PB-2 EF-1 RACER

Approved for AMA EF-1 Pylon Racing

Assembly Manual

SPECIFICATIONS

Wingspan	**50.5 in**
Wing Area	**408 sq.in**
Weight	**3.0 to 3.5 lbs**
Length	**39 in**
Radio	**4 channels**

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Algonquin, Illinois 60102
USA
Email: sales@gator-rc.com
Phone: 1-800-380-9373
www.gator-rc.com

INTRODUCTION

Thank you for choosing the Gator-RC PB-2 ARF! This model captures the look of the full scale Formula 1 Proud Bird race plane. The PB-2 is designed to meet the requirements of the AMA Electric Formula 1 (EF-1) class racing rules and is approved for AMA EF-1 racing. The PB-2 by GRC is an updated version of the classic Proud Bird EF-1 racer, one of the most popular planes for the class since its beginning. Originally, designed by highly respected and multi time AMA NATS winning pylon racer, Jim Allen, the Proud Bird EF-1 has been both a competitive EF-1 race plane and a great everyday sport plane. Gator-RC and Jim worked side-by-side throughout this project to refine the original racer into something we know you will be PROUD to own.

The rules for the AMA EF-1 racing class can be found on the AMA Competition Regulations page at:

https://www.modelaircraft.org/events/competition-resources/competition-regulations

The model will accommodate a variety of brushless motors, electronic speed controls and batteries but is designed specifically around the motors approved for EF-1 racing.

The PB-2 was specifically designed for racing but, it makes a great sport flyer too. For a more relaxed experience, use a 3S battery and appropriate propeller, the plane flies at perfect speeds for general sport flying with longer flight times than the 4S race setup. Testing has shown that the approved EF1 racing motors work great with a 3S battery for sport flying with the only recommended change along with battery is to the propeller. Propeller recommendations for 3S and 4S setups are covered later in the manual. The choice is yours.

This instruction manual is prepared to help you assemble and dial in the model to be a great flying addition to your fleet. Please read the manual thoroughly before starting the assembly process. This will greatly improve the enjoyment of getting this plane into the air safely and successfully.

WARNING

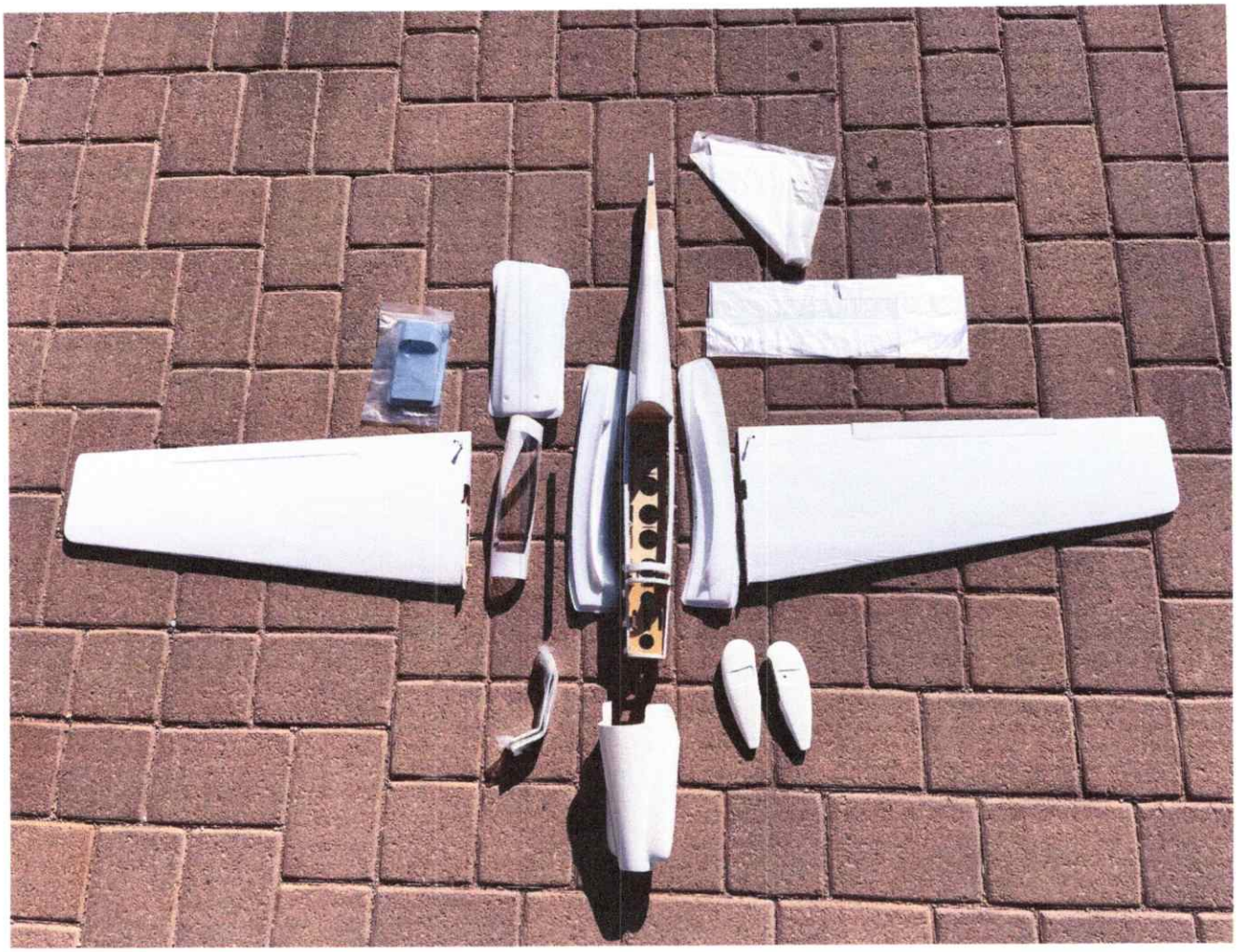
Please be aware that this airplane is not a toy and if assembled or used incorrectly, it is capable of causing injury to people or property. When you fly this airplane you assume all risk & responsibility.

This is a high performance airplane and needs to be respected for its capabilities. If you are not an experienced pilot, it is highly recommended that you seek out the assistance of an experienced pilot to help you with your first flights. A local R/C model flying club can have members who can be very helpful in achieving success in flying your model.

ACADEMY OF MODEL AERONAUTICS

If you are not already a member of the Academy of Model Aeronautics (AMA), we recommend you join this great organization. The AMA is an FAA recognized Community Based Organization (CBO) for model aviation. Membership provides liability insurance coverage, protects modelers rights and interests and is required at most R/C flying sights. For more information on the AMA, they can be found at:

Academy of Model Aeronautics
5151 East Memorial Drive, Muncie, IN 47302-9252
Phone (800) 435-9262
www.modelaircraft.org



KIT CONTENTS

Fuselage
Wing Set
Horizontal Stabilizer & Elevators
Vertical Fin & Rudder
Cowling
Canopy and Frame
Wheel Pants
Main Wheels
Main Landing Gear
Belly Pan
Wing Tube
Wing Filets
Cockpit Floor
CA Hinges
Wheels
Tail Wheel Assembly
Various Hardware

ADDITIONAL ITEMS REQUIRED

Brushless outrunner electric motor
Electronic speed control (ESC)
Radio with 3 mini or micro servos
4S or 3S Lipo Battery
Propeller to suit selected power system.
1 ¾" (45mm) spinner
Hook/Loop, adhesive type
Hook/Loop, strap type
With EF1 approved motors:
APC 8x8E or 9x6E for 4S battery.
APC 9x7.5E or APC 9x9E for 3S battery.

Note on Propellers: After extensive testing, the AMA EF-1 racing class has changed the official racing propeller to the APC 9x6E, starting in the beginning of 2024. The former official prop, the APC 8x8E is still a good prop for the PB-2 and gives a bit more ground clearance if that is an issue at your flying site. The speed with the APC 8x8E and the 9x6E are very similar. It has been found that the 9x6E gives the PB-2 friendlier handling due to less torque effects.

TOOLS AND SUPPLIES NEEDED

Thin and medium CA glues
30 minute epoxy.
5 minute epoxy.
E6000 or Zap-Goo elastomeric glue
Hand or electric drill
Assorted drill bits
Modeling knife
Straight edge ruler.
Masking tape.
T-pins.
Paper towels.
Various hand tools
Curved scissors for cutting lexan car bodies.
(NOTE: These curved scissors are a big help when cutting plastic parts out as will be done assembling this plane. The benefit of having and using a set of these scissors can not be stressed enough)
Optional: Z-bend pliers

EQUIPMENT CHOICES TO BE MADE

BRUSHLESS MOTOR

There are many brushless outrunner motors available that will work well in the PB-2. For EF-1 class racing, a motor approved for the racing class will be required for EF1 competition.

Popular Approved EF-1 Motors:

Spektrum Avian EF1 Race 3545-1250kV
(previously sold as the Great Planes Rimfire EF1 motor in gold anodize color. Both Avian and Rimfire versions are approved motors)

E-Flite Power 25 1250kV

Cobra C-2826-EF1 1200kV and C2826-EF1-SS

ELECTRONIC SPEED CONTROL

EF1 rules require a minimum of 60A ESC but not specific "approved" ESC's. For racing, higher amperage ESC's may be desirable for performance and reliability under race conditions. ESC's in the 75A, 80A or 100A versions are typical.

Popular ESC's:

Castle Creations Talon 60A or Edge Lite 75A
Spektrum Avian 60A or 80A Smart ESC
Futaba MC980H/A(J) 80A ESC
Hobbywing Platinum Pro 80A ESC

BATTERIES

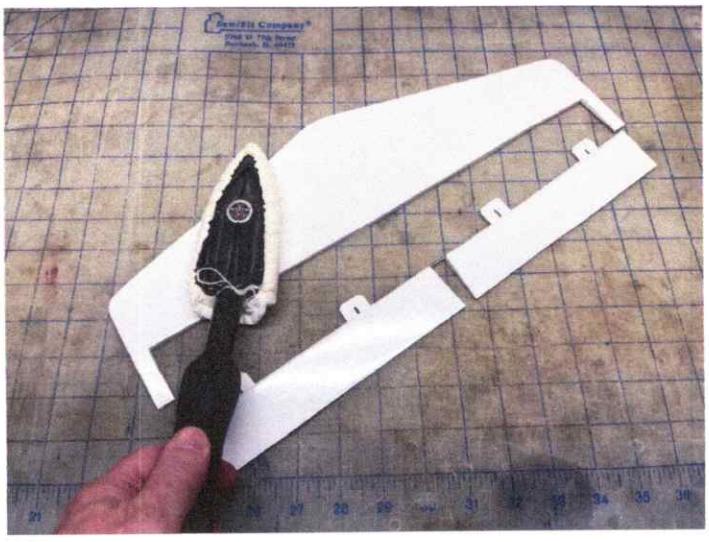
Racing and high performance sport flying:
4S Lipo batteries with 2500 to 3600 mah capacity.

Sport flying:
3S batteries from 2200 to 4000 mah can be used.

For EF-1 racing a 4S battery is required with a maximum weight of 365g, with connectors. Batteries commonly used in this type of competition are higher "C" rated packs for best performance. "C" ratings are best compared within a given brand of battery as each manufacturer has their own criteria for defining the "C" rating for their packs. Batteries with higher "C" ratings are typically heavier than those with lower "C" ratings of the same mah capacity but will perform better due to lower voltage drop under load. For racing the EF-1 class, be careful when selecting your batteries to make sure they do not exceed the 365g maximum weight required for EF-1 racing.

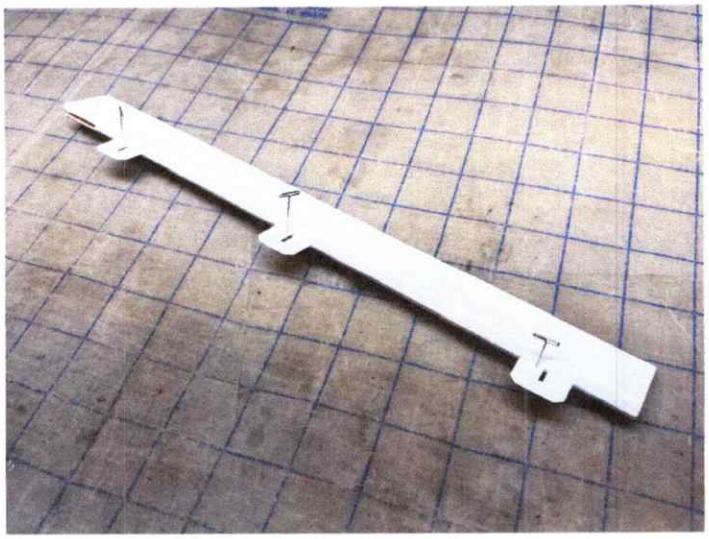
INSPECTION AND PREP FOR ASSEMBLY

Remove the kit pieces from the box for inspection. Look for any damaged or missing parts. Remove the rudder and elevators from the tail surfaces and the ailerons from the wings. Be sure to mark which aileron came with each wing panel. Set the hinges aside. Use a covering iron with a covering sock to tighten the covering material if necessary.

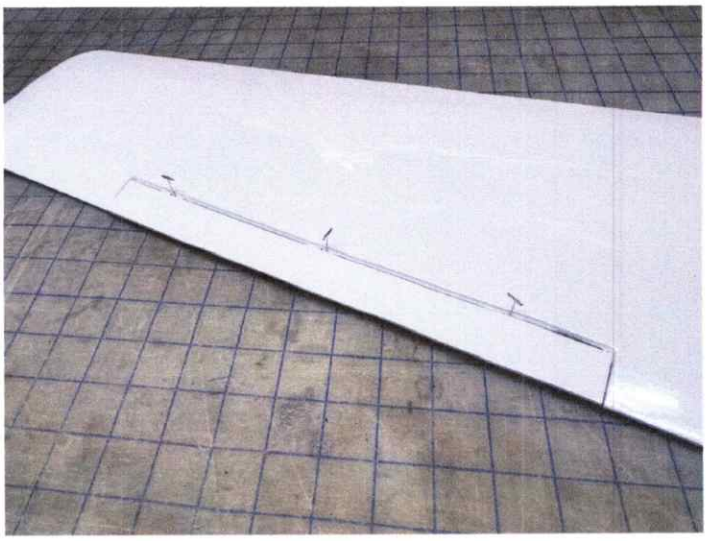


WING ASSEMBLY

Select hinges for the ailerons and insert a T-pin or similar in the center of each hinge. This will keep the hinge centered between the wing and the aileron during installation. This will be done on the hinges for the elevators and rudder control surfaces as well.



Slide hinges into each of the slots in the ailerons till the T-pin gets to the surface.



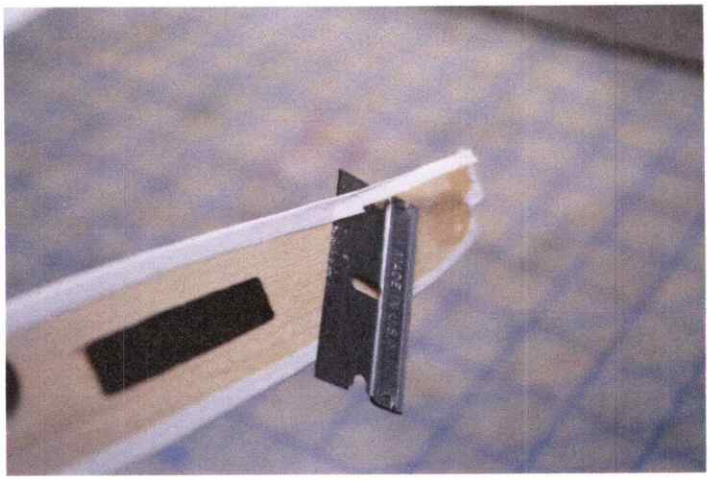
Test fit the ailerons and hinges to the wings, engaging the aileron torque rods into the ailerons. Be sure each of the ailerons is centered in the wing opening. It is recommended that you keep each aileron mated with the wing they were temporarily hinged to when received.

Once satisfied with the fit, remove the ailerons from the wings. With a small piece of sand paper, sand the torque rod arms a bit to scuff the surface for better adhesion of the epoxy when installing the ailerons.

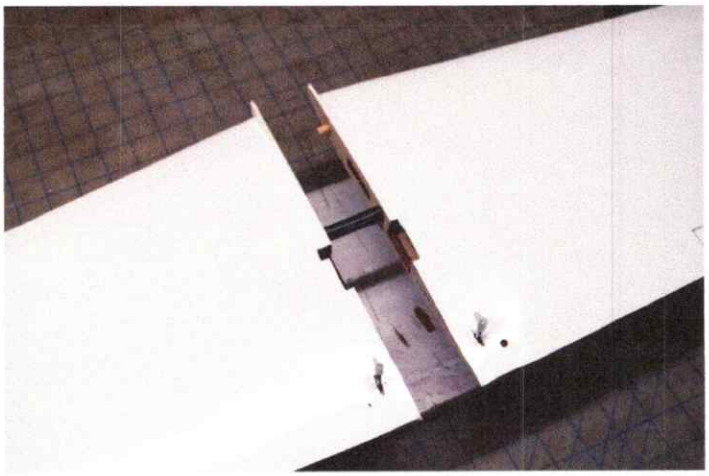
Mix a small amount of epoxy to glue the torque rods into the aileron holes. 5 minute epoxy will work but you will need to work fast to get the aileron and its hinges installed. A separate batch of epoxy is suggested for each aileron if using the 5 minute epoxy.

Apply a bit of epoxy to the arm of the torque rod wire and use a toothpick to put a bit down into the hole in the aileron. Now slide the aileron into place, engaging the hinges until the hinge gap is only the width of the T-pins. Remove the T-pins and push the aileron a bit more into the wing to minimize the hinge gap, once again making sure the end gaps are the same.

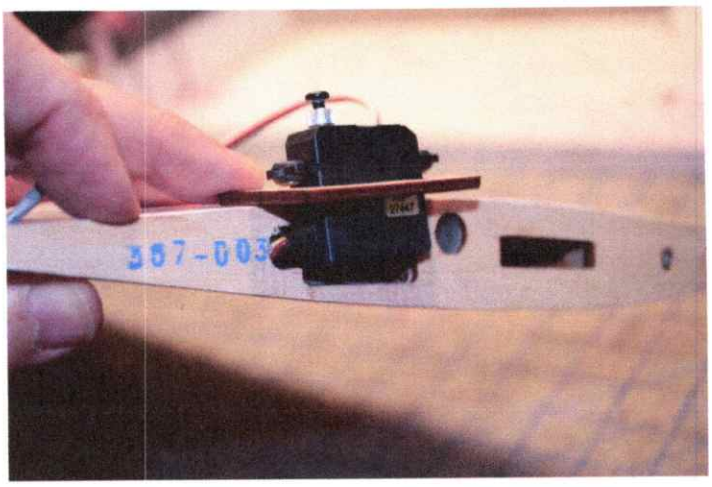
Deflect the ailerons down and apply 5-7 drops of thin CA to each hinge. Make sure the CA wicks into the hinge. Turn the wing panel over and deflect the aileron the other direction to apply the CA to the other side of the hinges. When the CA is cured, pull on the ailerons to make sure they are secure.



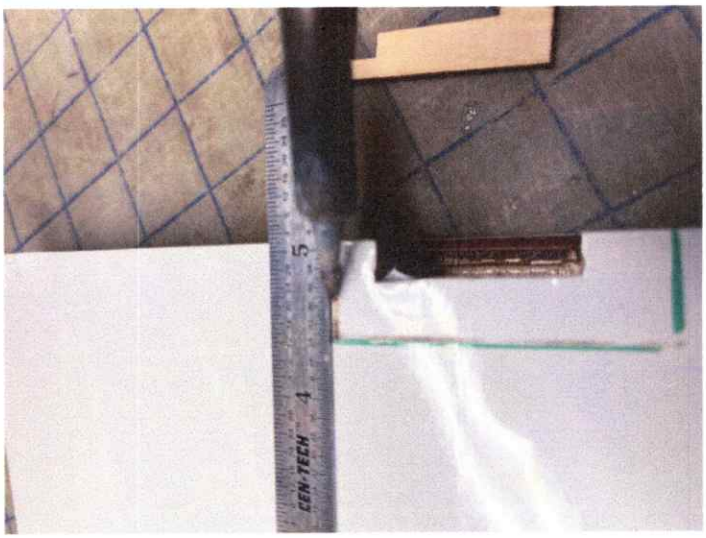
Trim the covering material from root rib area to prepare for joining the wing halves. Use a sharp modeling knife or single edge razor blade for this operation.



Test fit the wing halves together onto the wing tube to check alignment. The wing should fit nicely together without any gaps. If needed, lightly sand a bit with a sanding block to get the desired fit.



Find the plywood aileron servo mount and the servo you plan to use on the ailerons. Check the fit of the mount to your servo and adjust as needed. Test fit the mount and servo into one half of the wing for proper clearance and make sure there is clearance for the servo lead without putting stress on it. Use a moto-tool and sanding bit to remove material as necessary. There should be enough room for the servo to be installed and removed without putting unnecessary stress on the wires after the wing is assembled. Make the similar clearances on the opposite wing half.



Trim the covering material where the ply servo mount will be glued. Align the servo mount plate and trace around it with a small marking pen. If using a hobby knife or razor blade, do not cut too deep. Work to only cut the depth of the covering material. Cutting too deep and cutting into the wood can weaken the area where the servo tray is mounted.

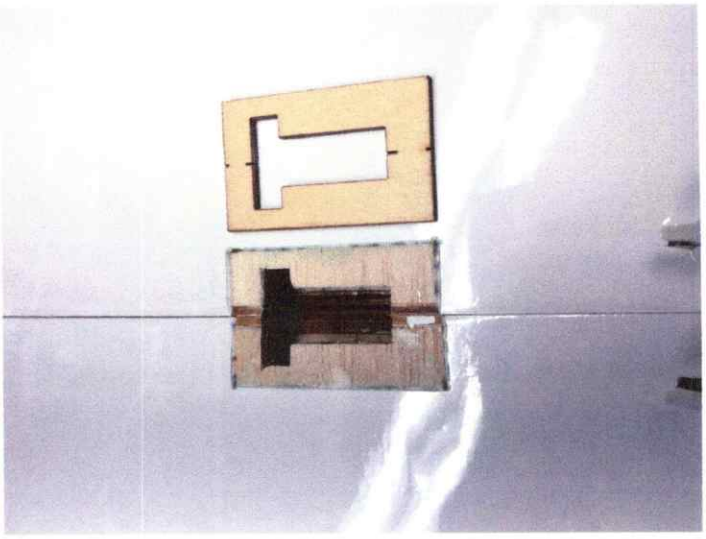
Building Tip: *A great way to trim the covering in areas like this is to use the tip of a soldering iron*

along a metal straight edge to melt the covering along the line. Move the iron at a pace that melts the covering but doesn't allow the wood to be burned. You can then peel off the covering from the desired area. This method greatly reduces the risk of cutting and weakening the wood.

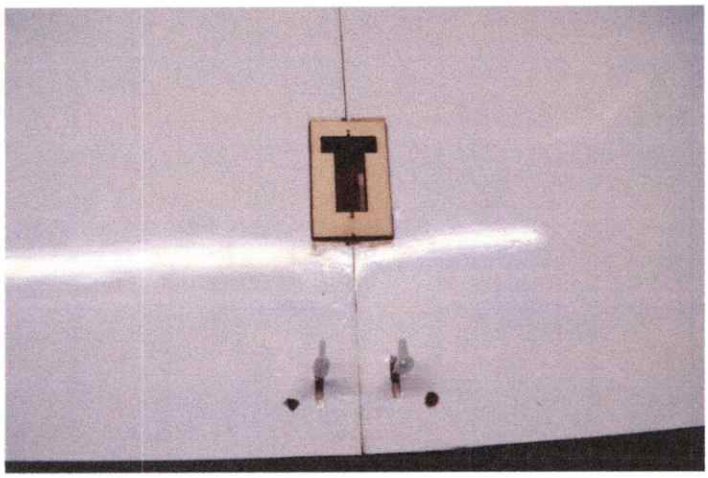
When satisfied with the fit of the wings and servo into the wings, prepare to join the two wing halves. You will want to use 30 minute or some similar slower curing epoxy. Use the wing mount screws or similar, two rubber bands, and two squeeze clamps in this step. These will be used to hold the wing halves together and in alignment while the epoxy cures.

Mix about 10cc or a bit over a ¼ oz of epoxy. Coat one half of the wing joiner tube and slide it into one of the wing panels. Next, coat the root ribs of both halves, the exposed half of the joiner tube and the alignment dowel. Slide the wings together and wipe away any excess epoxy. You can use alcohol on a small piece of paper towel to wipe it clean around the joint before the epoxy starts to cure.

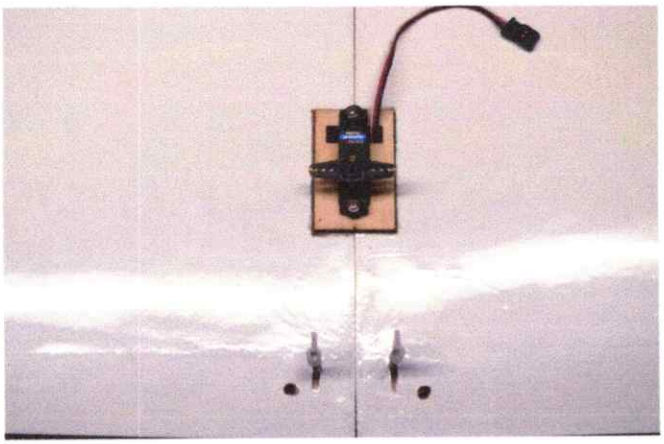
Now, place one clamp on the two front mounting tabs to hold them together. Place the screws or similar in the aft mounting holes and put rubber bands between the two screws on the top and bottom. Next, use another clamp or similar to hold the trailing edges in alignment. Set the wing aside and allow the epoxy to cure thoroughly.



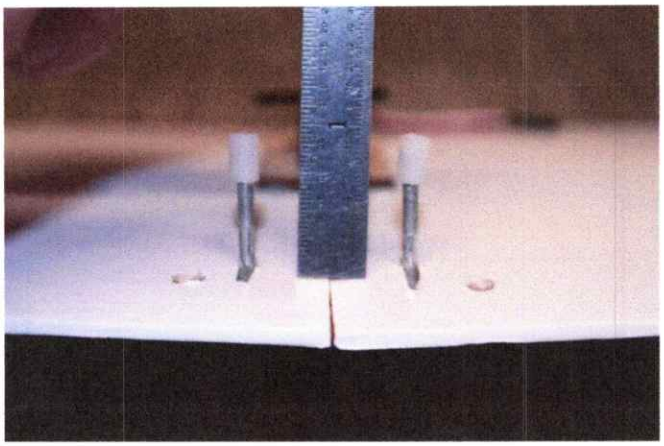
Glue the aileron servo mount plate in place with either medium CA or 5 minute epoxy..



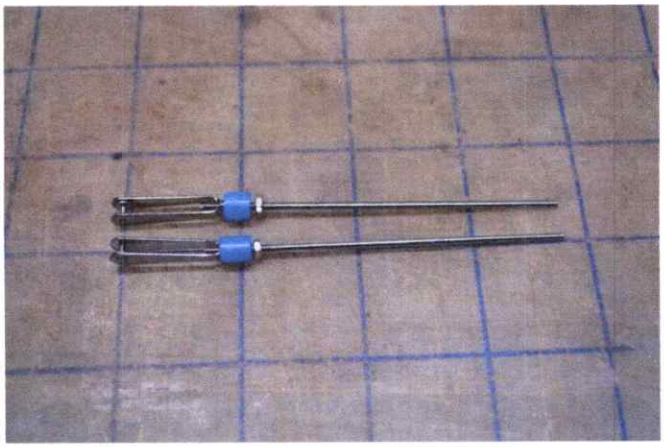
Install the aileron servo mount and the servo as shown. If the servo is designed to use grommets and eyelets, be sure to use those. Drill a small hole for each screw. Install the screws to mount the servo.



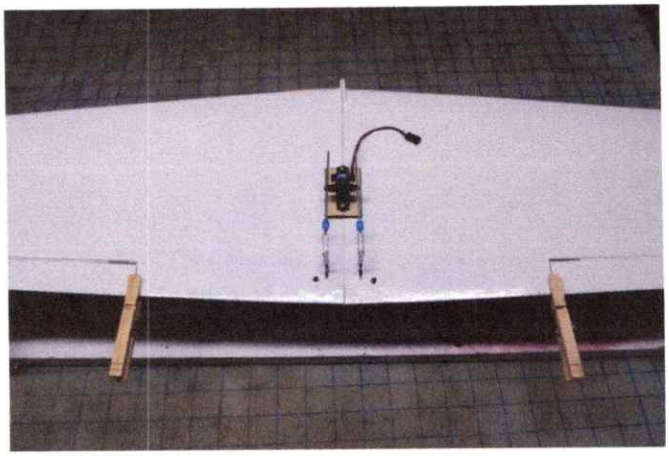
Electronically center your servo using your radio system by initially setting the trim AND sub trim to neutral. Select a servo arm that has holes approximately ½" from the center of the arm. The arm must be square to the centerline of the wing as shown. If it isn't, rotate the arm on the output shaft to get the best alignment. If needed, use your sub trim feature but keep this to an absolute minimum. Do as much as you can by trying different positions on the splines of the servo output shaft. If the arm you are starting with has more than two arms, trim off the unused arms.



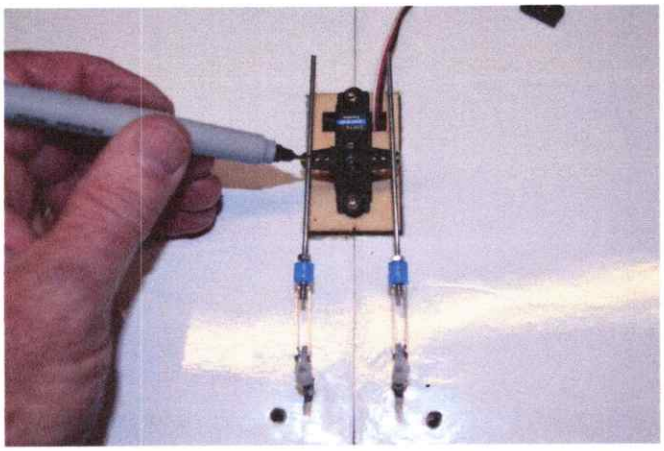
Make sure the torque rod horns are the same distance from the wing surface, adjust as needed.



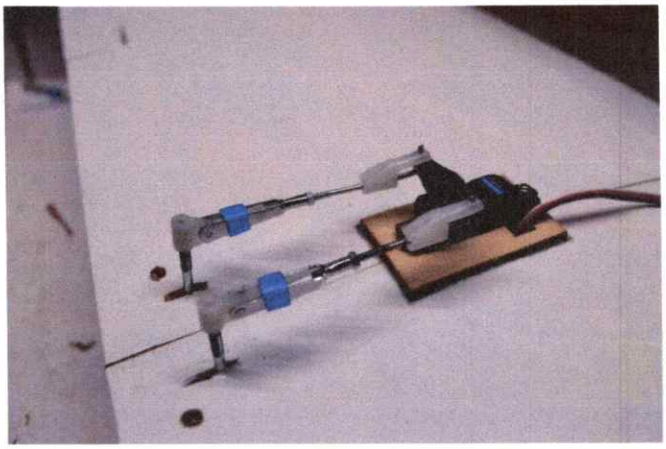
Find the two shorter pushrods in the kit with clevis, nut and safety tubing. Make sure the threaded portion of the clevis and nut are approximately in the middle of the threads of the pushrod.



Use a clamp or clothespin to hold each aileron centered in the neutral position as shown during pushrod setup. Install the clevises and pushrods on the torque rod horns and line them up over the servo arm holes approximately ½" from the center of the servo arm.

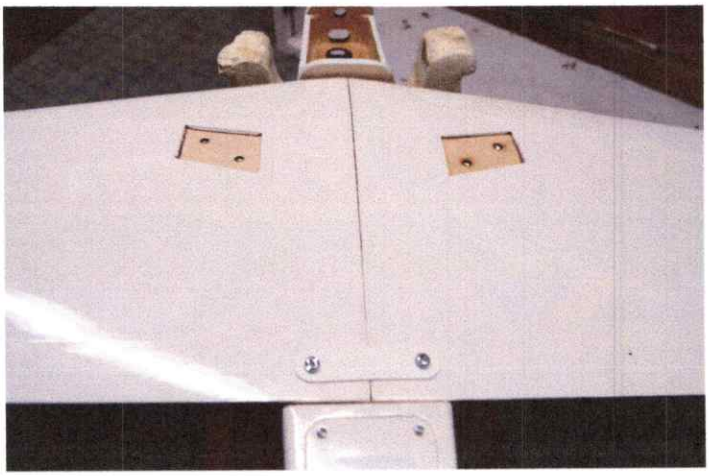


Using a marking pen, make a mark where you want to bend the wire to go through the arm. You may need to use an appropriately sized drill bit to open the hole just big enough for the pushrod wire to go through. DO NOT make the hole too big. You want to have smooth movement in the servo arm but with no slop. Bend the wire 90 degrees at the appropriate location and snap the pushrod snap keeper into place. Repeat for the second pushrod



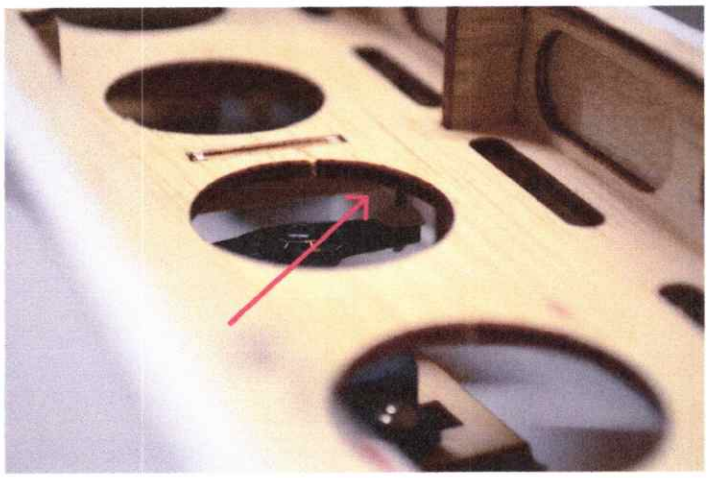
In this picture, the snap keepers have been used to connect the pushrods to the servo arm. Depending on the height of the servo used, there may be interference with a small bulkhead in the fuselage when the wing is installed.

NOTE: The clearance is small inside the fuselage for the aileron servo and linkage. Make sure the wire enters the servo arm from the bottom to keep the pushrods close to the wing surface to improve the fit to the fuselage. You will want to install the wing onto the fuselage and verify the clearance between the aileron servo and linkage with the fuselage structure. This is done through the holes in the battery floor from the battery compartment top side. This applies whether you use the supplied snap keepers or make Z-bends in the wire at the servo end of the pushrods. The height of the servo you install will impact the clearance between the aileron linkages and the small former in the fuselage in that area.

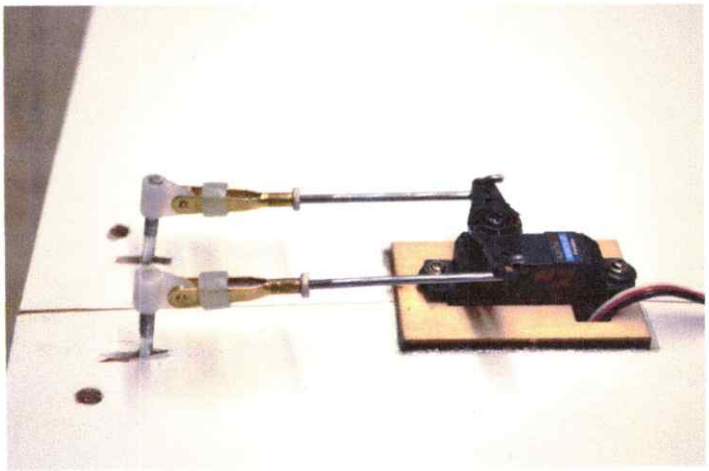


Temporarily install the wing onto the fuselage with the supplied screws, washers and plastic screw plate. Carefully pay attention to test if there is any interference or resistance as the wing is installed. Do not force the wing onto the fuselage at this point. Any resistance to seating the wing properly in the saddle of the fuselage should be dealt with. Sometimes, glue will collect on the bottom of the leading edge tab that keys into the fuselage former. If any excess glue is on the lower part of that tab or the tab is just a bit too tight, trim a bit of material off the bottom of that tab. Only take off as much as is needed for a good fit. You do not want to go too far and end up with looseness in the wing fit.

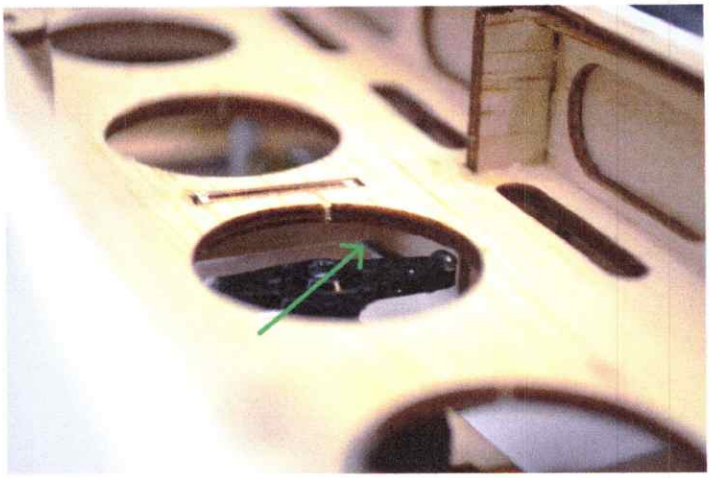
With the wing fully seated, turn the assembly over and look in the cockpit/battery area, through the holes at the aileron servo and linkage for any interference. If it looks like you have clearance, connect your aileron servo to your radio and move the servo each direction and verify there is still clearance to the former.



As you can see in this picture where the **RED** arrow is pointing, the servo used in this build is too high to use the snap keepers at the servo end and is interfering with the small former in the fuselage.

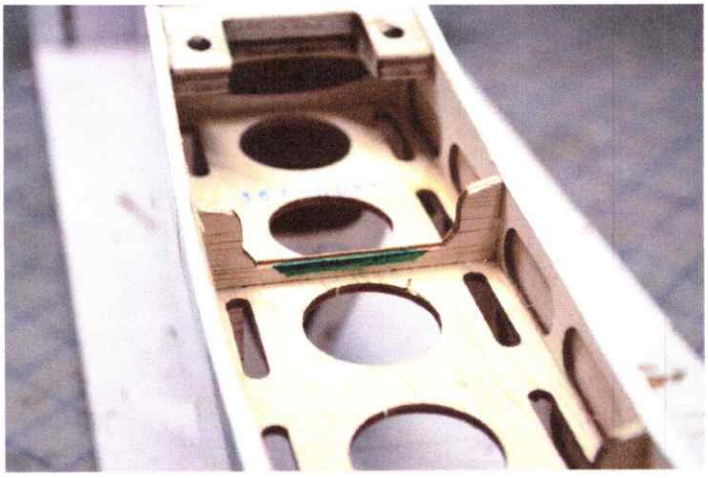


The decision was then made to make pushrods with Z-bends at the servo end. Again, install the pushrods into the bottom of the servo arm as shown.



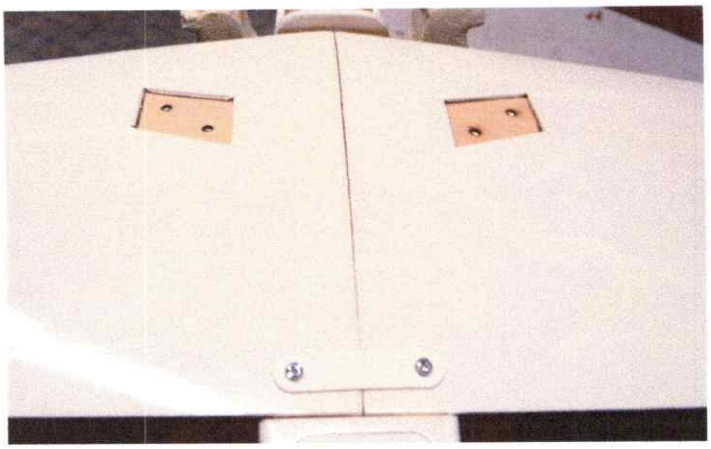
With the connection to the servo being changed from the snap keepers to a Z-bend, and the wing reinstalled on the fuselage, you can see the interference has been eliminated and is shown by the **GREEN** arrow.

There are numerous methods to connect pushrods to servos on the market that can be used to gain clearance if the height of a servo causes interference. Be sure whatever type of connection you use, it is slop free and moves smoothly.

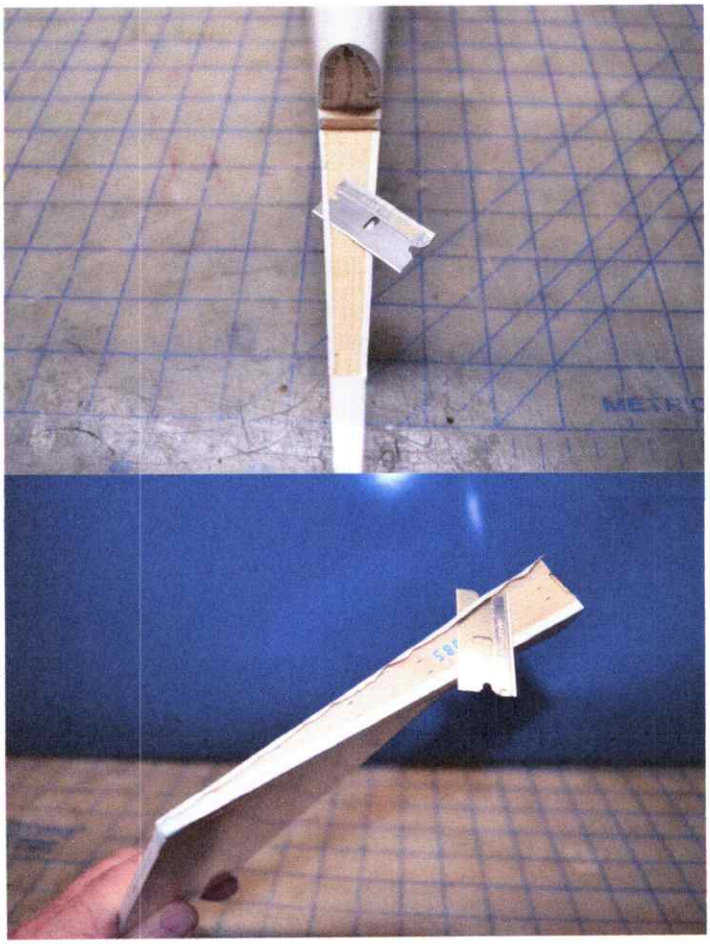


If there is still some interference, use a moto tool or sanding tool to remove enough material from the interfering former, marked in **GREEN** here, to obtain clearance through full motion of your servo and linkage. Turning the torque rod horns down one or two turns may help as well but do not turn them any more than that.

INSTALLING THE TAIL SECTION

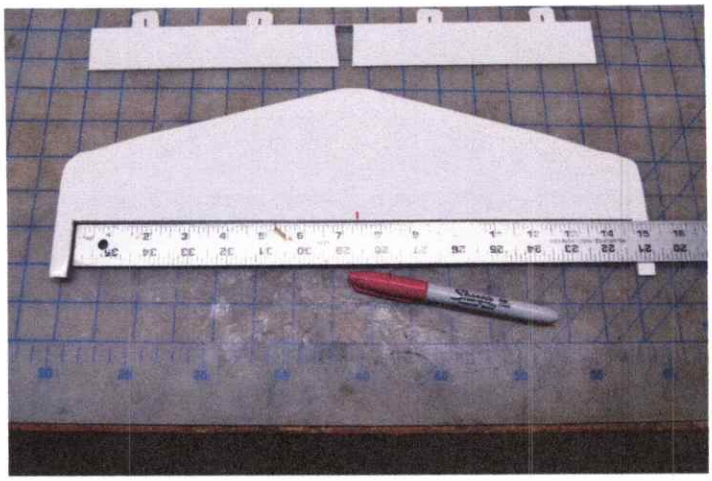


Install the wing using the screws and the plastic plate supplied in the kit. At this time, you can use E6000 or ZapGoop to glue the plastic plate to the surface of the wing.

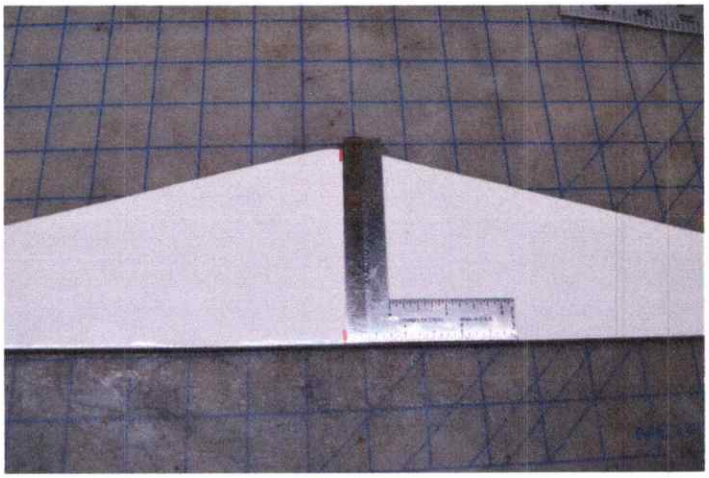


With a hobby knife or single edge razor blade, trim the covering from the surface on the fuselage where the horizontal and vertical tail surfaces will mount. Also do the same on the surfaces of the vertical fin

where it will mount to the top of the stabilizer and the back of the turtle deck of the fuselage. DO NOT trim the covering from the stabilizer YET.

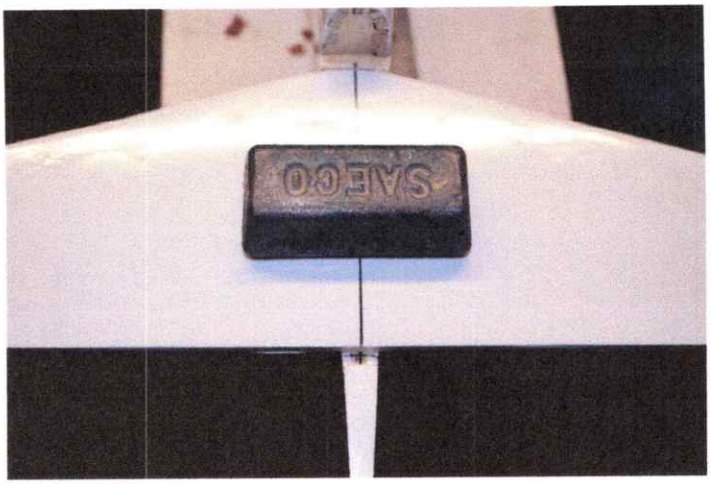


Find the center of the horizontal stabilizer and mark it with a fine marker as shown above.

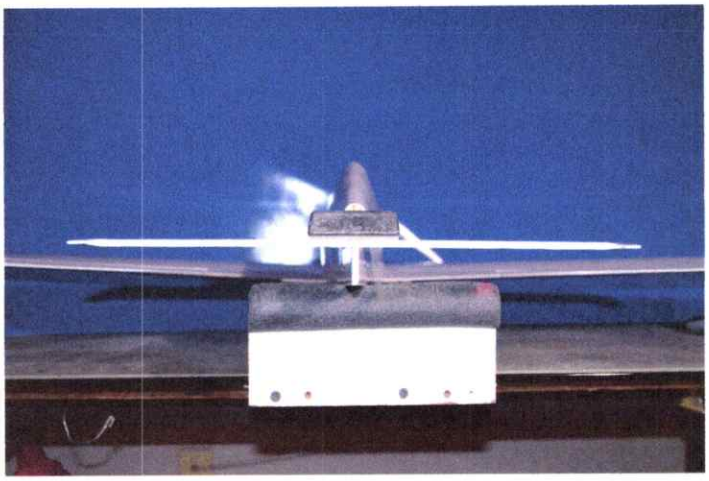


Use a square or similar to draw a centerline at the leading edge of the stabilizer to guide the alignment to the fuselage.

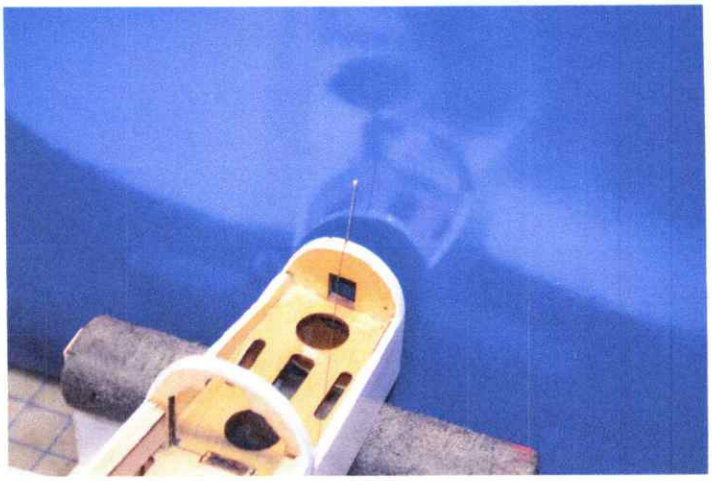
Place the fuselage and wing assembly on a surface where it will be stable in the upright position as shown above.



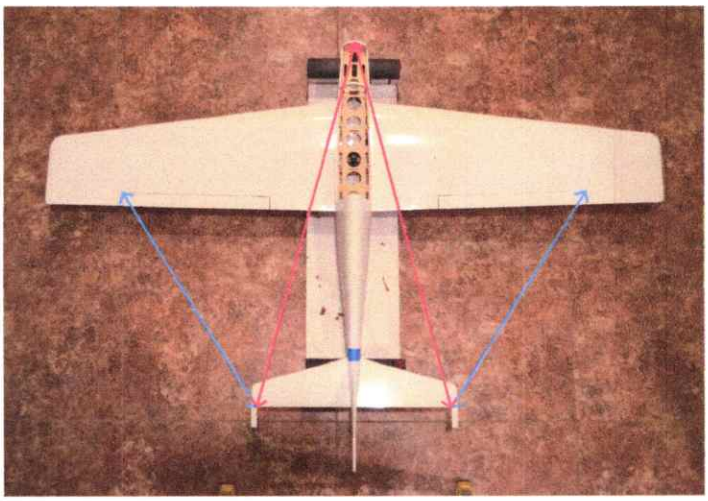
Place the horizontal stabilizer on the fuselage. You may want to put a small weight on the center or a couple of T-pins through the stab into the fuse, or both, to hold it while alignment checks are made. Use the line you just put on the stabilizer to get it as square as possible.



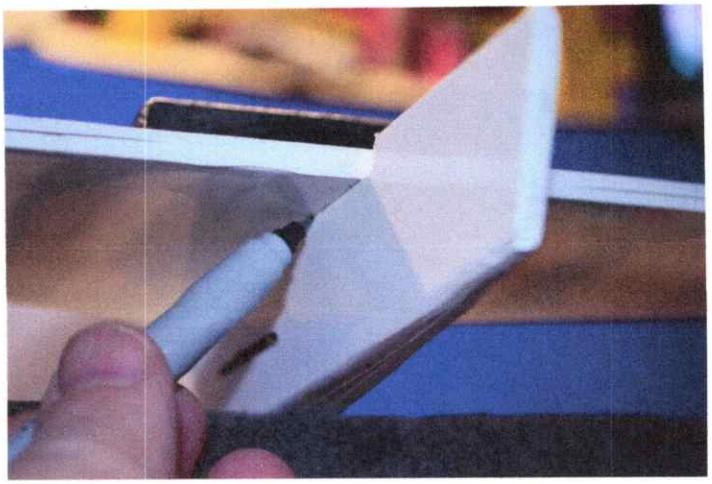
Make sure the wing and horizontal stabilizer are parallel when sighting from the back. If necessary, lightly sand the fuselage platform to achieve the alignment as shown above.



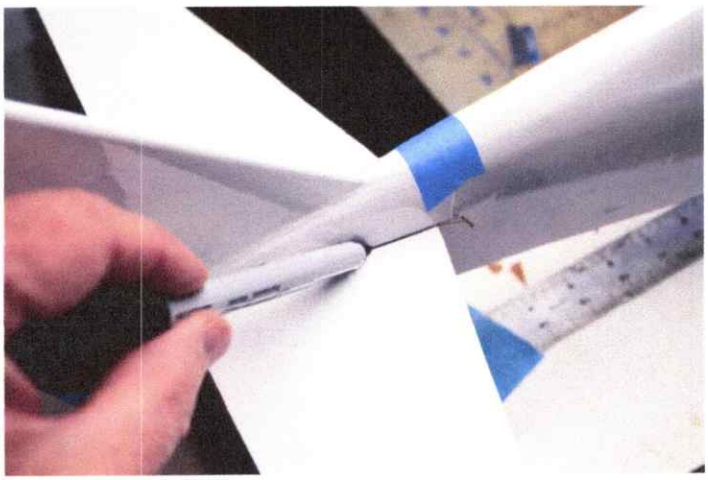
Insert a pin into the top center of the firewall and tie a piece of strong string to it that is bit longer than the distance from the pin to the TE tip corner of horizontal stabilizer. You will use this string to compare the distance to similar points on both sides of the stabilizer to verify it is aligned properly to the fuselage.



Use the string to verify distances from the pin at the nose to the stab are the same on both sides as shown by the RED arrows. Also use a ruler or string to verify the distances shown by the BLUE arrows are the same as well.

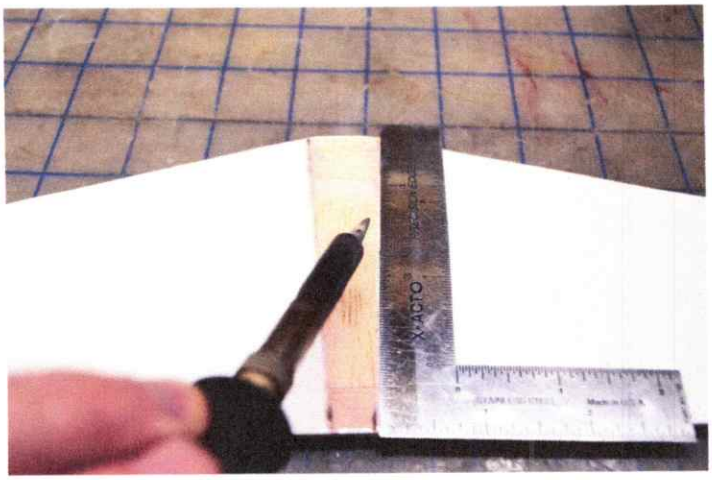


Once the stabilizer is aligned properly, hold it carefully to make sure it doesn't move and draw a line along both sides of the fuselage onto the bottom of the stabilizer to mark where the covering material needs to be removed in the center. A fine point Sharpie works great for this.

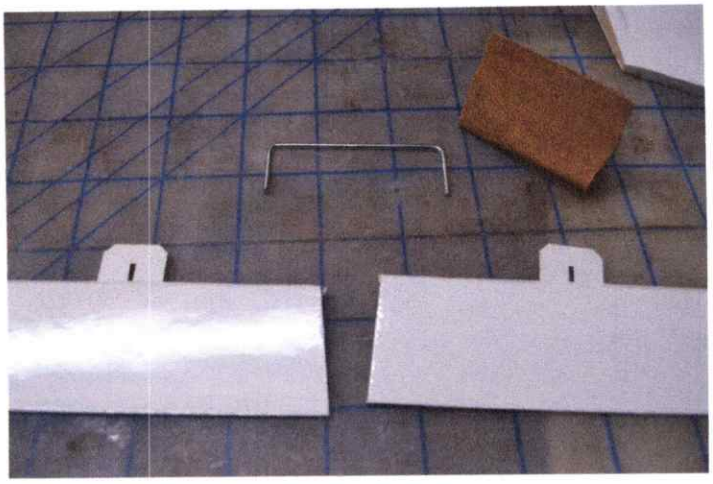


Set the vertical fin in place and carefully line it up at the front and back to the fuselage. Add a piece of tape at the front and back to hold them in place. Draw lines on the top of the horizontal stabilizer along the sides of the fairings on the vertical fin.

Remove the tape and set the fin aside for now.



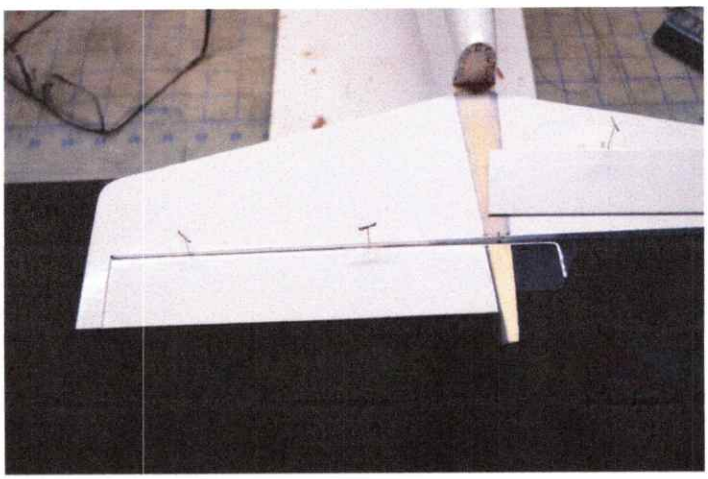
Remove the covering material from the middle of the horizontal stabilizer on the top and bottom between the lines drawn. Be sure to re-mark the centerline marks at the hinge line and the LE for alignment during gluing in the next step. Once again, the soldering iron method is recommended to reduce the chances of injuring the balsa with a sharp blade and creating a weak spot. This is especially important for this step because you don't want to create a weak spot in the stabilizer by cutting too deep into the balsa with a blade.



While the epoxy on the horizontal stabilizer cures, prepare the elevators for installation. Sight the trailing edges of the elevators to ensure they are in line while connected with the wire joiner. If one is higher than the other, pull out the wire joiner and lightly twist the joiner until the two elevators are lined up when joined. Scuff the wire joiner with sandpaper for better epoxy adhesion.

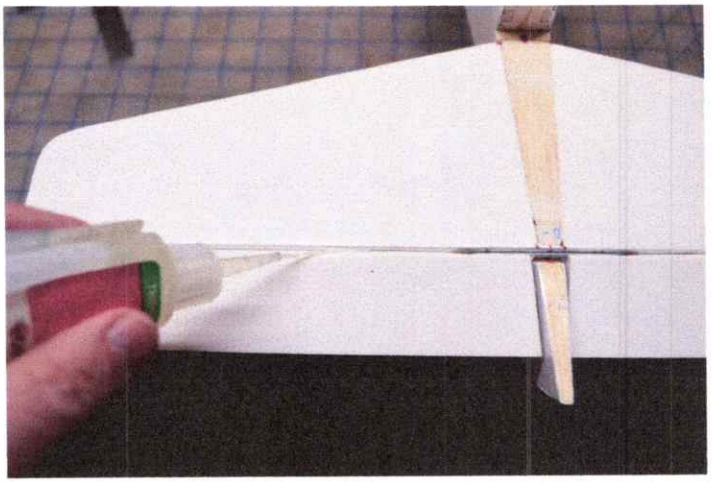
Install T-pins in the middle of the hinges as you did on the ailerons.

You are now going to glue the horizontal stab onto the fuselage. Apply mixed 30 minute epoxy to the platform on the fuselage and set the tail in place, lining up your marks and the area where the covering has been removed. Use weight and or clamps and T-pins to hold the horizontal stabilizer in place to cure. Verify the alignment from the rear view and top view before the epoxy cures.

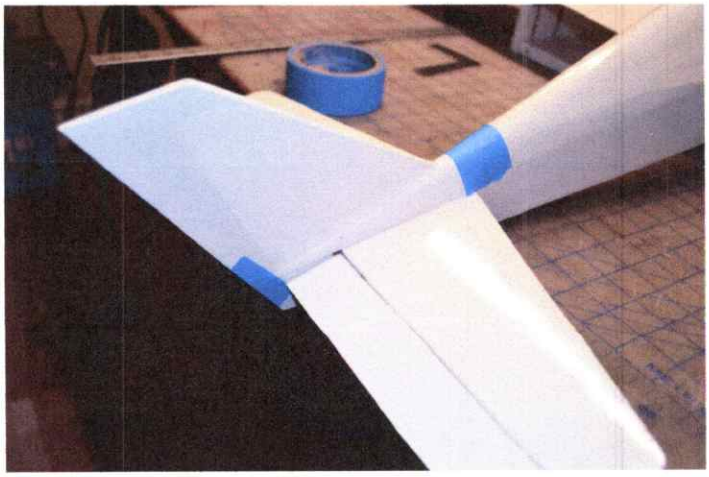


Mix a small amount of 30 minute epoxy and using a toothpick, apply epoxy into the holes in the elevators where the wire will be inserted. Also apply a small amount on the wire arms. Slide the wire into one elevator and install the elevator hinges into that side of the horizontal stabilizer. Next, install the opposite elevator. Remove the T-pins and push the elevator against the horizontal stabilizer to minimize the gap. If the second elevator doesn't push onto the joiner wire easily, slip a thin metal object like a thin metal ruler or knife blade between the wire and the stabilizer

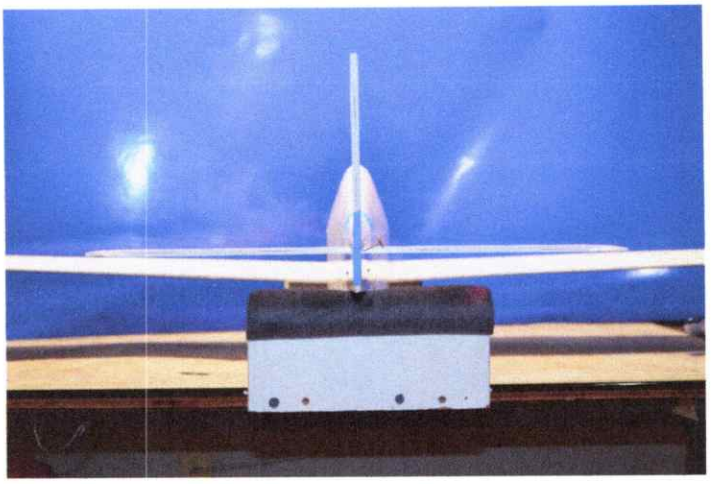
so the wire doesn't dent into the stab as you push the elevator onto the wire joiner.



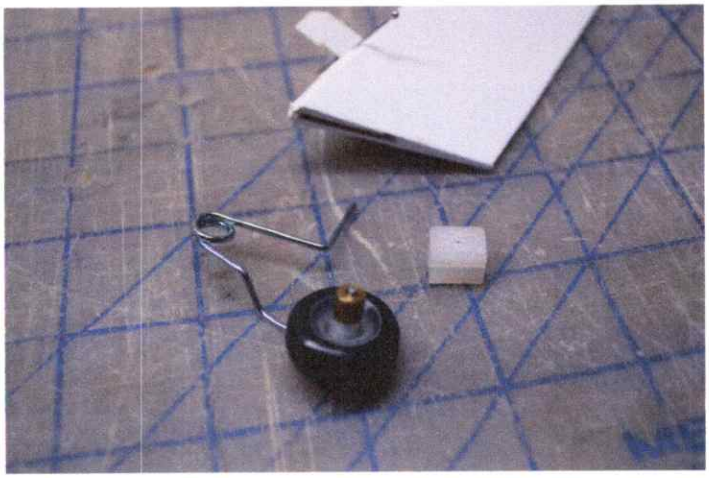
Remove the T-pins and push the elevator against the back of the stabilizer to minimize the hinge gap. Verify the elevators are centered in the horizontal stabilizer with equal gaps on both ends. Apply 5-7 drops of thin CA to each hinge on the top and bottom. After the CA cures, gently pull on the elevators to verify the hinges are glued properly. Flex the elevators up and down to ensure the hinges move freely but with no slop.



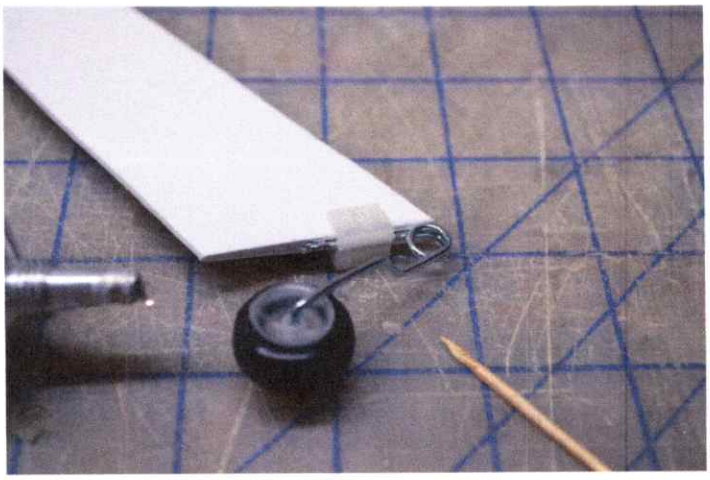
Set the vertical fin in place and tape it as shown to hold it while you verify proper alignment



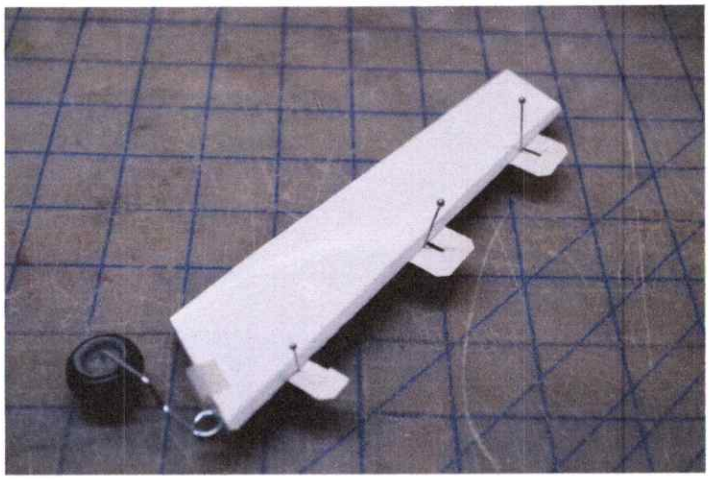
With the wing installed, sight from the rear to verify the alignment of the tail to the wing. You'll notice above that viewed from this angle, both the left and right tips of the horizontal stabilizer are the same distance from the wing and the vertical stabilizer is at a right angle to the horizontal stabilizer. If satisfied with the fit, take the tape off and prepare to glue it in place. If the angle is off, sand the base of the vertical fin assembly lightly until it aligns properly. Mix some epoxy and set the tail in place, taping it again, front and rear, and verifying the alignment again before it cures.



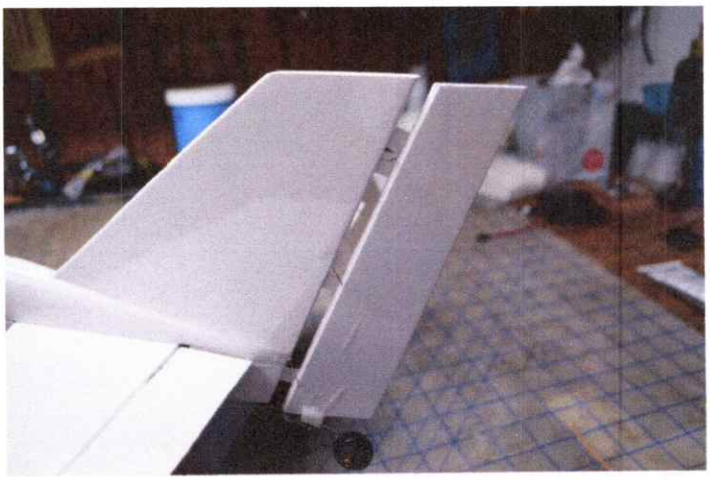
While the vertical stabilizer epoxy cures, prepare the rudder, hinges, tail wheel and plastic support for assembly. You'll see there is a slot and hole in the bottom of the rudder for the tail wheel wire to be inserted into. Test fit them to verify proper fit and remove them for gluing.



Using E6000 or Zap-Goo, install the tail wheel into the bottom of the rudder along with the plastic support piece. Use a toothpick to push some glue into the hole and slot in the rudder. Also put a bit of glue on the wire where it will fit in the hole and slot.

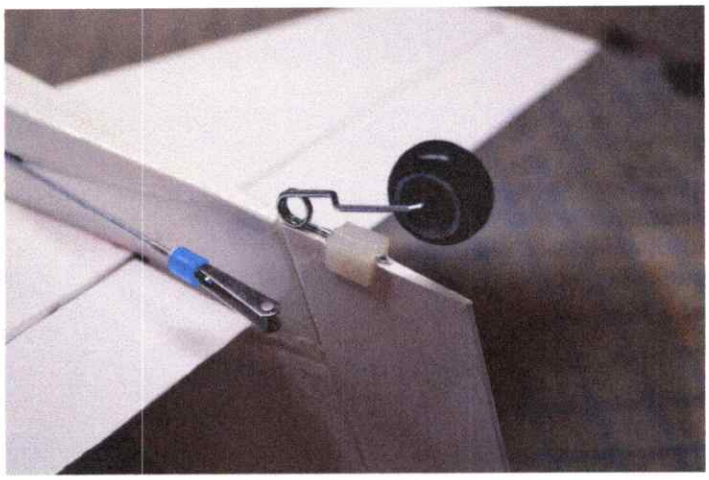


After the glue of the tail wheel assembly installation is dried, install the hinges with T-pins as on the ailerons and elevators.



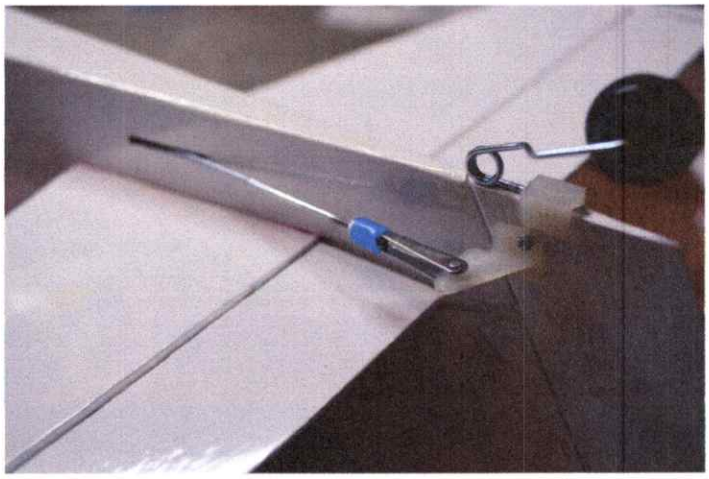
Slide the rudder hinges into the slots in the fuselage and vertical stabilizer up to the pins. Pull the pins and make one final alignment of the rudder with the top of the fin, then glue the hinges with thin CA glue.

Find the longer pushrods in the kit with clevis, jam nut and safety tubing. These will be for the elevator and rudder. The longer wire of the two should be used for the rudder.

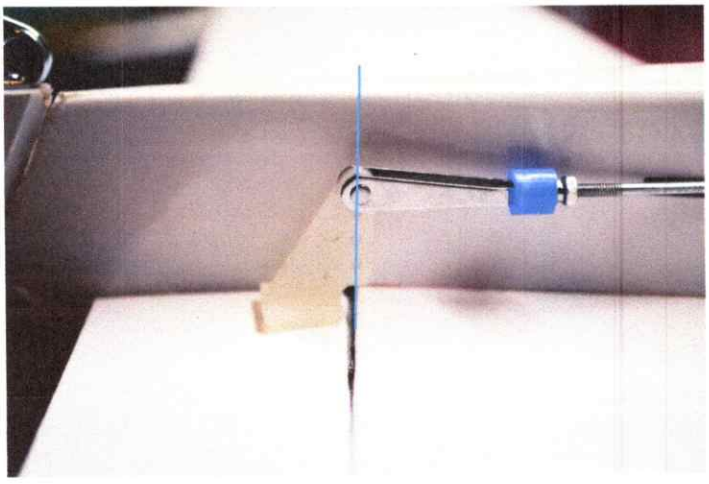


Slide the rudder pushrod into the fuselage tubing on the right side of the fuselage. Do not bend the pushrod. Keep it as straight as you can to allow it to move smoothly.

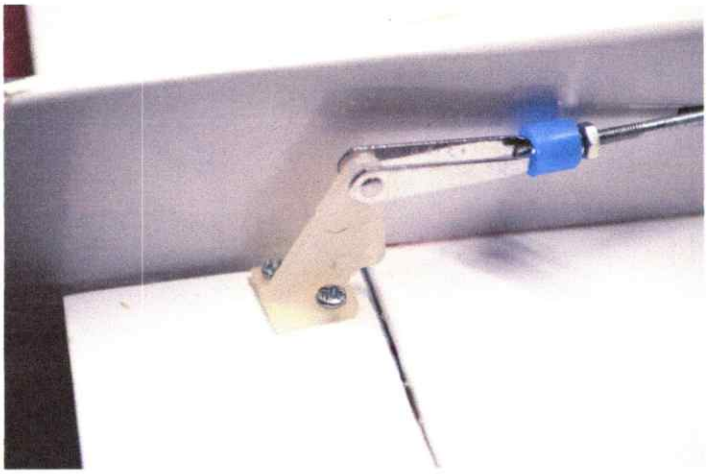
Attach the rudder horn to the clevis of the rudder pushrod with the pushrod slid into the fuselage tubing. Make sure the row of holes on the horn is lined up over the flex point of the rudder hinge. Mark the locations of the horn mounting holes either with a small marker or a pin.



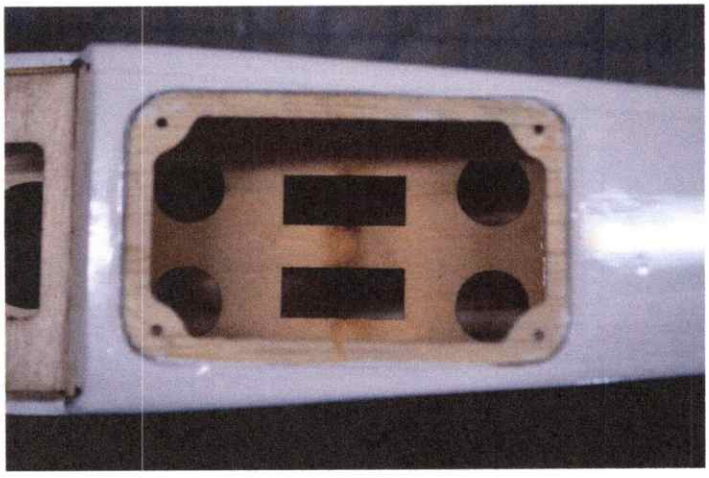
Drill holes for the rudder horn mounting holes and install the screws along with the screw plate on the opposite side.



Attach the elevator horn to the clevis of the elevator pushrod with the pushrod slid into the fuselage tubing. Make sure the row of horn holes are lined up over the flex point of the elevator hinge per the BLUE line. This is very important for proper control throw geometry. It is also important to let the pushrod wire naturally guide the location of the horn. This will allow the pushrod to be straight and smoothly slide in the fuselage tubing for smooth control movement. Mark the location of the screw holes for the horn and drill holes.



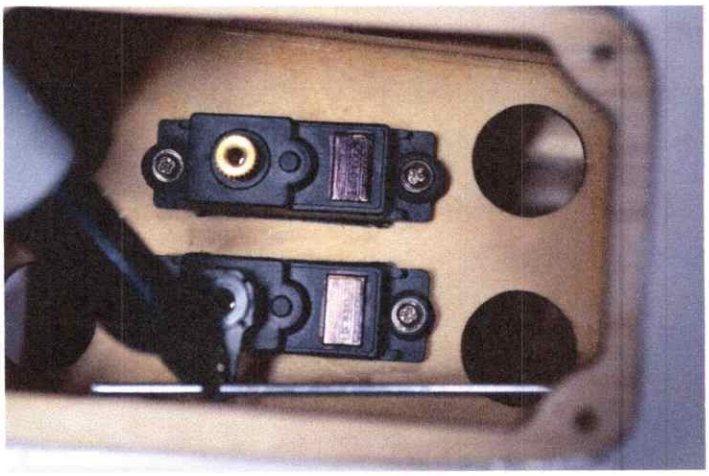
Install the horn screws and thread into the horn plate on top of the elevator.



Remove the hatch from the aft bottom of the fuselage and you will see the tray for mounting the elevator and rudder servos. Test fit your servos and adjust the size of the openings to fit your servos as needed with a rotary tool.

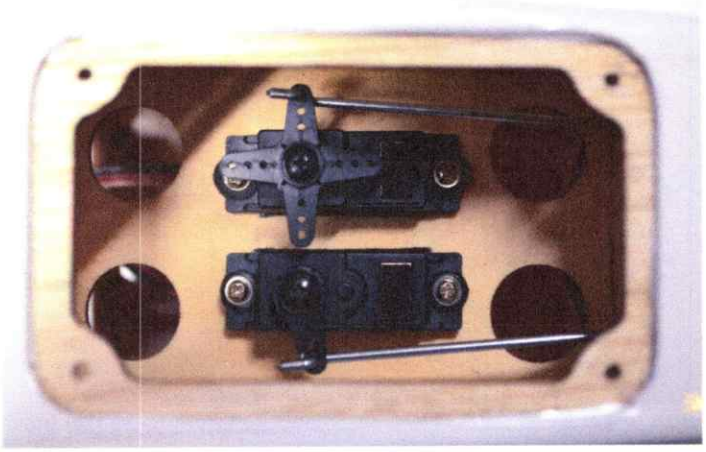
Once your elevator and rudder servos are fitted into the tray, mark where you need to drill holes for the mounting screws. Drill the tray with an appropriate drill bit for the screws being used. A drop of thin CA in the holes will improve the toughness of the threads cut by the screw. Install the servo mounting screws.

Before connecting your pushrods at the servo end, move the rudder and elevator to see if there is any drag in the pushrod action. You may need to make slight bends at one end of the wire or the other to reduce the drag. Any drag will make your servo work harder and could affect the quality of the centering of the control surface.



Install arms onto your servos and mark the location of the bends for the wire to be connected to the arm. If you are using the supplied snap keepers, the wire will need a tight 90 degree bend. You can also use Z-bends on the servo end of the pushrod wires. Those are best made with Z-bend pliers.

Disconnect the clevis from the control horn on the elevator and rudder and remove the nut and clevis from the threaded end of the wire. Slide the wire forward and remove it from the fuselage to make the appropriate 90 deg bend or Z-bend. It can be handy to fit and install the servo arm to the wire before reinstalling the wire in the fuselage.



Slide the pushrods back into their tubes, reinstall the nut and clevis and reconnect to the control horn at the tail. Complete the installation of the servo arms and connection to the pushrod wires. Don't forget to install the servo arm screws.

Use your radio system to power the servos and set the neutral position.

Final adjust the control surfaces to the neutral position by adjusting the clevis with the servos at neutral with your radio system. After final adjustment, tighten the jam nuts against the clevis.

The plane is supplied with two hatches for the aft servo compartment. One hatch has cooling holes and one does not. If you want to use the one with cooling holes, you will need to remove the covering material from the holes. To open the holes, use a soldering iron to melt the covering around the perimeter of the holes. A hobby knife can also be used for this. The soldering iron method seals the edges nicely.

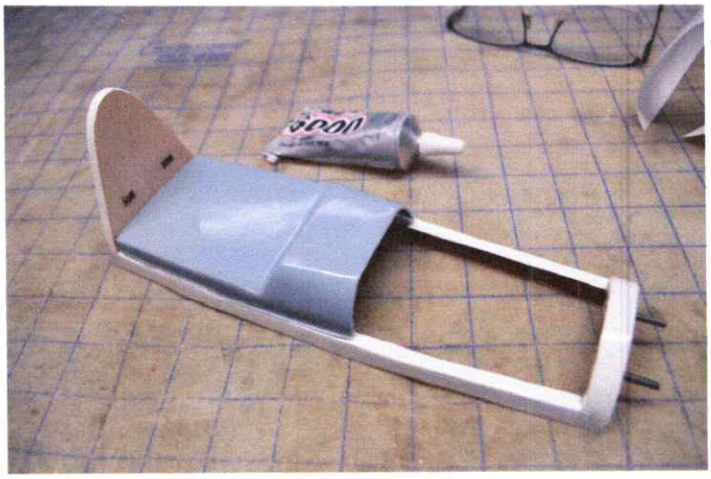
At ambient temperatures above 90 degrees F (32 deg C), the additional cooling flow can be beneficial for your motor, ESC and battery, especially for sport flying with longer flights. For racing, during the relatively short timeframe of a race heat, the warmth in the battery can be beneficial from a performance standpoint so using the solid hatch might be best, as long as it doesn't end up too hot. Having both hatches allows you to adjust to the conditions.

The hatch with cooling holes opened.

The canopy, frame, and cockpit floor are shown ready for assembly. It is recommended that E6000 glue (or Zap-Goo) be used for this. Also shown is a set of the curved scissors designed for cutting out lexan RC car bodies. These are a huge help when cutting out vacuum formed plastic parts.

Trim the cockpit floor to fit as shown in the picture below. The curved scissors work great to get close to final shape. A moto-tool with sanding drum can also be used. Use sanding block or moto-tool with sanding drum to clean up the edges to the final shape. Cut open the front to give more clearance in the battery compartment.

CANOPY ASSEMBLY



Use E6000 to glue the cockpit floor against the back bulkhead and down onto the frame as shown. Make sure the edges of the cockpit floor do not stick out along the edges of the canopy frame causing a problem gluing on the canopy.

If you are planning to add a pilot and or other features to the cockpit area, now would be the time to do that.

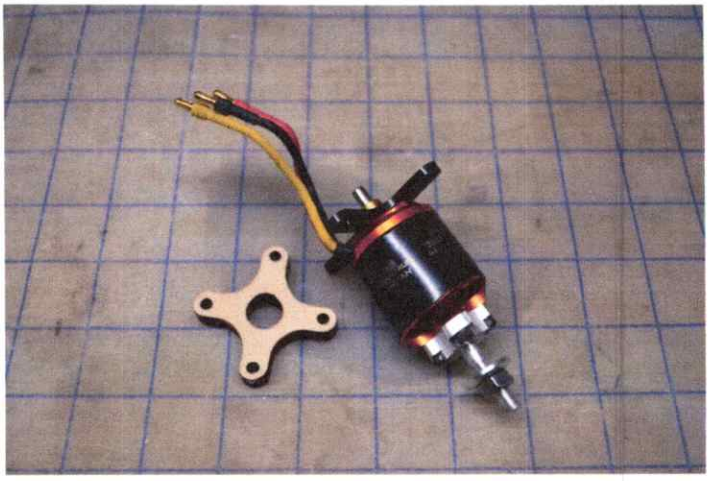
Test fit the canopy onto the frame. If the canopy is curled as removed from the box, carefully pull it open and put it in place on the canopy frame with tape. You may be able to warm the canopy very carefully with a heat gun while it's taped on the frame to release some of the stress causing it to curl. Let it cool before taking the tape off.

When ready to glue the canopy on the frame, prepare by having several pieces of masking tape ready to grab and use to hold the canopy on the frame. Use E6000 or Zap-Goo to put a small bead all the way around the frame where the canopy will sit. If the bead of glue is too big, it will ooze out along the edges. Set the frame on the table in front of you and pull the canopy open enough to set it down on the frame, touching the top of the fwd and aft formers first. Ease it down both sides of the front or the back first and add a piece of tape on both sides. Go to the other end and do the same. Shift it around as needed to get it centered. Add more pieces of tape along the sides. Don't pull too hard and distort the frame. Be especially careful if you've chosen to not add the cockpit floor. Let it dry thoroughly before removing the tape.

Test fit the finished canopy to the fuselage. Some adjustments may be needed. If the magnets are pulling the canopy into place properly, it will grip very well. To remove, pull the canopy assembly forward to disengage the magnets and lift the rear.

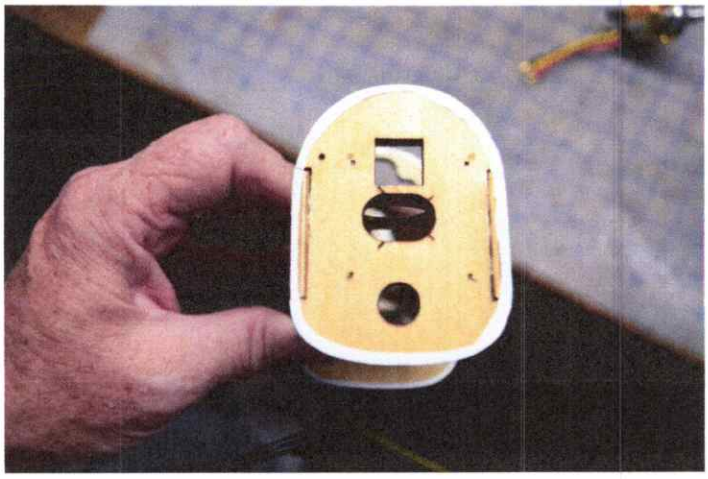
INSTALLING THE POWER SYSTEM

Notice that the firewall has right thrust built into it. This is to compensate for the torque from the power system setup used in EF1. If you would like to have less right thrust, put washers between the motor mount and the spacer or firewall. It is not recommended that you shim to not have any right thrust. The amount you want is up to you. These power systems have strong torque effects and the right thrust is typically very beneficial to overall handling. You can try different amounts to see what you prefer.

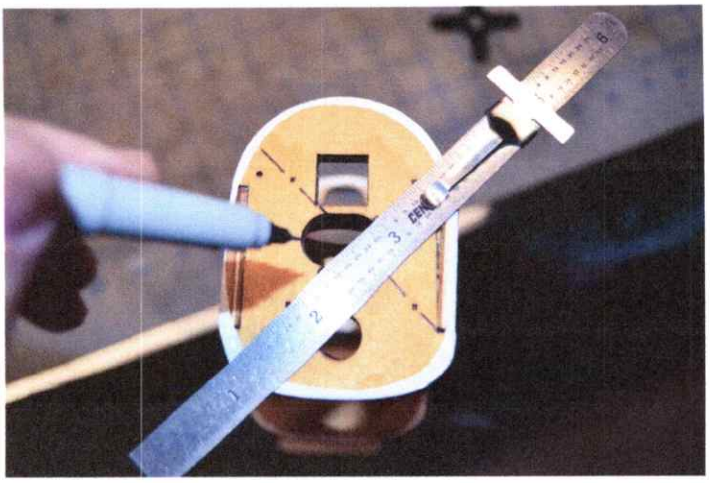


If using the Spektrum Avian or Rimfire EF1 motors, the "X" spacer supplied in the kit will be needed to place the spinner the right distance from the firewall for the cowl.

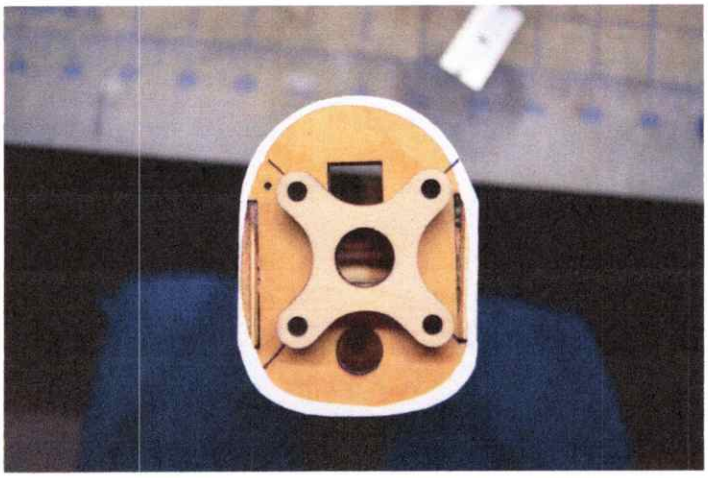
The E-Flite Power 25 1250kv EF1 motor typically will be mounted directly on the firewall without the spacer as it is longer than the other approved motors.



The forward side of the firewall has laser marks to show the approximate location where the X-mount should be located.

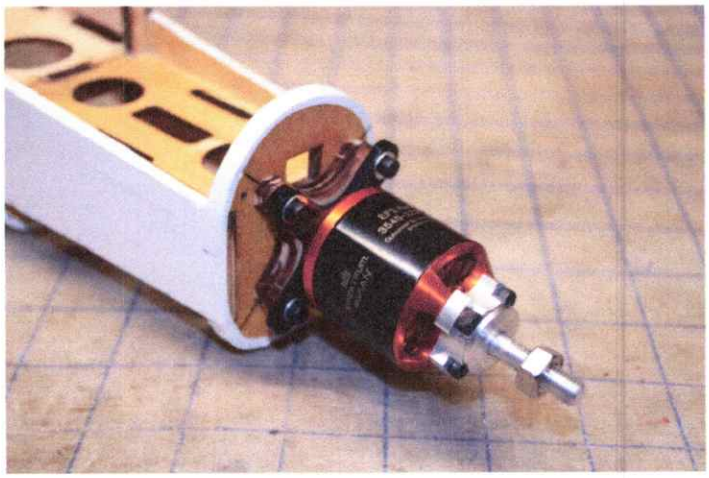


Use a straightedge and draw lines in an "X" pattern based on the laser marks.

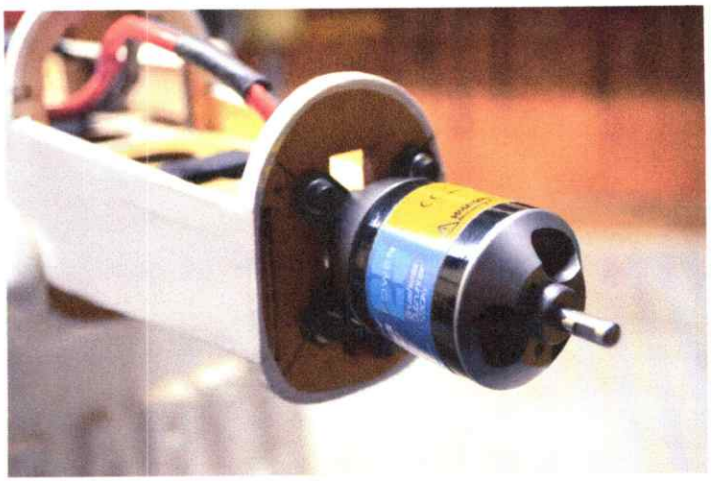


Set the spacer on the firewall and align it with the lines as shown. The spacer can be used as a drill guide. You can tack it in place in a couple of small spots to hold it during drilling but allow it to be removed afterward. Drill one of the upper holes first with a 5/32" bit. Use one of the supplied bolts and a washer to install one of the blind nuts on the back side of the firewall in the hole drilled. Tighten till the blind nut is seated.

The other three holes will now be drilled, installing the bolts and blind nuts one at a time. The two bottom holes will be near the triangle stock on the back of the firewall. After drilling each hole, use a hobby knife to clearance the triangle stock so the blind nut can seat in the back side of the firewall properly. Do not over tighten the blind nuts. You want them seated but not so much that the firewall wood starts to be crushed. A bit of thick CA glue around the edges of the blind nut flanges is a good idea to keep the blind nuts in place.

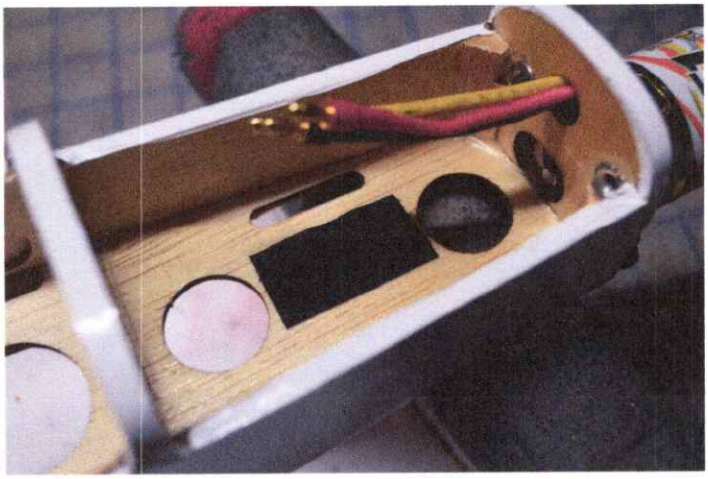


Install the motor as shown with the wires fed through the hole in the firewall, into the ESC compartment.

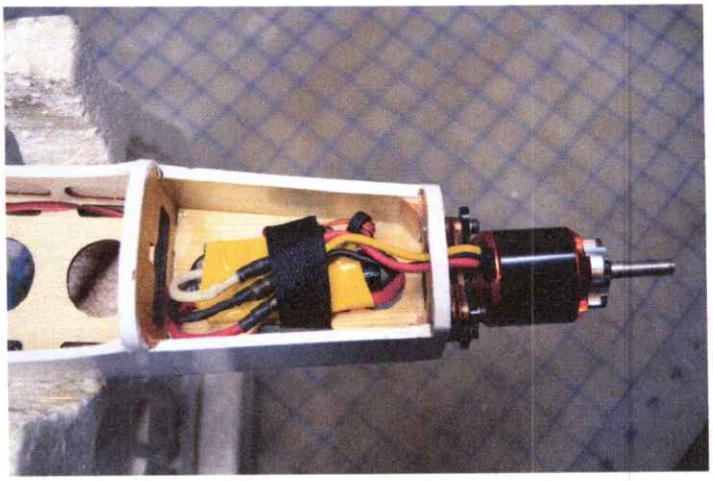


This is the E-flite Power 25 1250kv motor installed with no spacer. This motor uses a collet type prop adapter. E-flite also sells a very nice spinner with a built in collet that works great in this application. This spinner will be lighter weight and will place the spinner closer to the firewall.

NOTE: Make sure the top motor mount bolts do NOT extend past the blind nuts into the battery compartment. If they do, cut the bolts shorter, replace with a shorter bolt or put a scrap of wood over the bolts to protect the battery in case of a hard landing or crash. This will greatly reduce the risk of a lipo battery fire from the battery sliding forward and being impacted by the bolt(s).

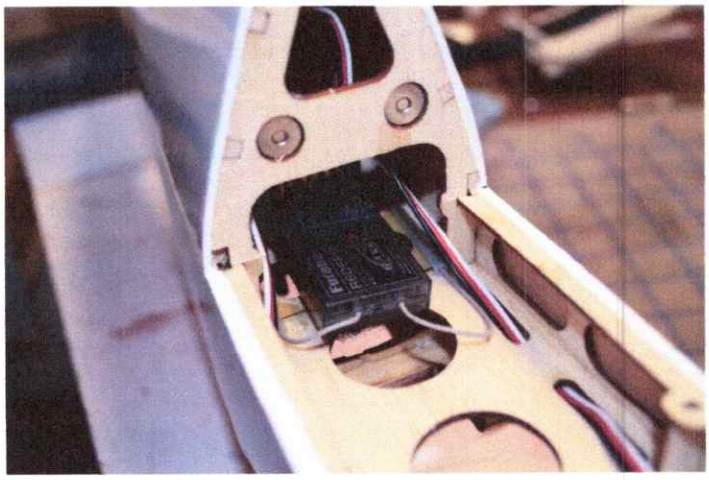


This view is looking at the lower side of the fuselage nose area where the ESC is typically mounted. After mounting the motor, install a piece of adhesive hook and loop material in the ESC area. Typically the "hook" side is installed in the fuselage.



Typical ESC installation with hook and loop strap in addition to the adhesive backed material previously installed.

Connect your receiver to the ESC and use your radio to test the operation of the system. Make note whether the motor rotates in the correct direction. Now is the time to get the rotation right by switching two motor/ESC wires if needed. CAUTION: Do not install the prop during testing on the bench.



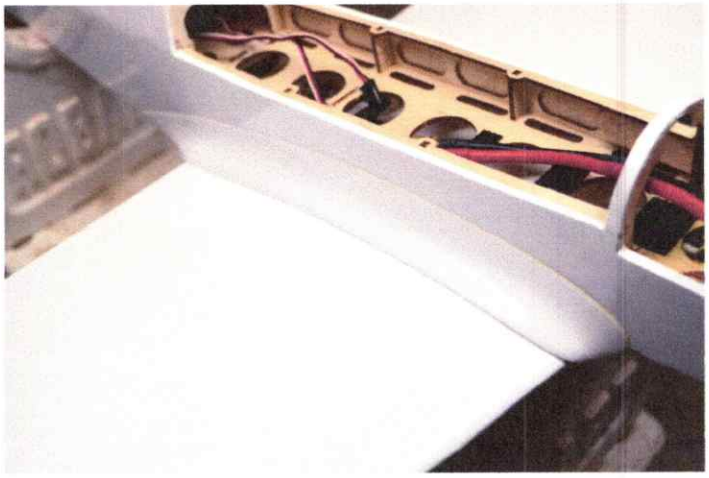
Typical receiver installation with hook and loop material. Route the receiver antennas per the radio manufacturer's instructions.

INSTALL OPTIONAL WING FAIRINGS

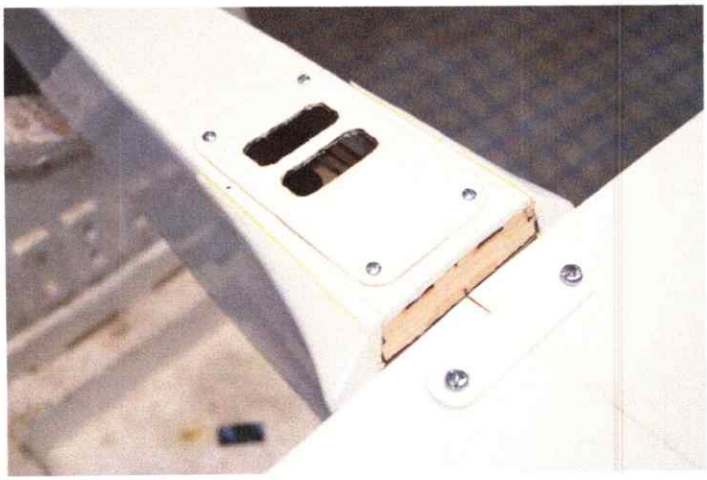
The kit is supplied with vacuum formed wing fairings. The builder can choose to use them or not. The plane is approved for EF1 racing with or without the fairings installed. This is another case where the curved RC car body scissors are a huge help and make what can otherwise be a frustrating task very easy.

The fairings are cut out along the lines molded into them. The initial cut should be 3/16 to ¼" outside the line. This will make it much easier on the second time around to cut pretty close to the line. After getting the cuts close with the scissors, use a sanding block to smooth and put a final shape on the edges.

This picture shows a finished fairing and the other unfinished for comparison.



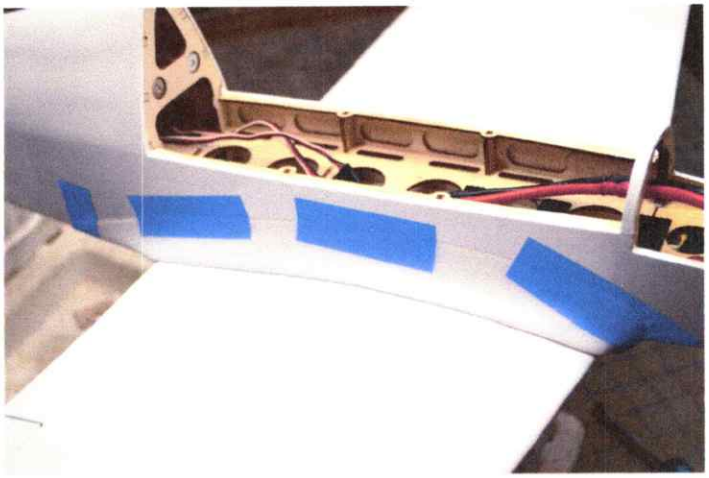
After test fitting on the fuselage alone, install the wing on the fuselage but only engage the screws a couple threads. With the wing loose, turn the plane over and slide the filets into the gap between the fuselage and wing. Seat them all around and trim a bit as necessary to get the desired fit. Snug up the screws to hold the filets in place.



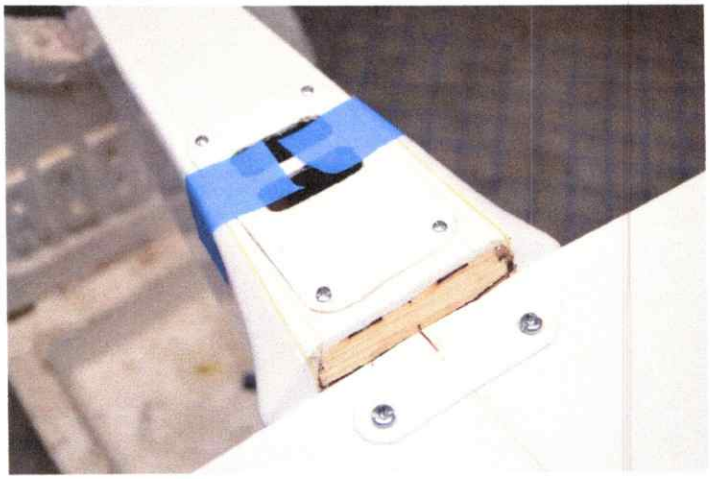
The portion of fairing behind the wing engages the fuselage as shown above. When satisfied with the fit remove the wing and remove the filets.

Prepare 8 to 10 pieces of masking tape for holding the fairings in place to dry.

Apply a thin bead of E6000 or Zap-Goo along the wing saddle on the fuselage and to the angled face just aft of the trailing edge. Apply a bead around the remainder of the perimeters on the fairings themselves. Set the fairings in place on the fuselage saddle and hold them there while you reinstall the wing. Just before you get the wing fully tightened, go around the fairings and make sure they're seated as good as possible, including the aft portion behind the wing. Snug up the wing mounting screws but don't overdo it.

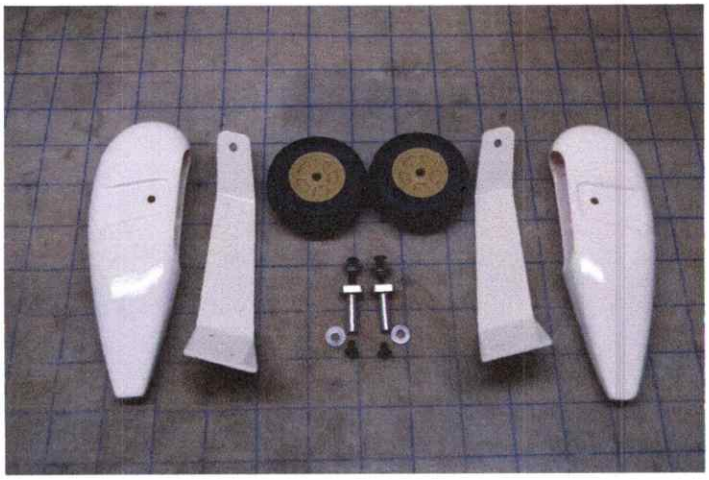


Turn the model over and use tape along the edges as shown above. Also be sure to tape the back end of the fairings as shown below. Allow to dry overnight before removing the wing and tape.



After the glue is dry, remove the wing and check to see that the fairings are adhered to the fuselage well enough. If necessary, use a toothpick or similar to apply some glue to any loose spots you find.

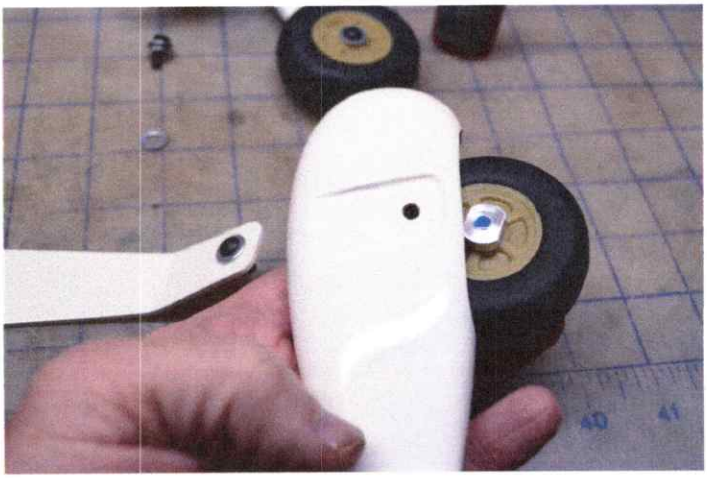
ASSEMBLE & INSTALL THE LANDING GEAR



The supplied parts of the landing gear assemblies. The shorter screws are to hold the wheel onto the axle. The longer screws go through the landing gear leg and wheel pant, into the flanged side of the wheel/axle assembly.

Test fit the wheels on the axles. If there is resistance to spinning after tightening the screw in the axle, use a moto-tool and sanding drum or some other tool to remove some material from the sides of the wheel hub to slightly reduce the width until the wheel spins easily. Before final assembly, apply a small drop of light oil on the axle.

Use blue thread locker on the screws holding the wheels on the axles and the ones holding the axles, pants and gear legs together.

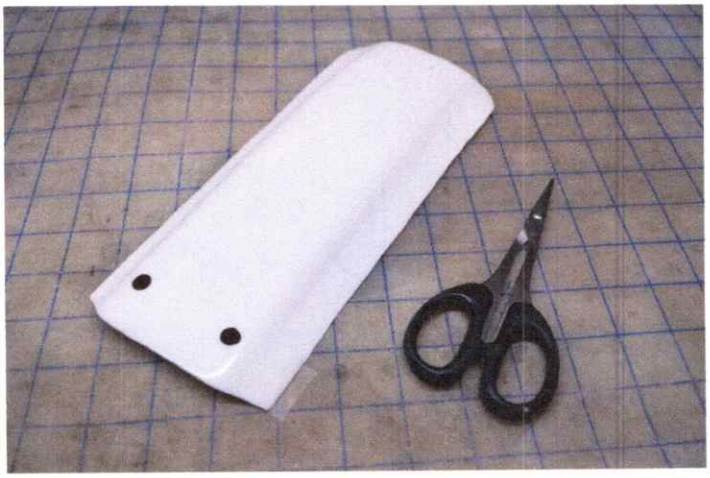


Slide the wheel/axle assembly into the wheel pant. Place the longer screw and a washer into the landing gear leg hole and thread it through the hole in the pant and tighten in the axle.

Use a wrench on the flats of the axle flange and tighten the screw.

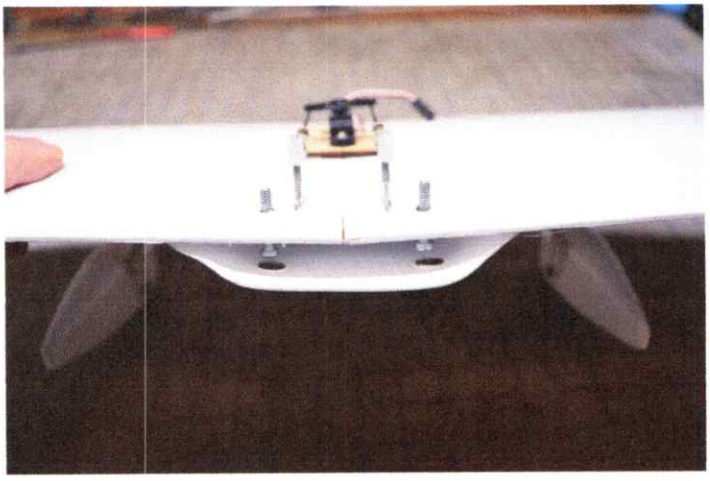
The landing gear installed in the wing with the 4x12mm button head screws.

INSTALL BELLY PAN

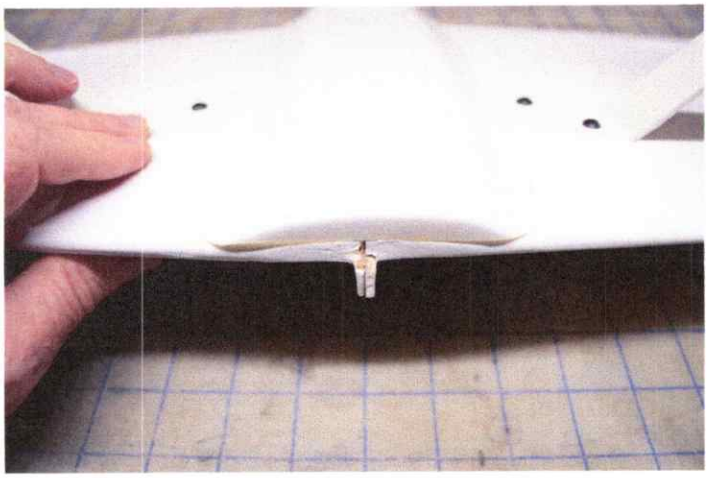


The belly pan is trimmed with the curved scissors, in the same way as the wing fairings and cockpit floor.

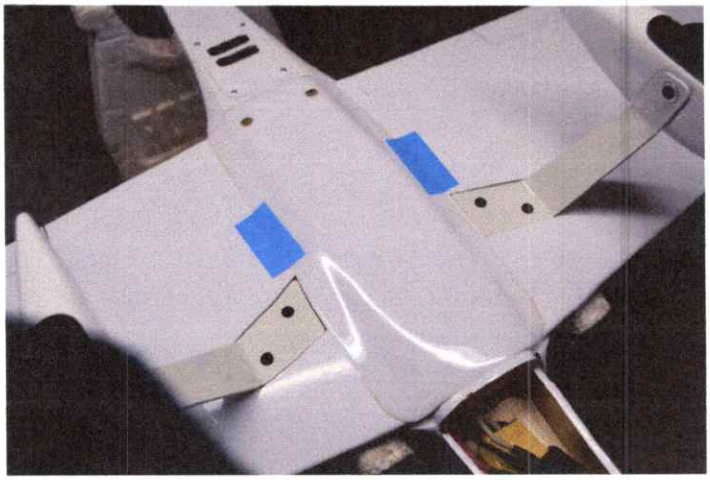
Cut a first pass within 3/16" to ¼" of the line and fwd and aft flanges. Come back for a second pass to cut the belly pan out close to the line. Use a sanding block to smooth and straighten the edges.



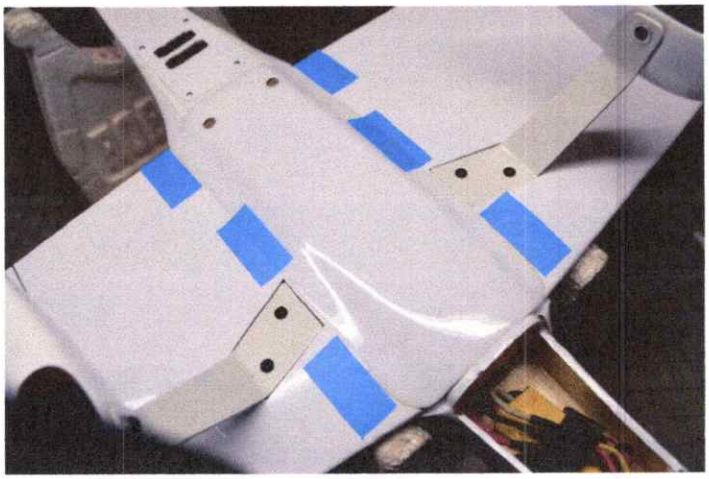
Leave a bit of flange in the back end where it wraps around toward the inside. This helps keep the shape of the back end of the belly pan to fit nicely with the back side of the wing opening and fairings.



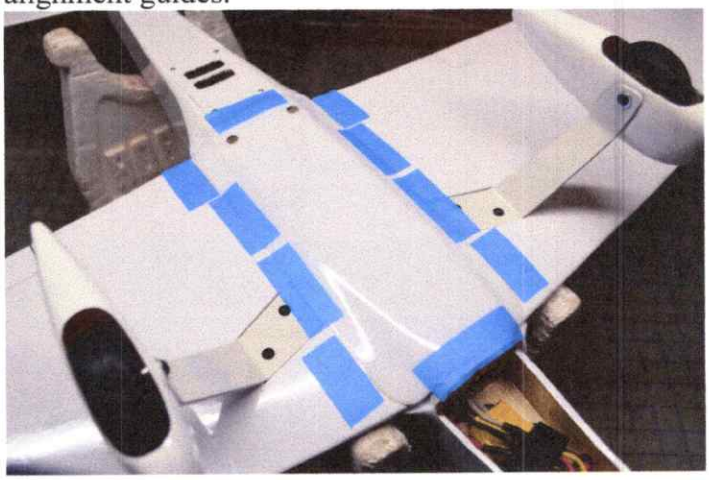
The forward end should be cut and sanded to be approximately straight across.



Temporarily tape the belly pan in place on the bottom of the wing and check the fit.



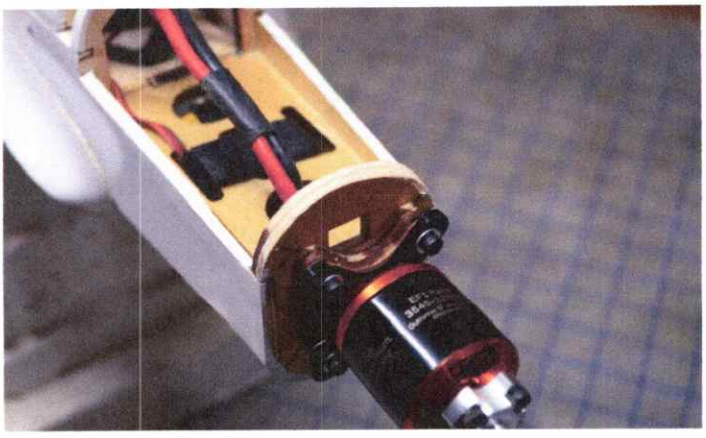
Once satisfied with the fit, put pieces of tape just along the edge at the front and back of each side for alignment guides.



Apply E6000 or Zap-Goo along the edges where the belly pan will contact the wing. Set the belly pan with glue in place using the tape guides you just applied for positioning. Apply more pieces of tape along the sides as well as the front and rear to hold the belly pan while the glue dries. Give the glue adequate time to dry.

INSTALLING COWL

Slide the cowl onto the fuselage over the motor. Install the spinner backplate on your motor. Slide the cowl forward until it is just behind the spinner backplate but does not rub when turning. If the cowl sits a bit high compared to the spinner, pull the cowl back off and sand the top of the firewall former a bit till it lets the cowl line up with the spinner better.

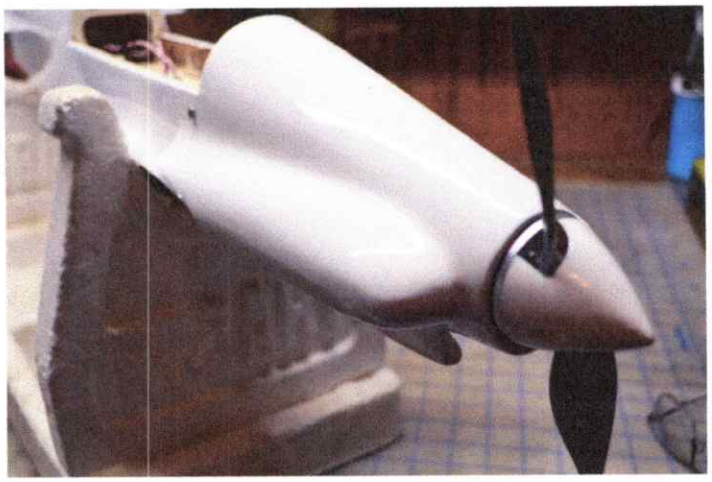


You can see the covering has been removed from the top of the firewall former and some material sanded off the top. It should be beveled a bit to follow the inside shape of the cowl.

Once you line up the front of the cowl to the spinner backplate, you can drill a 1/16" hole in each side at the location shown. There is a reinforced area inside the fuselage for the cowl screws to engage.

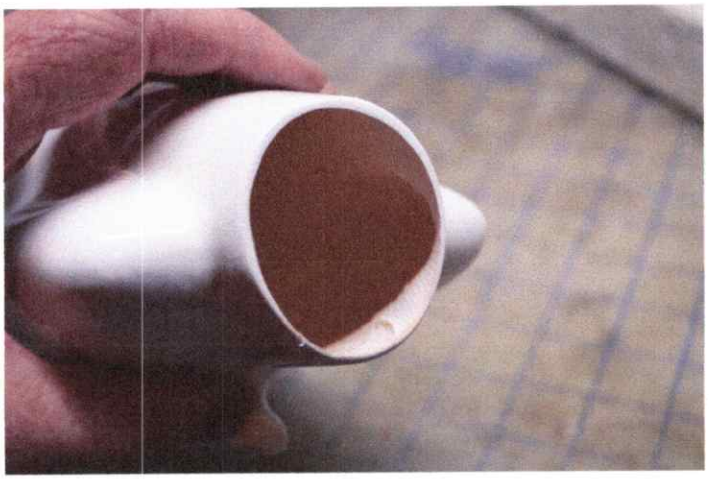
Install a screw on each side to hold the cowl. You could potentially install a screw on the bottom into the edge of the firewall if you feel one is needed due to the cowl moving too much.

NOTE: Make sure the point of the cowl screws are not extending into the battery compartment. If needed, use a sanding drum on your moto-tool to grind the point off flush with the wood inside. A point sticking into the battery compartment can damage the lipo battery and result in a fire.



Here you can see the spinner lines up better after sanding the top of the firewall a bit. Don't do too much, as it doesn't take much material removal to do the trick.

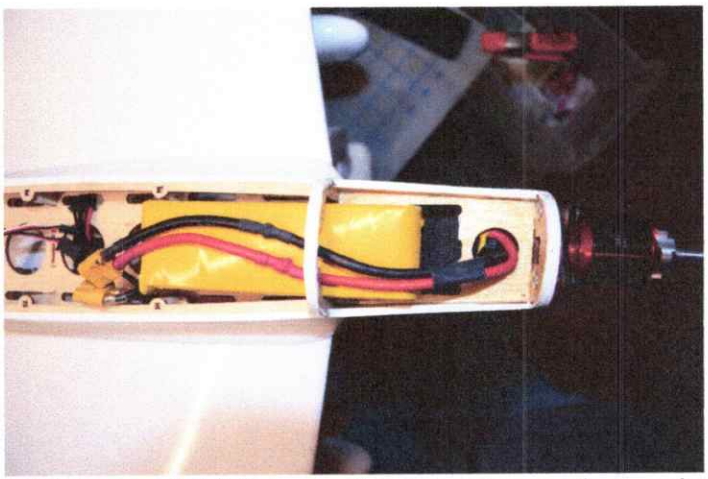
When relieving the top of the firewall, the cowl may begin to touch one or both of the top motor mount arms. Those can be ground down a bit if more room is needed.



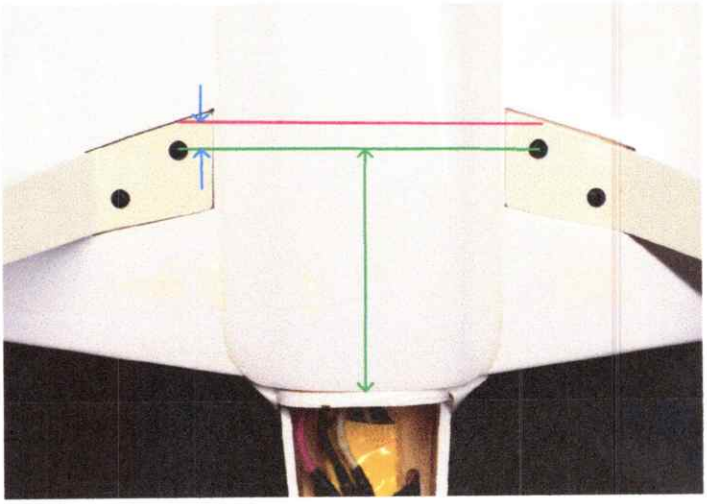
The flange in the "smile" inlet below the spinner may be ground open with a moto-tool and sanding drum if cooling flow there is desired.

Cowl "smile" area below the spinner opened to allow some cooling flow into the fuselage.

BALANCING THE MODEL, CENTER OF GRAVITY (CG)



With the model fully assembled, install your battery in the approximate location shown above (cowl and canopy not shown for clarity of the battery position). Install the canopy.



With the battery installed and the plane ready to fly, the CG should be **3 1/2"** to **3 7/8"** (89mm to 99mm) behind the leading edge at the center of the wing or the back side of the former that the leading edge keys into. See the picture of the bottom of the plane. In this picture, the nose is pointing down.

An easy way to check the CG accurately is to reference the landing gear bolts shown. By placing your fingertips on the back side of the aft/inner landing gear bolts you can get an accurate and consistent measurement of where the CG is. Adjust the battery position till it balances level there, your model will have its CG in the middle of the range. Do not fly with the CG behind the **RED** line. It is also not recommended that you fly with the CG forward of the **GREEN** line.

You should be able to adjust the battery position to achieve the proper CG. The location of the battery will depend on the weight of the battery. If you have batteries with different weights, the position in the fuselage, forward and aft, may be different for each of those batteries. When you get to the point of trimming for racing, as described in the back of these instructions, adjusting the CG from flight to flight is easy by simply changing the position of the battery slightly.

Prepare a hook and loop strap to hold the battery in place. Utilize the slots along the sides of the battery floor to wrap the strap under the floor and wrap around the battery after installing. Hook and loop material adhered to the battery and floor of the battery compartment is also recommended.

Another important check is the lateral balance of the model. Pick up the model by the propeller shaft and under the aft fuselage, forward of the rudder hinge. If one side is heavier than the other, add some weight to the light wing tip. This can be done by taping a coin to that side. A very good method is to go to a golf shop and pick up some lead tape. It's used for weighting golf clubs for "trimming" the way a club works. This tape is very handy in model planes too. Add some weight to the light wing until the model appears to be balanced laterally.

FLIGHT PREPARATION

Control Setup

Turn on your radio transmitter and make sure all trims and sub-trims are set to neutral. If needed remove and adjust the servo arms so that they are as close to 90 degrees to the pushrod they are actuating, with the transmitter stick and trims neutral.

Adjust the linkages so the control surfaces are in the neutral position.

Verify the controls move in the right direction. This is best done viewing the model from behind. Also verify the throttle is functioning in the right direction.

Set the control throws as shown below.

	Low Rate	High Rate
Ailerons	Left & Right 1/4" (6mm)	Left & Right 3/8" (9.5mm)
Elevator	UP & DOWN 1/8" (3mm)	UP & DOWN 3/16" (5mm)
Rudder	UP & DOWN 1/2" (12mm)	UP & DOWN 3/4" (16mm)

During your radio setup for first flights, you may want to adjust your trim step size higher for initial flights. Once the plane is trimmed, you can adjust the trim step size back to your normal setting for fine tuning. This will help getting the trims closer with less "clicks" on the trim levers if needed.

ESC setup

It is recommended that you read and follow the manufacturer's instructions carefully to set up your ESC. If there is a "Timing" adjustment, it has been found that the best setting for a racing type airplane is usually the highest setting. This is not always the case. Try the different settings available to find the setting that gives the highest RPM with the lowest amp draw. Some ESC/motor combinations will not work on the highest timing setting available. When you go too far advancing the timing, the RPM will not increase but the motor will draw more current and get warm faster. If you find this, back off a step at a time to lower settings until you find the sweet spot.

PREFLIGHT CHECKS

- Charge your transmitter and flight batteries.
- Go over the plane to make sure all fasteners are in place and tight.
- Verify the receiver and ESC are adhered well to their hook and loop material.
- Double check the CG
- Check control surface movement and direction.
- Verify Low and High rates if used. Use Low for initial flights.
- Verify receiver antennas are oriented in the model per radio manufacturer's instructions.

FLYING

It's a good idea to do some taxi testing and practice takeoff runs to get familiar with how the model handles on the ground and during the run-up for takeoff.

When you're comfortable with the ground handling and practice takeoff runs, it's time to fly! Make sure you are on LOW rates.

Check for other traffic at your flying site. Point the model into the wind as much as your flying site will allow. Take a deep breath and advance the throttle, holding a little up elevator and being ready to add some right rudder. Once you're airborne, climb to a safe altitude. Check the model for any needed trim inputs. Take your time getting the model trimmed for level flight. As you get closer on your trim, bring the model closer to the ground and make level passes so that you can see those little needed trim inputs. With a model as fast as this one, it needs to have the trimming done right.

Once the model is trimmed for neutral flight, it's time to start exploring how the control throw settings suit your needs and how the model reacts to the different controls. The recommended settings are the result of much flight experience and should be close.

Take the model up and slow it down with plenty of altitude to explore the stall characteristics. This will give you a great feel for how the model will feel on landing approach and where the low "limit" is, speed wise.

Don't make the initial flights too long to put pressure

on your landing because of the flight battery getting too low. After feeling out the handling, make some practice approaches to get comfortable with the handling under those conditions.

The PB-2 is a very sleek airplane and maintains airspeed very easily so, you need to plan your approaches accordingly. This model will require longer approaches than most "sport" models. That's considered a good thing for a race plane. Do NOT slow the model down too much to do landings near stall speeds. Don't hesitate to go around and make another approach. Another helpful tip is, don't make your turn to final approach and then drop the nose to descend. A clean plane like the PB-2 will increase speed too much and you will likely land longer than you had planned. Instead, do a gentle descending turn onto final approach. In a turn, you're pulling elevator and drag is higher so the plane won't gain as much speed in the descent. It can make your landings much easier.

An important tip for landing the PB-2 is what to do with the elevator as the model touches down. This will depend on what kind of surface you are flying from. The landing gear design is a compromise between the best location on the aircraft for landing on grass vs paved or smooth runways.

Grass landings will be basically normal where you flare and hold the model just off the ground till it settles in and hold some elevator until the model rolls to a stop and you turn to taxi back. The "fabric" or Petromat runways seem to be similar to grass in that they have some absorption at touch down and the model tends to settle nicely.

On pavement, things are a bit different. Because the gear needed to be far enough forward for grass landings, it's a bit too far forward for perfect pavement touchdown behaviors. So, touching down on pavement while holding some elevator used for flaring, will result in a tendency to bounce unless a perfect "greased" landing is done. The trick to landing the PB-2 consistently nice on pavement and dealing with this tendency is to let go or release the elevator input immediately to neutral as the main wheels touch the ground. It will stick and roll out nicely. What this does is it allows the tail to come back up a bit and shift the CG forward to be more over the wheels. You'll be amazed how well this works. It's just not typical for sport model.

TRIMMING THE PB-2 FOR RACING

"The National Miniature Pylon Racing Association (NMPRA) is the AMA Special Interest Group (SIG) for pylon racing in the USA. The organization originally developed the Electric Formula 1 class of racing to fill a need for a fun racing class that would be a great way for RC pilots to try racing and for expert pilots to have fun, with cool looking planes that are reasonably priced and fun to sport fly too. The rules were written to keep planes as equal as possible with specifically approved brushless motors and systems while controlling the model designs to keep airplane performance as equal as possible between competitors. The goals set in the beginning of the class have clearly been met in the years since. The class rules were eventually transitioned into the AMA RC Pylon Rulebook where they are now maintained by the AMA RC Pylon Contest Board as AMA Event #421. The rules can be found at the AMA Competitions Department at:

https://www.modelaircraft.org/events/competition-resources/competition-regulations

If you would like to learn more about the NMPRA and pylon racing in general, you can find tons of information and schedules for racing in different parts of the USA at the NMPRA web site: www.nmpra.org

You can also consider seeing if there is interest in your local club to do some club level racing. The members of the NMPRA would be happy to help get something like that going. It can be done in low key formats at the local level to keep it low on stress and high on fun.

Racing your PB-2 in the EF-1 class can be a great time. It can be much better when the plane is properly setup and trimmed to make it as easy as possible to get around the pylon course quickly and consistently. There are many little things that will contribute to improving your lap times. A pylon race plane that is easier to fly tightly around the course will make those fast lap times more consistent and your heat times will be much better. We're going to step you through the process of trimming your PB-2 to allow you get the most out of your plane and its great handling qualities

and speed. You'll find that most of the techniques can be applied to any plane to make it fly and handle better.

We'll start by verifying the center of gravity fore and aft to be within the range shown in this manual. Move the battery as needed in the compartment to achieve the desired CG without adding additional ballast to the plane. You will want to find the appropriate position for your battery and note that location so you can repeat it each time the battery is installed in the plane before a flight. If you have batteries that weight different amounts, you'll want to test the CG with each battery type to make sure you can maintain the proper CG from flight to flight. You may end up fine tuning the CG forward or aft to adjust the way the plane flies on the race course as we step through this process.

It was mentioned earlier in this manual that balance of your model side to side is important to check. Pick up the model by the propeller shaft and the bottom of the tail of the fuselage. Not the movable rudder. If it consistently falls to one side, add some weight to the opposite wing tip. Taping coins or lead tape on the wing surface near the wing tip is a great way to do this adjustment. Lead tape is available at your local golf supply store or online. Please note that this is just a starting point. After working through the trimming process, the tip weight may be adjusted more to get the handling in the turns we're looking for. We'll see but, statically balancing the plane initially is a great place to start.

Now, we need to once again verify the control throws. The control responses used for sport flying will usually be different than those used for racing. Every control surface movement, increases drag and causes the plane to slow down. Unnecessary control movements will result in a loss of airspeed and increase lap times. You want to get the plane trimmed and control throws set so you can maintain a tight course with minimum control movements. This will always be the path to the fastest lap time. Developing your setup so you can fly those fast lap times more consistently will result in improved heat times. Dial in and use your low rates for racing and higher rates for sport flying and landing in windy or turbulent conditions.

You should now be ready to start the real fine tuning and making the little adjustments that really make a difference flying a race course. Throughout the trimming process, after each change, always takeoff and re-trim for level flight…ALWAYS! Make long level passes at low enough altitude that the ground is a good reference. Do these checks before you pull the model onto the race course.

Turns in racing are always a compromise between how tight you turn and how much speed you loose pulling through that turn. The best turn is going to be somewhere in the middle between the tightest turn you can safely make and the wider turn with the fastest airspeed at the exit. Remember, any control movement increases drag. Find that best balance for the best lap times. Many of the fastest racers set their elevator throw so they use full elevator in each turn, once they settle on the turn rate they prefer. With your elevator rate set right for a 3-pole course, you should be able to bank into pylon 2 and smoothly pull the elevator to full deflection and end up just clearing pylon 3.

The next step is to dial in the way the plane behaves as you pull it through turns. What we're after is a plane that, when banked 90 degrees into a turn, it doesn't climb or descend as it completes the turn. If one wing is heavier than the other or it behaves like it's heavier than the other, the plane will roll toward the "heavier" side, causing the plane to climb or descend by rolling toward the heavy side. We already talked about statically balancing the plane and that will typically get you very close but, sometimes this rolling tendency in the turns is caused by something other than a weight difference. You can correct it by adding weight to the side that is "acting" like it's lighter. To check for this condition you'll want to fly the plane away from yourself so you can bank 90 degrees and pull the elevator to do a 180 degree turn back toward yourself. If it does roll left or right, it will also climb or dive as it rolls. If it rolls out of the turn and climbs, add weight to left tip or lower wing of a left turn. If it descends and rolls into the turn, add weight to the top wing. This will dramatically help with consistency of your laps and your ability to control the altitude as you navigate the course, lap to lap.

Next, lets trim the rudder. Of course, like aileron and elevator, you want to trim the level flight with the

plane not obviously yawing left of right. Now you're going to trim the rudder so the plane is easy to hold a constant altitude through the turns and is comfortable holding the partial bank angle in the straights. Don't add too much and cause it to fly tail low. You want just enough to get the plane comfortable and not wanting to descent or climb as you fly the course.

Sometimes, the amount of rudder trim you want for the turns can be different than the amount of rudder trim you want for the straights. This can be caused by the strong torque effects from the torque of the brushless electric motors and the high pitch props that are used. There are several ways to deal with the difference in trim requirements between the turns and straights. One way is to use the programmable mixing function in your transmitter. Mix a small amount of right rudder as the slave to the elevator as the master channel. It doesn't take much. Just enough mix that you can see it move if you very look close. Only a few percent will be needed and only to the right with up elevator. You will be surprised how much difference this can make.

Another method to help this behavior is to use a gyro on the rudder. The gyro, when set up properly, will compensate for the torque automatically through the turns and relax in the straights to where you have the trim set.

The next thing to dial in is the way the plane flies in the straightaways. This is going to depend on the course you'll be flying, 2 or 3-pole and what length. In dedicated AMA EF1 racing we mostly use the 375ft 3-pole course and 400-500ft 2-pole course. At some events where EF1 is being flown along with AMA 424 or 426 Q500 events, the 475ft 3-pole course is used. On the longer courses you will obviously spend more time in the straights. Ideally, you would roll out to a bank angle of approximately 45 to 80 degrees. When viewed from above, your path around the three pole course will look a lot like the shape of an egg with the course in the straightaway's being a gentle curve connecting the tighter turns on each end. If you do it right, this will reduce the time that you will spend in each turn at a high elevator deflection with the additional drag that comes with it.

To understand adjusting the way the plane flies the straights, you need to understand that a nose heavy plane will need more up trim in the elevator to fly level than a plane that has the center of gravity further back. We're not talking about very much difference, just a bit. Maybe a few clicks of trim. So, with a plane that is slightly nose heavy, the required up elevator trim to fly level will have an effect on the course the plane will fly when you bank the plane to about a 45 degree angle. That up elevator trim will then cause the plane to make a gradual turn in the direction it's banked. A more forward CG will need more up elevator trim and a less forward CG will require less up elevator trim to fly level. So, when you fly a race plane that has a further aft CG, it will carry less elevator trim and consequently, it will make a more gradual turn when simply banked to a given angle for the straights than a plane that has a further forward CG carrying more up trim.

With this in mind, go fly your PB-2 on the race course. When you exit a turn, roll to a 45 to 60 degree bank angle as you enter the straight and ease off the elevator. If the plane tends to drift to much toward the next pylon before you want it to, move the CG (your battery location) back a bit and go re-trim for level flight. It will now drift toward the next pylon less than it did before. IF it goes too straight for your flying style, move the CG forward and re-trim for level flight. It will now drift slightly more in the straights. Usually, you will want the CG a little further aft for a longer course to not curve the straights quiet as much.

Please keep in mind that, while you're working through these steps, you may find that one adjustment has a small effect on another. That's OK and normal. Just work with the different adjustments we've described to find a balance where all of these factors work well together. Once you've completed these steps, you'll have a PB-2 that will be easier to fly faster and more consistently than one where you have to work harder to fly well. These techniques apply to any pylon racing plane and much of it to any plane you fly.

You can continue to learn more by seeking out races and racers in your area and get to know them. The NMPRA is a great organization with a lot of members who enjoy helping the new guy develop their skills and helping them enjoy the thrill of pylon racing. As mentioned earlier, you can find out more at: www.nmpra.org.

HAVE FUN and GOOD LUCK at the RACES!!

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