



GPS Hiper Ga with FC-2000 Network RTK (NTRIP) SURVEY PROCEDURE GUIDE

Prepared By

Abdul Jaleel K.M.

Technical Support Engineer/Service centre in charge

Mobile: 050-6944728, Tel:04-2823145 Ext: 160

E-mail: topconsc@fajerest.ae



TOPCON Hiper Ga with FC-2000 GPS RTK (NTRIP) SURVEY PROCEDURE GUIDE

Introduction:

Real Time Kinematic surveying used for topographic survey and stakeout, and is the most precise method of Real Time surveying. The concept of GPS Network Reference Stations allows us to eliminate/reduce systematic errors in reference station data, to provide high-accuracy, real-time kinematic (RTK) GNSS positioning for wider areas. A VRS network improves productivity while at the same time reduces costs, by eliminating the need to set up a base station.

The purpose of this guide is to provide a step-by-step procedure for completing RTK topographic surveys using the Topcon hardware and software. This guide consists of following sections:

- Initial Setup
- Topography Surveying
- Importing Job
- Exporting Job
- Localization

Hardware Required:

- Topcon Hiper Ga Dual-frequency receiver
- Topcon Controller FC-2000 with Bluetooth Card (Data Collector)
- Mobile with SIM Card

Software Required:

- TopSurv running in Windows CE operating system (on FC-2000)
- Top Link software for PC (Download)

Our Related Guides:

- TopSurv User Manual
- TopSurv Reference Manual
- GR3 Operator's Manual
- Top Link Reference Manual

Additional information such as Bluetooth operation, radio frequency, etc. is not included in this guide. Contact our Technical support Engineers for assistance.



Turn on the FC-2000 by pressing the green Power Button for more than 1 second.

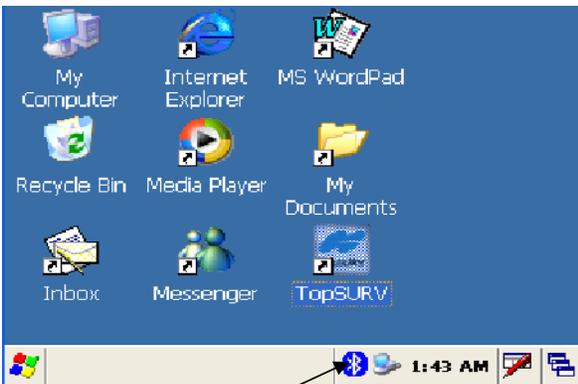


Turn Power ON

Green Button

If you want to reset the controller PRESS

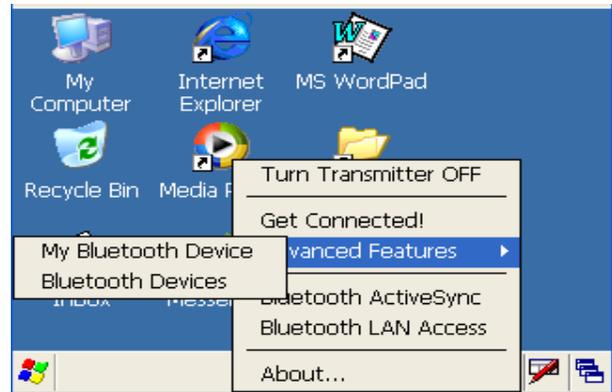
(Shift + Func + ESC)



Tab Here



Select Tools – Select Device Discovery



Select Advanced Features – Select Bluetooth Devices



Tab Next



Tab Next



Select Phone - Tab Next



Tab Finish



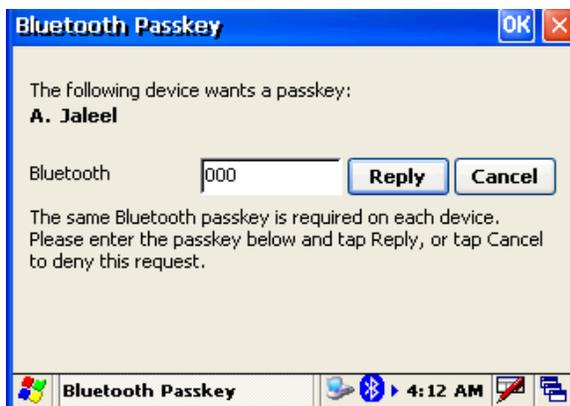
Select Required Mobile – Go to Device – Select Bond



Tab Next



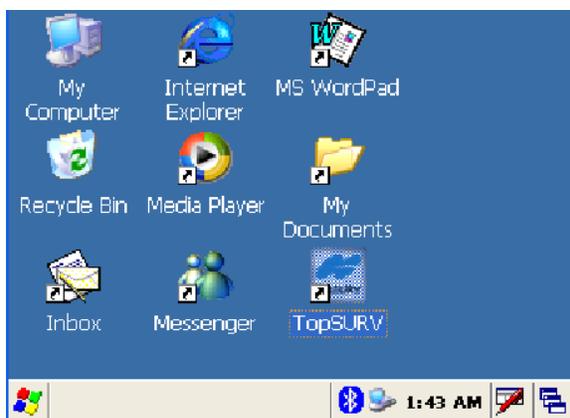
Tab Next



Enter passkey and Tab reply
(Note: Enter same Passkey in Mobile also)

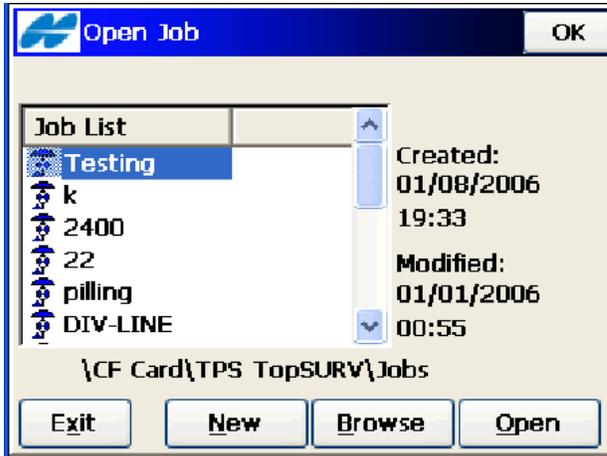


Tab Finish and Exit

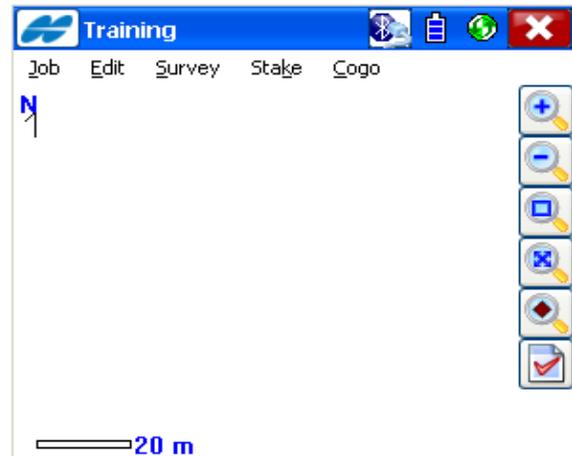


Double click the "TopSURV" icon

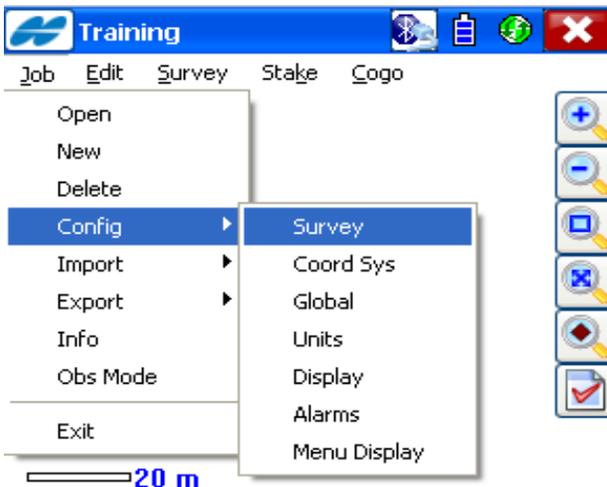




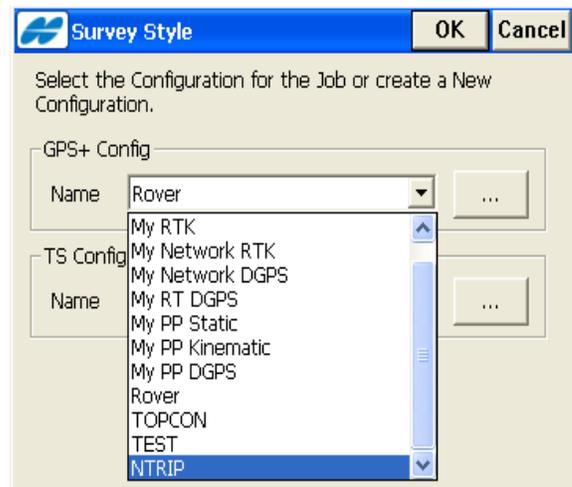
Create New Job



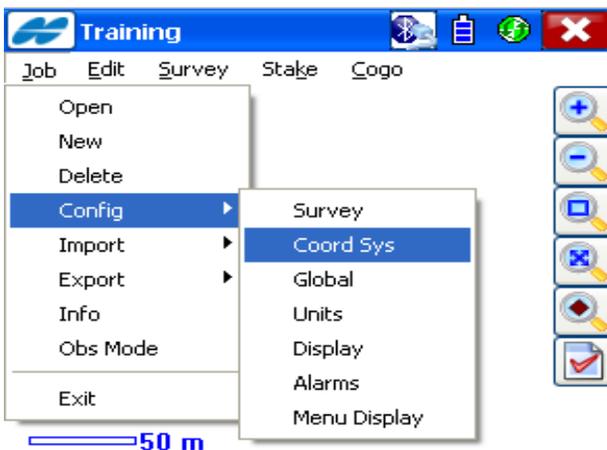
Enter Job Name or File Name



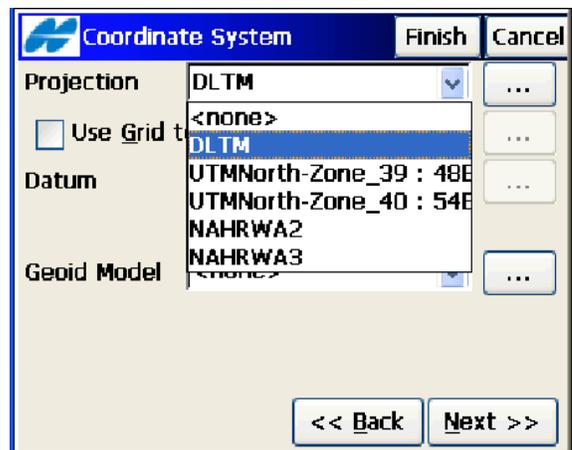
Select Job – Config – Survey



Select NTRIP



Select Job – Config – Survey



Select Required Coordinate System



NTRIP Configuration

Survey Style [OK] [Cancel]

Select the Configuration for the Job or create a New Configuration.

GPS+ Config
Name: **NTRIP** [...]

TS Config
Name: **<Default>** [...]

Tab Here

Configurations [OK] [Cancel]

Configuration Name

- My RTK
- My Network RTK
- My Network DGPS
- My RT DGPS
- My PP Static
- My PP Kinematic
- My PP DGPS
- Rover
- TOPCON
- TEST
- NTRIP**

[Delete] [Edit] [Add]

Tab Here

Select Following Configuration Parameters

Config: Survey [Finish] [Cancel]

Name: **NTRIP**

Type: **Network RTK**

Corrections: **FKP**

Post Processing
 mmGPS+
 Simulation Mode

[Next >>]

Config: Rover Receiver [Finish] [Cancel]

Receiver Model: **Topcon Generic**

Elev Mask: **10** deg

Protocol: **NTRIP**

Antenna: **HiPer Ga/Gb** 

Ant Ht: **2.000** m [Vertical]

[Peripherals] [<< Back] [Next >>]

Config: Modem Connect [Finish] [Cancel]

Modem Connect: **Controller**

[<< Back] [Next >>]

Config: Rover Radio [Finish] [Cancel]

Network Type: **Dialup Network Connect**

Port Connected to Modem

Port: **Bluetooth** Baud: **38400**

Parity: **None** Stop: **1**

Data: **8** [Defaults]

[<< Back] [Next >>]



Config: Modem Internet Info Finish Cancel

Internet Info

IP Address: 83.111.117.93/2101

IP Address list:

83.111.117.93/2101

Delete Add

<< Back Next >>

Config: NTRIP Login Info Finish Cancel

NTRIP Server

Server IP/Port

User ID test

Password ****

<< Back Next >>

Config: Modem Dialup Info Finish Cancel

Provider T-Mobile GPRS

Dialup Num *99***1#

User ID test

Password 4321

PIN 0000

APN etisalat.ae

GR-3 Digital UHF Defaults

<< Back Next >>

Config: Modem Receiver Info Finish Cancel

Receiver Info

Virtual Radio Port D

<< Back Next >>

Config: Survey Params Finish Cancel

Solution Type Fixed Only

Auto Accept

Num Meas to Avg 3

Precision (m) Hz 0.0150 Vert 0.0300

Auto Topo

Method By Hz Dist Interval 15.000 m

<< Back Next >>

Config: Stake Params Finish Cancel

Hz Dist Tolerance 0.050 m

Reference Direction Moving Dir + North

Solution Type Fixed Only

Auto Accept

Num Meas to Avg 3

Precision (m) Hz 0.0150 Vert 0.0300

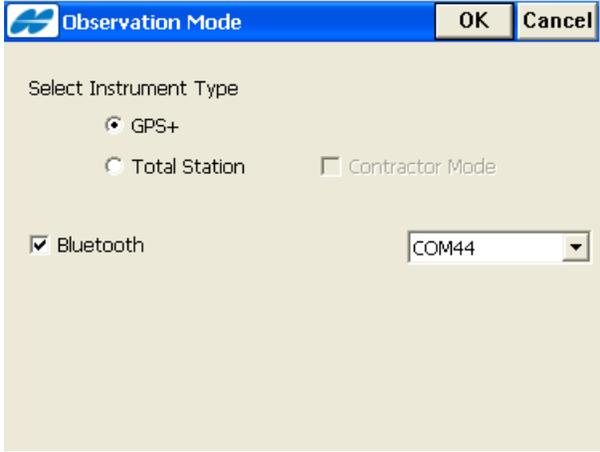
<< Back Next >>



The collage consists of six screenshots from the Topcon software interface:

- Config: Stake Params:** Shows the 'Store Staked Point As' section with 'Point' set to 'Design Pt Suffix' and '_stk', and 'Note' set to 'Design Point'. Buttons for '<< Back' and 'Next >>' are at the bottom.
- Config: Advanced:** Shows settings for 'Multipath Reduction' (checked), 'Co-Op Tracking' (checked), 'Satellite System' (GPS+GLONASS), and 'RTK Position' (Extrapolation). Buttons for '<< Back' and 'Next >>' are at the bottom.
- Miscellaneous:** Shows a list of checkboxes: 'Display coordinates after measurement', 'Prompt for antenna height', 'Prompt for feature codes', and 'Beep on storing points' (checked). A '<< Back' button is at the bottom. An arrow points to the 'Finish' button with the text 'Tab Here' below it.
- Survey Style:** Shows configuration for 'GPS+' (Name: NTRIP) and 'TS Config' (Name: <Default>). Buttons for 'OK' and 'Cancel' are at the top right. An arrow points to the 'OK' button with the text 'Tab Here' below it.
- Training (Left):** Shows a menu bar with 'Job', 'Edit', 'Survey', 'Stake', and 'Cogo'. A scale bar at the bottom indicates '20 m'. An arrow points to the 'Job' menu item with the text 'Tab Here' below it.
- Training (Right):** Shows the same menu bar as the previous screenshot, but with a context menu open over 'Job'. The menu items are: Open, New, Delete, Config, Import, Export, Info, Obs Mode, and Exit. An arrow points to the 'Obs Mode' menu item with the text 'Tab Here' below it.



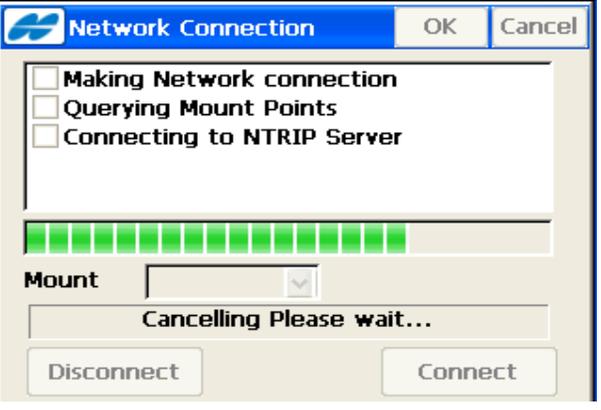


Select Bluetooth and Click OK.

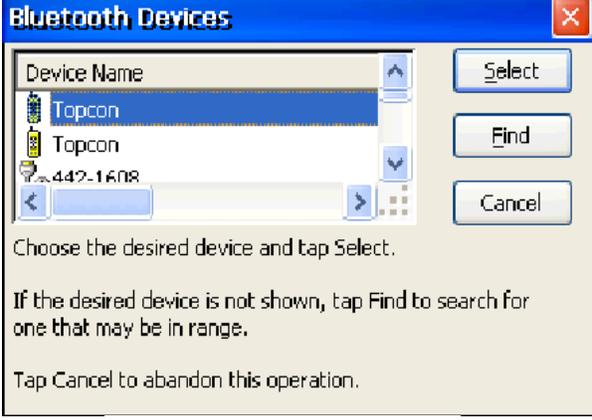


Find base receiver serial number and Then Select

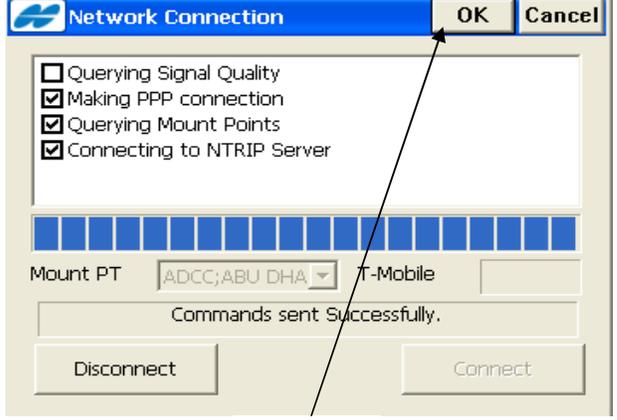




When the connection is established you will be hearing a sound and sees green icon connection comes to dark green colour. Then automatically searching **mount point & PPP Connection**. Finally a message will appear “commands sent successfully”.



Select Mobile Bluetooth



Tab Here



The screenshot shows the 'Training' software interface. The 'Survey' menu is open, highlighting 'Status'. Below it, a scale bar indicates 50 meters. To the right, the 'Status' window is open, showing position data for 'ABUDHABI [WGS84](m)'. The 'Position' tab is selected, and a red arrow points to the 'Settings' button. Below this, the 'Config Modem' window is shown with 'Internal GPRS' selected as the modem type and 'Rover' as the connection. The 'Mount Pts' dropdown is open, showing options like 'FKP01;RTCM correct' and 'ADCC;ABU DHABI CC;LE'. Below that, the 'Status' window is shown again, but with the 'System' tab selected, displaying details like 'Position Type: Fixed', 'Common Sats: 13', and 'Radio Link: 100 %'.

Select Survey – Status

Tab Here

Select Config Modem

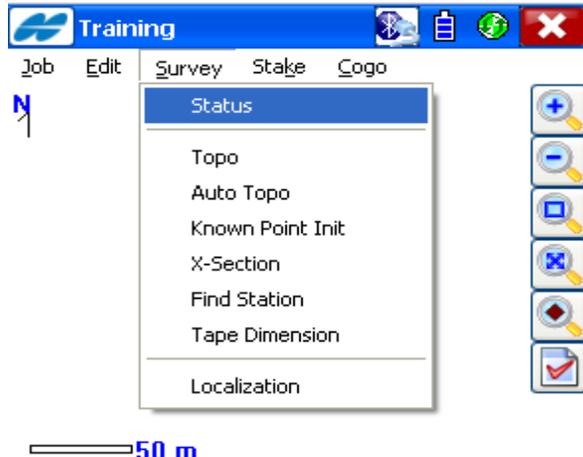
Select Required Mount Point and Connect

Note: The position should become “Fixed” and the common and initialized satellites fields will populate with the number of satellites being tracked, as on the screen.

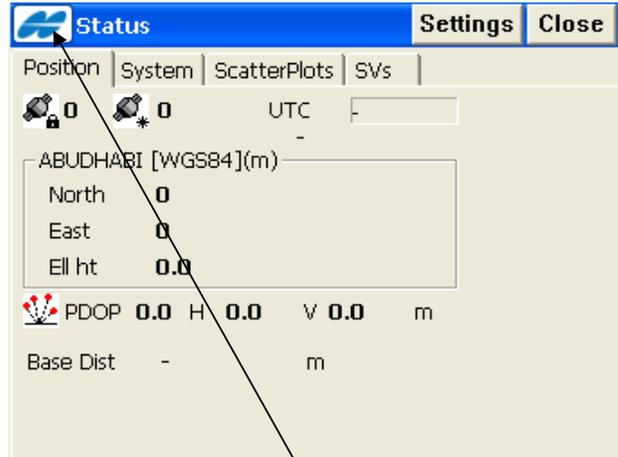
The Radio Link should be 100% and the RTK-age should be 0 or 1sec. This means the radio is communicating the base station information to the rover receiver. If either of these values is something different, the “Positioning Type” will not be “Fixed”



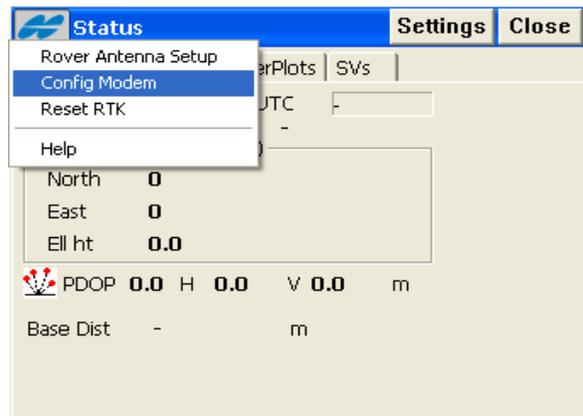
Note: If you want to reconnect the Network, do the following steps:



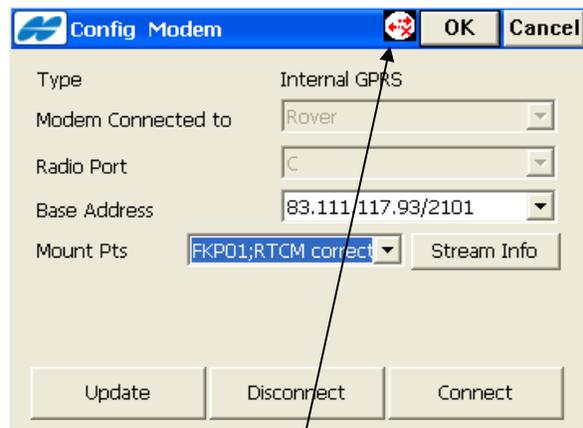
Select Survey – Status



Tab Here



The Red icon shows, there is no GPRS Connection Currently. So, to establish GPRS Connection. Select Provider, Input User ID & Password and APN.



Tab Here

The Virtual Radio must be D. Port C is occupied by the Radio modem.



Press Connect

Close Here

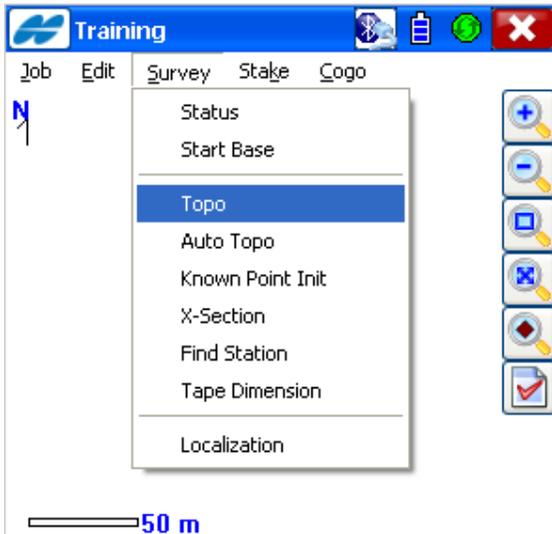
Select “Update” and then all the mount points’ shows will be in the Mount point List.

Select Required Mount Point from the list and connect it.

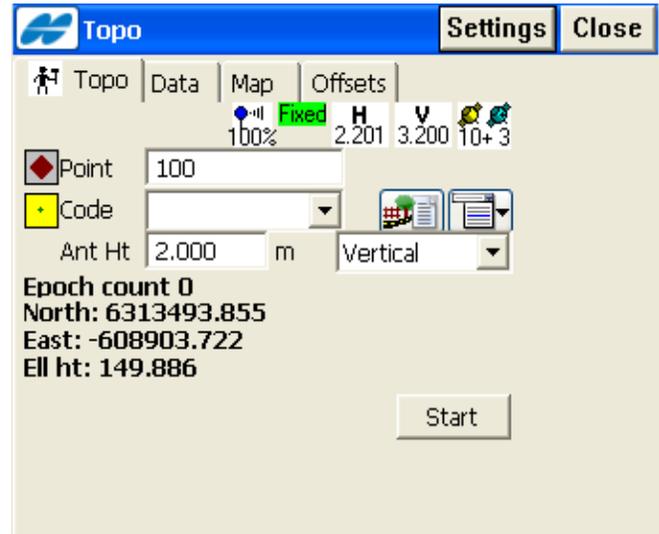
The position should become “Fixed” and the common and initialized satellites fields will populate with the number of satellites being tracked, as on the screen.



Topo Survey:



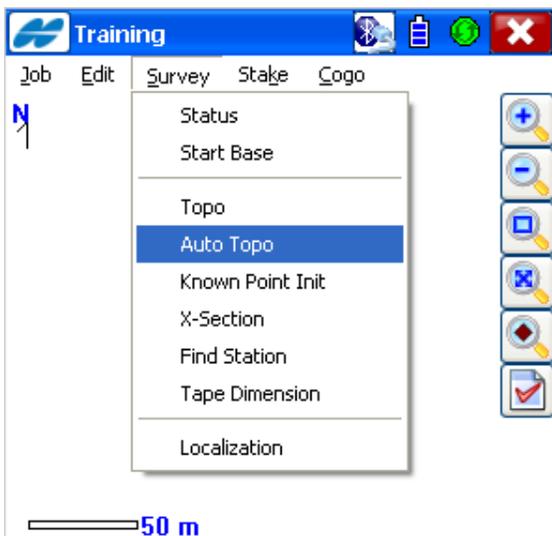
Go to Survey - Select Topo



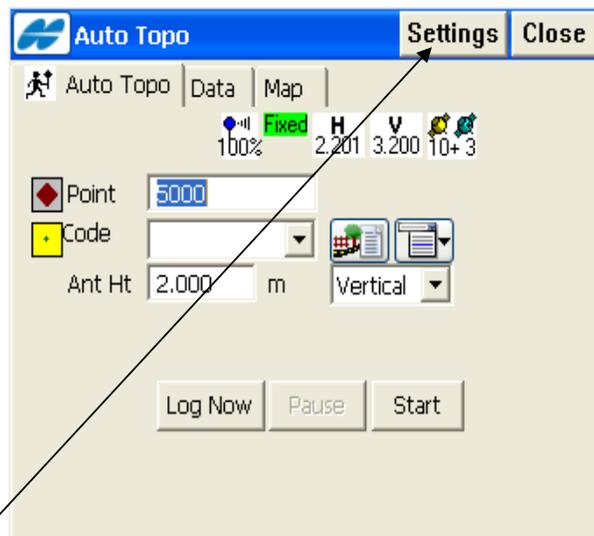
Give point Number – Click Start (Data store automatically)

Note: If you want to see the Topo survey points Go to Edit – Select Points.

Auto Topo:



Go to survey – Select Auto Topo



Give point Number-Log Now – Click start

Click here for changing the parameters. Set the Auto Topo method and interval (either by horizontal distance, slope distance, or time).



Note: If you want to see the Auto Topo survey points Go to Edit – Select Point

Point	Code	North(m)	East(m)	Ell ht(m)	Control ...	Notes
Base Point		6299729.653	-612517.421	150.558		

Click here (Topcon icon) and select
Show auto Topo Points

Stake out/Setout/Layout the Points:

If you wish to add points go to edit/ points/add then edit point coordinates then press ok

Point	Code	North(m)	East(m)	Ell ht(m)	Control ...	Notes
100		6314831.719	-608550.674	149.887		
101		6314832.832	-608550.380	149.886		
102		6314833.688	-608550.153	149.887		
103		6314834.667	-608549.895	149.887		
104		6314875.773	-608539.047	149.887		
105		6314877.737	-608538.531	149.888		
106		6314878.840	-608538.238	149.886		
107		6314883.137	-608537.104	149.887		
108		6314884.483	-608536.749	149.887		
Base Point		6299729.653	-612517.421	150.558		



Go to Stake – Select Point

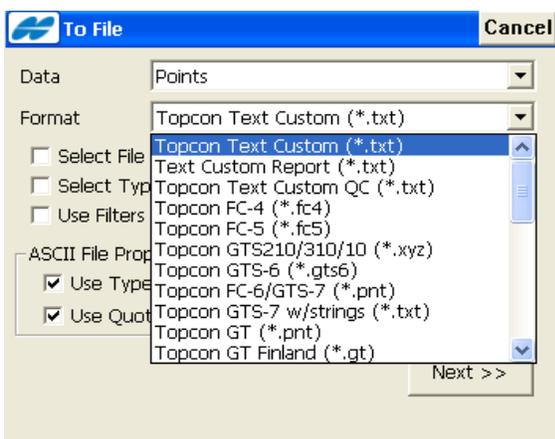
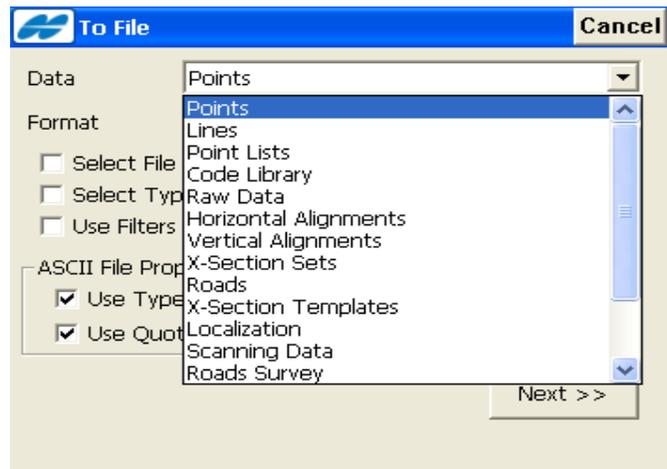
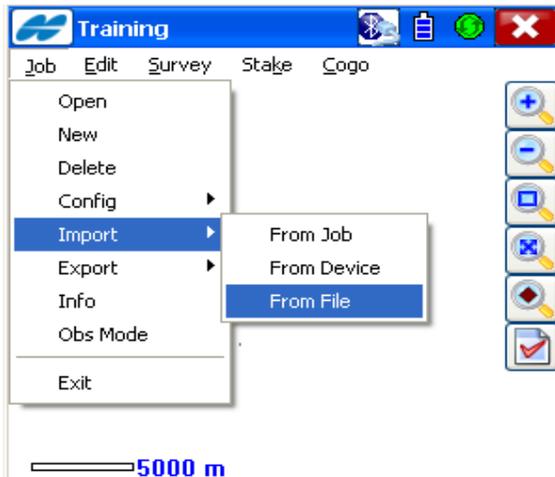
Click here and select required point and setout point

Click here (If you want to see the coordinates)

Click here (If you want to save the stakeout point)

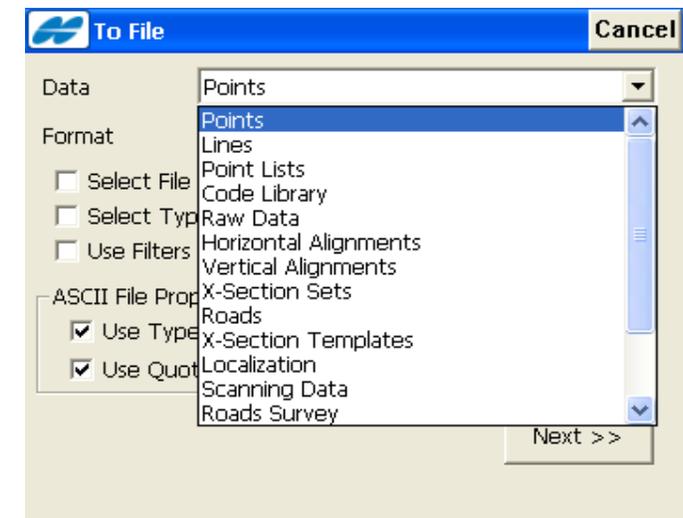


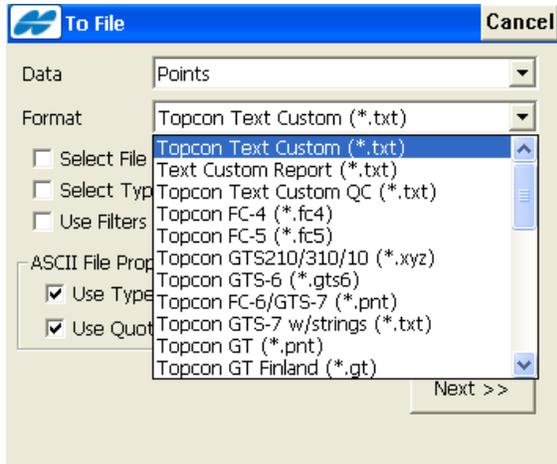
Import File



Go to Job – Import – From File - Select required Data – Select required Format - Click Next- Find File - Select required File style – Select Projection-Finish

Export File



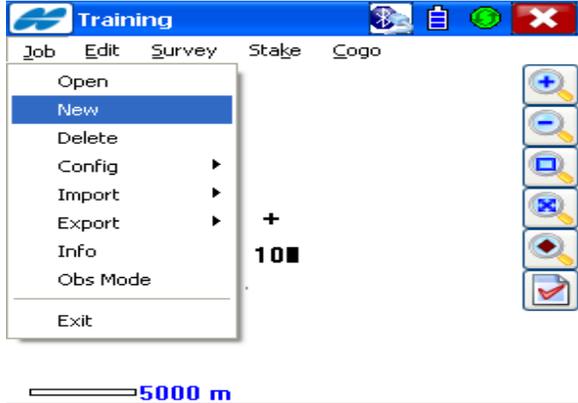


Go to Job – Export – To File – Select Required Data - Select required Format - Click Next- Select Location and give file name - Select required File style – Select Projection-Finish

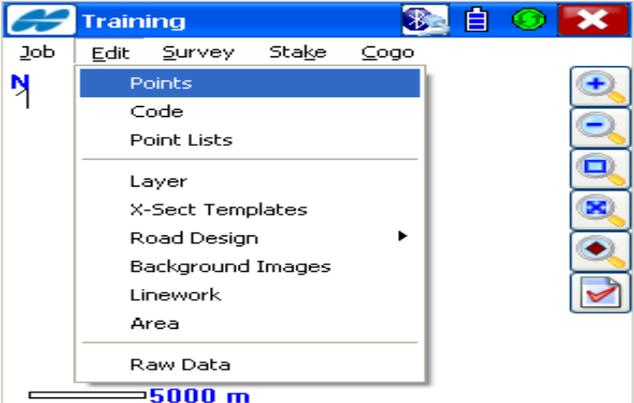
Localization:

Localization is used for transforming coordinates between local system and a WGS84 system. The more points used, the more precise the localization. Localization is performed on a site where you wish to work with the existing local coordinate system. To ensure an accurate localization you need at least 4 known points.

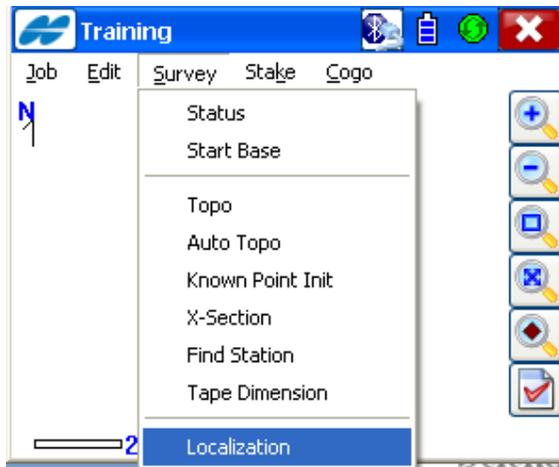
Select a position for your base that will give the best radio range for your project. This may be a known point or you may wish to create a new station a more suitable location. This point does not need to be part of your current survey network. Setup the base over the point, connect with controller and start base and after that connect rover. Localization file should be keep separately.



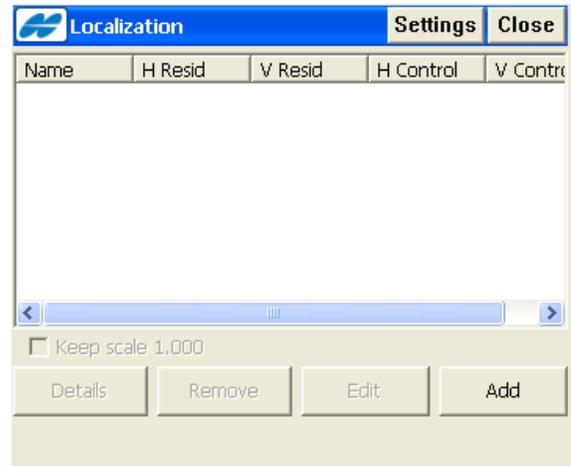
Create New Job



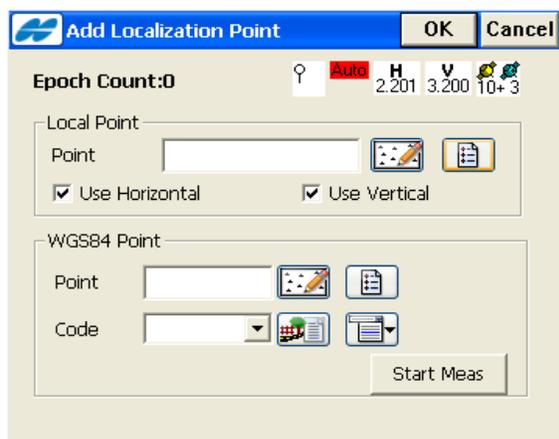
Add Local coordinates



Go to Survey - Select "Localization"



Click "Add"



Local point select from the list

Give WGS84 Point number

Start Meas

Continue to each local point and survey as above saving as you go. The localization screen displays the Horizontal and vertical residuals for each point you can see which points may not be good.

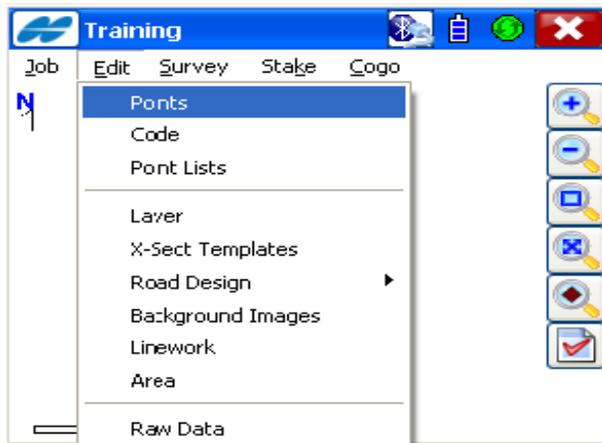
Note: Localization file should be keep separately. If you want to export a Localization file, go to export, select data is Localization and format is Topcon 3D (.gc3).As you create a new job and import localization file (gc3) and continue survey.

Known point Initialization:

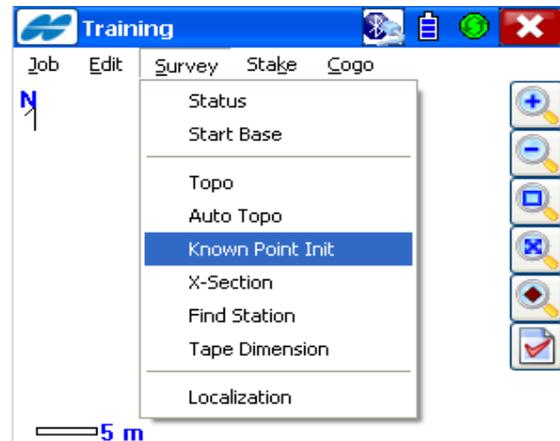
It means, Initializes the receiver using known coordinates for the rover station. Setup the base with required coordinate system and after that connect rover and



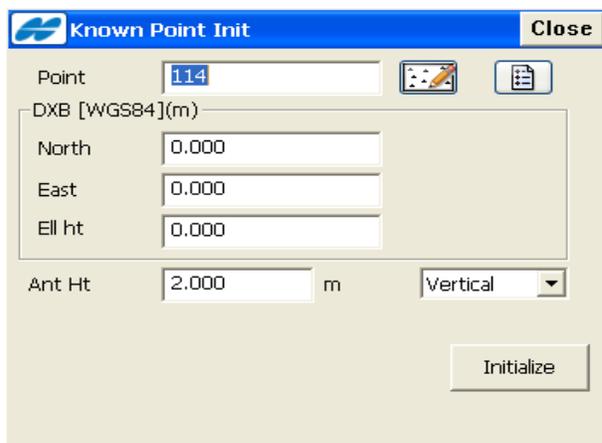
make the fixed solution. Add your control point and its coordinate and then go to survey, select Known point initialization. After open this window, Select required control point from the list and initialize the point and continue the survey.



Add control point

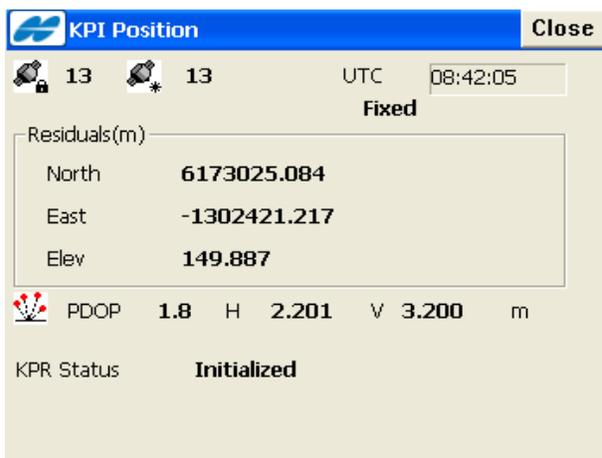


Select "Known Point Init"



Select required Point from the list

Initialize



Once you are initialized the control point, you can continue the survey.