"A model that makes people smile"

LONGSTER WIMPY

■ **Dereck Woodward**

Back in 1930s Oregon, Les Long designed and built lightweight single-seat aircraft. The Wimpy had a flat twin engine that Les built from Harley Davidson cylinders and his own crankcase. The low wing was unusual; his designs used shoulder or parasol wings for a better downward view, but a long tail and high aspect ratio are his style.

Scale modeling involves documenting dials, researching rivets, observing oil leaks. In Electric flight, the gurus say, "Size the model, work out the power needed, spend the money." I'd fallen for this aircraft, and wanted a model of it! Scale competition is out of reach nowadays, so I aimed to capture the "air" of the design.

For power, I had a $40 geared Graupner Speed 600 motor, some eight-cell packs, and wanted a home for them that didn't look like other eight-cell models. So I made a CAD file using a smaller version's outline and "adjusted" the size. A structure for a gentle flying sport low-winger was drawn inside the lines, and I was up and away.

Yellow with black is a "good-looking, best-guess" color scheme; better reference may emerge one day, but this is cute. It's

fun to fly, with decent performance, and always raises a smile.

While following the three principles of Electric flight—build it light, don't make it heavy, and take out all the weight you can—Wimpy is a practical sport flier that looks a tad like a full-scale aircraft; a good combination.

CONSTRUCTION

Laminated Parts: Make these parts first, and get on with other parts while the glue dries. These help prevent "Aft CG Migration"—if you make the stabilizers from solid sheet, on your head be it. The wingtips are also laminated; can't think of a better way to make them tough and light. Laminating forms can be anything that's 1/4-inch thick; I used corrugated cardboard edged with parcel tape.

Cut strips of 1/16 x 1/4 balsa, four per lamination. Soak them

LONGSTER WIMPY

Type: RC Electric Sport

Wingspan: 59 inches

Motor: Geared Speed 600

Functions: Rudder, elevator, ailerons, motor

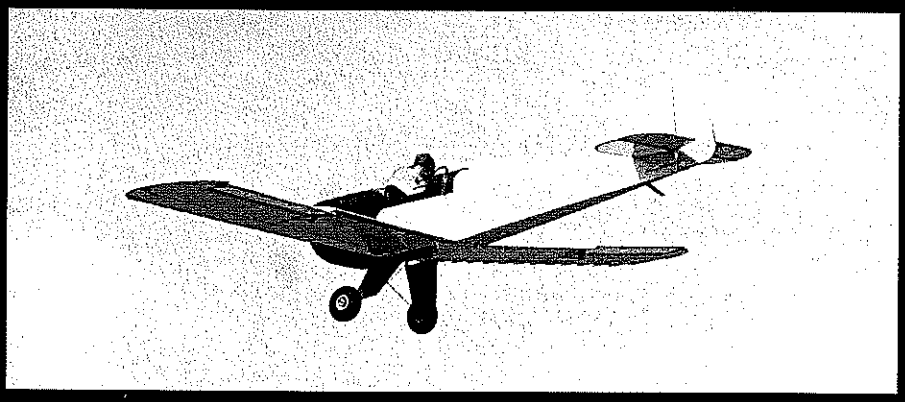
Flying weight: 52 ounces (approx.)

Construction: Built-up

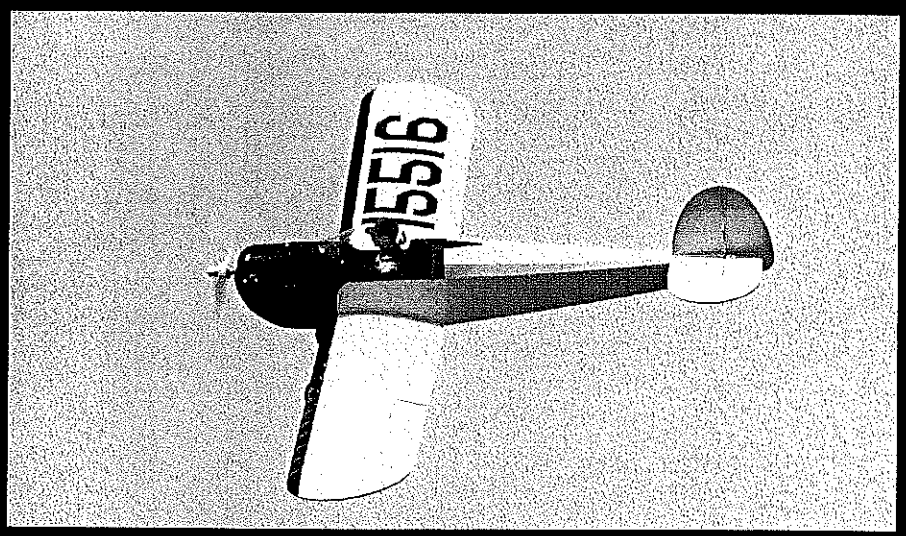
Covering/finish: Towerkote

Graphic Design by Carla Kunz photos courtesy the author

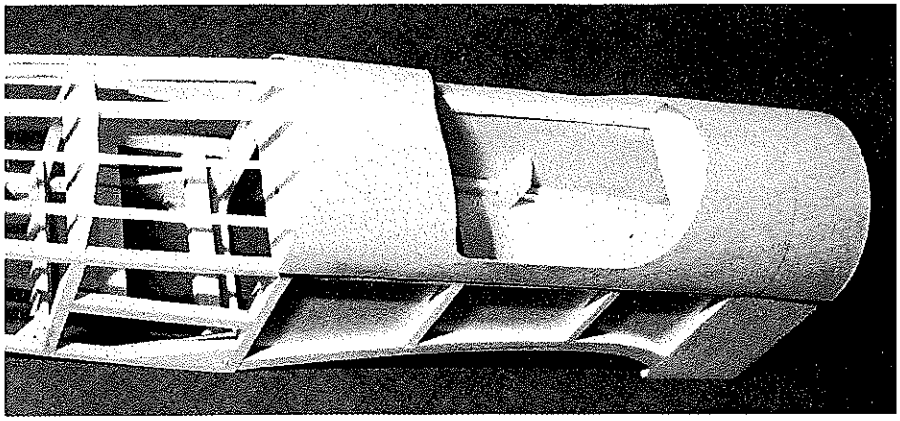
"Someone has to be behind this saga," says the author. "Wish I had a long, skinny body too!" The 59-inch-wingspan model is a very practical and economical size.



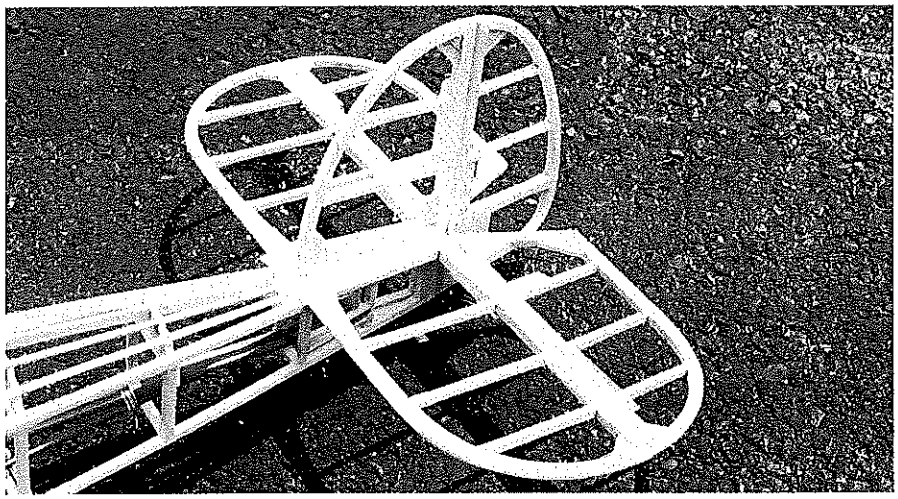
Nearly overhead to capture the bottom of Wimpy on a slow flyby. Cub Yellow TowerKote is slightly translucent, just shows off the lower wing structure here.



A high pass (well, you can't see the ground) to show off the plan view. Wimpy might be yellow, but no one should ask, "Is that a Cub?" Geoff Wells photo.



Top rear deck stringers are 1/16 x 3/16 spruce to show a sharp edge through the covering, yet withstand handling. The now-complete hatch sits in place.



Top deck formers are scalloped between stringers so they do not show. Tail units held on with clear tape to set up controls while the fuselage is uncovered.

in the bathtub. Make up a 50% mixture of white glue and water while the wood soaks. After half an hour or so, fish the wood out and dry off surplus water before spreading glue on all mating faces and positioning the strips together. Really push them together (rolling gently with a large dowel works) to ensure they are fully glued together. Wipe off the excess glue.

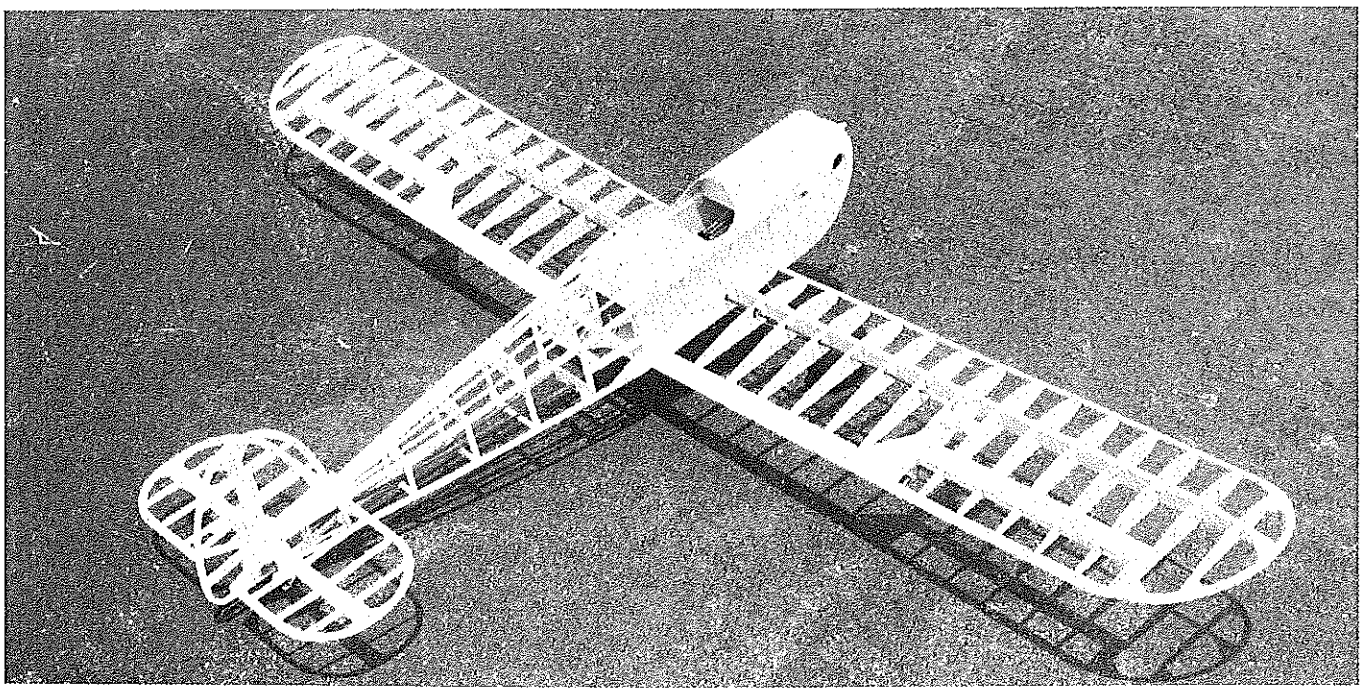
Hold the strips onto the former at the center with rubber bands or masking tape and work them down around the former, lashing down as you go. The aim is to have them together and held onto the former all around it. Leave somewhere warm, make up the next one and carry on until you have two wingtips, two tailplane tips, and the fin and rudder outline. Yes, it is messy and slow, but you can't better them for lightness and strength.

Tail Feathers: The fuselage reflects the family name: long! Great for stability, not so good for balance. Short-nosed Electrics are less of a problem—the Center of Gravity (CG) pays attention to a 16-ounce battery. Still, that tail is a long way aft, hence the laminated outlines and sparse internal structure.

Pin down the outlines and spars, add the "ribs," and sand smooth when dry. Round off the edges, bevel the fin and elevator LEs and put a little 1/64 plywood where the control horns go. Glue the fin in place, drill through the tailplane into the fin LE and TE, and insert short dowels as keys.

I used Mylar® hinges; feel free to use your favorite type.

Fuselage: The fuselage sides are built in traditional fashion, by making the second



"Trexler wheels are a little oversize, but have a high 'cute' factor, plus they soak up longer grass and little bumps."

atop the first and avoiding gluing them together. Note that the last upright is 1/4-inch short of the longeron ends. When the sides, trimmed to a sternpost thickness of 1/4 inch, are joined, this is filled with 1/4 sheet to allow the hinge to pass through wood rather than a glue line.

The sides are joined by what the "oily" guys call the firewall and F4. These are 1/8 birch plywood, being mostly outlines. Fit the battery tray with its grain across the fuselage; hard balsa is fine, but use 1/16 plywood if you're nervous. When the primary fuselage structure is assembled, it will take all flight loads, the rear deck and cockpit area being decoration.

Since I dislike having to remove the wing to swap battery packs, the fuselage top over the wing is removable. Just undo two screws and remove the top to change the battery without disturbing the aileron connection or wing. For rigidity, the battery tray joins the sides above the wing, and gussets ensure that stress points are minimized.

Velcro™ restrains the Ni-Cd—hooks on batteries and loops on the platform. This has proved fine for this eight-cell, gentle-flying model. Electric fliers are an independent and ingenious lot, so use what you're happy with.

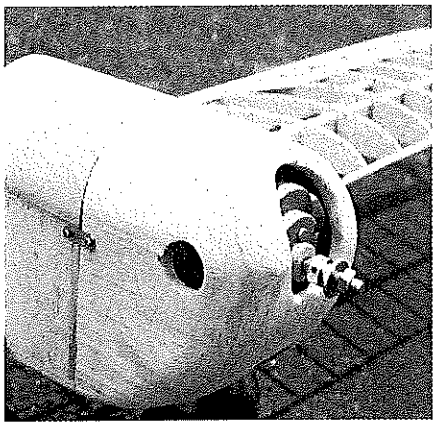
Lay your gearbox/motor and mount on the plan and adjust the holes in F1 to suit. The cutout behind the motor will vary, but keep the lower aperture in F1, for battery cooling and emergency egress. This wide fuselage allows the motor controller to fit against one side, alongside the Ni-Cd—not between motor and battery or "hammer and anvil"!

For the rear deck, fit the formers, then the 1/16 x 3/16 spruce stringers. They are as light as 1/8 balsa and resist handling better. Spruce comes from hobby shops, craft stores, and model railroad shops (basswood, too—it is as good as spruce here).

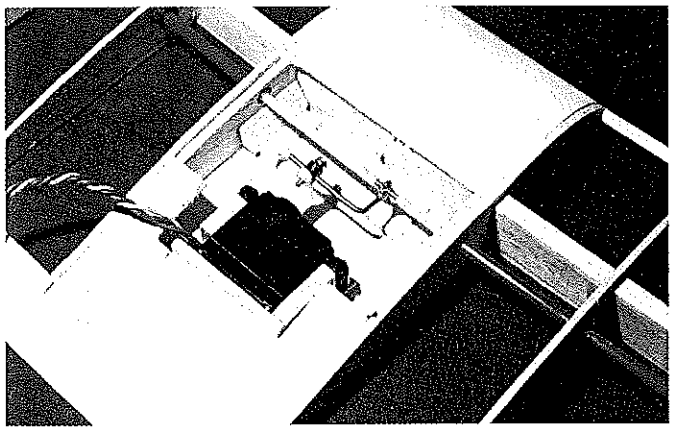
When you've fitted the stringers, undercut the formers as shown on the plan. When covered, the stringers will show, not the formers. Like full-scale aircraft in appearance, details like this shout "scale" for little effort and no weight.

The wing mount plates go into the rear corners of the wing aperture. Since I've never broken a nylon bolt in a crash—at least, one that left something aircraft-looking—I use 4-40 T-nuts in plywood breakout plates, with metal bolts. The bolts should be at right angles to the wing TE surface and a little scrap block fairs the nut plates down to meet the wing top.

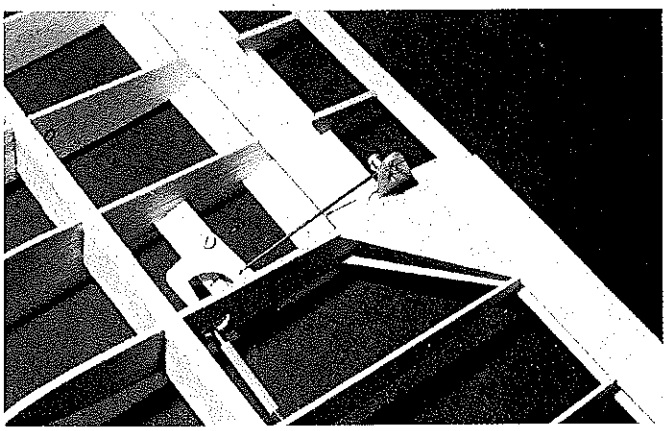
Now for the top hatch. Make up a 1/8 x 1/4 balsa framework atop the fuselage longerons and fit the hatch formers. A full-



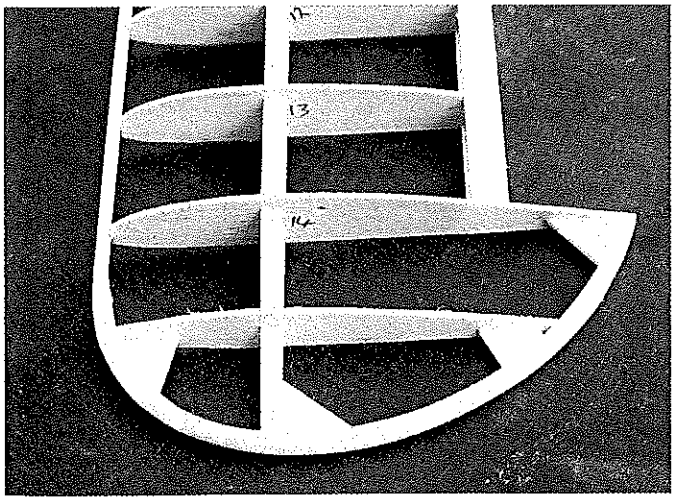
Nearly finished cowling from the balsa scrap box. Finish is sanding sealer and gloss black household spray paint.



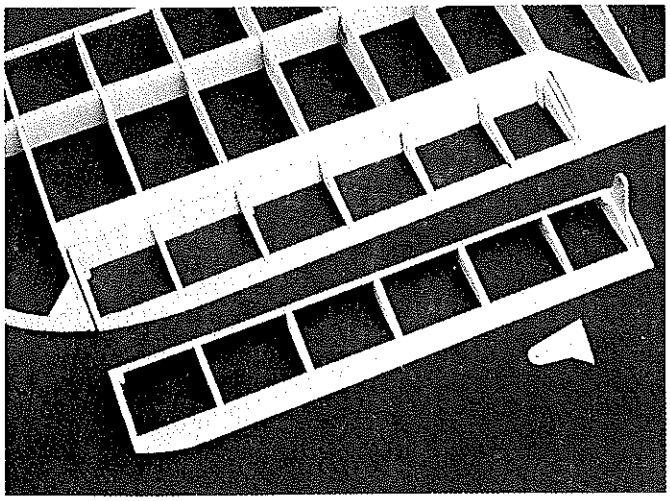
One aileron in place; the other is inverted to show off the sloping leading edge and plywood control horns.



Detail of aileron bellcrank setp shows hefty main spar; works fine in a model that has a low top speed such as Wimpy.



Tip rib is the only one that is markedly different in shape; the other ribs can all be cut from the same template.



FMA S200 mini servo drives the ailerons. Center section ribs align with fuselage sides to transmit landing loads.

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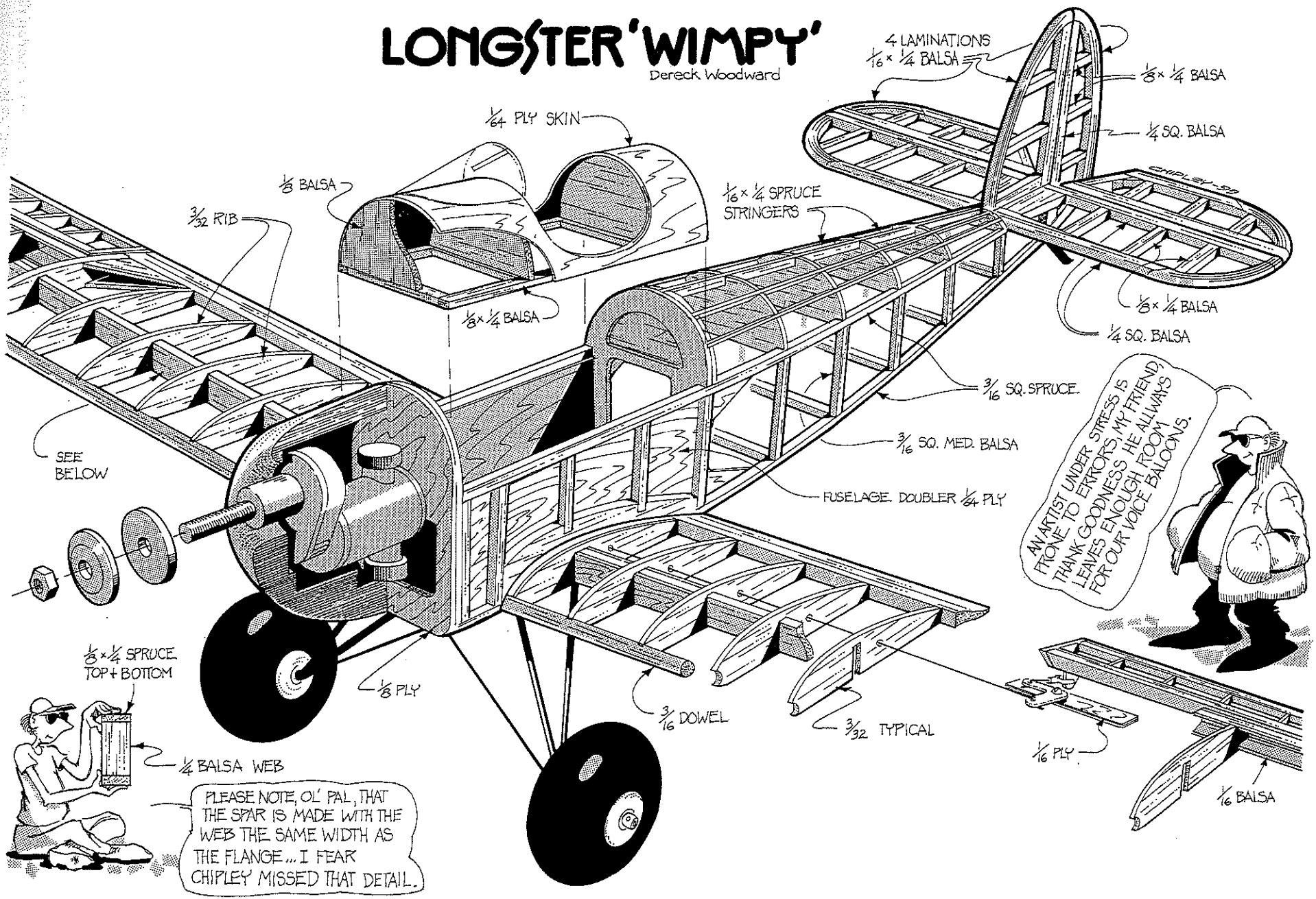
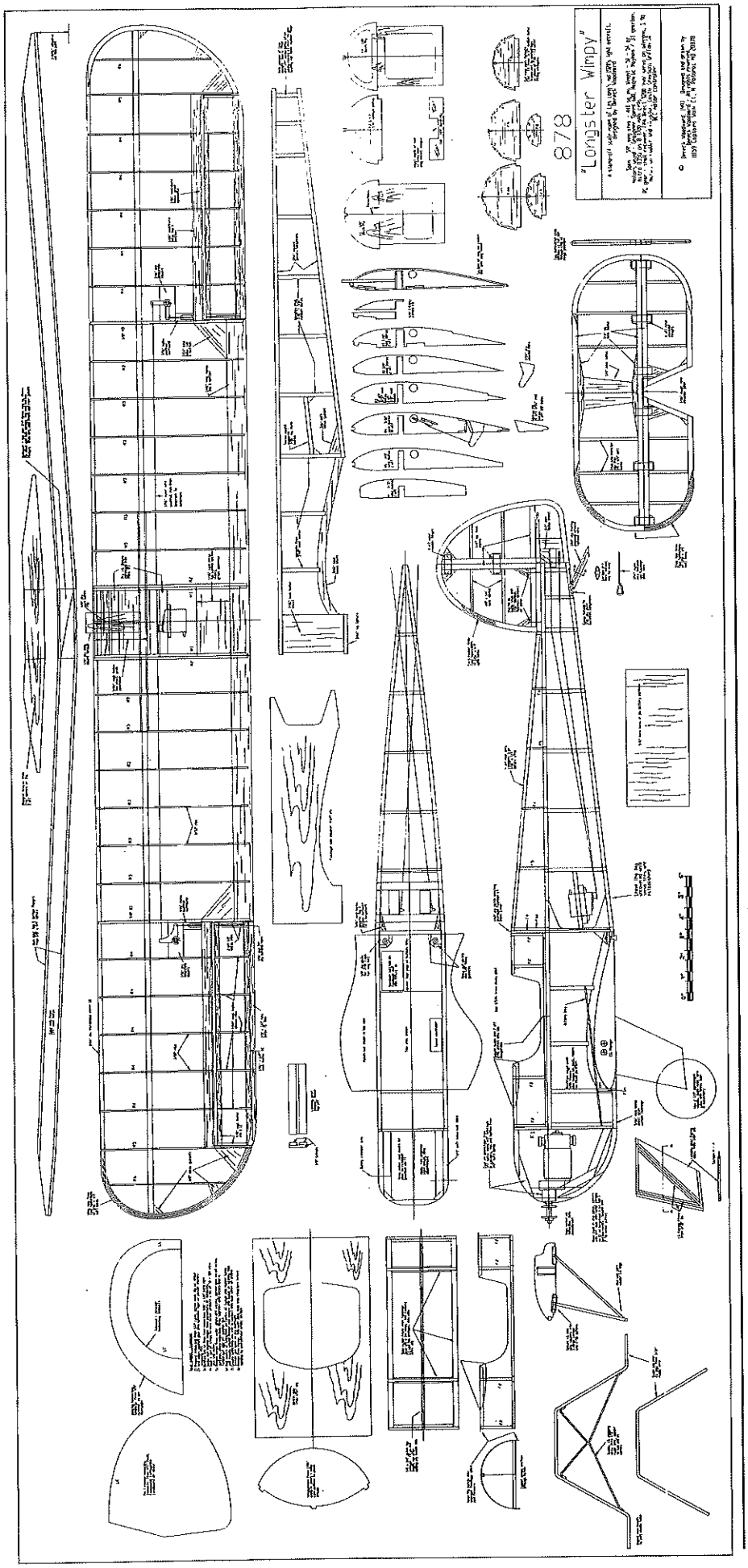


Full-Size Plans Available—see page 165



length top stringer stabilizes them while you glue on the 1/64 plywood deck. The 1/64 plywood is great here, because it is light, bends easily, and withstands handling that would crack balsa.

To affix the plywood, coat the frame with white glue, place the plywood and roll along where it will go into position. This puts glue on the plywood. Separate the two, check that the mating areas are thinly and fully coated with glue, and leave to set. When dry, heat up an iron (I use an old film iron that lost its nonstick coating) and position the decking on the framework.

You'll find that you can "iron" the plywood down onto the frame from the top longeron; the heat melts the glue and seals the plywood down. A great technique, but you might want to have a practice run with some scrap wood first.

For the cowling, I pondered over fiberglass, or brown paper and white glue over foam, then used good old balsa. A cowling is an opportunity to clear out scrap wood; make up a large box on the nose and remove any wood that isn't cowl-shaped!

Once the shape is right, give the cowl a few coats of sanding sealer—spray it black. The cowl is secured with four straps and 2-56 screws top, bottom, and sides. Allow a little clearance around the gearbox to cool the top of the motor, and don't forget the aperture in the cowl bottom.

The dummy cylinders came from a "bring and buy" in England and look enough like a flat twin for me. Dummy jugs could be sourced from Williams Bros., or made up from card and balsa; they don't get an oil bath every flight, so they can be as detailed as you like. Homebuilts are fitted with all manner of engines, so your model can be too.

Wing: You made the tips awhile back, so make up the main spar with its joiners. While that is setting up, make a plywood template of R3 and cut out the ribs, with trimming as needed.

I admit to being a traditionalist in structures, but I like to see what I can "tweak" for better effect, so Wimpy uses a hardwood dowel LE. This cuts "carve and sand" while being resistant to damage from hangar rash and excursions into the rough (our field is known as Mt. Trashmore).

For a round dowel, you need a round hole. I use a length of 3/16 OD steel tube (I used a piece of an old transmitter antenna) with one end sharpened on the inside; the other end is wrapped in electrician's tape. This will make a clean hole in plywood or balsa, and a clean hole in your hand if you forego the tape.

The first hole you cut will take a while—it's in the plywood template. Now cut a round hole in your balsa, leave the hole cutter in place, position the plywood

template against the tube, and cut out the rest of the rib.

The section is flat aft of the spar, so locate the spar over the plan, pin down the lower TE sheet, glue in the ribs, and then add the top TE sheet and LE dowel. Build both panels over the plan, then build the center section between them.

The rest of the wing is details. The aileron bellcranks sit on plywood plates. A wire pushrod runs between them, and an FMA Direct S200 miniservo drives that. The cost and weight of modern microservos suggests that in the future I shall put one in each wing and lead wires up the wing, rather than pushrods, but the setup shown works fine.

The ailerons are built with the wing, then cut free. Mine are top-hinged with clear adhesive tape; this works great on an oil-free Electric, is light, and seals the hinge gap. If you prefer to hinge with covering film, that's fine, and equally light. Regular hinges could be used, but you'd need extra wood to hold them, and that adds weight.

Notice that I sheeted only the wing center section. This saved weight, and the wing is fine. This is not an aerobatic ride, the stresses are low, and plenty of aircraft have flown successfully without that sheet—most Old-Timer models, for starters.

The landing gear fits into plywood channels in the center-section ribs. This positively locates the gear, and the straps hold the gear rather than provide location. Fit some scrap balsa between the center-section TE caps to reinforce the TE. I also put 1/64 plywood "washers" where the bolt heads bear on the wing.

Undercarriage: This is a simplified version of the original birdcage. Make up the front and rear legs, and solder together in place on the model. Check the axle alignment against the wing LE.

Bind the joint with soft wire or tinplate. Since 3/32 wire is too small for commercial wheels, I solder brass tubing onto the wire. The wire stops just inside the wheel, the tube extends 1/4 inch with a 1/16 hole drilled right through the tube. A "clevis pin" is

made from a paper clip for a securely held wheel that removes easily for service.

Those prominent fairings have sides of 1/64 plywood over a 3/32 square balsa frame. Since they cover the wire joints, they go on when everything is true and well-soldered. For wheels, light is good; size can be adjusted for your site. My model used 2½-inch Trexlers initially, then 2¼-inch foam wheels. The gear is held in place by clips of 1/4 wide alloy strip and 2-56 sheet metal screws.

Radio: I like to fit the RC gear as soon as I can. The alternative is peering down a covered fuselage to figure what is hitting what!

I used Goldenrod snakes for the tail controls, with microservos on rudder and elevator, and an FMA Direct S200 for the ailerons. The servos are mounted aft of the wing to free up the overwing bay. The receiver is a HiTec 535 micro and a 250 mAh Ni-Cd was used with an Astro 210 controller, before fitting a Castle Creations Griffin 50 controller with BEC (Battery Eliminator Circuit).

Covering: I used Towerkote—it is light and cheap. I used Cub yellow with black for trim. Towerkote handles easily and is still stuck firmly after nearly two years.

Cockpit: No Scale model should fly without a pilot! Mine is a latex lightweight from Pete's Pilots of England (45 Lichfield Rd., Stafford ST17 4LL, England). Pete's also supplied America's traditional headdress (glued on against the slipstream!). An old piece of ribbon was made into an extra-long scarf, for flapping in the wind as tradition demands. The instrument panel came from a deceased Speedy Bee.

Motor: A very successful power package was a Graupner Speed 600, 3:1 gearbox, eight cells, and a Master Airscrew 10 x 6 wood prop. The Wimpy only needs full power for takeoff and stunts, so flights last 8-10 minutes from the "old" 1,700 mAh cells.

It also flew on seven cells, for a slower climb with the lighter pack (two ounces lighter). If I really had to fly on seven cells, I would use a larger prop; those tests were flown to prove that the model is "seven-cell capable." All measurements were taken with an AstroFlight Whattmeter in the model, and thus are "real" rather than "computed."

Preflight: When you think you're finished, put the model aside for a night, come back with a clear mind, and check it out once more. With an Electric, you can perform a motor-running range check in your yard and the neighbors will be fascinated—not incensed by noise.

Take one final long, hard look at the control throws and CG position in the calm of the shop, and top up your "fuel

tanks" in anticipation of a great day's flying.

Flying: Now, off to the field with a really ready to fly model.

Around 50 ounces with eight cells, a wing loading of 17 ounces per square foot, and the classic 50 watts per pound translates into lively takeoff performance from tarmac or short grass, a sprightly climb, and the efficiency to cruise on low power for long flights.

The ailerons roll Wimpy smartly into turns, but you will find a full roll slow, though axial. The elevator is positive; the rudder has little yaw/roll coupling. On higher power, it moves out smartly, while the stall is hard to provoke at the other end of the envelope, with no wing drop and minimal height loss. As designed, spins or snaps are not cleared.

For a loop, I dive the model for speed, apply power as it's going upward for a slow first half. Over the top and reduce power to just spin the prop. Not very round, but looping a 30HP aircraft would look like that.

A roll without losing height is easy, and it will stall turn, with a short vertical leg. It has even flown inverted with little height loss. Those tricks were done because a conscientious designer should thoroughly explore the flight envelope. You believe that?

Mostly, I enjoy playing "in the weeds." Slow and low passes, sideslipping flypasts to show off Wimpy's topsides, into a lazy chandelle to return. Touch and gos are great fun, gliding down the downwind leg and into a long, curving turn on final, juggle a little *up* trim against power, and either land on the mains or hold off for a three-pointer. Like many Scale models, Wimpy is "draggy," so watch out for sink sneaking up on you.

If you fly from decent grass, you will find Wimpy easy to taxi. This amuses "wet" power fliers and Electric Soaring pilots alike, as if an Electric can't get around on its own wheels. Well worth landing early with a little power in hand! Since it flies around 10 minutes on 1700s, eight or nine minutes airborne with a taxi off the strip is routine.

So there you have it: a model that looks like a real aircraft, flies in a relaxing, yet spirited manner, and won't strain the wallet. You'll have a model that makes people smile, too—Wimpy has that effect on folk. At 59 inches in span, it isn't even perceived as being all that small, either.

Come on: fit a new knife blade, and let's do some real wooden aeromodeling! ✈

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