PFALZ DVII/DVIII 35 1/4"
R/C Scale Model Instructions

Designed by M.K. Bengtson
Prototype By: Frank Jaerschky

Manufactured and Distributed by:
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www.aerodromerc.com

PFALZ DVII/DVIII 35 1/4"

Thank you for buying the AerodromeRC Pfalz DVII/DVIII 35.25" laser cut short kit for electric flight.

THE MODEL

A semi scale adaptation of the Pfalz DVII/DVIII, this model is designed to be easy to build and exciting to fly.

MODEL SPECIFICATIONS

Over 460 Laser Cut Parts

Scale:	1/8th
Prop:	11x6
Channels:	R/E/A/T
Weight:	~29 oz
Wheels:	Balsa & plywood, Neoprene foam tires
Airfoil Type:	Scale Undercambered
Wing Area:	378 sq in
Wing Span:	35 1/4"
Cowl:	Built up Laser cut balsa and Plywood
Power System:	AXI 2217/20
Designer:	M.K. Bengtson
Prototype By:	Frank Jaerschky

BUILDING THE MODEL

The following is taken from Frank's build thread on AerodromeRC's discussion forum at:

http://www.aerodromerc.com/cgi-bin/yabb2/YaBB.pl?num=1276055570/0

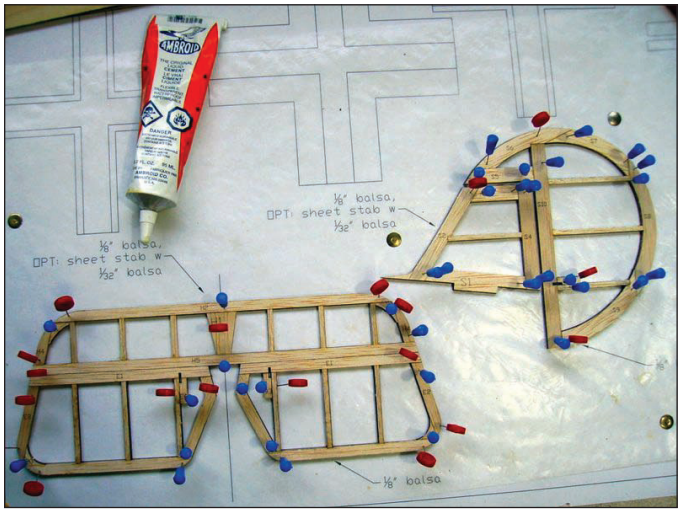
I am pleased to announce the prototype build of AerodromeR/C's 1:8 scale Pfalz D.VII. This model may also be built as a D.VIII, the only difference being an extra set of interplane struts on the D.VIII. Feeling somewhat lazy, I will likely opt for the D.VII. Wingspan is 35.25" with an area of 378 sq inches.

This is indeed a rare bird, and when Kay initially offered it to me as a build I said "a what?" I had never heard of it before. It certainly will stand out from the Fokker D.VIIs and the Dr.1s.

I love the fact that Kay has designed this model with an undercambered airfoil. I absolutely love the way my C.III and Gotha G.IV fly with their undercambered wings, and am looking forward to the same from the Pfalz.

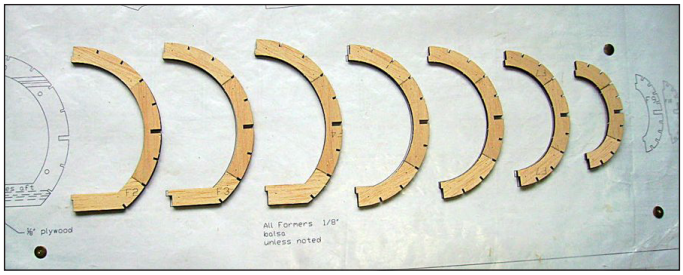
TAIL FEATHERS

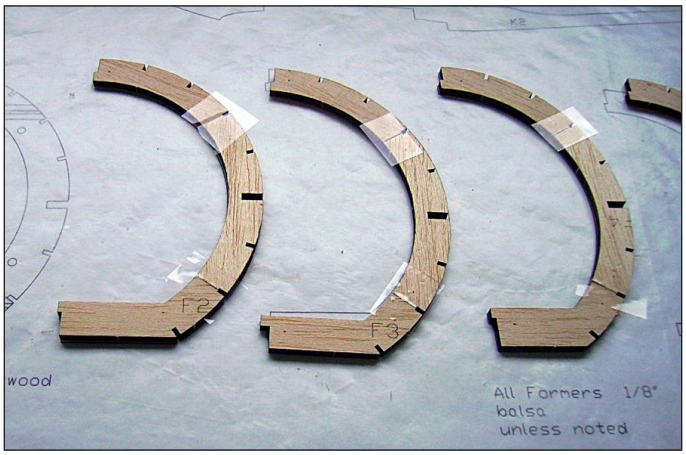
I made a good start tonight with the tail feathers

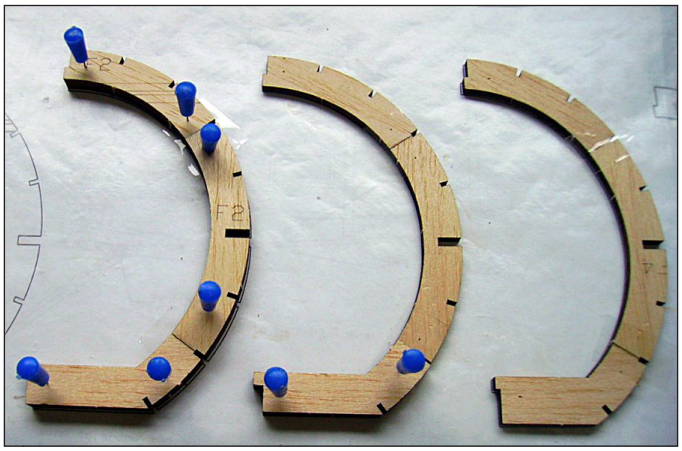


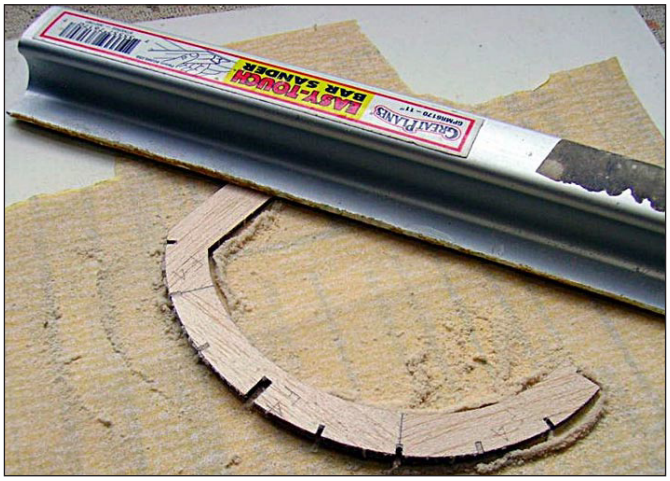
I started on the formers. The formers are 1/8" balsa and must be assembled over the plans. The fuselage is keel and half former construction, so make sure you don't make complete formers!

I carefully assembled one half of each former over the plans. Then I applied a small piece of packing tape over the area of each glue joint, and then assembled the other half directly over top of the first half. The tape keeps from gluing the two halves together. This ensures that both halves are identical. After the glue is dry, I gave each half a light sanding to make sure they are all flat.

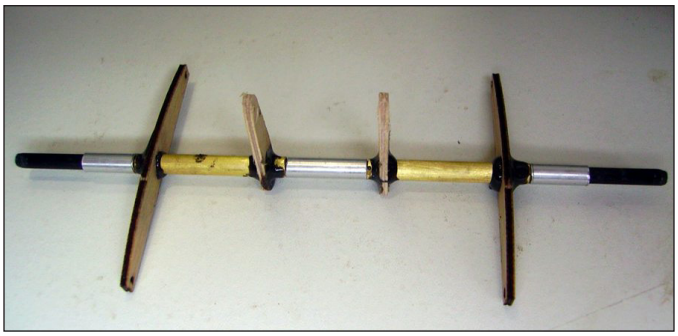


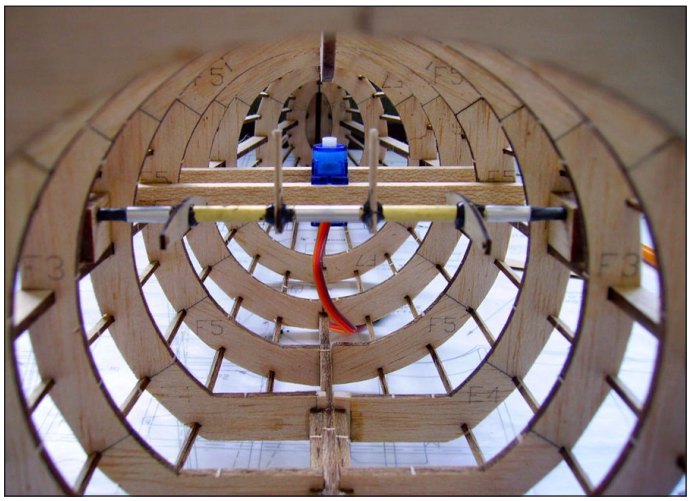






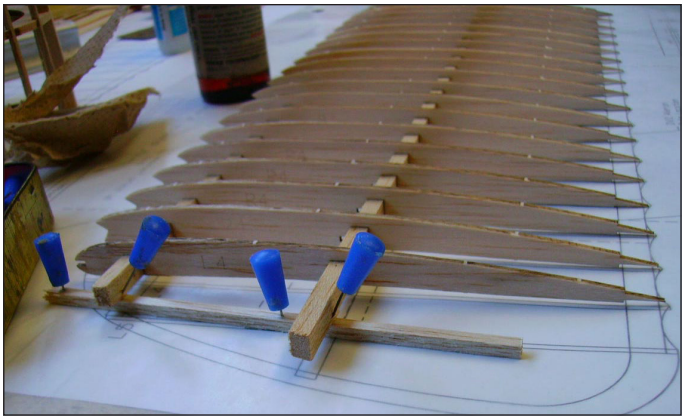
The aileron pull-pull cable layout is scale. With the thin undercambered airfoil, there really is no option to bury a servo in the wing, as it is just too thin. So the aileron servo sits in the fuselage, and drives a system of bellcranks to which the pull pull cables are attached.



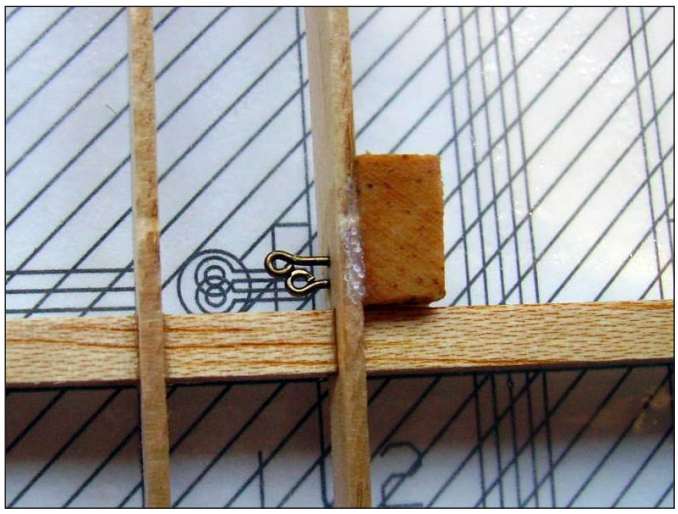


WINGS

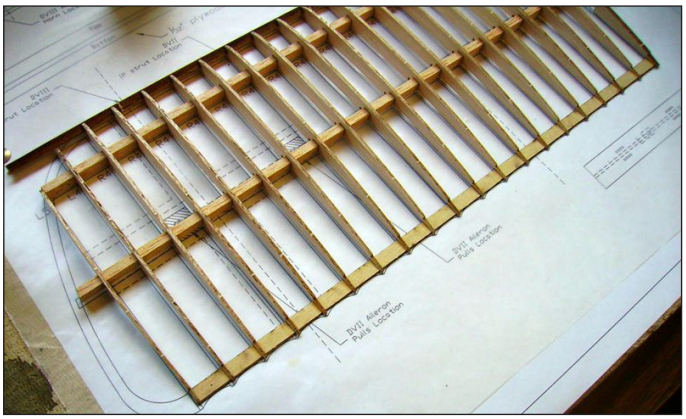
Because the ribs are undercambered, the wing can't be built flat on the board. I packed both spars up with some 1/8" balsa stock. Then each rib was carefully set in place over the plan, and secured with thin CA.



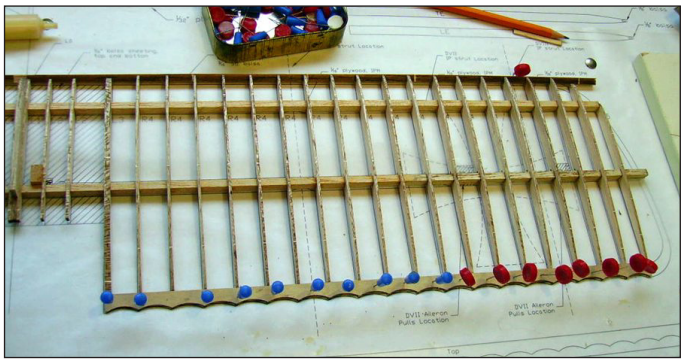
Aileron cable guides are made from small fish hooks. I cut the hook part off, then straitened the shaft. Try and leave the barbs on the shaft, they really help hold in the balsa. I used some 1/4" stock on the ribs to add some meat. Careful when working with the fish hooks! They are very sharp, and have a tendency to snap when straightening, shooting sharp shards of metal at a respectable velocity. I took one piece just above my right eye, and from then on in it was safety glasses on when working with these things!



Lower and upper trailing edges are laser cut 1/32" ply. Glue the bottom TE on first. When dry, sand the back of the ribs to an even taper with the lower TE, and then add the top TE.

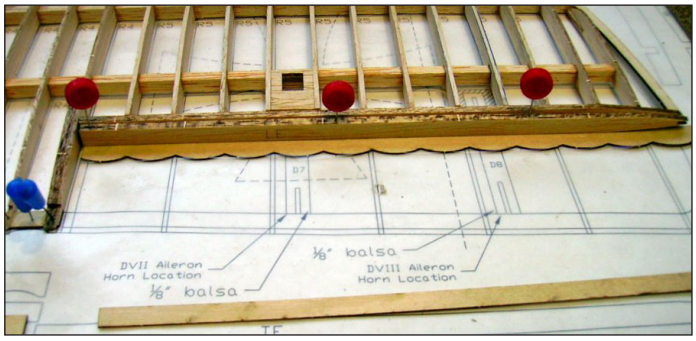


Top Wing

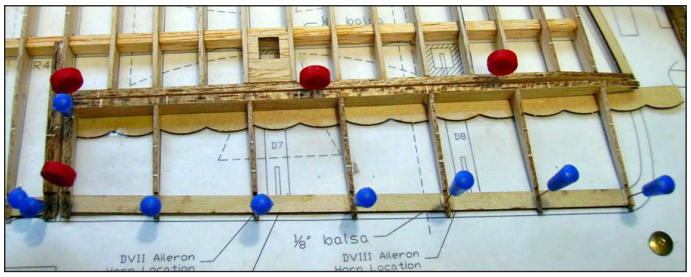


Some work on the top wing. Built just like the bottom wing.

Upper and lower trailing edges are all pre cut 1/32" ply. Everything fits great.

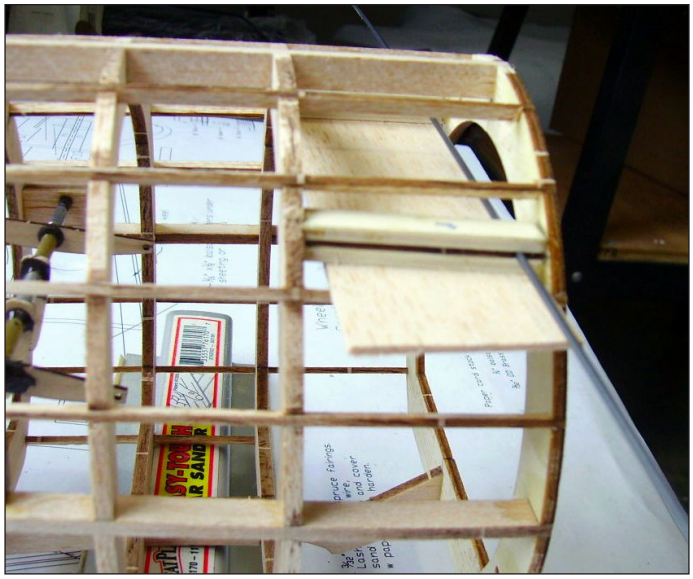


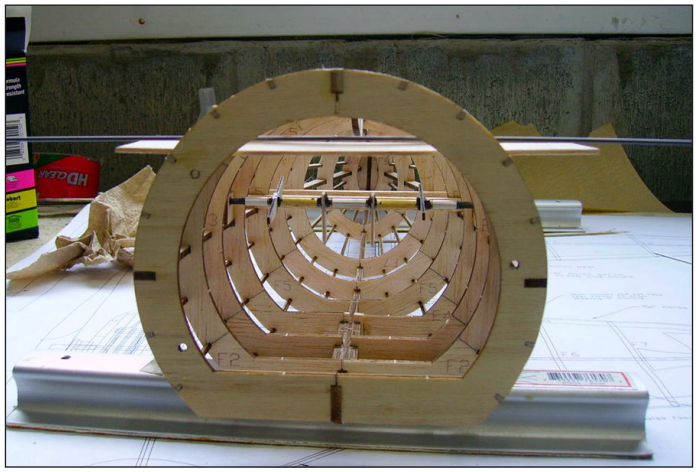
When building the ailerons, I suggest packing up the LE piece with some 1/32"ply before gluing the ribs to the LE. I covered the scrap ply with packing tape to keep the glue from sticking to it.



The cabane mounts in the fuselage are built up with laser cut pieces of 1/8" light ply and 1/16" ply. When assembling the mounts, use a scrap piece of 1/16" music wire to ensure that the gap through which the brass tube mount will pass is large enough.

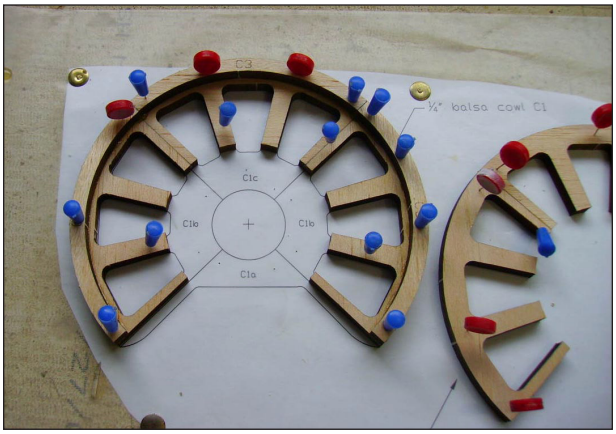
When gluing the mounts into place, I used a scrap of 1/16" balsa placed on top of the stringers to make sure the mounts are aligned properly. I also ran a piece of 1/16" music wire through both mounts to ensure alignment.

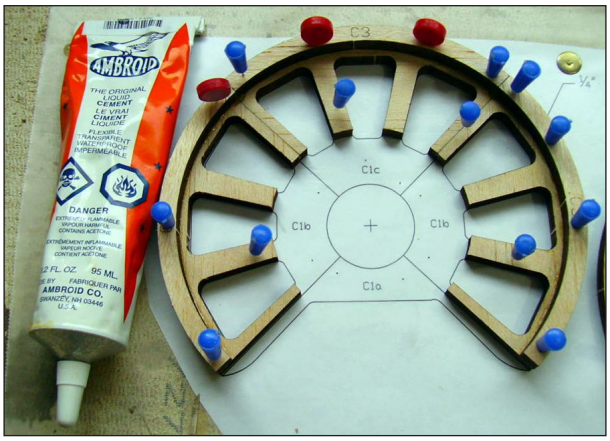




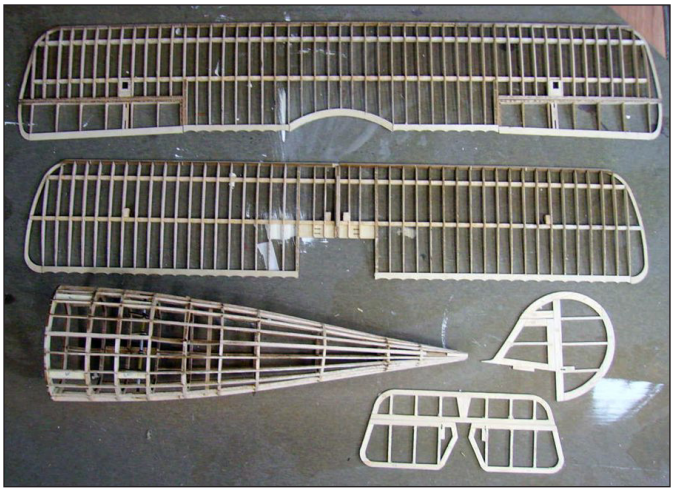
COWL

The cowl starts off by assembling the 1/4" sheet laser cut pieces over the plan. I highly recommend against using any form of CA adhesive when assembling the cowl. The balsa for the cowl is very soft, as it should be for light weight and easy carving and sanding. CA is very hard, and it will give you fits when trying to sand a smooth even surface later on. Regular yellow wood glue is a better choice and will work OK. But the best choice of all is Ambroid cement. When dry, it sands just like the balsa, so it will be much easier to get a smooth, even finish.



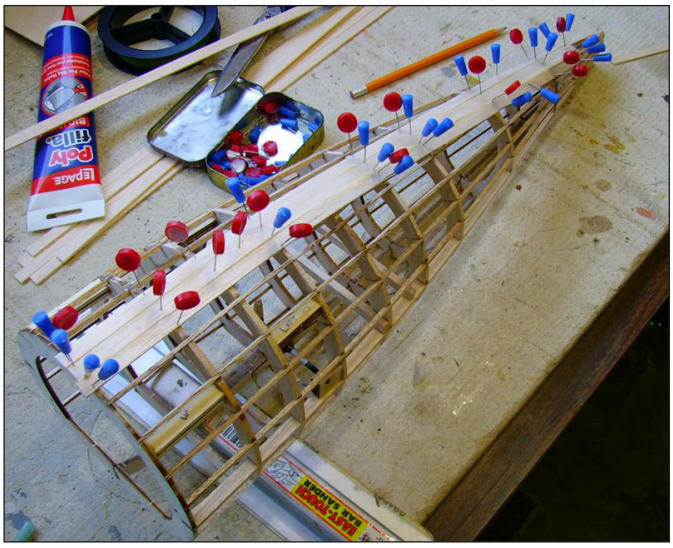


Finally, a photo of the major components to this point. Time to break out the sanding block. Oh, and sheet the fuselage, of course!



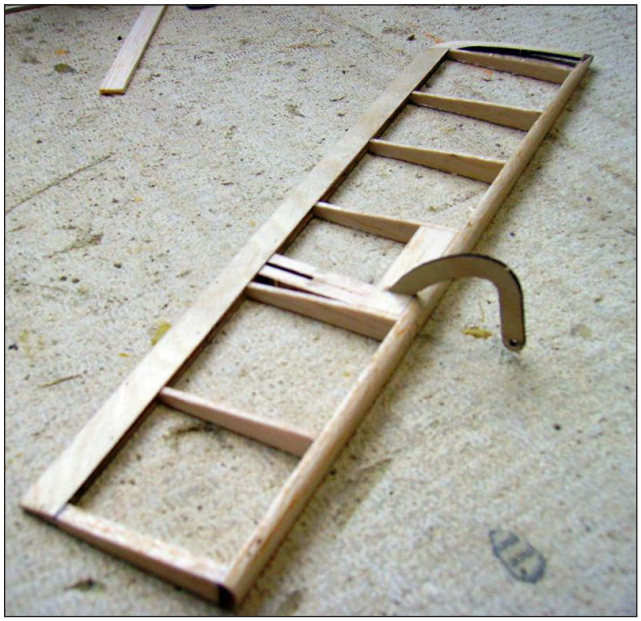
SHEETING THE FUSELAGE

Before starting to seal up the fuselage with planking, I tied small loops of control cable through the control arms. It would otherwise be tricky to attach the aileron cables from the bottom wing. My plan is to attach small hooks to the ends of the cables where they come out of the lower wing inside the fuselage, and then just hook them on to the loops. All this will need to be done through the open front.



Ailerons

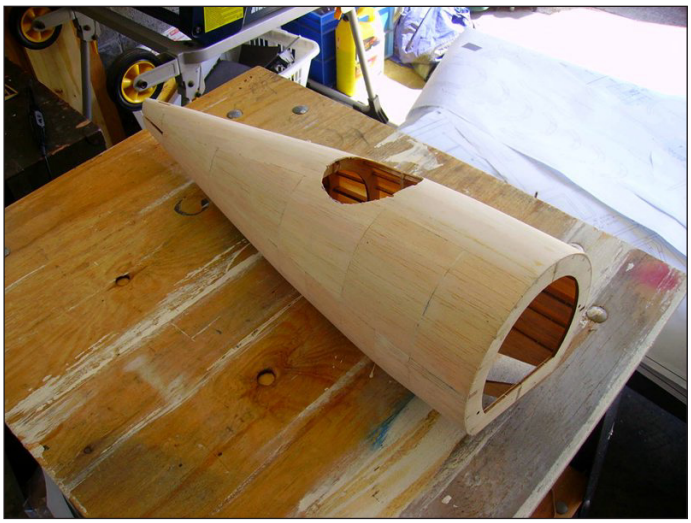
Here's a look at the aileron set up. The cables will attach to the C shaped horn and to another horn that will be attached to the rear of the aileron.

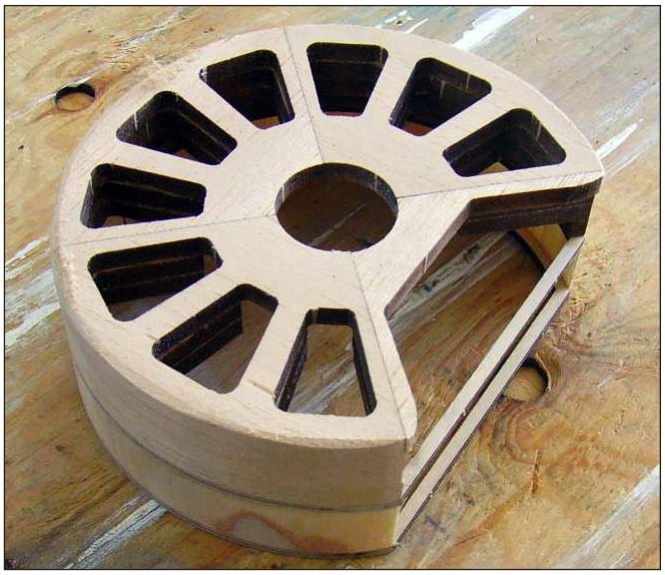


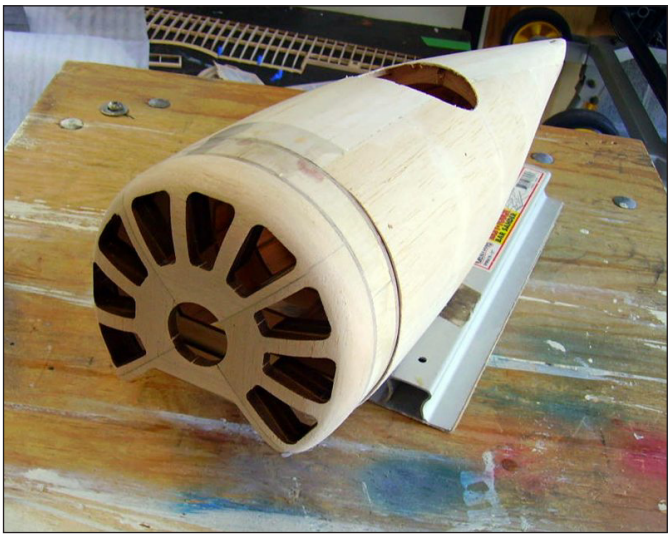
Cables are run through the guides and in the slots in the ribs prior to covering. Be careful to not get any twists. That would increase friction quite a bit.

The fuselage is planked/sheeted and sanded. I started with planking, got tired of how long it was taking me, so resorted to cutting thin cardboard templates of areas to be sheeted, transferring to balsa sheet, and then cutting them out and applying.

The cowl is also rough sanded to shape and ready for finish sanding. I'll wind up fiberglassing it.



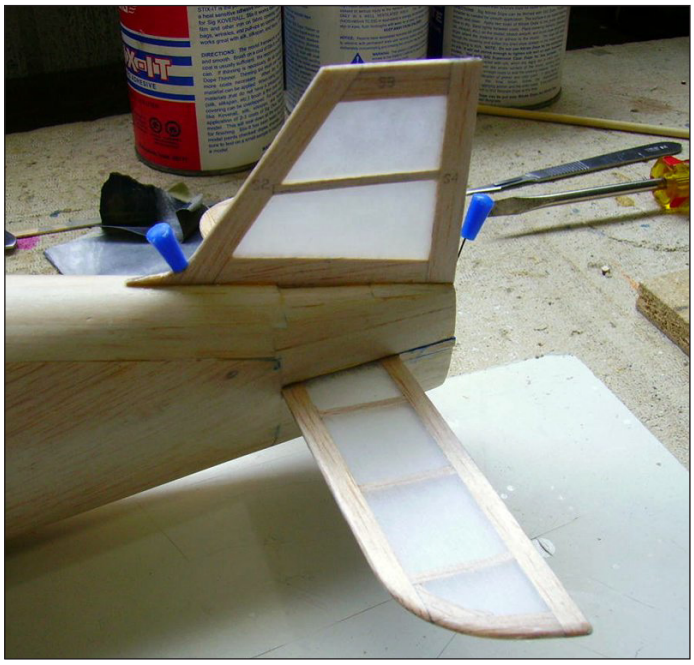


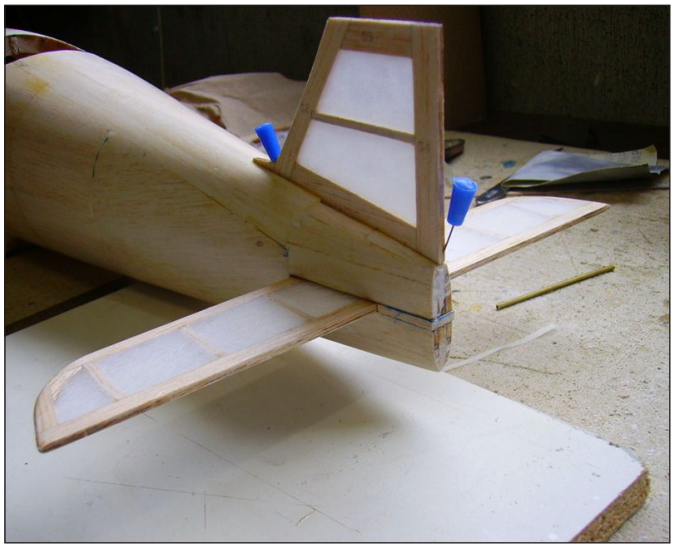


The fuselage has been finished with silkspan, 3 coats of clear nitrate dope, and then 2 coats of Sig sanding sealer. It is now smooth as glass and ready for paint. I know it doesn't look like it, but the silkspan is almost transparent so it still looks rough. I apply the silkspan wet, then dope around the edges. The silkspan shrinks as it dries. I spray the silkspan with water until it is good and wet. You don't need it dripping, but it should be saturated. When it has dried and has shrunk, I apply a coat of dope over the whole thing. I used dope thinned with about 25% thinner.

As for sanding the sanding sealer, it's a toss up between quick sanding and cutting though the silkspan. I use 320 grit at the most to sand down the sealer. Mostly I use 400 grit. Takes a while, but at least it is easier to avoid the dreaded sand though!

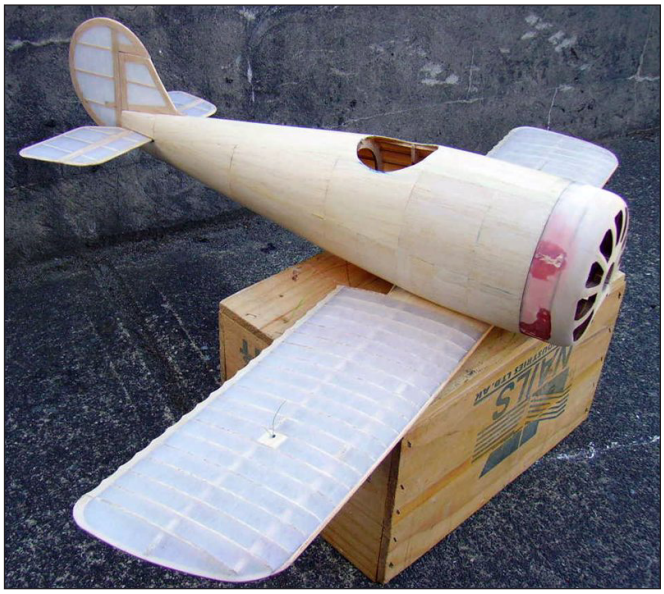
Before painting, I have glued on the stabilizer and fin. Still a bit of work to do at the very back, as there is a slot that needs to be filled on the sides of the fuselage just aft of the stab. I have glued in a piece of balsa and just need to sand it flush, and then apply a small piece of silkspan over top.





LOWER WING

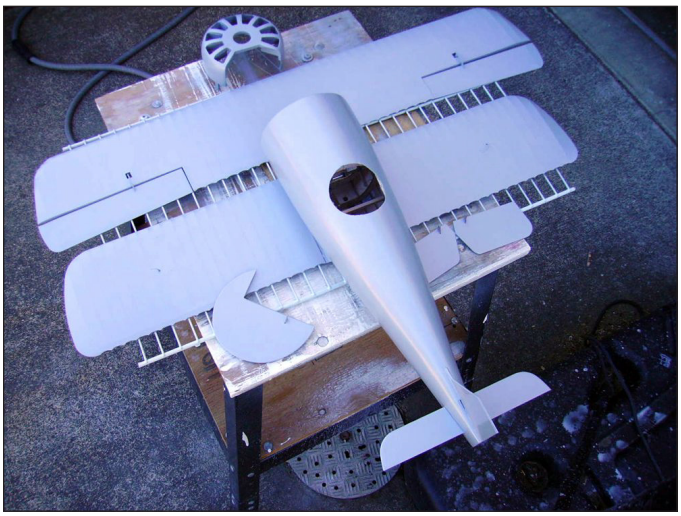
The lower wing is now permanently attached to the fuselage. I taped the rudder and elevators on for the photo op. Next step are some fairly large fairings between the fuselage and the lower wing. A complicated shape. My plan is to make them from thin card stock.

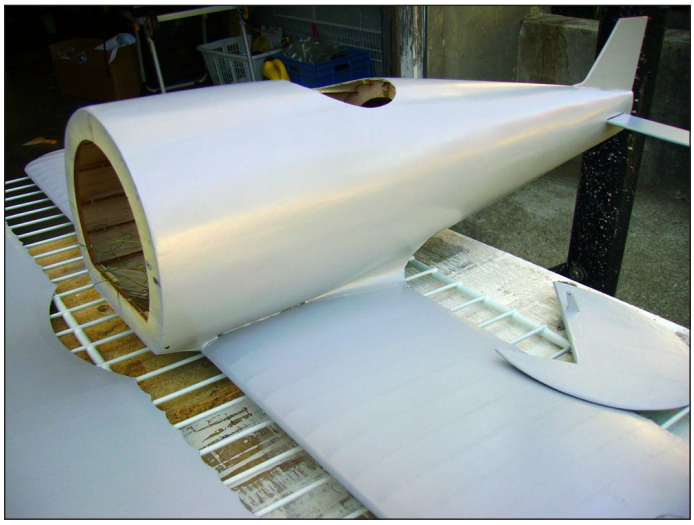


PAINT

It was finally time for paint!! The color is "Silbergrau", literally Silver Grey. I found a recipe on the Internet in a plastic modeler's forum that consisted of 2 parts silver to one part white. I made up a test batch and it seemed good, so I mixed up enough to do the job and shot it on with the airbrush today. I am using Brodak dope applied with my Paasche VL airbrush with the HD tip, using 30lbs of pressure at the brush.

The final result is very pleasing and the photos don't really do it justice. The effect is very subtle. At first glance it looks like a light grey, but when you look close, you can really see the silver, too. Another bonus of the silver mixed into the paint is that it takes only two fairly light coats to make a completely opaque finish.

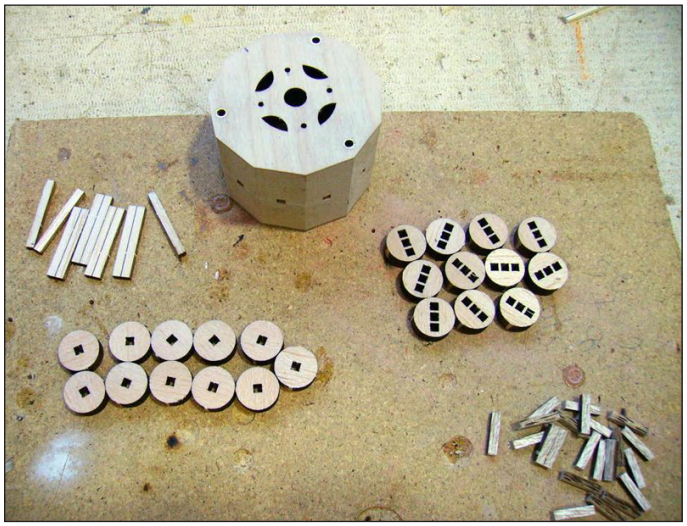




DUMMY ROTARY MOTOR

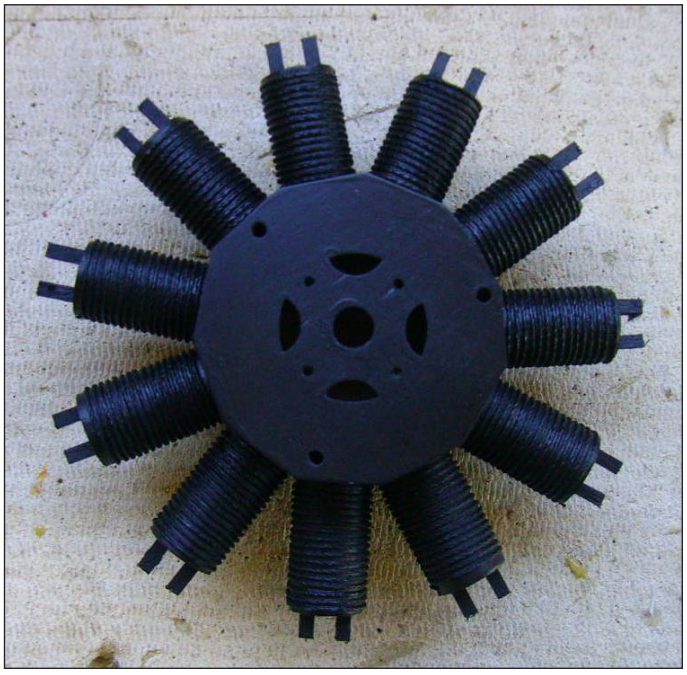
Some work on the dummy rotary motor, which also houses and mounts the electric motor.

The first photo shows the already assembled crankcase and the parts for the 11 cylinders. I thought I took some photos of cylinder construction, but apparently not. It goes quite quickly. The round cylinder bases are glued to each end of the pre cut 1/8" sq balsa sticks. Leave about 1/16" protruding from the base of each cylinder. Then the simulated rocker arms are glued into the holes of the cylinder heads. A pattern is shown on the plans to cut out of card stock and then wrap around each cylinder. I find slightly dampening the card stock made it wrap more smoothly around the cylinders.

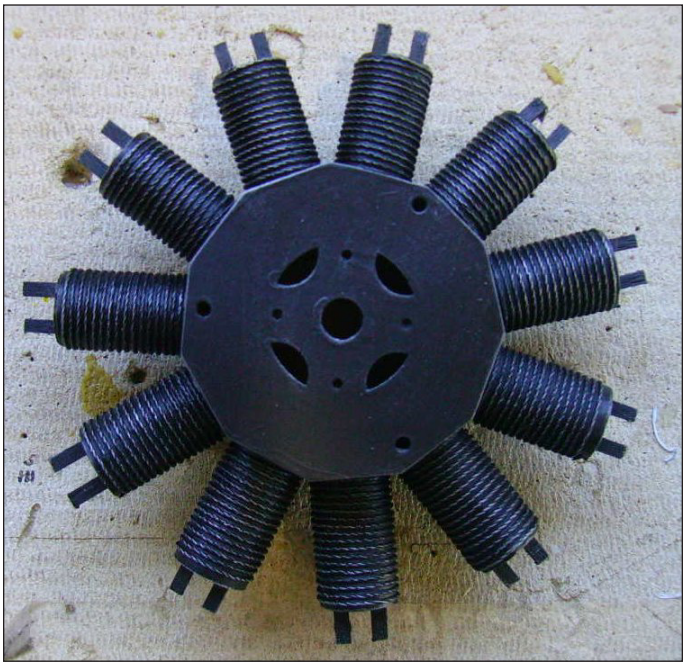


After that, I used the double thread method http://www.youtube.com/vonJaerschky#p/u/28/uequk9u9wP8 to simulate cylinder fins. Eleven cylinders are somewhat tedious, but I took them with me to work on a quiet night shift and got them done in a few hours.

Next, the cylinders were glued to the crankcase, and everything given a coat of grey auto primer from a spray can. After that was dry, the motor received a coat of Krylon semi-gloss black.



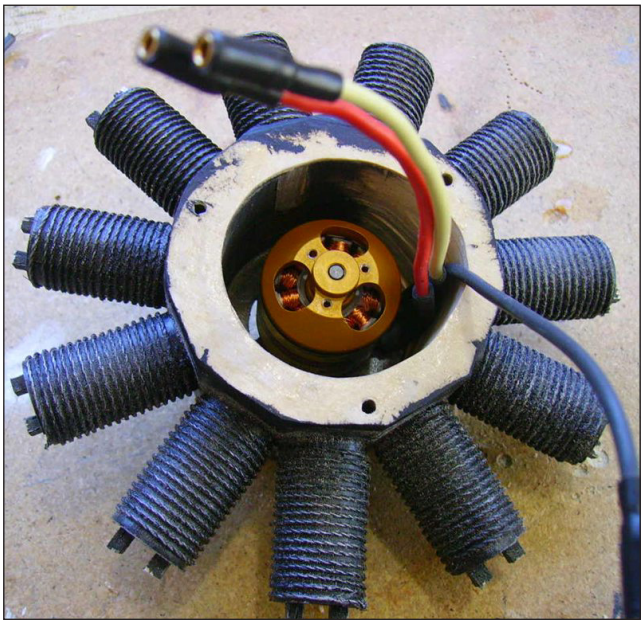
After the black was dry, I highlighted the raised surfaces by dry brushing with Humbrol silver enamel.



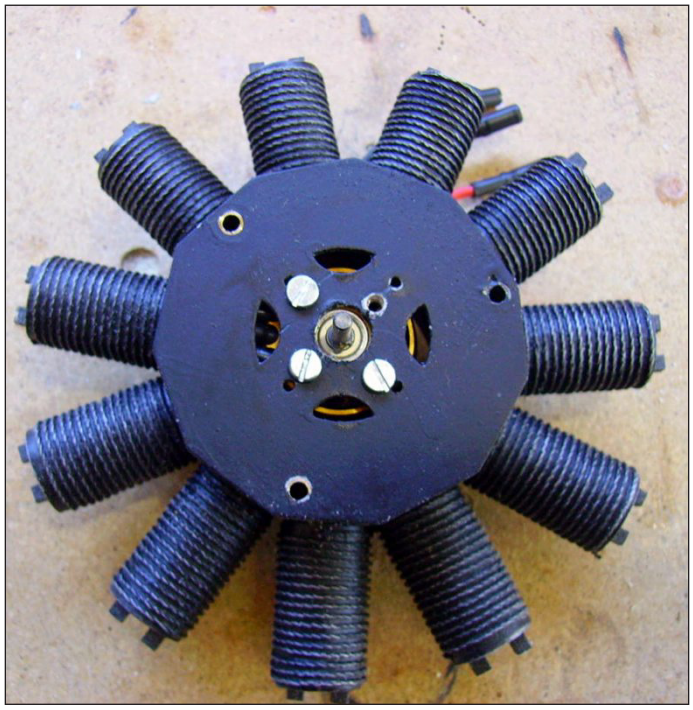
BATTERY

The method of getting at the battery is rather unique, and at first I thought Kay was crazy, but now I see the genius behind it all! The entire cowl, firewall, and motor remove easily with 3 socket cap bolts. This opens up the entire inside of the airplane, making battery changes a breeze. And no nasty hard to make round hatches to deal with, either. The entire assembly takes less than a minute to remove and re-attach, so battery changes are indeed quick and relatively convenient, at least for a scale model. True, once the ESC is in place, there will be wires attaching the assembly to the rest of the model, but this should not slow things down at all. Hopefully the pictures tell the story.

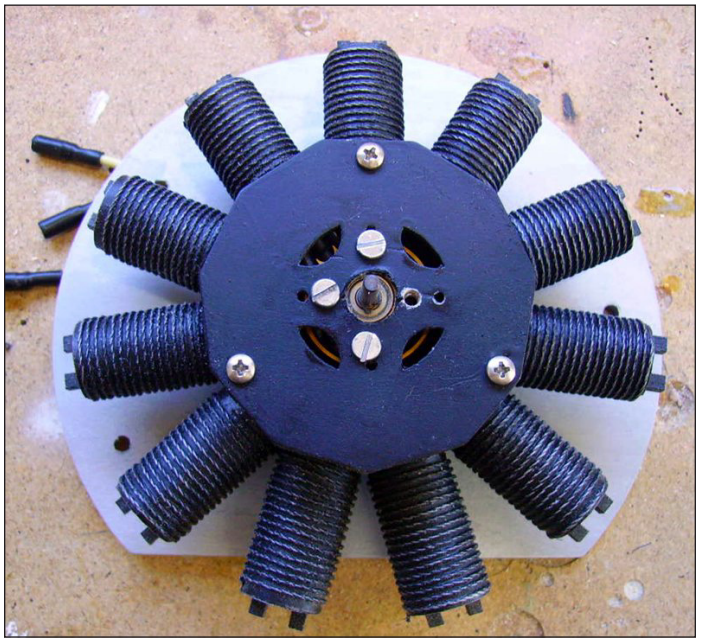
Photo 1: Axi 2217/20 in the dummy rotary



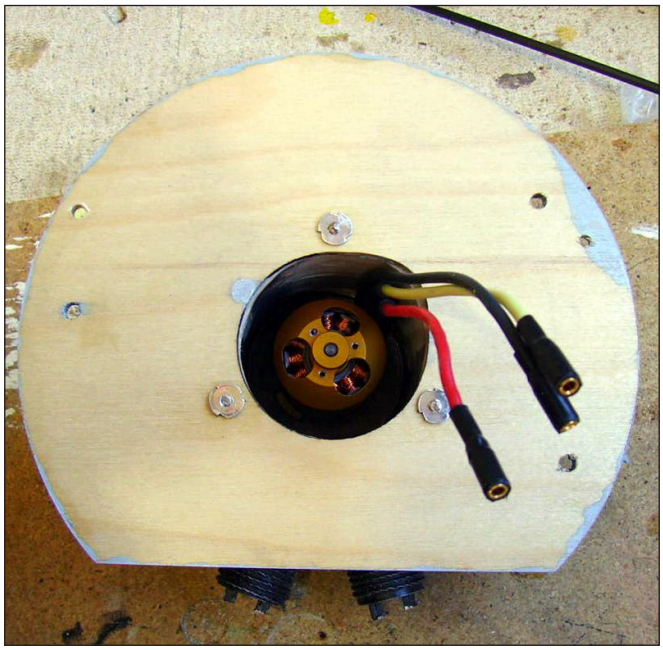
2: Front view (need another screw!)



3: Attached to firewall with 3 4-40 bolts



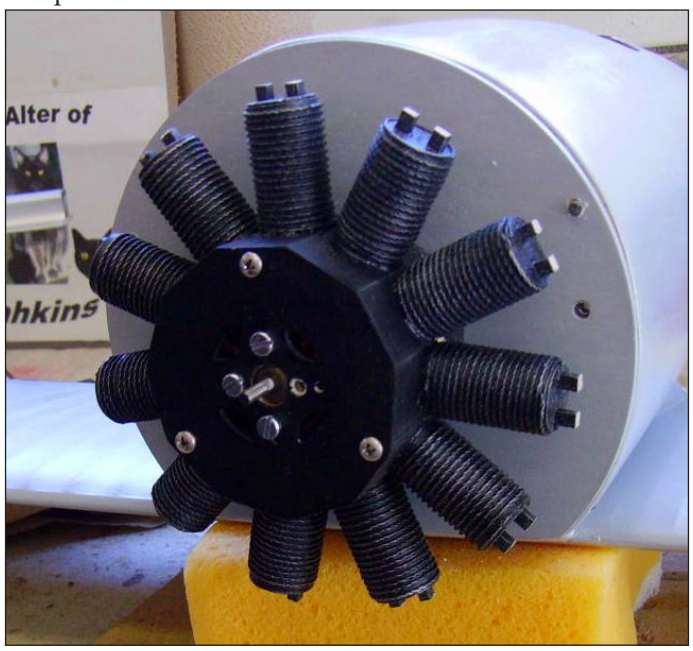
4: Rear view through firewall.



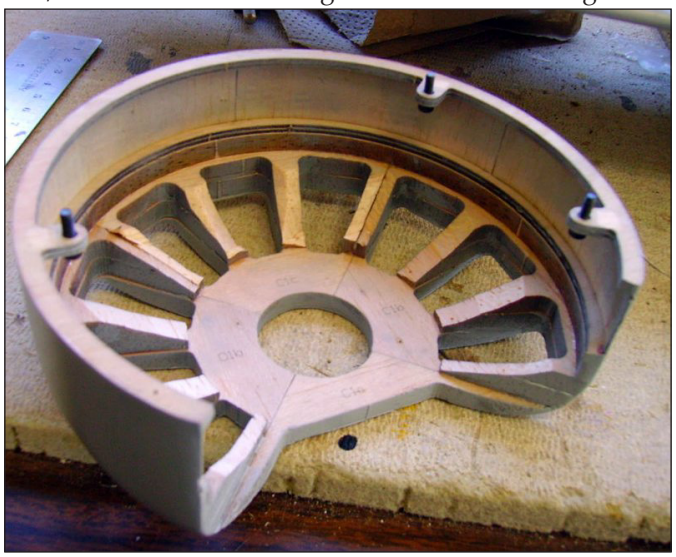
NOTE: Since the prototype has flown it was discovered that it is best to route these wires on the outside of the crankcase as they can be grabbed by the rotating electric motor.

Photo 1: Small 1/8″ pegs to help locate the front end assembly.

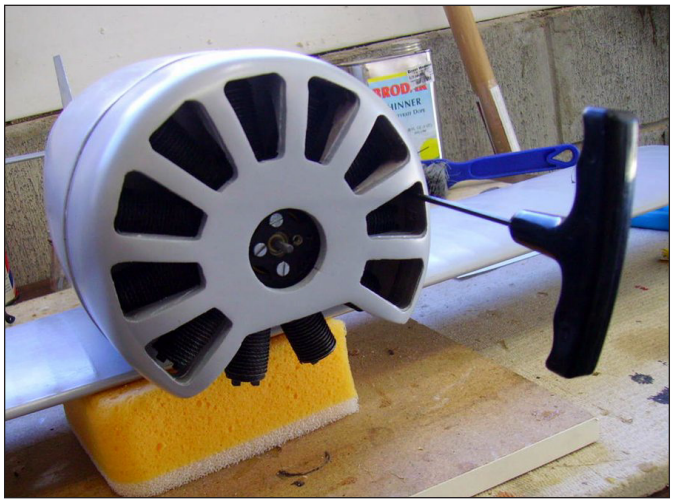
2: In place.



3: 3 4/40 bolts inserted through tabs in the cowl ring.

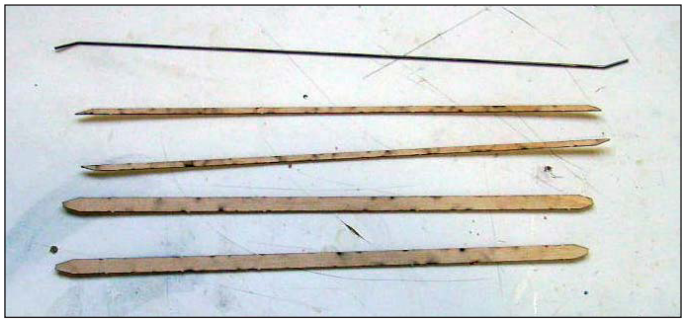


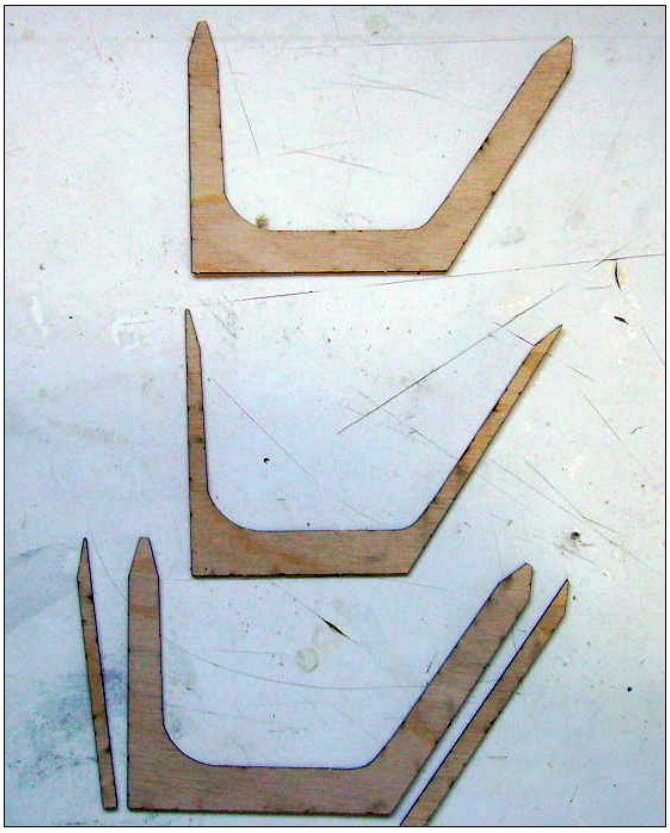
4: Tightening the bolts with a T-wrench

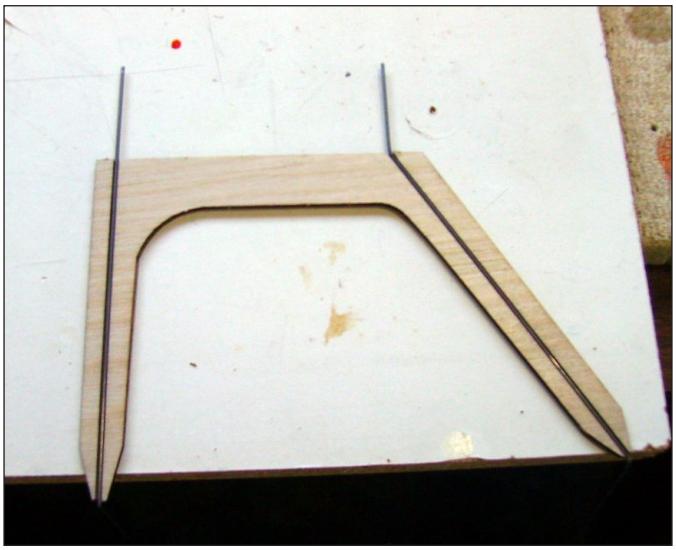


STRUTS

Time for some struttery. All the struts are assembled from laser cut pieces of 1/32" ply and have a 1/32" music wire core. Everything fits together well and the completed struts are quite strong. The wire ends plug into aluminum tubing sockets installed previously in the wings and fuselage.

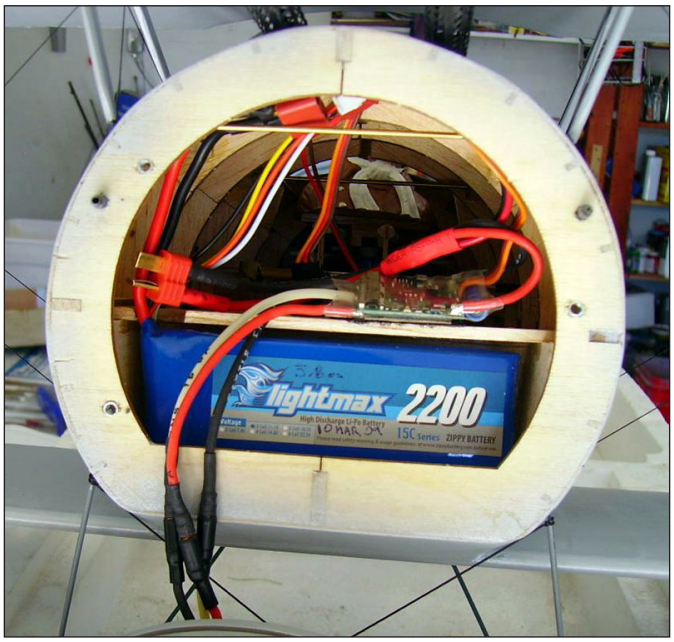






Here's the layout behind the firewall. The 2200mah pack fits nicely. I made a shelf and "Roof" out of 1/8" balsa. Once the firewall is attached, the battery is secure.

Balance worked out not too badly for such a stubby bird. It actually hung level with no extra weight. I decided to add an extra ounce of lead right up front in the cowl to be on the safe side. After flying tonight I can decide whether I can remove it.



I just put her on the scales. Empty weight right now is 21.6oz. The only things to add are two very light machine guns, a windshield, and a pilot. So I figure empty weight will be 22oz. The battery pack is quoted at 5.4oz, so flying weight should be 27.4oz. That gives a wing loading of 10.4oz/ sq ft. That is very good! She should actually be a decent floater with that wing loading, despite her menacing and rather portly shape. I haven't checked the balance yet, so the final weight may yet increase a tad, but it should still be fairly light.

I have some 2200mah 3S packs that look like they will fit inside the fuselage easily.

FLIGHT REPORT

The Pfalz has pflown! I wish I could say the evening ended without incident, but that is unfortunately not the case. More on that in a bit....

The weather was warm and sunny, with a bit more wind than I would have preferred but still well within safe limits. The first take off went well. Lots of power, but the model was quite a bit out of trim and required quite a bit of down and right trim. Once I had it trimmed out, I was able to get the feel of her. It handles very well. The ailerons are effective but a little on the slow side. Certainly nothing to worry about. The rudder is very effective, and as with most WW1 models coordinated turns with a wallop of rudder fed in makes for very nice turns indeed. The elevator I found quite sensitive, but I think much of that has to do with the fact that the model is still tail heavy and could use another ounce of lead up front making the final AUW 28.4oz.

Time to set up for landing. Because of the tail heaviness, it did not want to lower it's nose as it lost airspeed, so I had to compensate with more throttle and flying the model onto the ground at a shallow angle rather than a nice gentle flair. So of course a nose over was the result. No matter - no damage and a successful maiden flight! I was airborne for about 8 minutes and used 600mah from the 2200mah pack, so lots of flight time available!

Flight Two

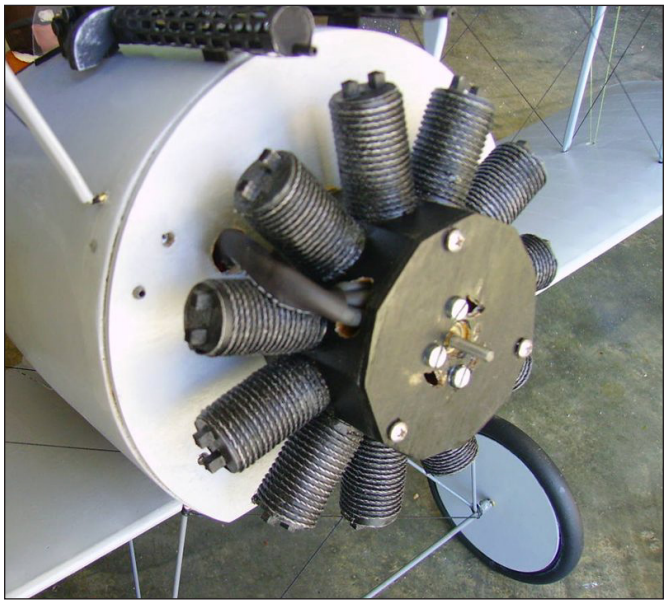
Time for flight number two. Now the wind had dropped entirely. The model took off nice and straight with a solid climb. Nice to have her trimmed out now! I flew a few laps, and then started wringing her out a bit, doing nice chandelles and lazy 8's with lots of rudder at the top to bring her around. Very nice! She felt solid and maneuverability, and now that the first flight jitters were out of the way, I was really beginning to enjoy and get the feel of her. Then -brrrrrrrrraaaaaappppp! What the heck was that? Sounds like the motor has come loose. Can't use power as it makes a hell of a noise. So dead stick to the ground. No damage in the landing.

First glance showed the ply motor mount at the front of the dummy rotary had broken, and the motor was totally free. Wonder what caused that? I removed the cowl and motor, and had a closer look. Hmmm, the three motor wires are twisted so tightly that it looks like one piece of braided wire! I think what happened is that the wires touched the rotating can of the motor, wound themselves into a knot, and jammed up between the inside of the dummy rotary and the outside of the rotating can of the motor. It was enough to twist and rip out the ply front mount.

Sooooo... the airplane is a winner. Very nice flying model and looks great in the air. Just need some more nose weight. Repairs are not a huge job. I need to make a new ply front plate for the dummy rotary, and fix up a fair bit of cosmetic damage on the front face of the cowl.

Nice job Kay! Congrats on another great design!

New and improved.... Here's the new motor installation. This time I have brought the motor wires immediately out of the dummy crankcase and fed them back through the firewall. No chance at all now of the wires interfering with the rotating can of the motor. I put some black heatshrink around the three motor wires to help disguise them a bit.



FLYING TIPS

The model should ROG on grass, pavement or hard surfaces. The model may require coordinated turns using both ailerons and rudder control. This is due to adverse yaw. Halving the aileron down throw may reduce the yaw. This effect can be accomplished by rotating the control arm of the aileron servo forward about 20 degrees.

Let the model gain altitude slowly off the runway. Applying too much up elevator at slow speeds risks a stall. Make your turns gently as tight turns risk tip stalling in any model. Don't expect the elevator to make the model climb. Think of the elevator as a device to change the attitude of the model. The wing and airspeed ultimately make the model climb. Often down elevator applied at stalling can avoid a major crash. The most important details for proper flight operations are:

- CG location. Tail heavy models never fly well or at all.
- Down and right thrust
- Straight and non warped wings

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