



EZSurv™ Mapping Systems/ Datum

October 10th 2012

2012 - Training documents

What is a Mapping System

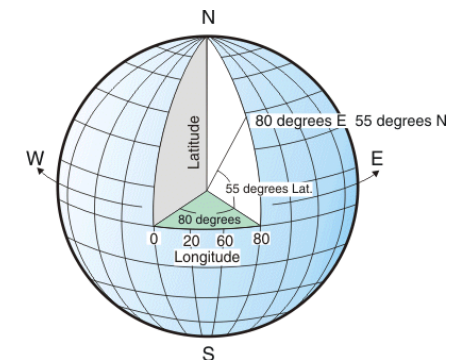
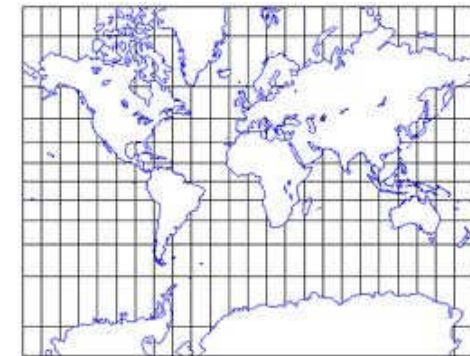
A mapping system in EZSurv™ could be a

- **Projected System** or a
- **Geographic System.**

A **Projected system** is defined by a Map Projection template (*Mercator Transverse, Lambert, Azimutal, etc.*) and a Datum. (we supports 18 specific map projection templates and over 70 pre-defined datum).

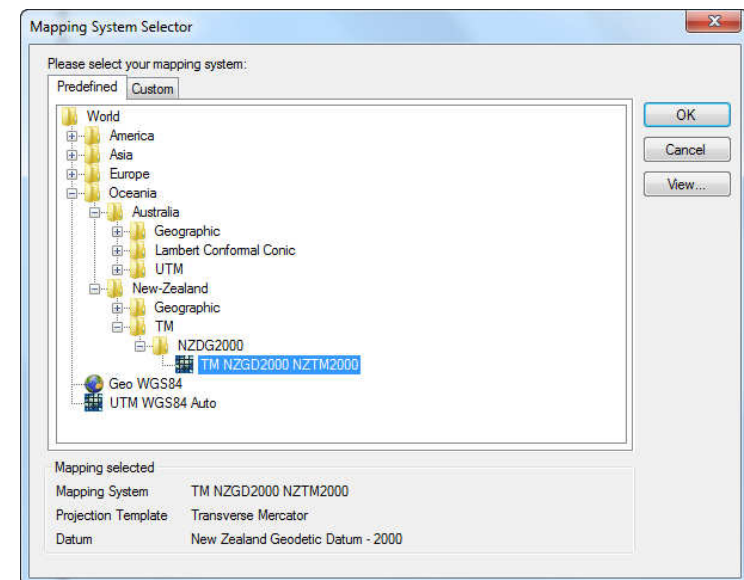
A **Geographic System** is simply defined by a Datum.

Whereas a **Datum** is defined by an Ellipsoid and a set of 15-Parameters transformation.



How to select a Mapping System

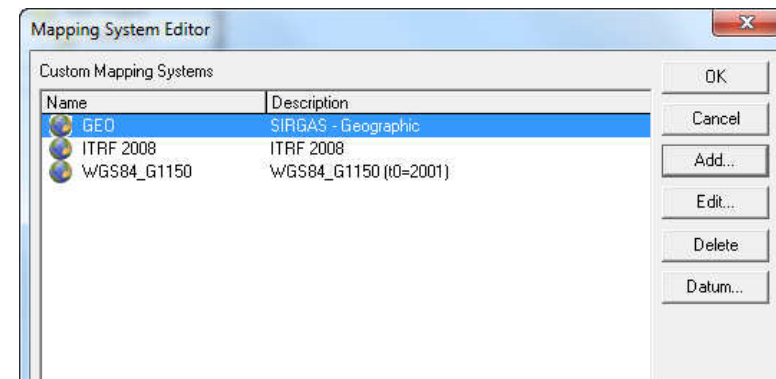
- Under **Tools** menu (**Mapping Systems > Selector**), you can access a pre-defined list of Projected System and Geographic System. You also have access to a custom list.
- You have to make sure that your selected mapping system uses the proper datum (covering your area). Use the **View** button to see it.
- Pre-defined Mapping Systems cannot be edited
- However, you can create a custom Mapping Systems (if you cannot find one in the pre-defined list)





Create Custom Mapping Systems

- The selected Mapping System is used in all EZSurv's results analysis, report and export files. You can select one in the pre-set list or create new ones.
- Under Tools menu, select **Mapping Systems > Editor**, then Click **Add** to create a new Mapping System to be added to the pre-set list
- Click **Edit** to modify a custom Mapping System
- Click **Delete** to erase a custom Mapping System from the list
- Click on **Datum** to manage your datum list





Typical Projection Template

Custom Short name/ Long name



Customizable parameters



Selected datum



Datum parameters

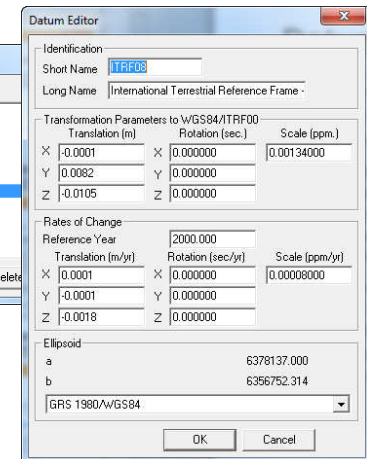
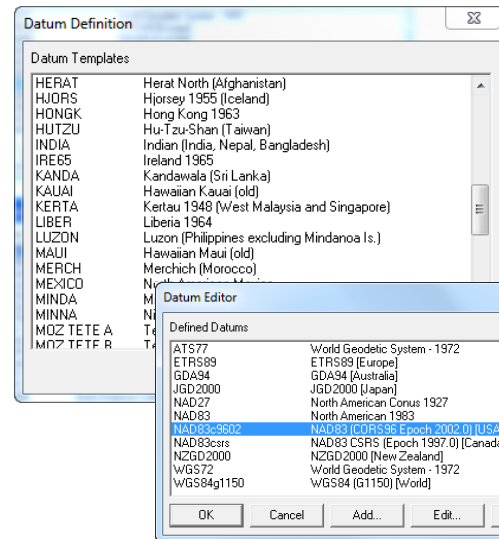
Lambert Conformal Conic Configuration

Projection Parameters		Datum	
Short Name	<input type="text" value="LCC"/>	Ellipsoid Parameters	
Long Name	<input type="text" value="Lambert Conformal Conic"/>	GRS 1980/WGS84	
		a	6378137.000
		b	6356752.314
		Parameters to WGS84	
		Reference Year	2000.000
Origin Latitude	<input type="text" value="0"/> <input type="text" value="00"/> <input type="text" value="00.000"/> <input type="text" value="N"/>	Tx	-0.0001 m dTx 0.0001 m/y
Central Meridian	<input type="text" value="0"/> <input type="text" value="00"/> <input type="text" value="00.000"/> <input type="text" value="E"/>	Ty	0.0082 m dTy -0.0001 m/y
Std. Parallel 1	<input type="text" value="0"/> <input type="text" value="00"/> <input type="text" value="00.000"/> <input type="text" value="N"/>	Tz	-0.0105 m dTz -0.0018 m/y
Std. Parallel 2	<input type="text" value="0"/> <input type="text" value="00"/> <input type="text" value="00.000"/> <input type="text" value="N"/>	Rx	0.000000 sec. dRx 0.000000 sec./y
False Easting (m)	<input type="text" value="0.00"/>	Ry	0.000000 sec. dRy 0.000000 sec./y
False Northing (m)	<input type="text" value="0.00"/>	Rz	0.000000 sec. dRz 0.000000 sec./y
		S.	0.00134000 ppm. dS. 0.00008000 ppm./y
		Datum Selected	
		<input type="text" value="ITRF08"/>	
		<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

*The new Mapping Systems are available in the Mapping System Selector under **Tools > Mapping Systems > Selector** (the custom TAB)*

Datum Management

- Use the **Datum Editor** to Add or Edit a Datum (**Tools > Mapping Systems > Editor**, click on **Datum**)
- You can set a New Datum by entering the 15 transformation parameters to WGS84/ITRF2000 (*the direction of the parameter are «from user datum to WGS84/ITRF2000»*)
- New modern datum like Nad83 CORS96 Epoch 2002 (USA), NAD83SCRS (Canada), ETRS89 (Europe), NZGD2000 (New Zealand), JGD2000 (Japan), GDA94 (Australia) are supported.





Typical Datum Template

Custom Short name/ Long name

Translation/Rotation Parameters

Reference year

Translation/Rotation annual rate of change

Selected Ellipsoid

Datum Editor

Identification

Short Name: ITRF05

Long Name: International Terrestrial Reference Frame

Transformation Parameters to WGS84/ITRF00

Translation (m)	Rotation (sec.)	Scale (ppm.)
X: -0.0001	X: 0.000000	0.00134000
Y: 0.0082	Y: 0.000000	
Z: -0.0105	Z: 0.000000	

Rates of Change

Reference Year: 2000.000

Translation (m/yr)	Rotation (sec/yr)	Scale (ppm/yr)
X: 0.0001	X: 0.000000	0.00008000
Y: -0.0001	Y: 0.000000	
Z: -0.0018	Z: 0.000000	

Ellipsoid

a: 6378137.000

b: 6356752.314

Selected Ellipsoid: GRS 1980/WGS84

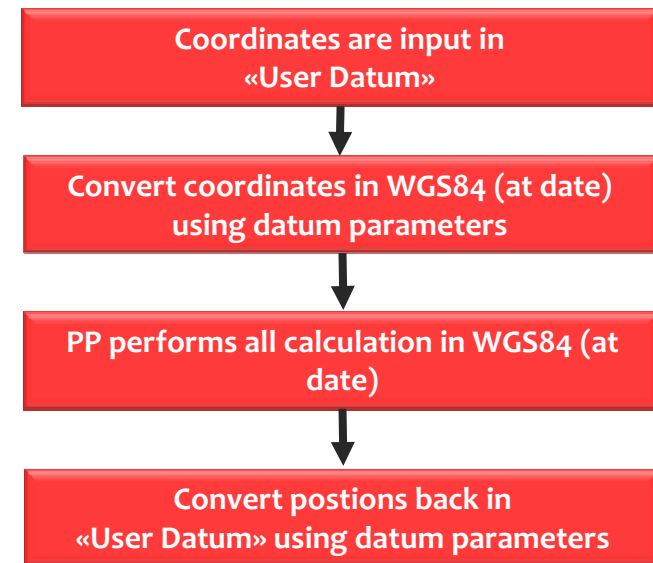
OK Cancel

Most of the old datum only have three translations that represent an approximation of the relation with WGS84 (which is good enough for a correct vector calculation).



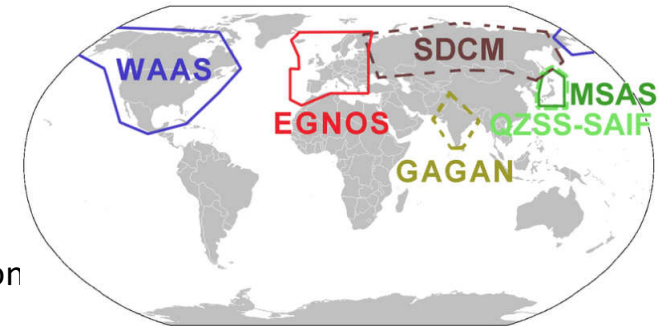
Coordinate System used by the Post-Processor

- All calculation in the Post-Processor are done within **WGS84** (at date)
- Datum parameters used in EZSurv™ are to properly convert user positions (*specified in the user datum*) into **WGS84** (at date)
- Once the GNSS calculation are done, the Post-Processor uses these parameters to reconvert WGS84 positions (at date) into the user datum, and if required, re-project them into the proper mapping system



Coordinate Systems - Discussion

- The real issue with coordinate systems is when you are using an SBAS system (or equivalent system, Omnistar, WAAS, StarFire, etc)
- These system will typically calculate positions in WGS84 datum or with respect to some ITRF system
- Then a proper transformation is required to convert these position (and mapping coordinates)
- For example, when EZSurv™ is used in PPP, Precise Orbits are typically with Respect an ITRF system, then EZSurv have all the necessary transformation tools to convert these coordinates into your local datum (if the transformation between the ITRF system and your local datum is known).



If there is a need for, we can assist you to set these complex transformations



Coordinate Systems in short

- EZSurv™ offers predefined mapping System/Datum
- The pre-defined sets can easily be upgraded with new sets by a simple web download
- You also have a tool to create your own mapping System/datum from existing templates
- Effigis Technical Supports can help you in setting up your local mapping system/datum (just transfer us all the necessary technical information)
- EZSurv™ supports modern datum with their 15-parameters
- In PP mode, complex datum transformations are not an issue

