

Survey Grade GPS Setup with SurvCE

Two Point Localization (Localizing at the Base)

Tripod – Setup

- 1) Drive the hub flush with the ground. Put tack at the center or mark the center of the hub.
- 2) Unlock the center leg of the tripod, and set the leg to desired height by tightening the handscrew and inserting pegs into holes in the leg. Heights that are used are 1.5 meters, 1.8 meters, and 2.0 meters. *Usually you want the height to be 2.0 meters which is the tallest the tripod will go.
- 3) Put the center leg on top of the tack in the hub. Unlock the legs with the hand releases. Release the bottom portion of the legs all the way out using the handscrew. Once the legs are all the way out tighten the handscrews.
- 4) Now use the hand releases to lengthen legs down to ground level, and level the tripod bubble.
- 5) Release the remaining leg that has the brass screw. Start with extending the bottom portion of the leg all the way and lock. Use the brass screw to release the leg the rest of the way to the ground. Do not tighten the brass screw yet.
- 6) Insert all of the tripod feet into the ground and level the tripod using the hand releases. Turn leveling bubble around the tripod to make sure it is level on all sides.
- 7) Once the tripod is completely level, tighten the brass screw on the last leg.
- 8) Now, on the base plate, loosen the brass screw on the side of the plate. Not all the way.
- 9) Take out brass stub in the center of the plate.
- 10) Screw the brass stub into the bottom of the GPS Base unit with the antenna attached to the top. Make sure that the GPS Receiver is labeled Base and **not** Rover.
- 11) Put the stub and the GPS Base into the center of the base plate and tighten the brass screw.
- 12) Turn the base unit on by pressing the green button in the top left corner of the unit.

Carlson Explorer II - Initial SurvCE Setup using the Survey Grade GPS

- 1) To start SurvCE Double – Tap SurvCE Icon
- 2) Tap “**Select New/Existing Job**”
- 3) Type in the name of the job. Put your job in your respective folder for your county. Tap “**OK**”.
- 4) The Job Settings Box will appear.
- 5) Double check the Units tab to make sure the readings are configured to your liking
 - a. Recommended:
 - i. Zero Azimuth: **North**
 - ii. Vertical Obs: **Zenith**
 - iii. Distance Obs: **Slope**
 - iv. Angle: **Azimuth**
- 6) Once this screen is set, you will not have to change anything in it again.
- 7) Tap the New Job tab. Here the Pt ID, Coordinates, Elevation and Descriptions are grayed out. You will be able to enter your 1st point later.
- 8) Tap the GPS tab. To change the map projection, if you plan to survey in Maryland state plane Tap “**Edit Projection List**”
- 9) Tap “**Add Predefined**”. Country: **USA/NAD83**
- 10) Scroll down and highlight “**MD**”, Tap “**OK**”
- 11) Tap the Options tab. This based on your preference as the user.
- 12) The Stakeout tab is only used if you are doing any type of stakeout work.
- 13) Once you have completed these tabs, tap “**OK**”
- 14) The Bluetooth Receiver screen will come up.
- 15) If there are no receiver names in the list. Tap “**Find Receivers**”. When you do that the base should appear as **Base XXX-XXXX**. The X’s represent the serial number of the unit. The serial number is located on the bottom of the GPS Base. Highlight the base in list based on your serial number. Tap “**Connect**”
- 16) If done properly, it will tell you that it is connected
- 17) Go to the Equip tab. Tap Instrument. The instrument type should be: **Topcon GPS +**
- 18) Tap Configure Base. (Note: This is whenever you are starting from a new position.)
- 19) Go to the Station tab
 - a. Receiver Type: **Hiper Lite Plus**
 - b. Antenna Type: **Hiper Lite**
 - c. Enter Antenna Height: **Either 1.5m, 1.8m, or 2.0m**. Make sure that when you type in the height that you put the “m” for meters behind it. Once you tap outside of that box, it will convert to feet automatically. This will be a vertical height. (Note: This is the height of the base)
 - d. Elevation Mask: **10**

- 20) The Radio Tab (Default)
 - a. Radio Type: **Sp Spectrum**
 - b. Radio Port: **C**
 - c. Radio Baud: **38400**
 - d. RTK Message Type: **CMR+**
- 21) Tap **“OK”**
- 22) It will come back to the Bluetooth Receiver screen again. Tap **“Connect”**
- 23) To include base location in the localization file and in the coordinate file, Tap **“From Known Position”** tab.
- 24) Next, tap **“Use Local Coordinates”**.
- 25) Input the information for Point #1
 - a. Point ID: **1**
 - b. Northing: **5000**
 - c. Easting: **5000**
 - d. Elevation: **100.00** (Whatever elevation that you want to use for a benchmark.)
 - e. Description: Base
- 26) The localization file will be named job_name.dat. Tap **“OK”**
- 27) The continue with base setup screen appears. Tap **“Yes”** to continue with the setup.
- 28) Save Base Configuration. Tap **“Yes”**. It will name the file with the job_name .ref as the extension. Tap **“OK”**. (.ref is the extension given to base configurations)
- 29) Tap Configure Rover
 - a. The Radio and Station tabs will be the same as they were for the base unit.
- 30) Tap **“OK”**
- 31) The Receiver Screen will appear again. Now you want to add the receiver that you plan to have with your collector. Make sure the rover is turned on. If the rover is not in your list tab **“Find Receiver”**. Highlight the correct rover that has the serial number that you plan to work with. Tap **“Connect”**
- 32) You now are ready to begin taking shots by going to the Surv tab and tap, **“Store Points”**. The triangle on the screen represents the rover. When you move then you will see the triangle move.
- 33) Move to the first point. This will be another fixed point other than the base location. Make sure to change the point number to **100**. Before you take the shot, setup your rod over your point that you will be using for localization. Using the bi-pod, make sure that the bubble is level on your point, and hit the green enter button on the keypad of the data collector. Put in the description of this point, then tap **“OK”**
- 34) Now go back to the main menu, then tap the **“Equip”** tab. We are now going to add point # 100 to the localization file.
- 35) Tap **“Localization”**. Next, tap **“Add”** to add new point from the coordinate file.
- 36) Tap the grey box next to the point from file box. This will take you to the list of points that are currently in the coordinate file.
- 37) Highlight **point # 100**, tap **“OK”**
- 38) The GPS Coordinate screen appears. Make sure the **“Read GPS”** is highlighted. Then tap **“OK”**.
- 39) The localization screen appears. The number of samples that is read is normally 10. This will take 10 readings, 1 reading every 1 second. Those readings will be averaged. Tap **“OK”** to localize. Once all readings have been completed tap **“OK”**. When the collector is cycling through the readings, the readings box should say **“Fixed”** for each reading.

- 40) The Localization Point screen appears again. Now save the modified localization file. Tap “**Save**”. When it asks to replace the already saved file tap “**Yes**”. (.dat) is the extension used for localization files. You only have to localize one data collector and 1 rover.
- 41) It will ask you to reprocess the raw file, Tap “**No**”.
- 42) If you are only using one data collector, you now are ready to begin taking shots by going to the Surv tab and tap, Store Points. The triangle on the screen represents the rover. When you move then you will see the triangle move.

Transferring between 2 Data Collectors and 2 Rovers

- 1) Go to File tab on both data collectors.
- 2) Tap Data Transfer
- 3) For the type of transfer, you want to select “**Kermit Transfer**” on both collectors.
- 4) You have the option to send or receive files
- 5) Plug the data transfer cable into the data port at the bottom of each collector.
- 6) The collector receiving the files must tap “**Receive**” before the Send button is tapped on the other collector.
- 7) On the collector that you are sending from, tap “**Send**”, and select the files that you would like to transfer. The files that you want to transfer have the extensions (.ref & .dat). You can not send them at the same time. When using 2 data collectors, you have to adjust your point numbers accordingly. You have to use 2 sets of numbers so you will not overwrite points once you are ready to combine the data into one file. (Ex. On data collector #1 – 1000, 1001 or on data collector #2 – 2000, 2001) or vice versa.
- 8) Now you are ready to survey
- 9) Tap the Surv tab
- 10) Tap Store Points. The map view will appear. To take shots tap “**S**” or hit the green enter button on the keypad.

Downloading Survey from 2 Data Collectors

- 1) Once you are back in the office, download both of your data collectors and as you normally would. The files that you need to download are as follows: .crd, .rw5
- 2) In SurvCadd, go to the Cogo Module & then select the **Points** menu.
- 3) Once in the point menu, click “**Set Coordinate File**”.
- 4) Select one of the coordinate files that you downloaded.
- 5) Next, click “**Coordinate File Utilities**”, under the file utilities column click “**Copy/Merge CRD File**”.
- 6) In the command line, it will ask do you want to copy a crd file **From** another file or do you want to copy the crd file that you set earlier **To** another file. You want to select **From**, then you select the file from that you want to merge into the current crd file.
- 7) Now, it wants to know which point numbers that you want to copy. Here you can type all, to copy all the points.
- 8) Then it will ask if you want to renumber the points. Type **no** if you used different numbering when you were in the field. If you used the same numbering you will have to renumber your points.
- 9) You have to print the raw files out separately.

File Storage on the Data Collector

- 1) Double – tap “**My Computer**” on your desktop screen.
- 2) Double – tap the “**SystemCF**” folder.
- 3) Double – tap the “**Data**” folder.
- 4) The location **My Computer\SystemCF\Data** is where all your data will be stored. If data is stored anywhere else such as in My Documents, the data will be lost if the collector were to crash.
- 5) Here you can create sub – directories such as folders for each county.
- 6) You go here and delete jobs if they are no longer needed on the data collector.

Logging Static Data Using Data Collector

(Static data must be logged for a minimum of 2 hours to get sufficient data)

- 1) On main menu tap the “**Surv Tab**”.
- 2) Tap the “**Log Static Data**” button.
- 3) Highlight New, type in the new file name for your static data.
- 4) Enter the Elevation Mask:**10**
- 5) Enter the antenna height: **2m** (make sure that you type in as seen with the “m”, it will convert to feet automatically)
- 6) Tap exit
* This data will be stored in the GPS receivers.

Download Static Data

- 1) Have PCCDU.exe file on your desktop. This file was on CD that was included with the GPS equipment.
- 2) Plug the COM cable into Port D on the rover or the base. Plug the other end of the cable into the desktop. (Make sure that the rover or base is turned on.)
- 3) Double click on the PCCDU.exe icon.
- 4) Click on “**File**”, then click on “**Connect.**”
- 5) The connection parameter screen opens:
 - a. Connection Mode: Direct
 - b. Port Settings: Port: Com 1 or Com 2 (depending which com port you are plugged into on the desktop.
 - c. Baud Rate: 115,200
- 6) Click “**Connect**”
- 7) Click on “**File**” again, then click on “**File Manager**”
- 8) The file manager screen opens. To change the download path, Click on “**Download Path Tab**”. Then navigate to the desired path.
- 9) Go back to the “Download Files” tab.
- 10) Highlight desired file to download.
- 11) Click “**Download**”
- 12) Click “**Exit**”
- 13) Go to “**File**”, then click “**Disconnect**”
- 14) Close the PCCDU.exe program

Post-Processing Downloaded Data

- 1) Open Internet Explorer.
- 2) Go to Online Positioning User Service (OPUS) website. <http://www.ngs.noaa.gov/opus>
- 3) Once at the website, fill in the required information.
- 4) To upload your data to the website, click “**browse**”. You can only download one file at a time.
- 5) Your antenna type is the **TPSHiper Lite**.
- 6) The antenna height is **2 meters**. It could be different for the base.
- 7) Click “**options**”
 - a. Pick MD State Plane
 - b. Select MD from the list of state to locate base stations in MD.
- 8) You can let OPUS choose which stations are close to your location.
- 9) You can select the std. output file.
- 10) Leave project name blank.
- 11) Click “**Upload**”
- 12) Once the upload is complete the screen will show your inputs.
- 13) You should get an email displaying state plane coordinates and UTM coordinates.