

# ***Image corrections, scaling***

**ME-CAE/2019**

Roland Pawliczek, PhD

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Based on:

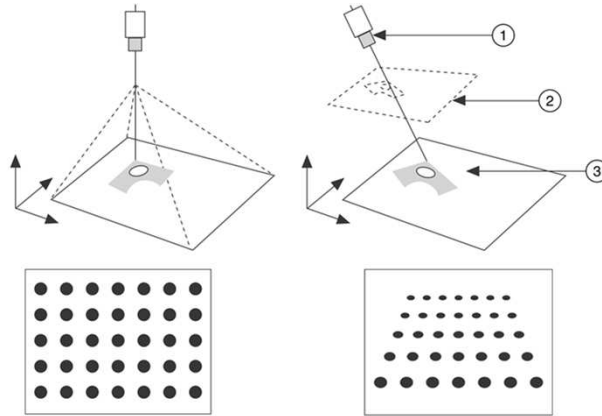
**NI Vision Assistant Tutorial**

**June 2011 372228M**

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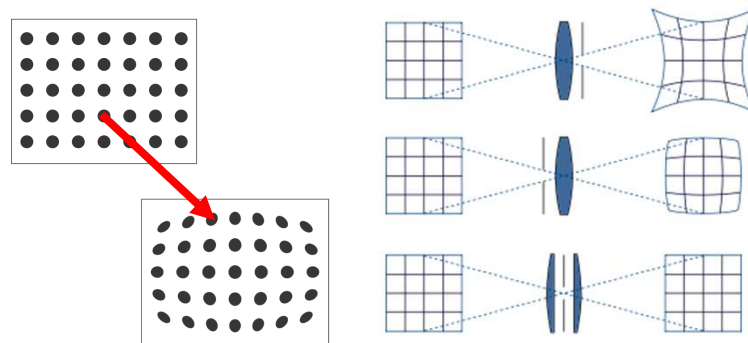
**Image errors because of system setup:**



**Perspective:** the error occurs when the camera is not set perpendicular to the analyzed object.



**Image errors because of system setup:**

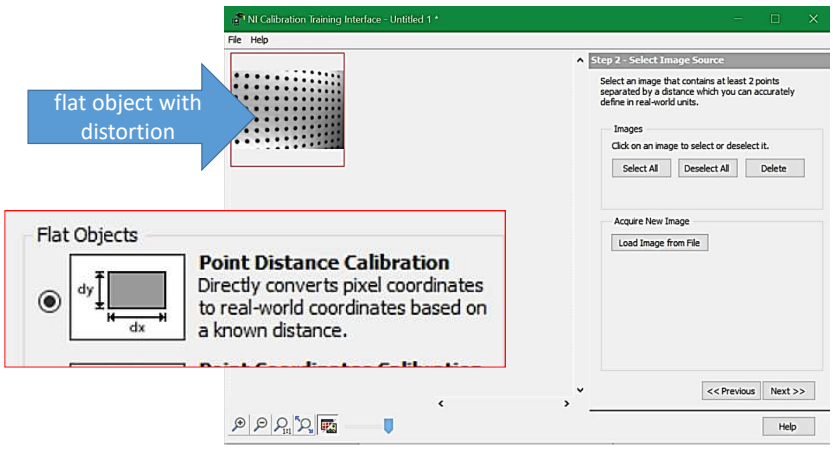
**Distortion:** optical defect of the optical system based on a different magnification of the image depending on its distance from the optical axis of the instrument. It usually causes a non-linear image distortion.



**Metric measurement scaling: based on pattern.**

Processing Functions: Image»Image Calibration.



flat object with distortion

**Flat Objects**

**Point Distance Calibration**  
Directly converts pixel coordinates to real-world coordinates based on a known distance.

Step 2 - Select Image Source

Select an image that contains at least 2 points separated by a distance which you can accurately define in real-world units.

Images

Click on an image to select or deselect it.



Select All Deselect All Delete

Acquire New Image

Load Image from File

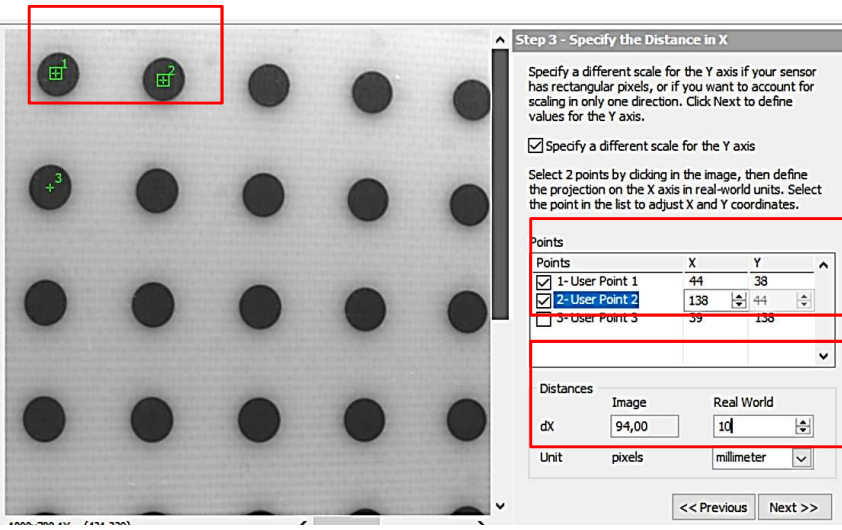
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Help

**Metric measurement scaling: based on pattern.**

define axis steps  $dx=dy$  lub or for different  $dx$  and  $dy$



Step 3 - Specify the Distance in X

Specify a different scale for the Y axis if your sensor has rectangular pixels, or if you want to account for scaling in only one direction. Click Next to define values for the Y axis.

Specify a different scale for the Y axis

Select 2 points by clicking in the image, then define the projection on the X axis in real-world units. Select the point in the list to adjust X and Y coordinates.

Points	X	Y
<input checked="" type="checkbox"/> 1- User Point 1	44	38
<input checked="" type="checkbox"/> 2- User Point 2	138	44
<input type="checkbox"/> 3- User Point 3	39	138

Distances

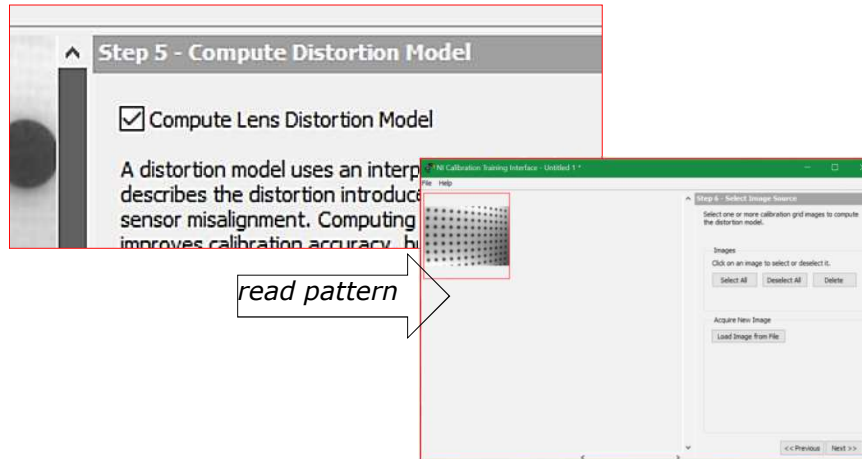
	Image	Real World
dx	94,00	10

Unit pixels millimeter

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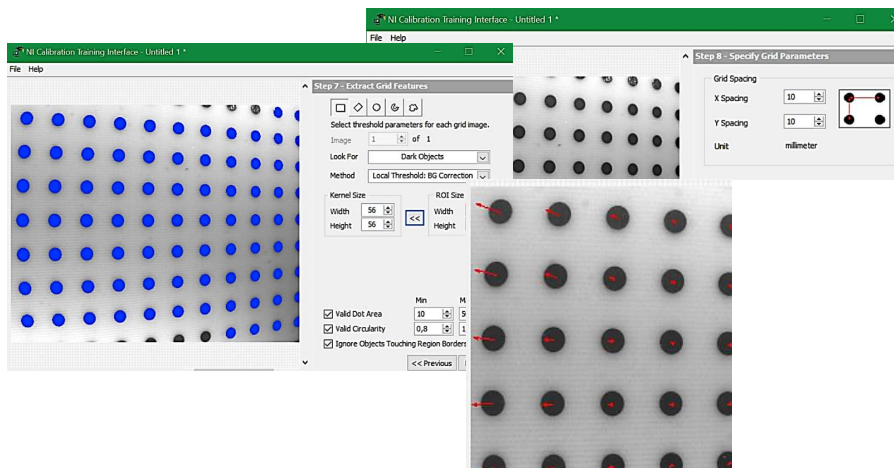
**Metric measurement scaling: based on pattern.**

- Lens distortion error correction



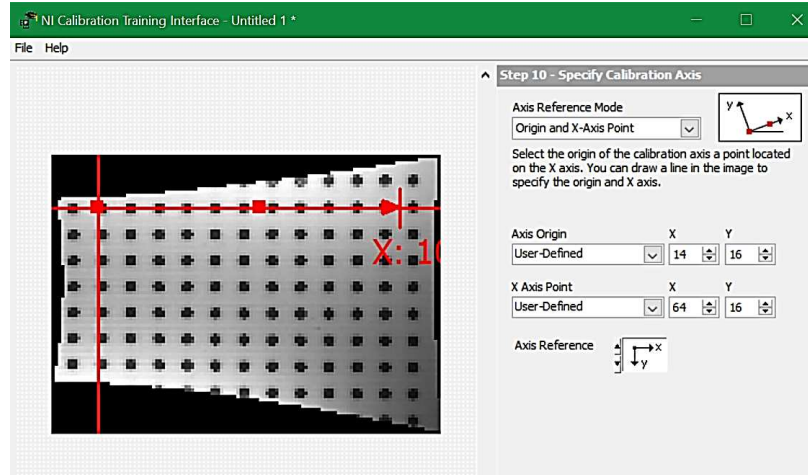
**Metric measurement scaling: based on pattern.**

- mark detection and distance definition

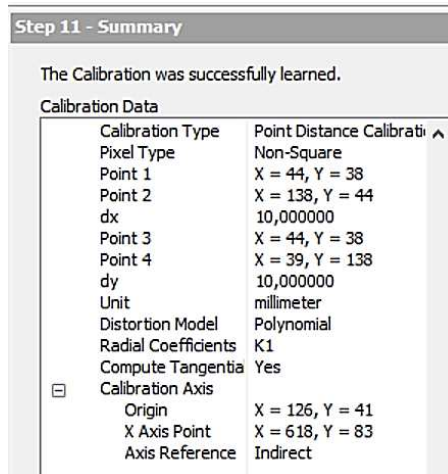


**Metric measurement scaling: based on pattern.**

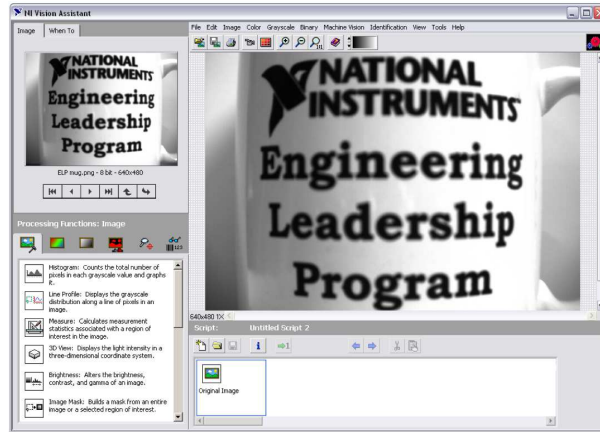
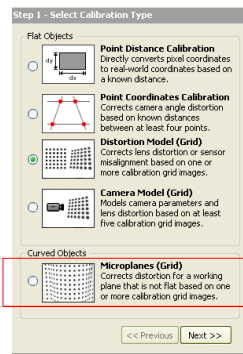
- correction of the orientation of the coordinate system



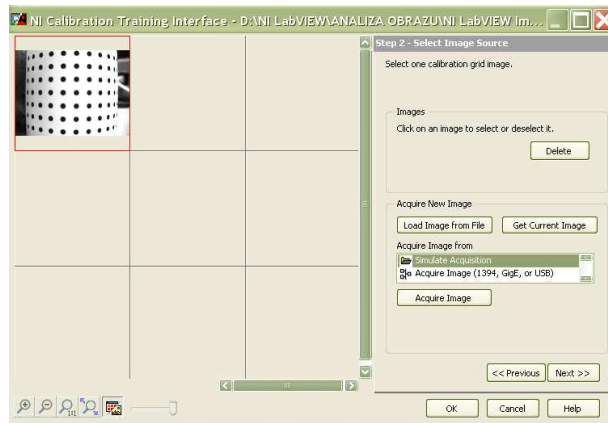
**The calibration results are saved as a template for further processing:**



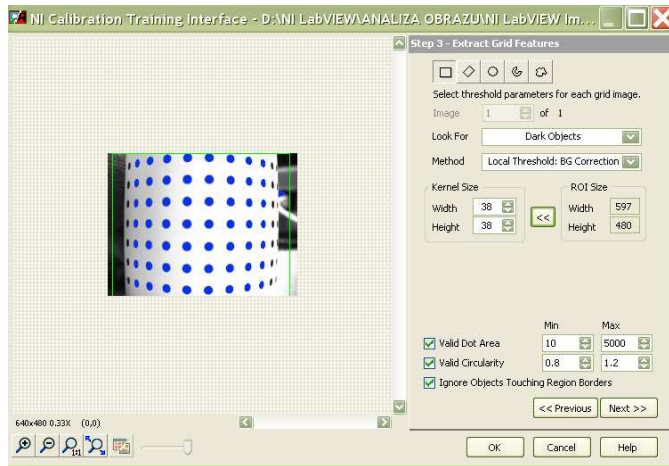
**Correction of optical distortion: for not flat surfaces**



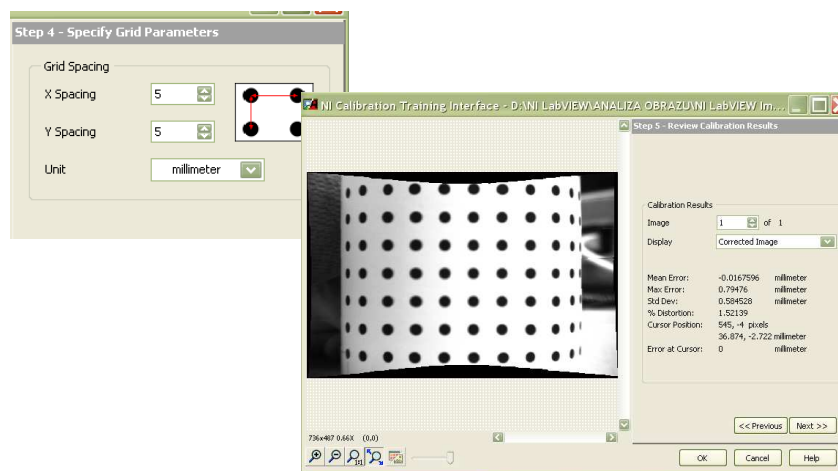
Read image with pattern made in the same environment as object image.



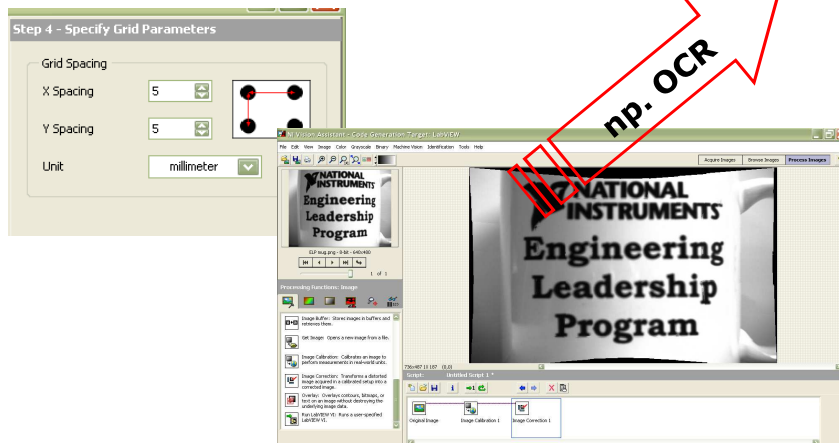
□ Mark detection



□ Grid spacing definition

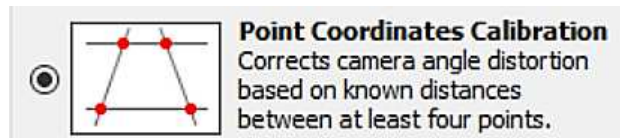


☐ Application of the pattern to correct the image.



**Point Coordinates Calibration**

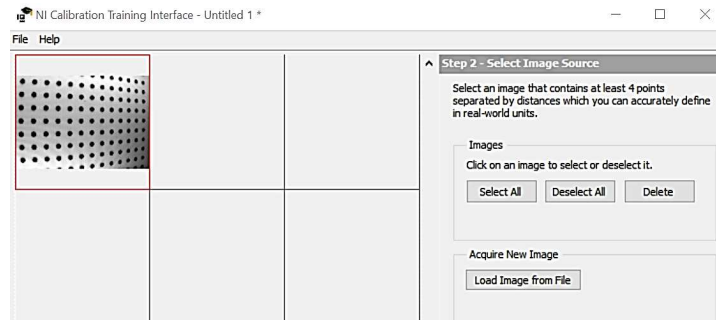
- The inspection image contains lens distortion or the inspection image contains perspective distortion caused by a camera that is mounted at an angle to the inspection surface.
- You know the real-world coordinates of at least four distinct points in the image.
- Point coordinates calibration is typically used in applications involving a lens positioned at an angle to the inspection surface.





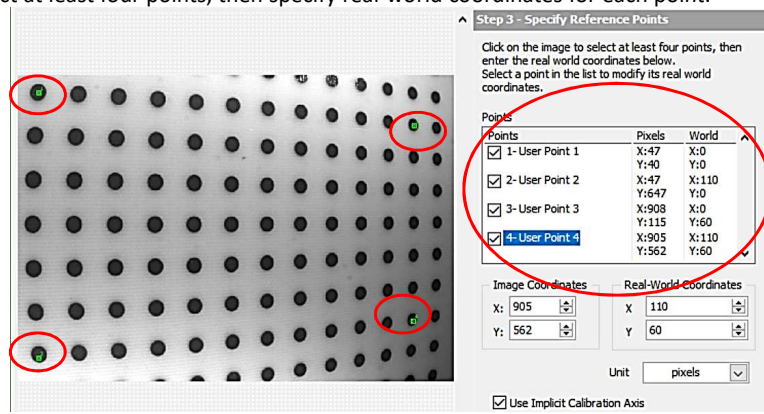
**Select Source Images**

- The Calibration Training Interface requires images acquired with the imaging setup that you want to calibrate.



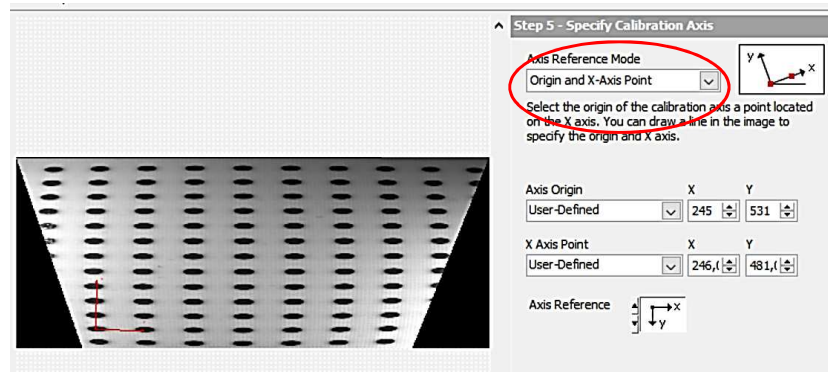
**Specify Reference Points**

- Use point coordinates calibration to correct perspective distortion introduced by a camera that is not perpendicular to plane of the object under inspection. Click on the image to select at least four points, then specify real-world coordinates for each point.



**Specify the Calibration Axis**

- To express measurements in real-world units, you must define a calibration axis as a reference. The NI Calibration Training Interface provides three modes to define a calibration axis.



**Review Calibration Results**

- Use the controls in this step to review the results of the distortion model and add additional calibration grid images, if necessary.

