

# Surface Contour Matching

## Purpose

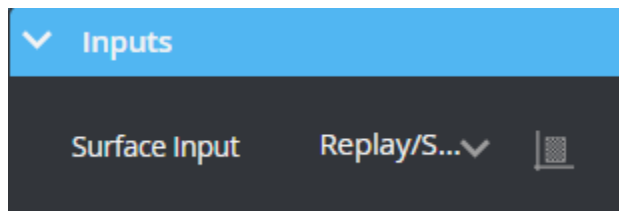
The tool lets you align an object with the maximal contour area in the current scan to a predefined template in 3 DOFs (X, Y, Z Angle).

Three key steps of the algorithm

- Extract the contour of the object with maximal area in the current scan. The contour points are in the cartesian coordinate system.
- Convert the contour points from the cartesian coordinate system to polar coordinates
- Perform template matching between the contour and the template with correlation matching method

Note it is of key importance that the object contour should be extracted correctly, so users may need to apply some preprocessing tools (e.g., Surface Filter's open operator) to remove noises from the contour.

## Inputs



Name	Description
Surface Input	The surface data (uniform) that the tool will apply measurements to.

## Parameters

Parameters

Template

FileName

Master-0001....

File

Master-0...▼

Operation

Normal ▼

Angle Range

10.000 ▼ deg

Angle Resolution

0.100 ▼ deg

Smoothing Kernel

4 pts

Display Contour

☐

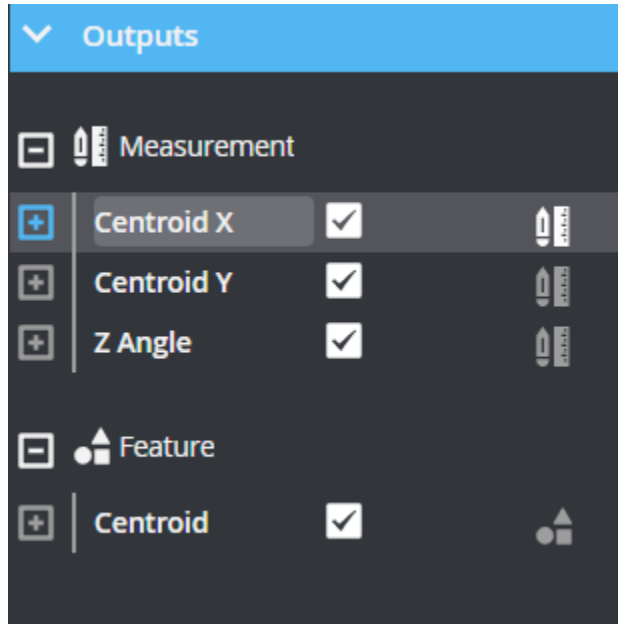
External ID

SurfaceContol

Name	Description
FileName	Shows the current file used. It is read-only
File	A drop-down containing the currently available templates.
Operation	<p>The operation to perform on the currently selected template in the File drop-down. One of the following:</p> <ul style="list-style-type: none"> <li>• Normal: The default value after having performed another operation.</li> <li>• Create: Creates a new template based on the current frame of scan data. Limited to the region if Use Region is enabled.</li> <li>• Load: Loads the currently selected template.</li> <li>• Save: Saves contour data to the currently selected template, overwriting its contour data.</li> <li>• Delete: Deletes the currently selected template.</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>Refresh:</b> Refreshes the list of templates. This is useful if you have renamed a template (using the Pattern Editor or manually in the client PC's file system).</li> </ul>
Operation	<p>If <b>Enforce Frame Order</b> is disabled, the <b>Operation</b> drop-down is displayed. One of the following:</p> <ul style="list-style-type: none"> <li>• <b>Normal:</b> The tool automatically chooses this operation after you have chosen another operation.</li> <li>• <b>Reset buffers:</b> Resets the buffers used to stitch frames.</li> <li>• <b>Lock:</b> Lets you lock the current processing and outputs of the tool. Useful when you need to add another tool that will use this tool's output (for example, a Surface Section tool). If you do not lock the tool, as soon as you add the other tool, the output is cleared, which means you must re-execute the combined output again to configure the additional tool. Be sure to unlock the tool after you have configured any other tools.</li> </ul>
Angle Range	Specifies how large the rotation angle between the current object and the template
Angle Resolution	Specifies the searching resolution in angle range
Smoothing Kernel	Specifies the half window size for smoothing the polar data (which is converted from the contour points in cartesian coordinates)
Display Contour	When enabled, show the contour points

## Outputs

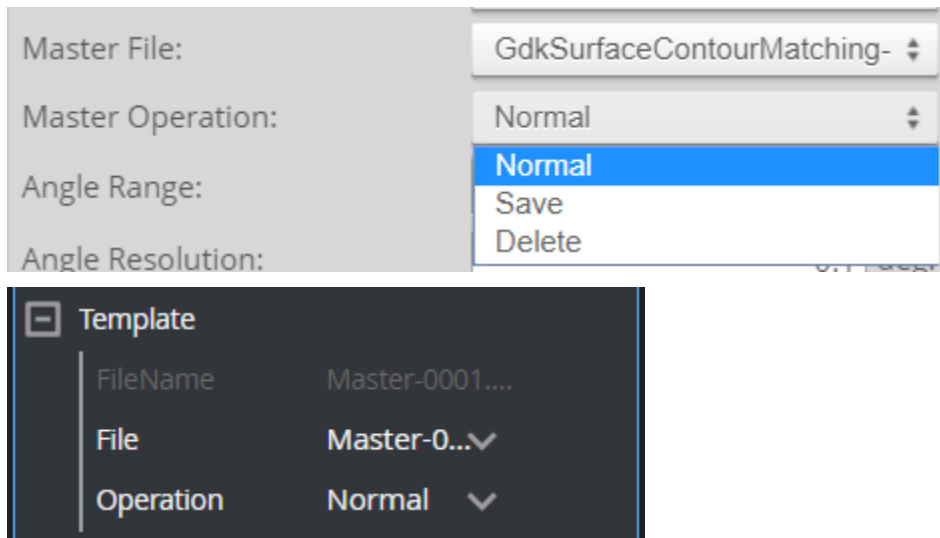


Type	Name	Description
Measurement	Centroid X	X position of the contour centroid
Measurement	Centroid Y	Y position of the contour centroid
Measurement	Z Angle	Rotation angle between the current object and the template
Feature	Centroid	The contour centroid of the current object

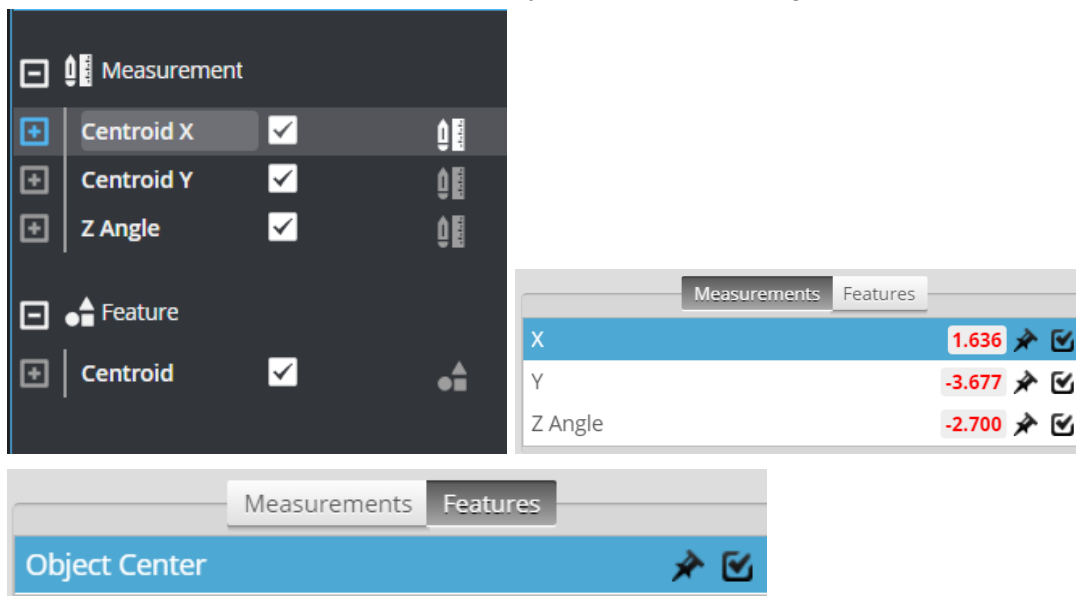
## Major Revisions

### Gocator Classic to GoPxL

1. Use the new persistent tool APIs implemented by Vincent in GoPxL



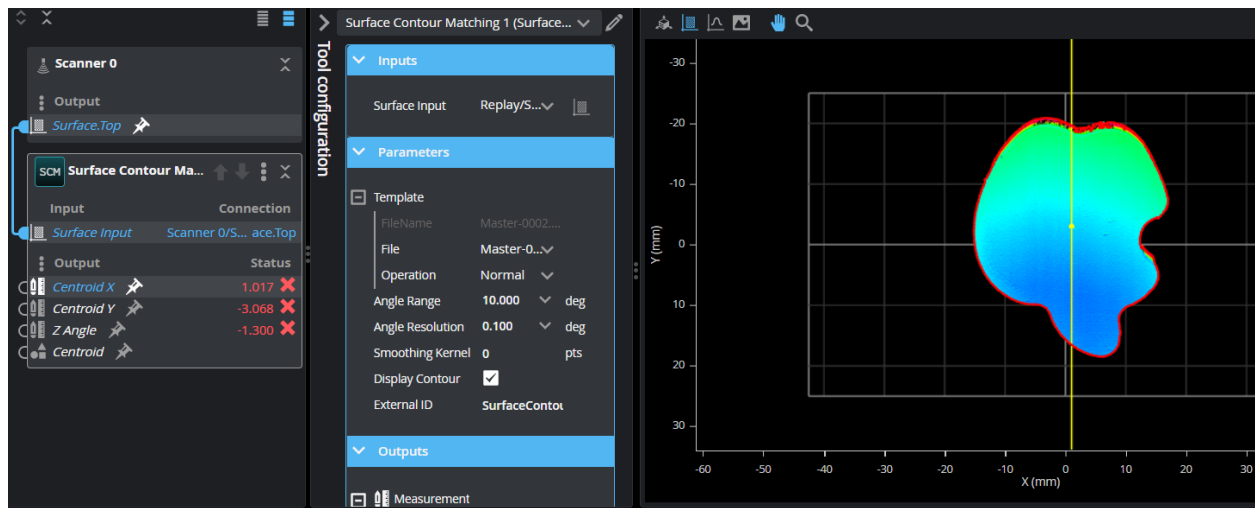
2. Update the labels of the outputs to clearly show their meaning



3. When no template is loaded, the measurement output **Z Angle** will be Invalid in GoPxL, while Classic will show it as 0

4. The centroid always show up for all the measurements in GoPxL, while Classic won't show it for the measurement **Z Angle**
- 5.

## Application Examples



## Algorithm Details