Alien Technologies

Mini Wanderer

A simple mini version of a classic!

Specs:
2-3 channel
(Rud/Ele/Throttle)
45" wing Span
224 Sq. In.
5-7 oz. Flying Weight
2 oz./ Ft. wing loading

Thank you for buying the Alien Technologies - Mini Wanderer. It is designed to be an easy building, fun to fly anywhere 2 channel mini glider. The Wanderer designed by Mark Smith is the inspiration for this kit. It is the perfect size to toss around the school yard, local slope or keep in the backseat of your car for a quick lunchtime thermal session. I hope you enjoy it as much as we do.

Although it is easy to build, it does require a nice flat surface that will accept pins to ensure the wing is built straight & warp free. A balsa building board is ideal, but an acoustic ceiling tile or nice flat piece of cardboard will suffice.

Care should be taken in the covering that you choose. Lightweight film or tissue should be used. Traditional covering like Monokote and Ultracote may warp or crush the structure, do not use them! The prototypes were covered in Parklite and Flying Film coverings with great results.

All part markings should face inward and right side up unless otherwise noted. Parts should be left in their sheets until needed to prevent damage or loss. When removing, cut the tab holding them in place carefully with a sharp X-acto knife and sand any remnants of the tab away with 220G sandpaper for a nice tight fit.

If you have any questions, comments or concerns, please do not hesitate to contact me.

Thanks

Red

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or Aloft at:

contact@alofthobbies.com

Kit design by Red @ Alien Technologies in partnership with Aloft Hobbies.

Manufacturing by Aloft Hobbies.

Equipment needed:

- Two servos, receiver and battery
- Motor, prop and ESC if desired
- Covering (Flying Film, Coverite MicroLite, CoverLite, UltaCote Lite etc.)

Tools needed to Complete:

- Masking tape
- Waxed paper
- Straight or T pins
- Straightedge
- Sandpaper 80, 150 & 320 grit
- X-Acto knife with fresh blades
- 90 deg. triangle
- Covering iron (heat gun optional)
- Thin & Med CA, Epoxy, ShooGoo or silicone equivalent
- Small piece of velcro or double sided tape to secure radio gear

I like to use a pipette for precise CA joints, especially with the thin stuff. The parts are small and it can run everywhere right out of the bottle if you aren't careful. They are available from a few different sources. Give them a try, I won't build without them now. Most of the construction uses thin CA, except in a few instances where med CA is called for. The fine one is shown, one with a larger tip for medium CA is also available. (Good CA suppliers also offer fine tips for their bottles.)

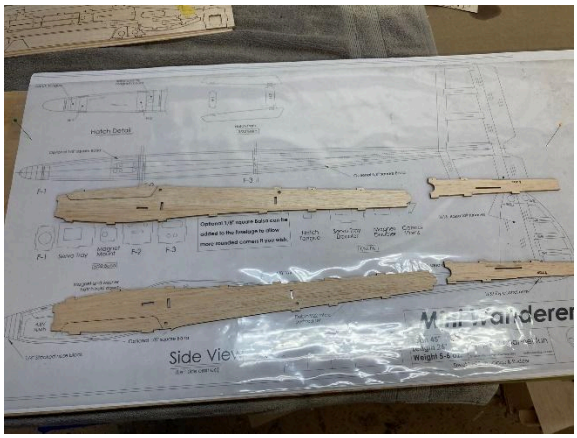
Fuselage Construction

Use thin, high quality CA glue (Cyanoacrylate) unless otherwise noted.

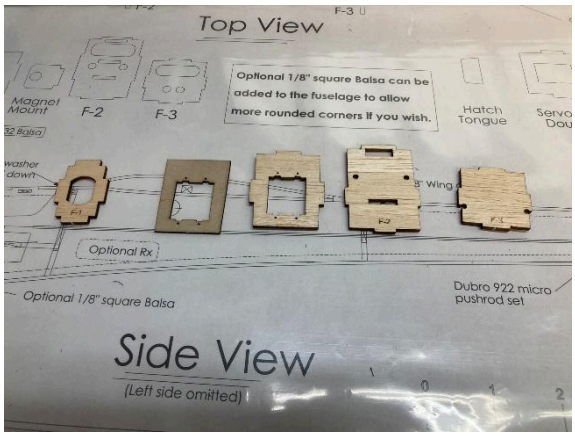
1. Start with plan sheet 1, fuselage and rudder.

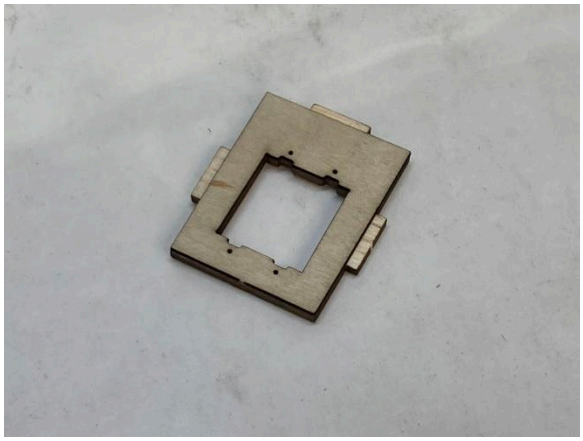
2. It is not necessary to build the fuselage over the plans, but it can be helpful for reference. Each fuselage side is cut in two pieces, tape the front and aft section together. Use a straightedge to ensure alignment and when satisfied bond in place. Note: Make sure you build a left & right side, marks to the inside.

   NOTE: Do not cut the canopy sides free yet. It will be built in place and cut loose later.



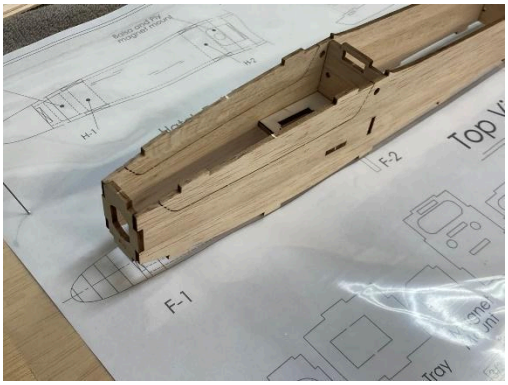
3. Locate formers F-1, servo tray, servo tray stiffener (ply) F-2 & F-3. Laminate the servo tray and stiffener with Medium CA. (It is a good idea to confirm servo fit into the tray at this time. Modify as needed. Tray is sized to fit the Emax ES9052 servos.)





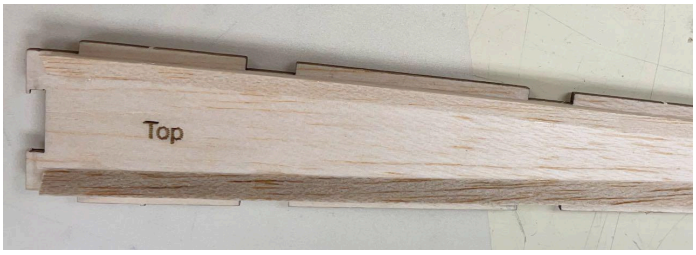
4. Tape the aft end of the fuselage sides together making sure that the right side has the pushrod exit. Dry fit F-3 but do not glue.

5. Working forward, dry fit F-2, servo tray and finally F-1 in place. Using a rubber band around the nose helps hold everything together before you glue. Once you have everything lined up square and straight, glue the fuselage sides together at the tail, F-3, F-2 servo tray & F-1



6. Locate the bottom sheeting pieces. Starting from the rear, fit the sheeting in place and bond. Care must be taken to not introduce a warp at this point. Continue with all of the bottom sheeting.

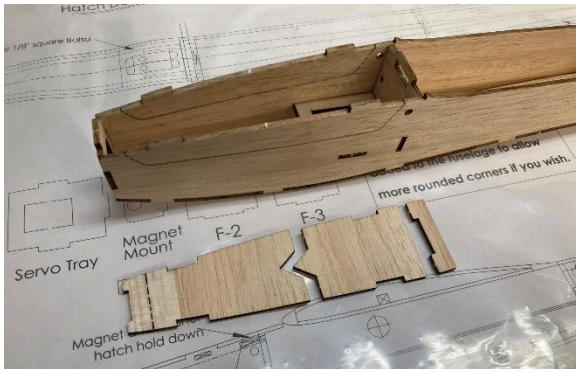
7. Flip the fuselage over and fit the optional 1/8" triangle stock inside the corners.
   Note: *For minimal weight the triangle stock can be skipped, but we do suggest the use of the stock for both a stronger joint and the ability to make a much more rounded fuselage. Stock is placed in all outer corners except the wing opening, also to the sides of F1 if you are using an electric motor.*

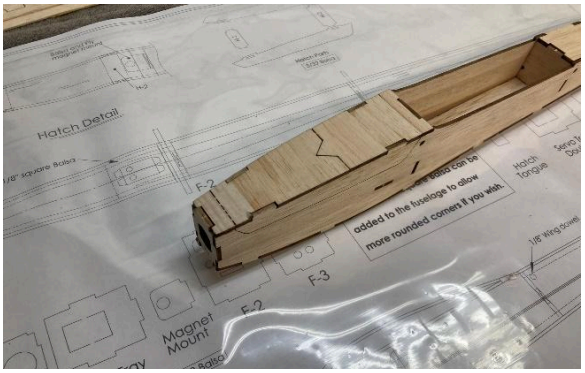


8. For the rear top sheeting the triangle stock can be added up to the tabs.

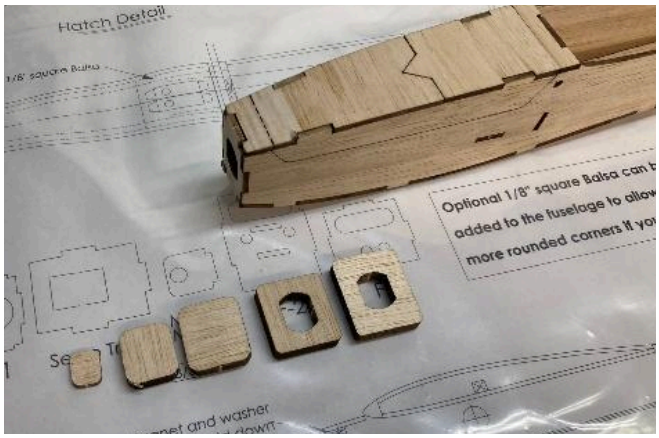
   NOTE: *At Aloft we like to install the pushrods at this time. Fully gluing them to the fuselage sides and installing F4. (Skip F4 if not installing pushrods at this time.)*

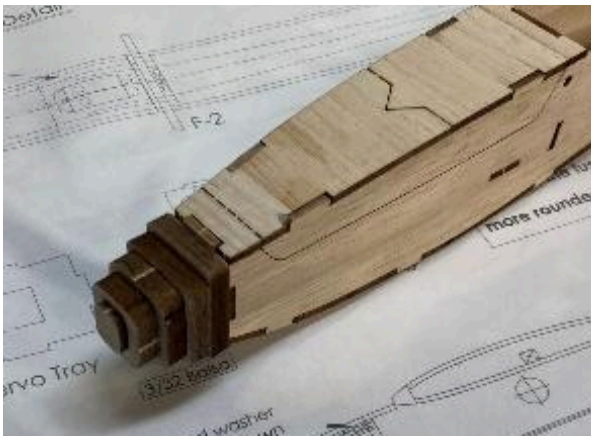
9. Add the upper sheeting to the nose and aft fuselage. We have added small holes to the aft fuselage to help glue the triangle stock to the sides. Just place one drop of thin CA on each hole.
   NOTE: *The sheeting over F2 will be bonded to the fuselage only, not the hatch.*





10. *<u>If you intend to fit an electric motor, see the addendum elsewhere in this manual.</u>* Locate and bond the stacked nose blocks in place as shown.

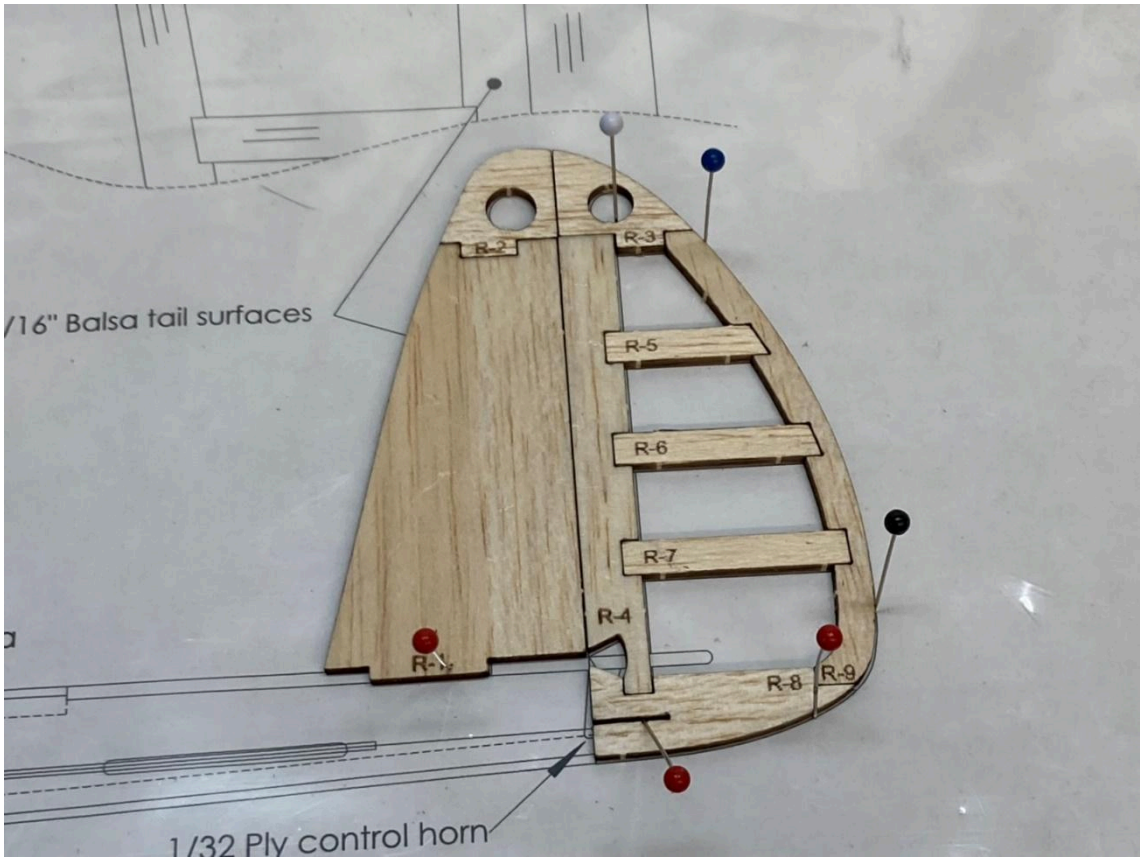




Tail Construction

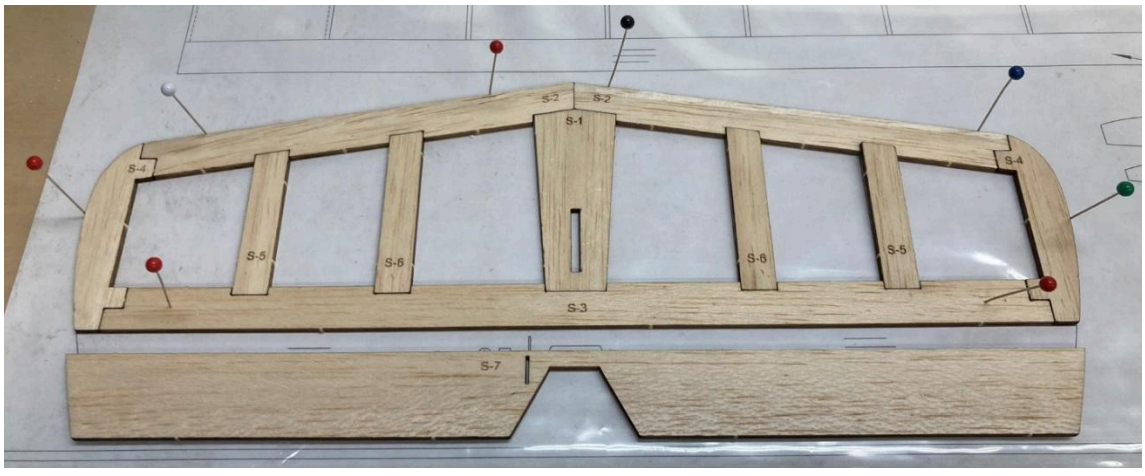
1. Locate all the vertical fin parts (Marked with an R series number) and lay them out as shown. Only glue R-1 & R-2 together (fin), and not to the rest of R-3 through R-8 (rudder).

   Then glue R-3 through R-8 to create the rudder



2. Switch to plan 2, wing and horizontal tail.

3. Locate the stabilizer and elevator parts S-1 through S-6 and bond together over plan.
   NOTE: Do not glue S-7 elevator to the rest of the stabilizer



Wing Construction

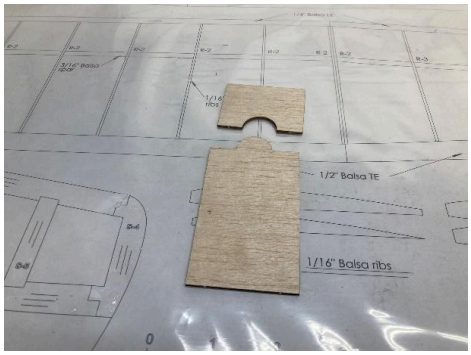
Although the wings are built directly over the plans, humidity (*or lack thereof)* can cause the plans to shrink or stretch. This can make the parts appear not to fit exactly. Not to worry, the parts are self-jigging and will end up in the right place. Use the plans as a reference to keep the ribs straight etc., but don't fret if the parts don't match the plans exactly.

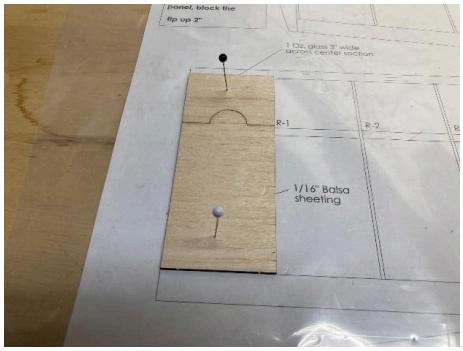
Each wing half is built with an inner and outer portion. They are joined together later to get the proper dihedral and polyhedral angles. The spars are cut with the dihedral & polyhedral angles precut, and a jig is included to check for accuracy.

Begin with the right wing.

1. Locate the bottom sheeting, it is in two pieces. Pin in place and bond together.

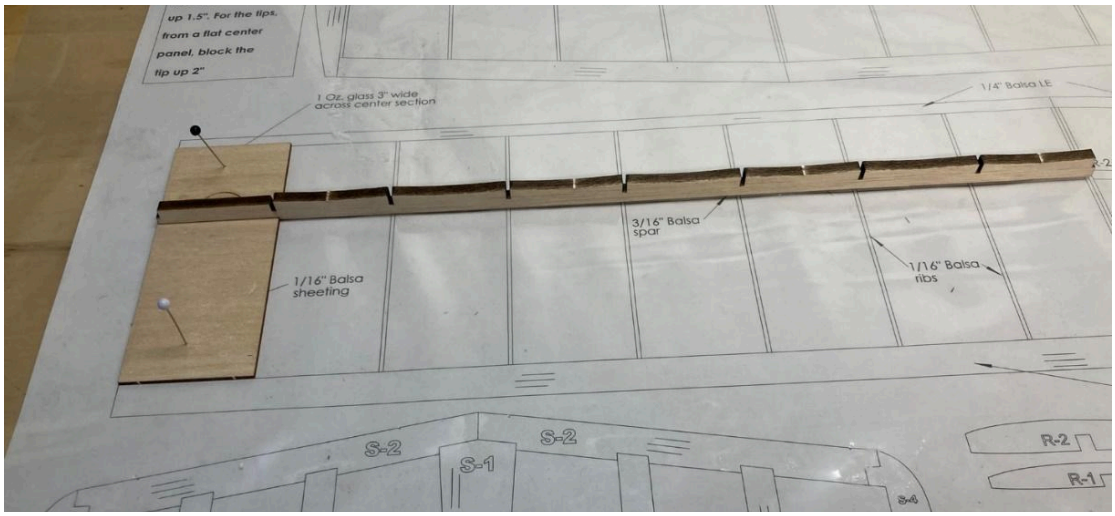
   NOTE: The bottom sheeting is shorter than the top. The aft pieces are the same, but the forward pieces are a different length. Use the shorter for the bottom.



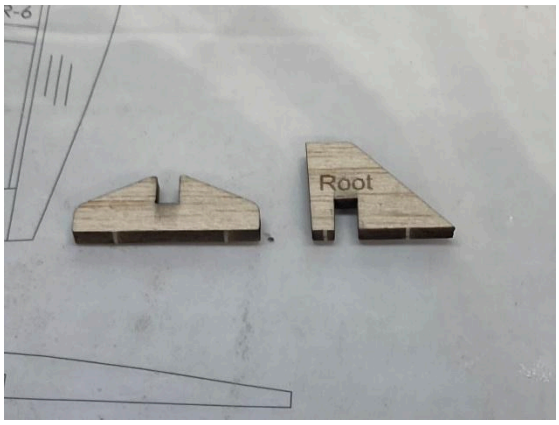


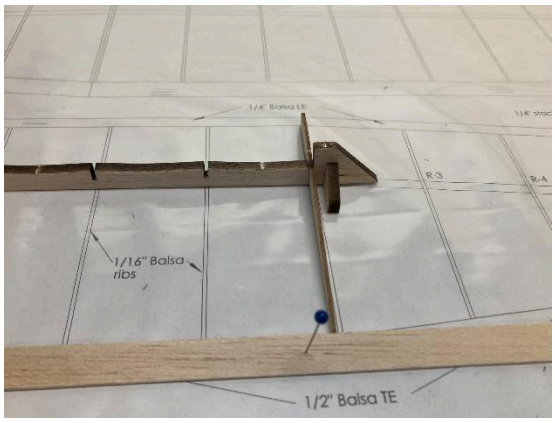
2. Locate the spar and position it in place over the plan, but do not pin.

   NOTE: the center portion of the spar is no longer notched to fit over the bottom sheeting when using the ***new basswood spar****, cut the sheeting where the spar is located. (Do not notch the new spar.)*

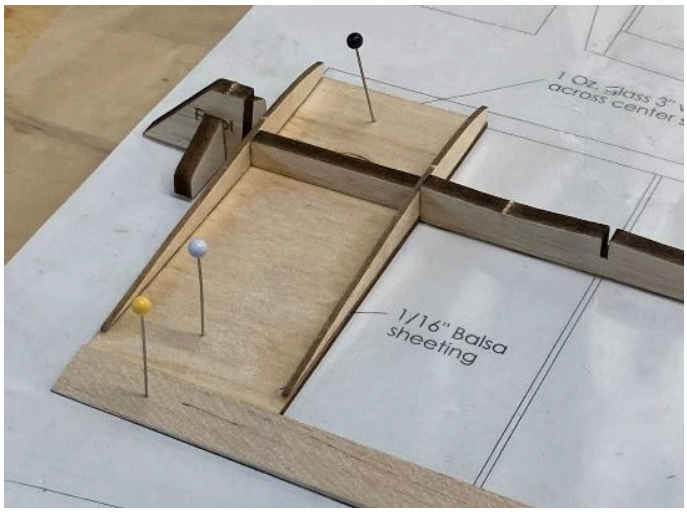


3. Locate the Root and Tip dihedral gauges & assemble. Using the TIP gauge, set the last R-2 in place, but do not glue yet. Fit the ½" trailing edge stock and pin in place behind F-2 and bottom sheeting.

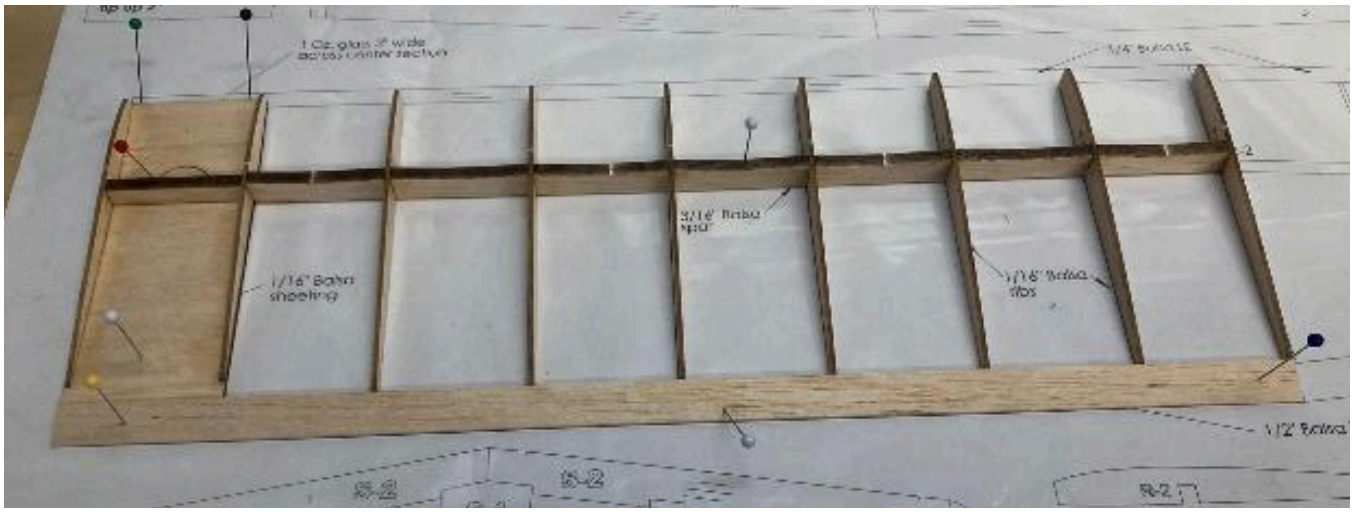




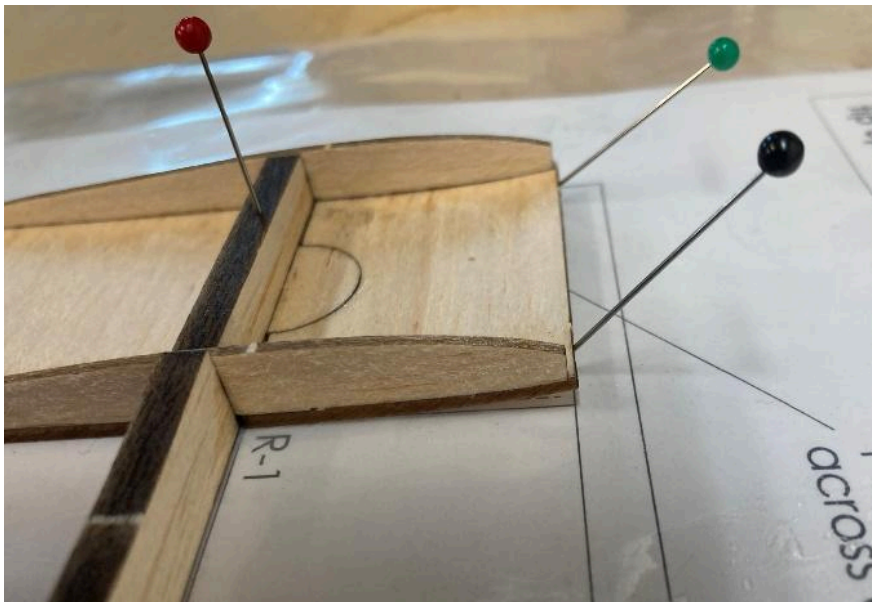
4. (2) R-1 ribs. Using the ROOT gauge, place R-1 at the proper angle on the spar. Add the second R-1 the same way, but align vertically. Add the rest of the R-2 ribs. Once satisfied with the fit, glue all the ribs in place to TE (note correct TE orientation) and spar.



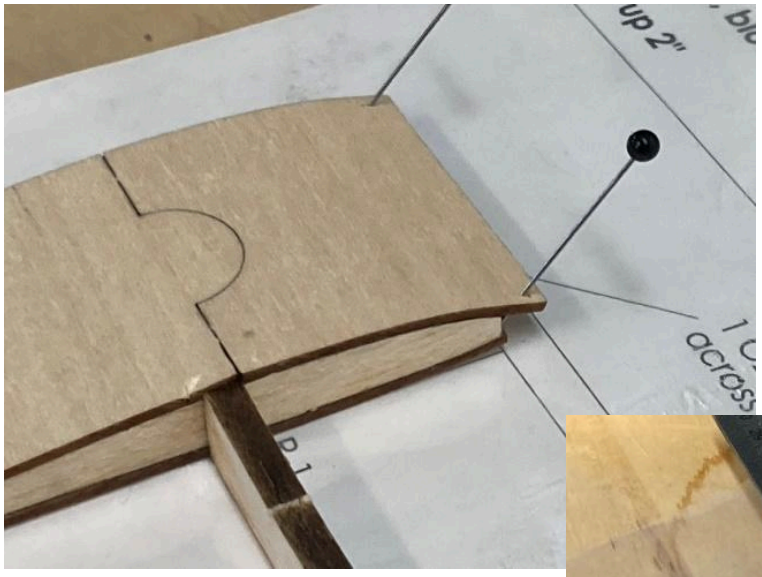
<u>Do not glue bottom sheeting forward of the spar to the ribs, that will be bonded in the next step.</u>



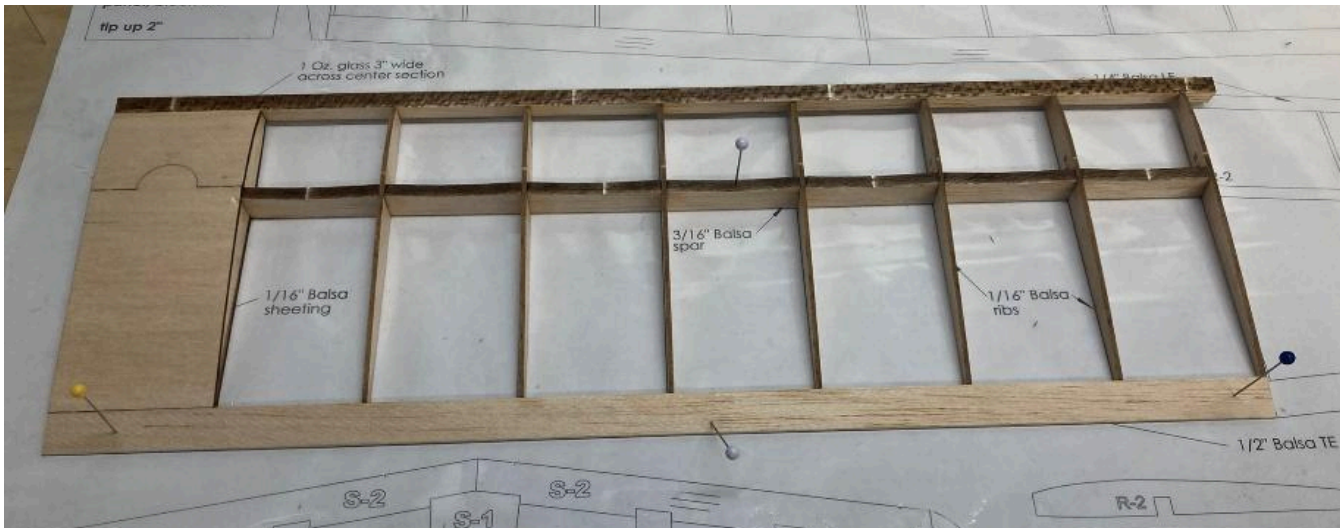
5. Using a couple pins ahead of, but not through, pull the bottom sheeting up to contact the bottom of the R-1 ribs as shown. Bond in place. Once dry sand any excess sheeting flush with the front edges of the R-1's.



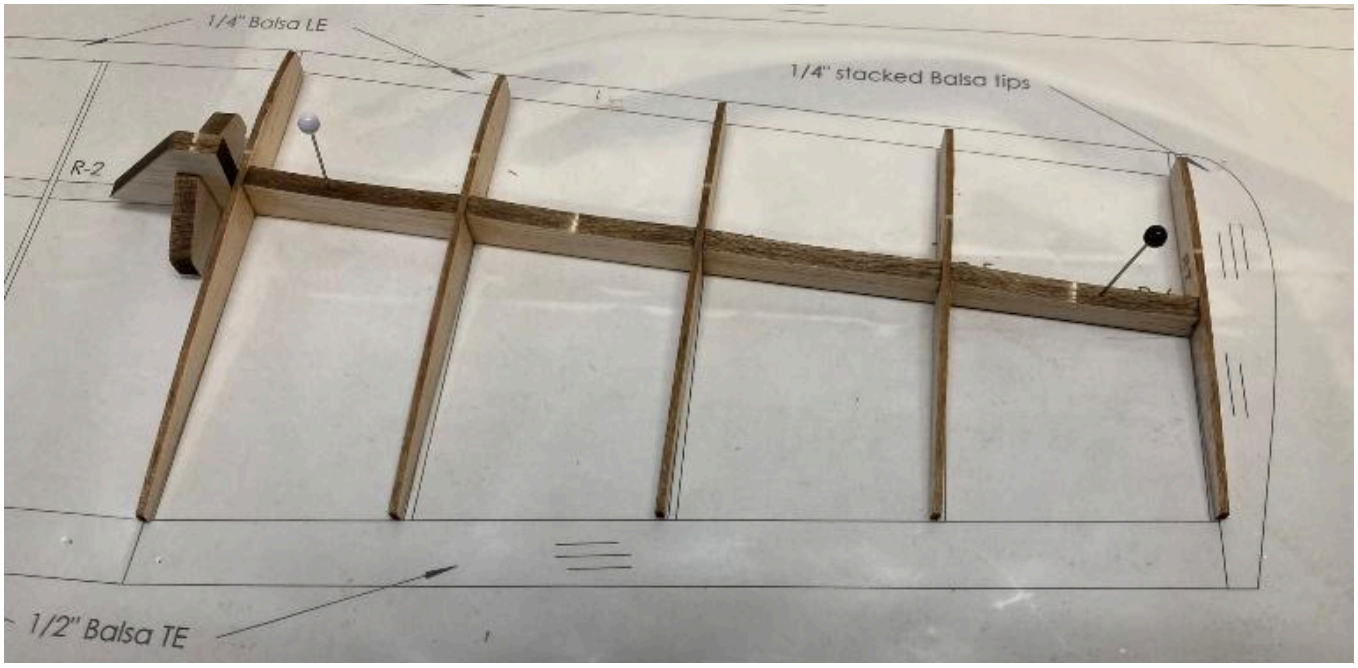
6. Assemble the 2 pieces of the top sheeting and bond in place as shown using pins. Once dry, trim the excess flush with the F-1's using an x-acto knife and straight edge.



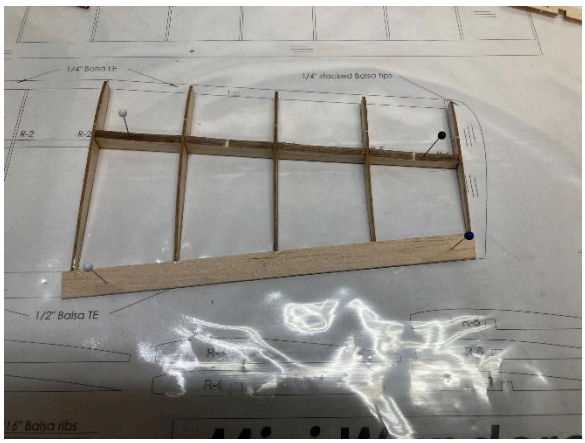
7. Fit the leading edge in place making sure it is well centered on the ribs and bond. You can now remove the right center panel from the building board to make room for the right tip.

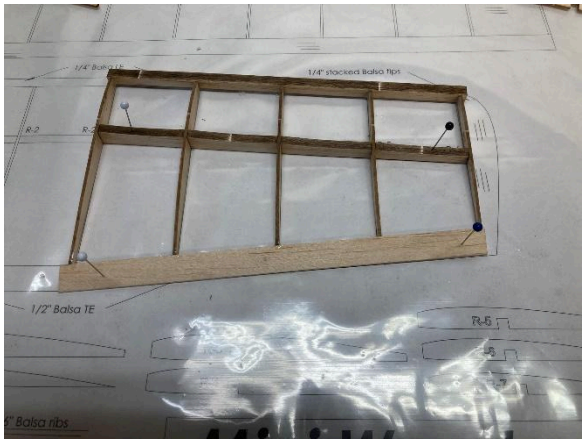


8. Pin the right tip spar in place over the plan. Using the TIP dihedral gauge, set R-2 in place at the proper angle. Add R-3 through R-6 but do not glue.



9. Add the leading edge and ½" trailing edge. Once satisfied, bond everything in place.





10. Laminate the two tip blocks, and bond in place.

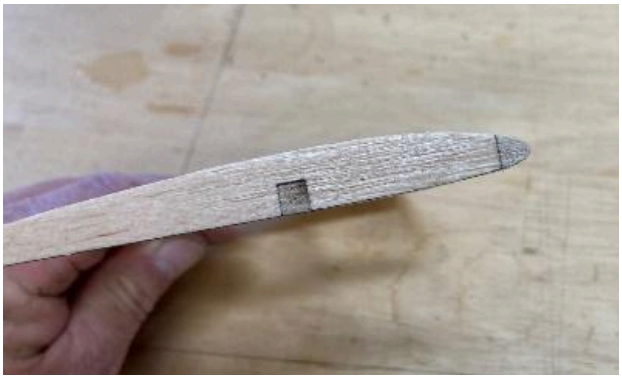
    Note: The tip blocks are made up of (1) 3/16" and (1) 3/32" pieces.

11. Remove the right tip panel from the board and repeat the above steps for the left center and tip panels.

<u>Wing Panel Assembly</u>

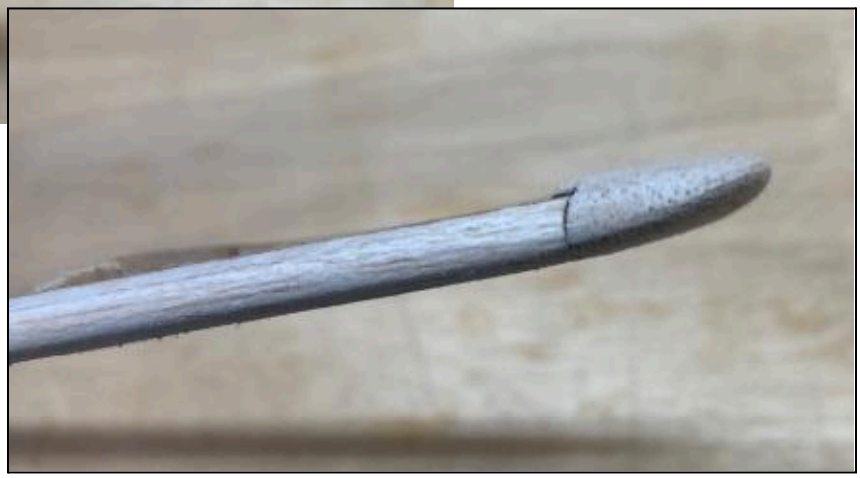
12. Sand the leading edge and trailing edge flush with the ribs at both ends of the wing taking care to preserve the proper angles. double check with the dihedral gauges.

13. Using masking tape to protect the ribs, sand the leading edge to rough shape top and bottom. start with an 80 grit block then fine tune with a 150 grit block.

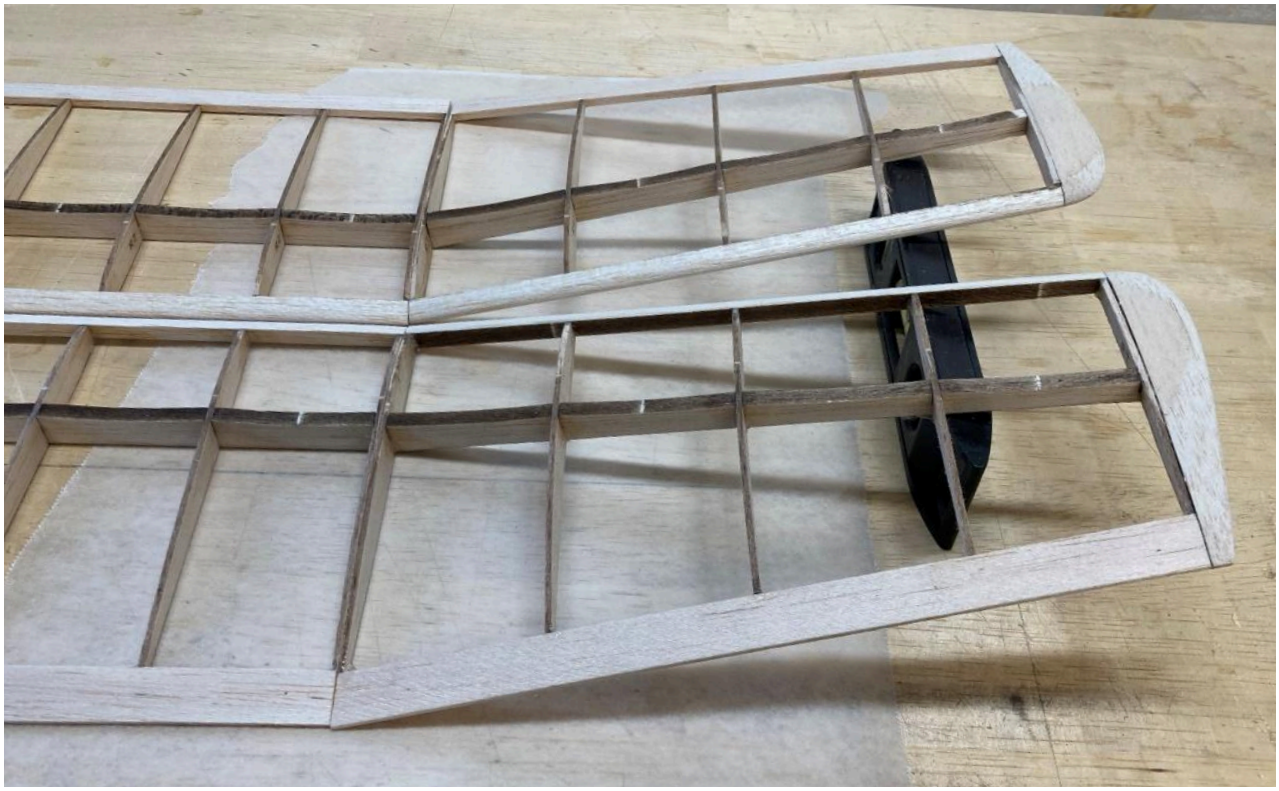



14. Rough shape the wing tip with 80 grit on a block. I like to sand from the bottom up following the natural contour of the airfoil. Leave about 1/16" of the laser etch line as a guide.z


15. Final shape the wing tips with 150 grit on a block followed by 320 grit by hand.

16. With the inner panel pinned flat, block the tip up to achieve 2" of polyhedral measured at the bottom of R-6. Sand the inner/outer joints so they match for a good bond. Pin the second wing right behind it so you can match the angles precisely. Bond with medium CA or epoxy.

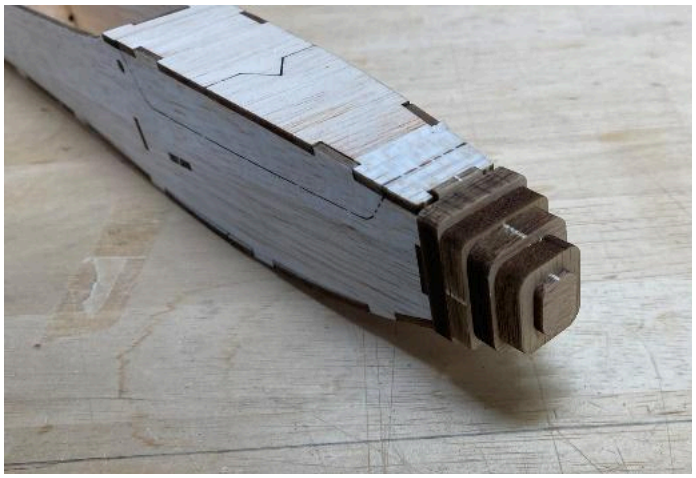


17. With one center panel pinned flat, block the other up to achieve 1.5" dihedral. Bond with medium CA or epoxy.

NOTE: If you intend to fly the model hard or launch from a bungee or aero-tow, it is recommended that you apply 1 oz. fiberglass cloth top and bottom of the center section joint 3" wide for reinforcement. Another option is to bond a little carbon tow along the bottom of the spar, tip to tip.

Hatch

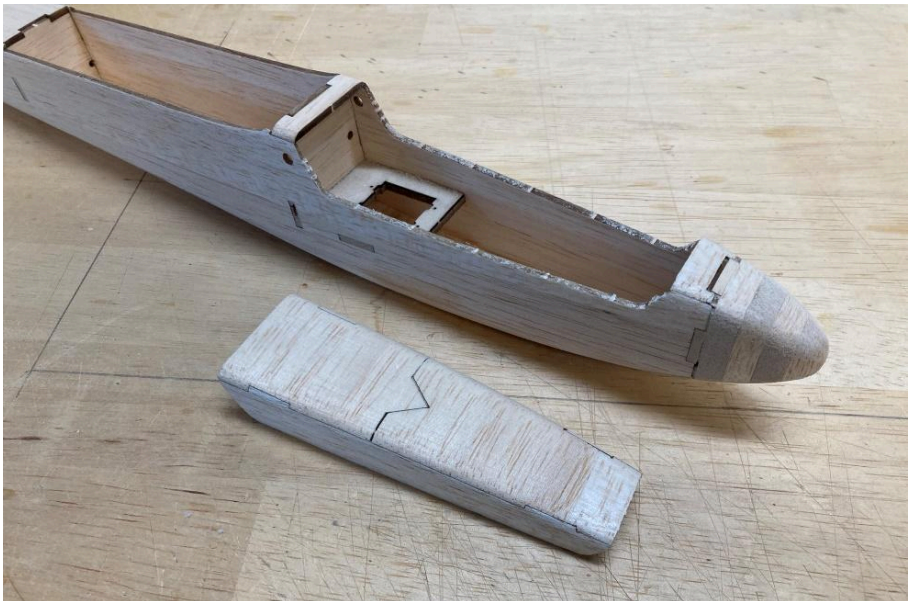
1. Beginning with 80 grit, sand the nose block to shape. I find it easier to sand it to rough shape with flat sides first.



NOTE: Please jump ahead and see our section for ***Rounding the Fuselage*** *later in the manual before proceeding.*

2. Using 150 grit round nose with the rest of the fuselage. Final sand with 320 grit.

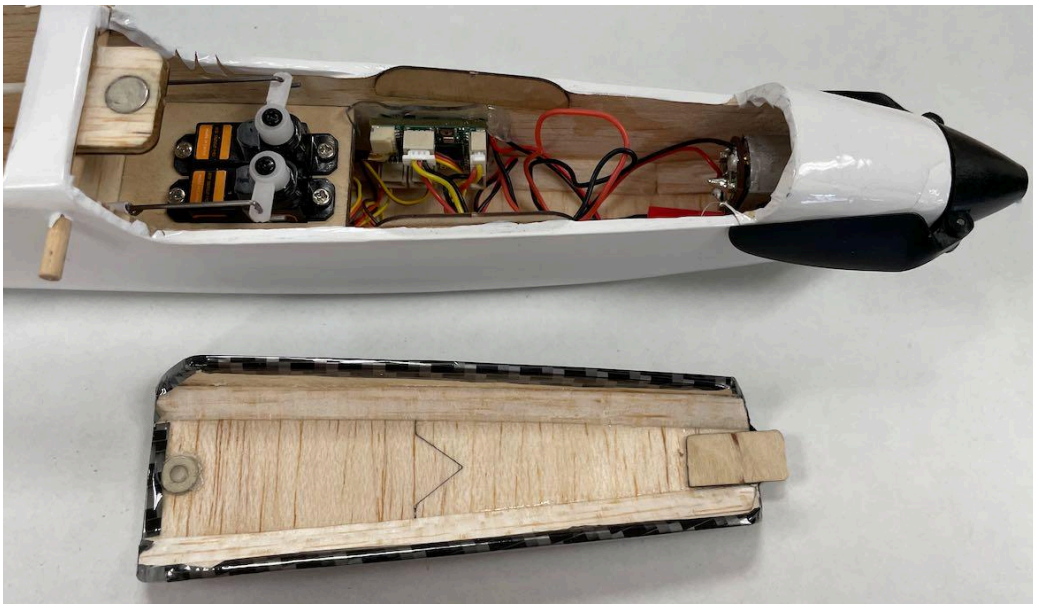
3. The hatch can now be cut free. A sharp x-acto knife works best.

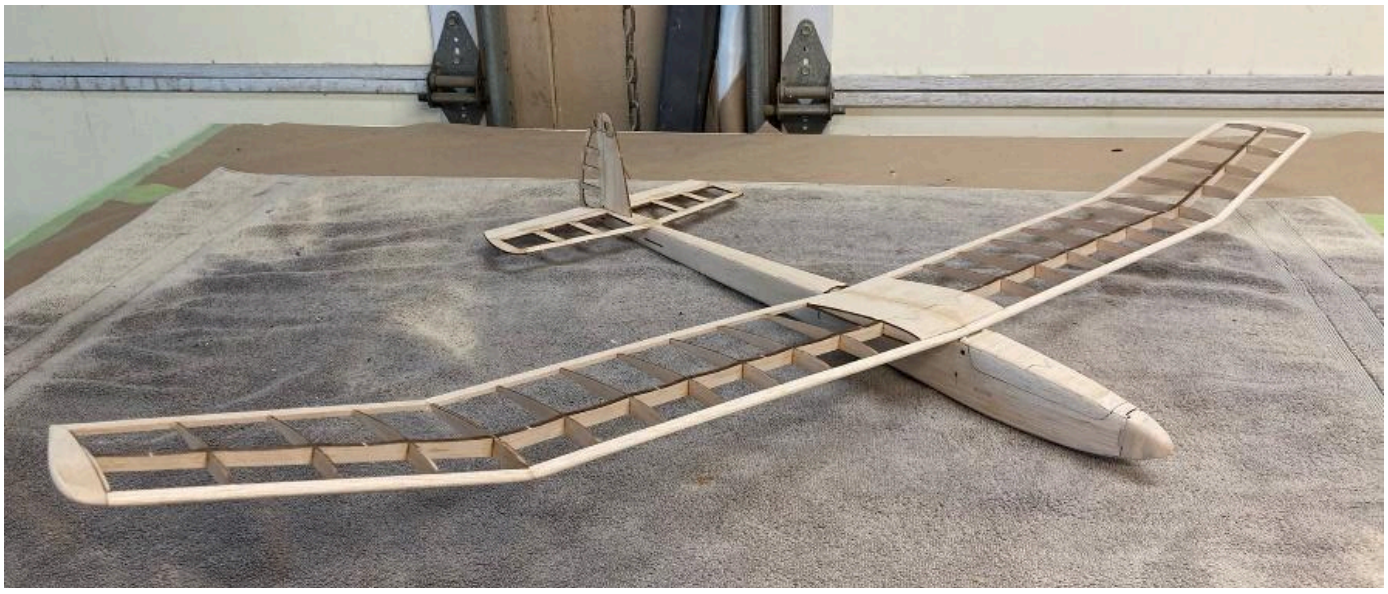


4. Locate the hatch mount, mount reinforcement (ply) hatch tongue (ply) magnet and washer. Laminate the hatch mount and reinforcement, bond the magnet in place with Medium CA.

5. Glue the hatch tongue in place as shown.

6. *<u>You may want to skip this step until after the fuselage is covered and the servos are mounted as the hatch mounted in place limits access to the aft servo mounting screws.</u>*
   Glue the washer flush with the aft edge centered as shown with Medium CA. Place the hatch mount in place, but do not glue. Install the canopy, this will put the hatch mount at the correct angle for a perfect fit. Bond the hatch mount in place from behind F-2 in the wing mounting area. Once dry remove the hatch and bond to the front of F-2 and underside of the top sheeting. Done correctly, the mount will have a slight gap under the fuse sheeting to match the slope of the hatch.
   Install the plywood hatch guides to the inside of the fuselage. Slightly round the inside edge of the hatch sides to easily slide into place. In this photo you can see the triangle stock installed in the hatch, we recommend adding this if you did not already.





(tail is not glued, just resting in place for this photo)

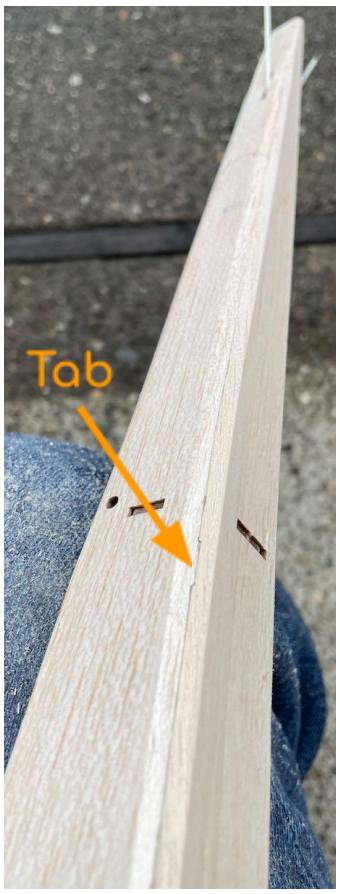
Rounding the Fuselage with triangle stocks installed

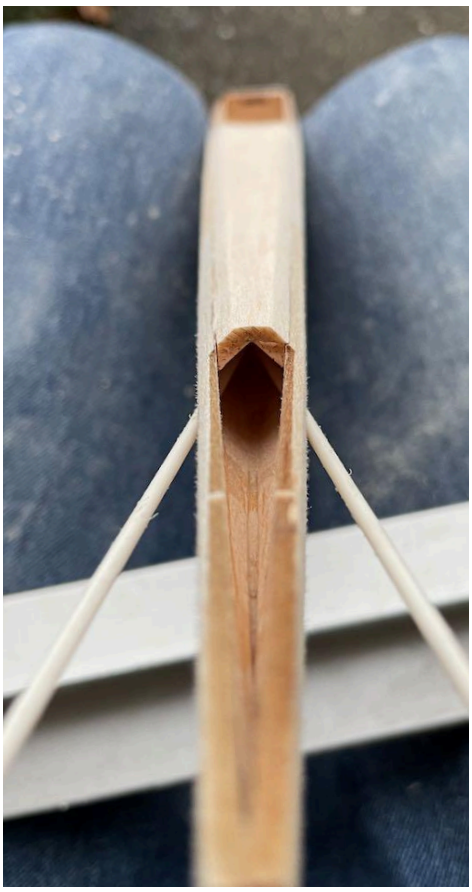
The triangle stock allows us to make a much better looking model. Many people find this process a bit scary, the way we have designed the Mini Wanderer makes this far easier.

First off, get a comfy chair outside. We recommend 2 sanding blocks. One with 80 grit, and another with 150 grit. (Nothing fancy, you can glue some paper to a piece of wood.) We start off with the 80 grit and attack the corners at a 45 degree angle. The course paper will make quick work and keeps everything nice and flat. Smoother paper can leave pumps where the CA glue joints are.

The goal as you sand is to keep the glue joint of the wood in the middle of the sanded bevel. Just adjust your sanding block to achieve this.

The goal is something like this:



You can sand the bevel until all signs of the corner tabs have been removed. (See arrow above) In the last photo above you can see we still have a lot of material left.

When you are happy with the 45 degree bevels you can then start rounding off the corners of the bevel. Rough it into shape gently with the 80 grit block, then switch to the 150 grit for final rounding. No need to rush, it will go pretty fast. If you notice some wood pop free, just add a drop of thin CA before continuing.

Take your time on the nose block, checking to see that the left and right sides are matching. If you find some lumps you don't like, you can switch back to the 80 grit and make a few passes to smooth them out before jumping back to the fine grit again.

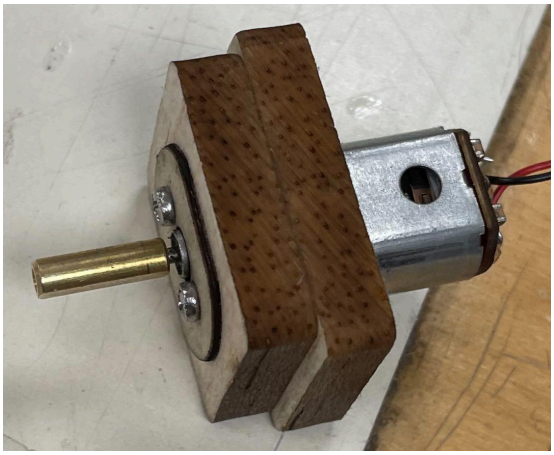
We like to fill any voids with some scrap balsa or light weight filler as seen above. It is then ready for final sanding with 320 grit prior to covering.

Hot Tip - The hatch should have a very tight gap at this point. It is not a bad idea to use the 150 grit block to very carefully sand the edges of the hatch to make a tiny gap for the covering to occupy.

Electric Motor Installation

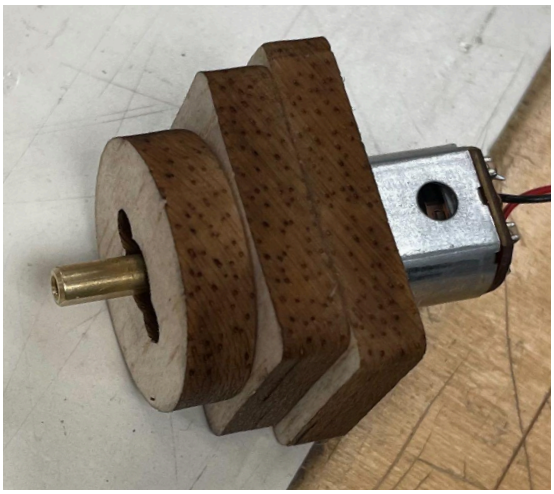
We have chosen a brushed motor with a folding prop. Why a brushed motor in this day and age?

- Low cost
- Micro receivers tend to offer brushed ESC.
- It works well for the CG on this model.



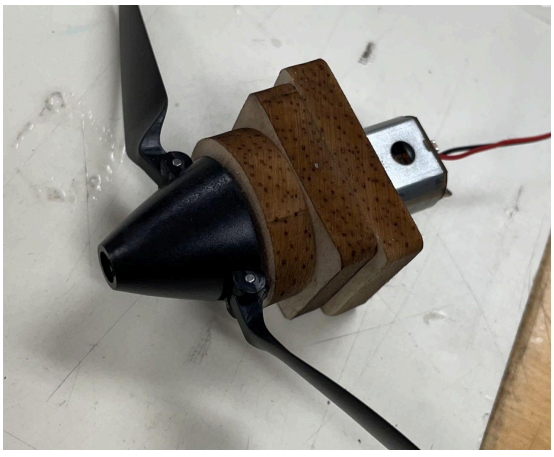
1. Find the nose blocks and slide them into position and lightly screw the motor to the plywood. Lightly tack glue the blocks with a tiny bit of thin CA being careful to keep it away from the motor.

2. Remove the motor and add more glue to the wood joints.



3. Add the round block as shown and glue (do not install motor when gluing) make sure you have oriented the round block so you can still access the motor screws!

4. Install motor and slide into position on the F2 bulkhead. Carefully tack the blocks to F2 so you do not glue the motor. Remove the motor and fully glue blocks to F2.



5. Test fit the spinner and prop on the plane. Trace a circle around the spinner with an ink pen onto the round block. This will be your sanding guide. The spinner is just a bit wider than the fuselage sides so be careful not to remove much material from the sides when sanding to shape.
6. We find some of the blades will not fully fold when the motor is off during flight, a bit of trimming of the plastic on the blade root and hub may be needed to cure this.

Covering

Once again go over the entire airframe, this is your last chance to check for blemishes. I'm going to assume that you know how to cover, so I will not go over it step by step. However, I will offer a few tips;

- Cover the bottom of the wings first. This helps to hide the seams and makes for a nicer job. I was able to cover each half of the bottom in one piece. The top I had to do in 4 pieces, 1 each left and right inner and outer panel.
- Cover the fuselage starting with the bottom, each side and finally the top, then the hatch.
- It is best to tack and then seal all edges first, then shrink the middle sections. If you have a covering heat gun, they make this step much easier, but be mindful not to overheat the covering or over shrink.
- If pushrod housings are already installed, avoid contact with iron or heat gun.

  In this photo the film on the side of the fuselage is tacked in place but not yet shrunk.

The sequence below describes my method for using covering as a hinge. Although it takes a bit more time this makes for a very durable hinge and I think a nicer looking model. If you plan to use another hinging method, please read through and deviate where appropriate to suit your needs.

1. Final sand the tail pieces, round all the leading and trailing edges, but *do not* sand the hinge lines.

2. Sand a 45-degree angle into the bottom LE of the elevator.
3. Tape the elevator in place and sand to fit if necessary to achieve a tight, straight gap.
4. Cover the bottoms of the Stabilizer and Elevator first. Once done, tape the Stabilizer and Elevator together (over the covering), flip it over and cover the top in one piece. This will yield a nice tight gap free hinge. If the hinge is too tight, you can heat it up with your iron and flex it further if necessary.
5. Use the same process for the rudder.

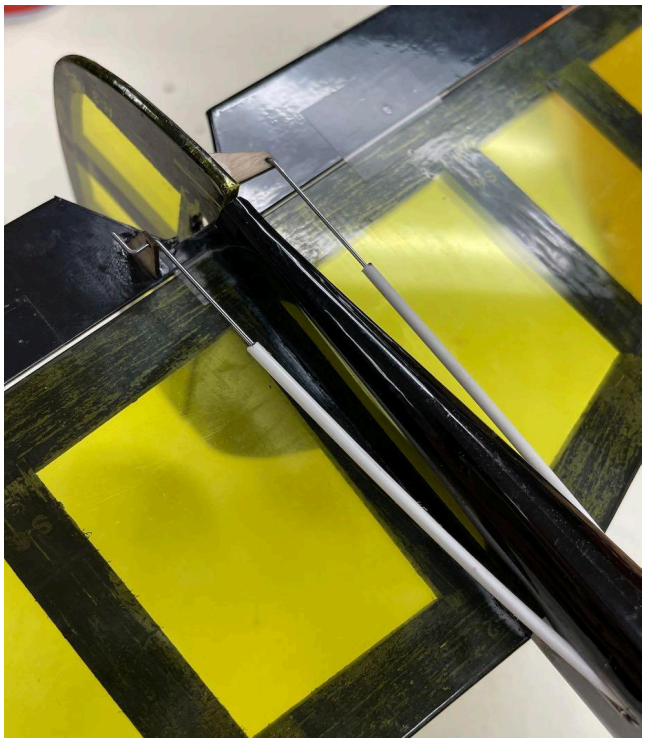
Final Assembly

1. Remove the covering where the wing hold down dowels will pass through and install with Thin CA. Install the wing with a few rubber bands. This plane does not need a lot of force from the rubber bands. 2 is plenty, 4 is safe.
   NOTE: If you are using heavier rubber bands, (2) ply pieces are provided to bond to the wing to keep them from digging in to the wing. If you have glassed the center section, these pieces are not necessary.

2. Carefully remove the covering from the bottom of the stabilizer and top of the fuselage where they will bond. Block the horizontal tail level and square with the wing and bond in place. Medium CA is fine for this. Try to keep it square to the fuselage.

3. Repeat for the vertical tail, removing film from glue joints. A 90 degree angle is helpful for this step.

4. If you have not already, locate the two pushrods. Feed the outer sheath through F-3 towards the aft exit slots. If you have trouble getting the sheath to exit from the fuselage side, add the wire push rod and use a magnet to guide it through. Bond the housings into the fuselage at F-3 and where they exit.



5. Starting with the Elevator, locate the ply control horn. Uncover the horn slot in the elevator with an X-acto knife.

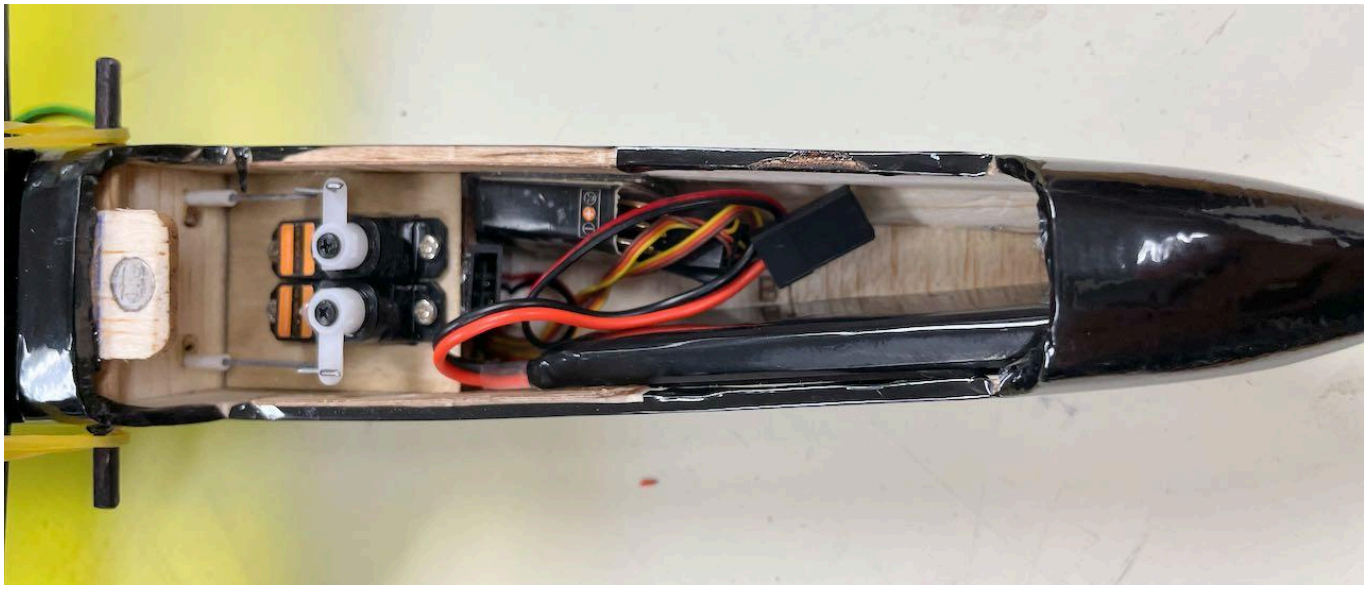
6. Place the horn on the pushrod (Z bend or keeper) and install in the slot.

7. Tape the elevator straight. Making sure the servo is still centered, and then fit the horn in the slot in the Elevator. Adjust the horn till it is vertical and keeps the elevator centered. Glue in place with Medium CA.

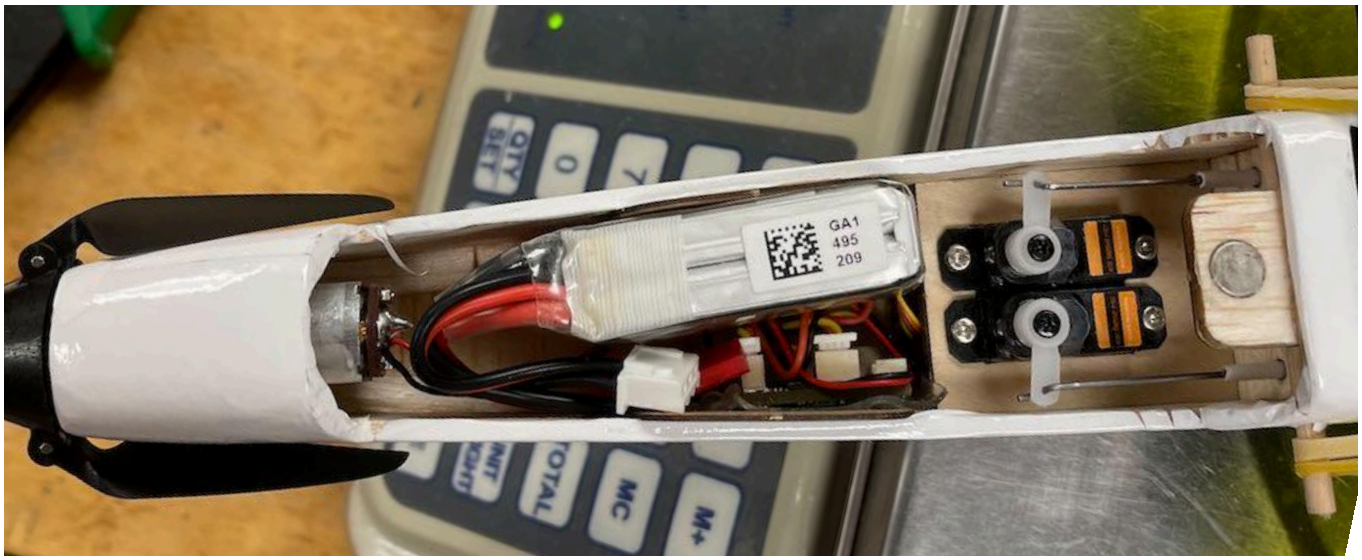
8. Repeat for Rudder.

9. Set up the radio so the rudder is close to touching the elevator cut outs at full throw. Adjust elevator so you have ¼" up and ¼" down at the trailing edge. You can add 20% expo to the elevator if you like, but may be best not to add any to the rudder.

10. Add a piece of Velcro in the fuselage to hold the battery in place.
    Typical radio install for glider using 1S Lipo battery and some lead in the nose:

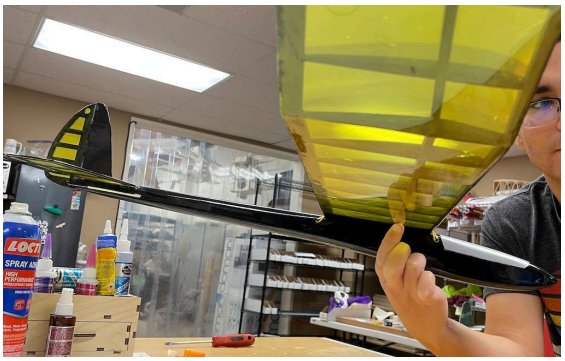


Typical radio install for electric version using micro receiver:



11. It is very important to adjust the Center of Gravity (CG). The **CG is located on the spar at the sides of the fuselage**. For beginners we suggest first flights with the CG near the front of the wing spar. You can slowly move the CG back each flight until you have found the point you like the most. At the rear of the spar the Wanderer should perform nice loops without much effort.

    To measure your CG, place the assembled model with hatch and all gear in place and put your finger tips under the wing near the spar, move your fingertips until the model points slightly down, this is your current CG location. You can add or remove ballast to fine tune.



12. The electric version will be very close to CG depending on your radio gear. CG should be able to be adjusted by battery location when using a micro receiver. The electric motor is designed for a 2S 450mah lipo battery. The recommended Emax servos are limited to 6 volts, so you may need to add a BEC to limit voltage to the servos as many micro receivers do not offer this. Aloft offers a micro BEC that works very well for this.

Congrats! Your Mini Wanderer is now complete!

For first flights we like to recommend a nice green lawn to do a few glide tests.

<u>Preflight</u>

- ☐ Double check CG.
- ☐ Check for proper direction of Rudder & Elevator, throws of your choice, it's not critical.

We hope you enjoyed this project and it will bring many years of trouble free use.

If you have any issues or have suggestions to improve, please let us know!
contact@alofthobbies.com

Enjoy!

Red and the Aloft Team!