SPRUCE Mashup – London 2

Laser scanning and 3D data

Collections

- "3D Modelling Data for Terracotta Roundels" (Historic Royal Palaces)
- "Laser Scanning data of Gabo sculptures" (Tate Collection)

Short version

- Go read the Archaeological Data Services' "Laser Scanning for Archaeology: A Guide to Good Practice"
- (And if you're a DPC member, read the notes from a recent event, "3D Laser Scanning: Seeking a New Standard in Documentation")

Issues

"What have we got, and what does it do?"

(Essentially: "appraisal“)

What is laser-scanning/3D-modelling?

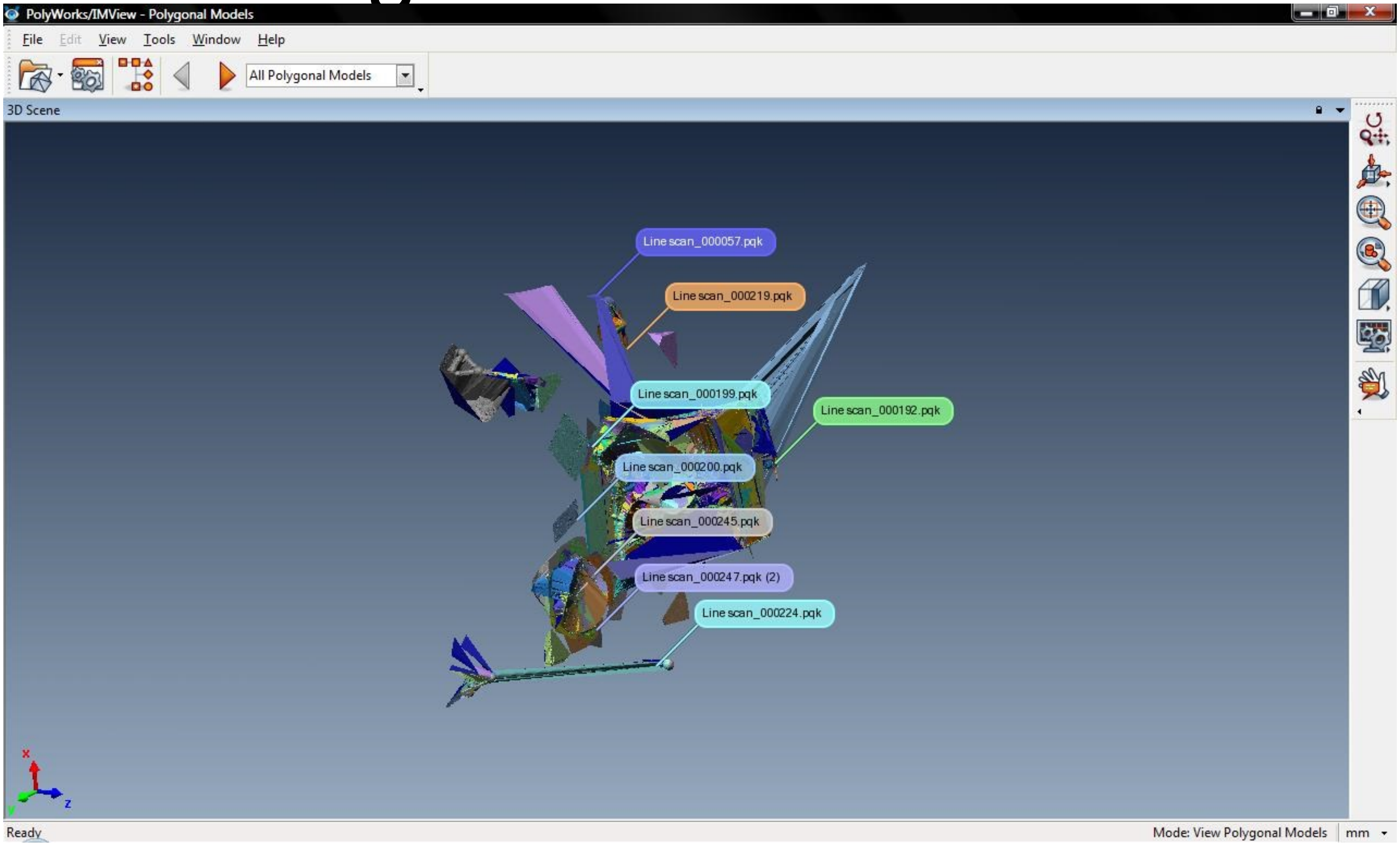
- Scanning
- "Registering"/processing
- Modelling
- Rendering

What happens?

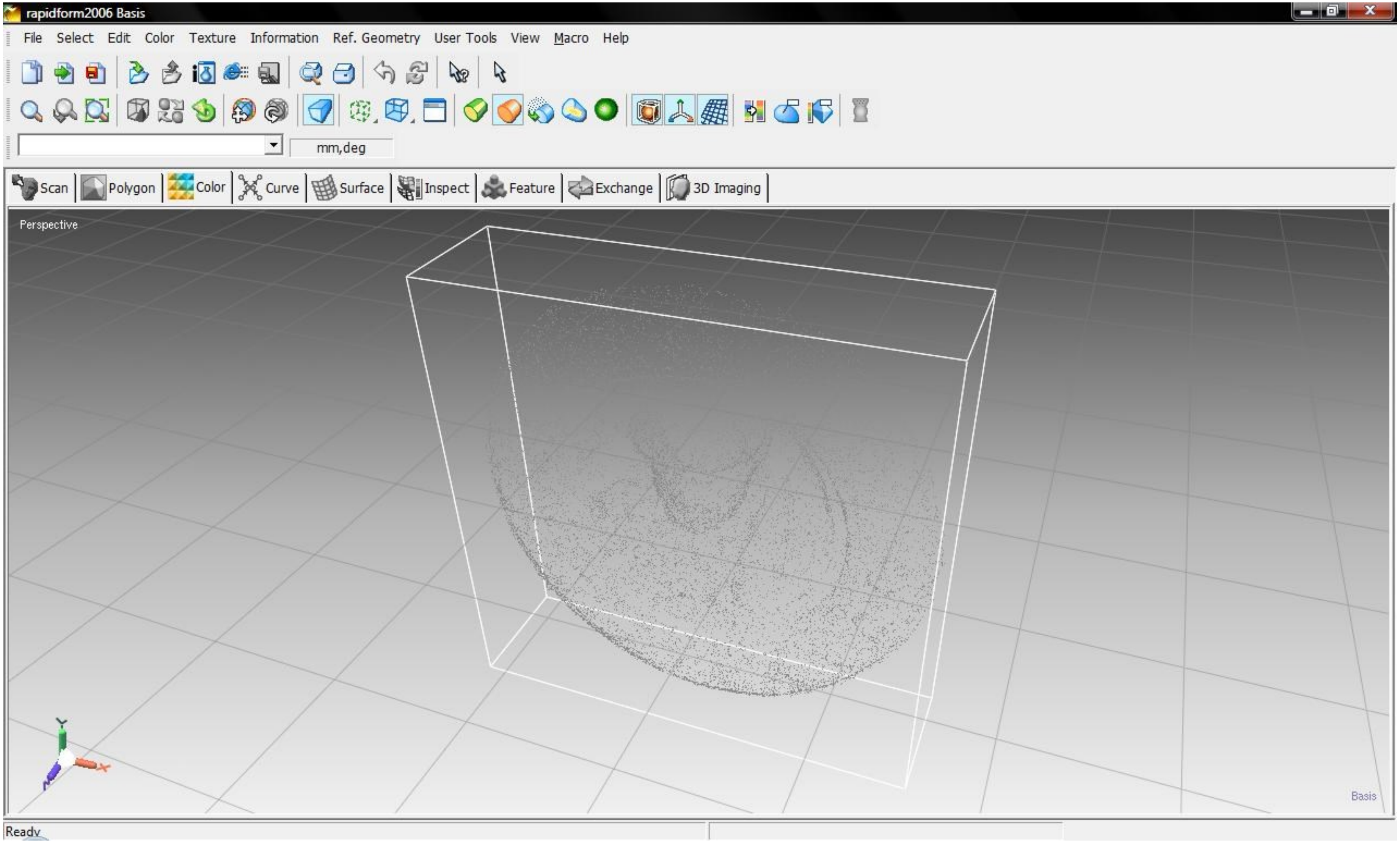
- Scanning: produces "raw" laser scan data, can be proprietary, or plain-text
- Registration/other processing: produces "point-cloud" data, often in a plain-text format
- Modelling: produces a 3d model, in an often-"standard" (if proprietary) format

  (and/or may produce an "object mesh" object -- again, often in a plain-text format)
- Rendering: produces images, videos, VR, etc. (usual formats)

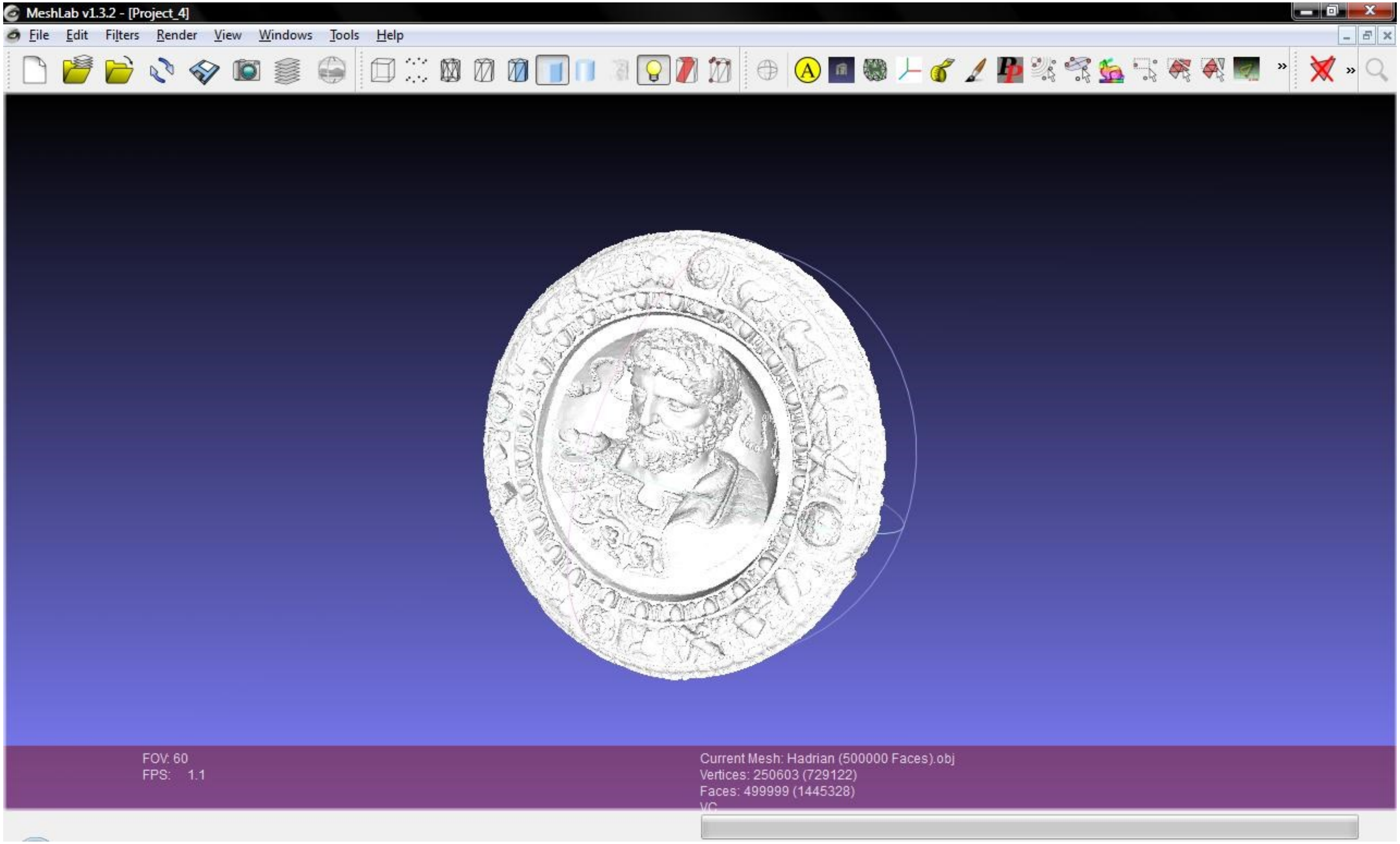
Scanning data



Point cloud


rapidform2006 Basis
File
Select
Edit
Color
Texture
Information
Ref. Geometry
User Tools
View
Macro
Help
mm,deg
Scan
Polygon
Color
Curve
Surface
Inspect
Feature
Exchange
3D Imaging
Perspective
Y
X
Basis
Ready

Object/surface mesh

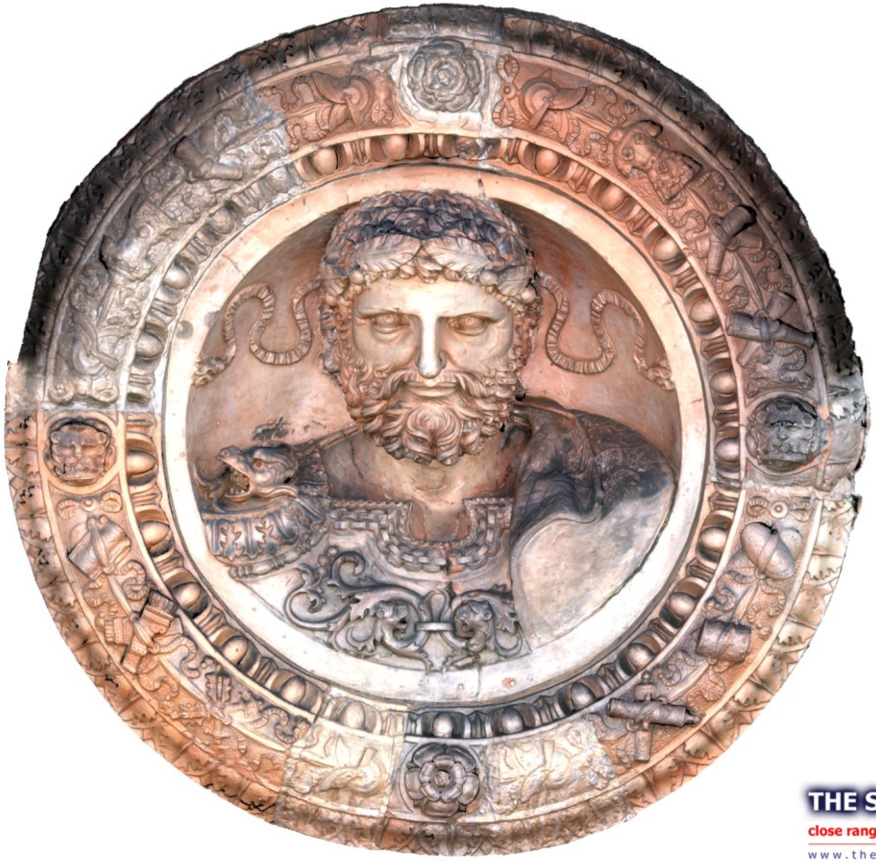


MeshLab v1.3.2 - [Project_4]
File Edit Filters Render View Windows Tools Help

FOV: 60
FPS: 1.1

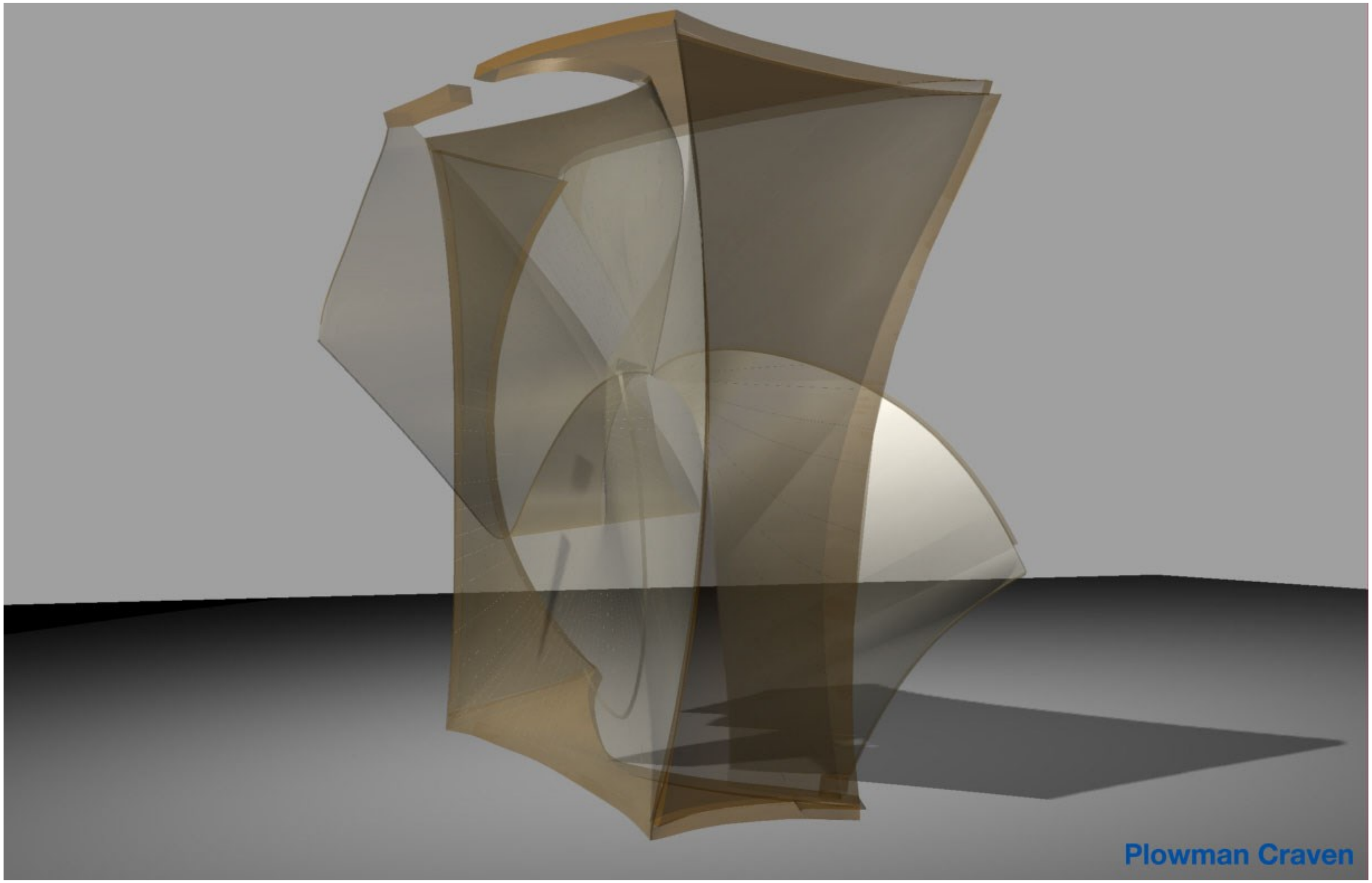
Current Mesh: Hadrian (500000 Faces).obj
Vertices: 250603 (729122)
Faces: 499999 (1445328)
VC

Rendered image



THE SCAN TEAM
close range 3D laser scanning
www.thescanteam.co.uk

Rendered image



Example file types/counts from one HRP roundel (at various resolutions/scale):

- 5 obj
- 4 tif
- 4 rtf
- 4 ply
- 4 exe
- 3 txt
- 3 mov
- 1 wrl
- 1 swatch
- 1 mayaSwatches
- 1 fbx
- 1 dmg
- 1 asc

(In total, so far, about 9.6 Gb, for three separate scanning events; but that’s just one roundel out of twelve.)

Example file types/counts for one Tate sculpture (at single resolution/scale)

- 496 pqk
- 478 mask
- 478 hist
- 248 pf
- 230 bre
- 21 jpg
- 4 db
- 4 avi
- 3 archive
- 2 txt
- 2 3dm
- 1 vlt
- 1 pwk
- 1 dwg

What have we worked out?

- bre -- laser scan data (?) -- proprietary format
- pqk -- laser scan data (?) -- proprietary format?
- mask/hist -- ??? (seems to belong with laser scan data)

- asc/txt -- ASCII text -- point clouds or scan data, generally

- obj/ply -- object meshes (mostly plain text) -- contain surface/object meshes (i.e., "joined-up" point-clouds)

- 3dm -- "3d model", represents the object as a collection of 3d geometry shapes (can be opened, and possibly modified by a number of tools)
- fbx/wrl -- also 3d models, but of a different format

What have we worked out (2)?

- dwg -- "drawing" -- 3d model in proprietary AutoDesk format
- pwk -- "Polyworks" -- 3d model in proprietary Polyworks format

- avi -- AVI video -- rendered video of object
- jpg/tif -- Images -- rendered images of object
- mov -- video/QTVR -- rendered video, or (QuickTime) virutal-reality object

- mayaSwatches/swatch -- suspected rendering assets (images/textures/etc.)

- (archive/dmg/exe/vlt/rtf -- miscellaneous cruft)

What HAVEN’T we worked out?

Exactly what do we preserve? (See ADS best practice guidance -- especially regarding metadata for preservation) But still not completely clear.

- Images/videos/VR are all (in-theory) derivable from the 3d models (in the same way JPGs are derived from TIFFs), but does depend on relevant software to perform this task
- Point-clouds are easily preserved (just plain text), but may be results of pre-procesing work, which may or may not need to be preserved in its own right
- 3d models and object meshes are also important (since there may be pre-processing work here, too), but often highly-tied to the software that created them
- For laser-scanning/point-clouds/etc., recent DPC event notes comment on new file formats ("E57") which are intended to be more interoperable, but weren't designed with preservation in mind, and still very much in development/controversial/etc.

What are the take-aways?

- Seriously, go read the ADS guide to best-practice.
- This is a novel, still-evolving space; probably need some in-house documentation/expertise, as well as clear and open relationships with vendors who can be relied upon to provide the "right" data
- Very much ***not*** a "solved problem“ (yet).
- Shared learning/community/etc. should help out somewhat