WHIMPY TOO

After hanging in the local hobby shop for the last eight years, a refurbished original "Whimpy" was again making its take-off roll down a runway, this time in the humble capacity of acting as "station hack" with a load of untested new radio equipment in its belly. Watching the little fellow again, I began to feel a bit better about the "flak" I had just taken in the pits about flying such a "wimpy airplane" when from the end of the flight line someone yelled out: "Lookit! That's a Whimpy! I built one of those things five years ago, and that's the best flying ship I own!" The flier came over as old "Whimp" climbed slowly out, and asked me when I had built mine. Now a golden opportunity like that only presents itself infrequently at best, and I couldn't resist it. "I hate to disappoint you," I said, "but it is not **a** Whimpy." Then after an appropriate moment for that to sink in, I added: "It's **the** 'Whimpy,' — the original aircraft the article was written about."

A lot of air has gone through the prop since I did Whimpy over eleven years ago, and I've learned a lot about flying and designing since then. Sometimes, though, I think that I haven't learned as much about myself as I have about the flying and the designing, and the lessons which brought about the original model have been mislaid or forgotten, over the years, in the usual pursuit of contest wins and trophies. The hobby used to be more fun, but, of late, the constant practice of aerobatics, while

By Roger Tennyson

challenging and interesting, was becoming the same type of thing at which I spend my work days . . . and the stress level wasn't much different, either. I was coming home from the flying field in the same shape as I was when I came home from the office.

Nearly everybody at the field stood by to take a turn flying Whimpy that day, and we had a hell of a time. I can't remember a more enjoyable day of flying. Part of it was, of course, the ego trip of having my stuff remembered and appreciated after so long a time, but what was **really** neat was rediscovering the pure joy of flying, not of flying to impress the judges, or anyone else for that matter . . . of exploring the parameters of an airplane . . . of seeing if it would slip, or skid, or whatever . . . of: "Can you do this?" I got so stoked-up that I began designing on the way home from the field.

Whimpy had been designed to have a positive stability envelope. In those days, I needed that, and even now, it wasn't a bad characteristic for an airplane to have. Whimpy would fly hands-off, once trimmed. If I got into trouble, I could always let the airplane do the flying. Go to Plan B: "Take your dumb thumbs off of the box." The airplane would undoubtedly do a better job than I was doing. Left alone, the fool thing could absolutely land itself, if the field was big enough.

It turned out that an airplane with a wide stability range wasn't much fun to fly for very long, so after I got bored, I had added ailerons to the original three channel design, and in an effort to exceed the stability envelope, utilized bigger control throws as well as that additional third axis of control.

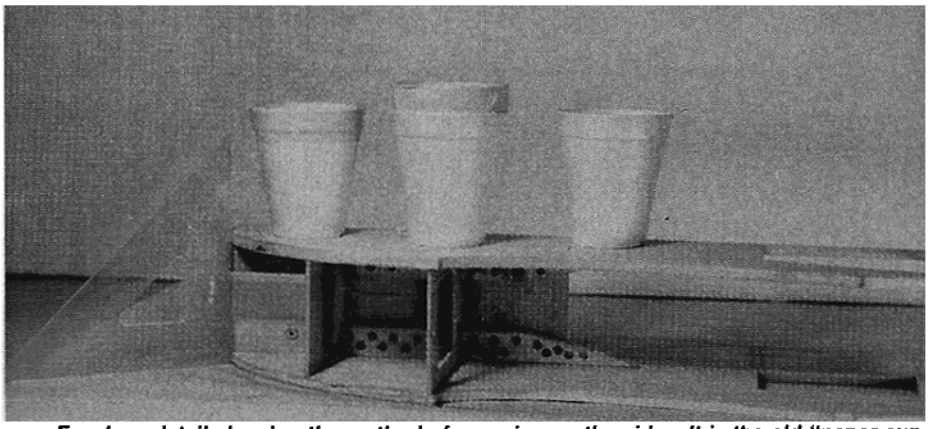
So now, nine years later, as we experimented with Whimpy's flight characteristics again, this addition turned out to be most fortuitous, because the trailing edge now could be "reflexed," i.e., the ailerons adjusted up at their trailing edges. This did some neat things to the bottoms of the loops, and also delayed the daylights out of the stall. In fact, at full back stick and idle, the aircraft simply mushed happily along, with nary a sign of a wing drop in sight. At this point, we figured that we simply had an airplane with inadequate elevator throw to stall it. Of course, the way to find out if there is adequate elevator deflection is to see whether or not the plane will spin or snap-roll, once rudder is applied. Yes, Virginia, there is a Santa Claus. The little guy spun tightly in either direction! We were indeed able to exceed the stability envelope. We found out something else, though, which we certainly didn't expect. When returning to "Plan B" (take your hands off the sticks, dummy), the airplane **stopped** spinning, and **pulled itself** out of the dive, leveled itself off and happily flew off in whatever direction it was pointed! This maneuver always evoked large numbers of open mouths, gasps, and assorted cusswords from the onlookers, who couldn't believe that they really saw that. If you really want to blow their brains out, start a spin, and then just set the transmitter down and walk away . . . believe me, that'll do it every time! It began to look as if we could have our cake and eat it too.

Whimpy Too is a friendly little fellow, capable of entertaining you with whatever type of flying you want to do. It is honest with no surprises.

WHIMPY TOO
Designed By:
Roger Tennyson, D.D.S.
TYPE AIRCRAFT
Sport
WINGSPAN
62 Inches
WING CHORD
9½ Inches
TOTAL WING AREA
545 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
2 Inches
O.A. FUSELAGE LENGTH
38½ Inches
RADIO COMPARTMENT SIZE
(L) 9½" x (W) 3" x (H) 3"
STABILIZER SPAN
24 Inches
STABILIZER CHORD (incl. elev.)
4 Inches (Avg.)
STABILIZER AREA
98 Sq. In.
STAB. AIRFOIL SECTION
Flat Bottom
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
9 Inches
VERTICAL FIN WIDTH (incl. rud.)
5 Inches (Avg.)
REC. ENGINE SIZE
.40-.46 4-Stroke
FUEL TANK SIZE
6 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Elev., Rud., Ail., Throt.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Ply
Wing ..... Balsa, Spruce, Ply
Empennage ..... Balsa & Ply
Wt. Ready To Fly ..... 76 Oz.(4¾ Lb.)
Wing Loading ..... 20 Oz./Sq. Ft.

And so with the parameters of "Whimpy One" in mind, I began to think about what I could do to make a machine which would be "more fun," while still retaining a lot of those desirable characteristics we so enjoyed in the original model. As there are certain drawbacks inherent in any high wing aircraft, I felt that I wanted to go with a low wing design, providing that I could still retain the general shape and thereby the character of "One." I also felt that a powerplant change was in order. I opted to go to a 4-stroke, for the usual reasons (noise, sound, fuel economy, and less mess to clean up), but also because the design had a relatively short nose moment, and it could easily carry the extra weight up front. I chose the Saito .45-II because I wanted no surprises, and we have several fliers at the field who know these engines inside and out, thanks to Ernie Aubert, who taught me to set the valves frequently and tightly (Saito specifies 0.03-0.1mm, and supplies you with a 0.1 feeler), and Rico Dalmau who taught me to never underpitch the beastie, I am ecstatic over the engine's reliability and performance. I've got a lot to learn about 4-strokes, so I certainly don't consider myself to be an expert on the matter, but so far I've had great luck. I'm running an 11 x 6 for the short runways, and an 11 x 7 in areas where I don't care about how long the landing run is.

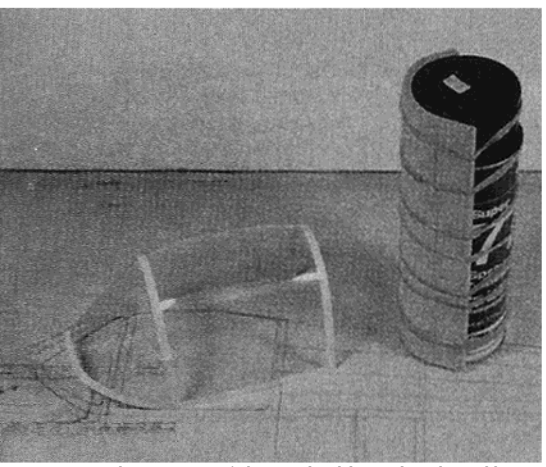
Whimpy Too is not, then, a beginner's aircraft in the sense that it will fly completely by itself, but it's close. You can easily exceed its stability envelope to do all the maneuvers in the IMAC pattern (albeit not as precisely as a ship which is designed to be an aerobatic platform) but it won't snap-roll on final approach if you get a bit slow or use too much elevator, as an aerobatic ship will. You can fly "Too" when a lot of guys are sitting on the ground, waiting for the wind to quit. Like its older brother, it is a friendly little fellow, capable of entertaining you with whatever you might want to do; it is a thoroughly honest airplane with no surprises. No one who has flown it has felt the least bit uncomfortable



Fuselage detail showing the method of squaring up the sides. It is the old "paper cup filled with shot" trick for weighting the sides.

with it, and that's what I was after in the design.

As you scan the plans, you'll find several things you won't be expecting, such as a lifting stabilizer (thought to be pure heresy in aerobatic design). Trust me. Under power, it lifts the tail, as the downthrust pulls the nose down, and there is no "pitch-up" when you pour on the coal. Inverted, the plane will fly almost hands-off in spite of the semi-symmetrical airfoil, because the stab and thrust line take over! When you do go to land, the prop



Canopy and front decking shaping. Use any convenient object, soak the balsa in ammonia, secure it in place, and let it dry. You'll love it!

blast decreases over the stab, the downthrust decreases in effectiveness, and the semi-symetrical airfoil floats you home like gangbusters for a "grease job" every time. There is a two degree wash-out in the tips (done very easily with a heat gun after covering the wing) which is responsible for the flat stall characteristic, and the full span ailerons work all the way through the stall.

You'll find two sets of control surface deflections listed on the plan. These are the presets for the dual rate radios. If you use the lower rates, it's very hard to get into trouble, and you can't snap or stall the aircraft. You can't do any aerobatics, either, except for **big** loops and **very slow** rolls . . . kind of an electronically induced

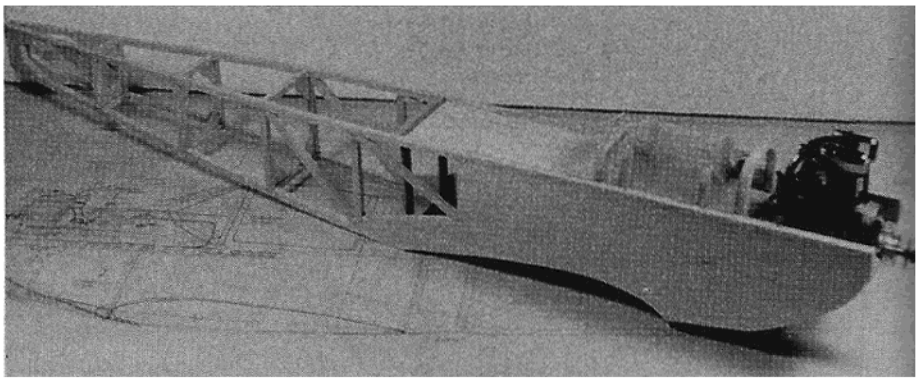
when you have no need to "three point 'er on." I find high rate ailerons and low rate elevator to be a nice, smoothly usable combination.

As I did on the plans with "One," I've put as many of the building notes which I could, directly on the plan; this way you won't have to keep referring to the text every time you want to know something. And **everybody** knows that one picture is worth a thousand words.

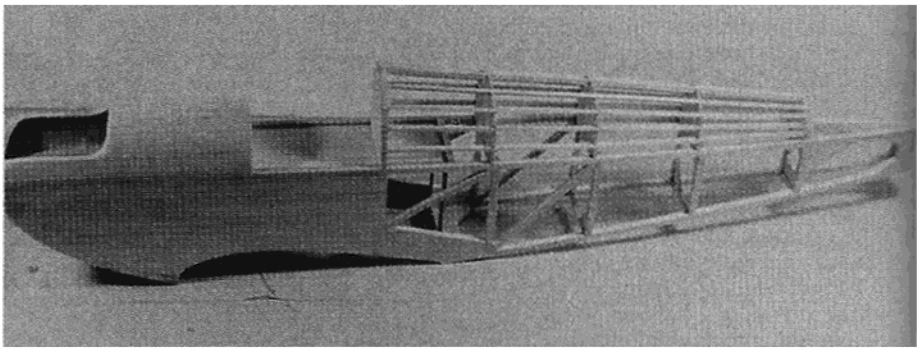
CONSTRUCTION

Fuselage:

Whimpy Too is done in the



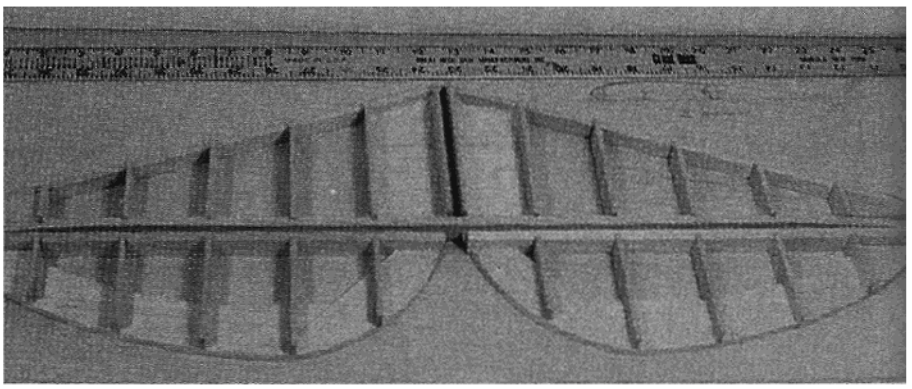
Fuselage before decking. Note position of T-1 and tank. You may want to add the shown tank side supports if you don't want to use foam to wedge the tank in place.



Completed and sanded fuselage. This view shows the original side pattern; the plans are simplified above the aft section of the wing.

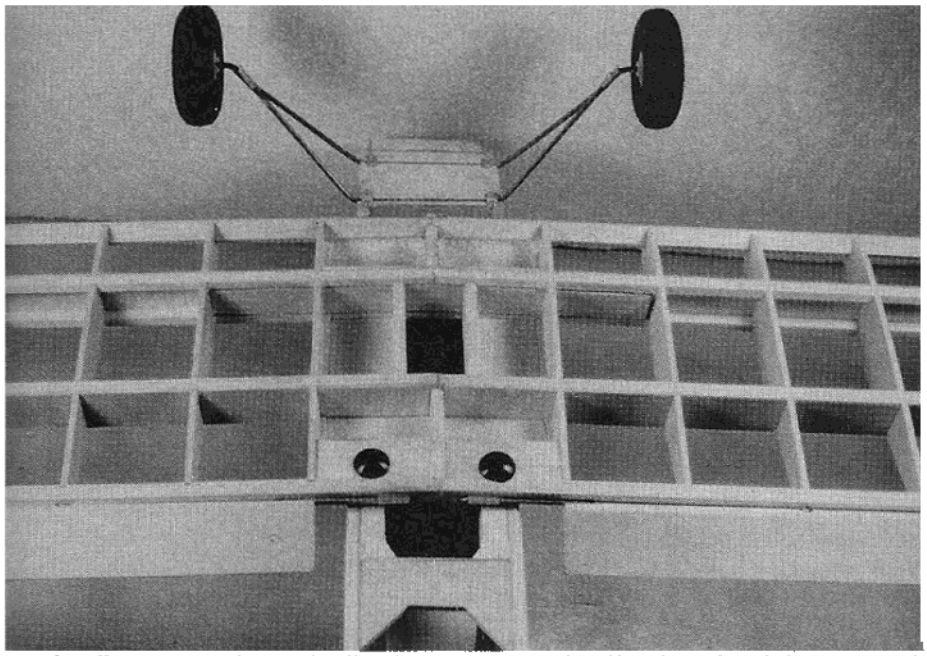
positive stability envelope, as it were. On high rate, you can do it all. You guys with the single rate radios may want to split the difference. I personally like the high rates most of the time, but in windy conditions

traditional box-frame manner of the old timers for a good reason. If you hit straight on, it breaks in zones, and you can easily rebuild it. Begin with the 1/4" x 1/4" x 36" longeron which goes all the way down the fuselage, and



Stabilizer and elevator are built flat on the board, then the airfoil is sanded in. Note the slot for the rudder key.

work off of that. You add the 1/32" ply doubler to the inside of the 1/4" sheet after you have it in place, and the doubler overlaps the longeron into the front; I built the side frames completely and added the doubler last. CA (cyanoacrylate) cement was used on all of the joints in the frame unless noted on the plan. I like CA for the "balsa to balsa" joints, and epoxy on the "hardwood to hardwood," and "hardwood to plywood" joints; i.e., anything which doesn't allow for penetration, I epoxy.



Landing gear attachment detail and wing center section. Note front dowel placement and the use of the basswood wing bolt seats.

After you get the sides done, cut out the bulkheads as shown on the plan, then invert the sides, and construct the box upside-down over the plan to assure alignment. You'll note on the plan a difference from the prototype in that the sheeting goes aft one bulkhead, a simplification which I feel will ease the construction. The engine mount rails are made of hard maple, but you don't need to drill the hell out of 'em as I did. I had a new drill press, and I was just enjoying myself.

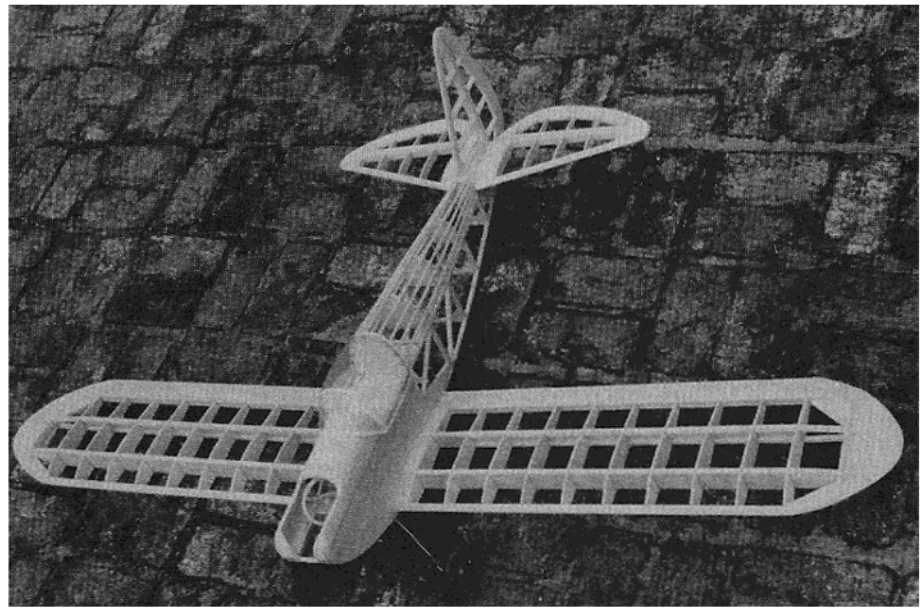
The turtle deck assembly is straightforward . . . just cut out the formers, and glue on the stringers. The forward deck is 1/4" soft sheet, since I like a lot of strength over the tank area, as this is where I grab the plane when I start up the engine. Note the picture. It is the old "soak the balsa in ammonia and wrap it around the spray can" trick. This preforms the sheet, and you can then easily adhere it to the front area. I prefitted it, then coated everything with epoxy on the inside, used that for cement and fuelproofing, all in one. There is no firewall between the engine and the tank, it's aft of the tank. For once, you can look at an aircraft and see if you forgot to fill up.

No, the canopy isn't one of those one-off jobs which you have to go nuts building. Would I do that to you? It is a standard Sig Mfg. Co. WW II canopy with a wedge cut out of it, and the windscreen folded back! A little trim stripe tape completes it (inside and out, please, for strength at the joint). If you can't find a "big Sig," you can forego the "Malcolm Hood" bump and simply make the thing out of two flat sheets of acetate. No sweat. You could even go with an open cockpit, for that matter. I have a feeling that the cockpit side area might be important for knife-edge flight, since it is set forward for this reason, but I don't have any data on this.

Tailplane detail showing block fill and counter-boring for hinge points. Note the points visible within the ribs.

Landing Gear:

The main gear is formed out of 1/8" music wire, as per the plans, then it is placed in position in the gear blocks which you built into the fuselage bottom. This will serve as a jig while you wrap the copper wire into position, and then solder things. Use a couple degrees of toe-in in the axles, and you'll never be worried about ground loops. The tail wheel may look a bit odd, but your rudder servo will appreciate the design no end. By



Finished and sanded, ready to cover and assemble.

mounting the wheel directly in line with the pivot, any side load winds up on the wire, not on the servo. You won't notice any difference in steering, but while everybody else is complaining how aerobatics "eat up rudder servos" you can go smugly on your way with your original servo, year after year. 'Tain't the aerobatic loads wot eats up servo gears mate, 'tis the landings and take-offs 'at does 'em in.

Wing:

Nothing other than an "open framework plain old wing," but again, for a good reason. If you pile this thing up, you can simply cut away the broken structure, rebuild the missing parts and graft them on. Whimpy One suffered a dive straight in from about 100 feet in its first month of life due to a bad crystal in a radio. I came home with a half of a wing and one-third of a fuselage, and was back in the air in two weeks. Try that with a sheeted structure. The only thing that is a bit of a pain in the wing area is the aileron thickness, and that couldn't be avoided. Nobody builds stock which is remotely close, so you have to make your own. I used the method on the plans, but you certainly could use one piece of thick stock and carve it down. Remember to make these things out of relatively hard balsa, lest they lose their effectiveness by torquing, or worse, by developing a flutter.

Note the drawing on the use of hinge points. This method of counter-boring the movable side, results in the very tight gaps you need for instant response. When you go to glue them in, cover only the trailing edge of the wing with a strip of covering film, then insert the point into the ribs, and then hit it with CA, from the inside. You can do this, since the ribs are only 1/8" thick, and once you drill for the hinge points, they'll be exposed on the rib sides. (I put a drop of oil on the metal pin before gluing anything, being careful not to get any on the point itself. This acts as a barrier for the CA or the epoxy, and you won't glue the hinge shut.) You see, with the hinge folded to 90 degrees and the aileron portion hanging straight down, if you force the point in as far as it will go, this automatically puts the hinge pin and its axis exactly where you want it. After everything is covered and I'm attaching the ailerons (or whatever), I use epoxy for the other half of the job. Insert the hinges into the aileron, force it completely up against the T.E. and then deflect it to the degree of movement that you need, and no more. This will give you the least possible gaposis.

After you join the wings and sheet the center section, don't forget to balance the panels. A lot of models stall and spin only to one side with perfectly warp-free wings because the builder overlooked this simple move.

Tail Surfaces:

On the stab I used a preshaped leading edge which you ought to find in your local hobby shop, but if perchance it isn't readily available, make the thing out of a 1/2" square balsa. You can easily shape it as you sand the airfoil into the frames. Before you start, study the pictures, and you'll see how the assembly goes. Nothing complicated here. You can get a good view of the hinge technique in the tailplane shot.

Assembly And Covering:

The tail surfaces are glued to the fuselage before covering, and then everything is sanded out. I covered the prototype in transparent MonoKote for several reasons. First, I like the effect; it is neat to see all the structure you've spent time building, and since it isn't **supposed** to represent anything except a model airplane, the covering is in order. Second, if you haven't done a job in transparent before, you've been missing something. When the sun shines through one of these, they are probably twice as easy to see in the air! Lastly, and most significantly, this airplane was designed to be easily repairable and rebuildable, should you prang it. With a see-through covering job, you can see any breaks in the structure. That is: what you see is what you **got!**

As noted before, I cover the hinge lines first, then the tops of the frames, finishing with the bottoms, since I usually punch holes in the bottoms of the wings and tail when landing in the weeds, and I don't have overlapped coverings with which to deal in repairs. Incidentally, yellow doesn't show the seams in overlaps as badly as do the other colors. I try to pull the covering tight after tacking it along one edge, finishing at the tip of the wings or tail, and then, using a leather glove on my left hand, I heat-gun the stuff and pull hell out of it at the tip, working it down and over the tip. In this method, you'll be able to get a smoothly finished surface, and only then do I shrink the whole surface.

One of the Wimpy Too's secrets is the old timer's method to induce stability. It is called wash-out, which is just a fancy name for a warped or twisted wing tip. I suppose everybody in the hobby knows what it's all about by now, but just on the odd chance that you got bypassed on the information on that one, what it does is to reduce the angle of incidence at the tips of the wings, and therefore the center section stalls first, producing a wings-level stall, and a docile aircraft in slow flight, as in landing. The problem with wash-out is that if you have too much, the aircraft is excessively stable, and you can't do anything much in the way of spins and snaps. "Too" uses two degrees, and that gives the stall characteristics you need, but you can still overpower it due to the large tail surfaces and short coupled fuselage. All you do to get the desired warp is to have your buddy hold the center section down flat on the table as you twist the trailing edge of the completed wing up while you shoot it with a heat gun. If you have an incidence meter (and if you don't, you really ought to), simply measure the root against the tip. If you don't, it's 1/4" at the tip.

Use the R/C gear for balance, and you will probably find that the locations on the plan will be about the usual: Battery, then servos, then receiver. The little fellow balances a little farther aft than you are used to because of the lifting stab, and this allows you to get the nose well up for landing. Adjust the control throws to match the plans, and charge everything up. We fly tomorrow.

Flying:

This is where it all pays off. I'd recommend that you taxi a bit to get used to the handling, and then make a few "false starts" if you aren't an experienced taildragger pilot, although the model will track dead straight once it is up on the mains. Like all taildraggers, it'll swing a bit to the left as you transition from tail down to level, but it certainly isn't violent, due to the huge fin and rudder area. On the first test flight, the thing broke ground and flew off at 1/3 throttle! I would recommend that once you get things trimmed and the thumbs stop shaking, you go up to about "three accidents high" and do stalls, so that you can get used to the landing configuration. Once you have determined that you don't have a wing drop, you are home free, and the landings will be a piece of cake. The rest of the fun is limited only by your imagination. Good luck, and happy landings! Anybody for a "BiWhimpy?" Maybe with a little sweep on the top wing, and a Saito Twin .90, and, of course, a cabin bipe, and . . .

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