

Question 1:

Target:

- Design an automatic machine to align Part A to PartB, and screw to assemble A and B together
- Propose the design concepts using sketch and description
- List the design challenges and potential risks

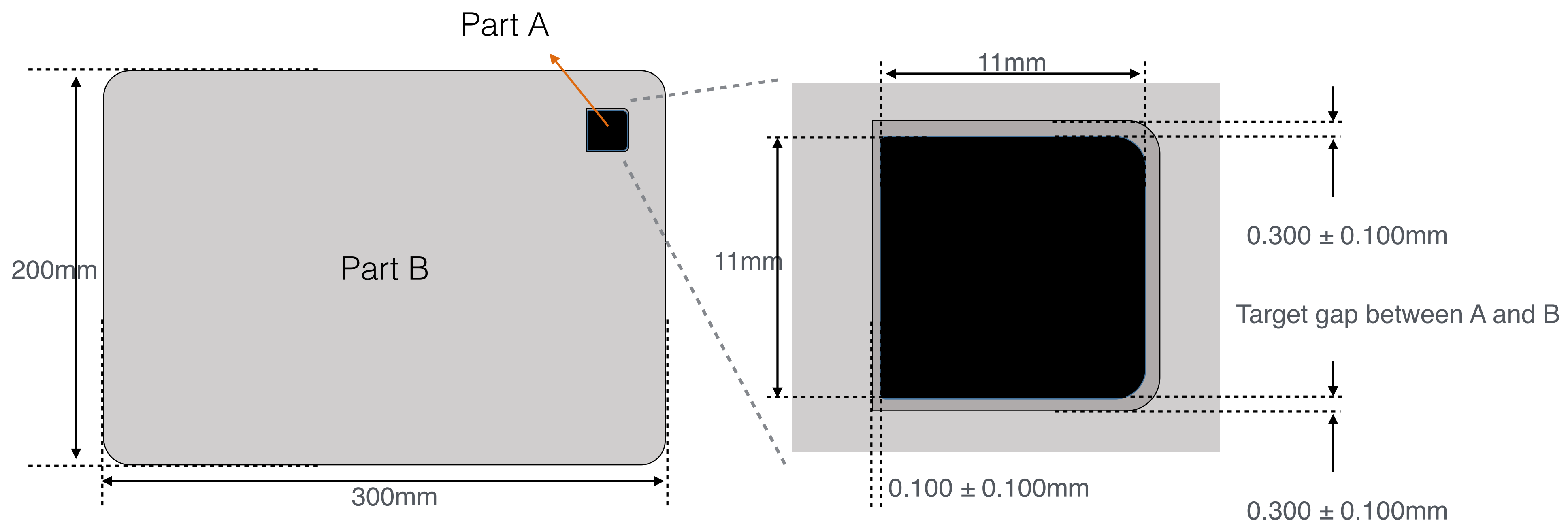
Incoming materials:

- Part A is already in the recess of Part B and can be moved freely in the recess.
- 2 screws need to be screwed after alignment

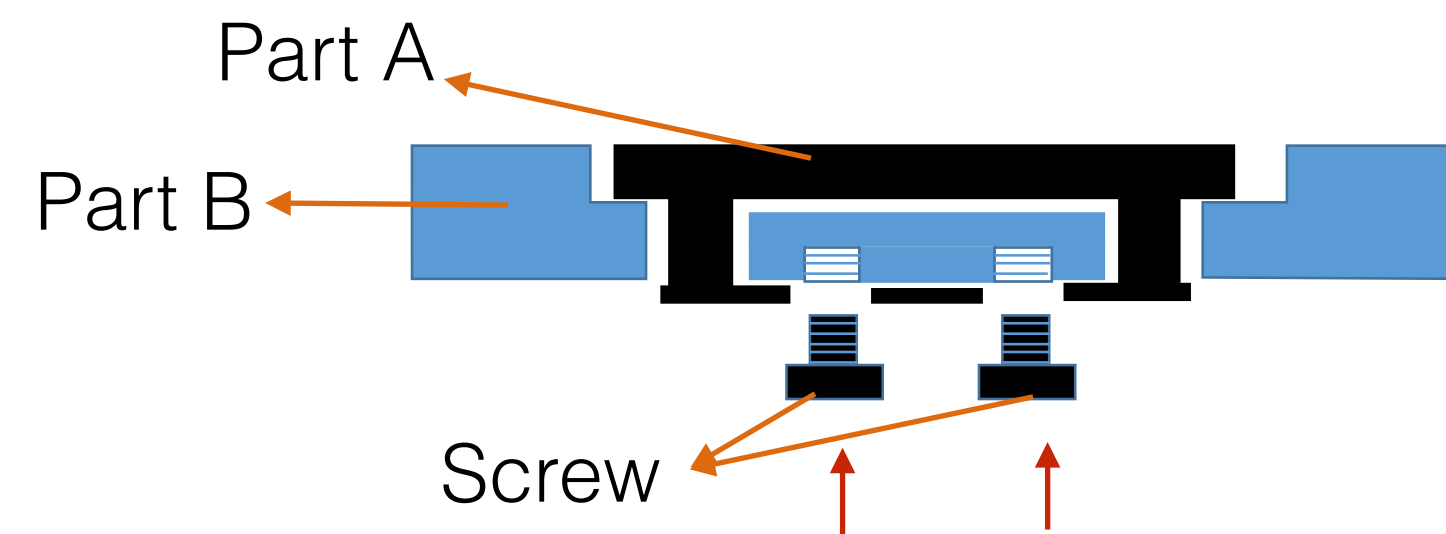
Gap Requirements:

- Alignment in Y direction: Center, (up gap - down gap): $\pm 0.100\text{mm}$
- Alignment in X direction: Left Gap $0.100 \pm 0.100\text{mm}$

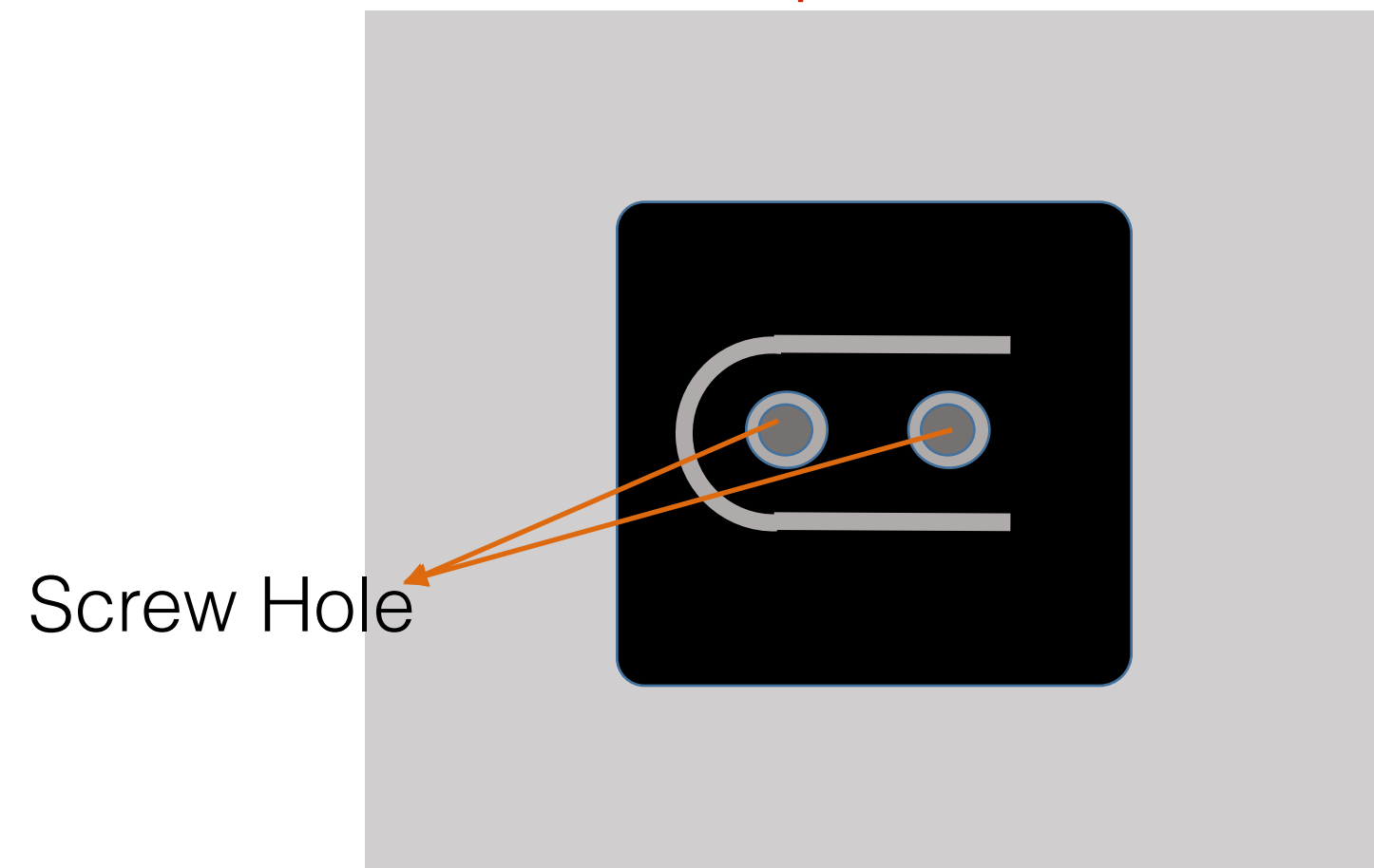
Top View



Side View



Bottom View



Question 2:

Target:

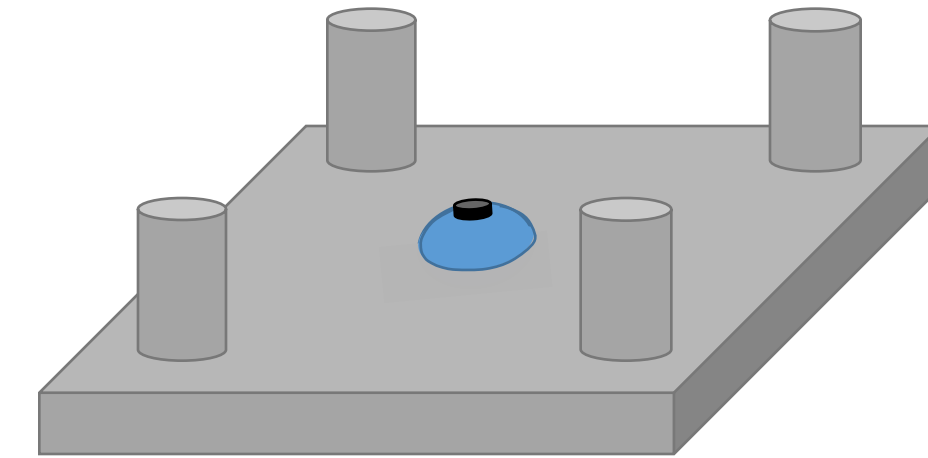
- Provide a solution to measure the height showed on the right picture
- Propose the design concepts using sketch and description

Information:

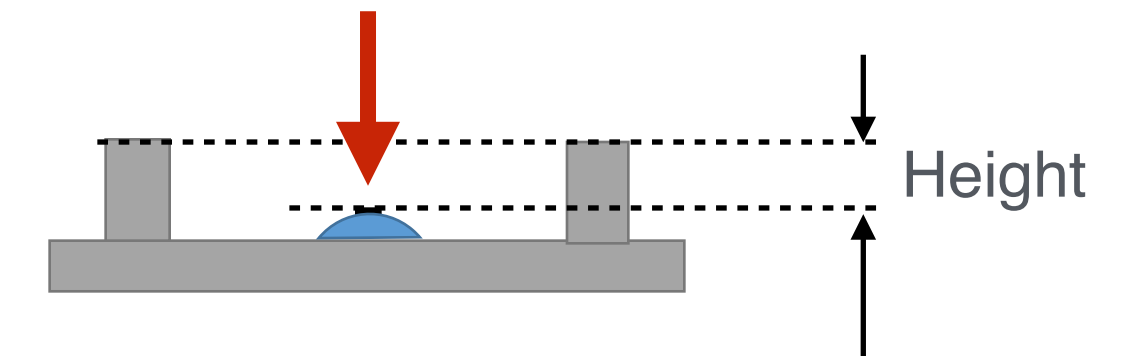
- The normal value of the height is 1.3mm

Requirements:

- Need to apply 40gf on the nub when measuring, the force accuracy is $\pm 2g$
- The measurement repeatability must be within 0.005mm



Need to apply 40gf on the nub when measuring



Question 3:

Target:

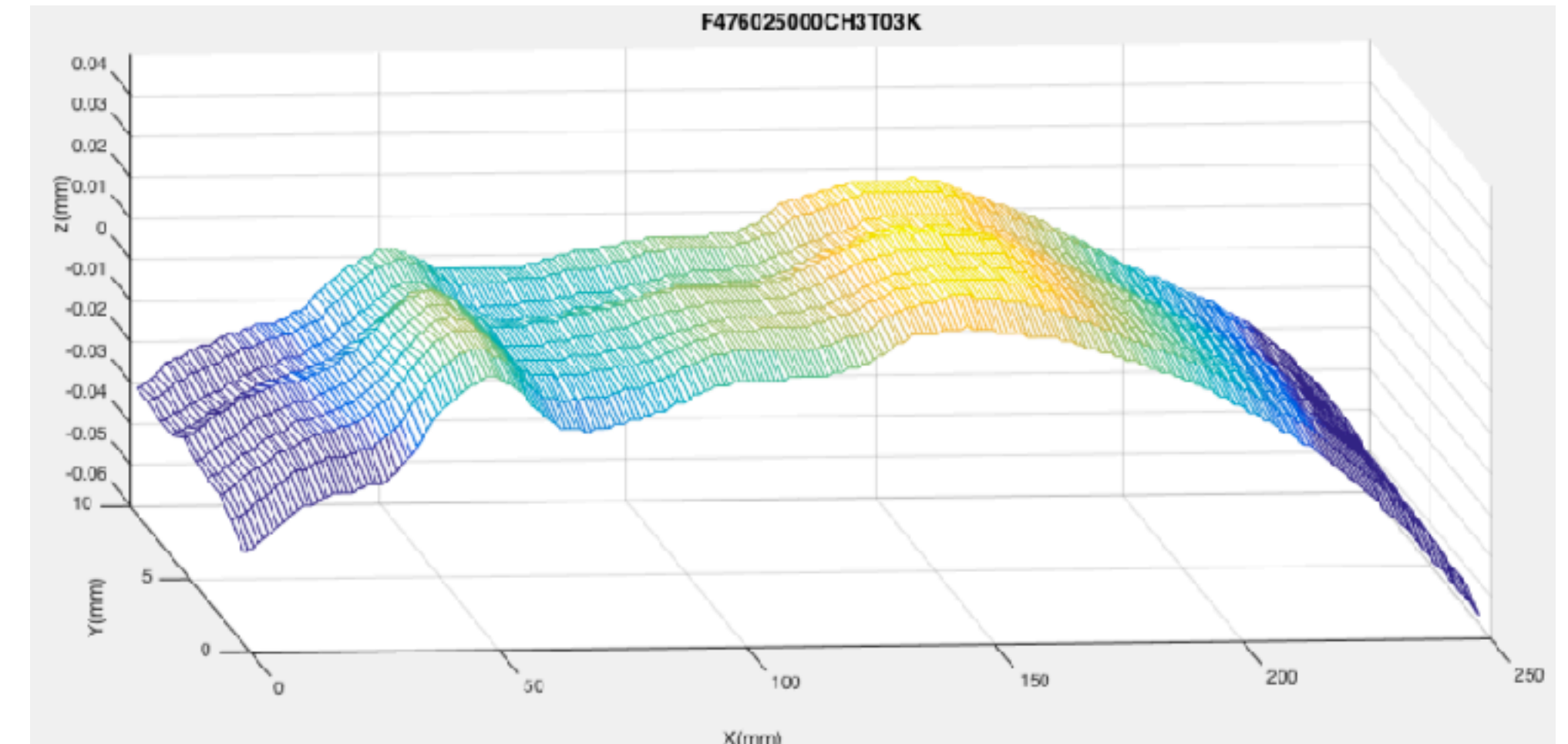
- Plot 3D using the software you are familiar with
- Calculate the flatness

Informations:

- The provided data is 2500 points in 1 row, need to split it into 250 points per row, total 10 rows, then plot 3D

Requirements:

- Use the software you are familiar with
- Attach the program or script



Example

Question4:

Target:

- Reconstruct the attached mage to color images
- Extract the edge specified in the right picture
- Extract the circle specified in the right picture

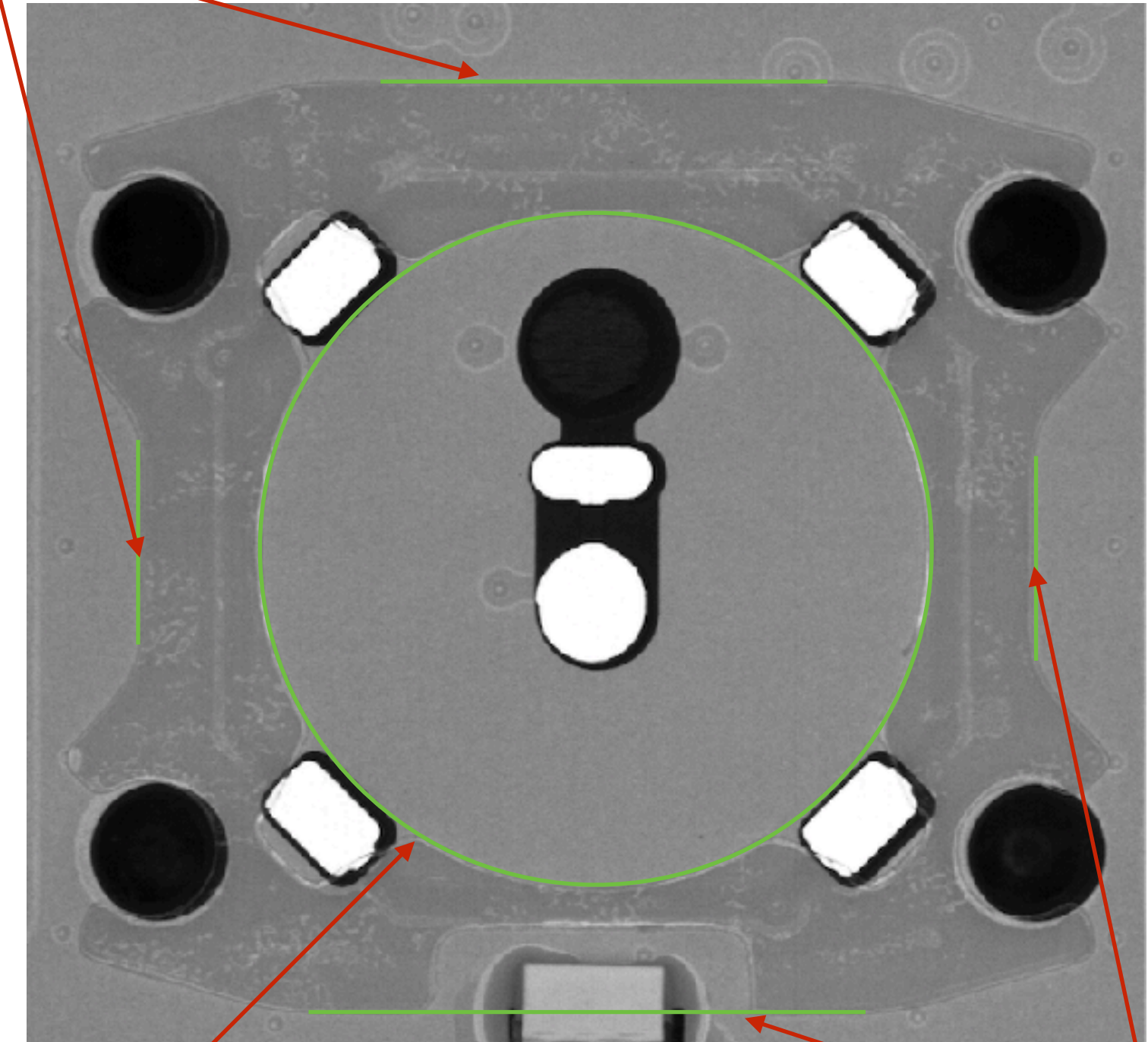
Informations:

- The attached mage is bayer format BMP file

Requirements:

- Use the software you are familiar with
- Attach the program or script
- Screen-shot the images with extracted with edges and circle

Edge need to be extracted



Circle need to be extracted

Edge need to be extracted