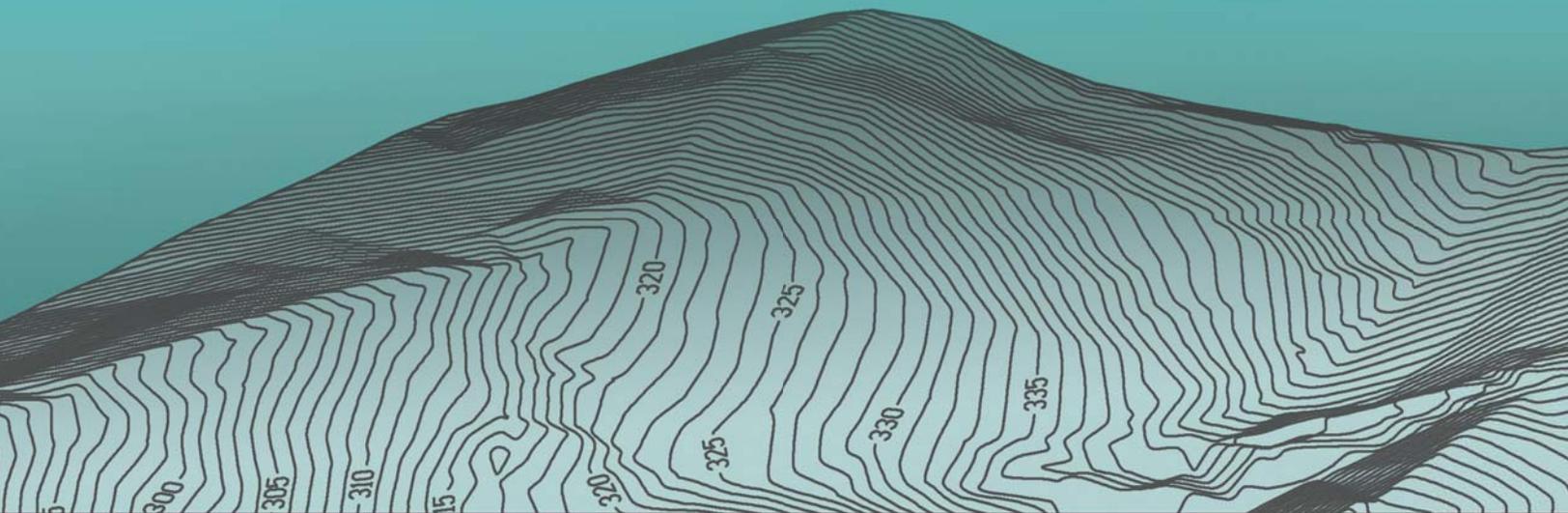


# SOKKIA

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**GEOPRO** FIELD





# **GEOPRO Field Operator's Manual**

Part Number 1017196-01

Rev A

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February 2017

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# Preface

Thank you for purchasing this Sokkia product. The materials available in this Manual (the "Manual") have been prepared by Topcon Positioning Systems, Inc. ("TPS") for owners of Sokkia products, and are designed to assist owners with the use of the receiver and its use is subject to these terms and conditions (the "Terms and Conditions").



Please read the terms and conditions carefully.

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## Manual Conventions

This manual uses the following conventions:

Convention	Description	Example
<b>Bold</b>	Menu, or drop-down menu selection	<b>File</b> ▶ <b>Exit</b> (Click the <b>File</b> menu and click <b>Exit</b> )
	Name of a dialog box or screen	From the <b>Connection</b> screen...
	Button or key commands	Click <b>Finish</b> .
Mono	User supplied text or variable	Type <i>guest</i> , and click <b>Enter</b> .
<i>Italic</i>	Reference to another manual or help document	Refer to the <i>Sokkia User’s Manual</i> .



Further information to note about system configuration, maintenance, or setup.



Supplementary information that can have an adverse effect on system operation, system performance, data integrity, measurements, or personal safety.



Notification that an action has the potential to result in system damage, loss of data, loss of warranty, or personal injury.

# Common

In order to be able to use for the first time the software GeoproField is necessary to perform two operations:

1. Install the software on your Controller / Total Station
2. Entry of the Activation Code

## Installation

To install or upgrade from previous versions of the software must do the following on the PC:

1. Install ActiveSync (on Windows XP) or Mobile Device Center 6 (on Vista, Seven or 8).
2. Unzip the file. Zip from which you will get a folder with 2 files.

Do not move the 2 files from this folder.

3. Then connect your Controller / Total Station to the PC via USB cable and turn it on.

Only on Total Station:

- a. When asked to enter in **USB mode**, answer **NO**.
  - b. Change to the window **Basic measures** without pressing the **PRG** button.
4. Next, execute the installer on the PC.
  5. On the Total Station:
    - a. Press **PRG**
    - b. You should see the entry for the installed software. If it does not appear, power off and on the total station.
    - c. Press on the entry

On the controller:

- a. Start the software from the icon created on the **Start Menu** of the controller.

## Product Activation

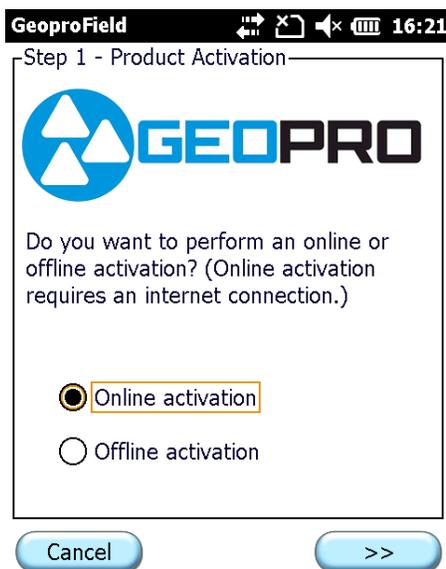
To operate GeoproField to its full potential, you must activate the program.

The software can also run in Demo mode, but the number of points that can be measured or staked is limited, as not all features are enabled.

The activation code is obtained from the SD Card inserted in the Controller or is calculated according to the serial number on the Total Station.

When GeoproField starts for the first time, the window for entering the activation code displays. Once these codes have been entered correctly, the window will not be shown again.

If you press **Cancel**, the program starts in Demo mode.



**Figure 1: Activation**

There are two methods for program activation:

- The Online activation
- The Offline activation

## Online Activation

1. Your controller must be connected to Internet for online activation. This can be done either by connecting via the ActiveSync software to a Pc in turn connected to Internet (ADSL, ...), a modem, or WI-FI.
2. Once connected, press the >> button to display the **Step 2 - Product Activator** window.
3. Enter your Sokkia account information to log into the license server.
4. Press >> to display the **Step 3 - Product Activator** window.

5. If the request code is successful, the appropriate fields will be filled automatically and will be enough to confirm them by pressing **OK**.



In the first window:

- if you press the button **Reset Password** the program send at your email address a message with the instruction for changing the account password
- if you press the button **Create Account** the program will show you a sequence of windows to create your Sokkia account
- if you press the button >> and the login data is correct the program will show the next window.

The figure shows two screenshots of the GeoproField software interface during the online activation process.

**Left Screenshot (Step 2 - Product Activation):** The window title is "GeoproField" and the time is 16:22. The text reads "Step 2 - Product Activation" and "Please enter your Sokkia login information:". There are two input fields: "Login (e-mail)" containing "email@provider.com" and "Password" containing "\*\*\*\*\*". A green "Reset Password" button is next to the password field. Below the fields is a green "Create Account" button. At the bottom are two blue navigation buttons: "<<" and ">>".

**Right Screenshot (Step 3 - Product Activation):** The window title is "GeoproField" and the time is 18:19. The text reads "Step 3 - Product Activation" and "Please enter the serial number found on the Software Purchase Certificate:". There are two input fields: "Serial Number" (empty) and "Device ID" containing "016FH-3VYTH-RQEDS". Below the fields are three buttons: a grey "Cancel" button, a blue "<<" button, and a grey ">>" button.

**Figure 2: Online Activation**

## Create Account

If you press the button **Create Account** the program will show you the sequence of windows shown in Figure 7.

The screenshot shows three panels for user registration in the GeoproField application. The top status bar indicates the time is 16:32. The first panel, 'Shipping Address - User Registration', has a checked box for 'Same as Billing Address' and fields for Street (address), City Name (city), Country (United States), State (Alaska), and Zip Code (60100). The second panel, 'Billing Address - User Registration', has fields for Street (address), City Name (city), Country (United States), State (Alaska), and Zip Code (60100). The third panel, 'Contact Information - User Registration', has fields for E-mail Address (email@provider.com), First Name (name), Last Name (surname), Password (\*\*\*\*\*), Confirm Password (\*\*\*\*\*), Company Name (my company), and Phone Number (111111). Navigation buttons include 'Cancel', '<<', and '>>' for each panel.

**Figure 3: Create Account**

In these windows you can enter all the required data to register on the Sokkia server and create your account for the activation procedure.

## Offline Activation

1. Offline Activation does not require that your controller is connected to Internet.
2. You will need the Serial Number and the Activation Code provided by your dealer.
3. Press >> to display the **Step 2 - Product Activator** window.
4. Enter the **Serial Number** and the **Activation Code** provided by your dealer.

The screenshot shows the 'Step 2 - Product Activation' window in the GeoproField application. The status bar shows the time is 17:57. The window contains the text: 'Please enter the serial number and a valid activation code for the following Device ID:'. Below this are three input fields: 'Serial Number' (empty), 'Device ID' (016FH-3VYTH-RQEDS), and 'Activation Code' (empty). Navigation buttons at the bottom include 'Cancel', '<<', and '>>'.

**Figure 4: Offline Activation**

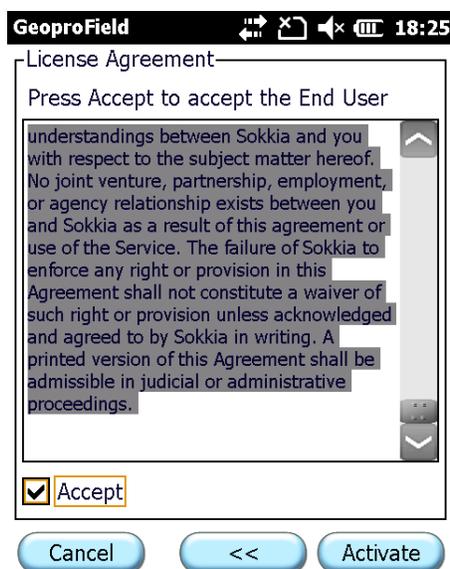
# License Agreement

The **License Agreement** window appears at the end of the Online or Offline activation procedure, or at the end of the **Create Account** windows. The window displays the License Agreement for using the Sokkia products.



Carefully read the entire license agreement.

1. Check the **Accept** box to accept the conditions of the license agreement.
2. Press **Activate** to activate the software.



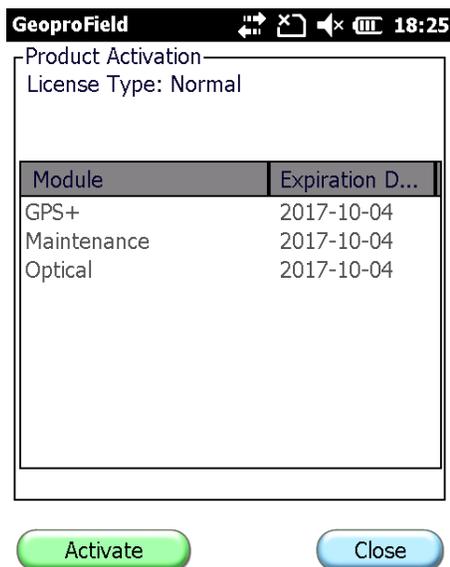
**Figure 5: License Agreement**

If the activation procedure is successful, the **Product Activation** window (Figure 7) displays the information related to the program activation.

This window displays:

- The license type
- The module activated
- The eventual Expiration date of any module

3. You can press **Activate** to restart the activation procedure, or press **Close** to start GeoproField.



**Figure 6: Product Activation Complete**



The **Device ID** shown in some windows is essential for the proper functioning of the Controller. If the window does not show, this data the controller is not able to work with GeoproField .

## First Steps

A GeoproField work corresponds to a file with extension **.FCE** stored on the Controller / Total Station memory.

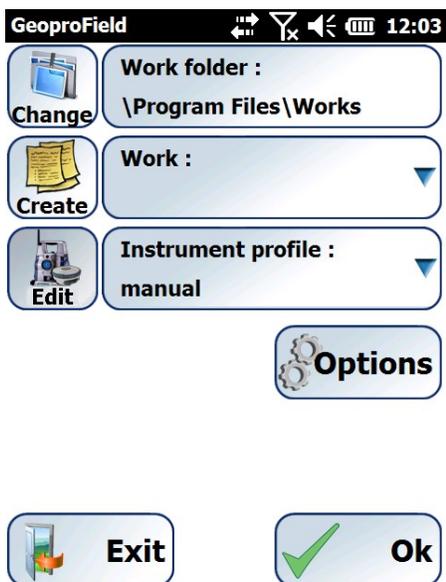
Each work contains a TS fieldbook and a GPS fieldbook. The first in turn can contain several Jobs, several Stations and multiple TS points for each station. The GPS fieldbook may contain several Groups and several GPS points of for each Group. The work may also contain control points to orient both the Stations and GPS Groups, as well as known points mainly useful for stakeout.

The first time you use GeoproField you must:

1. Select the folder where to store the works.
2. Enter the **Work** name.
3. Choose the **Instrument Profile** to use.
4. Press the **OK** button to confirm and go to the base view of GeoproField.



As long as you do not choose a valid folder, you will not create a new work



**Figure 7: Work Folder**

Initially the fields **Work** and **Instrument profile** are empty. The **Work folder** will be initialized to a folder **Works** created next to the folder from which you started GeoproField.

5. The next time you start GeoproField, all three boxes show the last choice. They have to be modified only if you want to change the folder where to save the work, the work or the instrument with which to work. To do so just press on the box you want to change or by pressing the button that precedes it.
6. By pressing the **Change** button located next to the **Work** folder, the following window will appear:
  - At the top appears the currently selected folder.
  - On the tree view you can choose the folder to save and to load works.
  - Pressing the **New Folder** button, you can create a folder in the desired position of the tree.
  - The **Update** button allows you to re-read the whole tree.
  - The **OK** button is used to confirm the new folder selection, while **Cancel** keeps the previous entry.



**Figure 8: Job Folder**

7. The Work field shows the name for the work you are going to open. Press the **Create** button to open a window where you can enter the name of a work to be created from new. If you enter the same name as an existing work, the software will not continue. To open a work already created, you must press on the text box and select the project from the list that appears.

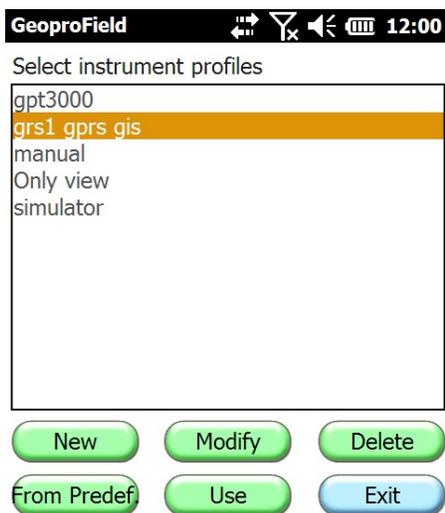
The Instrument profile field displays the name of the profile in which is stored the instrument type and the options that are to be used to measure data.

8. By pressing the **Edit** button the following window will appear:
  - All the Instrument profiles created and stored on your controller are shown in the list box.
  - Press **New** or **From Predef.** to start the creation wizard profile.

Select the profile you want to use and press **Use** to confirm your choice.



Pressing the **From Predef.** button, you will begin the creation of the profile from the default templates.



**Figure 9: Select Instrument Profiles**

9. To change the profile you are using within the software, or to choose another profile, select the menu item **Conf | Instrument selection**.



For information about using the software in the various modes, see the specific section.

10. Press the **Options** button that is located below the **Instrument profile** field, to display the window shown in Figure 10.
  - **Work management:** allows you to copy or delete works saved in the selected folder. This is useful if you want to save works on an external storage or to create backup copies.
  - **Work retrieving:** you can open backup works of GeoproField. This feature is useful if, for some reason, the .FCE or .FW1 file are no longer legible. By activating this function, a window appears in which you see the works that you can recover. It is advisable to use, if any, the file with extension .F\$\$ of the work that you want to recover as more recent or at least simultaneous to .BAK file. After selecting the file, the name by which the work will be recovered is shown. This name can be changed by pressing the **Change** button. However, it should not be renamed exactly as the original project.
  - **Settings:** allows you to set some general options.

- **Back:** returns you to the initial window.



**Figure 10: Work Manager**

GeoproField can read files created by Geopro Office. It may in particular:

- Open a work saved in a FW1 file by Geopro Office 2008 version agg. 3 or higher.
- Open a work saved in a FCE file by Geopro Office version prior to 2008 agg. 3.



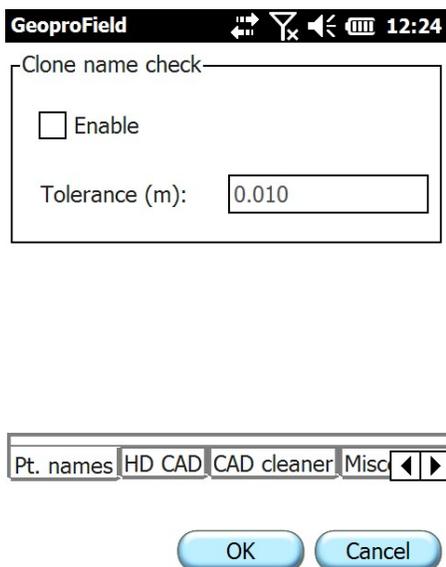
All files must be contained in the **Works** folder in order to be seen by GeoproField.

## General Options

The **General Options** window is activated when you press the **Setting** button from the selection window that appears when you start the software. This window allows you to choose the options that will be used each time you use GeoproField and are not related to the individual work. The window consists of five windows: Pt. names, HD CAD, CAD cleaner, Miscellaneous, and Local.

### Pt. names

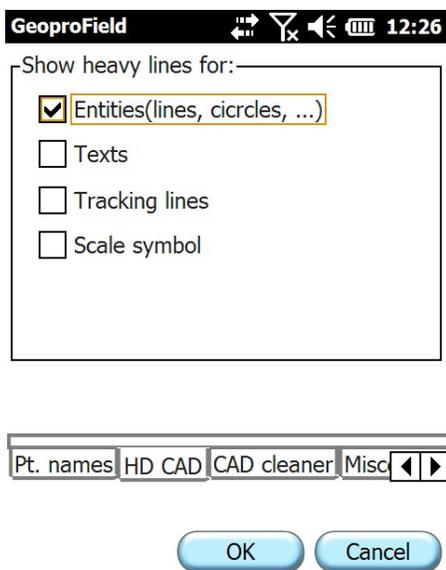
- It allows you to choose whether or not to activate the **Check clone name**.
- With the check on **Enable check**, GeoproField verifies, during the measuring operation, if there are points with the name cloned (duplicated) and the tolerance of these measure.
- If the software find points with cloned name shows the **Cloned name** window.



**Figure 11: Clone Name Check**

## CAD – HD

In this window you can decide to show the graphic **Entities ( lines, circles, etc...)**, the **Texts**, the **Tracking lines**, and the **Scale symbol** more markedly in the CAD view.

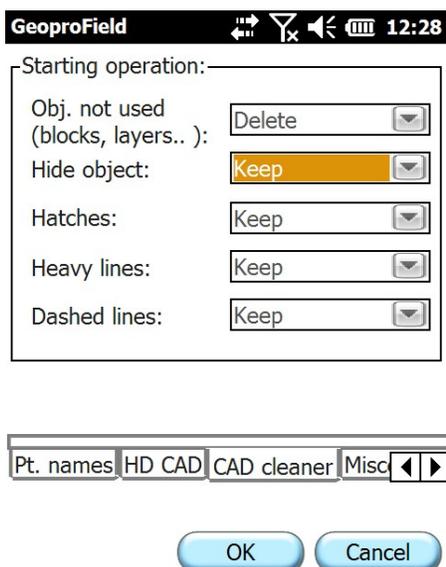


**Figure 12: Show Heavy Lines For:**

## CAD cleaner

In this window you can decide to keep or delete the following entities when opening FCE-FW1 files or when importing DXF-DWG files:

- Unused objects;
- Hide objects;
- Hatches;
- Heavy lines;
- Dashed lines

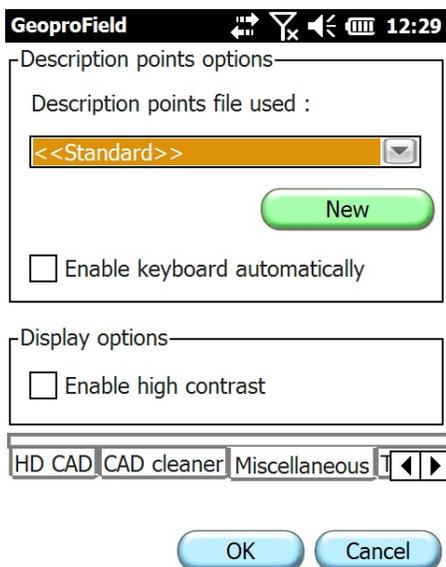


**Figure 13: CAD Cleaner**

## Miscellaneous

In this window you can decide:

- the **Description file** to use when entering of the description of the point. The software provides the user with a **Standard file**. The user can create a custom file using the command New; the new file may be created as an empty file or a file with the same descriptions of an existing one (Copy from).
- if the keypad will be automatically shown when the user enters the description of the point.
- if use the high contrast icons, which have only two color and can be better viewed on full light.



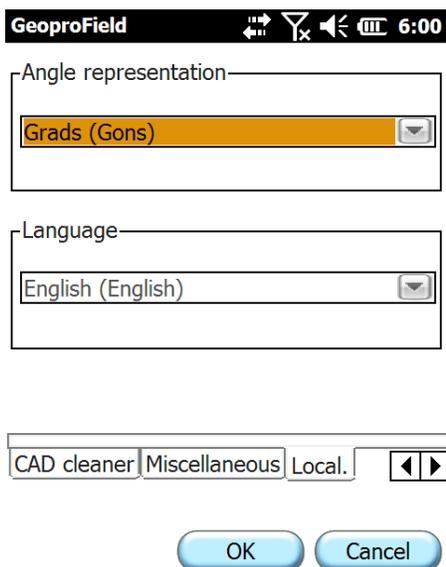
**Figure 14: Description Points Options**

## Local

In this window you can choose the angle representation format (Grads, Decimal Degrees and Degrees,Minuts,Seconds) and the software language.

The choices that have been made in these windows will be stored and used for all future used of GeoproField and not only in the current work. Some of these options change the behavior of the software, for example:

- If **Check clone name** checkbox is enabled in the Pt. Names window, the software recognizes, during the measuring operations, the points with duplicated name and shows a window consisting of two windows: Choice and Points.



**Figure 15: Angle Representation**

# Choice

The **Choice** window displays:

- the number of recognized points with the same name;
- the name of point just measured;
- the operation to apply to the cloned point;
- the suffix name of the point;
- The operations that can be chosen are:
  - Change the current point name;
  - Delete the previous points;
  - Delete the current point;
  - Add a suffix to the previous points;
  - Add a suffix to the current point;
  - Coordinates average;
  - Leave duplicates points with different coordinates.

Press the OK button to confirm and return to the measure window.



The point name field is enabled when the chosen operation is **Change the current point name**. The Suffix field is enabled when the chosen operations are **Add Suffix to the previous points** and **Add Suffix to the current point**.

GeoproField 10:57

Points found:2

Point name : 101

Wanted operation

Change the current point name

Suffix: \_Err

OK

Choice Points

**Figure 16: Choice**

## Points

The Points window displays:

- the duplicated point and the belonging station or group;
- the differences between coordinates;
- the average results between points.

The fields that aren't in the tolerance are highlighted in red.

The results of the average points are highlighted in cyan so that the results can easily checked in the case the chosen operation is **Coordinates average**.

This window has only the intent to show the differences between duplicated points, therefore to confirm the operation to be made, you must come back to the window **Choice**.

- If is enabled the option **Enable keyboard automatically** when is opened the window for the choice of description to assign to the point and is pressed the keypad button, the software remember this choice and then repeats it the next times. To use again the window for the choice of the descriptions you must press the keypad's **X** button.

GeoproField 13:29

List of points with name:101

Tipo	dN	dE	dZ
Cel, Sta: 200	0.582	0.459	0.013
Cel, Sta: 200	-0.582	-0.459	-0.013
AVERAGE			

Choice Points

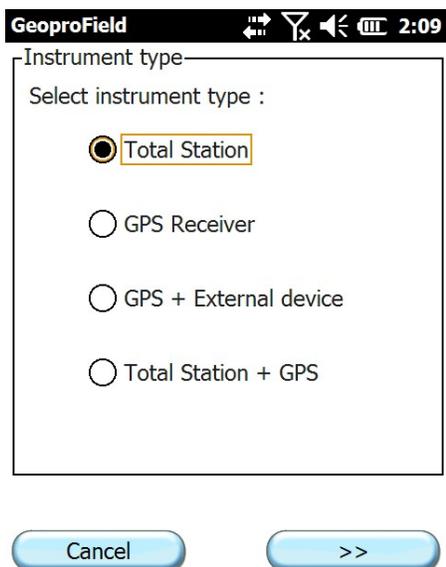
**Figure 17: Activation Code**

## Instrument Profile Creation

The creation of an instrument profile is made through a wizard. This starts pressing New or Modify button in the **Select instrument profile** window. The first window of the wizard showed is:

- Select instrument type – Allows to choose:

if the used instrument will be a TS, a GPS receiver or both

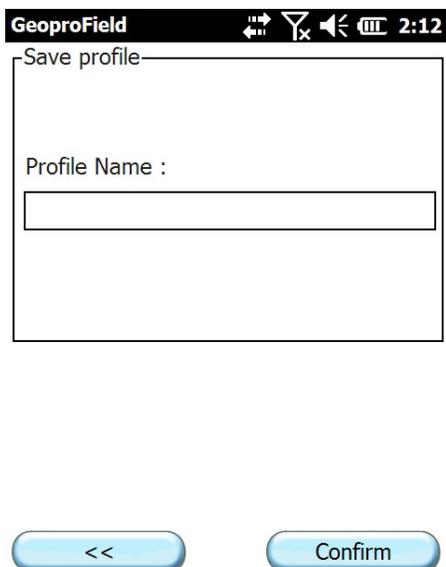


**Figure 18: Activation Code**

Select the instrument type you want to use and press the >> button to start the specific wizard. Any of these wizards are composed by more windows that are showed step by step depending on the choices that have been made during the wizard. The sequence of the windows depends on the instrument chosen and in part also by the choices done.

Whatever choice made, the wizard will finish with this window:

- Save Profile – Allows to choose the name assigned to the Profile.



**Figure 19: Save Profile**

# Total Station Profile Creation

## Select Total Station

Total Station Profile Creation allows you to choose the brand and the model of the Total Station.

GeoproField can be connected to a Total Station in two ways:

- By a direct connection with a serial cable or a Bluetooth..
- By a Remote Control System or a radio modem.



**Figure 20: Total Station Profile Creation**



The choice of the instrument affects the operations of:

- Stakeout.

The horizontal and vertical shifts in angles and distances will be inverted depending on the chosen mode (standard or one man operation).

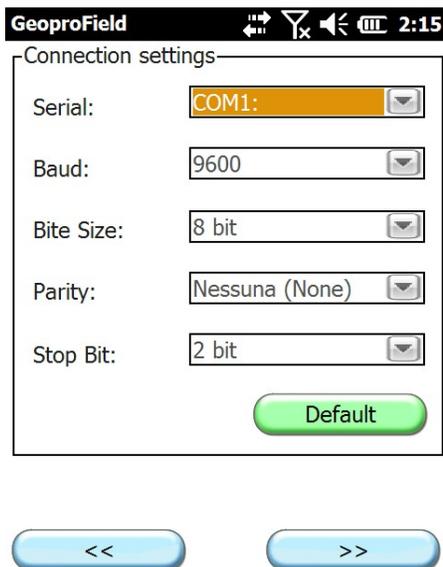
- Measured Offset.

The right and forward offset will be opposite effect depending on the chosen mode (standard or one man operation).

## Connection Settings

Connection settings allows you to choose:

- the serial port and the baud rate for connection with the Total Station;
- the number of byte ( Byte Size ), the parity type and the number of stop bit.



**Figure 21: Connection Settings**

The following options will be shown in the wizard only in the case a motorized total station was chosen. Moreover, depending on the chosen instrument, all or only some of the below options can be enabled.

The windows are:

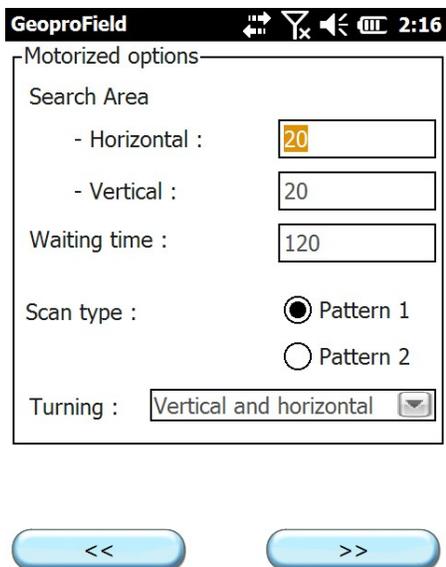
### Motorized Options

From the Motorized Options window choose:

- the size of Searching Area;
- the time that the instrument waits every time that the tracking with the prism is lost before to start a new research;
- the type of pattern to execute for the prism research;
- the type of rotation that has to be executed in rotations for searching.



Sokkia recommends choosing a valid research area for optimization the prism research by the instrument. For example, if we are in a plane ground, a rectangular search area, with a reduced vertical extend, will improve the research.



**Figure 22: Motorized Options**

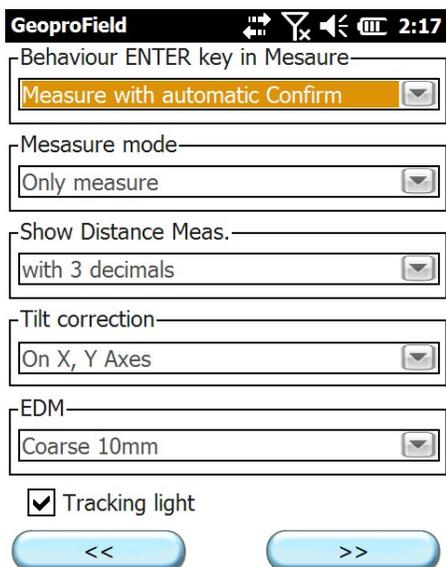
## Options

From the Options window choose:

- the behavior of ENTER key;
- the measure mode between Only measure and Collimate + Measure;
- 3 or 4 decimals for the distance;
- the axis for the automatic correction of tilt;
- the precision of the measurements;
- the enabling of the tracking light.



Increasing the precision of measure the instrument takes a longer time to execute it. At the same time it will more slow to start the measure if the tilt correction is used.



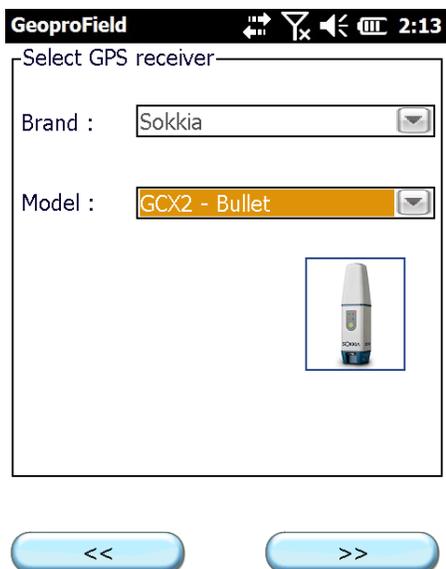
**Figure 23: Options**

## GPS Receiver Profile Creation

### Select GPS Receiver

From the Select GPS Receiver window choose:

- the brand and model of the GPS receiver.



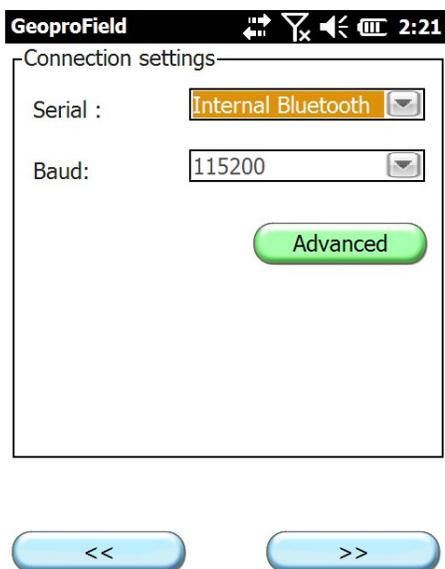
**Figure 24: Select GPS Receiver**

## Connection Settings

From the Connections Settings window choose:

- the serial port and the baud rate for connection with the GPS receiver.

By pressing the **Advance** button you can set some particular options of the GPS receiver.

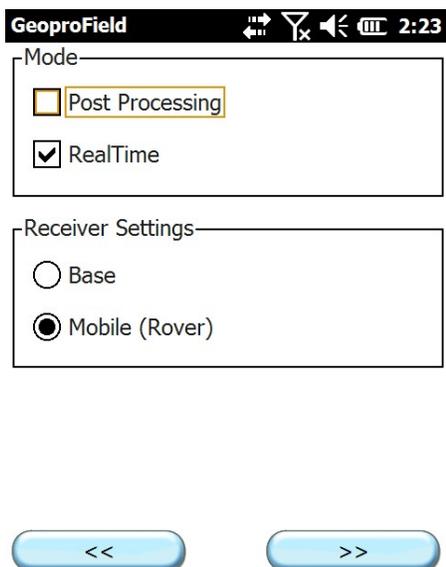


**Figure 25: Connection Settings**

## General

From the General window choose:

- the working mode between Real Time and Post Process or both;
- the type of receiver between Base and Mobile (Rover).

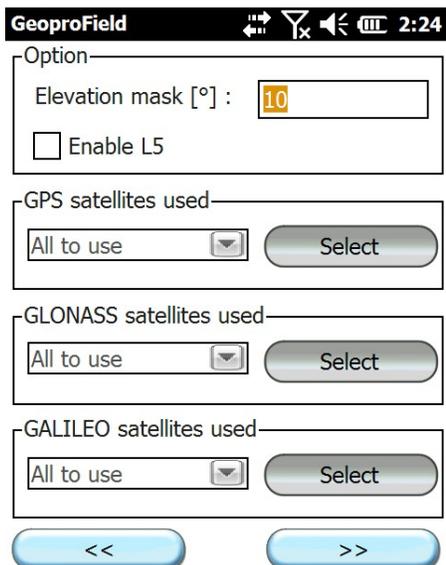


**Figure 26: General**

## Satellites Options

From the Satellites Options window choose:

- which satellites use and which satellites discard using the CutOff angle and if enable or not the L5;
- if use or not the GLONASS, GPS and Galileo satellites;
- which GLONASS, GPS and Galileo satellites discard and which of them keep by pressing the **Select** button.



**Figure 27: Satellites Options**

## Antenna Options

From Antenna Options choose:

- the antenna height in meter in respect to the ground and the eventual offset;
- the antenna model.



If the model chosen is **Generic** you must also enter the other values, otherwise the default values that can't be modified will be entered.

If the receiver type chosen is Base, the **Measured Height** data are not shown.

**Figure 28: Antenna Options**

## RTK Receiving Correction

This window appears only if the receiver type chosen is Rover.

It allows to choose:

- The type of device used to receive the RTK correction;
- the baud rate and the serial port to receive the RTK correction.

GeoproField 2:27

Receive RTK Correction

Receiver Port :  
c

Connected device :  
Controller Modem

Model :  
[Empty]

Baud :  
9600

Base Station Make :  
[Empty]

<< >>

**Figure 29: RTK Receiving Correction**

## RTK Message

This window appears only if the receiver type chosen is Rover.

It allows to choose:

- the message type for the RTK correction;
- the sending of the NMEA message;
- the method to receive RTK message.

GeoproField 9:50

RTK Parameter

Type :  
RTK-RTCM 3.0

Send NMEA message

RTK  
Extrapolation

Ambiguity fixing level :  
Medium

Max RTCM Period [sec] :  
30

<< >>

**Figure 30: RTK Message**

## Enable Solution

This window appears only if the receiver type chosen is Rover.

It allows to choose:

- the solution types accepted by the software;
- the possible use of validation criteria on precision,
- the maximum value for the horizontal and vertical RMS, as well as PDOP;
- the kind of acoustic warning to use in case of alarm;



If the Action for the Accuracy limits is **Nothing**, the text box of horizontal and vertical value, as well as PDOP, aren't enabled

**GeoproField** 9:52

Enable Solution

Fixed       DGPS Code

Float       Standalone

Accuracy Limits

Action :

Horizontal RMS [m] :

Vertical RMS [m] :

Pdup :

Sound alarm :

<<      >>

**Figure 31: Enable Solution**

## Connection Settings

This window appears only if the device chosen for the RTK correction is kind of Ntrip or is using a modem of the controller.

It allows to choose:

- the server to connect to download the Ntrip Source Table;
- the user name and the password to login to the server;

- the virtual port used by GPS receiver to receive the correction.



The virtual port must be a free serial port of GPS receiver, so be careful to don't choose the serial port used for Bluetooth or serial connection.

**GeoproField** 10:00

Connection settings

Server : NETGEO

Network : Automatic detection

User : user

Password : \*\*\*\*\*

Confirm password : \*\*\*\*\*

Virtual Port

Serial : b

<< >>

**Figure 32: Connection Settings**

## GPRS

This window appears only if the device chosen for the RTK correction is a GSM internal NTrip or external NTrip.

It allows to choose:

- the dial number to connect to the network;
- the user name, the password and pin to login to the service;
- the name of access point to connect to the network GPRS.

GeoproField 10:04

GPRS

Dial num : \*99\*\*\*1#

User : 333123456

Password : 0000

PIN : 1111

APN : ibox.tim.it

<< >>

**Figure 33: GPRS**



User name, password, PIN and APN depends on card SIM used from GSM and from the telephone provider, and except for the APN, they aren't always required.

## Select serial port

This window appears only if the receiver type chosen is Base.

It allows to choose:

- which serial ports of the GPS to use to out the correction

GeoproField 10:05

Select serial port for output correction

Serial A

Serial B

Serial C

Serial D

<< >>

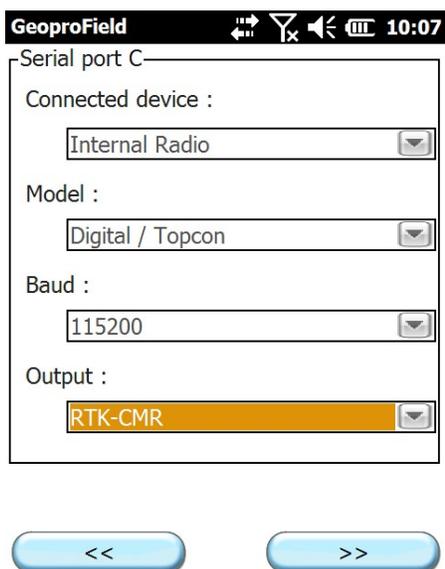
**Figure 34: Select Serial Port**

## Serial Port

This window appears only if the receiver type chosen is Base and will show one for each serial port chosen in the previous window.

It allows to choose:

- which device is used for send the RTK correction;
- the baud rate for send the correction correctly;
- the kind of message to send.



**Figure 35: Serial Port Options**

## Post Processing Alarms

This window appears only if the receiver type chosen is Rover and the working mode is Post Processing.

It allows to choose:

- if use or not the warning limits in the recording process of Post Processing data,
- the minimum number of satellites;
- the maximum value of PDOP;
- the minimum value of available memory in the GPS receiver;

- the kind of acoustic warning to use in case of alarm.



If it is not enabled the option Enable warnings, all the text boxes are disabled.

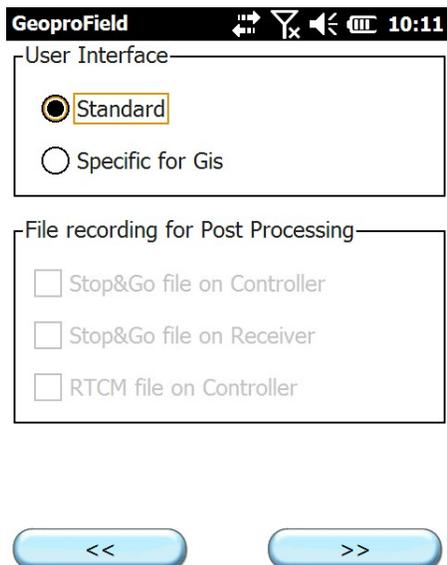
**Figure 36: Post Processing Alarms**

## Working mode

This window appears only if the receiver type chosen is Rover and the receiver working mode is RTK.

It allows to choose:

- the type of interface between the standard survey mode or a specific interface for the GIS operations.
- the possible saving of the Stop&Go file in in the controller
- the possible saving of the Stop&Go file in the receiver
- the possible saving of the RTCM file in the controller for post processing purposes



**Figure 37: Working Mode**



Many of the windows shown above can be retrieve individually by an entry in the context menu Conf., but the changes not be save in the file of the Profile.

## GeoproField Views

GeoproField is composed by some views: the Base view appears just after opening a work. Other views are Stakeout, CAD, Archive and Configuration.

The Base view changes depending of the instrument profile chosen: Total Station or GPS receiver. In both case an icon list is shown. Other specific views are opened by clicking on one of them, or some operations, like orientation, measure, stakeout, etc..., are launched.

### Base View for Total Station

- Station: to add a new station to the work
- Orient: to recompute the orientation of the last station entered or of all TS data
- Measure: to acquire new TS points
- Stakeout: to show the Stakeout view
- Scan: to show the Scan view
- CAD: to show the Graphical view
- Archive: to show the Archive data view
- Configure: to show the Configuration view for total stations

- Exit: to exit from the project and save the modifications



**Figure 38: Base View for Total Station**

## Base View for GPS

- New group: to add a group to the work
- Orient: to recompute the orientation of one or many groups
- Measure: to acquire new GPS points
- Stakeout: to show the Stakeout view
- CAD: to show the Graphical view
- Archive: to show the Archive data view
- Configuration: to show the Configuration view for GPS receivers
- Exit: to exit from the project and saving the modifications



**Figure 39: Base View for GPS**

## Stakeout View

- Points: to launch the stakeout operation and select or draw the points to stake
- Line: to launch the stakeout operation by line and select or draw a line to stake.
- Polyline: to launch the stakeout operation by polyline and select or draw a polyline to stake.
- Arc: to launch the stakeout operation by arc and select or draw the arc to stake.
- Plane: to launch the stakeout operation by plane and select or draw the plane to stake.
- Road: to launch the stakeout operation by selecting an existing road or profile to stake.
- Slopes: to launch the stakeout operation by selecting an existing road to stake its slopes.
- Back: to come back to the previous view



This view is the same for a TS profile or a GPS profile. The only difference will be in the stakeout data window that it will show the TS or GPS data



**Figure 40: Stakeout View**

## Archive Data View

- Grid: to show a view which displays in a grid all the stations, the groups, the TS points, the control points, etc... stored in the work
- Tree: to show a Tree view with nodes and sub nodes referring to stations, groups, TS points, control points, etc...
- Roads: to add, delete or modify the roads stored in the work
- Import: to show the data import view where choose the format of the file to import
- Export: to show the data export view where choose the format of the file to export
- Back: to come back to the previous view



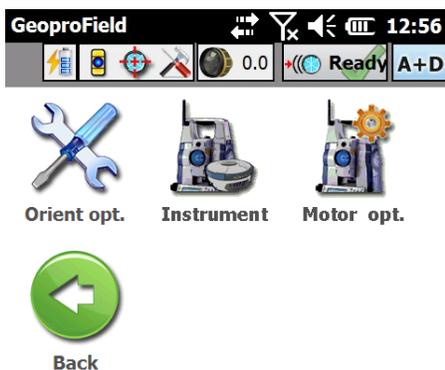
This view is the same for a TS profile or a GPS profile.



**Figure 41: Archive Data View**

## Configuration View Total Station

- Orient Options: to modify the scale factor and choose if work in 2D or 3D
- Instrument: to launch the instrument profile selection
- Motorized Options: to modify the scan settings for the prism research and other motorized options. This icon is showed only if you are working with a motorized Total Station
- Back: to come back to the previous view



**Figure 42: Configuration View for Total Station**

## Configuration View GPS

- Connect\Disconnect: to connect or disconnect from GPS Receiver
- Ext.Device: to enable or disable the external device used from GPS receiver to send or receive the RTK correction
- Satellites: to choose the satellites to be used or not for the position computation
- Ant.Height: to choose the model and the height of the antenna
- RTK Format: to choose the message type and some options for receive RTK correction
- RTK Receive: to choose which serial port and by which external device receive the RTK correction
- Clear NVRAM: to reset the GPS receiver
- Instrument: to launch the instrument profile selection
- Indietro: to come back to the previous view



Remember that all operations and the windows connected to the icon of the various views, can be executed also from the menus File, Conf and Tools at bottom of any view.



**Figure 43: Configuration View for GPS**

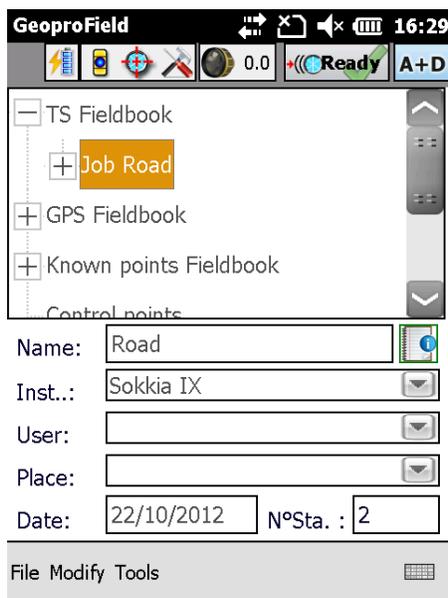
## Tree View

The Tree view of GeoproField is showed pressing first the Archive icon from the base view and after on the Tree icon. This view is divided in two parts. In one part a tree view with various nodes is shown:

- The first of these nodes represents the TS fieldbook:
  - inside there are the Jobs.
  - inside of any Job node are present the various stations.
  - inside of any station are entered the various TS points measured by such a station.
- The second node represents the GPS fieldbook:
  - inside there are the various Groups.
  - inside of the Groups are present the various GPS points.
- Other main nodes follow: Known points, Control points and Geographical Control points.

The other part of the view shows the information associated to the selected tree node. For example in the above window, the coordinates and other informations associated to the 200 station are showed.

Holding the stylus on a node, a context menu will be showed with the allowed operations on the selected node. Alternatively you can use the menu Modify.



**Figure 44: Tree View**

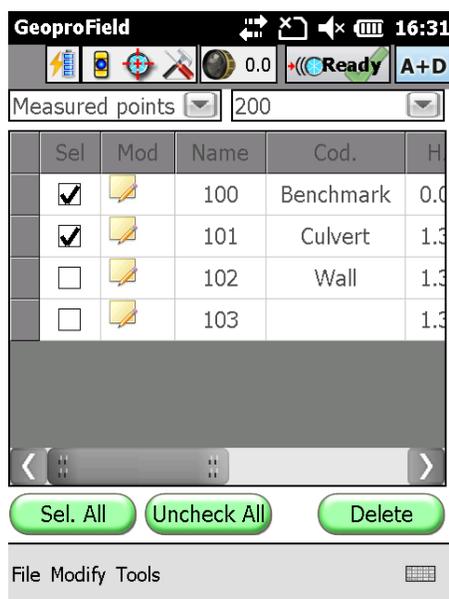
## Grid View

The Grid view of GeoproField is showed pressing the Archive icon from the base view and after on the Grid icon. This view shows:

- Two list boxes: the first on the left to choose if show the list of jobs, stations, groups, or TS, GPS, Known or Control points. In the second box you can choose the station or the group with the associated points to show.
- The buttons Sel. All and Desel. All are respectively used for select and deselect all the entity of the grid. Pressing with the stylus on the check box next to the entities name, you can select it or deselect it individually
- The button Delete will delete all the selected entities.
- Pressing quickly for two times with the stylus on the showed icon in the Mod column will launch the window to modify the data of entity entered in the corresponding row.



Remember that deleting a job, a station, or a group will delete also all the points included inside it.



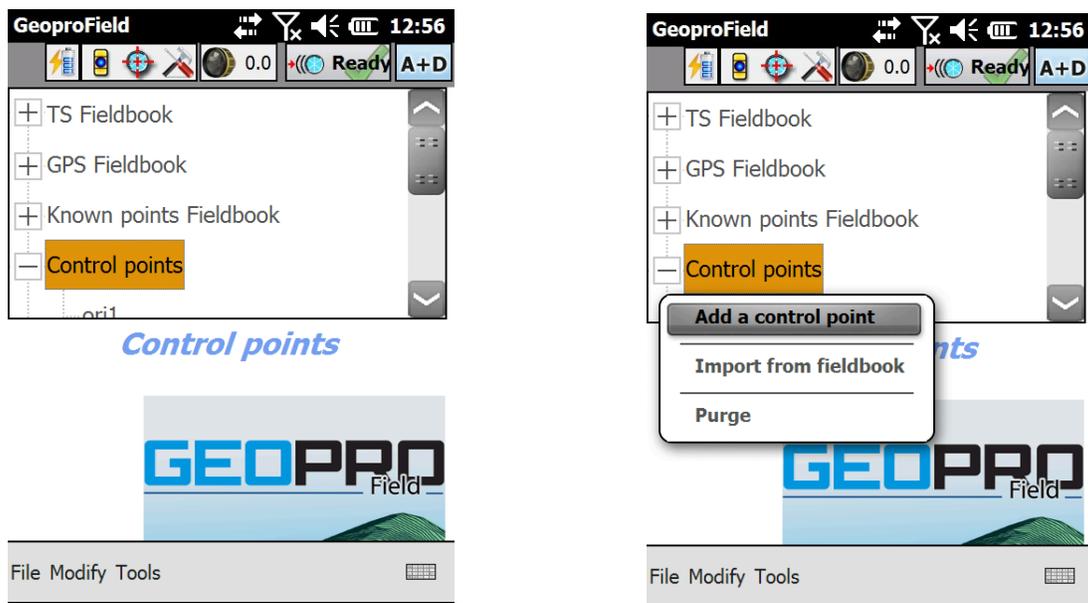
**Figure 45: Grid View**

## Add a Control Point and a Known Point

### Control Points

The control points are points of which you know the coordinates. They are useful for the orientation computation both for a Total Station and for the GPS receiver.

You can add to the project a control point by the menu Modify or from the Tree view by using the context menu of the node Control points.



**Figure 46: Control Points**

## Add a Control Point

In the New control point window you can enter the name and the relative data of the control point to create.

1. Press OK to store the control point.
2. Then a new dialog with the question Add another control point will be shown.
3. Answer NO to finish the adding.
4. Once Returned back to the Tree view, the name of entered point will be present in the control point node.

GeoproField

New control point

Name : P.ori1

Comm. :

North : 13.492

East : 32.475

Elev. : 98.236

OK Cancel

**Figure 47: Add Control Point**

## Import Points from Fieldbook

You can import and transform in control points TS, GPS or Known points stored in a work created previously with GeoproField (with extension fw1 or fce). After choosing the file you will show the window to select the points to import.



You can show this window also during the point selection for the orientation computation of a station or of a GPS group. In this case you can select only one point.

GeoproField

Imported points

- TS Fieldbook
- GPS Fieldbook
- Known points
  - grp1
    - pnt1
    - pnt2
- Control points

OK Cancel

**Figure 48: Import Control Points**

## Duplicates in Control Pt.

This function is present only inside of the menu Modify of the tree view of a TS point and allows to duplicate the selected point in a Control point.

## Known Points

GeoproField allows also to enter known points. Is recommended the use of this points for the stakeout function. The entering method is the same of the control points, with the difference that holding pressed with the stylus on the Known points node will be showed a context menu that allows to enter a group.

1. Enter the name to assign to the group that is required.
2. Enter the other informations and press the OK button.
3. After creating a group, holding pressed with the stylus on the group node will be showed a context menu that allows to enter or delete the known points, or use the context menu Modify | Add Known point.

The screenshot shows a dialog box titled "Create a new group..." from the GeoproField application. The dialog contains the following fields and values:

- Name: (empty text box)
- Cod.2: (empty text box)
- Cod.: (empty text box)
- Date: 20/6/2016
- Strata: Topographic entities (dropdown menu)

At the bottom of the dialog are two buttons: "OK" and "Cancel".

**Figure 49: Known Points Group**

4. This window will appear to manually enter the name and the associated data of the new known point
5. Enter the name to assign to the point.
6. By pressing with the stylus on the image of the sheet you can associate some codes to the point, whereas by pressing on the image of the block notes you can enter some note, a sketch or a photo.
7. Enter the description and the coordinates.
8. Press OK for confirm the entering.

9. To the question Would you enter another known point answer NO to finish the entering and return to the Tree view.

The screenshot shows a dialog box titled "New Known pt." within the "GeoproField" application. The dialog contains the following fields and values:

Name :	pnt1
Descr. :	
North :	23.594
East :	72.217
Elev. :	83.769

Below the dialog box are two buttons: "OK" and "Cancel".

**Figure 50: Known Points**

## Selection Point for Orientation Computation

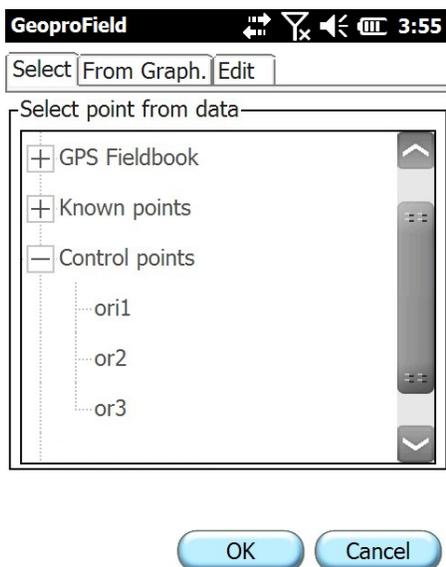
This window will be shown when is pressed the Measure button during the orientation computation or when you must choose a reference point where to place the station. This window consist of three windows:

### Select Point from Data

It allows to select directly the point for orientation selecting it between all of the stored points in the tree view.



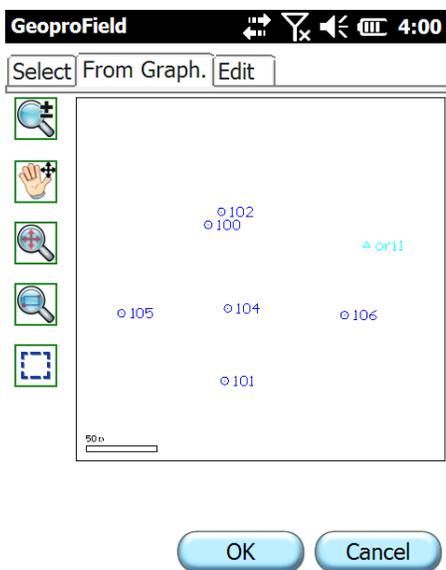
If the orientation method From other station has been chosen or you are duplicating a station, a tree with only stations will be showed.



**Figure 51: Select Point**

## Select Point from Graphics

It allows to select the point used for orientation by choosing it directly from the graphical view, or by drawing it by free hand or with a snap operation.



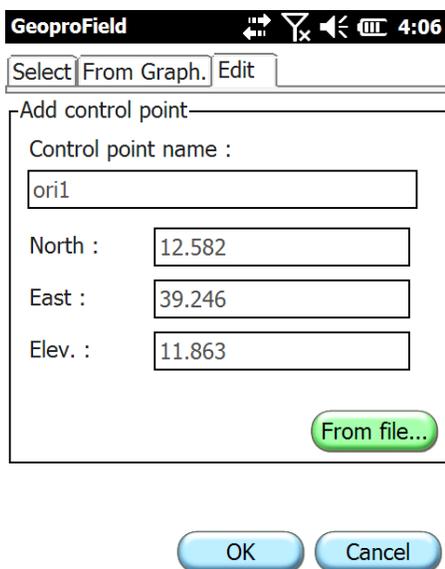
**Figure 52: Select Point from Graphics**

## Edit Points

It allows to create a new control point by entering the name and the coordinates.

If you enter the name of an existing point, the description and the coordinates will automatically be shown. In this case these values can not be edited.

By pressing the button **From file...** a point from an external file can be imported (See "Import Points from Fieldbook" on page 40).



**Figure 53: Edit Points**

## Selection Entities for Stakeout

This process comes before the operational phase of the stakeout. It is necessary to choose what kind of stakeout perform, and then to select the entities related to the type of stakeout chosen.

From the Stakeout view:

- Press with the stylus on the icon matching the type of stakeout that you will execute:
  - Point
  - Line
  - Polyline
  - Arc
  - Plane
  - Road
  - Slopes

In all these views, press the >> button to advance in the selection process and to pass to the stakeout procedure.

It is always possible press the << button to go to the previous windows and change the values already set. Press the **Cancel** button to finish the procedure and return to the stakeout view.



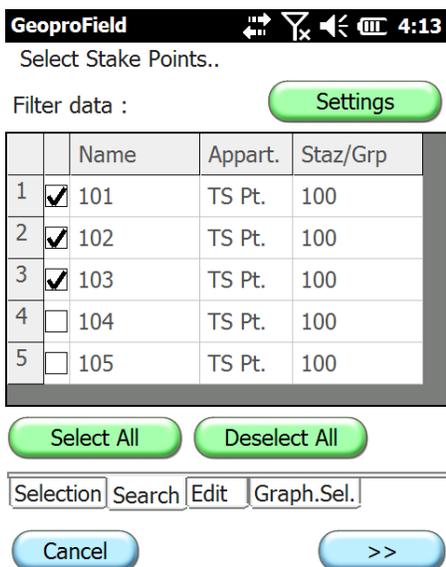
**Figure 54: Stakeout**

## Single Point Stakeout

If you choose this type of stakeout, a window consists of four windows (Selection, Search, Edit and Graphics) will be shown.

### Selection

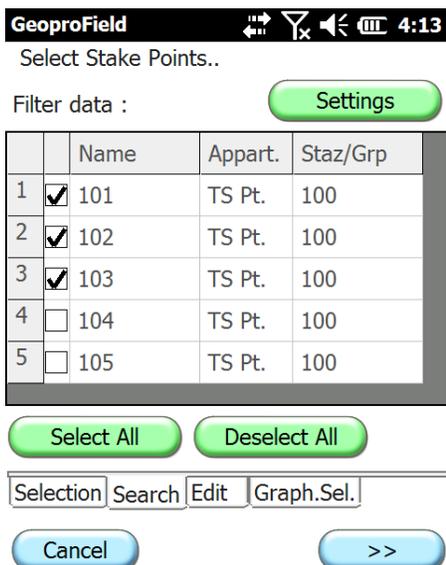
- With the two lists in the top of the window, you can choose where to select the points to be stakeout: fieldbook, station, group or points.
- Depending on the choices made, the grid will show the corresponding points. By pressing with the stylus on the check box next to the point, you can select or deselect it for stakeout.
- By pressing the button **Sel. All** and **Desel. All** you can respectively select and deselect all points.



**Figure 55: Single Point Stakeout**

## Search

- By pressing on the **Settings** button, a window appears where you can enter the search parameters for the points.
- The grid shows the result of the research by displaying the name of the point e where is stored. By pressing with the stylus on the check box next to the point, you can select or deselect it for stakeout.
- By pressing the button **Sel. All** and **Desel. All** you can respectively select and deselect all points.



**Figure 56: Search**

## Edit

- **Edit** allows to enter manually the name and the coordinates of the point to stakeout.
- Entering the name of an existing point, the description and the coordinates will automatically be shown. In this case these values can not be edited.
- Press the **Reset** button to delete all entered data.

GeoproField

Select Stake Points..

Enter control point

Name : pnt2

Descr. :

North : 5.193

East : 10.439

Elev. : 55.372

Reset

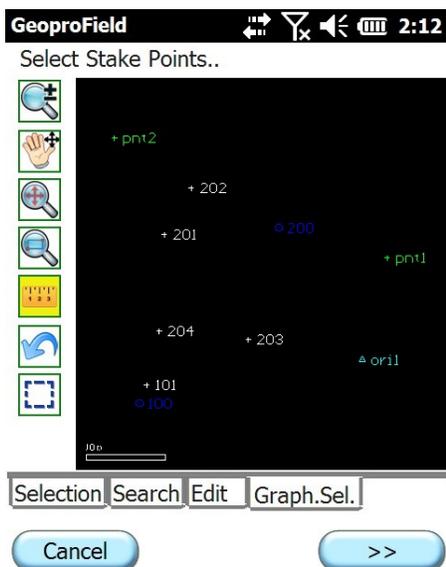
Selection Search Edit Graph.Sel.

Cancel >>

**Figure 57: Edit**

## Graphics

**Graphics** allows you to graphically choose the points to stakeout or to draw it directly with the stylus.



**Figure 58: Graphics**

## Line Stakeout

This type of stakeout allows you to use a line as a reference instead of points. This window will appear. It consists of three windows that allows you to draw or select a line to be used as reference.

### Select Points

- You can choose the start and the end of the line by manually entering the name and coordinates of points. Two entities will be created. They will be temporary and will be deleted at the end of the stakeout.
- You can choose the start and the end point of the line by selecting them directly from the tree view by pressing the icon next to the text box of the name of point.
- You can choose the start and the end of the point measuring them directly with the connected instrument by pressing the second icon next to the text box of the name of point.

**GeoproField** 2:17

Stake Line parameters..

Pt. start	202	 
East	42.469	
North	20.390	
Elev.	0.887	
Pt. end	204	 
East	32.886	
North	14.950	
Elev.	-0.371	

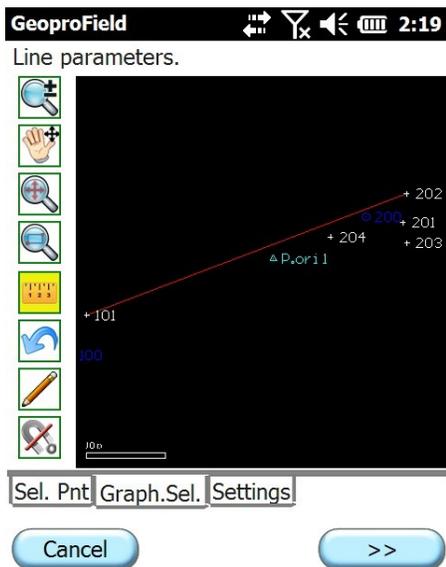
Sel. Pnt | Graph.Sel. | Settings

Cancel >>

**Figure 59: Select Points**

## Graphics

- It allows you to graphically choose a line, already present in graphics to stakeout.
- You can also draw the start and the end point of the line by free hand or with a snap operation.



**Figure 60: Graphics**

## Properties

- After selecting the start point or also the entire line using the Points window or Graphics window, you can enter the data for modifying the end point: the horizontal distance, slope distance, height difference, the slope and the azimuth from the start point



The two buttons next to the box Azimuth, allow to increase or decrease the azimuth of the line of a right angle.

The next window Stakeout options which appear after to have confirmed the selection, allows to:

- Enter the name for the graphic points that will be created temporarily, in case you choose to split the line into multiple segments.
- The eventual distance from the start or end point from the line.
- The number of segments into which divide the line or the possible length of each of them. In the second case the software will automatically divide the line into the number of segments required.
- The value of the various Offset that can be applied to the entire line.

GeoproField

Properties

Hor. Dist.[m]: 11.019

Slo. Dist.[m]: 11.091

Elev. Diff.[m]: -1.258

Slope[%]: -11.416

Azimuth[gon]: 267.1307

Sel. Pnt. | Graph. Sel. | Settings

Cancel >>

**Figure 61: Properties**

## Arc Stakeout

This type stakeout allows you to use an arc or a circle as a reference instead of points. This window will appear. It consists of three windows that allows you to draw or select an arc be used as reference.

- In the Select point window you can:

- choose the points of the arc or circle by manually entering the name and coordinates of points. Two or three entities will be created. They will be temporary and will be deleted at the end of the stakeout.
- choose the arc/circle points by measuring them directly with the connected device by pressing the icon of the column **Meas**;
- choose the arc/circle points by selecting them directly from the tree view by pressing the icon of the column **Sel**.
- choose the type arc or circle to use among these possibilities:
  - Circle: defined by the center and by the radius;
  - Arc: defined by center, start, end;
  - 2D Arc for 3 points;
  - 3D Arc for 3 points.
- In base of the selection made in the **Type**, the number of grid lines and the point characteristics will change.

GeoproField 5:41

Stake Arc parameters..

Me	Sel	Name	East	North
<b>Center point</b>				
		101	0.024	0.155
<b>Radius point</b>				
		102	1.382	1.902

Type :

Sel. Pnt | Graph.Sel. | Settings

Cancel >>

**Figure 62: Arc Stakeout**

## Graphics Selection

- It allows you to graphically choose an arc/circle, already present in graphics, to stakeout.
- You can also draw the 2 or 3 points describing the arc/circle by free hand or with a snap operation.



GeoproField 9:59

Stake Options

Text + num. PtPicch

Start Pt. Distance 0 m

End Pt. Distance 0 m

N. intervals 5

Internal 0 m

Up 0 m

Cancel << >>

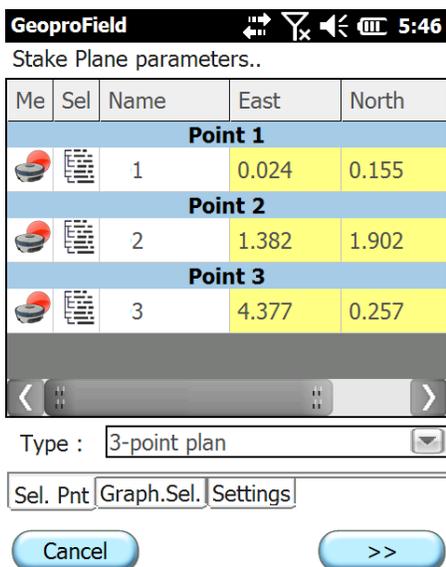
**Figure 64: Properties**

## Plane Stakeout

This type of stakeout allows you to use a plane as a reference instead of points. This window will appear. It consists of three windows that allows you to draw or select a plane to be used as reference.

The Select points window:

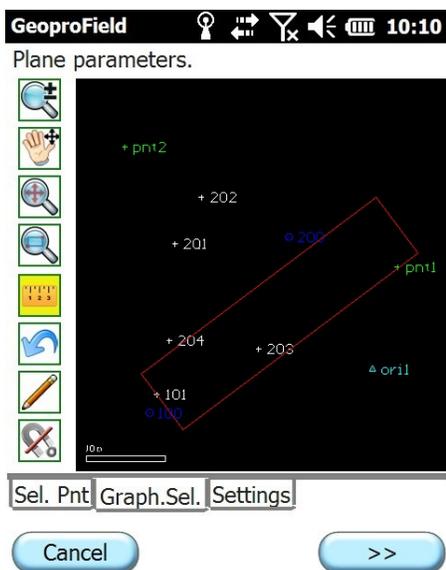
- choose the points of the plane by manually entering the name and coordinates of points. Three entities will be created. They will be temporary and will be deleted at the end of the stakeout;
- choose the plane points by measuring them directly with the connected device by pressing the icon of the column **Meas**;
- choose the plane points by selecting them directly from the tree view by pressing the icon of the column **Sel**;
- choose the type arc to use among these possibilities:
  - Plane for 3 points;
  - Plane by DTM.
- Following the selection made in the **Type**, grid will change aspect.



**Figure 65: Plane Stakeout**

## Graphics Selection

- It allows you to graphically choose the plane to stakeout;
- You can also draw the 3 points describing the plane by free hand or with a snap operation.



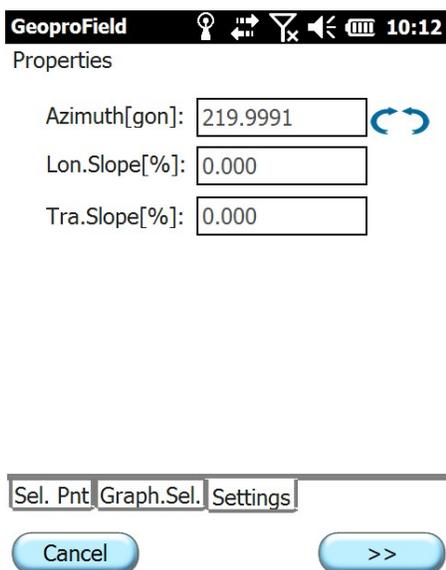
**Figure 66: Graphics Selection**

## Properties

- After to have chosen the initial plane using the Points window or graphics window, you can enter the data for identifying the inclination through the insert of the slopes and the azimuth (the two buttons at the side of the box allow you to increase or decrease it by a right angle).

The next window Stakeout options allows to:

- Enter the name for the graphic points that will be created temporarily, in case you choose to split the plane into multiple parts;
- Set the value of the vertical Offset that can be applied to the entire plane;
- Create a grid of points to stakeout by indicating the distance between them.



**Figure 67: Properties**

## Road Stakeout and Slope Stakeout

The topic Road Stakeout and Slope Stakeout will be described in the Roads section.

Remember that it is possible to stakeout profiles or sections.

## Import and Export of Files

If you intend to import data stored on an external file or you want to save the work in a different format from the file **.FCE**, you can do it from view Archive by pressing on the **Import** or **Export** icon or using the menu commands **File | Import Data** or **File | Export Data**. A view, that allows you to choose which type of file for data import or in which format save them to an external file, will be shown.

## Import view

1. Choose the type of file.
2. Depending on the choice made will need to choose some options, but in all cases you will need to choose a file name.
3. If the import of the file has been successful you will find the imported data in the Tree view or in Graphical View, if you imported an image.



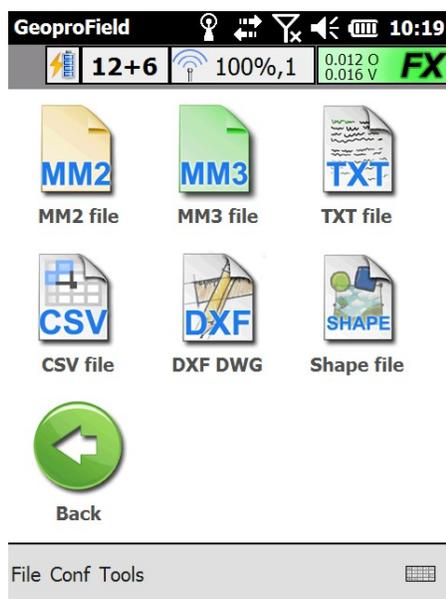
**Figure 68: Import Files**

## Export View

1. Choose the type of file.
2. Depending on the choice made will need to choose some options, but in all cases you will need to choose a file name.
3. If the export of the project has been successful you will find a new file stored in the controller with inside it all data of the project saved in the chosen format.



If you choose to export the file in DXF / DWG, you can specify whether explode the graphic blocks created by the fieldbook entities and whether to export or not the entities not shown.



**Figure 69: Export Files**

## Graphical View - CAD

The graphical view can be reached by pressing on the icon **CAD** from the base view.

The operation of this view is similar to that of normal CAD views. In addition to the graphical entities, all the points stored in the archive as well as other entities like profiles, roads, ..., are shown..



The TS and GPS points will be visible on the graphical view only when the station or the GPS group, to which they belong, will be oriented

At the top or at the left of the window you will find both the toolbar that contains six letters. Each letter corresponds to a section of CAD commands (F: File, M: Modify, V: Visualization, D: Draws, S: Snap, O: Options). At the side of this toolbar there is another with icons corresponding to commands.

By pressing on the various letters, the icons displayed, and therefore the commands available in the toolbar, will change.

The current operation is shown at the bottom of the window. In addition a menu, with all CAD commands, is present.

Because the toolbar is not large enough to show the icons of all available commands, the command sections have been duplicated (M1-M2; V1-V2, ...). By pressing on the letter icon, the suffix changes from 1 to 2 and vice versa (for example: from M1 to M2 and from M2 to M1).

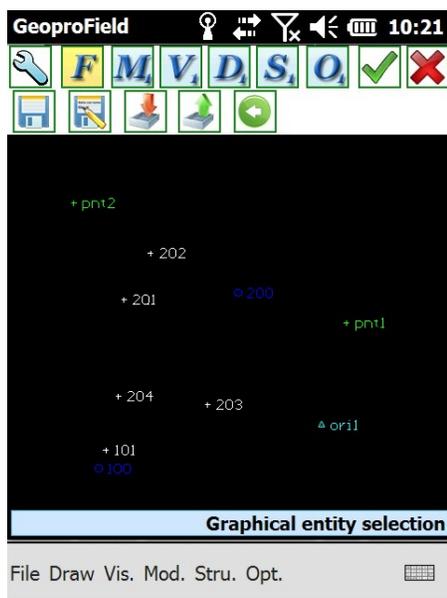
Each numbered command section contains some icons which can be user selected by mean of this window. This window is activated by pressing on the **wrench** icon of the toolbar.



"Map of the CAD Commands" on page 59 list all the operations of CAD divided into sections.

Example of how to draw a line:

1. Press the character **D** ( Draw )
2. Check for an icon indicating a simple line is present in the toolbar. In the case it isn't showed, press again on **D**.
3. Press the icon relative to the drawing of a simple line.
4. Place the stylus on the window and move it, without lifting it, to the point where you want to start the line. Remove the stylus from the window to confirm the entry of the starting point of the line.
5. Repeat this step to select the endpoint of the line.
6. The operation of drawing will continue until you press the red cross or the green tick on the toolbar, or:
  - a. Press with the stylus on the **Draw | Lines | Line** menu.
  - b. Proceed with drawing the line as described above.



**Figure 70: CAD View**

## Map of the CAD Commands

### Modify Menu

Undo – Redo– Erase– Move – Copy – Scale – Rotate– Offset – Extend – Cut – Cime – Break – Explode  
– Modify – Change Property



**Figure 71: CAD Commands - Modify Menu**

### Visualization Menu

Real Time Zoom – Real Time Pan–Previous View – Redraw – Window Zoom– Zoom In – Zoom Out  
Extents Zoom– Real Time Pan– Left Pan– Right Pan– Up Pan– Down Pan



**Figure 72: CAD Commands - Visualization Menu**

### Draw Menu

Point –Point with Name – Point Square to – Point by Angle and Distance – Points on Lines and Arcs –  
Line –Parallel Lines –Fractionation Lines – Arc by Center and Radius – Arc by 3 Points – Circle by  
Center and Radius – Circle by 3 Points – Circle Tangent to 2 Lines – Parallelogram – Polyline – Text



**Figure 73: CAD Commands - Draw Menu**

### Snap Menu

Free Draw – Snap to Node – Snap to Mid Point – Snap to End Point – Snap to Perpendicular – Snap  
to Intersection – Snap to Center – Snap to Quadrant – Snap to Tangent – Snap to Insert – Snap to  
Near Point – Snap to Input Coordinates – Object Snap Settings – Enable Orthogonal shift – Snap and  
Grid – Close Polyline – Snap to TS data

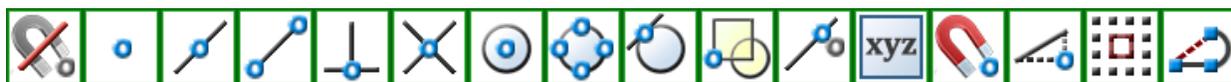


Figure 74: CAD Commands - Snap Menu

## Options Menu

General options – Cursor options – Entity sets – Manage layers – Manage Linetypes – Manage Text Style – Color Options – Topographic Entity Appearance – Showed Entity with name – GIS Theme – Show Coordinates – Calculate Distances – Calculate Perimeters and Areas – Transform point with name in TS Points – Transform point with name in Control Points – Transform point with name in GPS Points – Transform point with name in Known points – Image Options



Figure 75: CAD Commands - Options Menu

## Description Management

To view the list of descriptions press on the **Description** field in the window of measures.

The window consist in:

- The boxes in which are showed the names of the stored description;
- The **Enable keypad** button to type the description.
- The **Description sort** button, that propose various criteria to show the descriptions;
- The **Edit** button to change the descriptions contained in the file;
- the **X** icon to close the description window.
- The **Search** button that allows to execute the research of the description by entering the starting character;



In **Miscellaneous** window of the **Options** window, you can check the box **Enable keyboard automatically**. The software remembers the last choice and propose it again automatically the next time.



**Figure 76: Description Management**

## Descriptions Sort

In this window you can choose the sort type between:

- Alphabetical: descriptions are displayed in alphabetical order;
- Ranking: order the descriptions based on the most used;
- Custom: order the descriptions as are entered in the file;
- Last use: the descriptions in the archive are displayed starting from the latest used to oldest.



**Figure 77: Descriptions Sort**

## General Notes



If the software sends the message **Cannot access the serial port**, save all the data and perform a hard reset of the device and restart the software (see the manual of your controller to see how perform a hard reset of the product).

---



If your controller's battery runs completely out, part of the data stored on your controller may be lost. Transfer often saved data on your PC or performs the saving of the data in the flash cards.

---



To show the activation code and the version of the software, execute the item Information about software of the menu Tools.

---

## Work Start

If you are using a profile configured for Total Station, the **Creation of a new job...** window will be shown to create a job.

The choices are:

- The name of the job. The software proposes automatically a name equal to that of the work that is being created, but can be changed.
- The date of creation of the Job. The software automatically inserts the current date, but this can be changed.
- The type of instrument, the locality and the operator.
- Lo Entity set where insert the job.
- Press OK to create the Job which will contain the Stations to create later.

The screenshot shows a dialog box titled "Creation of a new job ..." from the GeoproField software. The dialog box has a title bar with the text "GeoproField" and several system icons on the right, including a volume icon and a clock showing "17:36". The main area of the dialog contains several input fields with labels to their left: "Name:" with the text "Job name", "Date:" with "8/10/2012", "Instr:" with an empty dropdown menu, "Location" with an empty dropdown menu, "Operat:" with an empty dropdown menu, and "Entity set" with "Topographic entities" and a dropdown arrow. Below the dialog box, there are three buttons: "Options" (green), "OK" (blue), and "Cancel" (blue).

**Figure 78: Creation of a New Job**

## Station Orientation

This wizard is used to calculate the circle correction and planar coordinates (and elevation) of the present station.

The station orientation is obligatory. In fact, it is not possible to create a new station without orienting it. This is necessary because otherwise, all operations that use them (stakeout, calculating areas, ...) would be impossible, as well as the display of the points measured in graphics.

To orient a Station just follow the initial wizard or:

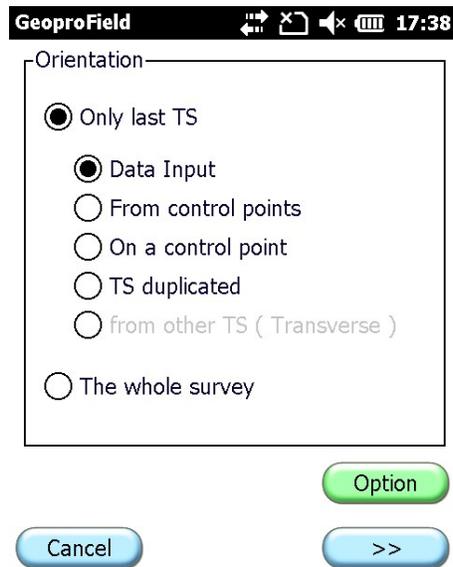
1. Press the **Orient** icon in the basic view
2. Go in the tree view and use the context menu of the Station node or menu command **Modify | Orientation**.



You can perform the Station orientation more than once.

---

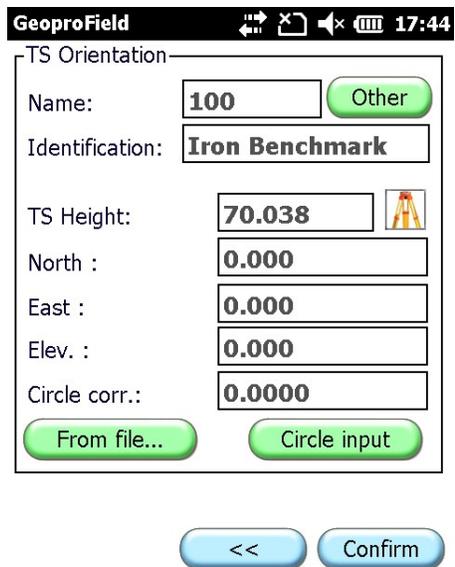
3. The Orientation window appears.
  - The first choice is between:
    - Only last TS
    - The whole survey
  - If you chose Only last TS, you have to select the orientation type among:
    - Data Input
    - From control points
    - On a control point
    - TS duplicated
    - From other TS ( Transverse )
4. Press **Options** to choose how to set the azimuth value.
5. Press >> to continue and, depending on the choice made, one of the following windows will open.



**Figure 79: Orientation**

## Data Input

1. In the **TS Orientation** window, enter the **Name**, the **Identification**, the **TS Height** (total station height), the **North** and **East** coordinates, and the **Circle corr.** (correction).
2. Press **Other** to enter other additional information to the station or enter the codes.



**Figure 80: Total Station Orientation - Data Input**

## From Control Points

- The TS Orientation control points window allows you to enter only the name and the Station height, or you can measure the height by pressing the **Tripod** icon
- Automatically computes the coordinates of the Station using all points of detail that are coded OR or QU and shows them in the grid.
- By pressing on the checkbox, the code OR or QU can be removed or added. The coordinate calculation will be redone of consequence.
- By pressing **Info**, information about the accuracy of the coordinate calculation are shown.
- By pressing **Measure**, the window, that lets you select a control point for orientation, will be shown. Then you can measure the point.

GeoproField 18:19

-TS Orientation-

Name **200** TS H. **0.000**

North **28.882** Elev. **39.231**

East **48.795** Cir.C. **0.0000**

Name	OR	QU	DDh	DElev.
101	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	29.570	27.265
102	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5.042	-1.924
103	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6.026	18.033

Info... Measure

<< Confirm

**Figure 81: Total Station Orientation - From Control Points**

## On a Control Point

- A window to select a point will be shown (see Point Selection for orientation of the Common Section manual). This point will be used to position the station. Once the point has been chosen, the station will have the same name and the same coordinates of the point. Then the right window will appear.
- It allows you to enter only the Station height.
- The operation of this window is similar to that displayed by choosing the orientation **From control points**. The difference is that the points are used only to compute the circle correction.

GeoproField 18:19

-TS Orientation-

Name **200** TS H. **0.000**

North **28.882** Elev. **39.231**

East **48.795** Cir.C. **0.0000**

Name	OR	QU	DDh	DElev.
101	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	29.570	27.265
102	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5.042	-1.924
103	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6.026	18.033

Info... Measure

<< Confirm

**Figure 82: Total Station Orientation - On a Control Point**

## TS Duplicated

By mean of the **Choice pt. to station** window, it is possible to choose the station you want to duplicate. After the following window will appear.

- It allows you to enter only the Station height. The name will be the same of the station to duplicate.
- By pressing on the checkbox next to the measures in the grid, you can choose whether or not to use a point to calculate the circle correction. If a point is not used it is also renamed.
- By pressing the **Measure**, the window, that lets you select a control point for orientation, will be shown. Then you can measure such a point. This will have the same name and the same codes as the one selected, and will be used to calculate the circle correction.

In all the orientation windows, the **Circle input** button is present. Pressing it, the process of zeroing circle will start. However, this button will be visible only if, in the orientation options, you chose to set the circle to the user's choice and only if it no points were measured for this station.

Press **Confirm** to complete the orientation wizard or << to cancel the operations made.



Some station types do not allow to reset the circle through remote connection. In these cases the **Circle input** button will be disabled.

**GeoproField** 1:01

TS Orientation

Name  TS H.  

North **0.000** Elev. **0.000**

East **0.000** Cir.C. **0.0000**

Name	Use	DDh	DElev.	DNorth
pnt1	<input checked="" type="checkbox"/>	20.488	62.711	79.897

**Figure 83: Total Station Orientation - Duplicated**

## From other TS (Transverse)

- A window to select a point will be shown (see Point Selection for orientation of the Common Section manual). This point represents the foresight to the new Station. Once you choose this point, the new station will have the same name. Then the left window will appear.
- It allows you to enter only the Station height.
- By pressing **Measure**, the window, that lets you select a Station already present in the archive, will be shown. Then you can measure the position of such a Station. The new point will have the same name of the Station and will be used to calculate the transverse.
- The grid shows all the measurements made to other Stations.
- By pressing on the checkbox next to the measures in the grid, you can choose whether or not to use a point to calculate the Transverse.

GeoproField 12:59

TS Orientation

Name **200** TS H. **0.000**

North **12.345** Elev. **0.000**

East **22.437** Cir.C. **0.0000**

Name	PO	DDh	DElev.	DNorth
100	<input checked="" type="checkbox"/>	-7.524	-13.676	267.977

Info... Measure

<< Confirm

**Figure 84: Total Station Orientation - Transverse**

## Whole Survey

It lets to recompute all Stations in the archive using all points of orientation and transverse measured.

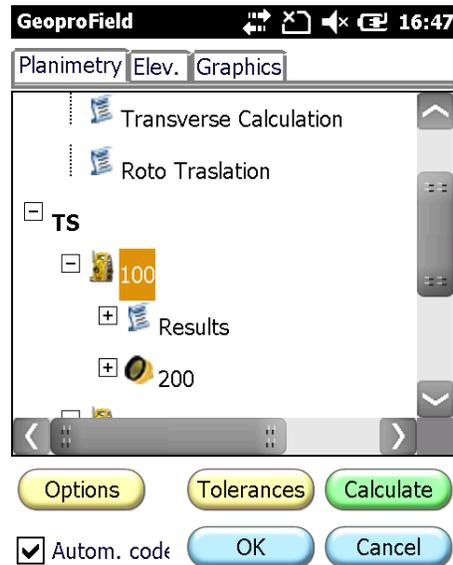
The calculation is performed automatically when choosing this type of processing and, at the end of the process, a window, with a summary of the calculations and any tolerances, will appear.

- By pressing **Calculate**, the orientation calculation is rerun using points and tolerances choices.



If **Autom. codes** is active, orientation calculation is performed using all points of orientation and altimetry that the software is able to automatically detect in the archive. If the option is off, you can select which code to enable or disable the individual points in the tree.

- By pressing **Tolerances**, a window will be shown to enter the tolerances you want to set for the calculation.



**Figure 85: Total Station Orientation - Whole Survey**

## Point Measurement

Once you create the Job and at least one Station, you can begin to measure points.

To do so, it is necessary to take a measurement and then confirm to store it in the archive.



All the measures will be stored in the last Station in the archive.



In the demo version the number of points that can be created is limited.

To measure and store points in the archive:

- press the icon **Measure** in the basic view;
- or go in the tree view and use the context menu of the Station node or menu command **Modify | Insert new measures**. In the tree view, you can select which station store the points. If you do not choose the last Station entered, the software automatically duplicates it because the deemed terminated.

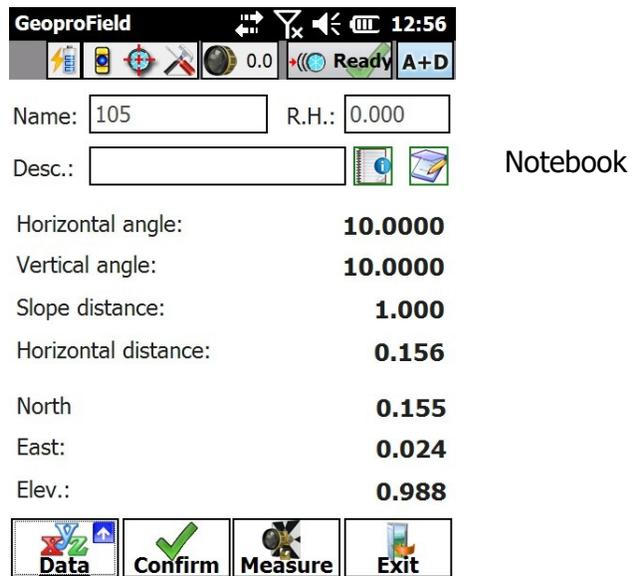


**Figure 86: Main View**

## Data

The Data window shows:

- The name of the new point that will be equal to that of the previous point, or to that of the Station, incremented by one unit;
  - The reflector height and the description that will remain equal to that of the previous point;
  - The horizontal angle, the vertical angle, the slope distance, the horizontal distance and the coordinates of the measured point.
1. Press the icon depicting a sheet with an i, to enter the various codes of the point.
  2. Press the Notebook icon, to enter notes, a drawing, a photograph or any GIS data.
  3. Press the Data button, located in the lower left, to switch from this window to another: Graphics, Edit, Offset, P.Spec.

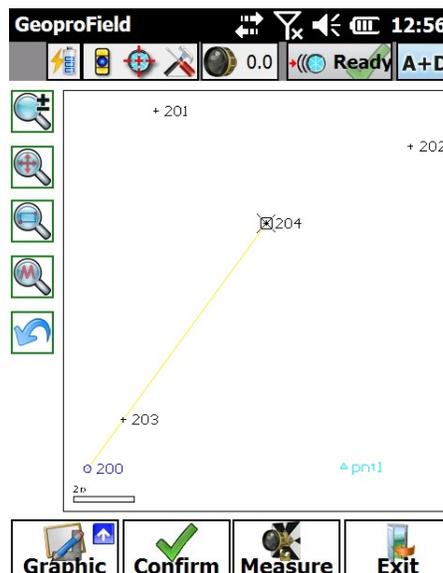


**Figure 87: Data**

## Graphics

The Graphics window shows:

- A gray cross shows the measured point but not yet confirmed. Also the Station and measure points are shown with the color assigned to them.
- On this window you cannot make drawing or editing but only viewing operations.
- On the left side there are five buttons: Zoom Real Time, Extended Zoom, Zoom Window, Measured point pan and Previous View.
- The movement of the pen on the graphic corresponds to an operation of Pan Real Time.



**Figure 88: Graphics**

## Edit

The Edit window shows:

- A grid containing the points (default max 100) stored in the current Station. The **All** button shows all measured points.
- You can delete points by using the **Delete** button.
- You can change the name of a point, its description or reflector height, by pressing twice quickly on the corresponding field, or by pressing the **Modify** button after selecting the desired line.
- The yellow background indicates that the data is not editable.



Figure 89:

## Offset

The Offset window shows:

- a series of buttons that refer to various types of offset managed by the software:
  - Angular
  - Tangential
  - Measured
  - Cylindrical



The original values of the measured point will be stored in the field Notes.



**Figure 90:**

## Angular offset

- The data of a near point, which was effectively measured, are shown.
- The Station has to turn toward the real point to be measured.
- Press Measure to measure only the horizontal angle of the real point.
- By pressing Store, a point will be stored. Their data will be the same of the point effectively measured but with the horizontal angle of the real point.
- Vertical angle, distance and reflector height remain the same.

**GeoproField** 12:04

Name:  R.H.:

Desc.:   

Measured point:

Hor.Ang.:	23.4930
Vert.Ang.:	98.8460
Distance:	4.385

New horizontal angle:

**Figure 91: Angular Offset**

## Tangential offset

- The data of a near point, which was effectively measured, are shown.
- The Station has to turn toward the real point to be measured.
- Press Measure to measure the angles of the real point.
- By pressing Store, a point will be stored with the horizontal and vertical angles of the real point, while the distance will be recalculated in accordance with a tangential shift.

**GeoproField** 12:09

Name:  R.H.:

Desc.:   

Measured point:

H.Ang.:	23.4930	Dist:	4.385
V.Ang:	98.8460		

Offset:

H.

V.

Computed point:

H.Ang.:	23.4850	Dist:	4.402
V.Ang:	94.2840		

**Figure 92: Tangential Offset**

## Measured offset

The data of a near point, which was effectively measured, are shown.

1. Enter the offsets to reach the real point.
2. For each data entry, the real point measurements will be recalculated.
3. Press **Store** to store a point with the recalculated measures.

The screenshot shows the GeoproField software interface. At the top, there is a status bar with the text 'GeoproField' and various icons. Below the status bar, there are input fields for 'Name:' (containing '101') and 'R.H.:' (containing '0.000'). A 'Desc.:' field is also present with a text input area and two icons. The main data area is divided into three sections: 'Measured point:', 'Offset:', and 'Computed point:'. The 'Measured point:' section displays 'H.Ang.: 23.4930', 'Dist: 4.385', and 'V.Ang: 98.8400'. The 'Offset:' section displays 'Up : 1.384', 'To right: 0.195', and 'Forwards: 2.462'. The 'Computed point:' section displays 'H.Ang.: 25.3058', 'Dist: 7.004', and 'V.Ang: 86.5948'. At the bottom, there are two buttons: 'Store' and 'Cancel'.

**Figure 93: Measured Offset**

## Cylindrical offset

The point which was possible to measure represents a point on a column.

1. The Station has to turn toward the two sides of the column and press Measure to measure both the angular tangents to the column.  
Once the two angle have been measured, the center of the column will be calculated.
2. Press **Store** to store a point with the calculated measures of the center of the column.

**GeoproField**      12:16

Measured point:

Distance:	4.385
Horizontal angle:	23.4930
Vertical angle:	98.8460

Tangency points:

L - H.Ang.:	<input type="text" value="19.2840"/>	<input type="button" value="Measure"/>
R - H.Ang.:	<input type="text" value="25.1860"/>	<input type="button" value="Measure"/>

Center of the column:

Horizontal distance:	4.577
Horizontal angle:	22.2350
Vertical angle:	98.8946
Radius:	0.212

**Figure 94: Cylindrical Offset**

## Special Points

The **P.Spec.** (Special Points) window shows:

- a series of buttons that refer to various types of special point managed by the software:
  - Alignment
  - Direct/Reverse
  - Strata
  - On Plane

GeoproField		12:56	
Name: 104		R.H.: 1.300	
Desc.: <input type="text"/>			
H.An.:	<b>306.4238</b>	S.Ds.:	<b>4.004</b>
V.An.:	<b>82.5458</b>	H.Ds.:	<b>3.854</b>
North			<b>-0.703</b>
East:			<b>0.511</b>
Elev.:			<b>-0.174</b>
			
<b>Alignment</b>	<b>Direct/Rev</b>	<b>Strata</b>	<b>On Plane</b>
			
<b>P.Spec.</b>	<b>Confirm</b>	<b>Measure</b>	<b>Exit</b>

**Figure 95: Special Points**

## Special Point with Alignment

- In this window you will have to measure or select two points to create a straight line used to compute points on this alignment.
- For each box it is possible:
  - take a measurement in distance by pressing the first icon;
  - Select a point stored in the archive by pressing the second icon;
  - select the point from the last measured points by pressing the third icon.
- By pressing **Rail** a special procedure, that allows measures along a railway line, will start.

GeoproField 12:23	
101	105
Horizontal Angle: 25.3058	Horizontal Angle: 96.2650
Vertical Angle: 86.5948	Vertical Angle: 98.8460
Slope Distance: 7.004	Slope Distance: 4.385
Reflector height: 0.000	Reflector height: 0.000
Rail	Continue
	Cancel

**Figure 96: Special Points with Alignment**

After measuring or selected both points press Continue. This window will appear where you can choose:

- the type of distance: Horizontal from 1st or 2nd point, or Sloped from 1st or 2nd point;
- the distance value;
- the perpendicular distance from the alignment;
- the type of elevation that will be used: **From Alignment, From Alignment+ diff., From elev. 1° pt + diff. , From elev. 2° pt + diff.**
- the elevation difference to be added based on the type of chosen;
- the name and description for the new point;

GeoproField	
Distance type	Horizontal from 1° pt
Distance	1.000
Perpend.	0.1
Elev. type	From alignment + diff
Elev. Diff.	0.3
Point Name	205
Description	Air Release Valve

Exit    <<    Store

**Figure 97: Special Points with Alignment**

Once all the data have been entered, press **Store** to create a new point.

## Special Point with Direct/Reverse

- Choose the type of collimation to use between:
  - All automatic: the Station rotates, collimates the reflector and automatically performs the measurement without operator intervention;
  - Auto. + Manual: the Station rotates and collimates the reflector automatically, but the operator will have, if necessary, correct the position of the instrument and to confirm the measurement;
  - All manual: the Station must be manually rotated from time to time by the operator who will perform also the measurements.
- Choose also the number of collimations, type of points to store, the sequence of the measures, linear tolerance, angular tolerance and the number of repetitions of the measure if it is out of tolerance.
- Press OK to continue.

GeoproField 2:24

Mode

Collimation: Automatic

Repeats Measure options

N. Collimations : 1

Store : All the collimations

Sequence : FS BS, BS FS, FS BS, .

Linear Tol. (m) : 0.0005

Angular Tol. (gon): 0.0005

N° Repeat tol. : 1

Cancel OK

**Figure 98: Special Points with Direct / Reverse**

This window appears consisting of 3 windows: Avg., Measures and Dev. showing the status and the results of measurements made in real time. In case you select the manual mode of collimation, it helps in the sequence of steps.

- Press **Start** to start the operation and the **Finish** to exit from the procedure.
- After starting, the **Start** changes to **Pause** and then to **Continue** when it is suspended; the process does not stop immediately, but only after the sequence **turn-collimation-measure**
- The button **Set Circle** sets the circle of the instrument, ex. during the operation suspension.
- Depending on the choices you have made, upon completion of the measures, one or more points will be stored. The coordinates of the first of these points will be calculated by averaging all the measurements done.

GeoproField		
Field	Value	
★ Name Pt.	206	
★ No. Dir.	1/1	
★ No. Rev.	0/1	
★ Hor. A.	100.0000	
★ Vert.A.	100.0000	
★ Slope D.	10.000	
★ East	10.000	
★ North	-0.000	
★ Elev	-0.000	

Pos=1/2 -

Avg.	Measure	Dev.
------	---------	------

**Figure 99: Special Points with Direct / Reverse**

## Special Point with Strata

A window to select points will be shown (see Point Selection for stakeout of the Common Section manual).

After finishing the selection, the right window will appear to choose the type of measurement between Direct/Reverse or just Direct.

- Choose the type of collimation to use between:
  - All automatic: the Station rotates, collimates the reflector and performs the measurement automatically without operator intervention;
  - Auto. + Manual: the Station rotates and collimates the reflector automatically, but the operator will have, if necessary, correct the position of the instrument and to confirm the measurement;
  - All manual: the Station must be manually rotated from time to time by the operator who will perform also the measurements.

**GeoproField** 11:28

Mode

Measure Type:

Collimation:

Strata

N. Strata:

Sequence :

Linear Tol. (m):

Angular Tol. (gon):

<< >>

**Figure 100: Special Points with Strata**

- Choose also the number of strata to be measured, the sequence of measurements and tolerances.
- Once you have made your choices, press the >> button to continue.
- This window appears where you can choose number of collimations, type of points to store, the sequence of the measures, linear tolerance, angular tolerance and the number of repetitions of the measure if it is out of tolerance.
- Choose whether to rerun the orientation of the station at the end of the operation.
- Press the >> button to continue.

**GeoproField** 11:52

Repeats Measure options

N. Collimations :

Store :

Linear Tol. (m) :

Angular Tol. (gon):

N° Repeat tol. :

Final operations

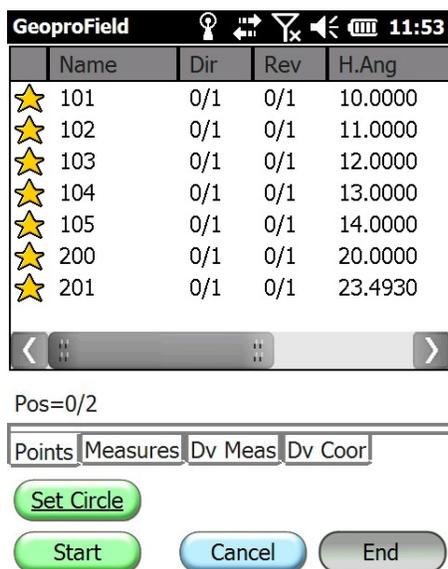
Orientation station :

<< >>

**Figure 101: Special Points with Strata**

This window appears that shows the status and the results of measurements made in real time. In case you select the manual mode of collimation, it helps in the sequence of steps.

- Press **Start** to start the operation and the **Finish** to exit from the procedure
- After starting, the **Start** changes to **Pause** and then to **Continue** when it is suspended; the process does not stop immediately, but only after the sequence **turn-collimation-measure**
- The button **Set Circle** sets the circle of the instrument, ex. during the operation suspension.
- Depending on the choices you have made, upon completion of the measures, one or more points will be stored. The coordinates of the first of these points will be calculated by averaging all the measurements done.



**Figure 102: Special Points with Strata**

## Special Point on a Plane

- In this window you must select three points if the plane is tilted, 2 points if vertical or one point if horizontal. Subsequently angular measures will intersect this plan to create the points.
- For each of the three boxes, take a measurement in distance by pressing **Meas..**
- Or select a point stored in the archive by pressing **Sel.**
- When all the points of the plan will be measured or selected, the **Continue** button will activate. Press it to move to the second window.

GeoproField 12:49

103	206	207
H. Ang.:	H. Ang.:	H. Ang.:
10.0000	23.4930	10.0000
V. Ang.:	V. Ang.:	V. Ang.:
10.0000	98.8460	100.0000
Sl. Dist.:	Sl. Dist.:	Sl. Dist.:
1.000	4.385	10.000
Refl.H.:	Refl.H.:	Refl.H.:
0.000	0.000	0.000
Meas.	Meas.	Meas.
Sel.	Sel.	Sel.

Plane type: Oblique

Continue Cancel

**Figure 103: Special Points on a Plane**

- In this window you can measure the special points on the plane created.
- Point the station on the real point to be measured and press **Measure**.
- A measurement in angles of the point will be performed and the distance calculated according to its intersection to the plane.
- Press **Confirm** to put the measurement in the upper list.
- When you press the **End**, the points in the list above will be stored as TS points.

GeoproField 12:54

Total points:

Name	H.Ang.	V.Ang.	Dist.
210	12.4580	110.5870	1.363

Point to insert:

Name: 211

Descr:

Prism: 0 Ha : 12.3450

Dist : 1.369 Va : 94.1590

Measure Confirm

<< End

**Figure 104: Special Points on a Plane**

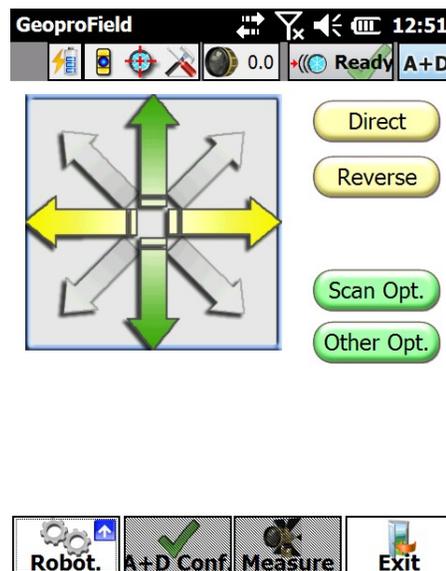
# Robot

The Robot window shows:

- The direction in which to rotate the instrument. By pressing with the stylus on the desired direction the instrument moves accordingly.
- Press the **Direct**, to rotate the instrument in the direct direction.
- Press the **Reverse** to rotate the instrument in the reverse direction.
- The button **Scan Opt.** shows the scan options window (see the "Common" section).
- The button **Other Opt.** shows the options window (see the "Common").



This window appears only if the connected instrument is motorized.



**Figure 105: Robot**

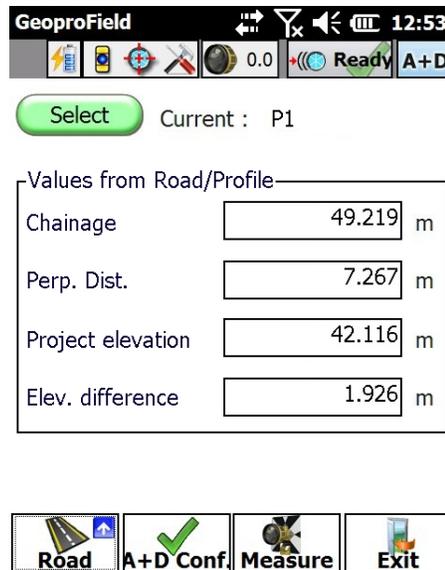
# Road

The Road window shows:

- The Road/Profile/Section actually selected.
- The Select button allows to choose which Road/Profile/X-Section to use as reference.
- The values of Chainage, Perpendicular Distance and Elevation between the measured point and the Road/Profile/X-Section chosen



This window appears only if a profile is stored in the archive.



**Figure 106: Road**

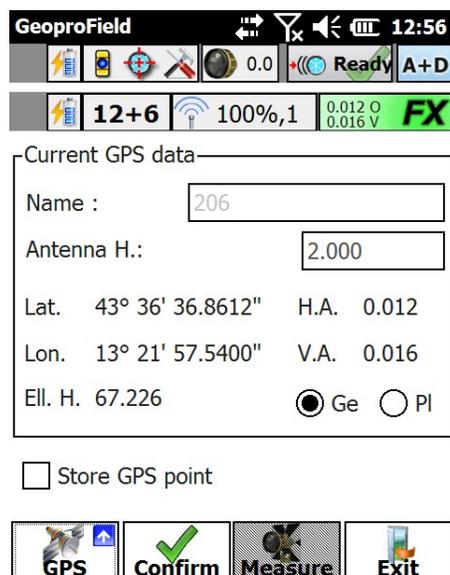
## GPS

The GPS window shows:

- the position calculated by GPS receiver connected to the controller. In this window you can choose if store the GPS point associated to the point measured by Total Station.



This window appears only if a ST + GPS profile was selected.



**Figure 107: GPS**

In all windows:

- Press **A + D Conf.**, if enabled, to perform measurements and store them automatically just performed. If a measurement is already done, the name of this button id Confirm.
- Press **Measure**, if enabled, to perform only a measurements. Once the measurement is performed, the values appear in the appropriate fields.
- If the data is correct, press **Confirm** to store the TS point. After the storing, the fields will be empty.
- Press the button **A + D** or **Ang.** in the upper right of the window to change the measurement mode from only angles to distance, and vice versa, and to check the bubble of the instrument.
- The button in the lower left changes icon and name depending on the window shown. Just click on it to switch from window to window.

## Creation of a New Station

The first station is created at the start of the work, the others may be added by:

- pressing on the **Station** icon of the main view;
- in the Tree view, you can use the context menu of the job node or the drop-down menu Modify | TS insertion. In the Tree view you can also choose in which job entered the station, but the software stored it automatically in the last job present.



**Warning!** You can no longer measure TS points for stations prior to what that will be created. To reposition and resume a previous station, you have to duplicate it.



**Figure 108: Creating a New Station**

A window in which you can choose the orientation type to use to create the new station will be shown.

- Choose the orientation type that you want use and press the >> button.

At the end of the orientation procedure, the software ask if enter new measures.

## Stakeout

The stakeout phase allows you to locate the position on the ground of a point of which you know the coordinates. Of course stakeout can be made only after the station has been oriented and only on the last station present in the archive. To perform stakeout:

1. Press the **Stakeout** icon of the main view

- Alternatively, in the Tree view, you can select **Stakeout points and lines** from the context menu of the group or use the drop-down menu **Modify | Stakeout points and lines**.

The type of possible stakeout are:

- Point
- Line
- Polyline
- Arc
- Plane
- Road
- Slopes



**Figure 109: Stakeout**

- Before you begin the stakeout you must select the points to be stakeout by **Selection ...** that changes according to the type of stakeout selected. These windows are described in the section **Selecting entities for stakeout** in the manual **Common part**.

After selecting the objects, the software will enter in the Stakeout view.

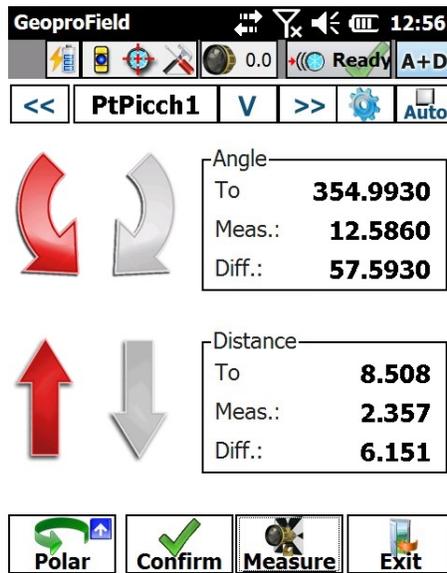
This view is composed by several windows as for the case of the Measure view. Also the mechanism to change window is the same.

Some of these windows (Polar, Tangential, Altimetry, ...) are in common for all types of stakeout with the exception of Slopes. Other depends from the type of stakeout chosen.

## Polar

In the **Polar** window, the measurements of the angle and distance are shown.

- Rotate the station following the directions of the circular arrows until to align it with the point to stakeout (both the arrows will become solid green).
- Shift the reflector until that not arrived at the right distance (also in this case both the arrows will become solid green).

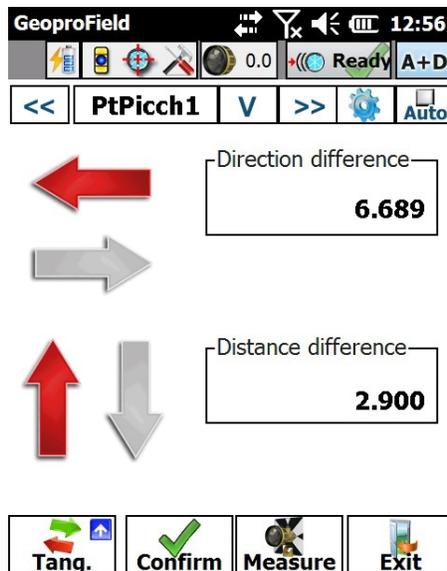


**Figure 110: Polar**

## Tangential

The **Tangential** window provides directions on the shifts to be made with indications only in distances.

- It is useful if you use a remote control of the total station (RC2, RC3, RC5, radio modem or long link bluetooth) and you work as Mono-operator.
- If you are working as Mono-operator, the indications shown are effectively what must make the operator that holding the reflector.

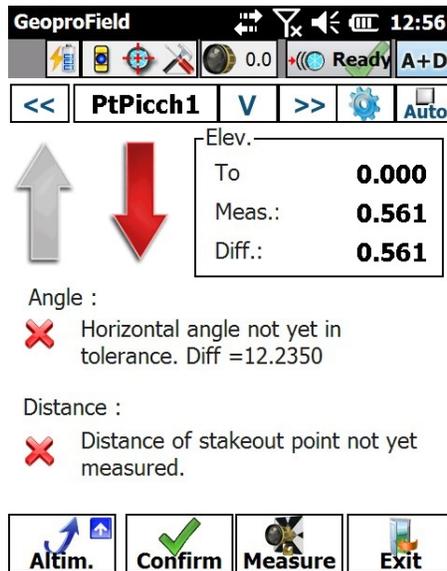


**Figure 111: Tangential**

## Altimetry

The **Altimetry** window is useful in case we must make stakeouts also in elevation.

- At the top information on the elevation are provided.
- At the bottom information on planar position are shown together tolerance data.

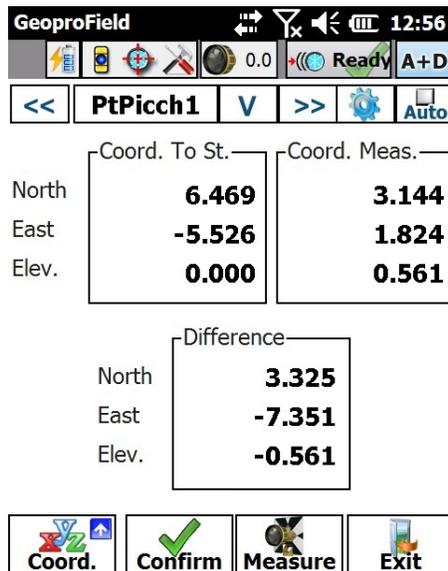


**Figure 112: Altimetry**

## Coordinates

The **Coordinates** window shows:

- the coordinates of the current position;
- the coordinates of point to stakeout;
- the difference between these coordinates.



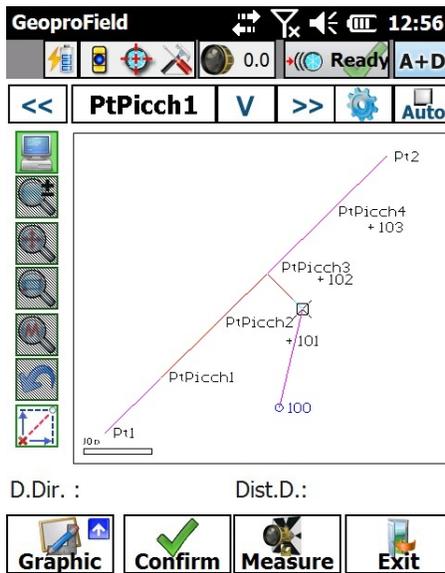
**Figure 113: Coordinates**

## Graphics

The **Graphics** window recaps graphically the Polar or Tangential stakeouts. In the view the position of the station, of the measured point and of the point to stakeout are drawn.

- At the bottom are provided the indications on the distances between the measured point and the point to stakeout.
- The circles around the point to stakeout are related to the tolerance levels set.
- Line window
- The Line window is present only if the type of stakeout chosen is Line.
- It shows the distance along the line between the projection of the current position and the start, and the end, of the line
- It is possible to show or the perpendicular distance between the current position and the line, or the distance along the line between the projection of the current position and the point to be stakeout.
- It is possible to show or the elevation interpolated along the line by the projection of the current position, or the difference between this value and the current measured height.
- It is possible to show the slope between the current position and the interpolated point in percentage or degrees.

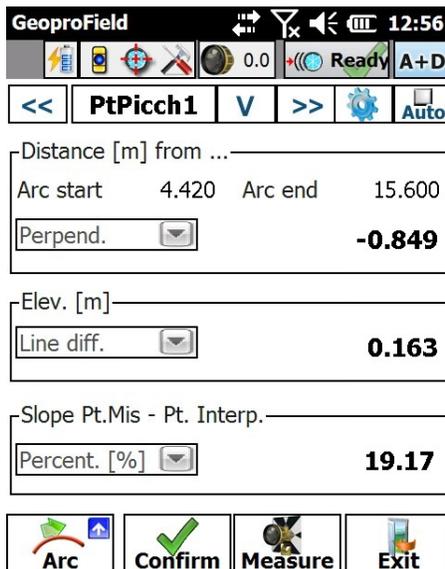
The choice of the values to show, is made by pressing on the corresponding text box.



**Figure 114: Graphics**

## Line Graphics

The same information displayed in the line window (the distance from the stakeout point, the distance to square from the line, etc...) are shown in graphic format.

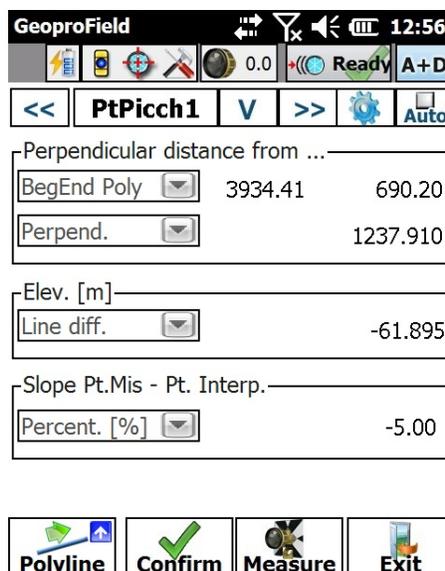


**Figure 115: Line Graphics**

# Polyline

The **Polyline** window is present only if the type of stakeout chosen is **Polyline**.

- It is possible to show or the distance along the polyline between the projection of the current position and the start, and the end, of the polyline, or the distance between the projection of the current position and the start, and the end, of the current segment.
- It is possible to show or the perpendicular distance between the current position and the polyline, or the distance along the line between the projection of the current position and the point to be stakeout.
- It is possible to show or the elevation interpolated along the polyline by the projection of the current position, or the difference between this value and the current measured height.
- It is possible to show the slope between the current position and the interpolated point in percentage or degrees.

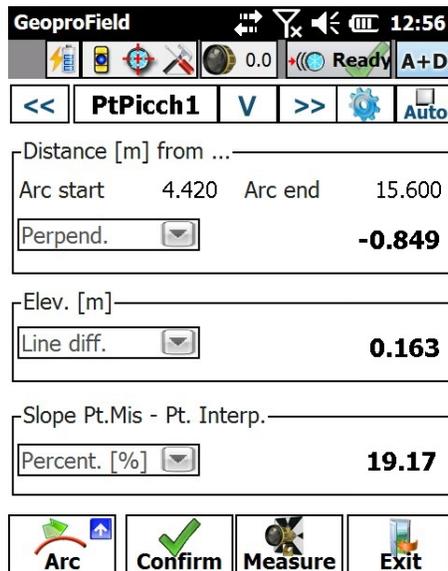


**Figure 116: Polyline**

# Arc

The **Arc** window is present only if the type of stakeout chosen is **Arc**.

- It shows the distance along the arc between the projection of the current position and the start, and the end, of the arc
- It is possible to show or the perpendicular distance between the current position and the arc, the distance along the arc between the projection of the current position and the point to be stakeout.
- It is possible to show or the elevation interpolated along the arc by the projection of the current position, or the difference between this value and the current measured height.
- It is possible to show the slope between the current position and the interpolated point in percentage or degrees. These data will be shown only if arc, and not circle, was selected.

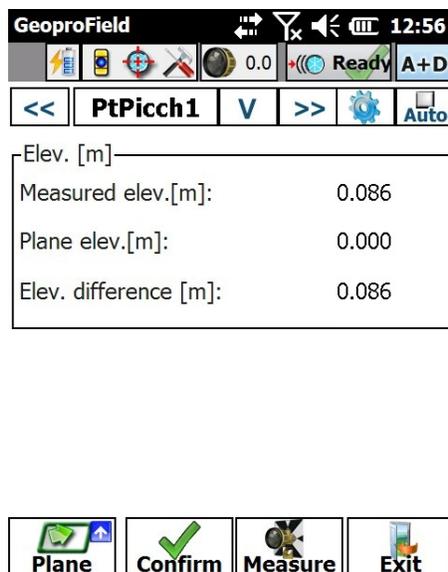


**Figure 117: Arc**

## Plane

The **Plane** window is present only if the type of stakeout chosen is **Plane**.

- It shows the current elevation, the plane elevation at the current planar position and the elevation difference.



**Figure 118: Plane**

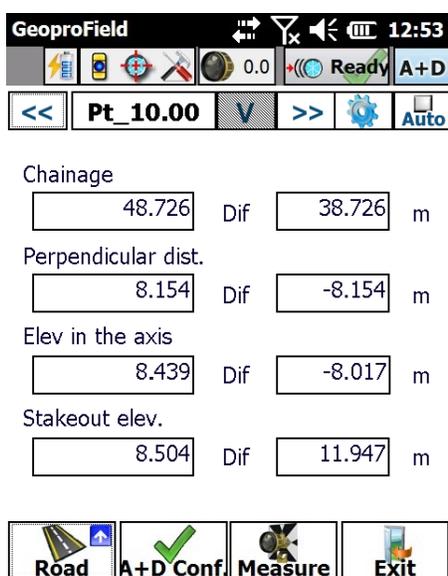
## Road

The **Road** window appears only if the type of stakeout chosen is **Road**.

- Shows the chainage at the current position, its perpendicular distance from the stakeout point, the elevation of the road in function to the chainage showed above, the elevation of the stakeout point and the relative differences with the current position.



Further explanations about the Roads are in the **Roads** section of this manual.



**Figure 119: Road**

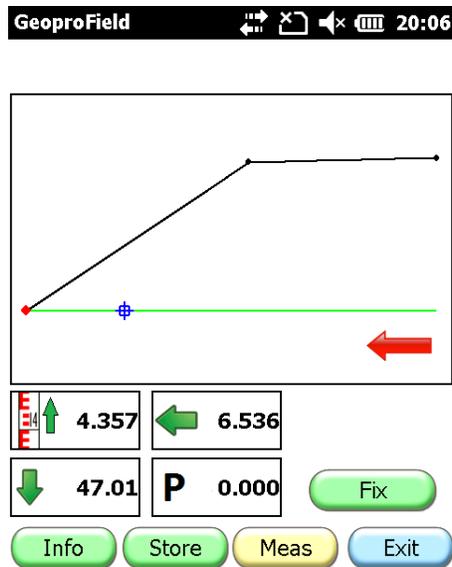
## Slopes

The **Slope** window is shown only if the type of stakeout chosen is **Slope**.

- Slope shows:
  - the elevation difference between the measured point and the slope;
  - the distance difference between the measured point and the hinge point;
  - the chainage difference between measured point and the reference chainage;
  - the reference chainage.



Further explanations about the Roads are in the **Roads** section of this manual.



**Figure 120: Slope**

In all the windows:

- Press the **Measure** button to perform the measurements. To perform measurements continuously without pressing whenever the **Measure** button, check the **Auto** box.
- To scroll the selected points list use the buttons << and >> beside the point name that is found at the top of the window.
- Press **Confirm** button when the point has been identified. If the appropriate option was selected in the **Options** window, the measurements will be saved as a TS point. A confirmation window will appear where you can edit the point name and entered notes, or a sketch.
- You can exit from stakeout or after confirming all the points selected for stakeout or by pressing the **Exit** until to return to the initial window.

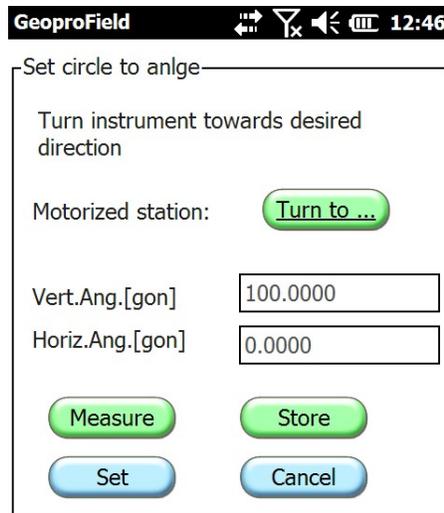
## Circle Reset

The **Circle reset** operation sets the direction in which the station points as horizontal angle at 0.0000. The reset can be performed from the context menu of the station by pressing on the item **Reset circle** or can be displayed directly from the menu **Conf | Reset circle**.

The following window appears:

- Enter in the text box an angle value desired
- Point the instrument in the direction that you want to associate the angular value entered

- Press the **Set** button to associate the angular value in the text box to the current direction of the instrument
- Furthermore:
- with the **Turn to...** button you can turn the station automatically to a desired value if this is motorized;
- with the **Measure** button you can measure the current value of the vertical and horizontal angles;
- with the **Store** button you can store the value of the angles shown in the window, so that they will be pre entered for next execution of this window.



**Figure 121: Circle Reset**

## Toolbar

Both in the main view of GeoproField and in all windows of TS measure and stakeout, is always visible a Toolbar. In this bar the information obtained from the connected instrument and from the controller are shown. Some operations can be quickly launched by pressing its icons.

The first icons show the level charge of the instrument, the others are used for:

- turn on or off the tracking light;
- launch the collimation;
- show some general options of the instrument (see manual Common Section chapter Total Station Profile creation)
- select the reflector type and its constant;
- activate or deactivate the Tracking mode;

- modify the measure mode from only angles to angles and distance, and verify the bubble of the instrument.



Depending on the connected instrument, some of those icons will be visible or not.



Figure 122: Toolbar

## Computation of Perimeters and Areas

Once measured some TS points, you can use these like vertex of a polygon to compute areas or perimeters.

To create a polygon for compute an area, at least three vertexes are needed. You can also use the stations like vertexes of the polygon.

To perform the computation of perimeters and of the areas:

1. Select the Tools drop-down menu of the software;
2. Press **Computation of perimeters and areas** from the drop-down menu.

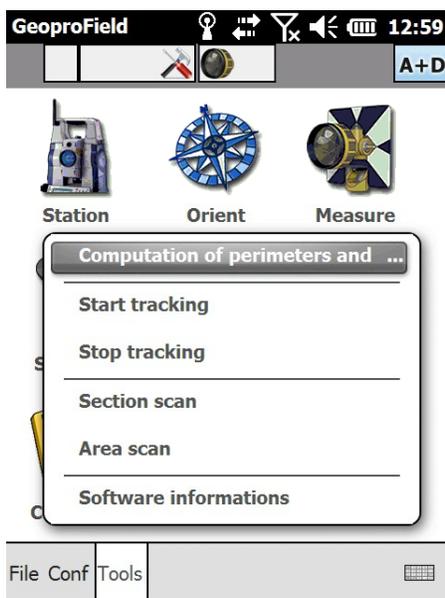


Figure 123: Computation of Perimeters and Areas

The Perimeter and Area Compute window displays.

3. Press on the text **Click here** of the list to add a point or a station like vertex of polygon.

- At the second point added, the measures between a point and the next one (Side, Azimuth, Height difference) will be shown next the name of the vertex.
  - At the third point added, also the Perimeter and Area will be computed.
  - On the last point, the values (Side, ... ) related to the first point in the list, will appear.
4. Press the vertical arrows to change the vertices order.
  5. To terminate the computation, press the **Exit** button.



A computation of perimeters and areas exist also in the Graphics, where, after you have drawn the polygon, a window equal to that described above will be shown.

**GeoproField** 1:01

Perimeter and area compute

Name	Side	Azim.	H.Diff.
100	10.000	10.0000	-0.000
101	10.243	29.7606	-0.000
102	20.000	220.0000	0.000
Click here	-	-	-

2D plane     Vertical plane  
 Enable shifts    ↑ ↓

Perimeter : 40.243

Area : 15.643

Exit

**Figure 124: Computation of Perimeters and Areas**

## Keypad Operations

All the total stations are equipped with a keypad more or less complete depending on the model and some called OnBoard have a controller already integrated. In the models OnBoard you can use the keys of the instrument to execute some routine operations without having to press every time the button or the menus of the software. The implemented keys are:

- Key **Trigger** or **Enter**: launches the chosen operation in the Options window during the creation of the profile for the total station (see the "Common" section).
- Key **Target**: allows to change cyclically the reflector type used among those supported by the instrument.
- Key **Func**: if in the window which we find ourselves ( ex. Measure) show the **Options** button, the key **Func** launches the same operation.



Only the models Topcon OS, PS and DS and Sokkia FX, SX, DX and iX support these operations.

---

# Motorized Station

## Project Initialization

GeoproField currently works with several Sokkia motorized stations and with different types of connections.

Some examples are:

### 1. Sokkia conventional(Cable or Bluetooth):

- Sokkia CX
- Sokkia FX
- Sokkia Set4
- Sokkia Set5
- Sokkia Set6
- Sokkia SET

### 2. Sokkia motorized

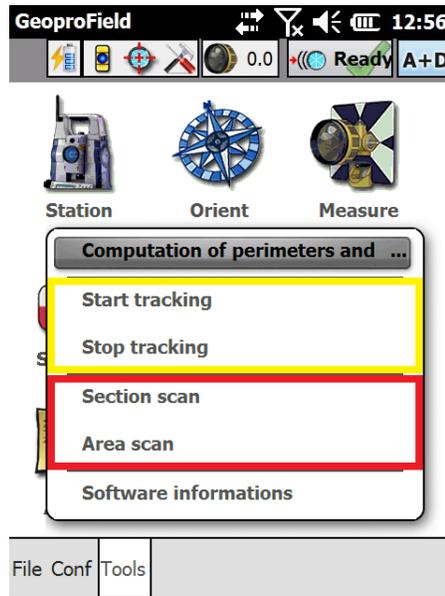
- Sokkia IX
- Sokkia SX
- Sokkia DX
- Sokkia NET
- Sokkia NET II
- Sokkia SRXx

### 3. Sokkia robotic

- Sokkia IX -RC
- Sokkia SX - RC
- Sokkia IX - Bluetooth
- Sokkia SX - Bluetooth
- Sokkia DX - Bluetooth
- Sokkia NET II - Bluetooth
- Sokkia SRXx RC

The following items are present in the **Main View Tools** menu:

- Yellow entries are active selecting a remote connection by RC.
- Red entries are active by selecting a direct connection.



**Figure 125: Main View**

## Using “One-Man” Operation

In order to perform the measurements in “one-man” operation mode it is necessary that the instrument is aligned with the prism. The instrument then goes in search of the prism, and once found, it automatically follows (tracking).

The following buttons are useful to manage the tracking in GeoproField:

 Starts collimation.

 Active tracking looking for the prism and hooking.

 Stops tracking.

The following buttons are present in the toolbar visible in all the software views and capture windows and staking.



Enable search on Remote Control System or Radio Modems according to the profile that you are using . Equivalent to pressing the Search button Remote Control System



This button is located in the graphical page of the acquisition view. Once pressed it is necessary to use the CAD cursor to define the search direction.



This button is located in the GPS page of the acquisition view. Once pressed the GPS receiver position is used to define the search direction.

In addition to the toolbar buttons, you can activate or stop tracking from the **Tools** menu of the Main View using the appropriate entries.



These buttons will never be all active at the same time. Moreover they will be visible depending on the type of instrument and profile used.

## Additional Utilities for Motorized Total Stations

Additional utilities in GeoproField are:



This button is present in stakeout pages near to the name of the point to stake. By pressing it, the station will turn to the target point.



This button is present in the page for station orientation. It will be present when a certain number of control point have been measured.

It can be activated (when it is colored ) or disabled ( grayed out ) by the user. If activated, when the user insert a new control point, the station will turn to the inserted point according to the calculated orientation.

## Scanning of a Section

The scan functions of a section allows the acquisition of some measures linearly (horizontally or vertically).

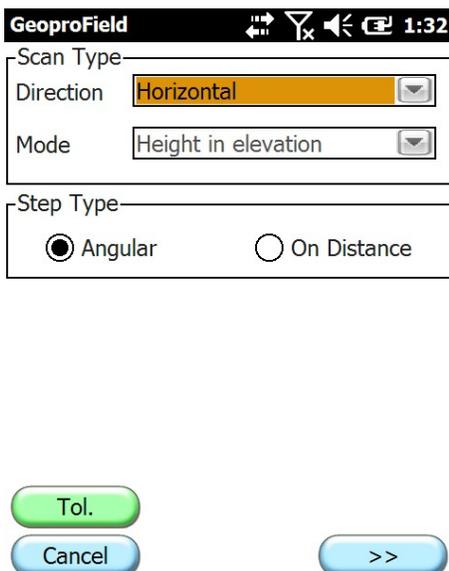
1. To activate these functions press the icon **Scans** icon of the Base view for Total Station in the Main View and the icon **Section** in the Scan view.

You can also click on the item **Section Scan** of the **Tools** menu.



**Figure 126: Main View for Total Station**

2. The **Scan Type/Step Type** window will appear where you can set the following parameters:
  - The direction and the scan mode.
  - The type of step to use between the various measurements (angle or distance).



**Figure 127: Scan**

3. Press the >> (forward arrow) button to open a new window. Its aspect will depend on the choices made in the **Scan Type/Step Type** window.

- If you have chosen an horizontal scan, the **Horizontal Section** window appears.

You can set:

- The start and end point of the section to be measured .
  - The step progress in the measurement section.
  - And in a subsequent window also the number and the distance of the parallel sections to the right and to the left
- Press the **Tol.** (Tolerances) button to set the precision of the scanning operations and the maximum number of retry in case of wrong measures.

The screenshot shows the 'Horizontal Section' window in the GeoproField application. The window has a title bar with 'GeoproField' and some navigation icons. Below the title bar, the text 'Horizontal Section' is displayed. The main area contains several input fields and buttons:

- '- Horiz. Angle[gon]' section:
  - 'Start' field: 78.2450, with a yellow 'Meas\*' button to its right.
  - 'End Ang.:' field: 99.3500, with a yellow 'Measure' button to its right.
- '- Elev. (m)' field: 2.5
- '- Step Ang[gon]' field: 5.0000
- At the bottom left, there is a small circular icon and the value '0.0'.
- At the bottom right, there is a sun icon.
- Below the main window, there are several buttons: a green 'Tol.' button, a blue 'Cancel' button, a blue '<<' button, and a blue '>>' button.

**Figure 128: Horizontal Section**

- Press the >> button display the **Parallel Sections** window (Figure 129 on page 108) to create and measure eventual parallel sections to the previously defined one.
- Enter the number of upper or lower sections to be created and the distance between them.

If you do not want parallel sections, set the number at 0.

In case of vertical sections, you will be asked for the number of right or left sections create.

GeoproField 1:36

Parallel Sections

- Upper

Nº: 1

Dist: 0.75

Parallel Sections

- Lower

Nº: 1

Dist: 1.2

Toll.

Cancel << >>

**Figure 129: Parallel Section**

8. Press the >> button to jump to the effective scan window.
9. To start scanning press the **Scan** button (Figure 130 on page 109). This will turn off during the scanning operations.

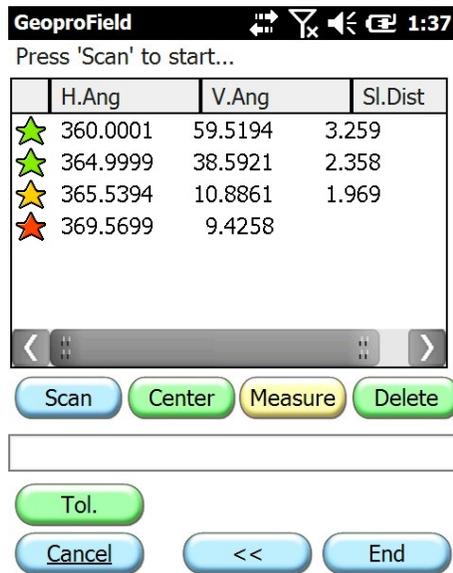
Each point measured will be displayed in the window list with a red, yellow or green star:

- Green means that the measurement point is within the wanted tolerance range,
- yellow means that the measurement is not within the tolerance,
- and red means that it was not able to measure the point.

10. Once the scan is completed, press the **Finish** to store the measured points in the field book .



During scanning, you can cancel the operation by pressing **Finish** button.



**Figure 130: Start Scanning**

11. When scanning is finished, you can select each measured point and perform the following operations by using the relative buttons:
- Center point — The station will turn to the point selected in the list.
  - Measure the point — Perform a manual measurement of the point.
  - Delete the point — Delete the point from the list and in the subsequent record in the field book.

## Scanning Area

The scan of an area allows the acquisition of some measures regularly spaced in a rectangle section of the space seen by a motorized total station.

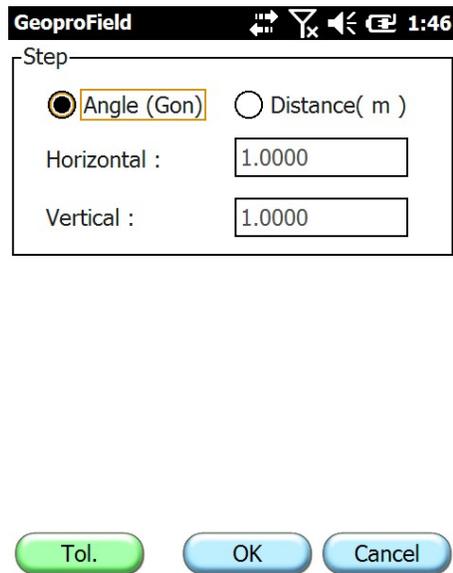
1. Activate this function by pressing the **Scans** icon of the Base view for Total Station and the **Area** icon in the Scan view.

You can also click on the item **Area Scan** from the **Tools** menu.



**Figure 131: Main View**

2. This will open the **Step** window.
3. Set the type of step between the measures, and its horizontal and vertical value.
4. Press the **Tol.** (Tolerances) button to set the precision of the scanning operations and the maximum number of retries in case of wrong measures.
5. Pressing **OK** to switch to the plan definition window.



GeoproField 1:46

Step

Angle (Gon)  Distance( m )

Horizontal : 1.0000

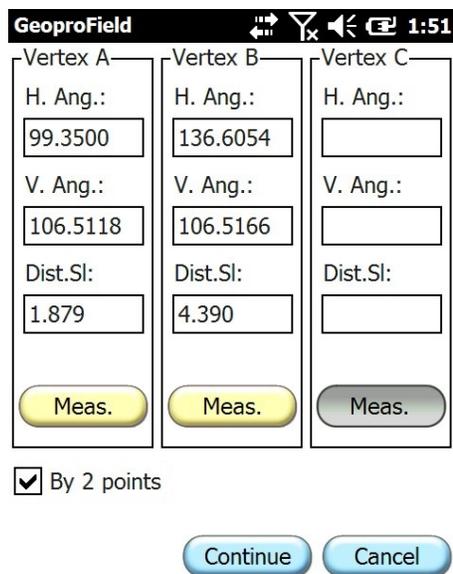
Vertical : 1.0000

Tol. OK Cancel

**Figure 132: Step**

In the **Plan Definition** window you must define the points that create the plan on which project the area to be scanned.

6. The check box activates or deactivates the option to create a vertical plane using only two points.
7. Press the **Meas.** button to measure of the two/three points necessary to define the plane.
8. Once you have defined the vertices of the plane, press **Continue** to display the **Area Bounding Box** window.



GeoproField 1:51

Vertex A	Vertex B	Vertex C
H. Ang.:	H. Ang.:	H. Ang.:
99.3500	136.6054	
V. Ang.:	V. Ang.:	V. Ang.:
106.5118	106.5166	
Dist.SI:	Dist.SI:	Dist.SI:
1.879	4.390	
Meas.	Meas.	Meas.

By 2 points

Continue Cancel

**Figure 133: Plan Definition**

- In the **Area Bounding Box** window define the vertex of the rectangle where the measures will be taken.  
The values are preset to those collected in the previous windows, but they can be changed.

**GeoproField** 1:51

First Vertex—

Horizontal Ang. : 99.3500

Vertical Ang. : 106.5118

Measure

Second Vertex—

Horizontal Ang. : 136.6054

Vertical Ang. : 106.5166

Measure

OK Cancel

**Figure 134: Plan Definition**

- After entering the data and pressing **OK**, a scan area window, very similar to the scanning section window previously shown, will appear.

For the description of this window "Scanning of a Section" on page 105, because the operation is the same.

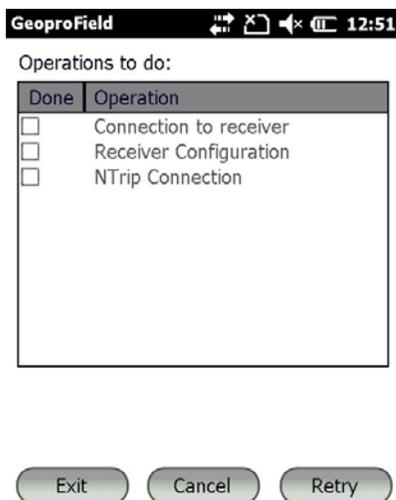
## Work Start

If you are using a profile configured for a GPS receiver, the software will launch an automatic procedure for configuring the receiver.

## Rover Configuration

The **Operations to do...** window displays several lines of text under Operation whose number and content depend on the chosen configuration.

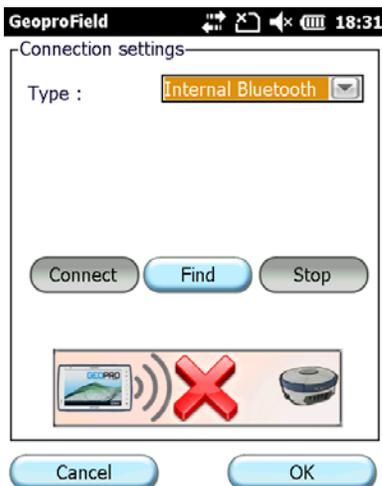
In the following example, the lines are a consequence of a configuration of a receiver configured as a Rover with the Ntrip correction received from network.



**Figure 135: Operations to do...**

1. The first time you run a setup, this window automatically opens. You need to connect to the receiver by entering the serial port and baud rate, or the device you want to connect using Bluetooth.
2. Press **Connect** to connect with the receiver.
3. As soon as the connection is done, press **OK** to continue.

The software will store the connection parameters in the profile so as not to show this window again and connect automatically.

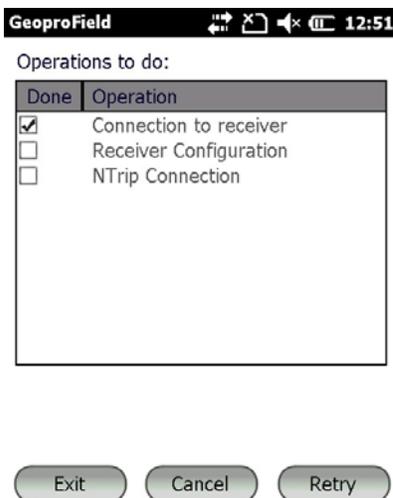


**Figure 136: Connection Settings**



If you press **Cancel** the connection to the receiver is canceled and you return to the window for automatic configuration.

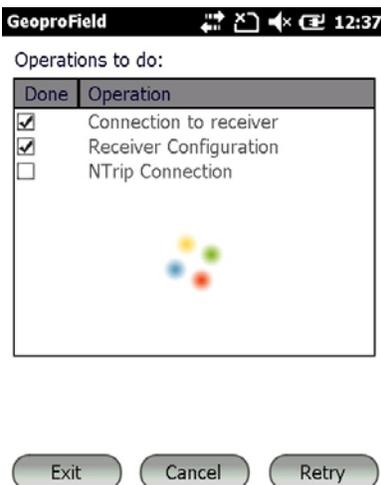
- Once the connection to the receiver is active, you are returned to the **Operations to do...** window. The operation that successfully executed will have a check mark.



**Figure 137: Connection to Receiver**

- The transition between windows is automatic and the buttons are disabled as long as the listed operations are performed correctly.
- This is the step in which the software shows that the GPS configuration has been successfully performed.

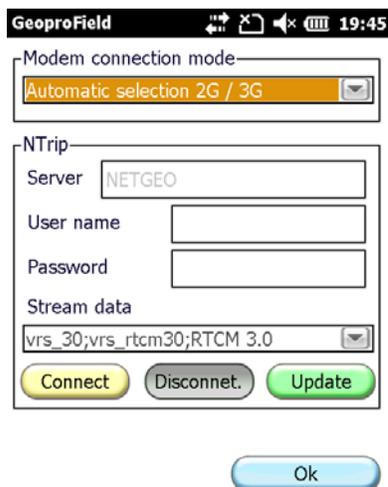
This operation can take several seconds.



**Figure 138: Receiver Configuration**

The Modem connection mode window displays only if you have chosen a configuration that provides that the correction has to be received from a network of permanent GPS stations.

It only displays the first time you run a configuration.

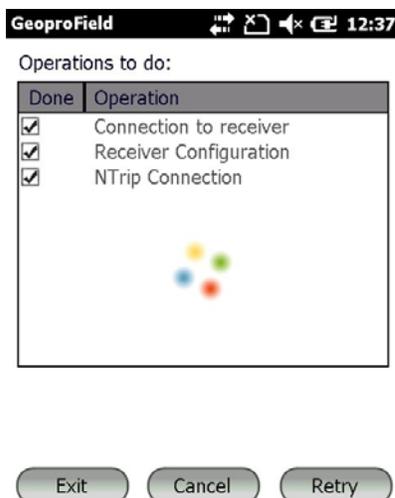


**Figure 139: Modem Connection Mode**

7. You will have to choose the **Data Stream** from which to receive the correction. If the line **Stream Data** is empty, press **Update**.
8. Press in the list box below text **Data Stream** to see the list of the possible corrections that the network provides.
9. Choose the correction type and press **Connect**.
10. If the connection is successful the **Connect** button and **Update** button will be disabled, and the **Disconnect** button will be enabled. Press **OK** to continue.

The software will store the connection parameters in the profile so as not to show this window again and connect automatically.

The next times, **Operations to do...** window will be shown only if the connection fails.



**Figure 140: NTrip Connection**

11. When all phases of the configuration of the receiver successfully completes, the window closes automatically, and the **Create a new group...** window displays.



**Figure 141: Create a New Group**

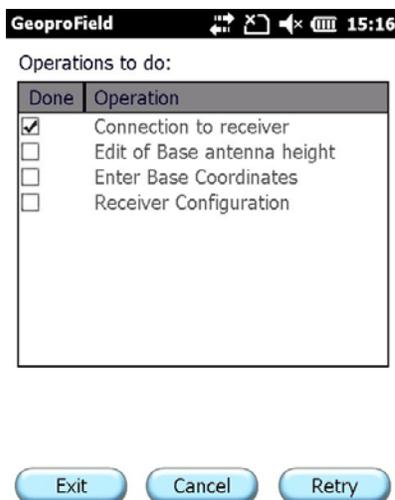
12. The **Create a new group...** window is used for the creation of the group, proposing a name equal to that the project that is being created.
- The today's date will be set.
  - The button **Not create** is shown only if no GPS groups are present in the work. By pressing it you will continue without create a group but you will not be able to measure points.
  - If one or more GPS groups are present in the work, the button **Use last group** is shown. By pressing it, you will continue without create a group. The new measured points will be inserted in the last group present and will be projected or localized depending of the choices made for such a group.

- By pressing the >> button, a new group will be created and the user will be asked to select projection or localization options. The new measured points will be inserted in the new group.

## Base Configuration

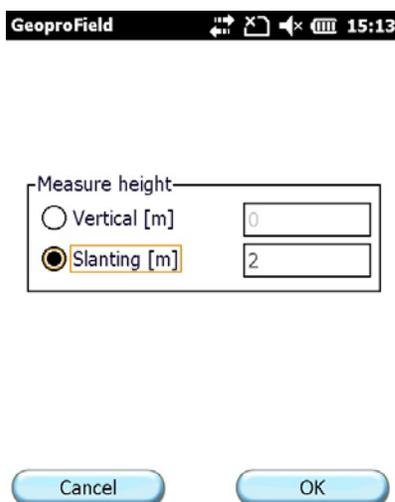
If the receiver is configured as a Base, the following instructions explain the progress of the automatic configuration.

1. The first step is the connection to the receiver. It is identical to that of the configuration of the rover.



**Figure 142: Connection to Receiver**

2. The next window that is shown is **Measure Height**. Set the **Vertical** and **Slanting** height of the Base, and press **OK**.



**Figure 143: Measure Height**

3. From the **Base Station** window:

**Figure 144: Base Station**

- a. Choose the name of the base station GPS and its coordinates.
  - b. Save the station name and coordinates entered by pressing the **Data save** button.
  - c. Enter the number of epoch to calculate the position of the base station GPS when you press **Acquire** button. In this case the coordinates are read from the GPS receiver.
  - d. Use the coordinates set into the receiver by pressing the **Receiver** button
  - e. Press **From point** to use the coordinates of a point in the archive.
  - f. Enter the height of the ground where the receiver is located.
4. The **Recording status on Controller** window is shown only if the receiver has been correctly configured and set in the mode Post Processing.
- In this window you can:
  - Choose whether to save the file into the controller memory, or into the receiver memory, or both.
  - Enter the name of the Post Processing file to be recorded in the controller or in the receiver memory.
  - Set the value of the record interval in case of receiver recording.



This window is shown also by selecting **Post Process Management** from the **Tools** menu.



**Figure 145: Recording Status on Controller**

## Fast Orientation

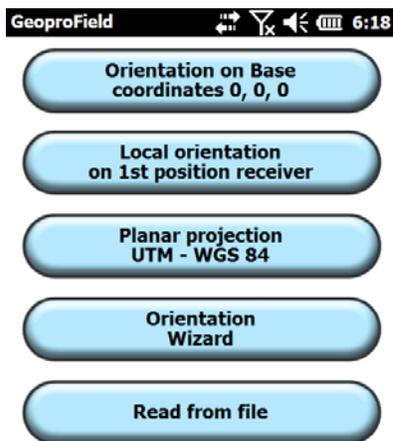
The **Fast Orientation** window appears only when you create a group or during the work start or from inside the software. It allows the user to quickly choose, for the group just created, what kind of orientation to use between:

- Orientation by setting the base at coordinate 0,0,0.
- Orientation by setting the first receiver position at coordinate 0,0,0.
- Planar Projection UTM - WGS 84.
- Orientation wizard.
- Orientation read from file.

By pressing on the first three buttons, the orientation is performed directly by the software, while by selecting the fourth button the orientation wizard is launched.

By pressing the last button you can instead load the information needed to orient the group from a special file (\* .cal) previously created by the user at the end of the orientation wizard.

After you have oriented the group, the software will ask if you want to enter points. Answering **NO** the creation of the new work will be finished. By answering **YES**, you will go to the **Measure points** window.



**Figure 146: Fast Orientation**

## Orientation Wizard

This is a wizard that helps the user in the orientation of the group and can be launched in different ways:

- By pressing **Orientation wizard** button in the choice of the method to be used to orient the group.
- By pressing the **Orient** icon of the base view.
- As an alternative, in the Tree view, you can select the command **Orientation** from the context menu of the group or use the drop-down menu **Modify | Orientation**.



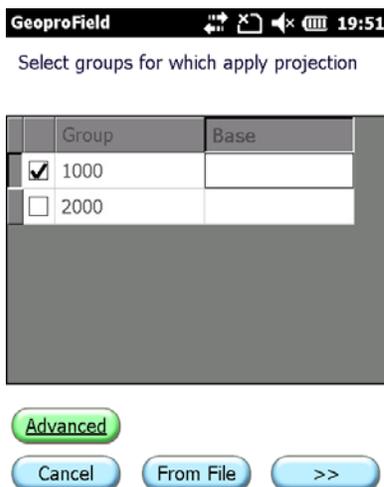
**Figure 147: Main View**

The wizard consists of windows that appear depending on the choices made.

## Group Selection

**Group selection** displays all groups present in the archive and allows you to choose which groups to apply the orientation you are going to perform.

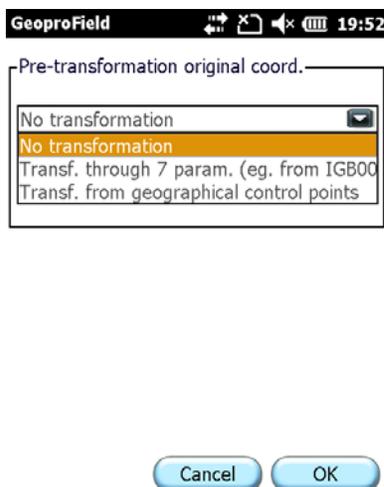
1. Press on the check box on the left of the group name to select a group.
2. Press >> to orient all selected groups by using the same parameters.



**Figure 148: Group Selection**

## Pre-transformation Coordinates

A pre-processing will be applied to the original data. In the next steps, the projection of the points will be performed on the data pre-processed. The pre-processing is useful if you want to change the reference system with which the RTK correction was received. It is possible to pre-transform data or by using a transformation to 7 parameters or by calculating the shift by means of geographic control points.



**Figure 149: Pre-transformation Coordinates**

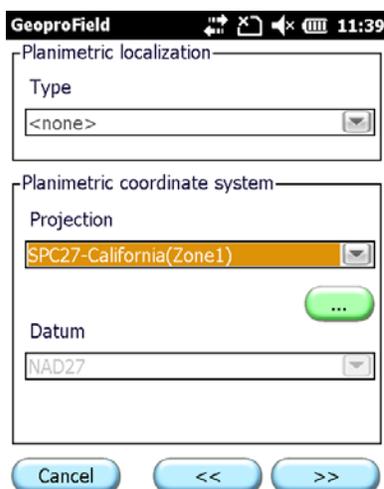
## Planimetric Localization

Choose the horizontal projection type among:

**<none>**: the orientation is performed by projecting the points on standard cartographic representations. With this choice you have to select the Projection and the Datum in the relative lists. The projection list contains only the active projections. To add active projections to the list press the button ...

**Control points**: the orientation is performed on two or more control points of the archive which have valid planar coordinates and were measured. The shift, scale and rotation are computed by the software with the least squares method.

**Data entry**: this type of computation projects the points so to assign to one of them the desired coordinates by the operator or by a control point. The operator can then enter the values for the scale and angle of rotation.



**Figure 150: Plainmetric Localization**

### Planimetric Localization: Planimetric coordinate system

This is the screen where you can add active projections to the list. At the top, a tree view shows all the projection available for the planimetric localization.

Press on the button with the green arrow to add in the **Active** list the selected projection.

Press on the button **Delete** to remove the selected file from the **Active** list.



**Figure 151: Planimetric Coordinate System**

## Vertical Localization

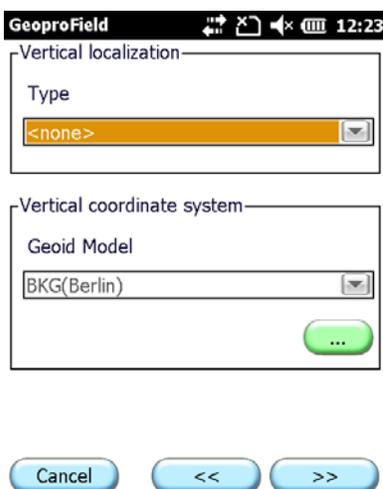
Choose the vertical projection type among:

**<none>**: the orientation is performed by projecting the points using the geoid model. With this choice you have to select the **Geoid model** in the relative list. The Geoid list contains only the active geoids. To add active geoids to the list press the button ...

**Ellipsoidal height**: the elevation value is simply set equal to the height ellipsoidal measured.

**Control points**: the orientation is performed on two or more control points of the archive which have valid elevation and were measured.

**Data entry**: the elevation computation of the points is done assigning to one of them the elevation desired by the user.



**Figure 152: Vertical Localization**

## Vertical Localization: Vertical coordinate system

The first screen displays the list with the active geoid used by the operator. If you press on the button **Remove** you can delete the selected Geoid from the list. If you press on the button **Add** the program will show the second window.

The second window show the Format used read the geoid information. The **File Path** the the file name and path of the selected geoid. In the **Geoid Boundary** are shown the coordinates range of the selected geoid. If you press on the button **Browse** the program will show the third window.

The third window show the folder where search the file containing the geoid data. The **File type** depends on the format selected in the previous window. In the **File name to import** are shown all the file found in the **Data Folder** and which match the selected **File type**. Press the button **Change** to modify the path where to search for the file.



Figure 153: Vertical Coordinate System

## Planimetric Localization: Control points

At the top, all of the TS and GPS points (white check box) and the eventual base station (green check box) are shown. If the check box is yellow it means there is a control point with the same name.

Uncheck the box at the left of the name in order to not use the point for computation.

Press **Measure** to add a measure for the computation. A window will appear in which you should select an existing control point or adding a new one (See Operating Manual-Common Part, Ch.12). After the point was selected, the window for the acquisition of a GPS point will be shown.

The computation is automatically performed after any modification.

The window shows the average and maximum deviation, the scale and rotation angle calculated.

S.	Name ...	C.Ric...	C.Ric...	D...
<input checked="" type="checkbox"/>	pnt1	61.751	67.386	27.196
<input checked="" type="checkbox"/>	pnt2	66.652	63.113	27.196

Scale = 1 Measure

Calcolo OK

Deviations

Mid.

Max.

Calculation results

Scale

Rot.A.

Cancel << >>

**Figure 154: Plainmetric - Control Points**

## Planimetric localization: Data entry

At the top, all of the TS and GPS points (white check box) and the eventual base station (green check box) are shown. If the check box is yellow it means there is a control point with the same name.

Select the point on which you want to make a roto-translation (only one point can be selected). This will have the box checked.

Verify the coordinates north and east to be associated to the selected point, as well as the scale and angle of rotation.

Also in this case press **Measure**, to add a measure for the computation.

The computation is automatically performed after any modification.

S.	Name P...	C.Ric.X(...)	C.Ric.Y(...)	D
<input checked="" type="checkbox"/>	BASE_1...	0.000	0.000	
<input checked="" type="checkbox"/>	pnt1	3982.894	-11715.918	
<input checked="" type="checkbox"/>	pnt2	3976.904	-11718.447	
<input type="checkbox"/>	107	3999.088	-11740.702	

Measure

Calculation OK

Transformation Values

North  Scale

East  Ang.

Cancel << >>

**Figure 155: Plainmetric - Data Entry**

## Vertical localization: Control points

At the top, all of the TS and GPS points (white check box) and the eventual base station (green check box) are shown. If the check box is yellow it means there is a control point with the same name.

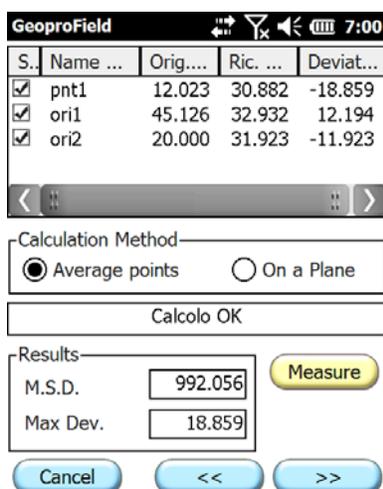
Uncheck the box at the left of the name in order to not use the point for computation.

Choose "Media points", to calculate the average value of the difference between the elevation of control point and height measured on the ellipsoid.

If you are measured at least 3 points you can choose "On a plane". In this case it is calculated the plane passing through the selected points and the elevation calculated on this.

Press **Measure** to add a measure for the computation.

The window shows the average and maximum deviation, the scale and rotation angle calculated.



**Figure 156: Vertical - Control Points**

## Vertical localization: Data entry

At the top, all of the TS and GPS points (white check box) and the eventual base station (green check box) are shown. If the check box is yellow it means there is a control point with the same name.

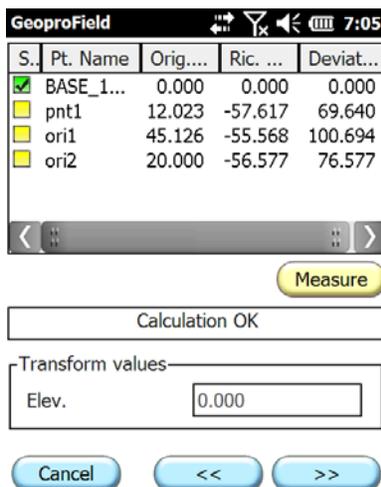
Select the point on which you want to make the computation (only one point can be selected). This will have the box checked.

Verify the elevation to be associated to the selected point.

Press **Measure** to add a measure for the computation.

The computation is performed automatically after any modification.

The last screen of the wizard contains the button "**Save to File**" to store in a file (\*.cal) information orientation just ran. This file can be reused for other orientations as described above. Press "**Confirm**" to complete the orientation.



**Figure 157: Vertical - Data Entry**

## Creation of New Group

To begin the survey you must enter a group to which all the measured points belong. The first group is created when you create or open a GPS survey, others will be entered through the following procedure:

1. Press the **New group** icon in the GPS main view.
  - Alternatively, in the Tree view, you can select **Insert a Group** from the context menu of the GPS fieldbook or use the drop-down menu **Modify | Insert a Group**.



Warning! You can add GPS points only in the last group.



**Figure 158: Main View**

2. Now the **Create a new group...** window, which appeared during the creation of the work, will be shown.
3. Enter the required parameters.
4. Press the **OK** button.
5. Press **OK** to close the window. Then you will be asked to make the orientation of the group and if insert the new measurements.



**Figure 159: Create a new group...**

At the end of all these requests it will be shown the main view.

## Measure GPS Points

Once you have created at least one group you can measure the points. For each measurement confirmed, a GPS point will be stored in the current group and the controller will beep.



Warning!! In the demo mode the number of groups and of points that can be created is limited.

To measure GPS points:

Press on the **Measure** icon in the main view.

Alternatively, in the Tree view, you can select **Insert new measures** from the context menu of the group or use the drop-down menu **Modify | Insert new measures**.



**Figure 160: Measure GPS Points**

A window, composed of the windows **Data**, **Graphics**, **Edit** and **Post processing**, will be shown.

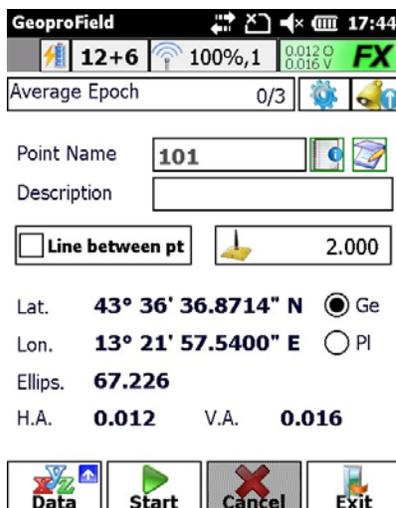
By pressing the button **Data**, located in the lower left, you can switch from one window to another.

## Data

The **Data** window displays:

- The point name, which automatically increases of a unit every time you store a point, and it can anyway be modified by the operator.
- The description, which will remain equal to that of the previous point. It can be selected from a list or be entered from scratch.
- The option **Line between points**, which can be switched on or off. The codes IL and FL will be added to the points so as to automatically create the lines between them.
- The antenna height. Pressing the corresponding icon you can change the data of the antenna of GPS receiver.
- The current position, expressed in geographic or planar coordinates depending on the option chosen.

- The horizontal and vertical precision.

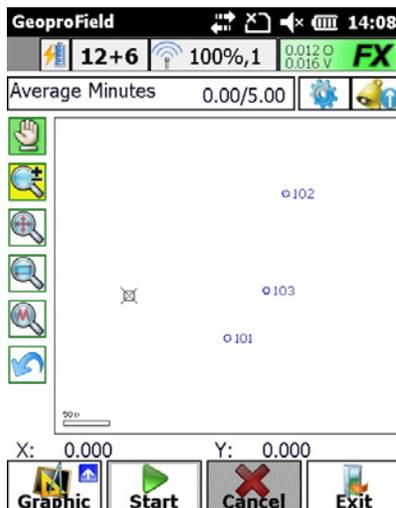


**Figure 161: Data**

## Graphics

The **Graphics** window displays:

- A gray cross shows the measured point but not yet confirmed. Also other points measured previously and eventual maps or vector data present in the archive, are shown with the color assigned to them.
- Below the graphic view the planar coordinates of your current position are shown
- On this window you cannot make drawing or editing but only viewing operations.
- On the left side there is a green button that depicts a computer or a hand. They respectively specify if the graphic is zoom adapted automatically or manually. Pressing on it you can switch from one mode to another.
- In automatic mode the 5 buttons below are disabled, as it is the software that adapts the graphic in order to leave your current position measured by GPS in the center of the display area.
- In manual mode, the 5 buttons become active. They are (from top to bottom): Zoom Real Time, Extended Zoom, Zoom Window, Zoom on the measured point and the previous view.
- The pressure of the stylus on the graphic corresponds to an operation of Pan Real Time, independently that the window is in manual or automatic mode



**Figure 162: Graphics**

## Edit

The **Edit** window displays:

- A grid containing the points (default max 100) stored in the current group. The display of rows takes place in reverse order to show first the last measured point. The **All** button shows all measured points.
- You can delete points by using the **Delete** button.
- You can change the name of a point, its description or antenna height by pressing twice quickly on the corresponding field, or by pressing the **Edit** button after selecting the desired line.
- The yellow boxes indicate that the data is not editable.



**Figure 163: Edit**

# Post Processing

The **Post Processing** window displays:

- The name of TPS file created.
- The number of epochs and the progressive dimension of the file.
- The list of currently visible satellites and the number of epochs recorded for each of them.

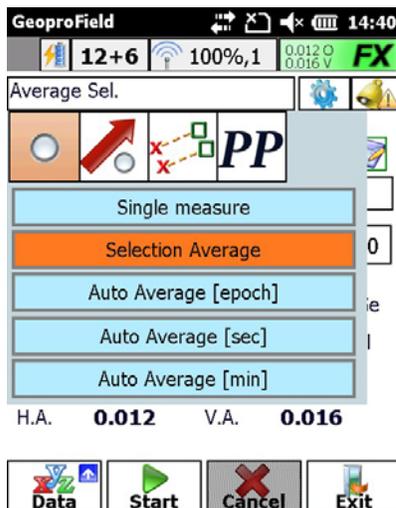


This window is shown only if the selected profile was set also in post-processing mode



**Figure 164: Post Processing**

- At the top of the windows described above, you will see the command bar consisting of:
  - A text box showing the currently used type of measure and the eventual storage interval. Pressing on it you can quickly change the type of measure through a special window as shown on the right. Icons identify the type of measure (Single pt., Path, etc. ...). Their specific methods are reported below.
  - The Options button to show the relative window.
  - The Alarms button to show the relative window.
- There are four buttons at the bottom: the first from the left is used to choose which window to show, the other 3 allow the data collection or exit the measure procedure. The names of the buttons change depending on the showed window, the selected measure options and the measuring phase.

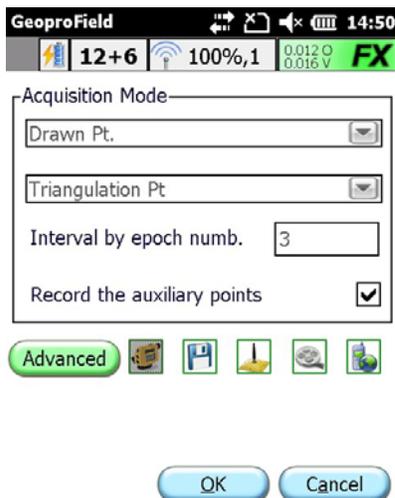


**Figure 165: Command**

## Options

The window **Options** displays:

- The measure type that can be chosen from the list that appears by pressing over the first list box.
- For each type there are specific methods. They are shown in the list that appears by pressing over the second list box.
- The measure range, which must be set depending on the type and of the method chosen.
- From this window, using the appropriate buttons, you can also launch some functions such as:
  - set some options like the offset;
  - measure points using a laser tool to calculate the offset;
  - save the file;
  - set the antenna parameters;
  - start or stop recording (only if the profile was set also in post-processing mode);
  - enable or disable the device for RTK correction.



**Figure 166: Options**

## Alarms

The **Alarms** window displays:

- The values subject to control. They are followed by a green symbol if these are within the predetermined thresholds or by a symbol with a red circle in the opposite case.
- If you have set the instrument profile both Real time and Post Processing, you can to control the limits set for both modes by choosing the appropriate item.
- The icon with the bell serves to enable and / or set the limits of both working mode.
- The symbol shown with the icon with the bell that is located in both windows, indicates there are some values that exceed the limits. If alarm is signaled you can show this window to find the value that generates it.

The symbol take the form:

- of white arrow with blue background, if there aren't alarms;
- of danger, if there are alarms that do not prevent the measure of the points;
- of access prohibition, if there are alarms that prevent the measure of the points.



**Figure 167: Alarms**

## GPS Stakeout

The stakeout phase allows you to locate the position on the ground of a point which you know the coordinates. The stakeout can be made only after performing the orientation of the group.

- Press on the **Stakeout** icon of the main view.
- Alternatively, in the Tree view, you can select **Stakeout points and lines** from the context menu of the group or use the drop-down menu **Modify | Stakeout points and lines**.

The type of possible stakeout are:

- Point
- Line
- Polyline
- -Arc
- Plane
- Road
- Modine

Before you begin the stakeout you must select the points to be stakeout by **Selection ...** that changes according to the chosen stakeout. These windows are described in the section **Selecting entities for stakeout**.



**Figure 168: Stakeout**

After selecting the objects, the software will show a series of windows that changes depending on the stakeout chosen. Below is reported the description of the windows that can be shown.

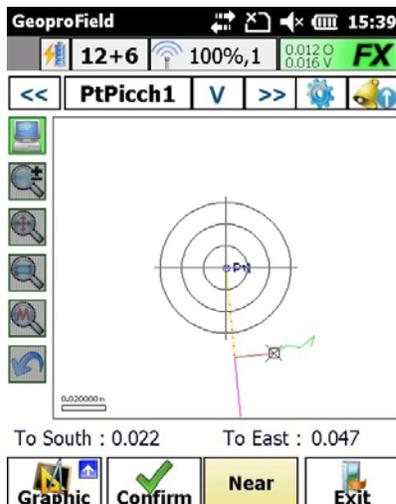


**Figure 169: Stakeout**

## Data

The **Data** window displays:

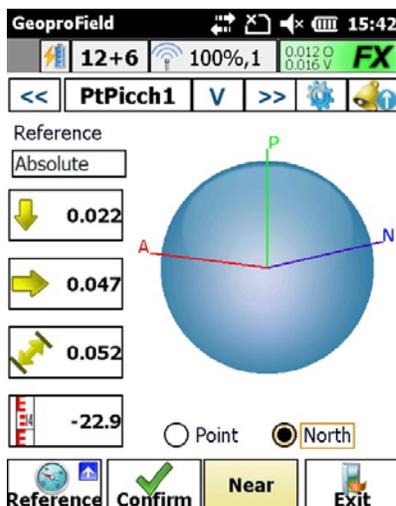
- The coordinates of the current position.
- The coordinates of the position of the stakeout point.
- The difference between these coordinates.
- The horizontal and vertical precision.



**Figure 170: Graphics**

- The operation of this window is almost identical to the graphics window in the procedure of measuring points.
- At the bottom are shown the directions to arrive to the point to stakeout.
- Also are shown:
  - some lines linking reference position, point to stakeout and the current position measured by GPS;
  - some circles around the point to stakeout with a diameter depending on the value of tolerance set.
- In automatic display mode, the view is gradually adjusted to maintain visible the point to be stakeout and the current position.
- When the distance from the point to stakeout decreases below a certain threshold, the point is brought to the center of the screen and the zoom factor is gradually increased as they approach you.

# Reference



**Figure 171: Reference**

The **Reference** window displays:

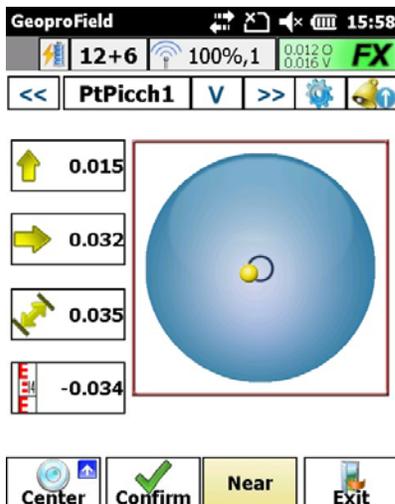
- The type of reference.
- The directions based on the reference chosen to locate the point to stakeout. The arrows drawn alongside the numerical values indicate the direction in which to move and they change color: from red to yellow and finally to green, as you approach the point to stakeout. The color change is based on the tolerances set in the options.
- The compass points: the north (blue line), the position of the stakeout point to the current position measured by the GPS receiver (green line) and the direction in which you are moving (red line).



These indications are updated and reliable only if you're actually moving, but will remain the same if you stop.

- There are two options for displaying the compass:
  - Point: the green line is anchored to the vertical axis, while the other two rotate as you change position.
  - North: is the blue line which is anchored to the vertical axis, as in normal compasses, while the other two are rotating.
- To arrive to the point to stakeout, you must move in a direction that brings the red line to coincide with the green.

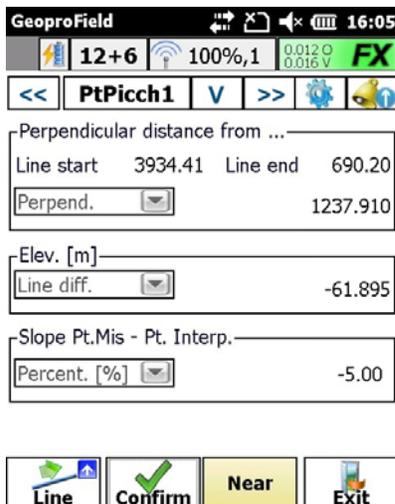
# Center



**Figure 172: Center**

- It shows the directions based on the reference chosen to locate the point to stakeout. The arrows drawn alongside the numerical values indicate the direction in which to move and they change color: from red to yellow and finally to green, as you approach the point to stakeout.
- It shows a bubble to precisely locate the point to stakeout. A colored ball will change from red to yellow and finally to green as you approach the stakeout point and indicates the current position measured by the GPS receiver. When the ball is fully into the small blue circle in the center of the design we are exactly on the point to stakeout.
- Both arrows and ball change color depending on the distance from the stakeout point. The changes are based on the tolerances set in the options.

# Line

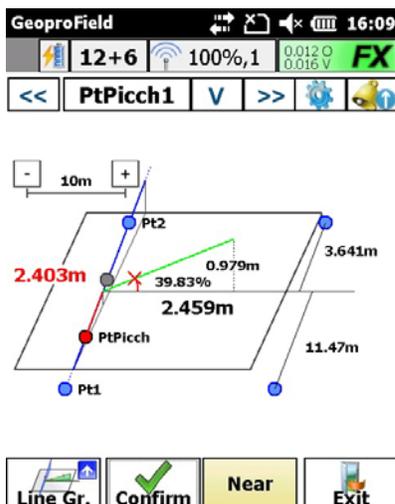


**Figure 173: Line**

The **Line** window is shown only if the type of stakeout chosen is **Line**.

- It shows the distance from the current position to the beginning and to the ending of the line.
- It is possible to show or the perpendicular distance between the current position and the line, or the distance between the current position and the point to be stakeout.
- It is possible to show or the elevation difference between the current position and the line, or between the current position and the elevation interpolated.
- It is possible to show the slope between the current position and the interpolated point in percentage or degrees.

The choice of the values to show, is made by pressing on the corresponding text box.

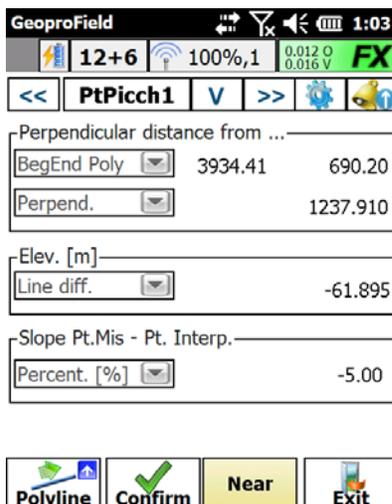


**Figure 174: Line**

## Line Graphics

The same information displayed in the line window (the distance from the stakeout point, the distance to square from the line, etc...) are shown in graphic format.

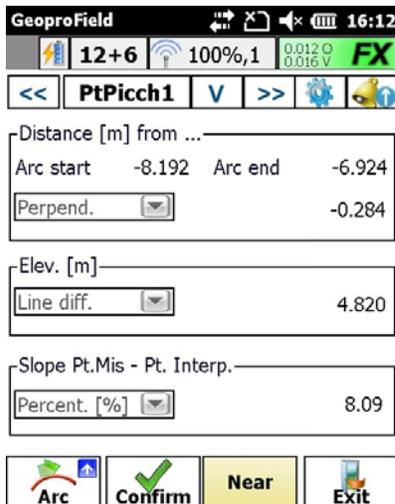
## Polyline



**Figure 175: Polyline**

- The **Polyline** window is shown only if the type of stakeout chosen is **Polyline**.
- It is possible to show or the distance from the current position to the beginning and to the ending of the polyline, or the distance from the current position to the beginning and to the ending of the current segment.
- It is possible to show or the perpendicular distance between the current position and the polyline, or the distance between the current position and the point to be stakeout.
- It is possible to show or the elevation difference between the current position and the polyline, or between the current position and the elevation interpolated.
- It is possible to show the slope between the current position and the interpolated point in percentage or degrees.

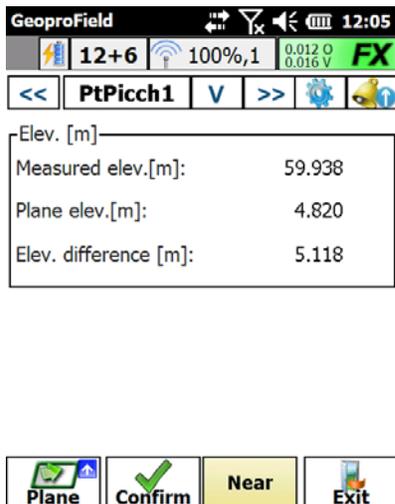
# Arc



**Figure 176: Arc**

The **Arc** window is shown only if the type of stakeout chosen is **Arc**.

- It is possible to show or the perpendicular distance between the current position and the arc, or the distance between the current position and the point to be stakeout.
- It is possible to show or the elevation difference between the current position and the arc, or between the current position and the elevation interpolated.
- It is possible to show the slope between the current position and the interpolated point in percentage or degrees. These data will be shown only if some arc type was selected.



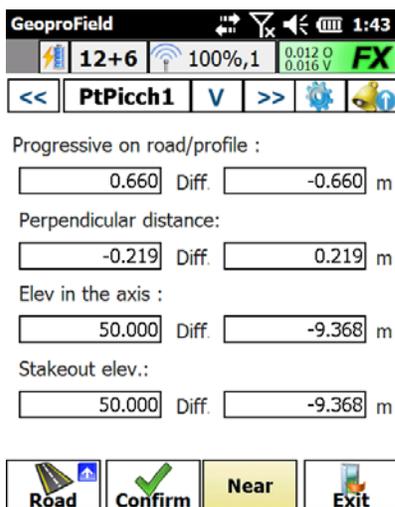
**Figure 177: Arc**

## Plane

The **Plane** window is shown only if the type of stakeout chosen is **Plane**.

It shows the current elevation, the plane elevation and the elevation difference.

## Road



**Figure 178: Road**

The **Road** window is shown only if the type of stakeout chosen is **Road**.

- Show the chainage than the current position, its perpendicular distance from the stakeout point, the elevation of the road in function to the chainage showed above, the elevation of the stakeout point and the relative differences with the current position.



Further explanations about the Roads are reported in the chapter "Roads" on page 154.



**Figure 179: Road**

## Modine

The **Modine** window is shown only if the type of stakeout chosen is **Modine**.

- **Modine** displays:
  - the elevation difference between the measured point and the slope;
  - the elevation difference between the measured point
  - and the hinge point;
  - the chainage difference between measured point and the reference chainage;
  - the reference chainage.



Further explanations about the Roads are reported in the chapter "Roads" on page 154.

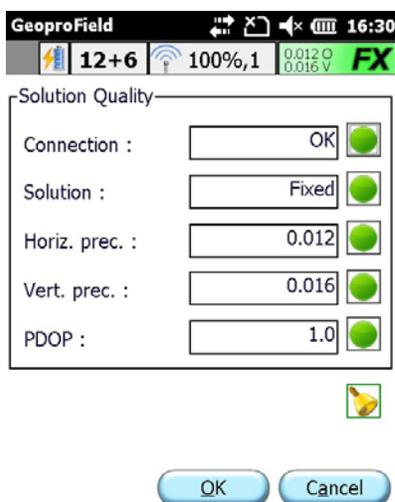
In all windows:

- At the top of the window, a command bar consists of:
  - A text box with the name of the stakeout point.
  - The buttons << and >> to scroll through the list of points to stakeout
  - The button **V** to select the nearest to the current position.
  - The **Options** button to show the relative window.
  - The **Alarms** button to show the relative window.

- The colored text box at the bottom of the window indicates with different text (Far, Near and Identified) and colors (red, yellow and green) the distance from the point to stakeout, on the base of the tolerance set in the options.
- Press **Confirm** button when the point has been identified and pass to the next point. If the appropriate option was selected, the measurements will be saved as a GPS point.
- You can exit from stakeout or after confirming all the points selected for stakeout or by pressing **Exit** until to return to the initial window.

The **Options** window displays:

- The type of reference: the various indications (distances and directions) shown in other windows, depend on the type of reference chosen.
- The sequence of the points: ie the point than will be selected to stakeout, after that another was confirmed.
- The tolerance in meters. This value will be used by the software in order to indicate if the point is reached or not and the varying levels of remoteness.
- The option **Store the point** to save or not the points confirmed.
- As in the measure window, buttons for saving the file, for setting the antenna parameters and for enabling or disabling the device for RTK correction, are available.



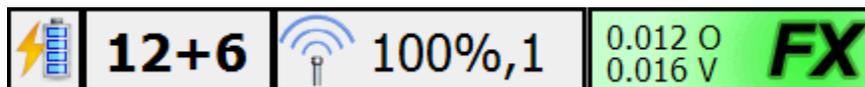
**Figure 180: Solution Quality**

The **Alarms** window displays:

- Is completely identical to that present in the procedure of point measure, except for the fact that the values are only shown for the Real Time working mode because the Post Processing is not active in stakeout.

## Toolbar

Both in the main view of GeoproField and in all windows of GPS measure and stakeout, is always visible a Toolbar. In this bar the information obtained from the receiver and the controller are shown:

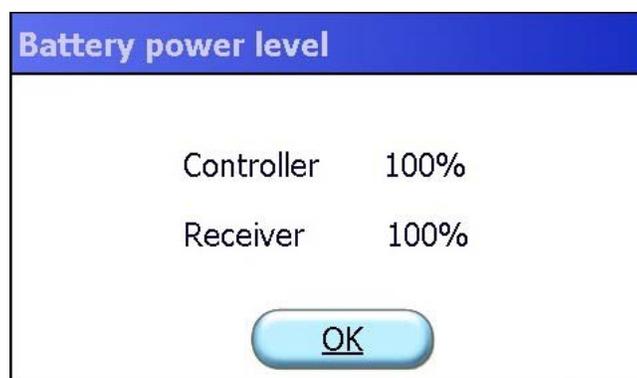


**Figure 181: Toolbar**

- The level charge of the GPS receiver.
- The number of the GPS and GLONASS satellites used by receiver for the position computation.
- The percent of the radio solution and the delay time of the message
- The receiver solution.

Some operations can be quickly launched by pressing above its icons.

Pressing on the icon or the text of the charge level of one of the batteries, it will open a window showing in more detail the two charge levels.



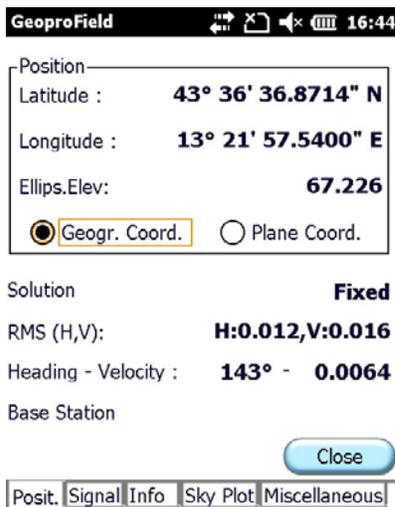
**Figure 182: Battery Power Level**

Pressing instead on any other point of the toolbar, displays a window consists of five windows, which show the main data obtained from the GPS receiver.

The five windows are **Position**, **Signal**, **Info**, **Sky Plot**, and **Miscellaneous**.

## Position

The **Position** window shows:

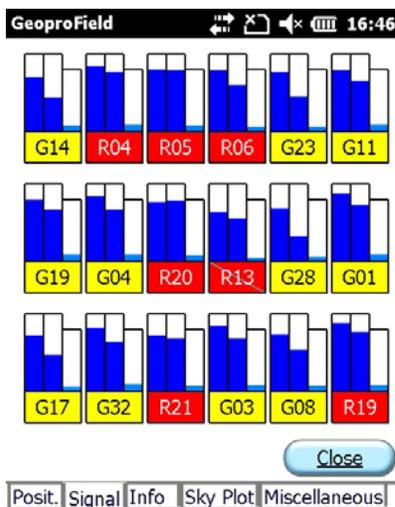


**Figure 183: Position**

- The current position that can be displayed in Geographical or Planar coordinates.
- Other data regarding the position computation: solution, RMS, heading, speed and distance from the base station.

## Signal

The **Signal** window displays:



**Figure 184: Signal**

For each visible satellite

- The signal quality for the two frequencies (blue bars).
- The tracking time (cyan bar).
- The satellite number on yellow if it is a GPS or on red if it is a GLONASS.

- The number is crossed by a bar if the satellite is not used for the position computation.

## Info

The **Info** window displays:

The screenshot shows the 'Info' window in the GeoproField application. The window title is 'GeoproField' and the time is 16:48. The table below represents the data shown in the window:

	N	Az	EI	CA	P1	P2	S
	G14	46	26	42	26	26	[5:..]
	R04	32	53	50	49	46	[9:..]
	R05	258	65	48	47	47	[9:..]
	R06	234	11	47	46	36	[9:..]
	G23	196	17	46	27	27	[9:..]
	G11	198	81	47	39	39	[9:..]
	G19	240	61	48	40	40	[9:..]
	G04	102	71	50	40	40	[9:..]
	R20	316	64	46	45	47	[9:..]
	R13	44	8	38	37	33	[1:..]
	G28	282	12	41	17	19	[9:..]
	G01	226	75	52	42	42	[9:..]

Below the table is a 'Close' button and a tabbed interface with the following tabs: Posit., Signal, Info, Sky Plot, Miscellaneous.

**Figure 185: Info**

- On this window the satellite information, that are presented in graphical format in the Signal and Sky Plot windows are shown in numerical format.
- In particular for each satellite the PRN, the Azimuth, Elevation and the solution signal for the two frequencies are shown.
- The status of each single satellite is shown in the last right column.
- The colors and the bar associated with each satellite have the same meaning as they have in the **Signal** window.

## Sky Plot

The **Sky Plot** window displays:



**Figure 186: Sky Plot**

- The position that the satellites occupy in the vault sky is shown.
- The CutOff angle is reported in the bottom of the window and is graphically represented by the green circle.
- The colors and the bar associated with each satellite have the same meaning as they have in the **Signal** window.
- Pressing on the **Satellites** button, the **Select Satellite** window will appear where it is possible to enable or disable the satellites.

## Miscellaneous

The **Miscellaneous** window displays:



**Figure 187: Miscellaneous**

- The date and time provided by the receiver.
- The total Satellites seen and those used to position computation.

- The radio solution, the type of message and the port of the receiver where the correction arrives (eg R stands for RTCM correction and it enters from the port C).
- The delay between messages for RTK correction, followed by the ratio between the number of lost or incorrect messages and the number of messages received.
- The solution and its ambiguity computation.
- The values of HDOP, PDOP, VDOP and GDOP.
- The **Reset** button restarts the RTK computation.

## Acquisition types

GeoproField provides five methods to acquire points with GPS:

- Single Point
- Path
- Drawn Points
- Point also in Post Processing

Each of these types includes specific methods.

Whatever method is used, when a point is stored, the controller beeps to confirm the operation. It will sound different if the point is rejected (eg. Out of bounds).

If the profile is configured as a Post Process, every time you start the acquisition, the point will also be re

## Single point

This acquisition type allows you to store one point at a time and includes the following specific methods:

### Single Measure

Just press the **Measure** button to store the single point.

### Selection Average

- Press the **Start** button to start the average of the measures received.
- Press the **Cancel** button to abort the acquisition.
- Press the **Finish** button to stop the average and to store it in a point.

### Auto Average [epoch]

- Press the **Start** button to start the the average of the measures received.

- Press the **Cancel** button to abort the acquisition.
- Press the **Suspend** button to suspend the average and the **Resume** to resume it.
- When the number of epochs set has been received, the average is stored in a point.

### **Auto Average [sec]:**

The operation is identical to that of the average for epochs, only that the countdown is in seconds.

### **Auto Average [min]:**

The operation is identical to that of the average for epochs, only that the countdown is in minutes.

## **Path**

This acquisition type allows you to store points in succession at intervals of time or space. It includes the following specific methods:

### **Epoch interval**

1. Press the **Start** button to start the acquisition of the path point. The countdown of epochs is shown in the text box. The point is stored just after pressing **Start** and whenever the interval time is reached.
2. Press **Finish** to terminate the acquisition.

### **Time Interval [sec]**

The operation is identical to that of the average for epochs, only that the countdown is in seconds.

### **Time Interval [min]**

The operation is identical to that of the average for epochs, only that the countdown is in minutes.

### **Distance Interval 2D**

The operation is identical to that of the average for epochs, only that the point is stored after covering the 2D distance set.

### **Distance Interval 3D**

The operation is identical to that of the average for epochs, only that the point is stored after covering the 3D distance set.

In all path methods, when the acquisition begins, other two buttons will be available:

## Event

Press **Event** to store a single point without to stop or to reset the countdown of the method used, and without increasing the point name, but adding at the end of the current name the word "**\_event**".

## Single Pt

Press **Single Pt** to stop the countdown of the method used.

A window opens showing:

- Name : The name of the point, which is equal to current one. It is editable. If it is not modified, the software increments the current one after storing the point.
- Description : The description of the point, which is equal to current one. It is editable, but it can also be chosen from the list that appears by pressing the arrow at the end of the text box.

Three buttons are present:

- Store: Stores the point and return to the previous view.
- Cancel: Cancels the operation and return to the previous view.
- Not : Lets you place notes, draw a sketch and / or insert point options.

In any case, when you quit the window, a message appears informing the user to press **OK** to resume the countdown and the acquisition.

## Drawn Points

This method allows you to store a point derived from a calculation performed on other points previously acquired. It includes the following specific methods:

### Triangulation Pt

1. The operation is identical to that of the average for epochs, only that, once measured the point, a window appears where you must enter:
  - The distance between the point to be measured and the newly acquired.
  - The difference in height between the point to be measured and the newly acquired. This value is optional.
2. Press "**OK**" to store data or "**Cancel**" to abort and delete the point.
3. When at least two points are acquired, just press the "**Calculate**" button, and the software automatically creates two or more points that meet the measures included. Then the graphical view is shown where you have to choose the point to be stored from those calculated by the software.
4. You can erase all them and cancel the operation by pressing the "**Cancel**".

## Alignment 2pt.

1. The operation is identical to that of the average for epochs, only that, once measured the second point, a window appears where you must enter:
  - The distance between the point to be measured and the newly acquired.
  - The difference in height between the point to be measured and the newly acquired.
  - Any perpendicular distance between the point to be measured and the line formed by the two points just acquired.
2. Press "**OK**" to store data or "**Cancel**" to abort and delete the point.
3. Then the graphical view is shown, where you can stored the point calculated by the software by pressing **Accept**, or you can erase the point and cancel the operation by pressing the **Cancel**.

## Intersection 2 Ali.

1. The operation is identical to that of the average for epochs, only that, once measured the fourth point, a window appears where you must enter:
  - Any difference in height between the point to be measured and the newly acquired.
2. Press **OK** to store data or **Cancel** to abort and delete the point.
3. Then the graphical view is shown, where you can stored the point calculated by the software by pressing **Accept**, or you can erase the point and cancel the operation by pressing the **Cancel**.

Sum notes, which contain the values used for the calculation and their deviations, will be automatically added to all calculated points.

## Points also in Post Processing

This acquisition type allows you to store one point at a time also in Post Processing mode. It includes the 4 "average" methods of the "Single Point" acquisition type. Even their operation is identical.

The only difference is that the software will create a file containing static data useful for post processing. This file has the same name as the point being measured and will be placed in a folder with the same name as the file open.

Geopro Office can semi-automatically process these files.

## Stake Out Road

This type of staking allows you to use a road, a profile or a section as a reference instead of points . First you will see the window below that allows you to select the item you want to use as a reference.

Profile selection window:

- You can choose which items to show in the selection list of roads, profiles, sections;
- if you decide to stake the points, choose **Roads**:
  - or axis
  - or a Lane ( left / right )
  - or a Shoulder ( left / right )
  - or a Sidewalk( left / right )
- If you choose Sections, you can select the road the section belongs to.



**Figure 188: Profile Selection**

The Select Stake Road/Profile Points window is used to set:

- the name to be given to graphics points that will be created temporarily if you choose to share the road / profile / slice into several intervals;
- any initial and final progressive to divide the road / profile / slice into several intervals ;
- the number of intervals in which to divide the road / profile / section or the possible length of each of them . In the second case the software will automatically divide the road / profile / section in the number of required intervals.
- You can also choose Special Points( the start and end points of each planimetric element ) as points to be staked.

Figure 189 displays the values of the various Offset that can be applied to the entire road / profile / section and if you use the original slope or pick one absolute.

GeoproField 14:59

Select Stake Road/Profile points

Text + Chain. PtPicch

From Chainage 0.000 m

To Chainage 1930.971 m

Chainage Ranges 10.000 m

Special points  Yes  No

Cancel << >>

**Figure 189: Select Stake Road/Profile Points**

## Stake Out Slopes

This type of staking allows select the road on which the stake slope and their modalities:

- Single Chainage, the slope is staked at the entered chainage;
- Multiple Chainage, staking more slopes in the entered chainage interval (enter starting and final chainage and step);
- Free Chainage, the slope is staked based on the user current location
- Special point, the slope is staked at the chainage of the chosen special point.



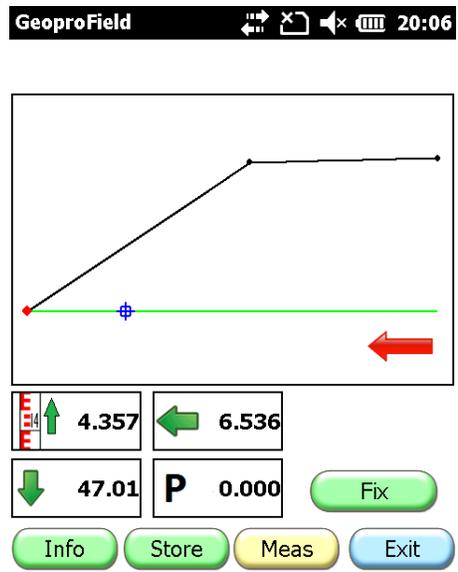
Depending on the chosen mode, the parameters to be entered will be different.

## Stake Slopes

The **Stake Slopes** window appears only if you choose the staking type **For Slopes**.

**Stake Slopes** displays:

- the height difference between the measured point and the escarpment;
  - the horizontal distance between the measured point and the intersection of the land with the escarpment,
  - the chainage difference between the measured point and the reference chainage (in the example 0.0 is shown because **Free Chainage** was chosen);
  - the reference progressive.
- In the graphic area on the **Stake Slope** window, the measured point is represented in blue, the intersection is red, ground is green, and the xsection is black as shown in Figure 190.



**Figure 190: Stake Slopes**

# SOKKIA

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[www.sokkia.com](http://www.sokkia.com)