Andy Clancy Speedy Bee Build Description

The Speedy Bee is a fun 40" wingspan four channel mid-winged sport plane, which is still very much a Bee. You know: Oversized control surfaces, hands-off stability, very low minimum flying speed, easy aerobatics. The Speedy Bee is just a Bee that's a little speedier. It can handle having more power than a Lazy Bee. It's also a speedier building job. No lamination required! :-)

Model Specifications:

Wingspan: 40"

Wing Chord: 14"

Fuselage Length: 32"

Weight: 30 oz. to 42 oz. depending on power source selected.

Glow engines: from .10 two-stroke up to .30 four-stroke.

Electric: Output of about 250 to 600 watts, 4-cell LiPo pack of around 2200 mah.

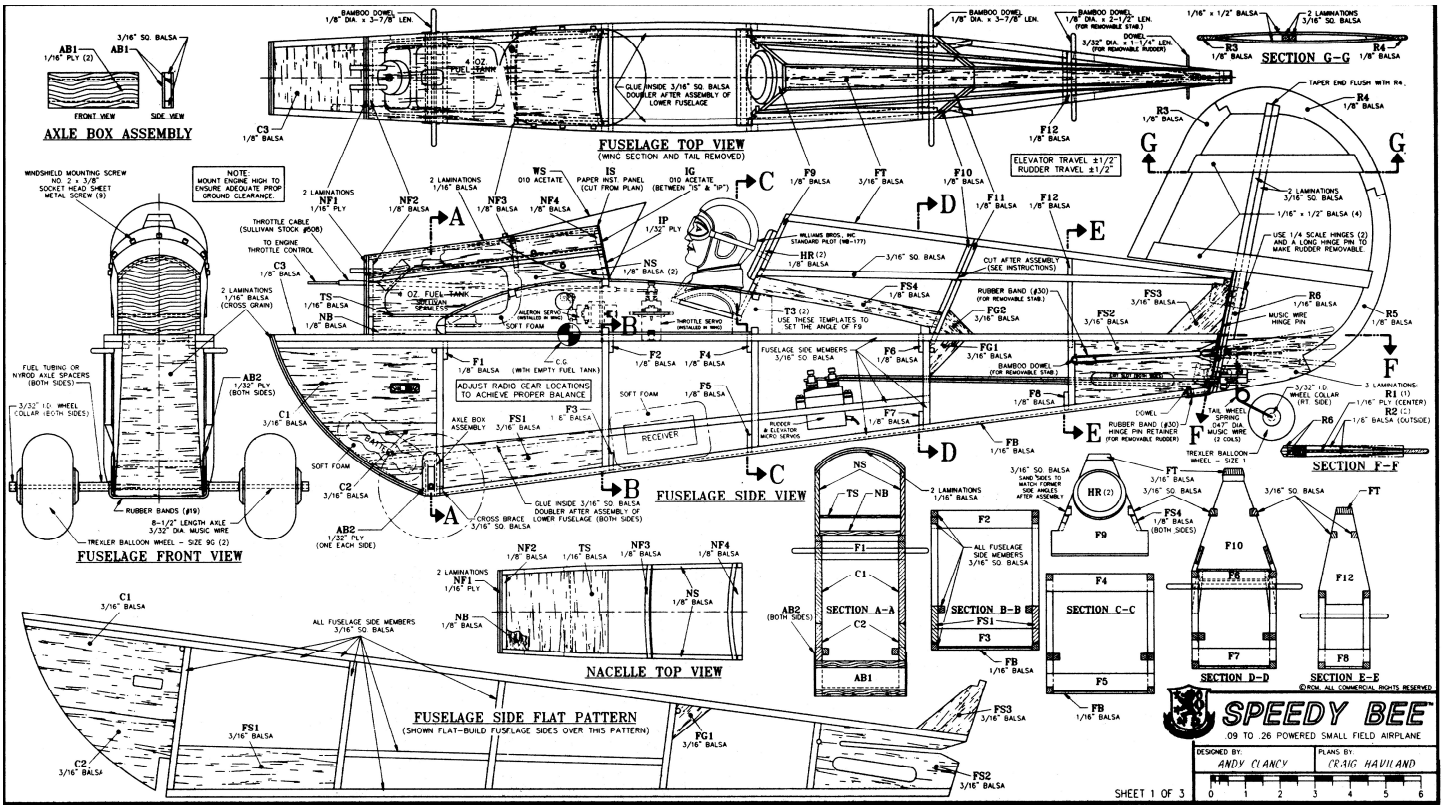
The Speedy Bee is light enough to fly with glow engines as small as the Cox .09, and strong enough to handle larger engines up to .25 sport two-cycles or up to .30 four-cycles. It will climb at an angle of about 75 to 80 degrees on a sport .15 and have a take-off roll measured in inches rather than feet. With larger engines it will probably have vertical capabilities.

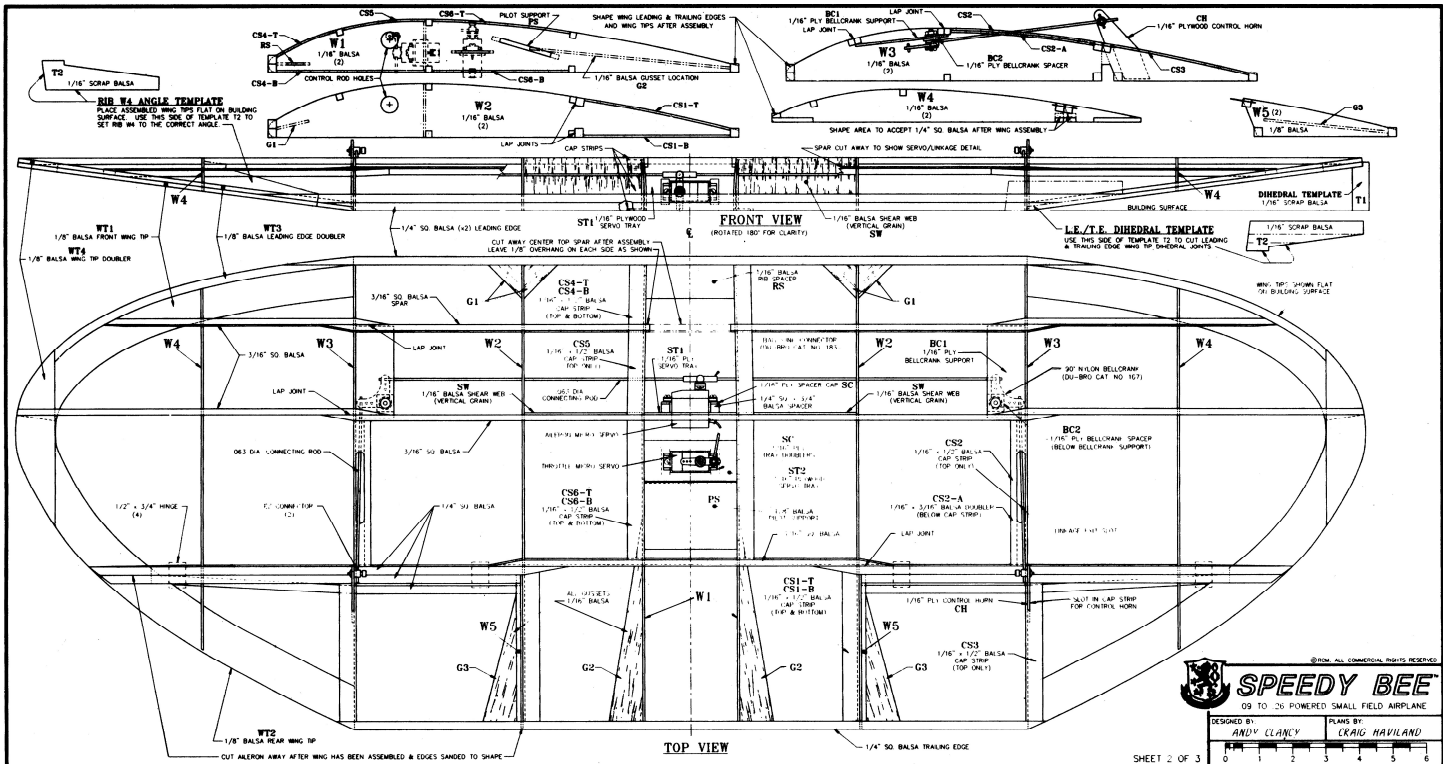
An electric-powered Speedy Bee typically will have a total flying weight of around 30 to 35 ounces ready to fly. It's recommended you use motors with a power output of about 250 to 600 watts. The electric Speedy Bee tends to be tail heavy with brushless motors. You might want to use an oversize motor to help balance the plane even though you don't need the extra power. Larger motors can be detuned by throttling them down, or by using a smaller prop than specified for the motor, or by not using the maximum number of cells. The best battery size to use is a 4-cell LiPo pack of around 2200 mah.

Speedy Bees work great with #9 Trexler Wheels--the same as those for the Lazy Bee, and they can be purchased through "Andy Clancy Designs" at https://www.andyclancydesigns.com/. You can also use the same Lazy Bee floats for fun on the water or snow.

Here is a link to an **excellent** 21-part build series video: https://www.youtube.com/watch?v=-h6i094cQiE&list=PLGILJsUw3dvTw8AfnD5zX5AdNs2WkpzW/ "Speedy Bee - Build Series - Balsa RC Planes. By Mark Robinson". This build series will take you step-by-step through the construction of the Speedy Bee model, culminating in the maiden flight, and a build & flight review. **A very well-done video series**. The

model is built from a great set of plans, which were obtained from: https://outerzone.co.uk/ “Outerzone” and are available for you to download along with a manual, build instructions, and an article from RCM magazine.



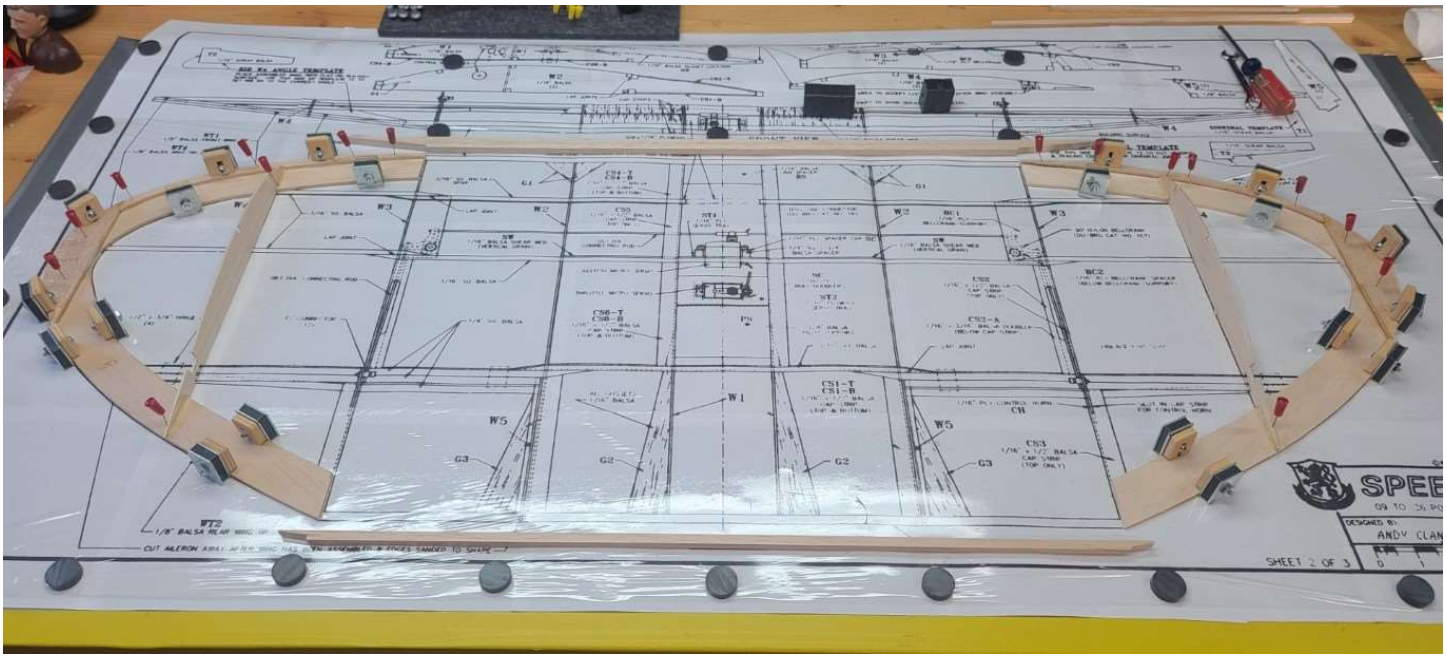


Using the Speedy Bee plans, I go through and determine all the materials I'll need to make the build. Once I have worked up a complete wood and material list, any balsa sticks and sheets, basswood, and plywood needed were ordered from Balsa USA. The four Hitec HS-225BB servos, receiver battery and switch harness, Spektrum 4-channel receiver, wire control rods, 4-once fuel tank and fuel tubing, Dave Brown motor mount, pilot bust, nose cone, Gold-in-Rod control rod set, landing gear music wire, and all other required hardware shown can be easily located on the web or your local hobby shop. I'll be using an O.S. .25 FX 2-cycle for power. A complete list of all the materials and hardware required are listed in the Speedy Bee build instructions I referenced earlier. The picture below shows all the materials and hardware required to build your Speedy Bee.

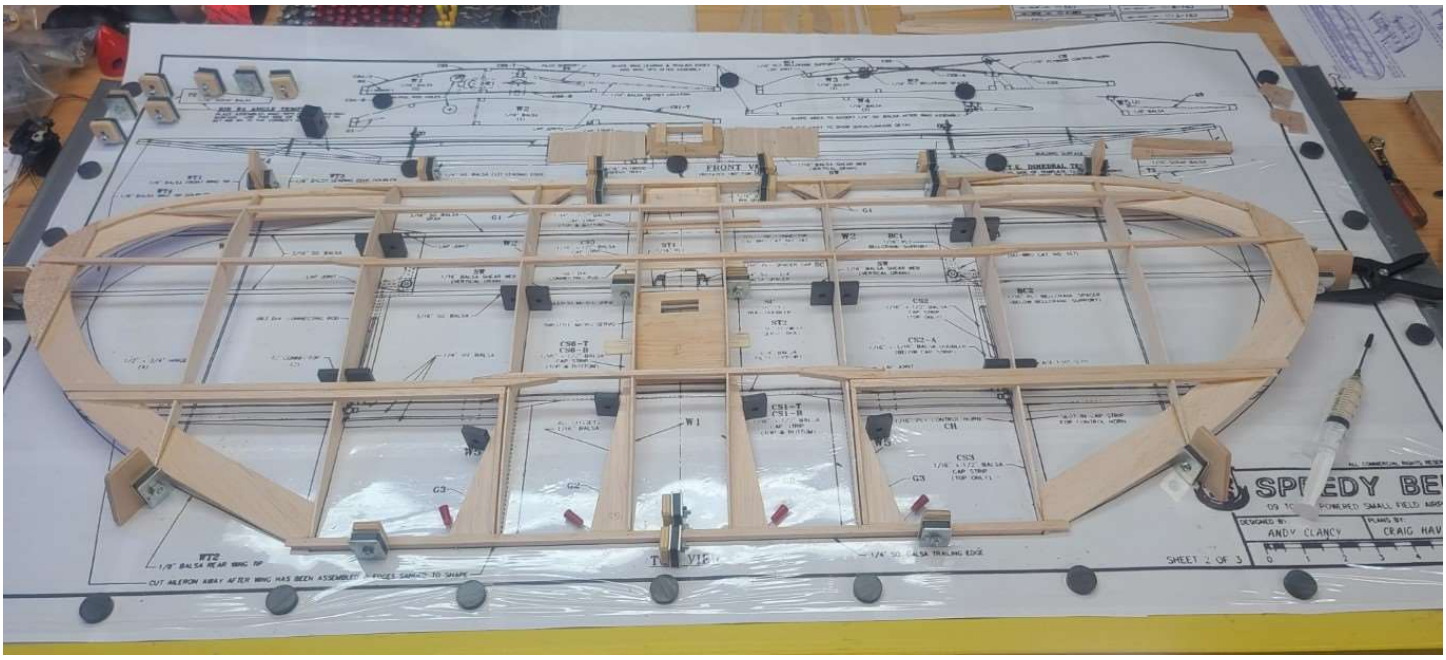
So, with all that said, let's get started with our Speedy Bee scratch build. The first thing I do with all my scratch builds is to print out the plans on my Canon printer using the "poster" settings to get a full-size plan. Then I take all the pages and put them together to get the three plan sheets for this model. **Builders Note** – the third sheet of the Speedy Bee plan contains the templates for all the various pieces that will be cut out, so you may want to use a thicker stock paper when printing out the third sheet versus standard printer paper. For this build I'm going to use my magnetic building board and fixtures, so I put the second sheet of the plans (which is the wing views) on the board and cover it with clear plastic film to prevent the glue from sticking to the plans.

Now the real fun begins. Using the templates from the third sheet of the plans, cut out the various wingtip pieces from the balsa stock and place them flat on the plans to check for proper fitting. Using my hand made mag board fixtures, I place each wingtip piece over the plans and start to glue each of them together using Titebond III Ultimate wood glue. You will find it much easier to glue parts if you put the Titebond III in a plastic syringe with a large diameter needle, versus trying to place the glue straight from the large glue bottle. I'm not going to duplicate all the build instructions that are contained in the Speedy Bee manual referenced earlier but will try to point out things that need attention and other recommendations based on

what I find during my scratch build. **Builders Note** - ribs W4 are placed at a slight angle using template T2 so they will be vertical once the wingtips are raised at the ends to the correct dihedral angle. The picture below shows both wingtips glued together and held in place by my mag fixtures and builders' pins until everything dries overnight.



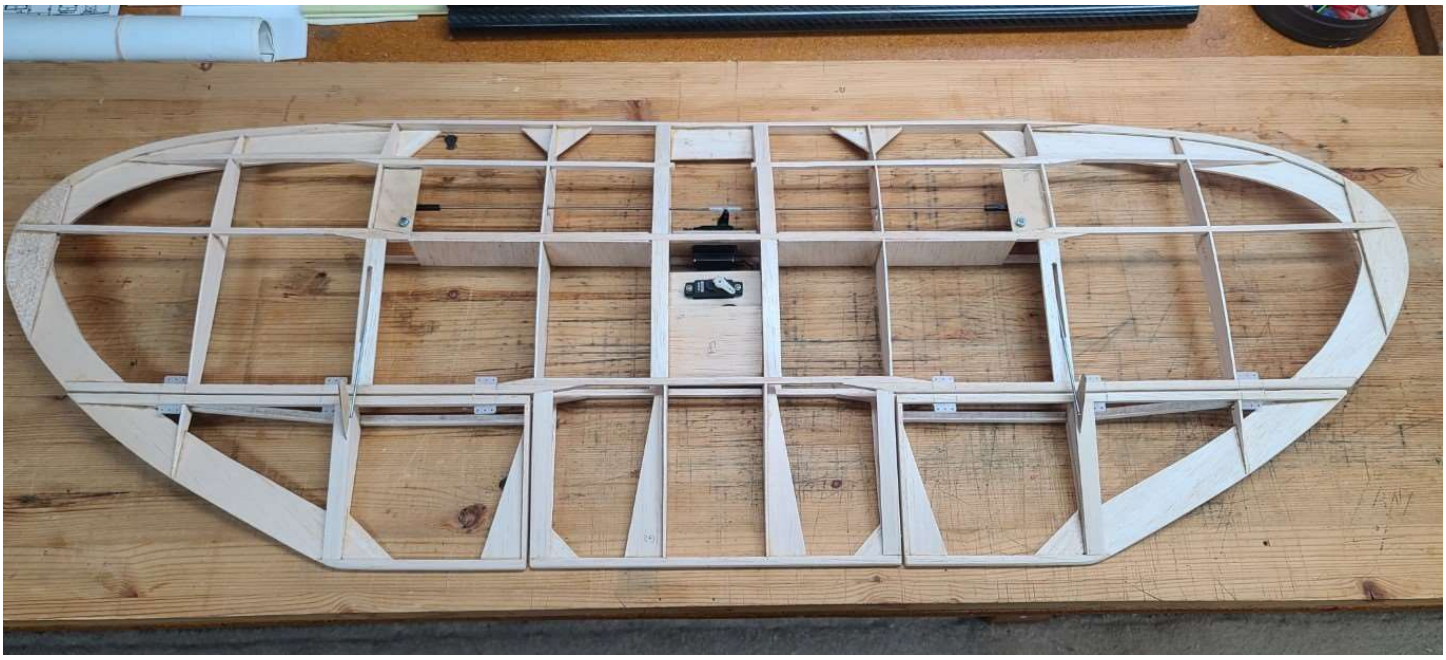
Ok, now cut out all the wing ribs and the many other pieces needed for the wing assembly, paying attention to the directions of the balsa grain that are shown for each piece. **Builders Note** – carefully follow the templates for each wing rib because the outer profiles change from rib to rib to allow for 1/16-inch cap strips in various positions on the ribs, and their positions change from one rib to another. Also, take care to check the sizes of all the spar notches in the ribs given the spars are two different size balsa sticks. If I were to do this wing build over, I would use 3/32-inch sheet balsa for the ribs versus the 1/16-inch called out on the plan. I found myself having to repair ribs when sizing the spar notches using a fingernail sanding stick. Another tip is to use template T2 to cut the correct angle at the ends of the spars to match up with the wingtip dihedral. The next picture below shows the wing about ready to come off the building board to turn over and continue the build on the bottom side. The plastic syringe I discussed earlier can be seen in the lower right. You can find these on the Amazon website.



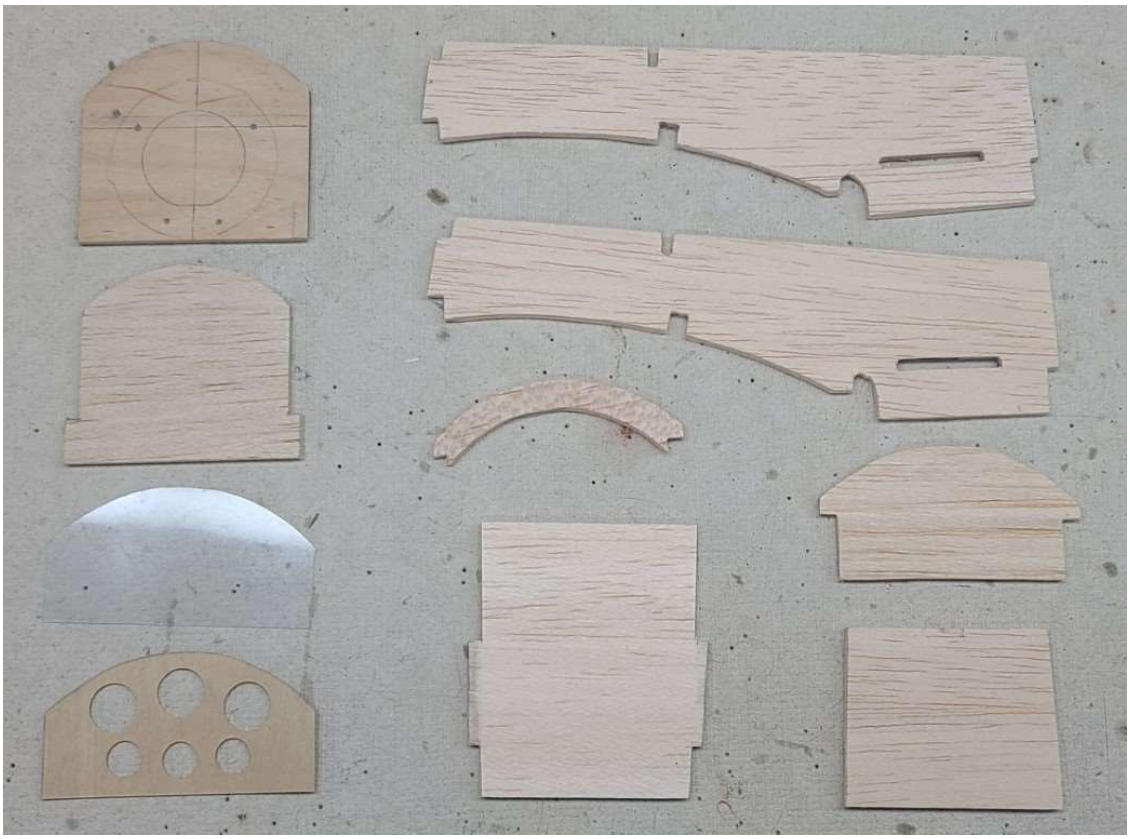
Builders Note – I found I had to change the throttle servo from the HS-225 I planned to use to a smaller Hitec HS-81 because the HS-225 was too tall to fit inside the depth of the wing center section. This also drove a change to the throttle servo mounting plate.

With the wing removed from the building board I flip the wing over to continue with my build. First, all the wing bottom spars were cut to size and glued in place. Next, I installed the two 1/16-inch ply aileron bellcrank supports with the Du-Bro 90-degree nylon bellcranks installed. Some 30-minute epoxy was used to attach these two plates, which I then also used to install the assembled center wing aileron plate. This was followed with 1/16-inch vertical grain shear webbing along the middle spars. For additional strength, I put sheer webbing on both sides of the spars and ran it out all the way to the bellcrank supports. I then added the 1/16-inch balsa cap strips positioned on the bottoms of ribs W1 & W2 as shown on the plan views. With the bottom finished, flip the wing back over to complete the build on the top. This includes the cap strips along the tops of ribs W1 thru W3 as shown on the plans. Remember to cut out the center section of the forward spar between the W1 ribs leaving just over 1/8-inch extending beyond the W1 ribs, which will be used to mount the engine nacelle.

With all that complete, sand the wing to shape using a Du-Bro sanding bar or a solid hardwood block covered with 100 grit sandpaper. You can now separate the ailerons from the wing. I used my razor saw to do this. Sand the ailerons to the correct shape and then install three hinges along the top of the aft spar for each aileron. Now is the time to test fit the wing servos and aileron linkages. Mount the servos to their trays, and then cut the various aileron control rods to the required lengths. The plan shows the control rods with "Z" bends at the ends, but I used metal clevises to connect the control rods to the bellcranks. The picture below shows the wing at this stage of the build. Note that I added some additional 1/8-inch balsa gussets at the corners of ribs W2 & W3. You can also see the 1/16-inch ply aileron control horns temporally mounted on ribs W3. This completes the wing build for now. While not the simplest wing build I've ever done, it does produce a very light yet strong wing assembly.

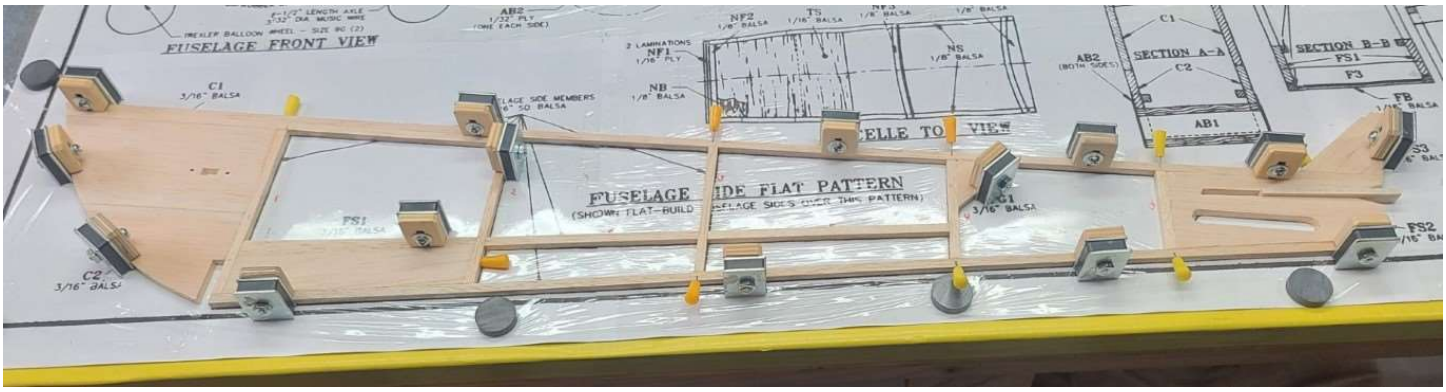


Let's move on to the engine nacelle build next. Using the templates from sheet 3 of the plans, cut out the various parts needed for the engine nacelle as shown in the next picture below. I'll be using a Dave Brown nylon motor mount, and I've marked the locations for the 4-40 mounting bolts (with blind nuts) and the throttle control cable passthrough on a 1/8-inch plywood firewall (top left corner piece). These holes will be drilled, and the blind nuts installed before I assemble the nacelle. The paper instrument panel is not shown in this picture because I still need to pull some graphics from the web for the various gauges.



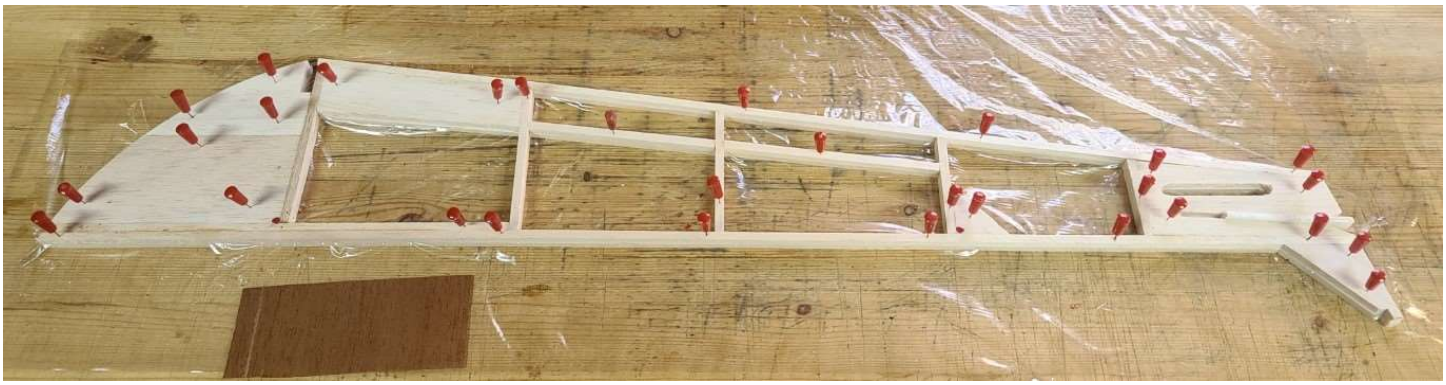
The Speedy Bee Manual calls for the wing to be built first, while the Speedy Bee Article from Outerzone has you build the engine nacelle first. Having used the build sequence from the manual, if I were to do this over, I'd build the engine nacelle first so it can then be used to establish the correct spacing between the two wing W1 ribs for a good fit. Adjustment of engine nacelle parts to fit the built wing is not the way to go, trust me. **Builders Note** – Temporarily pin together the engine nacelle and test fit on the wing, adjusting the size of parts to get the best fit. The nacelle can then be built directly over the first sheet of the plans as shown below. Note that I added some small balsa triangle stock to the corners of the firewall to increase the strength of these joints. Next, test fit the fuel tank you plan to use to establish the location for the fuel and pressure tubing passthrough holes in the firewall. Drill these two holes now, and then apply a thin coat of epoxy to the inside of the fuel tank area to help protect the balsa from fuel and to increase the strength of the nacelle. The top of the nacelle can now be sheeted using two 1/16-inch balsa sheets. To protect the plywood from any engine residual, I paint the front of the firewall with flat black enamel prior to covering the rest of the nacelle with Ultracoat. The last step is to mount the instrument panel layers to NF4.

How about we start the fuselage for this scratch build! Again, using the templates from sheet 3 of the plans, cut out and shape the parts needed for the left fuselage side from 3/16-inch balsa sheet. Then, as shown in the picture below, the left fuselage side is built directly over the fuselage side flat pattern on sheet 1 of the plan.



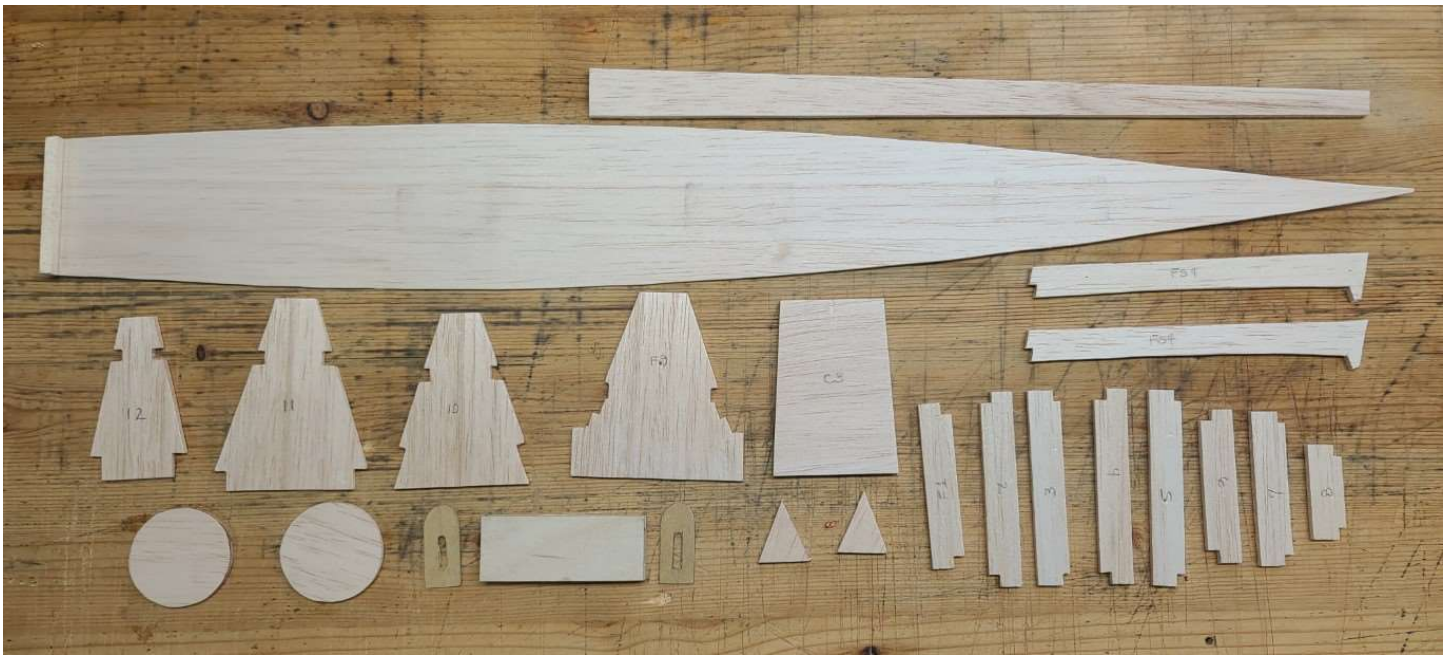
By using the mag fixtures, I can position all the parts together to check twice for proper fit. Prior to gluing, use the parts from the left fuselage side to cut and shape all the parts that will be required for the right fuselage side (minus the power switch mounting holes in C1). With that done, glue up all the parts for the left fuselage side.

After this side has dried overnight, remove it from the mag board, flip it over, and cover with clear plastic. Now I take all the parts cut earlier and build the fuselage right side directly over the left side as shown in the picture below. This ensures both sides are the same size.

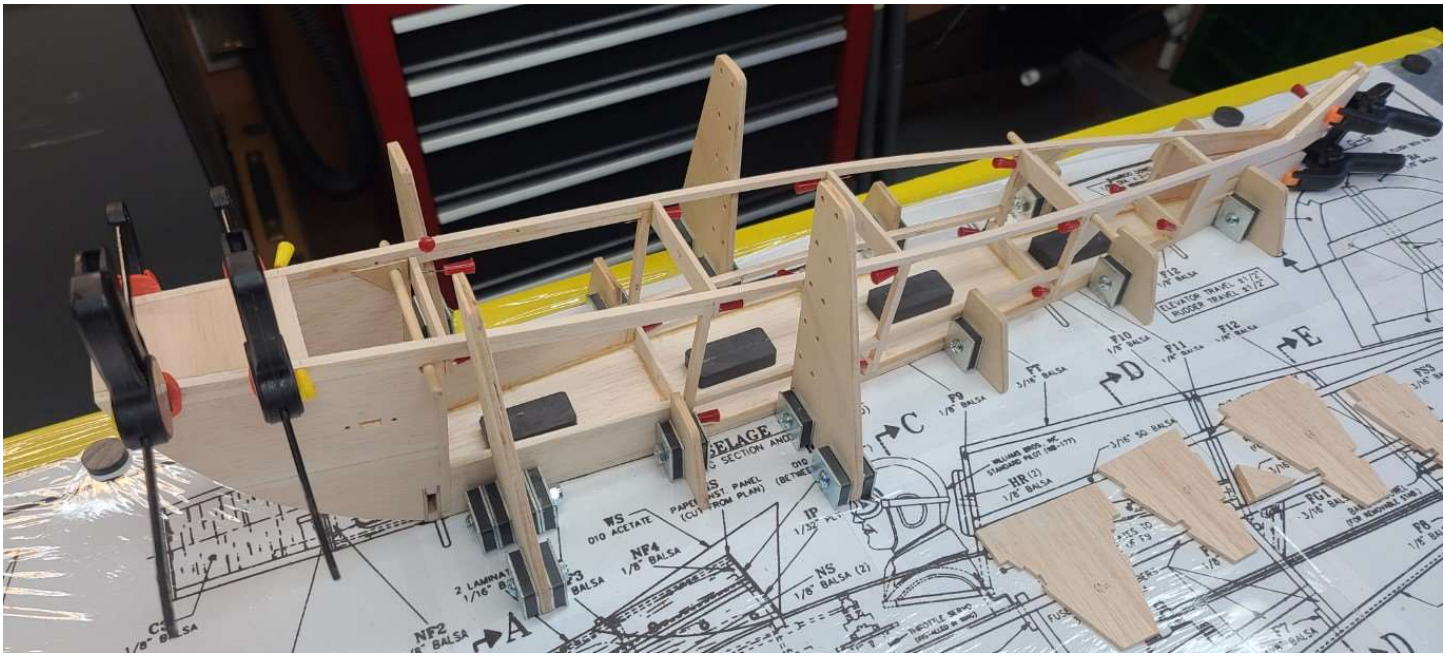


Once this side has dried, before removing anything from the building board, I drill the two holes required for the 3/16-inch hardwood dowls that are used to attach the wing with rubber bands. I'm not going to build the removable tail version of the Speedy Bee, so those holes are not required. **Builders Note** – I added 1/32-inch plywood gussets on the inside of each fuselage side over the corners where the hardwood dowels pass through the balsa sheets. Also, now is the time to check the fit of the landing gear axel box assembly in the notches cut in each C2. I had to enlarge these slightly because I used 3/16-inch square basswood sticks when I built my axel box assembly.

Again, using the templates from sheet 3 of the plans, I cut out and shape the various parts (cross members, formers, fuselage bottom, etc.) needed for the rest of the fuselage build as seen below, paying special attention to the material type and thickness required for each part, as this varies.



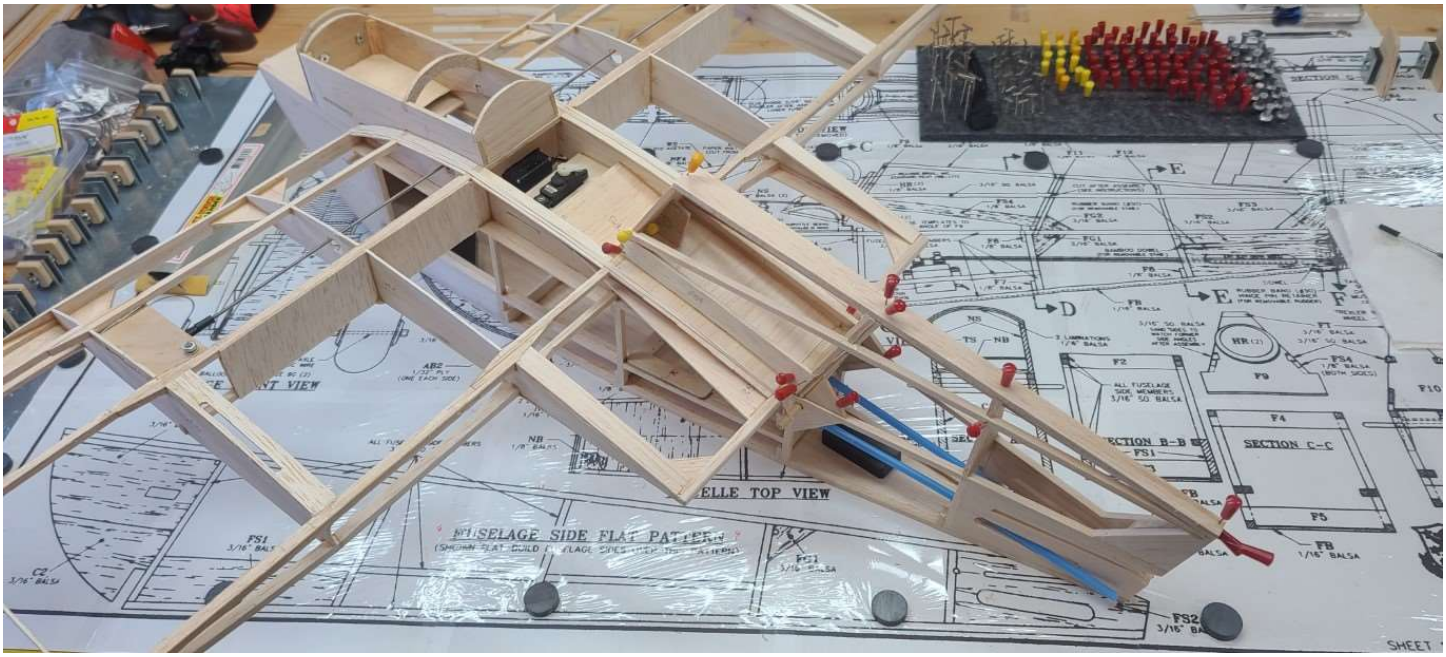
Now moving back to my mag building board, I first dry fit the various parts with the two fuselage sides directly over the plans to verify everything fits together as needed. This is where the mag build board and fixtures really comes in handy. The tall mag fixtures ensure the fuselage is built true and square. When I'm happy with the parts fitting together as needed, I glued everything up using Tightbond Ultimate wood glue. **Builders Note** – You can see in the picture below the plywood gussets that were added to the inside of the fuselage sides to strengthen the areas where the hardwood dowels are mounted. Additionally, I added some shaped balsa material between the two sides at the tail joint. This was required not only to strengthen the joint, but to also provide additional gluing surface area for the two rudder hinges.



When everything has dried, the fuselage gets removed from the mag board so I can sheet the front using two layers of 1/16-inch balsa sheeting. Then I sand all the fuselage sides down using 100 grit on my Duo-Bro sanding bar so everything is nice and smooth.

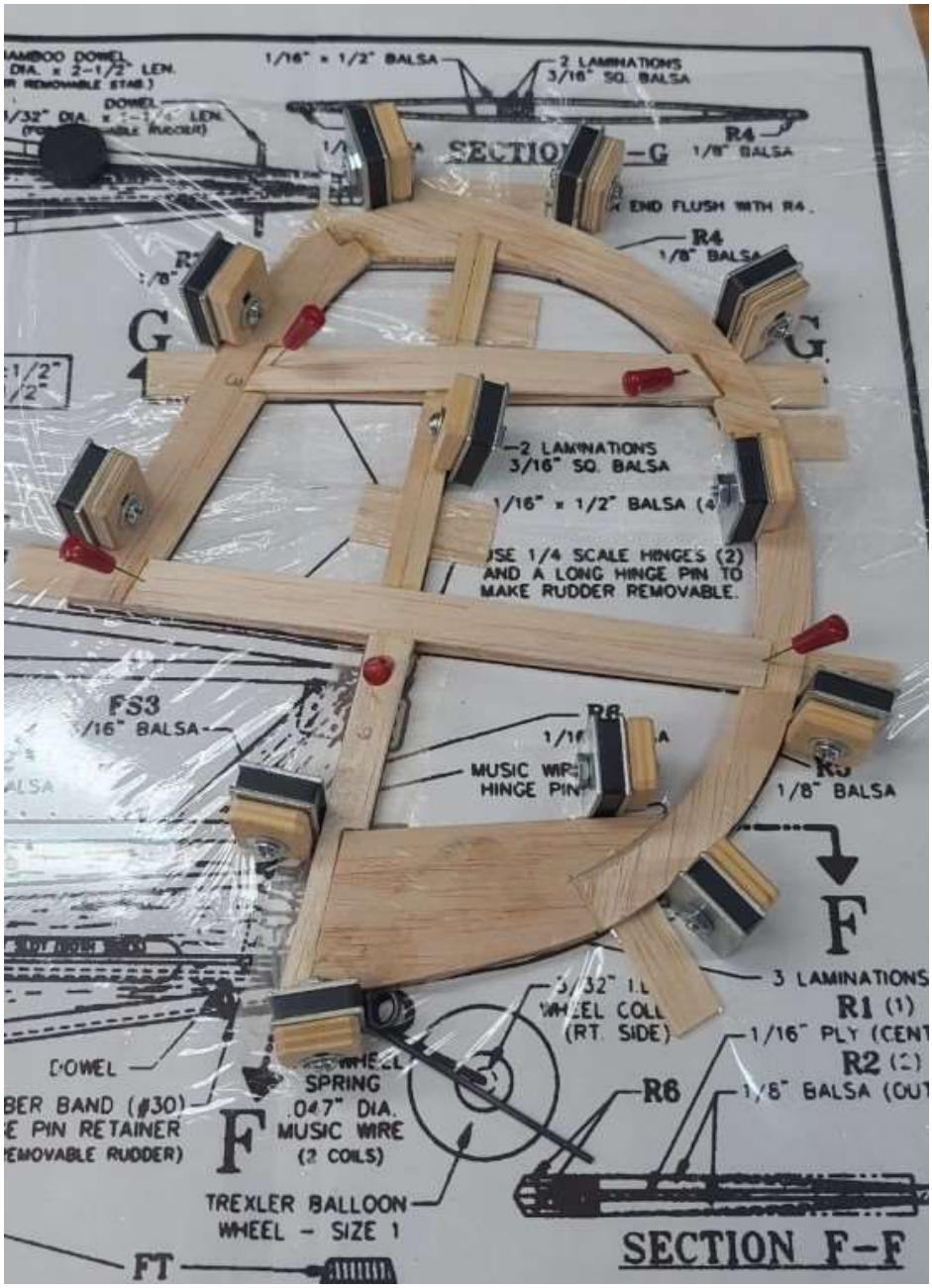
Before I move on with the turtle deck build, there are a couple items that need to be accomplished first. One is the installation of the servo tray for the rudder and elevator servos. I made the tray using 3/32-inch hardwood ply and after cutting out the servo mounting holes, I glued the tray just aft of F5. The other item is the installation of the rudder and elevator control rod tubes which are held in the correct position with a balsa cross brace just above the cross member F7.

Ok, lets add the turtle deck. Install the wing on the fuselage making sure it is firmly held at the correct position. Double and triple check this with the plans. I added four 1/8 x 1/4-inch basswood guideposts to the inside of the fuselage sides to help maintain the correct position of the wing and used rubber bands to attach the wing. Dry fit and pin together all the turtle deck parts first, because there will be some adjustments needed and beveling of the tops of each former. **Builders Note** – This dry fit also found another change to the wing that was needed. As originally built, there was very little contact area between the upper surface of the wing and the two turtle deck formers FS4 on each side. To correct this, I added 1/16-inch balsa sheeting over the top of the wing aft of the cockpit. This required trimming of the two W1 ribs to allow for this new "cap stripped" area, which you can clearly see in the picture below. After you have all the turtle deck parts fitting as needed, go back and glue everything up, being careful to not glue formers F10 and F11 together. I put some wax paper between them.



Using a razor saw, separate the turtle deck sections by cutting the turtle deck top and two 3/16-inch side stringers at the joint of formers F10 and F11. **Builders Note** – before sanding the turtle deck sections to the required shape, I'd highly recommend adding 1/8-inch balsa corner gussets to the underside of the turtle deck top at each corner of formers F9 thru F11. I also added a short piece of 1/8-inch balsa sheet between the two stringers in the fuselage turtle deck section. These stringers were soft balsa that flexed more than I liked.

Well, I guess we need to see about building some tail feathers for this little bird. The first thing I noticed about this model design is that the vertical stabilizer and rudder are built together as one single control surface. This is the first model that I've built using this configuration. As shown in the picture below, the "rubber" is built directly over the plan. I used 3/16-inch square basswood for the center spar versus the balsa called out on the plan. I also used epoxy for the laminated assembly at the bottom of the rudder since this could be a higher stress area if you make a hard tail first landing tail first. Once everything has dried, shape the rudder as shown on the plan per the cross sections F-F and G-G.



The horizontal stabilizer and elevator are a very simple build using 1/8-inch balsa sheets. I'm not building my Speedy Bee with the removal tail option, so this eliminates the two holes along the front edge of the horizontal stabilizer. Last item for this assembly is to cut out the six hinge slots and sand everything to shape.

It's about time to temporarily fit everything together to double check the build before any Ultracoat covering is applied, and to get an initial check on the C.G location. For this "fit-check" I install all the hardware needed for flight; this includes the engine mount, engine with muffler, prop and spinner; all the control surface hinges, servos and control rods; a four channel Spektrum receiver and 4-cell 2,000 mah Ni-Mh battery pack with switch harness; a 4-once fuel tank and fuel tubing; the complete main landing gear assembly and tail wheel; and don't forget the pilot. The results of all this can be seen in the picture below.

I found during this fit check that my Speedy Bee is nose heavy for a C.G. position at 3 ¾-inchs back from the wing leading edge as shown on the plans. I moved the battery pack back to just forward of the fuselage cross member at the back of the cockpit (see picture below), which helped, but it's still slightly nose heavy. Once all the Ultracoat is applied, and I have everything installed again, I think we will be good, but it may require me to use a 5-cell (6 volt) battery pack or put some lead ballast in the tail to obtain the correct C.G. position. Note - Don't forget to check the lateral C.G. to see if you will need to add any lead ballast in the left wingtip to offset the engine muffler sticking out on the right side.

Now I will take everything back apart and hit all the balsa surfaces with fine (220-grit or finer) sandpaper until I get the final shaping as I want. Before the Ultracoat is applied, I will wipe down each assembly with a tack cloth (which you can get at the local hardware or lumber supply) to remove the balsa dust. Let's start applying the Ultracoat covering. I'm going to use solid red, white, and some red-white checker pattern to cover my Speedy Bee. I move the mag building board off the table, clean everything up, and then I put down a folded cotton sheet (the pink in the above picture) over my table. I've found that this helps hold the assemblies in place while I'm applying the covering material and helps to reduce putting dents in the balsa from the hard wood tabletop. First items to be covered are the tail feathers, then the ailerons. **Builders Note** – I check the positions needed for the elevator and rudder control horns during the fit-check, and then I drill the holes for the mounting screws before applying the Ultracoat. The rudder control horn screws will pass thru the lower hinge, so this also adds to its strength.

Th picture below shows all the major assemblies with the covering applied. As I indicated earlier, the bottom of the wing/upper fuselage assembly is covered with the red/white checker that I used on the tail feathers. I still have not decided if there will be any color trim applied to the top of the wing.

Well, she is finally finished and ready for first flight. Decals were printed from my Canon ink jet printer using Koala glossy “no spray” waterslide decal paper which you can get from Amazon. Now all we need is some warmer weather.

Overall, this has been an interesting scratch build. I learn something new from each one. One item I think I’m going to address is the landing gear mounts. Using rubber bands doesn’t provide a very stable gear and the model wants to rock to one side or the other. The Clancy assembly instructions have an option using RC racer spring shocks and they will be simple to add even with the build completed.

Hope you enjoyed this build description. If you decide to try and build one yourself, please feel free to contact me @ l.nieman@yahoo.com if you have any questions.

Below is one more final photo which shows the modifications I made to replace the standard rubber bands suspension to one that uses RC car oil filled shocks/springs. These are Traxxas 3760A Ulta shocks, and the pair cost me $17.50 from the local hobby shop. This is much better.