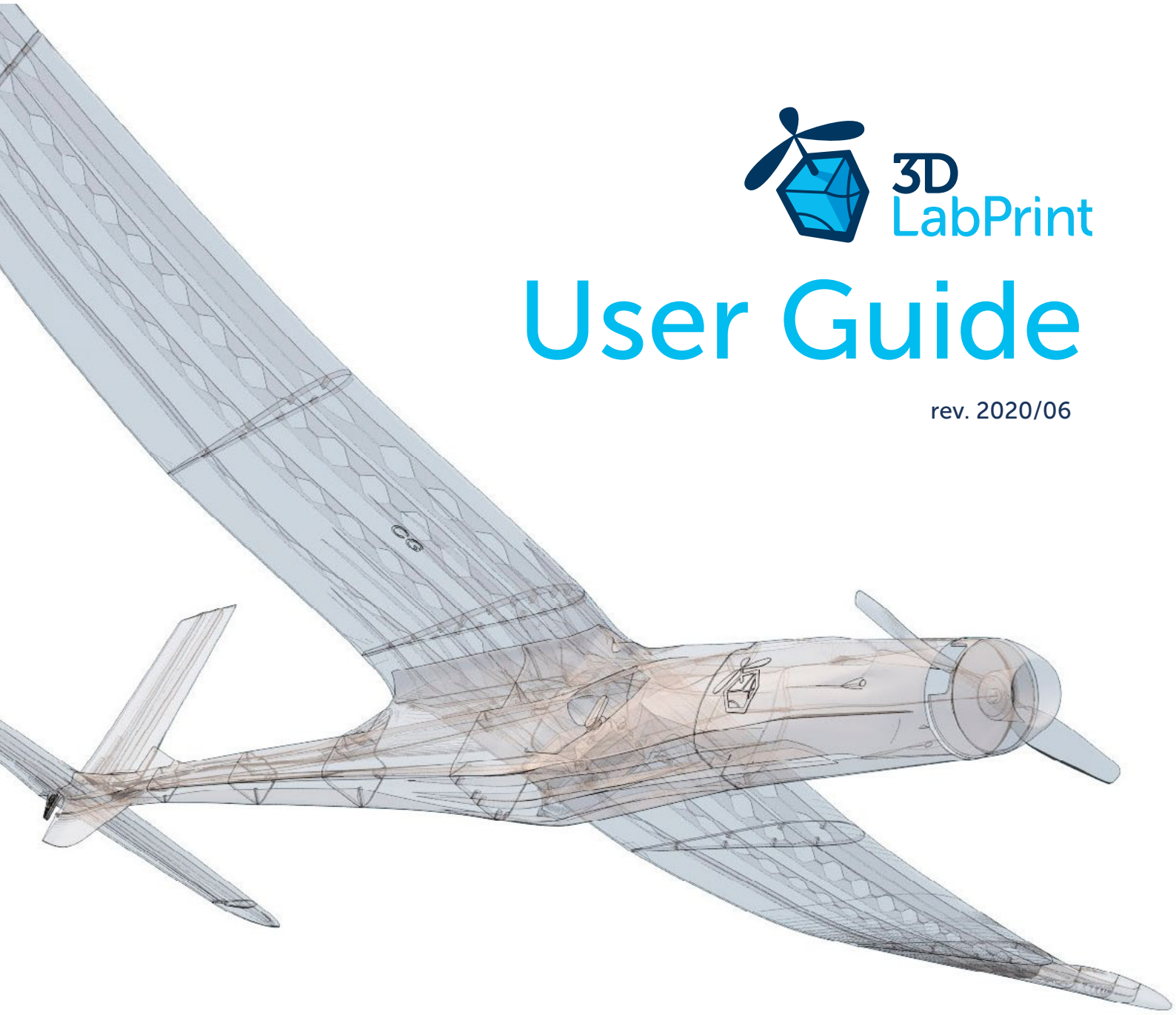


3D LabPrint

User Guide

rev. 2020/06

Fully 3d printable

Bungee Prop

wingspan 1180 mm / 46.5 inch - 320g / 11.3oz

LW planes

Bungee Prop
fully printable extra stable R/C glider.

With its flight weight of 320g, this is a very capable glider. This plane has been designed for foaming PolyLight 1.0 LW-PLA filament to be printed in a continous vase/spiral mode (with-out retractions).

The first fully printable airplanes with files prepared for your 3Dprinter, with flight characteristics, comparable or even supperior to classic build model airplane. This is not a dream, now you can print this HI-TECH at home. Simply download and print the whole plane or spare parts anytime you need just for a cost of filament only about $12

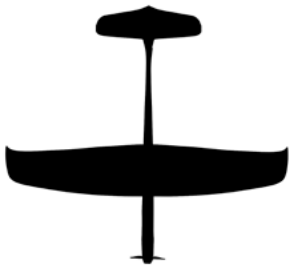
Extensive hi-tech 3d structural reinforcement making the model very rigid while maintaining a lightweight airframe and exact airfoil even it's just a plastic. This perfect and exact 3d structure is possible only thanks to additive 3dprinting technology. So welcome to the 21st century of model flying and be the first at your airfield.

Easy to assembly, you don't need any extra tools or hardware, just glue printed parts together and make pushrods for control surfaces. The rest of the assembly is very easy. Simply add brushless motor, ESC, servos and radio system. Don't worry, detailed step by step PDF/VIDEO is included.

You'll get an extra stable and lightweight airplane, able to fly and land on its own wihout any stick input such as free gliders do, so eventually you can use it as a free glider or to learn RC flying basics. Great as a first RC plane suitable for calm weather conditions.

General specifications:

Wingspan:	1180 mm / 46.5 inch
Lenght:	1070 mm / 42.1 inch
Height:	260 mm / 10.2 inch
Wing area:	21,2 dm2 / 2.3 square feet
Wing loading:	15,1 g/dm2 / 4.9 oz/square feet
Center of gravity:	84 mm / 3.35 in from leading edge CG tag on wing...
Airfoil:	3DLabPrint glide flight 03
Print weight (LW PLA):	216 g / 7.6 oz
Takeoff weight (2s 350 lipo):	320 g / 11.3 oz
Never exceed speed, VNE:	40 km/h / 25 mph
Design maneuvering speed, VA:	32 km/h / 20 mph
Stall speed, VS:	7 km/h / 4 mph

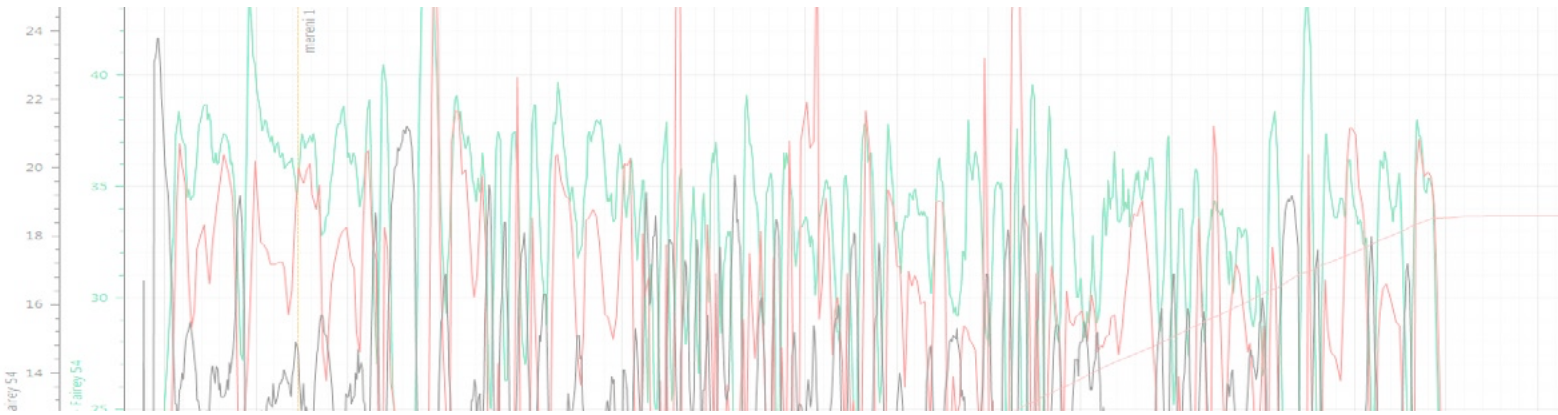


Recommended setup

Motor:	2805 - 2800KV - 26g
ESC:	Turnigy 12A or similar
Propeller:	two blade GWS 5 x 3 (ugly orange)
Battery:	LiPol 350mAh / 2s

Performance measurement

Max speed VH (level flight):	35 km/h – 18.9kn – 22mph
Rate of climb:	15 m/s, 2950 ft/min
Flight time (350mAh/2s):	+30min (glider flying)



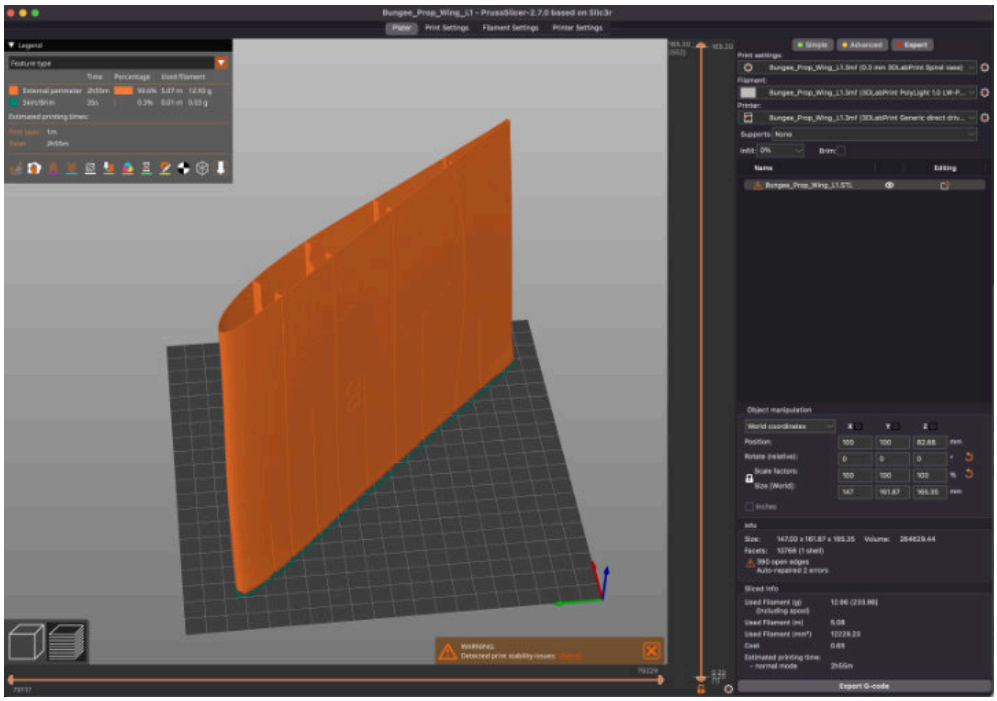
Included:

1. 3MF 3D files (primary)

PrusaSlicer

Used instead of STL files

3MF files can be used instead of standard STL files, but also include information about slicing in the new version of Prusa Slicer (since version 2.4). Open them directly in the Prusa Slicer as a project or import to the slicer of your choice. The files contain settings for printing on a direct drive printer with dimensions 200x200x200 mm, that can be further adapted to suit your printer. The generic settings are compatible with Prusa MK2/3/3S printers.



2. STL files - universal for all slicers

STL files are no longer necessary, as 3MF files can be imported to any slicer (Cura, Simplify3D) same as the STL files. Please use the 3MF files instead which contain more information than plain STL.

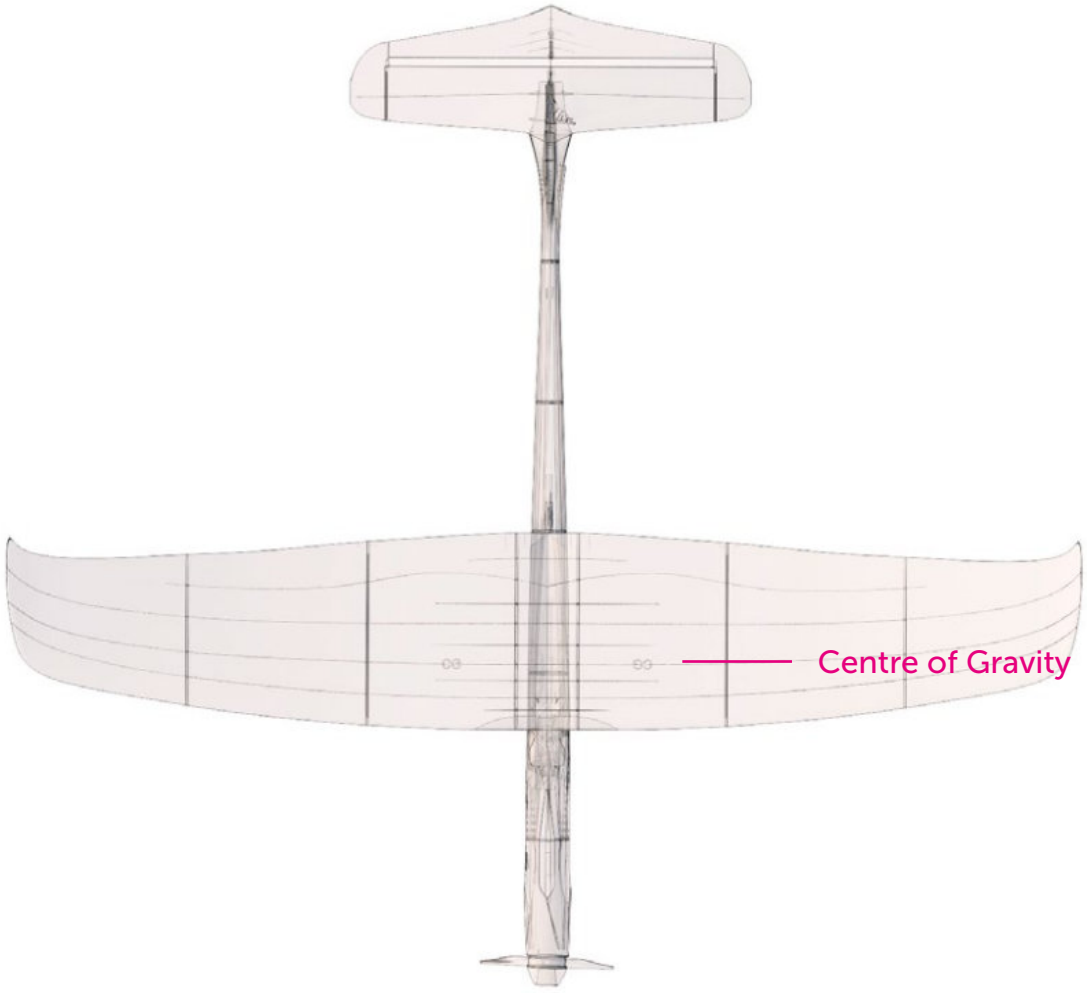
3. Printing Guide in our Help Section

Apart from this userguide, please see the Printing Guide for PrusaSlicer, Simplify3D or Cura to find some Tips and Advice for airplane printing (Thin Wall Printing).Remember: We use 0 retraction and 0.35-0.5 flow with LW-PLA.

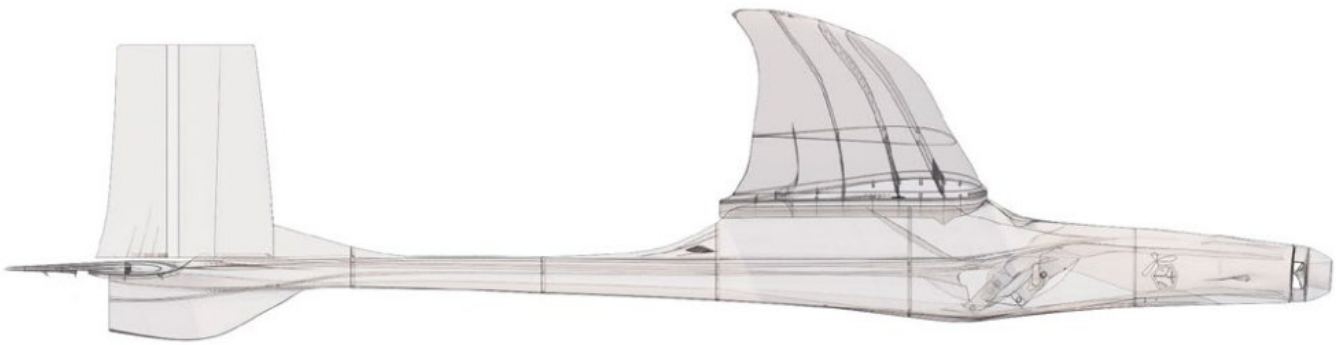
4. Gcodes

Basic Gcodes prepared for direct use, as universal as possible. Should work on i3 style printers, Give it a try, but we can't guarantee it will work on your printer. Wall thickness should be 0.55-0.67mm.

Bungee Prop



Wing area: 21,2 dm2 / 2.3 square feet



Lenght: 1070 mm / 42.1 inch

Wing span: 1180 mm / 46.5 inch

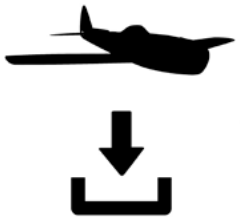
Step By Step PDF/VIDEO userguide

1. Choose airplane at www.3Dlabprint.com, visit our Facebook for latest info.

Basic requirments for Bungee Prop are 195/195/200 mm volume, nozzle 0.4mm recommended (0.35 or 0.5mm alternativelly). Heated bed recommended. Designed to be printed with Polylight LW-PLA filament by 3DLabPrint.
Contact: support@3dlabprint.com

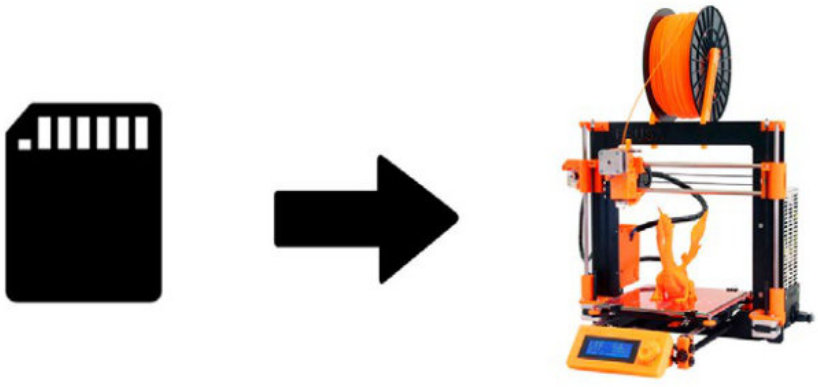
2. Create account, download

You will receive download link to all the zipped files to your email (please check your spam folder if not) or you can log in to your account and download directly from our websites.



3. Prepare Gcodes

option A Gcodes:
if your printer is i3 comptatible you can use prepared gcodes directly. Just save them to the SD card and let the 3d printer do it's job. HE temperature is set to 250°C so the layers fuse together well (with great foaming effect), you can adjust speed and temperature only through your printer's LCD. If these Gcodes does not work for you, please proceed to the next options.



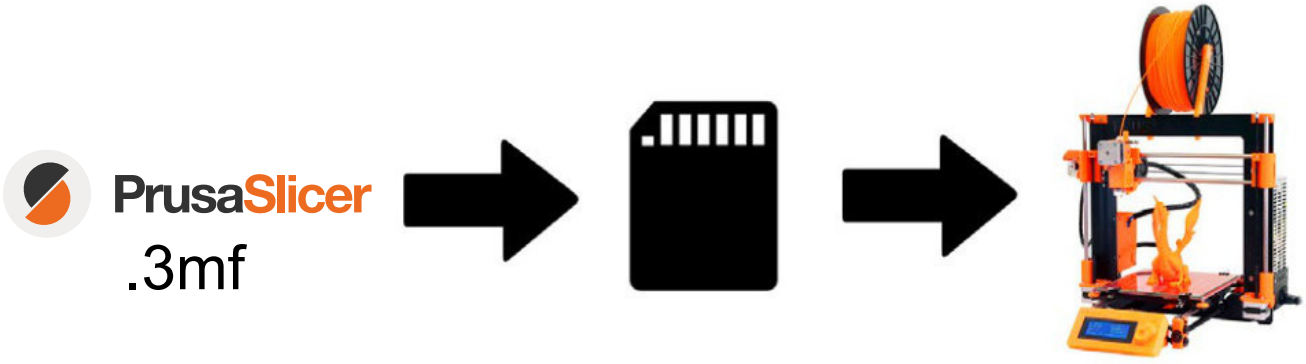
option B Prusa Slicer 3mf files (recommended)

Note: check proper extrusion multiplier for each part - see weight chart on page 11.

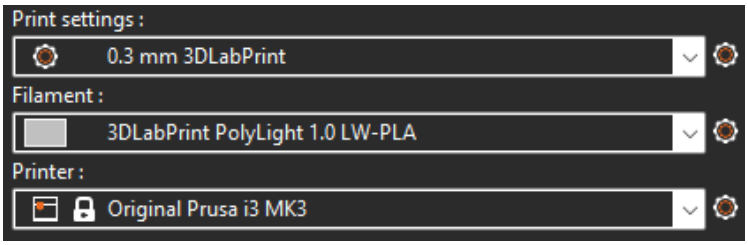
Please follow the guide in the Help section of our website about Prusa Slicer setup.

Drag and drop the 3mf file to the Prusa Slicer window and open it as a Project. It will create a Generic 3DLabPrint printer, printing profile and materials. Please use these as a starting point instead of your printer profiles provided by your printer manufacturer. Strong thinwall printing is a different discipline than printing Benchys what are the stock profiles usually optimized for. Once you tweak your profiles (retractions, etc.) you can easily switch the profile everytime you open the 3mf file. All the slicing tweaks, such as added top/bottom layers etc. are stored in the models below, so it won't be overwritten.

Remember: We are using 0.35-0.5 multiplier and 0 retraction with LW-PLA.



This method is also suitable for other common brands of printers, such as Creality (Enders), BambuLab and other. Prusa Slicer provides all the features we need and the settings are preconfigured in the 3mf files. Use the Print Settings and Filament profiles from our 3mf files and your Printer profile to ensure the compatibility.

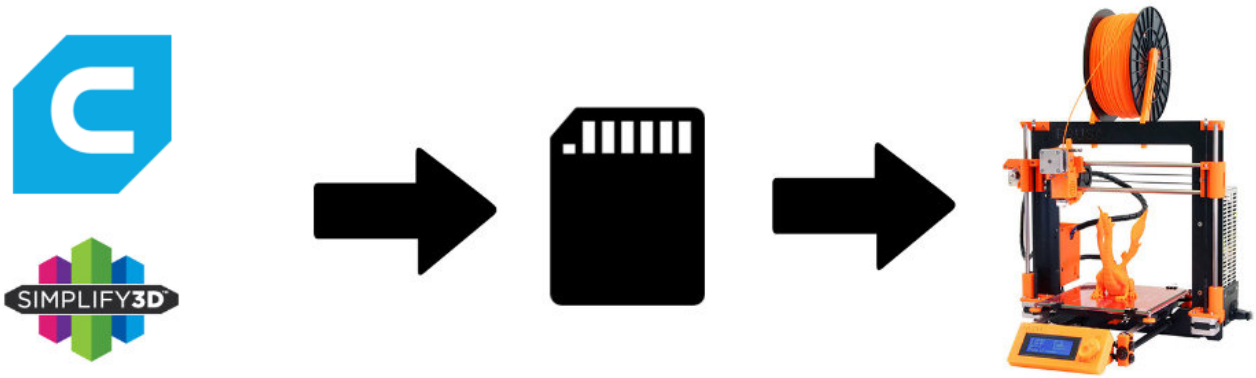


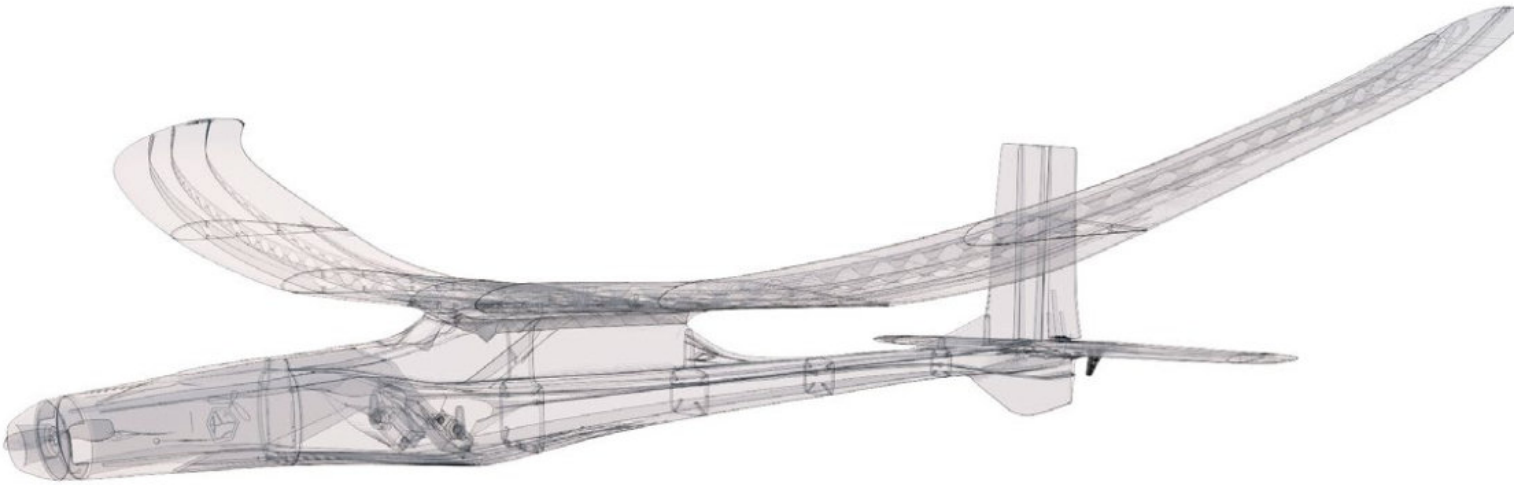
option C CURA or Simplify3D

CURA and Simplify3D option is for advanced users who insist on using it. There's no advantage compared to Prusa Slicer option but it still remains available. If you struggle with setting up Cura or Simplify3D, please use the option above which provides better results by default. You can import the Prusa Slicer 3mf files just like any other STL files but it won't import any print settings.

Please check our CURA guide or Simplify3D guide. Please visualise our presliced gcodes to see how the result should look like and try to achieve the same in your slicer.

Remember: We are using 0,35-0.5 extrusion mulpiplier and 0 retraction with LW-PLA.





4. Print it

Save the Gcodes to the SD card and insert into your printer. Prepare your printer and start printing, we prefer to use SD card rather than direct USB connection. Scaling the model will lead to unusable result!

you will need: LW-PLA filament - (Polylight LW-PLA)
3DLac, Strong hair spray, PEI or your favorite adhesive bed surface

AND... please watch our VideoGuides:

LW planes

Basic Tips and Advice

This plane has been designed to be printed from foaming LW-PLA that means about 50% weight reduction on printed parts.
Note: check proper extrusion multiplier for each part - see weight chart on page 11.

Please Experiment with temperature and extrusion multiplier (0.55-0.67mm Wall thickness). Hotend temperature is very important (220° up to 260° celsius). The temperature determines, how much the LW-PLA foams while printing. Cranking up temperature means, you can go lower on multiplier as the material will gain on volume. Turn OFF cooling fan for better layer adhesion (HE fan should be ON). We dont need it for thin wall printing. Heated bed is very recommended, 55-58° Celsius (to prevent warping ends).

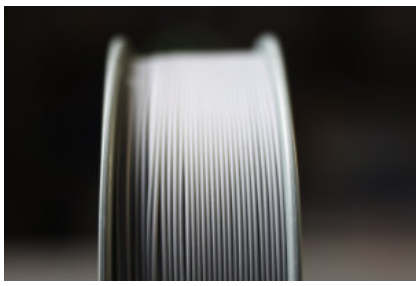
Price of the LW-PLA may look a bit steep at first glance, but since we're using 50% less material thanks to the foaming feature, the cost difference is not so high as it looks.

Please see the Printing Guide (Help Section)

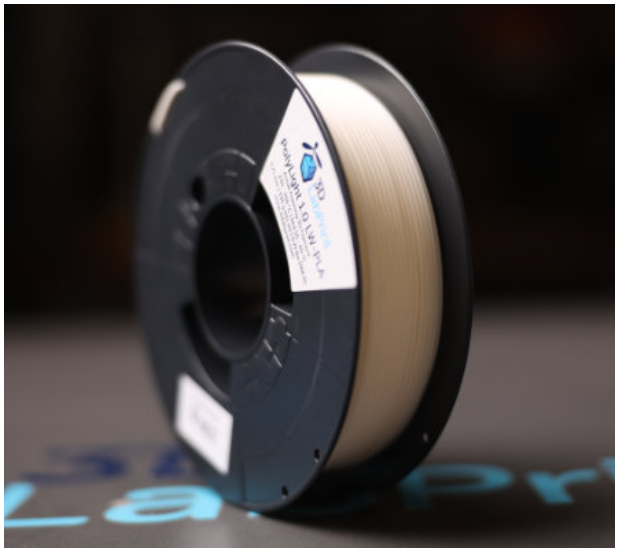
How to print PolyLight LW-PLA?

The basic print setup is almost the same as we use for standard PLA. The only difference is in extrusion multiplier set to 0.5 and turning off the retractions completely.

This results in parts with half the weight and still suitable mechanical properties, this model is designed mainly in VASE mode, even that expect some stringing inside and outside in some inpossible spots. Of course you can try to tweak the retractions for less stringing inside the parts, but there's a high risk of clogging the nozzle or throat. Increasing the retraction distance above 1 mm is not recommended at all and leads to nozzle clogs caused by foaming. Cleaning the hairy, but functional parts after printing with retractions completely disabled seems to be more efficient method. The nozzle is permanently pressurized and you don't need to worry about print failures. This method works fine even for bowden printers.



Extrusion multiplier 0,5 has been tested for easy print with massive weight saving around 50%. Feel free to experiment with extrusion multiplier and temperatures at will for the best results on your printer. This airplane is designed for **0.55 - 0.67mm** Wall thickness.
Cosmetic issues of the prints are easily fixed with snap knife or sand paper, as the LW is easily sanded and cut.



Enjoy the fun together!

Bungee Prop is another of a new LW Planes series designed for easy and cheap flying. The build is simple even for a beginner. It's very low weight, easy assembly and fantastic flight characteristics makes this model an ideal plane for beginner RC pilots.

Very suitable for dads and kids. Children will learn some modern building skills and technology and most of all have fun. This is the reason, why every dad should have a 3D printer at home.

This model has been completely designed with a new LW PLA material by ColorFabb in mind.

Parts printed from this LW PLA are light, easily sanded and glued together. This model requires only about 220 g of this material, that means it's a very cheap build. In case of accident, parts can be easily reprinted with just a filament cost.

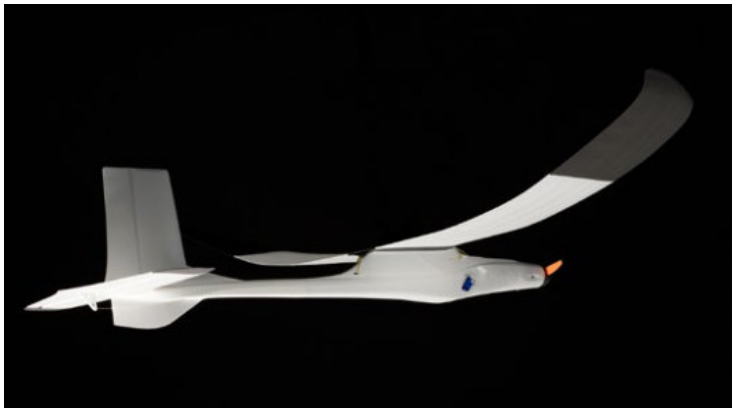
We've been testing this material for half a year before the first LW plane was released... The material is using an active foaming technology to achieve lightweight, low density PLA parts. At around 230°C this material will start foaming, increasing its volume by nearly 3 times.

All parts of this plane should be printed from LW-PLA.

Note: check proper extrusion multiplier for each part.

Bungee Prop weights of printed parts extrusion setting

fuselage	LW PLA
F1 (extrusion m. 0.50)	11 g
F2 (extrusion m. 0.50)	22 g
F3 (extrusion m. 0.40)	12 g
F4 (extrusion m. 0.40)	7 g
F5 (extrusion m. 0.40)	6 g
F6 (extrusion m. 0.40)	8 g
wing	
wing L1 (extr. m. 0.40)	17 g
wing L2 (extr. m. 0.40)	19 g
wing L3 (extr. m. 0.40)	14 g
wing R1 (extr. m. 0.40)	17 g
wing R2 (extr. m. 0.40)	19 g
wing R3 (extr. m. 0.40)	14 g
wing C (extr. m. 0.50)	12 g
tail	
H stab. L1 (extr. m. 0.35)	9 g
H stab. L2 (extr. m. 0.35)	1 g
H stab. R1 (extr. m. 0.35)	9 g
H stab. R2 (extr. m. 0.35)	1 g
V stab. (extr. m. 0.35)	10 g
accessories	
m. mount (extr. m. 0.5)	4 g
spinner (extr. m. 0.5)	4 g
all printed parts	**216 g**



LW planes

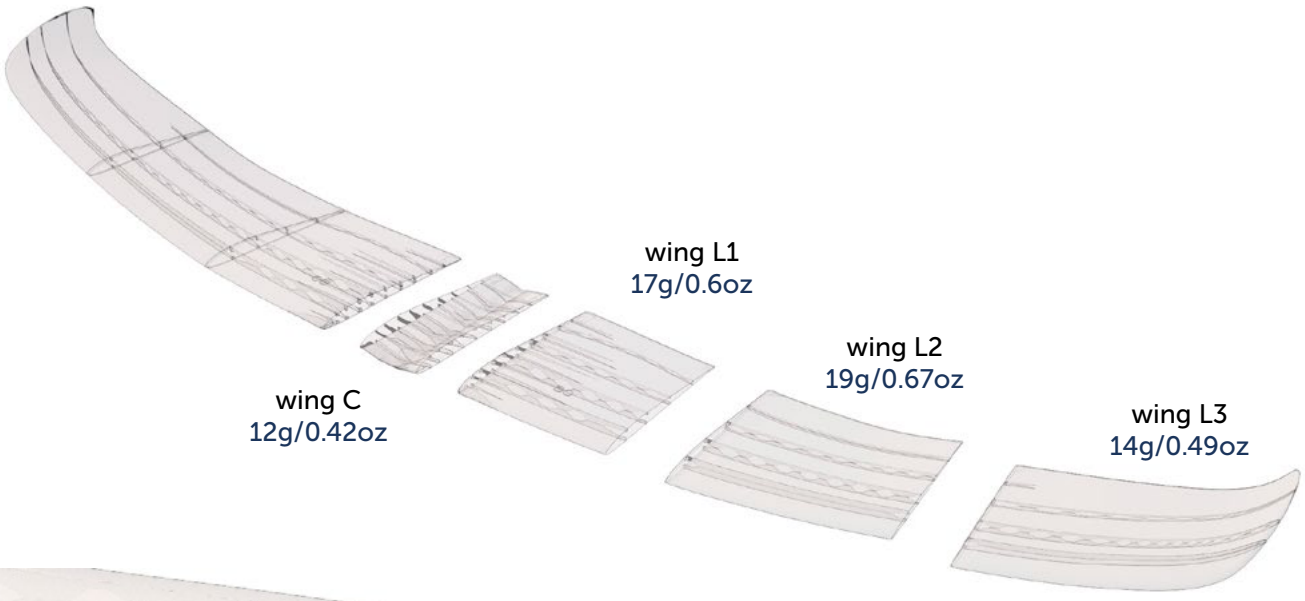
5. Assembly of printed parts

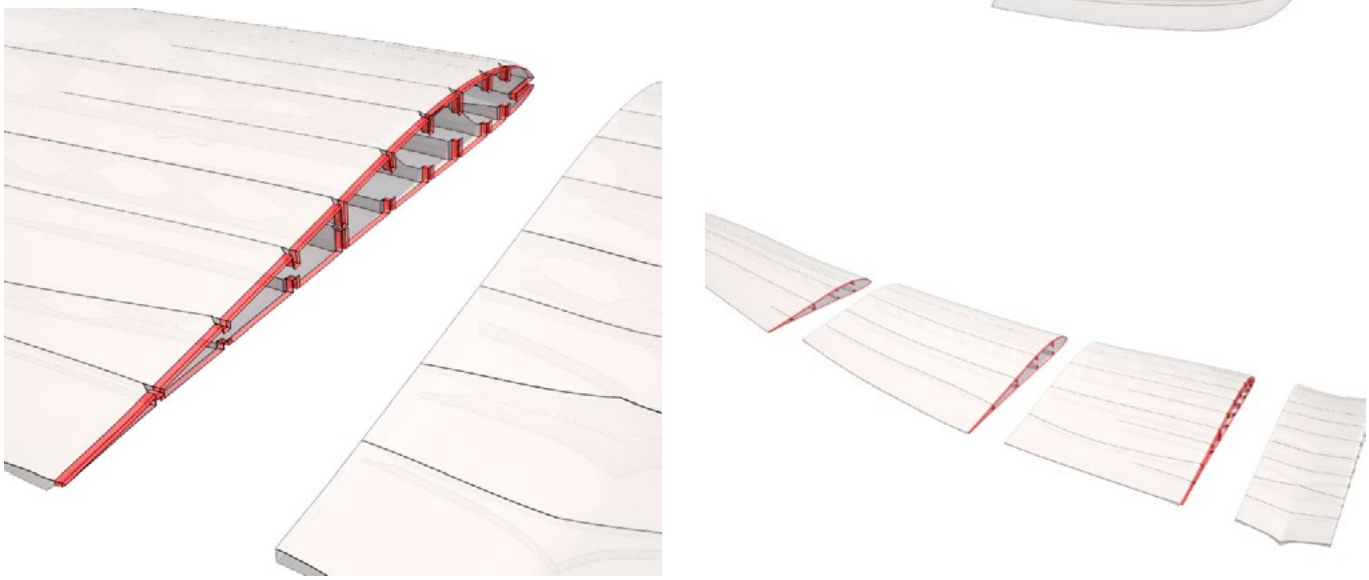
5.1 Wing assembly

Glue wing parts together. The new 3DLabPrint lock system will help you. Repeat for the right side. Glue both halves of the wing together. Use the CA glue and activator to speed up the glue curing.

See video guide #4

you will need: CA Glue medium viscosity + activator
Snap knife, some cloth for wiping CA glue...





5.2 Fuselage assembly

You can use snap knife for cleaning the surface of printed parts (joining spots), but mostly it is not necessary.
Glue fuselage parts F1-F6 with CA glue together. The new 3DLabPrint lock system will help you.
Use any hot tool to cut out the hole for rubber band in F4 part (main wing join).

See video guide #5

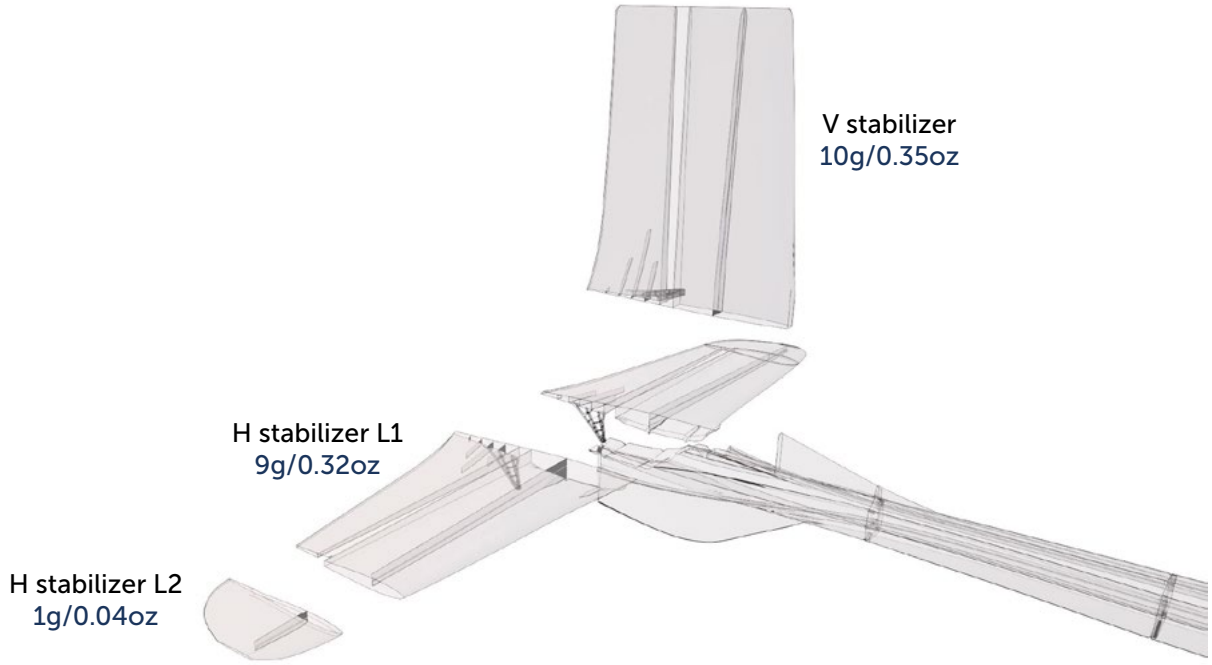
you will need: CA Glue medium viscosity + activator
Snap knife, Soldering Iron or any hot tool (dremel torch)

5.3 Fuselage tail

Use hot snap knife or any hot tool and cut out print bridge so the elevator can freely move (you can than cut some longitudal holes so the elevator hinges will be softer). Glue L1 and L2 parts of the stabilizer, proceede with R side and glue both sides together, then glue whole stabilizer/elevator to the fuselage.
V stabilizer/rudder - cut out the bridge the same way and glue it to the fuselage.

you will need: CA Glue medium viscosity+ activator
Snap knife, Soldering Iron or any hot tool (dremel torch)

See video guide #6

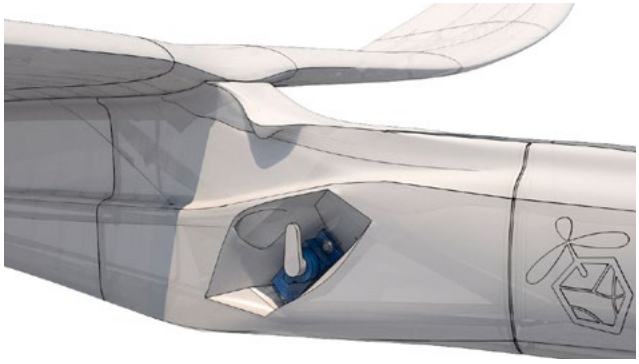


6. Servo and pushrod installation

Install servos to fuselage servo bays. Use a 0,6-0,8mm steel wire with L bends as a linkage between the servos and elevator/rudder control horns.

See video guide #7

you will need: 2x HXT900, or opt1, opt2, opt3 or any similar
23x12x26 mm / 0.74x0.42x0.78 inches
0,6-0,8 mm steel wire for elevator and rudder pushr
Snap knife, pliers



7. Motor & ESC

Mount the motor using small self-tapping screws to the printed universal motor holder. For long motors you can flip the holder to the front. Connect ESC and check rotation. Insert universal motor mount with motor into the fuselage in right position and secure with two screws.

See video guide #8

you will need:
6x 1.5/10self-tapping screws
soldering Iron, shrink tube...

Motor Setup

Motor: any 10-30grams, 28-05, 2800KV, opt1, opt2, opt3... or similar
+ suitable propeller holder (if not included)
ESC: any 12A/2s, opt1, with caution opt2 or similar
Propeller: two blade GWS 5 x 3 (ugly orange) or opt1, opt2 (use CCW)
Battery: 350mAh/2s, opt1, opt2, opt3, opt4,
Batt. connector: JST + shring tube

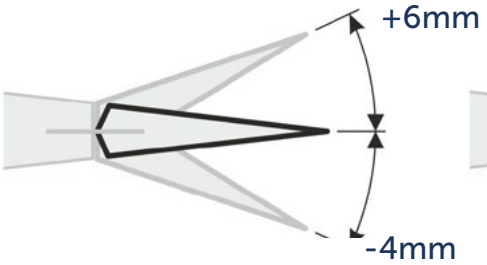
8. Final assembly/setting

See video guide #9

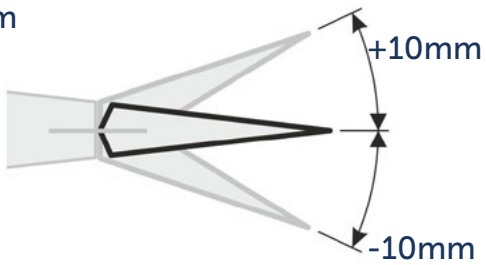
you will need: Your own Rx/Tx system
Rubber Band (thiny)

Refer to your R/C system userguide for setup information.
Install your reciever, connect battery, setup servos and etc. with your trasmitter, check servo position, then install propeller, and spinner.
Never set ESC with propeller installed, this could be very dangerous!

elevator



rudder



9. Go flying

Pre-flight check center of gravity is very important, battery properly charged, rudder and elevator deflection check, calm weather (wind under 5km/h, 3mph) ...

Bungee Prop -Flyght video

10. Pilots Please Attention! Wait for a calm weather.

With its 320g/11.3oz this is a very lightweight R/C Glider so We recomend to fly it only in very calm conditions (wind under 5 km/h, 3mph). You can then experiment with angle of attack by wedging the wing and shifting the Center of Gravity to achieve expected flight characteristics. By shifting the CoG backwards you can achieve better glide ratio (in this case you can go further because this plane is itself very stable). Feel free to experiment.

The plane is very stable and able to fly and land without any pilot inputs (given the plane is well tuned) so it can be used as a free glider as well (you need to use balast weight instead of a motor to achieve the CoG).

Never fly aft positioned Center of gravity (not too much in this case :-).

Please, use these files only for your own purpose, do not redistribute or publish. Thank you very much.
Enjoy your flight.

Shopping list

Printing material:	0,22 kg of PolyLight LW-PLA by 3DLabPrint
Motor:	any 10-30grams, 28-05, 2800KV or similar + suitable propeller holder (if not included)
ESC:	any 12A/2s or similar
Battery:	350mAh/2s
Servos:	2x HXT900 or any similar sized servos 23x12x26 mm / 0.82x0.47x0.86 inches
Glue:	CA Glue - medium Activator for CA Glue
Other:	2x 1m of 0.8mm / 16 AWG pushrod wire 6x 1.5/10self-tapping screws Rubber Band (thiny)