Big Bird II Build Description

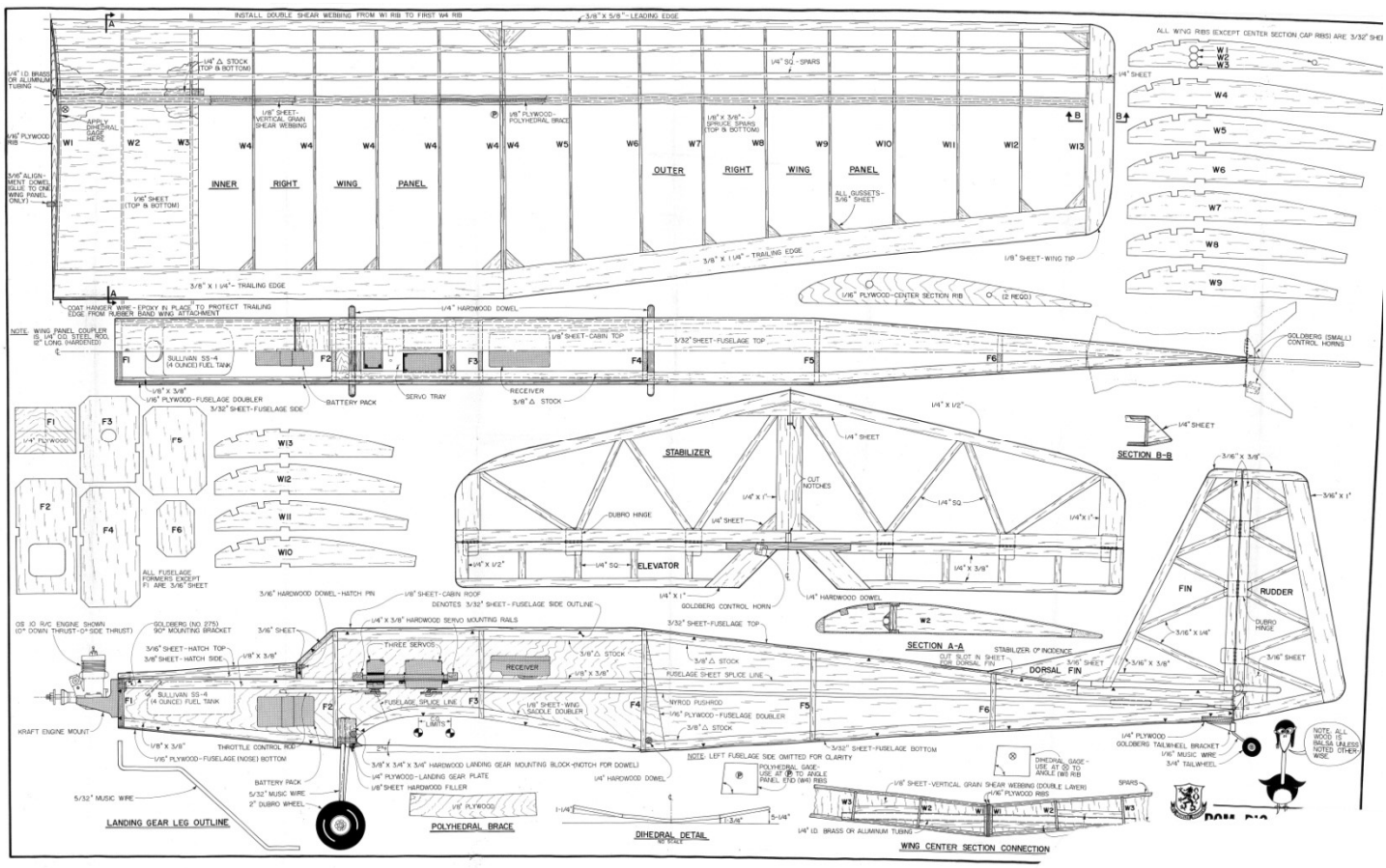


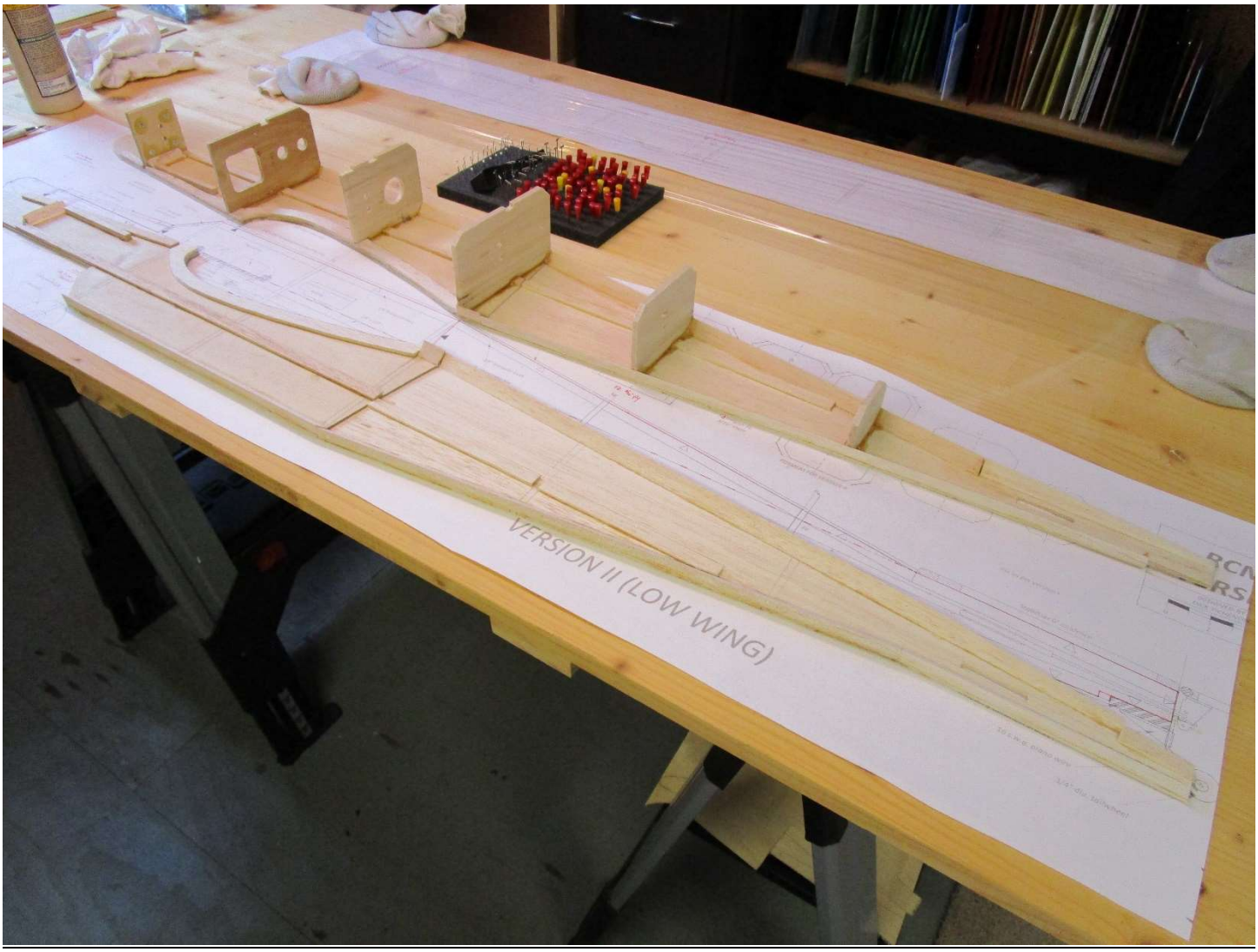
Image Source: A .png extract from Big Bird II RCM Plans.

The free Big Bird II plan shown above and Radio Control Modeler (RCM) article were both downloaded from AeroFred.com @: https://aerofred.com/details.php?image_id=79795. There also is a Big Bird I plan, which is very similar to the Dynaflight Butterfly plane.

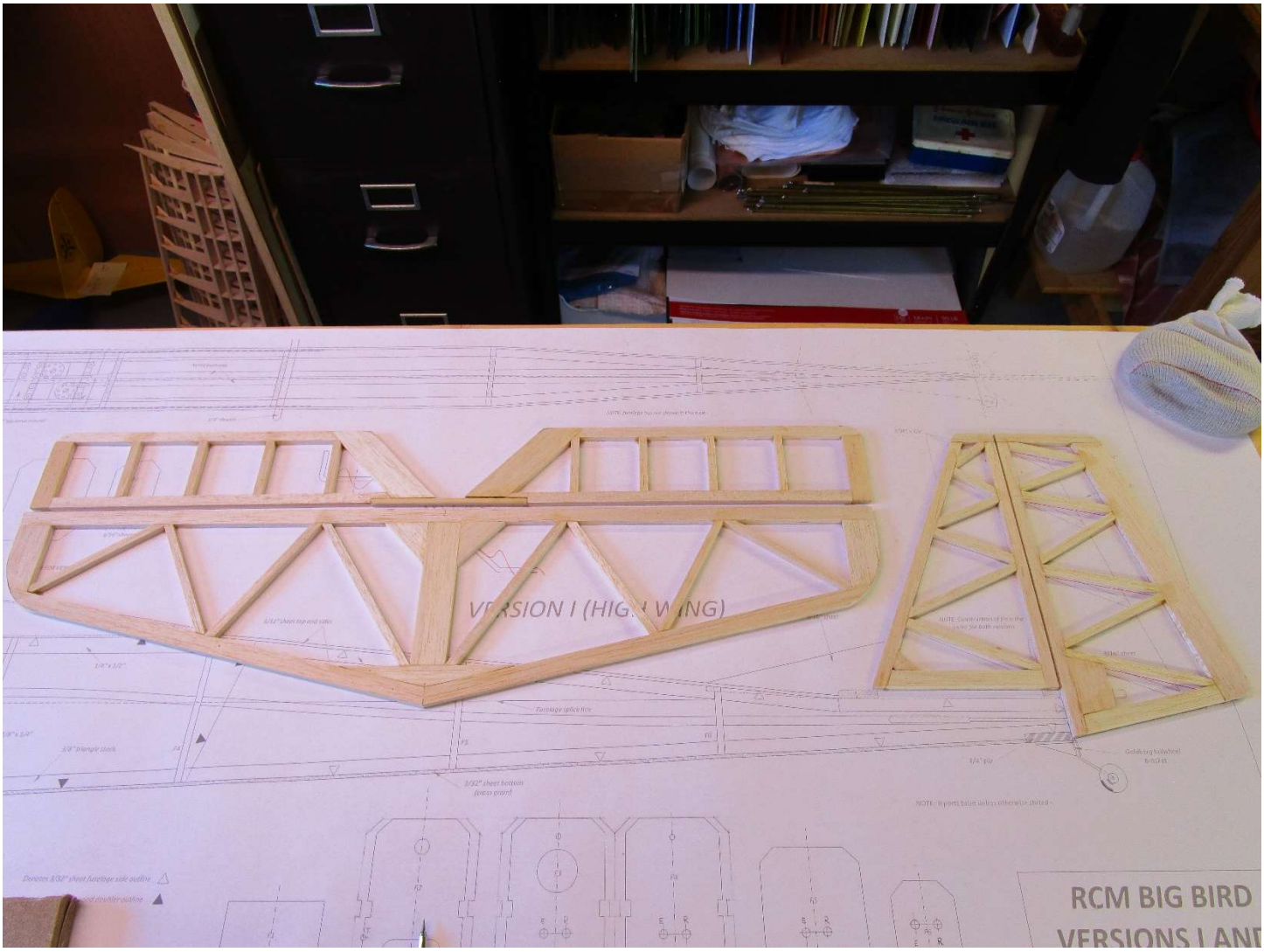
The construction is very straightforward. A basic **LONG** box fuselage, stick build tail surfaces, and a **BIG** flat bottom wing. This would be a great plane for the first-time scratch builder to build and fly. I modified the plans to use "bolt-on" wings, added ailerons to each of the outer wing panels and flaps to each of the inner wing panels, increased the rudder and elevator by approximately 30%, extended each of the inner wing panels to 23" which yields an overall wingspan of 94", and removed the dihedral at the wing center section joint. There are some other modifications which I'll call out later in this build description. I initially used an OS .26 Surpass 4-cycle for power, but later changed to an OS .25 FX 2-cycle so I could use the 4-cycle on another plane. I used five channels in my plane but that is not to say fewer could be used if you did not want the ailerons and/or flaps, or more can be used if you want to drive each flap and aileron surface servo using a separate channel on the receiver. Your call on this one.

First step in most of my builds is to print out a copy of the full-size plan on my Canon printer using the "poster" settings, and then putting all the pages together for an overall 66" x 42.5" plan. You can also get the plan printed out at FedEx for around $25 a copy, which is what I did this time.

Having the full-size plan, I go thru and determine all the materials I'll need to make the build. Any balsa sticks and sheets, basswood, or plywood I'll need is then ordered from Balsa USA. Hardware and any servos/receiver/battery needed are purchased at the local Anderson RC Hobby Shop in Thomasville, NC.

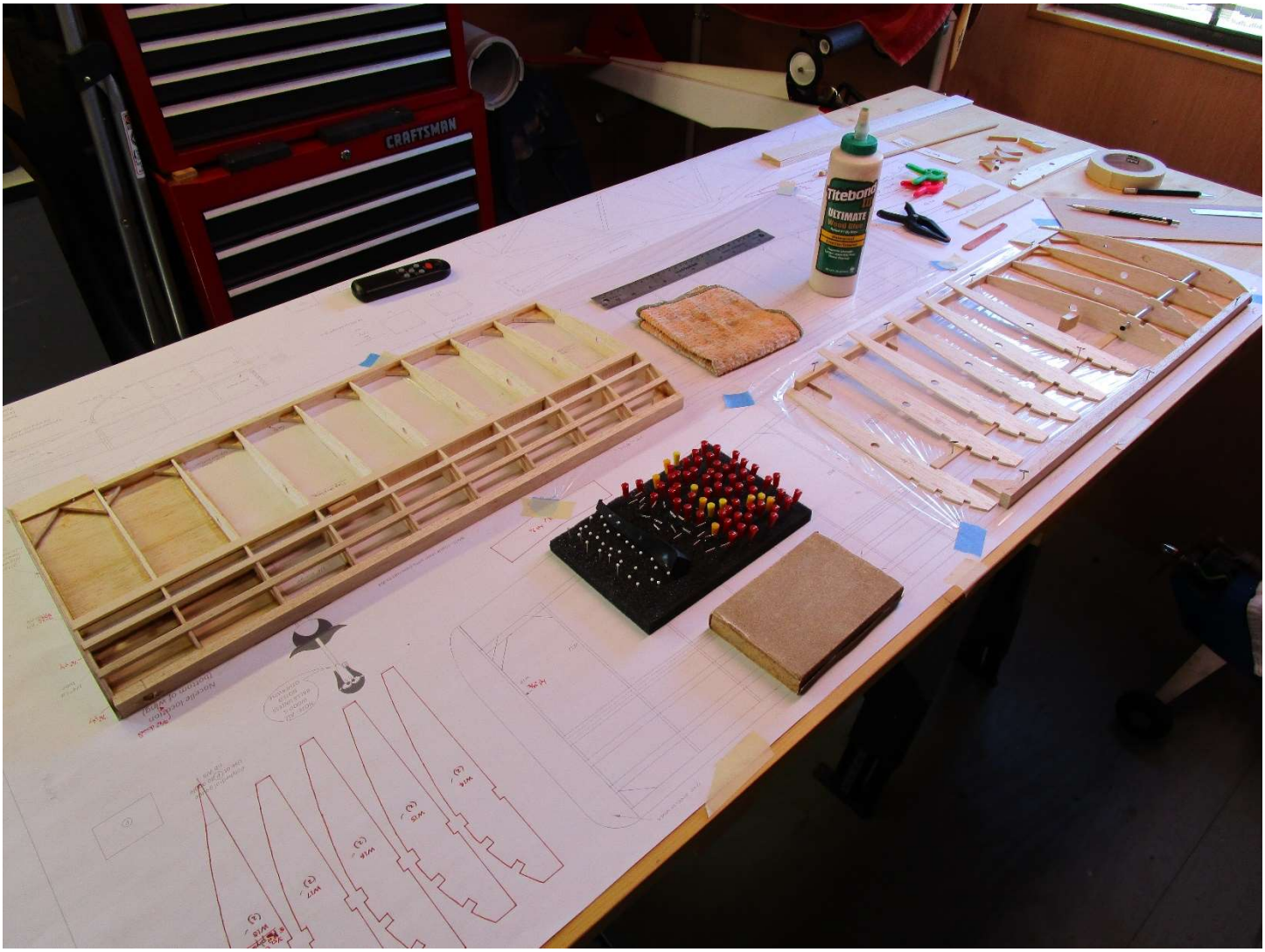


Fuselage sides are built directly over the plans. Modifications I made included the addition of a 3/8" x 1" hardwood wing bolt block former at the trailing edge of the wing saddle, changed former F2 to 3/16" plywood and drilled two 1/4" holes above the lower edge to accept the 5/16" hardwood wing dowels needed when bolting the wings to the fuselage, and addition of 1/8" plywood plates on each side at the bottom of F2 so I could mount an aluminum landing gear bracket versus the wire gear call out in the plan. Make all required templates directly off the plan for the various formers and fuselage sides. Before gluing the formers to the first side as shown above, make sure you drill out all required holes for the elevator and rudder control rod guide tubes thru F3-F6 and the throttle cable guide tube thru F2 and F3. Also epoxy the blind nuts for the engine mount to the backside of F1, and drill holes for the fuel/vent tubing. Join the two sides together and install the balsa sheeting needed to cover the top and bottom of the fuselage. Make the forward access hatch used to gain access to the fuel tank and receiver battery. The servo tray will ride along the inner sidewall balsa sticks you see running between F2-F4. This gives you lots of flexibility in establishing the proper CG later in the build. Remember to fuel proof the inside of the fuel tank compartment. I use epoxy brushed on all the balsa surfaces. Let's go do the tail feathers.



The picture above shows the build-up of the tail feathers. Each are built directly over the plans covered with some wax paper. Modifications I made were to use basswood for the vertical stab trailing edge, horizontal stab trailing edge, and the elevator and rudder leading edges. Another mod I make to all my scratch builds is to place some 1/64" ply on the bottom of the elevator to cover the joints between the center hardwood dowel rod, the leading-edge pieces, and the balsa corner bracing on each side of the center gap. I also add a piece of 1/64" ply to the area at the lower portion of the rudder where the control horn will mount (not shown in these pictures). All these modifications will add a very small amount of weight but will greatly increase the overall strength of the tail feathers and provide solid surfaces for the tail control horns. The leading edges of the elevator and rudder must be rounded to allow each to pivot at least 45 degrees in both directions. I will use Robart pin hinges, drilling the required holes in basswood pieces using the little Robart fixture. These get epoxied into the tail feathers after all covering is finished, and the tail surfaces are epoxied to the fuselage (horizontal stab first, followed by the vertical stab, then the elevator, and finally the rudder which fits over the elevator center dowel).

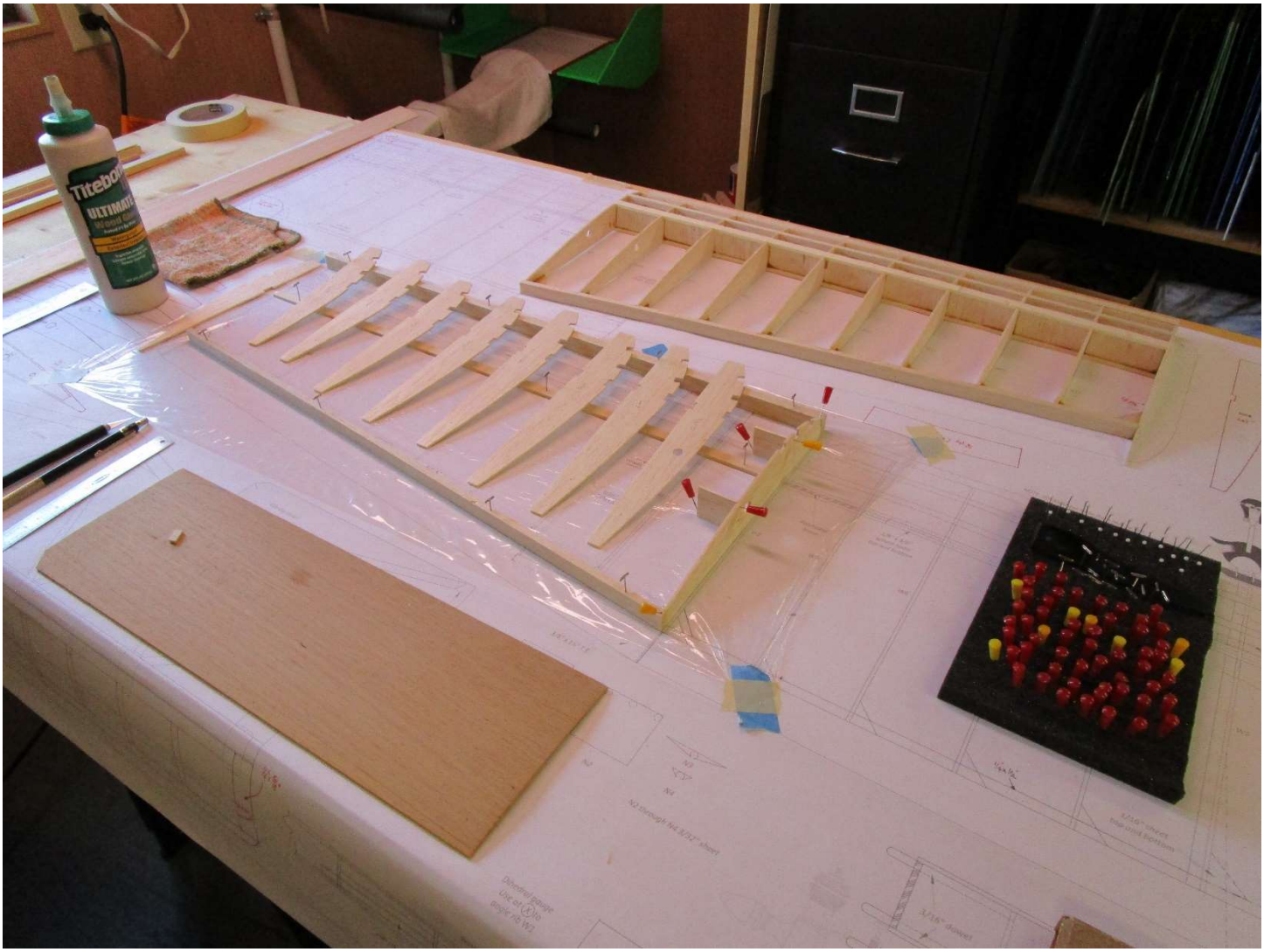
Time to move on to all the wing panels for this big, winged bird.



Since the airfoil is flat bottom, the wings can be built directly on the plans without having to use a wing jig. As I'm cutting out each set of ribs (and there are many for this one), I test fit and adjust each rib to fit over the lower spar and between the leading edge and newly added 1/4" x 1/2" trailing edge. This wing design has vertical grain shear webs between the spars, which results in a strong, but very light wing structure. While many builders use CA for their assembly, being an old man that moves slow, I prefer to use a premium wood glue (Titebond III from the lumber yard) for most of the assembly, and two-part epoxy for the high stress areas (like landing gear plates, F2 firewall install, horizontal tail to fuselage joins, etc.).

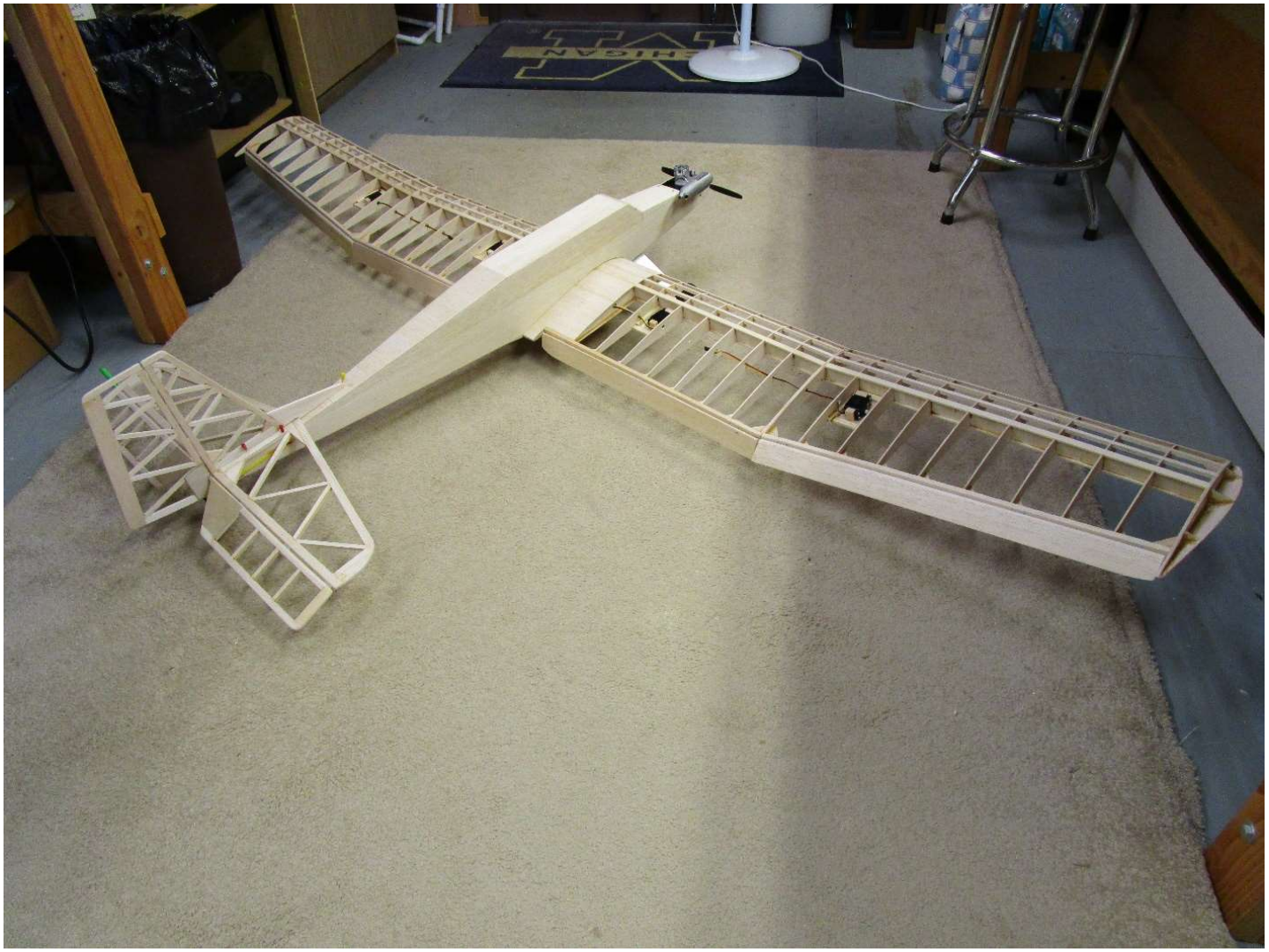
The wing is made up of two inner panels and two outer panels. The picture above shows the inner panels assembly. Each has a guide tube installed thru the first four ribs from the centerline and up against the main spar to guide the wing rod. Since I'm adding flaps to the inner panels, servo hatch mounting blocks must be installed between ribs W4 and W5. Servo cable holes (3/8") need to be cut thru each rib from W1 all the way out thru W10. I extended the inner panels with the addition of two more W8 ribs in each panel for a total length of 23" per panel. Also, since I'm removing the centerline dihedral, the location of the 1/4" holes for the wing rod guide tube do NOT change as shown on the plan but are all in the same location for W1 – W4. Also, I used 3/32" plywood for the W1 ribs. 1/8" plywood plates are added between ribs W-1 and W-2 to hold the 5/16" hardwood dowls that will be installed for the "bolt on" wing modifications. These two dowels run thru the two holes drilled in former F2.

The picture below shows the outer panels assembly. Here you need to add servo hatch mounting blocks between ribs W10 and W11. Rib W9 is glued at an angle using the polyhedral guides on the plan. You can see these in the picture. Once all wing panels are assembled join (with 30-minute epoxy) the inner and out panels for each wing half.



Now it's time to see how everything fits together. Install the engine along with the muffler, prop, and spinner. Install the fuel tank and receiver battery along with any required padding, and the throttle guide tubing. Slide the elevator and rudder control rods into guide tubes. Install the landing gear and tires on the fuselage. Install all servos in the wings and the servo tray assembly with servos in the fuselage. Temporarily install hinge pins in the ailerons and flaps, elevator, and rudder, and then mate to the respective members. As seen in the two pictures below, join the two wing halves with the wing rod and attach the wing to the fuselage, and then temporarily pin the tail feathers to the fuselage. Now see where the servo tray assembly needs to be placed in the fuselage to obtain the correct longitudinal CG. You also need to check the lateral balance and place any required weight in the wingtip that is light. Once you have finished that, disassemble everything, finish sand all surfaces with 220 grit sandpaper, wipe surfaces down with a tack cloth, and then lightly coat all areas that will contact your covering with Coverite Balsarite from SIG. I paint the inside of the engine compartment with flat black oil-based enamel paint to protect the balsa from any glow fuel. Apply whatever covering you like to use.

Note: The small window you see at the front of the fuselage upper deck is a voltage meter for the receiver battery pack. I try to install one on all my plans to keep track of the battery voltage at the flying field. You can get them off Amazon.



Once you have all covering finished, epoxy the horizontal stabilizer to the fuselage making sure it is level, then install the vertical stab to the top of the horizontal stab using epoxy. I use a plastic triangle taped to the two stabs to ensure they remain perpendicular to each other while the epoxy cures. With that finished the elevator is matted to the horizontal stab using epoxy and 6 pin hinges, followed with mounting the rudder to the horizontal stab. With all the tail feathers in place the control horns are mounted to the elevator and rudder and the control rods measured and installed. Install your receiver and battery pack and work thru the programming of your transmitter to get all the control surfaces to function as you need.

The picture below shows my finished Big Bird II at your flying field. Double check all the control throws, and throttle throw for correct directions, and verify the CG is per the plans. Don't forget to complete a range test of your receiver.

This is a very easy plane to fly. With the very big wing she is a gentle flyer for anyone just learning how to fly. With the flaps full down, reduced throttle, and a gentle headwind, the Big Bird II can **actually fly backwards** relative to your ground position.

I hope you enjoyed this build and have fun flying the resulting plane as much as I have.