Non-destructive inspection of cultural objects
using X-ray and Computed Tomography (CT)
About VisiConsult

VC in a nutshell …
- > 100 employees worldwide
- Founded in 1996
- Headquarter located in Northern Germany - Stockelsdorf
- Family owned company (second generation)
- Development, manufacturing and service
- Production & office area > 2.700 m²
- Since 2016 add. location in Atlanta, US

Principles
- Independent of component suppliers
- Tailored and customized solutions
- Global network of trained representatives
- Local 24/7 first line support
- Warranty and maintenance packages
- Sales and service partners global wide
What we normally do…

Non-destructive inspection of cultural objects
… but today ist different.
Basics of X-ray inspection

X-RAY TUBE

Non-destructive inspection of cultural objects
Basics of X-ray inspection

<table>
<thead>
<tr>
<th></th>
<th>Nanofocus-Tube</th>
<th>Microfocus-Tube</th>
<th>Minifocus-Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focal spot size d</td>
<td>150 nm</td>
<td>2 µm – 300 µm</td>
<td>0.3 – 1 mm</td>
</tr>
<tr>
<td>Voltage U</td>
<td>Up to 150 kV</td>
<td>Up to 300 kV</td>
<td>Up to 600 kV</td>
</tr>
</tbody>
</table>
Magnification and field of view

FOV = 1,82
FOV = 3,64
FOV = 5,46
FOV = 7,28
FOV = 9,1
FOV = 10,9
FOV = 12,7
FOV = 12,7
FOV = 14,5
FOV = 16,3

SOD = 1°
SOD = 2°
SOD = 3°
SOD = 4°
SOD = 5°
SOD = 6°
SOD = 7°
SOD = 8°
Magnification and field of view
Basics of X-ray inspection

Non-destructive inspection of cultural objects
Systems Standard cabinets

**InSpect**
- Small footprint and Compact design
- Film, CR or DR
- Microfocus or Minifocus X-ray tube
- Intuitive and simple touch operation
- Modular setup and automation options

**XRH111 ECO**
- Visual inspection cabinet
- Budget entry level system
- Full image quality
- Full automation features
- Compact layout

**XRH111**
- Universal inspection cabinet
- Designed for medium parts
- Optional CT and ADR modules
- Full automation features
- Compact layout and mobility

**XRH222**
- Universal inspection cabinet
- Designed for big parts
- Optional CT and ADR modules
- Full automation features
- Most sold system worldwide

**XRH222 TL**
- 600kg heavy duty manipulator
- Loading by crane through roof
- Optional CT and ADR modules
- Full automation features
- Designed for big and heavy parts

Oktober 19
Non-destructive inspection of cultural objects
Basics of computed tomography
Basics of computed tomography
From a part, to a 2D image, to a 3D model
Basics of computed tomography

STOP & GO SCAN
✓ Reduced scattering artefacts

QUICKSCAN / FASTSCAN
✓ Reduced acquisition time
Basics of computed tomography

RESOLUTION VS. DATA VOLUME

**Pixelpitch:** 200 µm  
**Pixelmatrix:** 1000 x 1000 px  
**CT Data Volume:**  
1000 x 1000 x 1000 x 16 bit  
= 1.86 GB

**Pixelpitch:** 100 µm  
**Pixelmatrix:** 2000 x 2000 px  
**CT Data Volume:**  
2000 x 2000 x 2000 x 16 bit  
= 14.9 GB
Results

Non-destructive inspection of cultural objects
Results

Non-destructive inspection of cultural objects
Results

Non-destructive inspection of cultural objects
CT – Structure

Non-destructive inspection of cultural objects
CT – Metal Plates

Non-destructive inspection of cultural objects
Non-destructive inspection of cultural objects
Non-destructive inspection of cultural objects
Non-destructive inspection of cultural objects

Unpainted silk
Gebetsmühle

Non-destructive inspection of cultural objects
Gebetsmühle

Non-destructive inspection of cultural objects
Virtually Unwrapping the En-Gedi Scroll
Thank you for your attention