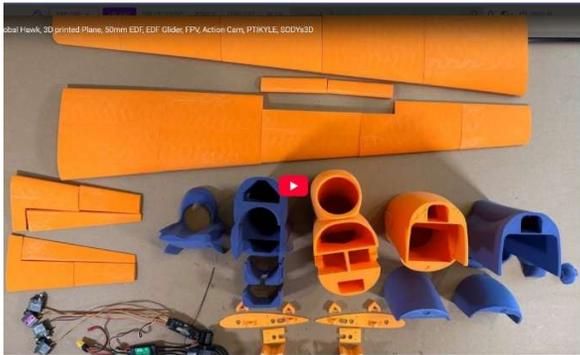


My Balsa & Glass Workshop

RQ-4 Global Hawk 3D Print/Build Description

21 February 2026

This RQ-4 Global Hawk 3D printed RC model was designed by Kyle Germanton with help from his co-designers Thomas Heuer and Chris Parent. You can see more of their 3D models on Kyles Designs RC @: <https://www.kylesdesignsrc.com/>, SODYs3D @: <https://www.sodys3d.com/>, and on Cults 3D @: <https://cults3d.com/en/users/ptikyle/3d-models>.



Figures 1 & 2 - 3D Printed RQ-4 Global Hawk

Images Source: <https://cults3d.com/en/3d-model/gadget/rq-4-global-hawk-ptikyle-2/>

I picked the RQ-4 3D model for a couple reasons. First, I wanted a 3D printed model that would be simple to build and easy to fly. Second, I worked on the USAF Global Hawk program for six years as a flight test manager and the Air Vehicle IPT program manager.

RQ-4 3D Model Specifications:

Aircraft Type: Powered Glider

Wingspan: 1,700mm (Wings are removable for transport!)

Airfoil: Flat Bottom

Wing Platform: Full-cantilever, Double Tapered, Variable Chord

Fuselage Length: 882mm

Fuselage Width: Varies

Rec. No. of Channels: 4 - Throttle, Flaperons, and V-tail Ruddervator

Landing Gear: None

Weight w/o LiPo: 937 grams depending on power system selection

Full-Up Flight Ready Weight: approx. 1,200 grams depending on LiPo battery size used

C.G. Location: At small bumps on underside of parts Wing L1 & R1

Electric Powered: Recommended Electric Ducted Fan 50mm min., 4000KV (4S); 5000KV (3S), LiPo tested 4S 2,200mah - 2,600mah (Tested EDF: QX4600 4S 50mm)

The 3D printing and build of this model is easy enough for even me. All the required STL files (a total of 47 of them) were purchased and downloaded from the Cults3d.com RQ-4 Global Hawk Webpage (<https://cults3d.com/en/3d-model/gadget/rq-4-global-hawk-ptikyle-2/>) for under \$20. Take the time to view the 24 minute build video at: <https://youtu.be/3dfQuzf0s8Q/>. For 3D printer filament material, I again used active foaming 3D LabPrint Polylight 1.0 LW-PLA, PLA/PETG, and TPU filaments. Kyle recommends using a Gyroid 3% grid infill for the wings (V-Tail 5%) and all other LW-PLA parts. The model can be built with a First Person View (FPV) Nose DJI O3 or similar, Action Cam Nose, or make your own FPV-Nose! This 3D model RQ-4 is easy to launch by hand, and it flies like a powered glider. It looks super menacing when it's in the air. You can view it flying in two videos at: <https://youtu.be/RbvSQ77566k?si=RGnFtUbmORhs3Qu/> First Good Flight, and <https://youtu.be/TknZOgAPucI?si=PDZO4zKKWTJZXEAr/> Thomas's First Flight.

RQ-4 Global Hawk Materials, Tools, and Hardware List

The Minimum requirements for successfully printing the RQ-A are:

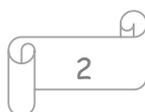
- 3D Printer with 200mm x 200mm x 205mm Print Bed Size (I used a Creality Ender-3 V3)
- 0.4mm Nozzle
- Heated Bed (recommended)
- Any Slicer Software (I used Creality Print 6.3)
- Lightweight PLA like ColorFabb LW-PLA, OVERTURE Air PLA, Polymaker LW-PLA, or **3D LabPrint Polylight 1.0 LW-PLA**
- High quality PLA like Creality Hyper-PLA or Paramount3D

Other Materials and Tools Needed:

- High Quality PETG for wing mounting parts
- High Quality TPU for control surface hinges (I did not use these, replaced with nylon hinges)
- Medium Bodied CA/Super Glue
- Accelerator for CA
- Sandpaper and/or Small Files
- Screwdriver and/or allen wrench for chosen screws/bolts

Flight Control System:

- Spektrum AR620 6-Channel 2.4GHz DSMX RC Sport Receiver
(<https://www.amazon.com/s?k=Spektrum+AR620+6-Channel+2.4GHz+DSMX+RC+Sport+Receiver>)



- Stemedu EMAX ES08MA II (12g) Mini Metal Geared Digital Servo or equivalent (x4) (https://www.amazon.com/dp/B0DXPWF XMZ?ref=ppx_yo2ov_dt_b_fed_asin_title)
- Servo Extension Cables: 500mm (x2), 400mm (x2), 200mm (https://www.amazon.com/dp/B0D459R172?ref=ppx_yo2ov_dt_b_fed_asin_title)
- Servo Extension Cable Safety Connector Clips (x5) (<https://www.amazon.com/Servo-Extension-Safety-Connector-Products/dp/B086J68CM1>)

Electric Power System:

- XFLY-MODEL 50mm 12 Blades EDF Ducted Fan with 4S 2627-KV4600 Brushless Outrunner Motor (<https://www.amazon.com/XFLY-MODEL-2627-KV4600-Brushless-Outrunner-Aircraft/dp/B09FS4PY23>)
- Flycolor 50A ESC 2-4S Electric Speed Controller 5v 3A BEC with XT60 & 3.5mm Bullet Plugs (https://www.amazon.com/dp/B09L5Z7GV7?ref=ppx_yo2ov_dt_b_fed_asin_title&th=1)
- LiPo Battery 4S 2,600mah (<https://innov8tivedesigns.com/badass-45c-2600mah-4s-lipo-battery.html>)
- 14AWG ESC to Motor Extension Cables w/3.5mm bullet connectors (20cm) (x3)

Hardware Needed:

- Carbon Fiber Tubes 8mm O.D. x 800mm (x2)
- Carbon Fiber Tubes 8mm O.D. x 400mm (made from the remainder of 2 ea. 1,000mm tubes)
- Carbon Fiber Tube 6mm O.D. x 400mm
- Carbon Fiber Rods 2mm O.D. x 98mm (x2)
- Steel Wire 1.5mm x 130mm for Ruddervator Hinge (x2)
- Steel Wire 1.5mm x 40mm Pushrod Connector Linkage for Ruddervator Servo (x2)
- Machine Screws M3x10 (x4) and M3 Nuts (x4)
- 10x1mm neodymium iron magnets (x2)
- Du-Bro #116 Standard Nylon Hinges (x12) for flaperon & V-Tail ruddervator hinging

3D Printing the RQ-4 Global Hawk

So, how about we get started with the RQ-4 Global Hawk printing and build. As I indicated earlier, there is a very nice build video at: <https://youtu.be/3dfQuzf0s8Q/>. I also found some helpful information from Chris Parent on LW-PLA printing @: <https://www.kylesdesignsrc.com/articles/lw-pla-settings/>.

Given all I learned in my 3D printing of the X-100 Infinity Wing, I expected the printing of this model to go much easier. I decided to start with printing the various STL files that would require Transparent Creality Hyper-PETG for added strength. I set up each of the STL files in Creality Print 6.3, using a 0.4mm nozzle, 0.2mm layer height, 0.42mm line width, single walls, three top/bottom layers, and

the Gyroid infill pattern. Material used, print times and weights for each part are listed in Table 1. The 3D printing results of the PETG parts are shown in Figure 3.



Figure 3 - RQ-4 3D Printed PETG Parts

Now for all the LW-PLA parts. As I used on the X-100 Infinity Wing, my Creality Print 7 slicer settings for **3D LabPrint Polylight 1.0 LW-PLA** printing with a 0.4mm nozzle are as follows:

Printing Nozzle Temperatures:

First Layer: 210°C

All Other Layers: **215-230°C** (Increased temp gives a higher foaming factor)

Build Plate Temperatures:

First Layer: 60°C

Other Layers: 50°C

Flow Ratios: **0.70** (Decrease to 50% when using higher print temps)

Retraction Distance: 4.0 mm

Retraction Speed: 40 mm/s

Cooling Fans Speeds: 20%

Print Speeds: 40 mm/s (I used 50mm/s for the two largest fuselage parts)

Travel Speed: 250 mm/s

Layer Height: 0.24 mm

Line Width: 0.42 mm

Seam Position: Back

Wall Loops Count: 2 (I increased this because the walls were too fragile with single wall loop)

Top Shell Layers: 4

Bottom Shell Layers: 4

Sparse Infill Density: 3-5% Gyroid (for lightweight prints, **adjust as needed for strength**)

Support if Needed:

Type: Tree(auto)

Style: Tree Hybrid

On build plate only: Checked

Support critical regions only: Checked

Brim: Auto (Use "Outer brim only" for any tall parts with a small base layer area)

Skirt:

Skirt type: Combined

Skirt loops: 2

Skirt distance: 1 mm

Skirt speed: 20 mm/s

Special Slicing Mode: Even-Odd

Using these slicer settings, I set up each of the STL files in Creality Print 6.3. One of the first things that jumped out at me was the difference in the design of the Kyles Designs RC RQ-4 parts from those of the 3DAeroventures X-100 Infinity Wing parts. The best way to show you this is the next two screen captures from Creality Print of their wing root parts.

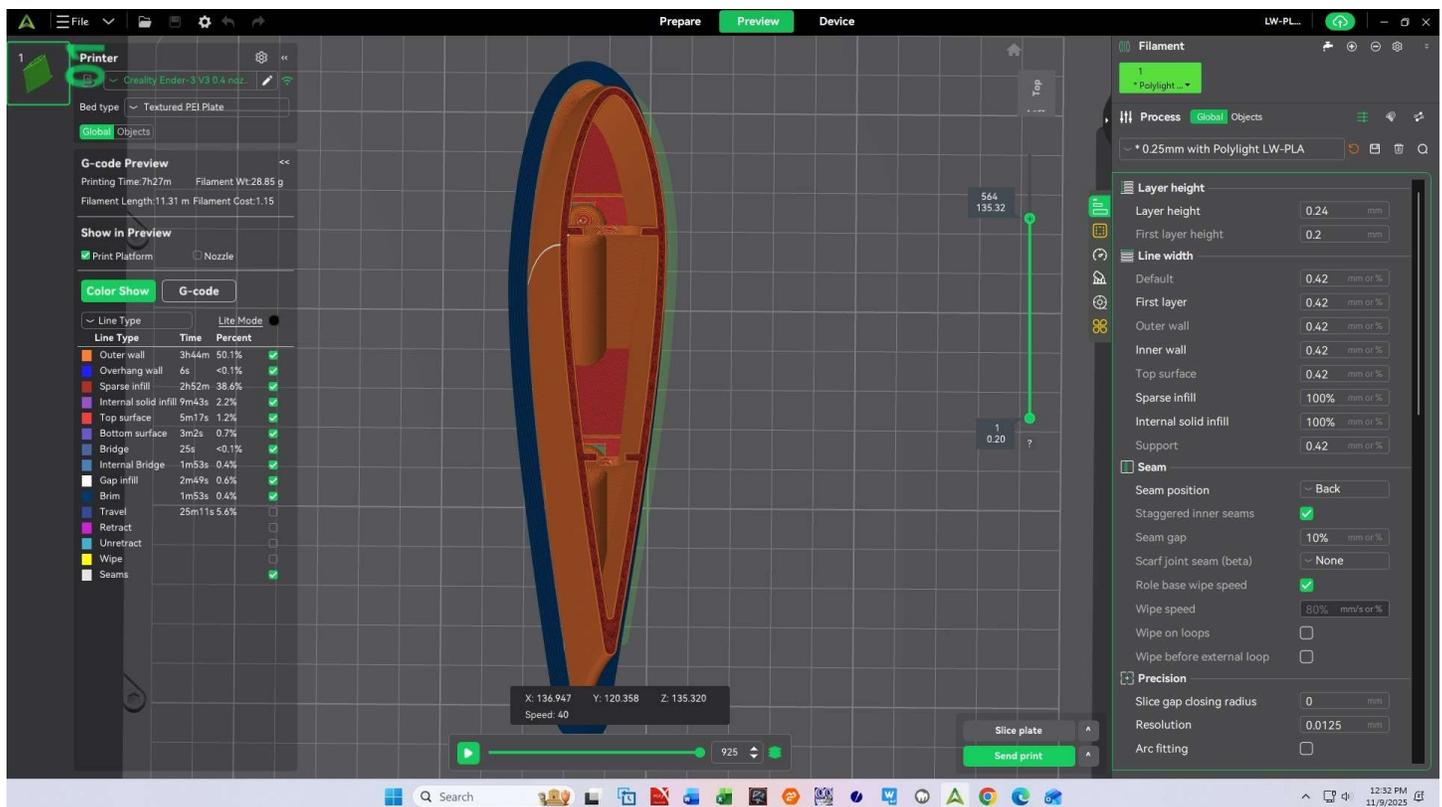


Figure 4 - X-100 Infinity Wing Part Set-up

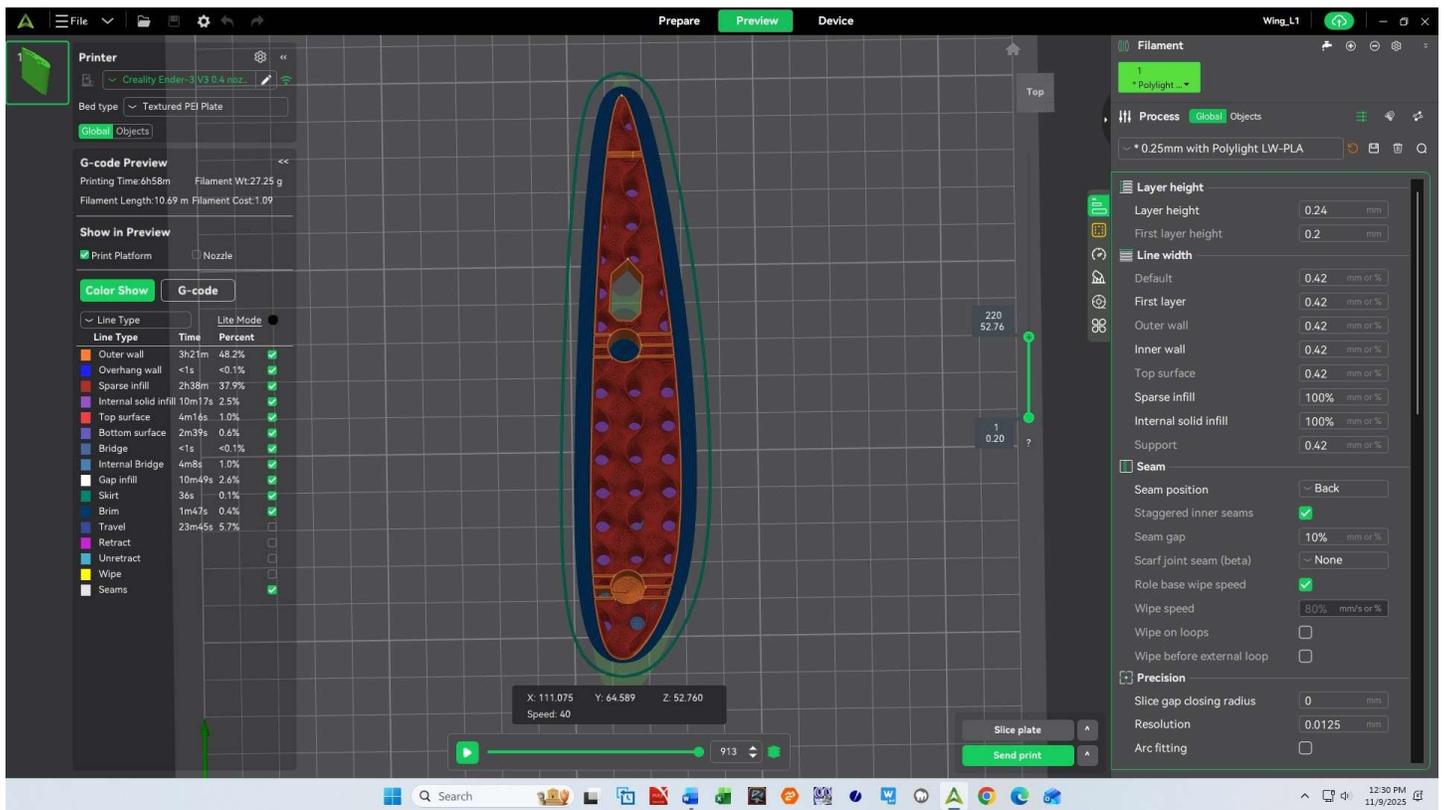


Figure 5 - RQ-4 Part Set-up

Each designer has taken a different approach as to how their parts 3D printing are to occur. It is going to be interesting to see how each design compares in weight, rigidity, and strength. So, I put a spool of Balsa colored Polylight 1.0 LW-PLA in my Ender-3 V3 and set off printing the fuselage parts. After *many hours of printing*, the eleven LW-PLA fuselage parts are shown below in Figure 6. Material used, print times and weights for each part are listed in Table 1. Fus 4 had the longest print time at **16 hours 3 minutes** and Figure 7 shows this printing on my Creality Ender-3 V3 printer @ 88% completion. Note the stink bug taking a ride.

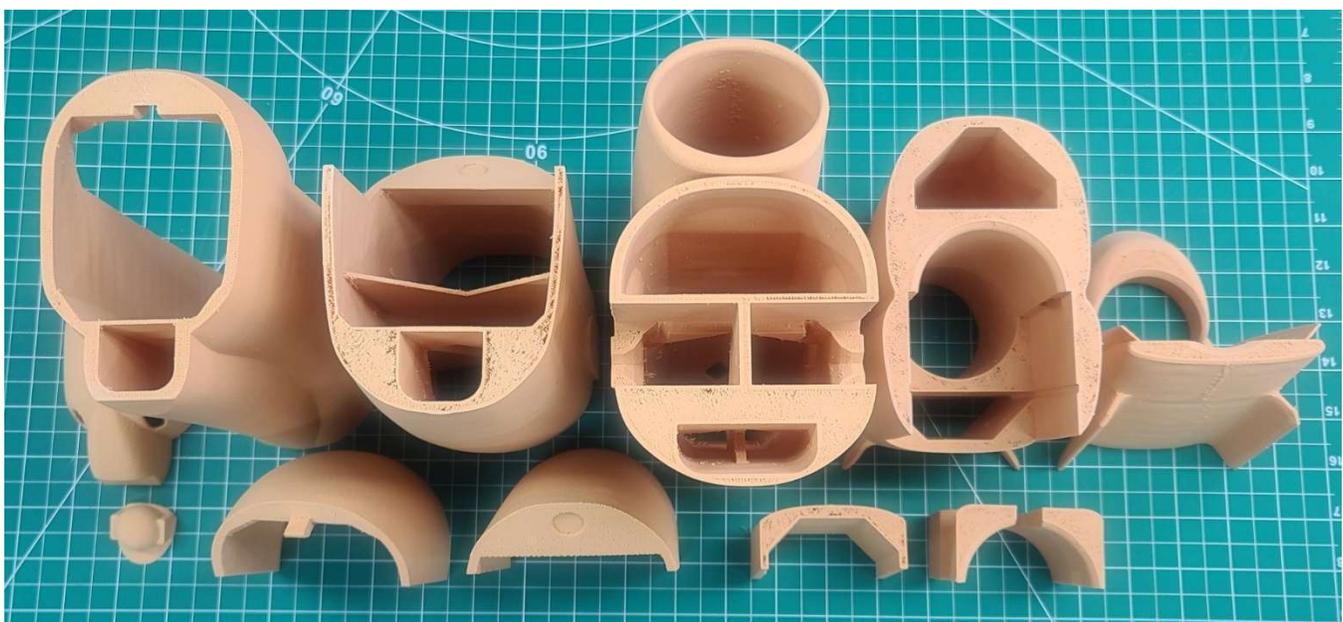


Figure 6 - RQ-4 3D Printed Fuselage LW-PLA Parts

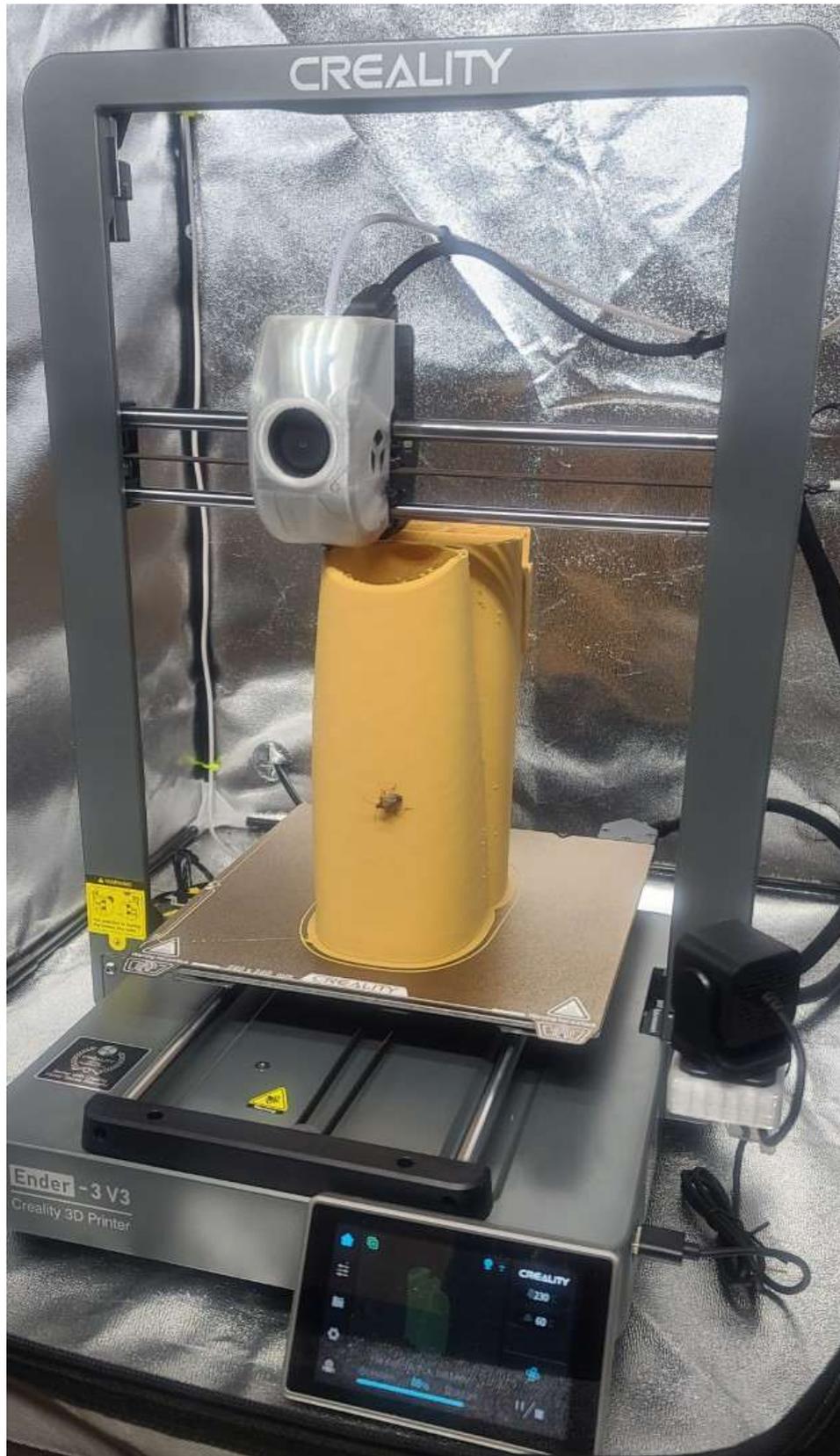


Figure 7 - RQ-4 Fuselage Part Fus4 Printing

With the fuselage parts completed, next up was printing all the wing and V-Tail parts using Red colored Polylight 1.0 LW-PLA. Figure 8 shows the V-Tail L1 part on my 3D printer very close to being finished.



Figure 8 - RQ-4 V-Tail L1 Part Printing

As you can see in Figure 9, I finally have all the Wing and V-Tail parts printed. The last parts to print were the wing and V-tail hinges. I printed them using Black Giantarm TPU with a 0.4mm nozzle and 0.2mm layer height. Next up was to review the build video and start putting my RQ-4 model together. Again, material used, print times and weights for each part are listed in Table 1.

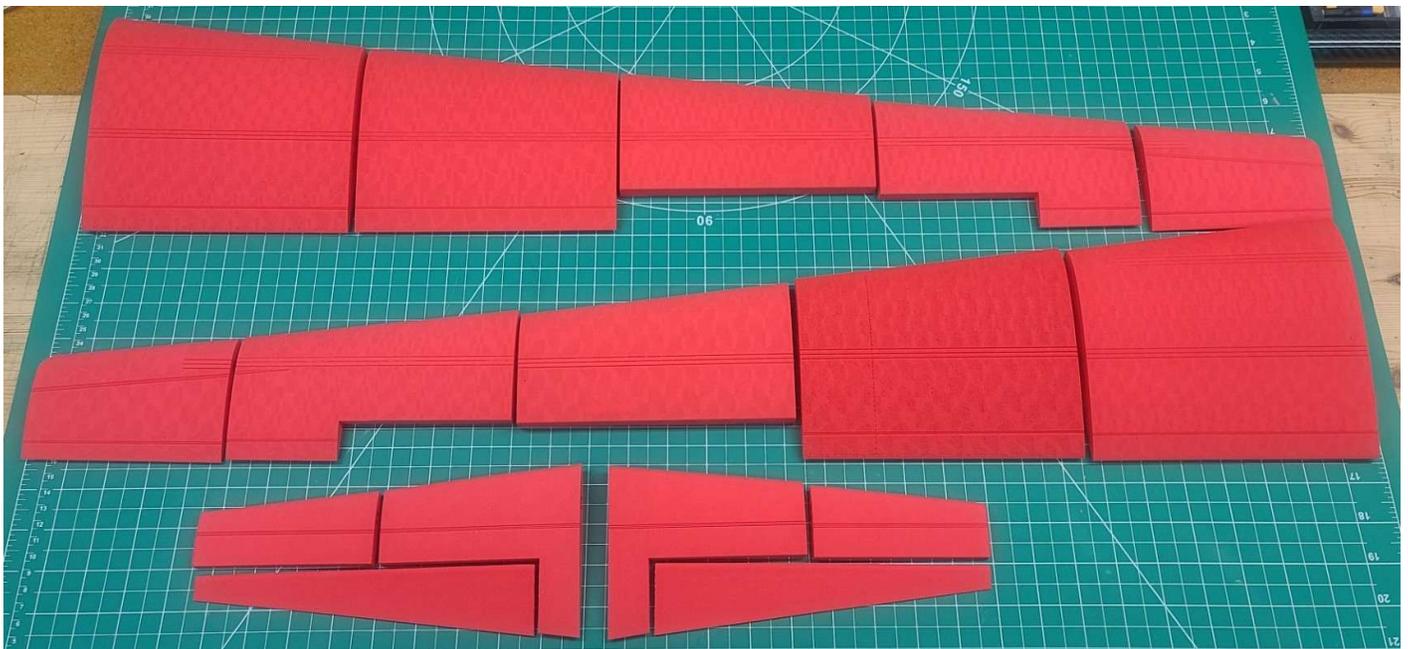


Figure 9 - RQ-4 3D Printed Wing & V-Tail LW-PLA Parts

With all my Electric Power System, Flight Control System components seen in Figure 10, and other required hardware in hand, I started the build of my RQ-4 Global Hawk with the wings and V-Tail parts. I followed the build video at: <https://youtu.be/3dfQuzf0s8Q/>, which is straight forward so I will not repeat all the steps here, but I will discuss any variations I made or issues I found.



Figure 10 - RQ-4 Power & Flight Control System Components

After gluing all the V-Tail and wing parts together using CA, I installed the ruddervators and flaperons using Du-Bro #116 Standard Nylon Hinges versus the TPU printed hinges. The TPU parts were just too thick and stiff. After electrical checkout of the flaperon servos, I installed them into the wings

using a hot glue gun, CA'ed the flaperon control horns, and then installed the control linkages. The finished wings and V-Tails are shown in Figure 11. Not sure what caused one wing part to come out a slightly different shade of red. I am NOT really happy with using LW-PLA.

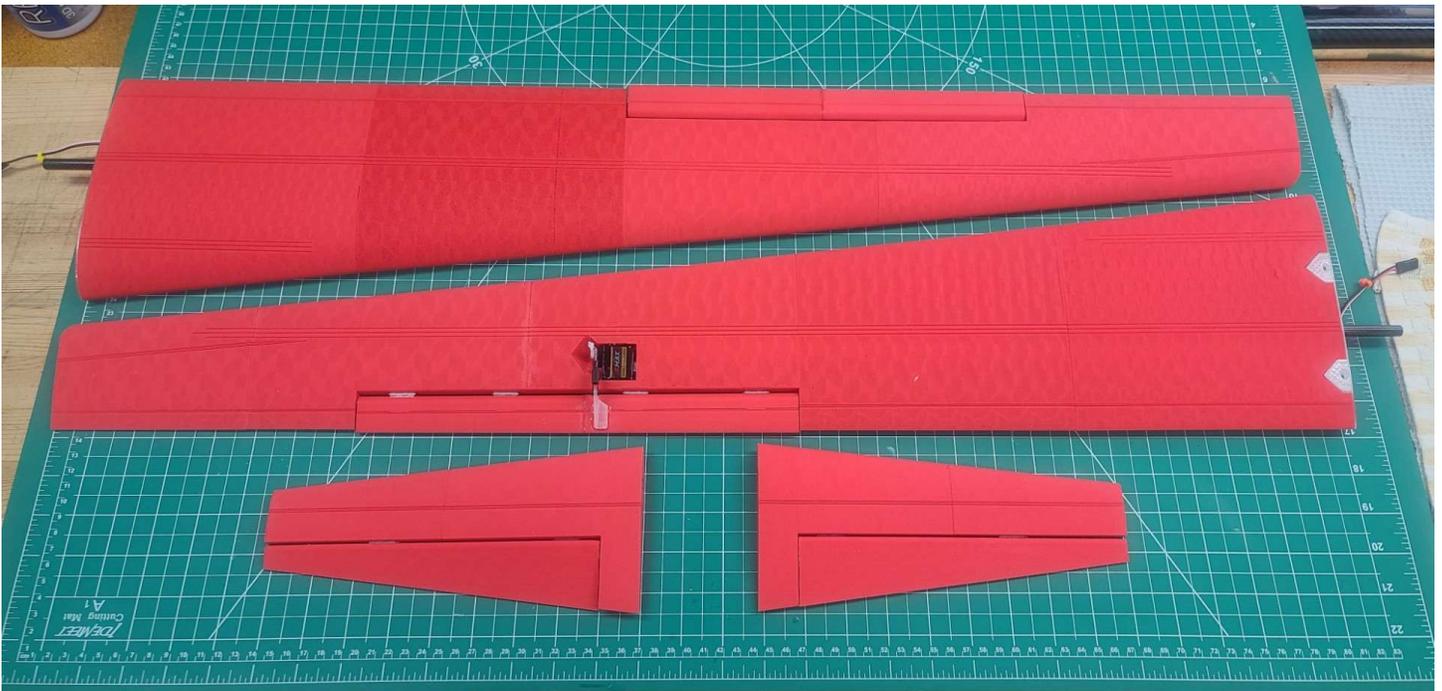


Figure 11 - RQ-4 Assembled Wings & V-Tail Surfaces

Next, I started the assembly of the RQ-4 fuselage. I first completed an electrical checkout of the two ruddervator servos, and then using a hot glue gun I installed them into each side of Fus5. I mounted the 50mm Ducted Fan in the front of Fus5 using a bead of hot glue around the backside of the fan shroud. The assembly video doesn't actually show where to place/attach the Electric Speed Controller (ESC), so I decided to mount it as close to the CG as I could using Velcro strips on the middle shelf in Fus3. To do this I had to add 200mm 14AWG ESC to Motor Extension Cables w/3.5mm bullet connectors to the ESC motor leads. Servo extension cables were also needed in order to reach the AR620 receiver, which is mounted near the top front edge of Fus3.

Builders Note - To identify what extension cable is attached to a particular control surface servo, I place different color small cable ties around the ends of the extension cables that plug into the AR620 receiver (i.e. Channel 1 Throttle - Black; Channel 2 Right flaperon - Orange; Channel 3 Right ruddervator - Blue; Channel 4 Left ruddervator - Purple; and Channel 6 Left flaperon - Yellow).

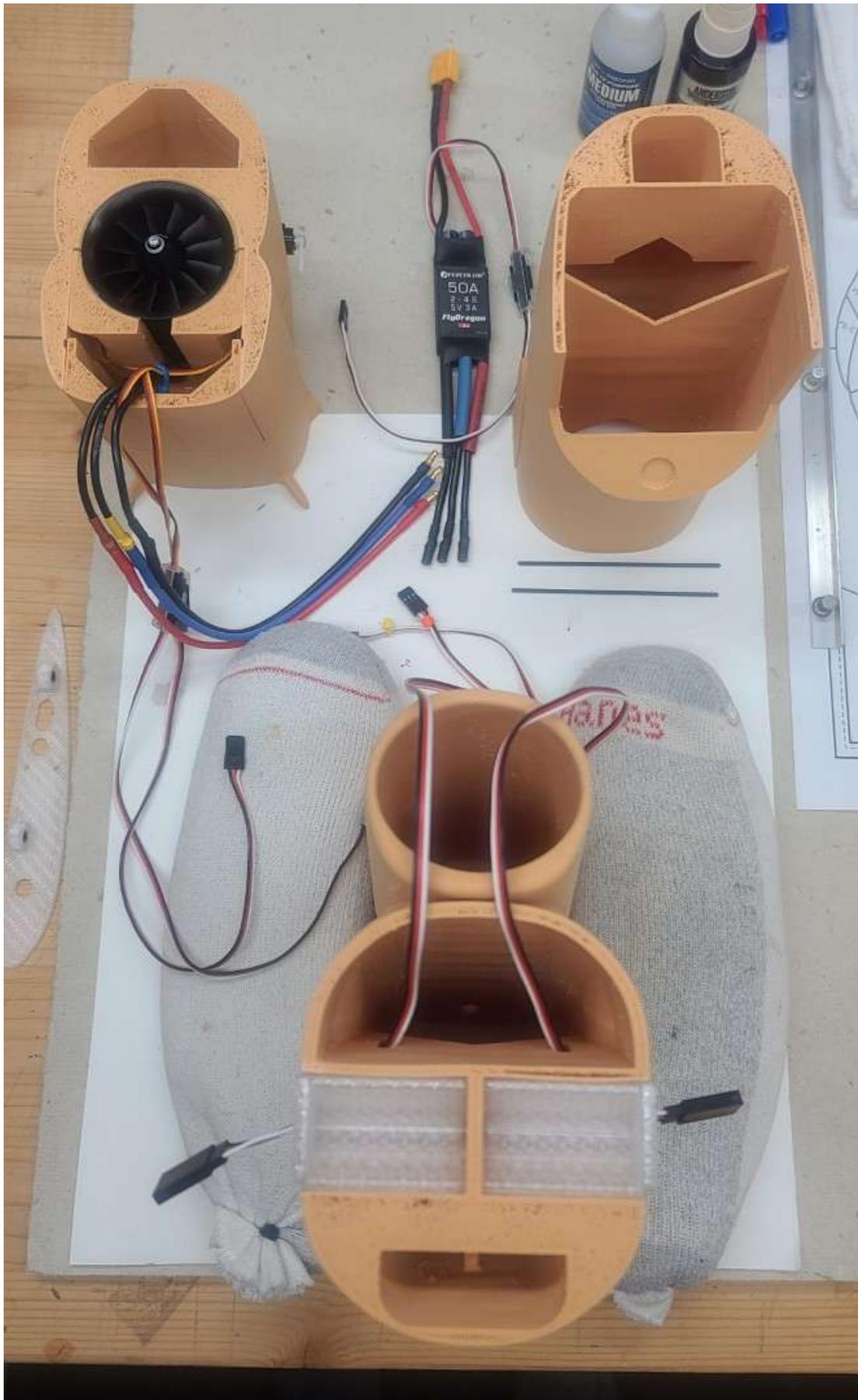


Figure 12 - RQ-4 Fus3, Fus4 & Fus5 Assembly

Completed the assembly of the fuselage per the build video, installed the ruddervator control linkages, put a Velcro strip in the bottom of the LiPo bay, established the required location of the LiPo for a correct CG, and set up my NX8 transmitter for proper control surface deflections and throw directions. Total full-up "ready to fly" weight with a 2,600mah 4S LiPo battery installed comes in at **1,247g**.

Figures 13 through 15 show you my finished RQ-4 Global Hawk. Now all I need to do is execute a first flight that doesn't end up similar to my X-100 Infinity Wing first flight.

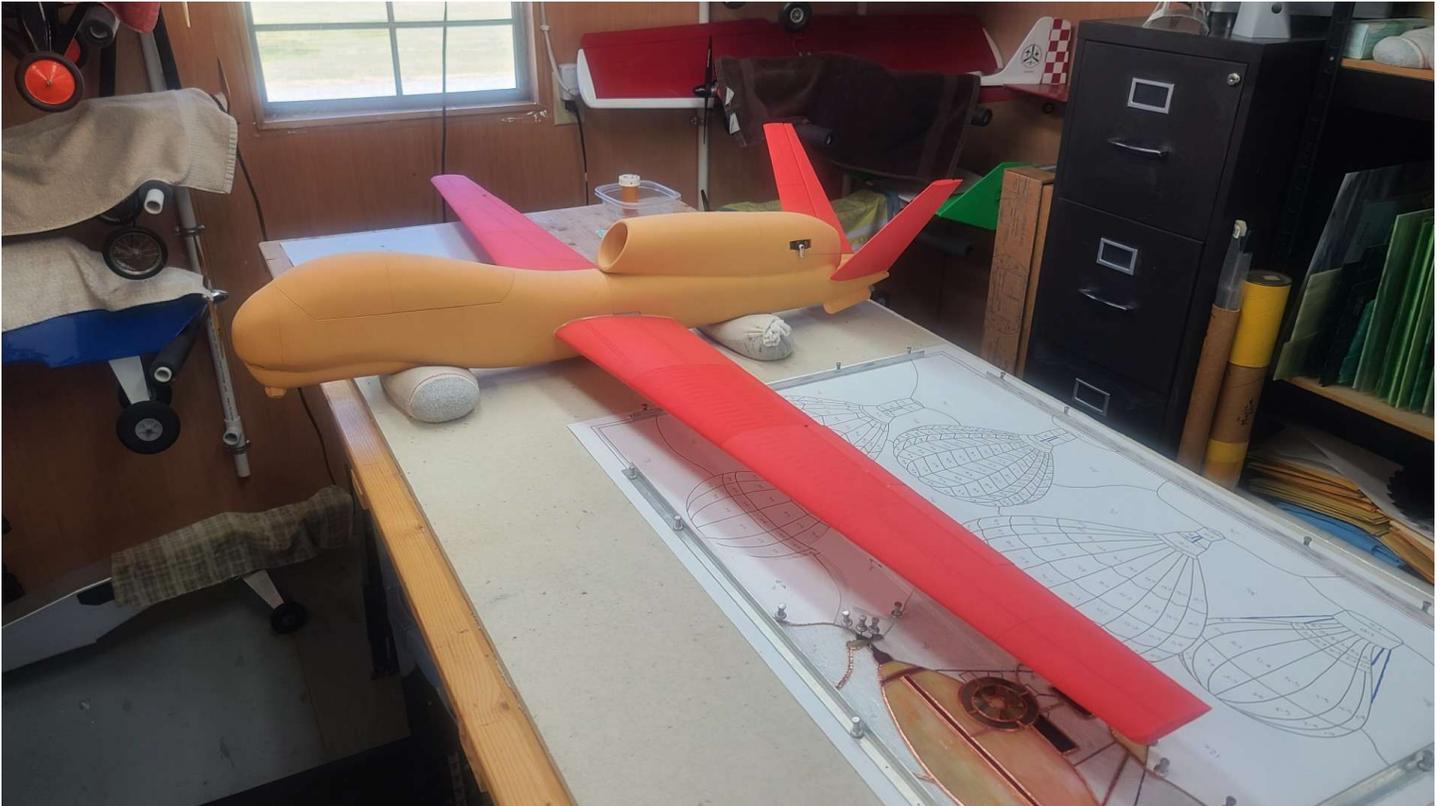


Figure 13 - RQ-4 Global Hawk Fully Assembled



Figure 14 - RQ-4 Global Hawk Front View



Figure 15 - RQ-4 Global Hawk Aft View

Table 1 - RQ-4 Global Hawk Parts Material, Print Time, and Weight

Part Name	Print Filament Used	Print Time	Part Weight
Aileron L1	Red Polylight 1.0 LW-PLA	2hr 14m	4g
Aileron L2	Red Polylight 1.0 LW-PLA	2hr 12m	4g
Aileron R1	Red Polylight 1.0 LW-PLA	2hr 15m	4g
Aileron R2	Red Polylight 1.0 LW-PLA	2hr 12m	4g
Canopy 1	Balsa Polylight 1.0 LW-PLA	2hr 47m	11g
Canopy 2	Balsa Polylight 1.0 LW-PLA	3hr 25m	13g
EDF Cover A	Balsa Polylight 1.0 LW-PLA	1hr 25m	5g
EDF Cover B	Balsa Polylight 1.0 LW-PLA	1hr 8m	5g
Fus 1 Cam Dummy	Balsa Polylight 1.0 LW-PLA	21m	<1g
Fus 1	Balsa Polylight 1.0 LW-PLA	3hr 22m	10g
Fus 2	Balsa Polylight 1.0 LW-PLA	8hr 21m	35g
Fus 3	Balsa Polylight 1.0 LW-PLA	12hr 45m	54g (at 50mm/s)
Fus 4	Balsa Polylight 1.0 LW-PLA	16hr 3m	83g (at 50mm/s)
Fus 5	Balsa Polylight 1.0 LW-PLA	8hr 19m	42g
Fus 6	Balsa Polylight 1.0 LW-PLA	4hr 48m	19g
Hinges (x12)	Black Giantarm TPU	1hr 6m	8g total for all parts
Rudder horns (x4)	Transparent Hyper-PETG	12m	3g total for all parts
V-Tail L1	Red Polylight 1.0 LW-PLA	2hr 26m	8g
V-Tail L2	Red Polylight 1.0 LW-PLA	1hr 58m	4g
V-Tail R1	Red Polylight 1.0 LW-PLA	2hr 27m	8g
V-Tail R2	Red Polylight 1.0 LW-PLA	1hr 58m	4g
V-Tail Rudder L	Red Polylight 1.0 LW-PLA	1hr 12m	5g
V-Tail Rudder R	Red Polylight 1.0 LW-PLA	1hr 12m	5g
Wing Cross L1	Transparent Hyper-PETG	45m	10g (w/20% infill)
Wing Cross L2	Transparent Hyper-PETG	5m	1.5g
Wing Cross R1	Transparent Hyper-PETG	45m	10g (w/20% infill)
Wing Cross R1	Transparent Hyper-PETG	5m	1.5g
Wing Fix L1	Transparent Hyper-PETG	19m	8g (w/30% infill)
Wing Fix L2	Transparent Hyper-PETG	22m	7g (w/30% infill)
Wing Fix R1	Transparent Hyper-PETG	19m	8g (w/30% infill)
Wing Fix R2	Transparent Hyper-PETG	22m	7g (w/30% infill)
Wing L1	Red Polylight 1.0 LW-PLA	6hr 28m	30g (at 50mm/s)
Wing L2	Red Polylight 1.0 LW-PLA	4hr 18m	20g (at 50mm/s)
Wing L3	Red Polylight 1.0 LW-PLA	3hr 51m	15g
Wing L4	Red Polylight 1.0 LW-PLA	3hr 29m	12g
Wing L5	Red Polylight 1.0 LW-PLA	2hr 18m	7g
Wing R1	Red Polylight 1.0 LW-PLA	6hr 31m	30g (at 50mm/s)
Wing R2	Red Polylight 1.0 LW-PLA	4hr 15m	20g (at 50mm/s)
Wing R3	Red Polylight 1.0 LW-PLA	3hr 52m	15g
Wing R4	Red Polylight 1.0 LW-PLA	3hr 30m	12g
Wing R5	Red Polylight 1.0 LW-PLA	2hr 20m	7g