GEO 7 SERIES WEBINAR Q+A

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Geo 7 Laser Rangefinder & Flightwave Questions

Q. WHAT ARE THE SPECIFICATIONS OF THE INTEGRATED LASER RANGEFINDER MODULE?

A. The rangefinder module outputs distance measurements relative to the internal GNSS antenna L2 phase center. The range accuracy and precision specifications are as follows:

Range:	Up to 120 m to passive (non-reflective) targets, up to 200 m to reflective targets
Accuracy:	±0.05 m (1-sigma, @ 20° C, to Kodak Grey card at 50 m)
Precision:	0.01 m

Q. WHAT ARE THE SPECIFICATIONS OF THE ORIENTATION SENSORS?

A. The orientation sensors are integrated into the Geo 7X handheld, and comprise of a 3-axis magnetometer (e-compass), 3-axis accelerometer, and 3-axis gyroscope. The sensors are aligned to, and report the orientation and motion of the plane of the internal GNSS antenna. The accuracy specifications of the orientation sensor output values are as follows:

Heading accuracy	±1.5° (1-sigma, @ 20° C)
Inclination accuracy	±0.5° (1-sigma, @ 20° C)
Roll accuracy	±0.5° (1-sigma, @ 20° C)

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Q. HOW REGULARLY DO THE ORIENTATION SENSORS NEED TO BE RECALIBRATED?

A. The orientation sensors should be calibrated:

- Prior to using the handheld for the first time.
- When using the handheld in a different location (e.g. a different city or country)
- When using the handheld in a different climate, or after significant temperature change

The handheld includes a sensors calibration utility that recommends the appropriate calibration to perform (either 'Full' or 'Fast'). Trimble field applications that use the sensors also report the detected accuracy of the current calibration parameters relative to the current usage environment and are a helpful guide to when recalibration is necessary. Recalibration should be considered if the software sensor disturbance indicator icon shows that sensor output measurements are potentially inaccurate or being affected by the local magnetic environment.

Mechanical impacts (such as vibration and drops) do not affect orientation sensor calibration.

If in doubt, recalibrate.

Q. WHAT IS THE PROCESS FOR CALIBRATING THE GEO 7X ORIENTATION SENSORS?

A. There are two calibration processes Full calibration and Fast calibration.

Full calibration should be used when using the handheld for the first time, or after a significant change in environment (the handheld will tell you when full calibration is recommended).

Fast calibration should be used at other times (e.g. when using the handheld in a new city or country, after changing the battery, or any other time that the device is reporting that it needs to be recalibrated.

For instructions, best practices, and a video describing the sensor field calibration processes, refer to the support downloads area for the Geo 7X handheld on mgispartners.trimble.com.

Q. HOW DO YOU MANAGE OFFSET(S) BETWEEN LASER AND ANTENNA PHASE CENTER?

A. Distances and angles from the laser rangefinder are reported relative to the antenna phase center.

Q. HOW IS THE DIGITAL COMPASS UTILIZED IN TRIMBLE SOFTWARE APPLICATIONS?

A. The digital compass provides accurate heading information to Trimble field applications, including:

- **Trimble TerraFlex™ field:** used in Flightwave™ workflows to provide accurate heading information when measuring offsets, heights and widths of remote features.
- **Trimble TerraSync™ software:** used to provide heading information in the map, Skyplot, and navigation views.
- **Trimble Geo 7X camera utility:** used to tag photographs with a heading reference when the photograph is captured.
- **Trimble Geo 7X Rangefinder utility:** used in Flightwave workflows to provide accurate heading information when measuring offsets, heights and widths of remote features.

Q. WHEN USING FLIGHTWAVE TECHNOLOGY WORKFLOWS, HOW DOES THE USER AIM THE LASER?

A. The Rangefinder module does not include an optical eyepiece. The user points and aims the laser using the Geo 7X handheld's integrated camera which is aligned to the same axis as the rangefinder.

Q: HOW DOES THE PERFORMANCE OF THE RANGE FINDER ON THE GEO 7X HANDHELD COMPARE WITH OTHER LASER RANGEFINDERS?

A. The rangefinder module uses the identical physical principals of operation as the Trimble LaserAce™ 1000 and other competitor laser rangefinders to determine distance to remote objects. An invisible (infrared) laser is emitted from the rangefinder, and the time taken for the signal to be reflected off the target and received through the laser receiver is measured. Using the principal of time of flight, the distance to the target object can be easily determined. The properties of the laser such as maximum range and the types and sizes of objects that can be targeted are determined by parameters such as the power of the emitted invisible beam, the ambient light conditions, and the reflectivity of the object being targeted.

Q: WHAT'S THE RECOMMENDED WAY TO USE THE LASER(/CAMERA) WHEN THE GEO 7X HANDHELD IS POLE MOUNTED?

A: Mount the Geo 7X on the pole as high as the operator is comfortable, to optimize the visibility of the display at different viewing angles. To optimize accuracy, try to keep the handheld located in the same location for each measurement in a Flightwave workflow. Both the Geo 7X rangepole bracket and monopole bracket have a free-tilt mechanism to allow easy vertical rotation of the handheld in the bracket.

To tilt the handheld in the monopole bracket, loosen the quick-release lever. To tilt the handheld in the rangepole bracket, pull the bracket out to the free-tilt position.

Q: HOW DOES THE RANGEFINDER MODULE COMMUNICATE TO THE HANDHELD?

A: The Rangefinder module attaches to the handheld using custom electronic connectors on the base of the handheld:

The Rangefinder communicates to the handheld using the Rangefinder Utility using the internal serial port COM 6 using a customized NMEA communication protocol.

For details of the format of the NMEA strings used by the Rangefinder utility, refer to the Geo 7X handheld User Guide available from the Technical Support area for the Geo 7X handheld at www.trimble.com/mappingGIS/geo-7-series.aspx.

Refer to the documentation for your field software for details of how to configure the application to use data from the rangefinder utility on COM 6.

Geo 7X Handheld GNSS Questions

Q: WHAT GNSS CHIPSET IS USED ON THE GEO 7X?

A: The Geo 7X uses a 220 channel Trimble Maxwell™ 6 GNSS chipset. For detailed specifications refer to the Trimble Geo 7X datasheet at www.trimble.com/mappingGIS/geo-7-series.aspx.

Q: WHAT IS "SBAS+"?

A: SBAS+ is an enhancement to regular SBAS operation. The goal of SBAS+ is to use as much SBAS correction information as possible and as many satellites as possible to help improve yield and accuracy when positioning in SBAS mode on Floodlight™-enabled Geo 7X handhelds.

SBAS+ enables the following:

- **Uses autonomous (de-weighted) satellites in an SBAS+ position.** Non-GPS, uncorrected satellites are used and contribute to the position solution. The autonomous satellites are de-weighted appropriately so that they add to the quality of the position without reducing the accuracy. As more satellites drop out of the position solution (for example in tougher GNSS conditions), the autonomous satellites have relatively more impact on the position.
- **Use the SBAS ionospheric model whenever possible, even for satellites without an SBAS pseudorange correction term.** One component of normal SBAS corrections is a regional model of ionospheric conditions. By modeling the ionosphere this impact of this error source can be mitigated. With SBAS+ the ionosphere model is also applied to non-SBAS corrected satellites (i.e. Galileo, BeiDou & GLONASS).
- **Use SBAS corrected satellites in an autonomous position.** If we don't have at least 4 SBAS-corrected satellites, (or something else prevents us from a full SBAS+ position), the position solution will be autonomous. However, we can still use the individually corrected satellites in the autonomous position—increasing the quality of autonomous position results.

Software Compatibility/Support Questions

Q: WILL THE SOFTWARE PORTFOLIO INCLUDE TRIMBLE GPS PATHFINDER SDK AT TIME OF PRODUCT RELEASE?

A: The Trimble GPS Pathfinder® Field Toolkit SDK is not supported immediately. For more information on Trimble GPS Pathfinder Field Toolkit SDK availability and support for the Geo 7X handheld, of contact your local Trimble representative.

Q: WILL FLIGHTWAVE SUPPORT BE AVAILABLE FOR ARCGIS MOBILE/TRIMBLE POSITIONS SOFTWARE AND WITH WHAT VERSIONS?

A: Flightwave workflows are available to ArcGIS Module and Trimble Positions™ users via the Rangefinder utility. The Trimble Geo 7X handheld is supported across the entire Trimble Positions software suite.

Q: WHAT SOFTWARE APPLICATIONS CAN BE USED WITH THE CENTIMETER OUTPUT OPTION?

A: The Geo 7X handheld with Centimeter output is designed for operation with the Trimble TerraSync Centimeter edition software only.

For other applications—including NMEA based GNSS field software, accuracy is limited to H-Star™ (decimeter) level.

Q: WILL SOFTWARE APPLICATIONS OTHER THAN TERRASYNC CENTIMETER EDITION BE ABLE TO USE THE CENTIMETER OUTPUT OPTION?

A: Trimble is interested to learn more about specific applications and markets requiring Centimeter-level accuracy. Contact your local Trimble representative for further information.

Q: IS DIFFERENTIAL CORRECTION POSSIBLE WITH USING TERRAFLEX SOFTWARE?

A: Real-time differential correction delivered via SBAS satellite, Internet connection or Serial connection is supported with the TerraFlex mobile application if using the Geo 7X handheld.

Differential correction is not supported on iOS and Android handhelds.

Differential correction via postprocessing is not supported on the TerraFlex platform at this time.

Q: CAN THE RANGEFINDER INFORMATION (E.G. SLOPE ANGLE), BE POPULATED AS AN ATTRIBUTE INSIDE OF TRIMBLE TERRASYNC AND/OR TERRAFLEX MOBILE SOFTWARE?

A: Yes.

TerraSync can be configured to automatically receive information from the Rangefinder module as either a laser rangefinder (for the purposes of capturing remote feature locations using offset workflows), or as a generic external sensor (for the purposes of populating attribute fields with height, width or angle measurements).

TerraFlex Mobile integrates Flightwave workflows more directly and the rangefinder can be used to provide offsets (e.g. distances and headings) and measurement attributes (e.g. heights, widths and angles) within the same form.

For details of how to configure the software applications to use these measurements as attributes and offset values, refer to the supporting technical documentation for the TerraFlex and TerraSync software respectively.

Q: CAN THE RANGEFINDER UTILITY BE USED TO CAPTURE OFFSET VERTICES FOR LINE AND AREA FEATURES?

A: Yes—if the field software that it is being used with (e.g. TerraSync) supports this feature, the Rangefinder utility can be used to capture offsets for any type of feature.

For details of how to configure the software applications to capture offsets for individual vertices on line and area features, refer to the supporting technical documentation for the software application.

Q: DOES THE GEO7X HANDHELD SUPPORT TRIMBLE ACCESS FIELD SOFTWARE?

A: No.

Q: IS THE RANGEFINDER UTILITY TRANSLATED INTO DIFFERENT LANGUAGES?

A: Yes. The Rangefinder utility will automatically install in the language of the operating system of the handheld that it is installed on. The Trimble Geo 7X operating system is available in the following languages: English, French, Spanish, German, Italian, Portuguese, Russian, Korean, Japanese, Simplified Chinese & Traditional Chinese.

Q: IS THERE AN API FOR THE RANGEFINDER TO INTEGRATE WITH CUSTOM APPS?

A: No. Custom applications interface with the laser through the Rangefinder utility.

Q: WHICH SOFTWARE PRODUCTS ARE COMPATIBLE WITH THE DIFFERENT GENERATIONS OF THE CURRENT GEOEXPLORER PORTFOLIO?

For full details of the interoperability of different Trimble hardware generations and software versions (including GeoExplorer® 6000 series, GeoExplorer 7 series, and all new updates to the Trimble field and office software offering), refer to the Software Compatibility Matrix.

Trimble Mapping & GIS software and hardware compatibility matrix.

Q: ARE REAL-TIME CONFIGURATIONS IN TERRAFLEX SUPPORTED ON OTHER TRIMBLE HANDHELD DEVICES AS WELL AS THE TRIMBLE GEO 7X HANDHELD?

Yes.

For full details of the interoperability of different Trimble hardware generations and software versions (including GeoExplorer 6000 series, GeoExplorer 7 series, and all new updates to the Trimble field and office software offering), refer to the Software Compatibility Matrix.

Trimble Mapping & GIS software and hardware compatibility matrix.

Service & Support Questions

Q: HOW SERVICEABLE IS THE GEO 7X HANDHELD AND RANGEFINDER MODULE?

A: The Geo 7X handheld is a fully serviceable device, backed with a 12-month standard warranty, extendible up to an additional 4 years. The service program will be implemented at the conclusion of the 3-month new product introduction period. The Geo 7 rangefinder module is non-serviceable, and should be replaced if damaged. Removing/replacing the rangefinder does not require the handheld to be returned and/or serviced.

Portfolio & Compatibility Questions

Q: WHAT DOES “ONE MODEL, FULLY UPGRADEABLE” MEAN?

One of the unique advantages offered by the Geo 7 series is that all accuracy modes/configurations can be met with a single hardware variant. The previous limitation of a submeter and decimeter hardware variant being sold as different products no longer exists.

Having a single model means that the customer can purchase the base Geo7X configuration with L1-capable GNSS receiver (which can achieve submeter-level accuracy), and the GNSS capability can be upgraded to H-Star performance enabling L1/L2 tracking (at decimeter-level accuracy), then subsequently upgraded to Centimeter performance (at centimeter-level accuracy).

In addition, a broad range of custom accessories is available to extend and supplement the solution.

Q: IS FLOODLIGHT INCLUDED ON ALL GEO 7X CONFIGURATIONS?

Yes.

Q: IS NMEA OUTPUT INCLUDED ON ALL GEO 7X CONFIGURATIONS?

Yes.

Q: DOES THE GEO 7X HANDHELD SUPPORT OMNISTAR?

No.

Q: DOES THE GEO 7X HANDHELD SUPPORT TRIMBLE RTX SERVICES?

No.

Q: WHAT NETWORKS ARE SUPPORTED BY THE GEO 7X INTERNAL MODEM IN CDMA MODE?

CDMA devices need cellular network certification in order to operate on specific CDMA networks. The Geo 7X has certification to operate on the Verizon network in the USA only. To determine if you have USA Verizon coverage in your locality, refer to the network coverage maps available at www.verizon.com.

Operation on other CDMA networks are not supported.