

3D printing for the hobbyist

Getting stuff to print

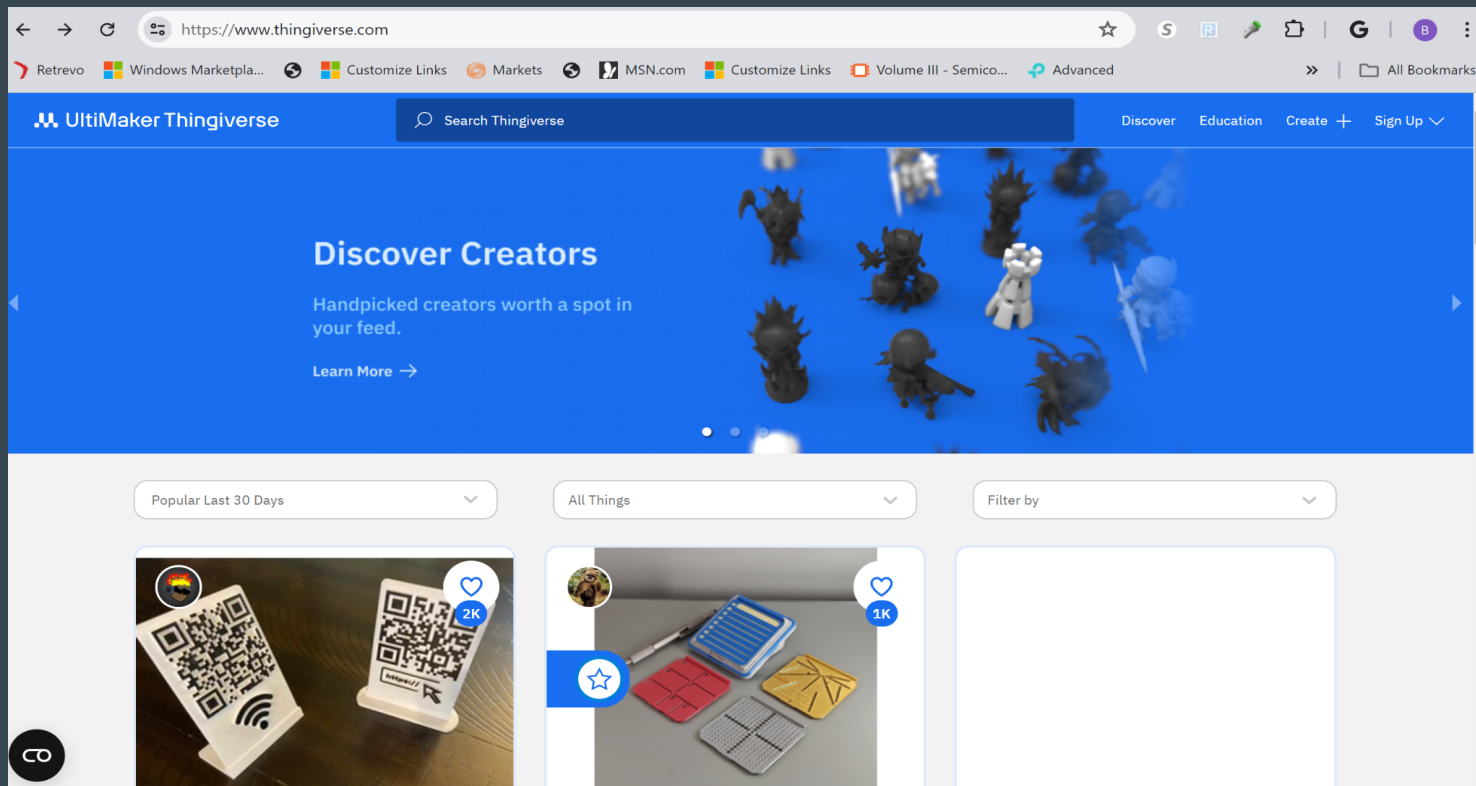
Already drawn

Tremendous library of free stuff

Thingiverse.com is the most common

Usually come as .stl files (stereolithography) which can be imported directly to
slicer program

Getting stuff to print



Getting stuff to print

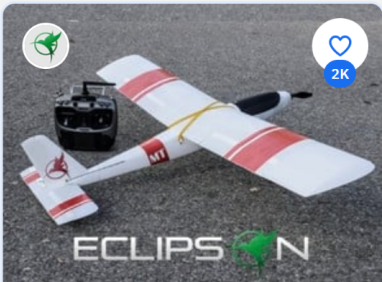
Retrevo Windows Marketpla... Customize Links Markets MSN.com Customize Links Volume III - Semico... Advanced >> | All Bookmarks

UltiMaker Thingiverse

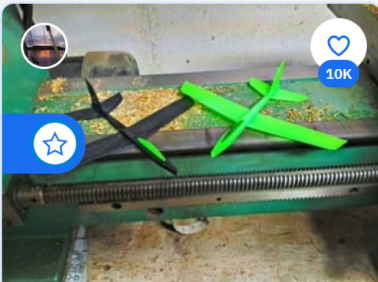
airplane

Discover Education Create + Sign Up v

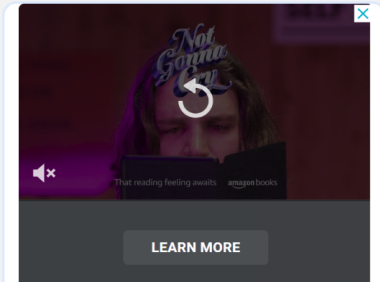
Relevant All Things Filter by

 2K

Free RC airplane

 10K

Stratos Glider

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Getting stuff to print

UltiMaker Thingiverse

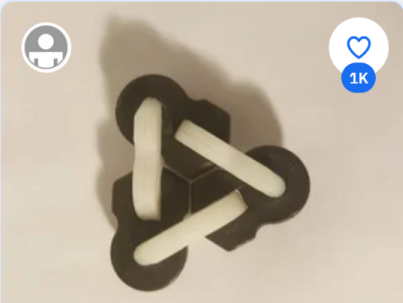
widget

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Relevant

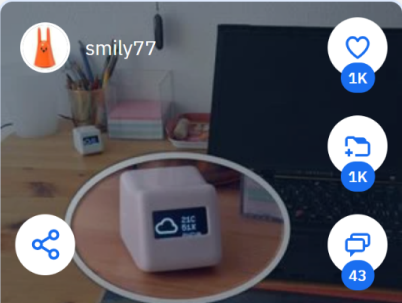
All Things

Filter by



Fidget Widget

1K



Desktop Widget (clock, weather forecast, world tim...

1K

43



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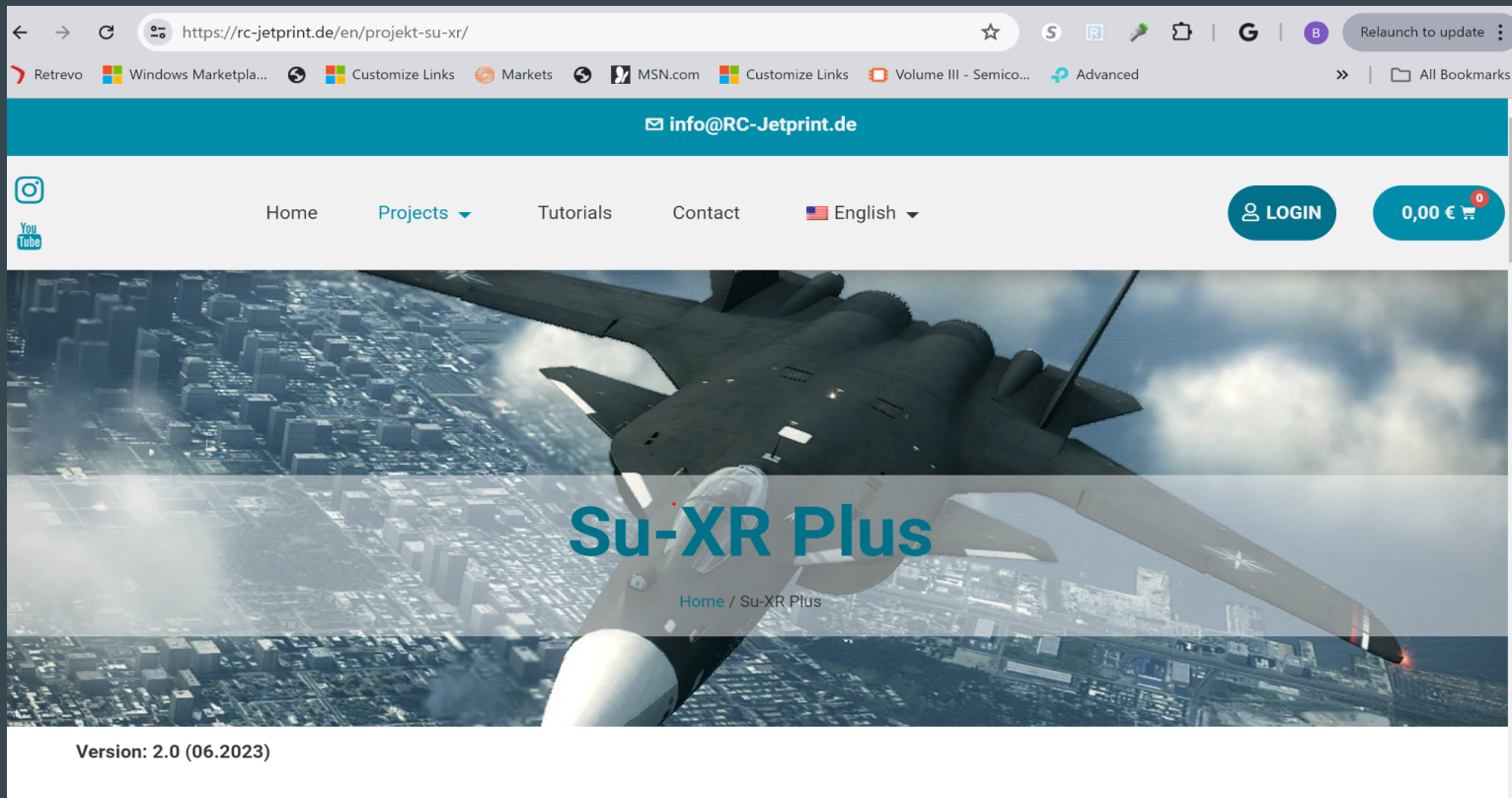


3K



710

Getting stuff to print



Getting stuff to print

Scan your object!

Using your camera or cell phone you take pictures as object rotates

Software then stitches photos together!

Lots of room for errors

Software may be free or costly!

Commercial scanners available. \$\$\$

Getting stuff to print

Draw your own

CAD programs allow you to draw your own models

Learning curve is steep, but worth it

Getting stuff to print

Modify already drawn files

EXTREMELY difficult

Easier to just make your own

Print filaments

PLA

Common

Easy to work with

Biodegradable

Made from corn starch

Print filaments

ABS

Super tough

Toxic!

Fussy to print

Print filaments

Nylon

Harsh environments

Tough

Long lasting

Fussy to print

Print filaments

Gimmicky filaments

Wood

Metal

Substrate embedded in plastic carrier

Looks like the real thing but not really

Print filaments

TPU

Strong

Very flexible

Print filaments

Carbon Fiber

Strong

Lightweight

Not pure, carbon fiber embedded in carrier

Requires a special ruby nozzle

Print filaments

Light weight PLA

Foams when extruded

Expands 2+ times

Easy to work with, like sanding and painting

Reasonable durability

Slicer programs

Instruct the printer how to travel and extrude the filament

Cura

most common

Matter controls

create and slice in one program

Prusa slicer

Many others. All are good

Slicer programs

Output gCode

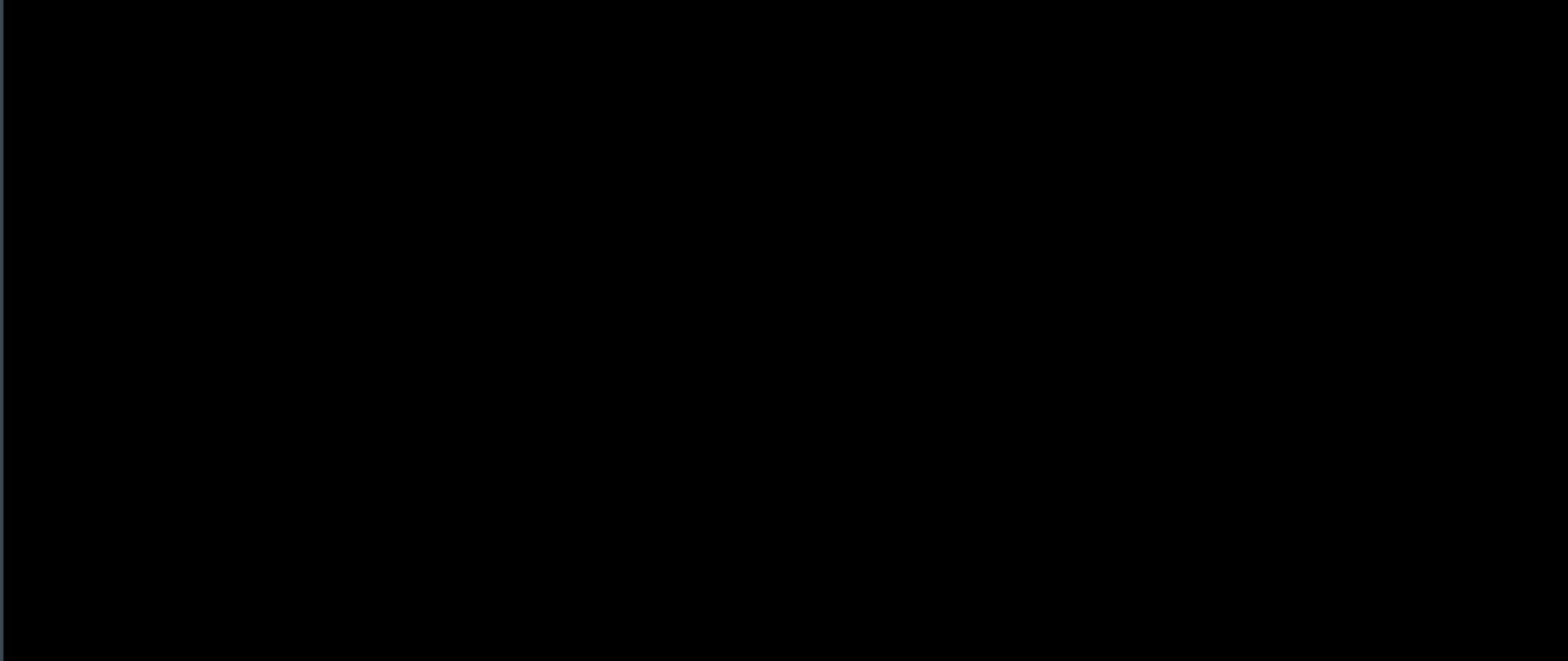
Example

```
G01 X247.951560 Y11.817060 Z-1.000000 F400.000000
```

CAD drawing programs

<u>Autodesk fusion 360</u>	Free for hobbyists Paid is \$680.00 per year Paid version makes it easier to edit .stl files
<u>FreeCAD</u>	free
<u>Sketchup</u>	now costs. Primitive
<u>Solidworks</u>	one of the most common
<u>Lots more!</u>	

Sample work flow drawing wing using Fusion 360



How to choose a printer

Bed size: common 200 x 200 but big might be better

Auto bed leveling: mandatory

WiFi printing: optional

Video monitoring: optional

Multiple filaments (for printing same filaments different color): optional

Speed: many excellent fast printers are becoming available. Worth it!

Costs: \$400.00 to \$1200.00