David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Tuesday, February 09, 2010 6:51 PM
To: Undisclosed-Recipient: ;@smtp102.sbc.mail.mud.yahoo.com
Subject: 58 Speed 400 Cloudster - Fuselage Side Inlay and Receiver Mount

Speed 400 Cloudster Project

I only got to work on the Cloudster off an on today between morning and afternoon scheduled medical appointments. Before I begin this report, I want to pass along a response from Jay Burkart correcting a statement I made in yesterday's Report No. 57.

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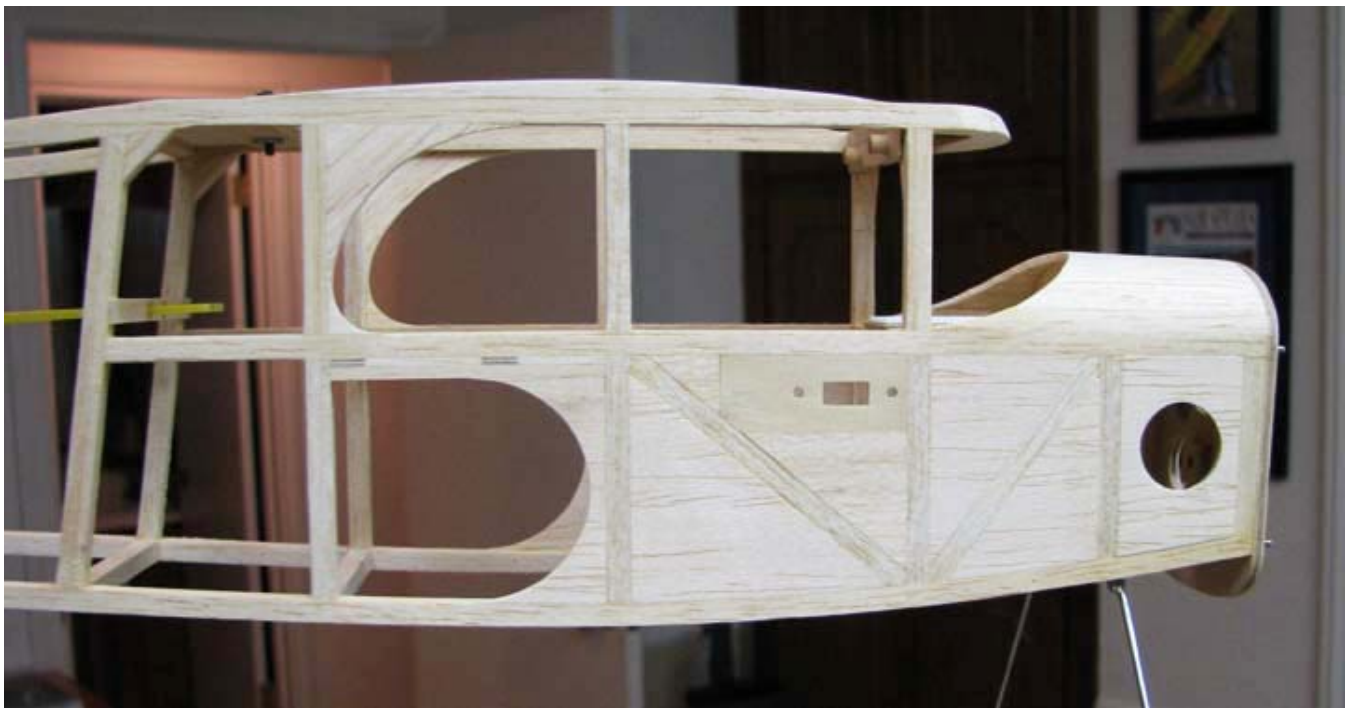
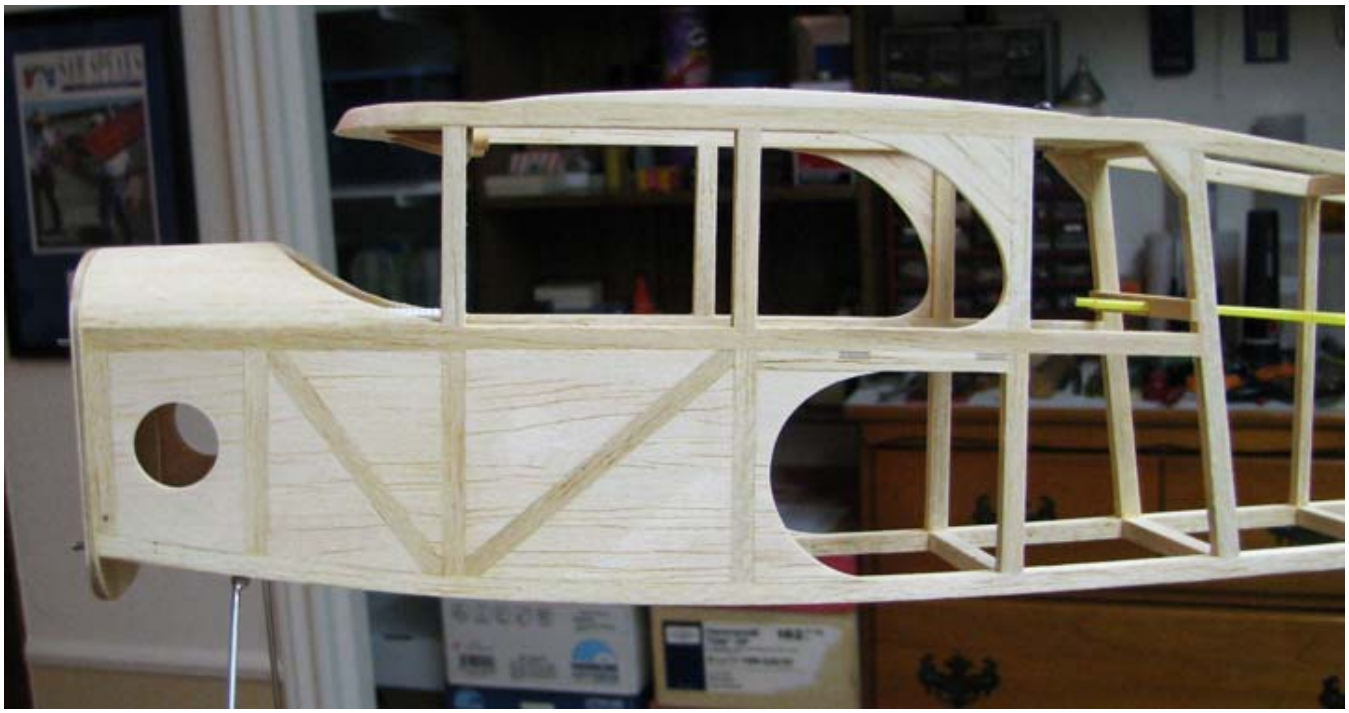
Tandy, a word to the wise to share with all of your buddies on electric. The switch on a ESC (speed controller) is NOT and On and OFF switch. It is an ARMING Switch. When you plug the battery into a ESC it is hot and working. but the switch keeps the signal from the receiver from getting to the ESC to hange the throttle setting. So that means that the ESC is drawing power from the battery even though it seems like nothing is happening. Which in turn means that it is draining the battery a little and if you forget to unhook the battery even though the switch is in the off position it can easily drain the battery FLAT. So that will absolutely ruin a Lipo battery. When you are done flying always unplug the battery or learn the hard and expensive way. I know because I forget at times and have to buy another Lipo.....
Jay

****

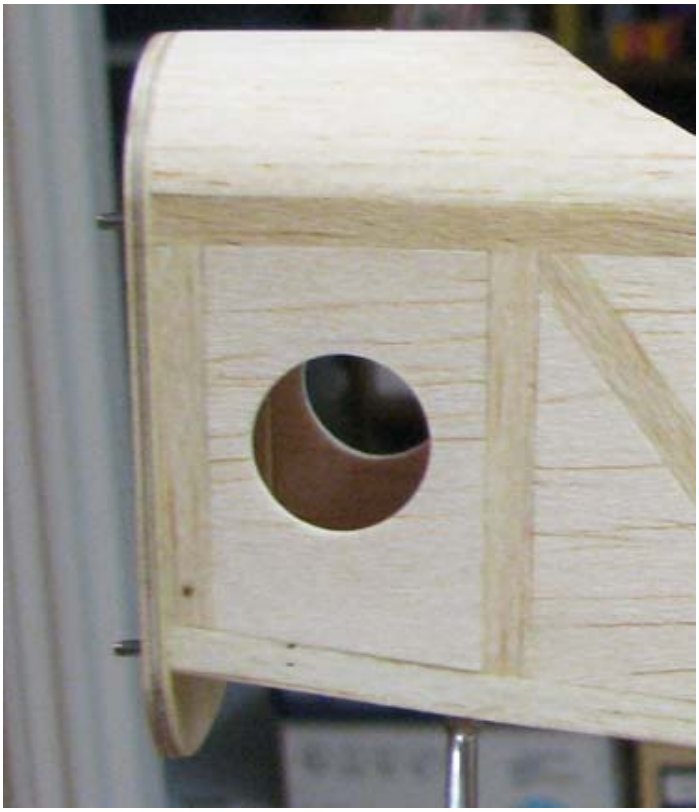
OK, to inlay the fuselage side structure, 1/16" medium balsa sheet was used. The right side of the fuselage inlay is shown below. However, 3/32" sheet balsa was used on the combing on the aft window at the rear. There is still more considerable work to do on the windows.



The left side of the fuselage inlay is shown below. Notice the hole in the inlay.



This is a close up of the hole in the first bay of the fuselage structure. Its purpose is to help promote additional air ventilation and circulation for cooling the Speed 400 electric motor.....Tandy



David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Wednesday, February 10, 2010 2:48 PM
To: Undisclosed-Recipient: ;@smtp101.sbc.mail.mud.yahoo.com
Subject: 59 Speed 400 Cloudster - Removable Battery Box Design and Window Fillets

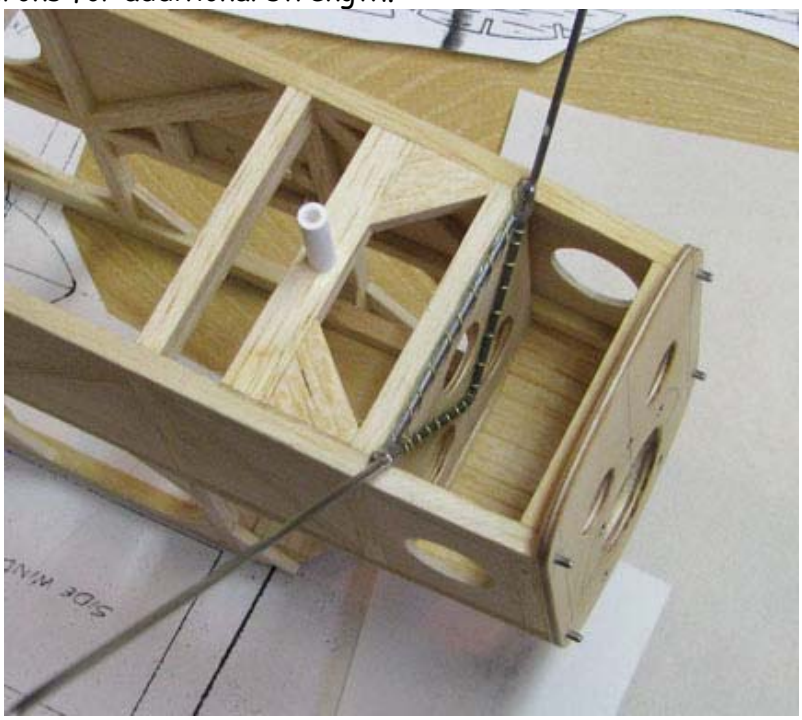
Speed 400 Cloudster Project

It was intended that the battery box made in Report No. 56 was to be glued into the fuselage structure. However, this will require a hatch in the bottom of the fuselage to get the Li-Po battery out for charging. As you well know, constructing and installing a hatch is a significant undertaking and should be avoided if at all possible. To address this issue, a design to make the battery box removable was developed so that the battery in its box can be installed and removed through the top opening in the fuselage under the wing.

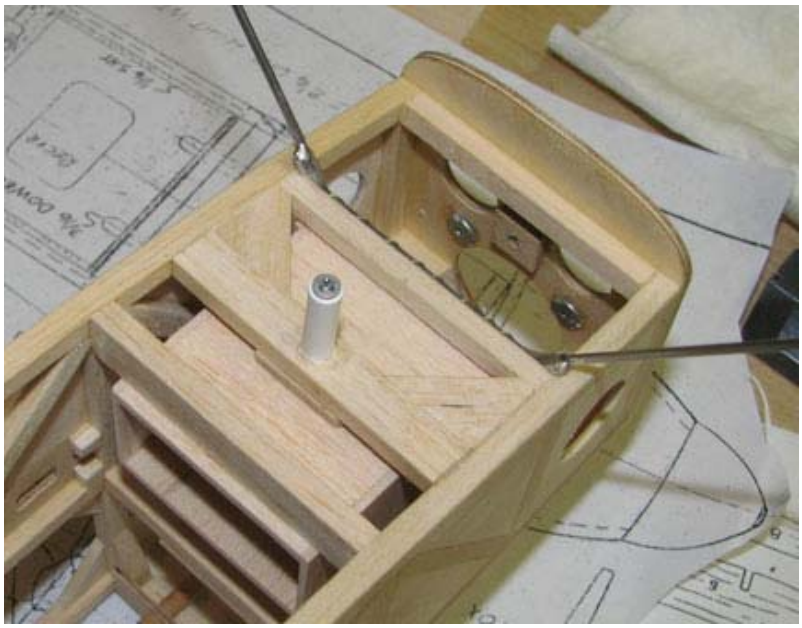
The first task was to provide an attachment hard point on the battery box itself. A small rectangle was cut out of 1/8" plywood. A hole was drilled in the center and a 2-56 blind nut was embedded in the plywood. Another hole was cut out in the center of the bottom of the battery box for the head of the 2-56 blind nut to fit down into so that the plywood rectangle would fit down flush on the bottom of the battery box when it was glued in place as shown below. Notice the slightly rounded forward edges on the forward face of the box to assist in aligning the box up against the firewall.

The second task was to provide adequately strong attachment structure in the bottom of the

fuselage to secure the battery box to. A hole was drilled in the center of a wide cross member and a length of ABS tubing was CA'd in the hole. This cross member was indexed in the fuselage structure with the battery box in its desired location and then the cross member was glued in place as shown below. Notice the two triangular gussets securely tying the cross member to the bottom longerons for additional strength.

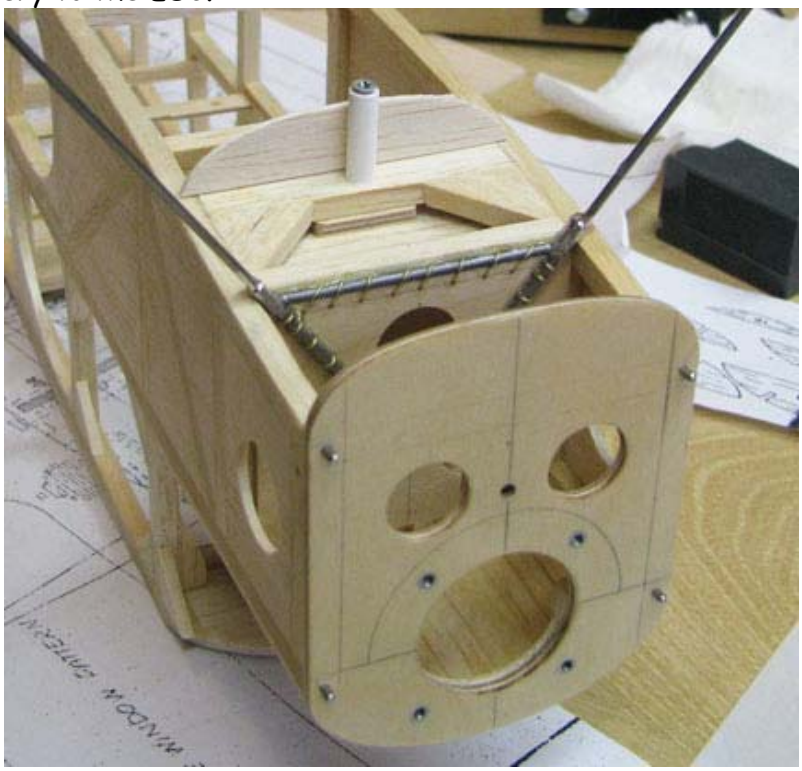


This picture shows the battery box attached to the fuselage with a long 2-56 screw inside the ABS tube.



The ABS tube was intentionally left long so that after the fuselage's bottom bulkheads and stringers are in place, the screw can be inserted from outside the fuselage as shown below. The tube will be trimmed and sanded flush with the bottom of the finished fuselage structure. Some

battery/battery box trial installations and removals in the presents of all of the ESC wiring will have to conducted to make sure of the functionality of this design before the requirement for a hatch is abandoned. The functionality has to include both the installation and removal as well as connecting the battery to the ESC.



Additional work was also done to complete the window openings by adding 3/32" fillets in the corners and sanding them to shape as shown on the right side of the fuselage below.

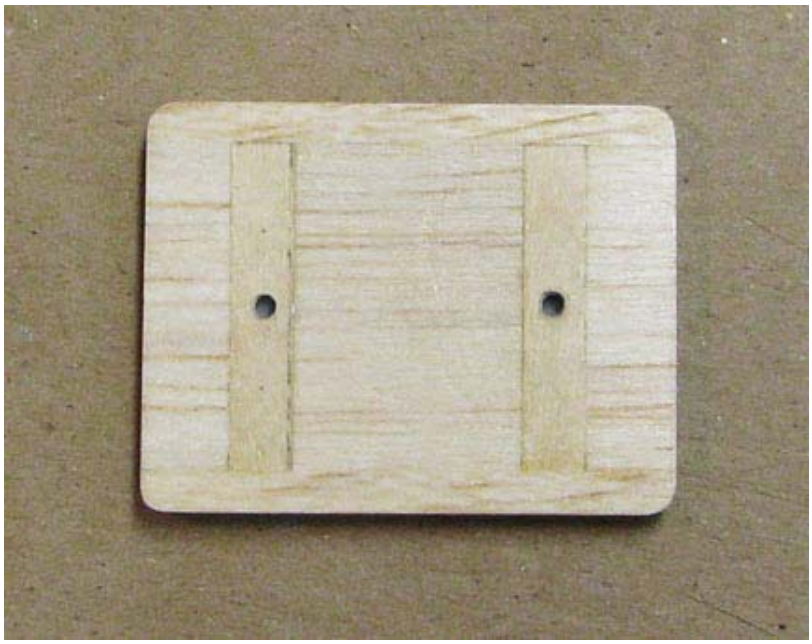
This picture shows the window openings on the left side of the fuselage. The sides of the fueslage have yet to be sanded to produce a smooth and integrated inlay surface, which is the "proof of the pudding" as they say.....Tandy

David Harding

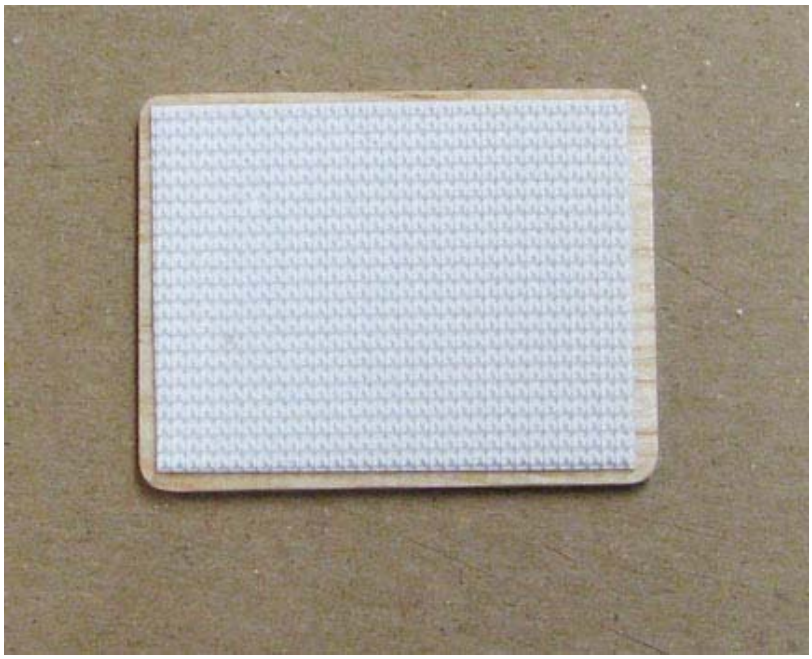
From: Tandy C. Walker [tandyw@flash.net]
Sent: Thursday, February 11, 2010 4:11 PM
To: Undisclosed-Recipient: ;@smtp108.sbc.mail.mud.yahoo.com
Subject: 60 Speed 400 Cloudster - Removable Receiver Mount Design

Speed 400 Cloudster Project

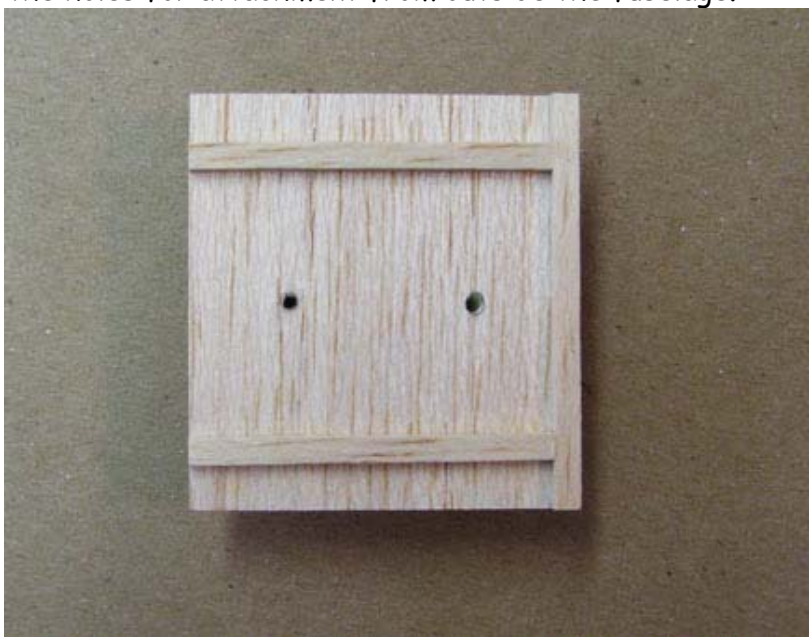
In order to have a removable receiver mount, one needs a plate that attaches to the bottom of the receiver with Velcro and screws to the fuselage frame. As part of the Cloudster's on going weight saving effort, the receiver plate is constructed primarily of 3/32" balsa with two 3/32" plywood cross strips embedded in the balsa. These cross strips are drilled and threaded in the center for 2-56 screws as shown below.



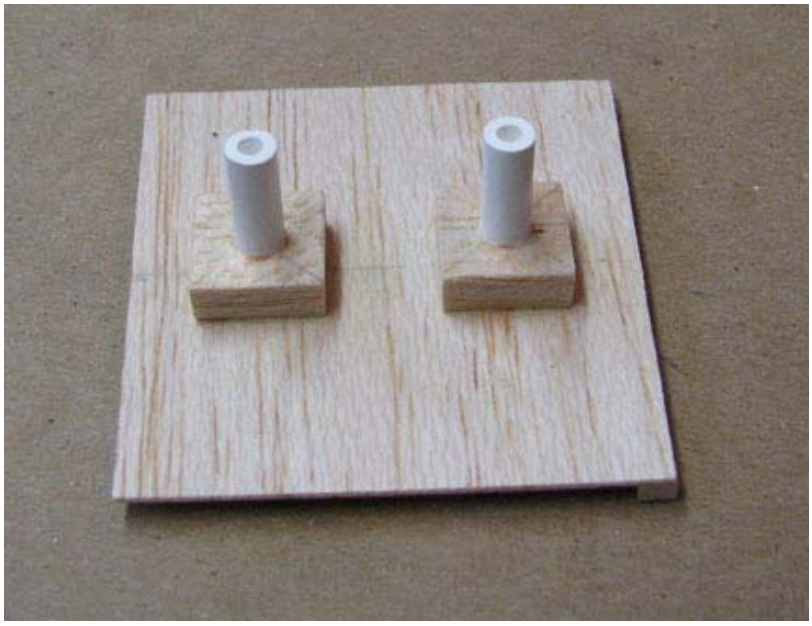
This plate was clear doped twice with sanding in between coats so that the hook side of the Velcro would stick securely. The picture below shows the hook side of the Velcro applied to the receiver plate.



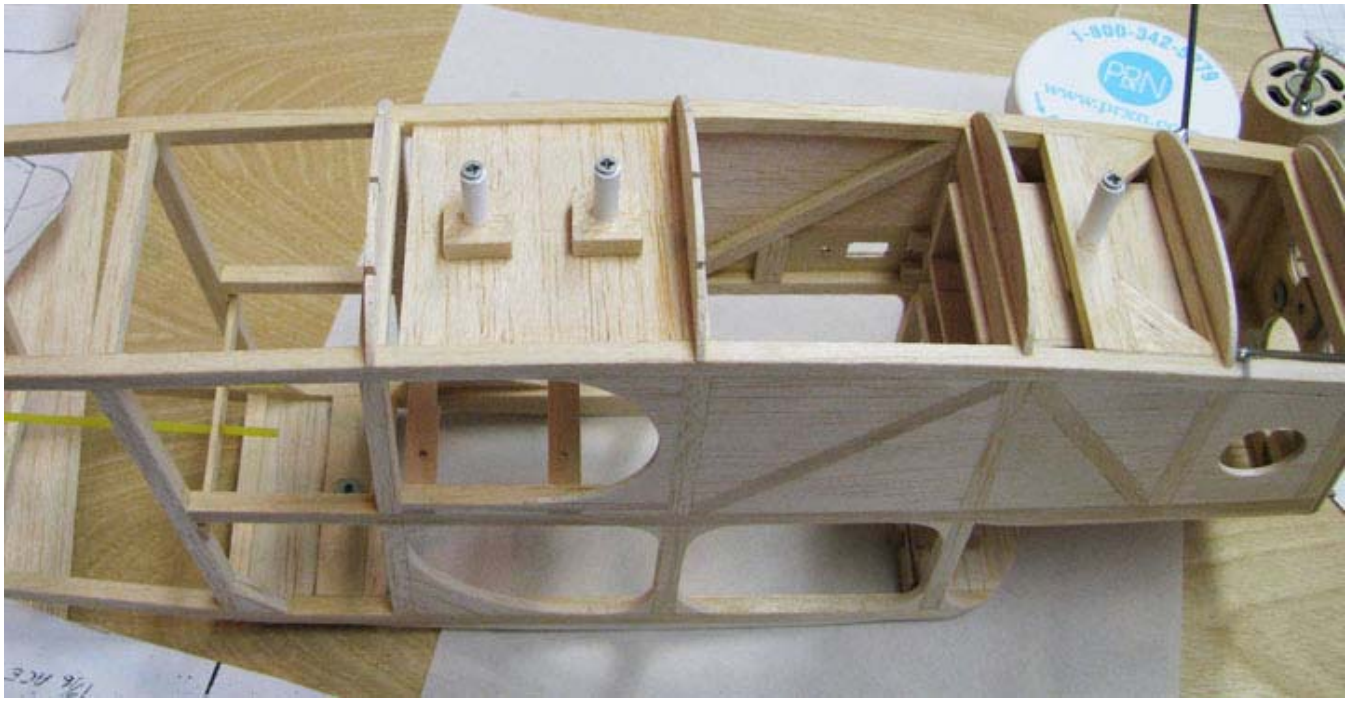
The attachment for the receiver plate was made out of 1/32" sheet balsa. Three strips of 3/32" X 3/16" balsa was glued to the top of the 1/32" sheet balsa as shown below so as to form a U-shaped guide for the receiver plate. The receiver plate slides into the U-shaped guide, which aligns the holes for attachment from outside the fuselage.



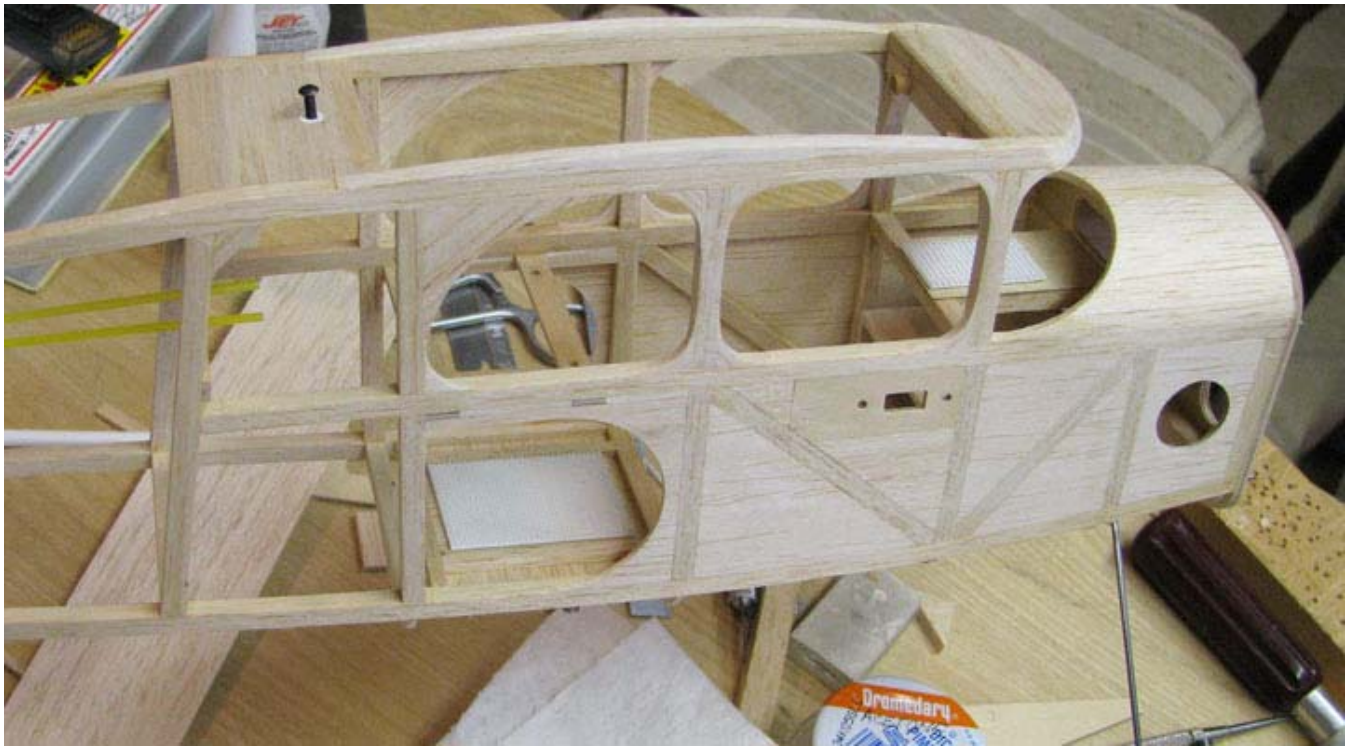
Two small balsa blocks were drilled and pieces of ABS tubing was CA'd in the holes. These two blocks were glued in place on the bottom of the 1/32" balsa sheet as shown below.



Then the 1/32" balsa sheet assembly was glued into the bottom of the fuselage frame as shown below. The ABS tubes were intentionally left long so that after the fuselage's bottom stringers are in place, the two screws can be inserted from outside the fuselage as shown below. The tubes will be trimmed and sanded flush with the bottom of the finished fuselage structure.



This final picture shows the receiver plate installed in the fuselage. You can see the hook side of the Velcro that the receiver will attach to in the picture below.....Tandy

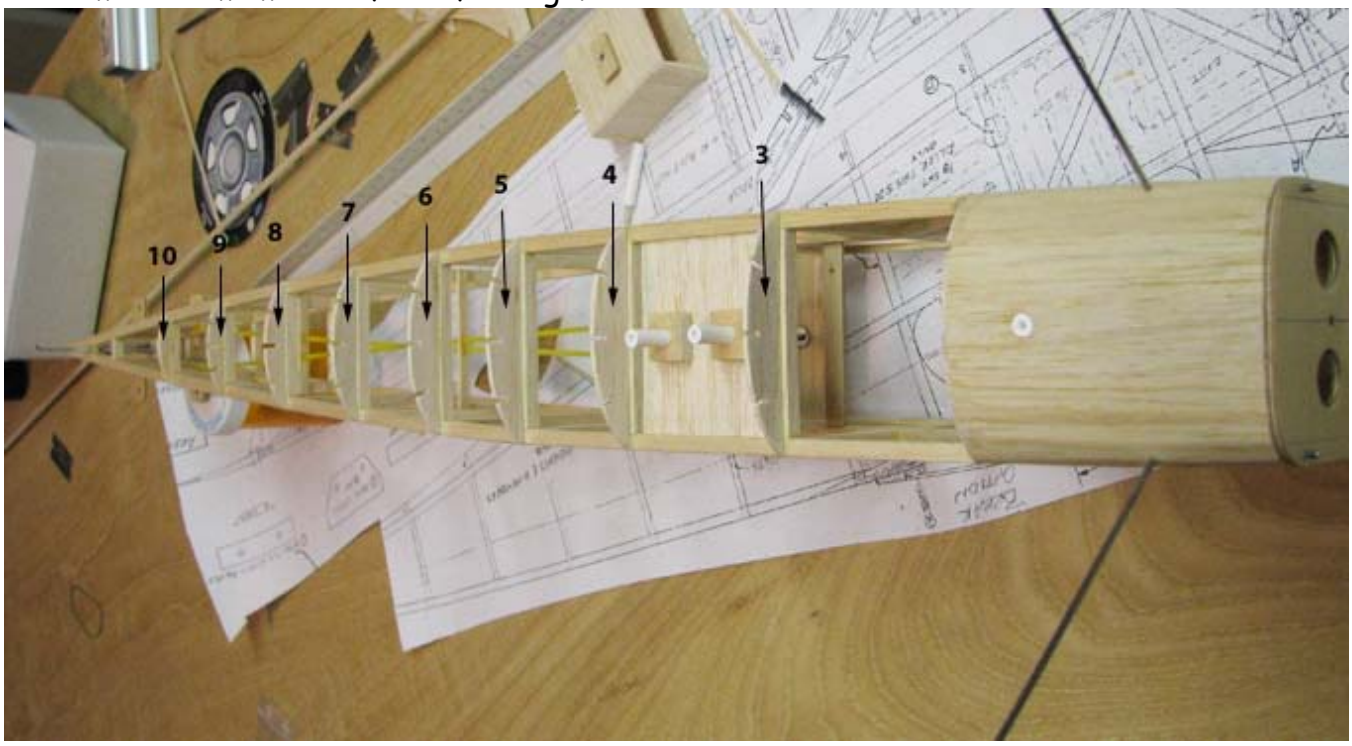

Dromedary

David Harding

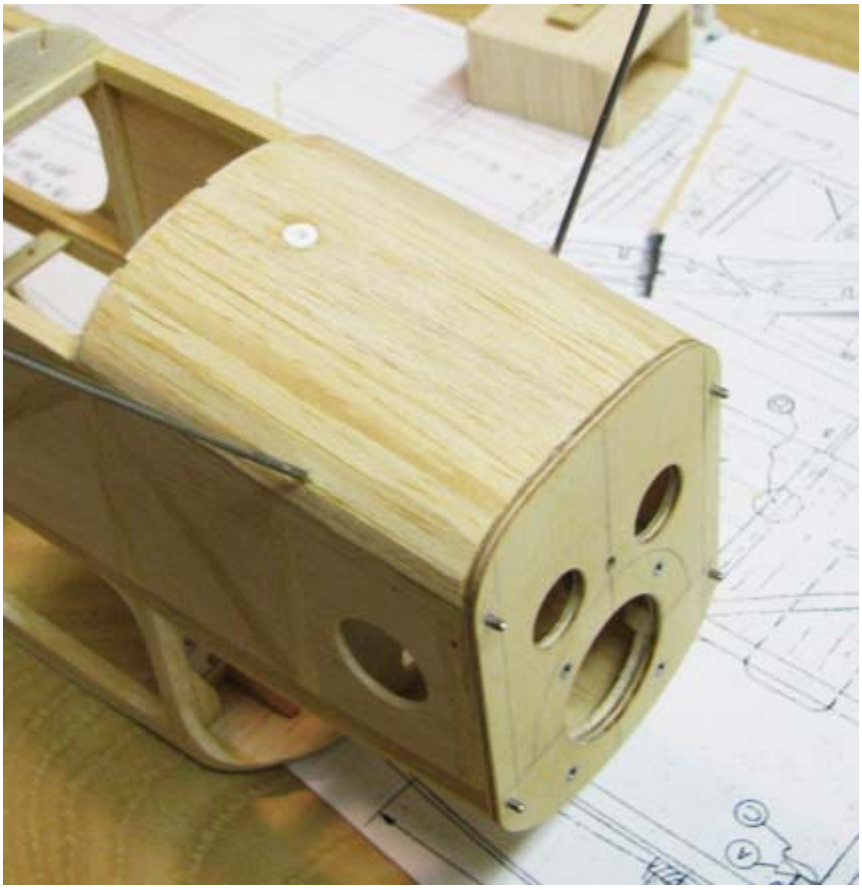
From: Tandy C. Walker [tandyw@flash.net]
Sent: Monday, February 15, 2010 4:22 PM
To: Undisclosed-Recipient: ;@smtp107.sbc.mail.mud.yahoo.com
Subject: 61 Speed 400 Cloudster - Bulkheads, Bottom Planking, and Cowl

Speed 400 Cloudster Project

In the picture below, you can see that the forward bottom strip planking has been complete and the ten bottom bulkheads have been cut out, sanded and glued to the bottom cross members of the fuselage.



This is close up of the forward bottom strip planking before it was sanded to shape. Notice the white ABS plastic tube embedded in the planking for the 2-56 screw to secure the battery box inside the fuselage.



The bottom block on the cowl was glued in place as shown below.

A week or so ago I saw a posting on the SAMTalk_Forum where Karl Gies recommended the Stanley break off blade knife for carving props, which looked like just what I needed to carve this cowl with. Karl said to extend the blade several inches without breaking off any pieces and use it like a long blade pocket knife. So I went to Home Depot and found the Stanley knife for $1.71. However, the term "Personna" on a *SNAPOFFBLADE* knife called "*SmartEDGE*" caught my eye. If you remember, the exceptionally sharp single edge GEM razor blades I use for cutting balsa also uses the same term "Personna" as shown below.

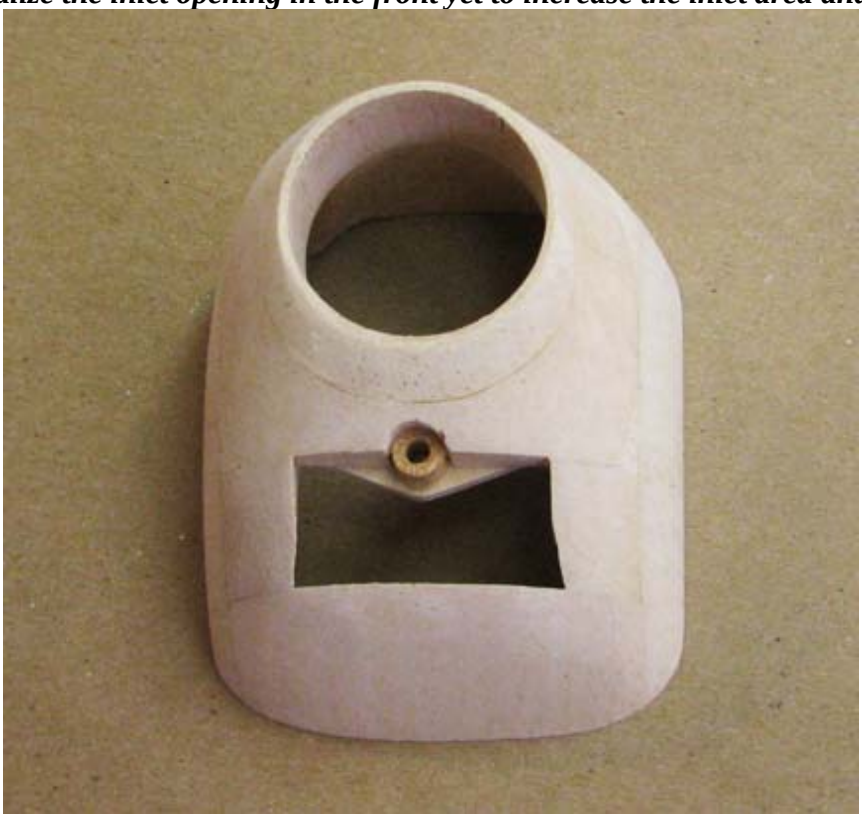
I hesitated because of the cost, but I went ahead and also bought the "*SmartEDGE*" knife at $4.98. Both the Stanley and *SmartEDGE* knifes are shown in the picture below. Even though the *SmartEDGE* knife is three times the cost of the Stanley, I found it was at least four times sharper than the Stanley! It slices balsa like butter just like the GEM blade does.

The cowl was easily carved, trimmed and sanded to shape thanks to the new *SmartEDGE* knife ***(thanks for ther tip Karl)***. Here are a few pictures of the Cloudster's cowl.

Side View

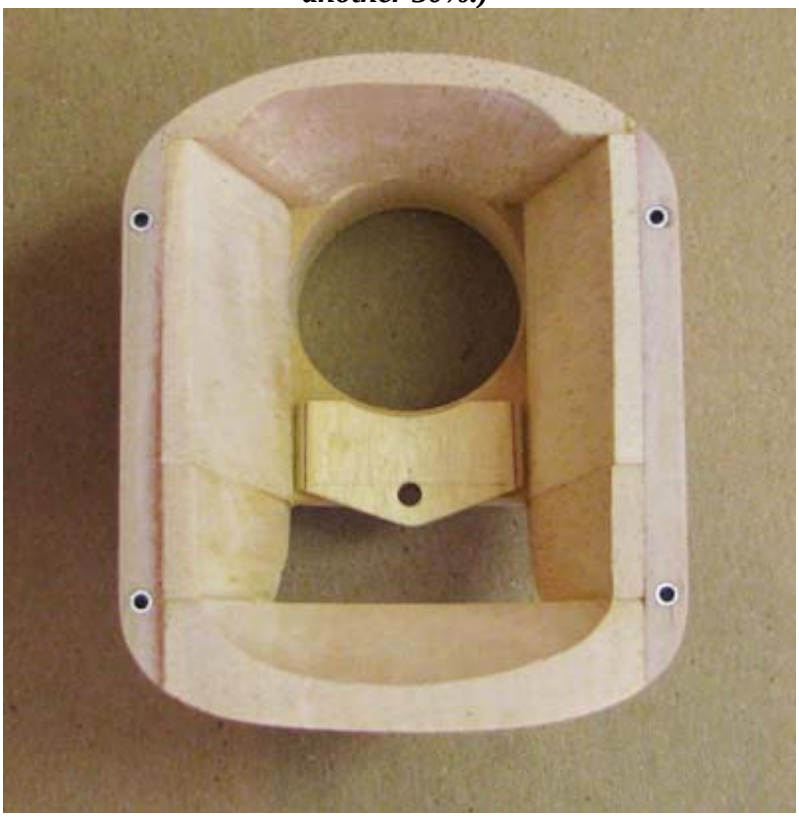
Front View

(I still have to ovalize the inlet opening in the front yet to increase the inlet area and reduce weight.)



Rear View

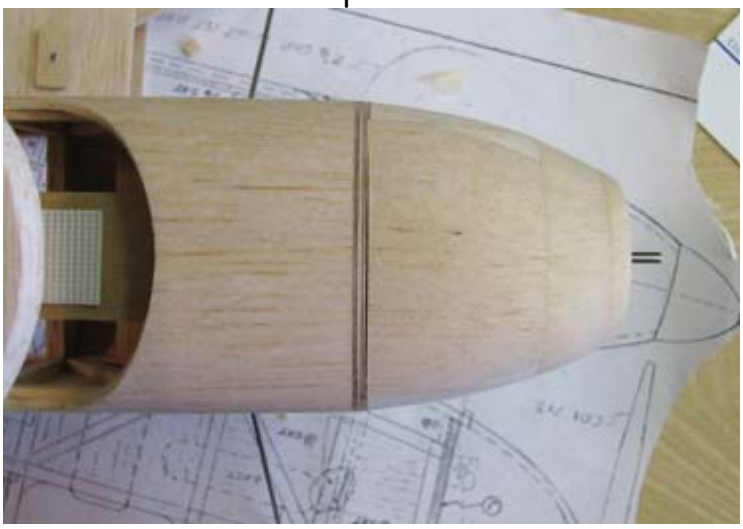
(I still have to remove some excess balsa from inside the cowl yet which will reduce the weight maybe another 30%.)



The cowl as it is now only weighs 7 grams or 1/4 of an ounce, but every little bit of weight that can be removed helps.

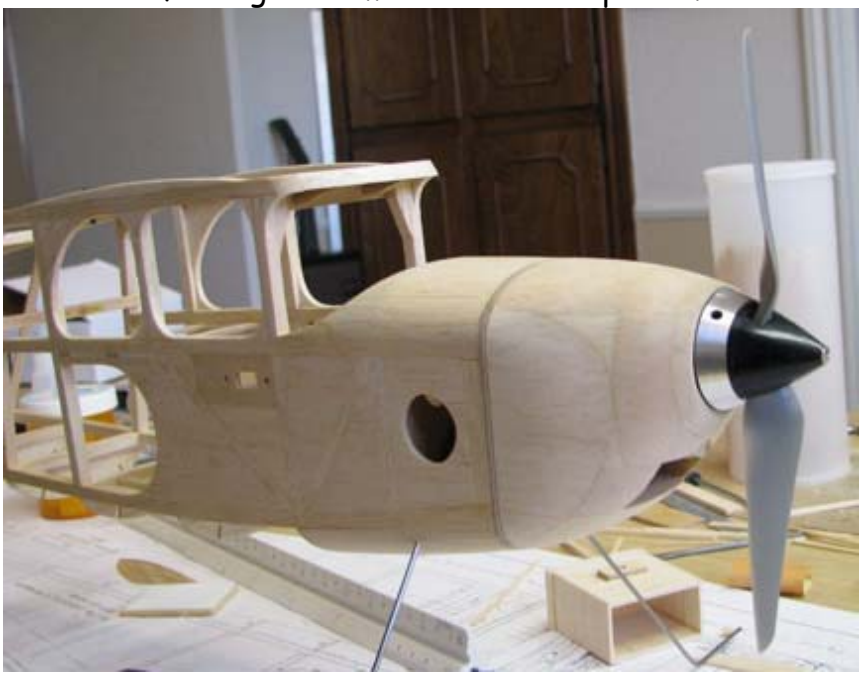
This picture shows the precise fit of the cowl to the Cloudster fuselage over the Speed 400 motor and mount.

Top View



Bottom View

This last picture shows how the clean lines of the cowl streamlines the front of the fuselage and mates with the spinner.



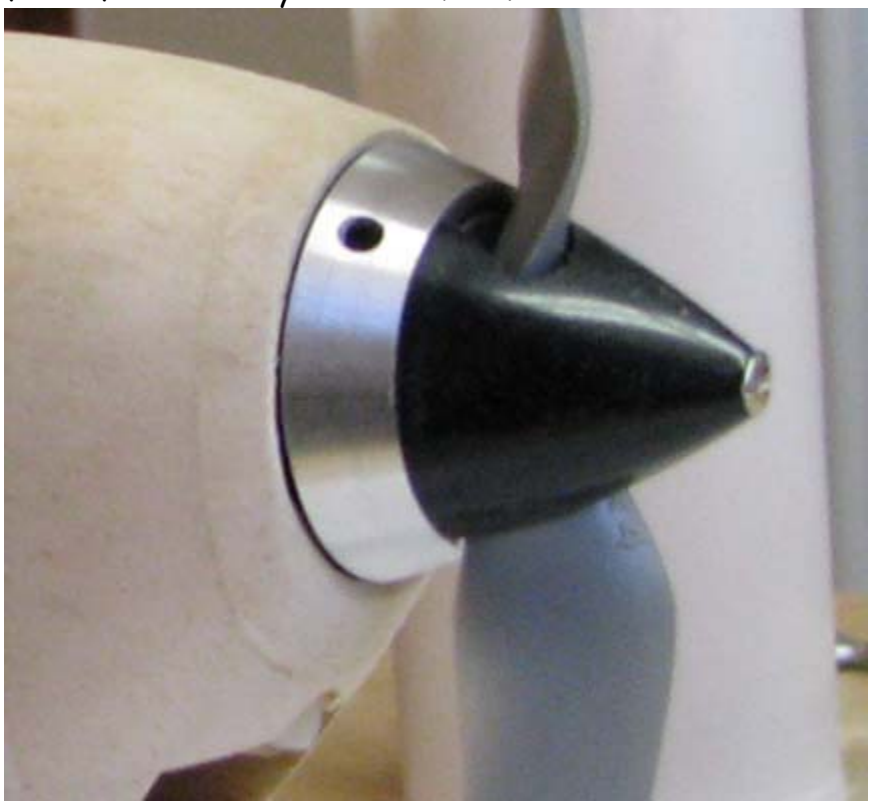
The next effort will be to wire up the Speed 400 motor to the ESC to the Li-Po battery with connectors. Then perfume some trial installations and removal of the Li-Po battery though the opening under the wing to see the hatch in the bottom of the fuselage can eliminated or not. This has to be done before the stringers are added to the bottom of the fuselage bulkheads.....Tandy

David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Tuesday, February 16, 2010 9:33 PM
To: Undisclosed-Recipient: ;@smtp101.sbc.mail.mud.yahoo.com
Subject: 62 Speed 400 Cloudster - Cowl-Spinner Interface Refinement

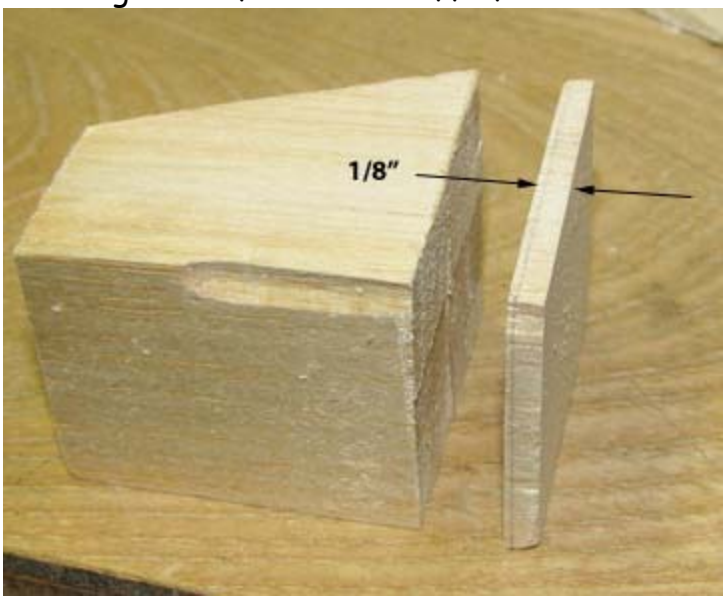
Speed 400 Cloudster Project

I was not happy with the cowl-spinner interface fit. In the picture below, you can see that the base radius of the aluminum spinner flange is smaller than the radius of the front face of the cowl by at least 1/16".

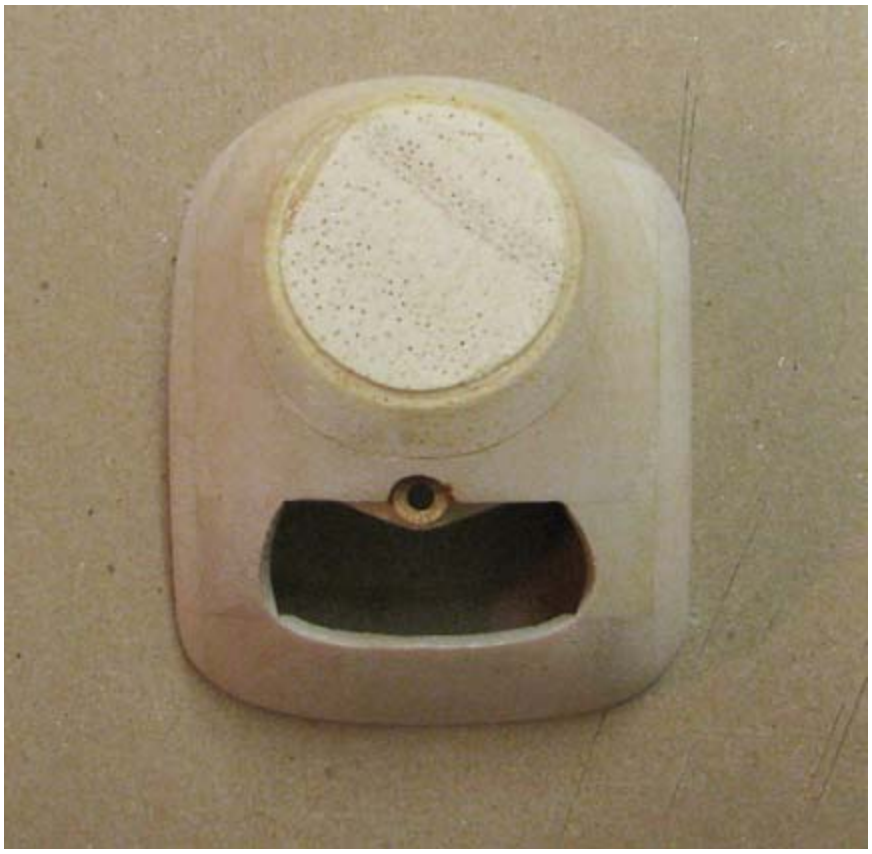


In order to correct this mismatch in the cowl-spinner interface, the radius of the front face of the cowl has to be reduced by 1/16". However, as you can see in the picture below, this is not possible because there is only a 1/16" left on the front face of the cowl opening. Notice that the motor mount stops an 1/8" short of the front face.

So another 1/8" cross grain wafer was cut off of the 2" block as shown below.



This wafer was then cut and trimmed into a circular plug to fit inside of the front face of the cowl opening an 1/8" and glued in place as shown below.



Next, the inner partion of the plug was cut out so as to leave a 3/16" toroidal ring inside the cowl opening as shown below.

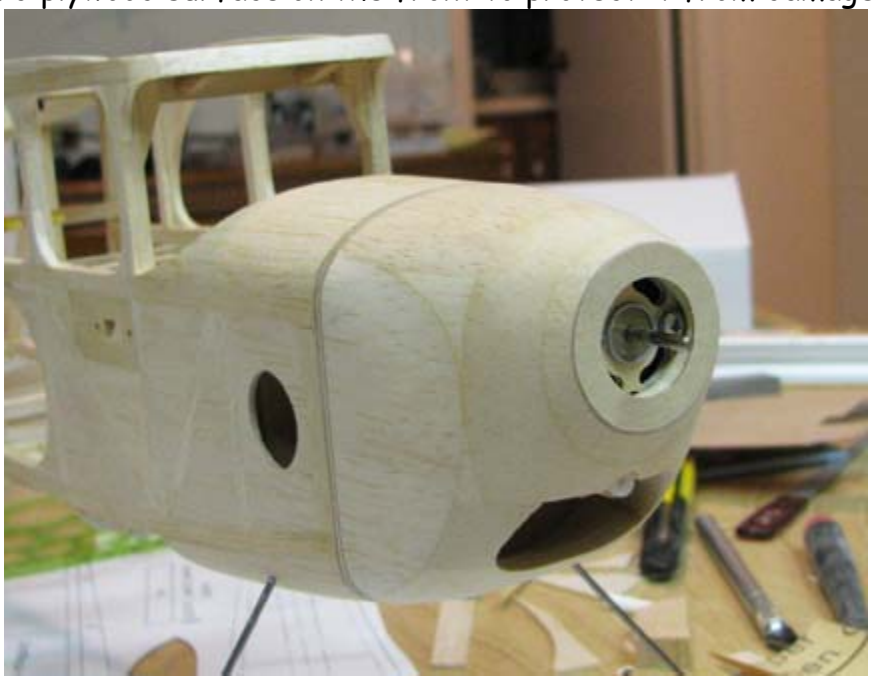
The ring was carefully sanded flush with the front face of the cowl and a piece of 1/64" plywood was glued onto the front surface. The picture below shows the large steel square block used as a weight to press the 1/64" plywood onto the front face of the cowl while the glue dried.

A hole was cut out of the plywood to match the hole in the toroidal ring as shown below.

The aluminum spinner flange was slipped onto the motor shaft and used to mark the outer trim diameter on the 1/64" plywood as shown below.

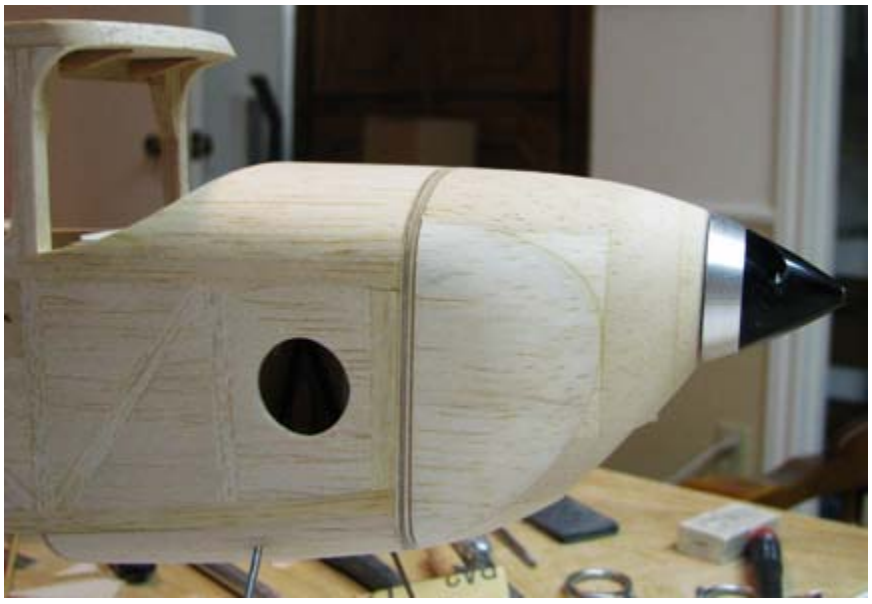
This picture just shows the outer circle that was marked in the plywood.

The cowl and 1/64" plywood was then trimmed and sanded down to the marked circle as shown below. Now the cowl has a hard plywood surface on the front to protect it from damage.

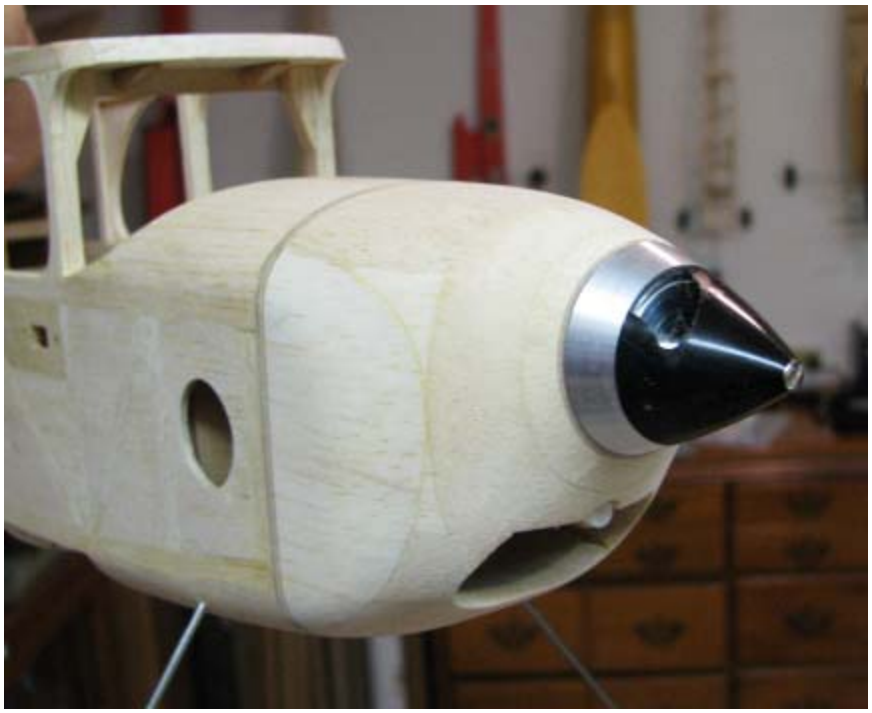


In the four pictures below, you will see the close fit that the aluminum spinner flange makes with the front face of the cowl.

Side View

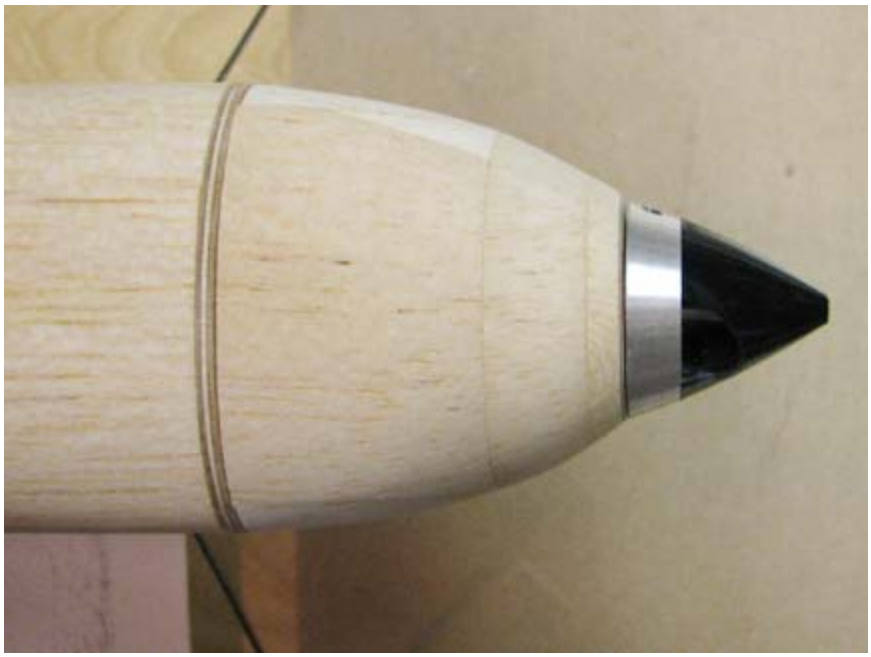


Right Side Quarter View



Right Bottom Quarter View
(Notice the enlarged inlet opening)

Top View



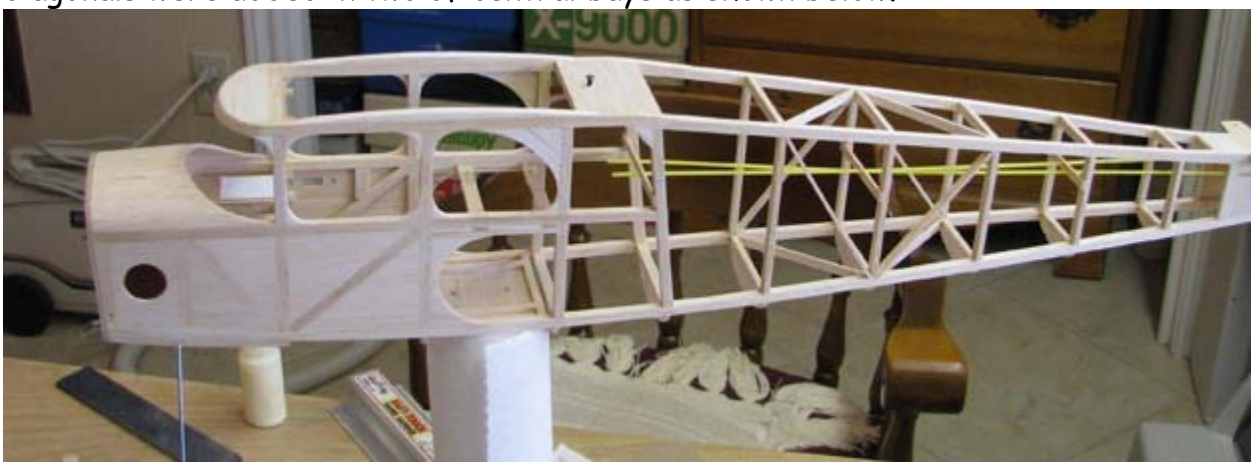
I am now pleased with the fit and functionality of the cowl and I will move on to wiring up the electrical power train using connectors.....Tandy

David Harding

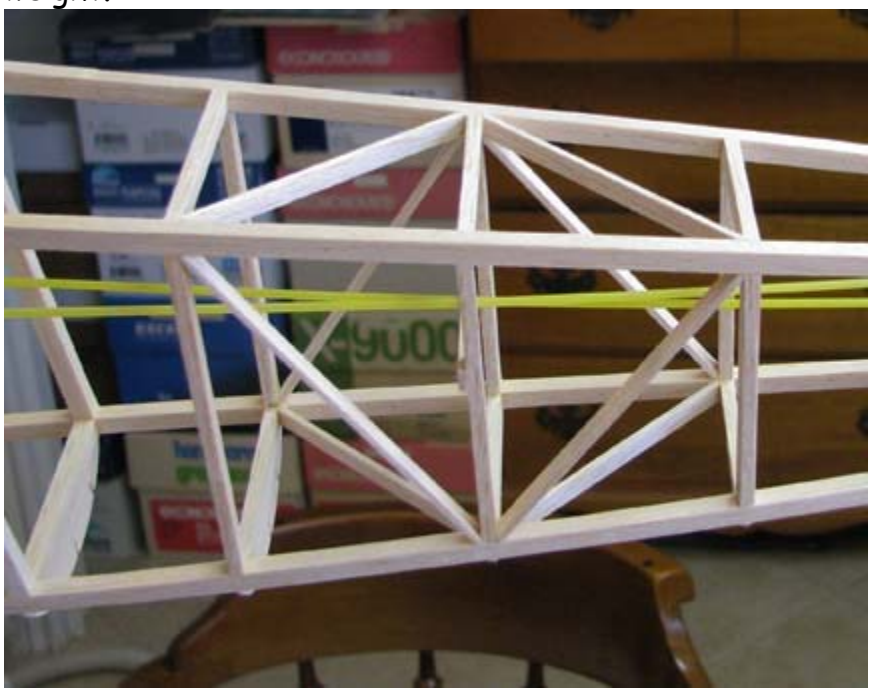
From: Tandy C. Walker [tandyw@flash.net]
Sent: Wednesday, February 17, 2010 2:40 PM
To: Undisclosed-Recipient: ;@smtp106.sbc.mail.mud.yahoo.com
Subject: 63 Speed 400 Cloudster - Fuselage Frame Bracing and Supplies Received

Speed 400 Cloudster Project

The Cloudster fuselage aft of the cabin area seems a little weak in torsion, even for an electric model. This is probably due to the light weight 3/16" square balsa used in the structure. To stiffen the structure up a bit, 1/16" X 3/16" balsa diagonals were added in two of central bays as shown below.

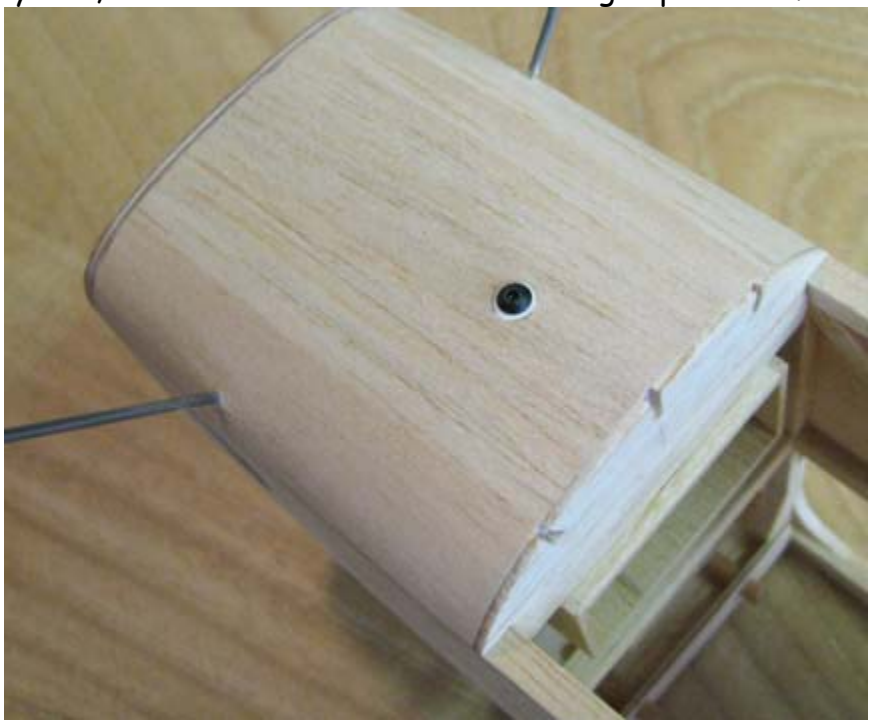


This is a close up of the diagonal configuration used. Even though diagonals were only added to two bays, they stiffened up the structure considerably without adding much weight.



I received extra long 2-56 cap crews from Micro Fastener as shown below to secure the battery box and receiver mount to the fuselage frame.

This shows the 1" long 2-56 cap screw that goes through the white ABS tubing in the bottom planking used secure the battery box, which can be seen in the lower right portion of the picture below.



This is just a close up of the cap screw.

I also received the four transparent colors of Microlite covering yesterday that I ordered from Tower Hobbies.

I still have to develop a color scheme to be used for the Cloudster covering. James Lollar indicated that I should use a varied color pattern because these Speed 400 models get pretty hard to see at the end of the 90 second motor run.....Tandy

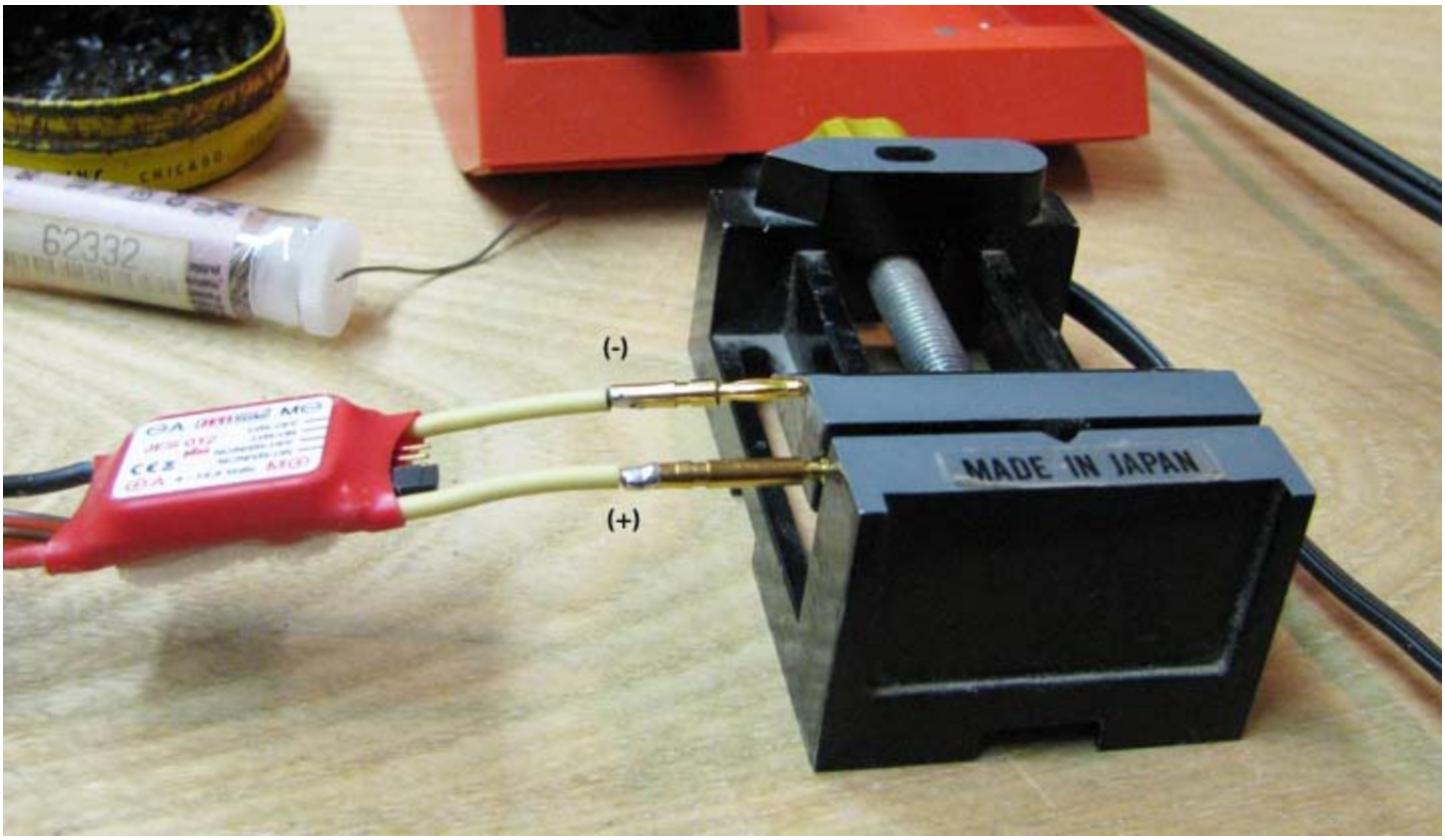
David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Thursday, February 18, 2010 12:42 AM
To: Undisclosed-Recipient: ;@smtp101.sbc.mail.mud.yahoo.com
Subject: 64 Speed 400 Cloudster - Connectors Between ESC and Motor

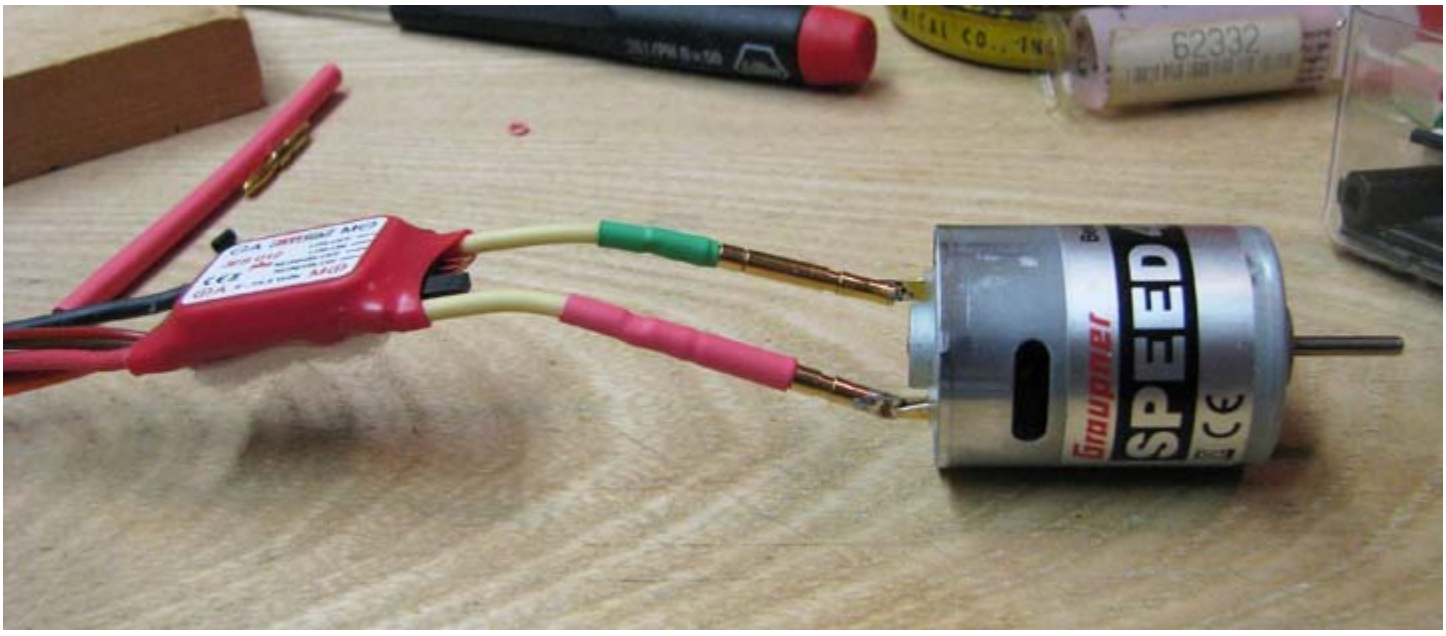
Speed 400 Cloudster Project

Most of the afternoon today was spent wiring up the Electronic Speed Control (ESC) to Speed 400 motor using the polarized connectors recommended by Jay Burkart. The close proximity of the motor to the ESC dictated a close tolerance hook up with very little wire involved. As per Jay's recommendation, the male connector was soldered directly to the (+) motor terminal and the female connector was soldered directly to the (-) motor terminal as shown below. Notice that the connectors are angled up about 35 degrees to the axis of the motor in order to line up with the connectors coming from the ESC.

This picture shows how short the ESC wires had to be cut. The male and female connectors are soldered to the ends of the wire as shown below.



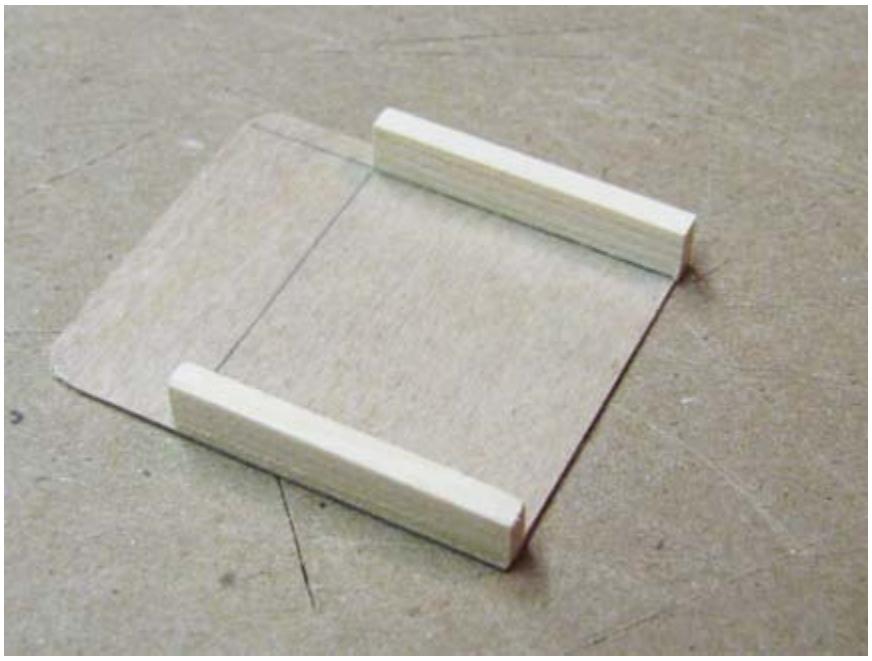
Red heat shrink tubing completely covers the ESC (+) female connector to prevent it from coming in contact with the male (-) connector when they are not connected to the motor as shown below. Notice how little wire is used.



For installation, the ESC is first connected to the motor. Then the ESC is inserted through the hole in the firewall from the front and back through the hole in the bulkhead under the turtle deck planking. Once through, the ESC is secured to the Velcro pad shown below. Of course it is virtually impossible

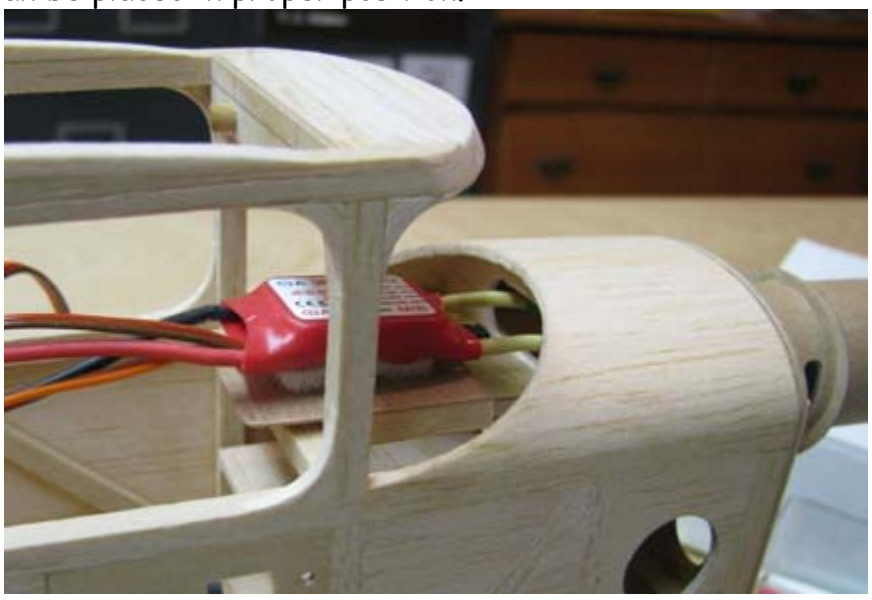
to get the ESC in the proper position on the Velcro pad because it keeps sticking to the Velcro pad as soon as it touches it.

Therefore, to solve this problem, a Velcro separator cover was made as shown below. The cover consist of a 1/64" plywood plate with two 1/8" X 3/16" spruce runners glued to the edges as shown below.

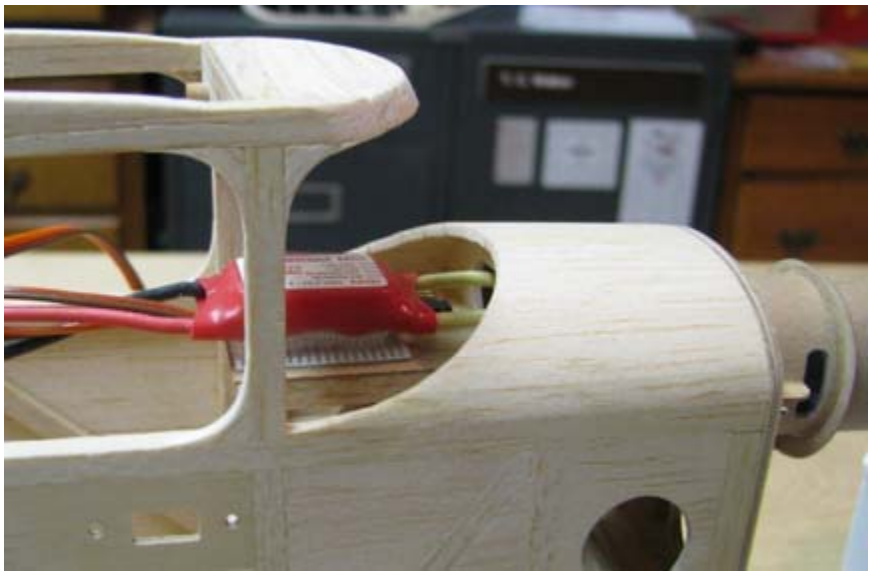


The Velcro cover is dropped into place over the Velcro pad and is held there by the two runners on each side as shown below.

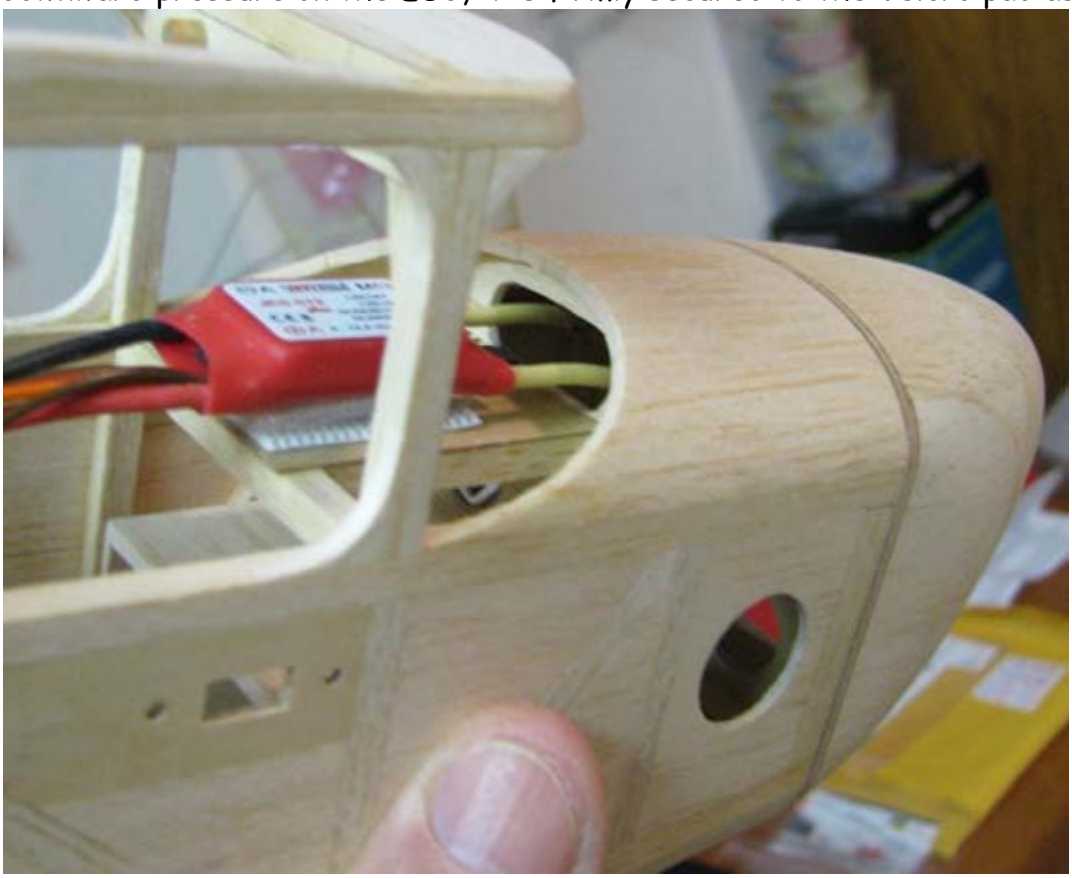
In the picture below, the ESC has been connected to the motor, inserted through the hole in the firewall from the front, and back through the hole in the bulkhead under the turtle deck planking. Notice that the fussy side of the Velcro on the ESC is kept separate from the hook side on the pad by the Velcro cover and can be placed in proper position.



Once the ESC is in proper position, the ESC is simply raised up and Velcro cover is slipped out, allowing the Velcro fussy side to mate with hook side as shown below.



With a slight downward pressure on the ESC, it is firmly secured to the Velcro pad as shown below.



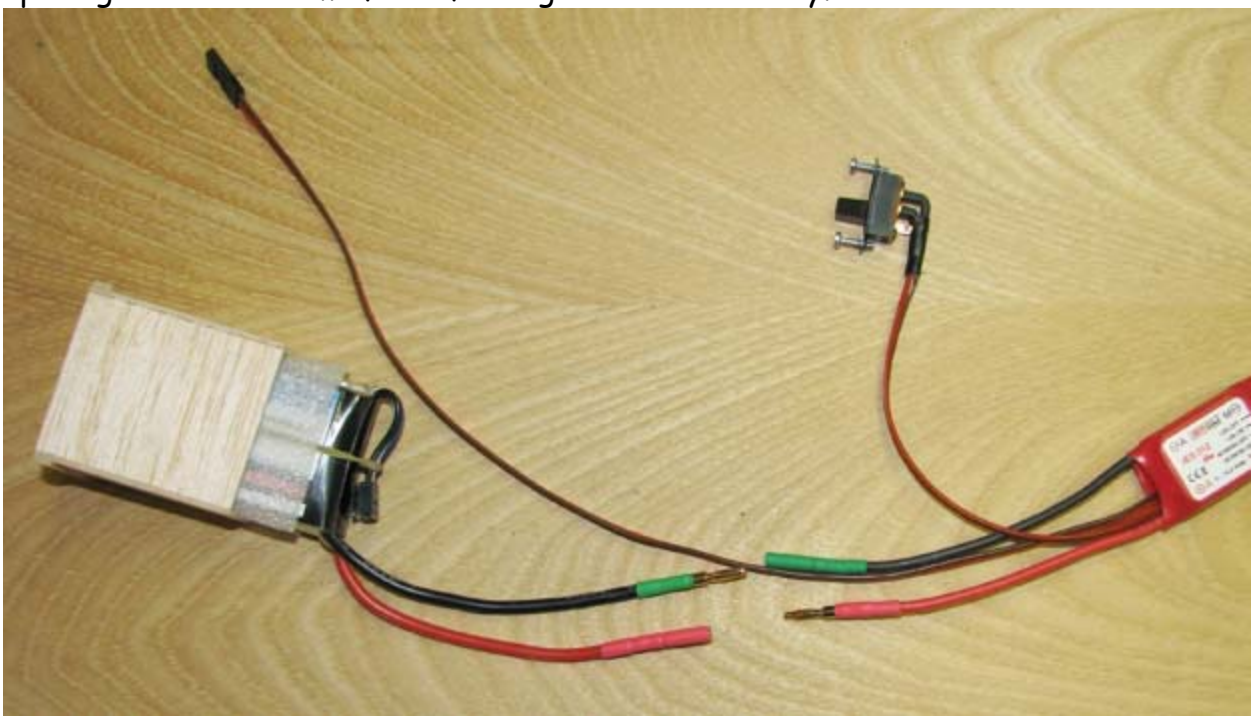
So now we have the motor and ESC wiring and installation worked out. Tomorrow will be spent wiring up the LI-Po battery to the ESC using the polarized connectors and determining if the battery can be installed and connected to the ESC from the cabin opening under the wing without having to have a hatch opening in the bottom of the fuselage.....Tandy

David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Friday, February 19, 2010 12:33 AM
To: Undisclosed-Recipient: ;@smtp107.sbc.mail.mud.yahoo.com
Subject: 65 Speed 400 Cloudster - Battery and ESC Connectors and Antenna Guide for 2.4 GHz Receiver

Speed 400 Cloudster Project

I began the day by soldering the polarized connectors to the red and black wires on the Li-Po battery and the corresponding red and black wires on the ESC as shown below. The battery in its box was successfully installed in the fuselage through the opening in the top of the cabin and the battery connected to the ESC a total of three times. Based on this exercise, it was concluded that a hatch opening on the bottom of the fuselage is not necessary.



The next task was to install the antenna guides for the two *FASST* receiver antennae. I want to restate Futaba's three antenna requirements to "maximize" the 2.4 GHz receiver's reception performance. They are as follows:
(1) The two antennae are to be 90 degrees to each other.
(2) The locations of the two antennae are to be as far apart as practical in the model's fuselage.
(3) The two antennae are to lie in different planes.

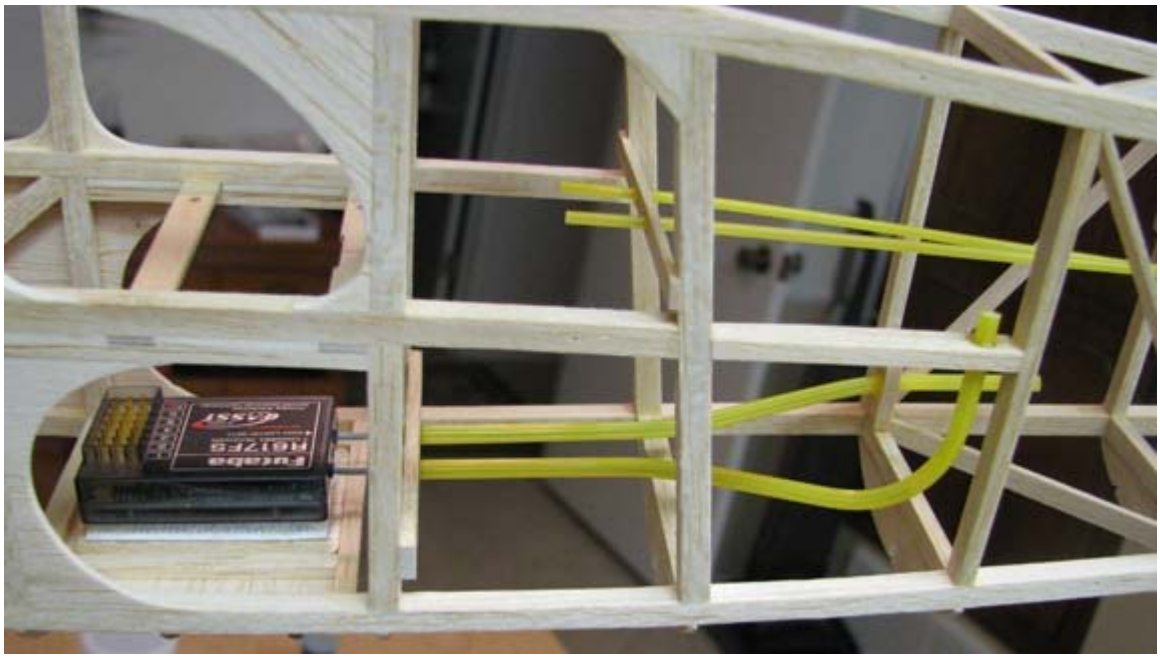
I used the standard Sullivan Gold-N-Rod for the antenna guides, which is yellow in color. It has a large enough hole in the center to accommodate the *FASST* antenna diameter and can be bent to hold its shape.

Here is a great tip for bending Sullivan Gold-N-Rod that was developed on the previous Sailplane project.

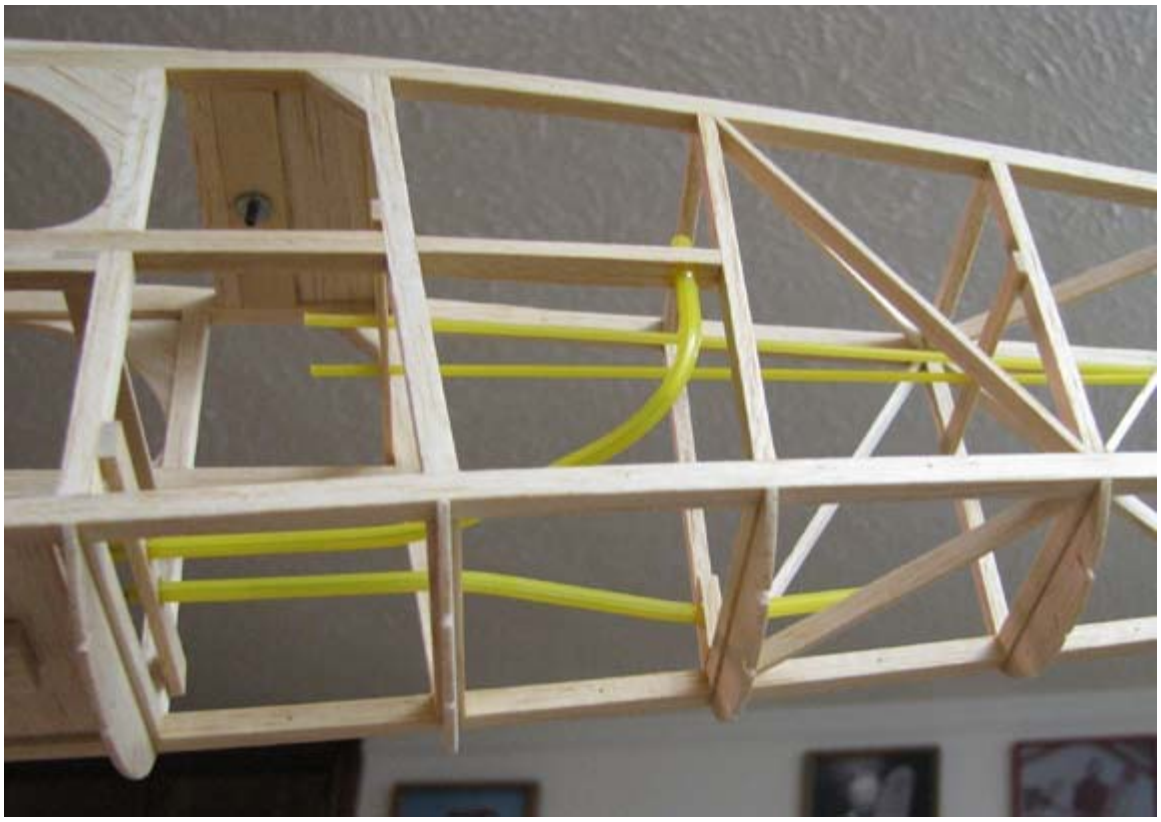
Gently heat the Gold-N-Rod with a heat gun and begin to bend it into the shape you want. Holding the shape you want and while it is still warm, dip the bend in cold water and this will instantly set the angle of the bend. If you miss the angle a little, reheat the bend and it will start to release or unbend. Again, hold in the angle you want and while it is still warm and dip it in cold water. This will again setting the angle of the bend that you want.

The configuration I chose to satisfy the above three requirements is shown in the pictures below. After the tubes were bent to shape, balsa brackets were glued to the fuselage structure, and the tubes inserted into the brackets. After some adjustment and alignment of the tubes, they were CA'd in place.

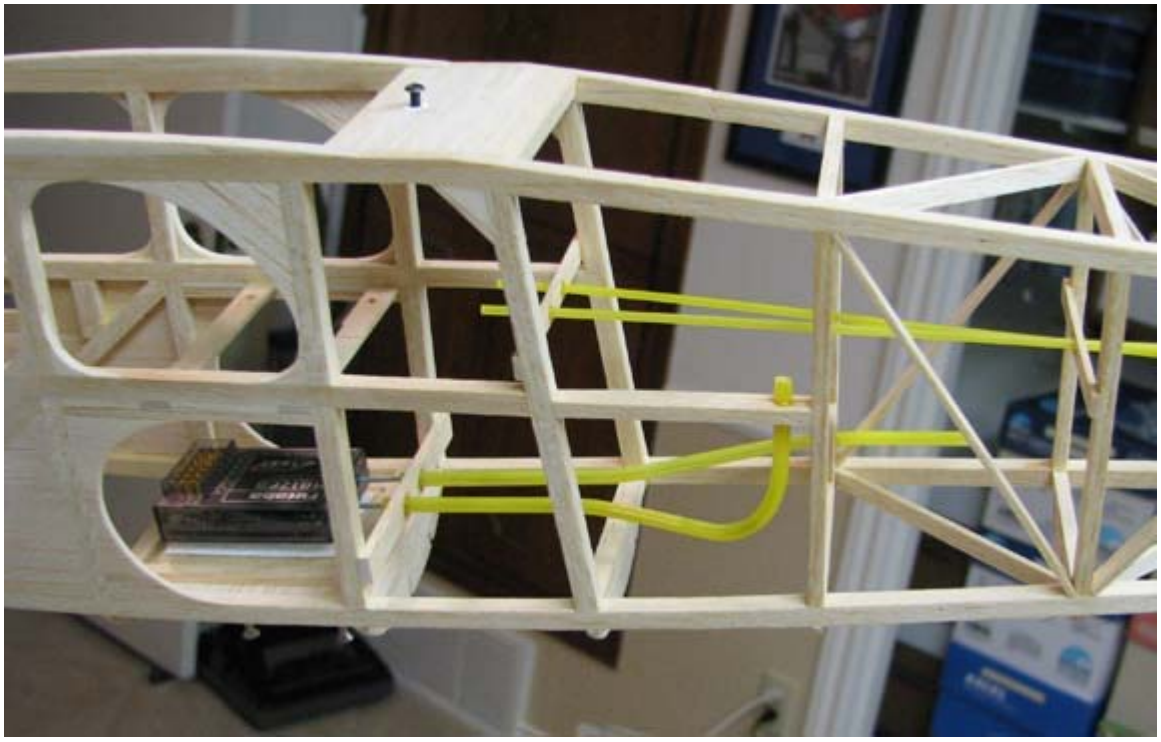
Left Side View



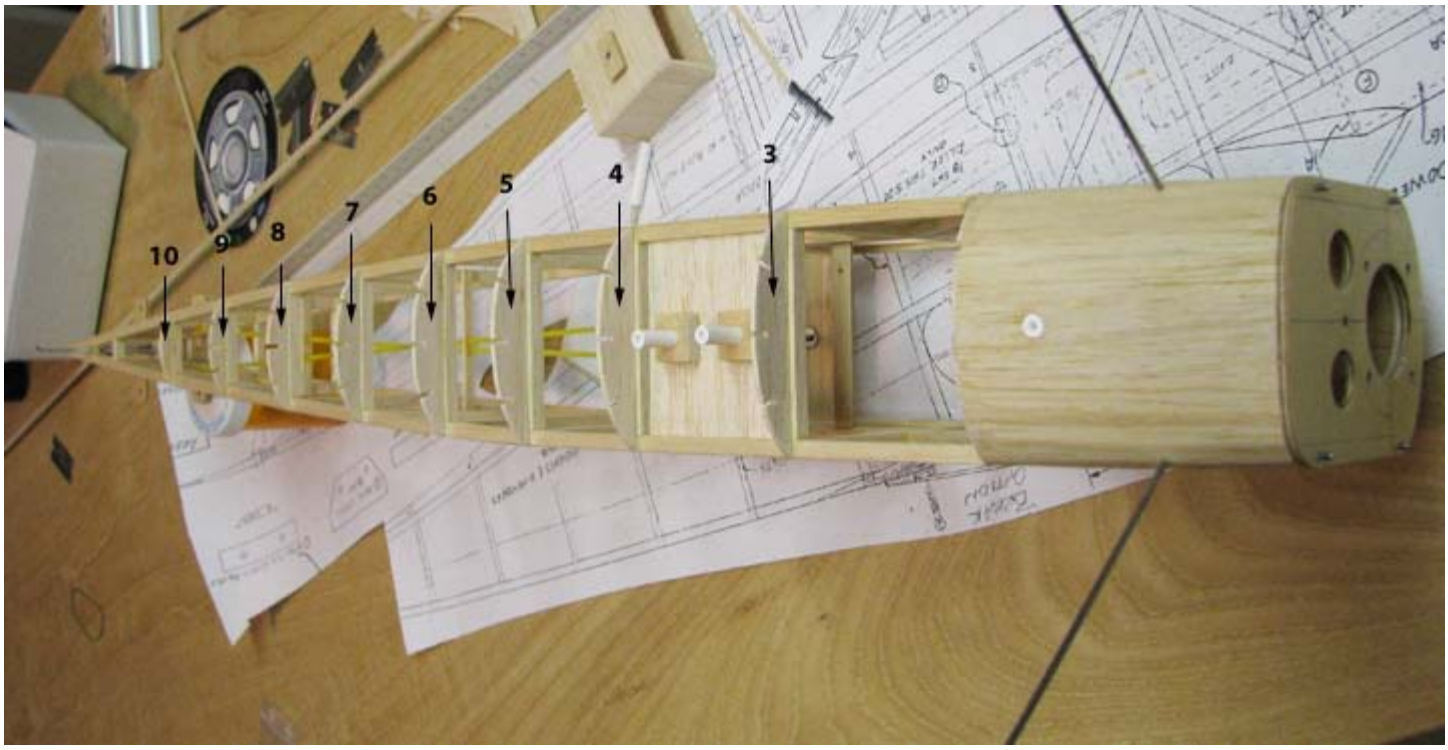
Left Side View from the Bottom.



Another Left Side View.



This now completes both the electric power train and radio installations. The next task for tomorrow is to glue the three stringers to the fuselage's bottom bulkheads shown below and plank in around the two ABS tubes through which the receiver is mounted.....Tandy


10
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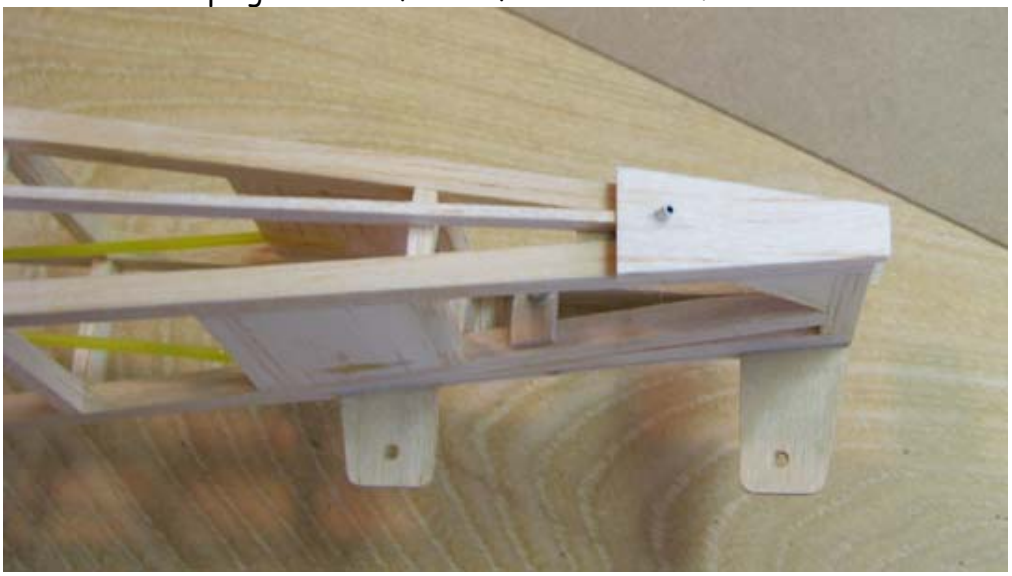
3

David Harding

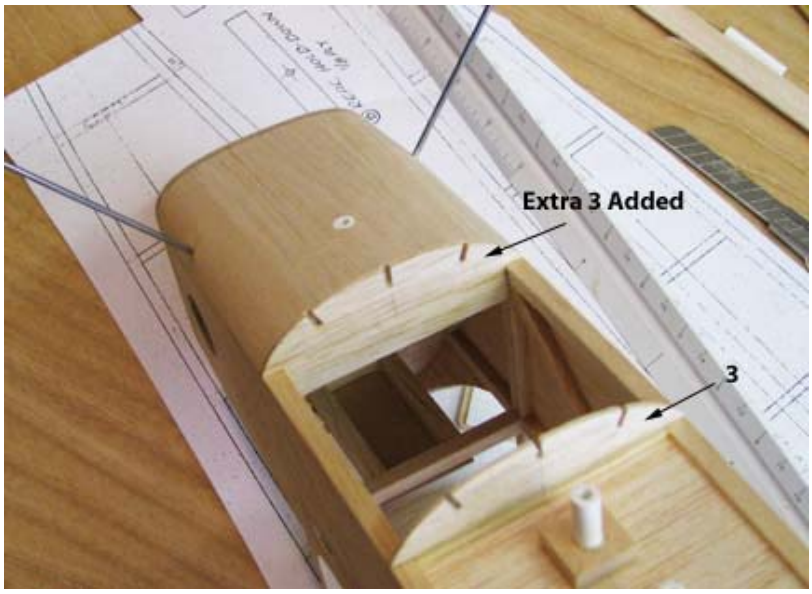
From: Tandy C. Walker [tandyw@flash.net]
Sent: Saturday, February 20, 2010 7:56 PM
To: Undisclosed-Recipient: ;@smtp102.sbc.mail.mud.yahoo.com
Subject: 66 Speed 400 Cloudster - Completing Fuselage Bottom Structure

Speed 400 Cloudster Project

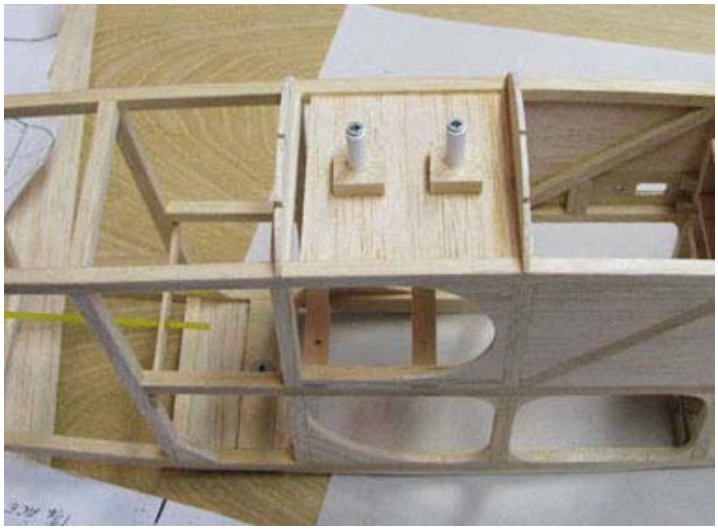
I have stayed pretty focused all day today on trying to finish the bulkhead/stringer structure on the bottom of the fusealge. I have always had problems fairing in a group of stringers at the back end of the fuselage and making them look right. To avoid this issue, I put in a solid balsa block at the rear to serve as a tail cone which can be more easily trimmed to shape than a bunch stringers! So before the 1/16" X 3/16" center bottom stringer was glued on, a .063" inclined hole was drilled in a triangular soft balsa block for the tail skid tube to slip through and the block was glued in place as shown below. Then the center stringer was glued in the bulkhead notches, which now butts up against the front of this tail cone.



Also an extra No. 3 bulkhead was glued on the back of the bulkhead supporting the bottom forward strip planking as shown below. This provides the location and support of the three 1/16" X 3/16" stringers that butt up against the back of the forward planking.

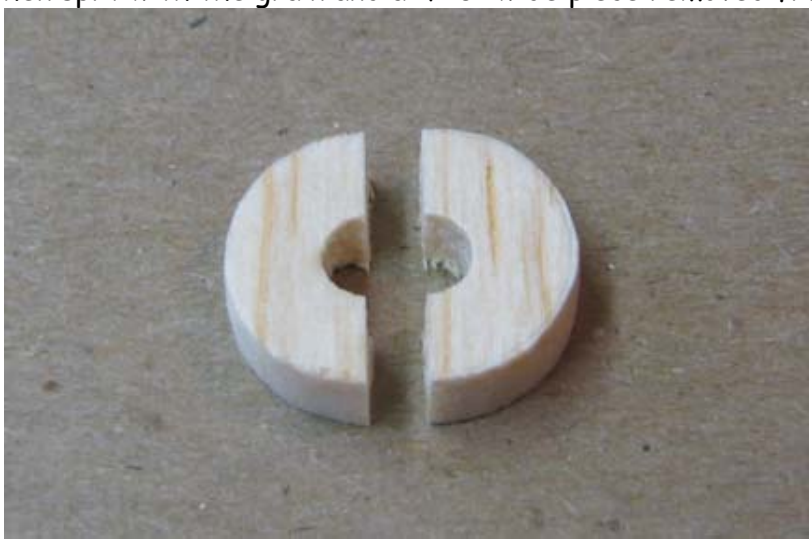


Since the two pieces of white ABS tubing for securing the receiver mount are on the centerline of the fuselage as shown below, the center stringer had to be pieced in between and on either side of the two tubes.

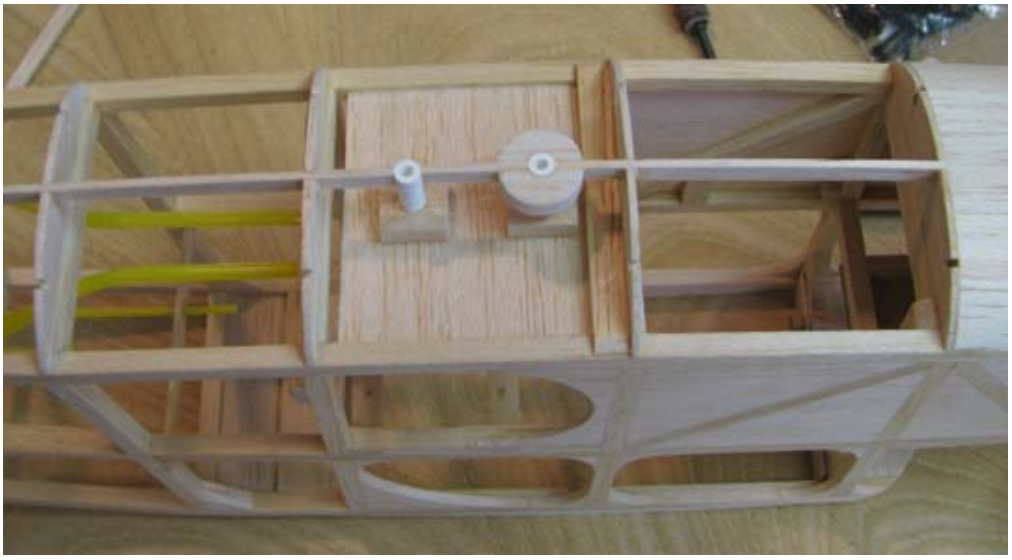


A surface has to be provided around these tubes in order to have an area to attach the bottom covering to. A No. 12 drill bit (.189") was used to drill a hole in a piece of 3/16" balsa sheet. The balsa was trimmed and sanded around the hole to form a .594" diameter flat disk shown below.

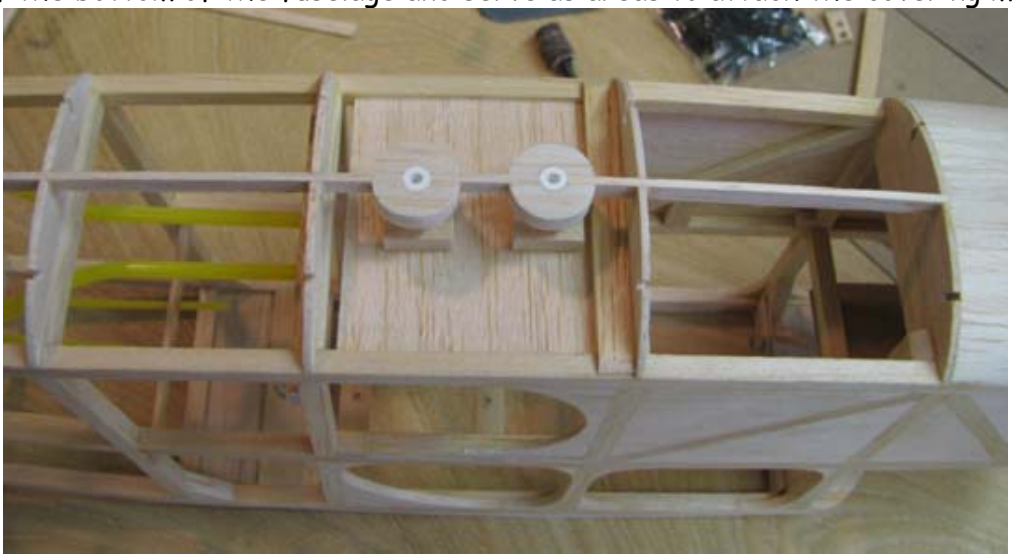
This disk was then split with the grain and a 1/16" wide piece removed from the center.



Each half of the disk was then glued in on either side of the stringer around the front tube as shown below.

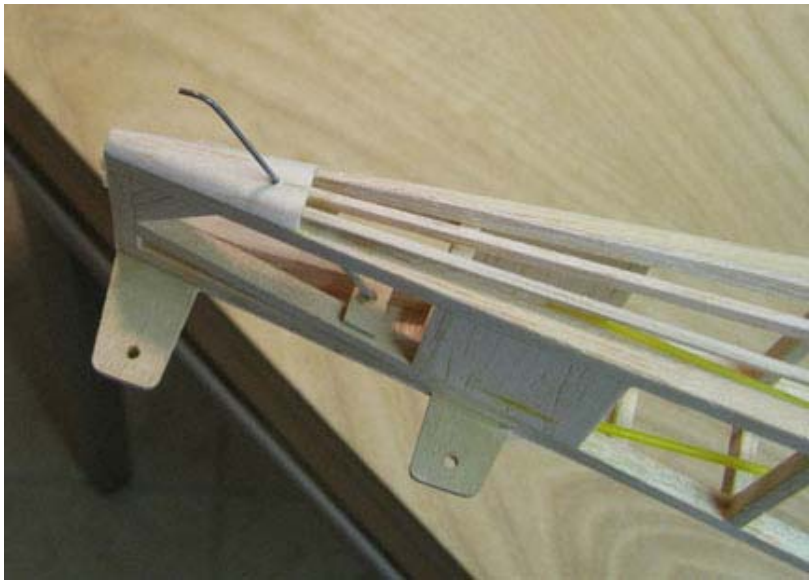


This was also done around the second tube as shown below. These two disks will be contoured to the shape of the bottom of the fuselage and serve as areas to attach the covering material to.



All three of the bottom were glued in place and the two disks and tail cone were contoured to the shape as the picture below shows.

This is close up of the tail cone.



This is a close up of the stringer fillets that were added at the stringer attach point on the forward planking. 

In the picture below, you can see that the bottom bulkhead/stringer structure has added considerable depth to the fuselage giving it a more attractive profile. I still have to add the fuselage block in front of the wing leading edge up above the cabin and then do all of the finish sanding on the fuselage before it is ready for covering.

There is one final decision I have to make on the bottom bulkhead/stringer structure. The oval shaped bulkheads are an extension of the oval shape of the bottom forward planking. However, the covering will stretch tight in a straight line across each stringer and cause the edges of the oval bulkheads to stick out under the covering. The oval bulkheads need to be sanded down to form either a straight line between stringers or recessed concave between stringers so as not to touch the covering at all. I am favoring the recess concave approach, but would appreciate any comments or recommendations?.....Tandy

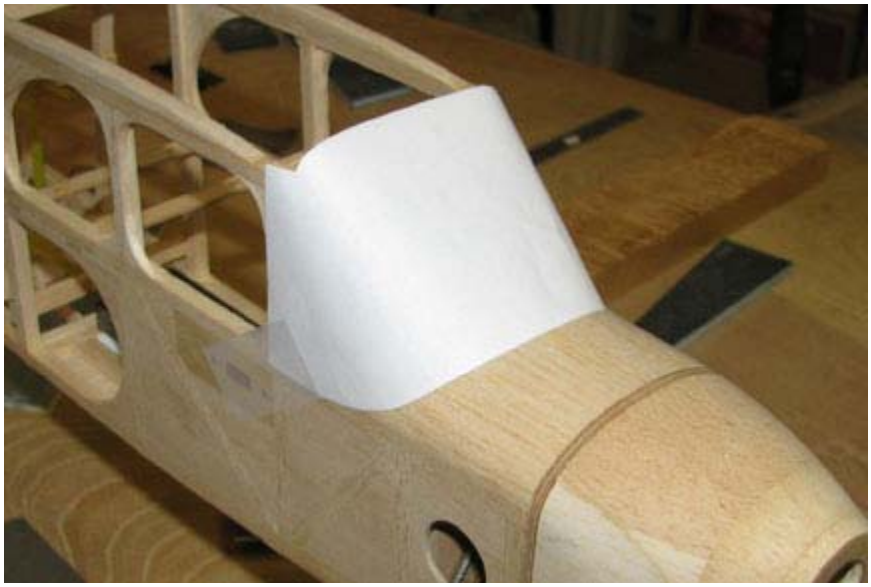
Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Monday, February 22, 2010 12:03 AM
To: Undisclosed-Recipient: ;@smtp103.sbc.mail.mud.yahoo.com
Subject: 67 Speed 400 Cloudster - Notched Wing Leading Edge Interface with Fuselage

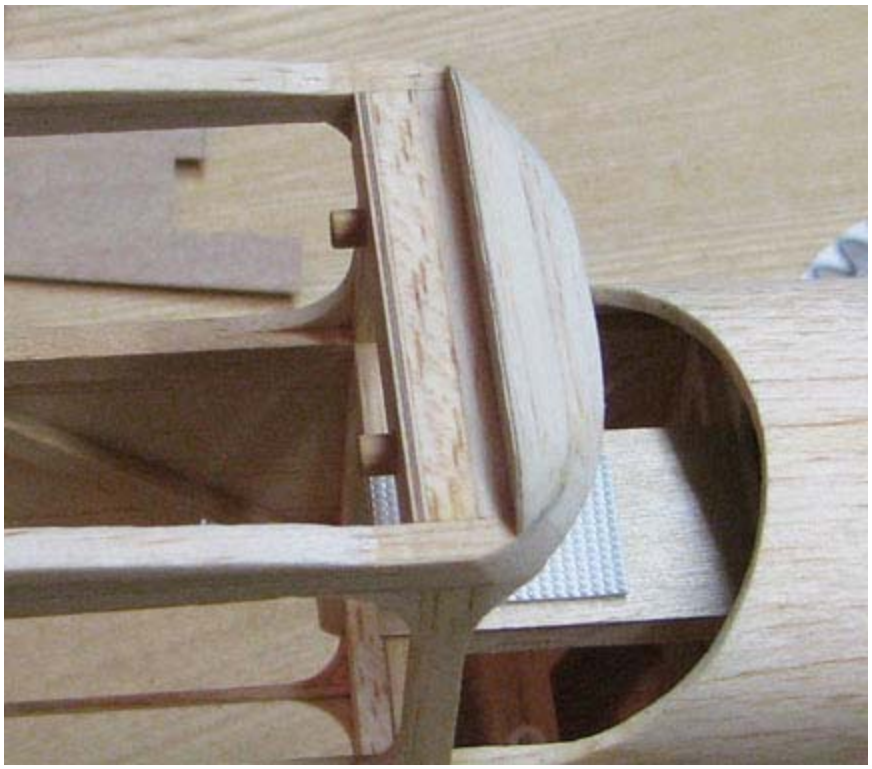
Speed 400 Cloudster Project

This morning Sue and I went to early church and then out for breakfast afterward. Shortly after noon, we drove over to Pantego see the new house our neighbors on the north just bought. They will be moving over there on Tuesday and Wednesday. So this afternoon there was time to finish the fuselage's top forward cabin stop that interfaces with the wing's notched leading edge, but I did not get to recessing the bulkheads between the stringers on the bottom of the fuselage.

The back side of the 1/4" X 3/8" balsa stop was lined with 1/64" plywood and then glued to the front of the wing saddle. This balsa stop was then carefully trimmed and sanded to shape with the appropriate slope for the wing screen attachment. The wind screen pattern was cut out of the plans and used to determine the right slope of the stop. This was an iterative process of trimming the stop, checking the fit with the pattern, and then trimming some more as shown below.



The finished cabin stop is shown in the picture below. Notice the 1/64" plywood liner on the back side of the cabin stop that the wing's notched leading edge butts up against.



This picture shows the wing's notched leading edge in proximity of the cabin stop.

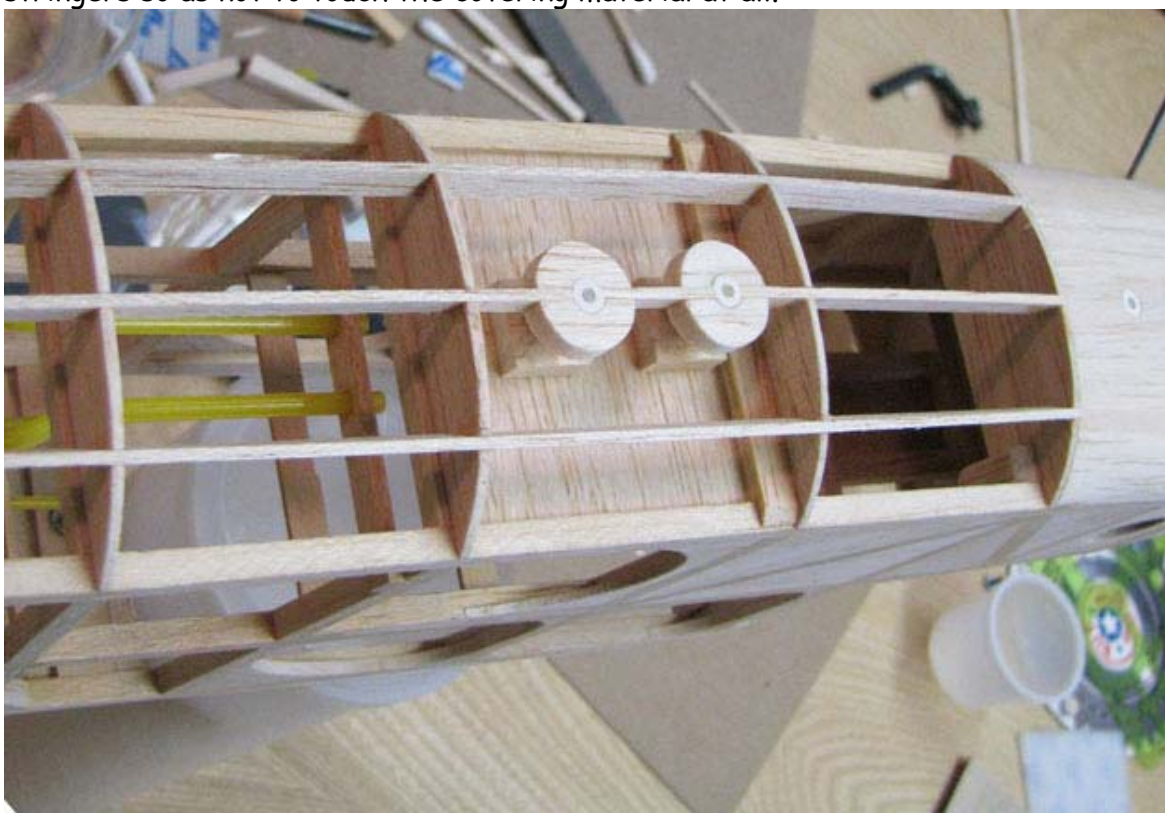
With the wing assembled to the fuselage in the picture below, you can see the nice fit of the cabin stop with the wings notched leading edge.....Tandy

Dave Harding

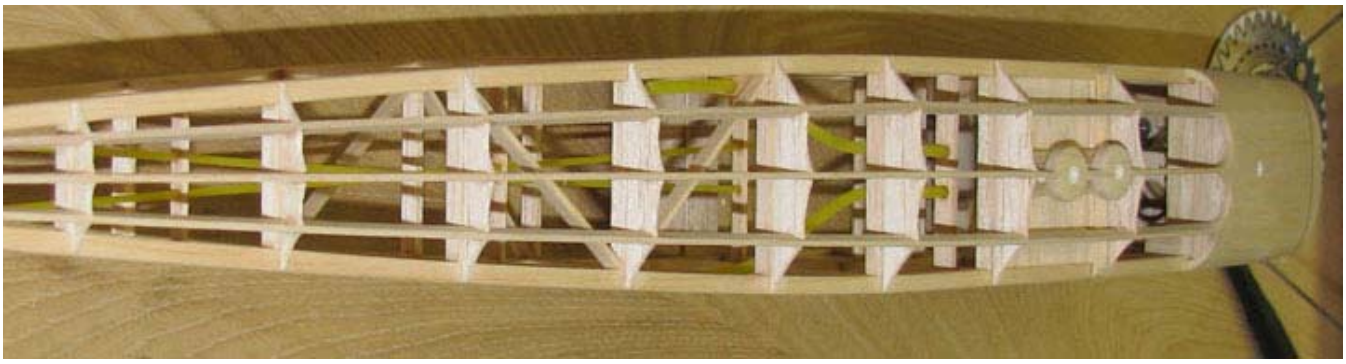
From: Tandy C. Walker [tandyw@flash.net]
Sent: Monday, February 22, 2010 10:18 AM
To: Undisclosed-Recipient: ;@smtp107.sbc.mail.mud.yahoo.com
Subject: 68 Speed 400 Cloudster - Recessing the edges of the Fuselage's bottom Bulkheads

Speed 400 Cloudster Project

As was stated earlier, the oval shaped bulkheads shown below are an extension of the oval shape of the bottom forward planking. The covering will stretch tight in a straight line across each stringer and cause the edges of the oval bulkheads to stick out under the covering. The oval bulkheads need to be sanded down to form either a straight line between stringers or recessed concave between stringers so as not to touch the covering material at all.



I decided in favor of the recess concave approach, so I took this task on the first thing this morning. It took me took approximately two hours to carefully trim and sand concave recesses on all 32 of the bulkhead edges between the stringers as shown below.....Tandy



Dave Harding

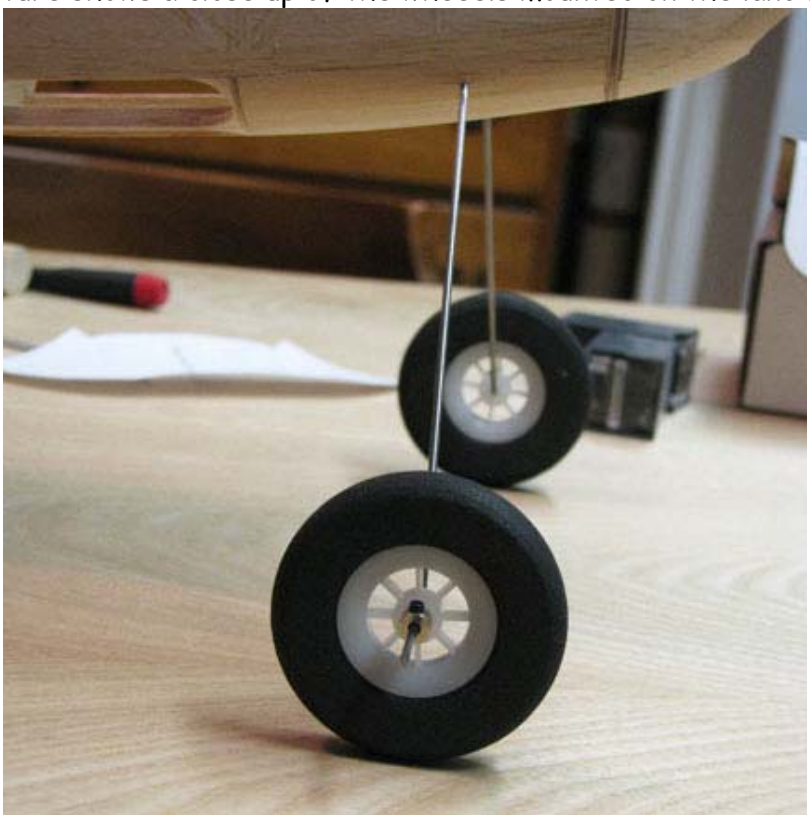
From: Tandy C. Walker [tandyw@flash.net]
Sent: Monday, February 22, 2010 11:56 PM
To: Undisclosed-Recipient: ;@smtp101.sbc.mail.mud.yahoo.com
Subject: 69 Speed 400 Cloudster - Main Wheels

Speed 400 Cloudster Project

The main wheels for the Cloudster arrived in the mail today from Tower Hobbies. They are 2" diameter GWS Light Foam Wheels and cost $2.50 a pair. The wheel has a light foam tire around a spoked plastic hub and is advertized to weigh 3.2 grams. The pair of wheels I received today weigh 7 grams as shown below.

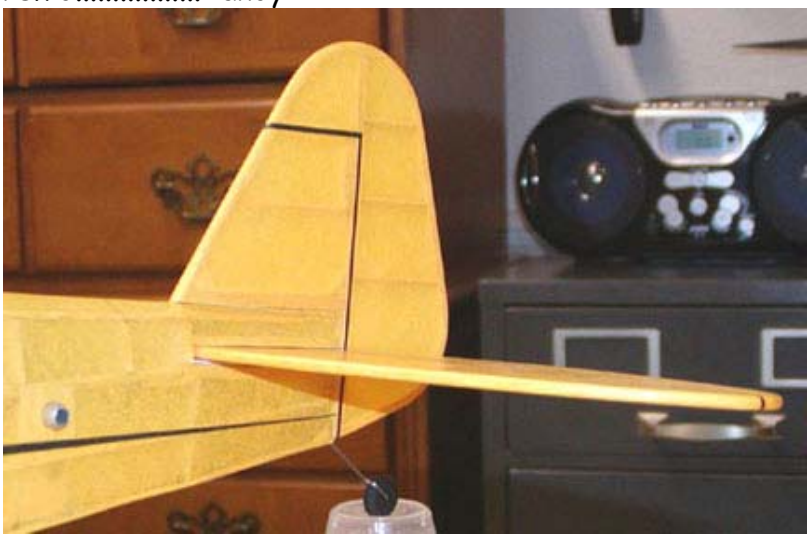
The holes in the plastic hubs are .082", which is too large for the cloudster's 1/16" piano wire landing gear (.063"). So the hubs were drilled for a .063" ID aluminum tube to serve as an axle bearing as shown below. The bearing tube length was 1/4".

This picture shows a close up of the wheeels mounted on the landing gear.



This shows the wheels in the presents of the fuselage and I think they look quite nice.

On the rubber powered J-3 Cub I made a tail wheel out of balsa with an aluminum tube axle bearing as shown below. I think that I will do the same thing for the Cloudster as I do not like the looks of the tail skid.....Tandy

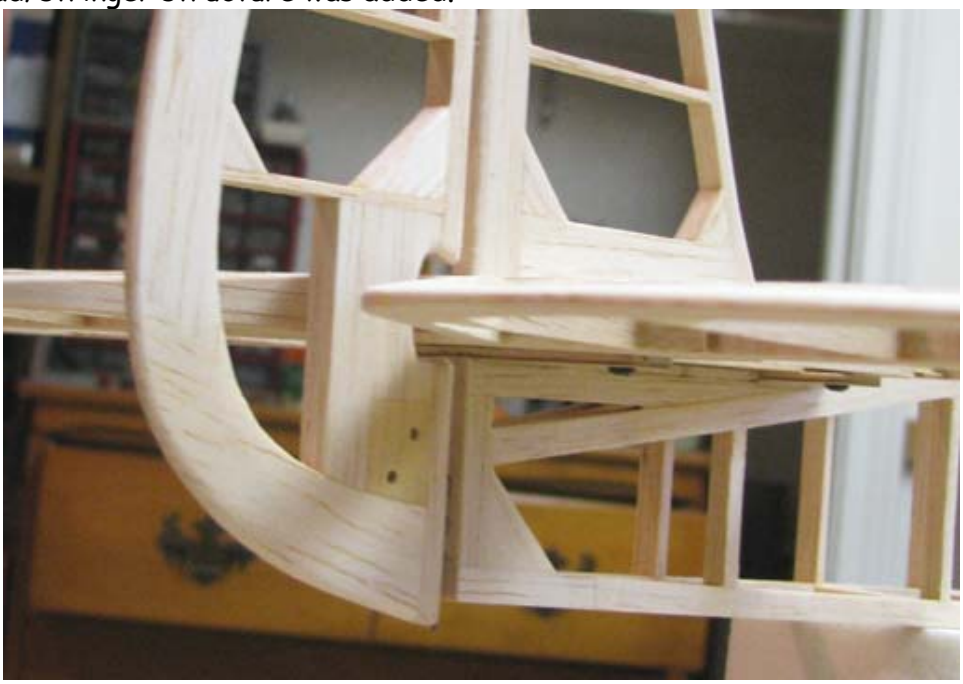


Dave Harding

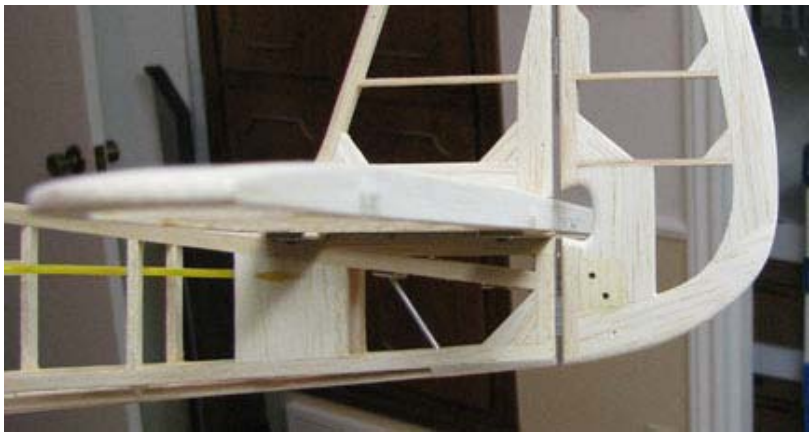
From: Tandy C. Walker [tandyw@flash.net]
Sent: Wednesday, February 24, 2010 12:43 AM
To: Undisclosed-Recipient: ;@smtp102.sbc.mail.mud.yahoo.com
Subject: 70 Speed 400 Cloudster - Trial Assembly for Weight and Balance Check

Speed 400 Cloudster Project

When I made and hinged the rudder back in Report No. 18, you probably do not remember that I left the bottom of the rudder structure extending below the bottom of the fuselage structure as shown below. This was done so that later the rudder could be faired into the bottom line of the fuselage after the bulkhead/stringer structure was added.



After the bulkhead/stringer structure was added to the bottom of the fuselage, the rudder was faired in as shown below.



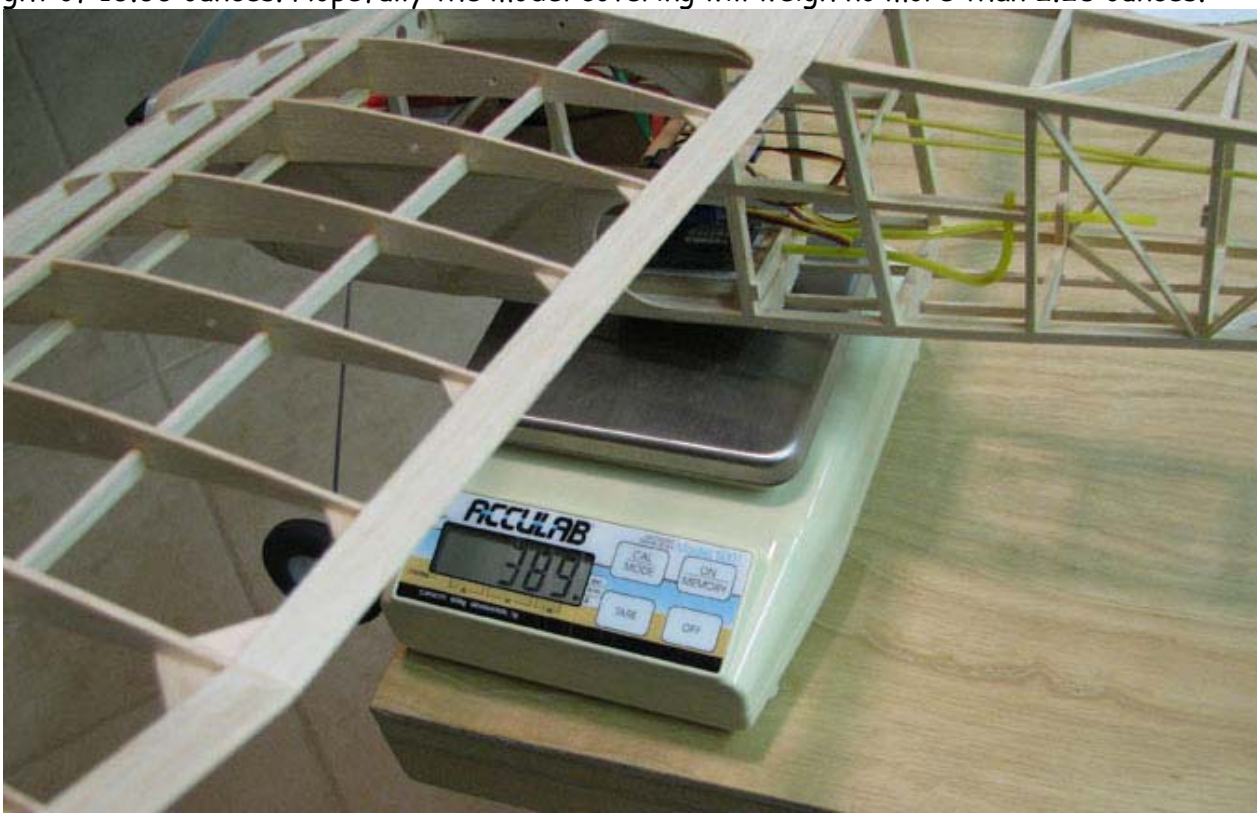
To perform a preliminary weight and balance, the entire model was assembled

including the Speed 400 motor, cowl, prop, spinner, ESC Li-Po battery, 2.4 GHz receiver, both servos, push rods, and wheels. This is everything except the covering, trim, and decals. The assembled model was hung from the ceiling in the model room and the two pictures were taken for you to see.

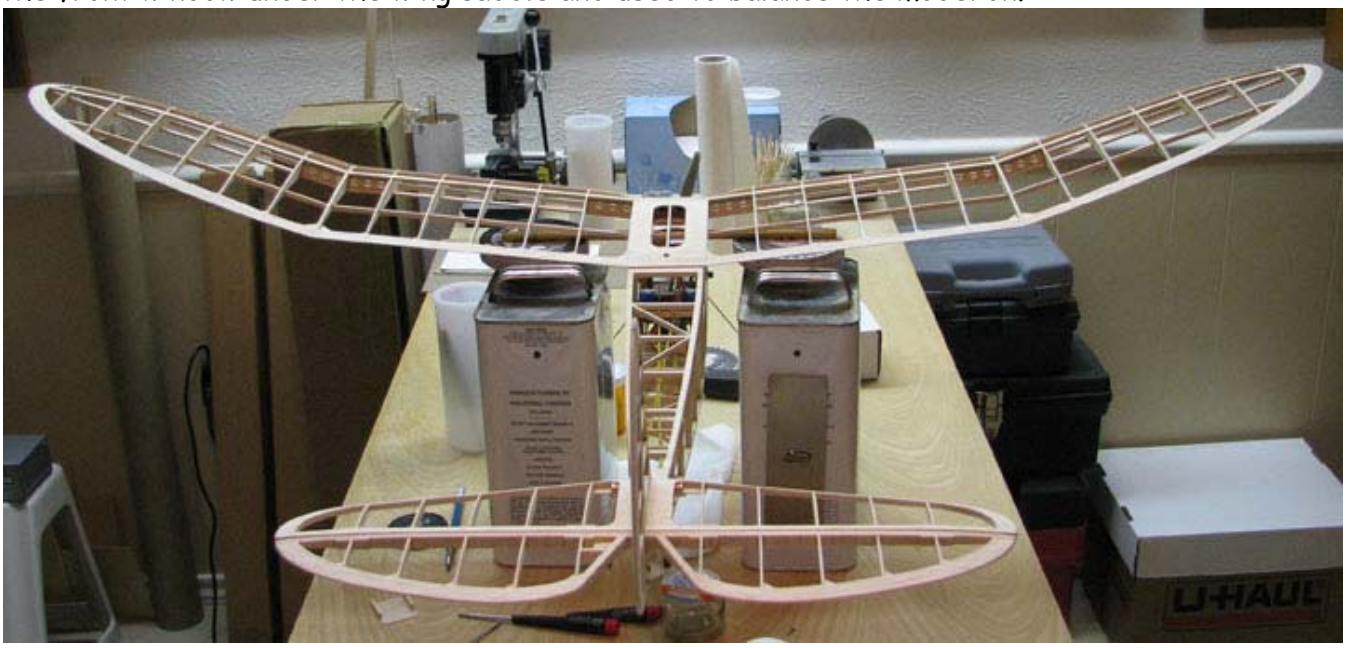
Right Front View

Right View

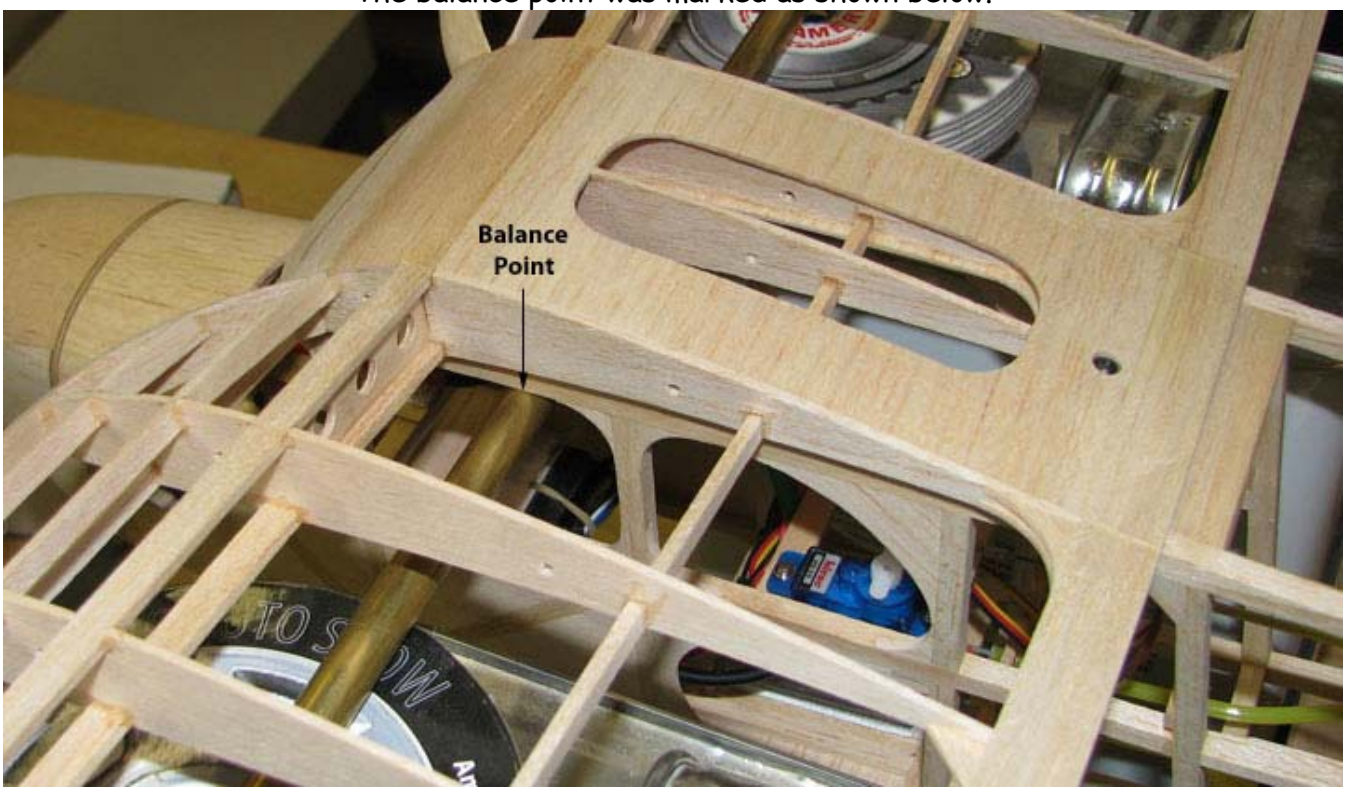
Next the complete model was weighed on the AccuLab scales. The total weight was 389 grams as shown below. This is 13.72 ounces, which is 2.28 ounces under the SAM Speed 400 minimum weight of 16.00 ounces. Hopefully the model covering will weigh no more than 2.28 ounces.



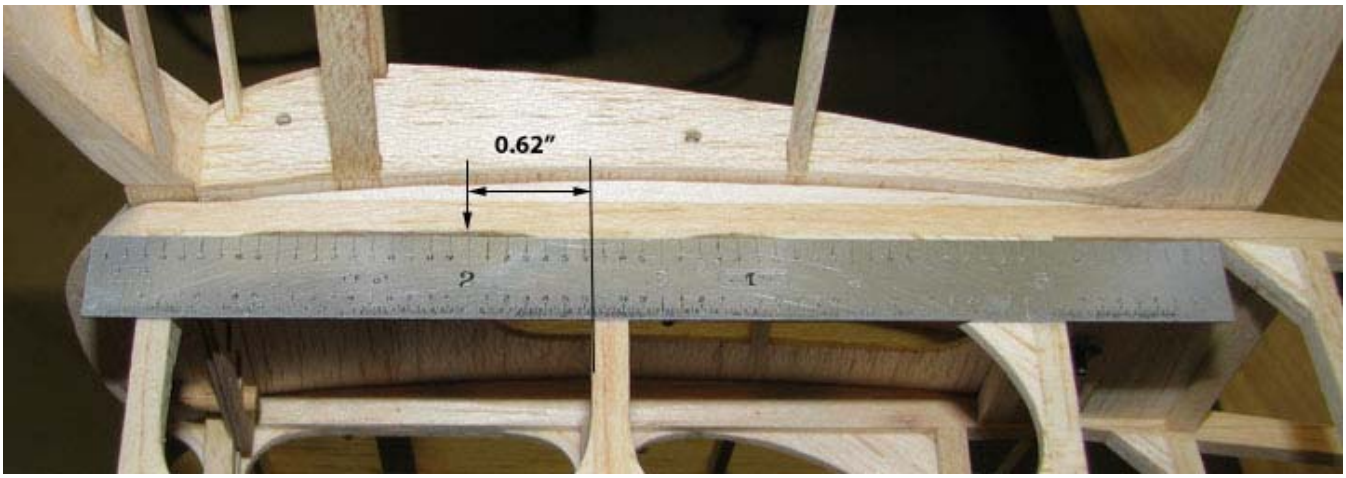
The model set up for checking the balance is shown below. Two one-gallon Randolph clear dope cans were placed on either side of the fuselage. A piece of 3/8" brass tubing was slid through the front window under the wing saddle and used to balance the model on.



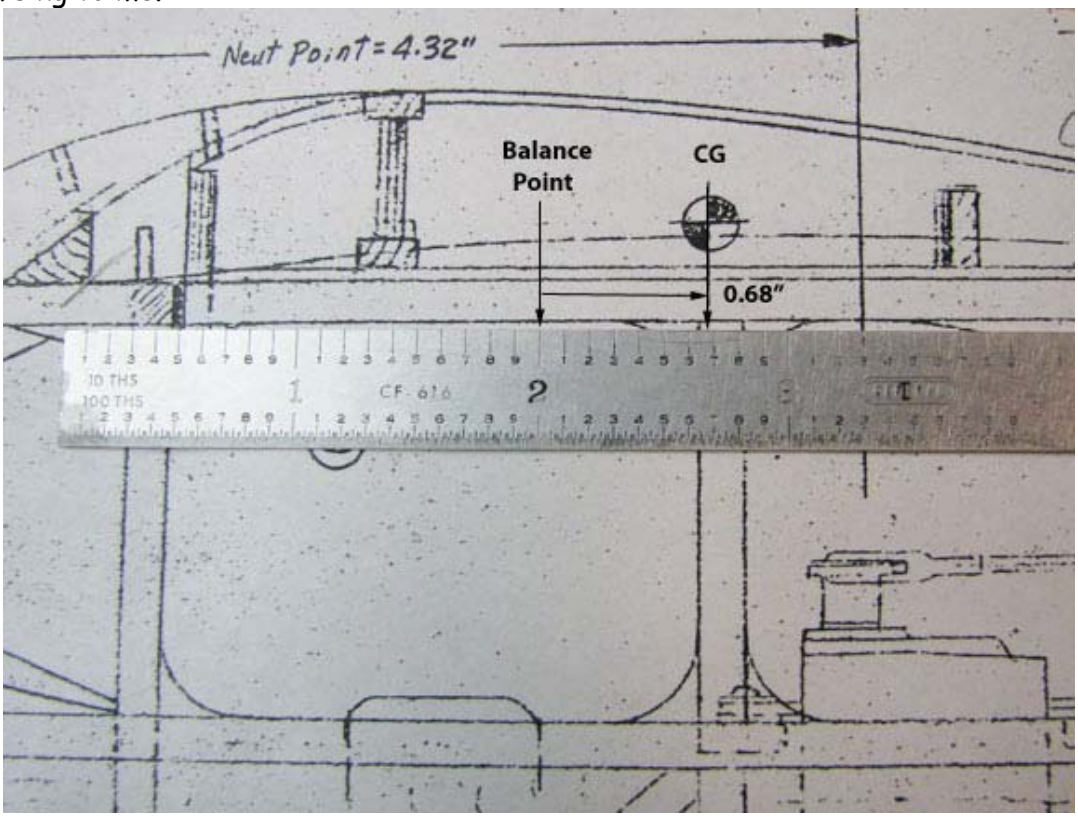
The balance point was marked as shown below.



This balance point lies 0.62" ahead of the front edge of the window frame as shown on the steel ruler below.



The balance point was then determined to be 0.68" ahead of the desired CG as shown on the plan below. The majority of the covering material will be behind this balance point and the covering material weight will move the balance in the direction of the desired CG. Just how close is unknown at this time. However, the results of this interim weight and balance check looks very promising to me.



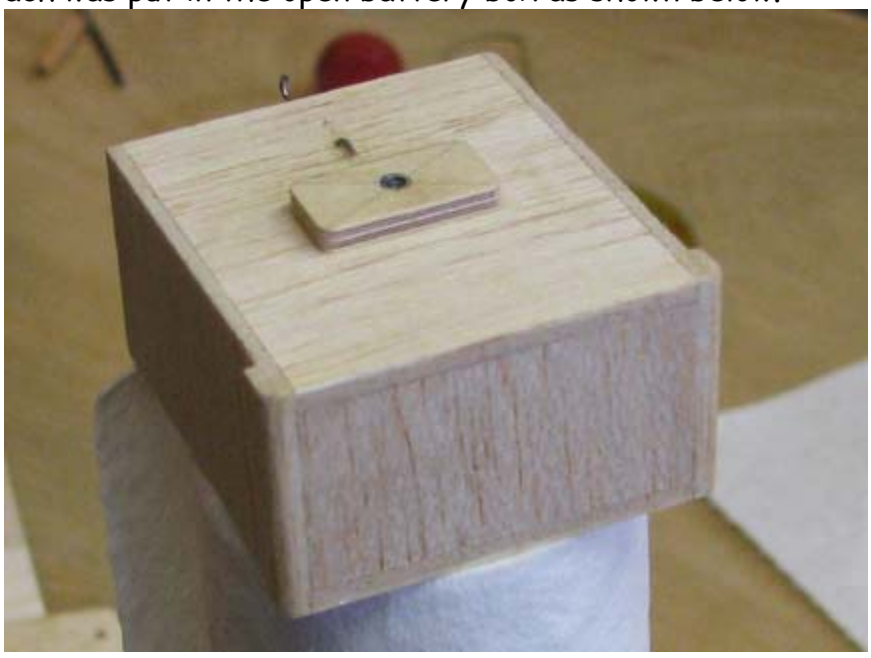
I will stop work on the Cloudster in the morning as it is time to start doing our annual taxes. :O< "***BARF***" While I am not looking forward to doing the taxes, the break from the Clouster project will be good for me to get away for awhile. Then when I come back, I will be fresh to start the covering process.....Tandy

Dave Harding

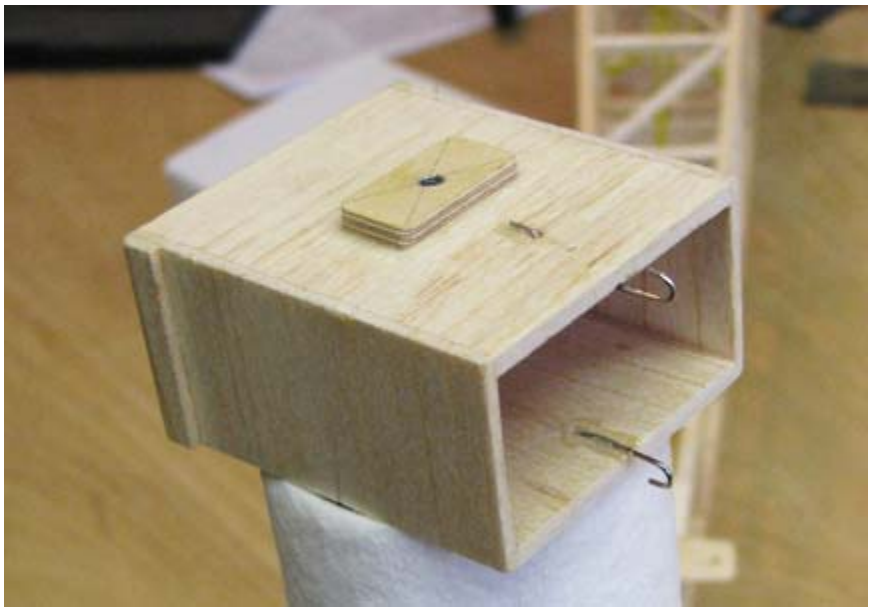
From: Tandy C. Walker [tandyw@flash.net]
Sent: Saturday, February 27, 2010 4:42 PM
To: Undisclosed-Recipient: ;@smtp102.sbc.mail.mud.yahoo.com
Subject: 72 Speed 400 Cloudster - Revised Battery Box, Suspension Insert, and Tail Wheel

Speed 400 Cloudster Project

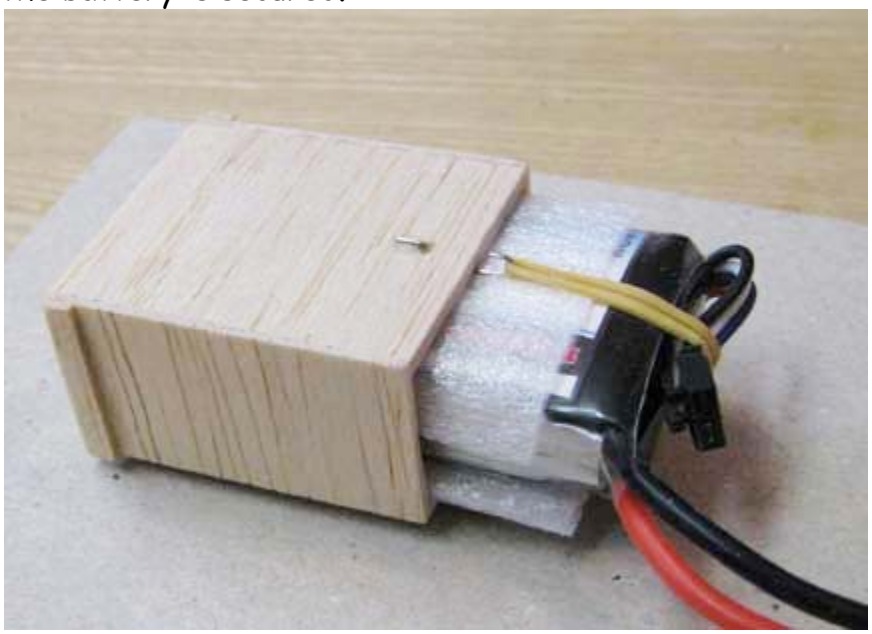
My cold is still with me, but I am beginning to feel a some better so I decided to do a little work on the Cloudster. I may need the ability to shift the large Li-Po battery back slightly to trim the balance point. To do this, first a vertical grain 1/16" balsa back was put in the open battery box as shown below.



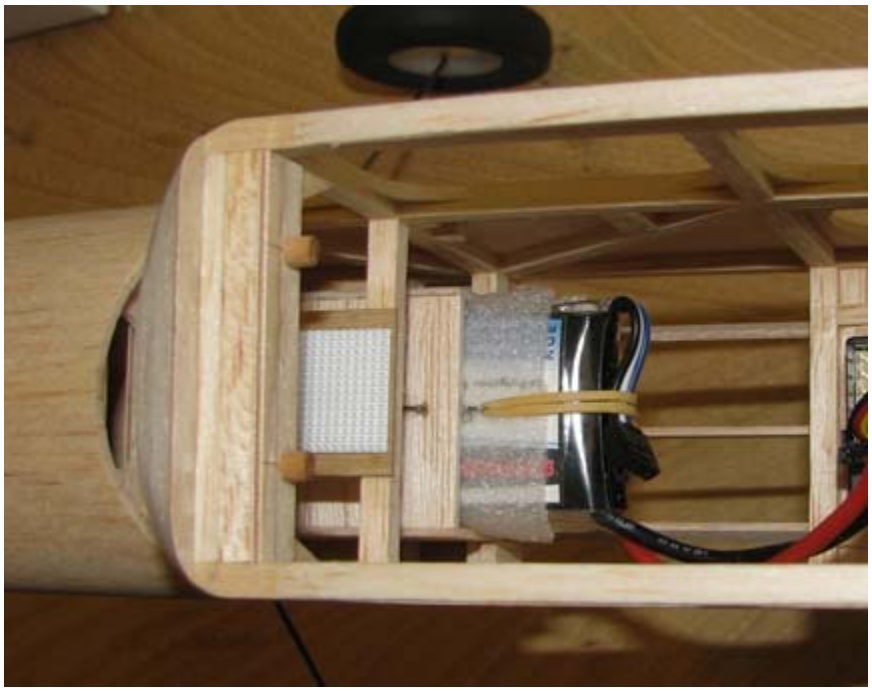
Next, two hooks were bent up out of extra long straight pins to shape and CA'd to the battery box's top and bottom as shown below. These hooks have a half-loop on one end for a rubber band to hook into and Z-Bend on the other to hook through the balsa as can be seen below.



This allows the battery to be secured in its box with a single No. 10 rubber band as shown below. Now the battery can be moved aft in the box by placing a balsa filler or spacer in the box before the battery is secured.



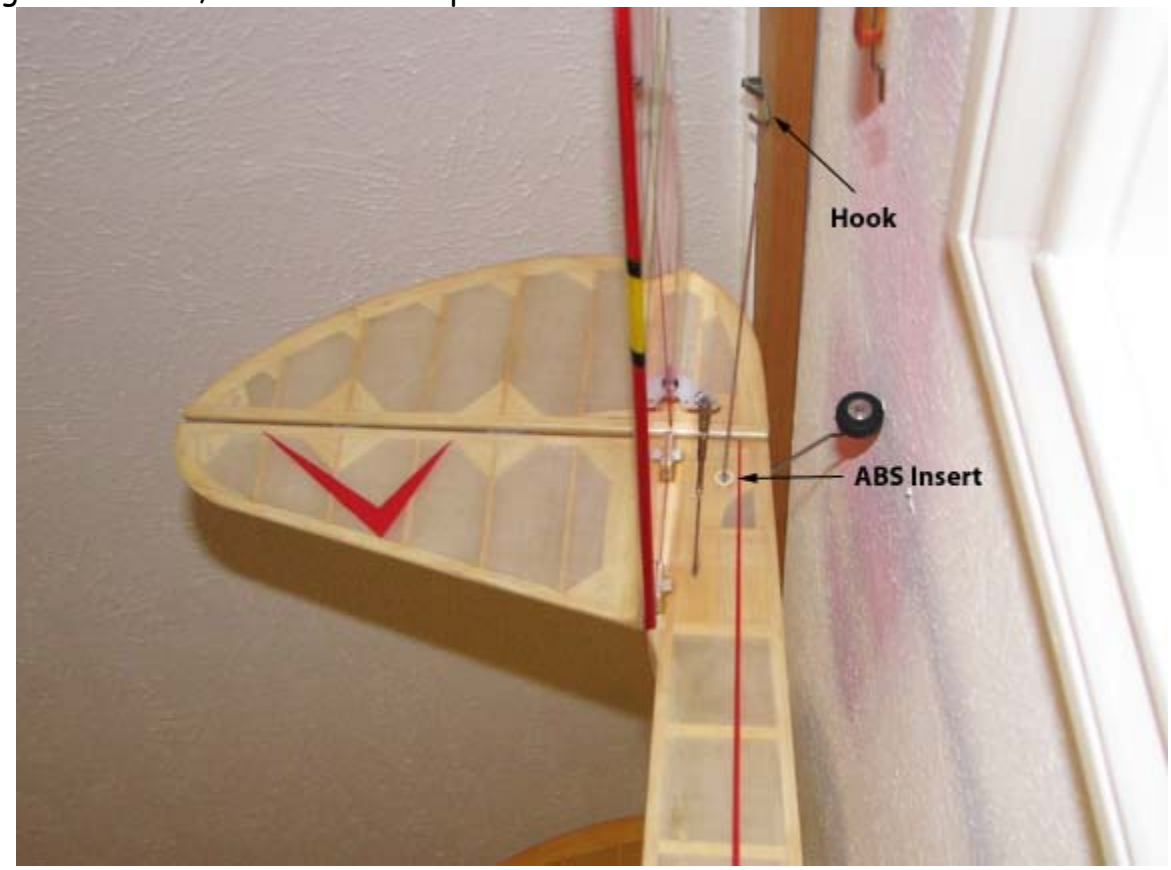
In the picture below, you can see the battery and box installed in the bottom of the fuselage.



I hang the fuselages of all of my models on the wall of the model room as shown below. Notice the Class B Airborn fuselage on the extreme right.

In this close up, you can see how the Airborn is hung on the wall. During construction, I insert a piece of white ABS plastic tubing through the fuselage's structure at the rear

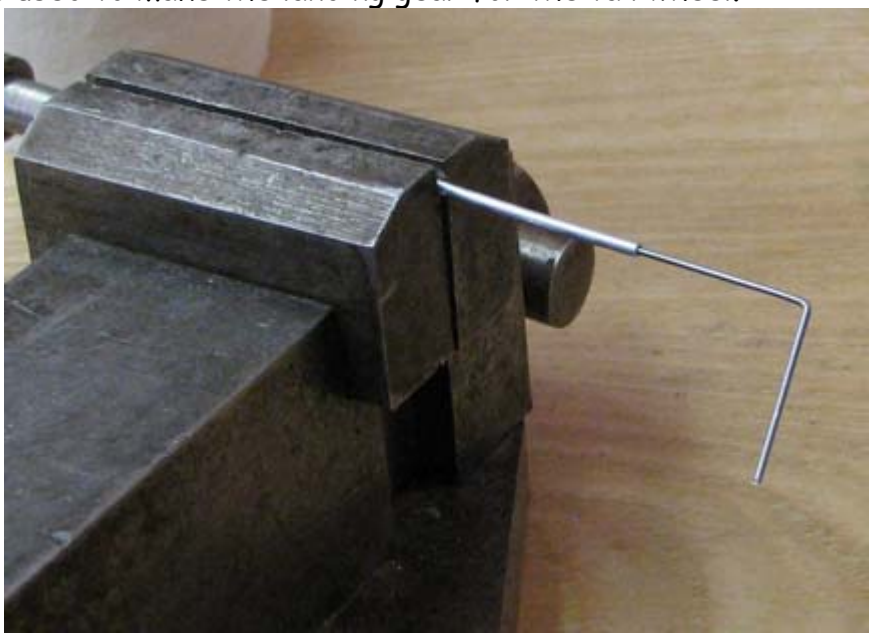
and sand it down flush with the fuselage's sides before covering. This permits the model to be hung on the wall with loop of waxed cord that runs from the hook on the wall, down through the insert, and then back up to hook as shown below.



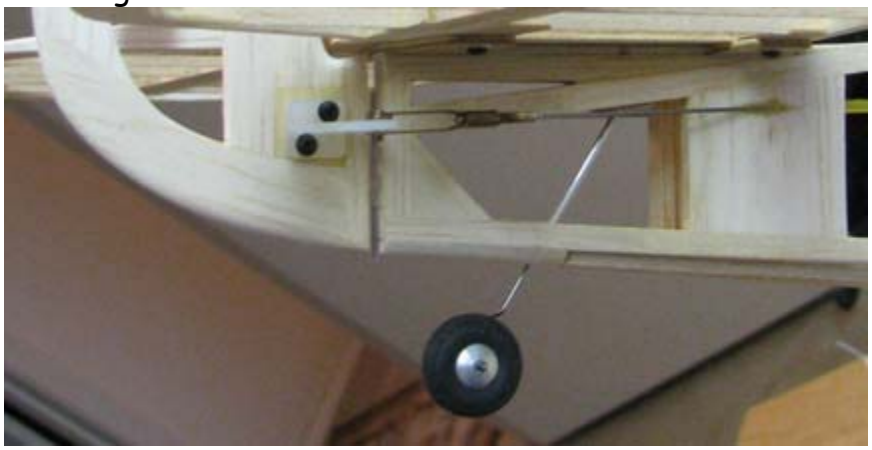
As you can see in the picture below, an ABS plastic insert has been installed through the two large gussets between the lower longeron and tail post. Thisd will permit the Cloudster fuselage to be hung on the wall in a similar manner.

The wire tail skid inserted in the aluminum tube in the picture above was made out 0.035" piano wire, but I could never locate any more 0.035" piano to wire to make a landing gear

for the tail wheel. Since 0.032" piano wire was loose inside the aluminum tube, particularly in torsion, I conducted a test using 0.032" piano wire and a separate length of aluminum tubing. A slight zig-zag was bent in the .032" wire and the wire inserted into the aluminum tube. The wire fit pretty tightly, but could be rotated very easily. Then I placed a drop of thin CA on the wire and it instantly wicked down in between the wire and the tube. I rotated the wire around several times and them let wire/tube combination set for about an hour. The tube was then placed in the table vise shown below and I proceeded to twist the wire. It was rock solid! In fact, I twisted the aluminum tube off in the vise without the wire ever rotating relative to the tube. This proves that the 0.032" could be used to make the landing gear for the tail wheel.



A tail wheel landing gear was bent up out of 0.032" piano wire for an aluminum hub 3/4" tail wheel. Again a slight zig-zag was put into the portion of the wire that slides up into the aluminum tube. A trial fit of the tail wheel is shown below, but the wire will not be CA'd in place until after the fuselage is covered. By the way, the weight of the tail wheel assembly is less than 2 grams.



Hopefully tomorrow I will feel good enough to finally start on our income taxes.....Tandy

Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Sunday, March 07, 2010 4:56 PM
To: Undisclosed-Recipient: ;@smtp103.sbc.mail.mud.yahoo.com
Subject: 76 (Revision A) Speed 400 Cloudster - Hinging Elevator to Stab

(This revision includeds the method used for retaining the hinge wires.)

Speed 400 Cloudster Project

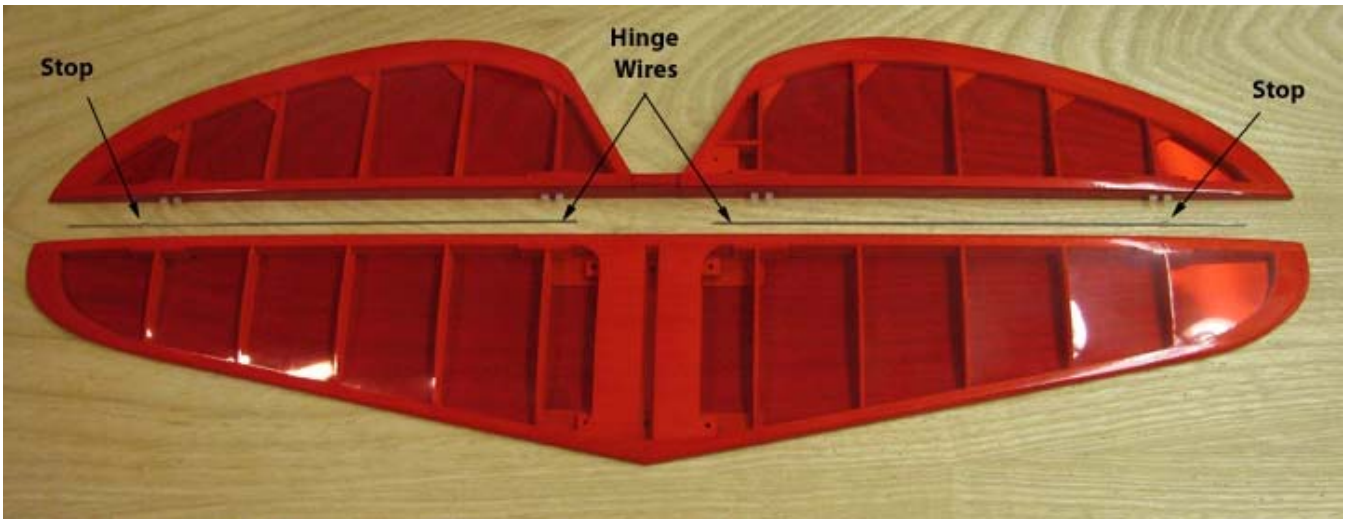
Once the stab and elevator surfaces were covered with UltraCote Lite transparent red, the covering over the hinge slots were cut and the hinge halves were inserted into their slots. The hinge wires were reinserted and the hinges were completely realigned. Then the hinge wires were removed in order to permanently bond the hinge halves in their individual slots as shown below. I use thin drops of Jett CA to wick down in between the hinge tongue and the balsa slot in several places as shown below, which takes a pretty steady hand and lots of time. Much care has to be taken because if the CA ever wicks into the hinge loops you are deep trouble. For years I have blunted the tip of a straight pin with a file. A drop of CA is applied to the blunted end of the straight pin and used to apply the CA to the hinge. This takes a lot of practice and you waste a lot of thin CA trying to get the drop to stay on the end straight pin, but it can be done, given enough time and patience.

*********GREAT TIP*********

As I reported back in my Sailplane construction series, my friend James Lollar from Ada, Oklahoma, clued me in on how to accomplish this task almost effortlessly. For years he has used a sowing needle with the tip of the eye cut off as shown below. When he puts a drop of thin CA on the needle, the drop will always catch and stay in the fork due to surface tension. Then he can easily touch the fork to the desired spots on the hinge and the CA goes right into where he wants it. I completed bonding in all eight hinge halves on the stab and elevator in less than twenty minutes this morning. Now why had I never thought of this simple approach in all my years of modeling?

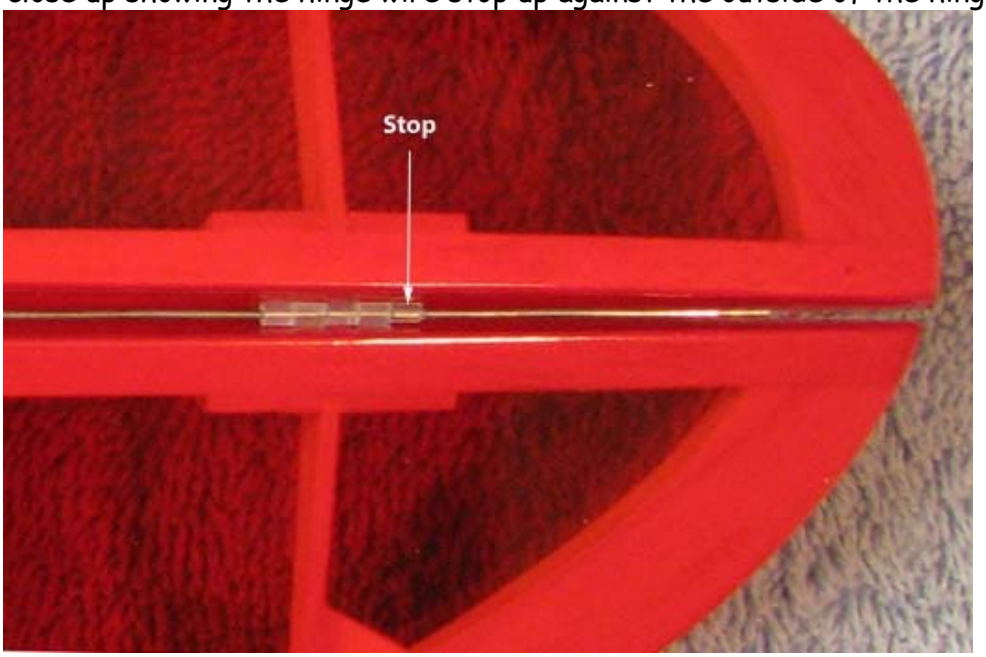
Thanks James for the great tip!

The 0.031" hinge piano wires were cut to their final length. A loop was cut off of an extra nylon hinge, positioned on the hinge wire, and CA's in place to serve as a stop for the hinge wire as shown below.



This is a picture of the right half of the horizontal tail with the elevator deflected down so you can see the continuous hinge wire installed.

This is a close up showing the hinge wire stop up against the outside of the hinge itself.



During final assembly, there will a "keeper" on the other end of the hinge wire like the one shown below on the stab/elevator combination of my Playboy Junior. The keeper is also made of a loop on extra nylon hinge. First thin CA is wicked into the loop. Holding the tongue of the hinge, the inside of the hinge loop is reamed out with a No. 69 drill bit (0.0292") so that a rather snug fit is achieved with the 0.031" hinge wire. Then the loop is cut off of the nylon hinge.

Now here comes the tricky part. To get the keeper onto the the end of the hinge wire, another wire with a little "L" bent on the end is inserted part way through the keeper. Using the wire with the L on ther end, the keeper is positioned at the end of the hinge wire, which is then pushed into the open side of the keeper. The back edge of a No. 11 X-acto blade is placed against the edge of the keeper and the keeper is pushed all the way onto the hinge wire. Now the stop is up against the outside hinge and the keeper is up against the inside hinge as shown above.

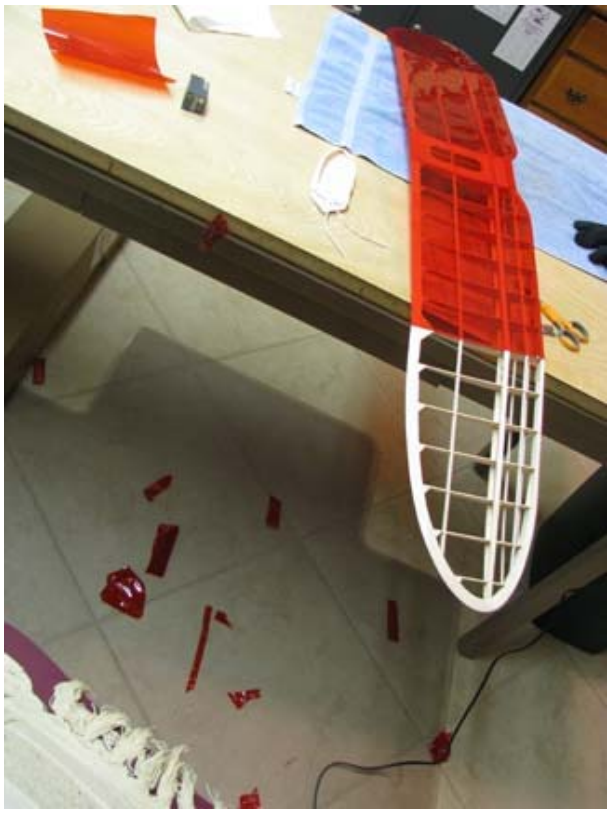
This completes the Cloudster's horizontal tail. The next task for this afternoon will be to start covering the wing.....Tandy

Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Sunday, March 07, 2010 5:44 PM
To: Undisclosed-Recipient: ;@smtp105.sbc.mail.mud.yahoo.com
Subject: 77 Speed 400 Cloudster - Started Covering Wing

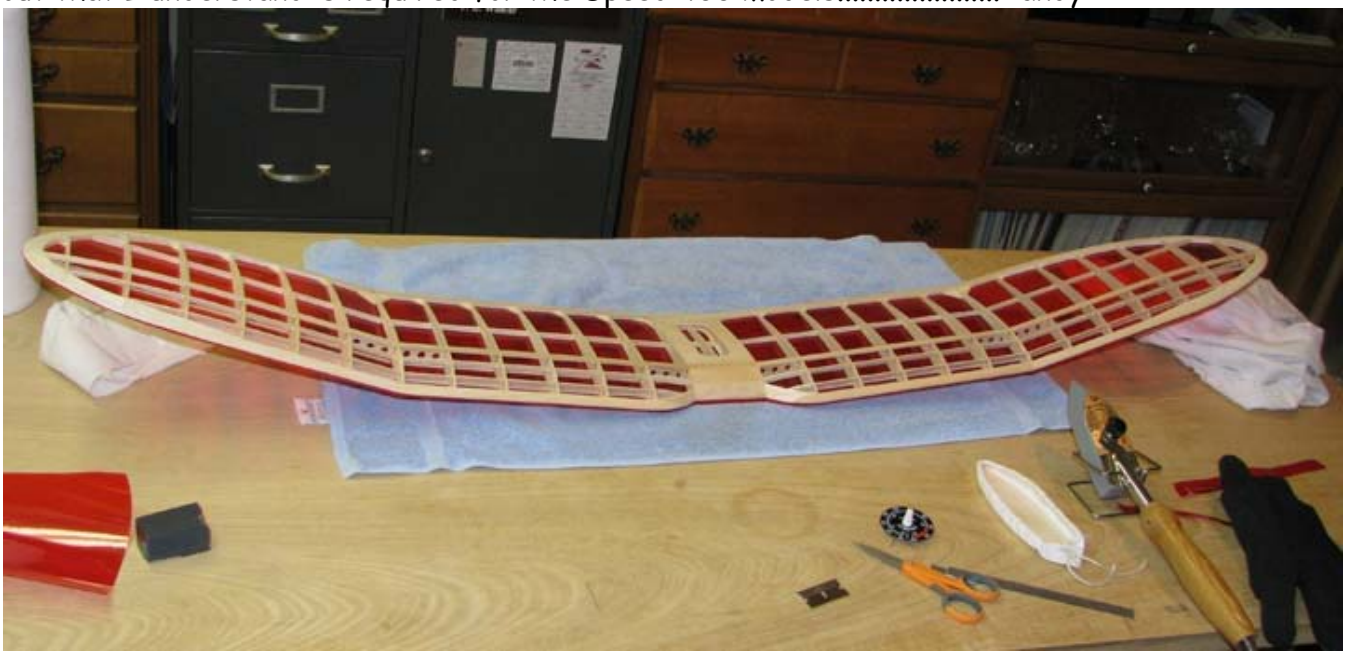
Speed 400 Cloudster Project

This afternoon I started covering the bottom of the Cloudster's wing as shown below.



I managed to finish covering the bottom of the wing with five separate pieces of UltraCote transparent red as shown below.

This picture shows the uncovered top of the wing, which I will finish up tomorrow. I am also going to have to get some graphics made for the AMA number as well as a 1937 Cloudster call out that I understand is required for the Speed 400 models.....Tandy



.....Tandy

Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Monday, March 08, 2010 3:07 PM
To: Undisclosed-Recipient: ;@smtp108.sbc.mail.mud.yahoo.com
Subject: 78 Speed 400 Cloudster - Wing Covering Completed

Speed 400 Cloudster Project

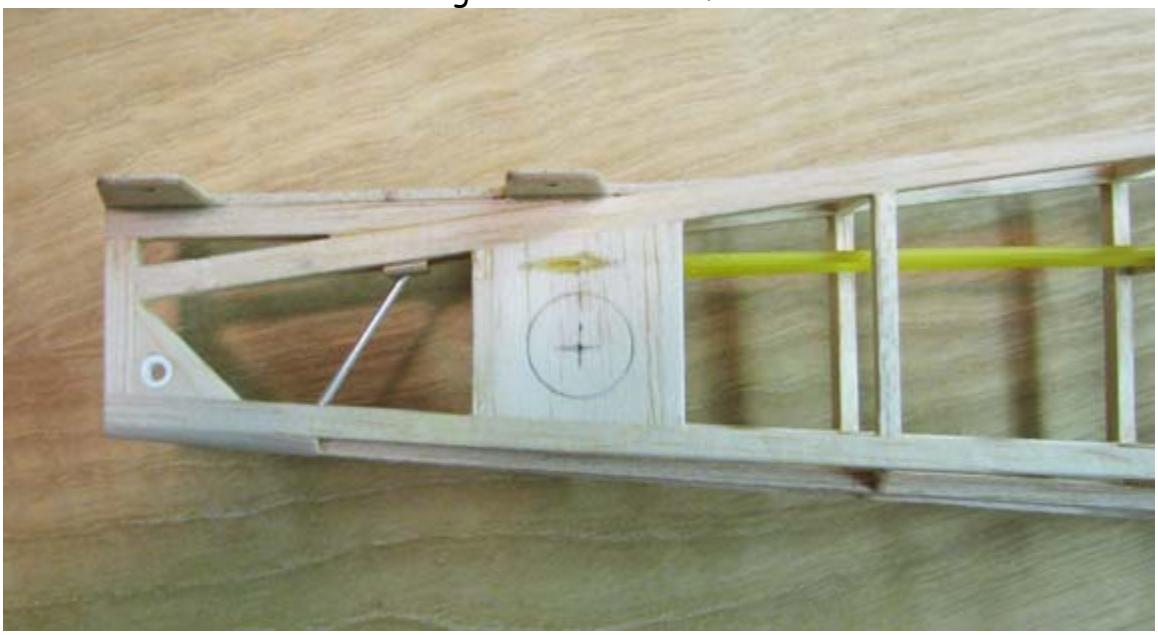
I finally completed covering the top of the Cloudster wing as shown below. I had some significant difficulty covering around the notched leading edge on top of the wing, ending up with puckers and over shrinking the covering in that area. I finally had to cut out the top right wing bay next to the center section and patch it $% #*! So I covered the top left wing bay next to the center section by itself and then the rest of the top left inner panel with a separate piece. I am really not happy with it, but is the best I could do.....Tandy

Dave Harding

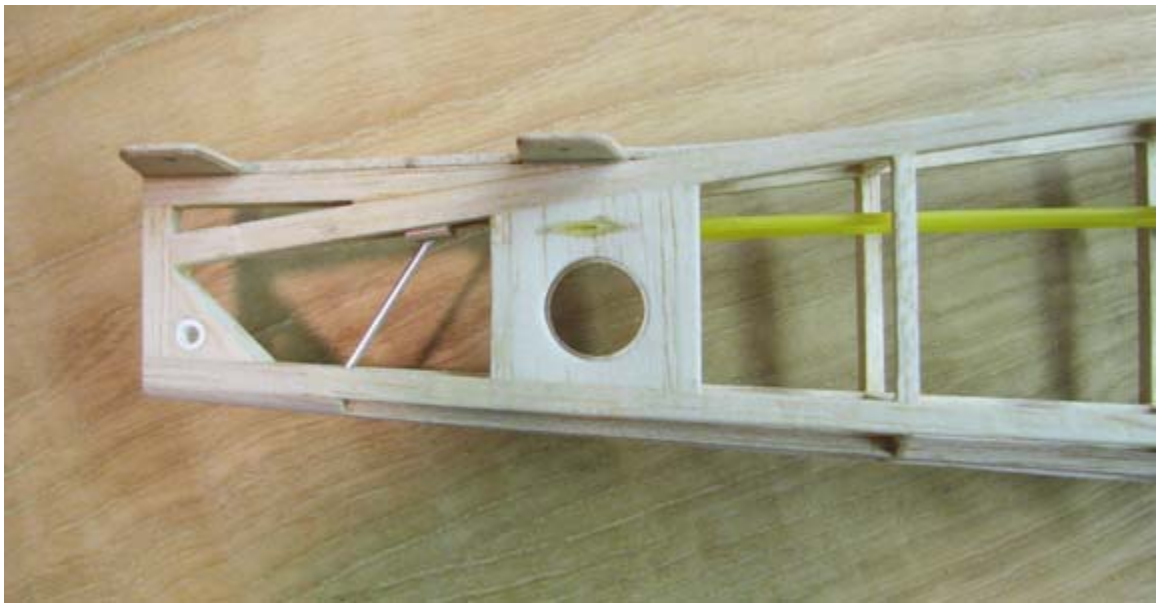
From: Tandy C. Walker [tandyw@flash.net]
Sent: Thursday, March 11, 2010 6:34 PM
To: Undisclosed-Recipient: ;@smtp108.sbc.mail.mud.yahoo.com
Subject: 79 Speed 400 Cloudster - Fuselage Polyspan Lite Covering Preparations

Speed 400 Cloudster Project

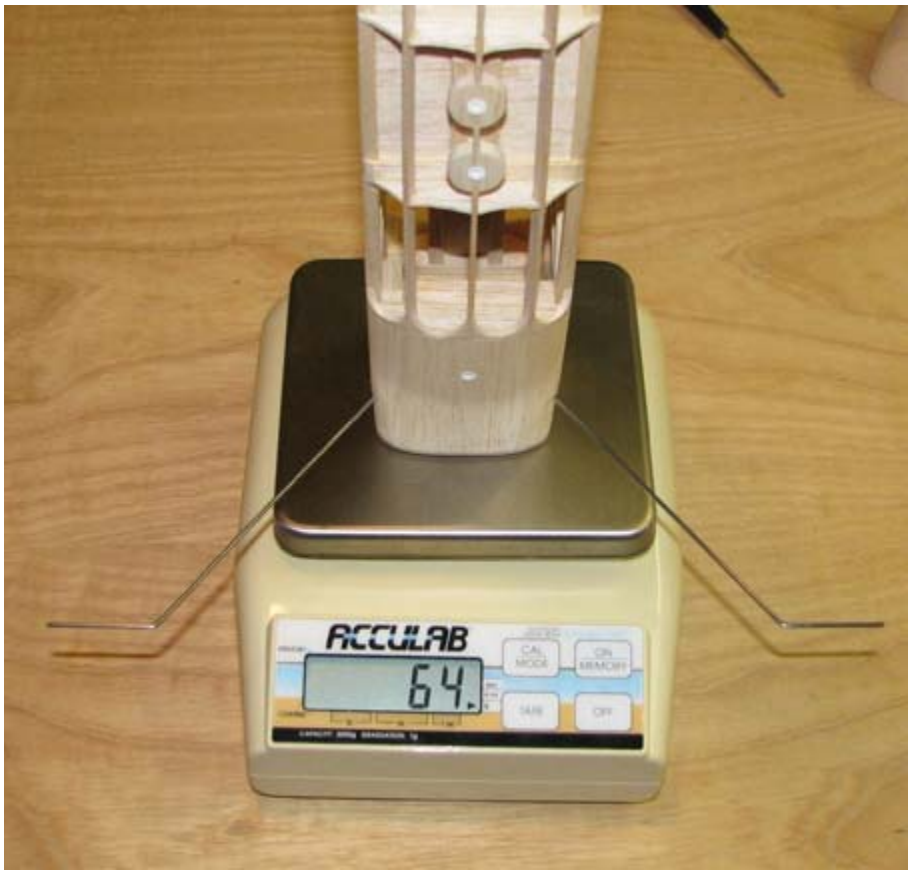
As I was starting to clear dope the fuselage in preparation for the first covering with Polyspan Lite, I realizes I really needed vents in the aft part of the fuselage for air circulation to dissipate internal battery and ESC heat. The ideal place for these vents is in the 1/16" sheeting under the leading edge of the stab. A hole pattern was drawn on the sheeting as shown below.



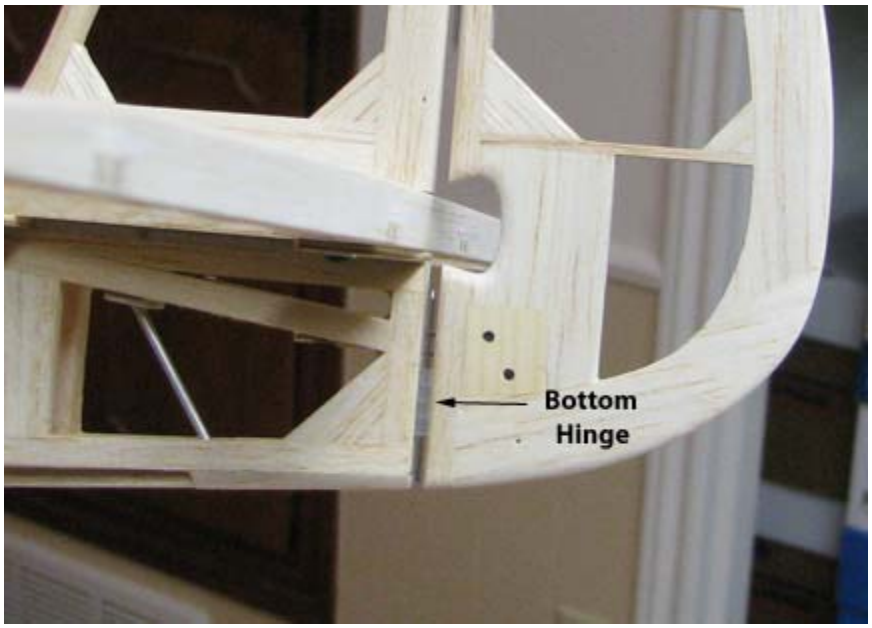
The hole was cut out and sanded to shape on both sides of the fuselage as shown below.



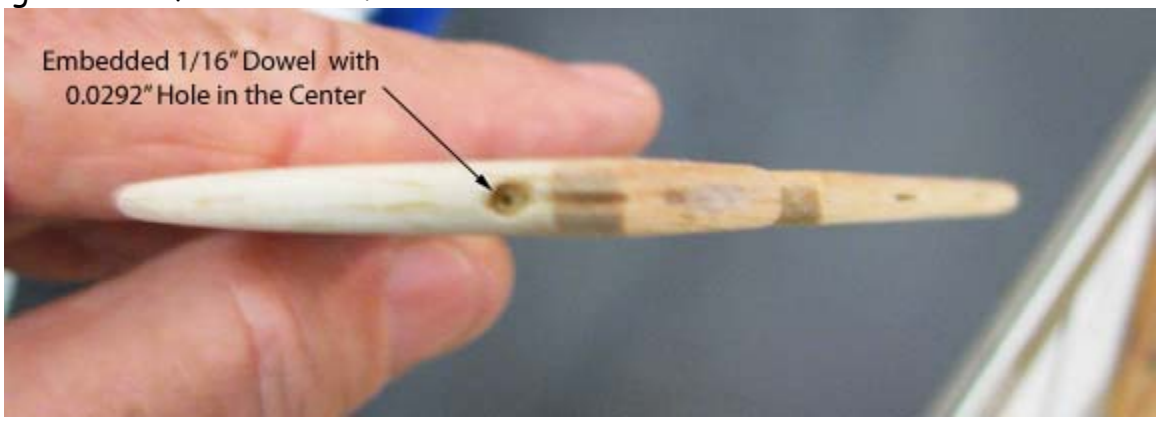
Before any clear doping, the bare fuselage structure weighed in at 64 grams (2.26 oz) as shown below.



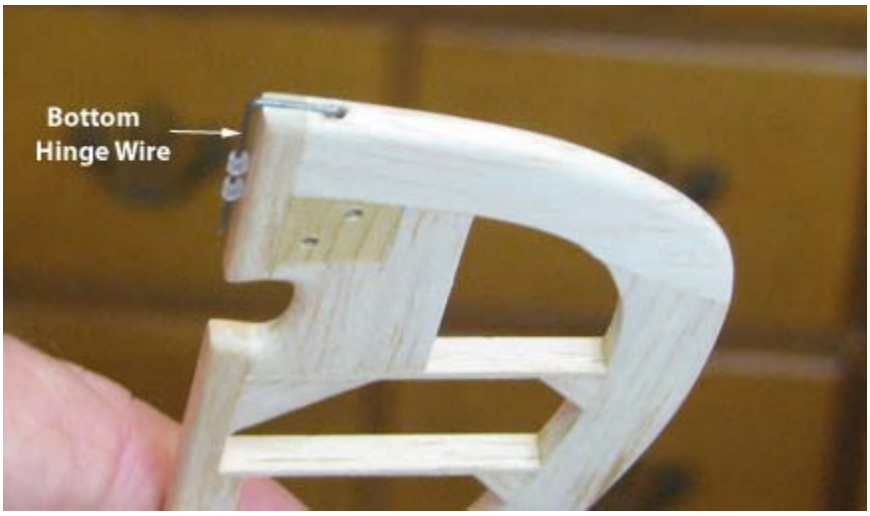
Oh yes, I almost forgot about securing the hinge pin in the rudder's bottom hinge shown below.



The approach used required drilling a 0.0292" hole in the end of a 1/16" wooden dowel that is 3/16" long. The dowel is then embedded and glued in the base of the rudder's structure as shown below. Notice also the recessed groove to the right of the dowel for the hinge wire to fit down into.



The 0.031" bottom hinge wire has "U" bent on the end as shown below that plugs into the hole in dowel with a force fit. This is sufficient to secure the hinge pin.



I have put three coats of 50/50 clear nitrate dope on the fuselage, cowl, fin, and rudder with sanding between the first two coats. Since it is late in the day, I will start the first covering of Polyspan Lite tomorrow.....Tandy

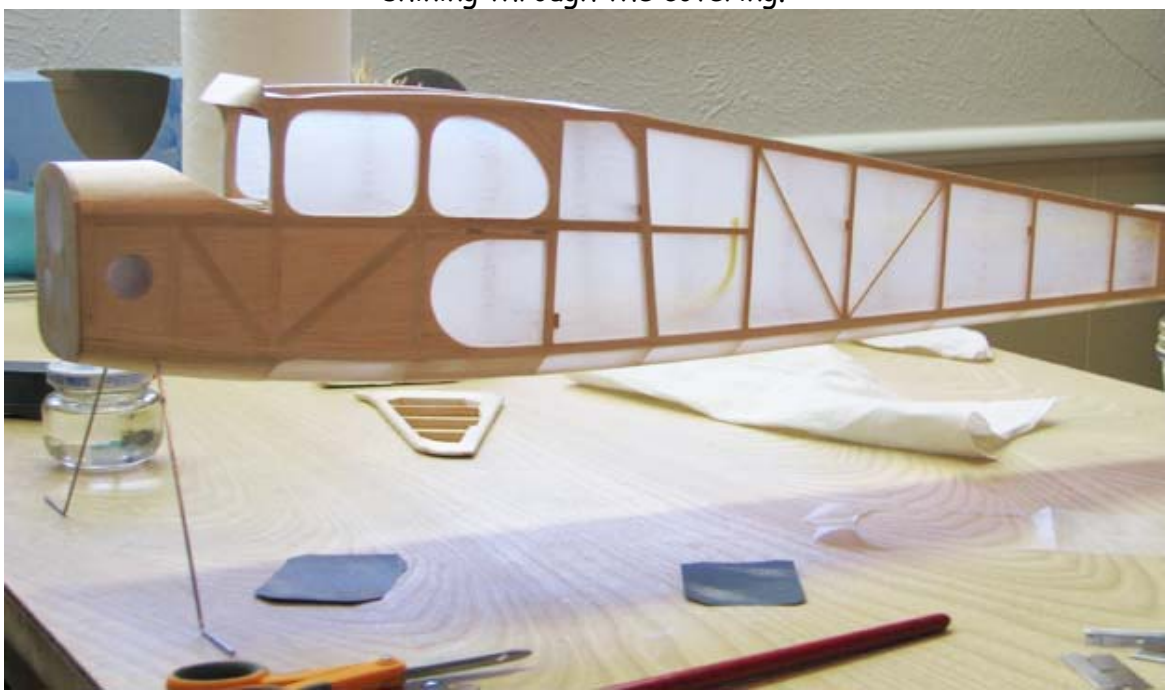
Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Saturday, March 13, 2010 5:29 PM
To: Undisclosed-Recipient: ;@smtp108.sbc.mail.mud.yahoo.com
Subject: 80 Speed 400 Cloudster - Fuselage Polyspan Lite Covering

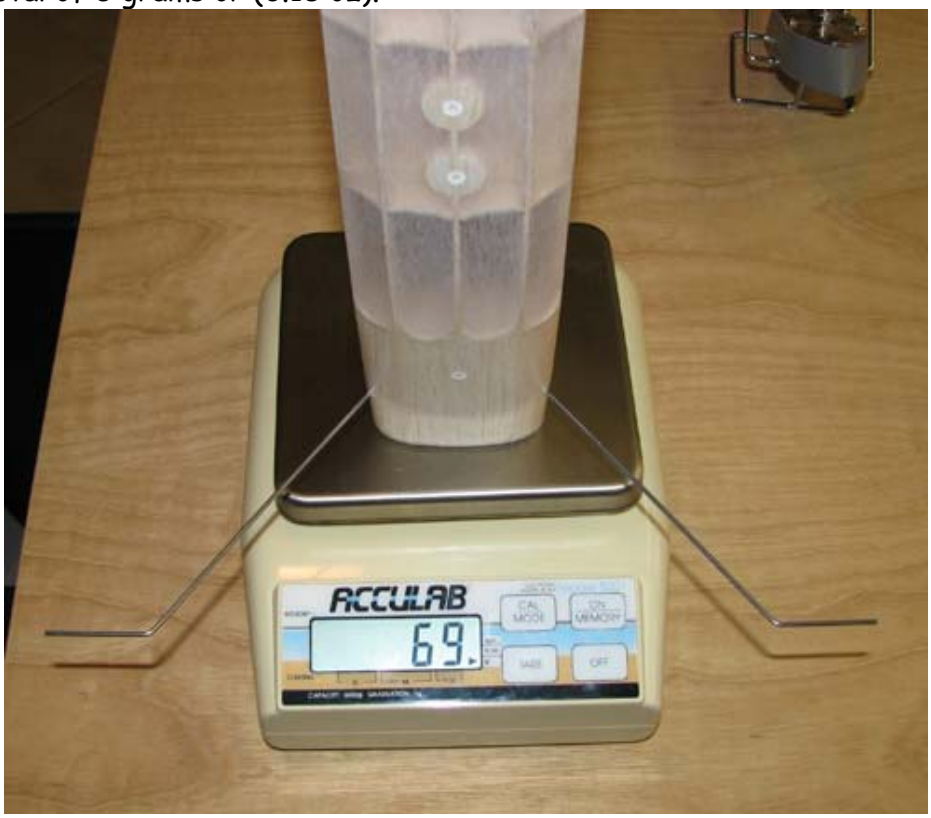
Speed 400 Cloudster Project

Well, yesterday afternoon and today I finally got the Cloudster's fuselage and vertical tail covered with Polyspan lite. The picture below shows the fuselage covered with Polyspan lite and two coats of 50/50 clear nitrate dope. Of course the four side windows will get cut out later after the second covering of silk.

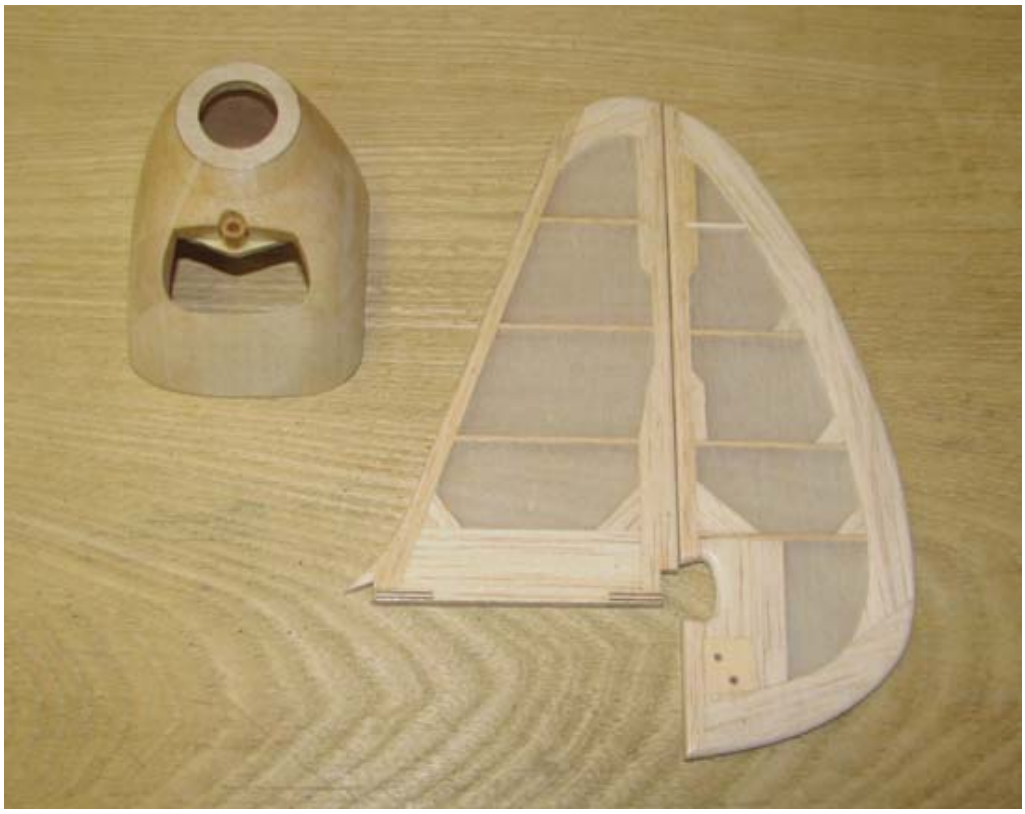
This is kind of a neat shot with no flash of the covered fuselage with the light shining through the covering.



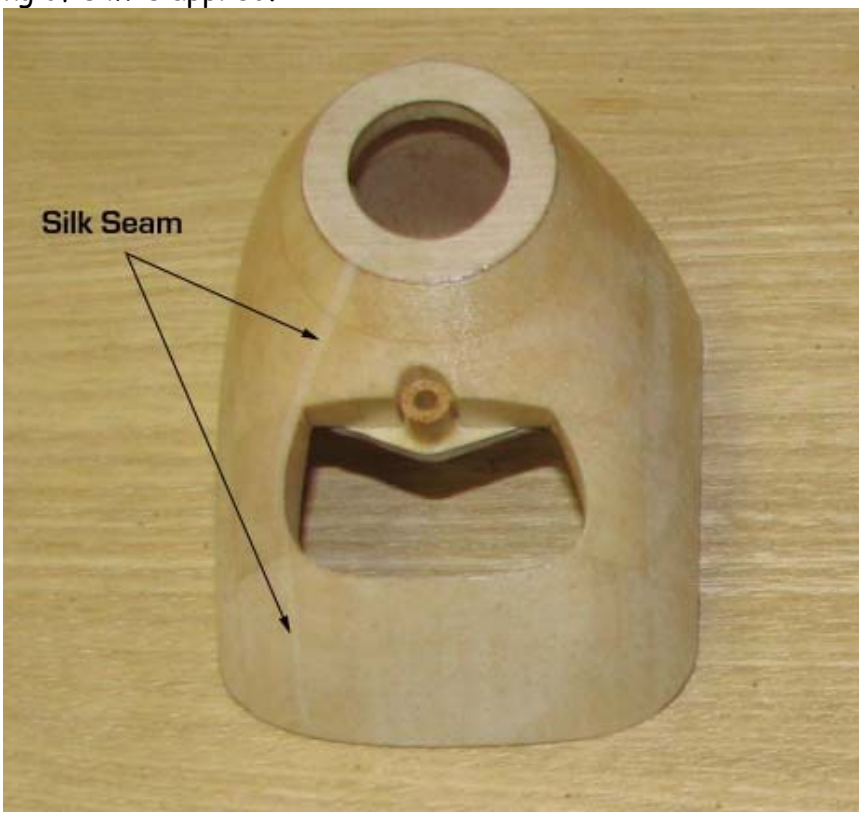
The bare fuselage structure weighed 64 grams as reported in Report No. 79. The Cloudster's fuselage with three coats of 50/50 clear dope on the structure, covered with Polyspan lite, and two coats of 50/50 clear dope on the covering now weighs 69 grams as shown below. So it has only gained a total of 5 grams or (0.18 oz).



The fin and rudder (***vertical tail***) also have three coats of 50/50 clear dope on their structure, covered with Polyspan lite, and two coats of 50/50 clear dope on the covering as shown below.



Because of the cowl's complex shape, Polyspan Lite was not used. Instead a single piece of white silk was used. Silk is an amazing material to cover with. As shown in the picture below, there is only one seam in the first covering of silk. There will be a matching seam on the other side when the second covering of silk is applied.



The several coats of clear dope on these covered components will be allowed to thoroughly dry overnight before they are sanded with 600 grit paper and the final coat of clear dope put on them. Then the second and final covering of silk will be applied.....Tandy

Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Tuesday, March 16, 2010 5:37 PM
To: Undisclosed-Recipient: ;@smtp103.sbc.mail.mud.yahoo.com
Subject: 81 Speed 400 Cloudster - Fuselage White Silk Covering

Speed 400 Cloudster Project

I still have a supply of "Model Covering Company" white silk that I chose for the Cloudster's second covering. In the picture below, a piece of the white silk has been cut to cover the right side with.

I spent yesterday and most of today covering the Cloudster's fuselage, cowl, and vertical tail with a second covering of white silk. The picture below shows the these components covered with silk and one coat of 50/50 clear nitrate dope. Again, the four side windows will get cut out later after the second covering of silk has had all of its coats of clear dope.

This shot shows the silk covering on the bottom of the fuselage. The light and dark colors of balsa used to make up the cowl are going to show through the silk as you can see below.

This picture also shows the bottom of the fuselage. You can see how the nicely the silk flows over the stringer fillets that were added at the stringer attach point on the forward planking as well as how the scolloped bulkheads that do not contact the bottom coverings.

The bare fuselage structure weighed 64 grams as reported in Report No. 79. The Cloudster's fuselage with three coats of 50/50 clear dope on the structure, covered with Polyspan lite, and three coats of 50/50 clear dope on the covering weighed 69 grams as reported in Report No. 80. With the second covering of silk and one coat of 50/50 clear dope the weight is now 74 grams. So the silk and one coat of clear dope has only added another 5 grams or (0.18 oz). The two coverings and a total of seven coats of dope weigh a total of 10 grams or a little over a third of an ounce (0.35 oz).

Tomorrow I will mix up 40% dope with 60% thinner and a small amount of retarder for penetration and start applying multiple coats of dope to these components to build up a finish on the silk.....Tandy

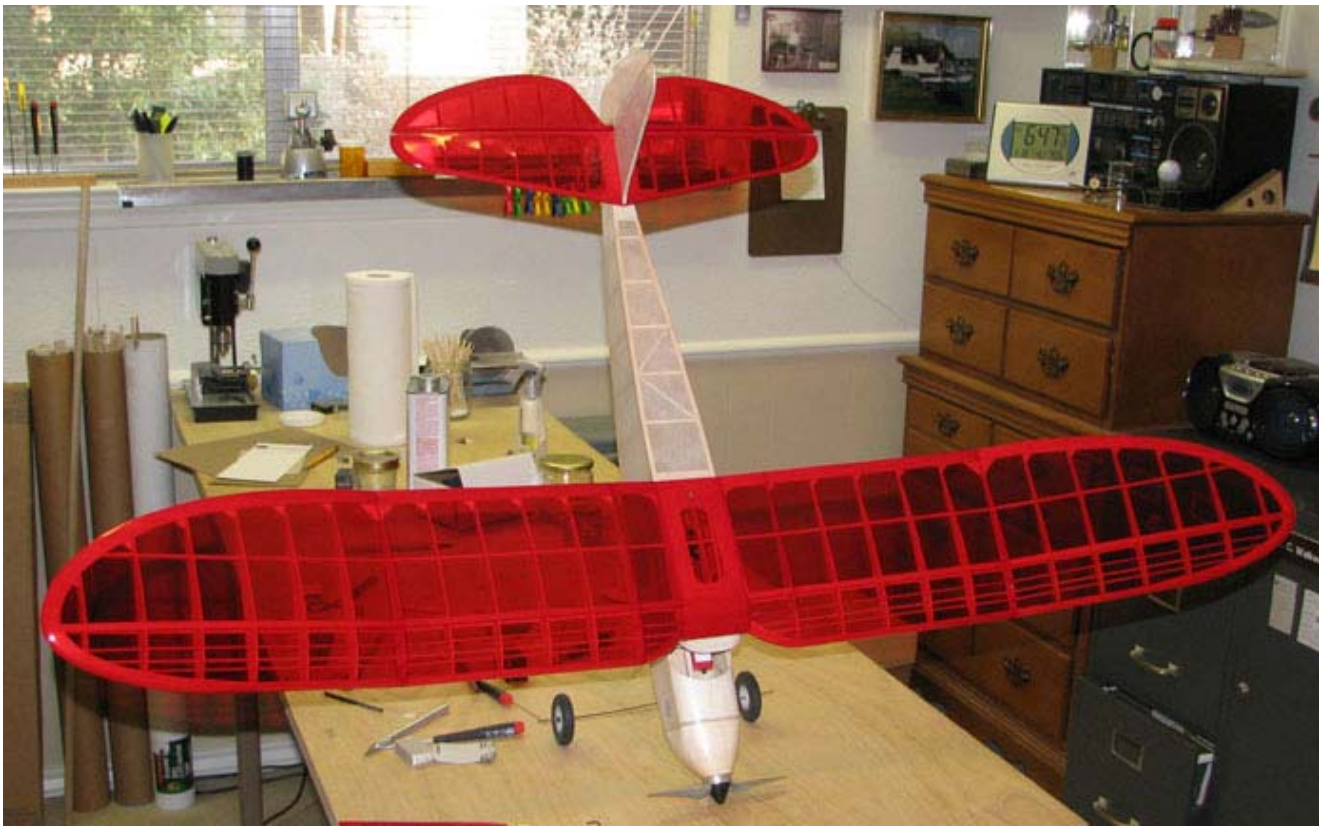
Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Friday, March 19, 2010 12:16 AM
To: Undisclosed-Recipient: ;@smtp109.sbc.mail.mud.yahoo.com
Subject: 82 Speed 400 Cloudster - Assembly for Weight and Balance Check

Speed 400 Cloudster Project

After six additional coats of 40/60 clear dope was put on the fuselage, cowl, and vertical tail, the fuselage weight alone has grown to 78 grams (2.75 oz) as shown below.

At this point, I decided to completely assemble the Cloudster as shown below in order to do a weight and balance check before finishing with all of the trim and graphics and installing the windows and windscreen.



The assembled Cloudster including the tail wheel was placed on the AccuLab scales as shown below.

The total weight was 429 grams as shown below, which is only 15.13 ounces. The model balance check showed the balance pont about a 3/16" forward of the desired CG location shown on the plans.

The Cloudster's continuous weight saving effort eleminating a few grams here and a few grams there really paid off. However, now I am 0.87 ounces short of meeting the 16 ounce minimun weight for the Speed 400 SAM event. I just hate to have to add dead weight to a light model. However, based on these results I am going to have to in order to be legal. So tomorrow I will disassemble the model and air brush one thin coat of clear satin Klass Kote on the fuselage, cowl, and vertical tail after all of the trim and graphics have been applied. That should put the balance point right on the desired CG. I probably will still have to add a little ballast to bring the model up to the 16 ounce minimum weight requirement.

By the way, I thought you might like to see how the tail went together on the back of the fuselage as shown below.....Tandy

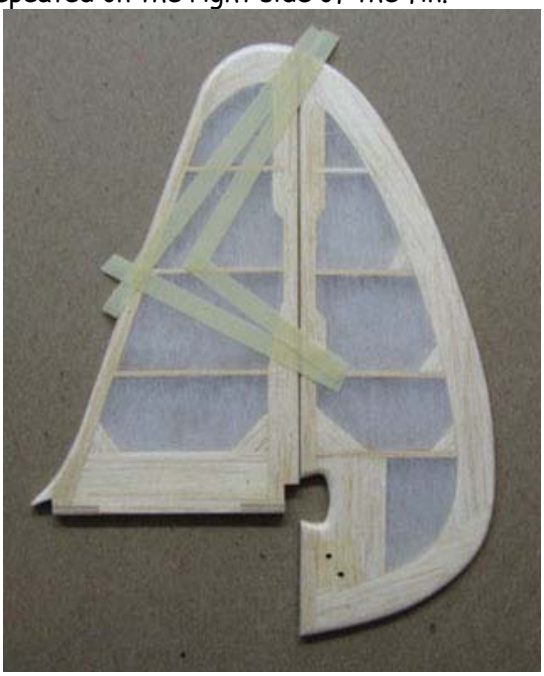
Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Saturday, March 20, 2010 4:23 PM
To: Undisclosed-Recipient: ;@smtp111.sbc.mail.mud.yahoo.com
Subject: 83 Speed 400 Cloudster - Fin Trim and Fuselage Paint Striping

Speed 400 Cloudster Project

This report is going to be somewhat tutorial, even elementry, but for documentation purposes I wanted to go through the step by step process of painting trim on silk and describing the materials that work best for me. In the picture below is a special masking tape made by Pactra that many the model car guys use and you can get it in 1/16", 1/8", and 1/4" widths. This is absolutely the best masking tape for painting trim strips and patterns on silk covering. However, it is a little pricey, but one 20' roll will go a long way.

The trim application that I will be describing here is on the Cloudster's fin. My favorite "Swept-V" pattern is carefully masked off on the left side of the fin in the presents of the rudder using the Pactra 1/4" wide masking tape as shown below. This is also repeated on the right side of the fin.



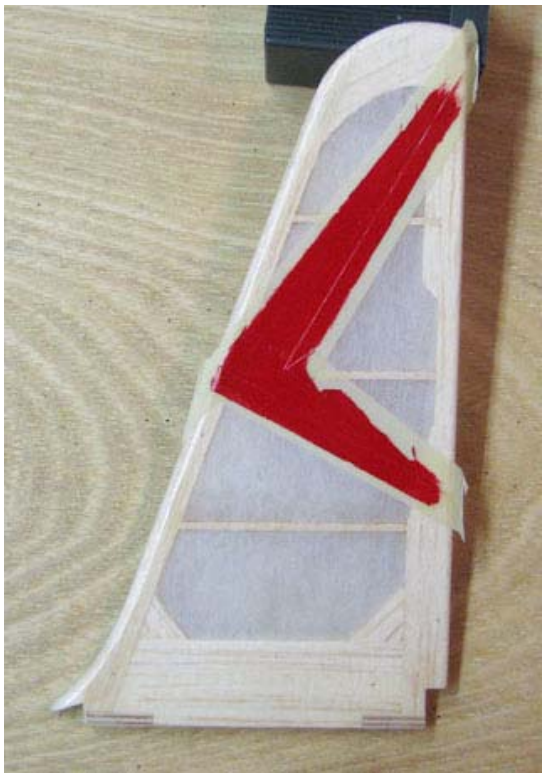
Some of 3-M's low tack blue masking tape is put over the outside part of the Pactra tape to prevent accidentally getting paint on the silk outside the 1/4" Pactra tape. Then two thin coats of clear nitrate dope were brushed on the area to be painted (***with drying in between***) to seal the edges of the tape as shown below.

I have had great success using the water base Tamiya acrylic paint for painting on trim. The picture below shows the jar of Glossy Red that will be used.

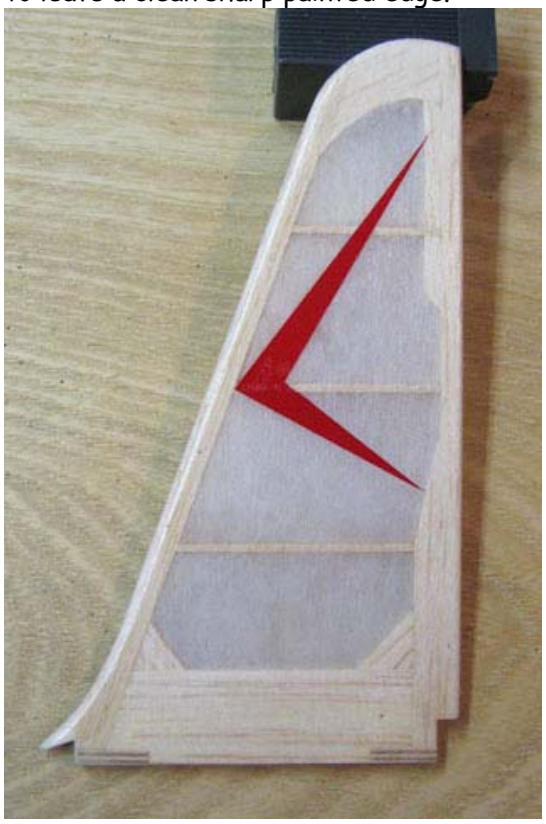
Testors make camel hair brushes especially for applying this type of paint, but again they are also a little pricey. The one used in this application is the Model Master No. 8851C 3/8" camel hair brush shown below.

A thin coat of Tamiya Red paint was brushed on the masked off pattern, which was followed almost immediately a second thin coat as shown below.

The outside blue tape was removed within about ten minutes as shown below.

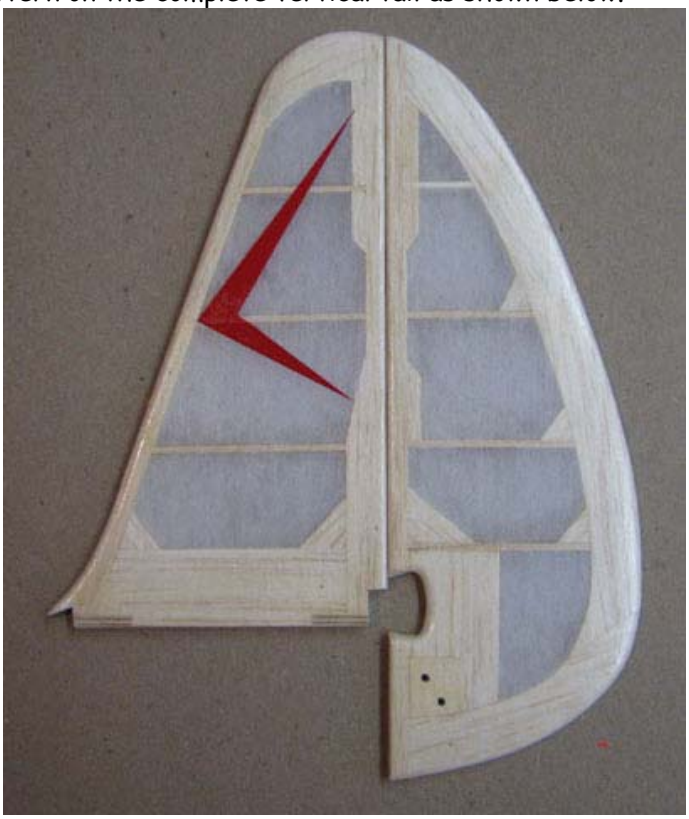


After about twenty minutes, the Pactra masking tape was removed, leaving the Swept-V pattern in Red as shown below. As most of you already know, the Pactra tape removal was done by carefully pulling it back over itself at a 45 degree angle to leave a clean sharp painted edge.



The look of this Red Swept-V pattern on the fin is best viewed in the presence of the rudder so you get

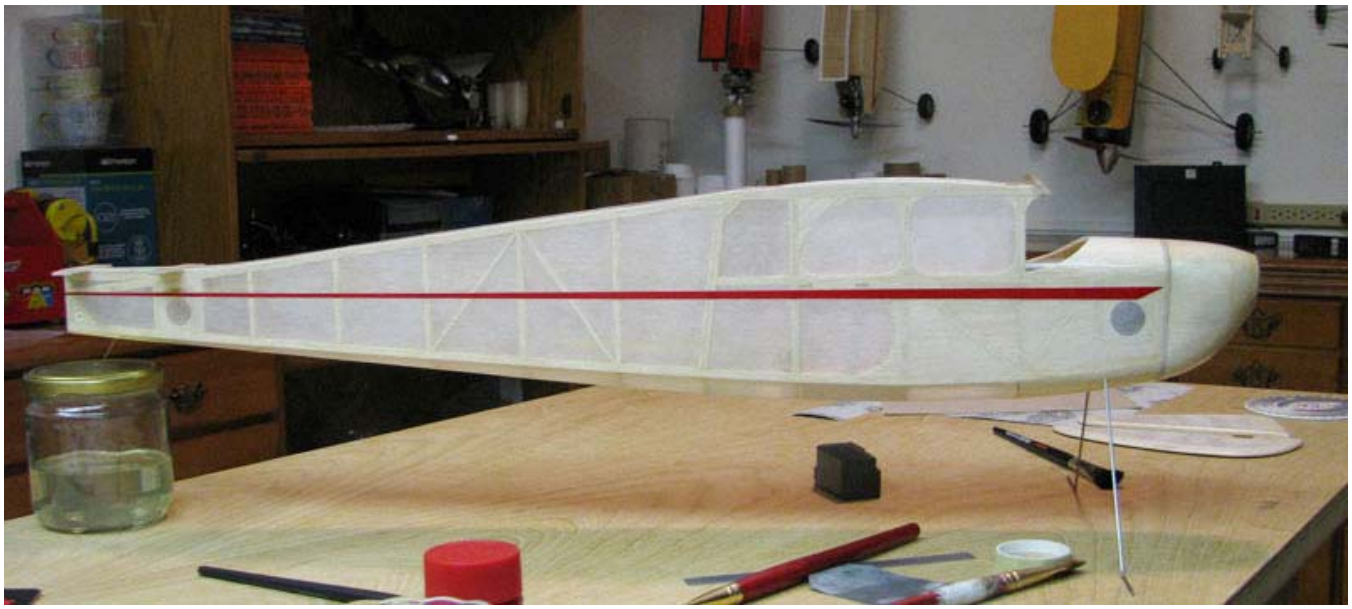
the perspective of the pattern on the complete vertical tail as shown below.



This procedure was also used to paint the tapered Red trim strip on both sides of the fuselage. Placement of the fuselage's trim strip was dictated by three self imposed constraints:

(1) Strip should be simple and taper down the full length of the fuselage.
(2) Strip should not be painted on covering over vent holes that are to be cut out. ***(prevents removing segments of the stripe)***
(3) Strip should not extend forward beyond the plane of the firewall. ***(just to keep the trim simple)***

These three constraints resulted in a Red strip on the side of the fuselage that starts a 1/4" wide at the front and tapers down to a 1/16" at the rear as shown below. This Red strip is clean and simple. Notice that removal of the covering over the two fore and aft ventilation holes will not remove or disturb any part of the Red strip. I think the Red strip will look even better when the covering over the fuselage's two side windows is removed.....Tandy



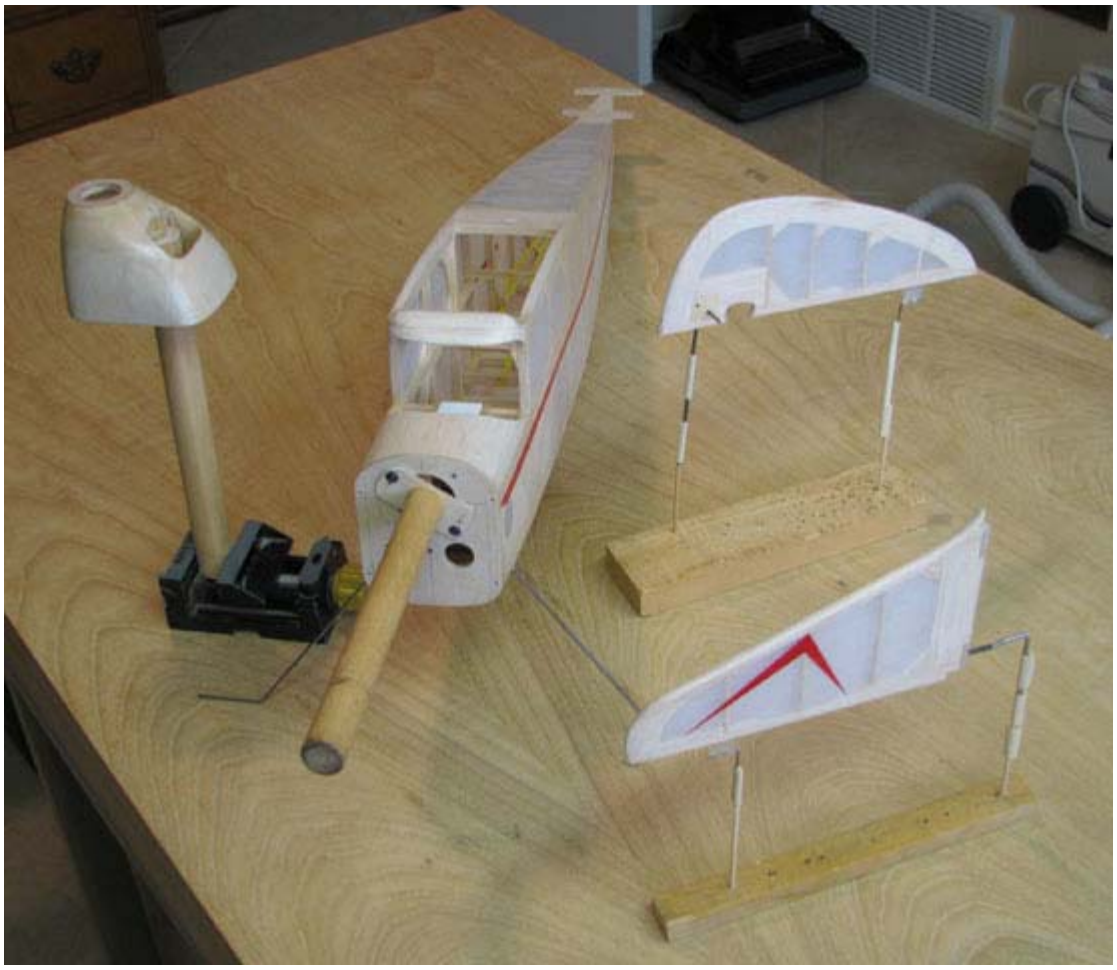
Dave Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Sunday, March 21, 2010 4:48 PM
To: Undisclosed-Recipient: ;@smtp107.sbc.mail.mud.yahoo.com
Subject: 84 Speed 400 Cloudster - Paint Fixtures for Air Brushing

Speed 400 Cloudster Project

We got up this morning to almost an inch of snow, a temperature of 30 degrees which seemed like 22 degrees with the 25 mph wind blowing. By the way, this our first day of spring here in north Texas. Brrrrrr! After going to Church, Sue and I went to breakfast and then returned home.

Since the Cloudster is 0.87 ounces short of meeting the 16 ounce minimun weight for the Speed 400 event, I decided to give the doped silk a coat of clear satin Klass Kote to achieve that ultra smooth finish. I spent this afternoon coming up with paint fixtures in preapation for air brushing one thin coat of clear satin Klass Kote on the fuselage, cowl, and vertical tail. To support the fuselage, a painting mandral composed of a 5/8" wooden dowel with a piece of 1/8" plywood on the end that was screwed to the firewall as shown below. The cowl was screwed to the end of a 3/4" wooden dowel to support it. Both the fin and rudder were suspended on 1/16" wooden dowels with a combination of 2-56 threaded rod and hinge halves that were a fixed to the ends as shown below. These fixtures provide places to hold while each component is air brushed. The temperature is supposed to be back up into the 70's by Tuesday, so my plan is to do the air brushing sometime Tuesday afternoon, depending on temperature.



On a different note, I saw a picture of Albert Pardue's outstanding Eugene III competition rubber model on SAMTalk_Forum yesterday, which is shown below. I noticed that this models has a beautifully installed windshield.

Thinking ahead on the Cloudster, I called Albert yesterday and had an informative phone conversation with him on windshield material ***(windscreen to some)*** and the adheisve to bond them on with. I want to pass along what he recommended.

Albert gets his windshield material ***(kind of like Mylar, but called something different)*** at the Hobby Lobby Arts and Craft store. It comes in three thickness'. He said the thinnest material was too flimsy for windshield and recommended one of the other two thickness'. He uses a glue product called "*Welbond-More Than Great Glue*". He gets it at Lowes or Home Depot hardware stores. He says it dries clear and works very well.

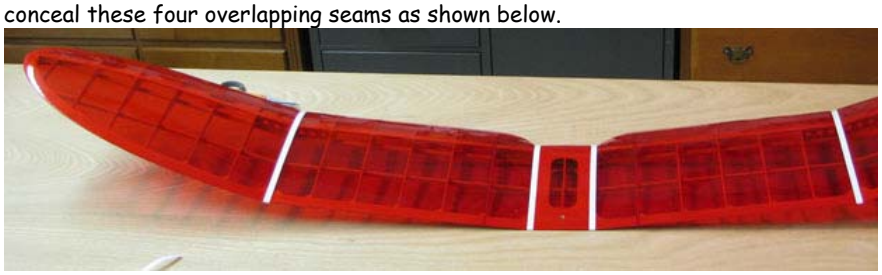
I called our local Hobby Lobby Arts and Craft store a little while ago, but they are not open on Sundays so I will get out tomorrow and see if I can pick up the windshield material and glue.....Tandy

Dave Harding

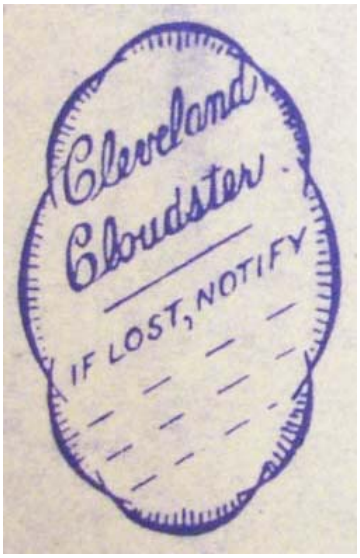
From: Tandy C. Walker [tandyw@flash.net]
Sent: Tuesday, March 23, 2010 12:27 AM
To: Undisclosed-Recipient: ;@smtp110.sbc.mail.mud.yahoo.com
Subject: 85 Speed 400 Cloudster - Graphics for the Wing

Speed 400 Cloudster Project

I spent some time considering what simple graphics would look best on the Cloudster wing. The first trim that was put on the wing was to hide the four covering seams. Where the transparent Red UltraCote Lite overlaps on these seams, the color is darker. So it required 1/4" white striping tape to adequately conceal these four overlapping seams as shown below.



When Joe Elgin designed the Cloudster back in 1940, he came up with a dual purpose label that he put on the plans. The label had the name ***"Cleveland Cloudster"*** encompassed by a cloud representation, but also served as a label for the modeler to put his name and address as shown below.



Using Joe's cloud theme and the Speed 400 requirement to show the models name and the design year, I came up with a similar label only more circular as shown below.