



SPAD

Simple Plastic Airplane Design



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SPAD CoroSpit



Designed for AMA 2610 scale combat competition, the CoroSpit is our most complex project to date. Although still simple and quick building compared to it's balsa wood adversaries, it will require a higher degree of effort and craftsmanship (as well as patience) than the basic open class gutter pipe planes. We would like to thank Don Fourson of Combat Goblin Models (CGM) for the inspiration to create the CoroSpit. CGM produces the best 2610 Spitfire ARF and kit on the market. If you would like to see the CGM Spitfire (and all of Don's other great designs), click on this link to CGM . It was after building and flying the CGM Spitfire, that we decided to try one with Coroplast®. The prototype (as seen above), was equipped with a TT Pro .25, three Hitec HS-81 metal gear servos, and a 600 mah battery pack. All up weight came in at 2 lbs 7 oz. -----

Type: 2610 Scale Combat

Wingspan: 41 1/4"

Length: 35 1/2"

Engine: .21 - .26

Channels: 3 - Elevator, Ailerons & Throttle



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SPAD CoroSpit Building Instructions

(Designed and built by Dean Tuinstra)



Designed for AMA 2610 combat competition, the CoroSpit is our most complex project to date. Although still simple and quick building compared to it's balsa wood adversaries, it will require a higher degree of effort and craftsmanship (as well as patience) than the basic open class gutter pipe planes. We would like to thank Don Fourson of Combat Goblin Models (CGM) for the inspiration to create the CoroSpit. CGM produces the best 2610 Spitfire ARF and kit on the market. It was after building and flying the CGM Spitfire, that we decided to try one with Coroplast®.

This airplane is for experienced builders and pilots! If you are a beginner pilot, we do not recommend this airplane at all! If you have never worked with Coroplast®, we strongly recommend building a Derelict or Dominator type airplane before tackling this project. The prototype CoroSpit weighed all up 2 pounds 7 ounces, and was equipped with a TT® pro .25 engine, a 600ma battery pack, three HS-81 metal geared servos, and 6 ounce fuel tank. It was only seconds into it's first flight that we realized we had a real winner on our hands, and would be putting it down on plans. Please keep in mind while building the CoroSpit that the same ideas and principals presented here can be applied to just about any WW II fighter aircraft which used an inline engine and a narrow fuselage. Armed with scale 3 view drawings and a little ingenuity...you should be able to create several different WW II fighters.

Materials List:

1. 2 Mil Coroplast®
2. 4 Mil Coroplast®
3. 2 ea. standard wooden yardsticks (wing spar and fuselage joiners)
4. ½" plywood (firewall)
5. 5/32" dowel (for mounting vertical stab)
6. Hardwood for servo rails (and some extra servo screws)
7. ¼" dowel or balsa for elevator pushrod
8. Medium CA
9. Clear silicon sealer for wing to fuselage area and canopy
10. Radio, engine, mount, tank, tubing, and associated hardware, push rods, clevises etc.
11. Canopy (available from CGM)
12. Propane or butane torch
13. Poster board or other thin cardboard (for templates)
14. Sharp razor knife blades, sharp scissors, and basic hobby tools
15. Clothe pins (to aid in gluing wing tips in place)

Lets go over a few things before you begin building your CoroSpit:

1. The canopy used on the prototype is available from CGM for \$5.00 each and they do take PayPal! Please contact Don Fourson at royfokker@sdf-1.com for more information.
2. Due to the nature of Coroplast® - how it folds, and the complex shapes of the CoroSpit, extra craftsmanship, and parts shaping will be required to make this airplane come together, please be patient, it will be well worth it. We highly recommend you make your patterns for the firewall, rear deck former, and vertical stab from cardboard first, and fine trim and fit these cardboard patterns to your airplane BEFORE committing them to plywood or Coroplast®.
3. Building the CoroSpit will rely heavily on the text in these instructions, so please read them closely!
4. Take your time and use new razor knife blades to cut the complex shapes in the Coroplast®. A good sharp pair of sewing scissors also works very effectively for cutting the 2 Mil Coroplast® used in wing construction.
5. ALL AREAS TO BE GLUED MUST BE "FLASHED" PRIOR TO GLUING WITH MEDIUM CA!!! Run a propane or butane torch with moderate flame over the area to be glued, slow enough to burn the manufacturing oils out of the plastic yet quick enough so as not to burn the plastic! PRACTICE ON SCRAP FIRST! There is very little evidence of the oils burning, however the plastic may warp slightly and turn a slightly darker color. It will return to normal in seconds. When gluing wood to Coroplast®, a moderate bead of glue may be used. When gluing Coroplast® to Coroplast®, use one moderate drop every ¼" to ½". USING A BEAD OF GLUE WILL NOT WORK AND IS THE BIGGEST MISTAKE MADE HERE!!! Please be careful in your hobby room of the fire and vapor hazards of flashing and gluing while building model aircraft!
6. The patterns for the aileron, wing tip, vertical stab, horizontal stab, firewall, and rear deck former are drawn on a 1" grid. Simply measure out and draw a 1" grid on a piece of cardboard, copy the drawings to your cardboard, and cut out your cardboard templates.
7. If you have any different/better ideas, please don't hesitate to try them! We can't stress this enough! The whole SPAD concept grew out of this attitude! Nothing we do is ever set in stone! This is especially true in the CoroSpit. In an effort to save the weight of doublers and screws, the wing is glued on permanent, and once the radio is installed from the top, the fuselage is closed up permanently. These plans will represent this, but you may wish to invent your own method of radio access. Ok... now lets get busy!

Fuselage:

1. The fuselage is laid out on a 30" x 15" piece of 4 Mil Coroplast® with the flutes running in the 30" direction. Using a straight edge and fine tip marker, lay out the fuselage as shown on the fuselage layout drawing. You will notice several places where the dimension of 4mm is used. Simply use a scrap piece of Coroplast® (which is 4 mm thick) for this dimension.
2. Using a new VERY sharp razor knife blade and straight edge, cut your fuselage out.
3. Using a straight edge and a small blunt tipped object (such as a #1 Phillips head screwdriver), score and prefold the 4 fuselage bottom fold lines.
4. Using a straight edge and box opener type knife with the blade tip barely exposed, slit the INSIDE FLUTES ONLY of the front and rear decks. This allows them to curve

inward to form the top surfaces of the fuselage.

5. Cut two standard wooden yardsticks down to 7/8" width. This gives you your spar pieces, and the thin sticks will now be used in fuselage construction.
6. Size and glue the thin yardstick pieces to both fuselage sides as shown on the left side of the fuselage drawing. Please take extra care in the alignment of the pieces in the firewall area, as a mistake here could give your CoroSpit an incorrect thrust line, and greatly effect it's flight performance. The CoroSpit has NO down or right thrust. Also note that yardstick pieces will need to be shaved down at the rear of the fuselage to allow proper fit of the lower rear fuselage.
7. Fabricate a Firewall from 1/2" plywood, and a rear deck former from 2 Mil Coroplast®. This is where craftsmanship, and "fine tuning" of the patterns comes into play to make thing fit together well, and give the deck areas the contour you desire. You will also notice that at the forward side of where the rear deck seam comes together, comes to a point. If you are planning to use a clear canopy, trim this area to give you a nice straight edge.
8. It is highly recommended to drill your firewall for your engine mount, fuel lines, and throttle pushrod at this point...it's a lot easier now than after it's installed!
9. Fold up the fuselage, gluing the firewall, and front and rear fuselage bottom sections in place. Do NOT install the rear deck former yet! For extra firewall security if desired, servo screws can be run through the outside of the fuselage into the firewall.
10. Close up the rear deck by cutting out a 1/2" wide strip of 2 Mil Coroplast® the length of the seam. When cutting this strip to length, keep in mind that you will want to leave just enough room at the front of the rear deck for the rear deck former to fit in. Glue half of the strip to the inside of one side, then fold and glue the rear deck together. You may wish to use some masking tape to hold the rear deck together while the glue dries.
11. Glue the rear deck former inside the fuselage at the front edge of the rear deck.
12. You will not close up the front deck until after the radio gear is installed!

Tail:

1. Using your horizontal stab/elevator template, trace outline to 4 Mil Coroplast® and cut out. Hinge elevator by cutting out the BOTTOM ONLY of the hinge line flute.
2. From a yardstick, cut out the triangle shaped tail mounting piece and glue into the fuselage, ever so slightly above the Coroplast®. THIS PIECE IS CRITICAL!!! It MUST be glued in solid and level.
3. Glue the horizontal stab/elevator to the fuselage, making sure it is centered and straight. MAKE SURE THE ELEVATOR HINGE IS NOT OBSTRUCTED IN ANY WAY.
4. Using your vertical stab template, trial fit it to your plane, and make any necessary adjustments to your pattern before committing it to Coroplast®. Once satisfied, trace to 4 Mil Coroplast® and cut out.
5. Trial fit your vertical stab, and mark horizontal stab for location of a 5/32" dowel which will be installed into a vertical flute, and into the tail mount wood. Exact location and length of this dowel is not critical, as long as it is in the "meat" of the stab. Remove vertical stab, and drill horizontal stab and tail mount wood for dowel.
6. Install vertical stab by sliding into bottom of the fuselage and gluing in place. Install 5/32" dowel down through vertical stab and down into the tail mount wood. Drip CA down flute to glue in place.

Wing:

1. The wing is laid out on a 42" x 19" piece of 2 Mil Coroplast® with the flutes running in the 19" direction. Using your wing tip template, a fine tipped marker and straight edge, layout your wing as shown on the wing layout drawing, and cut away the areas shaded in lime green on the wing layout drawing.
2. Trace your aileron template to 4 Mil Coroplast® and cut out a RIGHT and a LEFT aileron. Hinge by cutting out the LOWER SIDE ONLY of the hinge line flute.
3. Fabricate a wing spar with 3 sections of 7/8" wide yardsticks, and glue together with a dihedral brace as shown on the wing drawing.
4. Using a straight edge and small blunt tipped object (such as a #1 Phillips screwdriver) score and prefold the wing leading edges, tip folds, and dihedral folds.
5. Glue the wing spar to the wing at the lower wing center section, and then one side at a time, glue the spar to the bottom wing panels.
6. Call your Wife, girlfriend, child, neighbor, or buddy to help you with the next step.
7. One side at a time, trial fold the top wing panel over the spar and against the lower trailing edge. Mark the inside of the top panel to match the lower trailing edge, and also the top panel wing root must meet the lower panel dihedral fold line. Keep in mind that you are building a low wing that the fuselage will FIT DOWN INTO, so the gap between the upper panel wing roots must be the same as the fuselage width. While marking the top panels, be sure to hold the leading edge fairly flat (slight raising of the leading edge is acceptable). Don't worry about the wing tips at this time, simply get the wing roots and trailing edges marked. We'll get the wingtips after the top panels are glued in place. Once the above is accomplished, unfold, and trim the top panels as marked.
8. Glue the ailerons to the lower panel trailing edges. Make sure the hinges are not obstructed and clearly over hang the trailing edge! Note: To help wingtip fit - slit the hinge at the outboard end (to about a 1/2" in) to allow the Coroplast to "squish" a little so the wingtip looks better.
9. One side at a time, fold and glue the top wing panels to the spar and trailing edge.
10. Trial fold the wing tips up into the top panels, and mark the inside of the top panels. Trim the top panels for the wing tips. A sharp pair of sewing scissors works most excellent for this!
11. Glue the wing tips in place. Clothes pins work great for this!

Wing Attachment:

1. You must now cut a slot in your fuselage for the wing spar. Measure 2 3/16" back from the lower forward bottom fuselage fold line and mark. This will be the forward side of your spar slot. Measure the height and width of your wing spar, and mark the fuselage accordingly. Using a sharp razor knife, cut the spar slot in the fuselage.
2. Trial fit your wing to the fuselage, and trim as necessary for a good fit.
3. Glue your wing to your fuselage.
4. Seal the wing root to fuselage area with a bead of clear silicon sealer.

Equipment Installation:

1. Engine , engine mount, and fuel tank are mounted conventionally, and all equipment is installed through the top of the fuselage. Use foam to install your fuel tank as high inside the fuselage as possible for the best engine performance.
2. Use radio equipment to achieve proper CG. Your CoroSpit MUST balance level to slightly nose heavy AT THE WING SPAR.

3. Use the radio installation drawing as an example for installing your radio equipment. The drawing represents how the radio was installed in the prototype. Please note that the aileron servo is mounted low (front side on the spar), and the throttle and elevator servo are mounted high enough to allow the aileron pushrods to run underneath them.
4. The use of hard wood servo rails screwed in place as shown in the drawing assures good solid installation, and greatly aids in the stiffening up of the fuselage sides. Be sure to GLUE them in place as well as screws.
5. The battery and receiver are wrapped in foam, and can be secured in place with two sided foam mounting tape or (as in the prototype) yardstick scraps glued in place across the width of the fuselage.
6. Mount the switch as desired. For antenna routing, simply poke a small hole in the left inside fuselage side, and route the antenna down a flute and out the rear of the airplane. Either use a charging jack on the left side of the fuselage, or simply cut a small slit in the left fuselage side, and poke your charging lead through it.
7. Install control horns to the top side of the ailerons and bottom left side of the elevator. The prototype used home made horns (made from PVC gutter pipe), and were simply glued in place.
8. Fabricate a conventional elevator pushrod. Please note that a slight "Z" bend at pushrod exit points assures freedom of movement. Install all pushrods, cutting approximately 1 ¼" long x 1 flute wide slots in the fuselage exit points.
9. Rig ailerons and elevator for ½" travel each way (1" TOTAL) and rig throttle for max, Idle, and CUT-OFF.
10. Double check and triple check all radio installation and operation! The prototype was built to see combat action, so the next time the inside of the fuselage will be seen, will be when picking up pieces! All servo arm to pushrod connections are "Z" bends. Also used was a small amount of silicon sealer on the threads of all servo screws to assure they wouldn't loosen.

Final Assembly:

1. Double check and triple check all radio installation again. When overly satisfied, close up the forward deck in the same manner as you did the rear deck, with a ½" strip of 2 Mil Coroplast®, as well as gluing the front deck to the top of the firewall.
2. Trim canopy to fit, and glue in place using silicon sealer, or CA.
3. Install a means of combat streamer attachment. The prototype used a small PVC horn glued to the bottom of the fuselage.
4. Add trim decals or stickers. The prototype used home made stickers made from vinyl sign lettering acquired from the same sign supply store where the Coroplast® was purchased. Please note that if you are going to enter a 2610 combat event, your color and marking scheme must be authentic. With a little leg work in the library or on the internet, Spitfires with all green, blue, and silver schemes can be found. This works out great, as these are colors the Coroplast® comes in!

Flying:

1. If you are a beginner pilot, and have gotten this far, please do not attempt to fly your CoroSpit without the help of an experienced instructor pilot!!!
2. Follow ALL AMA safety guidelines and regulations!
5. MAKE SURE YOUR PLANE BALANCES LEVEL TO SLIGHTLY NOSE HEAVY AT

THE WING SPAR!!! If not, correct the situation before even thinking about flying your plane. A tail heavy airplane is a safety hazard, and besides, you have put too much work into this to crash now!

6. Make sure your prop is clocked to stop horizontal when the engine is shut off for landing, and make sure that your radio will shut the engine off.

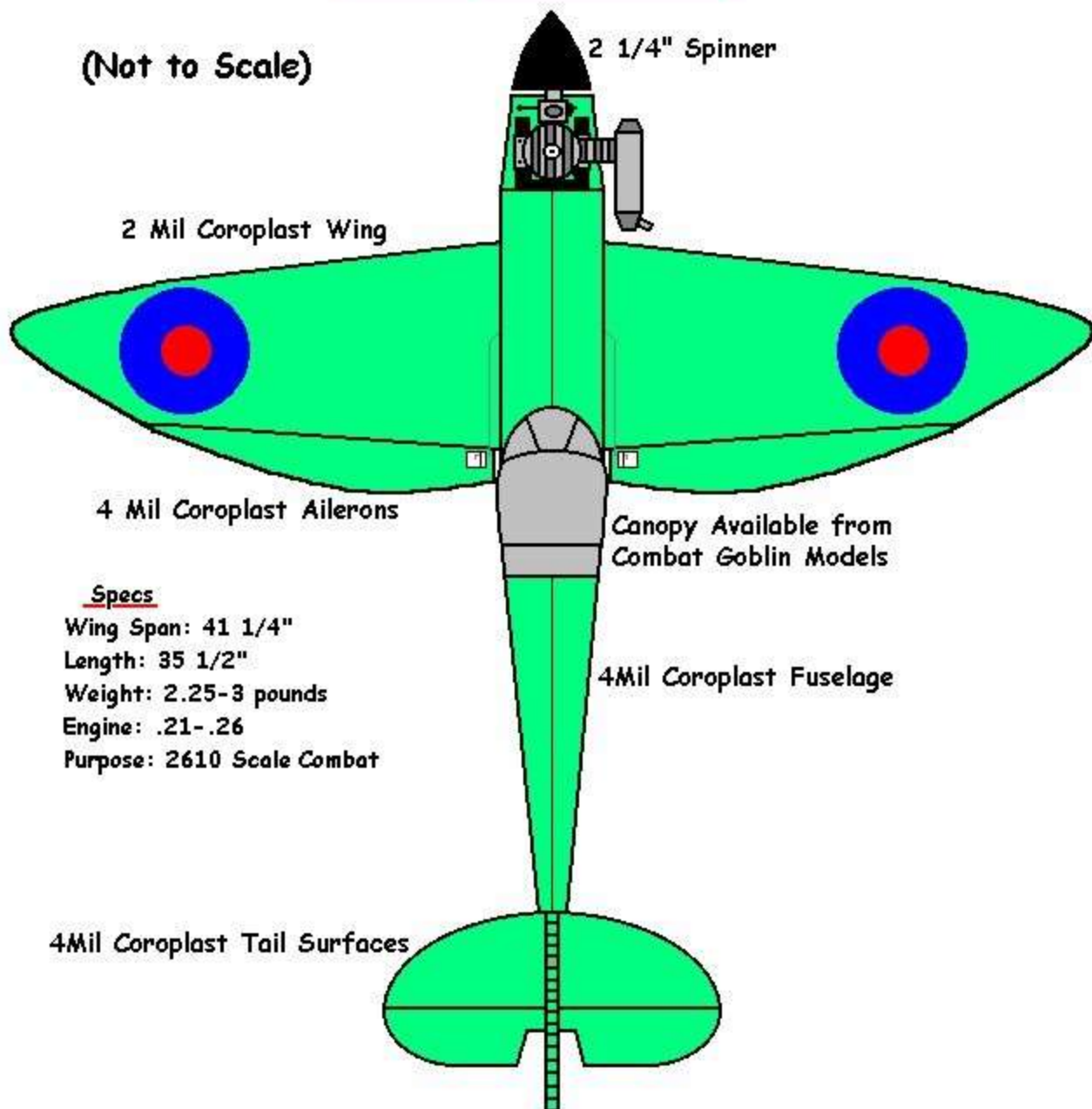
7. Always have someone else hand launch your airplane for its first flight! Once properly trimmed out, use a slight underhanded upward toss, and your CoroSpit should climb out perfectly in search of all enemies!

8. Questions? Comments? Please visit the SPAD message board . If you wish to show off your CoroSpit on our SPAD gallery, please send photos to Kraut at collin@spad.org!

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CoroSpit Overview

(Not to Scale)



Specs

Wing Span: 41 1/4"

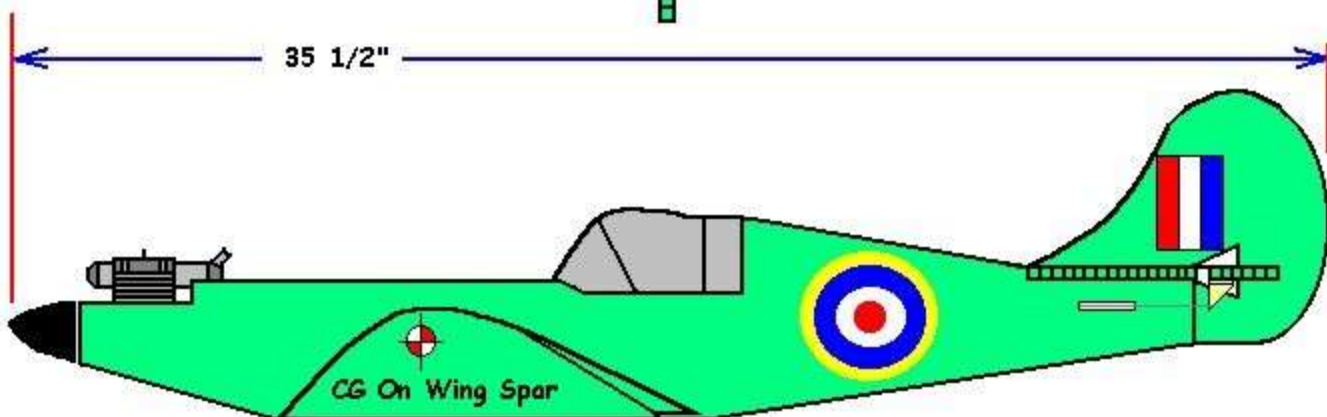
Length: 35 1/2"

Weight: 2.25-3 pounds

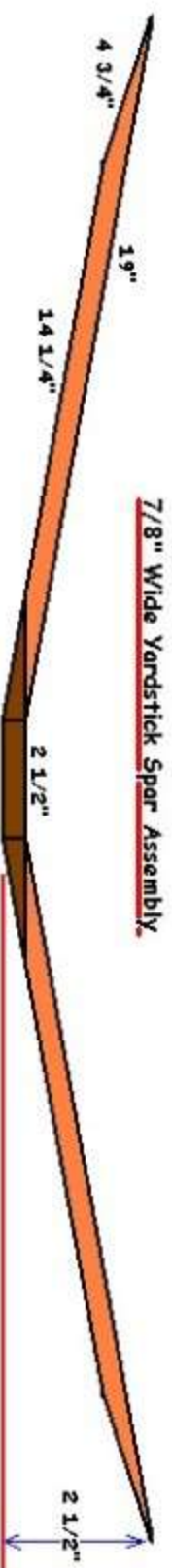
Engine: .21- .26

Purpose: 2610 Scale Combat

35 1/2"



CoroSpit Wing Layout



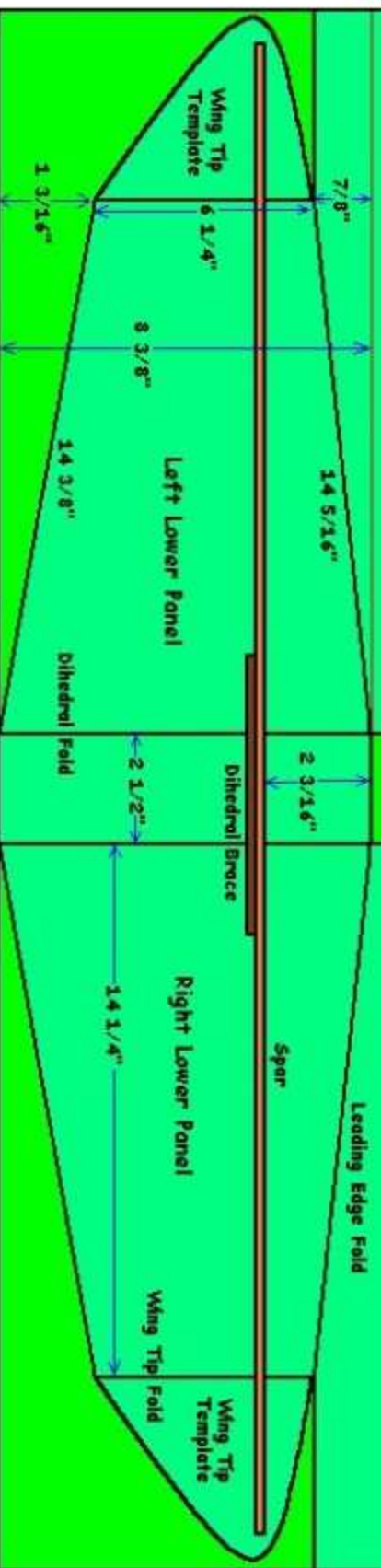
Layout Wing on a 42" X 19" piece of 2 Mil Coroplast as shown here. Once Lower wing is layed out, cut away sections shaded in lime green. Score and pre-fold LE, dihedral, and wing tip fold lines. Then Fabricate wing spar and glue in place. While holding LE down as flat (one side at a time) as possible, pre-fold wing top panels and mark them to match wing bottom panels. Unfold top panels and trim to match bottom panels. Glue allerrens to lower wing trailing edge. Fold and glue wing top panels to bottom panels at spar and TE. Glue up wing tips and trim as necessary (Clothes pins work great for gluing wing tips)

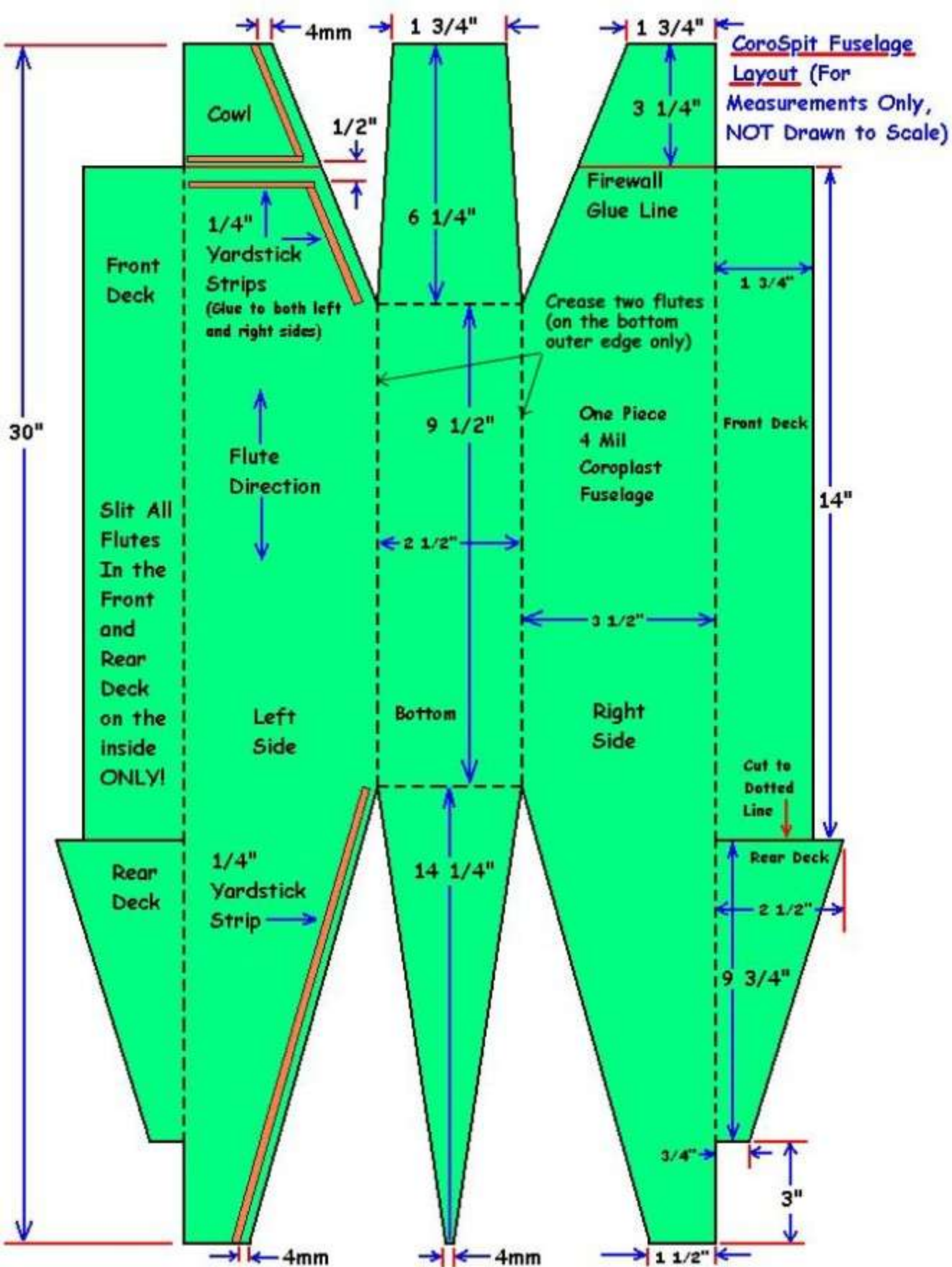
One piece 2 Mil Coroplast wing

Direction of Flutes



Fabricate wing spar by cutting down two yardsticks to 7/8" wide (save thin strips for fuselage construction). Construct spar from three yardstick sections and a dihedral brace as shown. Trim last 4 3/4" of each spar to a point as shown. Spar has 2 1/2" of dihedral on each side (5" total).

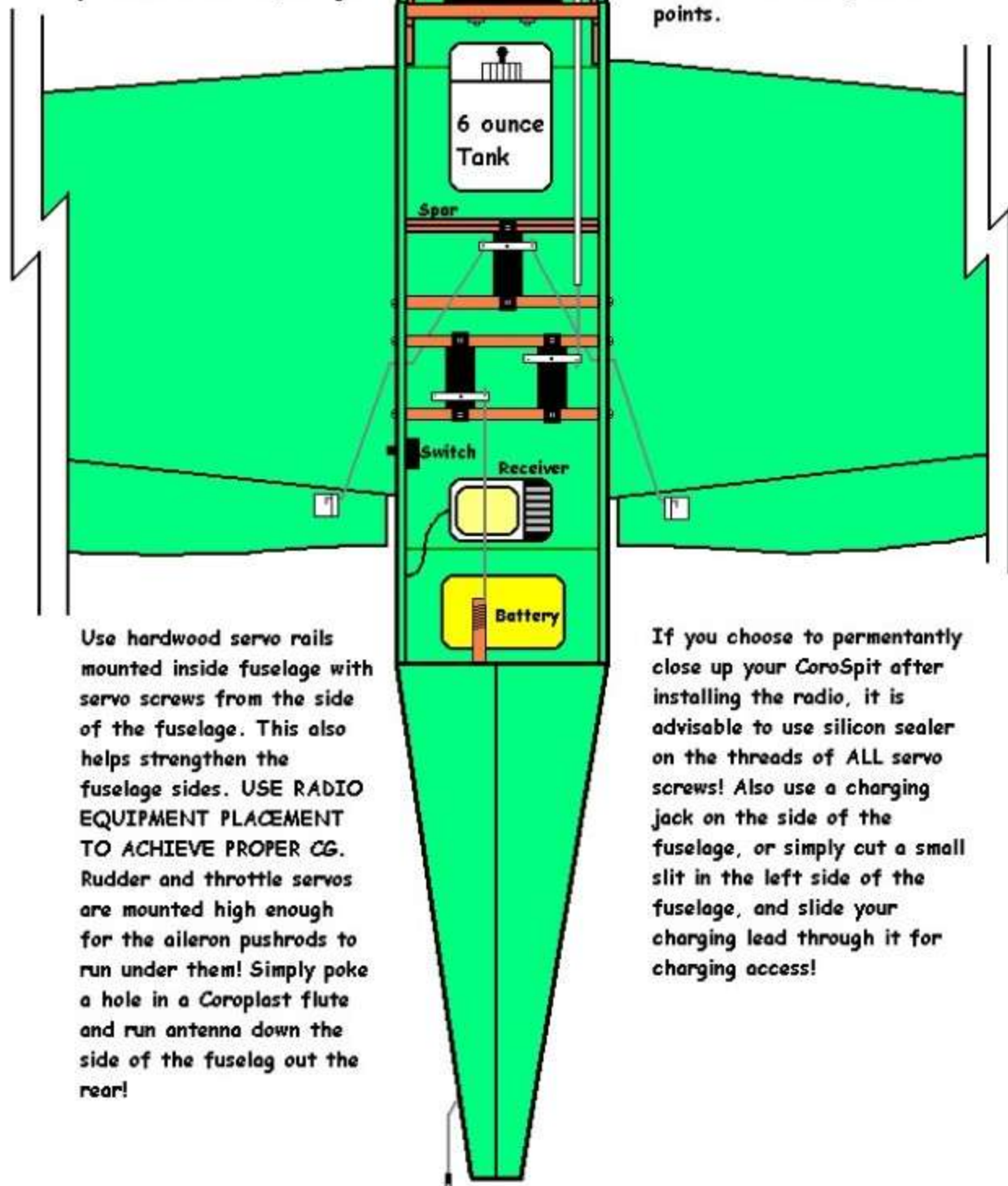




CoroSpit Radio Installation

For the optimum in engine performance, use foam under the fuel tank so your fuel tank is as high as possible inside the fuselage!

Cut 1 1/4" long x 1 flute wide slots in the side of the fuselage for aileron pushrods. Use A slight "Z" bend at the fuselage exit points.



Use hardwood servo rails mounted inside fuselage with servo screws from the side of the fuselage. This also helps strengthen the fuselage sides. USE RADIO EQUIPMENT PLACEMENT TO ACHIEVE PROPER CG. Rudder and throttle servos are mounted high enough for the aileron pushrods to run under them! Simply poke a hole in a Coroplast flute and run antenna down the side of the fuselage out the rear!

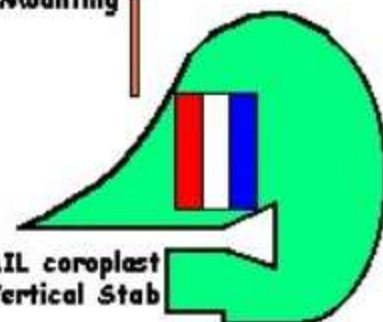
If you choose to permanently close up your CoroSpit after installing the radio, it is advisable to use silicon sealer on the threads of ALL servo screws! Also use a charging jack on the side of the fuselage, or simply cut a small slit in the left side of the fuselage, and slide your charging lead through it for charging access!

CoroSpit Assembly

Not To Scale
(Reference Only)



5/32" dia. Vertical
Stab Mounting
Dowel



2 Mil Coroplast
Forward Deck Seam Strip



2 Mil Coroplast
Rear Deck Fromer

2 Mil Coroplast
Rear Deck Seam Strip



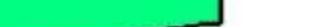
4 MIL coroplast
Vertical Stab



4 Mil Coroplast
Horizontal Stab/Elevator



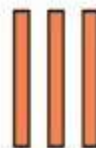
Yardstick Tail Mount



1/2" Ply
Firewall



Hardwood
Servo Rails



4 Mil Coroplast FUSELAGE

Spar Slot

2 3/16



Thin Yardstick Pieces



WING Side View

2 Mil Coroplast
Wing Top View
(Assembled)

4 Mil Coroplast
Ailerons

Spar

Yardstick Spar Pieces




CoroSpit Patterns (Sheet one)

SQUARE=1" 

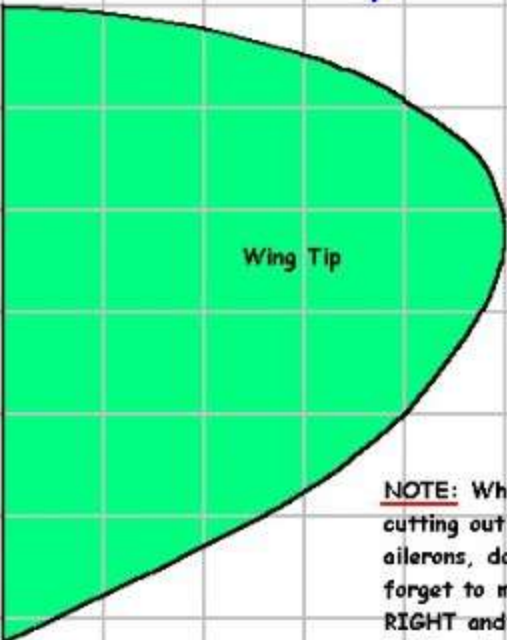
14" 

Hinge Line 

Aileron

Flute Direction 

6 1/4" 

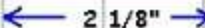
Wing Tip 

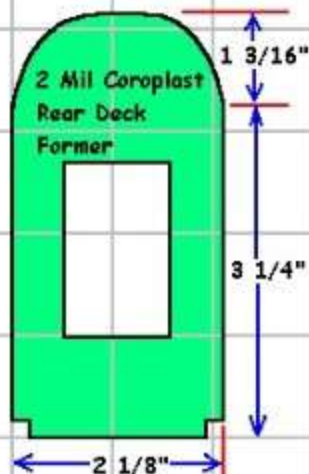
NOTE: When cutting out ailerons, don't forget to make a RIGHT and a LEFT one!


3/4" 

2 1/2" 

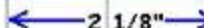


2 1/8" 



1 3/16" 

3 1/4" 

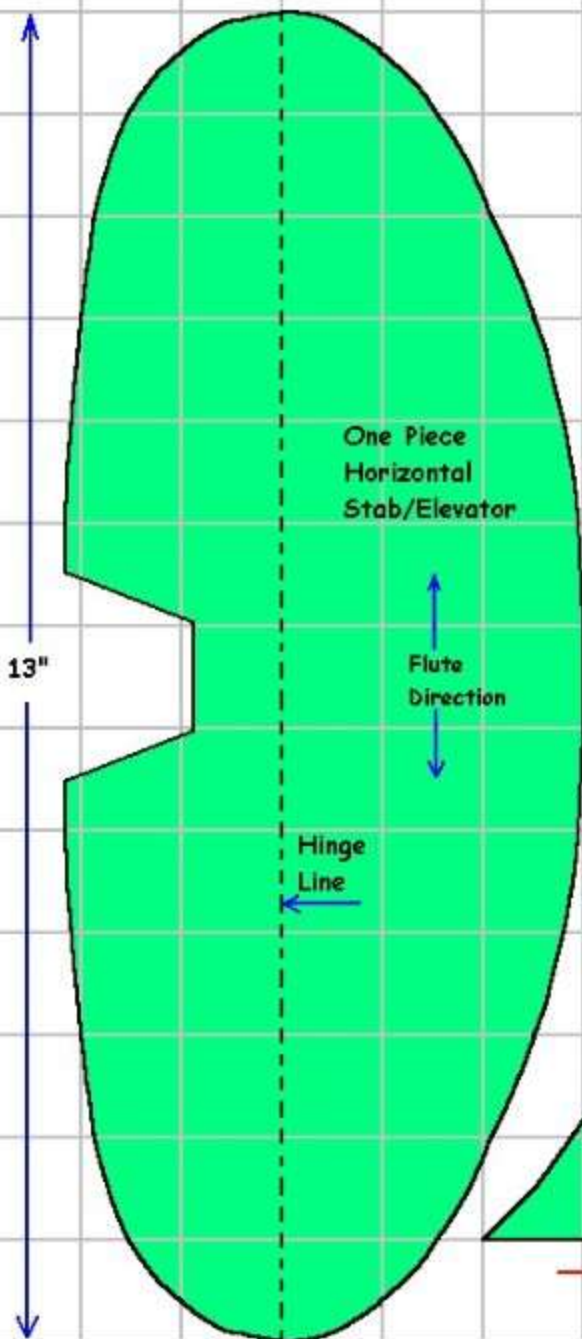
2 1/8" 

3/4" 

Yardstick tail mount 

4mm 

CoroSpit Patterns (Sheet 2)



Square=1"
↕ ↔



EXAMPLE: When hinging the elevator and ailerons, simply cut away the bottom side of a Coroplast flute.

