HOW TO GUIDE

Trimble Forensics Capture

Software

USING CAPTURE GNSS AS GROUND CONTROL IN PIX4D

Trimble

Legal Information

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Release Notice

This is the April 2020 release (Revision A) of the Trimble Forensics Capture - Using Capture GNSS as Ground Control in Pix4D. It applies to version 3.3.0 of the Trimble Trimble Forensics Capture software.

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Overview

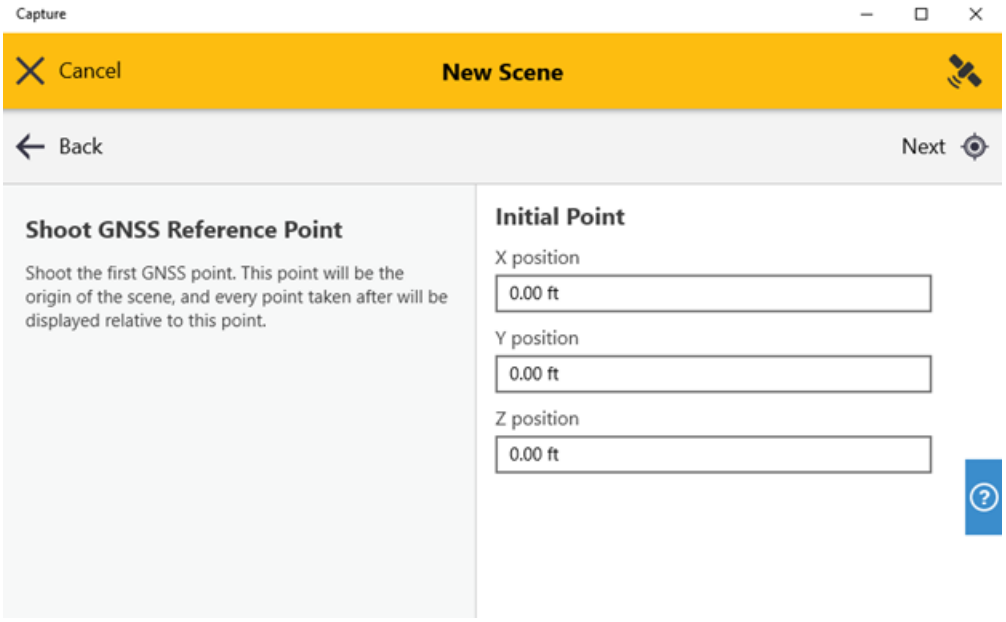
This document describes how you can use Capture GNSS scene measurements to create ground control points and a projection calibration file that enable you to process UAV photogrammetry into a point cloud and orthophoto that will match the coordinates and scale of your Capture scene measurements.

Collect Ground Control Points in Capture

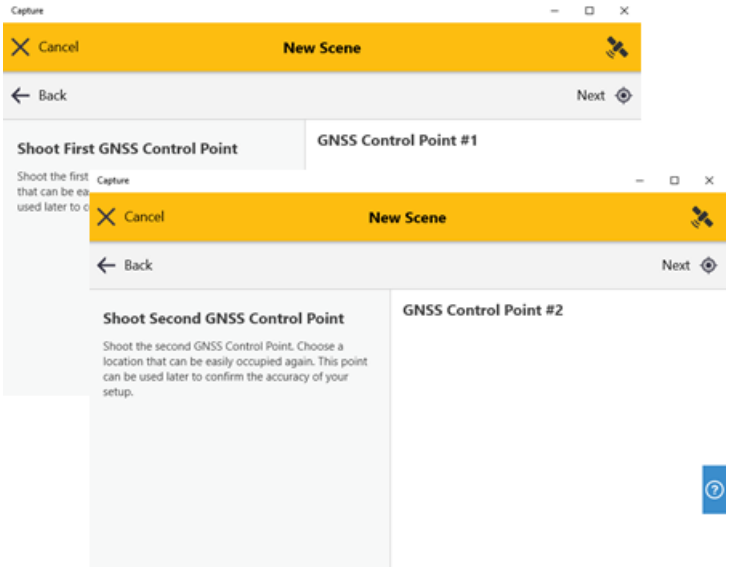
You can collect Ground Control Points (GCP) using the Capture field software with a GNSS receiver.

When you first start a scene with GNSS, you are prompted to shoot three reference points. These points are important because they can be used to position a total station on the scene, or to come back to the same scene at a later date and recreate the measurements. These points will also be marked as eligible for ground control.

Before you shoot the first point, you must also enter the desired local coordinate. The precise GNSS Latitude, Longitude, and Height are used as the ground control geodetic location. The local coordinate becomes the basis of the ground calibration system (described below).

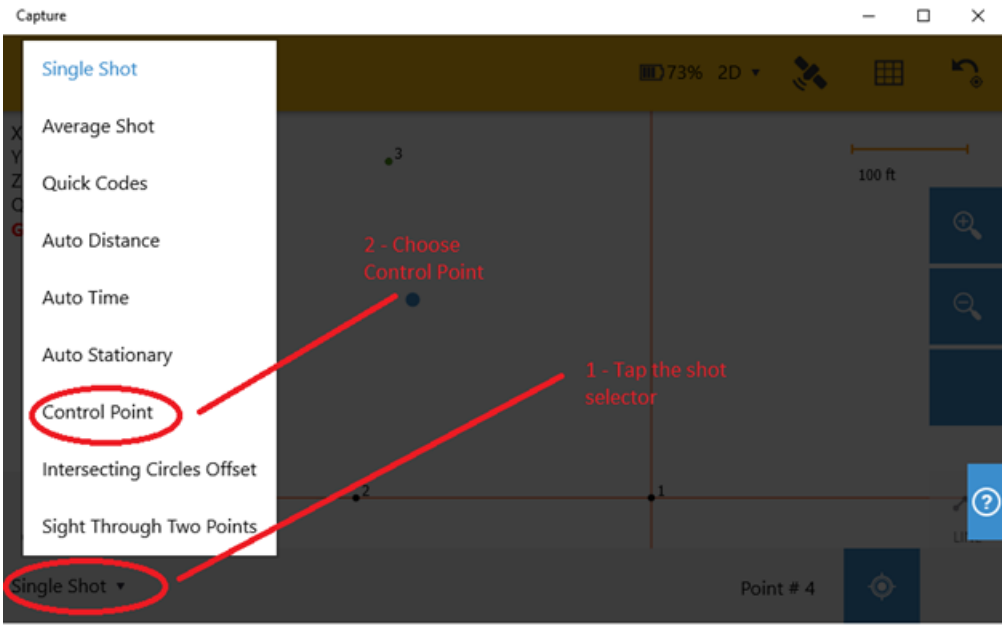


When you have collected the first point, you are prompted to collect two additional reference points. These points are also automatically marked as eligible for ground control.

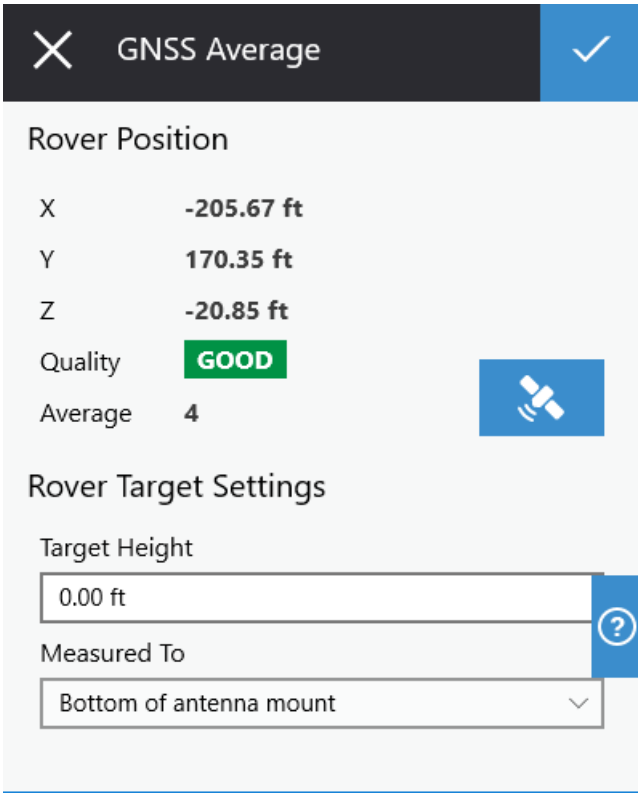


Collect a minimum of three points, so that you have two points to orientate new instruments on the scene, and one for backup.

If you are doing UAV photogrammetry work, you often want to have more than three ground control points. You can collect additional ground control points in Capture; tap the shot selector and then select Control Point.



Tap the Play button to start the control point occupation. Because you need this point to be more accurate, you are prompted to hold still on the point for 10 seconds to get a good average position for the point.

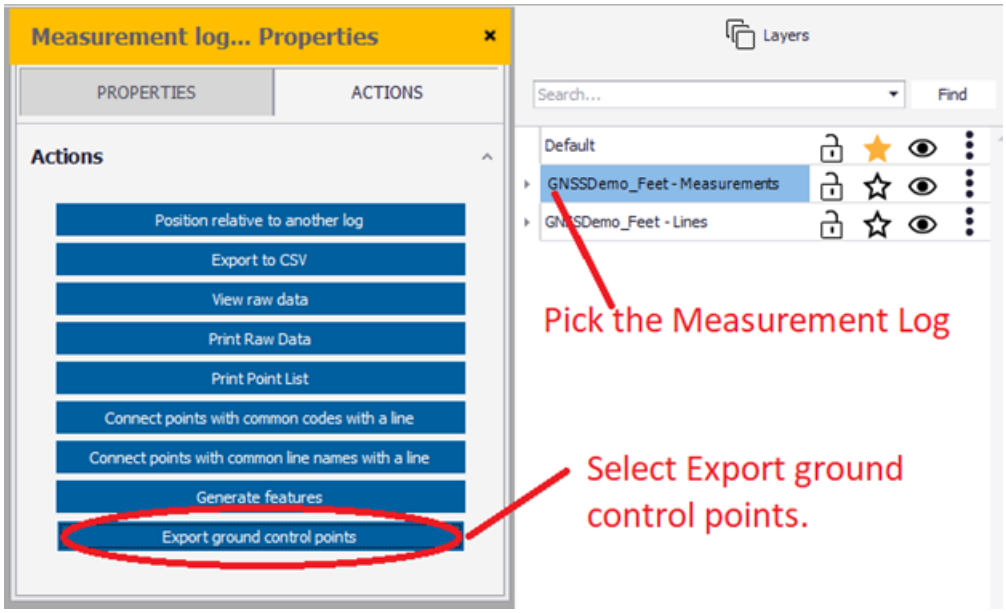


Continue to collect points and additional control points to complete your scene.

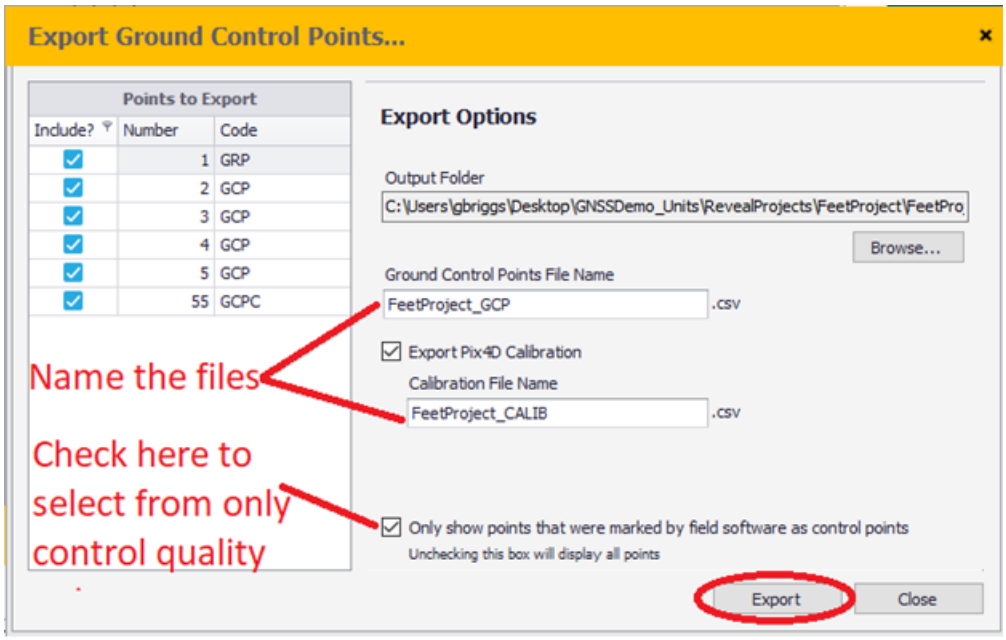
When you are done, close the scene, export the data as a .capture file and transfer it to the PC running your office software.

Export GCP and Calibration From Reveal

1. Import the .capture field data file into the Trimble Forensics Reveal software.
2. Select the Measurement log object, then on the **Actions** tab, select **Export Ground Control Points**.



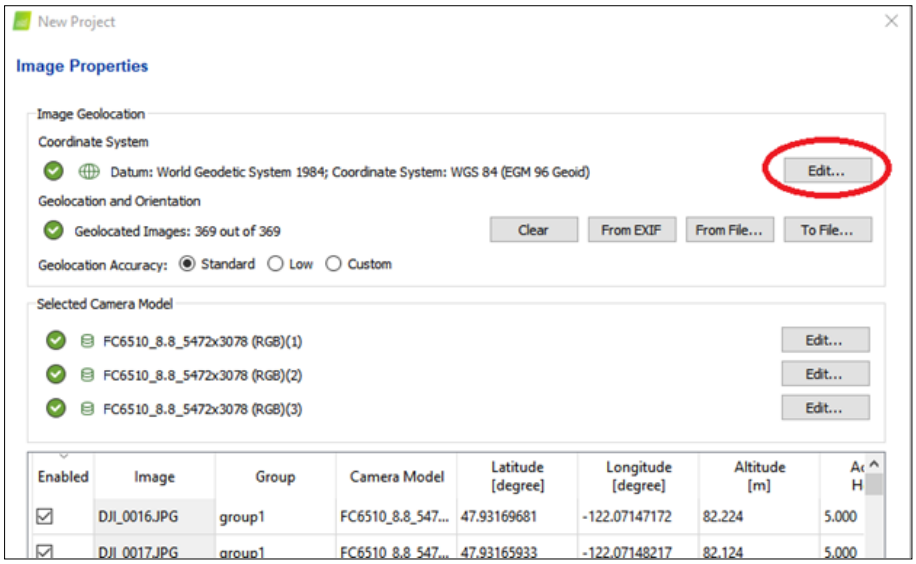
3. Select the points to export. By default this is only points you collected as control quality in the field. If you want to use other points you collected, deselect **Only show points that were marked by field software as ground control**.
4. Name the ground control points (GCP) file and the calibration file (CALIB), then tap **Export**.



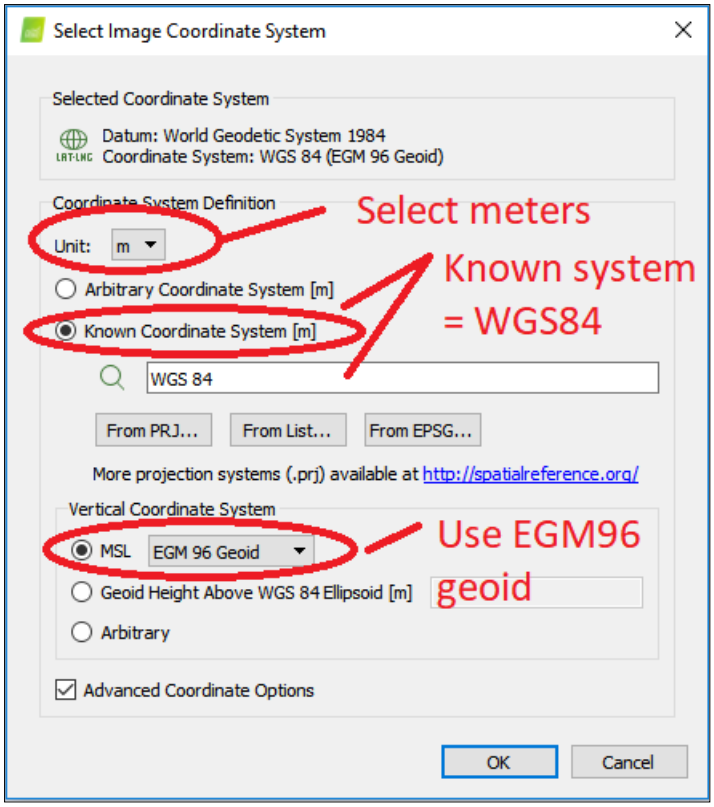
Working with Pix4D

Setting Up Coordinate Systems

1. Start your Pix project, and add images. On the **Image Properties** screen, tap **Edit...** to change the image coordinate system.



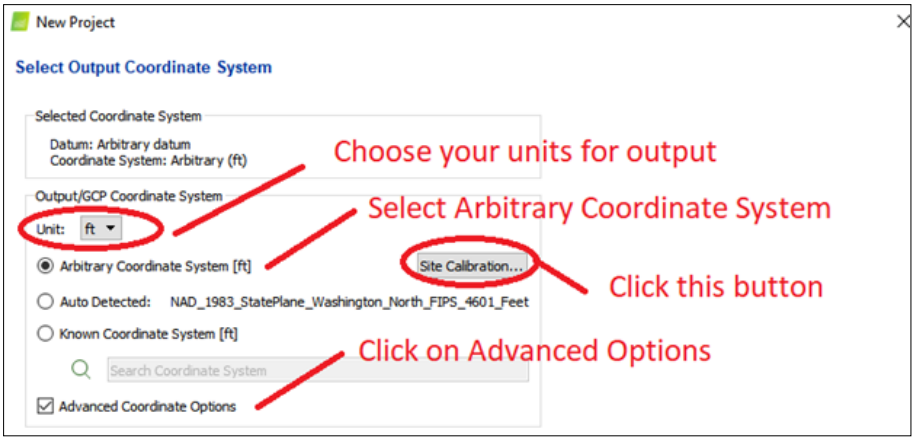
2. Set the coordinate system **Unit** as **m** (meters), **Known Coordinate System** as **WGS84**, and **MSL** as **EGM96 Geoid**.



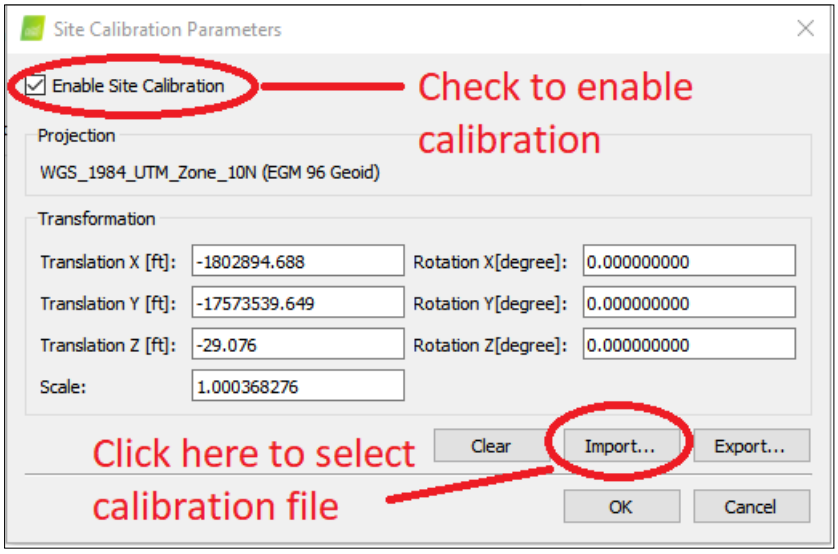
NOTE – Using metric units here is only for the input coordinate system. The units for the output coordinate system will be set by the CALIB file you exported from Reveal. You will be able to work in either feet or meters for the output system even though you select meters for the input system.

3. Click **OK** and select the output coordinate system:
   a. Select the units for the output (ft or m).
   b. Select **Arbitrary Coordinate System**.
   c. Select **Advanced Coordinate Options**.

d. Click the **Site Calibration ...** button.



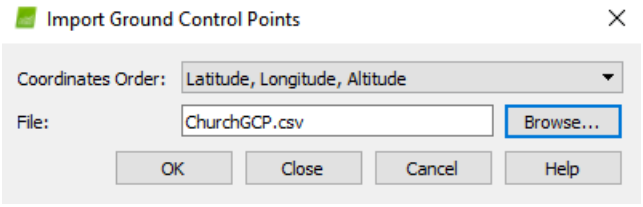
4. On the **Site Calibration Parameters** screen, select **Enable Site Calibration**, and click **Import** to select the *_CALIB.csv file you exported from Reveal. When you import the CALIB file, it will enter the translations and scale factor to process your point clouds and ortho photos in the same ground coordinate system with a 0,0 origin that you used in Capture.



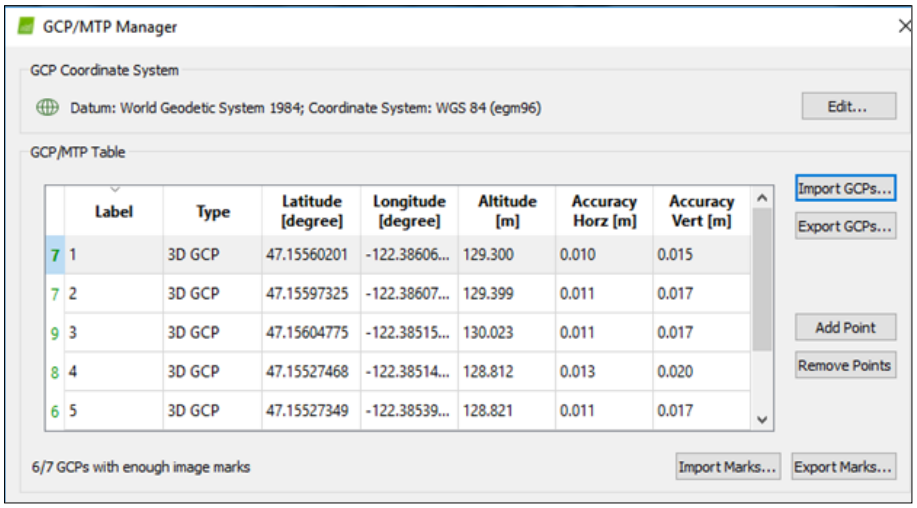
5. Click **OK** to finish setting up your project.

Import GCP

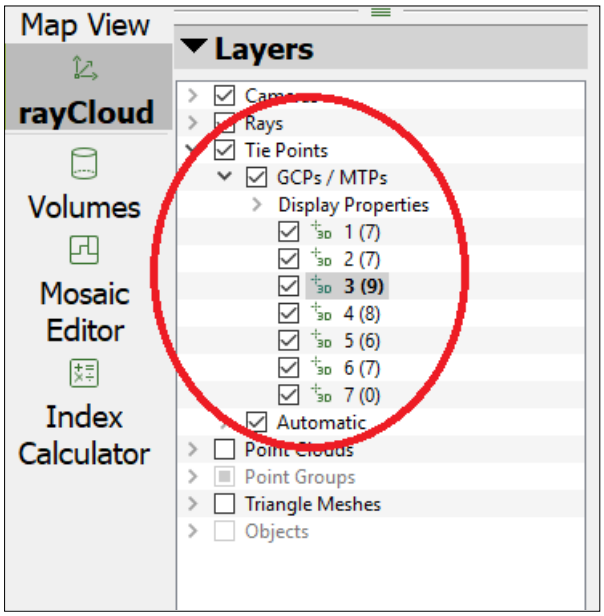
1. In the Pix4D software, select **Project** / **GCP/MTP Manager**.
2. Click **Import GCPs ...**.
3. Select **Latitude, Longitude, Altitude** from the **Coordinates Order** dropdown, and browse to the file you exported from Reveal. Click **OK**.



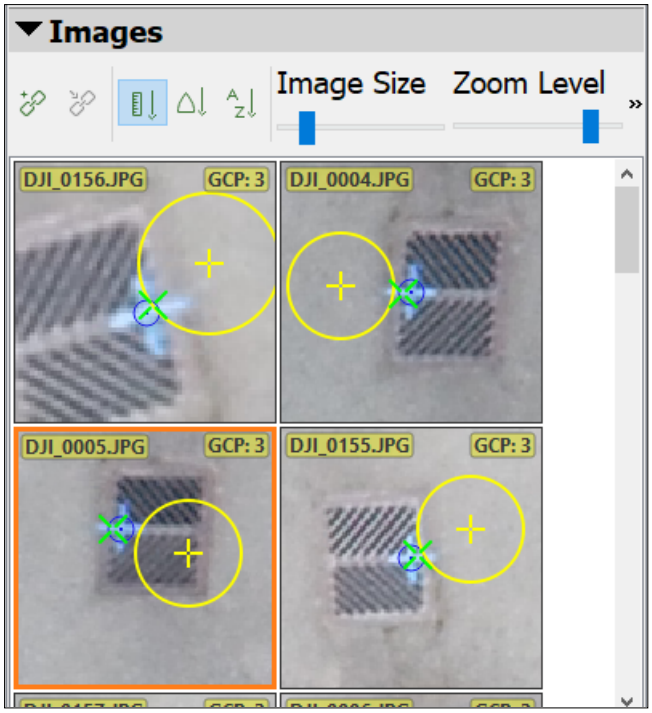
Your GCPs show in the table:



4. Select the **rayCloud** view and expand the **Tie Points** section to see your GCPs:



5. Select the GCPs one by one. With the GCP selected, go to the **Images** pane and line up the yellow cross with the green cross for 5 or more images that the GCP appears in:



...should become:



6. After completing the manual placement of each GCP in multiple images, you are ready to process the photos into a point cloud.

Finished Data (Point Cloud / Ortho Photo)

After you complete processing, you now have a point cloud and/or orthophoto that has been calibrated to the ground coordinate system you created with your Capture GNSS field work.

You can import the .las file point cloud into the Reveal software, and it should line up exactly with the Capture field work on the ground.