Upgrade for the X-100 Infinity Wing V2

Build Guide

Upgraded Fuselage File Set with Landing Gear and Rudder Capability

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Included in Your Download:

1. STL Files to upgrade your Infinity Wing with landing gear and rudder control
2. Simplify3D Factory Files (for the recommended materials)
3. Cura and PrusaSlicer Profiles and Recommended Slicer Settings for different materials
4. Generic Gcode for i3 style printers (for the recommended materials)
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, on to the technical stuff. This upgrade kit is compatible with the X-100 Infinity Wing V2 file set available on the website. It includes a whole new fuselage design with landing gear and rudder capability.

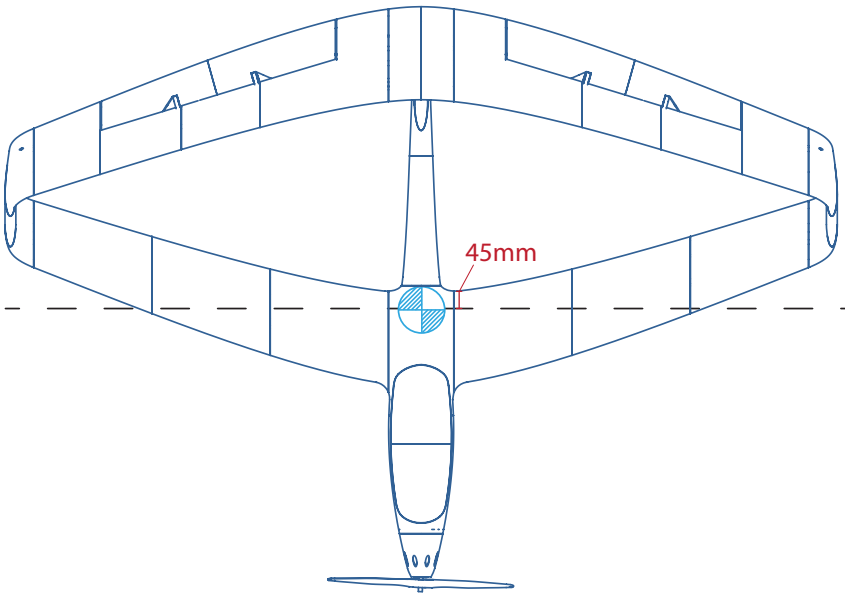
I recommended at least printing some of the parts in LW-PLA to keep the weight as low as possible and for the ideal weight distribution. The hybrid version balances perfectly at the new recommended CG position with a 3S 2200mah battery located in the middle of the battery compartment. A standard PLA version may require a larger battery or a small amount of nose weight to properly balance. If you do only print a few of the parts in LW-PLA I recommend printing the Back Wing parts in LW-PLA for better weight distribution.

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.

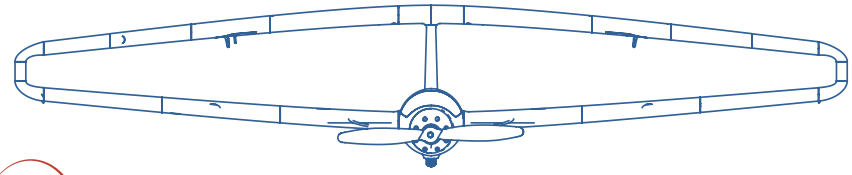
Thanks again and enjoy your flight!
Eric Haddad
Pilot in Command

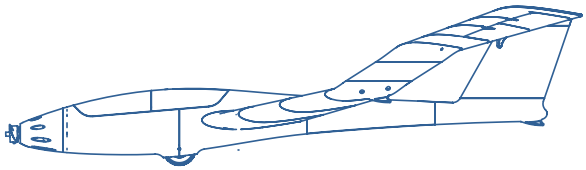
Specs of Full Aircraft with Upgrade:

Wingspan:	**1270mm / 50”**
Length:	**879mm / 34.6”**
Height:	**242.5mm / 9.5”**
Wing Area:	**437.5 in²**
Wing Loading (LW-PLA Hybrid):	**14.3 oz/ft²**
Wing Cube Loading (LW-PLA Hybrid):	**8.2**
Wing Loading (PLA):	**19.2 oz/ft²**
Wing Cube Loading (PLA):	**11**
Flight Performance Category:	**General Sport and Scale Aerobatics**
Center of Gravity Location:	**45mm in Front of Trailing Edge at the Wing Root**
Weight of Printed Parts(LW-PLA Hybrid):	**782g / 27.6 oz**
Weight of Printed Parts(PLA):	**1176g / 41.5 oz**
Flying Weight (3S 2200 mAh):	**1230g (LW-PLA) to 1650g (PLA) / 43.4 - 58.2 oz**
Recommended Max Flying Weight:	**1800g / 63.5 oz**
No. of Channels:	**4 - Throttle, Aileron, Elevator (Elevons), Rudder**



CG Location 45mm in front of the Trailing Edge of the Wing Root





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Additional Setup Requirements:

Motor Options: Leopard 3536-7T 1100kV
or motor with equivalent X mounting pattern

ESC Options: 50A Esc like HobbyWing Skywalker Series 50A ESC

Rec. Prop: 10x6 to 11x7 Propeller (do not use a prop larger than 11" for proper ground clearance)

Battery: 3S 2200mAh LiPo or
4S 2200 - 3300 mAh for more power

Radio: Radio with Elevon Mixing Capability + 4 Channel Reciever

Servos: 1 additional EMAX ES08MA II (12g) Metal Gear Servo
or equivalent 23x11.5x24mm size servo for rudder

Tools and Materials Needed:

- Min 200mm x 200mm x 200mm desktop 3D Printer
- 3D Printing Material of Choice (LW-PLA and PLA hybrid recommended)
  - TPU or TPE for Tires
- Medium Bodied CA/Super Glue
- Accelerator for CA
- Sandpaper and/or Small Files
- Soldering Iron (for heat set threaded inserts)
- Screwdriver and/or allen wrench for chosen screws/bolts

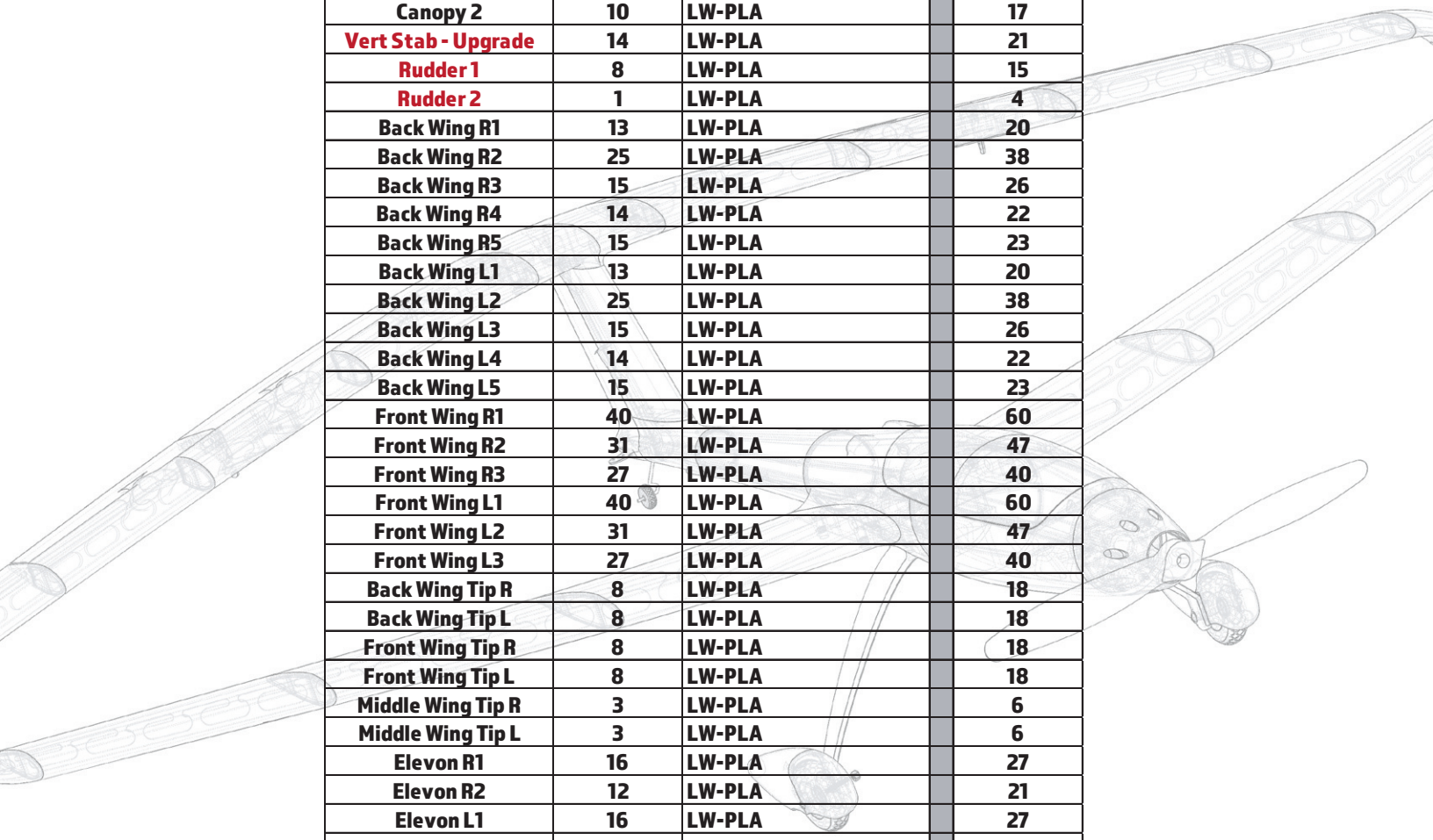
Additional Hardware Needed:

Fuselage:	Quantity:
- M3 x 0.5mm Thread Heat-set Threaded Inserts for landing gear mount	5
- M3 x 0.5mm Thread x 15mm Long Socket Head Screws for landing gear mount	5
- M3 x 0.5mm Thread Lock Nuts for main tires	4
- M3 x 0.5mm Thread x 30mm Long Socket Head Screws for main tires	2
- 1mm - 1.5mm O.D. x 150mm Long Carbon Fiber rod or Steel Wire for Rudder Hinge	1
- 1.2mm - 1.5mm steel wire for rudder servo control rod	1
- Pushrod Connector Linkage for Rudder Servo	1
- 1.8mm - 2mm steel wire for tailwheel	1
- Wheel collars to fit 1.5mm - 2mm steel wire for tailwheel	2
- 1mm O.D. x 10mm Long Pins cut from scrap carbon fiber rod for wheel pants	8

Estimated Part Weights by Material Type (Grams):

The parts highlighted in red are included in this upgrade file set. The other parts are included in the X-100 Infinity Wing V2 package which can be purchased here.

Part Name	Hybrid PLA/LW-PLA	Recommended Material for Hybrid (Provided GCode)		Estimated PLA/PETG Weights
Fuse 1 Upgrade	40	LW-PLA		66
Fuse 2 Upgrade	55	LW-PLA		79
Fuse 3 Upgrade	20	LW-PLA		31
Fuse 4 Upgrade	10	LW-PLA		16
Fuse Tray 1	12	PLA		12
Fuse Tray 2	8	PLA		8
Fuse Tray 3	4	PLA		4
Canopy 1	11	LW-PLA		20
Canopy 2	10	LW-PLA		17
Vert Stab - Upgrade	14	LW-PLA		21
Rudder 1	8	LW-PLA		15
Rudder 2	1	LW-PLA		4
Back Wing R1	13	LW-PLA		20
Back Wing R2	25	LW-PLA		38
Back Wing R3	15	LW-PLA		26
Back Wing R4	14	LW-PLA		22
Back Wing R5	15	LW-PLA		23
Back Wing L1	13	LW-PLA		20
Back Wing L2	25	LW-PLA		38
Back Wing L3	15	LW-PLA		26
Back Wing L4	14	LW-PLA		22
Back Wing L5	15	LW-PLA		23
Front Wing R1	40	LW-PLA		60
Front Wing R2	31	LW-PLA		47
Front Wing R3	27	LW-PLA		40
Front Wing L1	40	LW-PLA		60
Front Wing L2	31	LW-PLA		47
Front Wing L3	27	LW-PLA		40
Back Wing Tip R	8	LW-PLA		18
Back Wing Tip L	8	LW-PLA		18
Front Wing Tip R	8	LW-PLA		18
Front Wing Tip L	8	LW-PLA		18
Middle Wing Tip R	3	LW-PLA		6
Middle Wing Tip L	3	LW-PLA		6
Elevon R1	16	LW-PLA		27
Elevon R2	12	LW-PLA		21
Elevon L1	16	LW-PLA		27
Elevon L2	12	LW-PLA		21
Cowl	12	PLA		12
Servo Cover R	6	PLA		6
Servo Cover L	6	PLA		6
Rudder Servo Tray	1	PLA		1
Motor Mounts	9	PETG		9
Landing Gear R	32	PLA		32
Landing Gear L	32	PLA		32
Wheel Pant R	5	LW-PLA		13
Wheel Pant L	5	LW-PLA		13
Tire x2	14	TPU/TPE		14
Tire Hub 1 x2	6	PLA		6
Tire Hub 2 x2	6	PLA		6
Tailwheel - Upgrade	1	TPU/TPE		1
Printed Part Weight	782			1176



Step-by-Step Build Guide

Step 1. 3D Printing the Included Parts

Minimum Requirements:

- 200mm x 200mm x 200mm 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 using the materials we recommend. The provided G-Code is for our recommended PLA / LW-PLA Hybrid build. We've had good results with LW-PLA at 250º Celcius and standard PLA at 225º Celcius but experiment with your printer to make sure you achieve strong layer adhesion. If you wish to print this aircraft from a different material, reference the included Slicer Settings PDF and use your preferred slicer.

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 and excellent layer bonding.

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 reference the included Recommended Slicer Settings PDF. Cura and PrusaSlicer profiles for PLA are also provided

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.

Standard PLA Temperatures:

We see good results printing Paramount3D PLA at 225ºC 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%.

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

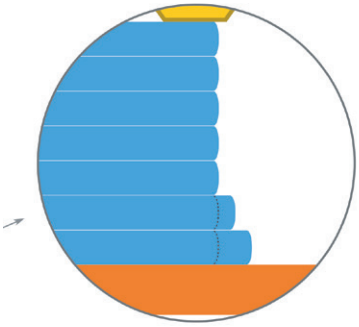
3D Printing Tips (cont'd)

Standard Materials 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.

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.



Step 2. Fuselage + Vertical Stabilizer Assembly

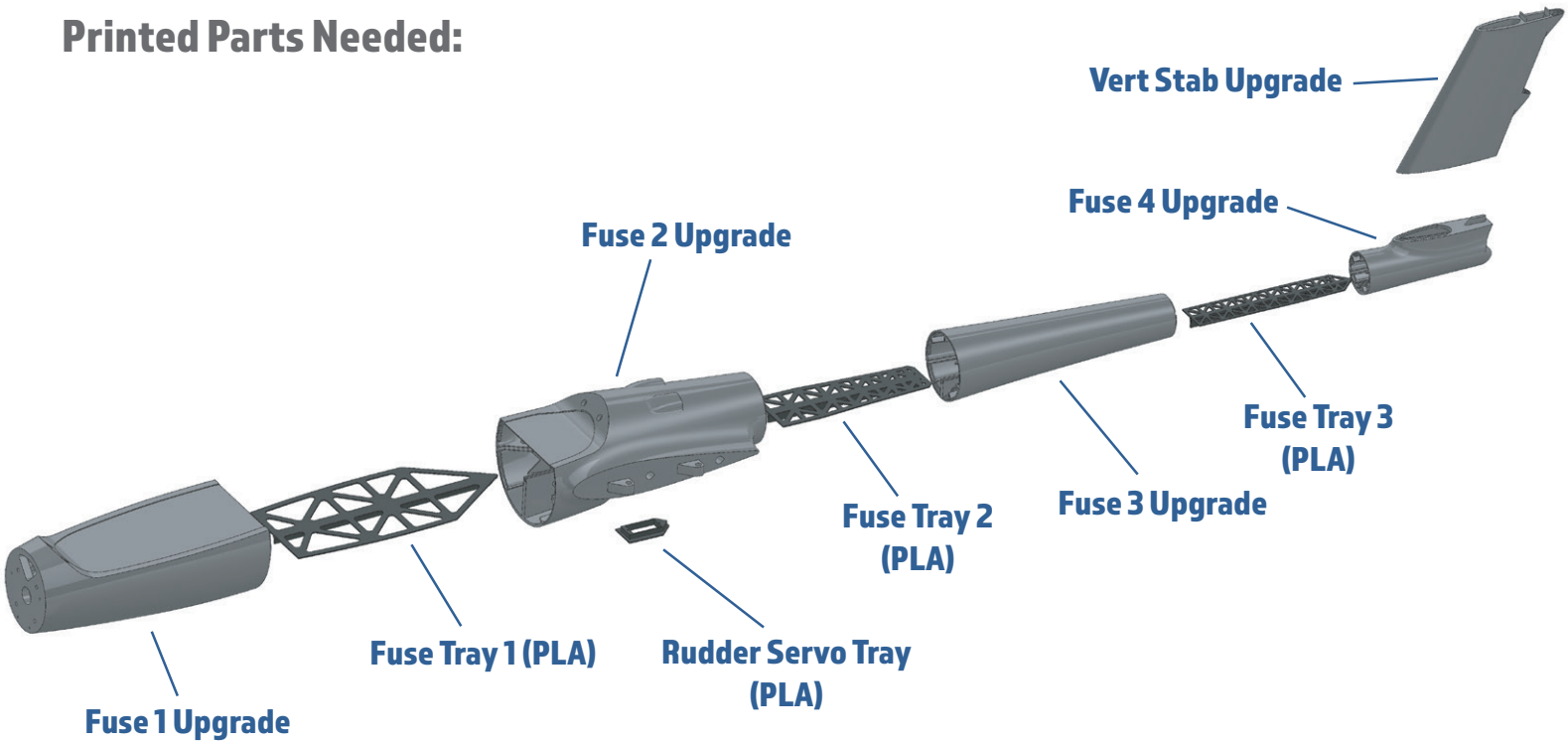
Tools and Materials Needed:

- Medium Bodied CA/Super Glue
- Accelerator for CA
- Sandpaper and/or Small Files
- Soldering Iron (for heat set threaded inserts)

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

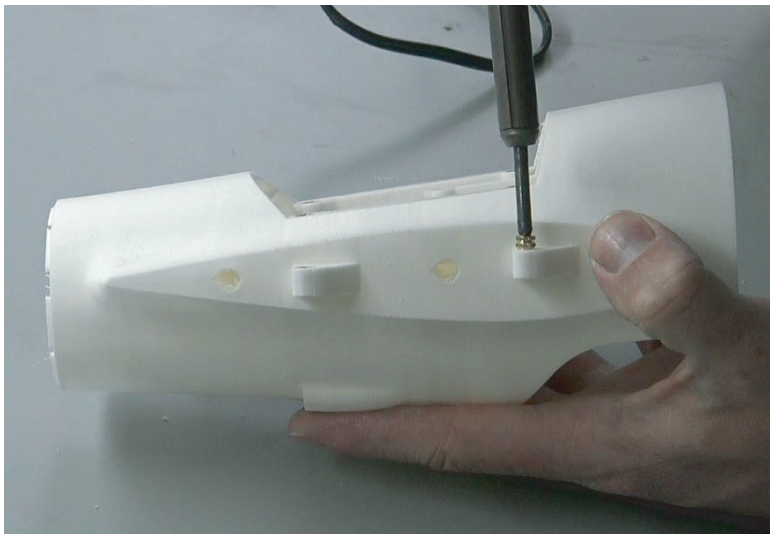
- M3 x 0.5mm Thread Heat-set Threaded Inserts for front wing bolts and landing gear mount (x9)

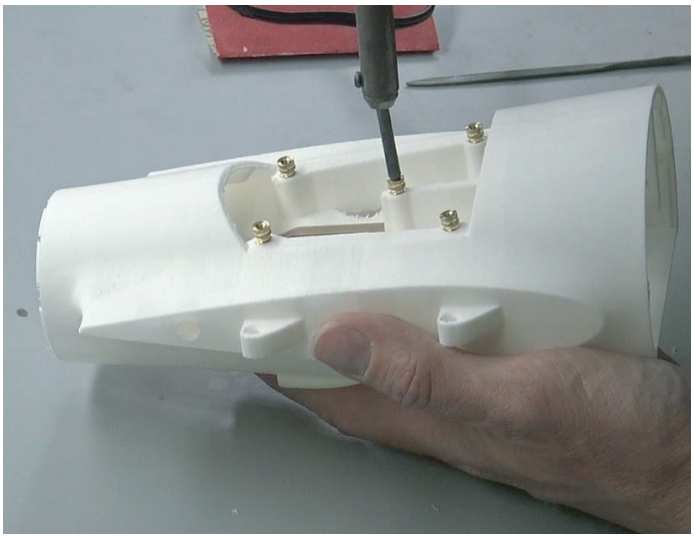
Printed Parts Needed:



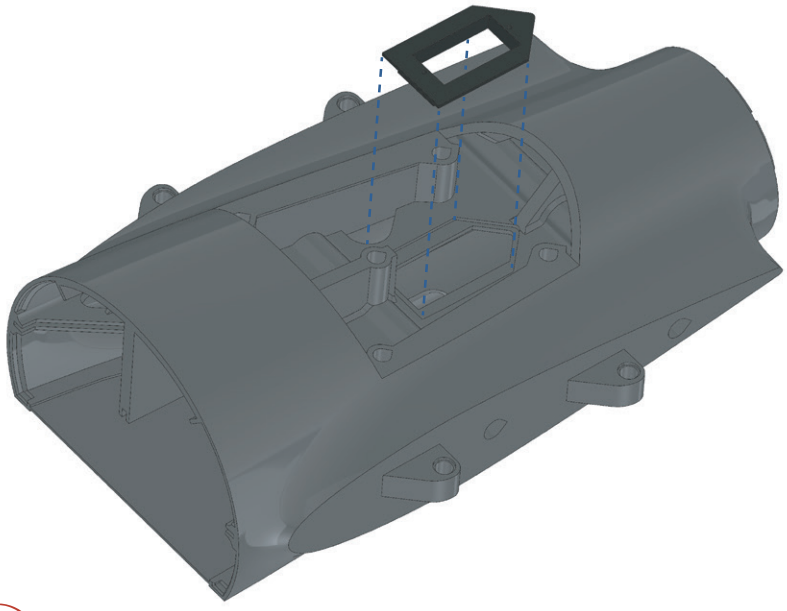
Step 2.1 Heat Set Inserts and Rudder Servo Tray

2.1.1 Before gluing parts together. Find parts Fuse 2 Upgrade and use a soldering iron to insert the M3x0.5mm thread heat set threaded inserts. You will insert a total of nine heat set threaded inserts, four in the front wing connection areas, and five in the landing gear mount area.





2.1.2 Glue the PLA Rudder Servo Tray into the mating recess in Fuse 2 Upgrade



Step 2.2 Glue Fuselage and Fuse Tray Parts Together

ATTENTION: The fuselage is designed with separate Fuse Tray parts. This was done in case you choose to print the Fuse parts in LW-PLA or LW-ASA. The Fuse Tray parts should be printed in a more rigid plastic like standard PLA, ABS, PETG, or PC.

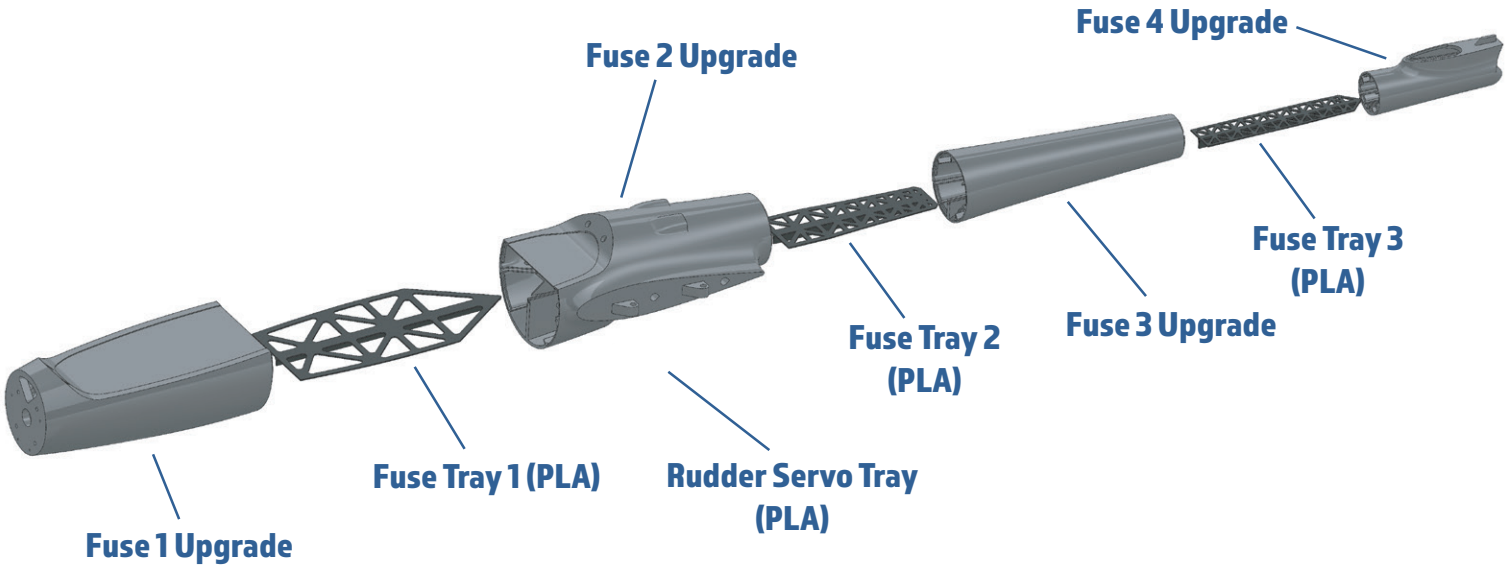
The Fuse parts must be assembled with the Fuse Tray parts in a certain order. You will notice the Fuse Tray parts slide into rails located in the Fuse parts. The Trays overlap the seams of the Fuse parts and make for a very strong, rigid fuselage.

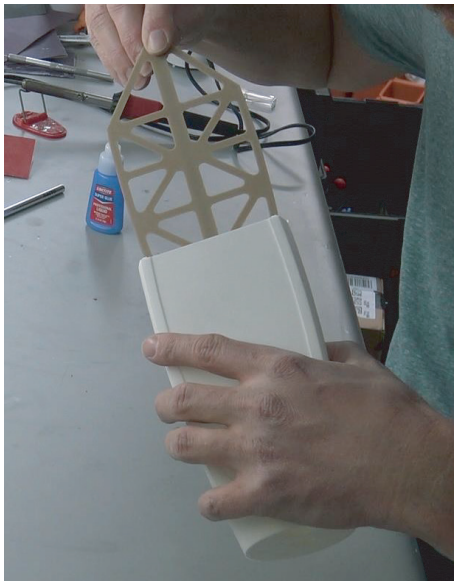
DO NOT GLUE ALL OF THE FUSE PARTS TOGETHER WITHOUT THE FUSE TRAY PARTS IN PLACE!

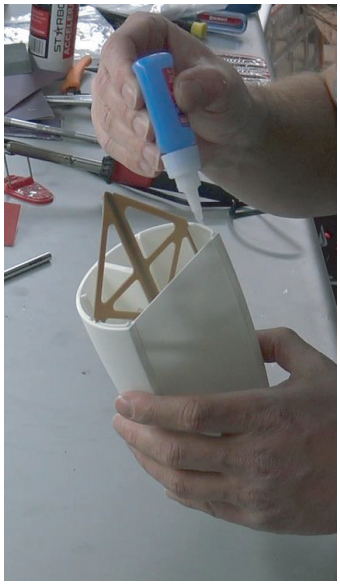
Step-by-Step Build Guide (cont'd)

2.2.1 Starting with Fuse 1, apply CA adhesive to the rails where Fuse Tray 1 slides into place. **Ensure Fuse Tray 1 is fully seated into place in the rail behind the firewall and wipe off any residual glue from the Fuse 1 surface that mates with Fuse 2 before applying CA Accelerator to secure the bond.**

2.2.2 Continue Gluing the Fuse and Fuse Tray parts, together, followng the order shown in the image below.



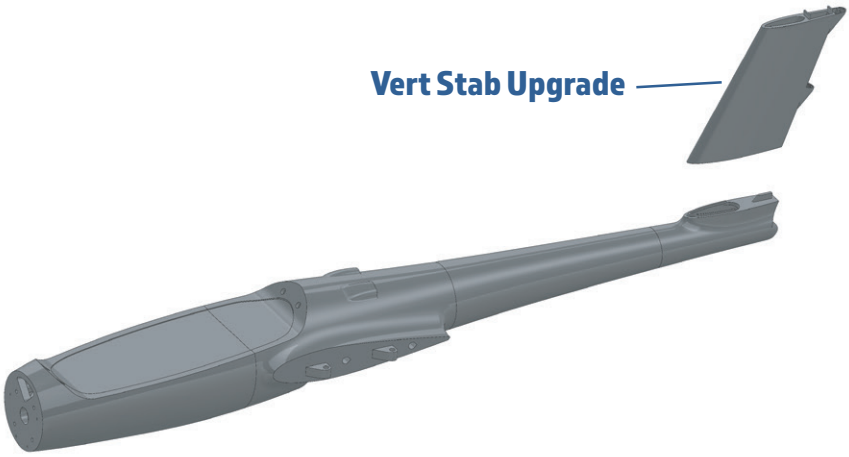




Step-by-Step Build Guide (cont'd)

Note: You can choose to route the 24" + 6" servo extensions through the vert stab and fuselage at this point, before gluing on the Vert Stab. This can make the routing process easier. Otherwise, use a piece of string with a weight (such as a lock nut) tied to one end, and your servo extension lead tied to the other end. Use the weighted string to aid in routing the extension. ALWAYS TEST YOUR EXTENSIONS AND SERVOS PRIOR TO INSTALLATION

2.2.3 Glue the Vert Stab Upgrade to your Fuselage assembly using CA glue. The built in alingment tabs will keep all parts well aligned.



2.3.4 Use a Soldering Iron or a hot knife to remove the support panel in the canopy area of parts Fuse 1 and Fuse 2. Cleanup the edge with sandpaper.

Step 3. Rudder Assembly + Servo Connection

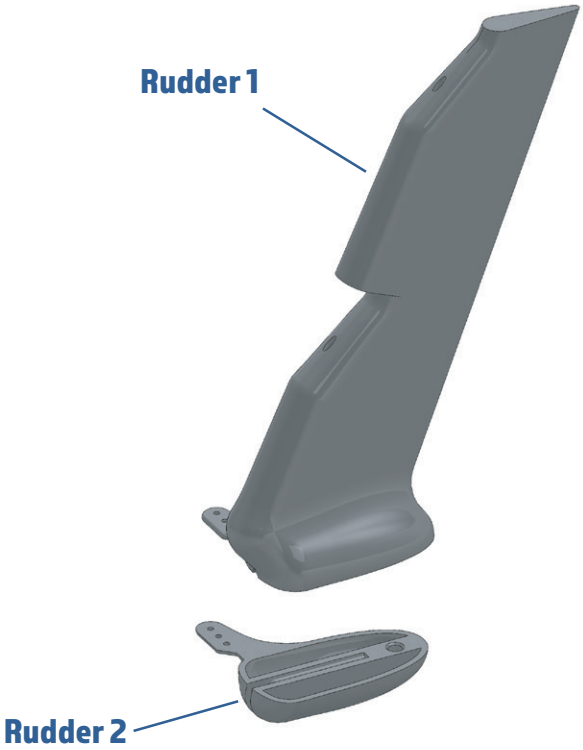
Tools and Materials Needed:

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

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

- 1mm - 1.5mm O.D. x 150mm Long Carbon Fiber rod or Steel Wire for Rudder Hinge1
- 1.8mm - 2mm steel wire for tailwheel
- 1.2mm - 1.5mm steel wire for rudder servo control rod
- Pushrod Connector Linkage for Rudder Servo

Printed Parts Needed:



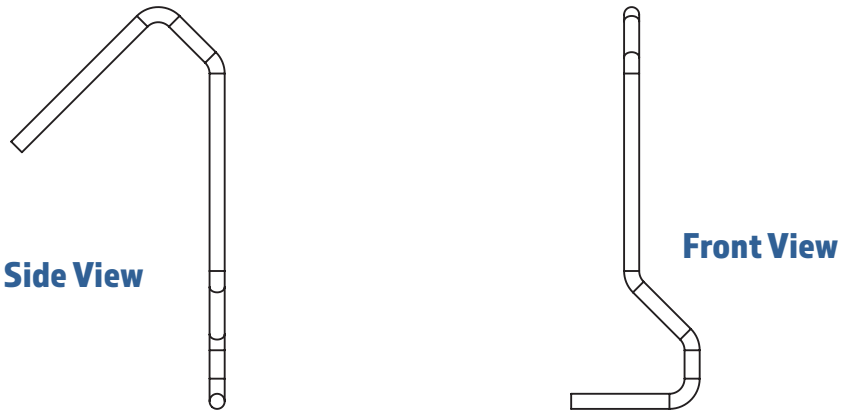
Step-by-Step Build Guide (cont'd)

Step 3.1 Rudder Assembly

3.1.1 Before gluing the rudder parts together, bend the tailwheel wire from a 1.8mm - 2mm diameter steel wire. You can print out this page and use the image below as a bending guide.

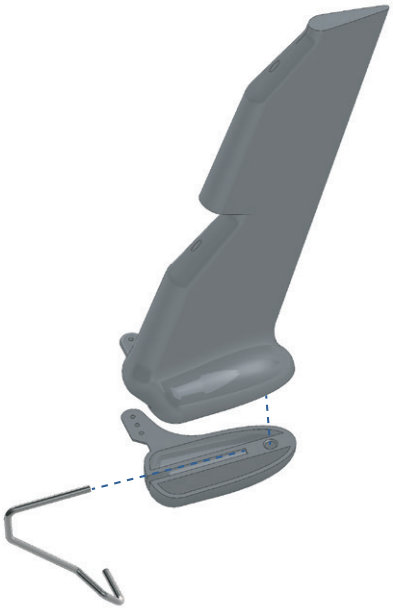
Tailwheel Wire
1.8mm - 2mm Diameter Wire

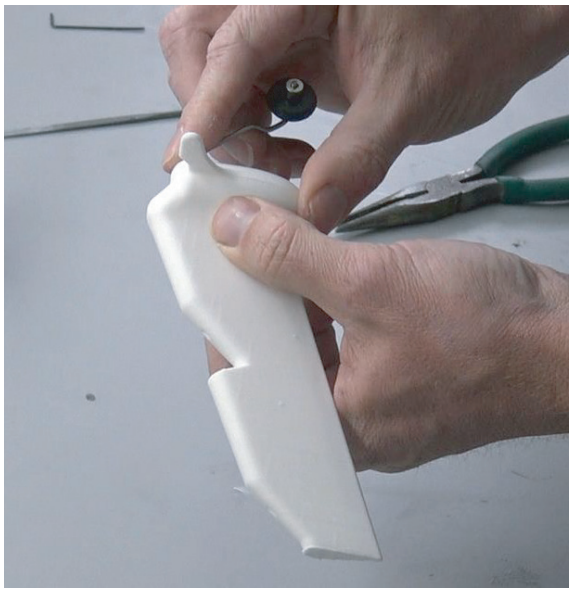
Scale 1:1



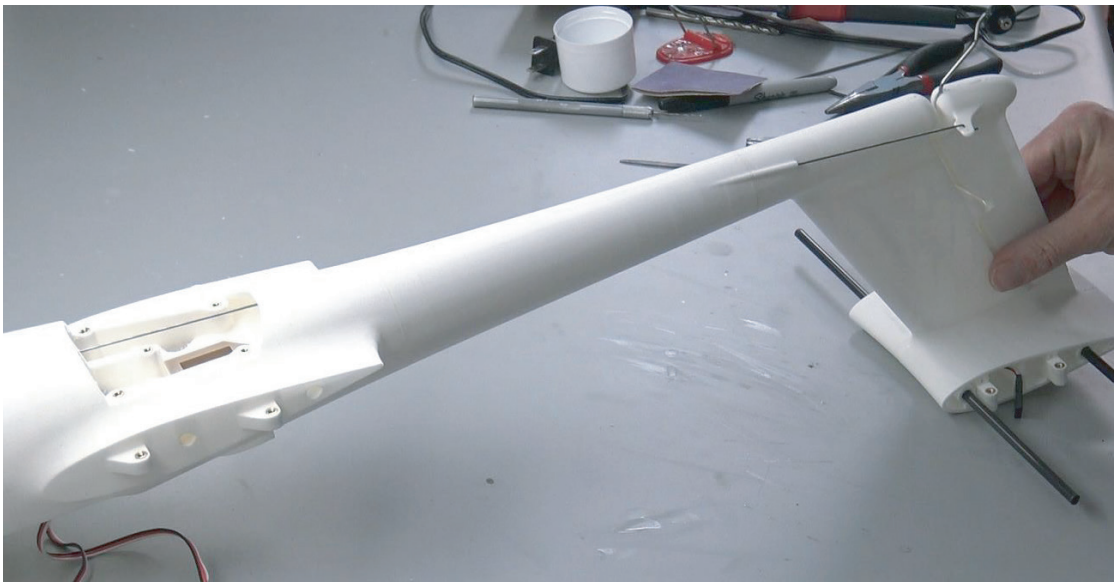
Step-by-Step Build Guide (cont'd)

3.1.2 Use qty. 1 , 3mm diameter x 10mm long dowel pin cut from a scrap wood dowel or a carbon fiber rod to align parts Rudder 1 and Rudder 2 together. You can also lay the tailwheel wire in place to help align the parts. Glue the two rudder parts and the tailwheel wire together with CA glue.

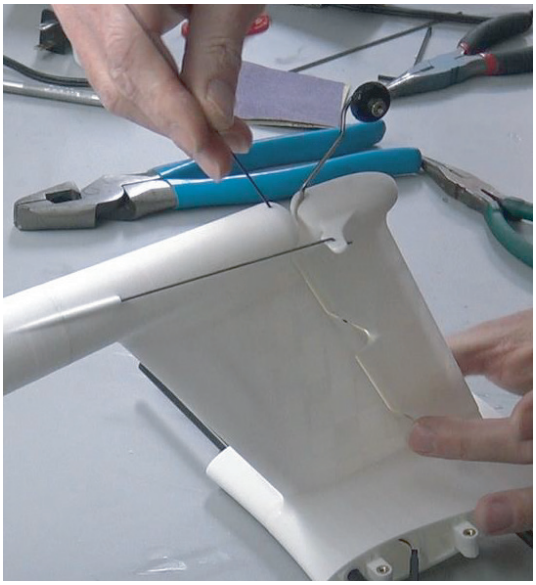




3.1.3 Use a 1.2 - 1.5mm steel wire for your rudder control rod. Bend a Z bend into one end and attach it to the rudder control horn. Insert the steel rod into the control rod exit hole located on the side of the fuselage and trim the wire to the proper length.

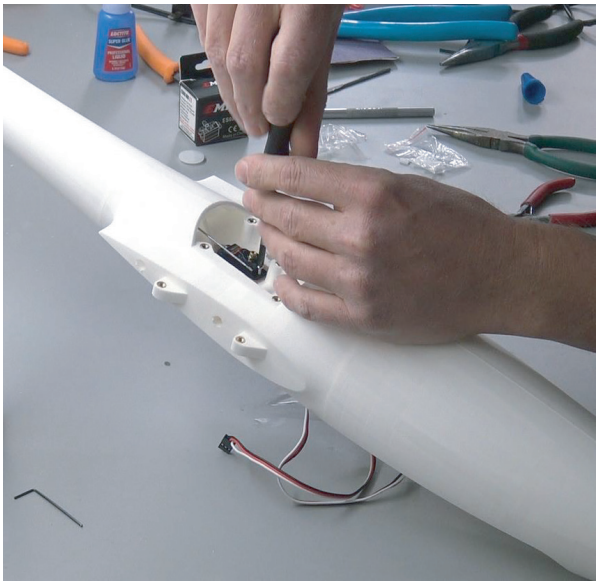


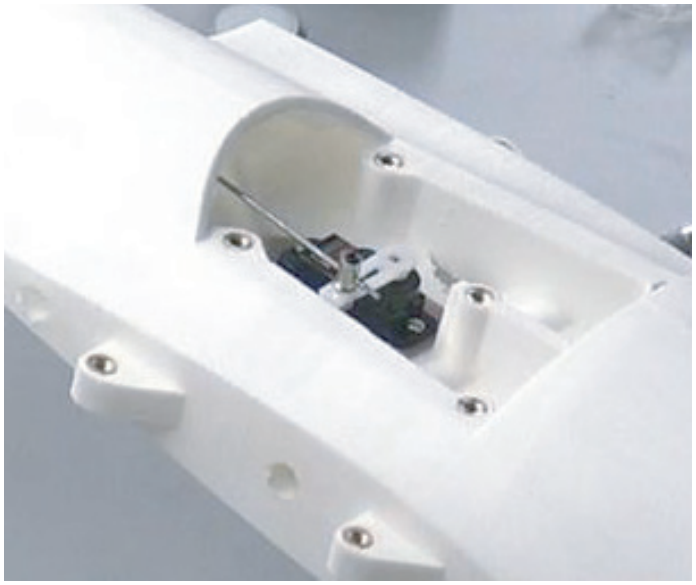
Step-by-Step Build Guide (cont'd)



3.1.4 Route the 1.0 - 1.5mm diameter carbon fiber rod through the rudder and vert stab hinge holes. Place a drop of glue in the hinge hole at the bottom of the fuselage to fix the hinge rod in place.

3.1.5 Using the mounting screws that came with your servo, mount the rudder servo to the Rudder Servo Tray. **Note: It is recommended to test and center the servos and install the servo control horn prior to installation.** Connect the rudder control rod to the servo control horn using a pushrod connector linkage and screw the servo control horn to the servo.





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

Step 4. Landing Gear + Final Assembly

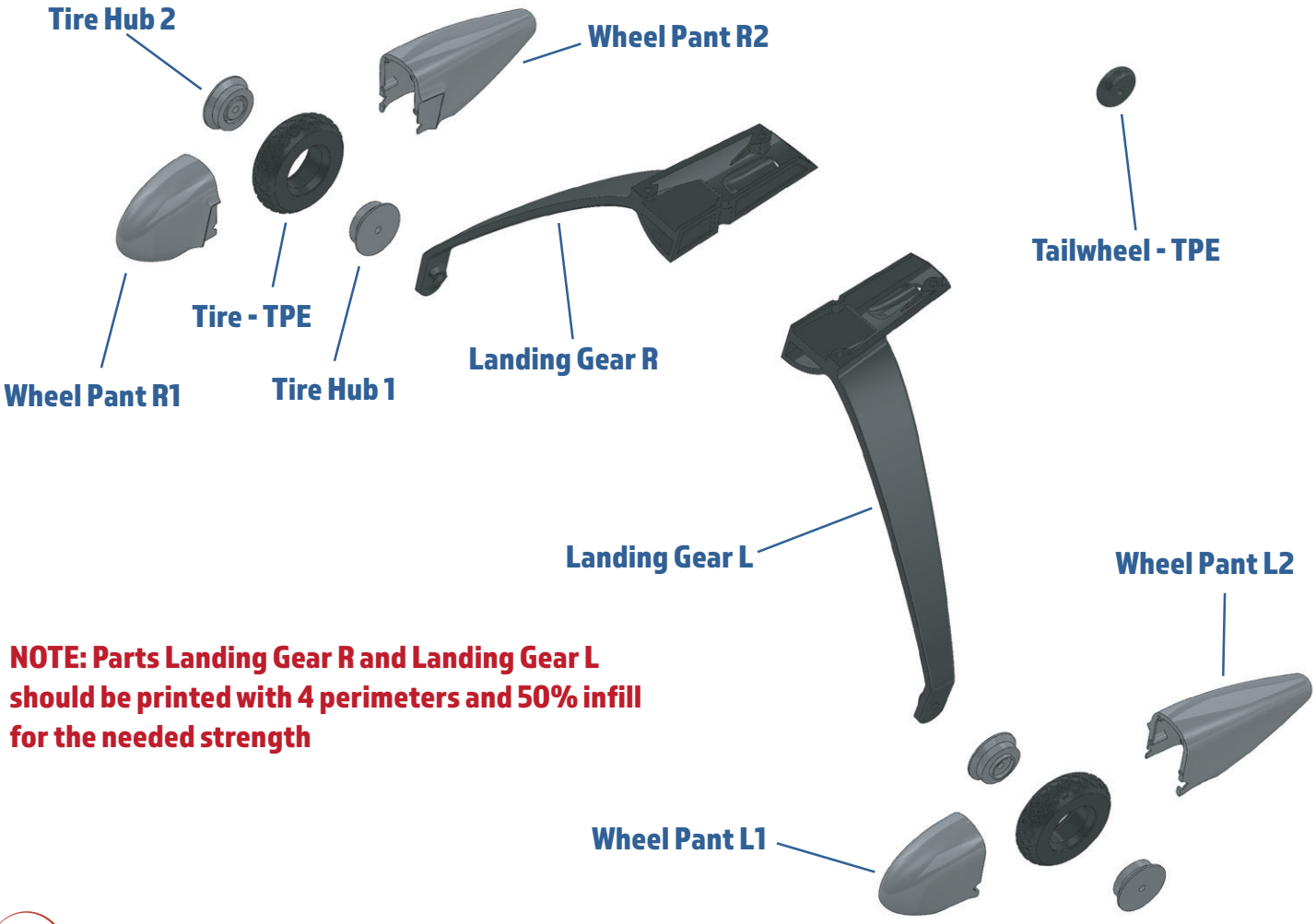
Tools and Materials Needed:

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

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

- M3 x 0.5mm Thread x 15mm Long Socket Head Screws for landing gear mount (x5)
- M3 x 0.5mm Thread Lock Nuts for main tires (x4)
- M3 x 0.5mm Thread x 30mm Long Socket Head Screws for main tires x(2)
- Wheel collars to fit 1.5mm - 2mm steel wire for tailwheel (x2)
- 1mm O.D. x 10mm Long Pins cut from scrap carbon fiber rod for wheel pants (x8)

Printed Parts Needed:



NOTE: Parts Landing Gear R and Landing Gear L should be printed with 4 perimeters and 50% infill for the needed strength

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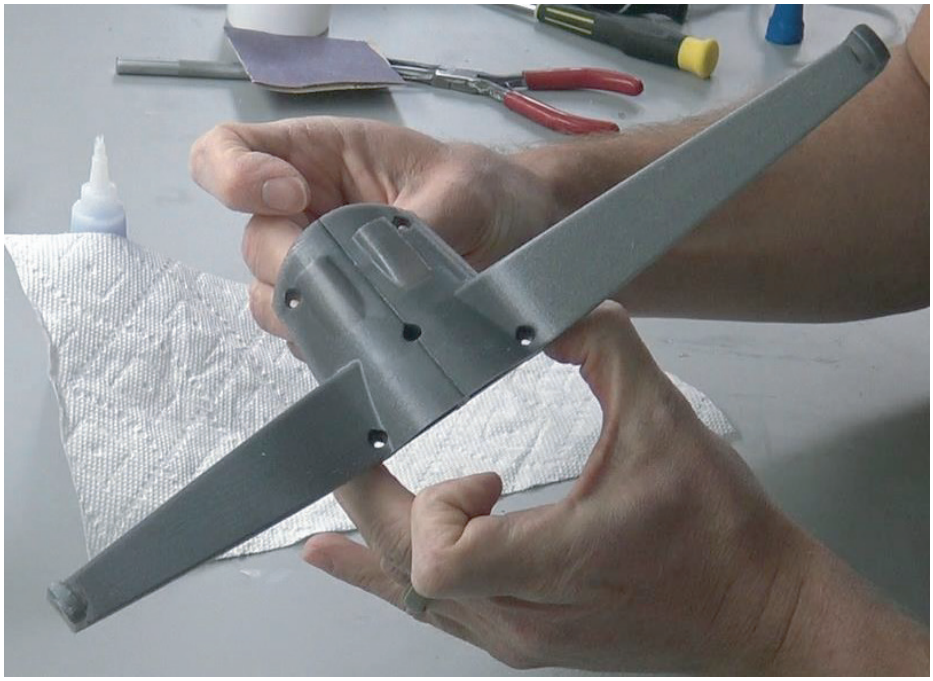
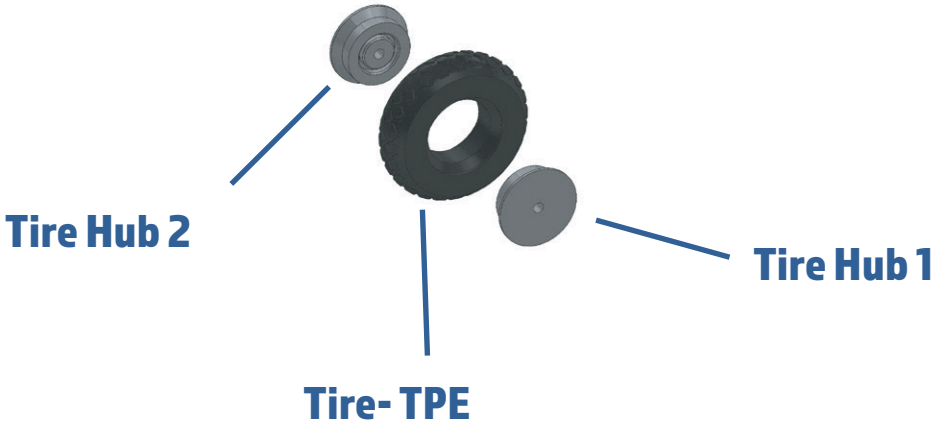
Step-by-Step Build Guide (cont'd)

Step 4.1 Landing Gear Assembly

4.1.1 Glue parts Landing Gear R and Landing Gear L together using CA or Epoxy

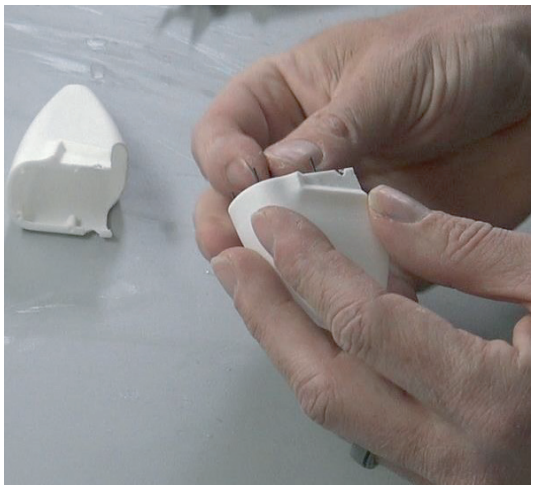


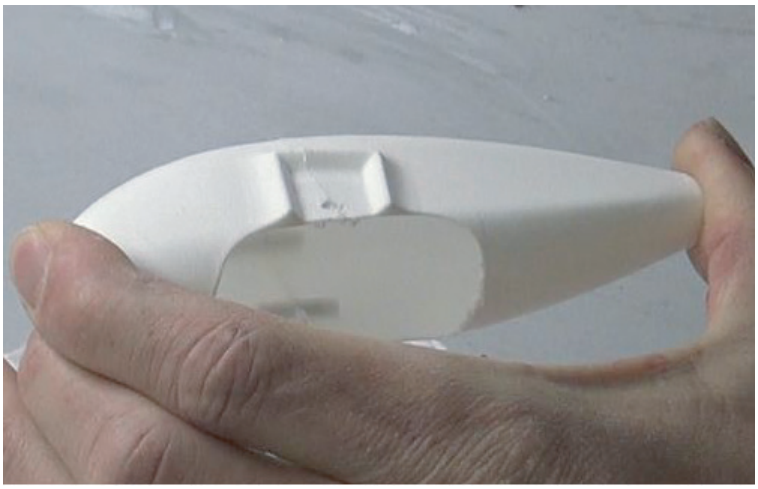
4.1.2 Tire Hub 1 and Tire Hub 2 are designed to be inserted into each open side of the Tire-TPE component. Insert Tire Hub 1 into one side of the TPE Tire, apply a small amount of CA glue to the mating face of the hub and insert Tire Hub 2 into the other side of the TPE Tire. Repeat this for the second main tire.



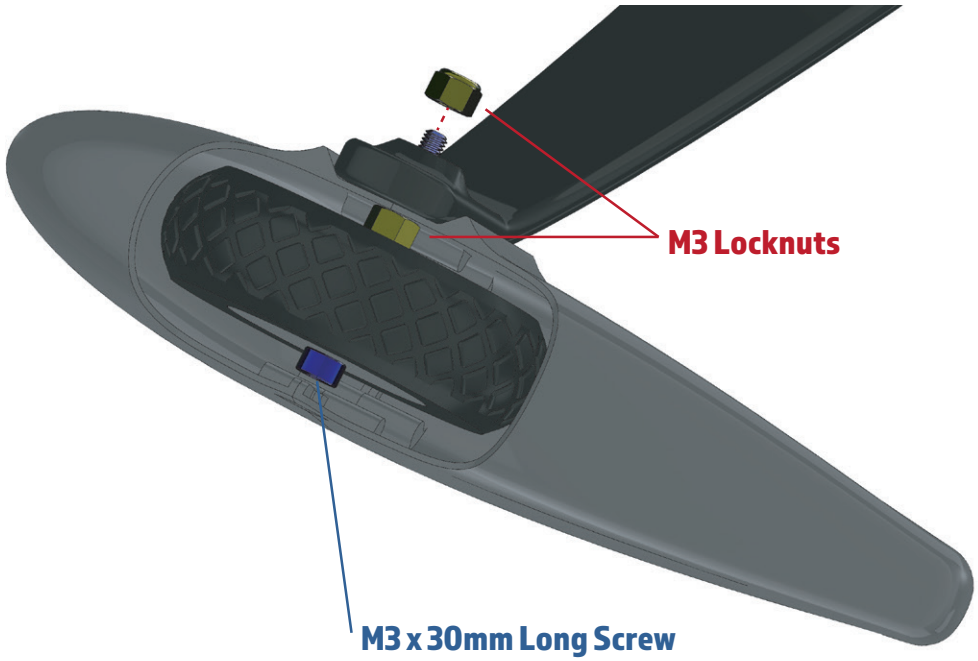
Step-by-Step Build Guide (cont'd)

4.1.3 If you choose to attach the optional wheel pants, cut qty. 8 pins from a scrap 1mm diameter carbon fiber rod to 10mm length. These will act as alignment aids for the wheel pant halves. Glue the wheel pant halves together with CA glue.



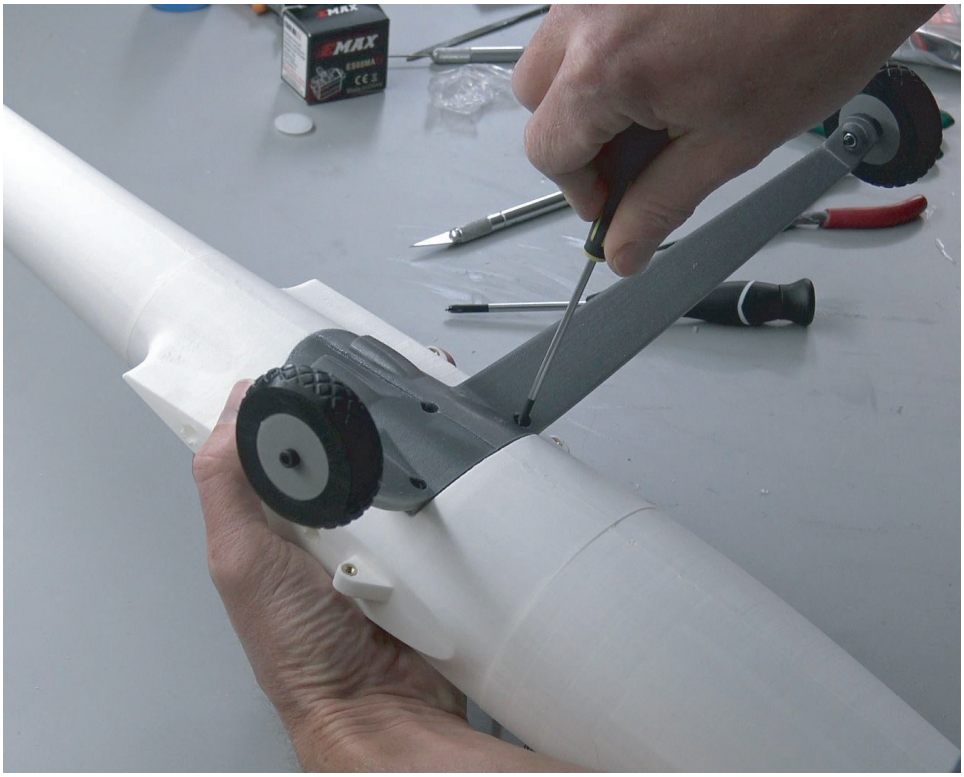


4.1.4 Attach the Right side tire and optional wheel pant to the landing gear assembly using a M3 x 30mm long socket head screw and 2 M3 locknuts in the order shown below. Repeat for the Left wheel.



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

4.1.5 Screw the landing gear assembly to the bottom of the fuselage using the qty. 5 M3 x 15mm long socket head cap screws.



4.1.5 Attach the tailwheel to the tailwheel wire using a wheel collar on each side of the tailwheel.

Step 5. Return to the build guide included with the X-100 Infinity Wing V2 file set to complete the assembly.

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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