Hello Surveyors,

Just anticipating the next step when you get to the adjustment stage. I thought I prepare for you a very quick overview of the steps which I hope will make life easier after the initial import of your observations & known stations.

For the Adjustment if you keep in mind the two major steps or phases you this will help when dealing with errors in the network. You don't always have to do a free network adjustment before a constrained adjustment but it's the logical steps for adjustment procedures which will take any confusion where any errors are in the observations (1<sup>st</sup> phase free network adjustment) or fixed stations 2<sup>nd</sup> phase constrained adjustment.

1st Phase Free Network, to check your own surveyed observations and avoiding the effect of errors in the control points thus your just looking at what you measured in the field without the connection to any known/fixed/permanent survey marks.



When you have a pass with your free network adjustment then you can proceed to the 2nd Phase Network a constrained network eg Absolute Constrained adjustment to check if your network fits onto the previously established control points and do the final adjusted coordinates computation.



1. Create a new project: Create a directory where you want your MOVE3 jobs to be found

Create r	iew project			<b>—</b> ×
Proje	ect name :	GLENCORE		
Direc C:\	ctory project file: Users\acer\Doo	s : cuments\MOVE3\MOVE3-JOBS	5\ [	Browse
		<- Previous Next ->	Cancel	Help

2. Next you have the option to load previous job parameters in your new job these are .opt files (option files) if you go to Browse you can find a list we have made

Australian SP opt file which you can select which will give all the Australian SP settings.

GLENCORE	
sweco/move3/australia.opt	Browse
	sweco\move3\australia.opt

If you don't set anything MOVE3 will have its default settings although you	may to set
the correct DMS and meters etc under units latter.	,
MOVE3 - [c:\users\acer\documents\move3\move3-jobs\glencore.pri]	
Project View Options Compute Results Import/export Settings Window H	
) 🗃 🖬 🧃 General 🔸 Project	
● ● ● ● ↓ ● Standard Deviations   Geometry	
O G D P     Additional Parameters	
Load Units	
Datasnooping	
If you did forget to load an .opt file you can do this in the program itself Lo	ad an opt
file or save your settings when your ready!	
MOVE3 - [c:\users\acer\documents\move3\move3-jobs\glencore.prj]	
Project View Options Compute Results Import/export Settings	
Ceneral +	
Standard Deviations	
Additional Parameters	
Load	
Save	

3. The Projection screen will first automatically pop up (Options- general –Geometry)

select from More the necessary MGA94 Australian zone projection or choose a Local (Stereographic) for just flat plane no MGA projection).

select 1D,2D,3D (you may wish to do a 2D adjustment first then latter a 3D its entirely up to you)

General options		×					
Project Geometry Adjus	tment MOVE3 output selection	n Units Datasnooping					
Dimension	3D 🔻	]					
Projection	None 🔻	More					
Projection name	None RD						
Longitude of origin/CM	RD(incl. correction grid)						
Latitude of origin	Lambert 72(incl. correction grid)						
Standard parallel 1	Lambert 2008 Gauss Knuger						
Standard parallel 2	UTM North						
Scalefactor	UTM South Local (stereographic)						
False Easting	TM Stereographic	m					
False Northing	Lambert 1 (1 parallel)	m					
Ellipsoid	Lambert2 (2 parallels) Borneo RSO Malaysian RSO						
Semi major axis	Swiss 1903	m					
Inverse flattening	298.257222101						
Transformation	None 👻	)					
GPS coordinate type	XYZ 🔻						
OK Cancel Help							

Options- general – Project set TPS/GPS , Here you can also set the Australia SP1.7
 2.1 under Project type to get class and order have the necessary settings for Level of significance etc. If you will not be importing any GPS baselines leave the Geoid model to none.

VE3 - [c:\users	s\acer\documents\move3\move	3-jobs\	\glencore.prj]	
oject View	Options Compute Results	Impo	ort/expand Suttings	Window H
ê 🖬 🚽 🕴	General	•	Project	
•, •, 14	Standard Deviations	•	Geometry	
G D P	Additional Parameters	•	Adjustment	
	Load		Output	
	Save		Units	
			Datasnooping	

General options					X			
Project Geometry A	djustment	MOVE3	output selection	Units	Datasnooping			
Network name : Terrestrial : Observations Coordinates GNSS/GPS : Observations Coordinates Geoid model :	GLEN	Feature None Project 1 Austral Default Kadast Austral	code ype a SP1 er (NL) a SP1					
None				-				
Geoid precision	0.000	0 m	0.0000 pj	pm				
Terr + GPS -> Local (stereographic)								
C	ОК	Ca	ncel		Help			

A good tip for underground mines If you have set an project height this could influence on the XY coordinates select a project height.

GNSS/GPS :	Project type	-
Coordinates	Project Height	0 m
Geoid model :		
None		
	0.0000	1

## 5. Options- general – Standard Deviations Observations, Stations

To view your standard deviations settings									
E3 - [c:\users\acer\documents\move3\move3-jobs\glencore.prj]									
ject View	View Options Compute Results Import/export Settings Window Help								
		Gen	eral		•				
b 🔍 🖂		Stan	dard Deviati	ions	•	Obse	ervations		
6) 🗋 P		Add	itional Parar	meters	•	Stati	ons		
		Load	d						
		Save	·						

Here under is an example of quite a tight industrial mine Standard deviations for observations and for your fixed stations you know best your quality!

itandard deviations for obse	rvations Standar	d devia	tions for	stations	
Terrestrial Observations:					
Direction	0 00 01.00	dms		0 00 00.00	dms.km
Distance	0.0020	m		0.0	ppm
Zenith Angle	0 00 01.50	dms		0 00 00.00	dms.km
Azimuth	0 00 03.24	dms		0 00 00.00	dms.km
Height Difference	0.00	mm		1.00	mm/sqrt(kn
				0.00	mm/km
Shift Vector EN	0.0100	m	н	0.0100	m
Local Coordinate EN	0.0100	m	н	0.0100	m
GNSS/GPS Observations	:				
GNSS/GPS Baseline	0.0100	m		1.0	ppm
GNSS/GPS Coordinate	0.0100	m			
Geometrical Relations:					
Angle	0 05 24.00	dms		pdate Observations All	
Distance / collinearity	0.0150	m	C	All types with chan defaults	ged
Offsets:			0	All with old defaults	3
Steel Tape measurement	0.0100	m	۲	None	
Auxiliary point	0.0100	m			

Standard deviations for obse	ervations Standard	deviations	for stations
Known Terrestrial coordinat	tes:		
X East / Y North	0.0020	m	
Height	0.0020	m	
Known GNSS/GPS			
XYZ	0.0100	m	
Precision of idealisation			
Precision XY	0.0000	m	
Precision Height	0.0000	m	
Setting for the network:			
Centring Error	0.0005	m	
Height of instrument error	0.0008	m	Ladata Stationa
			<ul> <li>All</li> </ul>
			<ul> <li>All types with changed defaults</li> </ul>
			All with old defaults
			None

6. Importing fixed coordinates: You can either import your fixed stations in first or your gsi/dbx/jxl etc it's up to you what order you prefer. You have different options on how you want to import your stations etc.



Added :				Import
Observations		0		
Stations		0		Close
Add as:	Known Statio	n	•	·
	📃 Update exi	isting only		_
Format:	Separator	•	Comma 🔻	·
	Begin	Length	Field	
Station name	0	0	1	
XEast	0	0	2	
Y North	0	0	3	
Height	0	0	4	
St dev X East	0	0	0	
St dev Y North	0	0	0	
St dev Height	0	0	0	
Feature code	0	0	5	Help

Once you have imported your data you should see it appear on the screen if there the screen doesn't present your job close up there may be a station or observation that is way out so you may have to zoom in to the main project network.

Click (right click on mouse to make a selection!) on a station, fixed station or observation line and you will see how you can easily view an editor will appear which makes editing easy.



7. To View your observations stations here you can edit station names Edit Change station names. Select and highlight and select Change Station Names. Double click on an observation and an editor will appear.

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•, •	Observations				
G) (	(	Graphics Le	gend		

C	Dbs	ervati	ons	-		-	-	
lo	se	Edit	Tools	_				
	N		Edit observation		Instr Hgt	Target		
	1		Insert		0.0000	0.0000	R0	9
	2		Delete		0.0000	0.0000	R0	10
	3		Add Steel Tape series		0.0000	0.0000	R0	29
	4		Edit Steel Tape series		0.0000	0.0000	R0	9
	5		Add Chainage Offset		0.0000	0.0000	R0	10
I.	6		Edit Chainage Offset	ι.	0.0000	0.0000	R0	ę
T	7		Add Shift Voctors	ι.	0.0000	0.0000	R0	10
I.	8		Add Shirt Vectors		0.0000	0.0000	R0	29
I.	9		Change Station Names		0.0000	0.0000	R0	ç
I.	10		Copy observations	ι.	0.0000	0.0000	R0	10
I.	11		Add observations		0.0000	0.0000	R0	29
	12	_	IFI 0400		0.0000	0.0000	R0	32



Under Tools- Properties you can change instrument height Target height or if you just want an observation to be 2D adjusted and not 3D you have the possibility. Just select highlight what you want to be change on the observation line.

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00	Change Properties		×	Z
00	Total Station			ZC
00	Serie number for directions	0		ZC
00	Casla factor for distances			20
00		0 -		70
00	Vertical refraction coefficients	0		ZC
00	🔲 Height unknown	Height0	-	ZC
00	Dimension	0 1D 0 2D @	0.3D	ZC
00				ZC
00	Instrument height	0.0000	<b>_</b>	ZC
00	🔲 Target height	0.0000	-	20
00	Prism Correction	0.000	0 m	70
00	GPS Baselines			ZC
00	Dimension	💿 2D 🔘 3D		ZC
00	All Turner			ZC
00				ZC
00				ZC
00	Update observations			ZC
00	All Selection			20
00	OK Cancel	Helo		Z
00				Z
00	0.0000 R0 148.01.00.00	S0 3	5,6690	70

8. Viewing the Stations: \* means the station is fixed either XY or height if you select the red box a # symbol appears which means the station won't be used in the adjustment but is still available so keeping the original survey in tact without erasing anything. Double click on a station and a editor page of that station will appear.

	Stations	and the design of the second second second			and the second					
Clo	Close Edit Tools									
	No.	Name	Туре	X East	Y North					
	1	TP1-RSV0501	TER	436399.1804	6447206.5170					
	2	188B	TER	436297.9532	6447514.6127					
#	3	159R	TER	436435.8175 *	6447203.8810 *					
	4	160R	TER	436416.2520 *	6447202.0090 *					
	5	161	TER	436396.6012 *	6447208.1621 *					
	6	TP1	TER	436400 3236	6447206 1429					

## 9. Adjustment:

You have two options to run the adjustment under Compute or select C, G L, P, M for a quick selection to run an adjustment.

MOVE3 - [c:\users\acer\docu	umento	c) move	aurelia	a metals-shelley	shelley080	32017	
Project View Options	Comp	pute	Resu'ts	Import/export	Settings	Win	
🗋 😂 🖵 🛛 159R		Appro	rimate C	oordinates	<u>C</u> OGO3	;	
1 🗸 🔍 🔍 1/4 /2	(	Geoid	<u>G</u> EOID3				
000PM	Loop Detection				LOOPS3		
	I	Pre-Ar	nalysis		PRERUN3	; T	
		Adjust	MOVE3				
		_					

- 1. **C** compute approximate coordinates (Free Network)
- 2. Run the **P** pre-analysis (Free Network) (but do not bother about small differences reported)
- 3. Run an adjustment M (Free Network) to check the measurements against the standard deviations used, unselect #(careful not to remove totally!) /repair rejections reported
- 4. Run a (Absolut Constrained network) adjustment to check if the network fits onto the Control Points unselect #/repair rejected control points) and do the final adjusted coordinate computation.

5. Any errors go to **Results Test summary** to go through each outlier double click one by one and do an re-adjustment.

Compu	ute Re	sults Import	/export	Settin	igs V	Vindo		
		Report						
E		Messages				1		
solute Co	onst	Test Summ	ary					
	_	Datasnoopi	ing Sumi	mary				
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HTTP1								
Te	est Summ	ary						
View	Close							Help
Rec	ord Ty	pe	From	То	Test	Factor	Redundancy	
2	Di	ection(R0)	TP1	160R	W-test	108.2	75%	
10	Di	ection(R0)	TP1	160R	W-test	35.6	75%	
7	Di	ection(R0)	TP1	160R	W-test	35.4	75%	

Check the box with the suspected wrong observation then do a readjustment. This observation is not permanently erased but won't be used in the adjustment

E	dit obsen	vations									
	Total Sta	tion									
	2 TF	P1	160R						•		
	From TP1			•	IH	0.00000 m				leight0	•
	To	160R		•	TH		0.00	000 m			
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	S	t Dev Abs					0 00 01	.00 dms			
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