LaserSoft®

QuickMap 3D®

iOS User's Guide

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LTI LaserSoft QuickMap 3D User's Guide
4th Edition for iOS
Part Number 3210011-E

First Edition: January 2018
Second Edition: July 2018
Third Edition: March 2019
Fourth Edition: July 2023

Patents:
This product is covered by patents and pending patent applications, refer to the following website for more details: https://lasertech.com/lti-legal/

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www.lasertech.com/customer-service

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Section 1 - Introducing QuickMap 3D for iOS

Thank you for purchasing LaserSoft® QuickMap 3D® (QM3D) for iOS from Laser Technology, Inc. (LTI). QM3D is the first field data collection software for accident/crime mapping available on the iOS platform. Combine Laser Technology's highly accurate surveying instruments with QM3D for a complete accident/crime scene mapping solution.

LTI surveying instruments can automatically enter data into QM3D, which can create two-dimensional (2D) and three-dimensional (3D) maps.

QM3D survey files can be downloaded to a computer and imported into most CAD-based drawing programs capable of reading a *.DXF file, such as IMS Map360 or Crash Zone.

Technical Specifications

LaserSoft QuickMap 3D has been designed to run on the iOS operating platform for use in conjunction with Laser Technology surveying instruments.

Specification	Description
Operating Systems	iOS version 12+; check the App store for current information
Supported Devices	• iPhones • iPads
Connectivity	Bluetooth® or WLAN depending on laser in use
Compatible Lasers	• TruSpeed® Sxb Speed Measurement Device • TruPulse® 200X Laser Range Finder • TruPoint® 300
Hardware	• MapStar® TruAngle (required for Radial with Angle mapping method) • X-Grip & Mounting Claw for 7" Tablets (Optional)
Supported Languages	English; template is available for translation

Warranty Information

A copy of the LTI Limited Warranty should have shipped with orders including hardware. If needed, please contact LTI to obtain a copy of the LTI Limited Warranty. See the inside front cover for LTI contact information.

What's New

LaserSoft QuickMap 3D (QM3D) is the first field data collection software for crash and crime mapping built for iOS devices. QuickMap for iOS provides many feature enhancements over LTI's past Windows Mobile versions including:

- Email for data transfer quickly and easily - no more Windows Mobile Device Center syncing necessary.
- Larger display area and new touch/tap zoom functionality.
- Advanced spline curve feature.
- Automatic laser recognition and connection - once a laser is paired to a tablet, it is automatically recognized each time a new survey file is started.
- Remote fire the laser from the tablet.
- New built-in help for field access to steps for correcting heights, notes, and point orientation, moving to a new control point, and more.

Instrument Configurations

QM3D is designed to work with two possible instrument configurations:

- TruSpeed® Sxb Speed Measurement Device (Figure 1A)
- TruPulse® 200X Laser Range Finder with TruAngle (Figure 1B)
- TruPoint 300 Laser Range Finder (Figure 1C)

(A) (B) (C)

Figure 1

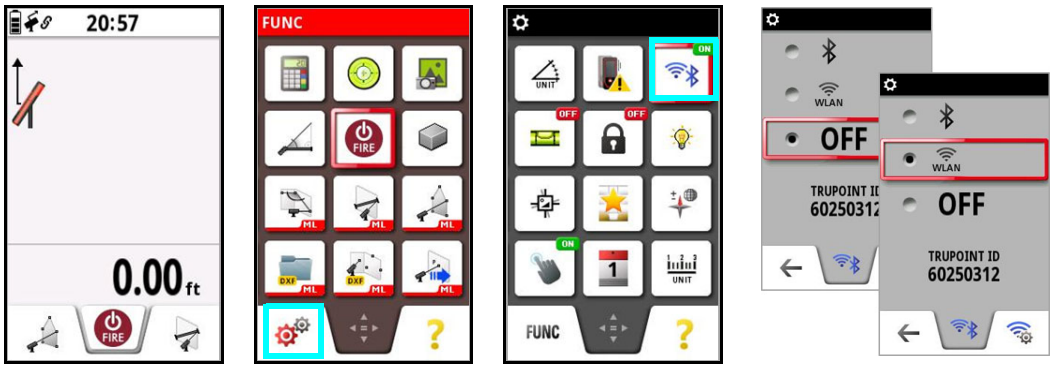
Laser Setup Notes

TruPoint 300:

The laser ships with meters as the default unit of measure. The unit of measure can be changed to feet at Function/ Settings/Units.

Set TruPoint Communication:

1. Default communication is "OFF" and must be switched to WLAN. Press  to power on the TruPoint 300 and display the Main screen (Figure 2A).
2. Press  on the TruPoint 300 to display function options and then tap  (Figure 2B).
3. Tap  twice to display connectivity options (Figure 2C).
4. Tap WLAN to activate WLAN connectivity (Figure 2D).
5. Short press the  on the TruPoint 300 (repeat if necessary) to return to the Main screen.



(A) (B) (C) (D)

Figure 2

TruPulse 200X:

This laser is designed specifically for mapping only and does not measure speed. When it is powered on, it is ready to begin taking measurements. When using a retro reflector, ensure the electronic filter is turned on AND that the mechanical foliage filter is affixed to the laser lens. This laser's default units setting is meters - please adjust the units to the desired setting (feet or meters) prior to mapping. Refer to the TruPulse 200X manual for further instruction.

TruSpeed Sxb:

This laser is designed to both map AND enforce speed. When powered on, it defaults to Speed Mode. Press the Mode button on the top of the laser one time to switch from Speed Mode to Mapping Mode. A Triangle will display in the lower left corner when looking through the scope. When using a retro reflector, ensure the electronic filter is turned on AND that the mechanical foliage filter is affixed to the laser lens. Refer to the TruSpeed Sxb manual for further instruction.

NOTE When mapping with a retro reflector, ensure that the electronic filter is turned on AND that the mechanical filter is affixed to the laser lens. If these filters are not used, close range measurements (where the retro reflector is within 10 feet of the laser or closer) may permanently damage the laser. Please see the hardware manual for further details.

For full out-of-the box and field setup information, see the QuickMap 3D Quick Start Guide (Appendix A, Page 74).

MapStar TruAngle Setup Notes

The MapStar TruAngle provides the horizontal vector necessary for 3D mapping from one position using the Radial with Angle mapping method. A user-defined zero is set and all angle measurements from that specific position are based upon that zero. In order to operate this device:

- Ensure to connect the laser to the TruAngle with the 4-pin cable included in the mapping package.
- Ensure the laser Bluetooth option is set for BT_Enc (use BT_On if not using a TruAngle).

Section 2 - Get Started with QuickMap

This section describes the download and installation procedure necessary to get started with QM3D. It explains how to get the app from the App Store and then launch it. Once the application has been successfully launched, follow the instructions in this section to license the program. QuickMap will work unlicensed for a 30-day trial period from the date of initial download.

Get QuickMap from the App Store

To get the QM3D app from the App Store:

1. Use the App Store search function to find "LaserSoft QuickMap" (Figure 2).
2. Tap the QuickMap icon to install the app as you would any other App Store application. If you do not already have an App Store account, you will be prompted to create one.

Figure 2

Pair a Laser with a Tablet

In order for data to be received from the laser to a tablet, the two must be paired via Bluetooth or WLAN. Once the laser has been paired to a tablet via Bluetooth, the pairing process described here does not have to be done again unless the laser is intentionally unpaired or the tablet is reformatted. When using a WLAN connection with the TruPoint 300, tablets and phones may reconnect to the default WiFi Internet network when the laser is powered off. In this case, go to Settings and select the TruPoint prior to starting a new survey map file.

Bluetooth Setup - TruPulse 200X and TruSpeed Sxb

1. Find and tap the Settings icon on the tablet (Figure 3).
2. Tap Bluetooth on the Settings list (Figure 4A).
   If Bluetooth is listed as "OFF," toggle it to "ON."
3. Tap the laser device's serial number which should be listed in section for available devices (Figure 4B). If it is not listed, tap search (or scan) for devices and/or ensure that the laser's Bluetooth is set to "BT_Enc" for Radial with Angle surveys and "BT_On" for Range Triangulation or Baseline Offset surveys.

   Bluetooth PIN Information: TruPulse 200X PIN = 1234 TruSpeed Sxb PIN = 6912 (Figure 4C)

4. Once successfully paired, the laser serial number will display in the My Devices section (Figure 4D).

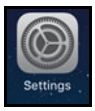
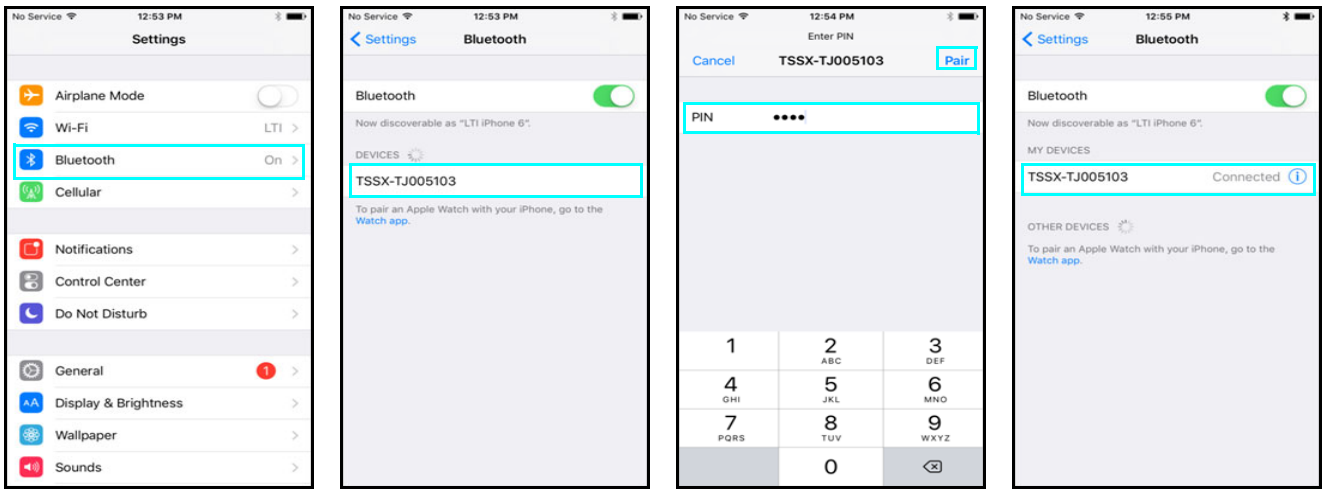


Figure 3

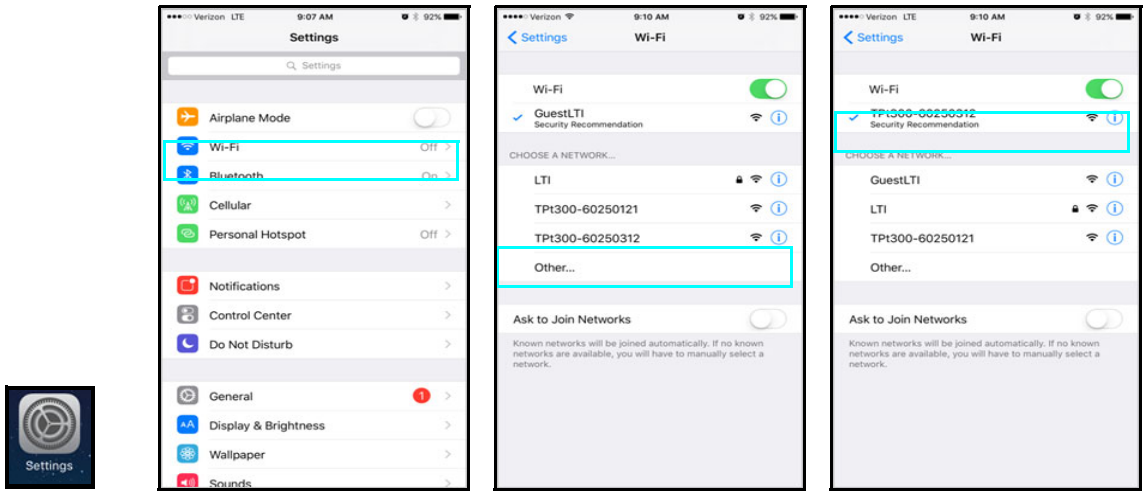


(A) (B) (C) (D)

Figure 4

WLAN Setup - TruPoint 300

1. Tap Settings on the tablet's main screen (Figure 5A).
2. Tap Wi-Fi (Figure 5B).
3. Find the laser serial number listed under "Choose a network…" (Figure 5C). If the laser serial number is not listed, ensure that the laser's WLAN communication is turned on (Page 7).
4. Tap the laser-serial number (Figure 5C). When the laser displays as "Connected" (Figure 5D), it has been successfully added as a network option and is ready to begin measurements.



(A) (B) (C) (D)

Figure 5

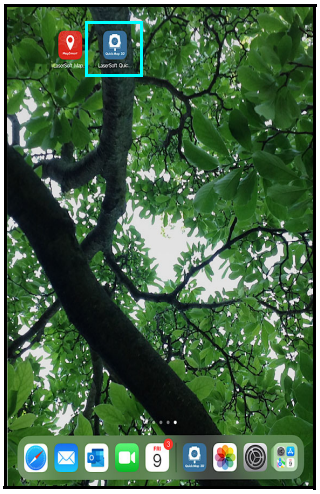
NOTE Depending on the operating system installed, not all iPhones/iPads will navigate to the Wi-Fi settings in same way as the example shown (iPhone 6 Plus/iOS 10); however, they will be very similar.

WARNING Due to the wide range of a WLAN connection, the TruPoint 300 can only be connected with one device at a time. If it is connected to more than one device (your phone and your tablet, for example) and those devices are within range of each other, the laser will not be able to make a connection to QuickMap.

Launch QuickMap

To launch the QuickMap app:

1. Find the QuickMap icon on the smart device (Figure 6A).
2. Tap the QuickMap icon (Figure 6B). After a short video, the licensing screen will display (Figure 6C).



(A)

(B)

(C)

Figure 6

Program Licensing

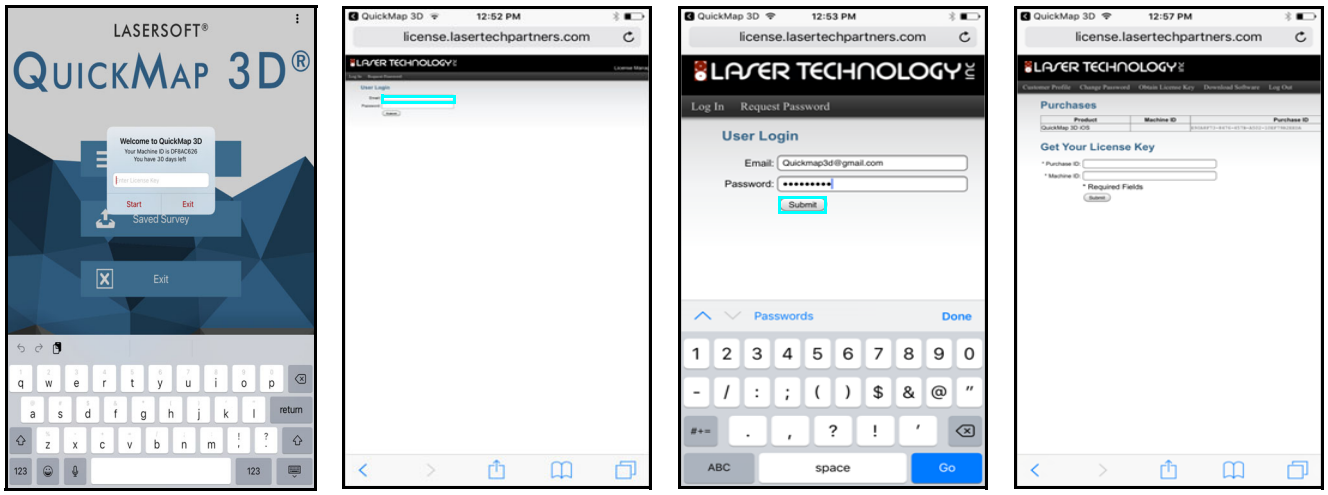
Upon any purchase of QuickMap 3D, Laser Technology generates a customer account on its License Manager website (http://license.lasertechpartners.com/CustomerLogin.aspx) that allows you to generate license keys. The first time QuickMap is started, a short video will play before the licensing screen is displayed. QuickMap can be used for 30 days from the date of download before a license key is required. Tap the License Manager button to proceed past the licensing screen and use the program. At the end of 30 days, QuickMap cannot be used without a license key. (Figure 7A).

About the 30-day Trial:

- The License Manager button is in the center of the licensing screen under the Start button. The content on the button changes depending on how many days are left in the trial. In Figure 7A, the button shows DEMO 25 DAYS LEFT.
- QuickMap 3D is fully functional during the trial period. Surveys made during this time are accessible during the trial and can be re-accessed when the program is licensed.
- Contact an authorized dealer near you to purchase a license key or call LTI for more information (1-877-696-2584 or 1-303-649-1000).

To generate a license key:

1. Notate the temporary password you received from licensing@lasertechpartners.com and open License Manager, http://license.lasertechpartners.com/CustomerLogin.aspx (Figure 7B). If you followed the link from the tablet QuickMap 3D licensing screen, your Machine ID has been automatically copied to the clipboard.
2. Tap the "Email" field to bring up the keyboard (Figure 7C). Enter the email address associated with your purchase and the temporary password. Click "Submit" to log in. If you do not have your temporary password, click the "Request Password" link at the top of the screen. Once successfully logged in, the "Obtain License Key" page displays (Figure 7D).

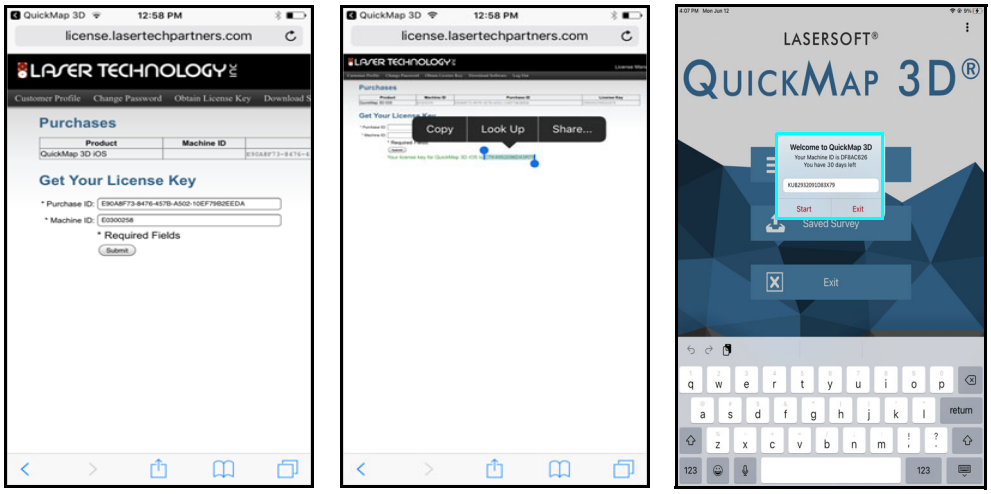


(A) (B) (C) (D)

Figure 7

(Continued on next page)

3. Upon logging in, your purchase is displayed (Figure 8A).
    - Machine ID: If you followed the "License Manager" link from the tablet (Figure 7A, Page 10), tap and hold the "Machine ID" field to paste the value. Or, enter the Machine ID displayed on the tablet screen (Figure 7A, Page 10).
    - Purchase ID: tap and hold the "Purchase ID" in the Purchase Table (Figure 8A) and select the "Copy" option. Tap and hold the "Purchase ID" field and select the "Paste" option.
4. Click "Submit" and your license key will display below the entry fields, as well as in the Purchases Table (Figure 8B).
5. Tap and hold to Copy, or notate the License Key (Figure 8B) and return to QuickMap.
6. Paste or enter the key into the "Enter License Key" field and tap Start (Figure 8C).



(A) (B) (C)

Figure 8

If an incorrect key is entered, the QM3D Main Menu will not be displayed. Instead, the display will return to the device home screen.

For assistance contact: servicecenter@lasertech.com or call 1-877-696-2584.

Please provide your name, company name, purchase ID (if known) as well as the Machine ID displayed on the tablet.

Section 3 - Mapping Methods

QM3D offers three unique mapping methods. This section provides an overview of those three methods. This section is only meant as an overview. Professional training on mapping methods in combination with the use of LTI measurement devices and computer software is strongly encouraged. Contact LTI for training options.

When deciding which method to use, consider:

- Equipment that you plan to use.
- 2D map: QM3D calculates X and Y coordinate for each data point
- 3D map: QM3D calculates X, Y, and Z coordinates for each data point
- Environmental factors such as terrain and curvature of the roadway
- Relative locations of the features to be mapped

Overview of Mapping Methods

Method	Requirements	Compatible Hardware
Radial with Angle	Clear line of sight from the origin point to each feature being mapped.	TruPoint 300 or MapStar TruAngle with a TruSpeed Sxb or TruPulse 200X
Range Triangulation	Able to occupy (stand over) every feature to be mapped. Clear line of sight from each feature to the control points.	TruSpeed Sxb or TruPulse 200X
Baseline Offset	Able to walk a straight line from one end of the scene to the other. Clear line of sight to each feature from a point along this straight line (the baseline).	TruSpeed Sxb or TruPulse 200X

Radial with Angle Method

This method requires the use of a TruPoint 300 or a MapStar TruAngle in combination with a TruSpeed Sxb (or TruPulse 200X). In this method, pivot around an origin point and measure to any feature of the scene in view from the origin point. QM3D uses the distance and angle (heading in degrees from a user-defined reference azimuth) to the feature to calculate X, Y (or X, Y, Z) coordinates for each feature. Figure 9 shows how an accident scene would be mapped using the Radial with Angle method.

To map this scene, physically move to the origin, also referred to as a Control Point or as CP, then define the reference azimuth (zero the TruAngle) to a reference point. The reference point should be a permanent object such as a fire hydrant. Then begin taking distance and angle measurements to as many features as can be seen. Once the features are measured, select any one of them as the new Control Point, and move to that point in order to measure the features not visible from CP1. Descriptive notes about the project and data can be entered, which aid in the clarity of the final data for easy diagramming.

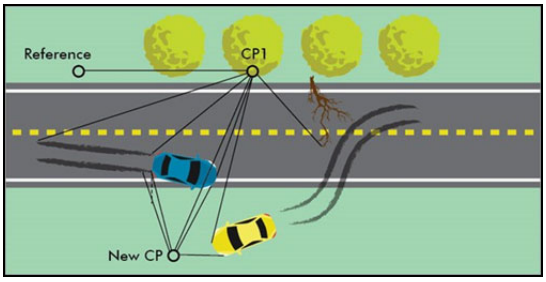


Figure 9

About Selecting the Origin Point

The origin point, also referred to as a control point or CP, defines where to begin collecting data and it can be located anywhere in the scene. It is a good idea to start from the point with the best visibility to most, if not all, of the features to be mapped.

When choosing an origin and reference point:

- Remember, if the user cannot see every feature to be mapped, set a new control point (Page 43), move to that point, and continue mapping.
- Consider plot scaling when choosing an origin. Avoid making a map with imperceptible clusters of points caused by one point being significantly distant from the rest.
- The reference point may be any identifiable, permanent object visible from the origin (CP1). As an example, use a telephone pole, street sign, or building corner as the reference point. More specifically, it's best to mark where on the fire hydrant the reference point was taken. The user will not need to measure the reference point, just site it with the laser and zero the MapStar Angle Encoder or the MapStar TruAngle.

Range Triangulation Method

In Range Triangulation, two measurements are required to map each feature (point) occupy the feature, shoot to CP1, and then to CP2 from that feature. The two measurements are made between two carefully positioned control points.

Measure from the feature to the control points and in some cases measure from the control points to the feature. The two control points and the feature form a triangle, and the geometry of the triangle is used to determine X, Y (or X, Y, Z) coordinates for each feature (Figure 10).

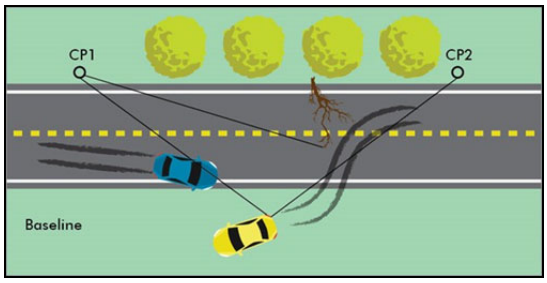


Figure 10

Measurements can be taken in one of two ways. Preferably stand at the tree branch and measure back to Control Point 1 (CP1), then to Control Point 2 (CP2), this method works for both a 2D and 3D map. Another option for 2D mapping is to measure to the branch from CP1, then move to CP2 and take another measurement to the branch.

Range Triangulation allows for a large degree of mobility in mapping because the user can redefine one or both control points at any time. For instance, a measurement to any feature can be redefined as a control point. In this way, the user can move about an accident scene to establish a good vantage point for mapping any feature. When making a 3D map, the user must measure from the feature to the control points.

About Selecting the Control Points

Range Triangulation uses the geometry of a triangle to calculate each coordinate. The two control points and the feature form the three points of the triangle. Select control points that can be seen from all features. However, if the view to any feature is blocked, set new control points (Page 45) to gain a better vantage point and successfully map each feature.

When choosing control points and mapping features, consider the following:

- Features that are in between or in-line with the control points are very difficult or impossible to map.
- Control points that are too far away from the features that need to be mapped will cause geometry warnings and will result in an unreadable plot.
- Features that are farther than 3 times the distance between the control points will cause geometry warnings. For example, if CP1 and CP2 are 100 feet apart, the features should not be more than 300 feet away from a control point.
- Looking at Figure 10 above, from CP2 the car is blocking the view to the end of the skid mark. From the Measure Menu, the Set New CP2 option redefines CP2 (Page 45), and then continue measurements using the new CP2.

Feature locations that produce poor or invalid data points (Figure 11). Features that fall in the hatched area (1) between the control points or (2) outside of the figure '8' shape will be difficult to map. Set new control points to map those features (Page 45).

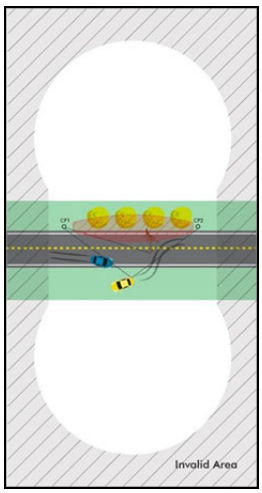


Figure 11

Geometry Messages

Geometry Warning - If the feature (data point) being mapped falls into the invalid area (Figure 11), it can present a possible error. The user can choose to accept marginal data and add the point anyway or select cancel and re-measure the point.

Geometry Error - The distances to the control points or features do not geometrically form a triangle, which is likely caused when a measurement to a point is missed. Clear the error message and re-measure (or manually re-add) the data point ensuring that there is a clear line-of-sight.

Baseline Offset Method

The Baseline Offset method is similar to Range Triangulation in that two measurements are required to map each point (feature). To begin, select a suitable object to serve as an origin point. The baseline is an imaginary line that runs from the origin point along the path of the accident. The baseline may run in any direction as long as it is perfectly straight. For example, a curb or sidewalk edge could serve as a baseline. Figure 12 shows how an accident scene would be mapped using the Baseline Offset method.

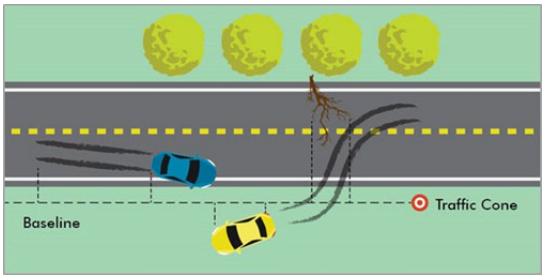


Figure 12

To map this scene, start by establishing the origin point, and then walking along the baseline. In Figure 12, a traffic cone is used as the Origin. Standing directly across from the accident feature at a 90º angle to the baseline, take two measurements. The first measurement is taken to the baseline Origin (traffic cone in this example), and the second measurement is taken to the feature itself. Continue to travel along the baseline and to measure each feature in this same way. Enter descriptive notes about the project and features (data points), which aid in the clarity of the final data for easy diagramming.

About Selecting the Origin and Baseline

Before starting a map, select an origin and a baseline. The baseline is a straight line that starts at the origin and runs along the path of the accident (or scene). When choosing a baseline, keep in mind that the user must be able to stand directly across from (and see) each feature while facing perpendicular to the baseline.

The Origin can be any feature that is already at the site, such as a tree, or it can be an installed point that is convenient to use (such as a traffic cone or a target mounted on a tripod). The Origin marks one end of the baseline, beyond which points cannot be mapped.

NOTE When choosing the Origin, baseline, and while mapping features, if the baseline and origin are too far away from the features that are mapped, the map will have an Origin far off to either edge and an imperceptible mass of data points somewhere in the middle.

Mapping Indoors

- All three data collection methods also work for indoor crime scenes. The results will be the same except on a smaller scale. Figure 13 shows an example of an indoor crime scene, measured using the Radial with Angle method. The investigator was positioned in a doorway and took shots to the broken window glass, the body, the gun, and the pool of blood.

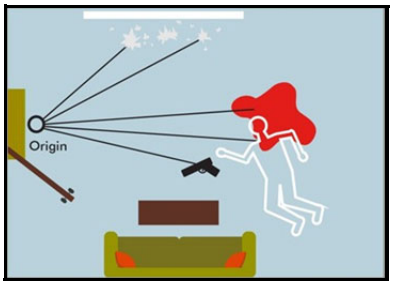


Figure 13

- If space constraints or accuracy requirements prevent the laser to measure distances, use a tape measure and manually enter the range into QM3D.
- A wall in the room could serve as the baseline when using the Baseline Offset method.
- Two corners of the room could serve as control points when using the Range Triangulation data collection method.

Section 4 - Collect Data

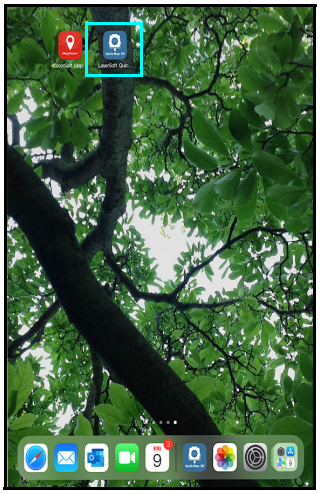
Once the equipment has been configured, the software has been installed and licensed, and the measurement method has been determined, it is time to begin collecting data. Ensure all equipment (laser, tablet, and TruAngle - if used) is powered on.

If at any time the tablet shuts down or locks up during the mapping process, power the unit back on and re-open QuickMap 3D to resume mapping. Data is automatically saved after each measurement to allow mapping to continue seamlessly.

Launch QuickMap

To launch the QuickMap 3D app:

1. Find the QuickMap 3D icon on the tablet (Figure 14A).
2. Tap the QuickMap icon (Figure 14B). If licensed, the Main menu will display (Figure 15).



(A)

(B)

Figure 14

About the Main Menu

This is the QuickMap 3D main menu (Figure 15):

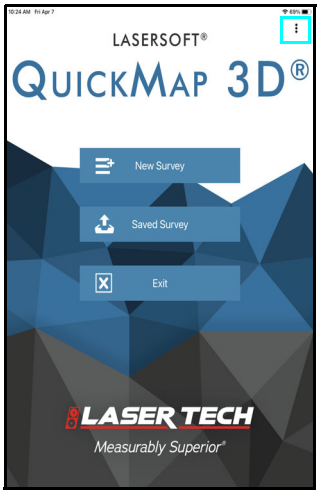


Figure 15

- Tap the Home button to leave QuickMap.
- Tap the Menu button ⋮ in the upper right corner of the screen to access:
  - Point Detail (displays as an option when a survey is open)
  - Help
  - File Properties (displays as an option when a survey is open)
  - Settings
  - About QuickMap 3D
- Tap [New Survey] to begin a new crash/crime scene map.
- Tap [Saved Survey] to display the Saved Surveys screen and select a survey. The Saved Survey screen includes 3 options:
  - Open
  - Delete
  - Send (as an email attachment)
- Tap [Exit] to close QuickMap and return to the tablet main screen.

Start a New Survey File

From the Main Menu, tap [New Survey] to create a new survey map. The New File Settings screen will display (Figure 16).

To fill out the New File Settings screen:

Figure 16

1. Enter/Select the following:
    - File name (a unique name for the map, dates are often used)
    - Tap to select equipment from the Device list
    - Tap to select desired mapping method.
    - Tap Units to change from Feet to Meters, if necessary
    - Enter instrument height (Page 18)
    - Enter the target height (retro reflector, if used)
    - Check boxes:
        - Reminders: Check this box to display reminders that may help throughout the mapping process
        - 3D: Check this box to map in 3D, uncheck for 2D
2. Tap [Next] to proceed to Set Origin or Control Points depending on the selected mapping method.

NOTE Any blank fields will be highlighted with an exclamation point. Enter the missing information and tap [Next].

File Name

Additional information regarding file name entry:

- File names may include any combination of alphanumeric characters.
- File names may contain a maximum of 1,500 alphanumeric characters.
- Four invalid characters include / \ & or space.
- An error message will be displayed if the file name includes invalid character(s).
- Clear the message by clicking "OK" and enter a name using valid characters.
- Duplicate file names are not allowed. If an existing name is entered, a prompt will appear indicating that a Duplicate File Name was entered. In order to proceed, the name must be changed.

Device

Tap to select one of the available device options based on the particular LTI device(s) being used and the desired mapping method (Figure 17).

Device	Range Triangulation	Radial with Angle	Baseline Offset
TruSpeed Sxb	✓		✓
TruSpeed Sxb with TruAngle		✓	
TruPulse 200X	✓		✓
TruPulse 200X with TruAngle		✓	
TruPoint 300		✓	

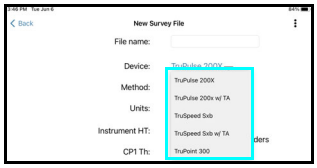


Figure 17

NOTE Only LTI Bluetooth model mapping lasers work with QuickMap 3D.
Units that require a cable are incompatible with the app.

Method

Select one of three available options: Range Triangulation, Radial with Angle, or Baseline Offset (Figure 18). For detailed information on each of these mapping methods, see Page 12.

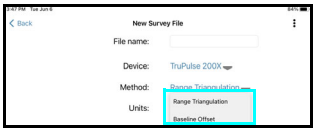


Figure 18

Units

Tap to select the desired units of measurement for distance and angle to match those set in the laser. Choose from:

- Feet/Meters

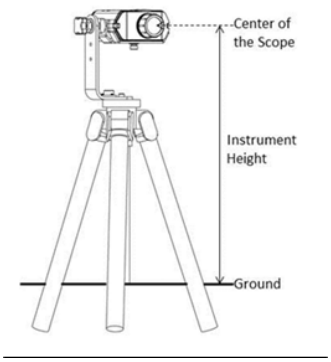
3D Mapping Option

There are some differences when mapping in 2D or 3D mode and some of the screens will display differently.

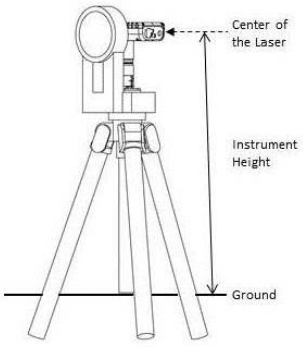
- When the 3D box is checked, the program creates a 3D survey map (default setting).
- When unchecked, the program creates a 2D survey map.

Instrument Height

When creating a 3D map, enter the distance from the ground to the center of the sighting scope (Figure 19).



TruPulse 200X
TruSpeed Sxb



TruPoint 300

Figure 19

Target/Feature Height

When creating a 3D map, enter the height of the retro reflector or piece of evidence to which you are shooting.

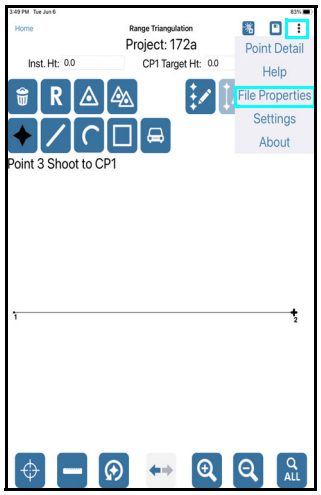
- This option varies depending upon the data collection method:
  - Range Triangulation: CP1 and CP2 Target Height
  - Radial with Angle: Target Height
  - Baseline Offset: Origin and Feature Height
- During data collection, height values may be changed through the Settings Menu (Page 49) or Editing Options (Page 60).
- When creating a 2D map, this option is available for notation purposes only. If values are entered, they are stored, but they do not affect map data.

Reminders

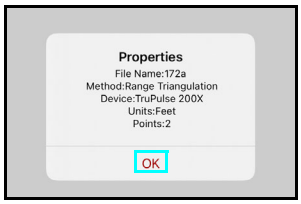
When this box is checked, reminder messages will be displayed throughout the mapping session that may assist in the data collection process. Reminders vary depending on the mapping method chosen at the New File Settings screen (Figure 16 on Page 17). If the box is unchecked, no reminder messages will display while mapping. It is possible to turn this option off using the Settings menu at any time during the mapping session.

Review Survey Properties

To see a quick view of the survey properties, tap the Menu button ⋮, and then choose File Properties (Figure 20A). The survey properties display (Figure 20B). Tap OK to clear the survey properties window.



(A)



(B)

Figure 20

Set Control Points/Origin

When using a TruPulse 200X or TruSpeed Sxb, upon tapping [Next] to advance ahead from the New File Settings screen, one of the following screens will be displayed. The specific screen that displays depends upon the mapping method that was selected when setting up the file.

Screen Views

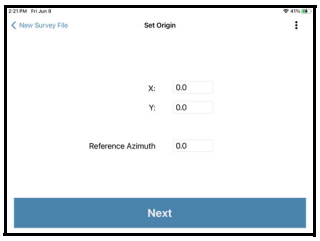
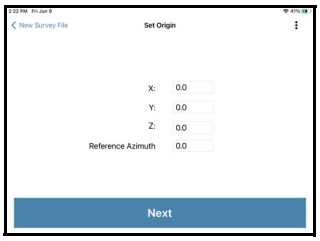
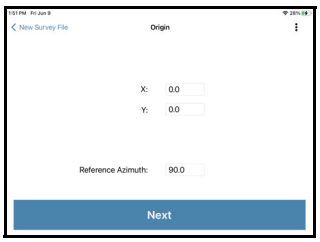
Mapping Method	2D Set Origin Screen	3D Set Origin Screen
Radial with Angle		
Range Triangulation		
Baseline Offset		

Figure 21

Radial With Angle

After choosing and physically occupying the origin and reference point, complete the Set Origin screen (Figure 21). Notice that default values (zeros) have been assigned. There are two options:

Option 1 - Choose to keep the default values of "0.00". Tap [Next] to advance to the Radial with Angle Data Collection screen, or tap the back arrow in the upper left corner of the screen to return to the New File Settings screen. These default values are used in most cases.

OR

Option 2 - If starting from a known coordinate position, enter the known X, Y (or X, Y, Z) coordinate for that instrument position. Tap [Next] to advance to the Radial with Angle Data Collection screen, or tap the back arrow in the upper left corner of the screen to return to the New File Settings screen.

TruAngle Quick Start

1. Connect laser to TruAngle with 4-pin to 4-pin cable.
2. Power on the TruAngle, screen displays "ind" (index) (Figure 22A).
3. Rotate the TruAngle until screen displays flashing "0.00."
4. Aim the laser at desired reference (0°) point, tighten down the TruAngle so it cannot rotate or move off target, and press the left-hand button or fire the laser to zero. The "0.00" will stop flashing (Figure 22B).
5. Press fire on the laser a second time to add the reference target as a point in your survey.

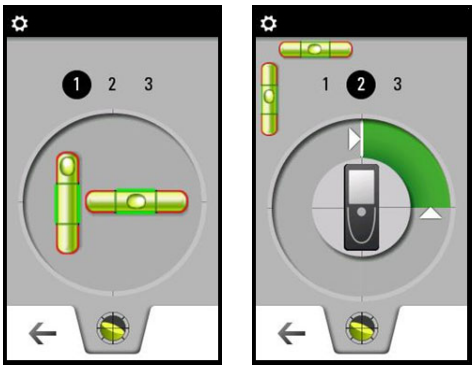
(A) (B)

Figure 22

Set the Origin and Zero Angle on Reference when Using a TruPoint 300

NOTE All equipment must be powered on to start a new file and begin mapping.

1. Tap  to establish connection to laser (takes 2-4 seconds) and the icon will change to reflect that the laser is connected and will also indicate if the battery life on the TruPoint 300 is sufficient (green) or requires a charge soon (yellow).
2. Level the TruPoint 300 so the bubbles appear in the green area and the TruPoint 300 beeps (Figure 23A).
3. Rotate the TruPoint 300 reducing the green area until TruPoint 300 beeps (Figure 23B).
4. Rotate the TruPoint 300 a second time, reducing the green until the TruPoint 300 beeps, and the Main screen displays.



(A) (B)

Figure 23

5. In QuickMap on the tablet, enter the coordinate for the instrument position. Two Options for the XYZ fields:
   - Option 1 – Choose to keep the default values of "0.00." TYPICAL OR
   - Option 2 – If starting from a known coordinate position, enter the XYZ values for that position.
6. Tap Red Dot On  and aim the TruPoint 300 to the Reference point (Figure 24A). If mapping outdoors, use the camera for aiming.
7. Tap [Shoot To Reference] to capture the angle value of the TruPoint (Figure 24B). The TruPoint Angle value will display. This value is considered "zero." Tap [Next] to continue to the Data Collection screen and begin mapping.

(A) (B)

Figure 24

Range Triangulation

After determining the two control points (CP1 and CP2), complete the Set Control Points screen (Figure 21 on Page 20).
These default values are used in most cases. Leave the zeros as they are and tap [Next].

NOTE The only time values might be entered is if X, Y or X, Y, Z are known values for the Origin (instrument position).

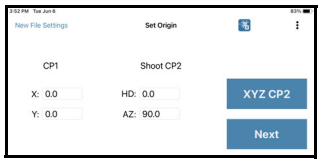
Set CP2 Manually

1. Tap in the fields to enter the X, Y (or X, Y, Z) coordinates of CP2 in relation to CP1.
2. Tap [Next] to advance to the next screen, or tap the back arrow in the upper left corner of the screen to return to the New File Settings screen.

Set CP2 Using the Laser:

1. Tap [HD AZ CP2] to set CP2 using the laser to automatically enter the location.
   The screen will change to Figure 25.
2. With the equipment centered over CP1, aim at the point you designated as CP2 and press the Fire button on the laser. The measured distance value will display in the HD field.
3. Tap [Next] to advance to the Range Triangulation Data Collection screen, or tap the back arrow in the upper left hand corner to return to the New File Settings screen.

2D



3D

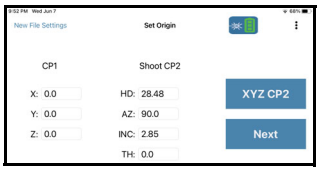


Figure 25

Baseline Offset

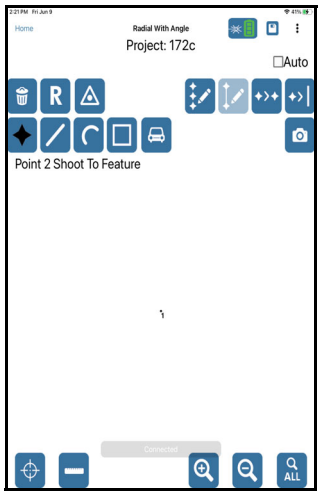
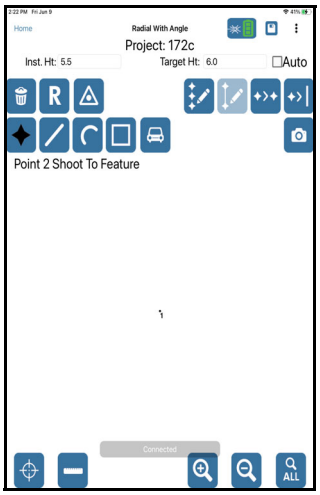
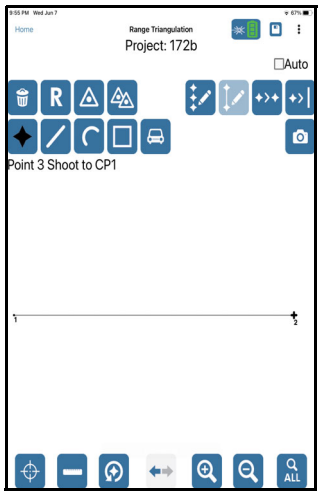
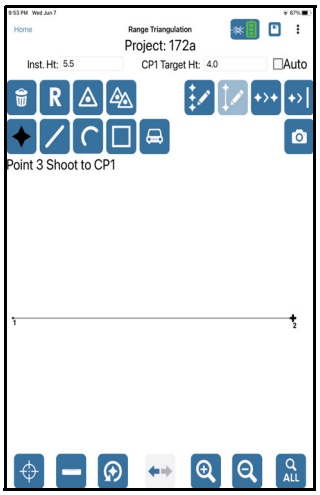
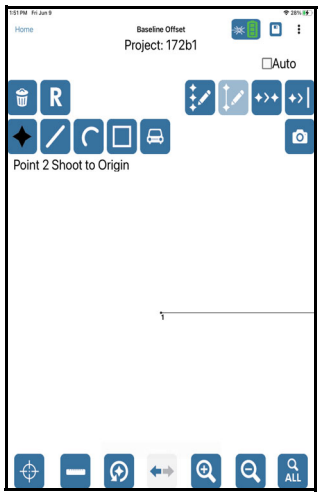
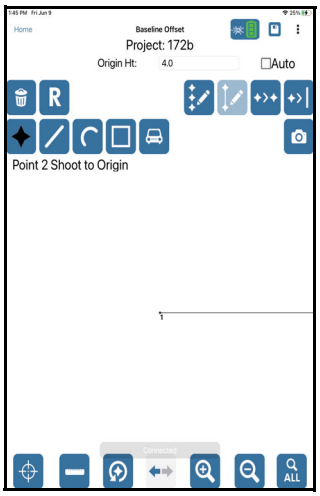
After choosing the Origin and the baseline of the scene, complete the Set Origin screen (Figure 21 on Page 20).
These default values are used in most cases - but may be edited.

Set Origin Manually Using Default or Known Values

1. Notice that zero-values appear. These default values are used in most cases. The only time other values might be entered is if there are known X, Y or X, Y, Z values for the Origin (instrument position).
2. Measure the Origin Height and enter it in the Origin height field (3D only).
3. Notice the Reference azimuth field says "90.00." When using the Baseline Offset mapping method, features are always measured at 90 degrees from the Origin. Leave this value unchanged.
4. Tap [Next] to continue to the Baseline Offset Data Collection screen, or tap the back arrow in the upper left corner of the screen to return to the New File Settings screen.

Data Collection Screen Overview

After control point(s) and/or Origin has been set, one of the following Data Collection screens will display depending on the selected mapping method and whether 2D or 3D was chosen on the New File Settings screen. Each screen view is shown in Figure 26.

Mapping Method	2D Set Origin Screen	3D Set Origin Screen
Radial with Angle		
Range Triangulation		
Baseline Offset		

NOTE For more information about that appear in QuickMap, please refer to the Icon Description Table on Page 25.

Figure 26

Icon Description Table

To locate a particular icon on the Data Collection screen, please refer to the previous page.

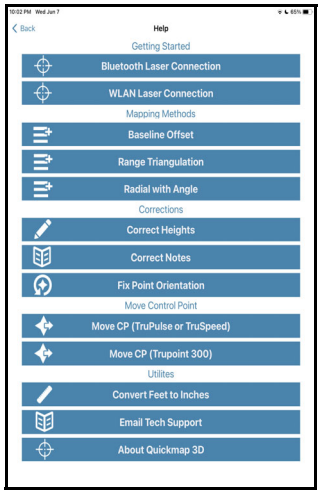
Icon	Description	Find out More
	**Laser Connection Indicator** - indicates that a laser is connected and the laser battery is good/sufficient. This icon will change from No Laser to Green or Yellow upon the first measurement taken.	N/A
	 - Change laser batteries as soon as possible.	
	 - No laser is connected/communicating.	
	 - The app is working to connect to the laser.	
	**Fire** - tap to fire the laser remotely.	Page 30
	Red Dot ON and Red Dot OFF (TruPoint 300 only).	Page 28
	**Point Feature** - tap to select (white area becomes shaded black) and add a point feature to the map.	Page 30
	**Line Feature** - tap to select (white area becomes shaded black) and add a line feature to the map.	Page 36
	**Curve Feature** - tap to select (white area becomes shaded black) and add a curve feature to the map.	Page 37
	**Area Feature** - tap to select (white area becomes shaded black) and add an area feature to the map.	Page 38
	**Vehicle Feature** - tap to select (white area becomes shaded black) and add a car feature to the map.	Page 39
	**Camera** - Add a photo of a measurement.	Page 42
	**Delete Point** - tap to delete a data point from the map.	Page 40
	**Reshoot** - tap to reshoot any measurement. For mapping methods that require two data points to create a measurement, the icon will switch to (R1) to indicate that the first measurement has been taken and can be reshot if necessary.	Page 41
	**New Control Point** - tap to set a new control point and move instrument position.	Page 43
	 **New Control Point (2)** - tap to set a new control point for CP2 in a Range Triangulation survey.	Page 45
	**Edit Point** - Found on the Point Detail screen (not the main Data Collection screen); tap to edit the heights or notes associated with any point.	Page 60
	**Edit Point Series** - tap to edit heights for a group of points.	Page 62

Icon	Description	Find out More
	**Edit Feature** - tap to edit heights for the group of data points that make up a line, curve, or area feature.	Page 63
	**Point to Point** - tap to find the measurement data between any two data points in the survey.	Page 51
	**Point to Line** - tap to find the measurement data between any data points.	Page 52
	**Zoom In** - tap to zoom in the map display area.	Page 53
	**Zoom Out** - tap to zoom out the map display area.	Page 53
	**Zoom All** - tap to zoom to the map display area view that includes all of the points in the display screen.	Page 53
	**Ruler** (Manual Measurement Entry) - tap to enter a measurement value in the event that a target cannot be acquired by the laser (target and laser are too close to each other or the target is obscured). This feature is available for Range Triangulation and Baseline Offset mapping methods ONLY.	Page 33
	**Flip Point** - tap to flip the last measured data point from Left to Right orientation or vice versa.	Page 66
	**Left/Right Arrow** - tap to indicate on which side of the Baseline or the line between CP2 and CP1 that the next data point will be assigned. When tapped, the gray arrow will turn red to indicate the orientation change.	Page 29
	**Save Reports** - tap to save and/or email reports from the map data of the open survey file (*.DXF, *.CSV, etc.).	Page 68
	**Point Detail** - tap to display the Point Detail screen. This icon appears to the right of the Save icon at the top right of the screen if the Android device has finer display resolution.	Page 60
	Traverse - tap to move to a new control point (Range Triangulation method only).	Page 45

Help Screens

QuickMap 3D Help includes information about the mapping methods, meanings of icons, how to traverse, and how to correct any errors that might have been made during the mapping process. Help is located as a menu option in the upper right corner of the QuickMap screen at any time the program is open (Figure 27A). Tap Help from the menu to display the QuickMap Help Menu (Figure 27B).

(A)



(B)
Figure 27

Help Menu Options:

- Getting Started
  - Bluetooth Laser Connection - correct the laser connection.
  - WLAN Laser Connection - correct the laser connection.
- Mapping Methods
  - Baseline Offset - notes for setting up, defining point orientation, and icon descriptions
  - Range Triangulation - notes for settings up, point orientation, and icon descriptions
  - Radial with Angle - notes for setting up and icon descriptions
- Corrections
  - Correct Heights - forgot to adjust a point height or the height of a group of points while mapping? See the steps to correct it here.
  - Correct Notes - forgot to uncheck auto? See the steps to correct it here.
  - Fix Point Orientation - forgot to change from left to right or right to left when mapping points? See how to correct it here.
- Move Control Point - is the scene too big to map from one position? See how to move to a new Control Point with the Radial with Angle mapping method.
  - Move CP (TruPulse 200X or TruSpeed Sxb)
  - Move CP (TruPoint 300)
- Utilities
  - Conversion Feet to Inches - for inches to decimal feet, for entering into Target/Feature/Instrument Height fields or manual measurement entry.
  - Email Tech Support - If a crash happens, re-open the survey and use this feature to send a diagnostics file and/or the *.QM3D file to technical support for assistance.
  - About QuickMap 3D - find the software version number and Laser Technology contact information.

Define the Orientation of Features

When mapping features, it is necessary to consider each feature's orientation relative to the Origin or Control Points.

Radial with Angle - TruPulse 200X and TruSpeed Sxb

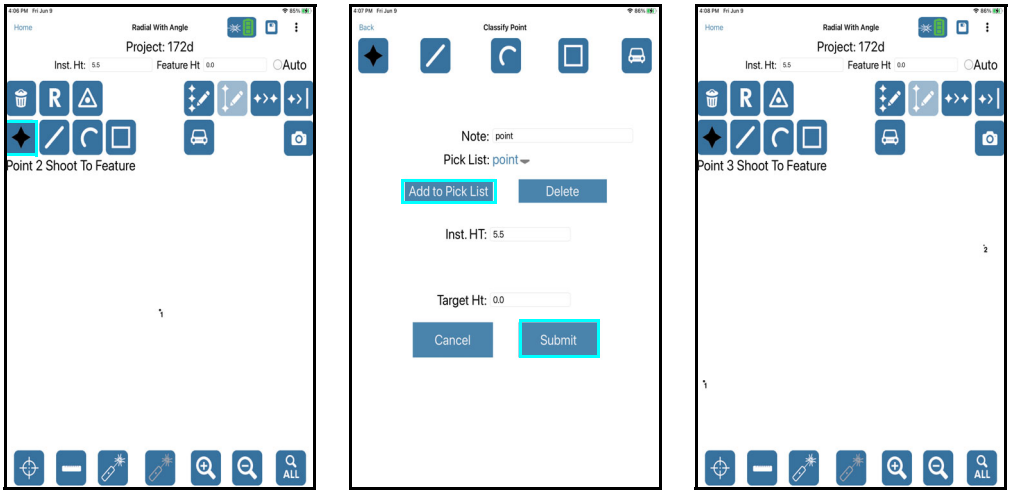
In this method, all shots are fore shots meaning that the user occupies a known position and shoots to an unknown. It is not necessary to define feature orientation.

Radial with Angle - TruPoint 300

When adding a point to a Radial with Angle survey, all shots are fore shots; shooting from the Control Point to the target. This example shows the Data Collection screen when making a 3D map. When making a 2D map, the Inst. Ht. and Target Ht. fields will not be displayed.

1. Occupy the CP (or Origin).
2. Tap the Point button  ; it is shaded black when active (Figure 28A).
3. Aim and fire the laser at the target feature.An audible shot sound signifies that measurement data has been successfully received. If there is no beep, press fire again or tap the laser connection icon and then press fire again. The Description Detail screen will display (Figure 28B). Enter a description in the Note field and tap [Add to Pick List] (or select an existing description from the Pick List drop-down menu) and tap [Submit]. See more about the Description Detail screen on Page 60.The new point (Point 2 in this example) displays (Figure 28C).

   NOTE In Radial with Angle, the CP is always Point 1 when starting a new file. Repeat the above steps to continue adding points to the map. When shooting a series of points that will have the same Note, check the [AUTO] box to skip the Description Detail screen. QuickMap will assign the previous note to points until the [AUTO] box is unchecked.



(A) (B) (C)

Figure 28

Range Triangulation

While using the Range Triangulation mapping method, points that will be mapped may be located on either side of the line that connects CP1 with CP2. The left/right arrow button at the bottom of the Data Collection screen (Figure 29) tells QuickMap on which side of the line to place the point. Before measuring, determine which side is appropriate for the point and ensure the left/right arrow is toggled appropriately. Tapping the left/right arrow icon with the stylus will toggle the view.

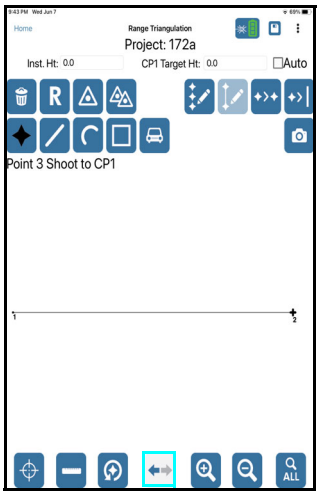


Figure 29

Right - Determined from the perspective of standing at CP2 and looking at CP 1; when the right arrow is highlighted, the feature will display to the right of the Control Points.

Left - Determined from the perspective of standing at CP2 and looking at CP1; when the left arrow is highlighted, the feature will display to the left of the Control Points.

Flip Point - If a measurement is accidentally placed on the wrong side of the control points, tap the Flip Point icon at the bottom of the screen to instantly move the point to the correct side of the control points.
For more information about Flip Point functionality, see Page 66.

Baseline Offset

While using the Baseline Offset mapping method, points that will be mapped may be located on either side of the baseline. The left/right arrow button at the bottom of the Data Collection screen (Figure 30) tells QuickMap on which side of the baseline to place the point. Before measuring, determine which side is appropriate for the point and ensure the left/right arrow is toggled appropriately. Tapping the left/right arrow icon with the stylus will toggle the view.

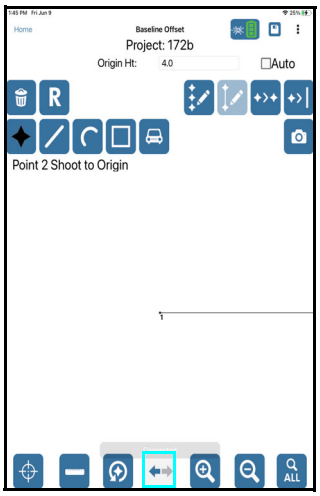


Figure 30

Right - Determined from the perspective of standing at a position along the baseline that is perpendicular to the feature and facing the Origin; when the right arrow is highlighted, the feature will display to the right side of the baseline.

Left - Determined from the perspective of standing at a position along the baseline that is perpendicular to the feature and facing the Origin; when the left arrow is highlighted, the feature will display to the left of the baseline.

Flip Point - If a measurement is accidentally placed on the wrong side of the baseline, tap the Flip Point icon at the bottom of the screen to instantly move the point to the correct side of the baseline.
For more information about Flip Point functionality, see Page 66.

Add a Point Feature

By default, the Point Feature button is automatically active when a new map is created. While this button is active, as data points are added, they are categorized as point features. If the Store Notes option (Page 49) is turned ON, each time a point is added, the Description Detail screen (Page 60) will be displayed. The Description Detail screen allows for the entry of descriptive information for the point that will add to the clarity of the final map. The Point Feature button is shaded black when active, and remains active until another button is selected. Data points may be added automatically using a laser or manually.

Add a Point Using a Laser

The steps required to add a data point using a laser depend upon the mapping method used.

Radial with Angle

When adding a point to a Radial with Angle survey, all shots are fore shots; shooting from the Control Point to the target (or retro reflector). This example shows the Data Collection screen when making a 3D map. When making a 2D map, the Inst. Ht. and Feature/Target Ht. fields will not be displayed.

1. Occupy the CP (or Origin).
2. Tap the Point button  ; it is shaded black when active (Figure 31A).
3. Aim and fire the laser at the target feature (or retro reflector). An audible shot sound signifies that measurement data has been successfully received. If there is no beep, press fire again or tap the laser connection icon and then press fire again. The Description Detail screen will display (Figure 31B). Enter a description in the Note field and tap [Add to Pick List] (or select an existing description from the Pick List drop-down menu) and tap [Submit]. See more about the Description Detail screen on Page 60.
4. The new point (Point 2 in this example) displays (Figure 31C).

(A) (B) (C)

Figure 31

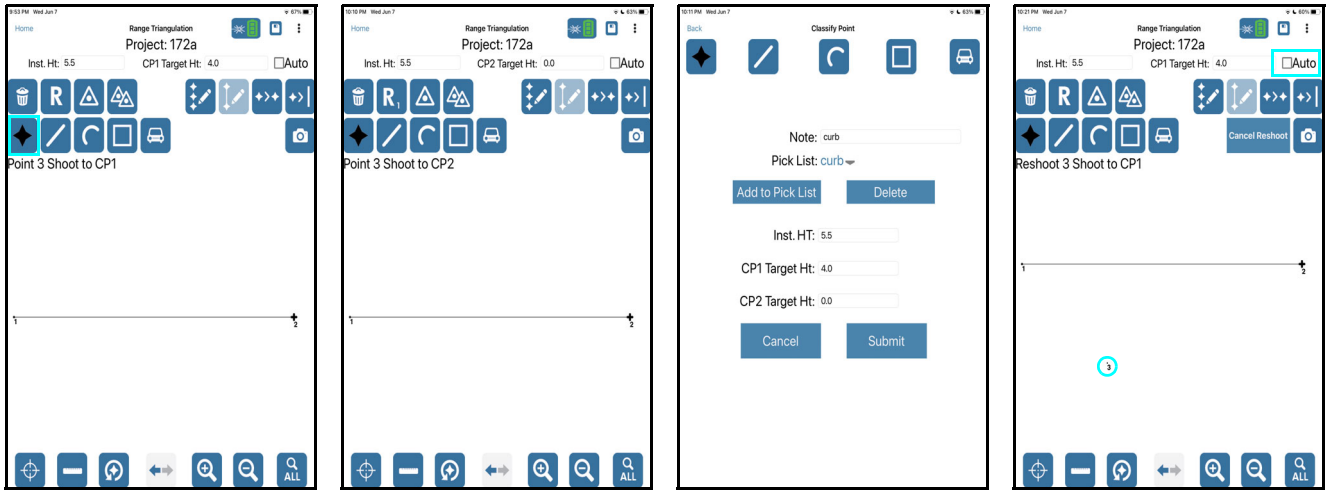
Important notes about adding point features:

- If the next point (or group of points) to be mapped will share the description of the previous point, check the box to engage the Auto option located in the top right area of the Data Collection screen (Figure 31C) and skip the Description Detail screen. Uncheck the box to measure a point with a new or different description.
- To measure points that do not have a clear line of sight from the current Control Point, use an adjustable height target or skip the point and map everything else using the current CP. Set a new CP later to pick up any remaining points. For more information about setting a new CP, see Page 43.

Range Triangulation

When adding a point to a Range Triangulation survey, each point requires two measurements to be taken in order to be placed in the display area; shoot from the feature (evidence location) to CP1 and then to CP2. This example shows the Data Collection screen when making a 3D map. When making a 2D map, the Inst. Ht. and Target Ht. fields will not be displayed.

1. Occupy the feature (evidence location).
2. Tap the Point button  it is shaded black when active (Figure 32A).
3. Determine if the point should be added to the right or left of the line that connects CP1 with CP2 and ensure the left/right arrow is toggled appropriately.
4. Aim and fire the laser at CP1. An audible shot sound signifies that measurement data has been successfully received. If there is no beep, press fire again or tap the laser connection icon and then press fire again. The Instruction Line will prompt "Point # Shoot to CP2" (Figure 32B).
5. Aim and fire the laser at CP2. An audible shot sound signifies that measurement data has been successfully received. If there is no beep, press fire again or tap the laser connection icon and then press fire again. The Description Detail screen will display (Figure 32C). Enter a description in the Note field and tap [Add to Pick List] (or select an existing description from the Pick List drop-down menu) and tap [Submit]. See more about the Description Detail screen on Page 60.
6. The new point (Point 3 in this example) displays (Figure 32D).



(A) (B) (C) (D)

Figure 32

Important notes about adding point features:

- **Point Orientation** — **Right**: Determined from the perspective of standing at CP2 and looking at CP 1; when the right arrow is highlighted, the feature will display to the right of the Control Points.
  Left: Determined from the perspective of standing at CP2 and looking at CP1; when the left arrow is highlighted, the feature will display to the left of the Control Points.
- If the next point (or group of points) to be mapped will share the description of the previous point, check the box to engage the Auto option located in the top right area of the Data Collection screen (Figure 32D) and skip the Description Detail screen. Uncheck the box to measure a point with a new or different description.
- To measure points that do not have a clear line of sight from a feature to the current CPs, use an adjustable-height target or skip the point and map everything else using the current CPs. Set a new CP1 (or CP2) later to pick up any remaining points. For more information about setting a new CP, see Page 43.

Baseline Offset:

When adding a point to a Baseline Offset survey, all points require two measurements to be taken in order to be placed in the display area; first to the Origin, then to the feature. This example shows the Data Collection screen when making a 3D map. When making a 2D map, the Inst. Ht. and Target Ht. fields will not be displayed.

1. Occupy the feature (evidence location).
2. Tap the Point button  it is shaded black when active (Figure 33A).
3. Standing at a position along the baseline that is perpendicular to the feature, determine if the point should be added to the right or left of the baseline. Ensure the left/right arrow is toggled appropriately.
4. Aim and fire the laser at the Origin. An audible shot sound signifies that measurement data has been successfully received. If there is no beep, press fire again or tap the laser connection icon and then press fire again. The Instruction Line will prompt "Point # Shoot to Feature" (Figure 33B).
5. Aim and fire the laser at the feature. An audible shot sound signifies that measurement data has been successfully received. If there is no beep, press fire again or tap the laser connection icon and then press fire again. The Description Detail screen will display (Figure 33C). Enter a description in the Note field and tap [Add to Pick List] (or select an existing description from the Pick List drop-down menu) and tap [Submit]. See more about the Description Detail screen on Page 60.
6. The new point displays, Point 2 in this example (Figure 33D).

(A) (B) (C) (D)

Figure 33

Important notes about adding point features:

- Point Orientation Right: Determined from the perspective of standing at a position along the baseline that is perpendicular to the feature and facing the Origin; when the right arrow is highlighted, the feature will display to the right side of the baseline. Left: Determined from the perspective of standing at a position along the baseline that is perpendicular to the feature and facing the Origin; when the left arrow is highlighted, the feature will display to the left of the baseline.
- If the next point (or group of points) to be mapped will share the description of the previous point, check the box to engage the Auto option located in the top right area of the Data Collection screen (Figure 33D) and skip the Description Detail screen. Uncheck the box to measure a point with a new or different description.
- The Origin marks the end of the baseline, beyond which points cannot be mapped.
- There is no capability for setting a new Origin point in the Baseline Offset mapping method.

Add a Point Manually

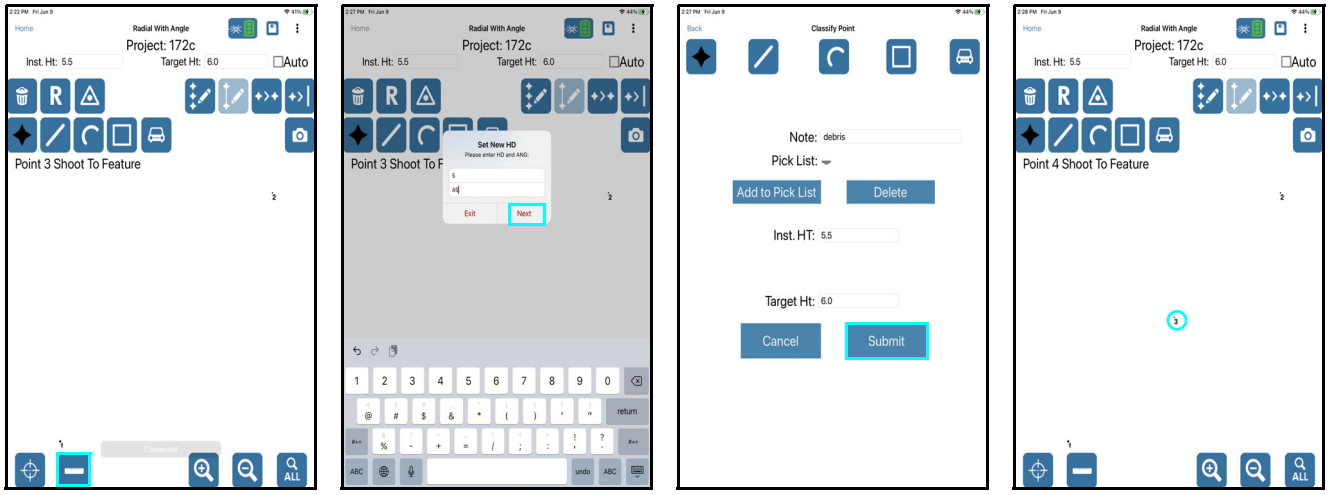
If use of a tape is needed instead of the laser, data points can be entered manually in any of the data collection methods.

TruPulse 200X and TruSpeed Sxb

If using a tape instead of a laser, data points can be entered manually in Range Triangulation and Baseline Offset surveys.

To manually enter a data point (works for the first or second measurement it takes to log a data point in a Baseline or Range survey):

1. Tap the ruler icon  at the bottom of the screen (Figure 34A).
2. Enter the HD value and the angle value displayed on the TruAngle while aiming in the direction of the evidence using the onscreen keyboard.
3. Tap Next (Figure 34B).
4. Enter a Note (optional) and tap Submit (Figure 34C).
5. The point displays on the Data Collection screen, in this example - Point 3 (Figure 34D).



(A) (B) (C) (D)

Figure 34

NOTE Refer to the conversion chart in Appendix B (Page 79) to equate fractional inches shown on a measuring tape to decimal feet (the decimal equivalent required by QM3D). The conversion chart is also available within QuickMap 3D's built-in help (Page 27).

TruPoint 300

Horizontal Distance measurements can be manually entered to create a point in situations where evidence is obstructed from view or when evidence is very close to or underneath the legs of the tripod. When working indoors, the ability to manually enter horizontal distance measurements can prevent a necessity to move to a new control point in order to measure all evidence inside of a room. For evidence within the radius of the tripod that is unreachable by the TruPoint, a horizontal distance is added and horizontal angle positioning is acquired by lining the laser up with the evidence and capturing the angle.

NOTE The radius that is excluded depends on the height of the tripod. Just above waist high is the most comfortable.

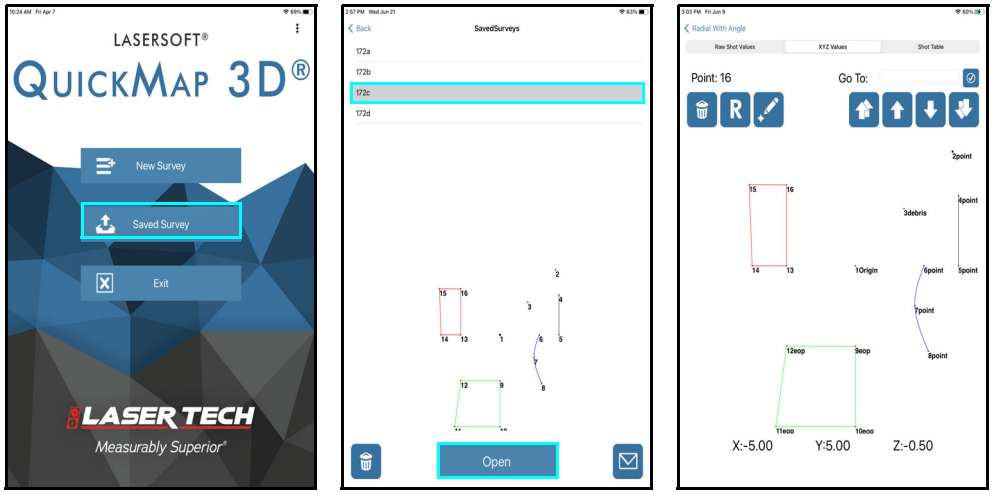
1. Tap the ruler icon  at the bottom of the screen.
2. Using a tape, measure the horizontal distance and enter the value in the HD field.
3. Aim and tap the Remote Fire button  to capture the horizontal angle.
   The angle value will display in the ANG field.
4. Tap OK to accept the HD and ANG values.
5. Enter a description for the point and tap SUBMIT.
   The new point will display on the Data Collection screen.

NOTE Refer to the conversion chart in Appendix B (Page 81) to equate fractional inches shown on a measuring tape to feet (the decimal equivalent required by QM3D). The conversion chart is also available within QuickMap 3D's built-in help (Page 27).

Add Points to a Saved Survey

It is possible to revisit a scene and add data points to an existing survey.

1. From the Main Menu, tap [Saved Survey] (Figure 35A).The Saved Survey screen will display (Figure 35B).
2. Select the saved survey you want to work with and tap [Open] to display the Data Collection screen (Figure 35C).



(A) (B) (C)

Figure 35

The steps to add points to a saved survey differ slightly depending on the equipment combination in use. The following steps assume that you have left a nail (or some other target at your instrument position(s) and reference when the original survey was mapped.

TruPulse 200X or TruSpeed Sxb + TruAngle

Set up on the last instrument position occupied when the original survey was mapped.

1. Power on all equipment.
2. Open QuickMap and tap [Saved Surveys].
3. Zero the TruAngle:
   - If there was only one instrument position in the survey (the Origin), aim the laser at the original reference point for the survey and zero the TruAngle on that point.
   - If there was more than one instrument position in the survey, aim the laser at the previous instrument position (not the original reference) and zero the TruAngle on that point.
     NOTE For help with zeroing a TruAngle, see Page 21.

Begin adding new data points to the survey. To verify that you have correctly re-entered the survey, shoot in a point that was mapped in the original survey. The new point should be on top of or very close to the point shot in the original survey.

TruPoint 300

1. Set up on the last instrument position occupied when the original survey was mapped.
2. Power on all equipment.
3. Open QuickMap and tap [Saved Surveys].
4. Tap  . Wait a few seconds for the laser to respond and prompt for the leveling routine.
5. Level the TruPoint. See Page 21 for more information on that procedure.
6. Long-press  to display the re-zeroing dialog. A short press on this icon implements the routine for moving your instrument position. Ensure that you see the dialog as displayed in Figure 36A that **DOES NOT** say "Move to Point."
7. Zero the TruPoint 300:
   - If there was only one instrument position in the survey (the Origin), aim the laser at the original reference point for the survey and tap t he Remote Fire button  to zero the TruPoint on that point.
   - If there was more than one instrument position in the survey, aim the laser at the previous instrument position (not the original reference) and tap the Remote Fire button  to zero the TruPoint on that point. The dialog will display "Angle Zeroed" (Figure 36B).
8. Tap OK to return to the Data Collection screen.
9. Begin adding new data points to the survey. To verify that you have correctly re-entered the survey, shoot in a point that was mapped in the original survey. The new point should be on top of or very close to the point shot in the original survey.

(A) (B)

Figure 36

Add a Line Feature

When the Line button  is active, points added to the display area will be connected with a visible black line and will be categorized as a line. The Line Feature button is shaded black when active, and remains active until another icon is selected. Data points may be added automatically using a laser or manually. If the Store Notes option (Page 49) is turned ON, each time a point in the line feature is added, the Description Detail screen (Page 60) will be displayed. The Description Detail screen allows for the entry of descriptive information for the point and that will add to the clarity of the final map. The following example walks through adding a Line feature in the Radial with Angle mapping method:

1. Occupy the CP (or Origin).
2. Tap the Line button  ; it is shaded black when active (Figure 37A).
3. Aim and fire the laser at the target feature (or retro reflector). An audible shot sound signifies that measurement data has been successfully received. If there is no beep, press fire again or tap the laser connection icon and then press fire again. The Description Detail screen will display (Figure 37B). Enter a Feature Name in the Name field and a description in the Note field and tap [Add to Pick List] (or select an existing note description from the Pick List drop-down menu) and tap [Submit]. See more about the Description Detail screen on Page 60.
4. The data point in the line displays (Figure 37C). In this example the line starts at Point 3 (Auto is checked) and continues through Point 6 (Figure 37D).

(A) (B) (C) (D)

Figure 37

Important notes about adding line features:

- Data points that make up the line feature must be added in sequential order.
- To insert a data point out of order, add it as a point feature and then use the Edit Point option to change the feature type from point to line (Page 63).
- Lines are shaded black to distinguish lines from curves, areas, and vehicles.
  - Curves = blue
  - Areas = green
  - Vehicles = red

Add a Curve Feature

When the Curve button  ; is active, points added to the display area will be connected with a visible blue spline curve and will be categorized as a curve. The Curve Feature button is shaded black when active, and remains active until another icon is selected. Data points making up a curve may be added automatically using a laser or manually. If the Store Notes option (Page 49) is turned ON, each time a point in the curve feature is added, the Description Detail screen (Page 60) will be displayed. The Description Detail screen allows for the entry of descriptive information for the point and that will add to the clarity of the final map. The following example walks through adding curve feature data points in the Radial with Angle mapping method:

1. Occupy the CP (or Origin).
2. Tap the Curve button  ; it is shaded black when active (Figure 38A).
3. Aim and fire the laser at the target feature (or retro reflector). An audible shot sound signifies that measurement data has been successfully received. If there is no beep, press fire again or tap the laser connection icon and then press fire again. The Description Detail screen will display (Figure 38B). Enter a Feature Name in the Name field and a description in the Note field and tap [Add to Pick List] (or select an existing note description from the Pick List drop-down menu) and tap [Submit]. See more about the Description Detail screen on Page 60.
4. The new curve data point displays, Point 8 in this example (Figure 38C).
5. As the rest of the curve is mapped, it displays as shown in Figure 38D.

(A) (B) (C) (D)

Figure 38

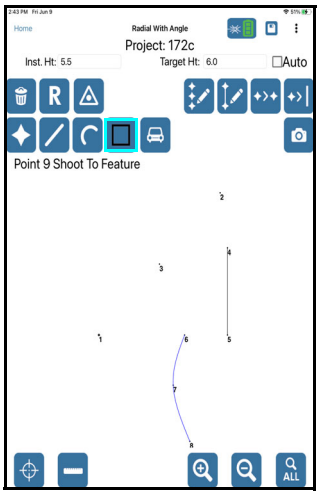
Important notes about adding curve features:

- Data points that make up the curve feature must be added in sequential order.
- To insert a data point out of order, add it as a point feature and then use the Edit Point option to change the feature type from point to curve (Page 63).
- Keep in mind that the Data Collection screen is a dynamic display. As data points are added, the curve's appearance may change. Due to physical limitations of the, curves may appear more jagged than expected. The same curve will appear smooth once the project is transferred to the PC and opened in a drawing program.
- Curves are shaded blue to distinguish curves from areas, vehicles, and lines.
    - Areas = green
    - Vehicles = red
    - Lines = black

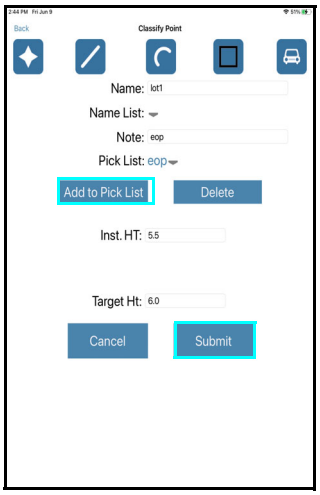
Add an Area Feature

When the Area button is active  , points added to the display area will be connected with a visible green line and will be categorized as an area. The Area Feature button is shaded black when active, and remains active until another icon is selected. Data points making up an area may be added automatically using a laser or manually. If the Store Notes option (Page 49) is turned ON, each time a point in the area feature is added, the Description Detail screen (Page 60) will be displayed. The Description Detail screen allows for the entry of descriptive information for the point and that will add to the clarity of the final map. The following example walks through adding area feature data points in the Radial with Angle mapping method:

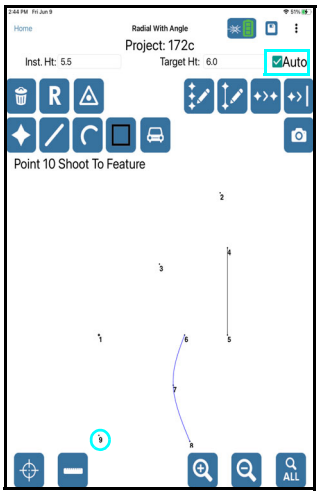
1. Occupy the CP (or Origin).
2. Tap the Area button  , it is shaded black when active (Figure 39A).
3. Aim and fire the laser at the target feature (or retro reflector). An audible shot sound signifies that measurement data has been successfully received. If there is no beep, press fire again or tap the laser connection icon and then press fire again. The Description Detail screen will display (Figure 39B). Enter a Feature Name in the Name field and a description in the Note field and tap [Add to Pick List] (or select an existing note description from the Pick List drop-down menu) and tap [Submit]. See more about the Description Detail screen on Page 60.
4. The first data point (Point 9 in this example) displays (Figure 39C).
5. As the rest of the area is mapped (with Auto checked), it displays as shown in Figure 39D through Figure 39F.



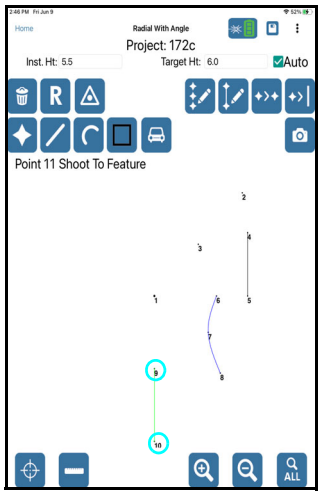
(A)



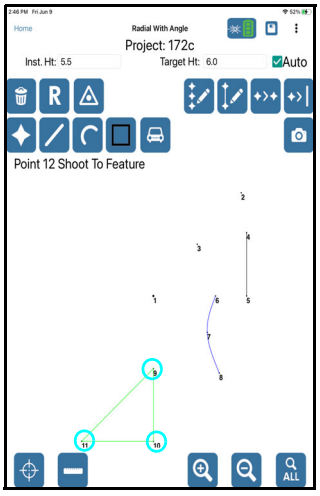
(B)



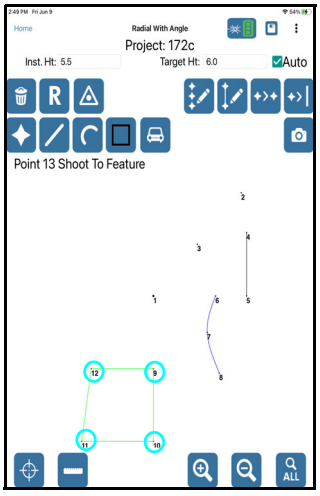
(C)



(D)



(E)



(F)

Figure 39

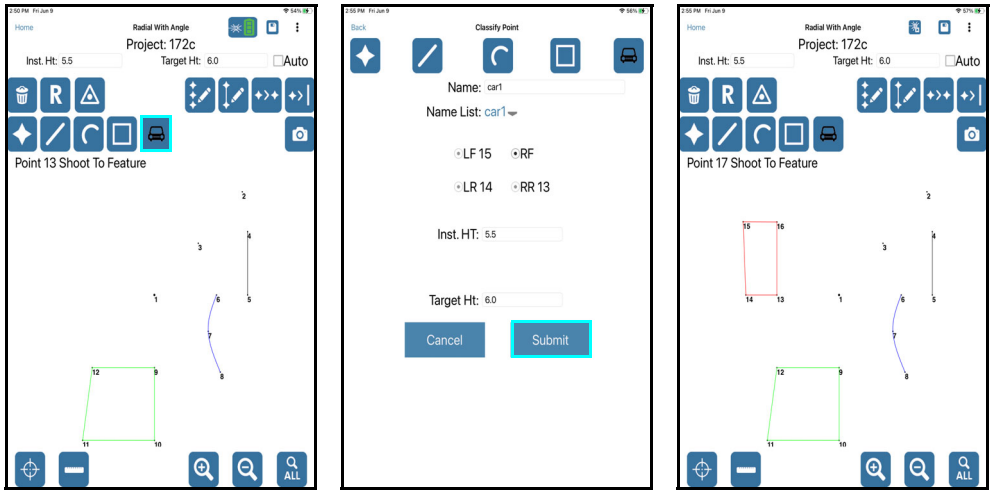
Important notes about adding area features:

- Data points that make up the area feature must be added in sequential order.
- To insert a data point out of order, add it as a point feature and then use the Edit Point option to change the feature type from point to area (Page 63).
- Areas are shaded green to distinguish areas from vehicles, lines, and curves.
  - Vehicles = red
  - Lines = black
  - Curves = blue

Add a Vehicle Feature

When the Vehicle button  is active, points added to the display area will be connected with a visible red line and will be categorized as a vehicle. The Vehicle Feature button is shaded black when active, and remains active until another icon is selected. Data points making up a vehicle may be added automatically using a laser or manually. If the Store Notes option (Page 49) is turned ON, each time a point in the vehicle feature is added, the Description Detail screen (Page 60) will be displayed. The Description Detail screen allows for the entry of descriptive information for the point and that will add to the clarity of the final map. The following example walks through adding vehicle feature data points in the Radial with Angle mapping method:

1. Occupy the CP (or Origin).
2. Tap the Vehicle button  ; it is shaded black when active (Figure 40A).
3. Aim and fire the laser at the target feature (or retro reflector). An audible shot sound signifies that measurement data has been successfully received. If there is no beep, press fire again or tap the laser connection icon and then press fire again. The Description Detail screen will display (Figure 40B). Enter a Feature Name in the Name field and choose from wheel options LF, RF, LR, RR, then tap [Submit]. As each option is used, it is grayed out the next time the Description Detail screen displays. See more about the Description Detail screen on Page 60. Repeat this step until all wheel options are used.
4. The new vehicle data points (Point 15, 16, 17, and 18 - in this example) display (Figure 40C).



(A) (B) (C)

Figure 40

Important notes about adding vehicle features:

- LF = Left Front; RF = Right Front; LR = Left Rear; RR = Right Rear
- Vehicles are shaded red to distinguish vehicles from lines, curves, and areas.
  - Line = black
  - Curve = blue
  - Area = green

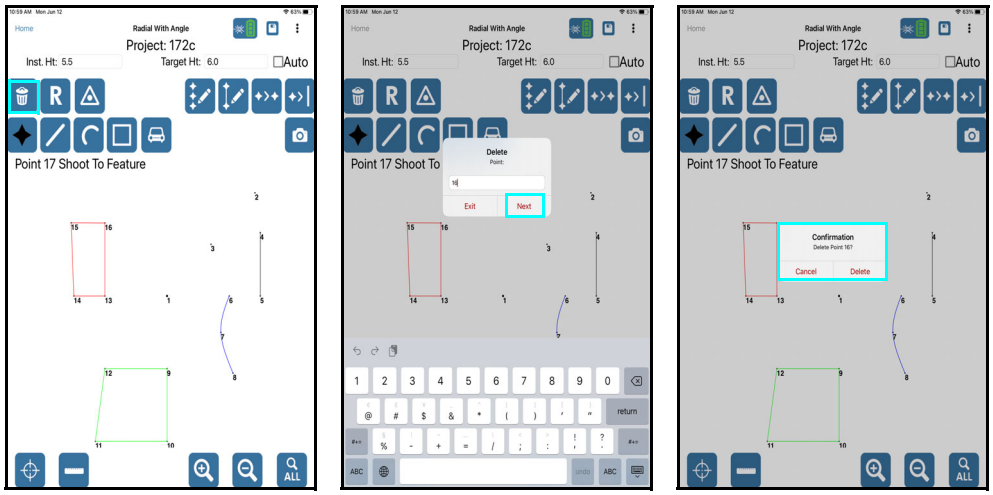
Delete a Point

It is possible to delete any mapped point while using any of QuickMap's mapping methods.

The Delete button  is located in the toolbar in the upper left area of the Data Collection screen (Figure 42A).

To delete a point:

1. Determine the point number of the point to be deleted.
   In this example, Point 16 will be deleted.
2. Tap the Delete icon  (Figure 41A).
3. Enter the point number, and tap Next (Figure 41B) to delete the point or tap Cancel to abandon the operation.
4. Tap OK to confirm the deletion, or tap Cancel to abandon the operation (Figure 41C).
5. The deleted point number is removed from the display area.



(A) (B) (C)

Figure 41

Important notes regarding point deletion:

- When a point is deleted, that point number is deleted from the data file. The remaining point numbers are not re-assigned. Attempting to find a point number that was previously deleted will result in an error message being displayed.
- Deleting the last point measured is a special case, and is actually the same as reshooting the point (Page 41). The next point added is assigned the same point number as the deleted point.
- Deleting points that were used as control points will cause all points measured from that control point to be deleted as well.
- There is no way to "undo" a point deletion.

Re-shoot a Point

It is possible to re-shoot the last point measured if something went wrong when the point was measured the first time.

The Reshoot button  is located in the toolbar in the upper left area of the Data Collection screen (Figure 42) in all mapping methods. To re-shoot a point other than the last point measured, see Page 60.

To re-shoot an established point:

1. Tap the Reshoot button  (Figure 42). Notice the Cancel Reshoot button has displayed, tap this button to abandon the operation at any time.
2. Follow the prompts in the Instruction Line (located below the toolbar above the display area) as you walk through re-shooting the point. For Baseline/Range surveys, two measurements must be taken to reshoot the last point.
3. The point number of the last shot taken will have the updated measurement assigned to it.

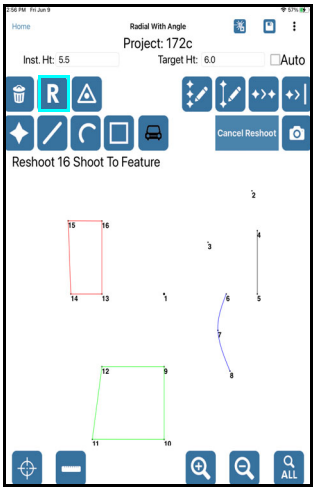


Figure 42

While using the Baseline Offset or Range Triangulation mapping methods, it is a common mistake to begin to execute the measurement without having moved the equipment position. Typically, this mistake is realized after taking the first shot of the 2-shot routine. It is possible to re-shoot JUST the first shot in the routine before the measured point exists on the map.

To re-shoot the first shot of the 2-measurement routine in a Baseline or Range survey:

1. After taking the first shot, to Origin in Baseline or to CP1 in Range, tap the Reshoot (1) button  (Figure 43). Move the equipment to the intended position, if necessary.
2. The Instruction Line directs to re-shoot to the Origin or to CP1 depending on what mapping method you are using. Take the measurement and then continue to take the 2nd shot in the routine to place the point on the map.

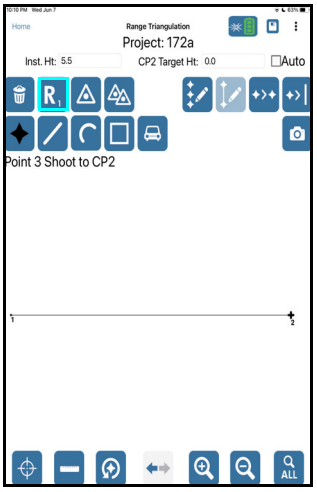


Figure 43

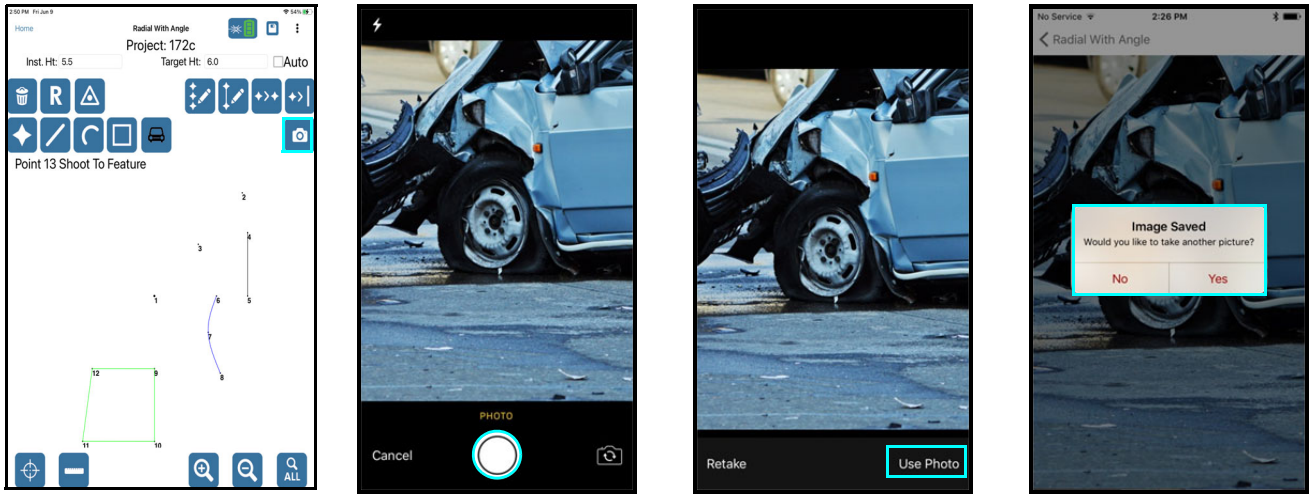
Add a Photo

From the Tablet Camera:

One or more photos may be added to each data point as it is measured. After adding a data point to the survey, use the Camera icon to take a photo(s) of the evidence. Photos are stored in the folder with the survey reports and named to match the description of the data point. If more than one photo is taken, a (2), (3), etc. is placed after the photo description.

1. Tap the Camera icon on the Data Collection screen (Figure 44A).
2. Aim/zoom to evidence (Figure 44B), and press the center button at the bottom of the screen to capture an image.
3. Tap the "Use Photo" in the lower right corner of the screen to accept the image (Figure 44C). If necessary, the image can be retaken.
4. When prompted, tap Yes to add another picture associated with the most recent measurement taken or tap No to return to the QuickMap Data Collection screen and continue mapping (Figure 44D).

NOTE These steps reflect the procedure for taking a photo when using an iPhone 6 ruggedized tablet. If using a different model phone or tablet with a different version of iOS, steps 2 and 3 will be similar but may differ slightly from how they work on the iPhone 6.



(A) (B) (C) (D)

Figure 44

From the TruPoint 300:

When the TruPoint 300 camera is activated, one photo is taken with each measurement.
To store that photo in QuickMap iOS, the following steps must be completed:

1. Press the Camera button on the TruPoint 300 if the camera is not already live.
2. Press the Fire button on the TruPoint 300 to activate the red dot.
3. Press the Fire button on the TruPoint 300 to fire the laser.
4. Press the Send Data/Image button on the TruPoint 300 to send the image to the tablet.

   Upon entering the note for the measurement, a thumbnail of the image appears next to the camera icon. Images taken for each point can be reviewed at full resolution on the Point Detail screen (Page 55).

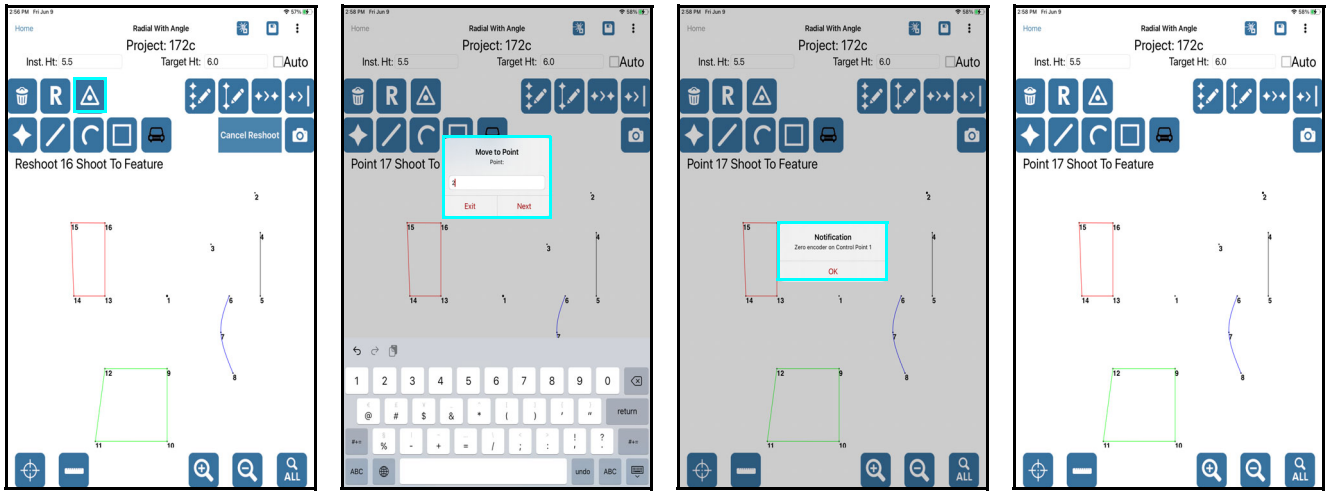
Move to a New Control Point

At times, when mapping a scene, there is not visibility to every feature on the scene from the origin (initial control point). When it becomes necessary to move a control point(s), a different point on the map can be selected to use as the new control point so that equipment can be moved to that position and mapping can continue. Moving control points can be done multiple times, if necessary, but should be kept to a minimum.

Radial with Angle - TruPulse 200X or TruSpeed Sxb

To move to a new control point:

1. If it doesn't already exist, create a point feature for the position to which you want to move.
2. Tap the Control Point icon  (Figure 45A).
3. Enter the point number for the new control point and tap [Next].
   In this example, point 2 was selected (Figure 45B).
4. Leave a target at the original equipment position, re-position and level equipment at the new control point, double check instrument height and adjust if necessary.
5. Aim at the original equipment position (that you moved from), and zero the TruAngle.
   Aim the laser at the point you just left from (in this case, Point 1 - also known as the Origin), tighten down the TruAngle brake, and press the zero button on the TruAngle to re-zero it. The TruAngle display will show 0.00. Tap OK (Figure 45C). Remember to loosen the TruAngle brake before continuing to measure. Zeroing the TruAngle is imperative for keeping data points measured from the previous position correctly related to data point measured from the new position.
6. Notice that Point 1 now displays with a small point indicator, and point 2 now displays with the large point indicator (Figure 45D). The large point indicator always signifies the current instrument position in the survey. Point 2 is now the control point for the survey. For 3D surveys, verify the instrument height in the new position, and edit the Inst. Ht: field, if necessary, before continuing to take measurements.



(A) (B) (C) (D)

Figure 45

NOTE To verify the move was performed correctly, shoot a point in that was measured before the traverse. The new point should appear on top of the old one. Most scenes can be measured from one control point, however, set as many new control points as necessary to encompass an entire scene.

Radial with Angle - TruPoint 300

To move to a new control point:

1. If it doesn't already exist, create a point feature for the position to which you want to move.
2. Tap the Control Point icon  (Figure 46A).
3. Enter the point number for the new control point and tap [Next].
   In this example, point 3 was selected (Figure 46B).
4. Leave a target at the original equipment position, re-position and level equipment at the new control point, double check instrument height and adjust if necessary.
5. Aim at the original equipment position (that you moved from).

   Tap Remote Fire  to capture reference angle (Figure 46C). Tap [OK].
   NOTE This step is imperative for keeping data points measured from the original position correctly relative to the data points mapped from the new position.
6. Notice that point 1 now displays with a small square, and data point 3 (the new control point) now displays with the large square (Figure 46D). Point 3 is now the control point for the survey. For 3D surveys, verify the instrument height in the new position, and edit the Inst. Ht: field, if necessary, before continuing to take measurements.

(A) (B) (C) (D)

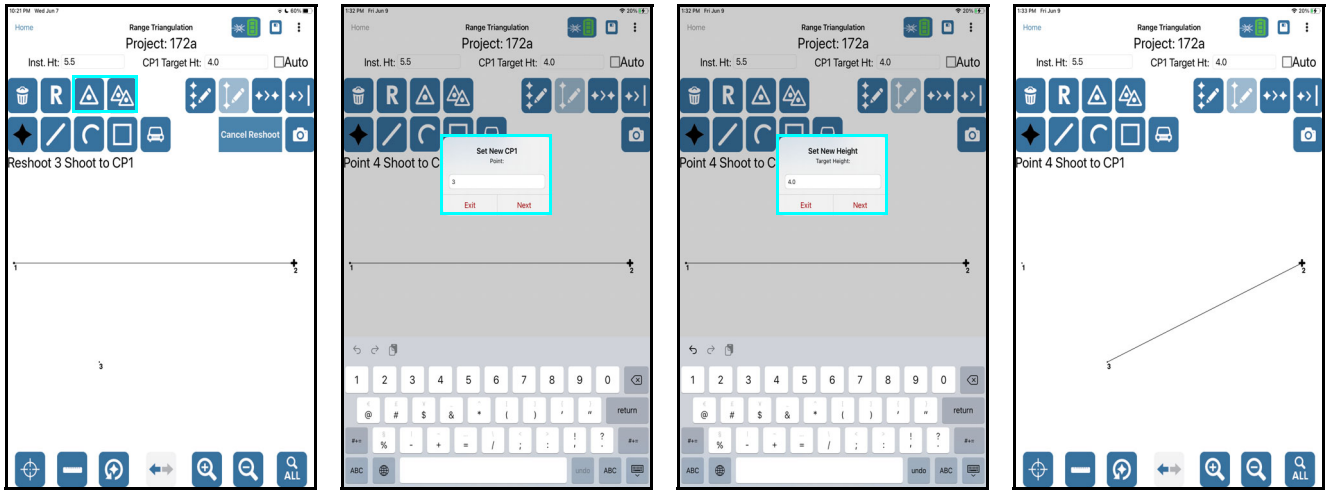
Figure 46

NOTE To verify the move was performed correctly, shoot a point in that was measured before the traverse. The new point should appear on top of the old one. Most scenes can be measured from one control point, however, set as many new control points as necessary to encompass an entire scene.

Range Triangulation

To move to a new control point:

1. If it doesn't already exist, create a point feature for the position to which you want to move.
2. Tap the Move icon  for CP1 or  for CP2, depending on which of the control points you are trying to move (Figure 47A).
3. Enter the point number for the new control point and tap [Next]. In this example, CP1 will be moved to Point 3 (Figure 47B).
4. Move the target for CP1 to the new position, verify the target height and adjust if necessary (Figure 47C).
5. Notice that the line that once connected points 1 and 2 now connect points 2 and 3.
   CP1 has been successfully moved to Point 3 (Figure 47D).



(A) (B) (C) (D)

Figure 47

NOTE A good way to verify that the new control point was correctly set is to measure a feature that was measured from the previous position to create a second point for that feature. If the move was successfully achieved, the two points will display directly on top of each other or very near to it.

Baseline Offset

Control points do not apply to the Baseline Offset mapping method.

Recover Your Instrument Position

Throughout the mapping process, events can occur that may disrupt the zero for your equipment setup, such as the following:

1. The tripod is accidentally kicked or moved off the instrument position.
2. TruAngle batteries must be replaced in the middle of the survey process.

The process to recover your instrument position varies slightly depending on which equipment combination you are using.

TruPulse 200X or TruSpeed Sxb + TruAngle

1. Ensure the tripod is set up properly on the instrument position.
2. Turn the TruAngle off and then back on again.
3. Re-index the TruAngle (turn 360° until "IND" becomes flashing 0.00).
4. Zero the TruAngle:
   a. If there was only one instrument position in the survey (the Origin), aim the laser at the original reference point for the survey and zero the TruAngle on that point.
   b. If there was more than one instrument position in the survey, aim the laser at the previous instrument position (not the original reference) and zero the TruAngle on that point.
   NOTE For help with zeroing a TruAngle, see Page 21.
5. Begin adding new data points to the survey. To verify that you have correctly re-entered the survey, shoot in a point that was mapped in the original survey. The new point should be on top of or very close to the point shot in the original survey.

TruPoint 300

1. Ensure the tripod is set up properly on the instrument position.
2. Hard close the QuickMap app (long-press the home button to display open apps and swipe QuickMap away).
3. Power cycle the TruPoint 300 (turn off and then back on again).
4. Re-open QuickMap and tap [Saved Surveys].
5. Tap to highlight the survey you were working on and tap [Open].
6. Tap  . Wait a few seconds for e laser to respond and prompt for the leveling routine.
7. Level the TruPoint. See Page 22 for more information on that procedure.
8. Long-press  to display the re-zeroing dialog. A short press on this icon implements the routine for moving your instrument position. Ensure that you see the dialog as displayed in Figure 48A that **DOES NOT** say "Move to Point."
9. Zero the TruPoint 300:
   - If there was only one instrument position in the survey (the Origin), aim the laser at the original reference point for the survey and tap the Remote Fire icon  to zero the TruPoint on that point.
   - If there was more than one instrument position in the survey, aim the laser at the previous instrument position (not the original reference) and tap the Remote Fire icon  to zero the TruPoint on that point. The dialog will display "Angle Zeroed" (Figure 48B).
10. Tap OK to return to the Data Collection Screen.
11. Begin adding new data points to the survey. To verify that you have correctly re-entered the survey, shoot in a point that was mapped in the original survey. The new point should be on top of or very close to the point shot in the original survey

(A) (B)

Figure 48

Change Target Height

When collecting data for a 3D map, it may become necessary to enter a new value for the Target Height. Each of the data collection methods includes a Target Height value which was entered on the New File Settings screen (Page 17) when the survey was created. The table below lists the Target Height value associated with each data collection method.

When collecting data for a 3D map, it may also become necessary to edit the Instrument Height (Page 49).

Data Collection Method	Target Height Options
Radial with Angle 3D	Target (Feature) Height
Range Triangulation 3D	CP1 Target Height
Baseline Offset 3D	Origin & Feature Height

To change a Target Height:

Although Target heights are set on the New File Settings screen during file setup, they can be changed prior to each measurement on the Data Collection screen. If changed, the new height(s) will be carried through for the remainder of measurements in the map unless it is changed back by the user.

- If an existing data point is using an incorrect height value, the incorrect value may be edited using the QuickMap Menu option for Point Detail (Page 55).
- If a series of data points is using an incorrect height, the incorrect value may be edited by tapping the Edit Point Series icon on the Data Collection screen (Page 62).
- If a Feature is using an incorrect height value, the incorrect value may be edited using the Edit Feature icon on the Data Collection screen (Page 63).

Survey File Settings

QuickMap 3D survey file Settings can be found by tapping the Menu button  any time a survey file is open. Then select Settings (Figure 49A) to see the current settings and make adjustments to them, if necessary (Figure 49B).

(A) (B)

Figure 49

Device

- Displays the equipment selected on the New File Settings screen when the survey file was created.

Instrument Height (3D only)

- Measured from the ground to the center of the sighting scope (Page 18).

Target Height, Feature Height, Origin Height, or CP1 Heights

- The height of the target where the laser's sighting scope will be aimed - options displayed depend on the selected mapping method:
  - Radial with Angle - Target (Feature) height
  - Range Triangulation - CP1 target height
  - Baseline Offset - Origin height and feature height

Email Address for Reports

- Enter an email address that will automatically be used when emailing QuickMap 3D reports for data transfer.

Store Notes

- Checked: Each time a data point is added, the Description Detail screen will display so a descriptive note may be entered.
- Not checked: Each time a data point is added, the Description Detail screen does not display; however, notes can be added through Point Detail > Edit Point (Page 60).

Recall Last Note

- Checked: If Store Notes is checked, the Description Detail screen will display the last note used in the note field each time it is opened.
- Not checked: If Store Notes is not checked, the note field in the Description Detail screen will be blank each time it is opened.

Beep

- Checked: The tablet emits a beep when it receives measurement data.
- Not checked: The tablet does not emit a beep when it receives measurement data.

Plot Labels

- Checked: The Data Collection screen displays data points and point numbers.
- Not checked: The Data Collection screen displays data points only; data point numbers are not displayed.

Plot Notes

- Checked: The point notes for each shot display on the Data Collection screen.
- Not checked: Default. The point notes for each shot do not display on the Data Collection screen.

Reminders

- Checked: Each time a new file is created, a reminder will be displayed prior to the Data Collection screen. The reminder content depends upon which mapping method was selected on the New File Settings screen (Page 18).
- Not checked: This option is toggled off and no reminders will be displayed.

Section 5 - Review Data

After measurements have been taken, QuickMap 3D can display the collected raw measurements, XY (or XYZ) coordinates, and associated heights for each data point. Additionally, distances can be calculated between any two measured points in a survey. In this section, find out how to review measurements and coordinates, calculate distances, and zoom the Data Collection screen.

Calculate Distances

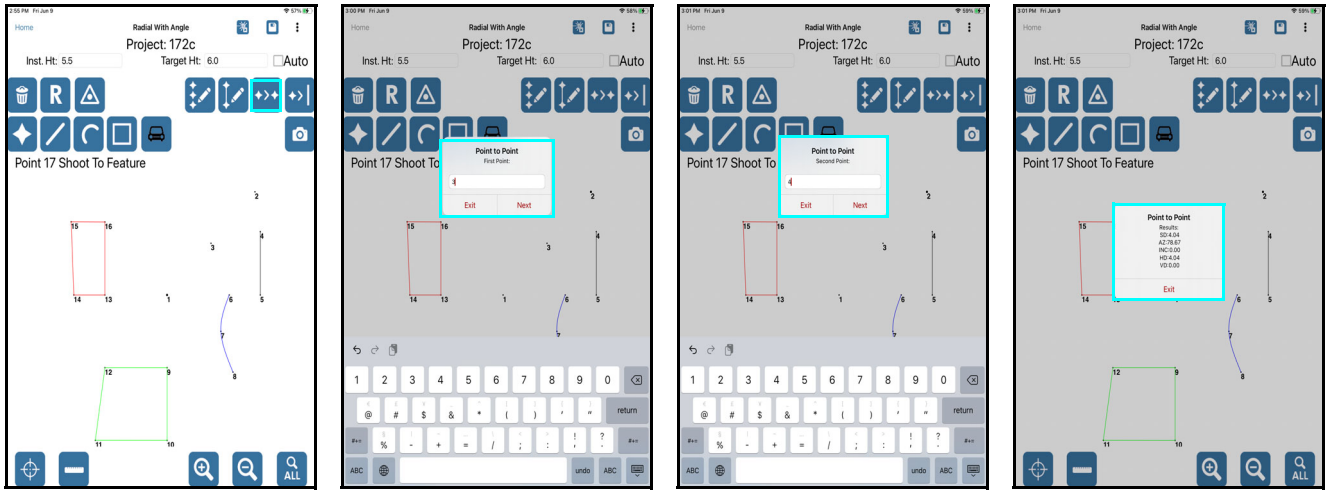
At any time a survey is open, and the Data Collection screen is displayed, QM3D can calculate two types of distances:

- Point to Point Distance
- Point to Line Distance

Point to Point Distance

To use the Point to Point Distance feature to display the distance between any two measured data points in a survey:

1. Tap the Point to Point icon  in the Edit/Measure toolbar in the upper right corner of the Data Collection screen (Figure 50A). In this example, the distance between point 3 and 4 is calculated.
2. Enter the point number of the first point - the point you are measuring from - and tap Next (Figure 50B).
3. Enter the point number of the second point - the point you are measuring to - and tap Next (Figure 50C).
4. The calculated measurements between the two points display (Figure 50D).
   Tap Exit to clear the calculation results window.



(A) (B) (C) (D)

Figure 50

Explanation of Calculation Results

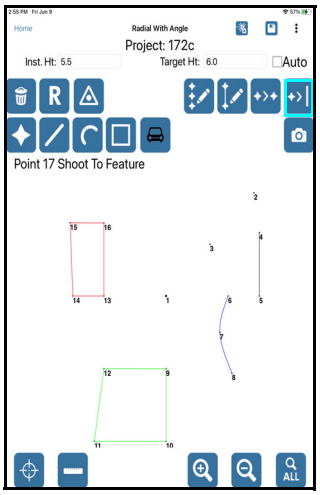
- **SD**: Slope Distance (Feet or Meters)
- **AZ**: Angle from the first point to the second point based on the zero reference set when the survey was started (Degrees)
- **INC**: The inclination from the first point up or down to the second point (Percent)
- **HD**: Horizontal Distance (Feet or Meters)
- **VD**: Vertical Distance from the first measured point up or down to the second measured point (Feet or Meters)

NOTE Any two data points can be selected, whether they are individual point features or part of a line, curve, area, or car feature.

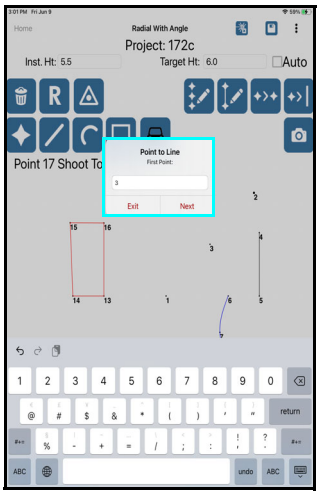
Point to Line Distance

To use the Point to Line Distance feature to display the distance between a measured point and a line segment:

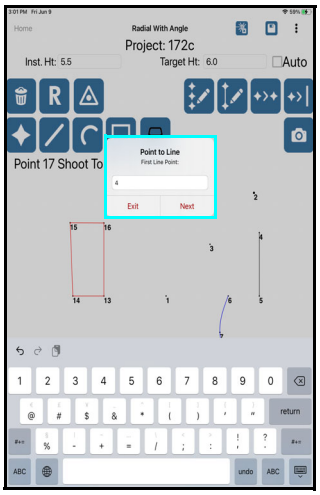
1. Tap the Point to Line icon  in the Edit/Measure toolbar in the upper right corner of the Data Collection screen (Figure 51A). In this example, the distance between point 3 and the line between points 4 and 5 is calculated.
2. Enter the point number of the first point - the point you are measuring from - and tap Next (Figure 51B).
3. Enter the point number for the first point in the line that you are measuring to and tap Next (Figure 51C).
4. Enter the point number for the second point in the line that you are measuring to and tap Next (Figure 51D).
5. The calculated measurements between the two points display (Figure 51E).
   Tap OK to clear the calculation results window.



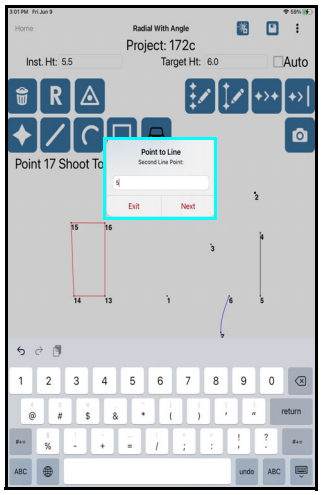
(A)



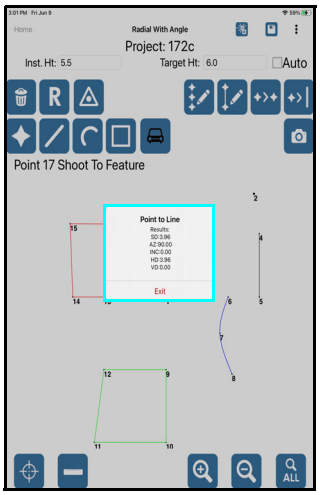
(B)



(C)



(D)



(E)

Figure 51

Explanation of Calculation Results

- **SD**: Slope Distance (Feet or Meters)
- **AZ**: Angle from the first point to the second point based on the zero reference set when the survey was started (Degrees)
- **INC**: The inclination from the first point up or down to the second point (Percent)
- **HD**: Horizontal Distance (Feet or Meters)
- **VD**: Vertical Distance from the first measured point up or down to the second measured point (Feet or Meters)

NOTE Any two data points can be selected to define the line segment, whether they are individual point features or part of a line, curve, area, or car feature. An error message will be displayed if a perpendicular line cannot be drawn between the data point and the line segment.

Zoom Options

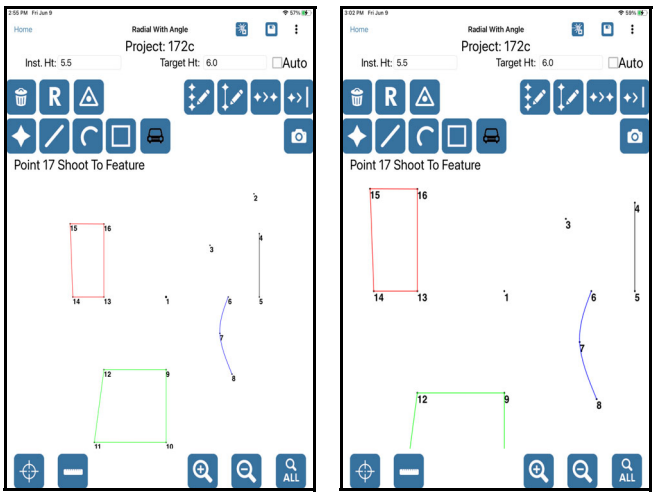
Any time a survey is open, the view of the Data Collection screen display area can be changed using zoom functionality. Use touch zoom functionality to zoom into and out of the display area. Touch and drag to pan. Icons are also available for zooming when using the stylus (or if wearing gloves). Zoom icons are located in the lower right corner of the Data Collection screen (Figure 52A).

Zoom Icon Descriptions

Zoom In - Tap to magnify the current view, thus creating a smaller view of the survey area (Figure 52B).

Zoom Out - Tap to reduce the current view, thus creating a larger view of the survey area. This feature does not zoom farther away than the full view of the survey area.

Zoom All - Tap to reset the display area to the default, 100% full map view.



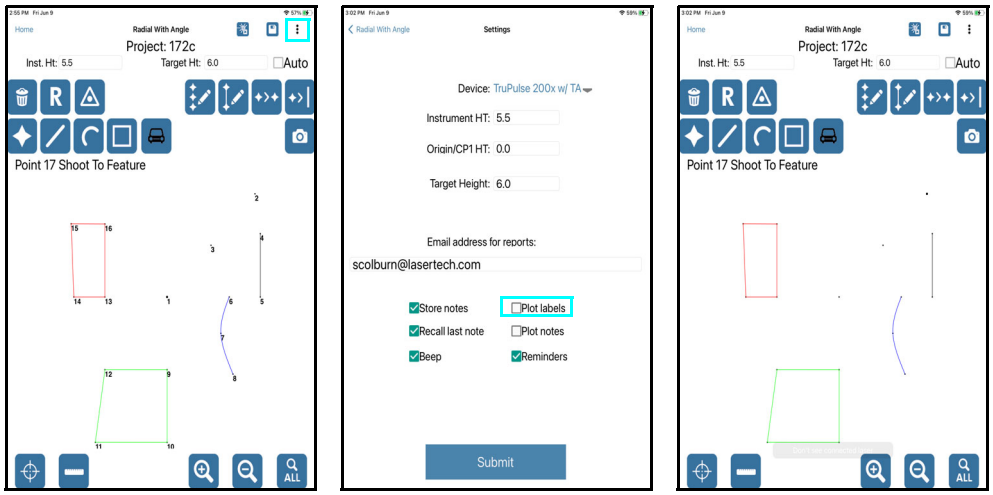
(A) (B)

Figure 52

Plot Labels

Data point numbers can be removed from the display area in QM3D Settings (Page 49). Tap the Menu button  , and then choose Settings (Figure 54A). Point numbers display by default, unless the Plot labels check box is unchecked. If unchecked, the Plot Labels checkbox will remain unchecked until it is changed by the user.

- **Checked**: The Data Collection screen displays data points and point numbers (Figure 53A).
- **Not checked**: The Data Collection screen displays data points only; data point numbers are not displayed (Figure 53B and Figure 53C).



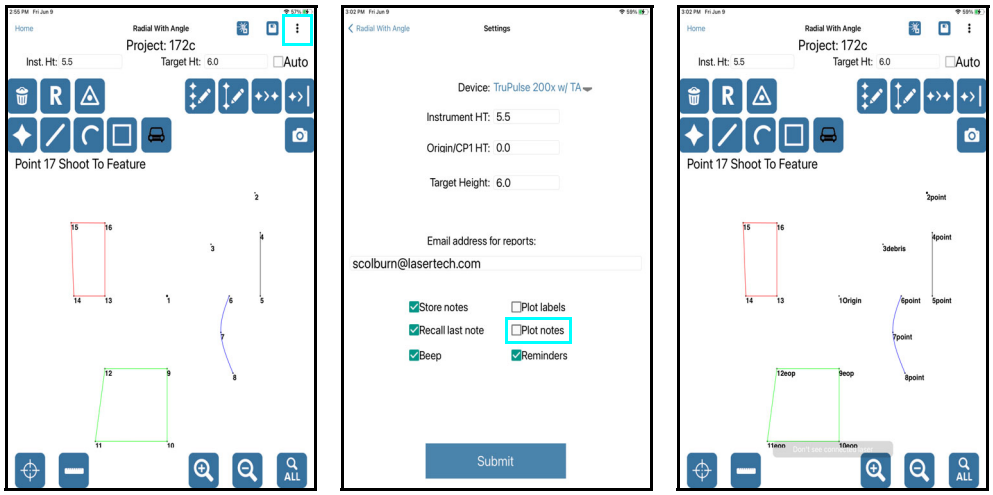
(A) (B) (C)

Figure 53

Plot Notes

Plot notes are the descriptions assigned to each data point during the mapping process.
To display these notes on the Data Collection screen:

1. Tap the Menu button  on the Data Collection screen.
2. Choose Settings (Figure 54A).
3. Tap the Plot notes checkbox to add the check mark and tap [Submit] (Figure 54B).
4. The Plot notes now display on the Data Collection screen (Figure 54C).



(A) (B) (C)

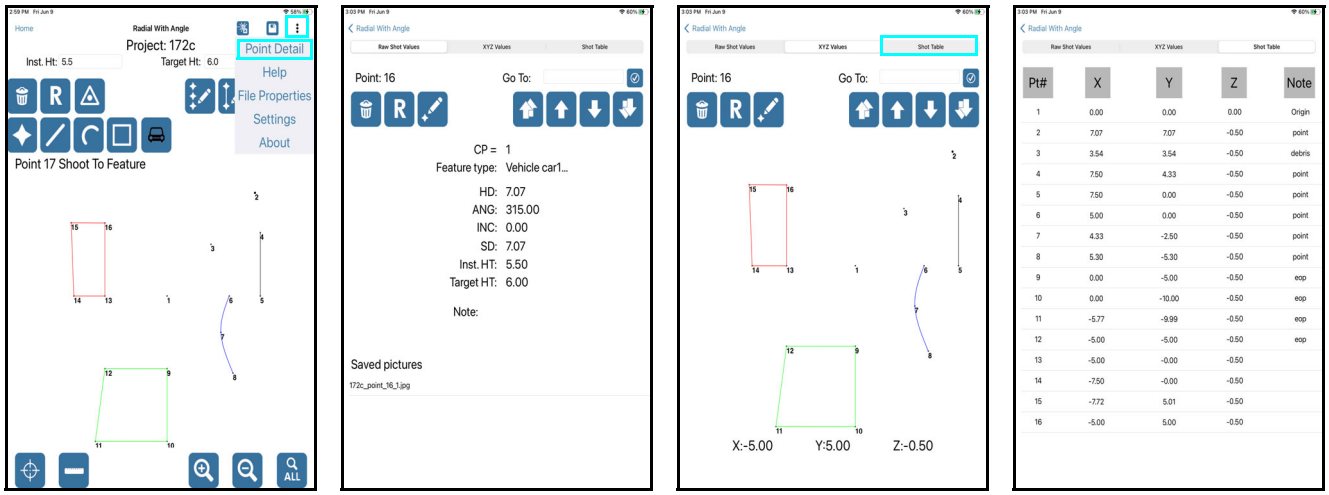
Figure 54

Point Detail

Use Point Detail to review raw measurement values and/or XY(Z) coordinates for each data point in a survey as well as to review the Shot Table. The Shot Table screen includes the point number, XY(Z) coordinate, and Note (if any) for each data point in an open survey.

To open Point Detail:

1. Tap the Menu button  on the Data Collection screen and select Point Detail from the drop-down list (Figure 55A).
2. The Point Detail - Raw Shot Values screen displays (Figure 55B).
3. To display the Shot Table screen, tap "Shot Table" on the menu bar at the top of the screen (Figure 55C).



(A) (B) (C) (D)

Figure 55

Field / Icon	Description
Point:	Indicates which data point is currently selected. Information displayed on the Raw Shot Values and XYZ Values screen is associated with the selected point.
GO TO: 	Choose a new data point for which to review values. Enter the data point in the GO TO field and then tap the checkmark icon to the right of the entry field to confirm. Double check that the new point number was selected by ensuring that it is listed as the Point: (X) in the upper left corner of the screen.
	Tap to delete the current selected data point. A prompt to confirm the deletion will display so the deletion may be accepted or canceled (Page 40).
	Tap to reshoot the current selected data point. The Data Collection screen will display with instruction line prompting to reshoot (or manually re-enter) the data point (Page 41).
	Tap to display the Description Detail screen (Page 60) and edit the note description, feature type, or height for any data point.
	Skips to the last measured data point in the survey file.
	Moves to the next data point in the file.
	Moves to the previous data point in the file.
	Skips to the first data point in the file (the CP or Origin).
	Tap the back arrow in the upper left corner of the Point Detail screen to leave Point Detail and return to the Data Collection screen.
	For Range Triangulation and Baseline Offset surveys, tap to change the orientation of the current selected data point from left to right or vice versa. This icon is not available for Radial with Angle surveys.

NOTE If a measured point has any images associated with it, those images will appear in a list at the bottom of the Raw Shot Values screen.

- A long-press of the image name will bring up a full resolution view of the image (Figure 56).
- Tap Delete to remove the image from the data file, or tap OK to keep it.

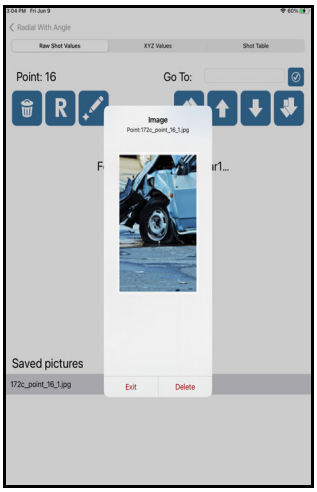
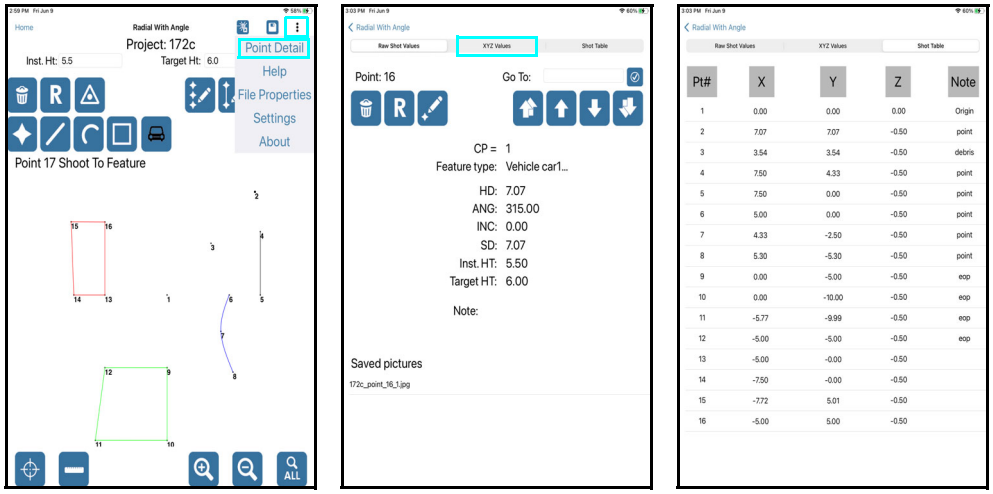


Figure 56

Display Tabular Data

The Point Detail Shot Table screen includes the point number, XY(Z) coordinate, and Note (if any) for each data point in an open survey in a tabular format.

1. Tap the Menu button  on the Data Collection screen and select Point Detail from the drop-down list (Figure 57A).
2. The Point Detail - Raw Shot Values screen displays (Figure 57B). To transition to the XYZ Values or Shot Table screens, tap the menu bar across the top of the screen.
3. When XYZ Values or Shot Table is tapped, the display changes (Figure 57C).



(A) (B) (C)

Figure 57

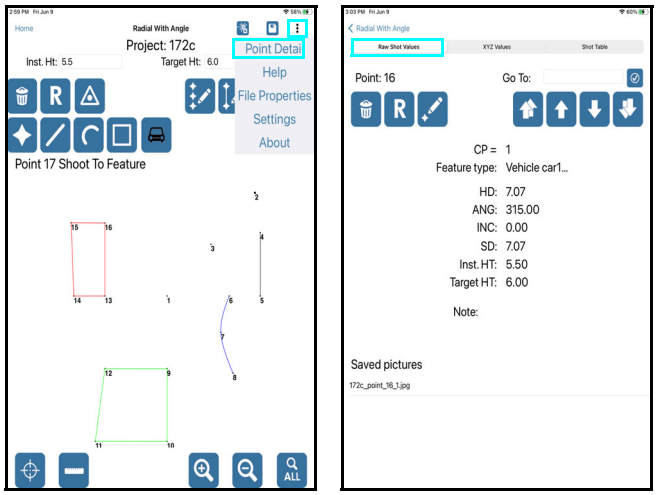
NOTE To see continued data not available in the initial view, scroll down by tapping near the bottom of the Shot Table screen and swiping upward. For 2D surveys, all Z values will display as "0.00."

Display Raw Shot Values

The Point Detail Raw Shot Values screen displays measurement and description data assigned to each individual data point in an open survey. Data points may be reviewed, deleted, re-shot, and/or edited from this screen.

To access the Raw Shot Values screen:

1. Tap the Menu button  on the Data Collection screen and select Point Detail from the drop-down list (Figure 58A).
2. The Point Detail - Raw Shot Values screen displays (Figure 58B). To transition to the XYZ Values or Shot Table screens, tap the menu bar across the top of the screen.



(A) (B)

Figure 58

The Point Detail Raw Shot Values screen displays differently depending on the mapping method selected when the survey was created. Here is a sample of the Raw Shot Values screen for each mapping method:

<u>Radial with Angle</u> <u>Range Triangulation</u> <u>Baseline Offset</u>

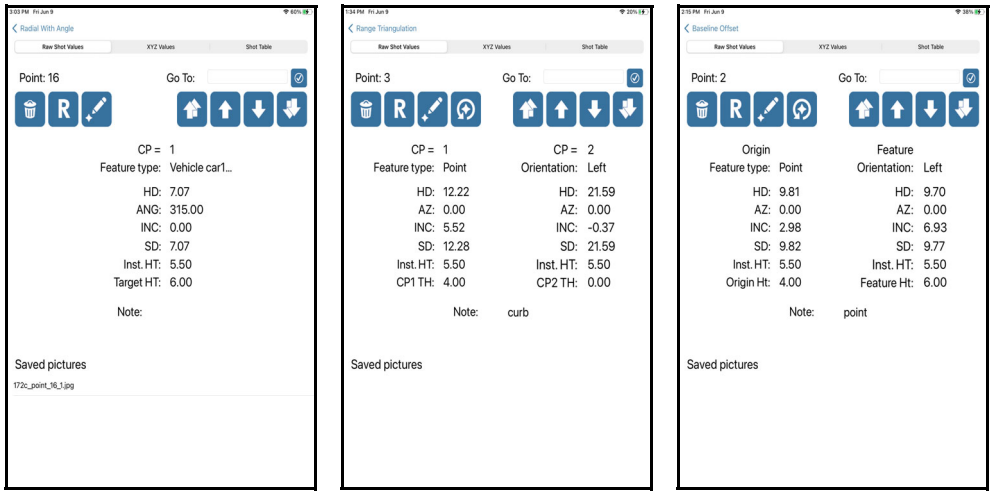


Figure 59

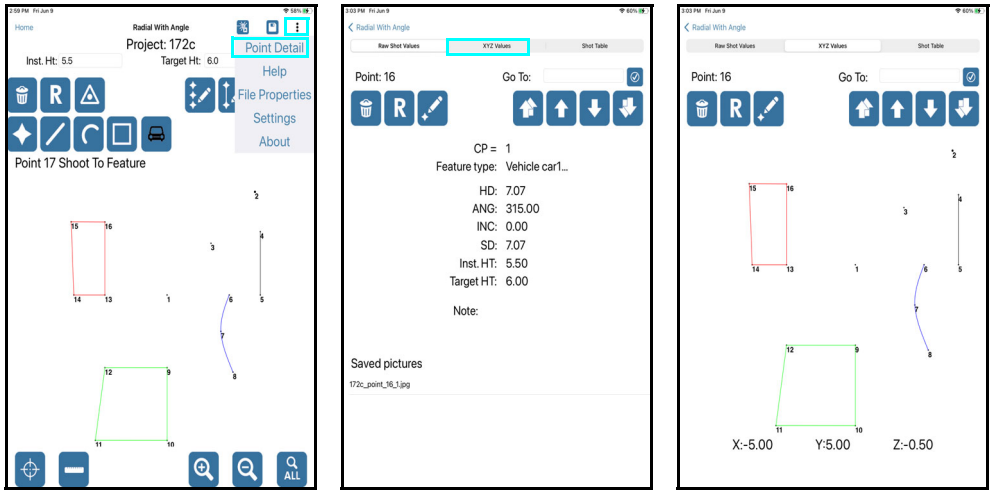
NOTE To change the current selected point number in order to view the raw shot values for a different point number, enter the desired point number in the GO TO: field and tap the checkmark. The Point indicator in the upper left corner of the screen will display the current selected point number. Also, the up and down arrows can be used to navigate to other data points in the survey. For Range Triangulation and Baseline Offset surveys, the Flip Point icon also displays on this screen so a data point's orientation may be changed from left to right or vice versa.

Display XYZ Values

The Point Detail XYZ Values screen displays the XY(Z) coordinates of each data point in an open survey. Data points may be reviewed, deleted, re-shot, and/or edited from this screen.

To access the XYZ Values screen:

1. Tap the Menu button  on the Data Collection screen and select Point Detail from the drop-down list (Figure 60A).
2. The Point Detail - Raw Shot Values screen displays (Figure 60B).
3. To display the XYZ Values screen, tap "XYZ Values" on the menu bar at the top of the screen (Figure 60C).



(A) (B) (C)

Figure 60

NOTE To change the current selected point number in order to view the XYZ values for a different point number, enter the desired point number in the GO TO: field and tap the checkmark. The Point indicator in the upper left corner of the screen will display the current selected point number. Also, the up and down arrows can be used to navigate to other data points in the survey. For 2D surveys, all Z values will display as "0.00." For Range Triangulation and Baseline Offset surveys, the Flip Point icon also displays on this screen so a data point's orientation may be changed from left to right or vice versa.

Section 6 - Edit Data

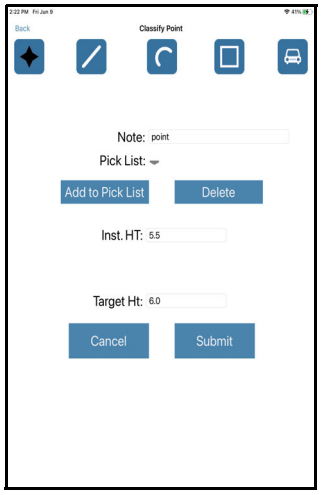
Any data point in an open survey can be edited at any time. Data points can be edited individually or as a group if it becomes necessary to change data point heights for more than just one point. These changes can be made in 2D and 3D maps; however, in 2D maps, height changes entered do not affect data points and are for notation purposes only. In 3D maps, the measured data points adjust to any height changes.

Edit a Data Point

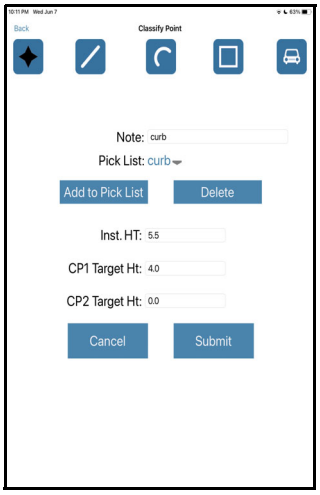
Individual data points are edited via the Point Detail screen. From the Point Detail Raw Shot Values or XYZ Values screens, tap the Edit Point icon to bring up the Description Detail screen, from which all changes to selected data points can be made.

The Description Detail screen as it appears in each mapping method is shown here:

Radial with Angle



Range Triangulation



Baseline Offset

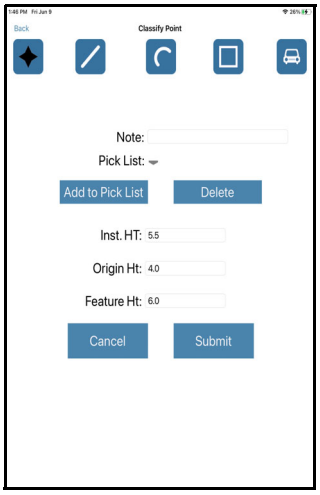


Figure 61

To edit an individual data point, access the Point Detail screen (Page 55):

1. With the Point Detail Raw Shot Values or XYZ Values screen displayed, select the data point to be edited using the GO TO field or the navigation arrows. The Point indicator in the upper left corner of the screen displays the current selected data point. In this example, point 31 is selected.

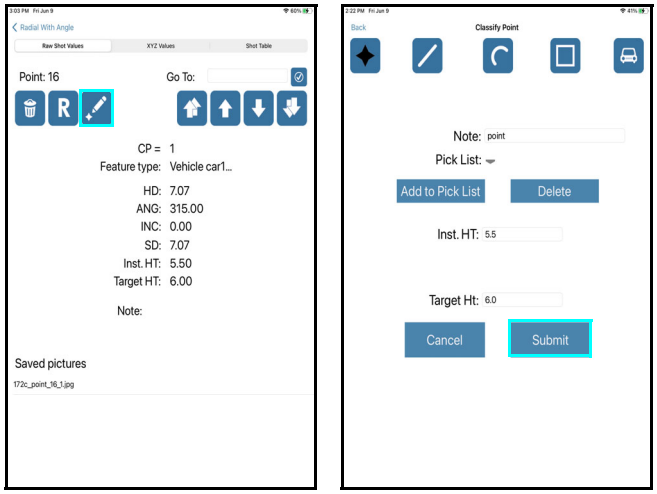
2. Tap the Edit Point icon  (Figure 62A) and the Description Detail screen displays (Figure 62B).

   From the Description Detail screen, the following changes can be made to the selected data point:

- **Change the Feature Type** - the current assigned feature type for the data point is highlighted in black. Tap the feature type it should be changed to in order to reassign the data point. See Page 64 for more detail.
- **Change the Feature Name** - enter a new name in the field. This option is only available for line, curve, area, or car feature data points.
- **Change the Note** - Type the new note in the note field or select an existing note from the Pick List.
- **Change Heights** - To adjust the Instrument Height, Target Height, Origin Height, CP Height or Feature Height for the data point. Enter a new value into the relevant field.

   NOTE Height options available on this screen depend on the mapping method selected when the map was created.

3. Tap [Submit] to save the changes or Cancel to forget them and return to the Data Collection screen.



(A) (B)

Figure 62

Edit a Point Series

The Edit Point Series function allows for the editing of height values associated with one or more data points. The appearance of the Edit Point Series screen varies depending on the mapping method selected when the survey was created. The Edit Point Series screen as it appears in each mapping method is shown here:

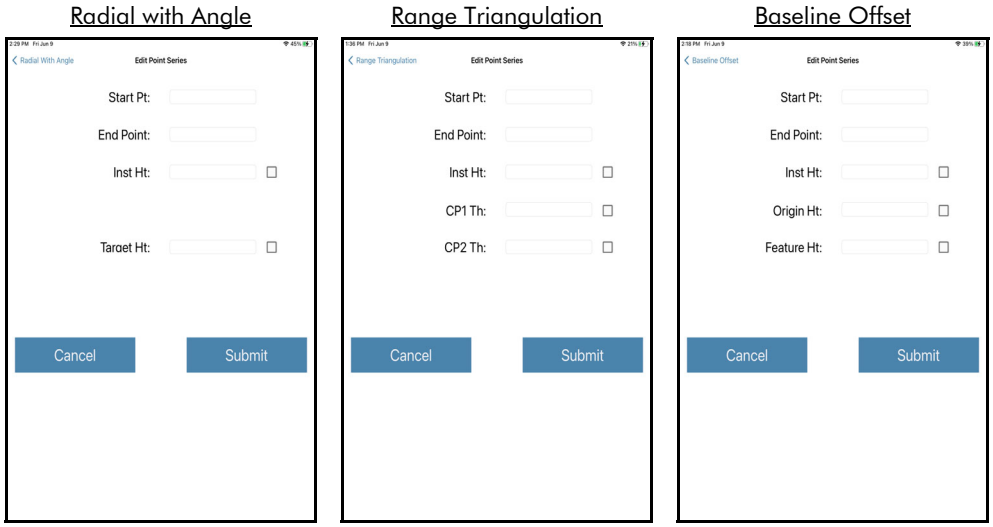
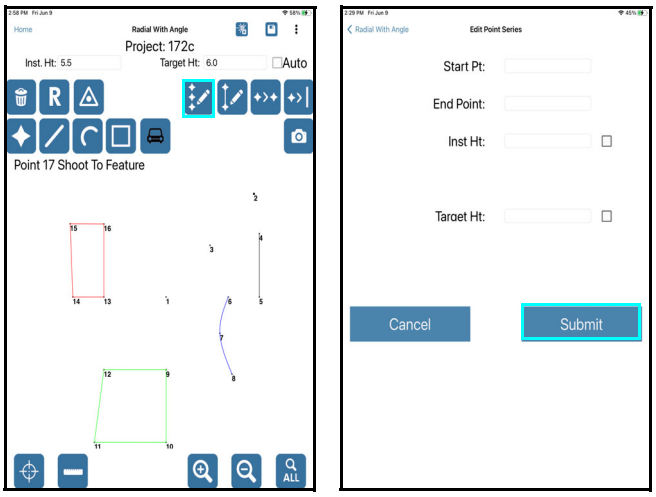


Figure 63

To use the Edit Point Series function:

1. With a survey file open, tap the Edit Point Series icon  on the Data Collection screen (Figure 64A).
2. Enter the start point number and the end point number of the series of data points to be edited (Figure 64B). If adjusting the height of just one data point, enter the same point number in the Start and End point fields.
3. Enter the new height value in the applicable field(s) (fields depend on the mapping method selected when the survey file was created - the survey in this example was done with the Radial with Angle mapping method).
4. Tap Submit to save the changes, or tap Cancel to abandon the operation and return to the Data Collection screen.



(A) (B)

Figure 64

NOTE The Edit Point Series function is typically used to correct heights when the retro reflector, instrument height or other targets had been raised or lowered and the new target height had not been entered on the Data Collection screen at the time the measurements were taken. If unsure of the start and end point numbers, review the Point Detail Shot Table (Page 57) to help figure out what they are (by note description or measurement value, if necessary).

Edit a Feature

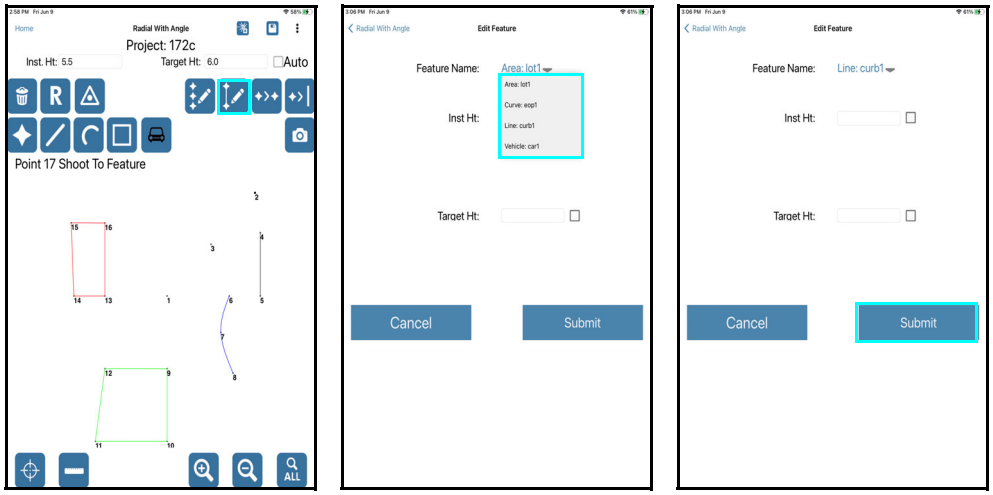
The Edit Feature function allows for the editing of height values associated with all data points assigned to a specific feature. The appearance of the Edit Feature screen varies depending on the mapping method selected when the survey was created.

The Edit Feature screen as it appears in each mapping method is shown here:

Figure 65

To use the Edit Feature function:

1. With a survey file open, tap the Edit Feature icon  on the Data Collection screen (Figure 66A).
2. Select the feature name to be edited (Figure 66B). The drop down list will include all features that have been added to the survey by Feature name and Note as "Feature name": "Note".
3. Enter the new height value in the applicable field(s). The fields depend on the mapping method selected when the survey file was created. The survey in this example was done with the Baseline Offset mapping method (Figure 66C).
4. Tap Submit to save the changes, or tap Cancel to abandon the operation and return to the Data Collection screen.



(A) (B) (C)

Figure 66

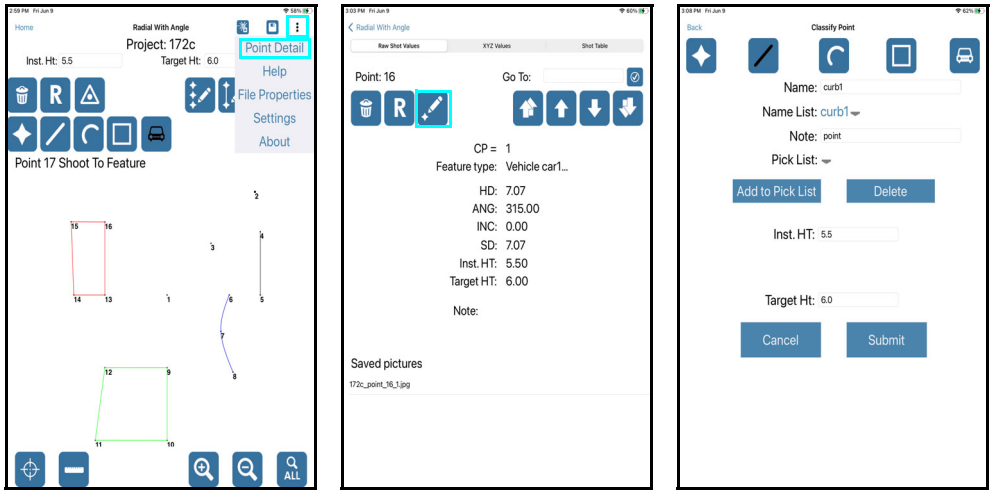
NOTE The Edit Feature function is typically used to correct heights when the retro reflector, instrument height or other targets had been raised or lowered and the new target height had not been entered on the Data Collection screen at the time the measurements were taken. It allows for the target heights of all data points within the feature be adjusted at one time.

Change the Feature Type

Data points that make up a line, curve, or area feature must be added in sequential order. If a data point is missed during a sequential measurement, it is possible to add the data point out of order by changing the feature type. Data points of any feature type can be changed to any other feature type at any time.

To change the feature type of a data point:

1. Tap the Menu button  in the upper right corner of the screen and select Point Detail (Figure 67A).
2. The Point Detail - Raw Shot Values screen displays (Figure 67B). If the data point you want to change was not the last data point you added to the survey, enter the data point number in the GO TO field and tap the Checkmark button. Verify that the current selected point (listed as "Point: X" in the upper left area of the screen) is the point number for the data point you want to change. For this example, point 3 will be changed from a point feature to a line feature.
3. Tap the Edit Point icon  (Figure 67B) and the Description Detail screen will display (Figure 67C). Notice that the Point Feature type is shaded black - the reason for this is that "Point" is the current feature type of the data point that will be changed in this example.



(A) (B) (C)

Figure 67

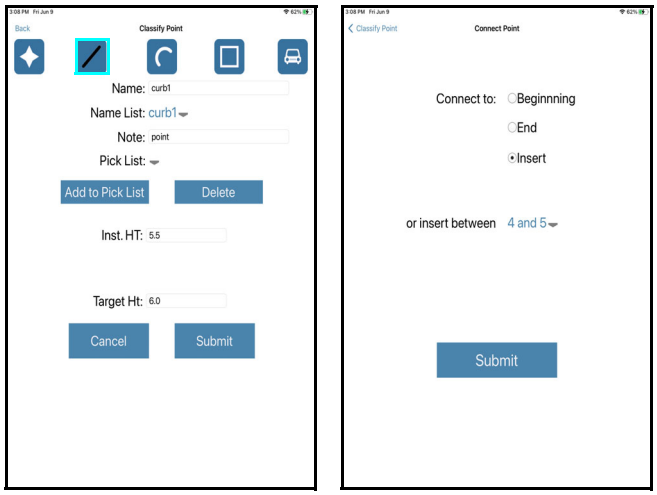
(Continued on next page)

4. Tap the Line feature icon  (Figure 68A).
5. The Connect Point screen displays (Figure 68B). Select a connection type and tap Submit. In this example, Point 3 is being inserted between Point 4 and Point 5. Use the drop-down menu to choose from available options for connection.

   More about the Connect Point screen:

- **Beginning** - Select this option to connect the new data point in the feature group to the beginning of the feature.
- **End** - Select this option to connect the new data point in the feature group to the end of the feature.
- **Insert** - Select this option to connect the new data point in the feature group between two specific data points in the feature.

6. The data point has now been changed from a point feature to a line feature and is included in the line.



(A) (B)

Figure 68

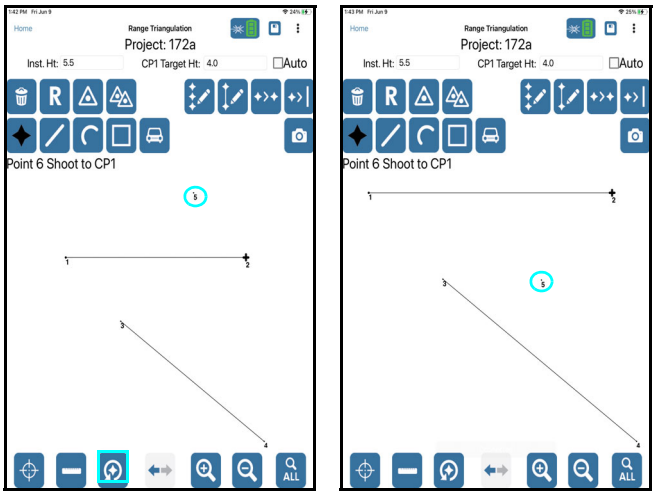
Flip a Data Point

The Flip Point function can be used to change the orientation of a data point for surveys created with the Range Triangulation or Baseline Offset mapping method. These mapping methods require assignment of points to the left or right of the baseline or the line between CP1 and CP2. If any data point(s) - whether part of a feature or not - was oriented incorrectly, it can be quickly and easily moved to the correct orientation. For more information about defining the orientation of data points, see Page 28.

Flip the Most Recently Added Data Point

To flip the data point that was most recently added to a survey (the last shot taken):

1. Tap the Flip Point icon  at the bottom center of the Data Collection screen (Figure 69A).
2. The last measured data point in the survey will move to the opposite side of the baseline (Figure 69B). In this example, the data point (Point 5) orientation was on the left side of the baseline and was flipped to the right side.



(A) (B)

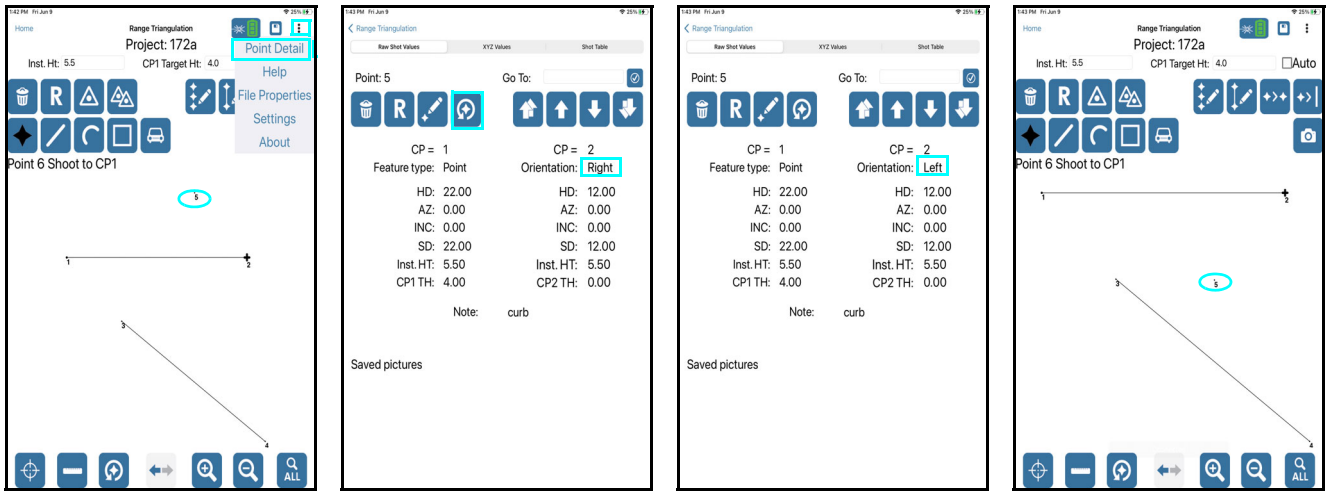
Figure 69

NOTE To flip the most recently added data point back to its original orientation, tap the Flip Point icon again.

Flip Any Data Point in the Survey

To flip any data point in the survey:

1. Tap the Menu button  in the upper right corner of the screen and select Point Detail (Figure 70A).
2. The Point Detail - Raw Shot Values screen displays (Figure 70B). If the data point you want to change was not the last data point you added to the survey, enter the data point number in the GO TO field and tap the Checkmark button. Verify that the current selected point (listed as "Point: X" in the upper left area of the screen) is the point number for the data point you want to change. For this example, Point 3 will be flipped from the left side of the baseline to the right.
3. Tap the Flip Point icon  (Figure 70B), and notice that the orientation for the point has changed from right to left (Figure 70C).
4. Tap the back arrow in the upper left corner of the screen to leave Point Detail and return to the Data Collection screen. Notice that Point 3 has moved from the left to the right side of the baseline (Figure 70A and Figure 70D).



(A) (B) (C) (D)

Figure 70

NOTE To flip a data point back to its original orientation, repeat these steps.

Section 7 - Reports & Pick Lists

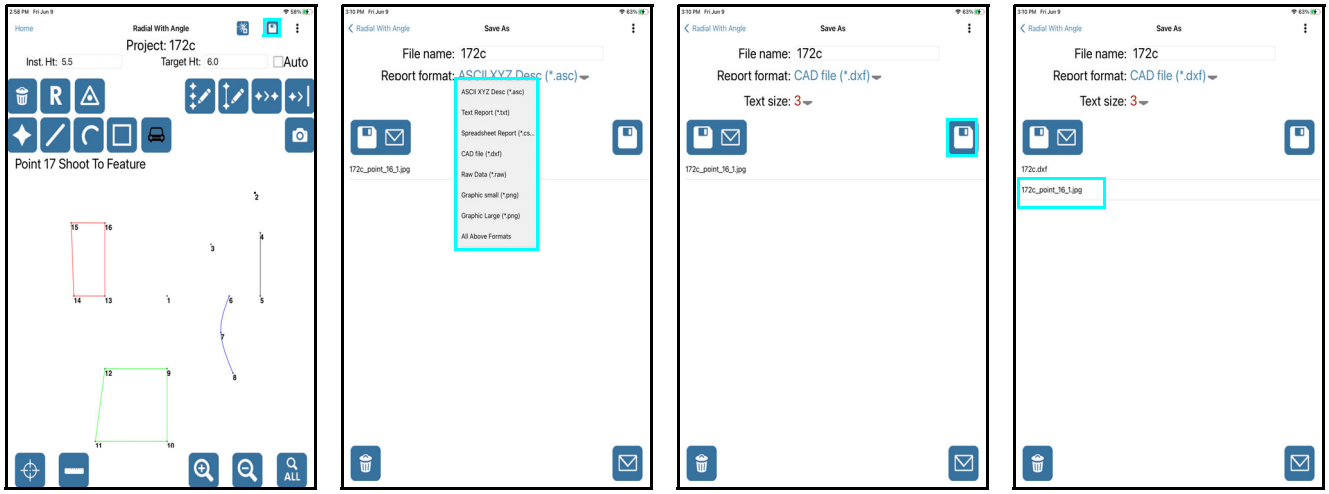
QuickMap 3D can generate reports for survey data that are saved on the tablet and are transferable to a PC via cable connection or email. Saved reports can be created in a variety of different formats:

- **ASCII XYZ Desc** - *.asc "plain text" file that can be imported into programs like IMS Map 360, Crash Zone and others.
- **Text Report** - *.txt file that can be opened with a text editor or spreadsheet program.
- **Spreadsheet Report** - *.csv file that can be opened with a spreadsheet program.
- **CAD file** - *.dxf file that can be opened with a CAD-based drawing program.
- **Raw** - *.raw file that can be opened with a text editor, spreadsheet program or many CAD-based drawing programs.
- **Graphic small** - *.png file (picture of the points and features) that can be opened with most graphics applications. The size of the images is 600x600.
- **Graphic Large** - *.png file (picture of the points and features) that can be opened with most graphics applications. The size of the images is 1200x1200.
- **All Above Formats**

Save a Report

To save a QuickMap 3D report for a survey:

1. With the survey file open, tap the Save icon in the upper right corner of the screen (Figure 71A).
2. Choose to keep the filename used when the survey was created or enter a new one. Tap the Report Format drop down list to select a format to save (Figure 71B). Also, tap the Text size drop-down menu to increase the text size of the plot labels when the data is opened in a CAD program for diagramming.
3. Tap the Save icon (Figure 71C).
4. The report has been saved on the tablet and appears in the Saved Reports section in the bottom half of the screen (Figure 71D). Saved reports display in this section with the most recently saved report at the top.



(A) (B) (C) (D)

Figure 71

Save and Send a Report

To save and send a QuickMap 3D report for a survey:

1. Ensure the tablet has access to Wi-Fi and that an email account has been added.
2. With the survey file open, tap the Save icon in the upper right corner of the screen (Figure 72A).
3. Choose to keep the filename used when the survey was created or enter a new one. Tap the Report Format drop down list to select a format to save (Figure 72B). Also, tap the Text size drop-down menu to increase the text size of the plot labels when the data is opened in a CAD program for diagramming.
4. Tap the Save & Send icon (Figure 72C).
5. The report file is automatically attached to the email (Figure 72D) and:

- Sends from the default email address set up on the tablet.
- Sends to the email address(es) assigned in QuickMap Settings (Page 49) - or a different email address can be entered.
- Includes the report file name as the email subject line.

6. Tap the Send icon (Figure 72D).

(A) (B) (C) (D)

Figure 72

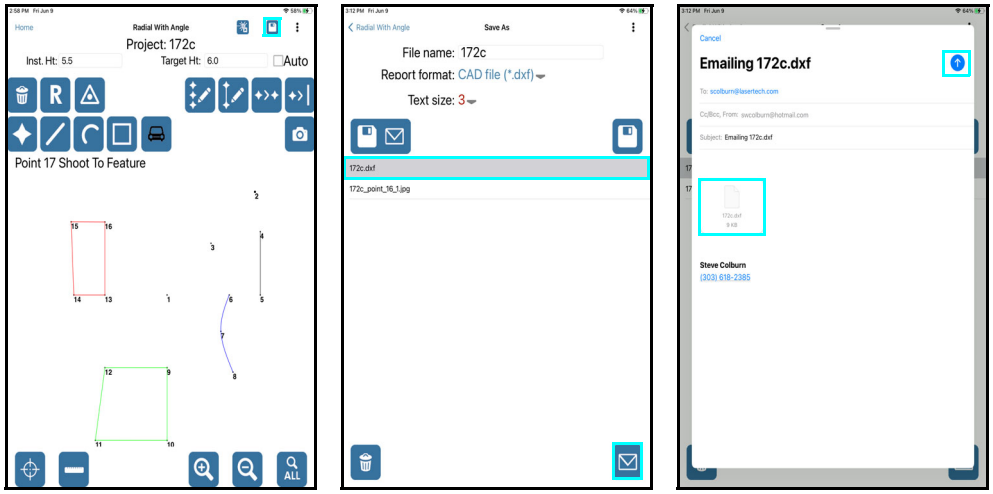
File Transfer Using Cable -In addition to email, reports can be transferred via a cable connection using iTunes. If using a cable to transfer saved reports to a PC, the reports can be found in the QuickMap folder. Within the QuickMap folder, a folder is automatically created and named after the survey. All reports and photos saved for a survey can be found in that folder. See Page 72 for further instructions.

Manage Saved Reports

Reports saved on a tablet can be sent or deleted from within QuickMap 3D. They can also be copied as a group using a cable connection to a PC. In order to manage saved reports for any survey, the survey must first be opened.

Send a Saved Report

1. Tap the Save icon  in the upper right corner of the Data Collection screen (Figure 73A). All previously saved reports for any survey are accessed via the Save icon.
2. The Saved Reports section displays in the lower half of the Save screen. Tap the saved report you wish to send, and then tap the Send icon (Figure 73B).
3. The report file is automatically attached to the email (Figure 73C) and:
    - Sends from the default email address set up on the tablet.
    - Sends to the email address(es) assigned in QuickMap Settings (Page 49) or a different email address can be entered.
    - Includes the report file name as the email subject line.
4. Tap Send (Figure 73C).

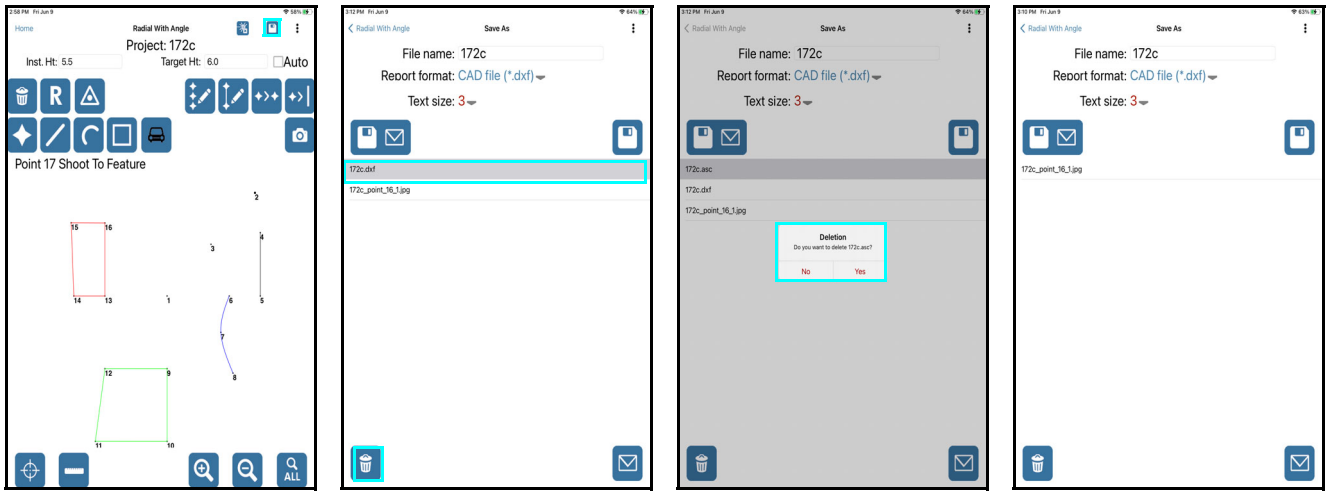


(A) (B) (C)

Figure 73

Delete a Saved Report

1. Tap the Save icon  in the upper right corner of the Data Collection screen (Figure 74A).
2. The Saved Reports section displays in the lower half of the Save screen.
   Tap the saved report you wish to delete, and then tap the Delete (trash can) icon (Figure 74B).
3. Tap Yes to confirm the deletion of the report (Figure 74C), or tap No to abandon the operation.
4. The deleted report no longer appears in the Saved Reports section (Figure 74D).



(A) (B) (C) (D)

Figure 74

Transfer Reports/Data to a PC

In addition to email, saved reports can also be transferred to a PC via the USB cable that accompanies the device. When QuickMap 3D is installed on a tablet, it creates a folder called QuickMap for storing program settings, reports, and *.QM3D format survey files. The *.QM3D survey files can only be opened within QuickMap 3D and are located in a sub-folder called "Data." In addition to transferring survey report folders to a PC, it is also a good idea to copy *.QM3D files over as well once all edits and changes to the survey are complete. A *.QM3D file can always be copied back over to the tablet if it becomes necessary to add more data points to a survey or make any other changes - and then reports can be re-created based on the updated file.

1. Connect the iOS device to a PC with the USB cable that accompanies the device.
2. iTunes should automatically open when it recognizes that the smart device is connected to the PC. If not, double-click the iTunes icon to open it.
3. Click the device icon in the upper left area of the iTunes program to display category options in the left pane (Figure 75).
4. Click "File Sharing."

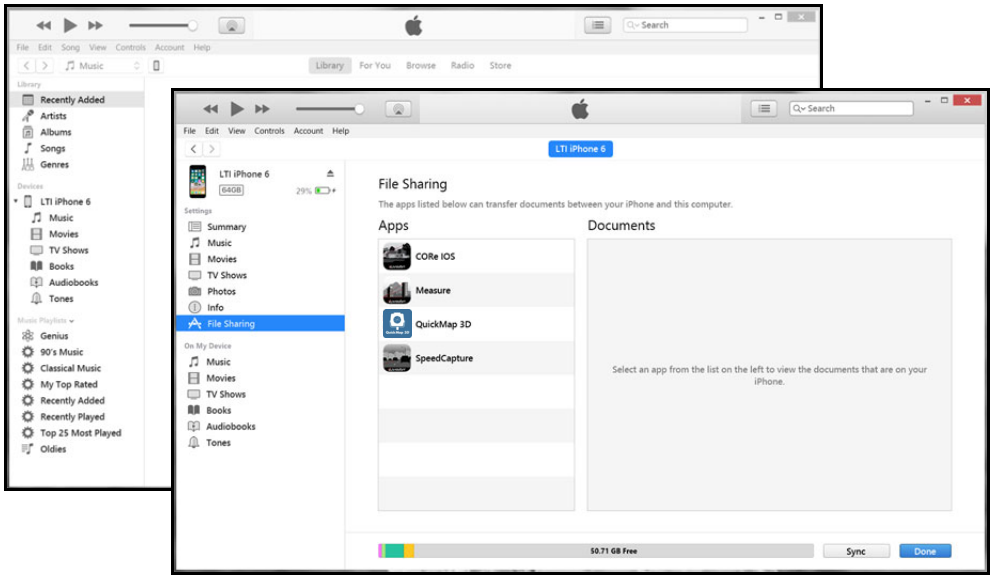


Figure 75

5. Click the QuickMap 3D app to select it and display the report folders in the QuickMap 3D Documents section. Any saved QuickMap 3D report folders will display in the right-hand pane.
6. Click report folders to select/highlight them for transfer, then Click [Save to…] (Figure 76).
7. Browse to a folder on the PC and Click [Select Folder] to complete the process.

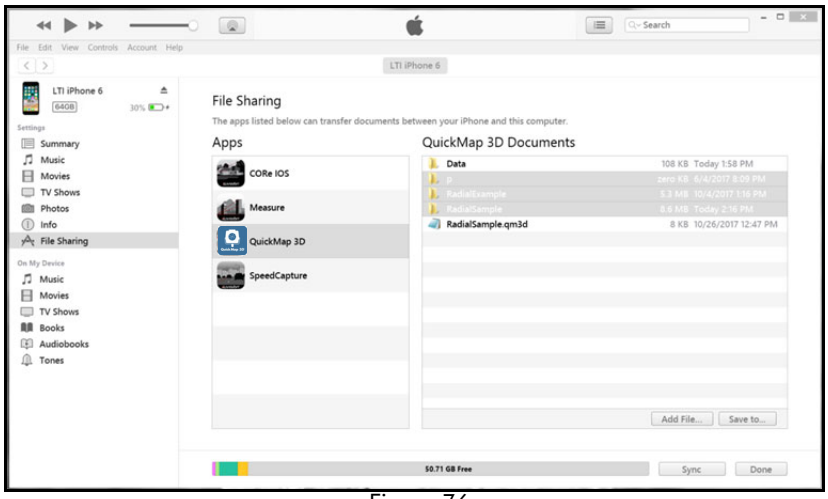


Figure 76

Pick List

The Pick List is a collection of notes used to describe data points in QuickMap 3D surveys. Notes are helpful for further clarifying data points during the diagramming process. Here are a few examples of some common Pick List notes:

EP = Edge of Pavement

VEH1 = Vehicle 1

FOG = Fog Line

CL = Center Line

SKID = Skid Marks

CRB = Curb

SW = Sidewalk

CW = Crosswalk

There is only one Pick List per tablet and it is accessible universally across all surveys that are created in QuickMap. The Pick List can be created in two ways:

- As data points are added to a survey, Pick List notes can be entered and include an option to "Add to Pick List." This is a "build as you go" method for Pick List creation.
- Create a Pick List on a PC, and then transfer it to the QuickMap Data folder on the tablet. If the Pick List is built this way, new notes can still be added at any time. Additionally, notes can be deleted from the Pick List at any time while adding or editing data points with QuickMap.

Add a Pick List Note

Each time a data point is added, QuickMap displays the Description Detail screen so that a description may be entered for that data point. An exception to this is if Auto is selected on the Data Collection screen. If Auto is selected, the last note entered is assigned to all the following data points until Auto is unchecked.

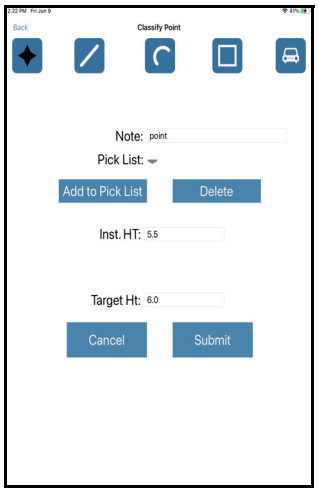


Figure 77

1. On the Description Detail screen (Figure 77), enter the desired description into the Note field.
2. Tap [Add to Pick List]. From now on, this note description will be available for selection from the drop-down menu under the Pick List field and will not have to be typed in again.
3. Tap Submit to save the note and return to the Data Collection screen.

Select a Pick List Item

Because Pick Lists are built by the user, the Pick List drop-down menu will be empty until notes have been added. Once a note has been added, that note will remain as an option in the Pick List drop-down menu unless deleted by the user.

1. On the Description Detail screen (Figure 77), tap the drop-down arrow ▼ to the right of the Pick List field.
2. Tap to select the desired note for the data point. The selected item will appear in both the Pick list field and the Note field.
3. Tap Submit to save the note and return the Data Collection screen.

Delete a Pick List Item

1. On the Descriptive Detail screen (Figure 77), tap the drop-down arrow ▼ to the right of the Pick List field.
2. Tap the desired note. The selected item will appear in both the Pick List field and the Note field.
3. Tap Delete to delete the item.
4. Tap Submit to return to the Data Collection screen.

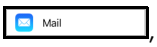
Appendix A - QuickMap 3D Quick Start Guide

This quick reference guide is divided up by specific LTI lasers used with the tablet.***start here***

Step 1 for All Lasers - Connect to Wi-Fi, Install QM3D, Get Licensed

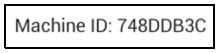
1. Turn on tablet, tap  , tap 

to set Auto-Lock to Never.
2. Tap 

to select a Wi-Fi network and complete process.
3. Tap  , then tap 

, 

, 

to add an email account or get assistance from your IT department to set up a dedicated email account for your reports. Skip this step if your device already has an email account.
4. Tap  , then Search for: "LaserSoft QuickMap 3D"  and INSTALL the app.
5. From the Main screen, tap  to open app.
6. Tap and hold 

to copy or notate Machine ID on paper.
7. Tap 

link, then log in with your Email and temporary password sent from LTI.
8. Paste or type the Machine ID into 

.
9. From the Purchases Table, copy and paste or type in your purchase ID into 

.
10. Tap 

, then copy or notate the License Key.
11. Tap  , then paste or type in the License Key and then tap 

.
12. Charge tablet.
13. Go to Step 2 for TruSpeed Sxb for laser setup **or** go to Step 2 for TruPulse 200X laser setup.

TruSpeed Sxb

Step 2 - Toggle On Bluetooth Link

1. Press MODE until 

.
2. Press ⌄ until 

, then press FIRE to confirm selection 

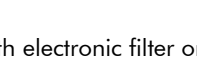
.

Step 3 - Toggle On Electronic Filter and Survey Mode

1. While in Speed Mode, press MODE until 

.
2. Press FIRE 

.
3. Press ⌄ to confirm selection 

.
4. Press MODE to toggle on Survey Mode with electronic filter on 

.
5. Apply the mechanical filter  to the front lens on the TruSpeed Sxb.

Step 4 - Sync Tablet's Bluetooth with TruSpeed Sxb

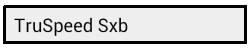
1. Tap 

, then tap 

.
2. Turn on tablet Bluetooth.
3. Tap the laser model/serial number under AVAILABLE DEVICES.
4. Enter PIN number: 6912 or accept any passkey.
5. Exit to main screen.

Final Step TruSpeed Sxb - Setting Up for Your First Shot

1. Power ON all components.
2. Tap 
, then tap 

.
3. Enter file name, then tap 

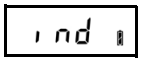
and select equipment.
4. Tap 

, then enter Units that match the laser.
5. Measure from center of laser to ground and enter value 

.
6. Measure center of prism to ground and enter value 

, then tap 

.
7. Leave all origin values at zero and tap 

.
8. On TruAngle, rotate 360 degrees until 

becomes flashing 

.
9. Aim laser at desired reference point (retro reflector) and press 

on laser, and 

stops flashing.
10. Press 

again to add the reference data point to your map.
11. Enter "REF" for the description and tap 

. Notice that 
turns into 
at the top of the QM3D screen. Tap 
to refresh connection if necessary.
12. Finish mapping the rest of the scene.

TruPulse 200X

Step 2 - Toggle On Bluetooth

1. Press FIRE to power the unit on.
2. Press MODE until (SETUP bt / oFF).
3. Press ^ until (SETUP bt / EnC).
4. Press FIRE to accept.

Step 3 - Change Units of Measure to Feet

1. Press MODE until (SETUP UnIt M / dEG °CM).
2. Press ^ to scroll through unit options (SETUP UnIt M / PEr CM), (SETUP UnIt F / dEG °IN).
3. Press FIRE to accept the units of measurement (HD ---- F / -- IN).

Step 4 - Toggle On Electronic Filter

1. Press MODE until (SETUP FILt / oFF).
2. Press ^ to choose (SETUP FILt / on).
3. Press FIRE to accept selection.
4. Apply the mechanical filter  to the front lens on the TruPulse 200X.

Step 5 - Sync Tablet's Bluetooth with TruPulse 200X

1. Tap Settings, then tap Bluetooth.
2. Turn on tablet Bluetooth.
3. Tap the laser model/serial number under AVAILABLE DEVICES.
4. Enter the PIN number: 1234 or accept any passkey.
5. Exit to main screen.

Final Step TruPulse 200X - Setting Up for Your First Shot

Same as Final Step TruSpeed Sxb - Setting Up for Your First Shot (Page 75).

TruPoint 300

Step 2- Activate WLAN

1. Pres  to power the unit on.
2. Press  , then tap  .
3. Tap  twice, then activate WLAN connectivity  .
4. Press  to accept.

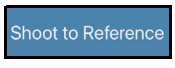
Step 3 - Change Units of Measure to Feet

1. Press  then tap  .
2. Tap  twice, then change the unit of measurement.
3. Short press  to return to Main screen.

Step 4 - Connect TruPoint 300 to Tablet

1. Tap  , then tap  .
2. Tap the laser model,serial number listed in available networks.
3. Laser will display as connected.

Final Step for TruPoint 300 - Setting Up For Your First Shot

1. Power ON all components.
2. Check tablet settings to verify the TruPoint is connected.
3. Tap  , then tap  .
4. Enter file name, then tap  and select equipment.
5. Enter Units that match the laser.
6. Measure from center of laser to ground and enter value  .
7. For 3D maps, measure center of target to ground and enter value  , then tap  .
8. Tap  , wait until the icon becomes  .
9. On the TruPoint, follow the leveling directions.
10. On tablet, leave all origin values at zero and tap  .
11. Aim the laser at desired reference point (target), then tap  to zero laser, and tap  .
12. Tap  to add the reference data point to your map.
13. Enter "REF" for the description and tap  .
14. Finish mapping the rest of the scene.

Access QuickMap Help

1. Tap the Menu button  and choose Help.

   Get help with:

   - Laser/tablet Bluetooth connection:
     * Low voltage on tablet or laser can hinder Bluetooth connection.
     ** Pair laser to only one device at a time.
   - Available mapping methods.
   - Corrections to data point heights, notes, and orientation.
   - Moving control point and equipment to a new position.
   - Converting inches to decimal feet for height entries.
   - Sending program diagnostics and/or survey *.QM3D file to LTI technical support (while on WIFI only).

Appendix B - Conversion Table (Inches to Feet)

The chart below converts fractions of inches into decimal equivalents. Conversions are also available in QuickMap's built-in Help (Page 27).

Inches	Feet	Inches	Feet	Inches	Feet	Inches	Feet
1/8″	0.0104	3 1/8″	0.2604	6 1/8″	0.5104	9 1/8″	0.7604
1/4″	0.0208	3 1/4″	0.2708	6 1/4″	0.5208	9 1/4″	0.7708
3/8″	0.0313	3 3/8″	0.2813	6 3/8″	0.5313	9 3/8″	0.7813
1/2″	0.0417	3 1/2″	0.2917	6 1/2″	0.5417	9 1/2″	0.7917
5/8″	0.0521	3 5/8″	0.3021	6 5/8″	0.5521	9 5/8″	0.8021
3/4″	0.0625	3 3/4″	0.3125	6 3/4″	0.5625	9 3/4″	0.8125
7/8″	0.0729	3 7/8″	0.3230	6 7/8″	0.5729	9 7/8″	0.8229
1″	0.0833	4″	0.3333	7″	0.5833	10″	0.8333
1 1/8″	0.0938	4 1/8″	0.3438	7 1/8″	0.5938	10 1/8″	0.8438
1 1/4″	0.1042	4 1/4″	0.3542	7 1/4″	0.6042	10 1/4″	0.8542
1 3/8″	0.1146	4 3/8″	0.3646	7 3/8″	0.6146	10 3/8″	0.8646
1 1/2″	0.1250	4 1/2″	0.3750	7 1/2″	0.6250	10 1/2″	0.8750
1 5/8″	0.1354	4 5/8″	0.3854	7 5/8″	0.6354	10 5/8″	0.8854
1 3/4″	0.1458	4 3/4″	0.3958	7 3/4″	0.6458	10 3/4″	0.8958
1 7/8″	0.1563	4 7/8″	0.4063	7 7/8″	0.6563	10 7/8″	0.9063
2″	0.1667	5″	0.4167	8″	0.6667	11″	0.9167
2 1/8″	0.1771	5 1/8″	0.4271	8 1/8″	0.6771	11 1/8″	0.9271
2 1/4″	0.1875	5 1/4″	0.4375	8 1/4″	0.6875	11 1/4″	0.9375
2 3/8″	0.1979	5 3/8″	0.4479	8 3/8″	0.6979	11 3/8″	0.9479
2 1/2″	0.2083	5 1/2″	0.4583	8 1/2″	0.7083	11 1/2″	0.9583
2 5/8″	0.2188	5 5/8″	0.4688	8 5/8″	0.7188	11 5/8″	0.9688
2 3/4″	0.2292	5 3/4″	0.4792	8 3/4″	0.7292	11 3/4″	0.9792
2 7/8″	0.2396	5 7/8″	0.4896	8 7/8″	0.7396	11 7/8″	0.9896
3″	0.2500	6″	0.5000	9″	0.7500	12″	1.000

Appendix C - Troubleshooting Tips

NOTE QuickMap 3D for iOS does not support tablets running iOS operating systems 10.x or older. To check the version of the operating system of the tablet, navigate to Settings/General/About. Remedy steps may vary slightly depending on the OS of the smart device.

TruPulse 200X and TruSpeed Sxb

Problem	Remedy
No communication between laser and the tablet.	• Tap the Laser Connection Indicator icon at the top of the Data Collection screen and try to take another measurement. • Verify that the Bluetooth feature in the laser is set to BT_Enc (when using a TruAngle) or BT_On (without a TruAngle). • Ensure that the laser is paired to the tablet via Bluetooth (Page 7). Lasers can only be paired to one device at a time. • If using a TruAngle: ensure that the 4pin to 4pin cable connecting the laser to the TruAngle laser connector is securely in place. Also verify that the TruAngle firmware is version 1.17 or better. Refer to the TruAngle manual for more information.
Points are displaying in a straight line (Radial with Angle mapping method).	• If using the Tribrach/Tribrach adapter, ensure the TruAngle is spinning on correct axis – and as not broken loose from the Tribrach adapter. • Check the laser Bluetooth setting and make sure that it is set to BT_Enc. • Ensure the TruAngle firmware is version 1.17 or newer. TruAngle firmware version 1.17 or newer: the laser sends distance and inclination values to the TruAngle. Next the TruAngle captures the horizontal angle and inputs that value into the serial string and sends it back to the laser. The serial string is then transmitted to the tablet via Bluetooth. TruAngle firmware Version 1.14 or older does not have this functionality, but can be updated to 1.17. Contact the LTI Service Department for details.
The tablet locked up or doesn't seem to be working properly.	Power the tablet off and back on again. Press and hold the power button to see the options for resetting the device. No matter what, each measurement is saved as it is taken, and no data will be lost.
An error message was displayed while working in QM3D.	Error messages are often self-explanatory. Clear the message and correct the error before proceeding. If the error continues, restart QM3D. If the error persists, reset the tablet (see above). Go to QuickMap Help and select Email Tech Support to send a diagnostic file to support@lasertech.com
A 3D map was started without entering the applicable height values.	Enter the value on the Data Collection screen or the Settings screen (Page 49). If data points have already been added, enter the value(s) on the Edit Point Series screen (Page 62).
A point was accidentally deleted.	Reshoot or manually re-add the data point. Point deletions cannot be undone.
Cannot save reports when trying to transfer them to a PC using a cable.	The tablet cannot be connected to the computer when reports are being saved. Unplug the cable, save the reports, and then plug the cable back in to access saved reports.

TruPoint 300

Problem	Remedy
No communication between laser and the tablet.	• Verify that the WLAN feature in the laser is turned on (Function/Settings/WLAN BT Communication). • Ensure that the laser is added to the tablet as a WLAN network. The laser can only be connected to one device at a time. • Tap the Laser Connection Indicator icon at the top of the data collection screen and wait 2-4 seconds for the icon to turn green. • Power the tablet OFF and back ON. Try the above steps again. • Delete the TruPoint 300 WLAN network from the tablet and re-add it. Re-open QuickMap and tap the laser connection indicator icon. If the icon does not turn green within 2-4 seconds, there could be a problem with the WLAN function in the laser or tablet.
QuickMap program closed unexpectedly.	If there is a 11-minute or more delay between shots, the TruPoint 300 may go to sleep. The connection to the tablet is lost which causes QuickMap to close unexpectedly. Re-establish check WLAN connection in tablet Settings, re-open QuickMap, and continue mapping. Go to QuickMap Help and select Email Tech Support to send a diagnostic file to support@lasertech.com.
The tablet locked up or doesn't seem to be working properly.	Power the tablet off and back on again. Press and hold the power button to see the options for resetting the device. No matter what, each measurement is saved as it is taken, and no data will be lost.
An error message was displayed while working in QM3D.	Error messages are often self-explanatory. Clear the message and correct the error before proceeding. If the error continues, restart QM3D. If the error persists, reset the tablet (see above). Go to QuickMap Help and select Email Tech Support to send a diagnostic file to support@lasertech.com.
A 3D map was started without entering the applicable height values.	Enter the value on the Data Collection screen or the Settings screen (Page 49). If data points have already been added, enter the value(s) on the Edit Point Series screen (Page 61).
A point was accidentally deleted.	Reshoot or manually re-add the data point. Point deletions cannot be undone.
TruPoint 300 Error Codes.	Error 256 – Return is too intense. If shooting to a reflective target, and the target is too close to the laser, the laser will return this error and will not take a measurement. Error 301 – Cannot acquire target. Try to get the measurement again, taking care not to move or shake the device.

Appendix D - Profiling a Damaged Vehicle

QM3D can be used to profile a crush or other damaged area of a vehicle. The data can be saved and imported into a third party program for further analysis.

Tips for doing a crush measurement:

- Mount the equipment on a tripod.
- Place the equipment close to the vehicle, while maintaining clear line-of-sight to all points.
- Use Radial with Angle method to produce the most accurate measurements.
- Use a new QM3D file rather than mapping the crush and the scene together.
- If possible map the crush at a secure location not at the crash scene.
- Reflectors can be used at key points of the crush as seen below. This will create a surface of equal reflectance. The laser has a Filter Mode to exclusively work with reflectors. For more information, refer to laser's user's manual.

Figure 78

Appendix E - Uninstalling QM3D

WARNING — If QuickMap is uninstalled, all data, images, and surveys are deleted!

Before uninstalling QuickMap, use the cable transfer instructions (Page 72) to save your proprietary surveys, images, and reports to your PC. If you uninstall without first transferring your data to your PC using iTunes, it will all be deleted when the app is deleted.

To uninstall QM3D iOS:

1. Tap and hold the QuickMap app icon until the "X" appears.
2. Tap the "X".

Appendix F - Additional Information

Localization

English is the default language of most tablets; however, it can be changed.

To change the language:

1. Power on the tablet.
2. Tap the Settings icon on the device home screen.
3. Tap [Language & input] g [Language].
4. From the list of languages displayed, select the language to use for text display on the device.
5. Press the Home button on the device to return to the device Home screen.

NOTE Text in other programs may still be displayed in English which is the tablet's default language.

Serial Data Format

The QM3D app accepts data from LTI instruments that use a data format which is based on the NEMA 0183 Standard for Marine Electronic Navigational Devices, Revision 2.0. For more detailed information about serial data format, refer to the user's manual that shipped with the LTI instrument.