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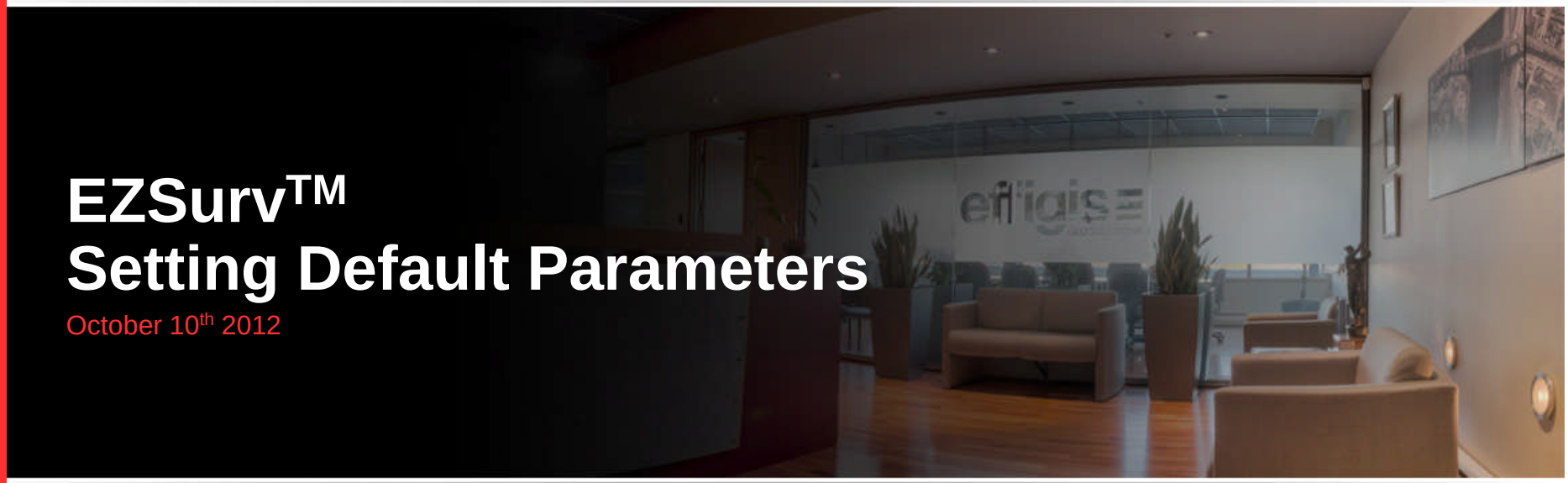


EZSurv™
Setting Default Parameters

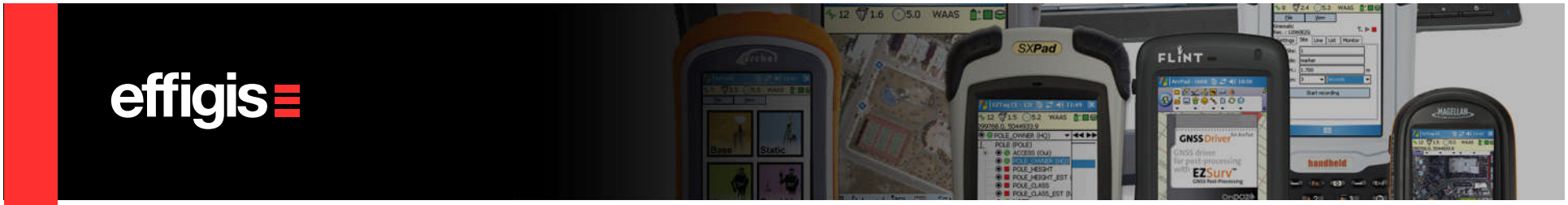
October 10th 2012

2012 - Training documents

What are default Parameters

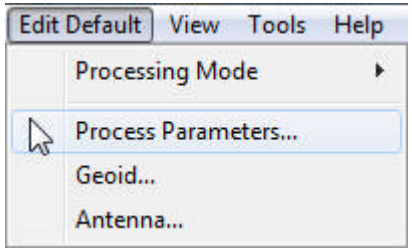
- Default parameters can be modified at any time in a project, but when a new project is created, these parameters are reset to their default values (they are kept as global default).
- All other parameters, when changed, will remain the same from one project to another (ex. mapping system, options, etc.)
- Default parameters in EZSurv™are:
  - Processing mode
  - Process parameters
  - Geoid Model
  - Antenna model

For instance, if you set a mask angle of 10 degrees as a default, you can change it to 15 degrees in a specific project but when you will create a new project its value will be reset to 10 degrees



How to set Default Parameters

- Close any active project using **File/Close**
- From the Edit Default menu (available only when there is no opened project), select the parameters to be changed
- Modify them as you want.
- Click OK.



Typically this has to be set once !

All these parameters can be changed any time within a project, but the new values will not be kept as default ***(you have to close your project to set them as default)***

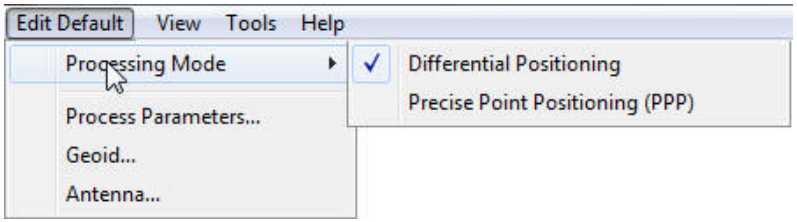
Processing mode - Differential

This is the typical GNSS post-processing mode used in survey application. It covers the two following survey cases:

- When you have **static** observations. *This is typically used to establish geodetic markers of high precision.*

- When you have **kinematic** observations. Rover receiver will typically record survey points (or GIS features) for few seconds (or only one epoch). Typically such a procedure is known as «stop and go» mode. *This is typically used by surveyors to establish centimeter accuracy survey points or by GIS users to establish sub-meter/sub-foot features.*

*The well-known RTK mode is simply a kinematic **Differential Positioning** mode computed in real-time. Every single position recorded in RTK can be recomputed in Post-Processing if the GNSS raw data is properly recorded.*



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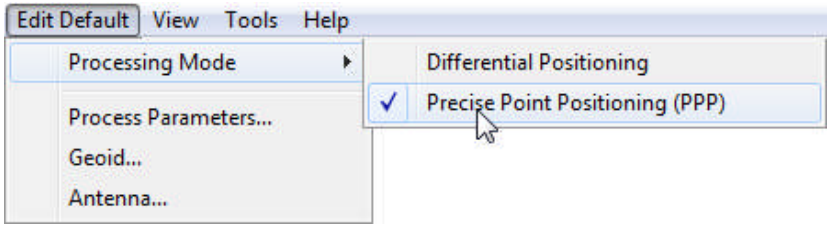
Processing mode – Precise Point Positioning

This processing mode is used when there is no base station data available:

- **Precise Point Positioning** (PPP) is an enhanced single point positioning technique for code and carrier phase measurements using precise orbits and clocks instead of broadcast data. The precise orbital data are provided by organizations like the International GNSS Service (IGS).

The convergence time to reach decimeter accuracy is typically about 30 minutes under normal conditions. To reach centimeter accuracies the PPP algorithms needs significantly longer period (convergence time is the time span from start to a stable accurate solution).



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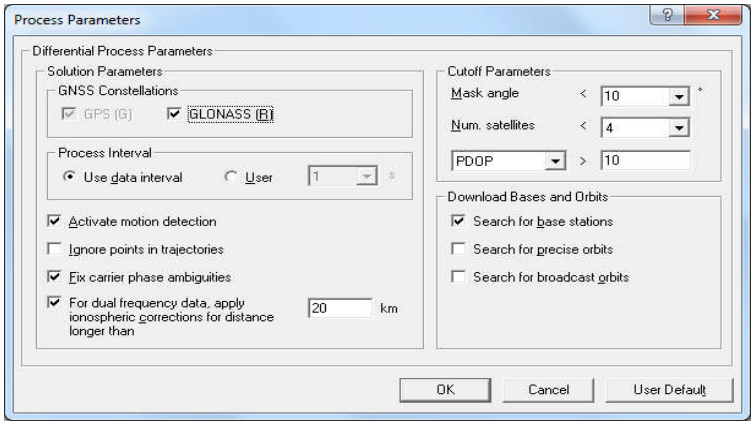
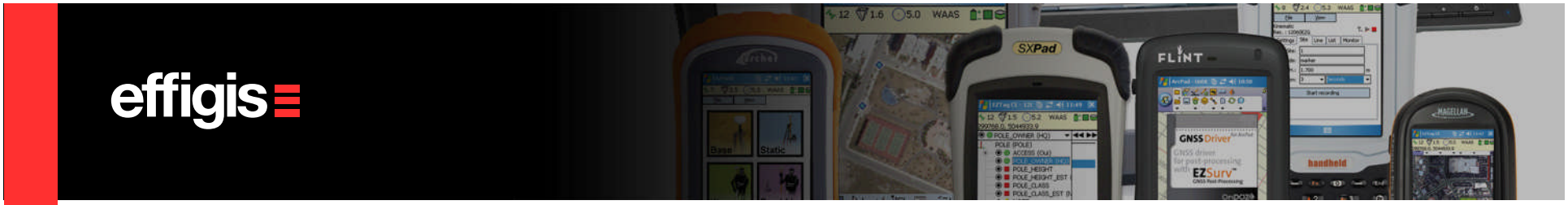
Process Parameters

Differential Process parameters are organized in three different sections:

- Solutions parameters
- Cut-off parameters
- Download base and orbits

When you are in PPP mode, the Process parameters dialog box is adjusted with fewer parameters





Process Parameters - Solution Parameters

- **GNSS Constellation** *(GLONASS is optional)*
- **Process interval** *(data interval or user selection)*
- **Activate motion detection:** *Automatically detect if the observed location is static or in movement. This should be checked when you do static or stop-and-go data collection. However, when observing a slowly moving object (tidal gauge), you should uncheck it.*
- **Ignore points in trajectories:** *Process trajectory without computing any sites or points included within the rover file. This is typically used for debugging purpose. For instance you may have recorded a site while you were moving. Such a situation may corrupt your post-processed positions.*

Process Parameters - Solution Parameters

- **Fix carrier phase ambiguities:** *Allow the Processor to launch its ambiguity fixing algorithm (for Survey applications).*

  In harsh environment (under canopy) you should uncheck this option (otherwise it may generate time to time bad fixes). So when processing typical GIS data (sub-meter/ sub-foot), this option should be unchecked.

- **For dual frequency data, apply ionospheric corrections for distance longer than:** *This option is for L1/L2 receiver only.*

  When checked, it simply applies ionospheric corrections if the distance separation between the known position (base station) and the unknown position is longer than the specified value.

Process Parameters - Cut-off Parameters

- **Mask angle:** *Specify the minimum mask angle to be used.*
- **Num. satellites:** *If at a specific epoch the number of satellites used to compute the position is lower than the specified value, this epoch is rejected.*
- **Geometry cut-off:** *First select the type of geometry cut-off (DOP), and then enter the maximum value for it. If at a specific epoch the DOP selected is higher than the specified value, this epoch is rejected*

  ***PDOP**: Position dilution of precision. Use horizontal and vertical precision;*
  ***GDOP**: General dilution of precision. Use horizontal, vertical and time precision;*
  ***HDOP**: Horizontal dilution of precision; Use only the horizontal precision;*

A low mask angle allows the Processor to use more satellites, but at the same time increases the potential of including bad data into the processing (multipath effects). Low observations are usually noisier. A proper mask angle should be between 10 and 15 degrees.

Process Parameters – Download base and orbits

- **Search for base stations:** *Download and add base stations from the providers defined in **Tools** > **Options** > **Base**. You must set at least one base provider for this option to work.*
- **Search for precise orbits:** *Download and add precise orbits from the providers defined in **Tools** > **Options** > **Orbits**. **Precise orbits takes at least a full day before being available** and the best quality (final orbits) are available only about two weeks after collect.*
- **Search for broadcast orbits:** *Download and add broadcast orbits to your project. These are daily orbits including all GPS satellites so they can be used with any project.*

*Broadcast orbits usually come with your data and from base stations so in most cases, you do not need these extra orbits. **These broadcast orbits take at least a full day before being available.***

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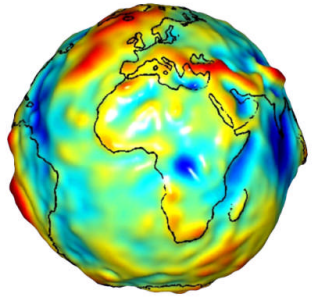
Geoid Model

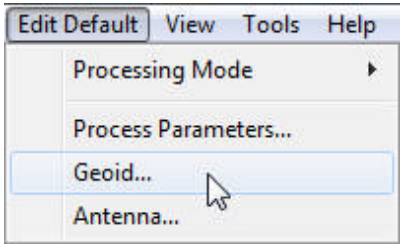


In GNSS positioning, heights are computed with respect to a reference ellipsoid.

You must apply geoid undulation corrections if you want to reduce your GNSS heights to the mean sea level (MSL or orthometric height).

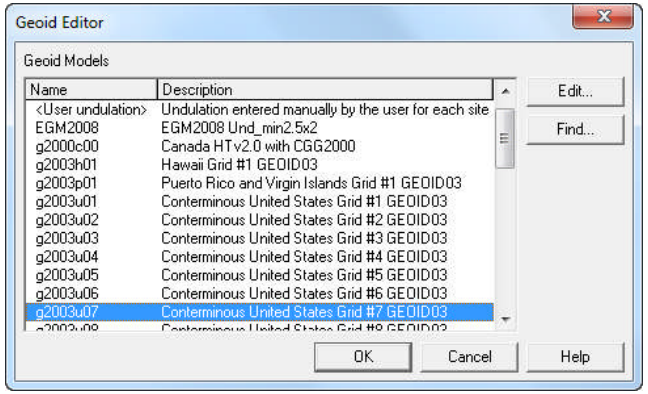
These corrections are usually computed using geoid proprietary tables provided by government agencies.

- *If you select a geoid model, MSL heights can be fixed at the reference site (not ellipsoid height);*
- *If you do not select a geoid model ellipsoid heights can be fixed at the reference site (not MSL height)*



Geoid Model

- The «Find» button can be used to find automatically the geoid models that cover you project area (this is functional only when you have an active project).
- Some Geoid models are installed with the application, some others has to be downloaded from FTP sites (ex. EGM 2008)



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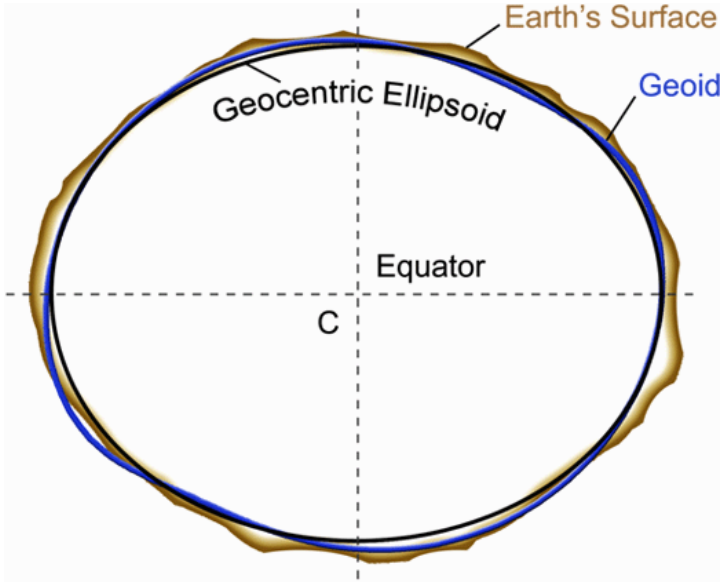
Geoid Model – Supported Formats

- NGS (USA) bin and geo files;
- NRCan (Canada) byn files;
- IGeS Text gra files;
- IGeS Text grd files;
- Surfer binary grd files;
- NASA/NIMA (USA) geo files;
- SLV (Canada) slv files;
- EGM 2008 (small endian) files;
- New Zeland 2009 sid files;



Geoid Model – grd Format *(for reference)*

The *.grd format is a text format align to the IGeS standard that can be imported by the Geoid Manager.

The first line of the file is a header that contains six values, separated by spaces or tabs. The header values in order from left to right are:

- Southern most latitude in decimal degrees
- Northern most latitude in decimal degrees
- Western most longitude in decimal degrees
- Eastern most longitude in decimal degrees
- Latitude spacing in decimal degrees
- Longitude spacing in decimal degrees

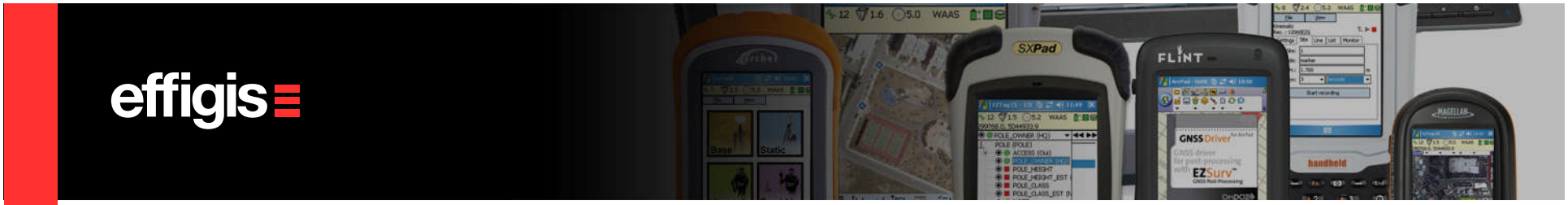
The header is followed by lines of data. Each data value of the grid must be separated by spaces, tabs, CR or LF characters. A line is usually 80 characters long.

The scan order of the data value table on the text file is from left to right and then from top to bottom. The values gathered from the file are mapped from west to east and then from north to south.

Example of a *.grd file:

```
27.00000 36.97500 -14.00000 -5.00000 0.02500 0.02500

52.383 52.342 52.302 52.257 52.205 52.147 52.073 51.978
51.864 51.742 51.619 51.498 51.378 51.261 51.144 51.029
50.916 50.805 50.695 50.588 50.484 50.391 50.301 50.212
50.122 50.029 49.930 49.821 49.700 49.571 49.437 49.298
```

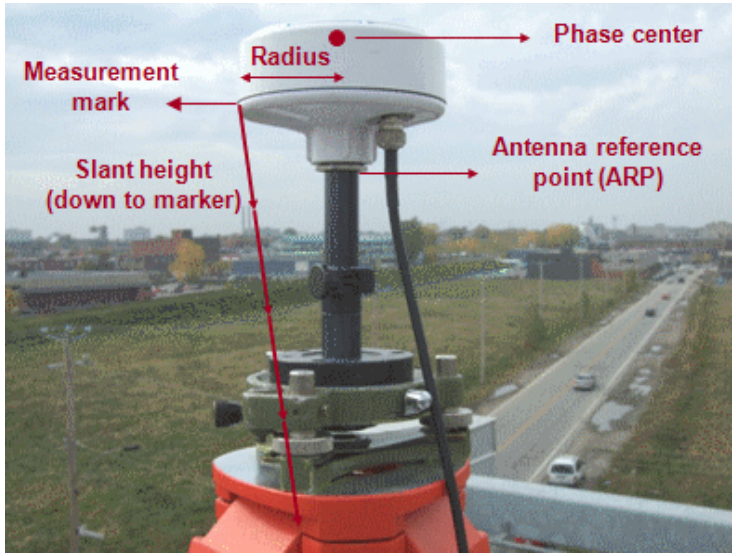


Antenna Models

- Default antenna model will be associated to all imported GNSS observation files at the following two exceptions:
  - If an antenna model is described in the imported file;
  - If a Base file, as automatically retrieved by our Search Tool, use an antenna model described in the NGS file (then proper parameters will be associated with this file)
- At any time in the process , antenna model associated with a particular file can be changed (using the site Editor/occupation page).
- In PPP mode, using the proper antenna model is also important to avoid bias in the height component

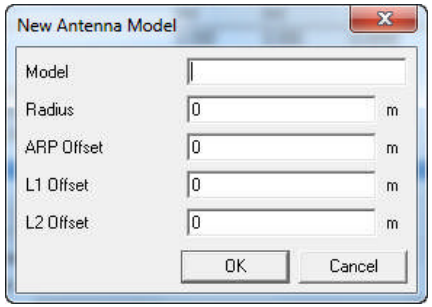
When two different antenna are used (at the base and at the rover), if proper antenna models are not used, height component will be affected accordingly (it could reach error up to few centimeters).

Antenna Models – (antenna Parameters)



Typical antenna parameters

- The Post-Processing software can model all these parameters
- L1/L2 antenna phase center can be retrieve from NGS file (or could be user input if not included in the NGS file)
- Radius (if any) and «ARP-Measurement Mark offset» are user input



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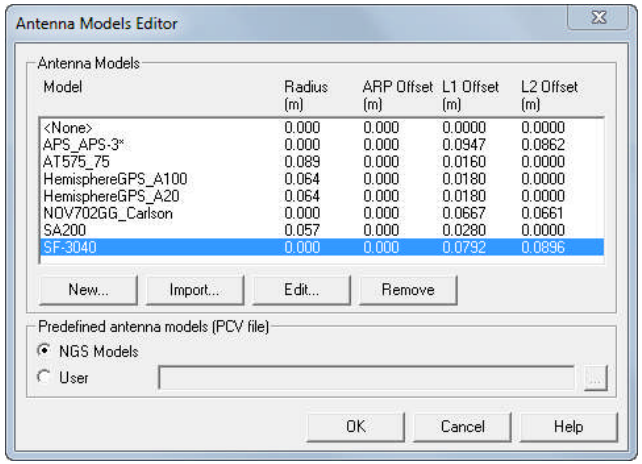
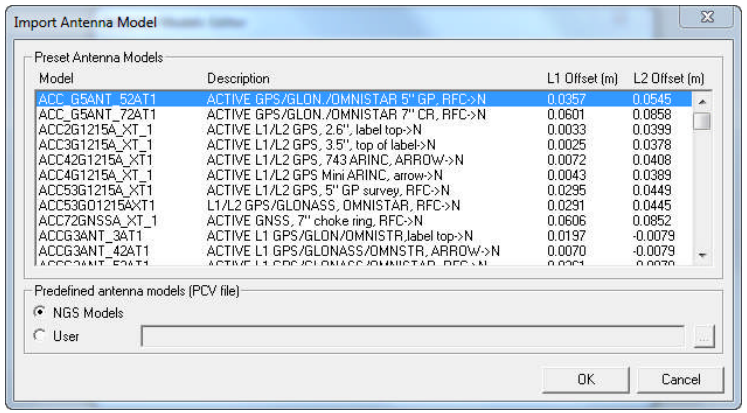
Antenna Models



From the Antenna Models Editor, you can **create** manually new models, **import** NGS model, **edit** existing model or simply **remove** models from the list.



NGS list

Default Parameters in short

- EZSurv™ supports all mode of processing (differential, PPP, static/baseline, kinematic, semi-kinematic, etc)
- Processing parameters are minimum in order ease the user experience
- EZSurv™ has a full connectivity to Base Station Providers and Precise Orbit/Clock providers
- We have the facility to easily add Base Station providers without releasing new software version (send us your local provider specifications)
- EZSurv™ has access to NGS antenna model database and provides a tool to model specific antenna configuration
- EZSurv™ offers a list of pre-set geoid models, and offer a compatibility to text format to import your local model.