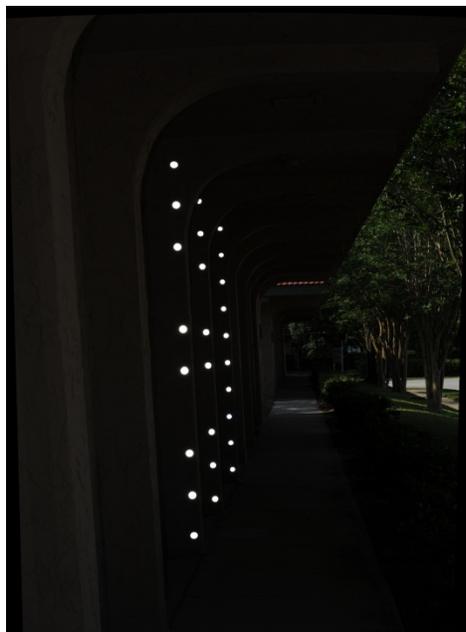




VZ series Camera Calibration

Calibration Field Setup

Place 30 5cm flat reflector targets 1 foot apart on three columns. Place 10 targets on each column vertically. The columns should be approximately 10 feet apart from each other in depth.



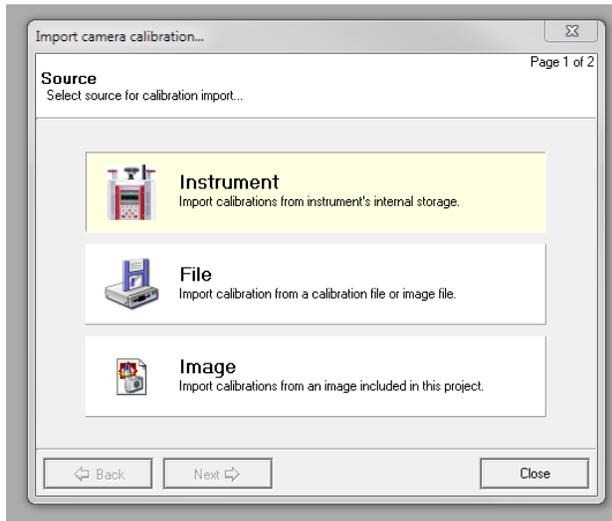
Place the system at such distance so that all targets are shown in the images. Tilt the system forward so that the targets are equally distributed vertical in the images. The best practice is to look through the peep hole of the camera to align the targets. Use a sturdy tripod and a power source that will be efficient enough for one hour. We recommend using the AC power for the scanner and camera.

RiScanPro Setup

Step 1) Create a new project in RiScanPro and name the project accordingly to the scanner's model, serial number, camera type, serial number, and lens type.

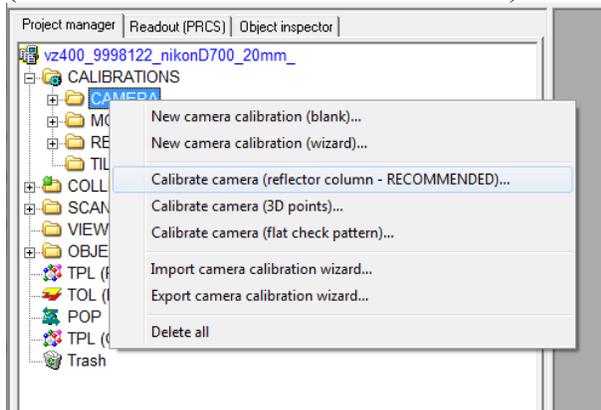
Example: VZ400_s999000_nikonD700_1234567_20mm_A

Step 2) Under the CALIBRATIONS folder, right click on camera and select "import calibration wizard" then select "Instrument".



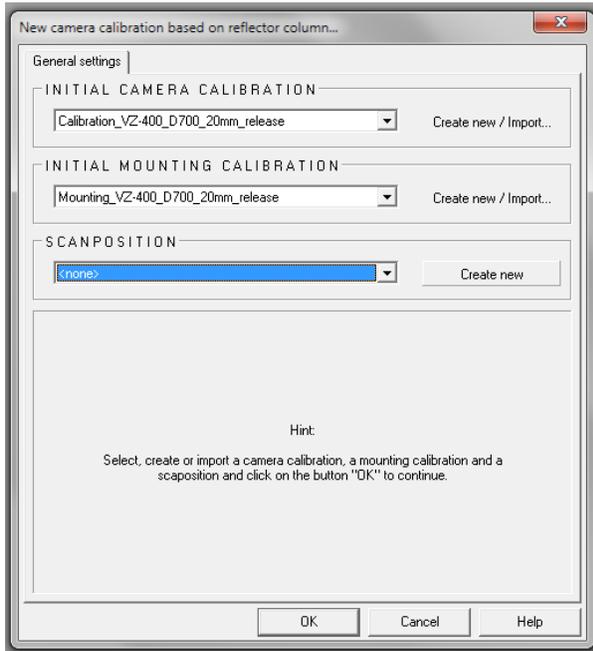
Chose the proper initial calibration files associated with the lens. If calibrating a 20mm lens then choose file “Nikon_D700_20mm_Init.cam”. After importing the initial calibration file, it will be located in RiScanPro in the “CALIBRATIONS” folder; camera and mounting.

Step 3) In RiScanPro; right click on the “CAMERA” folder and select option “Calibrate camera (reflector column – RECOMMENDED)”.

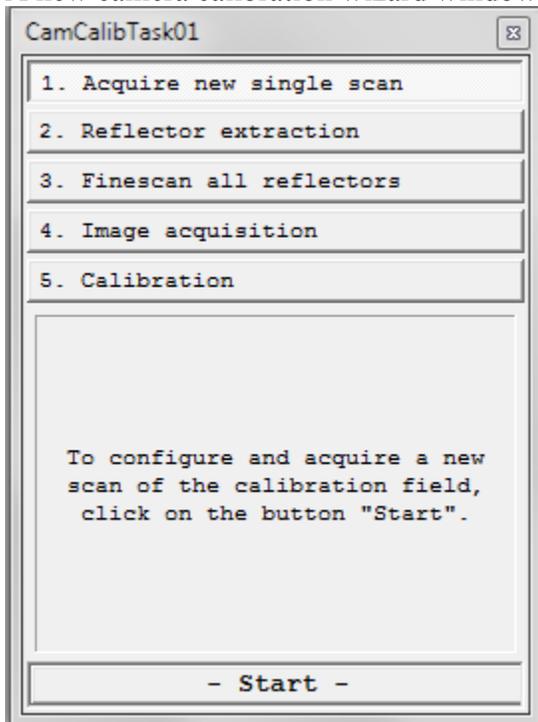


In the new pop-up window, under ‘INITIAL CAMERA CALIBRATION’ click on the drop down arrow and select the “calibration release” file and do the same for the “INITIAL CAMERA MOUNTING”.

After selecting the proper camera and mounting files click the “CREAT NEW” then click OK.



A new camera calibration wizard window should pop-up after clicking OK.

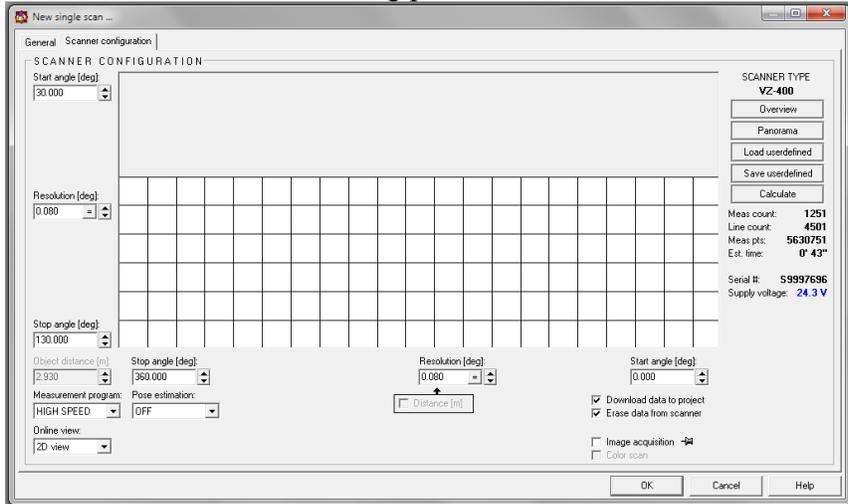




Camera Calibration Wizard

Step 1) Acquire new single scan

Click start and set the scanning parameters and resolution in the scanner configuration window.

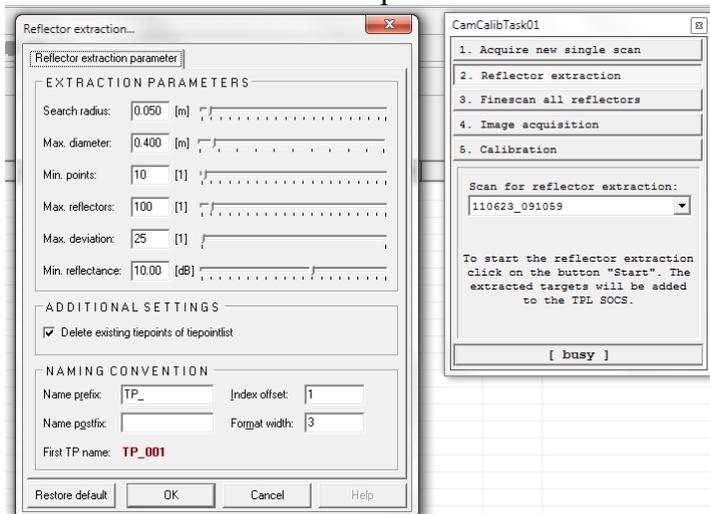


Only scan a window 10 degree to the left and right of the target field. Leave the vertical at start angle 30 degrees and stop angle 130 degrees. Set the resolution 0.060 degree then click OK.

Step 2) Reflector extraction

Click on option 2 (reflector extraction) from the wizard and click start then click OK on the following popup window.

This will automatically place a tiepoint on each reflector. Please note that the auto extraction algorithm will place a tipoint on most objects that are reflective so DELETE or ADD tiepoints as needed in the 2D view of the point cloud.





Step 3) Finescan all reflectors

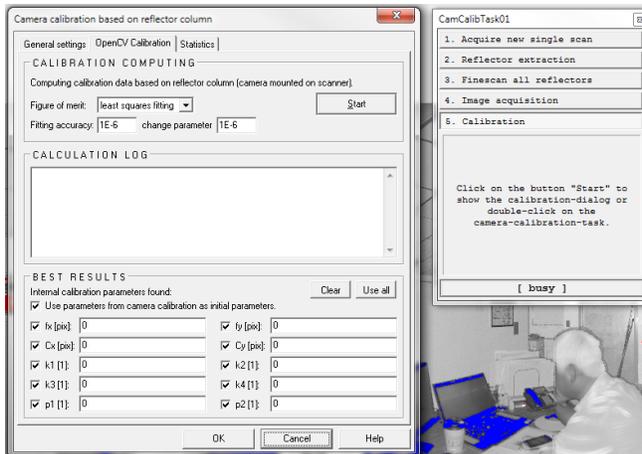
Click start on step 3 from the camera calibration wizard and RiScanPro will move the tiepoint to the center of each target.

Step 4) Image Acquisition

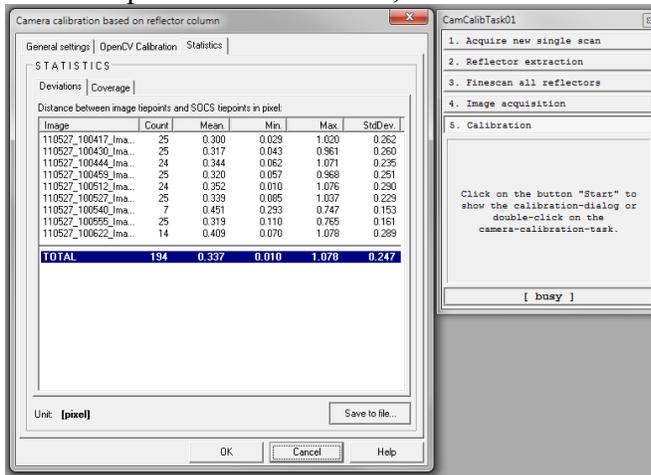
From the camera, turn on the flash then set the aperture and shutter speed to its highest settings. Reason for such settings is to enhance the targets so that RiScanPro can better locate all reflective targets in the images. After all camera settings are set, click START on the camera calibration wizard. The camera will take approximately 11 photos at different angles. There will be one or two images that will not contain any targets and some photos will contain more targets than other. After the image acquisitions are done, open an image and turn on the TPL SOCS and TPL image (Ctrl 1 and Ctrl 2).

Step 5) Calibration

Click start on the camera calibration wizard then select “USE ALL” in the popup window and click START. The new camera calibration is now being processed.



Once the processed is finished, click on the “STACTICES” fold to view the final results.





Acceptable values for lens variance 20mm:

Distance mean < 1.5 pixel

Distance mx < 2.5 pixels

Acceptable values for lens variance 85mm:

Distance mean < 2.5 pixel

Distance mx < 4 pixels

Acceptable values for lens variance 180mm:

Distance mean < 3 pixel

Distance max < 4 pixels

If the mean and max values are within the specified pixels then click OK.

To exit and save the new calibration files, click yes on the following promote.

If the mean and max does not meet the specified pixels, then click no and make adjustments in the images and reprocess step 5.

A new mounting and camera matrix will save to the CAMERA folder under "CamCalibTask01".

Right click on the Result calibration and mounting and rename both folds accordingly.

Example: Result calibration NikonDxxx_camera serial #_xxmm_Final.

Exporting new calibration matrix files to scanner

Step1) Export new results camera and mounting files to scanner

Under the camera fold, right click on the new result calibration then select Export camera calibration wizard. Follow the exporting wizard and select the proper camera and mounting calibration files.

Step2) Final Testing

Once finished exporting the files to the scanner, delete the old files, unmount the camera from the scanner then do a test scan. The mounting readjustments should continue to fall within the specified deviation pixels.