Radio Controlled Soaring Digest

July 2015

Vol. 32, No. 07

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Front cover: A 1:2 ASW 27 with AFT25 takes off at the JETI Model Meeting 2014 at the Czech Heaven Airport in Budkovice. Owned by Uwe Neesen, Germany, the glider has a span of 7.5 m and weighs 23.6kg (52 lbs.). It uses an Emcotec Battery Backer DPSI 2018 and Hacker TopFuel 10S-5800 battery. Uwe uses a JETI DS-16 transmitter. Photo by Martin Pilny.
Nikon D300, ISO 320, 1/1250 sec., f5.6, 75.0mm

Back cover: "Against the clouds," a photo by Joe Elzinga, courtesy of Joe Sampietro.
Canon EOS 7D, ISO 500, 1/8000 sec., f4.5, 200mm

R/C Soaring Digest

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R/C Soaring Digest (*RCSD*) is a reader-written monthly publication for the R/C sailplane enthusiast and has been published since January 1984. It is dedicated to sharing technical and educational information. All material contributed must be original and not infringe upon the copyrights of others. It is the policy of *RCSD* to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of each article is the opinion of the author and may not necessarily reflect those of *RCSD*. We encourage anyone who wishes to obtain additional information to contact the author.

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In the Air

We've been attached to the internet since around 1994, and we're one of those who found the move from a 28k modem to a 56k modem to be a true technological miracle. Our early web browsing was done using Mosaic, forerunner to Netscape, under the guidance of the "Internet Starter Kit for Macintosh" by Adam Engst and with Northwest Nexus serving as our ISP.

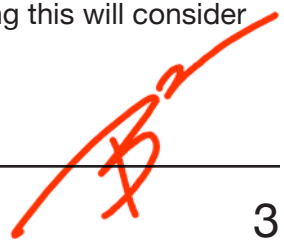
Things have come a long way since then. CenturyLink now provides our DSL connection and GoDaddy hosts both of our web sites, b2streamlines.com and rcsoaringdigest.com.

Publication of *RCSD* began in 1984 with Jim Gray collecting articles from the various newsletters he was receiving. That quickly gave way to individuals mailing materials to Jim and then, within a few years, to contributions being sent to Judy Slates on floppy disks. Once the World Wide Web became prominent and email became nearly a household necessity, materials could be sent in even more easily, and with relatively no expense. This transition was of very real benefit to those living outside the United States as they could now communicate with the *RCSD* editors electronically.

RCSD has been digitally distributed since April of 2004 and the PDFs have been created in landscape format since the November 2004 issue. While we're unable to directly track the number of copies downloaded each month, we believe it be several thousand.

Throughout this three decade evolution, *RCSD* has always been "the journal for RC soaring enthusiasts" and completely dependent upon those enthusiasts for materials suitable for publication. This magazine would cease to exist without those submissions, so our sincere thanks go out to all who have contributed items to *RCSD* over the decades. And we hope everyone reading this will consider contributing something in the future.

Time to build another sailplane!



Construction log

1:3 Cherokee RM, Part 2

Edited from <http://www.rcgroups.com/forums/showthread.php?t=2127351>

Al Clark, hotdogx@knology.net

Fuselage construction begins

I've managed to get in a bit of work over the last few days so it's time to post an update. I should state here that I'm putting more detail in this build thread than most experienced builders need, so you guys can skip over the details. However, it appears there are some relatively new builders who are starting work on Dave Smith's 25% and 33% Cherokee II, so a little extra detail might be of some benefit for those folks.

Scarf joints

Before the fuselage construction can begin the longerons need to be spliced and curved, and some sub-assemblies need to be completed. I was asked about scarf joints so I'll show how I do mine in just a few minutes using an old tried and true method.

I go by the old 12:1 rule to get the length of the scarf joint. For the 5/16" wide basswood longerons that works out to 3.75 inches long. I make a mark on the longeron 3.75 inches from the end and draw a line from top to bottom.

I then use my Dremel disc sander to sand the wood off close to this line. Do this for the end of each longeron section that will be scarfed.

Now lay the two angled ends on top of a piece of scrap wood that has the end squared off. Make sure the pieces are aligned straight and sand both surfaces with a good sanding block. I use 100 grit.

Since you already sanded these on the disc sander it shouldn't take much block sanding to get them the same.

Now test fit the scarf joint against a good straightedge and touch it up if the fit isn't close.

Once happy with the fit, make a pencil mark across the joint so you will know where to position the pieces when you glue them.

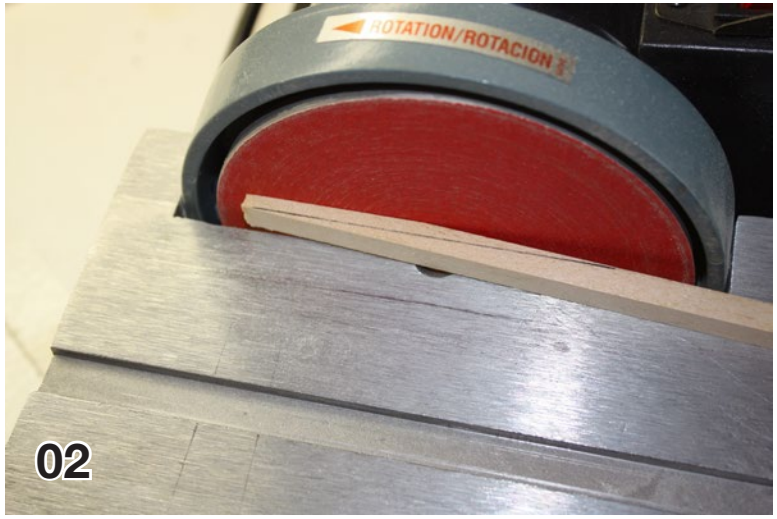
Put some wax paper under the straightedge, apply CA+ to one piece, and glue the pieces together holding them tight against the straightedge for 30 seconds or so. If you are sloppy with the CA+ you might also want to put small piece of wax paper between the wood and straightedge.

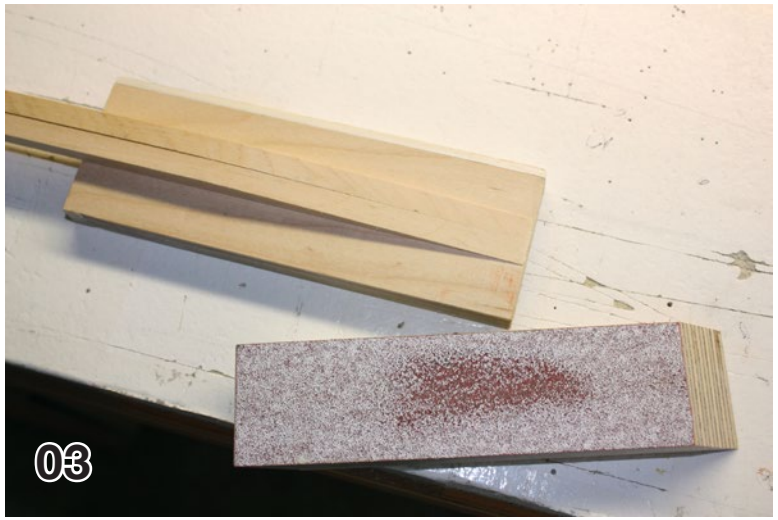
After the CA+ cures sand the sides of the scarf joint a bit to make it all smooth. That's all there is to it. Once you get some experience you will be able to make a good scarf joint in just a few minutes. See pix 1 - 5.

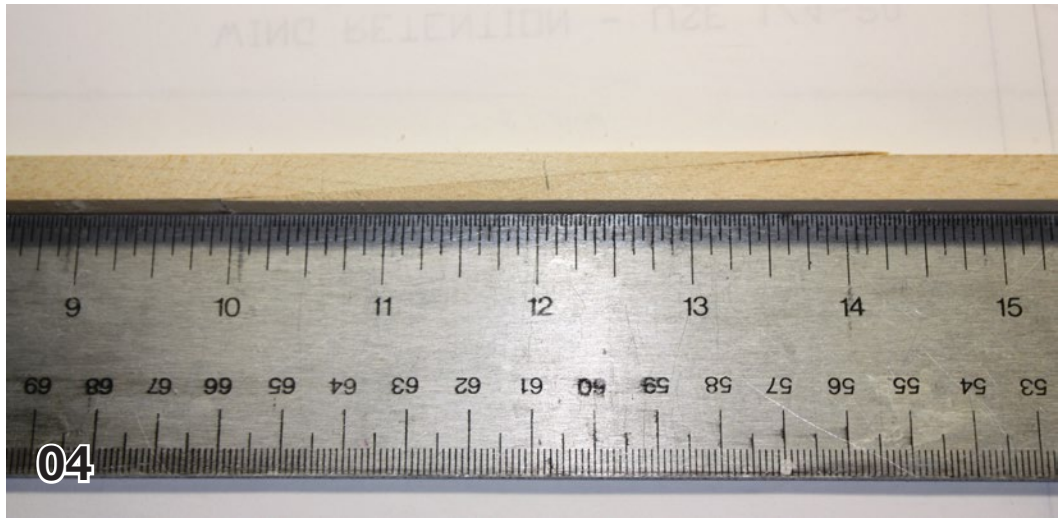
When I get to the wing spar caps later I will use the same method to make the scarf joints, except I will use epoxy glue on the spruce. Of course almost all the fuselage stringers will need to be scarfed as well, so a lot of scarfing to do!

The lower fuselage longerons have a lot of curve under the cockpit floor area. I tried steaming the basswood but I got a lot more spring back than I expected after steaming, so I reverted to my

01 & 05. I go by the old 12:1 rule to get the length of the scarf joint. For the 5/16 wide basswood longerons that works out to 3.75 inches long.







favored method of laminating the curves.

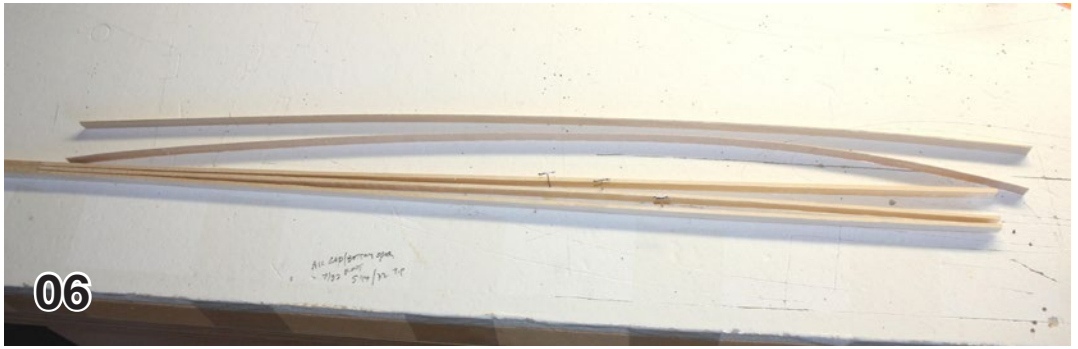
With balsa I normally use an X-Acto knife to split the wood into thirds, but the basswood is too hard to cut this way. As it turns out a Dremel scroll saw blade (the 0.163" wide one) has a kerf that matches the thickness of 1/64" plywood. So I marked lines on the longeron dividing it into thirds in the area that needs to be curved, and cut the longeron along each line using the scroll saw. I then cut strips of 1/64" ply to fit into the slots. I used some scrap plywood to make a form (based on the plan bottom view), bent the basswood with 1/64" ply pieces in the slots around the form, clamped one end tight and the other end loosely, and glued it with CA.

Starting at the end with the tight clamp and glue about 2 -3 inches at a time making sure all the wood pieces are down tight against the building board before applying the CA.

After gluing is complete, pull it off the form, turn it over and CA the other side, then sand both sides smooth. This method works well, is pretty easy to do, and when finished you get the curve that you need.

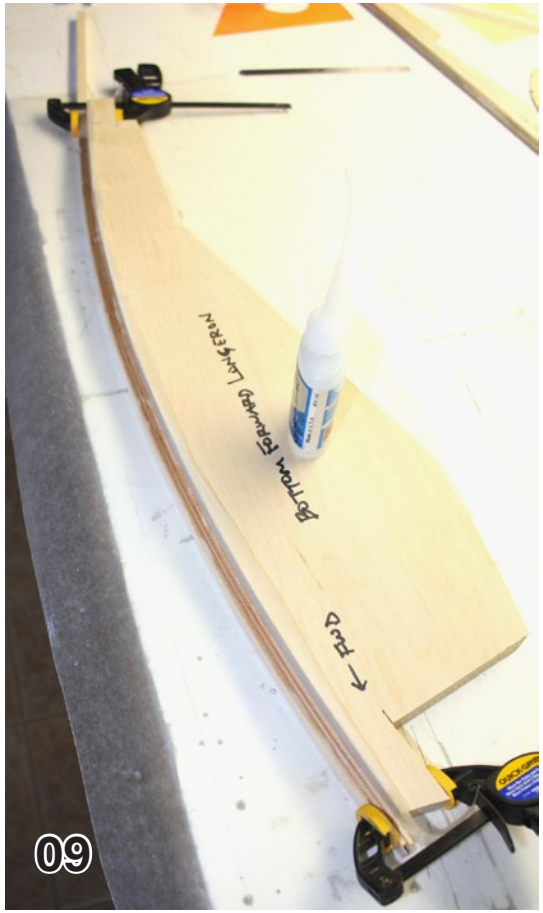
After you have the curved pieces laminated you can glue them to the bottom of the cockpit floor and install the balsa cross pieces.

Before gluing them, don't forget to cut the angle on the front of each longeron so it will interface with the plywood fuselage center piece. See pix 6 - 13.



07. Longeron and 1/64" ply pieces clamped to form and glued with CA.

08. A closer view of the glued longeron laminations.



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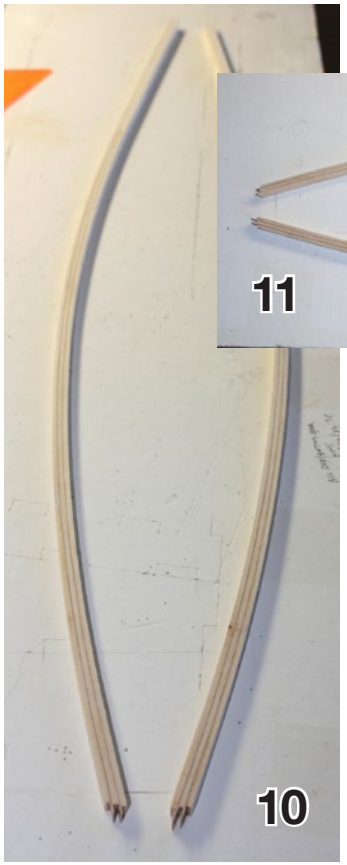
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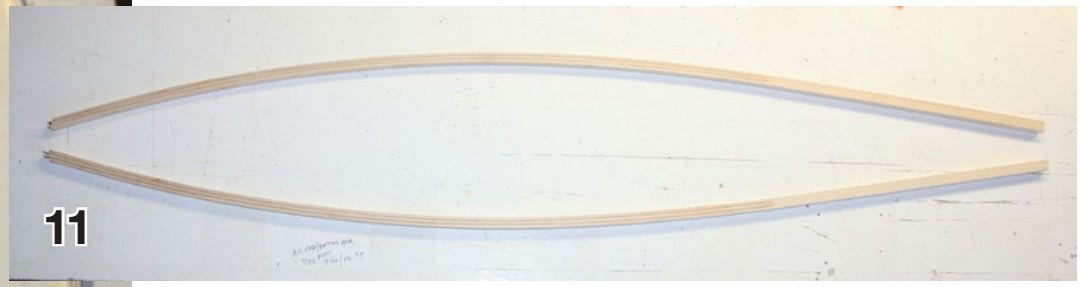
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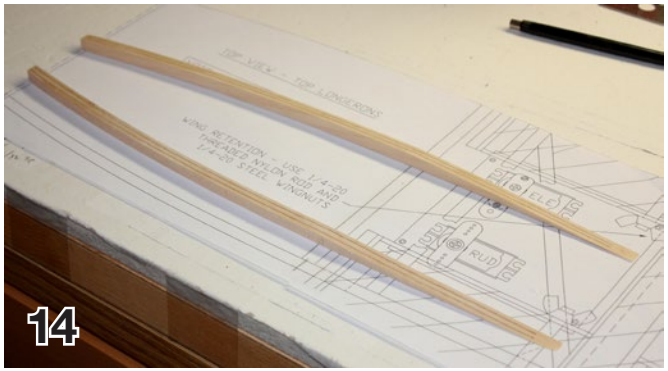
10. Finished forward lower longeron pieces. Top and bottom have been sanded smooth.

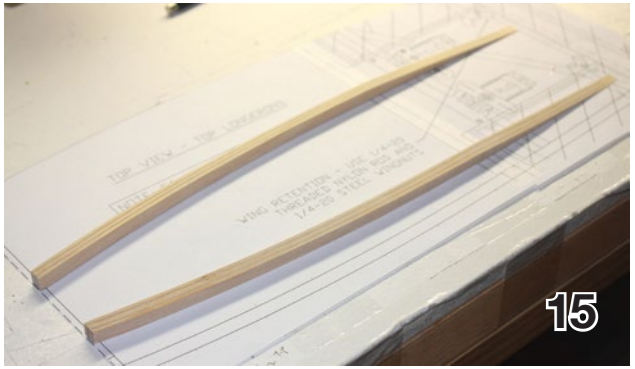
12. Laminated longerons glued to bottom side of cockpit floor with CA. Balsa cross pieces installed.

13. Another view of the installed longerons and cross pieces on the bottom of the cockpit floor.


12


13





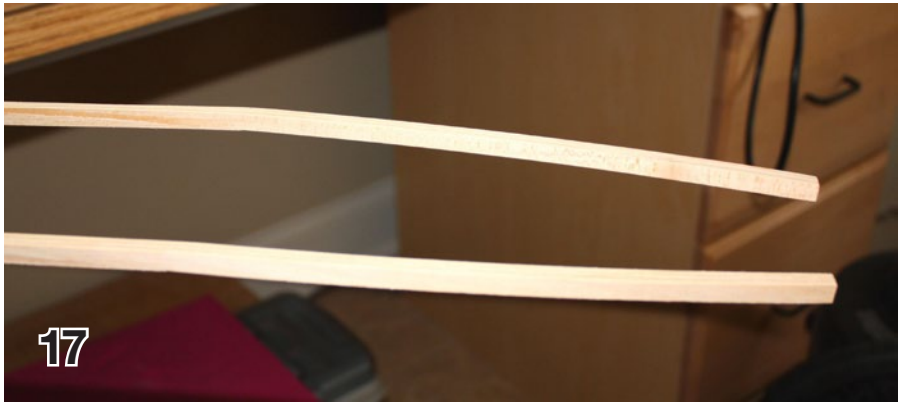
I used the same method to put the curves into the upper fuselage longeron pieces in the cockpit area. See pix 14 & 15. These upper longerons in the cockpit area are separate because they are installed at a downward angle and are scarfed into the aft portions of the upper fuselage longerons. Note in pix 14 & 15 the scarf angles have already been sanded to shape.

Next step is to join the upper forward longerons to the aft upper longerons. Note that the aft upper longerons need a scarf angle sanded in before joining. This scarf angle is determined off the plan side view (not by the 12:1 rule) so make sure the forward and aft piece angles match the plans accurately before you glue them together. Once joined, there will be two mirror image upper longerons with the forward sections curved and angled downwards. See pix 16 & 17.

Now that the upper longerons are completed it's time to install cross pieces, diagonals, and gussets.

Position the longerons carefully over the plan top view, making sure the fore/aft location is accurate. Leave a little extra length at the aft end of the longerons to be trimmed off later. I like to tack glue some small pieces of balsa to the sides of the longerons at the front and pin through these to prevent the longerons from shifting fore/aft while gluing in the cross members and diagonals. The front cockpit area sections that are angled downwards will have to hang off the end of the bench.

15 & 17. Note the ends have already been sanded to the proper angle for joining to the aft section of the upper longerons.



At this time do not install the cross pieces or diagonals in front of F7. While you have the longerons pinned down don't forget to install the 5/16" balsa between the longerons at the aft end. No need to buy 5/16" balsa - just edge glue four pieces of 5/16" square together and cut to size.

Same thing with the gussets - edge glue two piece of 5/16" square balsa together and cut the gussets from it across the grain. See pix 18 - 21.

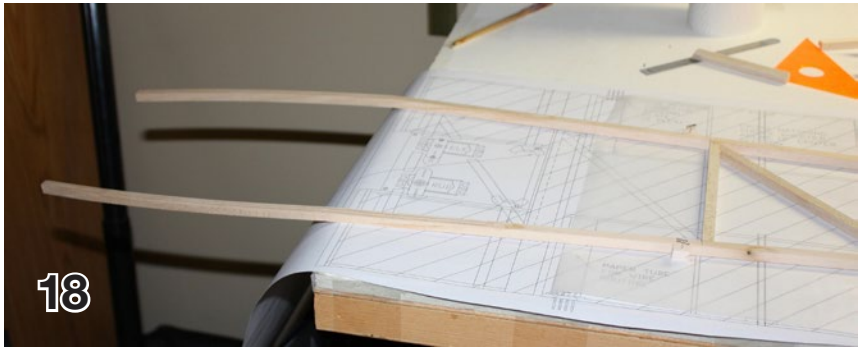
On the lower aft longerons, sand in the angle for the scarf joint which is just behind the cockpit floor. Make sure this angle exactly matches the plan.

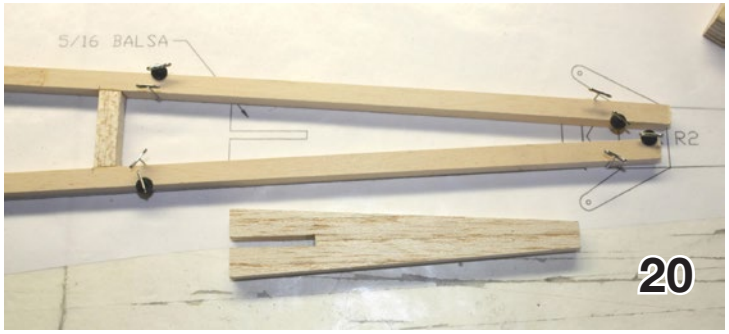
Cut the lower aft longerons a little long so they can be trimmed off later.

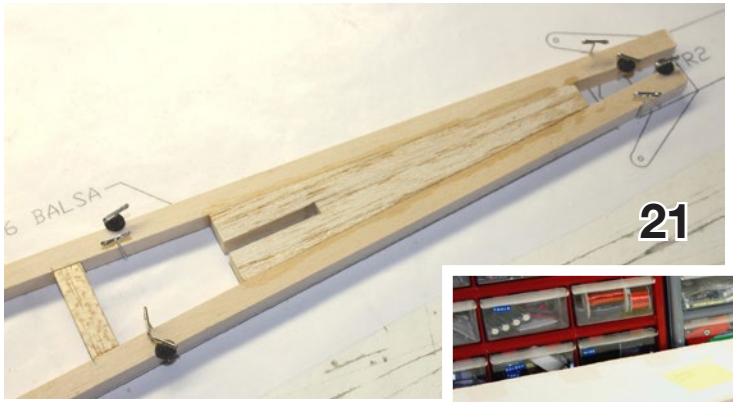
Determine from the plan where the lower aft longerons should be located and pin them down over the plan. Here again I tack glue small pieces of balsa to each longeron at the front to pin through and secure the fore/aft position.

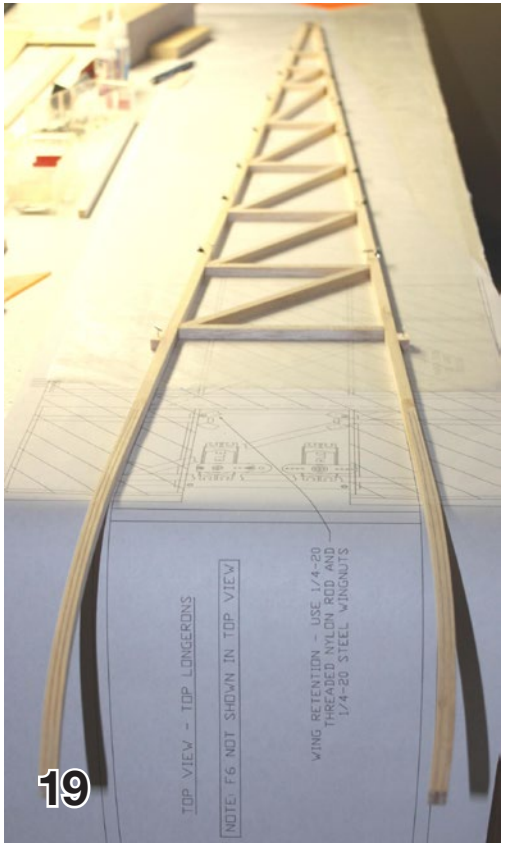
Glue in cross pieces, diagonals, and gussets. Do not install the pieces in front of the F7 location at this time.

Remember to add in the 1.5 inch long basswood pieces at the aft end that will be used later to mount the tail skid. See pic 22.

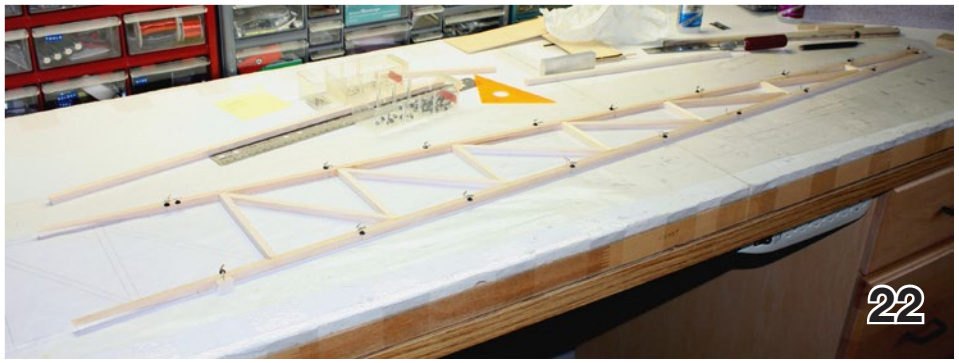


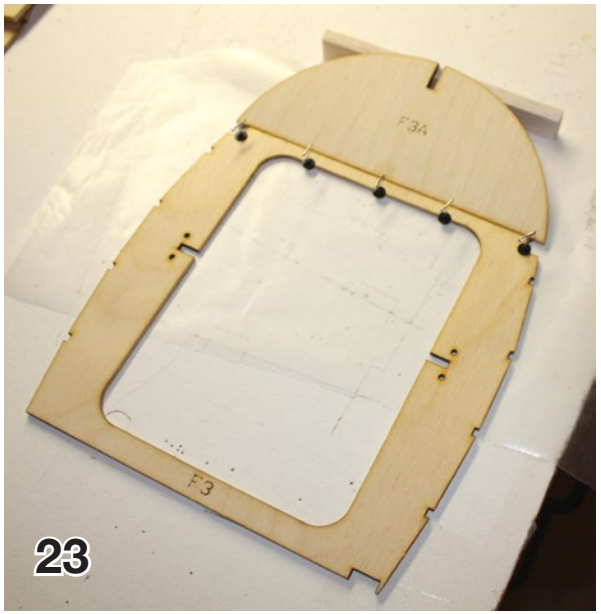






21. The fill-in between the aft upper longerons is made from four pieces of 5/16" sq. balsa edge glued and cut/sanded to fit.





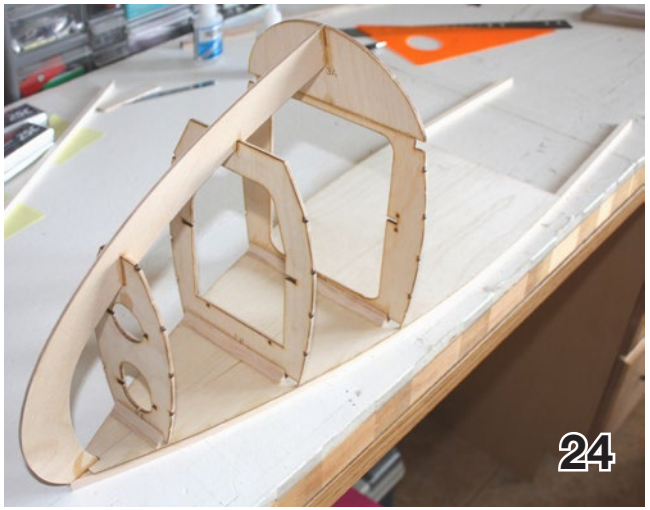
Former F3A which sits atop former F3 is angled, so sand the lower edge of F3A and upper edge of F3 so F3A sits at the proper angle. The very upper edge of F3A ends up 5/8" off the surface. See pic 23.

With all these sub-assemblies done the main fuselage construction can now begin. As you have probably already figured out, this fuselage is built in a different sequence compared to what you are used to. Usually a left and right side is built, and these are then assembled with formers in between. On the Cherokees, the top and bottom are mostly built and then everything is added in between.

Fuselage Assembly

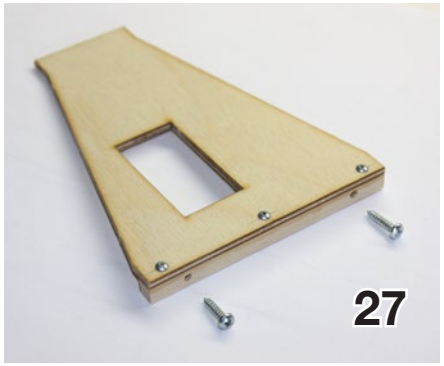
I am assembling the fuselage in the same fashion as Dave Smith has done on the 25% and 33% Cherokee II's. I think it is the easiest way to do it. There will probably be some differences on the RM, so for you guys who are building Dave's 33% Cherokee II I recommend you take a look at his build thread here <http://www.rcgroups.com/forums/showthread.php?t=1244137&page=23>
Formers F1 - F3 and the upper keel must be installed onto the cockpit floor.

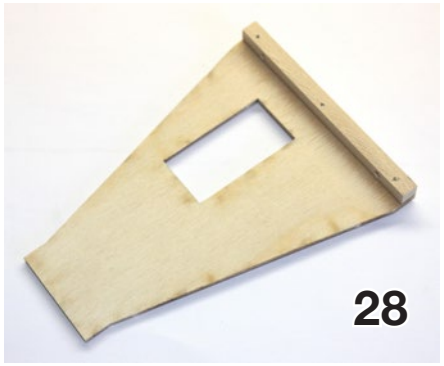
Draw a centerline on top of the cockpit floor. Measure off the plan and mark where the formers are located on the cockpit floor and draw lines perpendicular to the centerline. Make a center mark on each former and CA them all to the cockpit floor, using a square to make sure they are perpendicular.

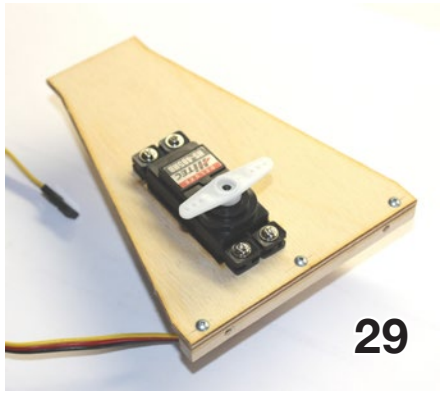


Add the 5/16" triangular balsa reinforcements using CA+.

Before gluing the formers make sure the cockpit floor assembly is flat on the building surface. Pin it or weight it down if required. Check the fit of the upper keel - you might have to relieve the slots in the front of the cockpit floor and or formers slightly - and glue it in with CA+. See pix 24 & 25





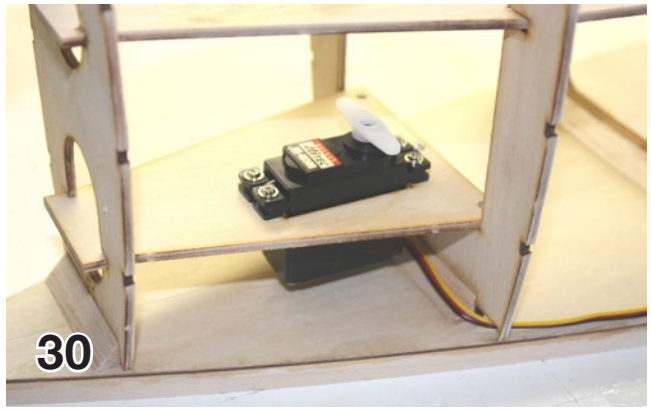


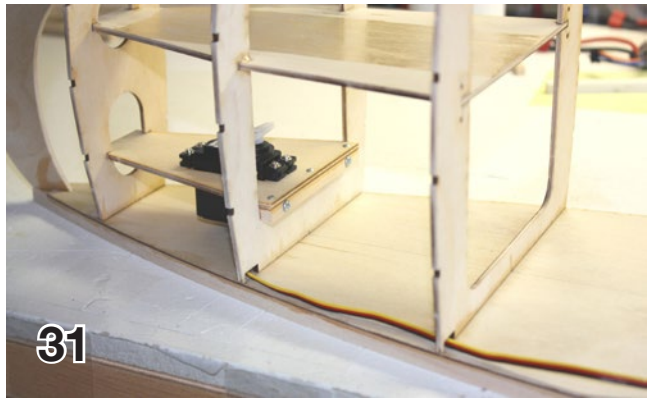
26 - 31. Removable tow hook servo mount. A thin coat of 5 minute epoxy helps Velcro stick better. The 1/4" sq. basswood rail is drilled for 4-40 and attached with CA and #2 screws. Hitec HS-485HB servo is installed. Views of tow hook servo mount installed into the fuselage.

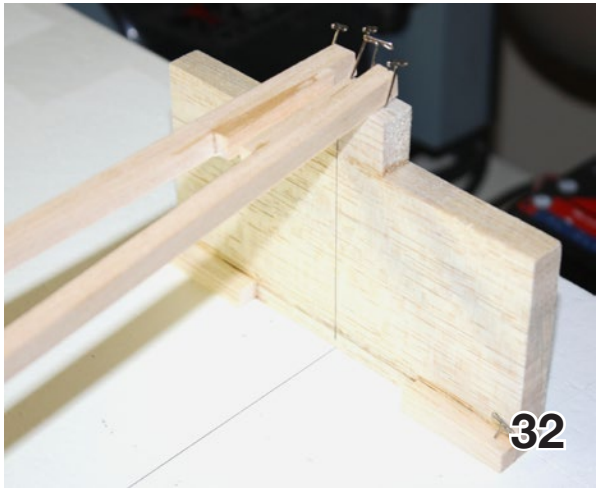
Sand the battery shelf smooth with 220 on the top and apply a thin coat of 5 minute epoxy down the center. I find the sticky back Velcro sticks much better to the thin epoxy layer than it does to bare wood. Glue the battery shelf into formers F1 - F3 with CA+.

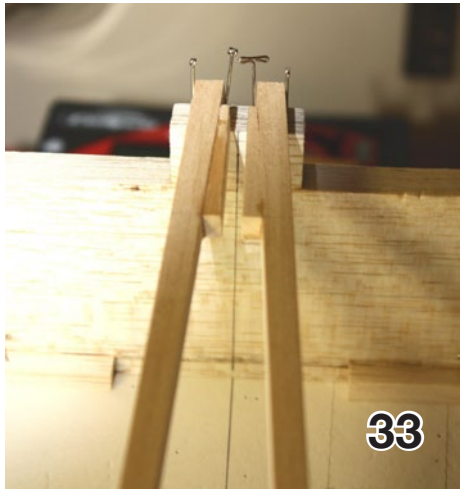
I originally planned to make the battery shelf removable but realized it wasn't necessary. Also, having it glued into place adds a lot of stiffness to the whole assembly, so I glued it in and won't use the small screw holes that you see in F3 for the retainers (these little holes won't be in the kit F3).

The tow hook servo board is next. Cut the 1/4" sq. basswood piece to length and hold it up against former F2 to mark where the holes should be drilled for the 4-40 screws. Drill the holes for the 4-40 screws, glue the 1/4" sq. basswood to the servo board, drill three 1/16" dia. holes, and install three #2 screws. I used button head screws because I have them on hand, but any type is fine. Drill 1/16" dia. holes for the servo mounting screws and mount the servo. Now install the tow hook servo board assembly into the fuselage for a fit check. The wire is routed through the small slots cut into the lower left corner of formers F2 and F3. See pix 26 - 31.









32 - 33. Aft lower longerons pinned into place on 3.8 inch block. Note centerline on building board and block.

34. Glued scarf joints.

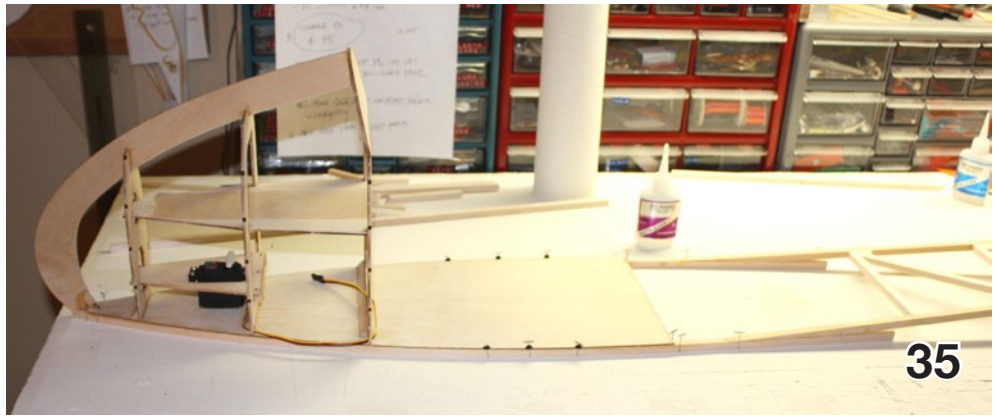
Draw a straight line over the length of your building board. Mark the center point on the aft edge of the cockpit floor assembly and pin the cockpit floor down on the building board. Weight it down if necessary.

Reference the plan to see where the aft fuselage longerons should be located relative to the cockpit floor assembly and make some kind of reference mark on the building board.

Make a 3.8 inch tall block for propping up the aft end of the lower fuselage longerons. Make sure this block is squared and has a vertical centerline so it can be located exactly over the centerline you drew on the building board. Measure off the plan and make a reference mark on the building board to locate the lower aft longerons fore/aft. Center the aft end of the longerons on the 3.8 inch high block and pin in place.

35. A view of the cockpit floor assembly glued to lower longerons.

36. Front view of cockpit floor assembly and lower longerons.



Once happy that the aft fuselage longerons are located properly relative to the cockpit floor assembly, make some index marks across the scarf joints and glue the longerons with CA+.

Make sure the outside edges of the longerons at the scarf joint are flush - use T pins or similar as guides if required. You can use epoxy here if you want a little working time to adjust the joints - with the CA+ once you put it together it's pretty much immovable; the basswood really likes the CA! See pix 32 - 36.

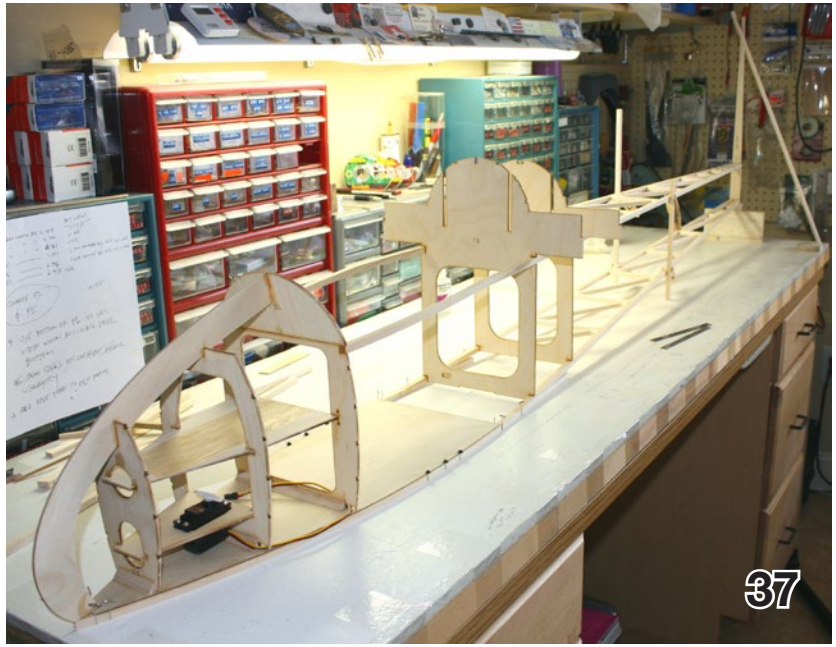
Fit check the four longeron notches in formers F6 and F7; make sure they fit the longerons properly.

Referencing the plan, make marks on the four longerons to show the position of formers F6 and F7, as well as the two cross pieces near F4 and F5.

Draw a centerline down the length of the fin post. Set the fin post into position and set the top longerons into place, engaging former F3 and the tail post.

Put formers F6 and F7 into place. Use tape or rubber bands if you need to hold things together - everything is pretty loose and floppy at this point.

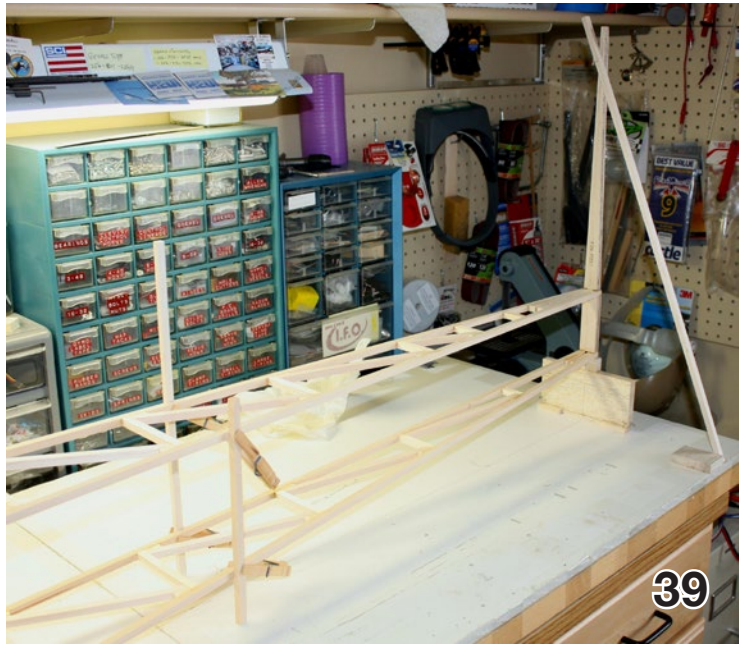
Use a large square to make sure the fin post is perpendicular and pin a balsa brace into place to maintain its position.

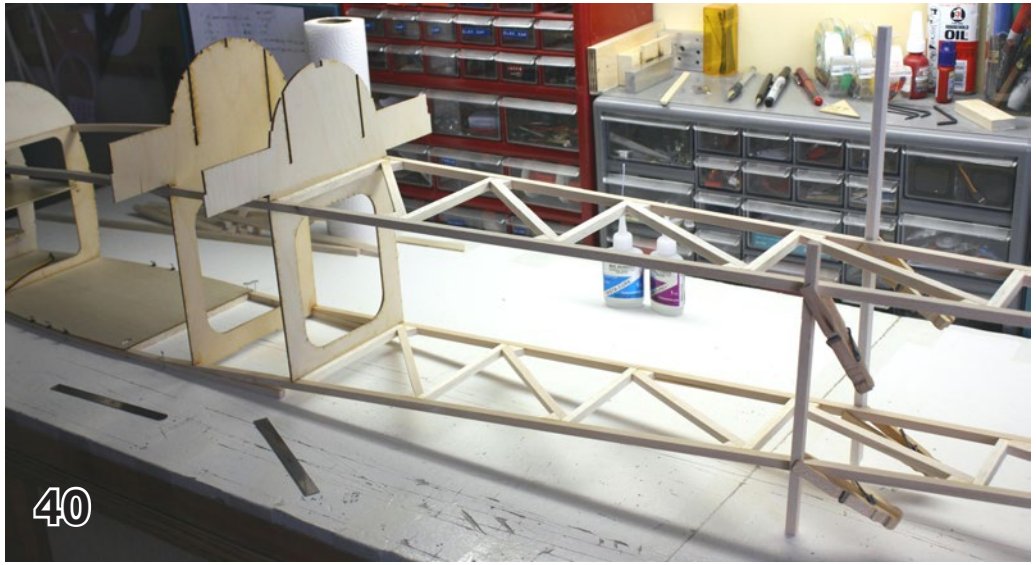


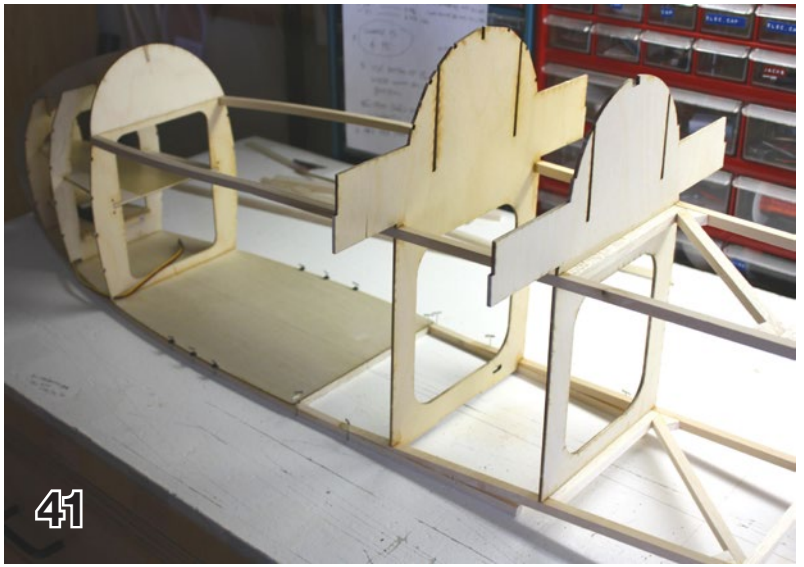
37. Upper longerons, fin post, and formers F6 and F7 jigged for gluing.

38. Fin post brace to maintain alignment. You can't see it here but there is a centerline drawn down the fin post that is used for alignment.

39. Aft end of jigged longerons.







The longerons tend to sag slightly due to their own weight, so use a straightedge to set them straight using a scrap stick of balsa clamped in place on each side.

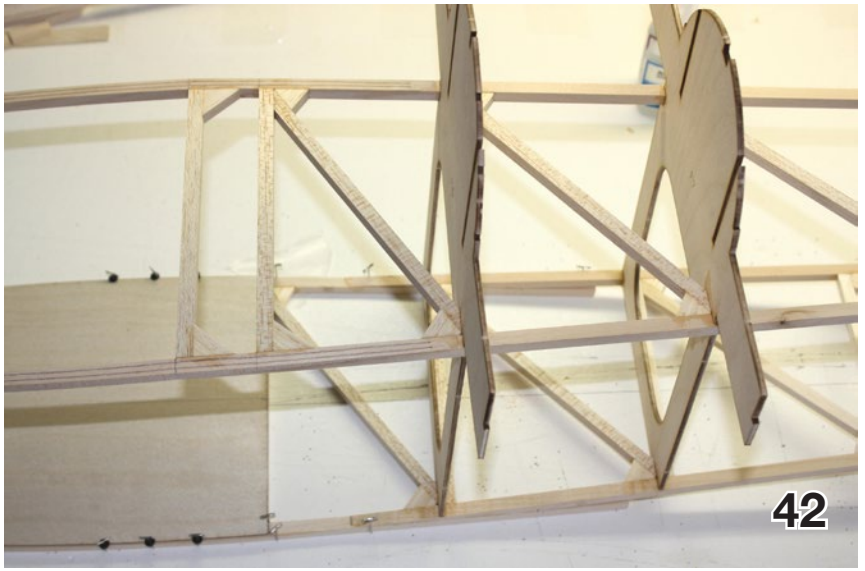
Now check that the fin post is perpendicular to the upper fuselage longerons in the fore/aft direction. Also check the sides of F6 and F7 to see that they are perpendicular to the building board.

Take your time and when you are happy that everything is aligned correctly, glue the fin post to the longerons and glue the upper longerons to F3.

Double check the position of F6 and F7 and glue them into place. Use CA or CA+ if there are any small gaps. See pix 37 - 41.

Now the remainder of the cross braces, diagonals, and gussets are added to the top and bottom ahead of former F7. See pic 42.

The fuselage is now ready for the verticals, diagonals, and gussets to be added to the left and right sides. Just for grins I set my JR X9503 TX in the cockpit for scale. Yep, it's a pretty big fuse! See pix 43 & 44.

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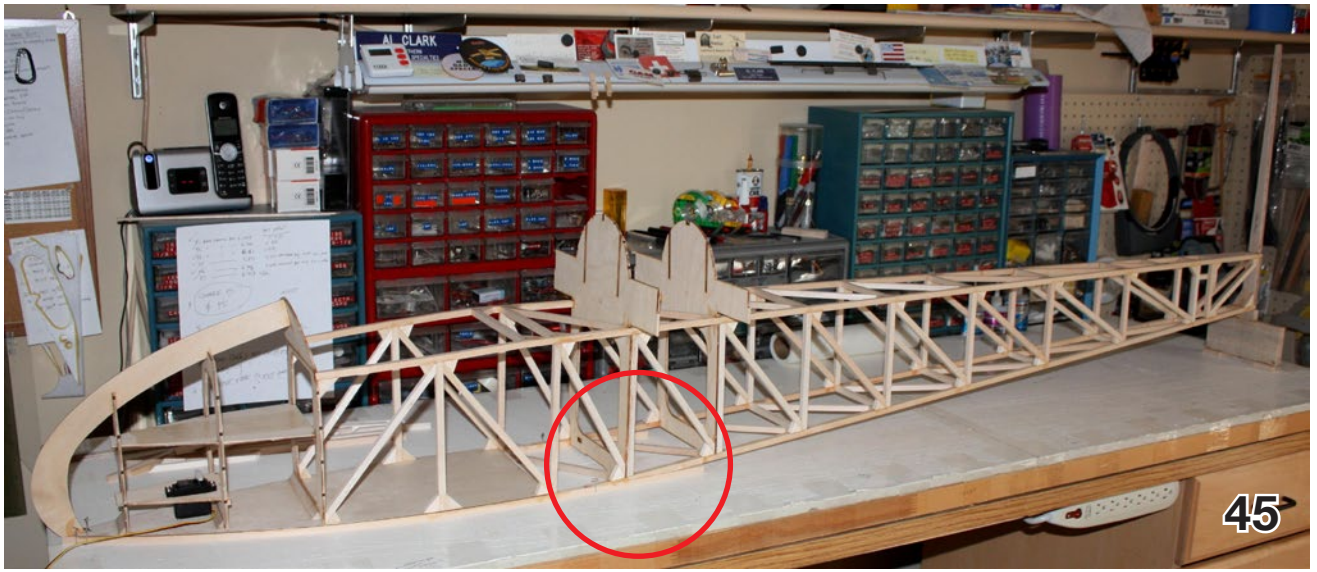
Fuselage main frame finished

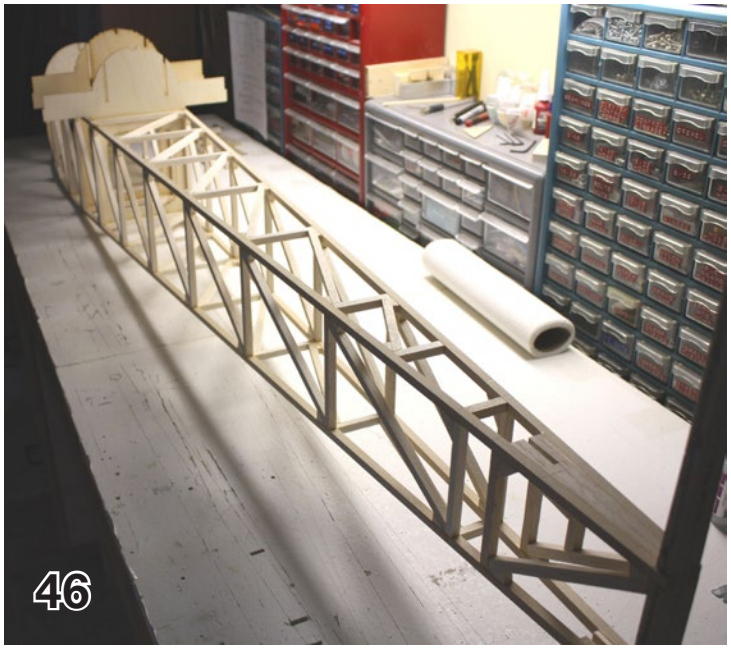
All the verticals, diagonals, and gussets have been installed into the left and right sides of the fuselage.

That's a lot of gussets! It always amazes me how rigid these structures are when completed, especially considering their light weight. Pix 45 & 46.

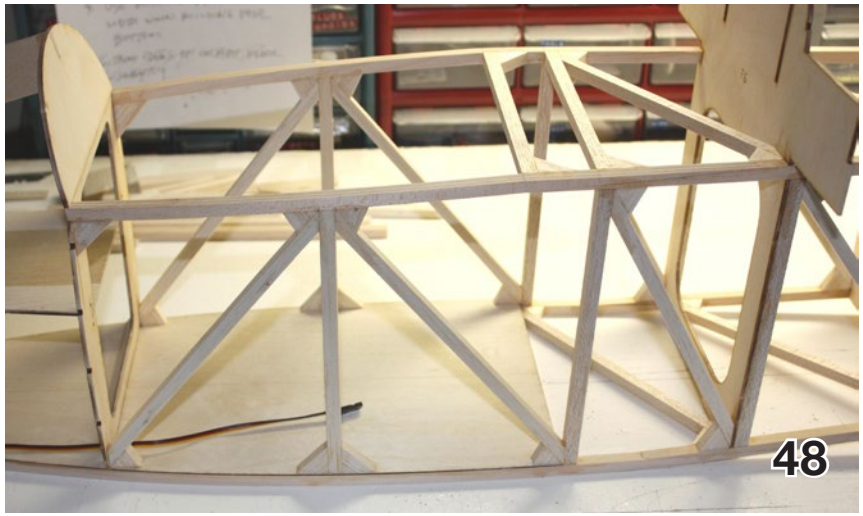
At this time I also trimmed off the excess longeron length from the cockpit floor assembly. Make sure you maintain the 5/16" longeron width when you do this and that the left and right sides are trimmed the same amount. See pic 47.

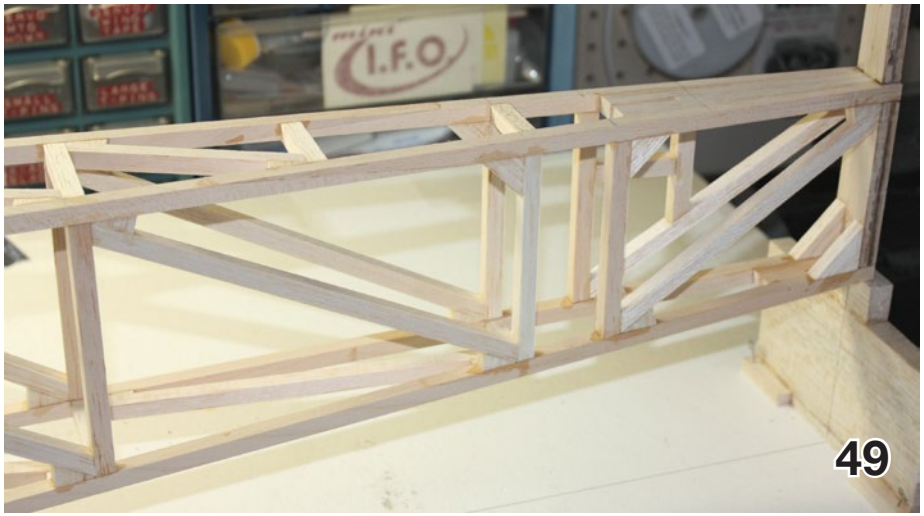


45. Circle indicates excess length of the lower cockpit floor longeron. This will be trimmed as shown in pic 47, below.



47. View of the right side of the fuselage. The cockpit floor assembly excess longeron length has been trimmed off at the scarf joint.

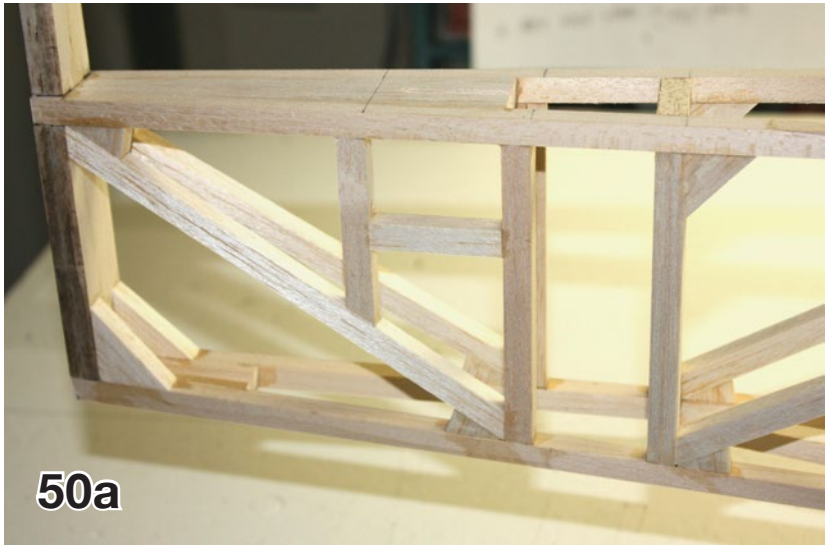


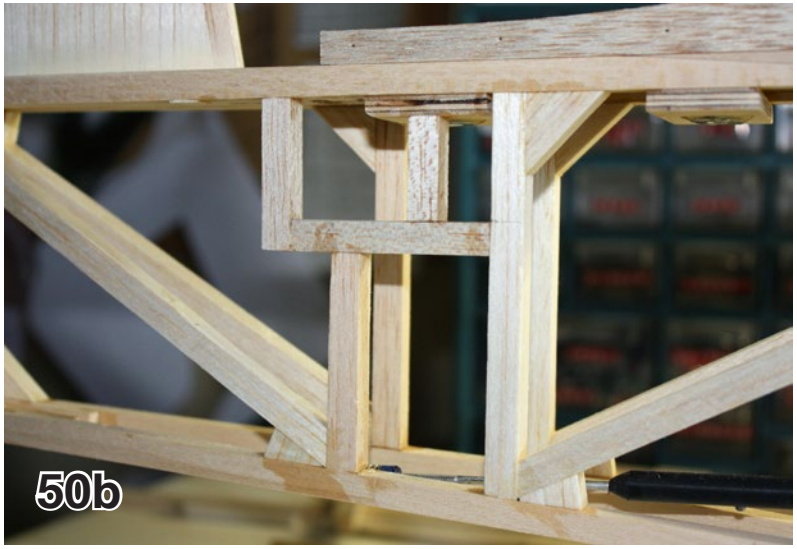


Pic 48 is a closer view of the verticals and diagonals in the cockpit area, and pic 49 is a closer view of the verticals and diagonals in the tail area.

Pic 50a shows the right fuselage side in the tail area. Note the two extra pieces of 5/16" square balsa that have been added. These form a rectangular access hole that will provide access to the elevator horn quick release fitting after the fuselage is covered. Note also there is no gusset at the top of the aft vertical as it would interfere with access.

I later changed the location of the access hole slightly to better align with the ball connector. See pic 50b. The plans have been corrected.





Fin and Tow Release

The fin post is vulnerable and easily subjected to shop rash at this point, so next I will complete the fin structure.

Sand an angle onto the front of each of the fin ribs so they will mate properly to the false LE.

Mark a centerline on the top and front edge of all the fin ribs.

Position F1 so it is parallel with the fuselage centerline and CA in place.

Glue on the rest of the ribs taking care that their centerlines are parallel to the fuselage centerline. Check the front ends of all ribs with a straightedge to see how they will fit the false LE, sand any as required, then glue on the false LE.

I usually make the false LE a little wide and sand the edges down flush with the ribs after it is glued in place. Make the hinge slots, using the centerline that was previously drawn on the aft side of the fin post, and install the 1/16" sheeting and LE onto the fin using the same method as described earlier in this thread for the stabilizer.

Add the hard balsa tip and sand to an airfoil contour. Temporarily hinge the rudder and use a sanding block to get the height of the fin and rudder tips the same.

Tape the rudder in neutral position and shape the fin and rudder tips. See pix 51 - 54.

The tow hook wire loop is made from 3/32" music wire. I made a rudimentary wire bending jig by drilling a 3/8" hole and a 1/8" hole into a scrap of oak. Slide the drill bits into the holes, put the block into a vise, and bend the wire.

The 3/8" bit will get the radius about right after allowing for spring back.

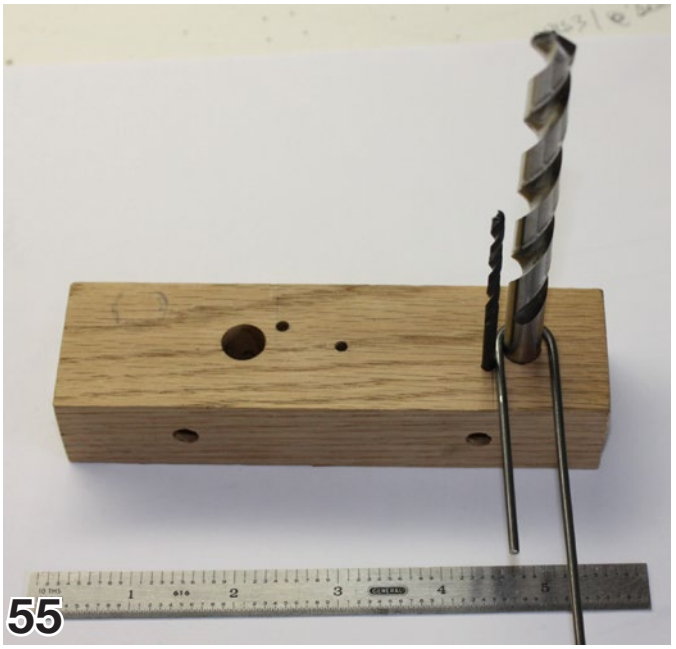
You might have to make a few tries, but music wire is cheap, so keep at it until you get one you like.

Once you get the U-shaped bend, the aft ends of the U legs need to be bent at 90 degrees. I put the U "shaped piece in the vise with a hard wood block and bent the ends over.

Once you get them bent, trim them off with a Dremel tool. See pix 55 & 56.

Refer to the plans and mark where the U shaped legs and the center wire will go on the right side of the upper keel. See pic 57.

Make a 1.25 inch wide 1/8" ply doubler and glue to the left side of the upper keel with CA+. Bevel at an angle that matches the angle of the lower longerons at the nose. See pix 58 & 59.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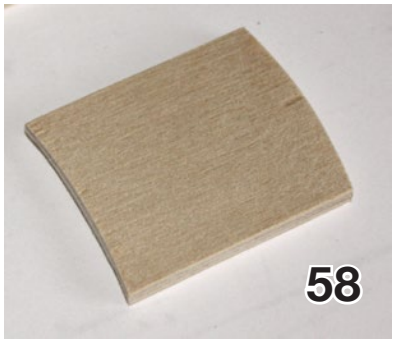
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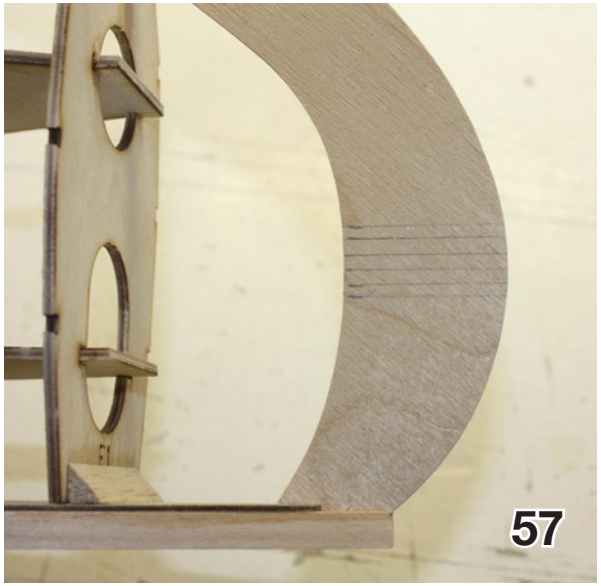
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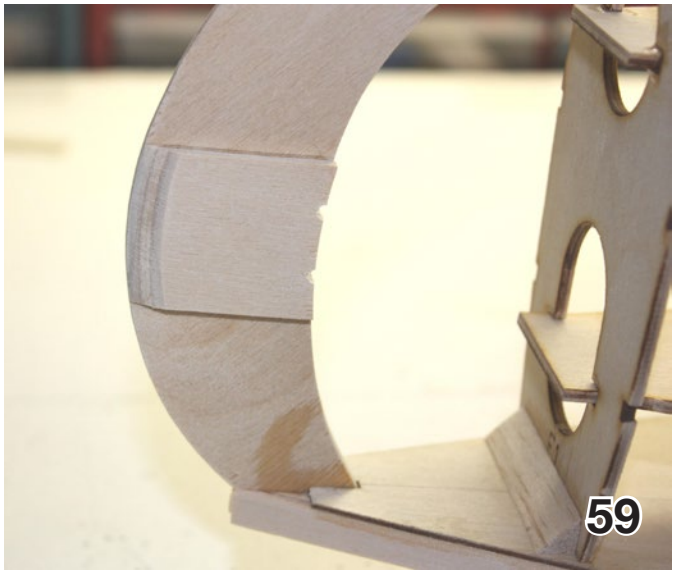
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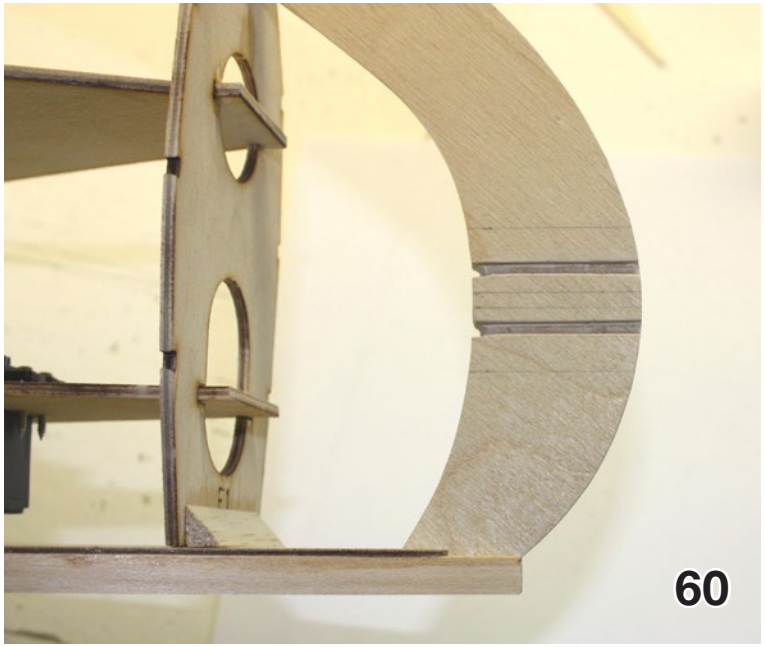
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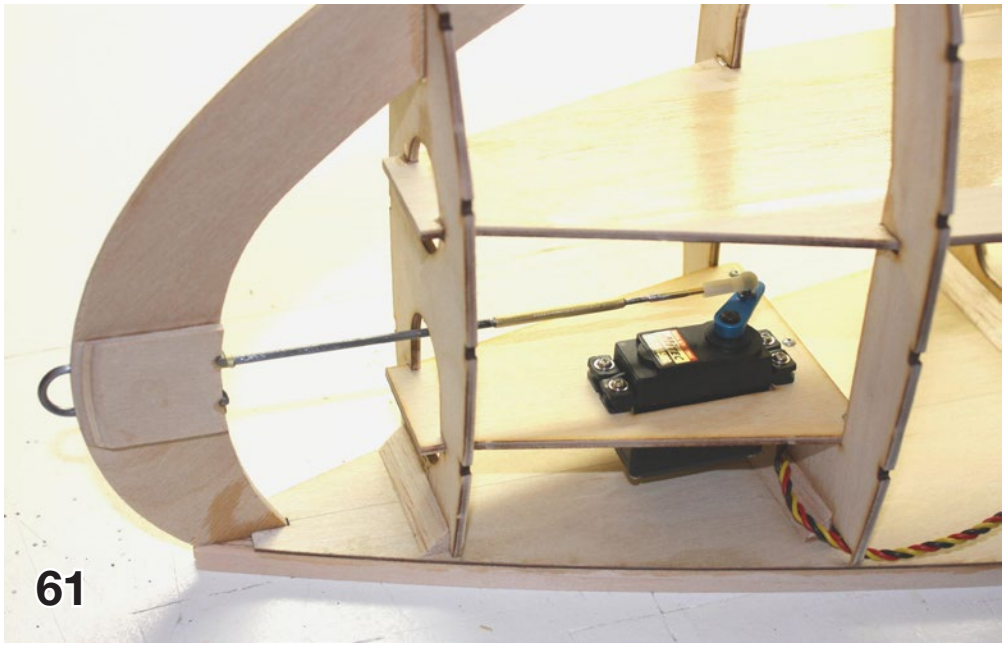
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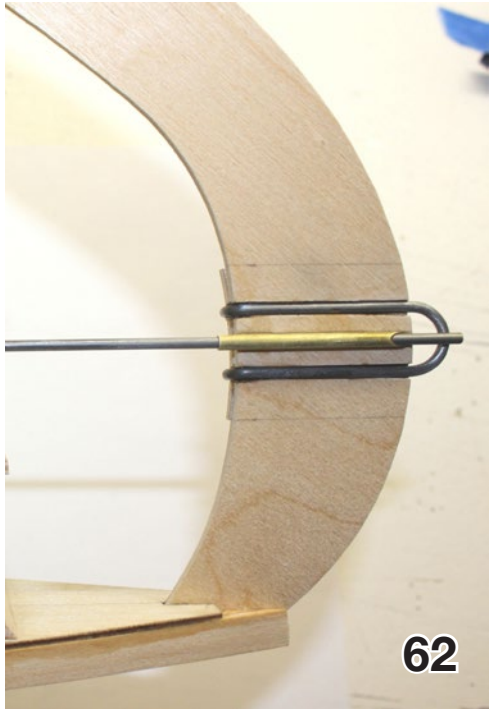

62

On the right side of the upper keel cut the grooves for the U-shaped legs. I used a razor saw and small files to make the grooves. You want the 3/32" music wire to be flush with the keel surface when the U-shaped piece is in place. See pic 60.

Sand the music wire with 220 and glue into the slots with CA+.

Make up the tow release rod assembly per the plan and leave some extra length.

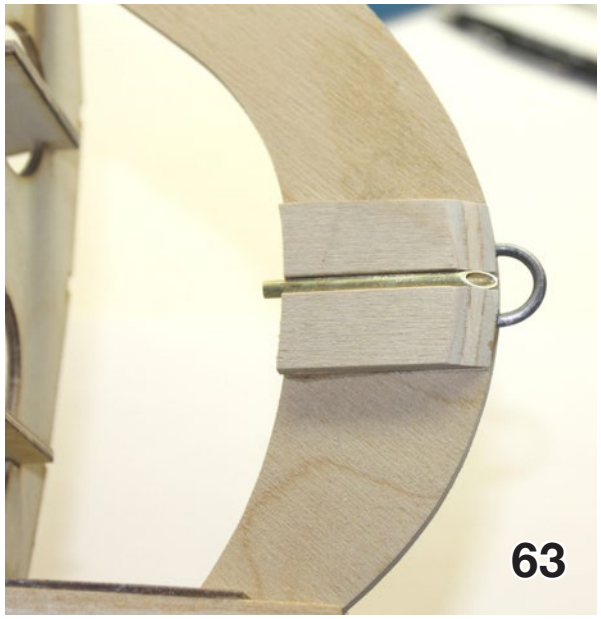
Install the 2-56 ball link onto the servo arm in about the 13mm radius position. Put on the servo arm without the screw. Snap the ball link onto the servo arm.

On the 1/8" O.D. brass tube that will be glued to the right side of the upper keel, file or sand an angle on the front end that matches the angle of the lower longerons at the nose. Slide the brass tube onto the tow release rod and position it on the upper keel. You want the tow release rod to be very close to touching the U-shaped wire piece.

If necessary, file the upper keel slightly to get the tow release rod closer, then glue the brass tube to the upper keel with a bit of CA. Be careful not to get the CA close to the ends and thus glue the rod to the tube! See pix 61 & 62.

Cut two pieces of 1/8" ply 9/16" wide and fit to the right side of the upper keel above and below the brass tube.

Bevel the front edges as was done on the left side ply doubler.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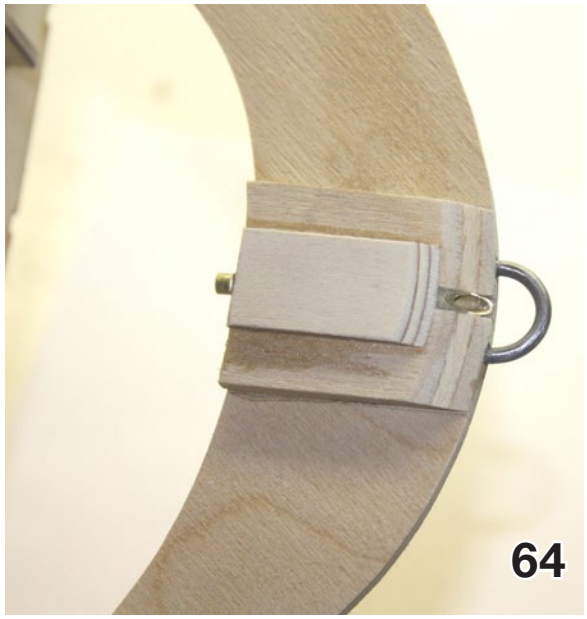
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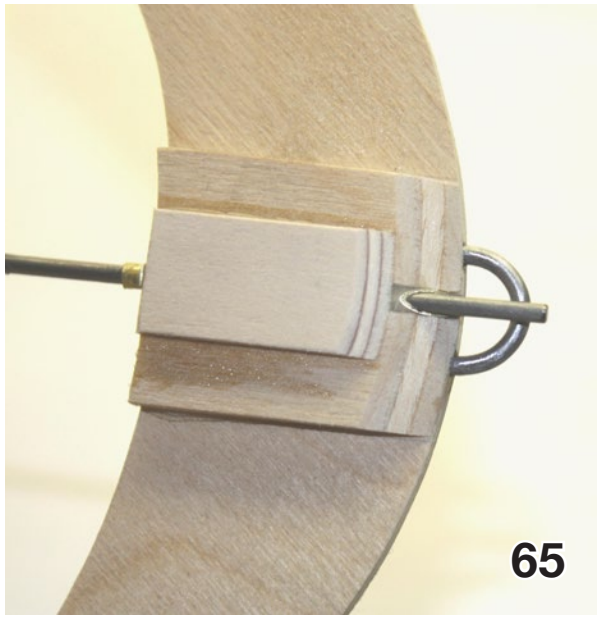
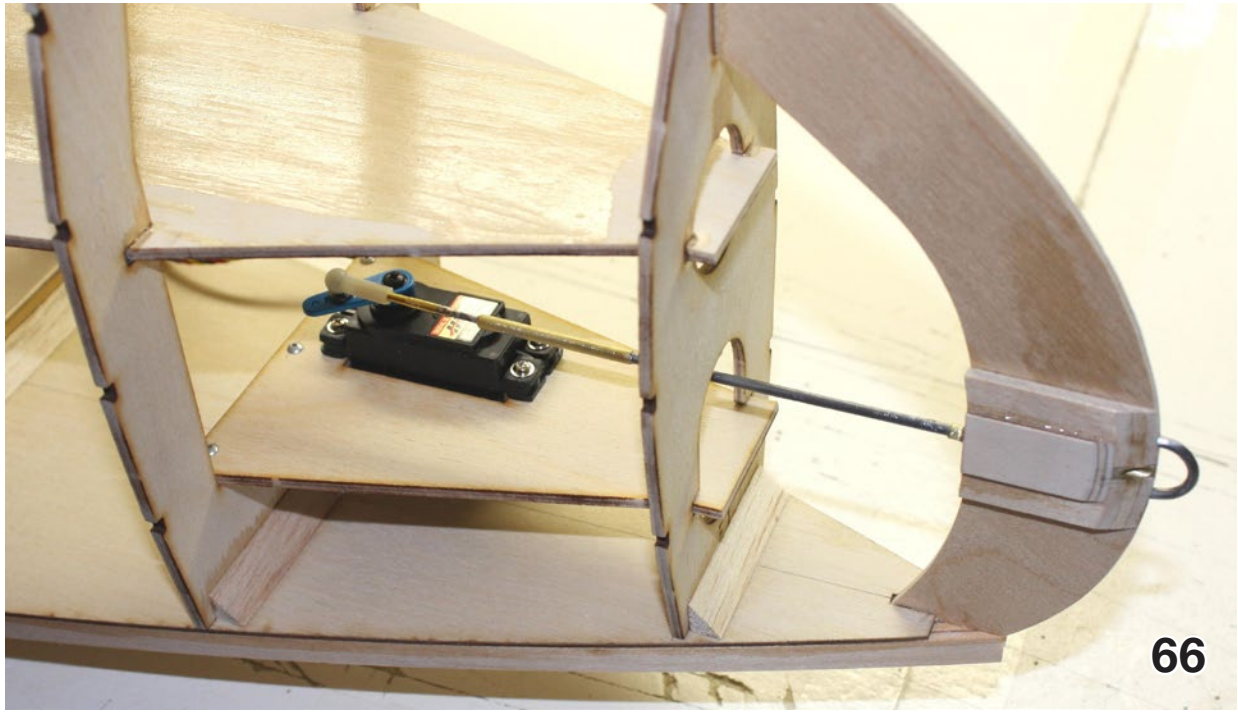

65

Remove the tow release rod from the brass tube and glue the two ply pieces with CA+. Now epoxy a 5/8" wide piece of 1/16" ply centered over the right side, and after it cures bevel it to match. See pix 63 & 64.

Hook up the tow release servo to the gear channel on your radio receiver and turn it on. Set the servo arm so it's roughly at a 45 degree angle forward and aft at the ends of its travel. With servo arm in the forward position, cut off the tow release rod so it overhangs the U shaped wire about 1/16 inch. Adjust the servo throw so the wire completely retracts inside the brass tube when the gear switch is flipped to the release position. See pix 65 & 66.


66

The 2-56 ball link allows the tow release rod to be disconnected if the servo ever needs to be replaced.

I should note here that I initially planned to use a Hitec HS-485HB servo for the tow release, but after trying some high loads by hand on a tow line loop, I decided I wanted more torque, so I changed to an HS-5645MG servo which has twice the torque. I also used the aluminum servo arm that came with the servo.

One other note. I use a little silicon tuner lube on the tow release rod, mainly to prevent corrosion, but it also makes it slide a bit smoother.

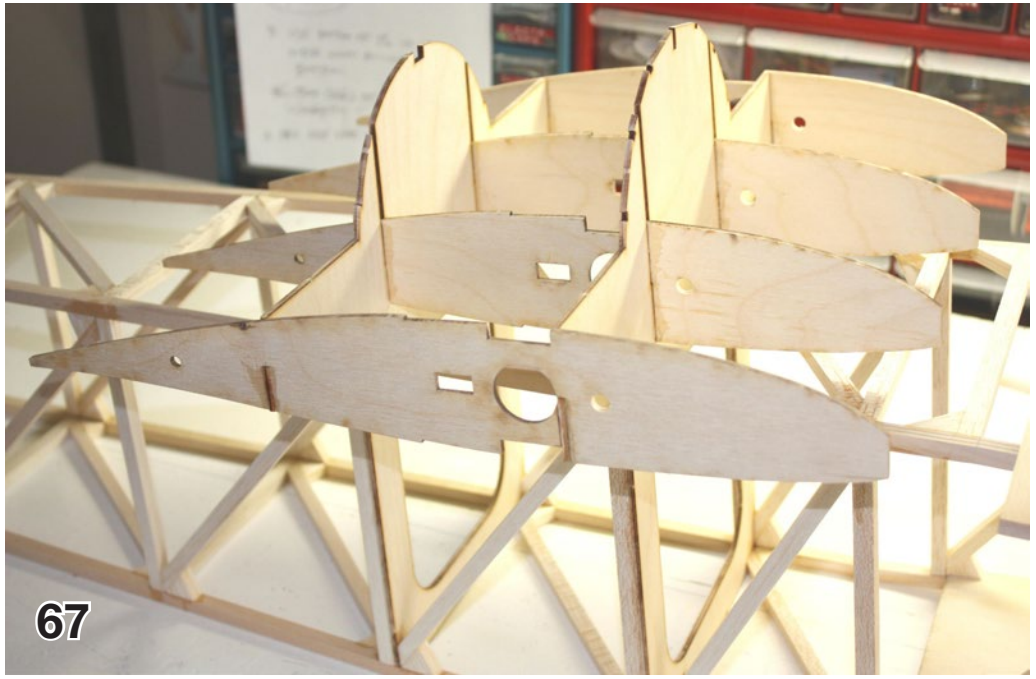
Next item to be built will be the wing center section.

Fuselage/Wing Center Section

Check the fit of the four fuselage root ribs. If you were careful locating your fuselage formers they should drop right onto F6 and F7. If not, adjust the slots. Before gluing, lay a ruler across the tops at the LE and TE to make sure all four ribs are aligned with each other. See pic 67.

Epoxy 1/4" sq. spruce to one side of a 24 inch length of 1/4" X 3/4" spruce. Sand the width down to 0.96 inches after the glue cures, and cut into two 12 inch pieces. These are the center section spar caps.

Check the fit on the four root ribs and then glue into place. See pic 68.



67. The four fuselage root ribs are glued into place to F6 and F7.

68. The spar caps are installed.

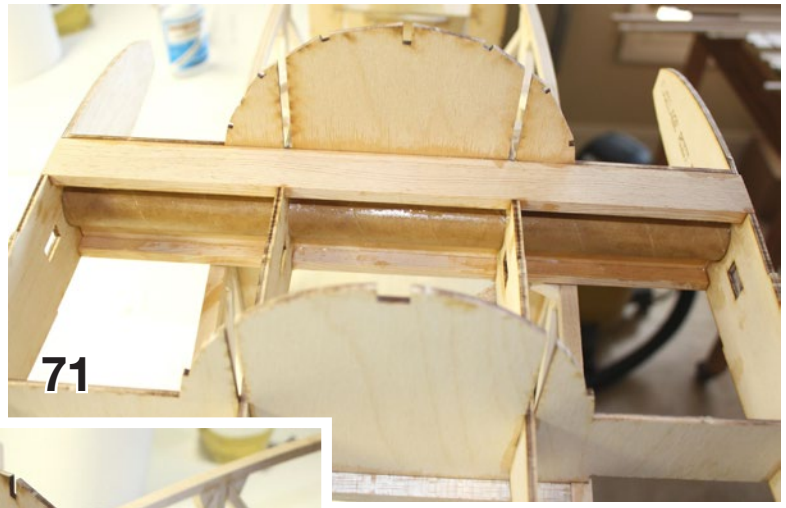
Cut a 12 inch length of the TNT phenolic wing tube socket and glue into the ribs.

The gap between the wing socket tube and the spar caps is slightly more than 5/16 inch. Since my 5/16" sq. basswood stock is a bit oversize, I just used it and let epoxy fill the remaining small gap. To properly position the basswood pieces just CA a piece of 5/16" sq. balsa onto the basswood - then you can push this combined piece all the way forward against F6 and the basswood will be centered under the wing socket tube. Make up six of these and glue in with epoxy. See pix 69 - 71.

Install 1/16" ply webbing (vertical grain) onto the aft side of the spar caps. See pic 72.

You will notice the TE ends of the four fuselage root ribs are clipped off a bit - this is due to my screw-up when I set up

69. 5/16" sq. basswood filler piece with 5/16 sq. balsa added for positioning basswood under center of wing socket tube. Six of these are needed.



71. All six basswood filler pieces installed.

72. 1/16" plywood vertical grain webs added.

the laser cut files. The ends of the ribs are supposed to come to a point (has been corrected in the laser files). So I had to add small pieces back on to each of the four ribs.

Install former F5.

In all of the following steps be careful handling the fuselage as it is easy to crack the F5 former if you whack it.

Sheet the bottom of the outer pairs of ribs between the aft edge of F6 and the front of the false LE with 3/32" balsa. The sheeting will need to be relieved to clear the inboard part of F6. I sheeted up to F5, then added another piece with a notch to clear F5.

Make sure the ribs are square with F6 - you can lay a ruler on the outside of the outer rib to check alignment on that rib, and a small square of the inner rib. Make sure to leave some excess in front of the rib ends so the false LE can be installed.

Add the 5/16" brass tubes (sand the ends so the glue holds well) in front of F6, and add the 1/8" balsa false LE. Add the four 5/16" thick balsa gussets.

Apply the bottom 1/32" ply sheeting from the middle of F7 to 1/32 inch aft of the ends of the ribs. Again, the sheeting will need to be relieved to clear the inboard part of F7.

Check again to make sure the ribs are square - use a ruler on the outside of the outer rib.

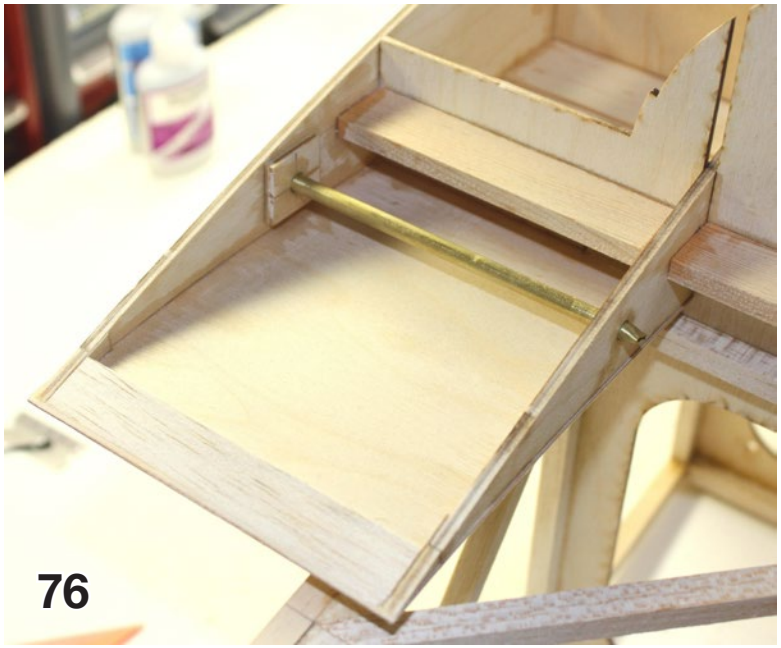
Install the small square ply doublers and the 3/16" brass tubes (sand the ends), and squash the inner ends of the tubes a bit.

Add the balsa between the ribs at the TE and sand flush with the ribs tops.

Add the three 1/4" X 3/4" spruce anti-crush pieces to the back of F6.

Finish sheeting the bottom by adding the 1/32" ply and 3/32" balsa between F6 and F7. See pix 73 - 77.


75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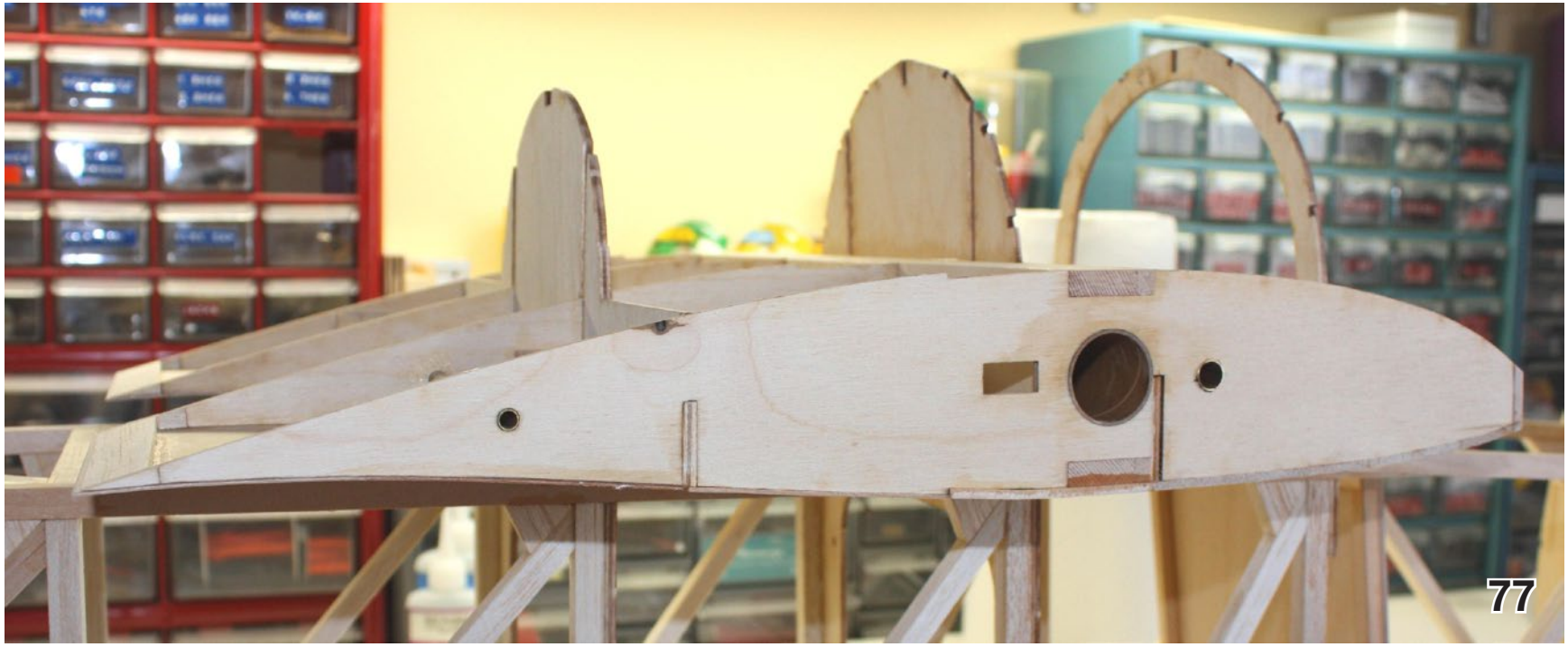
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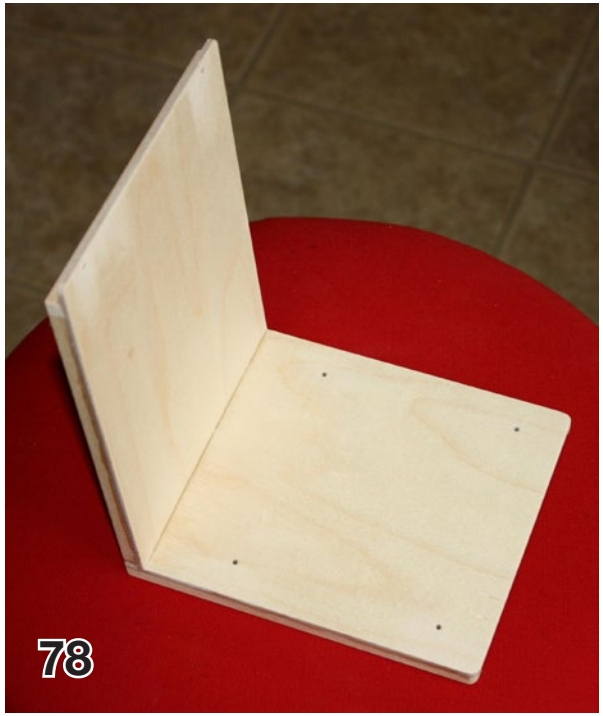
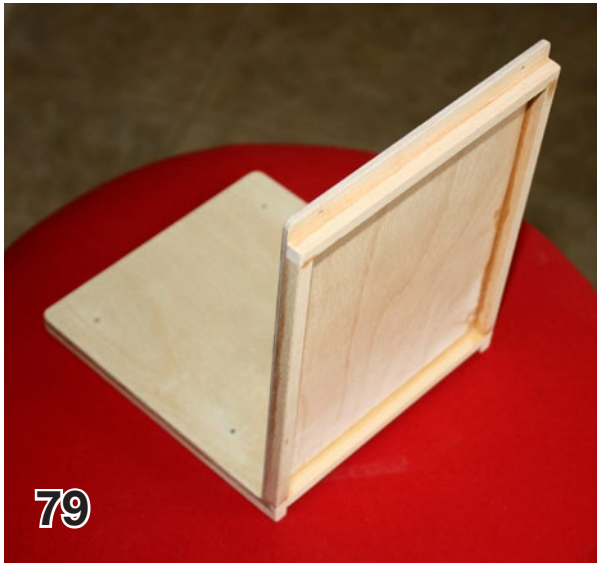
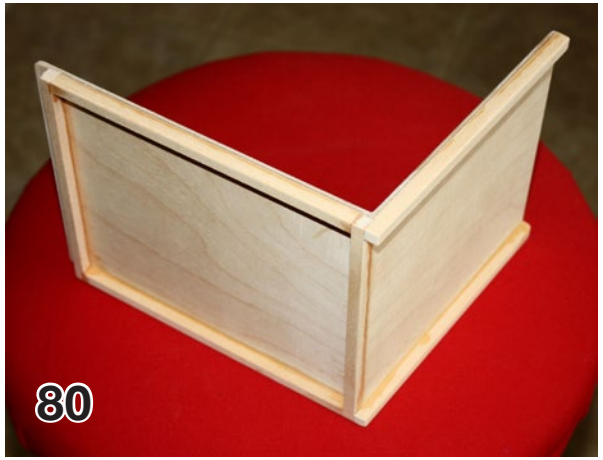






78. The seat is of 1/8" ply with 1/4" sq. basswood frame.

79. Bottom view.

80. Aft view.

The next step will be to make up the wiring harnesses that go into the center section.

Seat

Before I make the center section wiring harnesses, I need to mount the receiver so I know how long the wires should be. The receiver will be mounted under the seat, so I decided to go ahead and make the seat and mount.

The seat is made from 1/8" plywood with a 1/4" sq. basswood frame. Refer to the plans for all the dimensions. The seat top and bottom are 5.375" wide, and are at a 95 degree angle to each other. All pieces are glued together with CA.

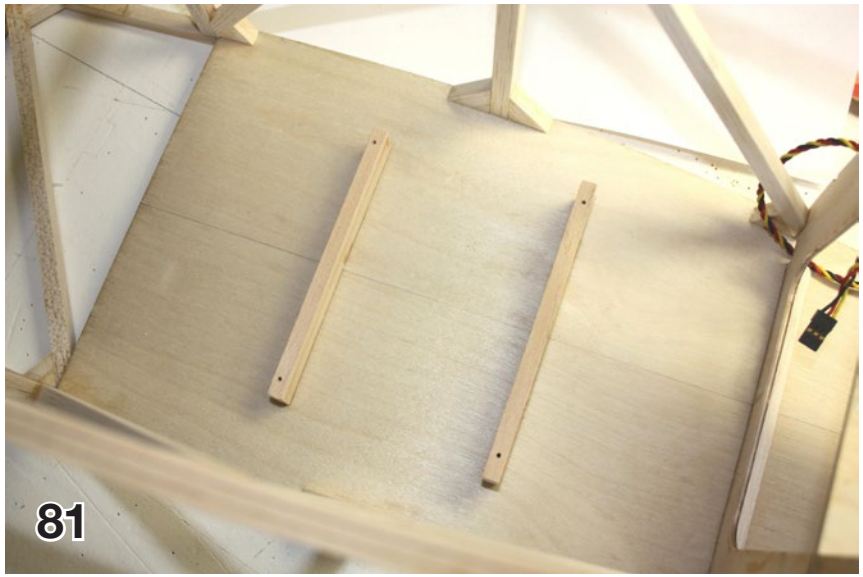
For the under seat supports/mounts I edge glued three pieces of 1/4" sq. basswood together with CA. There is a 2.7 degree angle on top of the seat mounts.

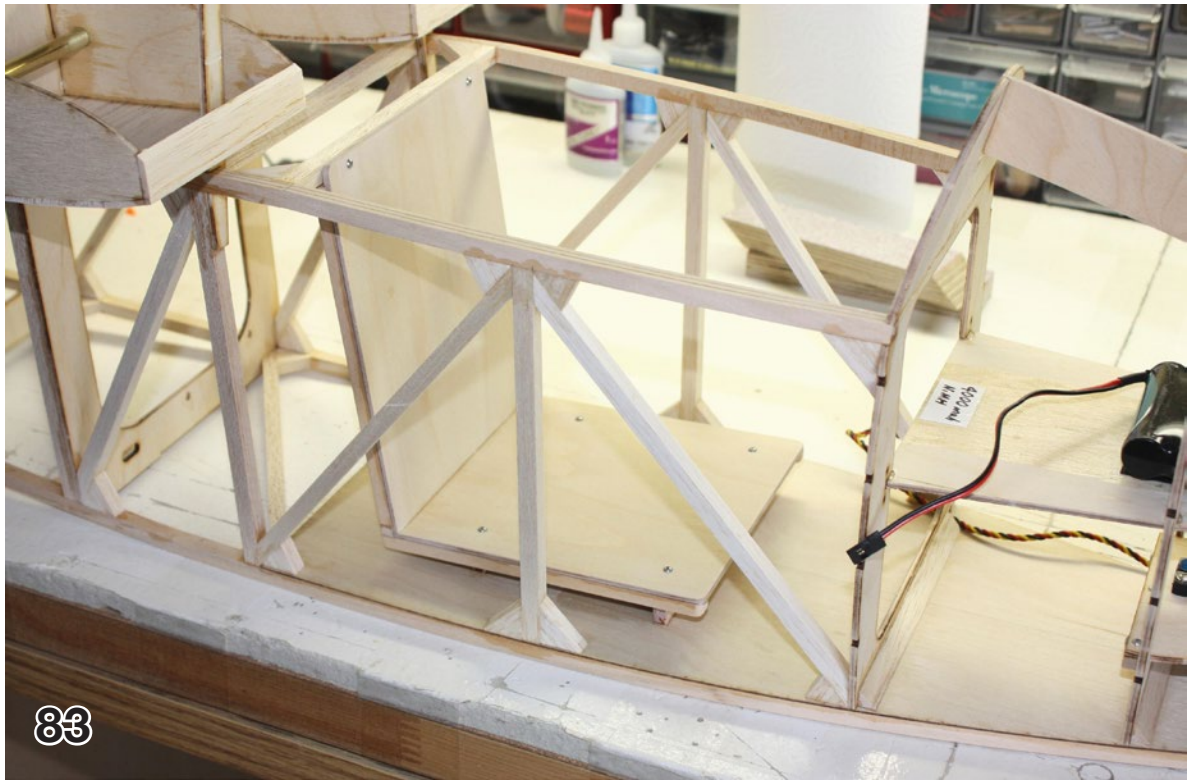
The seat is held to the mounts, and to the fuselage cross brace at the top, with #2 button head screws. I located the screws 5/8 inch in from the edge.

On the top two screws which go into balsa, run the screws in, then remove them and saturate the threaded holes with CA.

Between the seat mounts I applied a thin film of 5 minute epoxy so the Velcro strips will stick well later. See pix 78 - 83.

I also installed the battery with Velcro strips so I can hook up the switch harness. Since I will need a fair amount of nose weight I used a 4000 mah Sanyo 5-cell NiMH battery which weighs close to 10 ozs. See pix 84& 85.



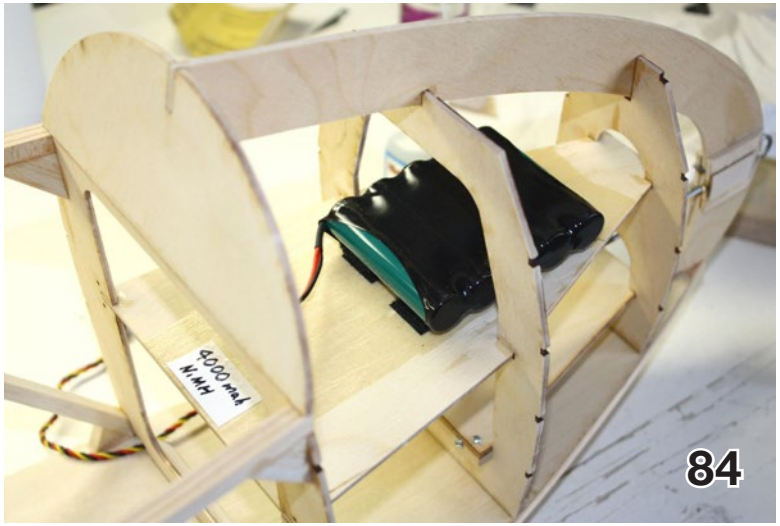


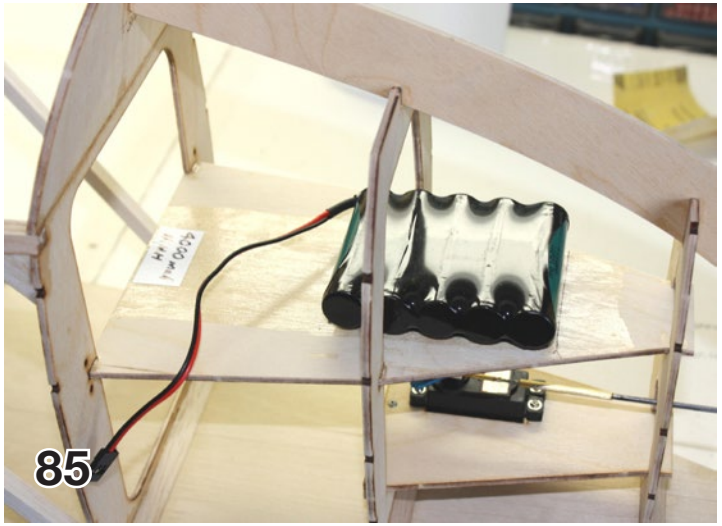
81. Three pieces 1/4" sq. basswood edge glued to make 1/4" x 3/4" stock make up the seat mounts.

83. #2 button head screws are used to hold the seat to the rails. Here the seat is in place. Notice the extensive gusseting and the battery tray.

Wiring harness fabrication is next.

Rudder and elevator servos will be mounted behind the seat, on rails and a tray. All the servos in this bird will be mounted so they can be removed without too much trouble.





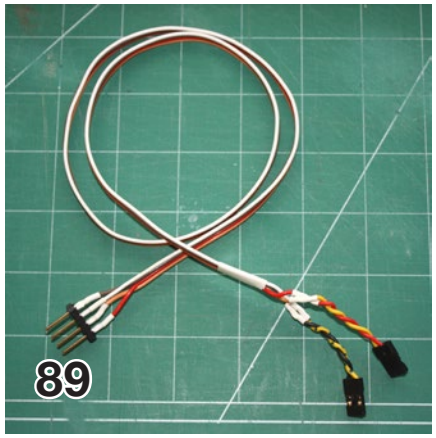
Wiring Harness, Radio Installation, and Finishing Center Section

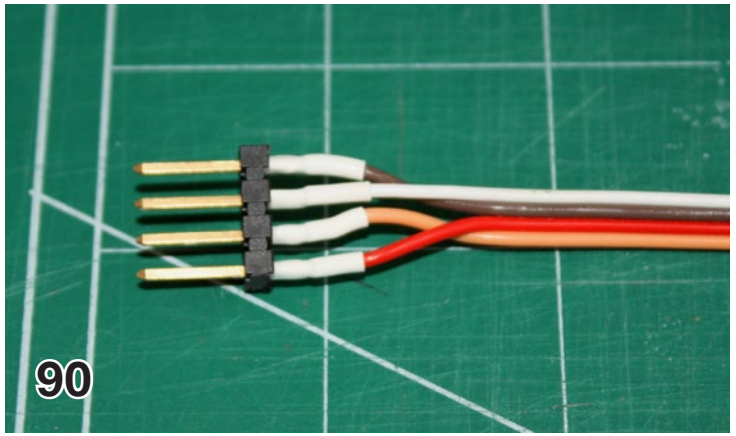
CA some 1/4" X 1 inch pieces of 1/32" ply onto the inside of the center section outer ribs where the Molex connector will be located. Leave enough gap to clear the soldered joints with heat shrink on the connector. These will be used later to glue the connector into the rib.

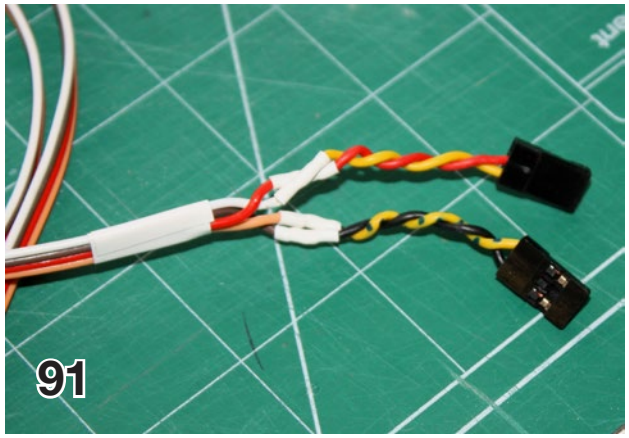
Also glue a paper tube between the outer two ribs on each side to route the wire harness. I just glued four pieces of 1/16 scrap balsa together instead of using a paper tube. See pix 86 -88.

86 & 87. The 1/32" ply backing plates for the Molex connector.

88. The tube for wire routing was made from scrap 1/16" sheet balsa.







I mounted the receiver under the seat with Velcro.

To make the wiring harnesses which feed the wing servos I used MPI JR/Hitec HD servo wire (stock #3715). I also added a fourth wire (Hyperion HP-WR020) with CA. All of these are #22 wire size. I just had this wire in my junk box - any will do as long as it's not smaller than #22.

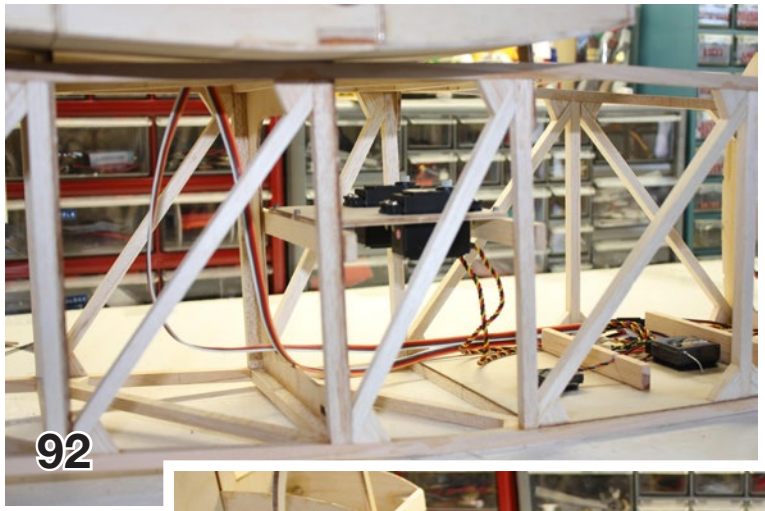
The Molex 4-pin connector (part # is on plans) is soldered on one end and placed into position on the outer center section rib so the length of wire needed to reach the receiver can be determined.

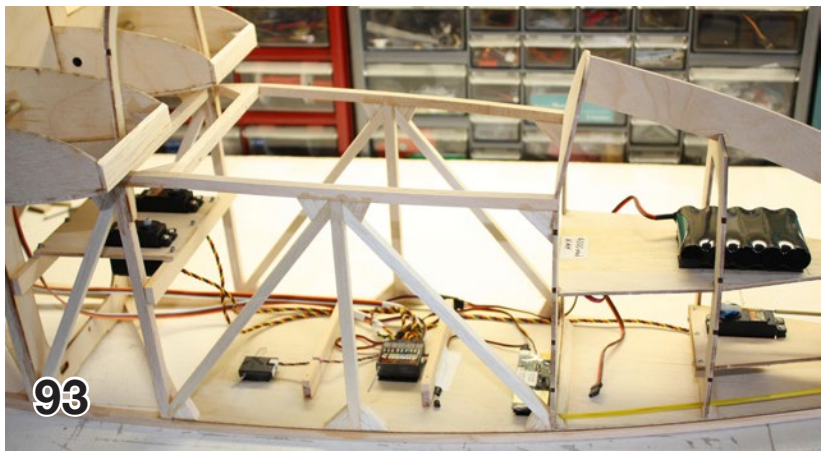
Two male connectors are soldered on the other end. Make sure you differentiate the two signal wires so you'll know which one is spoiler and which is aileron. See pix 89 - 91.

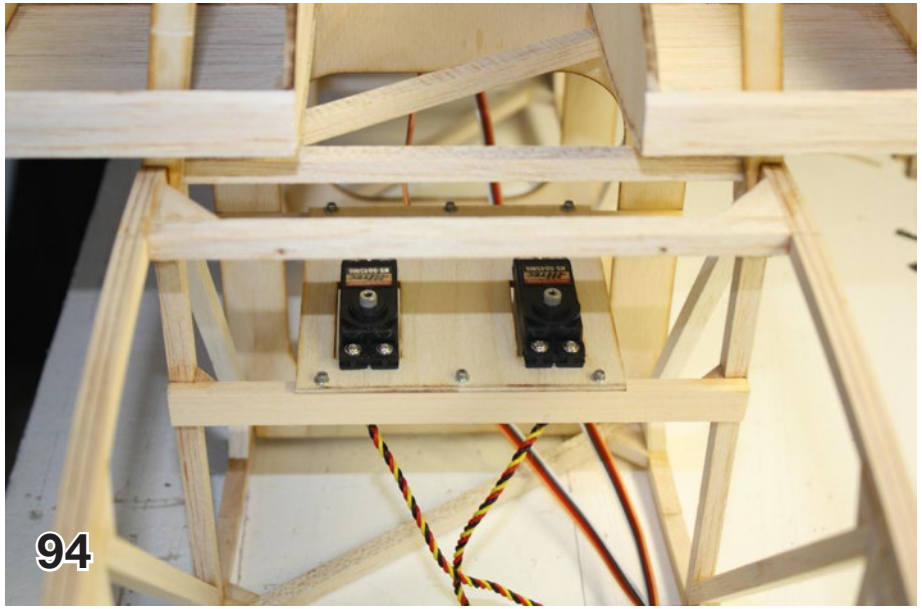
I recommend putting a small amount of CA on each of the gold pins at the base of the Molex connector after soldering because they are not very tight and have been known to move in at times.

The two wire harnesses are routed down along the left edge of former F6 and run along the left side of the cockpit to the receiver. See pix 92 & 93.

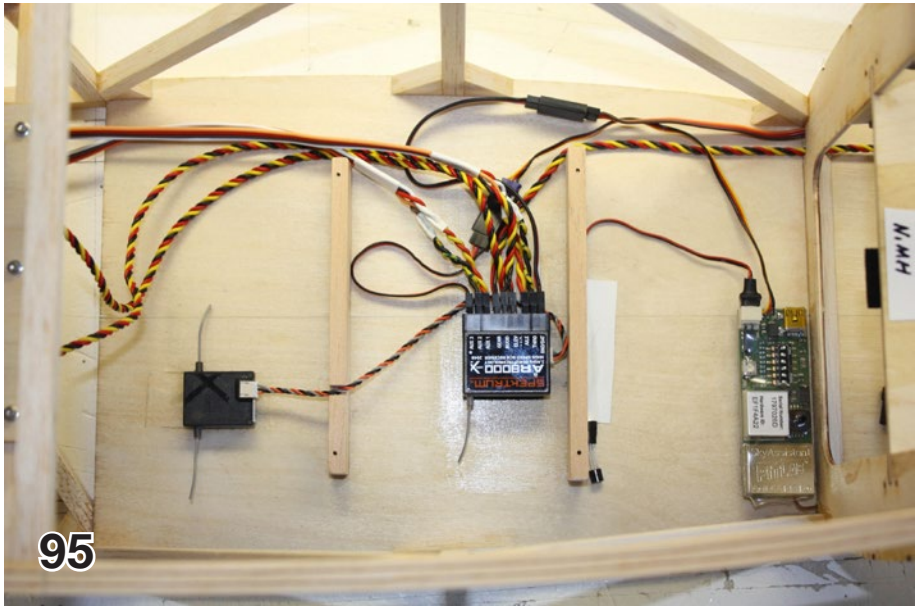
These will eventually be tied off to former F6 with a couple small tie wraps.







94. The elevator and rudder servos were mounted so appropriate cable lengths could be determined.



95. An overhead shot of all the various wires hooked to the receiver. See text for placement of additional satellite receivers on the fuselage sides.

I went ahead and installed the rudder and elevator servos at this time so I could see where all the wires run and make sure everything goes where expected. See pic 94.

Pic 95 is shot from above showing all of the wires hooked up to the receiver.

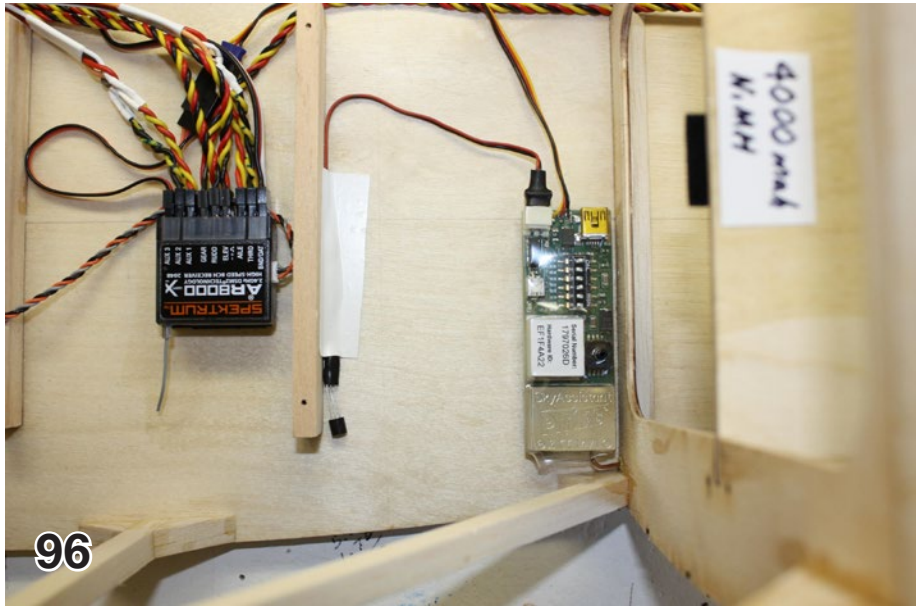
NOTE: During test flights I experienced some radio lockouts, and this was confirmed using a flight logger during extended range testing on the ground.

Certain orientations of the model relative to the transmitter would cause loss of signal to the receiver.

I changed to a Spektrum 9 channel receiver with two satellites. One satellite was mounted on the left fuselage side and one on the right fuselage side, aft of the cockpit.

This resulted in no more dropouts/lockouts during extensive range testing.

To mount the satellite receivers, I glued a piece of 1/32" plywood (about 1" X 1") to the fuselage vertical members, and Velcro mounted the satellites to the plywood pieces so that one had its antennas horizontal and one had its antennas oriented vertically.



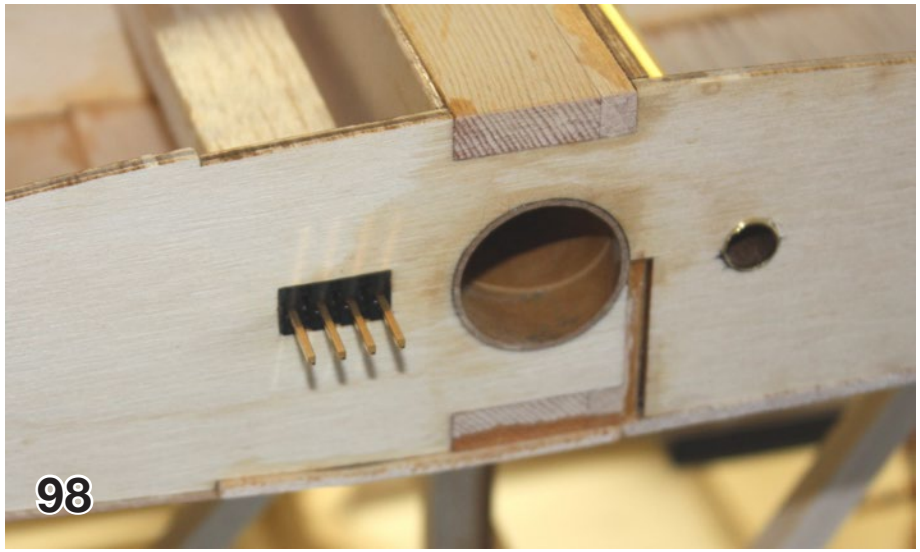
96. Sky Assistant vario/telemetry unit mounted against aft side of former F3.

It takes eight channels: rudder; elevator; two for ailerons; two for spoilers; tow release; and vario/telemetry unit.

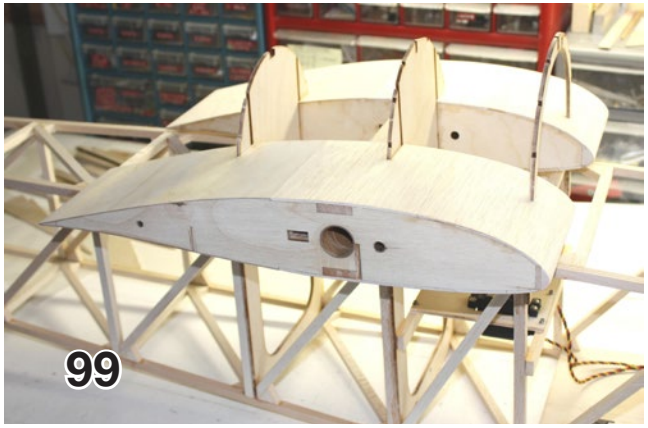
Off to the right in pic 95 is the Sky Assistant vario/ telemetry unit. See pic 96) for a closer view. You can see that a piece of 1/8" dia. inner pushrod has been installed into the front formers for the short vario antenna to go into.

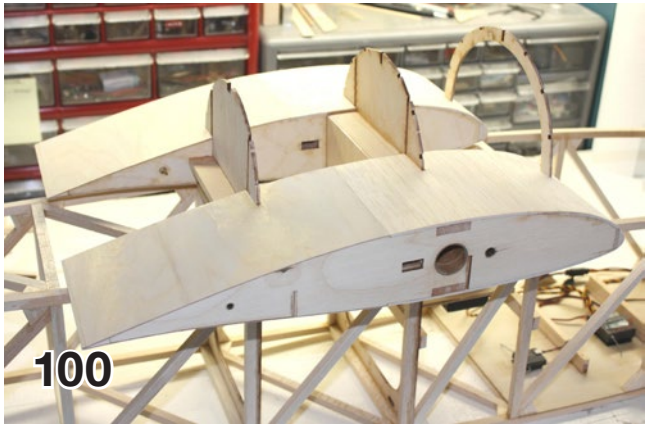
The switch is mounted on a 1/16" ply tab installed on the left side of the cockpit, just under the battery shelf, and the excess switch and battery wire is held to the underside of the battery shelf with a bit of Velcro. See pic 97.

Pic 98 shows the Molex connector in position on the outer center section rib.



98. The Molex connector in position on outer center section rib. This specific connector feeds power and signal to the right wing spoiler and aileron servos.





I don't install the wire harness until all construction is completed because the connector pins are subject to damage during the remainder of the construction, and I will also probably want to do a bit more sanding on the center section outer ribs to get a good match to the wing panels when they are finished.

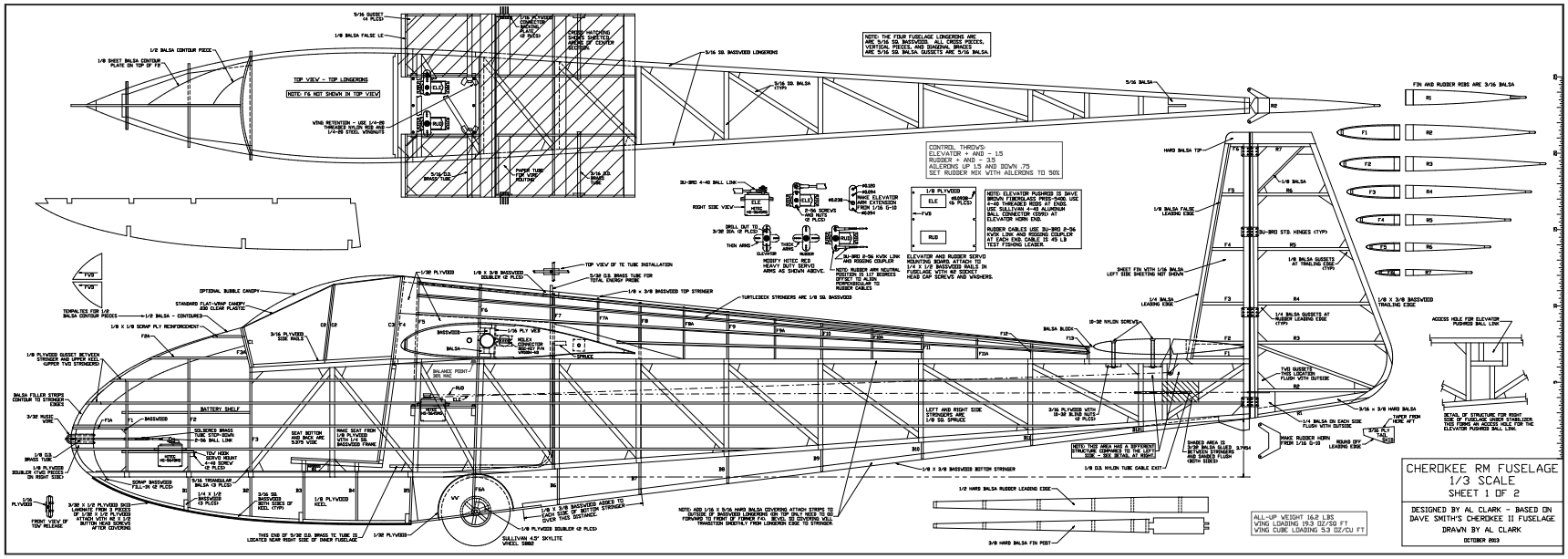
Now that all the wiring is sorted out the top of the center section can be sheeted with 3/32" balsa and 1/32" ply, and the edges of the sheeting sanded flush with the rib.

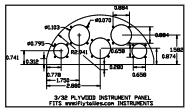
Here's where getting the rib straight during construction will pay off - very little sanding will be required to get a flat surface.

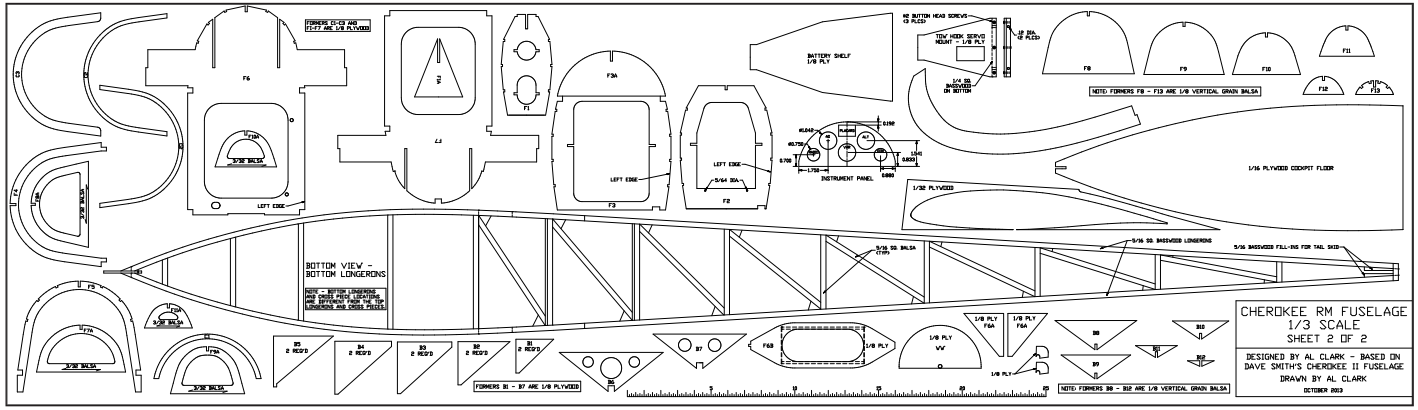
Sand the sheeting flush with the false LE and glue on the 1/4" thick balsa LE. Shape the LE per the plan. I make a template from the plan for about the first inch of the center section airfoil and use that as a guide. On these big LE's it's difficult to get the profile correct just by eyeball. See pix 99 - 103.

That's it for the wing center section and radio installation.

The elevator pushrod and rudder cable hookups will be done later, after the stab is mounted.







Part 3 of this series will include installation of the turtledeck, mounting the horizontal stabilizer, completing the fuselage bottom and adding the stringers, installing the elevator pushrod and rudder cables.

These 1/3 scale Cherokee RM plans are available for free: <http://www.rcgroups.com/forums/showthread.php?t=2246733>. Also, the wood list is available here: <http://www.rcgroups.com/forums/showthread.php?t=2246779>.

“Last flight of the day,” 8:53PM, used up every bit of light possible. Needed to fly. Photo by Roland Goudreau.

The First Brazil F5J 2015

Josenilson Torres Veras, josenilsonveras@yahoo.com, and José Evangelista Junior

The first Brazilian F5J contest was held in Sao Carlos, SP, Brazil, on May 23 - 2015.

Alexandre Cruz, our kind host, spent a lot of effort in order to bring us this awesome event.

São Carlos is a wonderful city in the state of São Paulo that offers easy transportation and has many hotels and restaurants. It is a place with flat terrain and a nice club (ARM – Associação Regional de Modelismo) where you can practice sailplane flying.

The club is located near one of the most important roads in the state, the Washington Luiz highway.

Alexandre, a great enthusiast of F5J, designed the Tera, a project of a rather small (1,75m wingspan) RC glider. It is an excellent floater that is sold as an inexpensive balsa kit. It started with version V1 and V2 and latest is V3. They are small, easy to build and show good performance. As you can see from the photos, we had a lot of them at the contest.

The contest started at 9 o'clock in the morning with one briefing made by Alexandre. The weather was clouded, windy and cold in the morning. In the afternoon we had bit more sun and some thermals rose on the field. But the wind remained for all of the time.

Alexandre Cruz and all of the Tera entered in the contest. The daddy and his children!

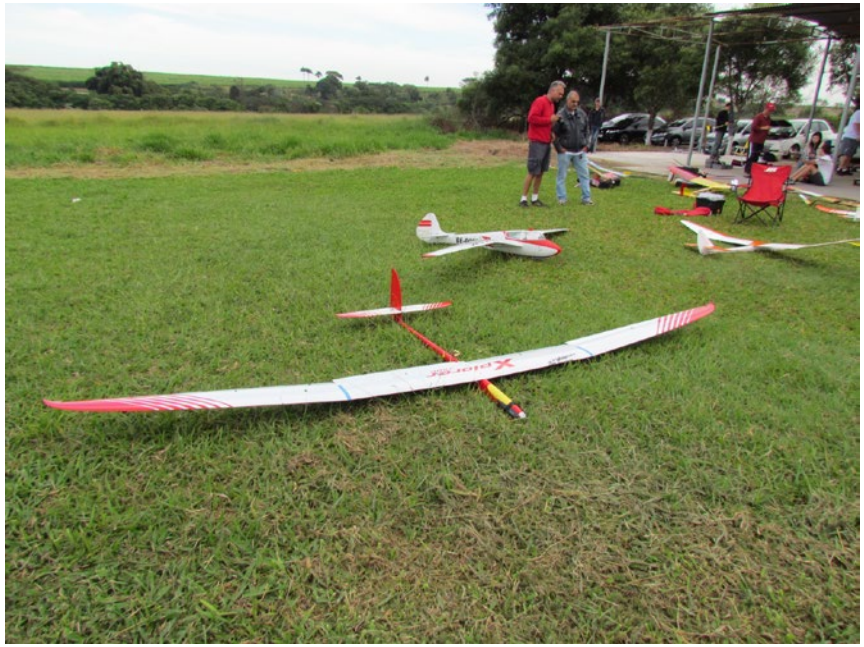
Besides Alexandre, we were supported by some club staff people. The club has a small and nice building with all the infrastructures needed by the pilots and it offered a delicious barbecue all day.

A sound system was used to run the rounds in the contest. It had all that was necessary to cope with F5J current regulations, starting with a regressive count to 5 minute prep time, going through each minute. Then the last minute of preparation and a countdown of 10 seconds to initiate working time. Each minute of flight time was marked and there was another countdown of 10 seconds to the final 2 minutes of flight time. As usual, at the end there was a 30 second countdown to the end of flight.

Above left:
The Tera V3.

Above right:
Do you have an electric sailplane? Join us!

Right:
The foam model in the background had good performance.



Above left: It was possible for older models to participate, too.

Above: A Bubble Dancer copy.

Left: This one made our eyes shine.

Above left: The most important thing was to participate.

Above: The Brasilia Team. On the left Zevang (Our national 1999 F3J champion) and on the right the chief of team Paulo Perez.

Left: One more old school model. So beautiful!

We had different models at the contest.

The winner was interviewed by a local TV station.

Look! The winning model (that one with yellow nose)!

This model didn't participate in the contest, but was good to see.

There were 39 pilots from five different states of Brazil and many distinctive models. Some were made of carbon fiber, others balsa wood and others used mixed balsa wings with fiberglass fuselages.

The pilots also had different skill levels and all these features brought fun to the contest while at the same time making it very competitive.

Overall we had a very friendly and cooperative environment at this event, when all pilots were involved in timing for each other, helping whenever possible and whenever needed.

This event followed the rules of FAI for F5J competitions and was also an opportunity to select the Brazilian pilots who will take part in the F5J World Championship to be held in Slovenia next August.

Upper left: The trophies and on right side some Tera V3 kits sold to benefit a non- profit aid association.

Left: The winners!

Tom's Tips

Why I GOOP servos instead of using epoxy

Tom Broeski, T&G Innovations LLC, tom@adesigner.com

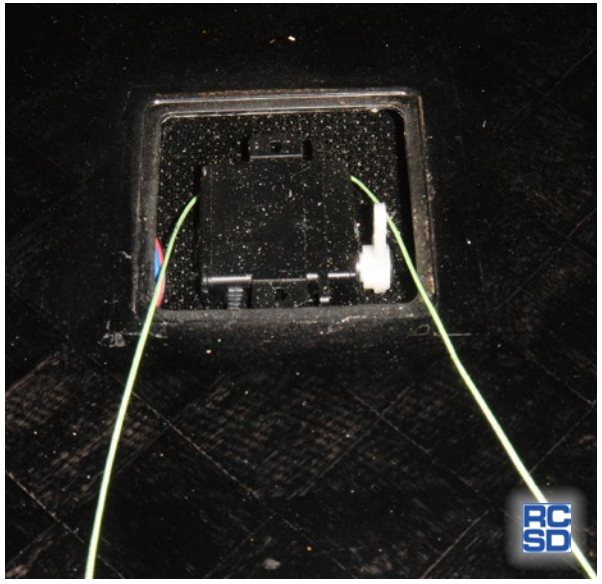
There are different ways to glue in servos if you don't have servo frames, and to glue in the servo frames themselves.

People use epoxy directly or tape the servo to prevent epoxy from sticking to the servo, but epoxy gets brittle over time and I've had servos pop out because of this. So..... I use GOOP.

There are all types, from GOOP, GOOP Marine, GOOP Household, GOOP Kitchen, GOOP Automotive, Shoe Goo, etc., etc, etc. They are basically all the same.

The really great thing about using this type of glue is that you have plenty of time to adjust the servo to get it just right, it doesn't get brittle, AND it is very easy to remove if you need to.

Just take a string soaked in Toluene and it cuts right through the glue. Servo is out and a tiny dab of the glue and it's right back in.



drilling aligned and centered holes through tubing

P. Chelan Denny, pchelandenny@frontier.com
via https://groups.yahoo.com/neo/groups/Kasperwing/info

Those RC soaring enthusiasts building scale models (like the pod and boom Bowlus) are often called upon to center drill tubing for attachment points. Centering the hole as it traverses the tubing is always problematic and those who tackle this project without fundamental guidance frequently create a pile of mistakes before success comes their way.

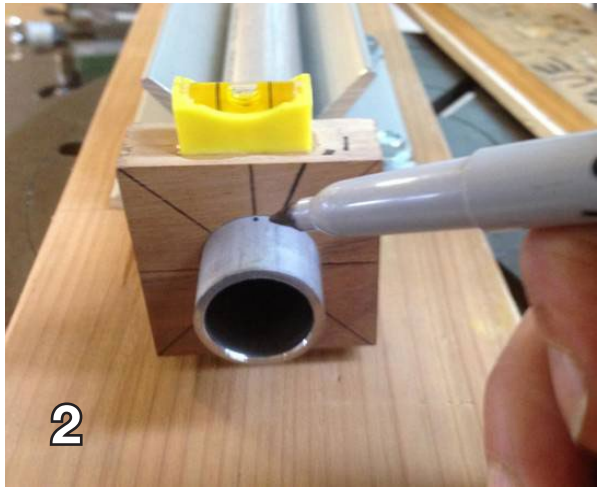
We found this material on the Kasperwing Yahoo! Group and felt it was worth sharing with RCSD readers.

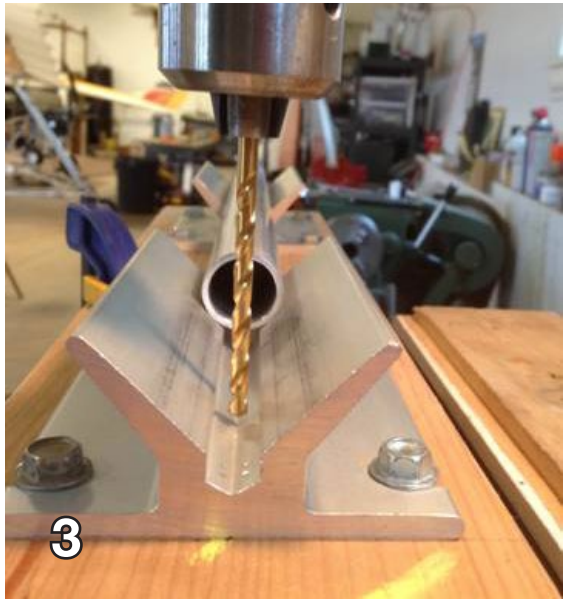
Good tips coming in to the Yahoo Forum for drilling aligned and centered holes through tubing. As much as I appreciate the beauty of [some of those] techniques, we only have some basic machinery for drilling in our shop, so we are somewhat limited by what's at hand. Maybe that's why we never throw away any small scraps of tubing!

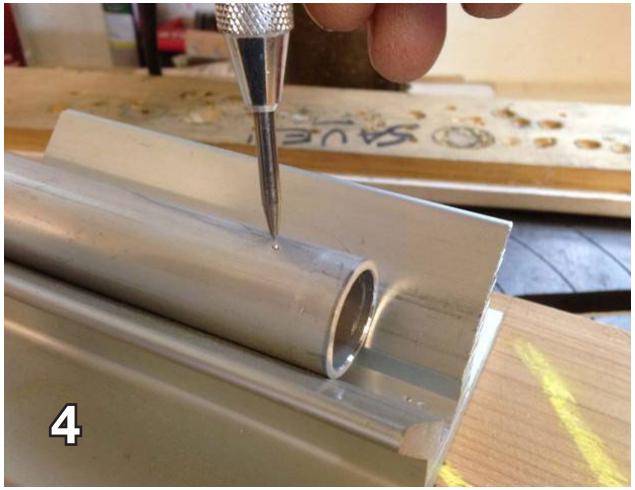
Anyway, I happened to be up at the hangar today, staring at some scrap tubing and the well-used drill press and decided to drill a quick hole and see just how far off I ended up being.

Below is my process, set up and a few misellaneous tools and jigs:

1. This was the double set up of V-blocks I was talking about last time. They are mounted to a 2 x 6 hunk of flat cedar (because that's what I had laying around).







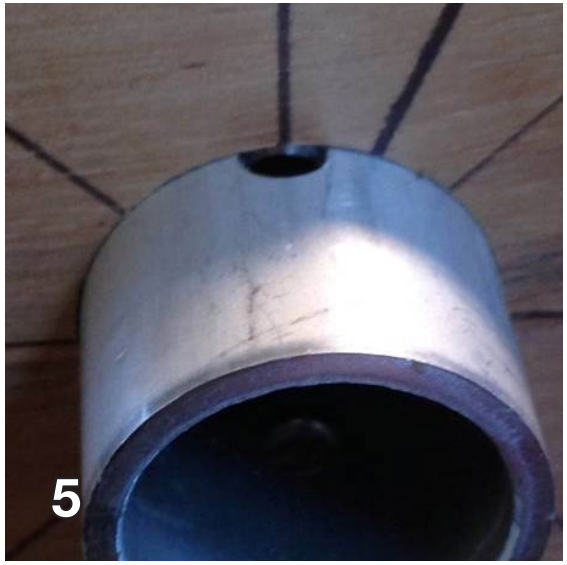
2. Sometimes I use a pair of these to reference a line of holes along a length of tube. In this case, I marked a dot at 12:00 and one at 6:00 so I could see if the top drilled hole and bottom drilled hole were somewhat in line with each other.

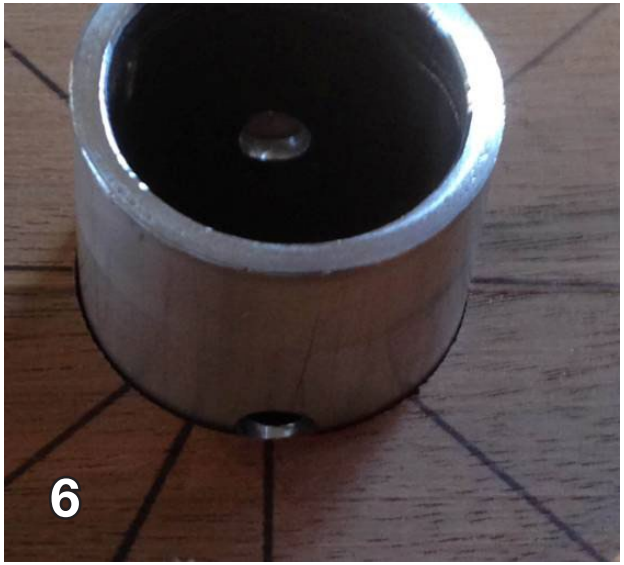
3. Next, I aligned the bottom of the V-block to the point of the drill bit. I usually start with a smaller bit and work my way up, but I was in a hurry and just grabbed a new ¼" bit. BTW: This is 1" x .083" 6061 T6 tubing.

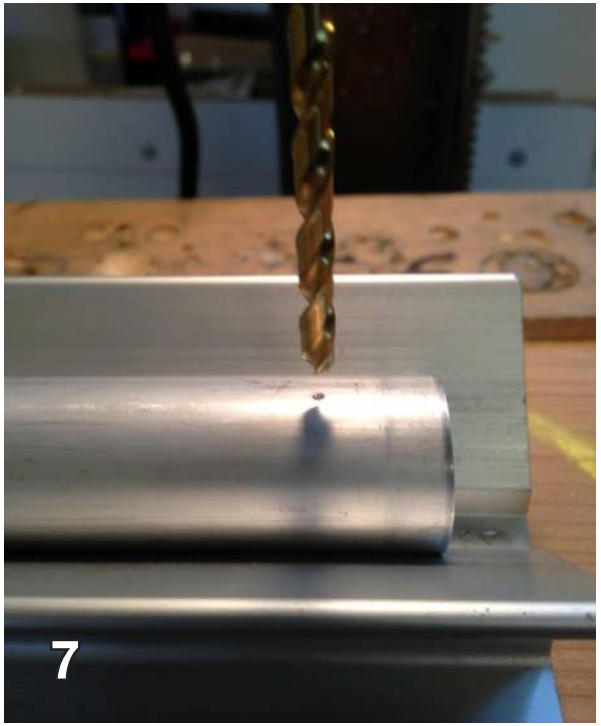
4. Using the 'dot' mark from above, I punched a hole in the tube to help locate the drill bit on the curved surface.

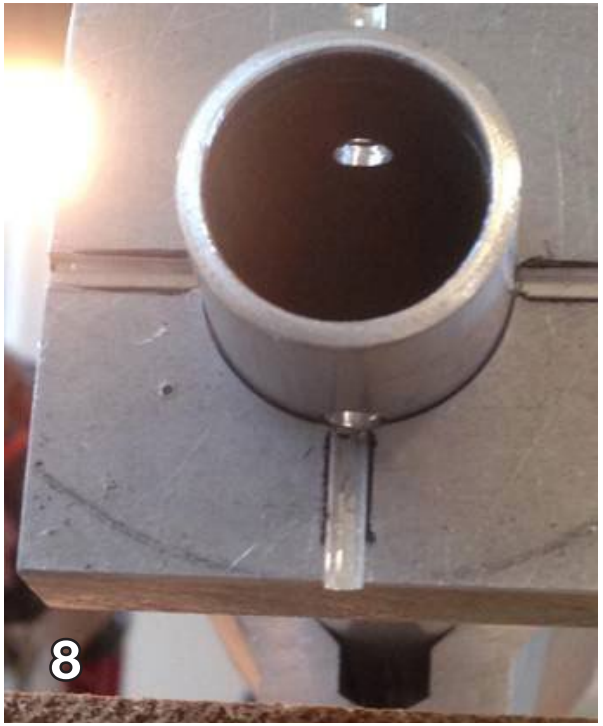
5. Entry hole

6. Exit hole. Just a tad off, but acceptable for a rush job.









7. Center punched, aligned and V-block assembly clamped down. We get a lot of use out of the Quick Clamps…

8. Checking results with another handy jig.

9. Exit hole. Acceptable.

10. I made a bunch of pairs of these for various sizes of tubes. They do work, but 100% accuracy is not guaranteed over a long distance. I've had good luck with them… so far.

11. If you have done plumbing or HVAC work, you probably recognize this tool.

12. An alternative for marking along a length of tube, i.e. spars. I usually make a mark at each end of the tube with a tool like this, then set up a laser to mark multiple holes if needed. You could probably use this tool if you can keep from bumping the tube or letting it roll.

13. It's always a good idea clean up burrs. I just place this countersink in the hole and turn it by hand. Saves a ton of time.

14. This is the tool George had mentioned. I use this a lot for drilling in place or if a long length of tube just won't fit (spars) on the drill press. I that case, I locate for the top hole, drill it and then use this drill to punch through to the other side.

JPAnderson <johnand@hwy2.com> said: To mark the top of a tube along its length I lay two tubes next to each other and rub the top with something that will leave a mark.

Chelan answered: Yes, we mark the top of our tubes the same way as you describe. We sometimes take a fat Sharpie and make a splotch in the general area where the drilled hole is going to be. That way when we run a straight edge over the tops of the two tubes, it makes the 'scratched' line a little easier to see.