

User Guide

rev. 2019/12



Fully 3d printable

North American B-25J Mitchell

12:1 ~ wingspan 1.72m/68in

North American B-25J Mitchell– fully printable R/C plane for your desktop 3Dprinter

Future of flying - Print your own plane. [flight video](#)

The really first 3d printable bomber plane. This even bigger evolution including some revolutionary features. For the second time this model uses new method of joining parts, really, now on most of parts - stronger, easier to assemble and more precise.

This plane can be recommended to medium skilled pilots. We hope you enjoy printing, building and flying it, although this build will truly test your abilities and quality of your printer.

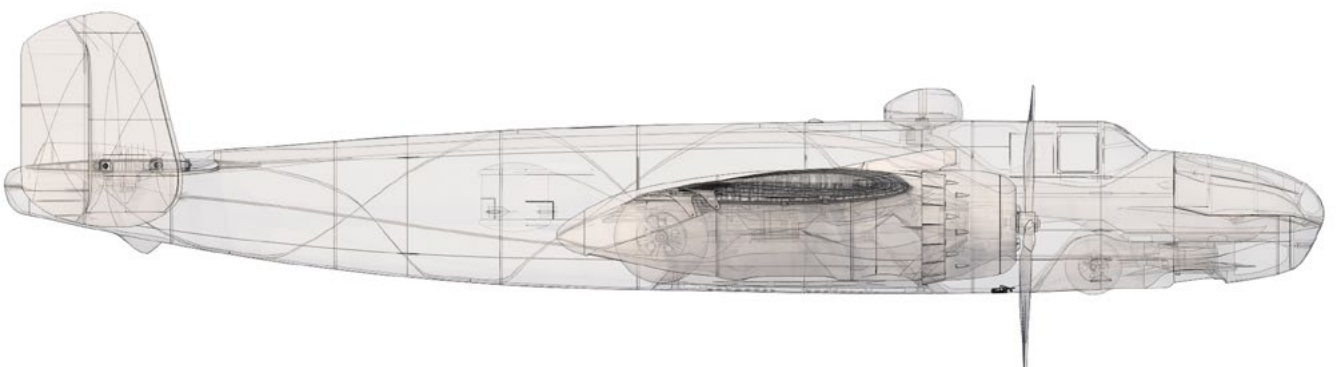
Welcome to the thin wall printing!

The first fully printable airplanes with files prepared for your 3Dprinter, with flight characteristics, comparable or even superior 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 \$40

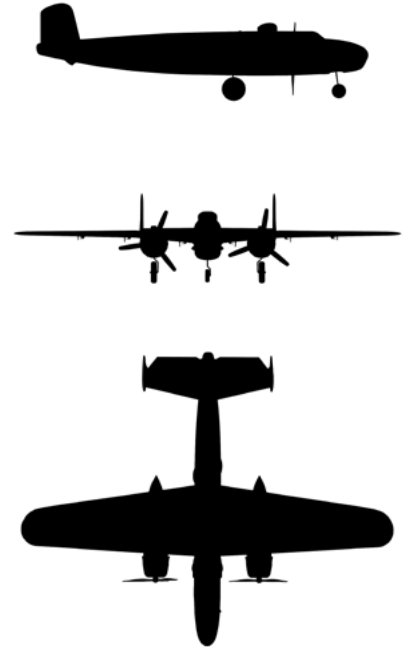
Extensive hi-tech 3d structural reinforcement making the model very rigid while maintaining a lightweight airframe and exact airfoil even it's just a plastic. This perfect and exact 3d structure is possible only thanks to additive 3dprinting technology. So welcome to the 21st century of model flying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

Easy to assemble, you don't need any extra tools or hardware. Just glue the printed parts together. The most complicated operation is probably shaping the landing gear legs, the rest of the assembly is very easy. Simply add brushless motor, ESC, servos and radio system. Detailed step by step PDF/VIDEO is included. You will get a superb performing precise and detailed legendary plane.



General specifications:

Wingspan:	1720 mm / 68 inch
Length:	1360 mm / 53,6 inch
Height:	400 mm / 15,7 inch
Wing area:	43 dm ² / 4.7 sq ft
Wing loading:	83.2 g/dm ² / 27.3 oz at sq ft
Center of gravity:	83mm / 3.27 in from LE
Airfoil:	3DLabPrint semi 04
Weight of printed parts (w/o wheels):	1980 g / 72.7 oz
Takeoff weight (4s 5000mAh Li-Pol):	3600 g / 160.5 oz
Max takeoff weight:	4200 g / 194 oz
Never exceed speed, V _{ne} :	120 km/h / 93 mph
Design max maneuvering speed, V _a :	75 km/h / 46 mph
Stall speed V _s :	32 km/h / 17mph



Performance measurement:

Max speed V _H (level flight):	110 km/h – 75.6kn – 87.0mph
Rate of climb:	21 m/s (6 500 ft/min)
Flight time (4s 5000mAh):	7:00 min (+20% reserve)



North American B-25J Mitchell, History

The North American B-25 Mitchell is a medium bomber that was introduced in 1941 and named in honor of Major General William „Billy“ Mitchell, a pioneer of U.S. military aviation. Used by many Allied air forces, the B-25 served in every theater of World War II, and after the war ended, many remained in service, operating across four decades. Produced in numerous variants, nearly 10,000 B-25s were built. These included a few limited models such as the F-10 reconnaissance aircraft, the AT-24 crew trainers, and the United States Marine Corps' PBJ-1 patrol bomber.

The Air Corps issued a circular (number 38-385) in March 1938 describing the performance they required from the next bombers — a payload of 1,200 lb (540 kg) with a range of 1,200 mi (1,900 km) at more than 200 mph (320 km/h). Those performance specifications led NAA[4] to submit their NA-40 design. The NA-40 had benefited from the North American XB-21 (NA-39) of 1936, which was the company's partly successful design for an earlier medium bomber that had been initially accepted and ordered, but then cancelled. However, the company's experience from the XB-21 contributed to the design and development of the NA-40. The single NA-40 built flew first at the end of January 1939. It went through several modifications to correct problems. These improvements included fitting 1,600 hp (1,193 kW) Wright R-2600 „Twin Cyclone“ radial engines, in March 1939, which solved the lack of power.

In March 1939, North American delivered the substantially redesigned and improved NA-40 (as NA-40B) to the United States Army Air Corps for evaluation. It was in competition with other manufacturers' designs (Douglas 7B, Stearman X-100, and the Martin Model 167F) [5] but failed to win orders. The aircraft was originally intended to be an attack bomber for export to the United Kingdom and France, both of which had a pressing requirement for such aircraft in the early stages of World War II. However, the French had already opted for a revised Douglas 7B (as the DB-7). Unfortunately, the NA-40B was destroyed in a crash on 11 April 1939 while undergoing testing. Although the crash was not considered due to a fault with the aircraft design, the Army ordered the DB-7 as the A-20.

The Air Corps issued a specification for a medium bomber in March 1939 that was capable of carrying a payload of 2,400 lb (1,100 kg) over 1,200 mi (1,900 km) at 300 mph (480 km/h) NAA used the NA-40B design to develop the NA-62, which competed for the medium bomber contract. No YB-25 was available for prototype service tests. In September 1939, the Air Corps ordered the NA-62 into production as the B-25, along with the other new Air Corps medium bomber, the Martin B-26 Marauder „off the drawing board“.

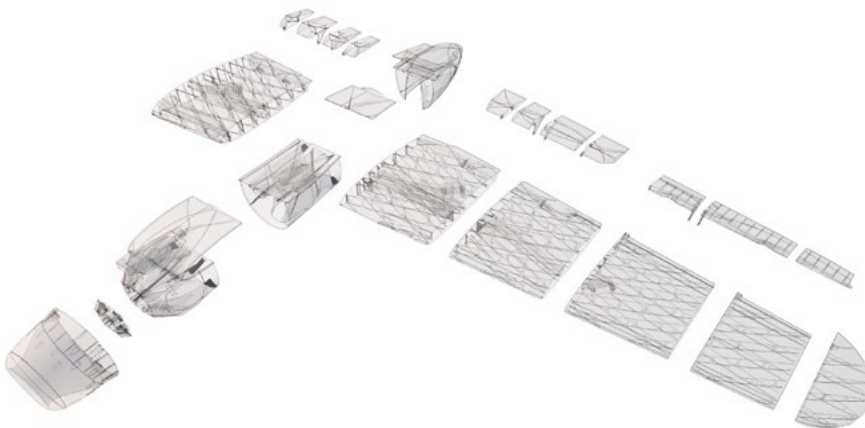
Interior of huge aircraft factory where rows of bombers are being assembled
North American B-25 Mitchell production in Kansas City in 1942

[More...](#)

Included:

1. STL 3d files

Universal STL files designed for use with desktop FDM 3D printers and slicer software such as Simplify3D (recommended) CURA or MatterControl (these STLs are not compatible with Slic3r/PrusaSlicer or Makerware slicers).

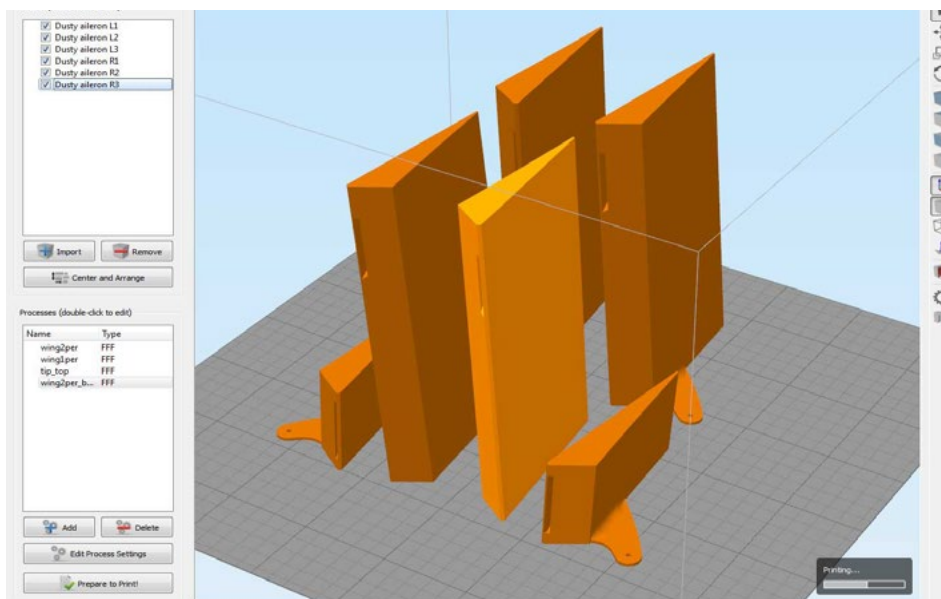


2. Factory files for Simplify3D slicer

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

Please use this user guide along with the Printing Guide where you can find Tips and Advice for airplane printing (Thin Wall Printing).

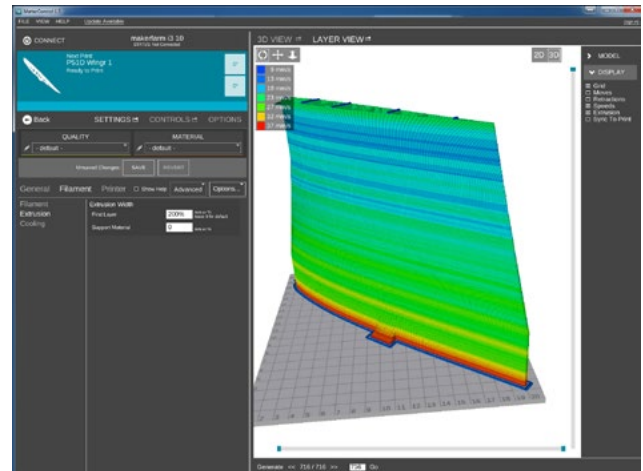
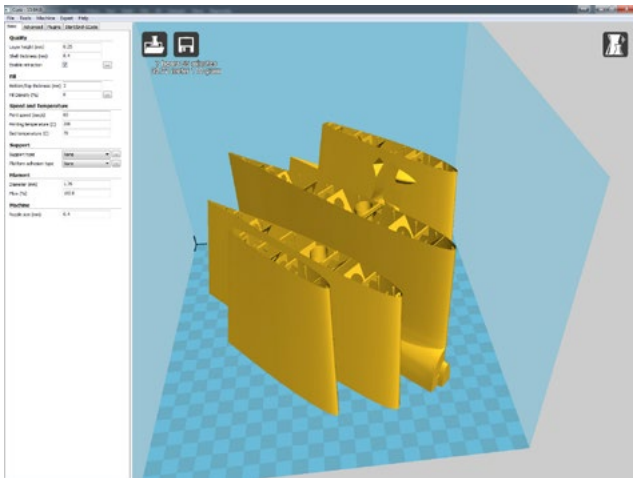


4. Gcodes

Basic Gcodes prepared for direct use. We made it as universal as possible, 100% compatible with PRUSA i3 ORIGINAL and most i3 style printers. Feel free to try it out, but we're not able to guarantee it's gonna work with your printer.

5. Prepared settings for CURA and MatterControl slicers

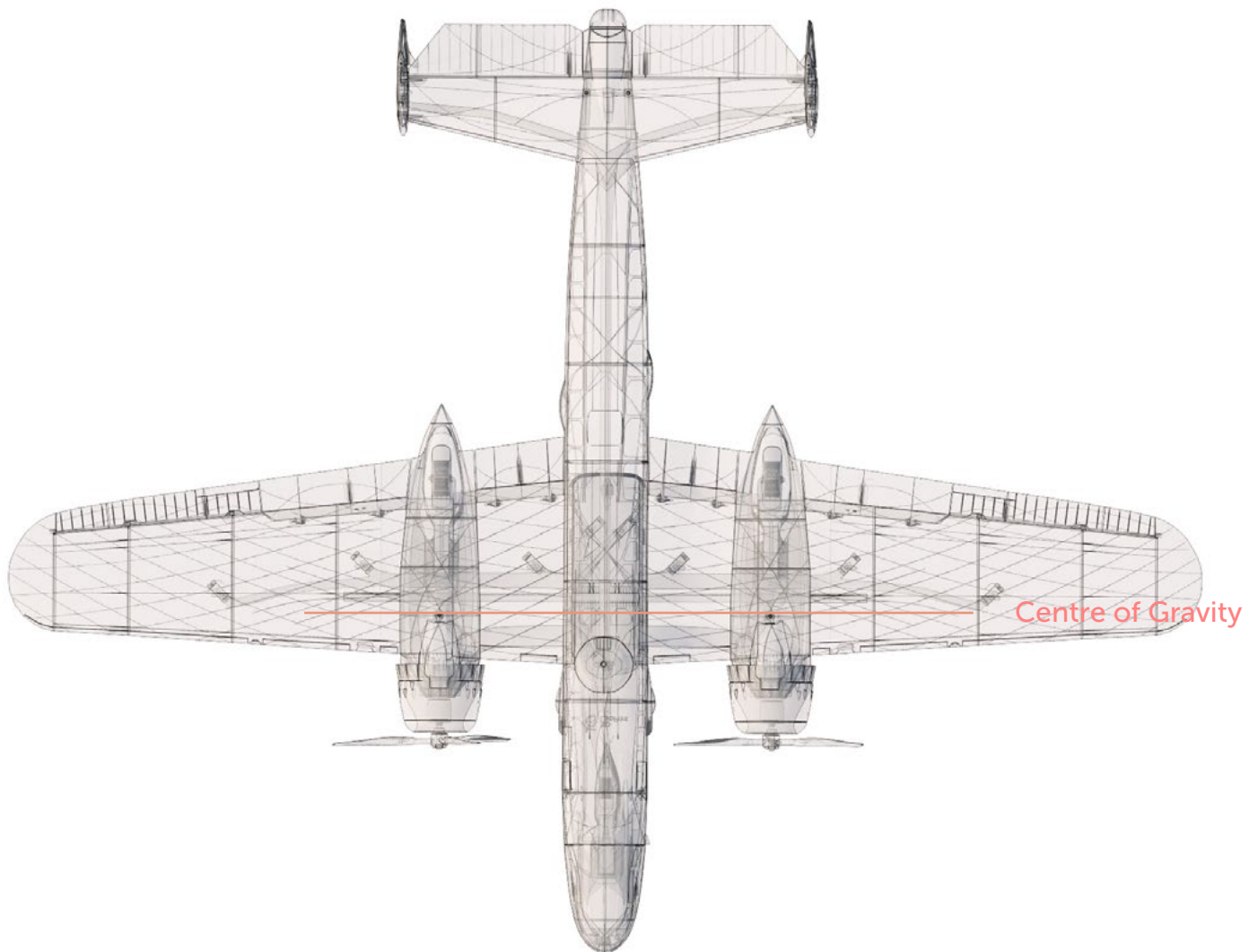
If you can't use Simplify3D for any reason, we provide our basic configuration files for free slicers CURA and MatterControl. Use these as a start point and amend as needed.



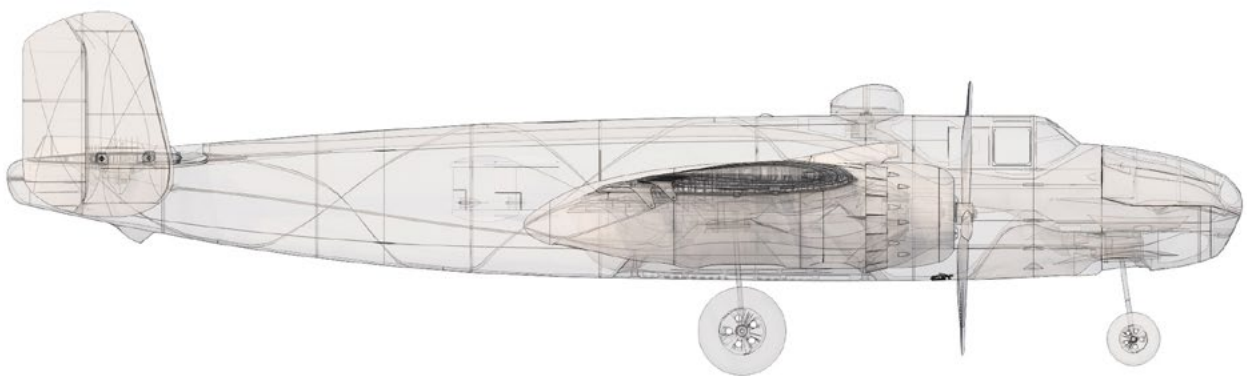
6. Scale markings and masking patern in PDF

Print this PDF on self adhesive foil, cut it and put it on the model according to your preferences. Martin Sonka marking or alternatively Hannes Arch marking.

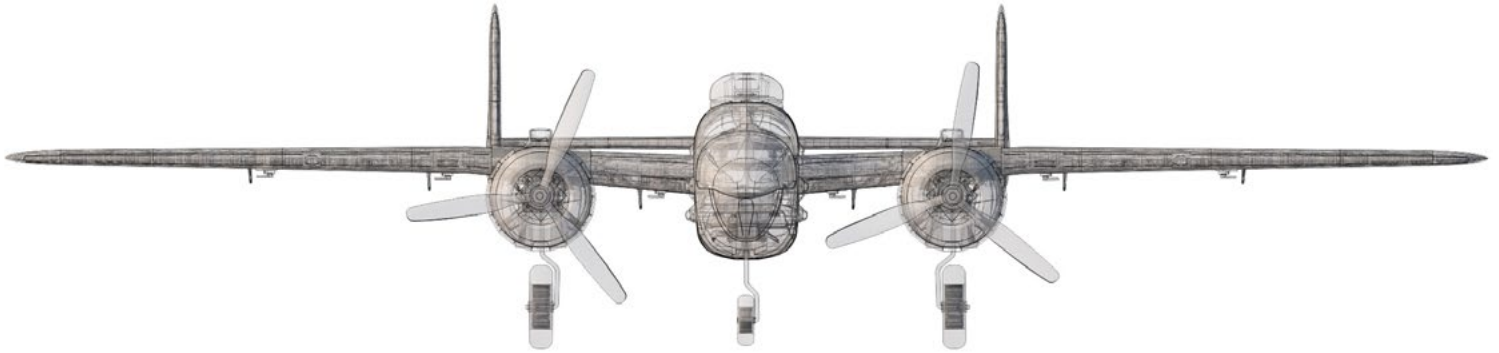




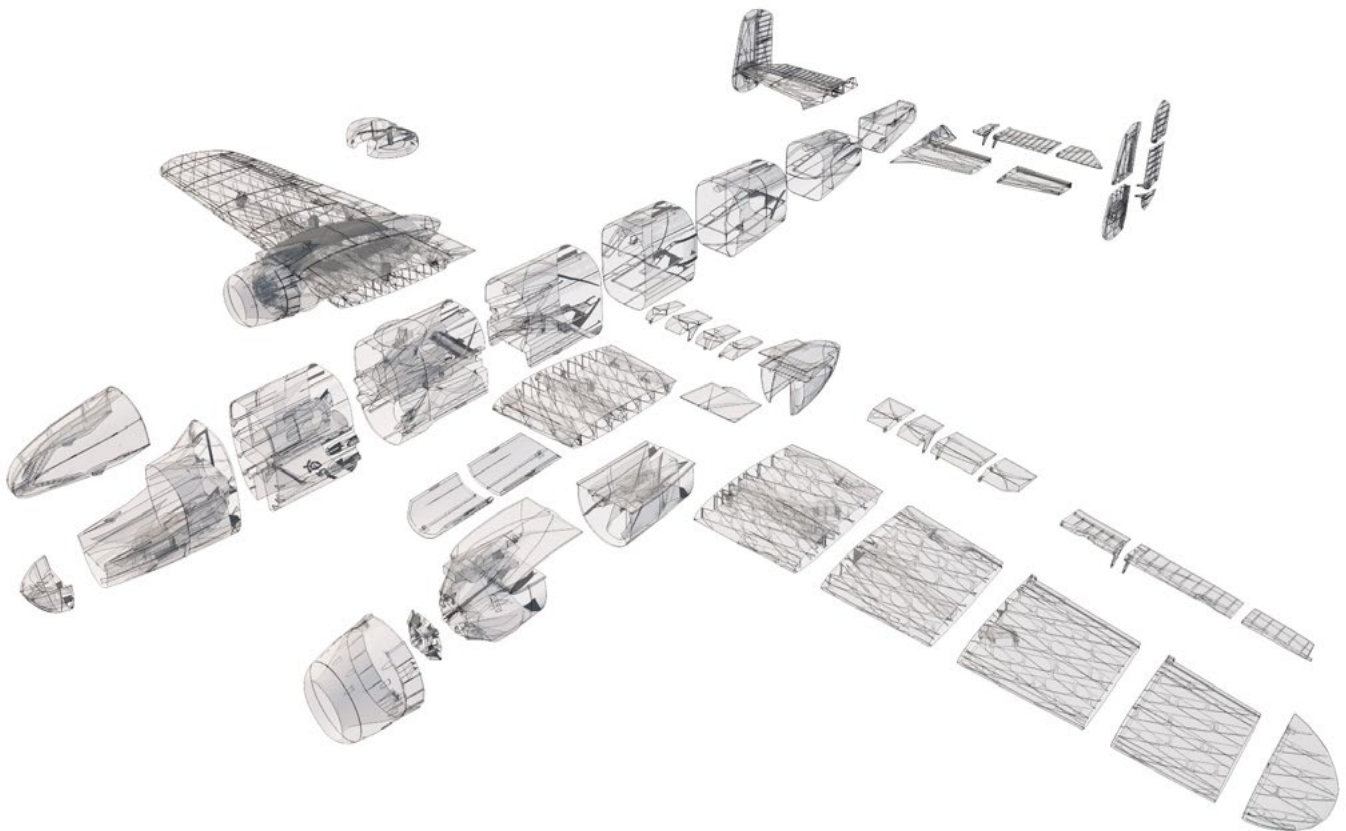
Wing area: 43 dm² / 4.7 sq ft / CoG is 83mm / 3.27 in from LE



Length: 1360 mm / 53.6 inch



Wing span: 1720mm / 68 inch



Step By Step PDF/VIDEO userguide (please go through all videos)

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



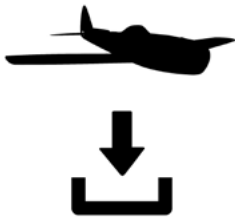
Basic requirements for our B-25J are: at least 200/200/200mm build volume. Nozzle 0.4mm recommended. Heated bed highly recommended.

PLA filament (or PETG, APLA, htPLA, PC-max.... not ABS) and some flex for tires...

If you're unsure your printer can handle this project, download the test part from our [FORUM](#) (usually the largest part)

1. Create account, download

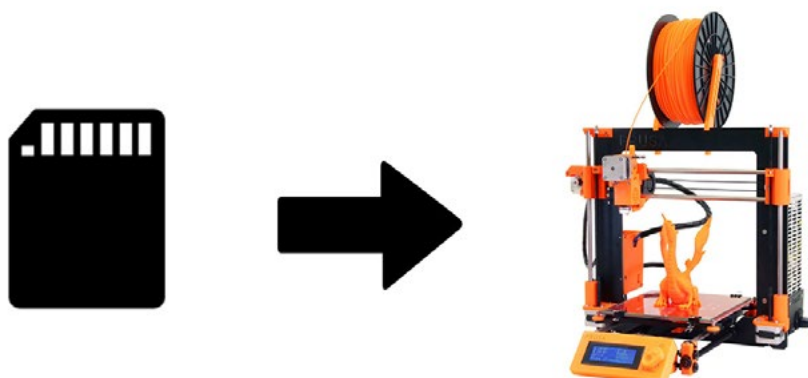
You'll get the download link for all zipped files to your email, or log in to your account and download directly from our website. If you don't receive the link right on checkout, please contact us on support@3dlabprint.com mentioning the order number. (WC-XXXXX on PayPal receipt)



2. Gcodes preparing

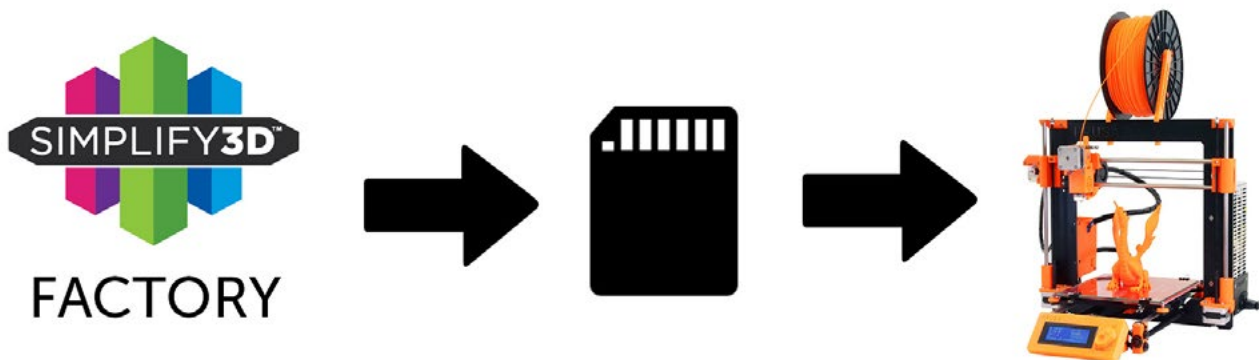
option A Gcodes:

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 225°C for the best layer bonding. You can edit speed and temperature on your printer LCD only. If prepared gcodes doesn't work for you, please proceed to the next options...



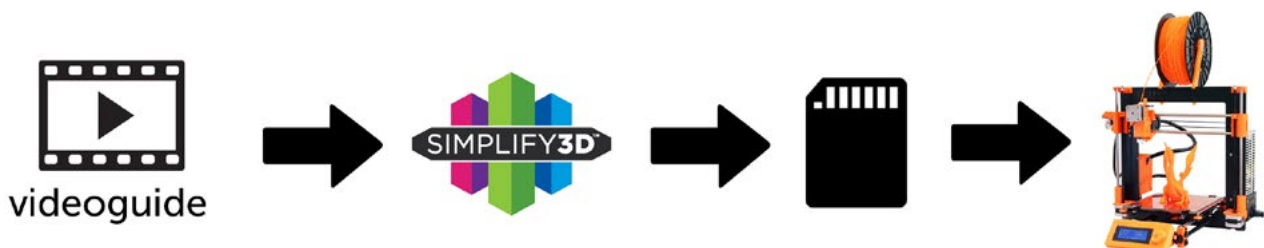
option B FACTORY files for Simplify3D (recommended)

We prepared all you need in the factory files (basic FFF profiles, parts arranged on the bed, etc.) Use our settings as a starting point and edit according to your needs (adapt it for your printer), choose the parts to print etc. Most 3d printers should be ok with files as they are, however if you need some customization, please do so. We are not liable for any damage resulting from the use of our settings. If you still encounter any difficulties, please proceed to the next option.



option C Simplify3D manual setting (watch and learn)

Use our [VIDEOGUIDE](#) and [how-to](#) to find explanation of proper settings. This is great option to 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. For simplification we explain only our basic settings for wings and fuselage, please consult our prepared Factory files for the right settings of other parts like motor mounts, landing gears etc.



AND... please watch the VideoGuides:

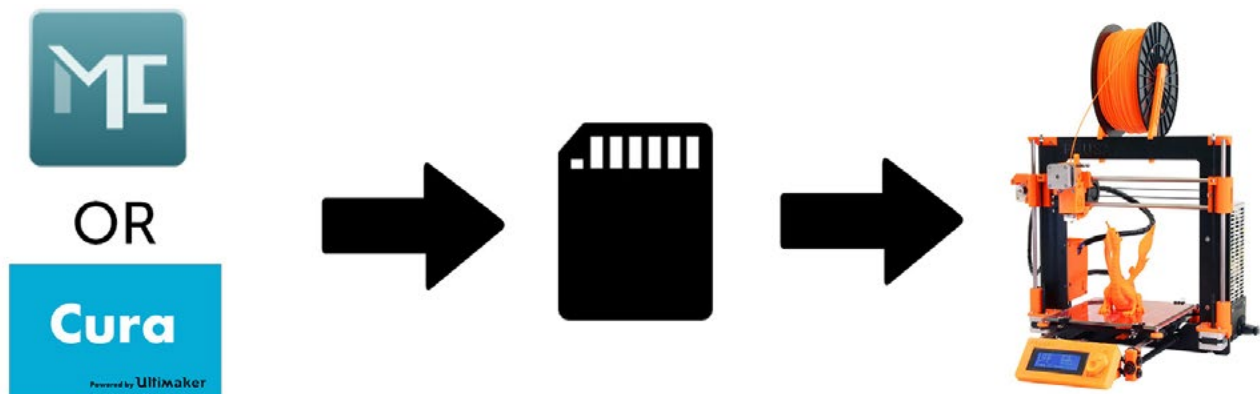
[video 2](#) Simplify3D setting

[2.1 video](#) about Thin Wall Printing

option D CURA or MatterControl (considered as the last resort, we recommend Simplify3D)
MatterControl and CURA are free and provide good results. The airframe is still strong enough, but don't expect the best quality. Both slicers lacks some very useful features, and finer settings, like multiple processes according to Z height, retraction options, layer start, etc. Please try to find the best extrusion multiplier and temperature for good weight and best possible layer bonding. Check the suggested parts weight list for proper multiplier settings.

Please check the [Cura setup guide](#) in the Help section.

As a starting point you can use our predefined CURA profile. Always adapt the settings for your printer, change build volume, filament diameter, etc. according to your printer. Please be aware some parts require different settings of perimeters, top/bottom layers and infill. For some thick part you'll need to use support structure. Check our gcodes in printing simulation for more details about how the result should look like. NOTE: some parts (nose, canopies, engine covers,...) require top layers to cover the steeper overhangs, but only for a certain spot. This is not possible to be set in Cura, however you can use the text editor gcode merge procedure described in the Cura setup guide article.



3. Print it

Save generated Gcodes and insert SD card to your printer, prepare your printer and start printing. We prefer to use SD rather than a direct connection via USB

Note: ABS filament is not suitable for this. Scaling the model will lead to unusable result!

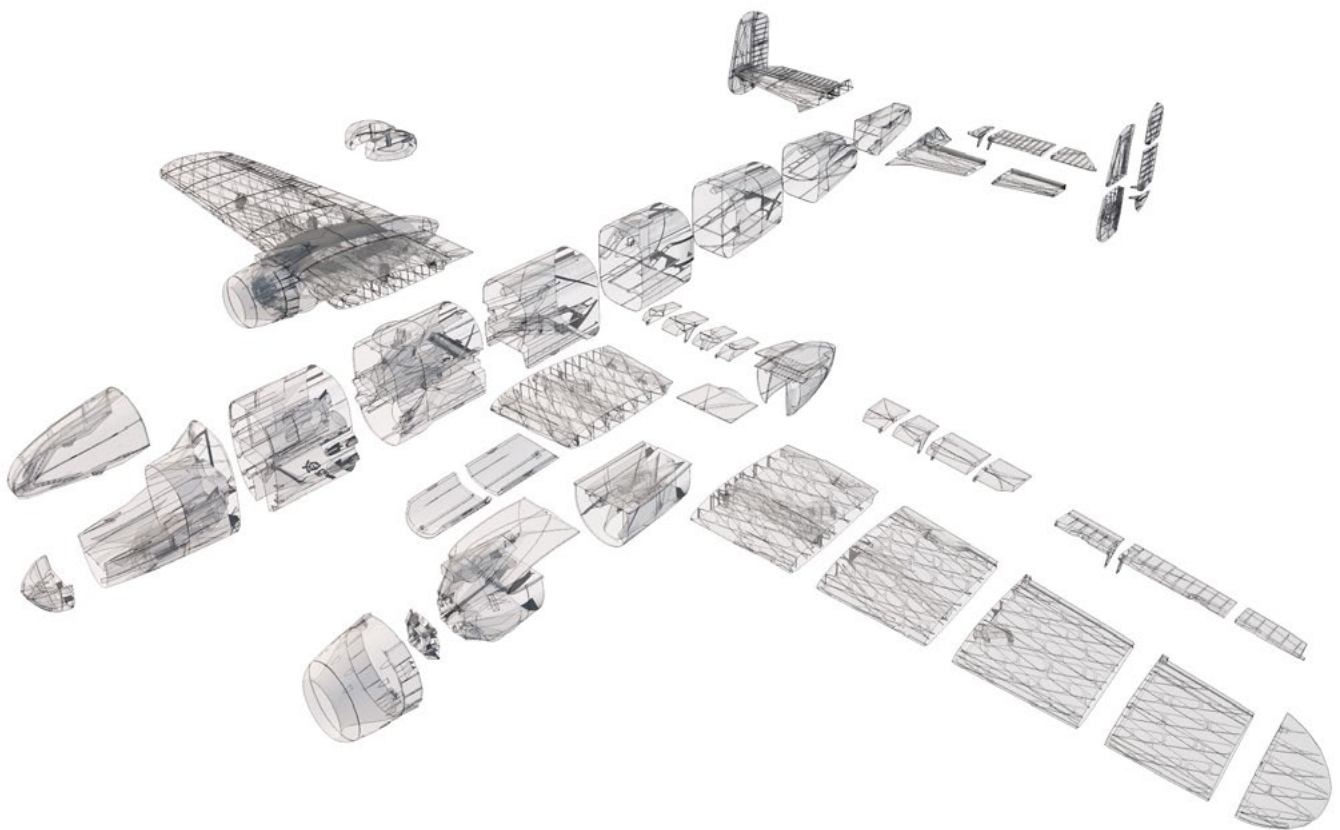
Note: ninja flex or simmilar fillaments can stick very hard to PEI based surfaces be careful...

You will need: PLA filament - good quality (we need good layer bonding)
Strong hair spray (or your favorite adhesive bed surface)
(disregard with PEI or similar bed surface, Mk2/3...)
Razor blade

AND... please watch the VideoGuides:

[video printing guide #3](#)

North American B-25J Mitchell - parts diagram:

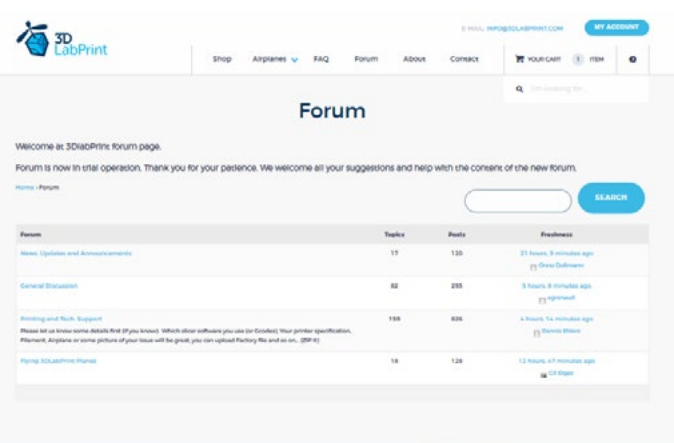
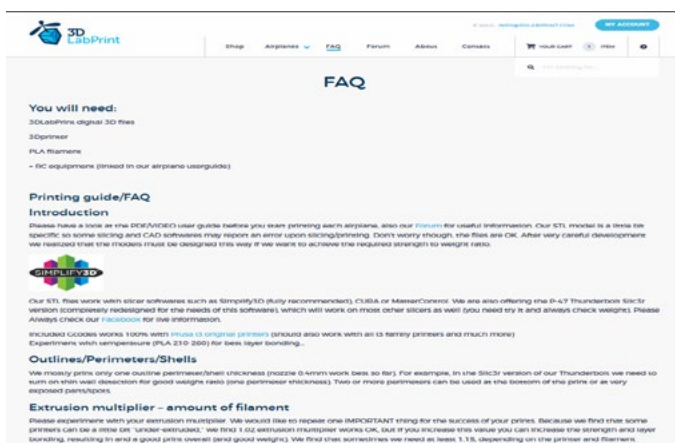


Basic Tips and Advice

Please experiment with your extrusion multiplier to achieve the similar weights as in the list. **HotEnd temperature is very important** for a strong result. The reason is, the plastic leaving the nozzle has to melt the previous layer to create solid joint. Please print the thinwall temperature tower to find the best hotend temperature value (215° up to 260° Celsius) to achieve strong strong layer bonding without underextrusion on layer starts.. **Turn OFF cooling fan** (Heatbreak fan of course has to be left ON). Thin walls easily cool down on its own and the cooling fan worsens the layer bonding. You can use cooling fan for thick or very small parts if needed...

Heated bed is very recommended, use 50-56° Celsius to print without warping ends. Any standard quality PLA is suitable to print our planes, but the result depends on combination of PLA vs. Extruder vs. HotEnd. Some colors and brands of filament has lower layer adhesion, please do experiment with it. There are a lot of 3dprinters on the market, most of them are OK for printing our aircraft (specific thin wall printing...) with sufficient volume, heated bed, 0.4 mm nozzle.

Please look at [FAQ](#) and our [Forum](#) for further information:



Some advice for rubberlike filament printing (printable tyre): it is a good IDEA to use some adhesive tape or foil... first layer bonding could be too strong or on the other hand too weak depends what filament is used... (picture: RubberJet - TPE32 245/30 print temperature)

After printed, heat up bed to 80 Celsius and remove tape along with printed tyre, clear the bed with isopropylalcohol...

4. Assembling printed parts

4.1 Wing assembly (including Engine Gondola)

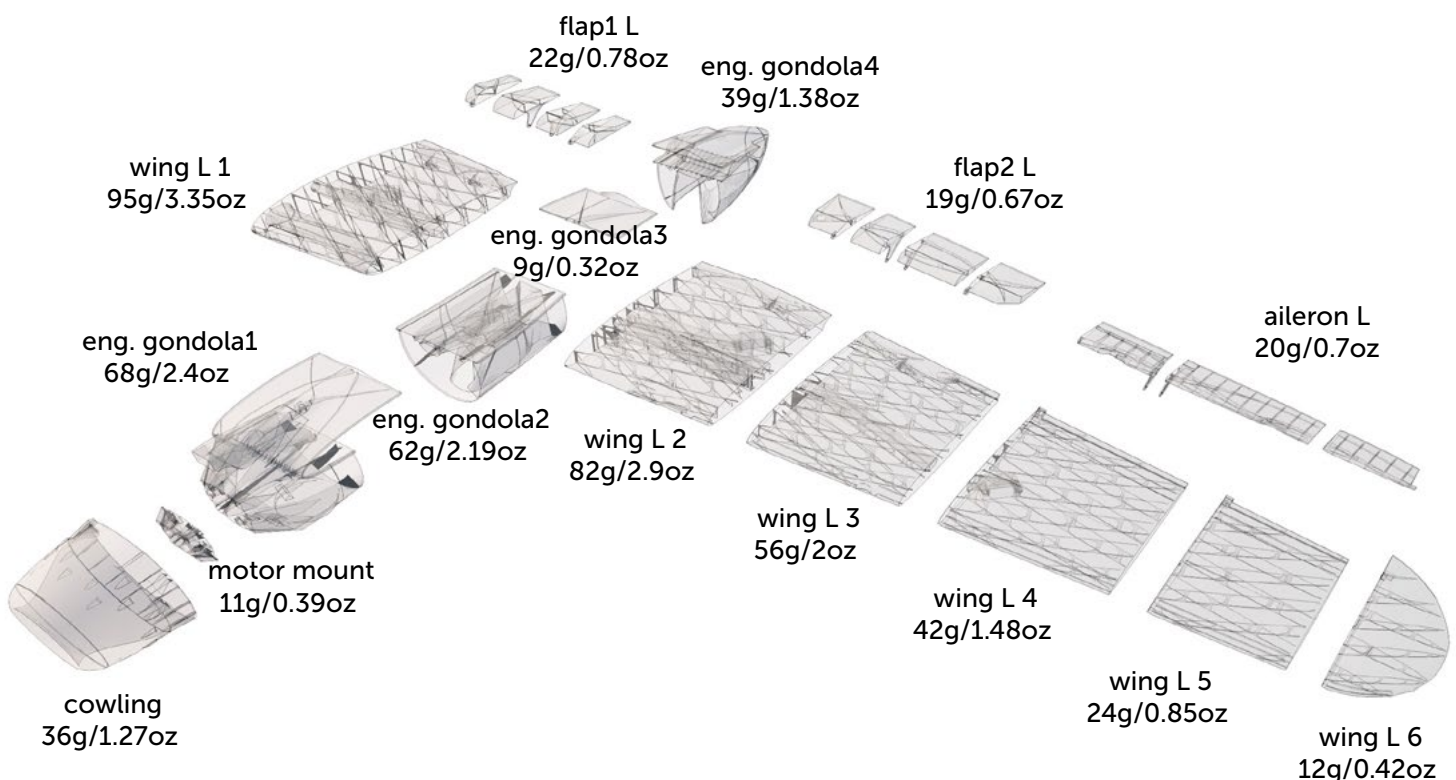
[See video guide #4.1](#)

you will need: CA Glue - medium or similar medium viscosity CA glue
Activator for CA Glue or similar, (gas pressurized works better)
 Soldering Iron (EU) (US) or any hot tool to cut holes
 1.75-2mm rod/axle for flap hinge (we use filament or toothpick)
 sound as a option (ESS-AIR Engine Sound System) + cable extension

Proceed the way shown in videoguide:

[See video guide #4.1](#)

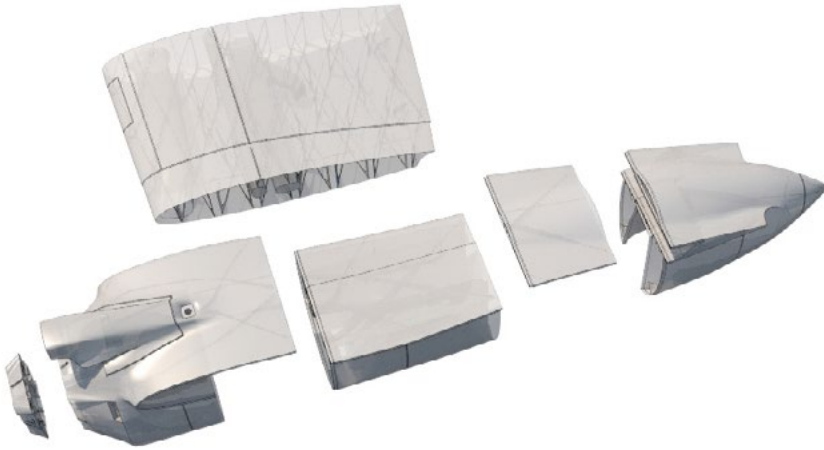
The weight of parts can vary +/- 8% due to diff PLA color or brand....!!!



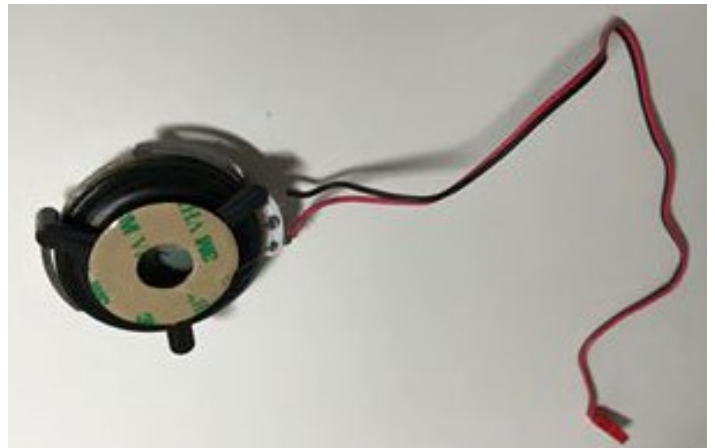
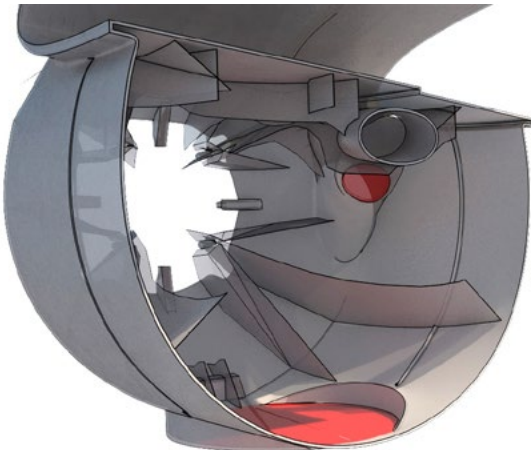
Proceed the way shown in videoguide:

[See video guide #4.1](#)

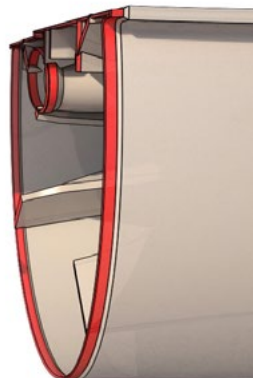
Start with glueing the engine gondola and wing1 parts (shown in the picture below):



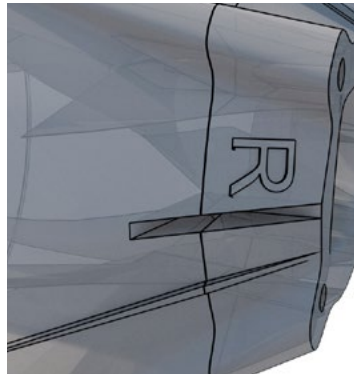
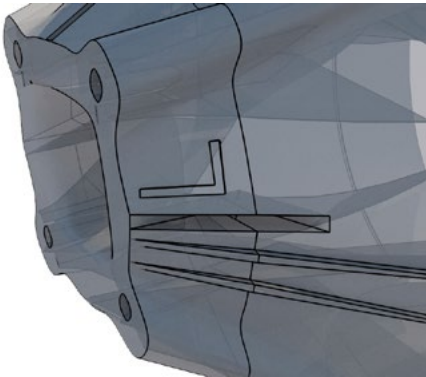
If you want to use engine sound system, this is the time to install the self-adhesive vibration speakers, use a hot tool to cut the hole for speaker cable (the smaller area marked red in the picture). Stick the speaker to bottom of the pod (use IP alcohol to degrease contact surface):



Apply CA glue to the contact surfaces (marked red in the picture) and assemble together, then apply the activator, proceed this way with gondola parts and glue them together:



Continue with R and L motor mount, note: for proper function there is angle compensation for propeller slipstream so right orientation is essential, see the pictures below):



!ANNEALING!

We suggest to anneal the PLA motor mount. You can use this procedure: submerge in boiling water for more than 30 minutes (pla is then much more heat resistant).

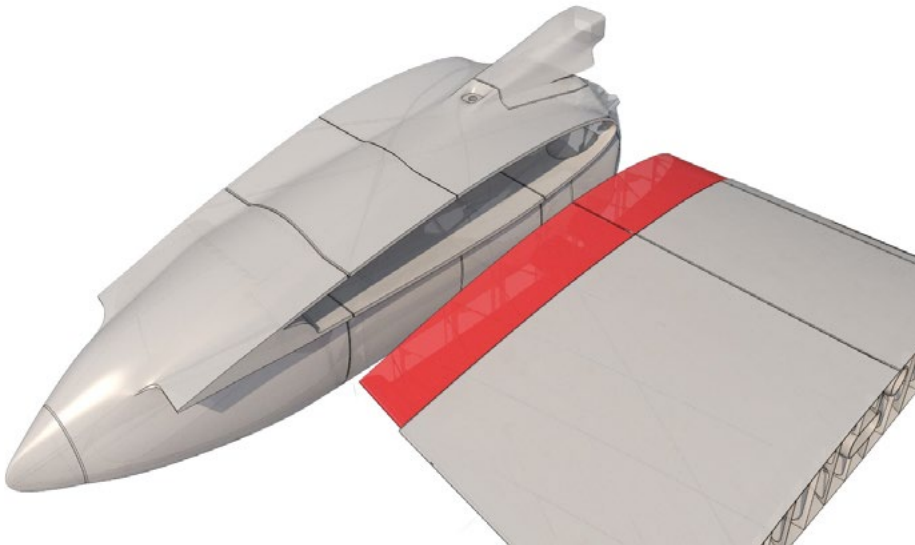
Because PLA shrinks when annealed (about 2%) it is good idea to use **motor_mount_annealing** compensated for this effect, or you can adjust the scaling exactly for your PLA brand in Simplify3D or any other slicer:



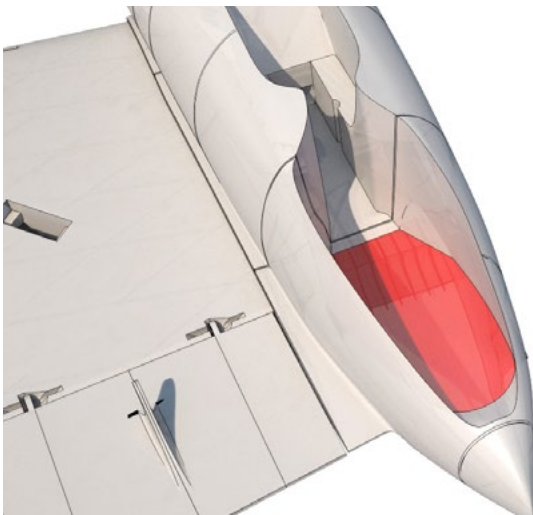
Now apply glue (marked red in the picture) and assemble together motor mount and engine gondola, then glue the „sure bonds“ (small triangle parts) in to the joints:



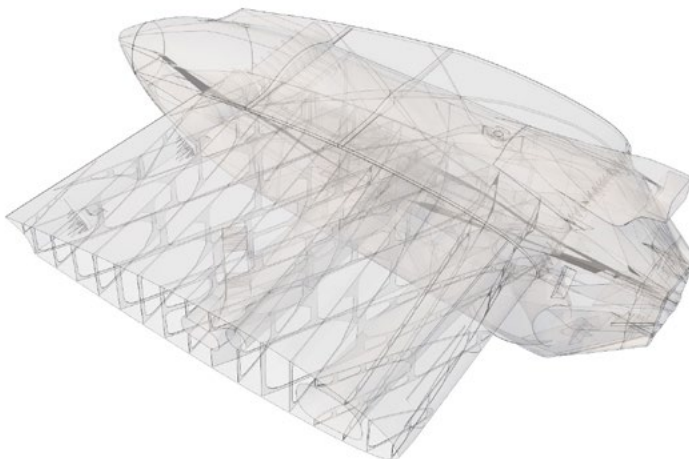
Test fit the parts together, apply glue (marked red in the picture) and assemble together engine gondola and wing1 parts:



Use any hot tool to cut out the hole (marked red in the picture) for main landing gear wheel:



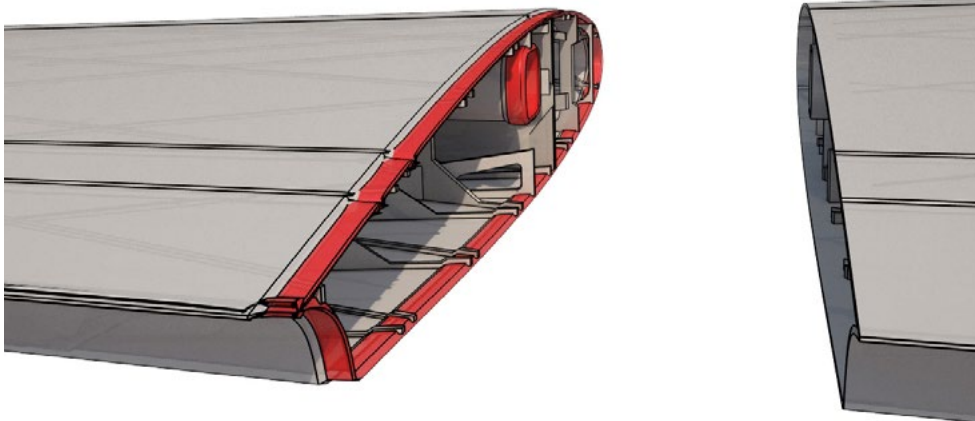
Now first part of wing and engine gondola is ready:



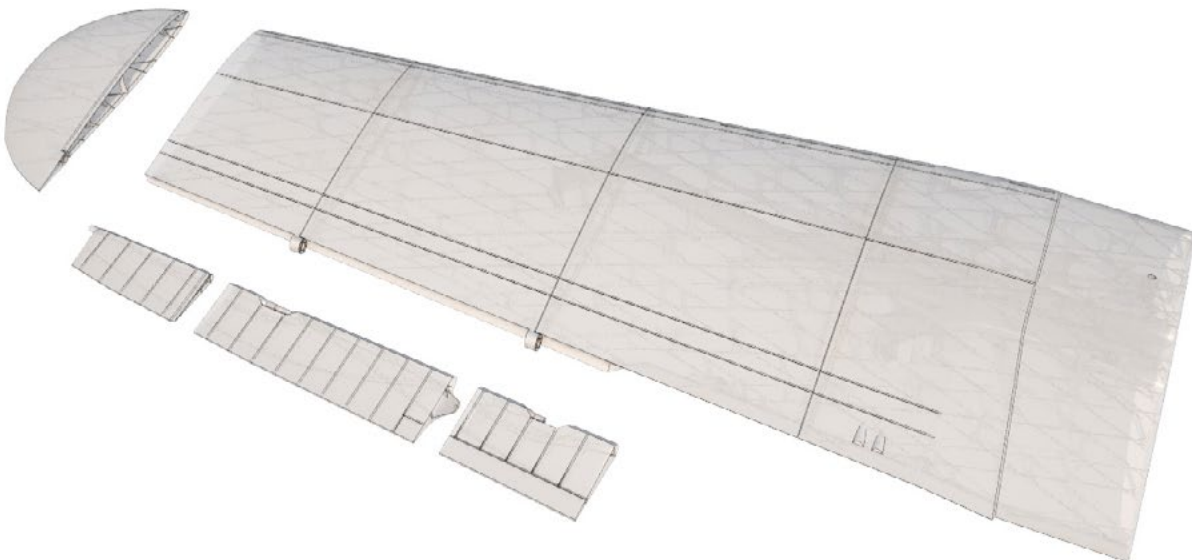
Now glue outer wing parts together (please don't glue the last wingtip part at this moment):



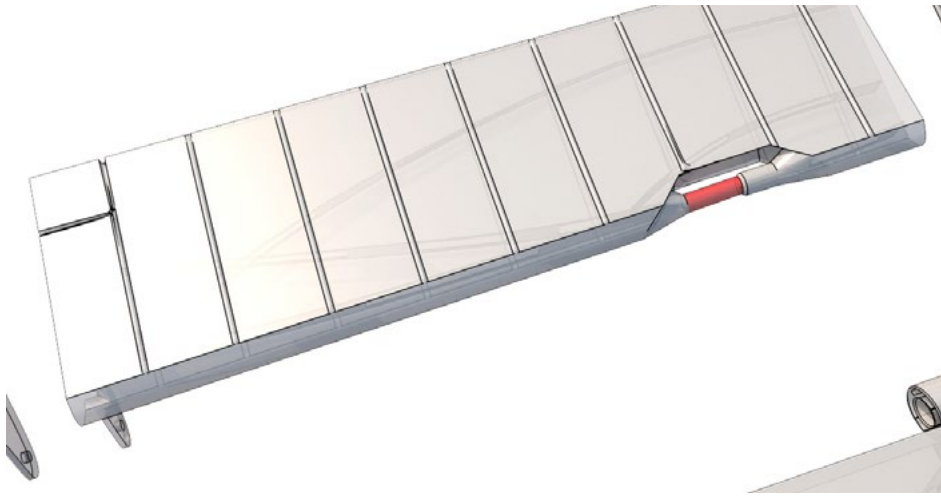
Apply CA glue to the contact surfaces (marked red in the picture) and assemble them together, then apply the activator:



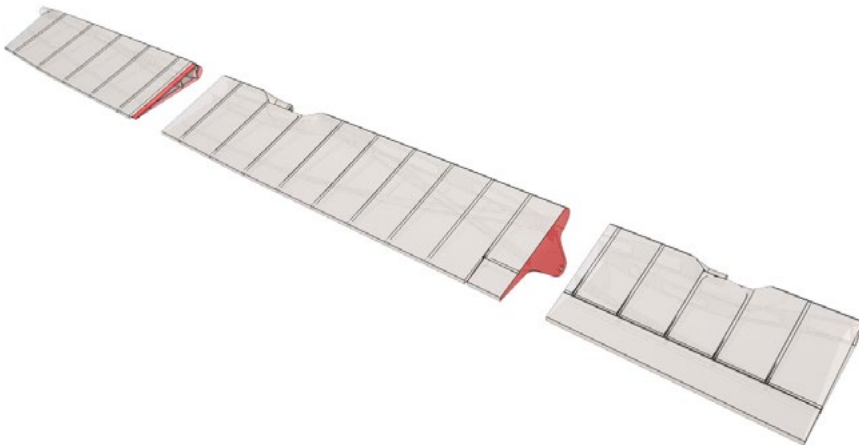
Proceed with next step:



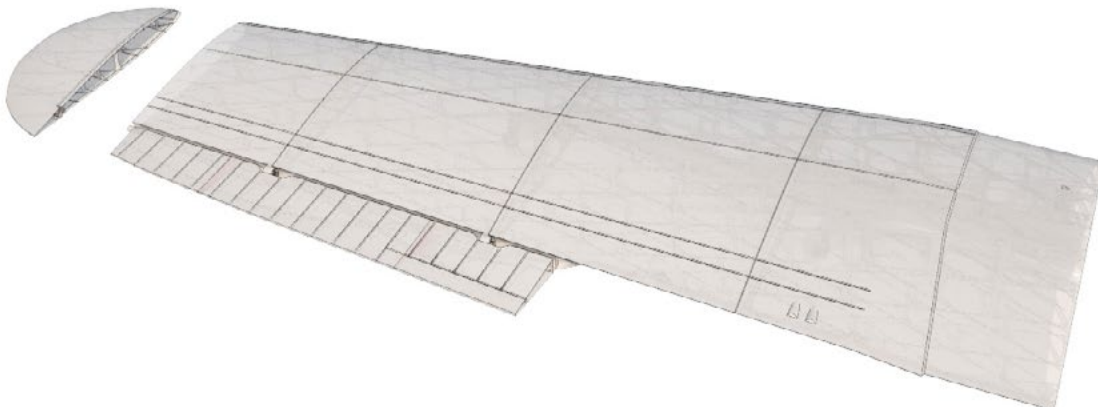
Use any hot tool and remove the hinge support (marked red in the picture):



Apply CA glue to the contact surfaces (marked red in the picture) and align the parts together, then apply the activator:



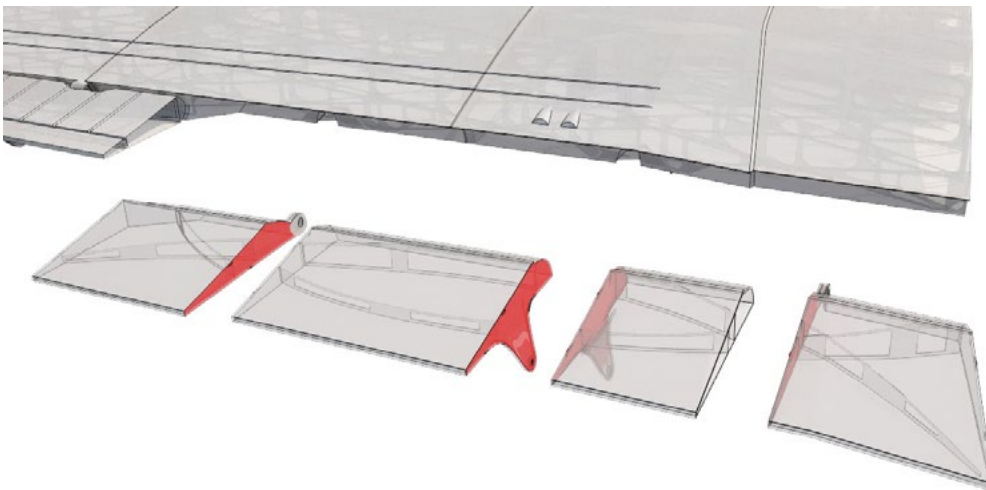
Now you can slide aileron to the main wing hinges:



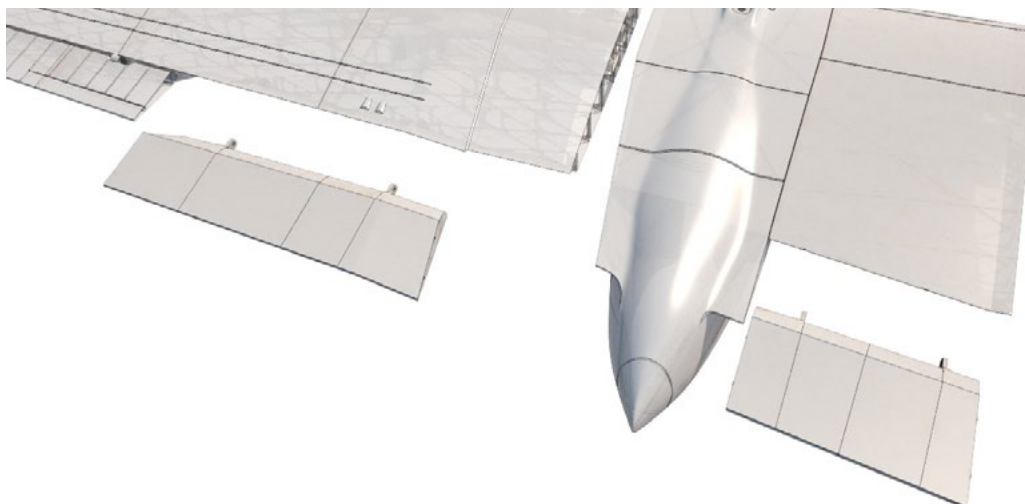
Apply CA glue to the contact surface of the part (marked red in the picture) and insert it to the main wing part. Make sure, the aileron axle is in the right position and not contaminated with CA glue , then apply activator:



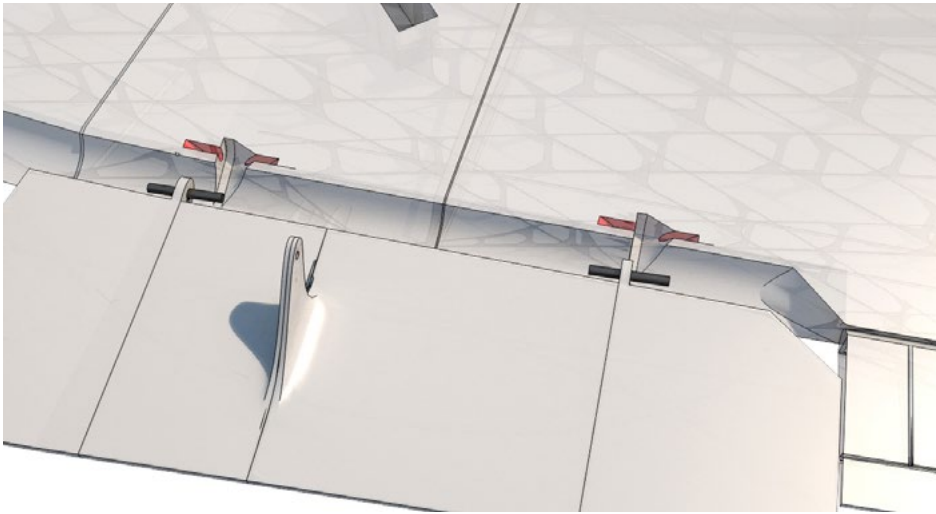
Apply CA glue to the contact surface of the flaps parts (marked red in the picture) :



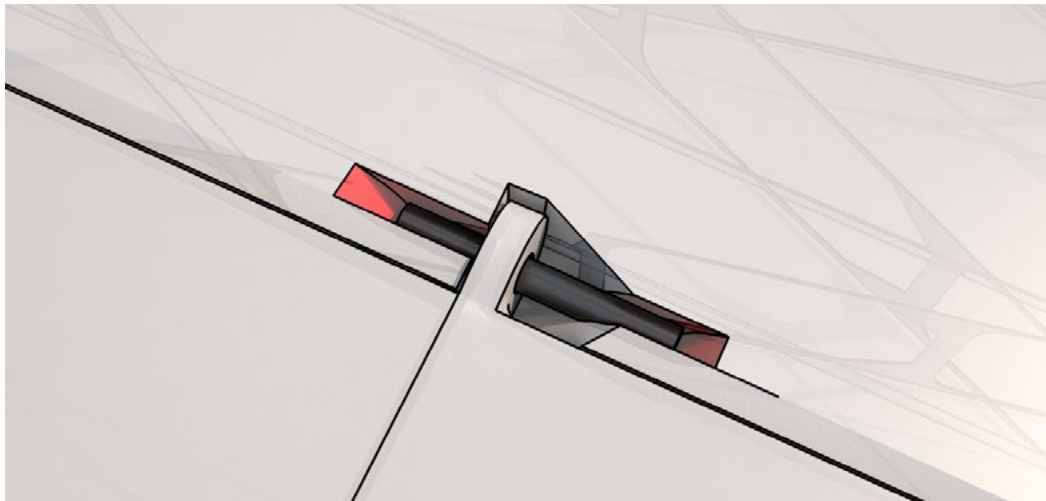
Go ahead and prepare both flaps:



For flap hinges you can use any 1.75-2mm rod (we use piece of filament or toothpick) :

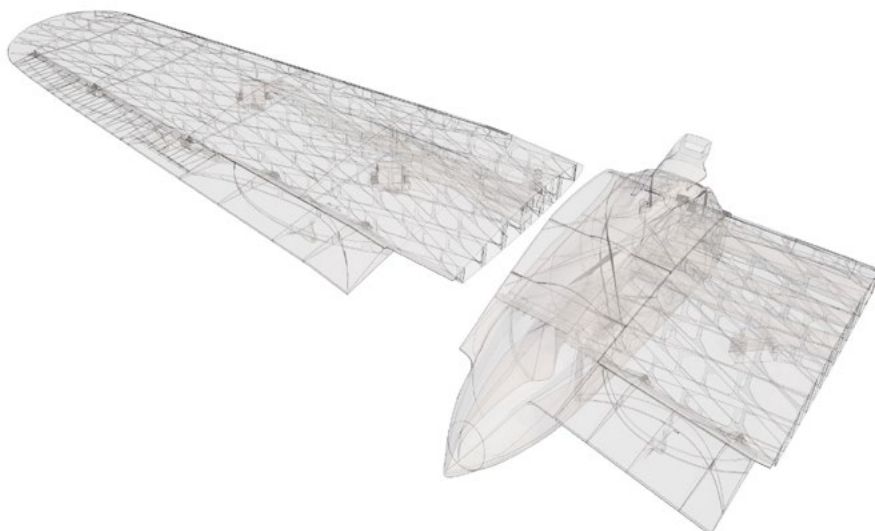


Apply CA glue to the contact surfaces (marked red in the picture) and insert flap with hinge, then apply the activator and operate the flaps till CA glue is completely cured:



Proceed with the flaps, exactly the same way for the other wing

NOTE: don't glue the engine gondola and outer wing together:

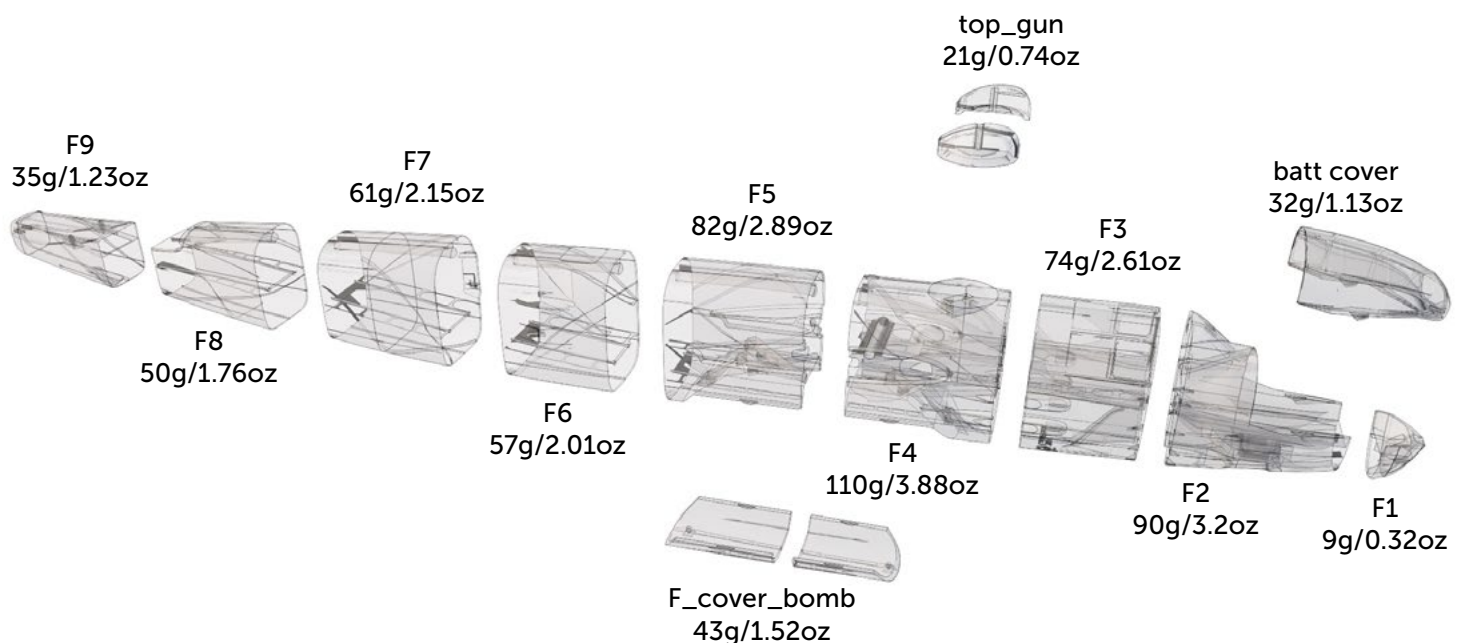


4.2 Fuselage assembly

You will need: [CA Glue - medium](#) or similar medium viscosity CA glue
[Activator for CA Glue](#) or similar, (gas pressurized works better)
 Soldering Iron ([EU](#)) ([US](#)) or any hot tool to cut holes
 2x 3.5/20mm (max 4/30mm) self tapping screw

Proceed the way shown in [videoguide](#):
[See video guide #4.2](#)

The weight of parts can vary +/- 8% due to diff PLA color or brand...!!!

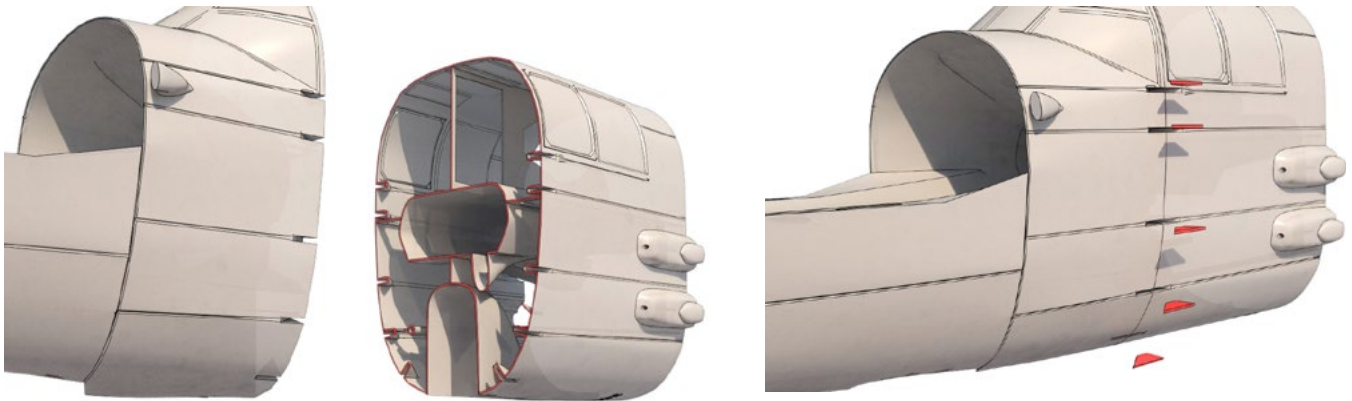


Proceed the way shown in videoguide:

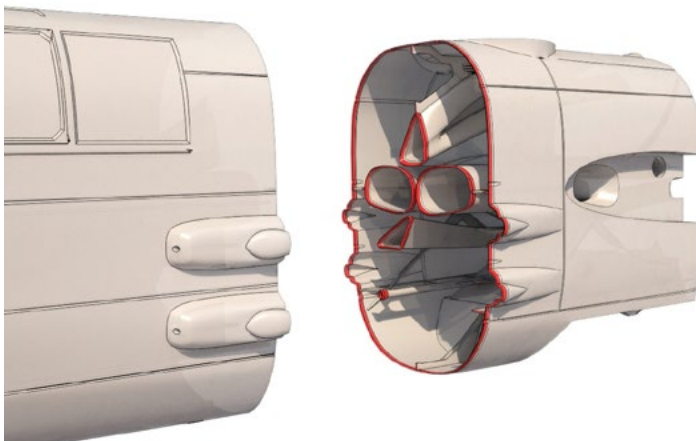
[See video guide #4.2](#)

Glue the fuselage parts F2-F3 with CA glue together. You can use snap knife to clean the shape of printed parts, but mostly this is not necessary.

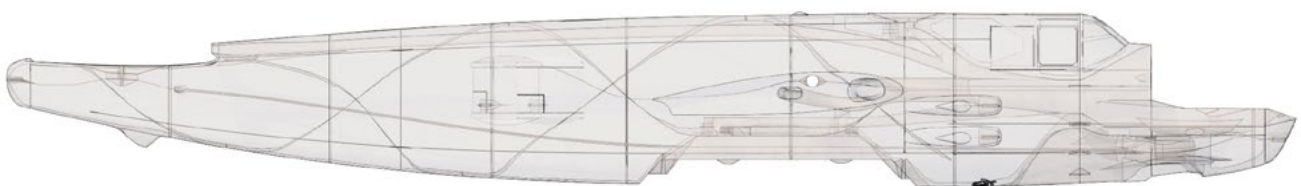
Glue in the „sure bonds“ (small triangle parts) to the slots in fuselage (F2-F3 parts):



Now you can proceed with next fuselage parts, there is a bit different coupling system (bayonet coupling) proceed the same way as with the wing assembly:



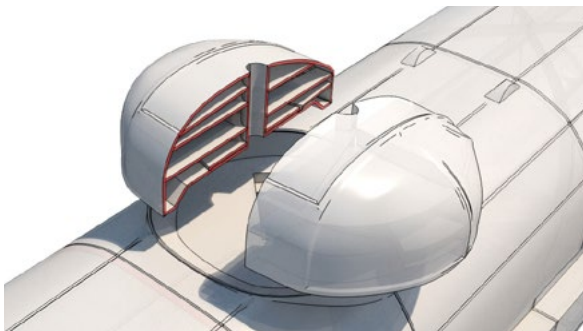
Go ahead and glue fuselage together parts as shown on the picture below:



Proceed with glueing fuselage bomb cover parts together and use two self tapping screws to mount it to the fuselage:



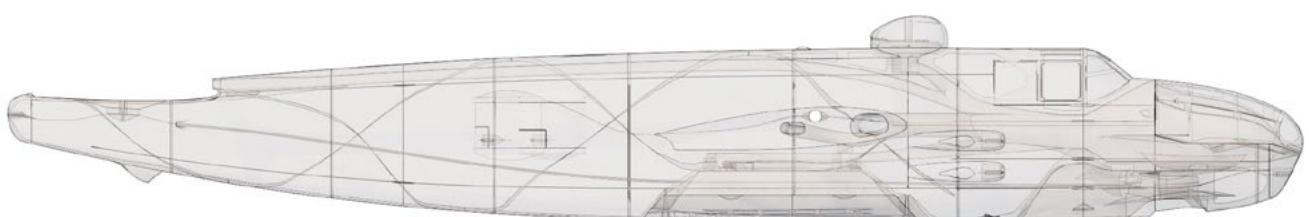
Glue both top_gun turret parts together:



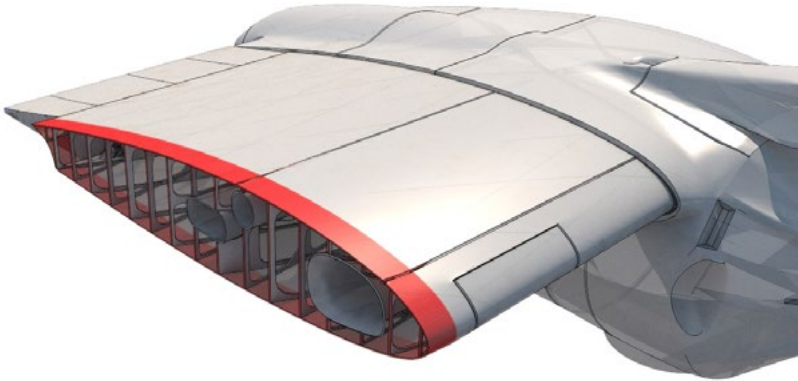
Now battery cover..., cut out both print supports (marked red in the picture):



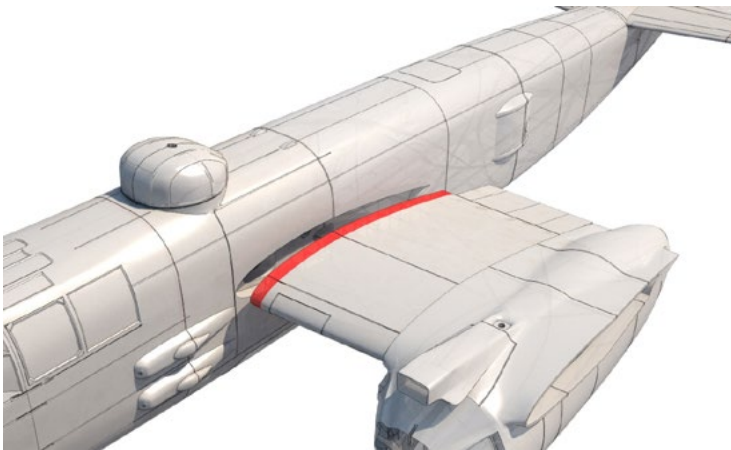
Now main fuselage is completed:



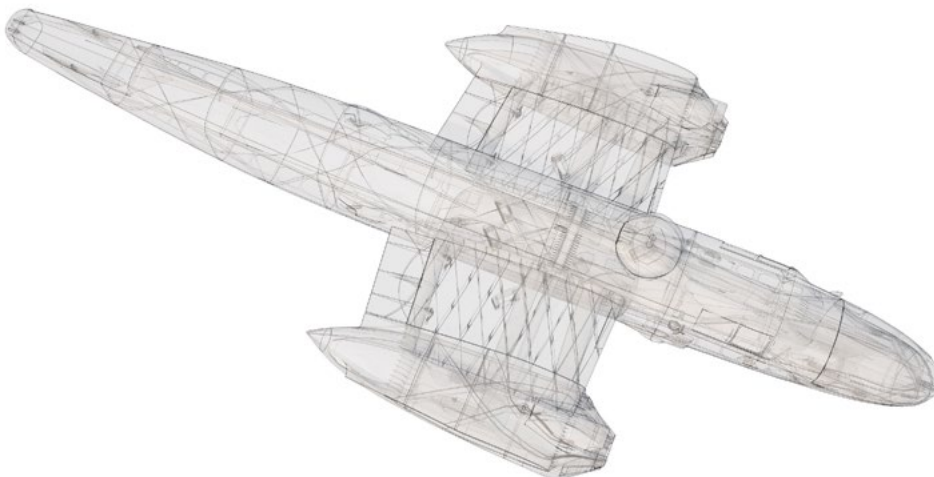
Now glue the inner wings part with gondolas into the fuselage.



Test fit the parts, then apply CA glue to the contact surface on the wing (marked red in the picture) and insert to the fuselage, finally apply the activator:



Proceed with the opposite side. The result should look like the picture below:



4.3 Fuselage tail and assembly.

Now it's a good time to assemble the tail stabilizers, elevator and rudder.

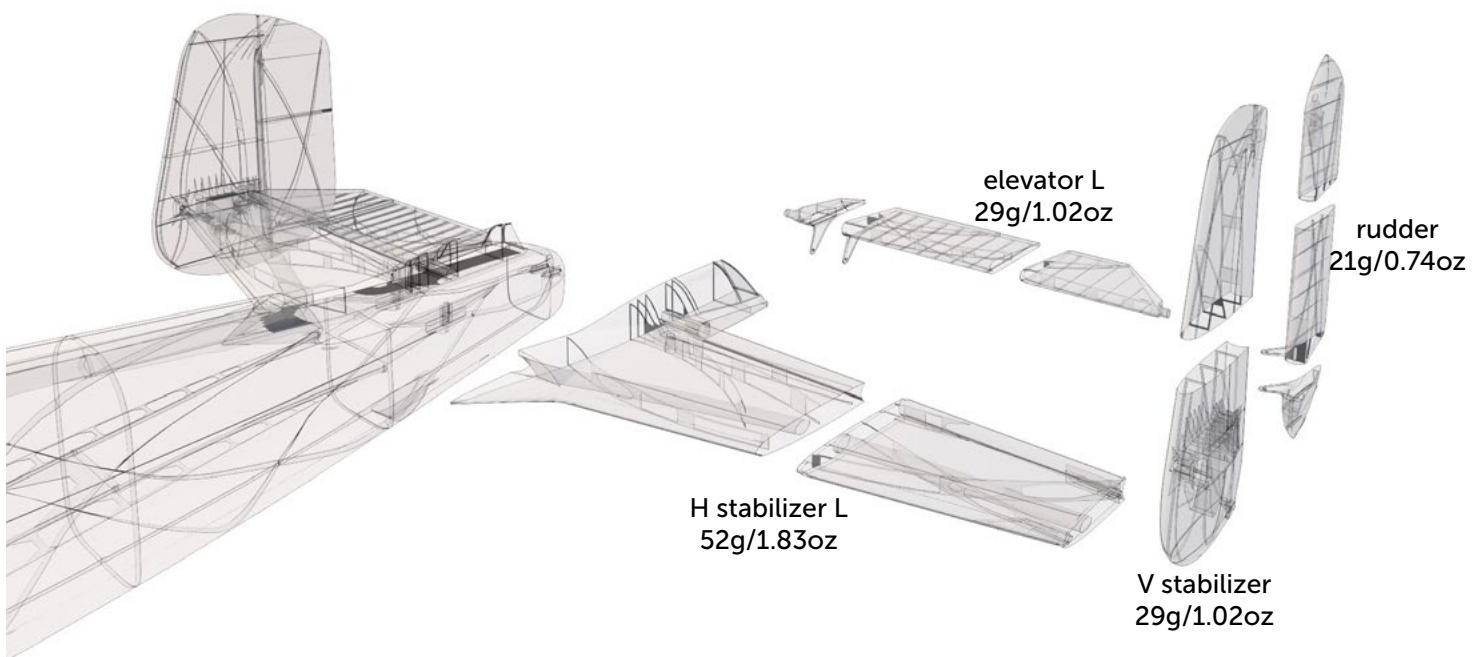
Proceed the way shown in videoguide:

[See video guide #4.3](#)

You will need:

- [CA Glue - medium](#) or similar medium viscosity CA glue
- [Activator for CA Glue](#) or similar, (gas pressurized works better)
- 8x 3.5/20mm self-tapping screws
- 12/750mm carbon tube
- 1.5mm carbon rod, or steel wire (rudder hinges)

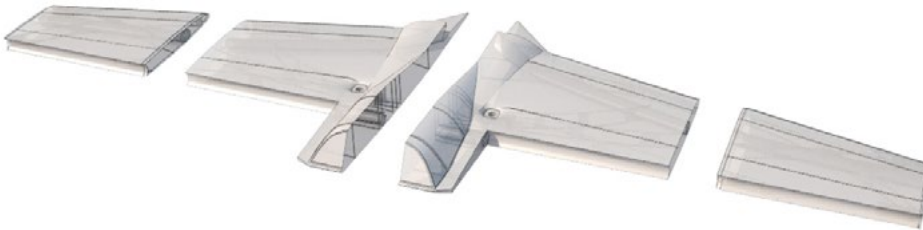
The weight of parts can vary +/- 8% due to diff PLA color or brand...!!!



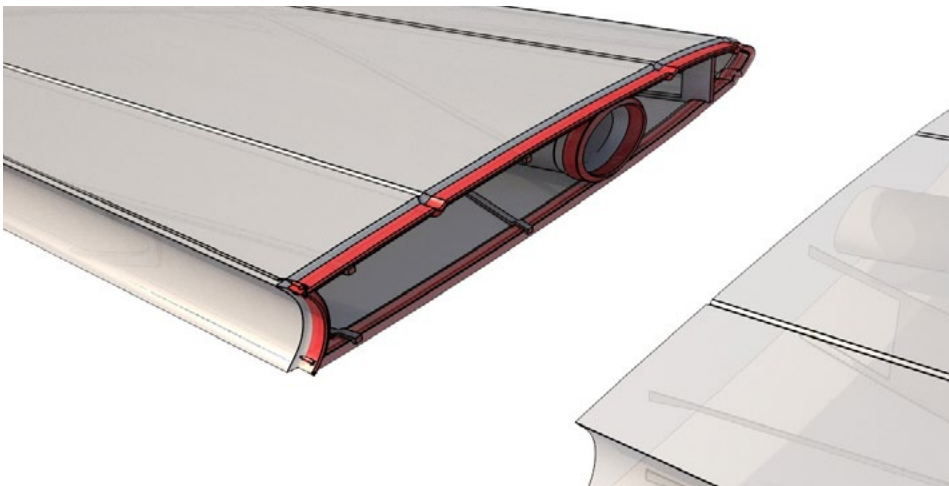
Proceed the way shown in videoguide (pictures will help you):

[See video guide #4.3](#)

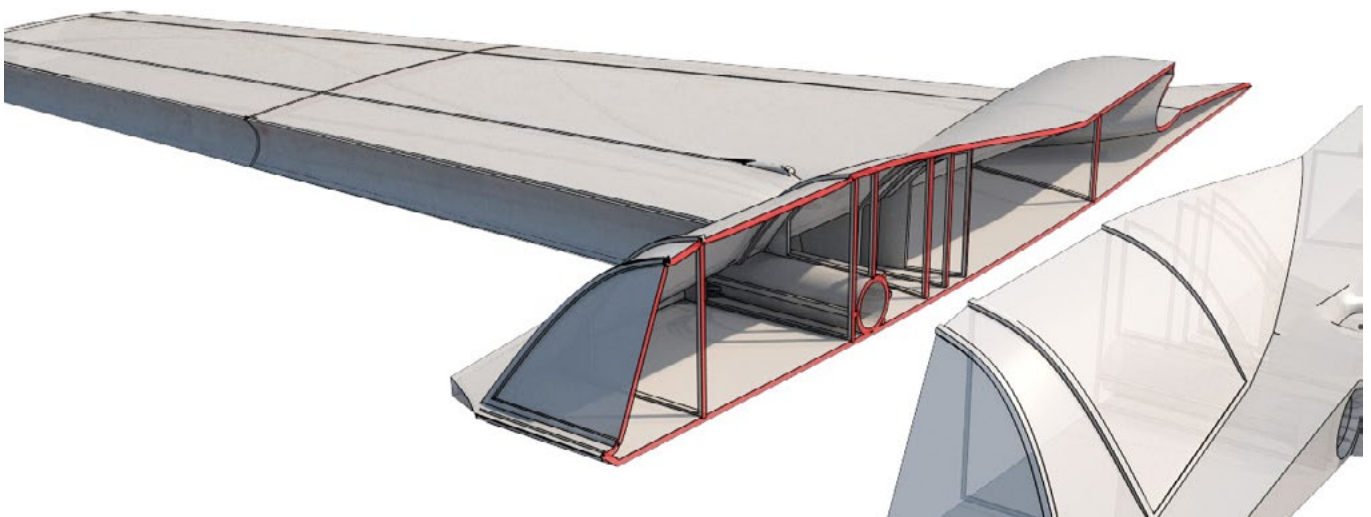
Start with glueing the horizontal stabilizer parts:



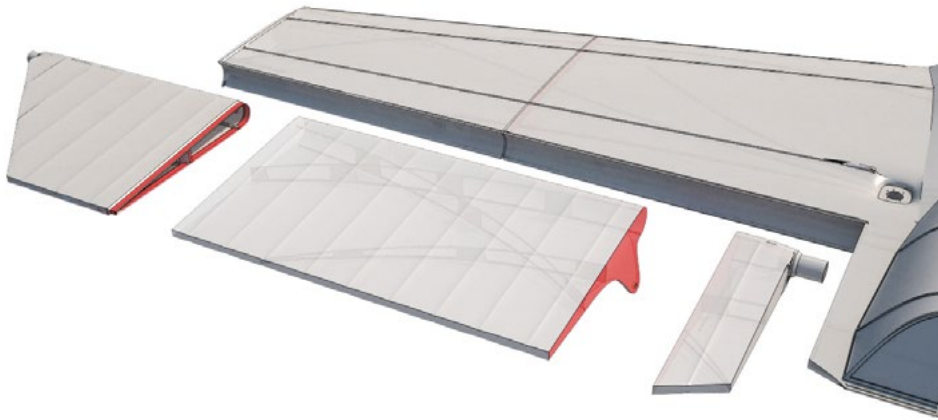
Apply CA glue to the contact surfaces (marked red in the picture) and insert them together, then apply the activator:



Go ahead and complete both stabilizer sides and glue them together now (side by side):



Well, the horizontal stabilizer is completed, assemble the elevator and fit them to the mounts:



Lets proceed with the vertical stabilizers:



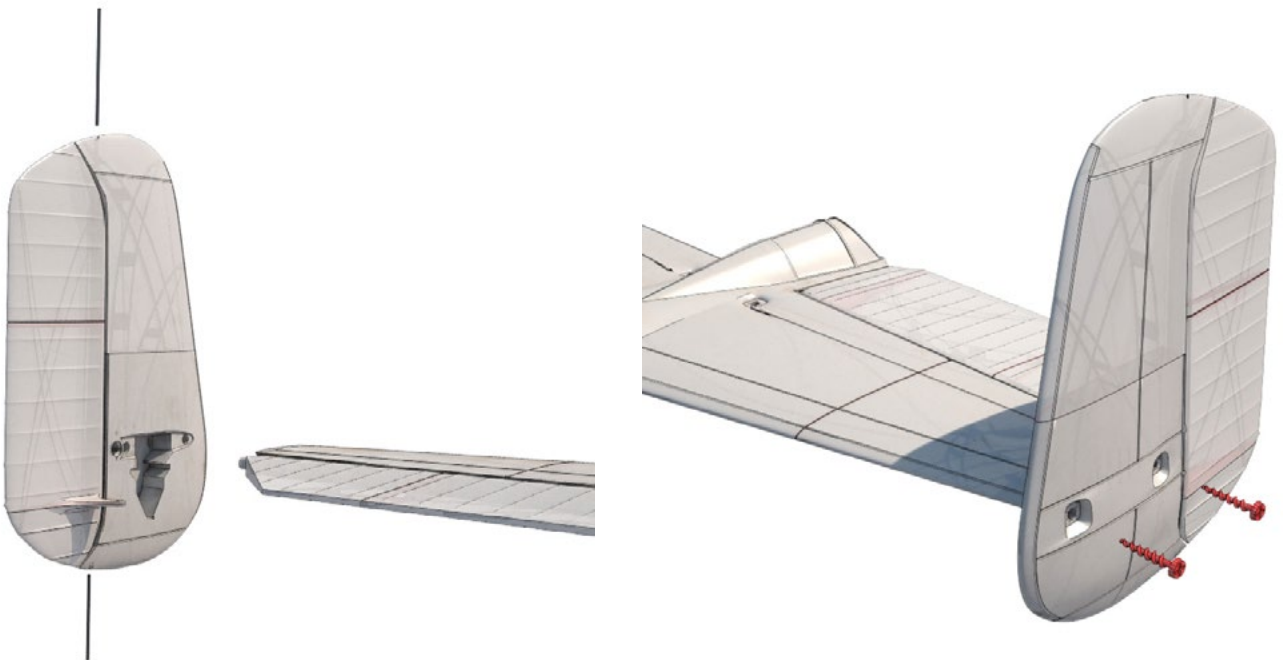
Glue both parts of the vertical stabilizer together (side by side):



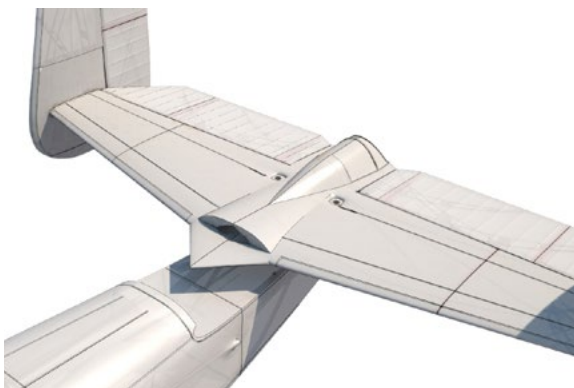
Assemble the rudder:



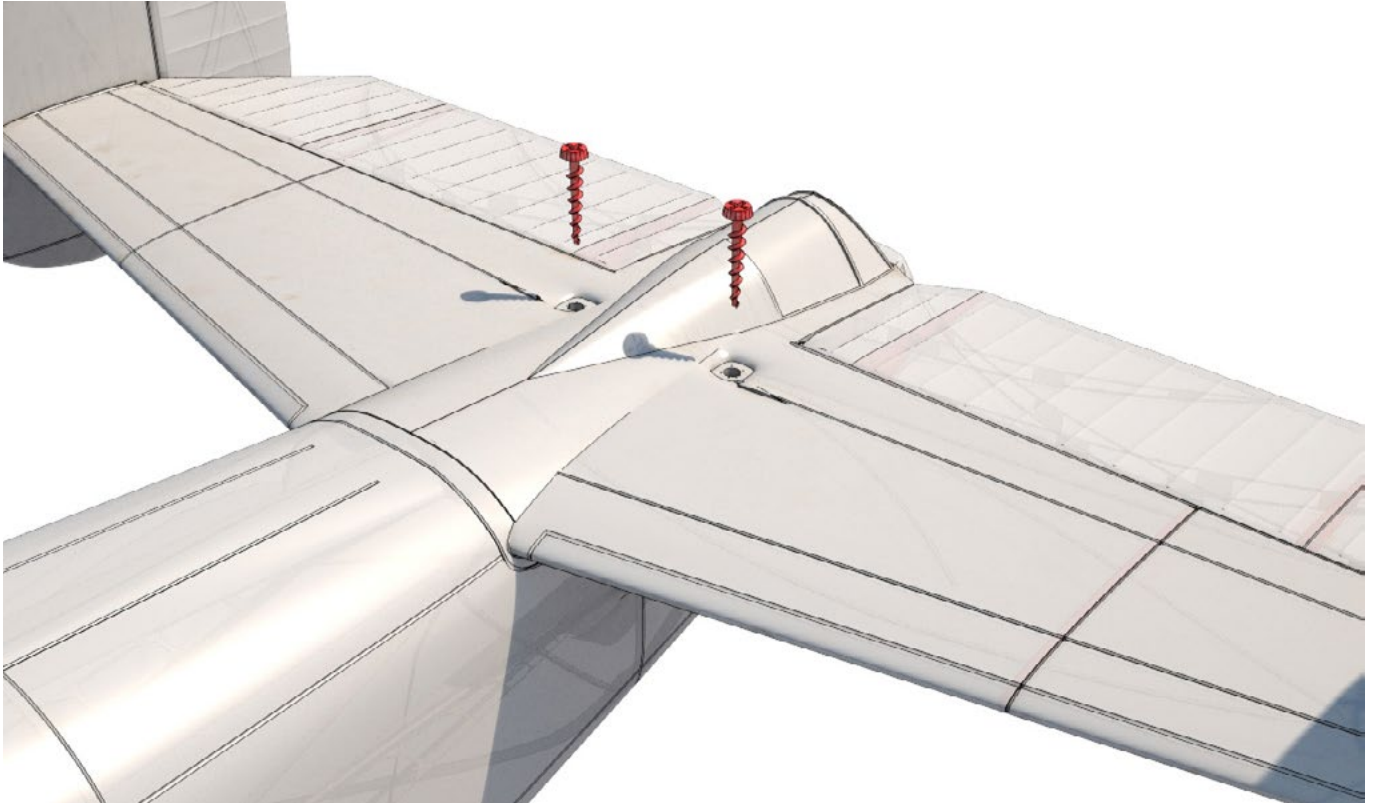
For rudder hinge use a 1.2-1.5 mm wire or carbon rod. Finally use two self tapping screws to mount it to the horizontal stabilizer :



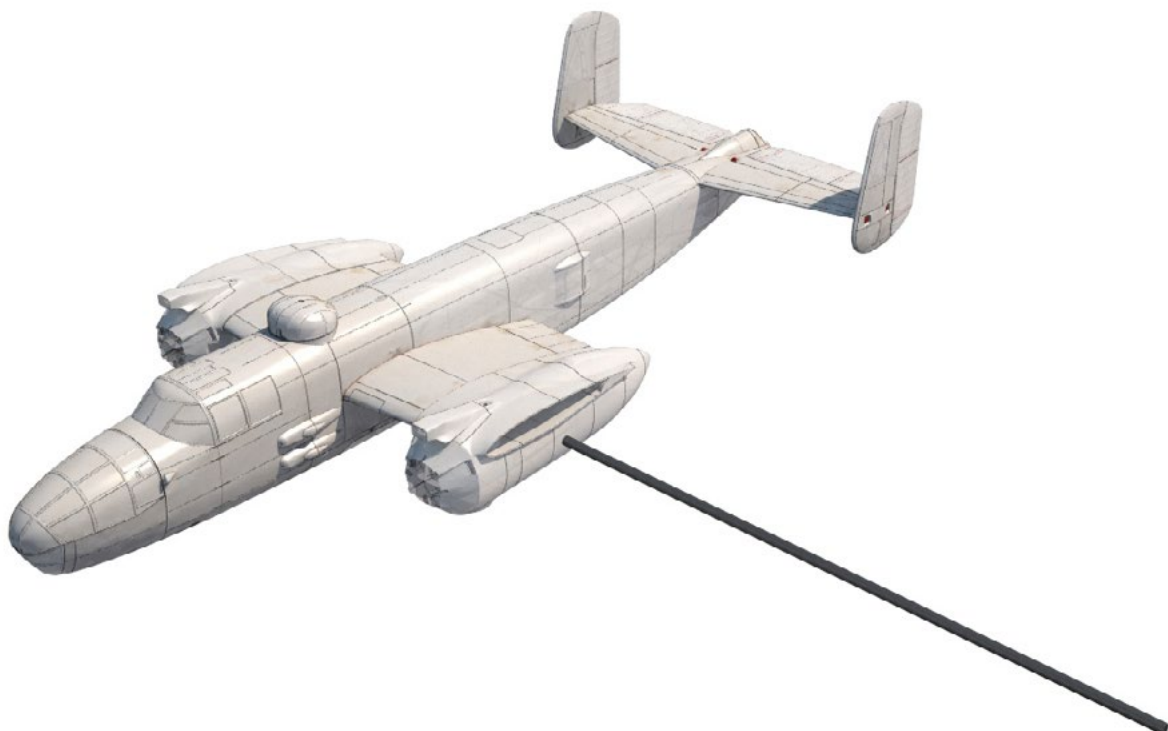
Now you can slide this assembly of tail parts in to the fuselage:



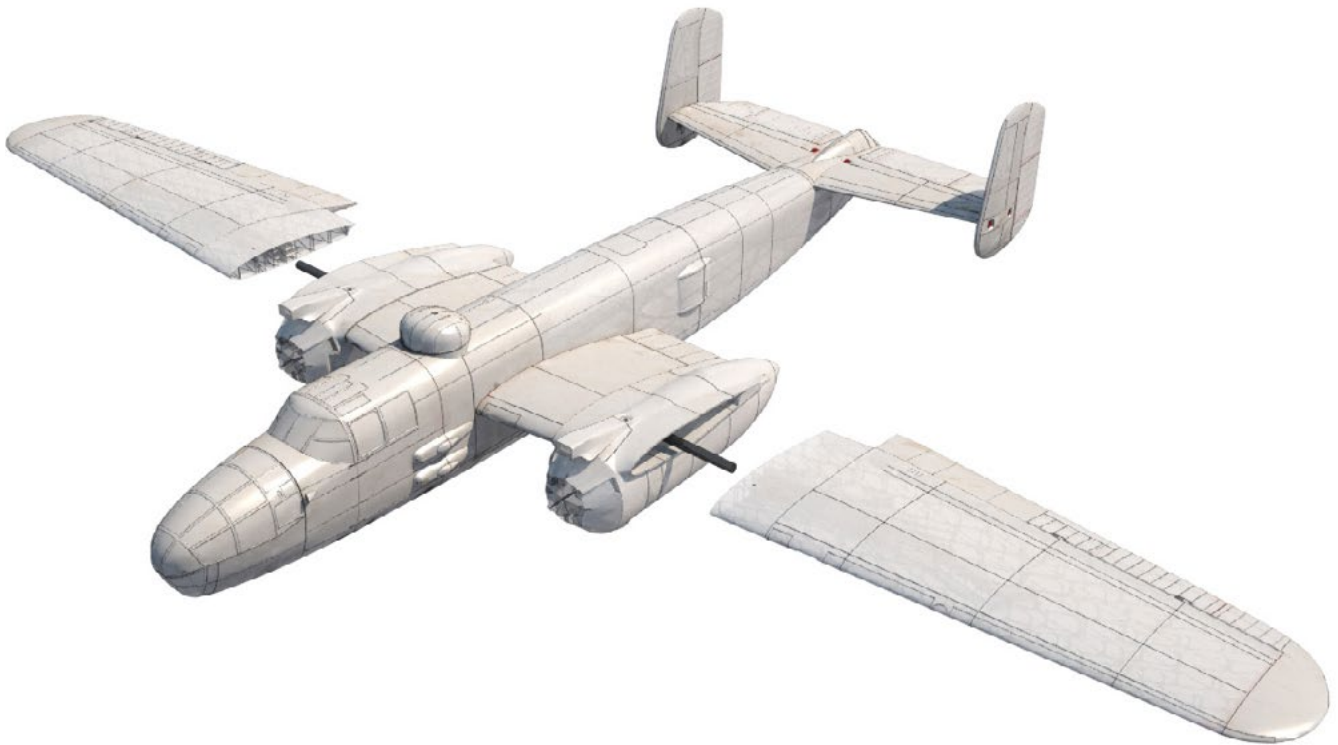
And use two self-tapping screws to secure it:



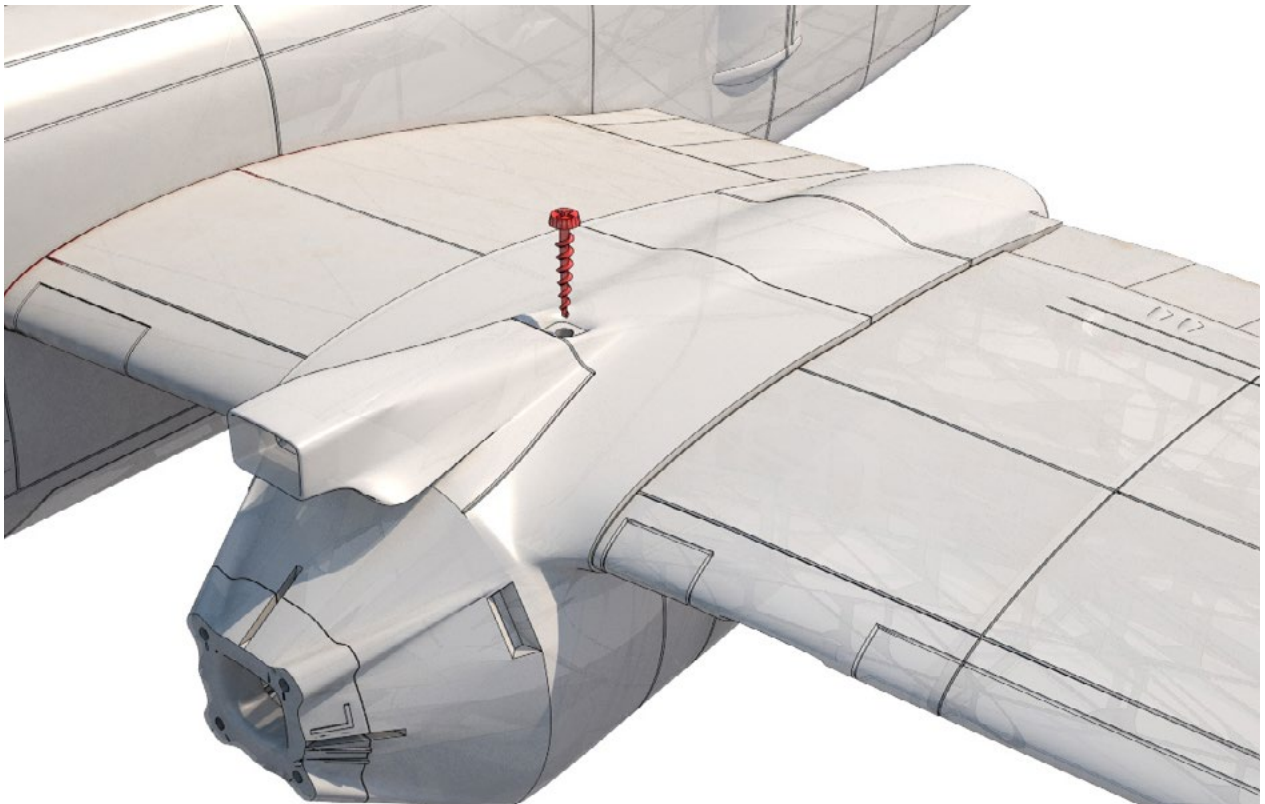
Insert carbon tube 12/750mm into the fuselage:



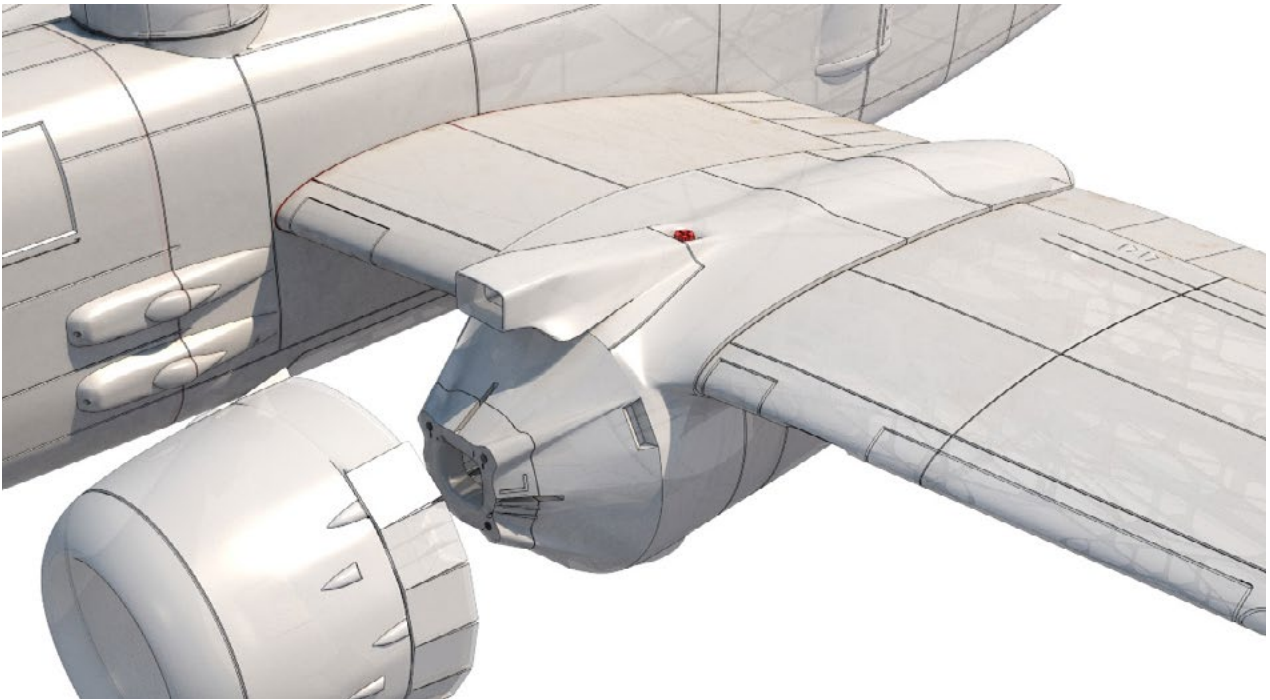
Slide the outer wings to the slots in the engine gondola parts:



And again, use self-tapping screw to secure the outer wing to the gondola:



Finally attach the engine cowling, just snap it on the engine gondola:



Wow, the whole airframe is finished:



5. Servo installation

You will need 4-12 servos (micro size 21/12/22 HXT900, G90 or compatible)

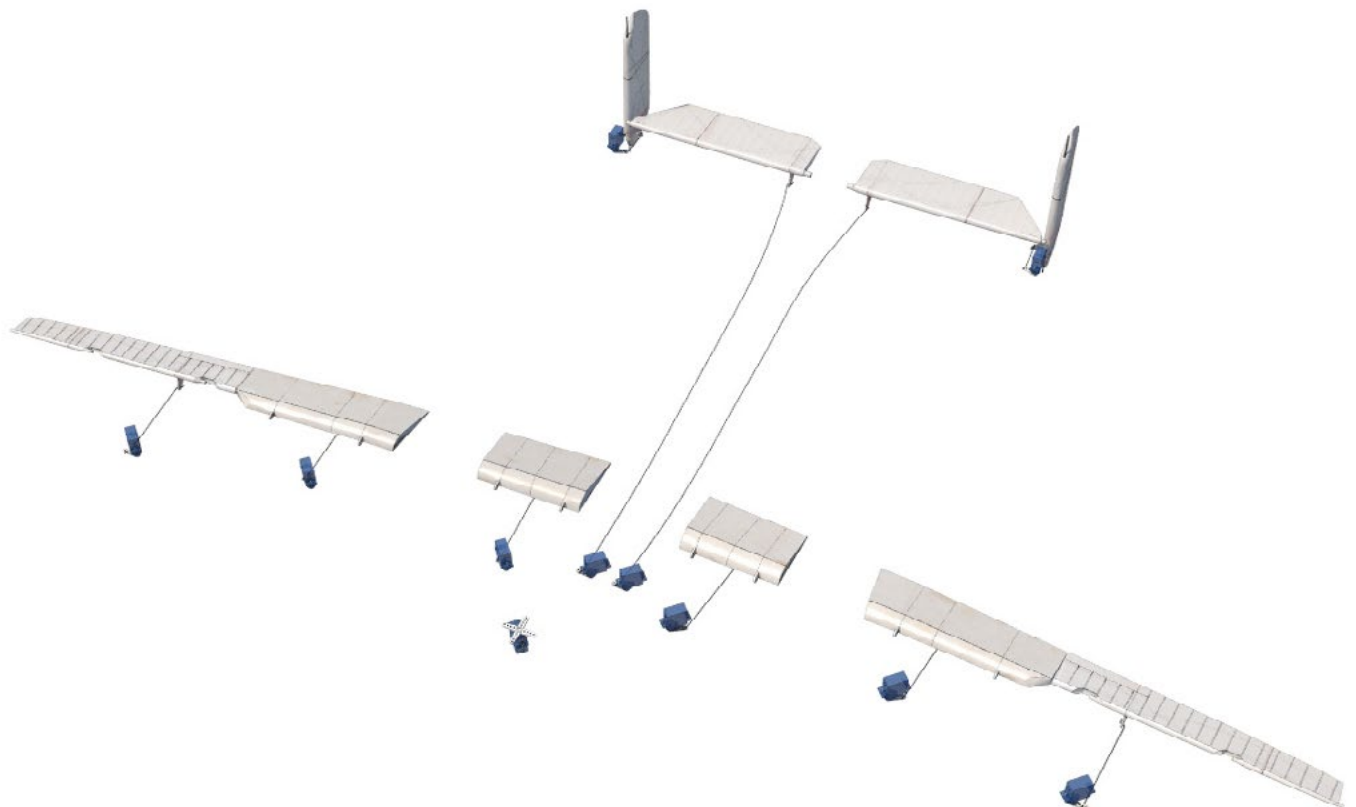
4 servos for both ailerons and elevators is absolute minimum (just fix rudder and flaps) to fly the plane, yes you can bank'n'yank like this, but adding two more servos for rudder (+one for nose wheel steering) makes taking off much easier and flying coordinated turns looks much better :-).

Add four more servos for the flaps to significantly reduce stall speed for much easier landings. When using flaps, it's good to compensate flaps rotating effect to elevator, this mix should be available on every today's RC transmitter and will help reducing the need to compensate manually during final approach. The last servo is only eye candy and should be used to rotate the top gunner turret.

Note: in case you want to use all the servos (and retractable LG), you might want NOT to use servo extension leads, but solder the wires directly. It makes running the cables through the tunnels easier.

[See video guide #5.1](#)

You will need: 12x [micro size servo](#) (you will need 4-12 servos) or similar
 light servo extension cables 2x bag [300](#) and [900](#)mm and [Y cables](#)
 1.2 mm /16AWG steel pushrod wires (1-1.2mm)
 use also as a hook for cables running through the tunnels...
 torch or lighter (to heat up the wire) for servo installing
 Wire cutter, [Z bend pliers](#) or just pliers.
 some gauge (f.e. ruler) or just pen for marking
 soldering iron... and thin shrink tube.



Proceed the way shown in videoguide (this pictures will help you):

[See video guide #5.1](#)

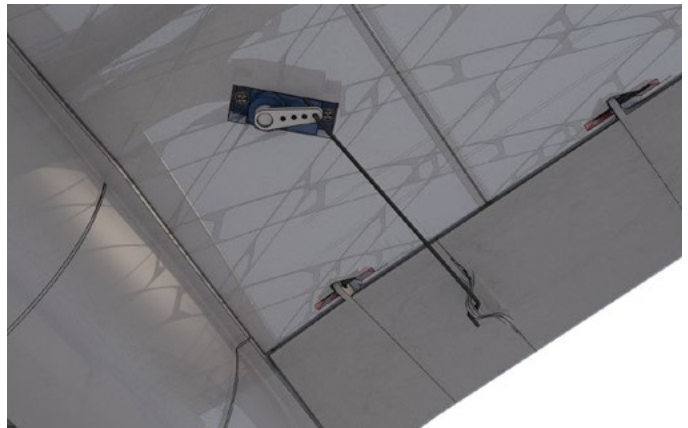
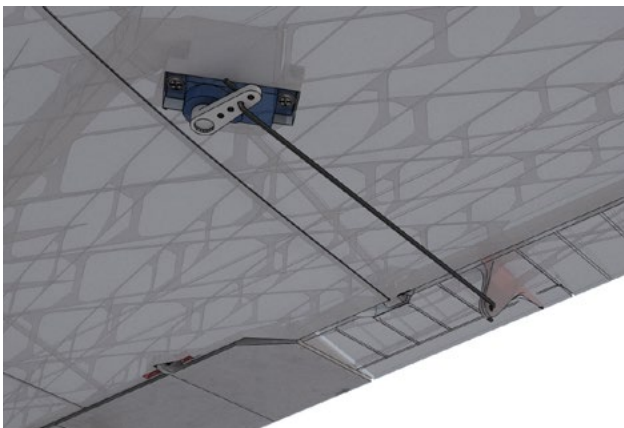
Start with connecting the servo extension cable. Center servo to its neutral position (use your RC system or servo tester) and attach the included servo arms.

Note: in case you want to use all the servos (and retractable LG), you might want NOT to use servo extension leads, but solder the wires directly. It makes running the cables through the tunnels easier.

Use any hot wire to make hole for instaling servo with two included self-tapping screws. Make Z bend on the end side of the wire then insert it in to the aileron/flap arm hole, then use some gauge or just pen and mark exactly position of servo arm to wire. Cut the wire and make another Z bend. Release servo arm and slide the Z bend wire in and put the servo arm on the servo again (secure with included self-tapping screw).

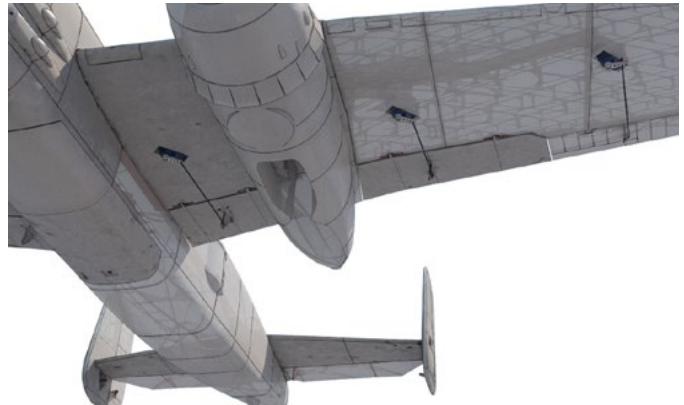
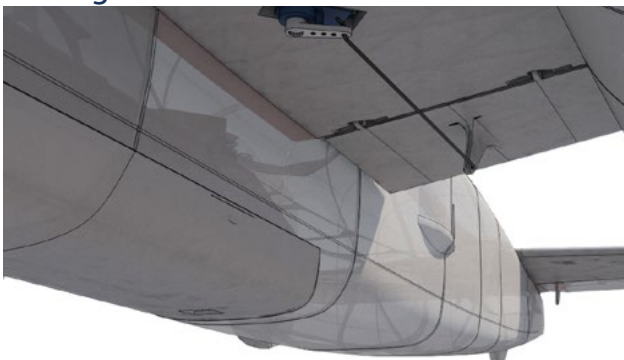
Ailerons, elevator, rudder and LG - set the servo arm in perpendicular position (with the aileron in neutral)

Flaps - set the servo arm 40 degree towards (with flaps in up position)



Remember, you must slide all servo cables in to the „servo cable tunnels“.

The servo cable extension must reach the battery/receiver compartment in the nose of the fuselage.



Proceed the same way for elevator as ailerons, only insert the steel wire in to elevator bowden:



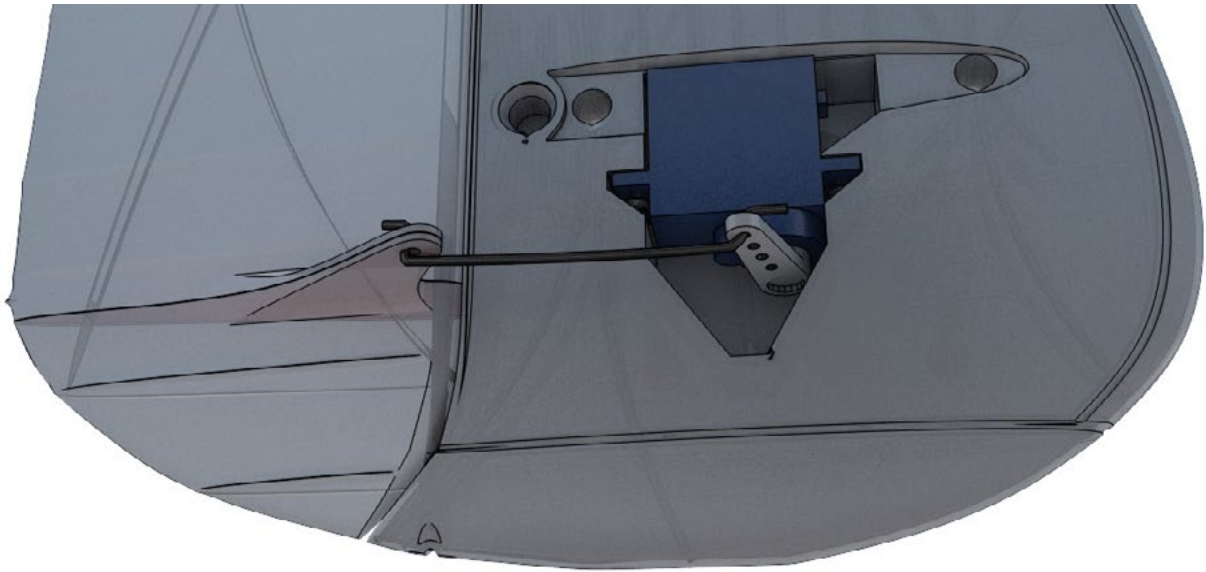
Center servo to its neutral position (use your RC system or servo tester). Attach the prepared servo arms. Remember that you must slide all the servo cables in to the „servo cable tunnel“ and the servo cable extension must reach the battery/receiver compartment in the nose of the fuselage.



Center servo to its neutral position (use your RC system or servo tester) and attach the included servo arms.

Make Z bend on the end side of the wire then insert it in to the rudder arm hole, then use some gauge or just pen and mark the position of the servo arm. Cut the wire and make Z bend. Release servo and slide the Z bend wire in and put the servo again in rudder servo slot in vertical stabilizer.

Remember that you must slide all servo cables in to the „servo cable tunnel“ and the servo cable extension must reach the battery/receiver compartment in the nose of the fuselage.



Now mount vertical stabilizer/rudder using two self tapping screws to mount it to the horizontal stabilizer again.



We highly recommend to test the power and function of the rudder, ailerons and flaps now. Of course you can use your trusted solution for servo pushrods...

Or just use your favorite servo linkage (some Ideas bellow):



6.1 Landing gear (retractable)

In this step instal both main LG to each engine gondola, and one nose steering LG... Of course you can use alternative LG Retracts, use suitable hot tool to enlarge the LG comparmnet if needed. You can aslo use just fixed landing gear and safe some receiver channels (see the 6.2 guide in the end of this chapter).

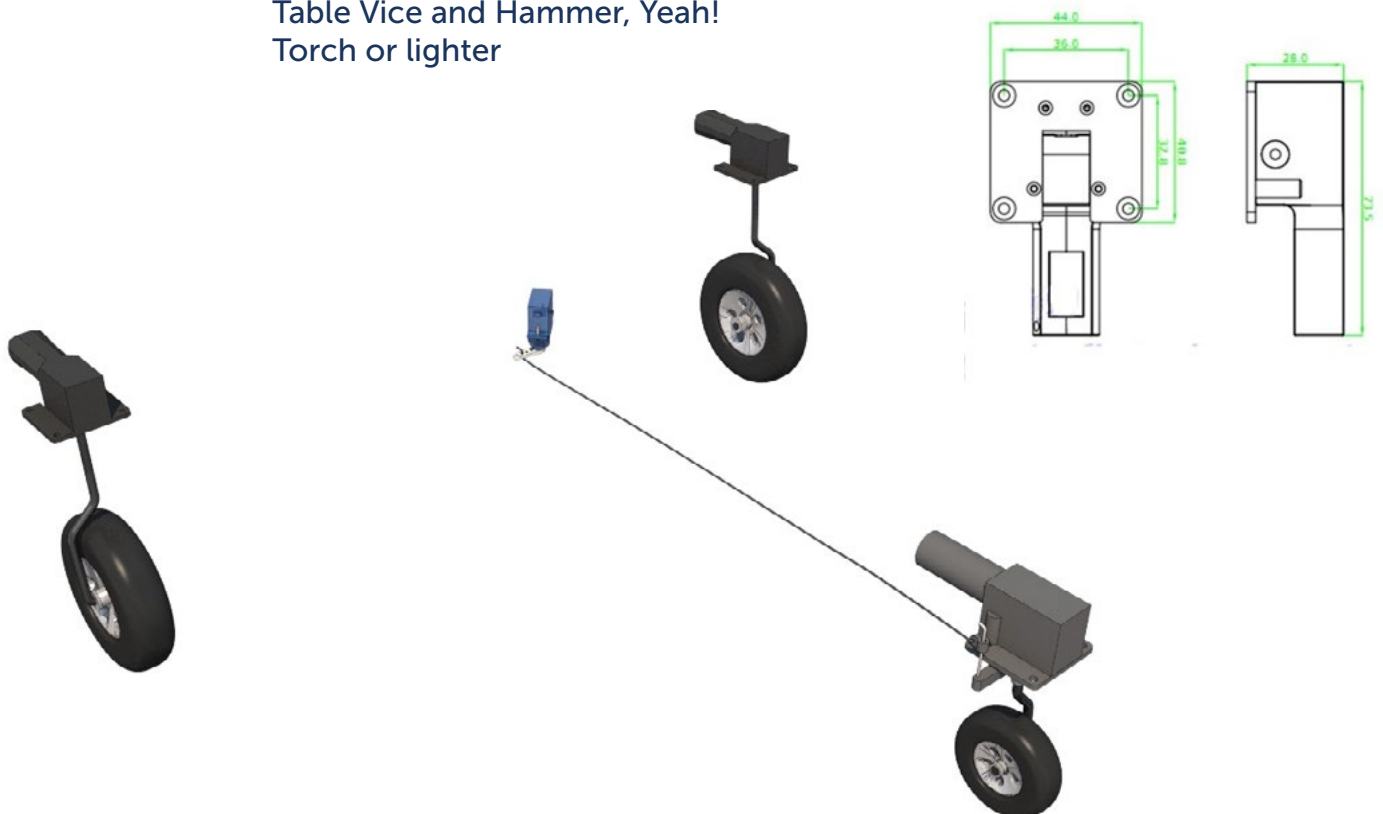
NOTE: retraction of the landing gear must pass smoothly without any contact with the fuselage, the landing gear (mainly wheels) must NOT touch in any case, or there is a risk of LG failure and crash... (we knof this is the most common reason of the LG failure, not the QC problem). **Check LG function after each landing.**

Proceed the way shown in videoguide/PDF.

[See video guide #6.1](#)

You will need:

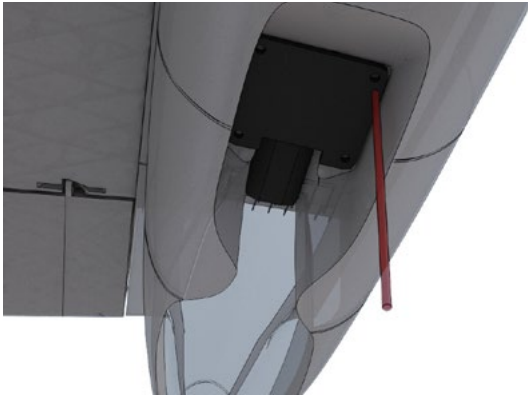
- [Light Foam Main Wheel](#) or any similar 85-90mm
- [Nose wheel](#) or any similar 45-60mm
- [Servoless Retract 44mm x 41mm Mount](#) or similar
- [Servoless Steerable Nose Retract 44mm x 41mm Mount](#) or similar
- 3x Servo Lead Extension + Y servo cabel
- clevis for nose LG steering
- [Landing Gear Wheel Stop Set Collar 9x5.1mm](#) or similar
- 5 mm wire/rod for LG leg
- Shaft coupler 5 to 5 mm inner diameter for steerable nose gear, or use any inner 5.1 mm steel/metal tube
- 12x 3.5-4/30mm self-tapping screw
- Dremell or any steel handsaw
- Table Vice and Hammer, Yeah!
- Torch or lighter



Proceed the way shown in videoguide (this pictures will help you):

[See video guide #6.1](#)

Insert LG unit then use any hot wire (marked red in the picture) and make hole for four self-tapping screws:



Secure the retract unit using all four self-tapping screws:



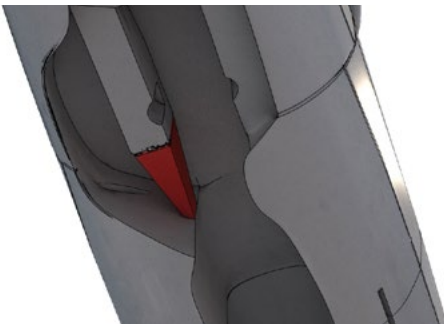
Shape the 5mm steel rod using vice, (you can add fire) and hammer according to the 3D printed template, cut the ends, slide in main wheel and secure it with Wheel Stop Set Colar and threadlocker (Loctite):



Release both side screws in the LG units and remove the included 5mm LG pin. Insert the prepared main leg with wheel, properly tighten the side screws, you can make seating pads with dremel (likewise the included ones) and use thread locker (Loctite) here. Insert completed main LG in to the slot and secure with self-tapping screws again. Remember that you must slide all servo cables in to the „servo cable tunnel“ and the servo cable extension must reach the battery/receiver compartment in the nose of the fuselage.



Nose LG gear is similar, moreover you need cut out print support marked red in the picture (use any hot tool):



Proceed the same way as with main LG, but here is the difference. Don't remove the 5mm LG pin, but use a shaft coupler to connect the LG leg. Depending on a coupler used, glue it with epoxy or CA glue, tighten the screws or make a solder joint.



Insert the completed nose LG into the slot and secure with self-tapping screws again:



Now add steering servo and linkage, solder the pushrod into the clevis:



This pictures shows the way that steerable nose LG gear works:



6.2 Landing gear (fixed)

You can also use just fixed landing gear and save some receiver channels, but of course flight characteristic will suffer from aerodynamic drag (will be not so smooth and stable)

You will need:

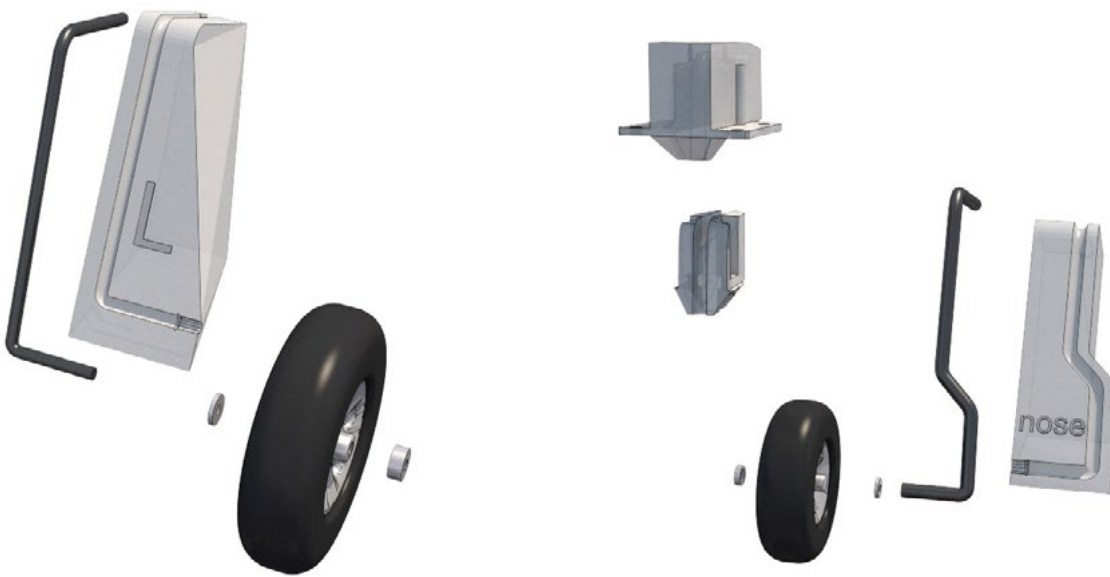
- [Light Foam Main Wheel](#) or any similar 85-90mm
- [Nose wheel or any similar](#) 45-60mm
- [Landing Gear Wheel Stop Set Collar 9x5.1mm](#) or similar
- 5 mm wire/rod for LG leg
- 18x 3.5-4/30mm self-tapping screw
- Dremel or any steel handsaw
- Table Vice and Hammer, Yeah!
- Torch or lighter



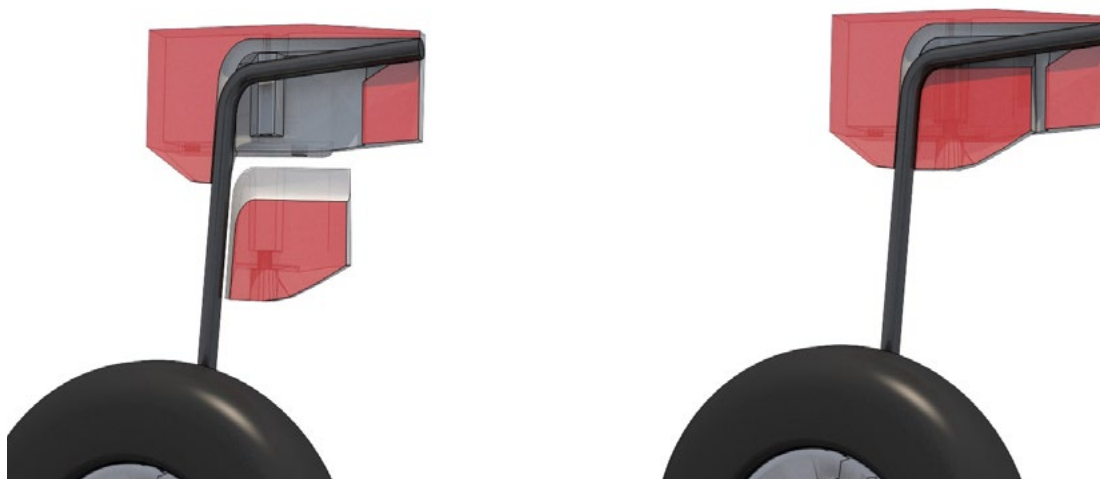
Proceed the way shown in videoguide (this pictures will help you):

Insert 3d printed LG unit socket into the engine gondola then use any hot wire (roceed the same way as with retractable LG) and make hole for four self-tapping screws. Secure the retract unit using all four self-tapping screws.

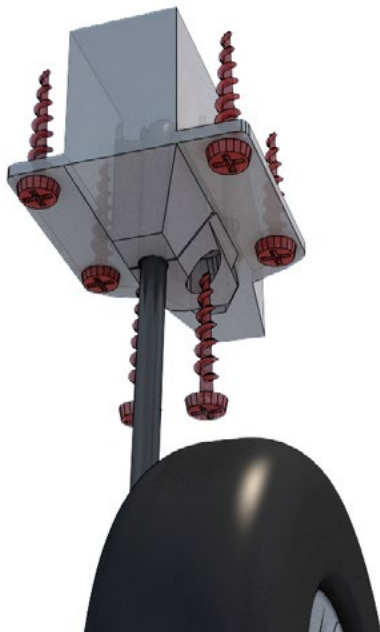
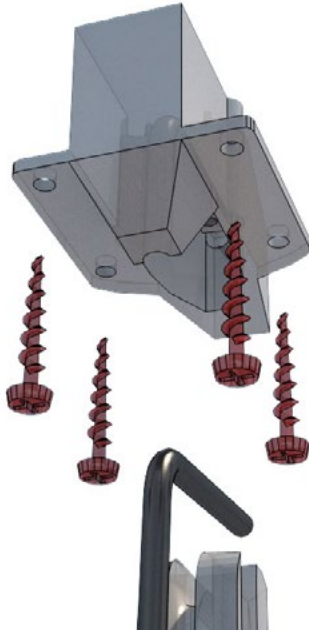
Shape the 5mm steel rod using vice, (you can add fire) and hammer according to the 3D printed template (for L, R main LG and nose LG), cut the ends, slide in main wheel and secure it with Wheel Stop Set Colar and threadlocker (Loctite):



This section/pictures shows the way that fixed LG gear works (we have some room for damping hard landings):



Insert the completed LG units into the slots and secure with self-tapping screws:



7.1 Decals/Marking

Use our prepared PDF marking - Cut decals from thin advertisement foil or use any local advertisement or graphic company. Apply it to your model by your choice. You can use also use our prepared shapes/patern (PDF) and make own paint work. This aircraft can be painted with any waterproof acrylic colours. Please use your favorite procedure there are many options, so it is hard to recommend any exact solution as the best.

8.1 Motor Setup installing

Use only annealed PLA for motormount.

Ensure your ESC bec/sbec is strong enough for all servos, or use separate BEC/battery...

We use two ESCs for this plane, so maybe you will need to use only one ESC bec, in this case interupt the red wire from your second ESC servo connector.

[See video guide #8.1](#)

You will need: soldering airon etc., shrink tube, servo cable, 3.5mm connectors, velcro

8x 3.5/30 self-tapping screw

Motor: 2x [3542 1000KV](#) , [P v2 3542 1000KV](#) or [this one](#) (approx 130g)

ESC: 2x [40A with UBEC 5.5V/4A](#) or better

Battery: [5000mAh 4S](#) or bigger (600-800g) + XT 90 1in2 paralel adaptor
12AWG cable for both ESC

Propeller: 2x two blade [11"x4.5"](#) ideally CW+CCW (counterrotating)

Note: you can use a scale three blade propeller up to 11x6", but use a 3S battery (with similar weight), so you don't overload the motor or use motor with lower KV (check it).

Alternatively (TOP):

Motor: 2x [AXI 2814/28 GOLD LINE V2 AIRCOMBAT 620KV](#)

ESC: 2x 30A(6s) with UBEC 5.5V/4A or better

Battery: 4000mAh 6S or bigger (600-800g)

Propeller: 2x two blade [11"x4.5"](#) ideally CW+CCW (counterrotating)

Important:

check motor mount and screws before each flight, don NOT use PLA motor mout without [annealing!!!](#)



9.1 Final completion and setting

Install your receiver, connect servo cable, setup servos and etc. with your trasmitter, check servo position. Set recommended deflections. **Check CoG point CoG is 83mm /3.27** from the Leading Edge of the wing, see the CoG tags on wings. As the last step install propeller.

It is generally ideal to correct the center of gravity by the weight of the batteries and not by adding lead to the nose or tail of the aircraft. You can use Y cables for elevator, rudder, LG and save some Rx channels...

Make sure the battery is placed properly and secured in position. If battery moves during the flight it can shift the center of gravity backwards and the aircraft becomes uncontrollable!

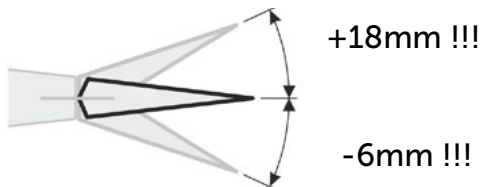
See video guide #9.1

You will need: R/C system, Tx ([EU](#)) ([GLOBAL](#)) + compatible Rx 5-14 ch. (see 5. servo chapter)
 2-5x servo Y cable
[adhesive velcro strip](#) for Li-Pol battery, ESC and Receiver
[battery strap](#)

NOTE: set ailerons differentiation 30-25% (up 100% down 30-25%) never fly this aircraft without or it will lead to bad flight characteristic (will rise in turn and so on...)

ailerons

expo 50%, diff 30-25%



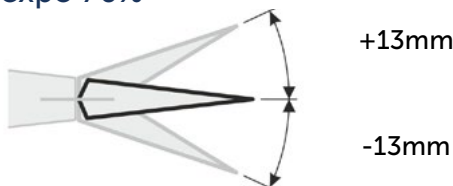
flaps

15° (take off and landing)
 -8% elevator compensation

35° (short landing)
 -13% elevator compensation

elevator

expo 70%



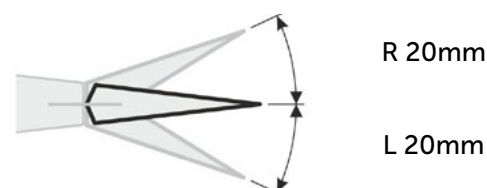
nose LG

expo 50%



rudder

expo 50%



10. Pilots Please Attention!

Make sure the battery is well fixed in proper position. If it moves during flight it will cause the CoG move aft and can lead to uncontrollable flight behavior. Standard CoG is 83mm / 3.27 from the Leading Edge of the wing (see the CoG tags on wings).

NOTE: always use appropriate throttle when flying with extended flaps (above stall speed).

PLEASE MAKE PRE-FLIGHT CHECK motor mount, screws, Ailerons, Rudder, LG and Elevator linkage before each flight (use Loctite when suitable), this is not a Toy...

IMPORTANT: retraction of the landing gear must pass smoothly without any contact with the fuselage, the landing gear (mainly wheels) must NOT touch in any case, or there is a risk of LG failure and crash... (we know this is the most common reason of the LG failure, not the QC problem). Check LG function after each landing.

Do NOT leave this PLA plane on direct summer sun or in car. (max. PLA temp is about 60C)

Never fly aft (out of recommended) positioned Center of gravity.

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

