Boels Survey & Laser – Tersus GPS Tiltrover Quick manual V25.8

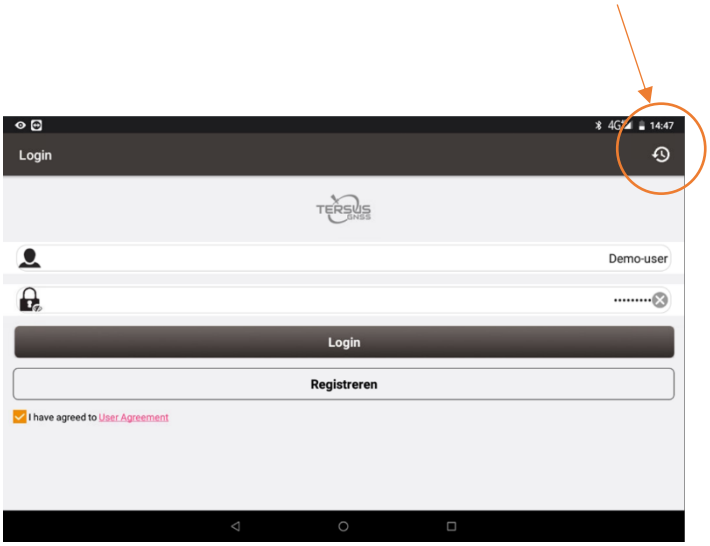
Ready to get started as a new user?

Do you have a cloud account?

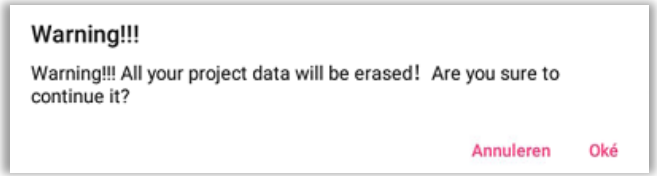
To work with the Tersus GPS Tiltrover, you will need an account. If you do not yet have an account, please contact Boels Survey & Laser +31 (0) 488 470 490

If the ‘User’ and ‘Password’ fields are empty, you do not need to do anything, you can log in with the login details we have provided.

If the ‘Password’ field is empty but a user name from the previous user still appears, the software needs to be reset by pressing the ‘Rental Ready Button’.



Select OK



Input the text ‘YES’ and select OK

... then select OK again

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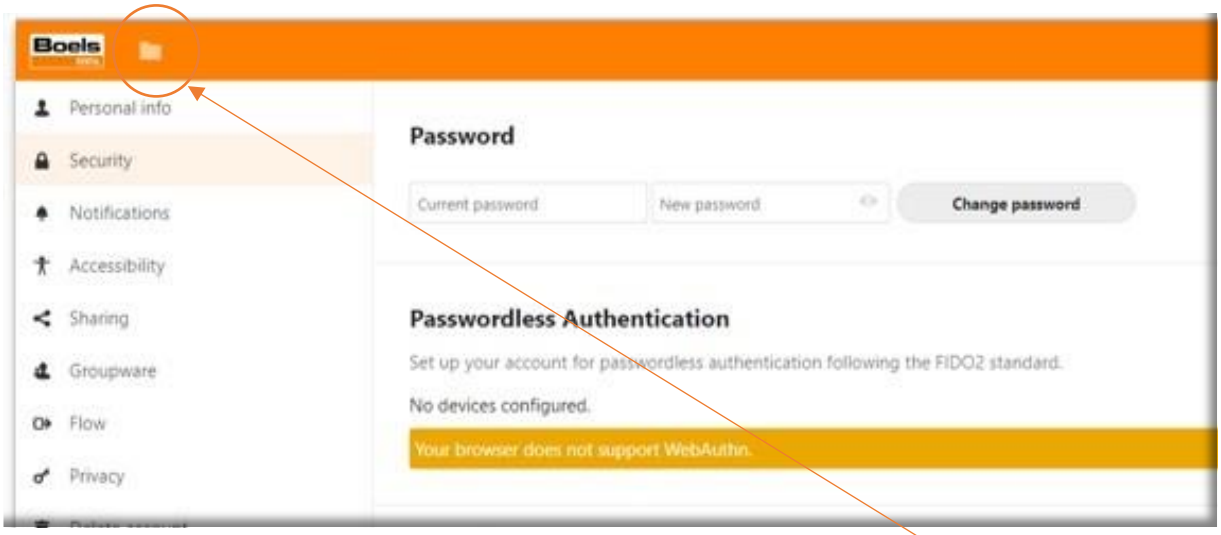
1. Cloud account

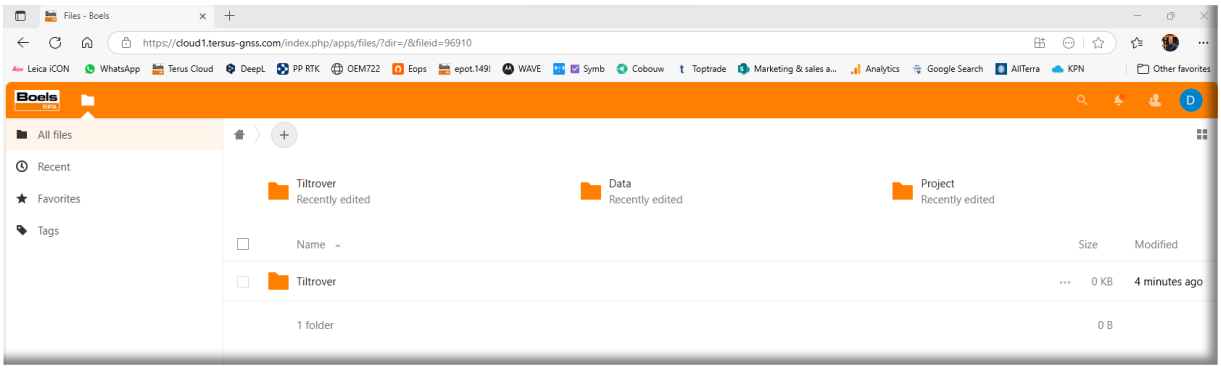
Log in to your account with the details provided by the Boels Survey & Laser Customer Support department. To do so, go to the following website:
http://cloud1.tersus-gnss.com/index.php/settings/user/security

This screen will ask you to change the password (not mandatory).



Your personal account is now ready to use. Go to data management by clicking on the folder to the right of the Boels Rental logo in the orange bar at the top.

One folder is displayed with the name ‘Tiltrover’.



Select Tiltrover; this folder contains the 2 subfolders below:

Data
This folder can be used to store files for surveying activities, but survey measurements exported from the Tersus GPS Tiltrover are also stored in this folder.

CSV files are exported and imported for text files, while CAD files include DXF, DWG, LandXML and XML files.

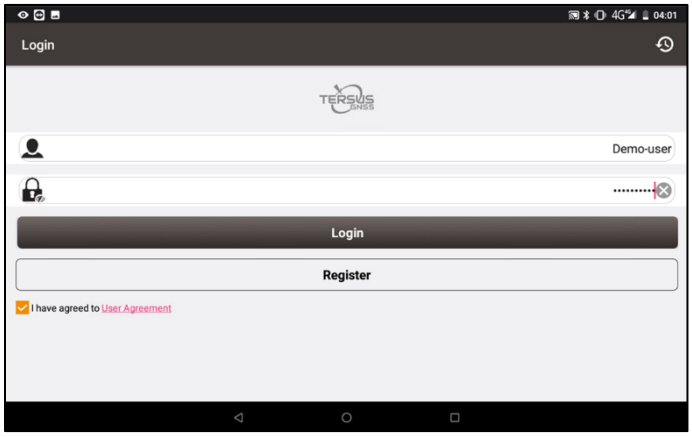
Project
The rough projects that are on the Boels GPS Tiltrover are synchronised with this project folder. The projects that are saved in the folder after the first synchronisation are compared with each other in the Nuwa software during each synchronisation. Newer versions are only uploaded and downloaded if there are any differences. Data can easily be dragged from the cloud to your own environment and vice versa. During the next rental, this allows the projects to be easily restored and you can continue surveying in the project.

2. Nuwa startup wizard on tablets

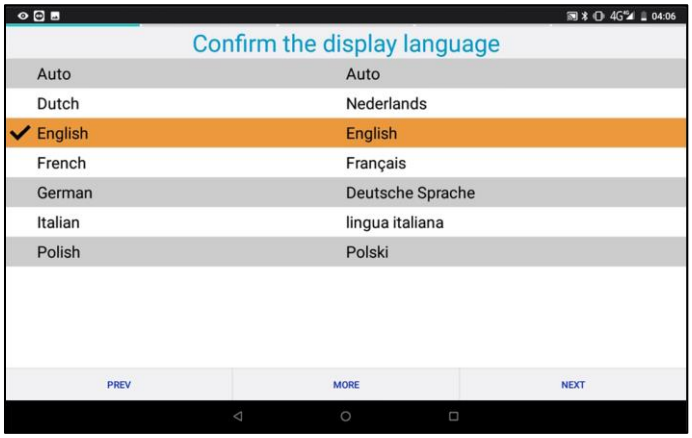
To be able to work with Tersus, you must have an account.
If you do not yet have an account, register by pressing the ‘Register’ button. A Boels Survey & Laser employee will then receive an approval request. You can also email sl@boels.com or call +31(0)488 470 490 for an account, this usually works faster.

From a PC or mobile device, the account can be accessed via http://cloud1.tersus-gnss.com/

Sign in on the device using your username and password and agree to the user agreement.

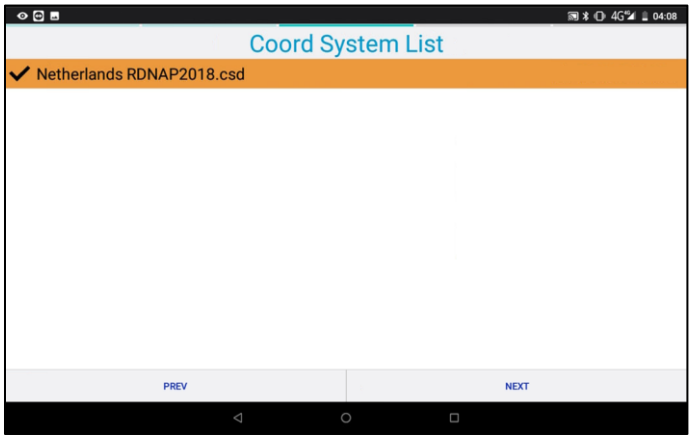


Select the language and press ‘NEXT’

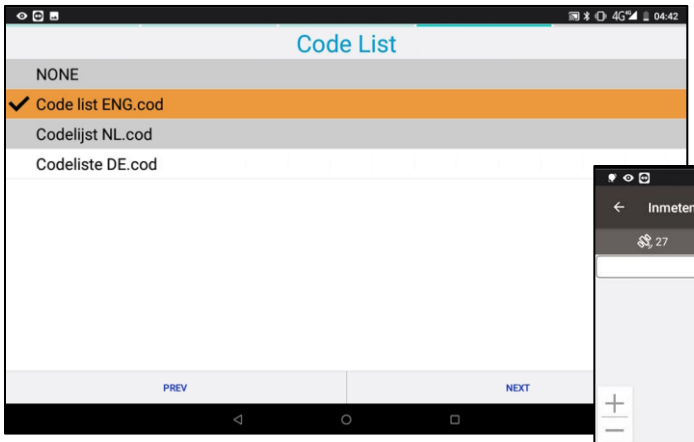


Select the country for the coordinate system and press ‘NEXT’

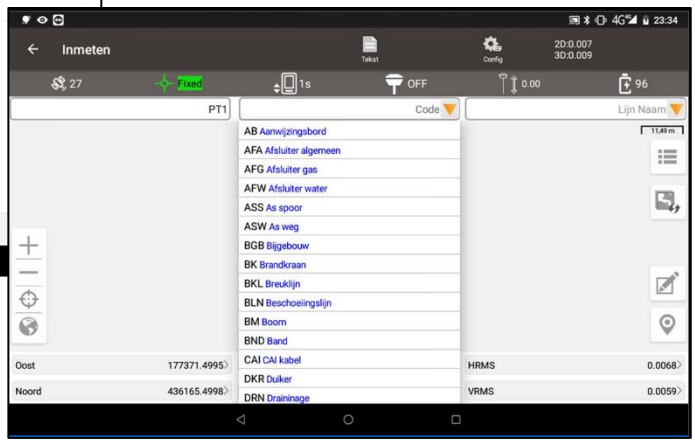
Choose the coordinate system and press ‘NEXT’ (for the Netherlands, this is Netherlands RDNAP2018.csd)



Choose whether or not you want to use a predefined code list and press ‘NEXT’

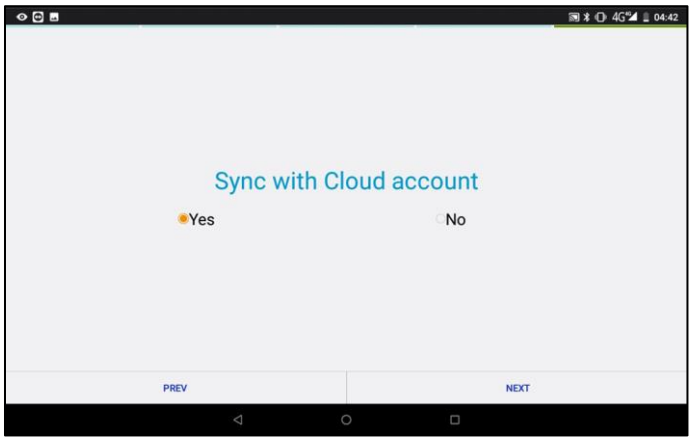


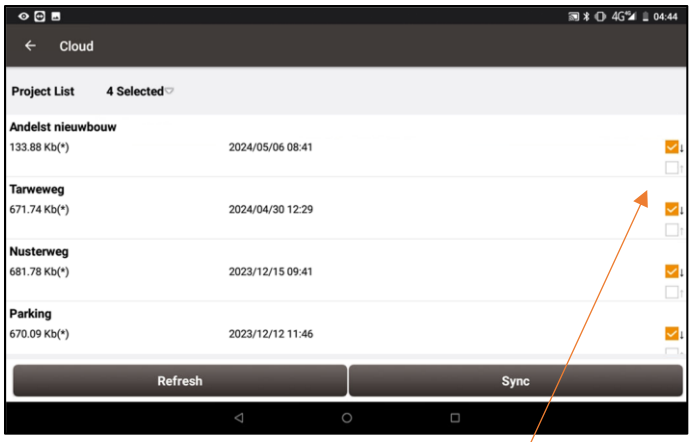
Code list example:



If the cloud only contains data ready to be transferred and no projects yet, select **‘No’** and press ‘NEXT’.

If there are projects in the cloud that you want to synchronise with your device, select ‘Yes’ and press ‘NEXT’

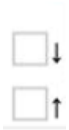




If you have chosen to synchronise, you can select the projects you want to synchronise in the screen shown above. Projects that you do not want to synchronise can be excluded by clicking the checkbox on the right.

The down arrow is from the Cloud to the GPS Rover, and the up arrow is from the GPS Rover to the Cloud.

From the GPS to the Cloud

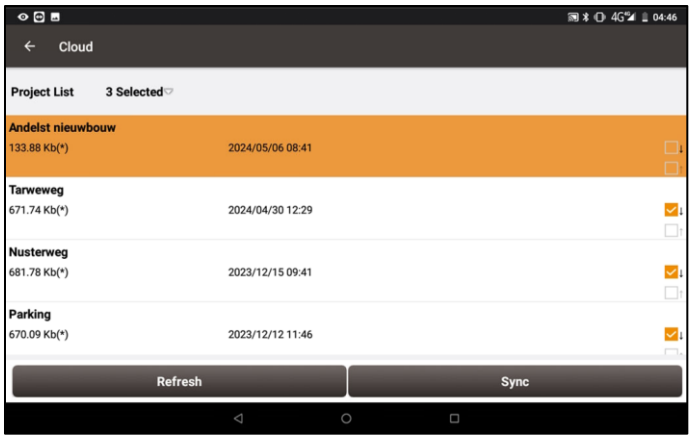


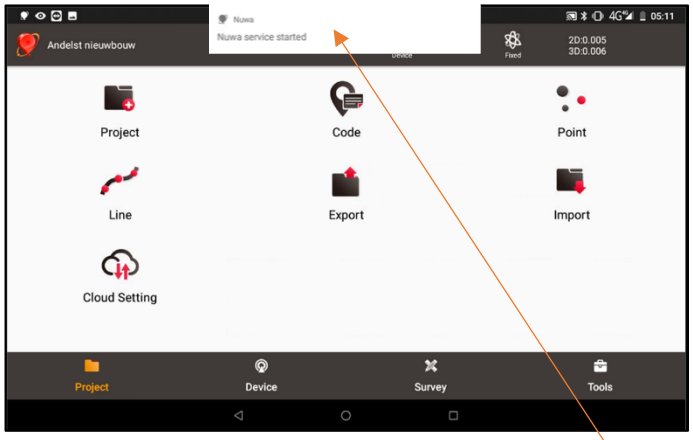
Project is not synchronised

From the Cloud to the GPS

A pop-up display shows the number of projects that have been uploaded and downloaded.

Select ‘Cloud’ at the top left of the screen to exit this overview.

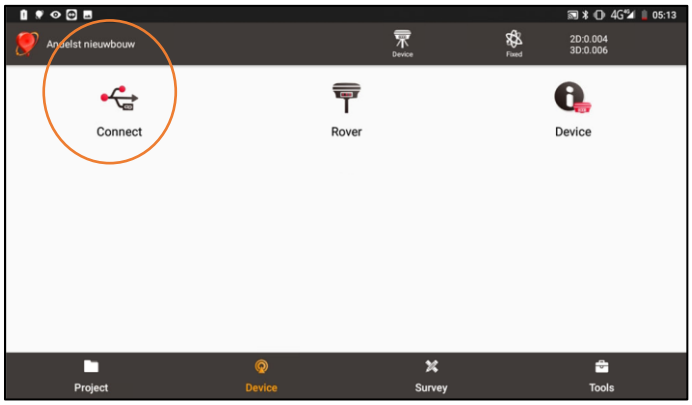




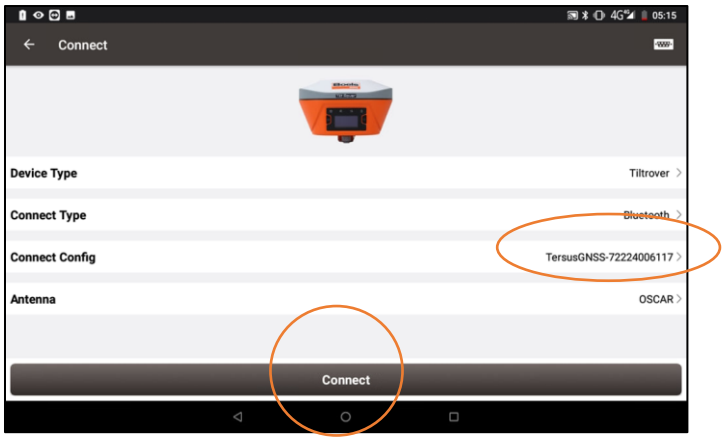
The Nuwa service is then started and once the antenna is connected, a signal will sound on the antenna.

3. Antenna coupling and network connection

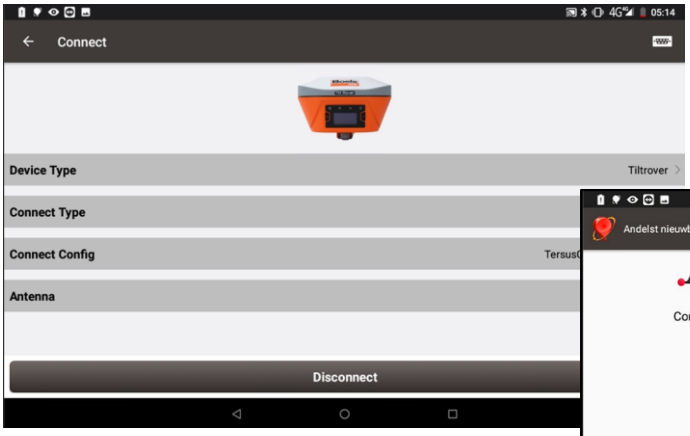
If the antenna is not connected:
Select ‘Device’ at the bottom of the screen

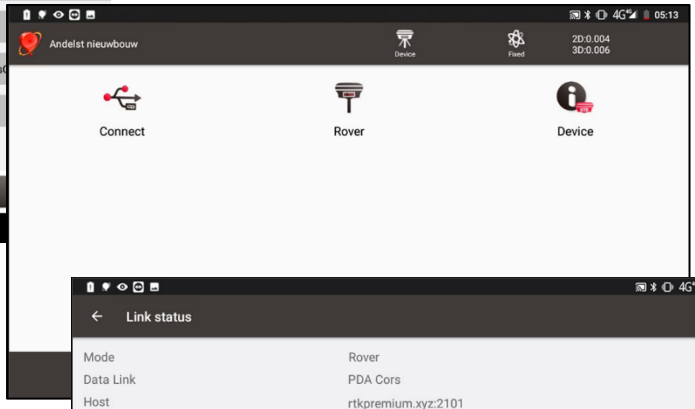


Search for the antenna via Bluetooth; the serial number can be read at the bottom of the antenna

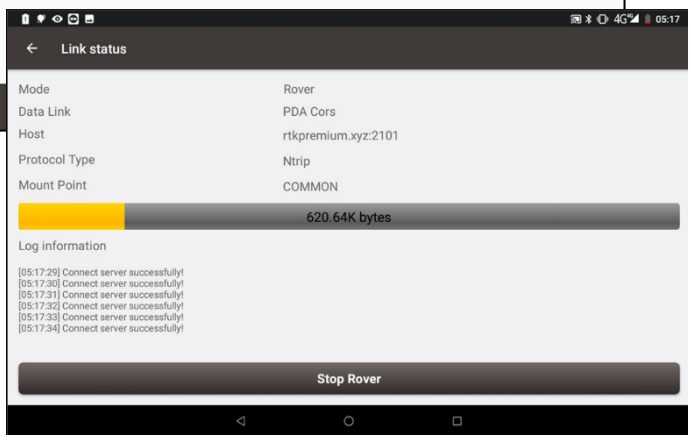


Select ‘Connect’





Click on ‘Rover’ to check the data flow

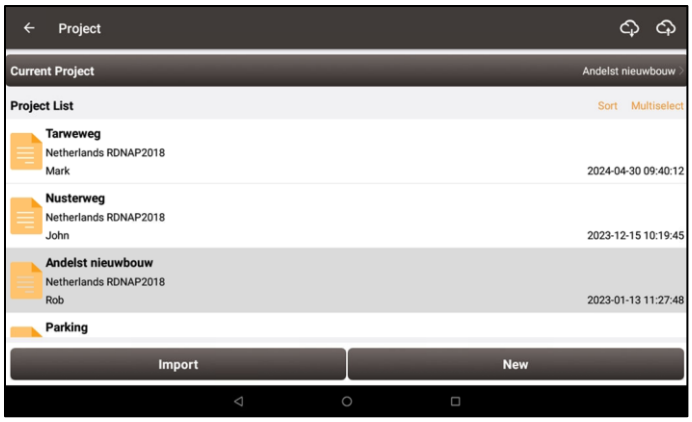


Please note! If the link status does not state ‘Connect server successfully!’ and no yellow bar is visible, press ‘Stop Rover’ and restart it.

4. Opening or creating a project

At the bottom of the screen, select ‘Data management’ and press ‘Project’ again in this menu

Open a project by selecting one from the list below or by pressing ‘New’ to create a new project.

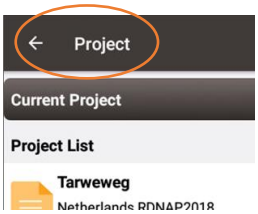


Create the new project; input the new project name and your name if required (not mandatory). The remaining settings are adopted from the startup wizard. Press ‘OK’

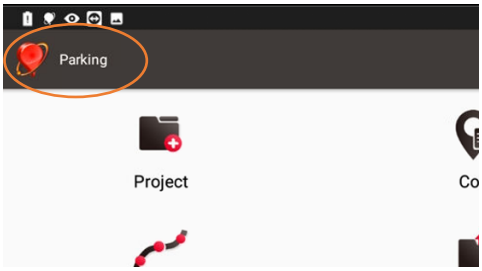
If desired, the new project can be synchronised directly with the cloud. To do so, use the symbol with the cloud and the upward arrow (top right of the display).

 is from the Cloud to the GPS Tiltrover  is from the GPS Tiltrover to the Cloud

Return to the main menu by pressing the arrow next to Project (top left).

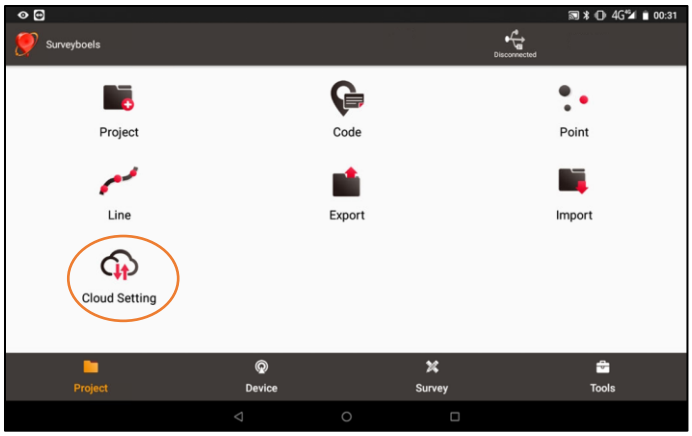


The newly created project is opened and displayed at the top left of the screen



5. Synchronising projects with the cloud

IMPORTANT Synchronising with your personal Cloud ensures that your projects are secured. Here, we are referring to the raw project data and not the exported survey data. The software does not synchronise automatically, you need to manually activate it yourself. Use ‘Cloud Setting’ to do so.



Once synchronised, the raw projects are stored in the **'Project'** folder

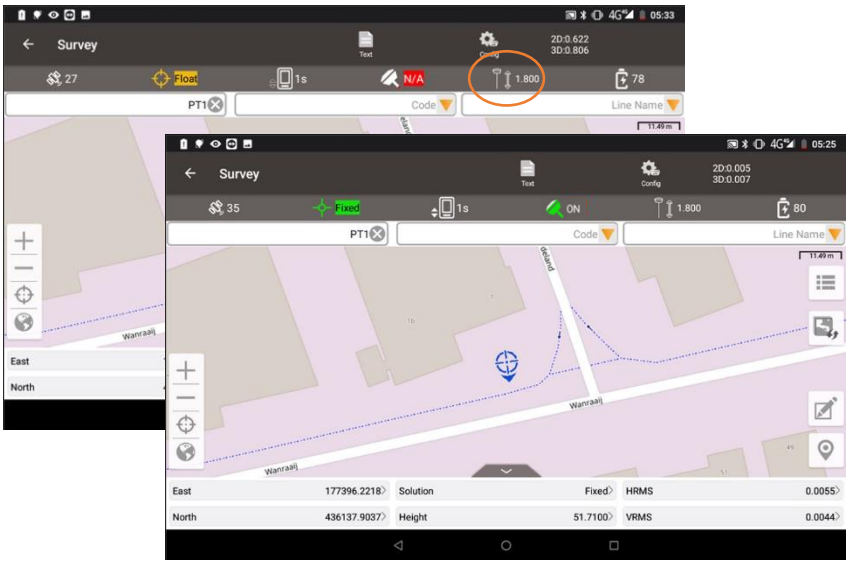
Why synchronising is important:

1. If there are any (technical) issues, this ensures that the data is at least secured, and allows:
    a. for further measurements to be taken with another GPS.
    b. the data to be edited and (re)exported.
    c. the data to be shared with your supplier in case of any technical issues.
    d. the project to be shared with another colleague if working with multiple systems.
2. For rentals, all data on the tablet will be deleted after the set is returned, however, the projects in your personal cloud will be stored for up to one year after the last login.
3. This makes it possible to resume the measurements of a project after a period of time.

6. Surveying

IMPORTANT Make sure the antenna height is set to the correct height, default is 1.80M, slide the pole out to this height to survey accurately. The antenna height can be adjusted by clicking on the symbol.

To store survey points, the calculated position must be sufficiently accurate and the symbol must be green. This is called a fixed position.


Survey
2D:0.622
3D:0.806
27
Float
1s
N/A
1.800
78
PT1
Code
Line Name
East
North
Survey
2D:0.005
3D:0.007
35
Fixed
1s
ON
1.800
80
PT1
Code
Line Name
Wanraaij
East 177396.2218
Solution Fixed
HRMS 0.0055
North 436137.9037
Height 51.7100
VRMS 0.0044

The following is the most important information to survey

Fixed position – the green symbol indicates that the accuracy meets the predefined tolerance.
Surveying is not possible without a fixed position!

Tilt ON – this is activated by moving the pole sufficiently and it **must be activated** in order to take survey measurements. Best skew correction provided when completely green.

It is **important** for the correct pole height to be input

Number of satellites received

Current position accuracy

Zoom and centring functions

Show coordinate list

Show background map

These 6 fields can be adjusted by clicking on them.

Start line, arc, etc. and switch between point and line.

SURVE

Point number, increases

Point or line coding, manual input or taken from the predefined list

Line number, all points with the same number are connected in a line

7. Coding

a. Standard coding

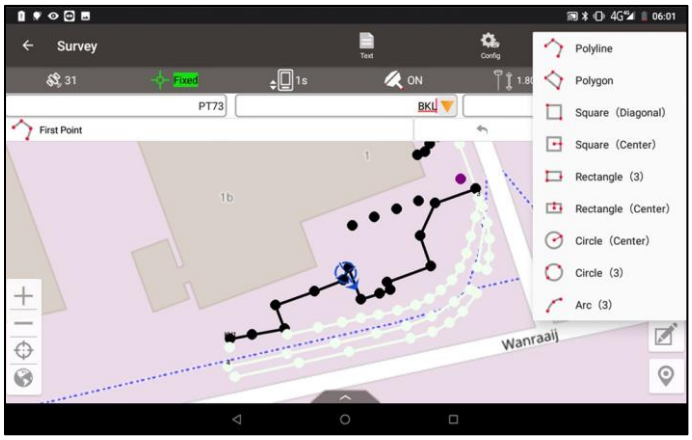
There are three fields above the survey screen, each with a specific function:

1st field	**Point number**	The point number must either consist entirely of numbers or end in numbers. For example, 42 or Pt42
2nd field	**Point or line code**	Input the desired code here; this can be done using the keyboard or using the list that opens by clicking on the orange triangle.
3rd field by a line	**Line number**	This field only needs to be filled in if points need to be connected and if they have to be unique for each line. For example, 3 or KGB3

Follow the procedure above when entering data!

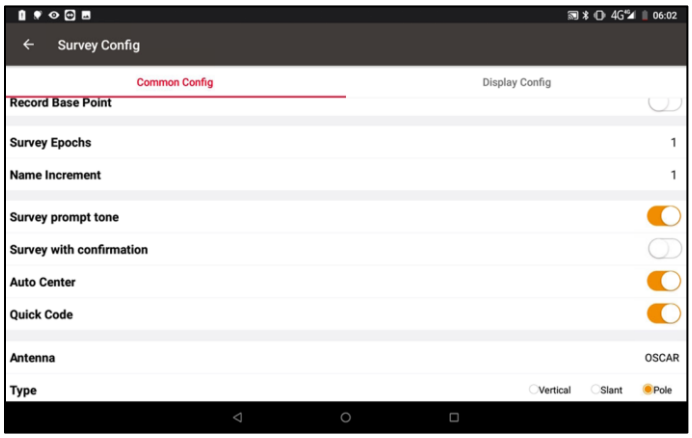
b. Drawing command codes

The button can be used to select drawing command codes; the function for measuring arcs, circles, rectangles, closing polygons, etc.

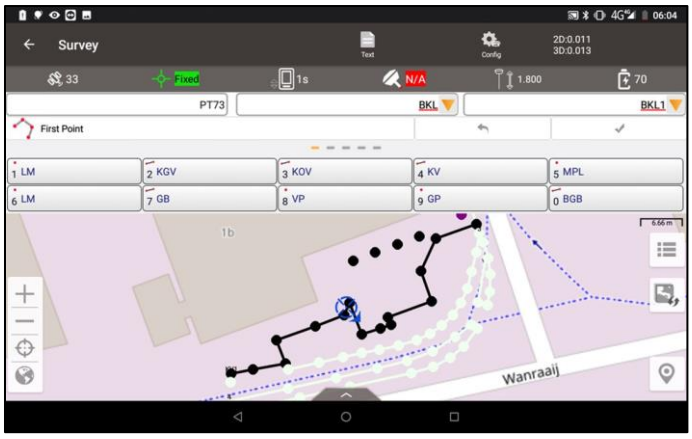


c. Quick coding

Quick codes can be activated via (in the ar) and by turning on the Quick Code switch



5 x 10 fields now appear, which can be filled with commonly used codes. If the field is empty, it can be filled in simply by clicking on the respective field. If the field is already filled in and you want to change it, you can do so by holding the field until a pop-up appears.



Swiping reveals the next 10 quick codes, etc.

d. Creating your own code list

It is possible to create your own code list, either in the Tersus GPS Tiltrover itself or by using a txt file in advance.

A txt file looks like this:

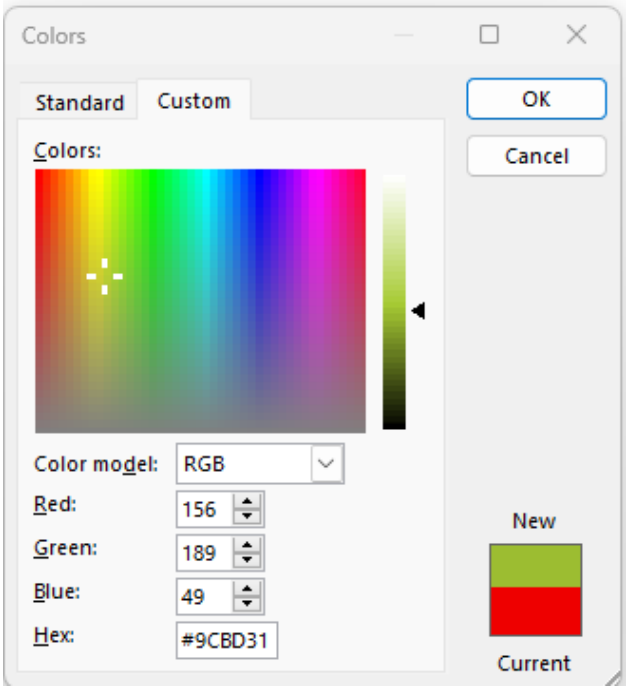
MV,1,,Ground level,0x008000
VP,1,,Fixed point,0x0000
HP,1,,Reference height,0x808080
PNT,1,,Miscellaneous point symbols,0x008080
GRZ,2,,Wall/Hedge/Fencing etc...,0x708090
LD,2,,Pipes,0xFF0000
GB,2,,Building,0xC0C0C0
BGB,2,,Annexe,0x800080

This coding is structured as follows:

Code is recorded as follows: abbreviated code, point code=1 / line code=2,, Description in the list, Windows hex colour code

(pay close attention to the commas, especially the double comma after the drawing command code)

The hex code can be found in Word, for example



Colour examples:

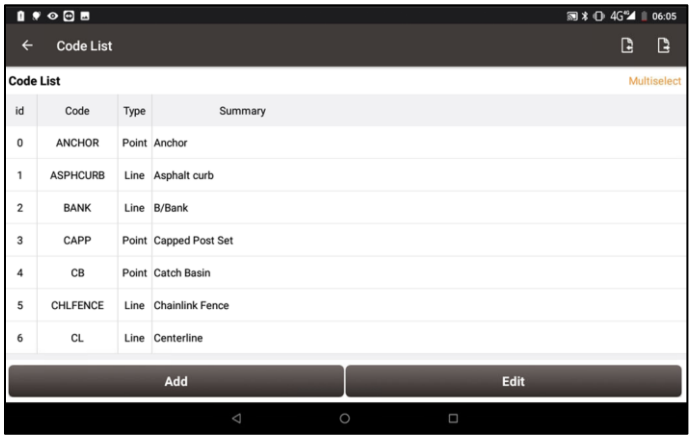
Black #000000
Blue #0000FF
Yellow #FFFF00
Red #FF0000
Dark green #00B050
Light green #92D050
Purple #7030A0
Pink #FF99FF
Orange #ED7D31

These colours are described in the Tersus as:

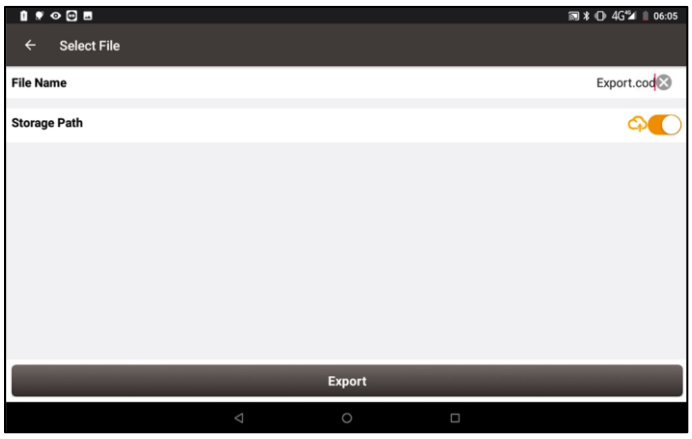
Black 0x0000
Blue 0x0000FF
Yellow 0xFFFF00
Red 0xFF0000
Dark Green 0x00B050
Light green 0x92D050
Purple 0x7030A0
Pink 0xFF99FF
Orange 0xED7D31
... additional colours can be found in Windows

Exporting the code list:

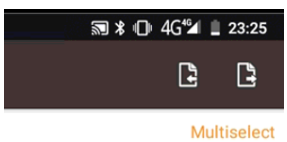
Go to ‘Data management’, choose ‘Code’ and select the right-hand download icon on the far right of the grey bar. The code file selected in the wizard will be exported.



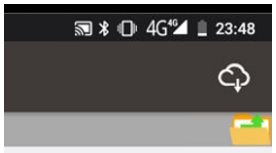
Enter a new name, e.g. ‘customer.cod’; an additional subfolder ‘Codes’ containing the exported file will now be created in the Cloud in the ‘Tiltrover’ directory. Remember to enter the extension ‘.cod’ after the name.



Conversely, a custom code file can be placed in the ‘Codes’ folder in your personal Cloud. On the tablet, it can be uploaded by pressing the left icon. This allows you to upload your own code list again when you rent the device out again. This is useful because the code list is automatically deleted from the tablet after each rental.



Then click on the Cloud icon

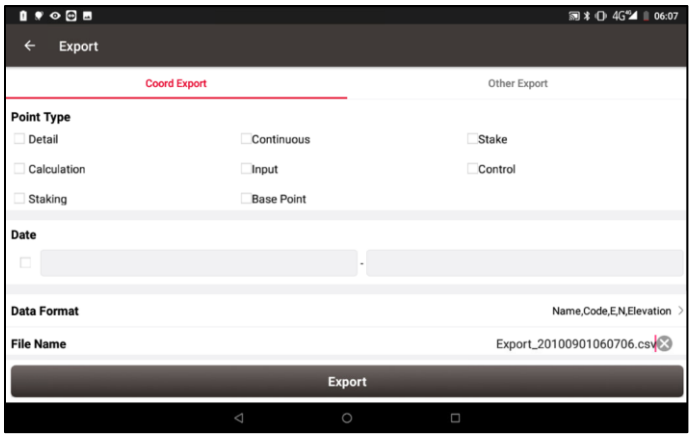


8. Exporting to the Cloud

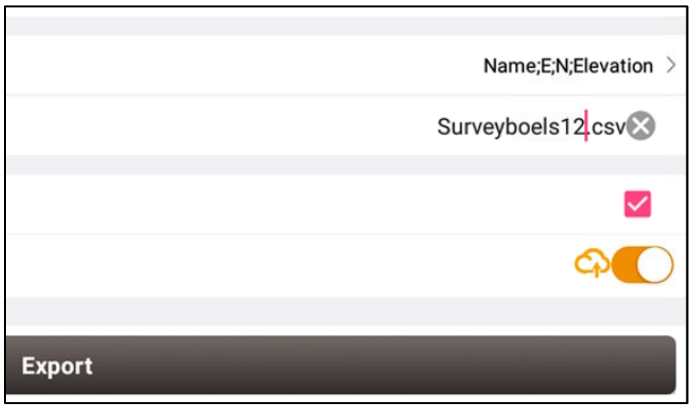
From the Data management menu, select the Export application. The measurements can be exported as a text file (CSV) or another specific format.

a. Coord exports (as text file)

1. Select the point type(s) to be exported or the date range if applicable.
2. Change the data format if required; this refers to the column order and the separator between the fields. For example: point number, O, N, H, code. There is also an option to generate your own text format by pressing ‘User defined’.
3. If desired, modify the system-defined file name to be exported but be sure to remember to enter the extension .csv after the file name
4. A header can also be included; select the checkbox if required.

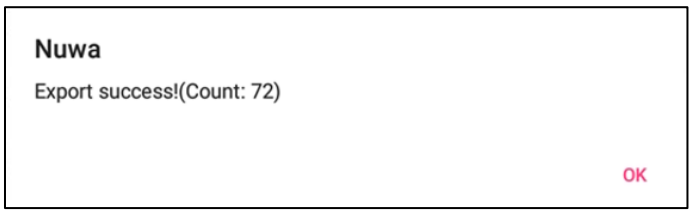


Example:



Then press Export

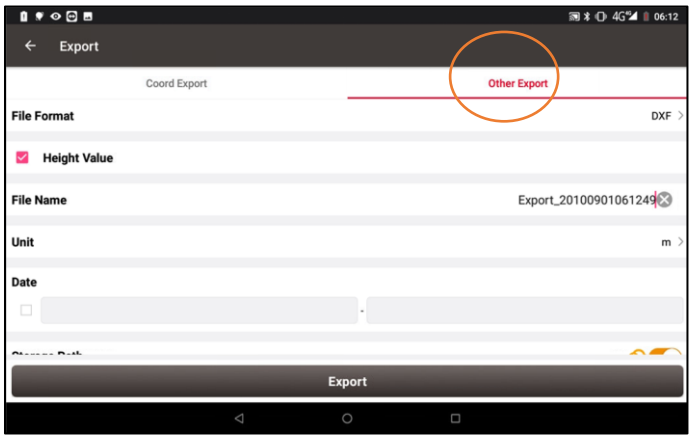
The number of lines exported will be shown in the pop-up window.



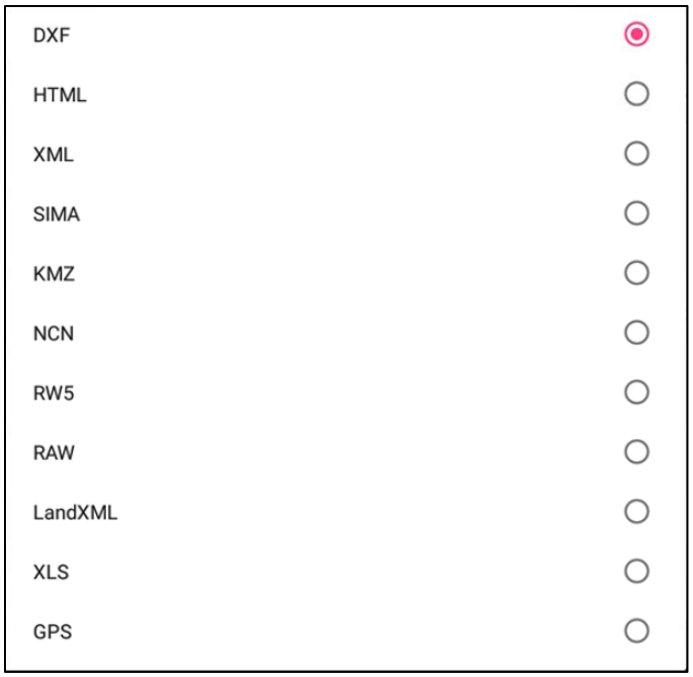
The export file is now available in your cloud account for further processing.

b. Other exports (as other file)

The same procedure applies for exporting to other formats including XML and DXF. To do so, select ‘Other export’. You can choose whether the height values should be added to the export. If the height is not required, untick the box next to ‘Height Value’.

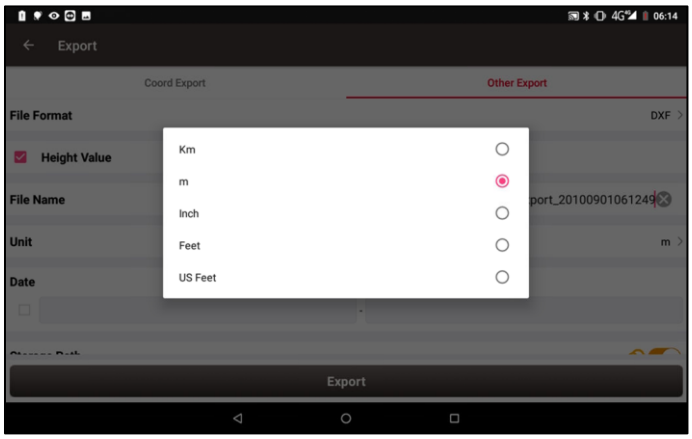


The default export format is DXF. If a different format is required, select the desired format from the list of optional formats

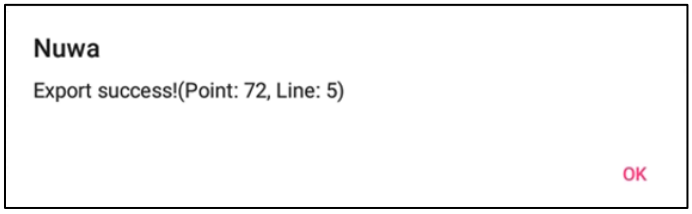


Give the export file the desired name; this does not require adding an extension to the file name. You can also use the file name suggested by the system.

Check or change the units of the drawing



Then press Export



After exporting, the file will be available in the Cloud account for further processing.

9. Importing

From the Data management menu, select the Import application. The measurements can be imported as a text file (CSV or TXT) or another specific format.

a. Coord imports (*. txt and *. csv files)

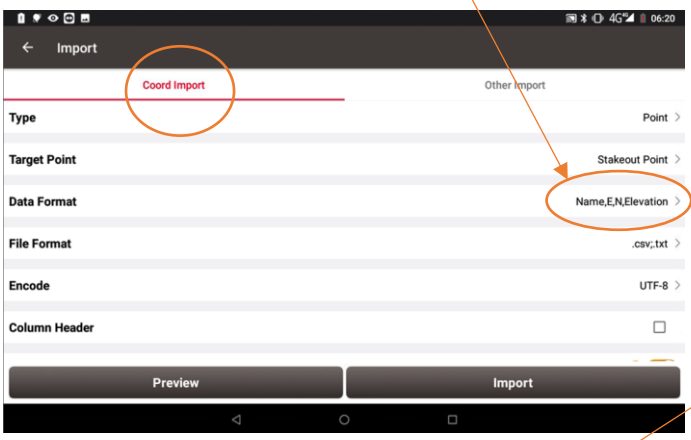
The file extensions *.txt and *.csv refer to text files without formatting. These can be read in via ‘Coord Import’.

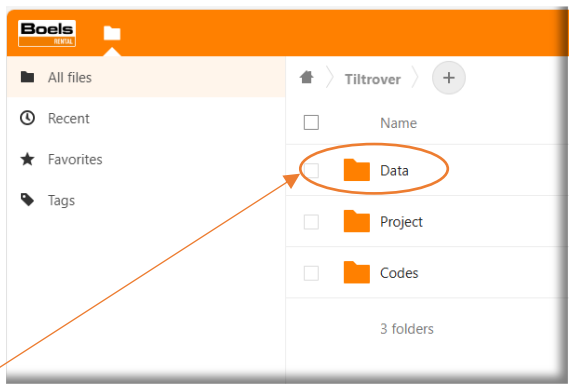
i. Select the point type to be imported; by default this field is set to the most commonly used point type which is ‘Stakeout Point’.
ii. Change the data format if required; this refers to the column order and the separator between the fields. For example: point number, N , O, H, code. There is also an option to generate your own text format by pressing ‘User defined’.

By default, the Tiltrover is set to read coordinate files as in the example below, where the separator is a comma and the decimal point is a full stop. This example contains a header; please check the ‘Column Header’ checkbox for this.

Name,E,N,h
PT1,33356601.789,5831049.821,31.437
PT2,33356592.188,5831049.331,31.426
PT3,33356588.265,5831048.749,31.493
PT4,33356583.137,5831048.960,31.518
PT5,33356578.220,5831049.142,31.486
PT6,33356574.055, 5831048.867,31.470
PT7,33356570.227,5831048.371,31.451
PT8,33356564.961,5831047.190,31.664
PT9,33356557.543,5831044.720,31.422

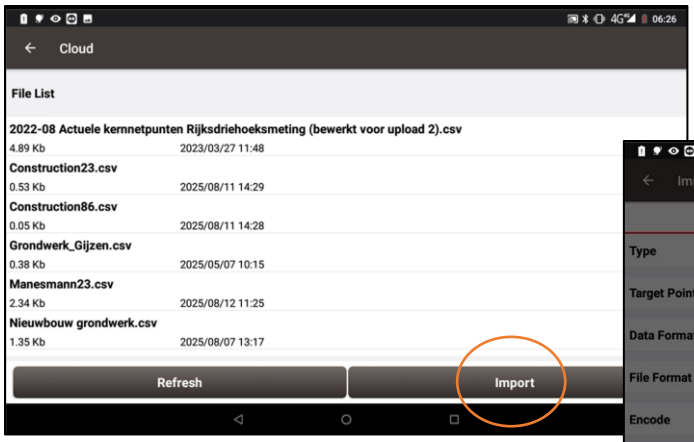
Name, E,N,H = point number, north, east, height

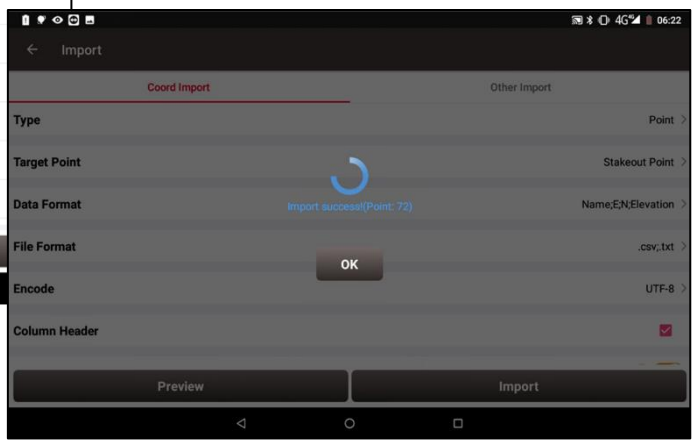




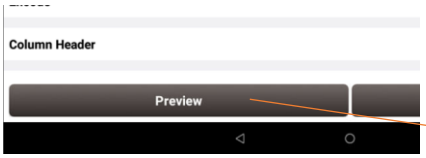
Press ‘Import’ and select the desired file in the cloud.

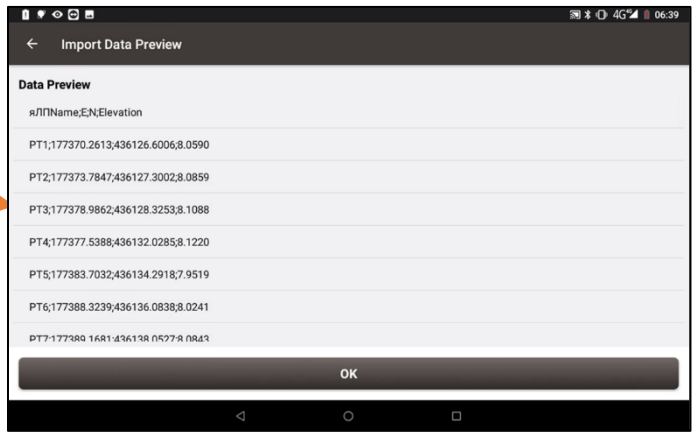
Note that the file must be in the ‘Data’ folder. Also do not use subfolders!





Press Preview to check the data

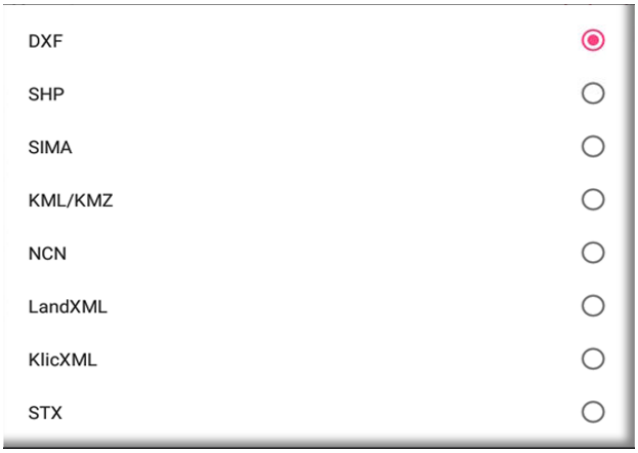


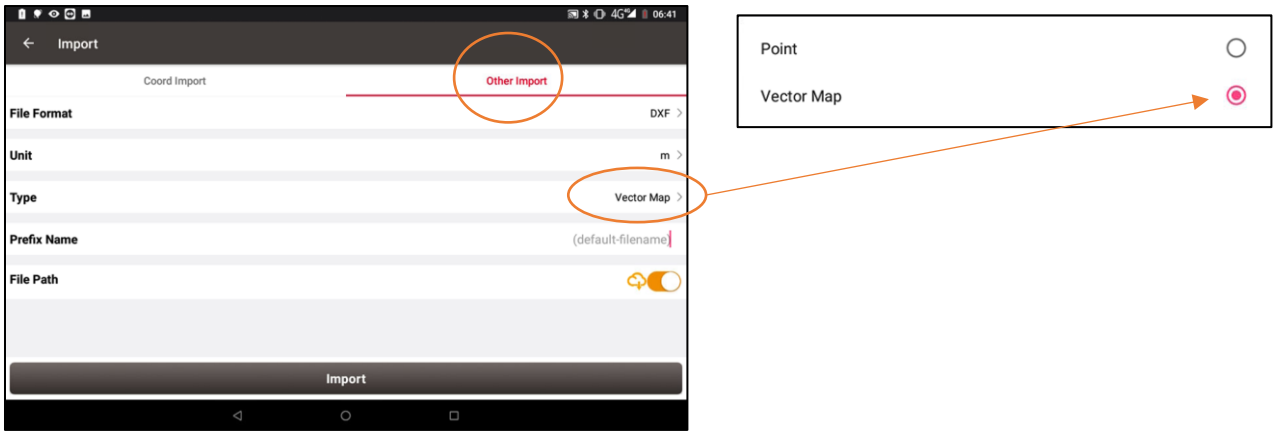


b. Other imports (e.g. DXF and XML files)

By default, the file type to be imported is set to ‘DXF’ and files are read in as ‘Vector Map’; this makes the points and lines visible. It is also possible to import the file as individual points. To do so, change the ‘Type’ from Vector Map to ‘Point’.

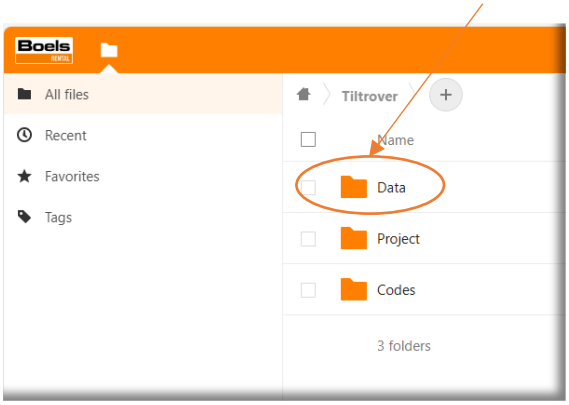
In addition to DXF files, various other files can be read in; select the desired format from the list,



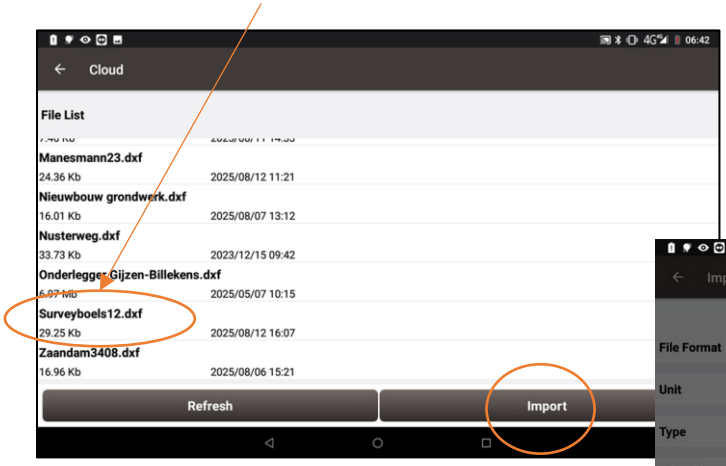


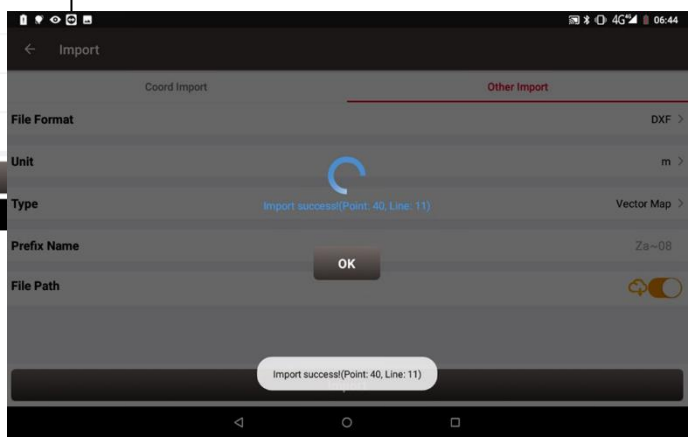
Press ‘Import’ and select the desired file in the cloud, then press ‘Import’.

Note that the file must be in the ‘Data’ folder. Also do not use subfolders!



For example, the ‘Surveyboels12.dxf’ dxf file

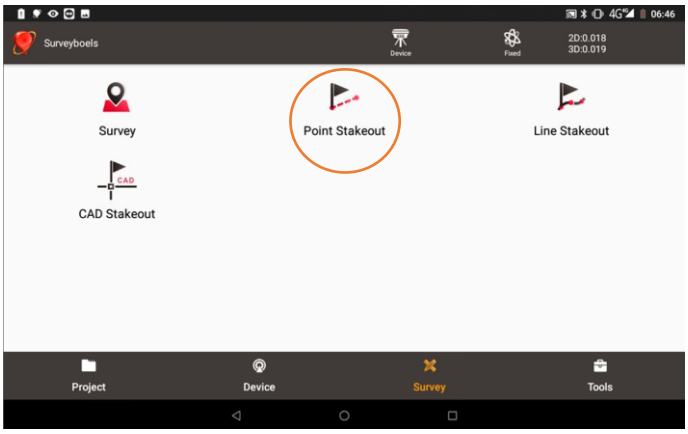




Once the import is successful, the number of imported points and lines is displayed.

10. Point stakeout

If the point stakeout data have been read in as single points, select ‘Point Stakeout’.



For staking out points, you can either select a point in the drawing or from the coordinate list by pressing the flag icon on the right side of the screen. See the example below.

Fixed position – the green symbol indicates that the accuracy meets the predefined tolerance. **Surveying is not possible without a fixed position!**

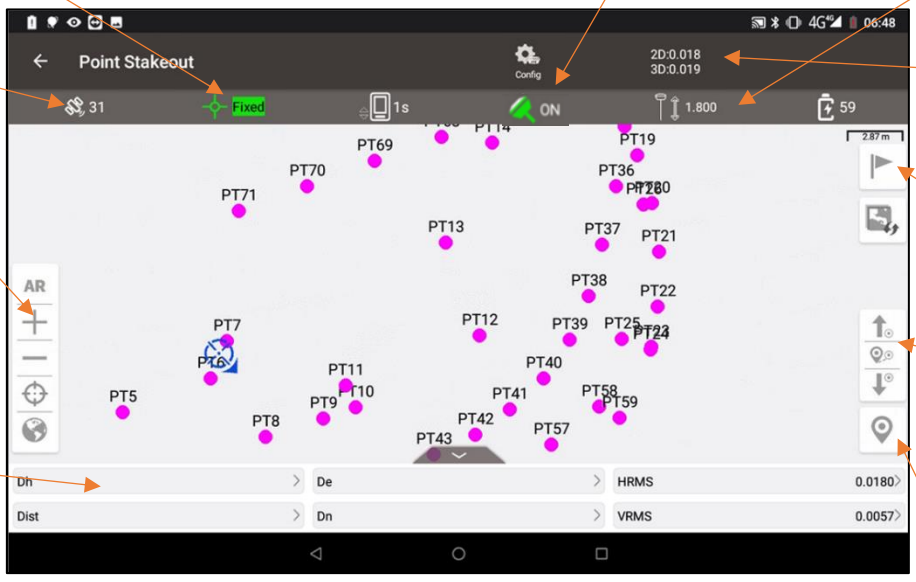
Tilt ON – this is activated by moving the pole sufficiently and it **must be activated** in order to take survey measurements. Best skew correction provided when completely green.

It is **important** for the correct pole height to be input

Number of satellites received

Zoom and centring functions

These 6 fields can be adjusted by clicking on them.

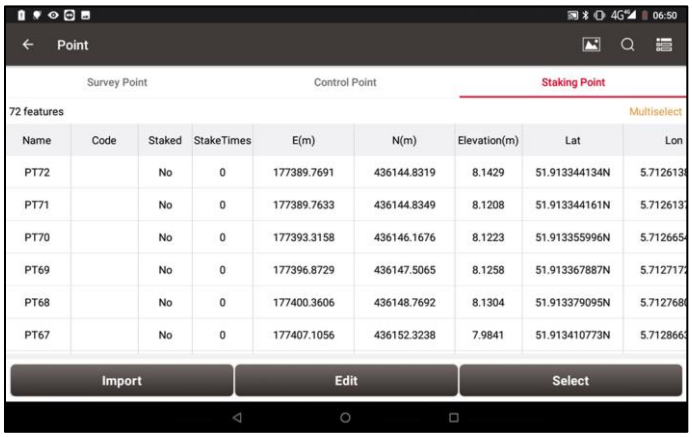


Current position accuracy

Show list of point stakeouts

Next/previous point stakeout

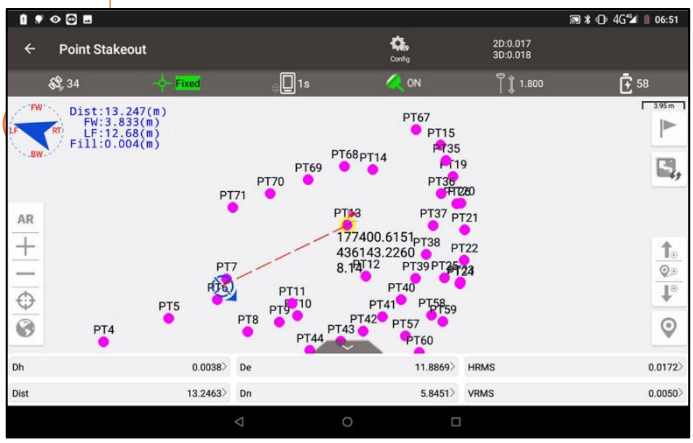
SURVE



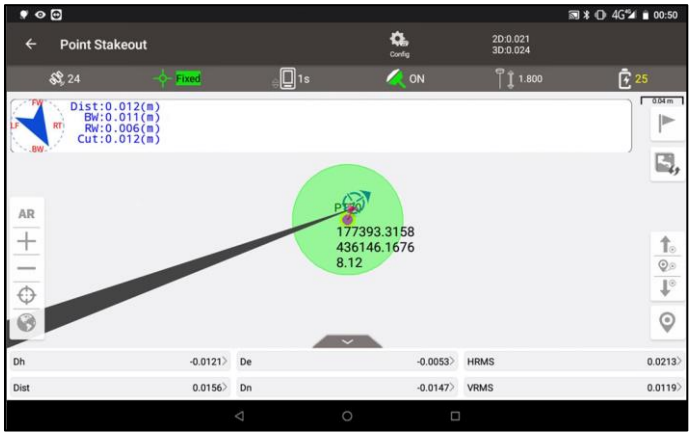
Example of coordinate list display

In the example below, point 72 has been selected.

On the top left, navigation directions are displayed in 3D and the current position is visible.



When the position of the point to be staked out is approached to a few centimetres, the screen changes as shown below. The tilt position of the GPS pole is also visible graphically.

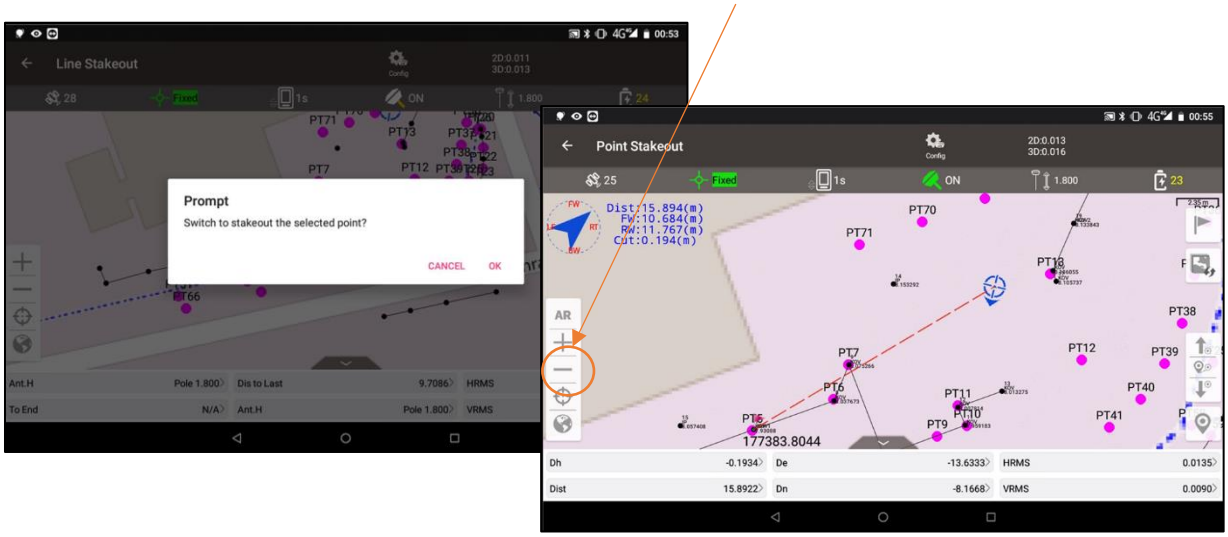


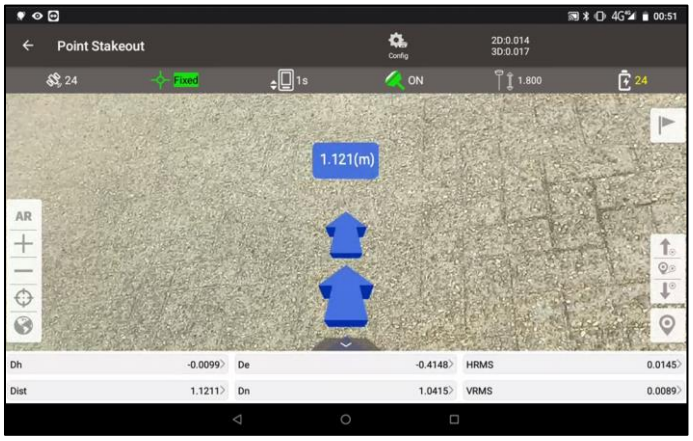
Augmented Reality

Another useful navigation feature is AR (Augmented Reality). Here, the camera on the tablet and the arrows on the display navigate you to the selected stakeout point.

The AR function only works for staking out points, and not for lines.

After selecting the point you want to stake out, press the AR button.

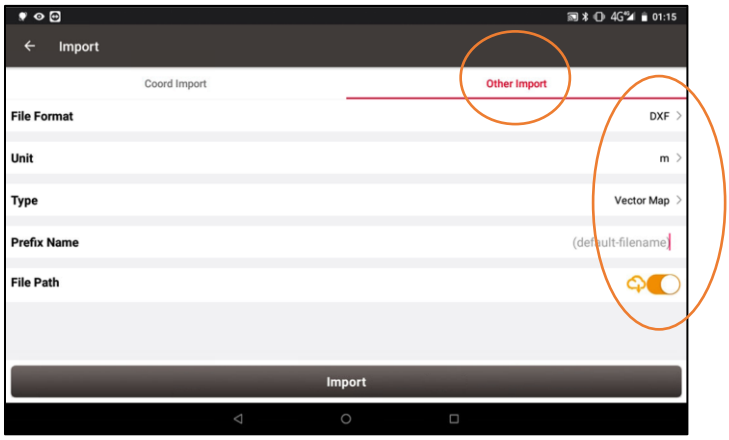




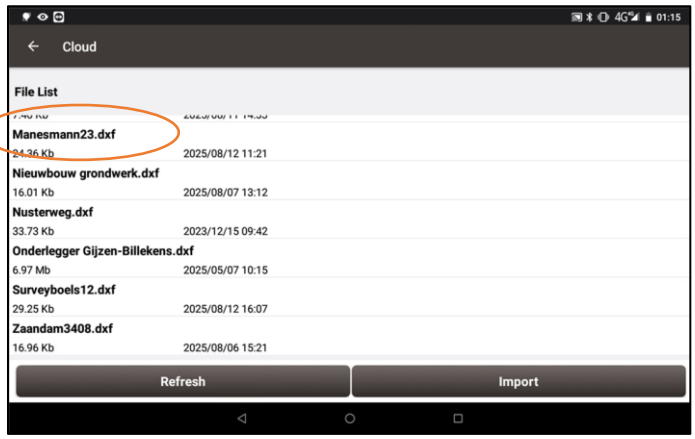
The camera and blue arrows navigate you to the selected stakeout point

11. Staking out points and lines (e.g. DXF)

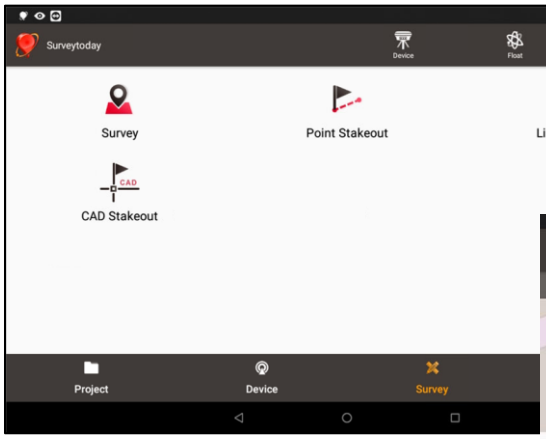
If a drawing has not been read in yet, go to the Import menu.
Once there, select: Other import, file format and other settings below



Select the desired drawing (in this example: Nieuwbouw grondwerk.dxf)

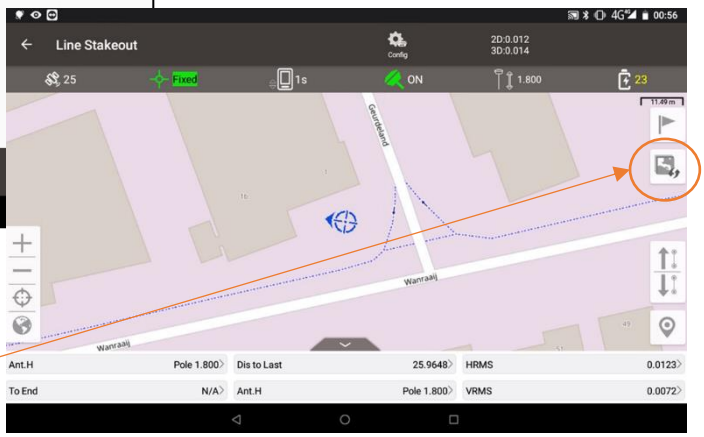


Go to the ‘Line Stakeout’ menu

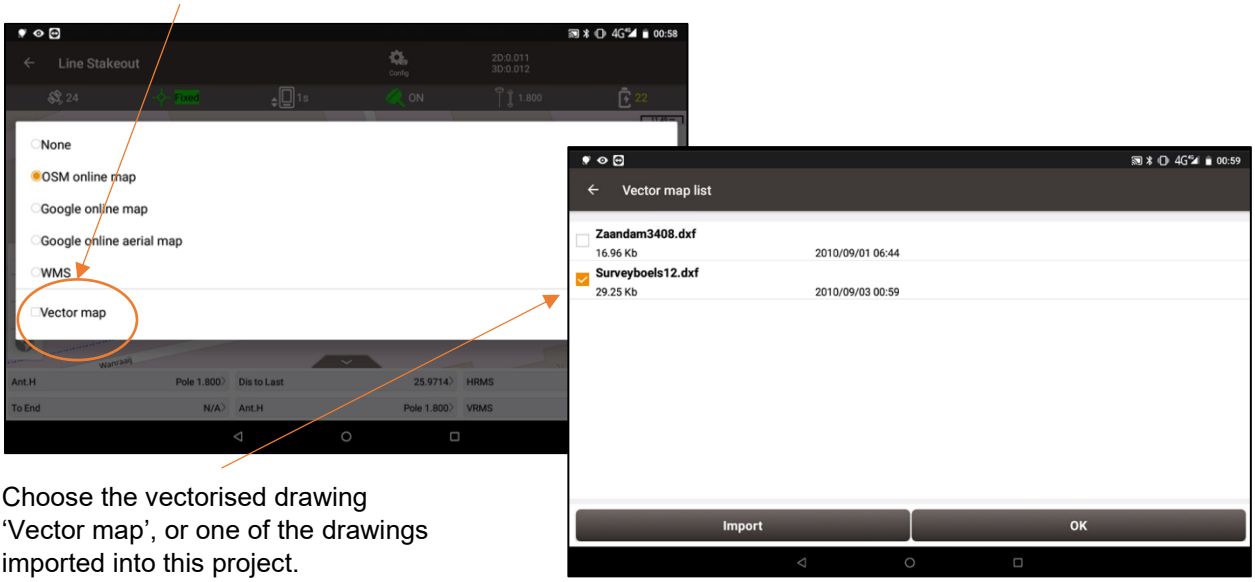


If the background file is selected, then the display shown here on the right will be displayed.

Select the map view icon

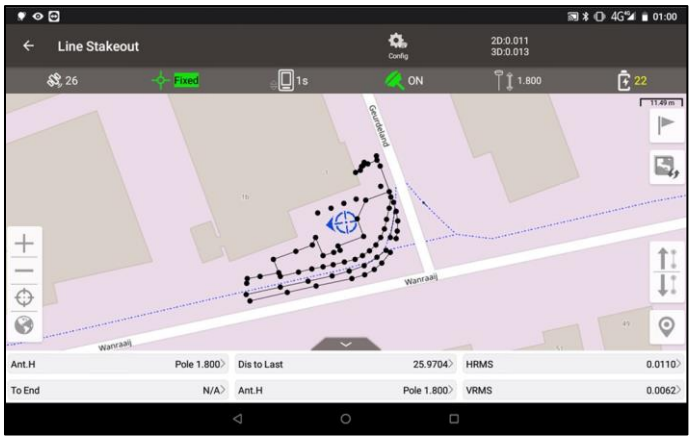


Select ‘Vector map’ and optionally a map as a background

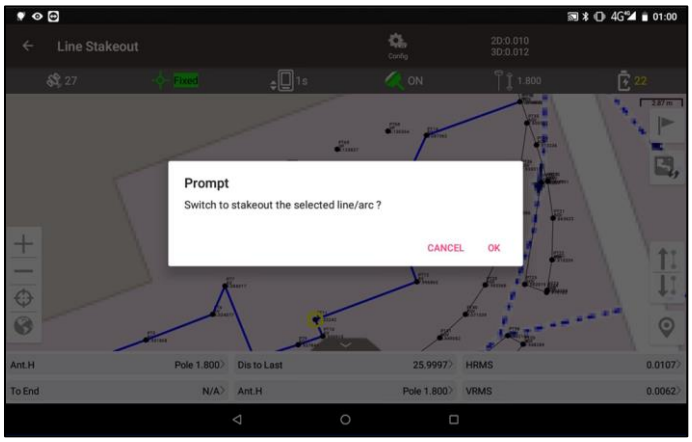


Choose the vectorised drawing ‘Vector map’, or one of the drawings imported into this project.

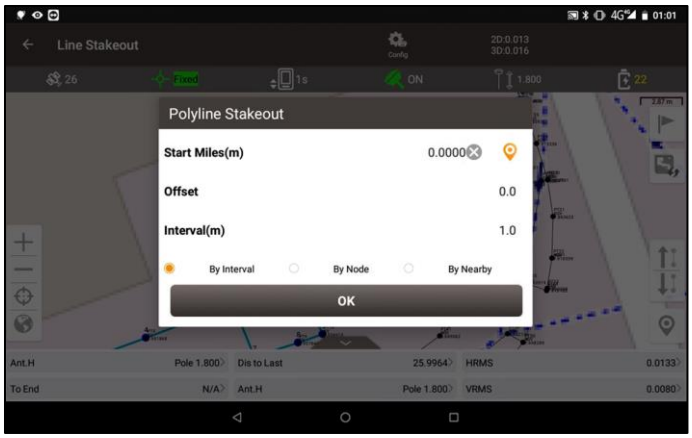
In the drawing, select the line/arc you want to stake out by clicking in the centre of the line element. It is also possible to stake out points in this menu.



Line selection: Confirm the selected line



To stake out the line or arc (polyline), a selection menu now follows. In most cases, ‘By Nearby’ is chosen.



Start miles(m)
Specify the distance across the line from where you want to start staking out.

Offset(m)
Offset relative to line; where positive values are to the right of the line and negative values are to the left. For example, with an offset of -0.5, the points are staked out 50 cm to the left of the selected line.

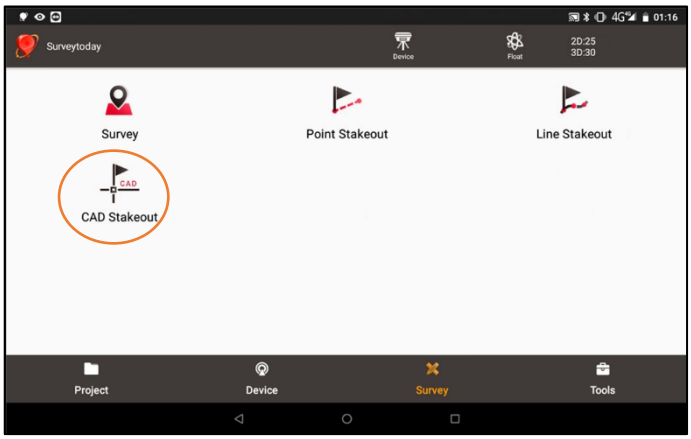
Interval(m)
At what interval on the line do you want to stake out points

3 options:

- By interval — Stake out points on the line using the interval distance entered across the line
- By node — Stake out all points of the polygon
- By nearby — Shows the perpendicular distance and the distance from the start of the line relative to the position of the GPS tilt receiver.

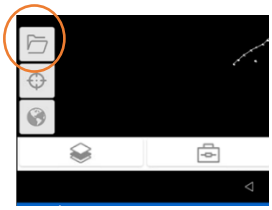
12. Staking out from CAD files, including DXF and DWG

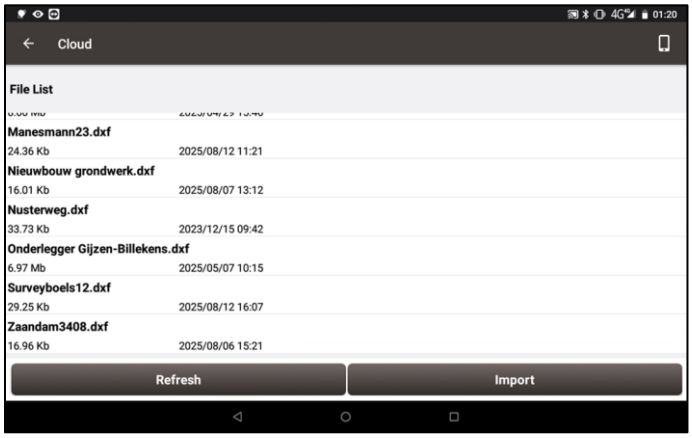
Select the ‘CAD Stakeout’ application from the ‘Survey’ menu to plot a DXF or DWG file.



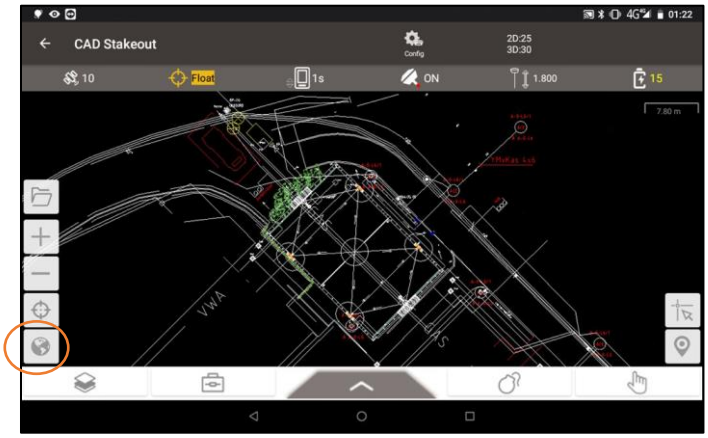
All files that are in the Cloud are shown; select the CAD file to stake out.

If a CAD file is already open, that file is immediately shown in the stakeout screen. Press the folder symbol on the left side of the stakeout screen to open another CAD file.





The CAD file is opened. Clicking on the Globe symbol zooms in on the data on the map.

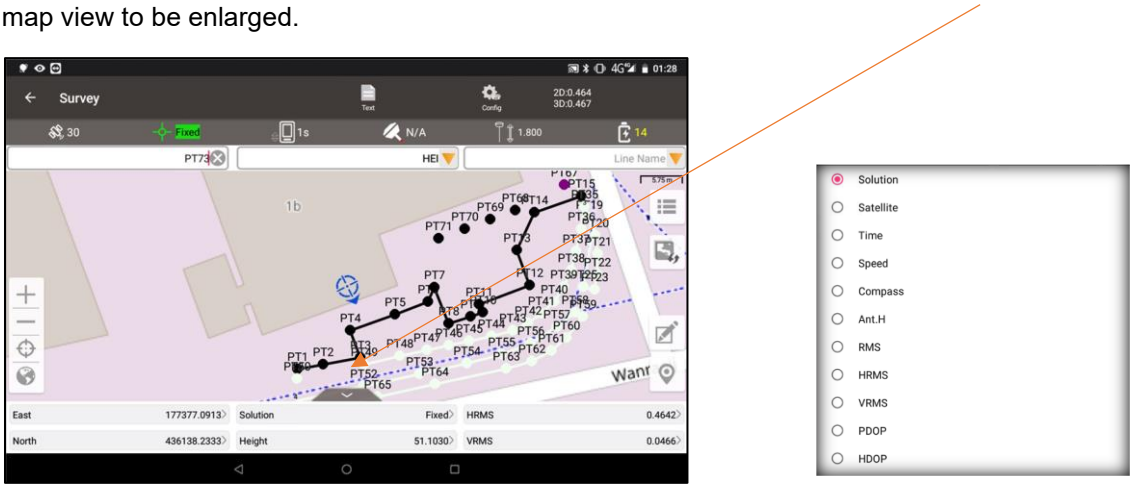


Icon	Description
	Zooms to the position of the Tiltrover.
	Zooms all.
	Point selection; makes a mouse (arrow with circle) appear on the display. Move the arrow to the point to be selected by sliding your finger on the round 'mouse'.
	Save stakepoint.
	Displays coordinate list of all points on the selected line.
	Layer management; activating, locking and freezing different layers.
	Toolbox with tools for: - surveying the distance between 2 points. - calculating an area and its perimeter. - search function. - changing the background colour: white or black.
	Distance measurement; select two points on the drawing and calculate the distance.
	Surface measurement; select points on the drawing and calculate the area and perimeter.
	Search function: enter text to search and locate.
	Changes the background colour to black or white.
	Explode, splits a composite object into its individual components. This means you can 'unpack' an object such as a block, polyline or region into the individual elements it is composed of, allowing you to edit and expand them individually.
	Default status; waiting for a point or the line to be selected.
	Stakeout point; for plotting the selected point.
	Stakeout line, for plotting the selected line.
	End stakeout point or stakeout line function

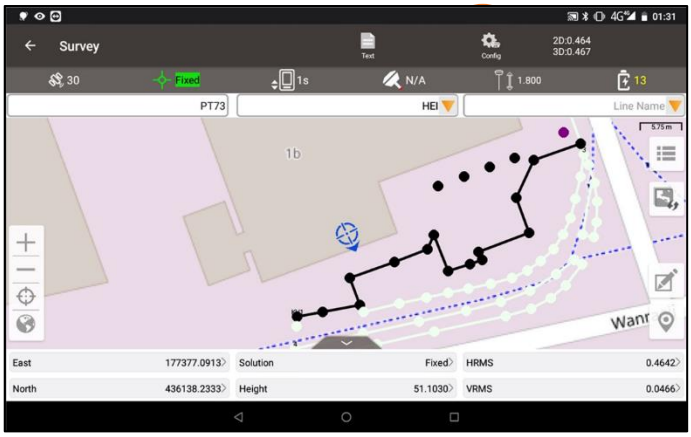
13. General settings

Changing or hiding display information

The 6 information fields at the bottom of the screen can be hidden by pressing the grey tab. Allows the map view to be enlarged.



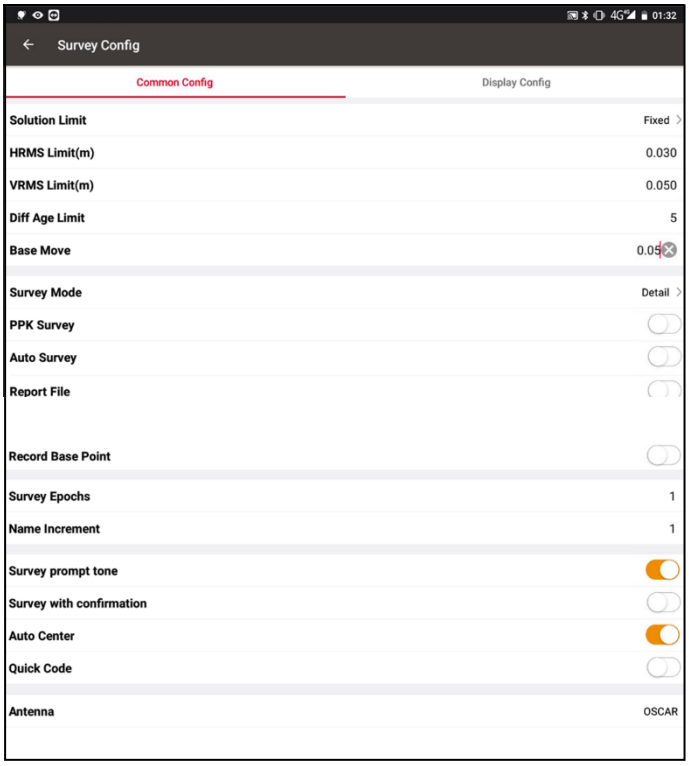
These 6 fields can be set according to personal preference. Click on the field you want to change; a pop-up screen appears where you can select the desired display option.



A number of default settings can be changed by pressing ‘Config’.

The main settings in the Survey menu

General Config tab



Solution Limit > must be set to Fixed

HRMS Limit(m) > maximum horizontal deviation

VRMS Limit(m) > maximum vertical deviation

Diff Age Limit > max interval of RTK correction

Base Move > new base station *1

Survey Mode > detail, continuous or offset measurements *2

Survey Epochs > number of times measured / average

Name Increment > default point number increment of 1

Survey prompt tone > sound on registration

Survey with confirmation > shows advance point info

Auto Centre > centres GPS position on the map

Type > for working with ‘Pole’ tilt select

Ant Height(m) > the antenna height in metres

*1 If the position of the base station exceeds the value entered, a new base station is generated and the coordinates of the GPS rover are recalculated.

*2 There are three options for surveying offset points:

- the tilt-offset method
- the two-point method
- one-point method.

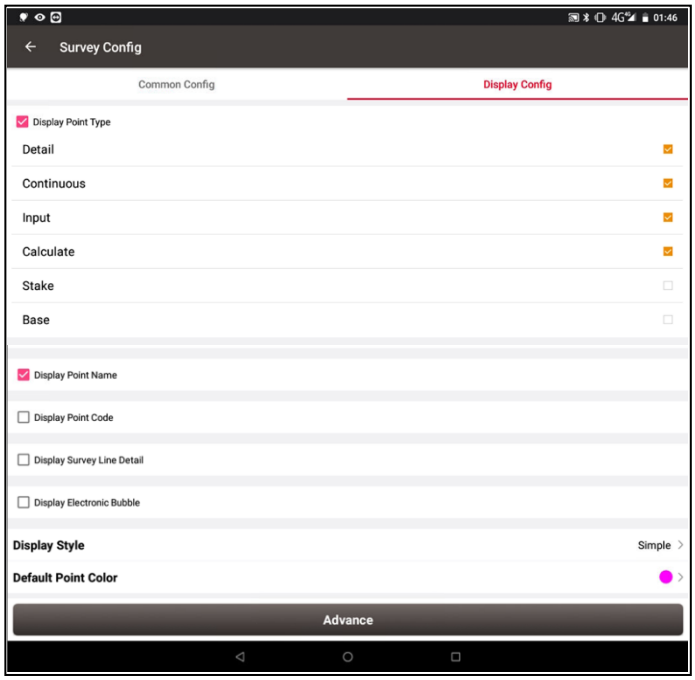
After selecting the survey mode as offset survey, return to the survey interface to select the method for surveying offset points.

[Tilt-offset]: The offset point is calculated based on the bottom position of the GPS pole and the offset value entered, which is in the opposite direction to the current tilt direction.

[Two-point method]: The direction is determined by the two surveyed points and the offset point is calculated in the extended direction based on the second point and the offset value entered.

[One-point method]: The offset point is calculated based on the current position, the entered directional azimuth and offset value.

➔ **Display Config tab**



Display Point Type > select for text at point

Checkboxes indicating which type of point is desired

Display Point Name > shows point no. on display

Display Point Code > shows code on display

Display Electronic Bubble > displays yes/no

Display Style > choice of display for surveyed point

Default Point Colour > colour of surveyed point