

Digital Media Fab Lab - 3D Scanning Guide

In industry, 3D scanning is utilized for:

- Repairs, or the replication of parts
- Reverse engineering in which one wants to make a significant change to a design/product/object, or create an after-market modification/upgrade
- For the creation and integration into other designs/artworks/3d scans/models

Which 3D Scanner should I use?

1. Decide what accuracy/tolerance the project requires
 - o Ideal tolerance of the scan is one step above the print capability – How will this object be materialized? Will it exist virtually or physically? If physical, how will it be manufactured?

3D Scanners

EinScan Pro 2x Plus	+/- 40 microns fixed scans with turntable
	+/- 50-100 microns
NextEngine	+/- 127 microns in macro
	+/- 381 microns in wide

3D Printers

FormLabs	+/- 50 microns
Prusa i3	+/- 10 x 10 x 5 microns

CNC Machining

Carbide 3D	+/- 127 microns
Roland Modela MDX20	+/- 50-200 (estimated)

Other Manufacturing Processes

Injection Molding	+/- 50-100 microns
Vacuum Forming	+/- 762 microns

2. Identify object scale and scanning process

Turntable

- o EinScan Pro 2x Plus Turntable
Maximum Size: 150mm/6in
- o NextEngine
Maximum Size: 5.1" x 3.8" (Macro) and 13.5" x 10.1" (Wide)

Handheld

- o EinScan Pro 2x Plus
Maximum Size: ??? Test it

3D Scan for Replication

1. Prepare part for scanning
 - a. Apply a matting agent to anything reflective of light or transparent
 - b. Secure the object to be scanned on or off the turntable
2. Scan part
 - a. Scan with a turntable or by hand
 - b. Scan complex objects in multiple families
 - i. Aligning Scan Families
NextEngine –
<https://vimeo.com/183066355>
https://www.youtube.com/watch?v=xC_Ivo_Raks (9:50 – 12:12)
EinScan –
<https://www.einscan.com/news/how-to-choose-the-proper-alignment-mode-with-einscan-pro-or-pro-on-automatic-scan-mode/>
3. Post Processing
 - a. Automatic Processing – Meshmixer (mesh repair software)

4. Make Minor Modifications
 - a. Add holes/labels etc.
5. Digital Fabrication
 - a. Choose a material and process that fits the concept

3D Scan for Reverse Engineering

1. Prepare part for scanning
 - a. Apply a matting agent to anything that is reflective of light or transparent
 - b. Secure the object to be scanned on or off the turntable
2. Scan part
 - a. Scan with a turntable or by hand
 - b. Scan complex objects in multiple families
 - i. Aligning Scan Families
NextEngine –
<https://vimeo.com/183066355>
https://www.youtube.com/watch?v=xCIvo_Raks (9:50 – 12:12)
EinScan –
<https://www.einscan.com/news/how-to-choose-the-proper-alignment-mode-with-einscan-pro-or-pro-on-automatic-scan-mode/>
3. Post Processing
 - a. Automatic Processing for Mesh Repairs
 - i. Meshmixer <http://www.meshmixer.com>
 - ii. Netfabb <https://www.autodesk.com/products/netfabb>
4. Forward Engineering
 - a. Move beyond what is present in the object to a new iteration
5. Digital Fabrication
 - a. Choose a material and process that fits the concept

Post-Processing & CAD Translation

- Fusion360 and ReMake
<https://studiofathom.com/blog/mesh-to-t-spline-in-10-steps>
- Fusion360
<https://knowledge.autodesk.com/support/fusion-360/learn-explore/caas/sfdarticles/sfdarticles/How-to-Convert-a-Mesh-to-a-BRep-in-Fusion-360.html>