POSTER # 1

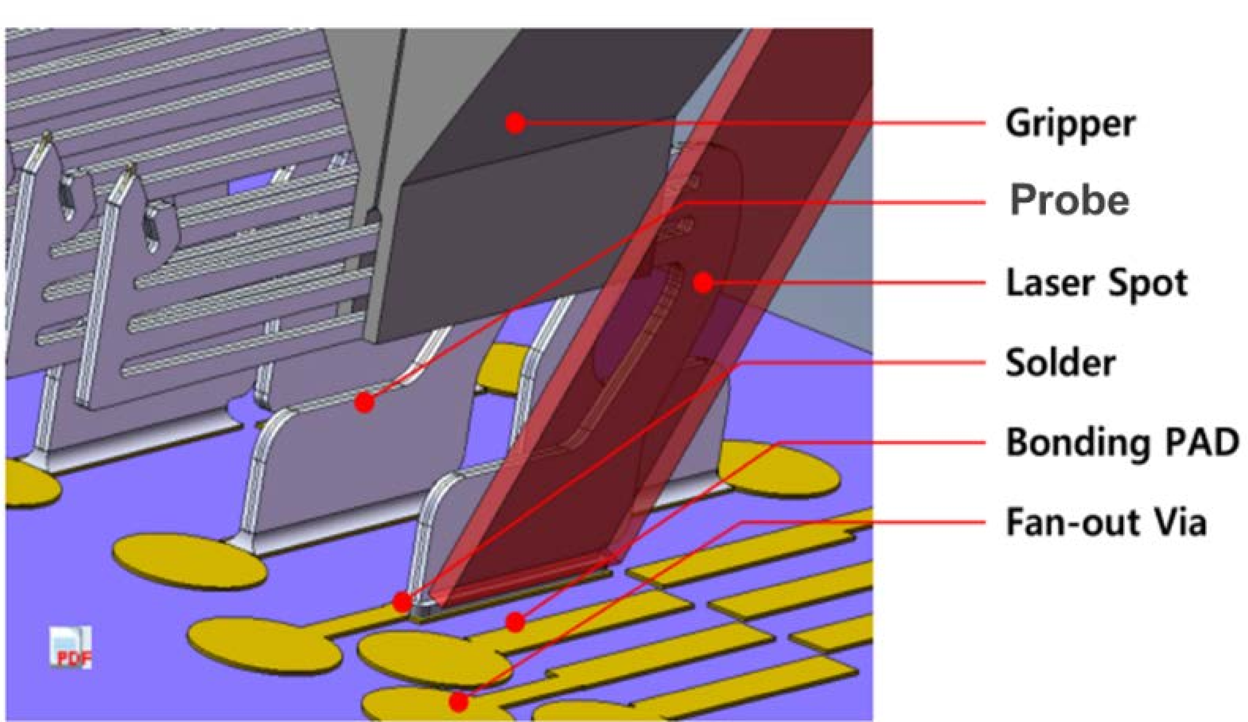
Study on 2D MEMS Probe Card Manufacturing by Using Laser Micro-Bonding Process

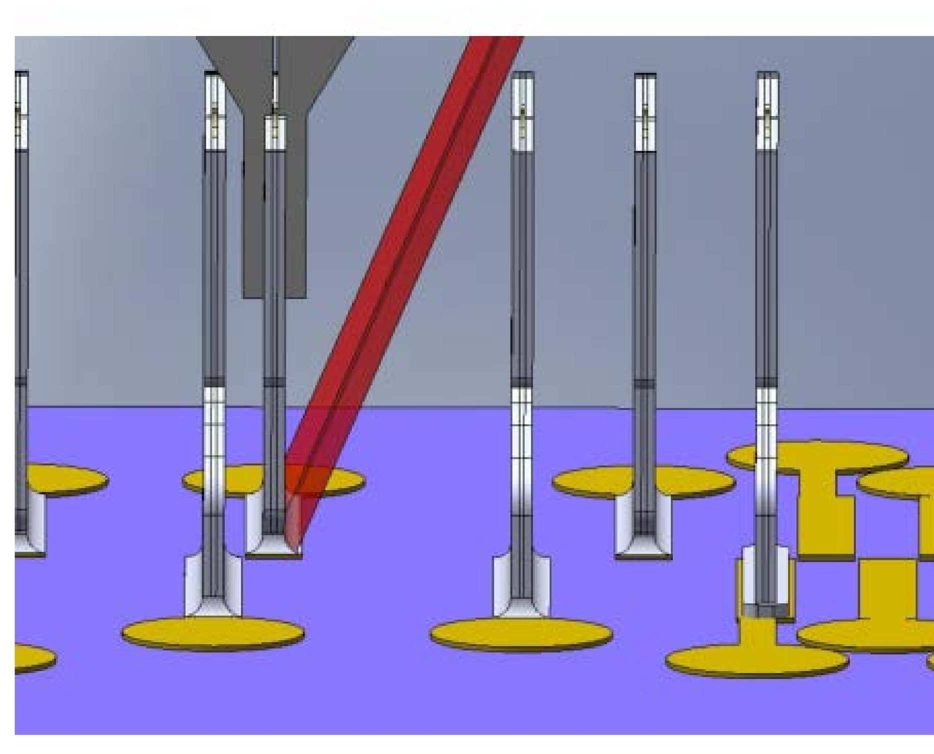
Overview

- 2D MEMS Probe Card Manufacturing by Using Laser Bonding Process
- The Experiment
- Key Parameters of the Process
- Summary
- Acknowledgements

2D MEMS Probe Bonding By Laser Process

- Ceramic Au Pad / Laser Source / Bonding Gripper
- SnAgCu Solder Paste / Nickel Alloy probe





The Structure of Laser Bonding Machine

- **Features**
  - Ceramic Substrate : LTCC (HTCC 0.5 ~ 1.0 sec Increase)
  - Pin pitch : > 60µm (Gripper type)
  - Bonding accuracy : available for NANDFLASH and D-RAM
  - Auto-soldering by pin/pad type recipe
  - Solder paste : SnAgCu
  - Card size : 8' , 12'
  - Auto alignment function of probe card

Flow Chart of the Process

Soldering/Inspection

Card Load

Card Alignment (x-y-θ)

Solder Paste Dipping

Tray Pick-up/Forming (x,y)/(x,y,θ)

Pin Alignment (x-y-z)

Laser Soldering

Pin Inspection

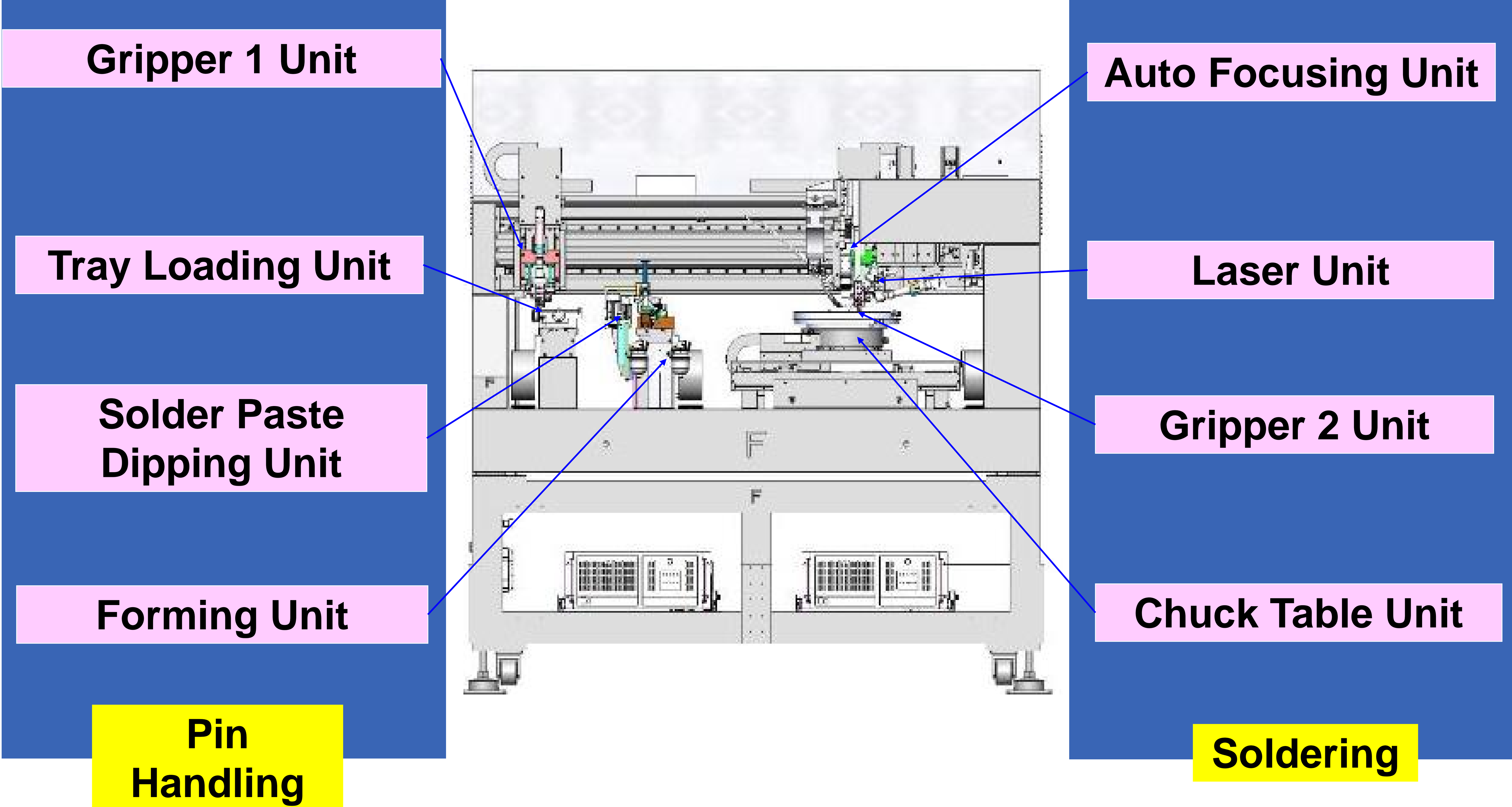
Judgment (Operator)

NG

OK

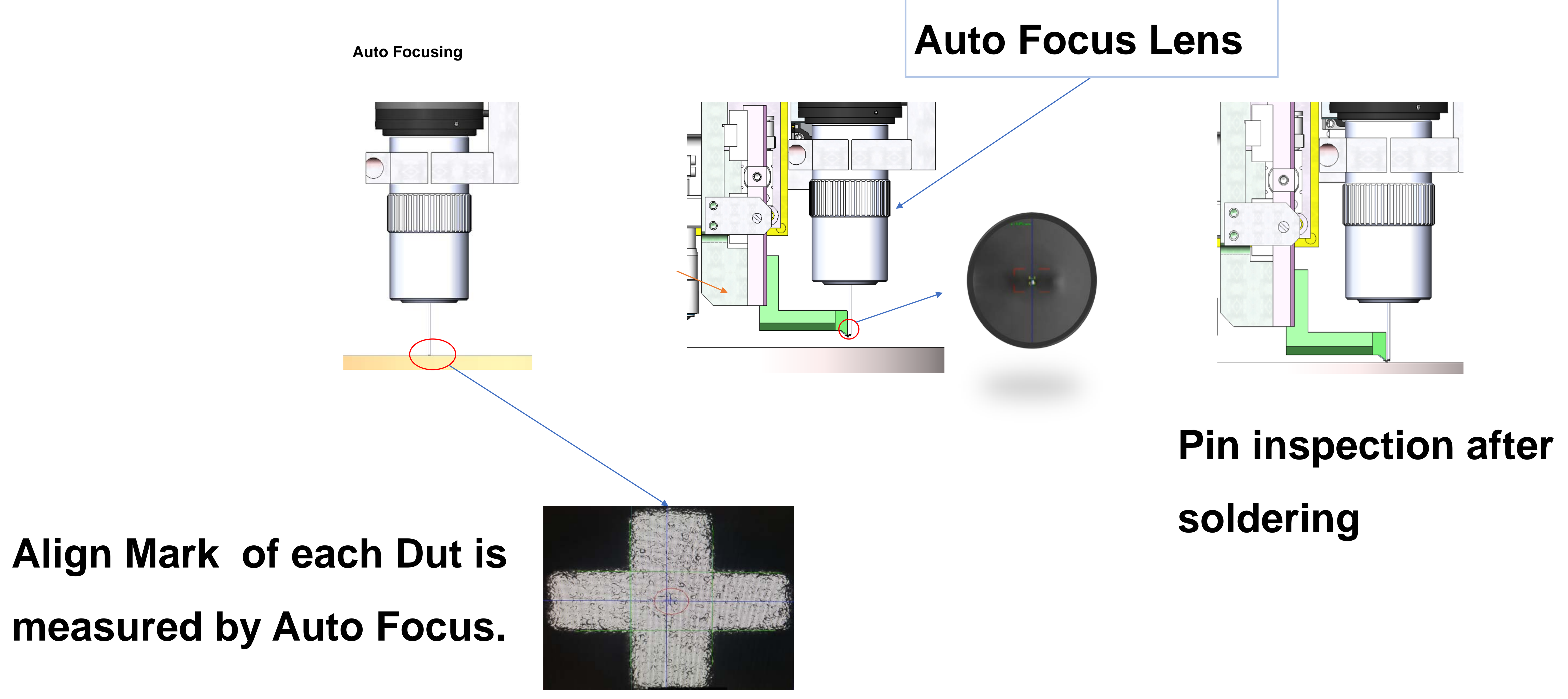
Finish

The Structure of Laser bonding Machine



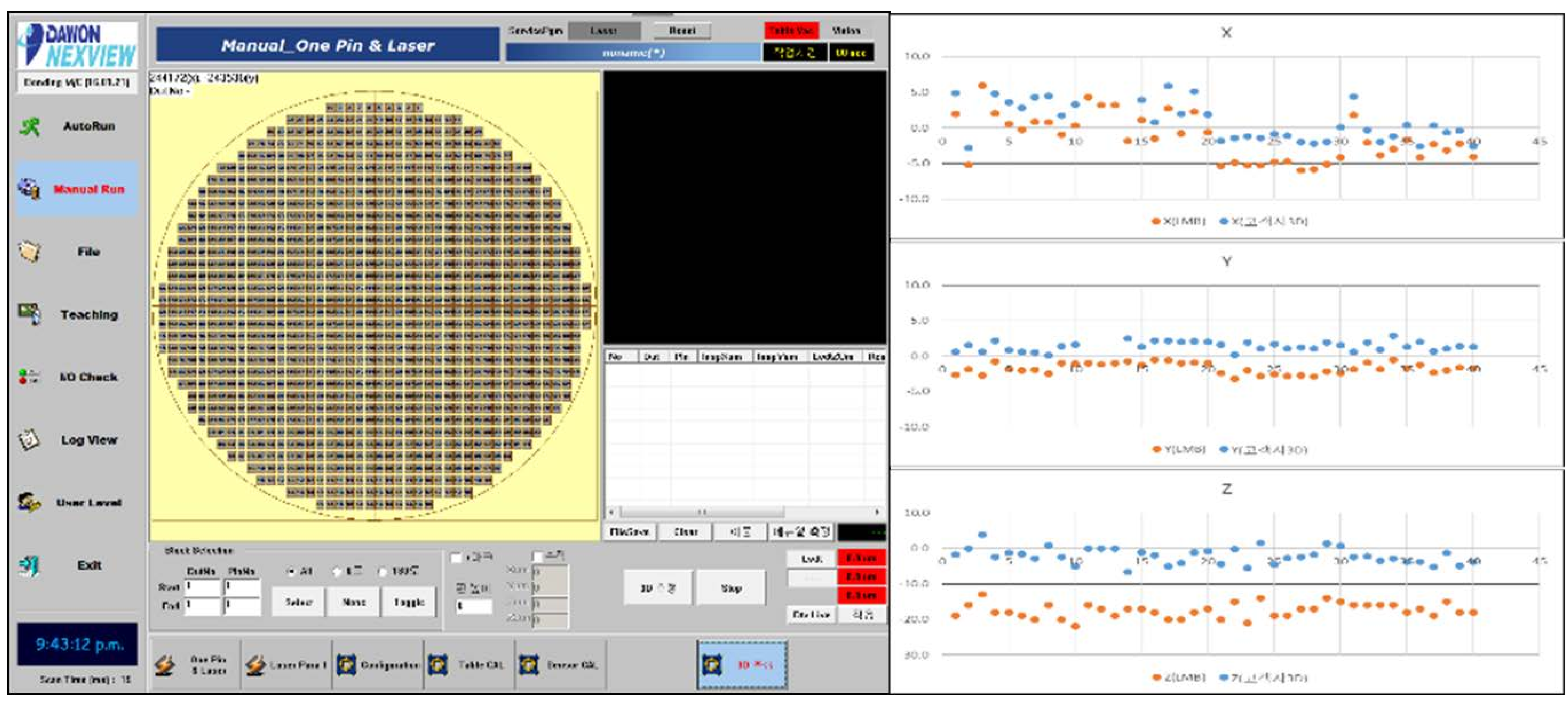
Auto-Focus Function

- Align Mark / Ceramic Flatness (Probe Tip to PAD) Measurement
- Probe X , Y , Z after Soldering Measurement



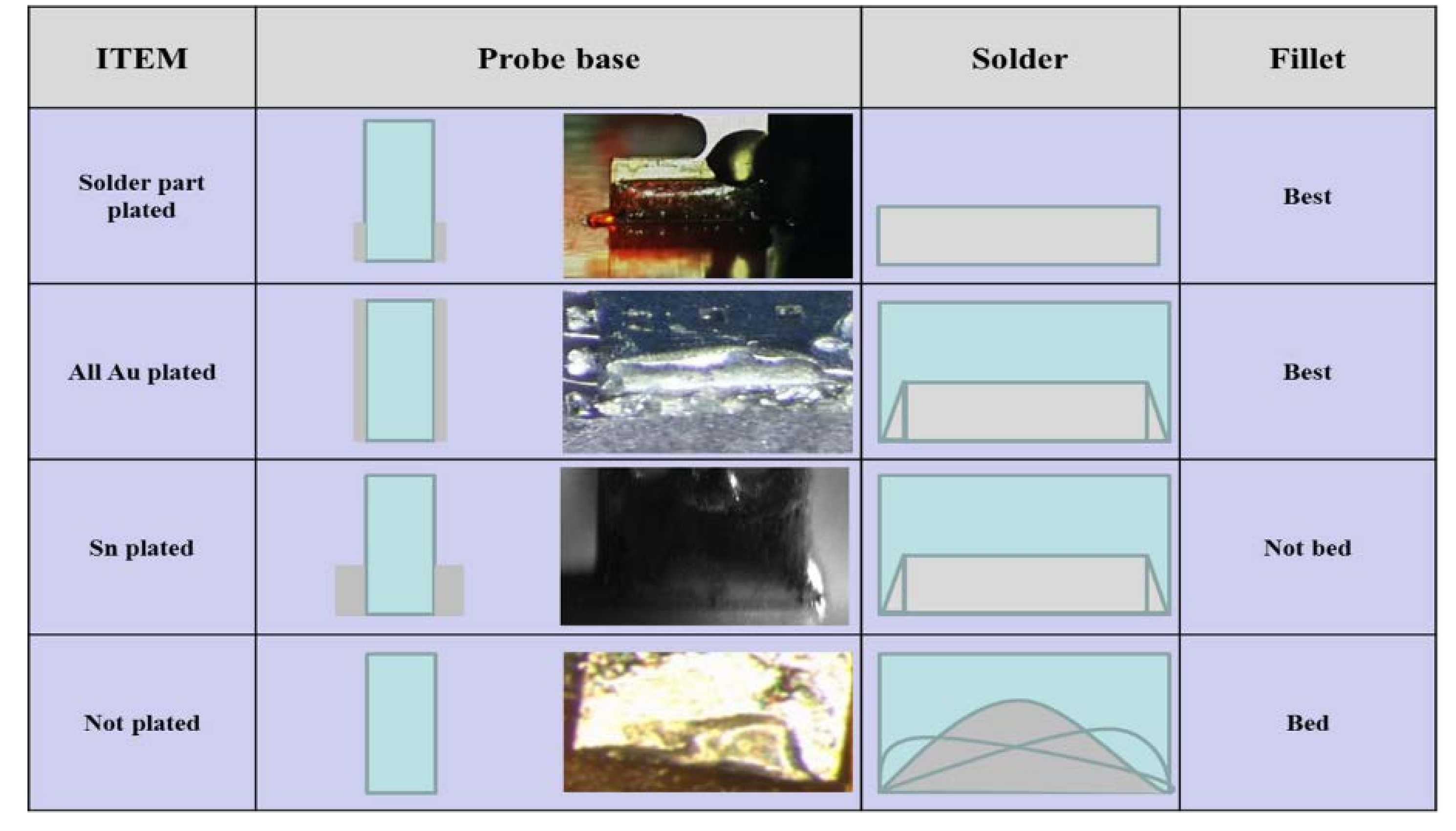
Auto-Focus Function

- After Bonding
  - Automatic 3D Measurement _ X , Y , Z



Bonding Reliability

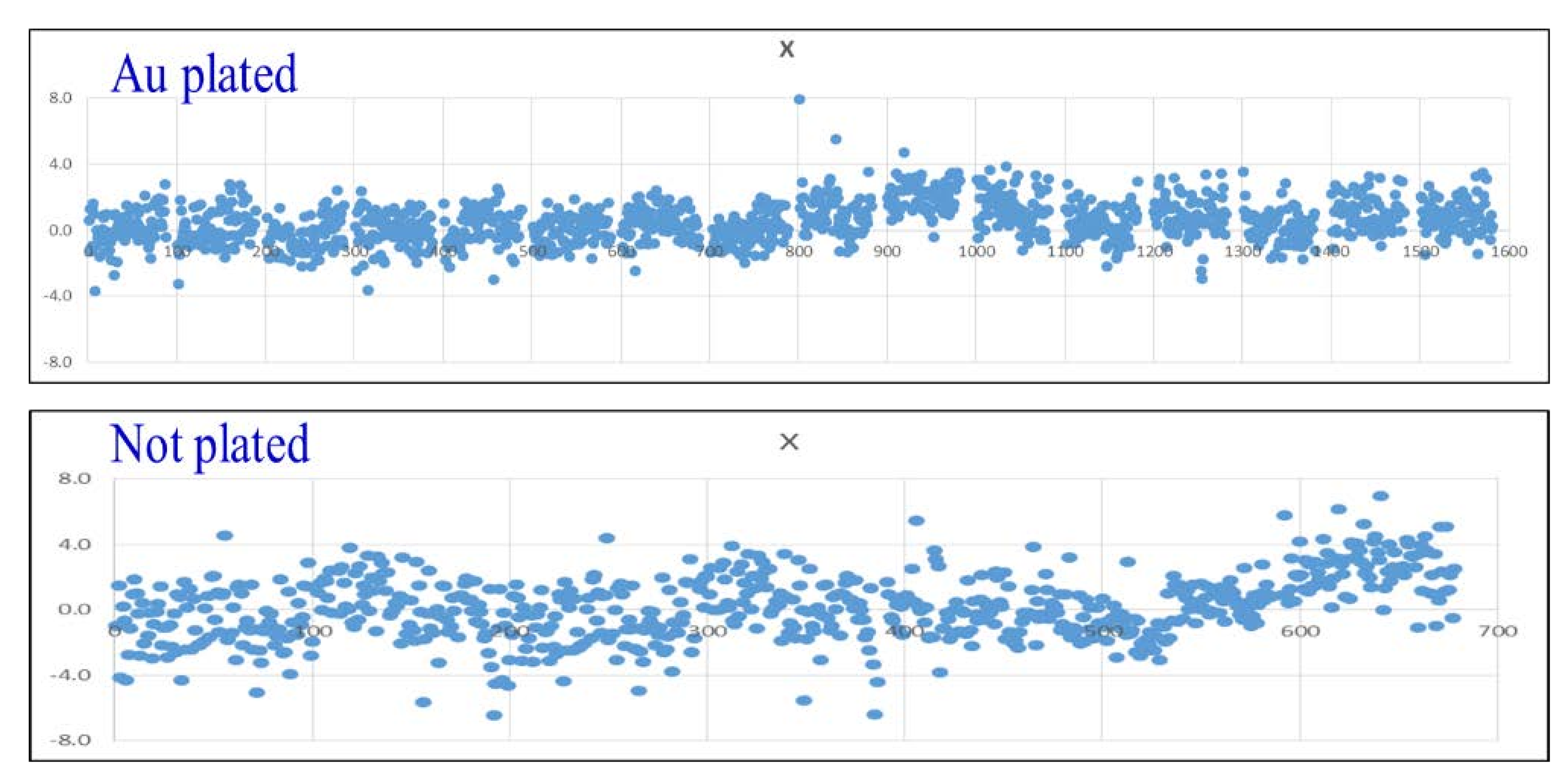
◆ Soldering Fillet : Fillet has a significant impact on accuracy.



ITEM	Probe base	Solder	Fillet
Solder part plated			Best
All Au plated			Best
Sn plated			Not bed
Not plated			Bed

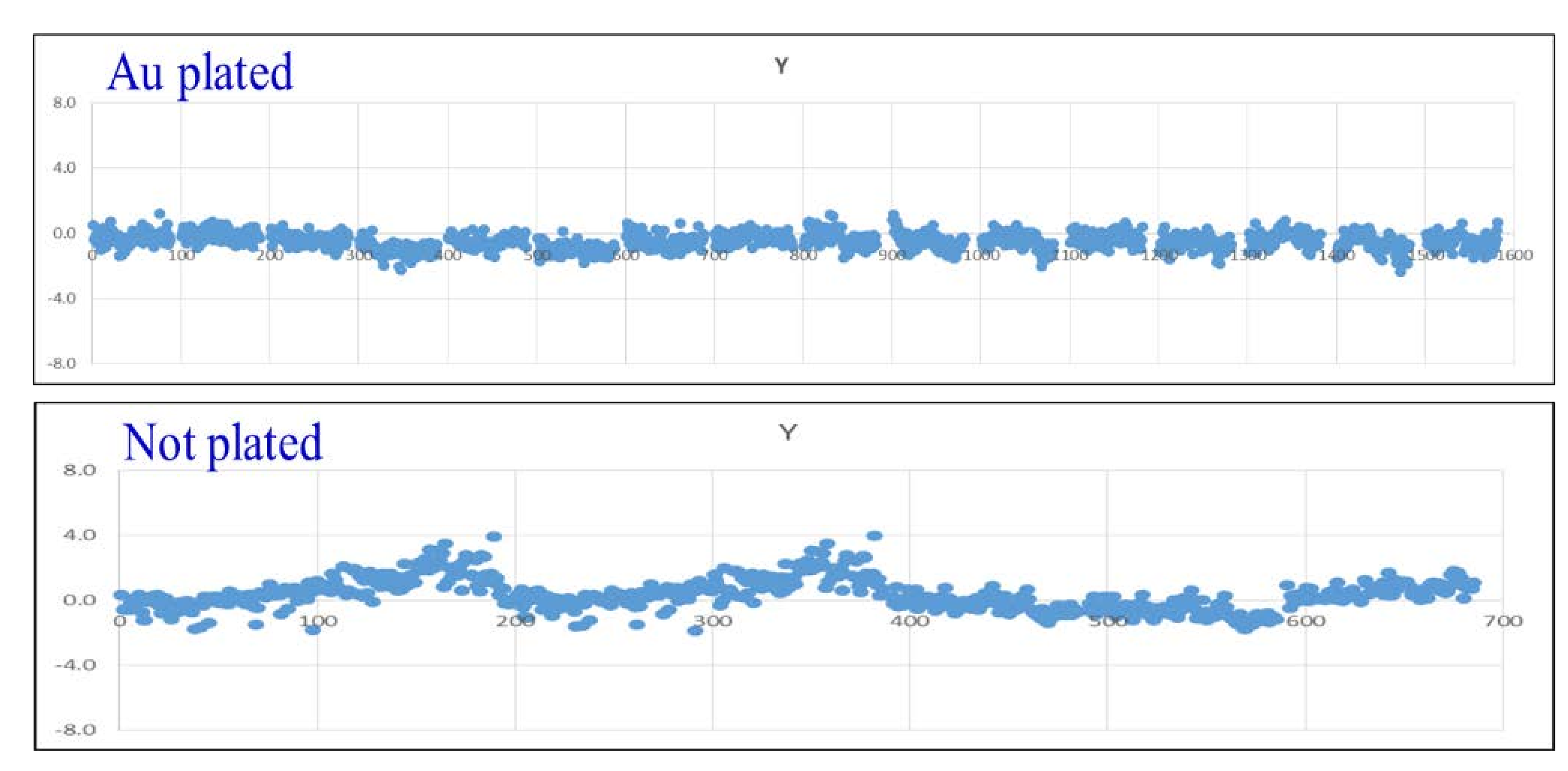
Bonding Accuracy

◆ Bonding Accuracy Data : X - axis accuracy was influenced by solder fillet.



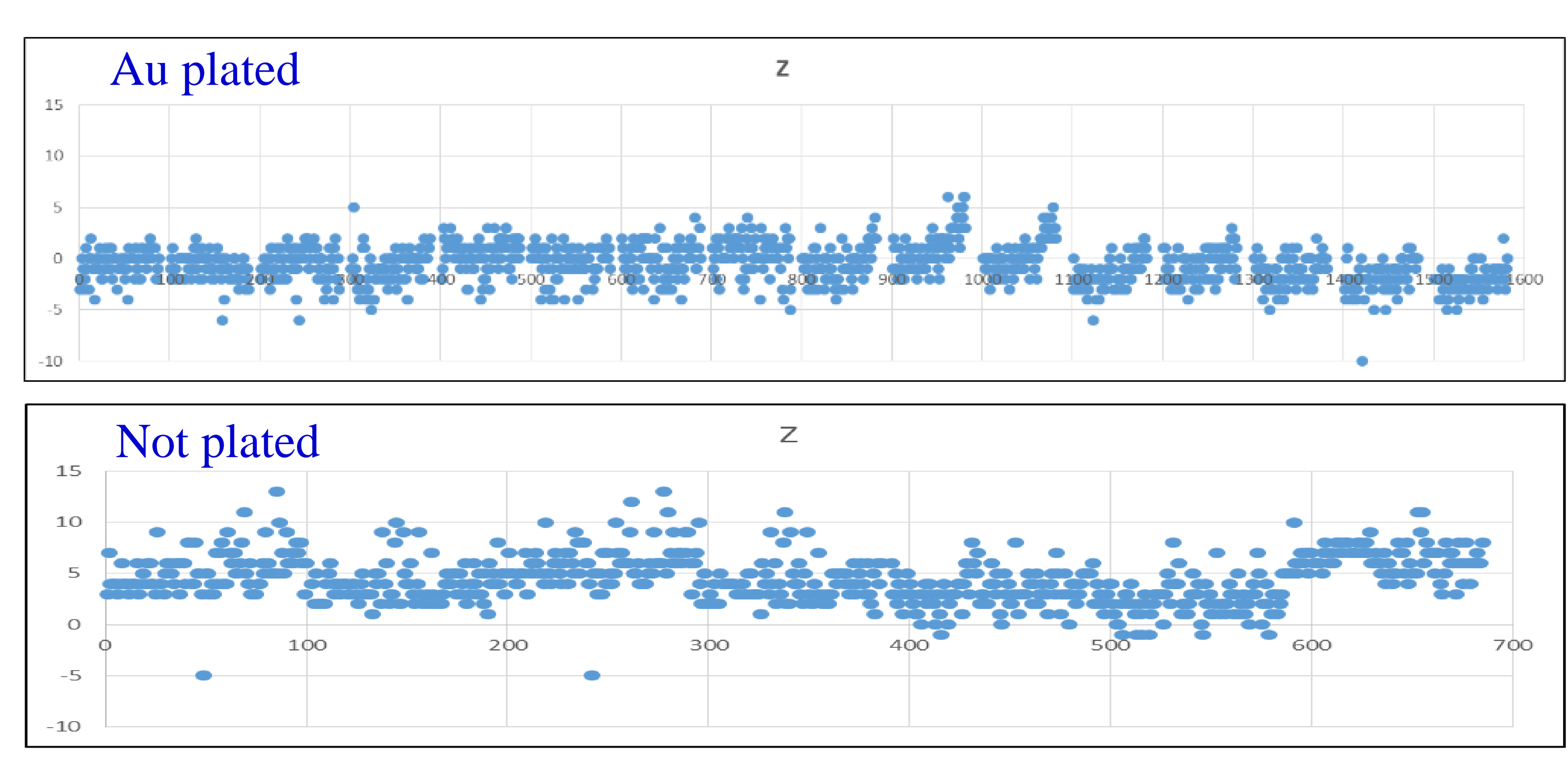
Bonding Accuracy

◆ Bonding Accuracy Data : Y- axis is not little influenced.



Bonding Accuracy

◆ Bonding Accuracy Data : Z – axis accuracy was influenced by solder fillet.



Discussion

◆ The bonding accuracy depends on various factor such as solder fillet, oxidized surface of the probe, solder volume and laser parameters.

◆ In especial the greatest effect on the accuracy is the solder fillet symmetry on both sides of the probe.

◆ Good fillet was shown in Au plated probe which had excellent wettability of the surface.

◆ High bonding force is obtained by a good fillet on both sides of the probe.

Summary

◆ 2D MEMS probe cards manufacturing is realized by using a laser bonding process.

◆ The bonding accuracy obtained in this work can be applied for NANDFLASH and D-RAM probe card.

◆ We are going to investigate the effect by various solder type such as AuSn and SnAgCuIn to increase a bonding force.

Acknowledgement

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Thanks for Your Attention

◆ Contact Our Team with any questions .

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