



# EZSurv<sup>®</sup> Getting Started for Survey data

Version 2.94

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## Summary

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- Compatible data collection software
- Basic post-processing concepts

### Actions **TO DO ONCE**

- Install and license
- Default settings
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- Configure Options

### Actions **TO DO AT EVERY JOB**

- Post-process data
- Analyze data
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For detailed information, refer to the User Guide under **Start > All Programs > Effigis > EZSurv Documentation.**



## Why post-processing ?

- To fill RTK failures when you are working on the edge of an RTK infrastructure.
- To secure centimeter accuracy when there is no RTK infrastructure in your area.
- To perform sub-centimeter geodetic survey.
- To perform QA on RTK results.
- To easily resolve the reference system alignment. By referencing your survey to a known Base Station (accurate coordinates), all your collected points will automatically be referenced to the Base Station Geodetic Reference System. There is no other transformation to perform.



## Compatible data collection software

Field data, properly recorded using the following field software can be post-processed using **EZSurvey®**. GNSS receiver binary files recorded without the following data collection software can also be post-processed.



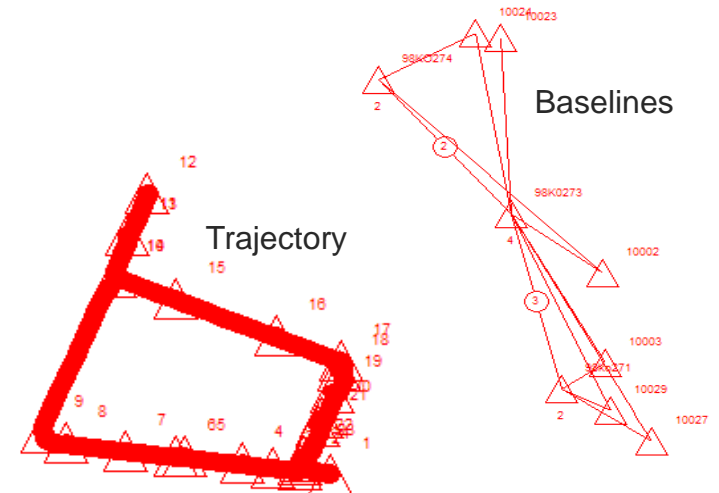


## Basic post-processing concepts

In order to improve the accuracy and reliability of your survey data with post-processing, GNSS data recorded at a reference point called Base Station is required. The accuracy of the positioning depends on the distance between the Base Station and the surveyed area and the quality of the field data. Many Base Stations are available on the Internet.

**EZSurv®** can post-process **baselines** and/or **trajectories**.

- A **Baseline** is created when two sites (points) have recorded simultaneously raw GNSS data.
- A **Trajectory** is created when a rover file (with raw GNSS data) is combined with a Base Station file (covering the rover file time span). Surveyed site are extracted from the trajectory positions.





## Install and license

Prior to install **EZSurv**<sup>®</sup>, remove the previous version of all Effigis products. Two different versions cannot be installed on a same computer.

- Download **EZSurv**<sup>®</sup> installation package, unzip it and run **Setup.exe** to install. Follow the instructions and, if necessary, refer to the User Guide delivered with the install.
- Start **EZSurv**<sup>®</sup> application from the Windows **Start** menu, select **All Programs**, then **Effigis > EZSurv**.
- When starting the application for the first time, your “receiver s/n” license will be updated directly from Internet. For RINEX or Opened license use **Start > All Programs > Effigis > License Management** to active your license (ask your vendor for your activation code).

Download Center



To be recognized by the “receiver s/n” license, the binary GNSS observations files **must** include the receiver serial number.

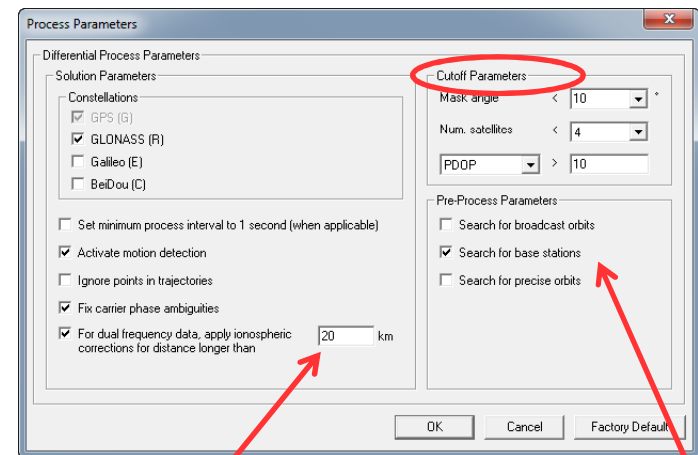


## Default settings – Process Parameters

When projects are closed, you can set defaults for all future projects.

- **Close** the current project from the **File** main menu.
- From the **Edit Default** main menu, make sure to leave the **Processing Mode** at **Differential Positioning**. It is the most accurate mode if you have access to base station data.
- From the **Edit Default** main menu, set the default **Process Parameters**. According to your specifications, set your own process parameters (**Cutoff Parameters**) and click **OK** to save your settings.

**Typically, the Factory Default values are correct for your needs.**



For dual frequency data, you may want to output L1 results (less noisy) for short baselines.

Activate the automatic **Search for base stations**.



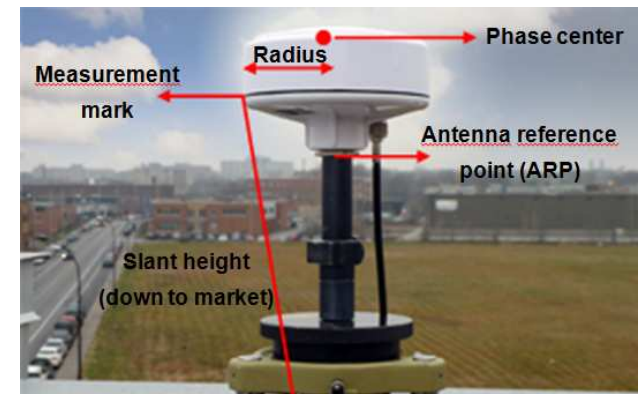
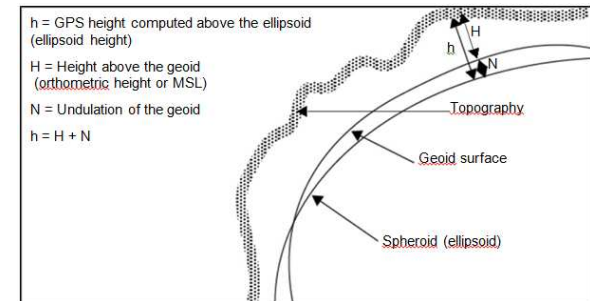
## Default settings – Geoid and Antenna

You can set defaults Geoid model if you are working with MSL heights:

- **Close** the current project from the **File** main menu.
- Set a default Geoid model using **Edit Default > Geoid**

If you are looking for centimeters results, you can set a default Antenna model:

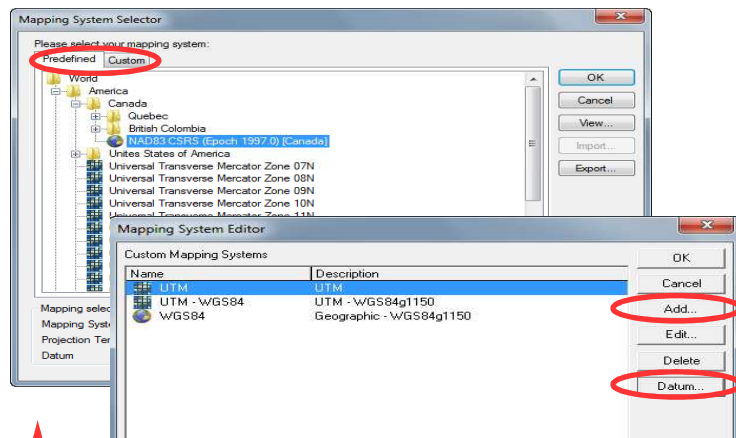
- Select **Antenna** from the **Edit Default** menu and select your antenna model from the NGS list. You can also create your own model according to your geodetic antenna specifications.







## Configure Mapping System



- Select a mapping system to display your results. Select it from a list of **Predefined** mapping systems found under **Tools > Mapping Systems > Selector...**
- If your mapping system is not in the list, you can create a **Custom** one using **Tools > Mapping Systems > Editor...** You may need to create a **Datum** prior to **Add** a mapping system. Once your mapping system is created, you can select it with **Tools > Mapping Systems > Selector...** use the **Custom** tab.



When using an RTK infrastructure, make sure your mapping system is using the proper Datum before you import your data so the input RTK positions and the output PPK are in the same system.

Users of ArcPad & **GNSS Driver** for ArcPad can use ESRI map projection kit instead of **EZSurv**® projection kit. **EZSurv**® will automatically use ESRI projection kit if ArcGIS is installed on the PC.



## Configure Options

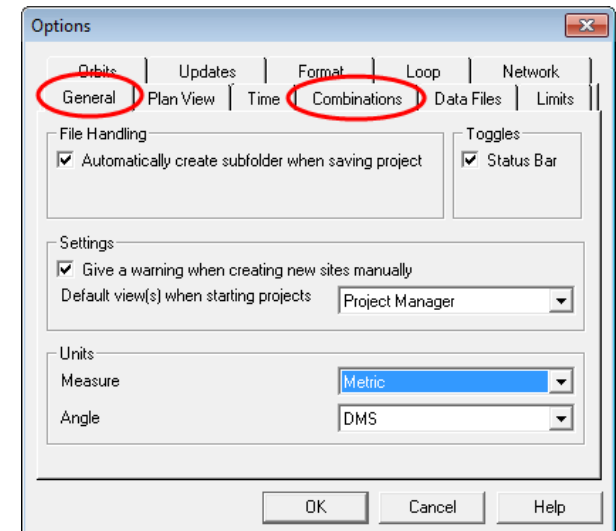
The options are kept from one project to another based on your last modifications. You access the Options through **Tools > Options**.

You must visit the following tabs to better control your process:

- **General** to set unit of measure (Feet or metric).
- **Combination** (explained page 11).

Moreover:

- ★ RTK users can configure the **Format** tab to select the option **Only update points that were not fixed within the RTK file**.



Options are well explained in the User Guide, refer to it for details  
**Start > All Programs > Effigis > EZSurv Documentation.**



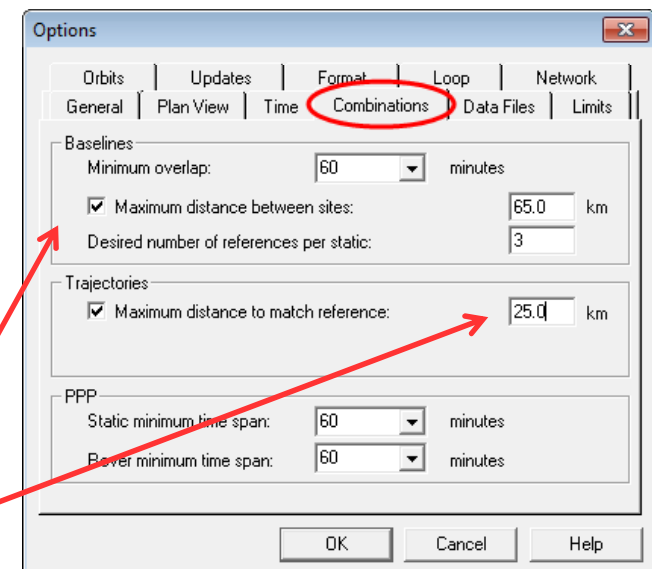
## Configure Options – Combination Tab

The accuracy of the positioning depends on the mode of operation (static/baseline or rover/trajectory) and on the distance between the base and the surveyed area.

Using your field data, the processor automatically generates baselines (static sites recorded simultaneously) and trajectories (Base-Rover) for each file imported in the project. The baselines and trajectories are created according to configurations set under **Tools > Options... > Combinations**.

Input a minimum simultaneous overlapping time required to create Baselines. Input a maximum distance between sites and the number of references you would like to connect to your sites.

Input a maximum Base-Rover distance to create Trajectories.



Section	Parameter	Value	Unit
Baselines	Minimum overlap:	60	minutes
	Maximum distance between sites:	65.0	km
	Desired number of references per static:	3	
Trajectories	Maximum distance to match reference:	25.0	km
PPP	Static minimum time span:	60	minutes
	Rover minimum time span:	60	minutes

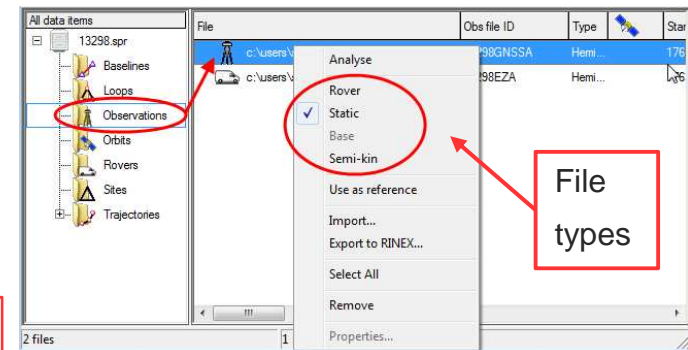
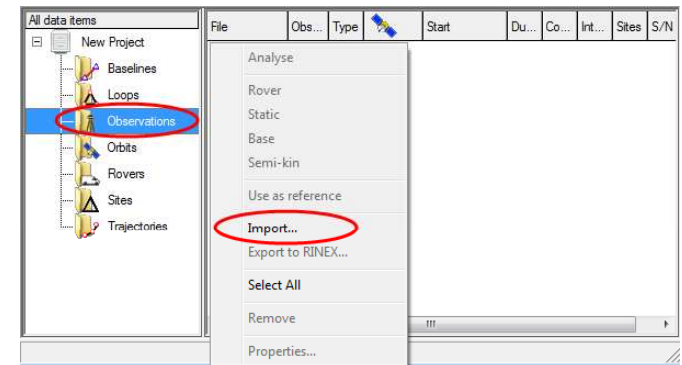


## Post-process data

### 1 – IMPORT YOUR DATA

- Transfer your data files to the PC.
- Start **EZSurv**<sup>®</sup>, highlight the **Observations** folder, right click and **Import** your data files (\*.RW5 for SurvCE, \*.RAW for MicroSurvey products, \*.GPS for ArcPad and OnPOZ products or \*.\* for a receiver binary file recorded without a data collection software).
- If you used your own Base, **Import** its file (could be RINEX).
- Once files are imported, make sure the **File type** is properly set. Otherwise, highlight the file (**Observations** folder), right click and modify its type. Users can pre-define the file type with **Tools > Options > Data Files**).


Semi-kin type is specific to data recorded with **EZField**<sup>™</sup>.






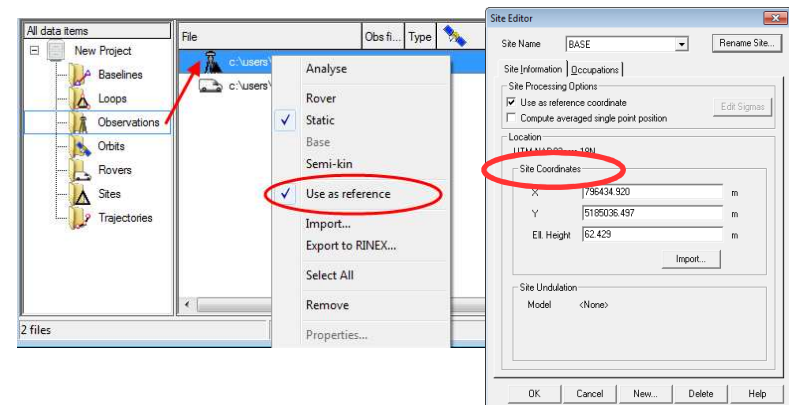
## Post-process data

### 2 – CONFIGURE THE BASE (reference) - TO DO ONLY IF YOU SET YOUR OWN BASE

Many Base Stations are available on the Internet. **EZSurv**<sup>®</sup> finds automatically the closest base station for your field data and transfers the required files on your PC (some providers require a subscription). The base station providers list is available under the icon . If you have access to an unlisted Provider, let us know at [onpozsupport@effigis.com](mailto:onpozsupport@effigis.com)

- From **Observations** folder, highlight your Base, right click and check **Use as reference**. The **Site Editor** opens: input your reference **Site Coordinates** in the proper mapping system.

 RTK users must set the proper mapping system (projection/Datum) prior to import data to make sure the input/output positions are in the same system.

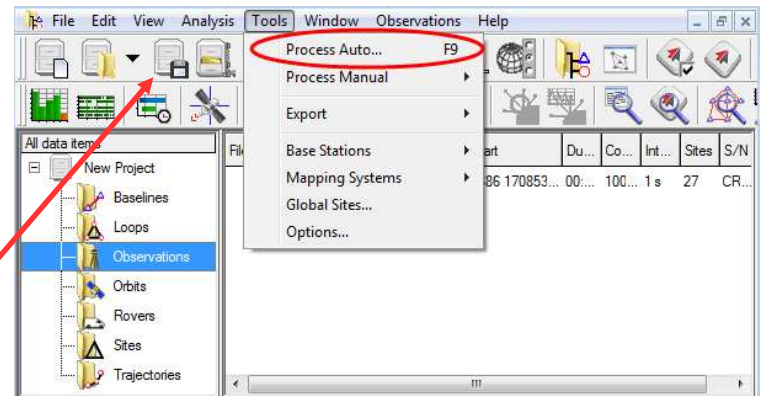




## Post-process data

### 3 – POST-PROCESS YOUR DATA

- Select **Process Auto...** from the **Tools** menu.  
The following tasks are performed:
  - ✓ Pre-process
    - Download and merge Base data (if required)
    - Define Combinations (baselines and trajectories)
  - ✓ Process All Data
  - ✓ Generate Loops (if selected with **Tools > Options...** > **Loop** tab)
  - ✓ Adjust Network (if selected with **Tools > Options...** > **Network** tab)
  - ✓ Display the Process Summary



### 4 – SAVE YOUR RESULTS

- Select **Save** from the **File** menu to update your files with post-processed positions (\*.RW5 for SurvCE, \*.RAW for MicroSurvey products, \*.SHP for ArcPad & **GNSS Driver** for ArcPad).

When post-processing, the original files are copied with a \*\_RT1.\* suffix.

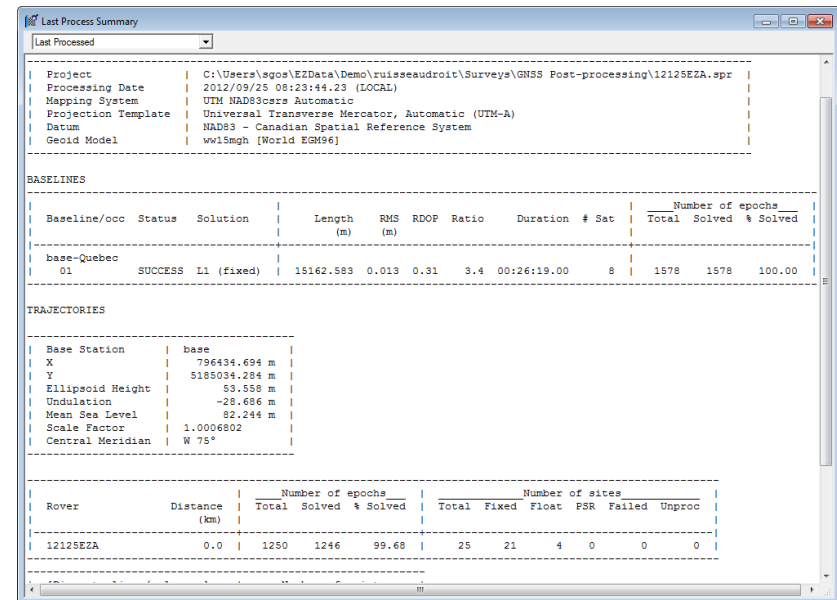


## Analyze data

### Analysis > Process Summary

The **Process Summary** is automatically displayed after post-processing. It provides the following information:

- Information on the project
- List of Baselines processed
- Information on the Base Station used
- List of rover files processed
- Sites and/or features available in the data



Last Process Summary										
Last Processed										
Project	C:\Users\ngos\EZData\Demo\ruisseaudroit\Surveys\GNSS Post-processing\12125E2A.spr									
Processing Date	2012/09/25 08:23:44.23 (LOCAL)									
Mapping System	UTM NAD83Srs Automatic									
Projection Template	Universal Transverse Mercator, Automatic (UTM-A)									
Datum	NAD83 - Canadian Spatial Reference System									
Geoid Model	wv15mgh [World EGM96]									
BASELINES										
Baseline/occ	Status	Solution	Length (m)	RMS	RDOP	Ratio	Duration	# Sat	Number of epochs Total Solved	% Solved
base-Quebec 01	SUCCESS	LI (fixed)	15162.583	0.013	0.31	3.4	00:26:19.00	8	1578	1578 100.00
TRAJECTORIES										
Base Station	base									
X	796434.694 m									
Y	5185034.284 m									
Ellipsoid Height	53.558 m									
Undulation	-28.686 m									
Mean Sea Level	82.244 m									
Scale Factor	1.0006802									
Central Meridian	W 75°									
Rover	Distance (km)	Number of epochs			Number of sites					
		Total	Solved	% Solved	Total	Fixed	Float	PSR	Failed	Unproc
12125E2A	0.0	1250	1246	99.68	25	21	4	0	0	0

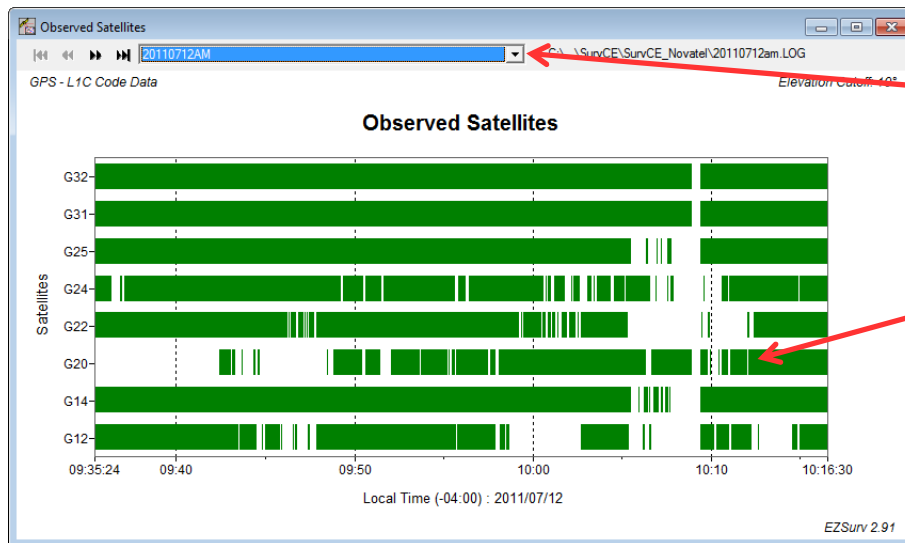
Select **Archive project** from the **File** menu to save your post-processing project into one file.



## Analyze data

### Analysis > Raw Observations

If some bad data was recorded, you can get rid of it for a specific time span.



If you have imported few files, navigate through each of them.

A discontinuity on a channel means a signal obstruction (cycle slip). A lot of discontinuities means a data set recorded in an obstructed environment.

With a right click, you can toggle between GPS and other constellations.

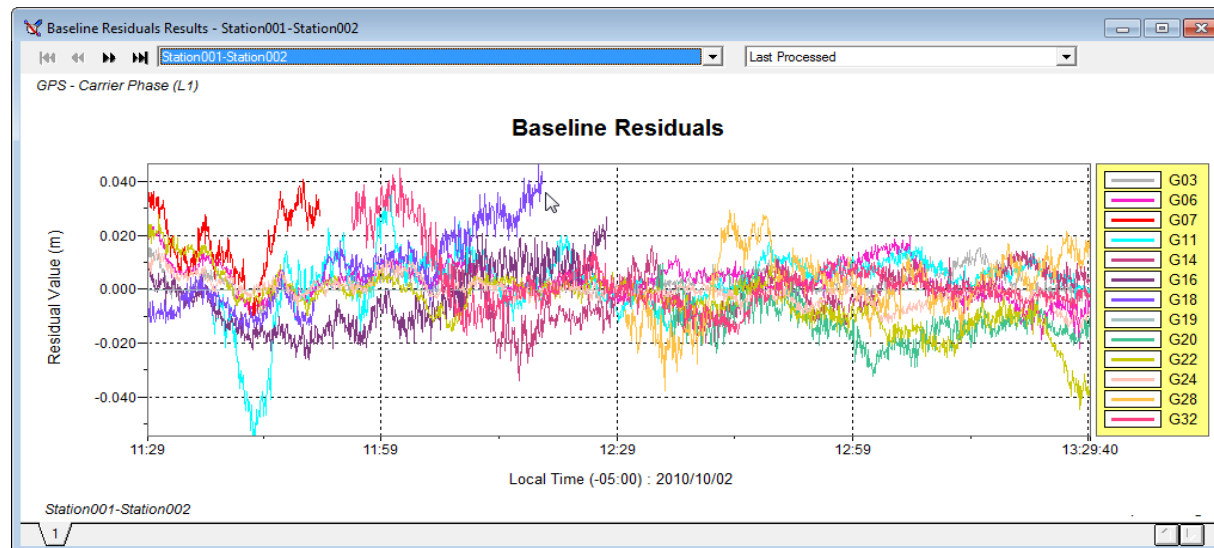




## Analyze data

Analysis > Trajectory or Baseline Results > Residuals

To confirm the results or to point out any problem with the data.





## Analyze data

Analysis > Survey Sites > Post-Processed Coordinates

For a complete list of all your positions.

Solution type as well as standard deviations **are not displayed if a site is connected to more than one baseline**. If you adjust your sites (least-squares), then all standard deviations from the least-squares adjustment will be displayed.

POST-PROCESSED COORDINATES  
EZSurv Post Processor 2.88

Project	New Project
Geoid Model	g2000c00 [Canada HTv2.0 with CGG2000]
Mapping System	SPCS [Lambert Conformal Conic]
Datum	NAD83

Sites from Baselines

Site	Solution	Position				Standard deviation			Baseline count
		X (m)	Y (m)	EllHgt (m)	MSL (m)	X (m)	Y (m)	Hgt (m)	
98ko271	*	5369514.744	2696576.625	282.638	314.248	*	*	*	5
98K0274	*	5353032.844	2709806.354	406.996	438.590	*	*	*	4
10002	*	5368543.008	2703889.137	461.397	492.905	*	*	*	2
10003	*	5370916.832	2698970.503	489.884	521.448	*	*	*	2
10023	L1 (fixed)	5357783.738	2714756.735	465.225	496.721	0.004	0.006	0.010	1
10024	*	5356505.534	2714432.174	447.124	478.639	*	*	*	2
10029	*	5372375.609	2696393.166	416.497	448.102	*	*	*	2

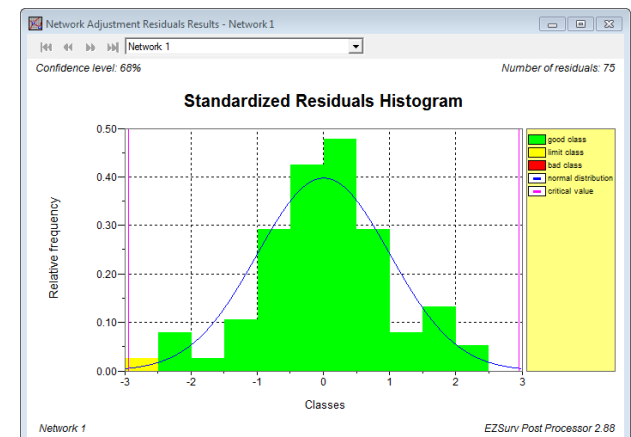
Number of baselines tied to the site





## Analyze data – Quality Control

- RTK users can compare RTK with post-processed positions (**Analysis > Trajectory Results > Trajectory Site Comparison**). If the RTK and PPK mapping system (projection and datum) are not the same, RTK and PPK will be miss-aligned. Make sure to set the mapping system properly before you import your data.
- Loops can be created with **Tools > Process Manual > Generate Loops** (according to users specifications **Tools > Options... > Loop** tab). Misclosure can be analyzed with **Analysis > Loop Summary**.
- Sites can be paired for further computation with **Analysis > Inverse Computation**
- Network of baselines can be adjusted using **Tools > Process Manual > Adjust Network** (according to users specifications set with **Tools > Options... > Network** tab) and analyzed using **Analysis > Network Adjustment**.





## Analyze data – Re-process

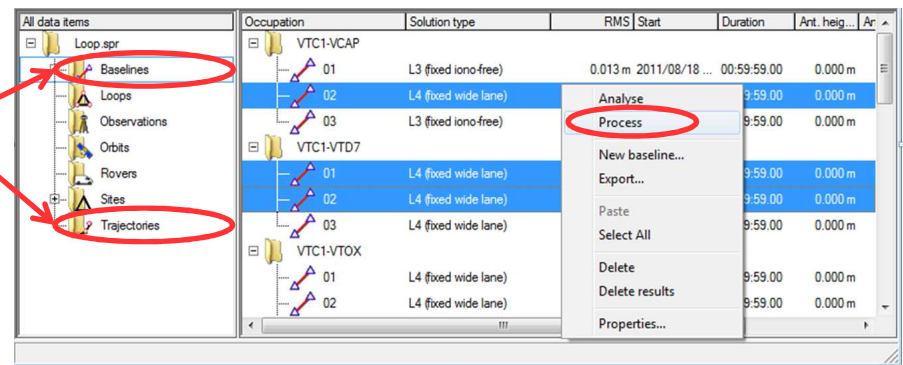
Based on the data and results analysis, users may modify some processing settings and configurations (**Edit > Process Parameters** and/or **Tools > Options > Combinations**); some satellites may be rejected for a specific time span (**Edit > Rejected Satellites...**); metadata entry and time span can also be modified using the **Edit** menu (**Site, Rover, Baseline, Trajectory**).

**To re-process data with modified settings and configurations:**

Re-process **all data**: select **Process All Data** from the **Tools > Process Manual** menu.

Re-process **a data sub-set**:

- Open the **Baselines** or **Trajectories** folder
- Highlight the items to re-process
- Right click and select **Process**.





## Export data

Generally speaking, here is the usual flow with survey data after post-processing:


- Continue within your typical dataflow using the updated input files (\*.RW5 for SurvCE, \*.RAW for MicroSurvey products and \*.SHP for ArcPad & **GNSS Driver** for ArcPad).
- Export your sites/trajectories/baselines in CSV format using **Tools > Export** (explained page 22).
- **EZTag CE™** or **EZField™** users can export using a specific GIS format with **Tools > Export > Features...** (explained page 23).
- You can also further analyze your raw data and post-processed results using the **GNSS Analyser** module. This module could help you to better understand your results using different graphical views.

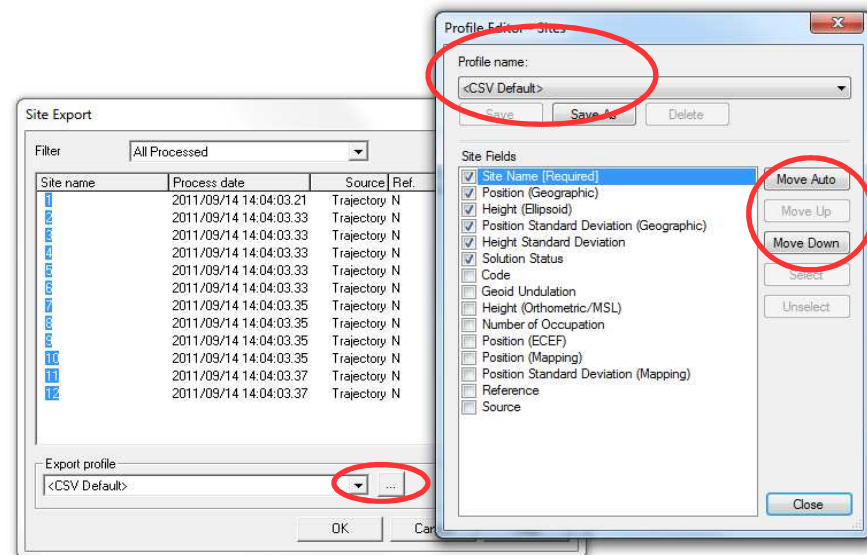


## Export data – CSV export

CSV export can be configured according to your needs. All parameters related to a site can be exported. Some parameters are required (like the site name). You can configure a CSV output and save it using a **Profile**.

### Tools > Export > Sites...

- Click on  to access the **Profile Editor**.
- Then select your parameters, order them using **Move Up** and **Move Down**.
- **Save** it under a specific **Profile** name.





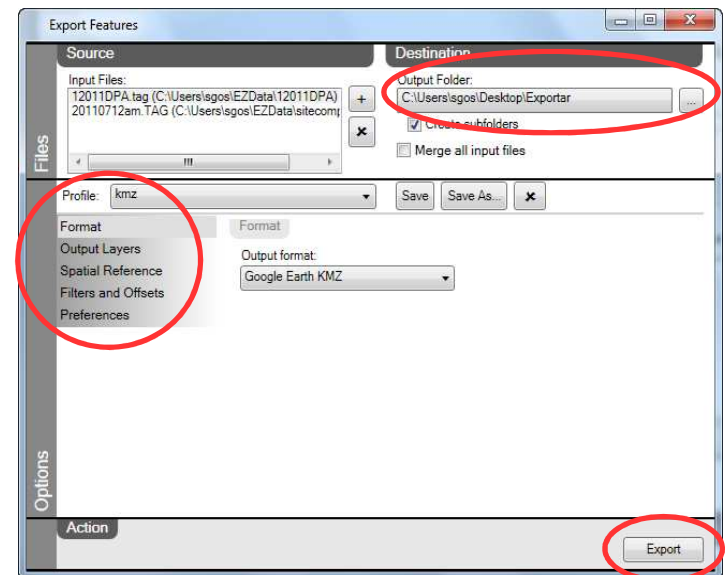
## Export data – GIS format

If you used **EZTag CE™** or **EZField™**, you can export your post-processed data using a specific GIS format with **Tools > Export > Features...**

Select the **Output folder**.

Configure the export (**Format, Spatial Reference, apply Filters and Offsets** to the output, set some output metadata according to your **Preferences**). Your export configurations can be saved in a **Profile** for future exports.

Click **Export** to export your files.



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