

National Park Service
Inventory and Monitoring Division



Basic GPS Settings for Position Collection—Version 1.0

Bracewell, J. 2017. Basic GPS settings for position collection—Version 1.0. Gulf Coast Network Standard Operating Procedure NPS/GULN/SOP—SHR04. Gulf Coast Network, Lafayette, Louisiana.

This standard operating procedure (SOP) details the critical settings of the sub-meter GPS/GNSS system for collecting the position of the shoreline and reference points and gives a specific example of settings for a Trimble GeoXH data logger running TerraSync data collection software. There are a number of parameters that need to be preconfigured within the GPS/GNSS system so that data collection is within the sub-meter quality specification. Additionally, standardizing the criteria for collecting GPS/GNSS positions assures that the survey is replicable and comparable. Once the data logger is configured, the settings should be re-confirmed immediately prior to conducting the survey.

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Critical GPS/GNSS System Settings

The following values need to be set on any GPS/GNSS unit used to execute the shoreline position protocol. These parameters are set on the GPS/GNSS unit prior to the survey through a variety of menus identified below. Although any GPS or GNSS data logger that is capable of achieving sub-meter accuracy is acceptable, the Gulf Coast Network will use a Trimble GeoExplorer data logger and TerraSync workflow for collecting shoreline position. It is assumed the project leader has a working knowledge of Trimble's TerraSync Software so this SOP is not intended to be a comprehensive "how to" guide, but rather to note the settings that are important for maintaining data consistency across surveyors and surveys.

Setup

Logging Settings

1. Enter "Logging Settings" to set essential elements for data collection (Figure 1)



Figure 1. Screenshot of Logging Settings for Trimble data logger.

2. Tap the wrench under 'Accuracy Settings' so that post-processed accuracy will be displayed while collecting data (Figure 2). This will allow the surveyor to monitor the expected final accuracy.

Regarding antenna height: Because only horizontal positions are being used to determine shoreline position, vertical elevations are not directly relevant to analytical process outlined in this protocol. However, entering an approximate antenna mounting or carrying height is good practice and may be useful in data editing and interpretation.

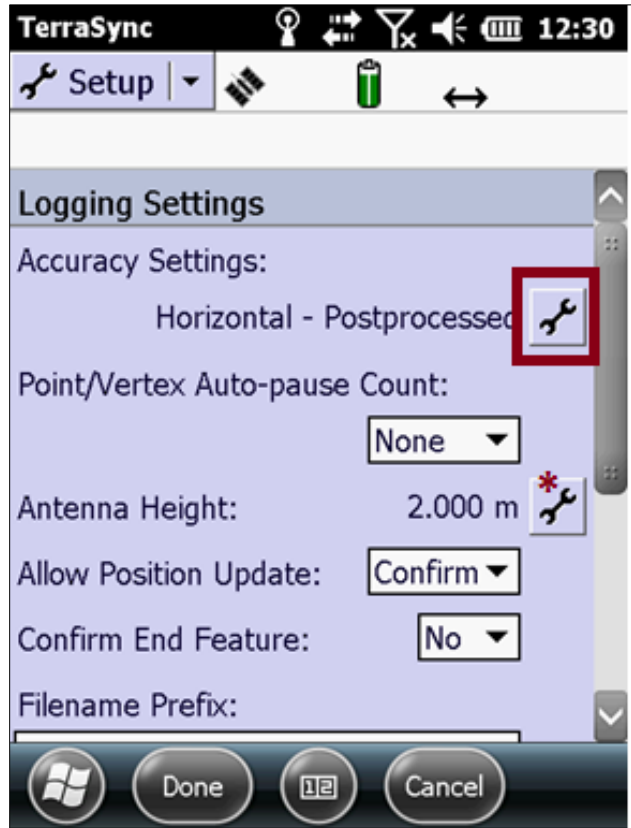


Figure 2. Screenshot of Logging Settings (Accessing 'Accuracy Settings').

3. Set the Horizontal accuracy to 'Postprocessed' to give the surveyor the anticipated postprocessed GPS/GNSS accuracy (Figure 3).

Critical Settings:

- a. 'Accuracy Value For Display/Logging' (Horizontal AND Postprocessed)
- b. 'Postprocessing Base Distance' can be adjusted to the actual base station that will be used for postprocessing (station generally < 25 kilometers [15.5 miles (mi)] for Gulf Islands NS and Padre Islands NS).
- c. 'Base Data:' typically set to 'Multi-constellation.' If the CORS station that will be used for post-processing is not GNSS-capable, set to 'GPS Only.'

- d. 'Use Accuracy-based Logging:' set to 'Yes'

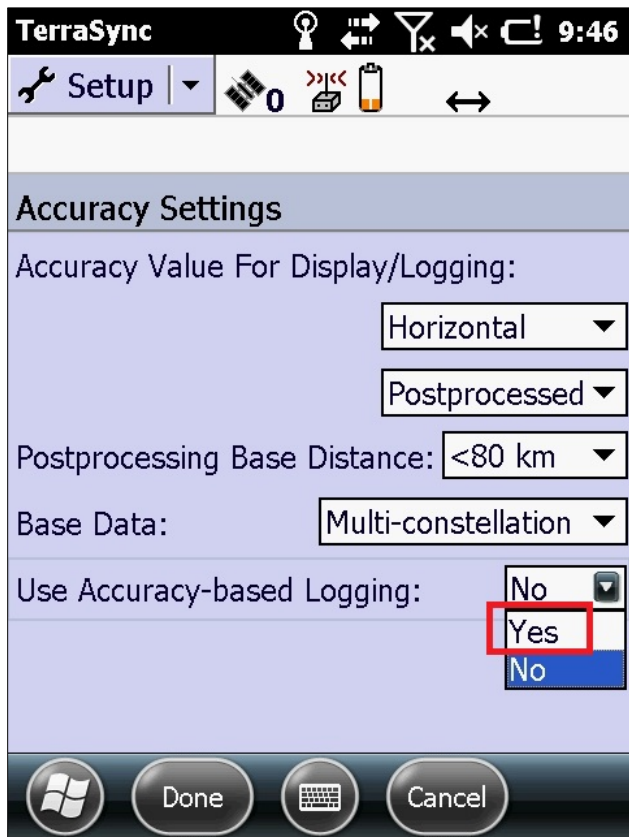


Figure 3. Screenshot of Logging Settings ('Accuracy Settings' page 1).

4. The 'Use Accuracy-based Logging:' dialog will appear (Figure 4).

Critical Settings:

- a. Apply Accuracy-based Logging To: 'All Features'
- b. Required Accuracy: '1m'

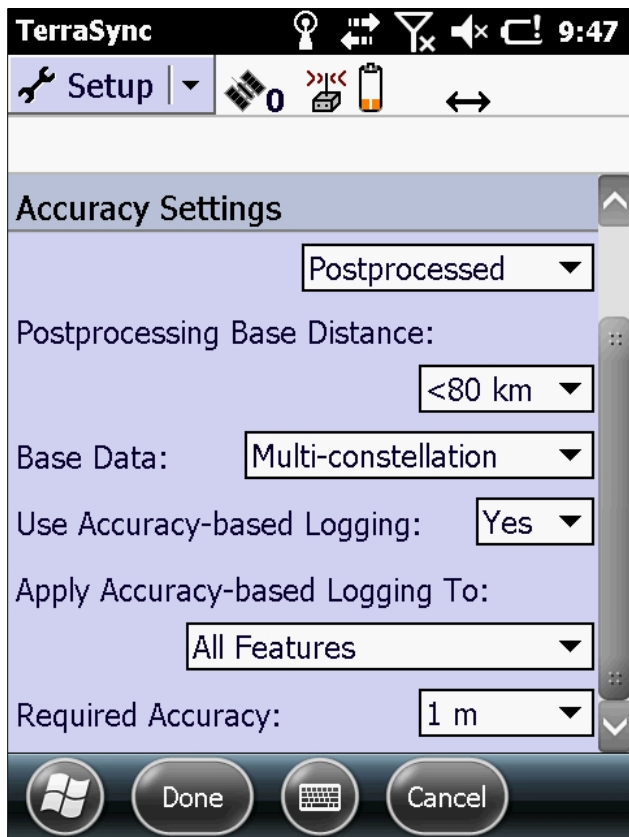


Figure 4. Screenshot of Logging Settings ('Accuracy Settings' page 2).

5. Set 'Between Feature Logging' to 3 meters (9.8 feet [ft]). 'Between Feature Logging' creates a "breadcrumb trail" that may be useful in interpreting survey results. For instance, if a gap is present in the shoreline feature because of an obstacle, the between feature points will depict the track of the deviation. This feature can also be used to fill gaps in an unsaved or inadvertently deleted section of shoreline, provided estimated accuracies of the between feature points meet the minimum accuracy threshold of 1 meter (3.2 ft; Figure 5).

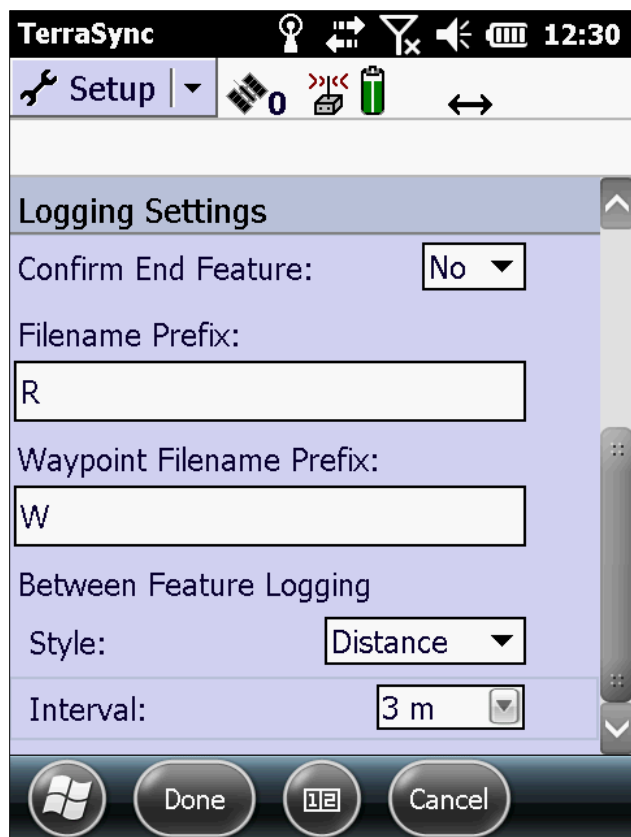


Figure 5. Screenshot of Logging Settings (Between Feature Logging).

GNSS Settings

1. Tap 'GNSS Settings' to access satellite communication filters (Figure 6).



Figure 6. Screenshot of GNSS Settings.

2. When using a Trimble Geo6000 or 7x, check 'Use Smart Settings' to allow the receiver to use the best satellites to calculate the most accurate solution (Figure 7).

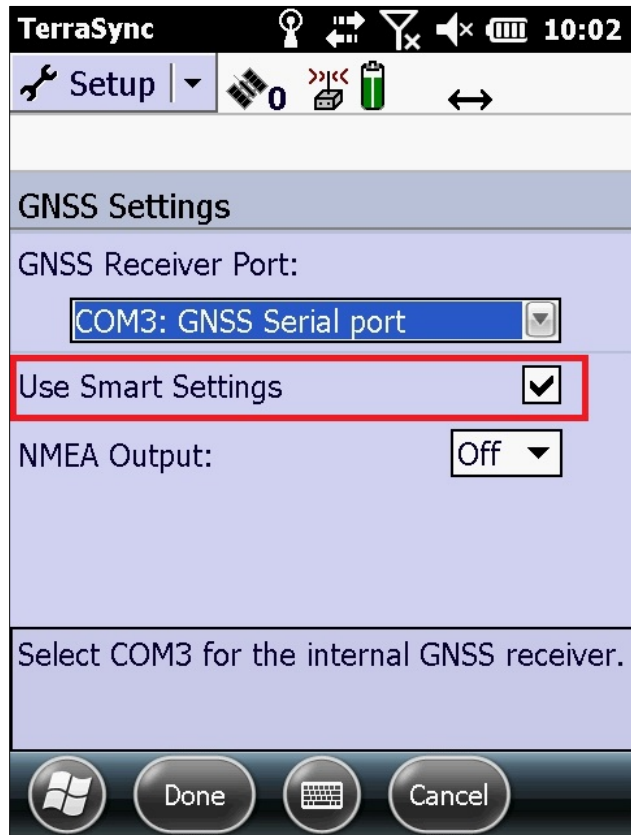


Figure 7. Screenshot of GNSS Settings (Geo6000 or Geo7x), 'Use Smart Settings.'

- When using a Trimble GeoXH or GeoXT, check the 'Productivity Slider' and position to 'Productivity' to allow the receiver to use the best satellites to calculate the most accurate solution (Figure 8).

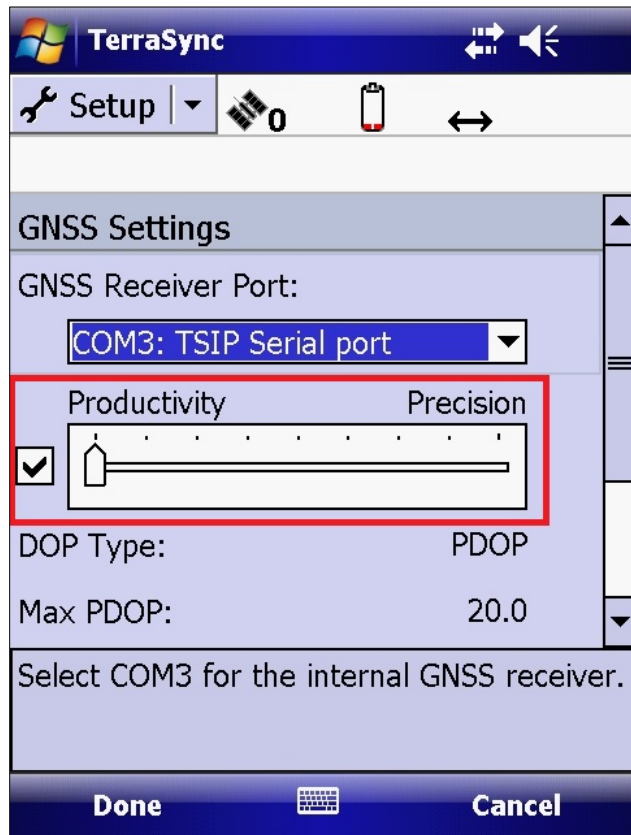


Figure 8. Screenshot of GNSS Settings (GeoXH or GeoXT), 'Productivity Slider.'

Real-time Settings

1. Tap 'Real-time Settings' to set satellite based corrections (Figure 9).



Figure 9. Screenshot of Real-time Settings.

2. Real-time Settings should be set to 'Integrated SBAS' (Figure 10).

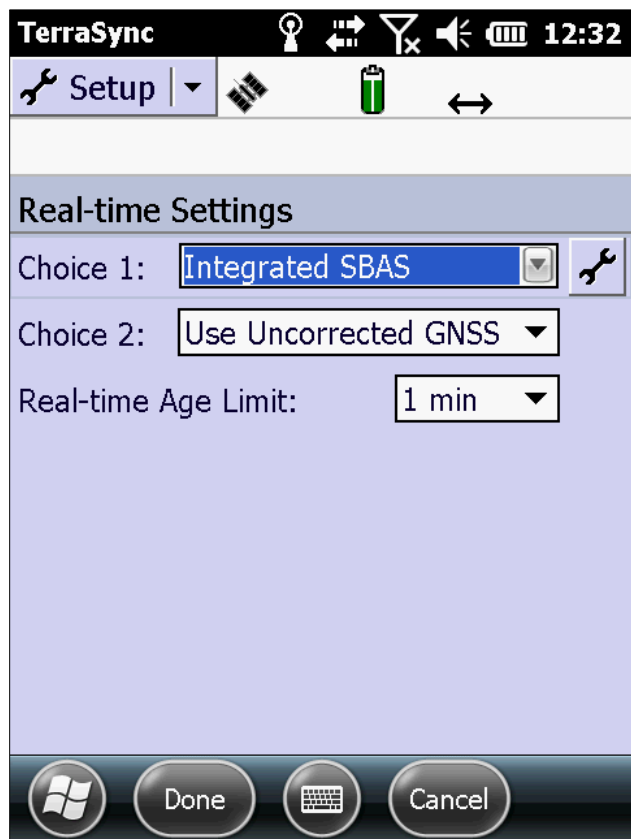


Figure 10. Screenshot of Real-time Settings (Integrated SBAS).

Coordinate System

When using base data such as imagery or benchmark locations, it is necessary to match the data logger's coordinate system to that of the base data.

1. To set the coordinate system, Tap 'Coordinate System' (Figure 11).

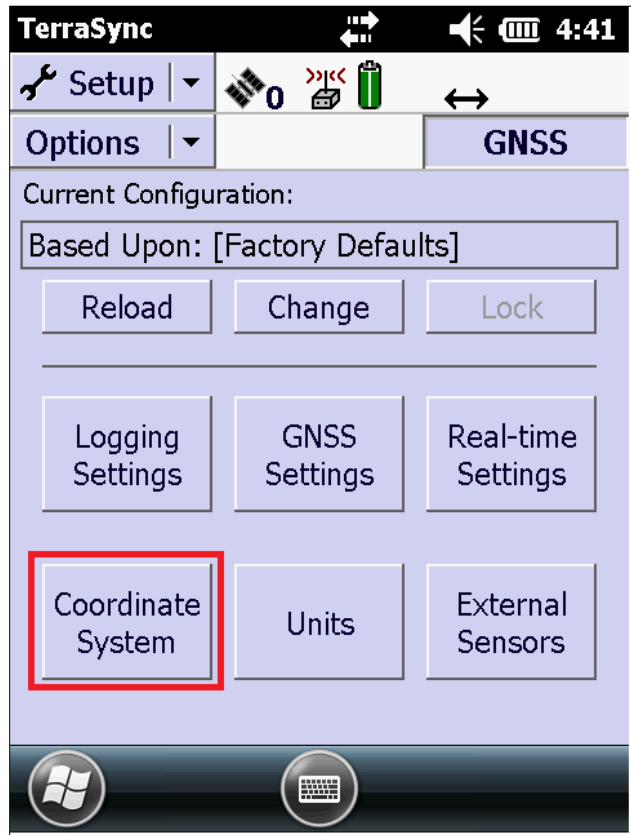


Figure 11. Screenshot of accessing 'Coordinate System' settings.

2. Set the coordinate system to match the referenced base data (Figure 12). The coordinate systems will vary for the incoming datasets, but will commonly be in NAD 83 (Conus) UTM Zone 14 (PAIS) or 16 (GUIS).

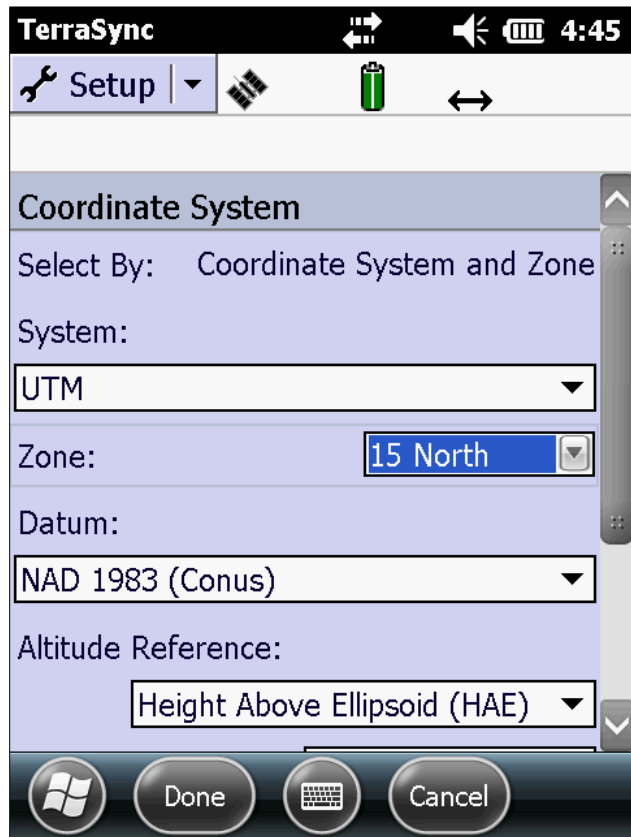


Figure 12. Screenshot of setting Coordinate System to match base data.

Logging Interval

Settings for feature logging interval are accessed only after a data file has been opened (Figure 10). Note—Settings for Logging Interval are preset in the GULN Shoreline Data Dictionary (DD) file (...\\Documents\\GNSS-Projects\\dataDictionaries\\gulnShorelineSurvey.ddf). If this DD is used, the following steps are not required.

From the Data Tab:

1. Tap the Point Icon (*Pt Int.). Note: Features will be identified with feature name that may not be “Point_generic” (Figure 13).

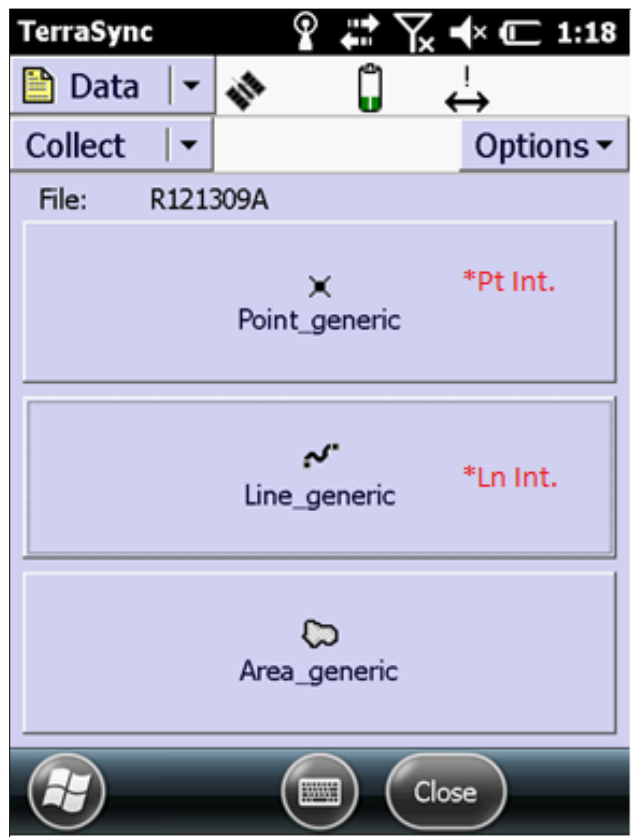


Figure 13. Screenshot of Feature Types (points used for benchmarks and other point features, lines used for shoreline position).

2. Tap 'Options', then 'Logging Interval' to set interval (Figure 14).

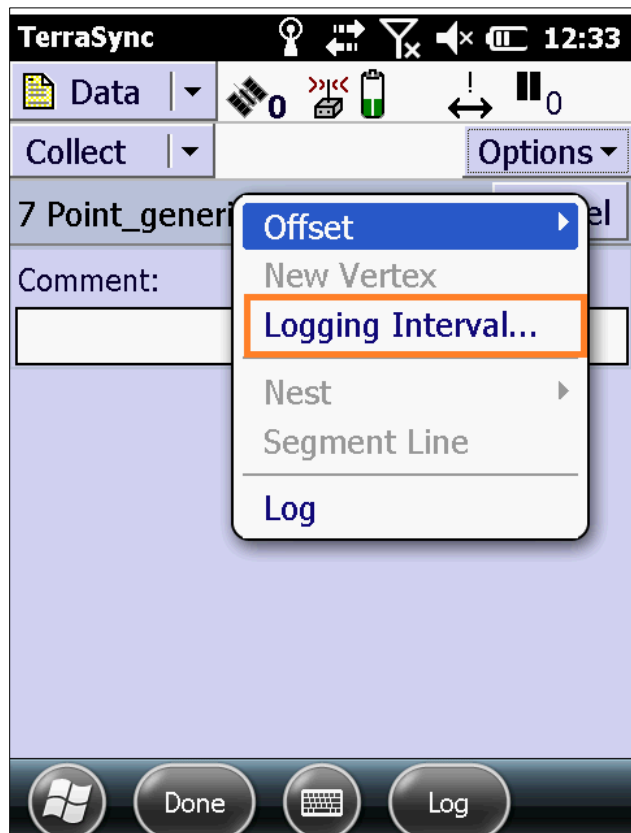


Figure 14. Screenshot of Logging Interval.

3. Set 'Logging interval' for points to '1s' (Figure 15).

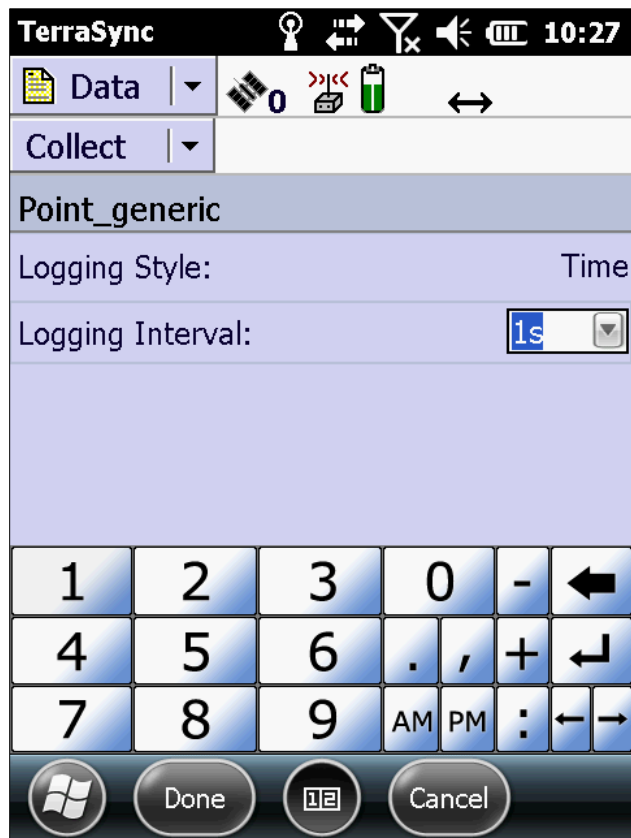


Figure 15. Screenshot of Logging Interval – Points.

4. Repeat Steps 1 and 2 for Line Features (*Ln Int.). 'Logging Style' should be set to 'Distance' and 'Logging interval' for line features should be set to '3 m' (Figure 16).

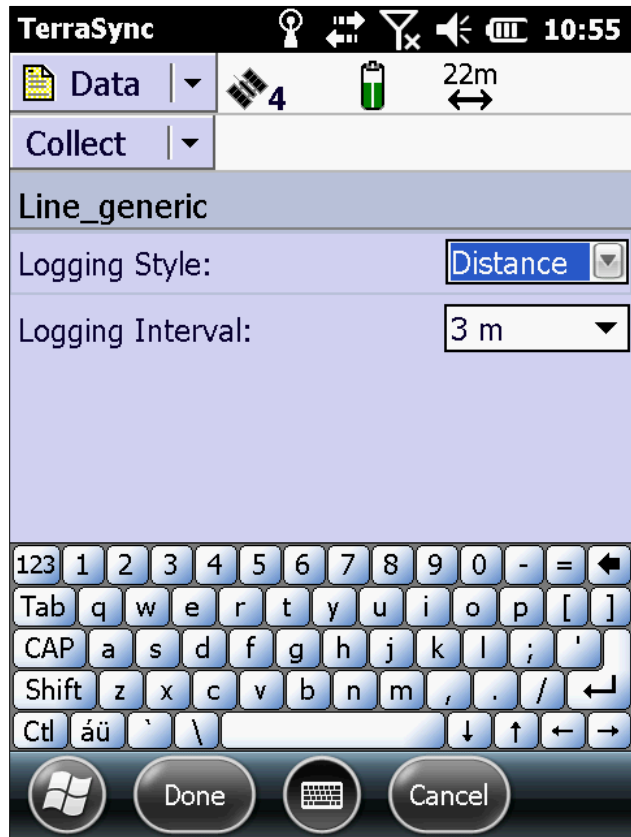


Figure 16. Screenshot of Logging Interval – Lines.

Literature Cited

Bracewell, J. 2017. Conducting the GPS shoreline survey—Version 1.0. Gulf Coast Network Standard Operating Procedure NPS/GULN/SOP—SHR05. Gulf Coast Network, Lafayette, Louisiana. Available at <https://irma.nps.gov/DataStore/Reference/Profile/2242637> (last accessed August 2017).