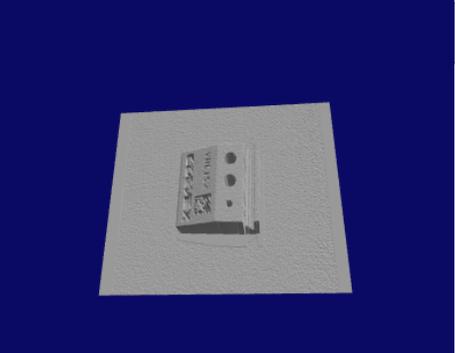
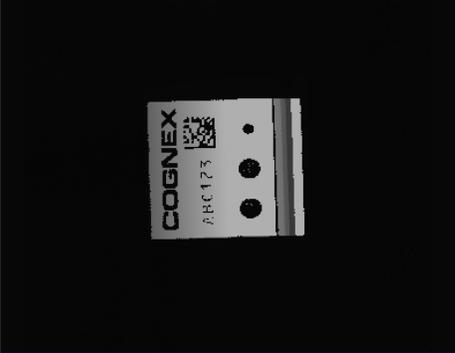


Cognex Designer Standard – Section 7
Cross Section Tool Lab
Approximate Duration: 30 minutes

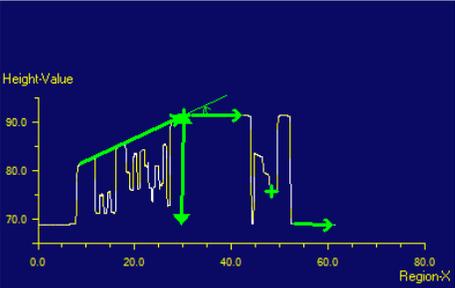
EXPECTED OUTCOMES:

- Use Fixtured image with the CrossSection Tool
- Determine angle and height measurements from CrossSection tool
- Add formatted results to the HMI

EXPECTED VISUAL RESULT:



Run



Height-Value

90.0
80.0
70.0

0.0 20.0 40.0 60.0 80.0

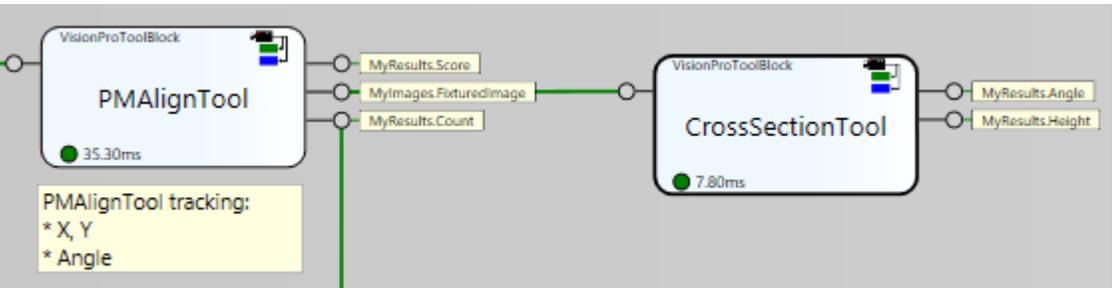
Region-X

Part Present ●

Score: 100 %

Angle: 25°

Height: 22mm



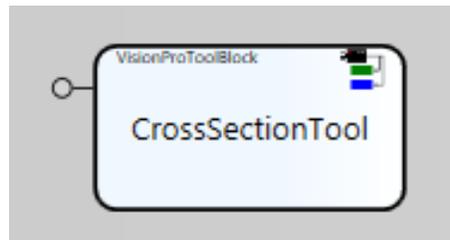
```
graph LR; Input(( )) --> PMAlignTool[PMAlignTool]; PMAlignTool -- MyResults.Score --> CS[CrossSectionTool]; PMAlignTool -- MyImages.FixturedImage --> CS; PMAlignTool -- MyResults.Count --> CS; CS -- MyResults.Angle --> Output(( )); CS -- MyResults.Height --> Output; PMAlignTool --- PMAlignInfo[PMAlignTool tracking: * X, Y * Angle]; CS --- CSInfo[7.80ms];
```

OUTLINE OF LAB:

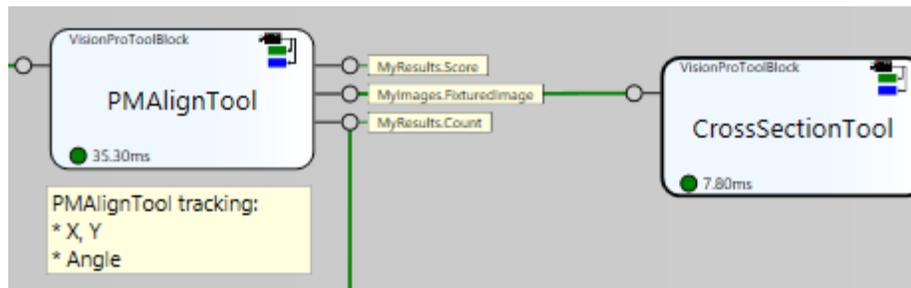
1. Create a new ToolBlock for the Cross Section Tool
2. Implement a Cross Section Tool to measure angle and height
 - a. Create appropriate operators
 - b. Expose operators as terminals and thus output pins
3. Add Cross Section Tool data to the HMI
 - a. Add a label and formatted data
 - b. Add Profile image
 - c. Save your project

Steps for the Lab:

1. Create a new ToolBlock for the Cross Section Tool
 - Add a new ToolBlock to the Sequence and name it “CrossSectionTool”.

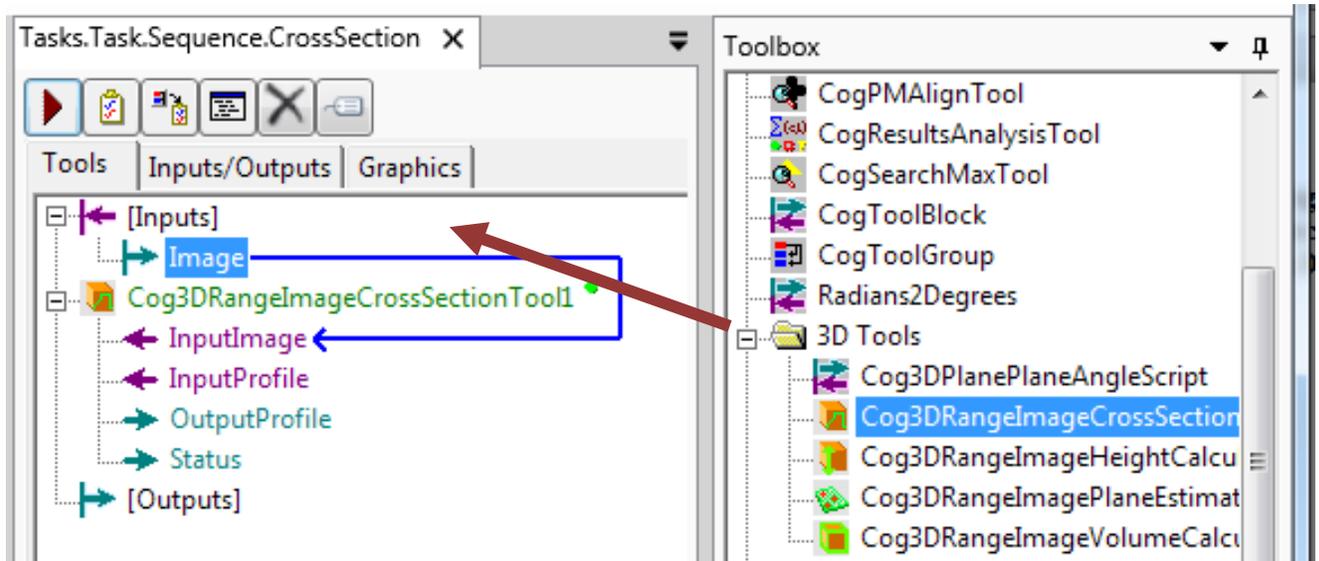


- Attach the Fixtured image to the InputImage of the CrossSection Tool ToolBlock

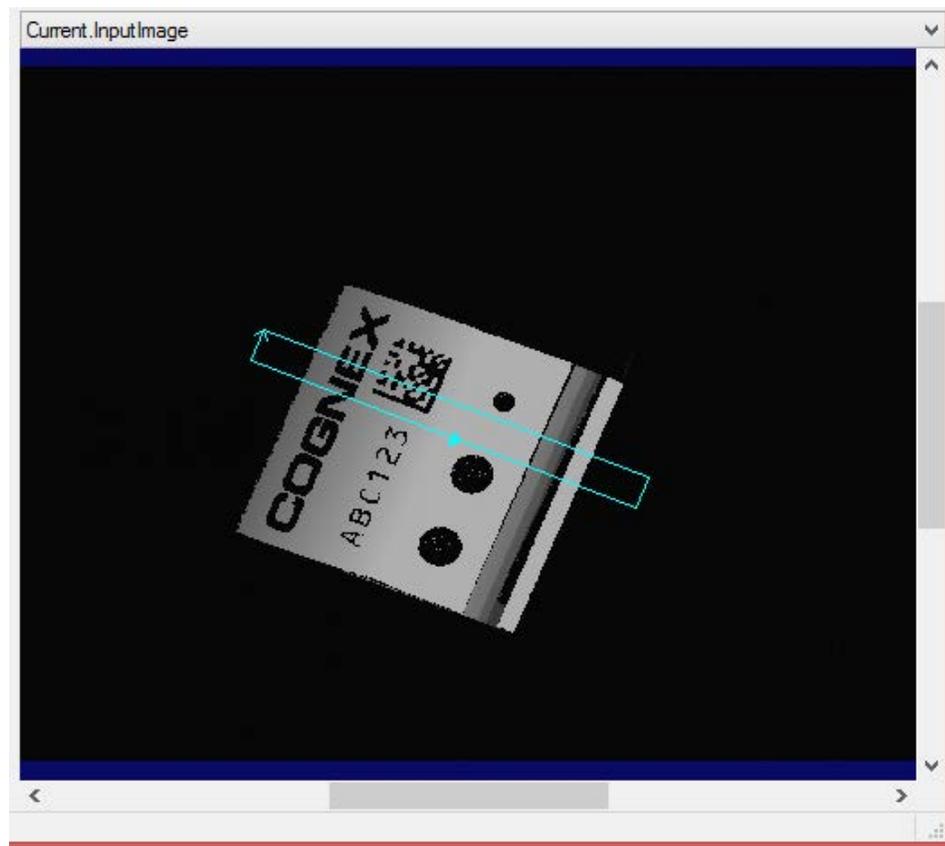


2. Implement a Cross Section Tool to measure length and height

- Open the CrossSectionTool ToolBlock and insert the Cog3DRangeImageCrossSectionTool into the tools area. Attach Image to InputImage and run once

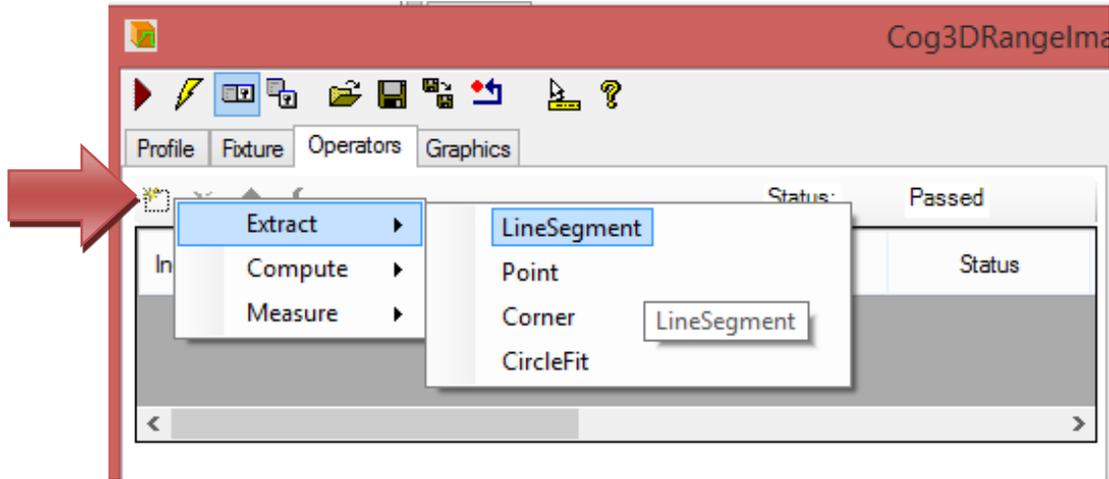


- Open the Tool and set the CrossSection area to slice across the part in this fashion:

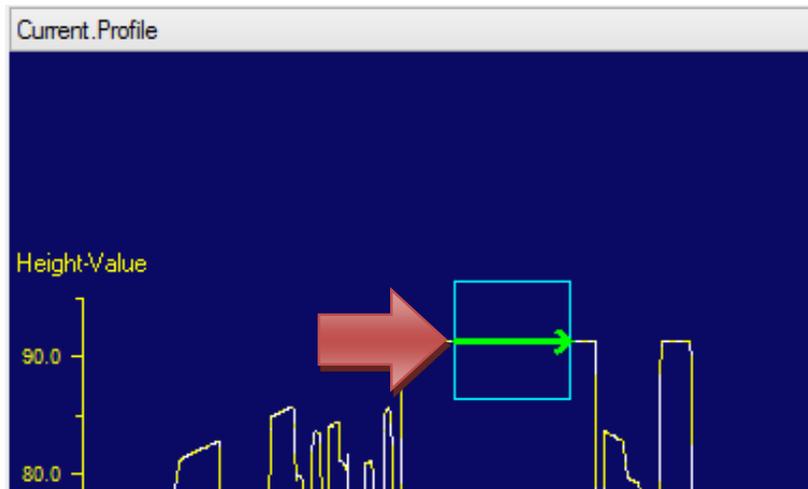


a. Create appropriate operators

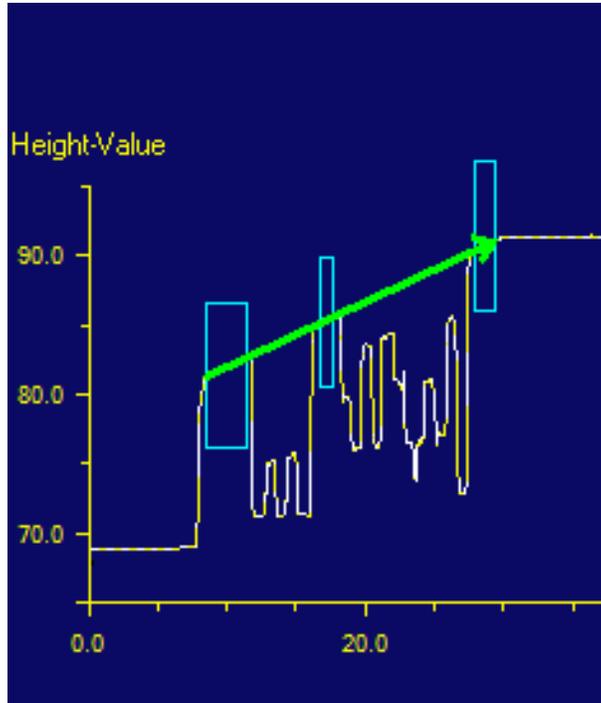
- i. Select the Current.Profile from the images and go to the Operators tab. Select the Add New button and add an Extract→LineSegment.



- ii. Place the line at the top of the part and rename it “TopLine”



- iii. Repeat the steps above to extract the angled line. Hint: Use multiple regions.



- iv. Add a Measure→LineLineAngle operator and choose the extracted line segments. Name it Angle.

The screenshot shows the 'Cog3DRangelImageCrossSectionTool1' software interface. The 'Operators' tab is active, displaying a table of operators. The 'Angle' operator is selected, and its configuration is shown below the table. A red arrow points to the 'Angle' operator in the table. The 'Current.Profile' window shows the profile with the green line segment and blue boxes.

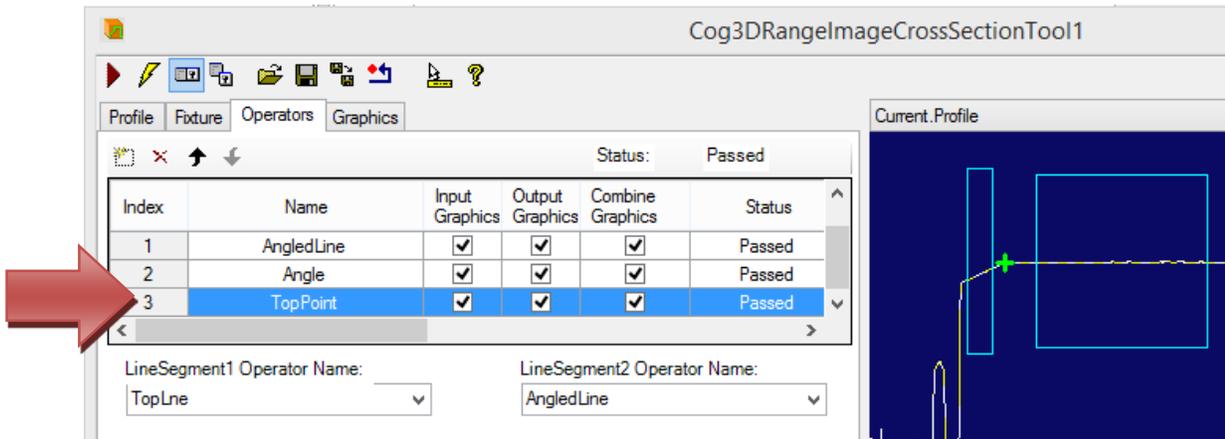
Index	Name	Input Graphics	Output Graphics	Combine Graphics	Status
0	TopLine	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Passed
1	AngledLine	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Passed
2	Angle	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Passed

LineSegment1 Operator Name: TopLine
LineSegment2 Operator Name: AngledLine

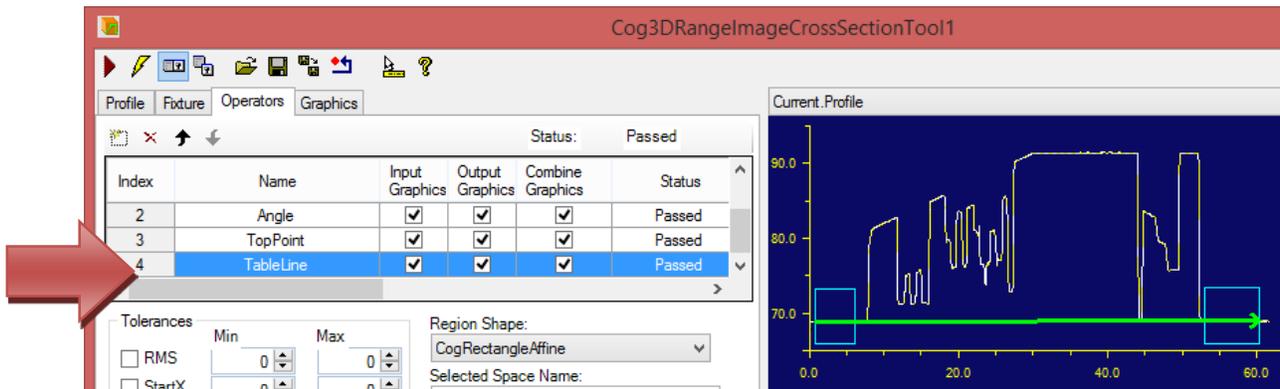
Supplementary Angle

Tolerances
 Angle
Min: 0
Max: 0

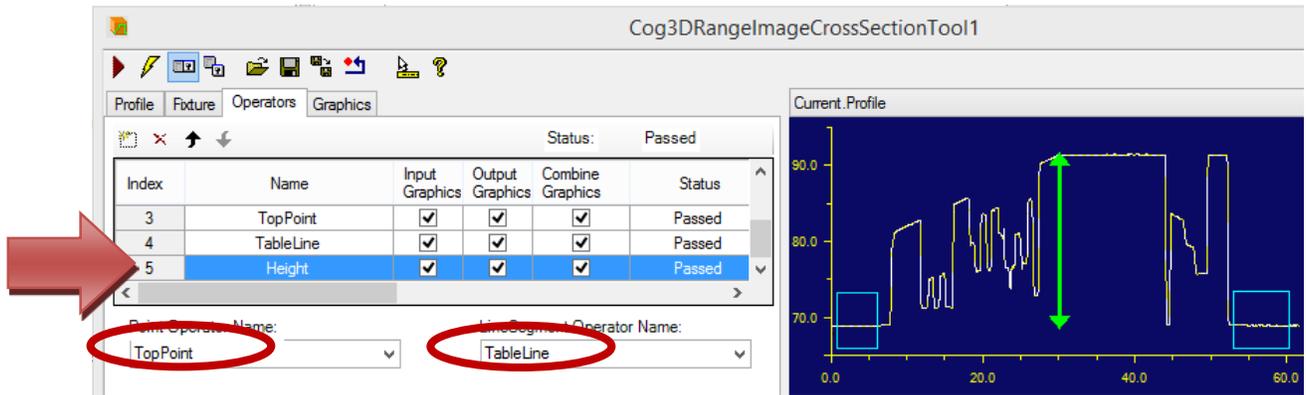
- v. Now add an Compute→IntersectLineLine operator to get the point of intersection between these two lines. We'll need it to measure the height in an upcoming step.



- vi. Now add an Extract→Line Segment tool to get the right side of the table top. Rename it to "TableLine".

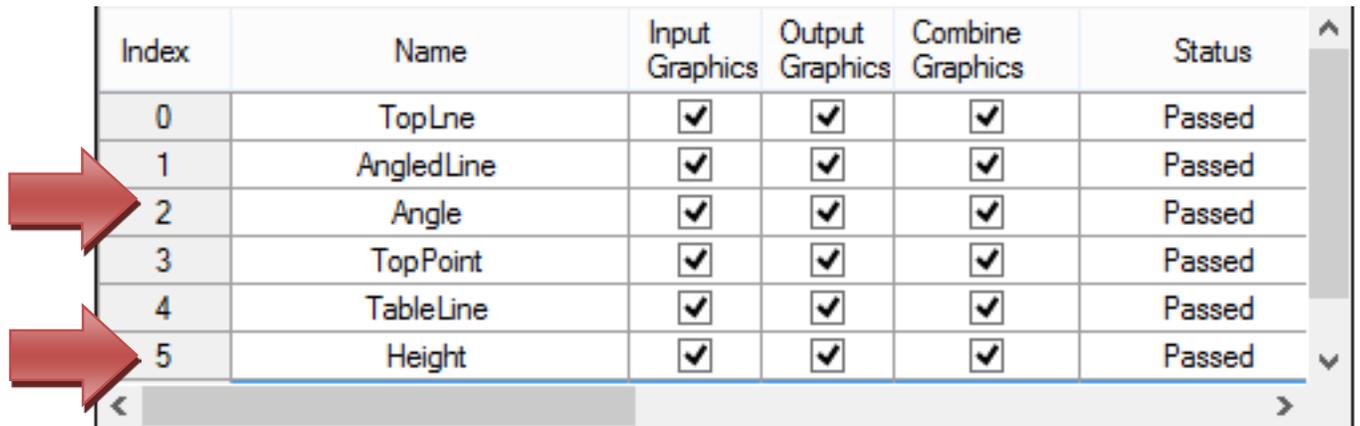


- vii. Add a Measure→DistancePointLine and choose the “TopPoint” and “TableLine” operators for the Point and Line selections respectively. Name it “Height”.

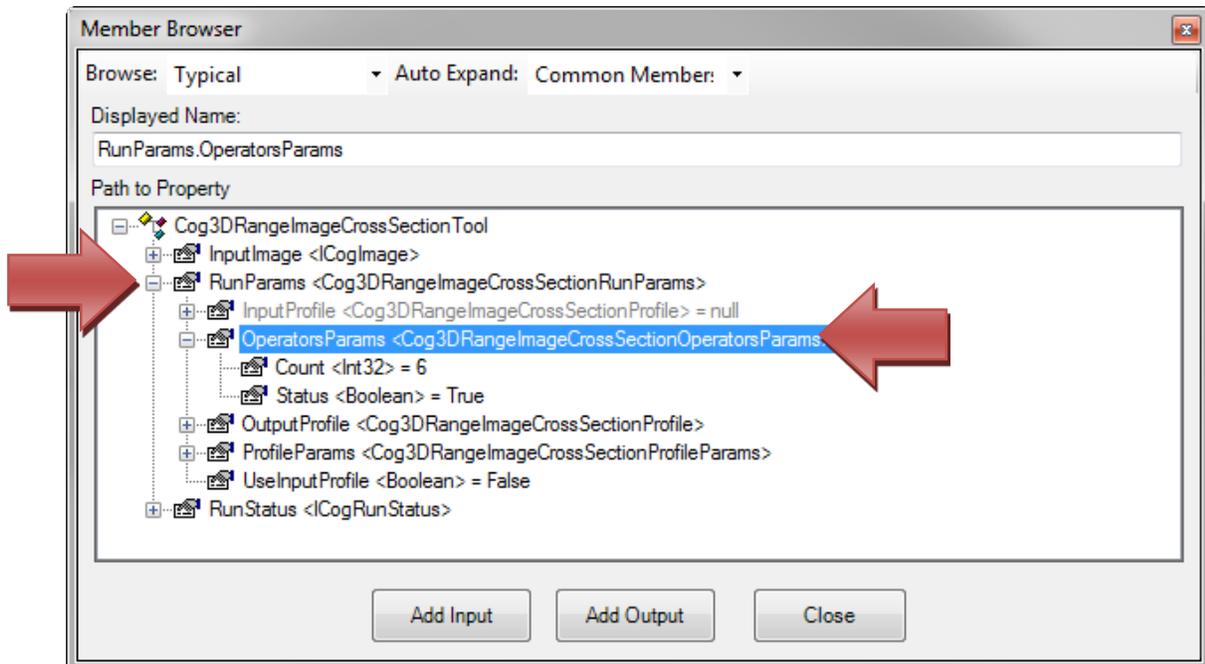
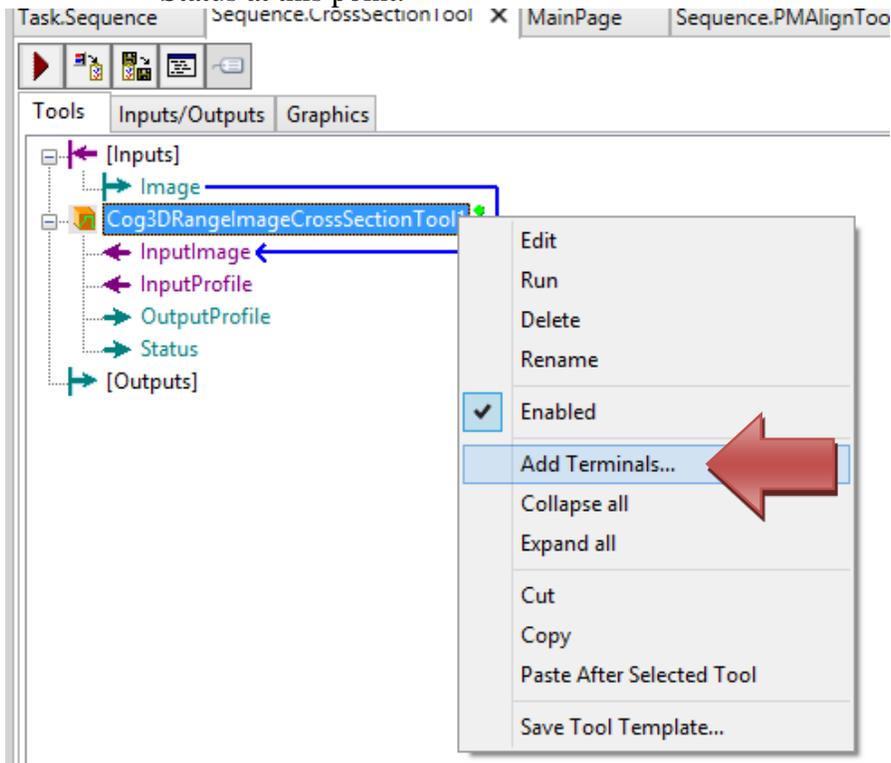


b. Expose operators as terminals and thus output pins

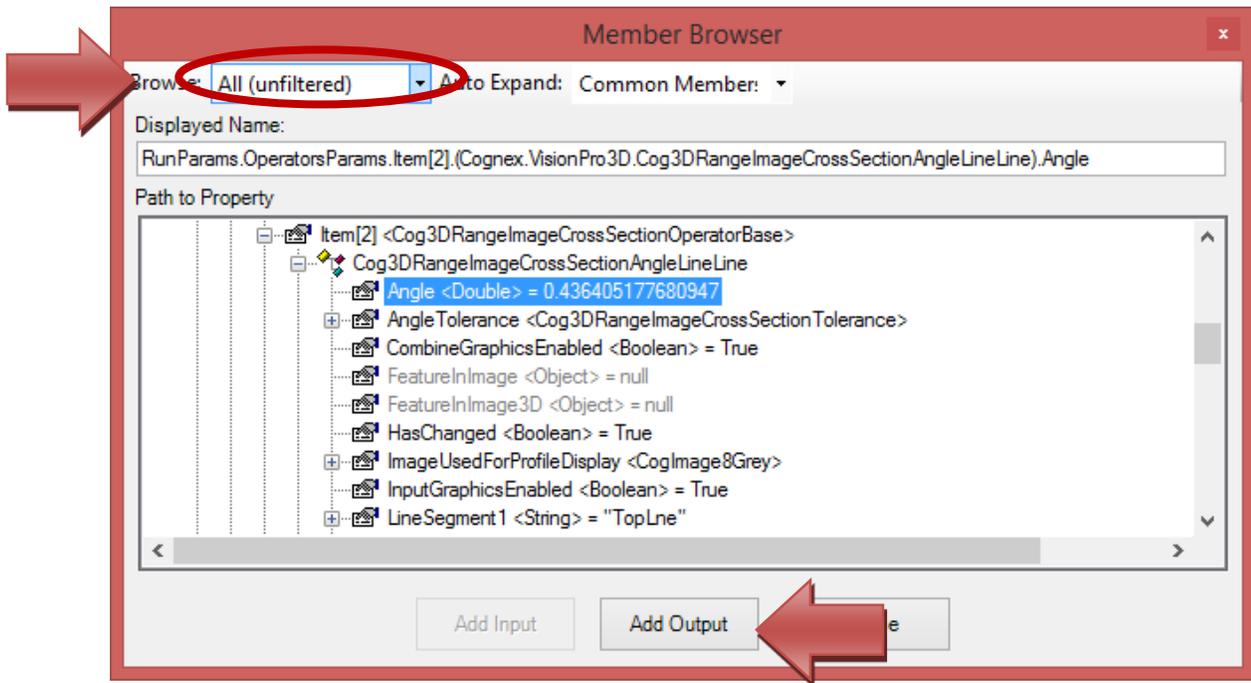
- i. Note the Indices of the Measurement operators that we want to show. They are Index 2 and 5.



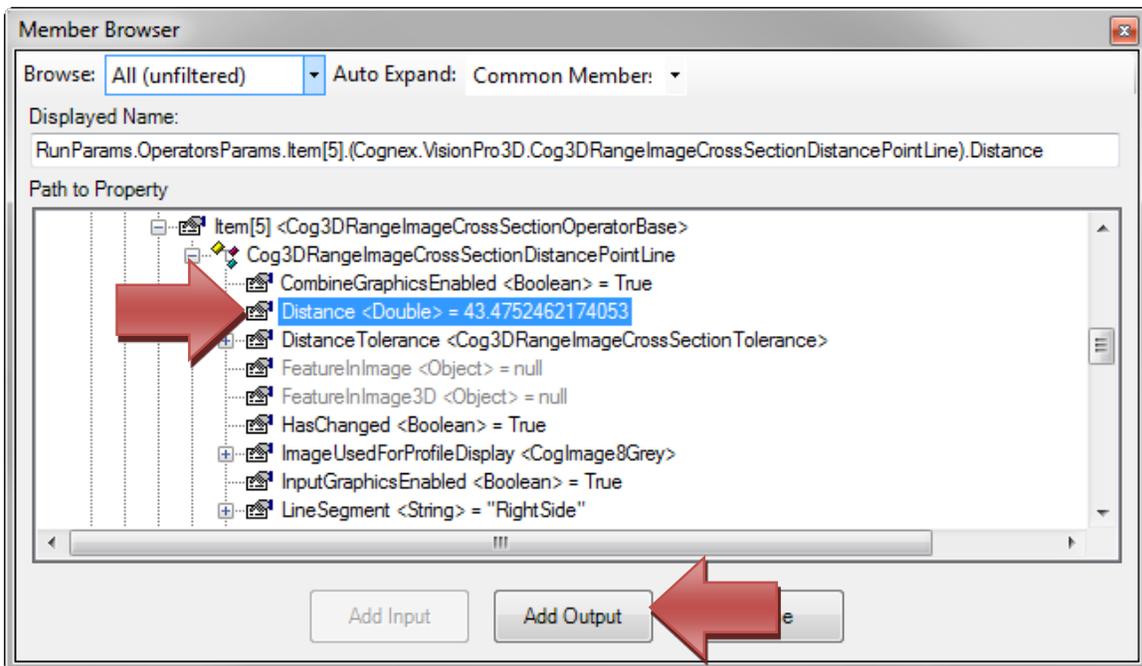
- ii. Go back to the tool in the Tool Block and right-click of the tool to “Add Terminals”. Go to the “Run Params” and then go to the “Operators Params”. Note that it should only give Count and Status at this point.



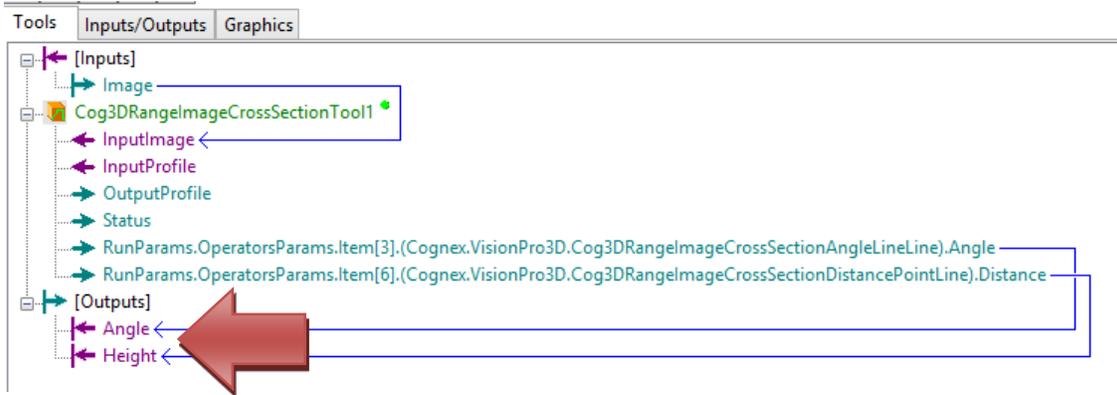
- i. Expand the Browse to “All (unfiltered)” Now you can see the indexes. Go to Index 2, choose the “Angle” value and select “Add Output”



- i. Go to Index 5, choose the “Distance” value and select “Add Output”



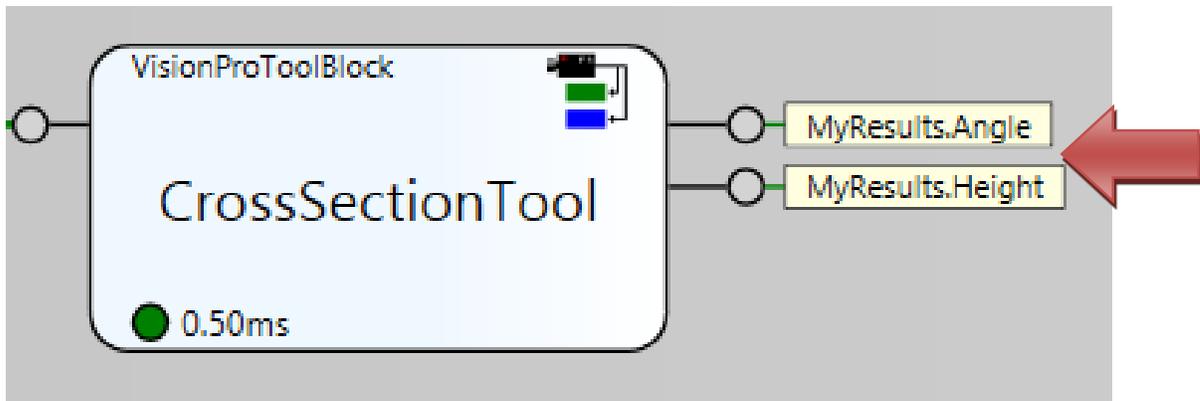
- ii. The Add Terminals dialog box can now be closed. Go back to the ToolBlock and drag the newly created terminals down to the [Outputs] area. You will want to rename the terminals as they are very long. We recommend keeping them simple. Angle and Height should do just fine for our needs.



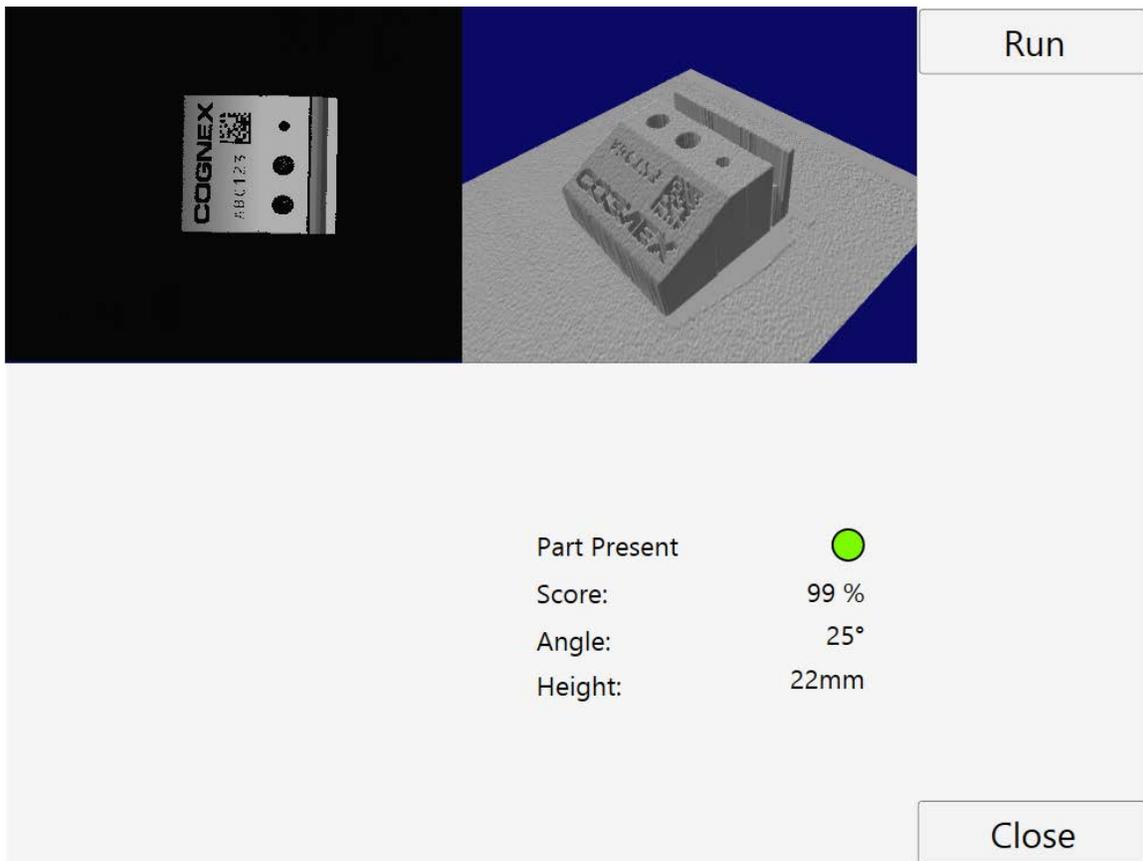
3. Add Cross Section Tool data to the HMI

a. Add a label and formatted data

- i. Add tags to the Sequence for the two new output pins on the CrossSectionTool. Name the tags “MyResults.Angle” and “MyResults.Height” to the appropriate pin.

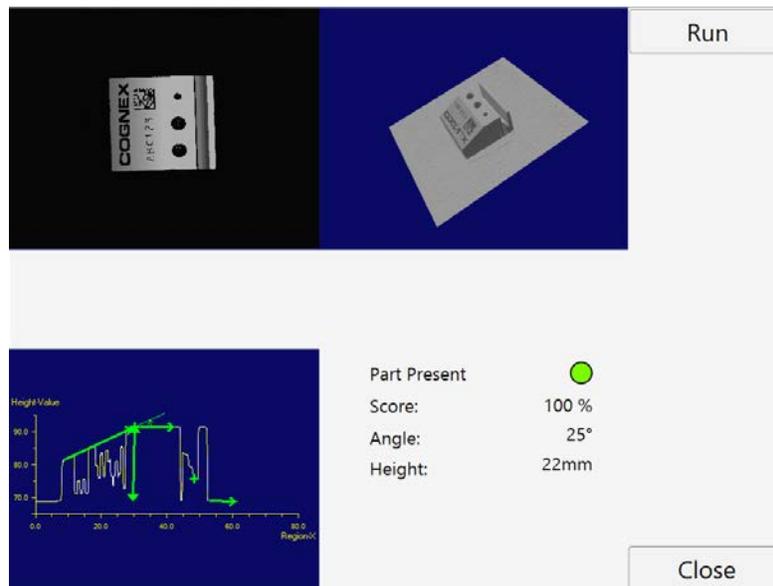


- ii. Add labels and tie them to the appropriate tags so that you can display the Angle and Height values to the HMI. Run application and see how things look.

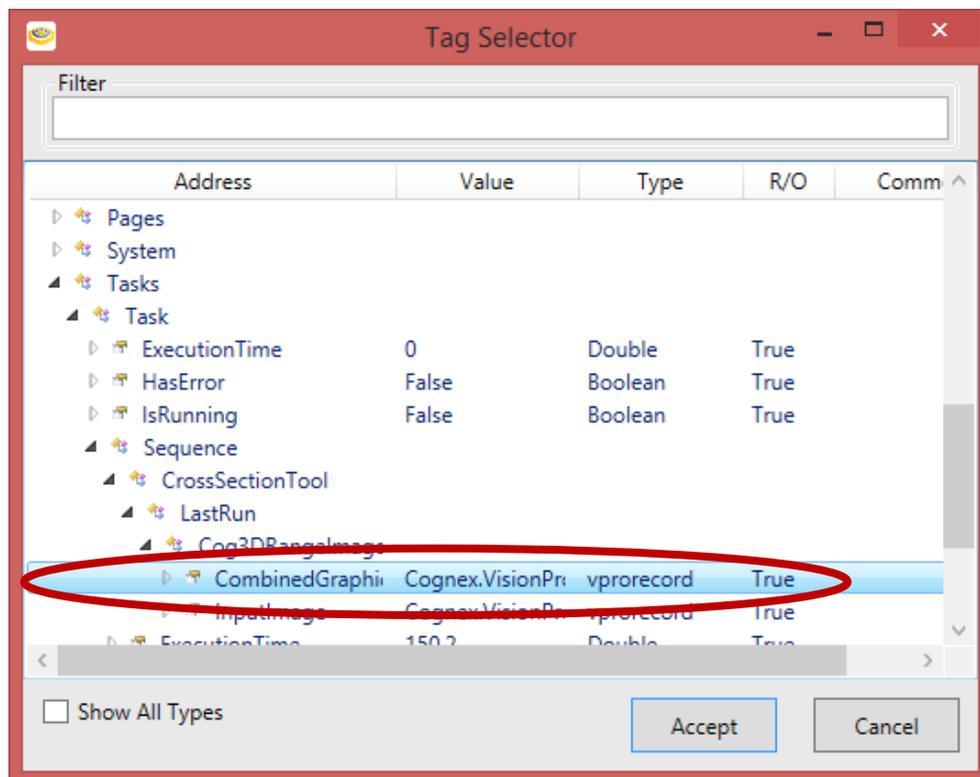


b. Add Profile image

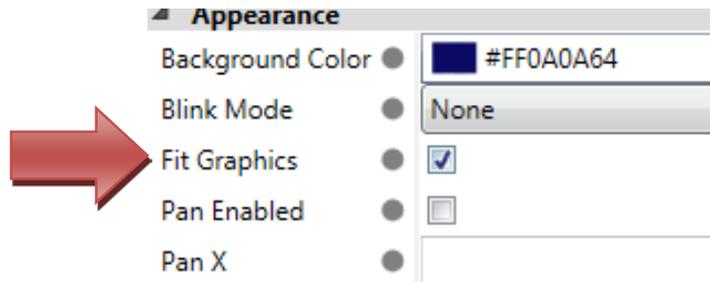
- i. Add a VisionPro Display (the regular 2D one) to the MainPage.



- ii. Attach the subject top the CombinedGraphicResult coming from the Cross Section tool. Use the Tag Browser to browse deeply to
\$Tasks→Task→Sequence→CrossSectionTool→LastRun→Cog3DRangeImageCrossSectionTool1-->CombinedGraphics



- iii. Make sure that “Fit Graphics” is checked in the Properties of the display.



- iv. Test your program in Test Mode

Part Present	<input checked="" type="checkbox"/>
Score:	100 %
Angle:	25°
Height:	22mm

- c. Save your project.