# Radio Controlled Soaring Digest

October 2015

Vol. 32, No. 10

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**Front cover**: Dave Nutt's friend George flew his Radian for over an hour in these beautiful conditions. Photo by Dave Nutt
Fujifilm FinePix S9200, ISO 100, 1/300 sec., f9.0



**Back cover**: A scratch-built Ninja nearly crosses the sun at Serra do Rola Moça, Belo Horizonte, Brazil.
Photo by Jose Henriques Iscold.
Motorola XT1069, ISO 80, 1/12500, f2.0

# *R/C Soaring Digest*

## October 2015

### Volume 32 Number 10

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# In the Air

Bill has been building model aircraft for nearly 65 years, mostly of wood, with a few foamies and composites thrown in every once in a while. (Yeah, and a couple of plastics, too.) Of all, he's found wood construction to be the most enjoyable.

As mentioned in a previous editorial, one of the great things about building an airframe from wood is the need for specialized tools which are not found in the everyday home repair tool box. Tool collections are a part of wood aircraft enthusiasts.

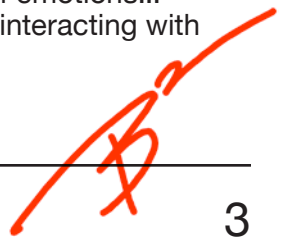
Things as simple as very fine sandpaper and surgical quality knives, small saws with 20 or more teeth per inch, small clamps (see page 48), a razor plane which actually takes thin double-edged razor blades, and of course epoxy and CA glue in addition to the usual wood glues.

Airfoil templates of sheet aluminum or some other stiff resilient material (see page 49) are stored away for future use "just in case." Custom made jigs and fixtures for tapering spar caps, matching edges for accurate scarf joints, and drilling holes for servo wiring conduits are made as needed. And there are templates, too, for contouring the wing leading edge.

Balsa, spruce and birch plywood are still relatively inexpensive, and very nice scale models of vintage sailplanes can be built from plans which are widely available at relatively low cost. Additionally, there are a number of competition classes where "wood wings" can still be competitive.

In all the years Bill has been flying model aircraft, his greatest experiences have all involved wooden aircraft which he had built, passing overhead right before sunset, the sun shining through transparent covering. What a tremendous mixture of emotions... seeing something you've built with your own hands interacting with nature in such an awesome way.

Time to build another (wood) sailplane!



Construction log

# 1:3 Cherokee RM, Part 5

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

Al Clark, hotdogx@knology.net

## Instrument Panel

I managed to finish making the instruments and instrument panel.

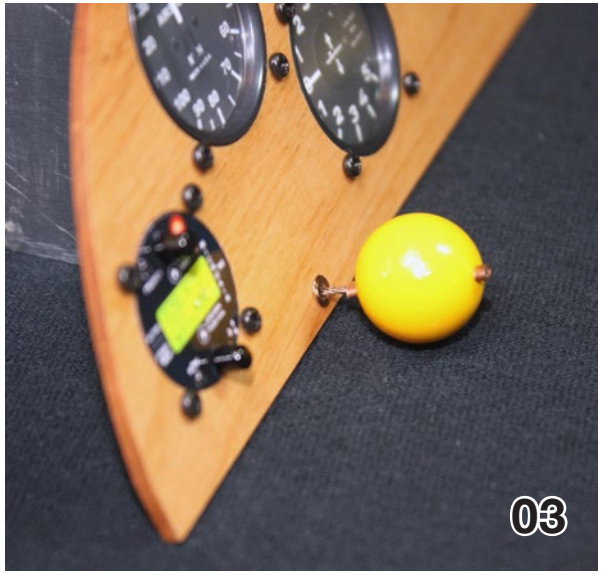
This is the first time I've made a panel with this kind of detail and it was a fun process figuring out what I could modify from my junk box (and my wife's junk box), and doing some computer graphics work.

Although I wouldn't want to do one for an IFR power plane!

### NOTES on the panel build:

The radio LED is fake - it's just part of the photo that was taken of the full size instrument.

I managed to find a photo of a Microair radio where the LED was on and glowing. It does result in a fairly convincing illusion, as many folks think it is a real. Maybe on the next model I'll put an LED there and power it!


I'll get a bit long-winded here and give a few details on the panel build.

Thanks to Asher Carmichael giving me one of his panel secrets, I learned that IFlyTailies sells instrument sets that have nice bezels.

They also sell separate bezels, but they were not suitable for my needs. So I got a set of instruments for one of their modern sailplanes and dis-assembled them to get the bezels.

Their instrument pieces are held together with hot glue which is fairly easy to remove.

I made my own clear plastic (theirs was scratched up), and my own instrument faces by scaling down photos of full scale instruments in Powerpoint and printing them out on photo paper, then cutting them to fit inside the bezels.

I used the existing IFlyTailies retainer ring and cardstock backing when I re-assembled my instruments. I also hot glued the cardstock on mine.

On the radio and vertical card compass, I machined some discs of 3/32" ply on my Taig lathe, CA'd the photos to the ply, sanded the edges of the faces down to the ply, and put a larger diameter piece of 1/64" ply on the back to act as a gluing surface.

The radio knobs were machined from some scrap brass and painted.

The altimeter knob was modified from a small fitting that held a necklace together, and then painted.

The tow release knob was made from an old set of purple plastic string beads my wife had. I drilled a hole through where the string had been, sanded off the purple paint, and re-painted it with some old Lusterkote paint I had on the shelf.

The tow release cable is the inner portion of some 3/32" cable I had on hand.

The swages are just short pieces cut off of small diameter copper tubing (K&S as I recall).

And the panel grommet for the tow release is an old Perfect 1/2A controline leadout guide.


*04 and 05: Composite image of the completed instrument panel. Instruments, left to right are Microair radio, airspeed indicator, variometer, altimeter, and compass. The large yellow knob at the lower left is, of course, the tow release. The placard provides maximum speeds permitted in mph, plus maneuvers permitted (stalls, spins and loops) and maneuvers prohibited (rolls and snap or "flick" maneuvers).*

I sent a drawing to Marc and he cut the panel for me from 3/32" pre-finished basswood.

I was going to go with a natural finish birch ply panel until I saw Marc's basswood, then thought better of it!

Anyhow, now that I know the process, I think I could make another similar panel in a relatively short time. It was a fun learning experience.

## Canopy Frame

After pondering a while I decided to go with the flat wrapped canopy per the original full scale Cherokee RM, even though it is more work than a bubble. The flat wrapped canopy has a bit of character that I like.

If I get ambitious after the RM has flown a while, I might make a second frame and a plug for a bubble canopy.

The canopy side rails are made from 3/16" birch plywood. I like to use manila file folder material for templates.

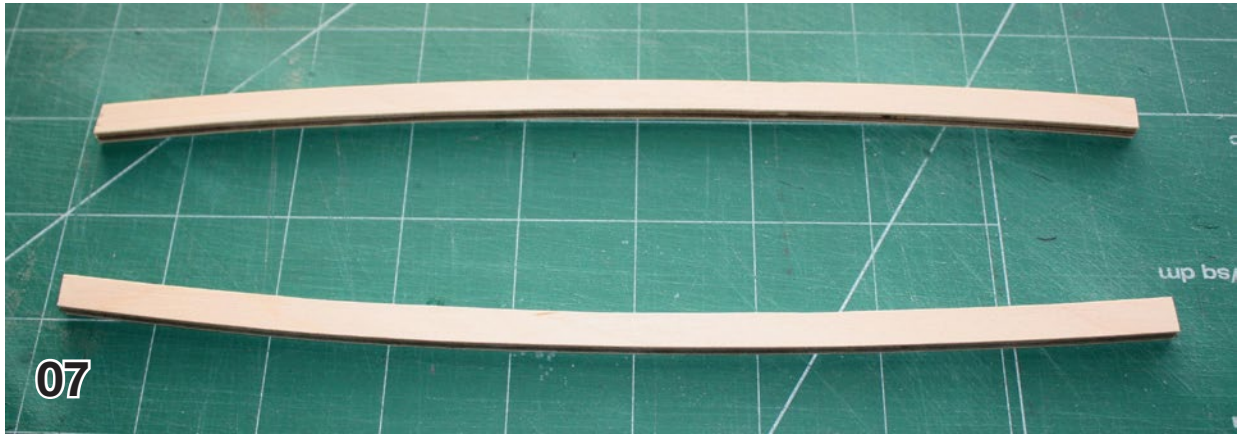
Cut a piece of manila to fit between C1 and C3, lay it on the fuselage top longeron and draw a pencil line along the outer edge of the longeron.

Cut along this pencil line with scissors, lay the manila back onto the longeron, move it inboard .030 inch, and draw a pencil line along the inner edge of the top longeron. Trim with scissors and you have a template for one of the canopy rails.

Mark this template so you know which side it is for, and what direction forward is.

Repeat for the other side of the fuselage.

Glue these two templates to the 3/16" ply with rubber cement, cut with a scroll saw, and use a disc sander to bring them down to final size. See pix 6 and 7.

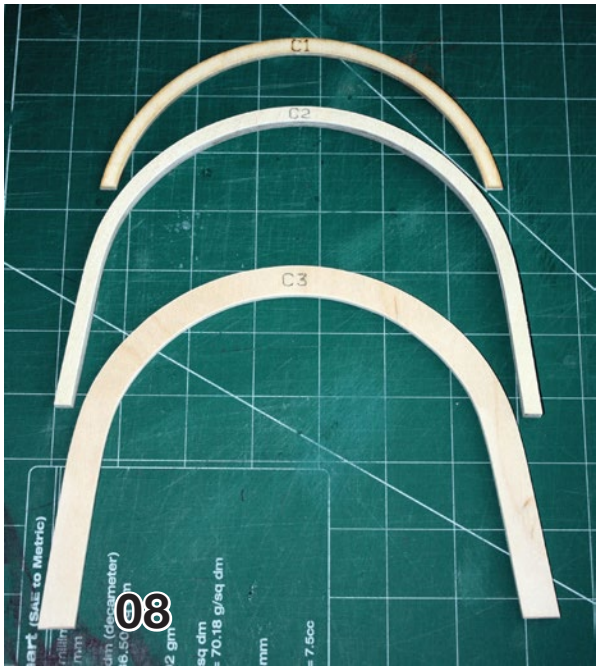

Laminate the two C2 formers together with CA+ or 5 minute epoxy. Pic 8 shows C1, one of the C2 formers, and C3.

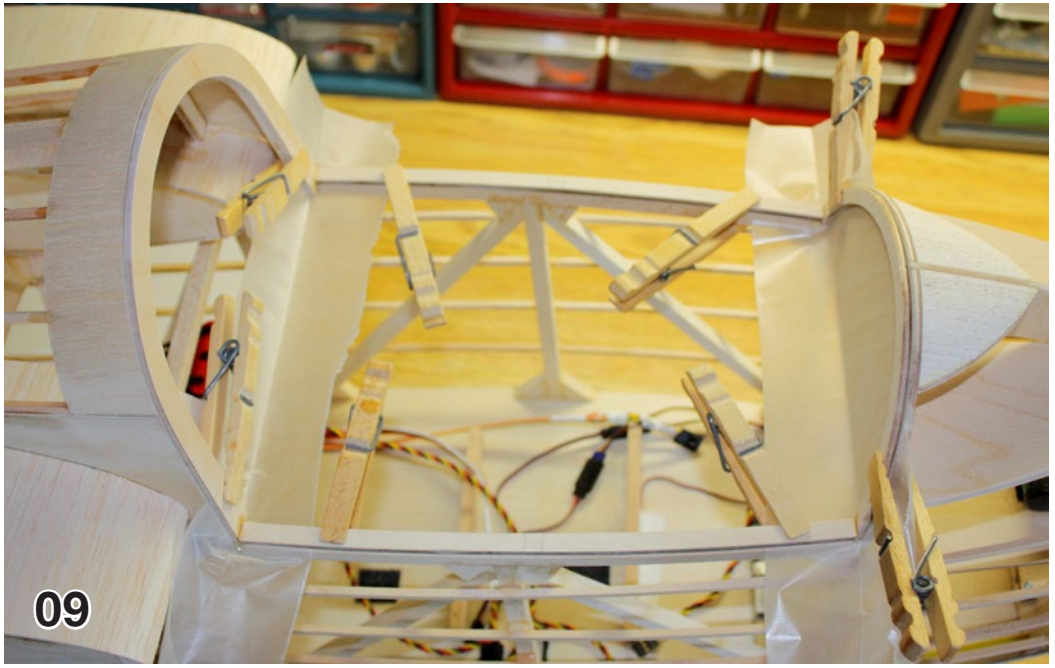
Center C3 on the turtle deck and hold in place with clothespin clamps.

Place a scrap piece of 1/64" plywood against F3A, center C1 on F3A, and hold in place with more clothespin clamps.

Now sand the ends of the side rails to get a snug fit between C1 and C3, and glue the side rails into place with epoxy, using more clothespin clamps to make sure they are held tight against the top longeron – make sure the side rails are inset .030 inch from the outer edge of the top longeron. See pic 9.

While the epoxy is curing, sand the lower ends of the laminated C2 formers to the angle shown on the plan, and mark where the lower ends will be located on the canopy side rails.

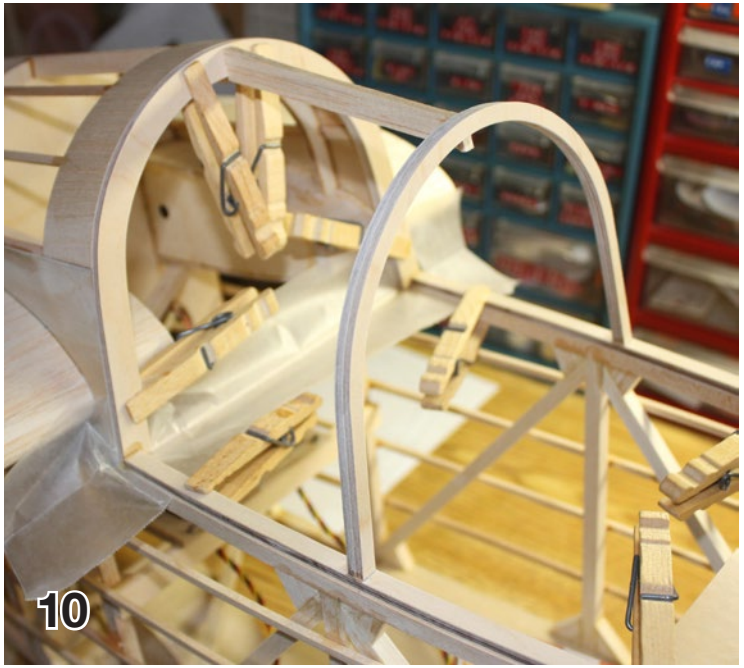


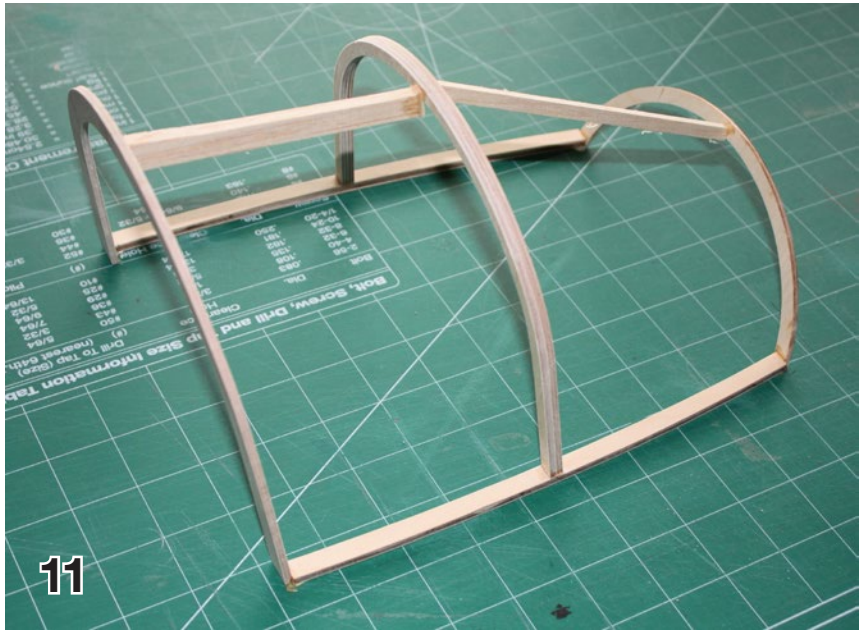



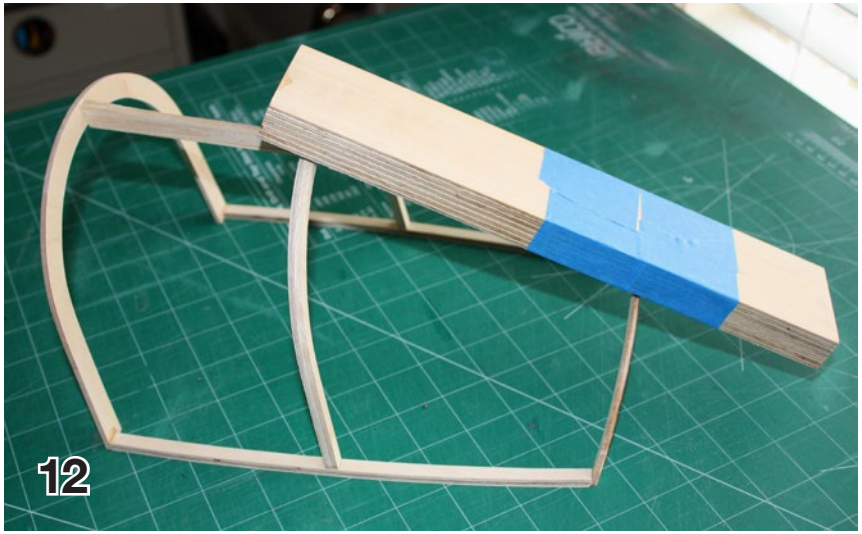

Make up a spacer from scrap balsa to maintain the proper distance between C3 and C2 at the top and tack glue it into place.

Glue the lower ends of the laminated C2 former to the side rails with CA+; note here that the outer edge of C2 at the base must be inset slightly so that when the outer edge of the side rail is beveled, C2 will end up flush with the side rail. See pic 10.

Next glue a scrap piece of balsa between C2 and C1 to hold the top of C1 in position. See pic 11.





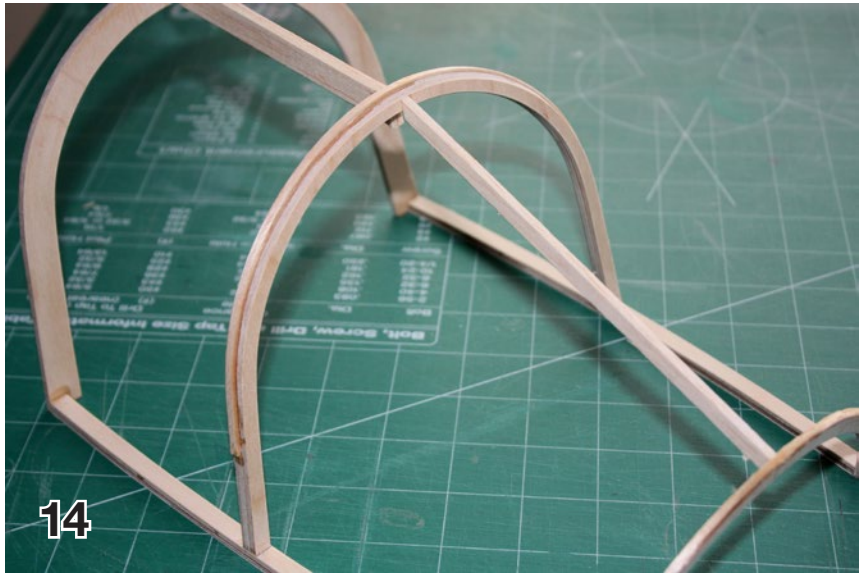



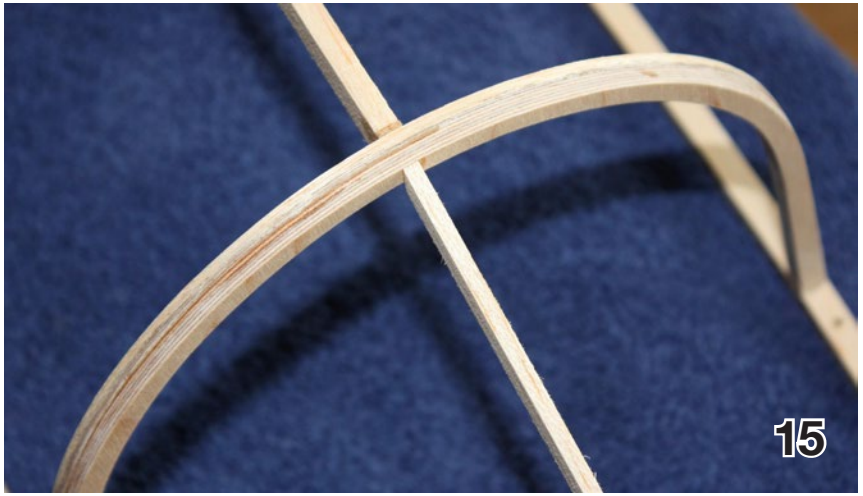

Now the edges of the canopy formers need to be sanded/ beveled so they will contact the inside of the plastic that will cover the canopy frame.

Tape a sanding block and use it to bevel the forward half of C2 first. See pix 12 and 13.

Some thin balsa will need to be added to the rear half of C2, and also to the top of C1, to get the proper angle.

Pic 14 shows some hard 1/32 balsa added to the rear C2 former – do the same for C1.





Again using the taped sanding block, bevel the aft half of C2, bevel C3, and bevel C1.

Pic 15 shows the aft half of C2 after sanding.

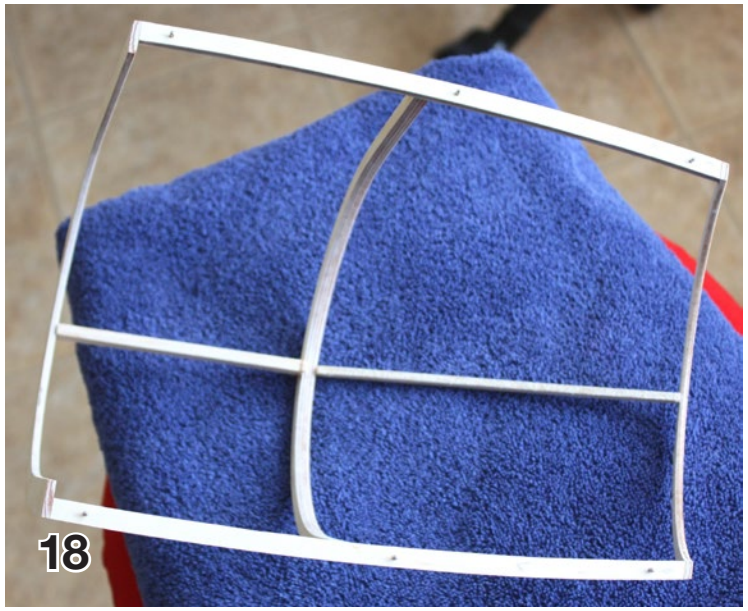
Also bevel the side rails to align with the sides of formers C3, C2, and C1 – there will be more angle towards the front to fair into C1 properly. When you are finished the flat wrapped plastic should make good contact everywhere along the canopy frame.

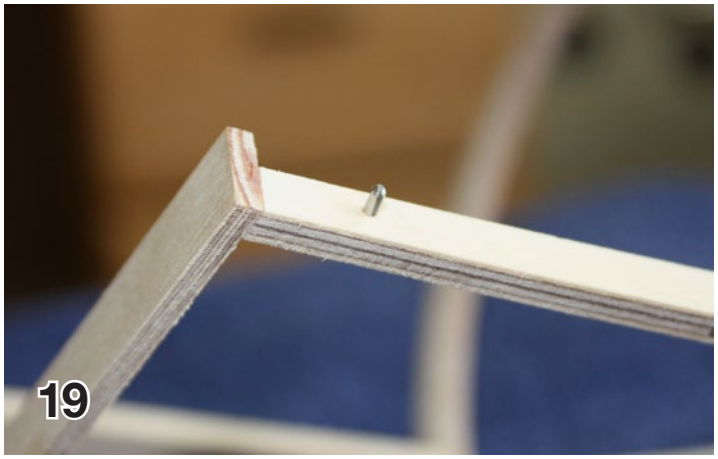
To accurately locate the canopy, and hold it in position on the fuselage, six pins are installed into the canopy side rails.

Put the canopy frame onto the fuselage with a piece of manila folder at each end as spacers, and clamp it down – make sure it's centered side to side. See pic 16.

Mark where the six pins will be located, and drill through the canopy side rails and the top longerons with a 1/16" drill bit at each location. See pic 17.

Remove the canopy frame and drill out the six holes in the longerons with a number 51 drill bit.

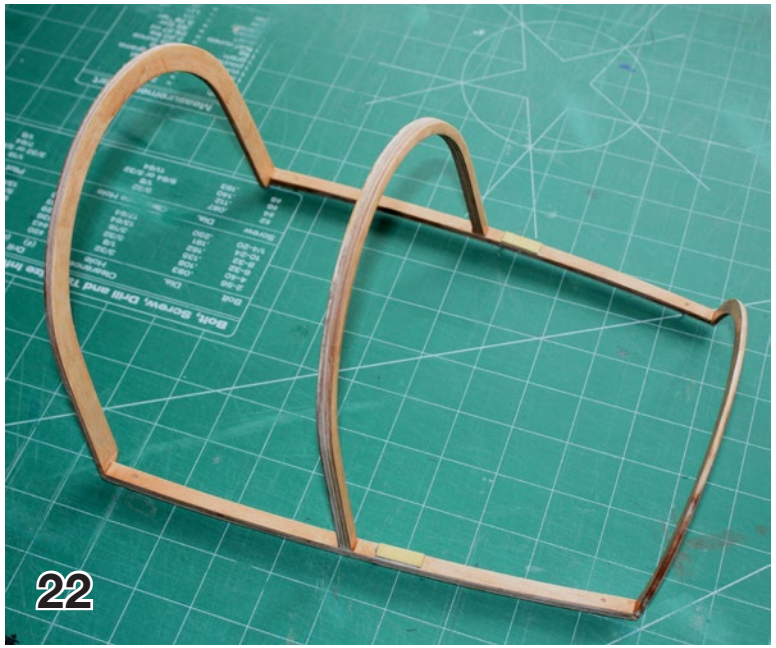


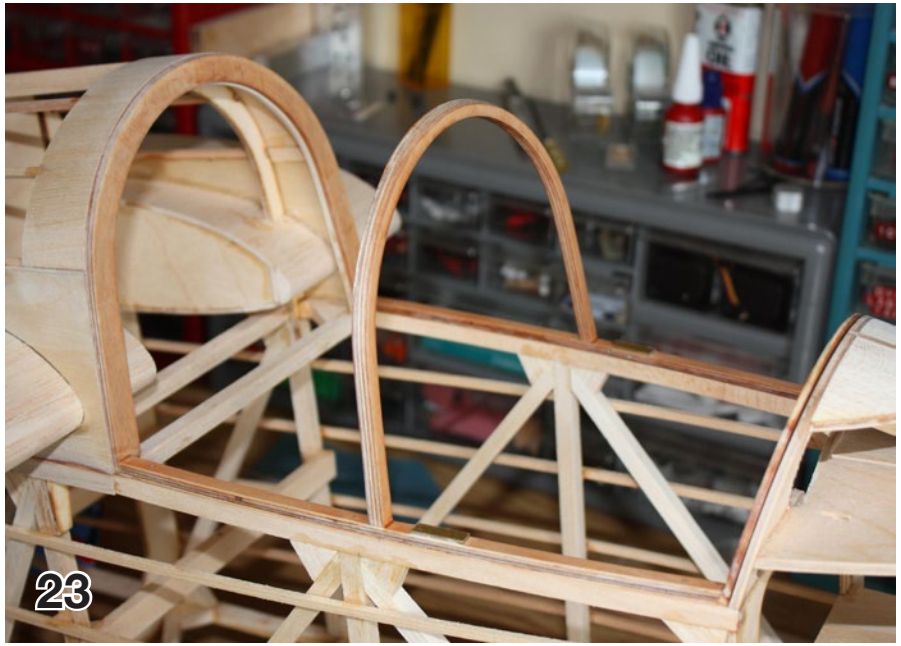




Make six pins, each 5/16" inch long, from 1/16" dia. music wire. One end of each pin should be rounded off nicely. Use a small hammer and tap the pins into the canopy side rails so they are flush with the top – later the pins can be CA'd into place. See pix 18 - 19.

Using a small piece of .030 plastic, check the spacing all around C1 and C3. Sand as necessary so the .030 plastic will end up flush with the turtledeck surface for C3 and the top edge of F3A for C1. See pix 20 and 21.

Check along the side rails as well. When you are happy with the fit everywhere, remove the frame and apply the finish of your choice to the frame, except where the plastic will be glued.


I chose to use a stain that is already mixed with Polyurethane, and which duplicates the look of varnished spruce. I used MinWax Pecan on mine. See pic 22.

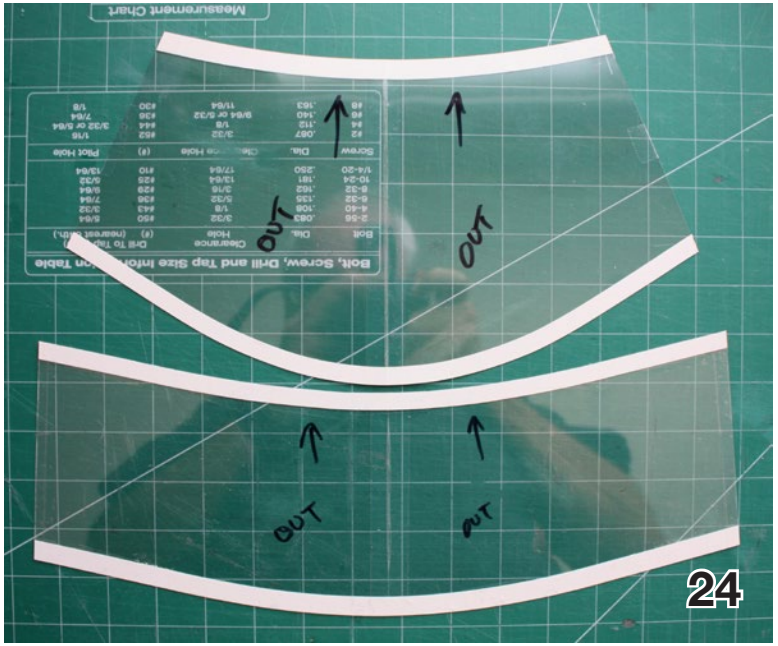
I should also mention here that in pic 22 you can see small brass plates glued onto the side rails – these are part of the latching system which I will describe in the next section.

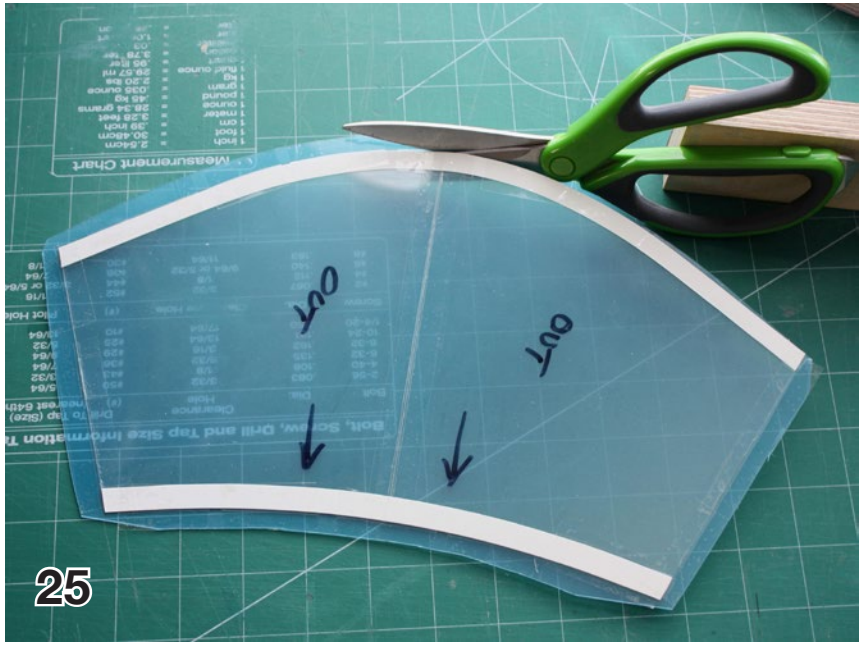
The canopy frame is now ready for the plastic to be glued on.

## Finishing the Canopy

Set the canopy frame onto the fuselage and make a template for the plastic that will cover the rear portion, and another template for the front portion. See pic 23. Although not shown in pic 23, it might help you to tape a couple scrap balsa braces between C3/C2/C1 to keep C2 from moving around.

You can use manila folder stock, thin clear plastic sheet, or whatever you like to make the templates. I used some 5 mil clear plastic I had on hand. It will likely take a few tries to get templates that are a good fit.





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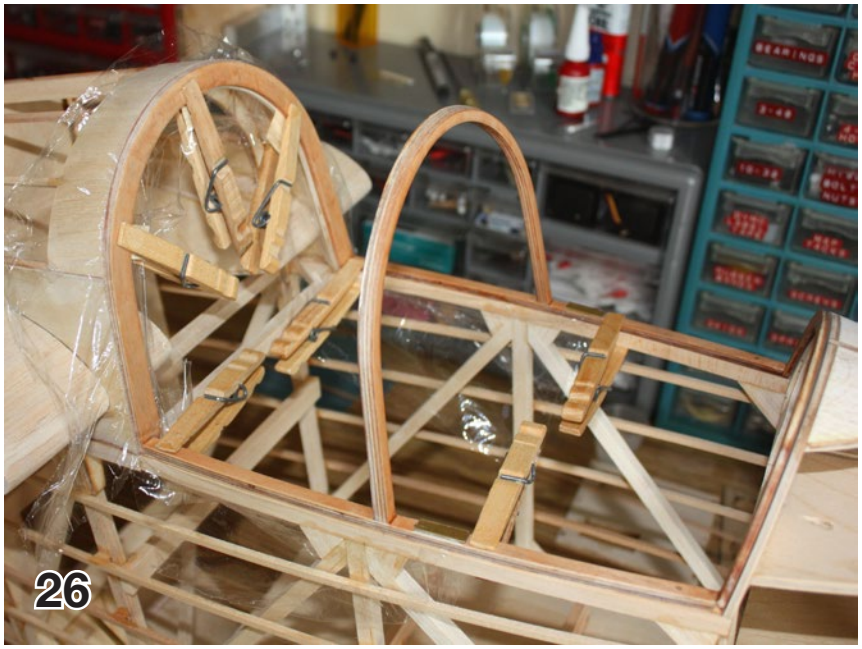

26

What you want is a template that fits as closely as possible so later you can glue the plastic onto the frame with the frame clamped into place on the fuselage.

The aft plastic piece should go forward to the middle of C2. When I finally had two templates that fit well, they looked like pic 24.

Note the edges have white 3M plastic tape – this makes for an easy guide when cutting the plastic.

Tape each template to .030 clear plastic (I use Sig's plastic sheet) with clear Scotch tape, and cut the .030 plastic with a good pair of scissors. Pic 25 shows cutting out the forward piece of plastic.

The aft piece of plastic will be glued on first. Use odorless/foam safe CA to glue the plastic to the frame – this type will not fog the plastic.

Lay a piece of Saran wrap down and clamp the canopy frame to the longerons with clothespin clamps.

Put some small pieces of manila folder stock between C3 and the turtledeck, and clamp C3 with clothespin clamps. See pic 26.

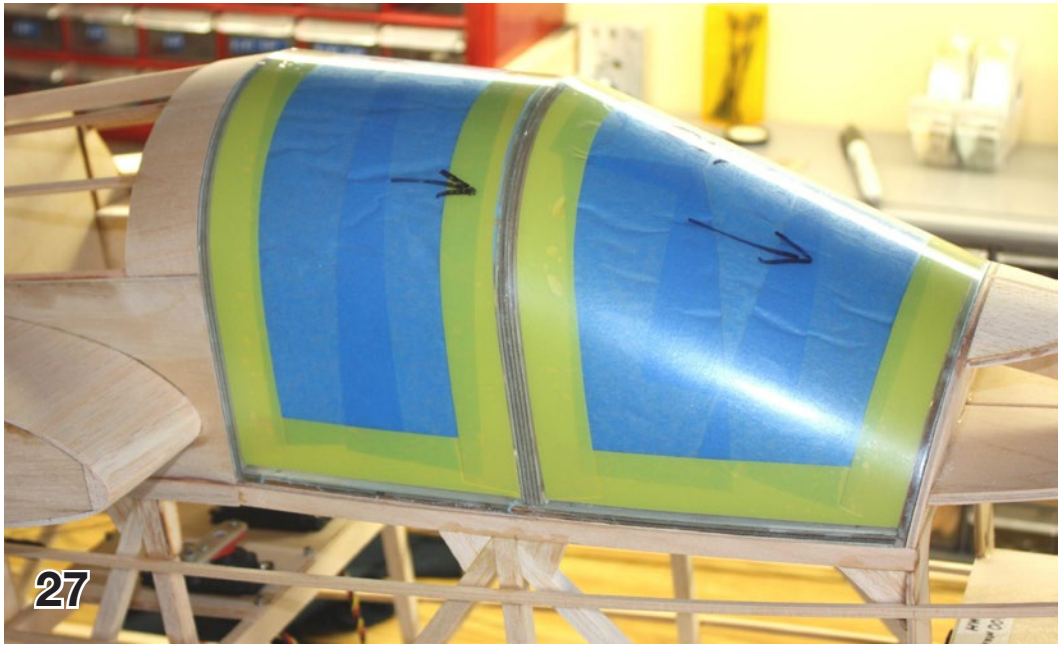
Remove the protective layer off the inside of the plastic, and tape off the inside surface with 3M plastic tape, leaving 5/32" along C3 and C2, and 7/32" along the edges that glue to the canopy frame side rails; cover the rest of the inner surface with blue painters tape.

All this tape will prevent any CA from getting onto the plastic if you get some where you don't want it (and you will – trust me!).

Trial fit the plastic onto the frame. It should fit perfectly if you did a good job on the templates.

I taped both ends of the plastic in place with a 2 inch wide piece of blue painters tape, and then started gluing at the left edge and worked my way around to the right side, alternating between C2 and C3.

Be aware that C2 will try to move aft at the top of the frame, so you might want to put a scrap of balsa between C2 and





C3 to prevent this – just make sure C2 is in proper position before you start applying CA to it.

At C2, I applied all the CA from the front edge.

At C3, I applied the CA from the inside at spots every inch or so.

Once I made it all the way around to the right edge, I removed the frame and plastic from the fuselage and glued the rest of the plastic to the frame along C3 and the side rails.

Just take your time while gluing and make sure things are lining up properly as you go along. If you mess it all up, you can always remove the plastic, sand the glue off the edges of the canopy frame, and try again with a new piece.

Once you have the aft piece of plastic completely glued on, put some more Saran wrap down, place the canopy frame back onto the fuselage and clamp it into place again with clothespin clamps.

Don't forget to put some manila folder spacers between C1 and F3A.

Tape off the inside of the front piece of plastic as described previously, and glue it on as before.

When both pieces of plastic are glued on it looks like pic 27.

To get the canopy off now you will have to reach inside the fuselage with sticks or whatever you have, and pop off the clothespin clamps.

There will be a small gap between the front and rear pieces of plastic at former C2.

Remove about 3/32" of protective plastic covering on each side of the joint and apply some 5 minute epoxy mixed with micro balloons to the joint. When cured, sand the joint smooth with 100 and then 220 grit paper. See pic 28.

Check along the lower edge of the plastic pieces. If there are any gaps, fill these with epoxy and micro balloons and sand smooth with 100 and 220 grit.

## Canopy latches

The canopy latches are next.

I used the same type latches I made for my previous 1/4 scale Cherokee II, only bigger this time. These are pretty easy to make.

Cut two pieces of 0.025" brass that are 3/16 X 5/8 inch. Drill a 3/32" dia. hole at each end.

Cut two pieces of 3/32" O.D. brass tube, each 3/16" long, and solder one to the middle of each of the flat brass pieces.

Make a 90 degree bend about 5/16" long at one end of a piece of 1/16" dia. music wire.

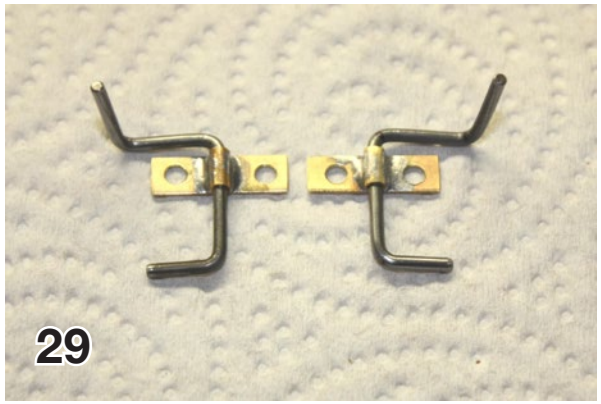
Slide the wire through one of the brass fittings, mark the wire to get about a 0.55" gap, and bend at 90 degrees again.

Then one more bend is made at 90 degrees to this one, at a distance of about 7/16" from the last bend, and the final end is trimmed off to 9/16" long.

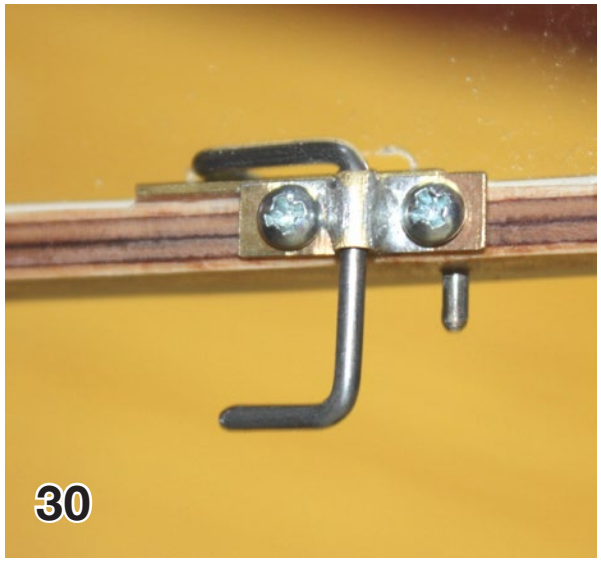
It is easier to look at the photos than it is to describe. Just make sure you make a left and a right! See pic 29.

Locate the latch assembly on each canopy side rail, mark the holes, and drill carefully with a 1/16" drill bit.

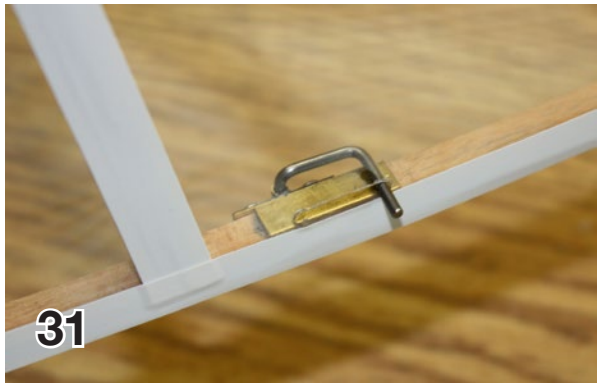
The latch plates are attached with cut off #2 sheet metal screws. Pix 30 - 32 show the right side latch in the open position.

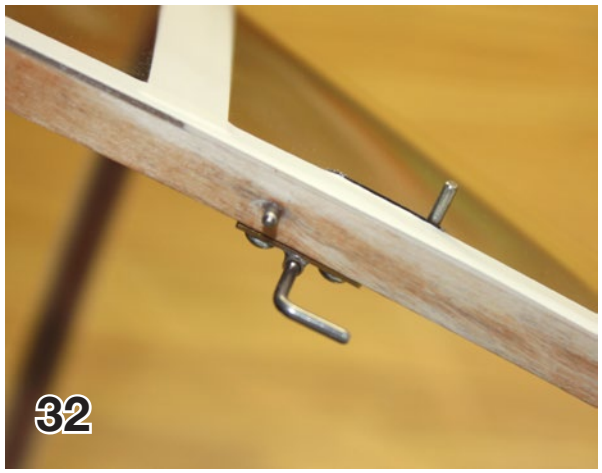


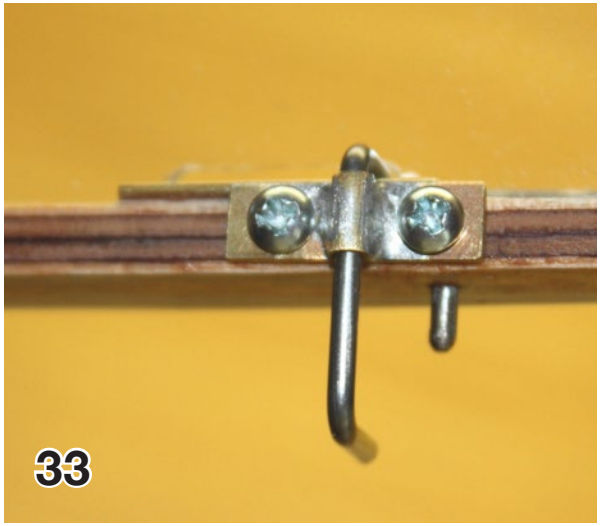

*29: Following the directions closely, you should end up with latches which look like this. Make sure you make a left and right.*




*30 - 32: The latches are mounted on the canopy side rail with cut off #2 sheet metal screws. These photos show the right side latch in the open position.*







*33 - 35: THe right side latch in the closed position.*

*36: The small brass pad on the underside of the top fuselage longeron. Note the dimple which prevents the latch from rotating forward on its own. The dimple is made with a center punch and is, of course, necessarily made before gluing to the longeron.*

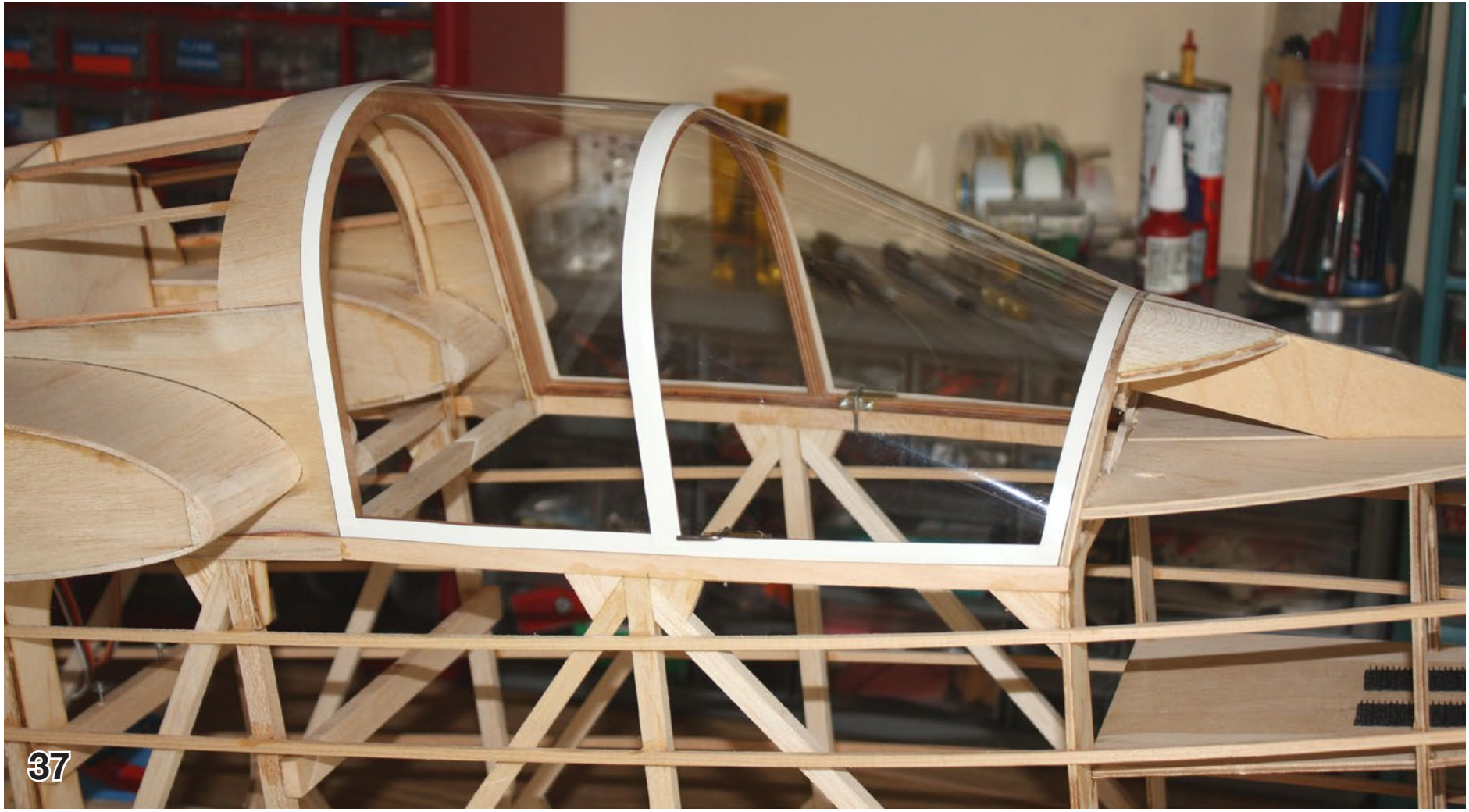


Pix 33 - 35 show the right side latch in the closed position.

Note there is a brass pad on top of the canopy side rail; this pad is made from 0.025" brass sized 1/4" X 3/4" and has a piece of 1/64" plywood glued under it to properly space it upwards. Just sand the brass with 100 grit and use CA to glue it.

There is also a 0.025" brass pad on the underside of the top fuselage longeron that is 1/4" X 7/8". Note this pad has a small dimple that keeps the latch from rotating forward on its own, once it is in the closed position.

The small dimple is made by setting the piece of brass on wood and using a center punch on the top side of the brass pad. See pic 36.




The actual vertical distance between the wire bends will depend somewhat upon you particular material thickness variations, so measure and set the distance accordingly.

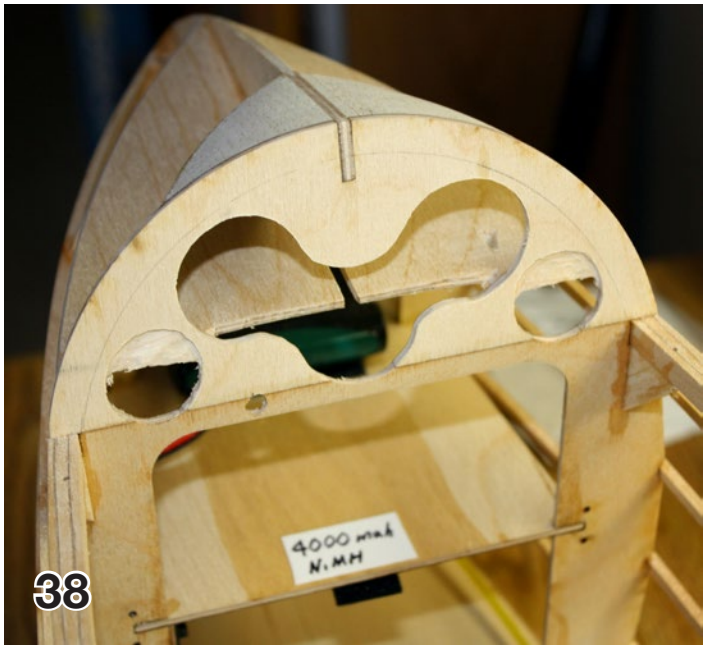
Music wire is cheap so if you don't get it right the first try, just make a few more until you get a good fit. You can also add some thin spacers between the bottom pad and longeron if needed.

A 3/32" wide slot needs to be made on each side of the canopy for the latch handle to go through – you can see where it is located in the photos.

Put a simulated frame onto the outside of the canopy plastic using cut down pieces of 3M plastic tape. I used 1/4" wide for the ends and lower edges, and 3/8" wide over C2.

That completes the canopy! See pic 37.

There are still some odds and ends left to do before covering commences.



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## Odds and Ends

There are a few things left to do before covering starts. My instrument panel has instruments that stick out of the back side, so I needed to cut out some of former F3A to provide clearance (see pix 38 and 39).

I tried to make the cockpit interior look like varnished spruce/fir, so I used a Minwax polyurethane that already has the stain mixed into it - I used their pecan color. The interior, seat, and servo mounting plate can be seen in pix 40 - 42.


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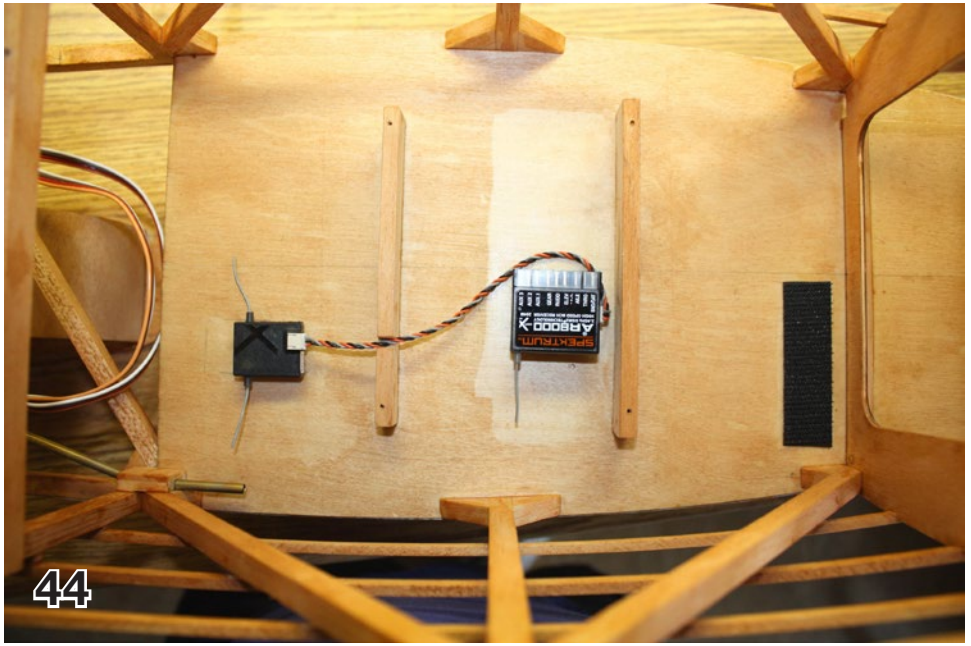
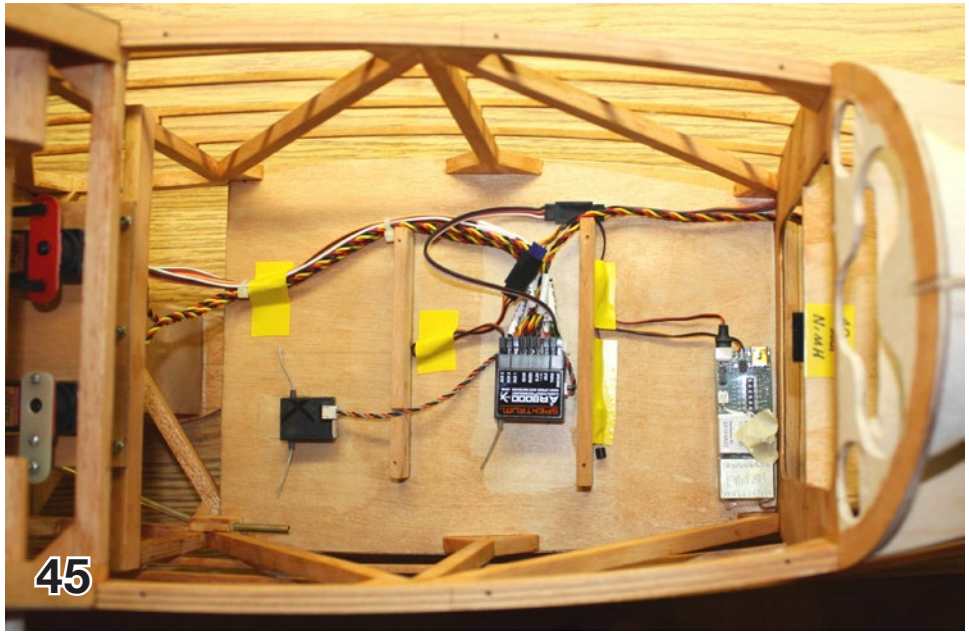
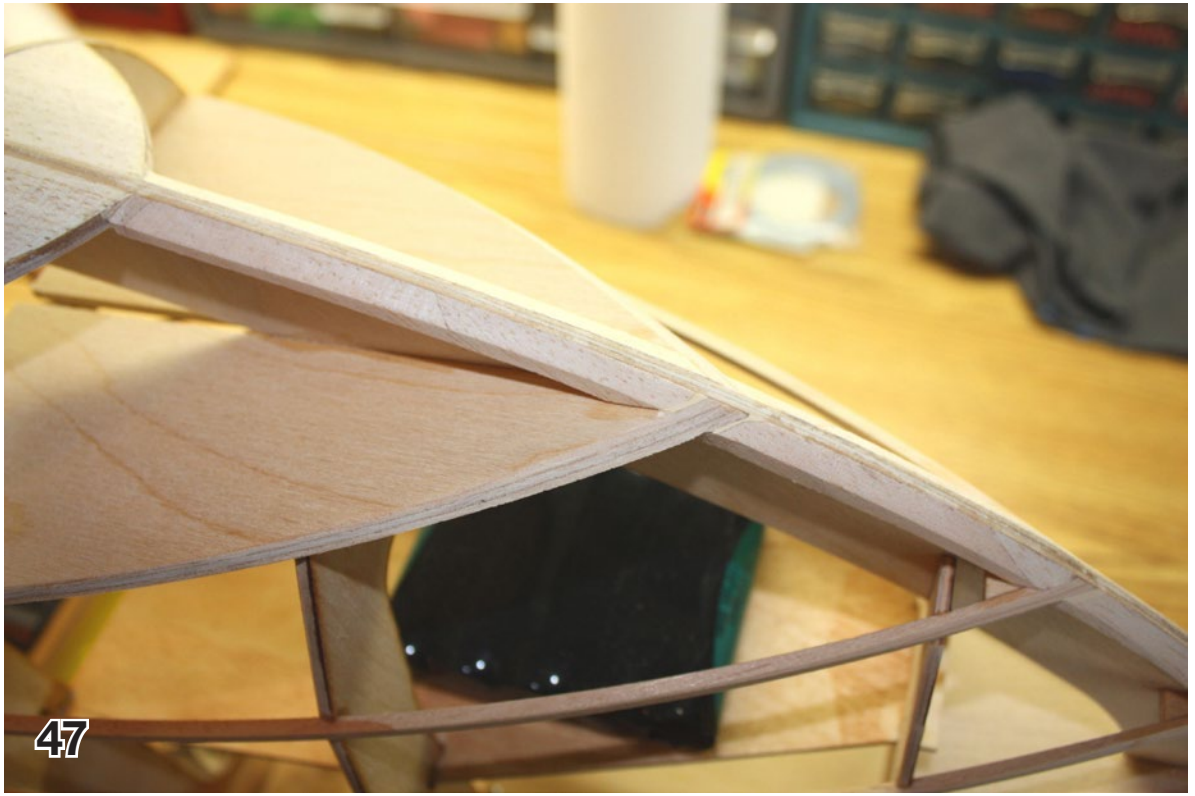



The wiring harnesses coming from the wing roots need to be tied down with two tie-wraps which use the holes provided in former F6. See pic 43.

Pic 44 shows where I located the RX and satellite.

Pic 45 shows where all the wires go from the servos, battery, switch, and vario/ telelmetry unit. When the seat is in place all but two wires are hidden, and the vario/telemetry unit will be hidden by the pilot's legs.

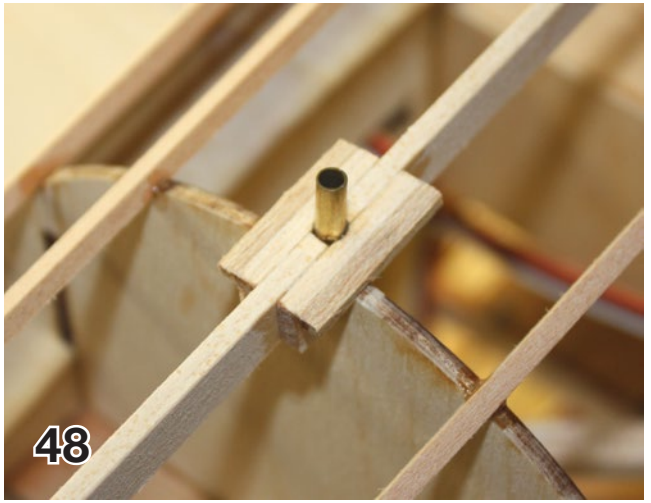




The upper keel is only 1/8" wide and that is not much for the covering to grab onto, so I added some balsa on each side of the keel that has a surface 3/16" wide for additional covering grip.

Just take some 3/16" thick balsa and cut a 1/4" wide strip that has the same shape as the upper keel, then cut/fit/CA pieces of it into place and sand to match stringers. See pix 46 and 47.

A bit more wood was needed around the TE probe for the covering to adhere to, so I added some 1/8" sq. balsa on each side. See pic 48.

All that is left to do now is to final sand everything with 400 grit and blow the dust off with my air compressor.




## Airframe is Finished - Ready for Covering

Everything that touches the covering has been sanded with 400 grit and after five months of fairly steady work she is ready for covering with Solartex. Yee Haa!

Here are some photos of the completed airframe ready for covering...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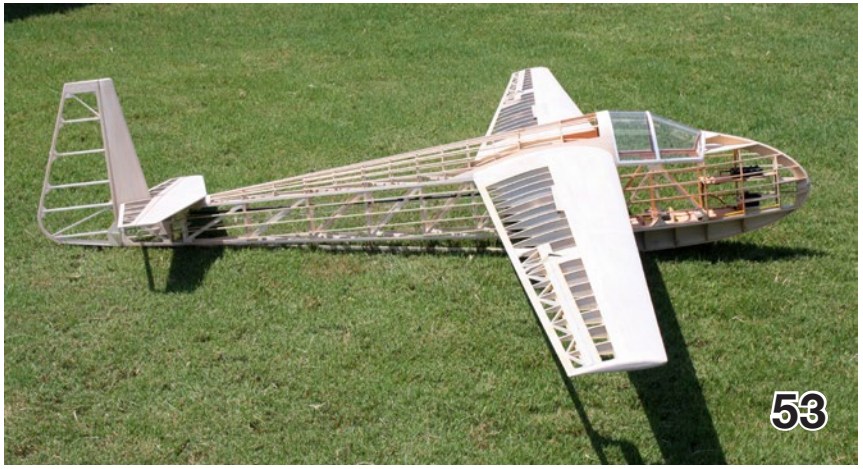
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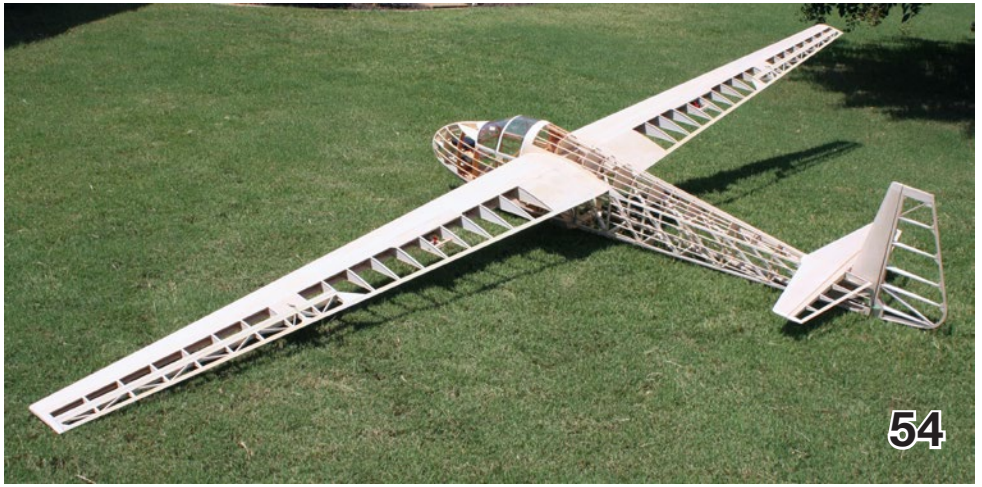
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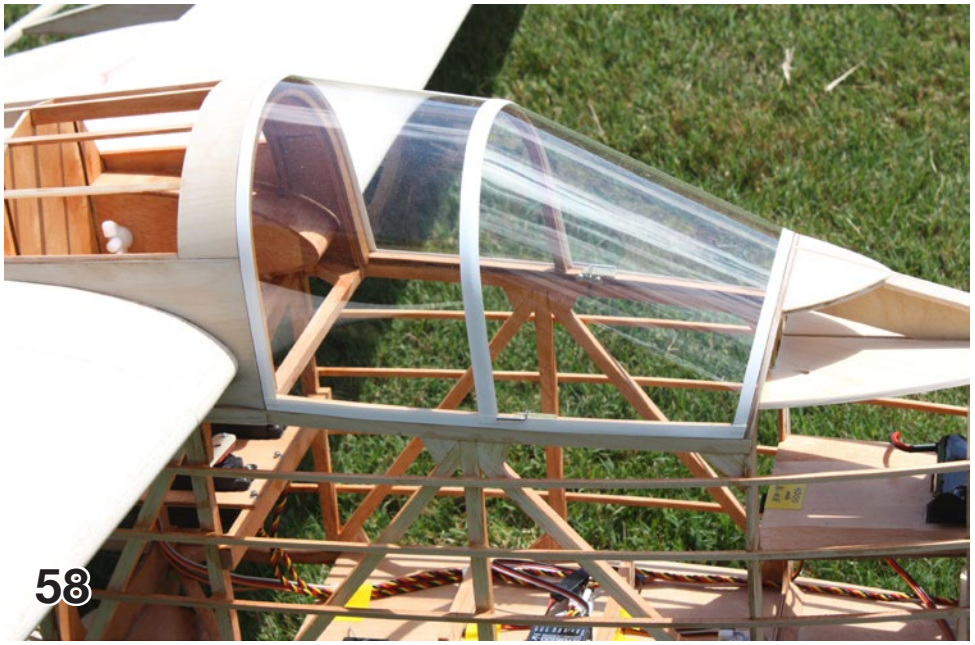
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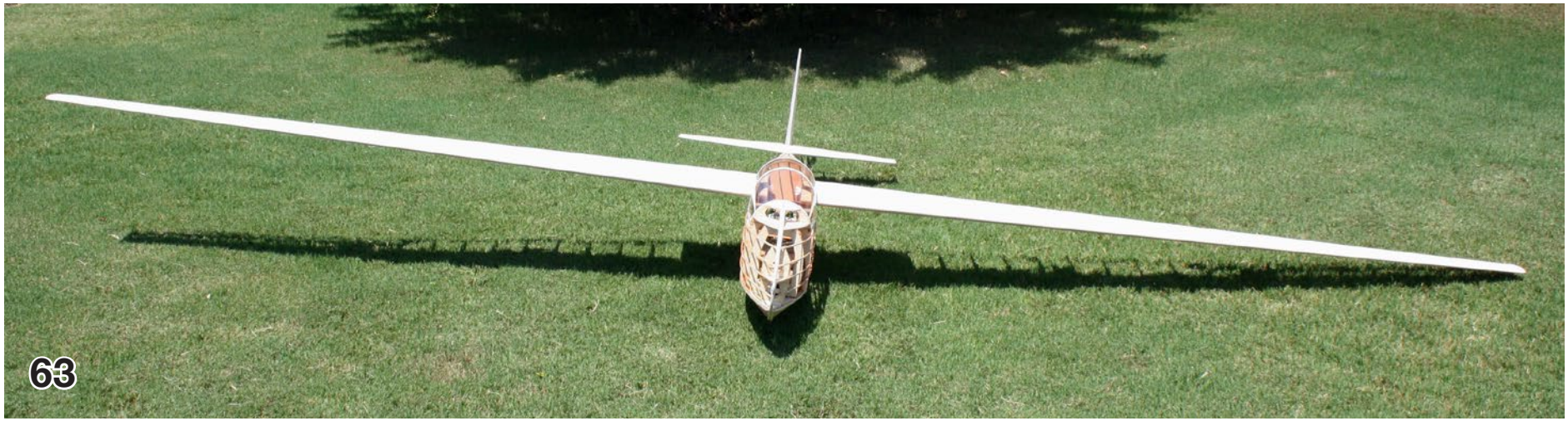

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Pratt Read PR-G1 N69215

Photo courtesy of Mark Nankivil, nankivil@charter.net

# 3rd GPS-Triangle World Masters

Text by Philip Kolb

Photos by Maja Marc and Philip Kolb

01

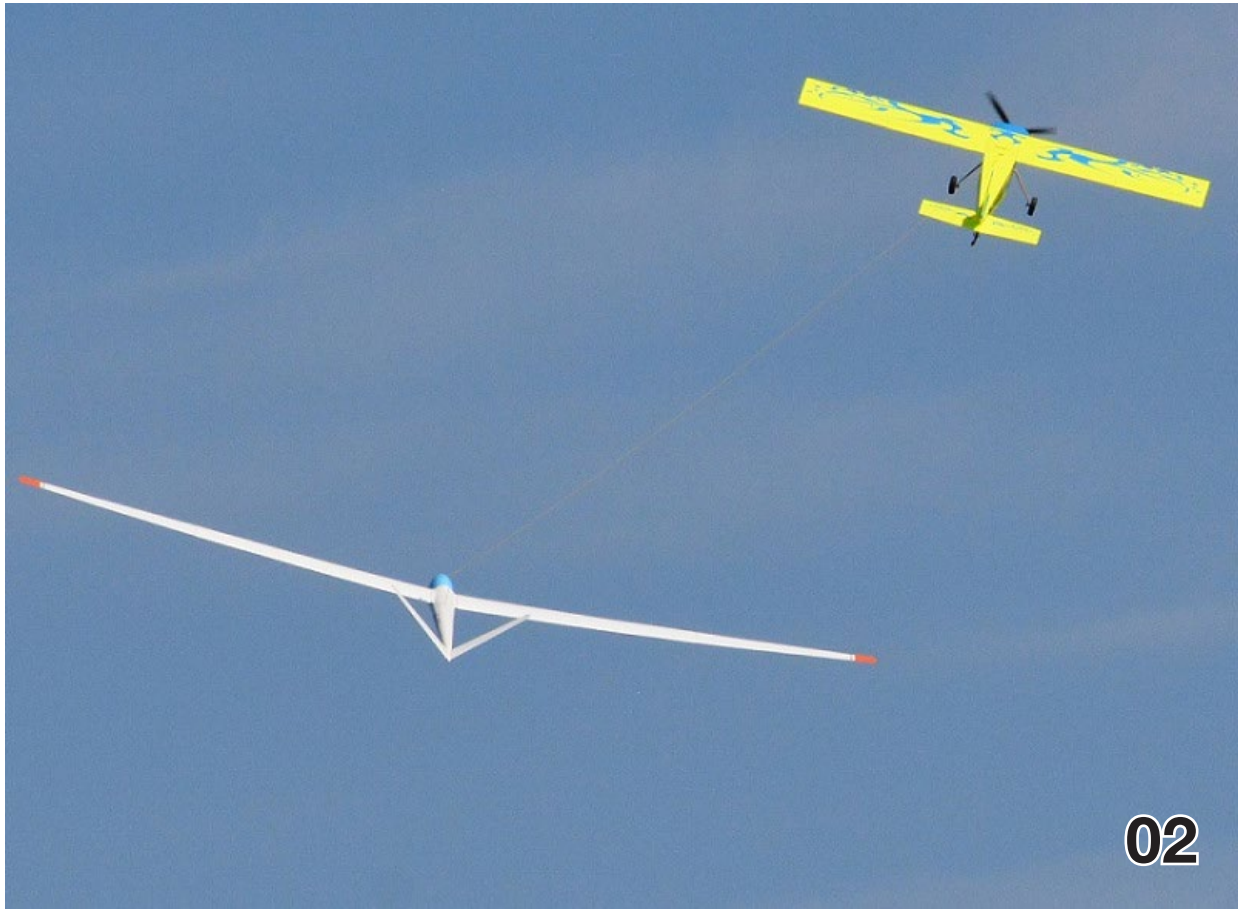
The second week of August saw the world's most enthusiastic GPS-Scalemodel pilots coming together in the Slovenian town of Vipava to compete for the World Masters trophies.

**01** So called "GPS-Triangle-racing" is a relatively new sports among aeromodellers and because of the availability of modern navigation gadgets it developed into a very fine sport which can be seen as a small blue print of full size soaring.

As mentioned this sports is very fresh and thereby not interwoven into the regulations of the FAI, nevertheless it is growing and appealing soaring enthusiasts from all over the world. Furthermore it builds a bridge between Scale modellers and Competition pilots. A wonderful and unique mix in RC-Soaring so to say.

The GPS-World Soaring Masters is a biannual event and after 2011 and 2013, which both took place in Spain, this happened to be the third and up to now biggest GPS-Triangle Soaring Masters, with participants from Germany, Switzerland, USA, South Africa, Slovenia, The Netherlands and Turkey.

For those of you unfamiliar with GPS-Triangle racing I suggest to seek all information about the planes involved, the rules and about the different classes on the GPS-Triangle web-site: http://gps-triangle.net/




For a further insight into the competition atmosphere in general and tactics in particular, please follow my write-up of the 2013 World Masters on RCGroups: http://www.rcgroups.com/forums/showthread.php?t=2004295

To outline the rules in short:

- The pilots must fly around a triangular course, with turnpoints defined by GPS, as often as possible within a 30 minute time window.

- The glider flight path is recorded and transmitted to the ground for navigation, so each pilot is using his GPS for navigating around the invisible course.

- The turnpoints are each 500m away from the pilot's standpoint which thereby


equals a 2.4km / 1.5 mile course length for one triangle.

- Once you enter the course the 30 minute time window will be started.

- The maximum entry altitude for entering the course is 500m AGL and the maximum speed to enter the course is 120kph / 74.5mph.

- Within the 30 minute working time the pilot can stop for thermals as often and wherever he wants, but only finished triangles will be counted for the result in the end.

- After finishing the last triangle the model needs to land from the designated direction into a designated landing area to get credit for the landing (worth 1.5 triangles!).

- Every five rounds there is a “Speed task” flown, where the pilot needs to fly as fast as possible one time around the triangle.

Back to Slovenia:

The team from the Model-Airplane Club “MD-Ventus” of Vipava around head organizer Jan Hlastec never organized a GPS-triangle event before, but with all their vast experience in organizing F3J and F5J competitions they did a marvelous job in organizing the 3rd GPS-Triangle WM.

**02** The towpilots which all in all performed more than 400 tows to altitudes higher than 500m in the 8 days of competition offered an excellent performance! Without their efforts GPS-Triangle racing would not exist.

**03** Even the airfield contributed to this World Masters in being an extraordinary one. The Vipava valley is known for its famous “Bora-Winds” that mainly occur during the spring time being created by a mix of maritime and mountain air and the obvious differences in their pressure. This winds can burst through the valley at up to 200kph / 120mph. The proximity of the Adriatic Sea (about 25km /15 miles straight line) and the foothills of the Julian Alps (about 1525m / 5000ft high) made

up for some real interesting, literally “explosive” weather even in mid August.

All in all a perfect setup with very challenging conditions just right for a world’s championship!

If only the temperatures had been a little more “mild” – one week of continuous 38°C / 100°F was hard on everyone, especially if they were flying in both competition classes, for that meant that one would stand out in the sun and heat at least for five hours every day.


**04** Both classes of GPS-Triangle soaring are determined by the way of launch. There is the classic “1:3” class which limits the planes to a scale of maximum 1:3 and 115gr/sqdm wing loading. Smaller or less is allowed of course, but not more. These planes are still comfortable to handle and relatively easy to launch with the tow-planes. The other class is called “SLS”-class which stand for “Self Launch System.” These planes don’t need to be launched by tow-planes as they either have an electric “Up&Go” or a “Front electric sustainer” unit for taking off from the runway by themselves. Thereby there is only a gross weight limit of 25kg maximum AUW implemented in the rules.

In the seven days of competition (two days pre-contest and five days of World Masters) there were lots of incredible flights to see, but given the frame of a report like this I surely can’t go into too many details.

However, there were two new world records set, which of course are worth being mentioned.

In the very first round of the pre-competiton, Saturday morning, shortly after 9 ‘o clock local time, Florian Schambeck and Philip Kolb managed to complete 19 Triangles! Philip Kolb got the higher average speed thus scoring the 1000 Points in this flight. The previous world record was held by Marco Mani (SUI), set in 2012 when he managed to fly 17 triangles for the first time.

I’m still not sure about what exactly caused the airmass over the airfield to rise at about 3m/s for about 45 minutes that early in the morning. It was quite phenomenal. In normal mountain weather you get diurnal processes where ponds of cold air in the valleys get heated up in the morning and then rise slowly up the hills. But that’s a whole different story.


TC-2260
TC-226
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Whatever caused this huge lift, may it be humidity or pressure differences, our planes were racing, scooting along the course at up to 170kph / 105mph without loosing altitude. Simply fantastic!

**05** Another new record was set in the Speed task. Florian Schambeck (flying an Arcus out of his own production) and Reinhard Vallant with a Fineworx AN-66 both stopped the clock for the speed-triangle at 54 seconds. That's an average of almost 161kph / 100mph and two seconds faster than ever flown before.

On the first day of competition in the World Masters the conditions hadn't changed that much. The strong thermal activity was still present, only the wind did pick up quite a bit and made the flights even more challenging. The organizers even halted the competition for about three hours in the morning due to gusty and heavy crosswinds which made towing operations rather dicey! A good decision considering that we are flying with quite big and heavy gliders where safety surely is a bigger issue.

**06** The scores of the first day reflected the thermal conditions in a very plastic manner. That means the "ups" and "downs" were even perfectly visible on the score sheets. One pilot for example flew 18 triangles in one heat, whilst he found himself on the ground after completing just one triangle in the next heat. I really never witnessed variometer interval values like these before. My interval is set to 20 seconds and in this time the voice in my earplug was telling me values ranging from "plus 5.8m/s" to "minus 6.9m/s" – awesome when you hit the "plus" part, scary when you need to push through the "minus" part! These rodeo like conditions soon were called "Rock 'n Roll" weather by the competitors.

**07** On the second day of competition these booming thermals seemed to have disappeared. The airmass rapidly dried out and there were way less cu's forming above the airfield. Their bases were even a lot higher than the days before, so that soaring underneath the clouds or spotting thermals using the cloud buildup


was not possible anymore. The only thing that remained from the previous day was the rather strong wind.

This again made up for quite some interesting conditions with challenging flights.

With the much weaker thermals the drift with the wind while circling was enormous. Most of the thermals were not stronger that 1m/s, so quite a few planes could be spotted far down wind while trying to get some altitude.

Suddenly some pilots found themselves in a situation where they were about 300m above the ground but about a mile outside of the course. With the GPS-navigation these numbers are easy to get. In these conditions 30 minutes of working time can be long – demoralizingly long! With these small and weak thermals and relatively strong winds, staying up and finding new thermals was less of a problem than covering ground – but only the latter will get you a good score.

There were quite some lines of trees on one edge of the flying site which frequently triggered these small thermals, but they seemed to break up after a while and never were reaching good altitudes.

**08** Reinhard Vallant was the man of the day in these conditions. It was quite impressive how he managed to solve this problem. He never circled really high in these thermals and tried to hop from one dissolving bubble to the next one – always along the tree lines without going very far downwind. Three of these micro-thermals granted him one extra triangle over his competition. This was “world class low thermal flying *a la* F3J” put into a scale format. Incredible to watch and a great show for all spectators!

It took some time - until late afternoon - for the conditions to get better. After the wind died down a bit the thermals became more stable and lasted for a longer while, so that the number of triangles flown improved, but nevertheless, the entertainment factor for the spectators got reduced by that.

Around the third day of competition the weather conditions settled back to


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normal and gave the competitors some welcomed break. It was a little easier to predict these conditions. The strongest thermals were in the 2m/s-range, but the sink-cycles could sometimes still last for quite a bit.

Especially in the afternoon as there was strong thunderstorm activity visible in the near mountains. This huge buildup of course was fed with the air out of the foothills of the mountains which cut off almost all thermal activity over the field.

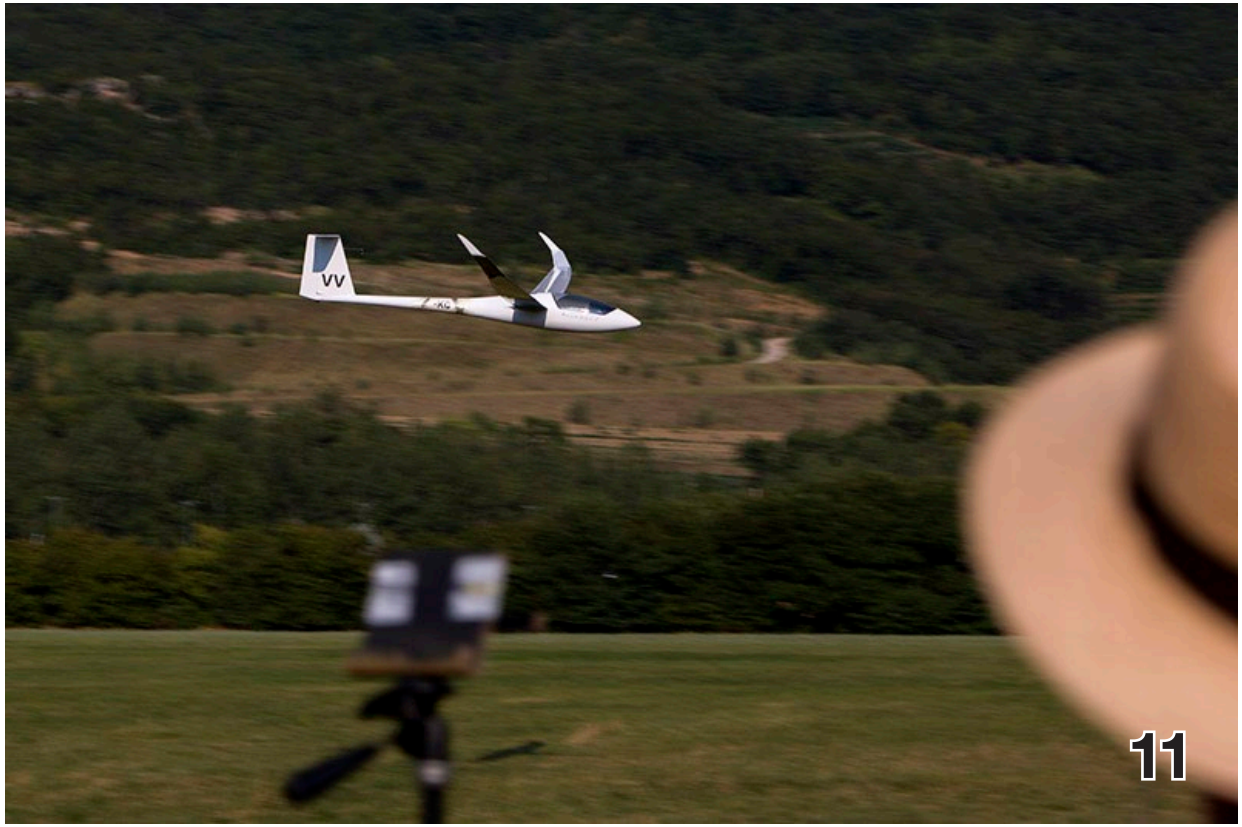
In the mornings conditions were almost flat now, so competitors were just flying as accurate as possible around the course, not stopping and thermaling.

Normally these conditions are considered to be quite boring as there is way less “gambling” involved. But after all the breath taking and exhausting flights of the last days, no one even stated a bad word about the slightly more relaxing flying now.

In these kind of conditions you need to carve the turns with as less energy lost as possible, but at the same time you should not lose too much time and “way” by overflying the turns with too much of a margin. Typically, to stay in competition, one needs to fly five triangles at an average speed of about 60kph / 37mph.

**09** Stefan Müller is known to be one of the most accurate pilots in these conditions and he really shined on these days. He also managed to convert a little “reduced sink” in one of his fights into some energy to give him an extra triangle – in these conditions he was the only one to fly six triangles. At the end of the day he found himself in the top three of the standings!

**10** Chris Adrian from South Africa made up point by point and showed very precise flights. He was a team member in several F3B and F3J national teams flying for South Africa and he is as well a full size soaring pilot owning a Ventus 2 and a BS-1 (Yes, the legendary classic from Björn Stender!). This experience of course is giving him a lot of knowledge from both ends (model soaring and full




size soaring) to contribute to his flying in GPS-Triangle competitions. Right from the beginning of the competition he made obviously clear that he wanted to compete for a medal here! And he did! Kudos to Chris – very well deserved!

In the SLS class it became quite obvious, especially in the weaker conditions of the second half of the contest, that Florian Schambeck and his new “Quintus E” were the ones to beat – and it also became quite clear, that this seemed almost impossible.

**11** The new Quintus was solely designed for the SLS class and as there is no limiting factor in scale, only in AUW, a scale of 1:2,6 was carefully chosen to grant an optimum in both maximum glide and penetration. Florian managed to prove several times that his Quintus is able to fulfil six triangles in the flat morning air! No “1:3” plane is able to do this at the moment!

**12, 13** In the end the Quintus took double victory in the SLS class with Florian Schambeck (GER) in the number one spot, and Georg Thanner (GER) in second position. Third place took Daniel Aeberli (Chocofly) from Switzerland flying his own developed and distributed Diana-2 (1:2,5 scale).

Daniel is a wonderful chap and a real competitor. He picked up the important items of this sport very quickly and practiced very hard to improve his skills. This is Daniels first season of GPS-Triangle flying and he managed to become one of the pilots “to watch”!

He also competes seriously in world class wind-surfing sports where he already won several championships. With this knowledge in the background he seems to be able to adapt very quickly to changing weather conditions and to sort out the important items in competition over the less important ones. At the same time his fun doing this sport and humour brought to the field is remarkable.

In the same way remarkable was his decision to develop, manufacture and produce his SB-14 in a bigger version now. As this great handling plane was only available in 1:3,5 scale up to now, he took the efforts and realized it in 1:3 scale. That really makes the SB-14 competitive (in performance) for GPS-Triangle competitions now.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**15, 16** In the end, after 14 rounds of competition, the winners in the "1:3"-class were:

Philip Kolb (TUR) with the AN-66 in first place. Philip defended his title from two years ago by winning again.

Chris Adrian (RSA) with his Baudis Antares finished in second place followed by Reinhard Vallant (GER) flying an AN-66 in third place.

Stefan Müller took 4th place after a mishap in the Speed task. He wasn't too sad about it as he said he had great fun during all his flights!

**17, 18** Remarkable as well is the decision of Tolga Tekdurmaz (TUR) and Nermi Karacabeyli (TUR). They decided to compete in this year's GPS-Triangle World Masters never having competed in Triangle racing before! For competing in a

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successful way they chose not to overstress or overload themselves by flying a heavy, big and expensive glider. They chose a 15 year old 4 meter Discus with foam/obechi wings and an RG-15 airfoil, weighing just a little more than 5.2 kg / 11.5 lbs!

Their primary goal was compete in all rounds and get back home with an undamaged model.

After that they set their priorities numbers 2 and 3:

2. Getting to learn how to use to navigation gadgets and compete under pressure, and

3. Flying as many triangles as possible

In all of these aspects they really succeeded and thereby gave a great example to all possible newcomers in GPS-Triangle racing. You don't need to have the latest and greatest model if you just want to go out and compete. First, one needs to know how competition really works anyway. This approach of Tolga and Nermi earned great respect and can be seen as a perfect example for any other newcomer!

In conclusion, we all need to say: "GPS Triangle rocks!!!"

I dare to say that the class really matured over the last three years and became an awesome sport because of the dedication of the pilots, organizers and as well of the soaring "industry," which luckily took up producing planes and navigation systems to make them available for the competitors.


Thank you's, Kudos, Planes and People:

**19** A huge thank you goes out to Jan Hlastec. He and his crew delivered a marvellous job. There's this saying: "The best organisation is the one you won't recognize!"

Jan took it even further by including the pilots and tow pilots into his decisions and thereby left no argument to suspicion. Jan gave extra breaks to his helpers and to the pilots in between rounds. Under the very hot conditions this was a very wise thing to do as it was definitely contributing to safety. One must always keep in mind, that as soon as a round is started, everybody on the field (helpers, organization, pilots and tow pilots) is in continuous stress.

Again Bravo Jan!!!



22


*Aykut Suavi (TUR) loads his H-Model Arcus with water ballast!*

**20** The scoring and the results service was better than ever. Christoph Maechler and Marc Schickler have joined forces to develop and deliver a web-based result service.

With this everybody at home can follow the competition and the results online! All the details are presented and stored at: http://gpstriangle.tanktalks.org/events.

**21** Tow pilots Urs and Silvio always cheerful and highly motivated. They came all the way from Switzerland to join with the local tow pilot. All three have demonstrated a flawless performance - Excellent work!!!

**22** The Nimbus-4 from the South African team. Chris Adrian has designed the whole plane in CAD and milled his own moulds! He chose a “1:3” scale to be able to fly the plane in both classes. Everything is moulded and built in “state of the art” carbon fibre technology – a huge effort and a very nice Open-Class ship with the typical performance edge in long glides at maximum L/D.

In Slovenia, ballast was not only an option for the Speed



task! With the prevailing strong winds, light planes were very often suffering in glide performance. There are two main advantages for using water ballast:

- You can get rid of it in flight as soon as the conditions are deteriorating.

- You can't forget your ballast-set at home! **23**

**24** Larry Jolly came all the way from California:
For long air travels the new trend in building "two piece fuselages" helps breaking down the big gliders into transportable boxes!


*Florian Schambeck after his last landing with his “Quintus E.” The title was “in the bag”!*

**25** Matej Rozman (on the sticks) and Andrej Vrecer (Navigator) at work. Andrej is the owner and developer of http://RC-Electronics.org. He is working hard to always be on top of things when it comes around navigation-systems in GPS-Triangle soaring. His system, the RC T-3000 has become “the standard” of GPS-Triangle navigation.

**26** Florian Schambeck after his last landing with his “Quintus E.” The title was “in the bag”!

**27** Josef Mögn and Gerhard Köberlein are coming from the F3B class and are still frequently flying F3B. They proved that flying large scale gliders can be equally as much fun as flying F3B!

Last but not least, kudos to Vipava! The whole surroundings were perfect for an organization like this as the valley doesn’t only offer perfect conditions for flying, but also for hiking, cycling kayaking and wine & food tasting!

**28** The banquet and prize giving ceremony took place in one of the oldest wineries of the country, in midst of the vineyards. Local food and wine tasting inclusive!!!


Cheers, Philip Kolb

Planes flown (up to place 8 each class):

SLS-Class:

| | | |
|---|---|---|
| 1st.: | Florian Schambeck (GER) | - Schambeck Quintus E |
| 2nd.: | Georg Thanner (GER) | - Schambeck Quintus E |
| 3rd.: | Daniel Aeberli (SUI) | - Chocofly Diana2 |
| 4th.: | Josef Mögn (GER) | - Schambeck Arcus race |
| 5th.: | Urs Affolter (GER) | - Schambeck Arcus race |
| 6th.: | Chris Adrian (RSA) | - Nimbus 4 homebuild |
| 7th.: | Gerhard Köberlein (GER) | - Paritech ASH-31 |
| 8th.: | Johann Bruwer (RSA) | - Nimbus 4 homebuild |

“1:3”-Class:

| | | |
|---|---|---|
| 1st.: | Philip Kolb (TUR) | - Fineworx AN-66 |
| 2nd.: | Chris Adrian (RSA) | - Baudis Antares 20E |
| 3rd.: | Reinhard Vallant (GER) | - Fineworx AN-66 |
| 4th.: | Stefan Müller (GER) | - Fineworx AN-66 |
| 5th.: | Florian Schambeck (GER) | - Schambeck Arcus race |
| 6th.: | Daniel Aeberli (SUI) | - Chocofly SB-14 (1:3) |
| 7th.: | Josef Mögn (GER) | - Schambeck Arcus race |
| 8th.: | Larry Jolly (USA) | - Fineworx AN-66 |

# clothes pin clamps

Bill & Bunny Kuhlman, bsquared@rcsoaringdigest.com

Those of you who have been following Al Clark's 1:3 scale Cherokee RM build may have noticed his use of a number of modified clothes pins to help hold the wing trailing edge as the glue cured. Al used 40 of these clamps during the construction of the right wing.

(See Part 4 photos 28, 29 and 30, pages 15 and 16 of the September issue. Photo 30 is reproduced at left.)

The clothes pin modification is simple to do, and going through a stack of 50 or so can be done rather quickly while you're watching a TV show.

The modification is rather simple — you just disassemble the clothes pin and turn the two wood parts around so what was the exterior becomes the interior as shown in the photo on the right.

Interestingly, clothes pins come in a variety of shapes and sizes and, because they are quite inexpensive, experimentation is definitely of benefit!

# STACK CUTTING RIBS

**Chuck Anderson, chucka12@outlook.com**

Stack cutting ribs and many other scratch building techniques are rapidly becoming lost arts. I don't remember when I started stacking ribs, but it was over 60 years ago when I was still flying free flight contests and had to build replacements for those lost in the woods.

Stack cutting is also very useful when repairing built up wings. If enough of two end ribs can be salvaged to make templates, these and the intermediate ribs can be stack cut.

Stack cutting was the only practical way of cutting all the intermediate ribs if the wing used different airfoils at the root and tip before programs that could interpolate intermediate airfoils were written.

I used this for the first prototype LilAn that used a SD 7032 at the root and a SD 7037 at the dihedral break for increased strength. Switching to carbon fiber spars reduced the need to increase wing thickness to increase wing strength. I stack cut ribs for LilAn until Charlie Bair wrote a DXF file to laser cut the ribs. The versions built with laser cut ribs flew no better than those built with stack cut ribs.

Referring to the photos on the following pages, this is how I stack cut the ribs for the outboard wing panels of LilAn:

1. Root and tip airfoils for each panel were printed and glued to 1/8 inch birch plywood with rubber cement. The airfoil templates were cut slightly outside the lines with a band saw and sanded to the airfoil. Making the templates is the most time consuming part of stack cutting airfoils. The templates can normally be used several times before they become too worn to use.

2. Rip strips of balsa slightly wider than the height of the longest rib in the panel. The strips are then cut into rib blanks. Rib blanks can be quickly cut to length by clamping a Miter Cut to the cutting board and clamping a stop to the board to give a rib blank long enough for the largest rib.

3. Clamp rib blanks for all except the root and tip ribs for a wing panel together. Be sure the stack of rib blanks are square to the board and tack glue with a drop of CA at the top corners. These corners will be cut away when carving the ribs. Root and tip ribs are cut separately using the templates as patterns.

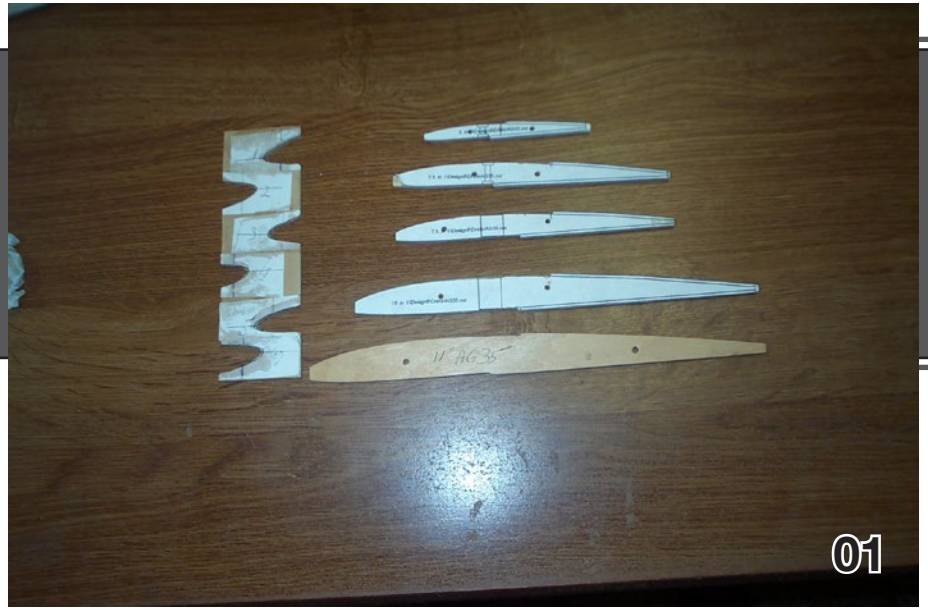
4. Place the root rib template on top of the stack and drill for clamping bolts.

5. Bolt the stack between the root and tip ribs with 4/40 bolts.

6. Carve to shape.

7. Coarse sandpaper glued to a block can be used for final shaping but a wood rasp is much better.

8. Numbering the ribs as they are removed from the stack will save a lot of time later.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MITER CUT
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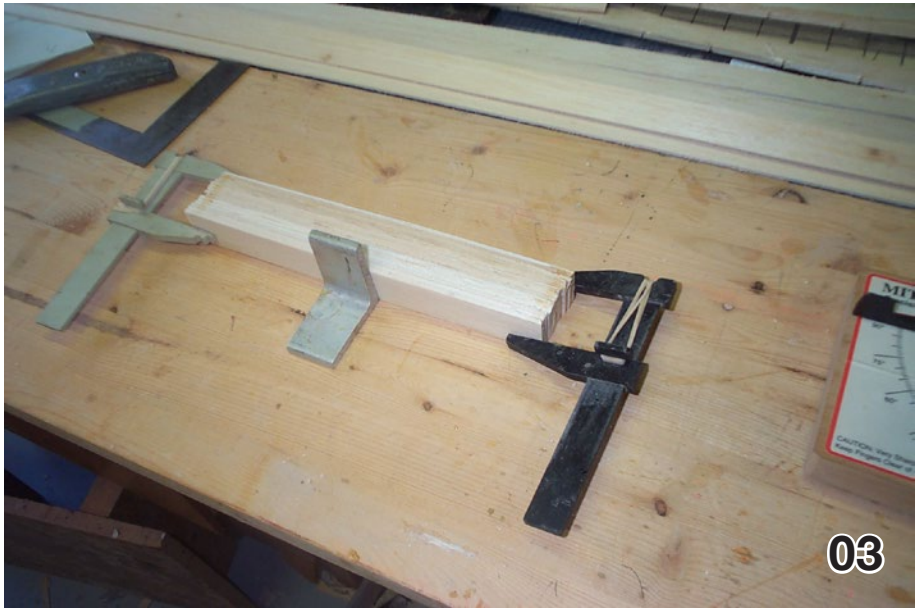
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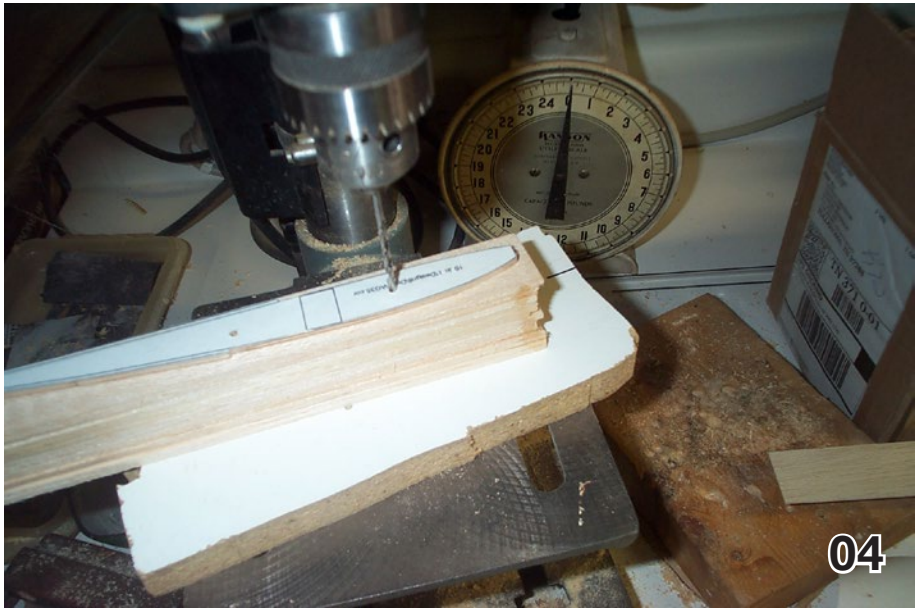
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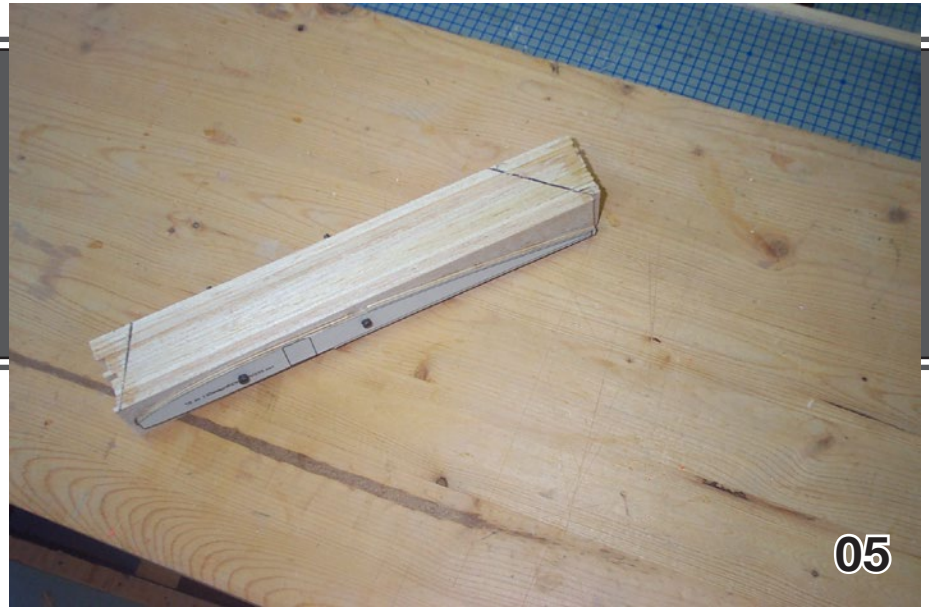
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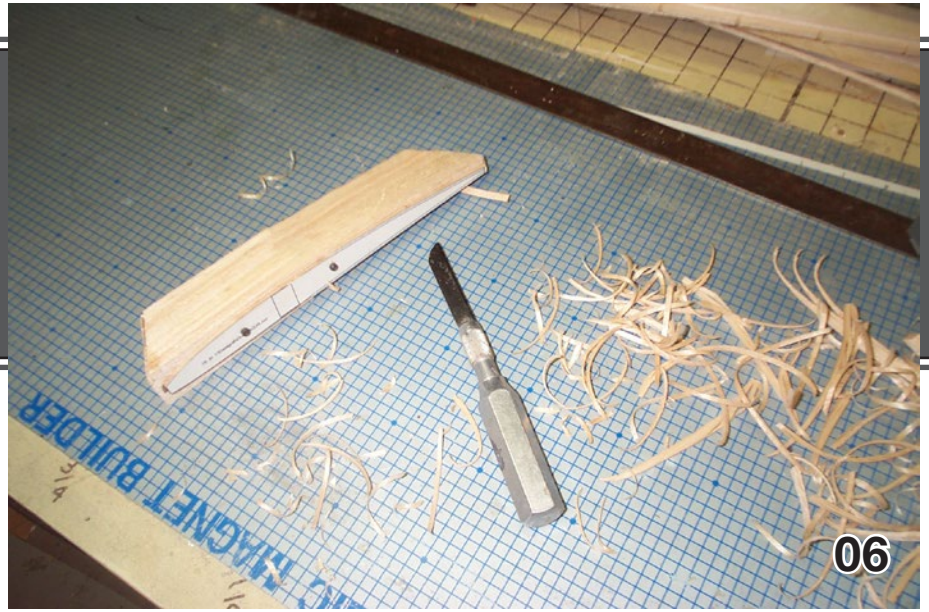
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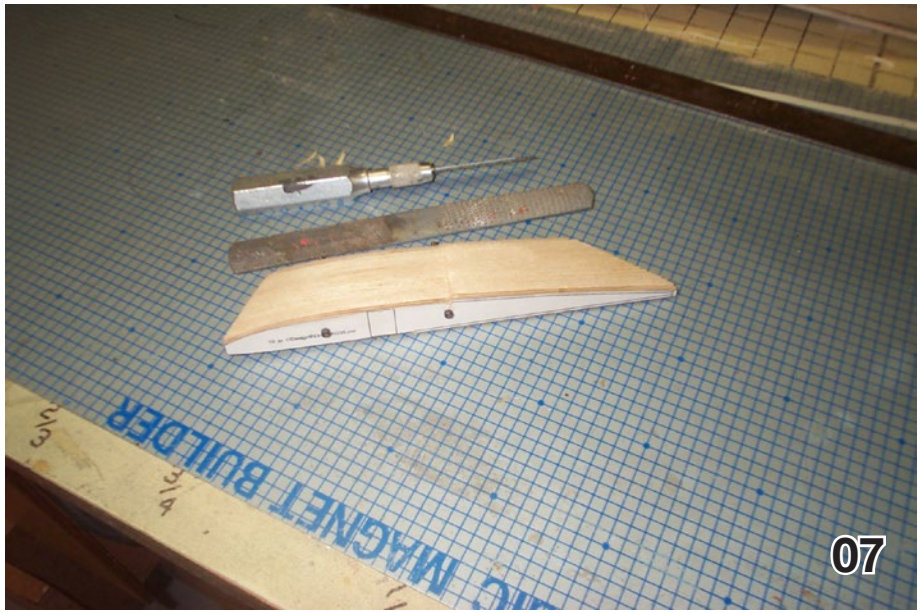
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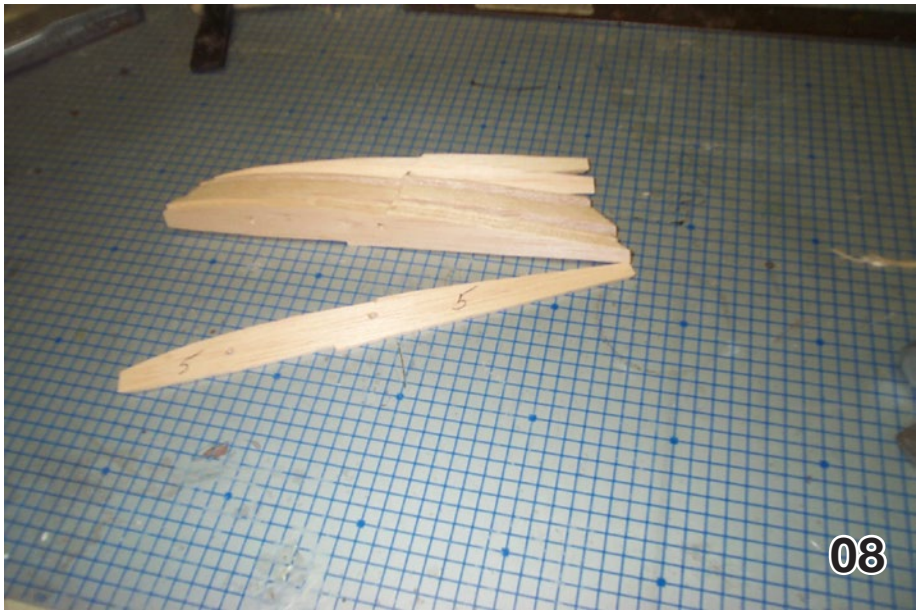

08

# Three Balsa Density Charts

Courtesy of Bob Angel, *Model Aviation* columnist, samrcflier@verizon.net

## Auszac Sheet Balsa wood Density Chart

**Stock density catagories in kg/m3 (lb/ft3)**

**Sheet weight in grams**

| | | *Super Light* | *light* | *Medium* | | *Heavy* | | *Very Heavy* |
|---|---|---|---|---|---|---|---|---|
| **SIZE 915mm (36") x** | kg/m3 (lb/ft3) | **64 (4)** | **96 (6)** | **128 (8)** | **160 (10)** | **192 (12)** | **224 (14)** | **256 (16)** |
| 0.8mm | **75mm (3")** | 4 | 5 | 7 | 9 | 10 | 12 | 14 |
| (1/32") | **100mm (4")** | 5 | 7 | 9 | 12 | 14 | 16 | 19 |
| 1.0mm | **75mm (3")** | 4 | 7 | 9 | 11 | 13 | 15 | 18 |
| (3/64") | **100mm (4")** | 6 | 9 | 12 | 15 | 17 | 20 | 23 |
| 1.5mm | **75mm (3")** | 7 | 10 | 12 | 16 | 13 | 15 | 18 |
| (1/16") | **100mm (4")** | 9 | 13 | 18 | 22 | 26 | 30 | 35 |
| 2.0mm | **75mm (3")** | 9 | 13 | 18 | 22 | 26 | 31 | 35 |
| | **100mm (4")** | 12 | 18 | 23 | 30 | 35 | 41 | 47 |
| 2.5mm | **75mm (3")** | 11 | 16 | 22 | 28 | 33 | 38 | 44 |
| (3/32") | **100mm (4")** | 15 | 22 | 30 | 37 | 44 | 51 | 59 |
| 3.0mm | **75mm (3")** | 13 | 20 | 26 | 33 | 40 | 46 | 53 |
| (1/8") | **100mm (4")** | 18 | 26 | 35 | 44 | 53 | 61 | 70 |
| 5.0mm | **75mm (3")** | 22 | 33 | 44 | 55 | 66 | 77 | 88 |
| (3/16") | **100mm (4")** | 30 | 44 | 59 | 73 | 88 | 102 | 117 |
| 6.5mm | **75mm (3")** | 29 | 43 | 57 | 71 | 86 | 100 | 114 |
| (1/4") | **100mm (4")** | 38 | 57 | 76 | 95 | 114 | 133 | 152 |
| 8.0mm | **75mm (3")** | 35 | 53 | 70 | 88 | 105 | 123 | 140 |
| (5/16") | **100mm (4")** | 47 | 70 | 93 | 117 | 140 | 164 | 187 |
| 9.5mm | **75mm (3")** | 42 | 62 | 83 | 104 | 125 | 146 | 167 |
| (3/8") | **100mm (4")** | 56 | 83 | 111 | 140 | 167 | 195 | 222 |
| 12.5mm | **75mm (3")** | 55 | 82 | 110 | 137 | 165 | 192 | 220 |
| (1/2") | **100mm (4")** | 73 | 110 | 146 | 183 | 220 | 256 | 293 |
| 16.0mm | **75mm (3")** | 70 | 105 | 140 | 175 | 210 | 246 | 281 |
| (5/8") | **100mm (4")** | 94 | 140 | 187 | 234 | 281 | 328 | 375 |
| 19.0mm | **75mm (3")** | 83 | 125 | 167 | 208 | 250 | 292 | 334 |
| (25/32") | **100mm (4")** | 111 | 167 | 222 | 278 | 334 | 389 | 445 |
| 25.0mm | **75mm (3")** | 110 | 165 | 220 | 275 | 330 | 384 | 440 |
| (1") | **100mm (4")** | 146 | 220 | 293 | 366 | 439 | 512 | 586 |

# TOTAL WEIGHT (IN GRAMS) OF VARIOUS SHEET SIZES OF BALSA WOOD

| Sheet Thickness (inches) | Sheet size: 2 x 36 in. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Density (pounds/cu.ft.) | | | | | | | | | | | | | |
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 1/32 | 3.0 | 3.5 | 4.1 | 4.7 | 5.3 | 5.9 | 6.5 | 7.1 | 7.7 | 8.3 | 8.9 | 9.4 | 10.0 | 10.6 |
| 1/20 | 4.7 | 5.7 | 6.6 | 7.6 | 8.5 | 9.4 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 1/16 | 5.9 | 7.1 | 8.3 | 9.4 | 11 | 12 | 13 | 14 | 15 | 17 | 18 | 19 | 20 | 21 |
| 3/32 | 8.9 | 11 | 12 | 14 | 16 | 18 | 19 | 21 | 23 | 25 | 27 | 28 | 30 | 32 |
| 1/8 | 12 | 14 | 17 | 19 | 21 | 24 | 26 | 28 | 31 | 33 | 35 | 38 | 40 | 43 |
| 5/32 | 15 | 18 | 21 | 24 | 27 | 30 | 32 | 35 | 38 | 41 | 44 | 47 | 50 | 53 |
| 3/16 | 18 | 21 | 25 | 28 | 32 | 35 | 39 | 43 | 46 | 50 | 53 | 57 | 60 | 64 |
| 1/4 | 24 | 28 | 33 | 38 | 43 | 47 | 52 | 57 | 61 | 66 | 71 | 76 | 80 | 85 |
| 3/8 | 35 | 43 | 50 | 57 | 64 | 71 | 78 | 85 | 92 | 99 | 106 | 113 | 120 | 128 |
| 1/2 | 47 | 57 | 66 | 76 | 85 | 94 | 104 | 113 | 123 | 132 | 142 | 151 | 161 | 170 |

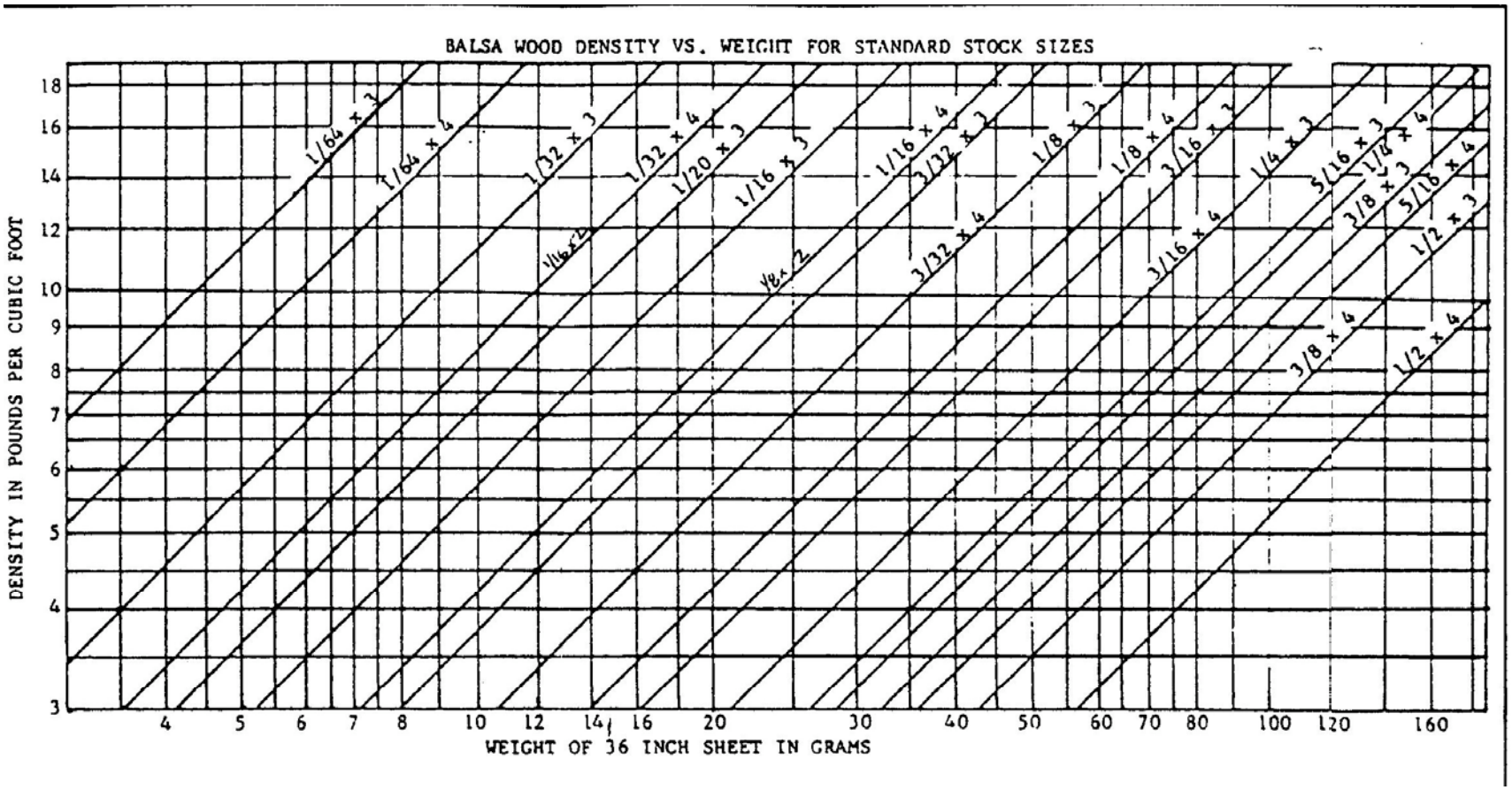
| Sheet Thickness (inches) | Sheet size: 3 x 36 in. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Density (pounds/cu.ft.) | | | | | | | | | | | | | |
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 1/32 | 4.4 | 5.3 | 6.2 | 7.1 | 8.0 | 8.9 | 9.7 | 10.6 | 11.5 | 12.4 | 13.3 | 14.2 | 15.1 | 15.9 |
| 1/20 | 7.1 | 8.5 | 9.9 | 11 | 13 | 14 | 16 | 17 | 18 | 20 | 21 | 23 | 24 | 26 |
| 1/16 | 8.9 | 11 | 12 | 14 | 16 | 18 | 19 | 21 | 23 | 25 | 27 | 28 | 30 | 32 |
| 3/32 | 13 | 16 | 19 | 21 | 24 | 27 | 29 | 32 | 35 | 37 | 40 | 43 | 45 | 48 |
| 1/8 | 18 | 21 | 25 | 28 | 32 | 35 | 39 | 43 | 46 | 50 | 53 | 57 | 60 | 64 |
| 5/32 | 22 | 27 | 31 | 35 | 40 | 44 | 49 | 53 | 58 | 62 | 66 | 71 | 75 | 80 |
| 3/16 | 27 | 32 | 37 | 43 | 48 | 53 | 58 | 64 | 69 | 74 | 80 | 85 | 90 | 96 |
| 1/4 | 35 | 43 | 50 | 57 | 64 | 71 | 78 | 85 | 92 | 99 | 106 | 113 | 120 | 128 |
| 3/8 | 53 | 64 | 74 | 85 | 96 | 106 | 117 | 128 | 138 | 149 | 159 | 170 | 181 | 191 |
| 1/2 | 71 | 85 | 99 | 113 | 128 | 142 | 156 | 170 | 184 | 198 | 213 | 227 | 241 | 255 |

| Sheet Thickness (inches) | Sheet size: 2 x 48 in. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Density (pounds/cu.ft.) | | | | | | | | | | | | | |
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 1/32 | 3.9 | 4.7 | 5.5 | 6.3 | 7.1 | 7.9 | 8.7 | 9.4 | 10.2 | 11.0 | 11.8 | 12.6 | 13.4 | 14.2 |
| 1/20 | 6.3 | 7.6 | 8.8 | 10 | 11 | 13 | 14 | 15 | 16 | 18 | 19 | 20 | 21 | 23 |
| 1/16 | 7.9 | 9.4 | 11 | 13 | 14 | 16 | 17 | 19 | 20 | 22 | 24 | 25 | 27 | 28 |
| 3/32 | 12 | 14 | 17 | 19 | 21 | 24 | 26 | 28 | 31 | 33 | 35 | 38 | 40 | 43 |
| 1/8 | 16 | 19 | 22 | 25 | 28 | 31 | 35 | 38 | 41 | 44 | 47 | 50 | 54 | 57 |
| 5/32 | 20 | 24 | 28 | 31 | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 67 | 71 |
| 3/16 | 24 | 28 | 33 | 38 | 43 | 47 | 52 | 57 | 61 | 66 | 71 | 76 | 80 | 85 |
| 1/4 | 31 | 38 | 44 | 50 | 57 | 63 | 69 | 76 | 82 | 88 | 94 | 101 | 107 | 113 |
| 3/8 | 47 | 57 | 66 | 76 | 85 | 94 | 104 | 113 | 123 | 132 | 142 | 151 | 161 | 170 |
| 1/2 | 63 | 76 | 88 | 101 | 113 | 126 | 139 | 151 | 164 | 176 | 189 | 202 | 214 | 227 |

| Sheet Thickness (inches) | Sheet size: 3 x 48 in. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Density (pounds/cu.ft.) | | | | | | | | | | | | | |
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 1/32 | 5.9 | 7.1 | 8.3 | 9.4 | 10.6 | 11.8 | 13.0 | 14.2 | 15.4 | 16.5 | 17.7 | 18.9 | 20.1 | 21.3 |
| 1/20 | 9.4 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 26 | 28 | 30 | 32 | 34 |
| 1/16 | 12 | 14 | 17 | 19 | 21 | 24 | 26 | 28 | 31 | 33 | 35 | 38 | 40 | 43 |
| 3/32 | 18 | 21 | 25 | 28 | 32 | 35 | 39 | 43 | 46 | 50 | 53 | 57 | 60 | 64 |
| 1/8 | 24 | 28 | 33 | 38 | 43 | 47 | 52 | 57 | 61 | 66 | 71 | 76 | 80 | 85 |
| 5/32 | 30 | 35 | 41 | 47 | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 94 | 100 | 106 |
| 3/16 | 35 | 43 | 50 | 57 | 64 | 71 | 78 | 85 | 92 | 99 | 106 | 113 | 120 | 128 |
| 1/4 | 47 | 57 | 66 | 76 | 85 | 94 | 104 | 113 | 123 | 132 | 142 | 151 | 161 | 170 |
| 3/8 | 71 | 85 | 99 | 113 | 128 | 142 | 156 | 170 | 184 | 198 | 213 | 227 | 241 | 255 |
| 1/2 | 94 | 113 | 132 | 151 | 170 | 189 | 208 | 227 | 246 | 265 | 283 | 302 | 321 | 340 |

# NFFS Digest Balsa Weight Chart

The following Chart has been shamelessly lifted from Carl Bakay's Southern Louisiana Indoor Modeling Journal, who in turn lifted it from a long ago NFFS Digest. The chart was originally submitted to NFFS by John Ferrer. A handy thing to have hanging over the workbench.



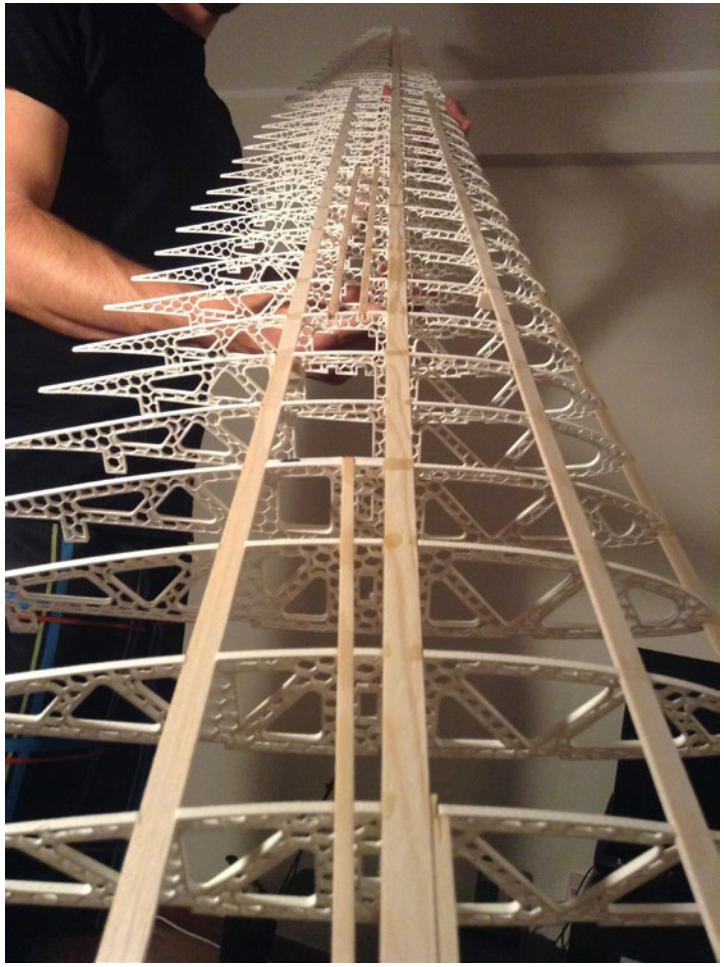

Note: for 2" wide stock, weigh and multiply by 2, then use 4" wide data

EQUIVALENT SIZES

| 1/64X3 | 1/64X4 | 1/32X3 | 1/32X4 | 1/16X3 | 1/16X4 | 3/32X3 | 3/32X4 | 18X4 |
|---|---|---|---|---|---|---|---|---|
| 1/8X3/8 | 1/4 SQ | 1/8X1/4(3) | 1/4X1/2 | 1/8X1/2(3) | 1/4X1 | 3/16SQ(8) | 3/8X1 | 1/2X1 |
| 3/16X1/4 | | 3/16X1/2 | | 1/4X3/4 | 1/2SQ | 3/8X3/4 | 1/2X3/4 | |
| 1/8SQ | | 1/4X3/8 | | 3/8X1/2 | | 3/8SQ(2) | | |

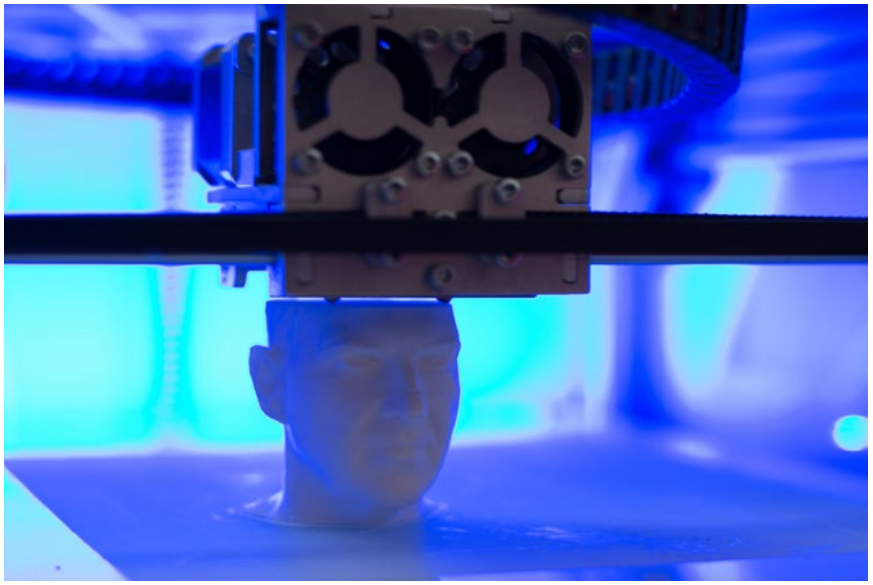
# 3-D Printed KA6E Glider

Renato Machado, jrenatomachado@hotmail.com



Being the owner of a 3-D printer for quite a while, I have been doing a lot of small things like servo trays, dummy engines, pilot heads (photo below), bits and pieces. But this time I decided to use the printer on a large scale, so I've been printing ribs and frames for the Jilles Smits' 4.7m KA6E (photo at left).

For the same weight the 3-D printed ribs and frames are not expected to offer better structural characteristics compared to plywood, however it is possible to "create" the whole set of parts in the living room without smell, noise or dust and it is cheap. (Photo on opposite page.)

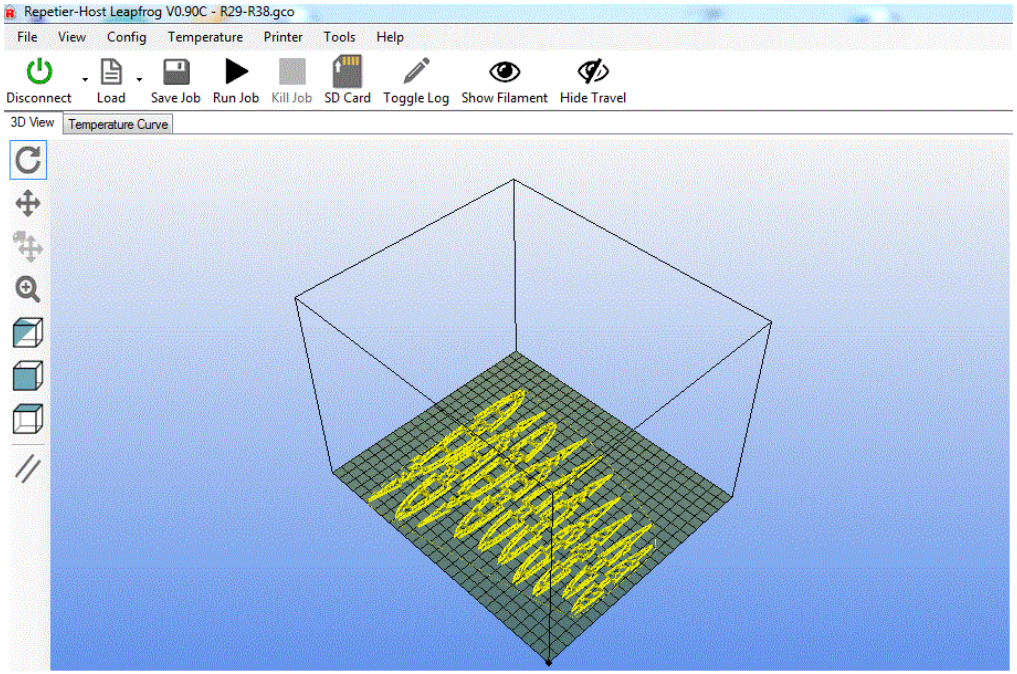


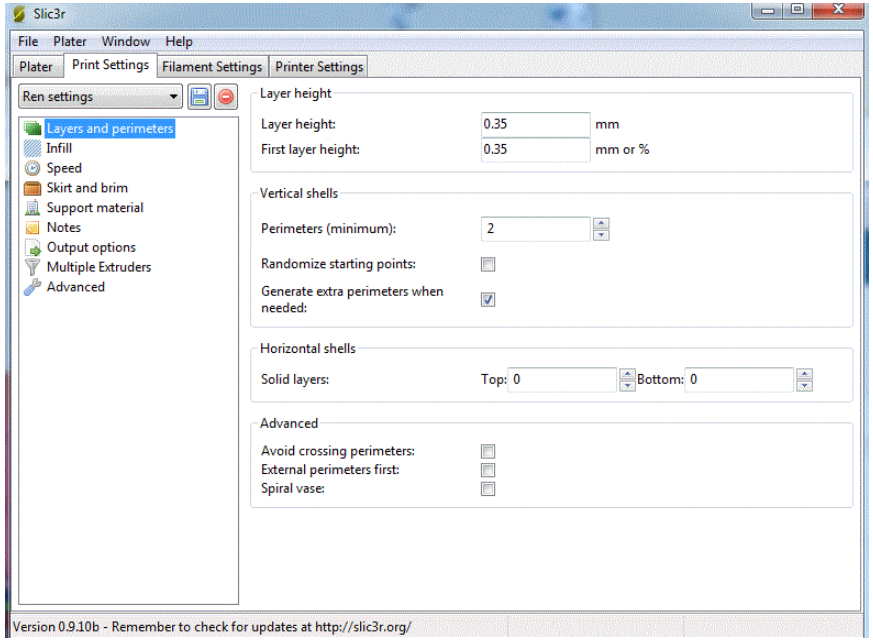
The printing time is quite high, around 30 minutes for a 29 cm rib, but this is mainly because the printer nozzle diameter is 0.35mm, which is good for detailed objects but not necessary for this particular job. The nozzle could be changed and that would reduce the printing time in half.

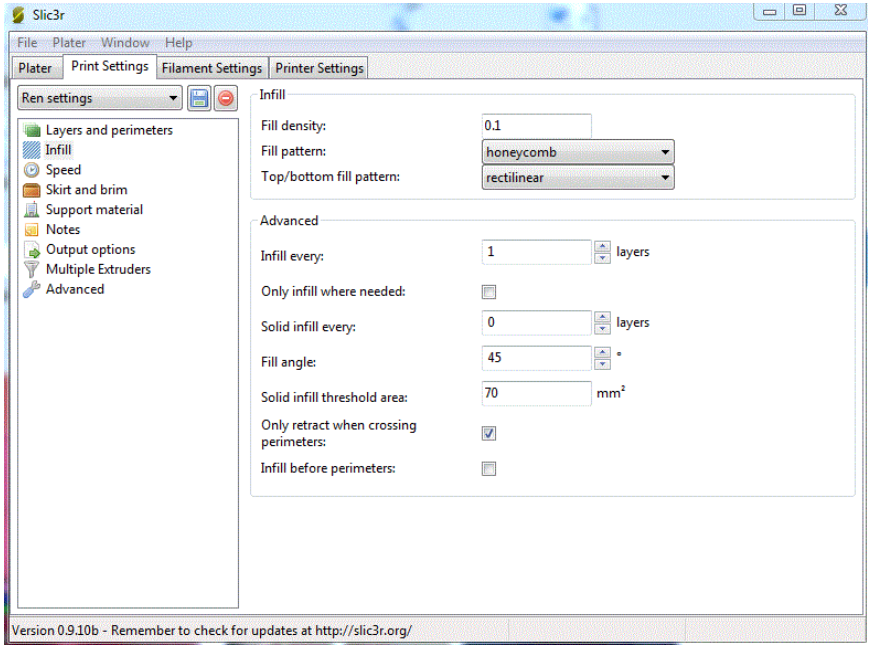
The extrusion speed can also be higher, but that means the printer will be noisier and because I am living in a flat my neighbors wouldn't like it. ☺

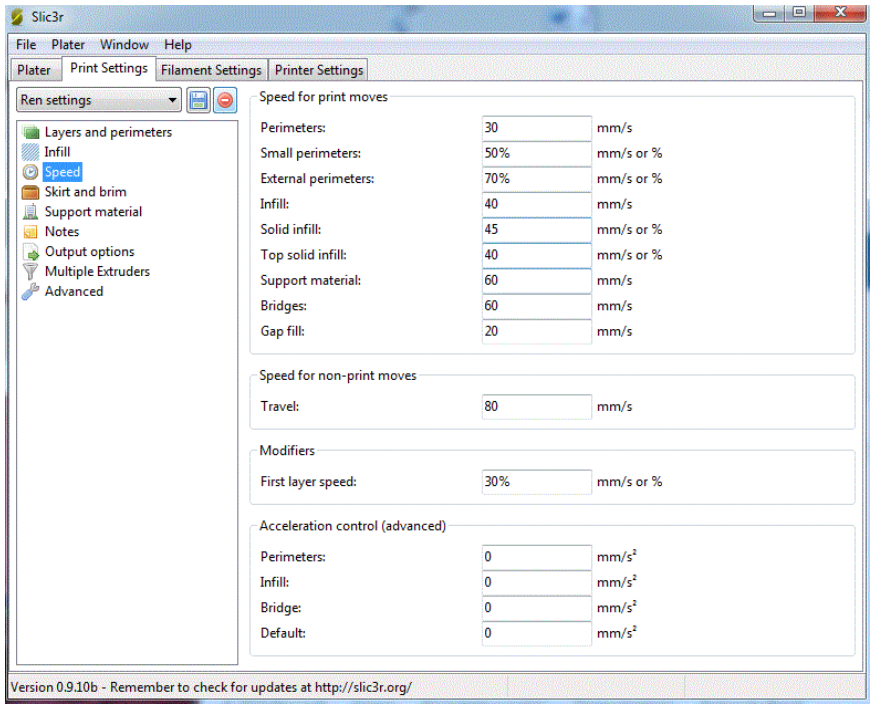
I am using a printer which has a printable area of 270mm x 200mm (photo below), thus some ribs/frames have to be printed in two parts and glued afterwards but that is not a problem.

Everything was printed using PLA filament because the bed temperature is lower and it proved to be up to the job.






The slicer parameters that I am using are shown in the three screen grabs on this page.

I am currently building the wing and so far I am happy with the results.

The downside is the printing time, but in my opinion it is acceptable.

Using the 3-D printing technique it is easy to create a special rib or frame with servo tray included, or change the rib thickness from the leading edge to the trailing edge, or maybe create ribs with cap strips included.

There are a lot of possibilities!

I do recommend! ☺

# Do you fly *Gliders* or *Sailplanes?*

Gordy Stahl, GordySoar@aol.com

The LSF (League of Silent Flight) Task Program is a series of tasks designed to create sailplane pilots. The first levels seem nearly impossible to the glider flyer, two 5 minute thermal flights and 10 landings within a 10 foot circle. Yet each level increases the amount of thermal times and shortens the landing circle diameter and pilots manage to achieve the levels. That is because each level was designed to cause pilots to start flying "on purpose."

An untrained person can drive a car around the middle of a 100 acre field, but would the same be true if that person were put in a car in your downtown at rush hour?

A glider pilot flies around and hopefully doesn't hit anything or damage his model when it gets near the ground or trees, a sailplane pilot looks for lift and guides his model exactly where he wants it to park.

A while back I stated that the difference between a glider and a sailplane was simple and obvious: A glider is any airplane that lands without a motor, a sailplane is an airplane designed to go up without a motor.

While any kind of model can go up if there is enough lift, likely you would not choose a P-51 to enter a sailplane contest, or to even spend a day chasing thermals off a bungee launch.

The same goes for "electric powered-models-with-long-wings." While they look like a sailplane and maybe are advertised as "able to thermal," they come fitted with a fast motor, the advertisement touts how fast and aerobatic can be, and the buyer is urged to buy large capacity and multiple battery packs.

Reading reviews on RC Groups, the topic is usually about "how to upgrade to an even bigger faster motor."

It doesn't take an aeronautical engineer to simply look at a model to interpret its intent. But the many foam versions promise excitement and thermals at a very cheap price, so what the purchaser ends up with is a powered model that glides down when the battery is done. These models are often called "warm liners" or "hot liners" depending on how big the motor and battery pack.

Yes, while we can do rolls, loops, fast inverted passes, etc. with our sailplanes, we tend to focus on finding and working lift.

Sailplane enthusiasts are sometimes referred to as elitists, yet many of us use electric motors to get our sailplanes to

*Likely a sailplane.*

*Not a sailplane.*

altitude. That's the difference between electric launch and electric powered.

Electric Launch Sailplane:

The key word is launch. It's the system by which a sailplane is launched to starting altitude. In fact, the invention of the altitude limit switch system confirms this; the model flies to launch altitude then the switch yells down to the pilot, "Okay, now it's up to you and the sailplane!"

Electric Powered Glider:

"Restarting the motor while the model is in flight."

That same sailplane becomes an electric-powered-model-with-long-wings the moment the launch motor becomes a source of propulsion.

Don't read that as some sort of judgement of purity, it is simply what it is... a powered airplane.

By the way, the reason for powering-on for anything other than the initial launch to altitude doesn't change anything. Powering-on to save the model when the pilot was either inexperienced or used poor judgement about flying too far away, or is just to lazy to land and launch. That decision to restart the motor in flight is a defining moment... but not a judgement of validity, or integrity, or anything other.

Powering-on hurts:

All of us have the ability to power-on in flight. We all have the switch on our transmitters, but there is a huge cost to the pilot if he does it.

I could go on and on about how if the pilot hadn't turned on he would have likely flown into a piece of lift and experienced a very satisfying flight which he'd still be recounting to his friends, but instead I'll recount my club mate Steve's flight the other night.

Steve had been a very proficient RC sailplane pilot years back, but life took him away from the hobby for a bunch of years. The models he flew back then were mostly wood, rudder, elevator, spoiler ships, so as a result his thumbs and confidence were rusty.

He'd purchased a very high performance but older design 140" molded full house ship from a retired pilot in the club and was finding it, it seemed to him, heavy

and hard to thermal, much less land with confidence.

I had assured him that there is a learning curve to every new model and that the “performance” would show itself with the amount of flight time he put in learning the new ship.

The first couple of weeks, he’d be zooming all over the sky, mostly launching and coming down. To add to his chagrin the weather turned hot and humid, not good for thermal learning, but he persisted. Over the past week, he had some “good flights” and maybe the ship did have some thermal magic left in it!

Yesterday was Labor Day, and our field is in a public park, and one corner of our field was full of picnickers, so we tend to keep aware of our flight locations.

Steve launched, zoomed around, didn’t find anything, so was setting up his landing approach.

With about 10 seconds left as he approached the spot he’d marked with a handkerchief, he saw the model indicate lift, so he turned into it.

Though he started at about 25' from the ground, wrap after wrap the thermal developed and his sailplane rose higher with each turn. Soon it was 200' above the field and working its way downwind and upwards. That flight went from a three minute launch-and-land to more than 20 minutes!

Exciting right? But let’s change his winch model to an electric launch model, as it was down to about 50 and time to set up for an approach, instead of continuing on path yet being vigilant for any sign of last minute lift, he simply hit the switch and motored back up to altitude.

In that case he would have cheated himself.

The experience, the event, the confidence in his own skills to save a flight even when it seems there could be no chance and landing was the only option, the feeling of satisfaction indescribable to any other than those who’d experienced the same miraculous save... so much, all erased by the flick of a switch.

In that one moment Steve went from being a glider flyer to being a sailplane pilot.

Yes, he is in the LSF program, and he will be quick to attest that without working the program he would never have been able to be prepared to be ready for that lift opportunity when it knocked.

Which do you want to be? A glider flyer or a sailplane pilot? If it’s a sailplane pilot, if you want to do more than occasionally luck into a good long flight, and end it with the model parked right where you wanted it to be, get signed up for the LSF Task program. It’s $2 and an envelope. <http:// http://www.silentflight.org/>

Which model is an awesome sailplane and is electric launch? The Radian is likely the best flying ready-to--fly foam sailplane ever created. It has incredible soaring potential, yet can bounce. Add an ALES switch and you have the basis for the perfect starter soaring machine.

While there may be another model in the same class, at the moment the Radian has earned its seemingly exclusive rank as a serious sailplane.

Consider which you kind of pilot you want to be. Do you want to learn more about thermal soaring and sailplane piloting? Then think about what I have explained.

Got comments or questions? You can contact me at GordySoar@aol.com. I fly RC sailplanes... a lot.

**Down East Soaring Society**

# DESS "Sweat 'n Soar" Aerotow and Fun Fly

## July 25th 2015

Martin Rudolph, mmrudolph@suddenlink.net
Photos by Martin Rudolph and Jesper Frickman

DESS (Down East Soaring Society) organizes several fun flies every year. The field is open to all glider pilots willing to make the drive to Wilson, in eastern North Carolina. The only requirement is a valid AMA membership and the desire to get together with other sailplane pilots for a day of soaring and fellowship.

Gunnar Stumpe and Duane Jenkins volunteered to bring their tugs and provide aerotowing service for this event.

Originally the aerotow was scheduled for April but had to be postponed due to weather. The weather gods were friendly for a late July event and provided

*Gunnar Stumpe and Brady Baggs reviewing the tow for Brady's SBX 18 by Gunnar's Rascal tow plane. Photo by Jesper Frickman*

a reasonable day, with temperatures in the mid 80's, low humidity, and plenty of thermal activity.

Lunch is always a pot-luck, and this time there were plenty of grilled brats, potato salad, cabbage salad, chips, cookies, watermelon – well you get the idea…

We had a few pilots bring their towable sailplanes ranging in size from the KA-8 foam to large scale ships.

Mike Saleeby brought his 4M jet powered Blanik and, on the other end of the spectrum, we had a few Whipits on the field as well. Jesper Frickman flew the plane his father built in the 1970's, taking the "oldest plane" honors.  I don't think we had any maiden flights, but all pilots in attendance flew to their hearts' content.

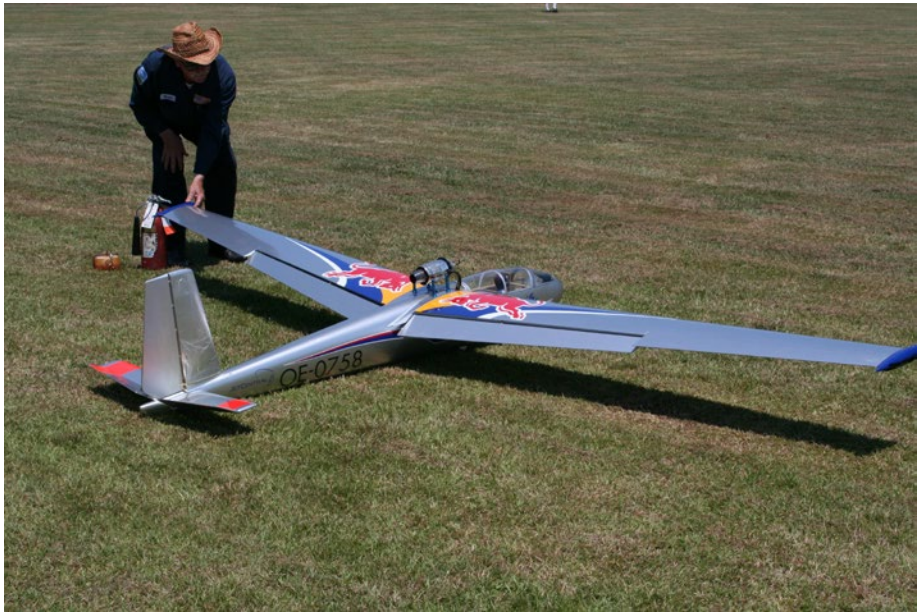
Video links:
https://vimeo.com/134513648 from Jesper Frickman
https://www.youtube.com/watch?v=no_yTor6iXY> from Gunnar Stumpe

*Early arrivals setting up. Photos by Martin Rudolph*

*Jesper Frickman pointing to a thermal, Brady Baggs and Garry Ogilvie waiting to launch & Jesper's father watching.*
*Photo by Martin Rudolph*

*Above: Mike Saleeby setting up his turbine powered 4m Blanik. Turbine start. Photos by Martin Rudolph*

*Below: A bit of assistance neededto get airborne. Photos by Martin Rudolph*



*Mike Saleeby's 4m Blanik climbing out! Photo by Martin Rudolph*

*Photo by Martin Rudolph*

*Louie Scribner launching a RES Mystique.*
*Photo by Martin Rudolph*

*Gunnar Stumpe's Rascal tow plane.*
*Photo by Jesper Frickman*

*Another shot of Gunnar Stumpe's Rascal tow plane. Photo by Jesper Frickman*


*Louie Scribner and Richard Proseus preparing to tow. Photo by Jesper Frickman*