28-01-2014

Carlson GIS360

GIS & GNSS map creation tools

user's guide

for Windows Mobile 6.1 & 6.5
and Windows CE 6

Version 4.02.800

Carlson
www.carlsonsw.com

www.carlsonsw.com
www.carlson-gis360.com

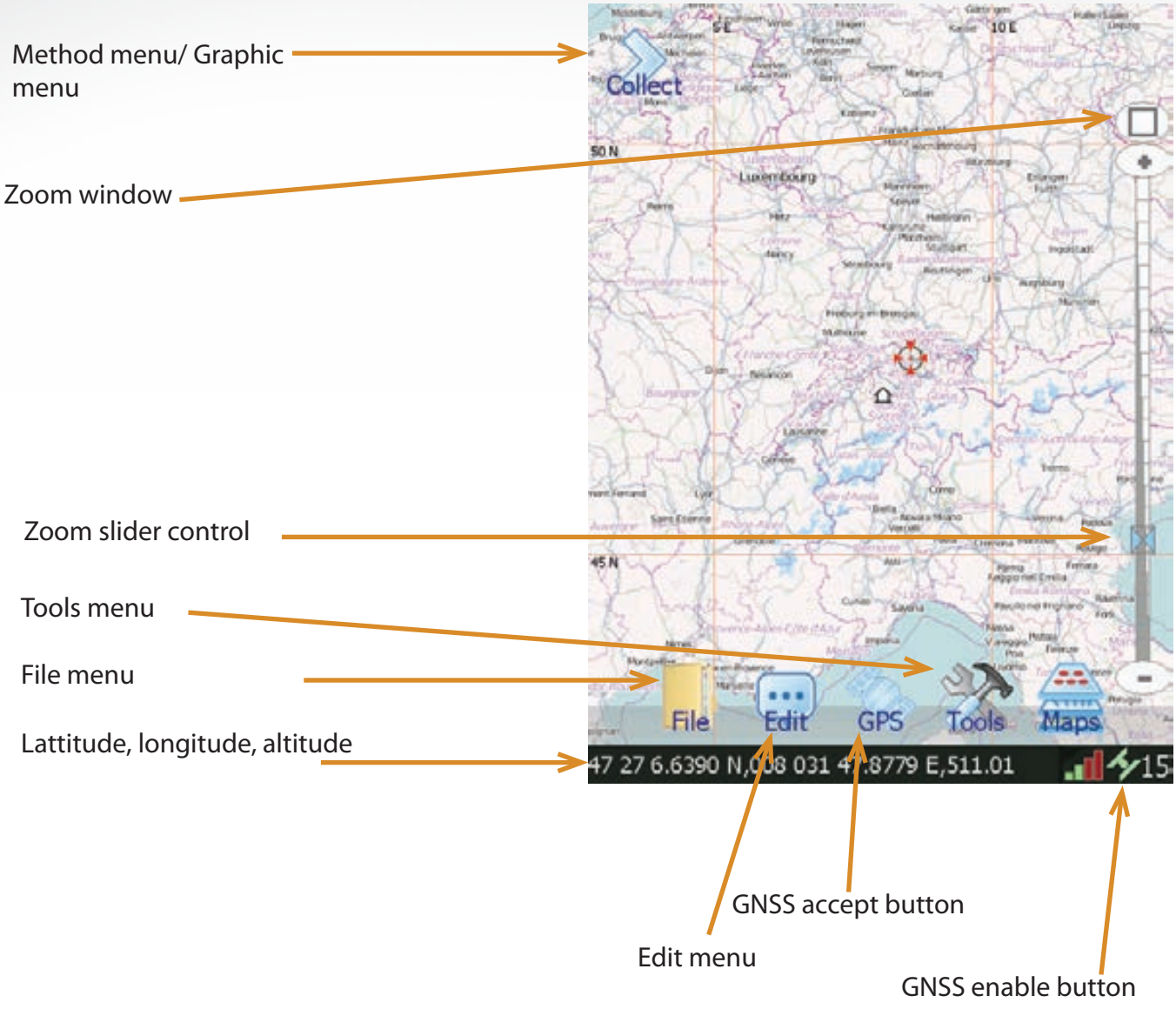
Table of Contents

Introduction

Note: GIS 360 runs on Windows Mobile 6.1 & 6.5, Windows CE, Windows XP, Vista, 7 and Windows 8. The functionalities are identical for all systems. Most screenshots in the present user manual are based on Windows Mobile 6.5, as this is currently the most widespread system in use for GIS360.

GIS360 is designed as a Geographical Information System recording and logging facility. Lists of attributes can be specified by the user to describe the information being stored. These attributes can then be used to collect data at positions that the user wants. The information can then be attached to areas, points and linear objects in a geographical area. These areas are described on a back drop of either satellite imagery or maps from 14 different map servers. Attributes and geometries may be saved and used in other situations like rendering them onto Google Earth ™ for examplee. Attributes may be edited and GNSS used to accurately place the geometric elements onto the map.

This system is made for Mobile PC and Tablet PC although there is no problem using this system on a Desktop PC either. All the examples shown in this brief guide are for the Mobile PC environment. GIS360 has a list of equipment which we have been able to test this system with. Whilst every care has been taken to conform to conventions, there is a variability in the features and performance of many mobile devices so we can not guarantee that our software will work on every product.

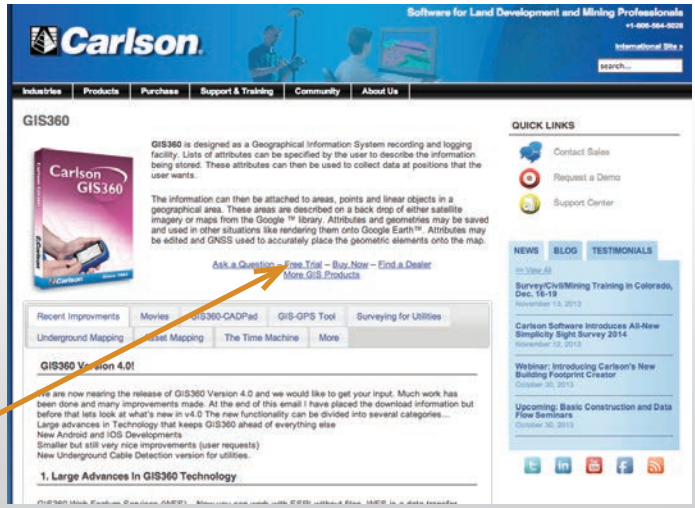


GIS360 Installation

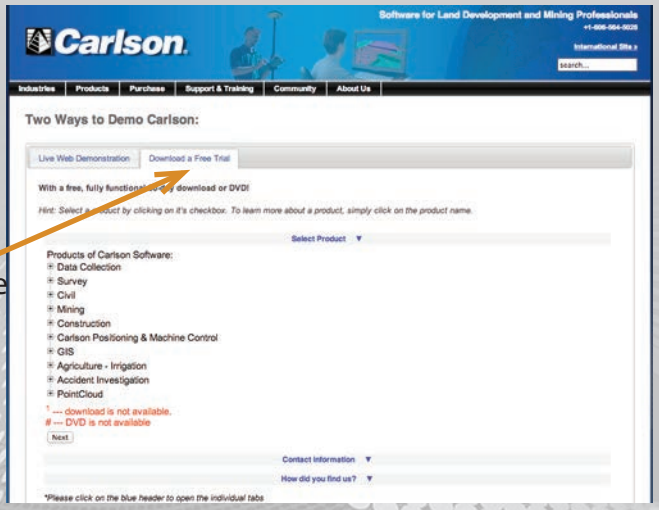
Option 1: Download from Carlson website

Go to http://www.carlsonsw.com and choose to download the GIS360 version.

Once at Carlson website choose GIS



Choose "Free Trial"



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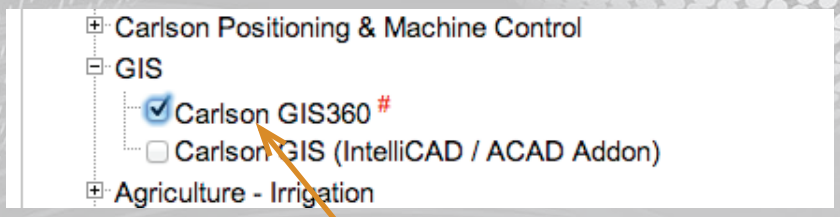
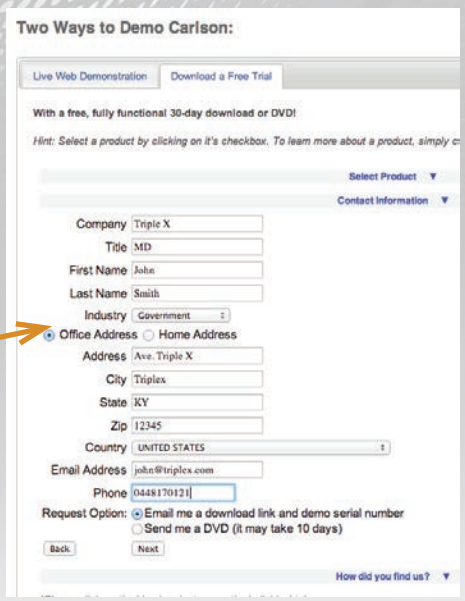


Choose first GIS and then "Carlson GIS360"



Please type in you correct contact details including a valid email address, and press "Next" and soon after you will receive an email from us with download links for three different versions of GIS360

Thank you for your interest in Carlson Software!.
You have requested the following products:

NAME: Carlson GIS360
VERSION: 4.1
Download URL:
For PC: http://update.carlsonsw.com/updates.php?product=GIS360&version=4.1&serial=DEMO-13880-73232-83967&platform=PC
For Mobile: http://update.carlsonsw.com/updates.php?product=GIS360&version=4.1&serial=DEMO-13880-73232-83967&platform=Mobile
For Windows CE: http://update.carlsonsw.com/updates.php?product=GIS360&version=4.1&serial=DEMO-13880-73232-83967&platform=CE
No serial number is required to install.

Training movies are available at http://www.carlsonsw.com/support/carlson-movies/

If you have any questions, please contact us at 606-564-5028.
We look forward to meeting your software needs, Happy Demo-ing!

Sincerely,

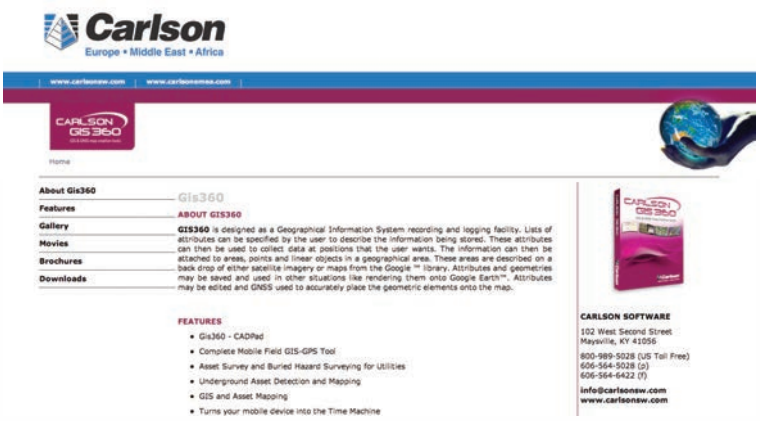
Team Carlson

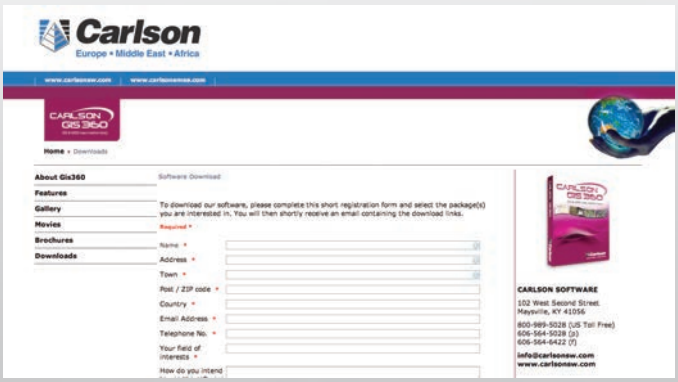
As soon as you click on one of the above links you will be directed to the download site and for Windows Mobile please download both files.

Option 2: Download from GIS360 website

Go to http://www.carlson-gis360.com and choose to download the GIS360 version.

Only the download from www.carlson-gis360.com will be shown here for simplicity.





Fill in the form and you will be sent the link in a separate email, to allow you to download the GIS360 software.

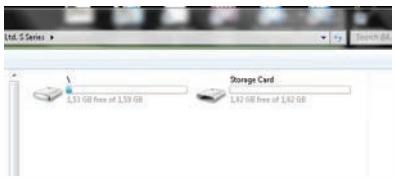
GIS360 first time installation

Important note: The installation procedure in this manual describes the installation of GIS360 on a Windows Mobile 6.5 device, but for those of you who will also use the PC version of GIS360 in the following few pages we will show you "the difference" in the installation . Basically there is no difference, you install both versions directly to the appropriate device and you must NOT USE active sync or a similar program.

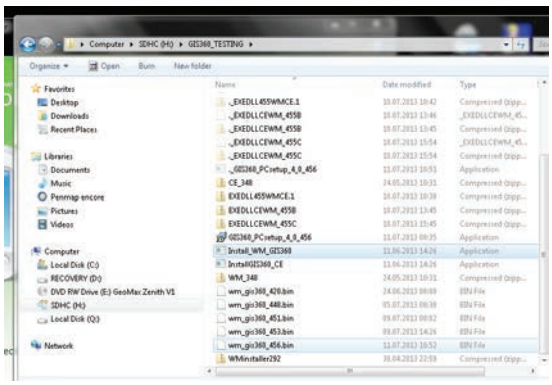
After you have downloaded the GIS360 software on your computer you have two options to install:

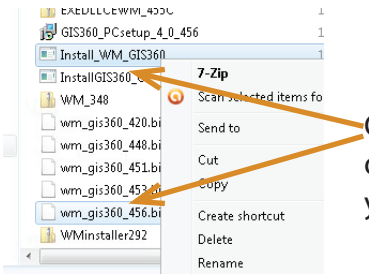
A) Installation on Windows Mobile 6.5 unit using Windows Mobile Device Center to copy the installation files across to the WM Device.

Please connect your WM device over USB cable to your PC. If everything is OK you will soon see that you are successfully connected

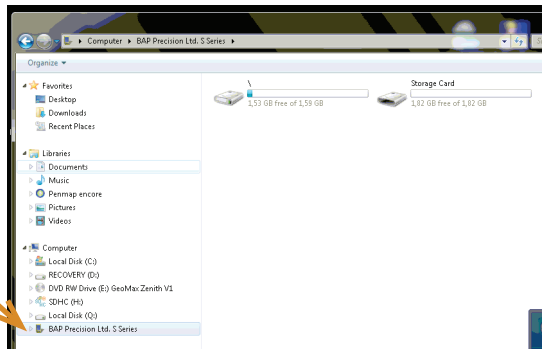


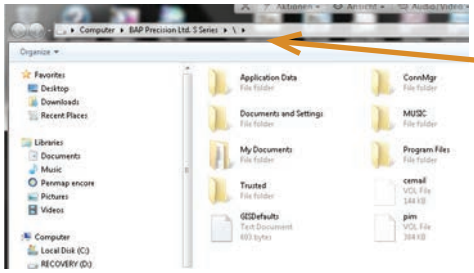
Depending on the model of your unit you may have either only internal memory, or possibly internal memory and a storage card. You can then decide where to install GIS360.



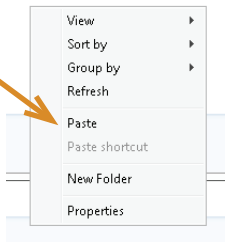


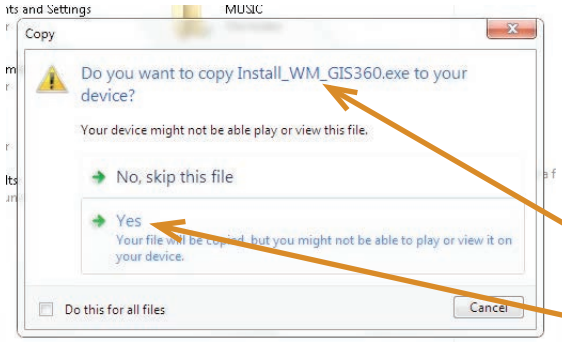
Copy both marked files required across from the PC to your WM device.

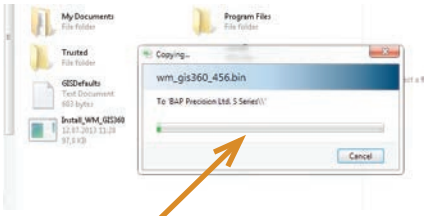




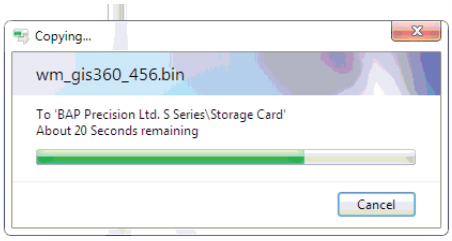
Set the appropriate location for the install files and drop them there

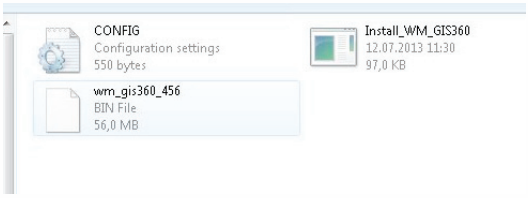






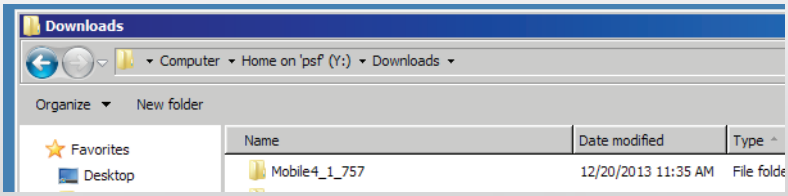
A window with a question will appear on your PC, please answer 'Yes' and your install files will be copied across to your WM Device



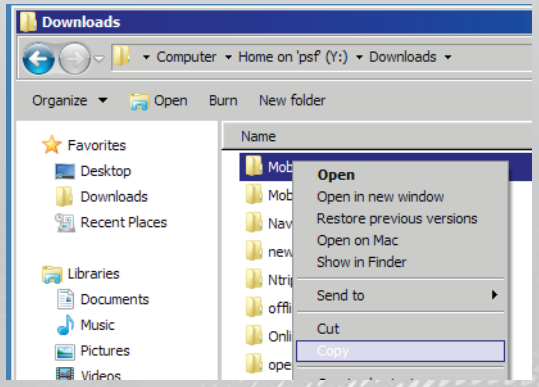


soon after your install files will be on your WM device, ready to perform the install procedure. This is described on the next page!

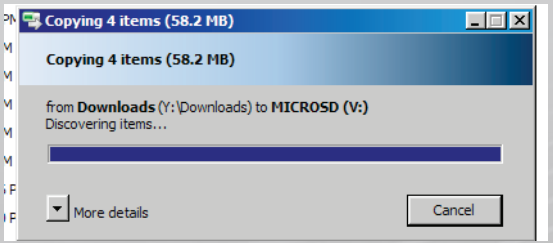
B) Installation on a Windows Mobile 6.5 unit using a Micro SD Card to copy installation files across to your WM Device



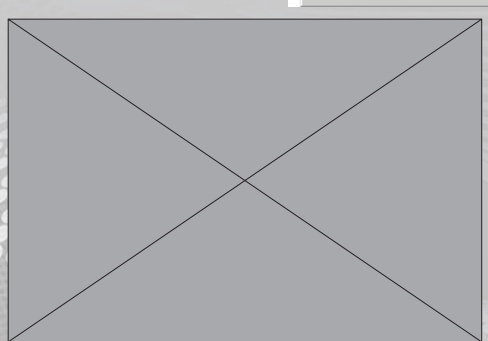
Please find where the install file is located on your PC now



Copy it and then...

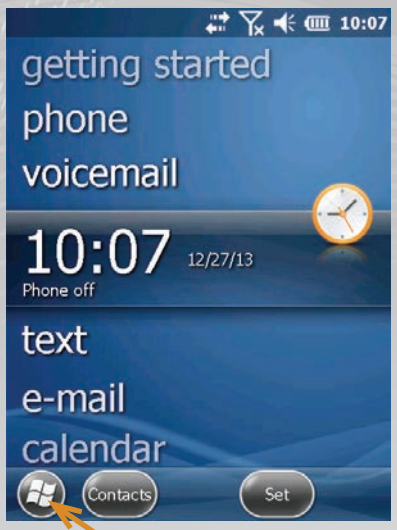


...paste it into your Micro SD Card

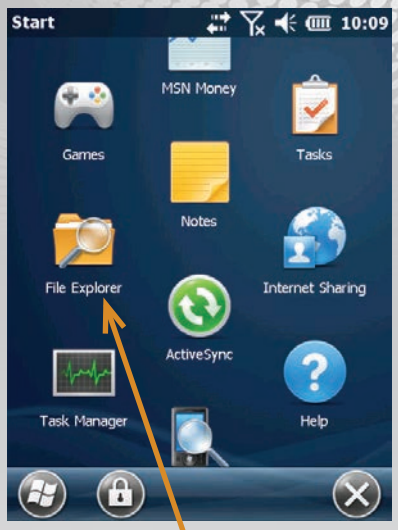


you only need to take your MicroSD Card from your PC and transfer it to your WM device and start EXE file and the installation will start

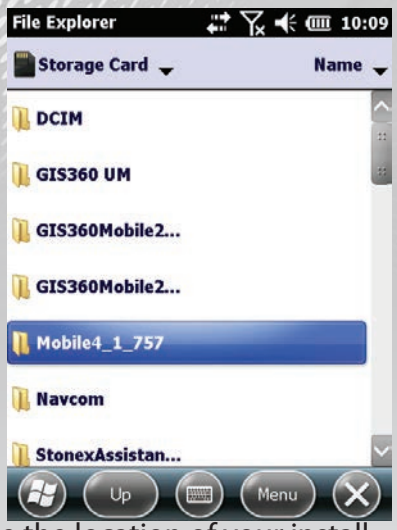
GIS360 installation (First or second time)



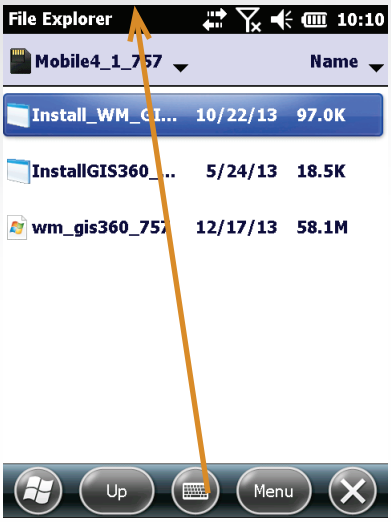
After the successful transfer of install files to your WM device, you can look at your WM device screen and press the Windows Start button



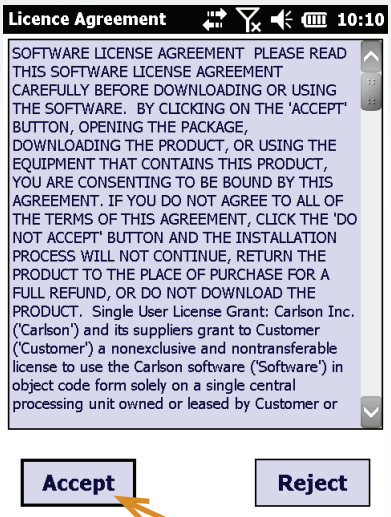
Find the File Explorer and click once



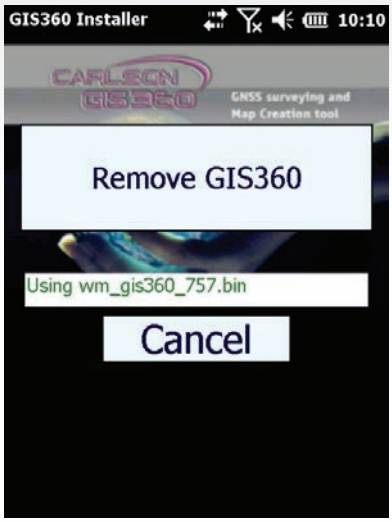
Choose the location of your install files, device or storage card (if available), then click once on the directory under which you saved them.



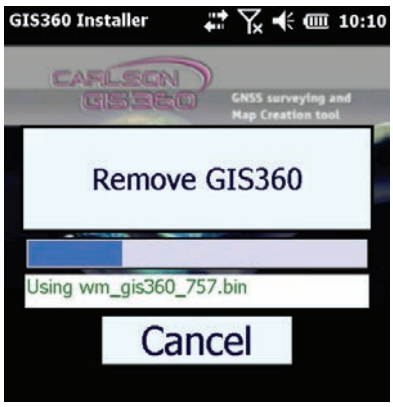
Choose the location, device or storage card (if available), then click once on "Install_WM_GIS360.exe"



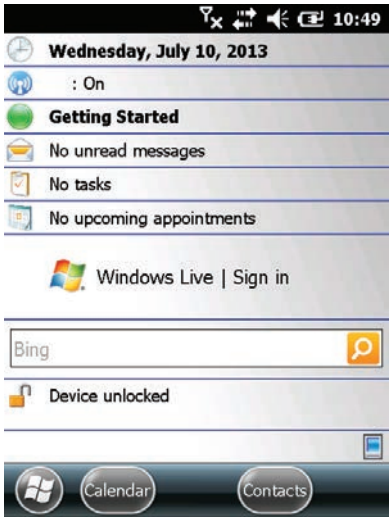
You need to accept our License Agreement

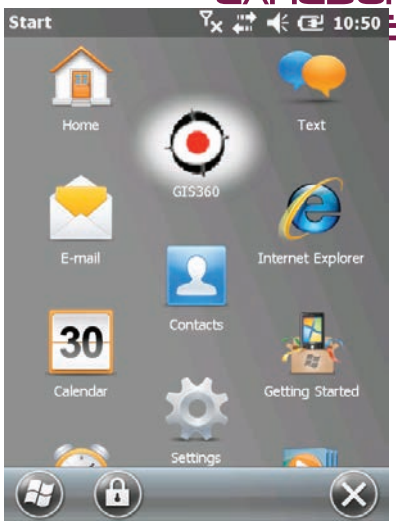


In case GIS360 is already installed on your device, you must first remove it before installing a new version.



After removal you can choose a place where you wish to install GIS360. This normally depends on the memory size of your unit.

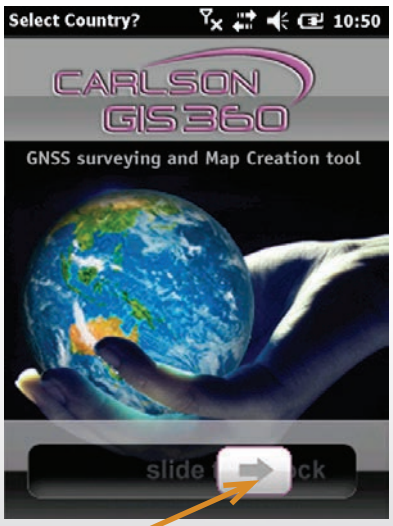




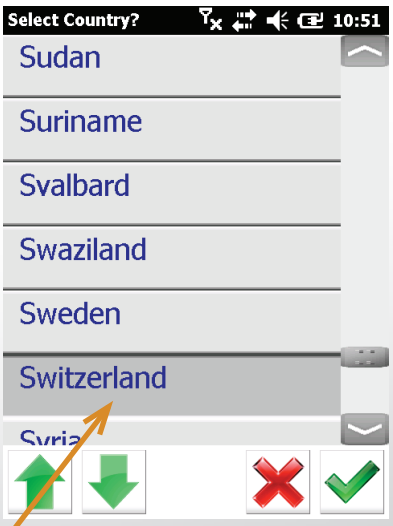
The installation is in progress and will take up to few minutes, depending on the processor speed and free memory on your particular device. As soon as the installation process is completed your unit will be rebooted, and you will see the following screens

GIS360 First time launch

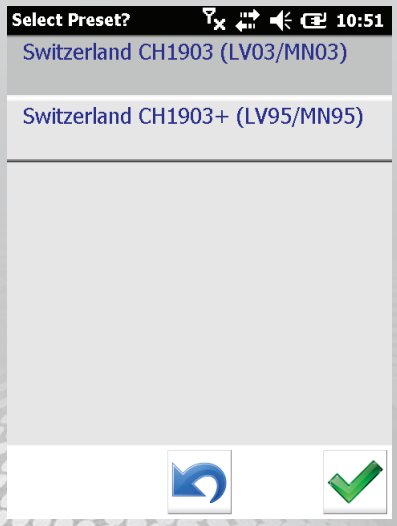
Click once on the GIS360 icon to start

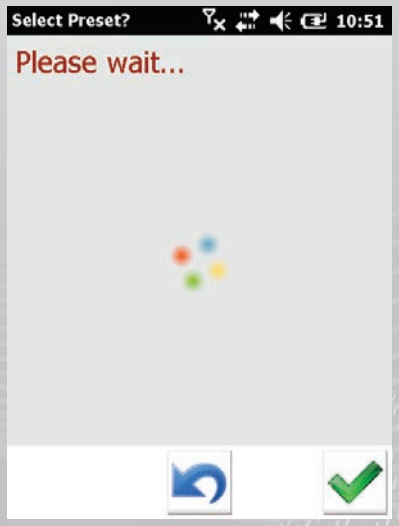


Click here to enter the program

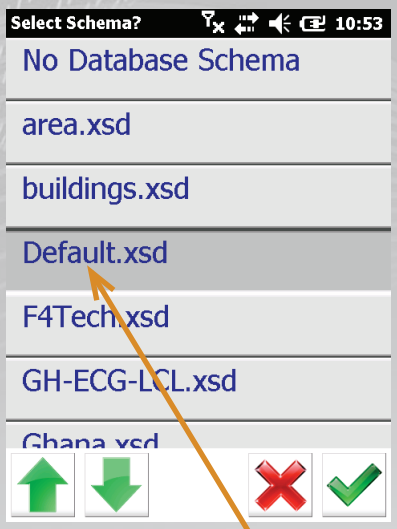


Choose your country from the list

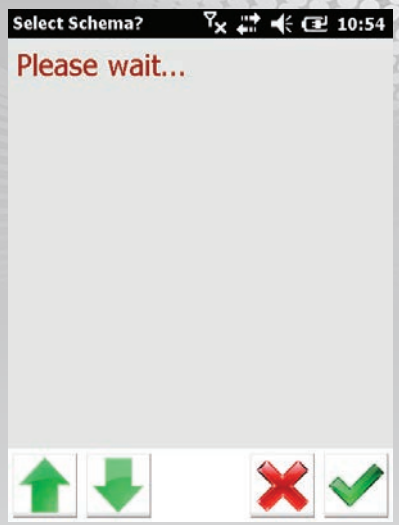




You will now be guided through the steps that will enable you to configure GIS360 according to your requirements.



Choose an appropriate schema. More details about schemas later



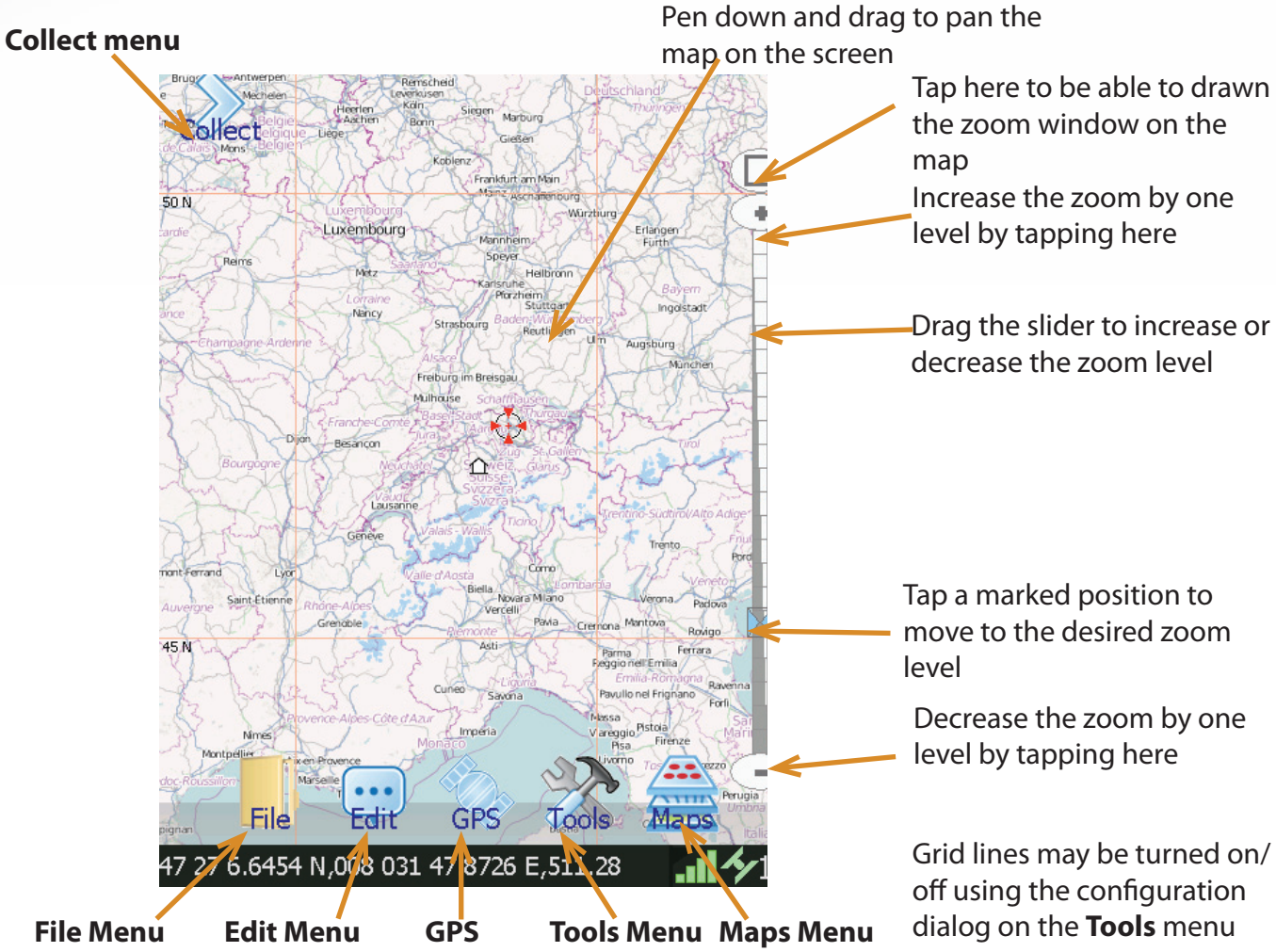
And now you are almost ready to use GIS360, maybe for the first time.

This is the final screen after the GIS360 launch, with your desired settings and maps. Now we will set up the parameters to allow GIS360 to work with your GNSS receiver. To do so, enter the Tools menu

Special note: Whilst every effort has been made to keep up to date with the most recent version of the software, some changes inevitably will be made before the manual changes. Please keep up to date by downloading the most recent manual from our site or from GIS360 FTP server.

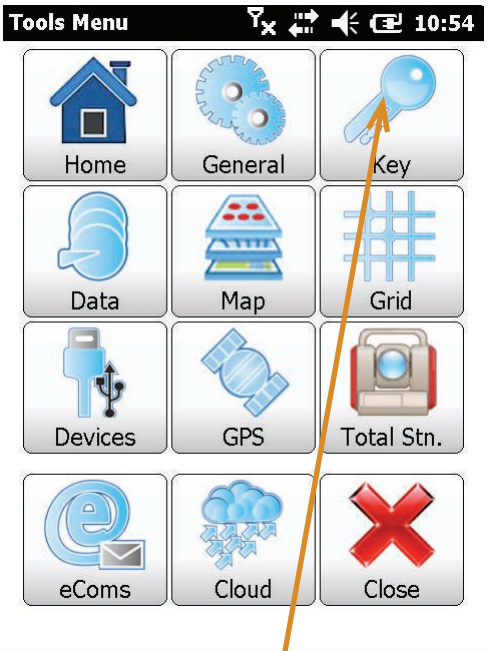
Basics

GIS360 is an intuitive Software with an easy to use main menu screen. Here are the main functionalities. The menus will be explained in detail in the following pages.

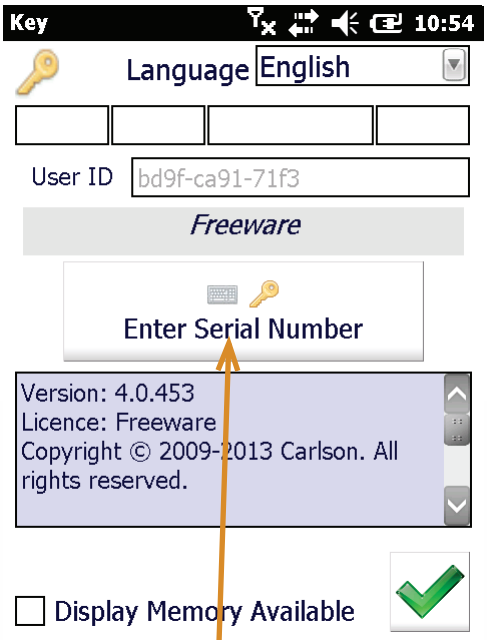


GIS360 - Enter Software key

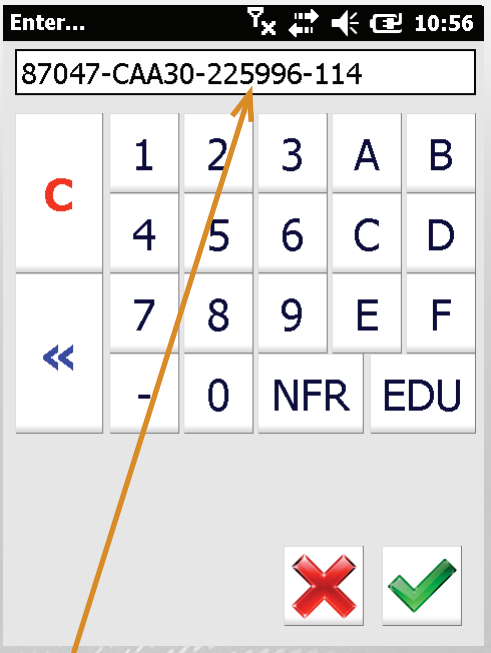
It is essential to first enter your software key, in order to enable all GIS360 functionalities.



In the Tools menu, go to the "Key" tab. Click "Enter Key"

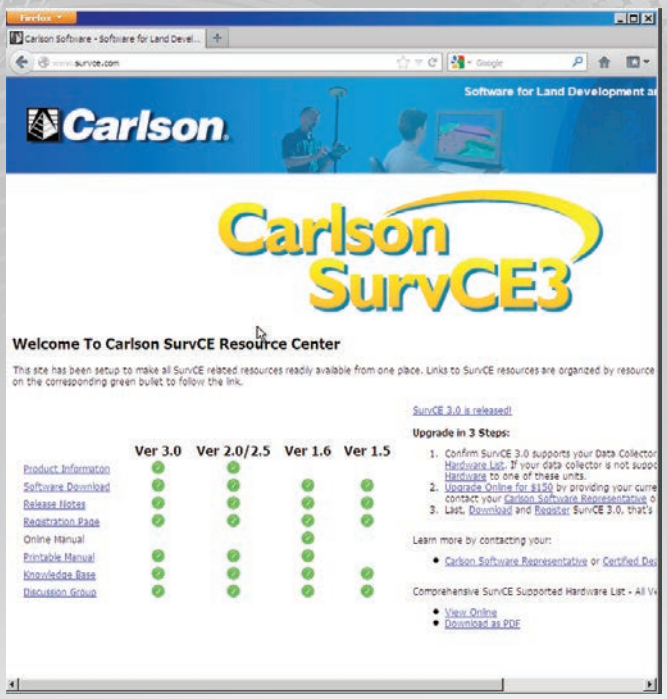


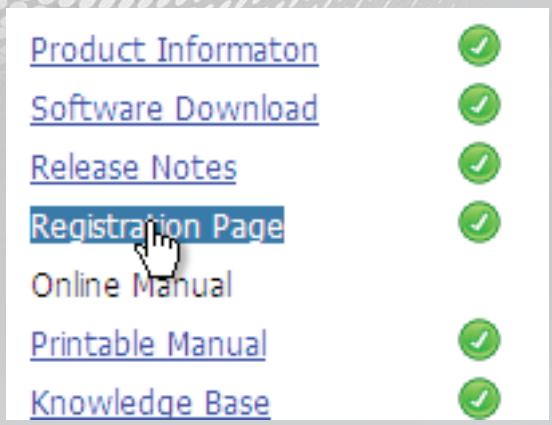
Press the Serial Number button in the highlighted green field first.



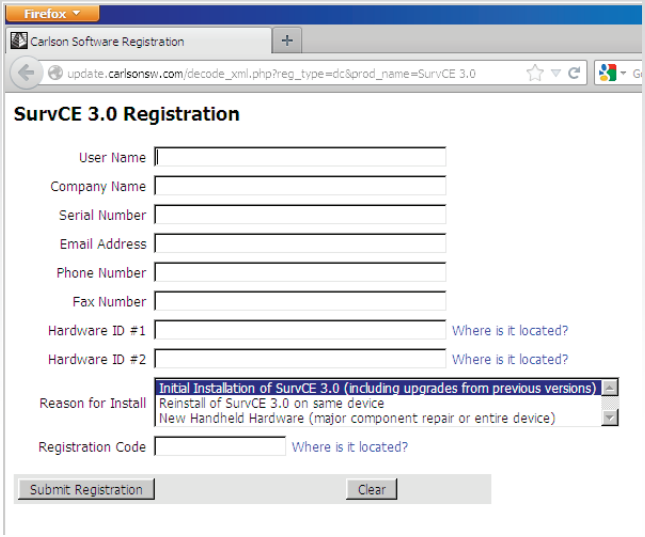
Now please enter the required and purchased Serial Number

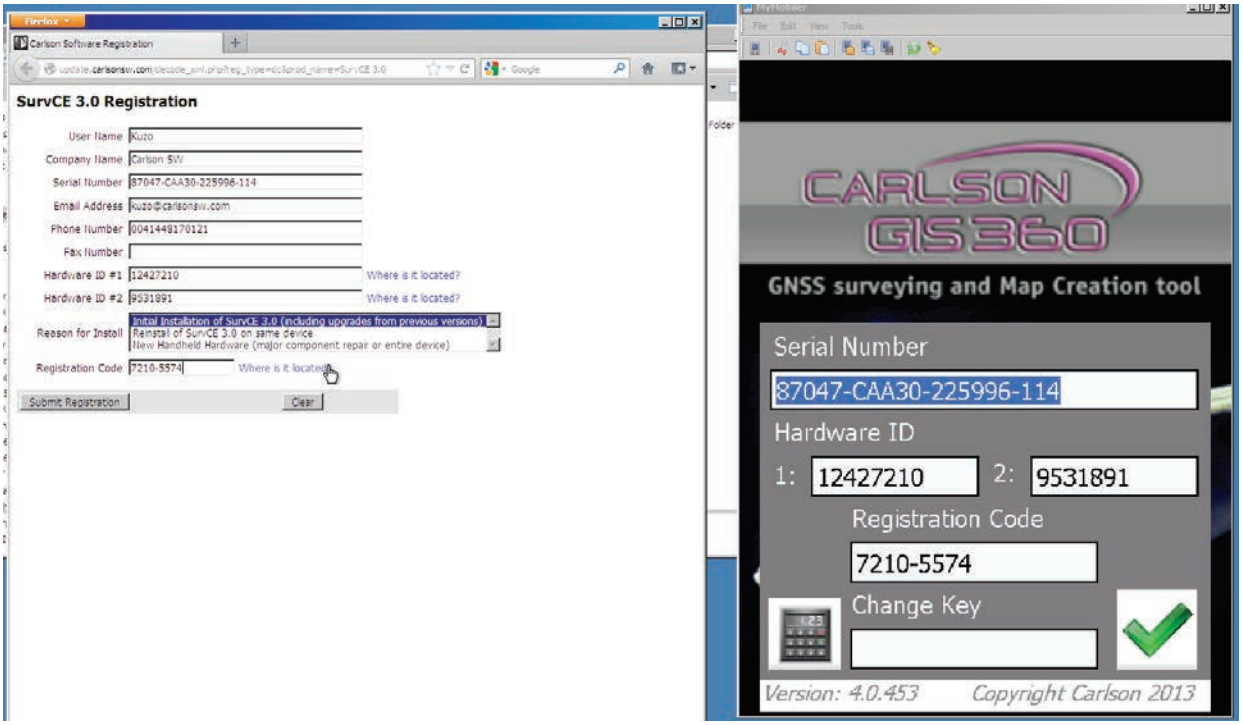
In the "About" tab you can see that you are now using a full license.



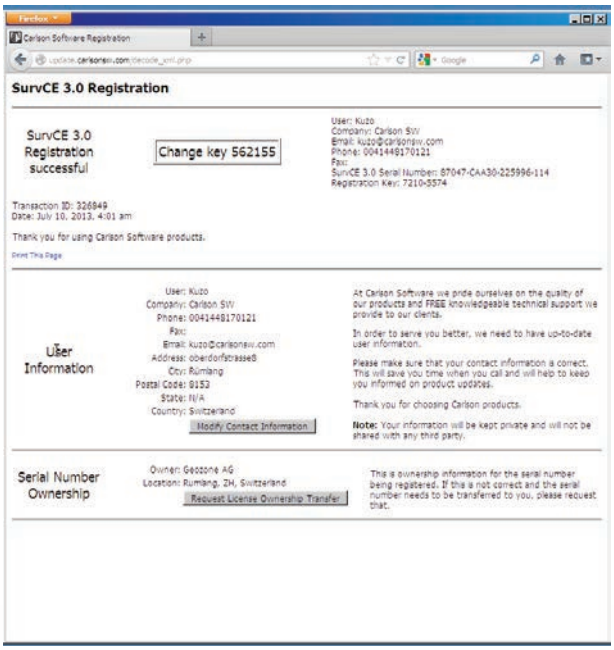


After the purchase of a GIS360 license please go to www.survce.com and click on the registration page. A new window will open: please fill in all the information required.

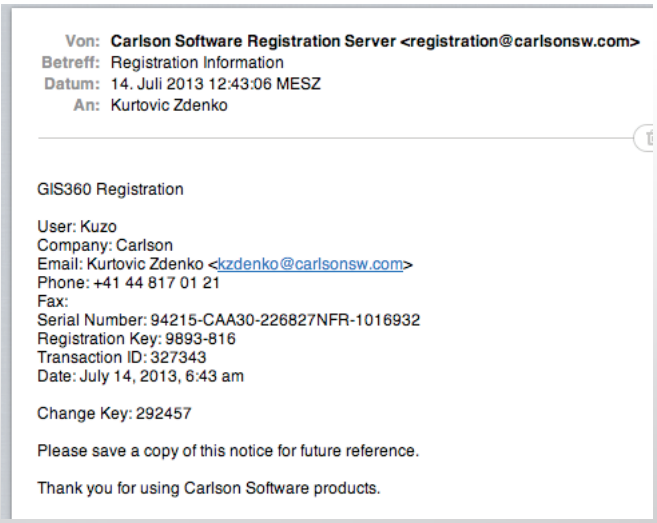




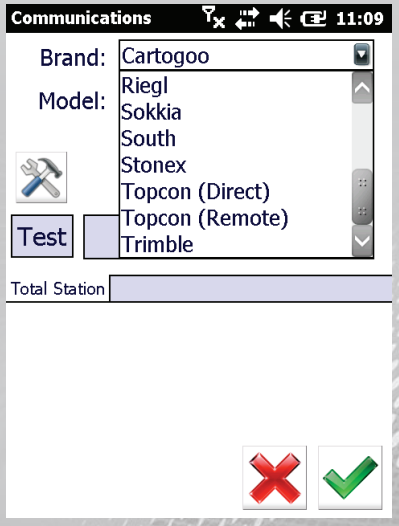
Now you will be also requested to enter the Hardware ID 1 and 2 and your Registration Code. Entering those three numbers from your field unit is the requirement for getting the Change key, which you need to enter in your field unit to activate your license key.

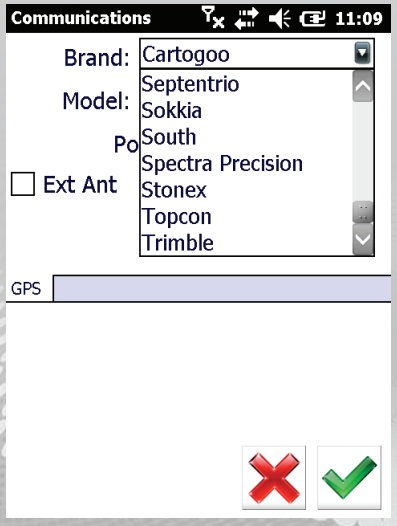


After entering the three numbers required, a new window will appear on your PC and you will see all of your data, plus the desired Change key. If you are using active sync and myMobiler please copy and paste the change key into your field unit. Now is registration process finished and you can start to use GIS360.



After successful registration you will also receive an email recording your change key.





The first evidence that your registration was successful is the fact that from now on all available GPS drivers are listed and not only the first 15 entries. To be able to check this please go to Tools/Devices/GPS. If the registration was not successful for whatever reason you will only see a few NEMA drivers listed.

GIS360 First time launch - GPS/GNSS Settings - Communication ports

We can distinguish between GNSS settings with DGPS or RTK units or simple NEMA settings with low cost GPS recievers or PDA's with build in GPS reciever. Please find first **NEMA settings** instructions:

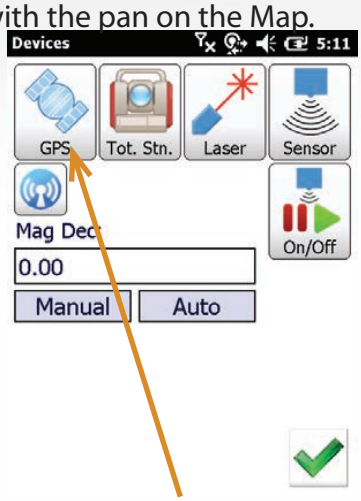
First let us put our HOME symbol on the map. Please press on the main screen Tools icon and then HOME

New windows will appear and please press now Set Home icon

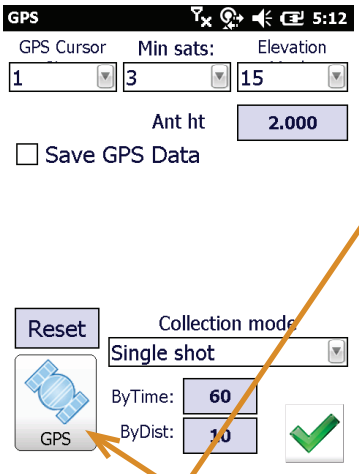
Now you will be asked to click on new home position simply pressing with the pan on the Map.

To start NEMA settings please press the Tools icon the the main screen.

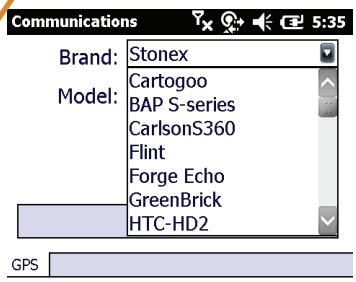
Then please press Devices icon.



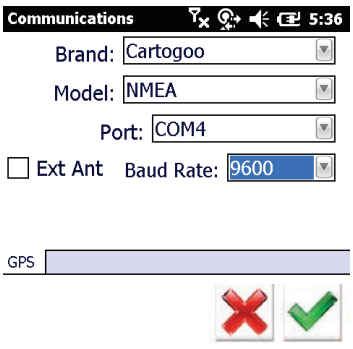
Then press GPS icon.



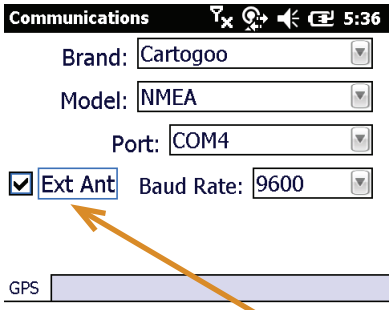
Alternative way to press GPS icon and then again GPS icon



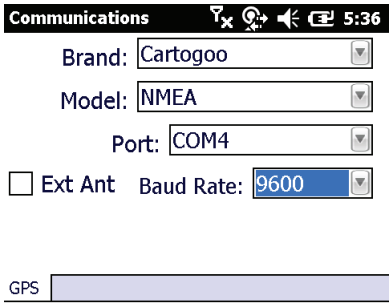
In the list of NEMA devices we have preset of few tested devices.



If you device is not preset please choose Cartogoo driver, Model NEMA. Port and Baud rate is different from unit to unit.



Port and Baud rate for your deive you can find in the user manual of the device



If your device has external antenna connector and you wish to use it you need to check it

Final proof that your settings were correct is the cursor on the map and number of satellites and singal Qual.

GIS360 First time launch - GPS/GNSS RTK Setting-Communication ports

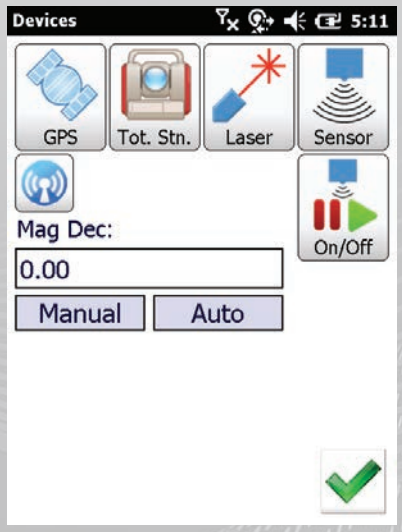
First let us put our HOME symbol on the map. Please press on the main screen Tools icon and then HOME

New windows will appear and please press now Set Home icon

Now you will be asked to click on new home position simply pressing with the pan on the Map.

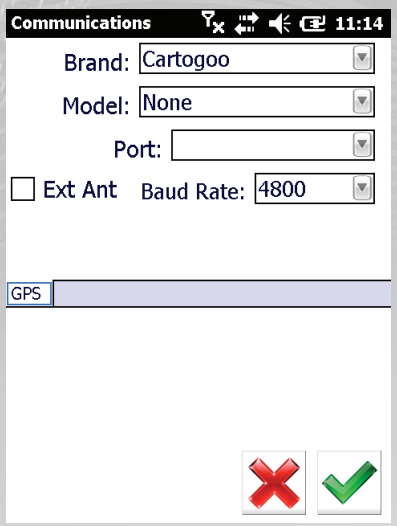
To start NEMA settings please press the Tools icon the the main screen.

Then please press Devices icon.

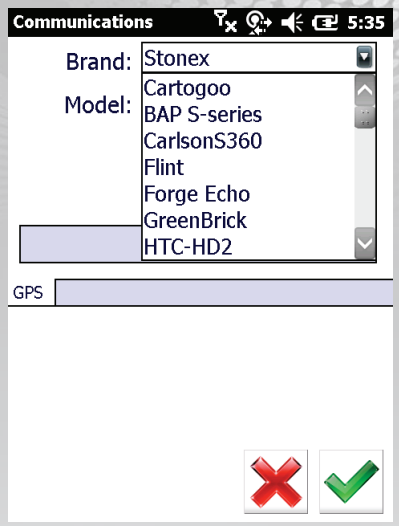


Then press GPS icon.

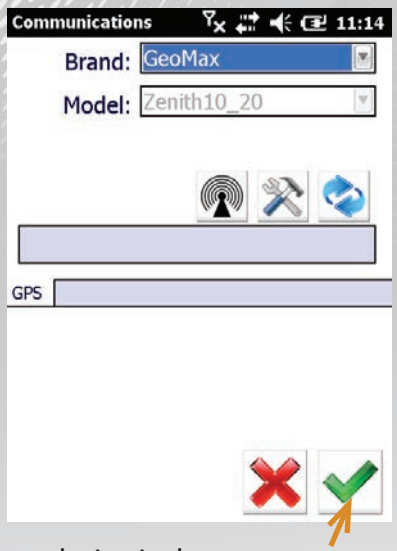
GIS360 First time launch - GPS/GNSS RTK Setting-Communication ports



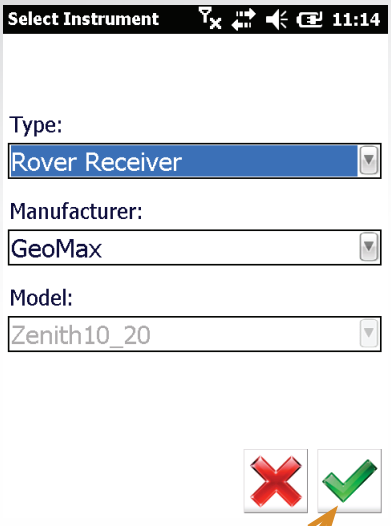
Alternative way to press GPS icon and then again GPS icon



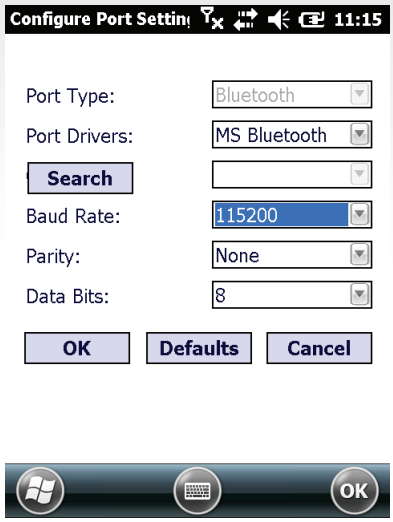
The list contains all supported RTK devices, if your device is not on the list please contact..... dealer/ Carlson



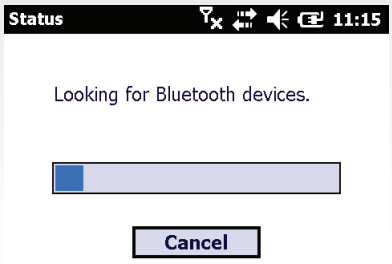
When you choice is done press green check icon

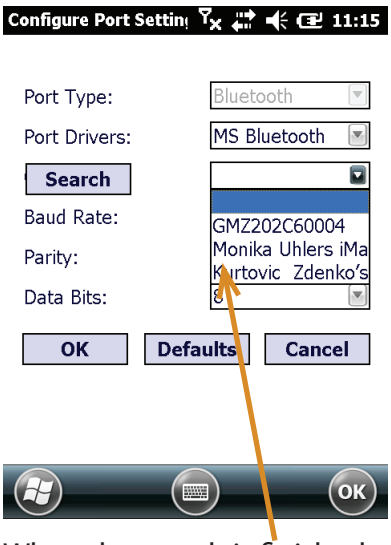


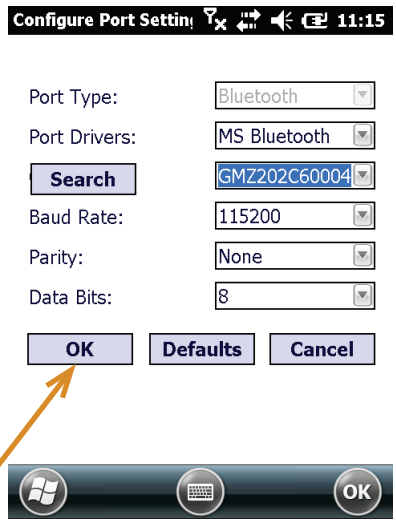
Now you will be ask to confirm your choice with Green check

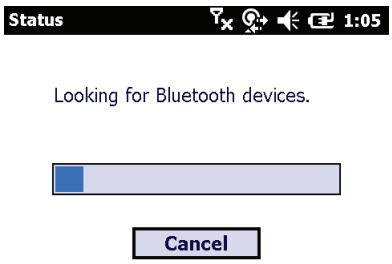


Now you will be ask to choose either Bluetooth or Serial connection. Please set Bluetooth and press search button. GIS360 will look for your unit now .

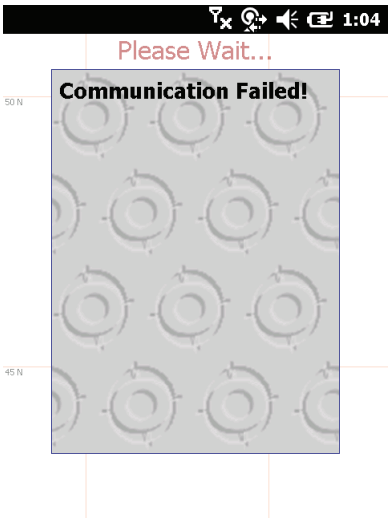




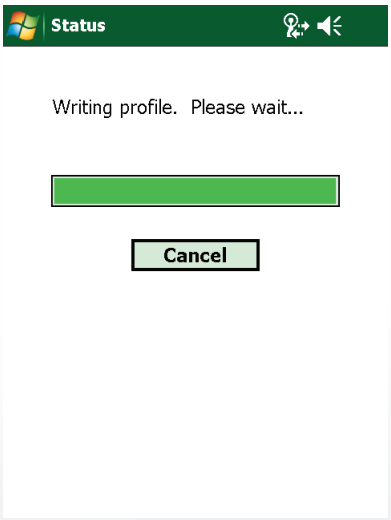




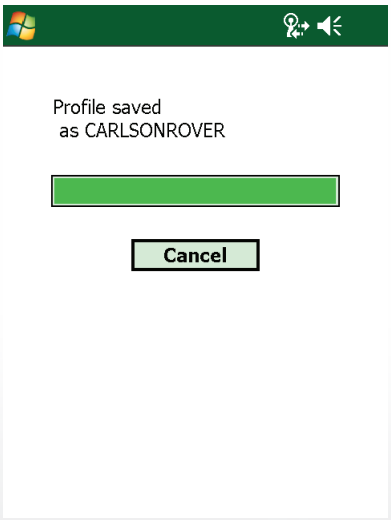
When the search is finished you will see all found devices. Please choose your unit and press OK.



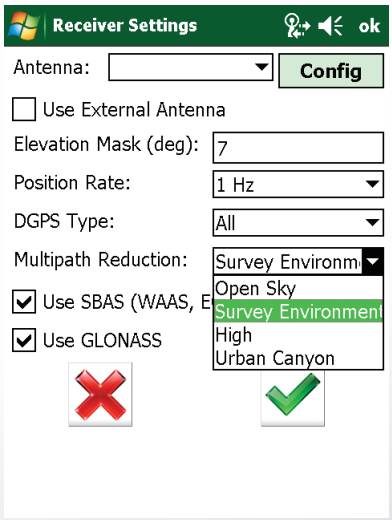
After few seconds GIS360 will either find your unit or maybe not.
If not please check again communication paramters.



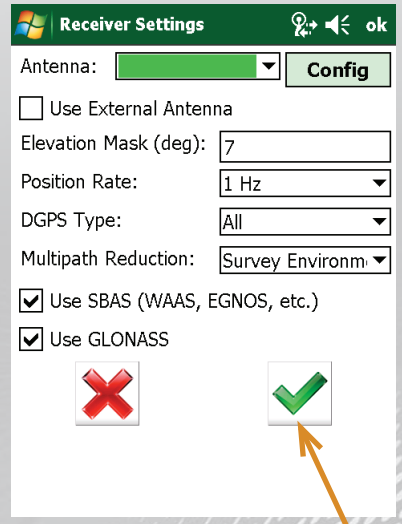
If initial communication was successfull GIS360 will continue "reading" informations from your GPS device.



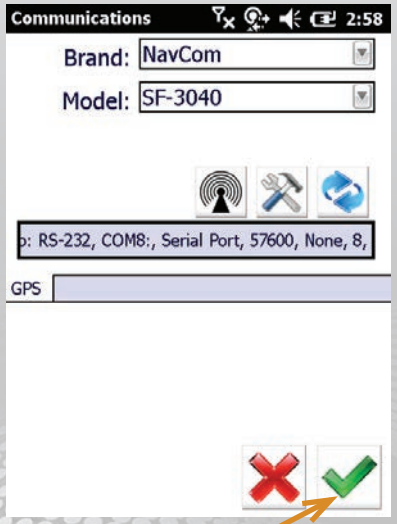
Dependend on the type and brand of the device you will see maybe different window, but basically sense is the same.



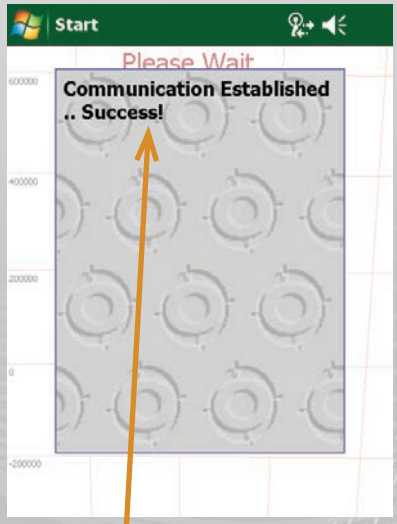
In this window you will get predefine choice of settings and if needed please set appropriate to your need.



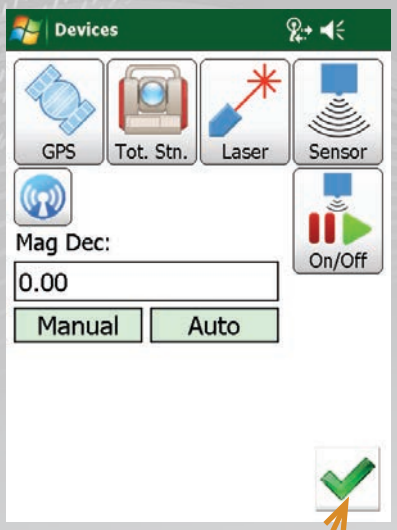
When done just press Green check



If all OK just press Green check



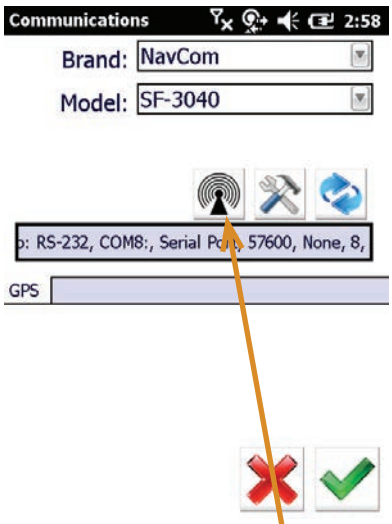
And you will see that communication with your unit was successful.



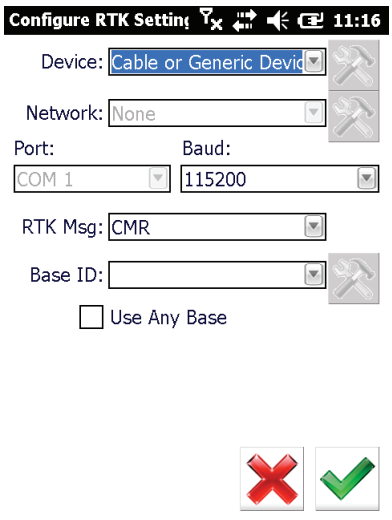
When done just press Green check

Easy way to see if you have your RTK or DGPS correction is to count signal strenght bars. 2 stands for DGPS, 3 for Float and 4 to RTK FIX. In those two screens you see only 2 bars, while making this user manual we used also unit with Star Fire capability.

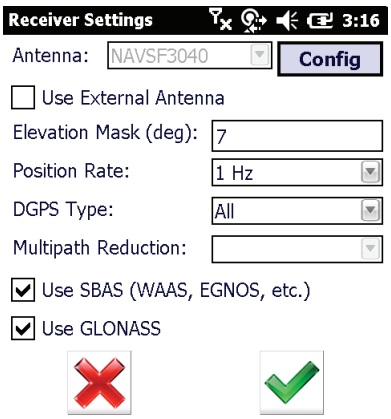
FEW REMARKS: StarFire™ is a Wide Area Differential GPS System
Originally, a set of regional wide area DGPS networks providing high accuracy service over independent continental areas Known as WCT (Wide Area Correction Transform)
Coverage for USA, Australia, Western Europe, Central & South Americas
Over time, it transitioned to a robust, unified global network
Uniform, 5 centimeter, real time service for most of the globe
Based on technology known as RTG (Real Time GIPSY)
Developed by the Jet Propulsion Laboratory (JPL) for the National Aeronautics and Space Administration (NASA)
Does not have the restrictions of a classic DGPS
Distance from a base station is not a consideration
The corrections are based on data from all reference sites in the network, not just on one site
Throughput and range of the communications link are not problems
Corrections are delivered via satellite using global beams with very broad coverage

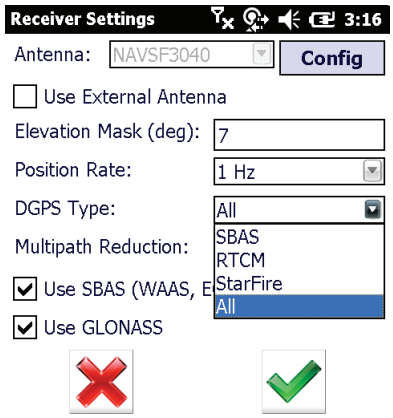


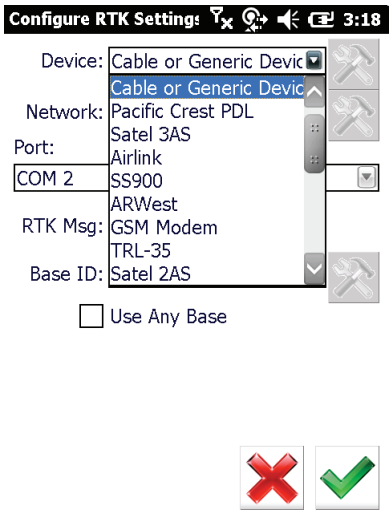
If you wish "more" then Star-Fire, please press this icon.



In this window you will be asked to set up RTK settings based on your own preference and your unit capability.

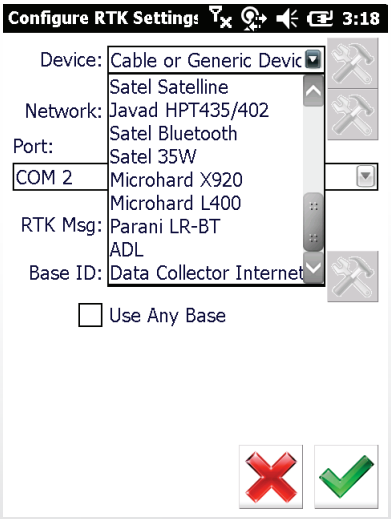


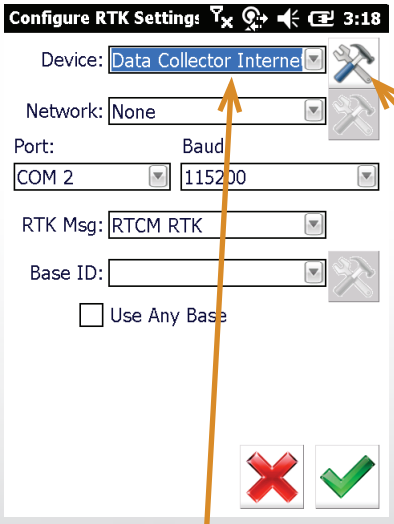


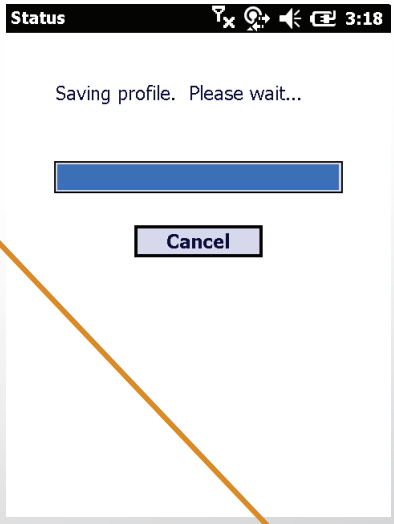


This two windows we saw on one of previous pages. And here is just as a reminder that you can set your elevation mask and if you wish to use Glonass, etc.

Please choose if you are using UHF Radio, or Internal or external GPRS modem.

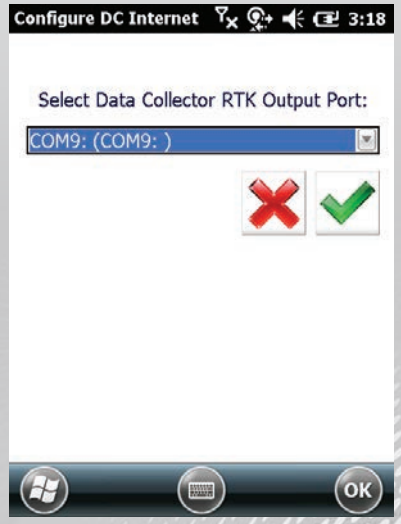


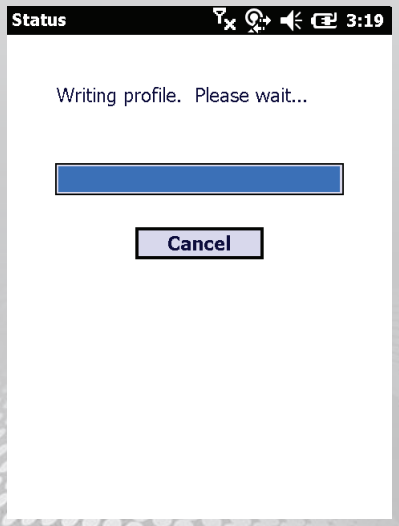


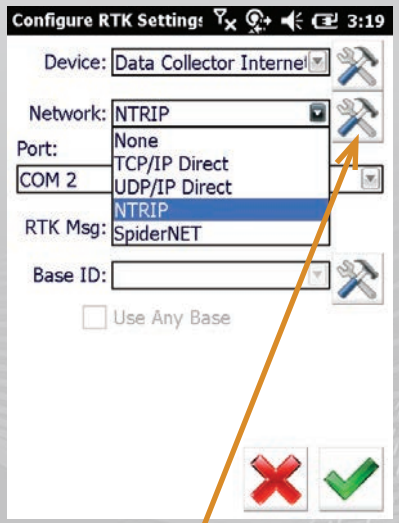


In our case our GPS/GNSS unit didn't had internal GPRS modem, we we decided to use GPRS Modem build in our PDA

Your profile will be saved. Now press please this icon

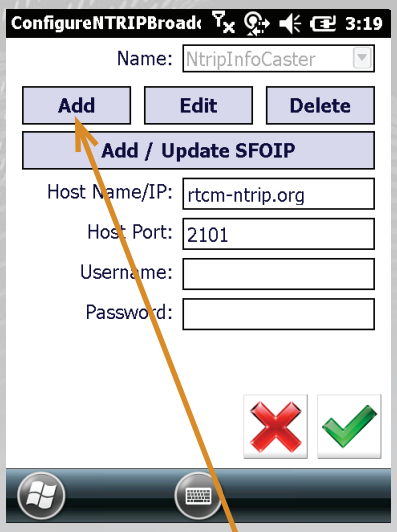




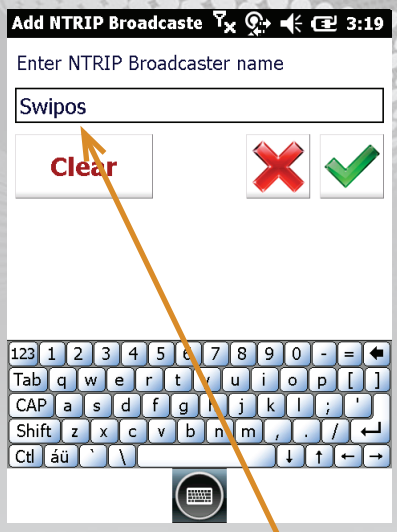


Please choose RTK output port

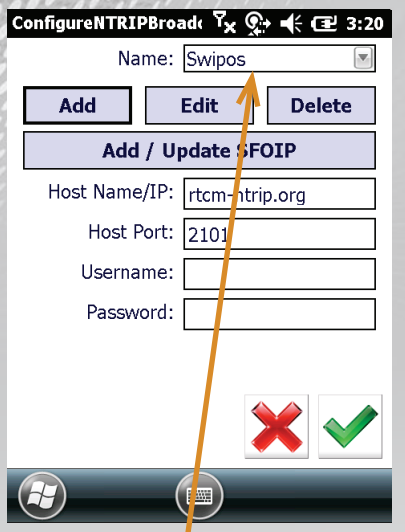
If you are using NTRIP please under Network select NTRIP, followed by pressing on this icon



In this window you setup the NTRIP or VRS network you use, this is done once and the settings saved.

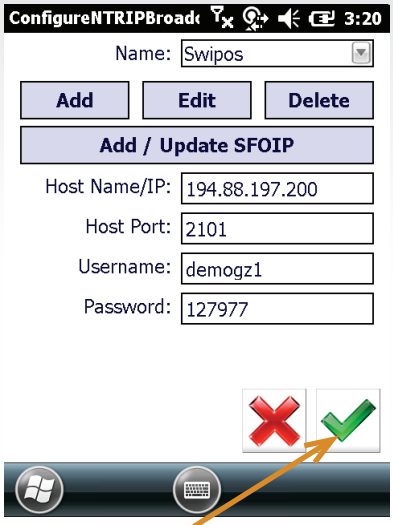


Enter the Name of VRS Network (can be any name).

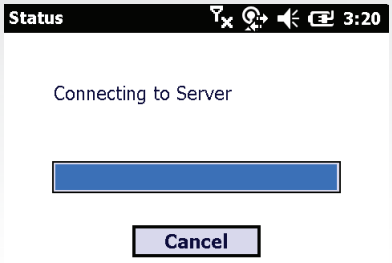


New entered name of your network will be now displayed und Name

Now please enter all other relevant informations, like IP, portusername and password.



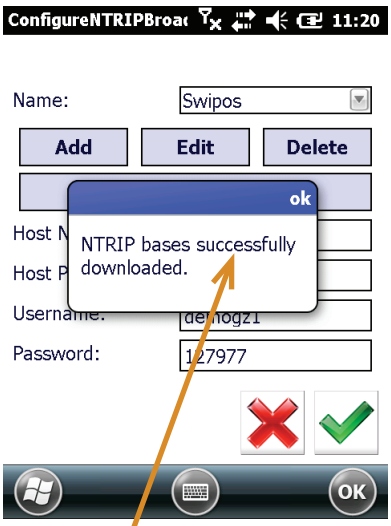
And press Green check



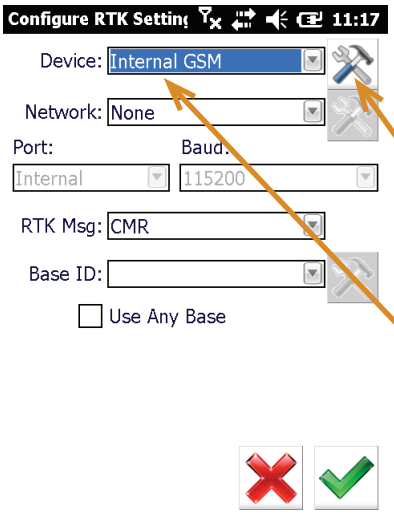
GIS360 will attempt connection the VRS server now.

Dependent on your Field unit you will see how are you connected to the internet.

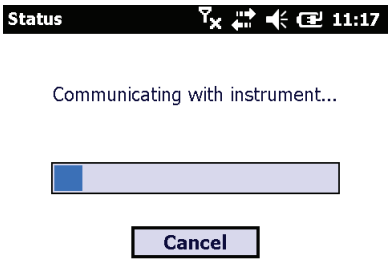
If some problem with the connection to the VRS server you may get one or other message.

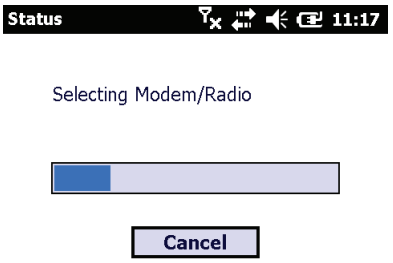


If your connection is OK you will be notify that Monut point are loaded.

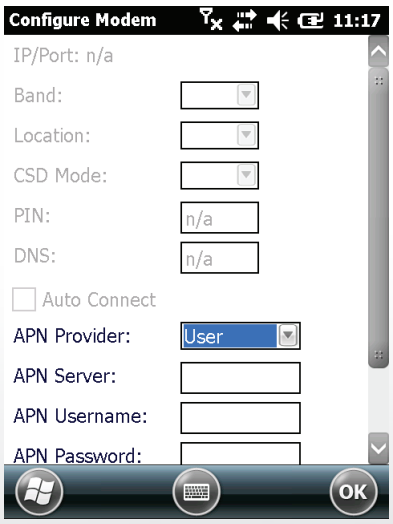


This section is to configure the internal GPRS in the device GIS360 is installed on

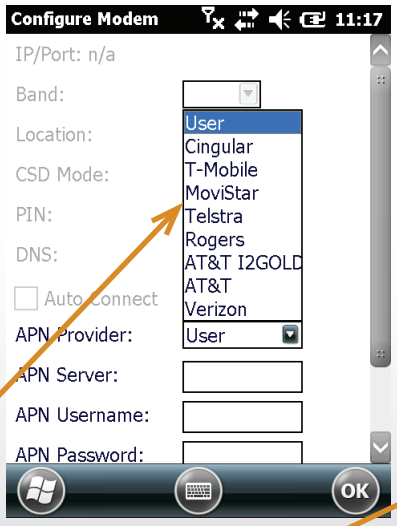


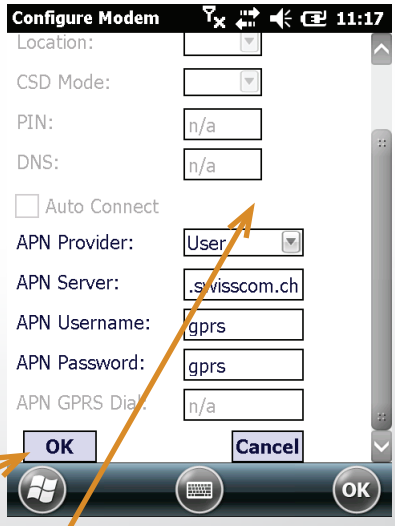


Please in the proposed list choose Internal GSM and press then this icon

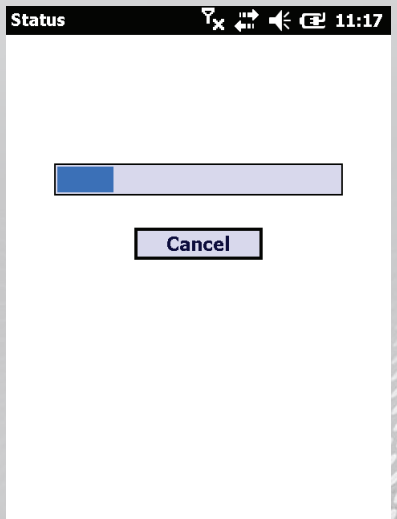


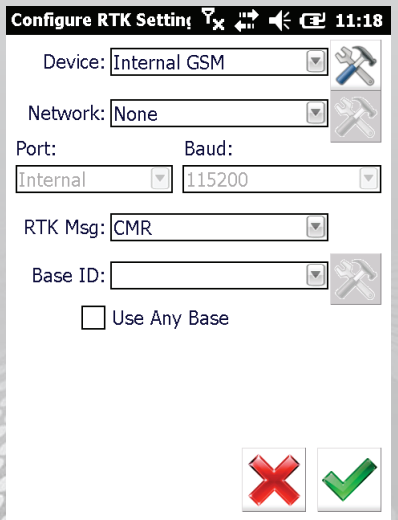
If your GSM provider can be found in the pull-down list of APN Providers please select it.

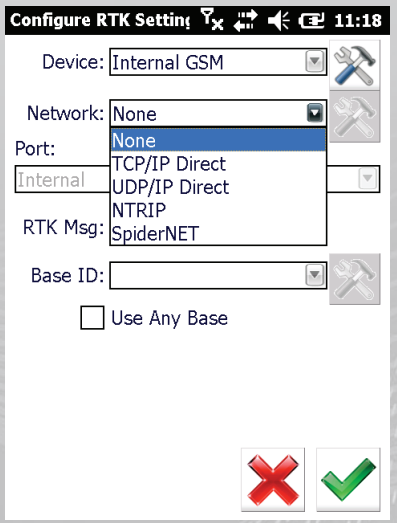


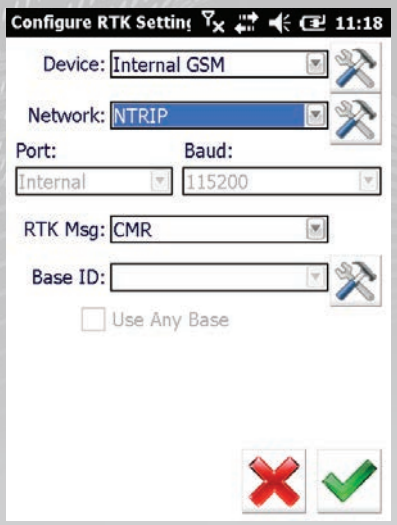


If not you can enter your provider settings manually. Just leave it at "User" and enter APN Server, Username and Password and then press OK.



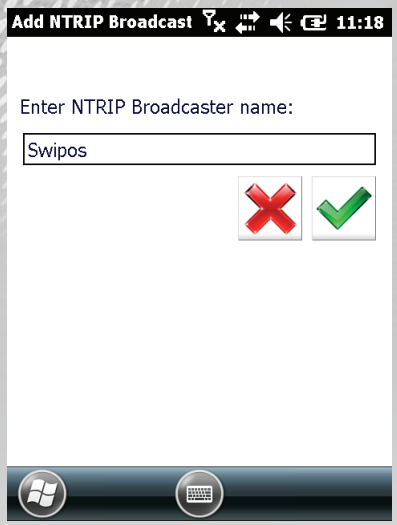




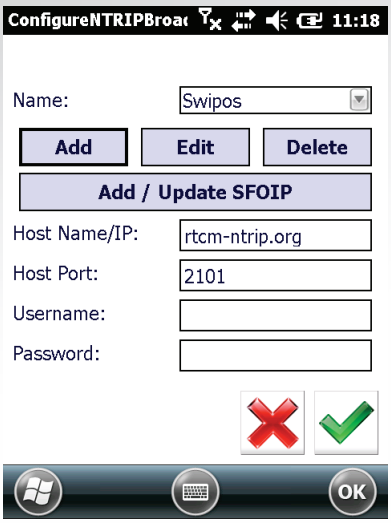


Now in this window you need to setup, only first time your access to NTRIP or VRS Network. Press on Add now

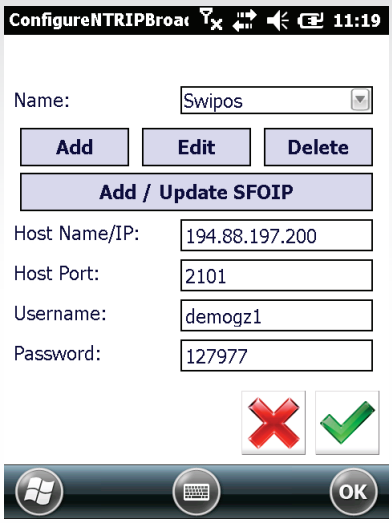
Enter the Name of VRS Network (can be any name).



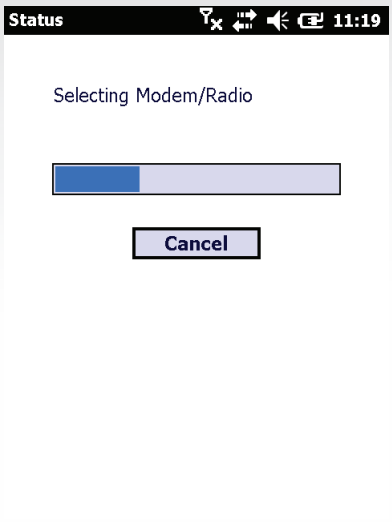
New entered name of your network will be now displayed und Name



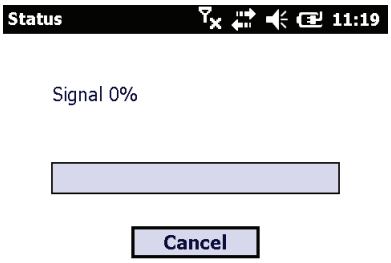
Now please enter all other relevant informations, like IP, portusername and password.



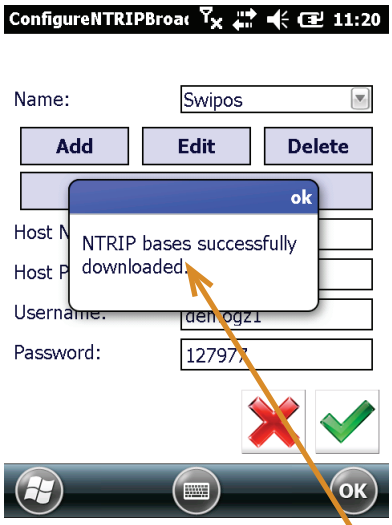
And press Green check



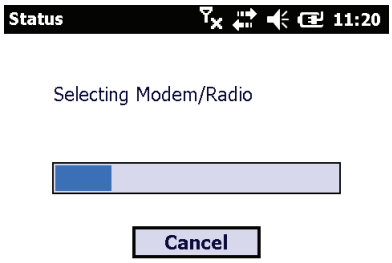
GIS360 will attempt connection the VRS server now.

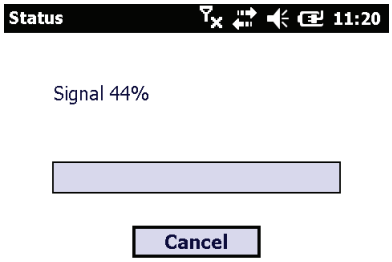


Dependent on quality of GPRS modem in your GPS and provider signal strenght you will see signal strenght in %.



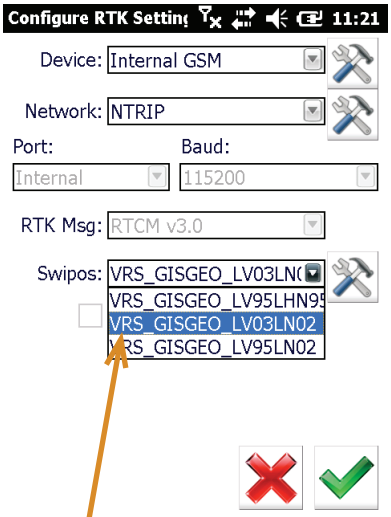
If your connection is OK you will be notify that Mount points are loaded.



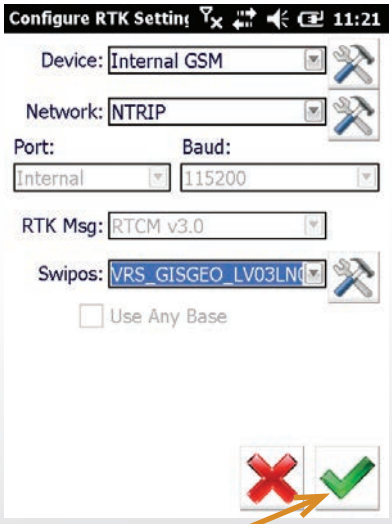


Dependent on quality of GPRS modem in your GPS and provider signal strenght you will see signal strenght in %.

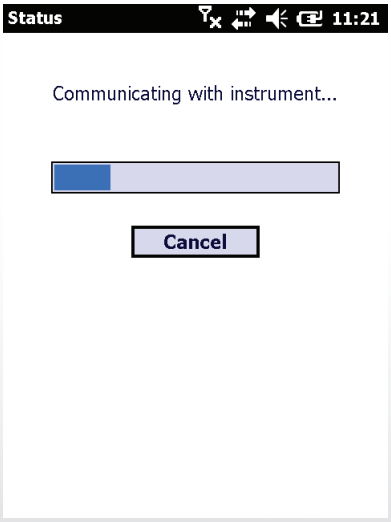
Press now Green check



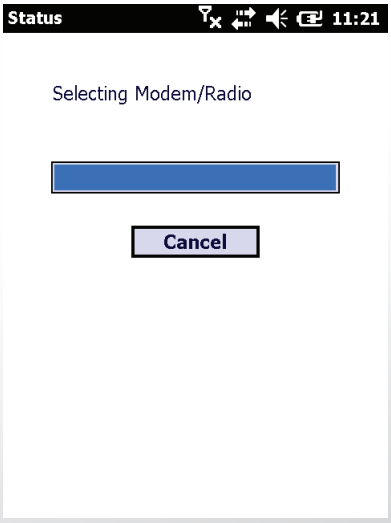
Please choose now appropriate Mount point

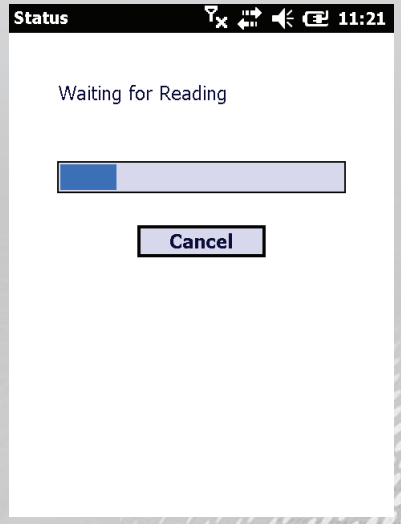


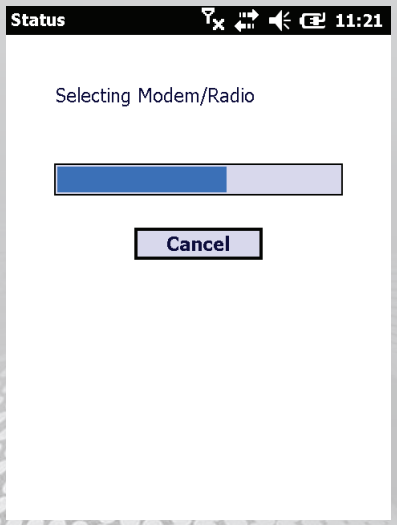
You are almost there. Press Green Check

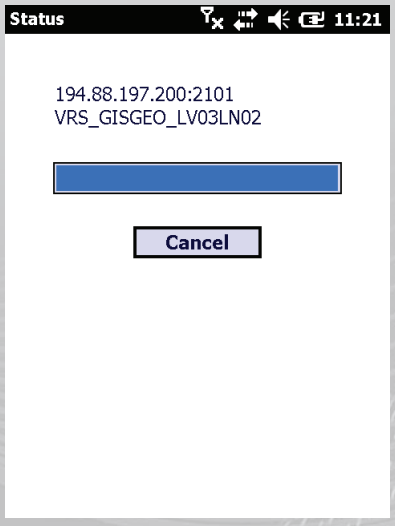


Unit is now connection to your VRS provider server.

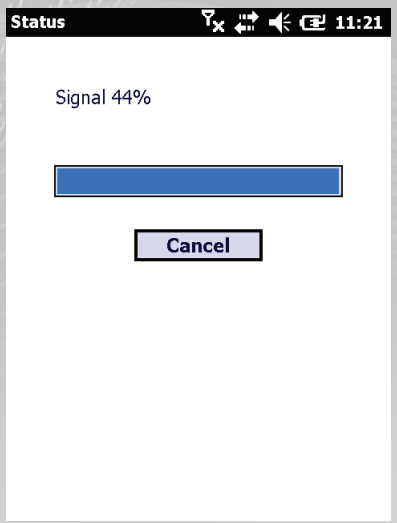








And after few seconds you should see IP, port and Mount points details.

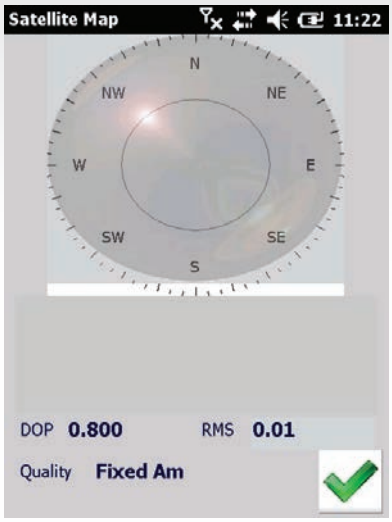


Signal quality will be displayed as well, in our case 44%.

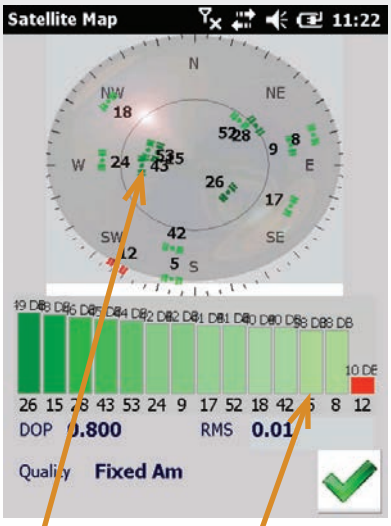
Map window will automatically come and last thing you need to press is the small Satellite symbol.

GPS cursor will appear on the screen and quality of GPS signal will be displayed in the bottom right corner of the screen.

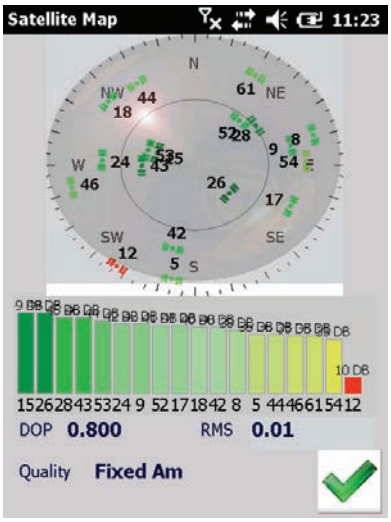
Usually only few seconds after main map window appeared you should see your full RTK signal strenght with 4 bars

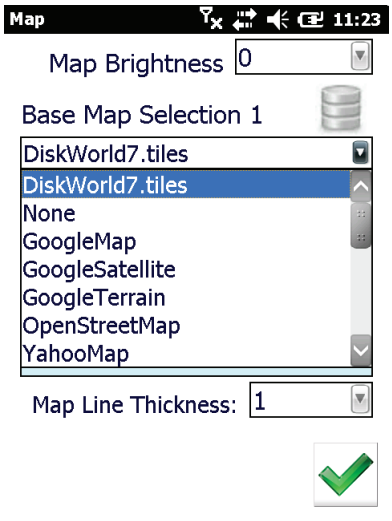


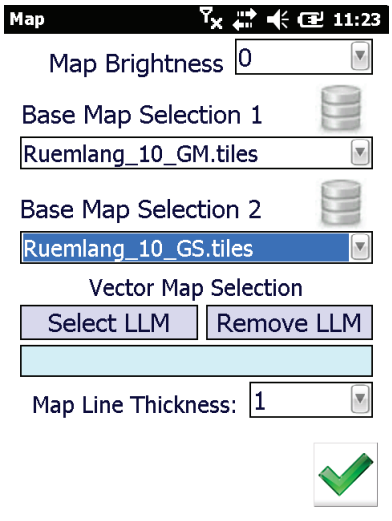
To be able to see you actual accuracy please press somewhere on the coordinate bar and this window will appear. In our case 1 cm

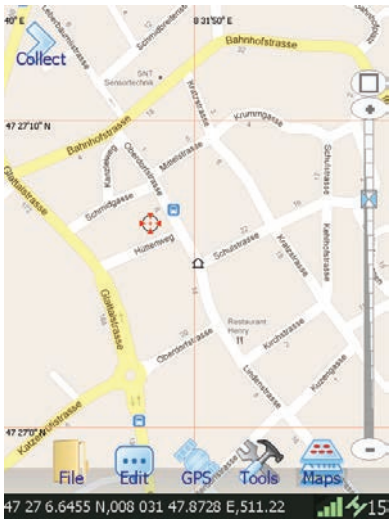


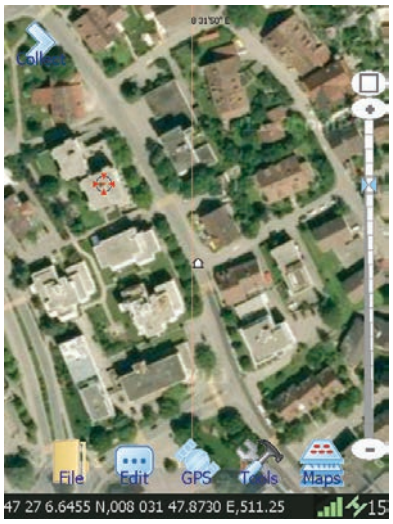
And after some 5 to 10 seconds you will also see sky view and signal strength and noise ratio.







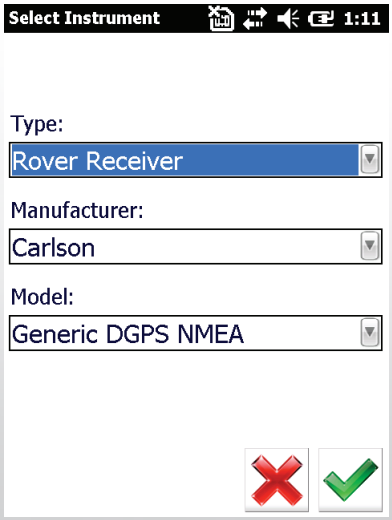


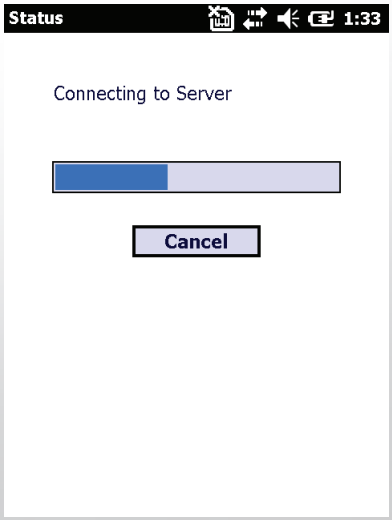


Load Maps
With internet connection

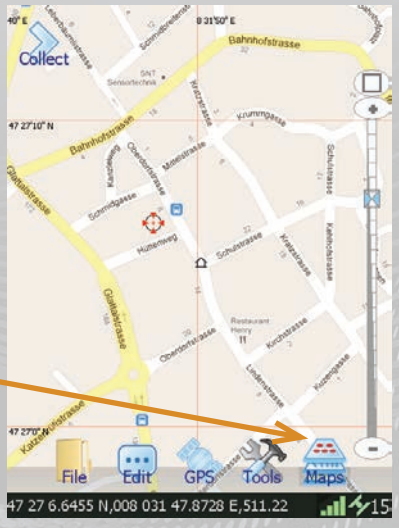
With an internet connection, WIFI or GPRS, GIS360 will load automatically the maps you have chosen. You only have to set the right parameters

For configuration, go to **Tools/Map**:





GIS360 allows you to have always 3 maps at hand, two layers with maps of your choice and also an empty map layer. You can switch between the maps by clicking on the "Maps" symbol.
The two maps layers offer many possibilities which you can define yourself.

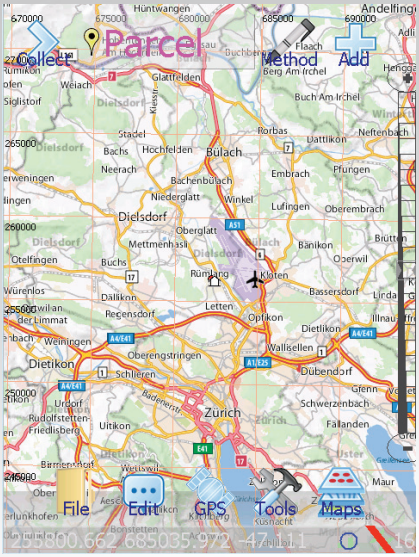


Load maps

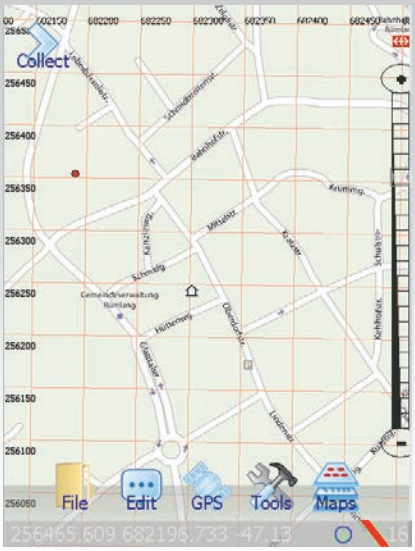
Without internet connection

If you need to go on the field where you have no internet connection, you will want to prepare your maps in the office prior going to the field.

Make sure you are connected with the net and have set the right parameters (see page before)



Reduce the zoom level in order to see the part of the map that is required.
With the pen, click on the GPS signal in order to have it switched off. Once switched off it will appear as in the next image with a red bar.



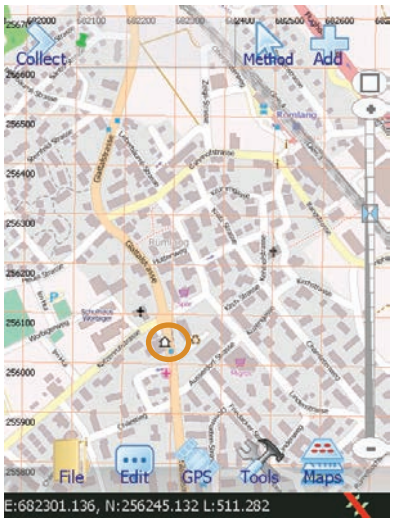
Move the map with the pen until you obtain the required view.

Important: You can load two different maps with GIS360. You need to save two maps, for instance "Maysville" for Google Maps and "Maysville_satellite" for Google Satellite.

Click on "Home" in the tools menu. you can choose

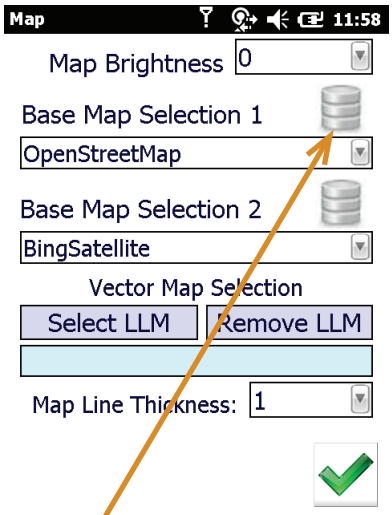
You will be presented again with the same map view as you had before. Now click on the exact position that you want to set as your home position.

Load maps

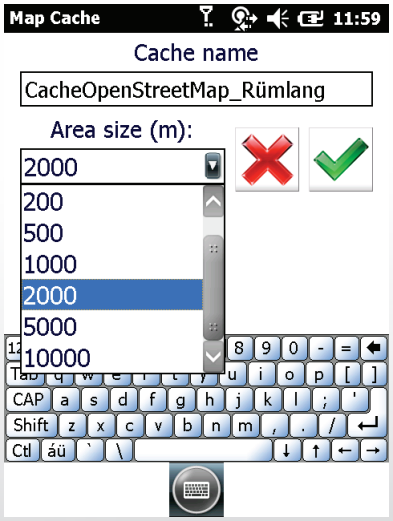


You can now see your new home position

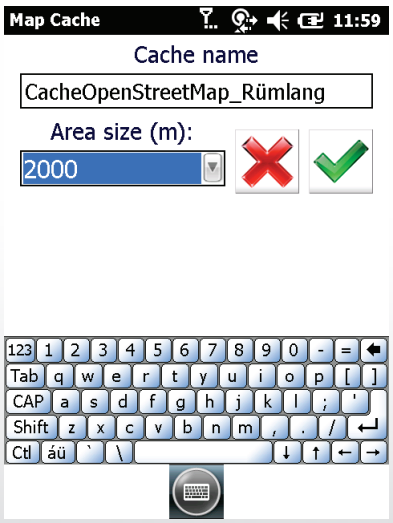
Now you can save maps around your home position in order to be able to work in areas without internet connection.



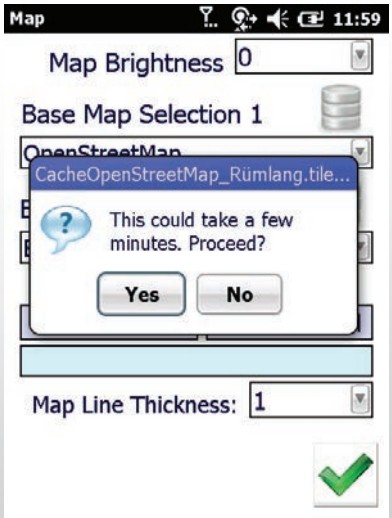
Save local area map: Click this button to save the tiles into a file for use in wireless blocked areas. The area fragment stored is a square of this edge length in metres.

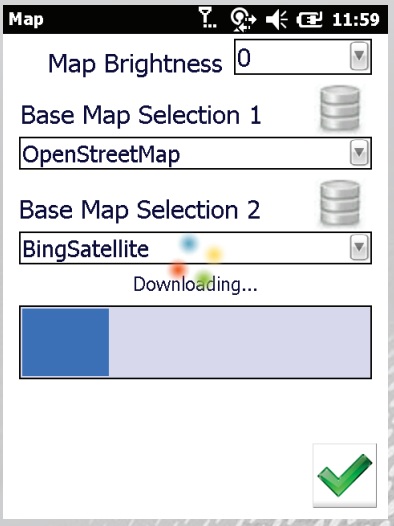


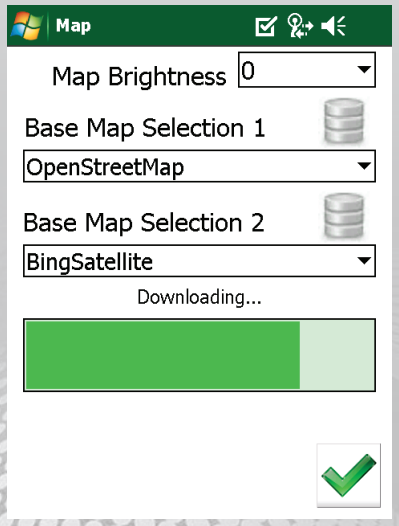
Choose the size of the background map

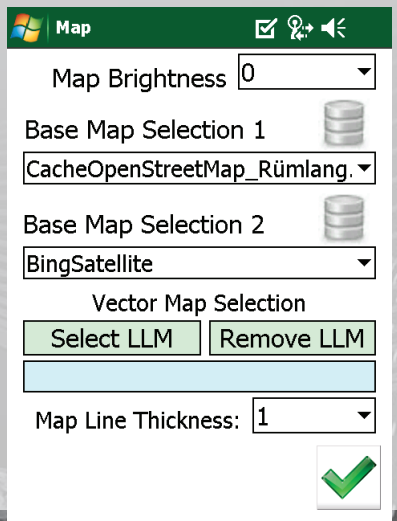


Choose the name of the background map before saving



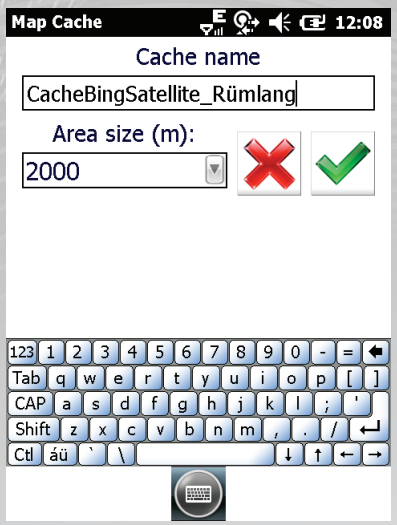


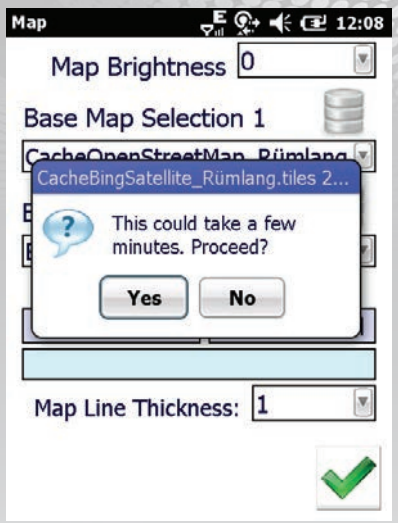


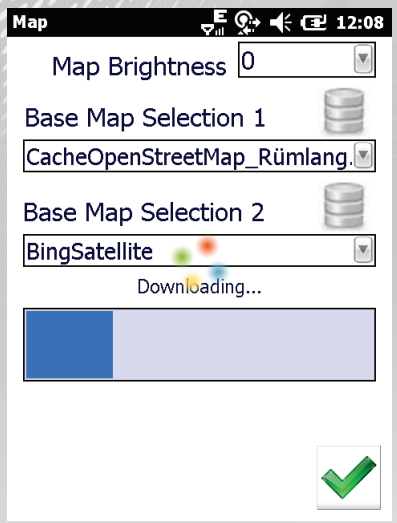


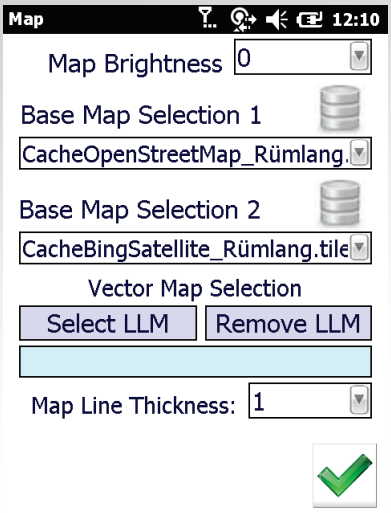
The Tiles are being saved so you can use these as maps in area with no internet access.

Load maps









The tiles are always saved into "My Documents", which is also where you shall put any tiles you intend to use.
You can now use these tiles or choose to use them later

Your map is loaded with the home position in the center.

And if you zoom out you should see that only limited map area is loaded, based more or less your desired map size, in our case 2000 meters.

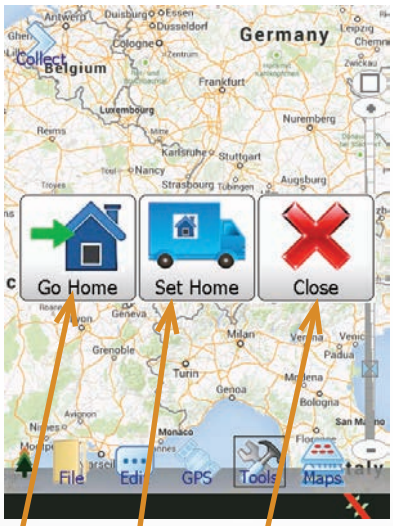
Since these maps have a definite area, moving the map around with the pen will show you the actual map size on the screen.

By pressing onto Maps icon you will now see your second map cache, in our case Bing Satellite map, once zoomed out and second time zoomed in.

Tools menu
Home Marker

Home Marker: The house symbol depicts the base position of the survey. When you start up or select **New Survey** it draws the map cantered around this point. This is the default position of an earlier session.
This marker can be moved. To do so, go to "**Tools Menu**".

Click on "Home Position"

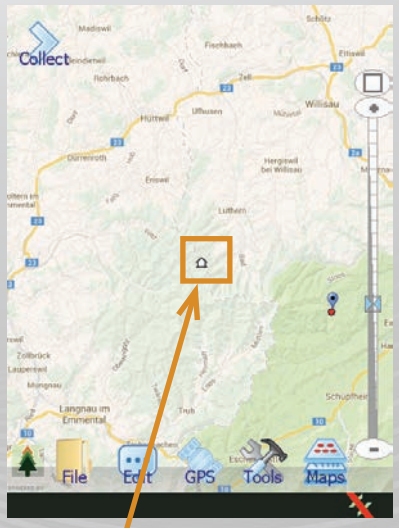


You have now three options, Go Home, Set Home or Close

If your choice was Set Home this window will come for 2 seconds, asking you to tap the screen at the position of the new home position.

Now you see the new position of the Home Marker

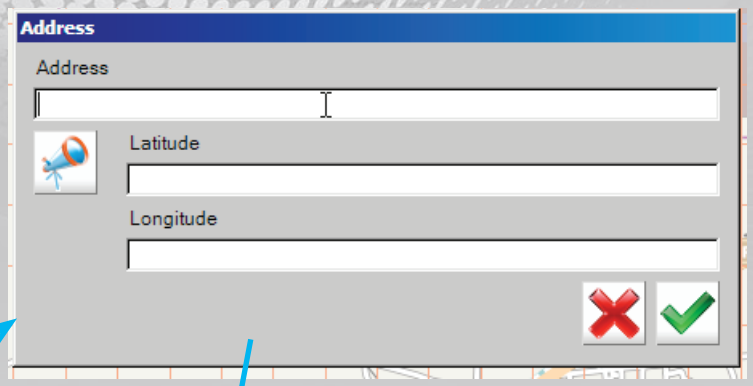
If you have lost yourself on the map, there's an easy way to find back to your home position, just go under Tools /Home and click on



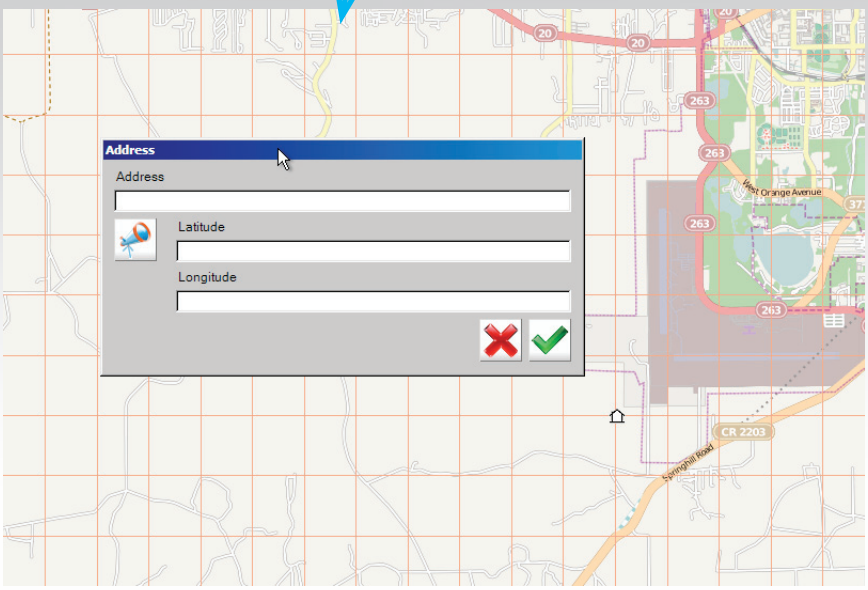
Now you see the new position of the Home Marker

Tools menu
Home Marker on the PC

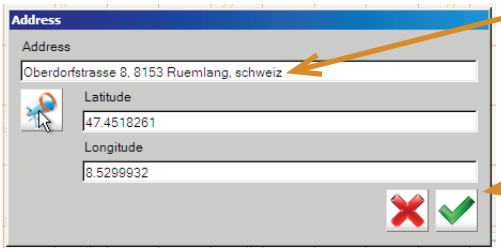
This feature on the PC is bit different from WM version. On the PC version you have also an option to enter exact address for your future home position. This is easier and faster then zooming and panning



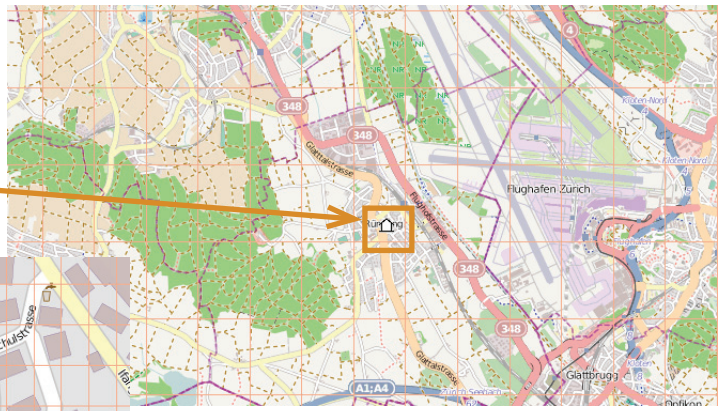
Under Tools/Home you will get following choice. Please click on Address

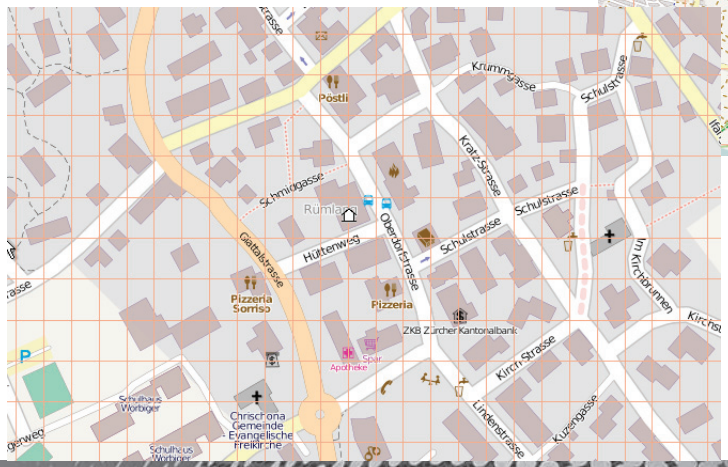


Independently from the fact that your map is maybe loaded with a wrong city , but as soon as you enter the exact or rough address and you press then to this icon  you can then to close this window press



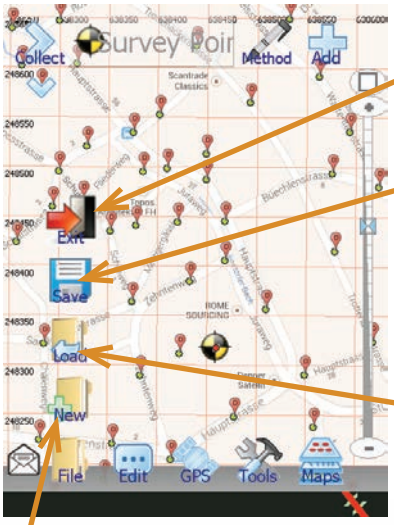
And your home position will be placed there and the map will be now cantered around new home position.





All that you need to do need to do is maybe to zoom it to a proper zoom level and you can start your job.

File menu

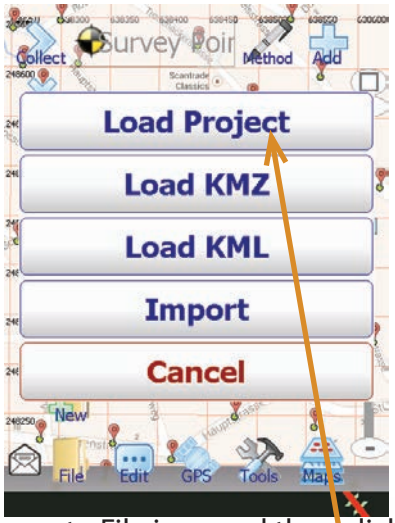


Click this button to exit the application.

Save survey: Saves the current data set as a survey to disk. The file will be saved as a **KML** compatible file.

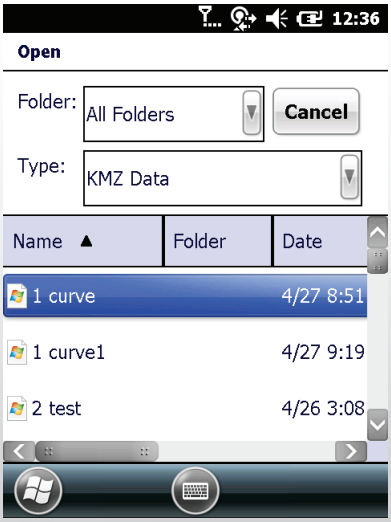
Load survey: Load a saved survey in from disk. The file must be a **KML**, **SHP** or **Tiles*** compatible file.

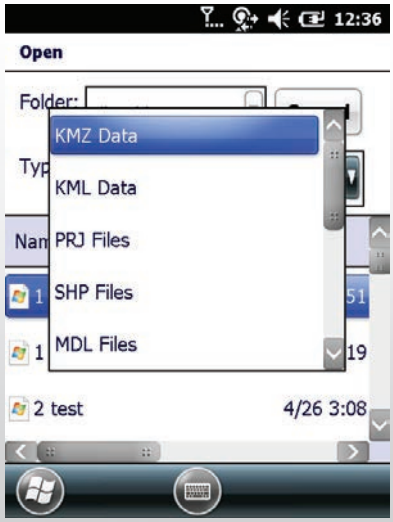
New survey: Start afresh from the HOME point. All existing data will be erased first. Make sure you have saved the existing survey first.

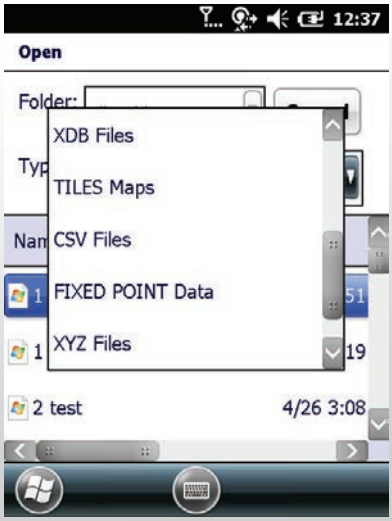


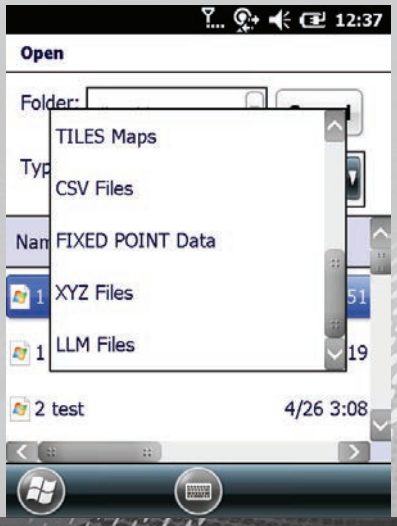
If you go to File icon and then click on Load icon you will land on this image. We will start with Load Project

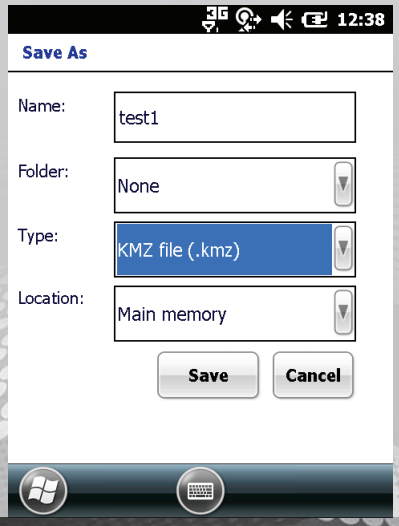
The File types include KML,KMZ, SHP, PRJ and Tiles format respectively. KMZ is the default format you load and save your surveys in. SHP allows you to import data from an ESRI Shapefile and Tiles* allow you to load local map data for use in wireless in regions without wireless communication.

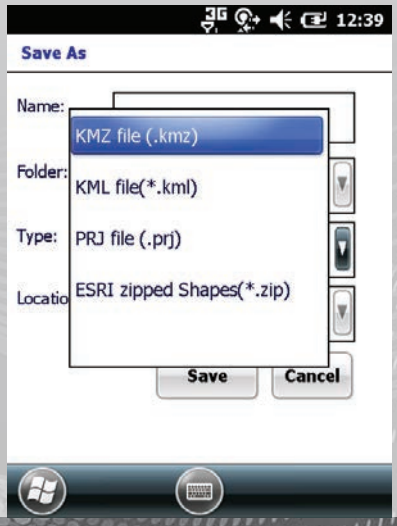


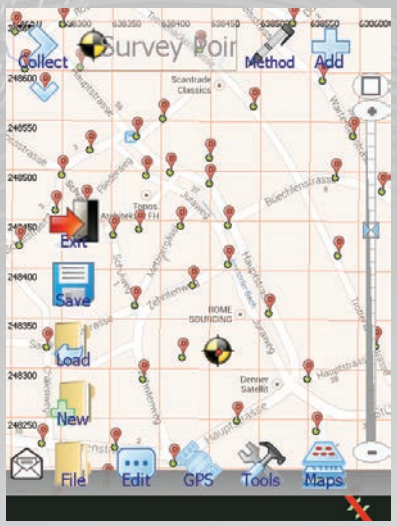


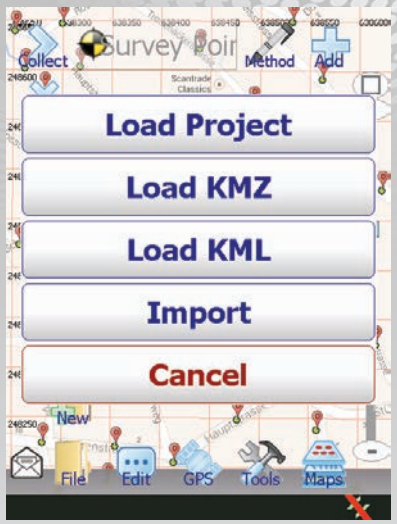


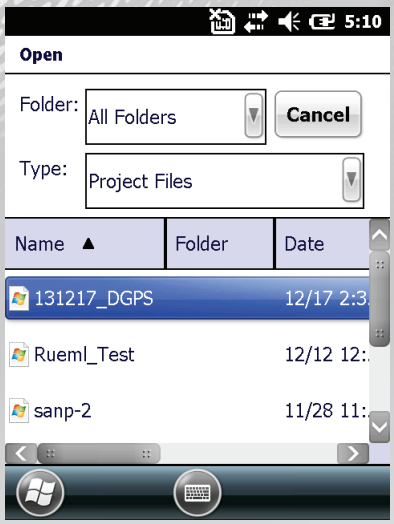


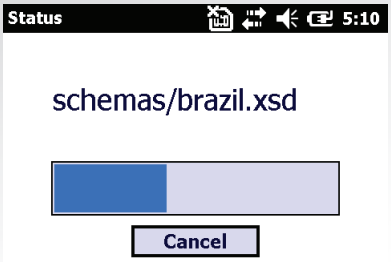


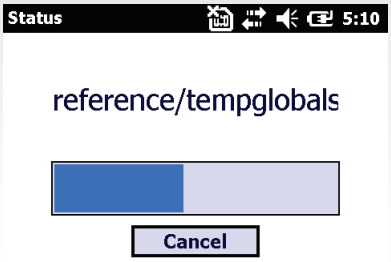


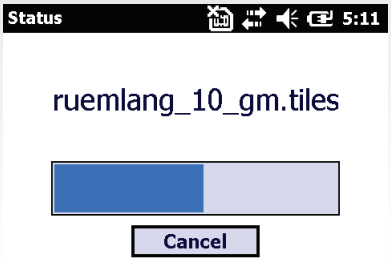

Collect
Survey Poir
Method
Add
Exit
Save
Load
New
File
Edit
GPS
Tools
Maps

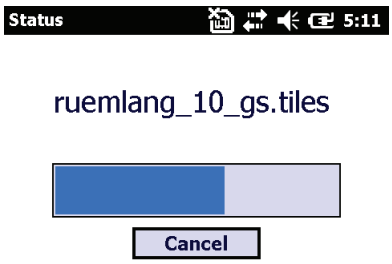

Collect
Survey Poir
Method
Add
Load Project
Load KMZ
Load KML
Import
Cancel
New
File
Edit
GPS
Tools
Maps

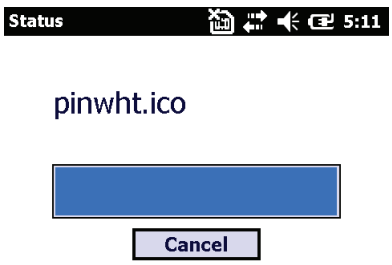

5:10
Open
Folder:
All Folders
Cancel
Type:
Project Files
Name
Folder
Date
131217_DGPS
12/17 2:3
Rueml_Test
12/12 12:
sanp-2
11/28 11:


Status
5:10
schemas/brazil.xsd
Cancel

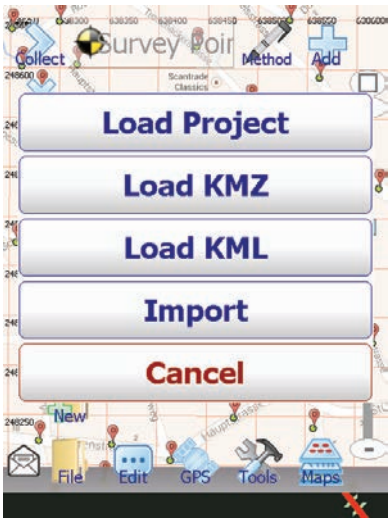

Status
5:10
reference/tempglobals
Cancel

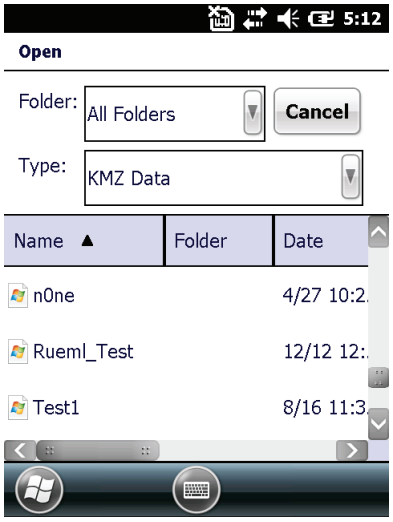

Status
5:11
ruemlang_10_gm.tiles
Cancel

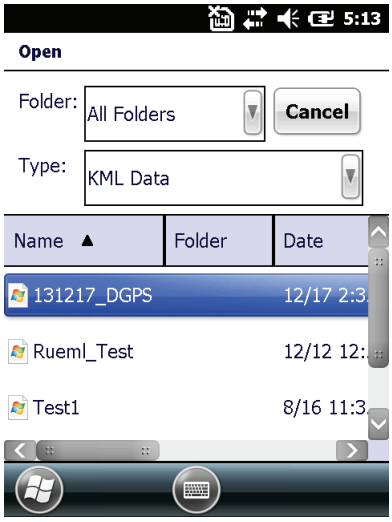

Status
5:11
ruemlang_10_gs.tiles
Cancel


Status
5:11
pinwht.ico
Cancel

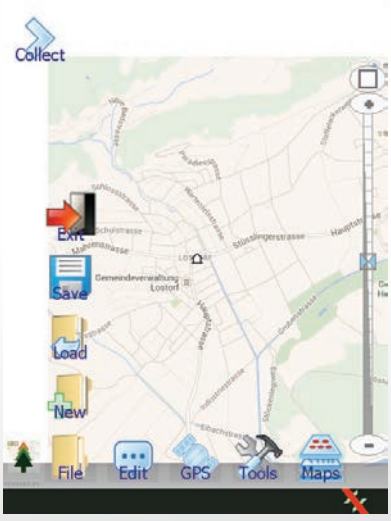

Collect
File
Edit
GPS
Tools
Maps
253930.851 684860.843

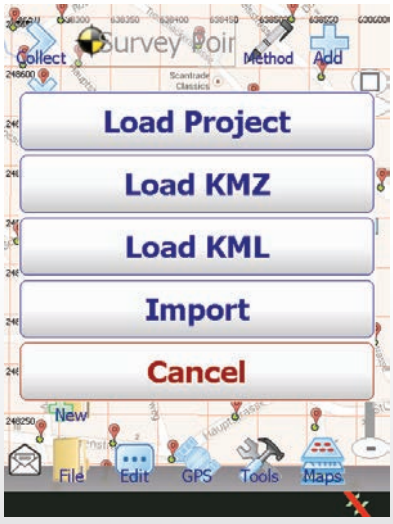


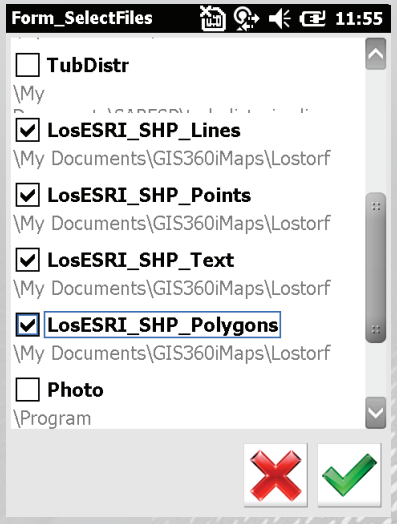


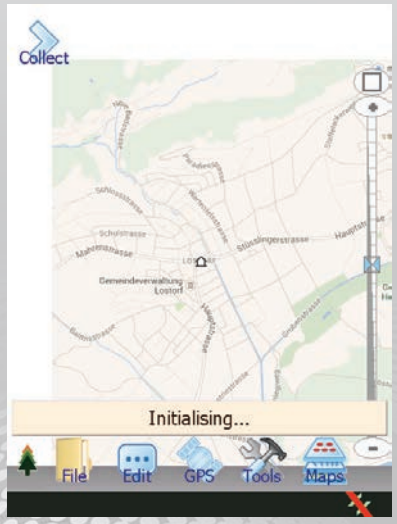


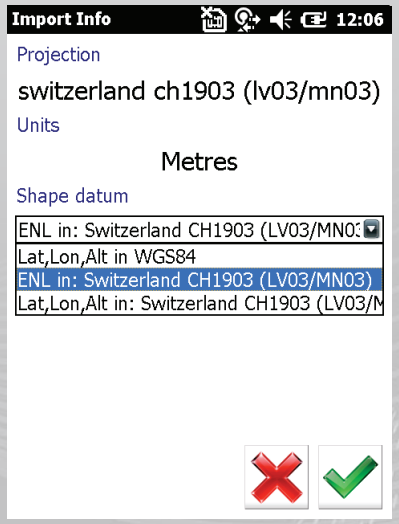
Loading Shape file in Foreground

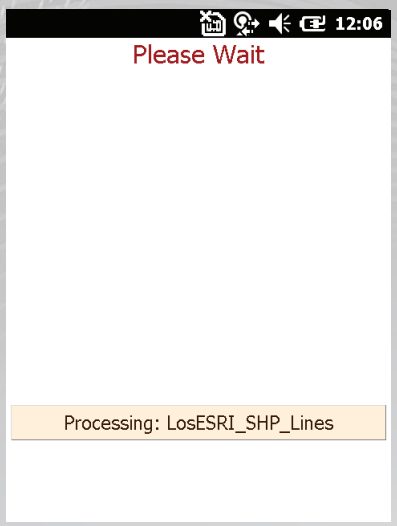




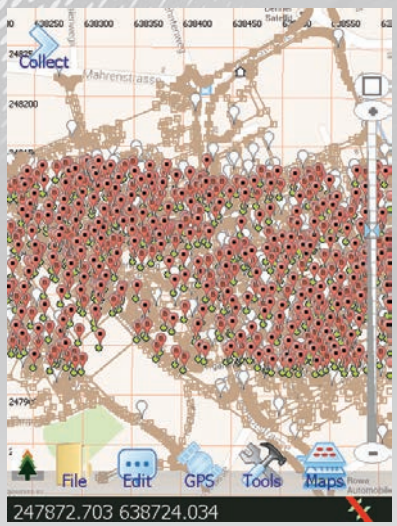






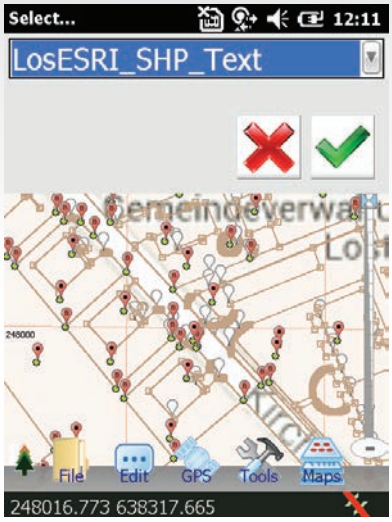

12:06
Please Wait
Processing: LosESRI_SHP_Lines

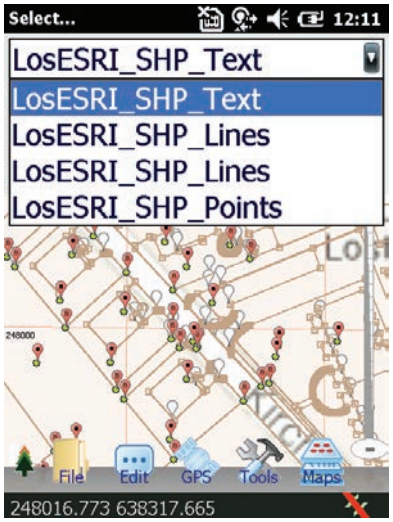

Import Info
12:08
Collect
Missing Information
ok
Please select a type for the table.
Load
Processing: LosESRI_SHP_Polygons
File
Edit
GPS
Tools
Maps
247872.703 638724.034

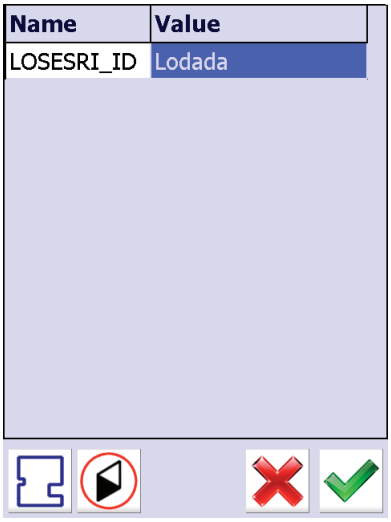

Collect
File
Edit
GPS
Tools
Maps
247872.703 638724.034


Collect
File
Edit
GPS
Tools
Maps
248016.773 638317.665

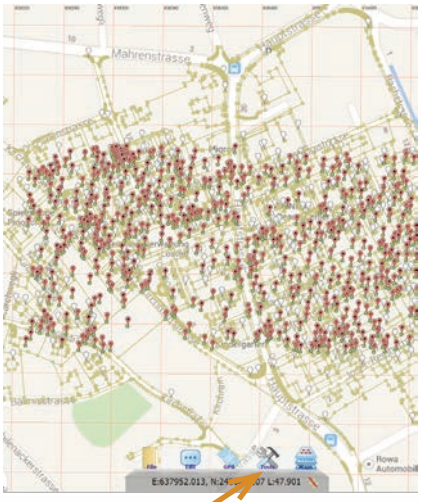

Collect
Ruler
Delete
Undo
Item
File
Edit
GPS
Tools
Maps
248016.773 638317.665


Select...
12:11
LosESRI_SHP_Text
File
Edit
GPS
Tools
Maps
248016.773 638317.665


Select...
12:11
LosESRI_SHP_Text
LosESRI_SHP_Text
LosESRI_SHP_Lines
LosESRI_SHP_Lines
LosESRI_SHP_Points
File
Edit
GPS
Tools
Maps
248016.773 638317.665

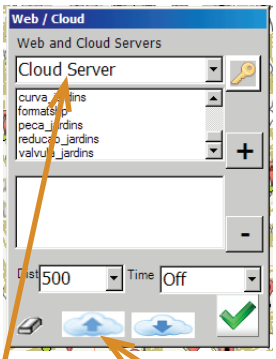

Name
Value
LOSESRI_ID
Lodada

To demonstrate now a great feature of GIS360 we will upload those shape files to the cloud, to make those data accessable at any given moment. More about it in a Cloud part of this user manual.

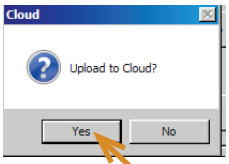


After loading a desired map on the the screen pülease go to Tools icon

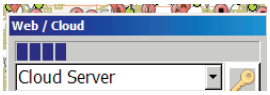
Chapter on page 59, Description of GIS360 Cloud – Mapping Services gives more details on setting up a cloud



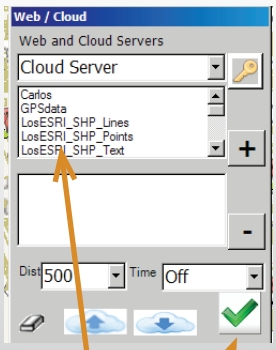
Choose from the list of three services a Cloud Server and then press Cloud upload button



Now you will be asked if you wish to upload your data to the cloud, which you should answer with Yes



Web upload progress will be shown. Please have a patience, based on the size of your files the time taken to upload will vary, small files will upload in a few minutes large files will take much longer.

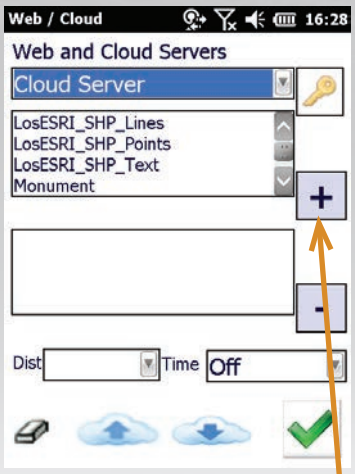


When finished you will see your new uploaded shape files in the list when they appear in the list click on Yes. The data uploaded is saved on the cloud and can be called at any time from this device or any other device which you or your associates are using in the field. More about it in Cloud section of this user manual.

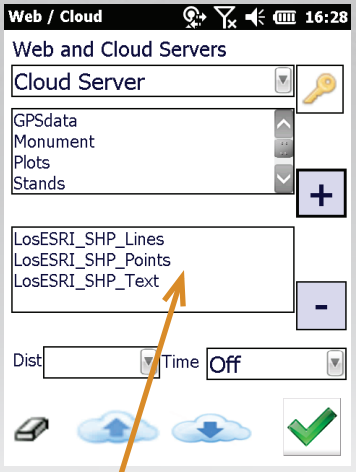
Loading already imported Shape file (Foreground) from Cloud to the field

If you are planing to work with a very large data sets it is highly recommended to import first your SHP data either over PC version or WM version of GIS360 and save them as foreground data, then simply up-load them to a Cloud Server. More about it in a Cloud part of this user manual.

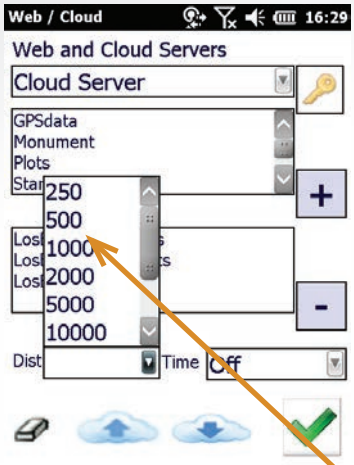
Under Tools go to Cloud



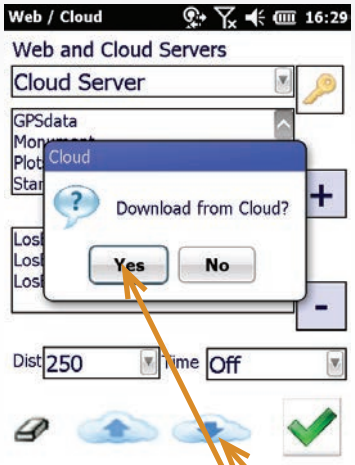
From three options, chose Cloud Servers and select desired files and press for each +



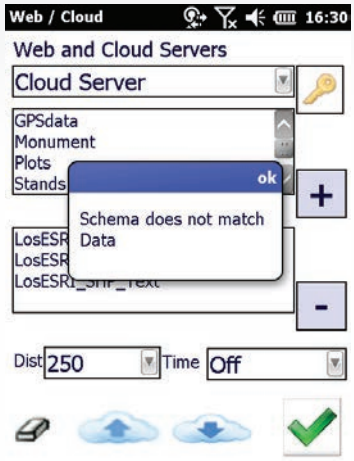
Now simply "load" all needed files to a lower section



Now you can first choose area . This will help you to load only the data needed in that particular moment.

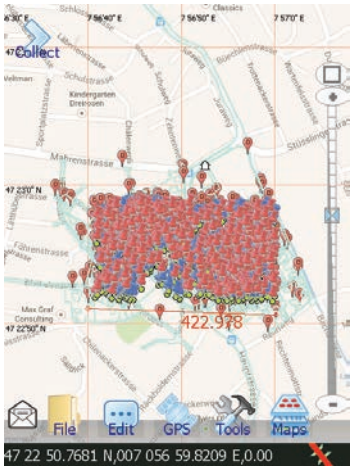


Now you are ready to download data from the cloud to your unit. Simply click on Soon after a new window will appear and confirm it with Yes

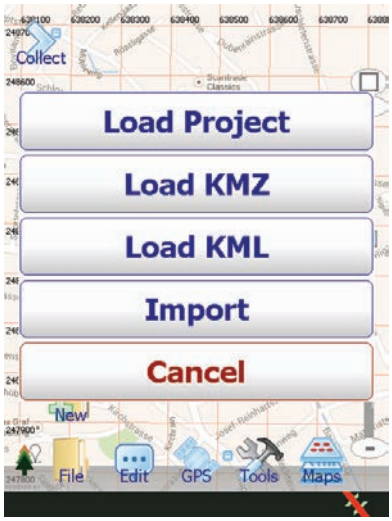


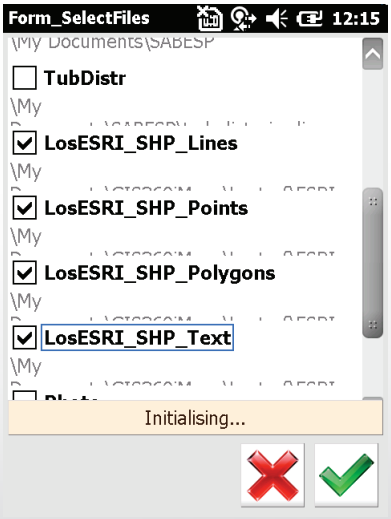
This message will appear if only if the schema of the data from the cloud are not identical with your correct schema.

A few seconds later the data stored on the cloud will appear on your unit, ready to be used in the field.



Loading Shape file in ENM

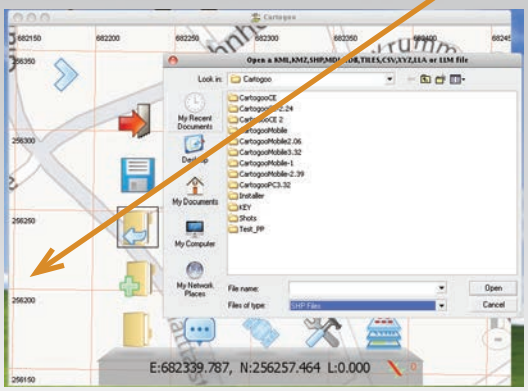




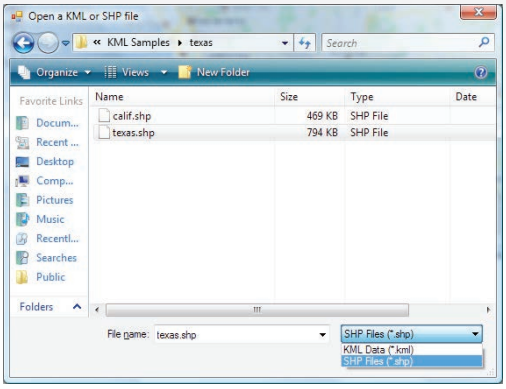
Important Features: Importing Shape Files

Importing Shape Files: These files are generated by **ArcGIS™**, **ArcPad™** and similar **ESRI™** products**.** Please see www.esri.com for details. This application needs two basic files to be available with extensions *.dbf (for attributes) and *.shp (for geometry). These files usually give no indication regarding the coordinate system. You have to select the type from a conversion list to proceed.

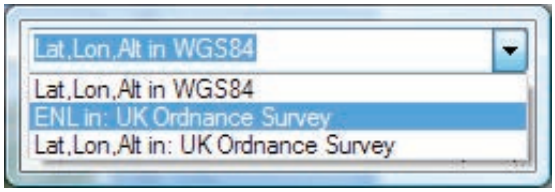
Importing Shape Files 1: Start Loading your SHP file by using the **Load Survey** button. Please note that both *.shp and its accompanying *.dbf file must reside in the same directory. This operation actually loads both files.



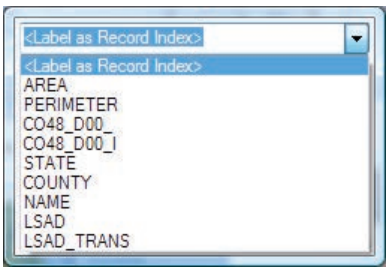
Importing Shape Files 2: Select the file extension choice and pick the file you want to import. Then click **Ok** to load it.



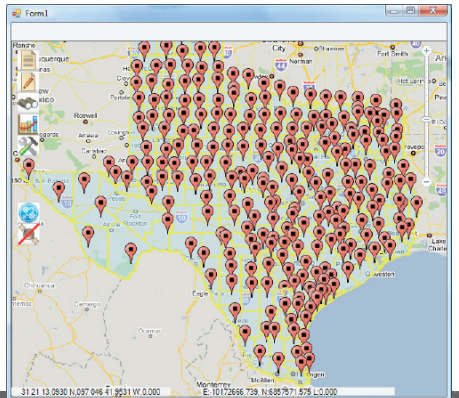
Importing Shape Files 3: Select the way Shapefile™ have the coordinates. **Note**: The 'datum' can be altered in the Tools menu.



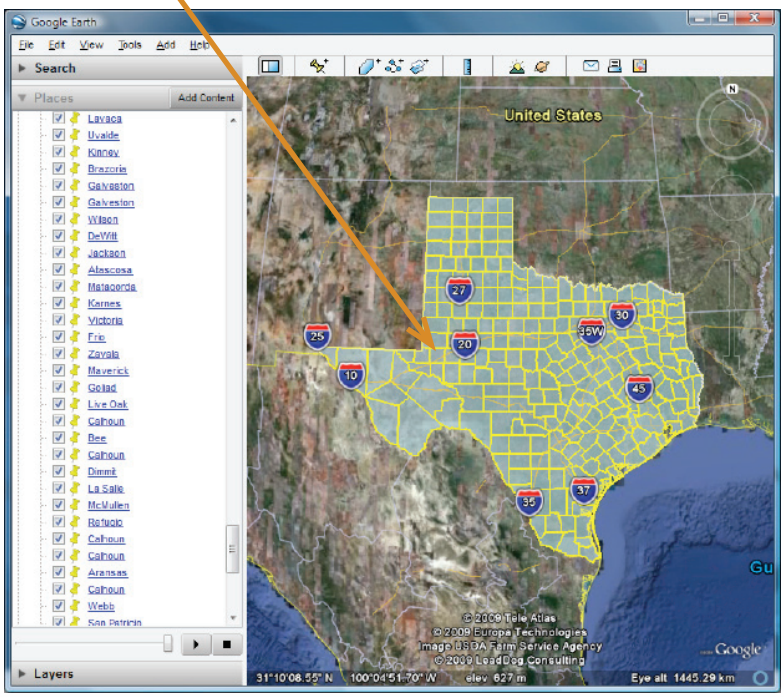
Importing Shape Files 4: Select the **Primary** field name from the list. The field value from the selected field will be used in **Google Earth™** to identify the record being examined. If you used <**Label as Record Index**> then the index position in the file is used to identify the object. Click the tick mark to proceed.



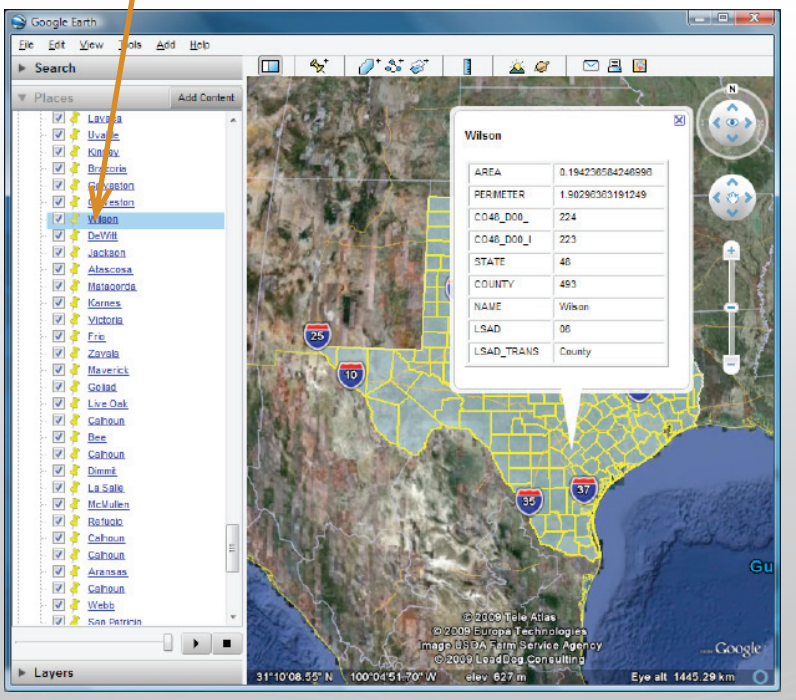
Importing Shape Files : Use **File: Save Survey** to save the file as a KML file.



I**mporting Shape File**s: Double click the chosen filename from the saved directory to automatically load Google Earth™ with the data you have just saved.



Importing Shape Files: To view attributes, just click on the Primary Attribute in the list in **Places** to bring up the data.



Edit menu Item

Edit Attribute data: Allows attribute data already collected by the application to be altered. Click to enable feature

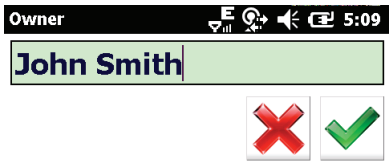
Edit Attribute data: When enabled, please note it is not possible to 'drag' the map. To re-enable the map drag, you must click this feature again to disable it.

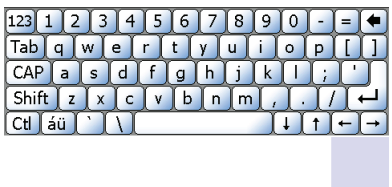
Name	Value
Owner	John Smith
Number	215
AREA	1881.314

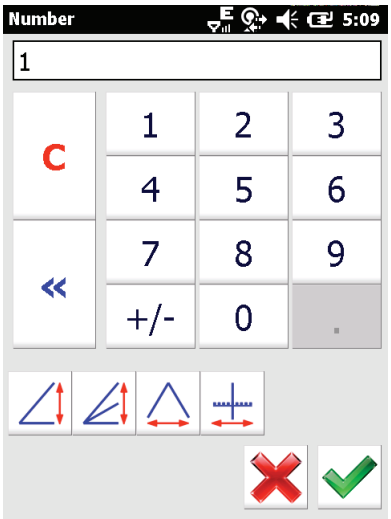
Edit Attribute data: Clicking the tip of the pin-point show the attributes:

Edit Attribute data: Double Clicking the **Name** or **Value** of Cause allows you to change the attributs:

Edit menu: Stake-out valeu will be shown on the screen







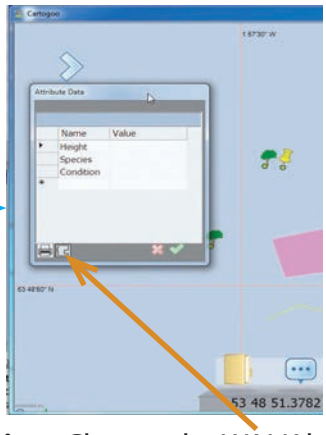
Edit Attribute data: Double clicking a field with numeric values will display the keypad.

Name	Value
Owner	John Smith
Number	1
AREA	1881.314

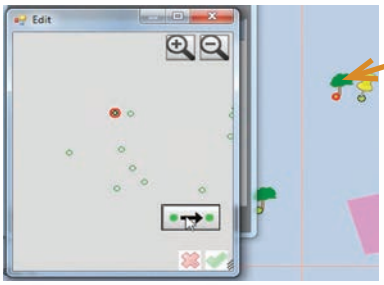
Edit menu: Stake-out icon

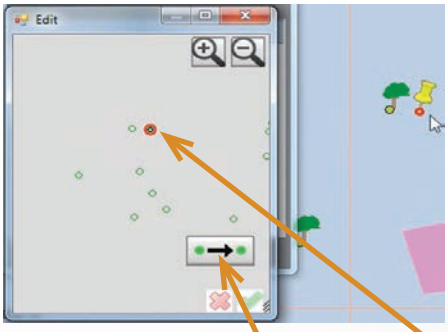
Edit menu

Point editing: Choose editing button and then tap on the point to be edited

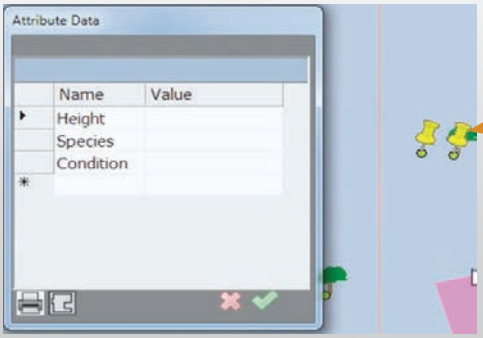


Point editing: Choose the WALK button then press on the point (TREE) to be edited





Point editing: Choose this button and tap on the new point

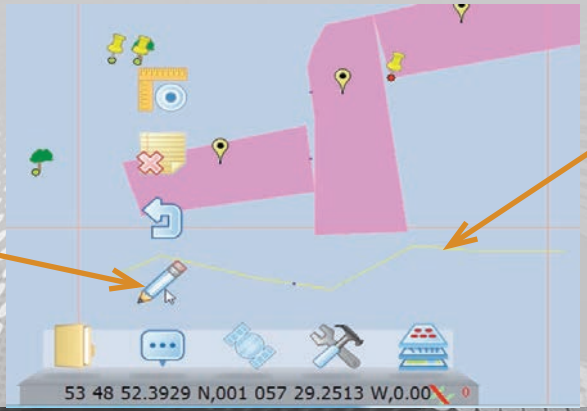


Point editing: As you can see, the TREE symbol changes place and point editing is finished

Edit Menu

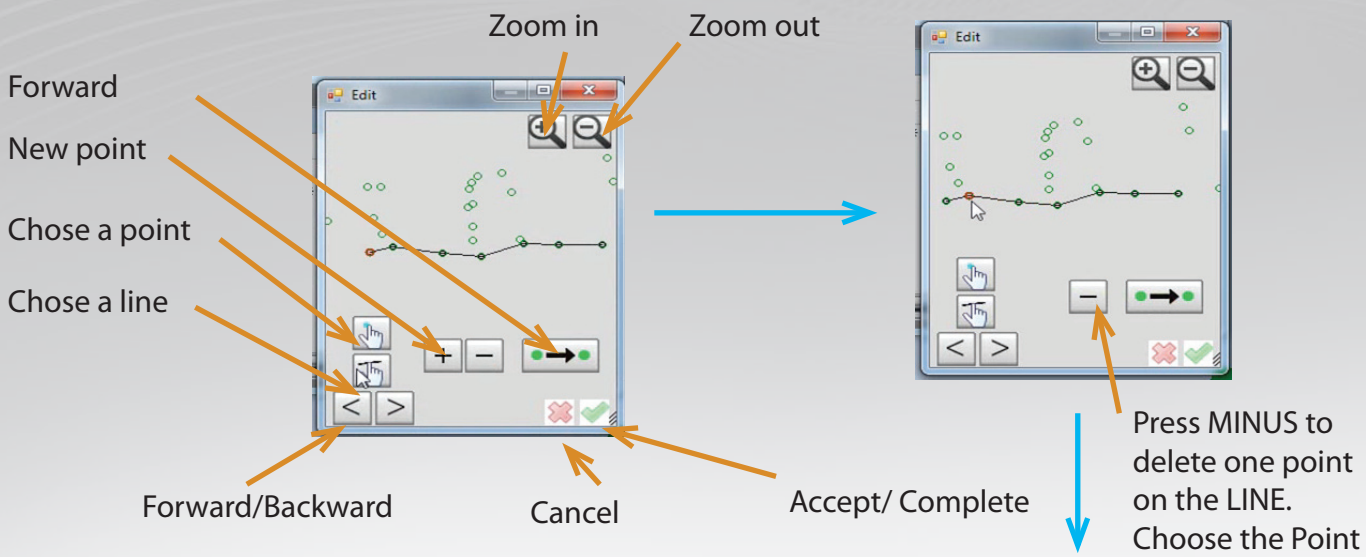
Editing Tool/ Line editing

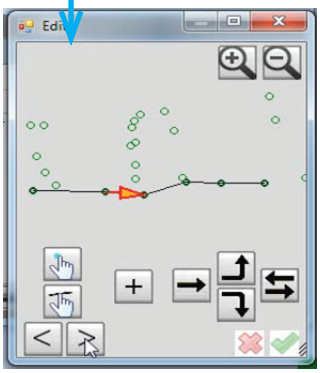
Line editing: Choose LINE to be edited editing button and then press on the LINE to be edited



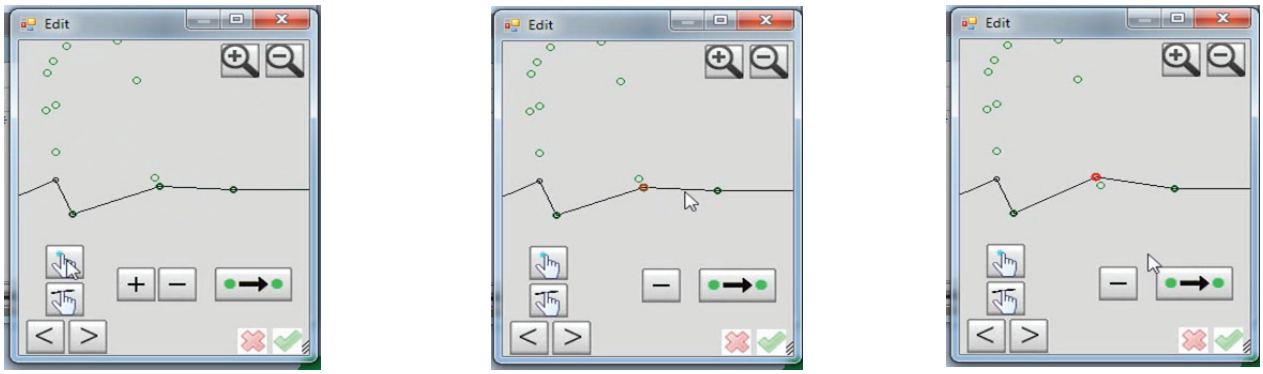
Line editing: Choose LINE to be edited, and then the symbol for the line must be clicked, which is in the middle of the line it self.

Edit Menu
Line editing





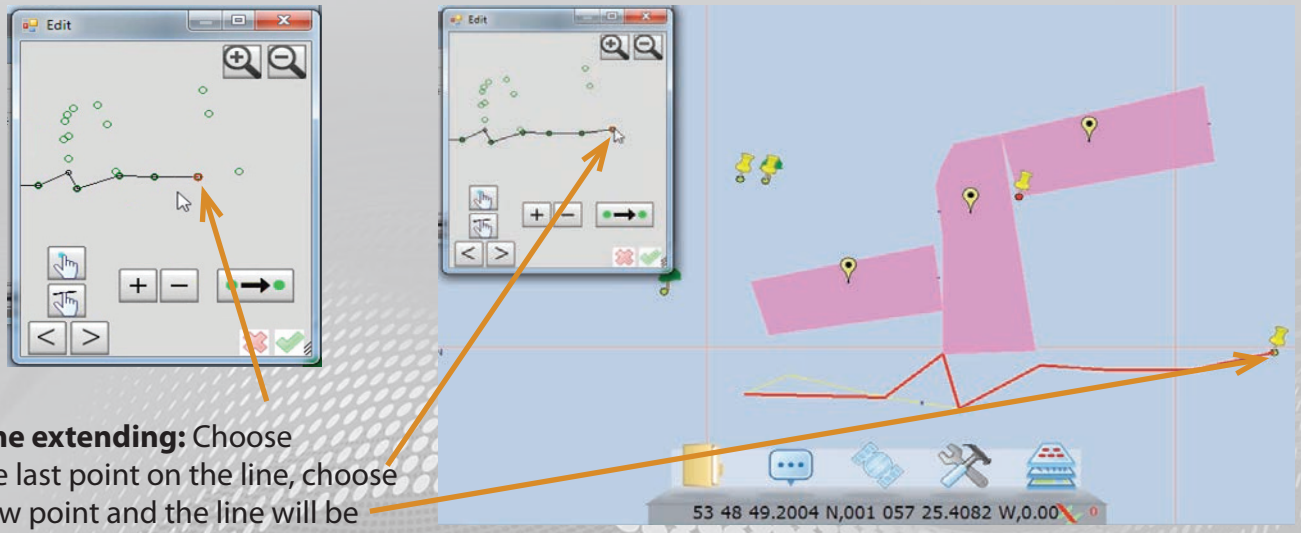
Line editing: Choose points to be added



Line editing

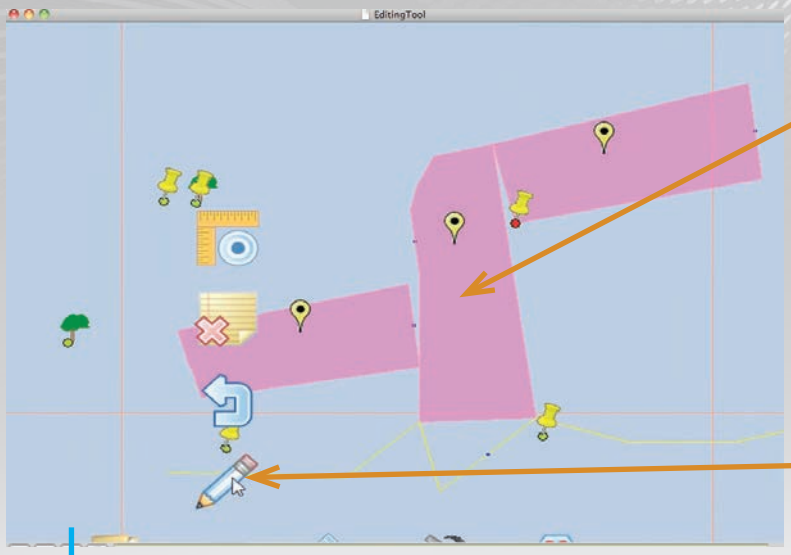
Edit Menu

Editing Tool/Line editing/Line extension



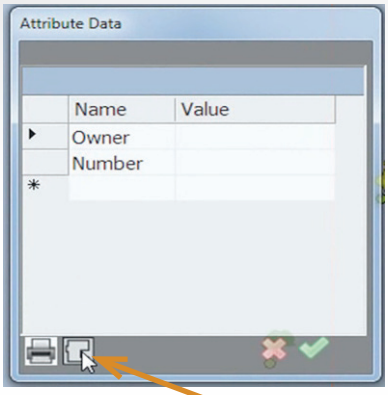
Line extending: Choose the last point on the line, choose new point and the line will be extended

Edit Menu
Editing Tool/ Parcel editing

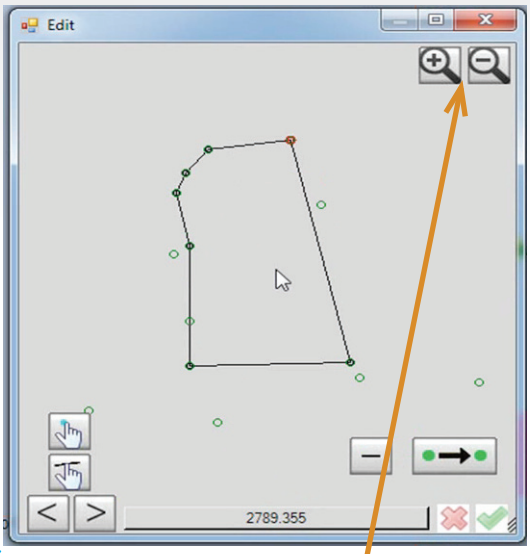


Parcel editing: Choose the parcel to be edited

Parcel editing: Choose EDIT Item

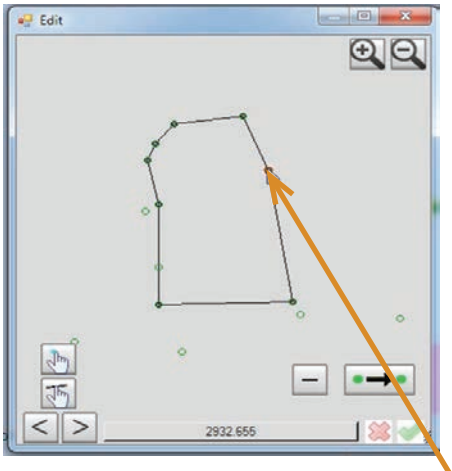


Parcel editing: The GIS Table apears. Press the Walk Mode button

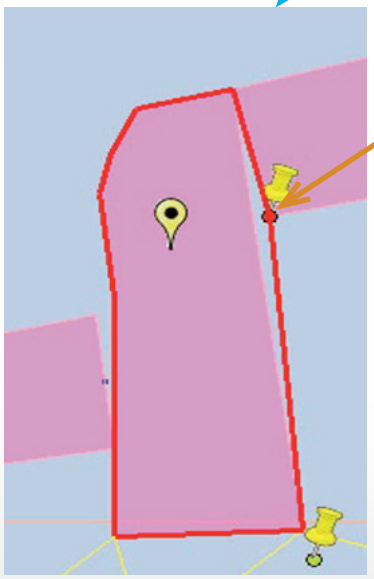


Parcel editing: Zoom and Pan choosen parcel to fit your screen

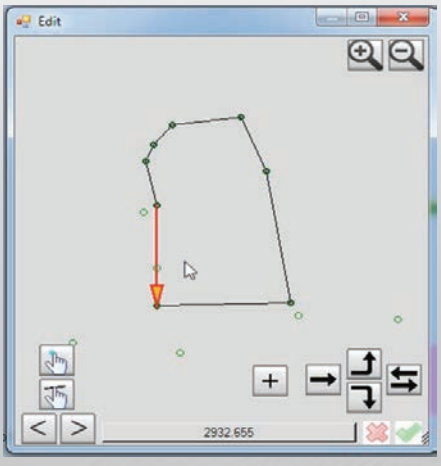
Parcel editing: Press the Line tool and choose the desired line



Parcel editing: After selecting the proper line press + and select the new point to be added

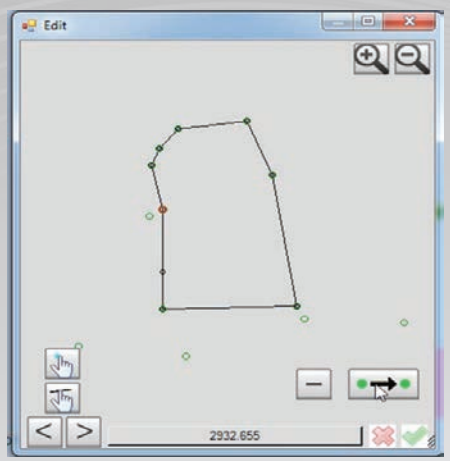


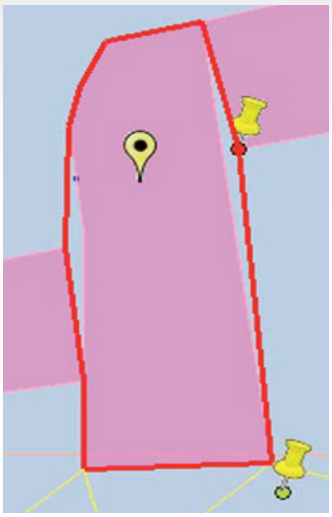
Parcel editing: the new point has been added



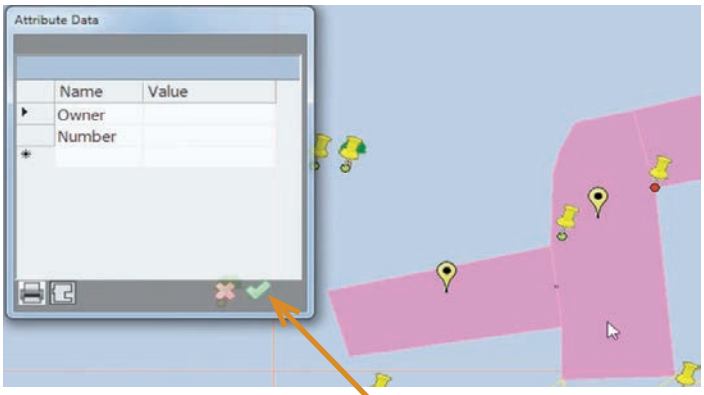
Parcel editing: repeat the same procedure for all points involved

Method menu: Editing tool/Parcel editing





Parcel editing: until your edited parcel doesn't get a proper shape. When finished press YES



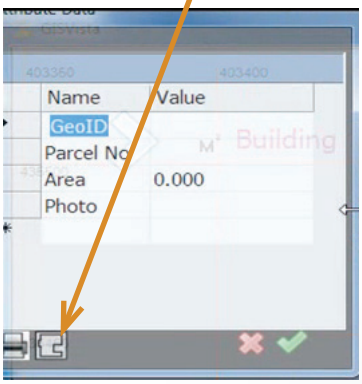
Parcel editing: to finalize the process press YES and your parcel is FIXED

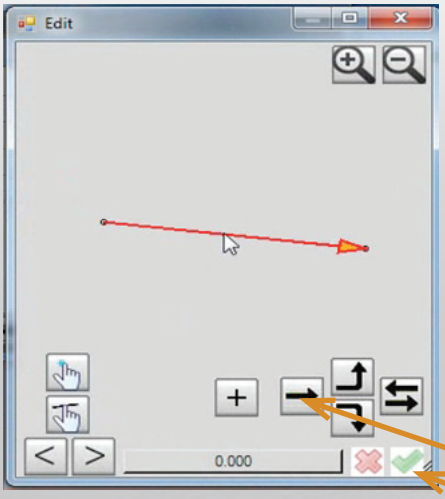
Edit Menu
Walk Mode

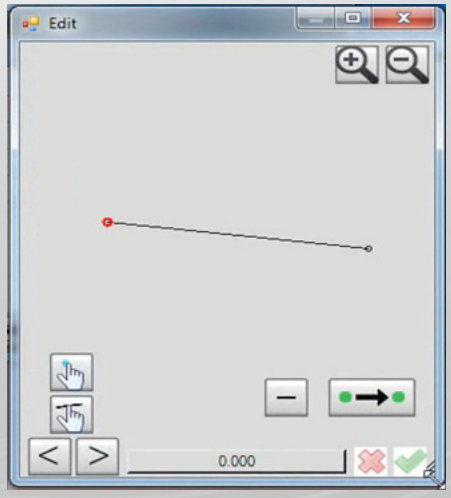
Walk Mode: First you have to ensure that you have 2 points specified on your map, where one will be the anchor point of your construction and the other will be a directional node. One corner of your constructed plan will be fixed at the first point and another corner will be fixed in the direction of the other anchor point.

Walk Mode: A walk type item will be created by selecting this button. When new points are added to the walk design and accepted, a new **Walk Mode (Special Polygon)** Item will be created.

Walk Mode: Example – Define the Anchor Points with GNSS/GNSS



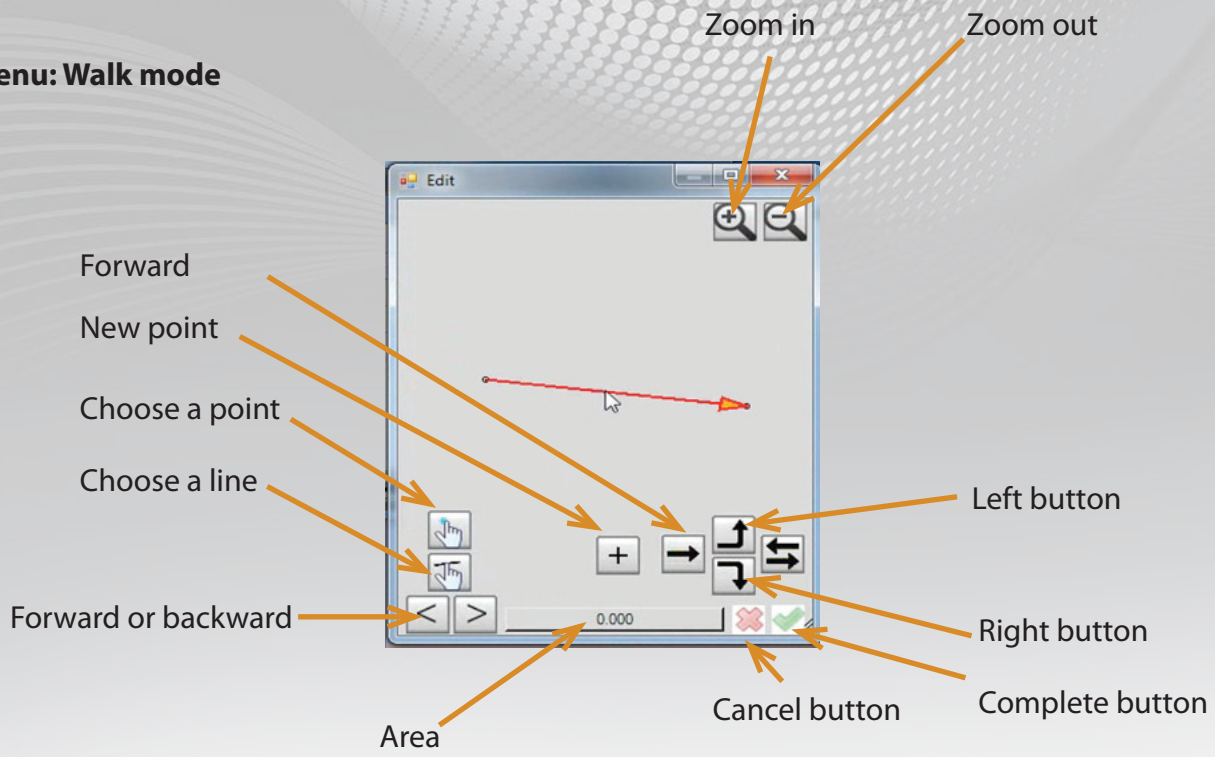


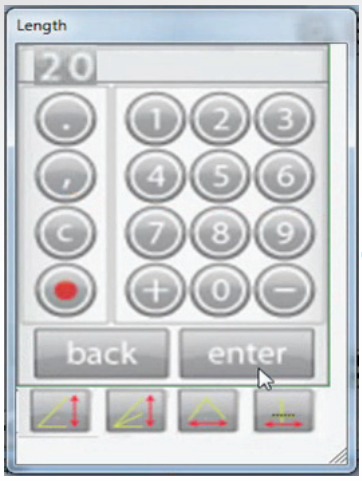


Walk Mode: This is a turtle graphic type of walk where you move forward, left or right and specify the distance from your current position. To complete the walk polygon, there is a **complete** button which guarantees the walk polygon will be closed. The idea is to ensure that each internal angle is always 0 degrees,90 or 270 degrees from the current direction.

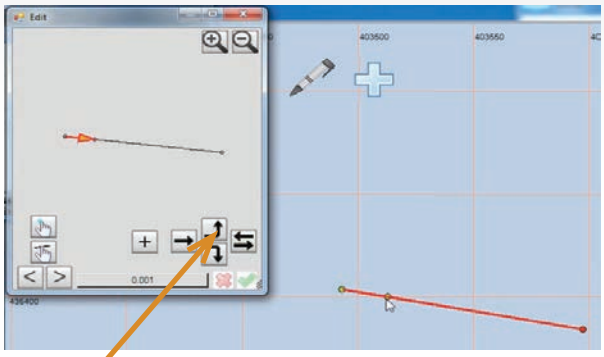
Walk Mode: Press this symbol to enter the first distance

Method menu: Walk mode

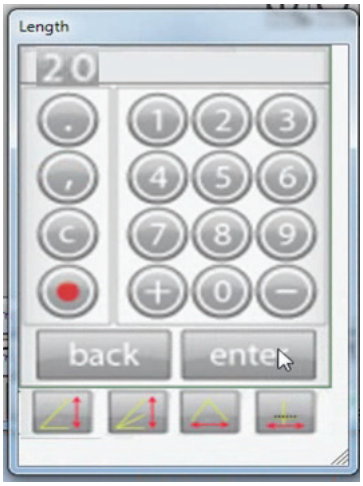


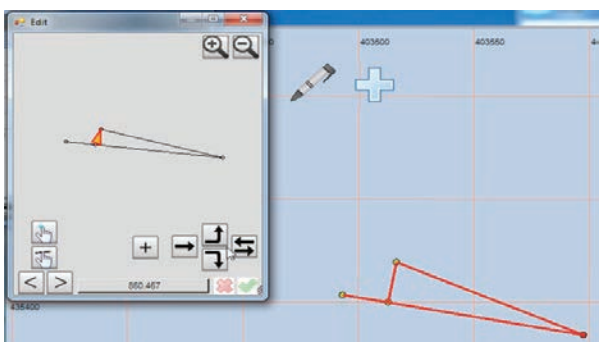


Walk Mode: Example – Click the Walk button then add the distance to move in the current direction -**forward**



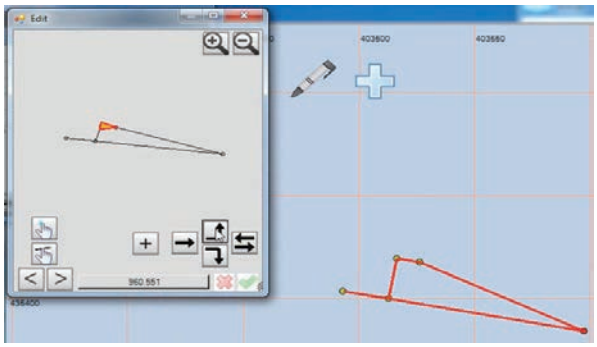
Walk Mode: Example – Click the Walk button then add the distance to move in the current direction **-left**



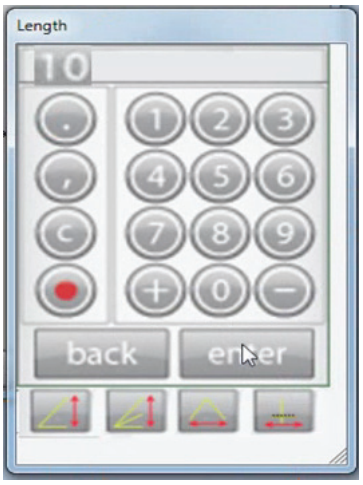


Walk Mode: Example – Continue the turtle graphics until you have most of the walls defined

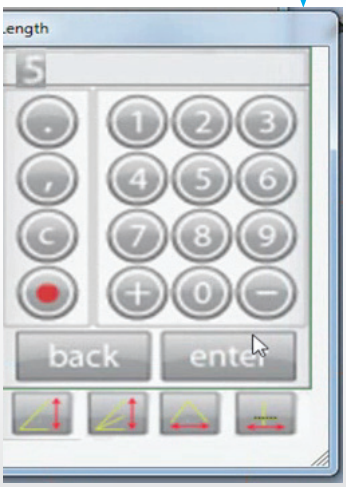
Method menu: Walk mode

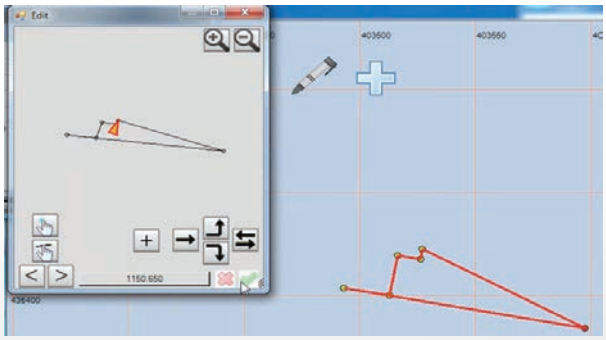


Walk Mode: Example – Now click the **Left** button then add a new **Walk** distance to move in the new direction.

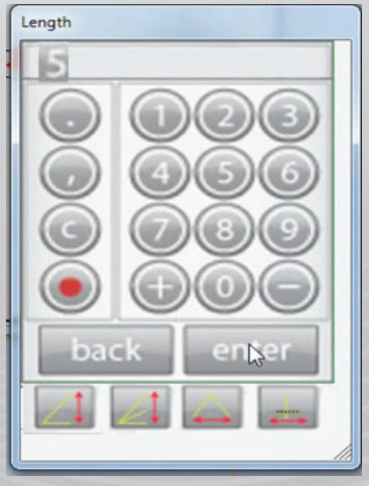


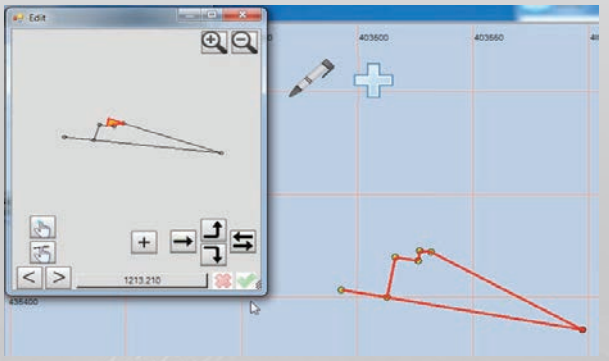
Walk Mode: Example – Now you can follow your progress in building construction for example





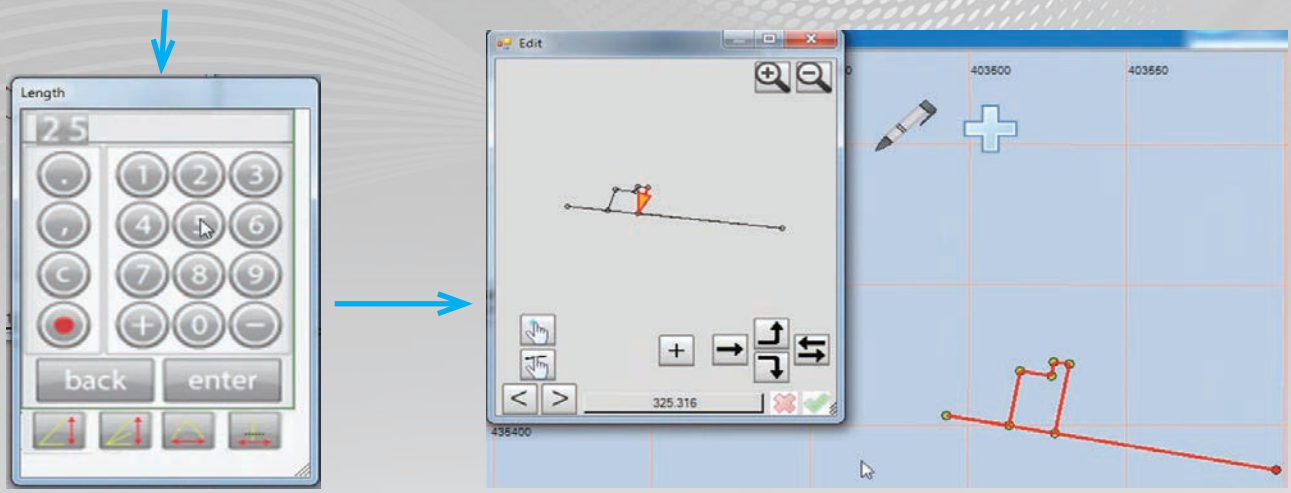
Walk Mode: Example – Continue the turtle graphics until you have most of the walls defined



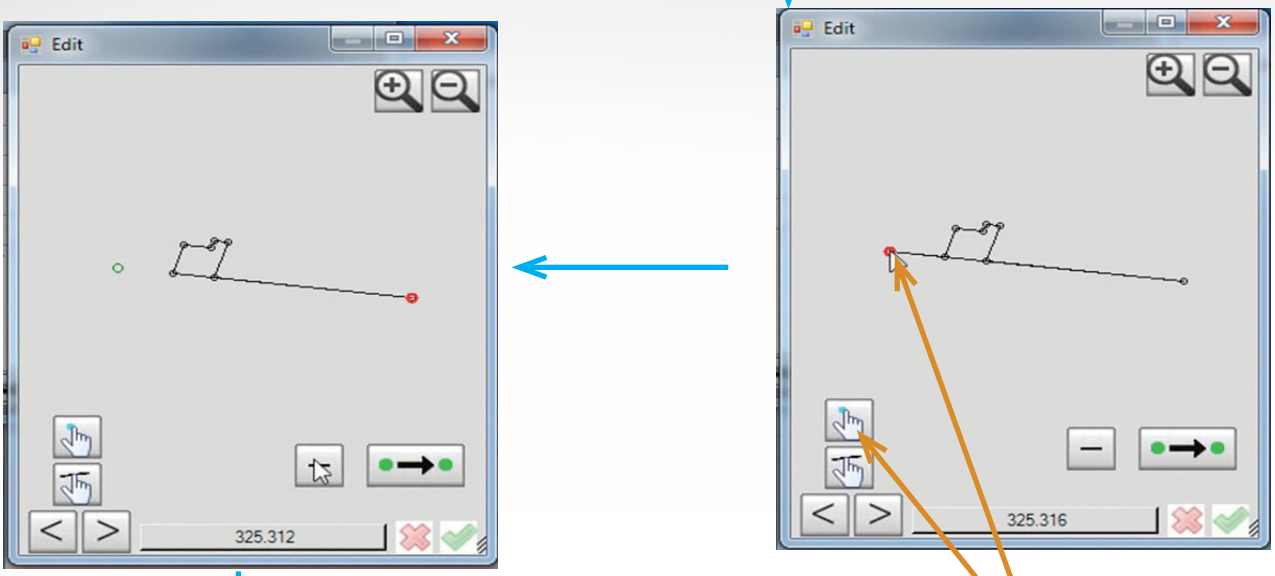


Walk Mode: Example – Continue the turtle graphics until you have most of the walls defined

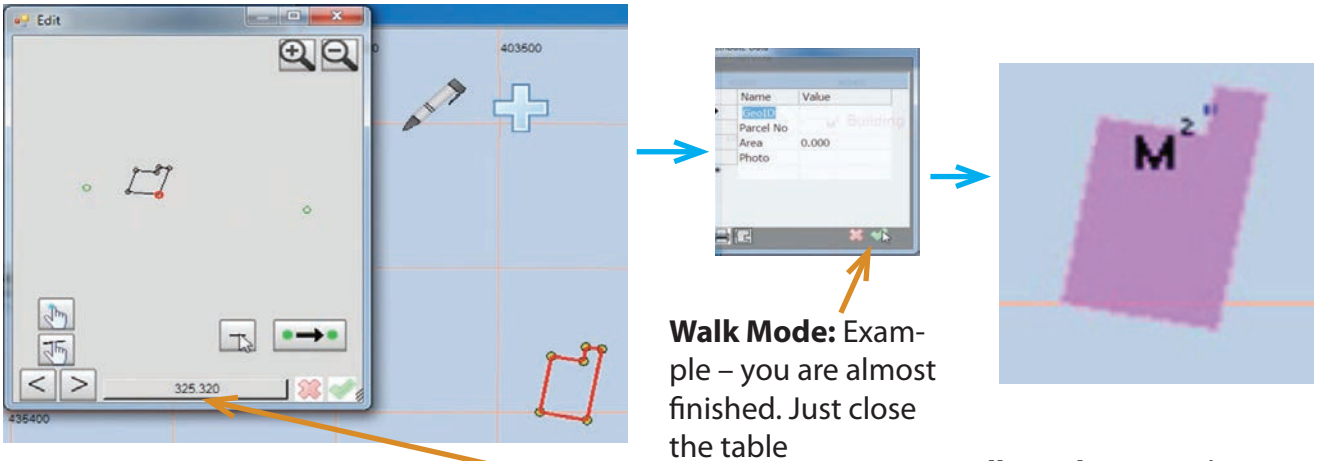
Method menu: Walk mode



Walk Mode: Example – you are almost finished. Now you need only to eliminate the points not needed.



Walk Mode: Example – you are almost finished. now you need only to eliminate the points not needed.



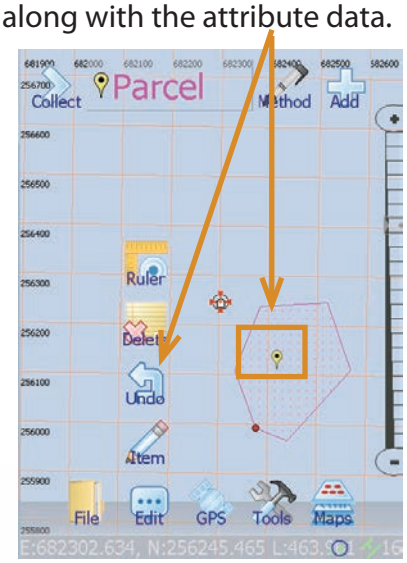
Walk Mode: Example – if an important AREA is shown as well

Walk Mode: Example – you are almost finished. Just close the table

Walk Mode: Example – you are finished

Edit menu
Undo

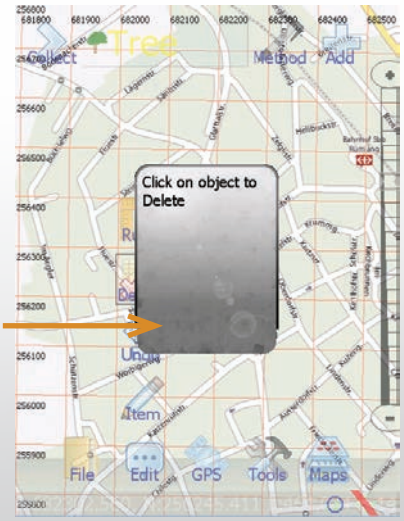
Undo: Deletes the last graphical feature added along with the attribute data.



Undo: Clicking the button removes the last graphical feature added.

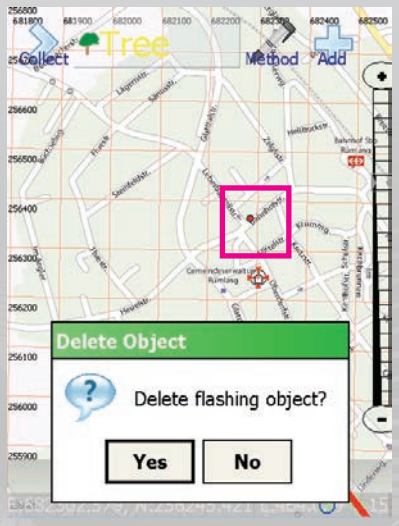
Edit menu
Delete

Delete: Deletes the graphical feature along with the attribute data.



Delete: Click the base of the Pin Point or Marker that you require to be deleted. This item will flash.

Delete: The graphical feature will be removed along with any attached attributes.



Delete: If your ITEM is covered by this window, just DRAG it away, then Click YES

Delete: Deleting areas and line items require you to point and select the base of the required marker

Delete: By selecting **Yes,** the graphical feature is removed along with any attached attributes.

Edit menu

Measure

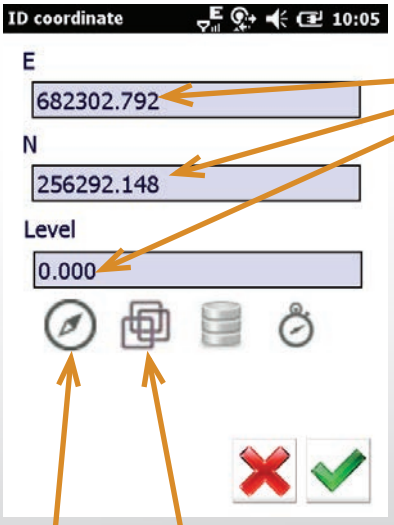
Measure: Select the **Measure icon.** The measurement can be done clicking on the map or snaping to two known points.

Measure: Selecting the **Measure icon** again will erase the measured distance between two points.

Edit menu
Display coordinates

As for "Edit Menu: Ruler", select the Ruler symbol, then double tap the point on the screen you wish to know the exact coordinates.

Stakeout

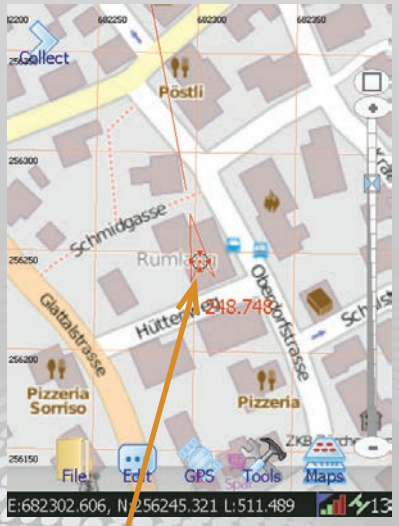


The coordinates are displayed. GIS360 can display Lat/Lon/Alt, or Grid coordinates. This can be defined in Tools/Grid.

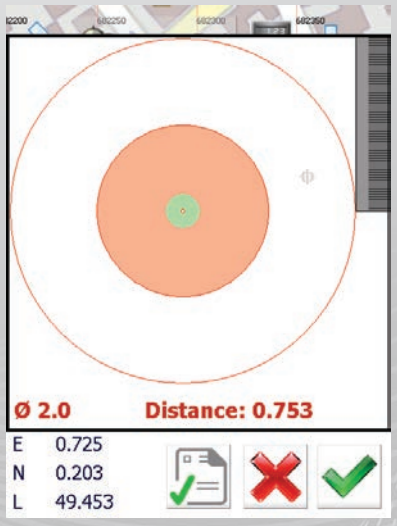
After clicking on the Stakeout icon you will see on your sidplay your current GPS cursor and a big circle with a distance to the point. This all depends on your current zoom level

Stakeout

Calibration/Localization

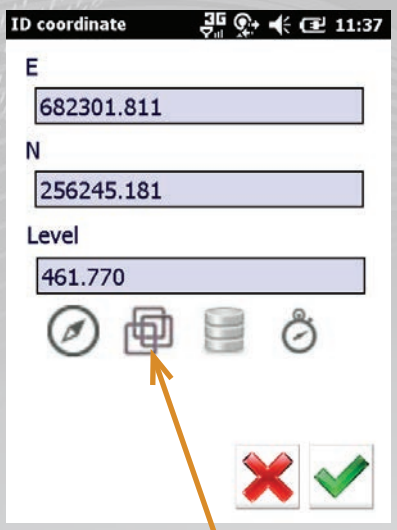


If you are using high zoom level, then you may see an arrow with a direction lince and a distance.



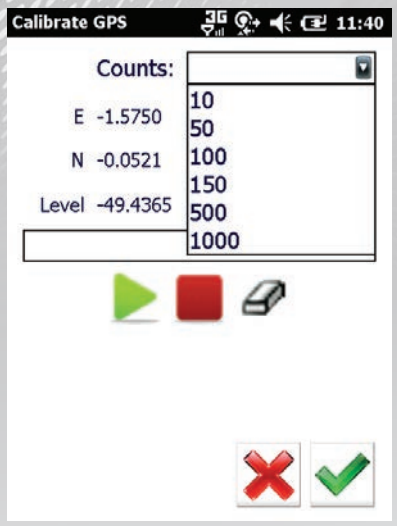
As soon as you come in range of 10 meters away from your desired point this window will appear, with all details

Calibration / localization

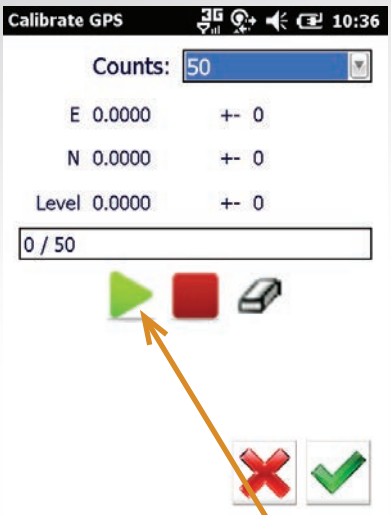


Calibration/Localization icon

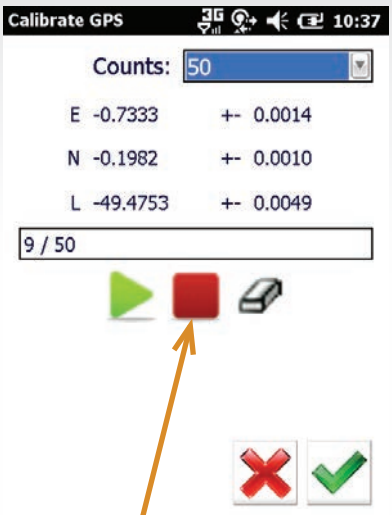
This feature you can use if you are standing on a known point with your GPS, but on the map screen your GPS cursor is away for some particular reason. To "MOVE" your GPS cursor to be exactly above your known point you can use our Calibration/Localization function.



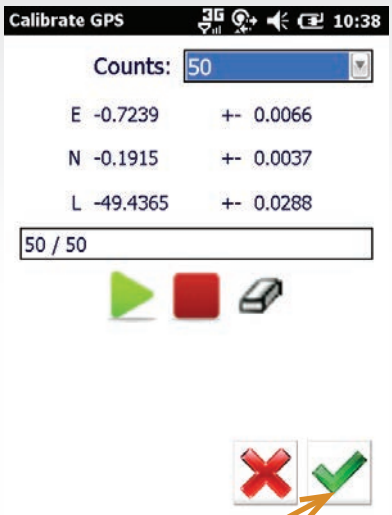
if you pressed localization icon before, now you will see a new window. Please enter under "Counts" choose number of epochs, usually we use 50



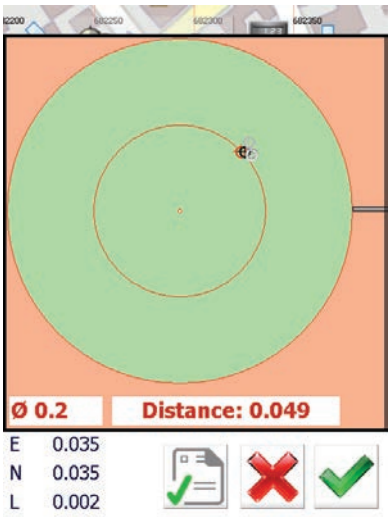
To start Calibration/Localization process click on Start icon



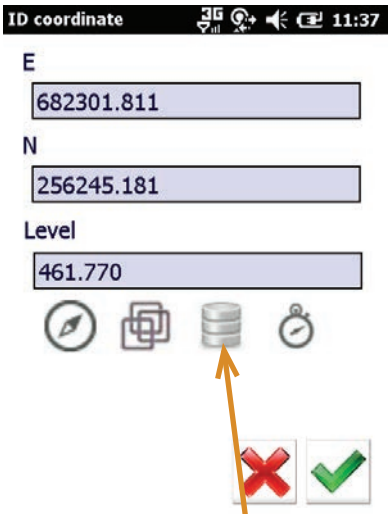
You can stop the calibration at any given moment just pressing this icon.



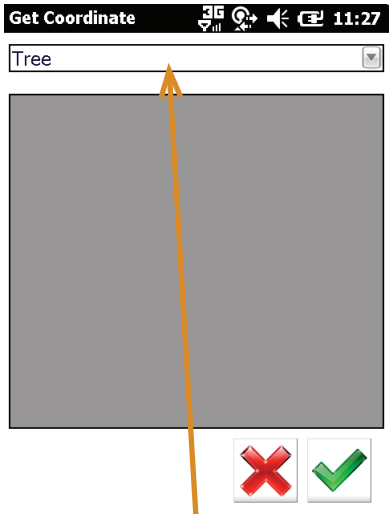
When counting is finished click on yes



Usually

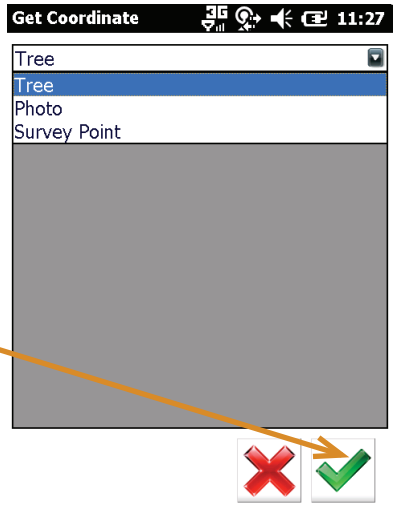


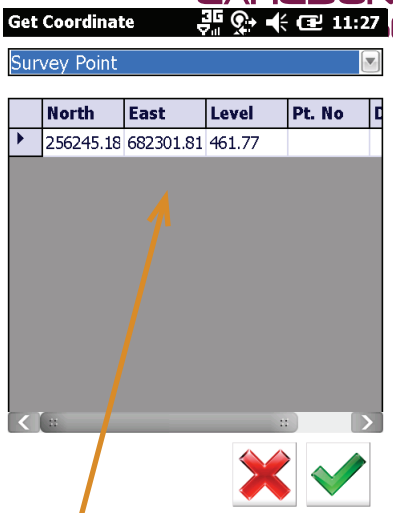
To get a coordinate list you can click on this icon



Here you c an choose the type of your Data Base

If you change it to Survey Point for example and confirm with Yes

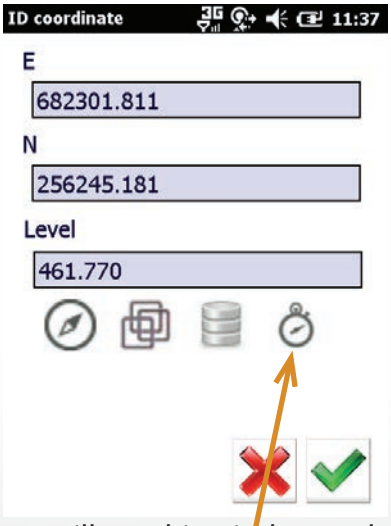




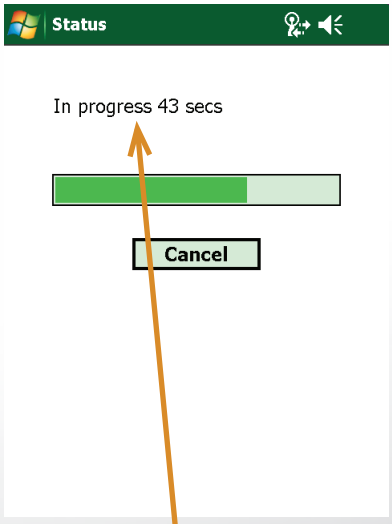
and if existing, list of coordinates will appear in this window

NAVCOM SF3040 Quick Start StarFire

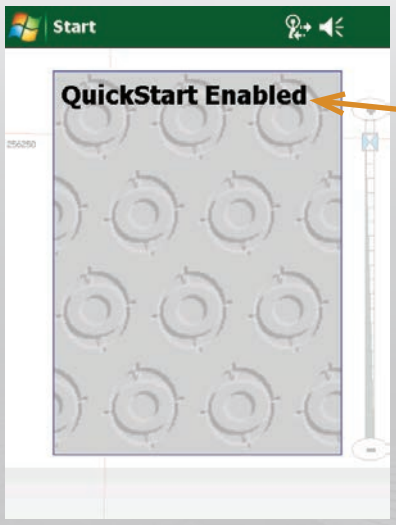
In Edit mode, click on Ruler icon



Then you will get this window and shoose following icon to start Quick Start Star Fire



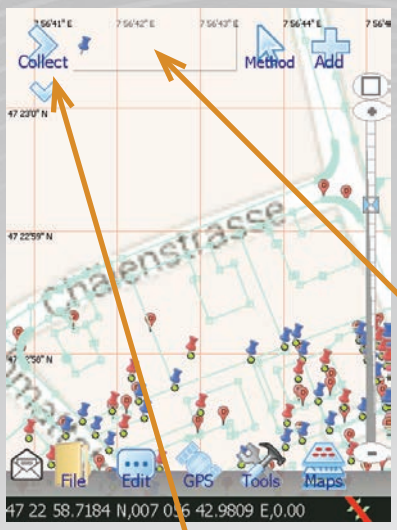
After Quick Start Star Fire process has started, it usually takes 50 seconds to finished and if all OK you will see following message



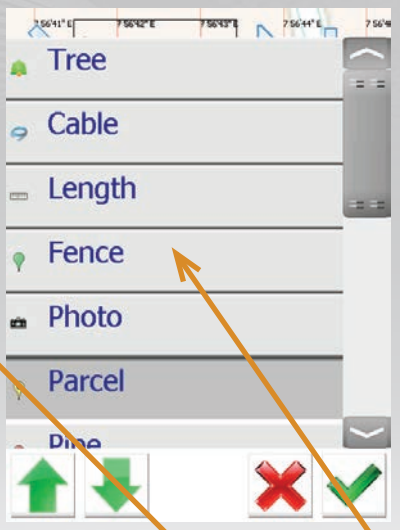
For Starfire it is important to allow two functions. Display the current license status and initialize StarFire with a 'Quick Start' position seeding. For StarFire Quickstart is important to keep in mind that Starfire uses ITRF coordinates. Currently this is ITRF08. We use WGS84 datum internally in GIS360 . The driver instructs the NavCOM receiver to convert to WGS84 with the datum function.
It will be necessary to provide methods for the user to select points or enter coordinates from the program. In GIS360 we allow multiple methods for the user to input points. Primary our users are using GPS Average and Previously Stored Points.

Collect Menu

The purpose of the Collect Menu is to define:
- What has to be measured
- How to measure, by GNSS, Total Station, Distance meter, Tape or manually



Click on the arrow to enable the Method Menu



Clicking on the **schema** will display the list of items that can be measured. This list can be defined individually (see chapter DataDesigner)

List of items that can be measures

Clicking on the **arrow** will display the measuring methods.
These will be explained in the following pages bit more in details

Several methods are available to enter an object

Snap point

Pen

Enter coordinates

Cogo

Total station

Once the method is selected, click the measure  to start

To end the measure, click on the green arrow 

Method Menu
Snap Point

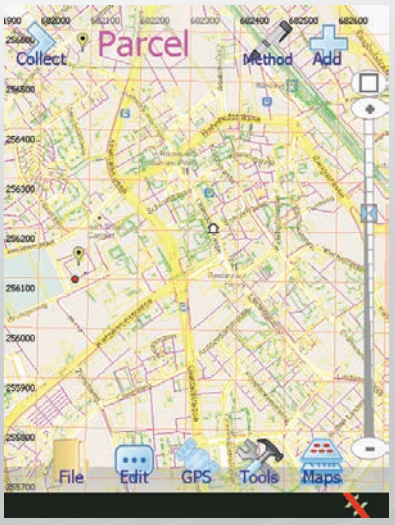
Snap Point: Allows you to glue a position in your graphic construction onto a point of an existing item. If we already have these three linear objects, we may want to start at a used point for the next linear object.

Snap Point: First, select your graphic type then select the Snap button. While this is selected, the closest survey point to the tapped point will be selected if it is within the search radius.

Method Menu
Tap Point

Tap Point: Select this button to put the application into **Tap Point** mode. This allows **both** tapping on the screen to select a new position **and** using the GNSS when it is enabled.

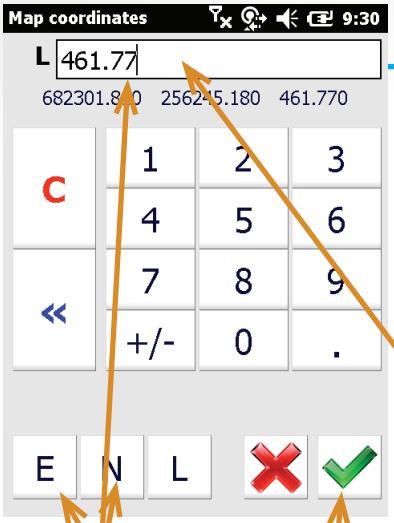
Tap Point: When you tap a point or select an enabled GNSS position, this leaves a tap point in the survey area.



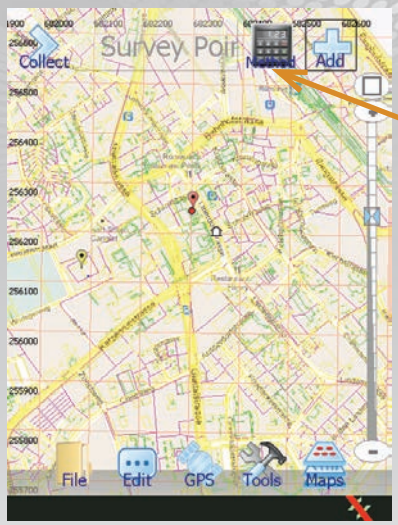
Method Menu

Enter Point coordinates

Enter Point: Select this button to put the application into **Enter Point** mode. This allows coordinates to be added by Easting, Northing and Level (Altitude above Mean Sea Level).



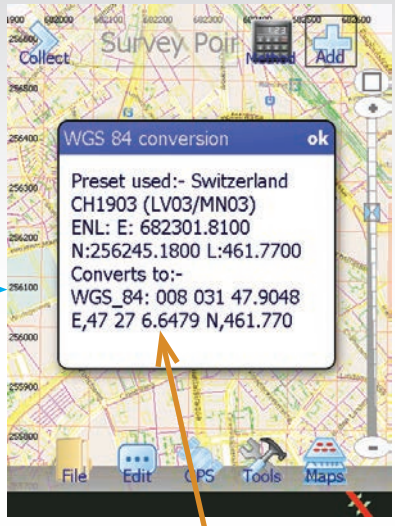
Enter Point: Highlight this text bar then key in the Easting value in metres (could possibly be US feet). Please note you can highlight **Easting** (E) **Northing** (N) **Level** (L) in any order and go back and edit them later until you finally click the **Enter button** or **Cancel button** to complete this data entry.



Once the method is selected, click to start the coordinate entering

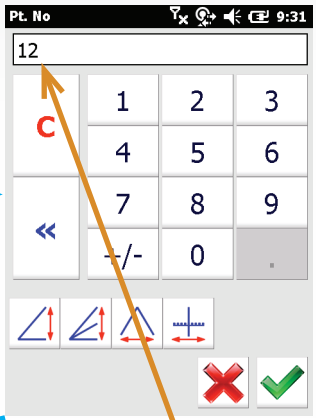
Note: You can only enter the Map coordinates as Easting, Northing and Level. Map coordinates are calculated from Latitude, Longitude and Altitude. This depends on the transformation and projection used which varies from country to country and the map system used there. You can change the projection/datum being used by reselecting it in the **Tools Menu.**

Please Note: Due to space restrictions, it is not possible to show the Easting Northing and Level simultaneously with the Latitude Longitude and Altitude on the Mobile PC platform. However you can see both sets of coordinates on a PC.

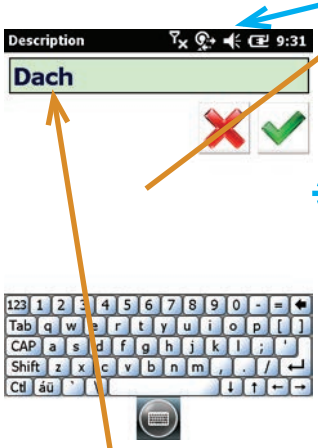


After entering all three coordinates you will see this message on the screen

Please Note: In this version of the software, the **Level** is interpreted as the **Altitude from Mean Sea Level**.



Now, depending of your schema and your attributes, you will need to enter maybe your point number and..



and a description

After all your attributes are entered please confirm it with Yes

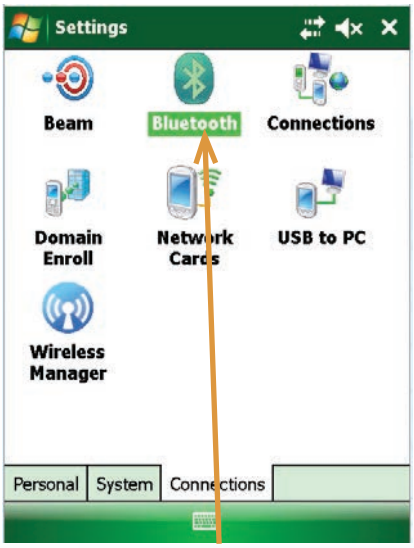
Now you can see your new entered point on the map

COGO with gestures recognition

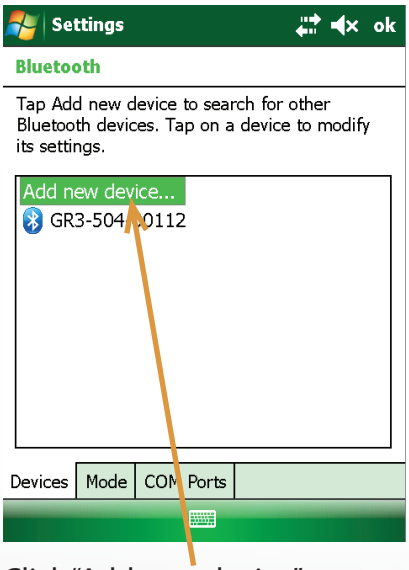
There are several possibilities to enter data, for instance manually by using tape or distancemeter, or with a distancemeter and Bluetooth connection. We will now look in details at the latter method.
First step: enable Bluetooth on the GRS1 in the Bluetooth Manager (as example only). Once enabled, the blue Bluetooth led at the bottom of the Topcon GRS1 will light up.

COGO: Using a Laser

First we need to pair the distancemeter with the device.
Also you will need to Software "Disto Transfer" from Leica in case you're using a Disto with Bluetooth (http://ptd.leica-geosystems.com/en/Support-Downloads_6598.htm?cid=12799&linkid=QMNH). .



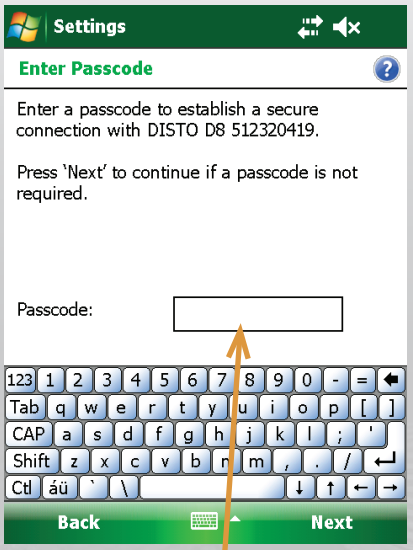
Go to the Bluetooth menu in Windows Mobile



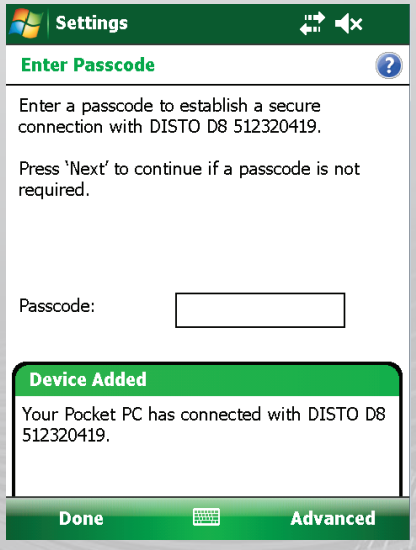
Click "Add new device".

Make sure to have activated Bluetooth on both the Disto and the handheld device. The system is looking for Bluetooth devices

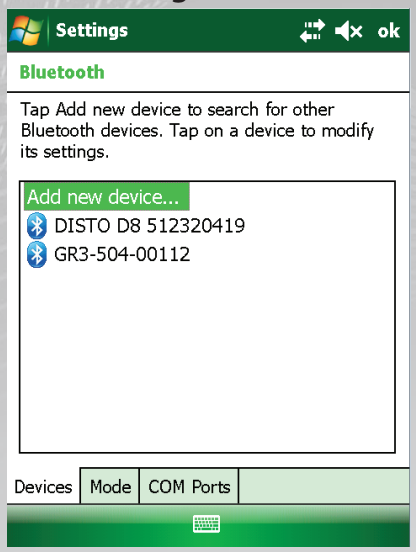
The Disto has been detected. Select it and click "Next"



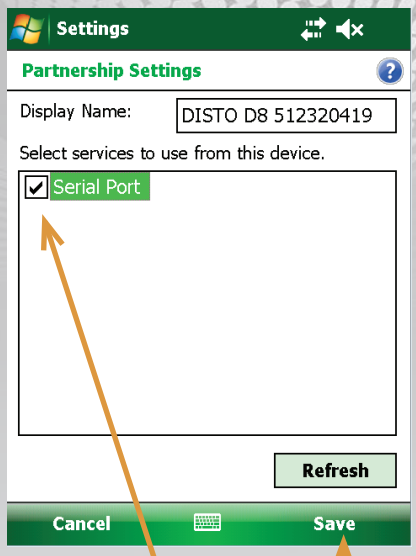
Enter the passcode (this code is often either 0000, 1111, or 1234)



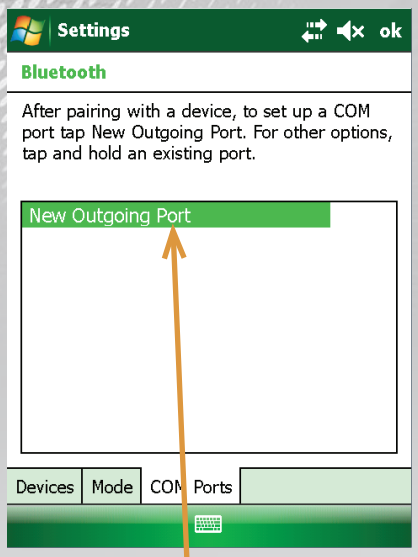
The Disto has been connected



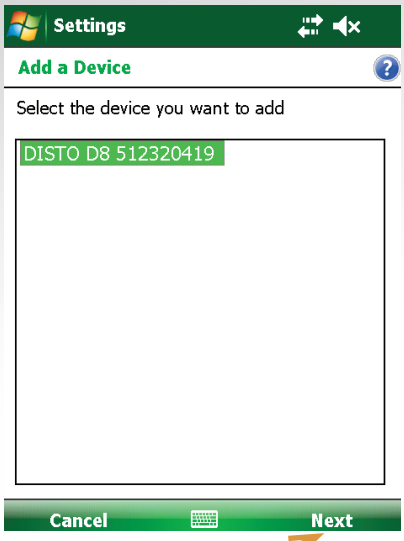
It is now visible in the list. Now click on "Mode"



Activate Serial Port, click Save

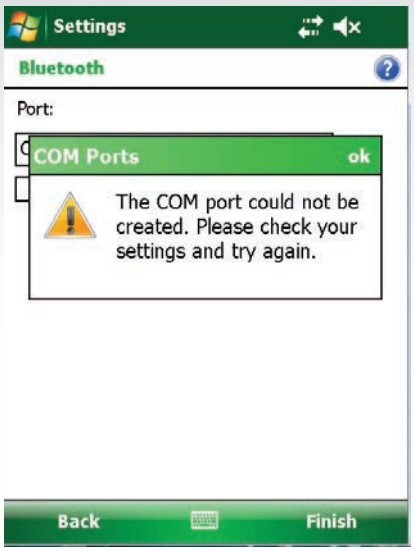


Click "New Outgoing Port"

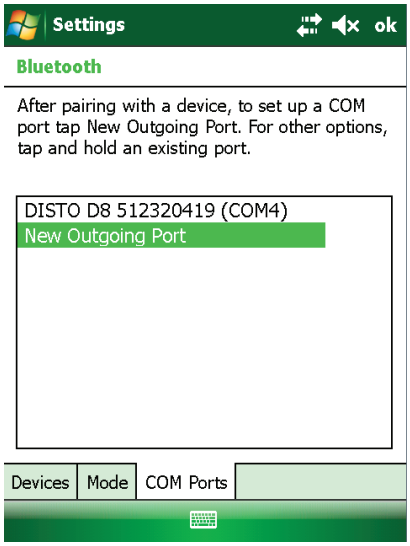


Click "Next"

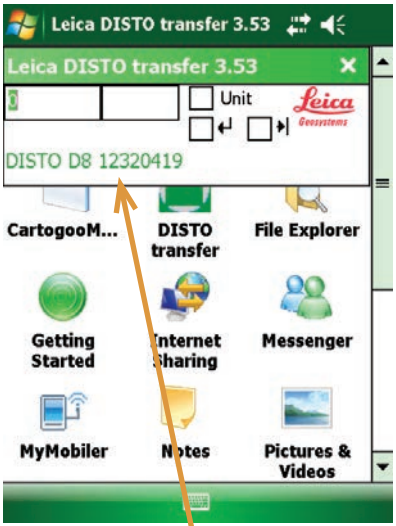
Choose the correct port. You might have to try until the system doesn't display any error messages. This port is different for each device.



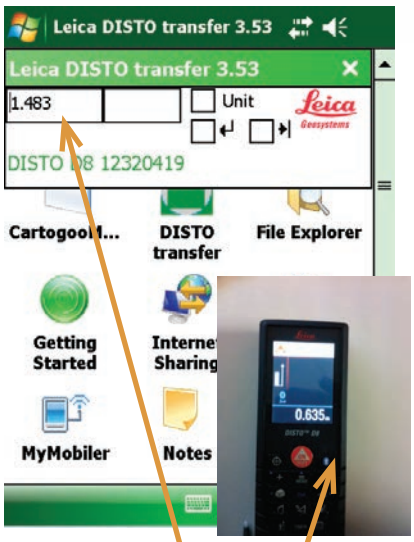
Example of an error message



The correct port has been set (here COM4)



Once the settings are correct, the DISTO will appear on your screen



You can test the transmission by measuring a point and pressing the Bluetooth button (Disto D8) for transmission. The measure shall appear as in the screen.

COGO: Using a laser

Start GIS360 once the connection is established

Select now the COGO tools

you can enter the values by hand or by pressing the Bluetooth button on your Disto to automatically enter the measure

The values can be entered as for the first circle

Select the Cogo tools.

The first circle appears on screen with the right diameter

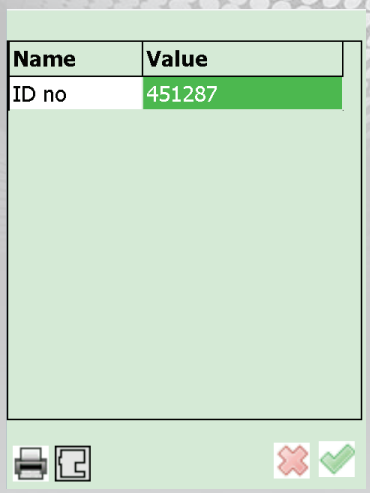
The 2 circles no appear on screen, with intersections clear and visible

Draw a circle around your first point, the next screen will appear automatically

Draw a second circle for the second point

Select the snap tool
Click on the intersection that you wish to register as your point

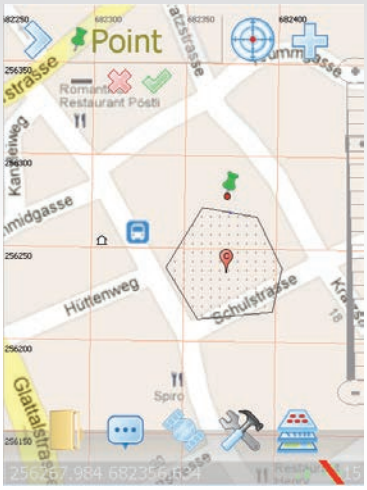
COGO: Using a laser



GIS360 will ask you now for the other attributes that you have set up for this point

You probably wish to have the point only and want to delete the construction. Click on the Edit Menu, then select delete

Here you only delete the constructions



The point now appears with its attributes, but without the constructions

You can use the CAD tools to draw a line or a polyline

We want to draw a line between these 2 points

Select the Cogo tools, then select the line

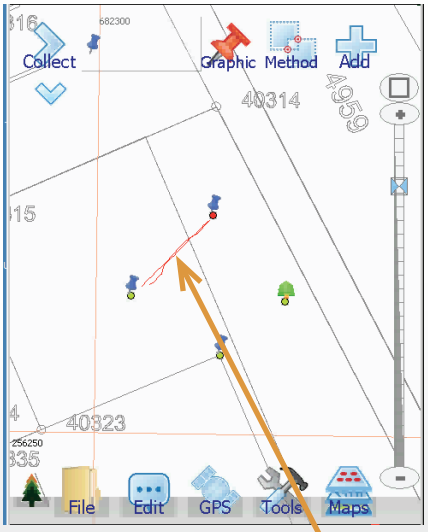
Cogo and line are selected

Remark: CAD menu is selected , from bottom of Schema

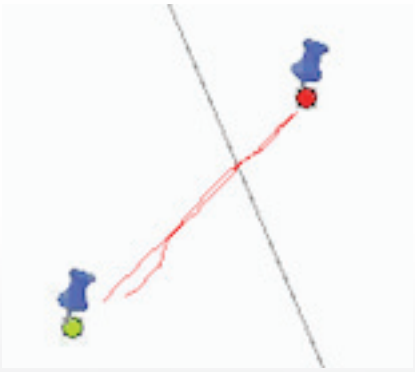
Draw a line on your screen with your pen between the two points

GIS360 will draw this line precisely

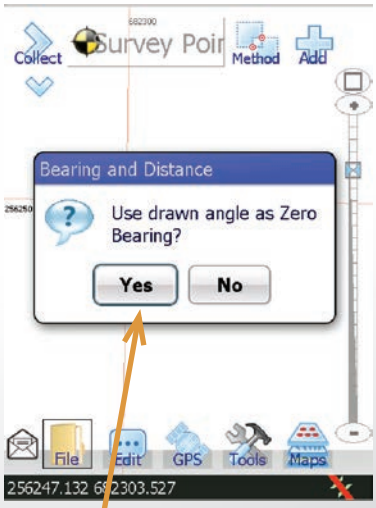
COGO: Bearing and Distance



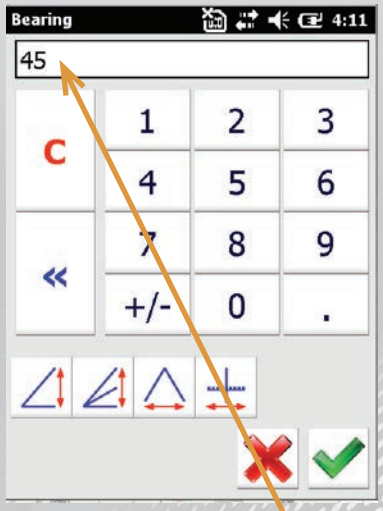
Do perform Bearing and Distance choose two points on the map and draw with your pen a line up and down between the two points.



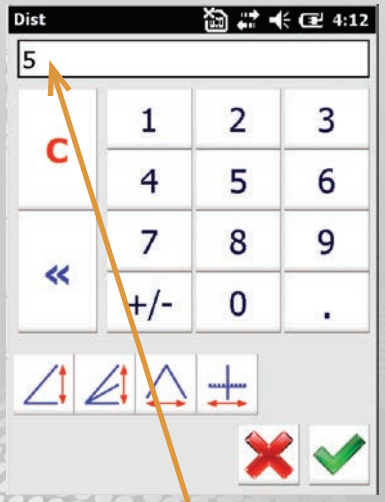
Like you can see this doesn't need to be a straight line



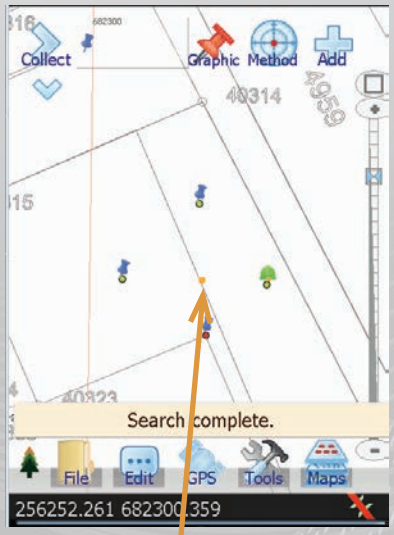
If you wish you can use drawn angle as Zero Bearing. Click on YES if so



Now enter Bearing angle..



and desired Distance, either manually or with the help of Laser distance meter



and your new point will be displayed on the map screen

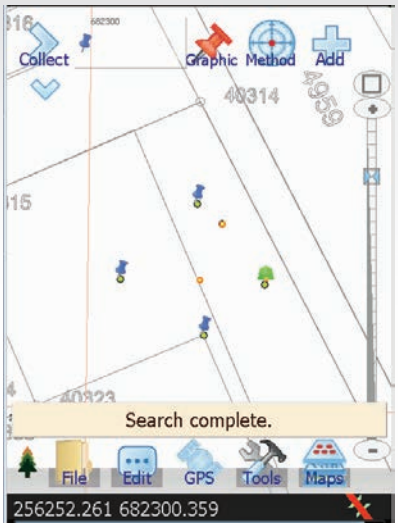
COGO: Chain and Offset

To make a Chain and Offset just draw such line between two points

and you will be asked to put in the Chain distance and then..

the offset distance as well

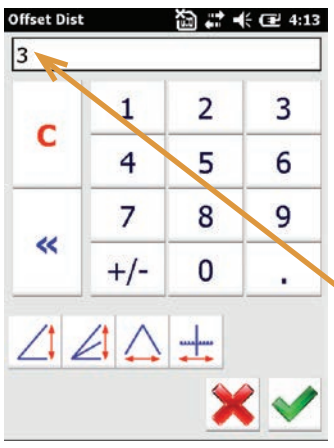
As a result you will see new point on the map



Now you need to change Method from COGO to Snap

and your point will be properly mark on the screen

COGO: Line Offset/Parallel



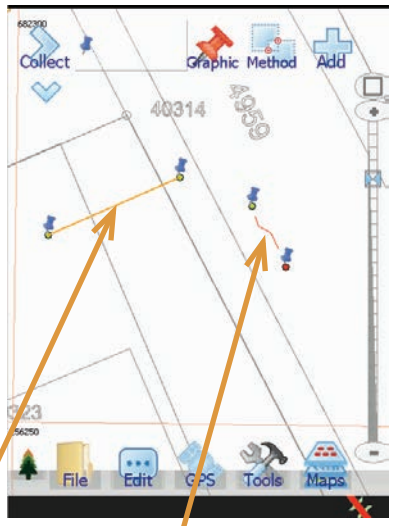
To be able to make a parallel to an existing line or even a parallel between two points, you need to drawn a two lines with a pen, from first to second point and again from first to a second point

So now enter the desired offset and you will see the result on the screen

COGO: Line intersection-Simple

If you wish to make an intersection point then you need to have either 4 points or two already existing lines

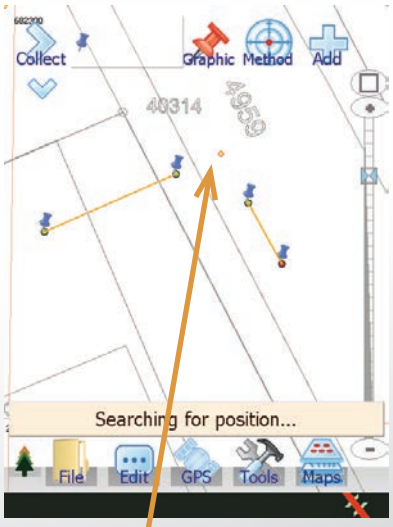
Like learned before draw a line between first to points. New straight line will be the result



and then draw a second line between second two points

New straight line will be the result and you will get a intersection point as well

Now just change from COGO Method to a snap



And click with the pen on the intersection point it self

COGO: Line intersection-Multiple

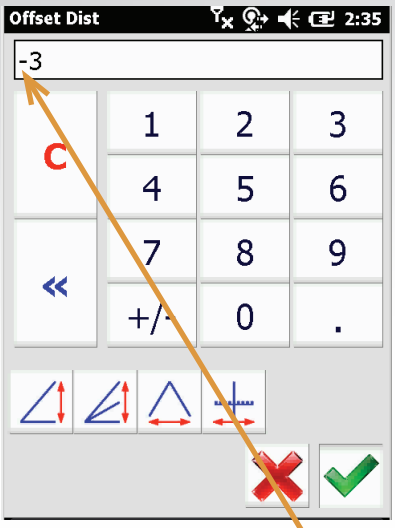
To do more complex intersections is very easy. For example if you have two more points to be used then..

Draw a line between first to points. New straight line will be the result and an new intersection point as well

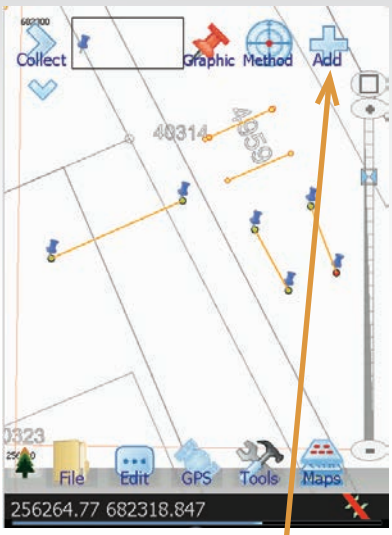
Drawn a line with pen between two new points

Line is straight and now..

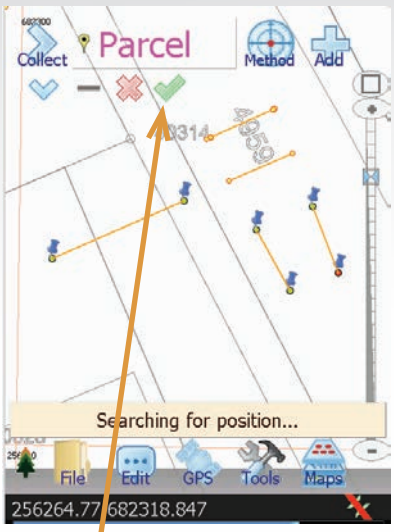
Drawn a second time a line starting from the fist point again. This will provoke a..



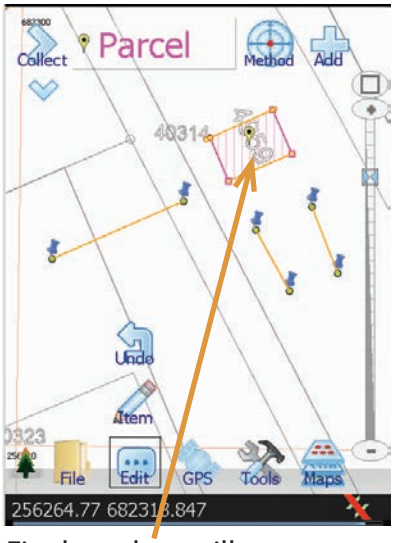
New window in which you need to enter a offset. If you need a new line top be left from your line enter the offset distance like in our case with (-)



Second line will appear on the map. Now press + to start for example Parcel and



Start snapping from first to last point and close it with Yes



Final product will appear on the map

GNSS Method

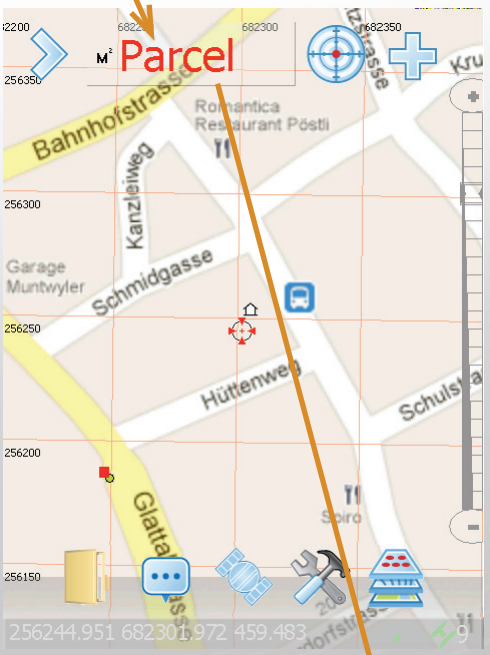
GNSS Method : Make sure you have got the GNSS device connected to the correct port. Instructions are under **Tools Menu: GNSS Port**.

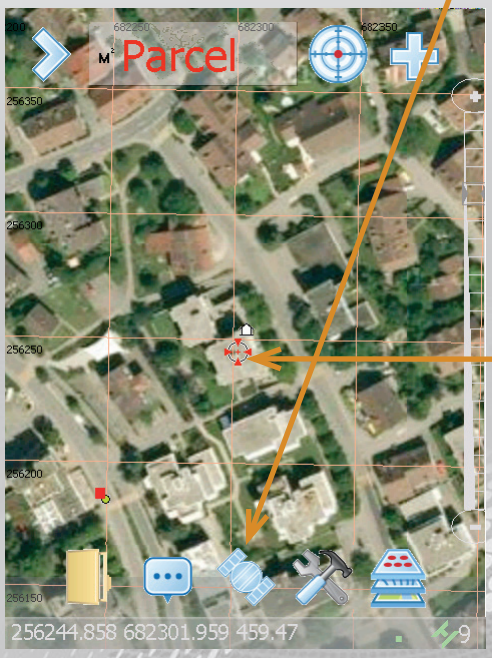
GNSS Accept: Click this button whenever you need to record a position at the GNSS cursor.

GNSS Enable: Click this button to enable the GNSS.

GNSS setup: Please note this version of the application assumes that the GNSS device will automatically transmit NMEA instructions at a baud rate of 115'000, com 7, Port 7, 1 start bit, 8 data bits, 1 stop bits and no parity. If you use Bluetooth ™ these values are not important.

GNSS Accept: For instance if the Graphics was set to **Parcel mode**, a trail would be created joining consecutive **Accepted GNSS points.**



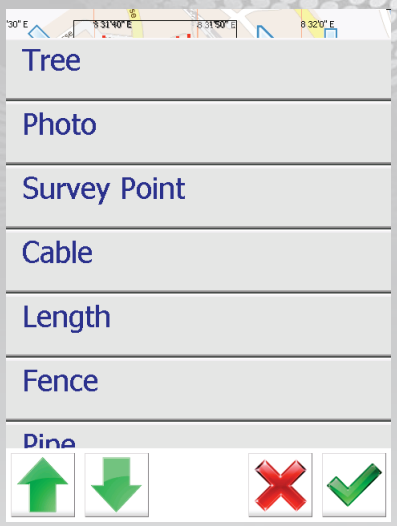


GNSS Enabled: The current GNSS position is shown by this cursor:

GNSS Enabled: Select your **Graphics Mode** to create new objects from selected points using **GNSS Method.**

Graphics Menu CAD

Graphics: If accepted, you will be offered the list of attributes available for that Graphics Mode.



Linear Mode: A trail of points will be created indicating a pathway or boundary of some type.

Area Mode: A trail of points will be created that will always be a closed pathway or boundary of some type.

Single Point Mode: A single point item will be created in this mode.

After pressing the **single point item**, a new sub menu will appear with the choice of Single Point Mode, Linear Mode and Area Mode

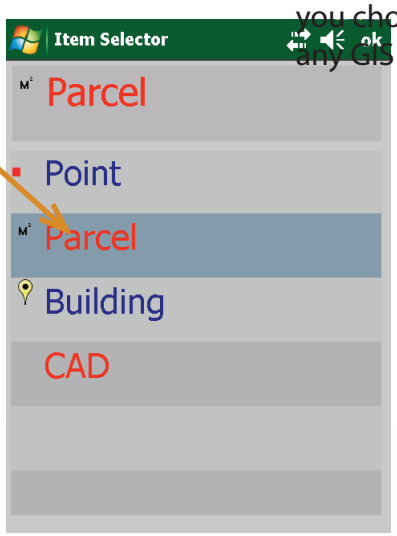
Please note: Once you select a mode, it is only valid for the lifespan of creating the new graphic item. To use it again to create another item, you have to reselect the mode in question, by pressing at big PLUS.

Note: Single Point Mode items do not require closure, they are automatically accepted but may be removed later using Edit: Undo.

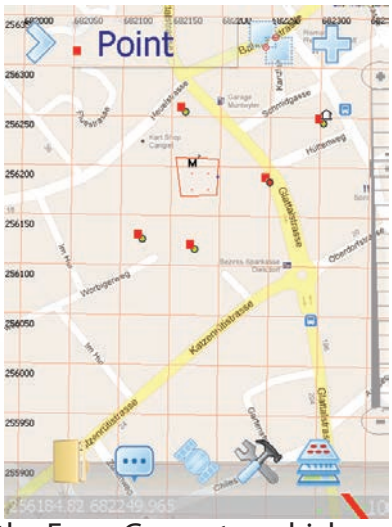
Graphics: When a new Graphics Item has been constructed, you can Accept the data or Cancel it.

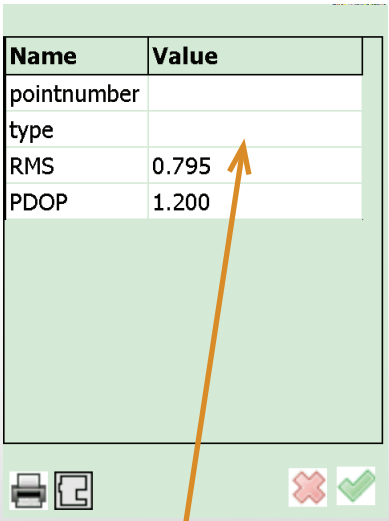
Graphics Menu: GIS

Single Point Mode: A single point item will be created by selecting this button. When a new point is added to the map sheet, a new Pin Point symbol will be created.



Single Point Mode: Select your position using tap point, snap point, enter point or GNSS point. The next screen frame to be shown is the one where you must choose which GIS. If you choose <**CAD**> the feature will not have any GIS fields attached to it.

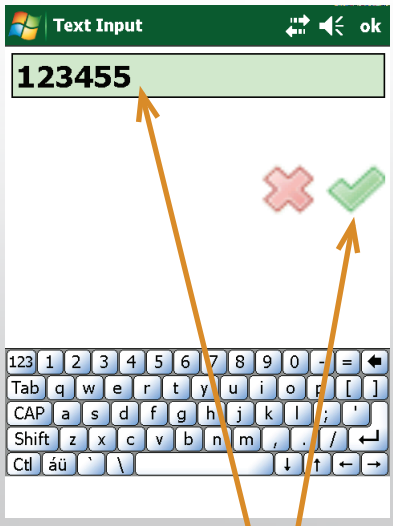


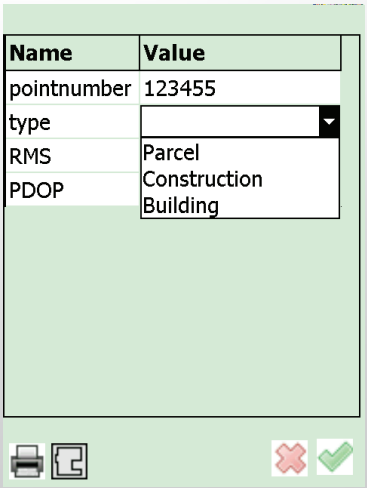


Name	Value
pointnumber	
type	
RMS	0.795
PDOP	1.200

Note: The style of these entries can be set in the Form Generator which creates Schema (*.XSD) files that control the way data is requested and edited.

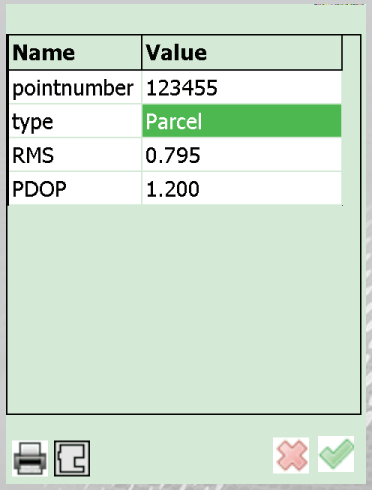
Graphics Menu: GIS Single Point





Name	Value
pointnumber	123455
type	
RMS	Parcel / Construction / Building
PDOP	

Graphics: Finally the table of the chosen database can be populated with relevant data. if the Accept button is clicked otherwise Cancel bypasses this operation.

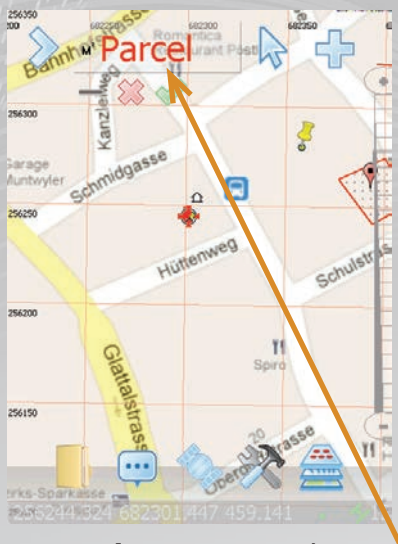


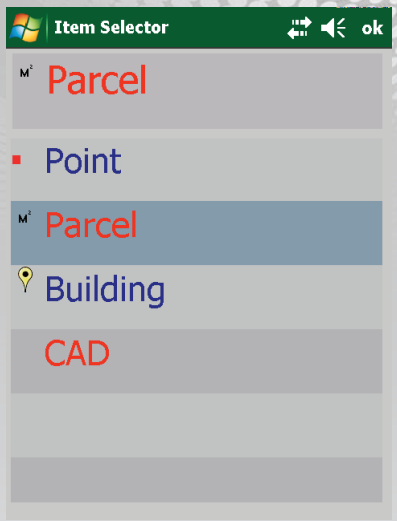
Name	Value
pointnumber	123455
type	Parcel
RMS	0.795
PDOP	1.200

Single Point Mode: Populate the fields according to relevant values then click the tick mark to accept the entries.

Single Point Mode: After refreshing the map area, the data pin point should appear.

Graphics Menu: GIS Area Mode

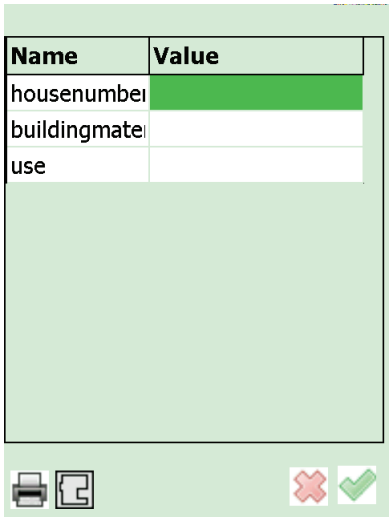


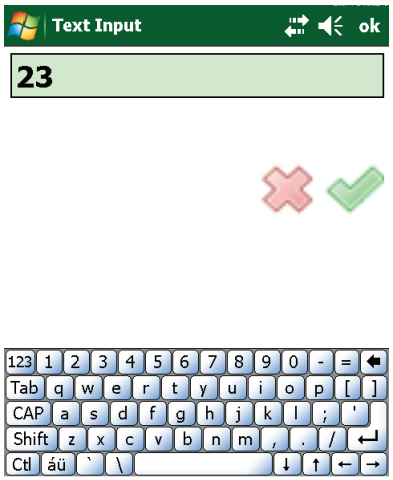


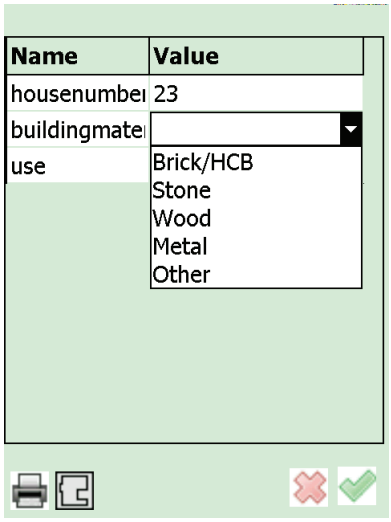
GIS Mode: Tapping in this window will list all options available:

GIS Mode: if you wish to survey a building, press Building.

Measure your points with the appropriate method, then confirm with the green button

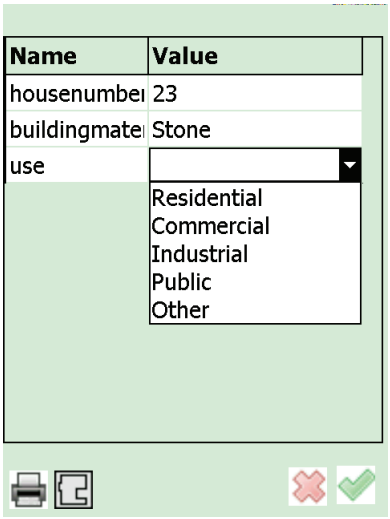


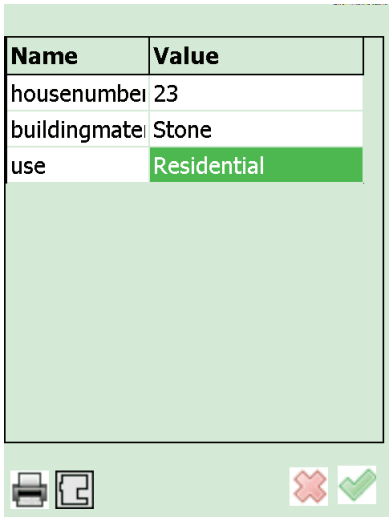


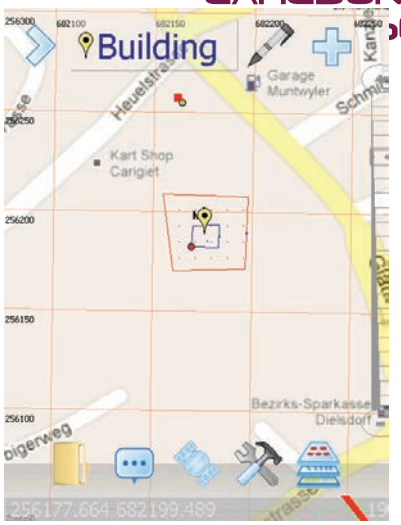


GIS360 will guide you to enter the values you have set up for the chosen item.

Note: The style of these entries can be set in the DataDesigner which creates Schema (*.XSD) files that control the way data is requested and edited. For more details, see chapter DataDesigner.







Graphics Menu: Linear Mode

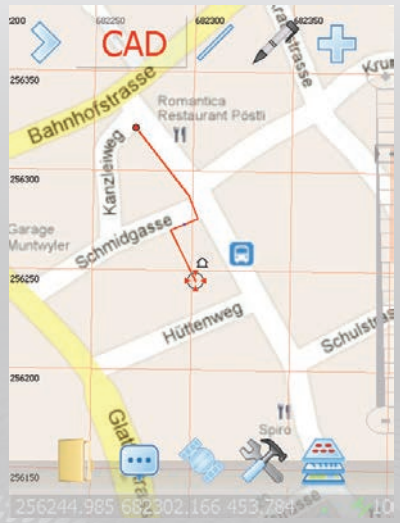
Once all values entered, the item appears on screen with all its attributes

Cancel button Accept button

Linear Mode: Use the point method you have selected (can be altered any time during the operation in this mode), to trace out the path of this linear object. Use the closure buttons to complete or cancel the polyline.

By clicking accept, if you have selected a database, the next screen will pop up

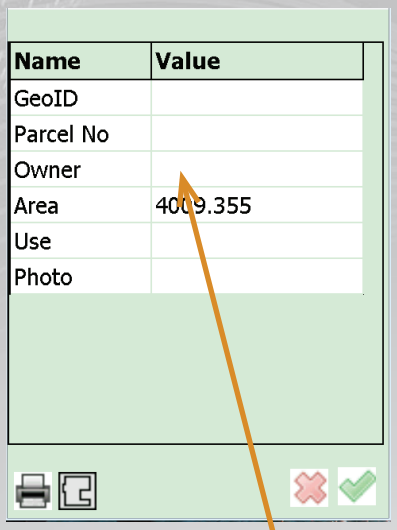
Linear Mode: A linear type item will be created by selecting this button. When new points are added to the map sheet and accepted, a **new Linear Mode** Item will be created.



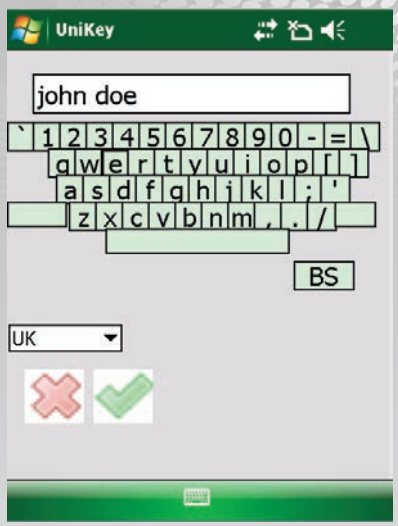
Linear Mode: Finally, the linear item (polyline) will be shown along with a marker. This marker is used to identify the item and allow the attributes to edited or viewed in the future. Also the entire linear item and attributes may be removed (see **Edit Menu: Delete** for details).

Note: The style of these entries can be set in the DataDesigner which creates Schema (*.XSD) files that control the way data is requested and edited.

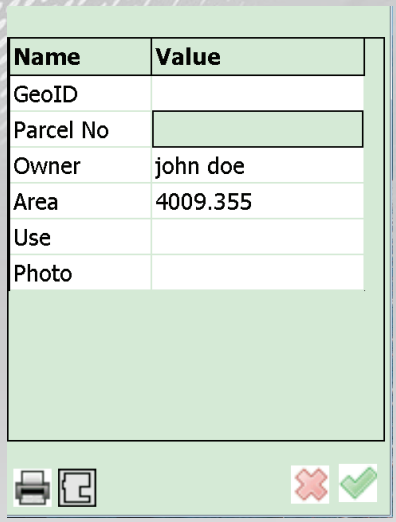
Graphics Menu: GIS Area Mode



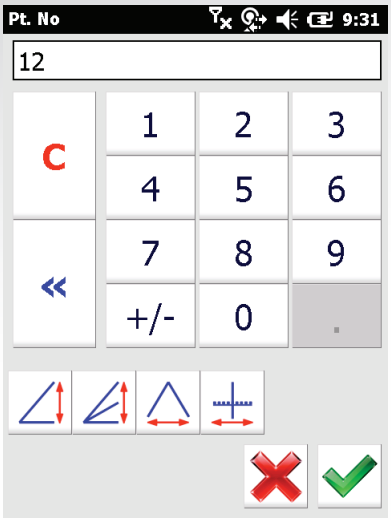
Clicking into the "Owner" field will bring the keyboard in this case.

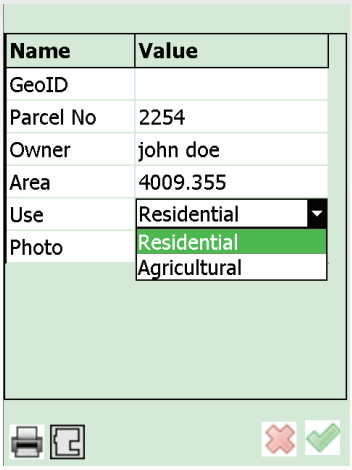


All values can be entered or skipped. For each field, either a list menu, or a key-board, or a numeric pad will pop up.

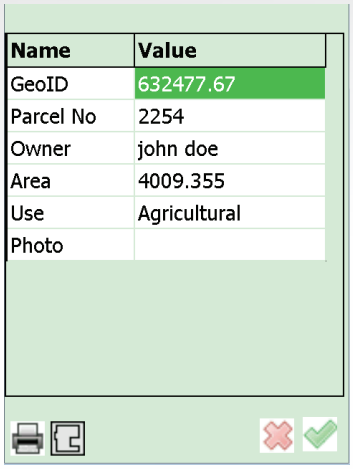


Clicking into the "Parcel Nr" field will bring the numeric board in this case.



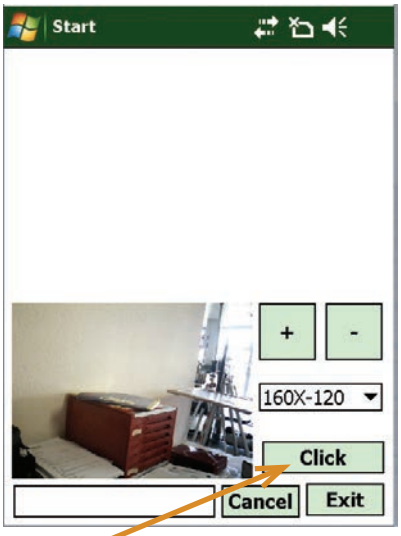


Clicking into the "Use" field displays a pulldown menu.

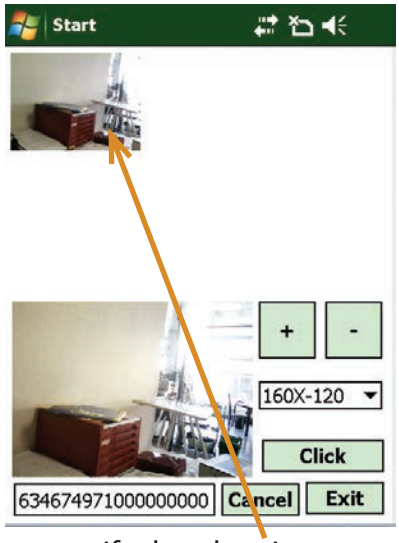


All values are now entered, only the image is missing.
Rremember you don't have to enter all values, you can skip some of them or skip them all.

If your device is equiped with a camera, you can simply double click the "Photo Field"

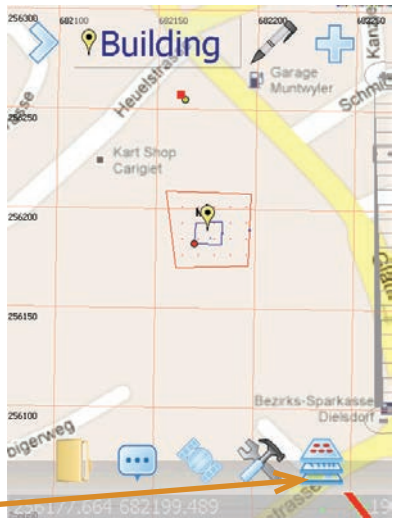


"Click" to take the picture



You can verify that the picture corresponds to your expectations, then "Exit" to register and exit this mode

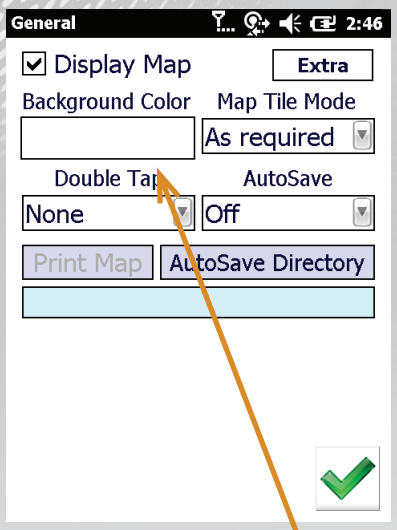
Map Mode



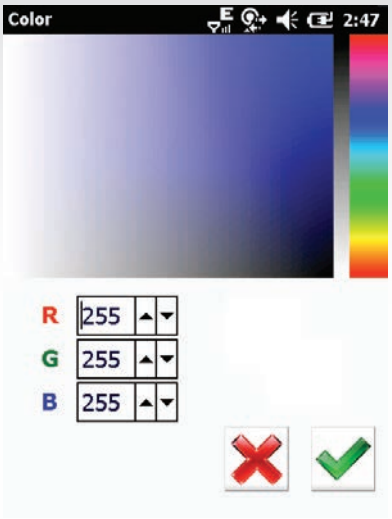
Map Mode: Clicking this button will produce a change in the type of background map being used.

Tools Menu
General

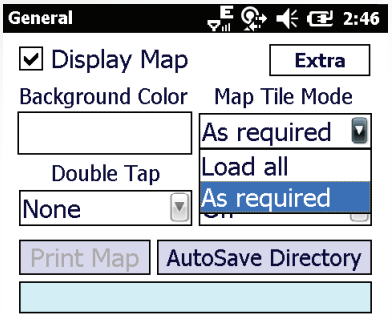
Configuration: Clicking this button will allow you to view the available configuration properties and the ability to store some local maps for use in wireless shadow regions*.

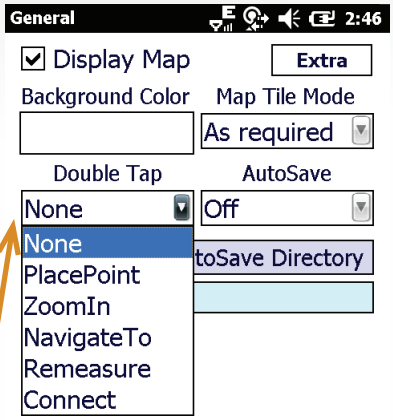


You can choose the background color. When clicking in the area from background color, you will be given the choice of colors

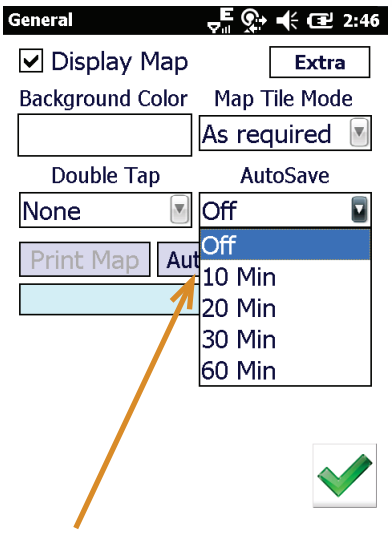


You can define the background color by clicking in that field.

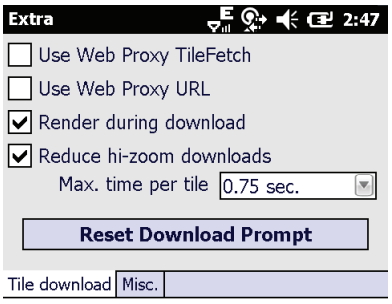


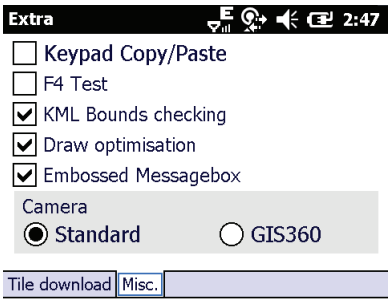


The double Tab function allows the user to place to point, to zoom , or to navigate to



Autosave



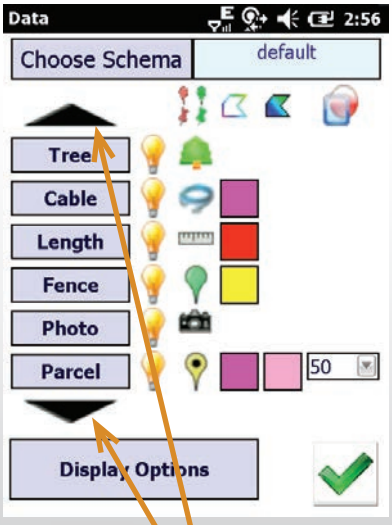


Tools Menu
Key

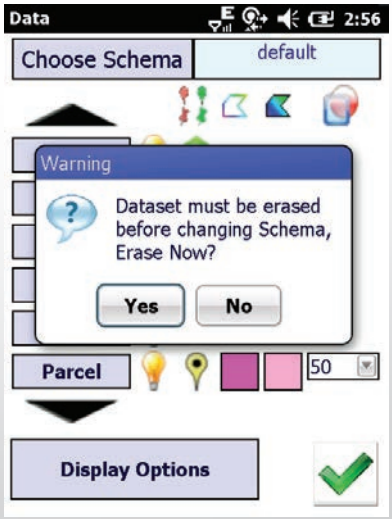
In previous pages, on the beginning of this user manual, we already described the key installing/activation process. Here we would like only to point out the fact that in the same menu you can change the language version of GIS360.
Also for units with very lower performance and shortage on Main RAM user can display memory available, just to be on the safe side if he has enough "power" to run the GIS360.

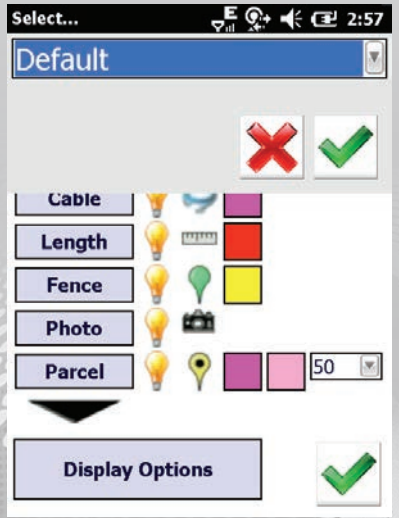
Tools Menu
Data

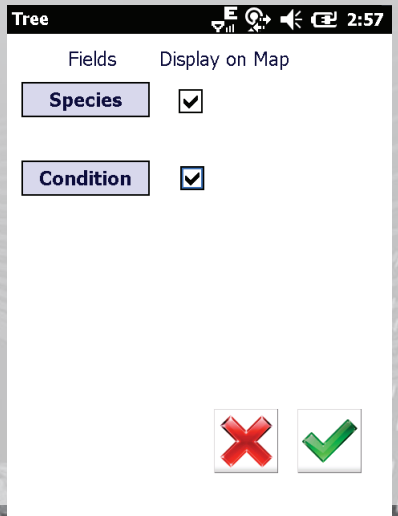
Main Data Configuration screen



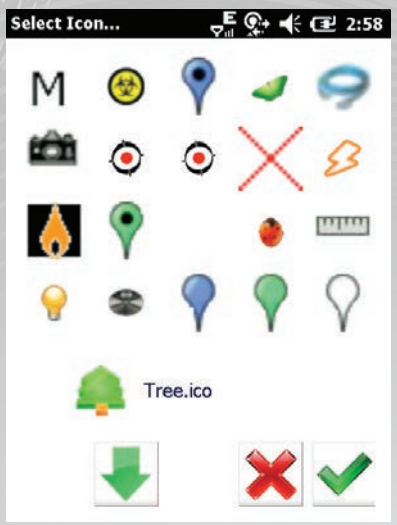
The black arrows help for the navigation through your attributes, if you have more than 5 or 6 attributes

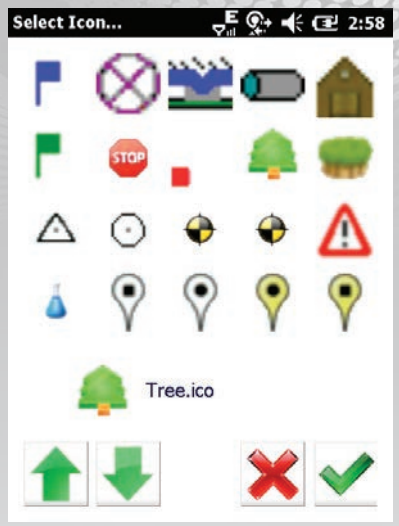


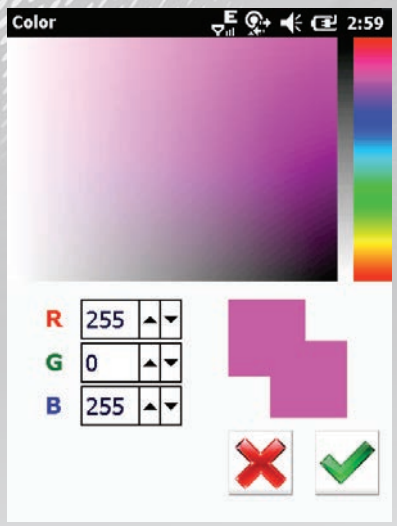




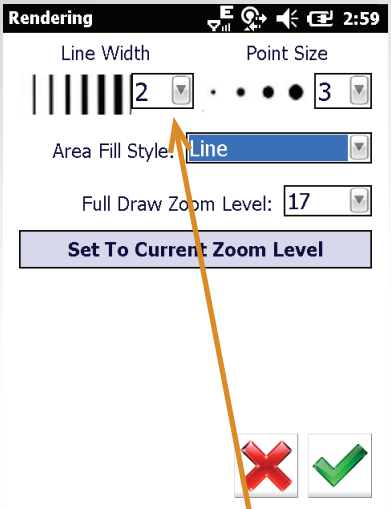
Tools menu: Data



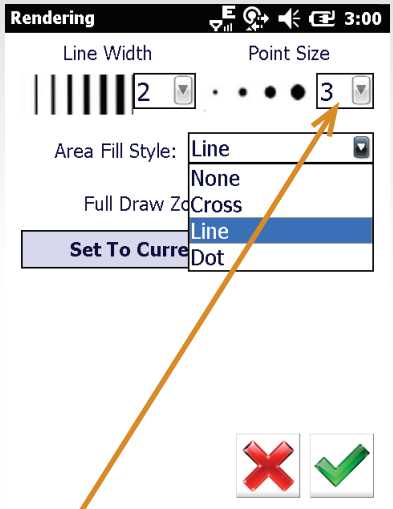




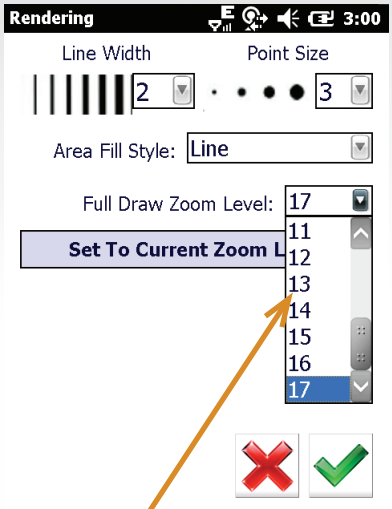
Choose the colour and confirm



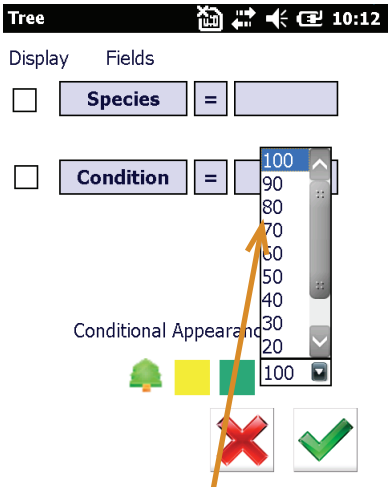
Define the line thickness. When clicking on the attribute, you will be asked to choose the desired colour



Define point size

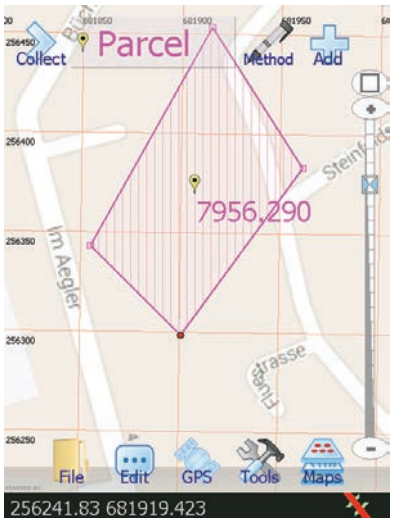


Or Full Draw Zoom Level

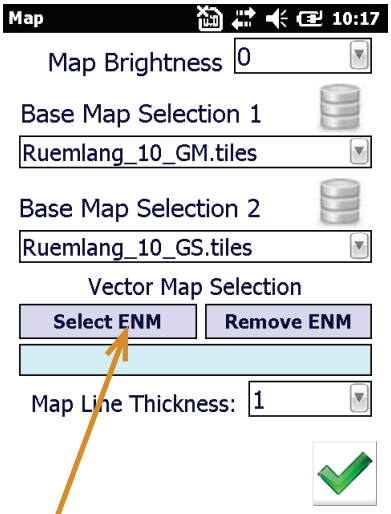


choose the opacity or transparency

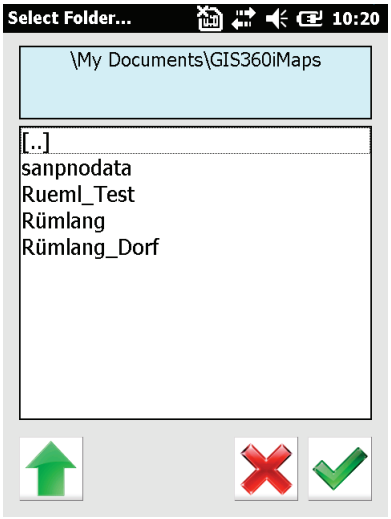
Note: The style of these entries can be set in the DataDesigner which creates Schema (*.XSD) files that control the way data is requested and edited. For more details, see chapter DataDesigner.



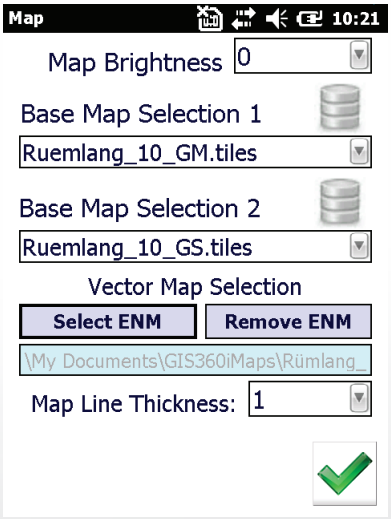
Tools Menu
Map/ Load DXF/DWG



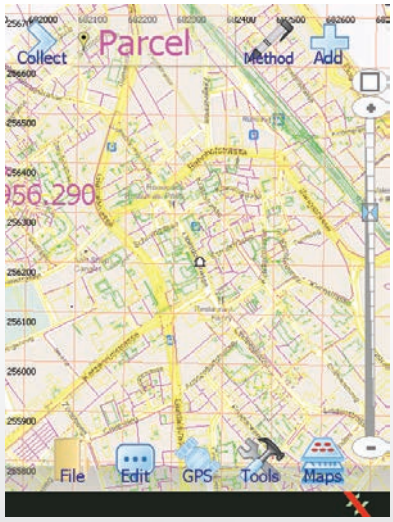
To load ENM tiles, click "Select ENM"



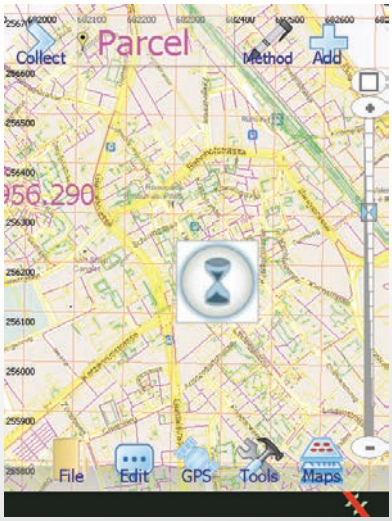
You can now choose your file or browse another folder and select the file you intend to use.



Desired file is listed now. confirm with Yes

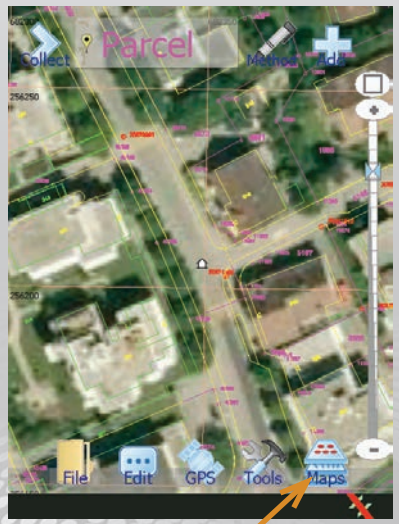


Your chosen file appears on the screen.

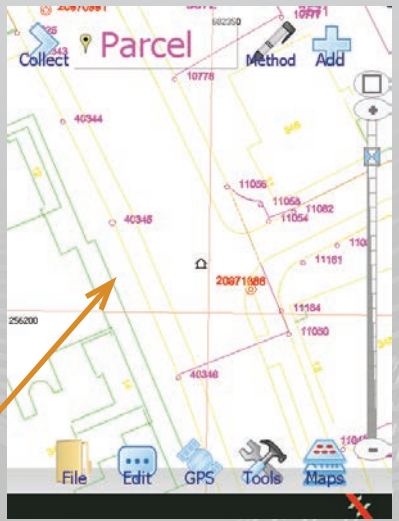


If you decide to zoom it bit more, this may take some time, depending on the size of your DFX/DWG file.

Your zoomed file appears on the screen.

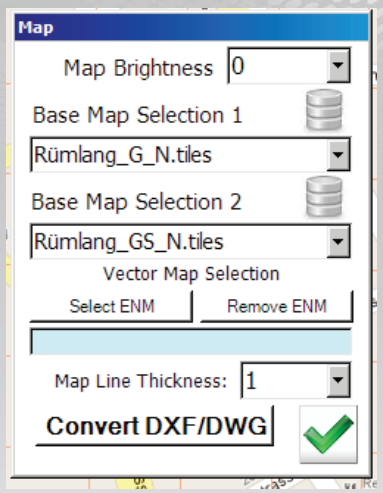


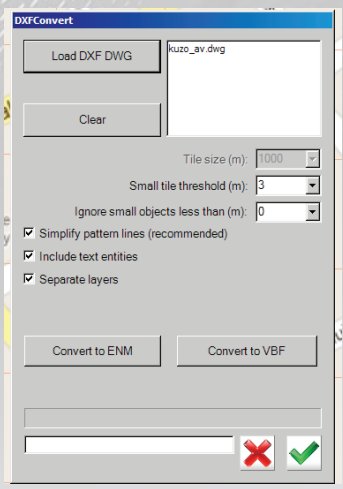
If you wish to change backgroud map just press the Maps icon, once or twice

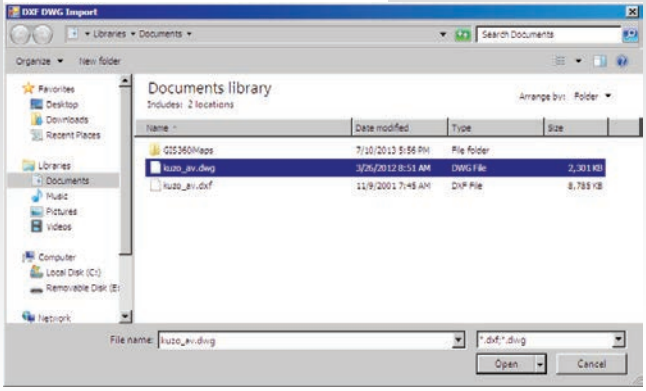


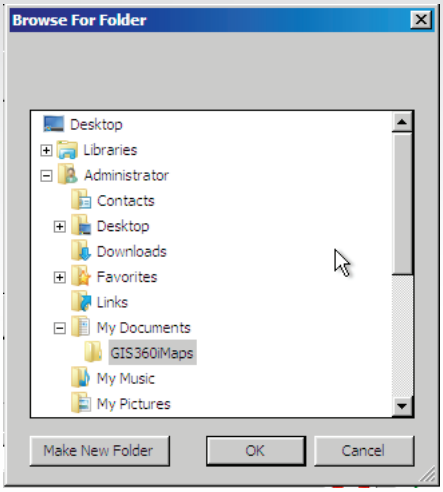
Tools Menu

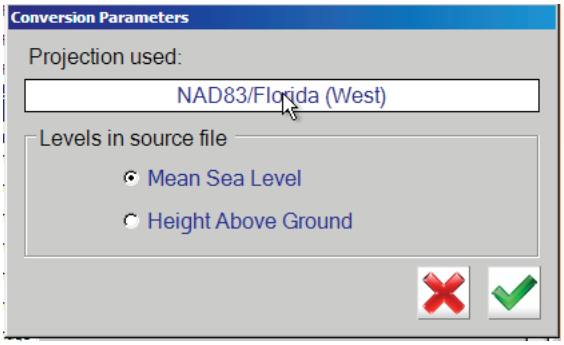
Map/ Create background map with DXF/DWG on PC

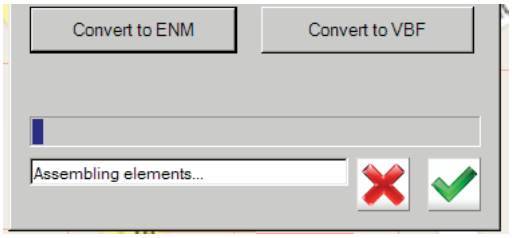


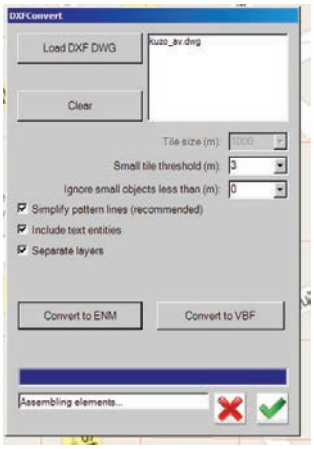


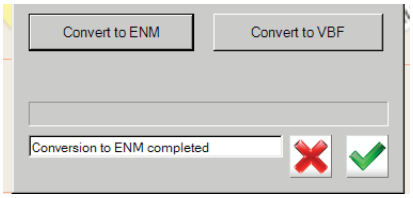


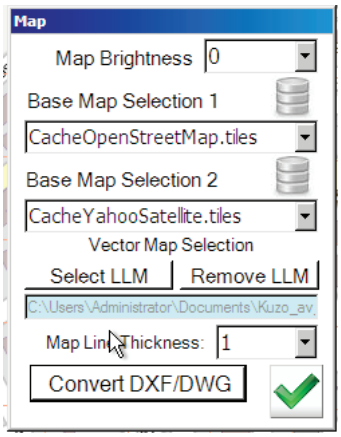


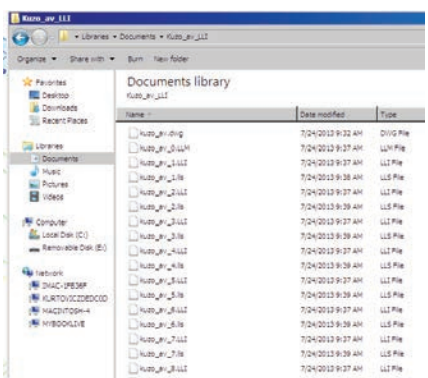






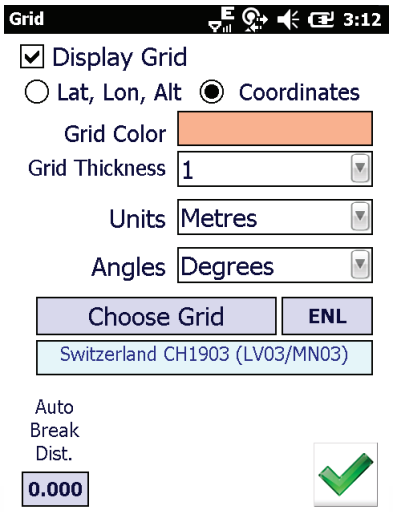


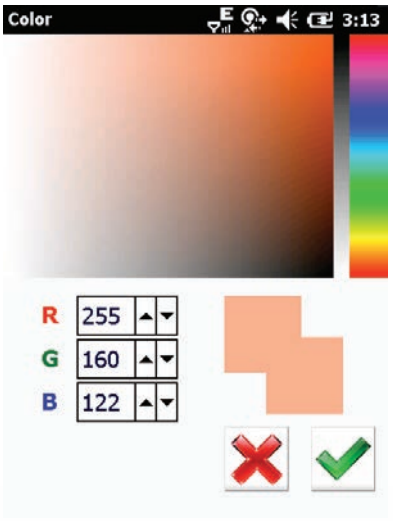


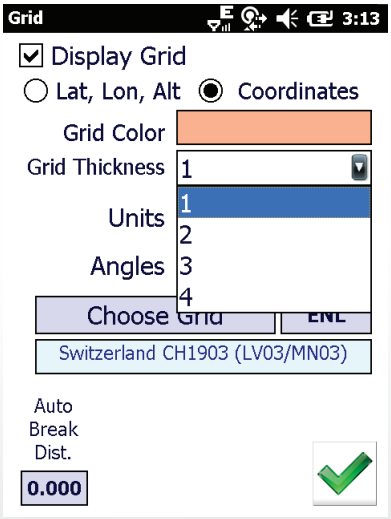


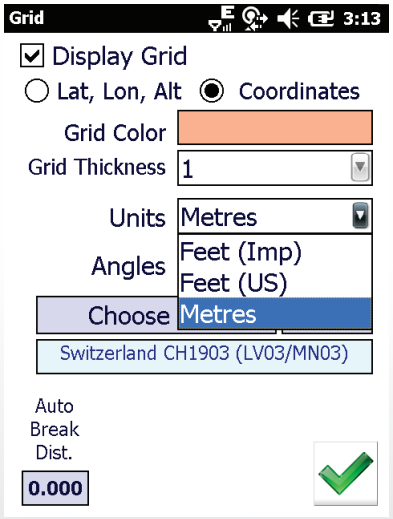
Tools menu

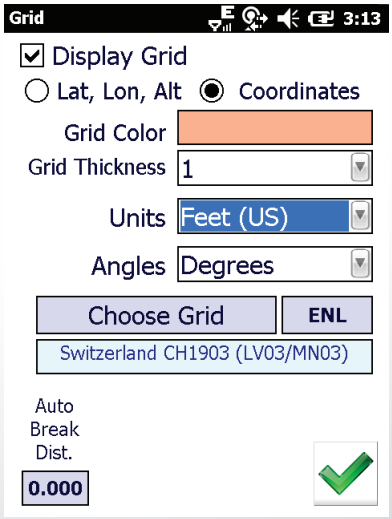
Grid

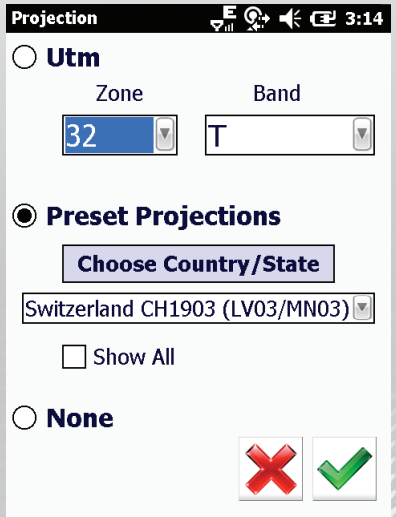


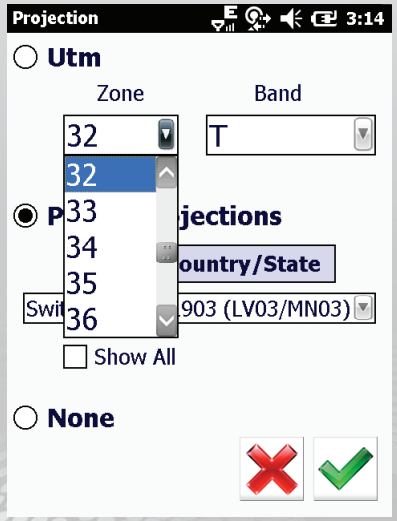


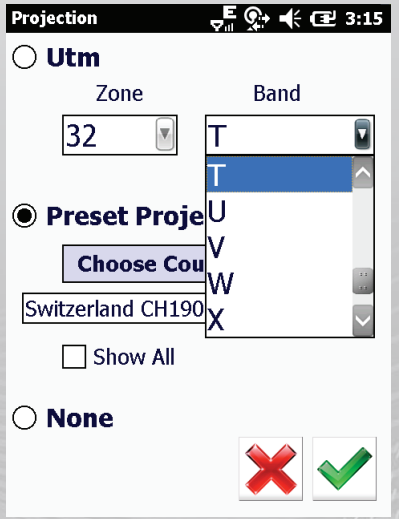


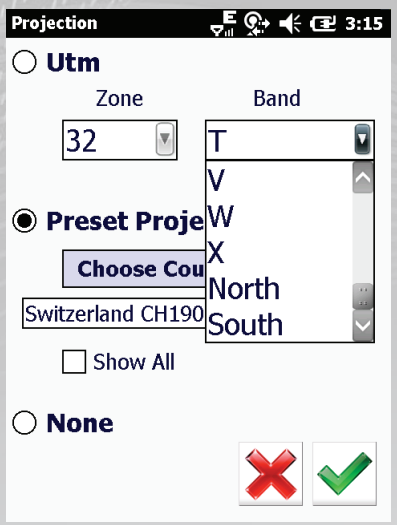


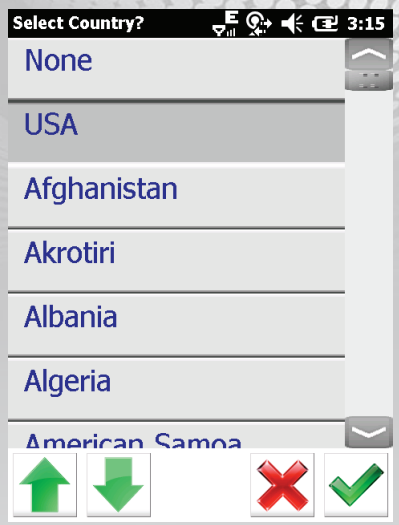


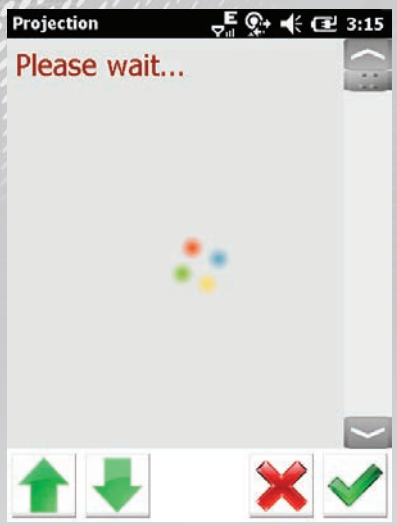


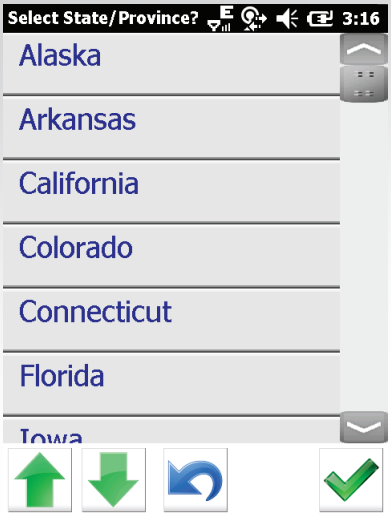






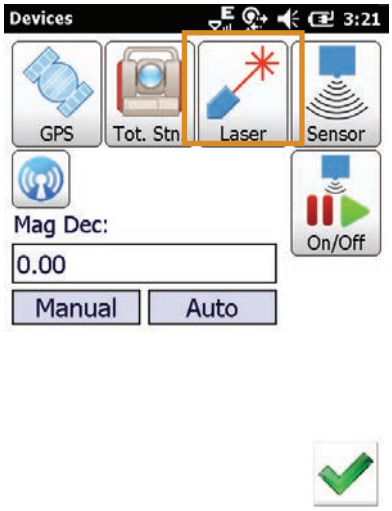


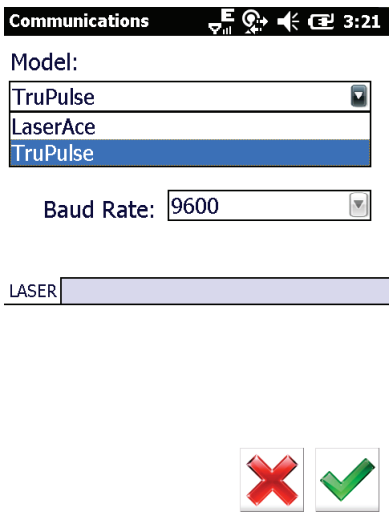


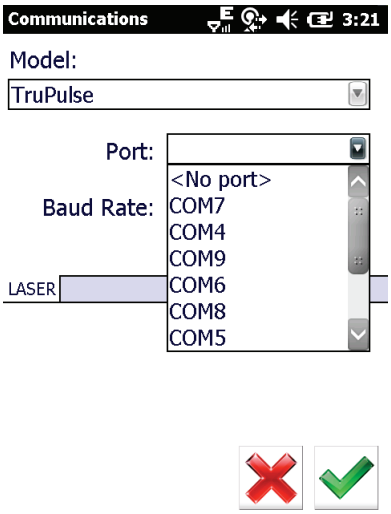


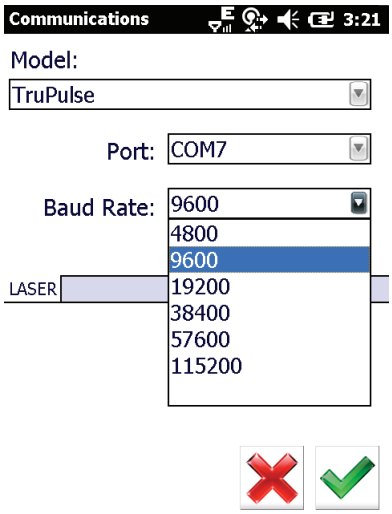
Tools menu

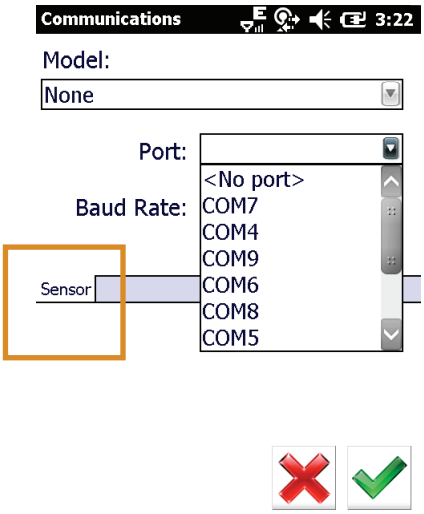
Devices

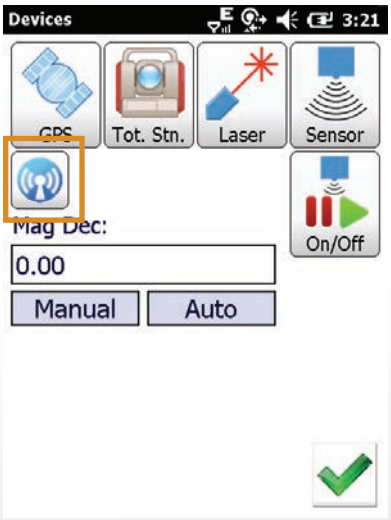


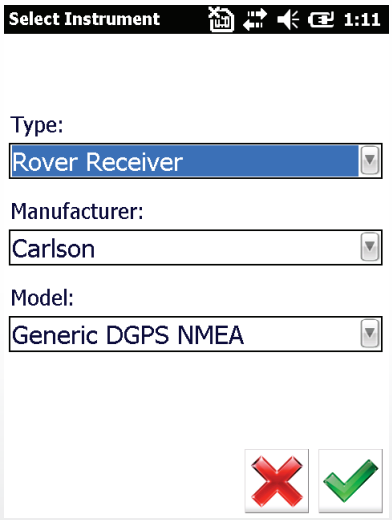






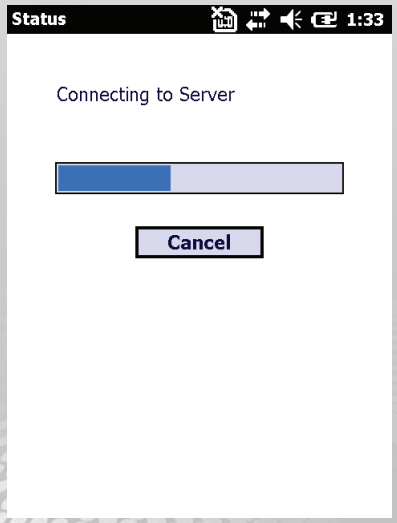






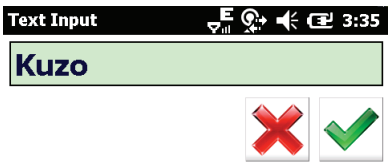
Tools menu

GPS



Tools menu

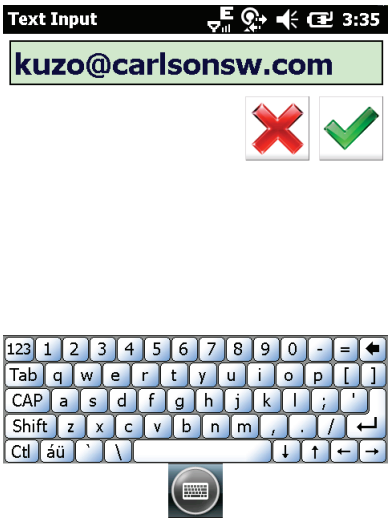
eCom



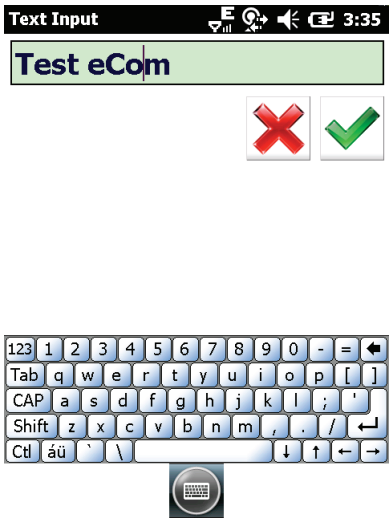
GIS360 can be configured to send periodical emails with the saved field-work. This feature allows the office to be precisely informed about the work progress.

Click on the arrow next to "Email Comms" to see the list of possibilites

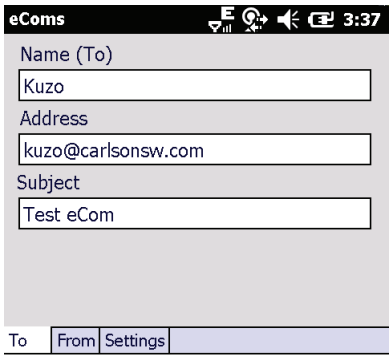
To set Name, Adress and Email of addressee, tap in the green box to show the keypad



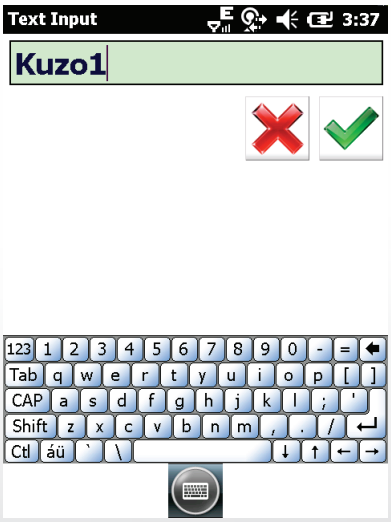
Enter the corresponding information

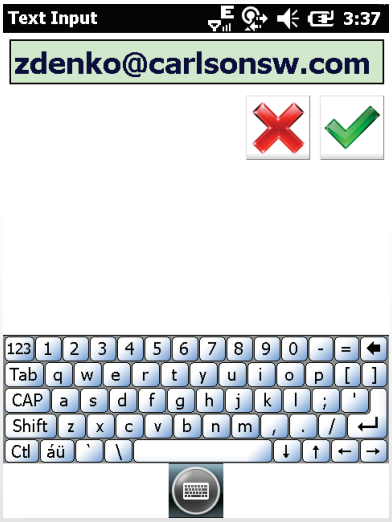


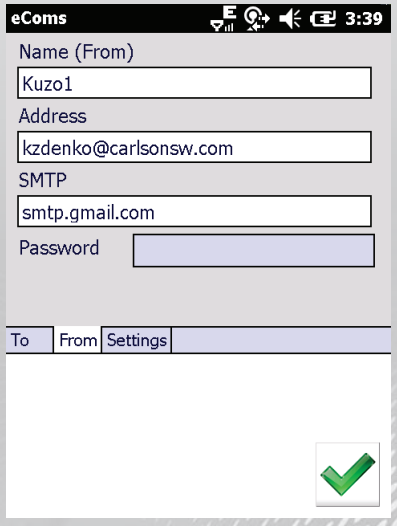
Enter the corresponding information. **Remark:** Subject can't be empty.



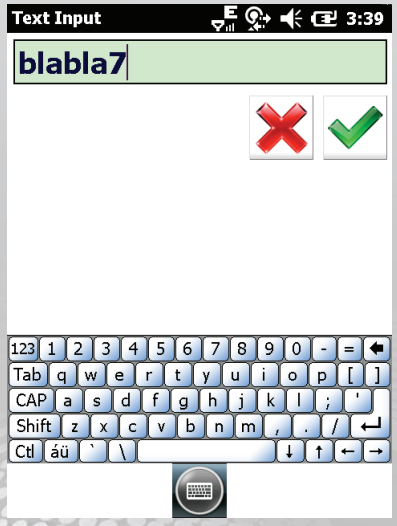
Enter all necessary information for "To"

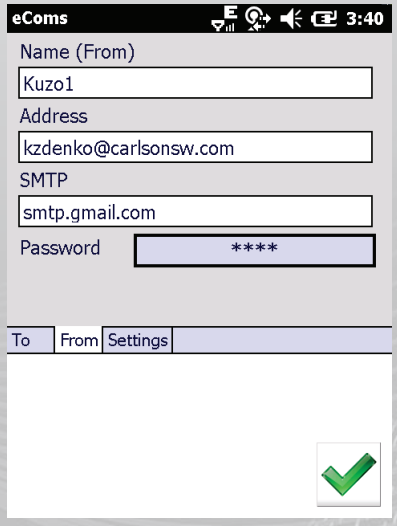


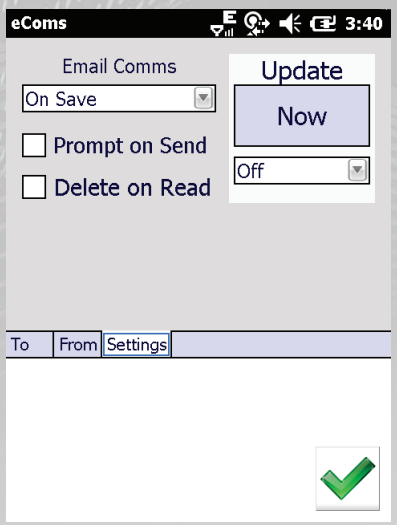


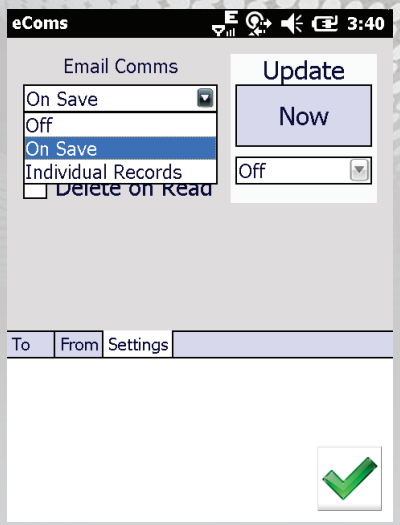


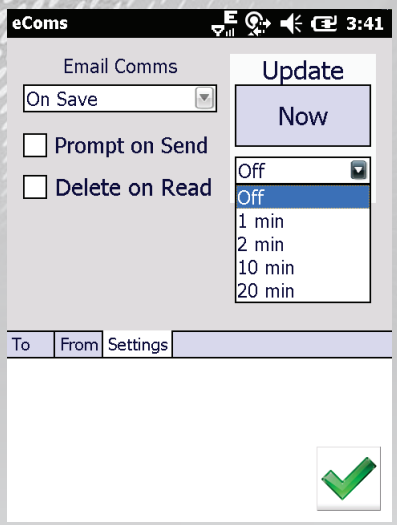
Enter all necessary information for "From" including your password for email account





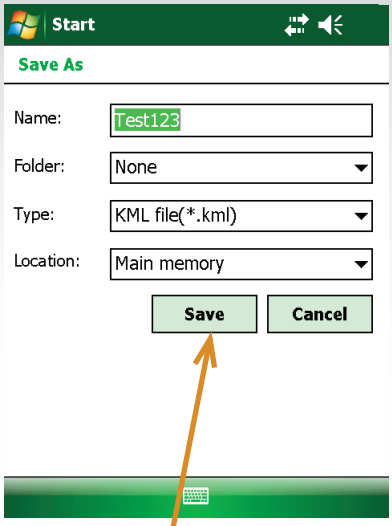




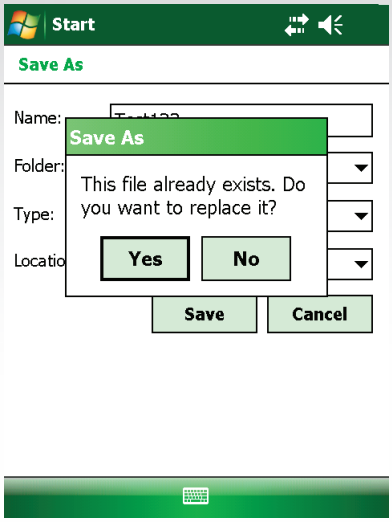


If you have set the Ecoms on "Individual Record", the data will be sent as soon as you close any GIS object

To test the Ecoms settings, will shall save the work in order to send the file

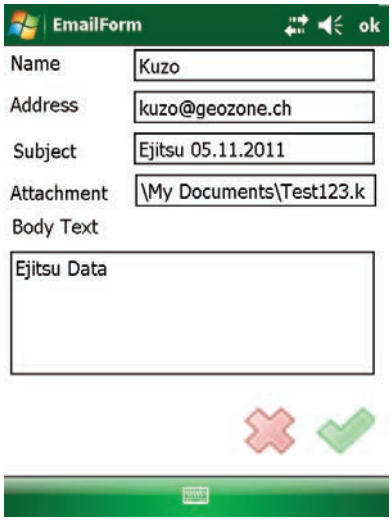


Enter Name, Type of file, Folder and Location, then save

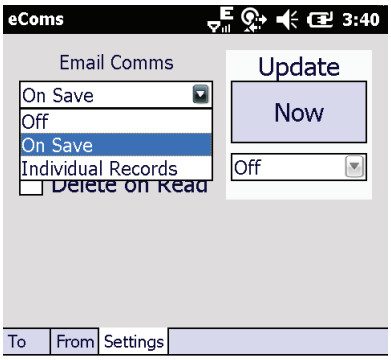


If this file is already existing, a pop up message will ask if you want to replace this file, if yes, your file will be saved

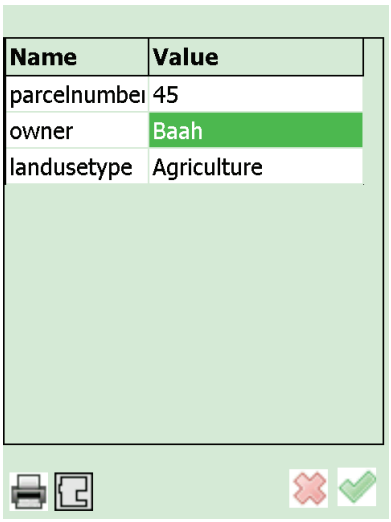
Upon saving, a message confirming that the file shall be sent



Now the file is shown in the "Attachment"



If you have set the Ecoms on "Individual Record", the data will appear as in the next screen

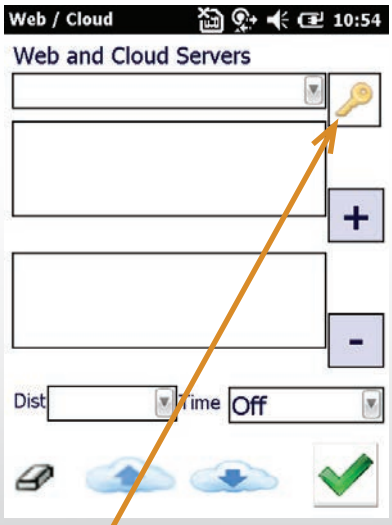


Confirming with the green arrow will send the file by email

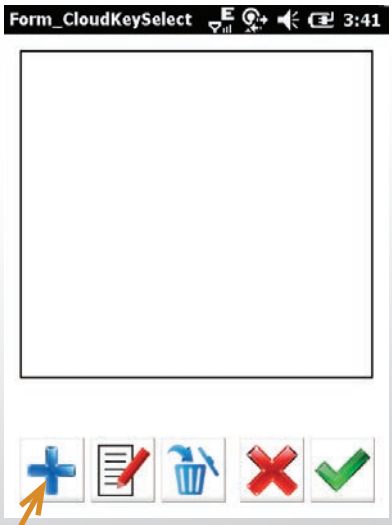
Tools menu

Cloud-using your own cloud server (Amazon)

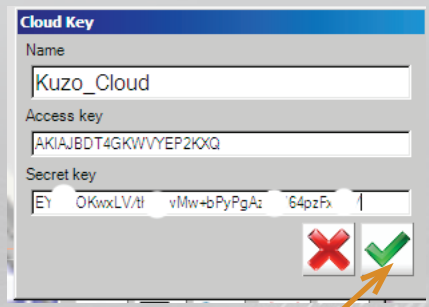
To start Cloud go to Tools and then cloud



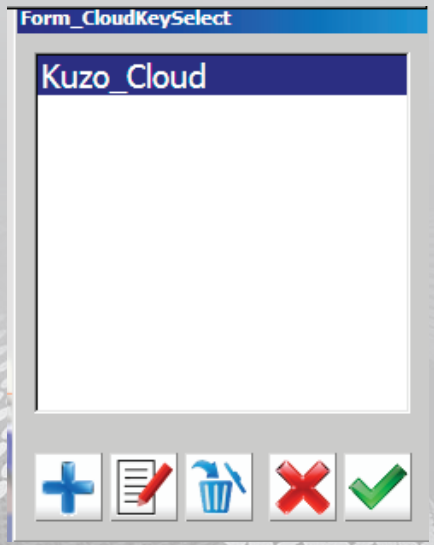
First you need to enter your cloud key

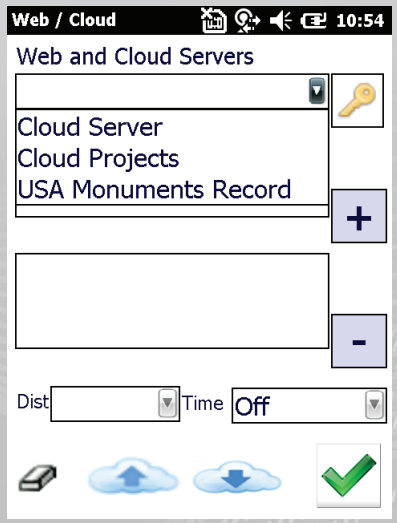


click on + and enter you access and secret key



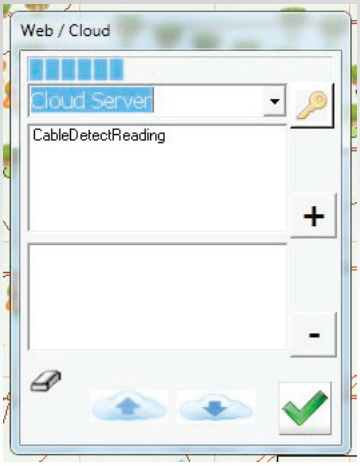
After this both keys are entered please press Yes

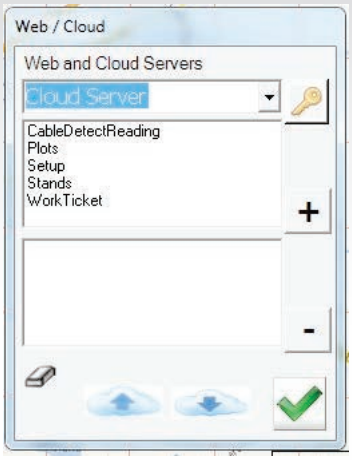


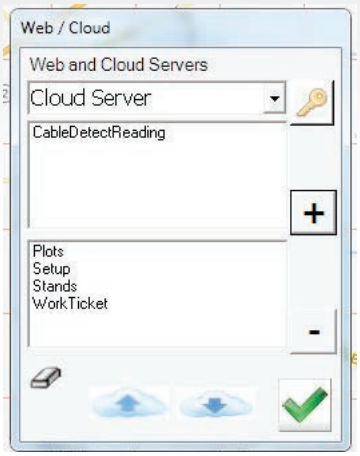


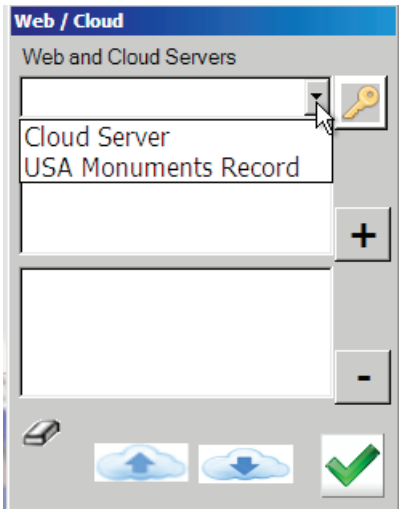

Web / Cloud
Web and Cloud Servers
Cloud Server
Home
General
Key
Data
Map
Grid
Devices
GPS
Total Stn
eComs
Cloud
Close


File
Edit
GPS
Tools
Maps


Web / Cloud
Cloud Server
CableDetectReading


Web / Cloud
Web and Cloud Servers
Cloud Server
CableDetectReading
Plots
Setup
Stands
WorkTicket


Web / Cloud
Web and Cloud Servers
Cloud Server
CableDetectReading
Plots
Setup
Stands
WorkTicket


Web / Cloud
Web and Cloud Servers
Cloud Server
USA Monuments Record


Collect
File
Edit
GPS
Tools
Maps

Description of GIS360 Cloud – Mapping Services.

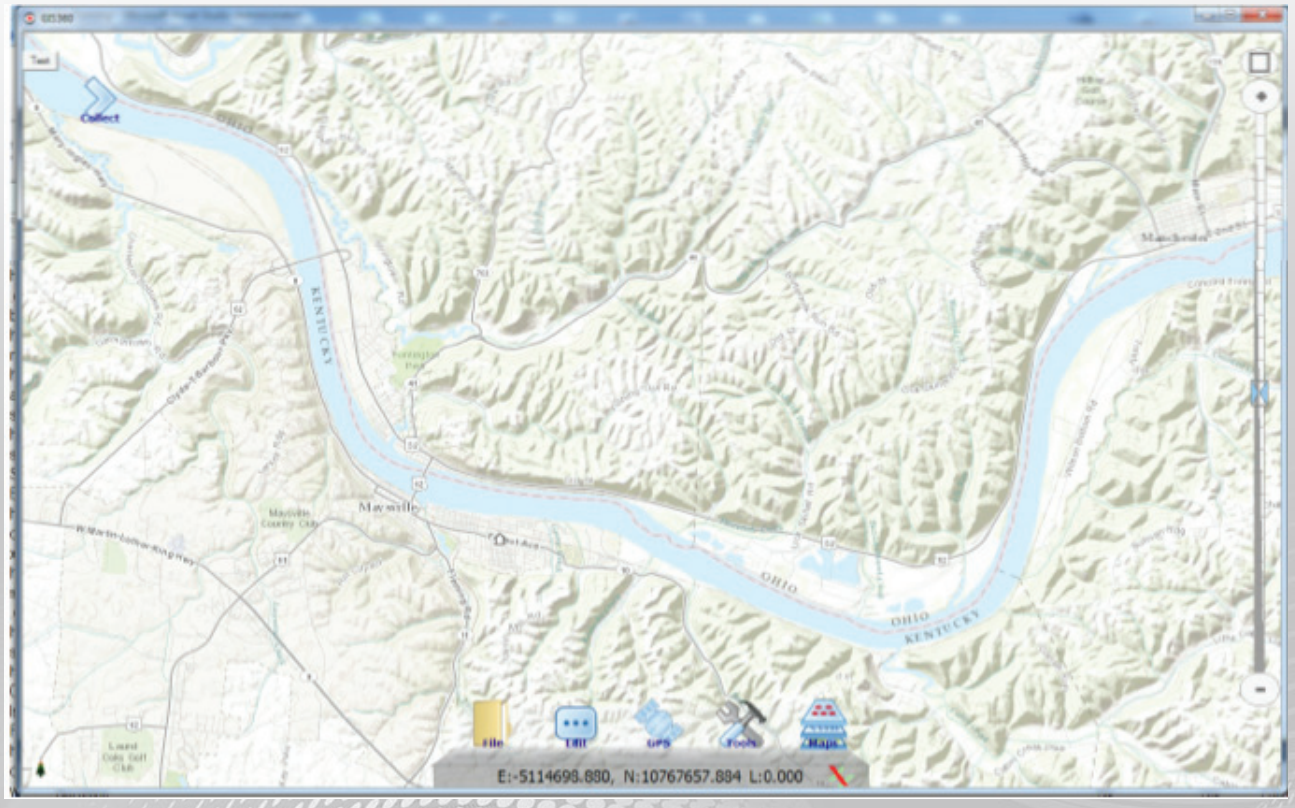
People have been getting a bit confused about the cloud – Map services that are available in GIS360 so we hope that this document will offer an explanation. The "Cloud" is just a server and you can put (and get) any data up there just like it was a hard disk on your computer. Instead of having your own server most people define "Cloud" as meaning that you are using a Cloud service, ie you have space and rights to use a server that someone else maintains. For example Amazon offers such a service for GIS360 users just as Amazon does for ESRI.

When you take the "Cloud" and add a geographically aware database, then you have a GIS in the Cloud. This Cloud-GIS can now respond to geographic requests for maps and data, and using its database it can respond in a variety of ways.

Cloud – GIS services can send out both Raster and Vector data. Some people use the terms "Maps" and "Data", to mean Raster and Vector, but that isn't strictly correct. Sometimes a Cloud published map can be vector data. The situation gets even more confused because most GIS servers can publish Vector data via the Cloud as a Raster map. So for the moment lets just say that Maps are Raster and Data is Vector.
Cloud – GIS's can securely publish maps and data for internal or individual use, or they can publish the data so it can be used by millions.

ESRI published Map Services

ESRI themselves publish map services for all of their customers to access. This is the equivalent to a Google Map service but focused on ESRI customers. The data is Raster data. These are the map servers that you will find in GIS360 in the maps selection pull down listbox.
For example "ARCGIS_World_Topo_Map" in GIS360 will produce maps like this.



This direct ESRI mapping can be accessed in GIS360 right now.

ESRI publishes User WMS maps

ESRI users can also publish their own map services. It's like having your own little Google Earth but with your data in it. WMS (Web Map Service) is an open standard supported by most GIS systems. ESRI users can take their data and easily publish it as a WMS service. Here are the instructions to do so http://web-help.esri.com/arcgisserver/9.3/java/index.htm#tutorial_wms_service.htm

If a user has an MXD file then all you do is load the MXD and publish it. It's pretty simple.

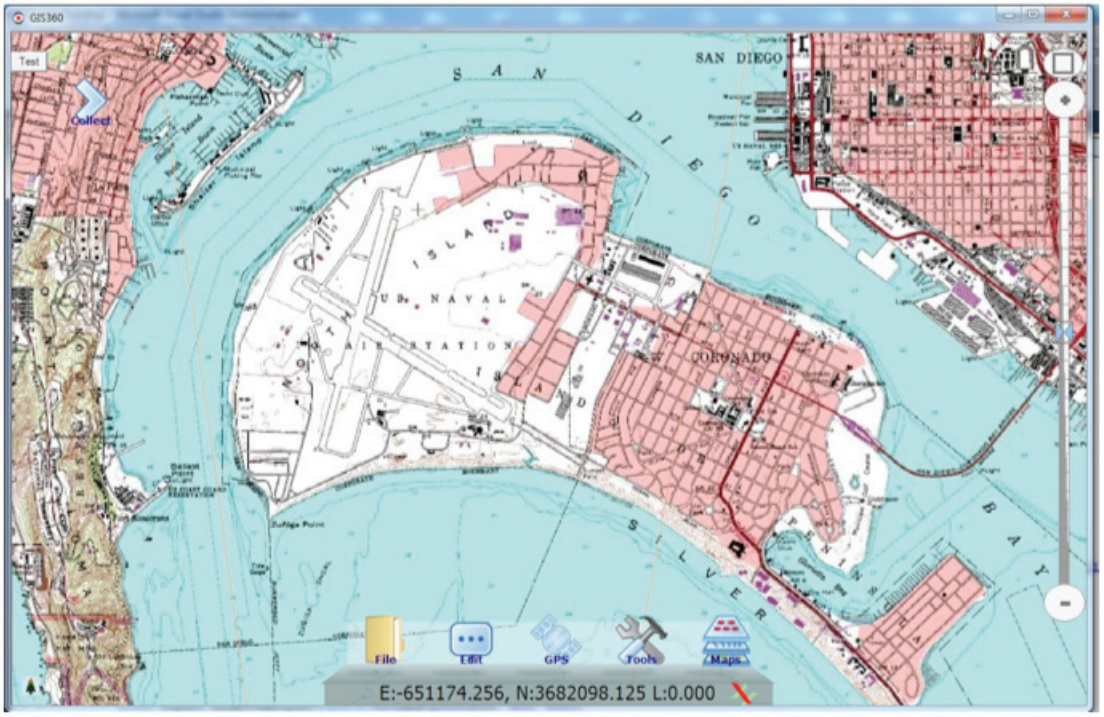
The data that goes into that service can be raster or vector but what comes out will be a complete map in Raster format. This is useful if you want your users to be able to see the data but not change it.

When the ArcGIS user publishes his data ArcGIS generates a web address. The user then takes that address and gives it to GIS360 by placing it in a file (in the Reference folder) called WMSservers.txt.

The file lists the WMS servers. All that's needed is to use Notepad to type a name on one line and then put the address on the next line down. The names will then appear in the list of map choices in GIS360.

The reason this is done in a separate file is that normally this is done by the ArcGIS system administrator because he is the one who generated the address. It's not something that will change on a daily basis and web addresses tend to confuse users.

Below is a USGS map published by an ArcGIS user.



This capability is in GIS360 right now.

ESRI Publishes WFS data

ESRI users can also publish data as WFS data. WFS (Web Feature Services) are vector data and are actually real live data straight from the ArcGIS database. Here are instructions to set it up. http://webhelp.esri.com/arcgisserver/9.3/java/index.htm#tutorial_wfst_service.htm

The terminology here is important, when you say that you are publishing WFS you say that it is data, you don't normally call it a map. Although it could be used to make one.

There are two types of WFS... WFS and WFS-T . The "T" means transactional or in other words I can send data directly to and modify the database directly in the field. If you just want to look at data in the field then you can publish plain WFS.

This is also in GIS360

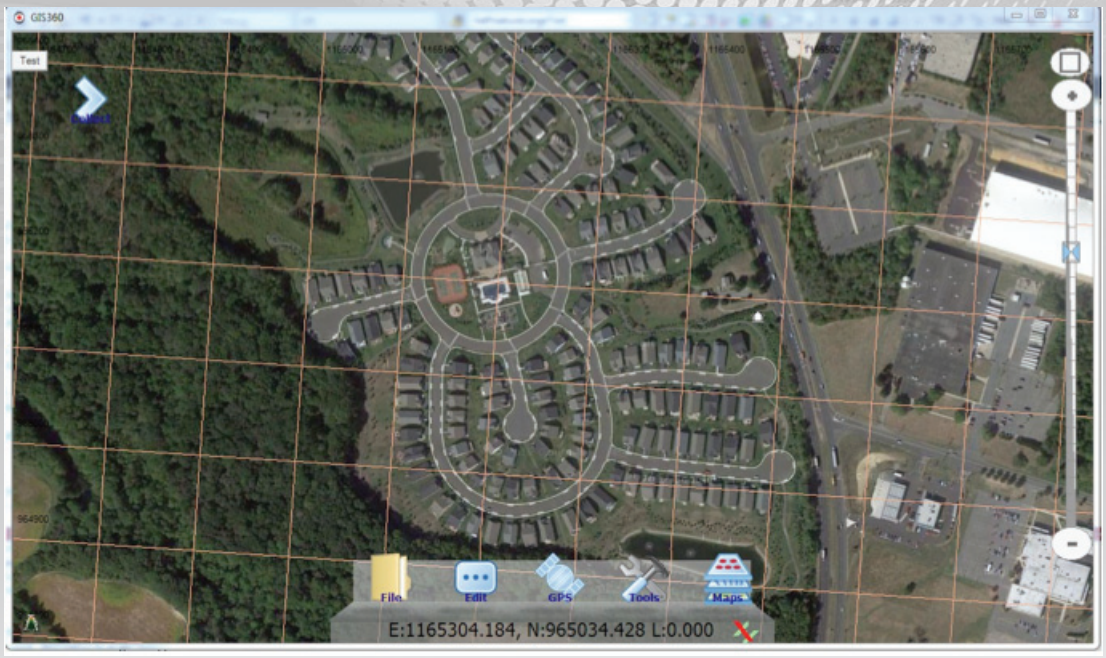
NON – ESRI solutions

ESRI isn't the only company doing this type of thing. Remember MWS and WFS are open standards. Since ESRI fully support WMS and WFS it isn't really important but it would have been nice.

LizardTech

LizardTech makes the compression engine Mr.SID used by many in the United States. They no longer support Windows Mobile BUT I have checked and we can connect directly to LizardTech server product and download Mr. SID data directly. This means that a Mr. SID user needs to publish their data and then GIS360 can use it just like any other map service. (It's also cool because our GIS360 cashing and tiling system works with it perfectly)

Below is a picture of some data that Mr. Sid sent us of New Jersey.



GeoServer

GEoServer is an open source (FREE!!!) server program that can publish both WMS and WFS data. GIS360 is compatible with it. We found it very useful when users wanted to load their own Raster data into GIS360. It supports most Raster formats and it was easy to load the files into Geoserver and setup a Map Service. Then GIS360 gets the users data just like it was from Google but it's the users own data.

Amazon

Amazon is one of the world leaders in cloud technology. ESRI themselves use it. Amazon produce a variety of products that developers can use to make products but Amazon isn't really an end user product, they make tools for others.

What we have done is to use their tools to make our own cloud system. It has a couple of big advantages. The biggest one is that we can setup a customer with a Cloud server in about 10 minutes and he can have his data up there in 15 minutes. It's very easy to use and we don't have to know our way around ArcGIS server, which is not a simple (or cheap)process.

In a way this can be thought of as the GIS360 cloud.

There are two types of Amazon based Cloud services in GIS360. Cloud Projects and Cloud Servers.

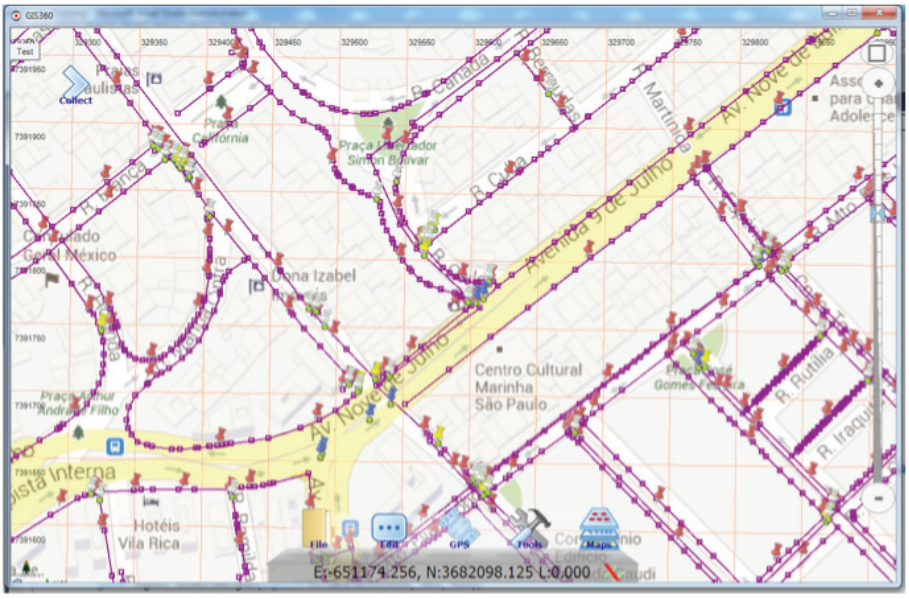
Amazon – GIS360 - Cloud Projects

Cloud Projects are online storage for Project GIS360 project files. These contain everything a user might need in the field, data, maps, settings, everything all ready to go. When a user select a Cloud Project the project file will download from the cloud. Then it will automatically unzip and start right up where the work needs to be done. All settings are made automatically. Cloud Projects are also a great way to do demos because it allows you to bounce back and forth to different parts of the world and different datasets with just a single click of the mouse.

Amazon – GIS360 Cloud Servers

This is actually what we use the most. What it does is store GIS360 data in the Amazon Cloud. When you setup a datatype in the GIS360 you can set it to be Cloud Compatible. Any data item that is cloud compatible (or shape file) can be loaded into the cloud. Then GIS360 will automatically send new data items to the cloud. GIS360 can also get small areas of data, edit them and send them back.

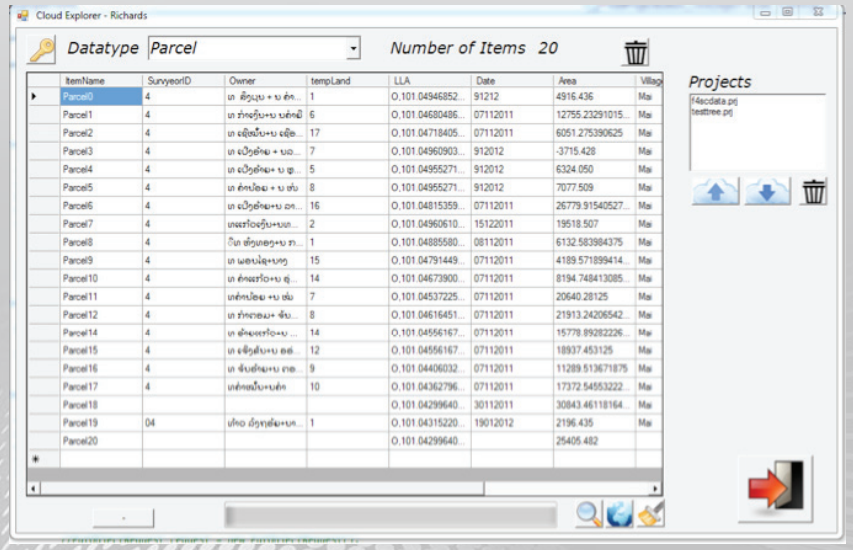
Below is an example of Vector GIS data using the GIS360 Cloud servers.



One big advantage of working with the GIS360 Cloud servers (and WFS servers) is that you can work with very large datasets. This is because GIS360 will only download the data near your position and only upload those items that have been changed or added. So a total dataset with millions of records can easily be dealt with one small local area at a time. This also makes it easy for multiple users to work on the same data.

Carlson Cloud Explorer

Both Cloud Projects and Cloud Servers can work with the Carlson Cloud Explorer. This started life as a useful debugging tool for checking on the current status of the cloud.

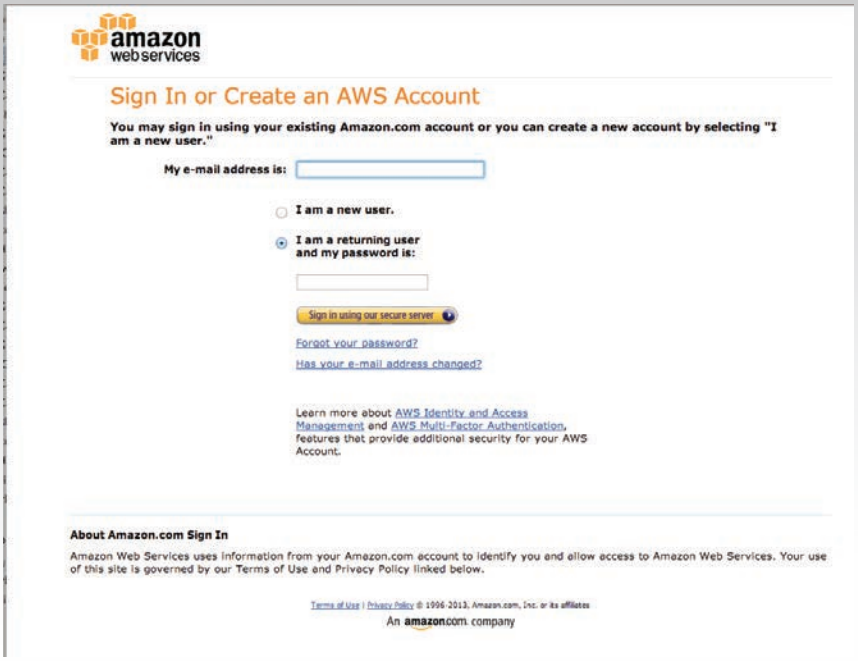


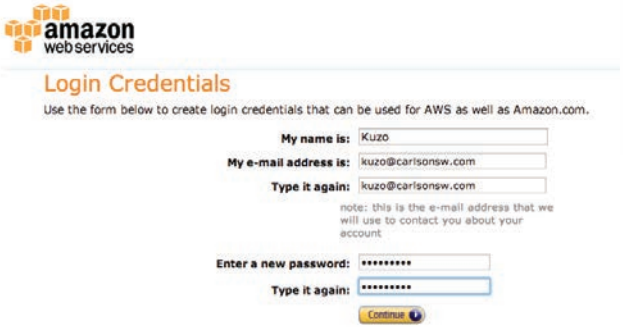
But it quickly became apparent that it was useful. Especially with the built in link to Google Earth. So for example it can find all the survey data done by a certain surveyor and plot in in Google Earth. It can also give you a view of your currently loaded Project files.

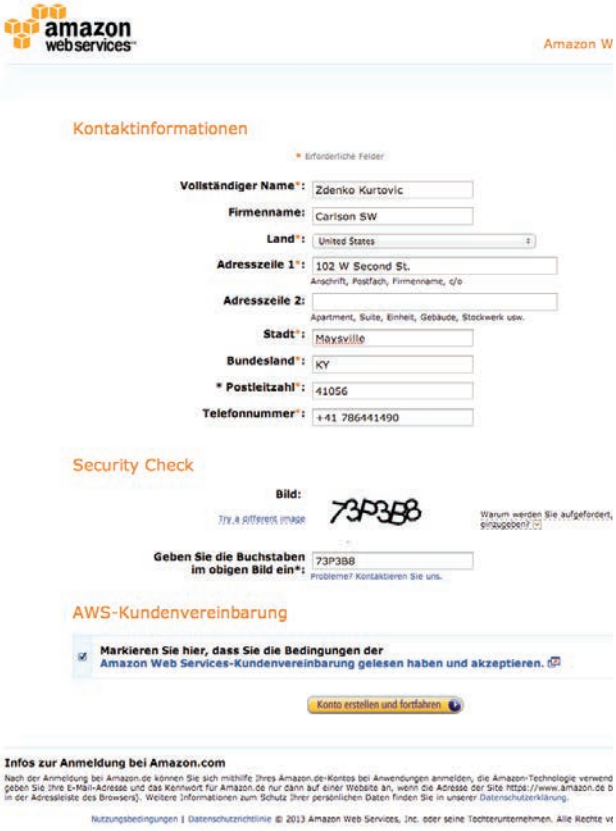
Tools Menu : Cloud functionality

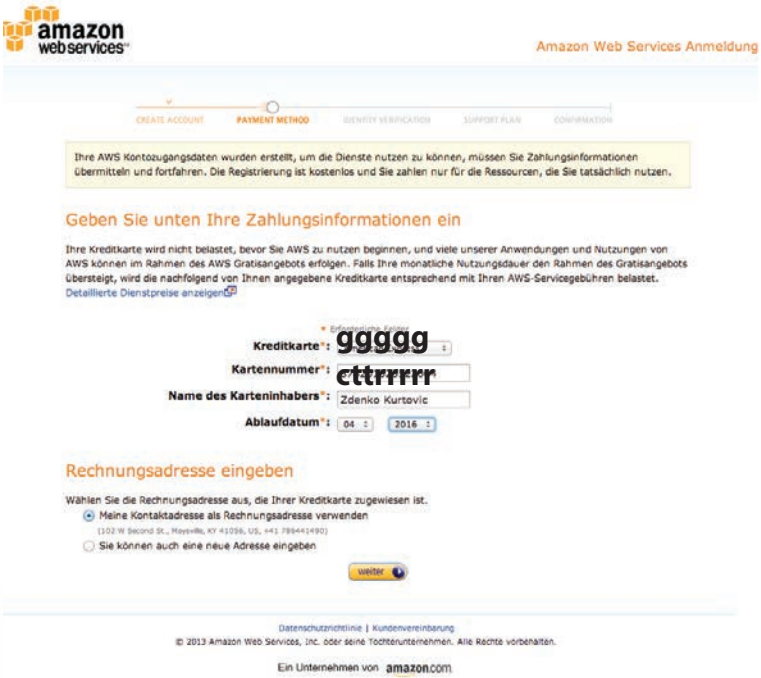
https://www.amazon.com/ap/signin?openid.assoc_handle=aws&openid.return_to=https://portal.aws.amazon.com/gp/aws/developer/registration/index.html&openid.mode=checkid_setup&openid.ns=http://specs.openid.net/auth/2.0&openid.identity=http://specs.openid.net/auth/2.0/identifier_select&openid.claimed_id=http://specs.openid.net/auth/2.0/identifier_select&action=&disableCorpSignUp=&clientContext=&marketPlaceId=&poolName=&authCookies=&pageId=aws.ssop&siteState=&accountStatusPolicy=P1&sso=&openid.pape.preferred_auth_policies=MultifactorPhysical&openid.pape.max_auth_age=3600&openid.ns.pape=http://specs.openid.net/extensions/pape/1.0&server=/ap/signin?ie=UTF8&accountPoolAlias=&forceMobileApp=0&forceMobileLayout=0

To sign up to the amazon cloud go to the following link and follow instructions



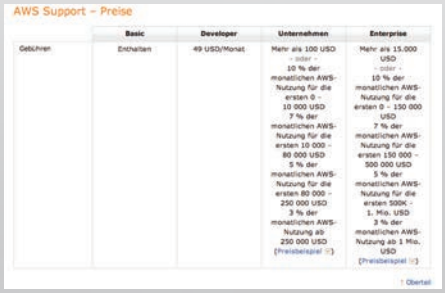






AWS Support – Funktionen

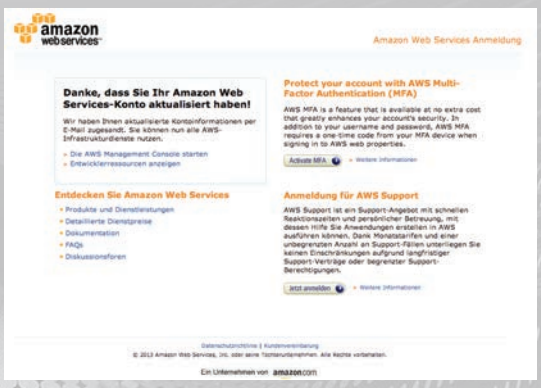
	Basic	Developer	Unternehmen	Enterprise
Kundendienst - Das ganze Jahr rund um die Uhr	✔	✔	✔	✔
Support-Foren	✔	✔	✔	✔
Dokumentation, Whitepaper, Anleitungen mit empfohlenen Vorgehensweisen	✔	✔	✔	✔
Zugang zu technischem Support	Support für Zustandsprüfungen	E-Mail(landesspezifische Geschäftszeiten)	Telefon, Chat, E-Mail,Live-Bildschirmfreigabe (rund um die Uhr)	Telefon, Chat, E-Mail,Live-Bildschirmfreigabe, TAM (rund um die Uhr)
Primary Case Handling	Technical Customer Service Associate	Cloud Support Associate	Cloud Support Engineer	Sr. Cloud Support Engineer
Namentliche Kontakte (Was ist das?)		1	5	Grenzenlos
Reaktionszeit		12 Stunden	1 Stunde	15 Minuten
Architekturunterstützung (Was ist das?)		Bausteine	Anleitung zu Anwendungsfällen	Anwendungsarchitektur
Anleitung mit empfohlenen Vorgehensweisen		✔	✔	✔
Kundenseitige Diagnosetools		✔	✔	✔
Identity Access Management (IAM) (Was ist das?)			✔	✔
Access to Support API - Beta (Was ist das?)			✔	✔
Support für Drittanbietersoftware - Beta (Was ist das?)			✔	✔
AWS Trusted Advisor - Beta (Was ist das?)			✔	✔
Infrastructure Event Management (Was ist das?)			✔	✔
Direkter Kontakt zum Technical Account Manager (TAM)				✔
Weiterleitung von Vorgängen mit höherer Priorität (Was ist das?)				✔
Geschäftsberichte für die Unternehmensleitung (Was ist das?)				✔

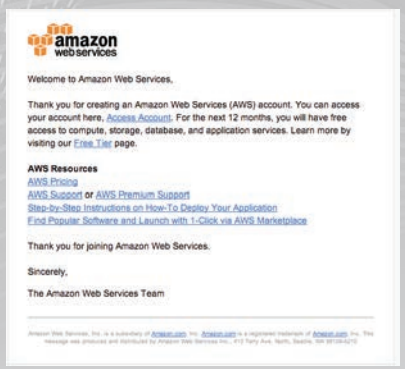


AWS Support – Preise

	Basic	Developer	Unternehmen	Enterprise
Gebühren	Enthalten	49 USD/Monat	Mehr als 100 USD - oder - 10 % der monatlichen AWS-Nutzung für die ersten 0 - 10 000 USD 7 % der monatlichen AWS-Nutzung für die ersten 10 000 - 80 000 USD 5 % der monatlichen AWS-Nutzung für die ersten 80 000 - 250 000 USD 3 % der monatlichen AWS-Nutzung ab 250 000 USD (Preisbeispiel)	Mehr als 15.000 USD - oder - 10 % der monatlichen AWS-Nutzung für die ersten 0 - 150 000 USD 7 % der monatlichen AWS-Nutzung für die ersten 150 000 - 500 000 USD 5 % der monatlichen AWS-Nutzung für die ersten 500K - 1. Mio. USD 3 % der monatlichen AWS-Nutzung ab 1 Mio. USD (Preisbeispiel)

↑ Oberteil





Welcome to Amazon Web Services,

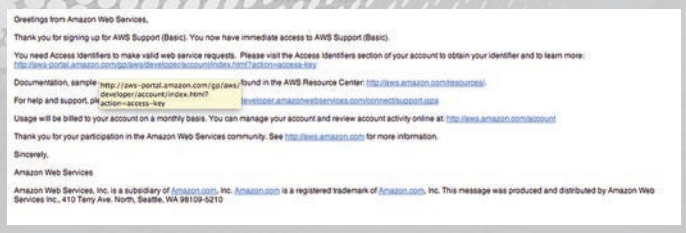
Thank you for creating an Amazon Web Services (AWS) account. You can access your account here, Access Account. For the next 12 months, you will have free access to compute, storage, database, and application services. Learn more by visiting our Free Tier page.

AWS Resources
AWS Pricing
AWS Support or AWS Premium Support
Step-by-Step Instructions on How-To Deploy Your Application
Find Popular Software and Launch with 1-Click via AWS Marketplace

Thank you for joining Amazon Web Services.

Sincerely,

The Amazon Web Services Team



Greetings from Amazon Web Services,

Thank you for signing up for AWS Support (Basic). You now have immediate access to AWS Support (Basic).

You need Access Identifiers to make valid web service requests. Please visit the Access Identifiers section of your account to obtain your identifier and to learn more: http://aws-portal.amazon.com/gp/aws/developer/account/index.html?action=access-key

Documentation, sample code, and libraries can be found in the AWS Resource Center: http://aws.amazon.com/resources/

For help and support, please visit http://aws-portal.amazon.com/gp/aws/developer/account/index.html?action=access-key or http://developer.amazonwebservices.com/connect/support.jspa

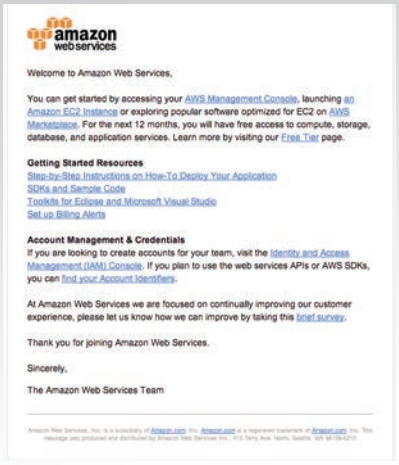
Usage will be billed to your account on a monthly basis. You can manage your account and review account activity online at http://aws.amazon.com/account

Thank you for your participation in the Amazon Web Services community. See http://aws.amazon.com for more information.

Sincerely,

Amazon Web Services

Amazon Web Services, Inc. is a subsidiary of Amazon.com, Inc. Amazon.com is a registered trademark of Amazon.com, Inc. This message was produced and distributed by Amazon Web Services Inc., 410 Terry Ave. North, Seattle, WA 98109-5210



Welcome to Amazon Web Services,

You can get started by accessing your AWS Management Console, launching an Amazon EC2 instance or exploring popular software optimized for EC2 on AWS Marketplace. For the next 12 months, you will have free access to compute, storage, database, and application services. Learn more by visiting our Free Tier page.

Getting Started Resources
Step-by-Step Instructions on How-To Deploy Your Application
SDKs and Sample Code
Toolkits for Eclipse and Microsoft Visual Studio
Set up Billing Alerts

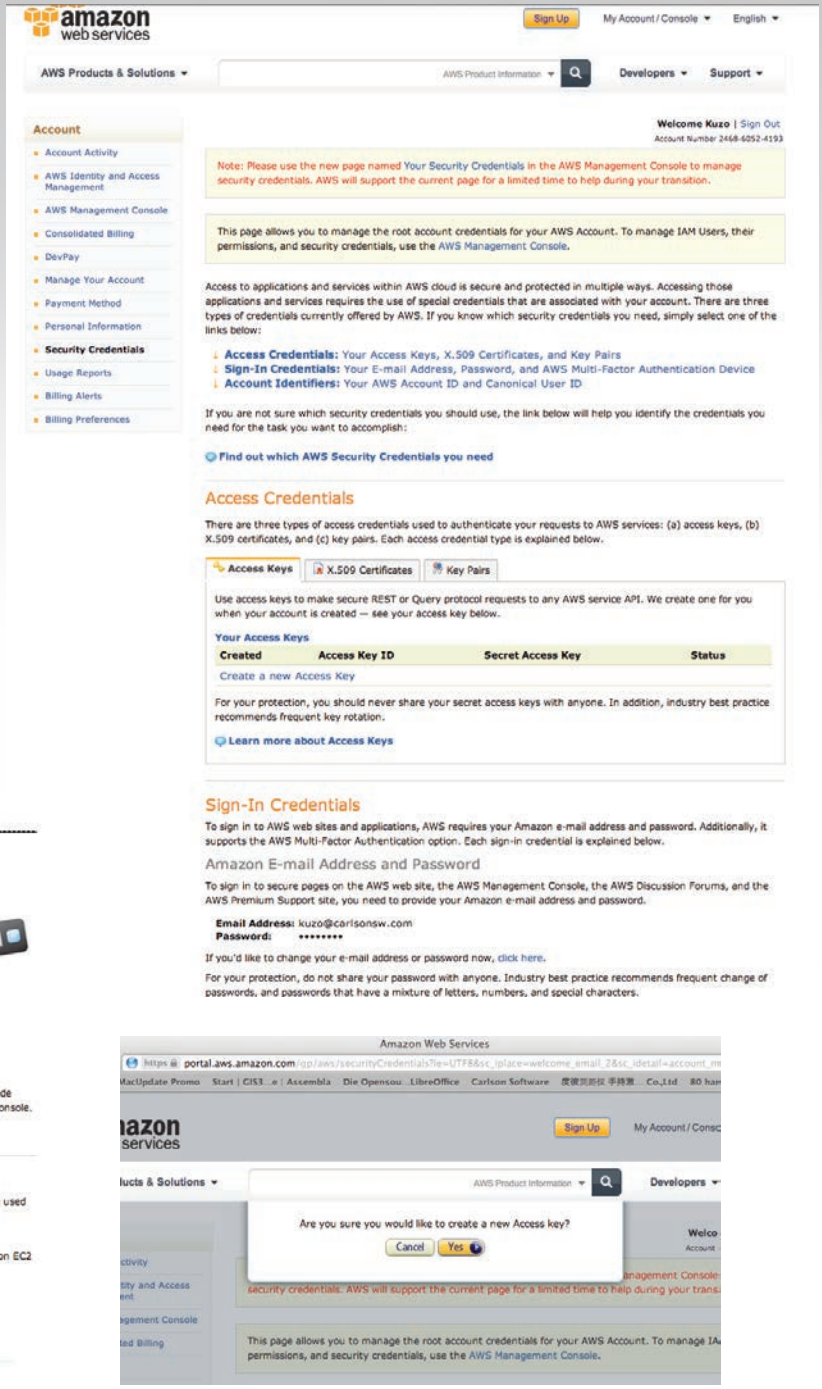
Account Management & Credentials
If you are looking to create accounts for your team, visit the Identity and Access Management (IAM) Console. If you plan to use the web services APIs or AWS SDKs, you can find your Account Identifiers.

At Amazon Web Services we are focused on continually improving our customer experience, please let us know how we can improve by taking this brief survey.

Thank you for joining Amazon Web Services.

Sincerely,

The Amazon Web Services Team



Sign Up | My Account / Console | English

AWS Products & Solutions | Developers | Support

Account
- Account Activity
- AWS Identity and Access Management
- AWS Management Console
- Consolidated Billing
- DevPay
- Manage Your Account
- Payment Method
- Personal Information
- **Security Credentials**
- Usage Reports
- Billing Alerts
- Billing Preferences

Welcome Kuzo | Sign Out
Account Number 2468-6052-4193

Note: Please use the new page named Your Security Credentials in the AWS Management Console to manage security credentials. AWS will support the current page for a limited time to help during your transition.

This page allows you to manage the root account credentials for your AWS Account. To manage IAM Users, their permissions, and security credentials, use the AWS Management Console.

Access to applications and services within AWS cloud is secure and protected in multiple ways. Accessing those applications and services requires the use of special credentials that are associated with your account. There are three types of credentials currently offered by AWS. If you know which security credentials you need, simply select one of the links below:

- **Access Credentials:** Your Access Keys, X.509 Certificates, and Key Pairs
- **Sign-In Credentials:** Your E-mail Address, Password, and AWS Multi-Factor Authentication Device
- **Account Identifiers:** Your AWS Account ID and Canonical User ID

If you are not sure which security credentials you should use, the link below will help you identify the credentials you need for the task you want to accomplish:

Find out which AWS Security Credentials you need

Access Credentials

There are three types of access credentials used to authenticate your requests to AWS services: (a) access keys, (b) X.509 certificates, and (c) key pairs. Each access credential type is explained below.

Access Keys | X.509 Certificates | Key Pairs

Use access keys to make secure REST or Query protocol requests to any AWS service API. We create one for you when your account is created — see your access key below.

Your Access Keys

Created	Access Key ID	Secret Access Key	Status

Create a new Access Key

For your protection, you should never share your secret access keys with anyone. In addition, industry best practice recommends frequent key rotation.

Learn more about Access Keys

Learn more about your E-mail Address and Password

AWS Multi-Factor Authentication

Amazon Web Services Multi-Factor Authentication is currently not enabled for your account.

What is Amazon Web Services Multi-Factor Authentication?
This is an optional credential that allows you to increase the level of your account security. To add this security option to your account, you will need to purchase a compatible authentication device from Gemalto, a third-party provider. Click the button below to purchase a device from the Gemalto website.

Purchase Device from Gemalto

Before the first use of this device, you will need to activate it using the button below.

Enable AWS Multi-Factor Authentication with Gemalto Ezio

Once your device is activated, you must provide your Amazon e-mail address, password, and an authentication code generated by the device each time you sign in to secure pages on the AWS web site and the AWS Management Console.

Learn more about AWS Multi-Factor Authentication

Account Identifiers

AWS uses two types of account identifiers — canonical user ID and AWS account ID. These account identifiers are used to share resources between accounts.

The canonical user ID can be used exclusively for Amazon S3 resources such as buckets or files.

The AWS account ID can be used for all AWS service resources except Amazon S3. These resources include Amazon EC2 AMIs, Amazon EBS snapshots, Amazon SQS queues, etc.

AWS Account ID: 2468-6052-4193
Canonical User ID: View canonical user ID

Learn more about Account Identifiers

Sign-In Credentials

To sign in to AWS web sites and applications, AWS requires your Amazon e-mail address and password. Additionally, it supports the AWS Multi-Factor Authentication option. Each sign-in credential is explained below.

Amazon E-mail Address and Password

To sign in to secure pages on the AWS web site, the AWS Management Console, the AWS Discussion Forums, and the AWS Premium Support site, you need to provide your Amazon e-mail address and password.

Email Address: kuzo@carlsonsw.com
Password: ••••••••

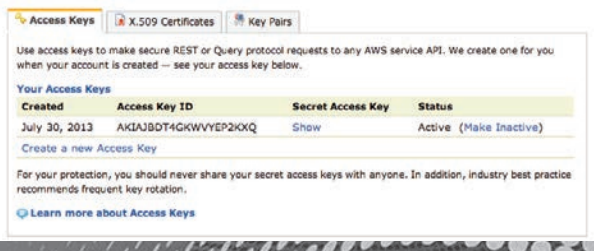
If you'd like to change your e-mail address or password now, click here.

For your protection, do not share your password with anyone. Industry best practice recommends frequent change of passwords, and passwords that have a mixture of letters, numbers, and special characters.

Amazon Web Services

Are you sure you would like to create a new Access key?

Cancel | Yes



Access Keys | X.509 Certificates | Key Pairs

Use access keys to make secure REST or Query protocol requests to any AWS service API. We create one for you when your account is created — see your access key below.

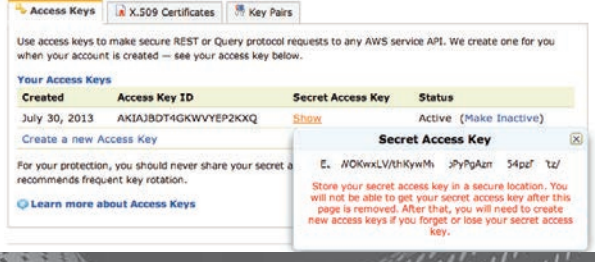
Your Access Keys

Created	Access Key ID	Secret Access Key	Status
July 30, 2013	AKIAJBDT4GKWVYEP2KXQ	Show	Active (Make Inactive)

Create a new Access Key

For your protection, you should never share your secret access keys with anyone. In addition, industry best practice recommends frequent key rotation.

Learn more about Access Keys



X.509 certificates, and (c) key pairs. Each access credential type is explained below.

Access Keys | X.509 Certificates | Key Pairs

Use access keys to make secure REST or Query protocol requests to any AWS service API. We create one for you when your account is created — see your access key below.

Your Access Keys

Created	Access Key ID	Secret Access Key	Status
July 30, 2013	AKIAJBDT4GKWVYEP2KXQ	Show	Active (Make Inactive)

Create a new Access Key

For your protection, you should never share your secret a

recommends frequent key rotation.

Learn more about Access Keys

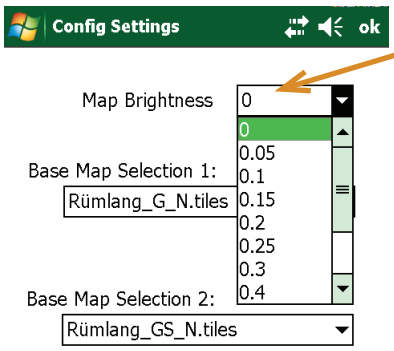
Secret Access Key

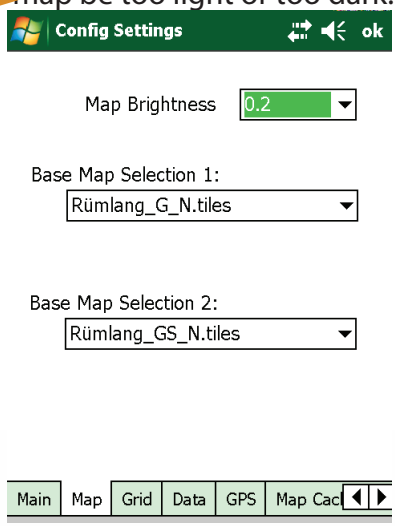
E. NOKwxLV/thKywMh 3PyPgAzn 34pf tz/

Store your secret access key in a secure location. You will not be able to get your secret access key after this page is removed. After that, you will need to create new access keys if you forget or lose your secret access key.

Tools menu
Map configuration

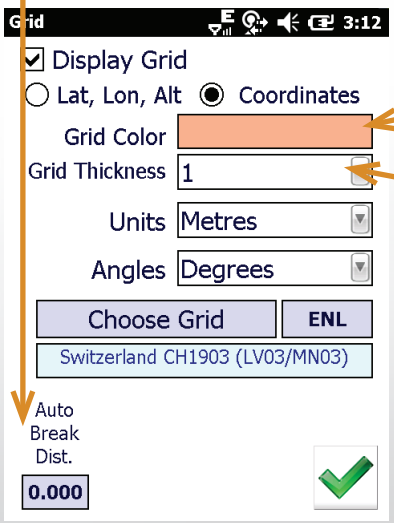
When clicking on "Map brightness", you will be able to set the value anywhere from 0 to 0.8. This function is essential, should the map be too light or too dark.





Before brightness application

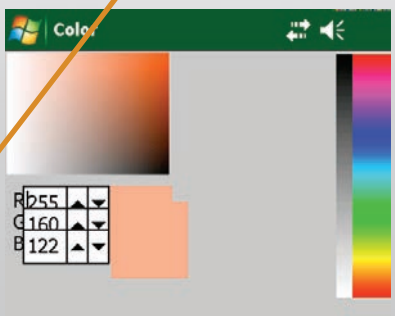
Tools Menu
Grid configuration



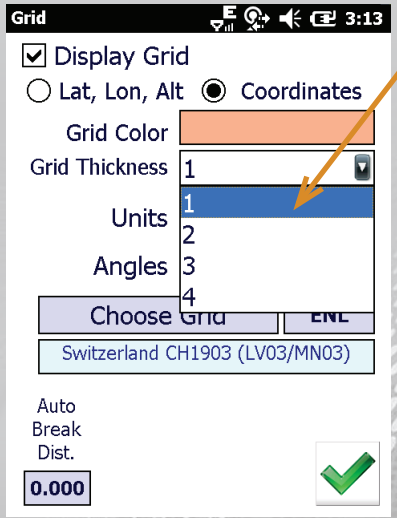
By clicking on grid color, you can choose the convenient color for your grid, as displayed in the next image

You can also choose the grid thickness

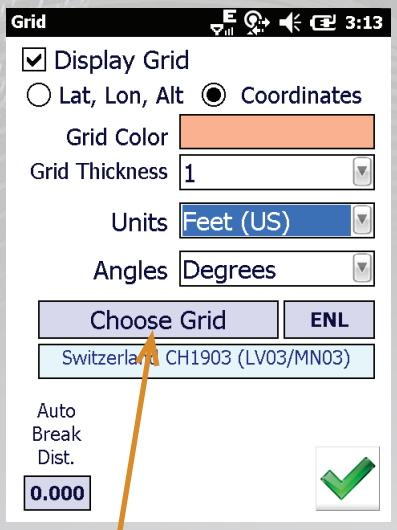
After brightness application



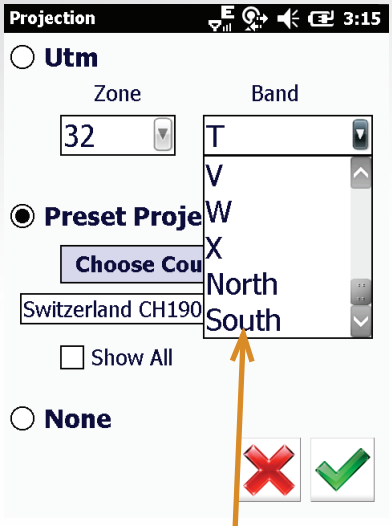
Show Grid: Show or Hide the grid lines on the screen area.



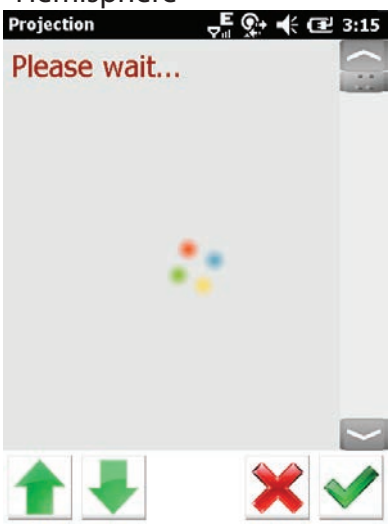
Choose appropriate colour and confirm with OK



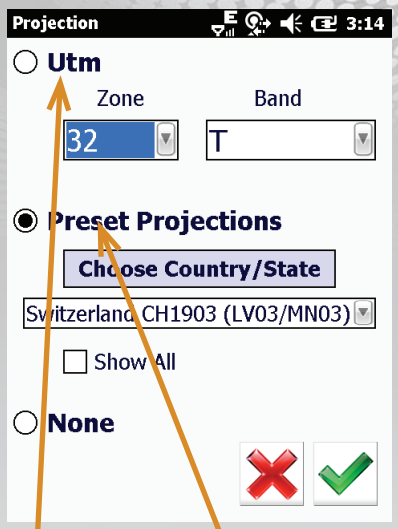
If you need to change the Grid system, click on "Choose Grid" to display the list of available grids:



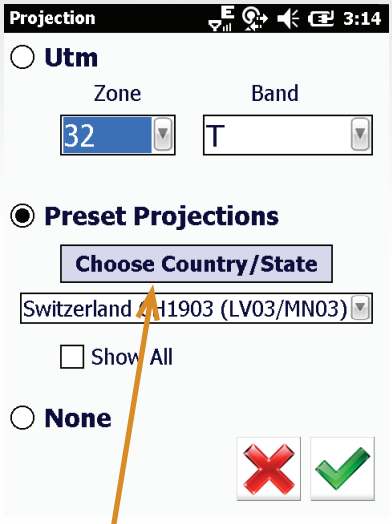
Band you can choose either based on it's appropriate letter or just simple North or South Hemisphere



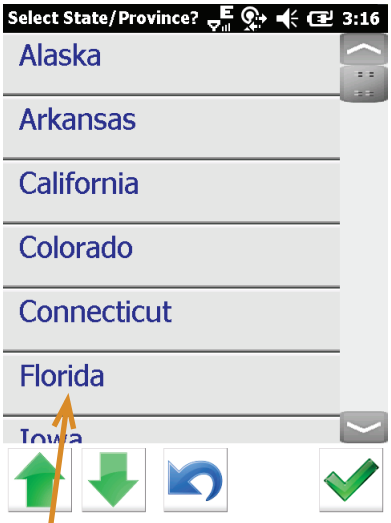
Maybe you need to wait few seconds



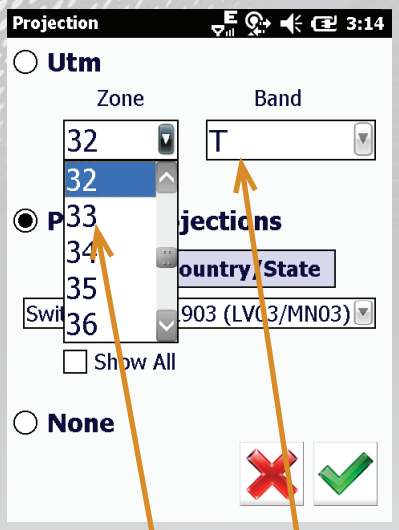
you have two choices, either UTM settings or preset projections



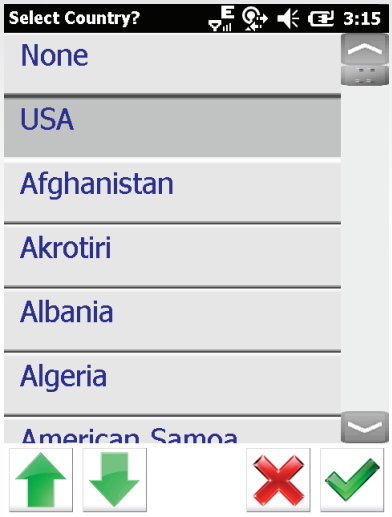
Other option is to choose your country directly



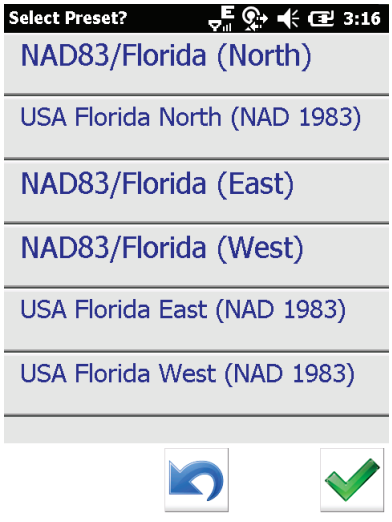
Now you need to choose your particular state.



For UTM you need to select appropriate Zone and Band



List of the countries is big, so scrolling up and down will help you to find it easy



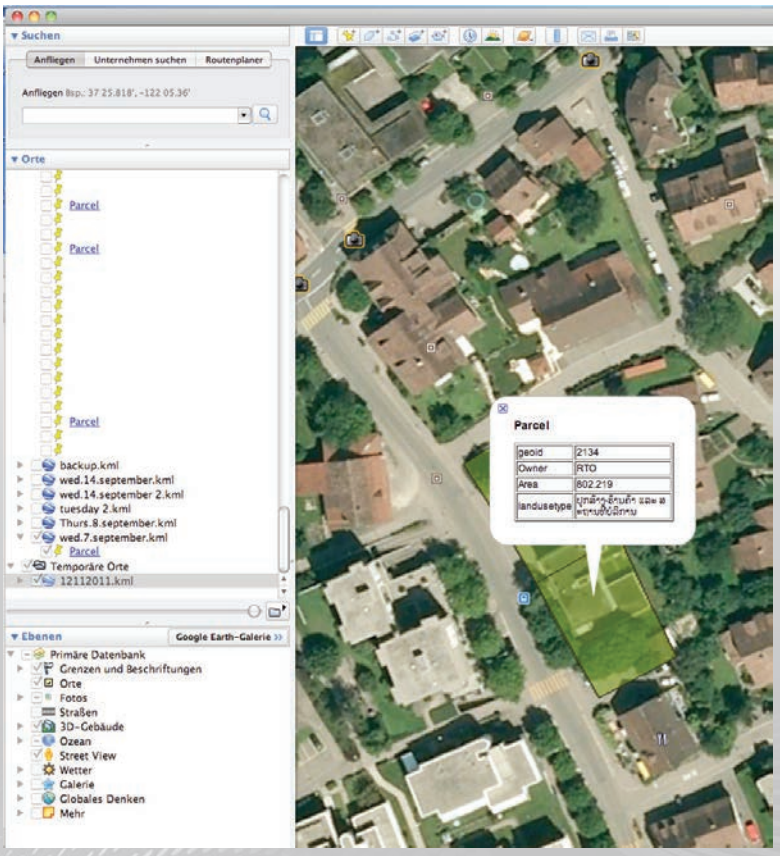
Even within the state now you maybe need to choose particular preset

Important features: Saved

Saved data: When you save data to disk, it will be in a KML/KMZ format,like mentioned before . This format is compatible with being shown on Google Earth ™ and other Google Map ™ applications. For instance saving the data as shown in this example...

(map drawn on the PC version)

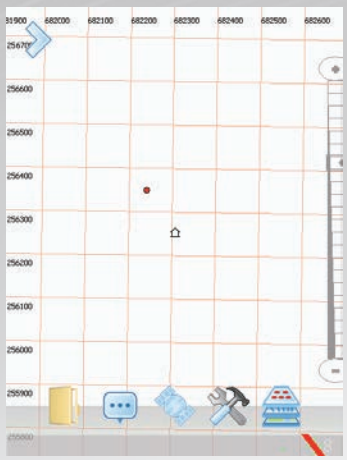
Saved attributes: Data with attributes will be saved in KML format. This format is compatible with Google Earth ™ and other Google Map ™ applications. For instance saving the data as shown in this example...



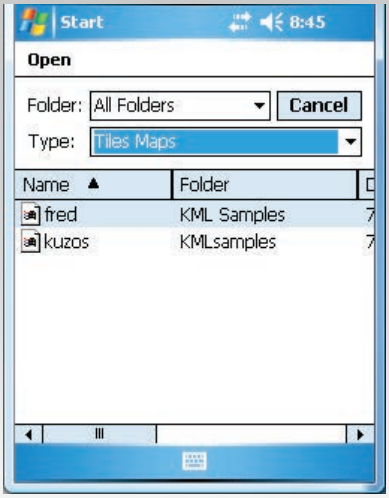
...will display like this on Google Earth ™

Important Features: Operating in a wireless blocked region*

Please note: This facility allows you to use your mobile PC to collect data in areas without wireless coverage. To enable this functionality, you must have a temporary background **Tiles** file previously stored using: **Tools Menu: Map Configuration.**



An Example region where no wireless communications is possible.



Select the correct folder and **Tiles** type then load in the background fragment

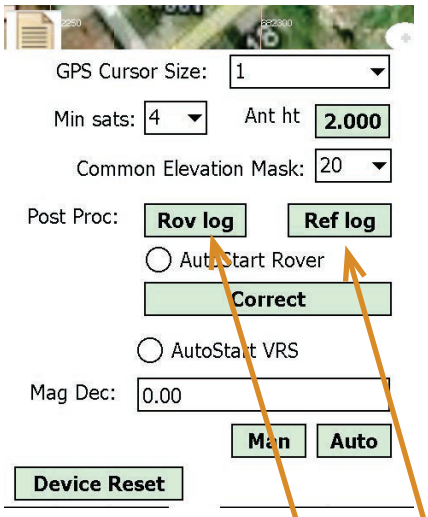
The area of interest will appear centralised on the **Tiles** files **Home Marker**.

Zoom into a working level.

Zoom further, alter to satellite images for example, then load in your previous unfinished survey for continued updating.

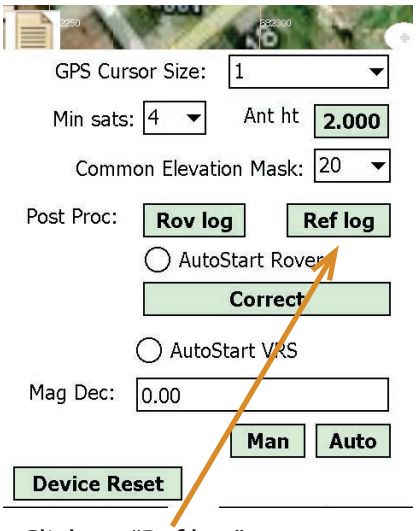
Datacollection for Postprocessing

Click on the "Tools Menu"

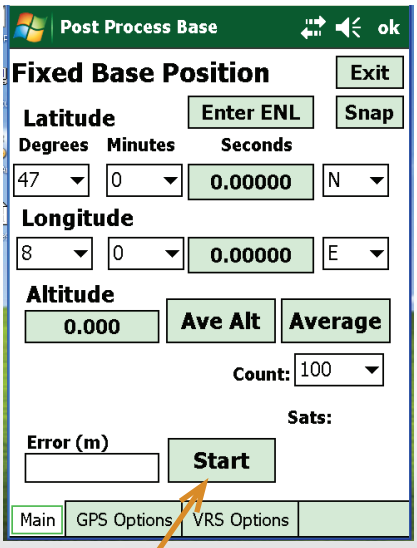


For Base station data, choose "Ref log"

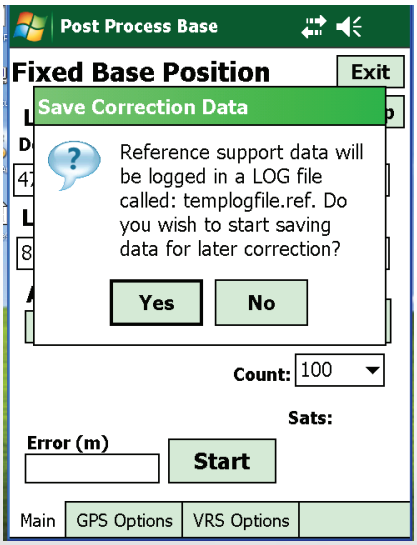
For rover data, choose "Rov log"



Click on "Ref log" to start saving base station data for post processing

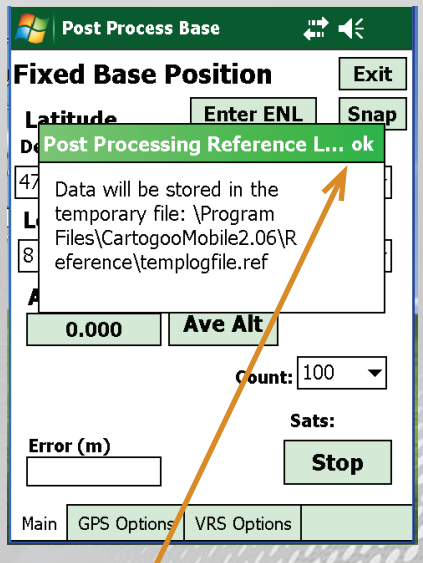


Click "Start"

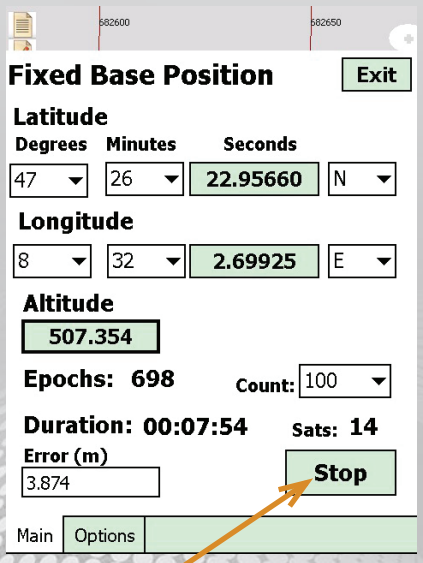


If you wish to start collecting and saving data, click "Yes"

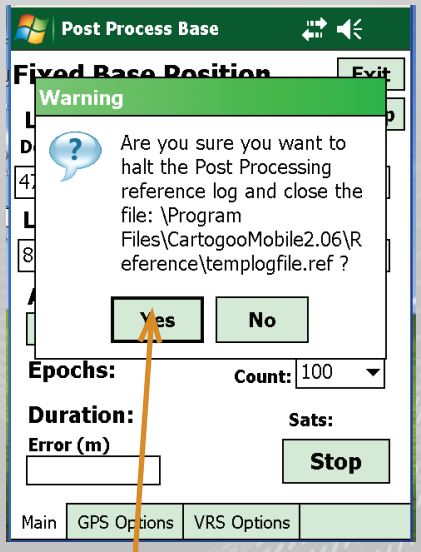
When pressing "Enter ENL", you can enter the base station coordinates for easting, northing and level



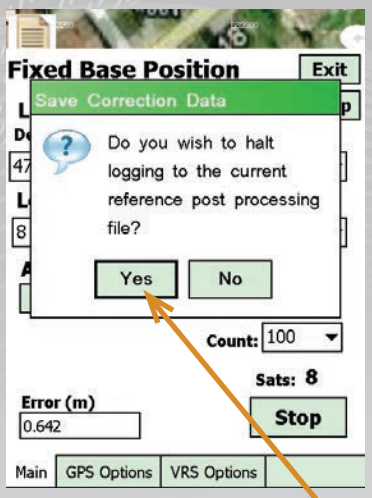
Click "OK"
Location of data storage



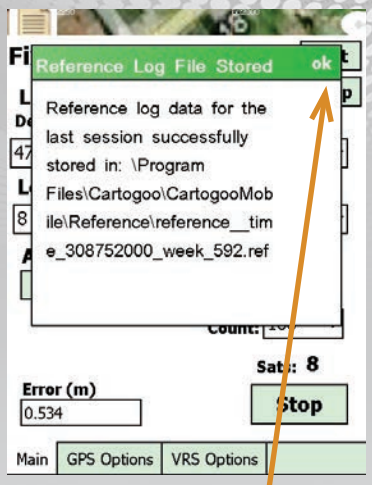
At the end of the working day, press "Stop"



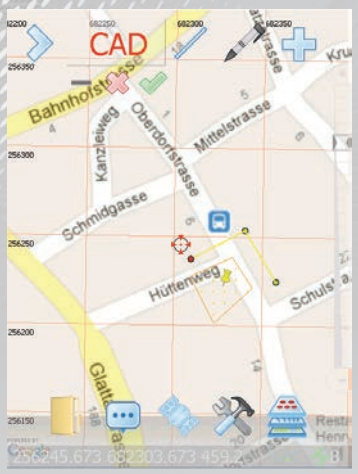
Confirm with "Yes" if you really wish to stop



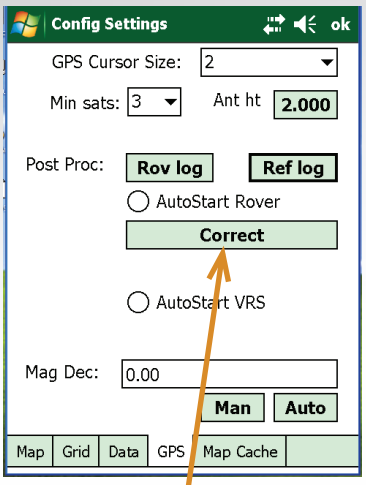
You want to stop: Click "Yes"



File location: click "OK"

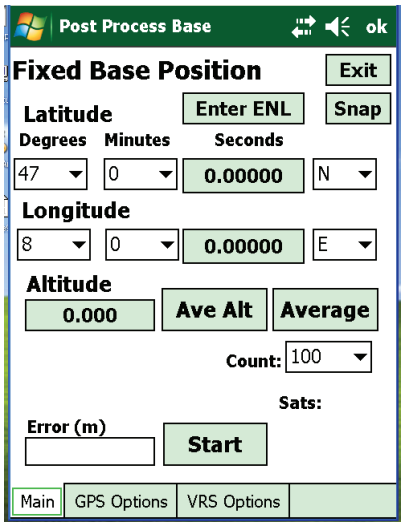


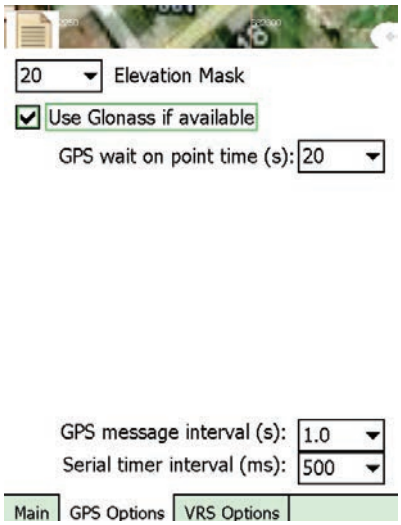
Note: it will be important to place the base station data into the same location as the rover data.



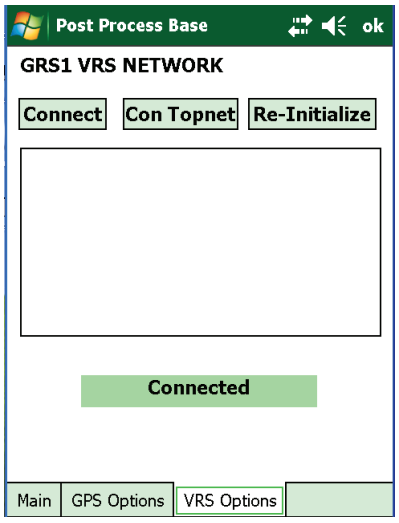
Press "correct"

Postprocessing: GNSS + VRS Options



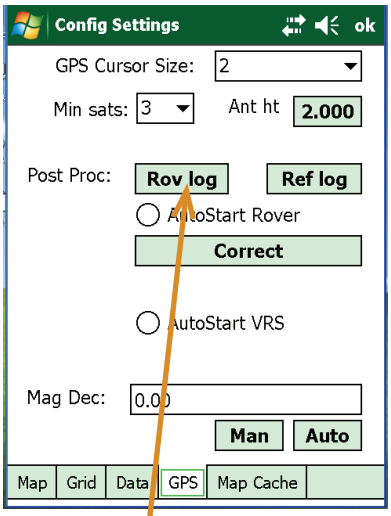


GNSS options allow the user to define the satellite constellation and to increase the postprocessing accuracy.

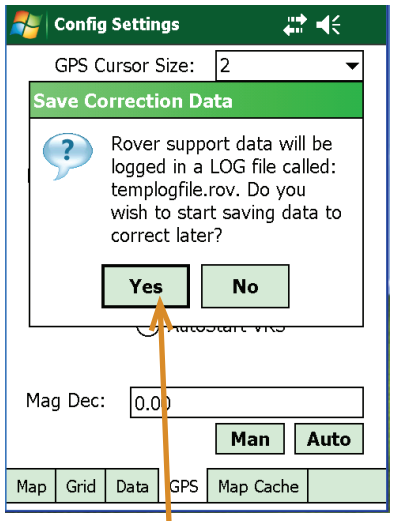


VRS options allow to define the login parameters to the VRS network

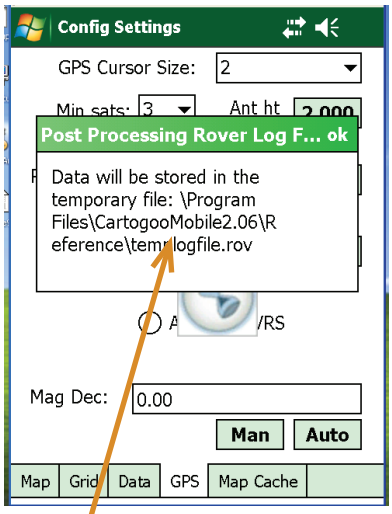
Datacollection for Postprocessing: Rover



Click on "Rov log" to start saving rover data for post processing



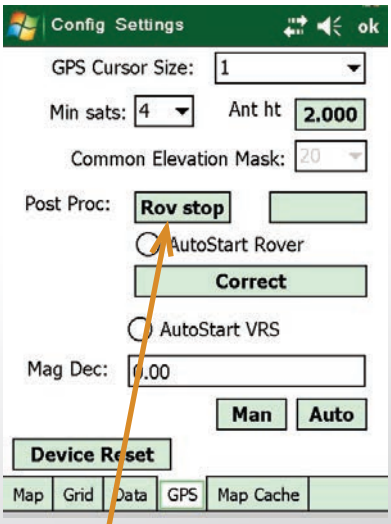
Click "Yes"



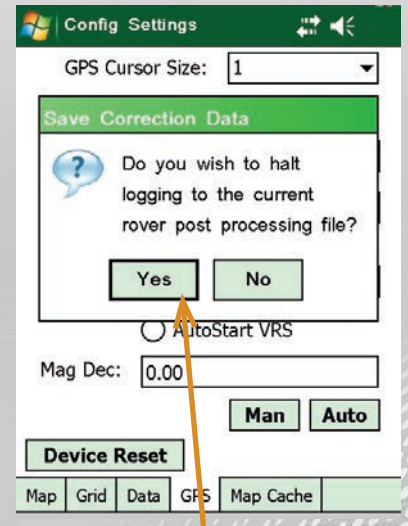
Location of data storage

If you wish to stop the registration of postprocessing data for the rover, go to: Tools

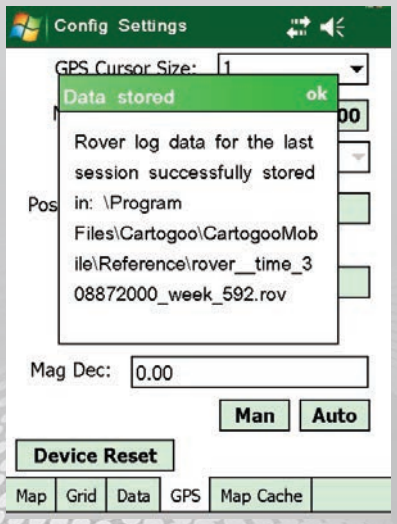
Then go to GPS



Click "Rov stop"



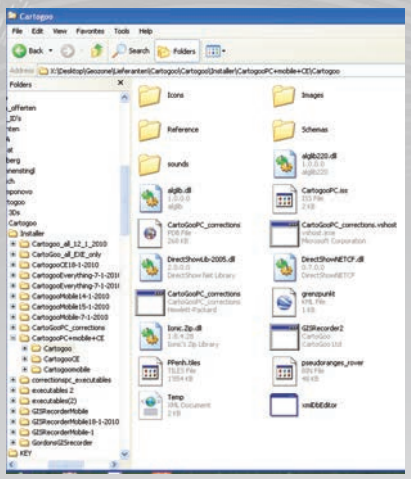
Confirm that you wish to stop by clicking "Yes"



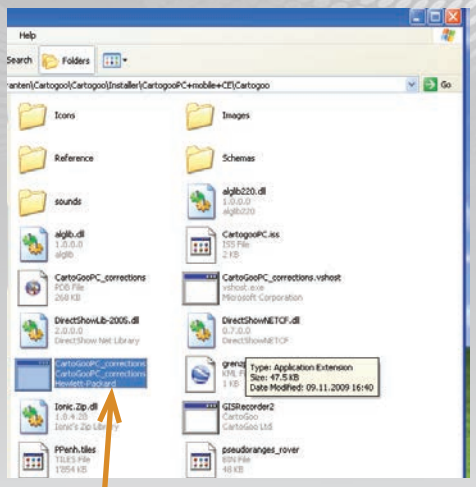
Here you have the information regarding the storage location of your rover data

Note: it is important that you copy your rover postprocessing files into the same location as your base station postprocessing data

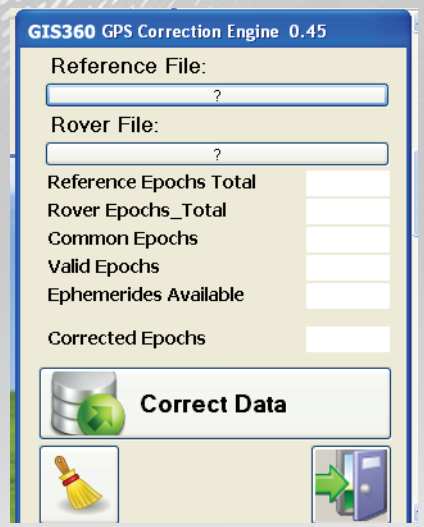
Postprocessing: Base + Rover Data



Look for the directory where your GIS360 PC version is installed.



To start the postprocessing program, click on the executive file "GIS360PC_corrections"



This is the Postprocessing program window

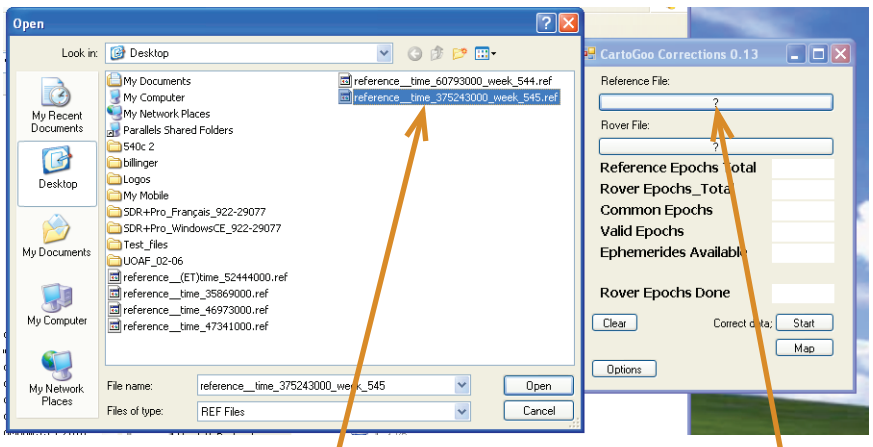
The Correction engine will default to the recommended settings so most of these options can be ignored. However the most critical is the Epochs selector which is the number of Epochs to be averaged together to form the final position on each point. If you stayed on the point for 20 seconds each time then select 20 seconds in the Epochs. You may then continue by pressing OK at the bottom of the Options menu. The other options are as follows….

Filter: Single difference filtering tends to work best for most data sets.

Elevation Mask: This can be adjusted to ignore satellites below a certain elevation.

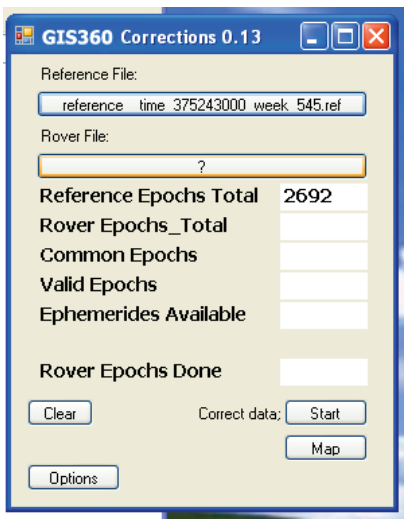
Correction Method: Single Difference is a Hatch filter and works best for mast cases.

Show Correction Rover Links: On the plot it will show the link between the point where the button was pressed and the corrected point

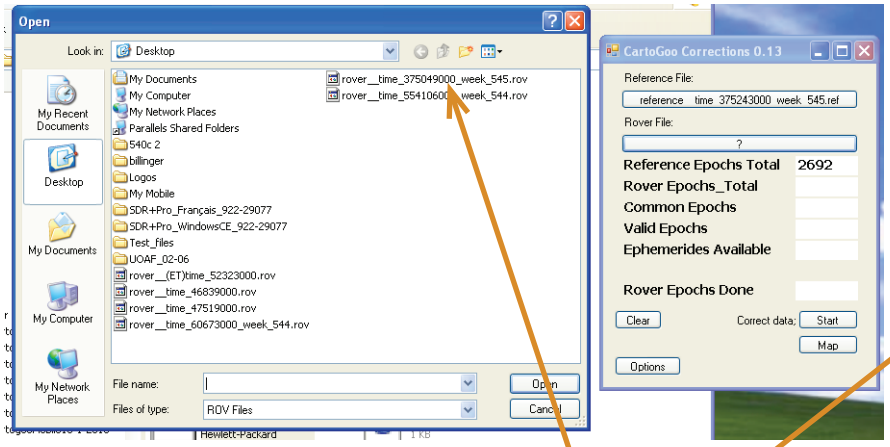


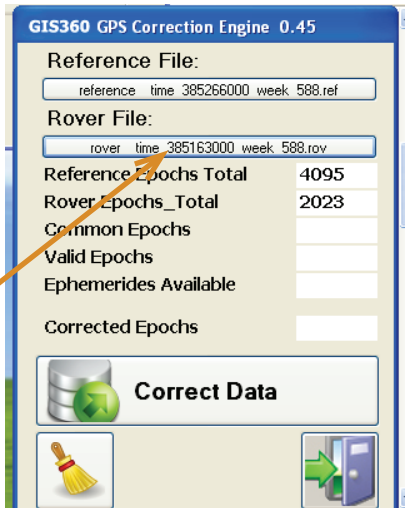
... choose the Reference File you want to apply postprocessing to

Look for your reference files (.ref) by pressing here

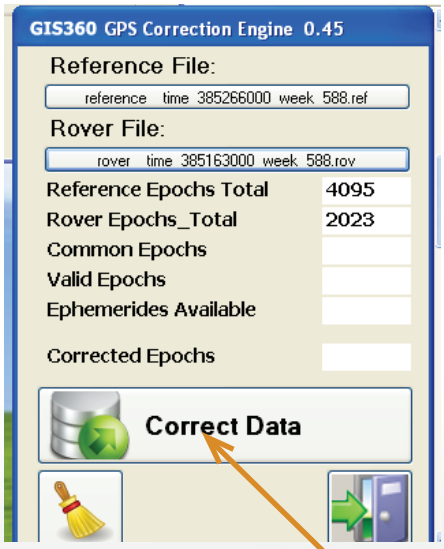


Look for your rover files (.rov)...

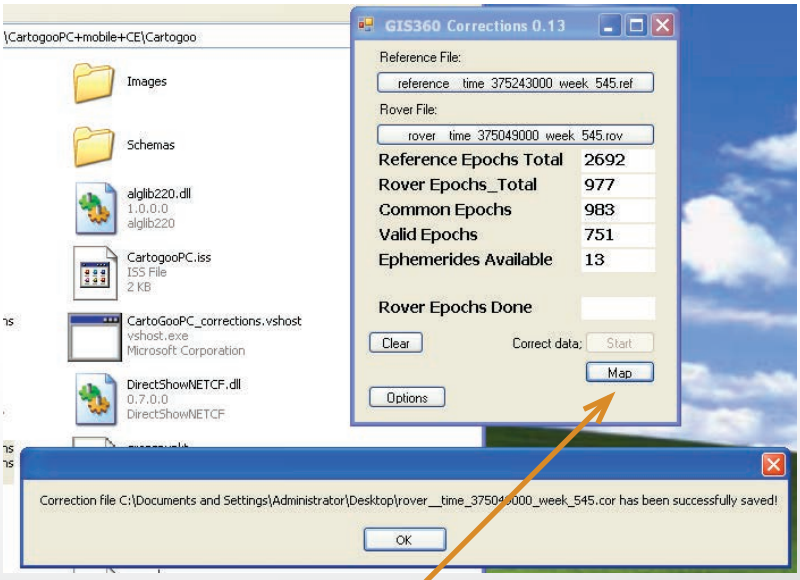




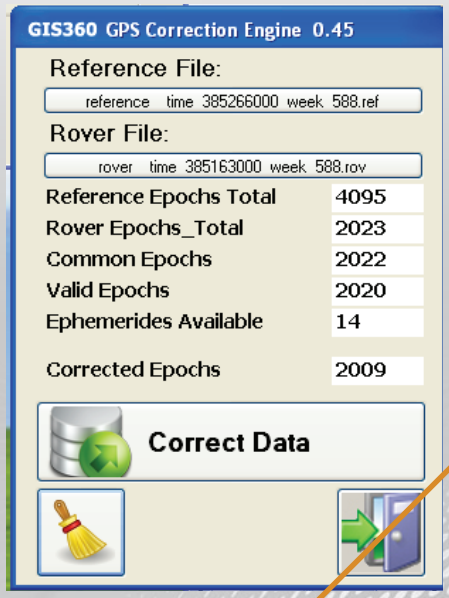
... choose also the Rover File you want to apply postprocessing to



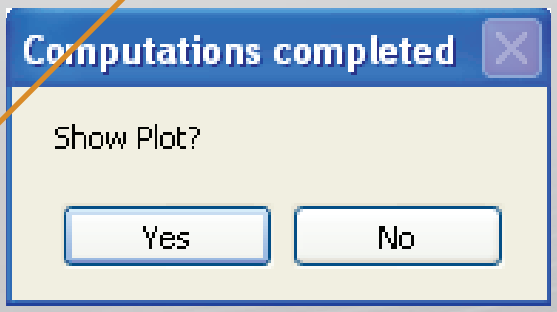
Once you have your rover and reference files, click on Correct Data



This is the confirmation of your saved data, click ok

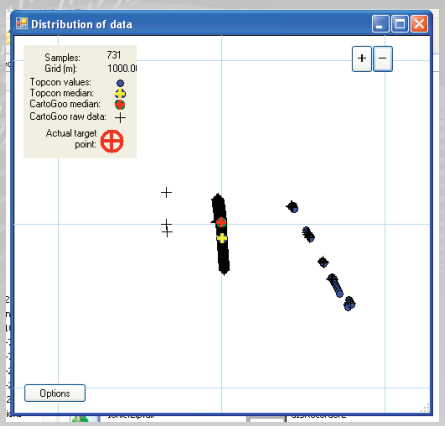


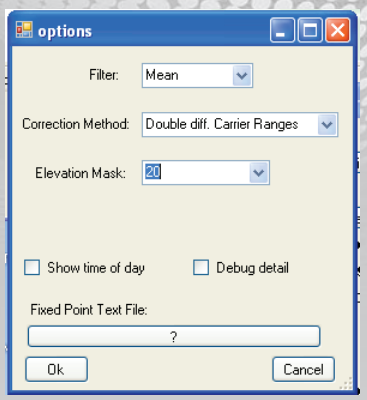
To see the map of your raw data, click on map

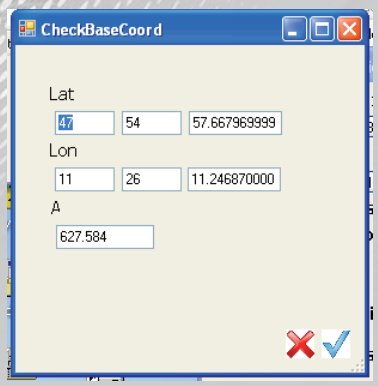


On this map you can see how your Rover and Base data look like. These are pure 1 second data. Blue dots are Topcon values and Crosses are corrections.

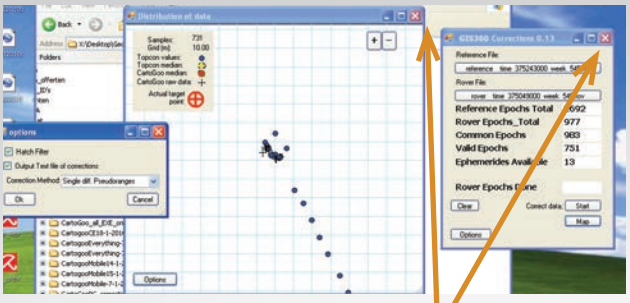
Postprocessing: Base + Rover Data





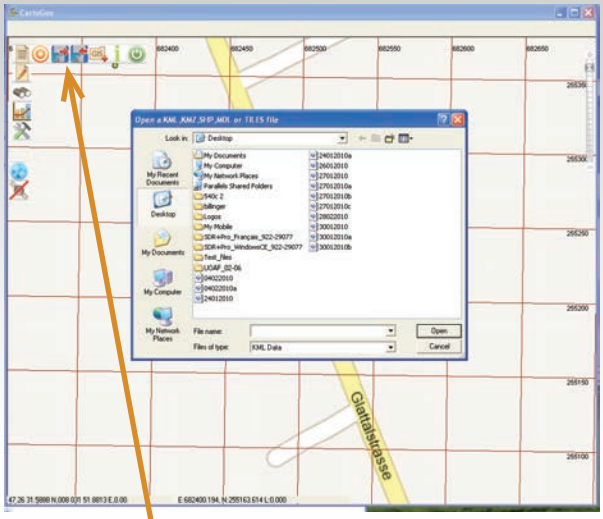


With the + and - you can zoom in and out to see the map of your raw data.

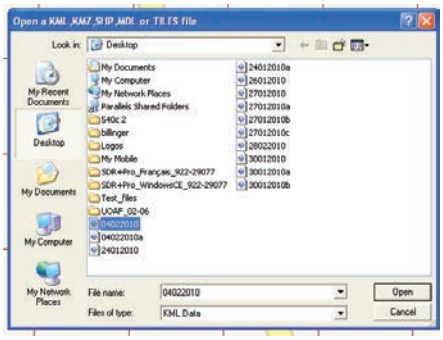


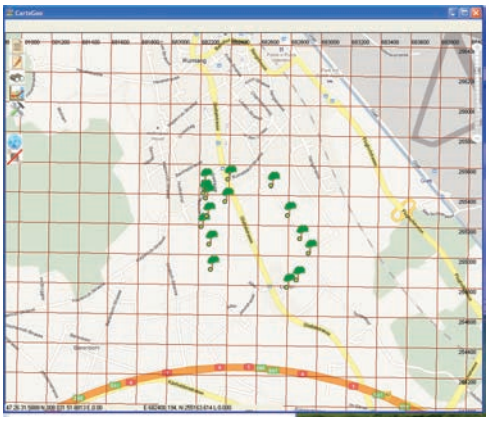
To end this view, simply click on X
The same applies to closing the postprocessing program

Important Note: Your Post Processed ROV file has been saved in the directory "Reference" and has a .COR extension.

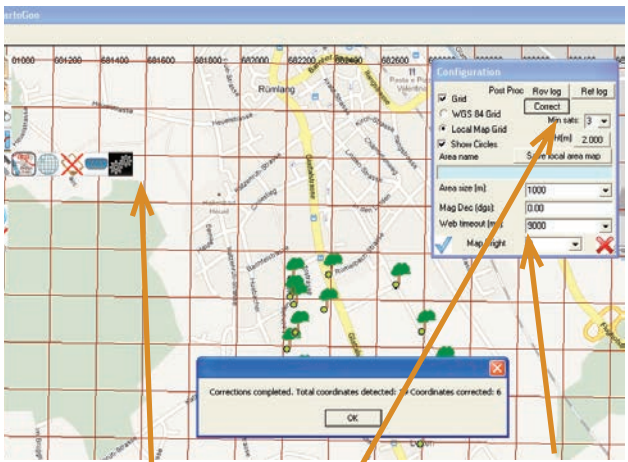


In the GIS360 PC version, click on the OPEN FILE button and look for your kml files, then select the one you wish to process

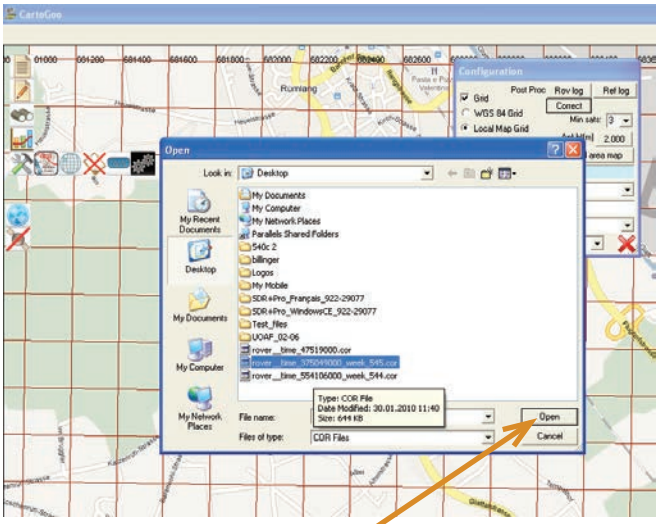




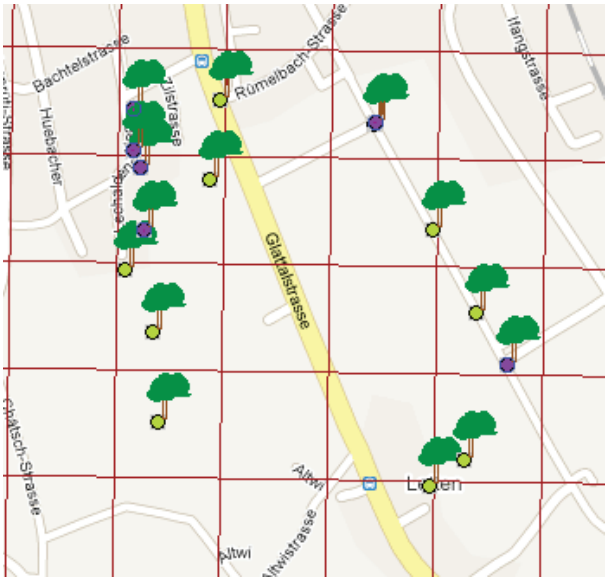
After opening your KML file, this is your raw KML data in GIS360, as surveyed in the field. Now you want to apply the postprocessing corrections



Click on "Tools" to see the following "dialog box", where you click on "correct"

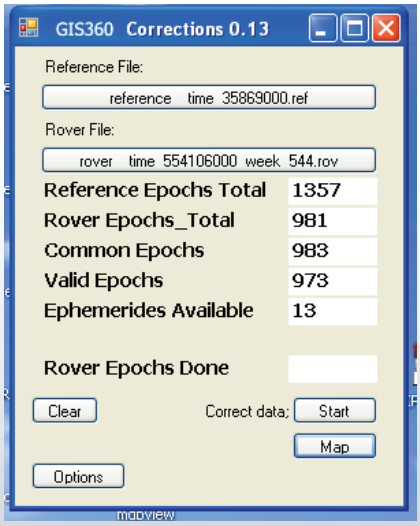


You can now choose the correction file (extention .cor) and click "open"

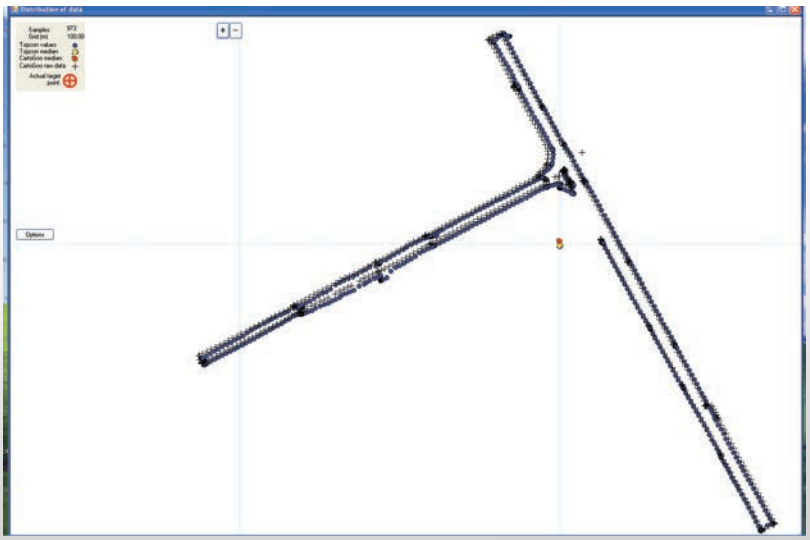


You can now see that the corrected points have a different color. In this example only 6 points have been surveyed, and we see 6 corrections.

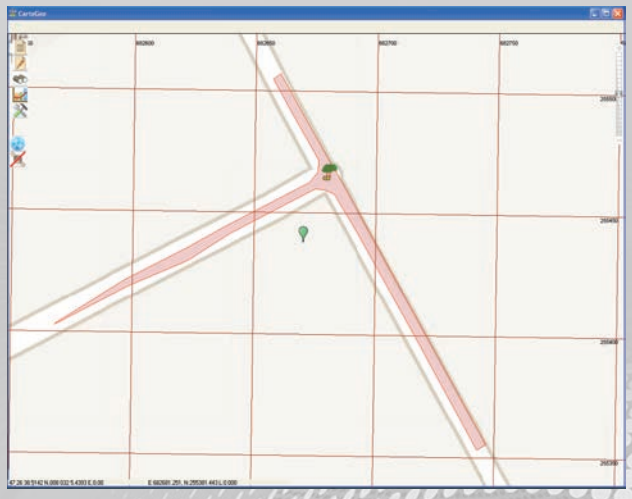
Here an example with a Polygon, following the same procedure as previously for single points. Without going as much in details as for single points.



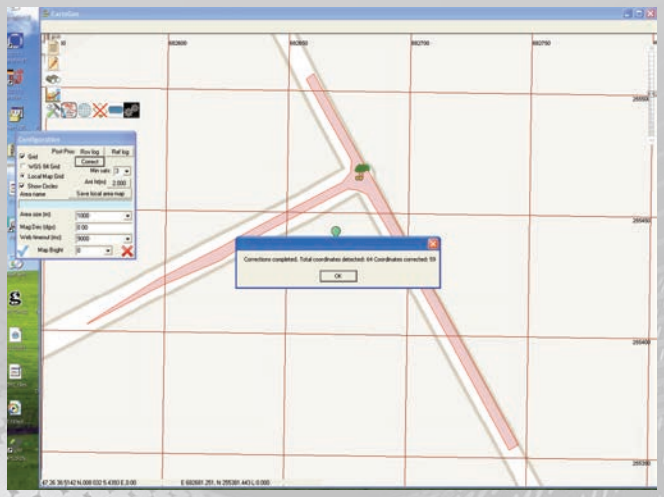
Start the rover and reference files



Map view of raw data

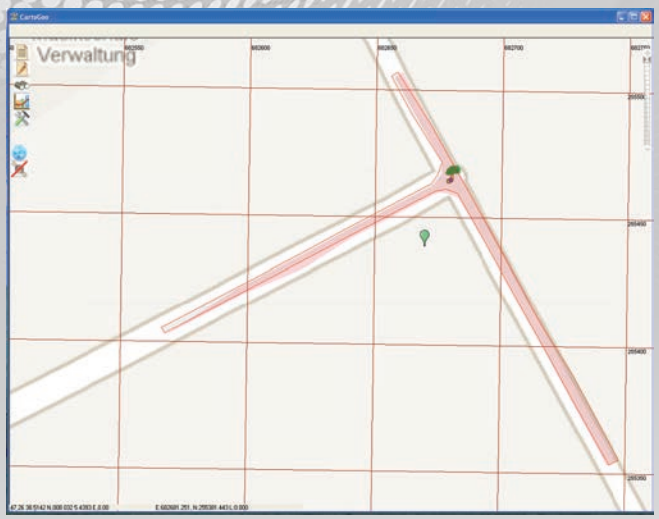


View of your field KML Field data

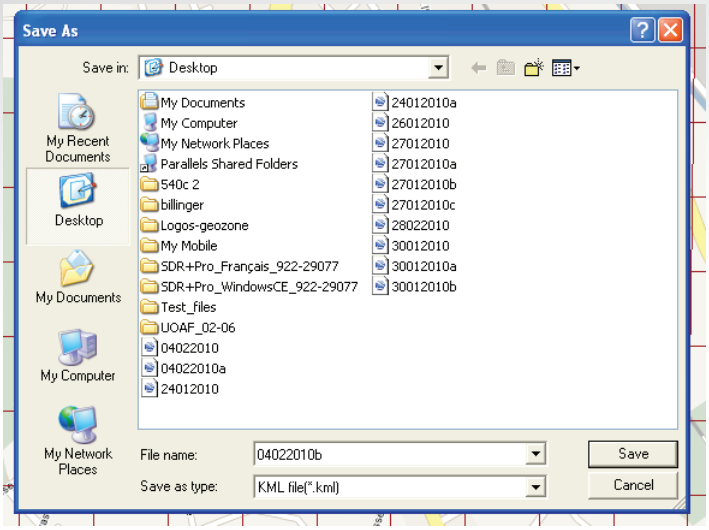


Here you can import COR file.

This image displays that the corrections have worked and that "old" points moved to the new positions, but with aerial image in the background.

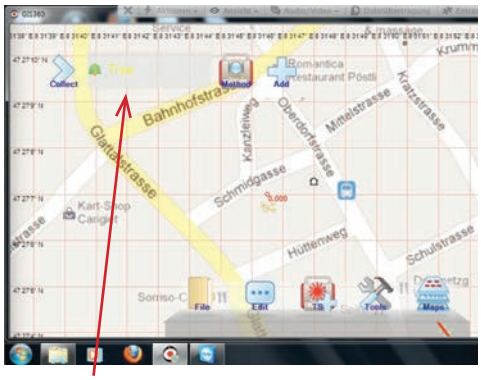


Here we see that the corrections have worked and that "old" points moved to the new positions.

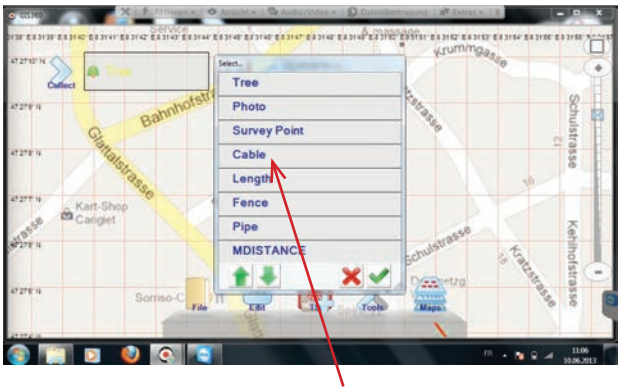


Don't forget to save your "NEW" KML file. We suggest to use the same name as the original KML, but adding and a "sufix" like a ,b or c.
Now you can export your NEW KML file into Google Earth.

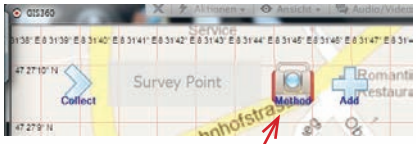
How to use Total Station with GIS360



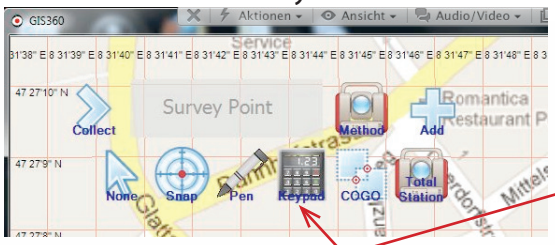
press here to change GIS Database

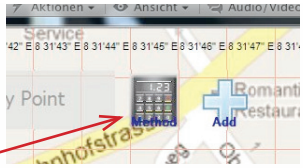


choose your preferable GIS Database, in our case Survey Point

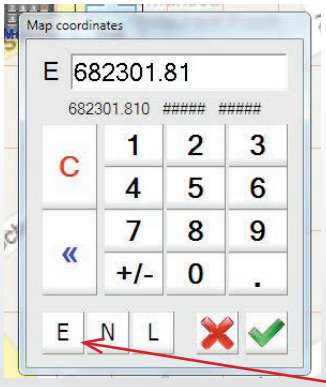


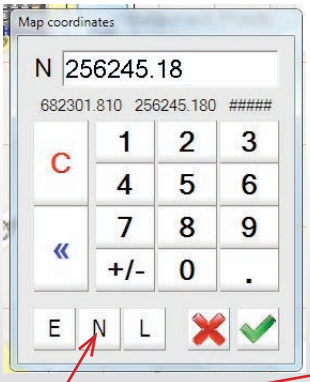
If you need to enter coordinate for your points please press here

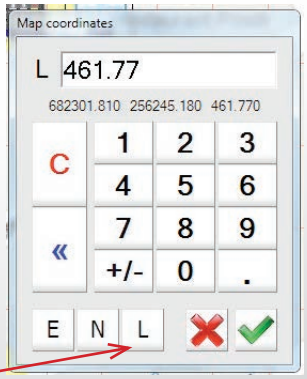




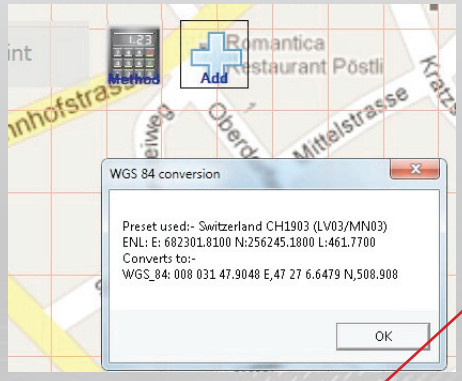
and choose a keyboard option

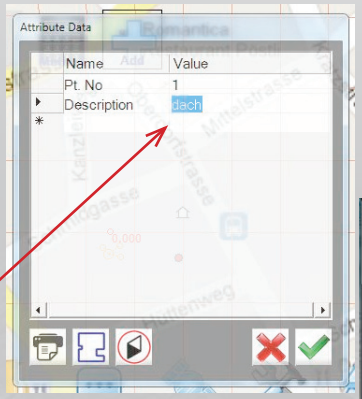


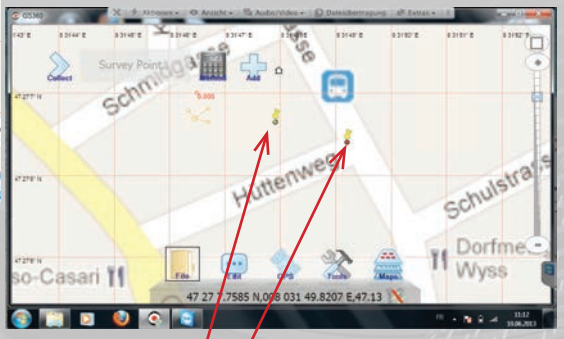




enter desired E,N and L values, by pressing to E,N,L



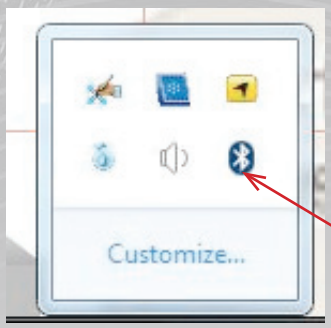


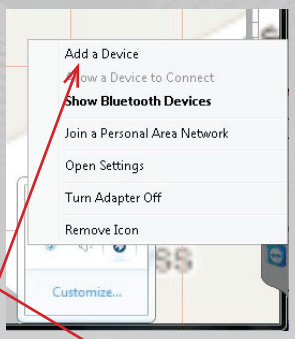


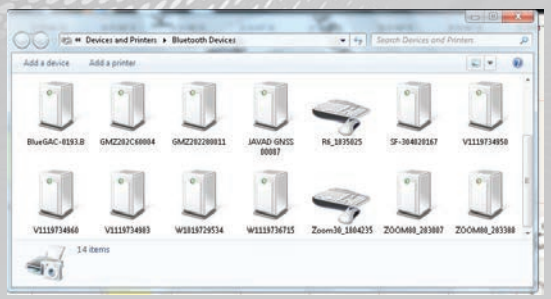
message about the WGS84 conversion will appear and you can enter the point name and Description

entered coordinates will then appear on the map screen

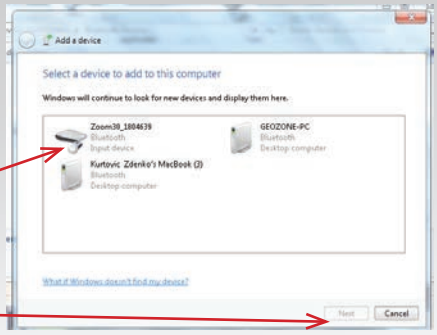
BLUETOOTH settings



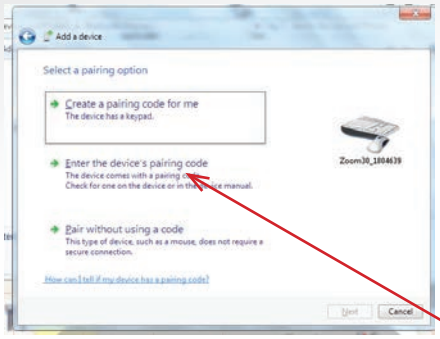


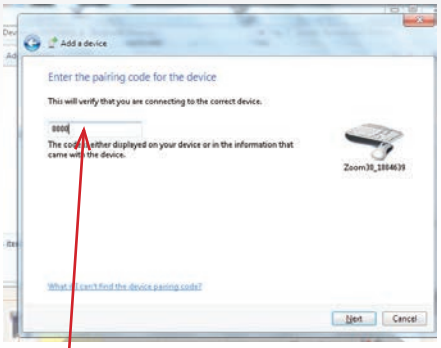


In GIS360 you have two ways to define communication with your Total Station. One over PC internal BT manager and other over GIS360 directly. If your total Station is not listed you need to press "Add a Device"

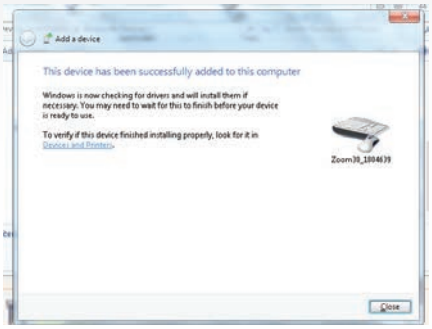


As soon as your unit appears in the list click on it and press Next

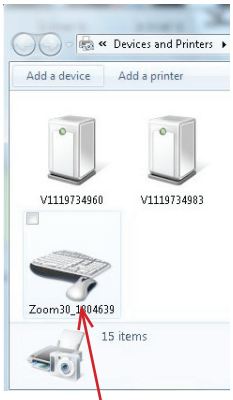


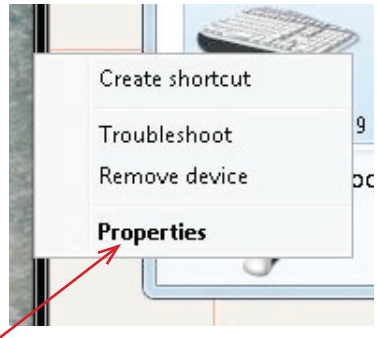


enter when requested pairing code in normal case 0000

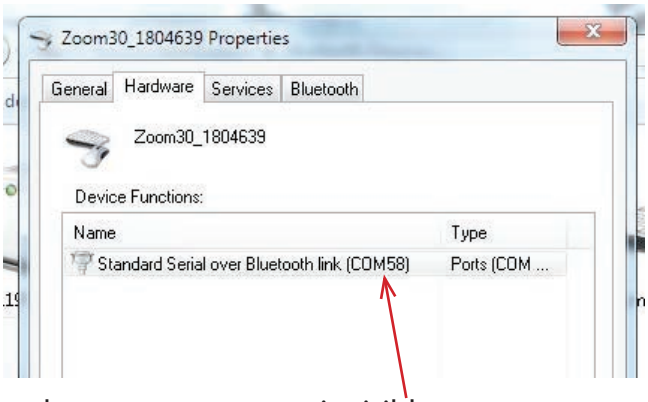


wait some time and then you should get this message



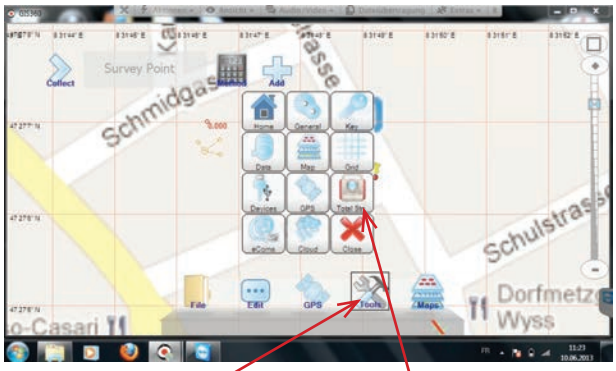


new icon for your Total Station will appear, and press your pen on this symbol to get following and choose properties

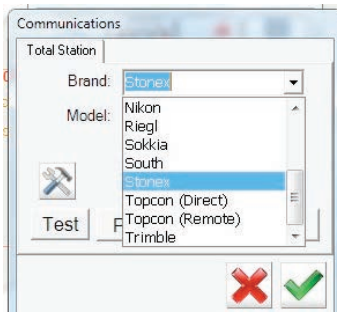


and now your com port is visible

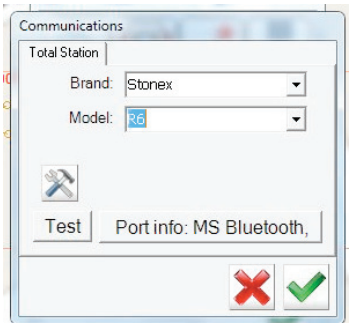
Other way of setting proper RS232 com port will be described bit later in this manual



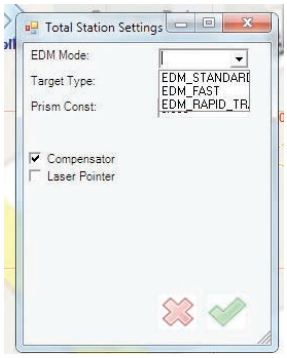
now, we need to set up our Total Station, so please press first Tools button, then you will get this new window and please press Total Station icon



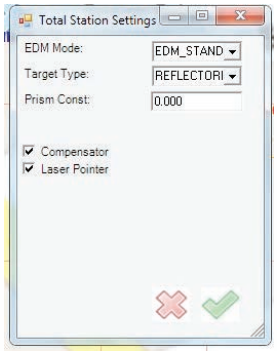
choose here your desired brand, in our case Stonex



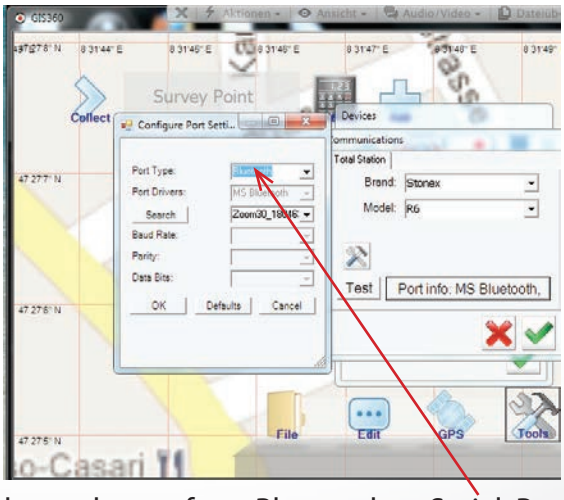
choose please your Total Station model, in our case R6



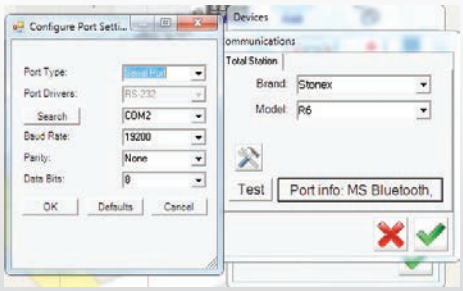
then you will be asked to chose EDM type, and if you wish to activate laser pointer



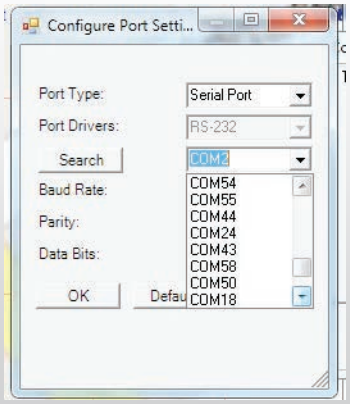
your final choice could look like in this

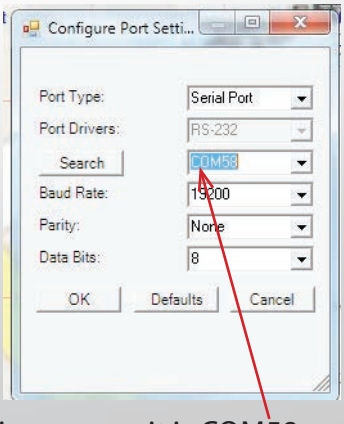


now please change from Bluetooth to Serial Port

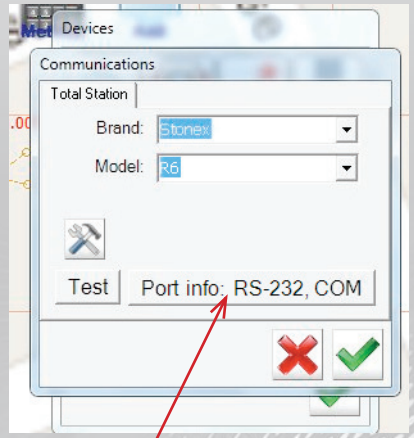


now please change COM port to yout appropriate one

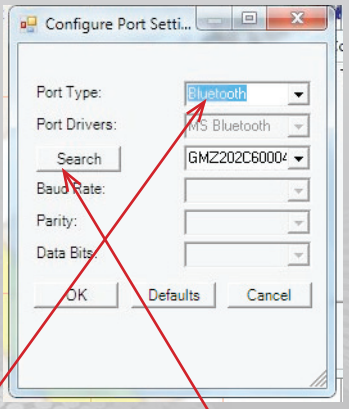




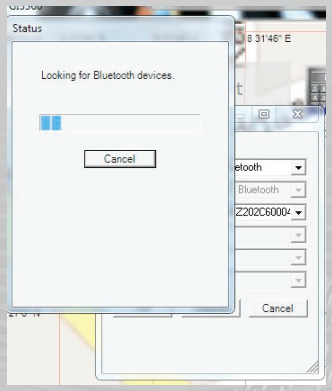
in our case it is COM58



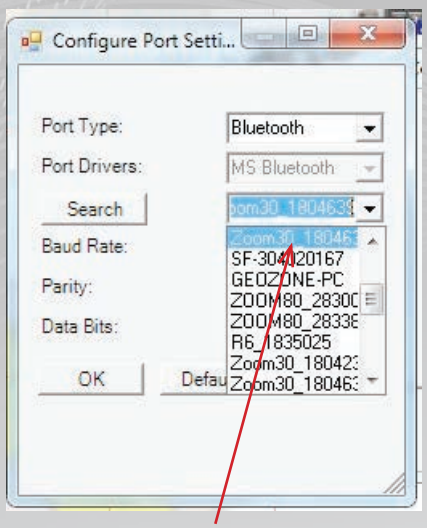
here is clear that we are using RS232 COM port



Now we will "play" with other option and this is to use BT interface directly in GIS360, without need to use BT Manager from the native OS, in our case Win7. Please press "Search" button now

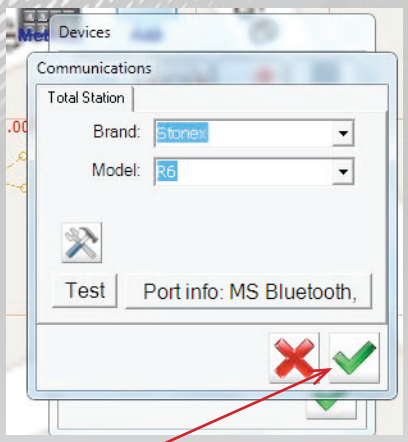


GIS360 is looking now for all units in your surrounding



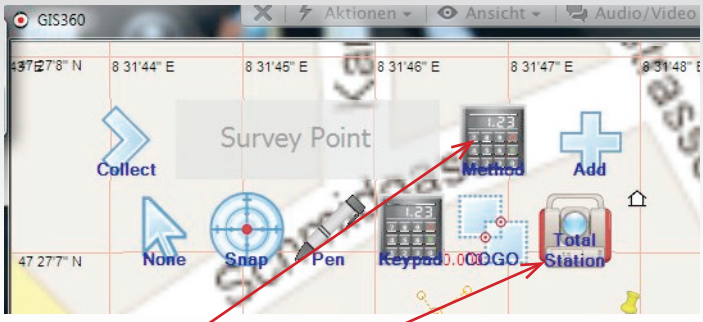
From the list chose the unit of your choice

now you only need to press OK



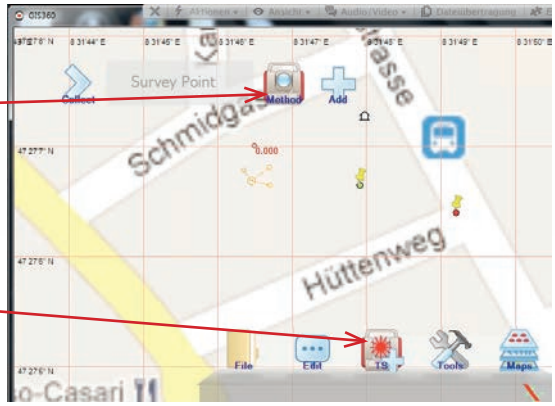
this will bring you back to this window and now only press green YES button

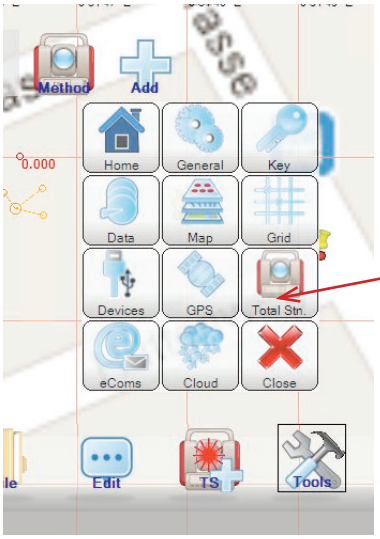
this will bring you back to this window and no only press green YES button



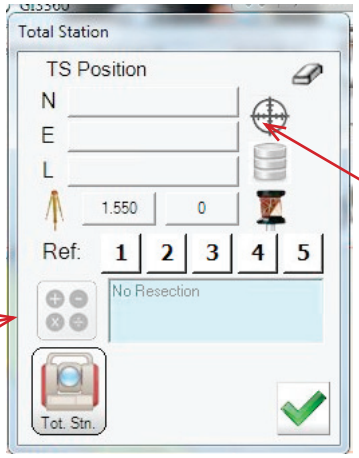
Now we need to change from GPS survey to Total Station survey. So please press this icon (it can be any of those 6 icons) and then please chose total station icon

you will see that not only Total Station icon changed on the top menu it also changed in the main menu. This is your Total Station Trigger button

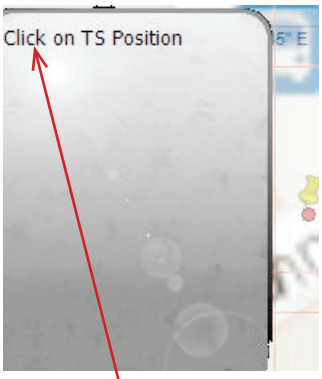




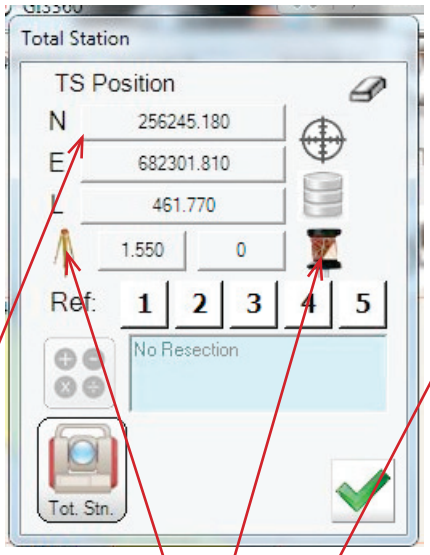
so now press the Tools icon to start you station-ing process. and you will see that new window will apear, so please press on Total St. icon and now new window will open

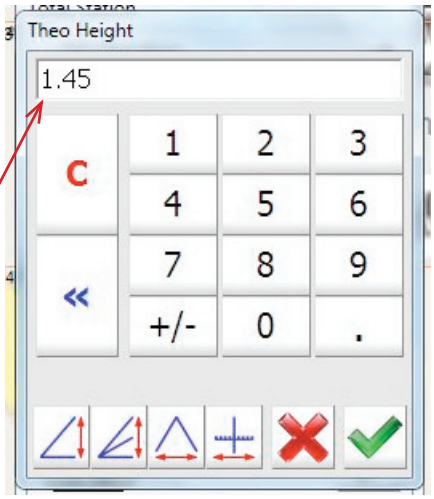


to enter coordinate of your known point press here

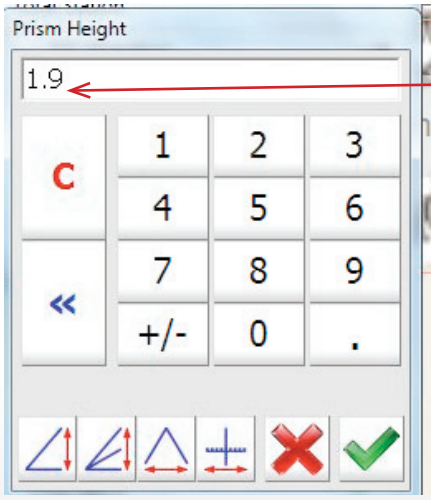


message is appearing to click on TS position, so after clicking on your point you will see your coordinates

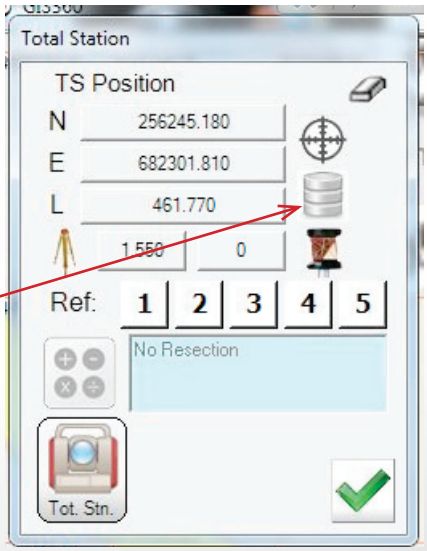




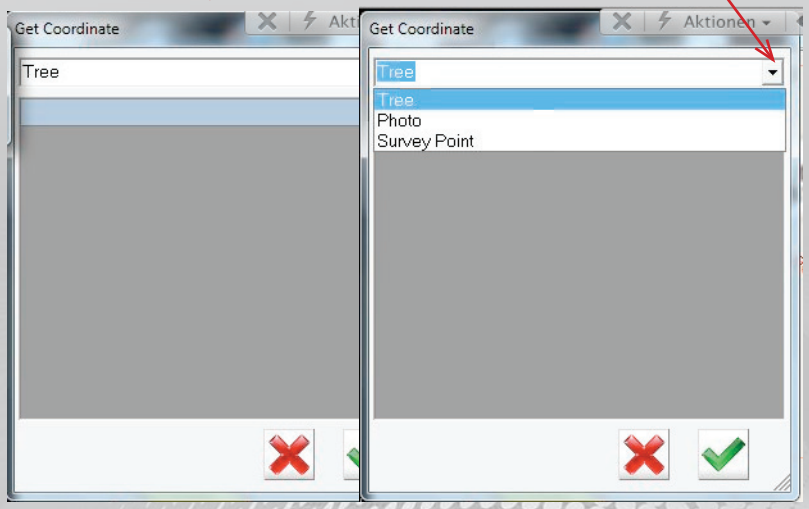
to enter Total Station height press here and to enter Prism height press here

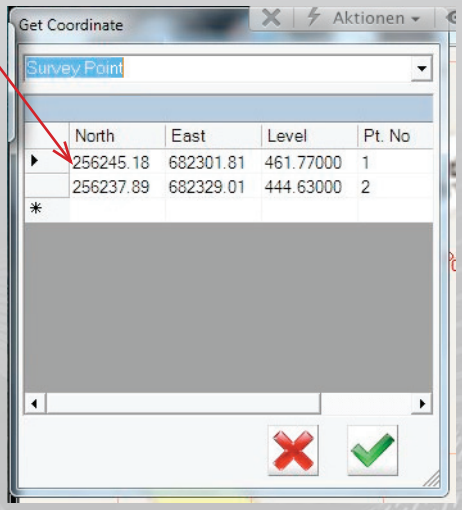


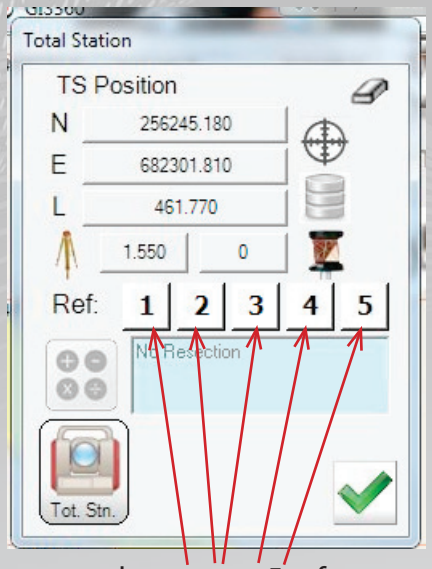
if on other hand you wish to chose from the list of your imported or surveyed points press this icon



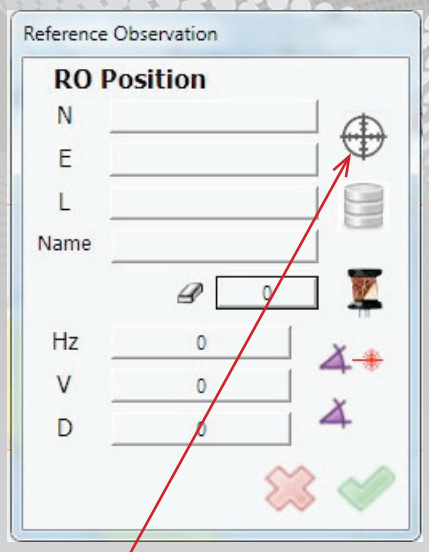
then will prompt new window where you can chose which type of the point you are looking for



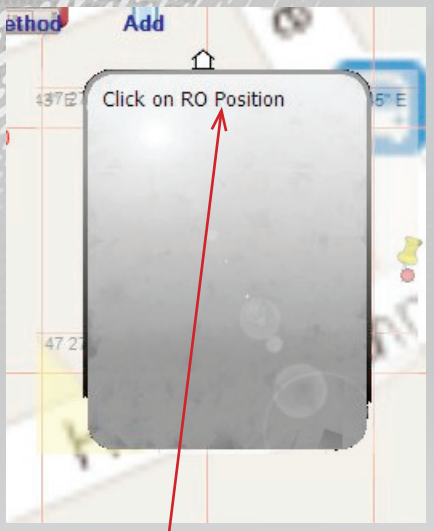




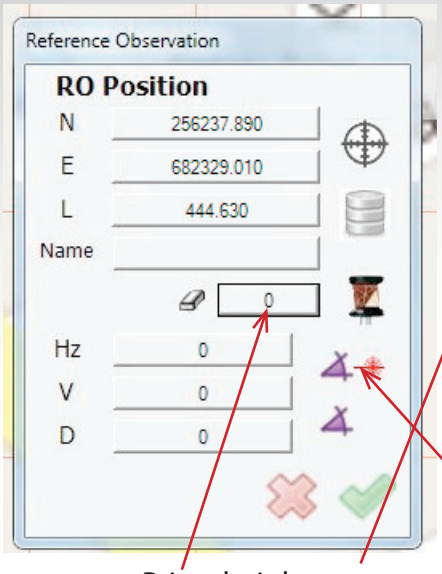
you can have up to 5 reference points, so now press 1



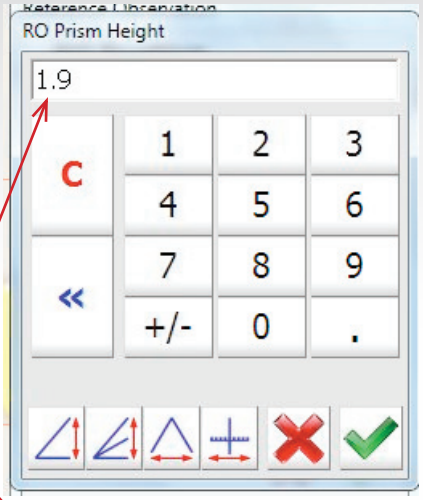
to enter coordinate of your known point press here



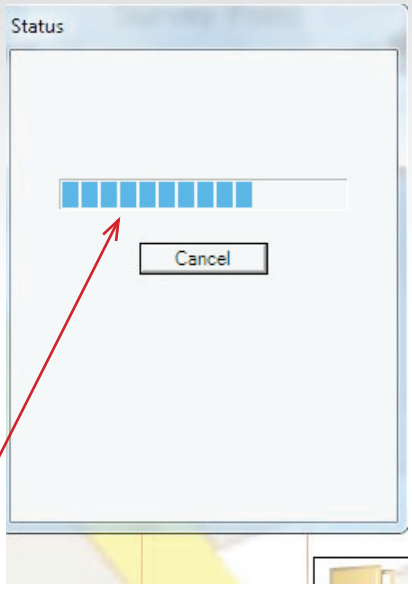
message is appearing to click on TS position, so after clicking on your point you will see your coordinates

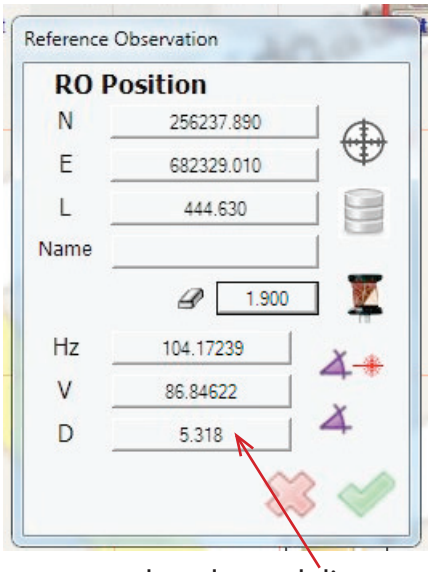


to enter Prism height press here

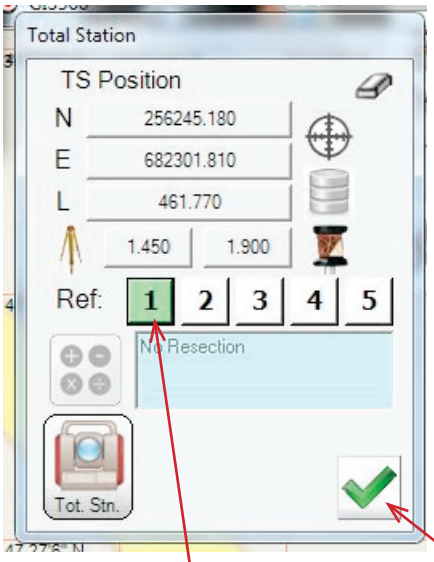


to start measurement to your reference point now press this button and you will see this window coming



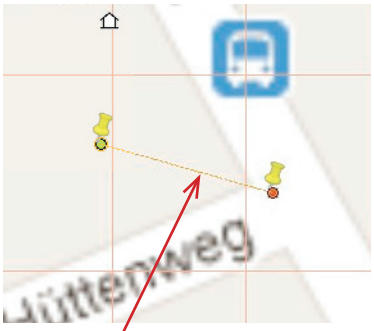


meassured angles and distance will appear on the screen

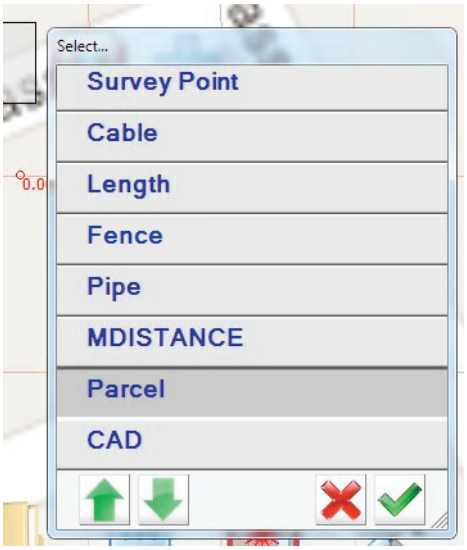


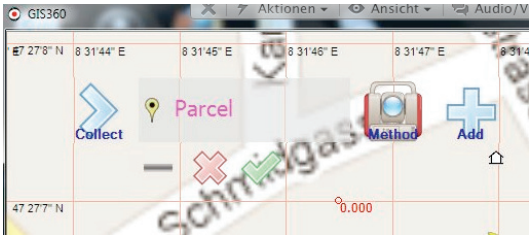
and first reference point is finished

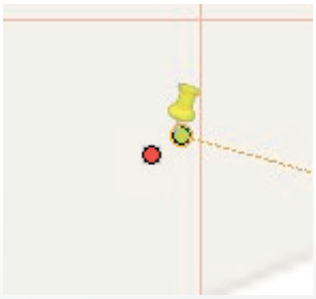
if you had finished your stationning you need to press green Yes icon and you will go back to main map screen

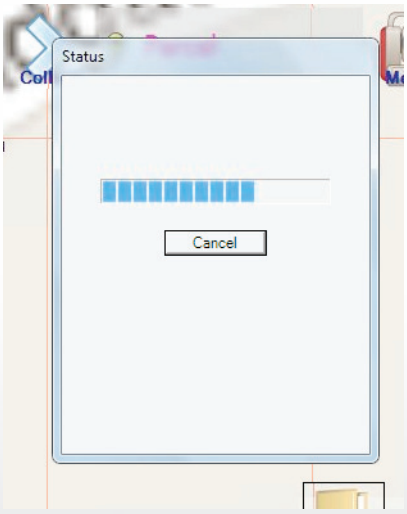


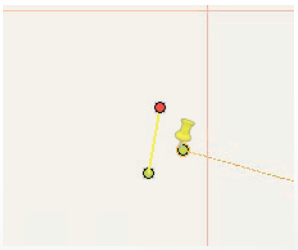
so no you see your orientation, in our case to one known point, but it can be to five max.

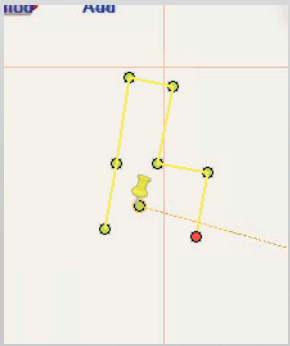


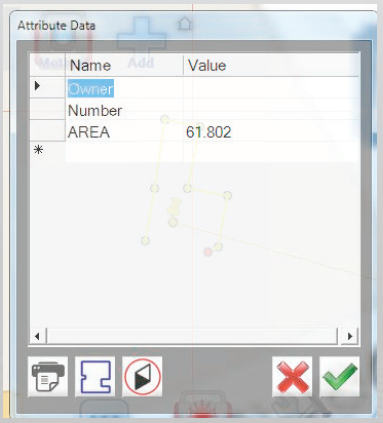


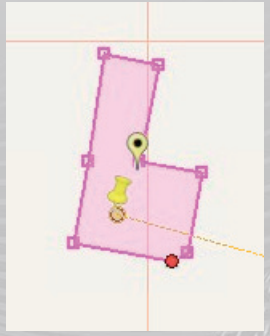




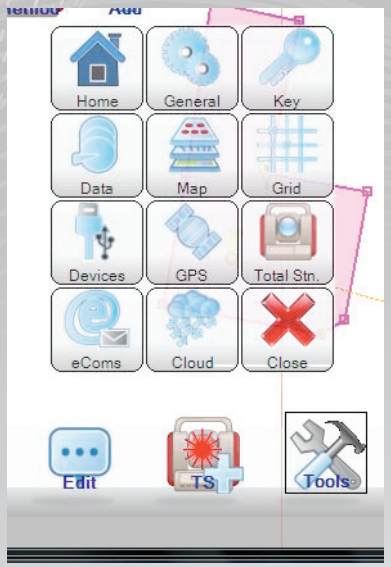


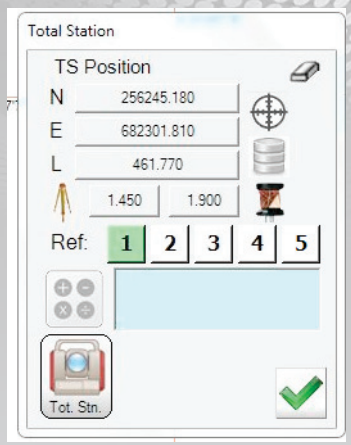


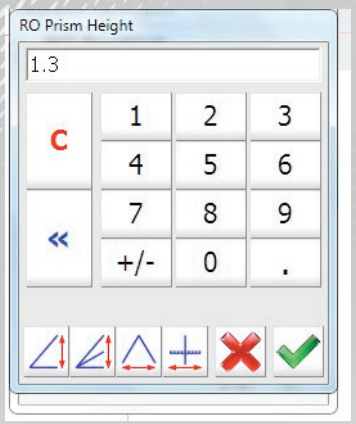


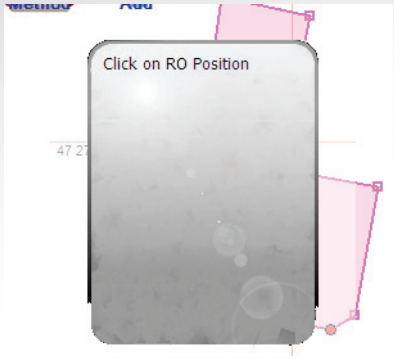


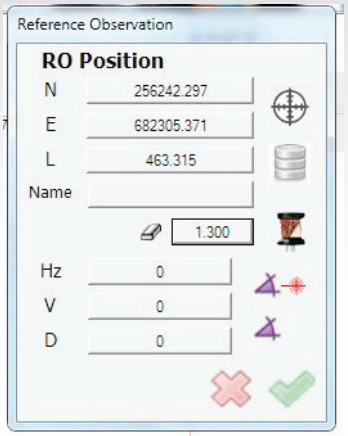
Free stationing

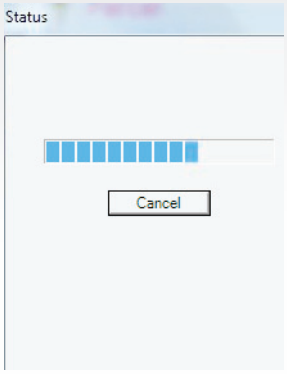


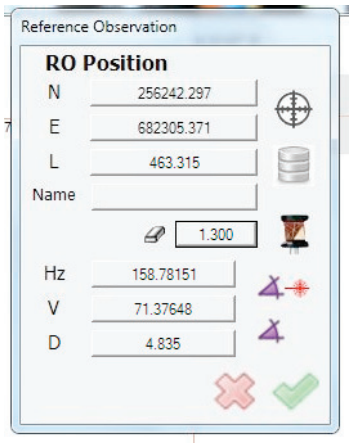


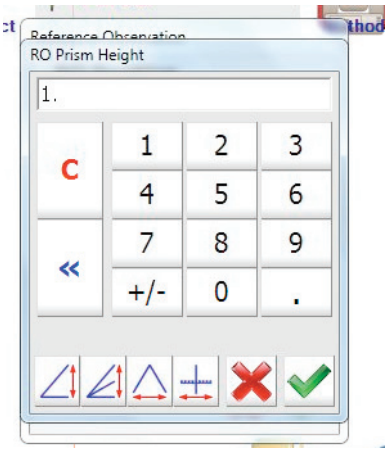


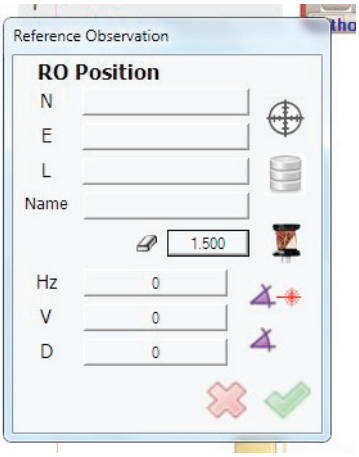


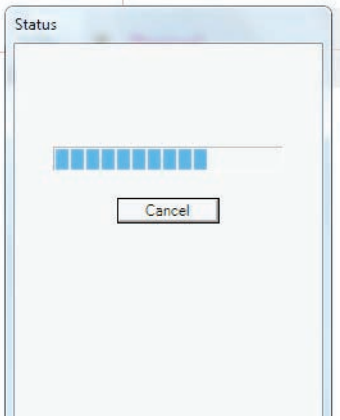


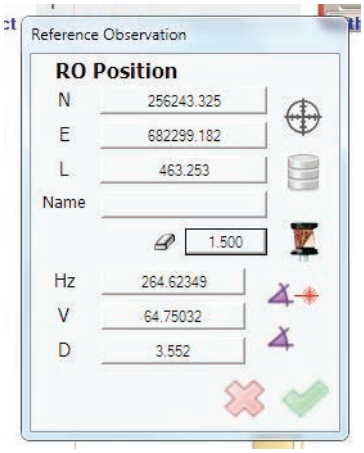


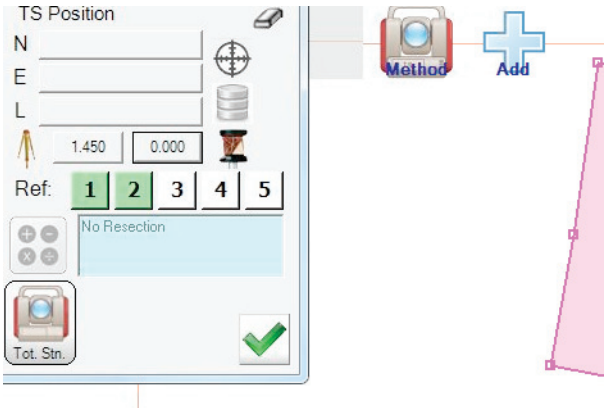


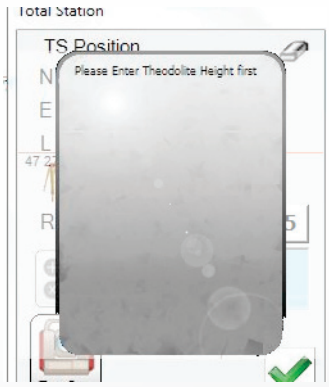


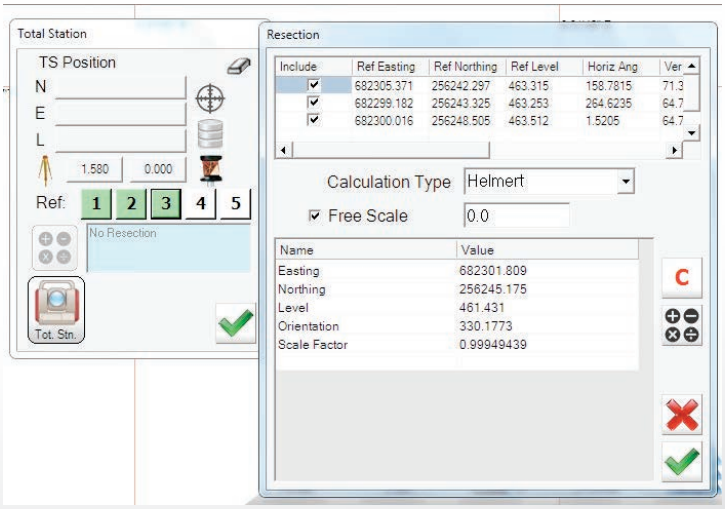


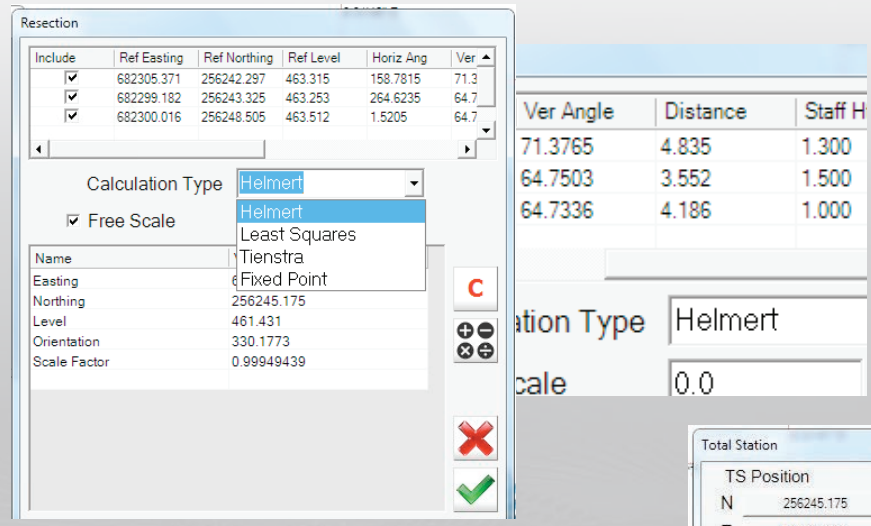

Status
Cancel

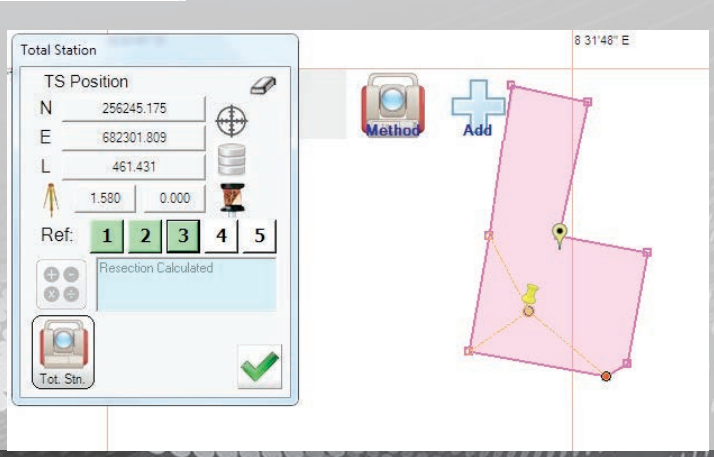

Reference Observation
RO Position
N 256243.325
E 682299.182
L 463.253
Name
1.500
Hz 264.62349
V 64.75032
D 3.552


TS Position
N
E
L
1.450
0.000
Ref: 1 2 3 4 5
No Resection
Tot. Stn.
Method
Add


Total Station
TS Position
Please Enter Theodolite Height first


Total Station
TS Position
N
E
L
1.580
0.000
Ref: 1 2 3 4 5
No Resection
Tot. Stn.
Resection
Include | Ref Easting | Ref Northing | Ref Level | Horiz Ang | Ver
682305.371 | 256242.297 | 463.315 | 158.7815 | 71.3
682299.182 | 256243.325 | 463.253 | 264.6235 | 64.7
682300.016 | 256248.505 | 463.512 | 1.5205 | 64.7
Calculation Type Helmert
Free Scale 0.0
Name | Value
Easting 682301.809
Northing 256245.175
Level 461.431
Orientation 330.1773
Scale Factor 0.99949439
C


Resection
Include | Ref Easting | Ref Northing | Ref Level | Horiz Ang | Ver
682305.371 | 256242.297 | 463.315 | 158.7815 | 71.3
682299.182 | 256243.325 | 463.253 | 264.6235 | 64.7
682300.016 | 256248.505 | 463.512 | 1.5205 | 64.7
Calculation Type Helmert
Free Scale
Helmert
Least Squares
Tienstra
Fixed Point
Name
Easting
Northing 256245.175
Level 461.431
Orientation 330.1773
Scale Factor 0.99949439
C
Ver Angle | Distance | Staff H
71.3765 | 4.835 | 1.300
64.7503 | 3.552 | 1.500
64.7336 | 4.186 | 1.000
ation Type Helmert
cale 0.0


Total Station
TS Position
N 256245.175
E 682301.809
L 461.431
1.580
0.000
Ref: 1 2 3 4 5
Resection Calculated
Tot. Stn.
Method
Add
8 31'48" E

Using a Cable Detection device with GIS360

Saving a Map Cache

Frequently before starting to use the field data collection system you need to know how to save maps incase you don't have mobile phone coverage on your site. It is best to do this on the office version of GIS360 and copy the cache to your field system.

1. Start GIS360 on your PC.

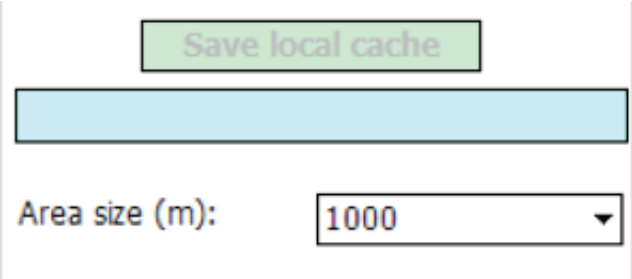
When GIS360 starts it will always put your Home position in the centre of the screen with a home marker.

2. Move the Home marker to the centre of the area that you want to save.

The home marker can easily be moved by making sure that the area that you want to move it to is on the screen. Go to the Tools Menu and select "Home Position". You will be prompted to tap the screen at the exact position you want to move the home position to. The Cache is always saved around the home position so that's why we had to move it first.

3. Save your Cache

To save your cache you go to the "Tools Menu" and then "Map Cache".



The Area size is the size of the Cache to save. This is measured in meters across. Select the required size. Remember that it will save all the maps and aerial photos at all resolutions so don't make the size to big. Then press "Save Local Cache", enter the name, and then wait till its completed. At completion you will be prompted "Do you want to use Tiles now?" answer yes and zoom in to take a look.

4. Copy the Tiles file to the GNSS.

Always put Tile files into the MyDocuments subdirectory of the GNSS unit.

Pairing your Cable Detector with your GNSS

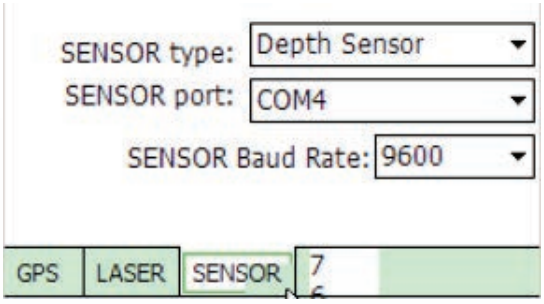
Before you start GIS360 you must make sure that your Cable Detector is paired with the GNSS. To do this you must use the Bluetooth software on the GNSS unit and then make the connection with the Cable Detector.

Using a cable detection device with GIS360

Once paired then you should not have to do this again. The key outcome of the pairing is that the Blue-tooth driver has given the Cable Detector a COM port number. You must know that number to setup GIS360. Different Cable Detectors might be given different COM ports so please be careful.

Setting Up your Cable Detector in GIS360

When GIS360 is running you must setup the Cable Detector by going to the "Tools Menu" and then "ports". Then pressing the sensors Tab on the Connections dialog will bring up the Sensors selection.



Set the SENSOR type to Depth Sensor (Cable Detection Unit) and then the Correct COM port from the pairing. Then set the Sensor Baud Rate to 9600 (The default setting for the cable detection unit)

These Settings will be saved to disk and will not need to be re-entered again as long as you are using the same Cable Detector or the same COM port.

Using GIS360 with a Cable Detector

1. Start GIS360 Mobile

You will then be prompted with a splash screen, followed by a couple of quick questions. The first is "Load Mapping From", either you can select Internet if your GNSS has an Internet connection or you can select one of the Map Caches that you downloaded earlier.
Select the Map Cache and press OK.

Then you will be asked if you want to load an existing dataset. Just press OK to start a new set.

You will now see your map on the screen.

2. Zooming and Panning

Pan - Is always on. Just touch the screen and drag with the pen.

Zoom In and Out - Is done with the scroll bar on the right of the screen. Press the + button to Zoom In and the – button to Zoom Out.

Map or Aerial Photo - You can change from viewing a Map to Viewing the Aerial Photography by pressing the "Map Menu".

3. Using GNSS

At the Lower Left of the screen are two GNSS buttons. The GNSS On/Off button will turn the GNSS on and off.
If the Icon has a red line through it then the GNSS is OFF. Clicking the button will turn the GNSS on. When this happens the GNSS cursor will appear on the screen.

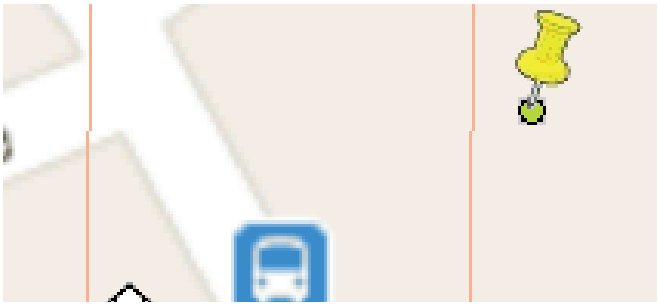
This cursor will move with the GNSS and if you move off of the screen, it will always centre again the map to your position. The GNSS Accept button will mark a GNSS reading on the map. This is used if you want to draw things on the map. If you are using a Cable Detector however then this will not be needed since pressing the Log button on the detector automatically does the same function.

4. Logging Detector Data

Logging data from the Detector is very easy. When you turn the detector on by pressing the switch on the handle the GIS360 system will start to beep. This means that data is coming in from the detector and that the Bluetooth connection is functioning correctly. Sometimes you might have to wait for 5 or 10 seconds for the beeping to start. If it does not beep them please check the Bluetooth settings, especially the paired COM port setting.

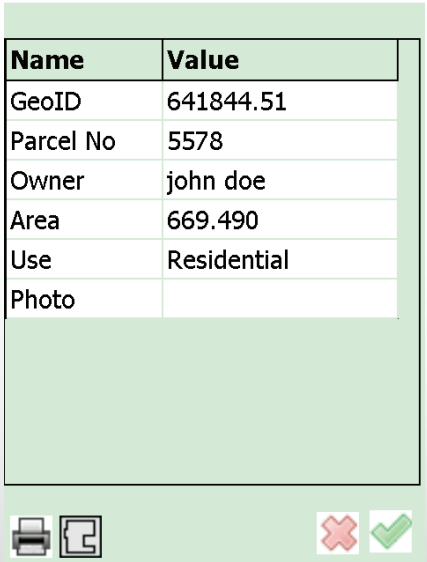
If GIS360 is beeping and you have a GNSS cursor on the screen then press the LOG button on the detector.

GIS360 will then save a Cable Detector record and a yellow "Pin" will appear on your map.



5. Seeing and editing your data.

Once Cable Detection readings have been placed on the map in the form of Yellow "Pins" you can see and edit the attributes by clicking in the "Edit Menu", selecting the pen and taping on the pin on the screen.



Name	Value
GeoID	641844.51
Parcel No	5578
Owner	john doe
Area	669.490
Use	Residential
Photo	

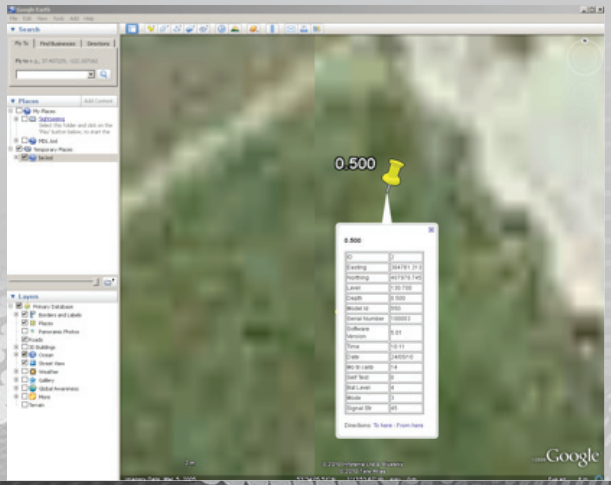
You can then edit and view the data. Press the green button to confirm and go back to the map.

6. Saving your data and Viewing in Google Earth.

The save your data go to the "File Menu" and choose save.

When prompted enter the file name, we recommend that you always save into the MyDocuments subdirectory. This will save in the KML format.

Copy your saved KML file across to your desktop system and then double click on the file in explorer.



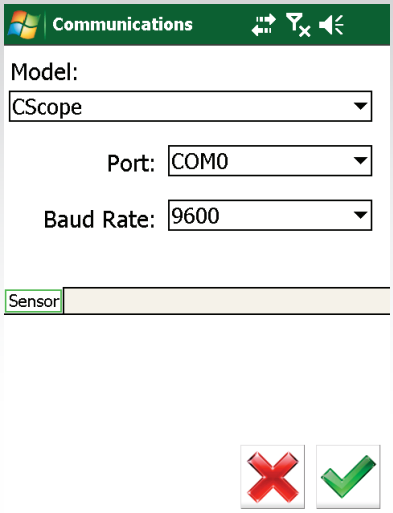
Using a cable detection device with GIS360- CScope Interface CScope Interface

Configuration

The first step required is to perform a Bluetooth pairing with the computer and the Cscope detector. This will vary according to mobile computer platform and should be covered in the manufacturer's documentation. At the end of the pairing process a Com port should have been assigned (e.g. COM0, COM22 etc.). This Com Port value will be needed when configuring GIS360.

One the pairing has been completed, GIS360 can be started. In GIS360 go to Tools> Devices, and click on the Sensor button.

This will lead to the following form for selection on the sensor model…



Select Model as Cscope, Set the Port to the Bluetooth Com port as configured at the start. Set Baud Rate to 9600. Click on the Green Tick to confirm the selections.

Using Cscope within GIS360

When GIS360 is running and Cscope measurements are required it will be necessary to manually start communications. To do this go to Tools>Devices and click on the sensor "Start/Stop" button.

This will lead to the following form which is used to control communications…

From left to right the buttons are as follows:
Start communication
Stop communication
Auto-start communication
OK (Green tick)
There is also an indicator at the top of the form which gives a visual display of in-coming data.

Note: For the Cscope it is recommended to always use the "Auto" button to connect to the device. In practice some Bluetooth interfaces may not reliably connect at the first attempt, and the Auto-start button will automatically retry the connection in the absence of incoming data.

Set the Cscope to the required measurement mode and then ensure the Cscope is ON, preferably with a strap around the On/Off trigger to ensure the device stays switched-on. Click on the Auto button and wait for the indicator at the top of the form to start showing a changing green bar. When the indicator is regularly changing, click on the OK button to start collecting measurements.

Collecting Data

Start communications as described in the preceding section.

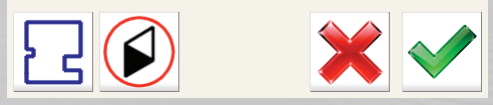
To make a measurement with the Cscope position the Cscope at the measurement position and hold the Cscope Measure button. Keep the Measure button depressed until the indicated depth measurement has been stable and without "LO" readings for at least 7 seconds.

Once the displayed depth measurement has been stable for at least 7 seconds, release the Measure button on the Cscope. GIS360 will then wait for a 4 seconds to be sure that measurements have stopped, and will then place a marker on the map.

The marker will contain the data recorded when the Measure button was released, at the location where that measurement was made.

Collected depth measurements can be examined by using Edit>Item, then clicking on the marker for the measurement. Collected data will then be displayed as follows:

Name	Value
ID	1
Easting	400105.147
Northing	455995.457
Level	0.000
Depth	5.950
Model Id	$CSCOPE
Time	13:34:21
Date	203
Mode	T
Frequency	33kHz
Measurement	D



When all measurements have been taken, go to Tools>Devices, click on the Start/Stop button, and in the resulting form click on the Sensor stop button.

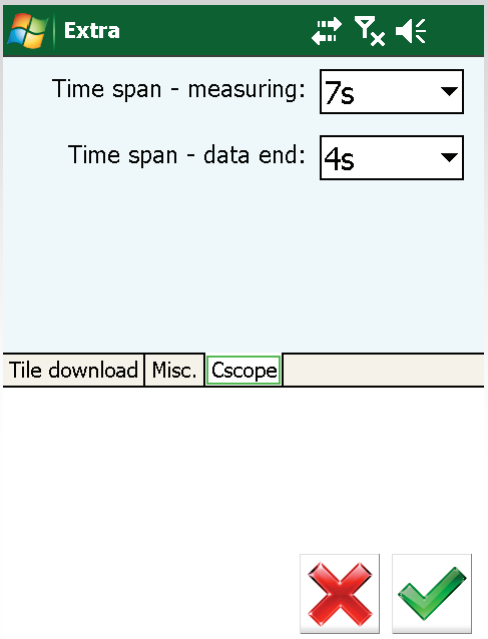
Fine Tuning

This should not be necessary, but it is possible to change the timing parameters for the Cscope interface.

Default operation is as follows:
The user should have collected at least 5 good depth measurements in the last 7 seconds. Any "LO" or zero depth measurements during this period will reset the count of good measurements to zero, so in practice unstable measurements should be eliminated.

Once the "Measure" button has been released GIS360 waits for a further 4 seconds to be sure that measurements have really stopped. This is necessary to eliminate possible problems from communications difficulties such as Bluetooth lag. After this period the data is stored in the survey.

The 7 second measurement timing and the 4 second data-end wait timing can be changed in this form, available via Tools>General, hit the Extra button.



Data Designer

Intro to DataDesigner

What does DataDesigner do and why do we need it?
Most GIS applications need date entry forms to collect data from the use about items being collected.
GIS360 uses the DataDesigner to make custom forms for these applications.
For example a property surveyor might want a data form like this:

Name	Value
Rooms	12
Type	residential
Access	private
Owner	Fred Smith
Street number	
Floors	
Age of Building	
Build material	

This screen allow data entry. The Form contains data fields like Rooms, Type, Owner etc. These fields also have different types, Rooms is the number of rooms and is a number, Owner is a Text String, and Type is a Picklist of choices. There are many different types and these will be discussed later in this document.

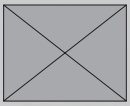
Each of these forms relates to a database. For most GIS applications these databases also have a type. The Database Type only has three options: either it's a database for a point database, a line database, or a polygon database. For Example a tree might be a point, a fence is a line, and a parcel of land is a polygon.

Note: The DataDesigner is designed to operate on your PC, it does not operate on a PDA or mobile device. However the forms and databases designed with XMLFD are meant to be used on the Mobile devices with the GIS360 Mobile software.

About XML and XSD files

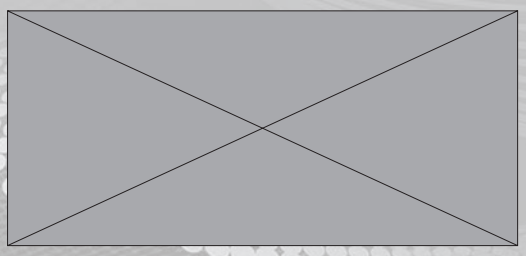
XML files are text files that contain data. XSD files are a subset of XML files. XML files can contain both the definition of the Databases as well as the data itself, whereas an XSD file contains only the Database Definitions. The GIS360 Software and 3DSurveyor use XSD files to store the Database definition.

How to Start and Install DataDesigner

DataDesigner will install automatically with the installation of the GIS360 Software. After GIS360 installation look at your desktop for this icon:  and double click on it to Start Data Designer.

Or an alternative method to Start DataDesigner:

1. Select the Start Icon on the lower left of your screen
2. Select All Programs
3. Select GIS360 then DataDesigner



The Carlson GIS360 Data Designer allows the user to modify GIS360 to exactly fit your needs. Most functions can be done without programming.

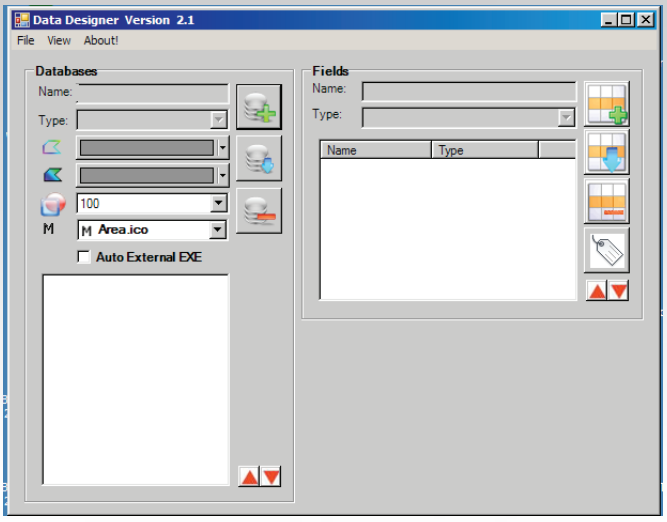
GIS360 has a variety of tools for customizing not only the look and feel of the program
The main tool is DataDesigner.exe. This program allows you to change the data structure and databases for GIS items.
Data Collection projects tend to have two major aspects, the design of the data structure, and the design of the collection methodology.
The methodology is mostly the ergonomic design of data entry forms in such a way as to speed up the data collection process. Data Designer can do some of this but for really custom workflows user designed forms are necessary.

Data Designer

The Data designer is a tool for editing the data schema. This is where we can modify the number and type of attributes. With DataDesigner we can …

- Add Delete and Edit Databases
- Select how each Database will display Colour, Fill Style, and Icon etc.
- Add Delete and Edit fields.
- Select Fields types String, Decimal, Integer, Photo, Sketch etc.
- Make Picklists
- Define Photograph fields
- Define Hidden fields
- Make some fields compulsory

Using the data Designer does not require programing skills; it is entirely self-contained and easy to use.



Main Menu – Contains all Menu functions. This is mostly used for loading and saving files.
Databases Window – Is where Databases are added and removed from the XML file.
Fields Window - Is where Fields are added and removed from Databases
Field Options Window – Is where Picklist options are added and removed from a Picklist type field.

Schemas, XSD files and Data

The data structure in GIS360 is stored as a schema. This is where the definition for each datatype is held. So for example if you position a Tree then GIS360 will look in the Schema to see which Attributes to put on a Tree. (How High, what species, etc.) Then GIS360 will present the user with a Form to fill in those attributes. Each attribute is a field and each field has a type (Number, Text, Date, Picklist)
GIS360 always has a Schema file loaded to define the current data. These files have an .XSD ending and are usually found in the /Schema folder in your main GIS360 folder. DataDesigner will edit your Schema file to change your data.
Beware **NEVER** change you Schema in the middle of a survey. Neither the software or your Computer manager will be happy. This is why you need to think carefully about the data you want to collect before you start collecting.

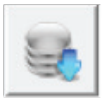
The basic structure of a Schema is pretty simple

- Schemas are made up of one or more Databases
- Databases are made up of one or more Fields
- Each field can have a type and other features to make collection easier

These databases are geographic databases. Aside from holding a bunch of fields they also define whether the geographic object is a Point, Line, or Polygon.

The Database section is on the left hand side of the DataDesigner window. In the middle of the Databases panel are the Add, Edit, and Delete databases buttons

Add Database Button. When you press the Add Database you will be prompted for a name and type. The name must be unique to the current schema, it is case sensitive but don't put two databases with the same name but different cases. You will also be asked if you want to make the Database Cloud compatible (See section on Cloud).



Edit Database Button. The Edit Database button will allow you to change the Name of the database and the Type.

Delete Database Button. Will delete the currently selected database.

The current database is selected by clicking its name in the list of databases.

Setting the Appearance of Database Items

Once you have the Database and that database has been selected. You can change how that database will draw items on the screen.

Line Color. This will allow you to change the line colour on Polyline databases and the outline colour on Polygon databases.

Fill Colour . This will set the Colour for the filling of Polygons

Transparency Sets the Transparency for Polygons. This will allow you to see what's under a polygon.

Icon. Every type of database (Point Line or Polygon) must have an Icon.

Creating, Editing, and Deleting Fields

Once a Database is selected you will see a list of the field associated with that database appearing in the listbox on the right hand side of the screen. You cannot edit fields without having a Database selected first.

Add Field . Adds a new Field to the Database. Once selected the user is prompted for the Field Name and Type. The name must be unique to that database. There are name different field types.

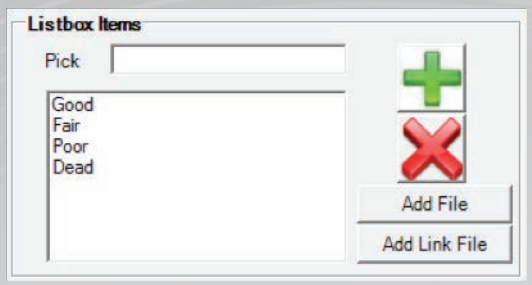
Boolean –	Yes No selector
DateTime –	The current data and Time
Decimal –	Decimal (double) numbers
Listbox –	A Picklist of items
Textbox –	Enter a String
Int32 –	Enter an Integer
NumericUpDown –	Allows you to move an integer up or down by one.
Photo –	Save a picture
Sketch –	Make a Sketch

Edit Field. Will allow you to edit the currently selected field.

Delete Field. Will Delete the currently selected field.

Picklists or Listbox fields

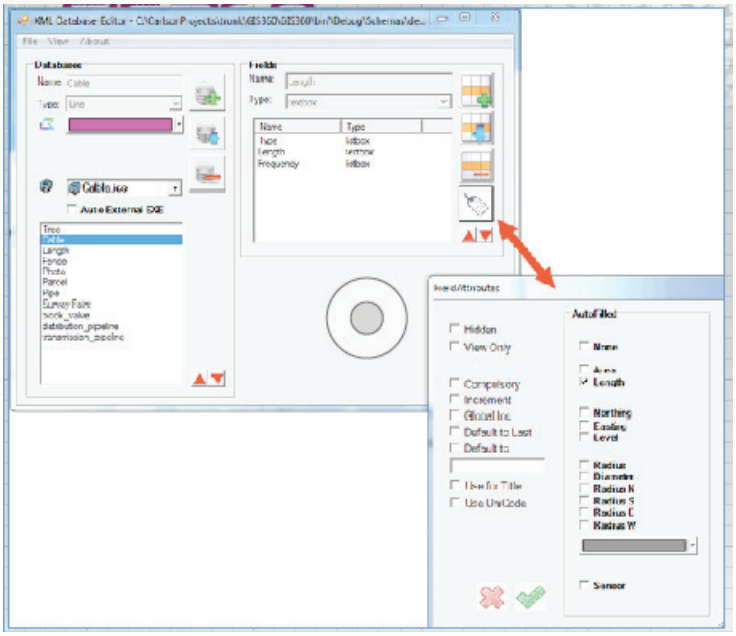
One very common feature on forms are listboxes. Which are popup lists of possible choices to pick from. If you set your field type to Listbox and make sure that it is the currently selected field then the Listbox selector will automatically pop on the screen. This only appear on Listboxes.



The List in the middle of the selector shows the current list of item to select from.
Typing anything in the Pick box and then pressing the Plus button will add an item to the list.
Pressing the red X will remove the currently selected item from the list
Frequently a list can be quite long and to make entry easier you can also press the Add File button and load the list from a Text file.
If the textfile itself is quite long then you could exceed the limits of the XSD file you can have the list stored as an external text file but linked to the XSD. This is done by pressing the Add Link File Button.

In the DataDesigner there are special field settings. These allow for features such as automatic area or length calculation for example. If you select a database and a field, then you may press the Tag button which allows you to configure settings for that field.

These special settings can be controlled by reserved words or directly in the Data designer. Any Field name with the correct reserved word will do whatever calculation is necessary.



The Tag button will Tag a field with the necessary options and pressing it will bring up the Field Attributes Dialog. These include the following options.

Hidden - This hides a field from the user. The Field still exists and will be imported and exported. Normally when data is sent to be used in the field there are a lot of fields that the user doesn't actually need to see when he is collecting data.
View Only – You can see the field but you can't edit it.
Compulsory – You cannot leave the data entry form until this field is entered.
Increment - this will increment the field from the last time this on this type of item field was incremented. It will start incrementing from 0 or you can change it on the first entry.

Special Field Settings

Global Increment – This is the same as incrementing but works across different types of objects.
Default to Last - This will default the field to the last value that was entered for this field.
Default To – Will default the field to whatever is set in the box below
Use for Title – Displays this field value next to the Icon on the map.
Use Unicode – Displays a Unicode Keyboard for data entry in this field.

On the right hand side are the Autofilled field types
Area – Fills in the area of the Polygon
Length – Calculated the length of the Polyline or the perimeter of the polygon
Northing – Fills in the Y coord in local coordinates
Easting – Fills in the X coordinate of the coordinates.
Other items on this form are not implemented.

There are also Reserved Words. Any field with a name that is a reserved word will have that field filled out upon entry of the form. The field name must be all uppercase characters.

HECTARES – Calculates the number of Hectares in a polygon
ACRES – Calculates the number of Acres in a polygon
LENGTH – Calculates the perimeter length of a polygon or the length of a polyline.
AREA – Calculates the area of a polygon
SENSOR - Places a sensor reading in the field

PDOP – The last PDOP received by the GPS
HDOP – The Last HDOP received by the GPS
RMS – The last RMS received by the GPS
DATE – The current date
LATITUDE – the Last latitude calculated by the GPS.
LONGITUDE – The last Longitude calculated by the GPS.
NORTHINGS – The last local coordinate Y axis
EASTINGS – The last local coordinate X axis
LEVEL – the Last calculated Level

Any reserved word appearing as a field name will cause that value to be automatically calculated and placed in the field value.

CartoTiff conversion App

Purpose of this conversion is to convert a TIFF formatted file with WGS84 UTM data to CartoGoo's TILES system file. Carto-tiff.exe File itself is an integral part of GIS360 for the Windows PC installation and you can find it under GIS360 directory.

Tiff files – some notes : The Tiff format is a widespread format where quite often image makers don't have a standard way of georeferencing their map. There is a part within the TIFF file which deals with tags and keys. Normally speaking a TIFF file has tags which do not hold much geo-reference data if any. However several developers expanded this format (www.remotesensing.org) to include private tags too which does have some geo-reference data (Spot, Intergraph and SoftDesk are examples).
(see http://www.remotesensing.org/geotiff/spec/geotiff6.html#6)
The year GeoTiff got established more rigorously was when there was a new set of entities introduced called:- Keys. These have all the intricate datum and projection data you could wish for. However, in our conversion world we expect the coordinate system to always be UTM based on the WGS84 datum. The units have to be in Metres. Also because of the UTM coordinate system, it is only required to have two other bits of data:- ZONE number (1 – 60) and hemisphere (North or South). The SEGMENT is calculated using the centre of the map transformed into Lat, Lon, Alt. UTM is the standard model used in Google Earth.

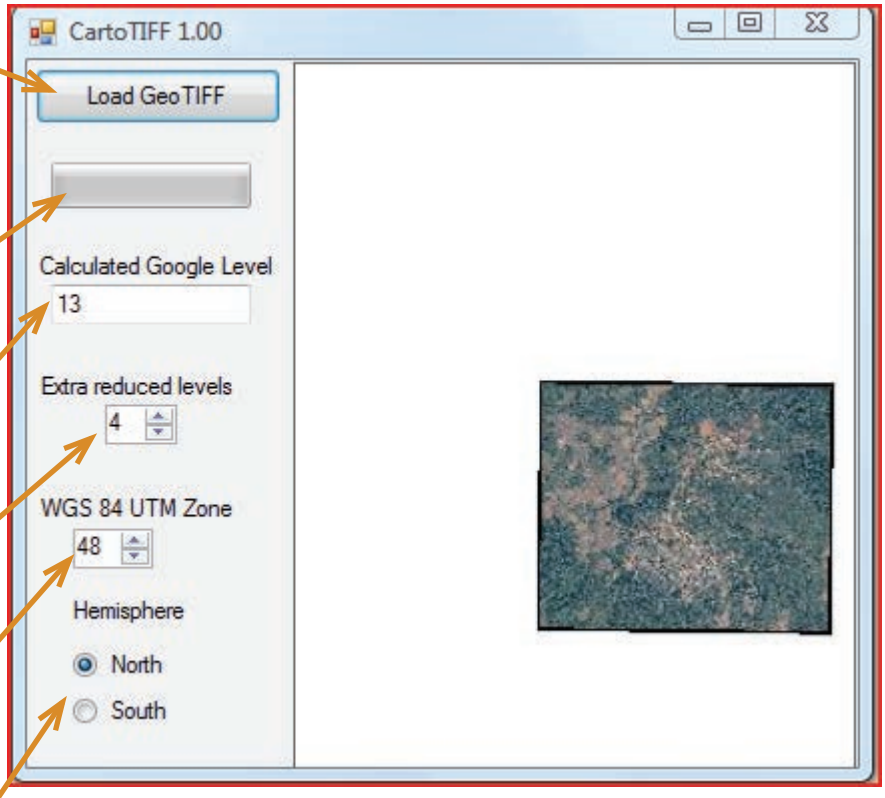
CartoTIFF layout

Load your Tiff file here. If you have a TFW file that relates to it, make sure its leaf name is the same as the Tiff file and they are in the same directory. The moment it is loaded the conversion process will begin.

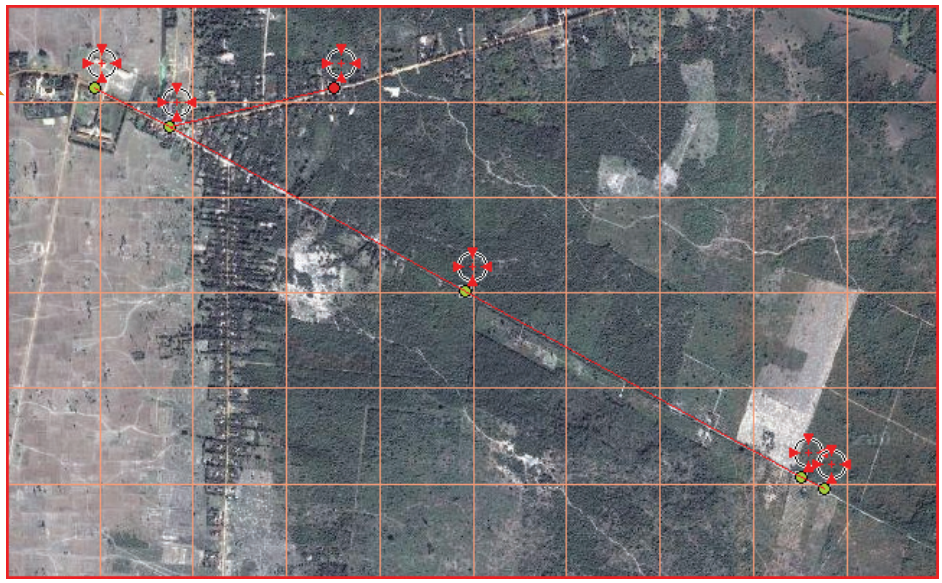
Progress Bar showing progress through the current level.

Zoom level currently (not shown until the calculation has ended)

These controls must be set before loading in the GeoTIFF file.
Extra reduced levels :- shrinks the size of the image so that it will show when you reduce magnification in CartoGoo.
WGS84 UTM Zone:- If there is no reference to this in the TIFF file, this selection is used instead.
Hemisphere:- If no reference in the TIFF file this value is used instead.

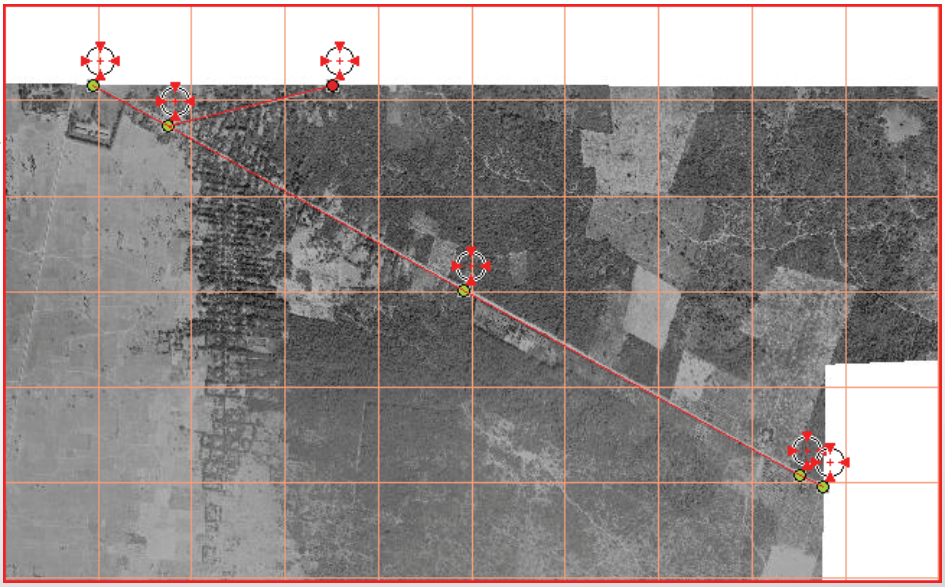


From Google Satellite Data



Please note the survey data is the same in each case. You can select the tile system using the left hand icon in CartoGoo and toggle the map type between No Map and two other types which is what we have done in this comparison.

From GIS360 TILES file



Our CartoTiff is getting a bit old and needs a soon a replacement. The problems include; the image files sizes are getting progressively larger and in a wider variety of formats, and people want to stitch multiple images together. So rather than devote extensive effort on repairing CartoTiff we decided to look for a better solution.

Look on the next page please!

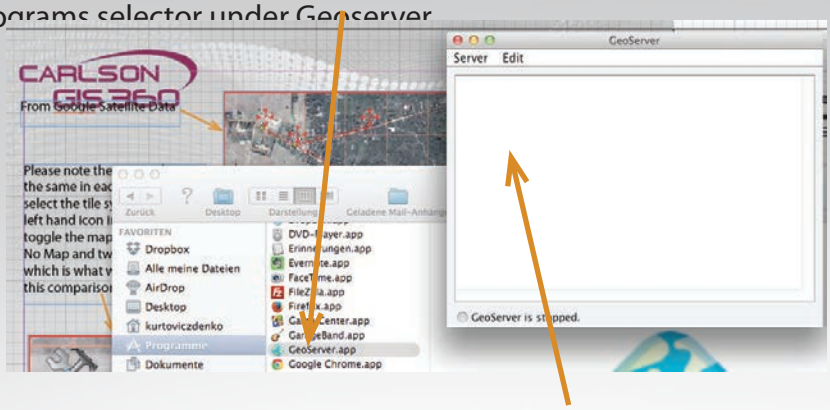
Geoserver as alternative to CartoTiff

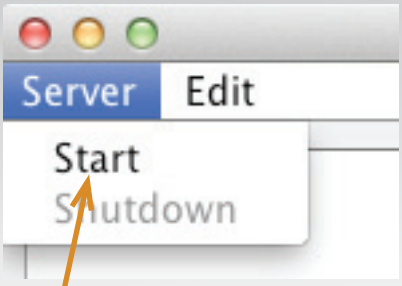
What we found was Geoserver (www.geoserver.org) which is an open source free program that allows you to setup your own geospatial server. Basically what it does is it allows you to load large quantities of Vector and Raster data. It supports a wide variety of formats and doesn't appear to have size limits.

Once loaded with data then GIS360 can directly grab what it needs. We have had to add one new option to GIS360.

First some notes on how to use **GeoServer**

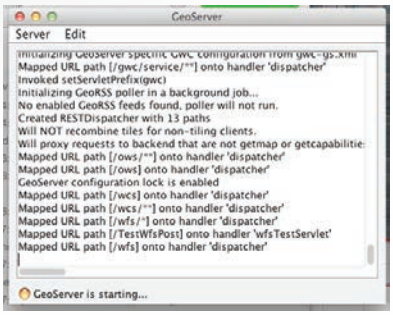
1. After Installing Geoserver you need to start the Geoserver Web Interface. This will appear in your Programs selector under Geoserver



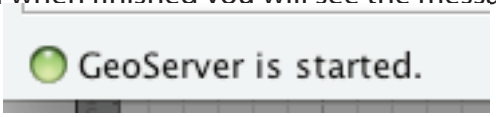


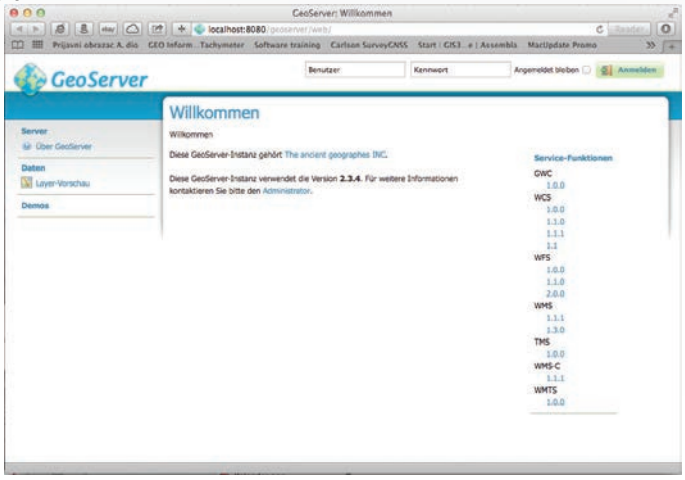
Go under Server and click on Start

After launching Geoserver this window will appear



Server will respond and start to load and when finished you will see the message





Geoserver Web Interface

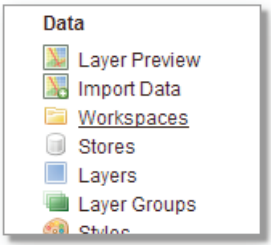
2. Create a new Workspace. This is where you can put all of your data.

2.1. Adding a workspace

The first step in data loading is usually to create a workspace. This creates a virtual container for your project. Multiple layers from multiple sources can all be contained inside a workspace, with the primary constraint being that each layer name be unique.

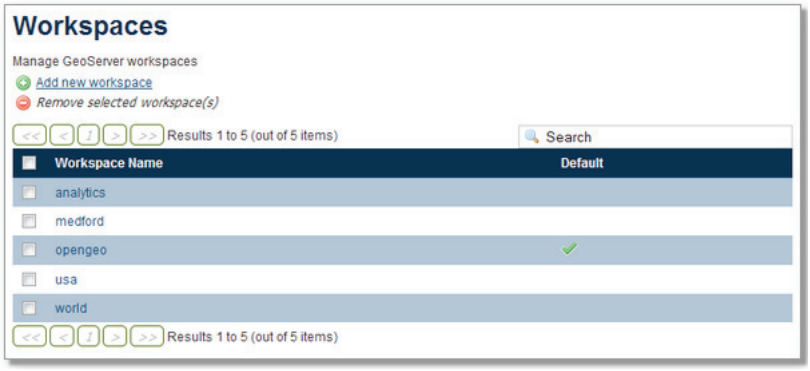
1)Navigate to the main GeoServer web interface page.

2)Click on the Workspaces link on the left column, under Data.



Click to go to the Workspaces page

3) Click on the "Add new workspace" link at the top center of the page.

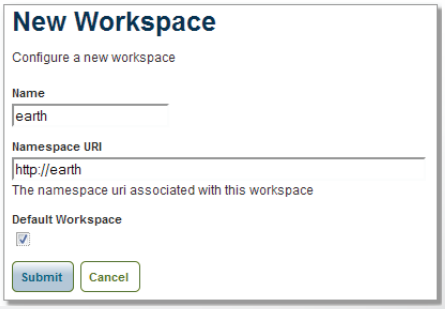


Workspaces page

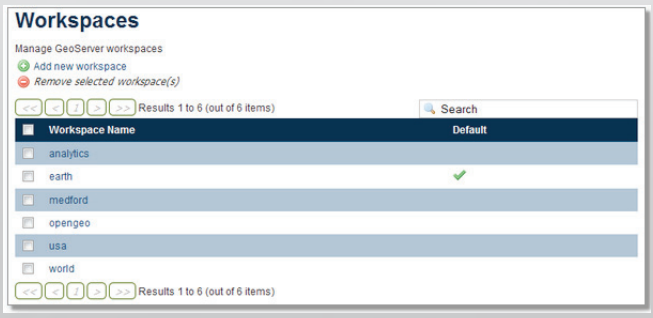
4) A workspace is comprised of a Name (also sometimes known as a "namespace prefix"), represented by a few characters, and a Namespace URI. These two fields must uniquely identify the workspace. Fill in the following information:

Name	`earth`
Namespace URI	`http://earth`
Default workspace	*Checked*

Creating a new workspace



5) When done, click Submit.



New earth workspace created

With our new workspace created and ready to be used, we can now start loading our data.

3. Follow the instructions on this page for loading a geotiff. http://workshops.opengeo.org/geoserver-intro/data/geotiff.html The only differences are that you should use your workspace name and that when it comes to Suggested Tile size choose 256,256

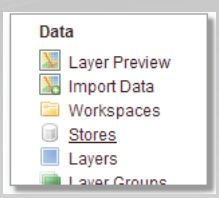
3.1. Publishing a GeoTIFF

GeoServer can also publish raster imagery. This could be simple georeferenced images (such as Blue Marble imagery), multi-band DEM (digital elevation model) data, or many other options. In this section, we will load a simple GeoTIFF containing a shaded relief of land area. The layer contains standard tri-band RGB values (0-255).

3.1.1. Adding a store

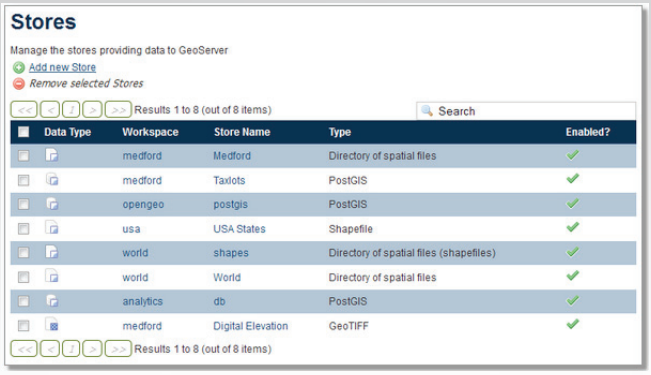
The procedure for adding a store for a GeoTIFF is very similar to that of a shapefile. A GeoTIFF, like a shapefile, is a store that contains a single layer.

a) From the GeoServer web interface page, click on the Stores link on the left side, under Data.



Click this link to go to the Stores page

b) Click on Add new store.

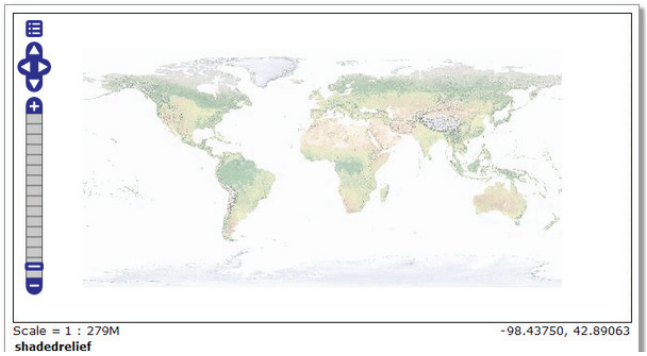


Stores page

c) Select GeoTIFF under Raster Data Sources.

Adding a GeoTIFF store

d) Fill out the following form:

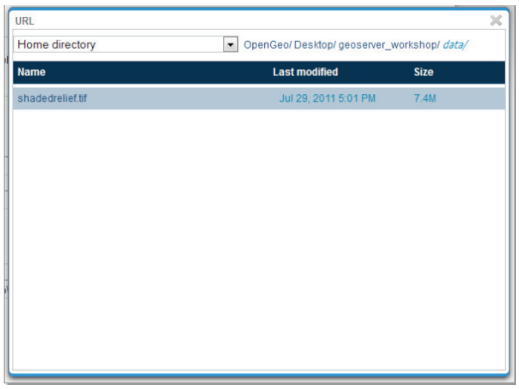


e) In the box marked URL, type in the full path to the shapefile if known, or click the Browse... button to navigate to the file. The file path may be something like:

```
C:\Users\<username>\Desktop\geoserver_workshop\data\shadedrelief.tif
```

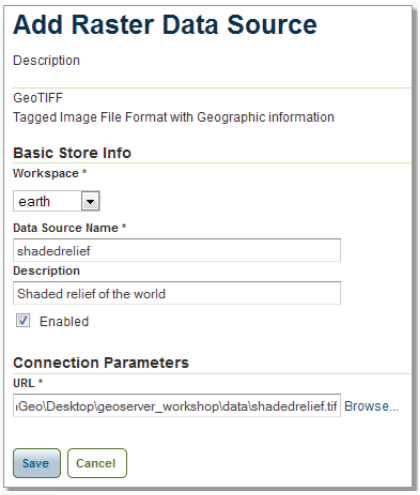
Note

Be sure to replace <username> with your user name.



Using the file browser to select a file

f) When finished, click Save.

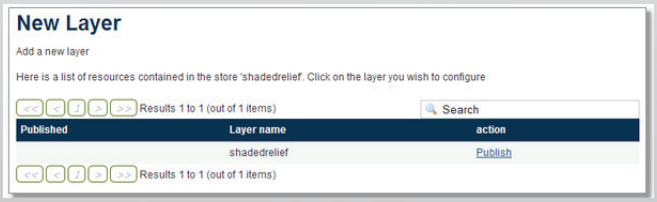


Configuring a GeoTIFF store

3.1.2. Publishing a layer

As with the shapefile, now that store is loaded, we now need to configure and publish the layer itself.

a) On the next screen, a list of layers in the store is displayed. Since we are working with a GeoTIFF, there is only a single layer. Click the Publish link to configure the layer.

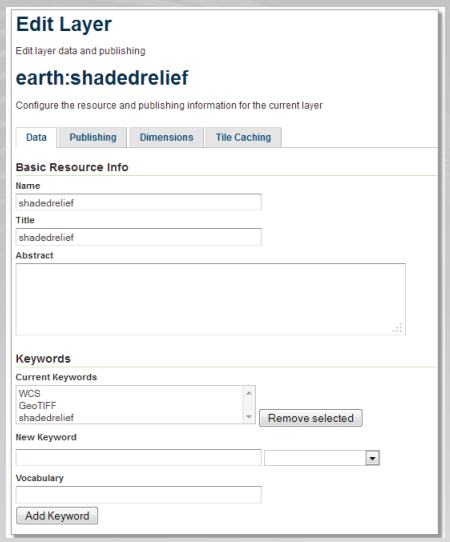


Selecting a layer to publish

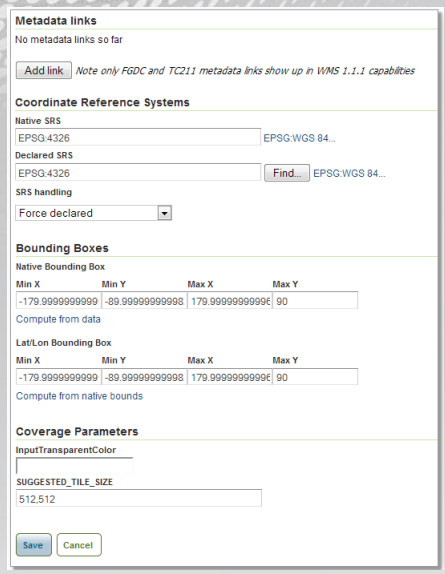
b) This is the layer configuration page. There are many settings on this page, most of which we don't need to work with just now. We will return to some of these settings later. Fill out the form with the following info:

1.In the Coordinate Reference System section, set the Declared SRS to EPSG:4326 and set the SRS handling to Force declared. This will ensure that the layer is known to be in latitude/longitude coordinates.

2.In the Bounding Boxes section, click the Compute from data and Compute from native bounds links to set the bounding box of the layer.



Configuring a layer to publish (Part 1)



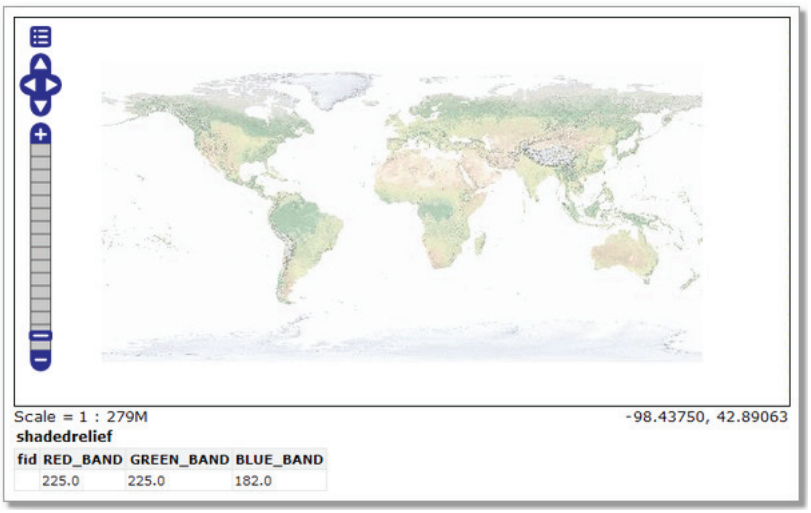
Configuring a layer to publish (Part 2)

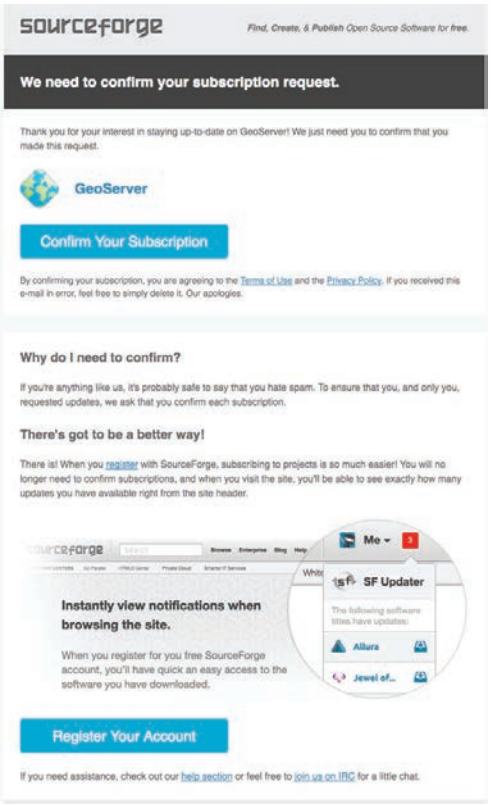
3) When finished, click Save.

4)Your GeoTIFF is now published in GeoServer. You can now view the layer using the Layer Preview as in previous sections. Clicking on the map will display the RGB values for that particular point.

Note

Remember that lists in GeoServer are paged at 25 items at a time so the layer may not be displayed on the first page. Alternately, type "earth" in the search box at the top to narrow the list.





4. If you have done this then you should Edit your new layer that includes your new geotiff and make sure that it is enabled.

5. You should also make sure that WMS is enabled. WMS is the tiled Raster map server that is most commonly used.

6. Then you need to put the Geoserver WMS link into GIS360. This is new. There is now a file called WMSservers.txt. This is where a user can add a service. The first line of the file contains the name of the service ("Doug Raster" etc) and the second contains the request link. In the case of Doug's data the request link was as follows….

"http://localhost:8080/geoserver/earth/wms?FORMAT=image/jpeg&VERSION=1.1.1&SERVICE=WMS&REQUEST=GetMap&Layers=HVGBtest&styles=&bbox={0},{1},{2},{3}&width={4}&height={5}&SRS=EPSG:4326"

Notice how we are using a localhost and not an IP connection. The only two things in that line you should need to change is "earth" which is your workgroup, and "HVGBtest" which is your layer name. If you want to have the data accessable from GIS360 in the field via wireless then you need to have a proper IP address instead of local host.

7. Then Start GIS360 on your PC and you will find your new WMS server listed under maptypes. Select it and view as any other Raster map service. The data will be tiled and available at a variety of different zoom levels.

8. Once selected then you can save Tiles files in GIS360, or you can use the data live via the internet connection.

This system has many plus points. Multiple images can be grouped together. Vector data can also be added and superimposed.

Forge Interface (Forge is unit mainly made for forestry applications

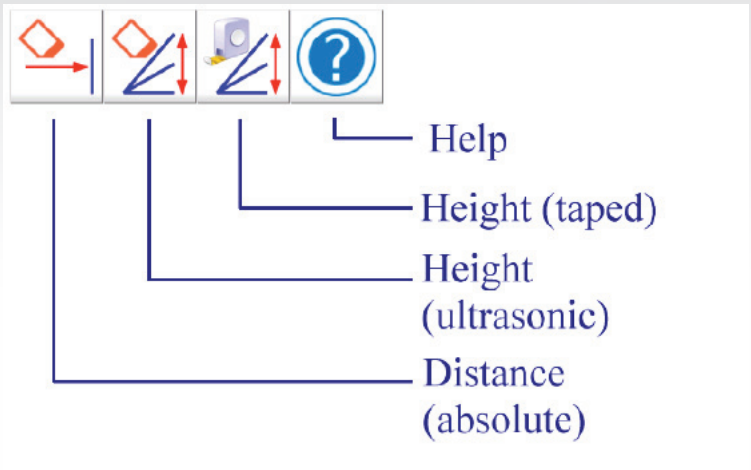
Important: This system relies on the replacement of the standard F4 Distance and F4 Height applications with modified versions.

It is necessary to manually start F4 Distance and F4 Height BEFORE starting GIS360.
F4 Distance should be used to turn on the transponder, and perform any necessary calibration prior to using it with GIS360.

The F4 Distance application can be set to provide either an absolute distance, or a slope-adjusted (horizontal) distance. Please note that GIS360 ignores this setting and always uses the absolute distance (what we would think of as the "slope" distance).

The interface to GIS360 is provided in a modified keypad in GIS360. If GIS360 detects that it is running on a Forge device where the F4 Distance and F4 Height applications are present, and there is NO laser rangefinder configured, then the alternative keypad will be presented in place of the standard one.

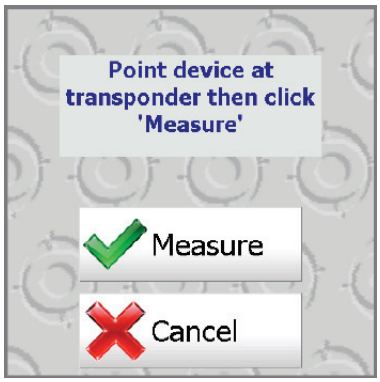
This keypad form looks like this…



There are 4 special "Forge" buttons in the keypad form which replace the standard laser rangefinder buttons. The function of these buttons is as follows…

Distance (absolute)

Pressing this button will lead to a prompt…

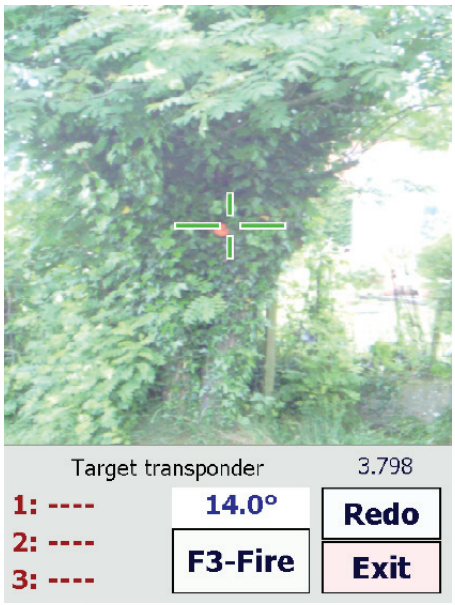


Confirming the prompt will take a measurement. This will be the absolute distance to the sensor. The result is entered into the keypad form.

Please note, the F4 Distance application can compute a "Horizontal" distance, but this is ignored by GIS360.

Height (ultrasonic)
The sensor should first be positioned on the tree trunk, or just to the side of it, or just in front of it. Pressing this button will lead to a "Measure" prompt. Confirming the prompt will take the distance measurement.

After that the F4 Height application will be presented but with a different interface….



A prompt will appear to advise you that you are first required to target the transponder in the viewer. Centre the transponder in the crosshairs and wait for the angle (displayed above the Fire button) to stabilise. When it is stable click on "Fire" (or press F3).

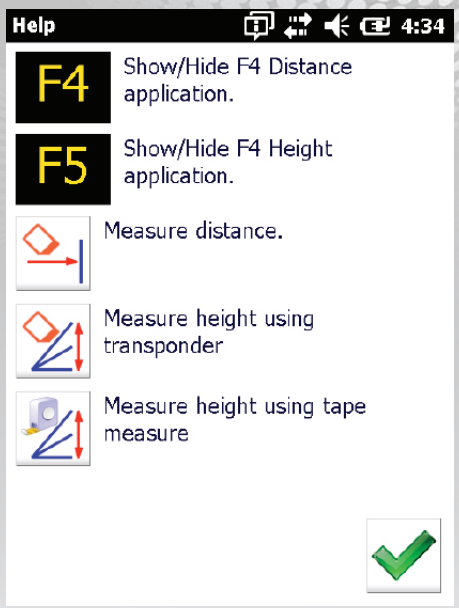
You will now be prompted to target the bottom of the tree. As for the first stage, wait for the angle value to stabilise then click on Fire again.

Finally you will be prompted to repeat this for the top of the tree. When all three angles have been collected the calculated tree height will be entered in the GIS360 keypad form.

Height (taped)
If for some reason the transponder cannot be placed on the tree, has been left at home, or perhaps its battery is flat, then you can still measure the tree height using a taped measurement. First measure the distance between the tree and your position using a tape measure.

Click on the "Height-Taped" button and enter the measured distance in the keypad which is presented. Once you confirm entry of the taped distance then the sequence of operations will be similar to the Height-ultrasonic method, except the first measurement will be to roughly half-way up the tree rather than to the transponder.

Help
Just displays a form which identifies buttons (hardware and software) related to these processes…



Notes.

If preferred you can take distance measurements with less screen interaction as follows. When keypad form is showing:
1. Press F4 to display F4 Distance application.
2. Press F1 to take measurement.
3. When measurement is taken, GIS360 will automatically re-appear.

If the F4 Distance application is running then you can switch to it from GIS360 by pressing the F4 hardware button. You can return to GIS360 from F4 Distance by pressing F4 again.

If the F4 Height application is running then you can switch to it from GIS360 by pressing the F5 hardware button. . You can return to GIS360 from F4 Height by pressing F5 again.

GIS 360 API

IMPORTANT NOTE: THIS PART IS ONLY FOR SYSTEM ADMINISTRATOR

The Carlson GIS360 API allows the user to modify GIS360 to exactly fit their needs. Most functions can be done without programming but for truly custom functions the user can use C# or Visual Basic to add additional functionality.

Introduction

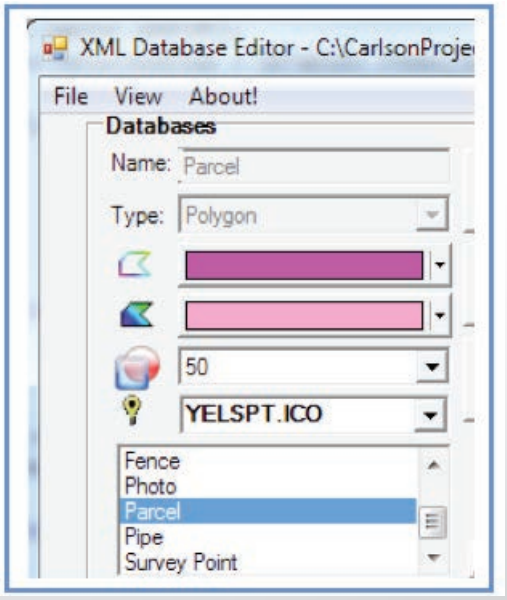
GIS360 has a variety of tools for customizing not only the look and feel of the program
The main tool is DataDesigner.exe. This program allows you to change the data structure and databases for GIS items.
Data Collection projects tend to have two major aspects, the design of the data structure, and the design of the collection methodology.
The methodology is mostly the ergonomic design of data entry forms in such a way as to speed up the data collection process. Data Designer can do some of this but for really custom workflows user designed forms are necessary.

Data Designer

The Data designer is a tool for editing the data schema. This is where we can modify the number and type of attributes. With DataDesigner we can …

- Add Delete and Edit Databases
- Select how each Database will display Colour, Fill Style, and Icon etc.
- Add Delete and Edit fields.
- Select Fields types String, Decimal, Integer, Photo, Sketch etc.
- Make Picklists
- Define Photograph fields
- Define Hidden fields
- Make some fields compulsory

Using the data Designer does not require programing skills; it is entirely self-contained and easy to use.



Schemas, XSD files and Data

The data structure in GIS360 is stored as a schema. This is where the definition for each datatype is held. So for example if you position a Tree then GIS360 will look in the Schema to see which Attributes to put on a Tree. (How High, what species, etc.) Then GIS360 will present the user with a Form to fill in those attributes. Each attribute is a field and each field has a type (Number, Text, Date, Picklist)
GIS360 always has a Schema file loaded to define the current data. These files have an .XSD ending and are usually found in the /Schema folder in your main GIS360 folder. DataDesigner will edit your Schema file to change your data.
Beware NEVER change you Schema in the middle of a survey. Neither the software or your Computer manager will be happy. This is why you need to think carefully about the data you want to collect before you start collecting.

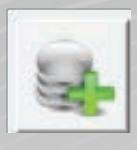
The basic structure of a Schema is pretty simple

- Schemas are made up of one or more Databases
- Databases are made up of one or more Fields
- Each field can have a type and other features to make collection easier

These databases are geographic databases. Aside from holding a bunch of fields they also define whether the geographic object is a Point, Line, or Polygon.

Creating, Editing, and Deleting Databases

The Database section is on the left hand side of the DataDesigner window. In the middle of the Databases panel are the Add, Edit, and Delete databases buttons



Add Database Button. When you press the Add Database you will be prompted for a name and type. The name must be unique to the current schema, it is case sensitive but don't put two databases with the same name but different cases. You will also be asked if you want to make the Database Cloud compatible (See section on Cloud).

Edit Database Button. The Edit Database button will allow you to change the Name of the database and the Type.

Delete Database Button. Will delete the currently selected database.

The current database is selected by clicking its name in the list of databases.

Setting the Appearance of Database Items

Once you have the Database and that database has been selected. You can change how that database will draw items on the screen.

Line Color. This will allow you to change the line colour on Polyline databases and the outline colour on Polygon databases.

Fill Colour . This will set the Colour for the filling of Polygons

Transparency Sets the Transparency for Polygons. This will allow you to see what's under a polygon.

Icon. Every type of database (Point Line or Polygon) must have an Icon.

Once a Database is selected you will see a list of the field associated with that database appearing in the listbox on the right hand side of the screen. You cannot edit fields without having a Database selected first.

Add Field . Adds a new Field to the Database. Once selected the user is prompted for the Field Name and Type. The name must be unique to that database.

There are name different field types.

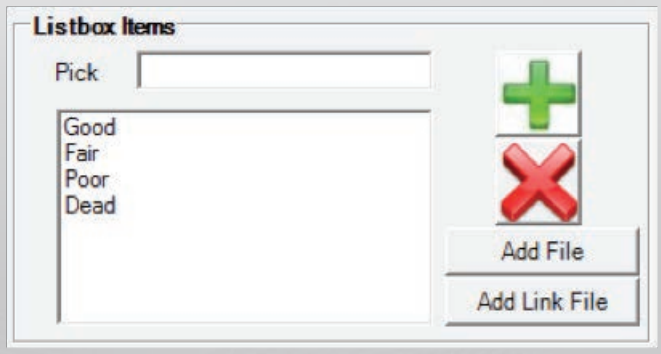
Boolean –	Yes No selector
DateTime –	The current data and Time
Decimal –	Decimal (double) numbers
Listbox –	A Picklist of items
Textbox –	Enter a String
Int32 –	Enter an Integer
NumericUpDown –	Allows you to move an integer up or down by one.
Photo –	Save a picture
Sketch –	Make a Sketch

Edit Field. Will allow you to edit the currently selected field.

Delete Field. Will Delete the currently selected field.

Picklists or Listbox fields

One very common feature on forms are listboxes. Which are popup lists of possible choices to pick from. If you set your field type to Listbox and make sure that it is the currently selected field then the Listbox selector will automatically pop on the screen. This only appear on Listboxes.

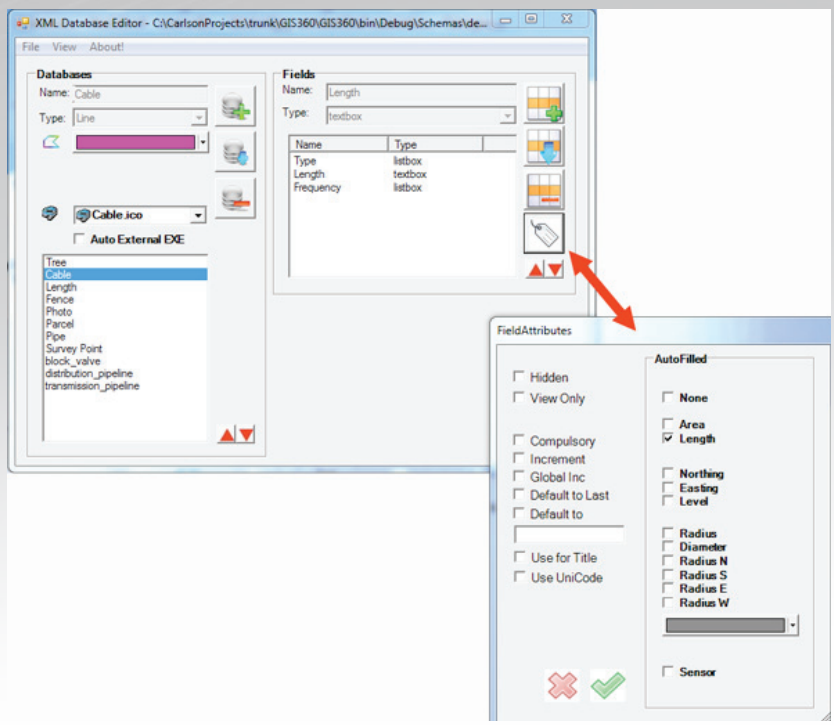


The List in the middle of the selector shows the current list of item to select from.
Typing anything in the Pick box and then pressing the Plus button will add an item to the list.
Pressing the red X will remove the currently selected item from the list
Frequently list can be quite long and to make entry easier you can also press the Add File button and load the list from a Text file.
If the textfile itself is quite long then you could exceed the limits of the XSD file you can have the list stored as an external text file but linked to the XSD. This is done by pressing the Add Link File Button.

Special Field Settings

In the DataDesigner there are special field settings. These allow for features such as automatic area or length calculation for example. If you select a database and a field, then you may press the Tag button which allows you to configure settings for that field.

These special settings can be controlled by reserved words or directly in the Data designer. Any Field name with the correct reserved word will do whatever calculation is necessary.



The Tag button will Tag a field with the necessary options and pressing it will bring up the Field Attributes Dialog. These include the following options.

Hidden - This hides a field from the user. The Field still exists and will be imported and exported. Normally when data is sent to be used in the field there are a lot of fields that the user doesn't actually need to see when he is collecting data.
View Only – You can see the field but you can't edit it.
Compulsory – You cannot leave the data entry form until this field is entered.
Increment - this will increment the field from the last time this on this type of item field was incremented. It will start incrementing from 0 or you can change it on the first entry.

Global Increment – This is the same as incrementing but works across different types of objects.
Default to Last - This will default the field to the last value that was entered for this field.
Default To – Will default the field to whatever is set in the box below
Use for Title – Displays this field value next to the Icon on the map.
Use Unicode – Displays a Unicode Keyboard for data entry in this field.

On the right hand side are the Autofilled field types
Area – Fills in the area of the Polygon
Length – Calculated the length of the Polyline or the perimeter of the polygon
Northing – Fills in the Y coord in local coordinates
Easting – Fills in the X coordinate of the coordinates.
Other items on this form are not implemented.

There are also Reserved Words. Any field with a name that is a reserved word will have that field §filled out upon entry of the form. The field name must be all uppercase characters.

HECTARES – Calculates the number of Hectares in a polygon
ACRES – Calculates the number of Acres in a polygon
LENGTH – Calculates the perimeter length of a polygon or the length of a polyline.
AREA – Calculates the area of a polygon
SENSOR - Places a sensor reading in the field

PDOP – The last PDOP received by the GPS
HDOP – The Last HDOP received by the GPS
RMS – The last RMS received by the GPS
DATE – The current date
LATITUDE – the Last latitude calculated by the GPS.
LONGITUDE – The last Longitude calculated by the GPS.
NORTHINGS – The last local coordinate Y axis
EASTINGS – The last local coordinate X axis
LEVEL – the Last calculated Leven

Any reserved word appearing as a field name will cause that value to be automatically calculated and placed in the field value.

Special Databases
Special Databases are reserved names for databases that have special functions. If these databases appear in your schema list then then GIS360 will automatically enable those special functions.

SETUP
A Setup database is almost like a log in form. It will come on the screen whenever you start a new site. This is used by users who need to have a user sign in before they start working. For example the might want to get the start time of any survey or the surveyor should have to enter his name. there can only be one Setup object in a dataset at any time.

WORKTICKET
The WorkTicket datatype is a database that holds tasks to do. (A TODO list) Each task is displayed in the task list. The Ticket can contain any fields that the user needs but as an example it will usually have fields like Task, Date, Assigned to, Completed etc. Each Ticket must have a coordinate so that if the user selects one GIS360 will navigate to that position.

MDISTANCE
This is a measured distance. If this database exists in the Schema then GIS360 will keep any distance measured and place it in a record of this database. This is mostly used when you want to record measurements on a map.

Calculation Module
The Calculations module is perhaps slightly misnamed. It originally came about because users wanted to perform custom calculations on data items as they were collecting the data. For example one user wanted to generate a serial number based the geographic position of the attribute. This was entirely specific to this particular user.
The Calculation Module allowed him to write a small program in c# or Visual Basic. This program is called every time a new item is generated and the program runs and calculates the serial number automatically.
The Calculations module is called both on entry of a new item and on completion. So it can be used to perform calculations before the GIS360 data form is presented to the user and also after the user has entered data.
To use the Calculations module the user must make a small exe program. The key is that the exe file must be placed in the schemas folder, and it must follow the correct naming convention.
The name of calculation exe's is as follows:
{Name of Schema}{Name of Database}Calculations.exe
So for example : **CadasterBuildingCalculations.exe**
Is a valid calculations exe, "Cadaster" is the name of the schema and "Building" is the name of the database. Everytime GIS360 is about to put the GIS form on the screen whether it be from creating a new Building or from editing an existing one, GIS 360 will check to see if the exe exists.

If it does exist then GIS360 will write all of the existing form data out to an ASCII file and then run the exe. This exe can now read the text file and do any calculations that you want. It can also do any other tasks that you want. You can read external databases; you can put forms on the screen. Almost anything you can write a program for can be done here.
When the exe has finished it must write the text file with the data fields back out in the same format and then exit.
GIS360 then reads this text file and puts the data in the right place in GIS360.

Format of Text file

A text file of data is written for the Calculation module each time a GIS form is opened. The same file is then read by GIS360 when the calculations program has finished. The format is of the following:

6	**(Number of Fields)**
Field 1	**(First Field)**
Field2	**(Second Field)**
Field3	**(Third Field)**
Hidden Field1	**(First Hidden Field)**
Hidden Field2	**(Second Hidden Field)**
Hidden Field3	**(Third Hidden Field)**
Easting	**(Center coordinate Easting)**
Northing	**(Centre Coordinate Northing)**
Level	**(Centre Coordinate Level)**

Fields are made in the Data Designer. Hidden fields are fields that don't display on the GIS form. For example you might want to have a time stamp that the user can see or edit, this could be a hidden field. If all the fields on the form are hidden then the GISform will not display, but the Calculations program will still be called and it can fill in the fields.

Example Program
The following is a small example program to make a Calculations exe. All this does is to take the Area field (no 4) and Truncate it to an integer.

```
string[] Fields = new string[100];
string Xstr = "";   // Easting
string Ystr = "";   // Northing
string Zstr = "";   // Level



// The Reference folder is where we look for the calculations
string strAppDir = Path.GetDirectoryName(Assembly.GetExecutingAssembly().GetModules()[0].
FullyQualifiedName);
        string Refdir = strAppDir;    //  We know its in the Schema dir along with the EXE  +"\\Refer-
ence";
```

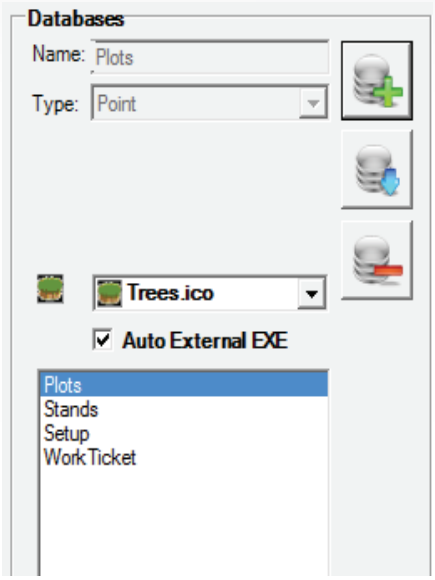
```
        string filename = Refdir + "\\Calculations.dat";

        // If the file is there then read in all of the fields.
        try
        {
        if (File.Exists(filename))
         {
// First Read in the data fields
          string st = "";
          int NoFields = 0;
          using (StreamReader sr = new StreamReader(filename))
           {
           st = sr.ReadLine();
           st = st.Trim();
           NoFields = Convert.ToInt32(st);
           for (int i = 1; i <= NoFields; i++)
               Fields[i] = sr.ReadLine();

           Xstr = sr.ReadLine();
           Ystr = sr.ReadLine();
           Zstr = sr.ReadLine();

           sr.Close();
           }
// Now do something with the data
// In this case we are just truncating the Area field.  Area is Field[4]
        if (Fields[4] != "")  // Truncate the Area
          {
          try
           {
           double doubleArea = Convert.ToDouble(Fields[4]);
           Int32 Iarea = Convert.ToInt32(doubleArea);
           Fields[4] = Convert.ToString(Iarea);
           }
          catch { }
          }
//  Now we write the fields out in the same format
// GIS360 will read the file and put the fields in the GIS database.
        StreamWriter sw = File.CreateText(filename);
        sw.WriteLine(NoFields);
        for (int i = 1; i <= NoFields; i++)
           sw.WriteLine((string)Fields[i]);
        sw.WriteLine(Xstr);
        sw.WriteLine(Ystr);
        sw.WriteLine(Zstr);
        sw.Close();
        }
```

Creating an external Form

GIS360 provides a standard interface for the entry and editing of GIS data. The standard interface is suitable for most data entry requirements, however it is unsuitable for applications that require maintenance of databases external to GIS360. All data collected and edited using the standard form is stored within GIS360's internal data structure.
There may also be instances where a custom data entry form is desirable, for example to replace a paper form whilst retaining a similar layout with which the end user is familiar. GIS360 allows the use of external third-party EXE files to be added to replace the standard GIS entry form to address these requirements. External EXE files can be written using any language which supports Windows Messaging. Example solutions are provided to demonstrate the concepts involved, these solutions are written in C# using Visual Studio 2008.

Setting the Data Designer to use the external form.

The first step before making an external form is to set the Schema to use that form. Start Data Designer and load your schema. Then select the database that you want to use the external for with.
Then check the Auto External EXE as shown below:

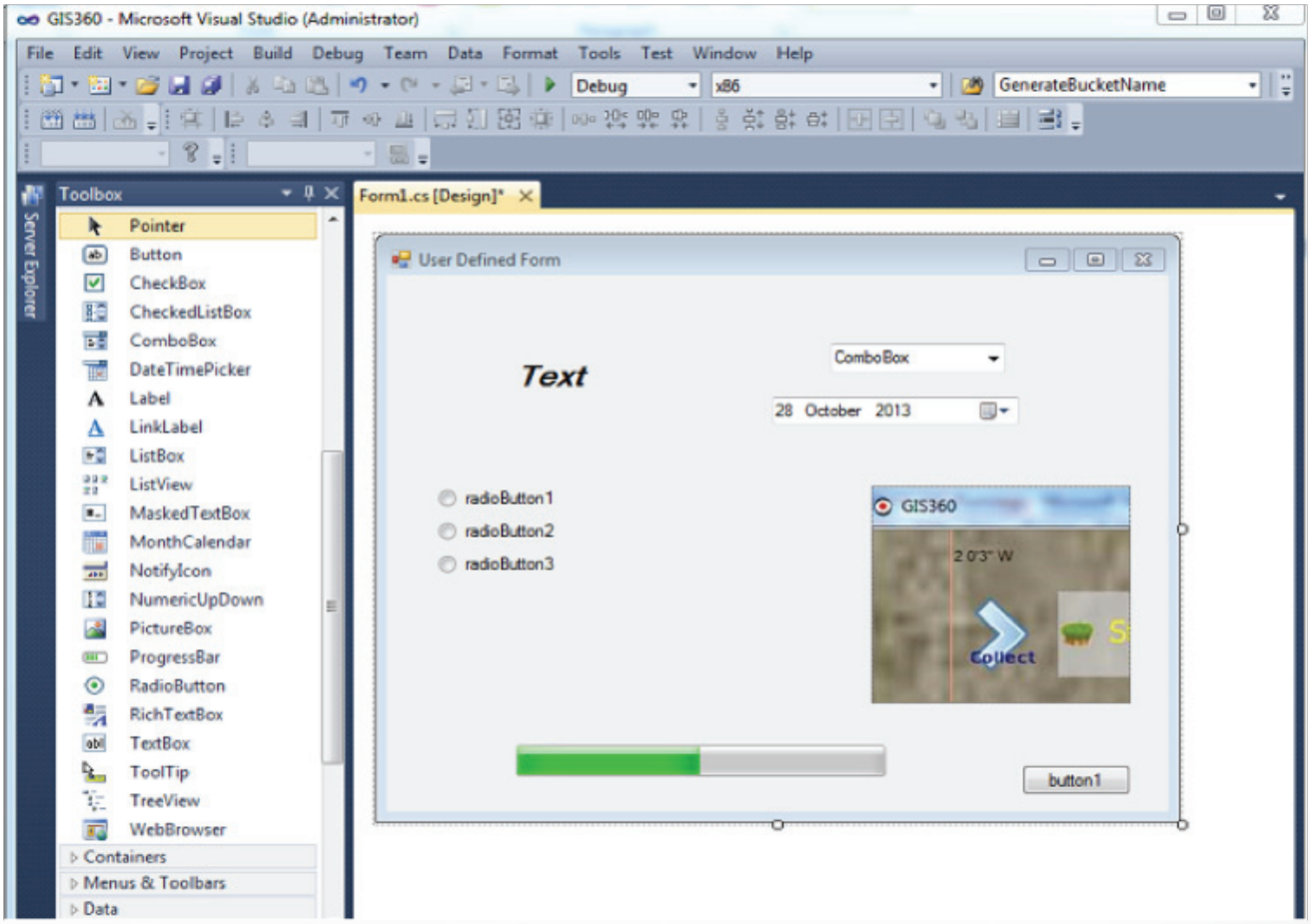


If you wish to have your user designed form come on the screen without having the standard form.

Design your Form

User data forms are a separate exe that GIS360 calls when needed. In effect they are two separate programs. The User Form exe can be written in any programming language but we recommend Microsoft C# or Visual Basic.
If you are going to be using the form on the Windows Mobile platform then you must build your form to run on that platform. This means that you will have to use Visual Studio 2008, if you are running on the PC platform then you can use more recent versions.

Once you start your new project in Visual Studio and then you can literally use any of the tools and user interface components in the toolbox.



External Connections and connecting to other applications

As you have seen users can create their own forms and these forms will be presented directly to the user instead of the standard GIS360 forms, thus taking advantage of all the graphical tools and ergonomic layout possibilities of Visual Studio. But the advantages can be more than just cosmetic this external form can be a complete software application, can have its own database links and external communication. This is particularly useful if the application requires linking to an external relational database or spreadsheet. It's similar to the Calculations system but does not have a time limit and the external program can stay open and doesn't need to be exited. This is useful if the external form needs to load a large external database or any other time consuming task.
There may also be instances where a custom data entry form is desirable, for example to replace a paper form whilst retaining a similar layout with which the end user is familiar.
GIS360 allows the use of external third-party EXE files to be added to replace the standard GIS entry form to address these requirements. External EXE files can be written using any language which supports Windows Messaging. Example solutions are provided to demonstrate the concepts involved. These solutions are written in C# using Visual Studio 2008.

The Basics

There are two modes in which an external Form can be displayed.
Augmentation Mode. In this mode creating or editing a placemark in GIS360 will cause the standard GIS Entry Form to be displayed. Within the form there will be one editable field which, if selected for edit, will cause the external EXE to be activated for custom data entry and manipulation. Exiting the external form will lead to re-entry into the standard form. Typically this mode would be used when the external EXE is required to operate with an external database. Other uses would be where the end user wanted to provide a custom entry form for a single specialised field.

Replacement Mode. In this mode creating or editing a placemark in GIS360 will immediately activate the external EXE for data entry, and on exiting the external form the control will immediately return to GIS360 without displaying the standard form. Typically this mode would be used where the end user required the custom entry form to cater for all fields to be entered.
The mode used is determined by the way the Schema is configured. The examples provided demonstrate both of these modes of operation. For each platform there are two example EXEs provided, the content of the EXEs is identical, only their names are different.
There are two parts to making an external form for GIS360. The first part is the creation of the Schema which will instruct GIS360 to look for an external EXE, the second part is the design and creation of the external EXE itself. In the majority of cases, all that will be required is the addition of the schema and the external EXE to the GIS360 "Schemas" folder.

Separate examples are provided for the Windows operating system and the Windows Mobile/CE operating system. The code for these two platforms is very similar, the main difference between the two platforms is in the code which controls and monitors communication between GIS360 and the external EXEs. The examples demonstrate both Augmentation and Replacement modes of operation so three files are used:
PC version:

ExtDemo.xsd
PC_ExtDemoPointDataIndex.exe§
PC_ExtDemoPointPartDataIndex.exe

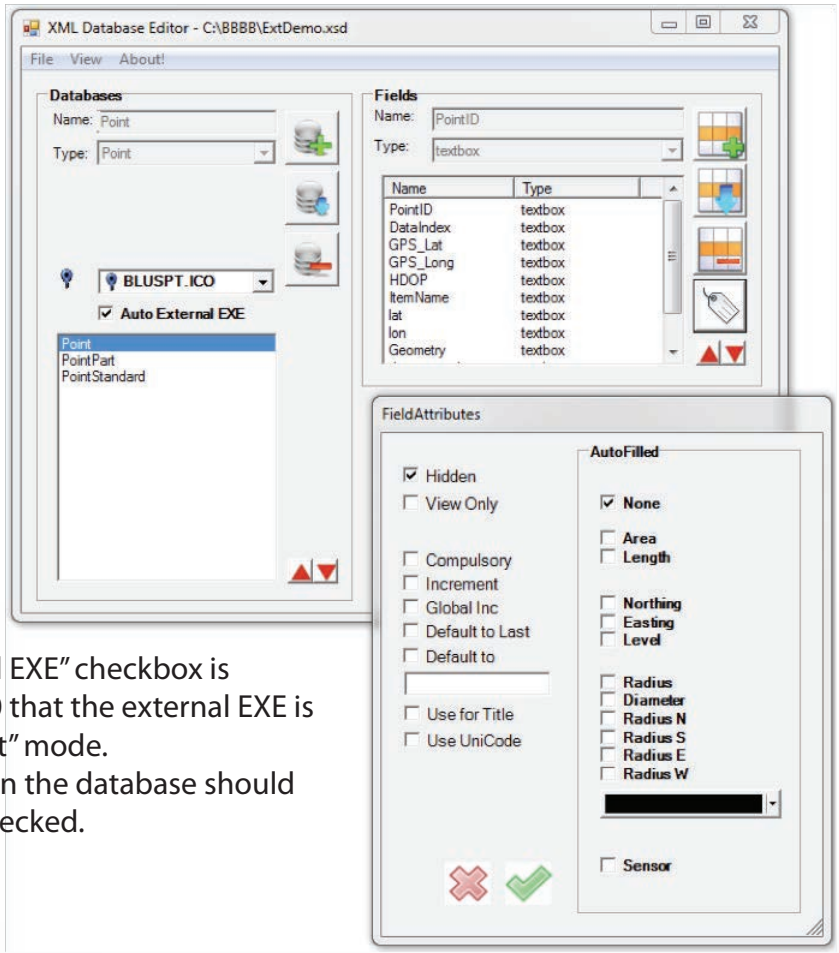
Mobile version:
ExtDemo.xsd
ExtDemoPointDataIndex.exe
ExtDemoPointPartDataIndex.exe

Configuring the Schema

GIS360 schemas are created and modified using the DataDesigner utility which is provided with the Windows version of GIS360. It is easiest to load in the sample ExtDemo.xsd Schema to see how the different modes of operation are configured.
The "ExtDemo" schema contains 3 definitions for types of Point data as follows…

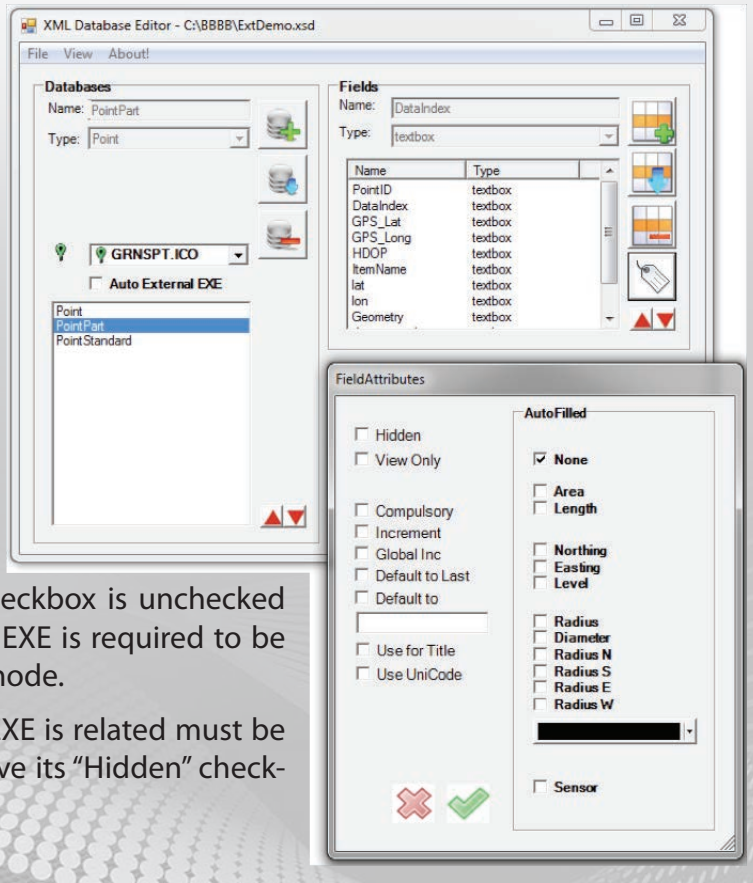
Point. This database uses an external EXE Form in "Replacement" mode.
PointPart. This database uses the standard GIS form, but if the "DataIndex" field is clicked in the standard form then the external EXE Form will be activated (Augment.
PointStandard. This database uses the standard GIS form only, it never activates an external EXE.
NOTE: In Augmentation mode, if the external EXE is absent then GIS360 will revert to using the standard form.

Point – Replacement Mode



In this database, the "Auto External EXE" checkbox is checked which indicates to GIS360 that the external EXE is required to be run in "Replacement" mode.
In addition, the various fields within the database should have their "Hidden" checkboxes checked.

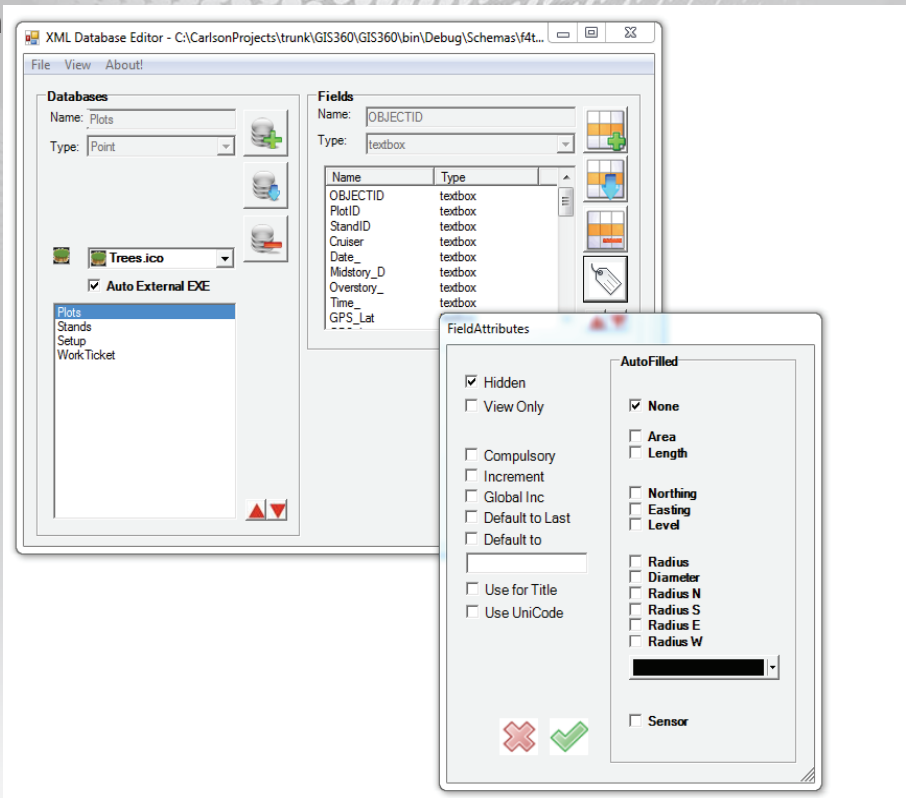
PointPart – Augmentation Mode



In this database, the "Auto External EXE" checkbox is unchecked which indicates to GIS360 that the external EXE is required to be run only when required, in "Augmentation" mode.

In addition, the field to which the external EXE is related must be visible in the standard GIS form, so must have its "Hidden" check-box unchecked.

Setting your Fields to Hidden



If you want your form on the screen and the GIS360 form to be hidden completely then you need to set all of the fields to hidden.
If all fields are hidden then the GIS360 form will not display at all.
To set your fields to hidden.
Select the database in the databases column.
Then Select your field in the fields column
Then press the field attributes button and made sure that Hidden is checked.

Then save your schema so that the changes are saved the the Schema file.

Naming the external EXE

The name of the external EXE form must adhere to a fixed format which combines the Schema, Database, and Field names.
For Windows Mobile/CE platforms…

Schema Name + Database Name + Field Name

…so for the example provided for the Point database relating to the DataIndex field this gives "ExtDemoPointDataIndex.exe".
For Windows platforms a "PC_" prefix is added…

"PC_" + Schema Name + Database Name + Field Name

…so for the example provided for the Point database relating to the DataIndex field this gives "PC_ExtDemoPointDataIndex.exe".

External EXE behaviour

The external EXE is started by GIS360 the first time it is required. After its first use the EXE should stay resident in memory but hidden from the user. When GIS360 needs the EXE to present itself again it will send a message to the EXE requesting it to display.
When a user clicks on OK or Cancel in the external EXE, the EXE should respond by hiding itself, it should not terminate. If OK is clicked then the EXE will also need to save any data which is to be passed back to GIS360 in two text files.
GIS360 interacts with external EXEs by first preparing all necessary information for them in two text files, then sending a message to the appropriate EXE to instruct it to display.
There are 2 messages sent from GIS360 to which the EXE must respond…
MasterToSlaveCodes.Display – When this is received the EXE should make itself visible, and bring itself to the foreground.
MasterToSlaveCodes.Terminate – When this is received the EXE should safely save its data and close.
To see example code for these functions, look at the "WndProc" methods.
NOTE: There are two other #"MasterToSlaveCodes" messages defined in the code, "PassMeasure", and "SaveDataNow". In practice these messages are never used so there is no requirement to add methods to respond to these messages.

Data exchange

When GIS360 requires and external EXE to display it will first prepare two text files which pass data to the EXE.
DataIn.dat – This is a UTF-8 encoded XML file which contains the values for all fields in the current record for the current database.
ExtInfo.txt – This file is used to pass information about access dates/times, and the current GPS position and quality
In the examples, these files are loaded and interpreted by the "LoadDataFromGIS360" method. . The example code places the "ExtInfo" data in an "ExtInfo" object.
Once the user has updated the fields and clicked OK in the external EXE Form, the EXE should create a file called "DataOut.dat" in the same folder as itself. "DataOut.dat" should be a UTF-8 encoded XML file containing the data for the fields edited in the EXE. For the examples, this file would contain data similar to this…

```
<?xml version="1.0" standalone="yes"?>
<DocumentElement>
 <Properties>
  <Name>PointID</Name>
  <Value>123</Value>
  <Type>textbox</Type>
  <Data />
 </Properties>
 <Properties>
  <Name>DataIndex</Name>
  <Value>7639</Value>
  <Type>textbox</Type>
  <Data />
 </Properties>
</DocumentElement>
```

Once the output data is saved, the EXE should send a "SlaveToMasterCodes.OK" message to GIS360 and then hide itself.
If the user Cancels the form, then the EXE does not need to prepare a "DataOut.dat" file, it just needs to send a "SlaveToMasterCodes.Cancel" message to GIS360 and then hide itself.
Examples of these operations can be found in the "pictureBoxOK_Click" and "pictureBoxCancel_Click" methods in the examples.

Managing external Databases

In some applications the data to be maintained will be in an external database rather than from GIS360's internal data structure. The external database could be large and performance would suffer if this had to be loaded every time the external EXE form was displayed. This is reason why the external EXE should operate by simply hiding itself and staying resident in memory when it is not displayed.

Handling external databases will depend on the format of the database so is not covered in the example programmes. There are two skeleton methods in the examples to indicate where the external database should be loaded and saved. These are the "LoadExternalDatabase()" and "SaveExternalDatabase()" methods.

Report Generator

GIS360 can also generate custom reports. To make a custom reports you must make a custom exe and place this in the /Reports subfolder. When you save a file in XLS format GIS360 will save the data in a CSV in the reports folder and then run the selected exe.

In theory there are a wide variety of tools that can be used to make the reports. We found that ClosedXML worked very well and was easy to adapt to our needs. http://closedxml.codeplex.com/
The Report EXE format a file called Showcase.xml which is then loaded by Excel.
For example here is a report generated by GIS360 for positioning and recording electricity meters.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2		Meter Survey Details											
3				Meter type (Tick)				Tariff Class					
4		Account No/ Cust ID/ User ID	Meter ID	Prepaid	Credit	Single Phase	Three Phase	Residential (Tick	Commercial (Tick	Other	Activity Code Name	Telephone	Email
5		2314	278123		X			X			dre	941-8236	R.T
6		2315	345667		X			X			dre	854-6702	
7		2435	372893		X			X			dre	606-4581	
8		3456	568923		X			X			dre	891-3456	

The data was collected in GIS360 then the user exports as File type XLS. Then Excel will appear on the machine with the report already loaded.
The code snippet to generate the above report is

```
public ReportForm()
{
   InitializeComponent();
   wb = new XLWorkbook();
   ws = wb.Worksheets.Add("Contacts");

   //Title
   ws.Cell("B2").Value = "Meter Survey Details";
   ws.Cell("E3").Value = "Meter type (Tick)";
   ws.Cell("I3").Value = "Tariff Class";
   ws.Cell("B4").Value = "Str ID ";
   ws.Cell("C4").Value = "Account No/ Cust ID/ User ID ";
   ws.Cell("D4").Value = "Meter ID";
   ws.Cell("E4").Value = "Prepaid";
   ws.Cell("F4").Value = "Credit";
   ws.Cell("G4").Value = "Single Phase";
   ws.Cell("H4").Value = "Three Phase";
   ws.Cell("I4").Value = "Residential (Tick)";
   ws.Cell("J4").Value = "Commercial (Tick)";
   ws.Cell("K4").Value = "Other";
   ws.Cell("L4").Value = "Activity Code Name";
   ws.Cell("M4").Value = "Telephone";
   ws.Cell("N4").Value = "Email";

   //From worksheet
   string rangestring1 = "B2:N" +(RowNo + 4).ToString();
   var rngTable = ws.Range(rangestring1);

   rngTable.FirstCell().Style
      .Font.SetBold()
      .Fill.SetBackgroundColor(XLColor.CornflowerBlue)
```

```
.Alignment.SetHorizontal(XLAlignmentHorizontalValues.Center);
        rngTable.Range("A1:M1").Merge(); //or rngTable.Row(1).Merge()

        rngTable.Range("A2:C2").Merge();
        rngTable.Range("A2:C2").Style.Fill.BackgroundColor = XLColor.Aqua;

        rngTable.Range("D2:G2").Merge();
        rngTable.Range("D2:G2").Style.Fill.BackgroundColor = XLColor.Aqua;
        rngTable.Range("D2:G2").Style.Alignment.Horizontal = XLAlignmentHorizontalValues.Center;
        rngTable.Range("D2:G2").Style.Border.LeftBorder = XLBorderStyleValues.Thin;
        rngTable.Range("D2:G2").Style.Border.RightBorder = XLBorderStyleValues.Thin;
        rngTable.Range("D2:G2").Style.Border.TopBorder = XLBorderStyleValues.Thin;

        rngTable.Range("H2:J2").Merge();
        rngTable.Range("H2:J2").Style.Fill.BackgroundColor = XLColor.Aqua;
        rngTable.Range("H2:J2").Style.Alignment.Horizontal = XLAlignmentHorizontalValues.Center;
        rngTable.Range("H2:J2").Style.Border.LeftBorder = XLBorderStyleValues.Thin;
        rngTable.Range("H2:J2").Style.Border.RightBorder = XLBorderStyleValues.Thin;
        rngTable.Range("H2:J2").Style.Border.TopBorder = XLBorderStyleValues.Thin;

        rngTable.Range("K2:M2").Merge();
        rngTable.Range("K2:M2").Style.Fill.BackgroundColor = XLColor.Aqua;
       var rngHeaders = rngTable.Range("A3:L3"); // The address is relative to rngTable (NOT the worksheet)
        rngHeaders.Style.Alignment.Horizontal = XLAlignmentHorizontalValues.Center;
        rngHeaders.Style.Font.Bold = true;
        rngHeaders.Style.Font.FontColor = XLColor.DarkBlue;
        rngHeaders.Style.Fill.BackgroundColor = XLColor.Aqua;

        LoadData(AppDir() + "\\METER.csv");

        string rangestring = "B4:N"+(RowNo).ToString();
        var rngData = ws.Range(rangestring);
        var excelTable = rngData.CreateTable();

        // Add the totals row
        excelTable.ShowTotalsRow = true;

        //Add thick borders to the contents of our spreadsheet
        ws.RangeUsed().Style.Border.OutsideBorder = XLBorderStyleValues.Thick;
        ws.Columns().AdjustToContents();
        wb.SaveAs(AppDir() + "//Showcase.xlsx");
Excel.Application excelApp = new Excel.Application();

 // if you want to make excel visible to user, set this property to true, false by default
 excelApp.Visible = true;

// open an existing workbook
 string workbookPath = AppDir() + "//Showcase.xlsx";
  Excel.Workbook excelWorkbook = excelApp.Workbooks.Open(workbookPath,
     0, false, 5, "", "", false, Excel.XIPlatform.xlWindows, "",
     true, false, 0, true, false, false);
     }
```

```
private void AddRow(string[] row)
{
   string CellName = "B" + Convert.ToString(RowNo);
   ws.Cell(CellName).Value = row[0];

   CellName = "C"+Convert.ToString(RowNo);
   ws.Cell(CellName).Value = row[1];

   CellName = "D" + Convert.ToString(RowNo);
   ws.Cell(CellName).Value = row[2];

   if (row[3] == "Prepaid")
   {
      CellName = "E" + Convert.ToString(RowNo);
      ws.Cell(CellName).Value = "X";
      ws.Cell(CellName).Style.Alignment.Horizontal = XLAlignmentHorizontalValues.Center;
   }
   else
   {
      CellName = "F" + Convert.ToString(RowNo);
      ws.Cell(CellName).Value = "X";
      ws.Cell(CellName).Style.Alignment.Horizontal = XLAlignmentHorizontalValues.Center;
   }

   if (row[4].Contains("ingle"))
   {
      CellName = "G" + Convert.ToString(RowNo);
      ws.Cell(CellName).Value = "X";
      ws.Cell(CellName).Style.Alignment.Horizontal = XLAlignmentHorizontalValues.Center;
   }
   else
   {
      CellName = "H" + Convert.ToString(RowNo);
      ws.Cell(CellName).Value = "X";
      ws.Cell(CellName).Style.Alignment.Horizontal = XLAlignmentHorizontalValues.Center;
   }

   if (row[5].Contains("Residential"))
   {
      CellName = "I" + Convert.ToString(RowNo);
      ws.Cell(CellName).Value = "X";
      ws.Cell(CellName).Style.Alignment.Horizontal = XLAlignmentHorizontalValues.Center;
   }
   else
   {
     CellName = "J" + Convert.ToString(RowNo);
      ws.Cell(CellName).Value = "X";
      ws.Cell(CellName).Style.Alignment.Horizontal = XLAlignmentHorizontalValues.Center;
   }
```

```
    CellName = "K" + Convert.ToString(RowNo);
    ws.Cell(CellName).Value = row[6];

    CellName = "L" + Convert.ToString(RowNo);
    ws.Cell(CellName).Value = row[7];

    CellName = "M" + Convert.ToString(RowNo);
    ws.Cell(CellName).Value = row[8];

    CellName = "N" + Convert.ToString(RowNo);
    ws.Cell(CellName).Value = row[9];
}

private void LoadData(string filename)
{
      using (StreamReader readFile = new StreamReader(filename))
      {
         string firstline = readFile.ReadLine();
         string line = "";
         //string[] row;

         while ((line = readFile.ReadLine()) != null)
         {
            string[ ] row = line.Split(',');
            RowNo++;
            AddRow(row);
         }
      }
}
```

User designed Field Entry

User Designed field entry is when one field in a form needs to have special attention. This can be because it needs to link to an external database, or any other special means of picking. For example in forestry there is frequently a list of species. This list can be so long that it is too long for a combobox. With this function the user can write a custom control that allows the user to answer questions to get down to the exact species. So it might start with " Is it coniferous or deciduous? "

User Defined Drawing

User defined drawing is when the user inserts a custom appearance for the GIS items being drawn. For example some users like to have the Tree canopy drawn based on distances from the trunk in the NSEW directions.

All of the above functions give GIS360 to perform virtually any GIS task and give the user exactly the tool they need.

Writing – Reading your own Project files

Project files are useful because they give you a way to compress everything needed to work into a single file. This file can then be easily emailed, copied, or transferred to the cloud.
A GIS360 PRJ file (project file) is just a ZIP file of data and settings. If you take a PRJ file and change the suffix to ZIP it will load into WinZip or any other Zip program.
The PRJ (ZIP) file can contain the following items.
1. A KMZ datafile.
This is where the main GIS data is held

2. TempGlobals.txt This file contains all of the global settings that go along with the project. It must be placed into the Reference subfolder. See section below for description of the file

3. User Images for the Work Button "hi_lmnew.png" , "hi_lmold.png", "lo_lmnew.png", "lo_lmold.png" These must go into the Images subfolder.

4. The current Schema file. This must go into the schema folder.

5. Any XML or TXT file that is in the schema subfolder gets included into the Project and will need to be returned there if the project is unzipped.

6. Any *.Tiles files that are currently used are included into the project file. They must be unzipped into the MyDocuments subfolder.

7. Any Icons used are included and must be returned to the Icons subfolder

8. Any ENM, ENI ENS files and they need to go into their choses folder. The folder name is in the TempGlobals.txt file.

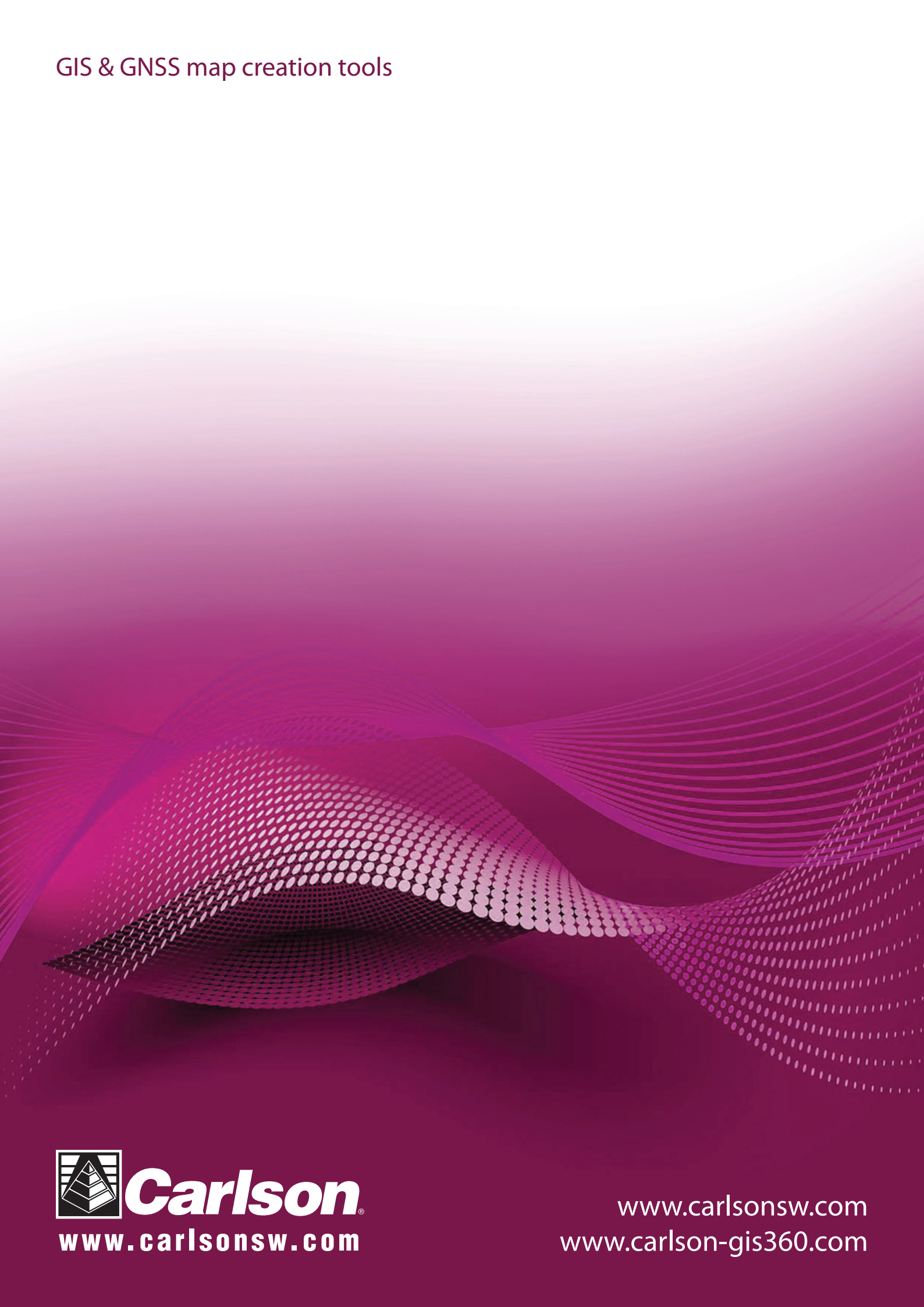
Definition of TempGlobals.txt

TempGlobals,txt is a test file that contains global variable settings for the project file. Each project file must contain this file. It tells GIS360 how to configure itself and setup the screen so that it is exactly like the moment the tempglobals file was saved.

Presetused -	This is the current map projection
homeearthcoord.lat	
homeearthcoord.lon –	This is the current Home Position
ecentre.lat	
ecentre.lon -	This is the Centre of the current screen view
zoomlevel -	The current Zoom level (0 - 18)
MapType1 –	The current maptype (Selection 1) This can be a map server or Tiles files
MapType2 -	The current maptype (Selection 2) This can be a map server or Tiles files
LLMDirectory –	The ENM file folder
Units	("metres", "imperial_feet","us_feet")

	PC Platform, XP,Vista,Windows 7 & Windows 8					Windows Mobile 6.1 & 6.5 and CE 6.0 Platform			
Features	Freeware	Standard	Profes-sional	Post.Proc	Office	Freeware	Standard	Profes-sional	Post.Pro-cessing
Limited to 15 points	Yes	No	No	No	No	Yes	No	No	No
NMEA GPS	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
GPS Simulation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RTK/DGPS GPS interfaces to many different Brands and models	Simul.	No	Yes	Yes	No	Simul.	No	Yes	Yes
GPS/GNSS "You are Here"	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Display Google Map On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Display Google Satellite Map On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Display ESRI Maps 5 servers On-/offline like:	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ArcGIS_World_Physical_Map On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ArcGIS_World_Shaded_Relief On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ArcGIS_World_Street_Map On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ArcGIS_World_Terrain_Base On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ArcGIS_World_Topo_Map On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Display Bing Map On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Display Yahoo Map On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Display Bing Satellite Map On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Display Yahoo Satellite Map On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Display Open Street Map On-/offline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Display WMS On-/offline									
Collect Digital Photos within GIS schema	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Load and Save ESRI Shape Files	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Save and Load Project	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Load Local Map Tiles	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GIS Data Designer, create schema for GIS data collection	Yes	Yes	Yes	Yes	Yes	No	No	No	No
GIS schema comes with predefine entries	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Save Local Map Tiles	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stake Out and Navigation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COGO tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bilateration (US Term?)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chain and offset (US term?)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk method	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distance and bearing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intersections/Line work	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Line extention	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parallel	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Point snap	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digitalization	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Add, View and Edit Attributes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
View DXF DWG Files	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Import/Export DXF/DWG	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Import/Export CSV	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Snap, Tap, Enter Points	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GPS Tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Auto Area and Length Calc	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WGS 84 and Local Grids	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grids in Local formats	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Laser Toolbox	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
KML, KMZ Google Compatible	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Work in wireless 'blocked' areas	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Total Station Interface to many different Brands and models	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
GPS Post-Processing	Yes	No	No	Yes	No	Yes	No	No	Yes
Direct Field to Office connection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cloud download and upload	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cloud Teamwork	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Converting GEOTiff	Yes	Yes	Yes	Yes	Yes	No	No	No	No
API available for third party integration	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Edit geometry for lines and areas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Localization of GNSS signal to a local grid	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Set home position with desired address	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Interface to different sensors, like Cable detection, Echo sounder, etc.	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Print map	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Multilingual	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nesting	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

GIS & GNSS map creation tools



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