

ASSEMBLY MANUAL & PRINT/USER GUIDE



L3D Wing

("L"earning "3D" Design)

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Introduction

This design evolved from an interest in RC flying, 3D printing, and learning Fusion360. The overall approach is for vase mode style printing with some modifications but ultimately as few retractions as possible. The design is best printed in LW-PLA and requires a 2205 2300kv or similar motor. It accommodates a 1300 3S up front for balance. A single 6mm carbon spar is required (alternatively a wooden dowel could be used) along with 3mm BBQ skewers as alignment pins between sections.

This model has taken hundreds of hours of effort and is actually the third iteration until I was comfortable with the repeatability of the print quality and flying characteristics. I wanted an easy to print wing, that was simple to hand toss (side arm), and a relaxing to fly wing.

General Specifications

Wingspan:	800mm
Print weight:	220g
Flying weight (w/o battery):	345g

Electronics

Motor:	2205 2300kv or similar (6x4 prop – dependent on motor specs)
ESC:	30amp
Servos:	9g
Battery:	1300 3s (or similar)

Included:

STL files of all components

Cura parameters utilized

Required Components:

2205 2300kv motor

30amp ESC

1300 3s lipo

3mm bamboo skewers

2 – 10mm x 10mm x 2mm magnet round

Velcro

6mm x 380mm carbon tube or pine rod

M2 screws (servo covers)

1mm piano wire

M3 screws/nuts for motor mount attachment

Print Settings:

The STL's without a prefix are LW-PLA. Those with a PLA prefix require PLA. Each part for the wing and fin need to be mirrored. Only the small elevon part needs to be mirrored as the larger are printed attached for better print quality.

Overall Settings for LW-PLA parts:

Nozzle temp = 235c

Bed temp = 60c

Nozzle diameter = 0.4mm

Line width = 0.33mm

Layer height = 0.25mm

Print speed = 50mm/s

Cooling fan = 40% for all layers.

1 wall

Infill percentage is set to 0%

1 bottom layer / 0 top layers

Spiralize outer contour - checked

Smooth Spiralized contours - checked

** The resultant wall thickness should be 0.85 - 0.95mm.

LW-PLA Exceptions:

1. Wingtip - uncheck both spiralize options and print additionally with 2 top layers
2. Fin top/bottom – 2 bottom layers
3. Elevon pieces (all) – 3 bottom layers

Overall Settings for PLA parts:

Nozzle temp = 210c (dependent on PLA brand)

Bed temp = 60c

Nozzle diameter = 0.4mm

Line width = 0.4mm

Layer height = 0.2mm

Print speed = 50mm/s

Cooling fan = 100% for all layers.

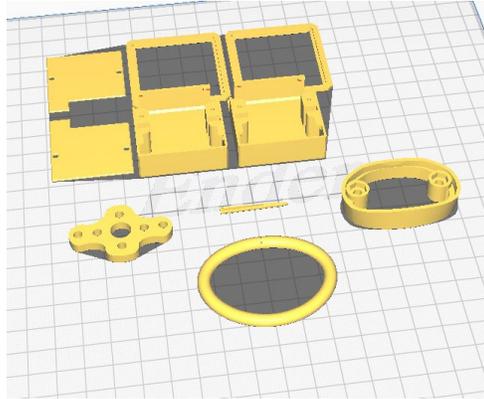
2 wall

Infill percentage is set to 20%

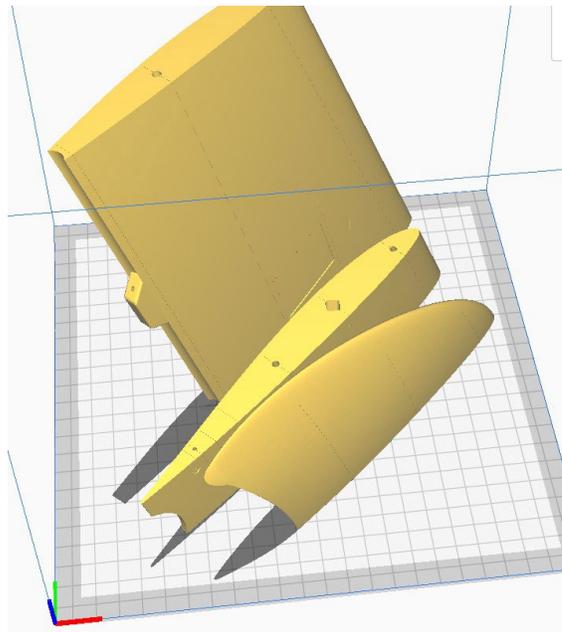
3 top/bottom layers

Part Orientation

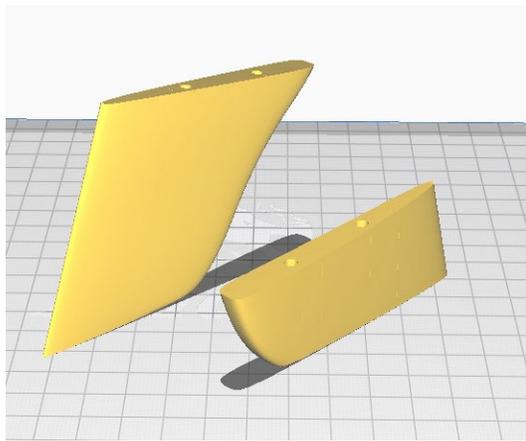
Some parts have been designed with an intentional print orientation. Please see the attached orientation. In order to simplify the photos, I show more than 1 part printing at a time. It is recommended that for the LW-PLA parts, that only 1 is printed at a time.



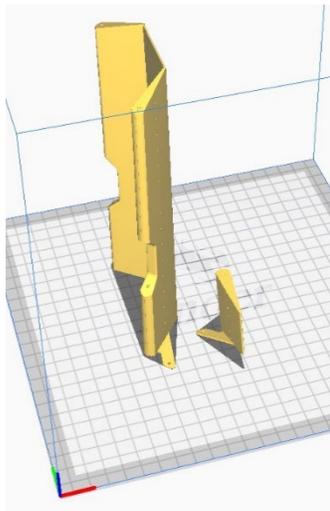
Accessory Parts



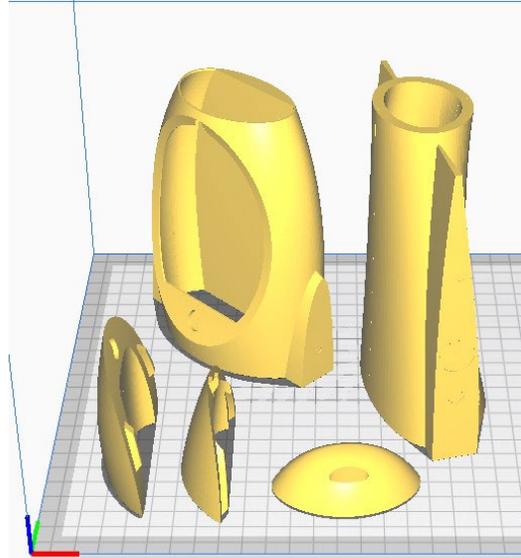
Wing Orientation



Fin Orientation



Elevon Orientation



Fuse Orientation

Print Weights (key parts)

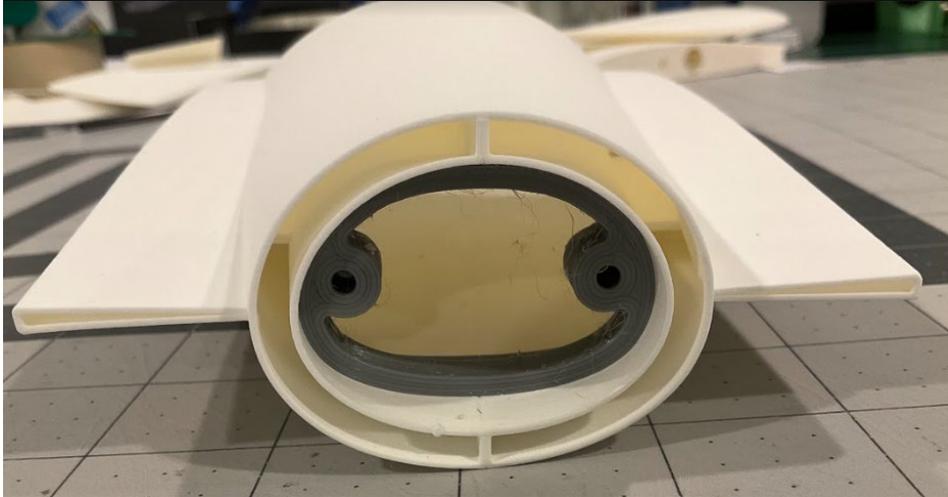
Fuse Front	19g
Fuse Rear	27g
Canopy Front	2g
Canopy Rear	4g
Main Wing	30g
Inner Wing	10g
Wingtip	9g
Fin top/bottom	4g

Assembly Instructions

Fuselage

Add the M3 nuts into the motor mount with a drop of CA glue.

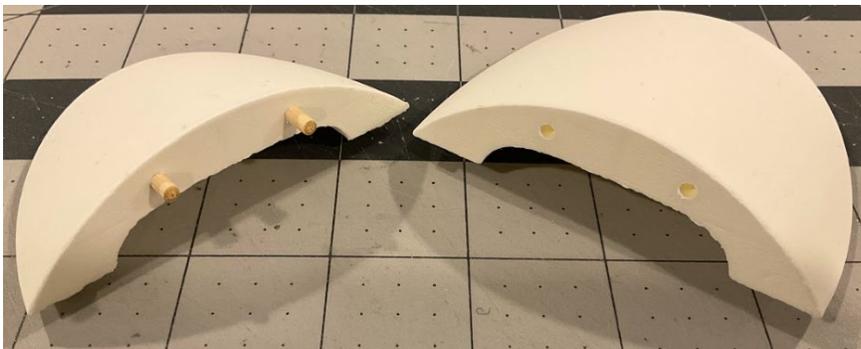
Insert the motor mount attachment through the rear fuse (start from the larger opening. It should seat perpendicular to the fuse at a point 10-12mm from the end of the fuselage. Make sure the space between the mount and the rear fuse is equal all the way around.



Use 3mm bamboo skewers, 10mm in length to connect the rear fuse to the front fuse.



Repeat with bamboo skewers connecting the canopy.

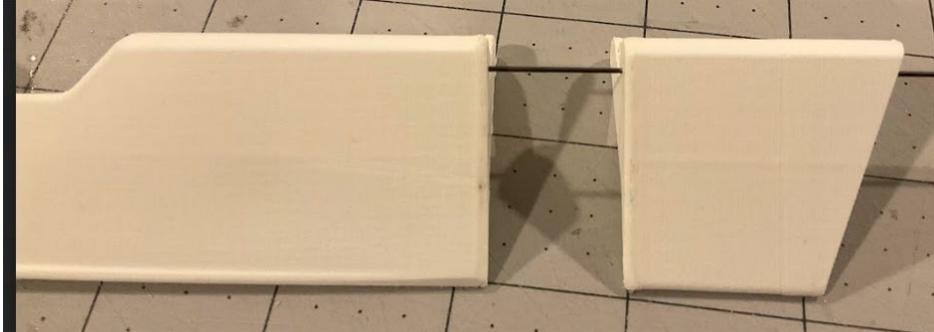


Add the magnets making sure to check alignment.

The rear fuse will need the areas marked cut out for both the spar and the servo wire pass through.

Elevon

Use a piece of piano wire to make sure the channel through the elevon is clear. Also use piano wire to align the two pieces for glue.



Wing

The wing goes together in the same way with bamboo skewers between each section. First, cut out the area marked for the servos. Attach the inner wing and main wing. Then add the elevon and slide the music wire through the elevon, through the hinge in the wing, all the way into the inner wing. Leave 15 mm that will insert into the wing tip. Test fit and sand the ends of the elevons if needed.

Insert the spar and the 3mm bamboo skewers and glue the wings to the fuselage.

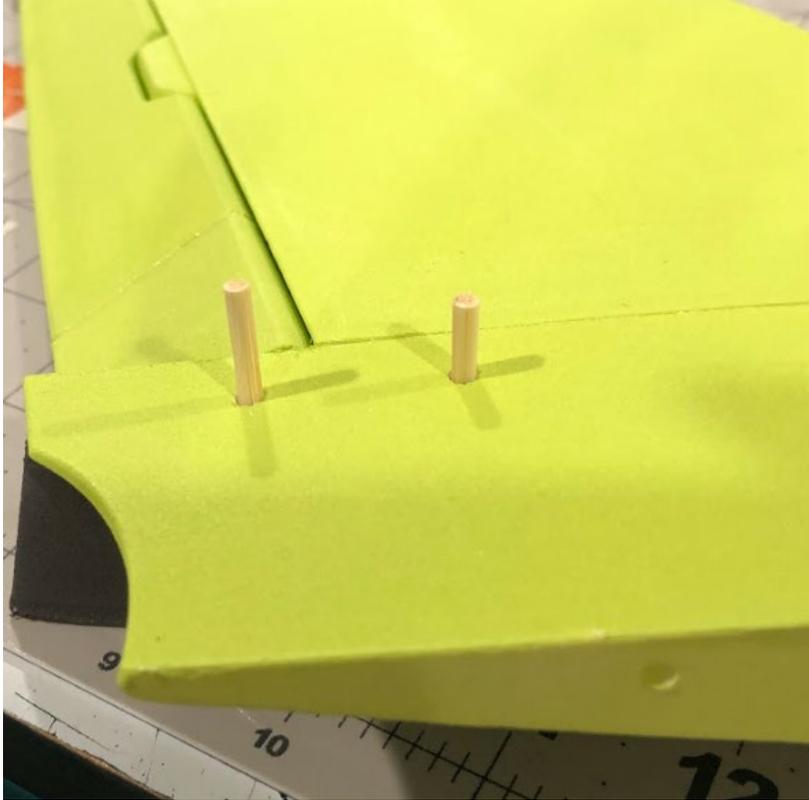
Servo Tray (design by Lockey on rcgroups, used with permission)

Glue the top outline to the servo box. Check the orientation as it will only fit cleanly one way. Drop in servo and run wire through the channel in the wing and through the fuse.



Fins

Drill through or cut through the layer of inner wing for the bamboo skewer holes to affix the fin. A longer skewer will be needed for the rear as compared to the front. Test fit and glue on the top and bottom fin pieces. Take note, the pieces with the lines that show on the skin should face inward.



Accessory pieces

Glue the motor ring and wing caps to cover the gaps at the rear of the fuse and inner wing respectively. Also apply the nose skid under the front fuse.



Nose

Leave the nose for last. After installing your motor, esc, battery, and rx check your balance based on the CG circle indents on the bottom of the wing. Depending on your battery weight you can print the nose with higher infill to achieve nose weight as needed.



First Flight

For the first flight add 2 mm of reflex. Depending on your motor setup and battery weight you may be able to remove this or partially trim it. A side arm toss at $\frac{3}{4}$ throttle and enjoy!