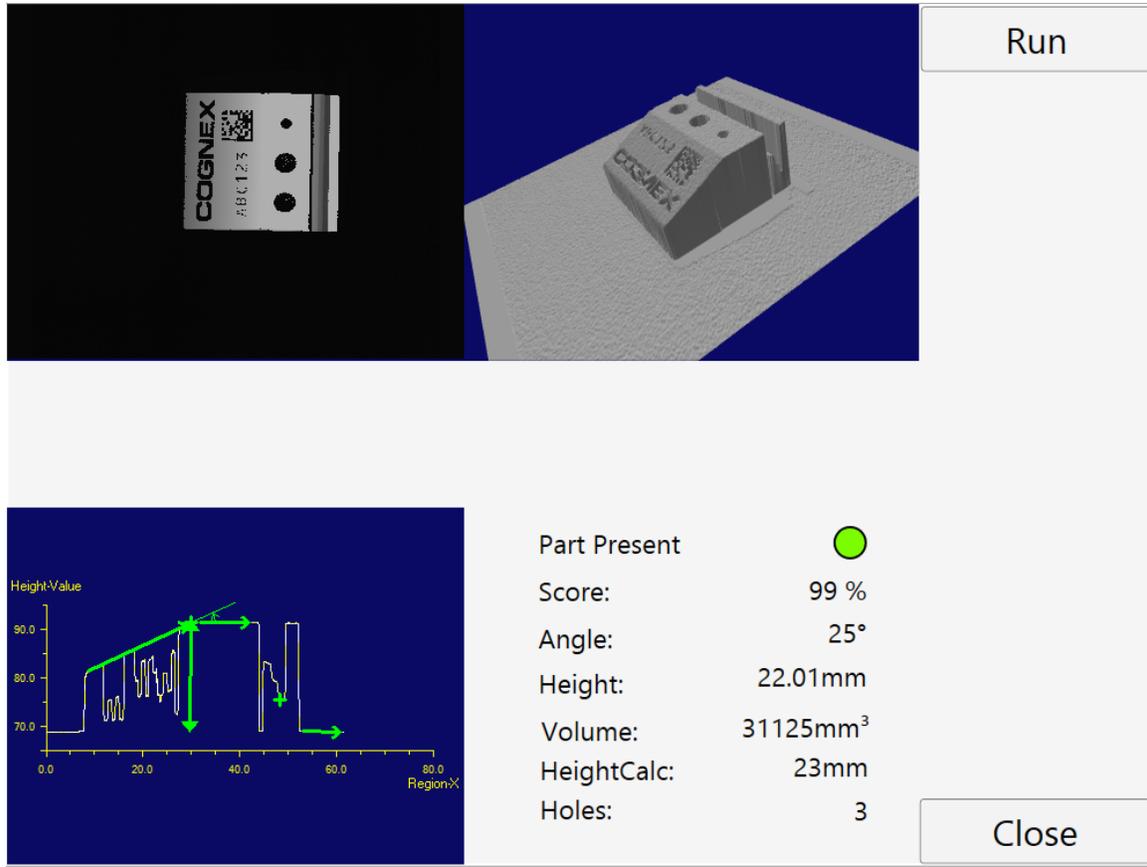


**Cognex Designer Standard – Section 7**  
**Height Tool Lab**  
**Approximate Duration: 30 minutes**

**EXPECTED OUTCOMES:**

- Use Fixtured image with the Height Tool
- Learn about the Height and Plane Estimator Tool
- Add formatted results to the HMI

**EXPECTED VISUAL RESULT:**



The screenshot displays the Cognex Designer HMI interface. On the left, there is a camera view of a COGNEX fixture. To its right is a 3D CAD model of the same fixture. Below the camera view is a height profile graph with 'Height-Value' on the y-axis (ranging from 70.0 to 90.0) and 'Region-X' on the x-axis (ranging from 0.0 to 80.0). The graph shows a series of peaks and valleys, with a green line indicating the overall height profile. To the right of the graph is a table of results:

Part Present	<span style="color: green;">●</span>
Score:	99 %
Angle:	25°
Height:	22.01mm
Volume:	31125mm <sup>3</sup>
HeightCalc:	23mm
Holes:	3

At the bottom of the screenshot is a process flow diagram showing two VisionProToolBlock components: 'VolumeCalculatorTool' (8.60ms) and 'HeightCalculatorTool' (5.00ms). The 'VolumeCalculatorTool' receives 'MyResults.Count' and outputs 'MyResults.Count' and 'MyResults.Volume'. The 'HeightCalculatorTool' receives 'MyImages.FixturedImage' and outputs 'MyResults.HeightCalc' and 'MyResults.HoleCount'.

**Run**

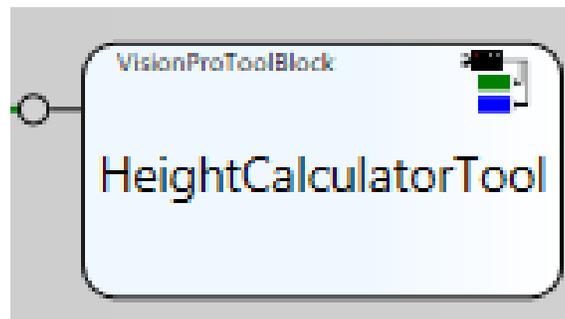
**Close**

## OUTLINE OF LAB:

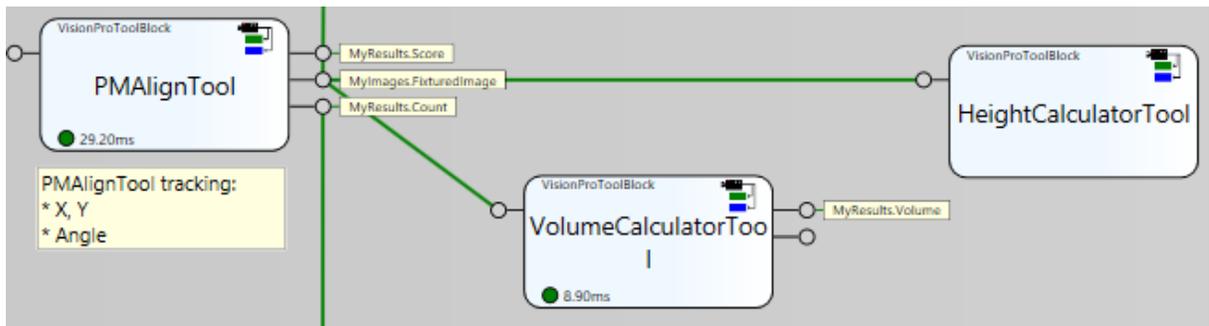
1. Create a new Tool block for the Height Tool
2. Implement a Height Tool to measure from part top to table
3. Reuse PlaneEstimator from previous lab
4. Implement a Blob tool using the PixelCountsDiag image
5. Add Height Tool data to the HMI
- 6.

## Steps for the Lab:

1. Create a new Tool block for the Height Tool
  - Add a new Tool block to the Sequence and name it “HeightCalculatorTool”.

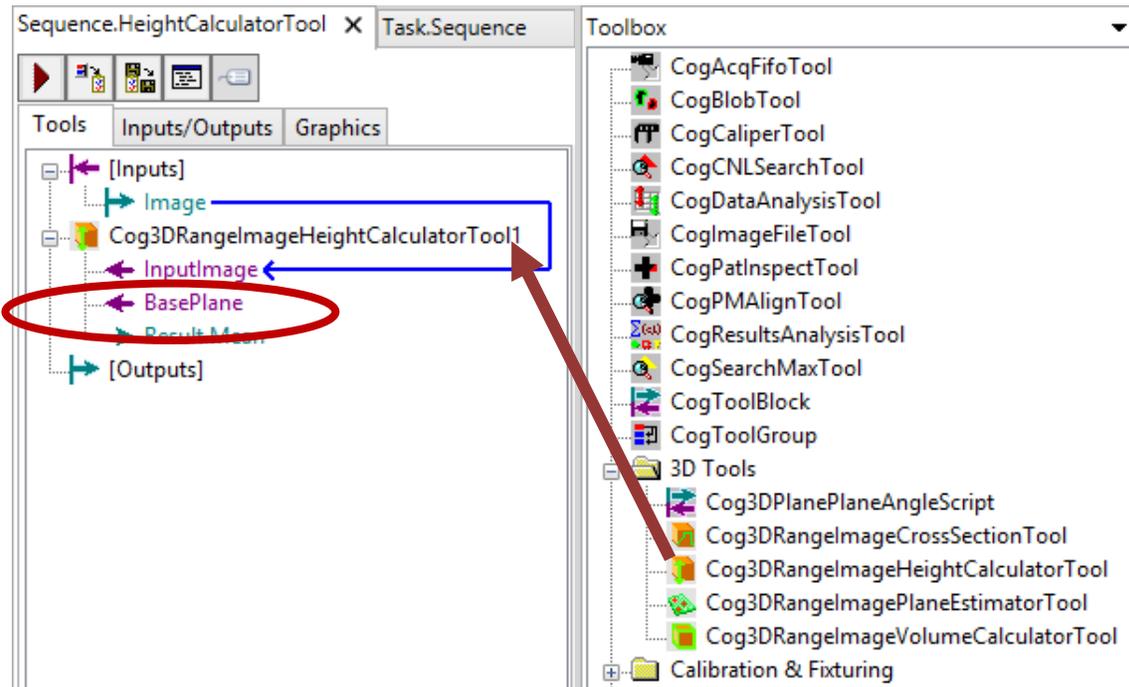


- Attach the Fixtured image to the InputImage of the HeightCalculatorTool tool block.



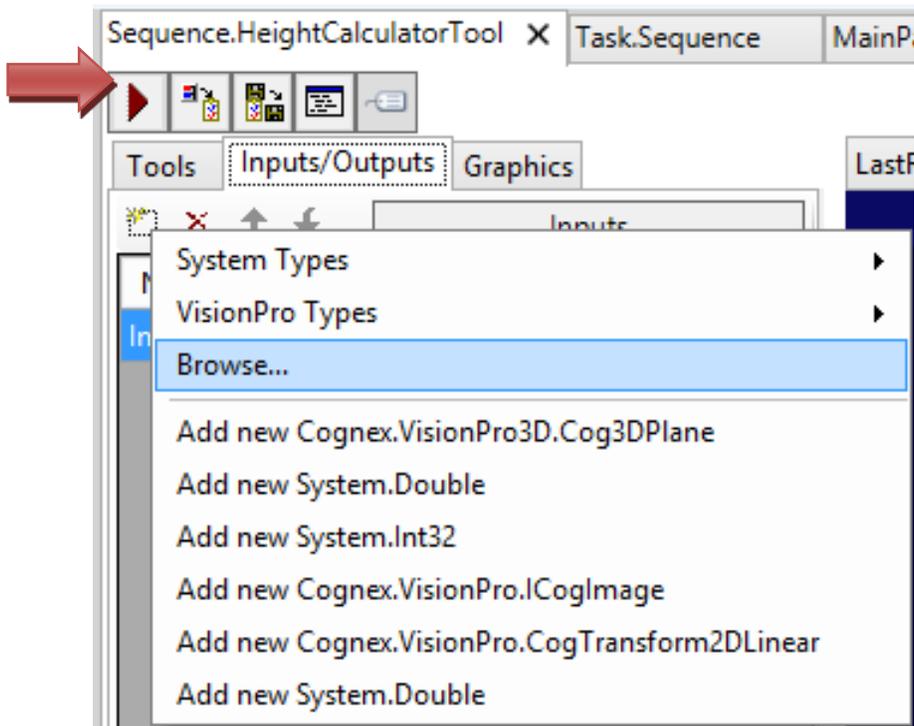
## 2. Implement a Height Tool to measure from part top to table

- Open the HeightCalculatorTool and add a Cog3DRangeImageHeightCalculatorTool. Note the inputs for both InputImage and BasePlane.

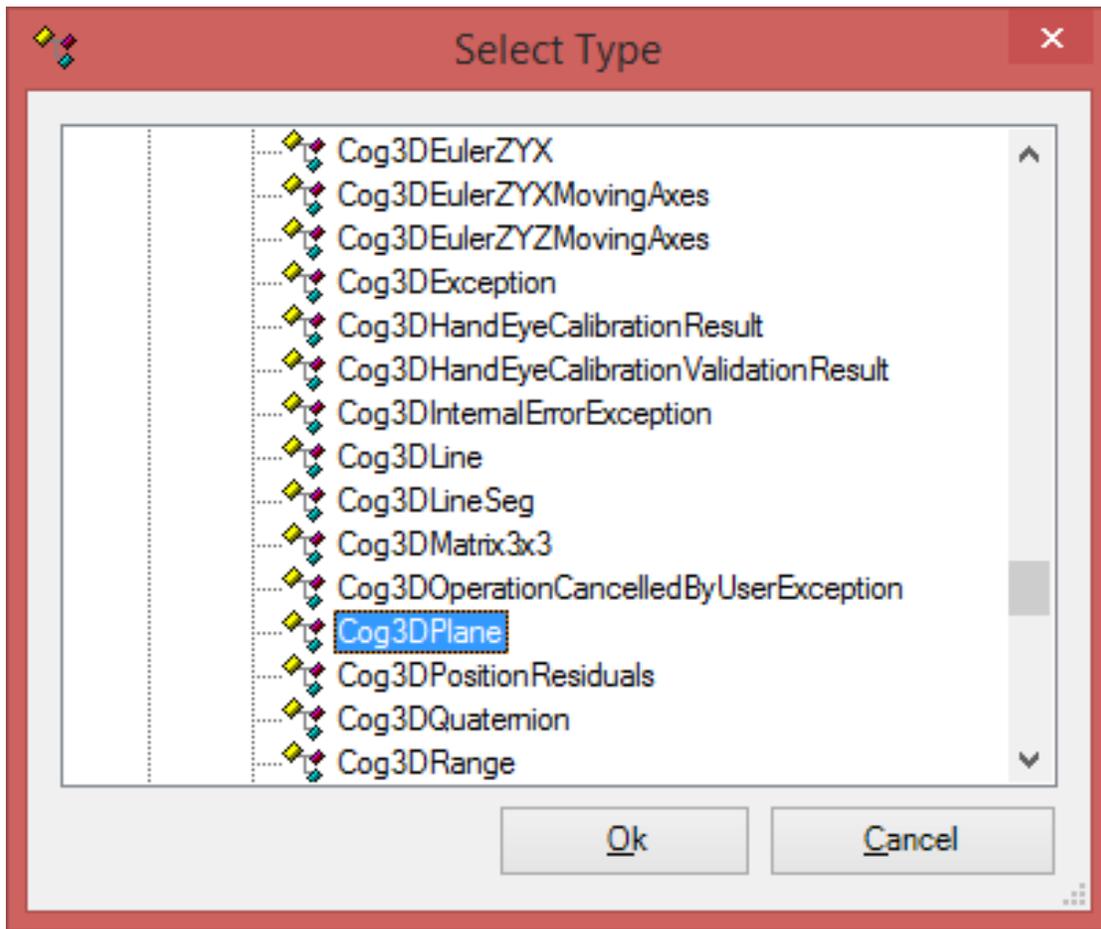


### a. Add a BasePlane input

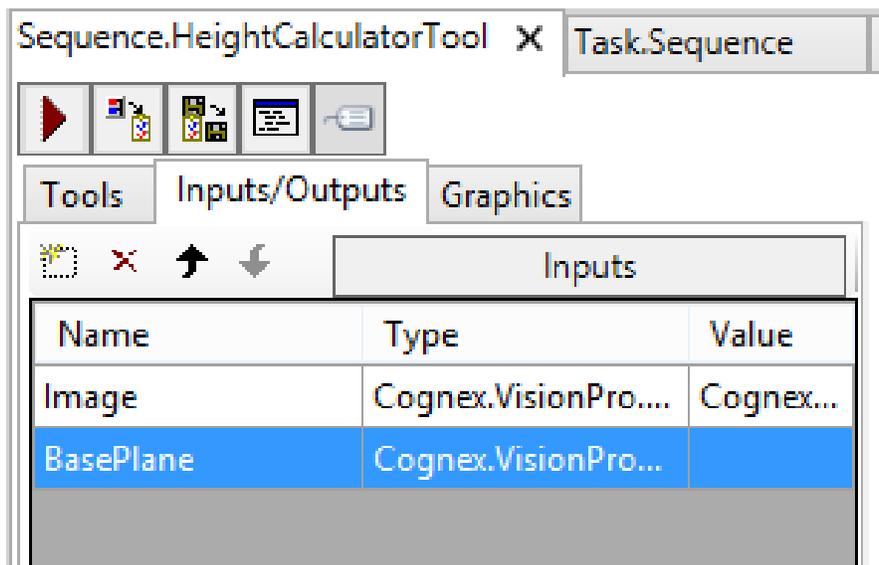
- i. Click the Inputs/Output tab. Click the New button and click Browse.



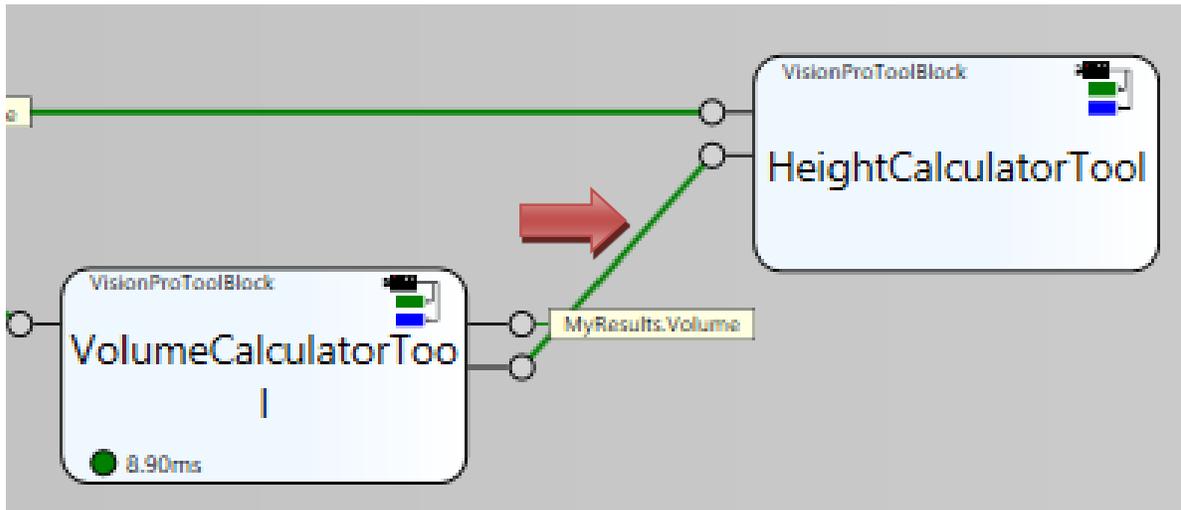
- ii. Navigate to and select  
 VisionPro→Cognex.VisionPro3D.Core.dll→Cognex.VisionPro3D  
 →Cog3DPlane.



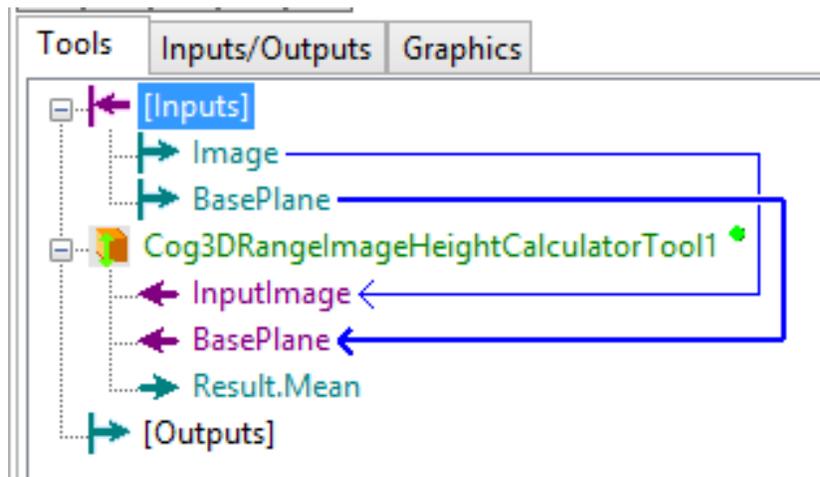
- iii. Rename the inout to BasePlane.



- iv. Back in the sequence, connect the VolumeCalculator's BasePlane output to the HeightCalculatorTool's BasePlane input.

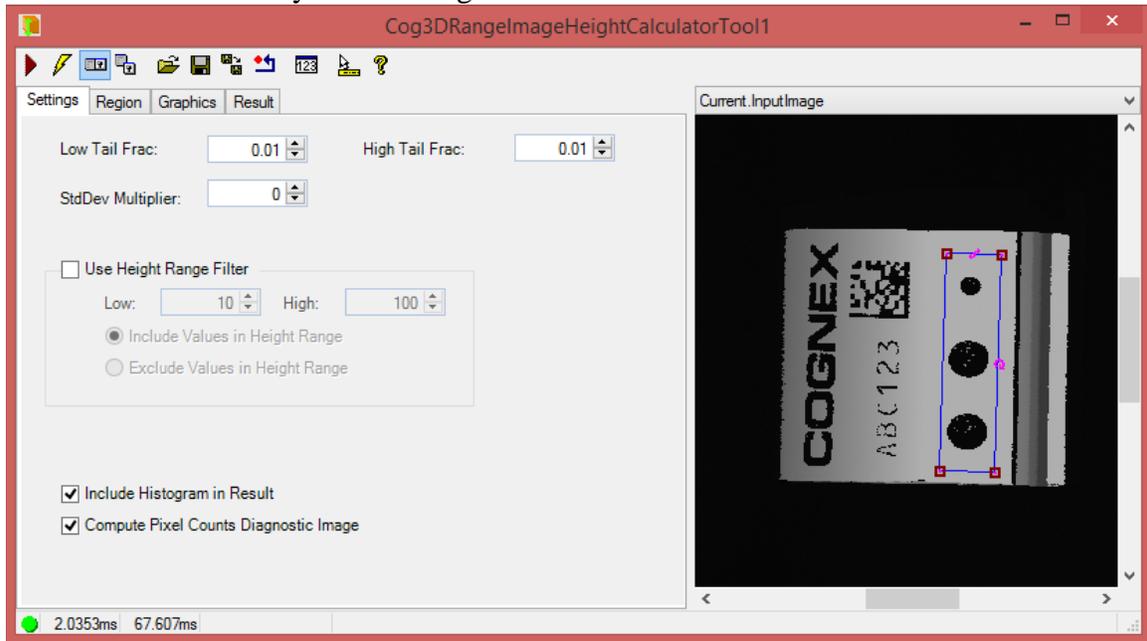


- v. Attach the BasePlane incoming BasePlane input to the BasePlane input terminal of the Cog3DRangeImageHeightCalculatorTool1 tool. Once connected, run the sequence once.

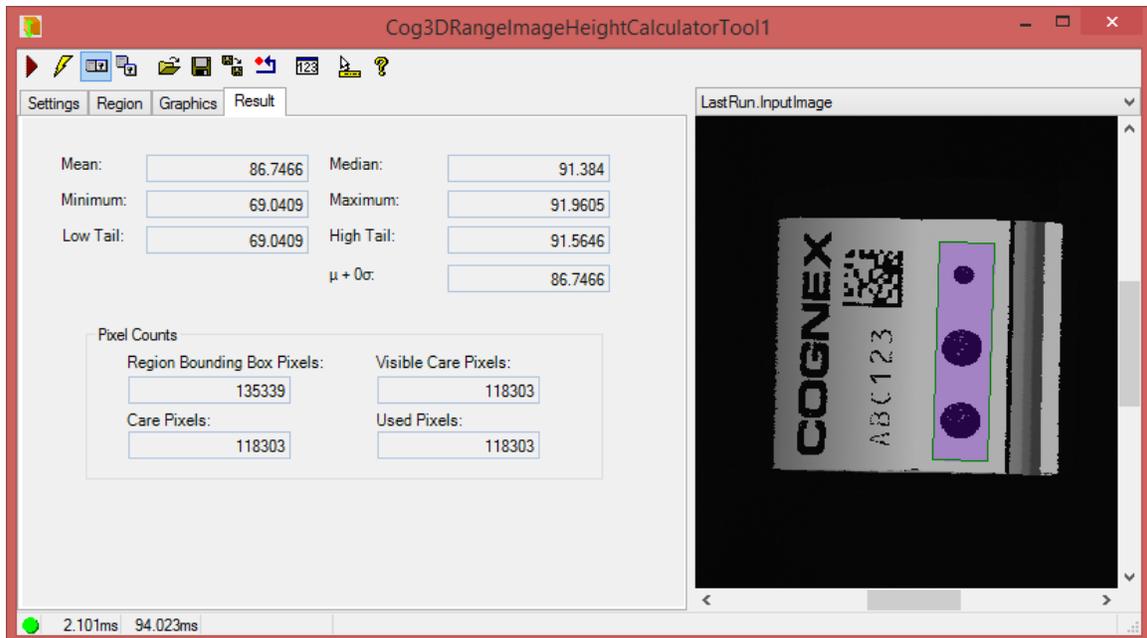


## b. Configure Height Tool

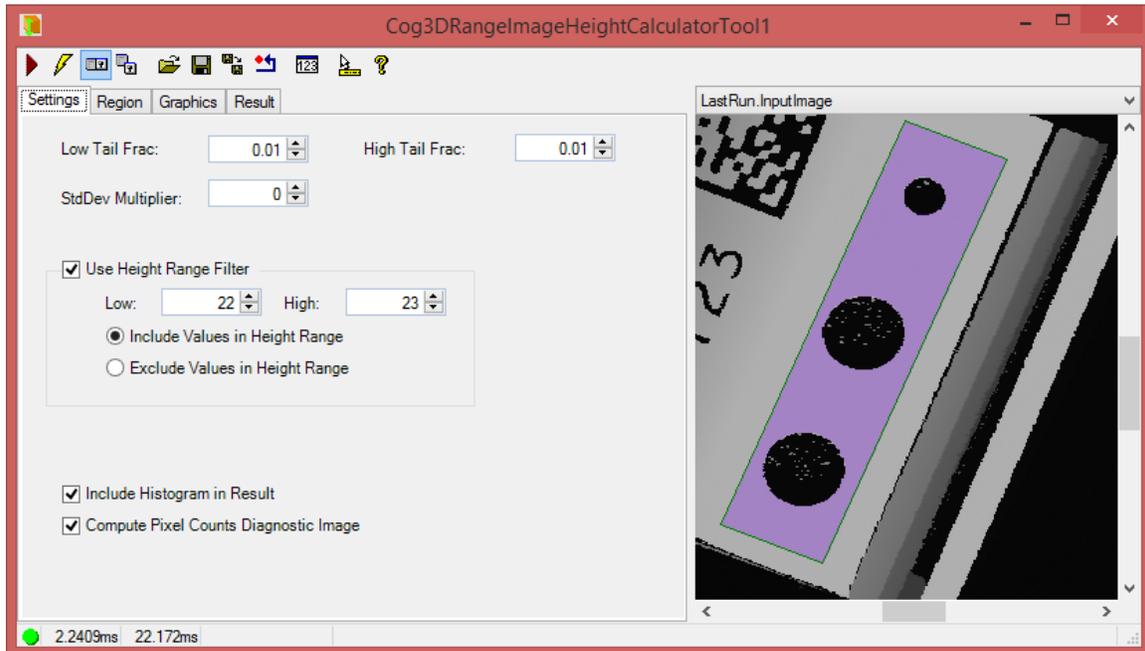
- i. Double-click on the Height Tool to open it. In the Current.InputImage, place your region around the area in which you want height data.



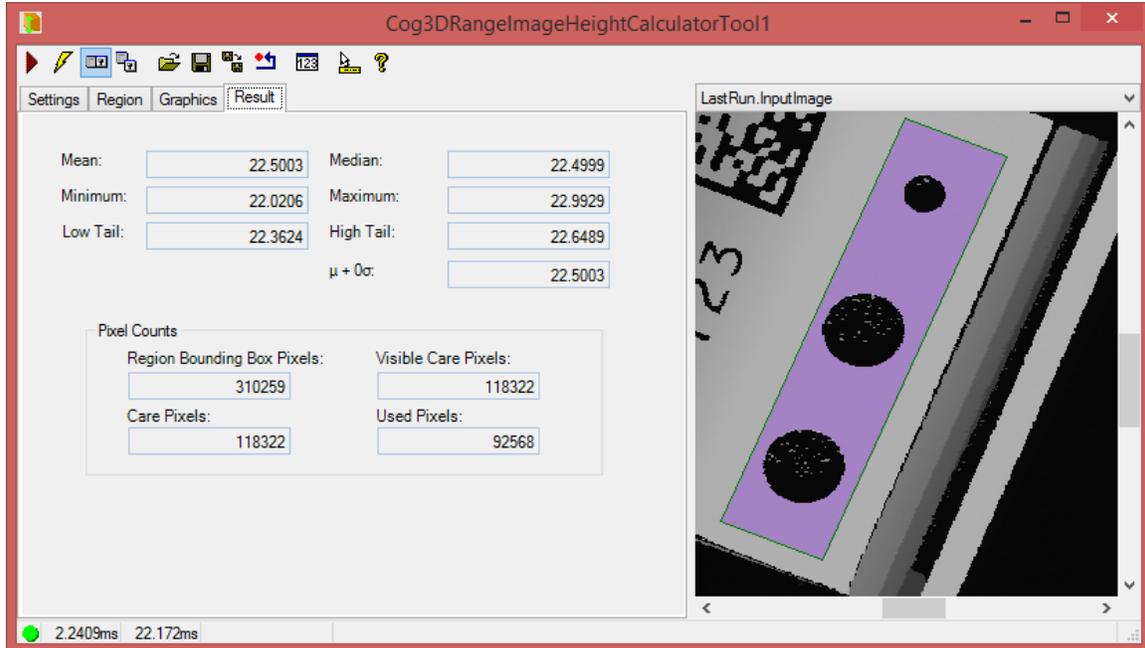
- ii. Run the tool once. Note the results on the “Result” tab. With a mean value around 86.7mm, it is not an accurate measurement of our object.



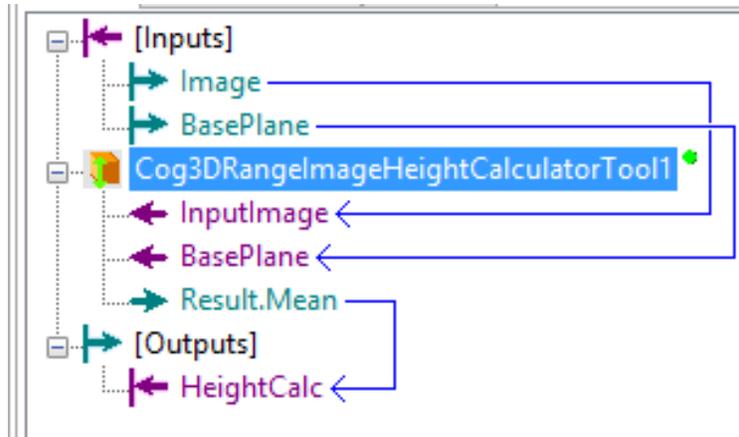
- iii. Change the Filer Height Range options as follows:
1. Check Height Range Filter
  2. Low: 22
  3. High: 23



- iv. Run the tool with the new settings and review the result.



- v. Attach the Result.Mean to the [Outputs] of the Tool block.

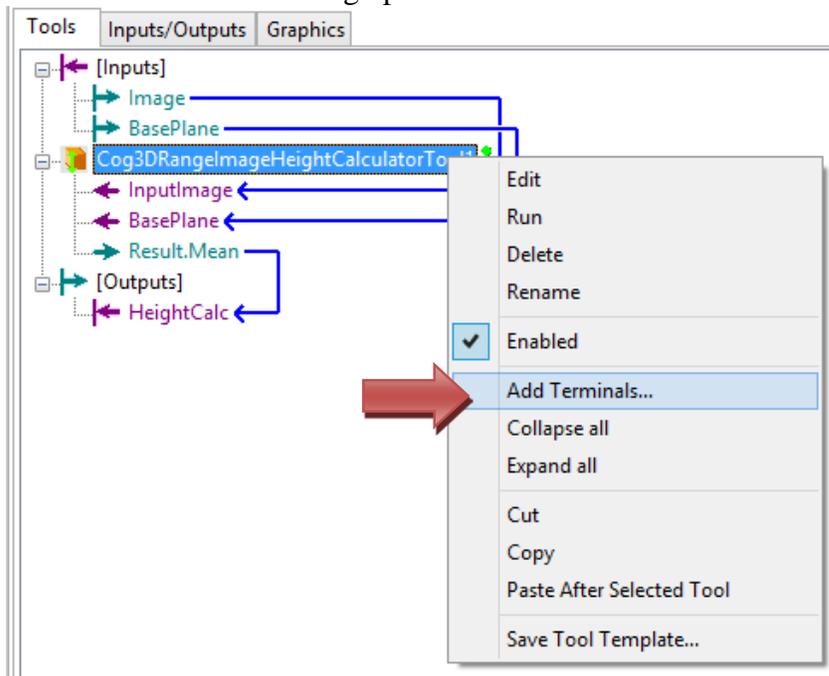


- vi. Create a new tag named “MyResult.HeightCalc “ on the output pin of the HeightCalculatorTool block.

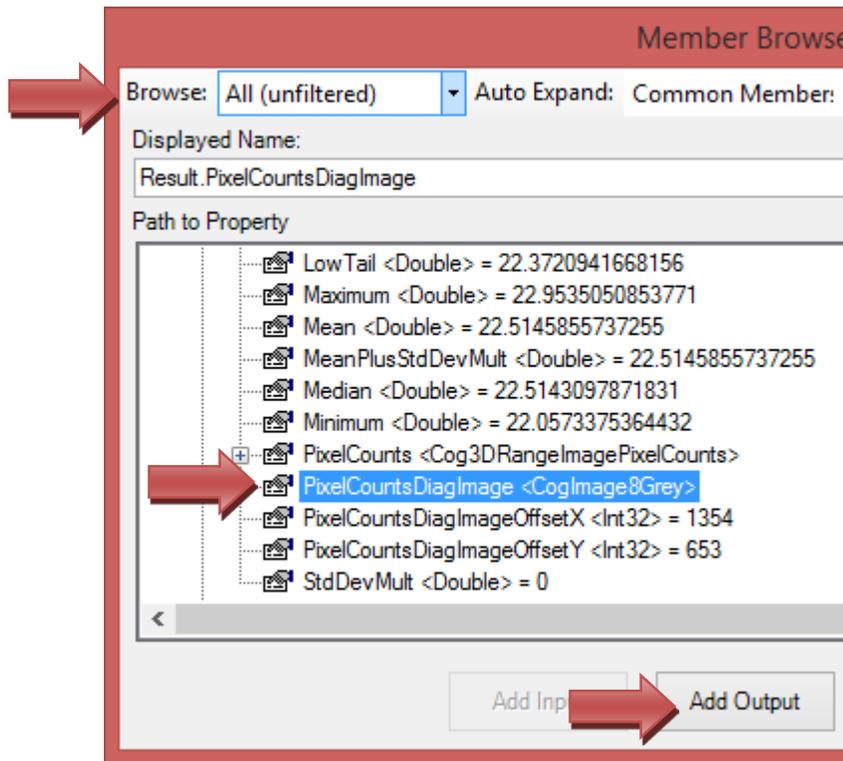


- a. **Feed result diagnostic mask into a Blob tool for further analysis**

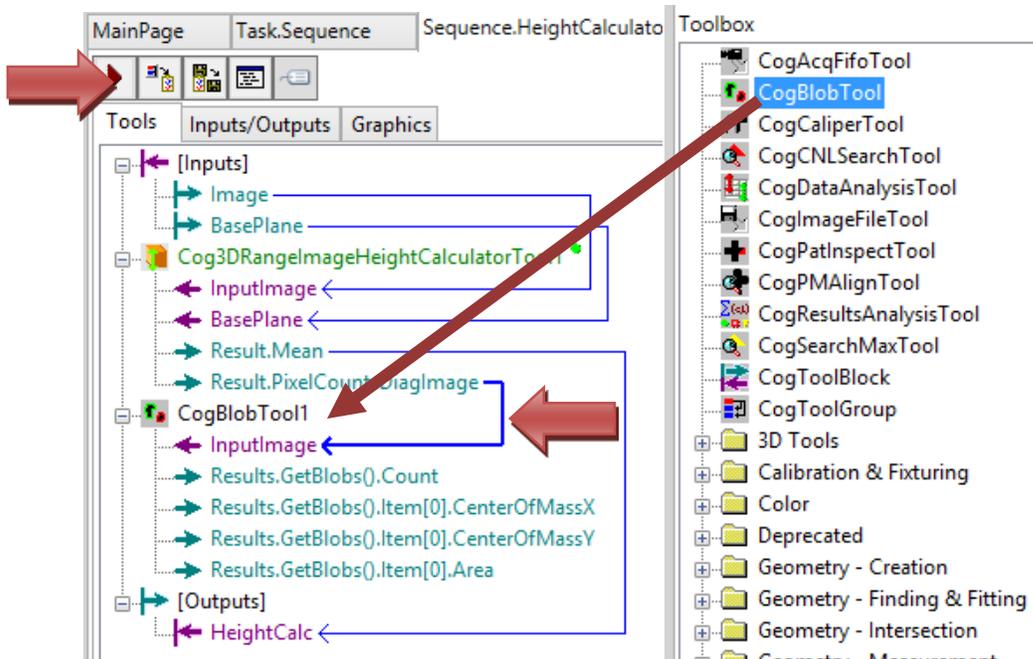
- i. Add the diagnostic mask terminal by going to the Cog3DRangeImageHeightCalculatorTool1 and right-clicking to bring up the list of functions. Select “Add Terminals”



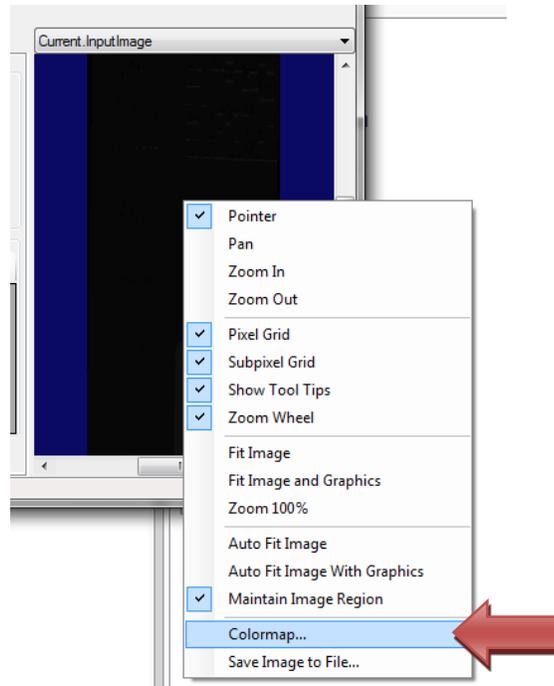
- ii. Select “All (unfiltered)” from the **Browse** list and then go down to the Result section and choose “PixelCountsDiagImage” and press “Add Output”



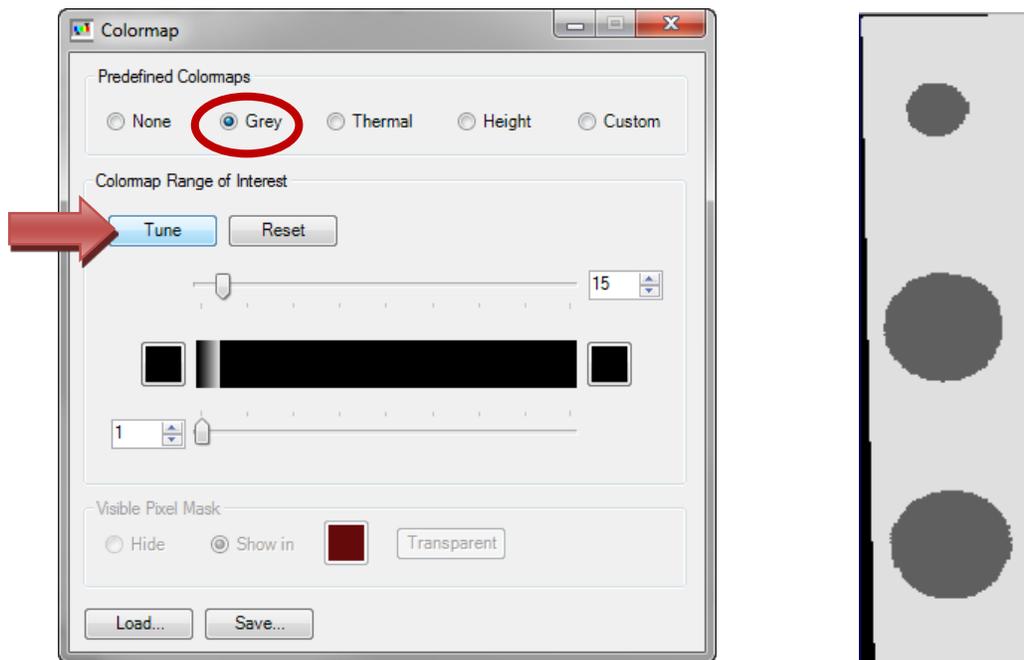
- iii. This will create an output terminal under the 3DRangeImageHeightCalculatorTool1. Add a Blob Tool and feed the newly added diag image into a Blob tool’s InputImage. Run the Tool block once.



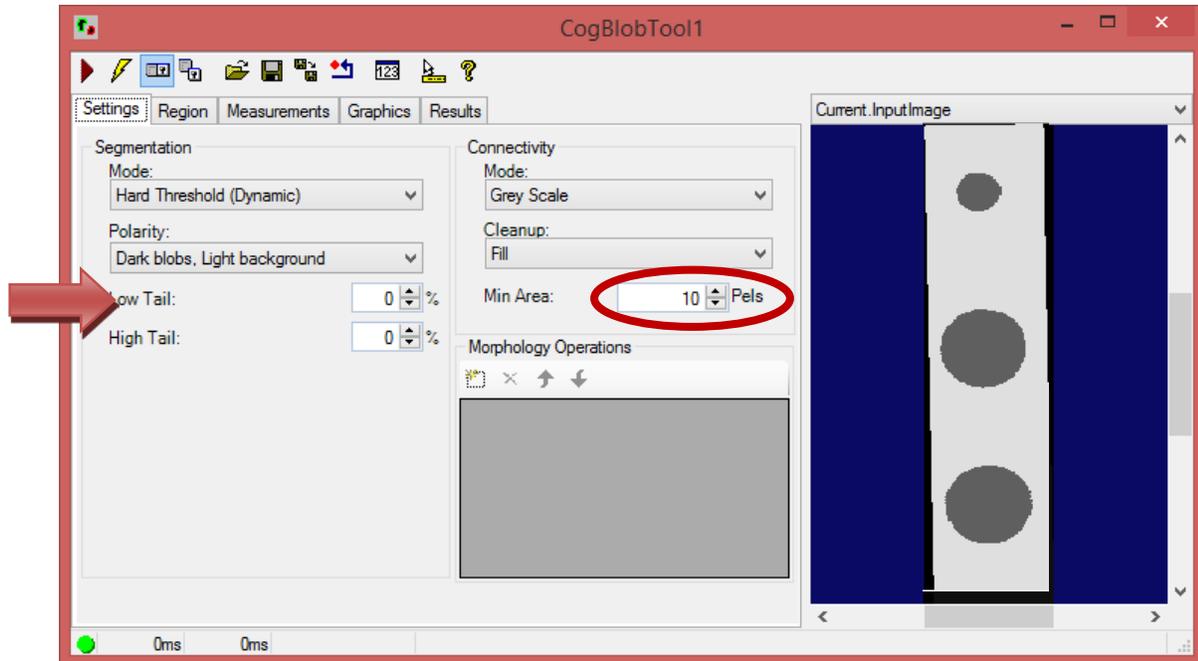
- iv. Open the Blob Tool and adjust the image so that better contrast is seen by right-clicking on the image and choosing “Colormap..”



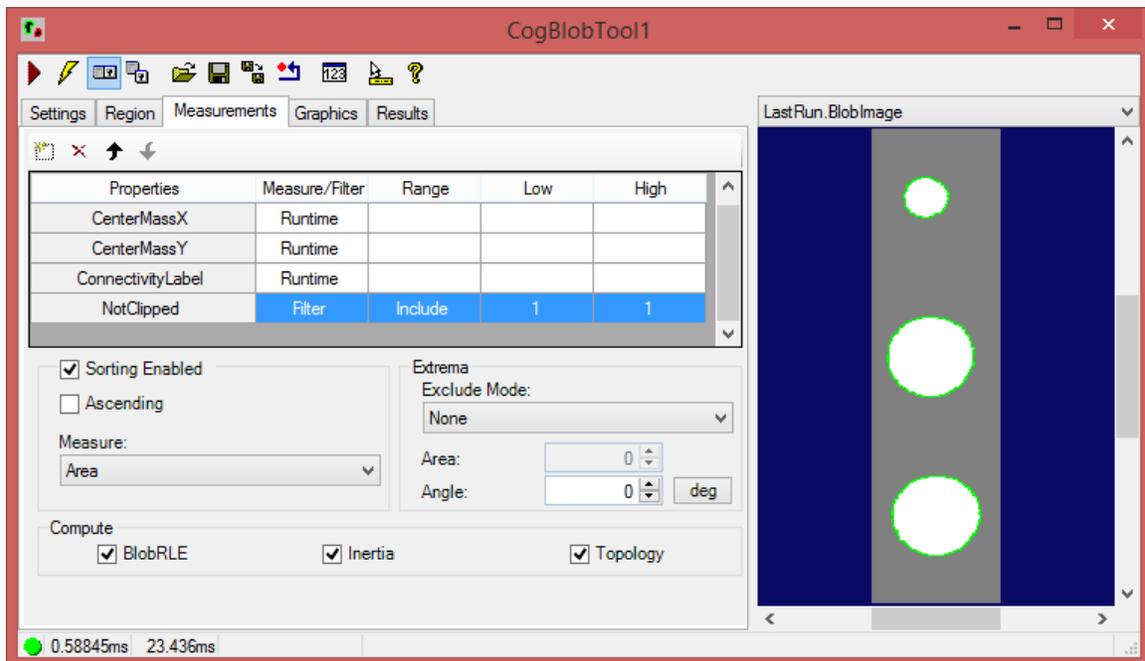
- v. Choose “Grey” and then “Tune” to get better contrast in the image. The light areas show that there is some sort of volume area.



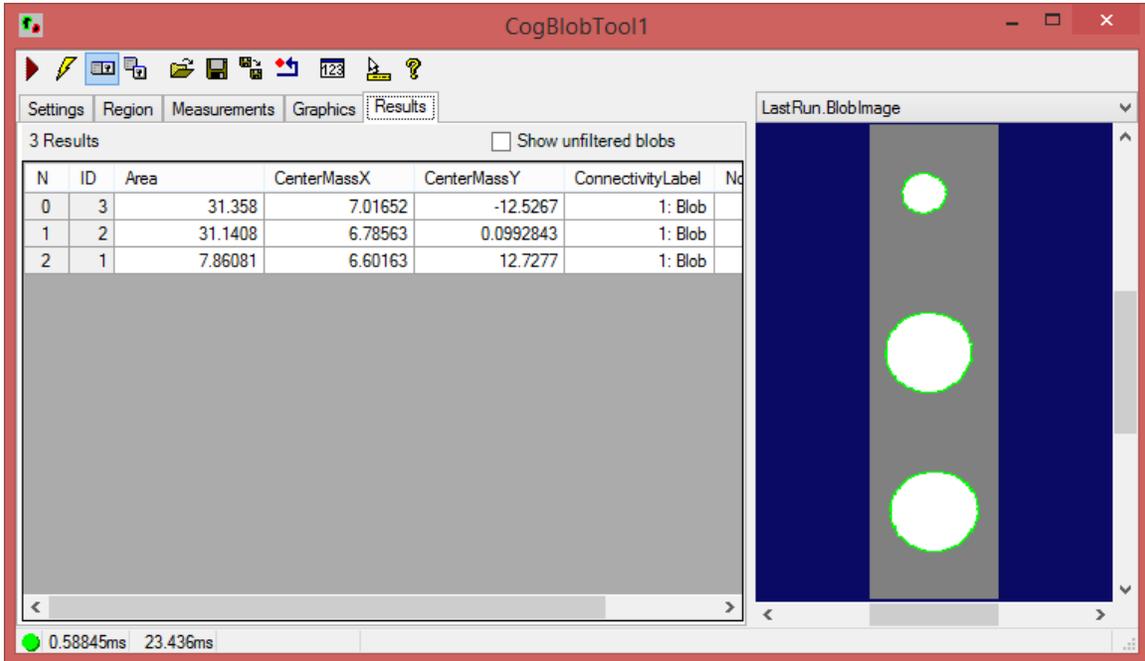
- vi. You should be able to use the default blob settings within the Settings tab.



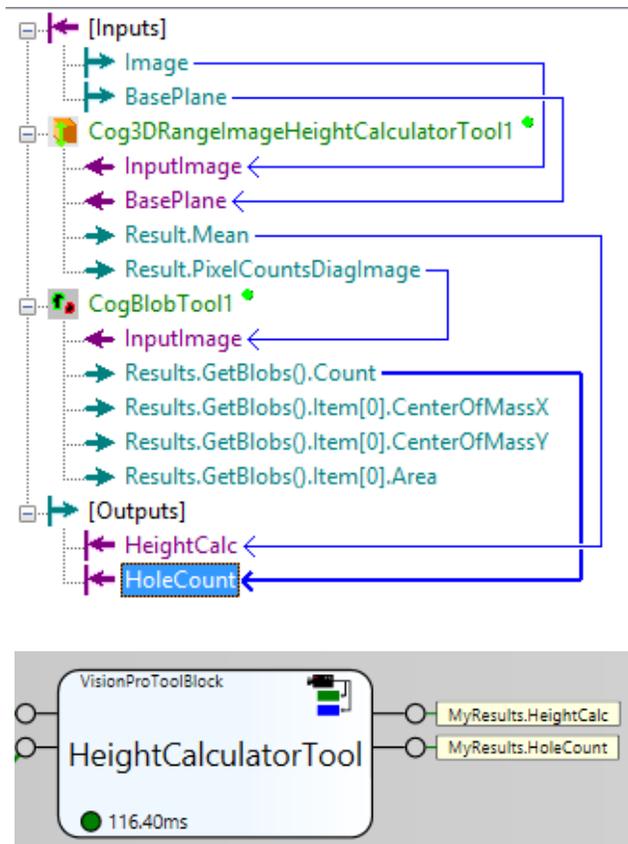
- vii. Use the Measurements tab to filter out all blobs that are “clipped”. You will need to add a new measurement called “NotClipped”, and then use it for filtering all the results.



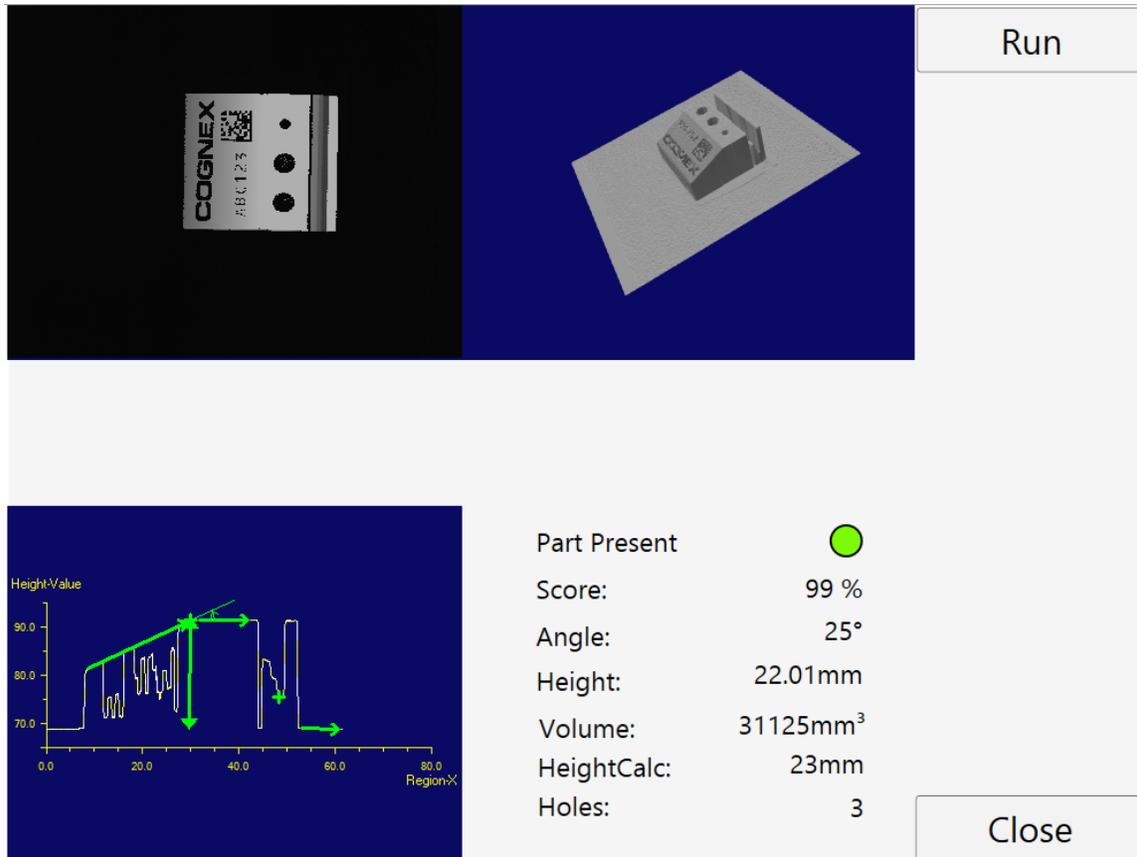
- vii. Check the Results tab to make sure that only the holes are being detected and no boundary blobs are being used.



- viii. Send out the number of results found by the Blob tool to the [Outputs] collection and add a new tag called “MyResults.HoleCount”.



### 3. Add height and hole count data to the HMI.



The HMI interface displays the following information:

- Part Image:** A photograph of a white rectangular component with "COGNEX" and "ABC123" printed on it.
- 3D Model:** A 3D CAD model of the component on a blue background.
- Height Profile Graph:** A line graph with "Height-Value" on the y-axis (70.0 to 90.0) and "Region-X" on the x-axis (0.0 to 80.0). A green line shows the profile with a peak at approximately x=30 and y=90. A green arrow points to this peak.
- Inspection Data:**

Part Present	<input checked="" type="radio"/>
Score:	99 %
Angle:	25°
Height:	22.01mm
Volume:	31125mm <sup>3</sup>
HeightCalc:	23mm
Holes:	3

Buttons: "Run" (top right) and "Close" (bottom right).

### 4. Save your project.