**WEEKLY DOCUMENTATION**

# **Week1**

## **Distance parameters (tolerance: +/- 0.1inches)**

1. Distance between backlight and setup base - 31.80 inches
2. Length of Setup - 36 inches
3. Width of Setup - 14.85 inches
4. Distance between camera mount (center) and rod - 33.5 inches
5. Dist. b/w camera mount and camera lens - 3 inches

## **Camera parameters and lens settings**

1. FLIR Mono Blackfly 5.0MP camera
2. 50mm C series lens
3. Current lens settings - aperture: 5.6 | Focus: Sharp

## **Image Acquisition & Camera Calibration**

1. Captured approx. 30 images(20 accepted, 11 rejected) of Part 1 Bend 2 (P1B2) using Spinview for Camera Calibration
2. Performed Camera Calibration using MATLAB’s in-built Toolbox and obtained the following parameters:
   1. Focal length (pixels): [15643.7180 +/- 113.2082 15653.6875 +/- 113.1472]
   2. Principal point (pixels):[ 1555.6994 +/- 35.4511 962.4421 +/- 30.3245 ]
   3. Radial distortion: [ 0.2270 +/- 0.0851 -31.4065 +/- 12.8901 ]
   4. Overall mean reprojection error per image = 0.55 pixels

## **Centerline approach-Insights**

1. The pre-programmed row/column centerline approach doesn’t work for images of tubes for multiple bends(P1B2) and hence, only one bend should be viewed in one run. **(Important)**
2. We are currently using edge detection approach separately for right and left edge and then averaging the left and right edge indices to get the centreline indices for the whole tube.

## **Background Lighting**

1. Also, backlight fluctuation could be accounted for the loss in accuracy.

# **Week2**

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