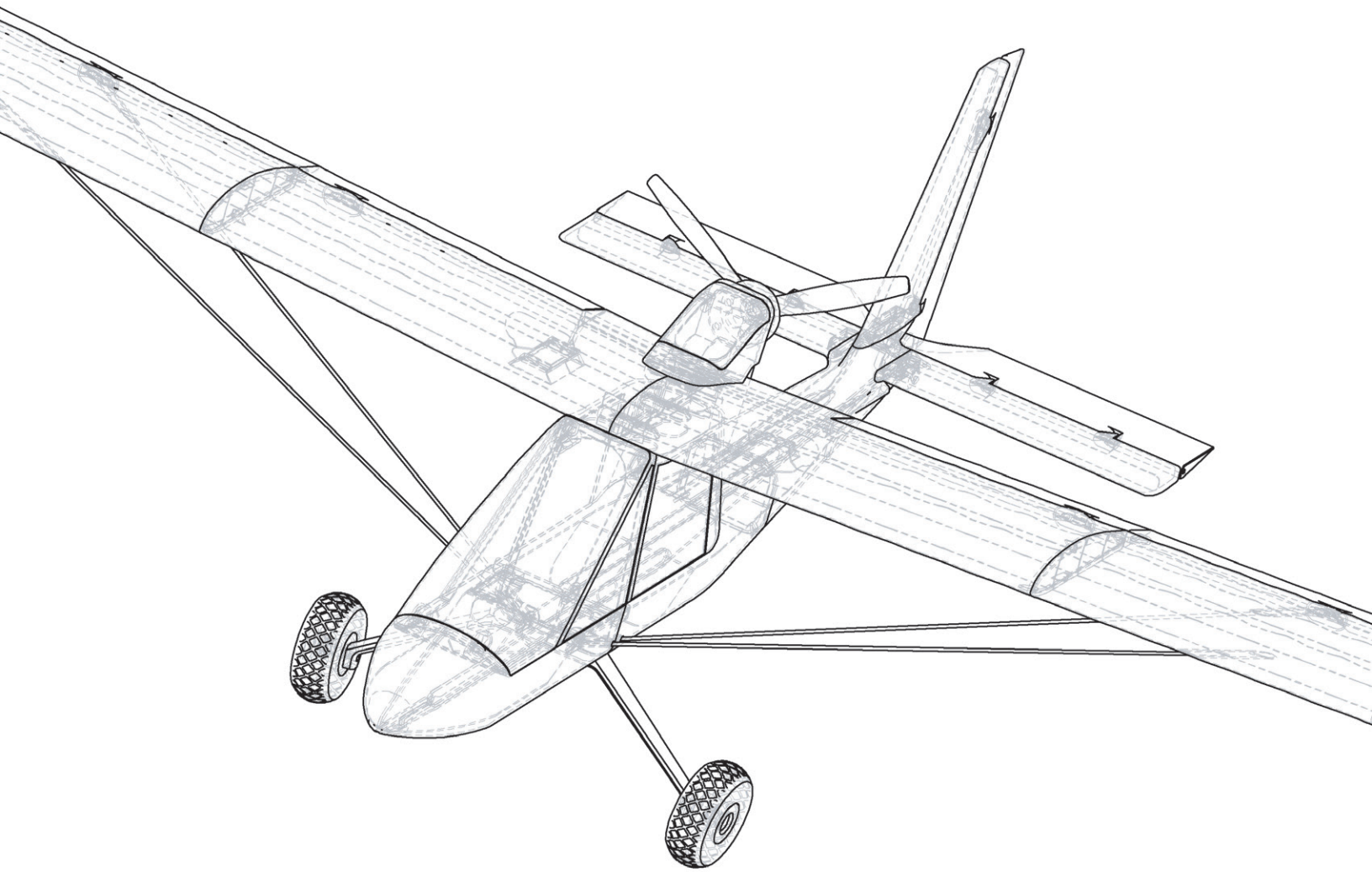
Micro SportCam

3D Printed R/C Aircraft

Build Guide

Wingspan: 695mm (27.4”)



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Included in Your Download:

1. STL Files
2. Simplify3D Factory Files (individual parts and grouped builds)
3. Starter Cura and PrusaSlicer settings (user refinement needed)
4. Generic Gcode for i3 style printers
5. PDF Build Guide

Please Read A Note from the Designer:

First of all, thank you so much for your interest and support of 3DAeroventures. I can't tell you how much joy I get out of designing and testing these aircraft, and the fact that you can now get joy out of my creations just makes this calling that much more special. I dove into the R/C aircraft hobby as a 12 year old kid with my dad and it's a passion I've maintained into adulthood. Part of 3DAeroventures mission is to encourage people to not let go of the thing they were most passionate about growing up. That's why our motto is "Never Stop Exploring. Never Stop Questioning. Never Stop Playing." I hope the building and flying of this model keeps your passion for model aviation ignited. More importantly, I encourage you to share your build and flying process with young people, hopefully igniting a fire in them and helping to maintain and grow this wonderful hobby.

Now onto the technical stuff. I recommend printing the Micro SportCam in ColorFabb LW-PLA. The reduced weight of this material improves its flight performance significantly, particularly giving it gentler flight characteristics on landing. The biggest complaint I hear about LW-PLA is that it is expensive at about $50 for 750g. At first glance this does sound expensive, but you must realize that LW-PLA is printed at an extrusion multiplier (flow) of between 0.35 - 0.4 so a whole reel will last significantly longer than Standard PLA. One reel of LW-PLA will last as long as about 2 reels of standard PLA. However, I understand that LW-PLA isn't for everyone. So I have provided seperate design files for a standard PLA version of the Micro SportCam. The standard PLA version uses the same motor setup but you may need to experiment with a larger 2S or a 3S battery to get the aircraft to balance properly. I had good results using a 650 mah 3S Lipo in the standard PLA version.

I'd love to hear about your build and flight experience with this aircraft. You may contact me directly at eric@3daeroventures.com with any feedback or troubleshooting questions. Or post your experiences on the 3DAeroventures Pilots Alliance Facebook Group.

Thanks again and enjoy your flight!
Eric Haddad
Pilot in Command

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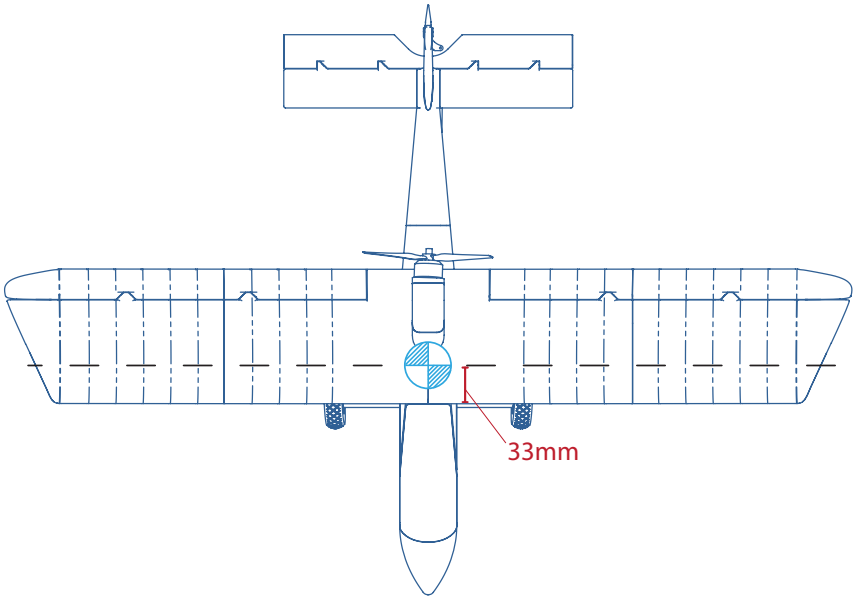
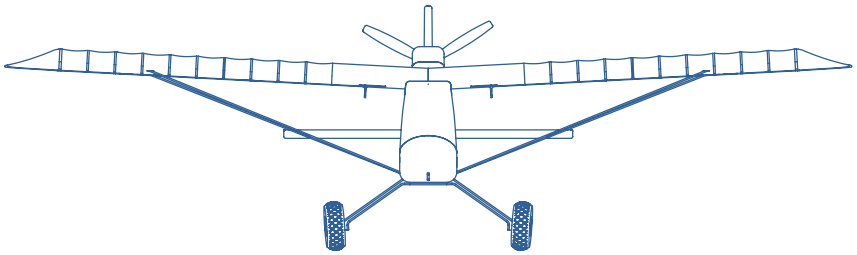
Specs:

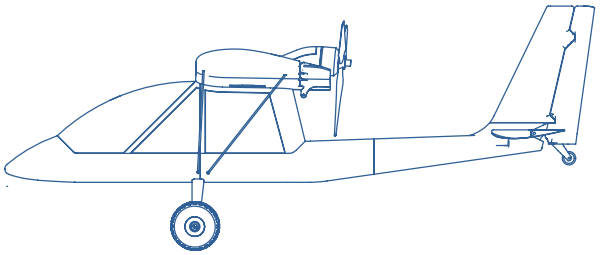
Wingspan:	**695mm / 27.4”**
Length:	**482.7mm / 19”**
Height:	**200mm / 7.9”**
Wing Area:	**118.4 in²**
Wing Loading (LW-PLA):	**9 oz/ft²**
Wing Cube Loading:	**9.9**
Flight Performance Category:	**General Sport and Scale Aerobatics**
Center of Gravity Location:	**33mm behind the Wing’s Leading Edge**
Weight of Printed Parts (LW-PLA):	**110g / 3.88 oz**
Weight of Printed Parts (PLA):	**195g / 6.88 oz**
Flying Weight (2S 650 mAh):	**210g (LW-PLA) to 300g (Standard PLA) / 7.4 - 10.58 oz**
Recommended Max Flying Weight:	**320g / 11.29 oz**
No. of Channels:	**4 - Throttle, Aileron, Elevator, Rudder (Flaperons optional)**

NOTE: All part weights shown in the manual are for parts printed from LW-PLA. If you would like to print the aircraft from standard PLA, reference pages 38 - 39 for target PLA weights.



CG Location 33mm behind the Wing’s Leading Edge





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Recommended Setup:

Motor Options: EMAX MT1806 - 2280KV
Flite Test "Radial" 1806 2280kV Brushless Motor
or motor with equivalent mounting pattern

ESC Options: 12A - 20A Esc like EMAX SimonK Series 12A ESC

Rec. Prop: APC 4.75x4.75 Electric Pusher

Battery: 2S 650mAh LiPo or
3S 450 - 650 mAh

Radio: Servos: Radio + 5 Channel Reciever
EMAX ES9251ii (2.5g) Digital Servo or equivalent 18.02x7.91x16.8mm size servo (x4)
Y Harness for aileron servos (optional)
- Alternativeley, we recommend using a 5 channel receiver to mix aileron servos

Tools and Materials Needed:

- Min 150mm x 150mm x 180mm desktop 3D Printer
- ColorFabb LW-PLA (Recommended)
- High Quality Standard PLA
- TPU or TPE for Tires
- Medium Bodied CA/Super Glue
- Accelerator for CA
- Sandpaper and/or Small Files
- Velcro strips with adhesive backing
- Screwdriver and/or allen wrench for chosen screws/bolts
- Needle Nose Pliers for bending nose gear wire

Hardware Needed:

	Quantity:
- 5mm O.D x 3mm Thick Rare Earth Magnets for Removable Canopy	4
- M3 x 0.5mm Thread x 12mm - 15mm Long Screws for Wheels (nylon preferred)	2
- 3mm O.D. x 190mm Long Carbon Fiber Tubes or Rod for fuselage	2
- 3mm O.D. (or 1/8" O.D) x 10mm Long Dowel Pins (cut from leftover carbon tube/rod)	4
- 1mm O.D. Carbon fiber rod or Steel Wire	
- 240mm Long for Wing Struts (x4)	4
- 300mm Long for Aileron Hinge (x2)	2
- 230mm Long for Elevator Hinge	1
- 100mm Long for Rudder Hinge	1
- 0.8mm - 1.2mm steel wire for servo control rods	2
- 1mm - 1.2mm steel wire for nose gear option	1
- Servo Control Rod Connectors	2

Step-by-Step Build Guide

Step 1. 3D Printing the Included Parts

Minimum Requirements:

- 150mm x 150mm x 180mm Print Bed Size
- 0.4mm Nozzle
- Heated Bed (recommended)
- Any Slicer Software

Your Options for Printing the Parts:

Option 1: G-Code

Transfer the included G-Code to an SD Card and run directly on your i3 style printer. We've had good results with LW-PLA at 250º Celcius and standard PLA at 220º Celcius but experiment with your printer to make sure you achieve strong layer adhesion.

Option 2: Simplify 3D Factory Files

If you prefer to use Simplify3D as your slicer, open the included Factory Files and edit the preset profiles for your printer/material to ensure nice outer surfaces, excellent layer bonding, and good a bond between the outer skin and the internal structures.

Option 3: STL + Your Preferred Slicer

If you prefer to use another slicer or create your own profiles in Simplify3D, use the included STL files and the starter Cura or PrusaSlicer profiles as a starting point. This will require the most experimenting and expertise in your chosen slicer to ensure nice outer surfaces, excellent layer bonding, and good bonds between the outer skin and the internal structures.

NOTE: The Aileron, Elevator and Rudder parts on the Micro SportCam are designed to be printed in vase mode, with 0% infill. You can use 1 or 2 perimeters. If printing in LW-PLA, we suggest printing with 2 perimeters for added strength.

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Step-by-Step Build Guide (cont'd)

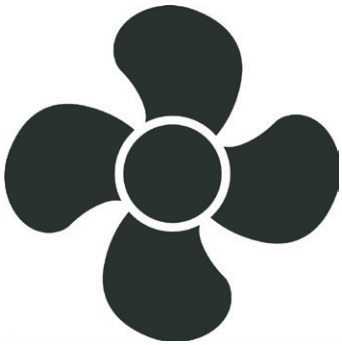
3D Printing Tips

ColorFabb LW-PLA

ColorFabb LW-PLA is an interesting material that uses foaming technology to achieve lightweight, low density PLA parts. This material is printed at a higher temperature (which causes it to expand) and a much lower extrusion multiplier than standard PLA. In order to determine the proper nozzle temperature and extrusion multipler for your particular printer you can follow ColorFabb's instructions: https://learn.colorfabb.com/print-lw-pla/ We had good results printing LW-PLA at 250ºC at an Extrusion Multiplier of 0.4 and a bed temp of 60ºC. You will also likely combat quite a bit of stringing with LW-PLA. We increase X/Y Axis Movement Speed to 200mm/s and run the cooling fan at 25% to help combat stringing. The LW-PLA version of Micro SportCam has also been designed with few lightening holes to help minimize stringing.

Standard PLA Temperatures:

We see good results printing Paramount3D PLA at 220ºC with a bed temperature of 70ºC. Experiment with your particular printer and brand of material to ensure proper layer bonding but you will likely land somewhere between 210 and 240ºC.



Cooling Fan:

Typically, PLA is printed with the fan set to 100%. However, this can cause layer bonding issues when printing thin walled aircraft. We have experienced nice , clean outer surfaces when keeping the fan speed up to 20% without negatively affecting layer bonding. Experiment with fan speeds set between 0 - 20%.

Step-by-Step Build Guide (cont'd)

3D Printing Tips (cont'd)

Standard PLA Extrusion Multiplier (Flow):

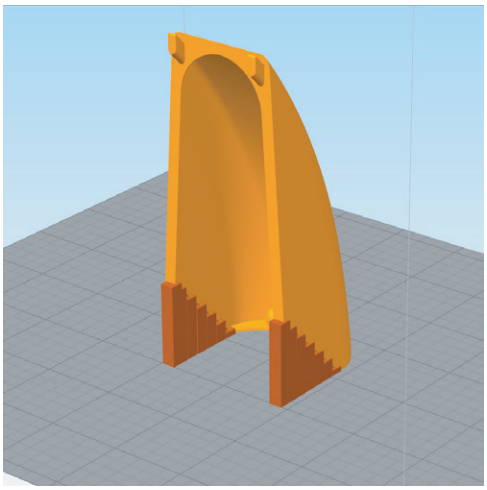
You will need to experiment with extrusion multiplier for your particular printer and material. You will likely land somewhere between 0.95 and 1.05 extrusion multiplier.

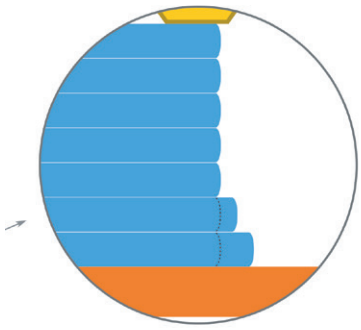
3DAeroventures Simplify3D Factory Files:

You will notice our factory file presets are setup to provide a balance between strength and light weight structures. Strategic areas are setup with slightly thicker walls with the rest of the structure using the "Allow Single Extrusion Walls" option selected.

Support Structures:

The "Canopy" part of this aircraft requires support structures and it's recommended to use your slicer's auto-generated support tructures. The GCode and the Simplify3D FactoryFiles already have the support structures in place.





Elephant's Foot:

Try to avoid the first few layers of each print from squishing too far outside the designed wall dimensions, also known as "elephant's foot". This can be caused by your nozzle being too close to the print bed or first layer width set too high in your slicer. A small amount of elephant's foot is okay but too much will interfere with the designed alignment aids.

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Step-by-Step Build Guide (cont'd)

Step 2. Fuselage + Stabilizers Assembly

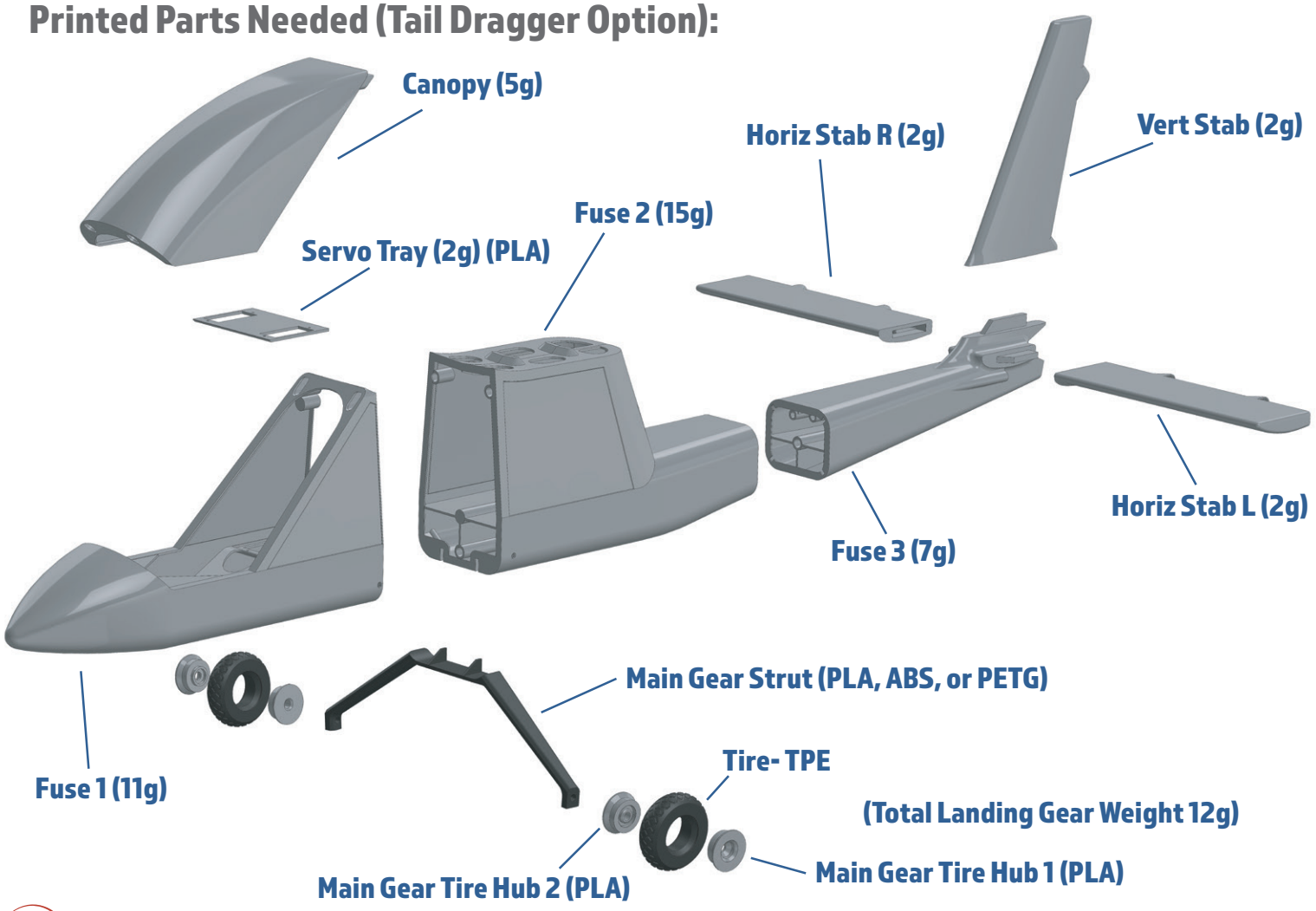
Tools and Materials Needed:

- Medium Bodied CA/Super Glue
- Accelerator for CA
- Sandpaper and/or Small Files
- Needle Nose Pliers for bending nose gear wire

Hardware Needed (links to recommended hardware on pg 4):

- 5mm O.D x 3mm Thick Rare Earth Magnets for Removable Canopy
- M3 x 0.5mm Thread x 15mm Long Screws for Wheels (nylon preferred)
- 3mm O.D. x 400mm Long Carbon Fiber Tube or Rod for fuselage cut to these lengths:
  - 190mm Long (x2)
- 3mm O.D. (or 1/8" O.D) x 10mm Long Dowel Pins (cut from leftover carbon tube/rod)

Printed Parts Needed (Tail Dragger Option):



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Step-by-Step Build Guide (cont'd)

For easier take offs and landings you have the option to setup the Micro SportCam in a tricycle gear configuration. In addition to the materials, tools, and printed parts shown on page 8, you will need:

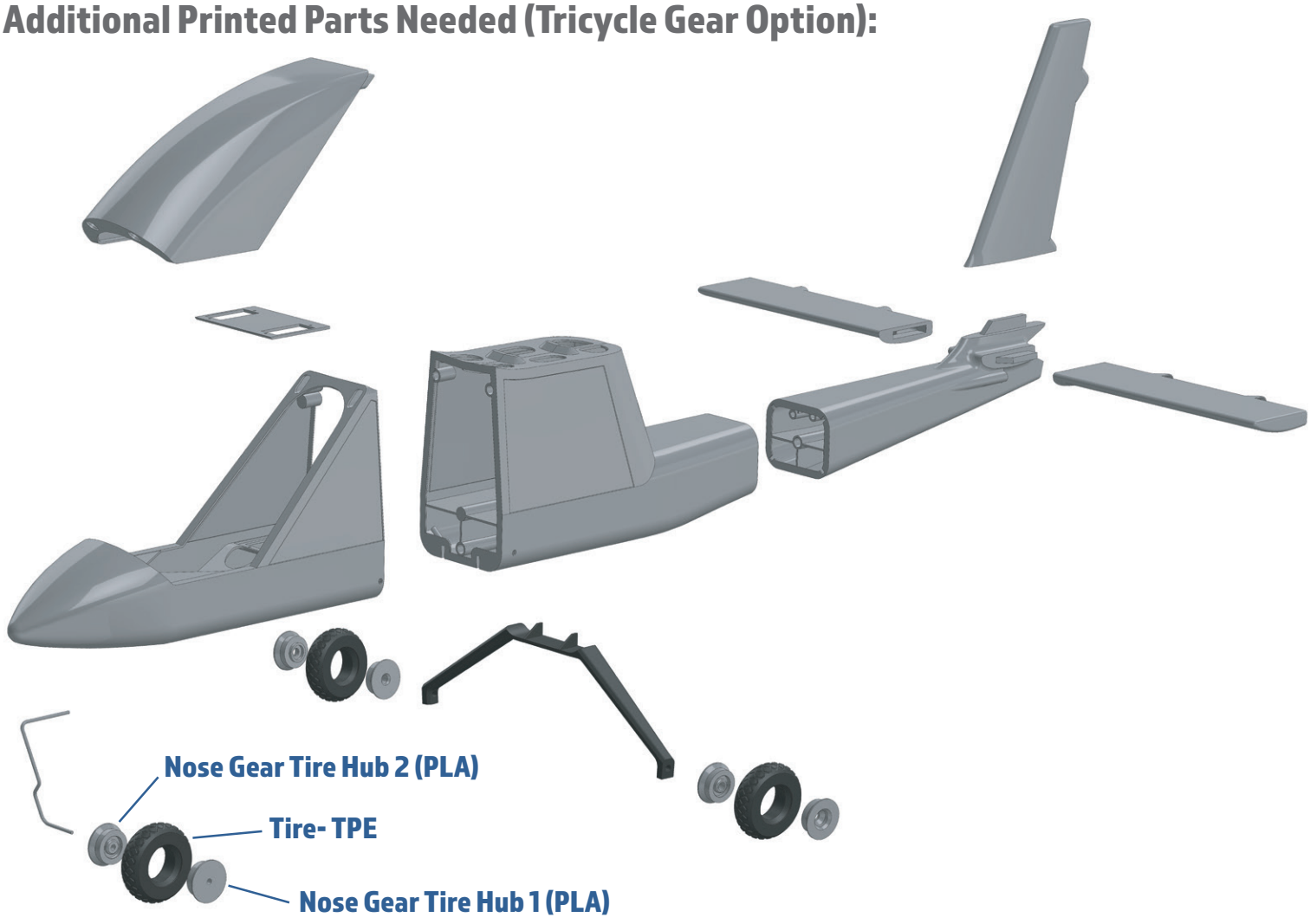
Additional Tools and Materials Needed:

- Needle Nose Pliers for bending nose gear wire
- Heat gun for heat shrink tube

Additional Hardware Needed (links to recommended hardware on pg 4):

- 1 - 1.2mm diameter steel wire for nose gear
- Heat shrink tube or small wheel collar to hold nose gear in place

Additional Printed Parts Needed (Tricycle Gear Option):



Step-by-Step Build Guide (cont'd)

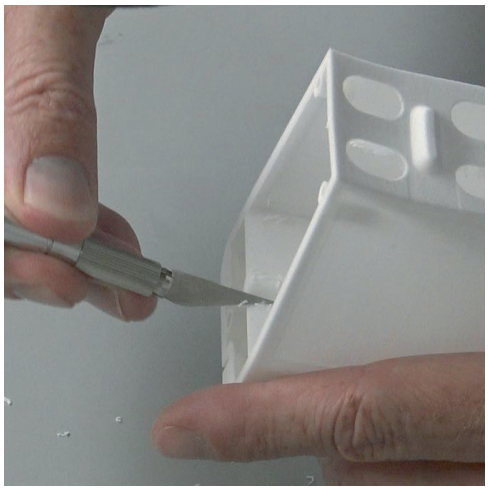
Step 2.1 Cut 3mm O.D. Carbon Fiber Tubes to Length

Using a rotary tool (Dremel), miter saw, or hand saw, cut your 3mm carbon fiber fuselage tubes and dowel pins to the proper lengths. You will need:

Qty. 2 190mm long
Qty. 2 10mm long

Step 2.2 Cut or Sand Away Any Stringing

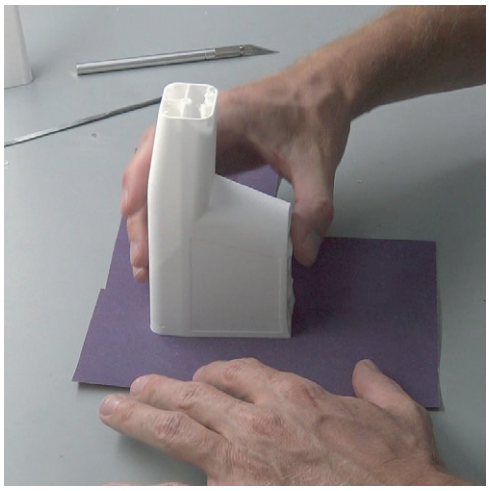
When printing with LW-PLA you will likely have some residual stringing. Inspect all of the printed parts for stringing and use sand paper, a small file or a hobby knife to eliminate the stringing, especially in areas where parts will mate. You will find most of the stringing comes off quite easily.

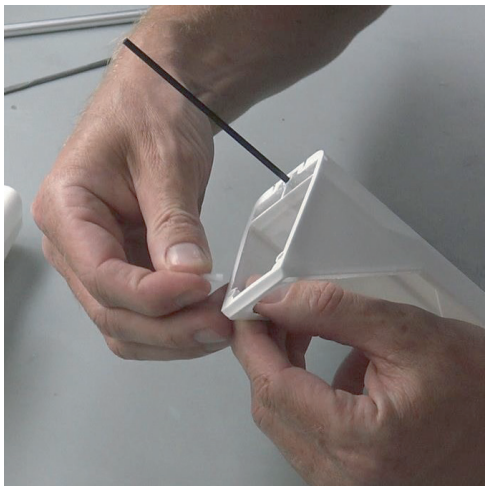
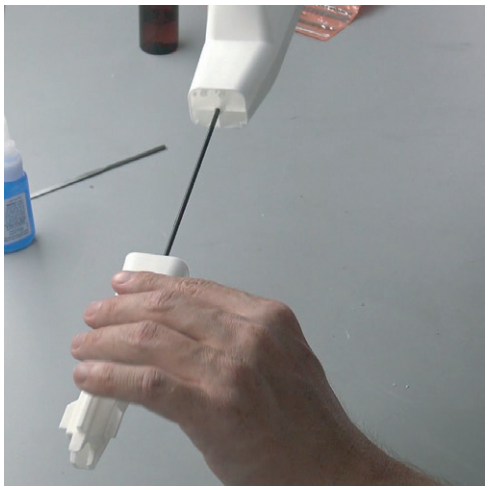


Step 2.3 Glue Fuselage Parts Together

ASSEMBLY TIP: We recommend sanding all mating faces with either 220 grit sandpaper or a small, flat file to ensure a flat surface and to give the CA glue some "grit" to adhere to. This provides a very strong bond.

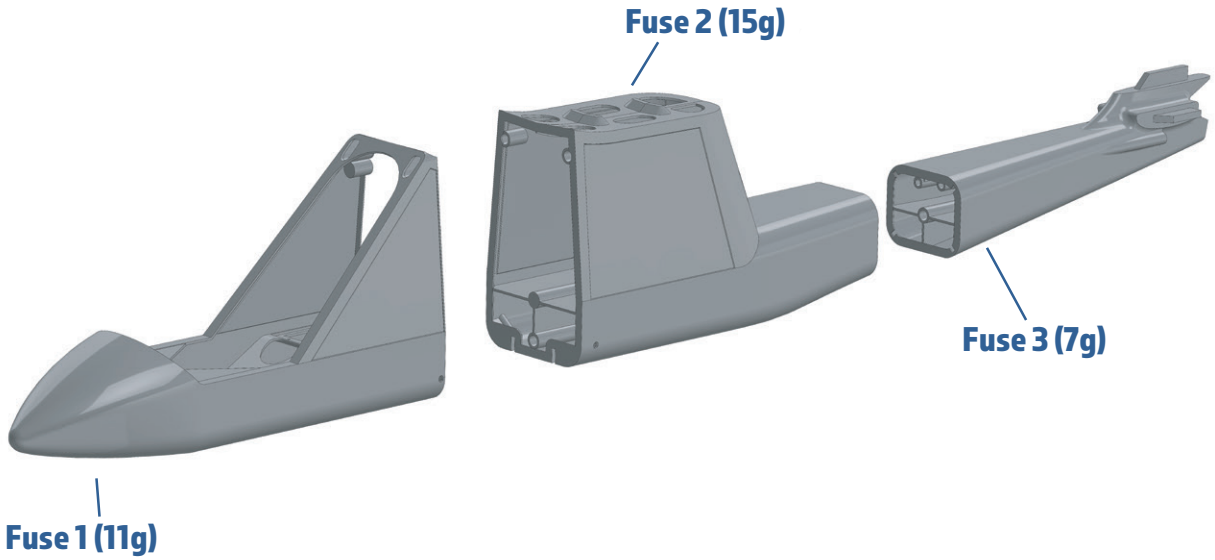
2.3.1 Insert one of the 3mm diameter x 190mm long carbon fiber tubes and the two 3mm diameter x 10mm long dowel pins into Fuse 1. Insert the second 3mm diameter x 190mm long carbon fiber tube into Fuse 3.

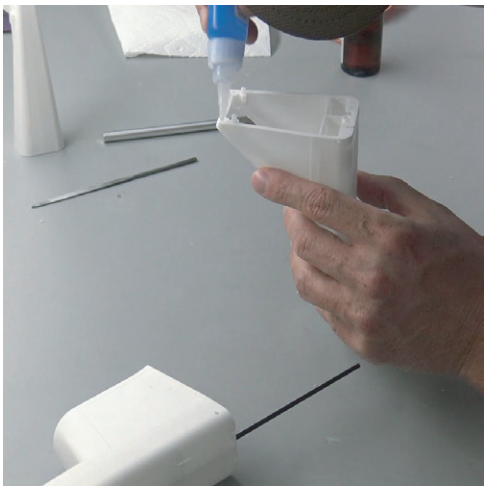


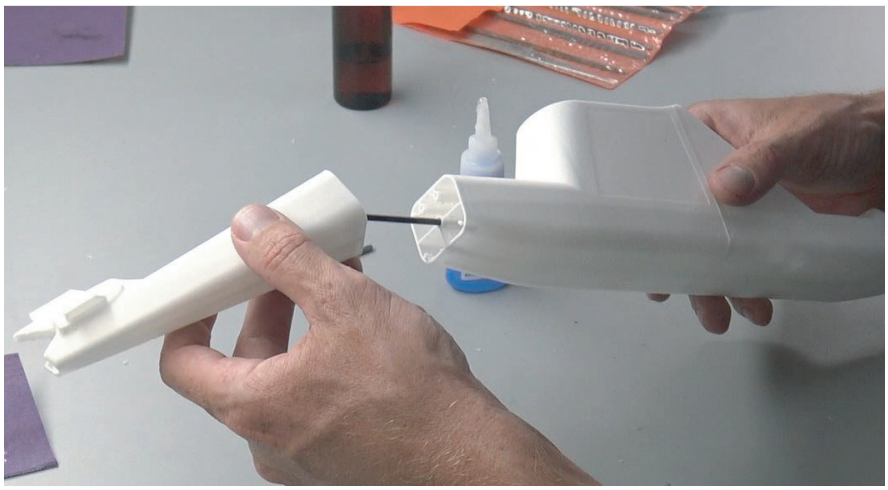



Step-by-Step Build Guide (cont'd)

2.3.2 Glue parts Fuse 1 - Fuse 3 together using CA glue. Spray accelerator on the joint to speed curing of the CA glue. The built in alingment tabs will keep all parts well aligned. **NOTE: Because of the stringing of LW-PLA you may need to clean up the alignmet tabs and alignment holes with a hobby knife**



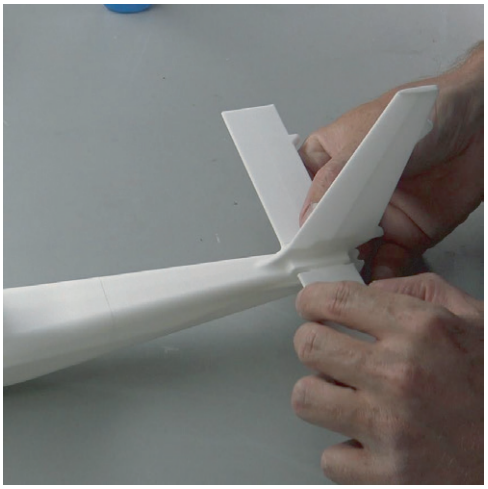


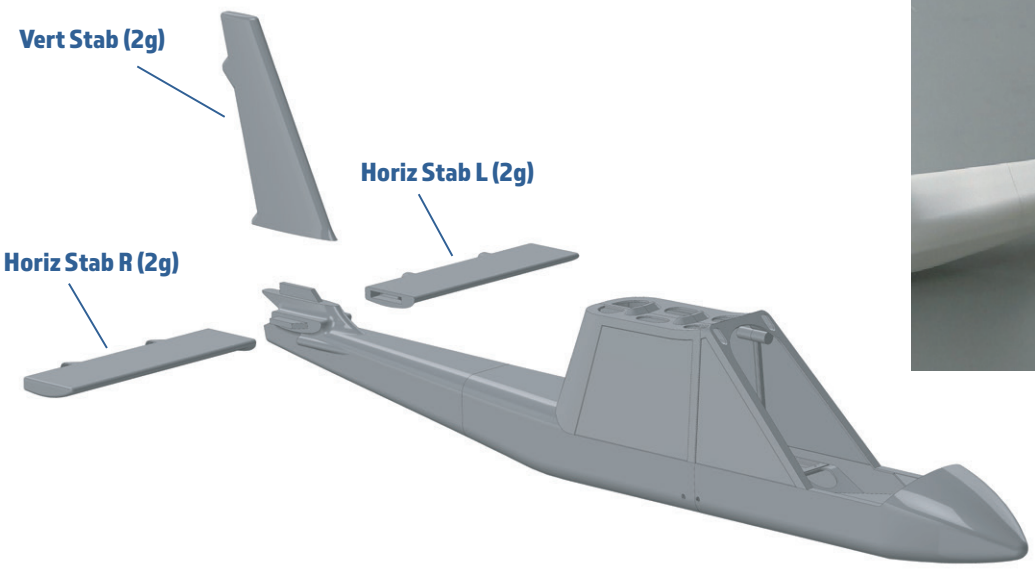


Step-by-Step Build Guide (cont'd)

2.3.3 Using a hot knife, follow the molded in line/guide to cut away the sacrificial support located in the front of the fuselage.

2.3.4 Prior to gluing the Stab parts on the fuselage you may want to drill out the holes for the hinge rod. We used a 1mm hinge rod so we drilled out with a 1.2mm drill bit.

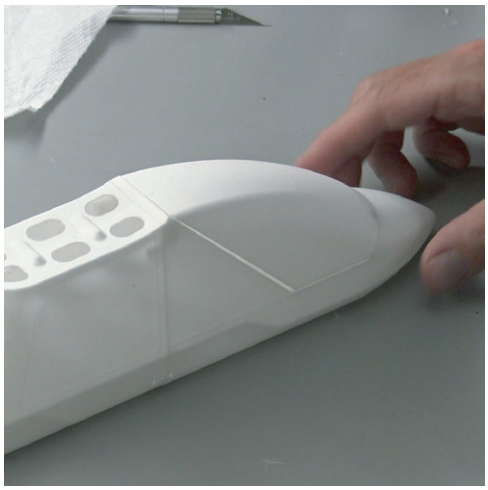




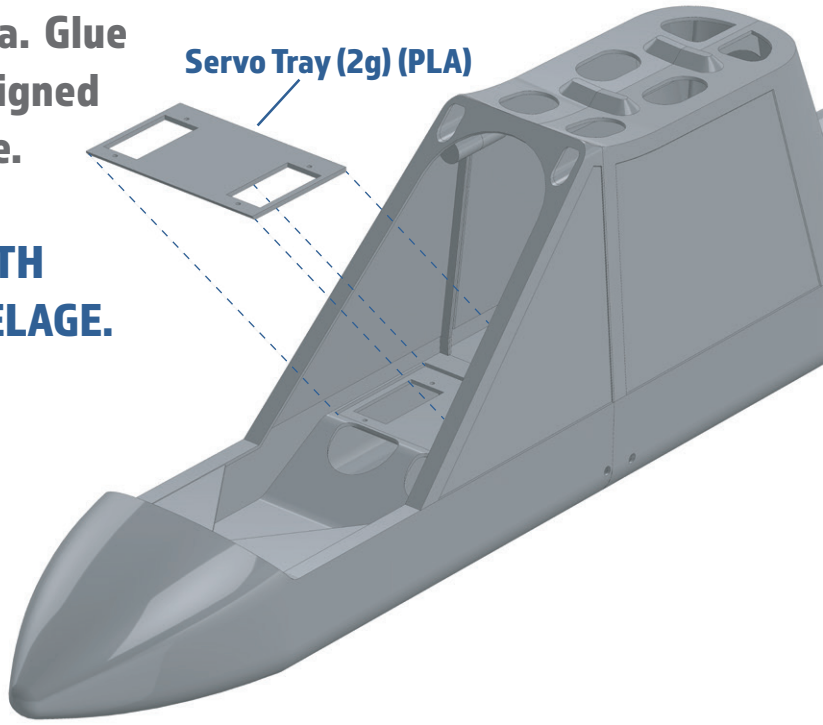
2.3.5 Glue parts Vert Stab, Horiz Stab R, and Horiz Stab L using CA glue. Ensure the Vert Stab is as close to vertical as possible, and the Horiz Stab is as perpendicular as possible before spraying the joints with accelerator.

Step-by-Step Build Guide (cont'd)

2.3.6 The canopy is held in place with 5mm O.D. x 3mm thick rare earth magnets. Apply a drop of glue into each magnet recess in the Canopy part and pop in your magnet. The mating magnets can then be glued into the magnet recesses in part Fuse 1. **BE EXTRA CAREFUL TO GLUE THESE MAGNETS IN THE PROPER ORIENTATION SO AS TO ATTRACT AND NOT REPELL THE MATING MAGNET.**



2.3.7 A seperate Servo Tray part is required to stiffen up the servo mounting area. Glue the Servo Tray into the recess designed into the servo area of the fuselage. **BE EXTRA CAREFUL TO ALIGN THE SERVO CUTOUTS ON THE TRAY WITH THE SERVO CUTOUTS IN THE FUSELAGE.**



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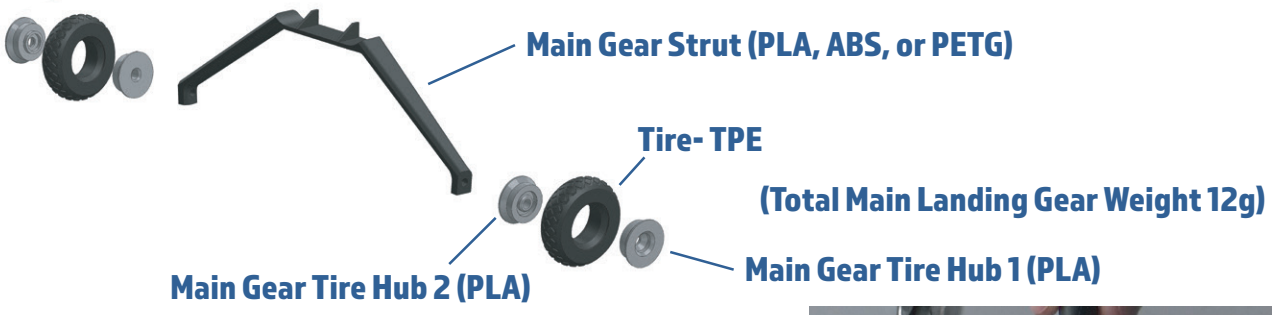
Step-by-Step Build Guide (cont'd)

Step 2.4 Assemble Your Preferred Landing Gear

You have the option to setup the Micro SportCam in a taildragger configuration or a tricycle gear configuration. Here are some important notes about the landing gear:

1. **The Main Gear Strut is the same for both configurations. It will just be glued into a different location on the fuselage depending on which configuration you choose.**
2. **The TPE Tire is the same for the main gear and the nose gear, but you also have the option of a larger diameter Bush Wheel for the taildragger configuration.**
3. **The nose gear uses different Tire Hub parts which have a smaller diamater through hole for the nose gear wire.**

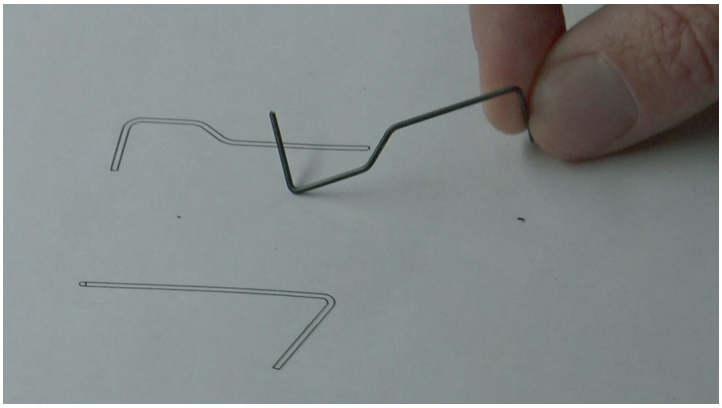
2.4.1 Main Gear Tire Hub 1 and Main Gear Tire Hub 2 are designed to be inserted into each open side of the Tire-TPE component. Insert Main Gear Tire Hub 1 into one side of the TPE Tire, apply a small amount of CA glue to the mating face of the hub and insert Main Gear Tire Hub 2 into the other side of the TPE Tire.



2.4.2 Main Gear Tire Hub 1 has a recess in it for the M3 x 0.5mm Thread x 15mm long screws. Insert a screw into each tire and screw them into the hole in the Main Gear Strut. Make sure you do not over-tighten the screw so the tires can turn freely. Apply a drop of CA glue and accelerator where the screw exits the inside of the Main Gear Strut.

Step-by-Step Build Guide (cont'd)

2.4.3 If you choose the tricycle gear configuration, print out the drawing of the nose gear wire located on the following page to aid in bending a 1mm - 1.2mm diameter steel wire to the proper shape.



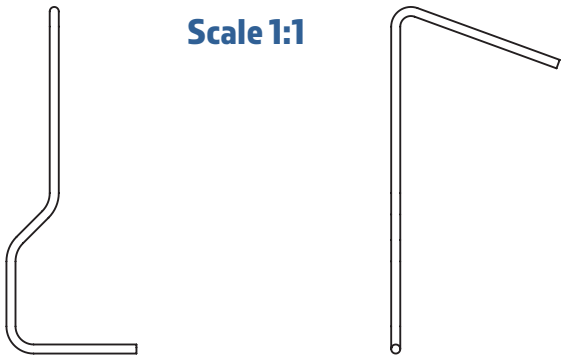
2.4.4 Nose Gear Tire Hub 1 and Nose Gear Tire Hub 2 are designed to be inserted into each open side of the Tire-TPE component. Insert Nose Gear Tire Hub 1 into one side of the TPE Tire, apply a small amount of CA glue to the mating face of the hub and insert Nose Gear Tire Hub 2 into the other side of the TPE Tire.

2.4.5 Slide the Nose Gear Tire assembly onto the nose gear wire and hold it in place with a small wheel collar, or use a heat gun to shrink a small piece of heat shrink tubing on the tip of the wire.

Set the landing gear aside - it will be attached to the model in a later step during final assembly.

Nose Gear
1mm - 1.2mm Diameter Wire

Scale 1:1



Front View **Side View**

Step-by-Step Build Guide (cont'd)

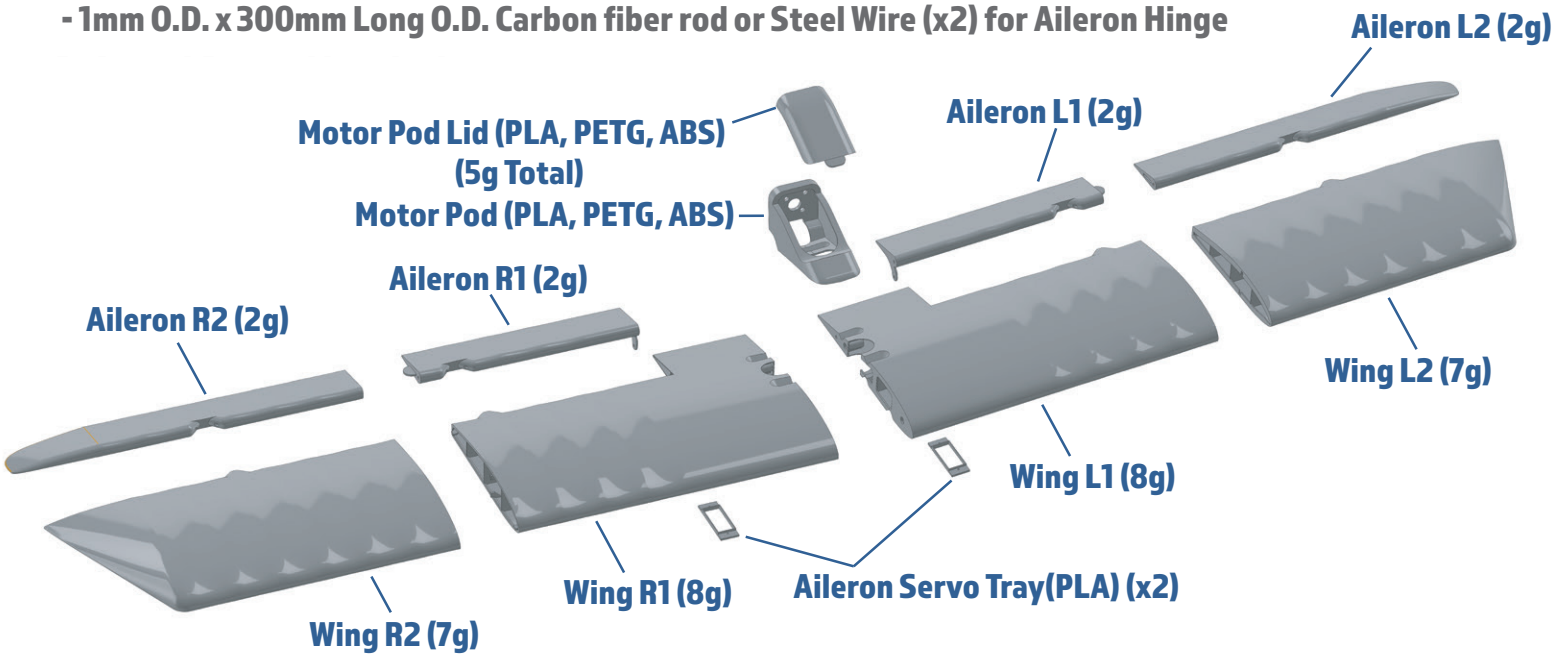
Step 3. Wing + Aileron Assembly

Tools and Materials Needed:

- Medium Bodied CA/Super Glue
- Accelerator for CA
- Sandpaper and/or Small Files

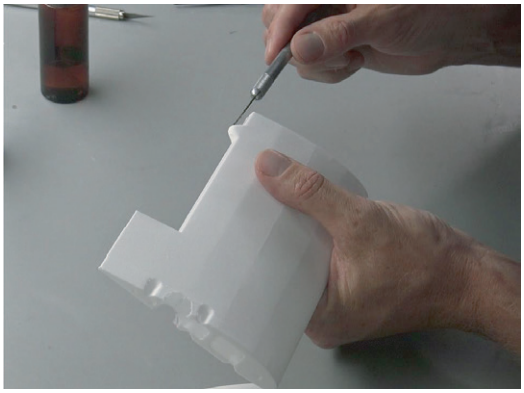
Hardware Needed (links to recommended hardware on pg 4):

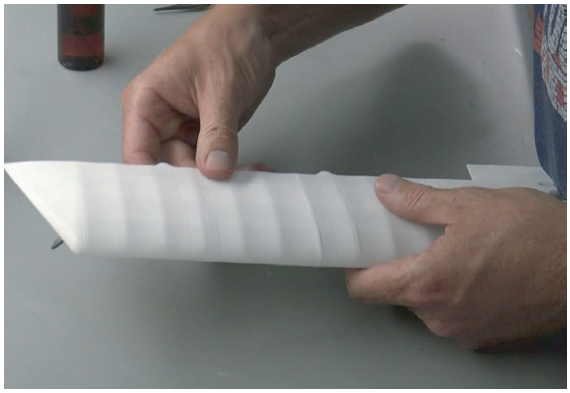
- 3mm O.D. (or 1/8" O.D) x 10mm Long Dowel Pins (cut from leftover carbon tube/rod) (x2)
- 1mm O.D. x 300mm Long O.D. Carbon fiber rod or Steel Wire (x2) for Aileron Hinge



Step 3.1 Glue The Wing Parts Together

3.1.1 Prior to gluing the parts together you may need to clear out the hinge holes with a small drill bit. Glue parts Wing R1 and Wing R2 together using CA glue. Spray accelerator on the joint to speed curing of the CA glue. The built in alingment tabs will keep all parts well aligned.





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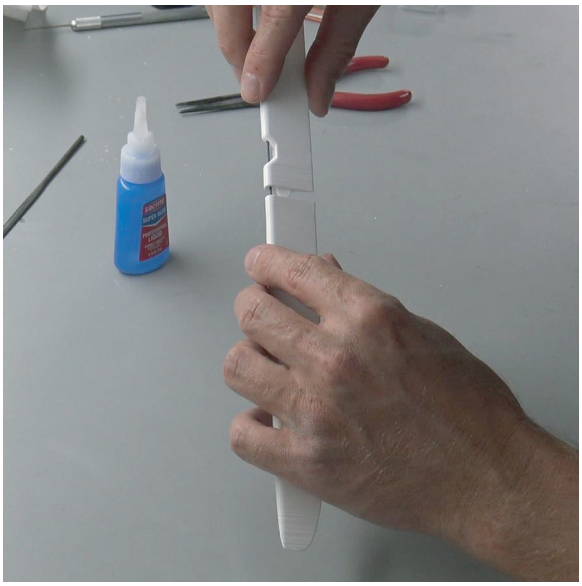
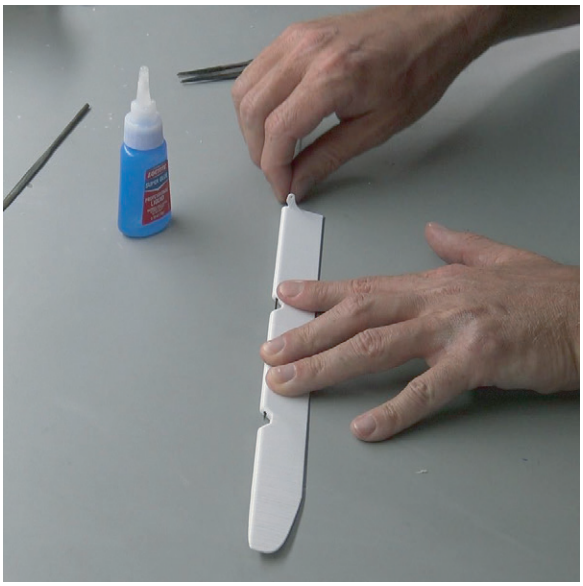
Step-by-Step Build Guide (cont'd)

DO NOT GLUE THE WING HALVES TOGETHER YET. THE AILERONS MUST BE ATTACHED FIRST.

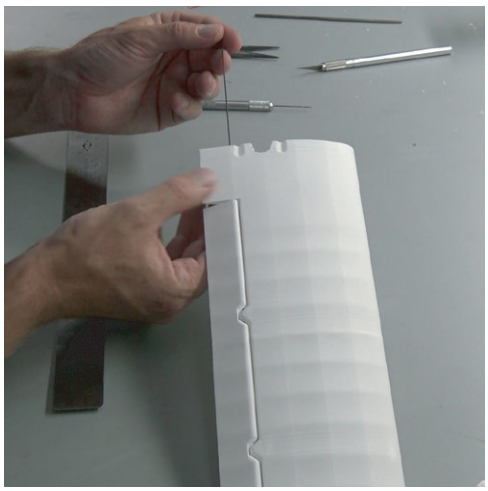
3.1.2 Prior to gluing parts Aileron R1 and Aileron R2 together, use the 1mm O.D. carbon fiber rod or steel rod to make sure it slides freely in the hinge hole. Then glue the two aileron parts together using the carbon fiber rod and the built in alignment aid to keep the two parts aligned. Laying the parts upside down on a flat surface while gluing helps keep them aligned as well.

BE VERY CARFEUL NOT TO GLUE THE 1mm O.D. CARBON FIBER ROD PERMANENTLY IN PLACE



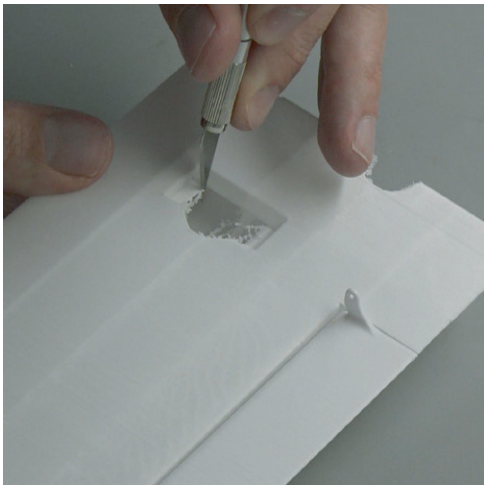
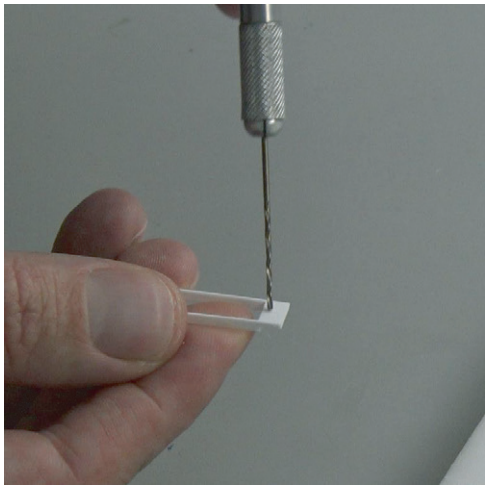
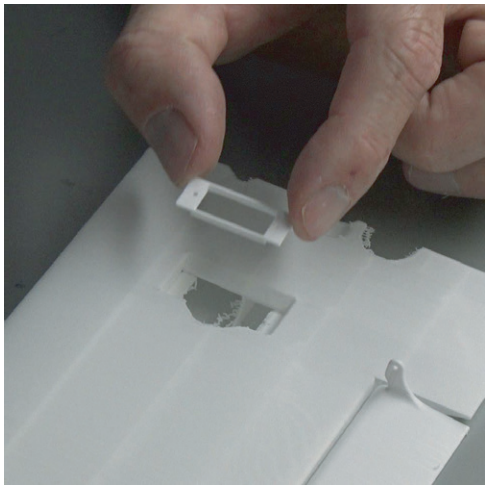


3.1.3 Holding Aileron R in place in the wing, route the 1mm O.D. carbon fiber rod through the entry hole at the root of Wing R, through the aileron and wing hinge holes, until the rod is fully inserted. Ensure the aileron moves freely.



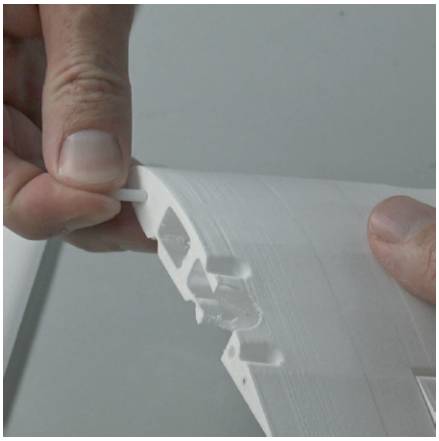
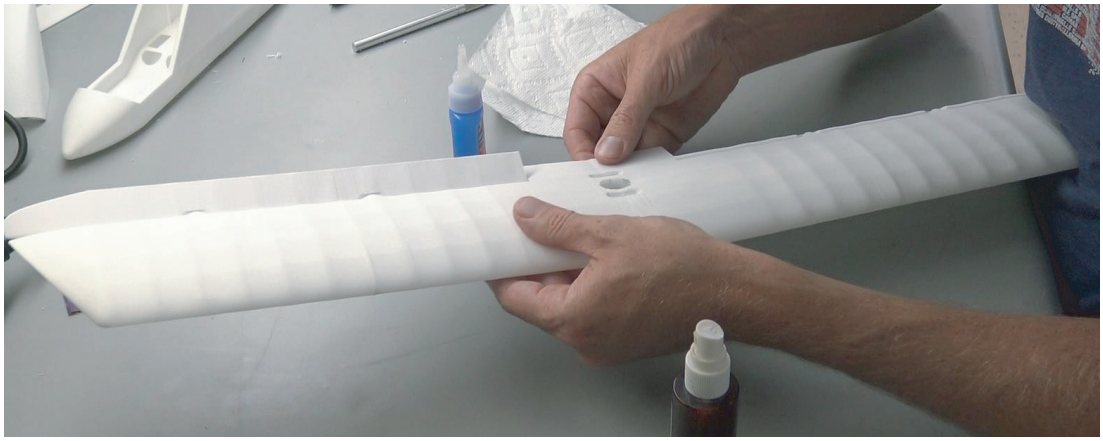
Step-by-Step Build Guide (cont'd)

3.1.4 Use a sharp hobby knife to clear out any stringing or debri from the servo opening and glue the PLA Aileron Servo Tray in place with CA glue. You may want to drill out the servo mounting holes with a 1.2mm drill bit prior to gluing.

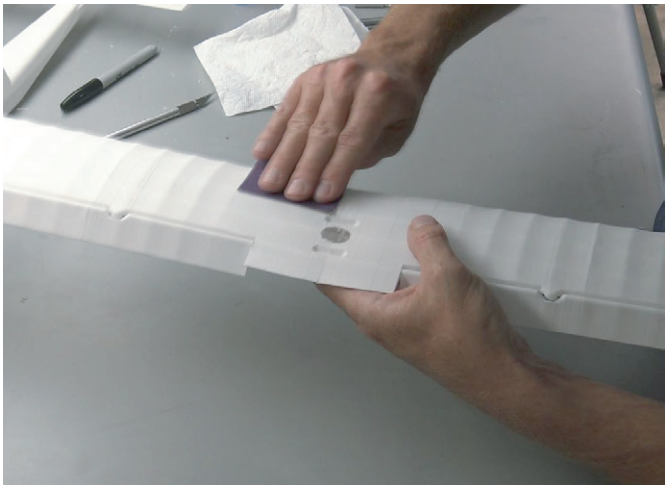
3.1.5 Repeat the previous 4 steps for the left wing using parts Wing L1, Wing L2. Aileron L1, Aileron L2, and another Aileron Servo Tray.

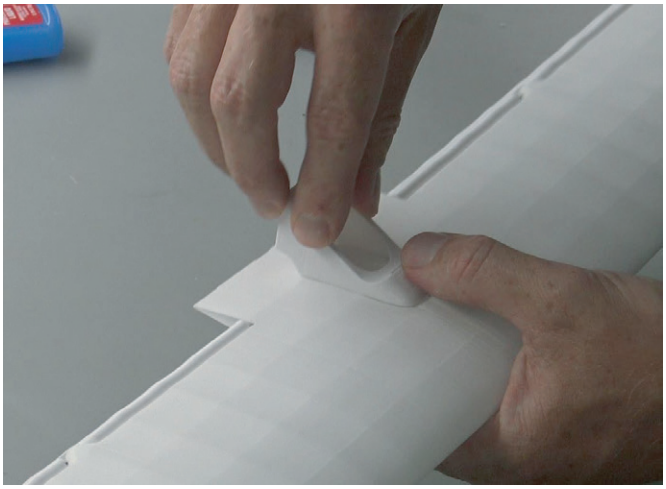
3.1.6 Now that both ailerons are installed, glue the Right Wing and Left Wing together with CA glue, using the 3mm diameter x 10mm long dowel pins to align the wings.

Step-by-Step Build Guide (cont'd)

3.1.7 Sand or file the joint around the wing root to eliminate any elephant's foot. This will ensure a smooth surface for gluing the motor pod to the wing. Glue the Motor Pod onto the wing assembly. **DO NOT GLUE THE MOTOR POD LID IN PLACE. THE LID IS DESIGNED TO SNAP INTO PLACE AND IS REMOVABLE.**





Step 4. Elevator and Rudder Assembly

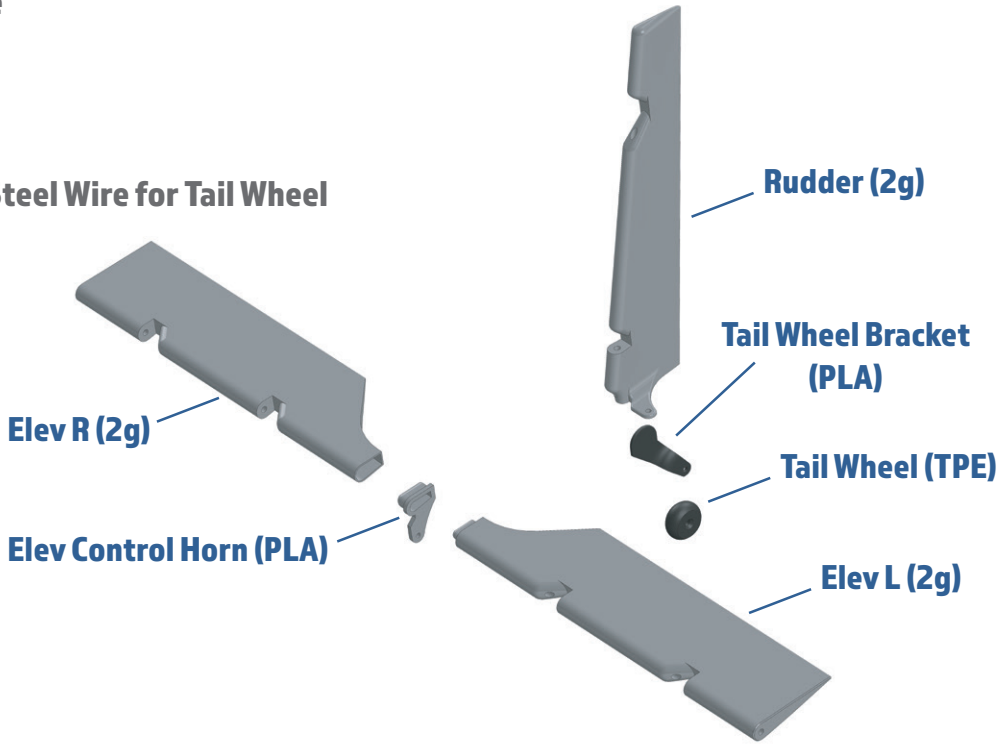
Tools and Materials Needed:

- Medium Bodied CA/Super Glue
- Accelerator for CA
- Sandpaper and/or Small Files

Hardware Needed:

- 1mm O.D. Carbon fiber rod or Steel Wire for Tail Wheel

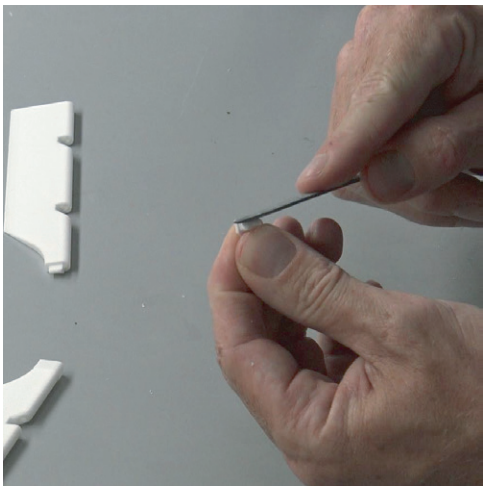
Printed Parts Needed:

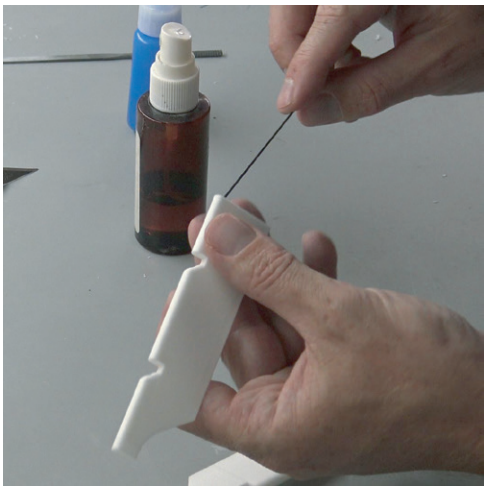


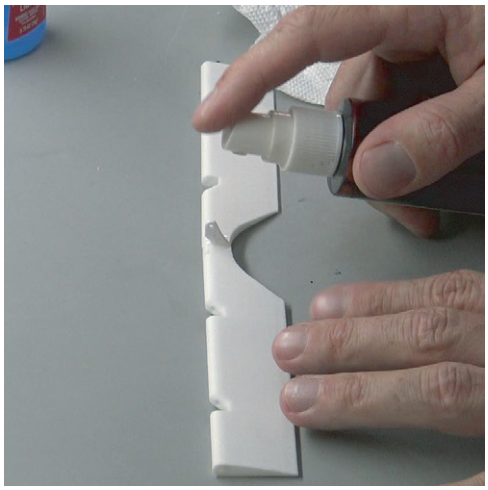
Step-by-Step Build Guide (cont'd)

Step 4.1 Elevator Assembly

Prior to gluing parts Elev R, Elev Control Horn, and Elev L together, use the 1mm O.D. carbon fiber rod or steel rod to make sure it slides freely in the hinge holes. Then glue the thee elevator parts together. The parts will self-align, but laying the parts upside down on a flat surface while gluing helps keep them aligned. **You may need to sand or file the PLA Elev Control Horn part a bit to ensure it fully seats into the two Elev parts.**

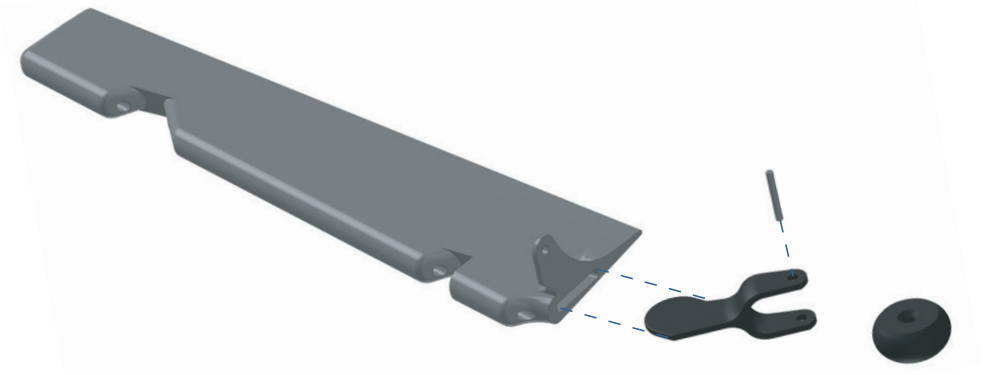






Step 4.2 Rudder/Tail Wheel Assembly

If you choose to setup your Micro SportCam as a taildragger, glue the Tailwheel Bracket into the groove in the bottom of the rudder with CA.
Insert a scrap piece of 1mm O.D. carbon fiber or steel rod as the axle for the tailwheel assembly. Trim to fit and add a small drop of CA glue on each side of the axle to fix it in place. **BE VERY CARFEUL NOT TO GLUE THE TIRE IN PLACE**

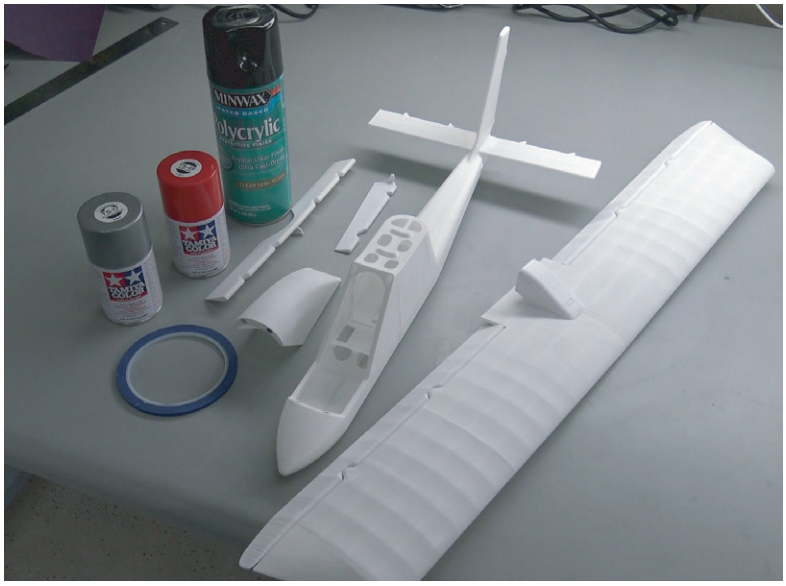


Step-by-Step Build Guide (cont'd)

Step 5. Painting/Finishing LW-PLA (Optional)

Tools and Materials Needed:

- 220 Grit and 400 Grit Sandpaper
- Isopropyl Alcohol/Rubbing Alcohol
- Oil-based or Water-based Polyurethane Spray
- Spray Paint Colors of your choice (we love Tamiya spray paints) or use an airbrush system.
- Pinstripe tape, masking tape, and plastic wrap for masking off parts
- Flexible steel wire for hanging parts while painting and drying
- Paper towels or lint free cloth



Step 5.1 Sanding

5.1.1 Sand all of the parts with 220 grit sandpaper to remove the larger imperfections. Then sand the parts with 400 grit sandpaper to further smooth the parts.

5.1.2 Lightly wipe down all parts with isopropyl alcohol to remove any residual dust from sanding.

Step-by-Step Build Guide (cont'd)

Step 5.2 Sealing/Clear Coat

5.2.1 Spray the Fuselage, Canopy, Wing, Elevator, and Rudder with the polyurethane spray. This helps fill some small gaps, it helps tape and decals stick to the parts better, and it slightly stiffens the LW-PLA parts.

5.2.2 Let the parts dry per the polyurethane manufacturer's instructions.

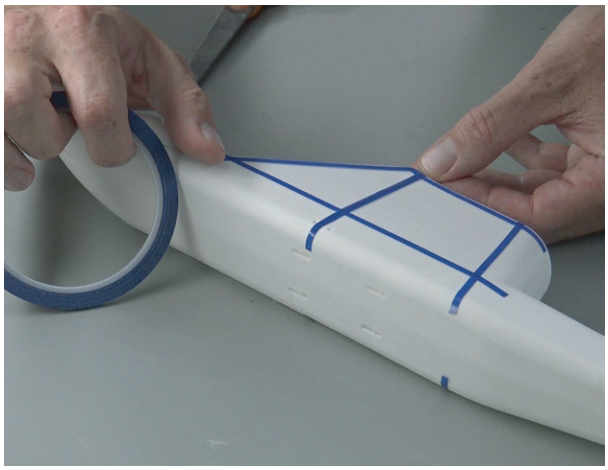
Step 5.3 Masking/Painting/Final Clearcoat

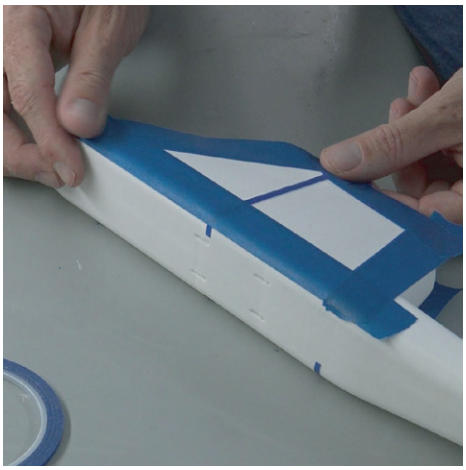
Use different types of tape to layout the paint design and block the paint from getting in the undesired areas.

5.3.1 Mask the fine detail parts, such as the window areas, and any curved areas with a flexible pinstripe tape. We used 3mm or 1/8" wide pinstripe tape.

5.3.2 Mask off larger areas with standard masking/painter's tape

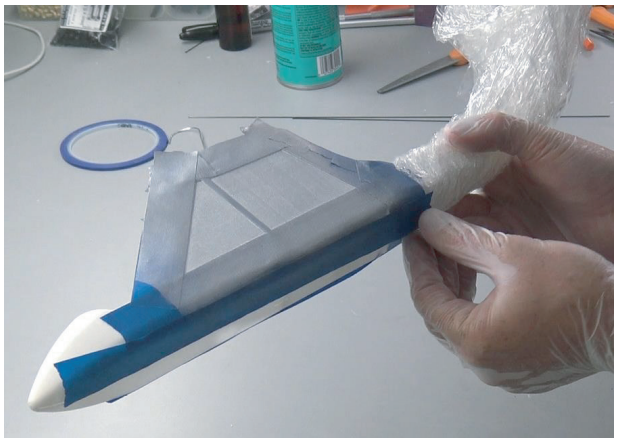
5.3.3 Mask off the largest areas with kitchen plastic wrap or newspaper

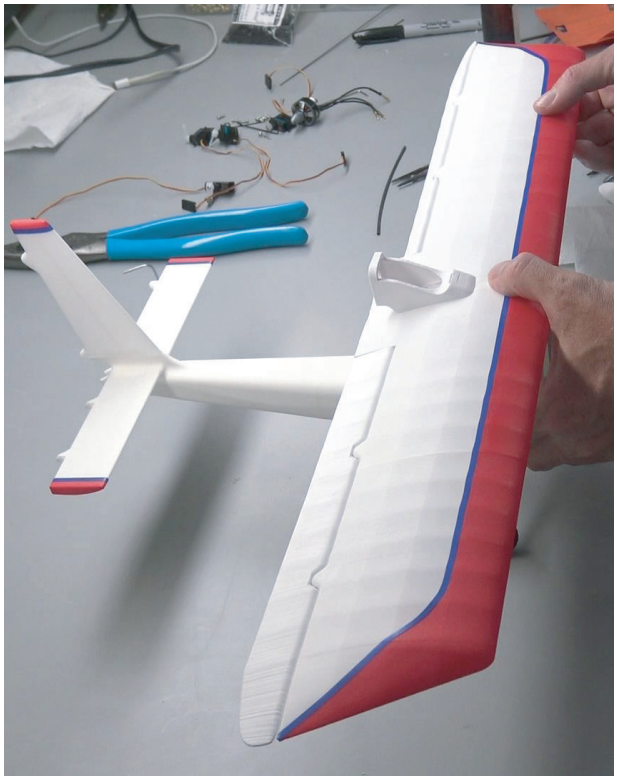




Step-by-Step Build Guide (cont'd)

5.3.4 Spray paint with your color choices in light coats. Start the spray off of the part and wave the spray across your part with the nozzle 8 - 10 inches away from the part. Spray multiple light coats until you acheive full coverage. Avoid overspraying to minimize the risk of getting runny paint.





5.3.5 After applying your color spray you can apply custom decals or pinstriping. In my case, I used the same blue pinstriping tape to give the design clean lines and another pop of color.

After applying decals, give the model a final light clear coat with a clear spray paint or you can use the same clear polyurethane from step 5.2.1

Step-by-Step Build Guide (cont'd)

Step 6. Final Assembly

Tools and Materials Needed:

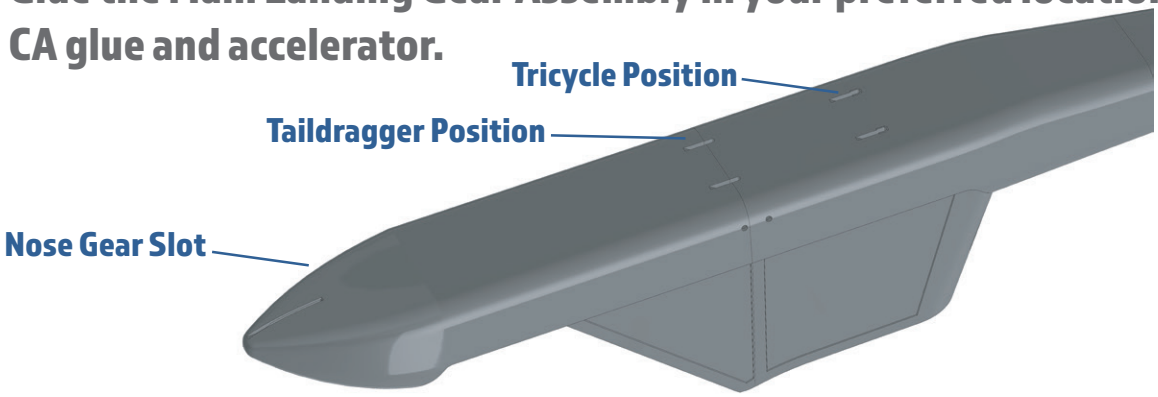
- Medium Bodied CA/Super Glue
- Accelerator for CA
- Needle Nose Pliers

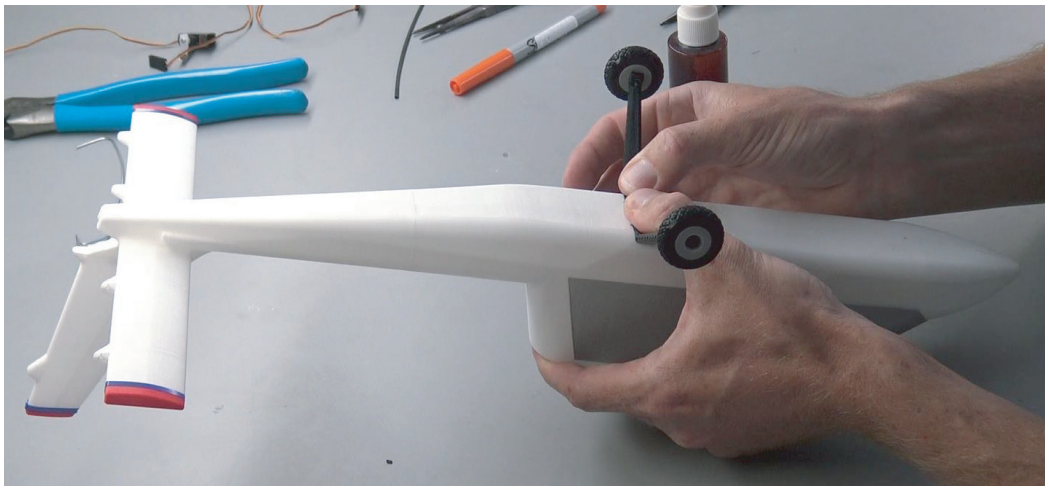
Hardware Needed (links to recommended hardware on pg 4):

- 1mm O.D. x 240mm Long Carbon Fiber Rod for Wing Struts (x4)
- 1mm O.D. x 230mm Long for Elevator Hinge
- 1mm O.D. x 100mm Long for Rudder Hinge
- 0.8mm - 1.2mm steel wire for servo control rods

Step 6.1 Install Landing Gear

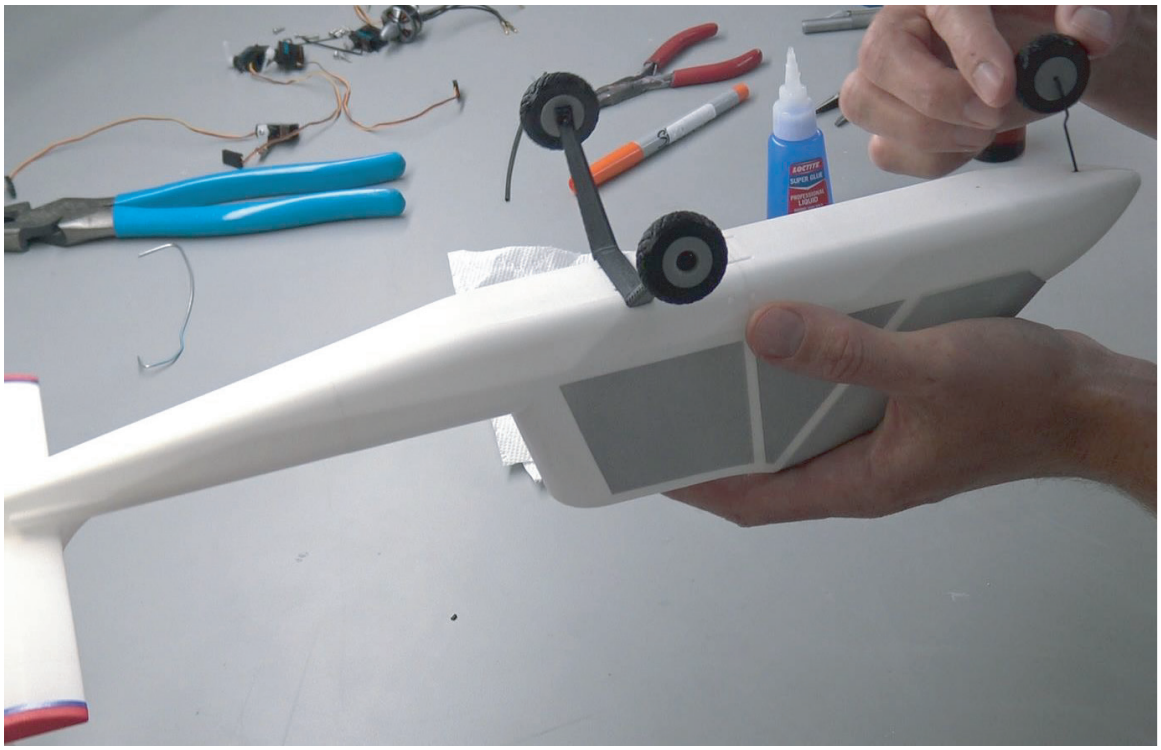
6.1.1 You will see two sets of slots in the bottom of the fuselage for the Main Landing Gear assembly. The forward slots are for the taildragger configuration and the rear slots are for the tricycle gear configuration. Glue the Main Landing Gear Assembly in your preferred location using CA glue and accelerator.

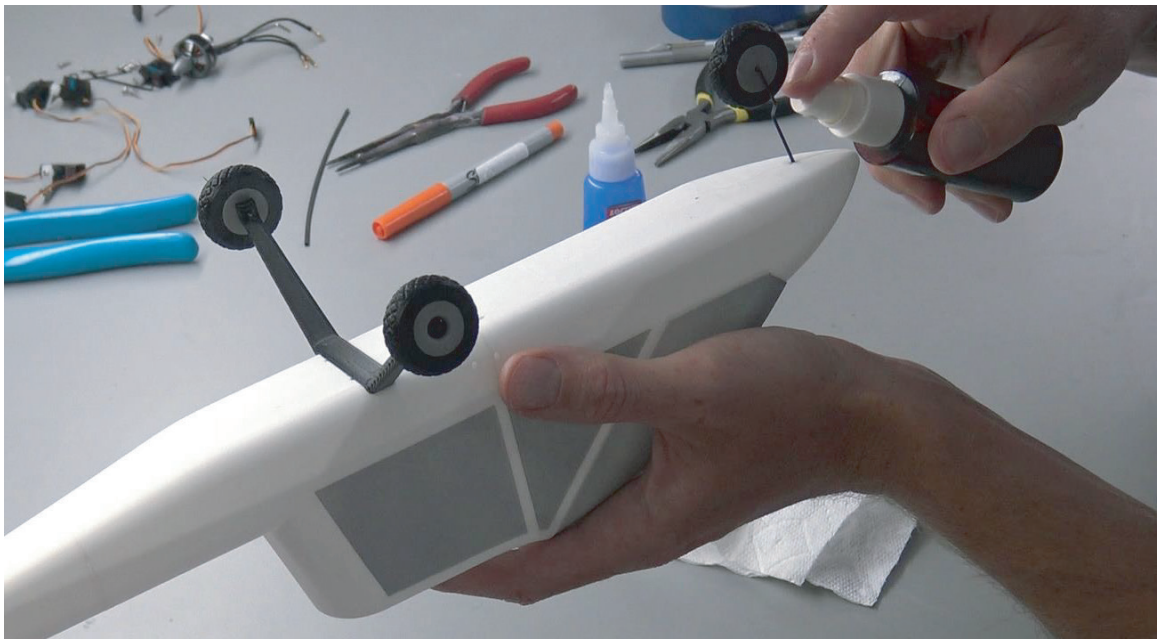




Step-by-Step Build Guide (cont'd)

6.1.2 If you have chosen the tricycle gear configuration, insert the Nose Gear assembly into the slot in the nose of the fuselage. Ensure the wire fully seats into the slot before applying CA into the slot to glue the Nose gear in place.

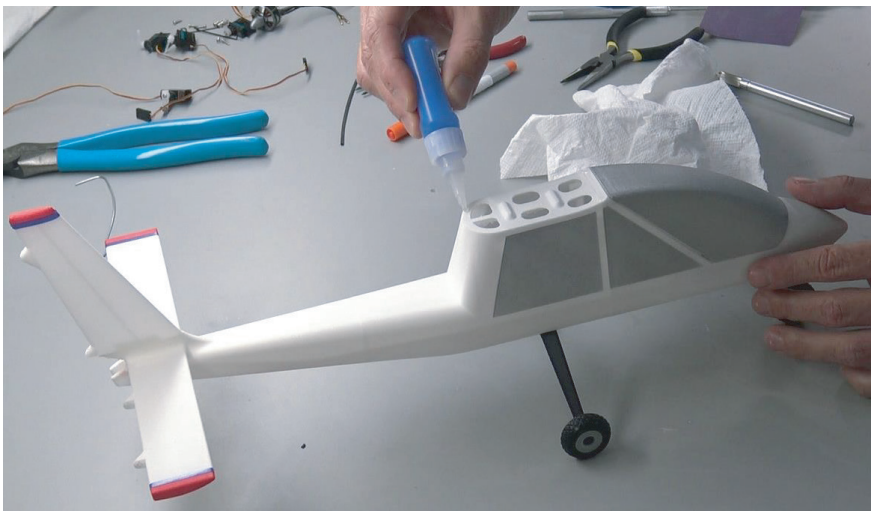


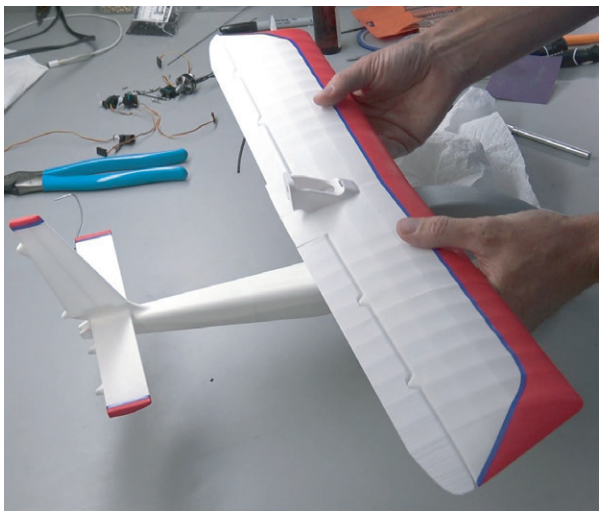


Step-by-Step Build Guide (cont'd)

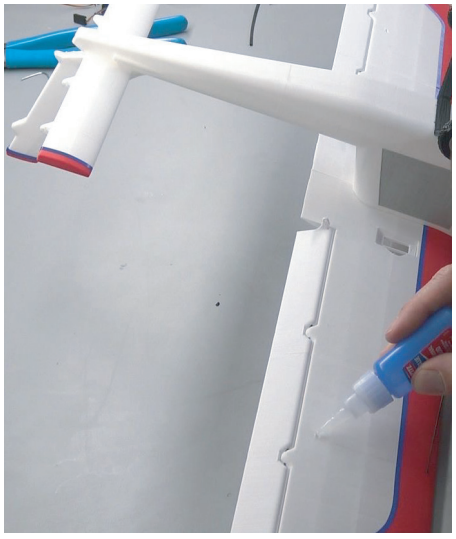
Step 6.2 Glue Wing and Wing Struts

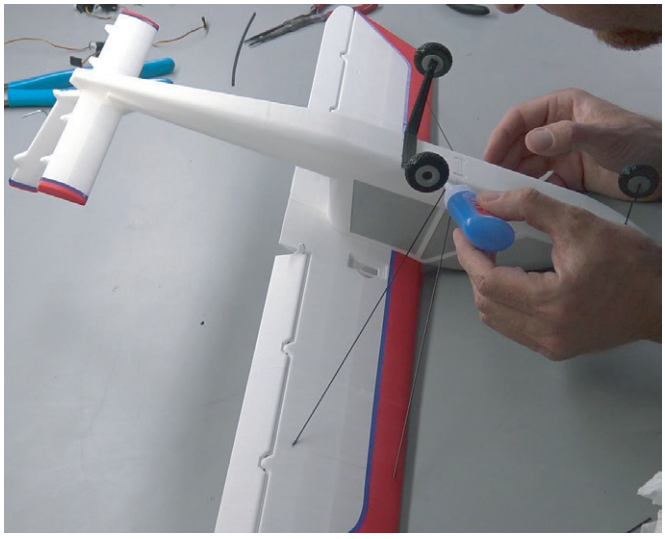
6.2.1 Apply CA glue to the wing attachment area on the top of fuselage and glue the main wing into place. There are built in alignment aids to keep the parts aligned but you may still have a bit of wiggle room. Ensure your wing is mounted parallel to the horizontal stabilizer.





6.2.2 Glue the 1mm O.D. x 240mm Long Carbon Fiber Rods in the wing strut areas. You may need to clear out the wing strut holes with a drill bit prior to gluing. The wing struts do stiffen the wings significantly so it is advised to not skip this step.

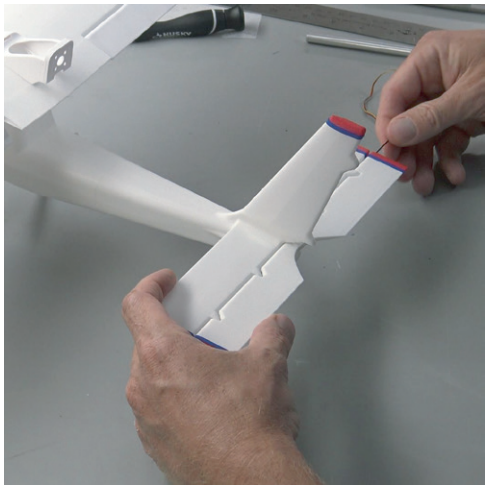




Step 6.3 Install Elevator and Rudder

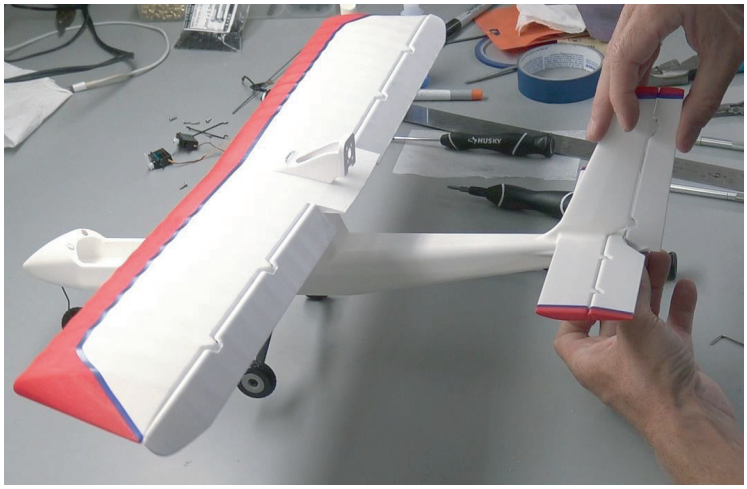
6.3.1 The elevator and rudder must be installed with the control rods in place. Put a Z-bend in one end of each control rod.

6.3.2 Route the Elevator control rod through the routing tube in the rear of the fuselage.



6.3.3 Attach the elevator control rod z-bend into the elevator control horn, hold the Elevator in place on the Horizontal Stab and permanently attach the Elevator with the 1mm O.D. x 230mm long carbon fiber rod.

6.3.4 Repeat the previous steps for the rudder, using a 1mm O.D. x 100mm long carbon fiber rod for the hinge.



Step-by-Step Build Guide (cont'd)

Step 7. Final Radio and Motor Installation

Tools and Materials Needed:

- Screwdriver for servo mounting screws and servo control horn
- Allen wrench for control rod connectors
- Needle nose pliers
- Velcro strips with adhesive backing

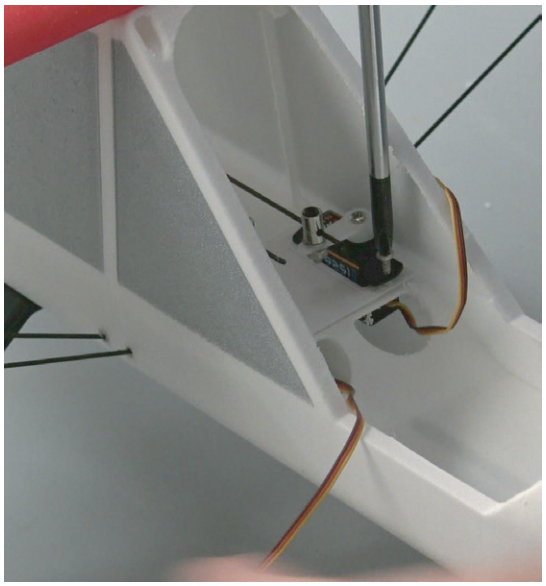
Hardware/Electronics Needed (links to recommended hardware on pg 4):

- 0.8mm - 1.2mm steel wire for aileron servo control rods
- Servo control rod connectors (x2)
- Motor: EMAX MT1806 - 2280KV
- ESC: 12A - 20A Esc
- Rec. Prop: APC 4.75x4.75 Electric Pusher
- Battery: 2S 650mAh LiPo or 3S 450 - 650 mAh
- Radio: Radio + 5 Channel Reciever
- Servos: EMAX ES9251ii (2.5g) Digital Servo or equivalent 18.02x7.91x16.8mm size servo (x4)

Step 7.1 Install Servos

7.1.1 Using the mounting screws that came with your servos, mount the rudder and elevator servos in the fuselage servo tray.

Note: It is recommended to test and center the servos prior to installation.

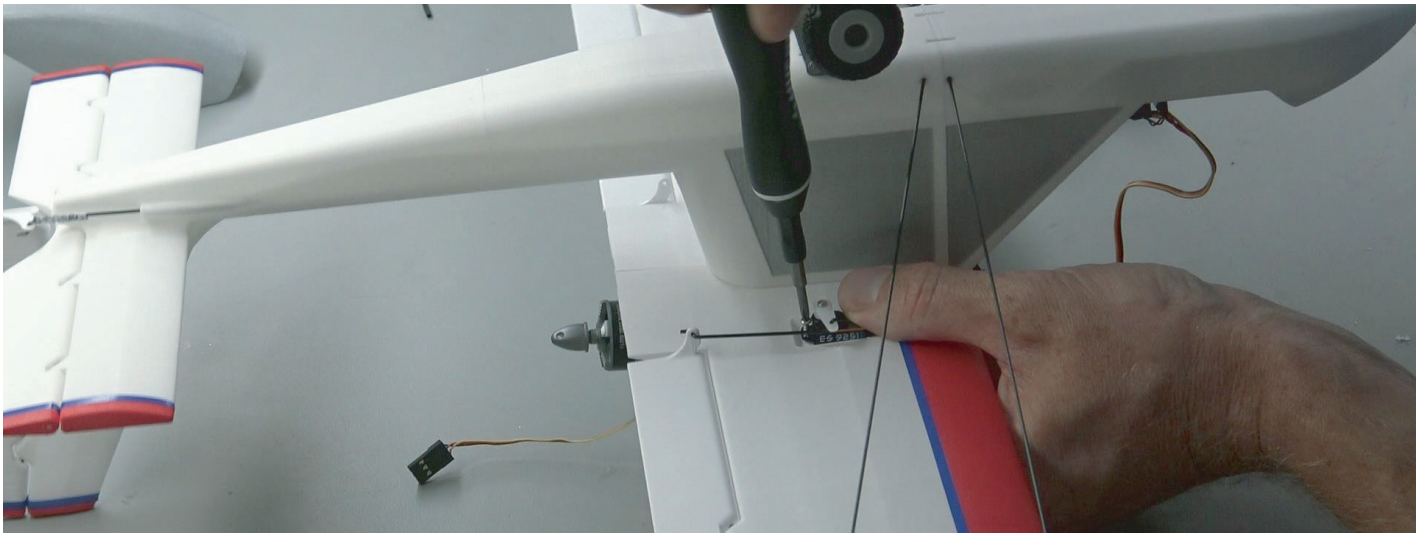


7.1.2 Install the servo control arms and attach the control rods using the control rod connectors.

Step-by-Step Build Guide (cont'd)

7.1.3 Using the mounting screws that came with your servos, mount the aileron servos in the aileron servo trays.
Note: It is recommended to test and center the servos prior to installation.

7.1.4 Cut the aileron control rods to the proper length and bend a Z-bend into each end. Install the control rods into the servo control arms and the aileron control horns.



Step 7.2 Install Motor, ESC, and Receiver

7.2.1 Mount the motor to the Motor Pod using the mounting screws that came with the motor.

7.2.2 Install the ESC. Use velcro with adhesive backing to attach the ESC to either the inside wall of the fuselage or to the ceiling of the canopy.

Step-by-Step Build Guide (cont'd)

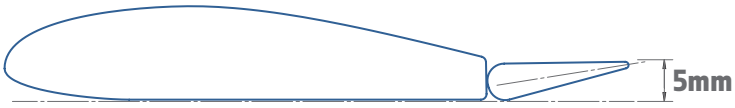
7.2.3 Install the receiver. Use velcro with adhesive backing to attach the receiver to either the inside wall of the fuselage or to the floor of the fuselage, just in front of the servos.

7.2.4 Connect the battery, bind your radio, and follow the instructions included with your radio for setting your drive rates and exponential.

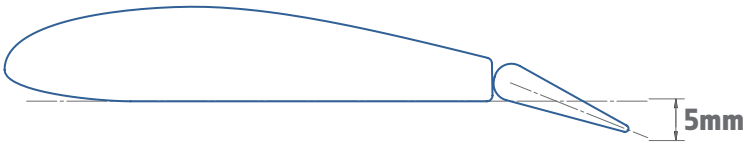
Recommended Rates and Exponential:

Ailerons

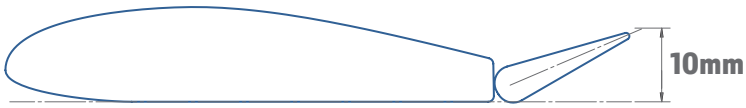
Low Rate



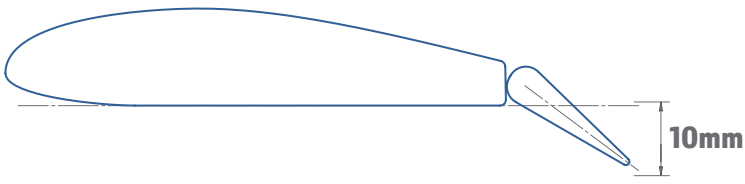
Exponential: 20%



High Rate



Exponential: 40%

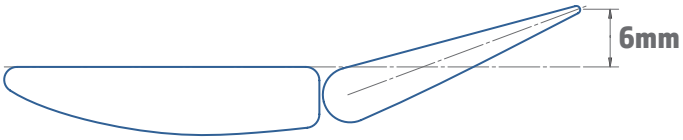


Step-by-Step Build Guide (cont'd)

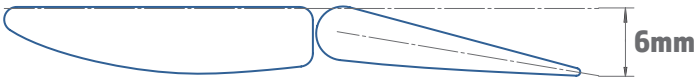
Recommended Rates and Exponential:

Elevator

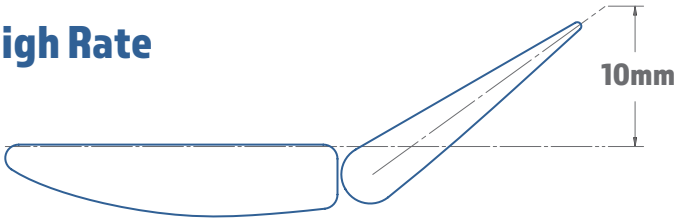
Low Rate



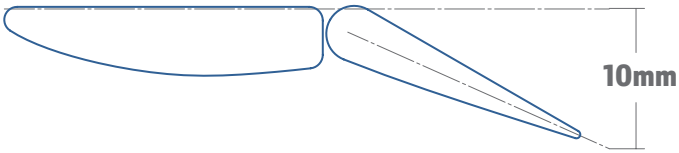
Exponential: 20%



High Rate

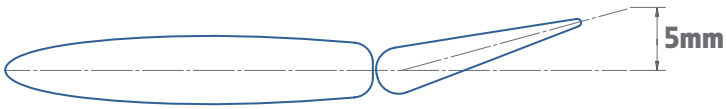


Exponential: 40%

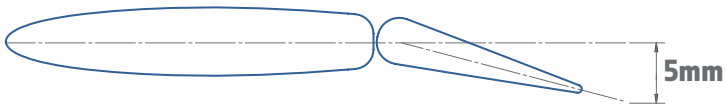


Rudder

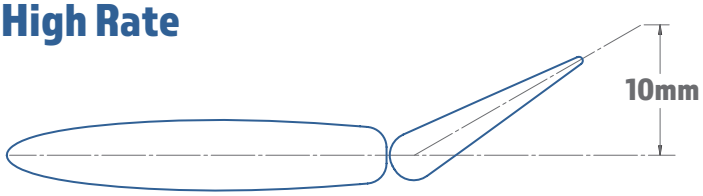
Low Rate



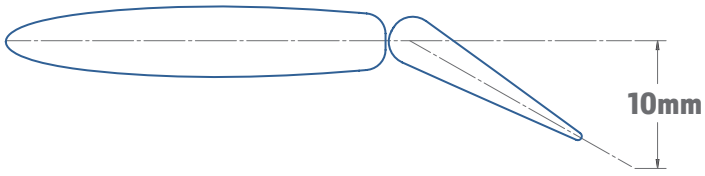
Exponential: 20%



High Rate



Exponential: 40%

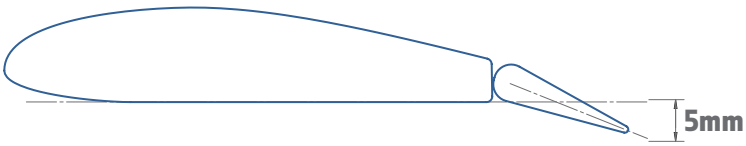


Step-by-Step Build Guide (cont'd)

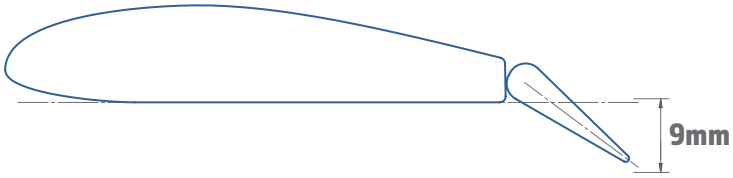
7.2.5 This aircraft can also benefit from other radio mixes, such as Flaperon mixing. If your radio is capable of Flaperon mixing, play with 5 - 10mm of flaperon deflection. This adds another level of slow flight performance to the Micro SportCam.

Flaperons

Half Flap



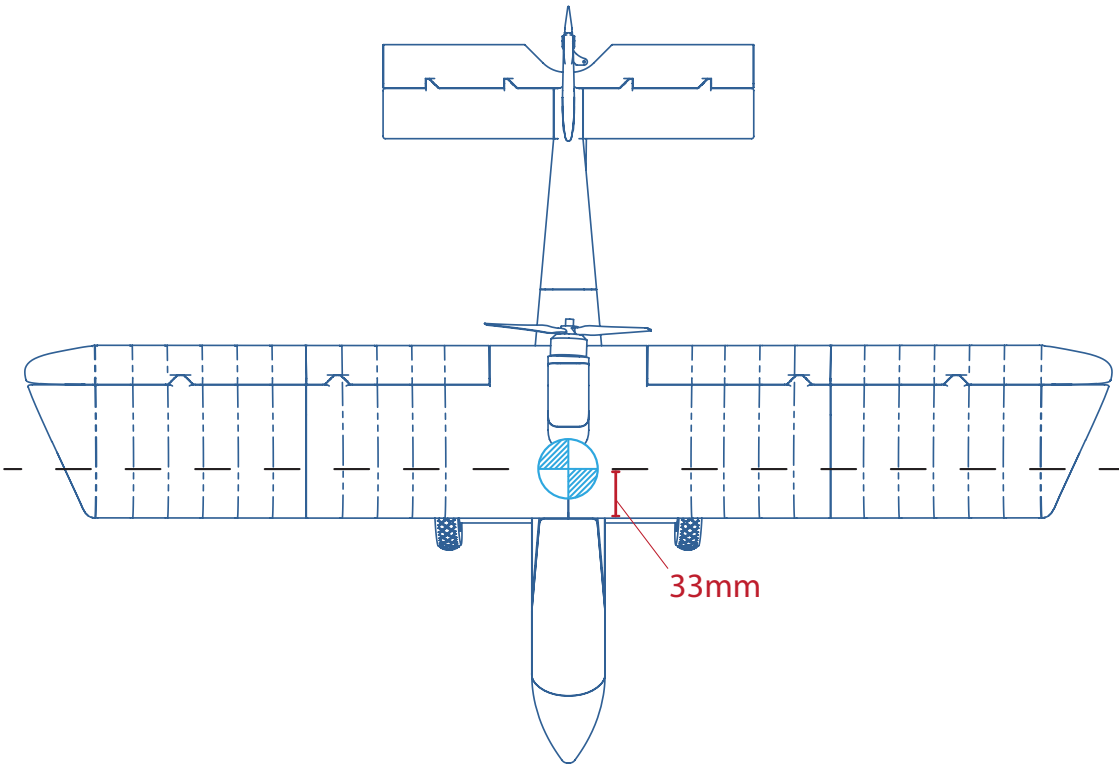
Full Flap



You can also experiment with mixing in coordinated rudder. Start with 50% coordinated rudder and adjust from there.

Step-by-Step Build Guide (cont'd)

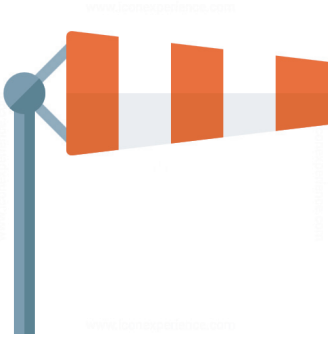
7.2.6 Finally, install your propeller, attach the canopy, and install a battery size that will properly balance the aircraft. One of the recommended batteries should work well. Balance the aircraft along the recommended Center of Gravity position. The Center of Gravity position for the aircraft is located 33mm behind the leading edge of the wing, as shown in the image below. Remember to err on the side of slightly nose heavy.



CG Location 33mm behind the Wing's Leading Edge

Tips For Your First Flight

Weather:



Due to the small size and light wing loading of the Micro SportCam it is recommended to fly on very calm days, with winds between 0 - 5 mph. With micro size planes, always ensure you are taking off and landing into the wind. Keep in mind that LW-PLA is particularly susceptible to warping in direct sunlight on hot days. Keep your aircraft in the shade when you're not flying.

Pre-Flight Checks:

1. Double check all screws to ensure they are tight, including servos, control horns, motor mount, and props.
2. Ensure servo extensions and all electronics are fully plugged in.
3. Radio and onboard LiPo batteries are fully charged
4. It is recommended to test your radio from long range (30 or more paces away from the aircraft) to ensure your radio signal is strong and you don't experience servo flutter.
5. Double check all controls are moving the proper direction!

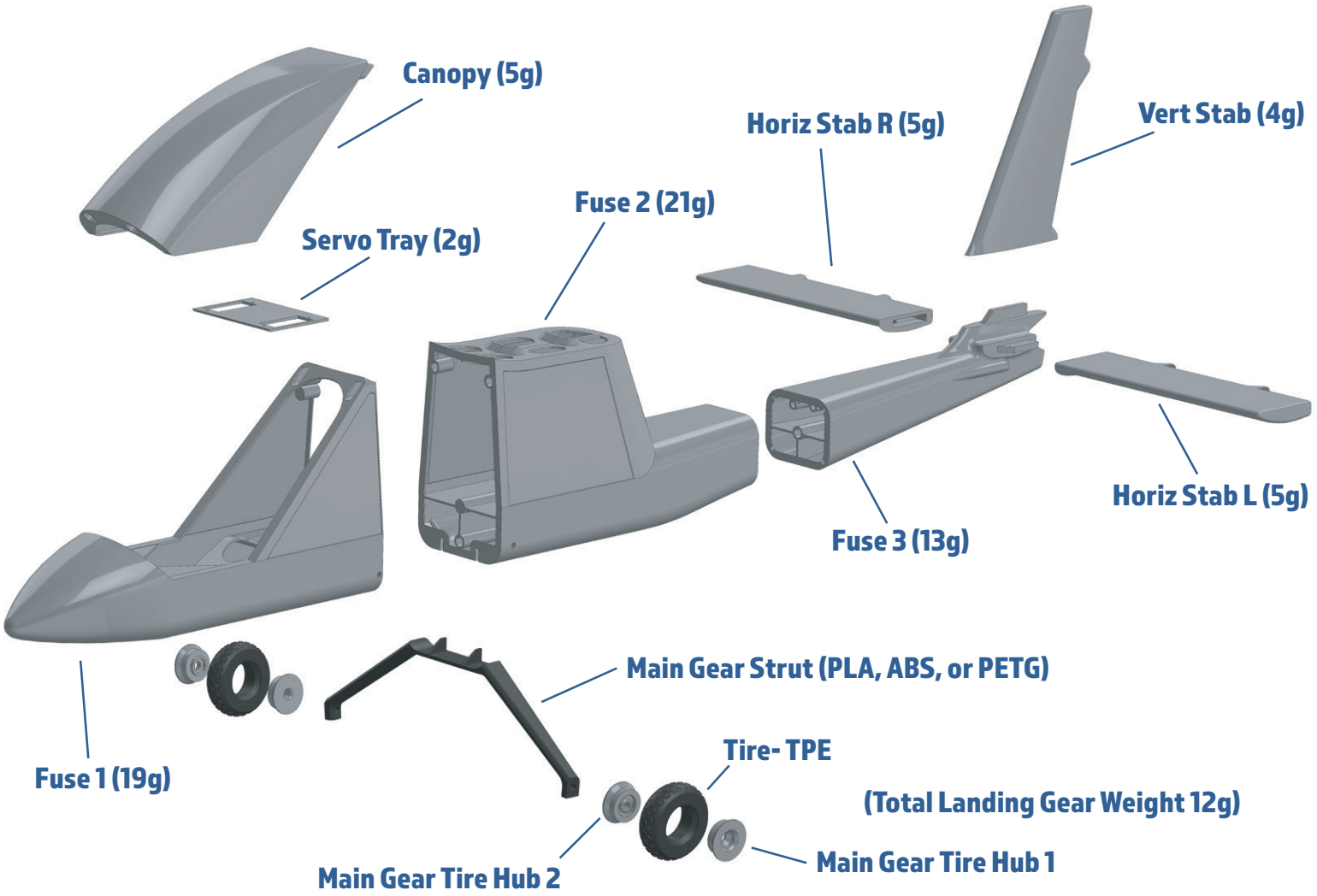
Tips For Your First Flight

Tips for Flying the Taildragger Configuration:

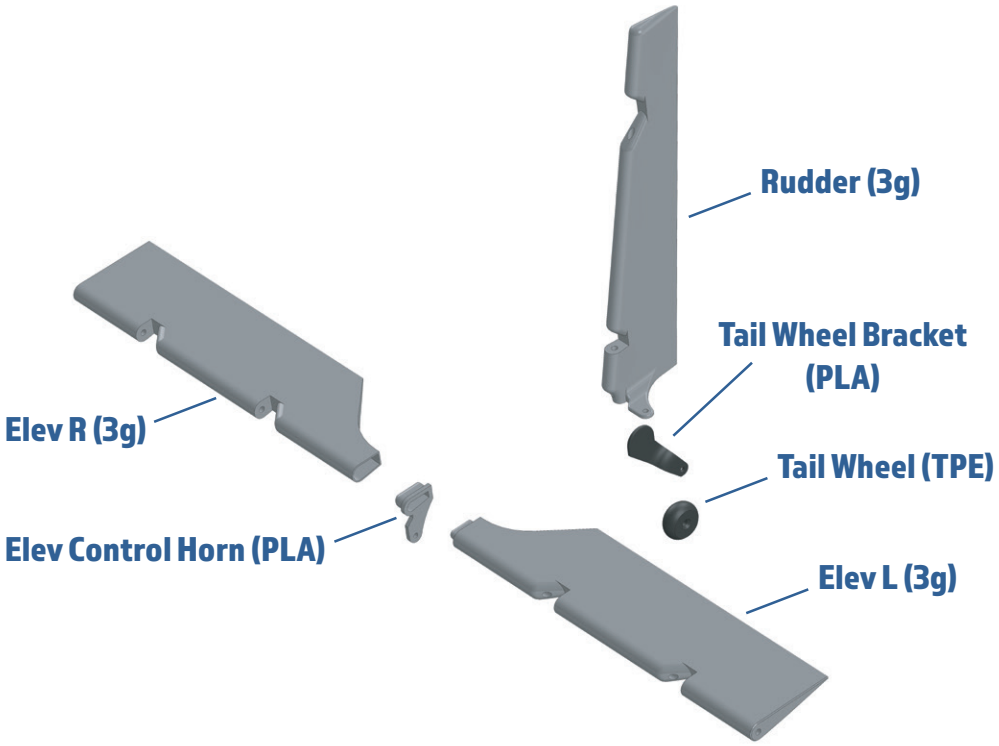
1. Because the motor on this design is mounted high, above the aircraft's wing, you may experience a downward pitching moment if you advance the throttle too quickly. The thrust angle of the motor and the shape of the horizontal stabilizer are designed to minimize this affect, but that is only once the aircraft has picked up sufficiant airspeed. On takeoff, advance the throttle slowly while holding slight up elevator to keep the tail down. As the aicraft picks up speed, ease-off of the up elevator until the aircraft's tail naturally rises, then pull up elevator slowly until the aircaft is airborne.
2. Landing the taildragger configuration can be a bit trickier than the tricycle gear version. I recommend carrying a bit more speed during the landing approach and greasing the aircraft in on it's main gear, rather than slowing to a 3-point landing.

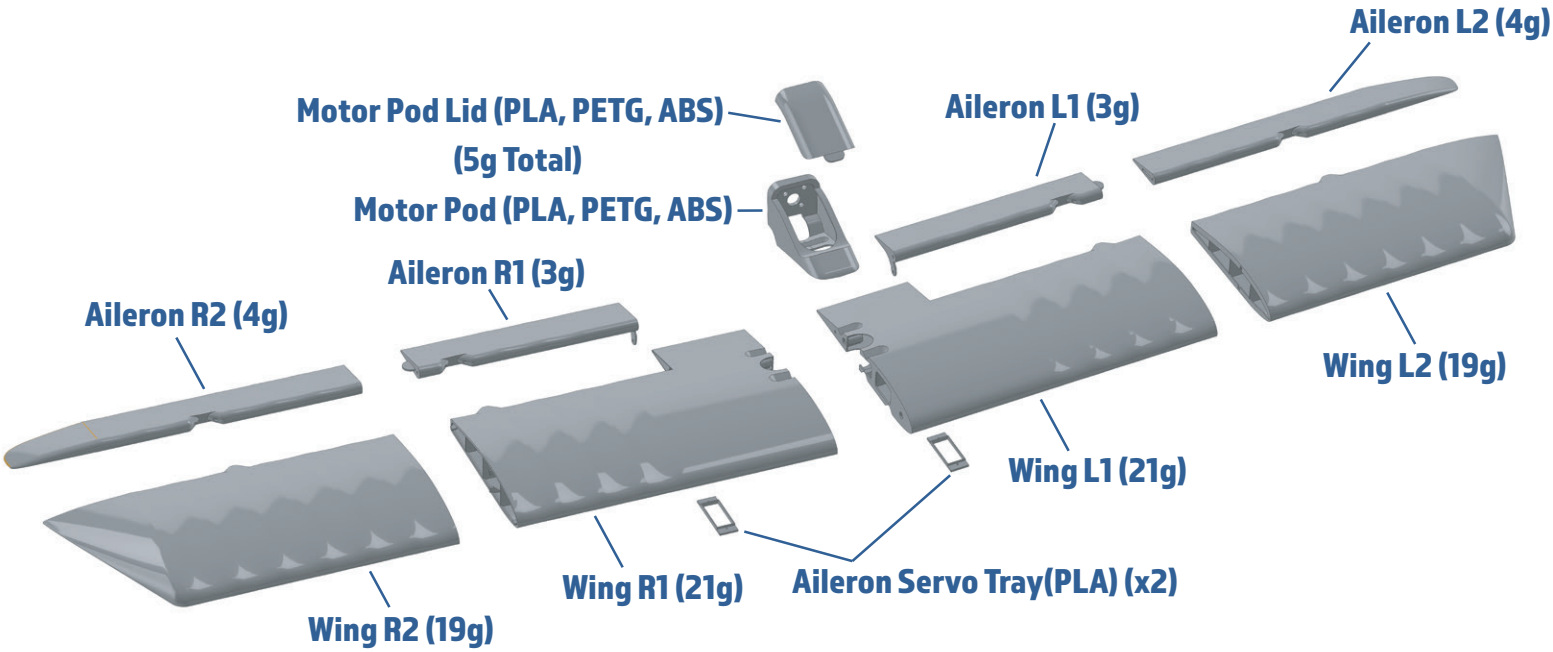
PLA Printed Part Weights

The target weights shown on all previous pages are for the parts printed in LW-PLA (unless otherwise noted). If you choose to print the parts in standard PLA instead, the target weights are listed below:



PLA Printed Part Weights (cont'd)





About 3DAeroventures

3DAeroventures is a YouTube channel and eCommerce store where content creator and Pilot in Command, Eric Haddad, uses engineering technology and model aviation to encourage his viewers, customers, and team members to never stop exploring, never stop questioning, and never stop playing.

3DAeroventures' fully 3D-printable, functional RC aircraft designs can be fabricated on hobbyist level desktop 3D printers out of common materials. The digital files of 3DAeroventures' aircraft are available online, with new designs being made available every 1 - 2 months. If you'd like to stay up to date on 3DAeroventures' latest content and designs, visit www.3daeroventures.com and sign up for our email list.

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- Join the Facebook group, 3DAeroventures Pilots Alliance, to connect with other Aeroventurers, to share your builds, and to troubleshoot any issues with us and the community.

- With any questions or feedback on 3DAeroventures' designs or content, you can email Eric directly at eric@3daeroventures.com

Never Stop Exploring. Never Stop Questioning. Never Stop Playing.

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