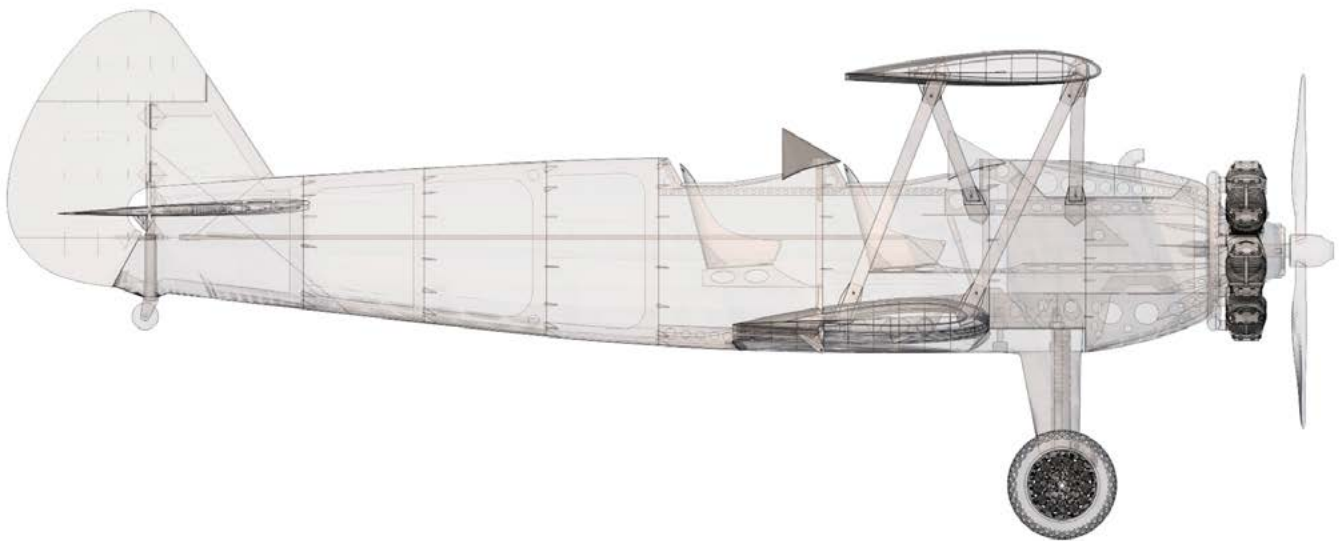


# User Guide

rev. 2017/01



Fully 3d printable

## Stearman PT-17 Kaydet

scale 1:8, wingspan 1217mm (47.9in)

# Stearman PT-17 Kaydet – fully printable R/C plane for your desktop 3Dprinter

Future of flying - Print your own plane

We still trying move things further, so this project is again full of other improvements for better durability , easier assembly , better geometry solution and so on..., we hope you enjoy it, although this print may test your competencies to and quality of your printer (welcome to the thin wall printing)

**The first fully printable** airplanes with suitable files prepared for your 3Dprinter. Flight charecteristics are comparable or even better than classic build model airplane. Simply download and then print it anytime you need only for \$18 (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 lightweight airframe and exact airfoil even when it is made only from plastic. This perfect and exact 3d structure is possible only due to aditive 3dprinting technology. So welcome to the 21th century of model flying. Be The first at your airfield.

**Easy to assembly**, 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 superb training and stable airplane for fun and relax flying. Stearman PT-17 Kaydet is a significant low stall speed and therefore very good flying is easy to land.



## General specifications:

Lenght:	946 mm / 37,2 inch
Wingspan:	1217 mm / 47.9 inch
Height:	356 mm / 14.0 inch
Wing area:	44 dm <sup>2</sup> / 4,7 sq foot
Wing loading:	56 g/dm <sup>2</sup> / 18.14 oz at sq foot
Center of gravity:	0 mm (0 in) at leading edge of bottom wing
Airfoil:	Stearman
Print weight:	1500 g / 52.9 oz
Empty weight (w/o battery):	2120 g / 74.9 oz
Takeoff weight (3s 3000 lipo):	2420 g / 85,3 oz
Max takeoff weight:	2800 g / 98.7 oz
Never exceed speed, VNE:	100 km/h / 62.14 mph
Design maneuvering speed, VA:	70 km/h / 43.49 mph
Stall speed, VS:	24 km/h / 14.9 mph



## Powerplant

Propeller:	APC 11x5,5
Motor:	<a href="#">Turnigy 3542/5 1000-1250KV</a> or similar
ESC:	<a href="#">40A Electronic Speed Controller</a> or similar 40Amps
Battery:	<a href="#">Li-Pol 3000mAh/3s/4s (11.1V)</a> , 300g/8.39oz, 25C

## Performance measurement

Max speed VH (level flight): 105 km/h – 56.7kn – 65.2mph with APC 11x6

Rate of climb: 20 m/s (5 373 ft/min) with APC 11x6

Flight time (3s 3000mAh/full): 7:40 with APC 11x5,5  
5:50 with APC 11x6







## Stearman PT - 17 Kaydet, History

The Stearman (Boeing) is a biplane used as a military trainer aircraft, of which at least 10,626 were built in the United States during the 1930s and 1940s. Stearman Aircraft became a subsidiary of Boeing in 1934. Widely known as the Stearman, Boeing Stearman or Kaydet, it served as a primary trainer for the United States Army Air Forces, the United States Navy, and with the Royal Canadian Air Force as the Kaydet throughout World War II. After the conflict was over, thousands of surplus aircraft were sold on the civilian market. In the immediate postwar years they became popular as crop dusters, sports planes, and for aerobatic and wing walking use in air shows.

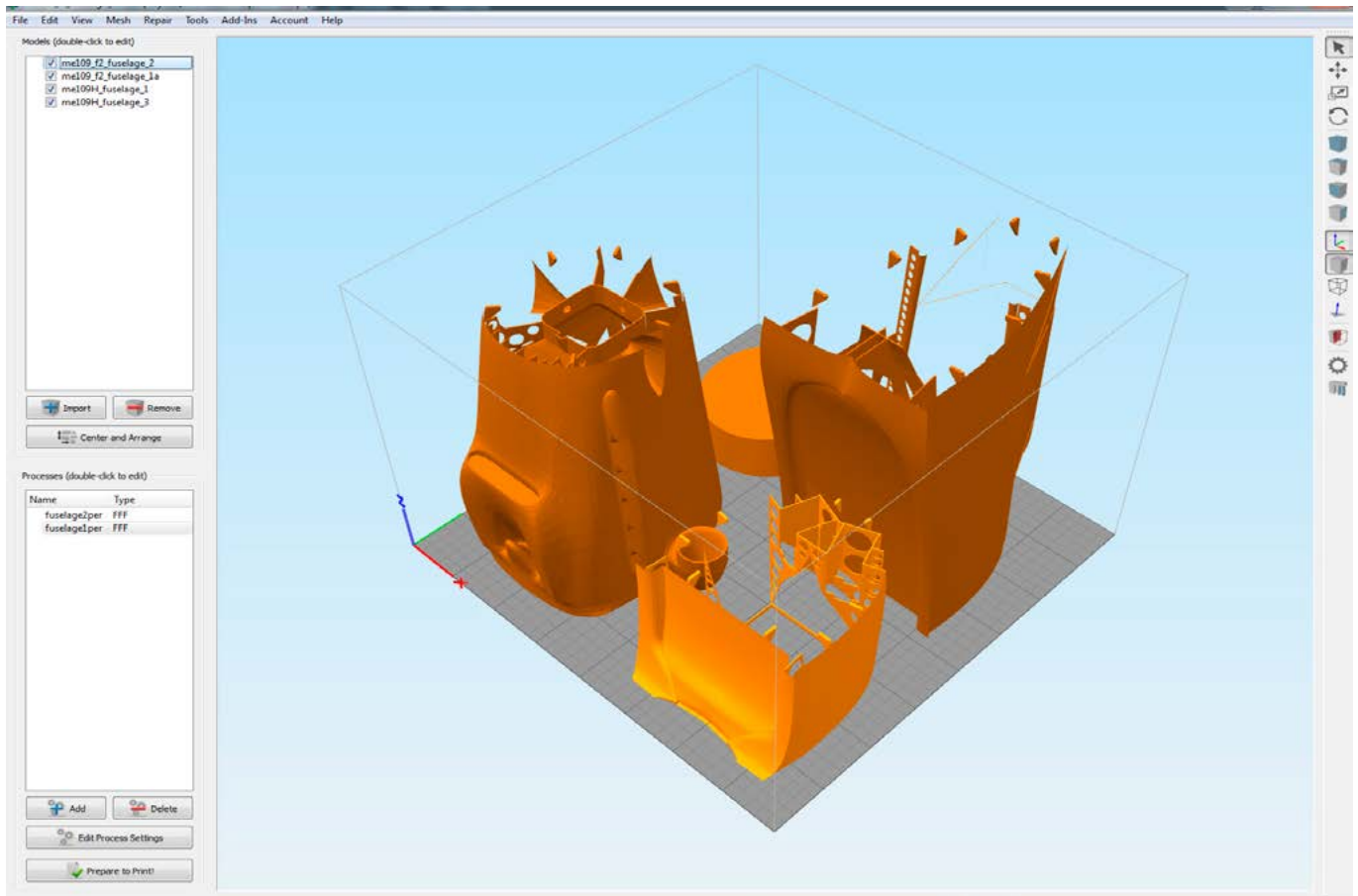
The Kaydet was a conventional biplane of rugged construction with large, fixed tailwheel undercarriage, and accommodation for the student and instructor in open cockpits in tandem.



## Included:

### 1. STL 3d files

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



### 2. Factory files for Simplify3D slicer

with all our setting, this Factory files included all you need, note: we use PRUSA i3 ORIGINAL printers so you may need adjust the basic printing parameters to match your printer or use it as a start point for you, please give a look to [Simplify3D](#)

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

Apart from this userguide, please give a look to the Printing Guide with some Tips and Advices for airplane printing (Thin Wall Printing).

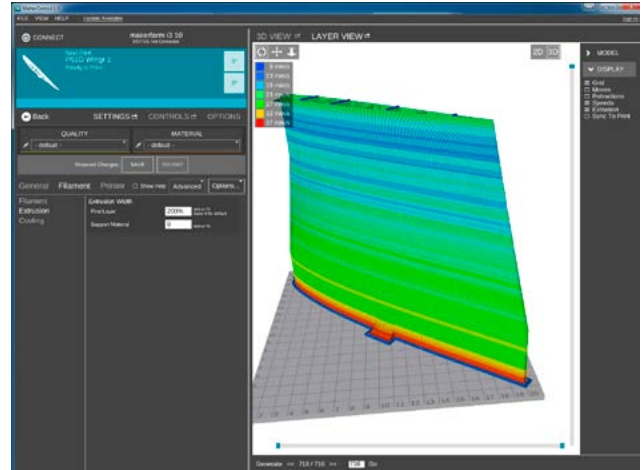
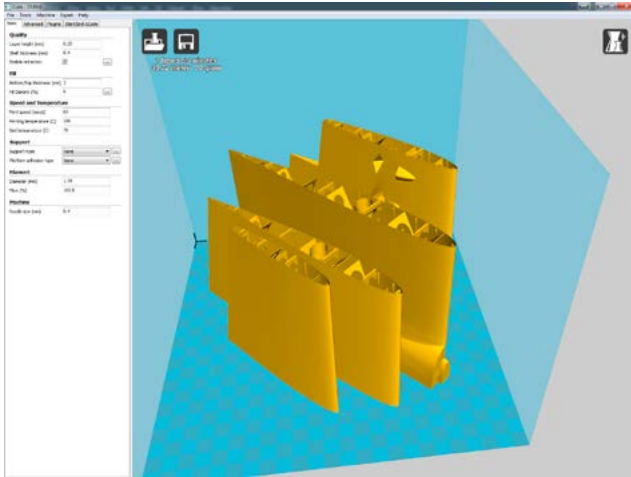
### 4. Gcodes

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



## 5. Prepared settings for CURA and MatterControl slicers

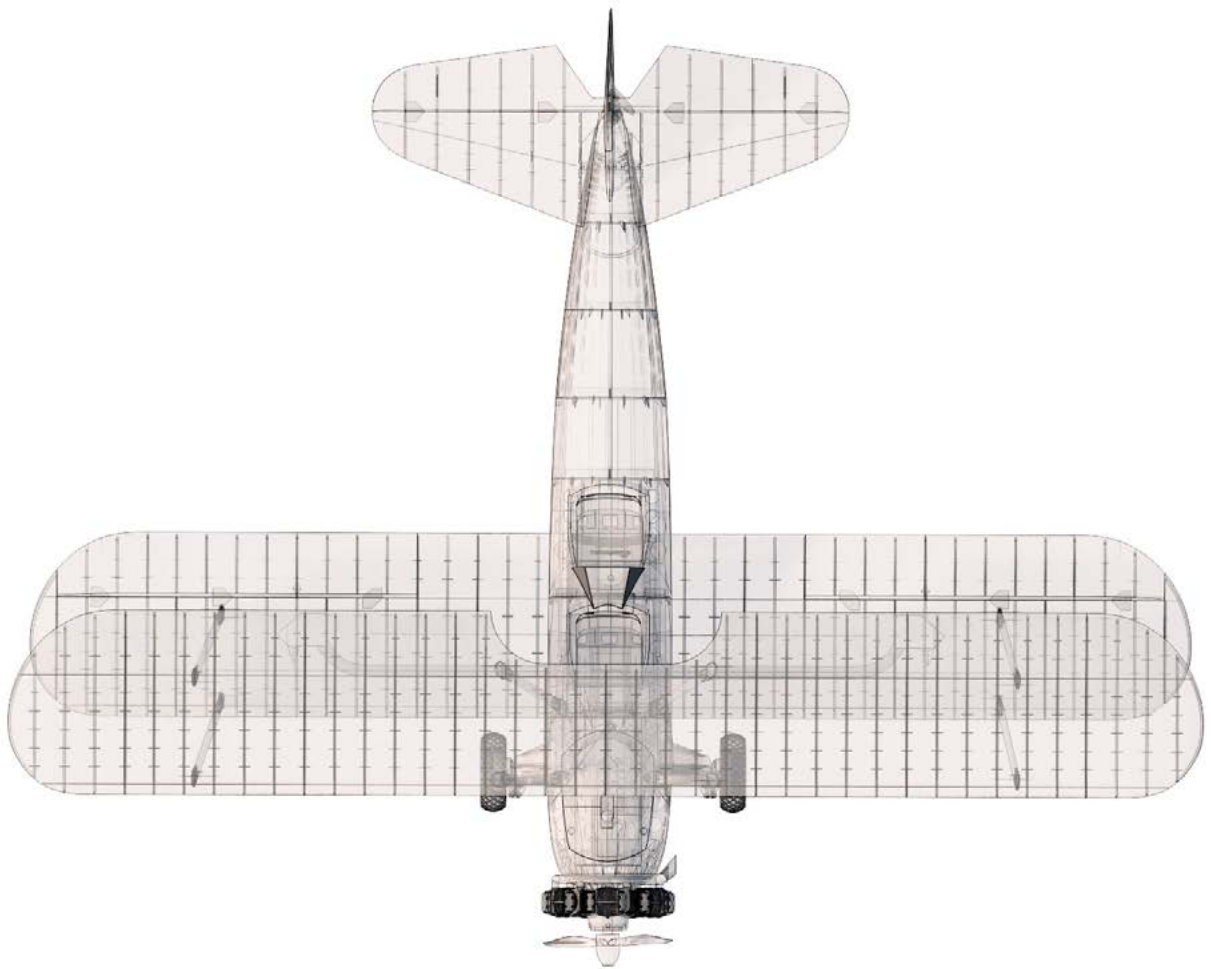
We recommend Simplify3D... If you don't like for any reason, there is always possibility to use another free slicer, you can use our basic setting (setting files) as a start point and edit it as you need.



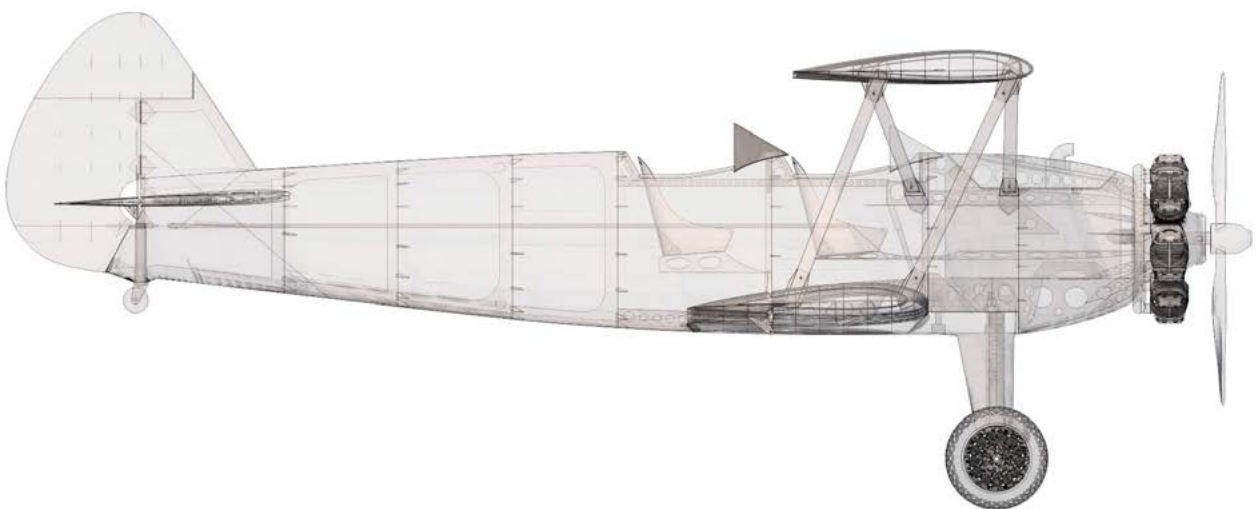
## 6. Scale markings PDF

Print this scale PDF at thin self tape advertisement foil and place it on the model as needed, violet cut lines included.





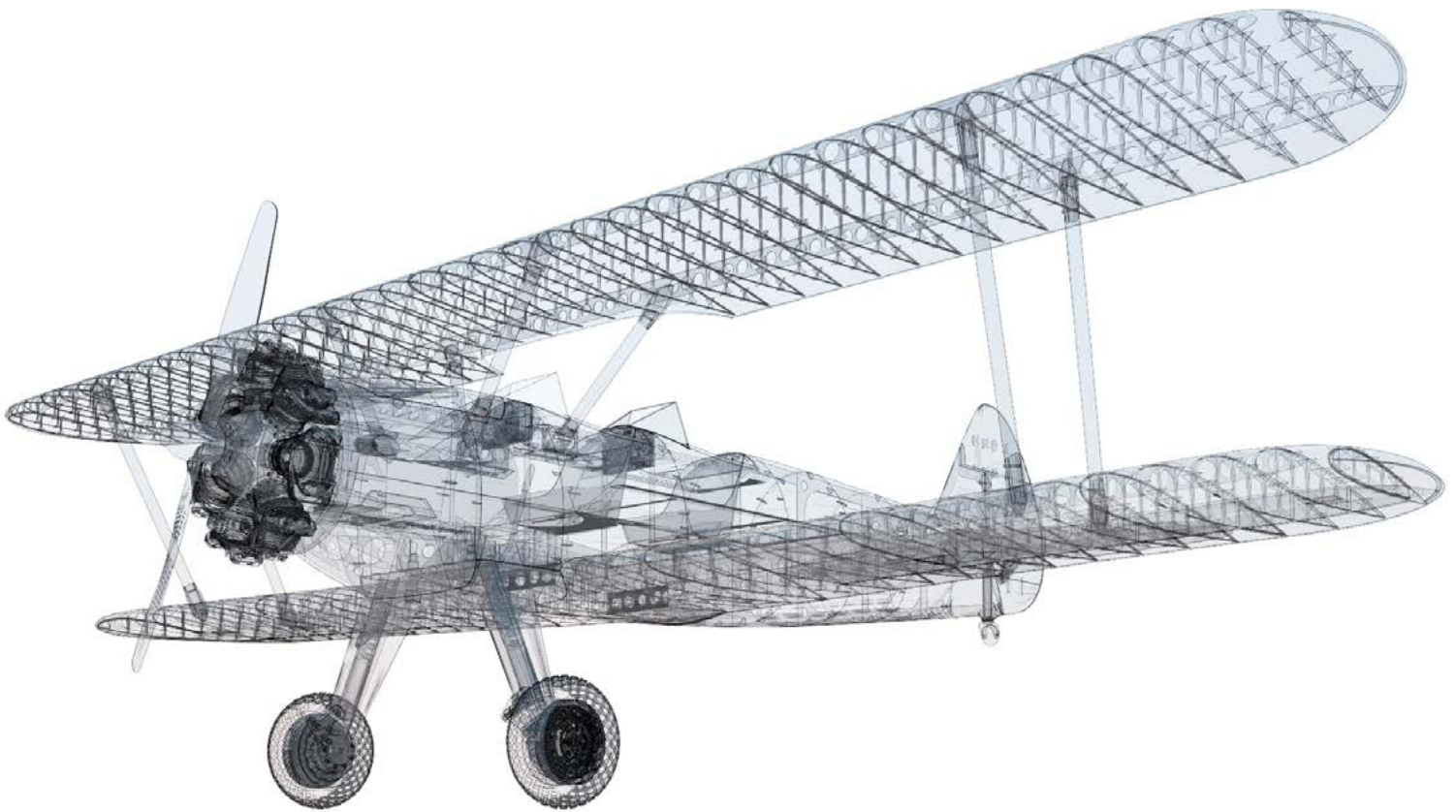
Wing area: 44 dm<sup>2</sup> / 4,7 sq foot



Length: 946 mm / 37,2 inch



Wing span: 1217 mm / 47.9 inch





## Step By Step PDF/VIDEO userguide

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

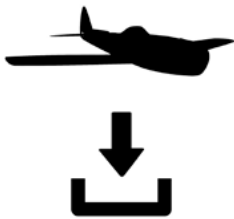


Basic requirments for Stearman PT-17 is 195/195/150mm **build volume** or equivalent. Nozzle 0.4mm recommended (0.35 or 0.5mm alternatively). Heated bed recommended. PLA filament (or PETG, APLA, htPLA, PC-max.... not ABS) and some flex for tires...

If you feel a little bit confused you can download test part from thingiverse (usualy the biggest part) search for Stephencz...

### 2. Create account, download

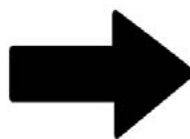
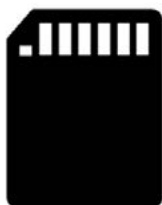
You will get download link for all files to your email (zipped) or you can log in to your account and download directly from our websites.



### 3. Gcodes preparing

options A Gcodes:

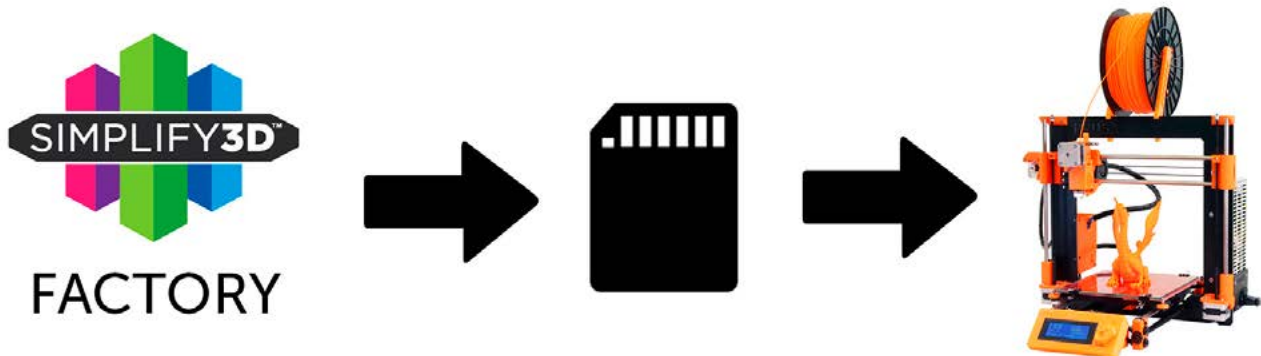
if your printer is i3 comptabile you can directly use [prepared gcodes](#), simply save each to SD card and let 3d printer do his job, HE temperature is set to 230°C for best layer bonding, you can edit speed and temperature on your printer LCD only. If Gcodes does not work please proceed to the next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



### options B Factory files Simplify3D (recommended)

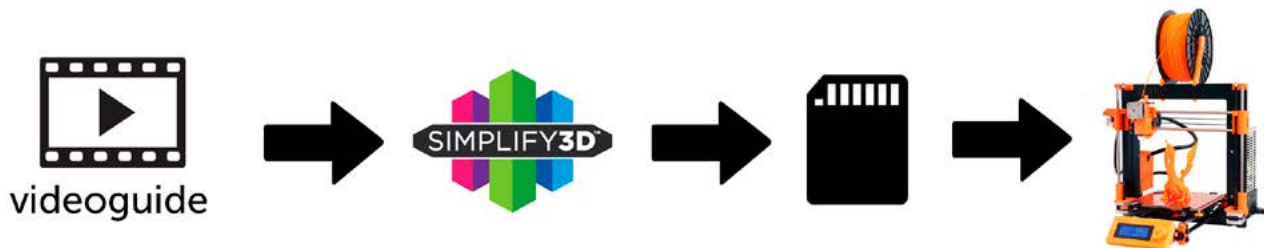
We prepare all you need in this files (basic FFF, parts arranged and so on...)

You can use this our setting as a start 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 give a look to the setting and edit it if is different to 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.



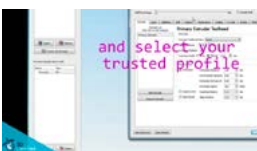
### options C Simplify3D manual setting (watch and learn)

Have a look at our [video guide](#) where you can find the way we make it... this is very good option and you will learn a lot about Simplify3D and become an 3d expert. Of course you spend a lot of time and youtube pause button will become your friend.

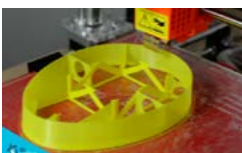


AND... please give a look to VideoGuides:

#### [video 2](#) Simplify3D setting



#### [video](#) about Thin Wall Printing



options [D CURA](#) or [MatterControl](#) (but note: we recommend [Simplify3D](#))

MatterControl and CURA are free :- ) and also gives very good results and airframe is still strong enough, slicer setting is very easy.

Please try **find right extrusion multiplier and temperature** for good weight and best layer bonding, give a look to parts weight list for proper multiplier setting.

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

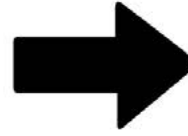
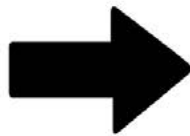
[CURA\\_wing\\_fuse.ini](#)  
[CURA\\_ailer\\_elev.ini](#)  
[CURA\\_thick.ini](#)

OR

[MC\\_wing\\_fuse.slice](#)  
[MC\\_ailer\\_elev.slice](#)  
[MC\\_thick.slice](#)

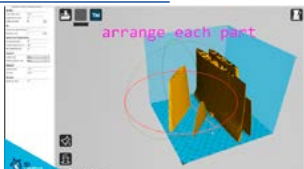
(wing and fuselage and so on... parts) + [CURA\\_wing\\_tip.ini](#)  
 (only ailerons, elevator and rudder parts)  
 (motor mount, holders, landing gear... )

(wing and fuselage and so on... parts) + [MC\\_wing\\_tip.slice](#)  
 (only ailerons, elevator and rudder parts)  
 (motor mount, holders, landing gear... )

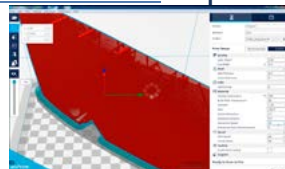


AND... please give a look to [VideoGuides](#):

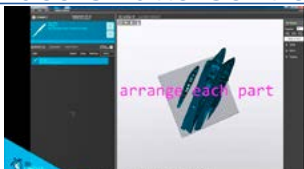
[video CURA slicer setting](#)



[CURA 2.3.1 import setting](#)



[video CMatterControl slicer setting](#)



## 4. Print it

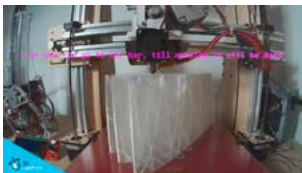
Save generated Gcodes and insert SD card to your printer, prepare your printer and start printing, we prefer to use SD than direct connection via USB Note: ABS filament is not suitable for this. Scaling the model will lead to unusable result!

### Video guide about printing

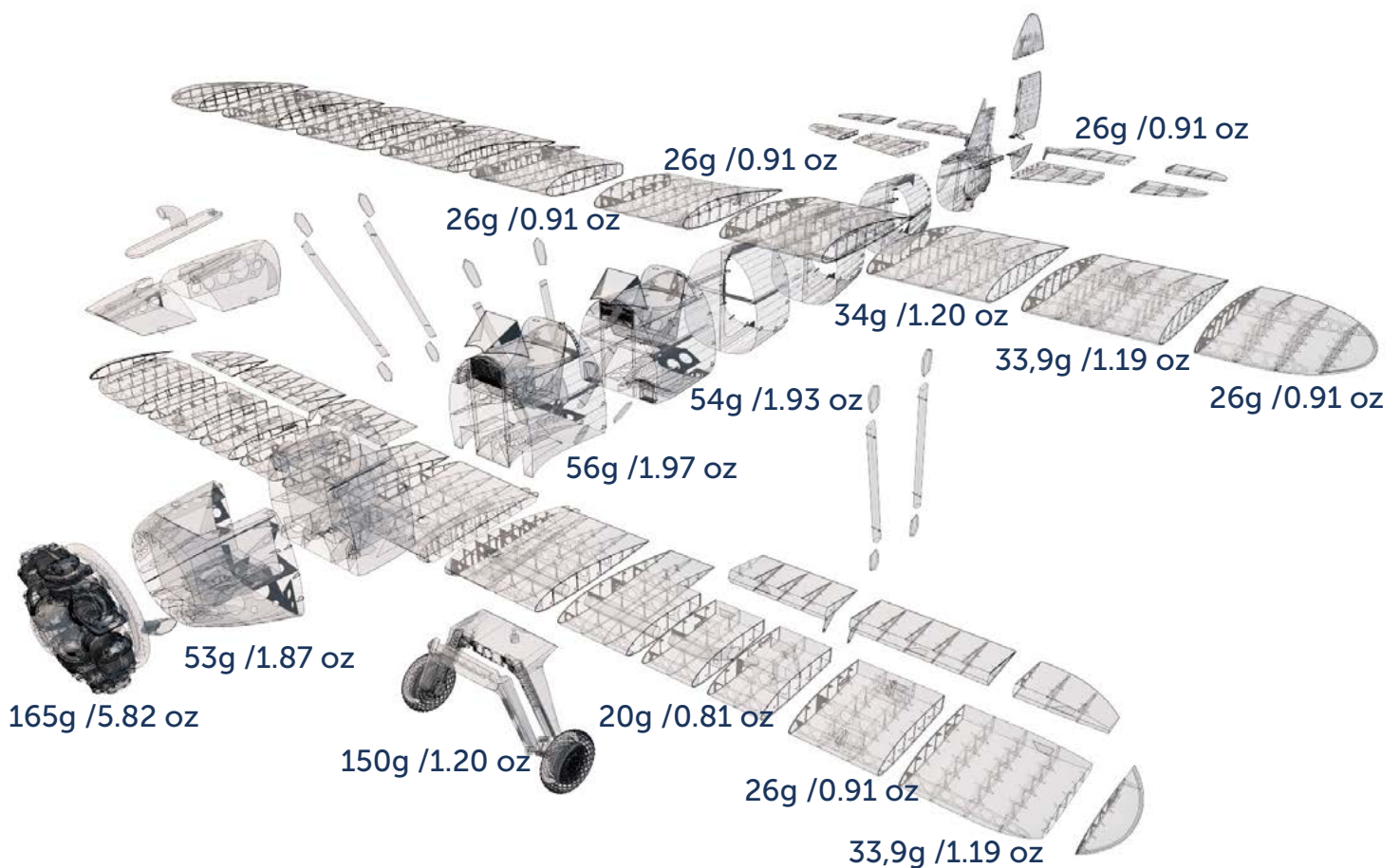
you will need: PLA filament - good quality and strong PLA (we need good layer bonding)  
Strong hair spray (or your favorite adhesive bed surface)  
Razor blade

AND... please give a look to VideoGuides:

### video printing guide



## Main parts weight list:





## Basic Tips and Advices

Please Experiment with your extrusion multiplier.

Also HotEnd temperature is very important for strong result, please try increase temperature to find the best value (200° up to 260° celsius).

Turn OFF cooling fan for better layer adhesion (HE fan of course ON). We dont need it for our thin wall printing. We try lot of filaments and so far PLA is still the best for our models (2017). You can try aslo PETG and PC-max from polymaker is very promising filament.

Heated bed is very recommended, 60-70° Celsius (print without warping ends).

Looks like any standard quality PLA is perfect 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 is lot of 3dprinters on the market, very most of them is OK for printing our airplanes (specific thin wall printing...) suficient volume, heated bed, 0.4 mm nozzle.

## Please give a look to Printing Guide:

Look at our website to FAQ section with [printing guide](#).



## 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 ...

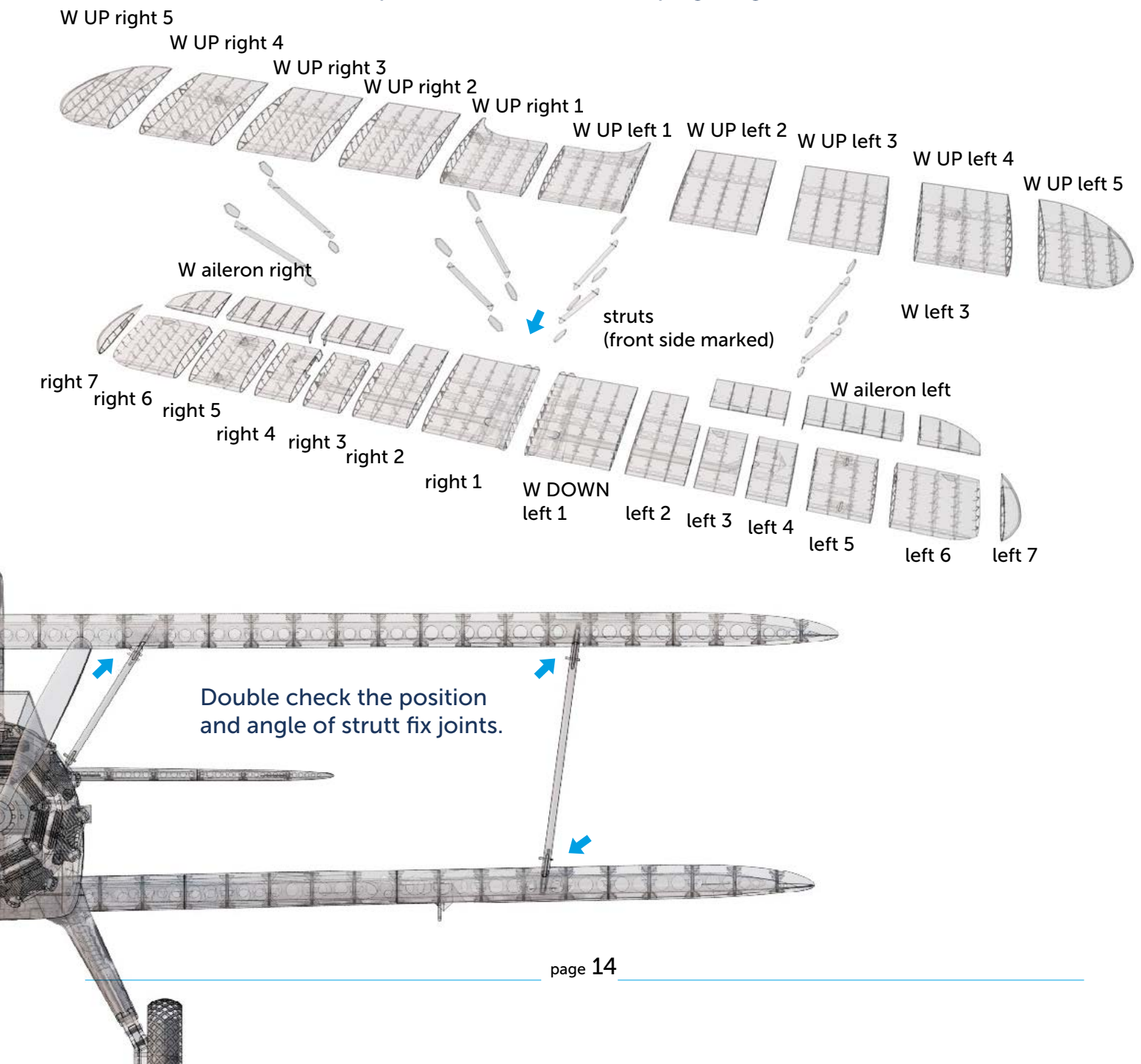
## 5. Assembling printed parts

### 5.1 Wing assembling

Glue wing parts with CA glue together. Pay attention to the order of parts. Glue strut fix joints to wing at correct position. Install ailerons by hinges. We recommend CA Hinge sheet.

[See video guide #4](#)

you will need: [CA Glue - medium or similar medium viscosity CA glue](#)  
[CA Hinge Sheet](#) or similar  
 Scissors, Snap knife, Some cloth for wiping CA glue...



## 5.2 Fuselage assembling

Now is good time for glue 7x M3 nuts to fuselage part 7 by small portion of epoxy glue. Clean the threads and try screws for motor mount. Glue 3x M4 nuts by small portion of epoxy glue for wing/gear attachment to fuselage part 6. Clean the threads and try suitable M4x30 polyamid screws. Fine tune parts shape with knife or sandpaper. Glue fuselage parts F0 - F5 with CA glue together. Glue fuselage parts F6 and F7. **Keep front and back part of fuselage separately for easy pushrods and servo installation.** Carefully observe the position of elevator stabiliser and glue it to fuselage. Insert pen spring to F9 part, insert canopy lock, glue F9 and F8 together. Glue wing strut fix joints to fuselage, **short piece marked F5 to part F5!**

[See video guide #5](#)

you will need:

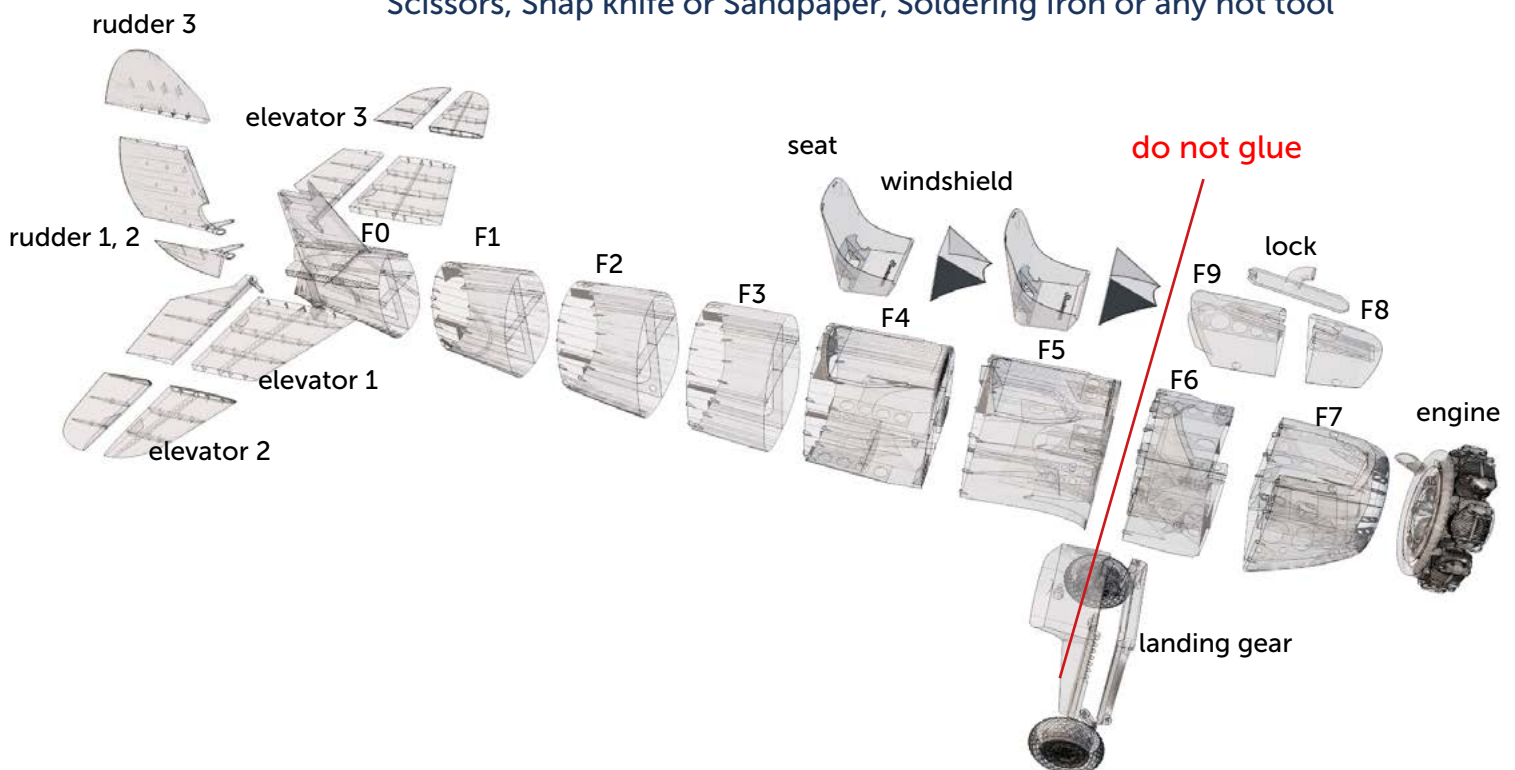
[CA Glue](#) - medium or similar medium viscosity CA glue

7x M3 blind nuts [MP-Jet 1035](#) or Hobbyking M3 nuts or similar

3x M4 blind nuts [MP-Jet 1007 AL](#) or Hobbyking M4 nuts or similar

1x ballpoint pen spring (a spring from old ballpoint pen will work fine)

Scissors, Snap knife or Sandpaper, Soldering Iron or any hot tool



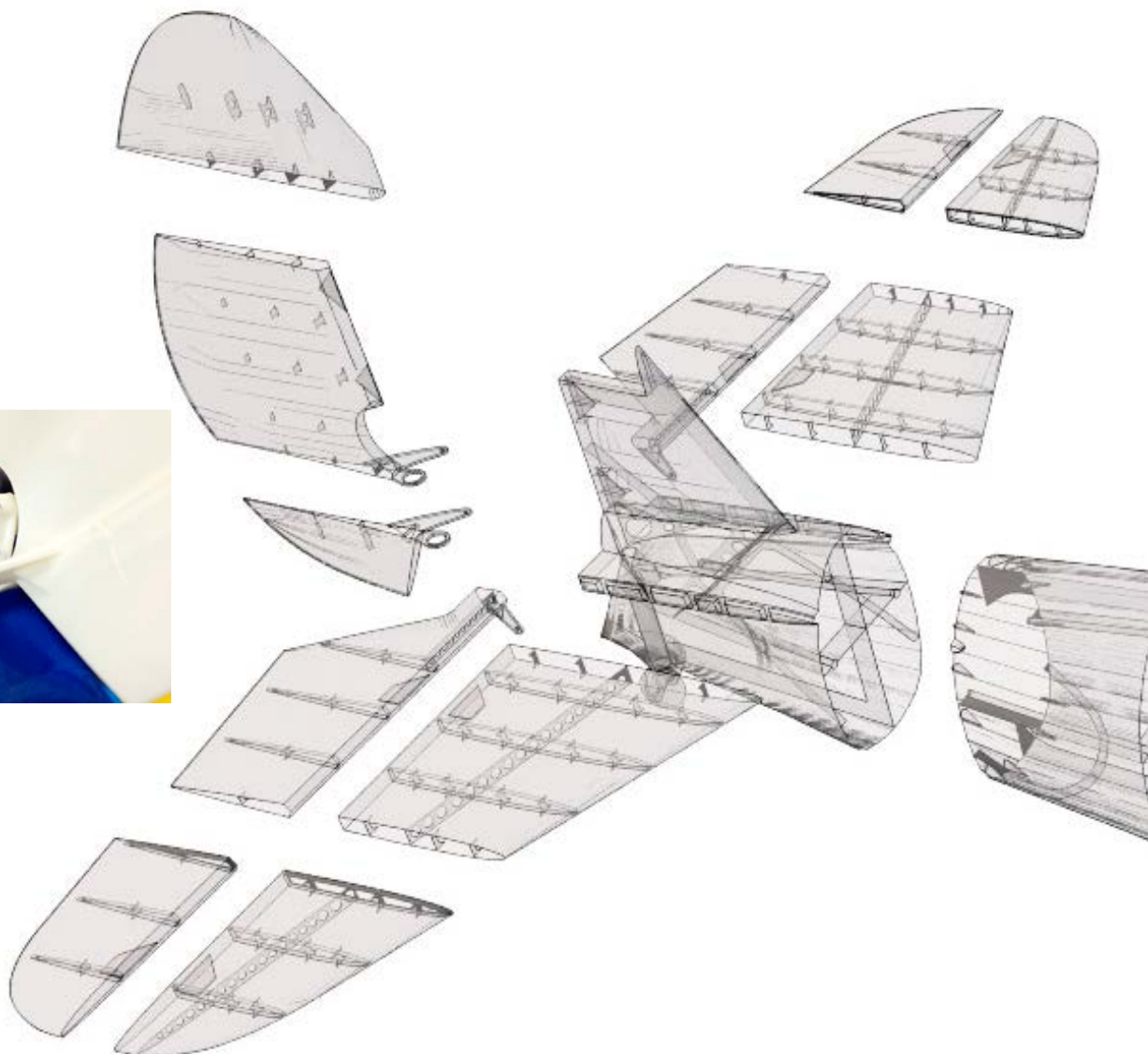
## 6. Fuselage tail - rudder, elevator pushrods and servos

Now is good time for install tail servos, pushrods, elevator and rudder. Simply push 1 mm pushrods wires to back part of fuselage. Put 2x Hitec HS-81/82 or similar servos to fuselage. Make Z bend or use your liked pushrods attachment and measure length of wires. Release servos and make Z bend at the end of wires. You have now precise pushrods with good length. Thread pushrods and glue the elevator and rudder in correct position with CA glue. Do not forget to use screws at servos during final assembly. Now glue fuselage front and back parts together.

[See video guide #6](#)

you will need:

- [CA Glue](#) - medium or thin viscosity CA glue
- [AC Hinge Sheet](#) or similar
- 2x 1 mm / 18-20 AWG pushrod wires
- 2x Hitec HS-81/82 or similar servos
- Wire cutter, Z bend pliers or pliers.





## 7.1 Landing gear

Wow, printed springs! Yes it works! If you have doubts, you can use conventional metal springs of appropriate size. Glue splited parts of landing gear and landing legs together. Sand it or use knife for smoth movement inside. Push pins to holes and check correct legs functionality. Use 80mm wheels or make it! Print tyres from ninjaflex or do experiment with any new rubber fillaments. Use M3 screw as wheel axle.

[See video guide #7](#)

you will need: [CA Glue - medium or thin viscosity CA glue](#)  
 2x M3x35mm screws  
 4x M3 nuts  
 8x M3 washers  
 snap knife or sandpaper



## 7.2 Motor and fuselage small parts

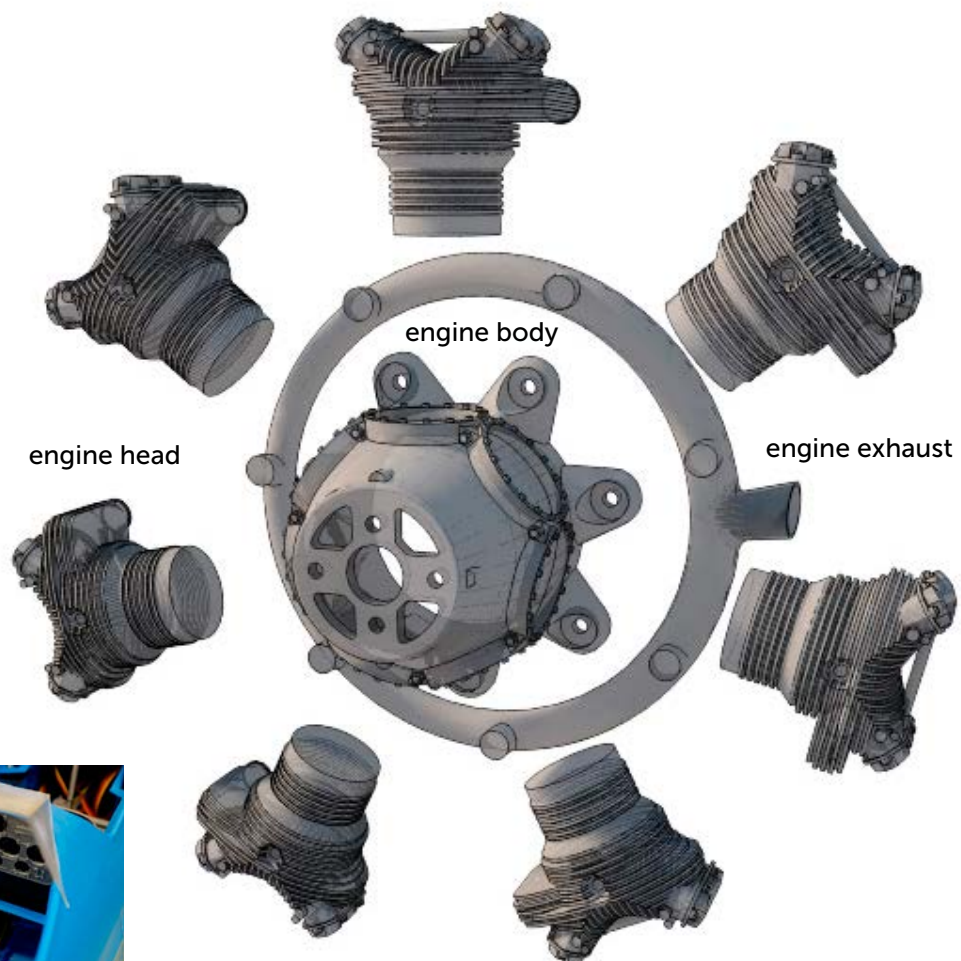
Glue the engine heads on the motor body. Glue the exhaust tube on to back side of heads. Be precise for a good looking radial engine. Mount prepared motor setup with EST to engine body.

Use hot wire or dremel for cockpit holes. Glue small parts for cockpit as a seats, instrument deck, knipel, windsheelds.

[See video guide #7](#)

you will need:

- Snap knife
- [CA Glue](#) - medium
- [Activator for CA Glue](#) or similar, but not mechanical is better
- 7x M3 Screws on motor mount
- Small screwdriver
- Your earlier prepared R/C equipment - motor setup with ESC

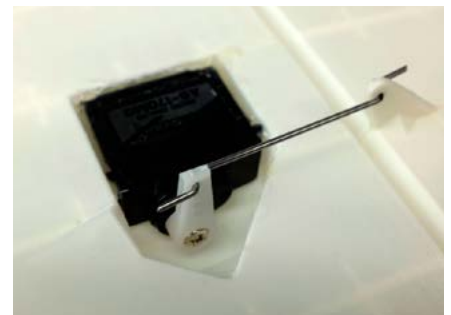
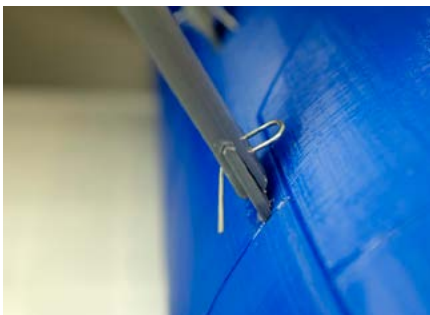
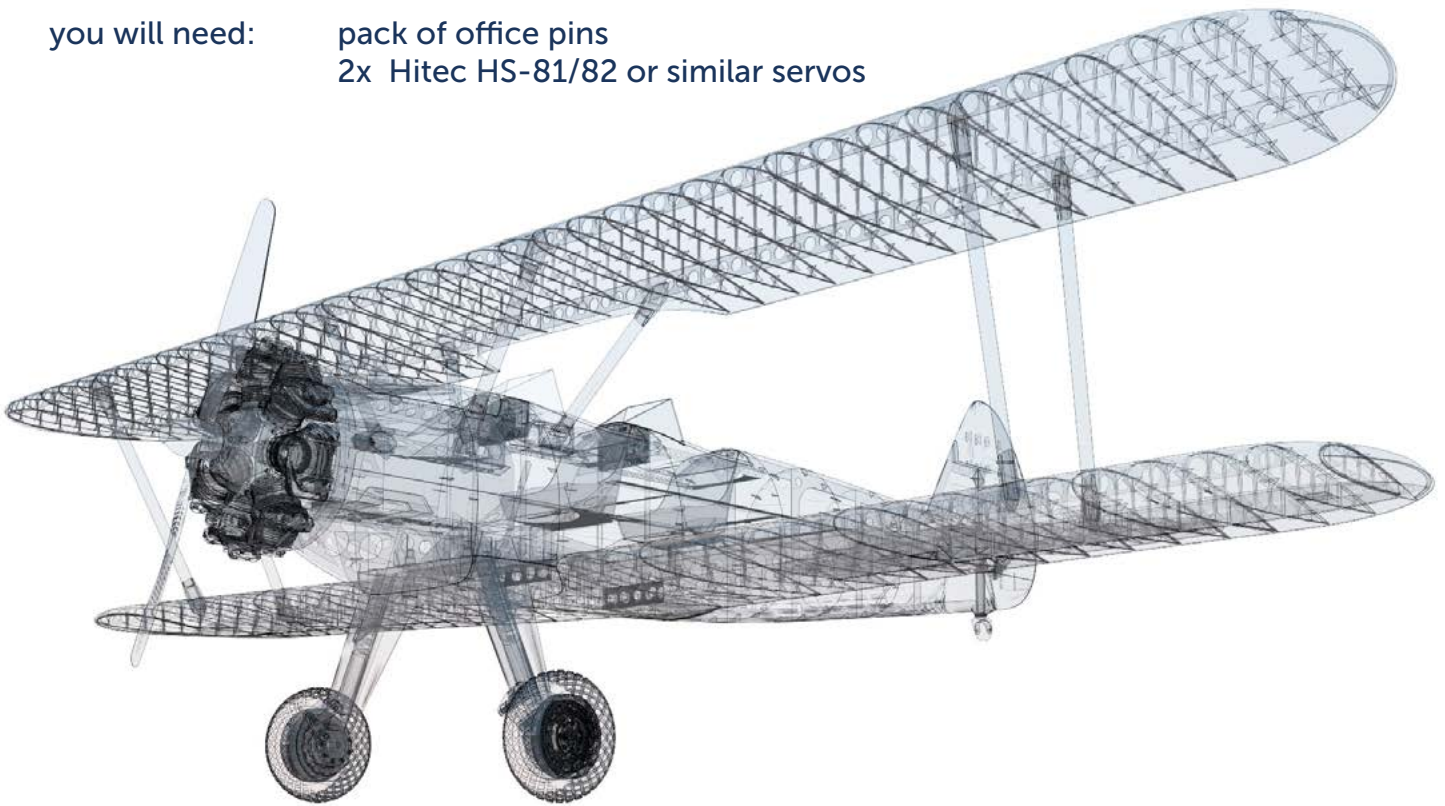


## 8. Servos and Final assembly

Mount servo wire extenders at ailerons servos. Install pair of Hitec HS-81/82 servos with Z blend pushrods for ailerons by hot melt glue or CA glue. Mount together completed upper wing, fuselage and landing gear. Clean wing struts by pliers, knife or sandpaper. Trim package of office pins (1 mm / 18-20AWG wire) for wing struts. Mount wing struts at upper wing by pins, front side marked at each strut. You can clean holes for pins by 1mm drill for easy assembly. Simply put and mount upper wing to bottom. Use and lock all pins at correct positions.

[See video guide #8](#)

you will need:      pack of office pins  
                         2x Hitec HS-81/82 or similar servos





## 9.1 Final completion and setting

Install your receiver, connect battery, setup servos and etc. with your transmitter, check servo position, then install propeller. Check CG point 0mm at leading edge of bottom wing.

**Make sure that the battery is placed properly and secured, if battery moves during flight it can shift the center of gravity backwards and aircraft will be uncontrollable! Never set ESC with installed propeller, this is very dangerous!**

you will need:

- Your own Rx/Tx system
- Battery for your setup...
- Foam strip for Li-Pol battery
- Propeller 11x5,5
- Scale markings printed to adhesive foil

[See video guide #6](#)

## 9.2 Recommended motor setups

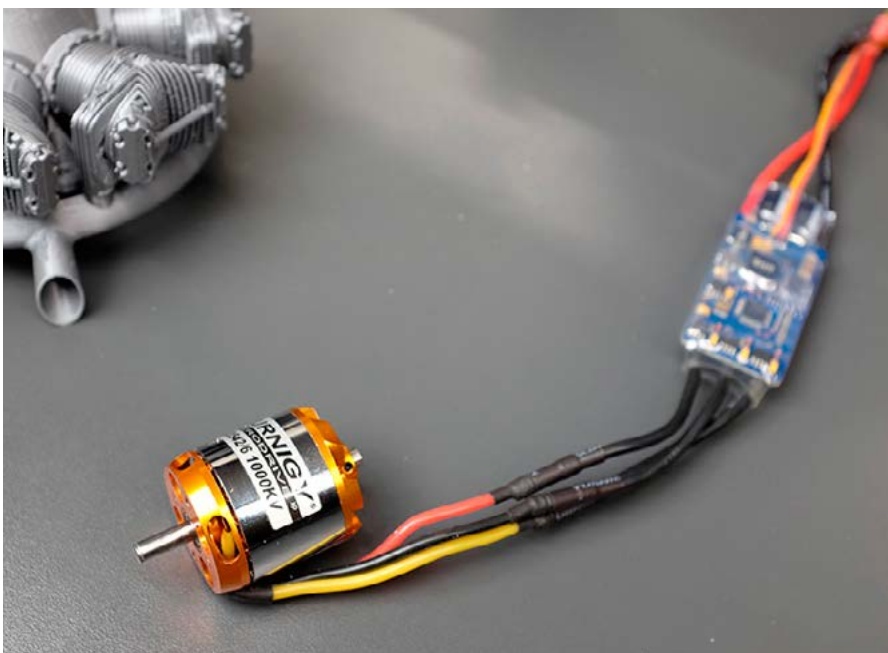
(or use your own with sufficient thrust and weight)

### Eco performance setup

[Turnigy 3542/5 1250KV](#) or similar  
[40A Electronic Speed Controller](#) or similar  
[Turnigy 3000mAh 3S 20C](#) or similar  
 propeller two blade APC 11x5,5

### Performance setup

[Turnigy 3542/6 1000KV](#) or similar  
[Speed controller \(ESC\) YEP 40A/6S](#) or similar  
[Battery 3000mAh/4s 40C](#) or similar  
 propeller two blade APC 11x5,5





## 10. Pilots Please Attention!

For the first flights we recommend set center of gravity of the airplane by about 5-10 mm forward of the CG tag - nose heavy, this increases the stability (you can use heavier battery). Also is good to increase expo settings on your transmitter for elevator and ailerons to 60 % (this calms response from your stick inputs). Also you can decrease elevator and ailerons deflection.

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

You can then return to the center of gravity (balance aircraft) the CoG point and expo set to 30-50 % ... this gain back extra maneuverability when you will be sure with flying your airplane.

**Never fly aft positioned Center of gravity.**

Please, use this files only for your own purpose, do not send it further. Thank you very much. Enjoy your flight.

