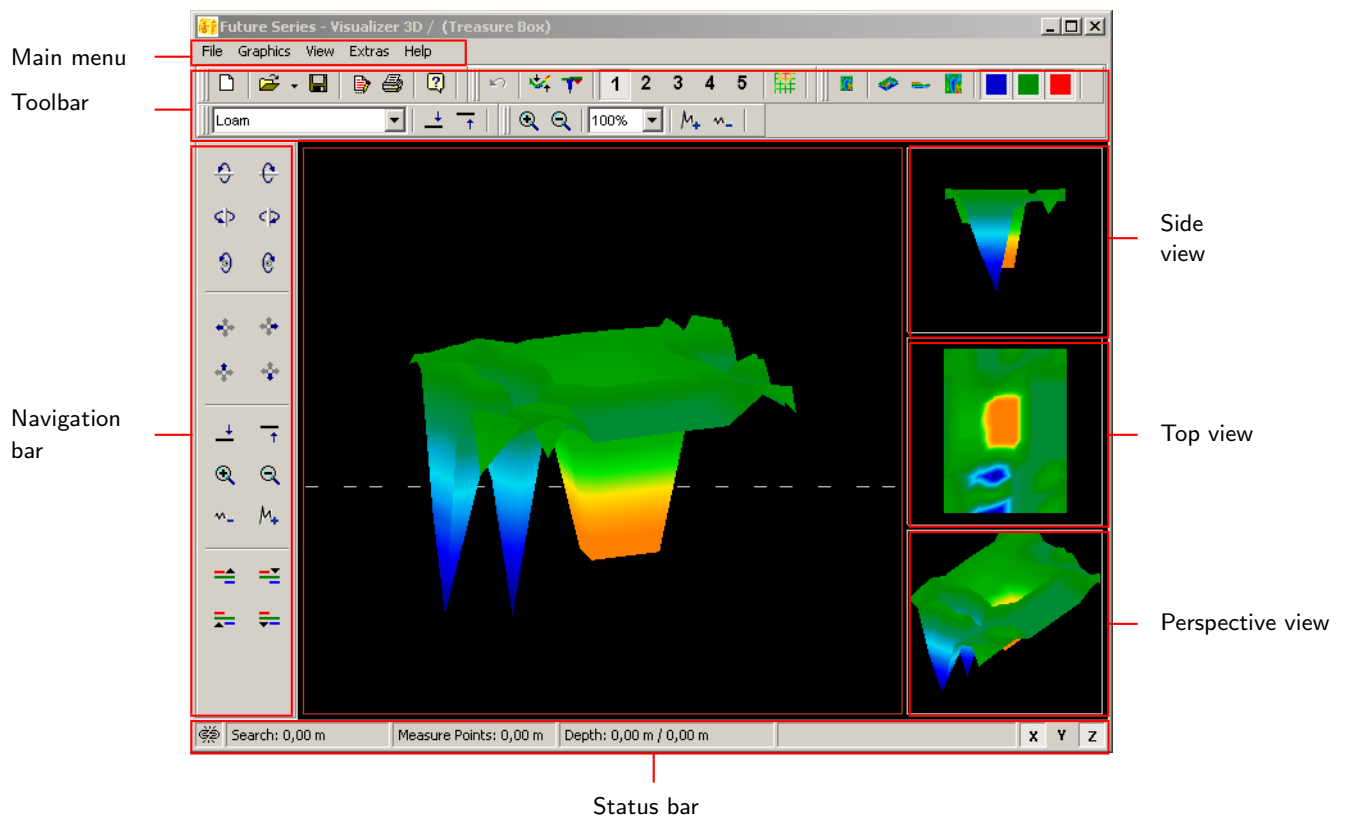


Figure 6: Software

3.1 Navigation Bar

In the Navigation Bar you can find different functions, to change the representation (position, rotation, size) of the graphic.

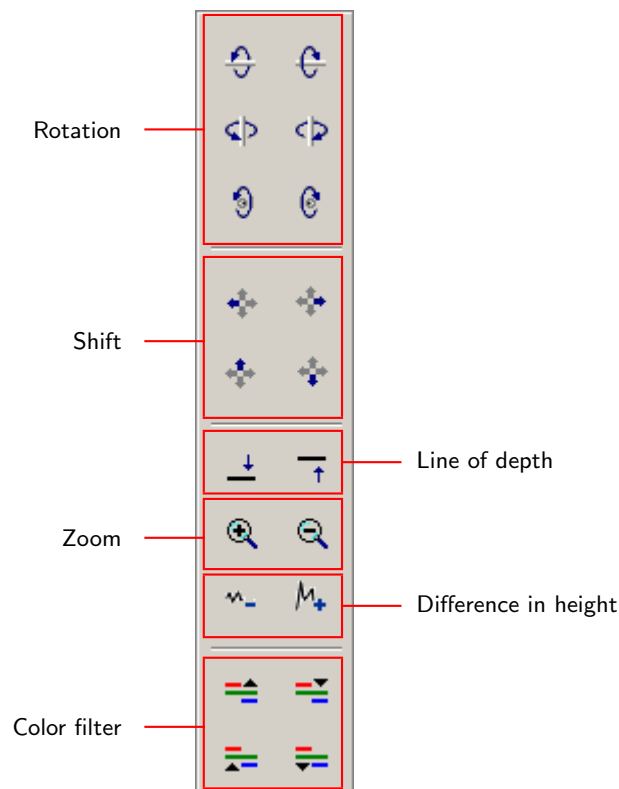


Figure 7: Operating Elements of the Navigation Bar

Rotation: These functions are used to rotate the graphic around the x-, y- or z-axis, to view the graphic from all sides. Through clicking on these functions several times you can rotate the graphic in the position you like. Another possibility to turn the graphic is to keep pressed the left mouse button and to move the mouse. The speed of this movement can be adjusted in *File* \mapsto *Configuration* inside the main menu.

Shift: With these functions the graphic can be moved to the left, right, up or down. This is necessary if certain parts of the represented image are not visible. Another possibility is to keep pressed the right mouse button and to move the mouse. The speed of this movement can be adjusted in *File* \mapsto *Configuration* inside the main menu.

Line of depth: With this function the line of depth in the graphic can be moved up or down. This option is necessary to determine the exact depth of located objects. Further information about depth measurement of objects you can find in section 4.1.5.2 on page 40.

Zoom: By using this button the graphic can be zoomed in or zoomed out. If your mouse possesses a turnable wheel you can also change the size of your graphic therewith. The speed of this movement can be adjusted in *File* \mapsto *Configuration* inside the main menu.

Difference in height: If the difference in height between the maximum and minimum value is too large you can make the graphic suitable to your screen. This function is useful in case the side view of your graphic is not completely visible in your computer screen. In case your graphic includes „*black patches*“ you should minimize the difference in height. Then all value outside of the visible area will be indicated also.

Color Filter: With these functions either the red or the blue color level of the graphical representation can be moved up or down. So potential structures inside the graphic can be made better visible. Detailed information about the color filter you can find in section 4.1.4 on page 37.

3.2 Status Bar

In the Status bar information about the program and about the current graphic are represented like for example position and depth about detected objects.

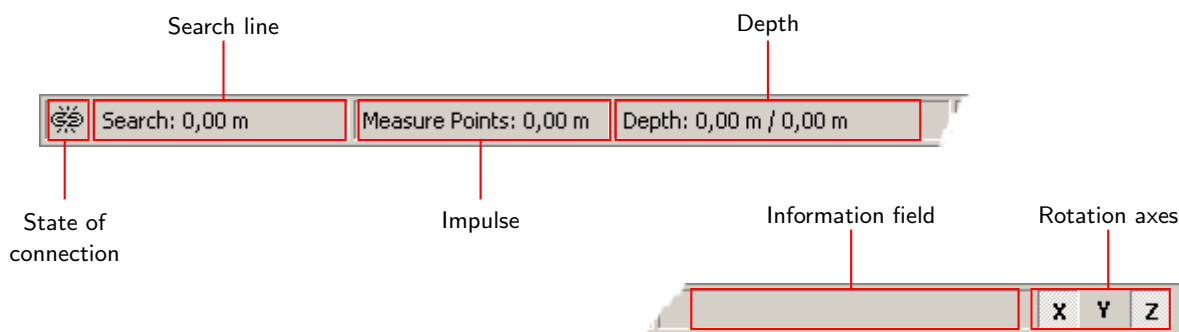


Figure 8: Status bar

State of connection: This field indicates if there is currently an active connection between computer and measuring instrument. There are the following possibilities:

 = Connection inactive

 = Connection active

Search line and Impulse: These fields indicate the position of the crosshairs inside the graphic. Detailed information about determination of the position you can find in section 4.1.5.1 on page 39.

Depth: Here you can read the depth of buried objects. To measure the depth the crosshairs or the line of depth should be placed directly over the object. The first value indicates the current depth of the line of depth and the second value indicates the depth of the measure point where the crosshairs are placed. Further information about depth measurement you can

find in section 4.1.5.2 on page 40.

Information field: This field indicates the function of the icon over which you move the arrow of your mouse.

Rotation axes: Here you can select around which axes the graphic should be rotated.

3.3 Toolbars

The toolbars are a fast way to use the functions from the main menu. The small icons you can find also in the main menu next to the corresponding entry.

The following sections give only a brief explanation about these functions. A detailed description you can find in section 3.4 on page 19.

3.3.1 Standard

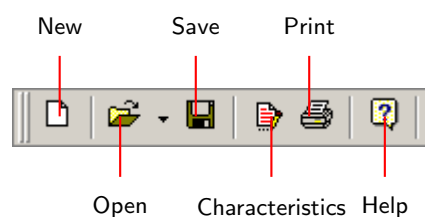


Figure 9: Toolbar „Standard“

New: Click here to scan a new area and to transfer data to your PC. Before you start the measurement you have to configure the data transmission. This function you can find inside the main menu under *File* \mapsto *New*.

Open: Load a stored scan file from your hard disk to review or analyse again. A dialog will open itself where you can select the file. This function you can find inside the main menu under *File* \mapsto *Open*.

Save: If you recorded a measurement or did some changes inside the graphic afterwards, like for example add some comments or information, you have to save the graphic again. This function you can find inside the main menu under *File* \mapsto *Save*.

Characteristics: Click on this icon to enter detailed information about your measurement to remind later. Thereto belong for example length and width of your measured area and type of soil. This function you can find inside the main menu under *Graphics* \mapsto *Characteristics*.

Print: If you want to print out the currently represented graphic click on this icon. This function you can find inside the main menu under *File* \mapsto *Print*.

Help: *This function is not yet implemented.*

3.3.2 Graphics

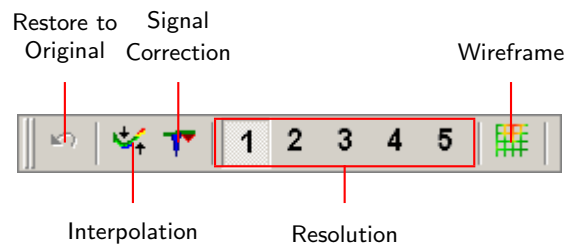


Figure 10: Toolbar „Graphics“

Restore to Original: With this icon you can cancel all changes which were made on the graphic. The graphic will be represented like a new opened file. This function you can find in the main menu under *Graphics* \mapsto *Restore to Original*.

Interpolation: This function is used to do a mathematical computation of the graphic. New measured points between the measured lines and impulses will be calculated. This function you can find inside the main menu under *Graphics* \mapsto *Interpolation*. Additional information about Interpolation you can find in section 4.1.3 on page 36.

Signal Correction: By using this function created error signals (e.g. caused by radio transmission) inside the graphic can be rectified. This function you can find inside the main menu under *Graphics* \mapsto *Signal Correction*. Detailed information about Signal Correction you can find in section 4.1.2 on page 34.

Resolution: With this icon the resolution of the graphic can be rarefied. Thereby new measure points are calculated mathematically. This function you can find inside the main menu under *View* \mapsto *Resolution*.

Wireframe: The graphic will be represented in a wireframe, whereby all measure points and measured lines becomes visible. This function you can find inside the main menu under *View* \mapsto *Wireframe*.

3.3.3 View

Undo all changes: Undo all changes of the graphic regarding rotation, moving and zoom of the graphic. This function you can find inside the main menu under *View* \mapsto *Undo all changes*.

Perspective View: By using this function the graphic can be rotated into perspective view. This function you can find inside the main menu under *View* \mapsto *Perspective View*.

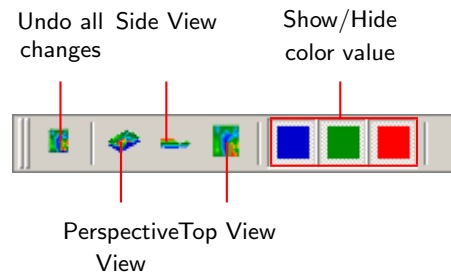


Figure 11: Toolbar „View“

Side View: The graphic will be represented in the side view. This function you can find inside the main menu under *View* \mapsto *Side View*.

Top View: This icon shows the graphic from above. This function you can find inside the main menu under *View* \mapsto *Top View*.

Show/Hide color value: These icons can be used to show or hide certain color values. When the button is pressed the corresponding color will be represented. This function is useful for example if an object is located inside a large cavity. From the side view the object will not be visible because the measured values are hidden from the cavity. In this case you can eliminate the blue color values to do a depth measurement (with line of depth) of the metallic object.

3.3.4 Depth measurement

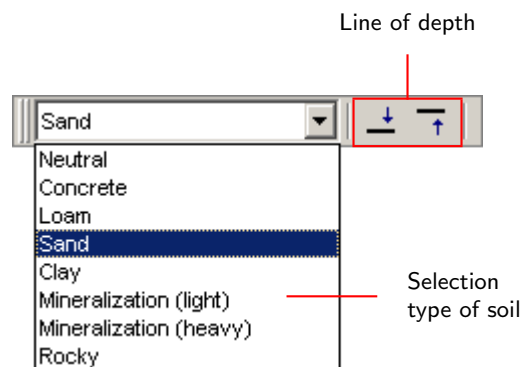


Figure 12: Toolbar „Depth measurement“

Selection type of soil: Here you can select the type of soil according to your measured area. The better the selected type of soil is adjusted to your measured area, the exacter will be the determination of depth. The type of soil you can select also in the menu option *Graphics* \mapsto *Characteristics*. The type of soil which you enter there will be stored with your graphic.

Line of depth: With these icons the line of depth can be moved up and down. This proceeding is important for the depth measurement with the line of depth. Detailed information about depth measurement you can find in section 4.1.5.2 on page 40.

3.3.5 Scale

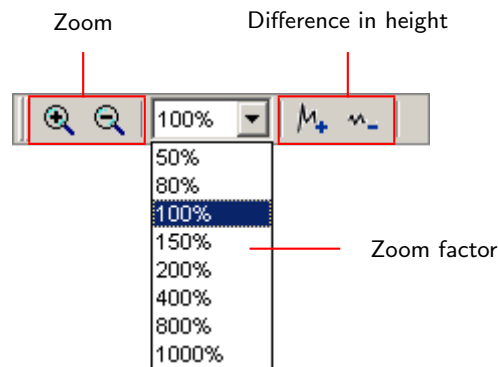


Figure 13: Toolbar „Scale“

Zoom: Here the graphic can be zoomed in or zoomed out. Alternatively you can use the turnable wheel on your mouse.

Zoom factor: From this list you can select the zoom factor of the graphic. The zoom factor will be adjusted immediately and the graphic will be adapted. This function you can find inside the main menu under *View* \mapsto *Zoom*.

Difference in height: With these icons the difference in height of the graphic can be minimized or maximized. This is necessary when the graphic is larger than the visible area when it is rotated into side view.

3.4 Main Menu

Through the main menu you can access to all possible functions, which are put on disposal from the software program. In the following sections all options are explained in detail.

3.4.1 File

In the following subsections all functions of the menu option *File* are described in detail.

3.4.1.1 New

If you are working with *eXp 3000*, *eXp 5000* or *Localizer 3000* this function is not needed. Instead of this you have to use function *File* \mapsto *Import*.

Click on *File* \mapsto *New* if you want to transfer data from a device to your PC. A window like in figure 14 will open where some parameters has to be adjusted.

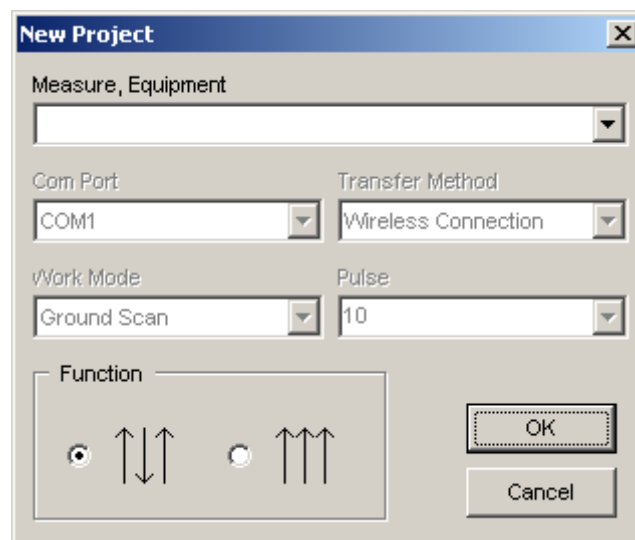


Figure 14: Dialog „New“

- **Measure, Equipment**
Select here the device from where you want to transfer the measurement.
- **Com Port**
Select here the corresponding Com Port to which your cable or USB dongle² is connected.

²Read in your device manual how to find out the corresponding Com Port when using a USB dongle.

- **Transfer Method**

Here you can enter the method of data transfer. The following possibilities are on disposal:

- **Wireless Connection:** Enter this type of data transmission if you are working with a data receiver and antenna.
- **Cable Connection:** You have to select this type of data transmission when your device is connected directly to the computer with a serial data cable.
- **Bluetooth:** Choose this method of data transmission when you are working with a Bluetooth USB dongle.

- **Work Mode**

Enter in this section which working method you want to use to record or transfer data. Beware that this working mode should correspond with the selected operating mode of your device and that not all devices proceed all of these working modes.

- **Ground Scan:** This function is standard function for every measuring instrument. It calculates a three dimensional image of the measured data. Detailed information about the analysis you can find in section 4.1 on page 32.
- **Discrimination:** This function is available for all devices with Super Sensor. Detailed information about this function you can find in section 4.2 on page 42.
- **Live-Scan (Horizontal Probe):** The measured data of a horizontal live probe are represented on the screen. Additional information about this operating mode you can find in section 4.3.1 on page 44.
- **Live-Scan (Vertical Probe):** The measured data of a vertical live probe are represented on the screen. Additional information about this operating mode you can find in section 4.3.2 on page 45.

- **Pulse**

Here you have to enter the number of impulses per search line. Beware that this number has to be exactly the same like the one selected on the measuring instrument. If for example you used 20 impulses for the measurement with your device you have to enter here also 20 impulses. If you are working with *Cavefinder B* you have to enter always 4.

- **Function**

There are two different possibilities to process the measured results:

- **Zig-Zag (↑↓↑):** This scanning method is used with *GEMS*, *Cavefinder B*, *Grailfinder*, *Rover C*, *Rover C II*, *Rover Deluxe*, *Walkabout* and *Walkabout Deluxe*. Additionally there is the possibility to use this manner also for *Future 2005* and *Future I-160*.
- **Parallel (↑↑↑):** This scanning method is used with *GEMS*, *Future 2005* and *Future I-160*. Additionally there is the possibility to use this manner also for *Grailfinder*, *Rover C*, *Rover C II*, *Rover Deluxe*, *Walkabout* and *Walkabout Deluxe*, but only in the manual mode.

After you entered all details about data transmission you can click on the button *OK*. The software is now ready to receive data from the measuring instrument.

3.4.1.2 Stop

This function is only visible if you used before the function *File* \mapsto *New*. Click on *File* \mapsto *Stop*, to stop the current connection to your device. Afterwards no other data can be received.

3.4.1.3 Open

To load a stored scan file from your hard disk click on *File* \mapsto *Open*. The dialog from figure 15 will open, where you can select the desired graphic.

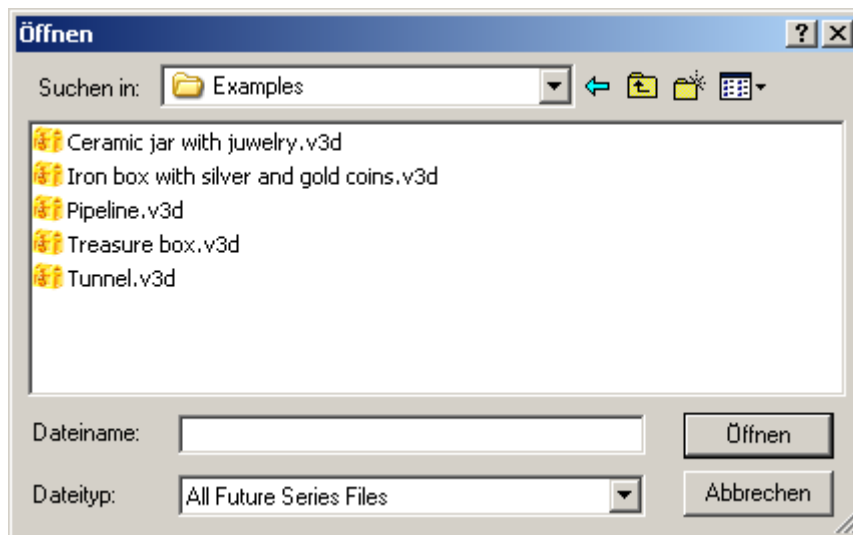


Figure 15: Dialog „Open“

After you selected the file click on the button *Open*. The graphic will be displayed.

3.4.1.4 Save

If you recorded a measurement or did some changes inside the graphic afterwards, like for example add some comments or information, you have to save the graphic again. This allows you to revert to all changed data every time.

If the current file is already stored on your hard disk you can click on *File* \mapsto *Save* to save again the file on the same name. If the current file is new recorded data the function *File* \mapsto *Save as* will be displayed automatically.

3.4.1.5 Save as

The function *File* \mapsto *Save as* opens the dialog from figure 16, where you can rename the current graphic.

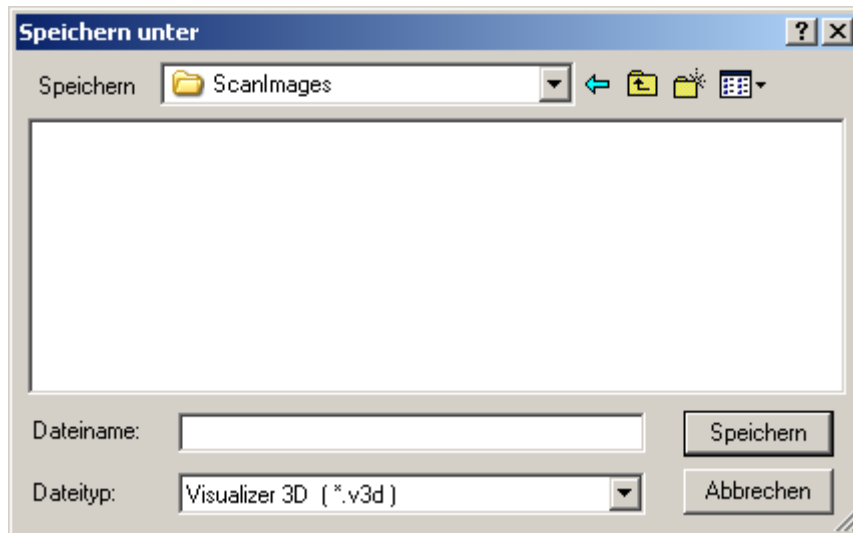


Figure 16: Dialog „Save“

After you selected the destination folder and file name click on the item *Save*. The graphic will be stored on your hard disk.

3.4.1.6 Import

With function *File* \mapsto *Import* it is possible to transfer measured data from *eXp 3000*, *eXp 5000* or *Localizer 3000* to a computer. Therefore click on the name of your device in the corresponding submenu. A dialog like represented in figure 17 will be displayed.

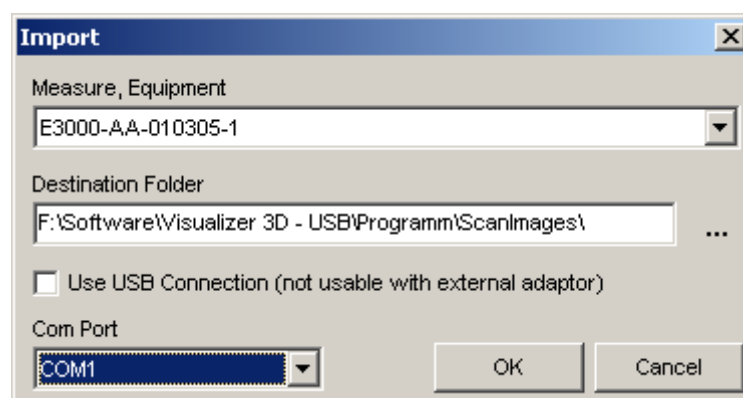


Figure 17: Dialog „Import“

Before transferring data from the measuring instrument to a computer you have to do some important adjustments.

- **Measure, Equipment**

In this field the exact serial number of your device has to be entered. Only if this number correspond with the serial number of your device a data transmission is possible.

- **Destination Folder**

Enter here the folder where the transferred data should be filed. If you click on the small item on the right side of the input field, a list will open, where you can select an already existing folder on your hard disk.

- **Use USB Connection**

Do only mark this entry when your measuring instrument has a USB Connection. If your device has a serial connection this field should *not* be marked, also if you connect it with an adapter cable to your USB connection of your computer.

- **Com Port**

This entry is only necessary for measuring instruments with serial Com Port. Select here the Com Port to which you connected the serial data cable.

Click on the button *OK* when you adjusted all parameters correctly. Now all data will be transferred from the device to your computer. Afterwards you have to use option *File* ↦ *Open* to open the transferred files.

3.4.1.7 Export as BMP

Click on *File* ↦ *Export as BMP* to save the image of the measured data as graphic file (Bitmap). A dialog will open, where you can enter a file name selected by yourself. After click it last some seconds until the window will open, because the graphic has to be prepared for export. During this proceeding an indication like *Graphic will be exported: 23%* is visible in the Information field of the Status bar.

After the image has been stored you can use it like a usual picture in different documents, emails or image processing applications.

3.4.1.8 Print

If you want to print out the graphic click on *File* ↦ *Print*. The dialog from figure 18 will open. After click it last some seconds until the window will open, because the graphic has to be prepared. During this proceeding an indication like *Preparing to Print: 38%* is visible in the Information field of the Status bar.

In the dialog you can adjust the following parameters:

- **Printer**

Here you can select the printer from where you want to print out the graphic. Additional options you can get by clicking the button *Preferences*.

- **Print Cover Page**

Mark this entry if you want to print a cover page with notes. The indications which you made in *Graphics* ↦ *Characteristics* will also be printed.

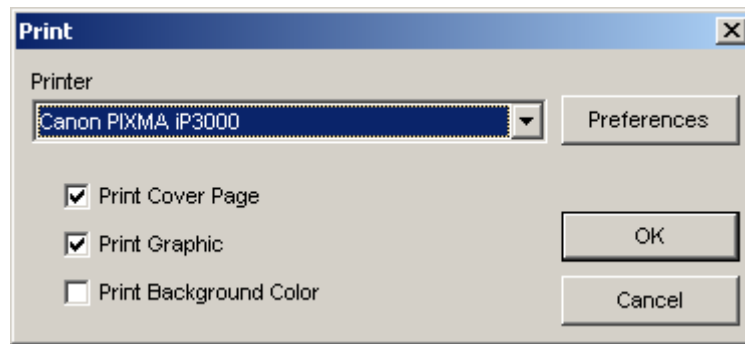


Figure 18: Dialog „Print“

- **Print Graphic**

If this option is marked with a tick, the current graphical representation of the screen will be printed. Deactivate this option for example if you only want to print the cover page with information.

- **Print Background Color**

Mark this option if also the background color besides the colored representation should be printed. Beware that this printing needs more printing ink.

Click on the item *OK* if all parameters are adjusted correctly. Now the data will be send to the printer and the printout will start.

3.4.1.9 Preferences

By clicking on *File* → *Preferences* you have the possibility to do certain program adjustments. A dialog like in figure 19 will open.

You can adjust the following parameters:

- **Language**

Select here the language in which the program should go. Currently the languages *English*, *German*, *French* and *Turkish* are on disposal.

- **Input Length**

Here you can adjust with which measures system you want to work. You can select between *Meter*, *Inches* and *Feet*. Depending on the adjustment the specification of length like width, length and depth are converted into the according format.

- **Date Format**

Here you select how the date should be indicated.

- **Time Format**

Select here how the time should be indicated.

- **Transformation Parameter**

Enter here the factors of the speed of your mouse movements. An indication of *2,0000* means that a Rotation, Movement or Scale is working with double speed. These indications depends on your used computer. Normally the standard indications are quite enough.

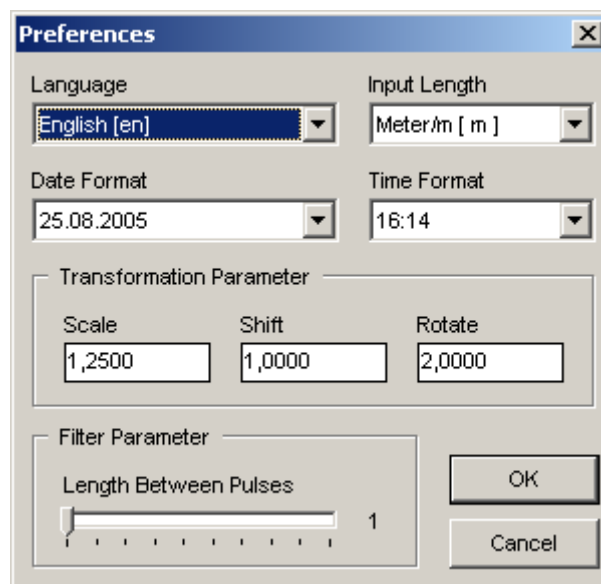


Figure 19: Dialog „Preferences“

- **Filter Parameter**

The filter parameter influence the fineness of the Color Filter, which you can change with the buttons in the navigation bar.

3.4.1.10 Exit

Click on *File* \mapsto *Exit* to close the program. If the graphic is not yet saved or has been changed during this time the program will ask you if the data should be saved before exit the software program.

3.4.2 Graphics

The following section describes all functions of the menu *Graphics* in detail.

3.4.2.1 Restore to Original

With function *Graphics* \mapsto *Restore to Original* you can cancel all changes which were made on the graphic, like for example Signal Correction or Interpolation.

3.4.2.2 Interpolation

Click on *Graphics* \mapsto *Interpolation*, to do a mathematical computation of the graphic. A dialog like represented in figure 20 will open.

Before the interpolation will be done you have to adjust how often the interpolation should be used for the current graphic. Therefore place the regulator on the desired position and click on the icon *OK*.

Detailed information about Interpolation you can find in section 4.1.3 on page 36.

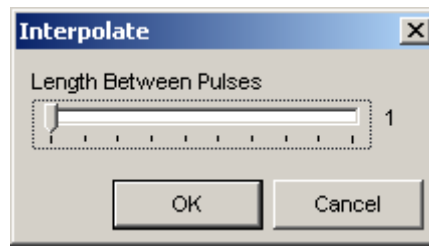


Figure 20: Dialog „Interpolation“

3.4.2.3 Signal Correction

The function under *Graphics* \mapsto *Signal Correction* allows to eliminate all error signals which can be caused by data transmission via radio. After click on this function a dialog like in figure 21 appears on your screen.

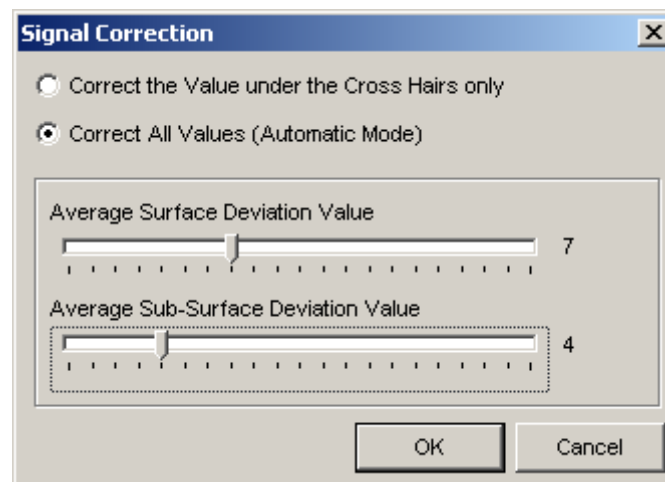


Figure 21: Dialog „Signal Correction“

You can select between two different types of signal correction:

- **Correct the Value under the Cross Hairs only**
If this option is marked only the value under the cross hairs will be corrected. So you can avoid the unmeant correction of other values.
- **Correct all Values (Automatic Mode)**
In this mode all measured values in the graphic will be checked and if necessary corrected.

The modification of the measured values results from the following parameters:

- *Average Surface Deviation Value*
The measured value will only be corrected if its deviation to all other measured values inside the graphic is higher than the selected parameter value (standard value = 7).
- *Average Sub-Surface Deviation Value*
The measured value will only be corrected if the deviation to all adjoining values is higher than the selected parameter value (standard value = 4).

Detailed information about Signal Correction you can find in section 4.1.2 on page 34.

3.4.2.4 Characteristics

Click on *Graphics* → *Characteristics* to enter detailed information about your measurement project. A dialog like in figure 22 will open.

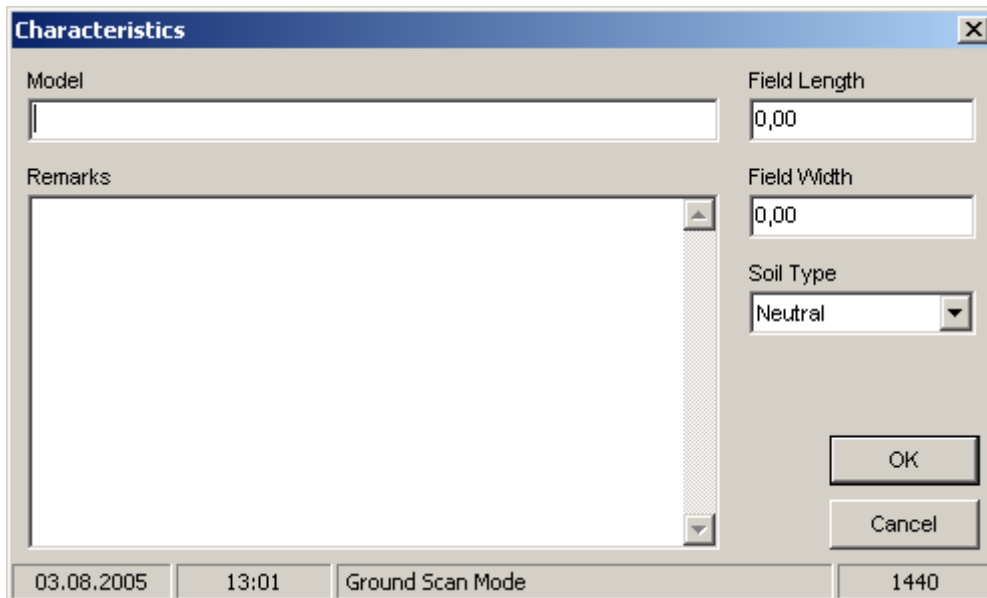


Figure 22: Dialog „Characteristics“

Essential information are not only length and width of your measured field but also the type of soil of the area where you did the measurement. Only with these values you can determine the correct position and depth of objects.

- **Model**
Enter here for example the name of your project or the place of your measurement.
- **Remarks**
In this field you can enter additional information like the distance between impulses, width of measured lines, walking direction and others.
- **Field Length**
Enter here the length of your measured area, also the length of your search line. The indication correspond to the selected linear measure (meter, inches or feet).
- **Field Width**
Enter here the width of your measured area. The indication correspond to the selected linear measure (meter, inches or feet).
- **Soil Type**
Select here the most corresponding type of soil of the area on which you did your measurement.

Click on the icon *OK* to take over the selected values and adapt the graphic. To save these data permanent you have to use option *File* \mapsto *Save* or *File* \mapsto *Save as*.

3.4.3 View

In the following subsections the functions of the menu *View* are explained in detail.

3.4.3.1 Undo

The function *View* \mapsto *Undo* cancel all rotations, movements or enlargements of the graphic.

3.4.3.2 Perspective

Click on *View* \mapsto *Perspective* to see the current graphic in perspective view. Alternatively you can double click on the graphic preview *Perspective*.

3.4.3.3 Side View

With a click on function *View* \mapsto *Side View* the current graphic will be moved in side view. You can also click twice on the graphic preview *Side View*. In this view you can measure with the line of depth how depth objects are buried in the ground.

3.4.3.4 Top View

If you click on function *View* \mapsto *Top View* you can see the current graphic from above (bird's eye view). Alternatively you can click twice on the graphic preview *Top View*. In this view you can measure not only the position but also the depth of specific points.

3.4.3.5 Cross Hairs

Click on *View* \mapsto *Cross Hairs* to fade in or out the white cross hairs, which are used to determine the position and depth.

3.4.3.6 Wireframe

Click on *View* \mapsto *Wireframe* to see the current graphic in a wireframe representation. Often small hidden details can become visible. Another click on this function shows the graphic again in the normal representation.

3.4.3.7 Quality

By clicking on *View* \mapsto *Quality* you can select how many additional mathematical calculated points you want to add to the graphic. You can select between *Level 1 (Fast)*, *Level 2*, *Level 3*, *Level 4* and *Level 5 (Slow)*.

The more points will be calculated the more computing capacity is needed. Your computer needs more time for the representation of the graphic. Change your graphic into wireframe representation to see and analyse exactly the effects.

3.4.3.8 Zoom

If you click on function *View* \mapsto *Zoom* you can select between the zoom factors *50%*, *80%*, *100%*, *150%*, *200%*, *400%*, *800%* and *1000%*. Click on any of these factors to see the graphic immediately in the corresponding zoomed level. Another possibility to scale is to use the turning wheel of your mouse.

3.4.4 Extras

In the following subsections the function of the menu *Extras* are explained in detail.

3.4.4.1 Split Screen

With function *Extras* \mapsto *Split Screen* you can fade in or out the three different graphical previews *Side View*, *Top View* and *Perspective*. If these views are visible the function in the main menu is marked with a small tick.

3.4.4.2 Navigation Rulers

With function *Extras* \mapsto *Navigation Rulers* you can fade in or out the navigation bar on the left side of your screen. If the navigation bar is visible the function in the main menu is marked with a small tick.

3.4.4.3 Fullscreen

When you click on function *Extras* \mapsto *Fullscreen* you see only the graphic on your complete screen and if visible the three graphic previews. This mode is most suitable for the measurement with Live-Scan, which is possible with *Future 2005* and *Future I-160*.

3.4.5 Help

In the following subsections the functions of the menu *Help* are explained in detail.

3.4.5.1 Index

This function is not yet implemented.

3.4.5.2 Homepage

With a click on *Help* \mapsto *Homepage* you will get on the homepage of the manufacturer, where you can inform yourself about new products or offers. An active connection to internet is required.

3.4.5.3 Internet Update

To use function *Help* \mapsto *Internet Update* an active connection to internet is required. When you click on this function the application will be closed and the program *WebUpdate* starts. Now you can download current updates from the internet.

Detailed information you can find in section 5 on page 46.

3.4.5.4 Information

Under *Help* \mapsto *Information* a dialog opens where you can find detailed information about your program version.

3.5 Key Functions

Most of the program functions can be activated by a simple keypress. In table 1 all available key combinations are shown.

Key	Function
F2	Show/Hide cross hairs
F3	Switch between full screen mode and wireframe
F5	Move blue color level down
F6	Move blue color level up
F7	Move red color level down
F8	Move red color level up
F9	Show characteristics of the project
F10	Open dialog preferences
F11	Fade in and fade out full screen mode
Page ↓	move line of depth down
Page ↑	move line of depth up
1	Graphic in resolution 1 (less CPU-intensive)
2	Graphic in resolution 2
3	Grafik in resolution 3
4	Grafik in resolution 4
5	Grafik in resolution 5 (more CPU-intensive)
Strg + P	Print graphic
Strg + I	Use interpolation
Strg + C	Use signal correction
Strg + R	Undo all changes
Strg + M	Fade in and fade out graphic preview <i>Side view, Top view and Perspective view</i>
Strg + F1	Perspective view
Strg + F2	Side view
Strg + F3	Top view
←, ↑, →, ↓	Move cross hairs

Table 1: Key Functions

4 Analysis and Evaluation of Measurements

Before measurement you have to know what kind of objects or cavities you are looking for and if the area you choose is suitable for this. Measurement without a plan will not give you the results you would like. For this reason please consider the following indications:

- What are you looking for (graves, tunnels, buried objects, ...)? This question has its effects on your concrete manner to measure an area. If you are looking for big objects you can enlarge your distance between the measure points (impulses), for small objects use small distances.
- Inform yourself about the area you select for measurement. Is it useful to search at this place? Are there historical indications, which confirm your speculations? What type of soil is on this area? Are there good conditions? Is a correct data recording possible?
- Your first measurement in a unknown area has to be large enough to get representative values (e.g. 20 impulses, 20 search lines).
- What is the form of the object you search? If you are looking for an angular metal box, the identified object in your graphic should have a form according to this.
- To get exact values concerning the depth measurement, the object has to be in the centre of the graphic, which means it has to be framed by normal reference values (normal ground). If the object is on the side of the graphic and not totally visible a correct depth measurement is not possible.
- There should not be more than one object in a graphic. This will influence the exactness of depth measurement.
- You should do at least two control scans to get sure about your results. So you also can recognize and isolate mineralized ground.

4.1 Ground Scan

With operating mode *Ground Scan* all recorded measured values are represented in a three dimensional graphic on the screen. All high-grade positive signals (e.g. metals) are shown in red color and all low-order negative values (e.g. cavities) are represented in blue color. The markedness of the red- and blue coloring depends among other things of the following factors:

- Type of soil (e.g. loam, sand, stone, ...)
- Contamination through other metallic objects

In the following subsections it is explained in which way the graphical representations can be edited and analysed.

4.1.1 Metal or Mineralization

On the beginning it is not always easy to find out the difference between metallic objects and mineralizations. Generally metals are represented in red color, but mineralized deposits in the ground can also include red color signals.

Here some important notes how to distinguish a real object from a mineralization:

- **Form**
If the object represented in your graphic has a special form (e.g. rectangle, circle, ...), you can conclude of a possible real found.
- **Color**
If there are many yellow and orange color values around the object, it will be probably a mineralisation.
- **Depth**
With a small depth of about 0,10m or 0,40m there is a high possibility that there is only a mineralisation of the ground.
- **Color Filter**
If position and form of the object are changing with the use of the color filter it is probably a mineralisation.
- **Control Scan**
If position, depth and form of the object stay nearly the same, also in further control scans you can conclude of a real object. Also if some graphics look similiar you always have to compare all indications.

Figure 23 shows a real object (left side) and a mineralized accumulation (right).

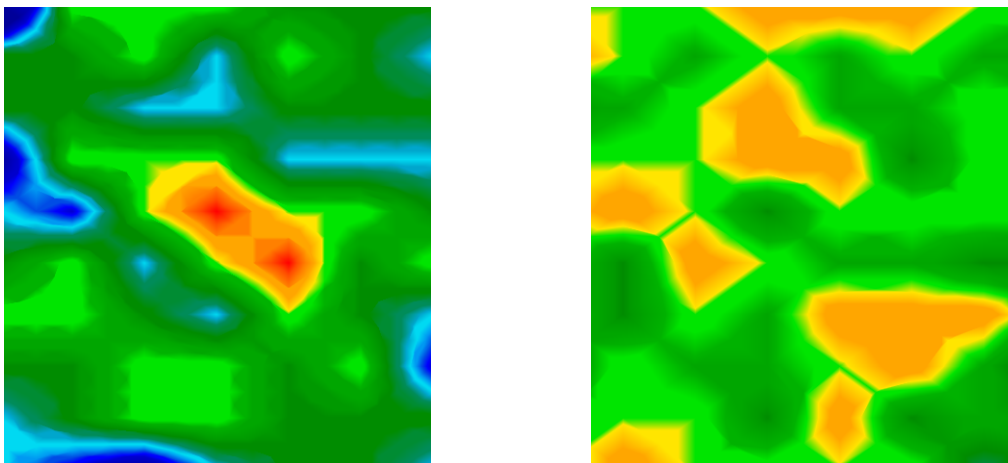


Figure 23: Comparison of object and mineral

4.1.2 Signal Correction

During the measurement there are different influences from the environment which can affect the graphical representation in a negative way. Especially other radio signals can impact negatively the measured values. This function is used to eliminate error signals from the graphical representation³.

A click on *Graphics* \mapsto *Signal Correction* shows the dialog „Signal Correction“ from figure 21 on page 26. There are two options possible:

- **Correct the value under the cross hairs only**
Manual mode, where only the marked value will be adapted.
- **Correct all values (Automatic Mode)**
Automatic mode, where all measured values will be adapted.

To use option Signal Correction the following parameters has to be adjusted:

- **Average Surface Deviation Value**
Here you assign how large the deviation of certain values to the average values of the complete measured field can be. The value *Zero* means no deviation.
- **Average Sub-Surface Deviation Value**
This value indicates how large the deviation of every measured point to the adjoining values can be. A value of *Zero* means no deviation.

The smaller the values of the parameters are, the more modulations will be made.

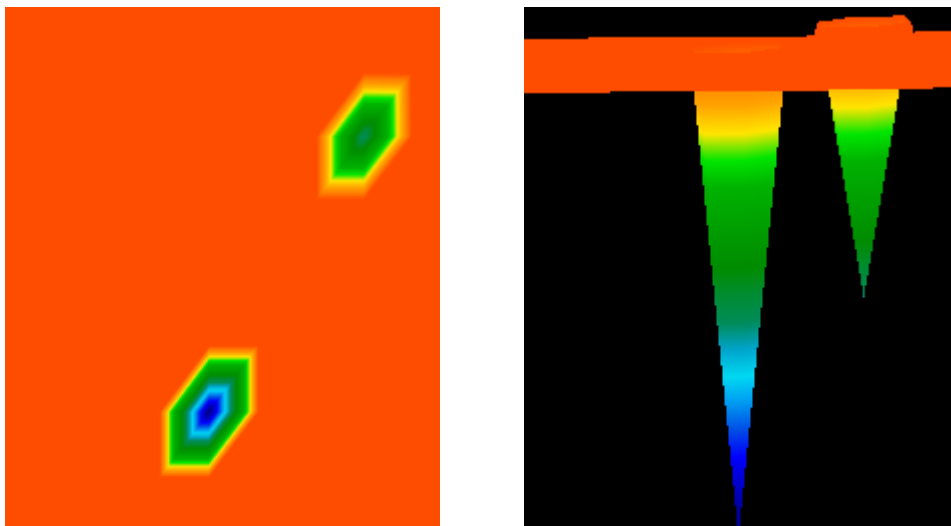


Figure 24: Graphic before signal correction

Figure 24 shows a graphic including two error signals. The side view shows clearly a high pointed deviation down. Often the complete graphic will be coloured in red if error signals are

³You should only use this function when you are using an older model with 433MHz-radio transmission, that is without bluetooth or direct cable connection.

included. The error signals itself will be represented as large spikes in blue colour.

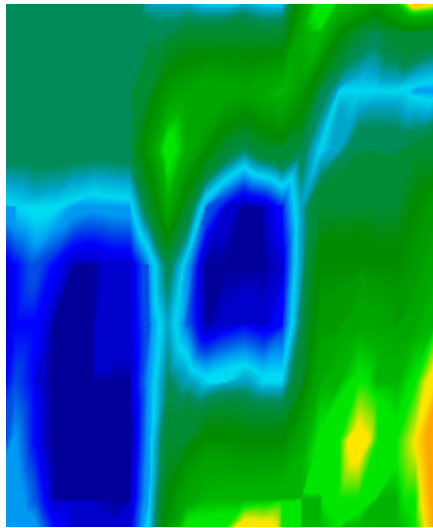


Figure 25: Graphic after signal correction

Figure 25 shows the same graphic like in figure 24, but after using the option Signal Correction. Now two blue parts become visible which were not visible before. They represent two places with excavations. Before the Signal Correction there was no indication visible.

4.1.3 Interpolation

With option interpolation you can improve the representation of your graphic. Also by using this option certain irregularities in the measurement will be eliminated. So it is possible to check possible objects regarding mineralization.

A click on *Graphics* \mapsto *Interpolation* opens the dialog „Interpolation“ from figure 20 on page 26. To begin place the regulator on number 1 and confirm your selection with a click on *OK*.

Figure 26 shows on the left side the graphic before interpolation and on the right side the same graphic after interpolation. You should repeat this procedure about 3 or 4 times. Alternatively you can also adjust an interpolation value of 3 to do the interpolation only one time.

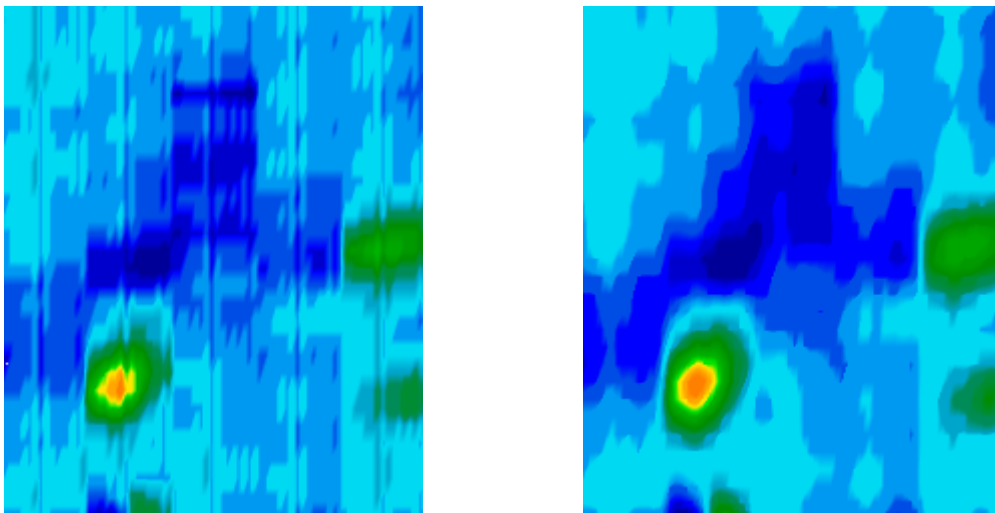


Figure 26: Graphic before and after interpolation

With the interpolation value you can adjust how often the interpolation procedure should be realized. So it is the same result when you do 3 times a interpolation with value 1 or just one interpolation with value 3.

The interpolation is also very suitable to distinguish real objects from mineralizations. When there is a real metallic object inside the graphic it will also be visible after using interpolation several times and it will keep the same position, size and form. If already after one interpolation the signal disappears or split in more parts or change its position radical, than it is probably a mineralization of the ground.

If you repeat the interpolation process too often, also real objects will disappear from the graphic.

4.1.4 Color Filter

The representation of the graphic can be varied by moving the blue and red color level. Therefore you can use either the buttons of the Color Filter from the Navigation Bar or the keys *F5*, *F6*, *F7* and *F8* of your computer keyboard. Figure 27 shows the original graphic (left side) and the changed graphic after moving the red color level.

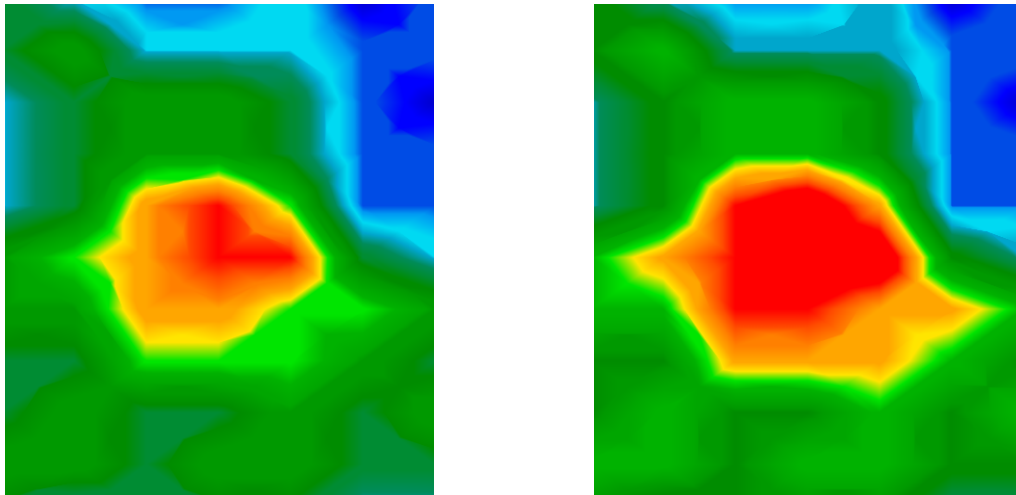


Figure 27: Usage of the color filter by moving the color levels

In figure 28 you can see two examples how the original graphic from figure 27 can be changed. On the left side the graphic after moving the blue color level is represented and on the right side the image after moving both color levels.

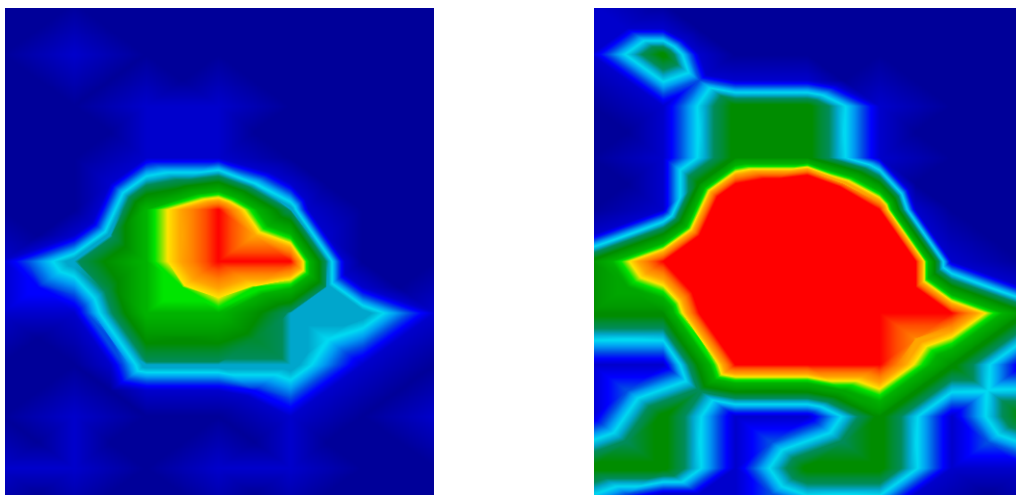


Figure 28: Usage of the color filter by moving the color levels

Normally the adjusted position of the color levels is selected optimal and do not has to be changed manually. But it can be useful to verify the graphic regarding to mineralization in the

ground. If the detected signal is changing strongly after only little moving of the color level, than the signal represents probably a mineral.

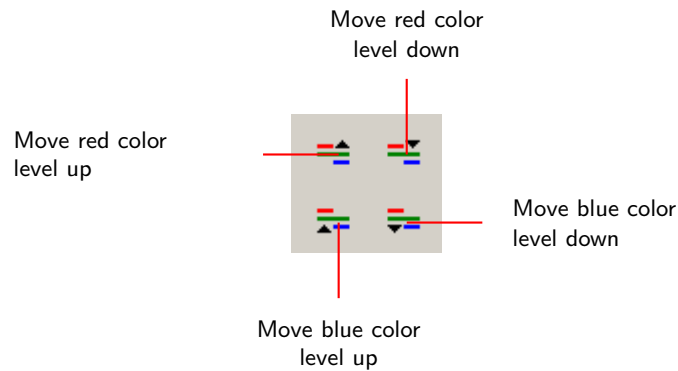


Figure 29: Operating Elements of the Graphic Control

In tabel 2 you can find again the key functions of the Color Filter, like already mentioned in tabel 1 on page 31.

Key	Function
F5	Move blue color level down (reduce blue color values)
F6	Move blue color level up (amplify blue color values)
F7	Move red color level down (amplify red color values)
F8	Move red color level up (reduce red color values)

Table 2: Key Functions of the Color Filter

4.1.5 Determination of Position and Depth

Only if you are sure to have found a real object you can begin to determine its position and depth. The next section explains how to proceed.

4.1.5.1 Determining the position

To locate the exact position of an object you have to enter the field length and width at first. Therefore click in the main menu on the entry *Graphics* \mapsto *Characteristics*. A dialog window will open which is represented on page 27 in figure 22. Enter here the corresponding values.

Place now the crosshairs with the arrow keys (\leftarrow , \rightarrow , \uparrow and \downarrow) directly over the object, like shown in figure 30.

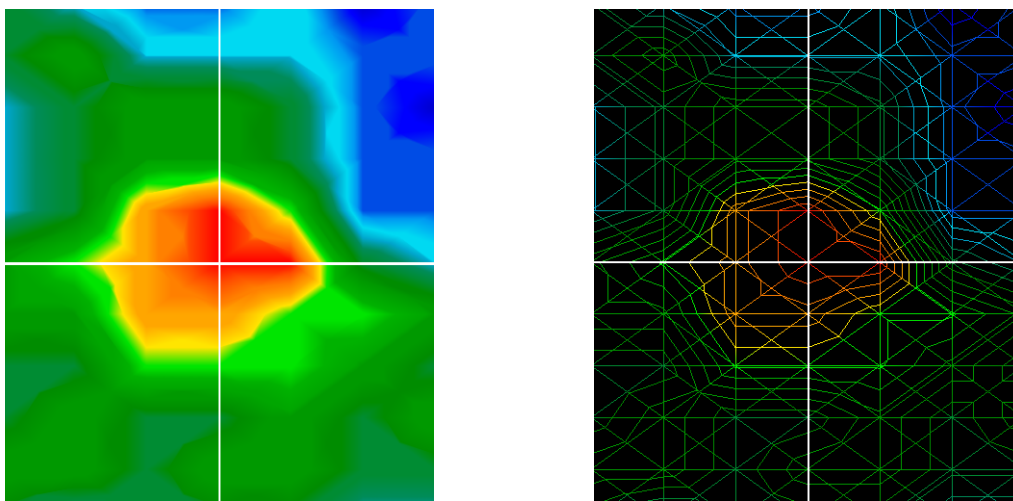


Figure 30: Determining the position of objects

Now you can read the relative distance between the object to your starting position in the arrays *Search line* and *Impulse* of the Status bar.

The represented position applies always to the measure point directly under the crosshairs, like represented in figure 30. You can move the crosshairs over any desired measure point inside your field with the arrow keys (cursor keys). During the representation of the the graphic with wireframe, which can be activated with *View* \mapsto *Wireframe*, you can recognize easily every single measure point. This is visible in figure 30 on the right side.

If for example the indication shows *Search line: 3m* and *Impulse: 5m*, this means that you have to walk 3m to the left and 5m forward beginning from your starting point to stay directly over the object.

Now you may see that it is important to remember the exact location of your starting point. Note this information always in the information dialog which you can open anytime by pressing the key *F9*. Additionally it is advised to place a little marking on the ground where your starting point is situated.

4.1.5.2 Determining the depth

For the depth measurement a single object should be included inside the graphic. Also the object should be placed in the centre of the graphic if possible, it should be surrounded by normal reference values. Therewith optimal conditions for the precise determination of depth are given.

To determine the depth differences are quite possible. The deeper the object is located in the ground the higher can be the variance from the real depth. Normally depth differences of about 0,50m are possible. If there is a strong mineralization of the ground higher differences can arise.

Before determining the depth you have to enter the type of soil which was present in your measured area. Therefore select in the toolbar Depth measurement the corresponding type of soil from the list.

To determine finally the depth of objects there are two possibilities:

- Depth measurement with line of depth
- Depth measurement with crosshairs

Both possibilities are described in detail in the following subsections.

Depth measurement with line of depth

At first rotate the graphic into side view, like represented in figure 31. Alternative you can click twice on the side view window on the right side of your screen.

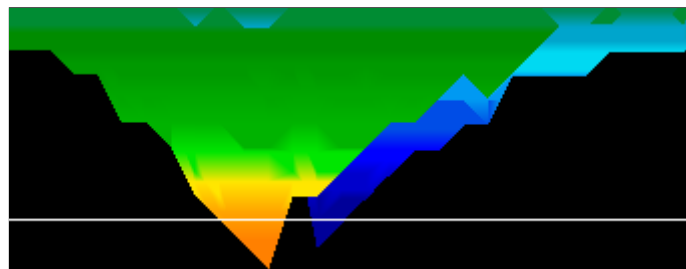


Figure 31: Depth measurement with line of depth

With the keys *Page* ↑ and *Page* ↓ of your computer keyboard you can move the line of depth to the ending point of your object. Now you can read the depth in segment *Depth* in the *Status bar*. Beware that two values are represented. You have to consider the first value. The second value is used for determination of depth with crosshairs.

Determination of depth with crosshairs

Rotate the graphic into top view, like shown in figure 32. Alternative you can also click twice on the view from above window on the right side of the screen.

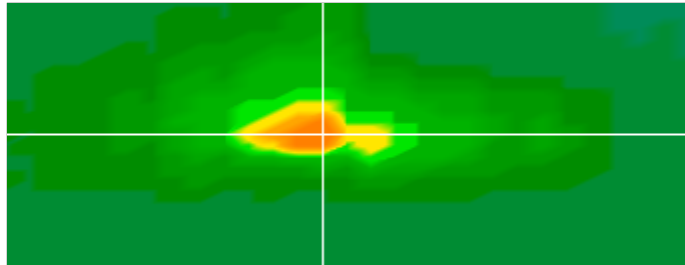


Figure 32: Depth measurement with crosshairs

With the arrow keys of your computer keyboard you can move the crosshairs directly over the measure point whose depth you want to determine. Now you can read the depth in segment Depth in the Status bar. Beware that there are two values represented. You have to consider only the second value. The first value indicates the determination of depth with the line of depth.

4.2 Discrimination

The operating mode *Discrimination* can only be realized with the Super Sensor. With this specialized probe it is possible to discriminate between ferrous and non-ferrous metals.

The recorded measured data is represented in curves. From these curves you can conclude to characteristics about possible objects. Generally there are three important forms representing non-ferrous metals, ferrous metals and cavities.

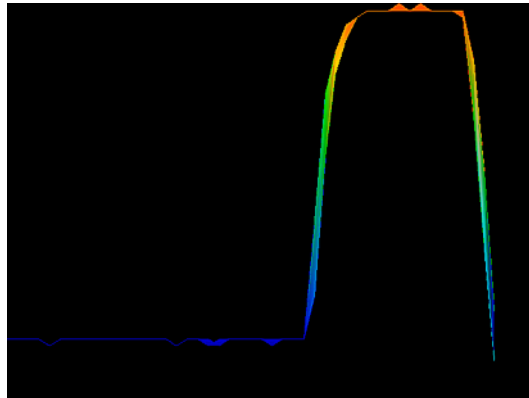


Figure 33: Curve Shape of Iron

In figure 33 it is represented, which curve shape results from ferrous metals. Typically is the high deflection to the top followed by the same deflection down.

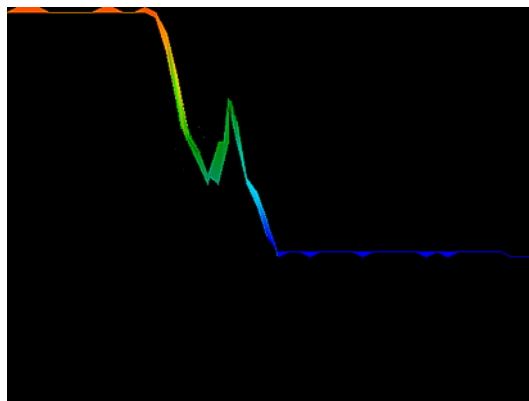


Figure 34: Curve Shape of Precious Metals

Figure 34 shows which principle curve shape is represented when passing over a precious metal. Typically is the small additional deflection with the difference that there is no deflection down.

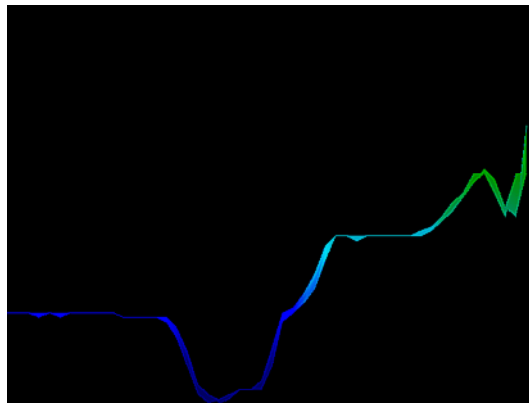


Figure 35: Curve Shape of Cavities

In figure 35 you can see the principle curve shape when passing over a cavity. Typically is the high deflection down. But there is no equivalent deflection in the opposite direction.

4.3 Live-Scan

The operating mode *Live-Scan* is only possible with the devices *Future 2005* and *Future I-160*. The measured data are recorded continuously and send directly to the software. This way you will get a „flowing“ image, which represents the current situation under the connected probe.

4.3.1 Horizontal Live-Scan

After connecting the horizontal antenna connect the device to your computer. Therefore select *Live-Scan (Horizontal Probe)* in the dialog from figure 14 on page 19. With impulses you select the amount of measurement series represented at the same time (recommended value = 10). The higher the value of the selected impulses the slower the image is flowing over the screen.

The latest measured data is always represented on the top of the screen. As soon as new data is present all values which were recorded before move down. In figure 36 the graphical representation is shown.

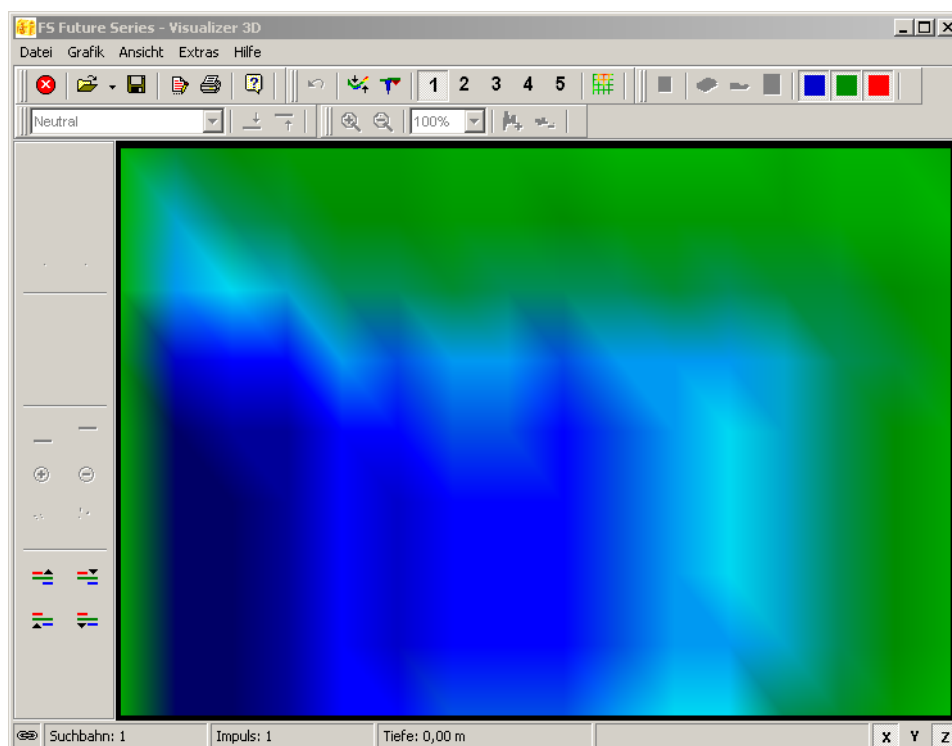


Figure 36: Horizontal Live-Scan

The measured values of the Live-Scan cannot be stored. You should decide during the measurement if there is an interesting discovery or not. In principle there are the same guidelines like in operating mode *Ground Scan*. Red color values represents metals and blue color values indicates cavities.

4.3.2 Vertical Live-Scan

Connect the vertical antenna and connect your device to the computer. Therefore select *Live-Scan (Vertical Probe)* in the dialog from figure 14 on page 19. With impulses you select the amount of measurement series represented at the same time (recommended value = 10). The higher the value of the selected impulses the slower the image is flowing over the screen.

The latest measured data is always represented on the left side of the screen. As soon as new data is present all values which were recorded before move to the right. In figure 37 the graphical representation is shown.

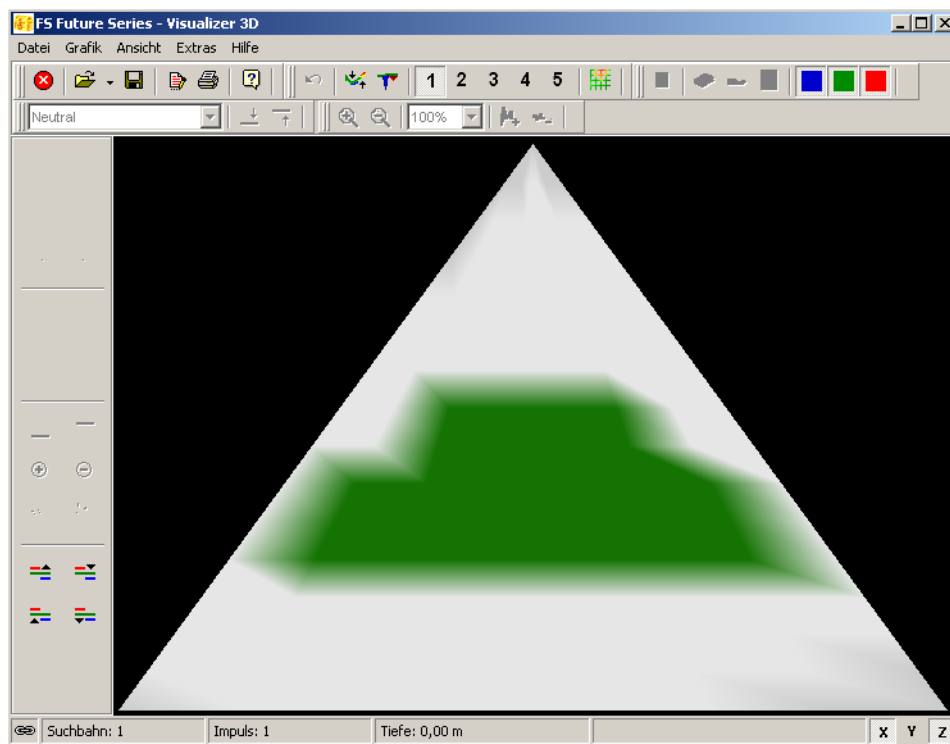


Figure 37: Vertical Live-Scan

The vertical live scan shows a cross section through the measured soil. The representation of depth is limited on 3 meters from the top until the bottom of the graphic.

The measured values of the Live-Scan cannot be stored. You should decide during the measurement if there is an interesting discovery or not. Light green color values indicates possible metal objects and dark grey color represents cavities.

5 Internet Update

From time to time certain program functions will be improved or new functions will be added. With the *Internet Update* you have the possibility to update your software. Therefore click on *Help* \mapsto *Internet Update*. Your software program will now be closed and the dialog from figure 38 appears on your screen.

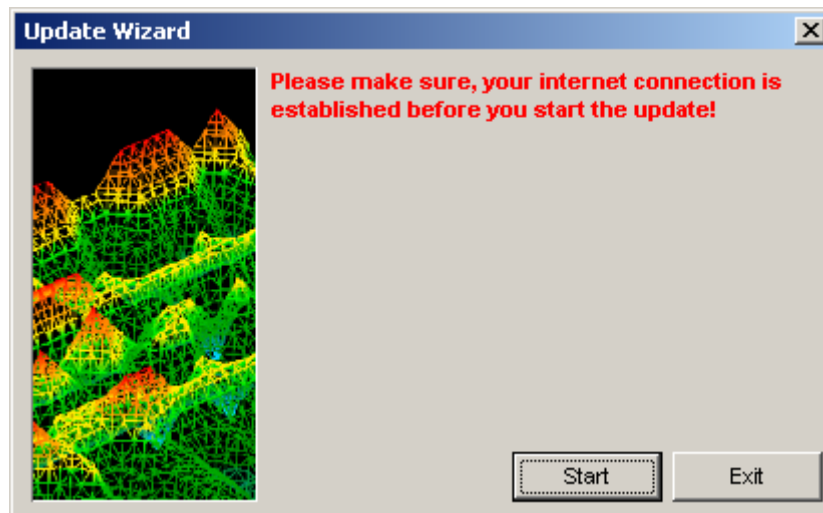


Figure 38: Start Internet Update

Be sure that you are connected to the internet and click on the function *Start*. Now the system will check if an updated version of your software program is available. If so than all necessary data will be downloaded and installed, like represented in figure 39.

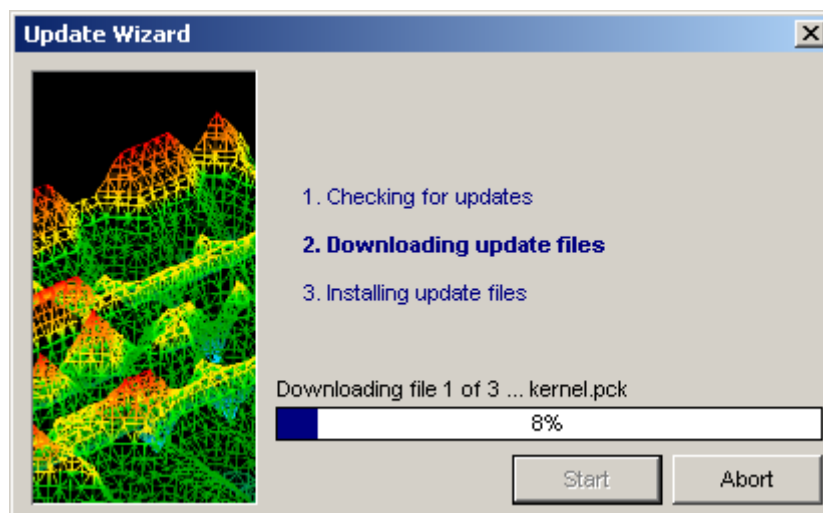


Figure 39: Update Files

When the installation process is finished please click on the function *Finish*, which restart your updated software program.

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