

WIDEBODY 60

BRIAN'S METHOD

The CA Widebody 60 seems to be a great plane with unlimited capability if set up correctly.

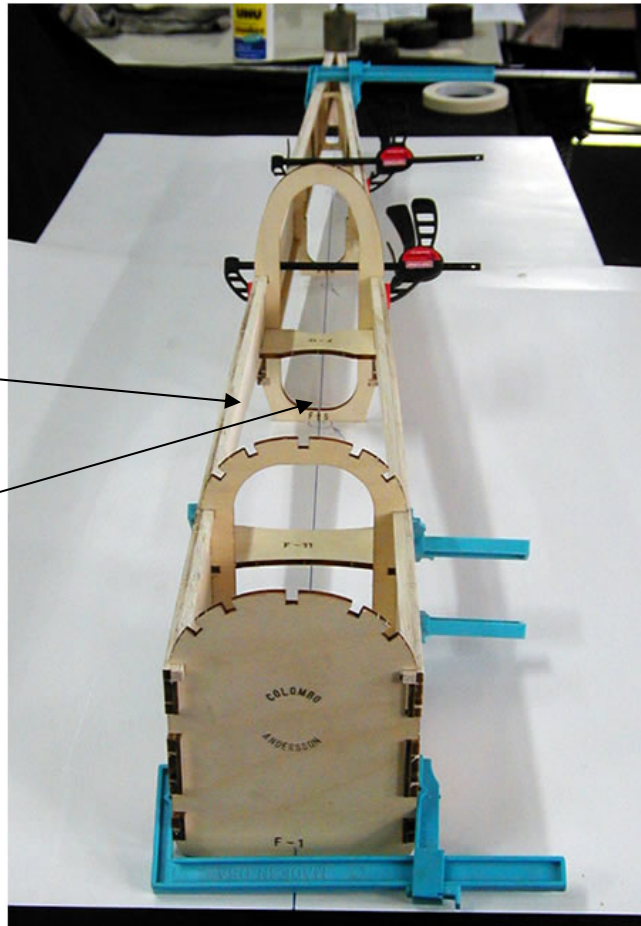
While the design makes it worth it and the laser cutting is superb, the instructions assume you are an expert builder and can redesign the building sequence to fit your needs. This is a log of how I built the plane. It is not necessarily the best way.

I. ROUGH CONSTRUCTION OF FUSE

The instructions cover how to set the fuse together and they seem OK. Be careful to get the stringers on the upper and lower edge of the sides as it will not go together if you miss the position. Lay the fuse sides on the table (one left and one right side). Get the square stock supplied and glue it on the upper edge and lower edge of the fuse sides. There is a photo of this in the instructions. The square stock is shown to the right.

Just push-fit the fuse together without glue and line it up on a straight line on the bench. (This works only if you put the center lines on the bottom of each former -- both sides.) Do not fail to get the tail end vertical, as well as straight, on the line on the bench. Vertical is key, as it is easy to miss it and that will cause the stab to be out of flat. You will not like that. Once it is all lined up, hit it with fast CA, but not a lot of glue. Add the triangle stock and then use medium CA to strengthen all the joints.

At this point, I needed to look at the control system as the instructions call for putting the bottom on the fuse and the turtle deck. This closes off the fuse and will make problems. I like the carbon fiber system of rods from Central Hobbies and there is a lot of fitting to make it work. In order to get it



done, I must know the position of the control rods. This means the stab needs to be in position

II. STAB CONSTRUCT

The stab has lines drawn on the top and it assumes the hinging is like Colombo designed. I would rather hinge with Robart's and hinge in the middle of the cross-section. This means the cut lines on the stab need to be changed to allow for the thicker wood on the leading edge of the elevators. I used the 4mm on the trailing edge of the stab and some $\frac{1}{2} \times 1'$ on the leading edge of the elevator. The lines are then set at a separation of $4\text{mm} + 1''$ and cut at an angle of 90 degrees to the center line of the air foil. The strip in the center of the photo below is the cut-out portion and mine was larger than the photo. After the tips are on and rough shaped, cut the elevators and glue on the facing wood on the elevator and the stab. Next, glue on the facing wood on the edge of the elevator.



The stab is now positioned in the slot in the fuse. The hole is under-size and requires careful work to get it to fit tight enough to ensure strength. I found the Dremmel tool with a straight rotary cutter worked best for this problem. This is not the final cut, just get it in position. The control horns can now be located on the elevators and the position marked on the fuse. I used post type horns and added hard points in the elevators now. The tips are simple round ends as can be seen in the stab above, so go ahead and get the shape close at this stage and the hinging will be simpler later. Leave the trailing edges on all the surfaces square! If you are like me, that seems wrong, but it really will help avoid flutter at high speeds.

III. CONTROL SYSTEM

I used the servo board that came with the plane, and found that the position of the



servos meant it could have clearance problems with the plate that mounts the wing in position. I mounted the servos with the elevator servo blocked up (which is really down in flying position). The elevator servo is on the board and will have one rod attached to it in the center of the fuse. The board is glued *below* the side rails in the photo to the left, and this lowers the board and gives the clearance needed for the control systems. This is not how it is designed, but it seemed to work better for me. The rudder servo has the white double control horn on it. This will be pull-pull

to the rudder. In the photo above you can see the end of the two carbon fiber support sticks. They are balsa and plastic guide tubes lashed to the balsa with blue thread and then spread with thin CA for strength.

In the photo to the right, you can see how the rods are set in position and supported so there is no play in the system. The .070 carbon fiber rods run in the tubes lashed to the balsa sticks. The plastic tube goes through the fuse sides and is sanded flat.



The rudder cables are run to attach on a dual control horn near the bottom of the rudder. This will ensure the cables do not cross the CF rods for the elevator. At the point that the cables pass through the fuse side, I used some small plastic tubing as a guide. The easiest way to get the position right is to cut slots in the fuse sides and hook up the cable to the servo. Pull the cables tight to the rear and slide the guide tubes so that they are in the slots and are straight. Set the guides in place with 5 min epoxy and micro-balloons. I do one side at a time due to the 5 minute work time on the glue.



Once the elevator guides and the rudder guides are in place, you can sand it flat and the control system stuff is ready to be sealed in the fuse. After sanding, be sure the holes are open and you still like the way everything fits. This is the last time to get everything inside glued in right. You should also address the position of the antennae as the fuse

will get closed up pretty soon and you do not want to get caught without a solution. I put a tube to the back of the plane and out the bottom just for fun.

IV. ENGINE POSITION AND MOUNTING

Before planking the upper front or the lower front, I thought the engine and tank should be in and the control rod to the throttle should be set up. This stuff will be hard later as you would be working blind. I put in the upper stringers before I figured this out, next time I would not put the stringers in. See the photo below.

The tank is set in the forward compartment, as I am not sure about the CG of the plane. All I read says that the plane builds tail heavy, because I am putting an OS 91 FX in it and it was designed for a heavy and low powered 4 stroke (go figure). I put in the foam and positioned the tank with tubing holes in the firewall. This is put in for the final time in the construction, but I did put a string around the tank and made sure I can get it back out if there is ever a need. The firewall is doubled in the inside of the plane. This is not in the instructions, but it seemed like a safety measure as the firewall is thin and would not stand much abuse.



I added ears to the firewall that will be used to hold the cowl in place. I have had enough trouble holding cowls on, and this one will have 5 motor bolts with fuel tubing lining the bolt.

The throttle control rod is in place and runs back to the servo. This is ny-rod hooked to a normal low power servo with the slide connector at the servo.

There is nothing in the instructions regarding the engine location and this could be a real problem. First, I drew a vertical line on the firewall that was in the center. Since there is built in right thrust and I want the spinner in the center of the plane, I move the vertical line to the plane's left 1/4" and draw the second line. The up/down location of the motor is a real trick. I put the cowl on and shot a line from the center of the spinner to the fire wall using a square. This requires that the center of the spinner be cut out of the cowl as well as the cut on the bottom of the cowl for the muffler. The dimension from the top of the firewall to the motor mount is 3/4" for my plane (this will be different for yours). My 1FX is set on its side with the head protruding through the cowl and the Pitts muffler out the bottom. Once the center of the mount is known then I drew the horizontal line and set the engine mount on the lines. Due to the position of the tank, I shot screws from the inside and put lock nuts on the motor side of the mount.

The next decision is to locate the engine on the motor mounts. Colombo gives a dimension from the firewall to the back of the spinner and the cowl is long enough to move the engine around. I just set the engine 1/4" further out the mounts than he called for to try and get over the tail heavy condition. I mounted it with 2 screws and I will go back later and adjust the engine and cowl position to get the CG right. This still gives a lot of cowl overlapping on the fuse and should work well. Do not fail to consider the spinner you are using as there are two designs. (GP is flat backed and the DuBro requires the cowl to be moved rearward.)

I put a Perry pump on the engine and a remote needle valve to ensure the performance I want. The whole mess turns out to be complicated, and I took it off later and the motor runs just fine without a pump.

The cowl position is set by the template method and the trimming of the cowl just takes time and a little Jack Daniels to get just right. Here again I use the Dremmel and sandpaper till I like the fit. With the spinner on and everything in position, I stop the mounting process so that I can get the plane covered and run the CG check before I mount the cowl. To simplify the removal of the cowl, I cut a slot in the top of the remote needle valve so I can tune it with a screw driver and that irritating wire need not stick through the cowl and mess up the look of the nose. I also use a fuel valve and it is mounted to the plane just ahead of the firewall so that it is not part of the cowl. (I tried that and it is not a good solution.)

OK --- the fuse is in shape for continuing with the construction so put the bottom on the rear area per the photos and sheet the top of the front and built the hatch that is shown below.

V. BEGIN THE WING AND RUDDER

Put in the leading edge on the wings and the rudder with epoxy or yellow glue. I find the yellow glue is best because it is easier to plane and sand the wood to shape without damaging the surface of the wing / rudder/ stab.

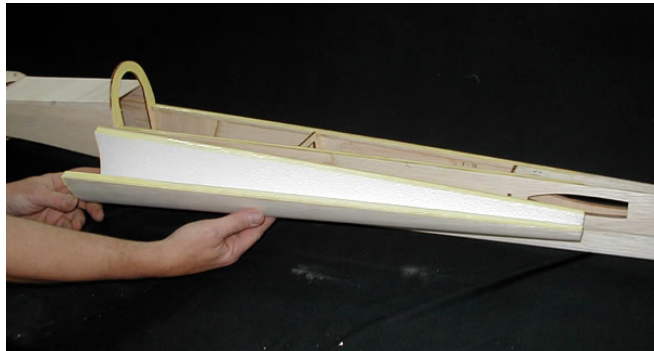
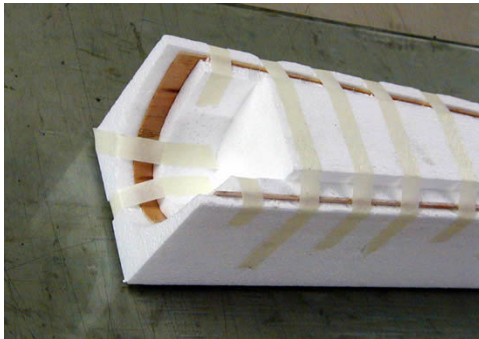
Glue the top on the rudder and sand it to shape

The Servos for the aileron now need to be put in, as the hole for the wire is pre-cut in the wings. I laid out the holes and cut them to full depth (to the top side skin of the wing). Put 3mm planking to line the hole being sure not to block the wire hole. Add birch for the mounting rails and it was done

Next it was time to lay out the wings and rudder in the same way as with the stab. I drew lines that were 1/2" + 4mm apart and cut on the band saw with a metal guide. The aileron and rudder can now have all the wood glued on them as well as the training edge of the wing and the surfaces on the end of the aileron and the root of the wing. This is a lot of gluing, but it will yield a very nice set of wings. Cut the wood to shape and rough sand the surfaces. Make sure you have the leading edge of the surfaces shaped and prepped for hinging



Next, glue the tips on the wing and finish shape the tips and fit the ailerons to the space left with the tips. Now put on all the hinges and set up all the surfaces. The hardpoints are now put on the rudder and the ailerons for the post control horns. I use the post type and am very happy with them. The thing that is very key to the flying is that the attachment point of the control rod and the control horn must be over the hinge line. If it is off at all, then there will be differential in the surface and the plane will not fly straight during a maneuver. The post type will make it easy to mount the post and get the attachment point in position.



VI Turtle deck construction

Set up the wood and edge glue them up to a sheet big enough to cover the turtle deck. Soak it in water and chlorox and form to the foam turtle deck with weights and glue. Follow the directions on attaching the turtle deck to the fuse.



VII Wing and fus

Wing is attached to the fuse and lined up to be sure it is straight. String to the tail is the preferred method. The wing is lined up and foam placed in the joint and then the wing is mounted down.

This starts the belly pan construction and there are no instructions in the kit. Begin with a cardboard shim at the front and back formers to be sure there is room for the covering and the wing will still come off. Be sure the front

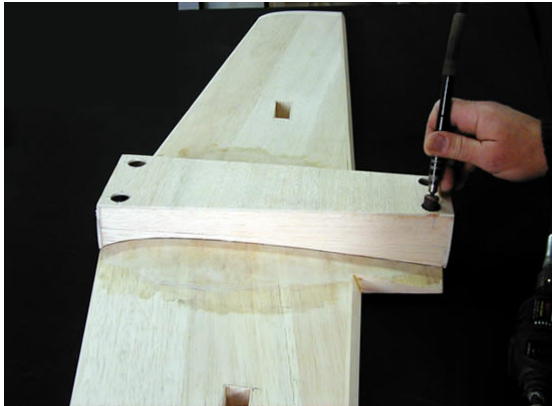
and back walls do not slope as that would lock the pan in place. Cut the formers to match the outside of the fus. Details on the formers include:

FRONT - The former is cut tall enough to line up with the true bottom of the fus in the nose area. The former is made from 3mm wood. Take care to allow for the 3mm bottom and make the shape and height of the formers so that they protrude to the outside of the pan.

REAR - the sides are not straight and the former is lined so that the sides can be bent to match and glued in place. The height is set so that the former is sanded to perfect height later.



The sides are cut to match the curve of the wing at the root. Use the foam saddle that the wings came in and trace the lines on the 3mm sides. Once the sides are sized, set the



height to allow for the 3mm bottom to go over the sides and be glued in position. Glue the formers to the wing and the sides to the formers. The sides are glued in position on the wing and some square stock on the inside to guarantee the sides stay put.

Now put the PVC tubes in to the wing bolts. Fit the lead and tail bottom sheets so that the tubes are glued in position. Fill in the remaining bottom sheets. Sand to shape and remove the wing.

VIII Hatch on the bottom of the nose. I think I want a hatch to get to the tank and the battery compartment if the CG calls for it. I put hard rails on each side and then built the hatch to fit on the rails. Spot glue it in place and sand it to fit.



After sanding cut the spot glue off. Hold it with nylon bolts in each corner and tap the hard rails for the threads.



IX Assemble surfaces Check the wing incidence and compare to the stab the both should be the same. We call this 0 incidence on both surfaces. Glue on the stab and the rudder after all the hinges are drilled into position. Next, set the balsa blocks to each side of the rudder and sand the entire thing to shape filling as necessary.

Check to be sure the surfaces all match and fit well together. This is the last chance to correct any problems with the surfaces.

X Covering. I like to cover these light planes with untracote or monokote in order to help the weight. The wings are first and then the tail feathers with the fus last. The seams should be sealed with a minwax product. Auto sealing tape is also an effective sealer and looks good too.(it is the black line shown below and is ¼” auto striping tape)

XI FINAL STEPS

SET UP THROWS This will fool you. Set up the throws so they look very small as the regular flight of the plane requires very little throw.

I used pull-pull for the rudder and rods for the elevators. About one inch of throw is all the elevator you will need and then set the high throw to 3D at 45 degrees. This is good to hover but do not try to fly it with a lot of elevator movement or you will get stalling and snap rolls that will set you free.

The Rudder is set at ½ throw on low rates and full throw on high rates. The rudder authority will dazzle you. On low rates you can buzz the field and pull to vert with full throttle and fly out of sight while using rudder to tail wiggle all the way.

I set the ailerons at normal throws and my first flight was exciting due to the roll rate. It is set at about one inch on low and about 1.5 inch on high. You will get it set up your way, I am just warning that the first flight surprised me and I ended up with less throw than I would normally use.

CENTER OF GRAVITY

I set the CG after covering and the motor position is used initially set the cg at 5” back from the leading edge. The zone is 30% to 35% of the root or 4.5 inches back to 6 inches. I flew it at 5” for the first flight and it is great to fly. I later set it to 5.5” back and it gave less down to hold inverted and made the harriers much better.



FINISH THE FRONT

After the CG was set, I then mounted the cowl and lined everything up to look good. I mounted the cowl to the ears I glued on the firewall and it seems to work. I have had problems with the screws making big holes in the cowl over time. I now use Phillips head wood screws like what you would use for motor mount screws. I slip some fuel tube over the screw (it is cut to ¼" length) and the hole in the cowl is big enough to take the diameter of the fuel tube. The screw goes into the ears and the cowl rides on the cushion of the fuel tube so that the screws can not cut into the cowl.

I then painted and striped the cowl since it is mounted in position

I am using a 14 x 6 prop and a light plastic spinner.

The fuel tank is up front and that is no problem. I have used the tank hatch in the bottom of the plane and so I am glad I put it in.

OTHER STUFF

The landing gear is painted and bolted on with metal screws, the nylon screws did not hold and the gear came off one time. The metal bolts are OK but the gear will not come off in a challenging landing.

I am using -50% expo on surfaces

Lateral balance is key, be sure to balance it before the first flight as a heavy wing will be obvious once you get into the air.

Good luck flying this plane, it is a joy. (I am hard to please, I have been doing this since the 60's when I won the junior nationals and this is the best plane I have ever flown for under \$2000)

Brian Deis

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