

# New Job with 10,000, 10,000 at Section Corner, Match East Line Bearing with Ground Distances

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*Note: this example is applicable to both SurvCE and SurvPC. The screens were captured from version 6.07.* 

#### Description

Setup a Base at a random location near the center of a section. Assign the coordinate 10,000, 10,000 to the Southeast corner of the section, rotate our basis of bearings match the East line of the section and apply the correct Combined Scale Factor so that reported distances are true 'Ground Distances'.

See also: [ SurvXX\_FAQ\_SimpleGroundJob\_002.pdf ]

### Solution

This survey is in the 'Utah North' state plane zone, so we make a new job and select 'Utah North' as the underlying projection with 'US Survey Feet' distance units:



Here is map showing section 14 where I want to work:



Setup the Base on the bluff (shown above as 'BASE') with a 'Read GPS' (autonomous) position. Drive to the Southeast corner of section, find the BLM resurvey aluminum cap alongside the original stone monument.



Set the receiver on a 2-meter rod at the center of X marked on the BLM aluminum cap using bipod to hold receiver exactly level. From the main menu, select "Survey: Store Points"



Set the description to 'SE' and click on the 'S' button to store the SE corner location as point 1.

Travel to the Northeast corner of the section:

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		0
	N <u>E</u> → Pt: 2 () E <b>()</b> (6.562	C
R	N:3502114.2> E:2285947.305Z:5841.420 Hrms:0.065 Vrms:0.066 PDOP:2.37 GDOP:3.10 TDOP:2.00	4

## Localize the Southeast Corner

From the main menu, click on 'Equip: Localization', then click on the 'Points' tab:

Localization			🛃 🖬	] 🔽	X
System	TS	GPS	Points	By He	Imert
Pt ID North	ing Ea	sting	Elevation	H Res	V Res
4				]	►
Add	<u>D</u> elet	te	<u>E</u> dit	<u>O</u> n	/Off
<u>L</u> oad	Viev	v	<u>M</u> onitor	<u>S</u> a	ave

Click on the 'Add' button:

🔍 Local Point		
Please enter loca a point ID from th	l coordinate values. Yone current or control jo	ou may use ıb.
Point From File:		2
Local Northing:	10000	ft
Local Easting:	10000	ft
Local Elevation:	5400	ft



Enter the local Northing, Easting and Height (10,000 10,000 5,400) then click on the green checkmark. SurvXX will ask where to find the Latitude and Longitude for this point:

🔍 GPS Coordinates 🛛 🔽
O Read GPS
O Enter Latitude/Longitude
• Erom Raw File
Erom Raw File

Select 'From Raw File' then click on the green checkmark. SurvXX will request the point number where it can find the raw data:

Surveyed Point	🔽 🔽
Please enter a point ID from job for which raw data exist	n the current or control ts.
Point From File: 1	

Enter '1' and then click on the green check mark.



The base point will be shown. Click the 'Add' button to add the second point:

Local Point		- 💌 💌
Please enter loca a point ID from th	l coordinate values. Yn ne current or control jo	ou may use b.
Point From File:		2
Local Northing:	15280	ft
Local Easting:	10000	ft
Local Elevation:	0	ft



If the local coordinate system is aligned to match the East line of the section, then the local northing for the Northeast corner will be 'about' 10,000 + 5,280 = 15,280 and the Easting will exactly match the Southeast corner.

Click on the green checkmark. SurvXX will request the source of the latitude and longitude for the Northeast corner:

GPS Coordinates			X
C <u>R</u> ead GPS			
C Enter Latitu	de/Longitu	de	
• Erom Raw	File		

Select 'From Raw File' and then click on the green checkmark. SurvXX will ask for the point ID of the matching point:

🔍 Surveyed Point 🔽 🔽	×
Please enter a point ID from the current or contro job for which raw data exists.	ol
Point From File: 2	

Enter 2, then click on the green checkmark.

🔍 Local	ization					X
System	m TS	GPS	Point	s	By Hel	mert
Pt ID	Northing	Easti	sting Elevation			H R
	10000.000	0 1000	0.0000	5400	0000.	0.00
	15280.000	0 1000	0.0000	0.0000		0.00
•						►
Scale:	).999402			2pt F	otate C	Only
Avg HR	les:0.0000/	Avg VRe	s:0.0000	)		
Ad	d <u>D</u> €	elete	Edit On/Off			Off
Loa	d <u>V</u>	iew	<u>M</u> onit	or	<u>S</u> av	/e

Both control points will be listed.

First, turn off vertical control on the second point. Click on 'On/Off':



Ose Point for:	
Horizontal Control	
Vertical Control	

Make sure that 'Vertical Control' is unchecked, then click on the green checkmark. From the Points menu:

🚴 Local	Localization					G	) 🔽	X	
Syste	System TS				Points By I			Helmert	
Pt ID	Nort	hing	Eas	ting		Ele	vation	H R	
	1000	0.000	0 100	00.0	000	540	0.0000	0.00	
	1528	30.000	0 100	10000.0000		0.0000		0.00	
•	4								
Scale:(	).999	402				2pt	<u>R</u> otate C	Only	
Avg HRes:0.0000 Avg VRes:0.0000									
Add Delet		lete		<u>E</u> dit		<u>O</u> n/0	Off		
Load <u>V</u> ie		iew	1	Monitor		<u>S</u> ave			

Check the '2pt Rotate Only' button:

🚴 Local	ization					) 🔽	X	
Syste	m	GPS	Points By Hel			mert		
Pt ID	North	ning	Easti	ng	Ele	/ation	H R	
	1000	0.0000	1000	0.0000	540	0.0000	0.00	
	1528	0.0000	1000	0.0000	0.0	000	3.15	
Scale:1.000000								
Avg HR	les:0.0	0000 Av	g VRes	s:0.0000	) (	-		
Ad	d	Dele	ete	Edit On/		Off		
Load <u>V</u> iew			w	Monitor Sa		<u>S</u> av	/e	

Click on the green checkmark.

🔍 Localization File 🔹 🗈 🔽 🗙
Type: LOC File 🔹 🛛 🍺 📴 🥅
\Program_Files\SurvCE\Data\
Backup
Name: J004.loc

Accpet the default filename for the localization file. Then clik the green check mark. SurvXX will ask if we want to reprocess the raw file:



SurvCE					
2	Points have been surveyed prior to updating localization file. Would you like to reprocess the raw file?				
	<u>Y</u> es	No			

Click on 'No', we will process the raw file after entering a combined scale factor. SurvXX will return to the Main Menu:

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<u>F</u> ile	<u>E</u> quip	Survey COGO Roa		<u>R</u> oad	
1 Total Sta	tion	1	6 Localization		
2 GPS Base	2	2	<u>7</u> Monitor/Skyplot		nt 🏘
3 GPS Rove	er	7	8 Tolerances		IP
4 GPS Raw	Only	7	9 Peripherals		tà )
5 Configure		℀	<u>0</u> GP	S Utilities	w)

Click on 'Localization' again, then select the 'GPS' tab:



Click on the 'Use Grid to Ground' checkmark, SurvXX will automatically compute the correct Combined Scale Factor for the first localization point, the Southeast corner of the Section:



Click on the red back button:

6



🖲 Localizati	on			🗅 🔽 🔀	
System	TS	GPS	Points	By Helmert	
Base Translation by Rover Readings         Localization Method         Multi Point Method:         Plane Similarity         One Point Azimuth:         Geodetic					
Geoid File: ContinentalUS_NGS2018.gsb Geoid Interpolation Method: Quadratic Use Grid to Ground: 1.0002858383 [3]					

Click on the green checkmark. SurvXX will again ask if we want to reprocess the raw file:

SurvCE					
Points have been surveyed prior to updating the Combined Scale Factor. Would you like to reprocess the raw file?					
	<u>Y</u> es	No			

Click on 'Yes':



Click on the 'GPS' button to load the Combined Scale Factor, then click on the green checkmark in the upper right corner. SurvXX will recompute the two points to match our localization:

🖲 Revi	iew File		🛛 🛃 🧲
Localiz Geoid	zation file> C:/P File> C:/Carlsor	rogram_Files/S n Projects/Data,	urvCE/Data/J /Geoids/Conti
Point	Latitude	Longitude	GPS Elev R
No.	Northing	Easting	Elevation De
2	40°55'00.7511	4" -109°09'50	.37869" 1768
2	15284.6684	10000.0000	5691.91
1	40°54'08.5483	4" -109°09'50	.60067" 1679
1	10000.0000	10000.0000	5400.00 🖵
•			• //

Click the red back button to return to the Main Menu.

#### Further Discussion

Now we can use the Inverse function to compute the distance between the points. From the Main Menu, click on 'COGO: Inverse':



Spoint Inverse	○ <u>2</u> d ●	30 🛃 🛃	←
Pt1: N10000.0000ft E	10000.0000ft Z540	0.0000ft SE	~
Bearing: N0°00'00"W	Ground: 5284.668	8ft Grid: 5283.158ft	
SDist: 5292.725ft	EDiff: 291.913ft		
Slope: 5.52%	18.10:1		
Pt2: N15284.6684ft E	10000.0000ft Z569	1.9130ft NE	
			~
<			>
Next Pt: 2	<u>i</u>	Show: Brg N,E	•

Enter 1, then 2. SurvXX reports:

Bearing: N0°00'00"W Ground: 5284.668ft Grid: 5283.158ft

We have succesfully aligned our coordinate system to the East line of the section and the reported Ground distance reflects the CSF at the SE corner of the section.