I had two different people make up this label for me. Albert Pardure produced the label on his computer using an ink jet printer, which had to be oversprayed with Krylon to set the print. Denny Melancon, owner of Cajun Graphics, produced the same identical label as well as my AMA number on vinyl. In the end, I used Denny's vinyl graphics on the wing as shown below.

This is a close up of the actual vinyl ***Cleveland Cloudster*** label on the left side of the wing.

Looking ahead, I have everything ready to airbrush the clear satin Klass Kote on the Cloudster's fuselage, cowl, fin, and rudder when the temperature gets up into the 70's, which will be sometime tomorrow

afternoon.....Tandy

Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Tuesday, March 23, 2010 3:52 PM
To: Undisclosed-Recipient: ;@smtp107.sbc.mail.mud.yahoo.com
Subject: 86 Speed 400 Cloudster - Clear Satin Klass Kote

Speed 400 Cloudster Project

At the end of Report No.82 I said: "However, now I am 0.87 ounces short of meeting the 16 ounce minimum weight for the Speed 400 SAM event. So I will disassemble the model and air brush one thin coat of clear satin Klass Kote on the fuselage, cowl, and vertical tail". The clear satin Klass Kote provides an incredibly smooth matte finish to doped silk and since it is an epoxy, it will add some needed distributed weight. Even then, I probably will still have to add a little ballast weight to bring the model up to the 16 ounce minimum weight requirement.

Before applying the Klass Kote, the fuselage, cowl, fin, and rudder were weighed in together at 95 grams (3.35 oz). This provides a reference weight used to determine just how much additional weight the single coat of Klass Kote adds.

For those of you who have never used Klass Kote epoxy paint, the picture below shows what I use and how I use it. The Klass Kote cans, from right to left, are Reducer #500, Part-A Clear #40, and Part-B Satin Catalyst $463. In the foreground on the right is a prepared mix of 1/2 oz Clear and 1/2 oz Satin Catalyst and the jar on the left is a quantity of Reducer. The instructions tell you to mix equal parts of Clear and Catalyst and then let it set for 30 to 40 minutes so that the clear and the catalyst have time to react to each other. Then add in the Reducer. I add 100% reducer to the mix (1 oz) to reduce the viscosity for air

brushing with Paasche's H-5 air tip.

This picture was taken in the garage and shows everything ready to begin. The 2 ounce mix in the jar is attached to the air brush. The other smaller jar is Reducer that will be sprayed through the air brush for cleaning after the Klass Kote has been applied.

This is a dumb looking picture of me I know, but I wanted to include it for your information. You are looking at a North Safety (Model No. 3001) mask that I always wear when spraying any kind of epoxy. It

has multi-stage filters, including the all important charcoal stage, to help filter out and prevent inhaling the atomized Klass Kote epoxy particles that get suspended in the air.

In less than ten minutes, the entire air brushing procedure was complete! The fuselage, cowl, fin, and rudder were brought into the model room and placed on the work table as shown below for curing overnight. Tomorrow, I will reweigh the fuselage, cowl, fin, and rudder together and report on the weight added by the single coat of Klass Kote.

Now it is time for the unfun part of disassembling the air brush and cleaning up all of the air brush equipment.....Tandy

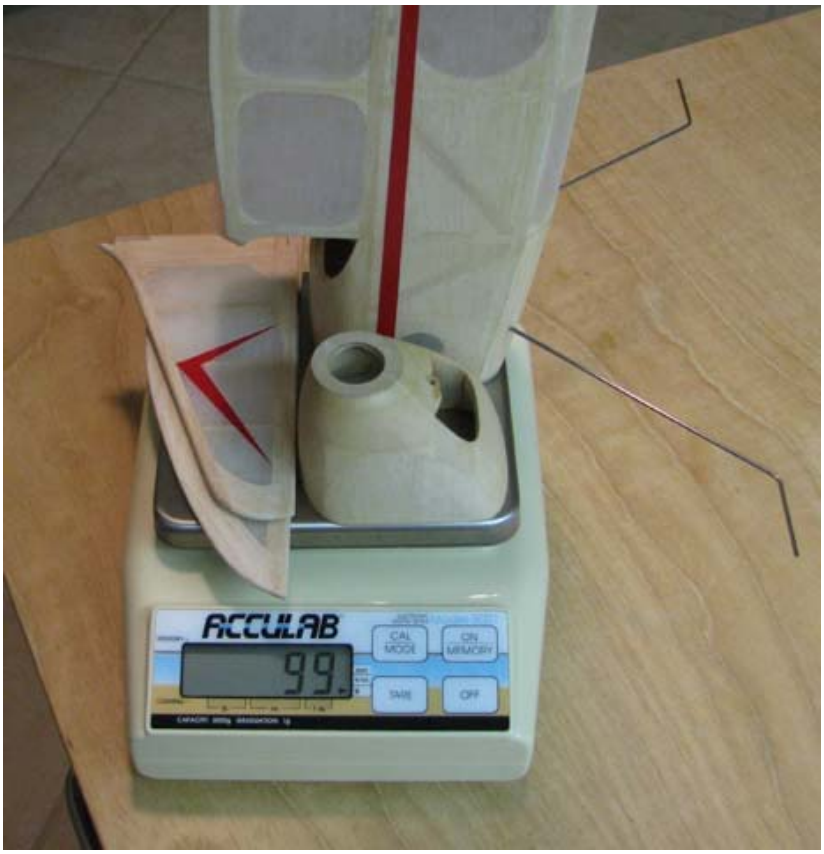
Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Wednesday, March 24, 2010 11:46 AM
To: Undisclosed-Recipient: ;@smtp104.sbc.mail.mud.yahoo.com
Subject: 87 Speed 400 Cloudster - Clear Satin Klass Kote Weight Addition

Speed 400 Cloudster Project

Before applying Klass Kote yesterday, the silk and dope covered fuselage, cowl, fin, and rudder were weighed in together at 95 grams (3.35 oz) as shown below. This provides a reference weight to determine how much additional weight Klass Kote will add to the covering.

A two ounce Klass Kote mix consisting of 1/2 oz Clear Epoxy, 1/2 oz Satin Catalyst, and 1 oz of Reducer was used to air brush one thin coat on the fuselage, cowl, fin and rudder. It is note worthy to point out that only about half of the mix was actually used in this application. After the Klass Kote had time to cured overnight, this morning the paint fixtures were removed and the fuselage, cowl, fin, and rudder were again weighed together as shown below. The weight with the Klass Kote is 99 grams (3.49 oz). The good news is that the application of one coat of Klass Kote only increased the weight by (99-95) = 4 grams (0.14 oz), not nearly as much as one would think for an epoxy paint. The bad news is that this is well short of the 0.87 oz I needed to meet the 16 ounce minimum weight for the SAM Speed 400 event. So just as I suspected, I am going to have to add roughly 3/4 of an ounce of ballast weight to meet the minimum.



There is one attribute of Klass Kote I want you to be aware of. In the picture below, you can see the Klass Kote's incredibly smooth matte finish left on the fuselage's doped silk covering. There is absolutely no evidence that there is any Klass Kote present. In addition, the finish is completely fuel proof, although that is not a requirement in this electric power application.

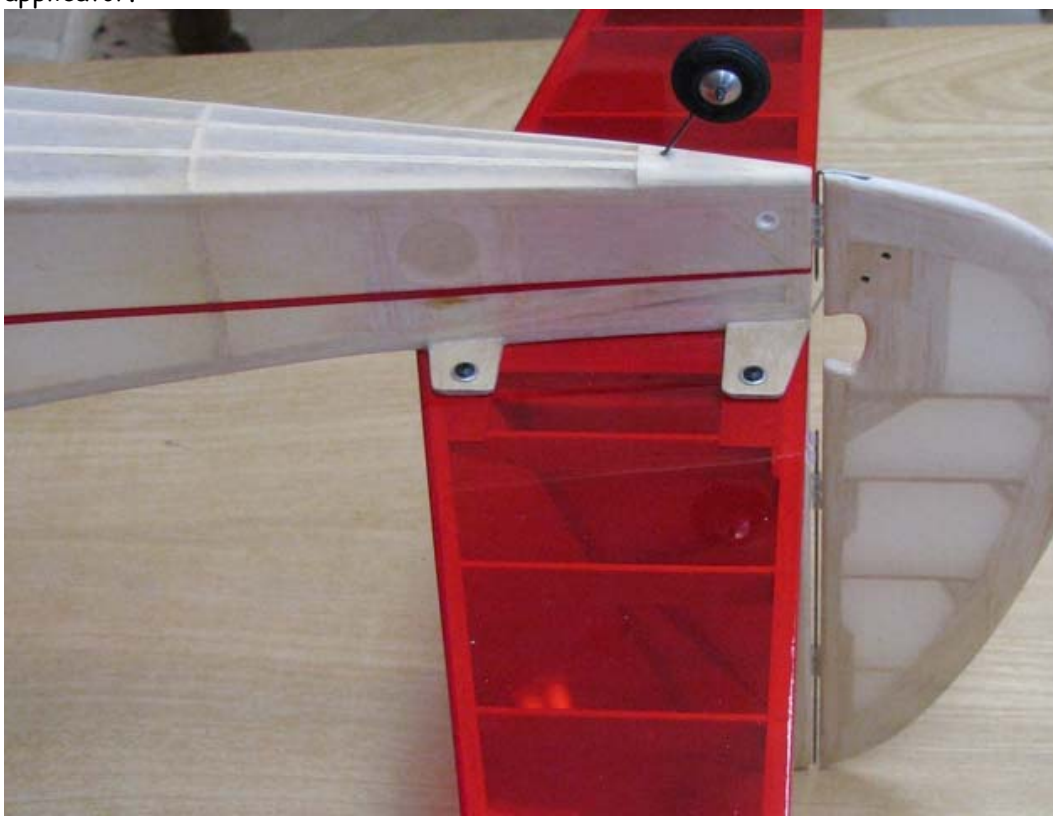
Over the next day or so, I will remove the covering from the window areas and vent holes and install the side windows and the windshield. Then I will assemble the model once again and do the final weight and balance. Looks like I am finally getting near the end of this project.....Tandy

Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Thursday, March 25, 2010 11:53 PM
To: Undisclosed-Recipient: ;@smtp110.sbc.mail.mud.yahoo.com
Subject: 88 Speed 400 Cloudster - Tail Wheel, Rudder Hinges, and Windshield Material Test

Speed 400 Cloudster Project

The .032" tail skid wire was removed from the aluminum tube at the aft end of the fuselage. In Report No. 72, the tail wheel landing gear was bent up out of 0.032" piano wire for an aluminum hub 3/4" tail wheel. A slight zig-zag was put into the portion of the wire that slides up into the aluminum tube to make it fit snugly. The tail wheel wire was coated with thin CA and pushed down into the aluminum tube, being careful to make sure the tail wheel was straight with the center line of the fuselage as shown below. Additional thin CA was wicked down in between the wire and the tube using the sowing needle with the tip of the eye cut off as the applicator.



The fin and rudder hinge halves were also CA'd in place as you can see in the picture above. The procedure for doing this involves cutting the Polyspan/silk doped covering over the hinge slots and inserting the hinge halves into their slots. The fin was attached to stab and the stab was attached to the fuselage. The upper hinge wire was inserted in the two upper hinges and lower hinge wire was inserted into the lower hinge between the bottom of the rudder and the rear of the fuselage. The rudder was moved back and forth several time to realign the hinge halves with each other. Then the hinge wires were removed in order to permanently bond the hinge halves in their individual slots with CA as shown above.

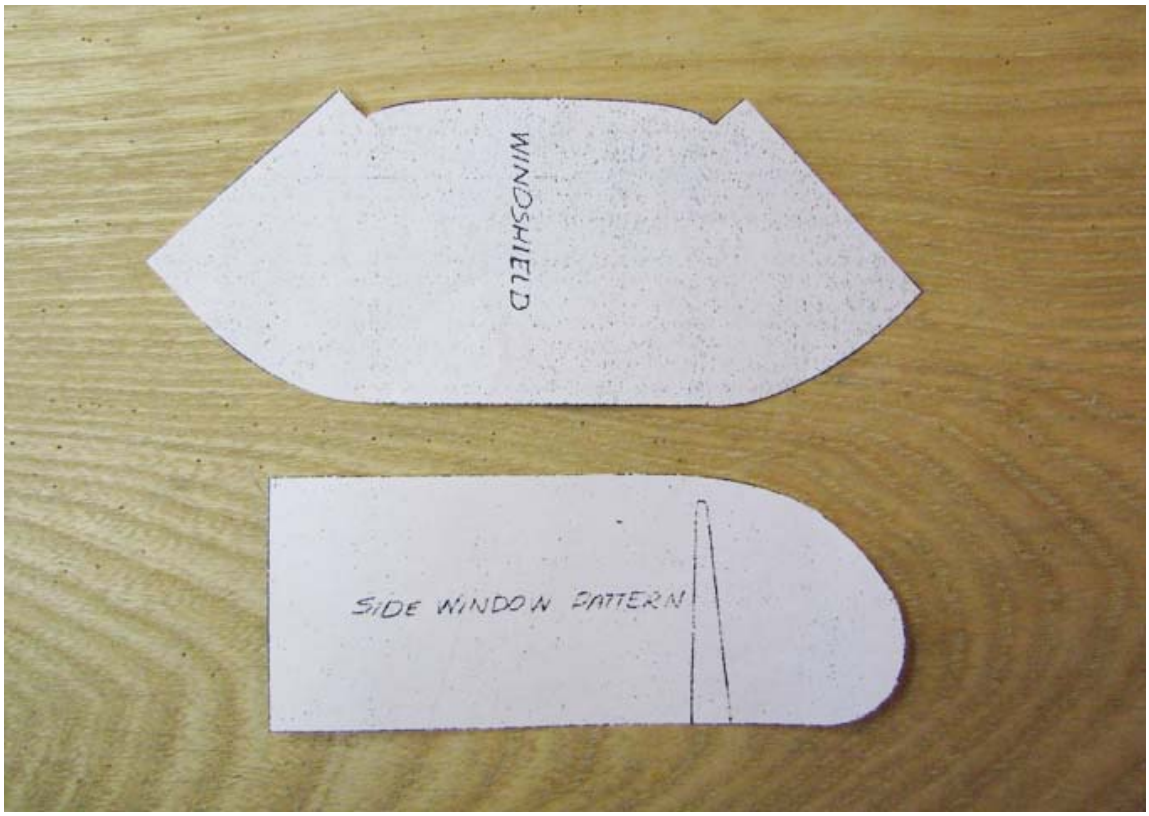
The Cloudster's "Lost" label was installed on the top of the fuselage just behind where the wing's trailing edge will be as shown below.

The Great Planes ballast lead weights I ordered from Tower Hobbies arrived in today's mail. The six ounce package comes in 12 individual 1/4 oz segments shown below with self sticking tape on the bottom. It looks like I am going to have to use three segments plus a part of one of the segments to get the Cloudster up to 16 ounces.

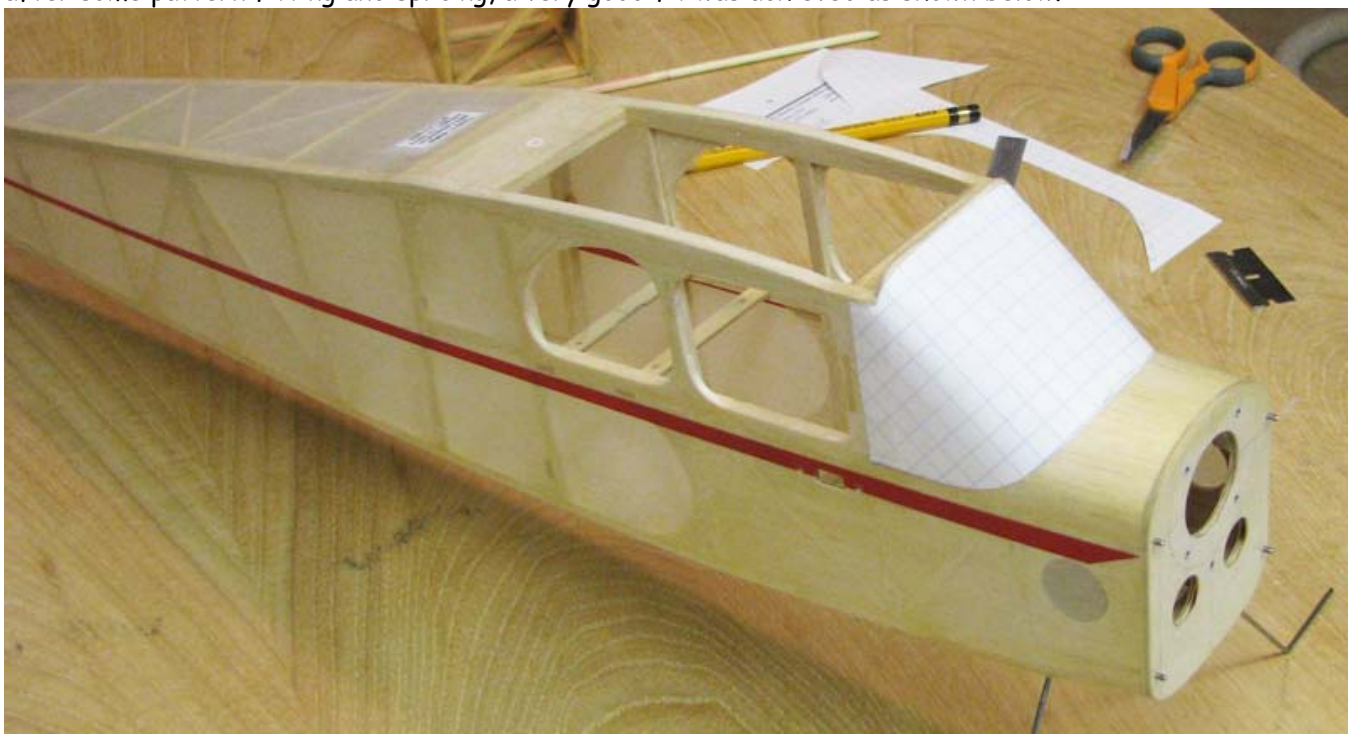
The four window openings were cut out on my Cloudster fuselage after lunch today, which is shown below. After a careful rim sanding, the openings are quite crisp and sharp!

From the right side, you can see that I also cut out the ECS switch opening and holes on the other side as well in the picture below. However, I had to cut into the red trim strip after all, which I was trying to avoid, but it could not be helped. Notice that I have not cut out the fore and air ventilation holes on the sides yet.

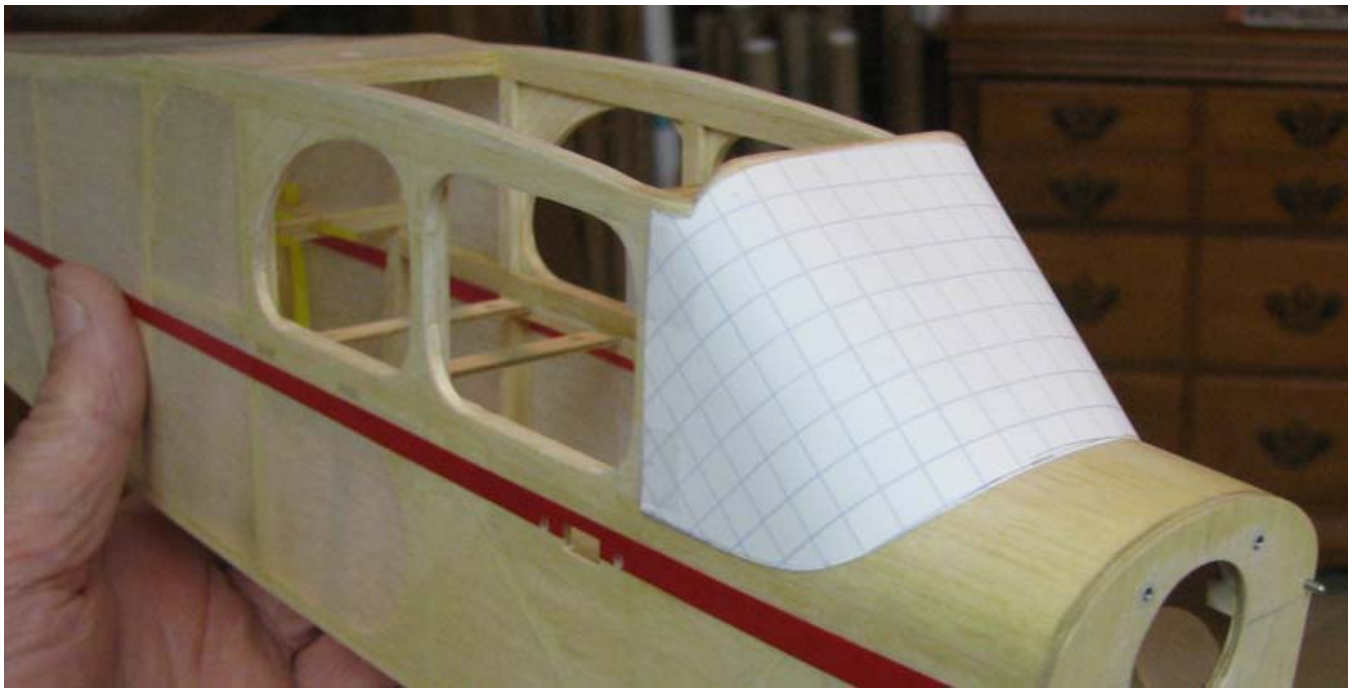
I cut the scaled down plan patterns for the windows and the windshield as shown below. They fit pretty closely, but some tailoring is required to get an acceptable fit to the fuselage framework.



The windshield pattern was traced onto a sheet of quadrille paper to preserve the original pattern. Then after some pattern fitting and splicing, a very good fit was achieved as shown below.



This picture shows a close up of the tailored windshield pattern taped in place for trial fit.



I saw the picture below of Albert Pardue's "Eugene III" rubber model with that beautiful windshield installation.

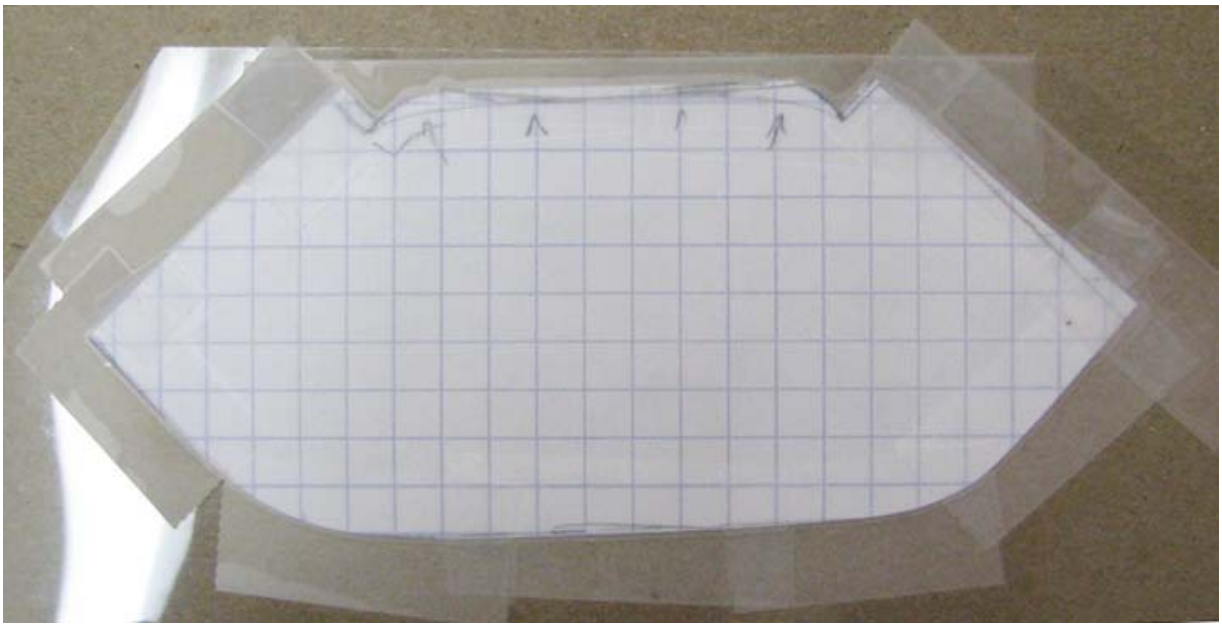
So I contacted Albert and he told me that he uses a material called DURA-LAR by Grafix for his windshields. It is very similar to mylar, but different. It comes in a 9" X 12" pad of 25 sheets as shown below. It is made in three thickness'; .003", .004", and .005". You can get it at your local Hobby Lobby Arts and Craft store and it cost $12.99 a pad, which is really only a little over fifty cents a sheet. As you can see, I bought the .005" thickness.

Albert uses Weldbond glue to install his windshields with. He said to try either Lowes or Home Depot, but neither one had the Weldbond glue. I finally found mine at one of our large privately owned hardware store here in Arlington for $2.99 a bottle.

Never having used either one of these products, I made a window mock-up this afternoon to use as a test

case for bonding DURA-LAR on with the new Weldbond glue as Albert recommended. As you can see in the picture below, the Weldbond glue dried completely clear and really has the DURA-LAR stuck down tight. I outlined the piece of DURA-LAR so you could see where it stops, otherwise, you couldn't tell.

I think these products are going to work well for me. Thank you Albert for sharing products with me. This evening, before I quit working, I taped the tailored windshield pattern down on a sheet of the DURA-LAR as shown below.



Tomorrow, I plan to cut out the DURA-LAR and tackle the installation of the windshield.....Tandy

Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Friday, March 26, 2010 5:02 PM
To: Undisclosed-Recipient: ;@smtp110.sbc.mail.mud.yahoo.com
Subject: 89 Speed 400 Cloudster - Windshield Installation

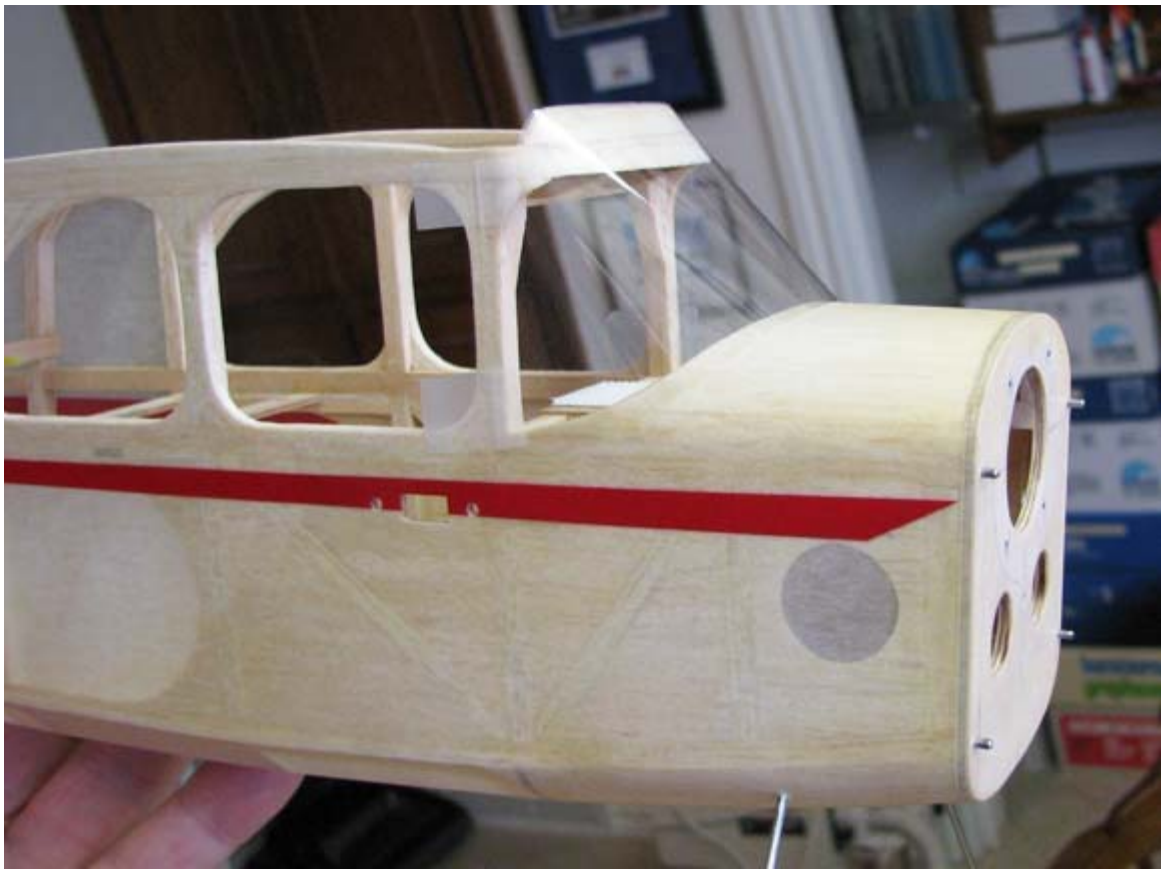
Speed 400 Cloudster Project

I want to review a problem I had before I ever got started on the windshield. When I was using the Weldbond glue on the test case yesterday, I noticed that it was somewhat thick and difficult to spread. So I called Albert Pardue in Alabama this morning to discuss two things with him. First I wanted to know how thick his Weldbond Glue was. Well, he said it was not thick at all and referred to it as "creamy" in viscosity. While I was talking with Albert, I also asked him how he glued his windshields on. He said he puts the glue along the top and two side edges, but NONE along the bottom edge. He pulls the windshield down tight with blue masking tape and then let the Weldbond glue dry thoroughly. Then he used 1/8" black striping tape around the bottom to seal it. He said one could also apply the Weldbond glue sparingly along the bottom seam with a tooth pick, but you have to be very careful.

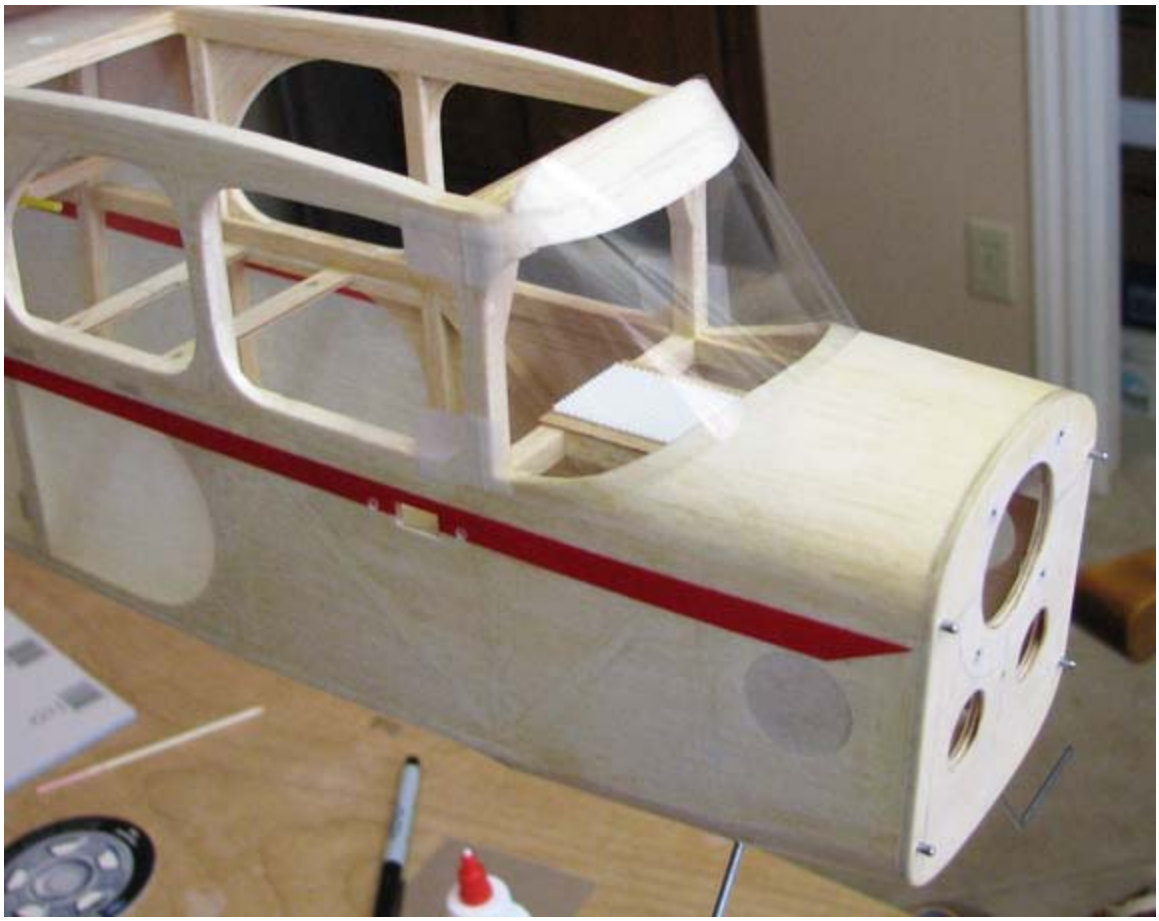
I went to the hardware store and bought a new bottle of Weldbond glue. The store clerk let me unscrew the top and check it out before I bought it. Sure enough, it had that creamy consistency that Albert described to me this morning. So I did in fact have a bottle that had gone bad.

The first step was to cut the windshield out of a sheet of the .005" DURA-LAR with the pattern taped on it and do a trial fit on the fuselage frame. I really like the 3M transparent tape ***(sometimes called Magic Mending Tape)*** for taping the DURA-LAR down with. As you might expect, the windshield cut out didn't fit too well, even though I thought the tailored pattern did. You really have to be patient trying to fit windshields because the material is "springy" and it is hard to get a good fit on all edges. As a matter of fact, it wasn't until the third windshield cut out that I got the fit to be acceptable.

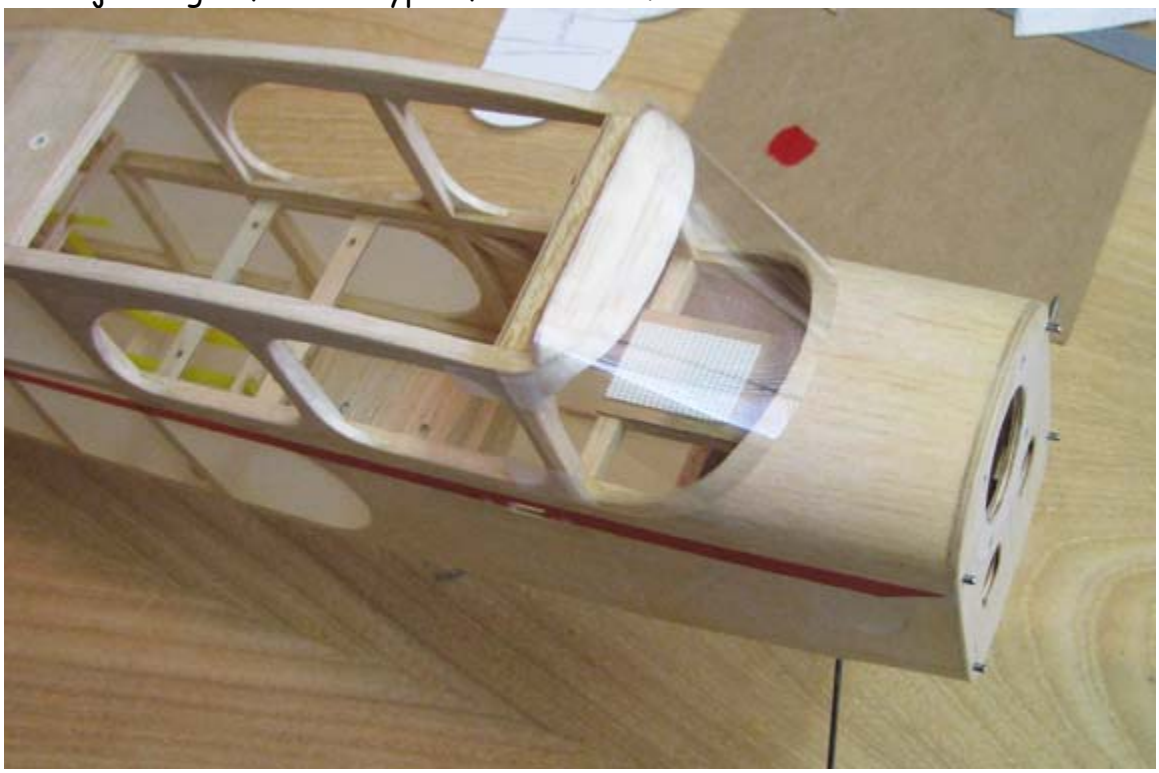
The picture below shows a side view of the trial fit of the third windshield cut out held in place with four small pieces of tape. The trick was to get the windshield material at the right angle so it would lay down flat against the upper wing stop.



This shows a second view of the trial fit more from the front to show the nice smooth contact of the windshield's lower edge around the fuselage turtle deck.

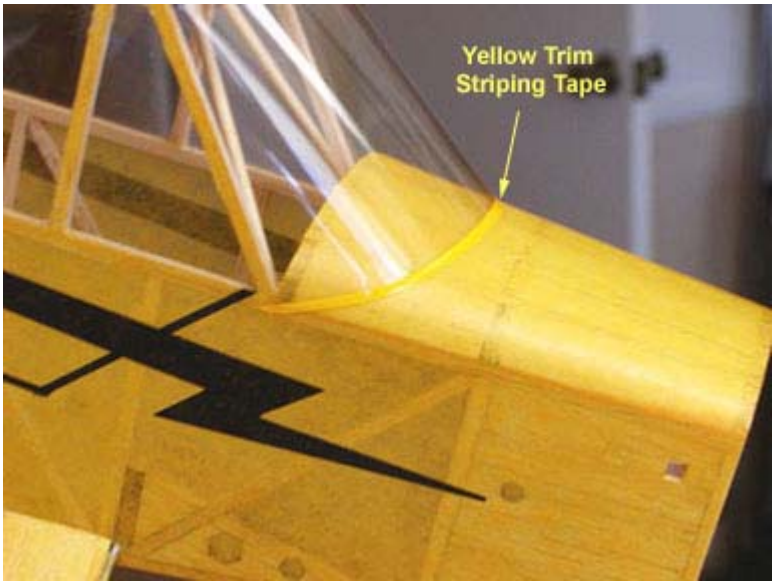


This shows the third view of the trial fit more from the top. The DURA-LAR's .005" thickness is just right for this type of windshield.



Finally the Weldbond glue was carefully applied to the top and both side edges and the windshield cut out was put in place, taping the right edge down first with two small pieces of tape. The windshield was wrapped around the frame and the left edge was pulled down tight and taped in place with two small pieces of tape. Using my thumb and finger, I squeezed the material against the frame to spread out the glue under the windshield and wiped off the excess with a damp rag. Then I came back and taped both of the side edges down tight against the vertical frames with a long piece of tape as shown below. Unfortunately, I did get a little of Weldbond glue onto the windshield inside, but hopefully it will dry clear enough to not be too noticeable. Albert's advice to not put glue on the windshield's lower edge, at least during the initial installation, kept me from getting into trouble.

Now I will let the windshield completely dry overnight before even attempting to remove the tape. I will be thinking about what to do with the unglued lower edge of the windshield. I may try to carefully put glue along the intersection of the windshield and the fuselage's turtle deck, but I am not sure yet. If it turned out too bad, the seam can always be covered up with thin black striping tape as Albert suggested. In fact, I secured the bottom edge of my rubber powered J-3 Cub's windshield that way, only using 1/16" yellow striping tape as shown below. The tape has stayed down for a couple of years now. I would appreciate any feed back or critique you might have concerning my approach to this windshield installation.....Tandy


Yellow Trim
Striping Tape

Dave Harding

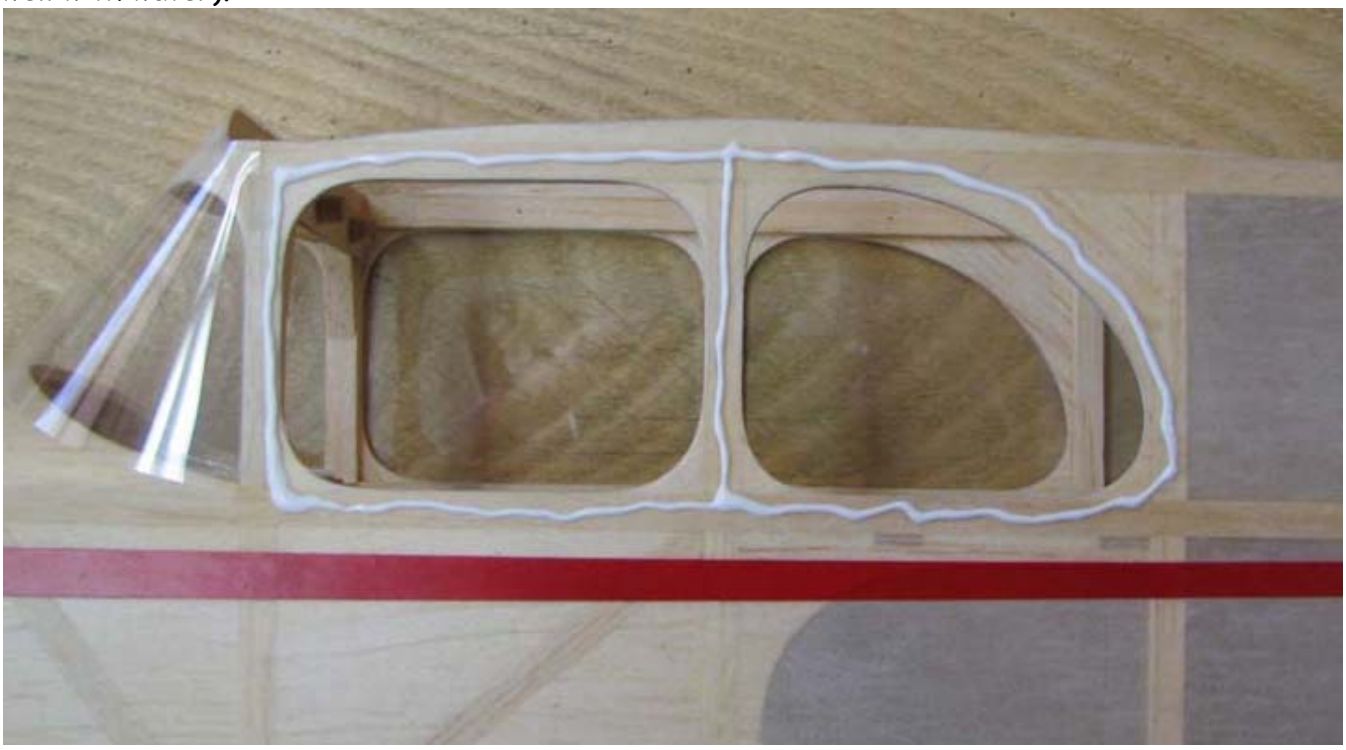
From: Tandy C. Walker [tandyw@flash.net]
Sent: Saturday, March 27, 2010 3:53 PM
To: Undisclosed-Recipient: ;@smtp108.sbc.mail.mud.yahoo.com
Subject: 90 Speed 400 Cloudster - Side Window Installation

Speed 400 Cloudster Project

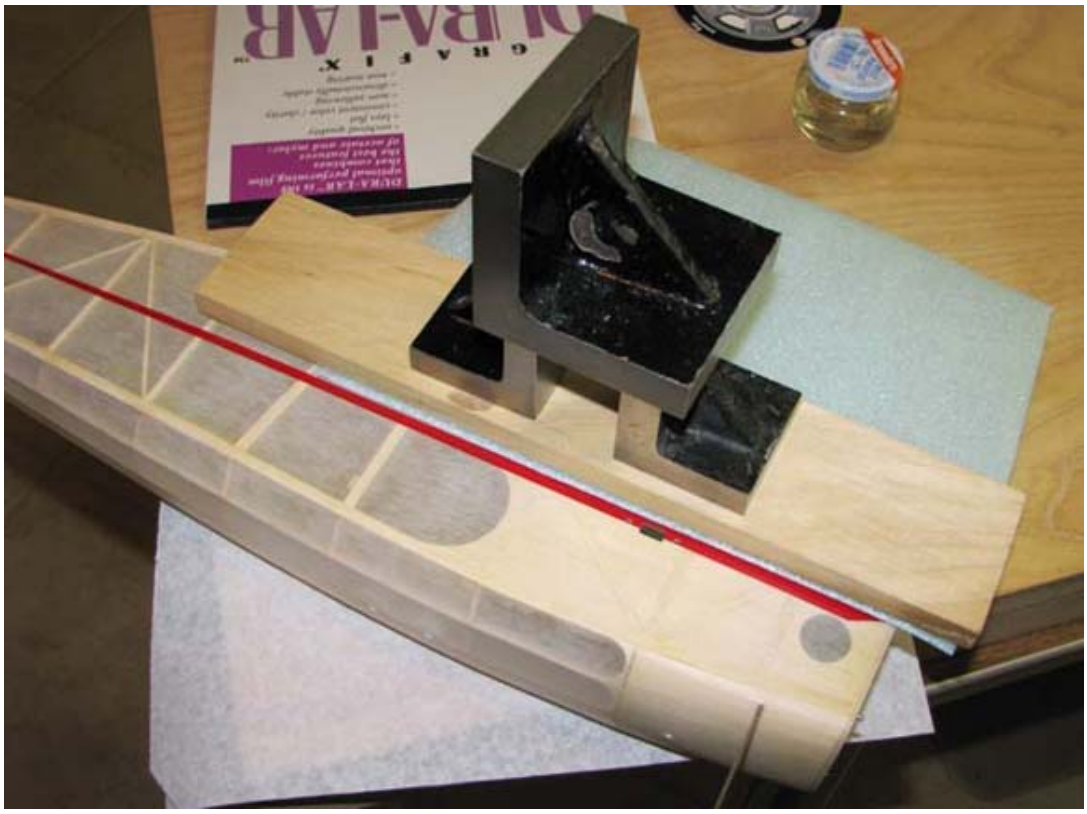
Last year, a fellow modeler ***(Van Wilson)*** sent me two identical glue applicators to try out. I filled one of them with aliphatic glue and have been using it with great success for some time. The small pointed opening of applicator's tip lets you put just right amount of glue where you want it. So today I filled the second applicator with the Weldbond glue as shown below in preparation for the Cloudster's side window installation.

I found the best way to glue the DURA-LAR windows in place was to put a small bead of the Weldbond glue around the window opening as shown below. However, the first time I tried to glue the side window on, I really messed it up. When I pressed the DURA-LAR down onto the glue bead, it oozed out onto the window inside %$#@* However, I was able remove the window and easily clean all of the glue off of the fuselage frame with a damp rag. I took the DURA-LAR cut out to the sink and also cleaned all of the glue off of it with warm water. On my next attempt, I applied the small bead of glue just as before, but this time I smeared the bead of glue out into a thin film with my finger. Working relatively quickly, I cleaned my fingers off with water and then put the DURA-LAR in place over the window opening. I went around the edges of the DURA-LAR and pressed it down

onto to the smeared glue film with my finger. Then I went around the edges of the DURA-LAR with a damp rag and cleaned off all of the excess glue (this Weldbond glue cleans up really well with water).



The fuselage was laid on its side on the work table and a piece of foam was placed over the fresh glued DURA-LAR window. A smooth Maple board was placed on top of the foam and three steel building blocks were placed on the Maple board for weight. This provided the necessary pressure around the window to hold it down while the glue thoroughly dried.



The picture below shows the end result of all of my windshield and window efforts, with which I am most pleased. You can not see it in this picture, but the forward edge of the side window's DURA-LAR butts up nicely against the back edge of the windshield's DURA-LAR on the fuselage's vertical frame. In summary, this particular part of modeling has always been a big problem for me. However, thanks to Albert Pardue's advice and recommendations, I think I have products and a procedure that I can do a respectable job with from now on. Hopefully, this discussions will be useful to some of you.

I still have to decide how to seal the bottom edge of the windshield, but not today as I want to think about it for a while. If you recall, Albert Pardue appears to have completely outlined his windshield and maybe the windows also of his Eugene III with thin black striping tape as shown below. I might do the same or I might just go around the bottom edge of the windshield only with a piece of thin white striping tape and not do the complete outline. What do you think?.....Tandy

Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Sunday, March 28, 2010 11:40 AM
To: Undisclosed-Recipient: ;@smtp105.sbc.mail.mud.yahoo.com
Subject: 91 Speed 400 Cloudster - Windshield Bottom Edge Seal

Speed 400 Cloudster Project

There are at least two approches to seal the bottom edge of the Cloudster's windshield. These include (1) applying sparing amounts of either Weldbond or epoxy with a tooth pick along the seam or (2) trying to put thin striping tape around and over the seam. Yesterday afternoon I did a test case of trying to apply Weldbond with a tooth pick on a sample and that did not work out for me at all so I didn't even try the epoxy.

Next I tried putting 1/16" wide white striping tape around and over the windshield seam, stopping it at the corners where the side windows begin. The color of the white striping tape did not look very good and the 1/16" width was so narrow that I could not accurately control the amount of tape on the windshield and the amount on the fuselage's turtle deck for a good seal.

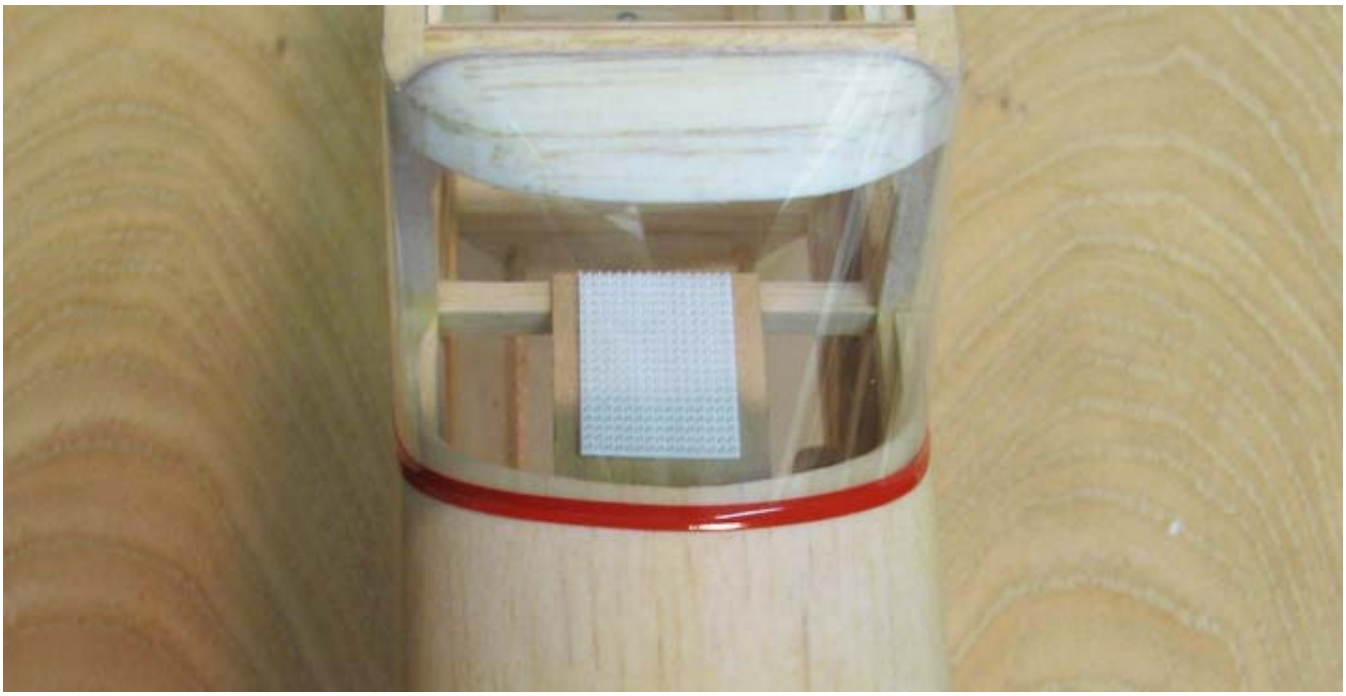
I did not have any 3/32" wide tape in white tape, but I did have some in both black and red. I put a strip of the 3/32" black striping tape around and over the windshield seam, stopping it at the corners as before. With the wider tape, I was able to control the amount of tape on the windshield and the amount on the fuselage's turtle deck and secure a good seal. However, the black did not look all that good either and I did not like the tape's abrupt termination at the corners.

I noticed that the color of the 3/32" red striping tape pretty much matched the color of the red Tamiya painted strip on the fuselage. It was then I got the idea to used the red 3/32" striping tape around and over the windshield seam, but instead of stopping it at the corners, take it on back along the bottom edge of the side windows and stop it midway on the upright behind the cabin. This way the thinner tape stripe will compliment the fuselage's side trim. The collection of the five pictures below show the red striping tape seal on the bottom edge of the Cloudster's windshield from different aspect angles:

Right side View

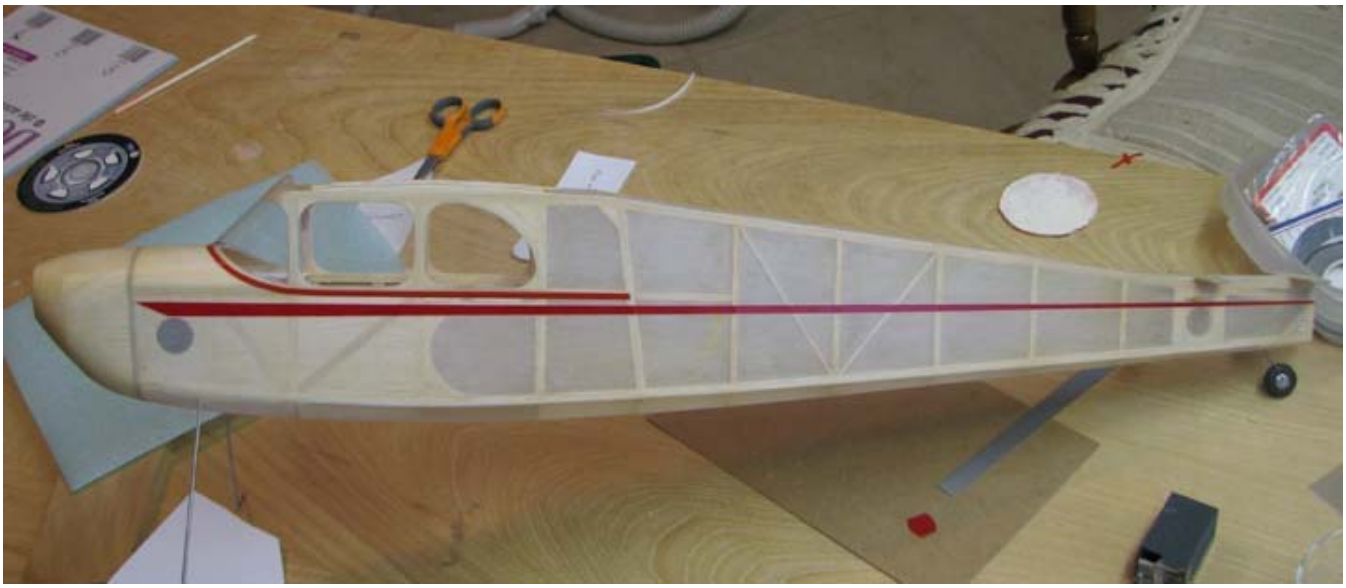
Right Frontal View Close Up

Top view showing the accurate control the amount of tape on the windshield and the amount on the fuselage's turtle deck. The bottom edge of the windshield is well sealed.



Left Frontal View Close Up

Left View of the Entire Fuselage



Well, what do you think of this approach of sealing the bottom edge of the windshield?.....Tandy

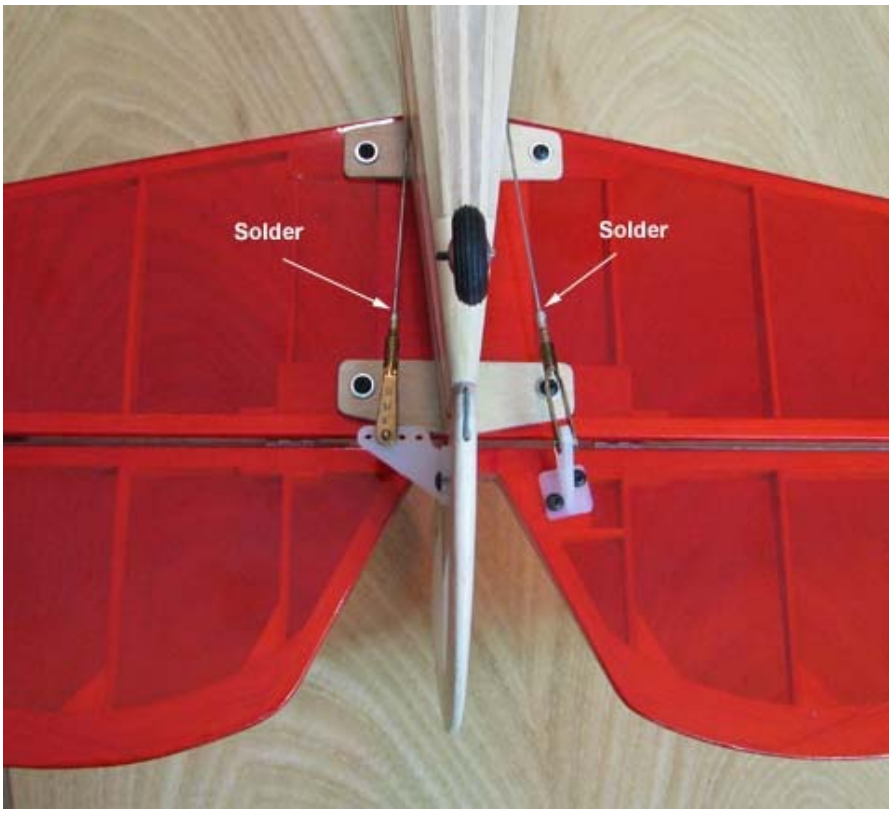
Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Sunday, March 28, 2010 11:23 PM
To: Undisclosed-Recipient: ;@smtp109.sbc.mail.mud.yahoo.com
Subject: 92 Speed 400 Cloudster - Completion

Speed 400 Cloudster Project

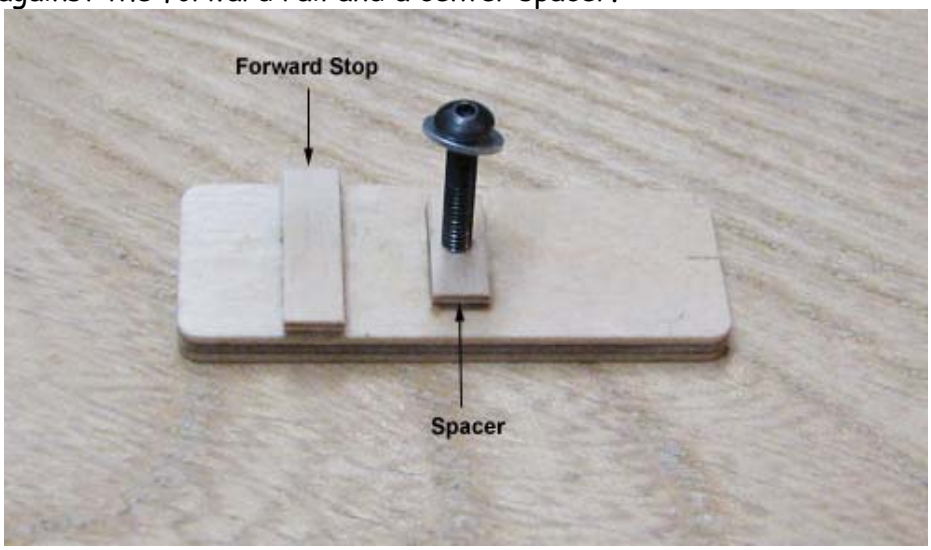
This morning I had a few final details to finish up before performing the final weight and balance on the Cloudster. The first task involved gluing the wing's forward plywood hold down plate into the slot in the wing as shown below.

The rudder and elevator .032" piano wire push rods were inserted through the yellow sheath guides and threaded brass couplers were soldered onto the ends of the wires as shown below.



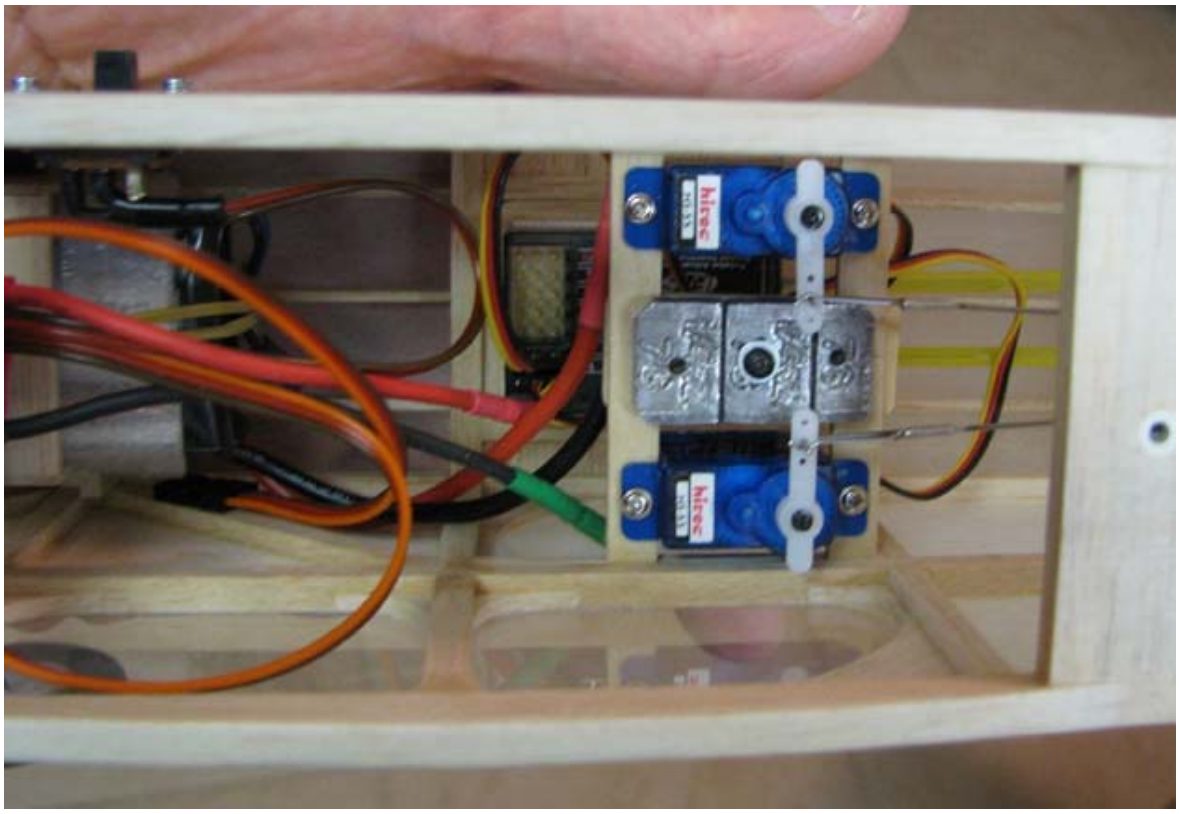
The model was completely assembled and placed on the AccuLab scales as shown below. The gross weight of the model was 437 grams (15.41 oz) as shown below. The balance point was still just slightly forward of the CG.

The minimum weight requirement for the SAM Speed 400 event is 16 ounces, which 453.60 grams. Therefore a ballast weight of 454-437 = 17 grams must be added to the Cloudster. A retainer for the ballast weight shown below was made using a 3/32" plywood plate and a 2-56 cap screw and washer. This was designed to fit under the two 1/16" plywood servo rails and utilizes a stop against the forward rail and a center spacer.



Three 1/4 oz segments of the Great Planes ballast lead weights was trimmed and drilled so that the weight including the plywood retainer, screw, and washer was 17 grams as shown below.

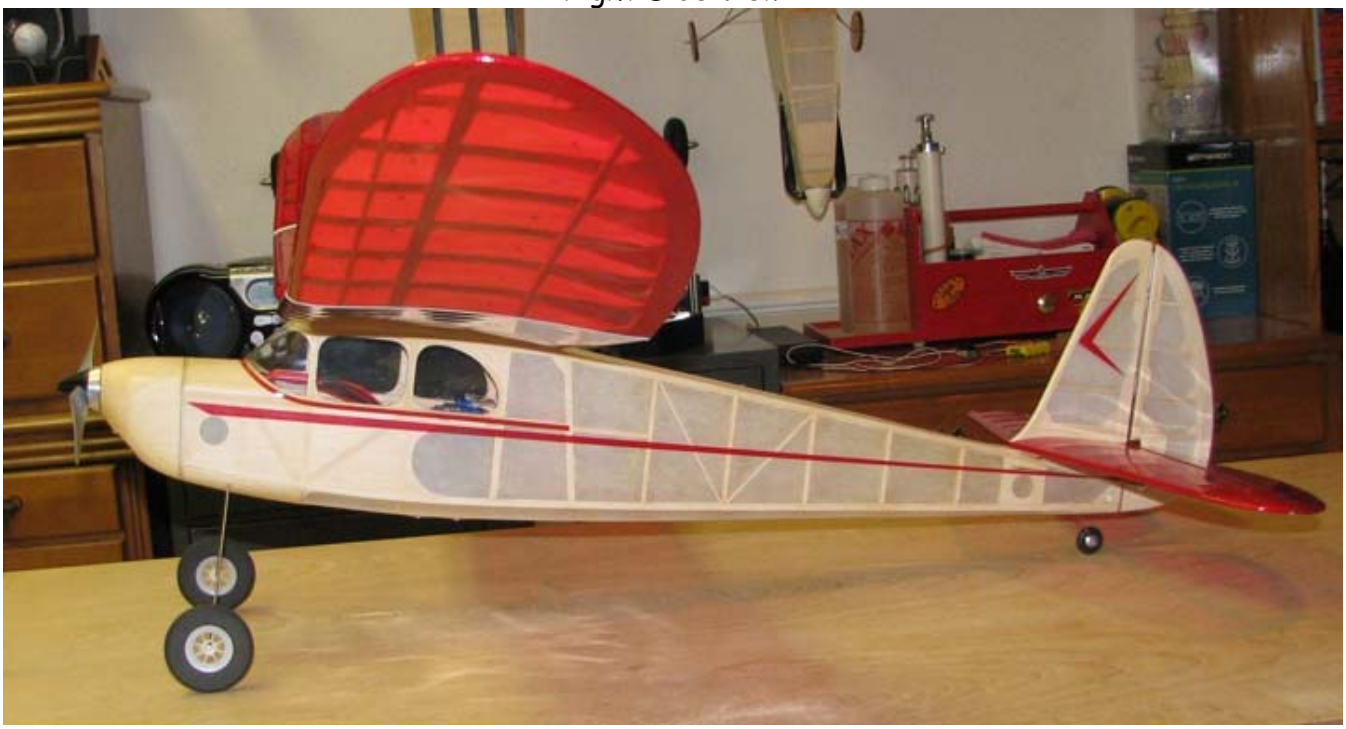
The ballast weight assembly was carefully positioned on the two servo rails between the two servos and screwed down tight as shown below. The weight's aft position put the balance point right on the desired CG.



For confirmation, the finished model, including the ballast weight, was again weighed on the AccuLab scales as shown below. The Cloudster weighs exactly 454 grams (16.01 oz) and is perfectly balanced.

I took the final six pictures of the finished Cloudster for you to see below.

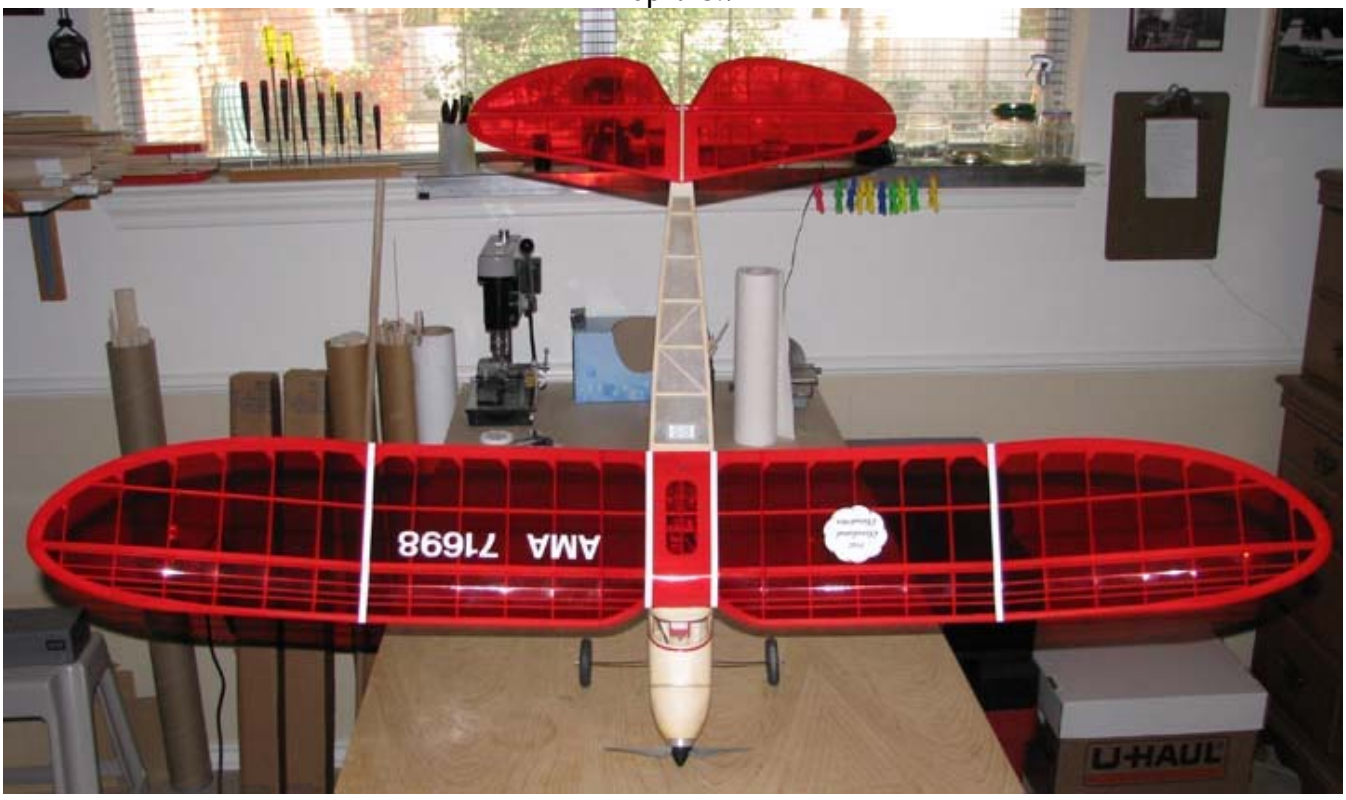
Right Side View



Left Top View

Right Frontal View

Top View



Left Rear View

Left Frontal View.

As this construction project draws to a close tonight, this is the 92nd and final Cloudster's construction report. I began this Speed 400 project on October 27, 2009, over five months ago and completed it this evening. I truly hope you have enjoyed my efforts on this project as much as I have sharing them with you. There will be one more follow up report later on in the spring after the weather gets good to present the results of the Cloudster's flight testing. So for now, good night and goodbye.....Tandy

Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Monday, May 03, 2010 10:02 AM
To: Undisclosed-Recipient: ;@smtp102.sbc.mail.mud.yahoo.com
Subject: 2010 Flt Test Prgm - 9 Cloudster Speed 400 Second Test Flight

2010 Flight Test Program

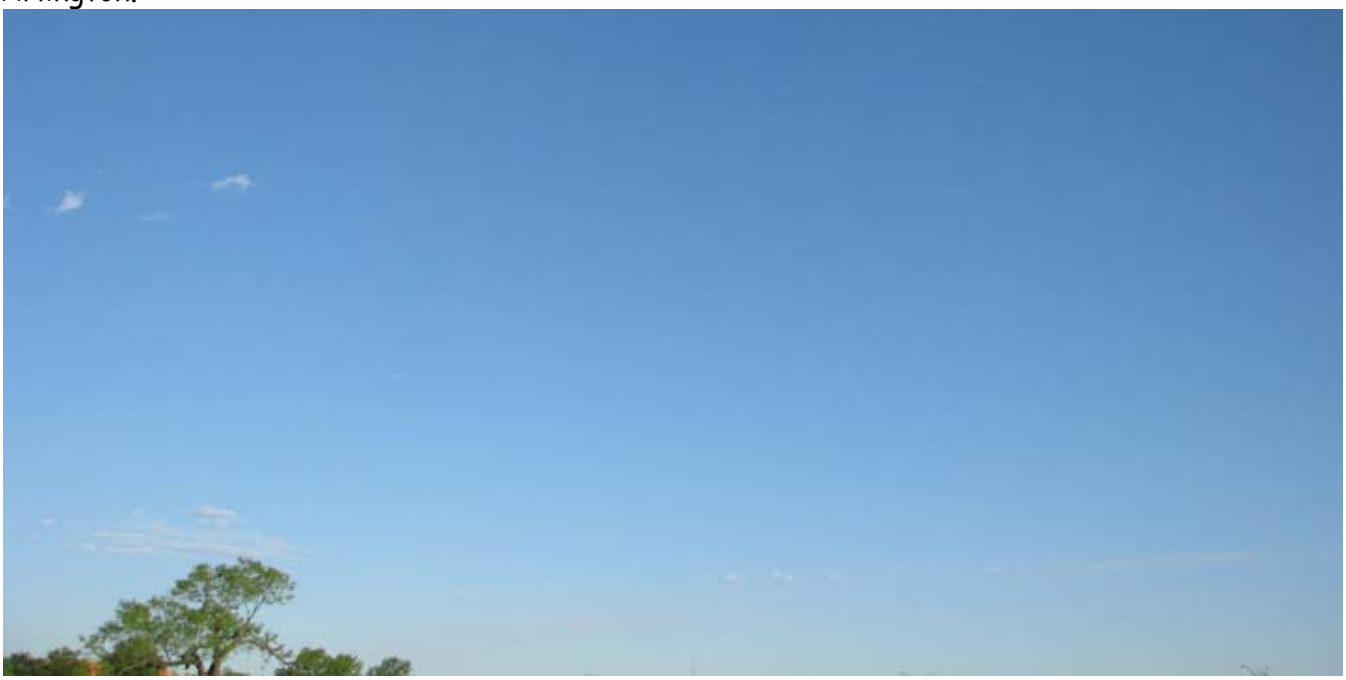
Sue and I went to Veteran's Park again this morning to test the 30% reduction in elevator control and get some in-flight pictures. We arrived around 7:30 a.m., clear, calm, and about 59 degrees. I assembled the Cloudster and took it to the edge of the park on the concrete walk way to check the RPM out in the open as shown below. At full throttle it tached 12,800 RPM. Yesterday I tried to check the RPM in model room and only got 6,500 RPM so it must have been the lights in the model room interfering with the tach.

We walked out to the center of the park's field to launch. I made one last check of the controls before I launched as shown below.

Sue caught the Cloudster a moment or so after launch as shown below.

For some reason I was having problems trimming the model as it was climbing out, but it did get quite high at the end of one minute. However, after I cut the motor I still couldn't seem to get

it under control and it was getting higher and further away. I sensed that I was beginning to loose the Cloudster as its image had grown very small now dur to range. So I added throttle to try to start coming back to the field. However, the power only aggravated the model's gyrations. Finally it just disappeared out of sight in the morning's clear blue sky somewhere over Arlington.



I have no explanation for went wrong this morning. I only know that the Cloudster is gone, unless someone happens to find it and calls me. Otherwise, this is last picture we will ever see of the Cloudster on its way up.....Tandy

Dave Harding

From: Tandy C. Walker [tandyw@flash.net]

Sent: Friday, July 09, 2010 3:21 PM

To: Buice, Bo; Burk, Jerry; Burkhart, Jay; Davidson, Larry (New); Ettel, Calvin; Folkerth, Dick; Friestad, Roland SAM Ed; Gies, Karl; Grant, George; Gray, Tommy; Hanson, David; Harding, Dave; Henry, Walt ; Herbon, Alfredo; Hiner, Jack; Holman, Bob; Horn, Duke; Hough, Patrick; Kime, Chuck; Kruse, Larry; Lollar, James; Lollar, James Shop; Martin, Gerald; McIntyre, Michael; McLeod, Dan; Montes, Sergio; Myers, Mike; Nevels, Ned; O'Reilly, Jim; Pardue, Albert M.; Phillips, Gary; Reich, Charlie; Rozelle, Steve; Ryan, Thomas; Stern, Marvin; Sutterfield, Cal; Fedor, Mike; Walker, T. Cy; Walker, Tandy C.; Wallock, Gene; Walter, Bucky; Wilson, Van; Angel, Bob; Taylor, Bill & Gail; Hudson, Bill; Kilmer, Michael; Hatch, Dick; Bollinger, Newt; Otts, Reese; Kafer, Ted; Vanderbeek, Bill

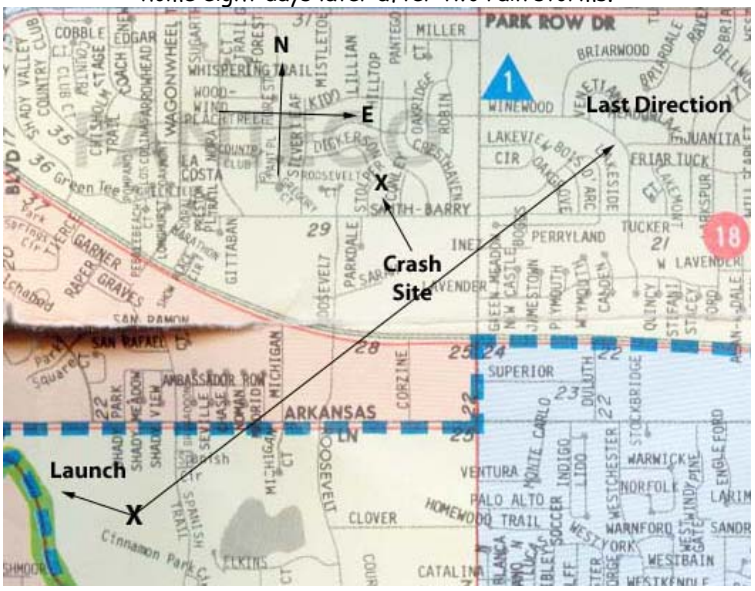
Cc: Dickerson, Nate; Cajin Graphics

Subject: Summary of 2nd Cloudster Rebuild

Second Cloudster 300

On May 3, 2010, I had a fly away on the third test flight of my new 300 sq. in. electric Cloudster.

On May 11, 2010, the lost Cloudster was found in the back yard of an Arlington home eight days later after two rain storms.



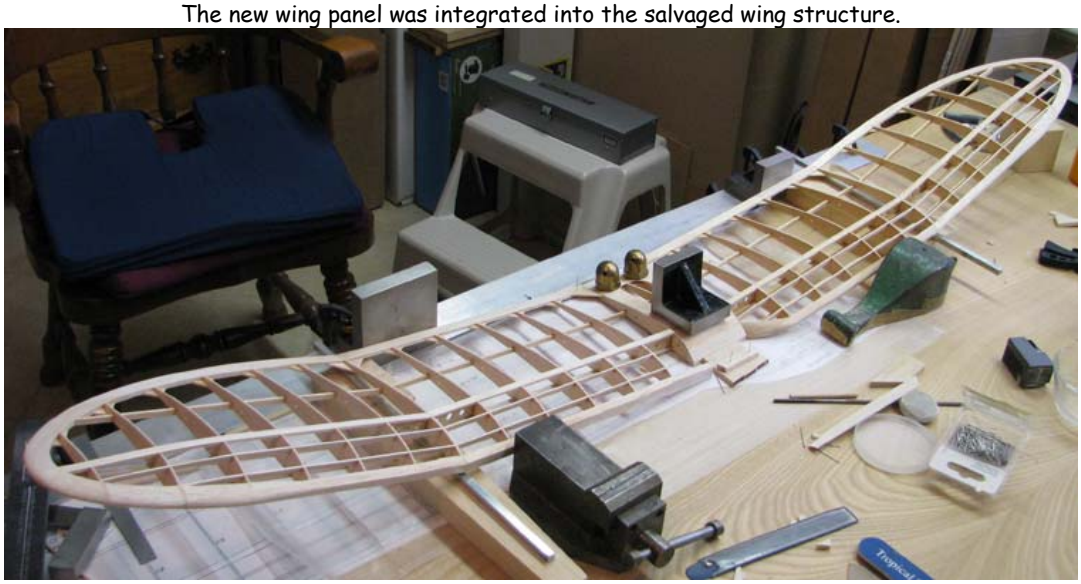
It had suffered rather extensive damage.

I decided to jump back in and build another 300 sq. in. Cloudster for the Speed 400 event! It was too good of a flyer for me not to have one for this year's SAM Champs, if it could be built quickly. I concluded that I could build a second one in a much shorter time using what components I could salvage and my own construction reports as a guide.

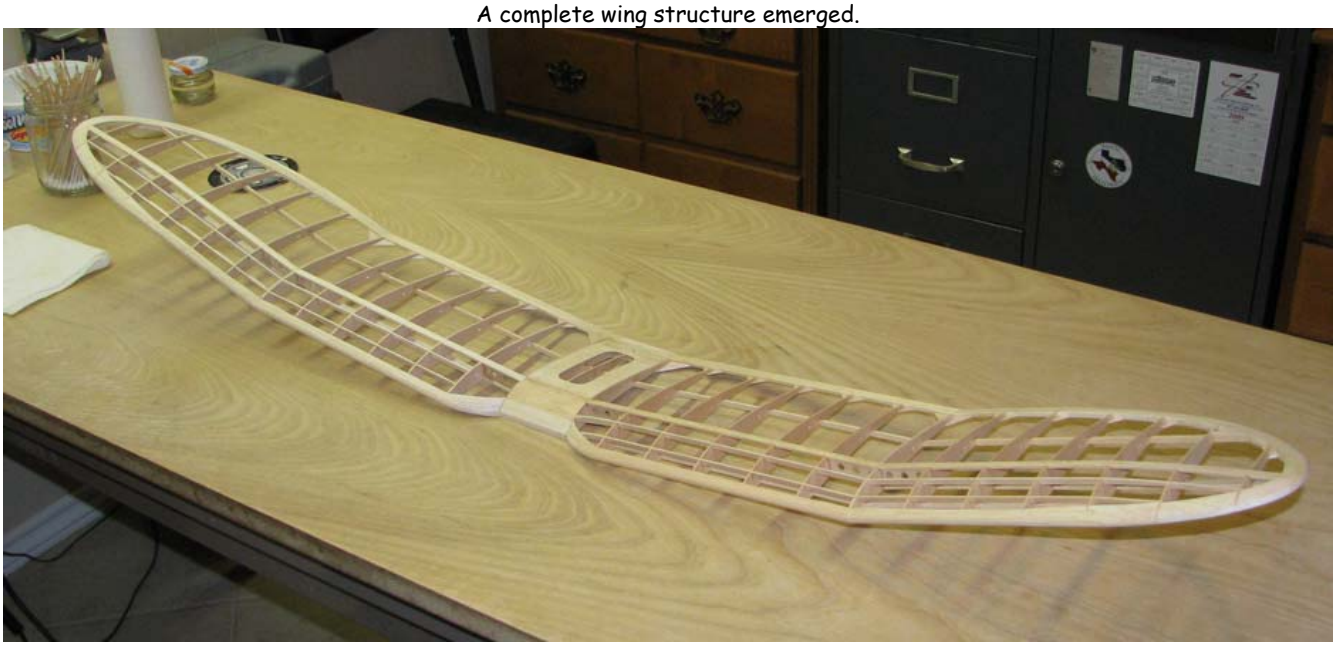
The right wing panel was missing and the center section was badly damaged, but the main plywood spar brace was in tact.

A completely new right wing panel was built.

The new wing panel was integrated into the salvaged wing structure.

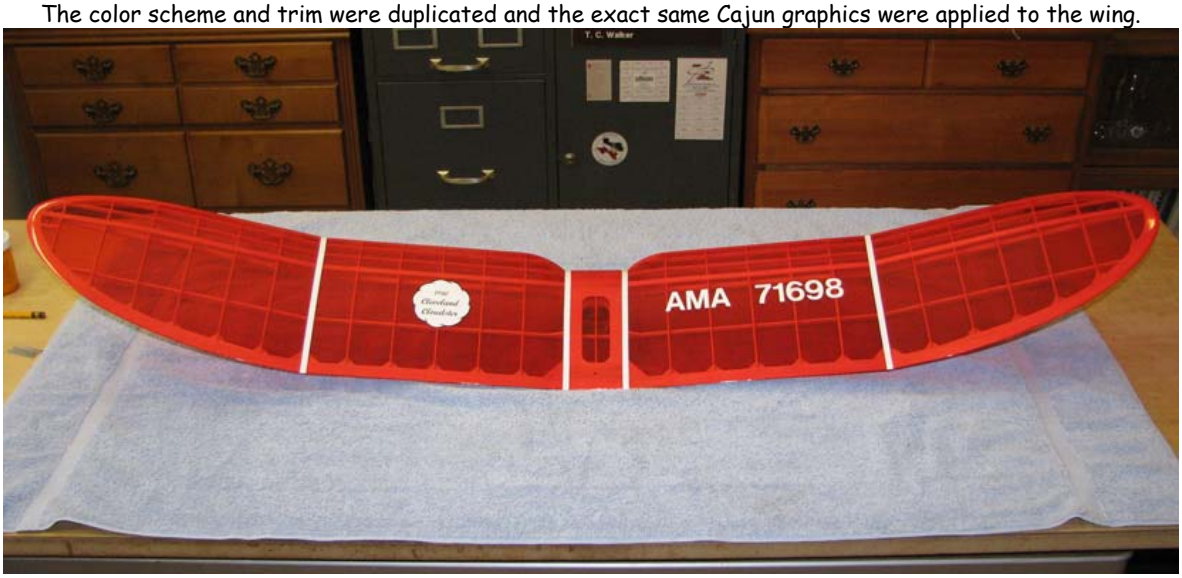


A complete wing structure emerged.

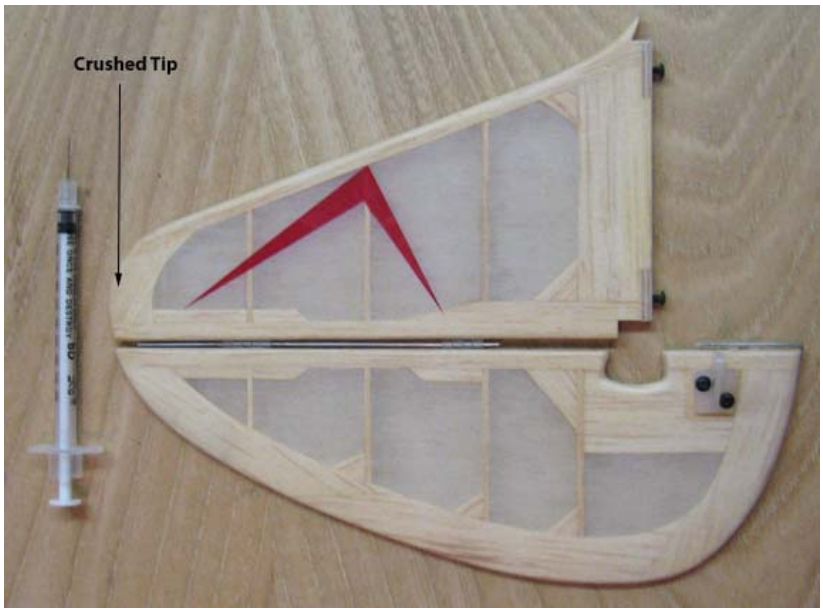


The wing structure was covered with transparent red UltraCote Lite.

The color scheme and trim were duplicated and the exact same Cajun graphics were applied to the wing.



When the vertical tail covering was cleaned off, it was discovered that the tip of the fin had received a moderate blow to the top edge, leaving the silk covering on one side of the tip wood a little wrinkled. Distilled water was injected into the crushed balsa through the covering with the syringe and a little heat was applied to the area, which expanded the damp balsa underneath and tightened up the silk covering.

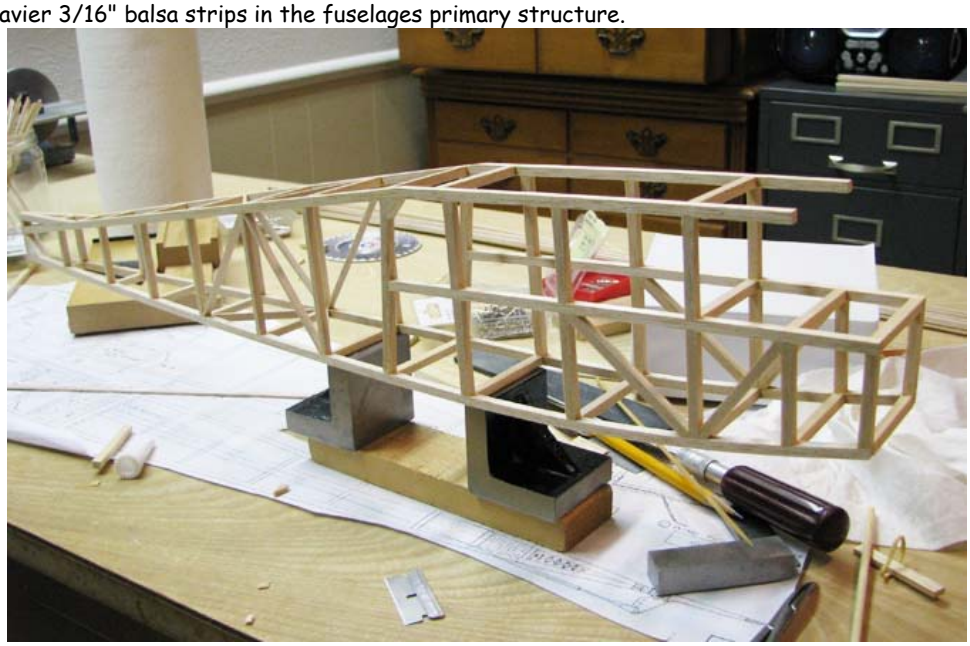


The elevator control surface has been subjected to exposure and over stressing, which had significantly wrinkled the covering.

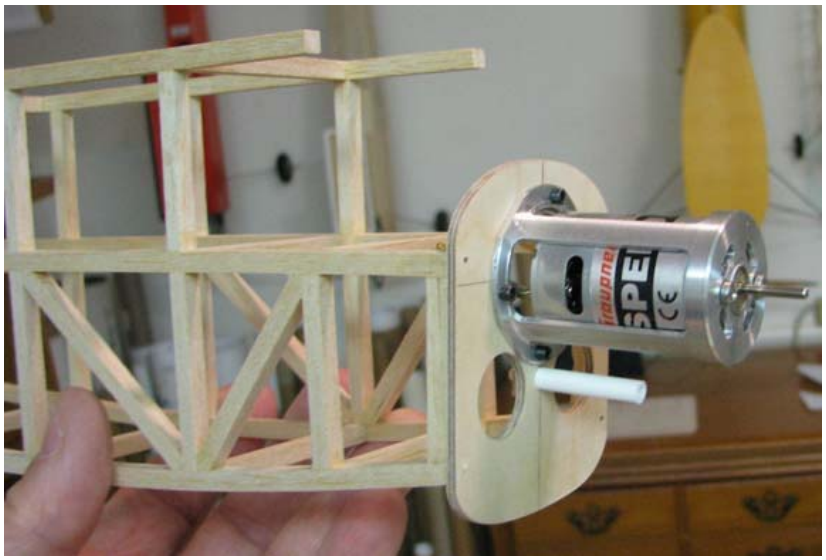
It was necessary to remove all of the covering from both the elevator and stab so each joint could be inspected and reglued as necessary. Discolored wood from water damage was bleached out with household bleach.

The elevator and stab were recovered with transparent red UltraCote Lite.

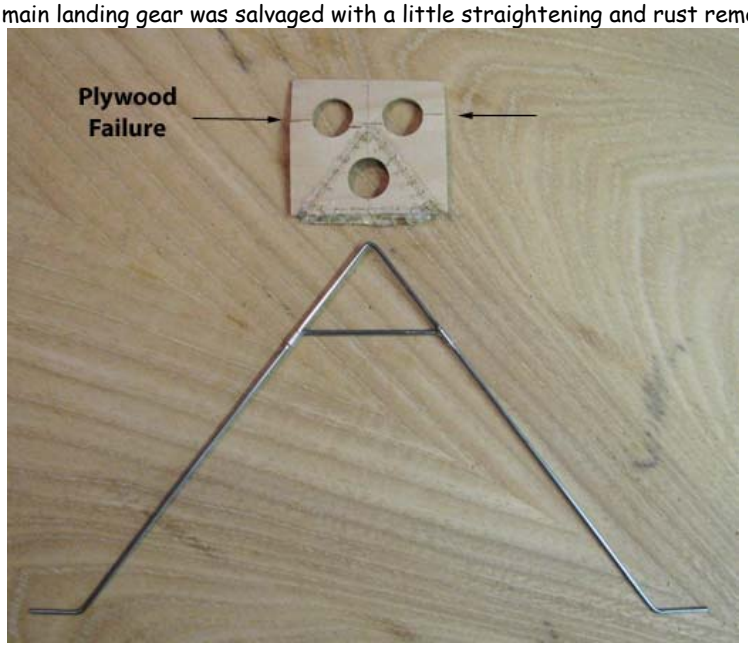
The fuselage was so damaged that it was not salvageable so a new one had to be built. To add a little weight and reduce ballast, I used heavier 3/16" balsa strips in the fuselages primary structure.



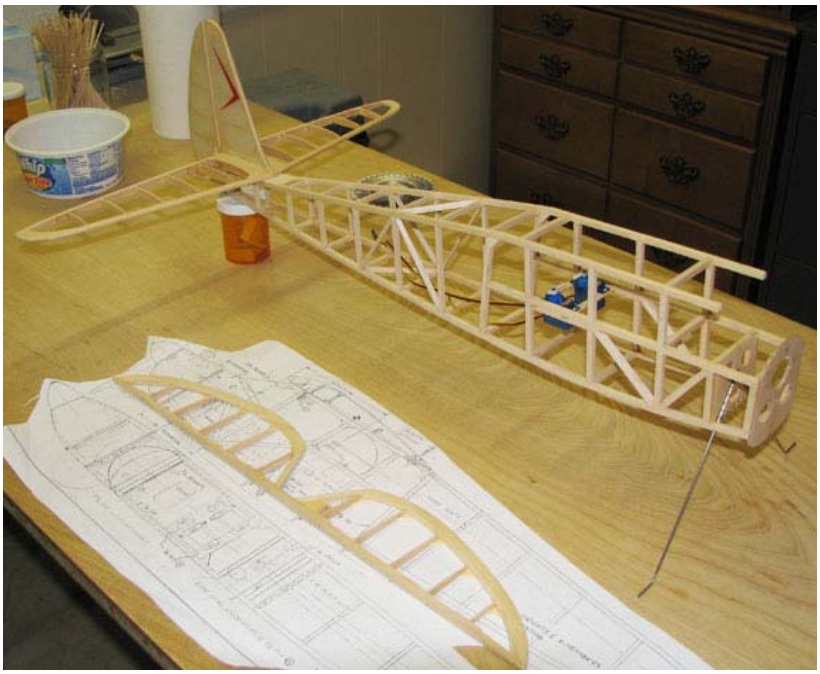
To save time an aluminum motor mount was used.



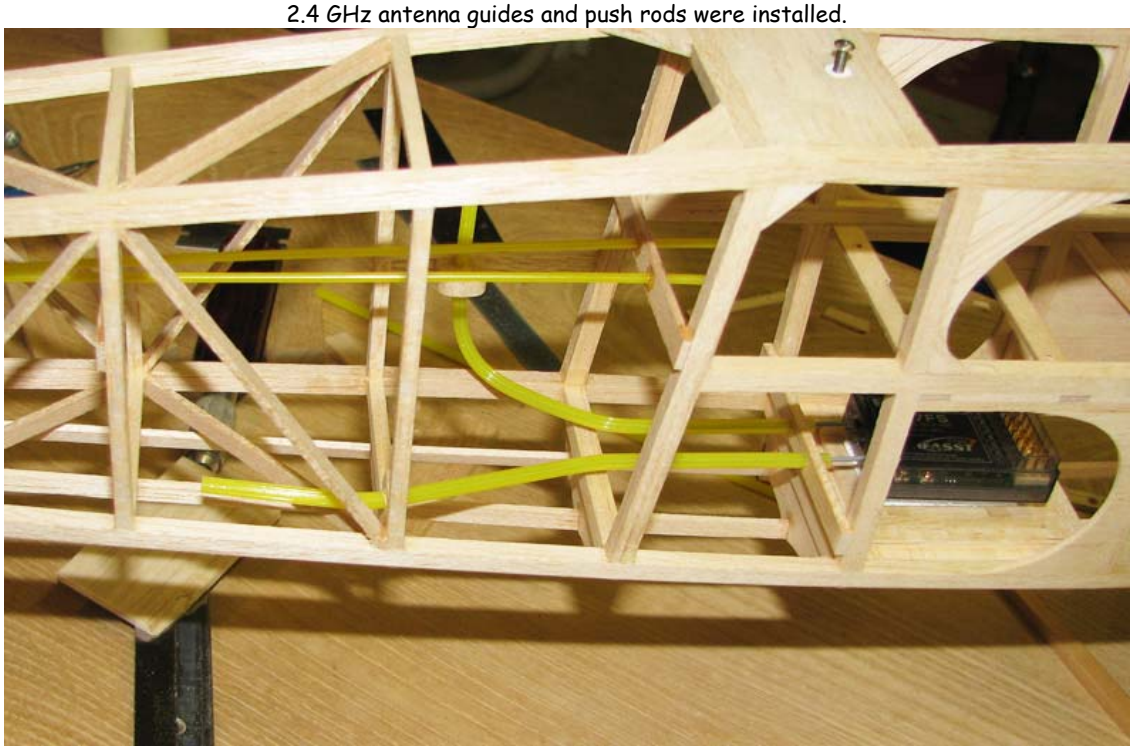
The main landing gear was salvaged with a little straightening and rust removal.



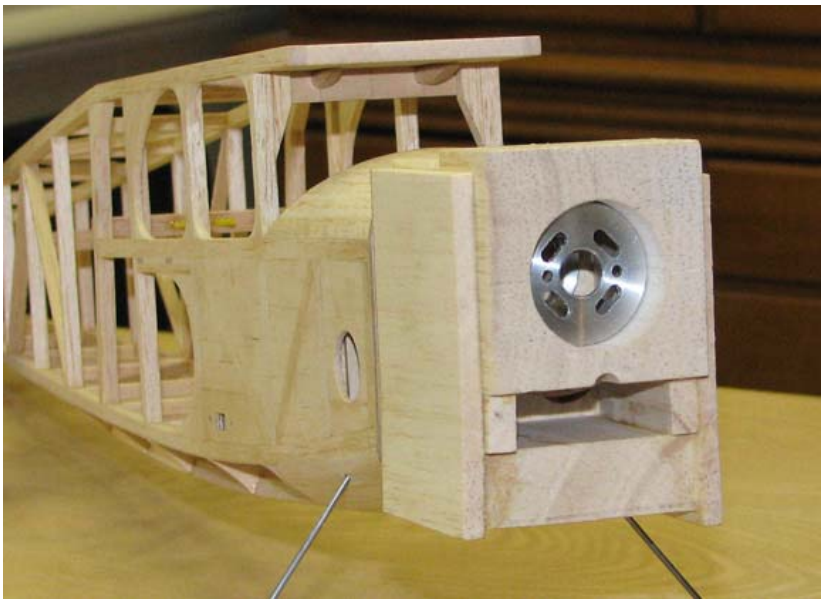
Because of all of the water damage, two new servos along with new receiver, ESC, battery, and motor were purchased.



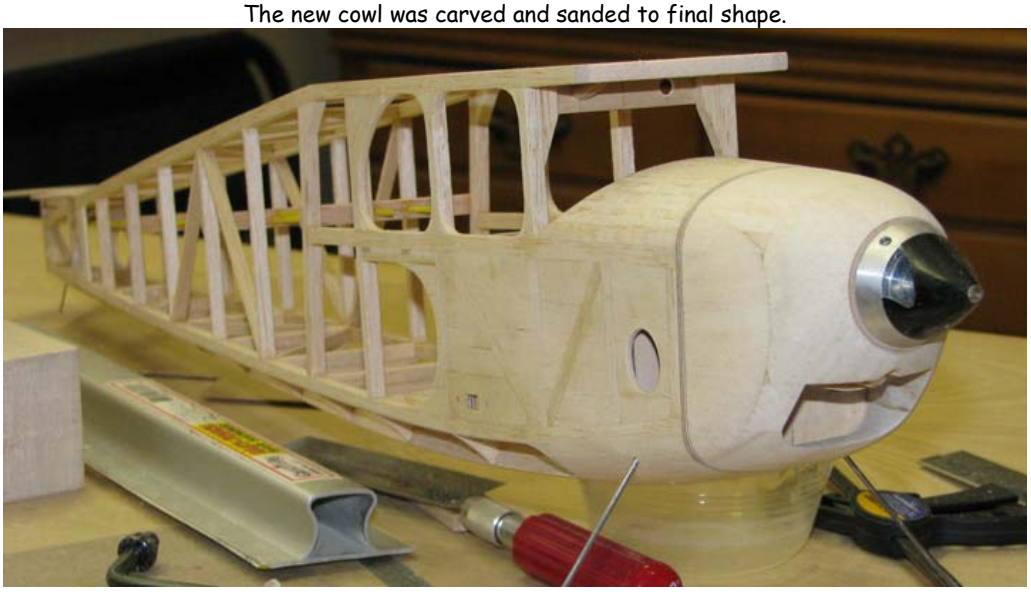
2.4 GHz antenna guides and push rods were installed.



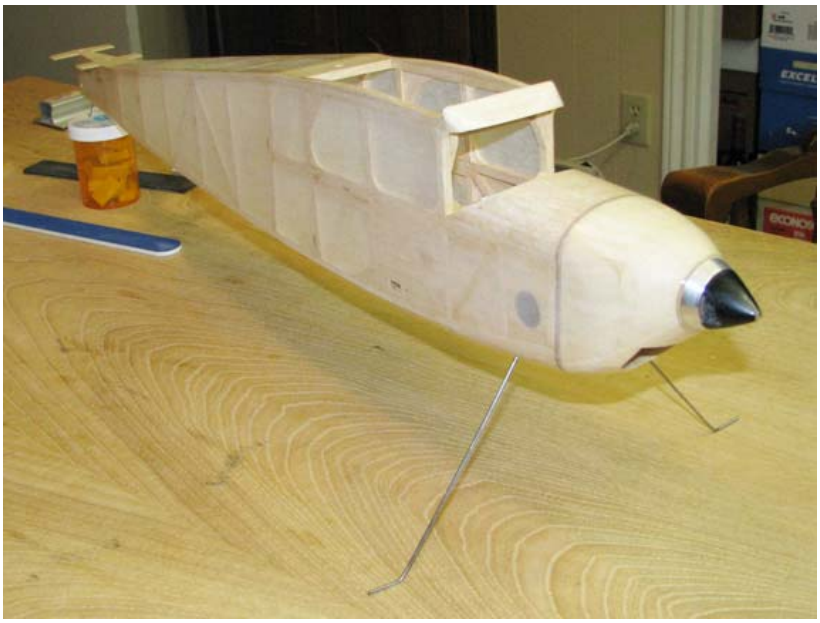
Balsa blocks were glued together to form the blank for the new cowl.



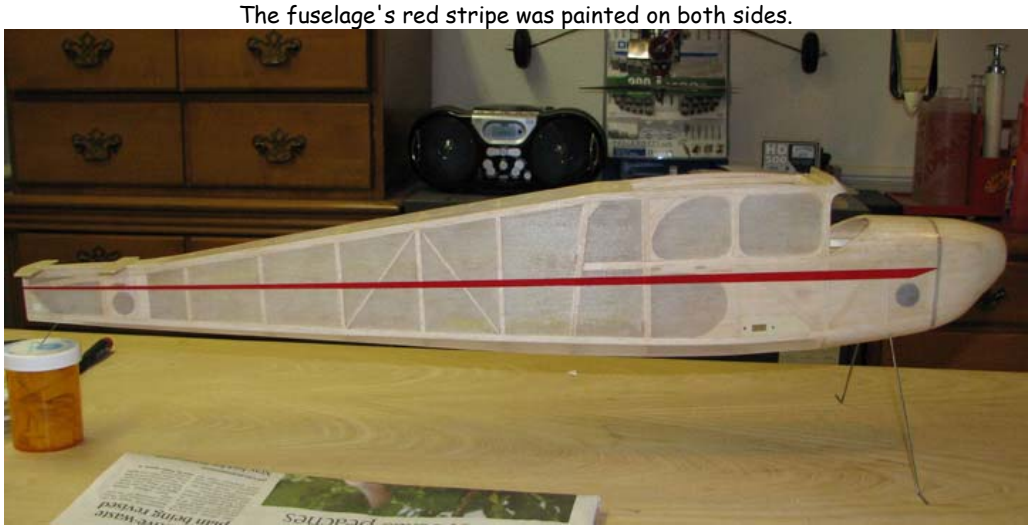
The new cowl was carved and sanded to final shape.



The fuselage and cowl were double covered with white silk over Polyspan Lite and given seven coats of clear nitrate dope.



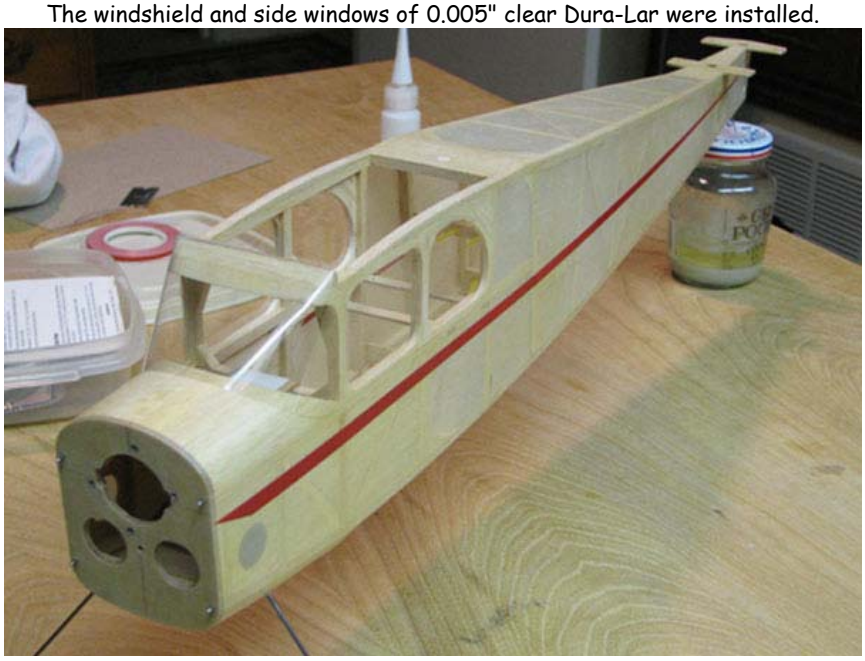
The fuselage's red stripe was painted on both sides.



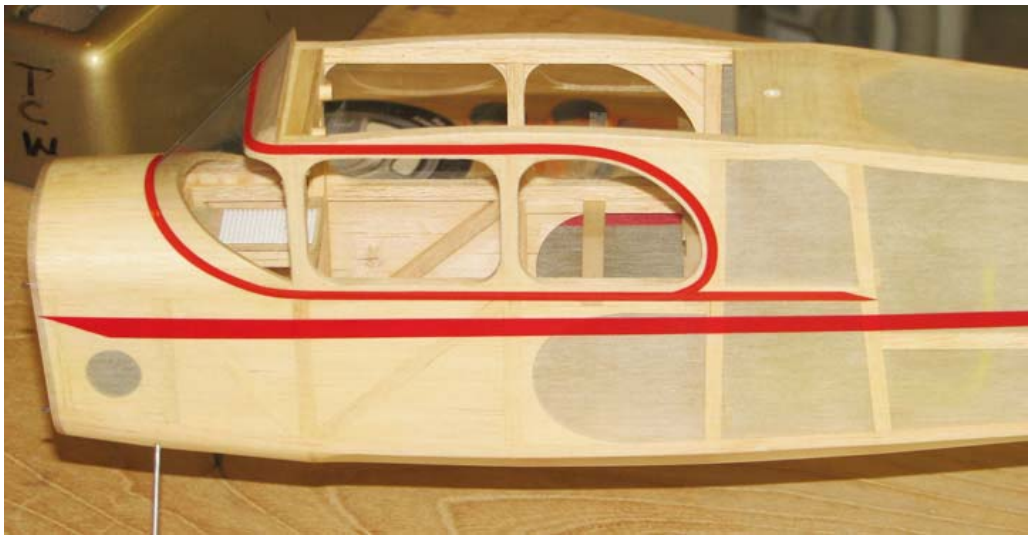
The fuselage and cowl were given one thin air brushed coat of clear satin Klass Kote.

The covering was cut out to form the four side window openings.

The windshield and side windows of 0.005" clear Dura-Lar were installed.



Red striping tape was used to seal the bottom of the windshield as well as trim the side windows.



This second Cloudster was finished this morning, 64 days after the decision to build a new one.

The Cloudster's balance point is at 48.7% as per the Jim Adam's plan and the total weight is 16.05 ounces.....Tandy


AMA 71698

Tandy's second Cloudster

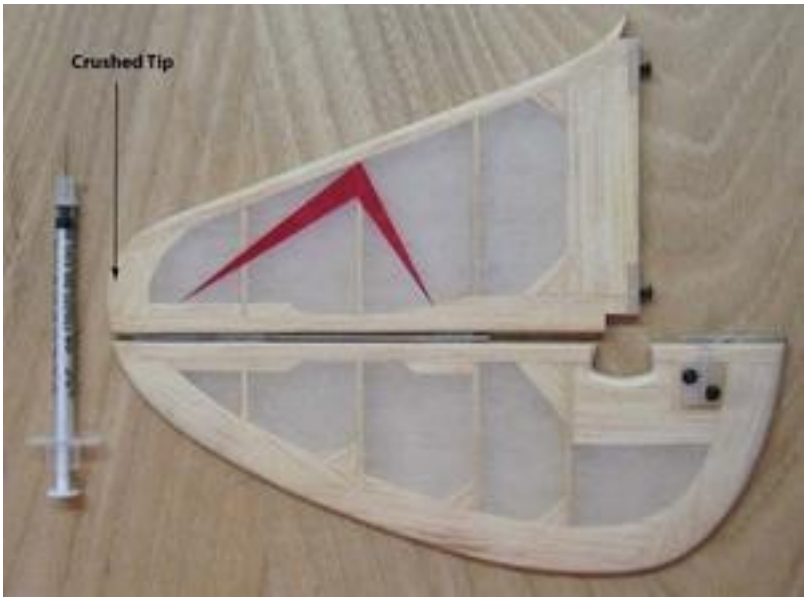
18 May 2010

Good Morning Trevor,
At 75 years of age, I am not one to give up or get discouraged easily. The Speed 400 event is one that interests me very much. I think the Cleveland Cloudster with the polyhedral wing is going to be strong competitor in this event. The recovered Cloudster is pretty well trashed out, but there are some tail components that are use-able. Since I still have time before the 2010 SAM Champs in September, I have started construction on a second Cloudster. I am not writing detailed construction reports on this rebuild because it would be redundant with the first series, but I will share a few pictures with you on where I am at the present time.


Jigging for Assembling New Fuselage Sides


New Fuselage Primary Structure

New Aluminum Motor Mount

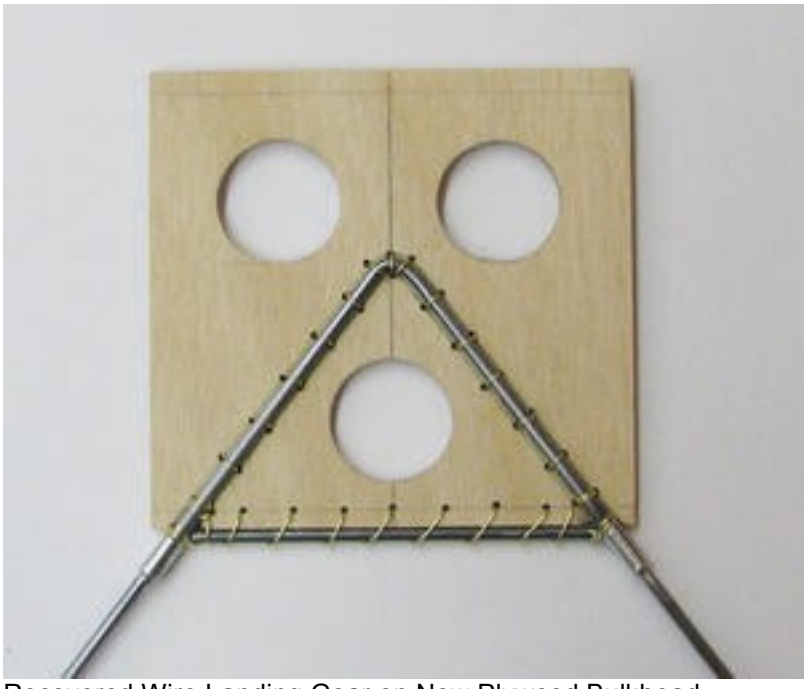


The vertical tail covering was water stained and I cleaned that all off with a glass cleaner and soft rag. I discovered that the tip of the fin had received a moderate blow to the top edge as shown below, which left the silk covering on one side of the tip wood a little wrinkled. I injected distilled water into the crushed balsa through the covering with the syringe that has a "hair" size needle also shown below. Then I applied a little heat to the area, which expanded the damp balsa underneath and tightened up the silk covering. This completely repaired the damaged tip so you can not tell it was ever damaged!

Recovered Stressed Elevator and Stab

Stripped, Re-glued, and refinished Horizontal Tail

Jigging for Stab Mounting Platform



Recovered Wire Landing Gear on New Plywood Bulkhead

So you see Trevor, there will be a new second Cloudster in not the too distant future.
Tandy

Instructions and Cautions for your Speed 400 Propulsion System.

For New To Electrics ~ Special Instructions/Cautions

1. **Always turn on your transmitter before plugging-in the battery**
2. **Always make sure the throttle is closed**
3. **The first time you try the system do so without the propeller.**
4. **On every landing make SURE you close the throttle***
5. **On a crash landing ALWAYS CLOSE the throttle***
6. **After every flight always unplug the battery****

* If you stall the motor by catching the propeller on the ground, the system will "see" very high current ~ high enough to melt something; ESC or Motor

** LiPoly batteries MUST NOT be discharged below about 3 volts per cell. For the two-cell battery this is 6 volts. If you leave it plugged in to the ESC it will drain to below this voltage and ruin the battery even if the transmitter is not turned on.

About Electric Motors and their Limits

Most motors we use in model airplanes have permanent magnets and copper wire wound armatures. The brushed motors use carbon brushes rubbing on a commutator to switch the voltage to alternating electro magnets. The brushless motors accomplish the same switching by electronic means.

However, all such motors have limits and as we are seeking the most power for the weight of the motor we push them towards these limits. There are three limits that concern us with the Speed 400 (Mabuchi) motor*. They are;

1. Temperature in the copper windings (the bare copper is insulated with a varnish like substance)
2. Temperature in the permanent magnet; beyond a certain temperature the magnetic properties are permanently diminished.
3. Speed of the armature; windings can separate due to centrifugal force.

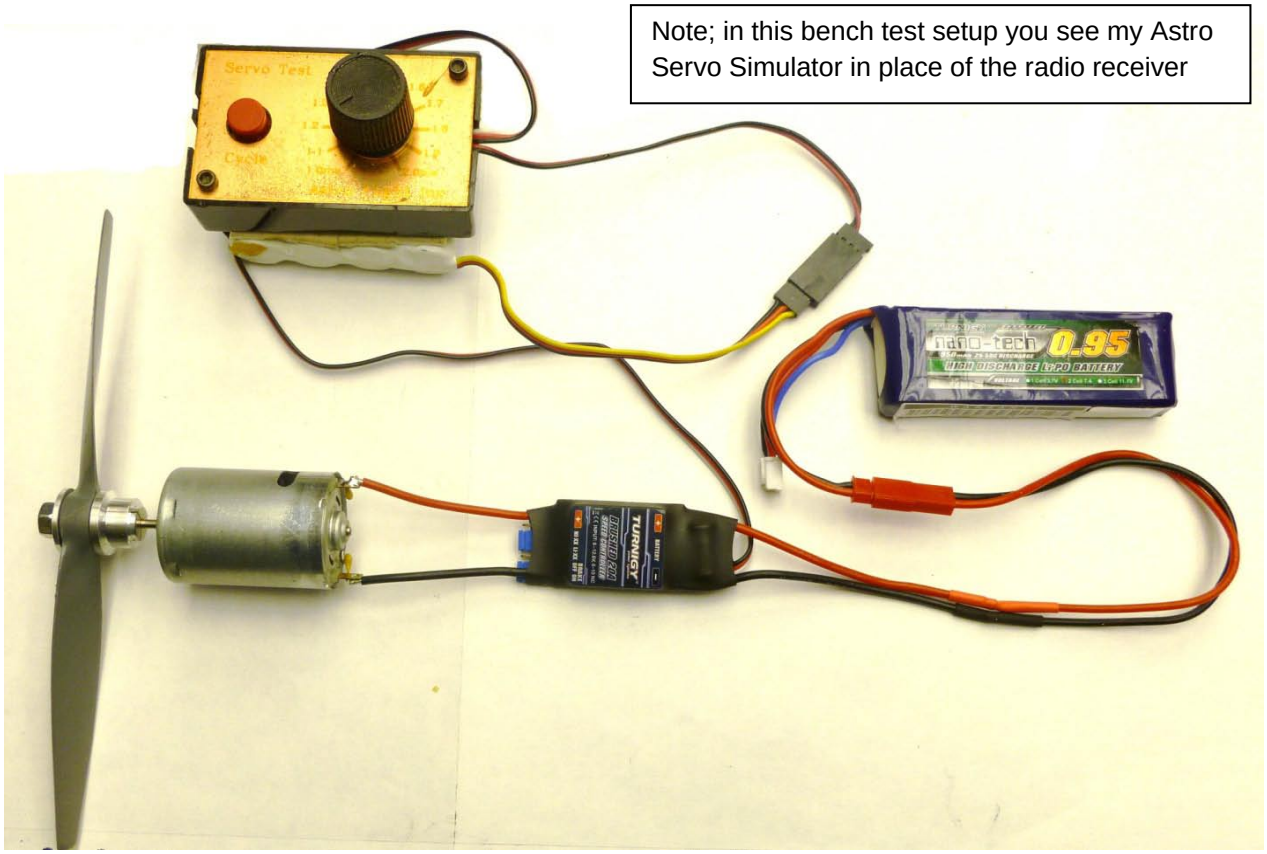
So long as we use a two-cell battery we don't worry about #3. But the first two are a real concern.

The temperature is dependent on the internal losses in the motor, cooling and run time. The losses are a function of the operating current, which in turn depends on the propeller used. For the Speed 400 SAM competitions I use the GWS DD 6x3 prop. It pulls about 8 amps and will take an aerodynamically clean 16 ounce model almost out of sight in the three minute run. If properly cooled the motor will survive just fine. Some use a bigger prop such as the APC 6 x 4 or even larger; do so at your own risk. But know that the magnet damage is not apparent until you fly and find the performance is way down.

I always include cooling in my Speed 400 airplanes. I usually mount the motor to a forward bulkhead where I cut cooling holes to match the front face of the motor. I have included a pattern for you to do the same if you mount your motor this way. In addition to these cooling holes I also arrange for the motor compartment to have cooling air via a small intake and exhaust. It is also a good idea to have some cooling flow over the ESC too.

**Note on Limits; High quality motors use high temperature insulation on the armature wires, neodymium or other rare materials in the magnets to increase the critical "Currie Point" temperature and armatures are nowadays wound with Kevlar thread to vastly increase the limiting armature speed.*

System description



Note; in this bench test setup you see my Astro Servo Simulator in place of the radio receiver

Maxx Products ACC341 motor http://www.maxxprod.com/mpi/mpi-10.html

Turnigy TGY-20A/33300 20A BRUSHED ESC
Turnigy nano-tech 950mah 2S 25~50C Lipo Pack
Hobby King USA warehouse; http://www.hobbyking.com/hobbyking/store/index.asp

Prop adaptor 2.3 mm shaft, and GWS DD 6x3 prop and JST Male connector and wire pigtail ~ many vendors

Motor mounting screws ~ 2.3 mm x 8 mm Search eBay as these are used in several model helicopters.

ESC instructions

Included.

Battery charging

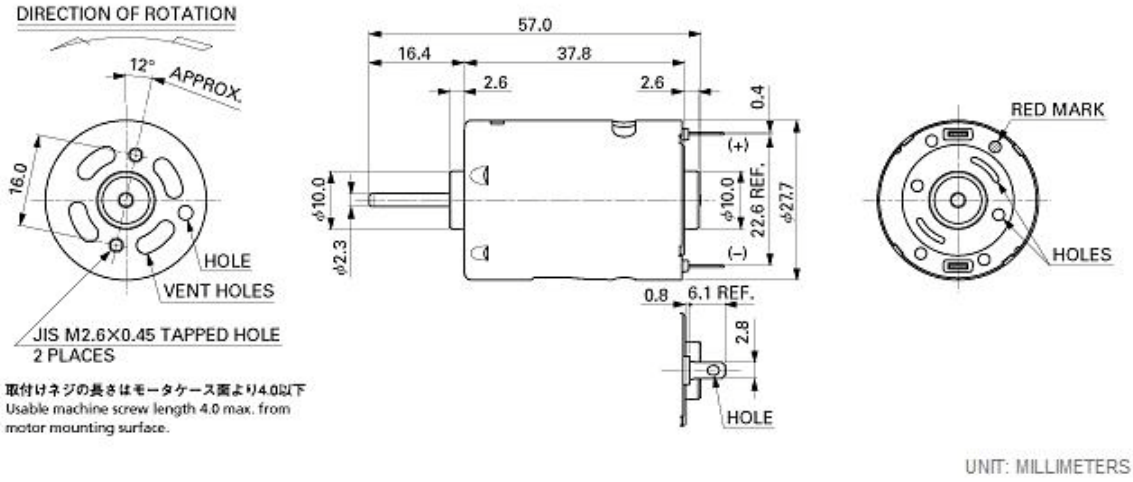
You MUST use a LiPo battery charger, and it is wise to hold the battery in a paint can, ammo box, cement block or other fire proof container while charging. This is probably over the top, but even the 1% problems can grow to be disasters. It is not necessary to balance charge the battery every time but check it once in a while.

If you damage the battery in a crash etc. discard it. Read the web to discover how.

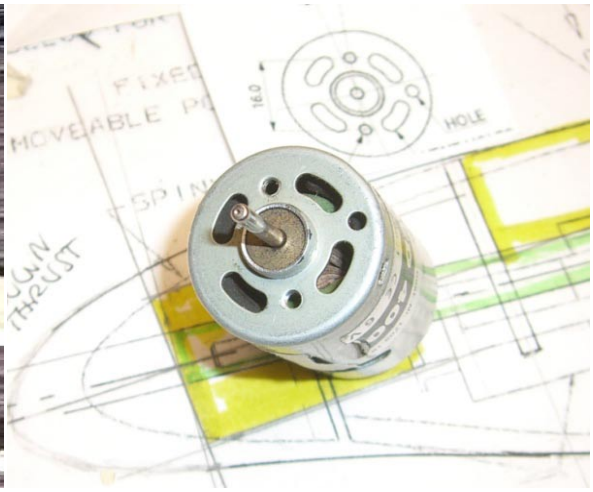
Your ESC will shut down the motor, but enable continued flight control when you have used up the juice to the 6 volt level. With the provided 950 mAh battery this will be about five minutes of full throttle running.

If you need more batteries make sure they are TWO cell ~ 7.4 volts nominal. If you can't solder then look for batteries with a JST connector that matches the one on the battery I have sent you.

Installation

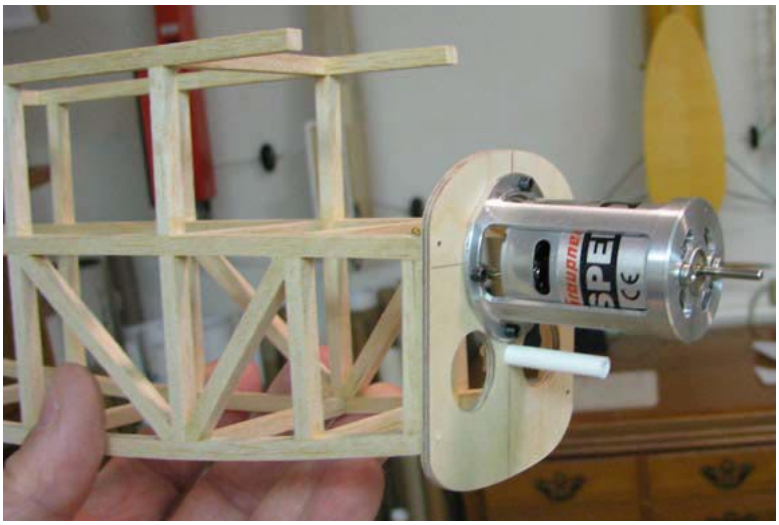


For models I design I find it simplest to mount the motor to the front former as shown here on my TU-ANT-25. The motor is fixed by two 2.3 mm screws. Make sure the screws are not bottoming on the motor as this will be into the windings. Test the length and use washers to ensure there is clearance.



If you are converting a 1/2 A Cox powered airplane you can buy mounts that will attach your Speed 400 to the Cox bulkhead. The prettiest of these mounts is made by Loren Kramer especially for this purpose. Here is one of his mounts used by Tandy Walker on one of his models. You can reach Loren at;

Loren Kramer; 707-763-9170



Another approach is to clamp the motor to longitudinal mount rails, like you might have used to attach a beam mounted glow motor. Here again heat is your enemy so aluminum clamps are recommended. You could buy them or simply make your own from aluminum flashing, a very useful material available inexpensively from Home Depot and other such stores.

Our friends in SAM 8 have a whole web page devoted to mounting Speed 400 motors although some of then involve gearboxes which are not allowed in this event. http://the-great-sam8.com/s400info.html

Operation

Be sure to test your installation for the first time without the propeller!

First hand launch should be with partial power. If you have insufficient downthrust you may climb into a loop with full power.

On landing watch the prop position. These GWS props are quite delicate and if the prop is up-and-down give the throttle a little bump until the prop blades are horizontal. Remember to shut the throttle landing.

If you do land with the prop vertical check the root of it after the flight. If a blade is somewhat swept back look at the root and see if there is any damage. If there is discard the prop. You don't want it to fail when turning fast; these guys will turn 15k.

Have FUN.

Oh, if you do fly in the Speed 400 event in a SAM meet let me know and I will send you $10 (one time only!) **Dave**