

Rev 2. Slightly modified throws and CG info.

There are 9 several PDF files that will be referenced by name. Print all of them out and have the photos available for reference. All construction is 3mm or 6mm (1/8 and 1/4) Depron unless otherwise noted. You can laminate two pieces of 3mm for the 6 if that's all you have. Make sure you get good glue coverage.

Wings

Two wing templates are provided. The upper one is deformed to allow for the airfoil shape forming. Trace the template for the bottom panel (Wing3) on 3mm depron. Cut this piece about 1/4 inch big on all sides. Locate the root rib onto the bottom skin. It appears to be short by about 1/4 inch on each end. This is fine, just center it and angle it slightly inward to the top. Put a small triangle next to it and raise the wingtip so the bottom is 1/2 inch above the work surface for dihedral. Glue the rib to the inside of the root line you traced earlier.

On the Template page is a 2-view of a hinge re-enforcement. This is centered and glued on the hinge line with the taper to the tip. This is so we can cut the aileron free after building the wing. You should cut a piece of 6mm about 1 inch wide. Then use a sanding block to sand the taper. When done, cut it in half and you will have matching parts for each wing.

Lightly bevel the edges of the upper and lower skins with a sanding block to get a better fit. You want about 1/4 inch contact area all around. Test fit the upper skin. Its tricky to form it but it should 'snap' into place for a near perfect fit. I think I glued the Leading edges first. Don't forget to glue in the hinge line reinforcement. When satisfied, pull the trailing edge down and glue it. You can just pinch the wing tip closed with a little glue. A light sanding should produce a nice air foiled wing.

Using a piece of 1/8 carbon rod or similar, drill a hole high in the root rib just under the upper skin. This will be used as a wing spar. You will need to build up some shim stock in the fuselage later to support it. Bevel the ends of the spar to get it to go as far in as possible. You will probably only get to within about 2 inches of the tip before you start gouging foam. This is fine. It will be plenty strong. A good hard dowel would probably work fine for this also.

Mark the leading edge where the blue line is on the top of the wing. Its shown on the bottom template (Wing3). Carefully wrap the leading edge with tape to this line. It doesn't matter where it ends up on the bottom. We want the tape leading edge to keep the foam from getting chipped up. I used Blendern or Dubro hinge tape. I used about 5 or 6 pieces for each wing, one for each straight section, and a few overlapping ones for the curves. You can see the wing taped in one of the photos on the X37/X40 web page. Don't tape the trailing edges.

Carefully cut out the aileron. Lightly sand a bevel from the top down on the aileron. It only needs to travel about 1/4 inch down at the trailing edge. Use some hinge tape along

the top to mount the aileron. Use the sanding block to clean up the trailing edge where the aileron meets the wing tip.

Tailplanes

I heated a piece of 3mm depron with a heat gun and folded it in half to form the leading edge. Wear a glove! A little practice and patience will pay off. When formed, bevel sand the inside trailing edges to try to get the trailing edge to about 1/8 inch thick. Trim the surface to the shape shown on the template sheet. I actually forgot to round the edges. If you are building a 40, I might shy away from the rounded root leading edge. You are sure to sand thru the foam and cause more problems. Its up to you...

I used a piece of 3/16 carbon rod for a hinge pivot. The quarter chord is marked on the template with a little tick mark about 1/8 inch either side. Sand a bevel and glue the rod in leaving about 2.5 inches for the bearing blocks and control horn.

I filled the roots with epoxy and micro balloons. I went heavy on the leading edge side of the rod for balancing although its probably not necessary on such a slow model. I weighed each one as I put the epoxy in to make sure I had the same amount. This is probably not necessary on this small model but I wanted to seal the end, mostly to protect the part from handling damage. I pinch glued the tips like the wing. Sand the tail planes and set them aside. I made some control horns from 1/16 ply. I glued some 3/16 wheel collars to the plywood with epoxy and micro balloons. The pushrod hole was 1.5 inches from the pivot center. We won't need much throw so this long arm is good.

Nose

The nose technique was borrowed from the card modeling world. It's quick and works for a simple model. Cut the templates out and tape them together. You probably should assemble one from card stock and tape it together to get an idea of what you are doing. Only cut to the stress relief circle. DON'T cut from the circle to the 5.5 reference dimension. The entire nose should be one piece of Depron. Once you start the foam one, be patient and glue one piece at a time. Get as far as you can to the nose. Once done, I filled the inside of the nose with epoxy and micro balloons. Then I used a sander to clean up the outside of the nose and get a nice round shape being careful to not go through the epoxy fillet on the inside. Don't do anything with the bottom yet.

Fuselage

The paper tape measure is just to allow you to tape the templates together before tracing it onto the foam. Use 6 mm for the bottom. Use the heat gun and lightly curve the front of the bottom piece to match the nose curvature. The main bulkheads are B1 and B4. The forward bulkhead is shown as B1. For reference, the hatch opening is 9 1/4 inches long. It doesn't show on the templates but as seen in the photos, cut the inside of each bulkhead out leaving about 3/4 inch all the way around. Look at the photos. This will keep them stiff enough but allow access through the bulkhead. Glue them in place making sure they are perpendicular to the bottom.

I lost the template for the aft bulkhead. I traced the exterior of the model to come up with the one on the template sheet. The external cover (I used 3mm black depron) will be this outer shape. Glue the bulkhead to the bottom making it perpendicular. Test fit the nose. Make sure it's square and straight. Once satisfied, glue it in place. Add the 3mm sides. Heat up the top aft piece to slightly pre-form it. Getting some curvature will make it easier to fit. Try to be careful to get nice seams along the side and glue it on when satisfied. Try to keep the 'box' square. Use corner re-enforcements if you need them (scrap 6mm works fine)

I glued some $\frac{1}{4}$ square balsa rails along the edge of the hatch opening that can be seen in the photos. Some 6mm depron could probably be used as well. Make a hatch as seen in the photos. I used small magnets to hold it in place.

I glued four 1 inch squares of 6mm depron together to make bearing blocks for the tails. I drilled slightly large holes in the foam part of the bearing block so the pivot rod only touches the plywood. I used some 1/16 ply on both sides to keep the pivot rods square and smooth. Just glue one side of the wood on first. Locate the tail plane using the photos. When satisfied, glue the bearing block inside with the plywood against the top decking. Locate the tail plane and make sure it pivots with about $\frac{1}{4}$ travel at the TE up and down (total $\frac{1}{2}$ inch) from a centered position. Making sure the tail plane is 45 degrees (perpendicular to the aft upper surface), glue the exposed piece of plywood in place. Hopefully you can see how this goes together in the photos. Just make sure they are straight and don't bind. I made some small round shims from card stock to space them off the fuselage.

Wing Assy

Locate the wings using the fuselage template. Drill the holes in the fuselage side for the spar. Remember, you still need to shim it off the fuselage floor with some depron. Verify you have about $\frac{1}{2}$ inch dihedral in each wing. Make up some aileron torque rods. I used some .047 music wire. They are taped to the top of the wing and stand up 1.5 inches on the inside of the fuse. I used some small heat shrink tubing as a connector between the torque rod and pushrod. Make a small hole in the fuse side for the torque rod. When satisfied with the wing fits, you may glue the wings on. I waited until after painting.

Set-up

The Rev 2 set-up uses V-tail and ailerons. The Rudder function doesn't do much but it could be explored more. Total throw on ailerons and elevators is 4mm measured at the trailing edge. The starting CG should be 14.4 mm ($5 \frac{5}{8}$ inch) ahead of the aileron trailing edge. Move the radio or add ballast. It flies light so an ounce of ballast in the right place is better than flying it out of balance.