■ BILL WINTER & JOHN HUNTON

MINIMUM INVESTMENT FOR MAXIMUM FUN

THIS SIMPLE, UNPRETENTIOUS, diminutive model, which gives us no-lift 15-20-minute flights, amazes me: Just flick the switch and fly. Under nearly calm conditions the Goblin can (and for best efficiency, *should*) be flown with just trim.

If you have a decent flying site with no turbulence from trees, the smaller six-cell battery pack provides protracted motor runs for seeking lift under power. Goblin still climbs higher than you will ever need to go—on six cells it just takes longer. On windy, turbulent days, the seven-cell 800 mAh pack works better to get you up and out of the chop. Eight cells is even more peppy but gives you a shorter (six-plus minutes) run.

The short-coupled Goblin will seek and ırn into lift. On a weak-lift day, if you are ırning left and the model changes off to ırning right, it is trying to tell you ›mething: Leave it alone.

I am convinced that if Bill Winter ›oks at a model it will go up, and if he ›oks away it will sink. I am not that ifted, so on a strong-lift day, look for the ıodel to "wiggle" when it enters lift, then ›el it over to stay in the lift.

'onstruction: When purchasing wood, :der or pick out "selected" light wood for lighter airplane. Use Titebond (an iphatic resin for relatively slow-drying ›plications) and CyA (cyanoacrylate) lue.

uselage: Trace the profiles of the side ınels and cut to shape. Sand both sides ith fine sandpaper on a block while they 'e in the flat. Cut out the side doublers milarly. Lay out the side framing in ›ncil (framing to be added later), being ıre to identify a left and right side. Install ıe doublers. We used 3M spray adhesive › join the sides and doublers—balsa tends › curl away from water-based glues. Add ıe longerons and verticals.

Cut out the formers and glue 1, 1a, 1b, ıd 2 in place onto one side, using a small iangle to hold vertical. CyA can be used ır this step, but it will be best to use itebond for attaching the opposite side to low time for positioning. When these ırmers are in proper alignment, CyA can › used through the Titebond for rapid lhesion.

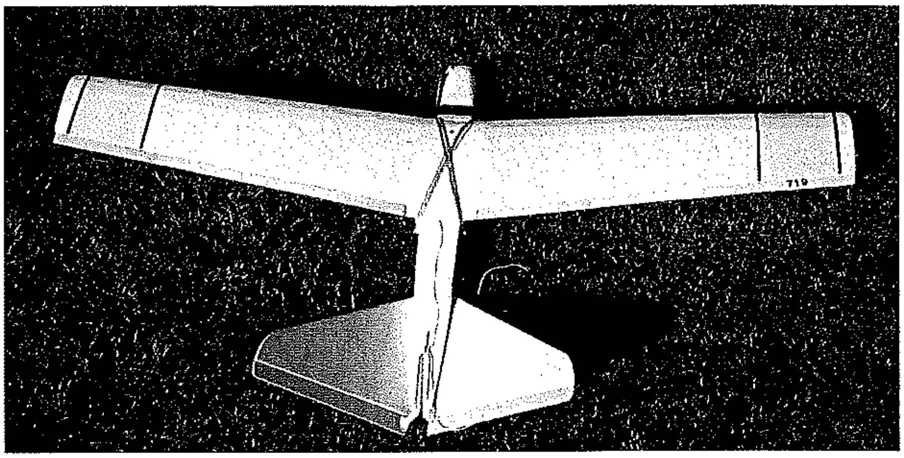
Place the partly assembled sides over ıe top view. Join the rear fuselage with ıe tail block. Check vertical alignment ith a triangle. Alignment of the sides ıust be right on the centerline, or the V-il will not align with the flight path. Use itebond to attach the intermediate rear 'osspieces.

Install all other fuselage members, the ıotor mount blocks, and the nose ring. ack-glue the front top block in place. and across the top and bottom of the ssembly with a sanding block before ıstalling the top and bottom sheets. Add ıe top and bottom sheets and finish ınding the completed fuselage.

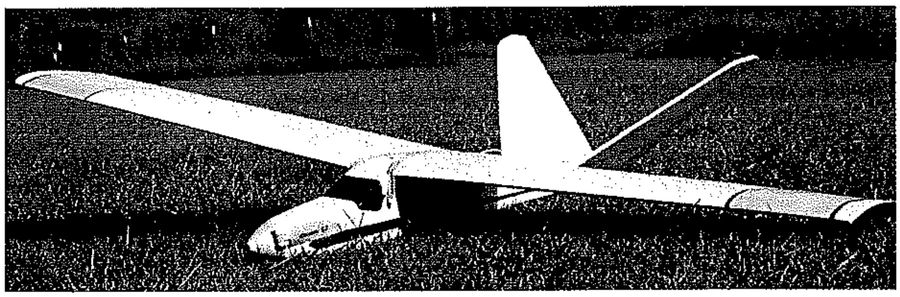
Cut out the battery hatch and detail it › shown. Do not install the skid until after ›vering. The optional lightening holes are ıade with a piece of one-inch-diameter :ass tubing that has been sharpened on ıe end with a file. Rotate the tube back ıd forth while pressing down lightly. Cut ıe ventilation holes now too.

Remove the top nose sheeting and ıstall the motor, all wiring, and switches. est-run the motor, then loosen and push l protruding switches, etc. inside.

'ing: Cut out all wing ribs. Place waxed ıper over the plan. Pin down the bottom ›ar and the trailing edge of one wing

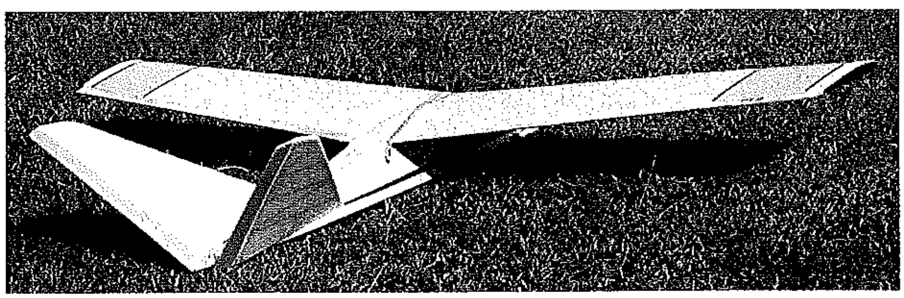


Goblin is easy to build and fly, with surprising performance.



Authors prefer skid landings (easier, more consistent) to wheeled gear.

Photos provided by Bernie Stuecker Graphic Design by Carla Kunz



Diminutive V-tailed model is easy to build and fly. Based on popular Speed 400 motor, design is inherently stable, aerodynamically clean.

Type: RC Electric Sport

Wingspan: 46¼ inches

Motor: Hobby Lobby LM002 Speed 400 (for 7.2V) with 1.72:1 titanium gearbox

Functions: Motor, ailerons, elevators

Flying weight: 33 ounces

Construction: Built-up

Covering/finish: Micafilm

Good grief, how complicated, costly, and scientific "silent" power has become, if you run with the hotshot crowd! Competition performance is the bedrock of progress, the pinnacle of feeling good ... if your instincts demand that kind of safari.

Not a big-game hunter, and not about "waiting for my ship to come in," I invested $11 in a Speed 400 (as they said: 50 million Frenchmen can't be wrong), a 9 x 7 Graupner folder, a 1.72:1 titanium gearbox (less than $30, designed for the Speed 400 motor contour), and a six-pack of 1000 mAh cells.

I would use 5° of *verboten* "forward" sweep, and a butterfly tail with 45° dihedral—the wing has 6°—and have, in effect, a short-coupled "cheater flying wing" because of the projected area of the vee as a stabilizer.

The spirit moved me to call it the Goblin.

Goblin draws seven amps (less, unloaded in flight). There was purpose in my madness: I wanted very long motor runs with reasonable climb to achieve extremely long "loiter" time by playing *on-off* to multiply encounters with lift by several magnitudes. The battery/prop combination ensures this mission.

On John's first test flight Goblin climbed moderately well (transition was good) and the BEC (Battery Eliminator Circuit) did not intrude until about 14-plus minutes into the flight. We agreed to bring it down after 29 minutes, meanwhile finding three thermals.

On an ideal weather day it is possible to quickly sniff a thermal, shut down, and after the lift eventually peters out, power-on to pick up another thermal. By nursing the charge in this way you might stay aloft in such conditions until the transmitter battery begins to fade.

To offer a range of performance, an alternate of eight 800 mAh cells was tried. Climb was respectable and the BEC did not kick in for more than six minutes. Something here is mighty efficient. Seven 800s is a nice compromise.

Goblin comes cheap. Not much wood, nor anything else. Span is 46¼ inches, area 330 square inches, gross weight 33 ounces, wing loading 14.4 ounces per square foot. Controls are motor, aileron, and elevators.

For convenience we used an old Futaba Attack BEC. If you use this system, don't play with throttle—drain is prohibitive. The BEC (no separate receiver battery required) on Goblin provides battery protection at high altitudes.

We can tell you that Goblin flies fine in nice air, when not speck high, with 4° of dihedral. In choppy air, and/or at extreme altitude, where shape is lost and adequate stability is essential, the 6° finally used for Goblin makes you look good. The bottom line is that Goblin is a great bang for your buck.

The Hobby Lobby catalogue makes it possible to compare data on about 50 motors with associated reductions, props and batteries.

Anything is possible—even the humble Goblin.

Bill Winter

panel. Insert the bottom center-section sheeting, then all ribs, tilting the root and tip ribs as shown. Glue the ribs in place.

Add the leading edge, top spar, web members, and the turbulator spar. Install the spar joiner (the plywood joiner is lightly cracked, not broken, for the 5° forward sweep, then the crack is glued) and then the top sheeting in one wing panel. Build the other wing similarly but do not sheet the top center section until the wing halves have been joined.

When the basic wings have been assembled, add the remaining top sheeting and the fixed trailing edge parts at the root. Cut ailerons from 3/16 x 3/4 TE stock shape if available. Install the aileron linkage.

Cut a hole into the bottom center section for the servo installation. After covering, install hardwood servo mount rails onto the balsa sheeting, then install the servo and linkage.

We used a gunsmith's trick to accurately mate the wing to the fuselage:

Lay strips of masking tape on the bottom of the wing where it mates. Apply lipstick to the tape. Mount the wing, then remove it. Sand away the fuselage material where the lipstick shows. Repeat the process until you get a good, tight match.

Finish-sand the wing panels with fine paper on a large block of wood. Do not oversand and lose the airfoil profile.

Empennage: Build up the stabilators over the plans. Sand smooth with fine paper on a block. Round off the leading edge. Cut the elevators from very light sheet and sand to tapered shape.

Pre-final assembly: Join the stabilators at 90°. Slip them into the fuselage slot.

Lay the fuselage on your bench. Check and trim the fuselage if necessary so that the stab is at 45° with respect to the work surface (check both sides). The stabilator center section must lay along the centerline of the bottom of the fuselage for proper decalage. Never mind that the slot in the fuselage seems to be at an odd angle; it will be OK as long as the stabilator joint line lies straight along the bottom of the fuselage. Do not glue in place at this time.

Fit the wing to the fuselage and check for level with respect to the bench. Drill holes for the wing hold-down dowels but do not install them until covering and finishing is complete.

Covering: Prepare all surfaces by sanding with a block, touch up the curves with a sanding pad, and apply two coats of Balsarite. Sand lightly with #150 production paper after each coat.

Micafilm is a very strong and light material. Follow the printed instructions closely. Cover the wing bottom first, then fasten to the workbench with the trailing edge blocked up 3/32. Cover the top. The object is to get 3/32 "twist" (washout) into each wing panel. This is important for stall characteristics and gliding efficiency.

inal assembly: Follow the same ignment steps as in pre-final assembly, ut this time glue the stabilator assembly i place. Check alignment in the top view y measuring from the tips to a common oint on the fuselage (not the firewall). heck for horizontal alignment of the ing by measuring from the tips to the ilpost, then mark the wing root at front id back for consistency in alignment. istall all servos and check for proper ontrol-surface motion.

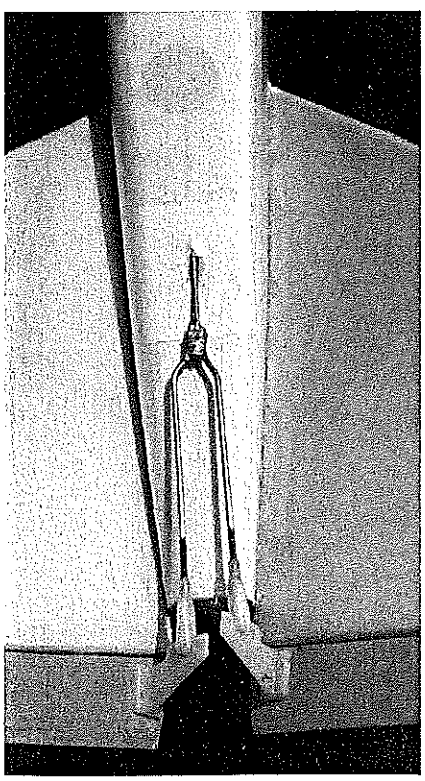
It is critical that the model balances here indicated. Shift the batteries if you in to get accurate balance, or add ballast. heck the spanwise balance and correct ith tip weight if required.

lying: The first test flight was nearly ½ our. We were not soaring with the agles, but we were with the buzzards. We ould see the buzzards better than the ien-all-white model. For the next flights ie bottom was painted black and the tips ellow, and this helped visibility onsiderably.

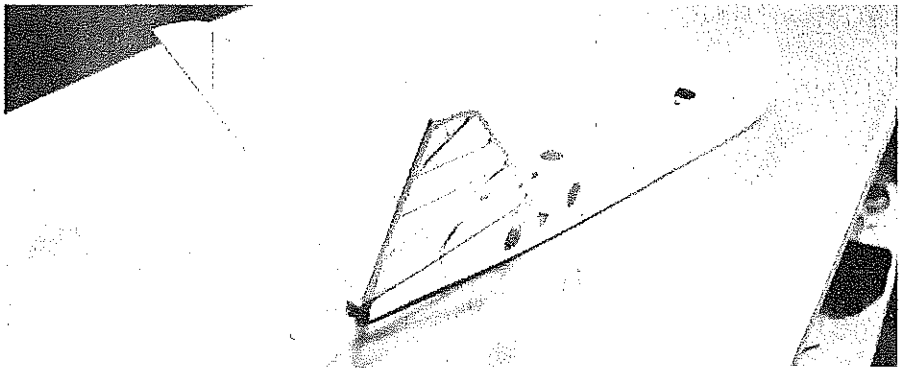
The numbers for motor performance ame up much better in the air than alculated. Just to verify the numbers, a st flight was made at a constant low ltitude of 100 feet so we could tell when ie BEC would kick in; the numbers iecked out fine.

An interesting flight phenomenon ccurred during these tests:

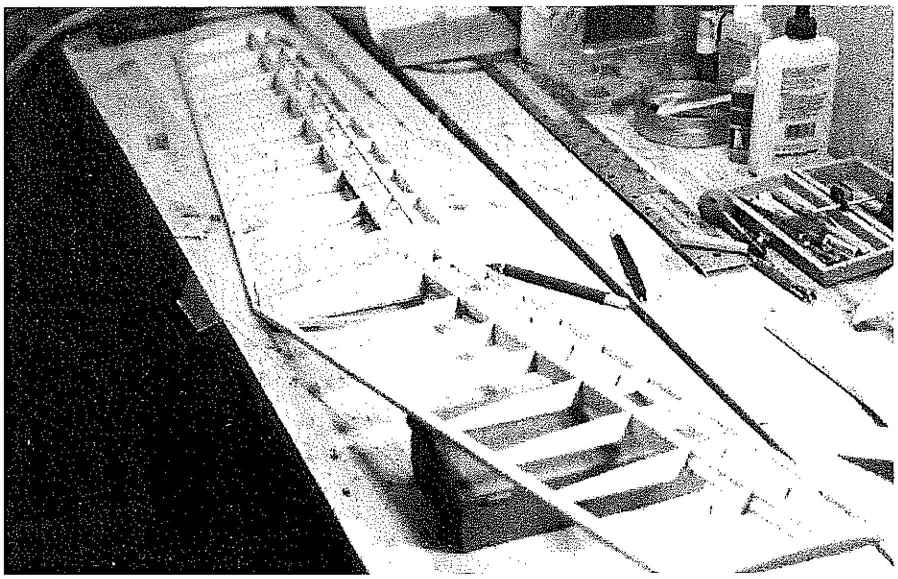
In normal flight you will be translating igine power into climb and will be olding velocity relatively constant; enerally no trim will be needed in



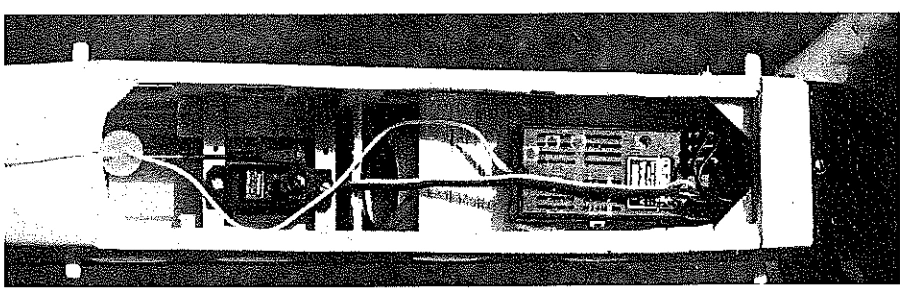
·tail linkage splits actuation to elevators. urn and bank coordination is provided y ailerons.



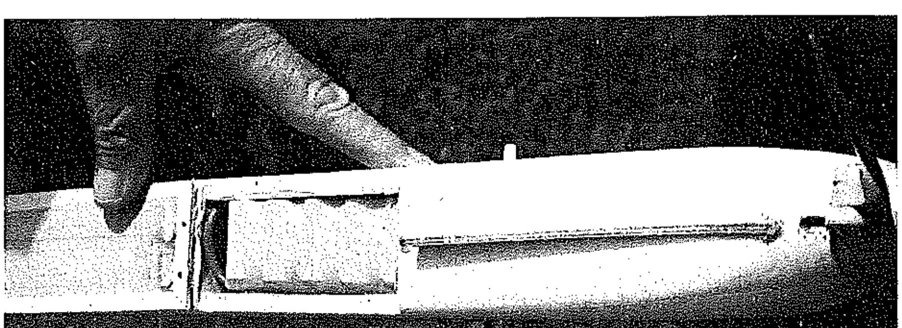
Fuselage construction is typical box. V-tail installation is made simple for accurate alignment. Lightening holes are optional.



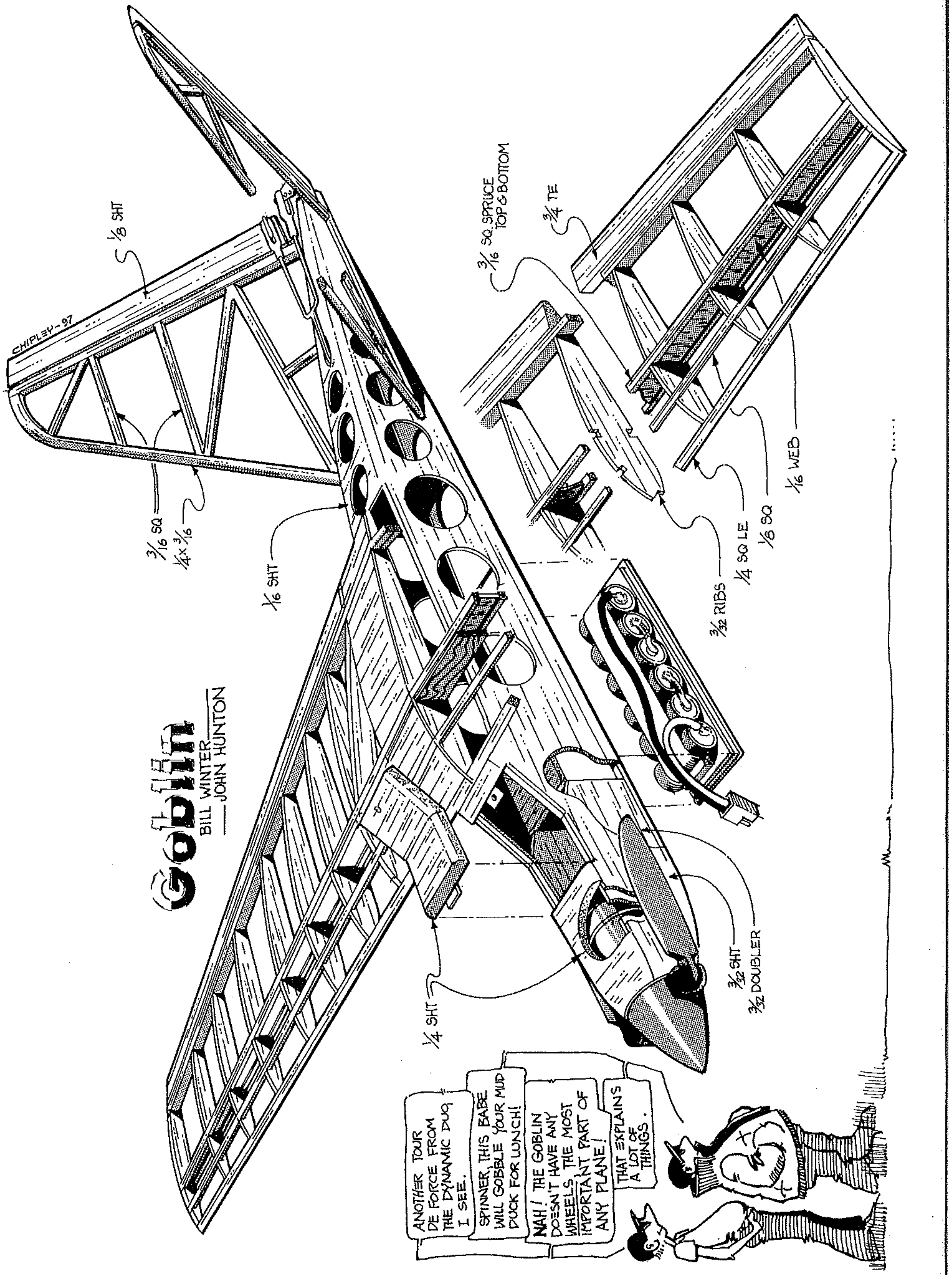
Goblin's wing construction is straightforward and light. Six degrees dihedral provides good stability for flying very high.



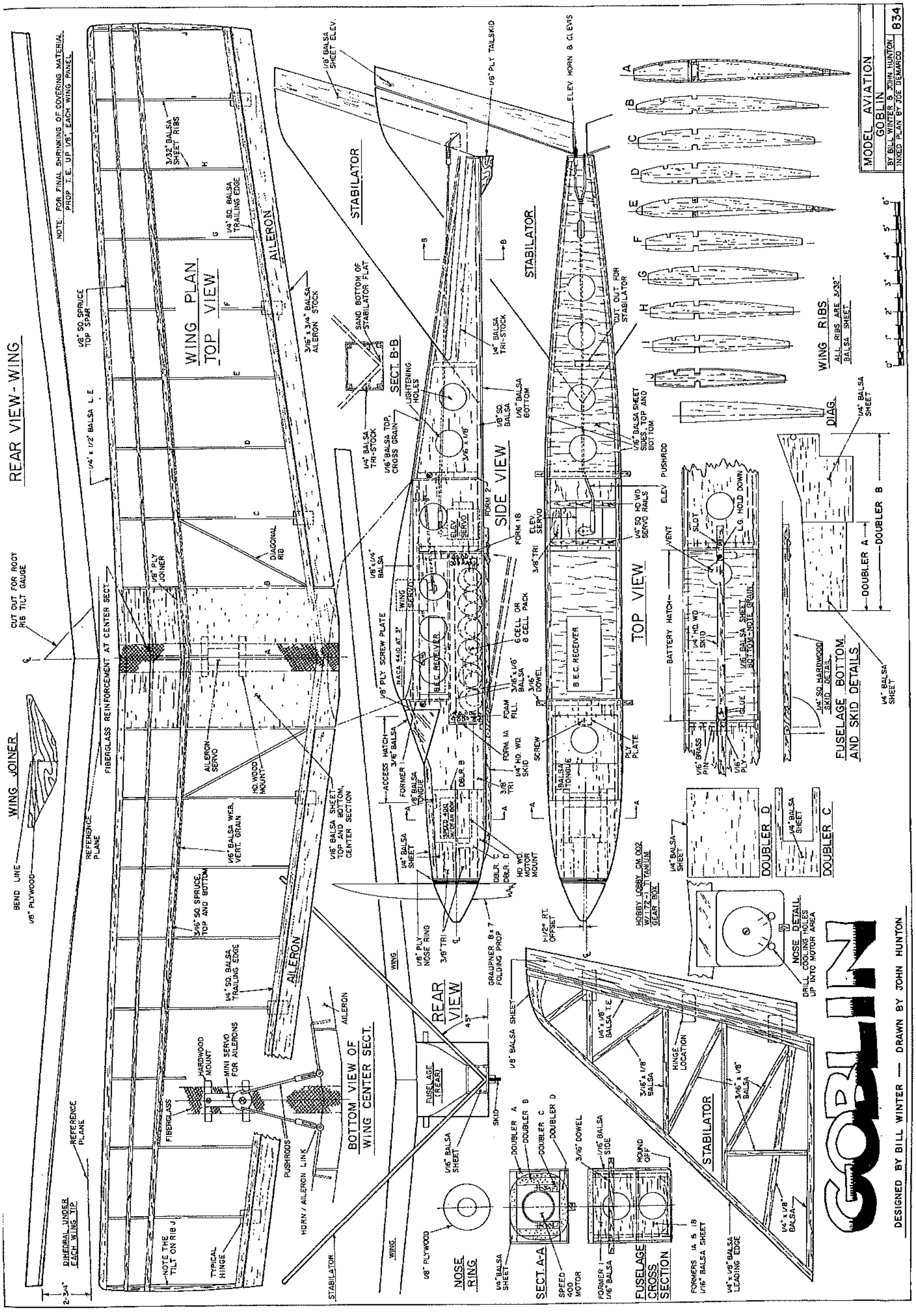
While radio systems will vary, Futaba Attack is shown, eliminating separate receiver battery and providing BEC high-altitude protection of power source.



Battery compartment is sized for a variety of packs. A six-cell pack of 1000 mAh cells is shown, which runs for 12 minutes or more.


Goblin
BILL WINTER
JOHN HUNTON
CHIPLEY-97
1/8 SHT
3/16 SQ
1/4 x 3/16
1/16 SHT
3/16 SQ SPRUCE TOP & BOTTOM
3/4 TE
3/32 RIBS
1/4 SQ LE
1/8 SQ
1/16 WEB
3/32 SHT
3/32 DOUBLER
1/4 SHT
ANOTHER TOUR DE FORCE FROM THE DYNAMIC DUO I SEE.
SPINNER, THIS BABE WILL GOBBLE YOUR MUD DUCK FOR LUNCH!
NAH! THE GOBLIN DOESN'T HAVE ANY WHEELS, THE MOST IMPORTANT PART OF ANY PLANE!
THAT EXPLAINS A LOT OF THINGS.

Full-Size Plans Available—see page 184



transition from power-on to power-off. By holding a constant altitude during the test flight, velocity varied with available power; it was very fast at first, then slowed down considerably. This meant that early in the flight almost full down trim was required. As the battery power began to diminish, more and more down trim was clicked off until we were back to neutral for the landing.

A word of caution: Goblin is an aerodynamically sleek aircraft. You could possibly exceed the airplane's structural capability in a dive out of a thermal. The best way to get Goblin down in a hurry is to rack it over in a wings-vertical spiral. If this tactic is insufficient, go ahead and dive as necessary, but apply up-control very gently and smoothly to recover.

Why is Goblin so efficient? It is the result of a fortunate combination of area, loading, foil, sweep, V, and perhaps the covering material (unfinished white Micafilm, which has a little "grain" to it, adds to efficiency through turbulation).

The Speed 400 with the prescribed gearbox, prop, and batteries is surprisingly effective. We would like to hear from you about your results. ✈

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