

User Guide

Trimble® Rangefinder v1.20

Welcome to Rangefinder

What is Rangefinder?

Rangefinder is a free control utility for the Trimble Geo 7 series Laser Rangefinder module. You can use Rangefinder to complete many different types of spatial measurements tasks using the Trimble Geo 7 series laser rangefinder module - and on-board orientation sensors of the Geo 7X handheld including offsets, width, height and angle measurements.

Rangefinder supports both NMEA-format, and plain-text output for applications running on the Geo 7X handheld, and also supports sending NMEA to external devices connected to the Geo 7X via Bluetooth.

What's New in Version 1.20?

Rangefinder version 1.20 introduces a host of new features:

- **Audio feedback.** Buttons and workflow steps now provide useful positive and negative feedback to the user's interaction.
- **New and improved cross-hairs.** Each workflow step uses a custom crosshair to better indicate the type of measurement being captured at each step
- **Enhanced outdoor video visibility.** The video preview windows in Rangefinder have been enhanced to increase the visibility of objects in dark shadows to improve targeting and aiming
- **Repeating workflows.** Turn on 'repeat' mode to capture multiple measurements from each workflow type without minimizing the application.
- **External device support.** Output Rangefinder NMEA measurements to external devices via Bluetooth
- **GNSS pass-through.** In addition to passing Rangefinder NMEA messages, use the Geo 7X's internal GNSS to pass through highly accurate GNSS data to an external application over the same Bluetooth port.
- **Copy to clipboard.** Each complete measurement result is copied to the device virtual clipboard as plain-text so that it can be easily pasted to a text field in another application running on the handheld.

System Requirements

The Rangefinder Utility is supported on the Trimble Geo 7X handheld with laser rangefinder module attached.

Checking for new versions

From time to time, Trimble releases new version of the Rangefinder utility. Make sure you have the latest version by periodically checking for updates.

Automatic (online) update checks

If your device has an active Internet connection, the Rangefinder utility will automatically check for the availability of software updates once per week. If an update is available, a message will pop-up on the display inviting you to download the latest update directly to the handheld.

Manual (offline) update checking

If you do not have access to the Internet directly on your handheld, you can still check for software updates by looking for new versions at trimble.com. To check the most up to date version, go to www.trimble.com/rangefinderutility/ on a PC, and check inside the release notes of the most recent version to compare the Version number to the one installed on your device.

For Additional Information

Consult the resources listed below for more information about Rangefinder:

- Rangefinder version 1.2 Release Notes
- Technical product support at www.trimble.com
- Contact your local Trimble representative

User Feedback

Trimble welcomes your feedback and suggestions for ways to improve the Rangefinder utility. Send feedback to the email address: rangefinder_feedback@trimble.com

Note: When submitting, include the version number of the Rangefinder utility that your feedback relates to. By sending feedback to this address, you agree that Trimble may contact you regarding your feedback report. Any personal information you submit, whether explicitly or incidentally will be protected in accordance with our privacy policies. **By submitting feedback, you agree that Trimble may use your feedback to improve any Trimble product or service.**

Using Rangefinder

Installation

The Rangefinder utility is bundled with the Trimble Geo 7X Operating System. To reinstall Rangefinder, either 1) re-install the Geo 7X Full Operating System, then use the Rangefinder updater to make sure you have the latest version, or 2) download the latest version directly from www.trimble.com.

Getting Started

To open Rangefinder, find then tap the Rangefinder icon  in the Start menu.

The first time you run Rangefinder, you will be asked if you want to assign the middle keypad key as a shortcut key to launch the Rangefinder utility. You can change your setting at any time by choosing  > Settings > Personalize > Buttons.

The first time Rangefinder runs, you may need to calibrate the sensors, or align the camera and laser to ensure optimal field accuracy.

User Interface

Rangefinder has simple on screen controls, and walks the user through different workflows in a wizard-like manner. Use the controls to aim and zoom, make or repeat measurements, accept and output results.

The main interface is broken into four areas. 1. menu bar, 2. video targeting window, 3. workflow/results area, and 4. keypad buttons.



Target and aim the Rangefinder using the video targeting window, and line up the crosshair with the target object. The crosshair icon will change depending on the type of measurement you are making, and the status of the laser.

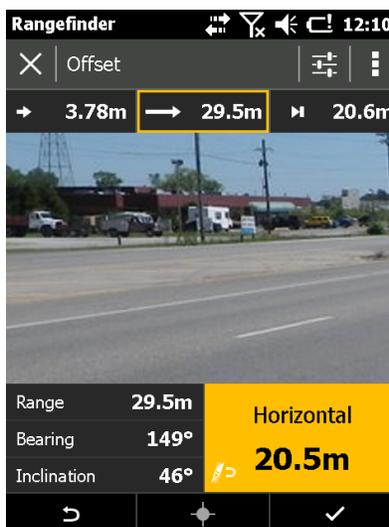
To make a single measurement:

1. In rangefinder, **press** the measure key on the keypad, or **tap** the measure button on the display.

To make a continuous/streaming laser measurement:

1. In laser distance measurement steps in Rangefinder, **press and hold** the measure key to enter continuous mode. When you release the key, you will see three results for the measured distance: Nearest, Farthest, and Last. Tap the result you wish to use in your calculation.

- Nearest is the nearest successful laser measurement captured.
- Farthest is the farthest successful laser measurement captured.
- Last is the last successful laser measurement captured.



TIP: Use Continuous laser measurement when targeting small or thin objects (such as overhead cables) or objects that are in a close cluster, then choose the correct result from the continuous measurement output.

Magnetic disturbance indicator

Always attempt to use Rangefinder in 'clean' magnetic environments to increase the accuracy of measurements made using the compass and inclinometer.

The Rangefinder application includes a magnetic disturbance indicator in the Workflow/Results area to help show when the handheld may be exposed to conditions that could negatively affect compass accuracy.



No disturbance



Minor disturbance



High disturbance

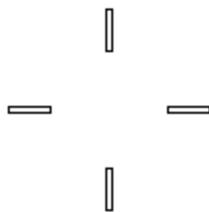
If the Magnetic disturbance indicator is showing high disturbance levels, try re-calibrating sensors, and if practical and safe, moving to a different location away from metallic or electromagnetic objects.

Targeting and Aiming

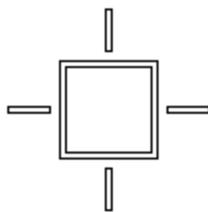
With Rangefinder, use the video preview screen to target objects in the real world. The crosshair in the center of the video screen shows you what you are aiming at, and indicates whether or not you are getting a return measurement from the laser rangefinder.

Laser crosshair

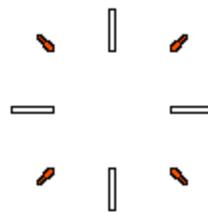
In Rangefinder laser measurement steps, the video preview shows the laser crosshair. The crosshair will show you information about the current laser-pointer setting, and whether or not you are getting a return reading from the laser.



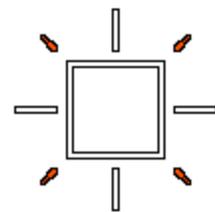
Rangefinder active
Pointer OFF
No return signal



Rangefinder active
Pointer OFF
Return detected



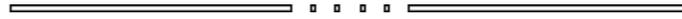
Rangefinder active
Pointer ON
No return signal



Rangefinder active
Pointer ON
Return detected

Vertical Angle (inclination) crosshair

In Rangefinder vertical angle (inclination) measurement steps, the video preview shows the vertical angle crosshair. This crosshair makes it easy to target the top or bottom of an object to measure vertical angle from your current position to the target object.



Vertical angle mode crosshair

Horizontal Angle (bearing) crosshair

In Rangefinder vertical angle (inclination) measurement steps, the video preview shows the vertical angle crosshair. This crosshair makes it easy to target the left or right edge of an object to measure the bearing angle from your current position to the target object.



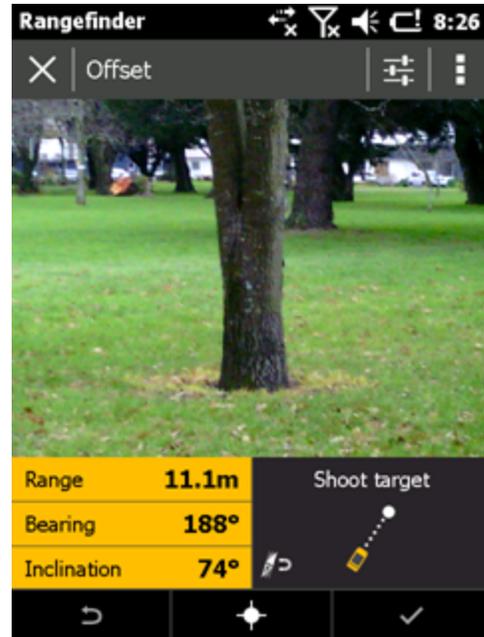
Vertical angle mode crosshair

Harsh Light Optimized Video Preview

With Rangefinder, an enhanced video preview mode is used to boost the visibility of objects in shadows, or against very bright backgrounds (e.g. objects being viewed against a sunny sky). This mode is on by default, but can be easily turned on or off at any time from the video preview screen.



Optimized preview ON



Optimized preview OFF

To toggle the harsh light optimized view:

1. In Rangefinder, tap in the **Video** preview window to bring camera controls into view.
2. Tap the harsh light optimized view icon to toggle the feature ON  or OFF .

Measurement Workflows

With Rangefinder, use the Workflows menu to choose the desired measurement mode. Choose from Position, Height, Width workflows or Measure tools. Each workflow or measurement tool outputs a different result string.

To change workflows:

In Rangefinder, tap the **Workflows** icon , then choose the desired workflow from the menu.

Position workflows



Offset

Use the Offset workflow to measure the distance and direction to a remote point. Use the Offset workflows in conjunction with a GNSS enabled data collection application (for example Trimble TerraSync) to compute the location of point of interest remotely.

To use the Offset workflow:

1. Select **Offset**  from the workflows menu.
2. Aim the laser at the base of the target object, then press the **Measure** button  to capture the Offset measurement.
3. To accept the measurement and output the result, press the **Accept** button . The result is copied to clipboard, and output over the Rangefinder NMEA port.
4. To undo and re-capture the measurement, press the **Undo** button  and try again.

Height workflows

Use height workflows to measure the vertical height of an object or the vertical distance between two points. Choose the workflow that best suits the environment and type of object you are measuring.



1 Shot Height

1 Shot Height uses a single distance/inclination measurement to approximate the height of a remote object. Use One Shot Height in scenarios where you want to quickly estimate an object's height with a single measurement, or in scenarios where you do not have clear line of sight to the entire structure, but still have clear line of sight to the top.

To use the 1 Shot Height workflow:

1. Select **1 Shot**  from the Height Workflows menu.
2. Aim the laser at the top of the target object, then press the **Measure** button  to capture the height measurement.

3. To accept the measurement and output the result, press the **Accept** button ✓ .
The result is copied to clipboard, and output over the Rangefinder NMEA port.
4. To undo and re-capture the measurement, press the **Undo** button ↶ and try again.

***TIP:** To maximize accuracy using 1-shot height, make sure the **Laser Height** setting is correctly set to the approximate height of the laser to the ground.*



2 Shot Height uses a two distance+angle measurements to measure the height of a remote object. Use two shot height in scenarios where you have clear line of sight to both the top and base of the entire object.

To use the Two Shot Height workflow:

1. Select **2 Shot**  from the Height Workflows menu.
2. Aim the laser at the base of the target object, then press the **Measure** button ✦ to capture the first distance+angle measurement.
3. Aim the laser at the top of the target object, then press the **Measure** button ✦ to capture the first distance+angle measurement.
4. The result is shown in the results area. To accept the measurement and output the result, press the **Accept** button ✓ . The result is copied to clipboard, and output over the Rangefinder NMEA port. To undo and re-capture any measurement, press the **Undo** button ↶ to go back and try again.
5. Measure Heights and Widths



3 Shot Height uses one distance measurement, and angle measurements to the top and bottom of a feature to measure the height of a remote object. Use three shot height in scenarios where you have clear line of sight to the object, but when the top and bottom of your target may be obstructed or difficult to target accurately with a distance measurement. Three shot height measurements make the assumption the target object is vertically oriented.

To use the 3 Shot Height workflow:

1. Select **3 Shot**  from the Height Workflows menu.
2. Aim the laser crosshair at the target object, then press the **Measure** button  to capture the first distance/angle measurement.
3. Aim the angle crosshair at the base of the target object, then press the **Measure** button to capture the angle to the base of the target from your current position.
4. Aim the angle crosshair at the top of the target object, then press the **Measure** button to capture the angle to the base of the target from your current position.
5. The result is shown in the results area. To accept the measurement and output the result, press the **Accept** button . The result is copied to clipboard, and output over the Rangefinder NMEA port. To undo and re-capture any measurement, press the **Undo** button  to go back through the workflow and repeat one of more steps.

Width workflows

Use width workflows to measure the width or span of an object or between two objects.



2 Shot Width

2 Shot Height uses a two distance+angle measurements to measure remote widths or spans. Use two shot width in scenarios where you have clear line of sight to both the left and right targets. Two shot width measures a distance and angle to both the left and right targets.

To use the Two Shot Width workflow:

1. Select **2 Shot**  from the Width Workflows menu.
2. Aim the laser at the left target object, then press the **Measure** button  to capture the first distance/angle measurement.
3. Aim the laser at the right target object, then press the **Measure** button to capture the second distance/angle measurement.
4. The result is shown in the results area. To accept the measurement and output the result, press the **Accept** button . The result is copied to clipboard, and output over the Rangefinder NMEA port. To undo and re-capture any measurement, press the **Undo** button  to go back and try again.



3 Shot Width

3 Shot Width uses one distance measurement, and angle measurements to the left and right of a feature to measure the width of a remote object. Use three shot width in scenarios where you have clear line of sight to measure the distance to the target, but when the left and right extents can't be easily or accurately targeted with a the laser. Three shot width measurements make the assumption the target object is oriented perpendicular to the point you are observing it from.

To use the 3 Shot Width workflow:

1. Select **3 Shot**  from the Width Workflows menu.
2. Making sure you are standing perpendicular to the object or span you are measuring, aim the laser at the target object, then press the **Measure** button  to capture the distance to the target.
3. Standing in the same location, aim the angle crosshair at the left edge of the target object, then press the **Measure** button to capture the angle to the left edge from your current position.
4. Standing in the same location, aim the angle crosshair at the right edge of the target object, then press the **Measure** button to capture the angle to the right edge from your current position.
5. The width result is shown in the results area, and is copied to the clipboard. To accept the measurement and output the result, press the **Accept** button . The result is output over the Rangefinder NMEA port. To undo and re-capture any measurement, press the **Undo** button  to go back through the workflow and repeat one of more steps.

Measure Tools

In addition to more complex workflows, the Rangefinder Utility offers a few simple measurement tools for capturing or measuring basic distance and angles.



Range

Use Range to measure the straight-line distance between your current location and a remote point.

To use the Range workflow:

1. Select **Range**  from the Measure menu.
2. Aim the laser at the target object, then press the **Measure** button  to capture the straight-line distance to the target.
3. The result is shown in the results area, and is copied to the clipboard. To accept the measurement and output the result, press the **Accept** button . The result is output over the Rangefinder NMEA port. To undo and re-capture the measurement, press the **Undo** button  and repeat the measurement step.



Bearing

Use Bearing to measure the compass bearing between your current location and a remote point.

To use the Bearing workflow:

1. Select **Bearing**  from the Measure menu.
2. Aim the laser at the target object, then press the **Measure** button  to capture the bearing to the target.
3. The result is shown in the results area, and is copied to the clipboard. To accept the measurement and output the result, press the **Accept** button . The result is output over the Rangefinder NMEA port. To undo and re-capture the measurement, press the **Undo** button  and repeat the measurement step.



Inclination

Use Bearing to measure the compass bearing between your current location and a remote point.

To use the Inclination workflow:

1. Select **Inclination**  from the Measure menu.

2. Aim the laser at the target object, then press the **Measure** button  to capture the inclination angle to the target.
3. The result is shown in the results area, and is copied to the clipboard. To accept the measurement and output the result, press the **Accept** button . The result is output over the Rangefinder NMEA port. To undo and re-capture the measurement, press the **Undo** button  and repeat the measurement step.



Missing Line

Use Missing Line to measure a number of different measurements between two points. Missing Line can output the Slope Distance, Horizontal Distance, Vertical Distance, Bearing Angle or Inclination Angle between the two remote points.

To use the Missing Line workflow:

1. Select **Missing Line**  from the Measure menu.
2. Aim the laser at the left target object, then press the **Measure** button  to capture the first distance/angle measurement.
3. Aim the laser at the right target object, then press the **Measure** button to capture the second distance/angle measurement.
4. The default output result is shown in the results area and is copied to clipboard. To change the result output tap the triangle in the results area, and choose the desired measurement type from the available results. To accept the measurement and output the result, press the **Accept** button . To undo and re-capture any measurement, press the **Undo** button  to go back and repeat any step in the workflow.

Using Rangefinder Outputs

With Rangefinder, you can output measurement data to other applications in different ways to suit your software workflow.

NMEA Output

Each Rangefinder measurement result is output over an internal serial port on the handheld (COM6). Field applications that can be configured to record information from external

sensors treat the Rangefinder utility just like any other external sensor outputting NMEA data.

Refer to the user documentation for your field application for information on how to configure that application to use data from external sensors. Connect to the Rangefinder utility on **COM6: Rangefinder Module**.

The NMEA string output by the rangefinder application is dependent on the workflow you are using. The following types of NMEA string are output:

Offset Workflows ‘A’ String

In Rangefinder, the ‘A’ string provides compatibility with the TerraSync software and is output by the Offset workflows. Each ‘A’ string contains 11 comma separated fields.

Example: \$PTNLA,HV,2.94,M,288.1,D,8.6,D,2.98,M*5F

Field	Description	Valid Range/Example Value
1	String header	\$PTLNA
2	Horizontal vector	HV
3	Horizontal distance	0.15 to 200.00
4	Units of measurement	M/F (meters/feet)
5	Horizontal angle	0.00-359.99
6	Units of measurement	D/G (degrees/gons)
7	Vertical angle	-89.99 to +90.00
8	Units of measurement	D/G (Degrees/Gons)
9	Slope distance	0.15 to 200.00 m
10	Units of measurement	M/F (meters/feet)
11	Checksum	e.g. *67

Height workflows ‘C’ String

Height workflows output a ‘C’ string, in the format below.

Example: \$PTNLC,HT,7.42,M*67

Field	Description	Valid Range/Example Value
1	String header	\$PTLNC
2	Height (vertical distance)	HT
3	Height value	e.g. 7.42
4	Units of measurement	M/F (meters/feet)
5	Checksum	e.g. *67

Width workflows 'C' String

Height workflows output a 'C' string, in the format below.

Example: \$PTNLC,WI,2.42,M*67

Field	Description	Valid Range/Example Value
1	String header	\$PTLNC
2	Width (horizontal distance)	WI
3	Width value	e.g. 2.42
4	Units of measurement	M/F (meters/feet)
5	Checksum	e.g. *67

Bearing workflows 'C' String

The Bearing workflow outputs a 'C' string, in the format below.

Example: \$PTNLC,BG,10.51,D*67

Field	Description	Valid Range/Example Value
1	String header	\$PTLNC
2	Bearing (horizontal angle)	BG
3	Bearing value	e.g. 10.51
4	Units of measurement	D/G (degrees/gons)
5	Checksum	e.g. *67

Range workflow 'C' String

The Range workflow outputs a 'C' string, in the format below.

Example: \$PTNLC,SD,22.35,M*67

Field	Description	Valid Range/Example Value
1	String header	\$PTLNC
2	Range (slope distance)	SD
3	Slope distance value	e.g. 22.35
4	Units of measurement	M/F (meters/feet)
5	Checksum	e.g. *67

Inclination workflow 'C' String

The Inclination workflow outputs a 'C' string, in the format below.

Example: \$PTNLC,VA,-15.61,D*67

Field	Description	Valid Range/Example Value
1	String header	\$PTLNC
2	Vertical angle	VA
3	Vertical angle value	e.g. -15.61
4	Units of measurement	D/G (degrees/gons)
5	Checksum	e.g. *67

Missing Line workflow 'C' String

The Missing Line workflow outputs a 'C' string, in the format below. The distances and angles are the relative difference from Point A and Point B in the missing line workflow.

Example: \$PTNLC, HD,100.75,M,HA,325.59,D,VA,1.2,D,SD,100.02,M,VD,1.6,M*71

Field	Description	Valid Range/Example Value
1	String header	\$PTLNC

2	Horizontal vector between points	HV
3	Horizontal vector value	e.g. 50.34
4	Horizontal vector units	M/F (meters/feet)
5	Horizontal angle between points	HA
6	Horizontal angle value	e.g. 15.33
7	Horizontal angle units	D/G (degrees/gons)
8	Vertical angle between points	VA
9	Vertical angle value	e.g. -15.3
10	Vertical angle units	D/G (Degrees/Gons)
11	Slope distance between points	SD
12	Slope distance value	e.g. 87.51
13	Slope distance units	M/F (meters/feet)
14	Vertical distance between points	VD
15	Vertical distance value	e.g. 1.25
16	Vertical distance units	M/F (meters/feet)
17	Checksum	e.g. *2F

Copy Result to Clipboard

With Rangefinder, each measurement result is automatically copied to the device clipboard so that it can be pasted into any other application running on the handheld. A result is copied to the clipboard at the conclusion of each measurement workflow (prior to outputting the value via NMEA). Only the displayed numeric value is copied to clipboard (units are not copied).

To paste the output value output to clipboard:

1. Complete a Rangefinder workflow, the output value is automatically pasted to Clipboard.
2. Minimize Rangefinder by tapping ✕
3. Open the application that you wish to paste the Rangefinder result into.

4. Bring up the keyboard, and choose Paste using the keyboard shortcut **Ctrl+V**

***TIP:** Use the Copy Result to Clipboard feature to use Rangefinder with applications that can not use external sensors via NMEA, or those applications that are limited to parse one NMEA sentence format at a time (for example Trimble TerraSync software). With this feature, Trimble TerraSync (for example), can be configured to receive Rangefinder Offsets measurements via NMEA, and height and width measurements can be entered using the Copy/Paste process.*

Bluetooth Output

With Rangefinder, you can use the Bluetooth Output feature to connect the Geo 7X handheld to an external PC or other field computer and feed the Rangefinder NMEA output to the external device via Bluetooth. Both the Rangefinder measurements and the Geo 7X handheld's GNSS positions can be passed through Rangefinder and output via Bluetooth. Refer to the section on Bluetooth set up for details on how to configure Rangefinder Bluetooth Output.

Adjusting User Settings

User preferences and settings for Rangefinder are accessible from the Settings Menu .

Show/Hide Laser Pointer

With Rangefinder, you can choose to either show or hide the red laser pointer during laser measurement workflows.

To show/hide the laser pointer:

1. In Rangefinder, choose the desired setting under  > Show Laser Pointer.
2. Tap Accept button  to accept changes .

Set Laser Height

With Rangefinder, the 1 Shot Height workflow, and Offset workflow apply a height offset from the ground to the laser to the calculated vertical height component of the results. Set the Laser Height to the height of the back of the laser to the ground.

To set laser height:

1. In Rangefinder, tap  > Laser Height.
2. Enter the desired laser height using the keypad. Laser height must be a numeric value between 0m and 2.0m (6.56ft).

3. Tap Accept button ✓ to accept changes .

Set North Reference

With Rangefinder, compass bearings can be output relative to True or Magnetic North. True North values are automatically calculated by Rangefinder using the magnetic declination for your current location, as determined by the last known GPS location prior to the application starting. Depending on your field application, set North reference to the appropriate value.

To set North reference:

1. In Rangefinder, tap tap  > North Reference.
2. Select the desired value (either True or Magnetic).
3. Tap Accept button ✓ to accept changes .

TIP: Trimble applications such as Trimble TerraSync software are compatible with either True or Magnetic North setting, and will automatically adjust compass angle measurements accordingly. Check the documentation for your field software to determine what setting is required by your application.

Set Distance and Angle Units

With Rangefinder, you can set distance and angle units to your own preferences. Distance and Angle unit preferences affect both the display output and the NMEA message output.

To set Distance units:

4. In Rangefinder, tap tap  > Distance units
5. Select the desired value (either Meters or Feet).
6. Tap Accept button ✓ to accept changes .

To set Angle units:

1. In Rangefinder, tap tap  > Angle units
2. Select the desired value (either Degrees or Gons).
3. Tap Accept button ✓ to accept changes .

Bluetooth Output to External Devices (NMEA)

With Rangefinder, you can output measurement results NMEA data and pass through the host handheld's GNSS NMEA data to a Bluetooth port. This function allows Rangefinder to be used as a sensor for an external device such as a tablet computer or other bluetooth capable field device. The Bluetooth output feature can operate in two modes: Rangefinder Only

mode and Rangefinder & GNSS mode. In Rangefinder Only mode, only the Rangefinder measurements are sent out by Bluetooth.

In the **Rangefinder** Bluetooth Output mode, the NMEA output for the current measurement mode is sent via Bluetooth whenever the measurement is accepted.

In **Rangefinder & GNSS** Bluetooth Output mode, the internal Geo 7X GNSS receiver NMEA stream is passed through Rangefinder. Whenever a measurement is accepted, the the NMEA output is interposed in the NMEA stream.

To configure Bluetooth Output:

Prior to using the Bluetooth Output feature of Rangefinder, you need to pair the Geo 7X handheld with the host device to establish a Bluetooth connection, then set COM port serial input settings for the host application running on the host device (refer to Bluetooth setup instructions for your host device and application for instructions on how to do this).

1. In Rangefinder, tap tap  > Bluetooth Output
2. Select the desired value (either Rangefinder or Rangefinder & GNSS).
3. Tap Accept button  to accept changes.

***TIP:** Use the free Trimble GPS Controller software to configure and customize GNSS output prior to using the Rangefinder & GNSS mode. For details, refer to the downloads section of the Geo 7X product pages on www.trimble.com.*

Audio

With Rangefinder, you can enable or disable the application's audio notifications. Audio notifications provide you with more information about what is happening in the application.

- **One short (low-pitched) beep** - indicates the start of a measurement
- **One short (high-pitched) beep** - indicates a successfully completed measurement
- **Three fast (low) beeps** - indicates an error, or invalid action
- **Three fast (high-pitched) beeps** - indicates presence of magnetic disturbance that may be affected compass heading accuracy

To configure Audio Preferences:

1. In Rangefinder, tap tap  > Enable Audio
2. Select the desired value.
3. Tap **Accept** button  to accept changes .

To set System audio volume level:

1. Tap anywhere on the Operating System status bar
2. Tap the Volume control icon 
3. Set the slider to the desired value.
4. Tap OK.

Repeat Measurement Mode

With Rangefinder, you can make one measurement at a time, then automatically minimize the application upon completing the measurement, or if your workflow supports it (for example if you are using Trimble TerraSync software in QuickPoint mode, or if you have connected the Rangefinder Utility to an external device via Bluetooth), you can make multiple repeated measurements without minimizing the application between measurement workflows using the Repeat Measurement mode.

With Repeat Measurement mode enabled, each time you accept a measurement and output the result, the software returns you to the final step in the measurement workflow you used, so that (for example) in a height workflow, you can measure a new height without repeating all previous steps, or in an Offset workflow, you can quickly take offset multiple measurements without minimizing the application.

To set Repeat Measurement Mode Preference:

1. In Rangefinder, tap tap  > Repeat Measurement
2. Select the desired value.
3. Tap **Accept** button  to accept changes .
4. The Measurement button icon changes to indicate the current measurement state - either  for Single Measurement mode, or  for Repeat Measurement.

TIP: With Rangefinder, you can also quickly toggle between Repeat Measurement mode, and Single Measurement mode. From any active measurement step, press and hold the measure key to toggle the current Measurement mode between Single Measurement  and Repeat Measurement .

Sensor Calibration and Camera Alignment

With Rangefinder, it is important for optimal measurement accuracy that the handheld's orientation sensors are correctly calibrated for the environment that you are operating in, and that the handheld camera and Rangefinder module lasers are aligned.

Sensor Calibration



Sensor calibration calibrates orientation sensors for the local magnetic environment and temperature. Fast Sensor calibration should be performed regularly (once per day, for optimal accuracy), or as recommended by the handheld's magnetic disturbance warnings.

To perform a sensor calibration:

1. On the handheld tap  > Settings > System > **Sensor Calibration**
2. Follow the instructions provided by the Sensors Calibration tool. For more details refer to the Trimble Geo 7X handheld's User Guide.

Laser Alignment



Laser alignment determines any angular difference between the plane of view of the Geo 7X camera, and the Rangefinder module lasers. Laser alignment should be performed before using the Rangefinder for the first time, or any time that a Rangefinder module is removed then re-attached to the handheld. Laser alignment parameters are stored in the registry of the handheld and automatically adjust the field of view of the camera so that the on-camera crosshairs are aligned to the direction the Rangefinder lasers are aiming.

To perform a laser alignment:

1. Find a reflective surface 5-10 meters away.

2. On the handheld tap  > Settings > System > **Laser Alignment**
3. Follow the instructions provided by the Laser Alignment wizard. For more details refer to the Trimble Geo 7X handheld's User Guide.

***TIP:** Laser Alignment uses the red-pointer to detect the position of the laser in the camera field of view. Laser Alignment works best in indoor conditions, aiming at a flat surface between 5 and 10 meters from the users position. Stand front on to the target surface, and stand as still as possible to increase the accuracy of the auto-detection process. Do not align the laser using target surfaces less than 3 meters away.*

Shortcuts & Tips

Learn shortcuts and other tips for using Rangefinder efficiently.

For this action/control	Do this...
Continuous laser measurement mode	Press and hold the Measure button  in a laser measurement step.
Change the default output result in the Missing Line workflow	Tap the Triangle icon in the results panel to bring up a list of other results values. Tap a result to close the panel. The last used output is remembered as the new default the next time you use this workflow.
Switch between Repeat  and Single Measurement  mode	Press and hold the Right Application key on the keypad in any active measurement step.
Quickly access the sensor calibration utility from the Rangefinder application	Tap the Magnetic Disturbance indicator.

Trouble shooting

If you are having trouble with Rangefinder, try these troubleshooting tips.

Problem	Troubleshooting
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<p>Inaccurate compass measurements.</p>	<p>Make sure that the correct magnetic declination is being applied fro your current location. To reset the declination value:</p> <ol style="list-style-type: none"> 1. Close Rangefinder (using the Task Manager) 2. Connect to GPS using a GPS-enabled field software (e.g. the Compass application) and ensure that the handheld is generating GPS positions 3. Re-run Rangefinder. <p>Make sure that the orientation sensors are calibrated.</p> <p>Look out for sources of magnetic disturbance, and where practical and safe avoid taking measurements near these objects.</p>
<p>My Bluetooth device wants to connect to the Geo 7X on COM6.</p>	<p>The Rangefinder module consumes COM6, which was previously a Bluetooth port. If you need to use COM6, you need to uninstall the Rangefinder utility.</p>
<p>Rangefinder display values and Rangefinder NMEA output do not appear to match.</p>	<p>Rangefinder NMEA outputs are calculated relative to the Rangefinder height offset. If Rangefinder Height is set, this number can affect the output. To disable Rangefinder height, and output the values measured by the laser directly, set Rangefinder height to 0.00m</p>

Uninstalling Rangefinder

The Rangefinder software can be uninstalled at any time.

To uninstall Rangefinder:

1. In the handheld, tap Start > Settings > System > **Remove Programs**
2. Tap Trimble Rangefinder, then tap **Remove**. The application will be uninstalled. The handheld will need to restart at the end of this process.

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Release Notice

This is the June 2014 release (Revision A) of the Trimble Rangefinder Utility User Guide. It applies to version 1.20 of the software.

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