

Investigation on uncertainties of measurements using Computed Tomography

Performance : Dao Duy Anh

Supervisor: Prof. Drégelyi-Kiss Ágota

Content

1. Introduction
2. Summary of previous results
3. Result of actual semester
4. Plan for future

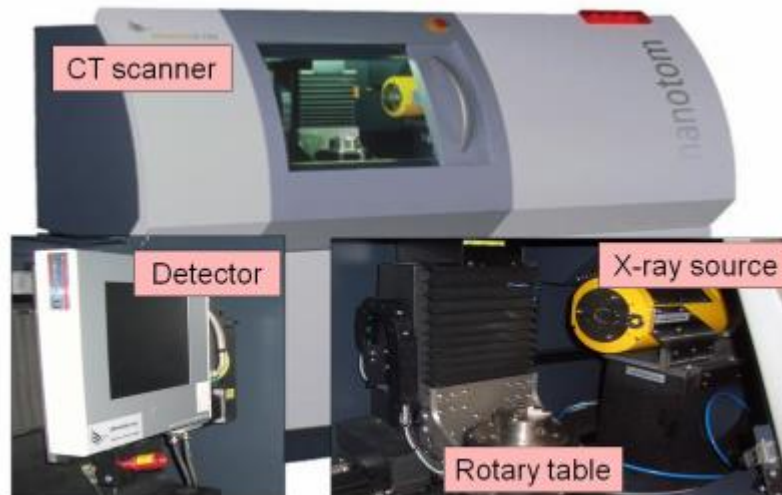
Introduction

What is Computed tomography.

Computed tomography (CT) is an imaging procedure that uses special x-ray equipment to create detailed pictures, or scans, of areas inside the body or object.

Principle of CT

A CT system consists of an X-ray source, a rotary table, an X-ray detector and a data processing unit for computation, visualization and data analysis of measurement results



Influence factors

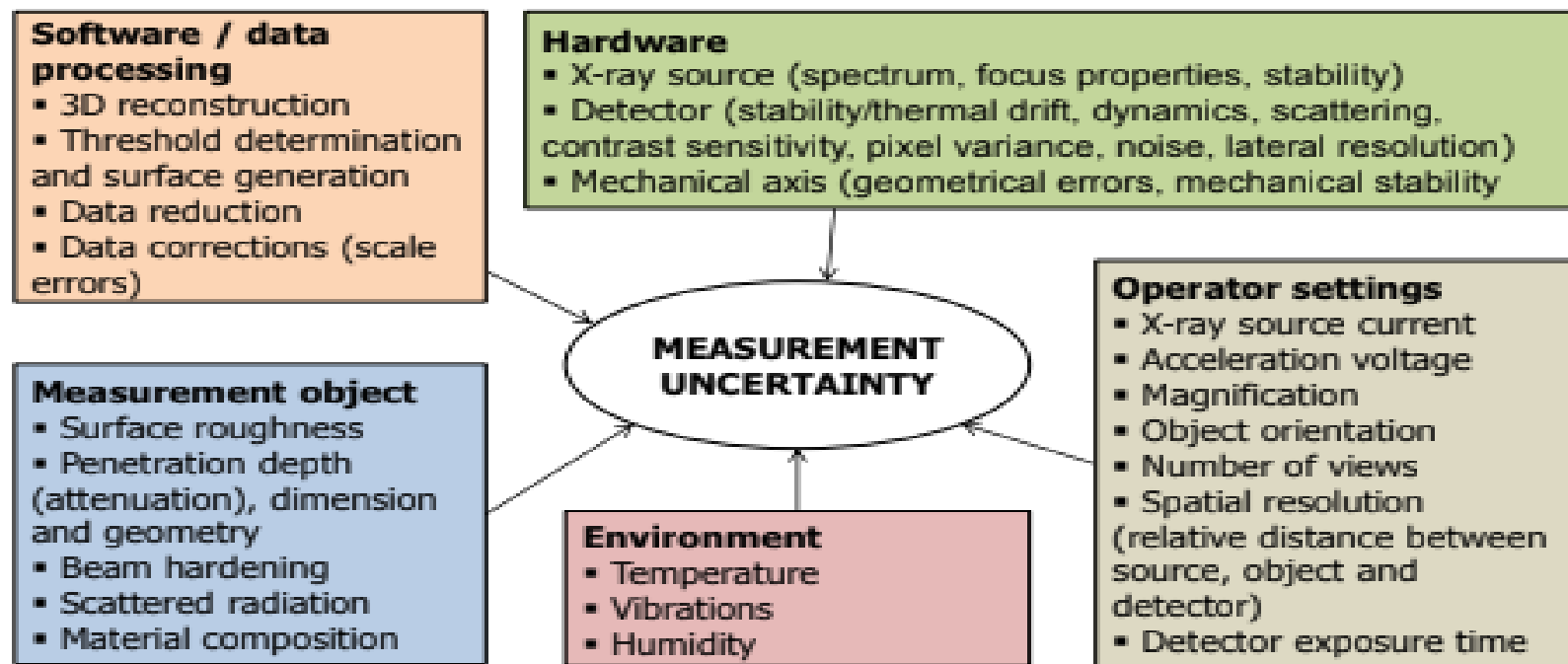
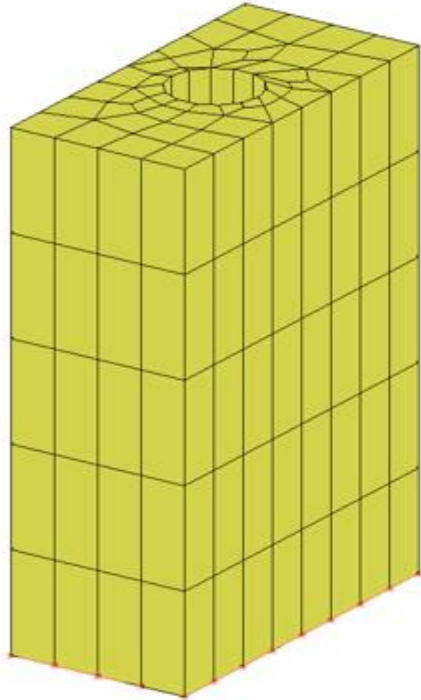


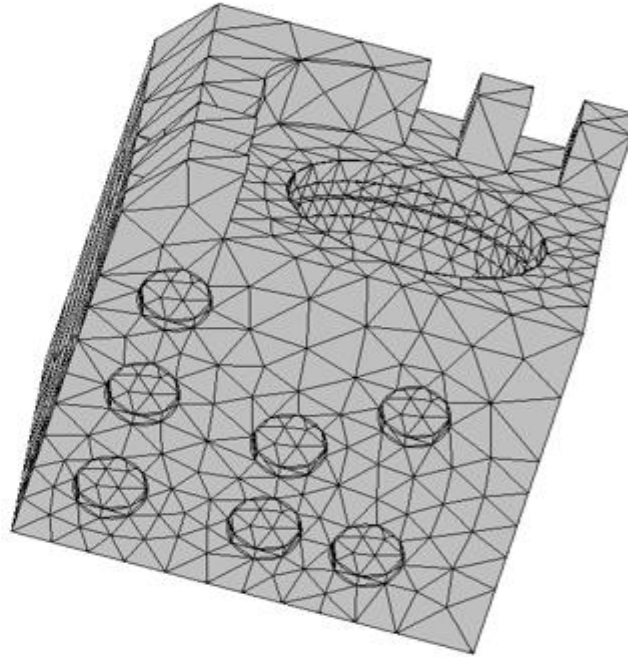
Figure 4.1: *Influence factors in CT.*

Previous results

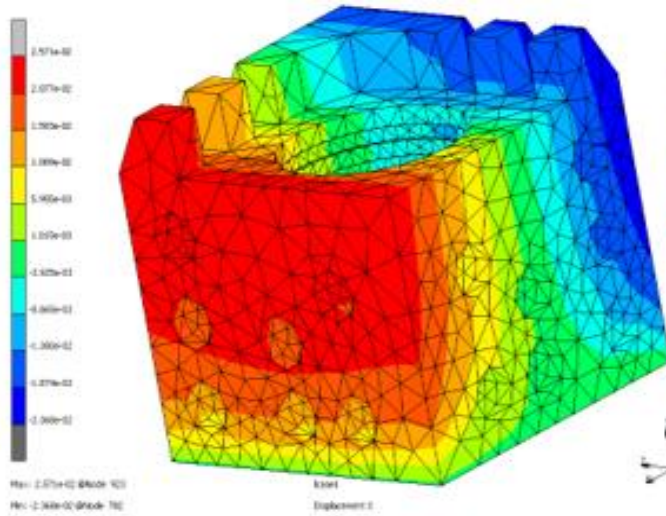
- ▶ Improving the paper about simulation the effect of temperature on measurement by CTs using Marc Mentat software and finite element methods



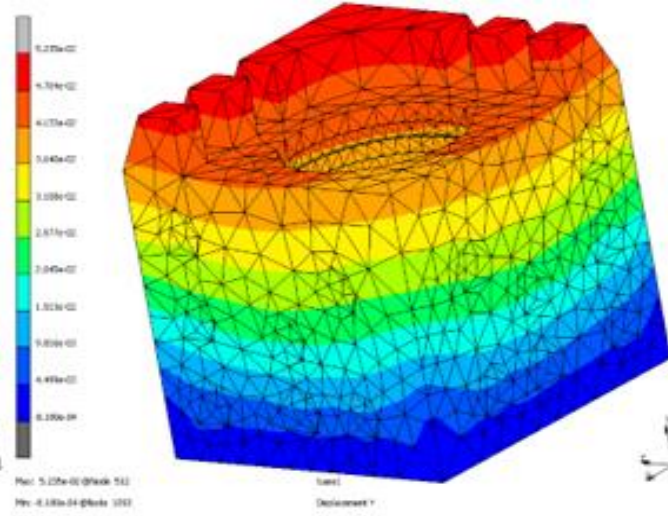
a



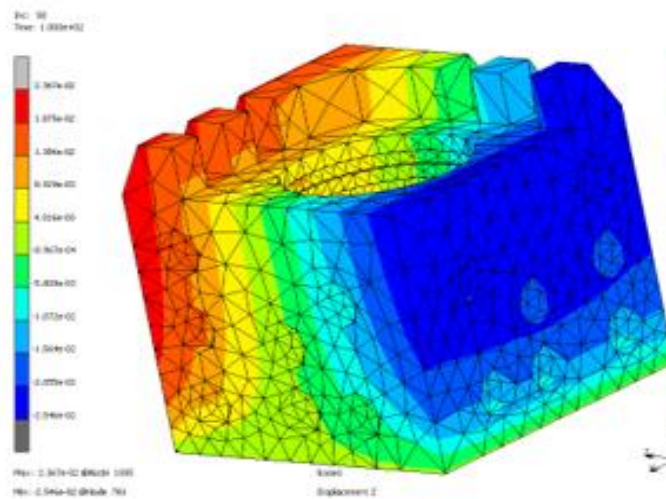
b



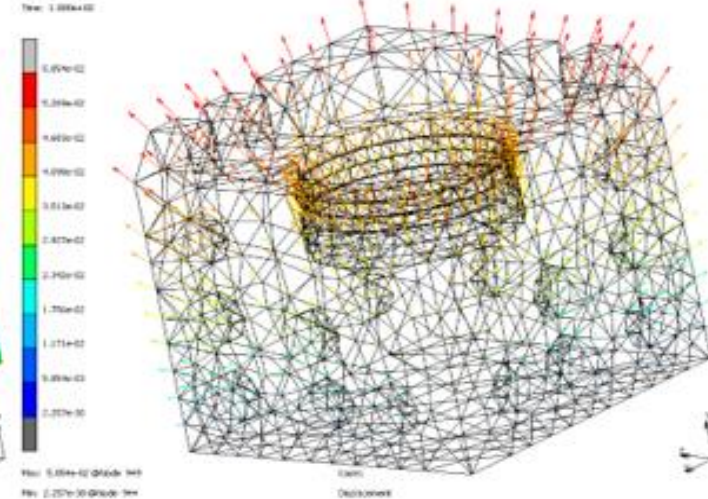
a



b



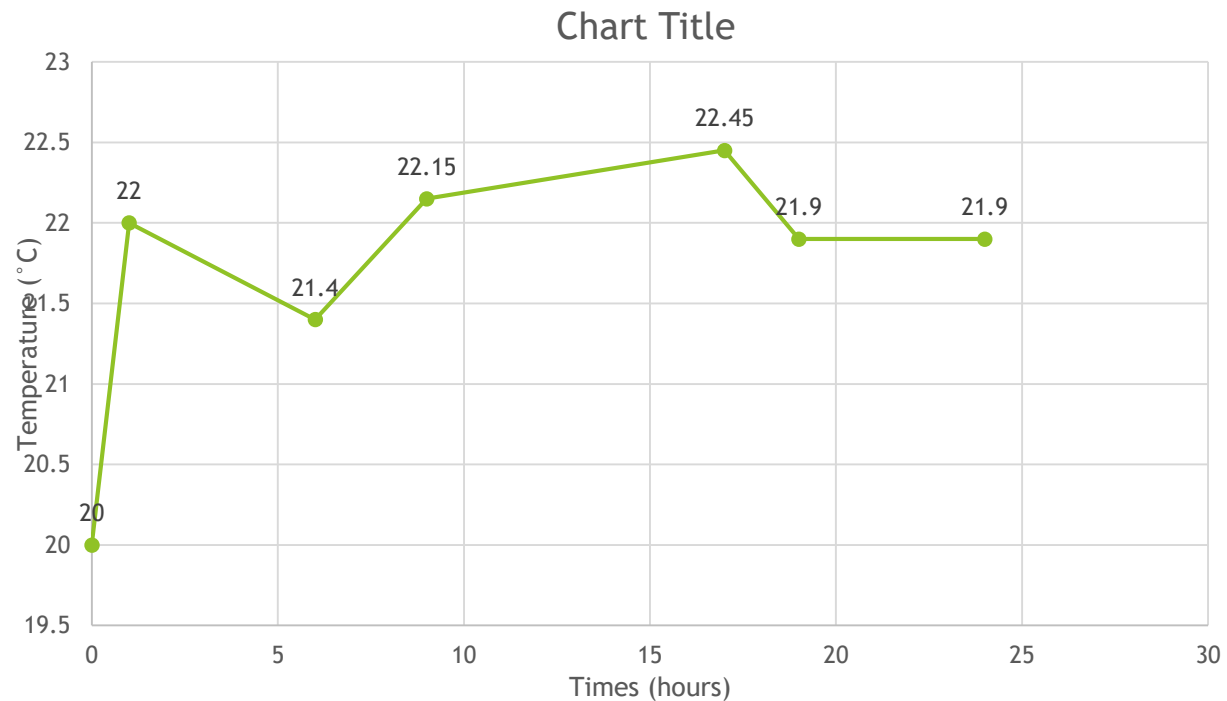
c



d

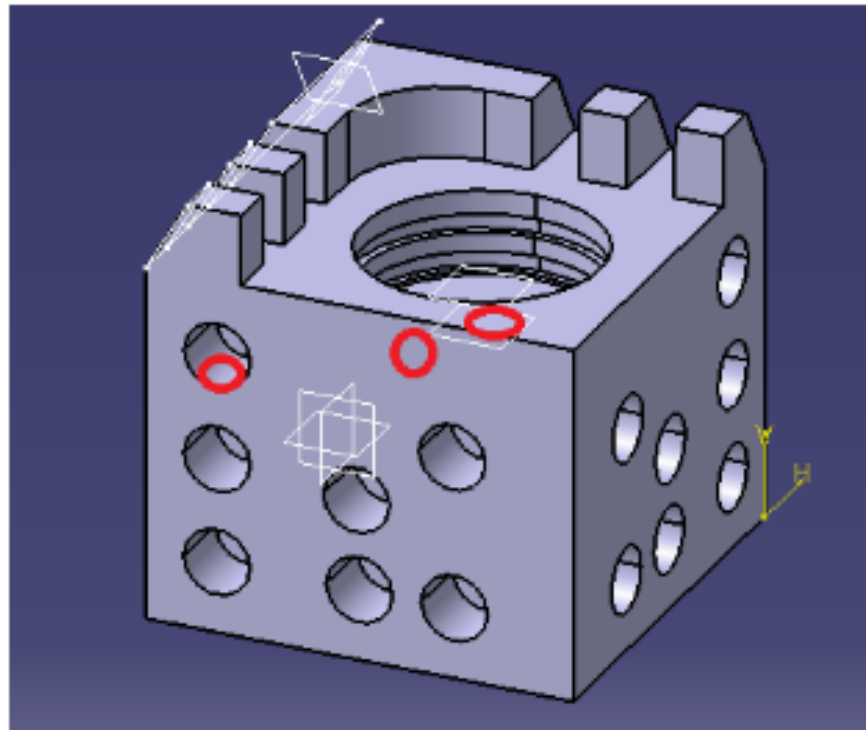
1. Improvement in simulation

- ▶ Change the graph of temperature change which is more similar to the real process of CT measurement
- ▶ The article about the simulation is in improving phase

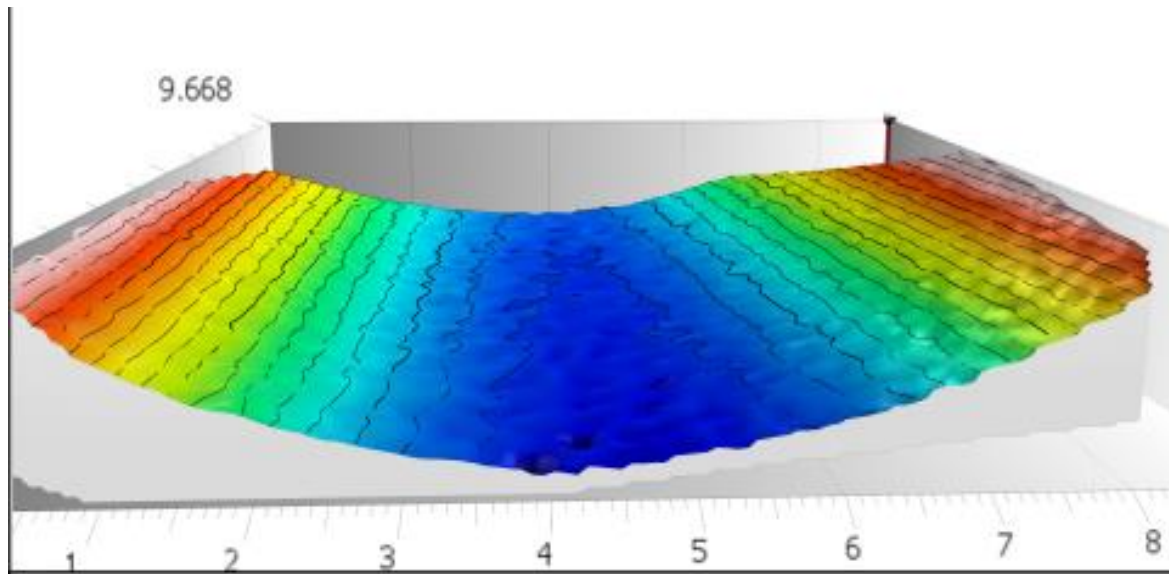


2. Surface measurement using CT

- ▶ Creating planning for surface measurement in CT
- Collecting topography of targeting positions in specimen using surface measurement instruments, which will be used as master

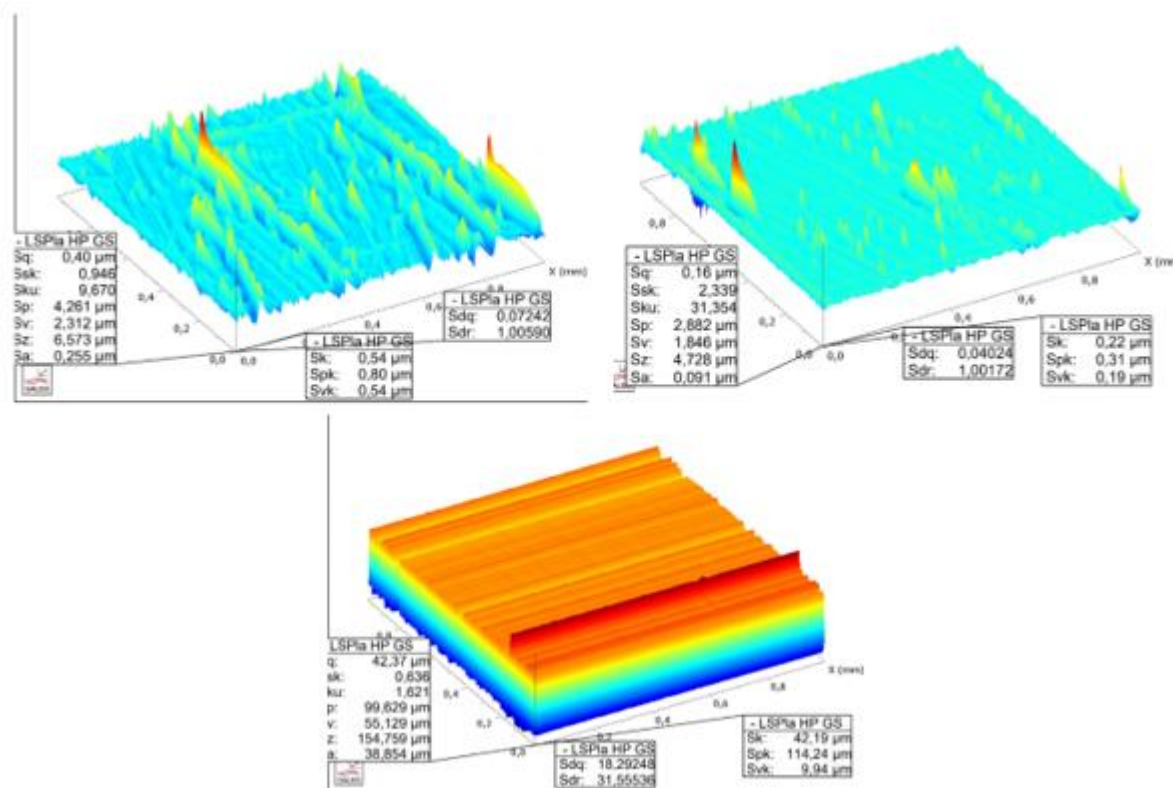


- Collecting STL file (point clouds) of surfaces in CT files (freeform surface)
- Aligning STL files with master files to assure investigating same area of surface
- Using third software to create topography based on STL files from CTs (Mountain Map, SurfSurface,...)



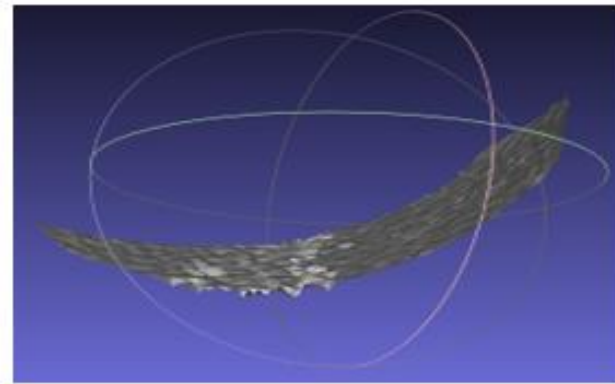
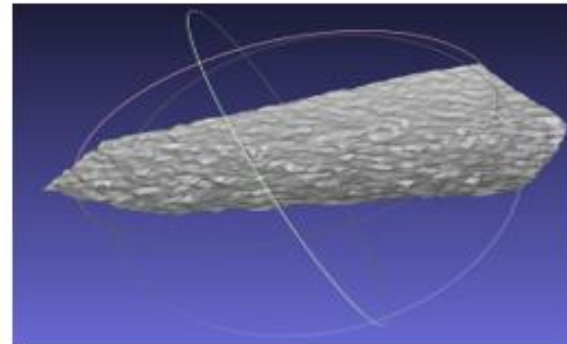
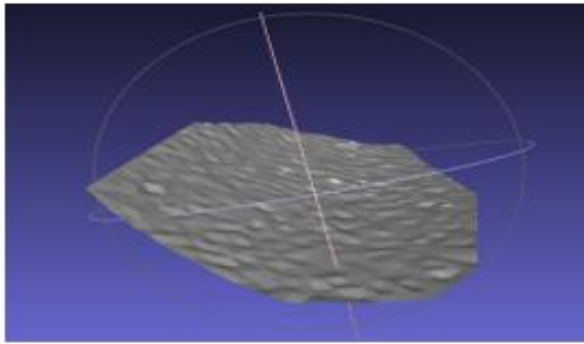
Result of actual semester

- ▶ Complete the paper based on the result from simulation
- ▶ Collecting topography of targeting positions in specimen using surface measurement instruments, which will be used as master



Result of actual semester

- ▶ Collecting STL file (point clouds) of surfaces in CT files (freeform surface)



Result of actual semester

► Challenges:

- The freeform surfaces were not able to assign to specific area (1mm x 1mm), which is difficult to make comparison
- When using the stl file to create height map, the images of height map become unstable and undefined.

Next plan

- Completing and publishing the paper of simulation.
- Crop the stl files (point cloud) to the same size as using measurement instruments (1mm x 1mm)
- Using Mountain map to create the heightmap for the stl files from that, surface's parameters will be determined
- Make comparison.
- Conclusion

Thank you for listening