Purpose: As accuracy requirements and expectations increase, it is important to configure your device settings properly in order to best take advantage of Trimble's "High Accuracy" hardware and software. Trimble recommends the following settings when collecting data in TerraSync software with a 6000 series GeoExplorer or Pro 6 series receiver to ensure the highest accuracy and productivity.
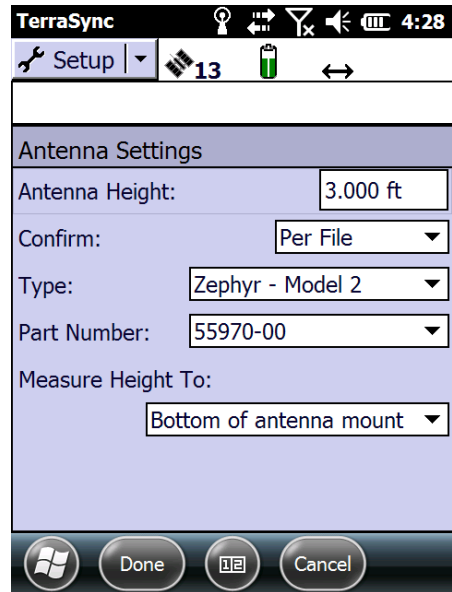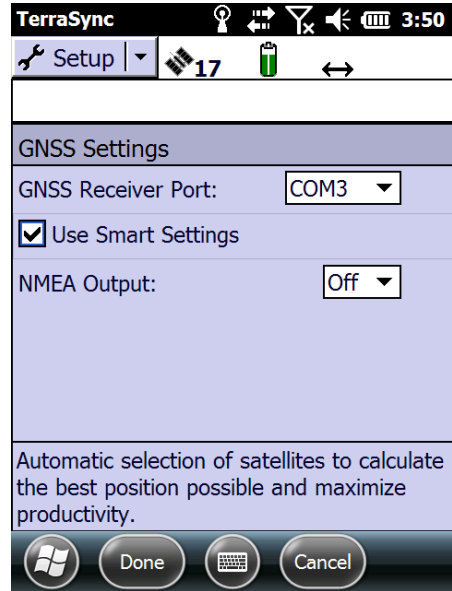
GNSS Settings: When collecting data with TerraSync it is essential to input the appropriate GNSS settings and information to ensure your data is collected properly and displays accurately. It is recommended to collect data using "Smart Settings".

Smart Settings:
Using Smart Settings, the GNSS receiver generates the best possible position for any given environment whether you are working under canopy, in wide open spaces, or somewhere in between. Using traditional mask techniques in open conditions, weak signals can accidentally degrade the accuracy of the position if masks are too relaxed, whereas in obstructed conditions, more satellites are needed to help maintain optimum accuracy if masks are set too strictly. Using Smart Settings, the receiver uses all available GNSS information to determine which combination of satellites to use to deliver the best possible position.

Antenna Settings: To collect accurate horizontal and vertical position data, it is critical that correct antenna settings be entered. In the Setup section of TerraSync, tap on Logging Settings, then tap the wrench icon next to Antenna Height and this will open the Antenna Settings page.

- Antenna Height: It is recommended to use an external antenna mounted on a pole to maintain a consistent antenna height, to accurately place the antenna above or next to the feature you are mapping, and to elevate the antenna above your body to prevent blocking satellite signals. You will need to make sure you enter an accurate value based on where you measure the height to on the antenna. (See "Measure Height To" on the next page.)

- Type: To specify the antenna that you are using, either select an option from this field, or select the correct part number in the *Part Number* field. When you change a value in one of these two fields, the other field updates accordingly.

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- Measure Height To: For accurate elevation measurements, the antenna height must be measured to the electronic center of the antenna (its Antenna Phase Center, or APC). For some antenna types, the APC is not accessible. To accurately measure the antenna height, measure to another location, then select that location from this field. The TerraSync software automatically adjusts the antenna height by the distance between the measurement location and the APC. The options in this field vary depending on the selected antenna type. If the selected antenna type does not allow alternative measurement locations (for example, if you are using the internal antenna in a GeoExplorer series handheld), this field does not appear. Refer to the pictures below for "measure height to" locations for the TornadoTM, TempestTM and ZephyrTM-Model 2 antennas.

Tornado/Tempest Measure Height To: Bottom of antenna mount

Tornado Measure Height To: Top of lower housing
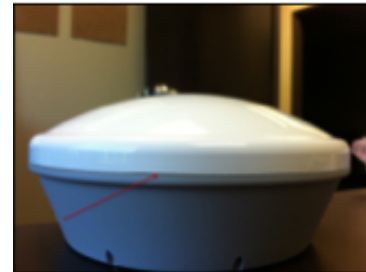
Zephyr-Model 2 Measure Height To: Bottom of antenna mount

Zephyr-Model 2 Measure Height To: Top of notch

Antenna Type: Certain antennas provide differing accuracy and optimal performance depending on the type of receiver you have it connected to. Below are the recommended antennas for the Trimble 6000 series GeoExplorers and Pathfinder® Pro 6H/6T:

6000 GeoExplorer XHTM ~ Trimble Tornado (PN: 57972-10)

6000 GeoExplorer XTTM ~ Trimble Tempest (PN: 57973-10)

Pro 6H ~ Trimble Tornado (PN: 57972-10)

Pro 6T ~ Trimble Tempest (PN: 57973-10)

6000 GeoExplorer XH (Centimeter edition) - Trimble Zephyr Model 2 (PN: 57970-10)

Please refer to Trimble's Mapping and GIS Product Compatibility List to verify you are using a compatible external antenna with your GNSS receiver:

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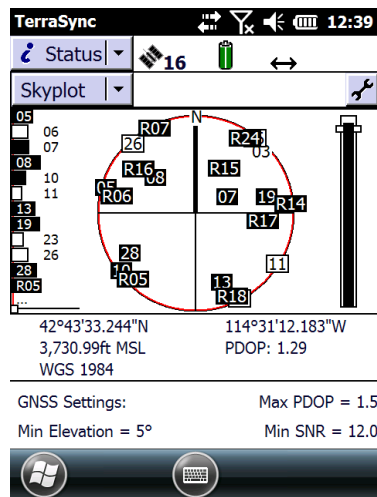Ph:208-324-6977   http://www.frontierprecision.com   support@geoposition.com

Real-Time Settings:

Use the *Real-time Settings* form to select a real-time differential GNSS source and to configure how your system communicates with each source.

Important information for using SBAS real-time corrections with Floodlight activated on your receiver:

Currently, SBAS does not provide real-time corrections for the GLONASS constellation satellites. If SBAS is set as your real-time correction source and you are receiving the SBAS corrections, GLONASS satellites will not be utilized in deriving your real-time positions. This may limit satellite availability and hinder you from acquiring a position fix. You may need to consider turning SBAS off in difficult environments to obtain a real time position fix. However, when receiving SBAS corrections, the GLONASS data is still stored in the data file (though not used to compute your real-time feature positions), and you can differentially correct the data against a GPS/GLONASS dual-constellation base station and have the COR file feature positions be composed of both GLONASS and GPS constellation derived satellite positions. In the screen shots below you will see the Skyplot screen of the same receiver showing the effects of applying SBAS real-time corrections to GLONASS satellite tracking.

SBAS real-time corrections turned off   Receiving SBAS real-time corrections
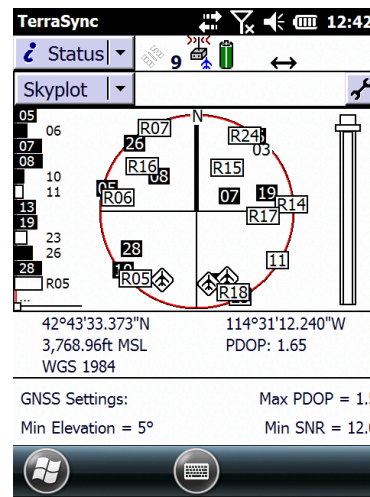
Numbered boxes represent the satellites currently available to the TerraSync software.
· Satellites shown as filled black boxes are currently being used by the TerraSync software to compute GNSS positions.
· Satellites shown as white boxes are being tracked, but are not being used to compute positions (for example, if their elevation is too low).
· Satellites shown without boxes are available, but are not being tracked (for example, if their signal is blocked by a tall building).
· If an SBAS satellite is being tracked, its location is indicated by this icon:
· Once SBAS corrections are being received in TerraSync, you will see this icon:

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External Source real-time corrections:
You can also configure your GPS receiver to receive real-time corrections from an external source such as a single-base or VRS (Virtual Reference Station). Select "External Source" from the real-time Choice 1 drop down and then tap the wrench icon to configure.

When GNSS positions are differentially corrected (real-time or post-processed), they use the datum (or reference frame) of the correction source. Examples are: •WAAS: ITRF2000 •NDGPS beacons: NAD83 •NDGPS beacons in the Pacific Ocean: NAD83 (PACP00 Epoch 2003.0) •OmniSTAR VBS (US): NAD83•OmniSTAR® VBS(non-US):ITRF2005•OmniSTARHP/XP(worldwide):ITRF2008•VRSnetworks: contact the system operator

The usual convention is that SSF files store GNSS positions in the WGS-84 datum, which is almost identical to the ITRF2000 or ITRF2005 datums. However coordinates in the NAD83 or ETRF89 datum can be up one meter apart from the same coordinates in the WGS-84 datum. To resolve this issue, the TerraSync software allows you to specify the datum of each real-time correction source, so that the corrected positions can be automatically transformed to WGS-84, before being saved to the SSF file.

In the Setup section, for each real-time correction source you use, assign the appropriate Correction Datum value. Some (such as SBAS) are assigned by default, but if you use other sources such as a VRS network, you need to find out which datum the system uses so that you can assign the correct value.

Note – The TerraSync software records all positions internally in terms of the WGS-84 coordinate system. This makes it possible to use different coordinate systems and datums without compromising the data. To allow for seamless data transfer when correcting data in real time, it is imperative that the real-time correction source reference system is correctly identified before use and selected during use.

Estimated Accuracy:Depending on if you are collecting real-time corrected data or you will be post-processing your data, you will want to configure TerraSync to report the estimated accuracy for your workflow. TerraSync can be configured to display either vertical or horizontal accuracy in either real-time (*In the field*) or after post-processing (*Postprocessed*). The type of estimated accuracy value shown depends on the settings in the *Accuracy Settings* form. Go to the *Setup* menu, select *Logging Settings,* and tap the wrench icon beside *Accuracy Settings*. If you plan on post-processing your data back in the office, configure the accuracy settings with the correct information about your base station for accurate estimate values. To show the predicted post-processed accuracy, there must be a data file open and the software must be logging GNSS positions.

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