

# Laser Cutting for the Rest of Us

## When should I consider laser cutting as an alternative to cutting by hand?

- I am making a complex part with many accurate cuts.
- I need many flat parts that are the same.
- I need customized texture on my cut out parts (brick work, stones, etc).
- I know how to draw a vector drawing in CAD type drawing programs.



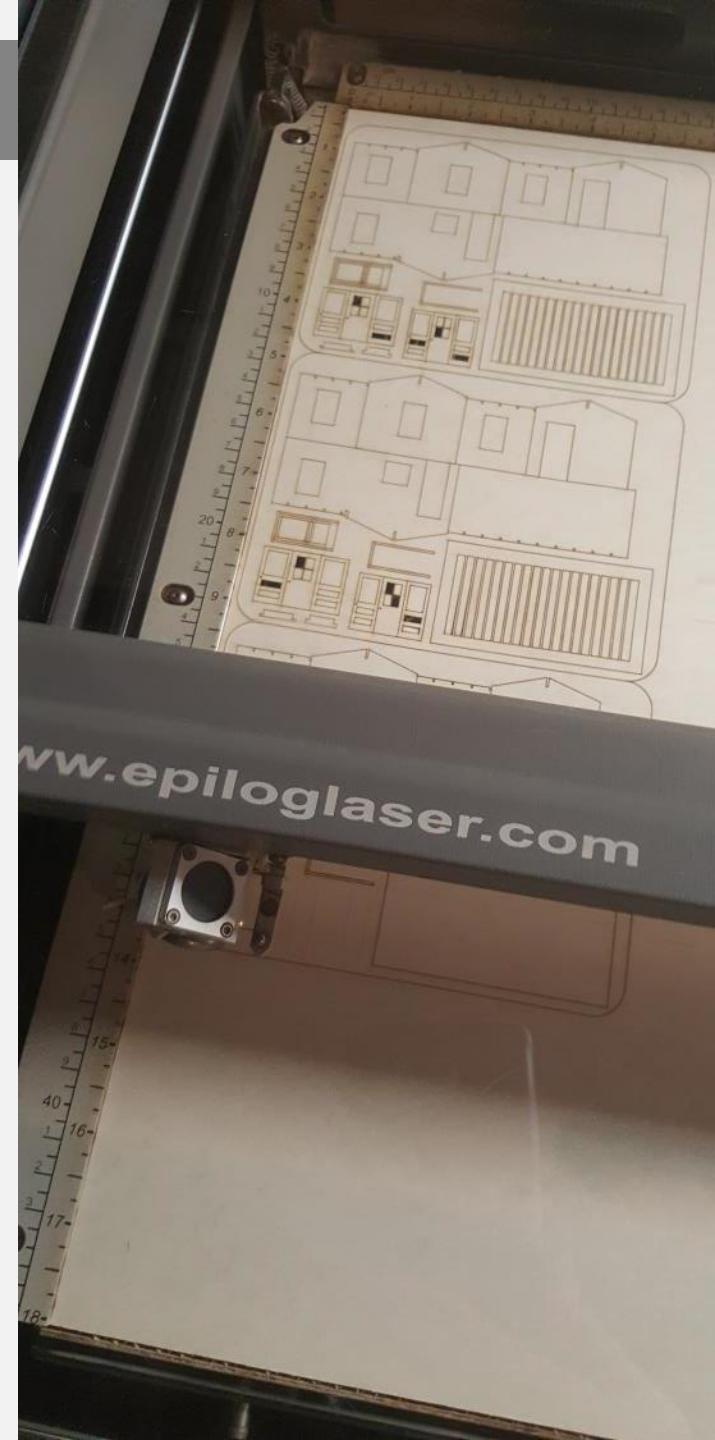
# Laser Cutting for the Rest of Us

## Who can cut my stuff?

Heritage House Trophies (Victoria),  
RSLaserkits, Manzano Laser Works, Local  
MakerLabs, Laser Cutter Café (Vancouver).

Also consider working with your local “Trophy  
Engraving” company.

- Many will do custom cutting and engraving if asked.
- Supplying vector based, ready to cut files will make things easier.
- Learn vector based drawing software such as TinkerCad, Coreldraw, Adobe, Autocad, Rhino.



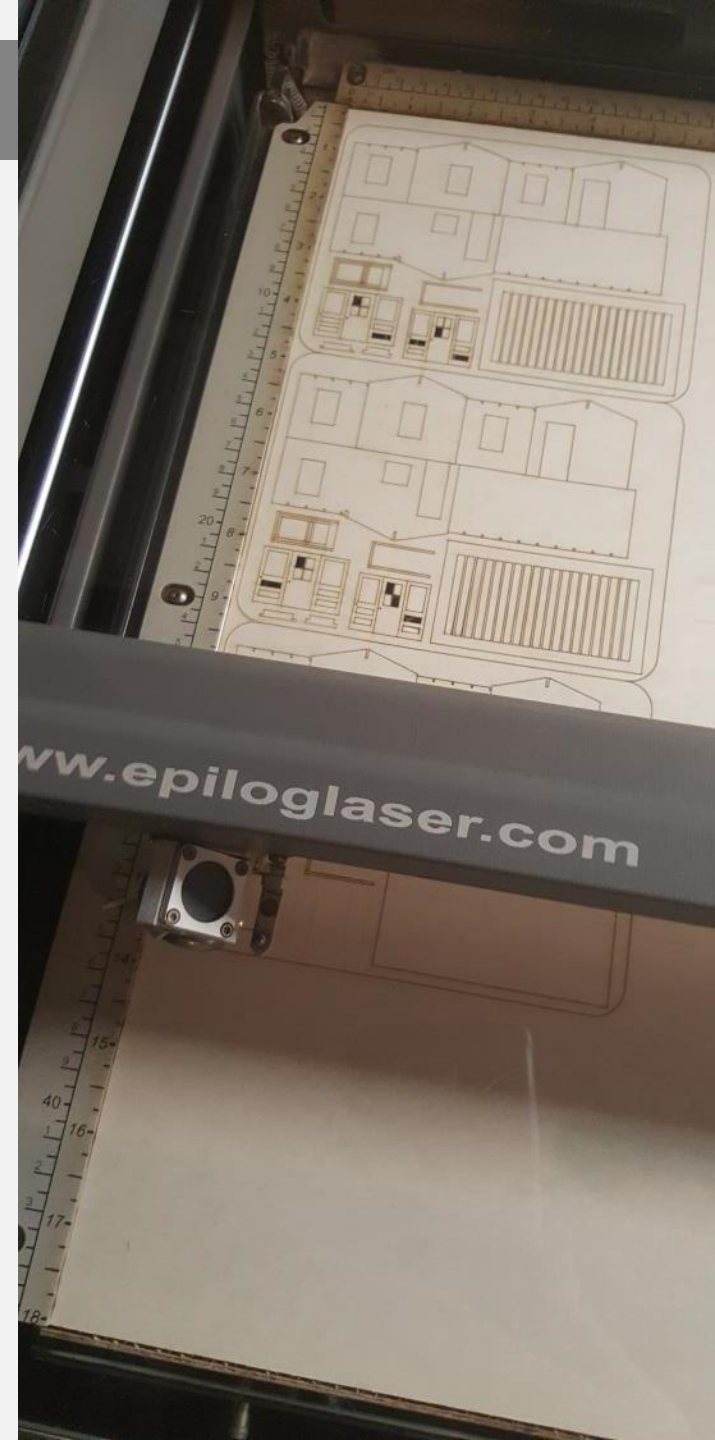
# Laser Cutting for the Rest of Us

## What can be achieved with typical Epilog, Trotec, & Universal cutters that services use?

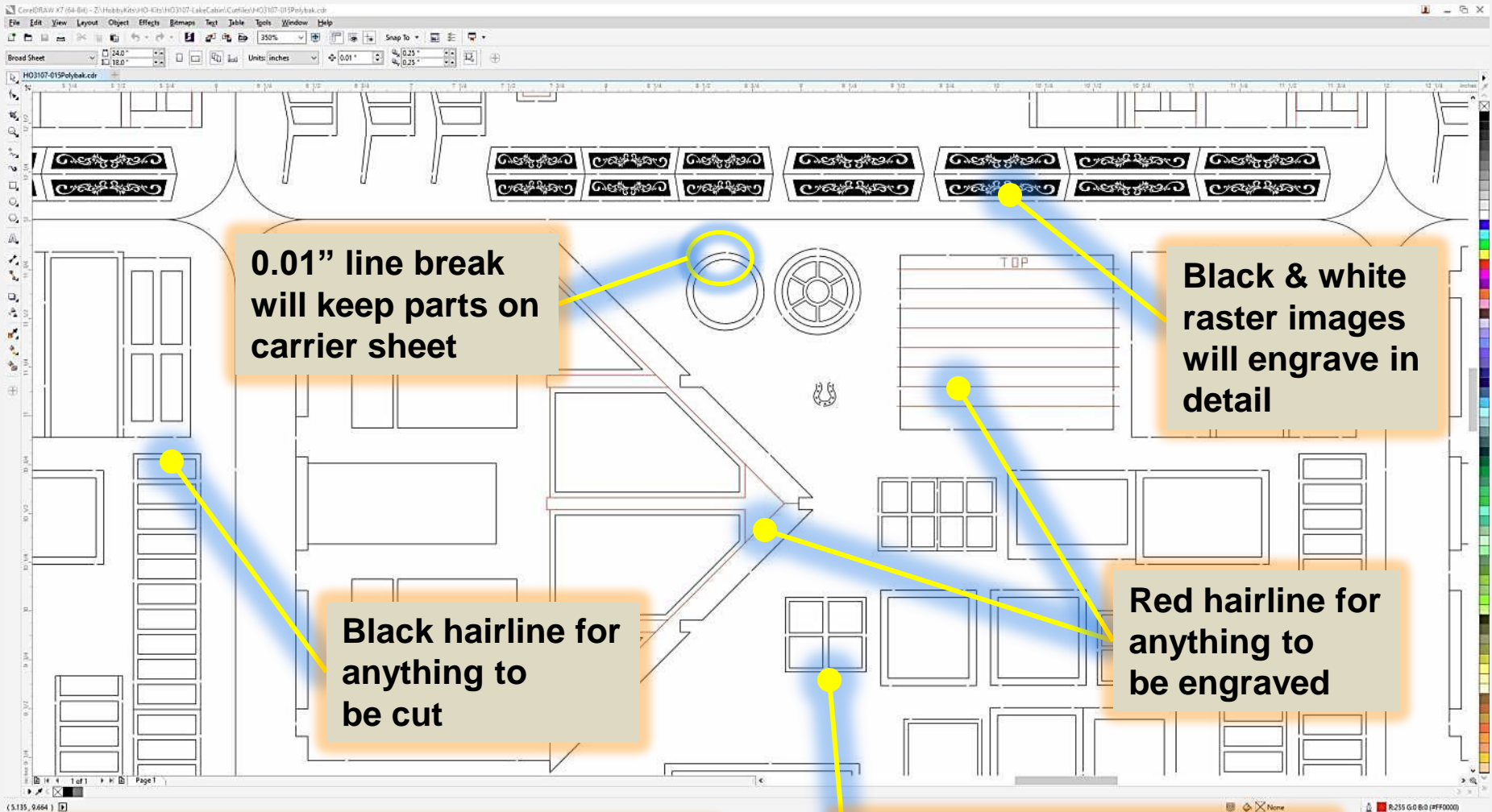
- repeatability  $<0.0015''$ , kerf  $0.004''-0.008''$
- cut feature size down to  $0.015'' = 380$  microns
- rastering resolution up to 1500DPI =  $0.0006'' = 16$  microns

## Typical materials that engravers will accept:

- basswood sheet, aircraft/hobby plywood
- acrylic sheet, acetate
- task board, cardstock, paper, matt board
- “laser board”, thin MDF
- Styrene? Meh...



# Some Basic Rules for any Laser Cutter



**0.01" line break will keep parts on carrier sheet**

**Black & white raster images will engrave in detail**

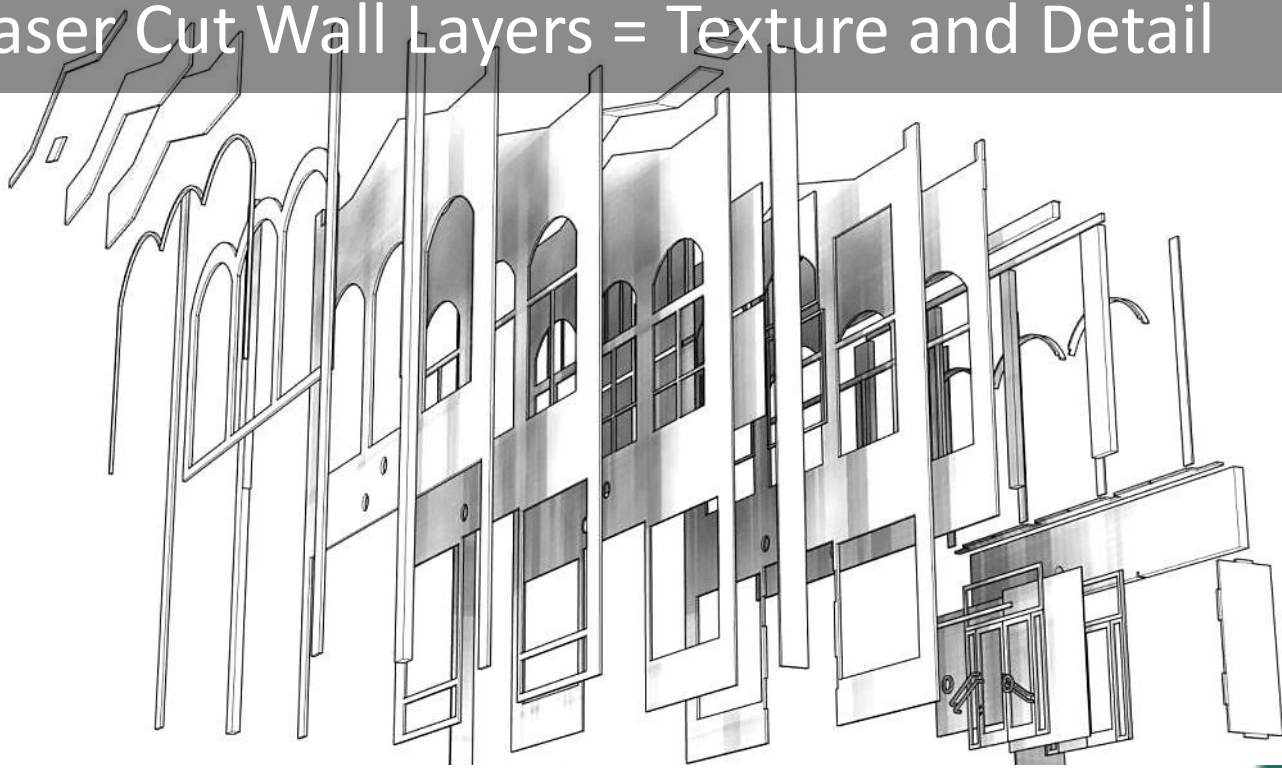
**Black hairline for anything to be cut**

**Red hairline for anything to be engraved**

**Make the drawing the same size as the material sheet you are cutting**

**Feature size down to 0.018" (depending on material)**

# Laser Cut Wall Layers = Texture and Detail



53 parts went into making this wall assembly.



# Where Laser Cutting Shines



Laser cut basswood and resin board awning parts with precision located holes to easily locate fiber optics strands



3D Printing is your Friend...if it Wants to be!

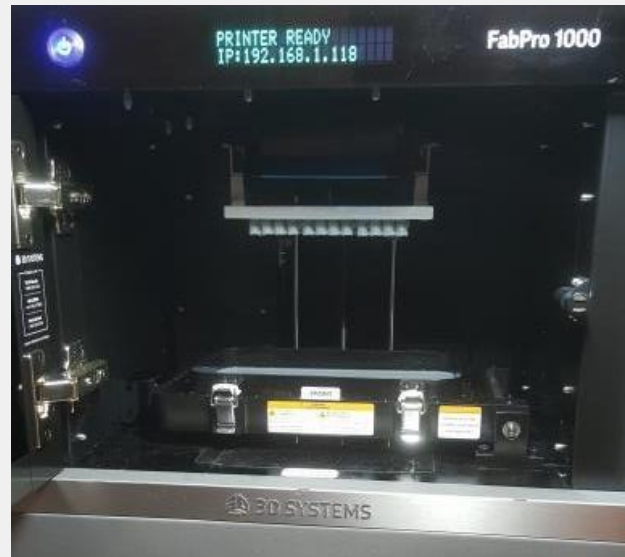
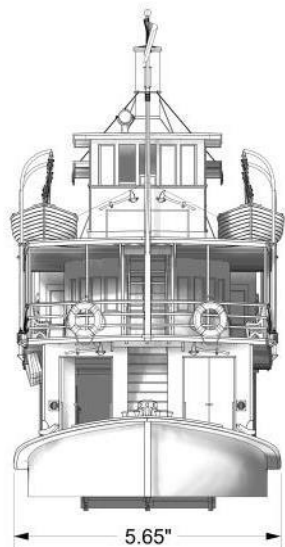
or

How I spent \$1000  
to make \$100 worth of parts!

# UV Resin 3D printing is Rewarding but can be Challenging

## Software:

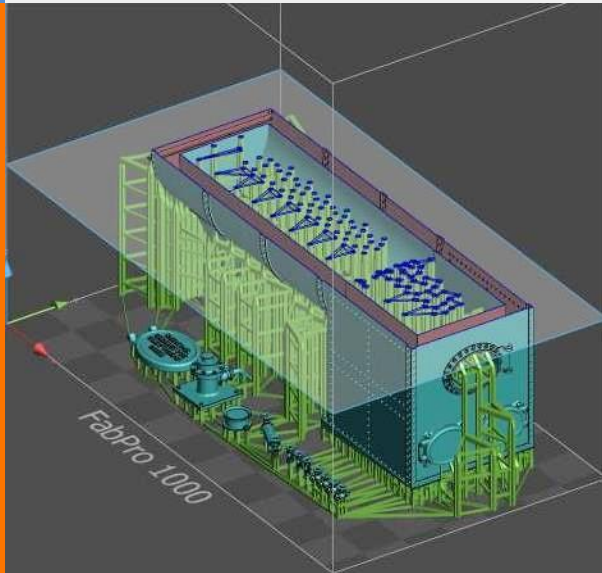
3D CAD  
STL Files  
Slicing programs



## Hardware:

DLP or LED  
2k or 4k screen  
Low force peel  
curing chamber

## Supports And Orientation

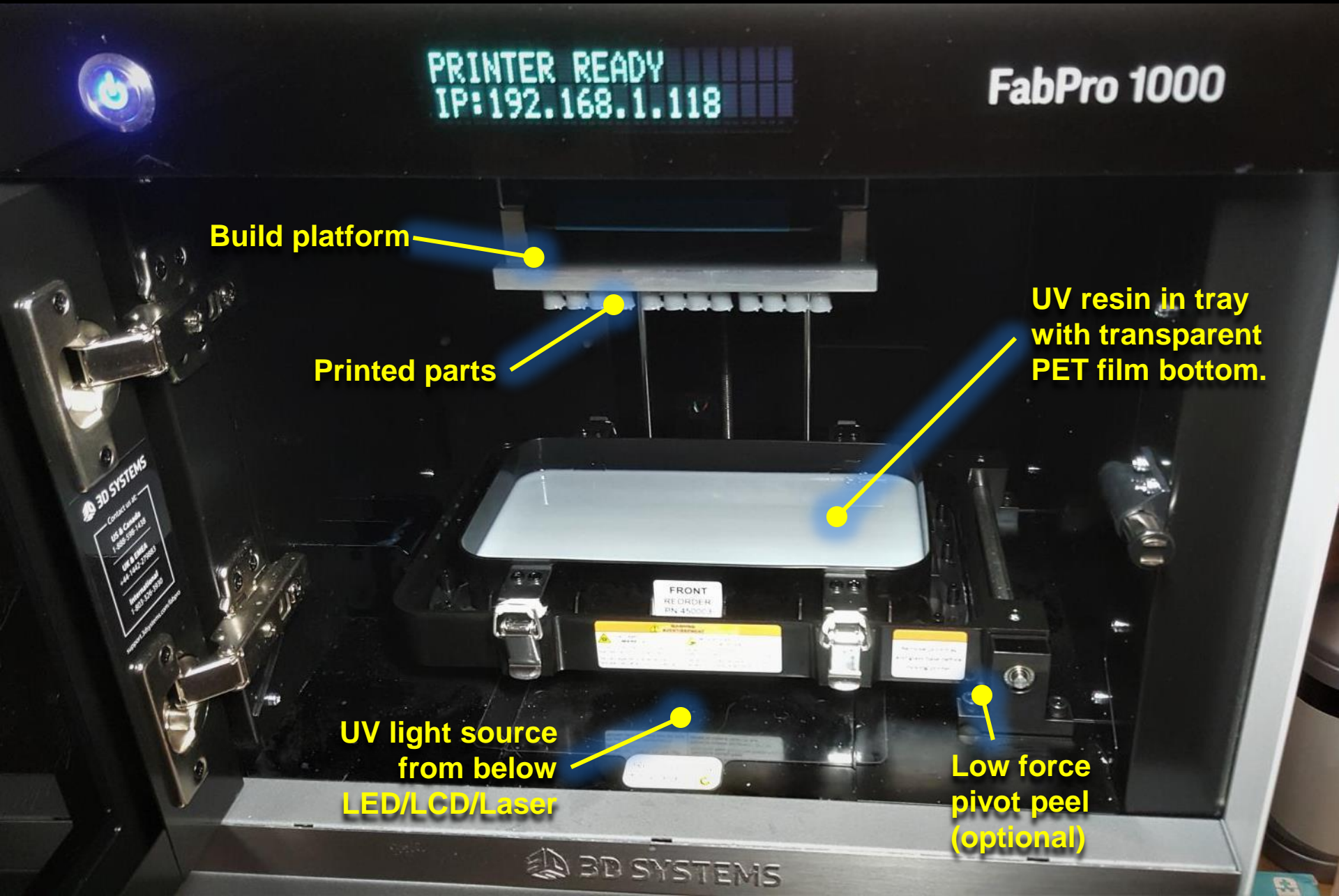


## Preparation and Cleanup

UV resin, FEP  
film, scrapers,  
IPA (lots of it)  
rubber gloves,  
paper towels,  
containers...



# Anatomy of a Resin 3D Printer



PRINTER READY  
IP:192.168.1.118

FabPro 1000

Build platform

Printed parts

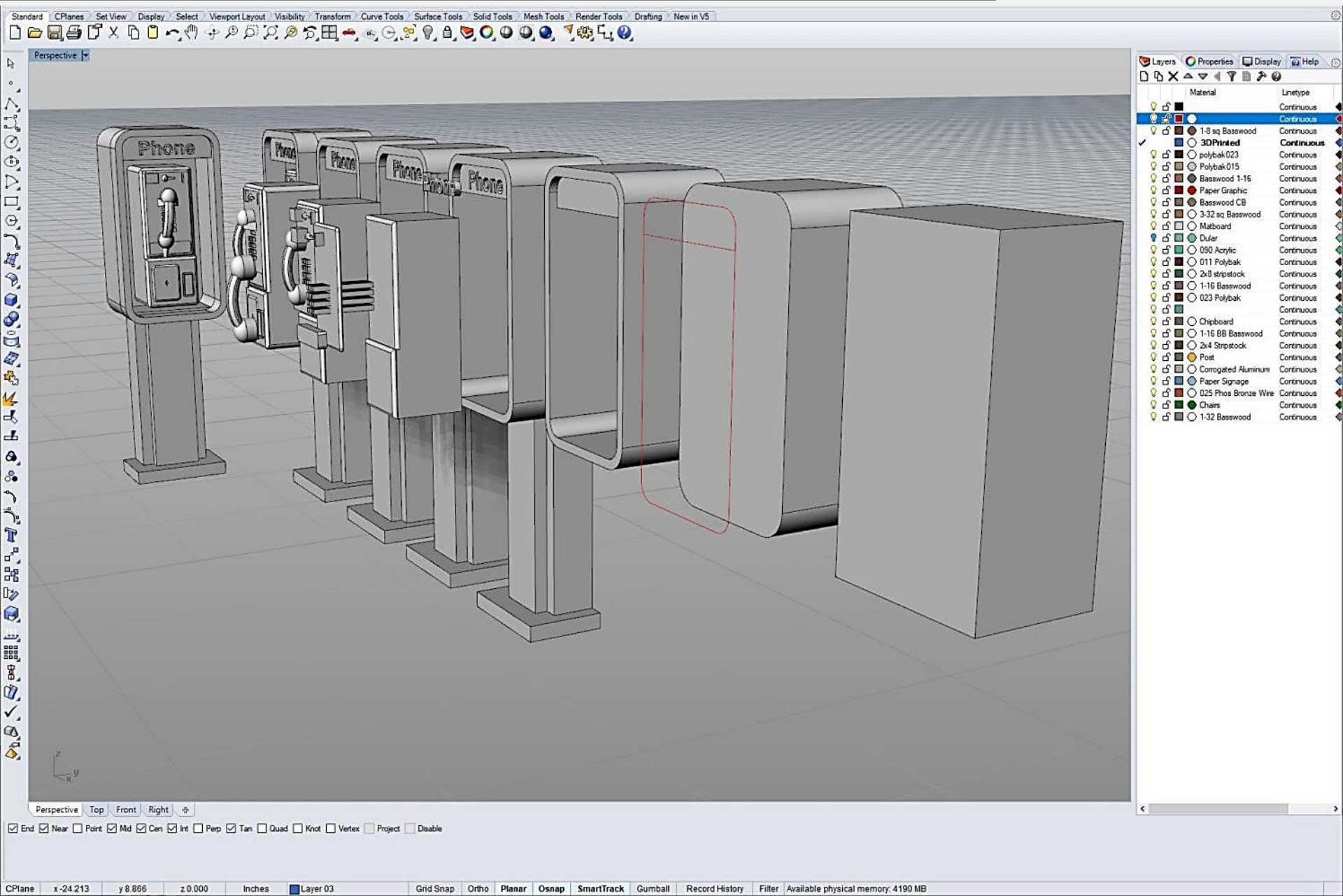
UV resin in tray  
with transparent  
PET film bottom.

UV light source  
from below  
LED/LCD/Laser

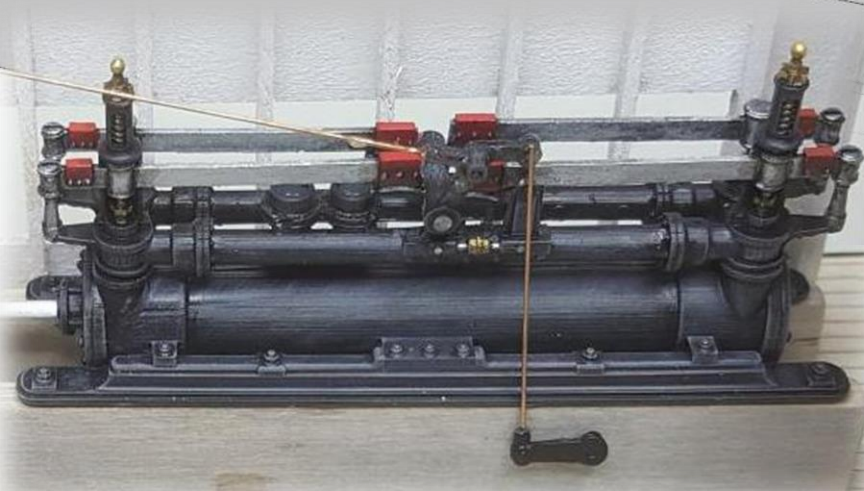
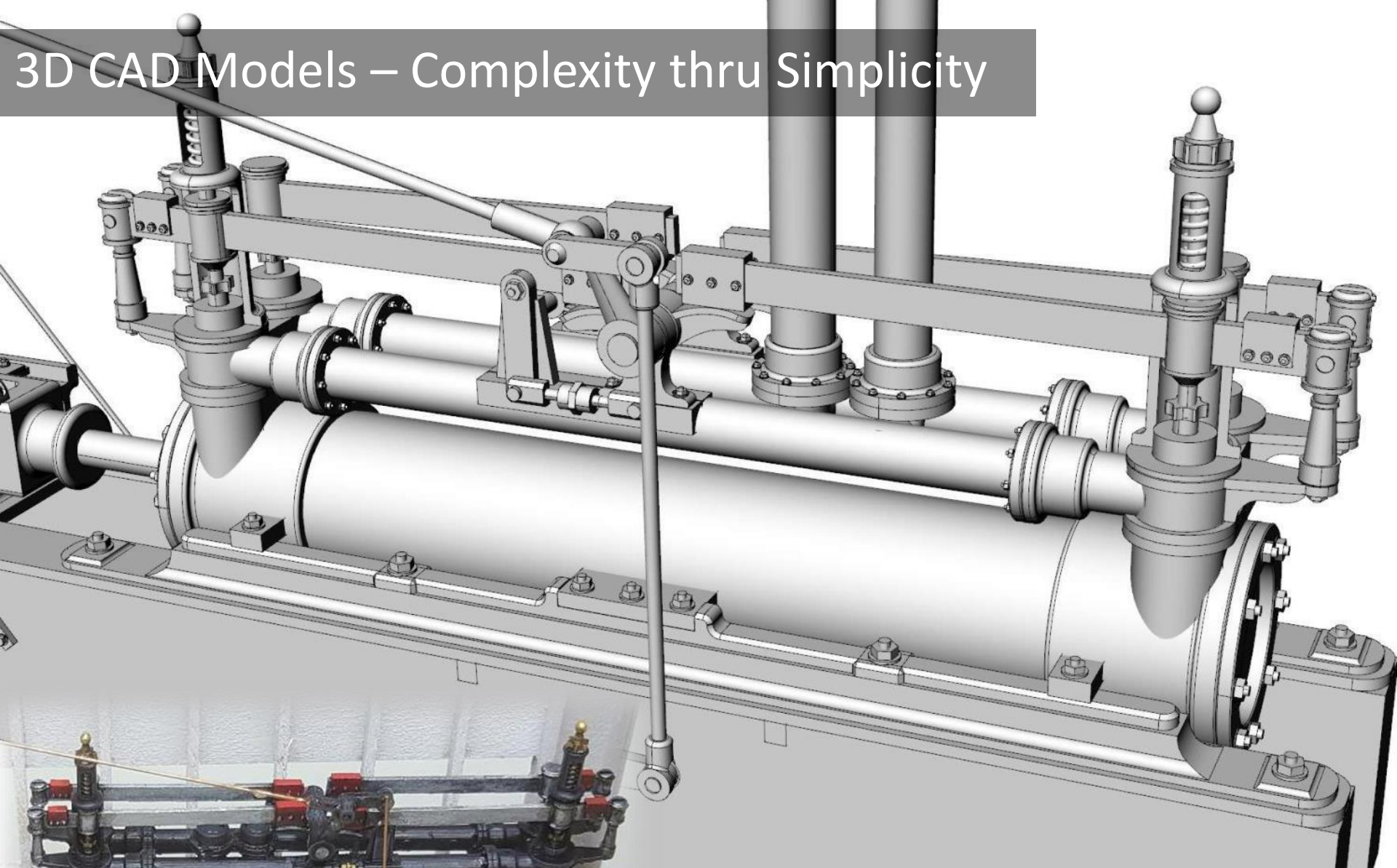
Low force  
pivot peel  
(optional)

3D SYSTEMS

# 3D CAD Models – Complexity thru Simplicity



# 3D CAD Models – Complexity thru Simplicity



It is a bunch of basic shapes stuck together.

# Should I Buy a UV Resin 3D Printer?

## PROs

- Make things that you can not buy
- Make multiple copies of a part
- Outstanding detail is achievable
- Many 3D STL models are available for free or purchase on the internet
  - Thingiverse
  - 3D model warehouses
- Some cheap CAD software will get you started.
  - Tinkercad
  - sketchup
  - Fusion 360

## Bottom Line

- 3D printing can produce awesome results
- You will need 3D STL files to feed the machine
- UV resin 3D printing results can be very rewarding once things go right. Patience and time is required.

## CONs

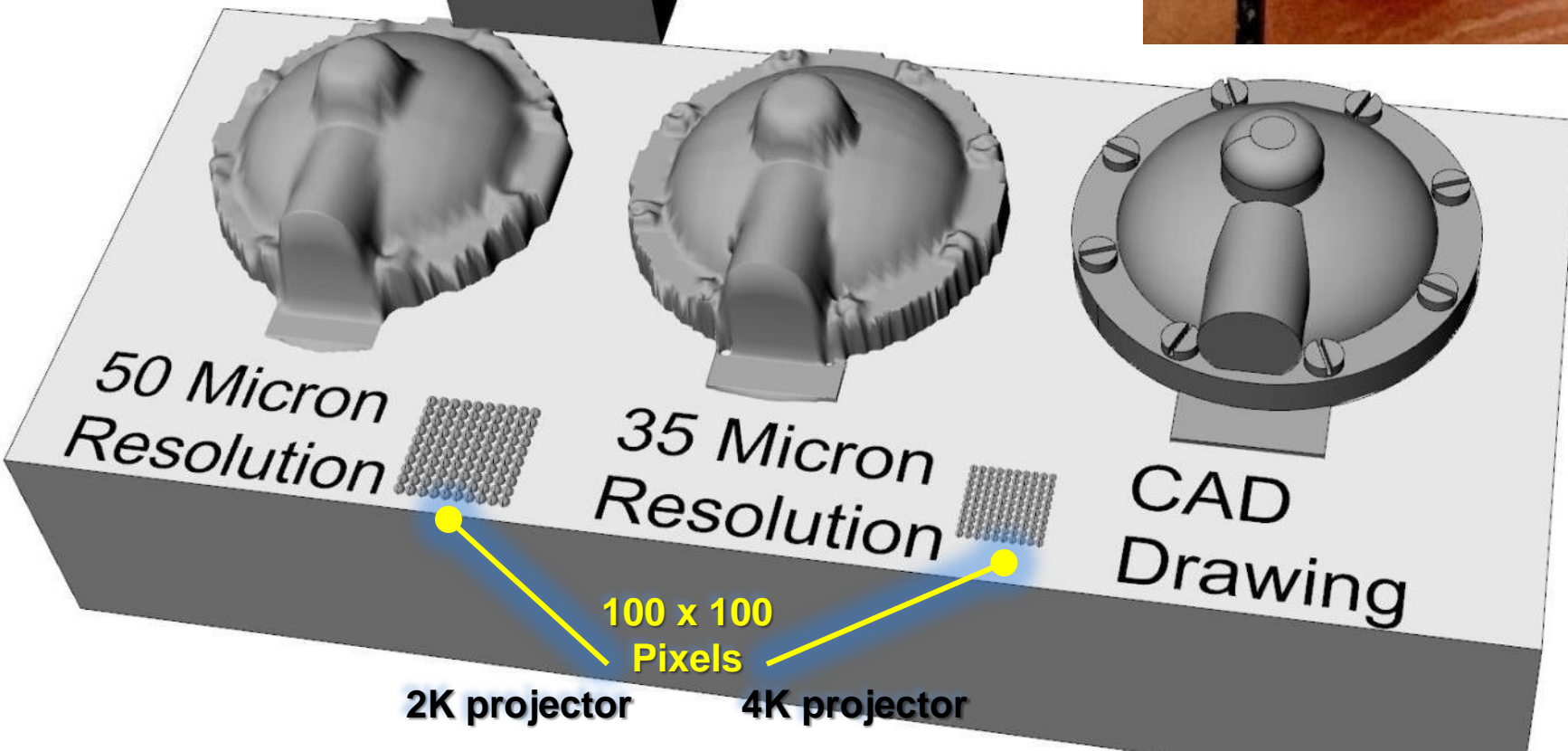
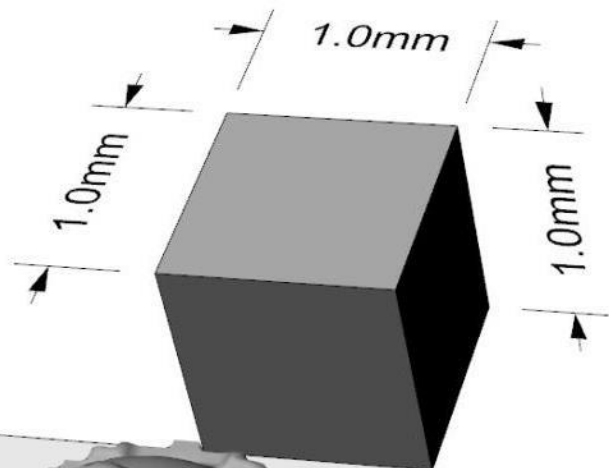
- Must know or learn 3D CAD. Good design software is a significant investment.
- Significant learning curve/frustration is expected
  - Learn 3D CAD
  - Support design and build orientation
- Designing 3D models is a hobby in itself
- Pricy - machine, software and consumables
- Messy – need a dedicated area for set up
- Smelly – resin can be offensive to some  
(personally, I don't find it bad at all)...  
*my wife disagrees*

# 3D Printer Resolution and the Human Eye



1:87 HO

# 3D Printer Resolution and the Human Eye



# What 3D Printer Should I Buy? (just a few examples)



**Elegoo Mars**

**Phrozen Sonic Mini  
Anycubic Photon**

- 50 Micron
- Plug and tinker
- Longer dial-in time



**Phrozen Sonic Mini 4K**

*(4K machines will be the new thing in 2021.)*

- 35 Micron
- Plug and tinker
- Longer dial-in time



**Phrozen Sonic 4K**

**Fabpro 1000  
Form 2/3**

- 35-50 Micron
- Plug and play
- Factory presets
- Resin is more expensive

## What to look for:

- Size of build platform
- X-Y axis resolution
- Rigid Z axis mechanism
- Good slicer program
- ChiTuBox compatibility
- Good support generator

**\$200-\$600**

**\$400-\$1000**

**\$1500-\$3500+**

**Note:** Some new machines claim 4K screens, but use them for bigger print area and not better print resolution in the X-Y axis.