



# SPAD

Simple Plastic Airplane Design



-  S.P.A.D.
-  SPAD Index
-  SpadStang
-  Wing
-  Wing Panels
-  Wing1
-  Wingtip
-  Frons & Scoop
-  Landing Gear
-  LG Block
-  Tail
-  Scoop & Tail
-  Fuse
-  Fuse1
-  Misc
-  Misc1
-  Skin
-  RX Install
-  Canopy and Cowl
-  Cowl & Spin

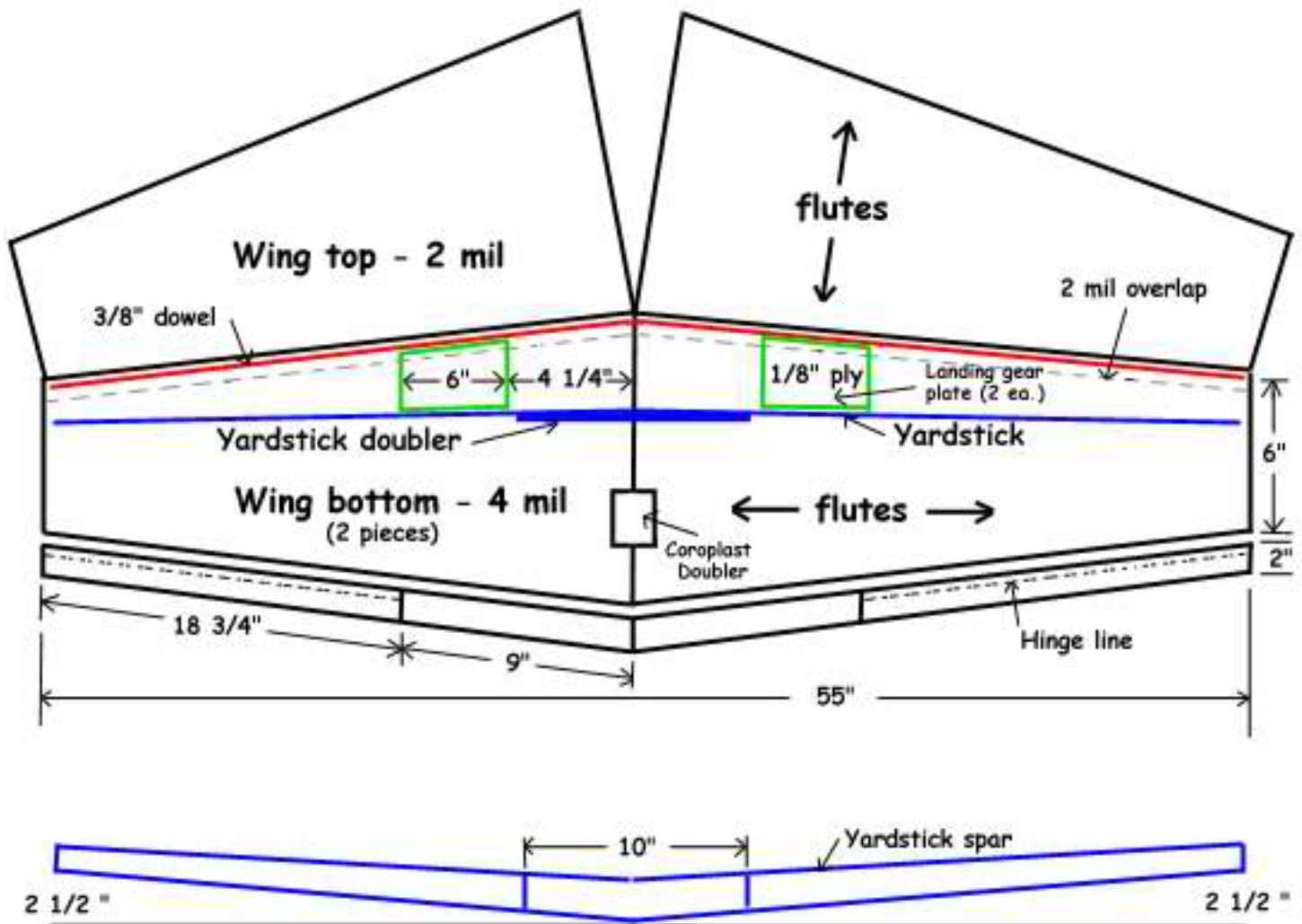
## SPADStang



The SPADStang was designed to prove that a great looking scale looking airplane can be built in just a few days, for just a few dollars! The SPADStang pictured above took me about 30 hours to put together - and that includes designing it as I went along - and scratch building the fiberglass cow! The real beauty comes from the fact that it only cost me a grand total of \$11.50 - and that includes the canopy! While this SPAD is certainly a far cry in terms of simplicity of most of our other designs - it is not too difficult over all to construct. The uniqueness of this building technique is that you could duplicate just about any plane out there! The SPADStang will fly great with a 2 stroke .46, but a .61 would make it really haul! I am running an O.S. 61 FS in mine, but I think that a 70, or a 90 four stroke would be awesome! The SPADStang flies very smooth, and any R/C pilot that has some low wing taildragger experience could handle her. I really like the way the SPADStang flies - but, my next SPADStang will have retracts - you just can't beat the way it would look with the gear up! The plane is built around the lighter weight Canadian PVC gutter downspout. I made the basic fuselage from the pipe, I then added pink foam for the turtle deck, and 1/8 inch lite ply for the wing saddle - then I covered it in silver 2 mil Coroplast. The strength of the plane comes from the downspout - and the rest is all just cosmetic! The wing is made very similar to the R/NAF Dogfighter wing found in our plans site - I just modified it to allow for the landing gear, dihedral and tapered leading and trailing edges. The plans and directions don't go into basic SPAD building detail - it is really designed for you experienced Spadomians! I think that if you look at all of the pictures, and use a little common sense - that you can complete the SPADStang project fairly easily.

I recommend that you build the wing first - you will need the contour of the center of the wing to complete the fuselage. I also recommend that you read through all of the text, and look at all of the pictures and drawings before you begin!

[\[S.P.A.D.\]](#) [\[SPAD Index\]](#) [\[SpadStang\]](#) [\[Wing\]](#) [\[Wing Panels\]](#) [\[Wing1\]](#) [\[Wingtip\]](#) [\[Rons & Scoop\]](#) [\[Landing Gear\]](#)

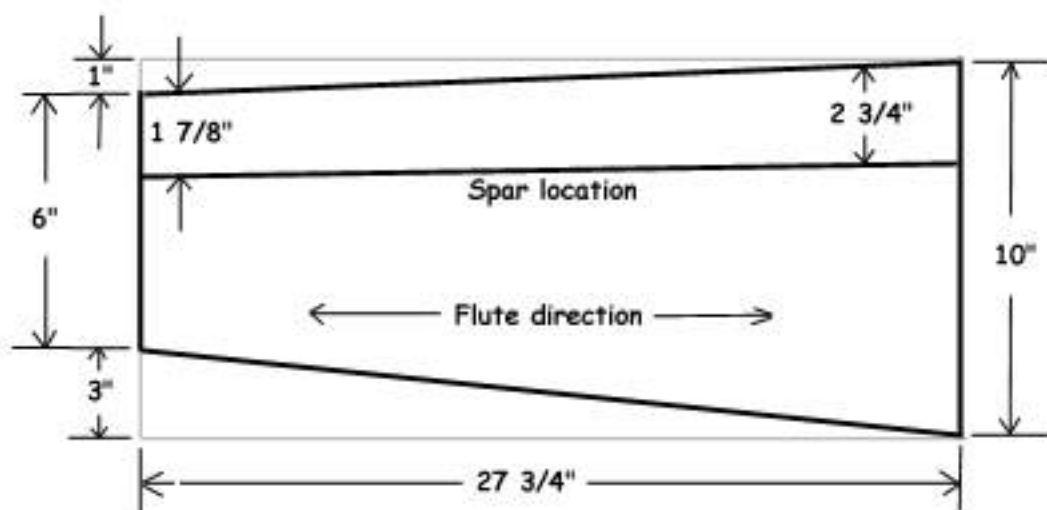


Taper yardstick down to 7/8 inch at tips  
 Yardstick spar made by splicing together two 27 inch pieces with a 10 inch doubler in the middle.

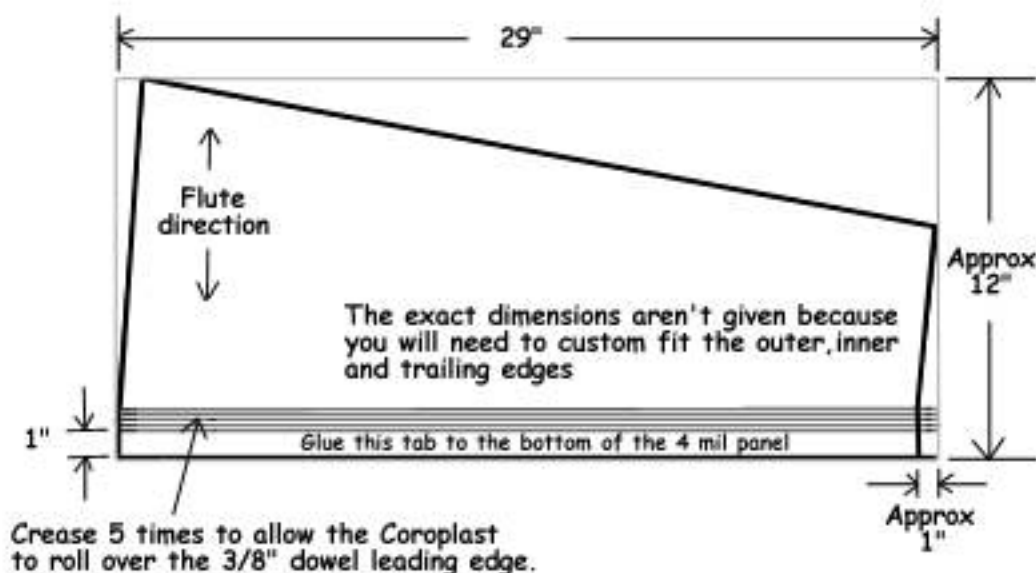
Aileron side view



**4 mil bottom panel dimensions  
(make a right and a left!)**

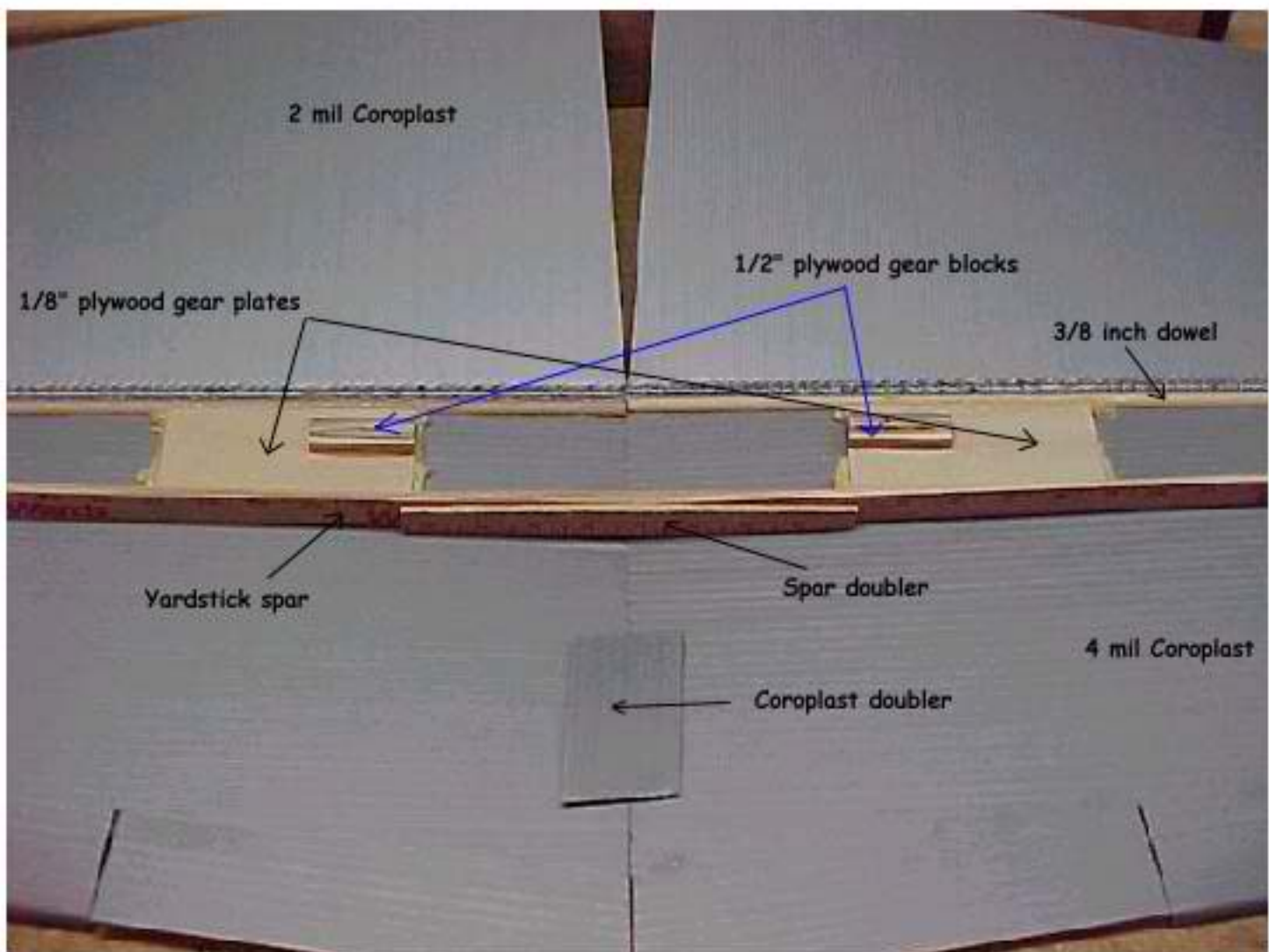


**2 mil upper panel dimensions  
(make a right and a left!)**

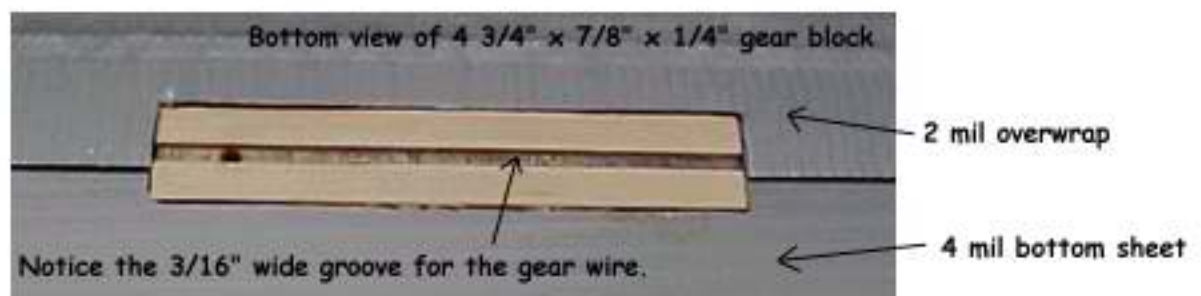


The upper wing panel is approximately an inch longer than the lower wing panel. The reason is the outer part of the upper panel needs to angle outward slightly to allow for the angled leading edge to line up with the tip at the trailing edge. If you cut the upper panel 90 degrees on the outer edge – it will come up short on the trailing edge at the tip – so be sure and make the upper panel one inch longer! The inner part isn't a problem because you will end up cutting about an inch off to allow the two panels to come together in the middle.

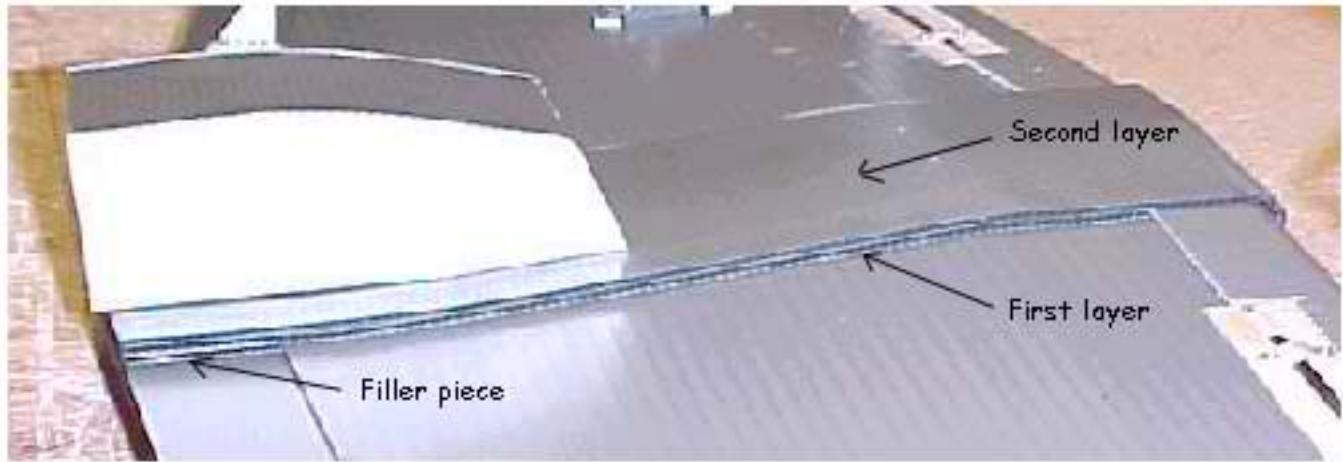




The gear plates (2 each) are made from 1/8" A/C grade plywood, and are 6 inches long – you will need to “cut to fit” for the side measurements. Butt the gear plates against both the leading edge dowel, and the yardstick spar – make sure that the plates sit flat on the Coroplast. The lower gear blocks (the one that retains the 3/16" music wire gear) measures 4 3/4" x 7/8" x 1/4" (make two!). Make them out of A/C grade plywood – with a 3/16" groove cut halfway into it lengthwise, and centered, for the gear wire to sit into. Measure where the gear blocks will be placed on the 1/8" gear plates, and mark them on the plates. Temporarily put the gear plates in place on the wing and mark where the gear block will be relative to the wing bottom – this is so you can cut out the 4 mil Coroplast where the gear blocks will be located. After cutting out the 4 mil Coroplast, glue the landing gear plywood plates on to the Coroplast with polyurethane glue. After the glue on the plates cure, glue the landing gear wire block to the bottom of the plywood plate with epoxy (where you cut out the Coroplast earlier). Now you will need to put a gear block in place for the upper part of the 3/16" landing gear torsion wire. Fashion two of them from A/C grade plywood (approximately 1/2" thick), and test to make sure that when the upper wing panel is folded over, that it doesn't bulge from the block.



This picture is to show how I did the wing center wrap. It is actually two layers on the bottom, with the outer layer going around the bottom and top panel. The first layer on the bottom is to make up for the 2 mil upper panel overlap on the wing - then the outer, second wing wrap is added - which covers the top and the bottom.



**Wing tip is made from 2 mil. Set the wing up on its tip on top of a piece of 2 mil (with the flutes running lengthwise) - then simply trace the wing tip outline, cut it out with scissors, and glue it on with CA.**

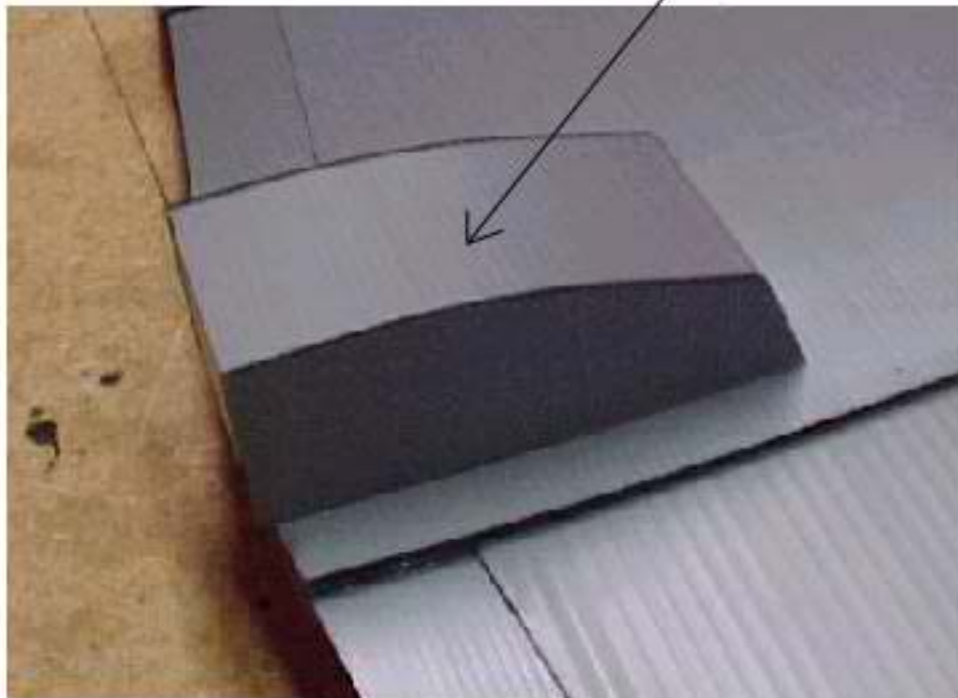


## Aileron servo closeup

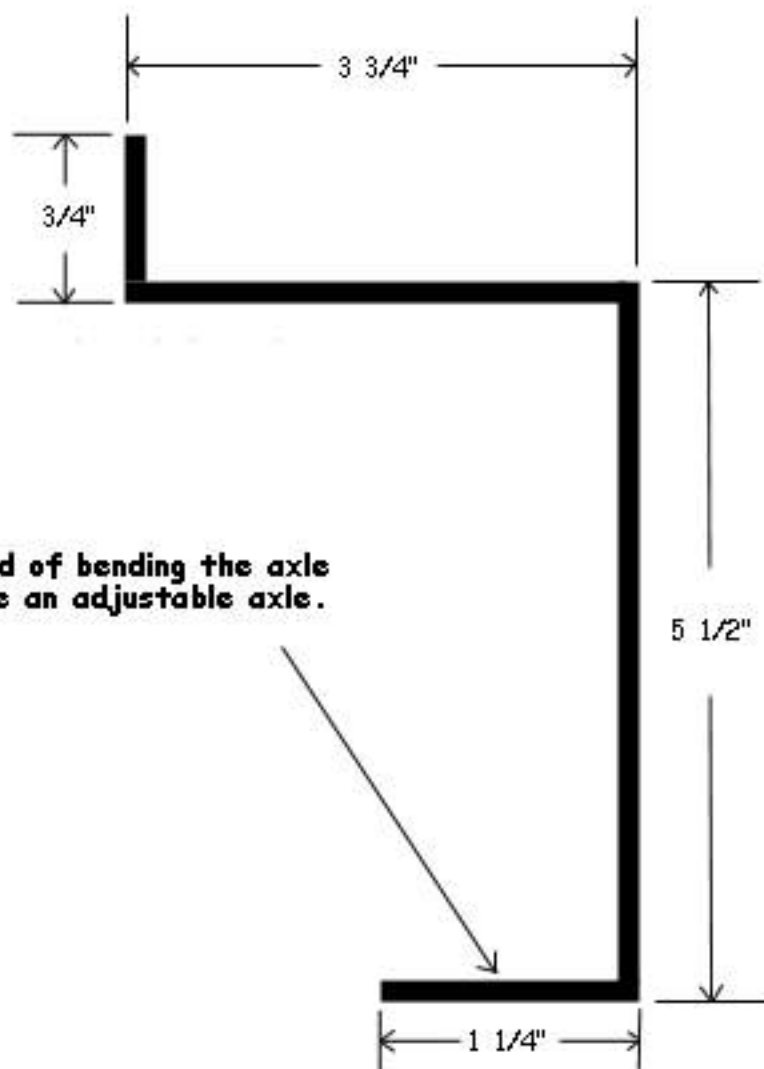


**I used two HS-81 MG servos, connected with a "Y" harness to run the ailerons. You could easily use full size radio gear - I just opted to use the smaller ones because I had them available.**

**Here is a close up of the forward part of the scoop. I made it from 1/8" lite ply, and "skinned" it with 2 mil Coroplast. I continued the contour of the rear part of the scoop to make it look right. I glued it on with rubber CA - but you could use Goop or something similar.**



# 3/16" music wire landing gear layout



Don't forget to make a left and a right!

Note: Instead of bending the axle - you could use an adjustable axle.

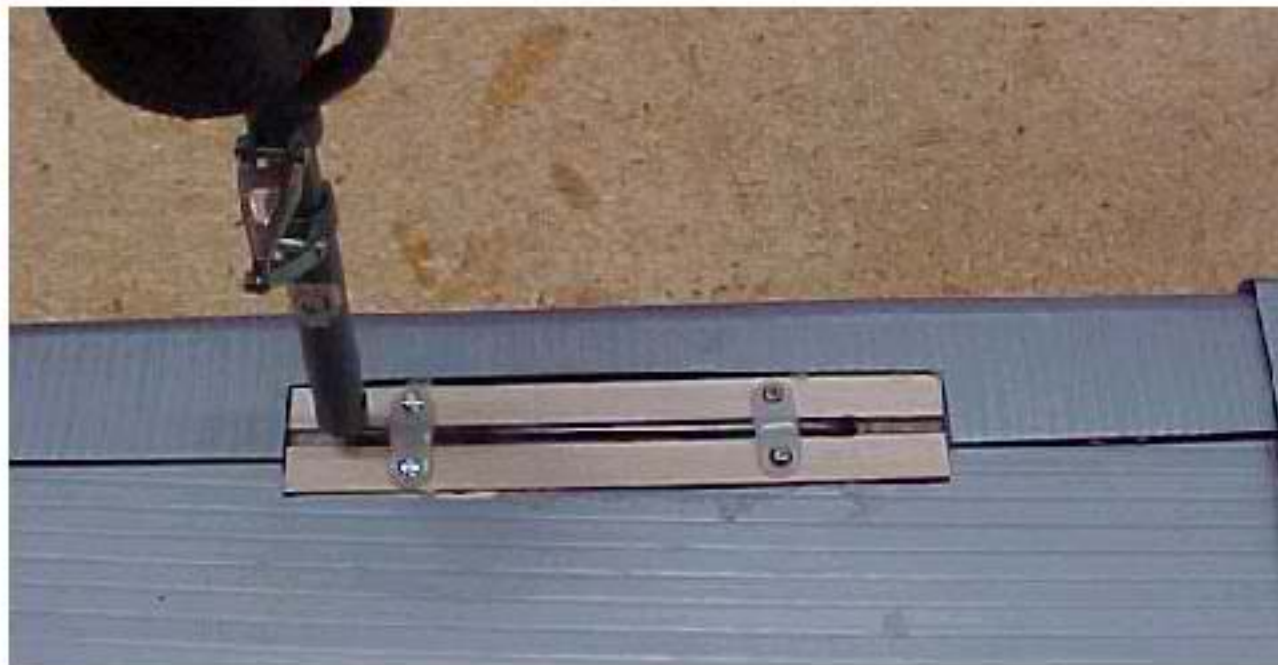
Notice how the upper part of the gear wire (the part that fits into the gear block on the wing) slants slightly - that positions the wheels slightly forward. The forward slant minimizes the nose over tendency that Mustangs are famous for!



I used 3 inch, scale type treaded wheels. The plane showed no tendency to nose over - even on the fairly short grass areas.



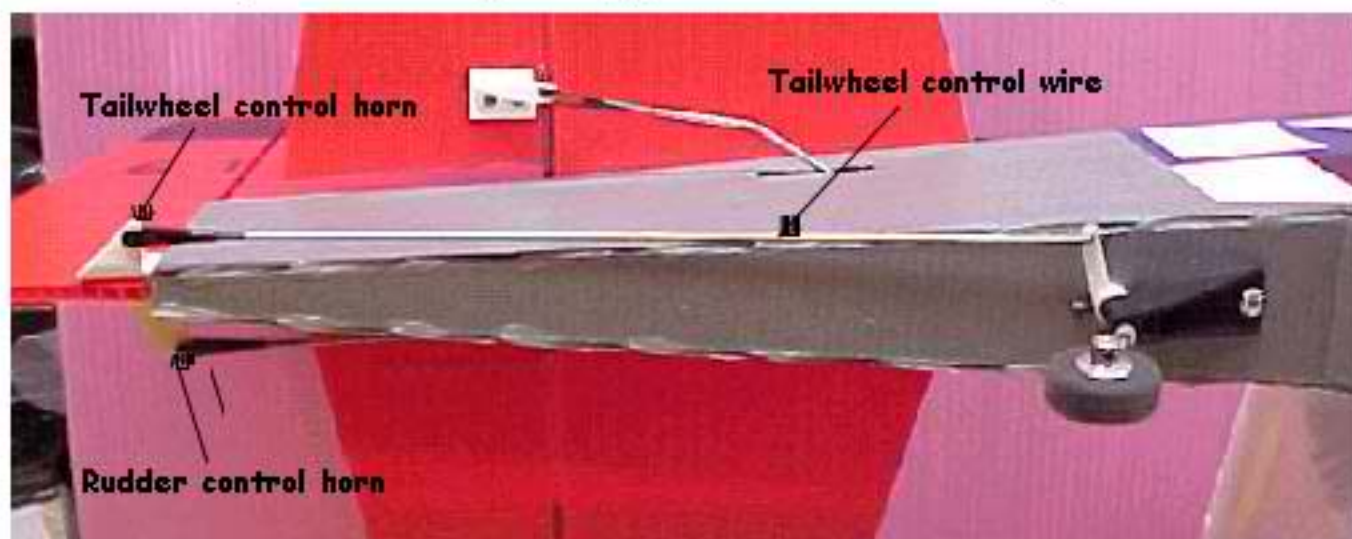
## Landing gear block and music wire



**This shot shows the landing gear block, and the landing gear music wire. I added a functional oleo strut - but the music wire would work by itself also.**

## Tailwheel and rudder hookups

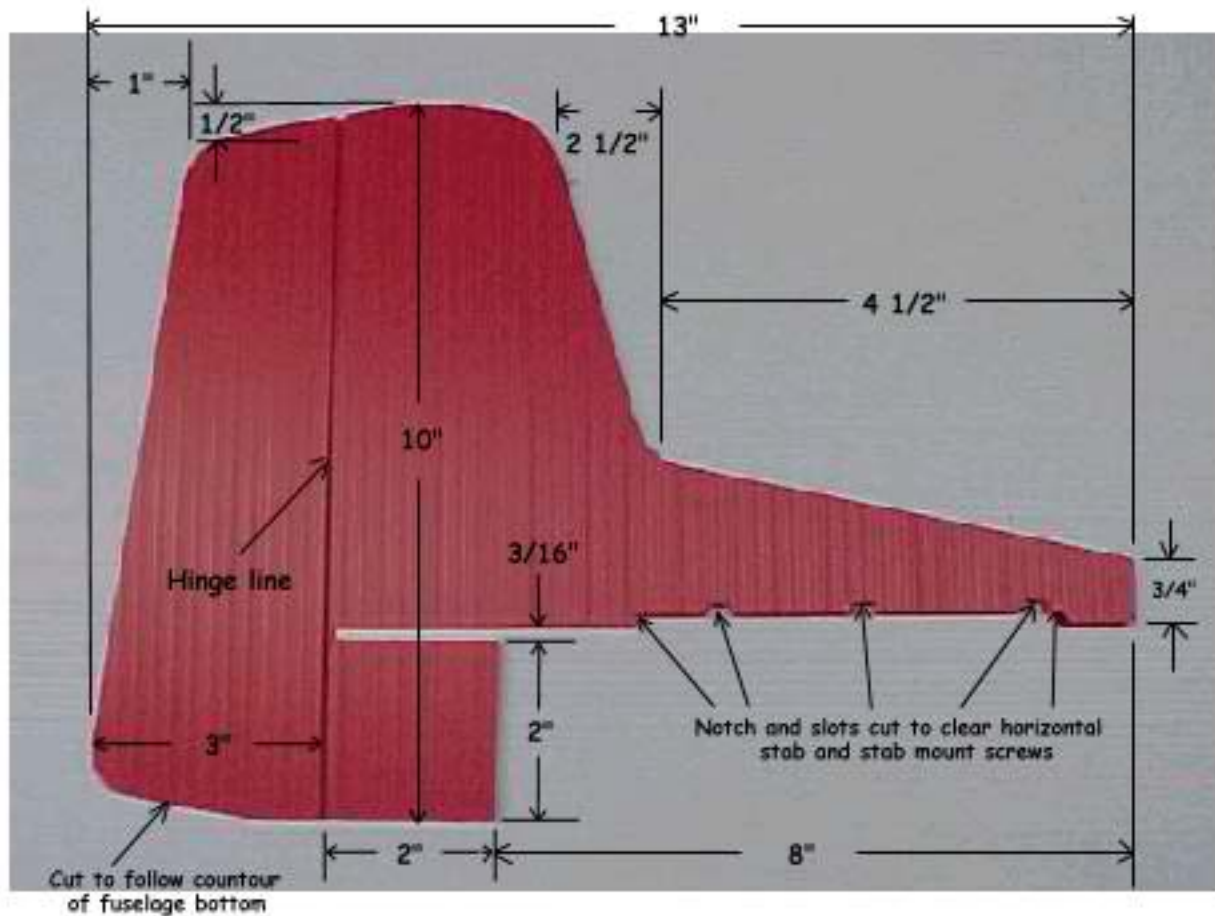
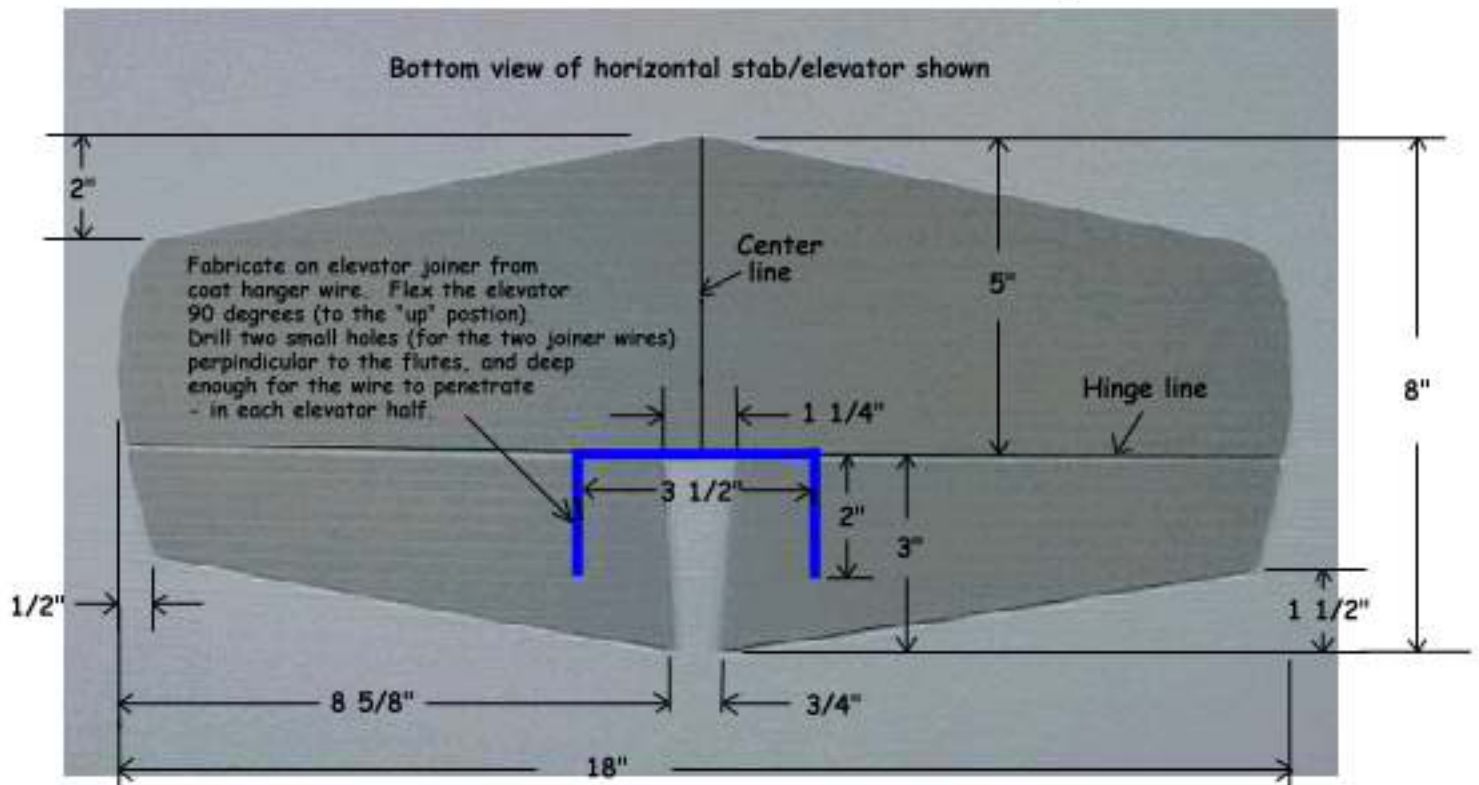
**Add a second horn - on the opposite side of the rudder control horn, and run a piece of music wire to the tail wheel. I mounted the tailwheel by screwing it through the 2 mil Coroplast into the 1/8" lite plywood. It seems to hold up OK.**





# Tail Feathers

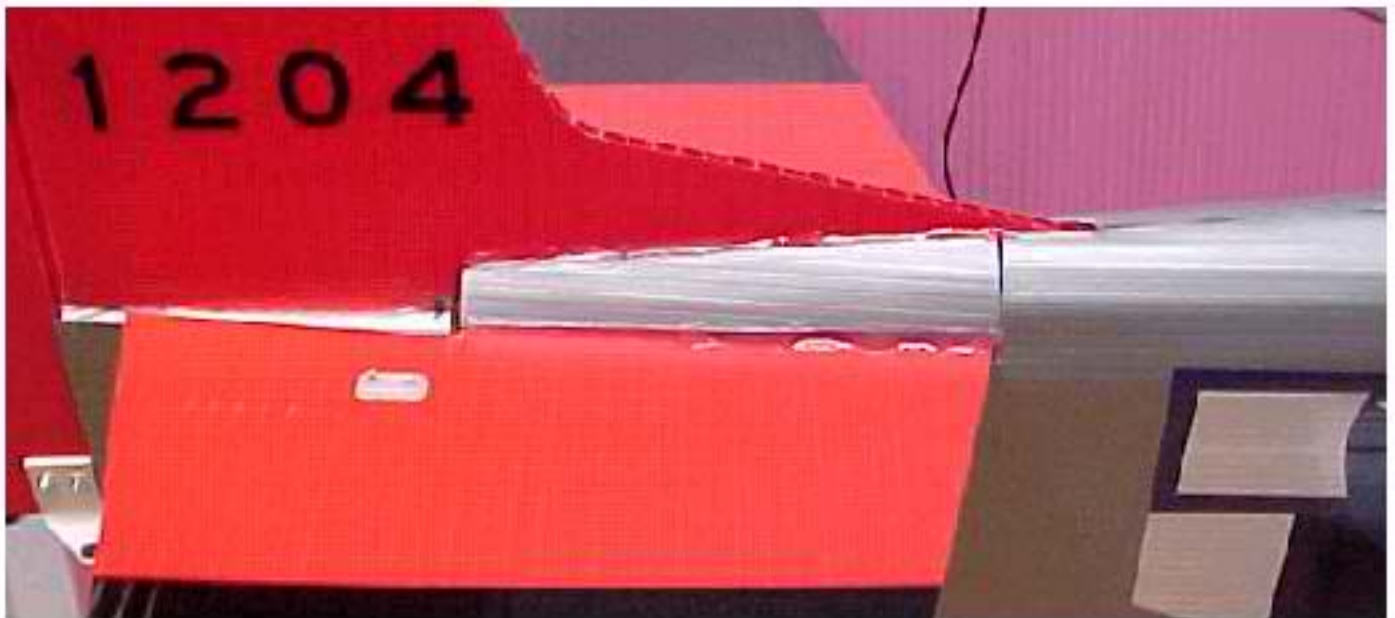
Round all corners on vertical and horizontal stabs off as you see fit.



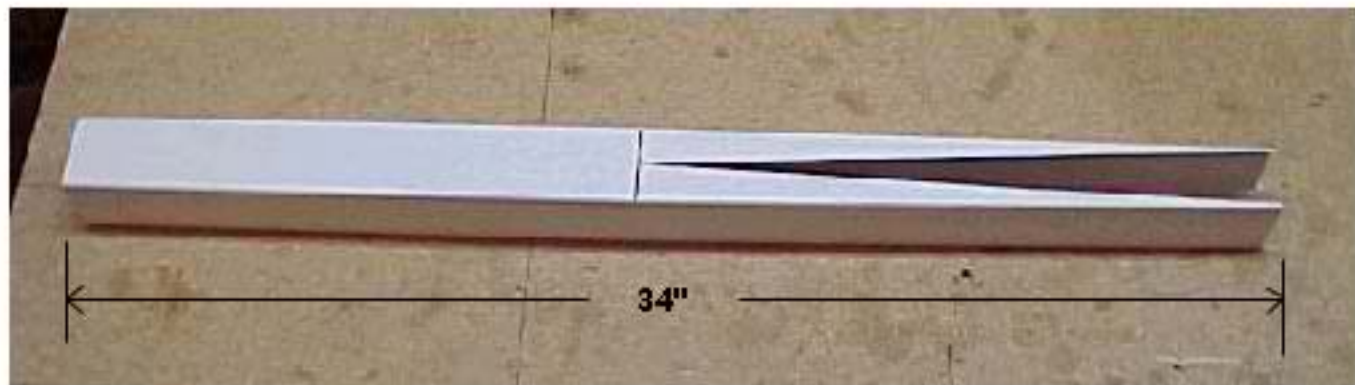
**Here is a close up of the the aft and forward scoop together.**



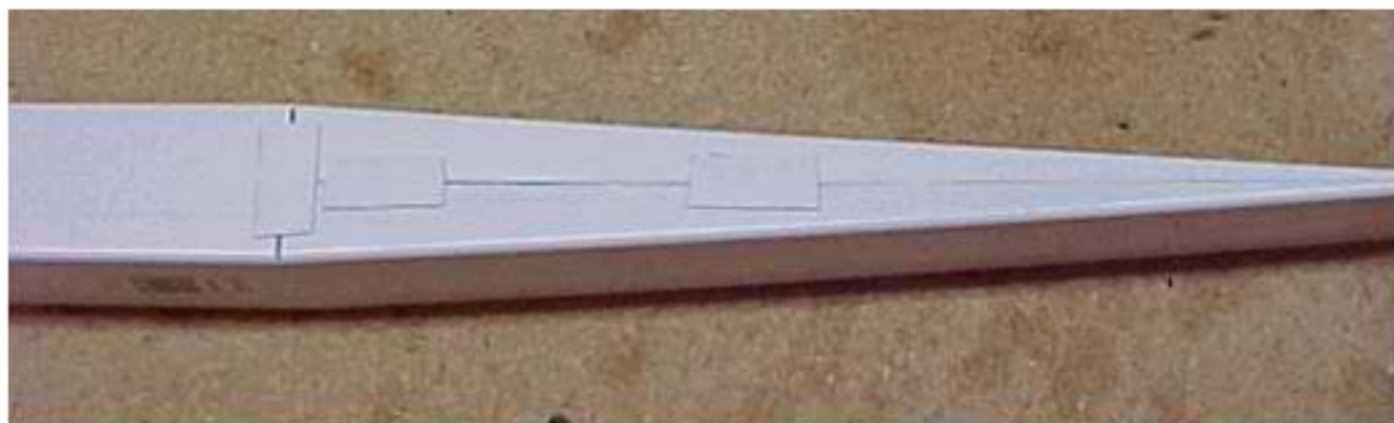
**This shot shows how I finished the 2 mil "skin" by the tail. I glued the 2 mil on with hot glue by the tail area.**



## Fuselage cutout

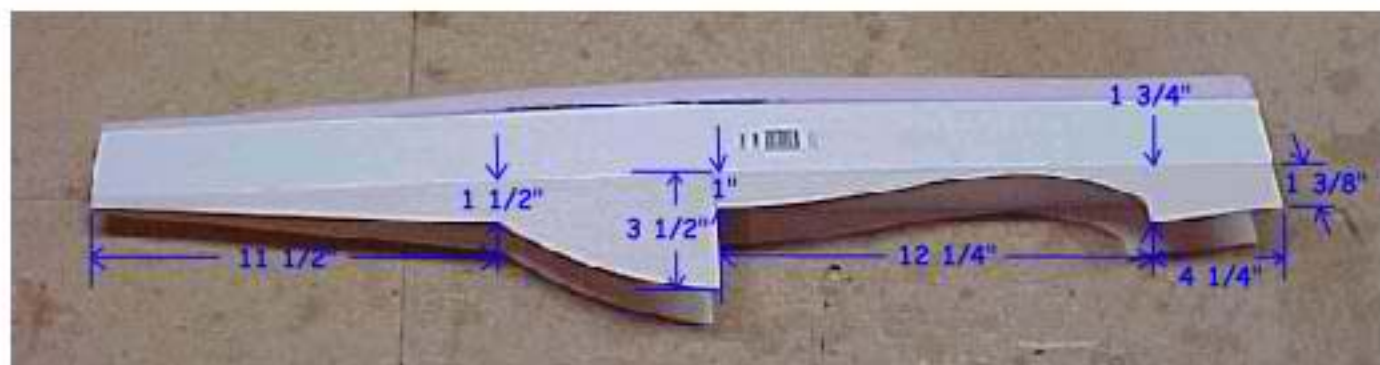


Cutout the rear portion of the 2 3/8" light weight PVC pipe as shown above. The rear part needs to end up being just thick enough to allow a piece of 4 mil C oroplast to be inserted (for the rudder). After cutting out the angled parts, close them together to check for fit and trim as necessary. Once you are satisfied with the fit, glue the fuselage angles together - ensuring that everything stays square and plumb. Once that is done, glue on a few doublers to help things stay together - as shown below.





## Fuselage formers and turtle deck



**Cardboard wing saddle template (example only!)**



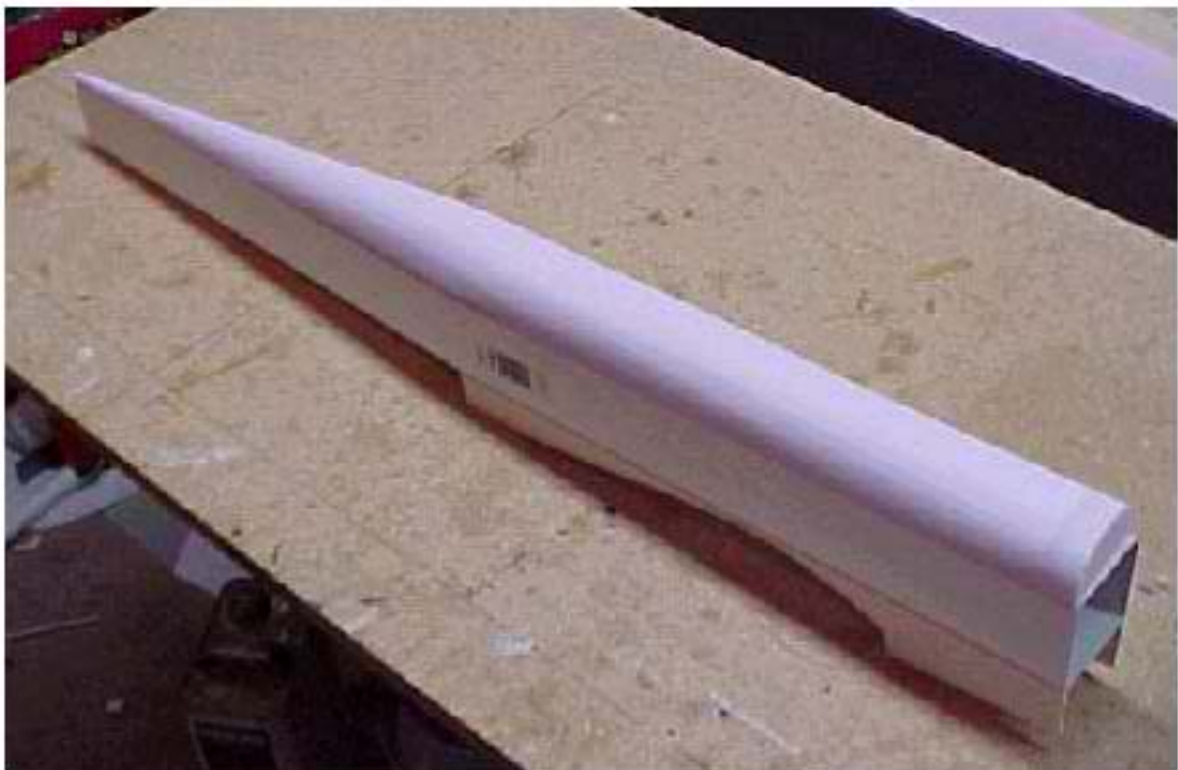
After fitting the cardboard template to the wing, cut off the rear portion - leaving it 1 inch tall at the trailing edge portion of the crutch. The rear part that gets removed ensures that the wing is set at zero degrees incidence (relative to the fuselage) while making the template.

The bottom formers, and the wing crutch were made from lite 1/8" plywood. The wing crutch saddle is 1 3/4" tall at the front (leading edge of wing), and 1" tall at the rear (just in front of the rear scoop area). If you look closely at the picture - you can tell that there are two separate pieces making up the front and rear parts of the lower formers/wing crutch saddle. The forward piece tapers down to 1 3/8" at the firewall. The rear part of the scoop was just freehanded. Draw the radius to make it look right - or if you can, find a template - that would help a bit. It looks like it has about an 8" radius - but you can experiment until it looks about right. I covered the aft portion (up to the rear of the scoop), and the forward part (forward of the wing to the firewall) with 1/8" lite plywood. I left the front and rear portion open on the forward part (between the wing and the firewall) to help cool the engine (I mounted my four stroke inverted). To make the wing crutch saddle fit the wing - I made a template from light cardboard that matched the contour of the center of the wing. Basically it was trial and error until it fit! I had the wing sitting flat on the table, and I cut the template until it fit nicely - and I made sure that the front and the back of the template were touching the table also - therefore assuring zero degrees incidence! After the template was finished - I transferred the shape to the 1/8" plywood. You will end up cutting off the rear part of the template (see the drawing above) Remember - the aft part ends up being 1" tall (just forward of the rear scoop).

**Elevator joiner close-up**



**Turtle deck view**



**Wing saddle close-up**



**Fuselage w/tail feathers**



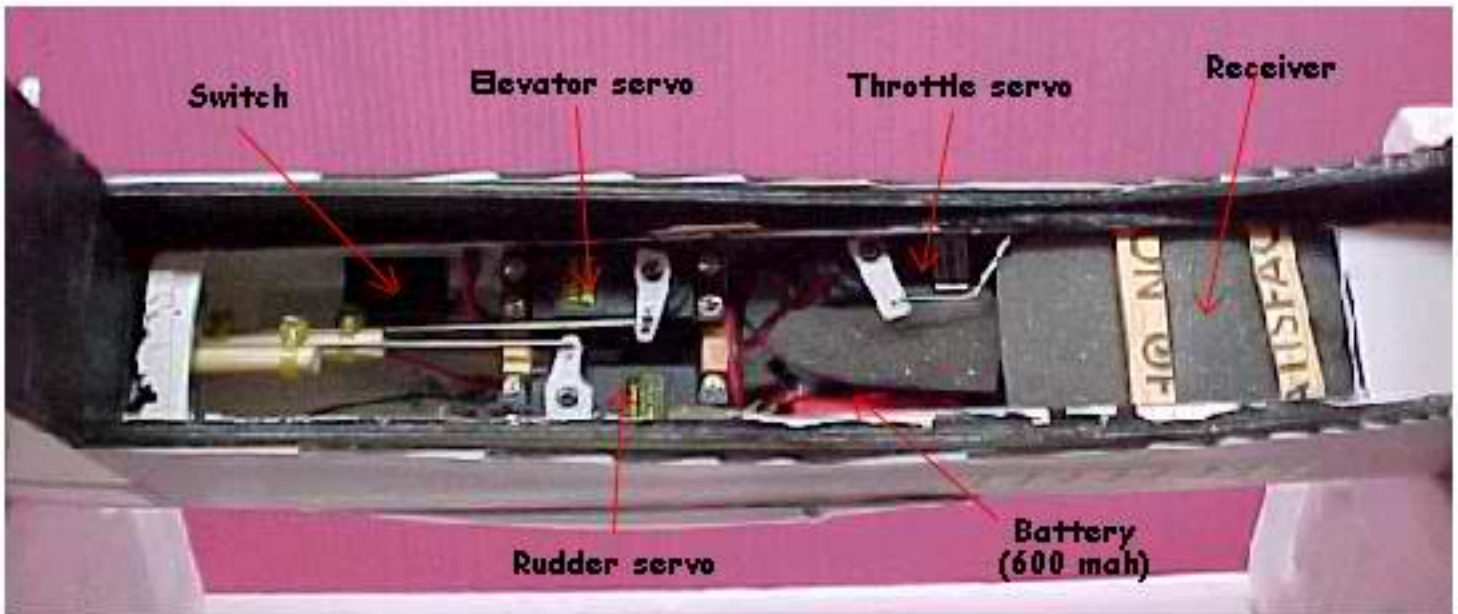


## 2 mil "skin" installation



The 2 mil Coroplast "skins" are custom cut to fit the sides. I used 3M-77 to attach the 2 mil coroplast to the PVC/foam/wood fuselage parts. First - glue the bottom pieces on. I cut out the pieces slightly oversized and then I trimmed them to fit after the glue setup. Next you will glue the side pieces on - but before you glue the side pieces on, you will need to slit the backside flutes to allow the Coroplast to form around the upper turtle deck. You do not need to slit the flutes where the Coroplast glues to a flat surface - only for the curved areas! I opted to slit the flutes completely instead of just scoring them - that allows the "skin" to conform better to the turtle deck. Test fit the skins first - cut them slightly oversized - then once you are sure they will fit - spray both the backside of the "skin", and the fuselage to maximize glue strength. Glue the pieces on, then trim to fit after the glue dries. I made four separate pieces to cover the sides - that way the "skin" won't try to pucker in the middle - where the turtle deck starts to taper in. If you look at the picture of the mock up - you can see that the "joint" between the forward and aft pieces is right where the turtle deck starts to taper inward and downward. I made the four side piece upper "skin" joints right in the middle of the turtle deck - since most of it will either be under the canopy, or it will be under the glare shield. I didn't try to get too fancy with the "skins" - in fact - if you look at the installed tail picture, you can see that I added the fillers for the tail after the other "skins" were already in place. I used a hot glue gun to attach the aft "skin" filler pieces to the vertical/horizontal stabs.

## Radio installation



## R/H trailing edge of wing



This view shows the R/H side of the trailing edge of the wing. The reason I am showing you this picture - is to show you the two layers of 2 mil that I added to compensate for the 2 mil wrap on the ailerons. By adding the upper and lower pieces to the trailing edge, all of the surfaces will match up.

10 inch WWII Canopy



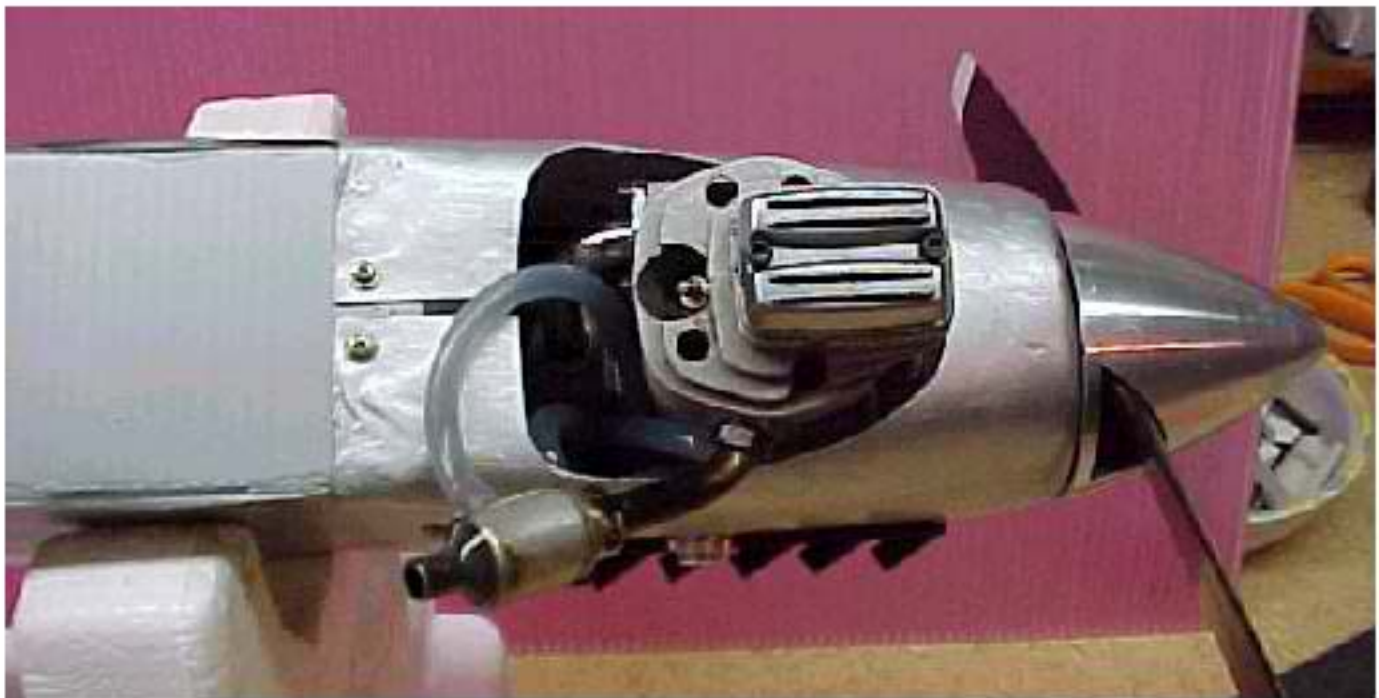
Custom made fiberglass cowl

2 1/2" aluminum spinner





## Cowling, engine and spinner



The cowling is custom fabricated by first carving a cowl from pink foam. Shape it exactly the way you want it to look like. After you get the cowl to look like you want to to - add a 3/4" flat piece of pink foam to the rear of the foam cowl - this gives you an extension that allows you to attach the cowl to the fuselage by slipping it over the fuselage by 3/4". Once you have the cowl and the 3/4" extension carved and sanded to shape - you will then need to cover the entire surface of the cowling with thinned down Elmers white glue (50% water - 50% glue). Give it three coats - allowing each coat to dry. The Elmers glue protects the surface of the foam from getting attacked by the fiberglass resin. After the third coat of Elmers was dry, I lightly sanded the entire cowl with 280 grit sandpaper to smooth out the rough spots. Once that was done, I proceeded to put two layers of 3/4 ounce fiberglass cloth and resin on the entire cowl (you don't need any cloth or resin on the back part)! Mix the resin and hardener as instructed on the can. I layed the first layer of cloth on in two halves (a right and a left) - that minimized the puckering. After the first layer of cloth is on - immediately add the second layer (just like the first!). You will need to work fast - so that the resin doesn't start setting up on you! Once the fiberglass has set up - I took the cowl outside and poured in about a cup of gasoline to melt out the foam (you could use Acetone, or MEK) - just be very careful! Once all of the foam is eaten away, I rinsed out the inside of the cowl with warm soapy water. Walla! You now have a cowl! Now all you need to do is trial fit it on your plane, cut out for the engine, paint it, and mount it on the fuselage with six servo screws (go right into the firewall - through the PVC pipe, and through the bottom 1/8 inch lite ply)!