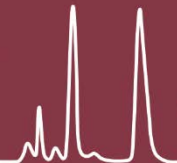


# Stellenbosch CT Scanner Facility



CT Scanner

**CAF**



Central  
Analytical  
Facilities

STELLENBOSCH UNIVERSITY

**CAUTION**

**X-RAY  
RADIATION**



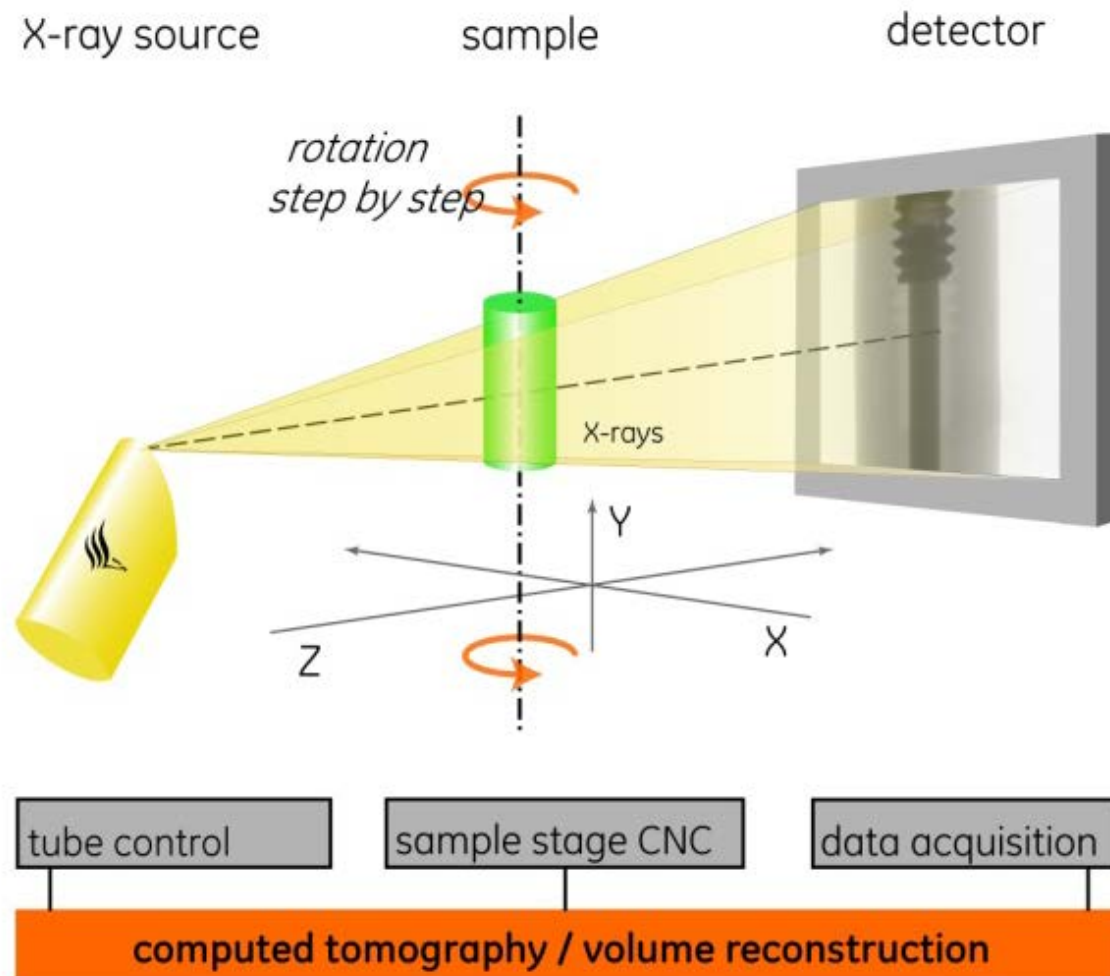
# What is CT scanning?

- Industrial X-ray Computed Tomography (CT) scanner
- Also known as microCT, X-ray tomography, microtomography, industrial CT, X-ray microscopy
- What is it? High resolution 3D imaging of materials using X-rays
- Similar to medical CT / CAT scan but
  - Much better resolution possible
  - Much more penetrating X-rays possible



# What is CT scanning?

- X-ray micro-focus Computed Tomography (CT)
- A 3D imaging technique for industrial and scientific applications
- 2D or 3D “microscopic” material inspections down to 500 nm



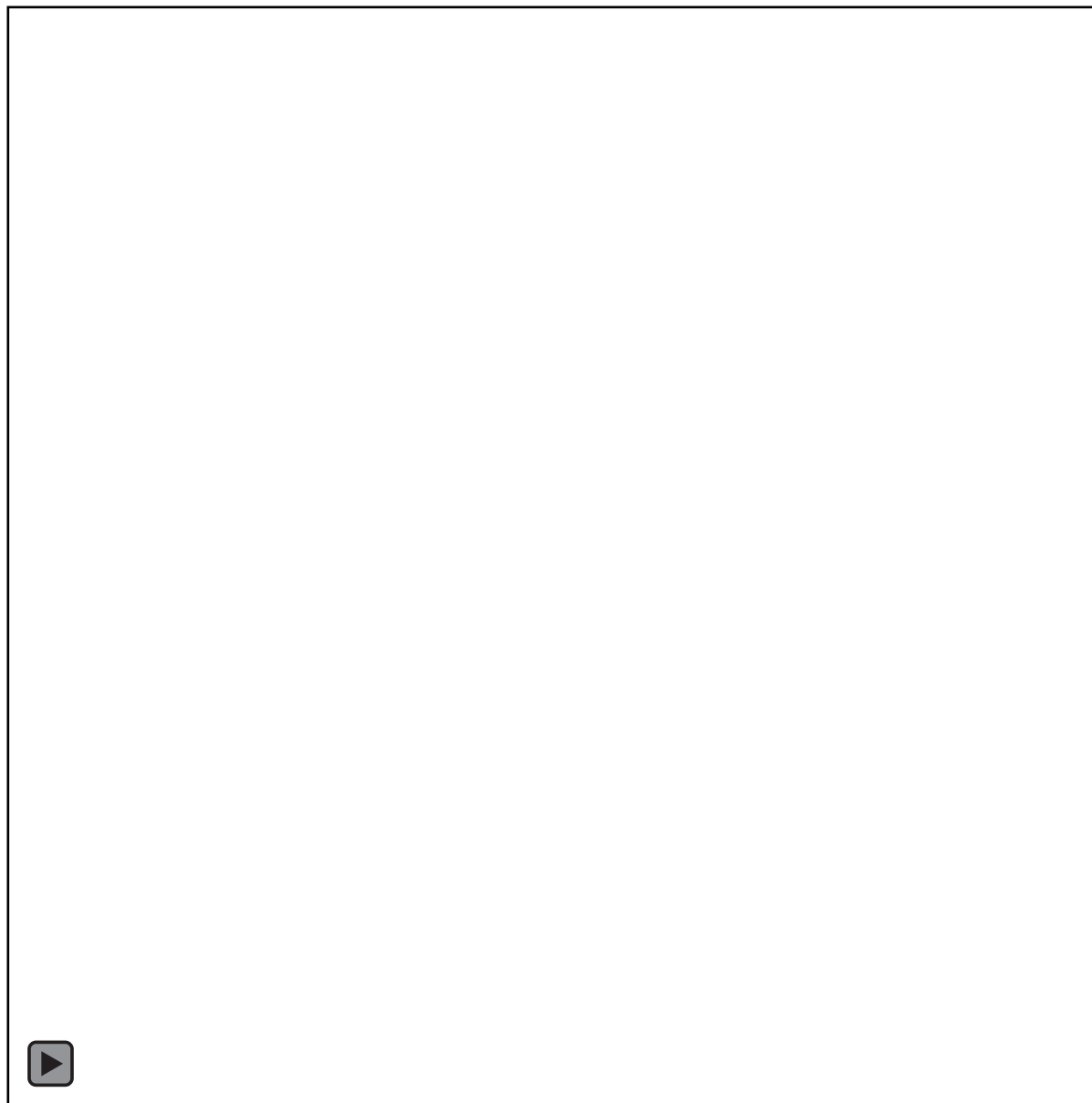
# Industrial CT scanning

- Is a mature imaging method for academic applications, especially useful for:
  - Nondestructive analysis, time lapse imaging of samples
  - No sample preparation
  - Internal features visualized
  - Internal features quantified in 3D, eg. Shapes, connectivity information, etc.
  - Real view of samples as compared to 2D slices / surface views
- Widely used and mature technology in manufacturing industry, for:
  - Part to CAD / Part to Part comparisons (internal and external surfaces)
  - Accurate dimensioning, eg. Wall thickness of parts
  - Non-destructive defect detection
  - Non-destructive porosity analysis
  - Reverse engineering

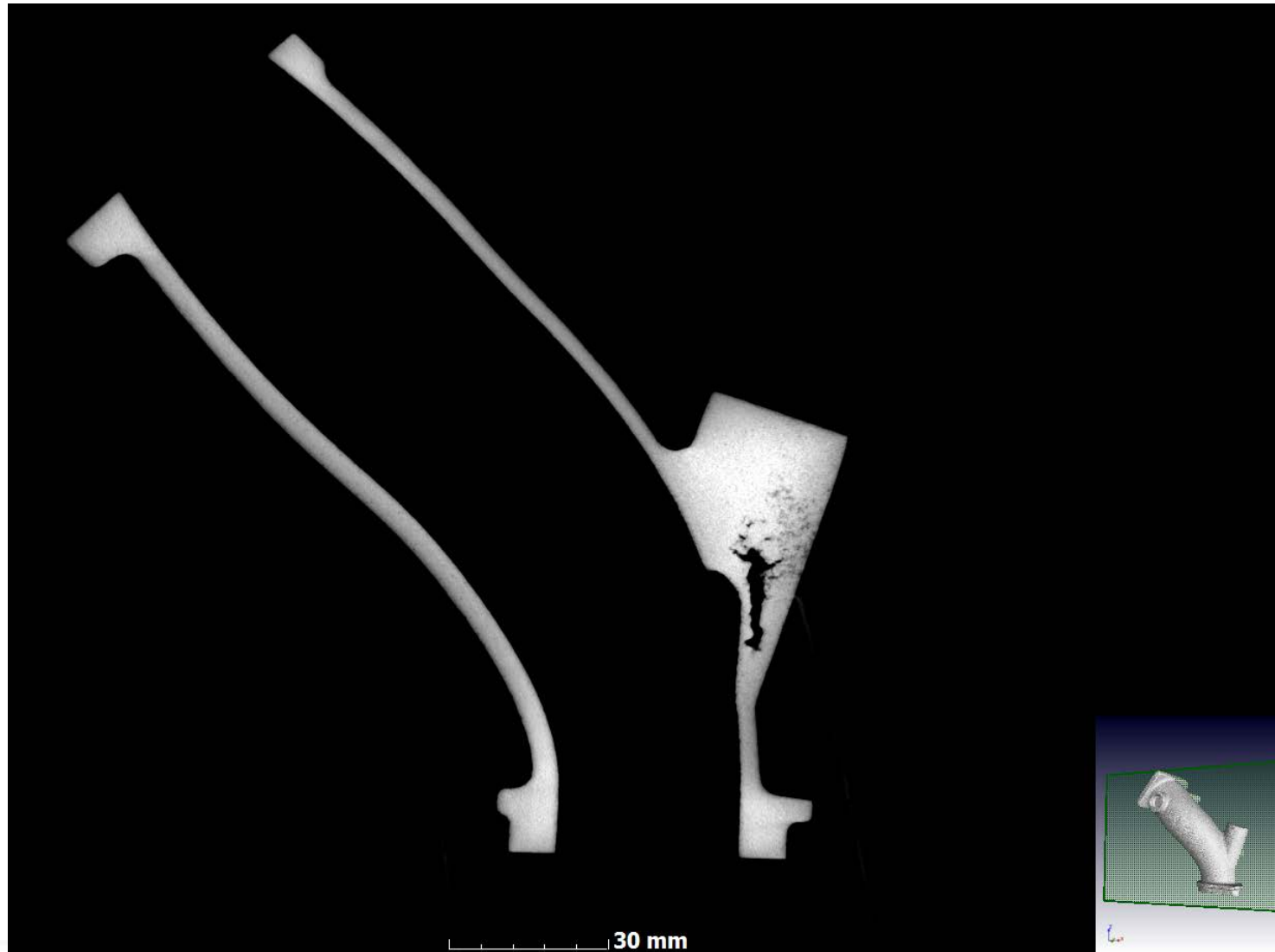
# Cast Part - Example 1



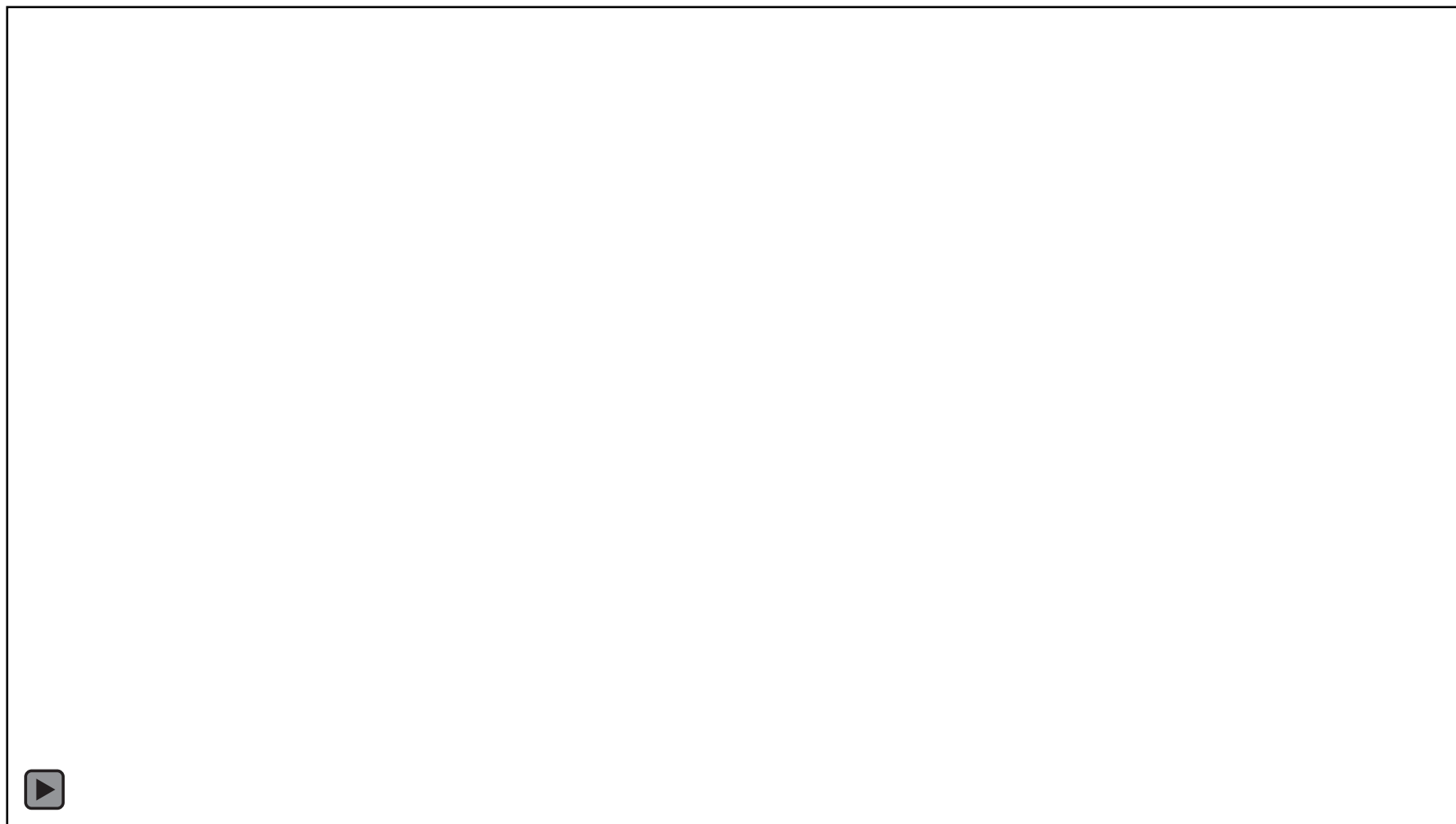
# Example 1 – 2D X-ray Rotation



# Example 1 – 2D microCT slice

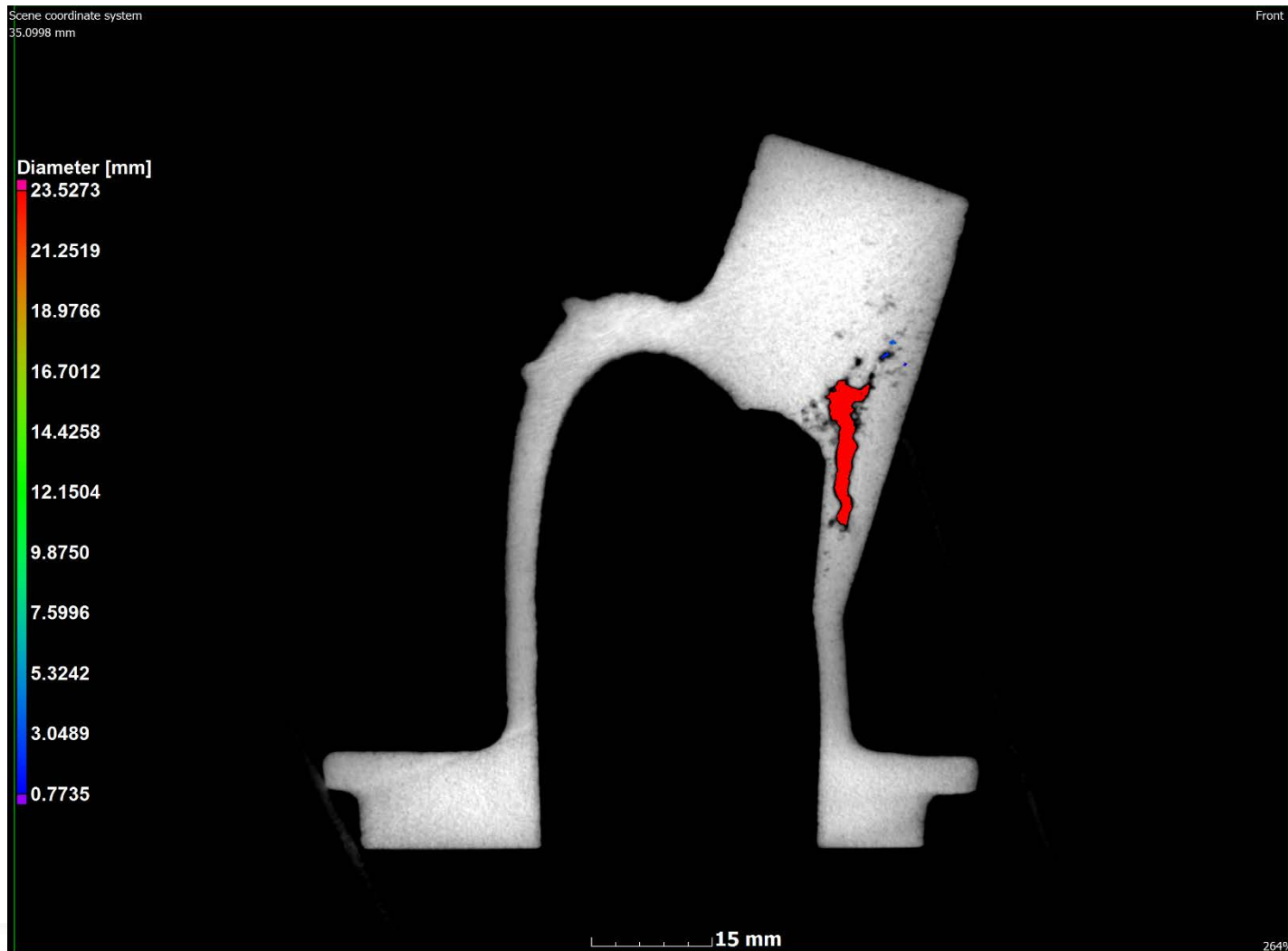


# Example 1 – 2D microCT Video

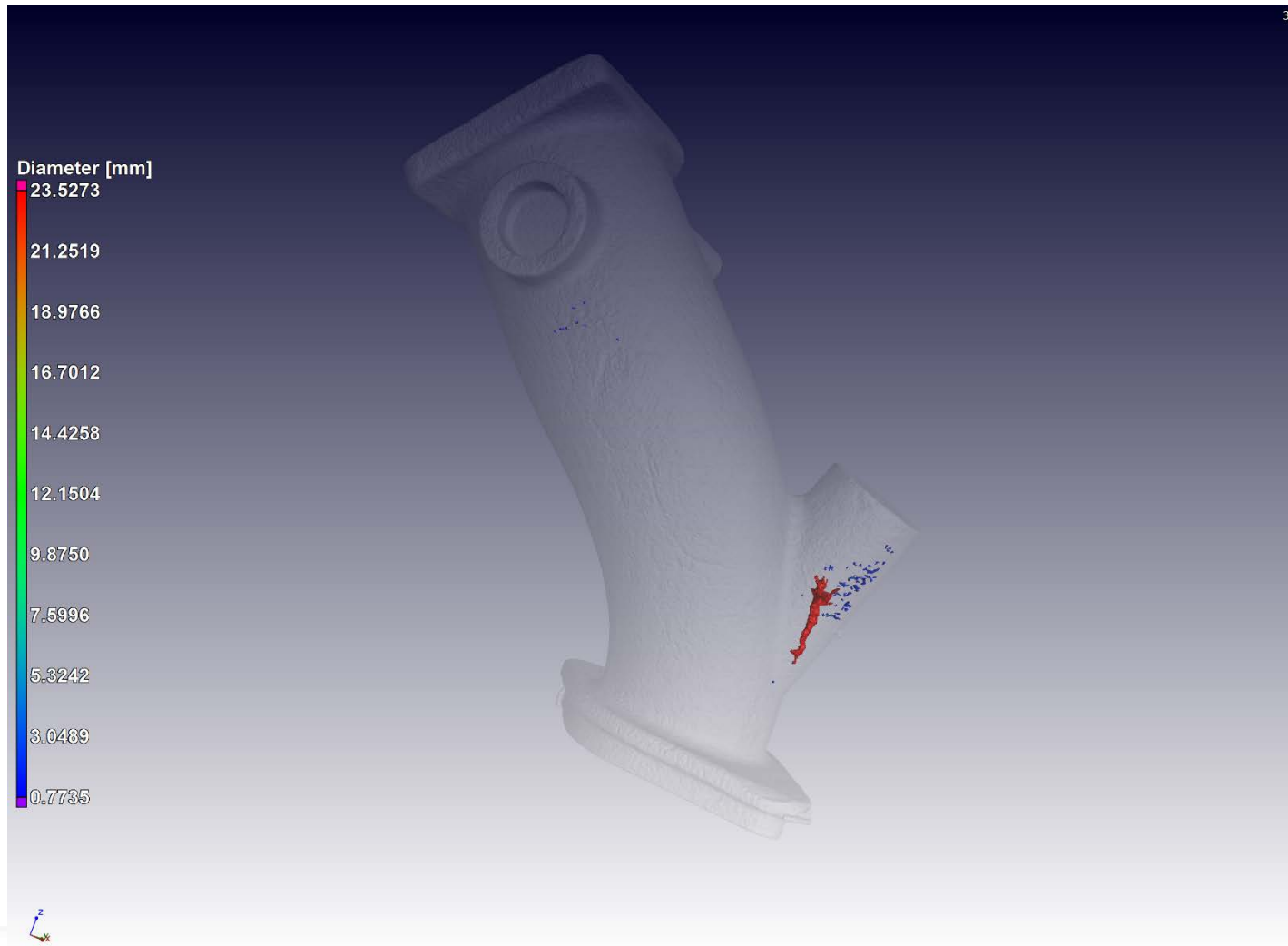




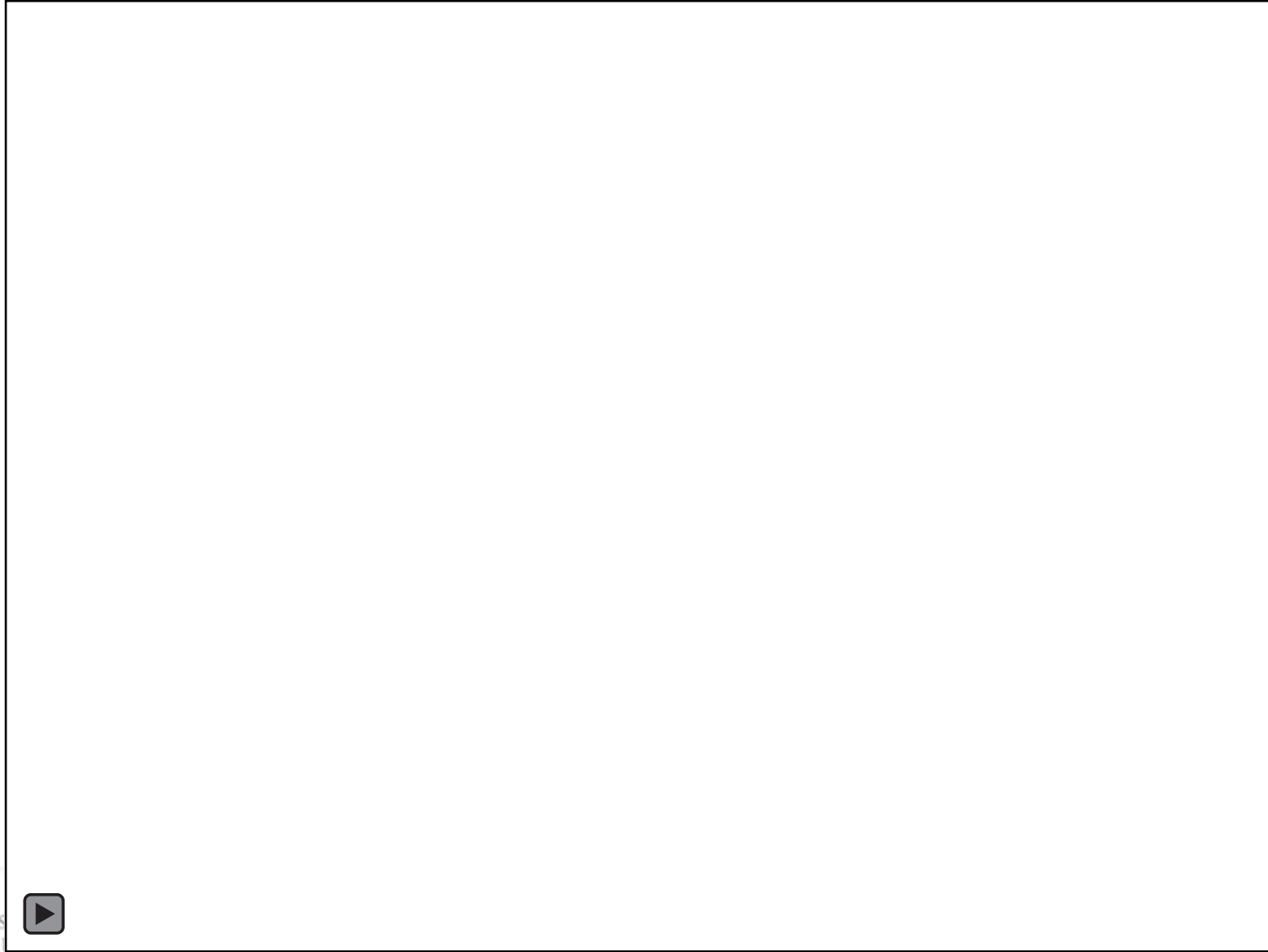
# Example 1 - 3D microCT Defect analysis



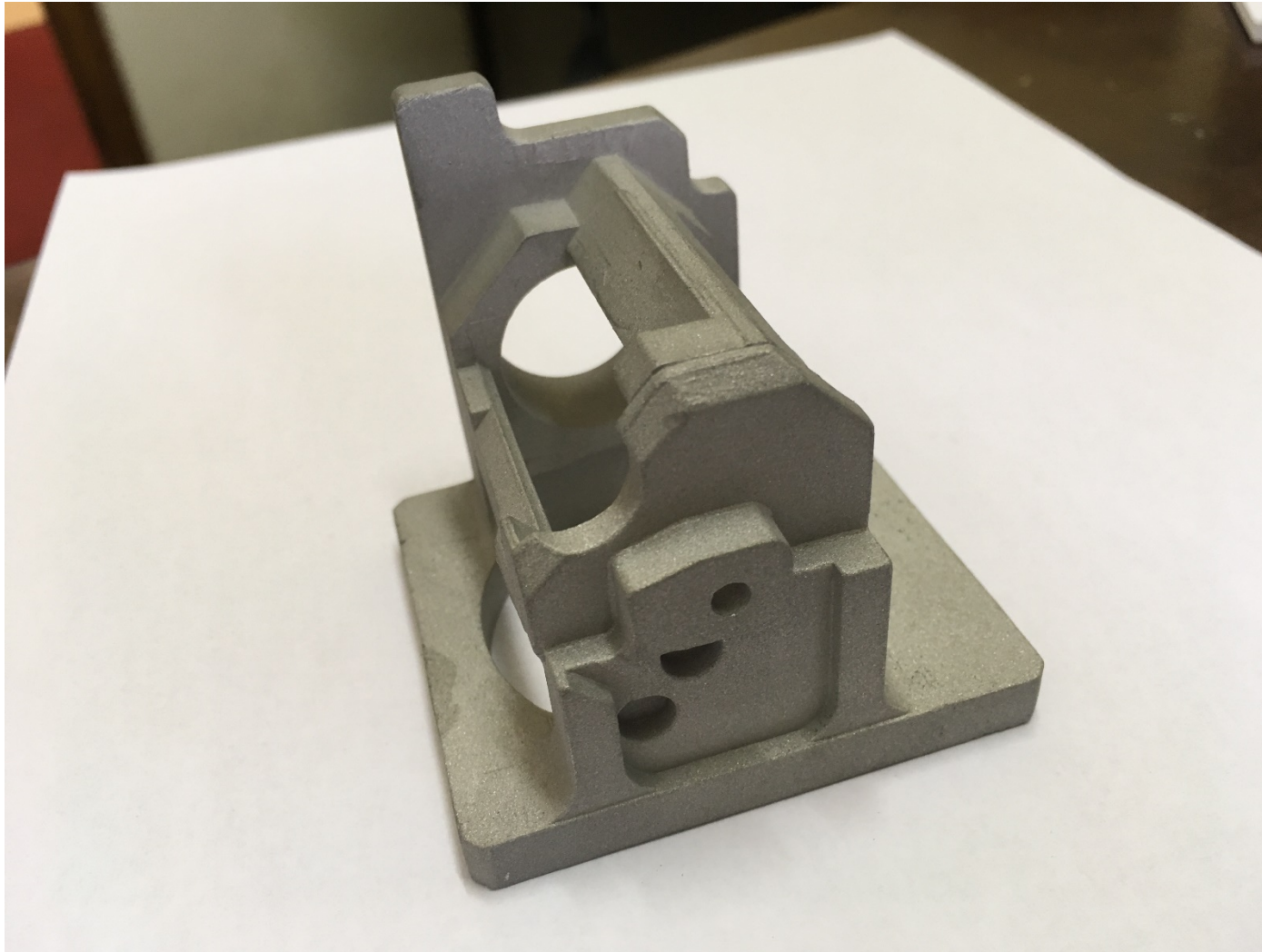
# Example 1 - 3D microCT Defect analysis



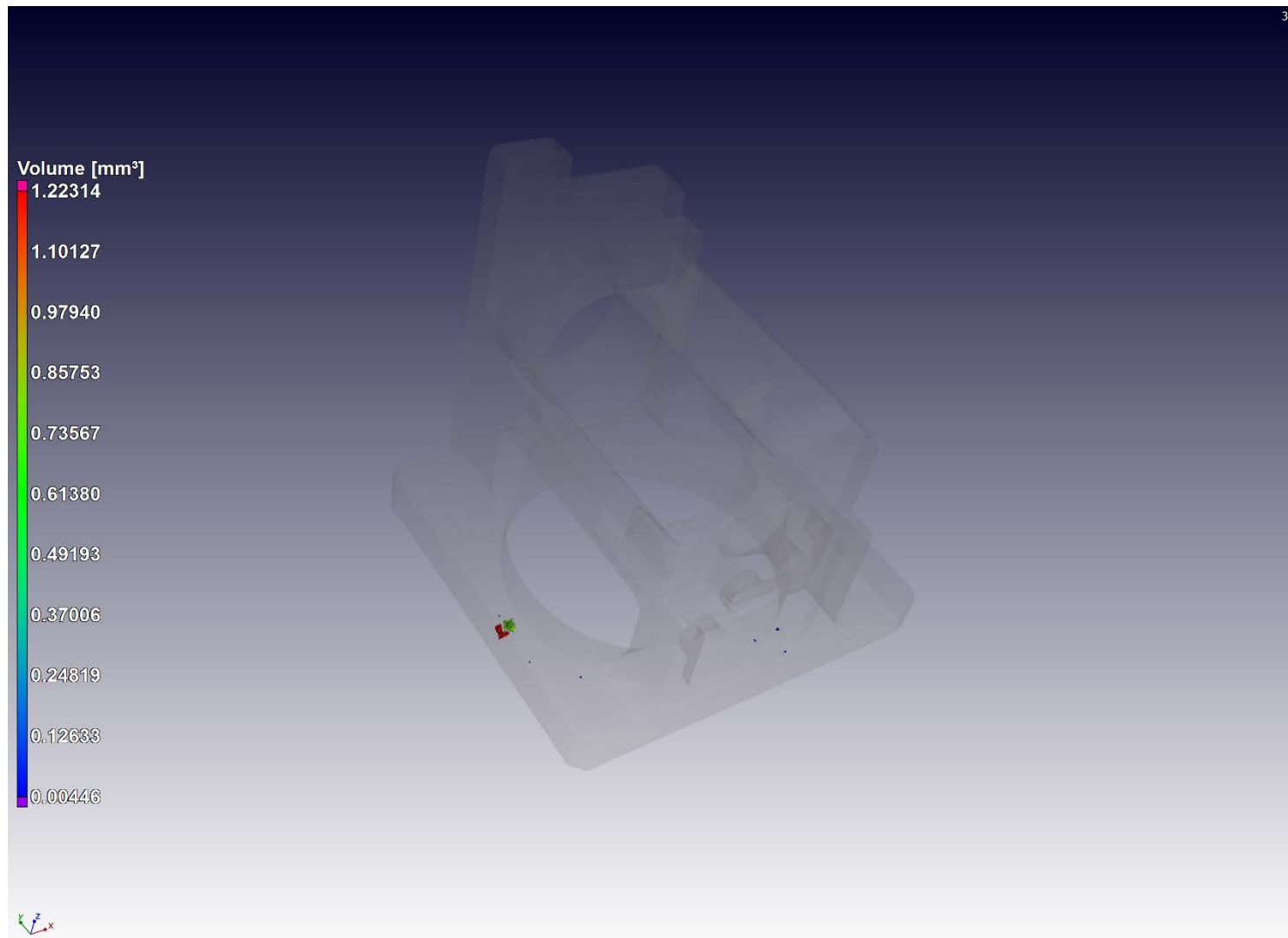
# Example 1 - 3D microCT Defect analysis



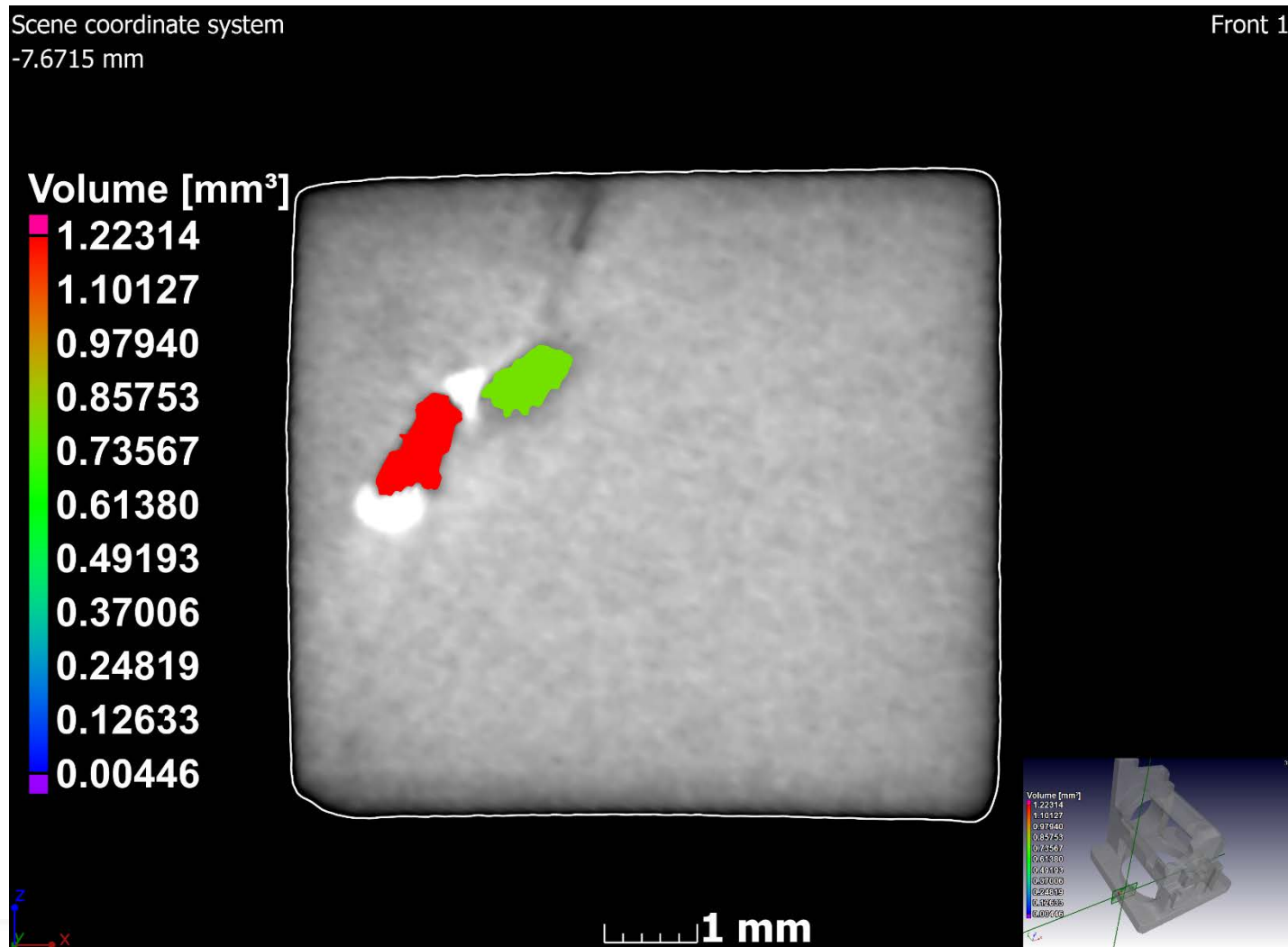
# Example 2 – Aluminium Cast



# Example 2 – Defect Analysis

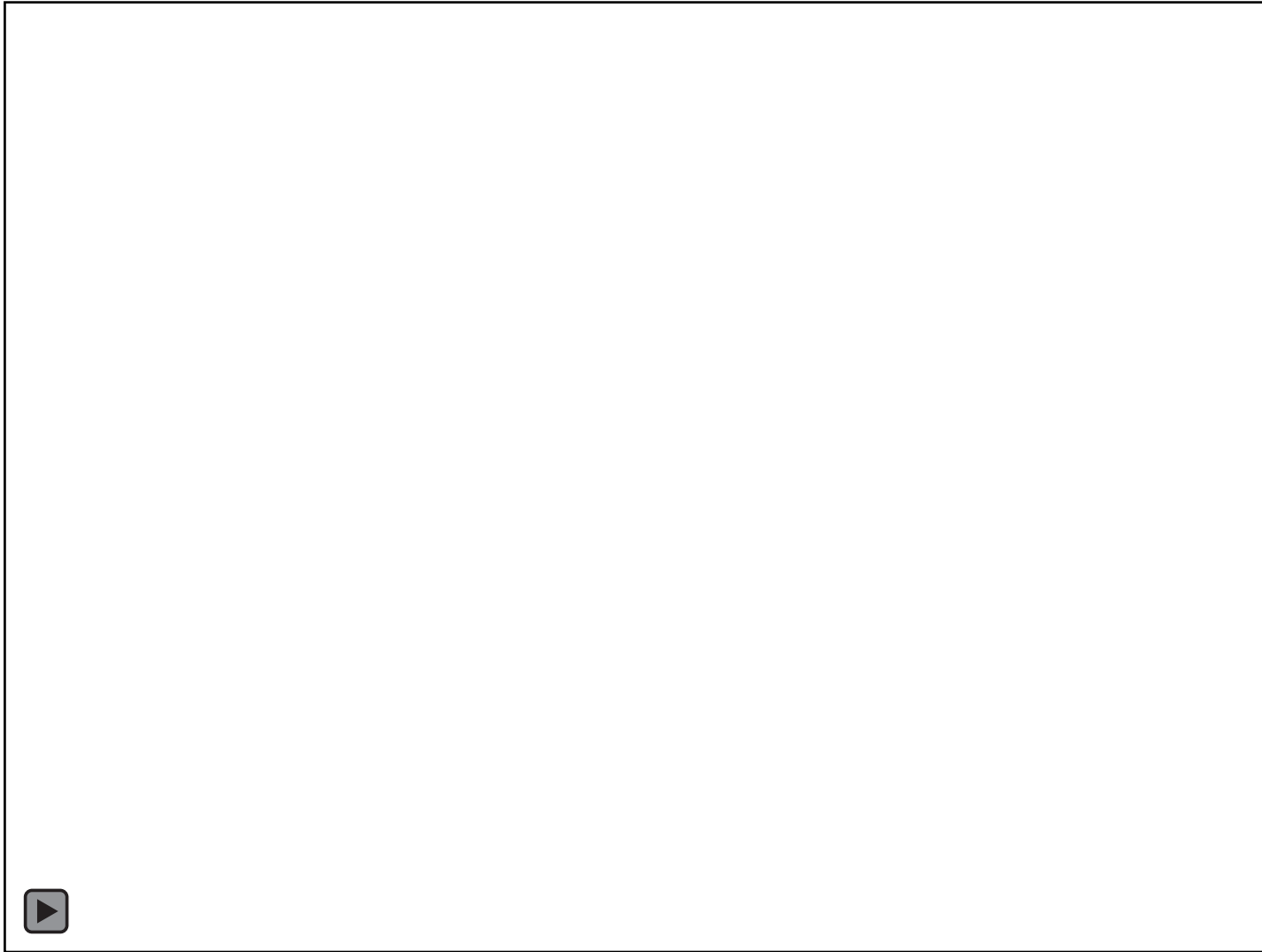


# Example 2 – Defect Analysis

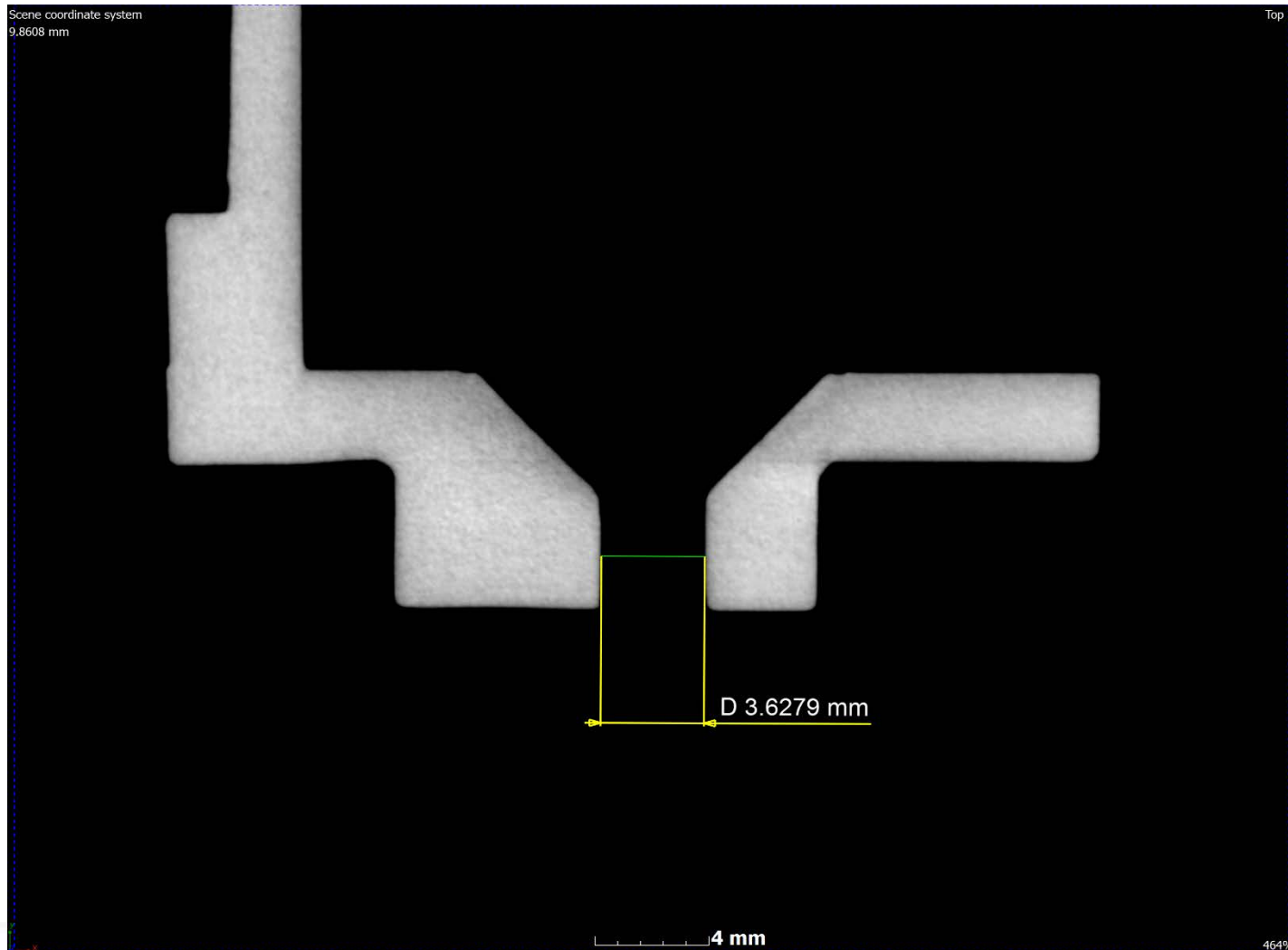




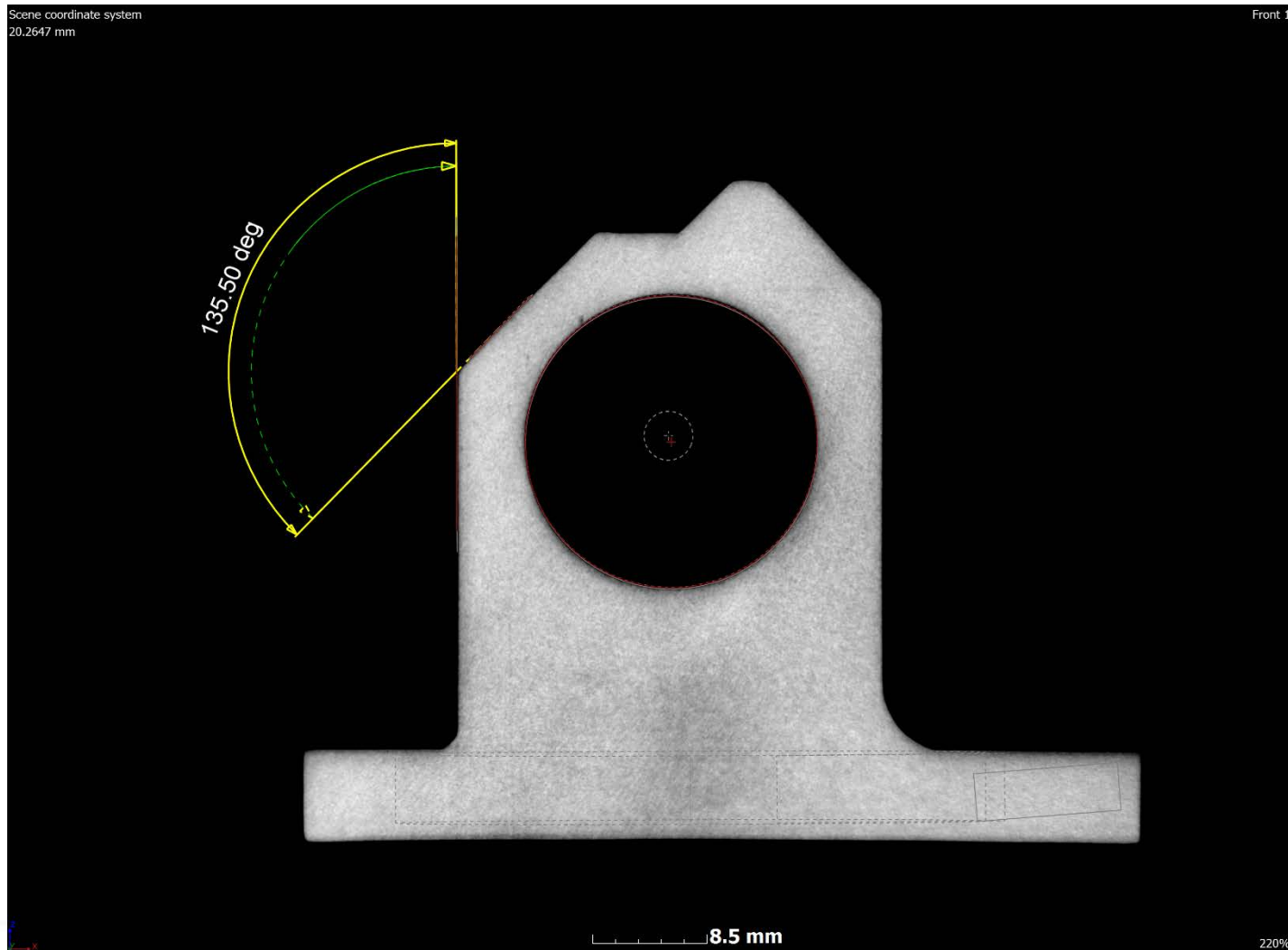
# Example 2 – 3D Metrology



# Example 2 – 3D Metrology



# Example 2 – 3D Metrology



# Faq

- Frequently asked questions?
  - Sample size determines resolution
  - Smaller sample, better resolution
  - Better resolution, better material discrimination
  - Can detect differences in the range of 0.1 g/cm<sup>3</sup>
  - Density calibrations are possible but must be done custom each time
  - Maximum size: 30 cm diameter x 30 cm high samples fit in one scan, multiple scans up to samples 70 cm high x 60 cm wide possible
  - Sample size limited by penetration of X-rays, typically solid steel only 15-20 mm, solid rock 30-45 mm, wood 450 mm
  - Cut the sample if possible for best resolution and quality

# Summary

- What do we offer?
  - X-ray CT Service, with results in the form of:
    - Full volume data with free volume viewing and analysis program (~ 10 Gb)
    - Image slice stack (~ 500 Mb)
    - Selected image slices (~ 1 Mb)
    - Surface files for reverse engineering (~ 50 Mb)
    - Analysis report (word document) - advanced analysis and custom analysis for specific samples can be developed with the client, eg. Dimension tolerance / deviation from CAD model within % / porosity
    - Normal 2D x-rays (cheap, fast non-destructive testing at high resolution)
- Pricing per hour R1250