

New Job with 10,000, 10,000 at Section Corner, force Geodetic North with Ground Distances

Date: 13 August, 2020

Filename: SurvXX_FAQ_SimpleGroundJob_001.docx

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

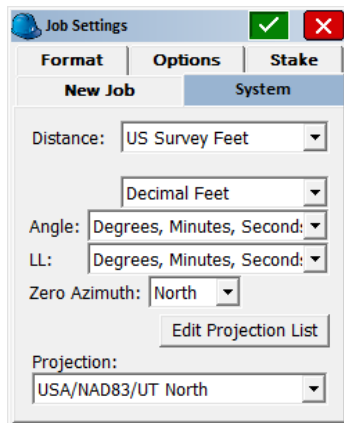
Description

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 to Geodetic north at the Southeast corner and apply the correct scale factor so that reported distances are 'Ground Distances'.

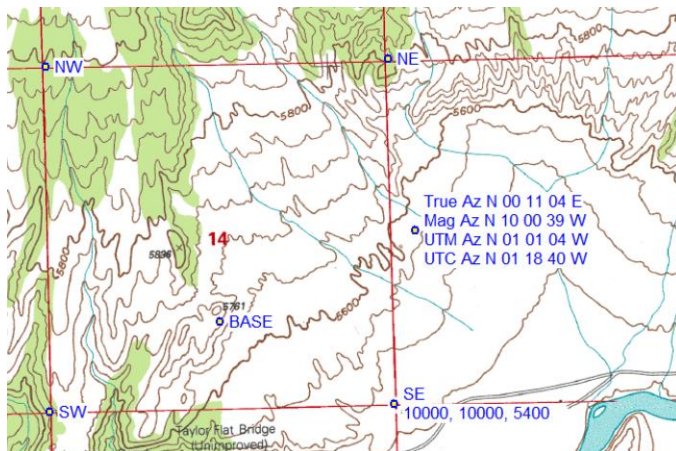
1

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:



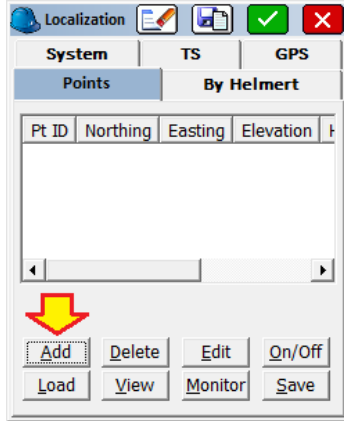
Setup the Base on the bluff (shown above as 'BASE') with a 'Read GPS' (autonomous) position.

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.

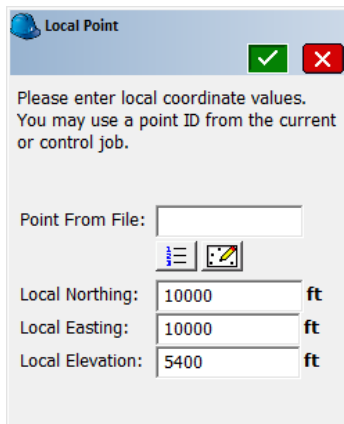
Localize the Southeast Corner

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



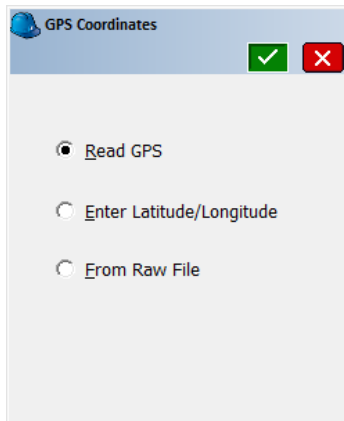
2

Click on the 'Add' button:



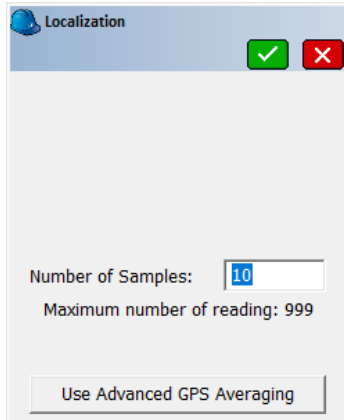
Enter the 'Local' (desired) coordinates that we want the SE corner to have, 10,000 1,000 5,400 as shown above.

Click the green checkmark. SurvXX asks where to get the GPS coordinates from:



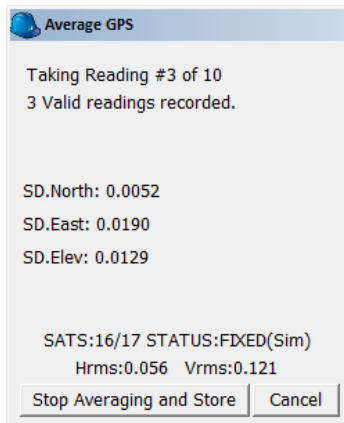
We are occupying the point, so just choose 'Read GPS' then click the green check mark.

SurvXX asks how many epochs we want to average:

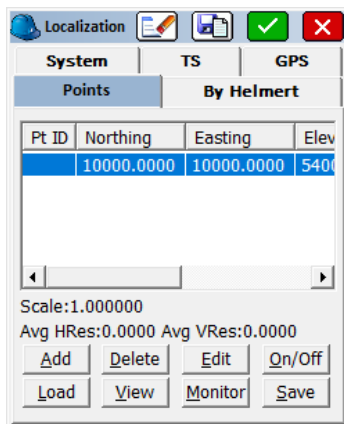


3

10 should be fine. Click the green checkmark at the top of the screen.

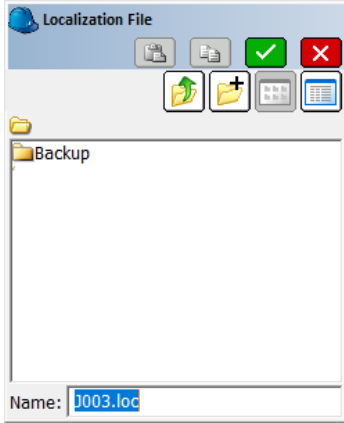


Wait for all of the samples to be collected. The results of the localization are shown:

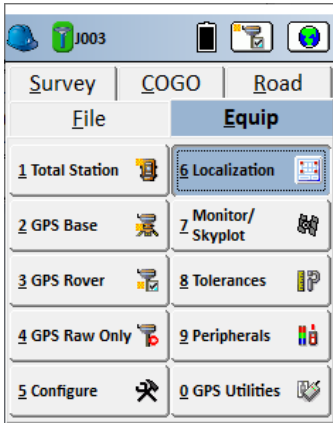


Click the green check mark in the upper-right corner.

SurvXX will prompt for a filename for this new localizaton:

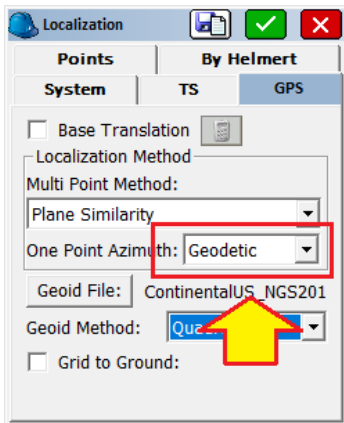


Accept the default (which is the Job name with a '.loc' extension) and click on the green checkmark at the upper-right corner of the screen to return to the main menu.



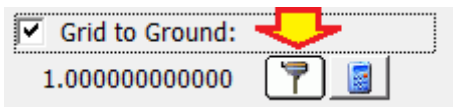
Set 'Grid to Ground'

From: 'Equip: Localization' click on the GPS tab:

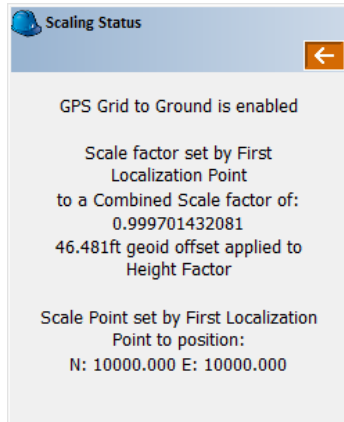


Set 'One Point Aziumuth' to 'Geodetic'.

Click on the 'Grid to Ground' checkbox, then click on the 'Read GPS' icon:

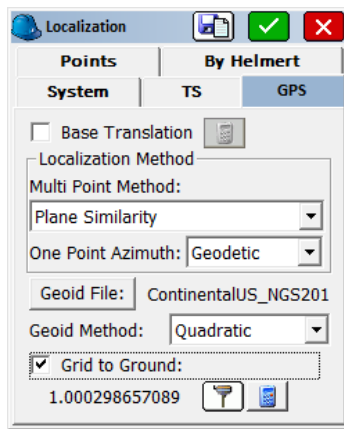


SurvXX will read the GPS current position and based on the location and elevation compute the correct scale factor:



The combined 'Ground to Grid' scale factor (CSF) will be shown.

Click on the red back button at the top of the screen to return to the GPS tab. Note that the 'Grid to Ground) factor is shown:

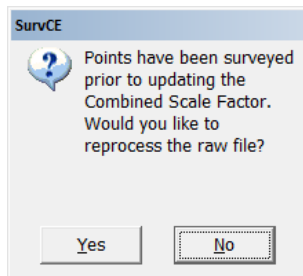


Remember that 'Grid to Ground' is the inverse of 'Ground to Grid':

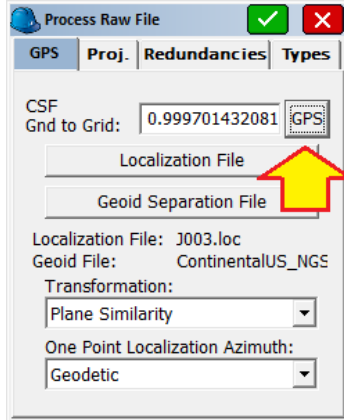
$$1.000298657089 = \frac{1.0}{0.999701432081}$$

We have successfully applied the correct CSF for the Southeast corner of this section. Click the green checkmark in the upper righthand corner.

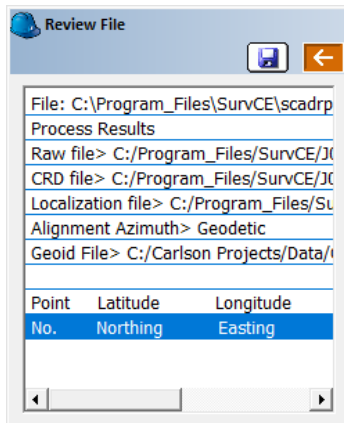
SurvXX will ask:



Click on 'Yes', the 'Process Raw File' dialog will be shown:



Click the 'GPS' button recall the new (but sofar unused) CSF, then click the green checkmark.
 You can review the reprocessed file (if you did not previously store the base position the point listing will be empty):

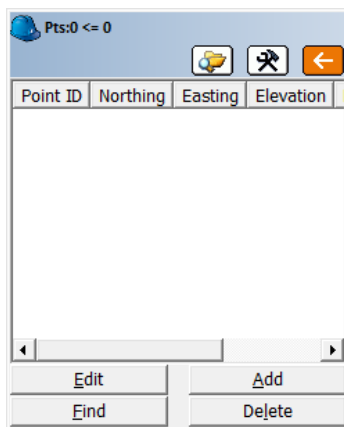


Click the red back button to return to the main menu.

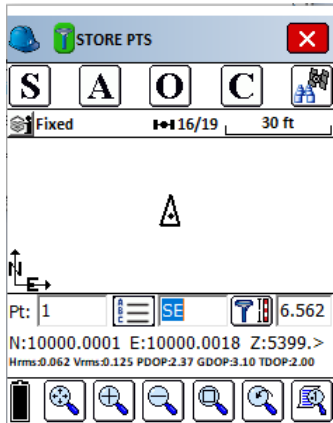
Further Discussion

Note that at this point, we have NO points in our job.

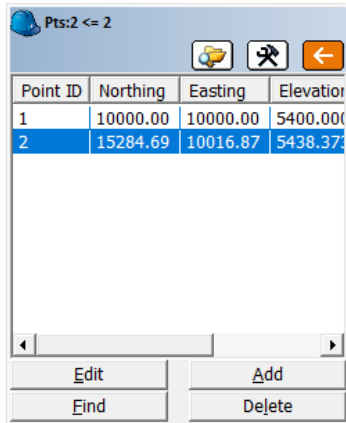
From 'File: Points' you can see an empty list:



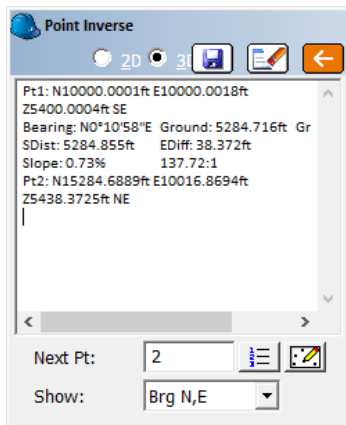
Let's store our current position, the Southeast corner of the section which we are still occupying.
 From 'Survey: Store Points'



Enter 'SE' as the description, then click the 'S' button to store this location.
 Next, drive and hike 1-mile to the north and store the Northeast Corner.
 With two points stored the point list looks like this:



Now we can use the 'COGO: Inverse' function to compute the distance between the points (the survey term for the distance/bearing between two rectangular coordinates is 'inverse'):



Both the Ground and Grid distances are shown:

Ground: 5284.716ft Grid: 5283.138ft

The Ground distance is the Grid distance multiplied by the Grid to Ground Combined Scale Factor:

$$5284.716 = 5283.138 * 1.00029866$$



The Bearing:

Bearing: $N0^{\circ}10'58''E$

Is the bearing from the the measured vector from the Southeast corner to the Northeast corner to the vector originating at the Southeast corner pointing to Geodetic North.