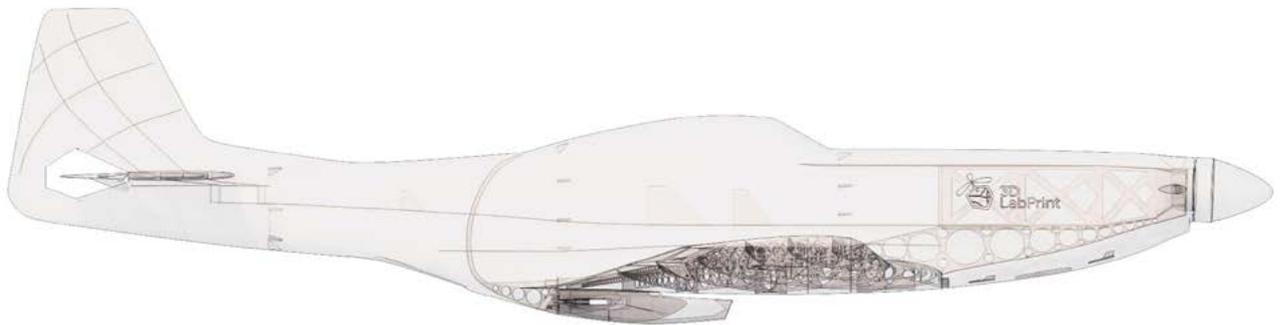


# User Guide

rev. 2016/09



Fully 3d printable

## North American P51 D Mustang

scale 1:12, wingspan 992mm (39.1in)

## North American P51 D Mustang – fully printable R/C plane for your home 3Dprinter

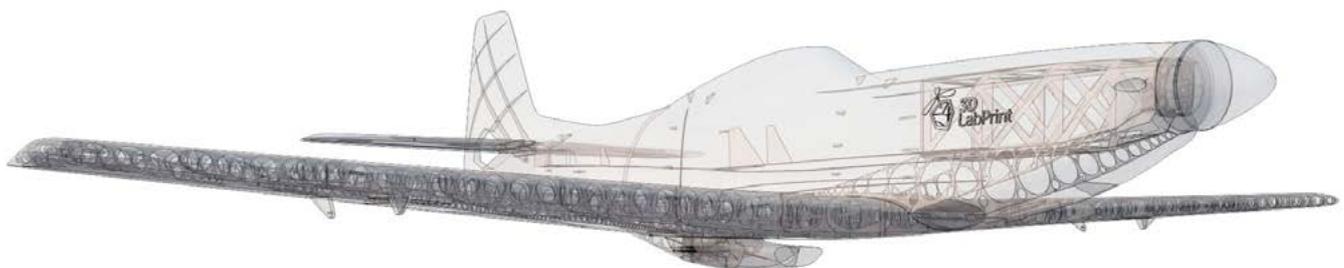
Future of flying - Print your own plane.

**The first fully printable** airplanes with suitable files prepared for your 3Dprinter. Flight characteristics are comparable or even better than classic build model airplane. Simply download and then print it anytime you need only for \$10 (filament cost). This is not a dream. Now you can print this HI-TECH .... at home, print spar parts, and so on...

**Extensive hi-tech 3d structural reinforcement** which makes the model very rigid while still maintaining a lightweight airframe and exact airfoil even when it is made only from plastic. This perfect and exact 3d structure is possible only due to additive 3dprinting technology. So welcome to the 21th century of model flying. Be the first at your airfield.

**Easy to assemble**, you do not need any extra tool or hardware, you only need to glue printed parts together and make pushrods for control. 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 will get a superbly performing airplane with a high efficient powerplant which will let you fly 7+ minutes at full throttle with the speed exceeding 150 kph (HP setup). On the other hand low stall speed is achieved for easy landing.



## General specifications (HP setup):

Length:	807mm (31.8in)
Wingspan:	992mm (39.1in)
Height:	226mm (8.9in)
Wing area:	17.1 dm <sup>2</sup>
Wing loading:	50.9 g/dm <sup>2</sup>
Airfoil:	aircombat modified
Print weight:	470g
Empty weight:	678g
Takeoff weight (6s 1300 lipo):	870g
Max takeoff weight:	1170g
Never exceed speed, VNE:	205 km/h
Design maneuvering speed, VA:	165km/h
Stall speed, VS:	30 km/h



### Powerplant

Propeller:	aeronaut ELP 9/6 or APC 9/6 – 9/7.5
Motor:	AX-4008Q/620KV, 22pole brushless HE electric motor
ESC:	Castle Creations TALON 25
Battery:	Turnigy nanotech 1300 mAh/6s/22.2V, 206g, 25C

### Performance measurement

Max RPM and Amps (static):	12 000/min with APC 9/6, current 19A
	11 550/min with APC 9/7.5, current 21A



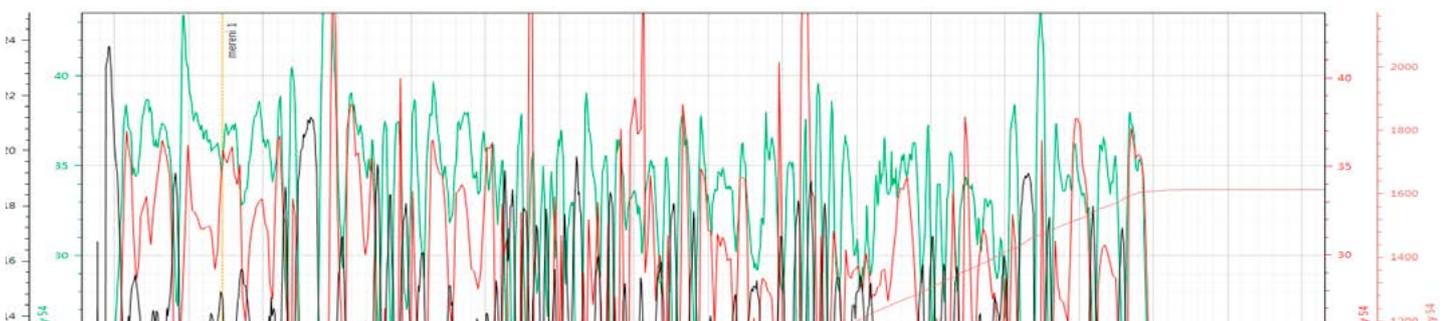
Max RPM and Amps (level flight):	13 700/min with APC 9/6, current 12A
	12 400/min with APC 9/7.5, current 13.5A

Max speed VH (level flight):	135 km/h – 67.5kn – 78 mph with APC 9/6
	150 km/h – 73kn – 84 mph with APC 9/7.5



Rate of climb:	29 m/s (5 373 ft/min) with APC 9/6
	32 m/s (5 728 ft/min) with APC 9/7.5

Flight time (6s 1300mAh/full):	7:40 with APC 9/6
	5:30 with APC 9/7.5
	7:40 with aeronaut ELP 9/6



## North American P51 D Mustang , History

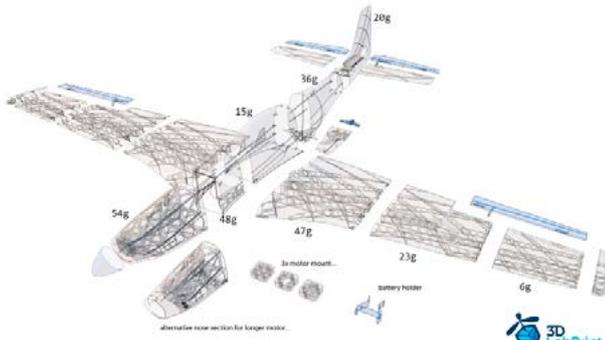
The North American Aviation P-51 Mustang is an American long-range, single seat fighter and fighter-bomber used during World War II, the Korean War and other conflicts. The Mustang was conceived, designed and built by North American Aviation (NAA) in response to a specification issued directly to NAA by the British Purchasing Commission. The prototype NA-73X airframe was rolled out on 9 September 1940, 102 days after the contract was signed and first flew on 26 October.

The Mustang was originally designed to use the Allison V-1710 engine, which had limited high-altitude performance. It was first flown operationally by the Royal Air Force (RAF) as a tactical-reconnaissance aircraft and fighter-bomber (Mustang Mk I). The addition of the Rolls-Royce Merlin to the P-51B/C model transformed the Mustang's performance at altitudes above 15,000 ft, matching or bettering that of the Luftwaffe's fighters.[8][nb 1] The definitive version, the P-51D, was powered by the Packard V-1650-7, a license-built version of the Rolls-Royce Merlin 60 series two-stage two-speed supercharged engine, and armed with six .50 caliber (12.7 mm) M2 Browning machine guns

## Included:

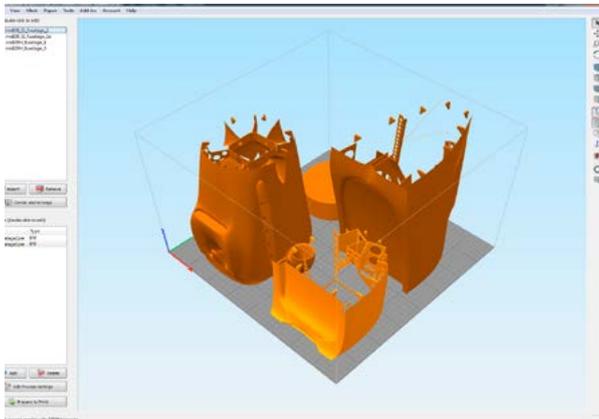
### 1. STL 3d files

universal STL files designed for use with desktop FMD 3d printers and slicer software such as Simplify3D (recommend) CURA or MatterControl (these STLs are not compatible with Slic3r, Marjeware).



### 2. Factory files for Simplify3D slicer

with all our settings, these Factory files include all you need. Note: we use PRUSA i3 ORIGINAL printers so you may need to adjust the basic printing parameters to match your printer or use it as a starting point for you, please look at [Simplify3D](#)



### 3. Step By Step PDF/VIDEO userguides

Apart from this userguide, please look at the Printing Guide with some Tips and Advice for airplane printing (Thin Wall Printing)

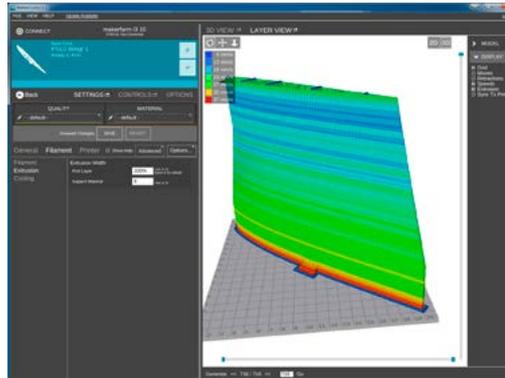
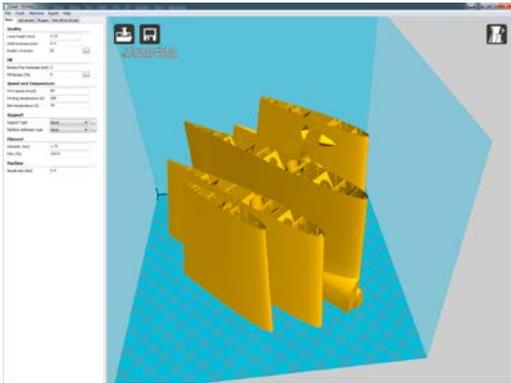
### 4. Gcodes

Basic Gcodes prepared for direct use, as universal as is possible. Should work with i3 style printers, you can try it out, but we cannot guarantee that it will work with your printer. 100% works with PRUSA i3 ORIGINAL 3d printers...

## 5.Prepared settings for CURA and MatterControl slicers

If you don't like Simplify3D for any reason, there is always the possibility to use another free slicer.

You can use our basic setting (setting files) as a start point and edit it as you need.



## 6.Scale markings PDF

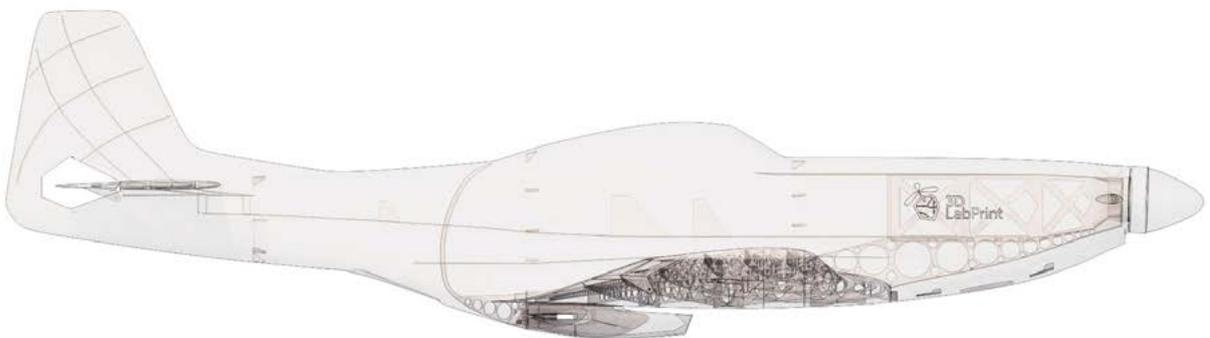
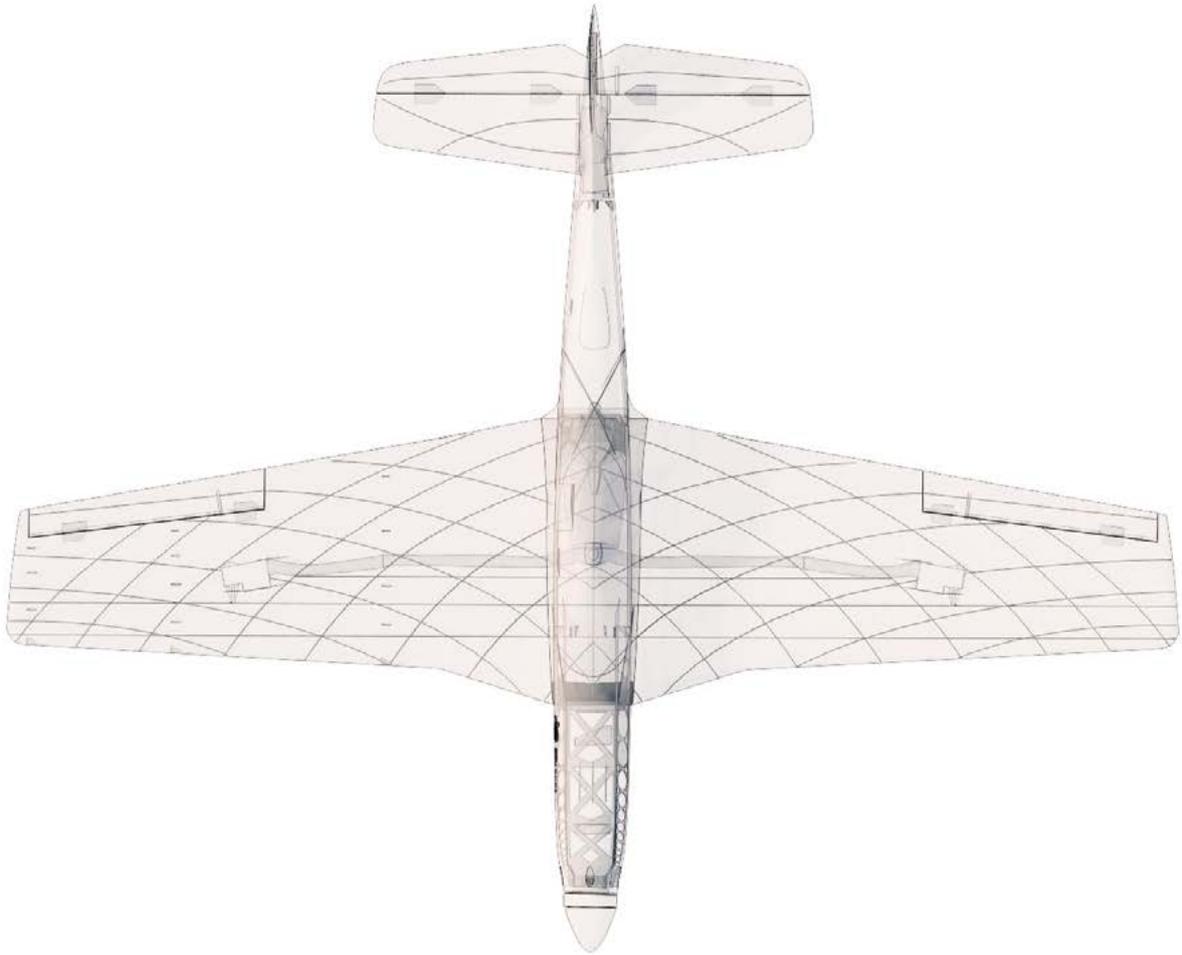
Print on thin adhesive foil and place on the model as needed. Violet cut lines included...



## 7.Stand

If you need this plane just for decorative or demonstrative reason...

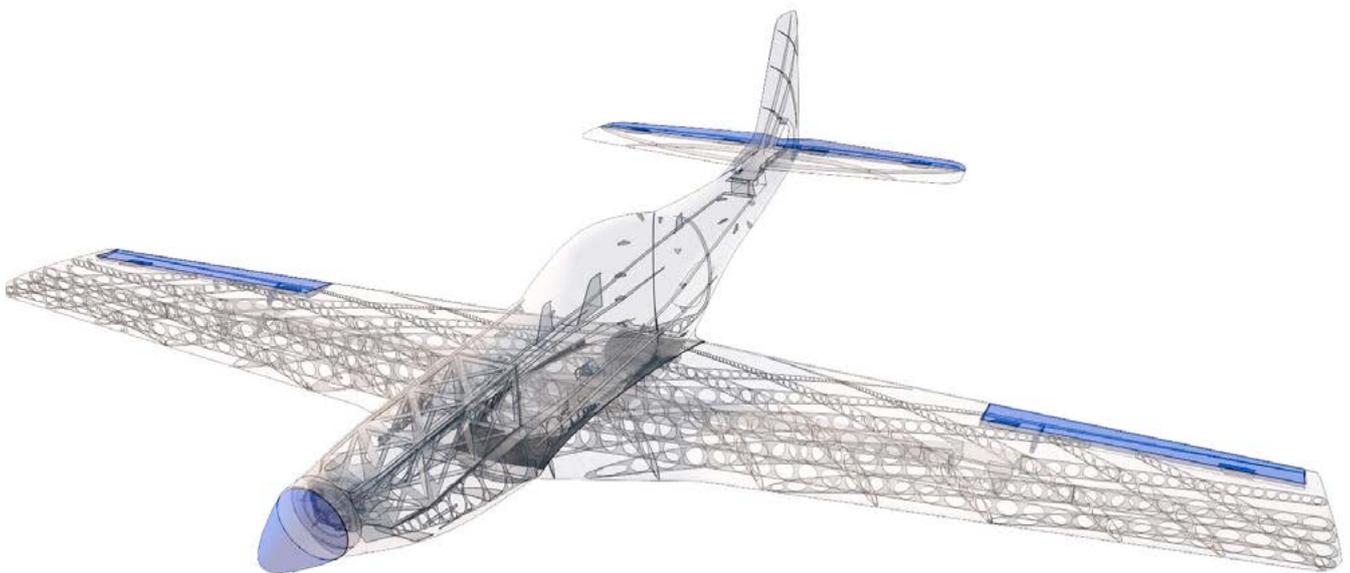




807mm (31.8in)



992mm (39.1in)



## Step By Step PDF/VIDEO userguide

1. Choose airplane at [www.3DLabprint.com](http://www.3DLabprint.com). Our [Facebook](#) for live information...



### Basic requirements (P51D Mustang ):

min volume 195/195/185mm (250/120/185)

nozzle 0.4mm recommended (0.35 or 0.5mm alternatively)

Heated Bed recommended

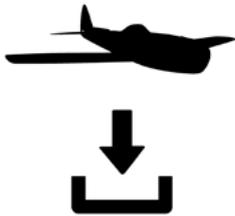
PLA filament (or PETG, APLA, htPLA, PC-max....) not ABS

If you feel a little bit confused you can [download wing test part](#) from our websites or thingiverse, (the biggest part). Or

contact [support@3dlabprint.com](mailto:support@3dlabprint.com)

## 2. Create account, download

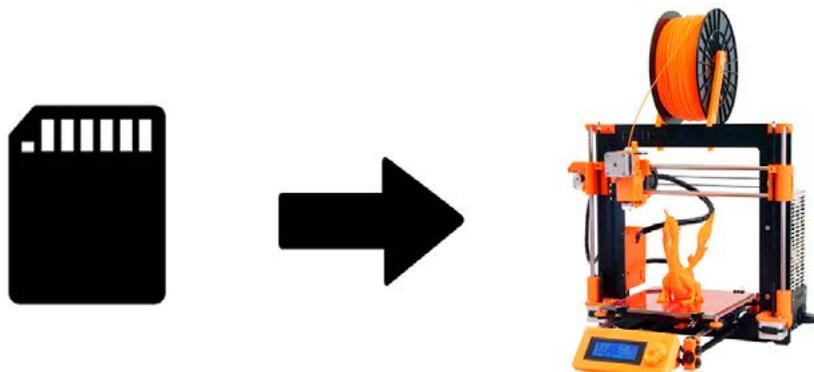
You will get the download link for all files sent to your email (zipped) or you can log in to your account and download directly from our websites.



## 3. Gcodes preparing

### option A Gcodes:

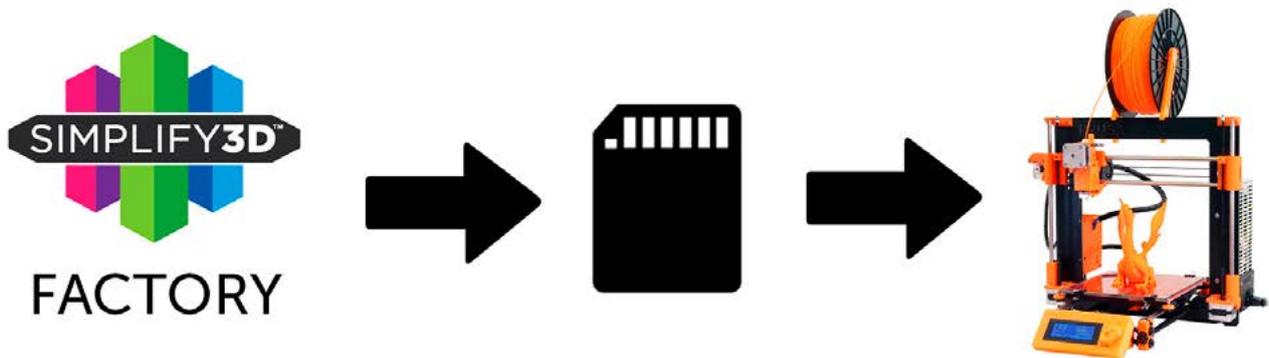
If your printer is i3 compatible you can directly use the [prepared gcodes](#). Simply save each to an SD card and let 3d printer do his job. The HE temperature is set to 230 for best layer bonding. You can edit speed and temperature on your printer LCD only. If Gcodes does not work please proceed to the next options.



**option B Factory files Simplify3D (recommended)**

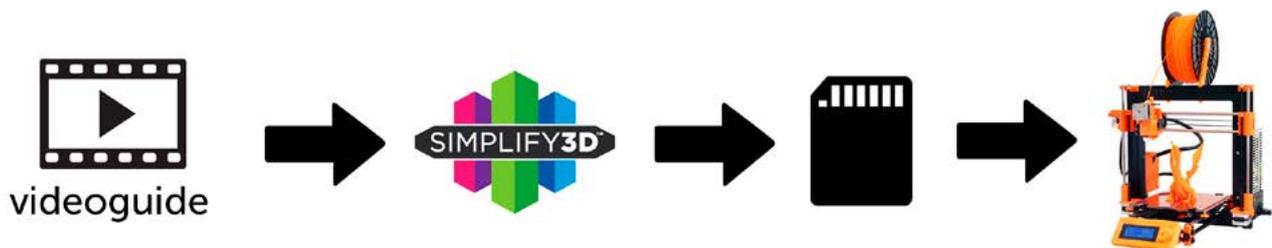
We prepare all you need in these files (basic FFF, parts arranged and so on...)

You can use our setting as a starting point and edit it as you need (adapt it for your printer), print only parts you need and so on... On most 3d printers it should work as it is, but please look at the settings and edit it if it is different for your printer. We are not liable for damages resulting from the use of our settings. If this does not work please proceed to the next option.



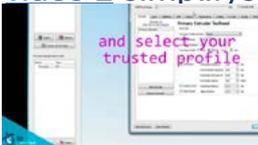
**option C Simplify3D manual setting (watch and learn)**

Use our [video guide 2](#) for proper setting. This is a very good option and you will learn a lot about Simplify3D and become a 3d expert. Of course you spend a lot of time and the youtube pause button will become your friend.



AND... please give a look to VideoGuides:

[video 2 Simplify3D setting](#)



[video 2.1 before start printing](#)



[video about Thin Wall Printing](#)



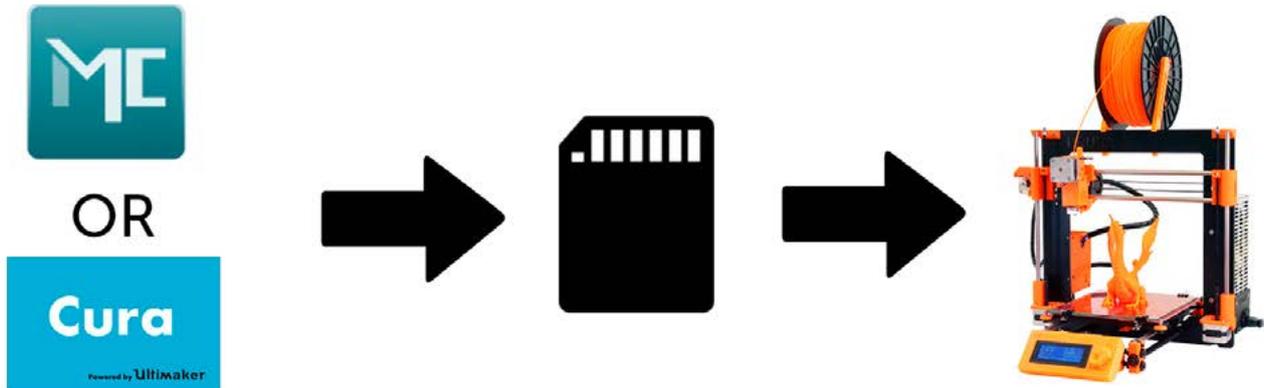
[option D CURA or MatterControl](#)

MatterControl and CURA are free :-)) and also give very good results and the airframe is still strong enough.

Please try to [find the right extrusion multiplier and temperature](#) for good weight and best layer bonding. Look at parts weight list for proper multiplier setting.

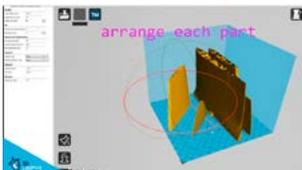
You can also use our [predefined](#) CURA or MC slicer setting file included in the package (always adapt it for your printer, change build volume, filament diameter and so on... depends on your printer!!!):

- [CURA\\_wing\\_fuse.ini](#) (wing and fuselage and so on... parts)
- [CURA\\_wing\\_tip.ini](#) (only wingR\_tip and wingL\_tip parts)
- [CURA\\_ailer\\_elev.ini](#) (only ailerons, elevator and rudder parts)
- [CURA\\_thick.ini](#) (motor mount, battery holder, spinner)
- OR
- [MC\\_wing\\_fuse.slice](#) (wing and fuselage and so on... parts)
- [MC\\_wing\\_tip.slice](#) (only wingR\_tip and wingL\_tipparts)
- [MC\\_ailer\\_elev.slice](#) (only ailerons, elevator and rudder parts)
- [MC\\_thick.slice](#) (motor mount, battery holder, spinner)

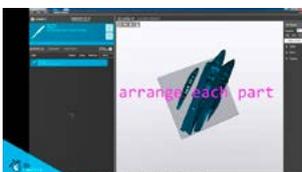


AND... please look at [VideoGuides](#):

[video CURA slicer setting](#)



[video CMatterControl slicer setting](#)



## 4. Print it

Save generated Gcodes and insert SD card to your printer, prepare your printer and start printing. We prefer to use SD card rather than a direct connection via USB. Note: ABS filament is not suitable for this...

Scaling the model will lead to unusable result!

[video guide about printing:](#)

you will need: PLA filament - good quality and strong PLA (we need good layer bonding)

Strong hair spray (or your favorite adhesive bed surface)

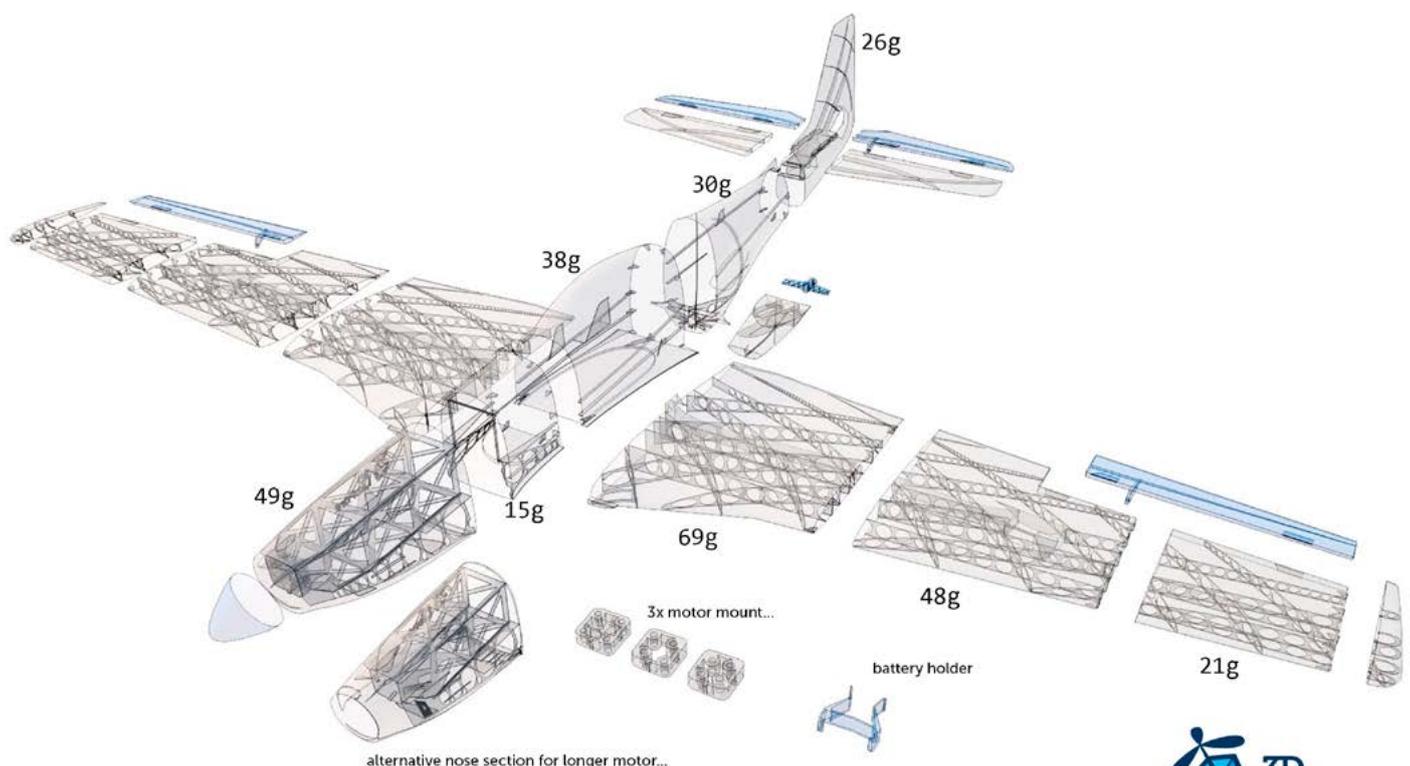
Razor blade

AND... please give a look to VideoGuides:

[video printing guide](#)



## Main parts weight list:



## Basic Tips and Advice

Please experiment with your [extrusion multiplier](#)...

Also [HotEnd temperature](#) is very important for a strong result. Please try increasing the temperature to find the best value ([210 up to 260 Celsius](#))

Turn [OFF cooling fan](#) for better layer adhesion ([HE fan of course ON](#)). We don't need it for our thin wall printing, you can use cooler fan only for thick parts...

We try lot of filaments and so far PLA is still the best for our models (2016).

You can also try aslo PETG and PC-max from polymaker. This is very promising filament.

HEATED BED is very much recommended. 50-65 Celsius (print without warping ends)

Looks like any standard quality PLA is OK for our planes, BUT it always depends on combination PLA vs. Extruder vs. HotEnd.

We find that some color of filament has lower layer adhesion also.

Nowadays there are lot of 3dprinters on the market, very most of them are OK for printing our aircraft (specific thin wall printing...) sufficient volume, heated bed, 0.4mm nozzle.

## Please give a look to [Printing Guide/FAQ](#)



### printing guide rev. 2016/06



Some Tips and Advices for airplane printing

#### [Printing fully printable 3dLabPrint Airplanes](#)

... If we want print aircraft there always be demand on low weight and enough strenght, with Thin Wall Printing we can achieve it ...

## 5. Assembling printed parts

### 5.1 Wing assembly

Glue wing parts with CA glue together. Use activator and install ailerons...

Please, ailerons and elevator may differ from videoguide, simply glue them together..

[See video guide #4](#)

You will need: [CA Glue - medium](#) or similar medium viscosity CA glue

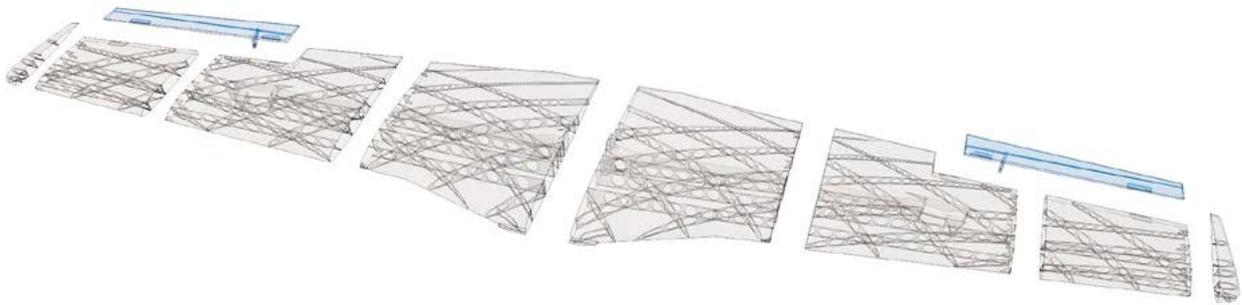
[Activator for CA Glue](#) or similar, but pressurised aerosol one is better

[AC Hinge Sheet](#) or similar

Scissors

Snap knife

Some cloth for wiping CA glue...



### 5.2 Fuselage assembly

Glue fuselage parts together with CA glue, use activator. Install elevator. Instal peg. Fine tune parts with knife or sandpaper f.e. when assembling slots for wing and fuselage, first! Fine-tune peg with a hole!!!

[See video guide #5](#)

You will need: [CA Glue - medium](#) or similar medium viscosity CA glue

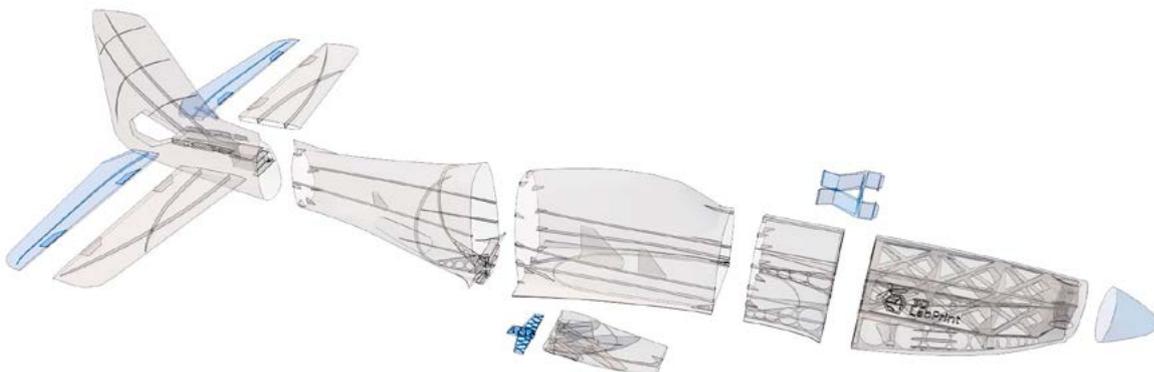
[Activator for CA Glue](#) or similar, but pressurised aerosol one is better

[AC Hinge Sheet](#) or similar

Scissors

Snap knife or Sandpaper

Optionally some cloth for wiping CA glue...



## 6. R/C equipment

### 6.1 motor setup

**HIGH PERFORMANCE SETUP** (if you like it hot, yeah)prop 9/6, 9/7 fast:

[See video guide #6](#) (for HP setup)

You will need: [Motor – AX-4008Q-620KV](#)

[Speed controller \(ESC\) – CC Talon 25](#) or similar 25A/6s

[3x PAIRS, 3.5mm Gold Connectors](#) - optional

[Battery 1300mAh/6s](#) – or 2x 1300/3s better (use 2to1 serial connector)

[Male XT60 connector](#)

[Shrink Tube black](#)

Solder wire and Soldering Iron

[Hands free Holder](#) - optional

printed motor mount (25/25)

**ECO PERFORMANCE SETUP**(spent only 30 bucks without any soldering)prop 9/6 10/5:

you will need: [Turnigy D3530/14 1100KV](#) or similar 3530-35 1100kv

[30A Electronic Speed Controller](#) or similar 30-40Amps

[Turnigy 2200mAh 3S 20C](#) or similar 1500-2400/3s

printed motor mount, find the one which fits... (25/19)

**!please use fuselage\_01\_conversion.stl part for this setup!**

### 6.2 servos

Test and center all servos with servo tester or transmitter, then install horns in middle position and cut wing servos mounts... use HXT900 or any 21x21x23mm

[See video guide #7](#)

you will need: 4x [9g Servo HXT900](#)

2x [Servo Lead Extension](#) or similar

Snap knife

Soldering Iron or Small handsaw or Dremel

## 7. R/C Equipment installing

Install prepared RC equipment: Motor, ESC, Servos...

Nose and motor mount are already angled for compensating rotating propeller stream.

[See video guide #8](#)

You will need: Printed motor mount. Find the one that fits for your motor...

2-4x Screw 3/12-30mm depends on motor-mount

Small screwdriver+

Your earlier prepared R/C equipment

3x Self Tapping Screw M3x8mm or similar

## 8. Pushrods

Make steel pushrod for ailerons, elevator, rudder and connect to servo arms...

[See video guide #9](#)

you will need: Steel pushrod, diameter 1.0mm

Pliers

[CA Glue](#) - medium

[Activator for CA Glue](#) or similar, but not mechanical is better

## 9. Finalization

Install your receiver, connect battery, setup servos and etc. With your transmitter, lock servo position, then install propeller...

**!!!Make sure that the battery is placed properly and secured with wing battery holder. If battery moves during flight it can shift the center of gravity backwards and aircraft will be uncontrollable!!!**

[See video guide #10](#)

you will need: Your own Rx/Tx system

Battery for your setup...

Foam strip for Li-Pol battery

Scissors

[Propeller](#) + printed spinner

Small screwdriver+

[CA Glue](#) - medium + [activator](#)

Scale markings printed on adhesive foil

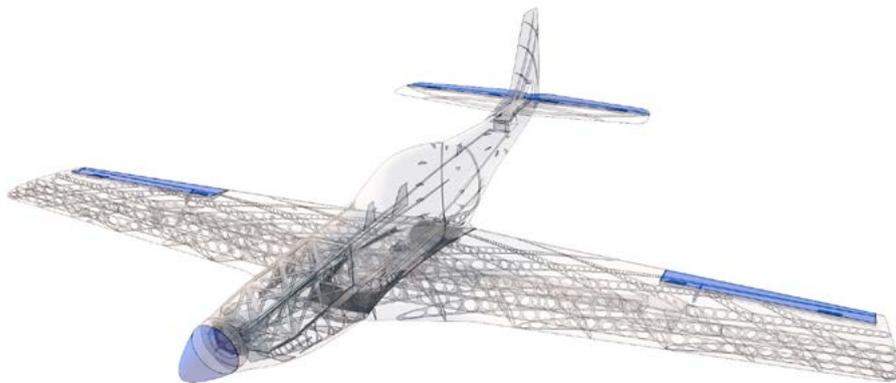
**!!!Never setup ESC with installed propeller, this is very dangerous!!!**

## 10. Go flying

Before flight check: **center of gravity is very important** (move it forward for the first flights. See CG markings and chapter 11 bellow), battery properly charged, ailerons and elevator deflection check, your own flying skills or RC simulator training...

Then go flying: set full throttle, put the elevator little upwards (1-2mm) and throw it energetically to the wind at approximately 10 degrees up, wait until plane gain speed, then fly it in your manner...

[See video guide #11](#)



## 11. Pilots Please Attention!!!

For the first flights we recommend to set the **center of gravity** of the airplane by about **5 mm forward** of the CG tag (nose heavy, this increases the stability) is also good to **increase expo** settings on your transmitter for elevator and ailerons to **80 %** (this calms response from your stick inputs)

Also you can decrease elevator and aileron deflection.

Make sure the **battery is well fixed** in proper position if it moves during flight it will cause the CoG to move aft and will lead to uncontrollable flight behavior...

You can then return to the proper center of gravity (balance aircraft). Set expo to 50-60 % as stated in the video/instructions... this will gain back extra maneuverability when you are confident with flying your airplane.

**!!!Never fly aft positioned CoG!!!**

**And Please, use these files only for your own purpose, do not send further... Thank you very much**