

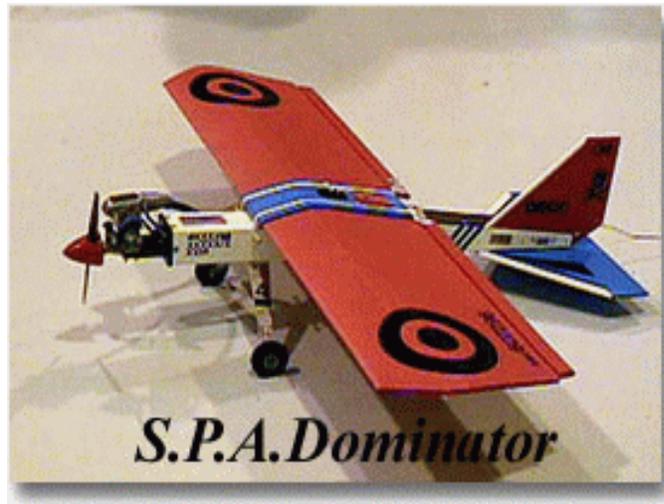


SPAD

Simple Plastic Airplane Design



SPAD Dominator



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This is the Dominator. While the Dominator is not our first design, it is the end result of six months of changes and evolution that finally perfected our early design attempts. Our original design, the dogfighter (may it rest in peace) had rudder only steering and lots of dihedral. It flew well, but after many months of trial and error, we decided that the Dogfighter needed ailerons, so behold - the Dominator was born!

Type: Sport/Trainer
 Wingspan: 47"
 Length: 30"
 Engine: .40 to .46
 Channels: 4 - Elevator, Rudder, Ailerons & Throttle

NEW!!! Thanks to Minnesota Jim, DXF files are available by clicking [HERE!](#)

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SPAD Dominator Building Instructions



Fuselage:

1. Using a 30" long PVC fuselage "blank" measure, mark, and cut out rear fuselage taper as shown on drawing 2.

NOTE: The drawings show the fuselage with 5 degrees of downthrust at the firewall. This is recommended to help your Dominator's trim settings in flight throughout all power settings.

2. Measure, mark and cut out the radio access hole as shown on drawing 2, leaving a 3/8" lip between the radio access hole and fuselage side for strength. If you're using an X-acto® blade or saw (rather tough) this can be made easier by drilling a 1/4" hole in each corner and cutting between them.

3. Course grit sandpaper or a file will get all the white fuzzies off and clean up the cut edges nicely.

4. Mark the wing hold down holes as shown on drawing 2, and 1/2" from top of fuselage. Drill 1/4" diameter holes.

5. Cut two 1/4" x 4 1/2" long wing hold down dowels, and install in fuselage. When satisfied, coat exposed portion of dowels with 5 minute epoxy or medium CA. This will effectively fuel proof, and glue them in place

Tail Feathers:

1. Refer to drawing 6 for the best layout we have come up with to get the most parts (and spare parts) from one 4' x 8' sheet of Coroplast®.

2. Cut out horizontal and vertical tail feathers as shown on drawing 4.

3. Elevator and rudder are created by cutting out ONE SIDE ONLY of the hinge line corrugation. This can be a little tricky. We use an adjustable blade, box opener type knife and straight edge. Wrapping an X-acto® knife with masking tape leaving just the tip exposed will work also.

Can you believe it? The tail feathers are done already! Let's attach them to the fuselage.

1. Fabricate 2 horizontal, and one vertical stab attach doublers as shown on drawing 7, from the PVC scrap removed from the fuselage cutouts.
2. Fabricate a tailskid as shown on drawing 7 from the PVC scrap removed from the rear fuselage cutout.

NOTE: Exact doubler hole location measurements are not given because this is not critical, and could change slightly from plane to plane. When positioning the doublers and tailskid, keep in mind that the screws will go through the Coroplast® very easily in the middle of a corrugation, and will almost certainly go crooked at the edge of a corrugation.

3. Drill 1/16" pilot holes in doublers and tailskid.
4. Using the doublers and tailskid as templates, drill 1/16" holes in the fuselage for each screw attach location.
Enlarge holes IN FUSELAGE ONLY to 1/8".
5. When satisfied with positioning, fasten tail feathers to fuselage using sheet metal screws, self-tapping into doublers and tail skid.

NOTE: Do not overtighten screws to the point of crushing the Coroplast®!

6. Optional panel edging can be added to the stab leading edges for dress up and to keep dirt & fuel out if desired.

Landing Gear:

1. Position landing gear on bottom of fuselage with leading edge of gear 5 ½" from front of fuselage. Mark and drill for bolt installation.

NOTE: Exact hole diameter, and location measurements are not given, as this will vary with different types of gear. Keep in mind there must be enough room inside of fuselage, between the boltheads for the "powerpack" assembly yardstick. (see drawing #5)

2. Install landing gear to fuselage with boltheads inside, and nuts outside of fuselage as shown on drawing 7.

NOTE: Use large diameter washers under bolt heads for strength.

3. Make sure the front of each wheel "toes in" towards the fuselage slightly. This will greatly improve the ground handling of your plane!

NOTE: If you desire a more forgiving landing gear attachment option, simply rubber band them on, utilizing the forward wing hold down dowels. This will position them slightly further forward, but it will still work just fine.

Power pack assembly: (firewall, engine, engine mount, fuel tank, throttle servo)

1. Fabricate a firewall to fit the inside diameter of your fuselage from 3/4" plywood and test for a snug fit. The firewall will be installed flush with the forward edge of the fuselage.

NOTE: If you wish to get fancy and you have a table or radial arm saw, "step" the firewall by cutting one and a half of the ply layers to the fuselage outside diameter, and the rest to the fuselage inside diameter.

This will give you a nice firewall "cap" and greatly increase it's impact strength.

2. Cut a groove, two plies deep, at the bottom of the rear side of the firewall, to receive a 7" section of yardstick and yardstick stand offs as shown on drawing 5.

3. Cut a 7" section of yardstick, and test fit into firewall groove. Test fit this assembly into fuselage, and assure the yardstick clears the landing gear mounting bolt heads. When satisfied, glue yardstick to firewall with CA or 5 minute epoxy.

NOTE: Don't forget to build the powerpack/firewall assembly with 5 degrees of downthrust!

4. Measure mark and drill holes for engine mount, fuel lines, and throttle wire housing, and install engine mount blind nuts.

5. Fuel proof the firewall with epoxy or dope.

6. Install engine mount, engine, and throttle wire housing to firewall.

7. Position fuel tank on a layer of foam on the yardstick as shown on drawing 5, and secure with at least two #64 rubber bands. Also install fuel lines.

8. Test fit this assembly into fuselage and decide on the best throttle servo positioning. When satisfied, remove assembly from fuselage. And install throttle servo to yardstick.

NOTE: Throttle servo is attached to yardstick with double face mounting tape. Then drill a hole on each side of servo and secure with a tie strap as shown on drawing 5.

9. Plug your throttle servo into the receiver, and turn on the radio. Install the throttle wire and rig to your satisfaction.

10. Install the "power pack" assembly into the fuselage. Secure in place using at least one sheet metal screw on each fuselage side as shown on drawings 1 and 2. You may wish to use silicone sealer for a good fuel proof firewall seal.

NOTE: Exact measurements for location of firewall mount screws is not given as this may vary from plane to plane, taking care not to puncture a fuel line or hit the throttle wire or an engine mount bolt.

Radio Installation:

1. Wrap your battery and receiver in foam and comfortably position them as shown on drawing 5.

NOTE: The "power pack" assembly should already be installed at this point.

2. Cut and drill the necessary holes, and mount the switch in the location of your choice. We like to put it on the left side of the fuselage, near the top, at the mid point of the radio access hole.

3. Mount the elevator and rudder servos as shown on drawing 5.

NOTE: Elevator and rudder servos are mounted by sticking them in place with double face foam type mounting tape, drilling a hole on each side of the servo, and securing with a tie-strap (Be careful not to drill a

hole in your servo!!!) When mounting the aileron servo, use supplied screws and attach the servo to the bottom

of the wing/fuselage. We have found that different engine and mount combinations vary the airplanes CG

greatly. Positioning of the rudder and elevator is the best way to achieve proper CG.

4. Fabricate 2 control horn doublers from the PVC scrap as shown on drawing 4, and install control horns, and doublers to elevator and rudder.

NOTE: Exact dimensions for control horns and doublers are not given as this will vary from plane to plane, with

different styles of control horns. Also note that control horns can be "homemade" from PVC scrap from the

rear fuselage cut-out!

5. Fabricate the pushrods of your choice. We have used conventional 1/4" square balsa, 1/4" dowels, nyrod, and even

3/8" wide scrap yardstick for our pushrods, and they all work just fine.

6. Install pushrods, plug in all your radio gear, and rig the elevator and rudder to your satisfaction. We recommend 1/2" travel (1" total) for normal sport flying and 1"+ (2" + total) for radical combat flying!

7. Secure the battery and receiver in place by placing a piece of foam over them. The foam will tuck nicely under

the radio gear access hole side lip.

8. Antenna exit routing is a matter of personal preference. Collin glues a piece of scrap plastic tubing to the inside

bottom of the rear fuselage for the antenna to run through. Dean drills several holes into the left rear fuselage

side and tie-straps a portion of plastic tubing in place for the antenna to run through. We have also ran the

antenna up through the vertical stab.

Way to go! You have only been at it for several hours, and you already have a flight ready fuselage assembly! Let's build a wing for it, and go flying!

Wing:

1. Fabricate a wing as follows:

2. Refer to drawing 3. The wing is laid out on a 2' x 4' piece of Coroplast® with the corrugations running CHORDWISE. It is acceptable to build this wing from two 2' x 2' Coroplast® pieces butted up against at

the wing center line.

3. Mark all fold lines, spar lines, and wing tips on the Coroplast®.
4. Cut Coroplast® material away from the outside edges of the bottom panel wing tips.
5. Cut the top wing centerline, to the leading edge fold line ONLY!

NOTE: This is done to facilitate folding half of the wing at one time, making assembly much easier. If you are building your wing from two separate pieces, this will already be done.

6. Refer to drawing 6 (parts layout) and cut two 2 1/2" x 20" pieces of Coroplast® with corrugations running LENGTHWISE for ailerons. Refer to drawing 3, and mark the hinge line, and notch the outboard edge 1/4", forward of the hinge line only (this is for wing tip folding clearance).

7. Hinge the ailerons by cutting away the BOTTOM portion of one corrugation, forward of the hinge line as shown in the profile view of drawing 3.

NOTE: If the Coroplast® is relatively stiff (it does vary), you might have to cut TWO corrugations out to make the hinge pliable enough. This is perfectly acceptable.

OK! We now have all the pieces, let's build the wing!

8. Score and pre-bend ALL fold lines. Pre-bend leading edge 180°, the upper spar lines 90°, wing tips 45°,

NOTE: Scoring is accomplished by using a straight edge and blunt tipped object (Small Allen wrench or Apex works well) and running it firmly along the fold line until you are satisfied a bend can be accomplished.

Folds ALONG a corrugation require little scoring, and bend easily. (score one corrugation for the wing tips).

Folds AGAINST the corrugations require heavy scoring (sounds like a baseball card in bicycle spokes) and are best accomplished by turning the wing over and bending along a straight table top edge. Use palm pressure, and

work along the fold. Please be patient, this is not easy and takes a little getting used to. But once mastered,

it sure beats balsa wood and Monokote®!

9. Lay the wing out flat, and glue the two spars to the bottom panel as shown on drawing 3.

NOTE: IF USING EPOXY, ROUGHEN UP THE COROPLAST® WITH COURSE GRIT SANDPAPER AT ALL

SURFACES TO BE GLUED! IF USING CA, USE A PROPANE TORCH AND QUICKLY "FLASH" THE PLASTIC

TO BURN OUT THE OILS (CAREFUL NOW!). USE SMALL 1/8" DROPS EVERY INCH OR SO. A BEAD OF

GLUE MAY NOT WORK! USING TOO MUCH GLUE IS THE BIGGEST MISTAKE HERE!

11. Test fold the wing, and trim the trailing edge excess off the top panels, to make them flush with the bottom panels.

NOTE: When folding the wing, the top panel pressure will tend to pull up on the leading edge, causing the lower panel to curve slightly up. A small amount of this is acceptable, and will even improve your planes performance!

12. Glue the ailerons to the lower wing panel trailing edges, with the hinge fully exposed, and outboard edge even with the wing tip fold line. If desired, trim aileron outboard edges to contour with the wing tips. Fill the 4" gap between the ailerons at the lower panel center section trailing edge with a piece of scrap trimmed from a top panel.

13. Working one top panel at a time, fold over and glue upper wing to the top of the spar. (a board and weights works good here)

14. Glue the top panel trailing edges down, using care not to get glue on the aileron hinge area.

15. Fold the wing tips up into the top panels, and glue in place. When dry, trim off the excess.

16. Refer to drawing 6 (parts layout) and cut out a 4" x 24" wing center wrap. Test fit, score, pre-bend, and trim for a good fit (flush with trailing edge). When satisfied, glue in place.

17. Cut a servo hole, centered, and just behind the aft spar, in the top of the wing. Cut a small hole in the bottom of the wing for the aileron servo lead. Servo should be snug, with the "ears" resting on the wing wrap.

18. Servo mounting is accomplished by simply drilling two holes in the BOTTOM of the wing, on either side and directly below the servo, then use a zip-tie to hold the servo in place. A small scrap of fuselage PVC must be placed between the zip-tie and wing bottom, to prevent the Coroplast® from pulling through.

19. Just as you did on the tail feathers, fabricate two control horn doublers from PVC scrap, and install control horns to the top of each aileron as shown on drawings 1 & 2.

20. Plugging the aileron servo lead into the receiver, install the wing to the fuselage temporarily with two rubberbands (wow! now that's a good looking hunk of plastic!). Install aileron pushrods, and rig to your satisfaction (we recommend ½" to ¾" travel, OR 1" to 1 ½" TOTAL travel)

NOTE: When rigging your ailerons, ensure that the bottom of the ailerons are parallel to the top of the fuselage! Do not allow them to droop (like flaps)! If your ailerons droop, they will drastically affect pitch trim!

21. Using a finger tip centered at each wing tip under the FORWARD spar, pick up your new airplane to check it's center of gravity. It must balance level or slightly nose heavy.

NOTE: If your plane balances tail heavy--DO NOT ATTEMPT TO FLY IT UNTIL THIS CONDITION

IS CORRECTED!

22. If your airplane does not balance to your satisfaction, correct it by shifting radio gear, adding prop shaft weights, bolt on weights, or stick on weights as you see fit.

That's it! Your SPAD is done! We sincerely hope you found our instructions and drawings clear enough for you to build your airplane without complications. If you found any errors, or procedures confusing, please e-mail us, we welcome your input and will do our best to improve any problem areas. (We are in the military and are greatly influenced by staring at Air Force technical manuals all day long).

Now, make sure you have plenty of rubber bands in your flight box, and lets go flying!

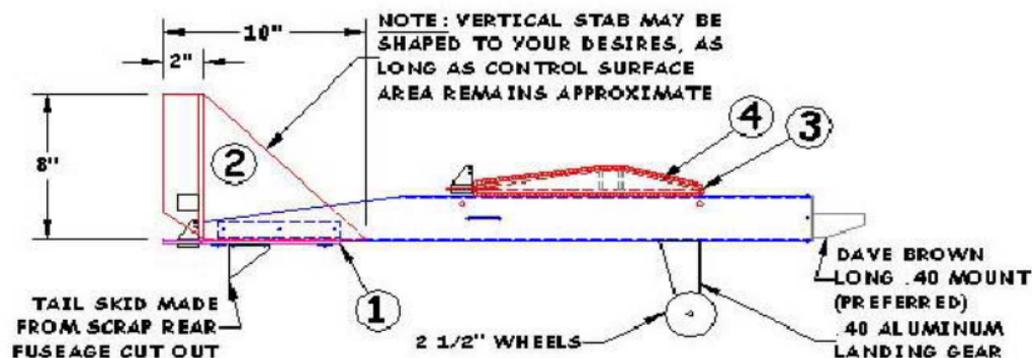
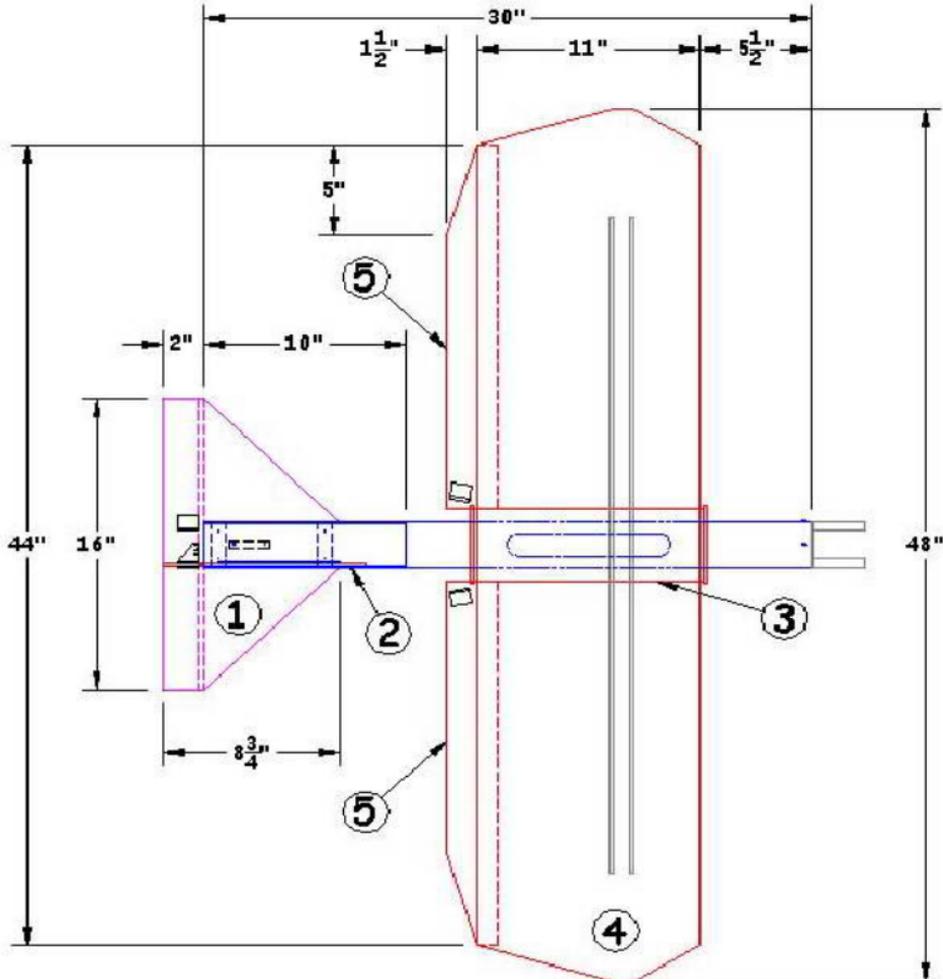
Flying the SPAD:

1. All procedures and dimensions we have presented in these instructions are tailored to flying your airplane with a .40 to .46 sized engine. We have however seen a SPAD sustain flight with a .15 sized engine, and fly like a guided missile with a .60 (We don't recommend this)! Your flight performance will be superb with a standard bushing engine, and be downright wild with a ball bearing engine.
2. Attach your wing with at least 6 #64 rubber bands on each side (12 total). Note: You may use scrap dowel inside the trailing edge corrugation of the wing center wrap to prevent Coroplast® crush.
3. Lets go over a few things before the first take off roll!
 - a. Assure you have range checked your radio.
 - b. Assure you have built the fuselage with the proper firewall down thrust.
 - c. Assure your elevator, rudder and ailerons are neutral, and have 1/2" to 3/4" travel each way (1' to 1 1/2" total) on the rudder and elevator, and 3/8" to 1/2" travel on the ailerons. Any more than that, and you better be pretty good!
 - d. Assure your airplane balances LEVEL at the forward wing spar or slightly NOSE HEAVY if you wish a little more forgiving flight performance. DO NOT ATTEMPT TO FLY YOUR SPAD TAIL HEAVY!!!
 - e. Assure the front of your wheels toe inward slightly, if they don't you may do some entertaining ground acrobatics!
4. Fuel up, turn on the radio, fire up the engine, tune to your satisfaction, and LET'S GO!
5. Line up into the wind, hold full up elevator, and SLOWLY advance the throttle to begin a conservative take off roll.
6. When you are comfortable that your airplane is tracking straight, and you have built up a little ground speed, let up on the elevator, advance the throttle, let the tail come up, pull back, and you will jump into the air all within about ten feet! Note: Your airplane may attempt to torque roll slightly to the left on take off, be ready for it with a little right rudder.
7. Trim your airplane for straight and level hands off flight, and then have a ball!

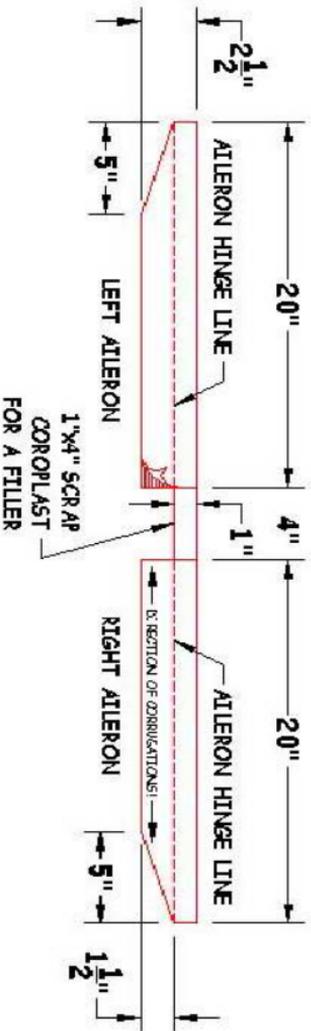
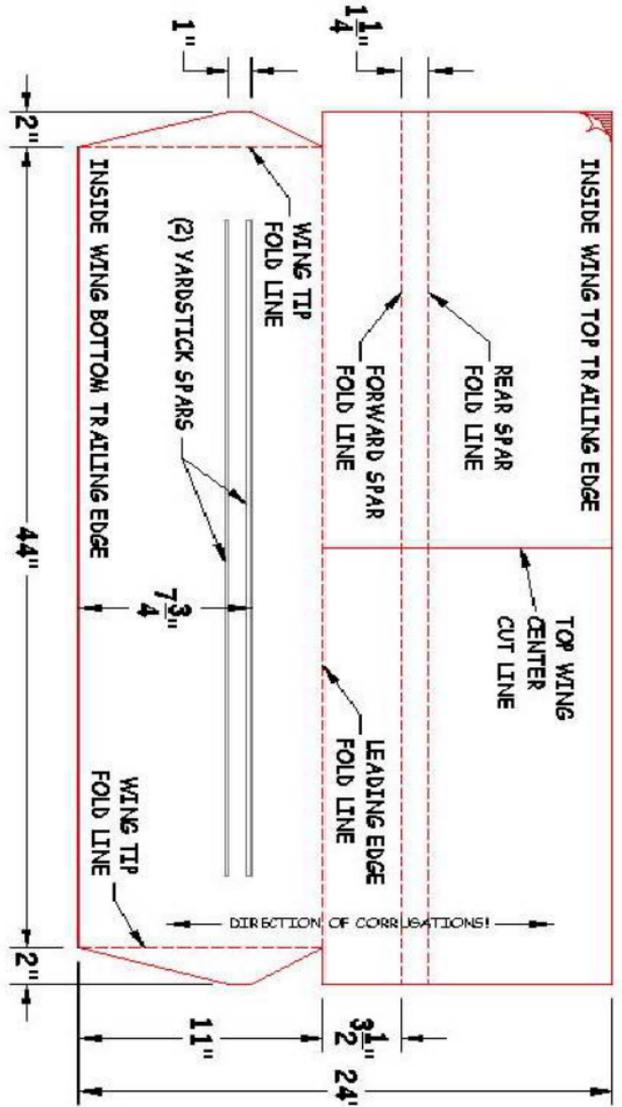
8. The SPAD will do almost anything you tell it to, and do it quick and tight. We do NOT recommend inverted flight or "outside" type aerobatics unless you are a very experienced pilot! Make sure you have plenty of altitude to bail out, while learning the inverted characteristics of your airplane.
9. Your SPAD will remain stable and hang on the elevator beautifully during slow flight and landing. With it's long wing chord, the SPAD will fly like a kite against a 10 mph+ wind! Keep in mind that the SPAD has quite a high drag front profile, and will slow down fairly quickly when throttled back or dead stick. If you're an experienced pilot, the SPAD will perform a truly wild carrier landing! Just remember when you're back on the ground, hold full up while taxiing.

We hope you have as much fun with your SPAD as we have with ours!

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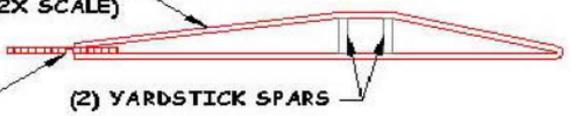


48" 24"



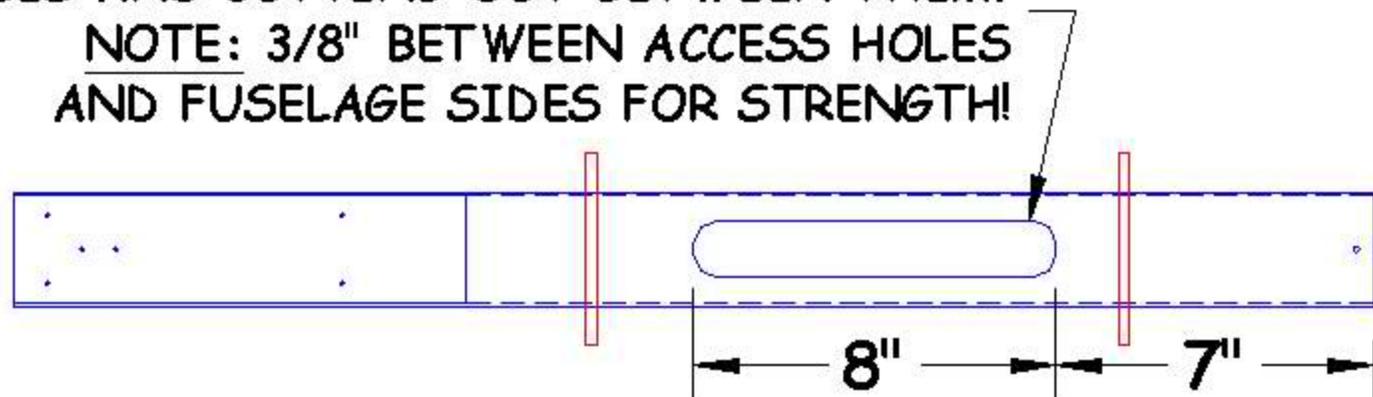
ASSEMBLED WING PROFILE (2X SCALE)

HINGE CREATED BY CUTTING AWAY BOTTOM OF A CORRUGATION

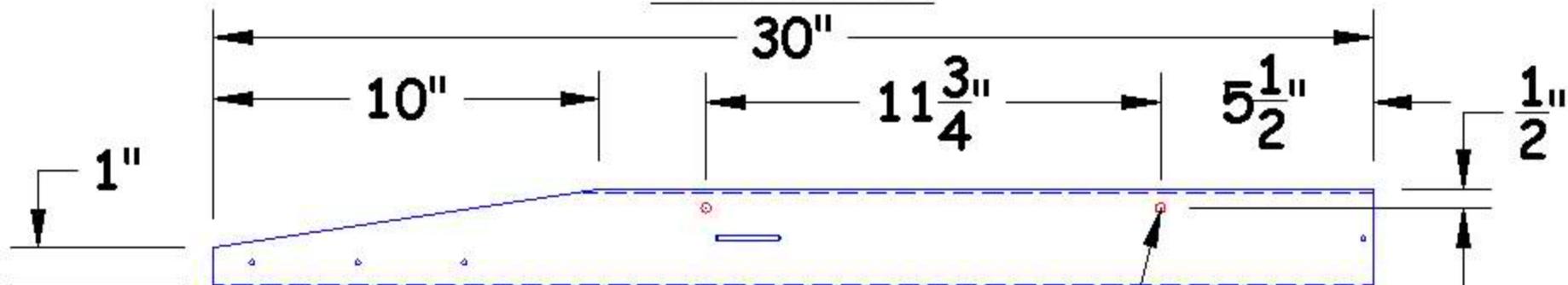


RADIO ACCESS HOLE MADE BY DRILLING FOR 1/4" HOLES AND CUTTING OUT BETWEEN THEM.

NOTE: 3/8" BETWEEN ACCESS HOLES AND FUSELAGE SIDES FOR STRENGTH!

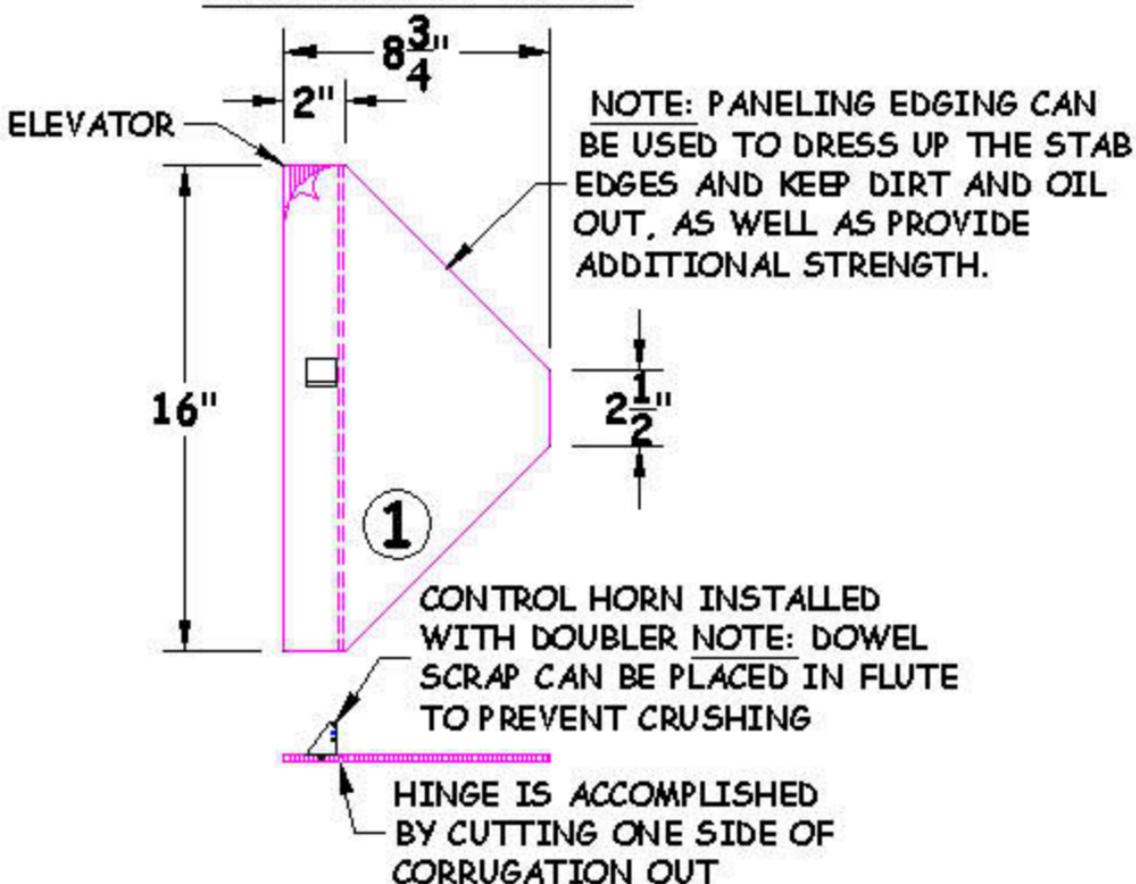


FUSELAGE

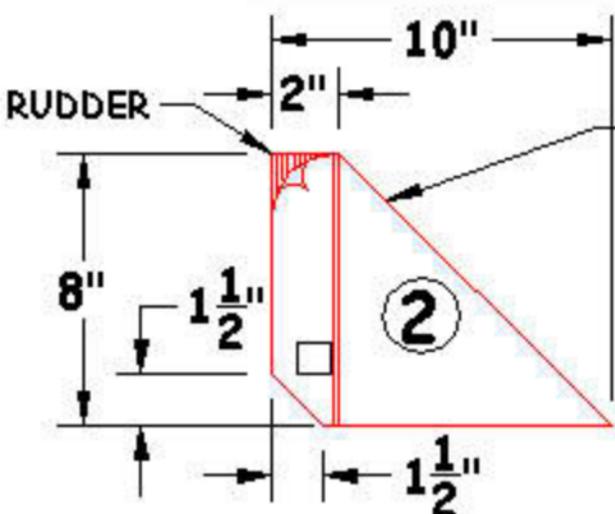


1/4" x 4" WING HOLD
DOWN DOWELS 1/2" FROM
DOWEL TO FUSELAGE TOP

HORIZONTAL STAB

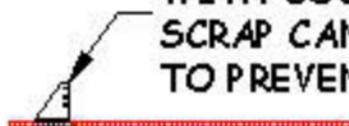


VERTICAL STAB



NOTE: PANELING EDGING CAN BE USED TO DRESS UP THE STAB EDGES AND KEEP DIRT AND OIL OUT, AS WELL AS PROVIDE ADDITIONAL STRENGTH.

CONTROL HORN INSTALLED WITH DOUBLER NOTE: DOWEL SCRAP CAN BE PLACED IN FLUTE TO PREVENT CRUSHING



HINGE IS ACCOMPLISHED BY CUTTING ONE SIDE OF CORRUGATION OUT

IF FRONT HOLD DOWN
DOWEL INTERFERES WITH
THROTTLE SERVO MAY BE
INSTALLED ON IT SIDE
FOR PROPER CLEARANCE

BATTERY PACK PLACEMENT
NOT SPECIFIC CAN BE
MOVED FOR BALANCE

SWITCH

ELEVATOR SERVO
FOAM TAPED TO FUSELAGE
AND ZIP TIE TO FUSELAGE

WOOD PUSHRODS
(YARDSTICKS SCRAPS
CAN BE USED TOO)

NOTE: WOOD PUSHRODS
NEED TO BE FUEL PROOFED!

TYPICAL .40 SIZE ENGINE MOUNT
DAVE BROWN 40 LONG PREFERRED
3/4" PLYWOOD FIREWALL
OPTIONAL "STEPPED"
6oz FUEL TANK RUBBER
BANDED TO YARD STICK USE
FOAM BETWEEN TANK AND
YARD STICK (GREAT PLANES
OR THUNDER TIGER FIT BEST)
THROTTLE SERVO
ZIP TIED TO YARD STICK

POWER PACK
7" PIECE OF YARD
STICK GLUED TO
BOTTOM OF FIREWALL

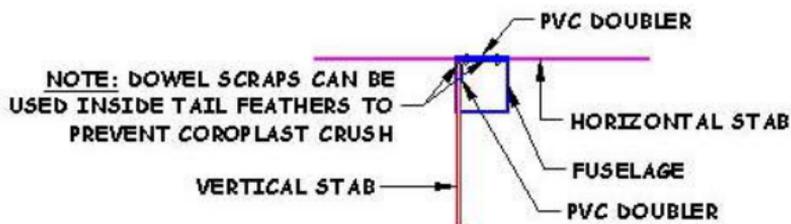
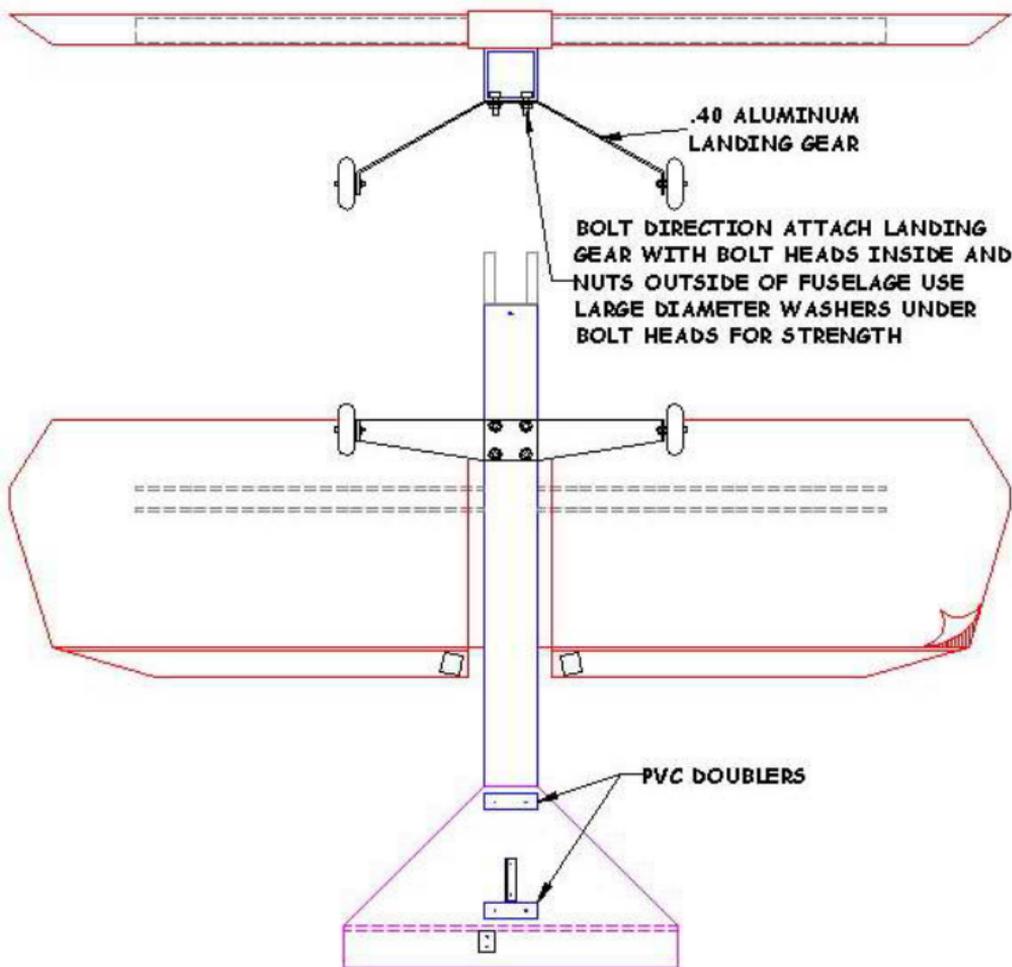
1/2" STAND OFF
YARD STICK SCRAP

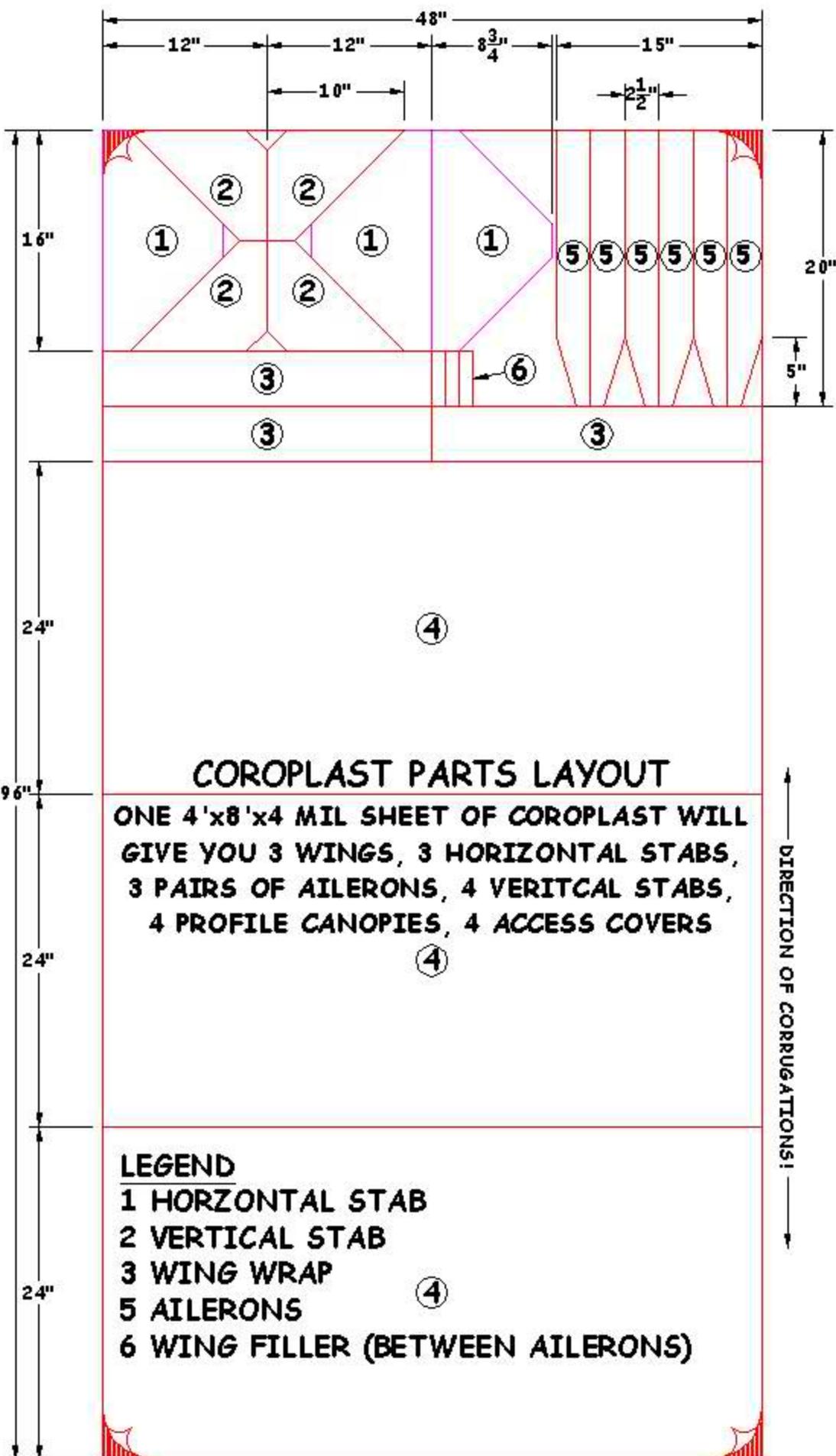
RECEIVER PLACEMENT
NOT SPECIFIC CAN BE
MOVED FOR BALANCE

RUDDER SERVO
FOAM TAPE TO FUSELAGE
AND ZIP TIE TO FUSELAGE

NOTE: MOUNT ENGINE AND RADIO GEAR
AS FAR FORWARD AS POSSIBLE, THIS
AIRPLANE CANNOT BE TAIL HEAVY!

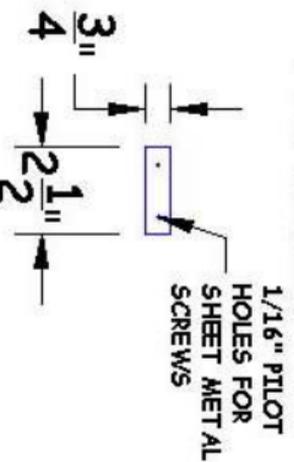
7"





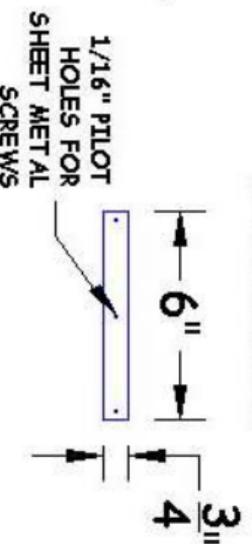
HORIZONTAL STAB DOUBLERS

PVC SCRAP



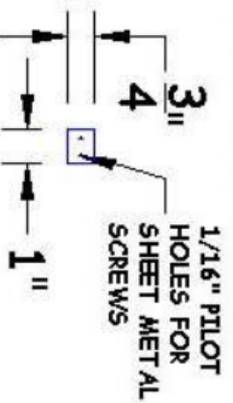
VERTICAL STAB DOUBLERS

PVC SCRAP



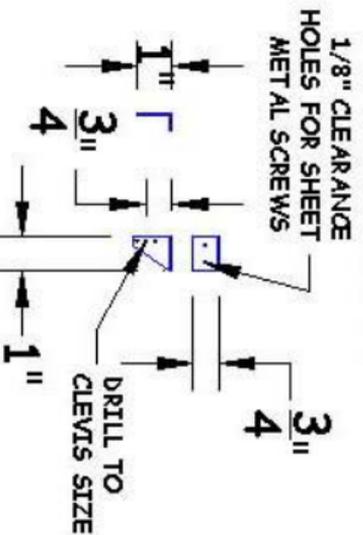
CONTROL HORN

PVC SCRAP



CONTROL HORN

PVC SCRAP



TAIL SKID

PVC SCRAP

