

EZSURVTM GNSS Post-Processing Software





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► EZSurv[™] Post-Processor

TO GET THE BEST OUT OF YOUR GNSS DATA

EZSurv[™] software is a complete solution designed by **OnPOZ** Precision Positioning to easily process raw GNSS data. It is an open solution that processes GPS as well as GLONASS signal. It provides all the flexibility you need by offering fully graphical (PlanView) and Windows Explorer types (ProjectManager) of user interfaces to accommodate your preferred way of working.

The software can also be adapted to the user's profile by offering a choice of manual post-processing steps or using a single keystroke to do it all in one step. This technical overview presents some of the key features of **EZ**Surv[™].

EZSurv[™] facilitates the post-processing of GNSS files since it is fully compatible with multiple GNSS receivers. **EZ**Surv[™] uses GNSS manufacturer binary format allowing users to skip RINEX conversions.

EZSurv[™] is fully compatible with **OnPOZ** Precision Positioning's **EZ**TagCE[™] and **EZ**Field[™] field data acquisition software.

EZSURV[™] KEY FEATURES

- Easy-to-use graphical user interface
- Project Manager for easy data handling
- Data archiving capability
- Fully automated Base Station search to post-process Rover data
- Multiple mapping system supports

- Rigorous Noise Reduction System (NRS) to smooth noisy data
- Support for all kinds of processing modes
- · Single keystroke to automatically launch all processing steps
- Advanced quality control tools
- · Compatible with many GNSS receivers raw format



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Planning Tools

EZSurv[™]'s **Planner helps schedule your GNSS data collection**. Different types of visibility plots: sky plots, number of visible satellites, DOPs plots, etc., can be generated to help determine the most suitable times for your data collection. Site obstructions (e.g. buildings and trees) can also be input (using azimuth and elevation) at each of your survey sites to help generate more realistic visibility plots.

Easy Data Import

Importing your GNSS datasets becomes a straightforward task since you can easily drag and drop your files into the observations window to quickly see their descriptions and attributes. To avoid long conversion processes, **EZ**Surv[™] directly supports raw binary formats from several manufacturers as well as the receiver independent exchange format (RINEX).

SUPPORTED GNSS DATA FORMATS

Rinex v2.10	Any GNSS receivers
Hemisphere GPS	All products
Magellan	DG14, ProMark 500
NavCom	All products
Novatel	All products
Septentrio	All products
Ublox	TIM-LH, LEA-4T, LEA-5T



Coordinate Systems

EZSurv[™]'s Mapping Systems tool provides complete coordinate-systems support. Over 62 standard datums and 22 standard ellipsoids are predefined. Additionally, you can create your own user-defined datums and ellipsoids. There are also over 12 different map projection templates, from which you can derive most mapping systems used in the world. The US State-Plane Coordinate System is fully supported, and local grids can be defined.

EXTEND YOUR BASE STATION NETWORK

To post-process your data, EZSurv[™] uses smart technology to search the Internet for the best GNSS base station that fits your field data. This search is performed on a number of existing GNSS networks around the world. Using this feature, you do not have to worry about post-processing your data since it's handled automatically with a single keystroke. All you need is an Internet connection. If you maintain your own GNSS network, it could be easily incorporated into the search through a LAN connection. Other networks can easily be integrated.

Add Base Station Providers		
Please select your new provider Australian Regional GPS Network (ARGN) British Columbia Active Control System (BCACS) Continuously Operating Reference Stations (CORS) Crustal Dynamics Data Information System (CDDIS) Local or network folder Min. ressources naturelles Québec (MRN) Orresers Real time GPS Network (DEGN)		
OK Cancel		

Map Projecti	on Definition 🛛 🔀		
Map Projection Templates			
ALASKA AZMEQD DSTEREO EQUIDC GEO HOM A HOM B LAMAZ LCC LCLGRID MERCAT POLYC PS SPCS STEREO TM UTM	Alaska Conformal Azimuthal Equidistant Double Stereographic Equidistant Conic Geographic Hotine Oblique Mercator (2 Points) Hotine Oblique Mercator (Azimuth Angle) Lambert Azimuthal Lambert Conformal Conic Local Grid Mercator Polyconic Polyconic Polar Stereographic State Plane Stereographic Transverse Mercator (TM) Universal Transverse Mercator (UTM)		
	OK Cancel Help		



Powerful Processing Engine

EZSurv[™] **uses the latest GNSS processing techniques** to get the most out of your GNSS data. Depending on your fieldwork methodology, the software will process any of the following modes:

- Rapid static
- Stop and go
- Kinematic
- Semi-kinematic
- OTF (for single and dual frequency receivers).

The processing engine has the following key features:

PRECISE POINT-POSITIONING MODE

Obtaining good accuracy for a site can be hard to achieve if no established network is available to perform differential GNSS. **EZ**Surv[™]'s precise point-positioning mode gives you the ability to build your own network to an absolute accuracy better than 20 cm with a dual frequency receiver (50 cm with single frequency). To achieve such accuracy in point-positioning mode, precise orbits and clock files are used.

EFFICIENT DATA SMOOTHING FOR NOISY DATA

Urban canyon and dense forest canopy are tough environments in which GNSS is often needed. To obtain acceptable results in those extreme areas, **EZ**Surv[™] **uses a Noise Reduction System (NRS) to optimize positioning accuracy**. The NRS uses Doppler and phase observations to greatly reduce the noise affecting pseudorange measurements.

AMBIGUITY SMOOTHING

Some software allows you to use a backward process to get optimized solutions for your GNSS trajectories. **EZ**Surv[™] makes this task obsolete since a rigorous forward ambiguity smoothing process is used to do the same job with much less data management.

DATA INTERPOLATION

You don't have to worry about your base station's data rate since **EZ**Surv[™] can automatically perform a polynomial interpolation (up to 60 sec.) to fit the rate you've used in the field. Using **EZ**Surv[™], you no longer have to interpolate your RINEX base station data.

EFFICIENT OUTLIER DETECTION

One of the key steps in data processing is the detection of bad observations that can greatly affect the quality of your results. **EZ**Surv[™] has efficient algorithms to detect and remove noisy data and outliers so you always get optimized results.

AUTOMATIC AMBIGUITY FIXING PROCESS

EZSurv[™] relies on the well-known Lambda method to search and fix phase ambiguities, giving you a powerful tool to achieve centimeter accuracy surveys. It also has the advantage of automatically fixing solutions on the fly when your observation window is appropriate, without the need to use static sites (initialization).

FULLY ADAPTED TO PROCESS EZBAR SETUP

Any tool that can help achieve a high level of accuracy is very important for GNSS users. One of them is the **EZ**Bar setup (bar with a known fixed length) which allows you to fix phase ambiguities within less than 2 minutes when using a single frequency receiver. **EZ**Surv[™] automatically recognizes **EZ**Bar's file attributes during the import process so you don't have to worry about their location in your dataset.





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Accuracy Table

EZSurv[™] can process single or dual frequency data. The table below illustrates the accuracies that can be achieved in different modes of operation depending on the GNSS data.

ACCURACY

RECEIVER	KINEMATIC	STATIC	SEMI KINEMATIC	OTF
Single frequency	submeter ¹ , subfoot ²	centimeter ³	centimeter ^{4,5}	centimeter ⁶
Dual frequency	N/A	centimeter ⁷	N/A	centimeter ⁸

- Horizontal accuracy (HRMS). Requires 5-10 minutes of continuous tracking with at least 5 satellites and a PDOP better than 6. Multipath and ionospheric effects can affect final accuracy. Base station separation may affect accuracy by about 5 ppm (depending on the quality of the base station data).
- Horizontal accuracy (HRMS). Requires 15-20 minutes of continuous tracking with at least 5 satellites and a PDOP better than 6. Multipath and ionospheric effects can affect final accuracy. Base station separation may affect accuracy by about 5ppm (depending on the quality of the base station data).
- 3. Horizontal baseline accuracy (HRMS). Requires 15-30 minutes of good data on a minimum of 4 satellites and a PDOP better than 6. Multipath and ionospheric effects can severely affect final accuracy. This horizontal accuracy usually translates into 1cm +/- 2 ppm.
- Requires L1 frequency receiver that outputs quality code, Doppler and carrier phase observations along with reliable real-time cycle-slip detection.
- 5. EZField[™] data collection software is designed to ease the semi-kinematic process. It allows you to easily initialize on an initialization bar or a known point.
- Horizontal accuracy (HRMS). Requires 45 minutes of continuous tracking with at least 5 satellites and a PDOP better than 6. Base station must be within 10 km. Multipath and ionospheric effects can affect this accuracy. This horizontal accuracy usually translates into 2cm +/- 2 ppm.
- Static results require only 10-15 minutes of data to achieve centimeter accuracy. This horizontal accuracy usually translates into 1cm +/- 1 ppm (with good dual frequency data).
- 8. OTF requires approximately 30 seconds of continuous tracking with at least 5 satellites and a PDOP better than 6. Multipath and ionospheric effects can affect final accuracy.

DATA EDITING

EZSurv[™]'s **interface allows you to easily** edit all site properties: name, coordinates, geoid undulation, height, time span, antenna model, antenna height, multiple occupations, etc. Rover (moving receiver) file properties such as antenna model and height, time span, site within a rover file, etc., as well as baseline and trajectory properties, can also be easily edited.

OnDOZ



Advanced Quality

are flagged to isolate them for further analysis.

19:50

EZSurv[™] offers a number of tools to help analyze your final survey results. Graphical representations of phase or code residuals allow

you to assess your baseline and trajectory results, and graphical tools help analyze cycle-slip occurrences in data. After processing, an analysis of common vectors is presented in a comprehensive report, and baselines that did not achieve the specified accuracy

Trajectory Residuals

20.00

UTC Time : 2002/09/20

20.10

20:19:15

Control Tools

0.016

0.012

0.00

-0.004

-0.00

-0.010

0.04

19:39:33

Residual Value (m)

✦ Loop Closure Tools

EZSurv[™] allows you to analyze your baseline closure when you have redundant data. This helps you detect outliers in your dataset. Loops can be directly created in the plan view by selecting the required baselines, or they can be created within Project Manager.

NETWORK ADJUSTMENT

EZSurv[™]s 3D network-adjustment tool allows you to choose between a fixed or weighted station type of adjustment that can be automatically or manually made in your baseline results. During manual adjustment, vectors can be included or excluded from your network with a simple mouse-click. After adjustment, a comprehensive report is generated showing all the adjusted parameters along with their statistical information. The plan view displays both point and baseline (relative error) ellipses and elevation error bars.



Conclusion

All members of an engineering project team require reliable survey results. **EZ**Surv[™] can help them without numerous settings. Our main focus is "easy-to-use" applications that provide optimum results.

EZSurv[™] VERSIONS

FEATURES	EZSurv [™] VERSION			
	LITE	L1	L1/L2	
Submeter/subfoot	•	•	•	
L1 fixe		•	•	
OTF L1		•	•	
L1/L2 Fixe			•	
OTF L1/L2			•	

Each version is available with full GNSS capability or GPS only.







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