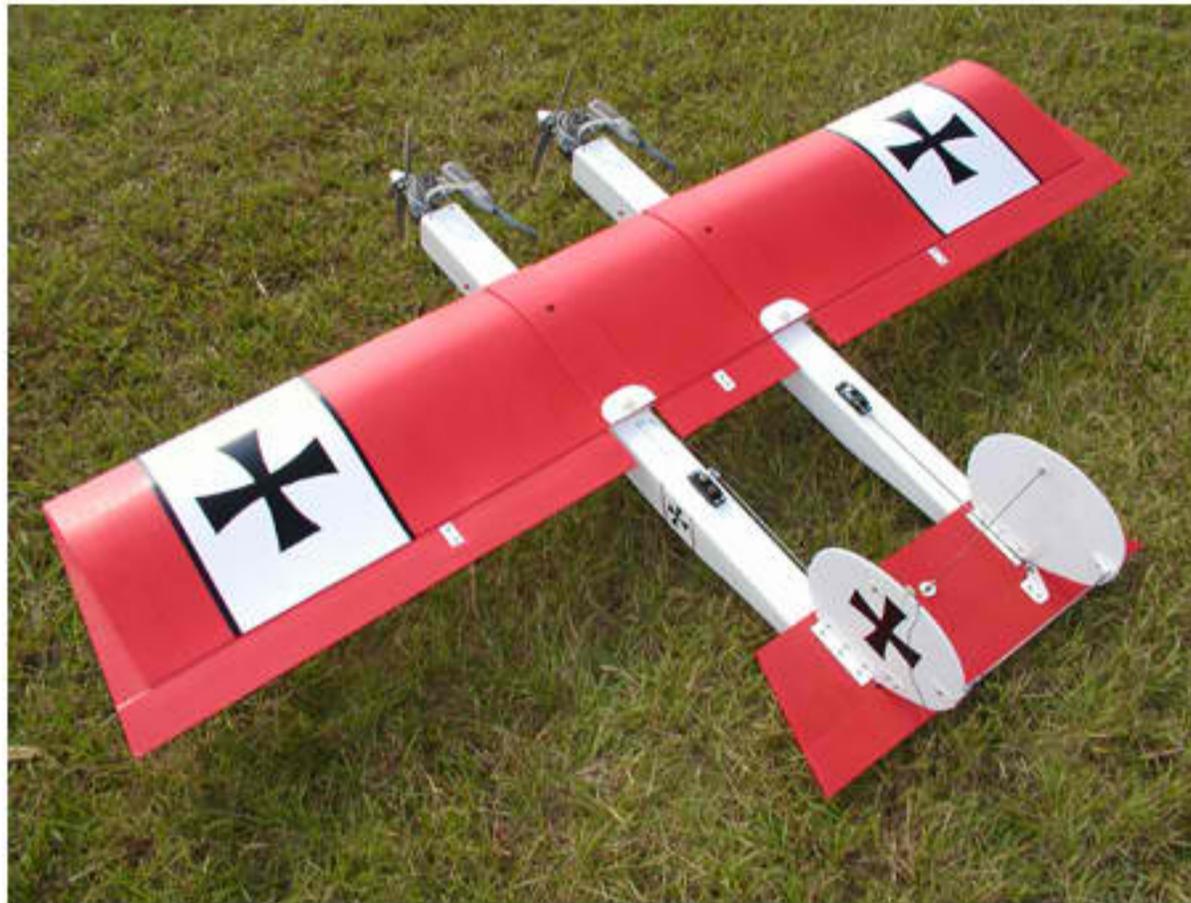


TWIN DPS



BY CRAIG CHASTNEY

Type: Twin Sport
Wingspan: 64"
Chord: 14"
Fuselage(s) Length: 36"
Weight: 8.5 lbs.
Wingloading: 21.2 oz./ sq. ft.
Engine: 2 .30-.46 2c or equivalent 4c

This design, by Craig Chastney, was spotted at Spadfest 2004 and drew attention for its incredibly stable and strong performance, not to mention the skill and grace of the pilot! The following plans are not really plans in the strict sense, but more of a brief overview with pictures and measurements for reference purposes. This is by no means an appropriate choice for a first Spad, as it is assumed that the builder already has a fair amount of Spad building experience. However, it is very simple construction-wise and is based on the tried and true design, the DPS or DasPlaStick. In about the time it takes to build a couple of standard DPS's, this great looking and great flying twin can be yours. In other words, a few hours.



Photo1

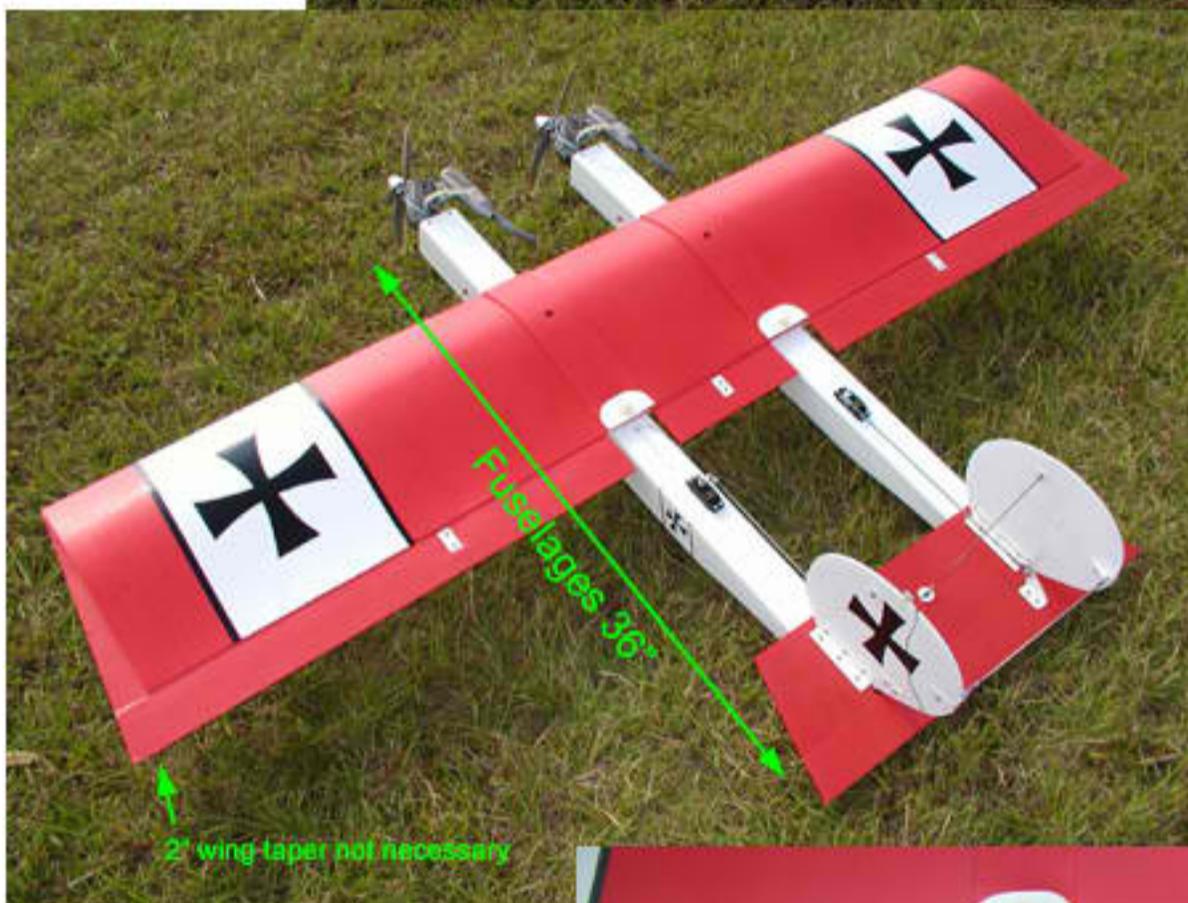
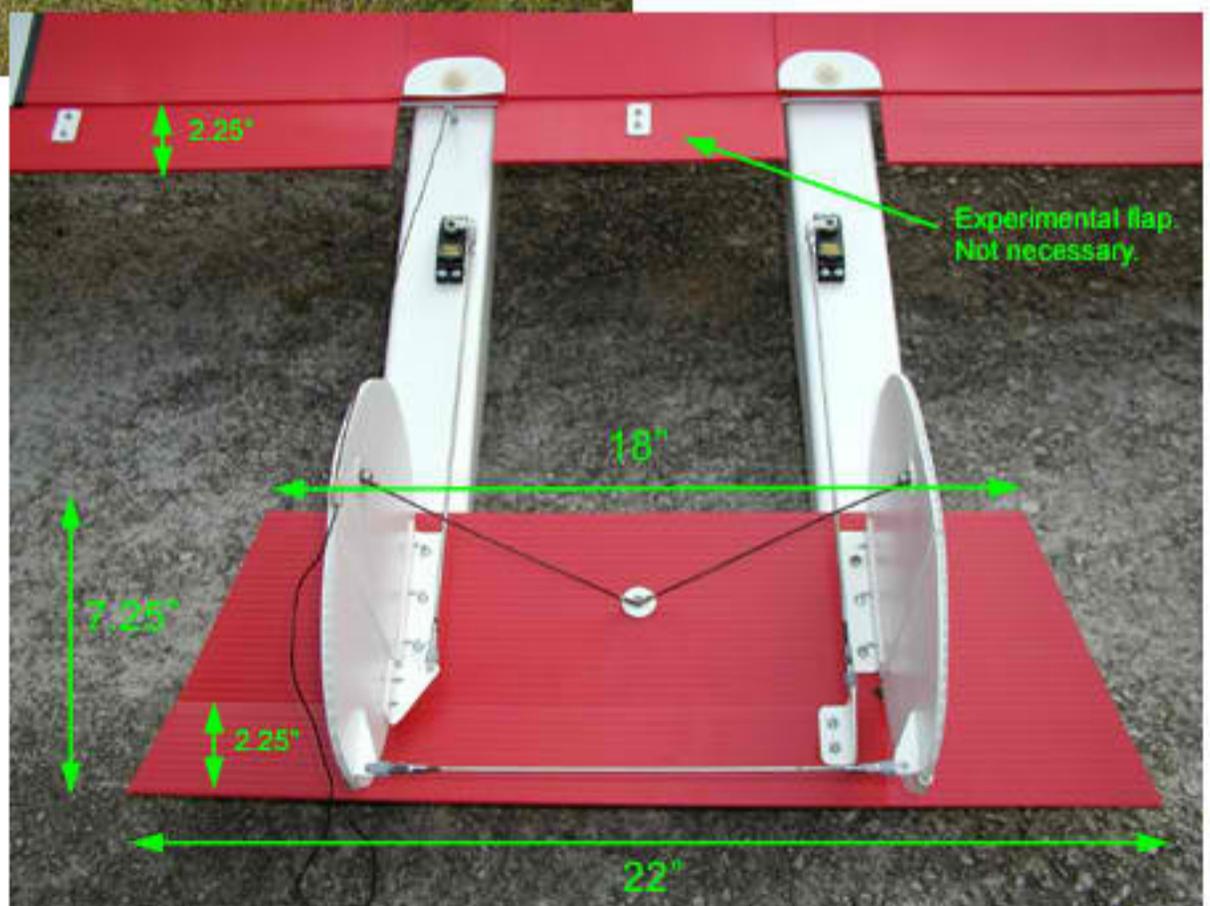


Photo2

Photo3



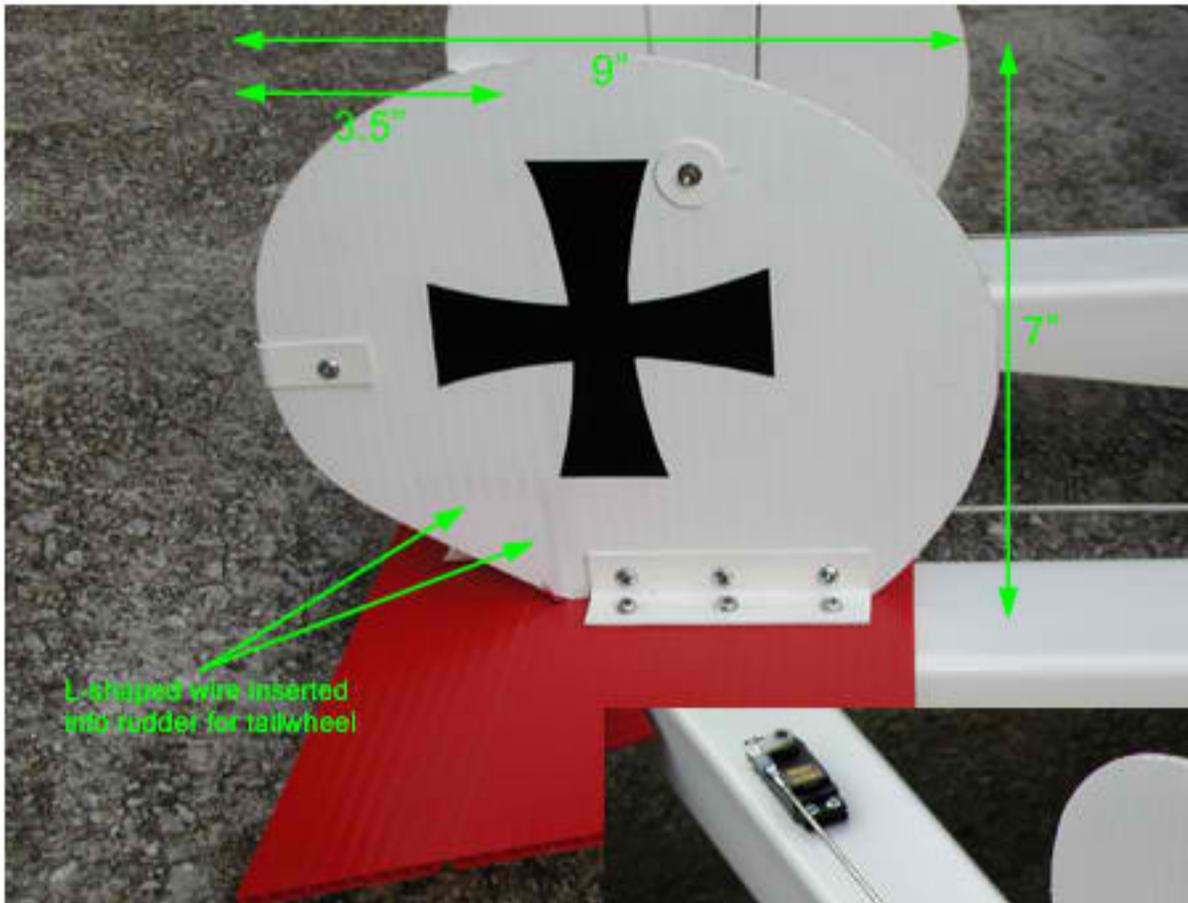


Photo4



Photo5



Photo7

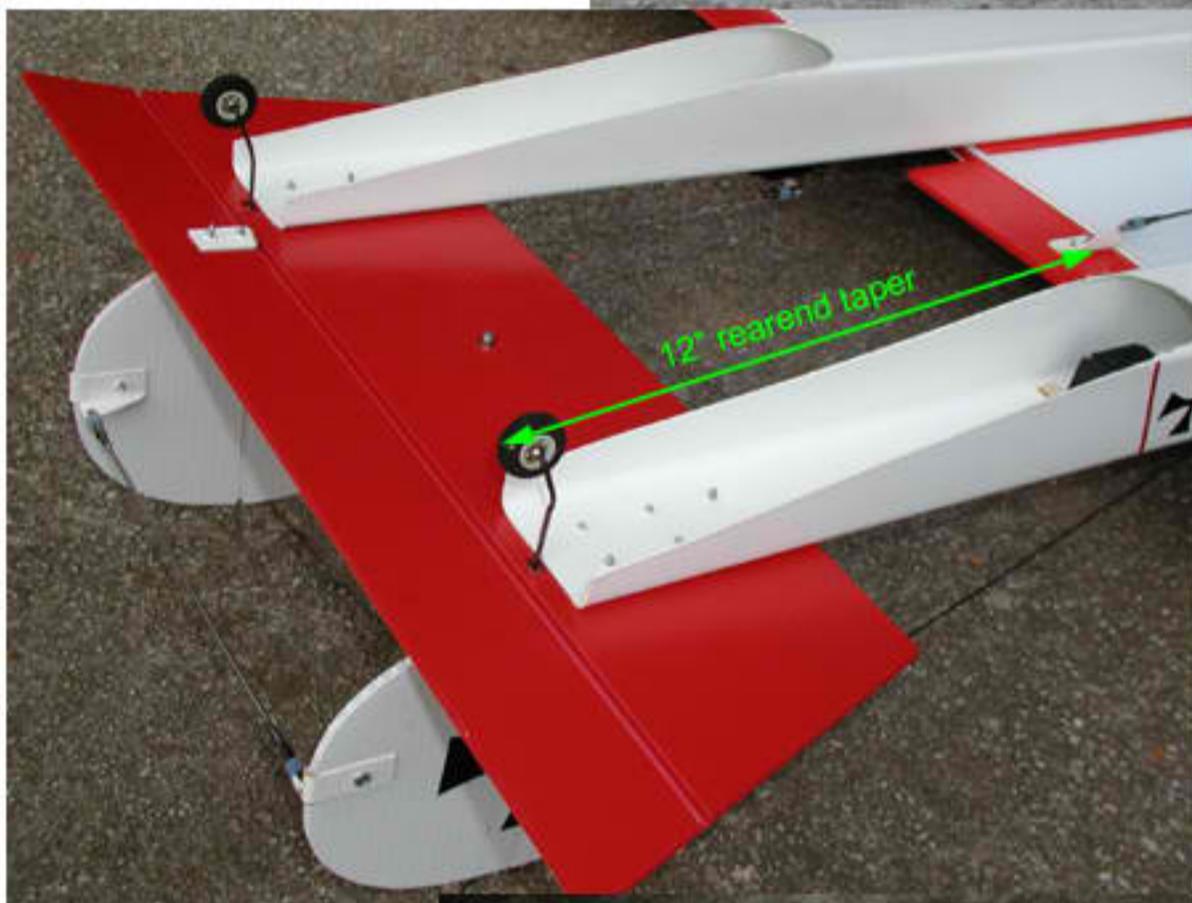


Photo8

Photo9



Photo10



Photo11

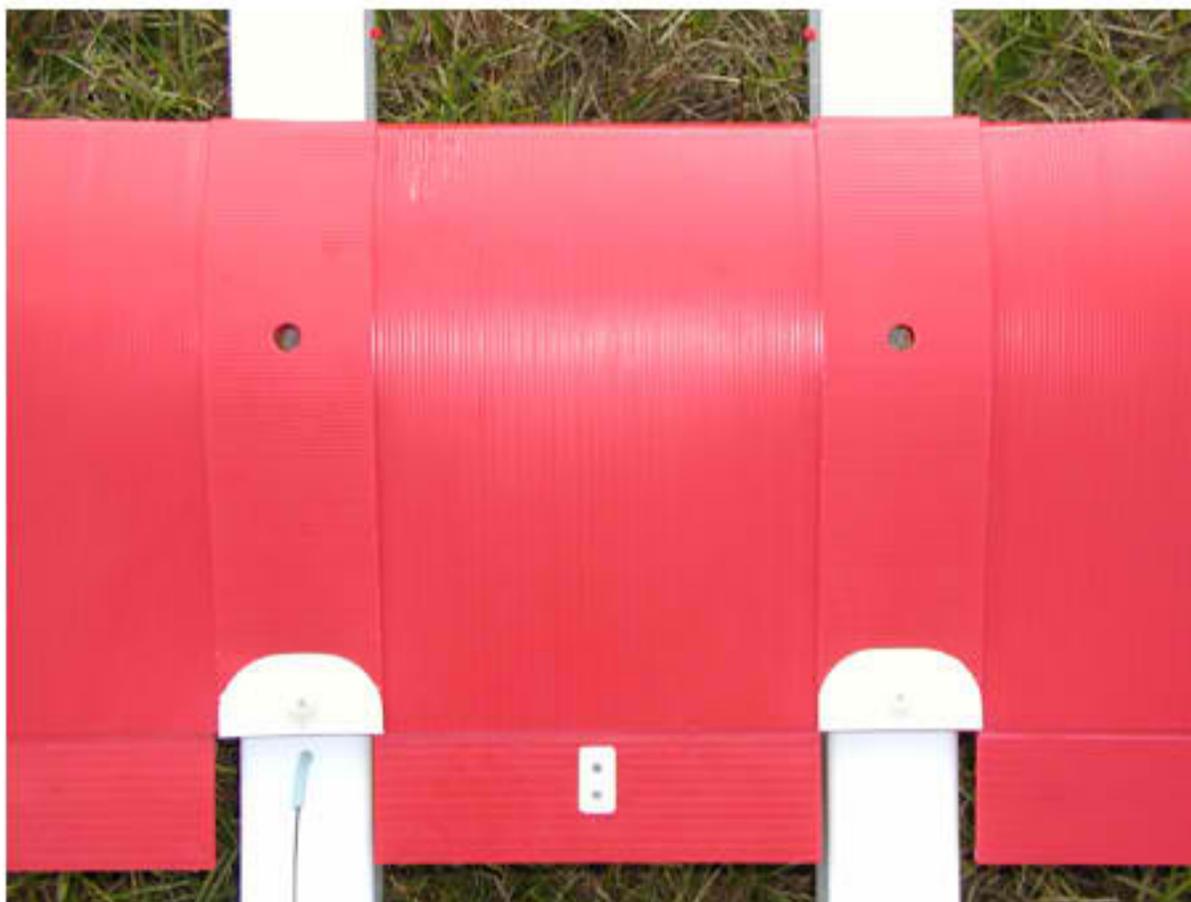


Photo12

Photo13



Twin DPS in flight

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Twin DPS

by Craig Chastney

I always wanted a twin...in fact I have two balsa scratch built twins each about 75% complete hanging in my basement. Funny thing is you never see a twin at our field for more than 2 or 3 times....then you never see them or hear about them again. They seem to have a high mortality rate and decided not to jeopardize my hours and hours of labor. And then came SPADs! I decided I would spend a few evenings creating a Twin Spad. My first twin was modeled after a P-38 since I wanted a tricycle gear. The nose gear would be mounted on the front of the center fuse and the motors on each of the two outer fuses.

I called it a C-38 as in "C"oro - 38. I must say it was not much to look at up close....but in the air it looked and sounded great. I flew it at Spadfest 2003 and has been subject of several posts.

I started out with a pair of inexpensive bushed .40's which I could not keep both of them running at the same time for any length of time. Not a good thing for a twin...you don't need to be a rocket scientist to learn this quickly. Since the twin was built around a pair of light weight .40's and I wanted more reliable engines I opted for a pair of OS .32s...one (actually two) less things to worry about. With a 68" wingspan it was not fast...maybe more realistic. Not much vertical performance but you could coax it to do basic pattern maneuvers....and could even knife edge...well maybe a banana shaped knife edge.

I must say the C-38 was a success. The only drawbacks were the wide motor separation (asymmetrical thrust), short coupled and heavy. After several hundred flights it has been retired to build a second twin...using the same engines...longer fuse, engine centerlines as close as possible and reduced weight.

After a few sketches it was a toss between a P-82 (Twin P-51 Mustang) or a twin Ugly Stick. The twin fuse arrangement gives you the least dimension between engine centerlines to minimize asymmetrical thrust. The only thing better would be with the engines in line...such as a push pull arrangement...but that will be another project. I didn't like the idea of a low (tapered) wing tail dragger so I decided on the Ugly Stick format. What is uglier than an Ugly Stick...you guessed it a Twin Ugly Stick...in fact it is twice as ugly. I have called it Twice as Ugly - Stick, Double DPS and finally Twin DPS as it is known today. A little trivia....I was the one who submitted the name Das Plas Stick (DPS) when they were searching for a name on the SPAD forum.

The TDPS is also a success. The construction is much simpler and flies much better. The only step backwards is the ground handling. But everyone needs to learn how to use the left stick...even on the ground.

I realize the engine of choice is probably a .40 or .46 and not the .32's I used. Just adjust the wing location on the fuse to suit the CG and separate the centerline of fuse's to suit the largest diameter prop (plus 1") and it will work just fine. You might however consider increasing the wing another 6" and the fuses another 2".

It is your typical, straightforward SPAD construction. The only innovative feature is the nylon bolt wing hold-down (note: download the .pdf file for a hand drawn sketch of the nylon bolt setup if you decide to do it this way as well). I do not like the looks of rubber banded wings....they serve a purpose but just don't look refined. Hmm....SPAD....refined...is that a dichotomy or what?

If you are considering building this, I suspect you have constructed more than one SPAD to date. The basic construction is similar to the DPS...only that the fuse is inverted... that is the taper is on the

bottom and the flat on the top...as I like the looks of the vertical stab and rudder on the center line of the fuse. Don't get me wrong...the DPS style (offset) tail will work as well, it's your choice.

The following dimensions are based on my OS .32 version presently flying:

Fuselages

The dimension between centerline of the fuse's is set based on the largest diameter propeller you intend to use plus 1" (see Photo 10). With my .32's I use a 10" propeller so the centerline of my fuses are 11" apart. Each fuse is 36" long with a 12" taper on the bottom (see Photo 2 and Photo 8).

Wing

My wing (airfoil section) is 64" long, RNAF style...that is 4 mm Coro bottom and 2mm Coro top (see Photo 1). With the 2" tapered wing tips at each end the overall wingspan is 68" long (if you forego the taper, your wingspan will then be 64"). The wing is made in two panels of different lengths with the joint falling on the centerline of one fuse. I wrapped the wing at each fuse with 2 mm Coro for that more refined look (ie hide the joint). The wing chord is 14" wide which includes 2-1/4" wide ailerons. I used a double yardstick spar that is two yardsticks separated by 1" scrap yardstick spaces...similar construction to the Debonair (except no dihedral, see Photo 7). Use 6" long yardstick doublers overlapping the center joint on each spar. The CG is on the forward yardstick spar which is 3-1/2" from the leading edge or at 25% of the chord (includes ailerons). To experiment with flaps, I hinged the "aileron" section between the fuses and create a single flap.

Wing Hold-Down

The wing hold down is a 1/4" piece of plywood X 4" long epoxied to and between the yardstick spars at the bottom on the centerline of each fuse. I box these in with yardstick scraps at each end of the ply and use balsa (sorry about that) triangles for more connection strength. One bolt goes through the ply between the spars on the centerline of fuse. I use 1/4" nylon bolts. Cut a hole in the top wing skin and wrap to allow the head of the nylon bolt to pass. (In one of the pictures taken from the top shows the head of the nylon bolt in it's bolted position....the head of the nylon bolt screwed down against the plywood between the spars.) Four (4) nylon bolts in total....one on the centerline of each fuse between the spar and one on each centerline near the trailing edge. The rear bolt hold downs are reinforced with a scrap piece of PVC downspout plate glued to the upper wing skin. There is a corresponding piece of 1/4" plywood cleat on the top/inside of the PVC fuse in each of the nylon wing hold down bolt areas. The holes in the wings are drilled to allow easy insertion of the bolt while the fuse and fuse plywood is drilled and tapped. (again, download the .pdf file for a drawing of this arrangement)

Horizontal Stabilizer

The horizontal stabilizer is 7-1/4" wide (includes 2-1/4" wide elevator) by 22" long. The dimension across the front of the horizontal stabilizer is 18" while the rear measures 22" giving a 2" taper each end. A half circle is cut out of the horizontal stab to make room for the tail wheel wire movement (see Photo 3).

Vertical Stabilizers and Rudders

The vertical stabilizers are 9" long (includes 3-1/2" wide rudder) by 7" tall. I chose to make the rudders more oblong (vs round) in order to maximize the vertical stab and rudder area. I believe this proportion is more like the original Ugly Stick. The vertical and horizontal stabs are held in place with 3-1/2" long PVC angles, sheet metal screwed to the fuse (see Photos 4-6). I use one servo for both rudders and link the rudders together at the rear with a 4-40 pushrod wire and clevises. To connect the link to each rudder I made a wrap around control horn from scrap PVC. No need to go to this extreme a simple PVC horn will work just fine.

Tail Wheel

I use a tail wheel wire where the wire is bent 90 degrees and inserted perpendicular into the rudder. I slit the web of the Coro on the rudder to embed the vertical wire into the first flute....spread the slit apart and use hot glue gun to glue the wire into the hollow area of the flute. If you look close at the pictures you can see a vertical dark line in the first flute of the rudder and then bends 90 degrees horizontally into the rudder....just above the control horn....this is the tail wheel wire (see Photo 4).

Landing Gear

I make all my landing gears out of structural aluminum flat bar. In this case I used 1/8" X 1" structural aluminum flat bar (overall length before bending is 31-1/2"). Two sources I have used in the past for aluminum flat bar are:

- www.aircraft-spruce.com
- www.onlinemetals.com

As with most tail draggers...the main gear is located so the wheel axles are in line with the leading edge of the wing. I use two (2) - 1/4" nylon bolts drilled and tapped into a plywood cleat inside each fuse to hold the gear on.

Flying Wires

With such large vertical stabilizers and small PVC angle attachment to the fuse I added diagonal flying wires from the top of each rudder to the center of the horizontal stabilizer. These are made of music wire with high temperature solder connectors on each end. I use a scrap piece of PVC washer on each side of the Coro and bolt them in place (see Photo5).

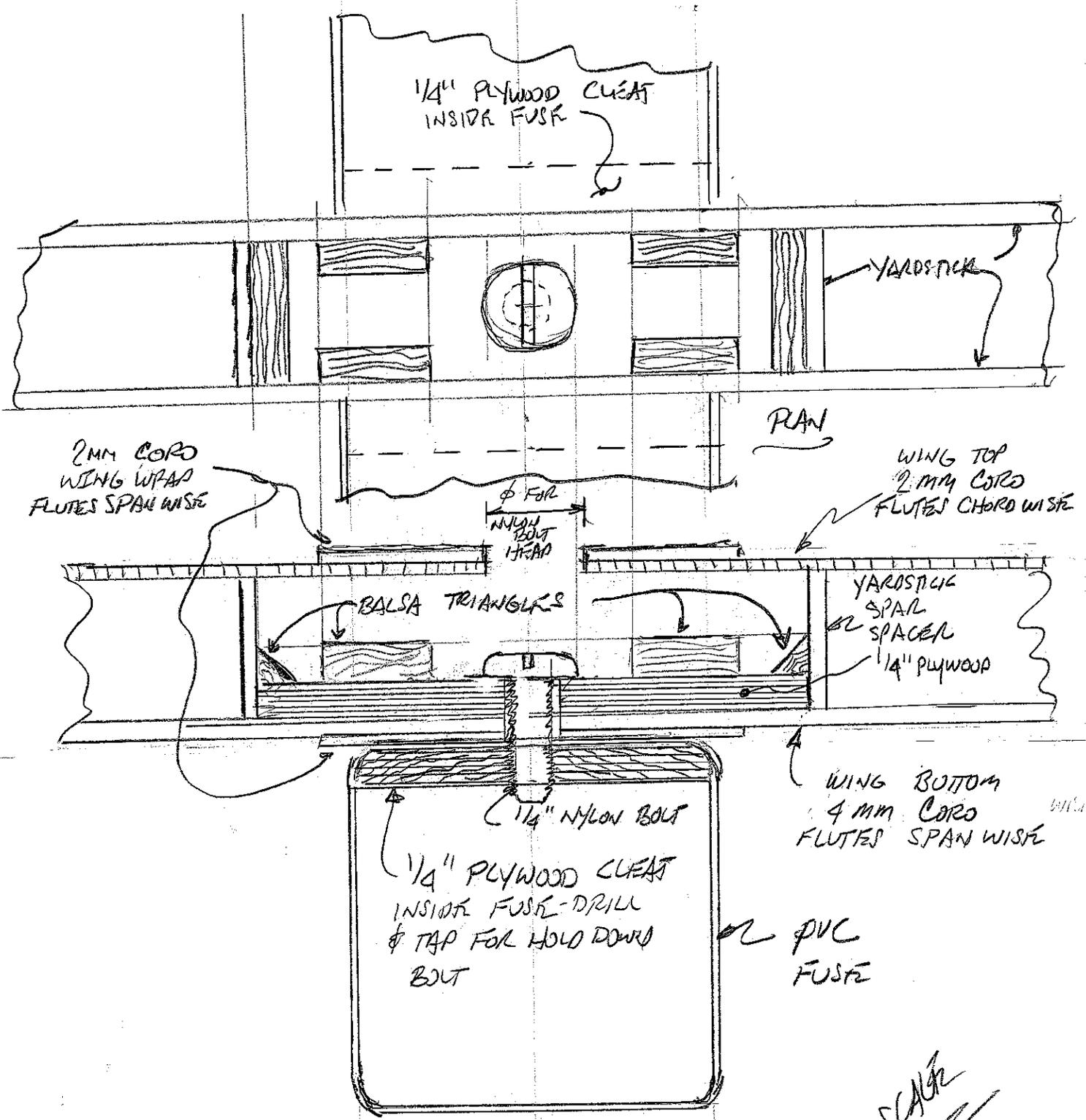
Comments

Although you will read varying recommendations concerning engine thrust angles to compensate for asymmetrical thrust in an engine out scenario....mine are at 0-0. I use a separate servo in each fuse with a Y connector for throttle control. I am not one to spend time fiddling; adjusting and fine tuning....I go to the field to fly not to tinker. Although I have a tachometer I rarely use it. I start one engine...lean it out...then richen it up. Start the second engine and slowly adjust it...audibly...to synchronize with the first. Once you've done this you will know what I mean. This is a great sound. Before taxiing, always point the nose up vertical and check to make sure it is not too lean. With minimal throws it flies like a trainer. With maximum throws it can do most pattern maneuvers. I hope you enjoy yours as much as I have mine.

SPADS take a lot of grief and anxiety (as in time and money) out of flying. If it were not for SPADS I probably would not have attempted to fly a twin-engine model!

-Craig Chastney

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ELEVATION / SECTION
THRU FUSE

NYLON WING BOLT ATTACHMENTS
FOR TOPS

~~NOT TO SCALE~~
C.A. CHASTNEY