**15 May 2008**

GeoExplorer 2008 Series: Real-Time H-Star Accuracy

With a Trimble® GeoExplorer® GeoXH™ handheld, you can collect positions using real-time H-Star™ technology to achieve decimeter (10 cm) to subfoot (30 cm) accuracy. This document describes the data collection and real-time protocol requirements to achieve this accuracy.

Data collection requirements

The GeoXH handheld provides subfoot (30 cm) accuracy when logging data using the internal antenna. To achieve decimeter (10 cm) accuracy, connect the handheld to an external Zephyr™ antenna. Both antennas are designed for horizontal use and with a clear view of the sky.

If you are using the Trimble TerraSync™ software to collect data, use accuracy-based logging to ensure the features collected meet your accuracy requirements. To obtain the most accurate results in real time, connect to a dual-frequency VRS™ network and apply the differential corrections to your data.

Use the Estimated Accuracy icon $\overset{10\,cm}{\longleftrightarrow}$ in the status bar to check the accuracy of the current GPS position.

If you are not using the Trimble TerraSync software, Trimble recommends that you log GPS data for at least 30 seconds, using a 1-second logging rate, when collecting point features or vertices. Collecting multiple positions for a static feature helps to improve accuracy by averaging out the errors in individual GPS positions. In more difficult environments, Trimble recommends logging for 1 to 2 minutes.
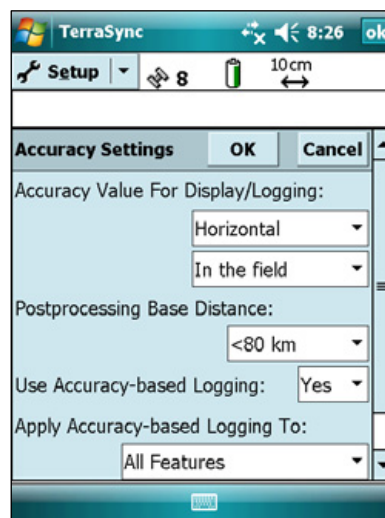
Note: The GeoXH handheld does not support the output of real-time H-Star corrected NMEA data to subfoot or decimeter accuracy.

If you are using real-time H-Star technology in the Trimble TerraSync software, the GPScorrect™ extension for ESRI ArcPad software, or an application based on the GPS Pathfinder® Tools SDK, you can still enable NMEA data output from the GeoXH handheld; however, the GPS positions in the NMEA data stream are corrected in real time using code data only. They will have submeter accuracy, and are not corrected to subfoot or decimeter levels of accuracy.

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Real-time protocol requirements

To collect subfoot or decimeter data using real-time H-Star technology, you must:

- Maintain a connection to a valid real-time correction source while collecting data. Examples include a VRS network connection by cellular phone, or a custom radio link using a dual-frequency base station. See below for supported protocols.

- Use dual-frequency base station(s).

- When using the GeoXH handheld's internal L1/L2 antenna, and when inside the coverage area of a VRS network, or when using a single base station at a baseline length less than 80 km; the receiver typically achieves subfoot-level accuracy.

- When using the optional Zephyr external antenna, and when inside the coverage area of a VRS network, or when using a single base station at a baseline length less than 30 km; the receiver typically achieves decimeter-level accuracy. At baselines of between 30 km and 80 km, you can expect accuracy in the subfoot range (30 cm).

- To obtain a real-time solution with subfoot or decimeter accuracy using H-Star technology, the receiver must track at least five satellites that the base station is also tracking.

Supported real-time protocols

- RTCM 2.x RTK
- RTCM 3.0
- CMR
- CMR+™