CE

# Ground Penetrating Analyzer

GPA 1000
V16

**User's Manual**
**GPA Visualizer, KTS 3 D**
**KTS-Electronic GmbH & Co. KG**
**Germany**

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# 1 General guidelines

## 1.1 Preface

Congratulations on purchasing one of the most advanced high performance detectors: the GPA 1000 V16.

The newly developed GPA 1000 V16 impresses with a new design and an easy handling with just one single ON-/OFF-Button and a display that shows all necessary information instantly.

Since the programs are already pre-installed, the assembly is quite easy. A clear, simple description, which includes numerous illustrations, should make the mounting to a problem-free operation.

This instruction has been developed by KTS-Electronic GmbH & Co. KG. Any alterations or duplications are only allowed with written permission of KTS-Electronic GmbH & Co. KG. KTS-Electronic GmbH & Co. KG reserves the right to modify the instruction with new knowledge at anytime. The new instructions always can be downloaded gratuitously from our website.

## 1.2 Important details

Please note:

- Protect device from wetness
- Avoid conducting overhead lines
- Do not use cell phones during operation
- Do not carry out measurements during thunderstorms
- Only a fully charged battery guarantees an accurate operation.
- For operation or loading only use the components enclosed or released by KTS GmbH & Co. KG.

## 1.3 Scope of delivery

**Hardware:**

- GPA 1000 electronic unit with Bluetooth® incl. installed li-ion battery
- Universal probe 45.5 cm (17.72")
- Super probe 60 cm (23.62") incl. bag
- 2-part carbon telescope bar with armrest and bag
- Tablet Computer with KTS software and operation system incl. li-ion battery
- Powerful quick-charger 220 Volt including 110 Volt adapter
- Transformer to charge in car
- Solid hard-top case

**Software:**

- KTS-3D GPA Visualizer software (pre-installed on PC)
- USB stick with software for processing data on other computers

**Additionally: GOLD SCAN II metal discrimination**

- GOLD SCAN II electronic unit with Bluetooth®, incl. installed li-ion battery and bag
- Powerful quick-charger 220 Volt, inverter with car charging cable and 110 Volt adapter
- 25 cm (10") Ø searchcoil (waterproof) with carbon telescope bar
- Cylindrical coil (waterproof) 5cm Ø, 20 cm (7.87”) in length, incl. 10 m (32 ft.) cable

**Service:**

- English, German, French or Spanish user's manual
- 2 years manufacturer's warranty for the entire scope of delivery (incl. hardware and software)

# 2 Hardware operation

## 2.1 Assembly of universal and super probe:

First of all plug the telescope bar into the probe's mount. Then insert the remaining parts in correct order. After that the universal or super probe can be attached to the holder. Subsequently the sensor cable must be connected to the electronic unit. Now your device is ready for use.

**Super probe with disassembled telescope bar**

**Please do not overwind the screw thread**

**Fig.: universal probe**

## 2.2 Electronic Unit

The newly developed GPA 1000 V16 impresses with a new design and an easy handling.

S: Sensor value
C: Calibration value
Bat: battery charge condition (graphically and in percent)

The calibration is conducted by a microprocessor and carried out automatically on every soil. Further modulations are not necessary. Therefore the GPA 1000 V16 set is applicable on every soil type.

The measured data is automatically digitized and transformed to the tablet computer via Bluetooth® wirelessly. The blue LED flashes after activation, constant light indicates the Bluetooth® connection.

**Fig.: Electronic unit (GPA 1000)**

## 2.3 Start of electronic

The Bluetooth®-connection allows a fast and save transfer of measured data from GPA 1000 V16 to the tablet computer – in contrast to other devices, which record data via parallel interface.

Through the On-/Off-button the current battery charge condition can also be controlled (graphically and in percent). At the same time the sensor and calibration data is shown. The sensor data should always be between 0 to 5, the calibration data approx. 2.5 (before the calibration automatically is set, display could temporarily indicate other values).

# 3 Start of program

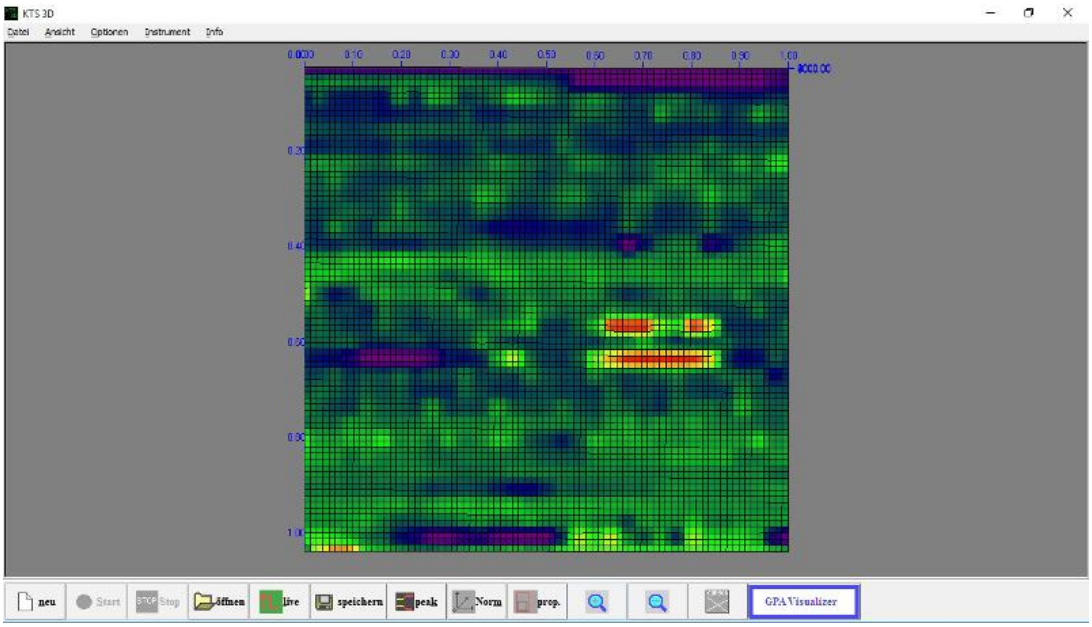
Boot up the PC and double-click on the KTS-3D icon, then start the KTS software. GPA 1000 V16 automatically is connected to the computer (be sure that GPA 1000 V16 is activated ***before*** you start KTS 3D-Software). Should this not be the case, we point to page 23, item 6.7.

## 3.1 GPA Visualizer

The current model of GPA 1000 V16 is additionally equipped with the new “GPA Visualizer” 3D software.

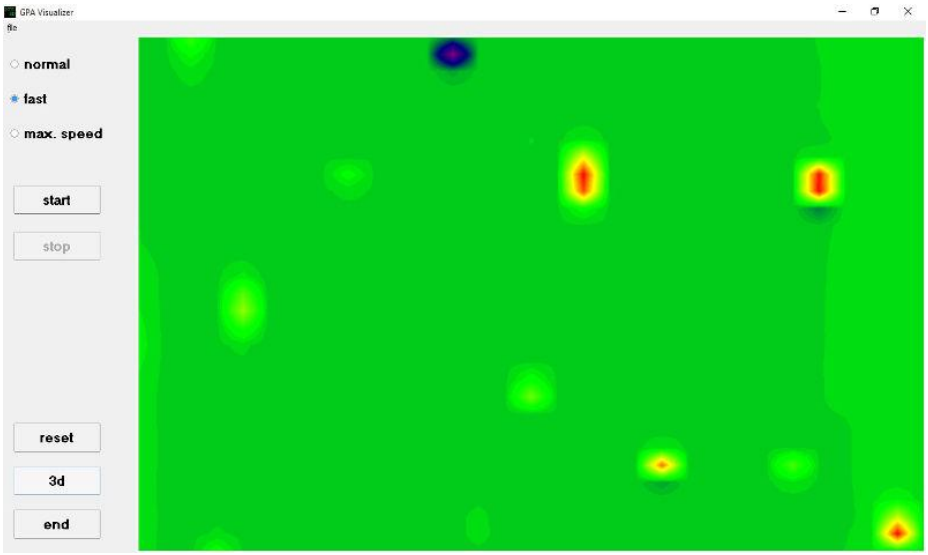
The “GPA Visualizer” 3D software is an easier option for a fast scanning, because the required input of track length or track number, values per track and moving direction is no longer necessary.

In the lower right you see the blue-framed icon “GPA Visualizer”. A double click on it will start the software.



The program only requires setting of measuring speed (normal, fast, max. speed) before the measurement starts by pressing the start button.

By pressing the „Stop“ button it is possible to interrupt the search at anytime. With the “Start” button the search is continued. Should the search be re-started, please press the “Reset” button.

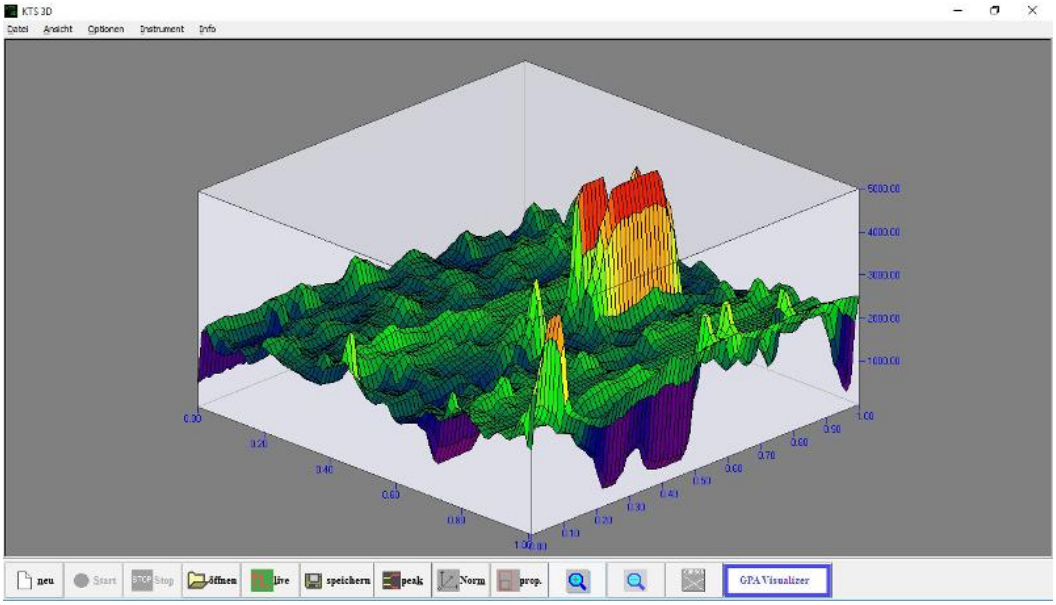



The search should always be proceeded in a straight line. With every change in direction (also by turnarounds or bypassing of obstacles) an interruption of measurement through “Stop” button is appropriate.

Press the “Start” button again to continue the search. Otherwise wrong values could be indicated while change in direction.

At the beginning of the search it is necessary to adapt the running direction to a sensor value of 2 to 3. Otherwise the higher search performance will quickly reach the highest resp. lowest sensor value.

After conclusion of measurements it is possible to change the 2D model to a 3D model by pressing the “3D” button.

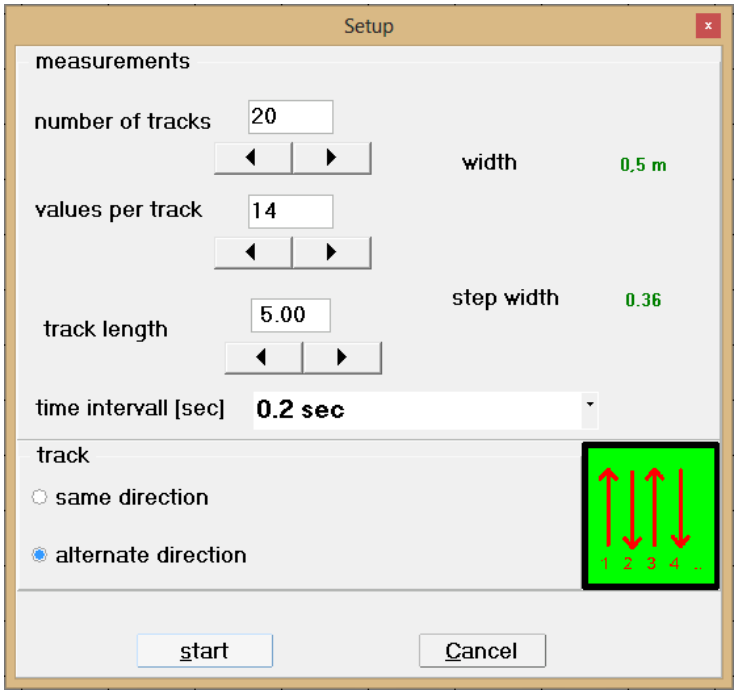



The automatic data interrogation is carried out after storage and completion of the measurement. Click “file” and ”save” if you want to save the data. Once these steps are completed, the search can be continued from the point where it was interrupted.

### 3.2 Preadjustment KTS 3 D

With the "new" button on the display the setting window is opened and

the computer requires the input of track number, track length, values per track and measurement speed, etc.

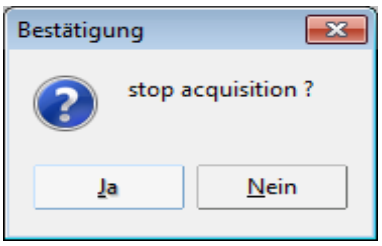


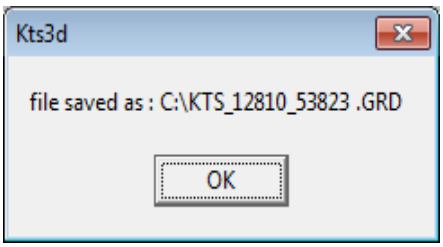

### 3.2.1 Start-button

By pressing the start button the search is initiated. On screen the results are displayed 2-dimensional. After all values are determined, the program stops automatically and the next track measurement can be carried out.

### 3.2.2 Completion of measurement

After completion of the last track, you are going to be asked, if you want to save the measurements. With the O.K.-button the measurement is automatically stored in a user-defined file.



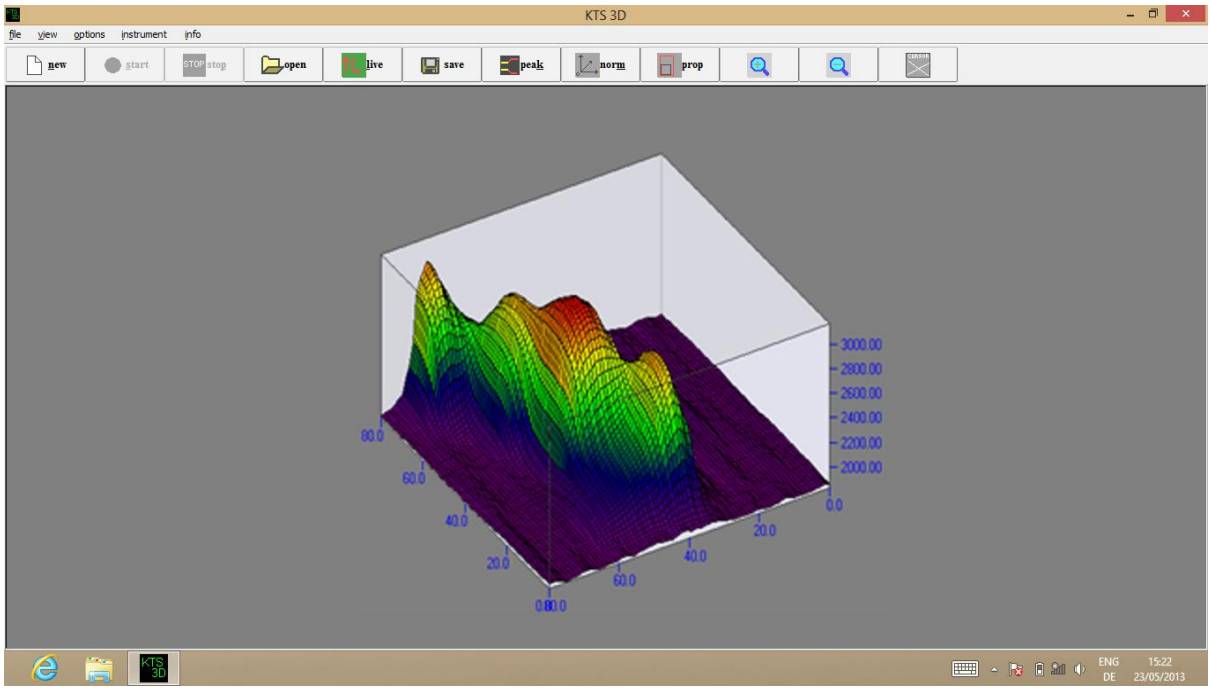




### 3.2.3 Transfer of measurement data

The provided USB-stick can also be used for the transfer of measurement data; you are able to transmit to other PCs and call up all informations for further processings.

### 3.2.4 3D presentation

The measurement data is shown in 3D.



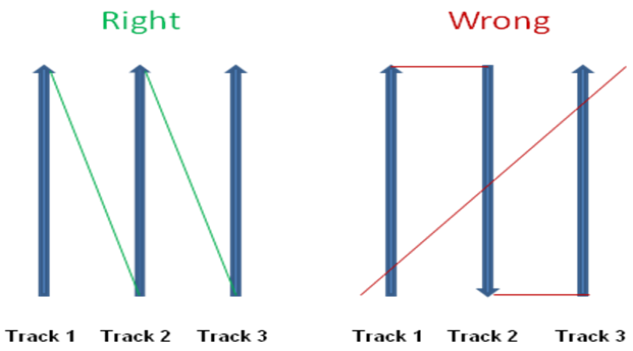

*The 3D presentation shows every modification and its dimension.*

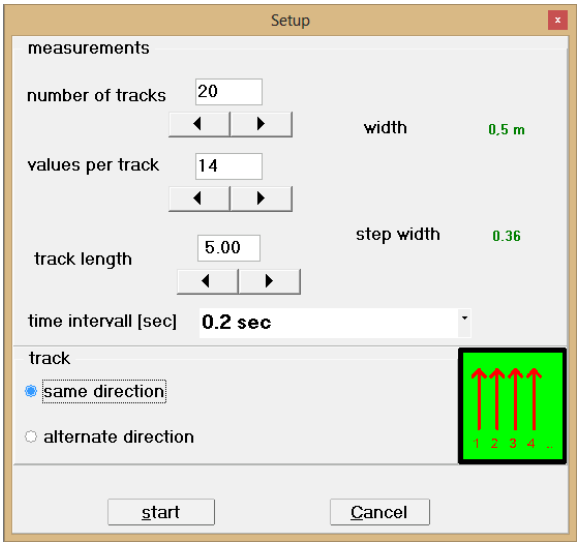
## 3.3 Search process (measurements)

The GPA is a measuring device, which can measure alterations of ground anomalies (caused by metal objects, soil structure or excavations) and can discriminate from normal ground magnetism. Correct results strongly depend on ground type and measuring method. Areas to be measured should not have electric fields (like high voltage cables or earth wires) or strong mineralising or wet grounds because they influence the measurement. The dryer the soil, the more precise the results.

Split the area you want to measure into even tracks. You may choose between 2 methods:

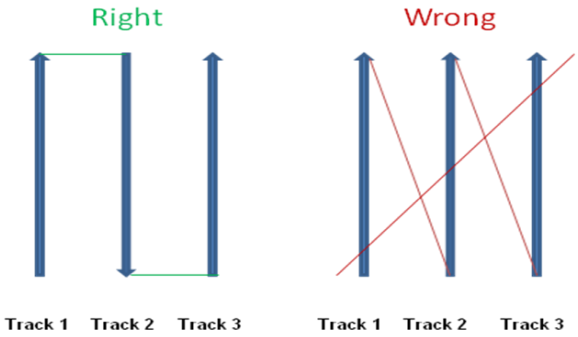
### 3.3.1 Search in one direction






If you have chosen the search in rectification, you should come back to the starting point after completion of each track and press the start button (for the measurements of the second track).

### 3.3.2 Search in counter direction




If you have chosen the search in counter direction, you should turn around after completion of each track, make a sidestep of approx. 50 cm (20 inches) to the right or to the left and continue with the next track by pressing the start button.

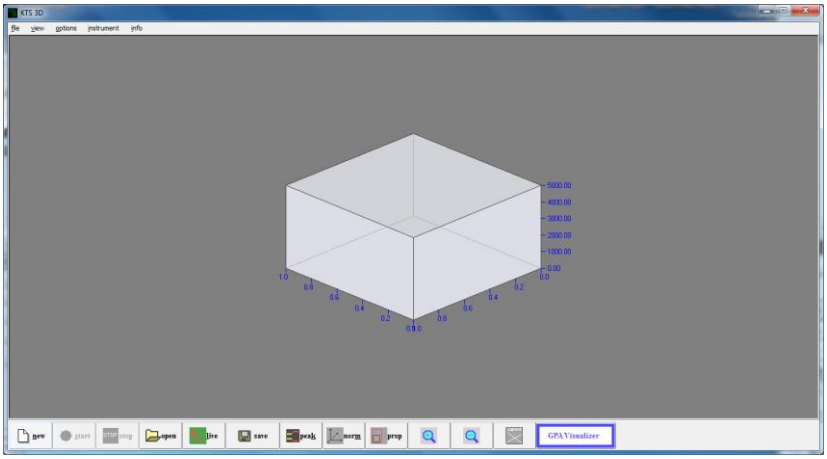
For precise measurements the walking speed should be constant while pacing the tracks. Hereby objects can be detected at the same spot during counter direction. For exact measurements track lengths between 5 to 10 meters (16 to 32 ft.) are expedient.

# 4 Program operations

The program serves as indication of magnet field data in colored, three dimensional representation.

## 4.1 Main window

After start of program the empty main window appears with the menu and tool bar and the setting and display range.



At the beginning display range is empty.

### 4.1.1 Toolbar

Some buttons are combined for fast operation. These are from left to right:

- ☐ New start of set-up for data acquisition
- ☐ Start starts a data acquisition
- ☐ Stop stops the current data acquisition
- ☐ Open reads a stored file
- ☐ Live starts the live mode
- ☐ Save saves the current file
- ☐ Peak switches between absolute and relative representation
- ☐ Norm resets main-representation to basic setting
- ☐ Prop switches between proportional and quadratic representation
- ☐ Zoom in and out with buttons [+] and [-]

### 4.1.2 Display range

The display shows a 3-dimensional, colored presentation of the measured values. The presentation can be rotated by moving the mouse while the left mouse button is pressed simultaneously.

## 4.2 Menu bar

### 4.2.1 Data menu

The data menu indicates entries to open and store measurement data. The stored measurement data is marked through the ending GRD.

- ***New*** starts a data recording with connected external measurement hardware. A pop-up window appears for the setting of measurement conditions.
- ***Copy into clipboard*** copies the current view into the temporary storage, so that it can be inserted into every image editing application.
- ***End*** closes program.

### 4.2.2 Display menu

In this menu you have the opportunity to switch between graphical and numerical view of measurements.

### 4.2.3 Options menu

With the options menu item a new window for the setting of program options is indicated. A description of various possibilities is shown there.

### 4.2.4 Info menu

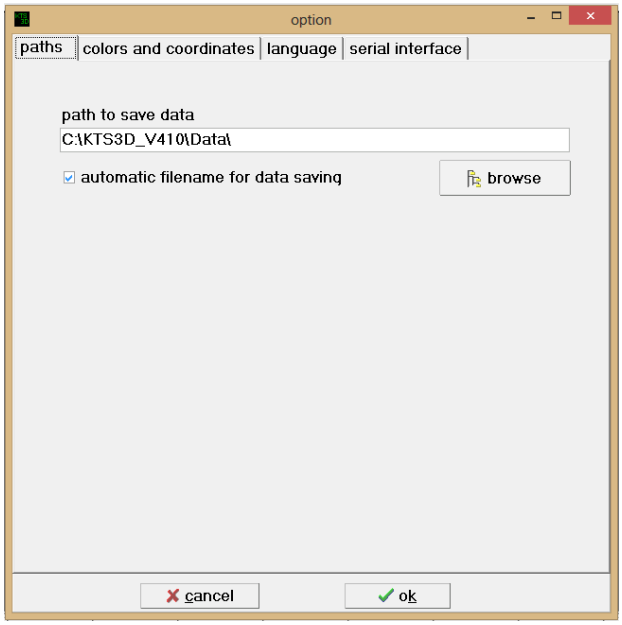
Delivers informations about the present version.

## 4.3 Options window

The options window is divided into four categories.

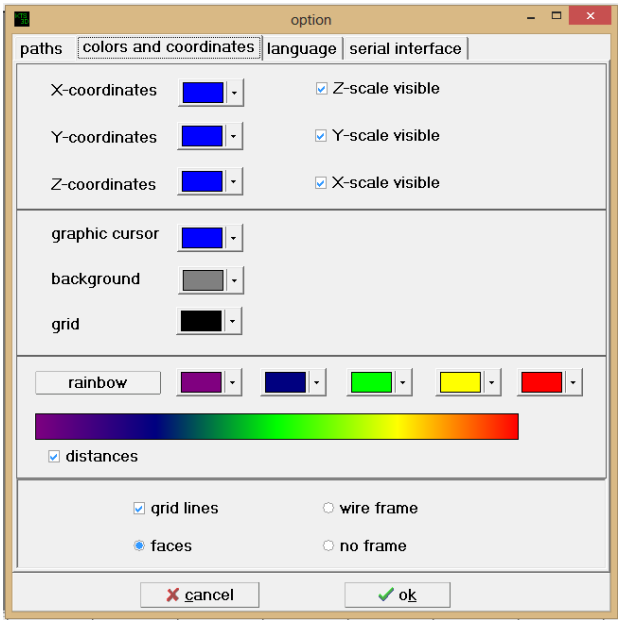
### 4.3.1 Paths

With the path modulation the index is defined for data storage. A selection dialogue appears after the [search] button is pressed.



### 4.3.2 Colors and coordinates

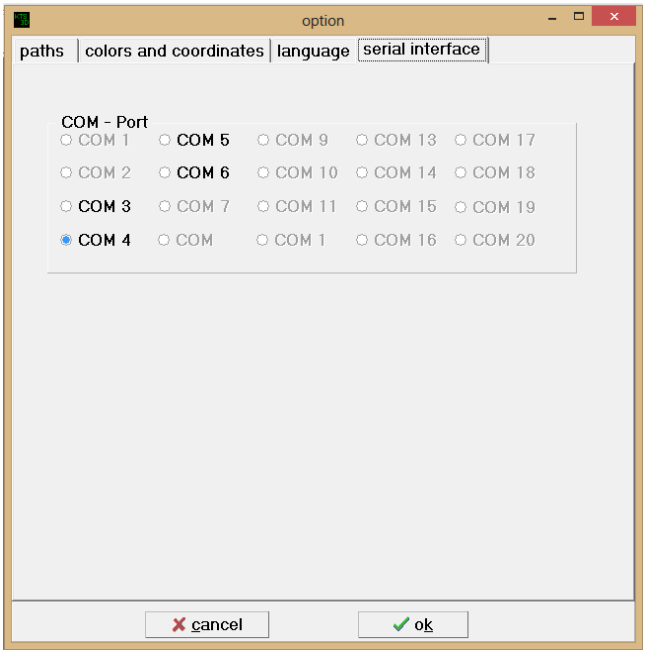
Here colors for the coordinate display, graphic cursor and background can be selected. After the appropriate corresponding buttons have been activated, a color-selection dialogue shows up.




### 4.3.3 Languages

For operation the program can completely be switched to languages shown below.

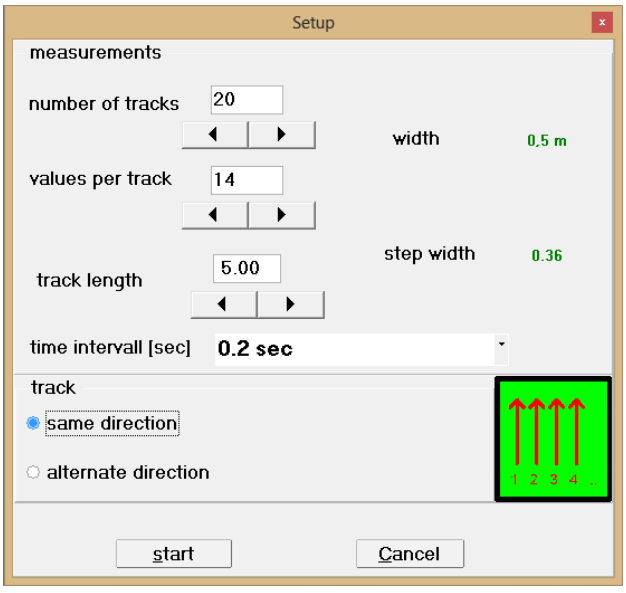
### 4.3.4 Serial Interface




In case of a reinstallation you can select the utilized Comport (see page 23, 6.7 Bluetooth pairing).

# 5 Data recordings

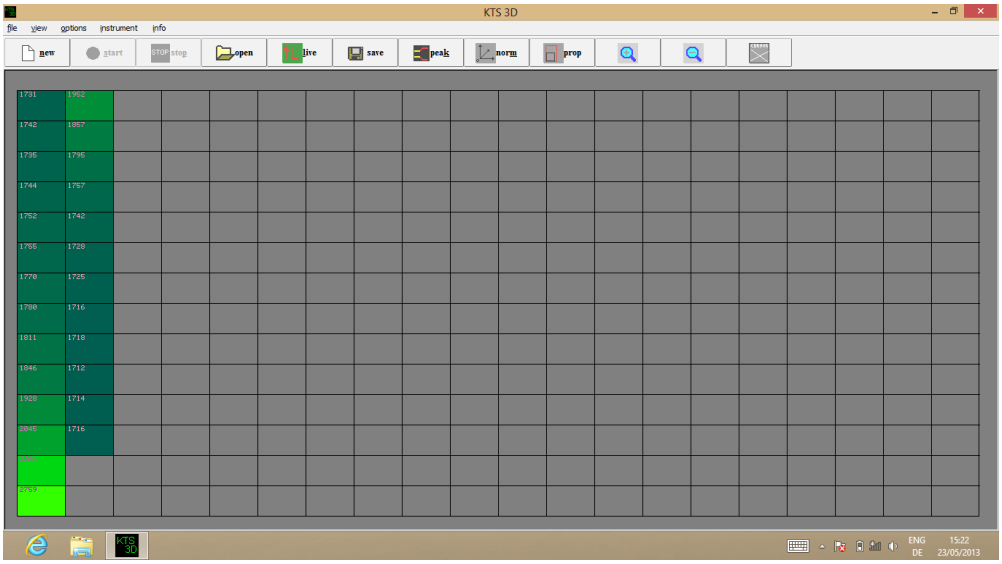
## 5.1 Modulation before data recording




Prior to data acquisition various settings are needed. In conjunction with the track values the track length determines the distance between the single measurements.(see *step width/settings window KTS 3D*). The values per track are limited to a maximum of 100.

After pressing [Start] button the measurement is activated; this can be carried out either manual or time-controlled (standard setting is 0.2 sec). With the [Cancel] button a program termination is given at all times. The switch between consensual and contrasensual movement is also possible.

### 5.1.1 Display during data recording




During data recording the display turns up two-dimensional and in color gradation. Of course, the shown nuances are dependent on the selected modulation. The end of a track is displayed, after confirmation the new track will be measured. A storage request appears at the end of the last track; afterwards a switch to the three-dimensional representation takes place.

### 5.1.2 Display after completion of data recording

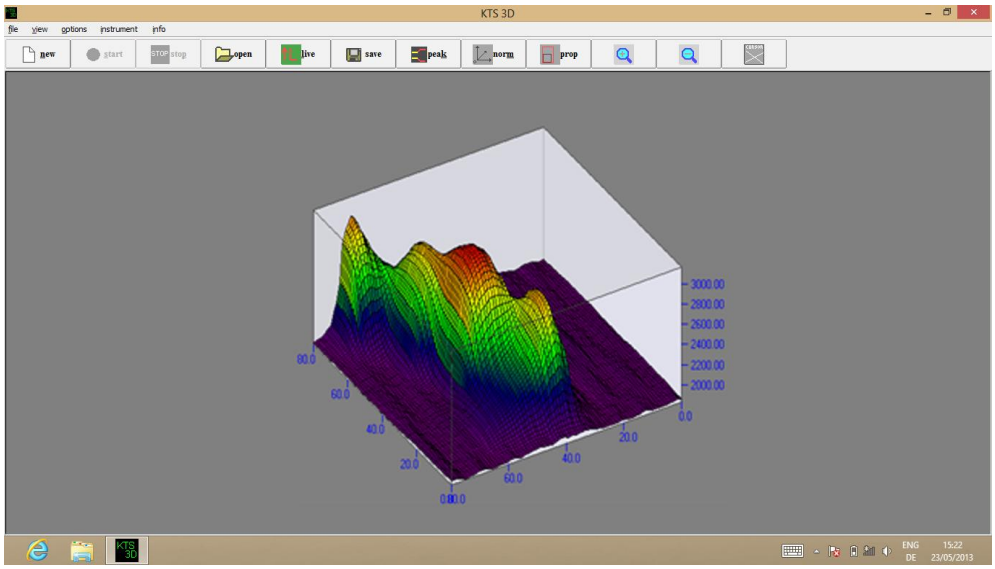



*Illustration results from under 5.1.1 pictured two-dimensional representation.*

### 5.2 Display alternatives

5.2.1 Proportional or square display

With the button [prop.] the representation switches between proportional and quadratic view. In the quadratic representation the image shows up with square elements. Details partially are better recognized here. The relation between track length to field width is not taken into account. The proportional representation is displayed under consideration of the real track length and field width like it was setted in [data recording].

> **Note:** The actual measured length / width is only given through the setting [data recording]. The correct input of exact length and width is essential.

5.2.2 Data presentation - absolute or relative

Here it is possible to switch between absolute or relative data presentation. The absolute representation shows the entire measuring range on the Z-axis. The value range for the relative representation is based on the smallest and largest measured value. This results in a maximum detail resolution – also with regard to the color representation.

## 6 Search process

During soil analysis you may choose between different search modes.

### 6.1 Search with the universal probe

- Activation through ON-/OFF-button.
- After switch-on display shows battery condition.
- Wireless connection via Bluetooth from computer to electronic unit.
- Hold the probe so that the arrow (fixed laterally) points to the ground during search (this way you will attain the highest search performance).
- Check of calibration (approx. 2.5) and
- Control of sensor value.
- Verify, that the indicated value is between 0 to 5. Should this not be the case, change the search direction slightly so that above value is displayed.

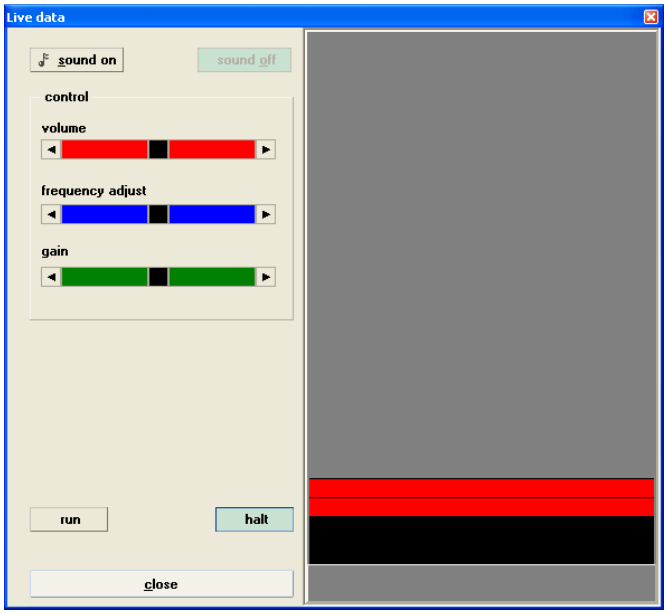
The further search process is decribed under 6.3.

## 6.2 Search with the super probe

The super probe is similar to the universal probe, but offers approx. 30% more depth performance. Beforehand it is absolutely necessary to select a search direction where values between 0 to 5 are displayed.

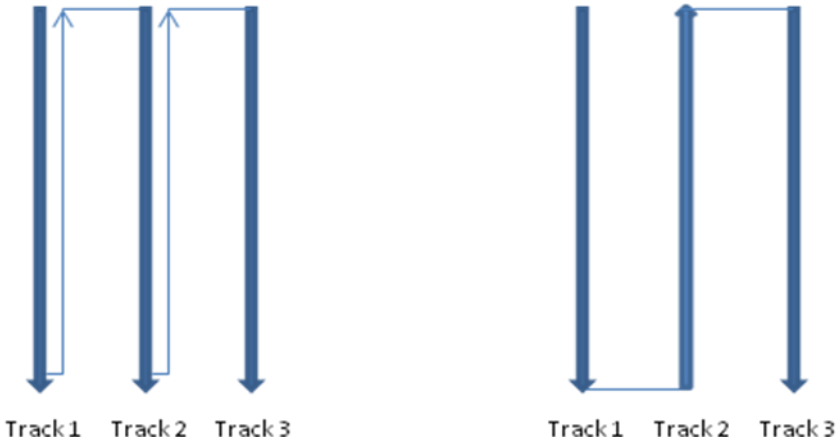
## 6.3 Live mode

To mark relevant sectors, it is reasonable to scan large areas in the live mode at first so that afterwards controlling in 3D is more precise. If the live mode stops unexpectedly, press “start” button again and continue with the search.



## 6.4 3D-search mode

For precise ground examinations the area must be divided into tracks. The tracks can be scanned in same direction or in alternate direction. Moving direction is selectable in the settings window.




The track length can be determined variably (during the search after large objects or excavations longer track lengths can be selected;.for the search after small items shorter track lengths are recommendable)..

## 6.5 Rechargeable battery and charger

Through the installed 2800 mAh li-ion battery a strong performance is guaranteed. With the lithium battery charger the battery can be fully charged within 90 minutes. The actual operating time is approx. 6-12 hours (depending on coil size and use of headphones). The charging procedure is indicated by the orange light emitting diode, the end of the charging process is signified by green light. After each charging the connecting cable for the battery charger should be removed.

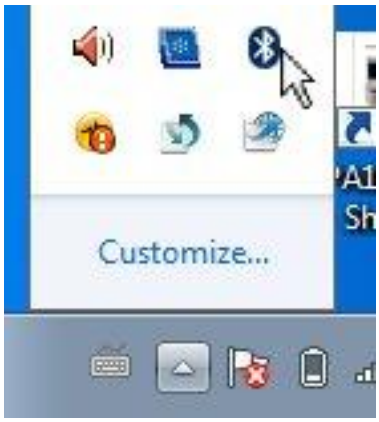
A voltage transformer enables charging in the car.

## 6.6 Driver-reinstalling (*only* by reinstalling)

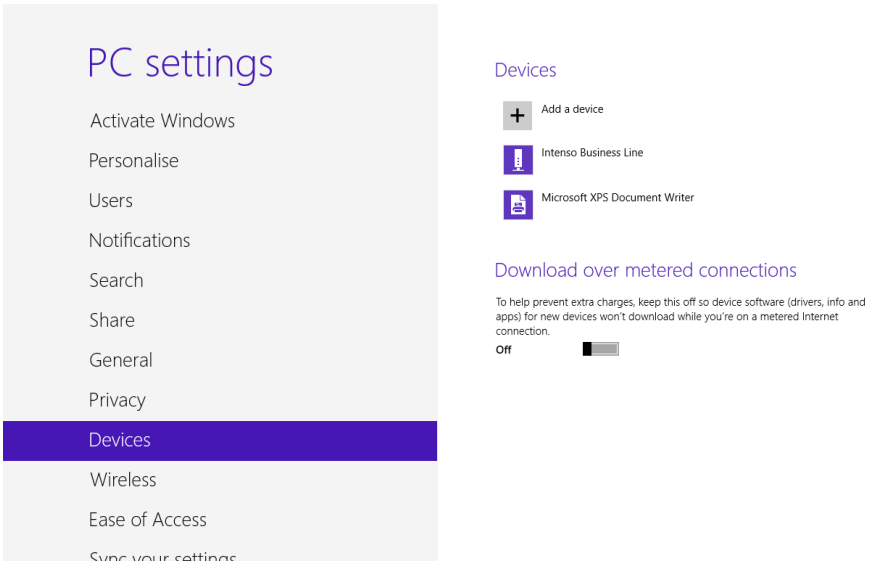
**Note:** In case you want to connect another laptop (with Bluetooth®-connection) to the GPA 1000 unit or if you have to reinstal Windows please copy the entire data content from the provided USB stick to the hard disc. Additional software is not necessary. Now the device is operational.

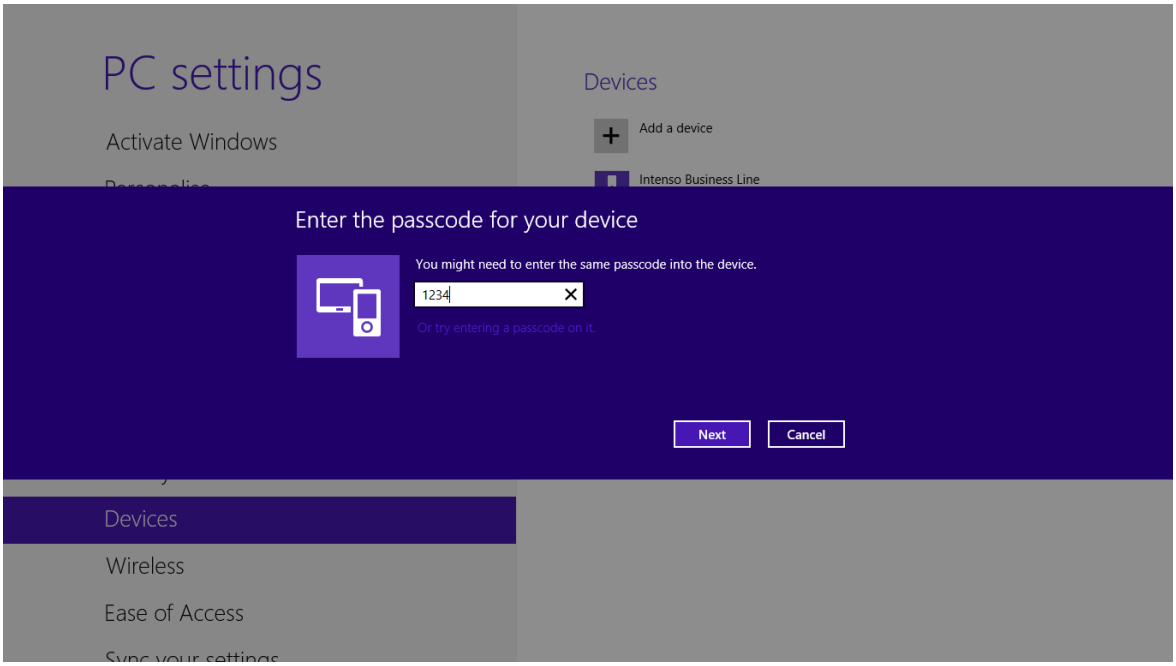
## 6.7 Bluetooth pairing

The Bluetooth® symbol appears in the menu bar. With a right-click on this symbol the **add a device**–window will show all available Bluetooth® functions (GPA must be working and the blue LED must flash).



Select **Ezurio Blu 2I**. In the next window insert the password **“1234”** and go to “Next” (the device will automatically instal the suitable drivers). Finally click the Close-button to conclude the procedure.




Click on the Bluetooth icon in Windows Taskbar, “Open Settings”, “COM Ports” – and keep the Outgoing COMPORT number in mind. After that open KTS 3D-Software, click on “Options” → “Serial Interface”, select the memorized COMPORT and click “OK”. Restart the software and the device will automatically be connected to the computer. The LED lights up permanently and GPA 1000 V16 is operational.

For additional application see that Bluetooth® is active and GPA 1000 V16 is operational (above proceedings must not be repeated).

# 7 System requirements and license agreements

## 7.1 System requirements

The program is a 32-bit-application, which is driven under Windows 98, Windows 2000, Windows NT, Windows XP or Windows 7 or 8. As minimum requirements for the expedient usage the PC should have the following configuration:

- Processor with pulse frequency from 1000 MHz or more
- Hard disc with approx. 10..20 MByte free storage space
- Graphic card with a minimum resolution of 800 x 600 points
- Bluetooth ability to the connection of the external measuring hardware

## 7.2 License agreements

The KTS 3D program as well as the entire accompanied electronic or printed documentation is subject to the copyright of KTS-Electronic GmbH & Co. KG. Should parts of the present license regulations feature alterations or expansions in comparison to former program versions, they will also apply to prior versions.

**The present license regulations become effective on May 1st, 2007.**

Through the utilization of the software the user agrees to the present license regulations. The right of use automatically will expire if the license regulations are violated.

## 7.3 Utilization regulations

After full payment of the invoice amount the customer is allowed to a not-exclusive right of usage of the program listed in the bill. This right is restricted to the owner of the original software. Consequently, the software can be used only on one single computer system at the same time. All present and future copyrights and/or industrial protection rights of the provided programs and of all programs derivative from it, program modules or in this context produced records remain at KTS-Electronic GmbH & Co. KG.

## 7.4 Liability exclusions

Despite carefully conducted tests mistakes cannot be ruled out. No acceptance of guarantee for the utilization of the program to a certain purpose. Especially no liability is adopted for consequential damages as well as profit and asset losses, that could result from the application of the program and the affiliated documentation.

Alterations in prices and modifications of all sorts in software or documentation shall remain reserved and do not require a separate notification..

# 8 Warranty

We grant repair work free of charge resulting from factory errors originated by mistakes and defects 24 months effective from date of purchase.

According to the following conditions we remedy deficiencies free of charge, if they are evidently based on manufacturing errors or defects and are reported to us immediately after assessment of damage within 24 months after delivery to the ultimate buyer.

Defective parts will be repaired gratuitous or will be replaced by efficient parts of our choice. KTS-Electronic GmbH & Co. KG reserves the right to exchange a device by an equal valued replacement unit in case the returned product cannot be required in an appropriate budget time frame.

On-site repairs cannot be demanded. Replaced, resp. exchanged parts will merge into our property.

The guarantee claim expires in cases of improper handling, gross carelessness or when repairs, modifications, additionally installed parts or extentions are carried out from persons which are not authorized on our part to do so.

Guarantee claims will neither effect an extention of the term nor they will implement a new time limit.

Further requirements, in particular such through extraneous causes resulting damages are excluded, unless a commitment is not necessarily the case.

We therefore are not liable for any accidential, indirect or other subsequent damages of any kind, which lead to limited use, data loss, profit setbacks or operating failures.

## 8.1 After expiration date

KTS-Electronic GmbH & Co. KG can agree upon a service after expiry of guarantee. In this case repairing and shipment will be charged.

## 8.2 Care

Your GPA 1000 V16 requires little maintenance, yet there are a few points, which should be taken into account, in order to ensure optimum operational readiness.. Avoid extreme temperatures, as this may damage electronic components. Protect the electronic housing with a plastic bag in case it is exposed to rain, fog or dust. Always keep your equipment clean and dry and wipe off sand and dirt.

### 8.3 Legal note

Before you start searching please note that monument protection regulations as well as other legal standards are relevant. KTS-Electronic GmbH & Co. KG assumes no responsibility for possible legal violations.

In case of doubts we recommend a comprehensive consultation with an attorney or national monument offices.

## 9 Contact

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