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Using the Emlid Reach RS+

The following steps will get you set up with the Emlid RS+ GPS receiver and ready to start field data collection. Before you begin, make sure that you have access to the Emlid Flow app. Emlid Flow provides an easy interface for collecting point data with the Emlid RS+. This app is already installed on the Samsung Field Tablets and is free to install on personal devices as well.

Setting Up the Emlid Reach RS+ for Survey

1. Remove the two halves of the survey pole from their carry case. Screw together the top and bottom halves, *being careful with the pointed end of the survey pole*. When complete, the pointed end should go down and the bubble level should be visible and facing up at the center of the pole.
2. Remove the Reach RS+ receiver from the case and carefully screw it on to the top of the survey pole. Make sure the Reach RS+ is secured to the pole, but do not overtighten.
3. If the Reach RS+ is being used for Static Base Corrections:
 - a. Remove the tripod legs from the survey pole carry case and position the clamp around the survey pole.
 - b. Extend the tripod legs (not the main survey pole) to create a stable base for the survey pole and gently press the ends of the legs into the ground.
 - c. Gently tighten the clamp on the tripod legs on to the survey pole but leave enough range of movement to be able to shift the survey pole.
 - d. Use the bubble level to ensure that the survey pole is perfectly vertical, then press the pole gently into the ground and tighten the clamp on the tripod legs.
4. Follow the instructions below to power on the Reach RS+ and get set up for data collection.
5. When collecting data, make sure that the antenna height is set to 2.000 meters, the height of the survey pole.

Powering Up the Reach RS+

1. Connect the antenna to the Reach RS+ receiver. Twist the base of the antenna until it is snug, but do not overtighten.
2. Place equipment in the open with clear view of the sky.
3. Power on the RS+ receiver. Hold the power button until the LEDs come on and begin lighting up in sequence.
 - a. Initially, all LEDs will light up, and then will begin cycling as the receiver tracks satellites.
 - b. Give the RS+ several minutes to track satellites and determine its location. During this setup phase, the flashing LEDs will be replaced with solid LEDs.
 - c. Once all the LED lights are on, the Reach RS+ is ready to collect data. The accuracy of the receiver can now be viewed in the Emlid Flow app to confirm that the receiver is ready for data collection, and the settings for data collection can be configured.

Connect to the Reach RS+

1. Turn on the Reach RS+ and wait until the three lights are on and no longer flashing.
2. Open the WiFi settings on the Survey Tablet or your personal device and connect to the “**Reach-RS:8B:53**” network. If you do not see this network, refresh the network list and make sure that the NET light on the receiver is solid blue.
3. Open the Emlid Flow app and select **Reach-RS** from the list of available devices. If it does not appear, return to the WiFi settings and make sure that the device is connected to the Reach WiFi network.

Setting up for Data Collection – this data collection method is used for capturing location coordinates with the Reach RS+ receiver to be exported for GIS projects. To use the RS+ to collect a data file that can be used for corrections of other GPS data in post-processing, see the section below on **Setting up for Static Base Corrections**.

1. Once Survey Tablet or other device is connected to the receiver, on the *Receivers* tab, select **Reach-RS**.
 - a. Settings for the Reach RS+ are shown on the screen.
 - b. “Reach-RS” and the battery level of the RS+ receiver are visible on the top left of the screen.
 - c. The GPS solution and the number of satellites in view are shown on the top right of the screen. Generally, when working with the Reach RS+ on its own, the solution should be a red box and the word SINGLE. If “No Solution” is shown on the top right, ensure that the receiver has a clear view of the sky and give the receiver time to determine its position.
2. Select the *Survey* tab, and click the plus button in the upper right corner to create a new project.
 - a. In the Name box, assign the project a name that you will remember.
 - b. The Author and Description categories are option, but can be used to help distinguish projects or record other project information.
 - c. Under project coordinate system, input the coordinate system that best covers your project area. For work done in South Carolina, this will generally be NAD83(2011) / South Carolina.
 - d. The default Vertical datum with NAD83(2011) / South Carolina is Ellipsoid Height. This is fine if you will configure other project settings to use ellipsoid height. For most projects, the Vertical datum wants to be set to NAVD88(GEOID18) height (will need to download on first use).
 - e. Once these settings are input, click Save on the upper right corner of the *Survey* view to create and enter the new project.
3. In the project view, click the blue plus in the center bottom of the screen to open the data collection window.
 - a. Click the grey box with a small survey icon to set the receiver antenna height. If using the yellow or green survey poles, input 2.0 meters. Otherwise measure the distance from the ground/base of the survey pole to the bottom of the RS+ and input that number in meters.
 - b. The grey box with H and V values shows the horizontal and vertical accuracy. The light grey box with E, N, and Ht values shows the current coordinates.
4. Input a Point name for the location to collect (and description, if desired) and click **Save**. That point is now recorded in the created project! Update the point name (and description, if desired) and continue data collection.
5. When finished collecting data in a project, export the data from Emlid Flow.

- a. In the *Survey* tab, click the grey circle with three dots in the upper right corner of the project.
- b. On the pane that pops up, click **Export**.
- c. In the Export pane, choose the file format for the export. Generally, exporting as a Shapefile will allow this data to be viewed and edited in a variety of GIS programs. For data that can be read as an excel table, select CSV.
- d. Choose how to save or share the data. It can be saved to the local device files or sent in a message or email. Generally, email works well. The data is now available at the location chosen for export.

Setting up for Static Base Corrections – this data collection method is used to collect a data file that can be used for corrections of other GPS data in post-processing. To capture individual location coordinates with the Reach RS+ receiver, see the section above on **Setting up for Data Collection**.

1. Set up the Reach RS+ receiver on the yellow survey pole and tripod.
 - a. Make sure that the survey pole is stable, to ensure it does not fall during data collection.
 - b. Make sure that the survey pole is level on the tripod by checking the level bubble near the center of the survey pole. If the bubble is not in the center of the level, move the pole slightly until the bubble rests in the center of the level.
2. Once Survey Tablet or other device is connected to the receiver and the receiver is set up in the base location, start logging static base station data.
 - a. On the *Receivers* tab, select **Reach-RS**.
 - b. On the list of receiver settings, select **Logging**. This opens the data logging pane.
 - c. In the logging pane, click Settings on the upper right corner of the Raw data tab to configure raw data collection.
 - d. Set *Format* to RINEX 3.03 unless processing data with a software that does not accept this version of RINEX. If your software will only accept a certain type of raw data file, set these parameters accordingly.
 - e. If set up with the yellow pole and tripod, select *Use antenna height* and enter 2 (the height of the yellow survey pole) or measure from the ground to the base of the receiver and enter that value.
 - f. Click apply to save these settings and exit the settings window.
 - g. Select *Start recording* on the bottom of the Raw data tab. The receiver is now collecting location data for post-processing corrections. You can disconnect from the RS+ receiver and return to it when done with data collection.
3. When done collecting static base station corrections, stop logging base station data and export.
 - a. Reconnect the Survey Tablet or your device to the Reach RS+.
 - b. On the *Receivers* tab, select **Reach-RS**.
 - c. On the list of receiver settings, select **Logging**. This opens the data logging pane.
 - d. In the Raw data tab, click the red circle at the bottom of the pane to stop logging.
 - e. Scroll down in the Logging pane to the **Logs** section. The most recent log will be under the *Today* header, and it lists the time that data collection started, the log file type, and the file size.
 - a. Click the blue arrow button to the right of the data log to open the Export pane. Choose how to save or share the data. It can be saved to the local device files or sent in a message or email. Generally, email works well. The data is now available at the location chosen for export.