

How to Align the Optics on the Icon Microscope

1. Make sure the microscope is in an AFM mode with the laser aligned on the cantilever.
2. Initialize the stage (Choose the INITIALIZE option under the STAGE pull down menu).
3. Click on the "NAVIGATE" icon.
4. Move the XY stage over the chuck (with no sample in place) and move the microscope head down until you are about 3mm above the chuck.
5. Locate tip using the "ALIGN" icon on the left side of the screen.
DO NOT GO TO THE ALIGNMENT STATION!
6. Adjust the illumination to 40%
7. Zoom all the way out (Zero setting).
8. Attempt to focus on the cantilever. If the cantilever is as shown below, the optics is aligned.
Skip to step XX



Otherwise, we need to move the optics until you can see the cantilever as shown above. Use a 5mm hex key to loosen the top and bottom screws on the optics dovetail. There two screws hold the dovetail in place.

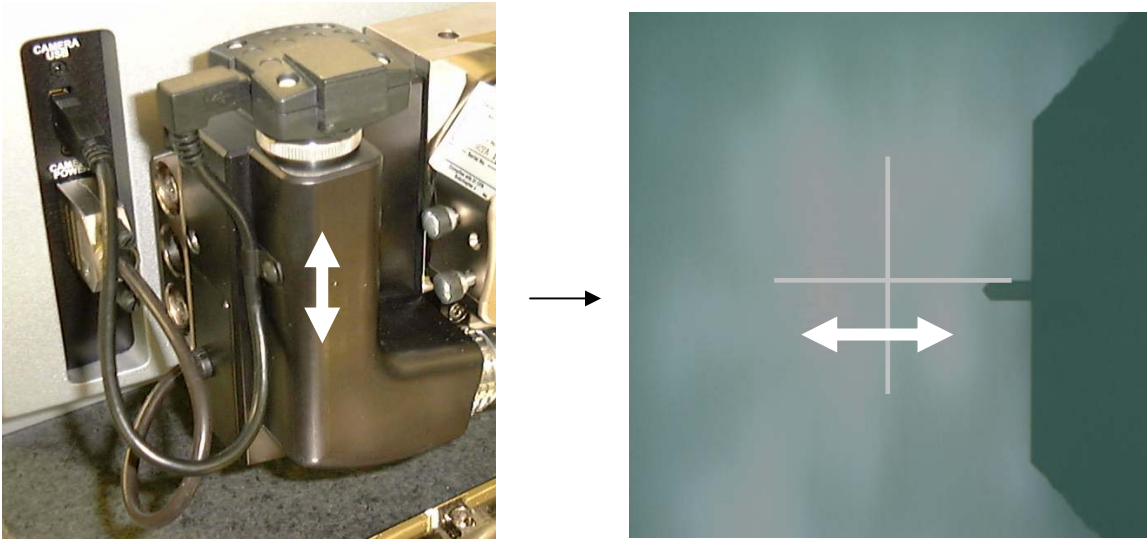


9. The dovetail is spring loaded in place using the center screw. If the dovetail is too loose and moves when you loosen the top and bottom screws, the center screw needs to be tightened to increase the spring force. If required, use a 4mm hex key and tighten the center screw and increase the spring preload. If you have too much spring preload, it will be too hard to move the dovetail to align the optics.



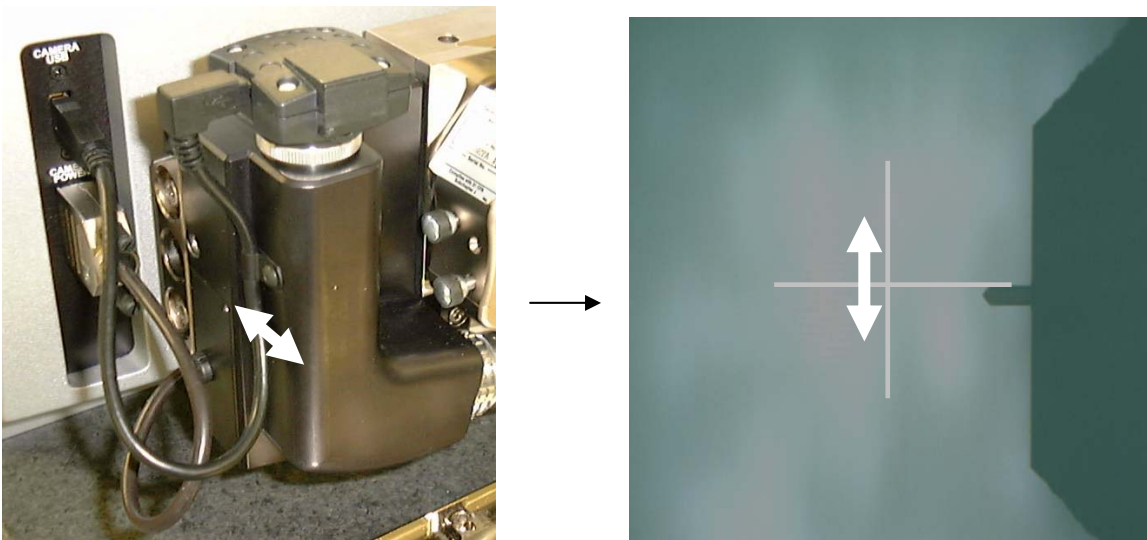
10. Move the optics up and down to shift the optical image left to right.

Lateral adjustment



11. Move the optics front to back to shift the optical image up and down.

Vertical adjustment



12. When the image is as shown below, lock the top and bottom screws on the dovetail to lock the dovetail in place.



13. Now you need to do some optics calibration. In the Nanoscope software, go to the optics calibration menu.

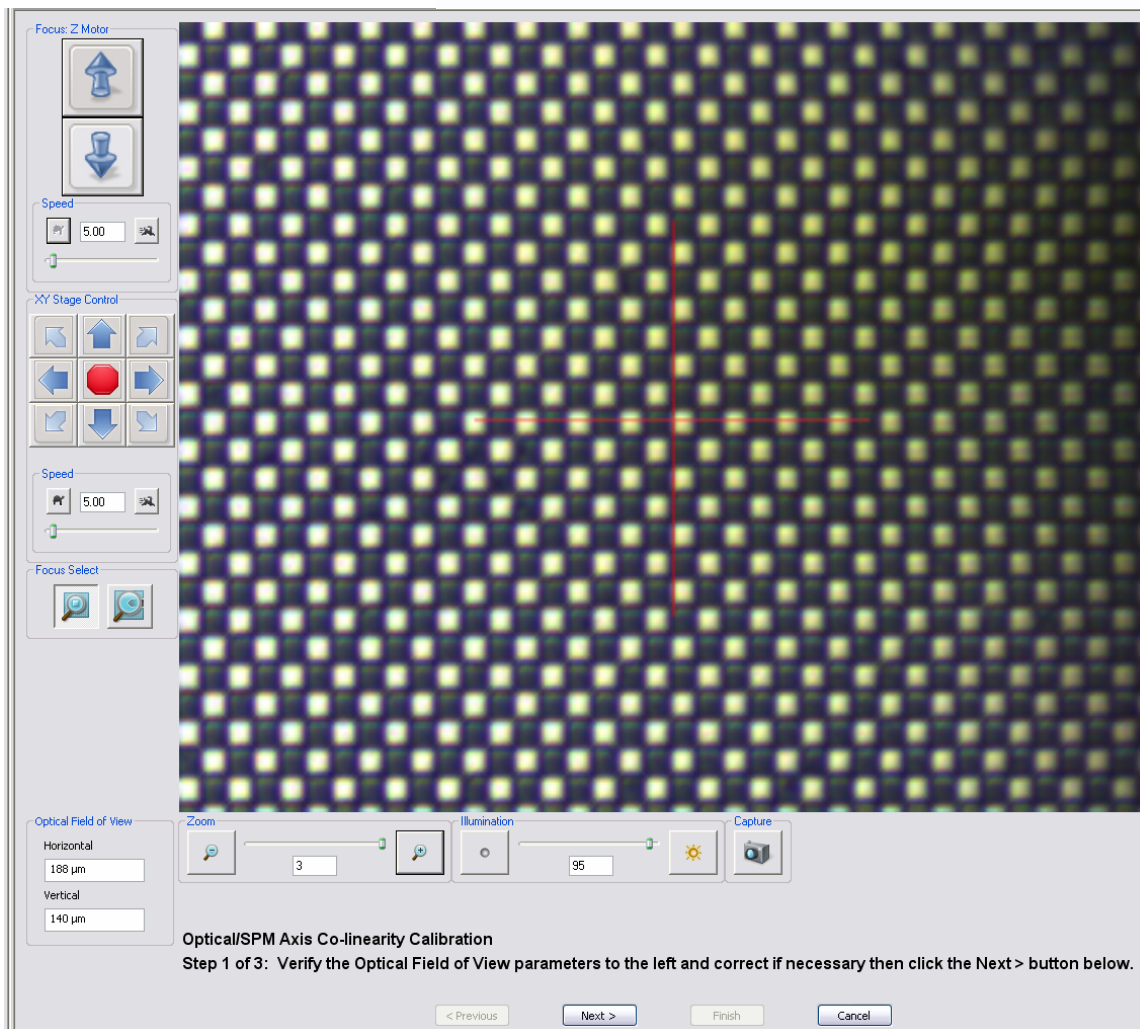
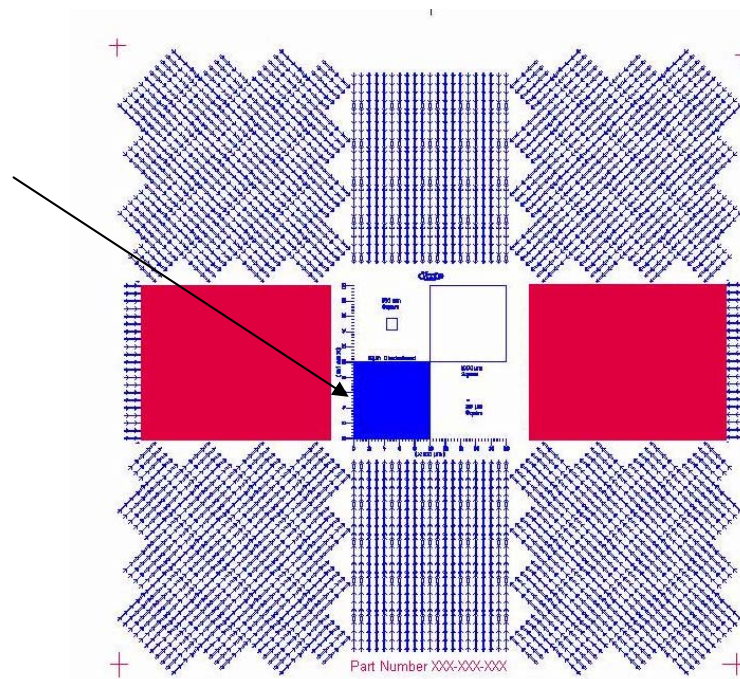
14. Move the XY stage over to the optical standard using the arrow buttons

Alignment station



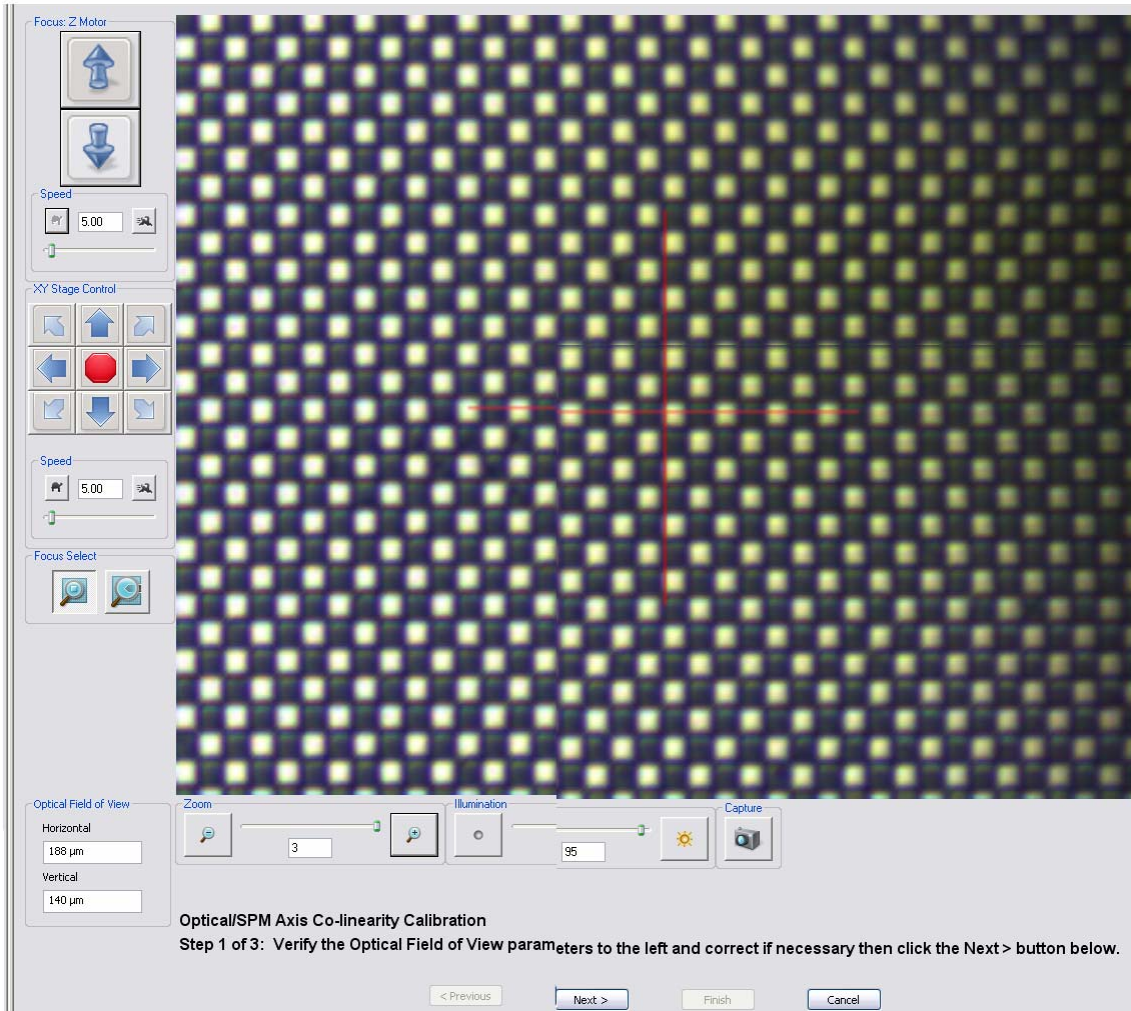
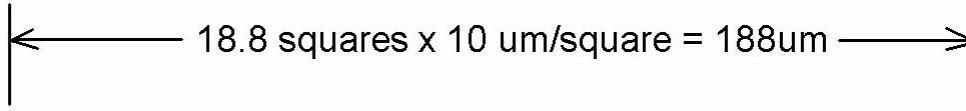
15. Focus the microscope on the 10um pitch grating on the optical standard:

10um pitch checkerboard pattern

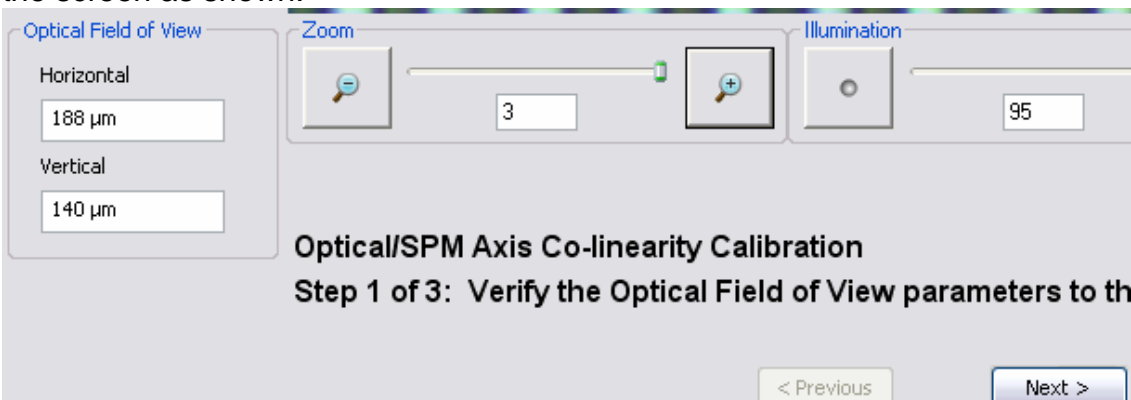


16. The first thing the software will ask is for you to calibrate the field of view parameters. If you are replacing the optics assembly, or are recreating the D4stage.par file, you will need to do this. If you are replacing the microscope scanner, the existing values are fine – skip to step 20.

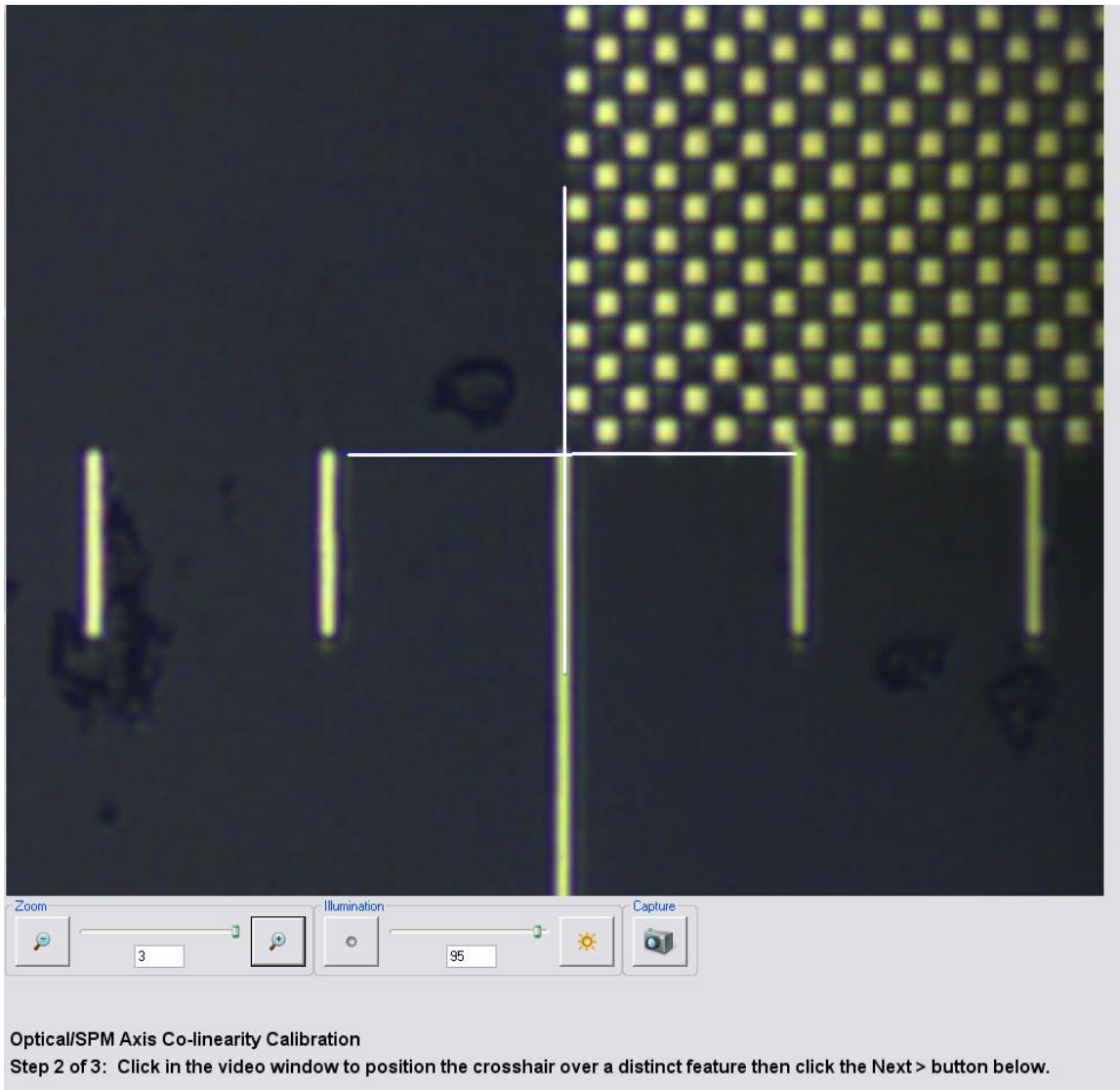
17. Zoom in the optics to the highest magnification (Setting 3). Count the number of squares vertically and horizontally. Multiply by 10 to get the horizontal field of view in microns. If needed, remove the tip holder temporarily for a better image on the right side of the screen. For example:



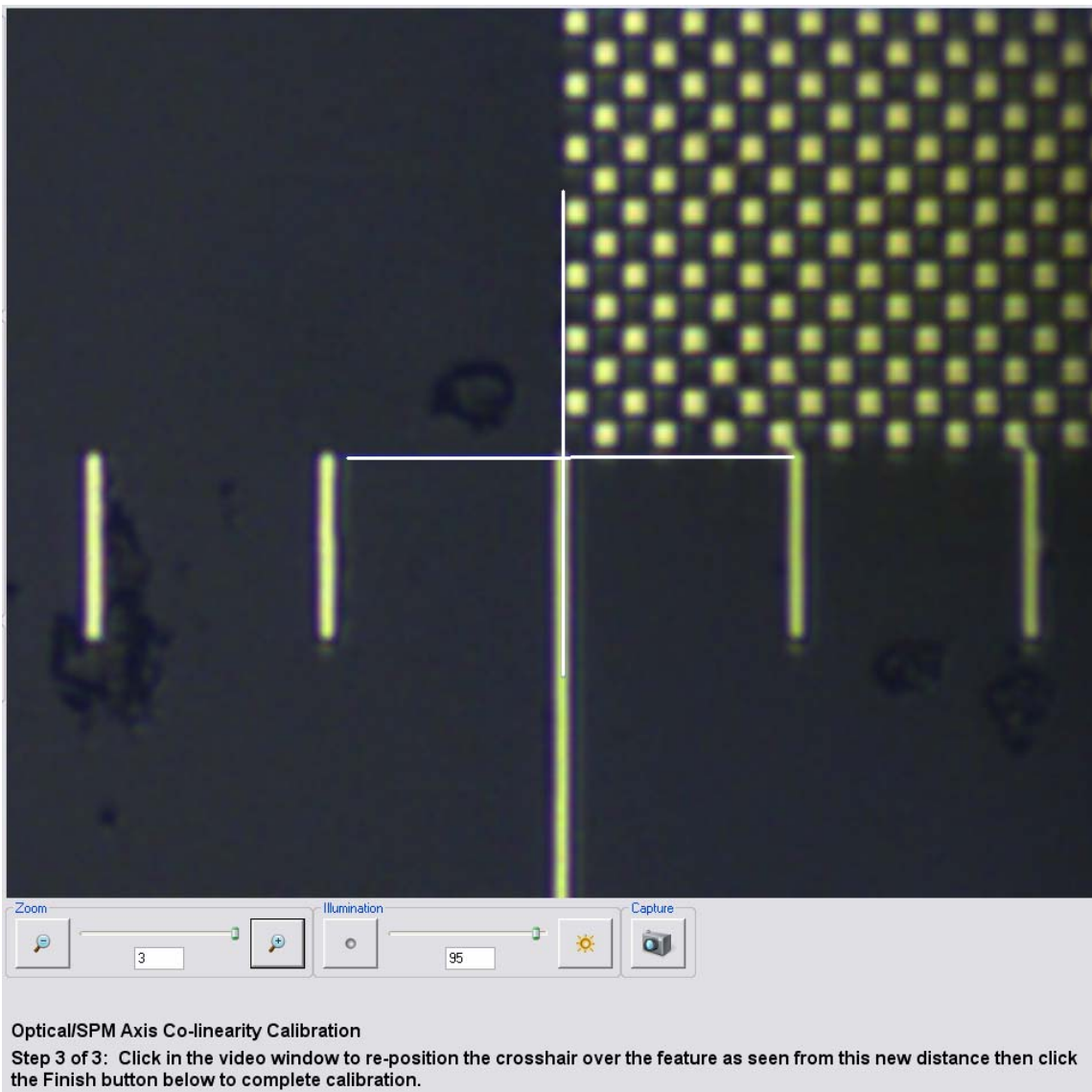
18. Enter the field of view for the maximum zoom setting (Setting #3) in the box on the bottom left of the screen as shown.



19. Press the NEXT button. You are now at Step 2 of 3. Zoom in the optics to the highest magnification (Setting 3). Move the XY stage with the arrow keys until you have some unique feature of the optical standard in the approximate center of the screen. Point at the feature using the mouse and click the mouse left button to move the crosshair to that feature.



21. Press the NEXT button. You are now at Step 3 of 3. The SPM (Z) axis will move up and the Optics axis will move down. Point at the same feature using the mouse and click the mouse left button to move the crosshair to that feature.



22. Then press the FINISH button and the calibration is complete.

23. At this point you will want to verify the Alignment Station Calibration parameters are still correct. Please now perform that procedure.