3D Scanning for Small Budgets: How Local Libraries and Museums Will Play a Role in Creating a 3D Digital Library

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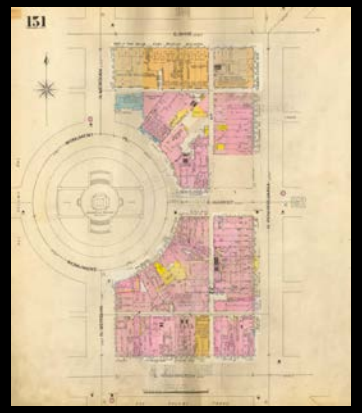
JD Schaumberg, Online Resources, Inc.

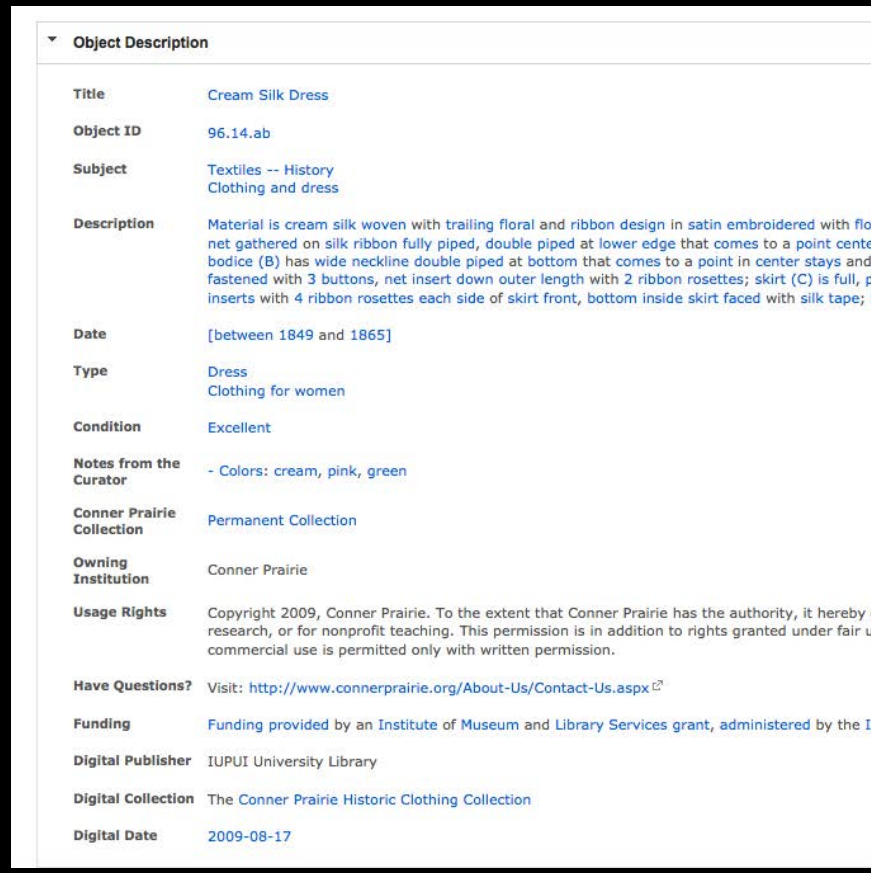
Jenny Johnson, IUPUI University Library

Digital Libraries

- Digitizing collections has become a standard practice for many libraries and museums
  - flat objects
  - photographs/negatives/microfilm
  - audio/video materials



Established Metadata Standards and Best Practices for Digitization



Object Description

Title	Cream Silk Dress
Object ID	96.14.ab
Subject	Textiles -- History Clothing and dress
Description	Material is cream silk woven with trailing floral and ribbon design in satin embroidered with flo net gathered on silk ribbon fully piped, double piped at lower edge that comes to a point cente bodice (B) has wide neckline double piped at bottom that comes to a point in center stays and fastened with 3 buttons, net insert down outer length with 2 ribbon rosettes; skirt (C) is full, p inserts with 4 ribbon rosettes each side of skirt front, bottom inside skirt faced with silk tape;
Date	[between 1849 and 1865]
Type	Dress Clothing for women
Condition	Excellent
Notes from the Curator	- Colors: cream, pink, green
Conner Prairie Collection	Permanent Collection
Owning Institution	Conner Prairie
Usage Rights	Copyright 2009, Conner Prairie. To the extent that Conner Prairie has the authority, it hereby research, or for nonprofit teaching. This permission is in addition to rights granted under fair u commercial use is permitted only with written permission.
Have Questions?	Visit: http://www.connerprairie.org/About-Us/Contact-Us.aspx
Funding	Funding provided by an Institute of Museum and Library Services grant, administered by the I
Digital Publisher	IUPUI University Library
Digital Collection	The Conner Prairie Historic Clothing Collection
Digital Date	2009-08-17

Originals as PHOTOGRAPHS [i]

	Master	Access	Thumbnail
File Format	TIFF	JPEG	JPEG
Bit Depth	8 bit grayscale 24 bit color	8 bit grayscale 24 bit color	8 bit grayscale 24 bit color
Spatial Resolution	300-800 ppi, or 3000 to 5000 pixels across the long dimension	150 ppi	96 ppi
Spatial Dimensions	100% of original	600 pixels across the long dimension	150-200 pixels across the long dimension

Originals as MAPS

	Master	Access	Thumbnail
File Format	TIFF	JPEG	JPEG
Bit Depth	8 bit grayscale 24 bit color	8 bit grayscale 24 bit color	8 bit grayscale 24 bit color
Spatial Resolution	3000 pixels across the long dimension, or 300-400 ppi	150 ppi	96 ppi
Spatial Dimensions	100% of original	600 pixels across the long dimension	150-200 pixels across the long dimension

Digital Libraries-Goals

- Access/Discoverability-Content management system
- Download capability
- Print
- Preservation
- Inclusion in DPLA
- Curriculum Development

Digital Libraries-Technology

- On the lookout for the newest scanners
- Reviewing content management systems
- Researching archiving and preservation

What about 3D objects?

- Libraries and museums have 3D items of interest that should be captured in a digital format.
- How is the best way to capture these collections and make them available?
- What is the value of making 3D objects available?

Conner Prairie Living History Museum

CONNER PRAIRIE
INTERACTIVE HISTORY PARK

Creating 3D Collections-Take 1

- Capture 3D objects using 2D practices
- Digital photography is used to “flatten” the object providing a 2D representation of the artifact

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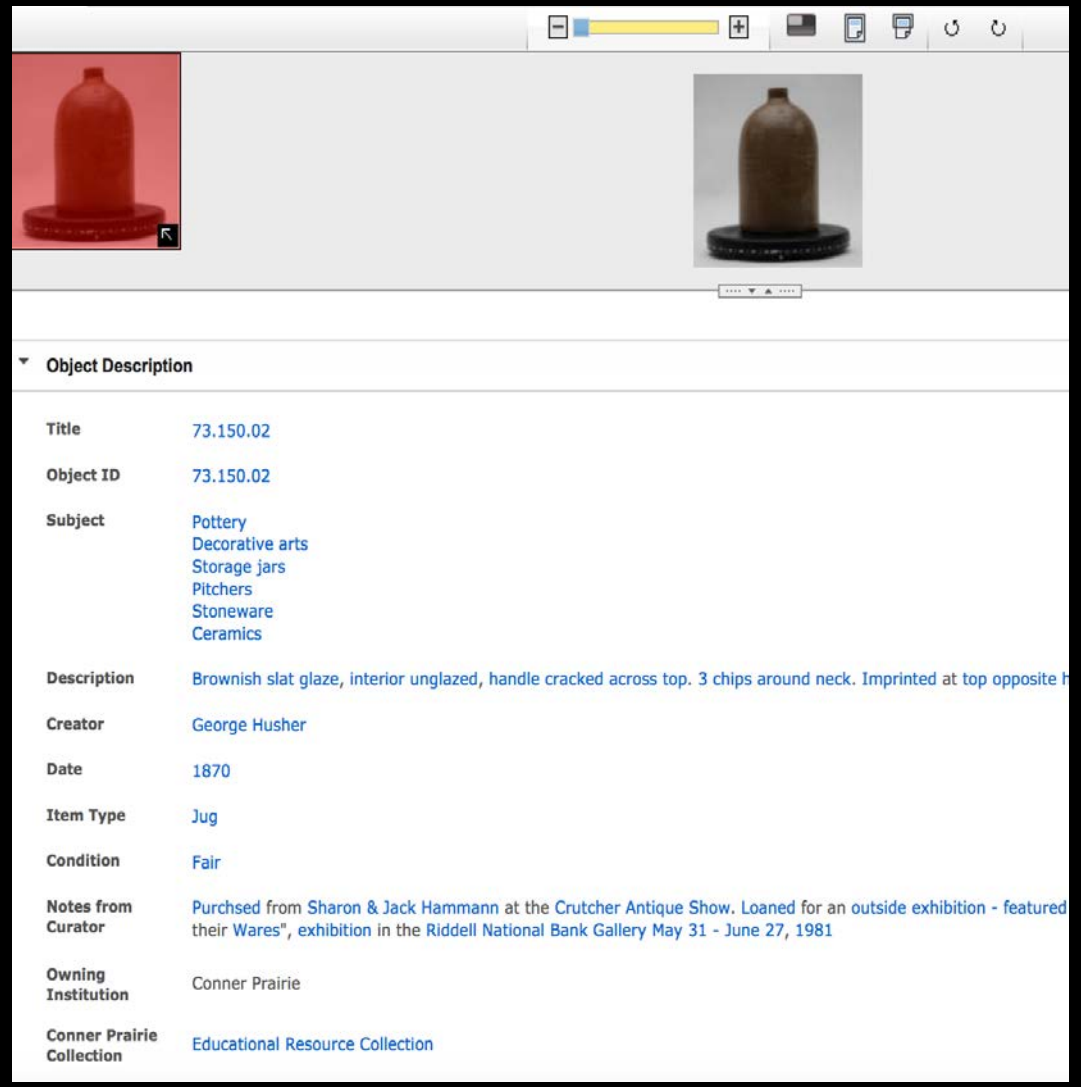
3D Digital Collections

- **Benefits**
- Access/Discoverability
- Metadata creation

- **Challenges**
- Tedious workflows
- Limitations of viewer



3D Technologies-Past

- 3D scanners for manufacturing
  - Original Scanners
  - Post Processing
  - Cost
  - 3D printers

3D Technologies-Today

- Desktop 3D printers
- Handheld scanners
  - Ease of Use
  - Decrease in cost
  - Affordability for libraries and museums

Benjamin Harrison Presidential Site

3D CONTENTdm Collection

Scanning Workflow

System Launch

- Connect the Go!SCAN 3D to the computer and launch VXelements.

Optimize Scanner

- Optimize the scanner using the reference plate to ensure acquisition accuracy.

Set the Acquisition Parameters

- Set the shutter time according to the surface to scan.

Scan the Part

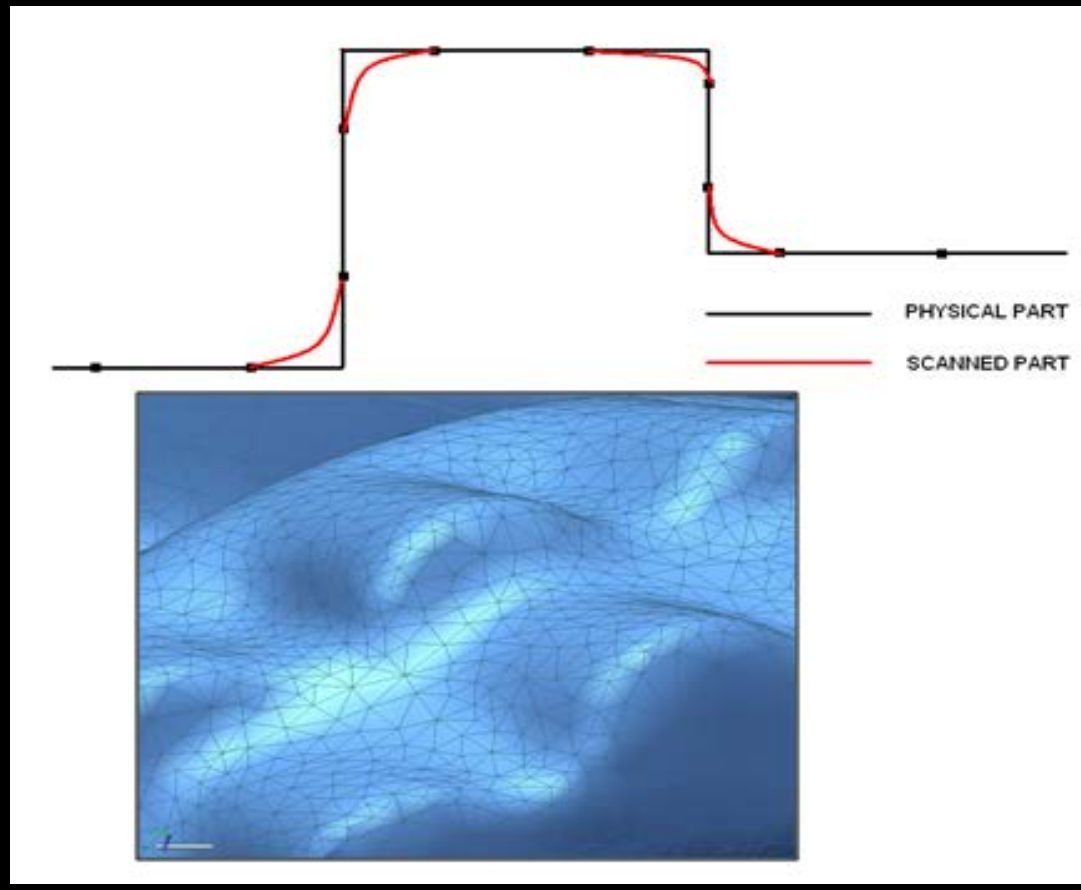
- Scan the part by “sweeping” the scanner over the surface.

Save and Export Data

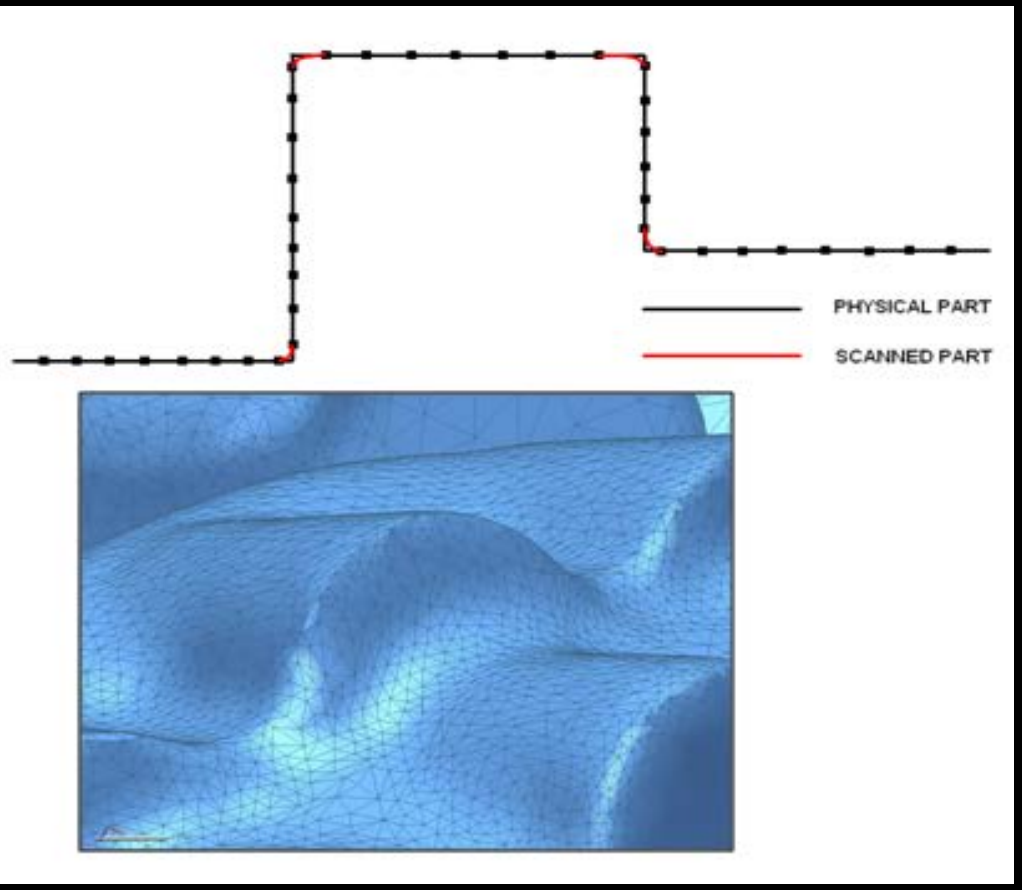
- Saved data can be reopened later in VXelements (.csf).
- Optimized mesh can be exported in various formats (.stl, .txt., .obj, etc.).

Scanning Terminology

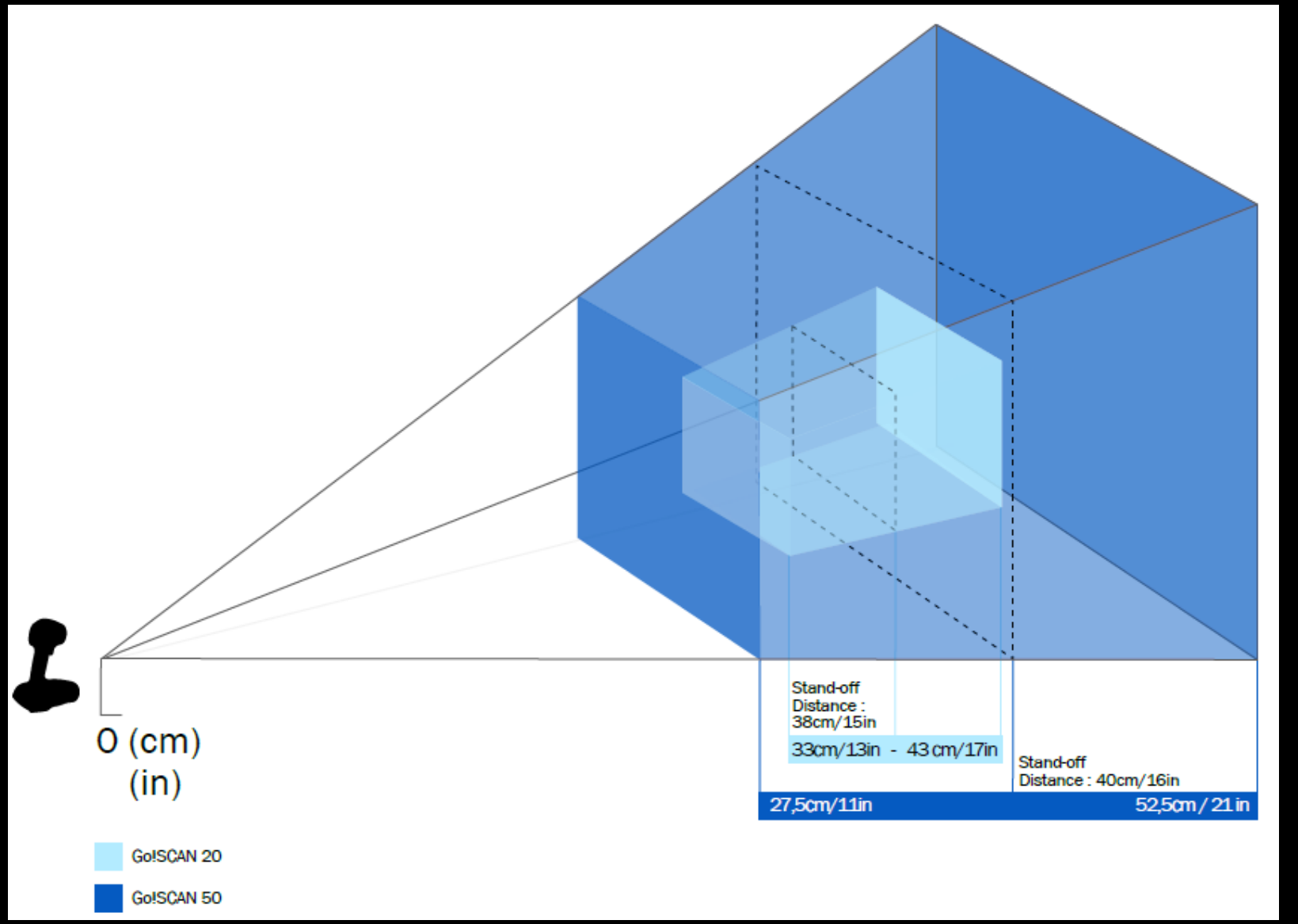
Resolution



Accuracy



Scanner Volume



File Output

VXelements output is an optimized mesh

Output Options:

- VXelements session (which contain everything: (***.csf***)
- Mesh file of the geometry only (**.stl**)
- Mesh file of the geometry & texture information related (**.obj**)

Value-Owning Institution

- The digital object provides a permanent point of reference for future research
- Eliminates access restrictions/travel
- Digital preservation- some physical objects may be destroyed, lost or damaged.
- Educational Resource-STEM
- Digital Humanities Projects
- Replication (3D printing)

Value-Hosting Institution

- Creation of derivative files for use outside of content management system
  - 3D modeling software
  - printing
- Establishing best practices for 3D digital files
  - Scanning
  - Metadata
- Digital Humanities Projects
- Inclusion into DPLA

“With the onset of the digital revolution, the library community assumed a leading role in the effort to help people of all ages build the skills and competencies they need to thrive in a high-tech world. 3D printing expands the frontier of the ongoing digital transformation of our society, and – in keeping with our reputation for digital leadership – library professionals are helping people and communities take advantage of this development. Library 3D printing is empowering people to engage in creative learning, launch business ventures and solve complex health problems.” ALA

“Libraries are a national network of community anchors,” ALA President Sari Feldman said. “As libraries transform, they can help our leaders harness the power of 3D printing to achieve individual opportunity and progress in every part of our country.”