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Welcome! “Innovation in NDT” Webinar Series

November 19, 2021

Host: Flynn Spears

Alban NDE

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ASNT...CREATING A SAFER WORLD!®



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GROW YOUR KNOWLEDGE. GROW YOUR CAREER.

Harnessing the Power of Virtual Reality to Get the Most Out of Your CT Data

November 19, 2021

Speaker: Gregory Bell

kineticvisionSM

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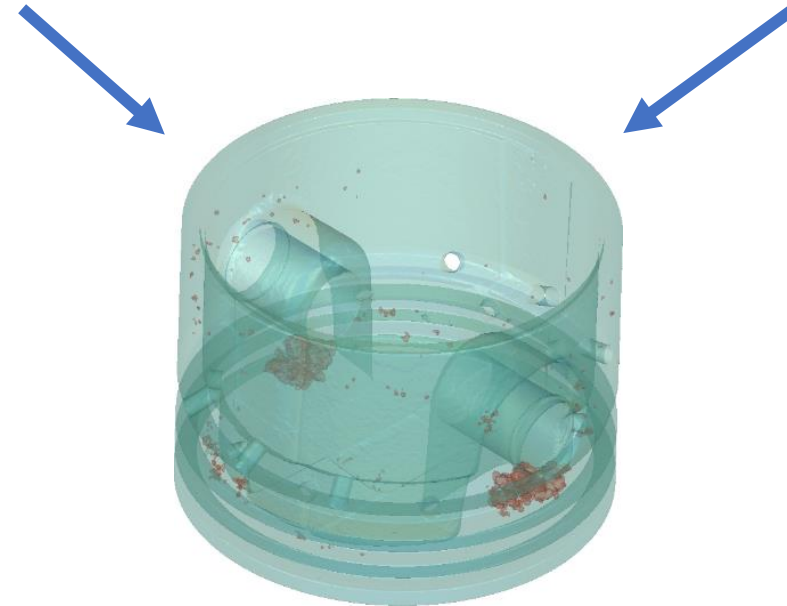


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Agenda

- Introduction
- Technology Overview
- Simple Examples
- Dynamic CT Scanning
- Unlocking Virtual Reality for CT
- Q&A



Introduction

- Gregory Bell
- Team Lead of Data Acquisition for Metrology + Inspection Group
- Focus on technical ownership, process development, and team training
- Been with Kinetic Vision since 2013
- Expertise with CT, Laser and Vision NDT

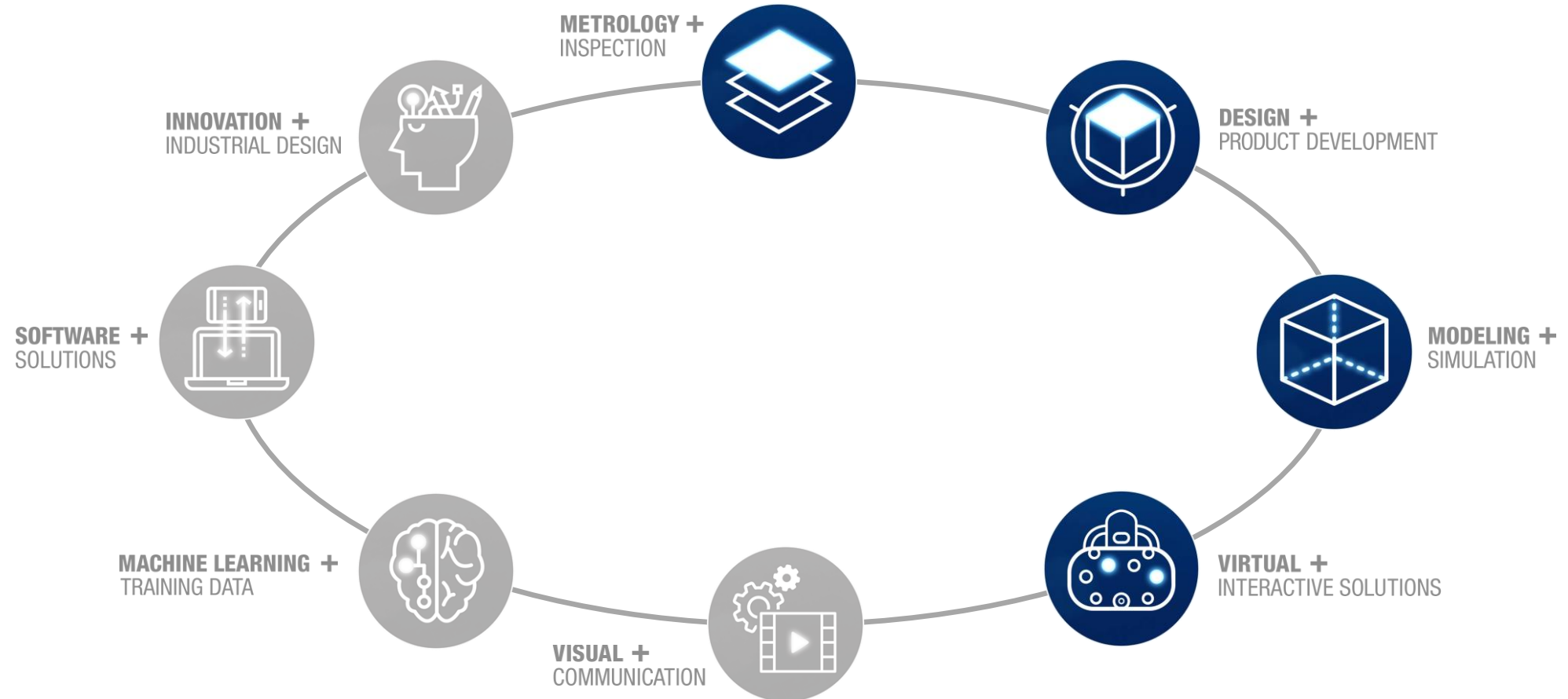


Introduction

- 175+ employees, comprising of engineering, design, and technical creative talent
- Multi-Disciplined skillset leveraged to deliver leading-edge, high-tech innovations



Introduction



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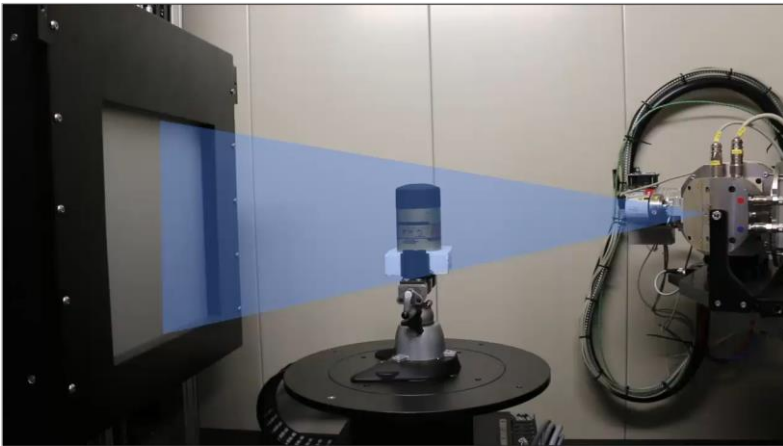
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Technology Overview

- Audience Poll:
 - How many of you are familiar with Industrial CT?
 - How about Virtual Reality?

Technology Overview – CT

- X-rays are attenuated by an object as it rotates
- A flat panel detector records resultant intensities as an image (radiograph)
- Hundreds or Thousands of images compiled into 3D volume



Scanning and Calibration

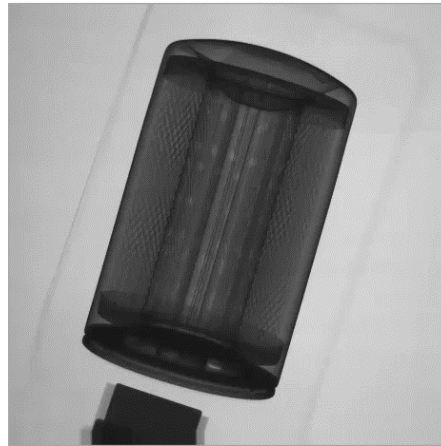
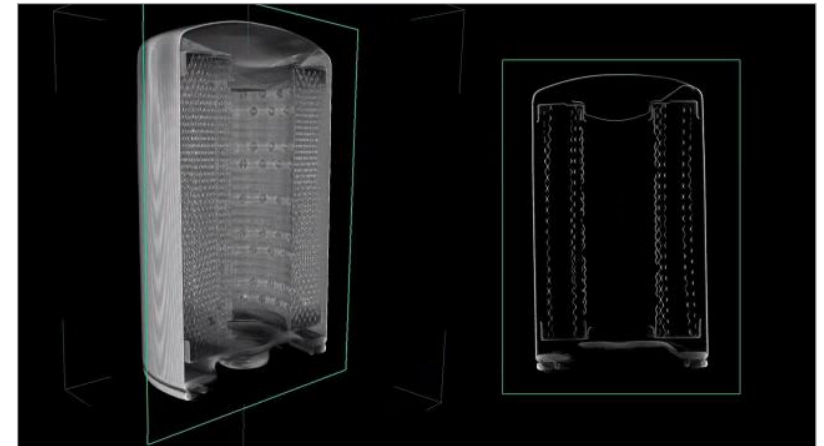


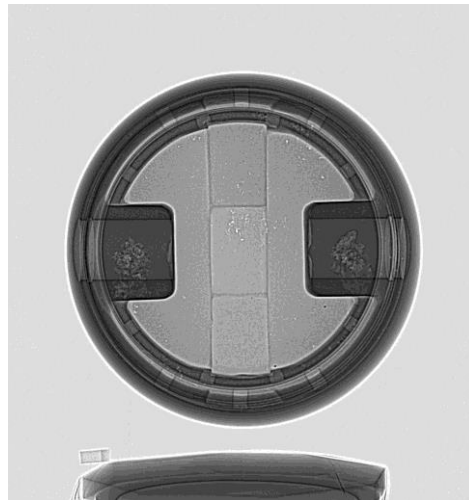
Image Acquisition



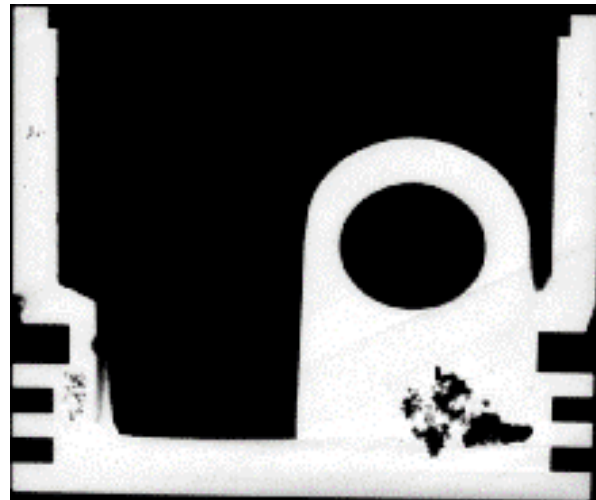
Reconstruction

Technology Overview – CT

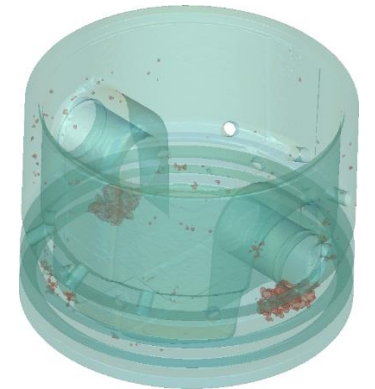
- A classic CT use case



2D X-ray Image



2D Cross-Section through
3D Data



Computational
porosity
quantification

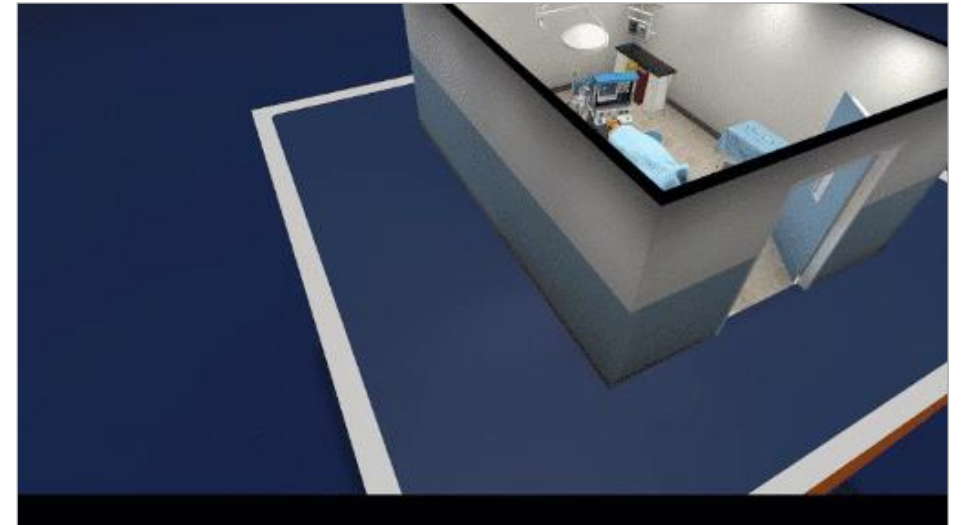
Technology Overview – VR

- Fully rendered, completely immersive environments
- Based on game engine technology
- Allows user to interact with life-scale Virtual Objects
- Interact with objects on an otherwise impossible scale
- Rapidly evolving technology

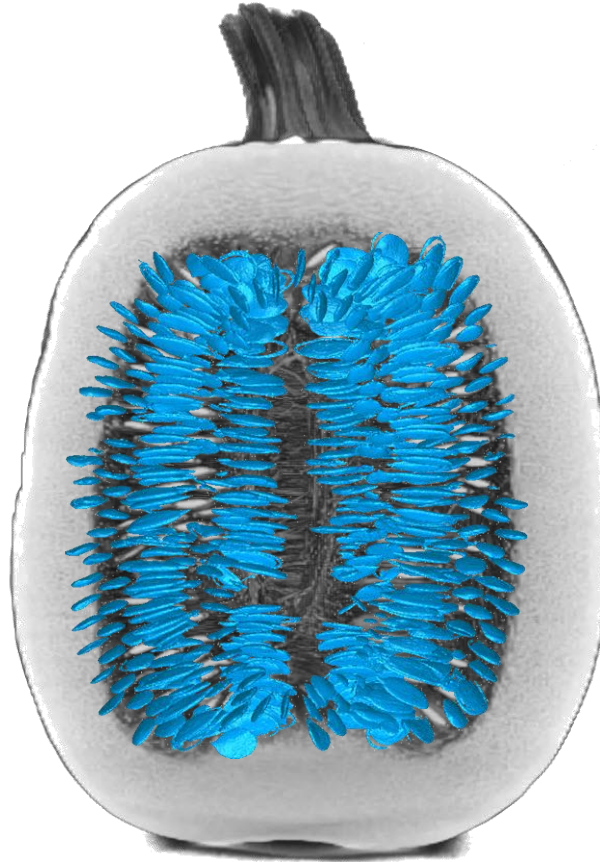


Technology Overview – VR

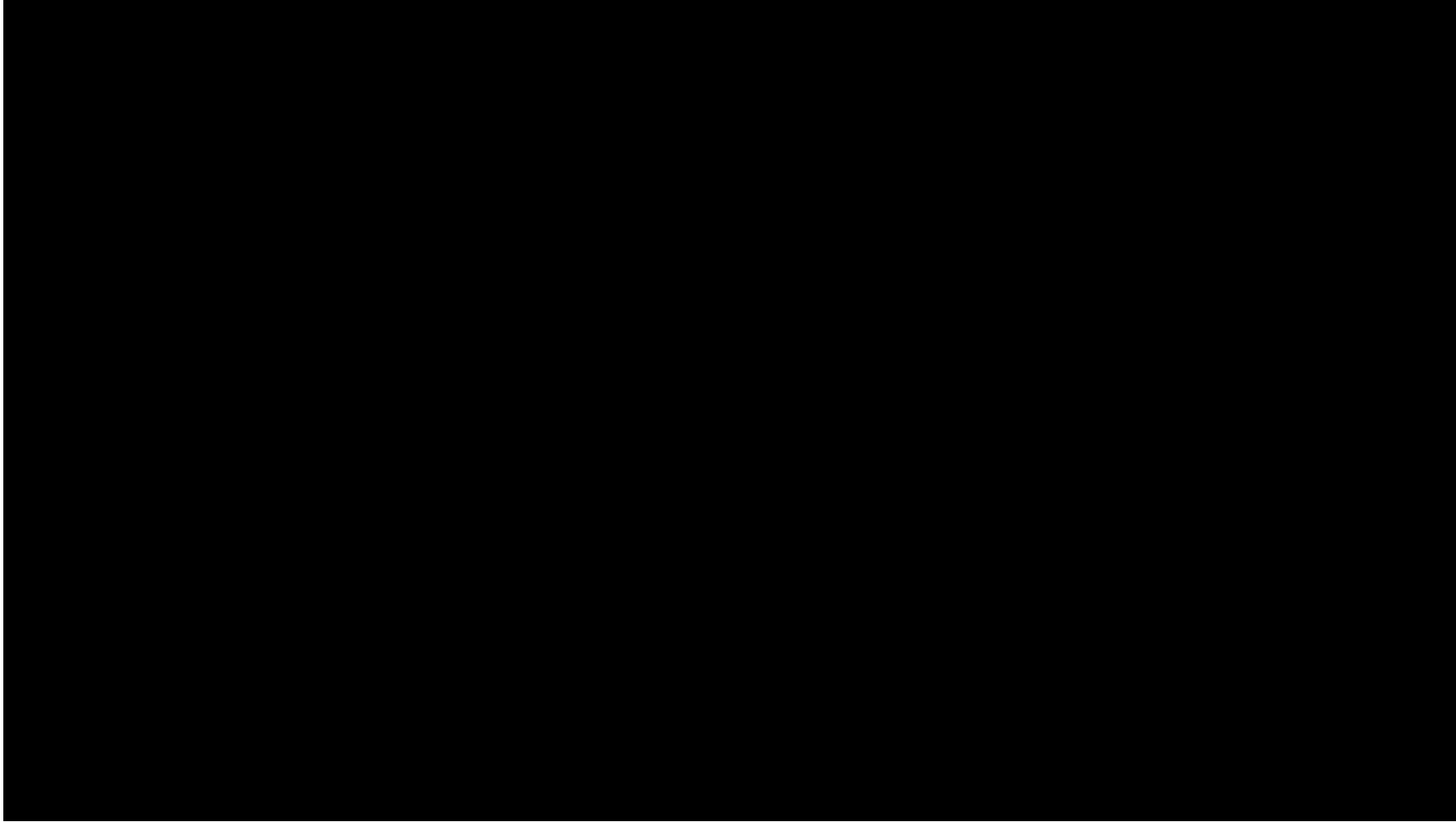
- Virtual Reality in NDT
 - Adoption is Accelerating
 - Existing buy-in with multiple industries
 - medical, aviation, manufacturing
- Training
 - Equipment Operation
 - Repair & Maintenance
 - Not limited by location or equipment availability



CT + VR Example – Pumpkin



CT + VR Example – Pumpkin



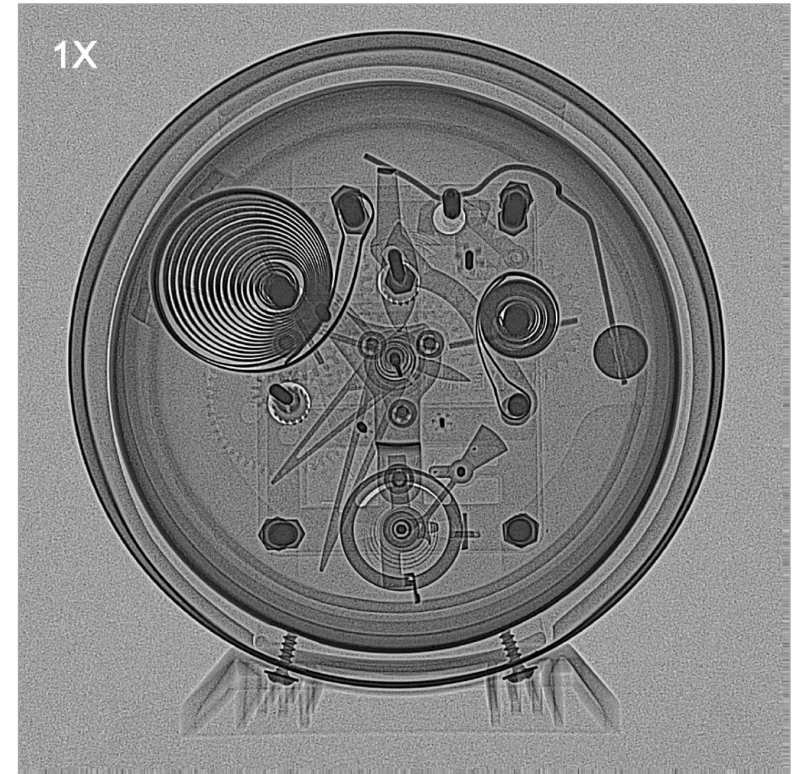
Dynamic Experiments

- We use the term Dynamic Experiments when using X-ray over time
- Extremely useful for troubleshooting & product validation
- 3 Main types of Dynamic Experiments
 - Dynamic 2D
 - Static 4D
 - Dynamic 4D



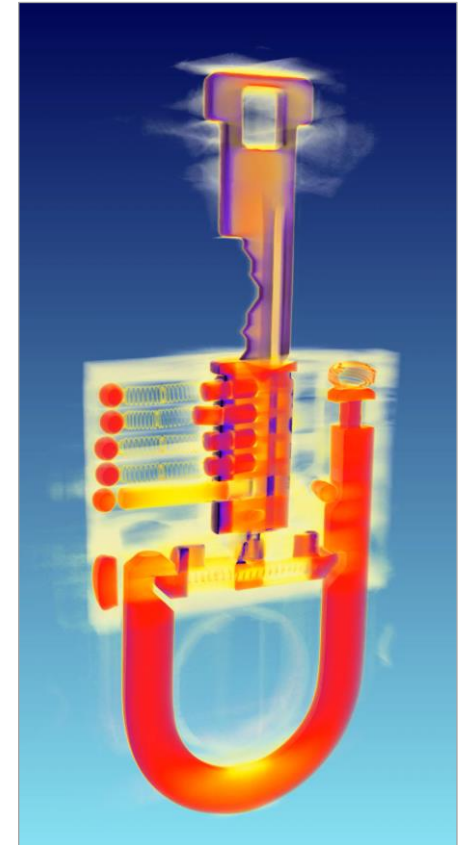
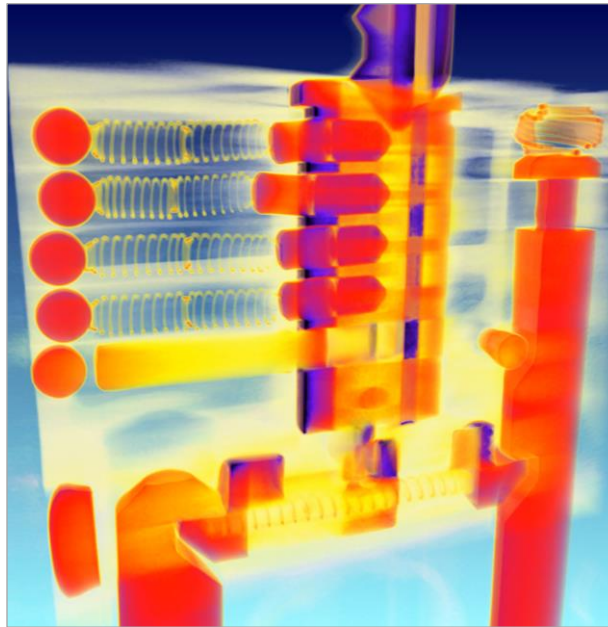
Dynamic 2D

- Capture of 2D Radiographs over Time
- Fast Acquisition
- Single perspective



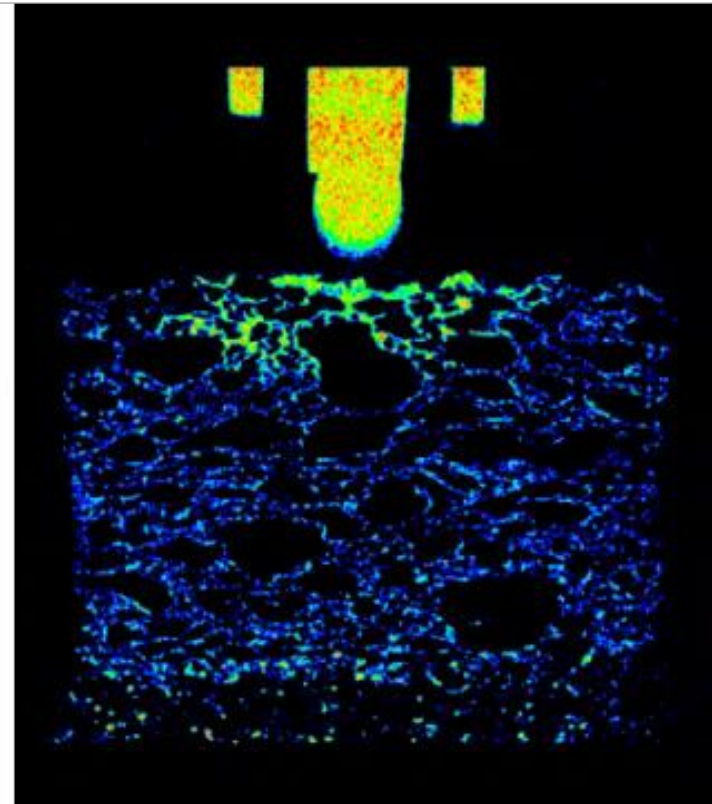
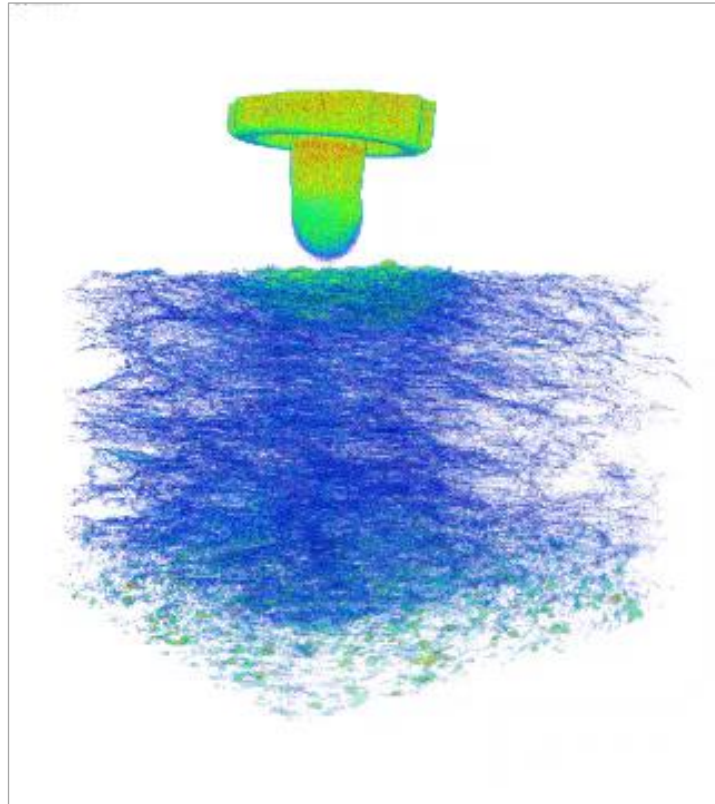
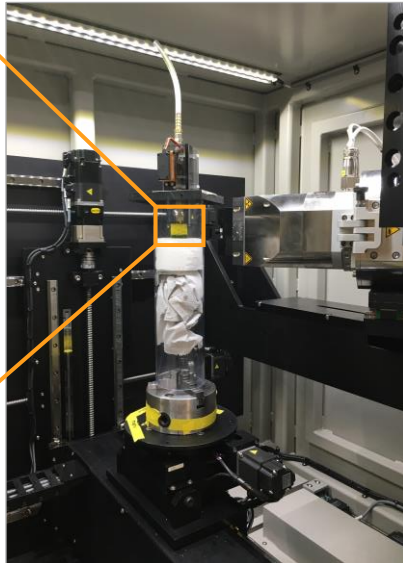
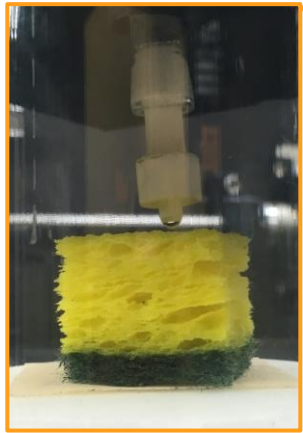
Static 4D CT

- 3D + Time Steps
- Short, contained events that can be manually or remotely triggered
- High image quality for each event step



Dynamic 4D CT

- Constant motion captured over time
- Slower event/interaction time
- Nearly true motion in 3D



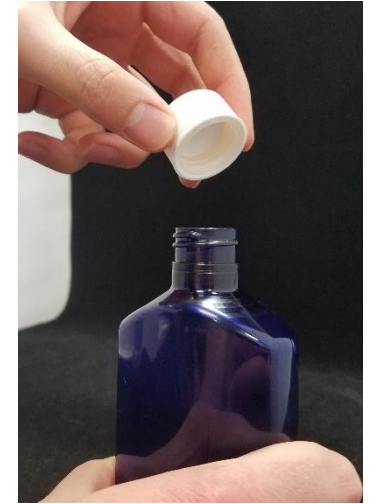
Dynamic CT

■ VR tech compliments well and can fill in the gaps...

- HUGE data sets (can be > 1 TB!)
 - Complex assemblies in motion are difficult to visualize
 - Long processing times leave little margin for error
- ✓ Data workflows are optimized for large data sets
 - ✓ Full 360° perspectives of assemblies quickly find optimal view angles
 - ✓ Platform for interactive review streamlines decision making processes

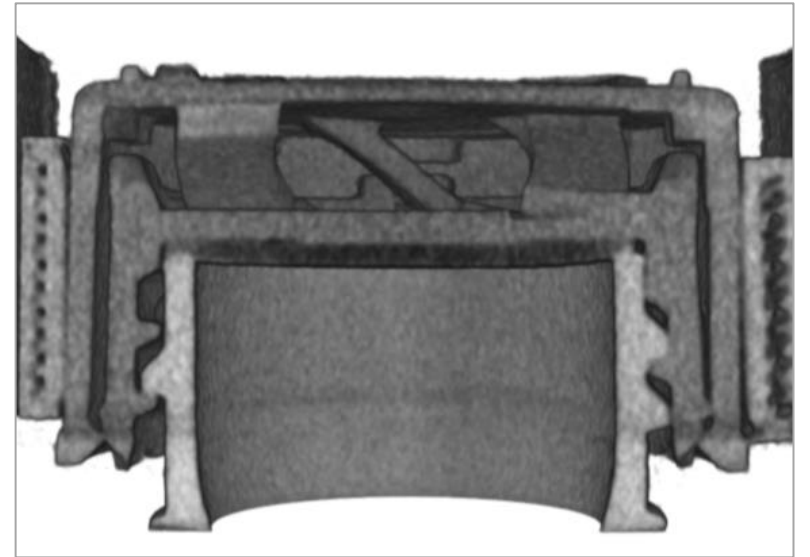
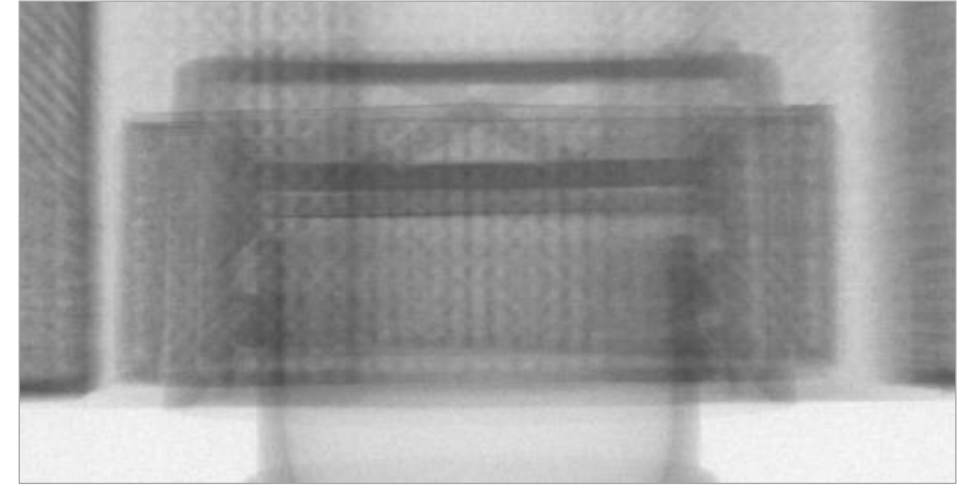
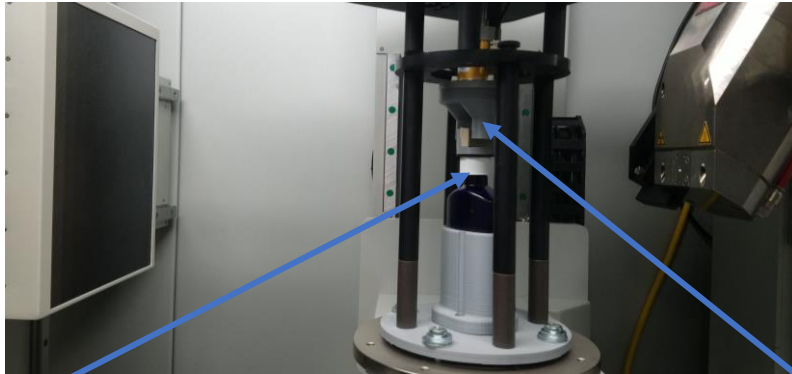
Dynamic CT + VR Example

- Child-Resistant Closure
- Need to evaluate impact of over-torque on assembly
- Results need to be communicated to non-technical stakeholders

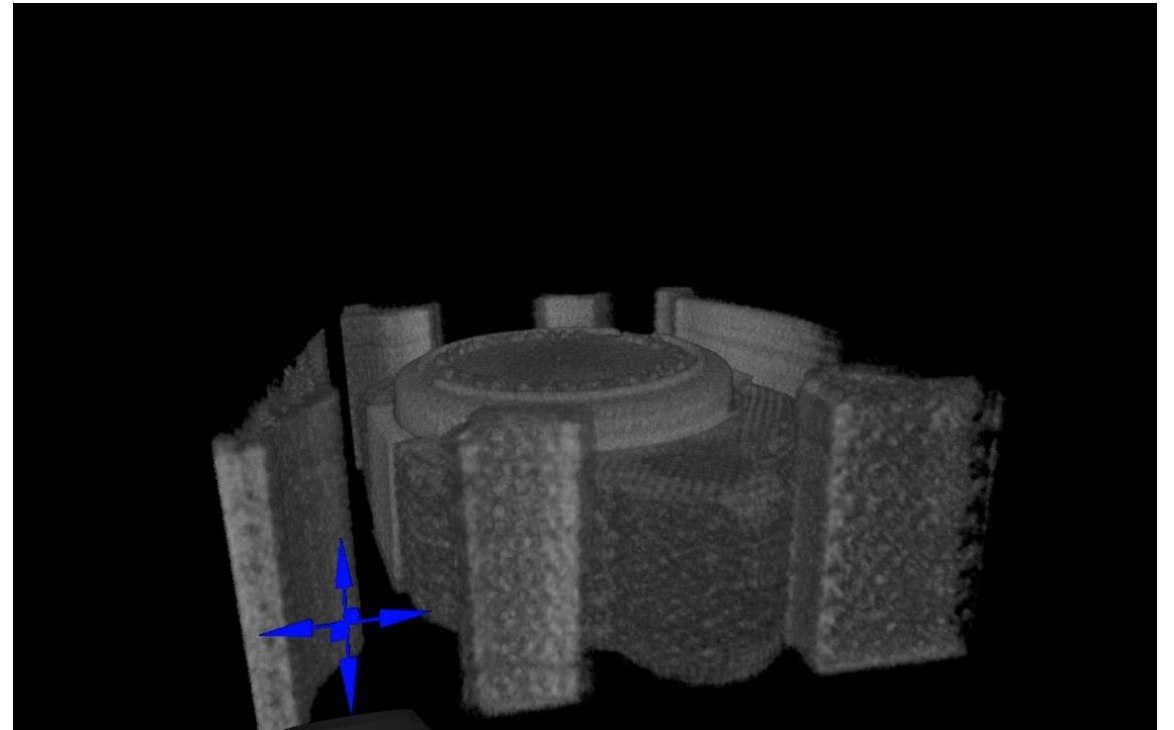
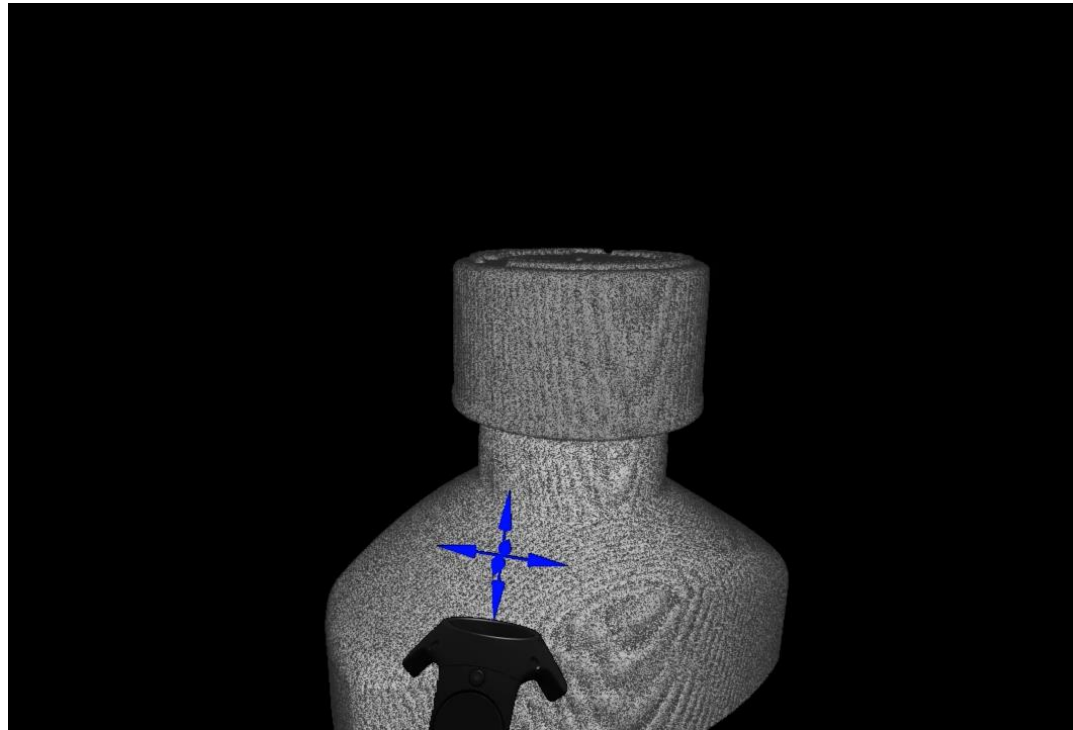


Linear compression of cap required for proper removal

Dynamic CT + VR Example



Dynamic CT + VR Example



Summary

- Benefits of VR with CT
 - Immersive Experience for Complex Data
 - Interactive Processing
 - Presentation and Communication
- Q&A



Additional Questions?

Contact:

Greg Bell

gbell@kinetic-vision.com

Flynn Spears

flynn@albannde.com

Thank you for participating!

The American Society for Nondestructive
Testing

1711 Arlingate Lane
Columbus, Ohio 43228-0518

(614) 274-6003 | (800) 222-2768
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