

Construction Guide for the T-38 Talon Park Jet

By Steve Shumate



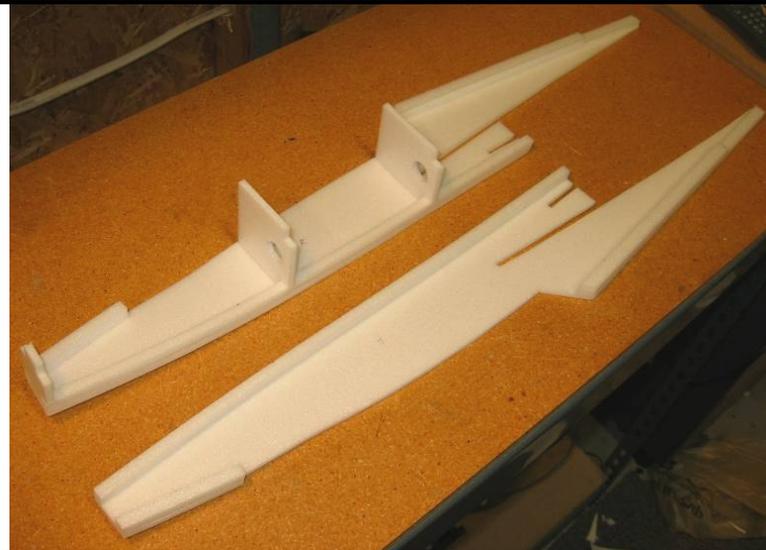


A NOTE ABOUT GLUES

This model can be built using the following types of adhesives:

- Epoxy
- Odorless cyanoacrylate (CA) with accelerator
- UHU Creativ for Styrofoam (or UHU POR)
- 3M 77 spray adhesive
- Hot glue gun
- ProBond (or Gorilla Glue)

To minimize weight, try to use as little epoxy as possible on this model, saving it for only critical joints such as wing spars and motor mounts. The majority of construction should use a lightweight and quick-drying adhesive such as CA, UHU Creativ, or 3M 77. I personally use 3M 77 and UHU Creativ (picture at left) for the majority of construction.



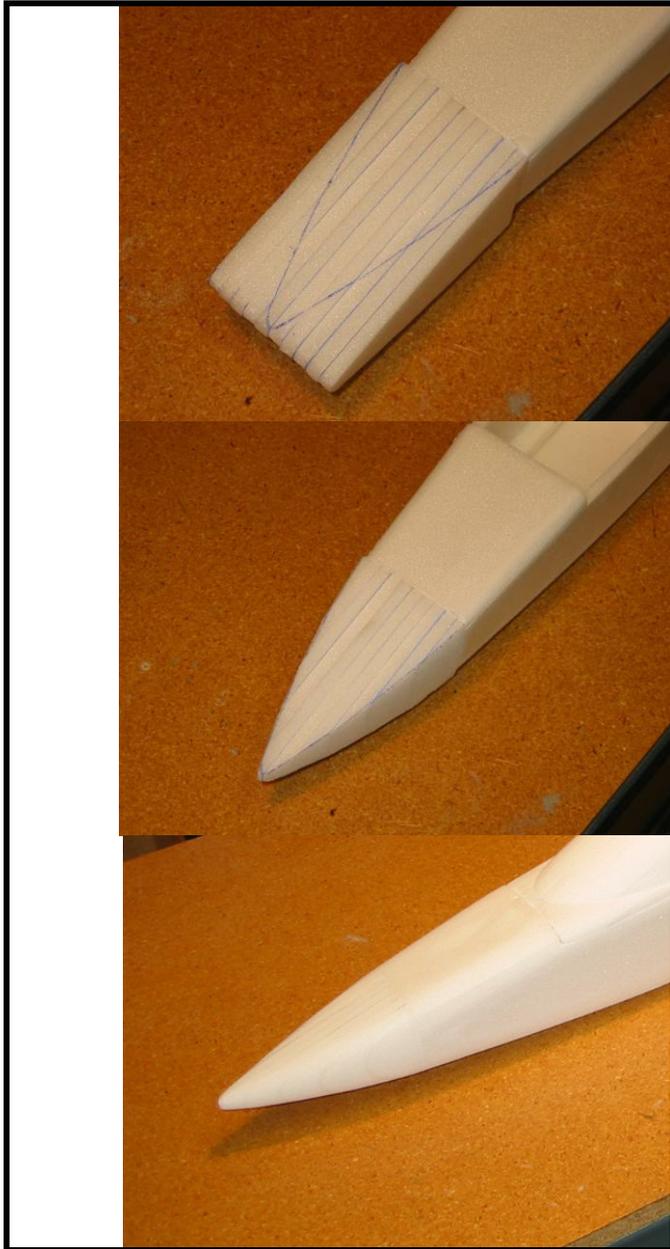
1. Start assembly with the forward fuselage. Lay the two fuselage sides down flat on the work bench and glue the foam corner doublers to the locations shown on the plans. Make sure to make two mirror image parts—a left side and a right side. Either 3M 77 spray adhesive or UHU Creativ works best for this step.

After the glue has dried, glue the three fuselage bulkheads to one of the fuselage sides at the locations shown, making sure they are perpendicular.



2. Glue the two fuselage sides together. Set the sides upright and flat on the workbench, apply glue to the edge of the bulkheads, and push the sides together. Note the aft end is left open at this point—it will be glued together later after the aft fuselage assembly is attached.

After the glue has dried, glue on the forward fuselage bottom piece and the forward fuselage top piece.



3. Laminate all of the nosecone pieces together using 3M 77 adhesive. Then glue the nosecone block to the front of the fuselage.

Once the glue has dried, sand the nosecone and forward fuselage to shape. Start by tracing the top outline of the nosecone onto the foam and cut to shape with a long knife or saw. Begin with coarse sandpaper (100 grit) to rough out the basic shape, then move to a finer sandpaper (220 grit) to do the final shaping. End with 320 grit sandpaper to do the final polish sanding and provide a very smooth surface.



4. Laminate and carve the canopy to shape using the same procedure as the nosecone. Note there's a thin piece that goes on the bottom outside of the block. This piece allows forming the lower sill of the canopy.



5. Glue the small plywood stabilator pivot supports to the aft fuselage sides at the location shown on the plans. Then stack the two sides together, carefully align them, and drill the 3/16" diameter hole through both pieces for the stabilator pivots (a drill press is highly recommended for this step to ensure the hole is exactly perpendicular to the sides).

Glue the foam corner doublers to the fuselage sides at the locations shown on the plans. Make sure to make left and right mirror image pieces.





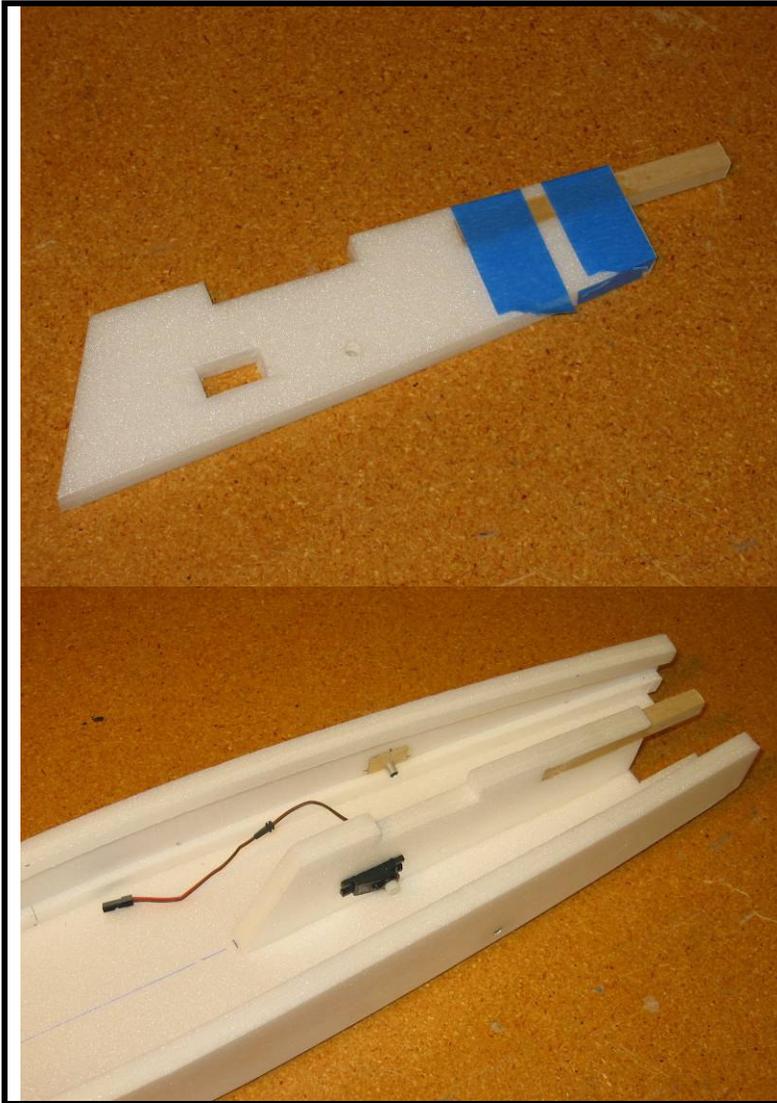
6. Now form the curvature in the fuselage sides. Hold each piece up to the aft fuselage bottom piece to judge the curvature required, use a heat gun to gently soften the foam, and bend the sides to the shape shown on the plans. It doesn't take much heat to soften Depron, so go easy with the heat gun! Keep re-heating and re-bending the foam until you get the curves perfect.



7. Draw a centerline on the inside of the aft fuselage bottom (to be used in the next step).

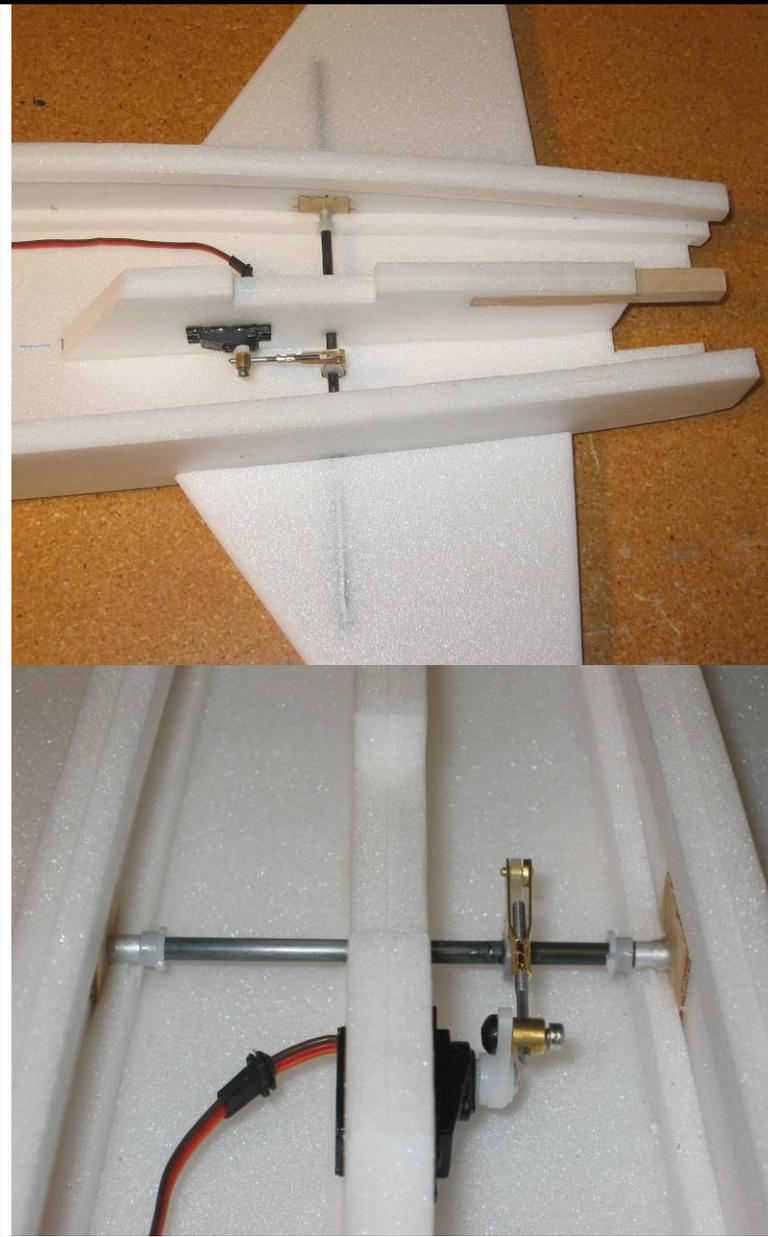
Use a heat gun to form the gentle curves in the fuselage bottom until they match the curves on the bottom of the fuselage sides.

Glue the fuselage sides to the bottom piece, making sure they are perfectly perpendicular.



8. Laminate the two motor mount pieces together (3M 77 spray adhesive recommended). After the glue is dry, glue in the hardwood motor mount with 5 minute epoxy and let it cure. Check the fit of the elevator servo used, and trim or shim the foam as required for a tight fit. Drill the clearance hole for the stabilator pivot rod.

Glue the motor mount support into the aft fuselage (5 min epoxy recommended), making sure it is aligned with the centerline drawn on the fuselage bottom.



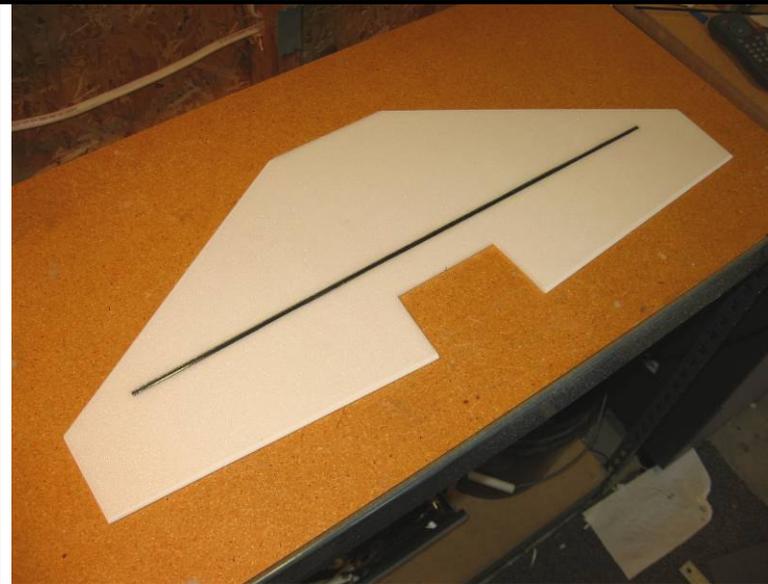
9. Next install the hardware for the pivoting stabilators. The 0.157" diameter carbon stabilator rod pivots inside two 0.5" pieces of 3/16" diameter aluminum, which are supported by two small squares of 1/64" ply glued to the fuselage sides (study the plans carefully here!). Two end stops (made from nylon servo arms drilled out to fit the rod and with the arms snipped off) butt up against the aluminum tubes to keep the rod from sliding left and right. The control horn on the pivot rod is made from either a spare nylon servo arm or a common nylon control horn cut to fit.

Sand the leading edges of the stabilators to a well-rounded shape, and sand the trailing edges to a gentle taper.

Test fit the aluminum tubes into the holes and slide the carbon rod into both pieces. Adjust the fit as required until the carbon rod is perfectly straight and turns freely, and then glue the aluminum tubes in place using CA or epoxy.

After the glue is cured, remove the carbon tube and glue it into one of the stabilators at the location shown (5 minute epoxy recommended). After the glue is cured, slide the carbon tube back into the airplane, and slide on the two end stop bearings and the pivot rod control horn (in the proper order). Install the stabilator servo and connecting hardware (I used 1/16" threaded music wire, Dubro EZ connectors, and a steel clevis).

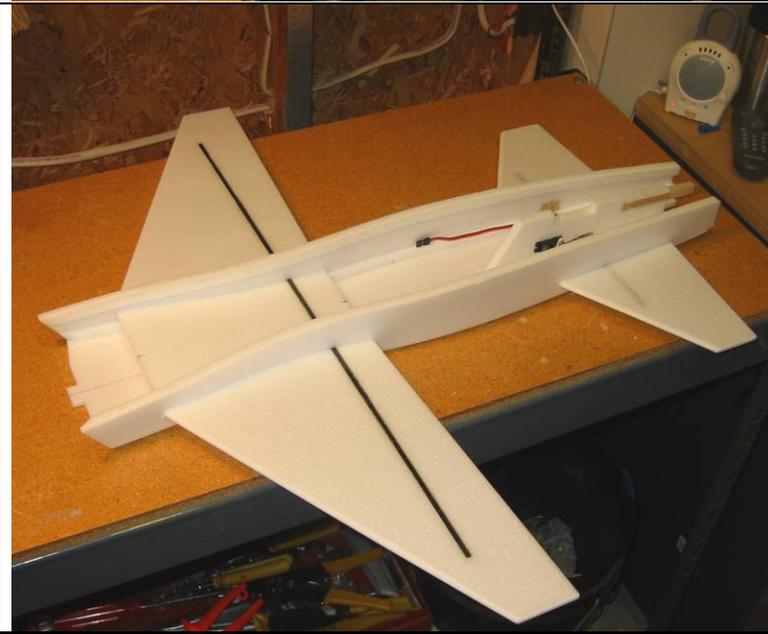
After everything is connected and aligned, glue on the second stabilator half, making sure it is perfectly aligned with both the fuselage and the other stabilator half (5 minute epoxy recommended). Then glue the end stop bearings and the control horn onto the pivot rod.



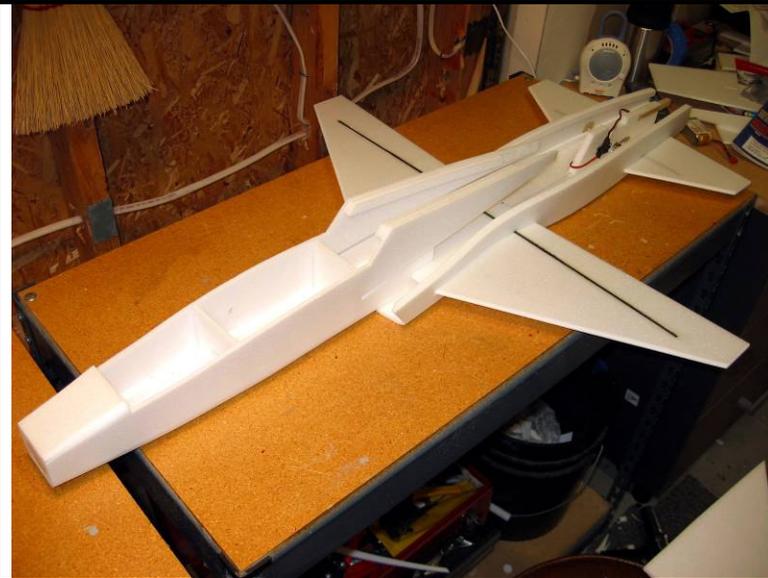
10. Sand the leading edge of the wing to a well-rounded shape, and sand the trailing edge to a gentle taper. Cut a slot for the carbon tube wing spar.

Lay the wing down on a flat surface and use 30 minute epoxy to glue the carbon wing spar in place. Place heavy books over wax paper on top of the wing to hold the wing perfectly flat as the glue cures.

After the glue has cured, cut the flaperons free from the wing. Then cut a 45 degree bevel in the leading edge of the flaperon using a ruler and a hobby knife. Don't hinge the flaperons to the wing yet—that will be done later.

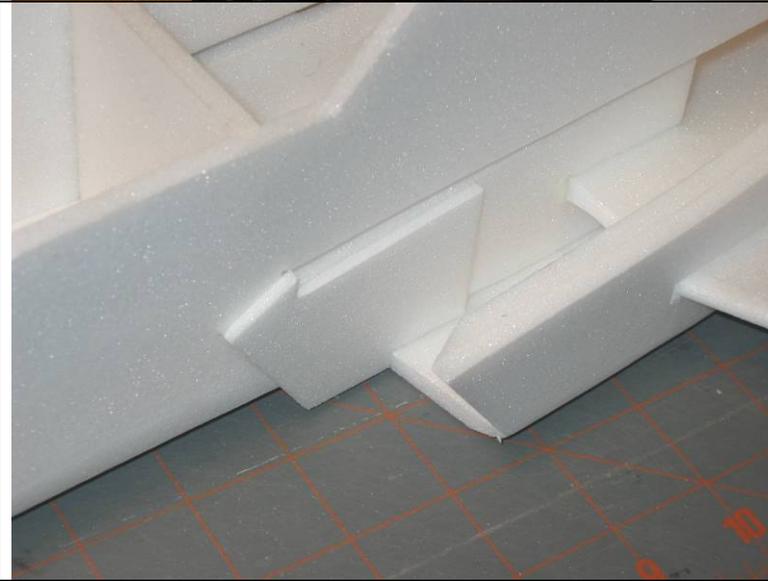


11. Slide the wing into the fuselage. Make sure it is perfectly flat and perpendicular to the fuselage centerline, trim and shim as required, and then glue into place.



12. Glue the forward fuselage assembly to the aft fuselage assembly.

After the glue is dry, attach the flaperons to the wing using your hinge of choice. I recommend 3M Satin tape hinges, running full span on the top and bottom of the wing.



13. Glue the 3mm Depron inlet fence pieces to each side of the fuselage at the location shown on the plans.



14. Glue the aft fuselage top into place as shown. I used 15 minute epoxy and taped it down as shown to ensure it was perfectly flat as the glue cured.

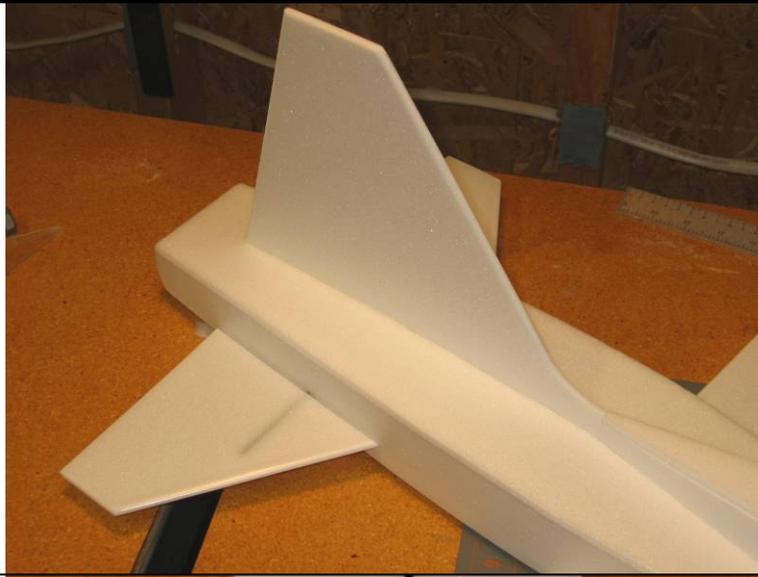


15. Glue the turtledeck sides onto the fuselage top, taking care to form the curves shown on the plans and making sure the ends are on the fuselage centerline.

OPTIONAL: The basic turtledeck design features flat sides for simplicity, but if you want to take the optional step of duplicating the scale crease in the turtledeck follow these steps. Cut the top part of the turtledeck free as indicated on the plans. Glue the additional foam support strips inside the airplane, and then re-glue the turtledeck top part back in place, inseting it slightly from the bottom piece to form a crease. Sand the edge of the crease to a gentle curvature.

Glue on the turtledeck top piece.

Now thoroughly sand the entire fuselage to round all corners. Start with coarse sandpaper (60 or 100 grit) to do the basic shaping quickly, and then progressively work your way to finer grades of sandpaper (150, 200, and then 320).



16. Sand the leading edge of the vertical tail to a well-rounded shape, and the trailing edge to a tapered shape.

Glue the vertical tail into place using epoxy.

Apply a single strip of 3M Satin tape around all leading edges on both the wing and tail. The tape helps provide a very smooth leading edge shape and also provides more durability against the inevitable “hangar rash.”



17. Cut holes in the fuselage sides to fit the flaperon servos tightly, and install the servos. Install the flaperon control horns, and make a pushrod from 1/32” music wire (using Z-bends at both ends).

Cut a hatch in the turtledeck as shown to allow access to the receiver. Use small strips of tape to keep this hatch in place in flight.



18. Install the receiver and speed control.

Make a wire extension to connect the battery in the forward fuselage to the speed control in the aft fuselage. Use at least 16 gauge wire. To reduce the amount of RF interference with the receiver, twist the wires in the extension tightly together and also wrap them tightly with 3 or 4 layers of household aluminum foil. This will provide shielding that should reduce interference. Solder the connectors of choice to both ends (Deans Ultra connectors are recommended).

Install Velcro in the forward fuselage to hold the battery in place.



19. The canopy is removable to allow easy access to the battery compartment. It is held in place with two bamboo skewers (or toothpicks) forward that slide into matching holes in the forward bulkhead, and two small strips of Velcro aft that are mounted to short pieces of 1/4" balsa triangle stock.

Cut two 2" lengths of bamboo and sharpen both ends. Stick the bamboo into the foam at the front of the canopy so that only 1/2" protrudes and glue into place.

After the glue dries, push the canopy onto the airplane so that the protruding ends poke holes into the forward bulkhead. Then glue the Velcro mounts to the fuselage sides as shown on the plans and attach the matching Velcro pieces to the mounts and to the canopy.





20. Attach the motor to the wood motor mount stick. Two screws (one on each side) can be used to hold the motor on. Make sure the thrust line is set with zero right/left and zero up/down thrust. If not, trim and shim the wood mounting stick as required.

Plug the motor into the leads to the speed control.

Note that a “soft-mount” prop adapter is recommended to prevent damage to the prop or the model during landings.



21. CONGRATULATIONS! Your model is now complete.

The model can be flown as is or can be painted using standard acrylic craft paint (available at most craft stores) applied with either a brush or airbrush. Remember to wipe the foam with rubbing alcohol before painting to remove any grease or dirt. Rough areas such as the canopy and nosecone should be filled with standard wall spackling compound thinned with water, which fills the holes and can be sanded to a very smooth finish (with minimal weight gain).

Additional Photos



Flight Setup

1. This model flies at it's best with flaperon controls enabled, which requires a transmitter with flaperon mixing. Flaps will improve takeoff and landing performance and also general maneuverability. However, if you don't have a transmitter that supports this function, the model still flies very well with ailerons only.
2. Adjust the controls to provide the following recommended deflections (all dimensions are measured at the root trailing edge):
 - Stabilators: +/- 1.0"
 - Ailerons: +/- 1.0"
 - Flaps: 0 up, 0.5" down
3. I recommend using -40% exponential rates on elevator and ailerons.
4. Recommended hand launch procedure: Grip the airplane near the CG, set 10 degrees flaps (optional) and 50% throttle, and throw it moderately hard straight ahead and parallel to the ground. **Be careful to keep your hand away from the prop as you throw it!** It's important to launch at only 50% throttle to minimize prop torque effects at launch, which could cause the model to roll left immediately after you throw it.

Slowly add throttle soon after launch, and after the model has gained some speed and altitude retract the flaps if desired. When flying in small fields, the flaps can be left at 10 degrees throughout the flight, which will allow the model to fly slower and turn tighter. If you're flying in a larger field and want faster speeds or better aerobatics, retract the flaps to zero after launch.
5. **WARNING: Remember to ALWAYS release the elevator control right before touchdown during landings, since the forward stabilator tips can dig into to grass or soft ground—which can significantly damage the model and/or stabilator servo! Also remember to pull the throttle back to zero just before touchdown so that the propeller and/or motor mount is not damaged on landing.**