TEXT & PHOTOS BY **ANDY CLANCY**

Designer Andy Clancy created the Lazy Bee model and all its variants.

The Bee Liner

A multimotor plane from the father of the Lazy Bee

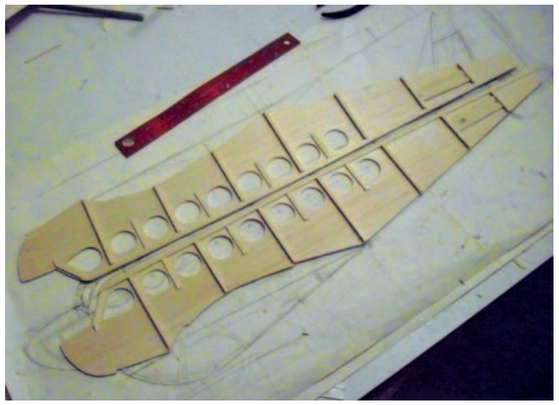
I suppose you might be expecting something "lazy." Let me introduce you to the Bee Liner, a plane whose finest trick is just sitting "stationary," taking a break, reclining in the air. You can do this stunt pretty easily. The Bee Liner stays airborne because it has four propellers blowing air over its wing. Be sure to read the complete instructions (at ModelAirplaneNews.com/beeliner) before you make the parts. Don't make the fuselage sides until you have read that section. Most of the parts should be made out of good hard balsa. There are few parts, and they are simple.

THE WING

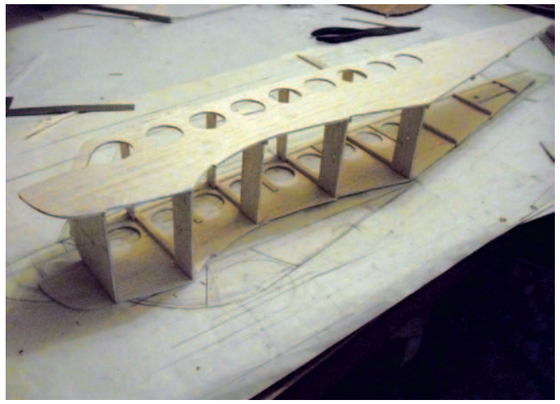
Build each of the three wing panels separately, from front to back. The best way to make the leading edge just as straight as it can be is by lamination, which is actually pretty easy. The ailerons are built as integral parts of the tip panels and will be cut away later, after the completed wing has been sanded to shape.

NACELLES

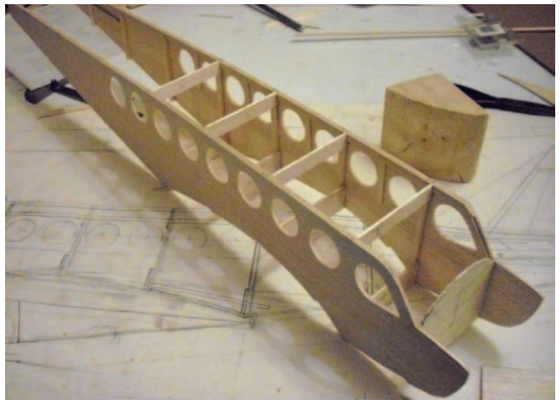
Each nacelle is built like a small fuselage. The outer pair houses the aileron servos. Use the wing as a building jig to make sure the outer nacelles match up to the wing. A tricky part: When your four nacelles are all made, you will need to drill two holes in the firewall of each one for the wing dowels to plug into. These holes will need to be precisely located. The engine nacelles are designed to allow for different-size motors to be used. The nacelles are intended to look good with either uncowled motors or cowled-in motors.



The fuselage starts by assembling the two fuselage sides. Make a left and a right side.



Using the crosspieces, join the two sides so that the sides are properly aligned.

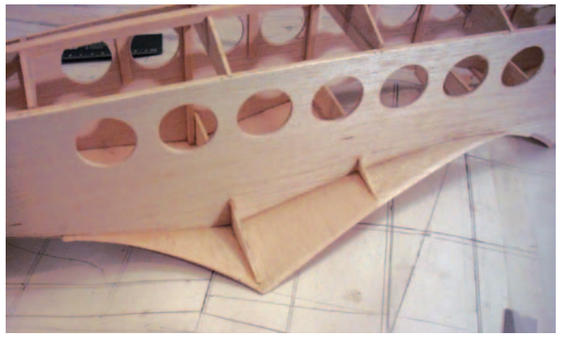


Here, you see that the fuselage sides are parallel to each other and easy to frame up.

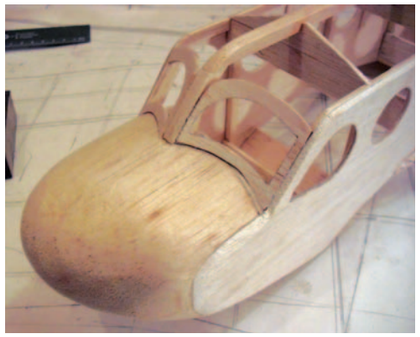
FUSELAGE

The fuselage is a simple box structure that has a keel on the top. It is designed to be assembled upside down over the top view of the plans. The peaked roof is built later. The three tail surfaces are mounted and aligned by carbon-fiber rod spars. The tail surfaces are secured by rubber bands. The wing fillets are built up on the bottom sheeting. Carve the nose block from a single piece of soft balsa. It's difficult to smoothly shape glued-together soft balsa; if you can't find a big enough block, use medium balsa. Use a Dremel Moto-Tool to hollow it out from its back side. Do the final sanding and shaping after gluing it in place.

Now the top of the fuselage can be built up.



The bottom sheeting forms the base of the wing fillets.



Sand and shape the nose block before you install the windshield frames. The bottom edges will need some beveling to fit. Lightweight spackling fills the gaps.

The wheels are mounted in the inner nacelles. This was done to reduce drag and complexity.

SPECS

Model: Bee Liner

Type: Sport flier

Wingspan: 51 in.

Wing area: 448 sq. in.

Weight: 28 to 46.5 oz.

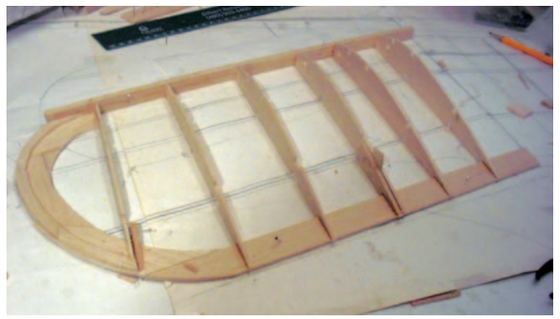
Wing loading: 9 to 15 oz./sq. ft.

Length: 32 in.

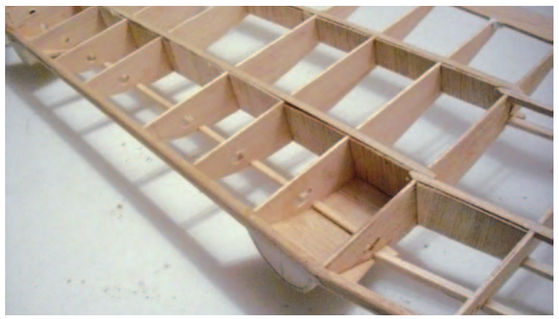
Radio req'd: 4-channel (throttle, aileron, rudder, elevator)

Note the access holes for the wing hold-down dowels. This is an effective and streamlined way to attach the wing to the fuselage using rubber bands.

The wing center section takes shape.

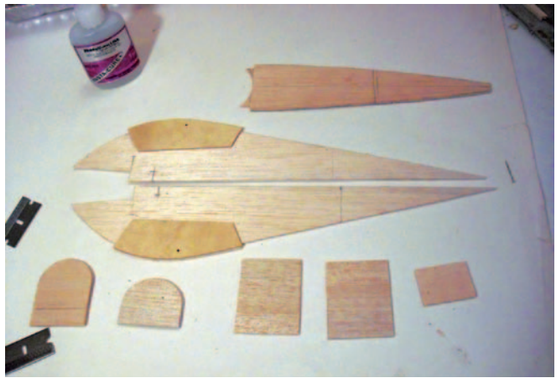


Here, one of the two outer wing panels is being assembled.

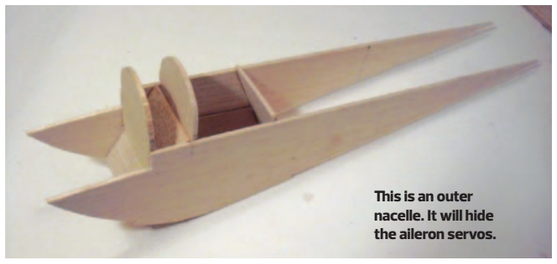


The dihedral is made with simple lap joints.

The dihedral is set with a jig piece under the wingtip.



Here are the parts for a nacelle assembly.



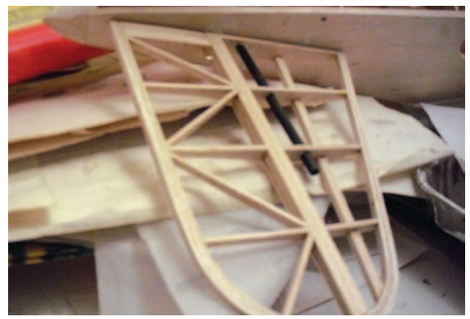
This is an outer nacelle. It will hide the aileron servos.

The nacelles go together like little fuselage assemblies.

The motor cowls are carved and sanded in place on the nacelles, then you hollow them out. They are a lot of work, and the plane does still look good without them. The online article shows some easier cool-looking alternatives.

Here are two nacelles: The bigger one is the inboard nacelle, while the smaller one is the outboard one, which also will contain the aileron servo.

The horizontal tail will be shape-sanded, then the two surfaces are separated. The front of the elevator should be round. The airfoil will be mounted inverted.



Note that the horizontal stabilizer is attached to the fuselage with the flat side up.

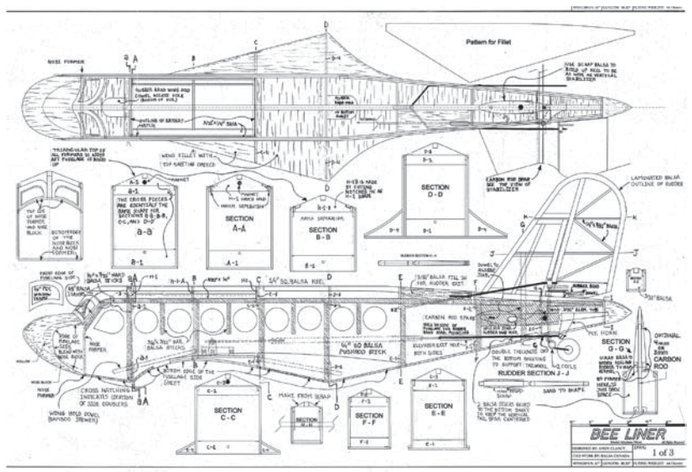
Install all the triangular top formers; they are the pieces that give the fuselage its peaked-roof shape. The keel goes in after these (fitted dry) and then the windshield frames. The battery hatch is built up in place using the fuselage as a jig. Do not remove the hatch until later, after the finishing shaping and sanding is done. I used small magnets to hold the hatch in place. The sides of the keel have to be built up with scrap balsa to form a base for the vertical stabilizer.

After you glue in the wing-alignment dowels and the pieces that form the underside of the wing fillets, install the remaining bottom sheeting. On the last piece of sheeting, you'll need to glue on a pair of sticks to form a slot. This is to hold the end of the rudder spar securely so that the vertical tail doesn't lean from side to side.

THE TAIL SURFACES

Use medium/light balsa. The vertical stabilizer has a symmetrical airfoil at its base and a flat airfoil at its tip. It has a center core frame made out of 1/4-inch-square balsa sticks. The outer sticks will need some carving to form the airfoil. Then you need to drill the holes for the spar.

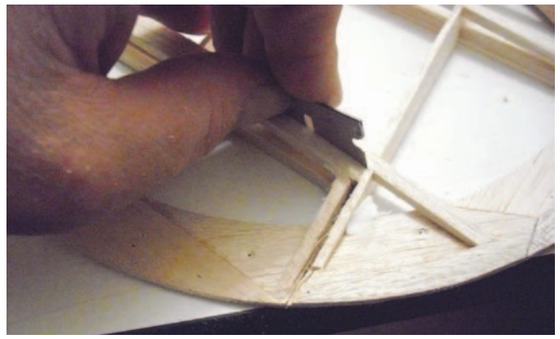
The rudder and the horizontal tail have



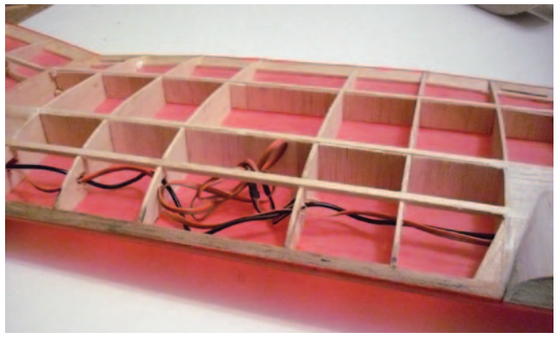
Bee Liner | X1117A

Designed by Andy Clancy, the Bee Liner is the latest in the Lazy Bee series. It is meant to be particularly versatile: docile yet capable of providing challenging stunt flying to an expert pilot. The model uses simple built-up wood construction. WS: 51 in.; L: 32 in.; radio: 4-channel; power: (4) small brushless motors; LD: 2; 3 sheets; $16.95.

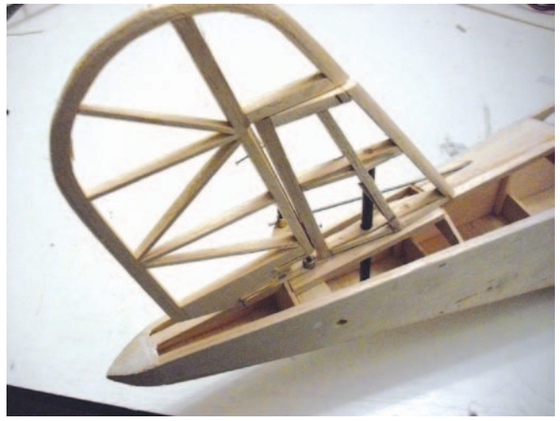
To order the full-size plan, visit AirAgeStore.com.



Here, I am separating the aileron from the wing structure before covering it.



Notice the vertical grain webbing applied to the wing spars and the holes in the ribs for the wiring to pass through. Don't forget about installing pull strings before you cover it.



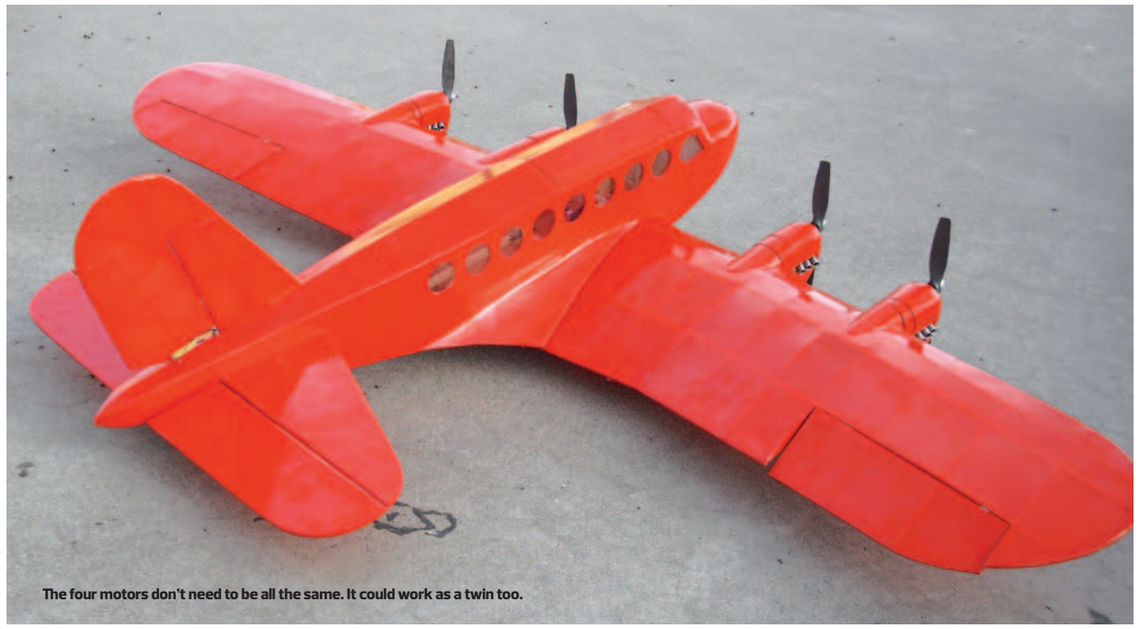
Here, the fin and rudder are in place on the tail of the fuselage.

laminated parts, so start with those. The rudder is a simple frame that is built in place over the plans and attached to the vertical tail with hinges. I favor removable hingepins to facilitate quick repairs as rudders tend to be a hot spot for damage. The horizontal tail uses a flat-bottomed airfoil turned upside down. So it's a flat-topped airfoil. Build it upside down, starting with the two tapered spars. You will build the horizontal stabilizer and elevator as a left-side pair and a right-side pair. Each pair is built in one piece and will be separated into a stabilizer and an elevator only after the shaping/sanding has been done.

The horizontal stabilizers can be glued to the fuselage, or they can be rubber-band-mounted. A small hook can be attached to each horizontal stabilizer's root rib. Holes in the fuselage sides would allow a rubber band to pass from the hook on one side, through the fuselage, to the hook on the other side.

COVERING AND BALANCE

This plane has a lot of surface area, and it will need two rolls of covering. The weight of that covering will make a giant difference in your plane's performance. So keep it light! Balance the model about 1/2 inch behind the main spar. This will make it somewhat nose-heavy and docile on the controls. The battery is mounted on the center of balance and can be shifted forward or aft to alter flight performance.



The four motors don't need to be all the same. It could work as a twin too.

FINAL ASSEMBLY

Because of its frame, the Bee Liner is not fussy about the motors or the size and weight of the radio equipment. But I always favor the lightest-weight equipment. If it will fit and there is enough power, it will fly. Keep in mind that your props need to be 7.5 inches or smaller. (Gear-driven motors raise the thrust line and can use larger props.) For the best all-around flying, I'd choose four small outrunners that are intended to fly a 3D plane of about 6 to 10 ounces.

To test the upper limit, I used the Electri-Fly RimFire 400 brushless outrunners (GPMG4560) with 7x4 props (smaller than these motors normally use). This was the maximum power the plane could handle (it would have been overpowered with only two of these motors!). The heaviest battery was a 3-cell 3350mAh pack. For baseline simplicity, I think something like the Grand Wing Servo GWS 300H C direct-drive can motors with their 5030 propellers and a 2-cell LiPo pack would be about the least expensive thing that would fly it.

Although I didn't use them, counterrotating propellers could be an improvement. There would be no torque constantly trying to turn the plane. I'd arrange them so that the prop tips move outward above the wing; that way, if any motor fails, the uneven asymmetric thrust would be minimized.

BOTTOM LINE

Flying this plane is fun and exciting. It's a Bee, after all! The Lazy Bee series of planes was meant to be particularly versatile: docile yet capable of providing challenging stunt flying to an expert pilot. The Bee Liner is no exception. Stalls are predictable and gentle. The response to stick and throttle is quick and powerful. If you take your hands off the controls, the Bee Liner will quickly go to straight and level from any nightmare attitude. It can be maneuvered in very tight spaces. Flying at its slowest speed, however, does take a little experimenting with technique.

Caution: Really Big Lazy Bee Ahead!

by Budd Davisson

Editor's note: Budd is the editor-in-chief of our sibling publication Flight Journal, *a magazine dedicated to full-size aircraft and heavy metal World War II warbirds. Budd also has a soft spot for RC models.*

While not a human-carrying version, this giant-scale KirBee is about as close as you can get. Kirby McKinney's 17-foot-span Lazy Bee was built in a team effort with Mark Davidson, and like the original Lazy Bee, it has only throttle, rudder, and elevator control. And it flies great! First flown in 2009, it was powered by an Air Hobbies 9.8ci twin-cylinder engine. It weighs 80 pounds and is now hanging in the main hangar at the Triple Tree Aerodrome in Woodruff, South Carolina. (Photo courtesy of Laura McKinney)

Everyone needs a crazy idea to fuel their day-dreams. All right, folks. I'm about to give everyone a license to laugh at me. (I expect this; actually, I encourage it because it's not healthy to keep a good belly laugh bottled up.) Many folks have projects lounging around in the back of their minds that they'd like to do. Most are super low priority and many aren't even close enough to a back burner to stay warm. Usually, they are forgotten for long periods of time. Then something triggers an interest button, and they slide over onto a burner, come to a slow boil, then drift away to cool off again.

I have literally hundreds of folders lying around that cover all the back burner ideas I've ever had. They act as repositories for notes, thoughts, articles, and drawings for each project, and the "Lazy Bee File" had all of those. At one point, I had done a lot of thinking about it. What, you may ask, is a Lazy Bee? An insect on welfare? No. It's a model airplane, designed by fellow Zonie, Andy Clancy, that has totally captured the imagination of the modeling community to the point that it's gone past fad status to become a full-blown legend. This is pretty amazing considering it's as funky as dirt. Maybe funkier.

It should be noted that the Lazy Bee's so-ugly-it's-cute looks wouldn't be enough to make it a runway pop star unless it was also an incredible flier. It started out as a super-light backyard flier with something like a 2-foot wingspan and has now been cloned in every size up to 17 feet!

The instant I saw the airplane, my brain went into hyperdrive, and the corner of my mind that's always reserved for designing airplanes began frantically dusting off mental drawing boards and polishing the rust off old engineering neurons. A message flashed upon my mental annunciator panel: I want to build a real, human-carrying version of this airplane!

In a matter of seconds, I was imagining truss layouts for the tubing fuselage and ways to make the round window frames. Images of possible wing fittings to handle the outboard joint popped into my mind like flip cards until I had to sit down with a sketch pad so that I wouldn't forget what my mental eye was seeing. Landing-gear designs rattled on stage, were examined, and then discarded. Everything from wheel-to-wheel leaf springs to an outrigger gear with a vertical shock strut pinned to the top of the fuselage (now that would be classic) made a showing. My brain was on a roll. Somehow, however, as life took its many turns, the Bee trundled off to mental obscurity and was forgotten—until yesterday. Now I'm in the Bee game again and ready to rock and roll.

Yeah, I know. This is a really crazy idea, but picture looking up on final and seeing those big balloon tires, slab-sided fuselage with windows shaped like John Denver specs, and polyhedral wings coming at you. What an absolute hoot! Will I do it? Maybe. Besides, I have a Pitts and I manufacture four-place, 260hp airplanes, so it's only fitting that I have an airplane that redefines the word "funky."