
MA 6528
PENSACOLA, FLA
Tiger Tail


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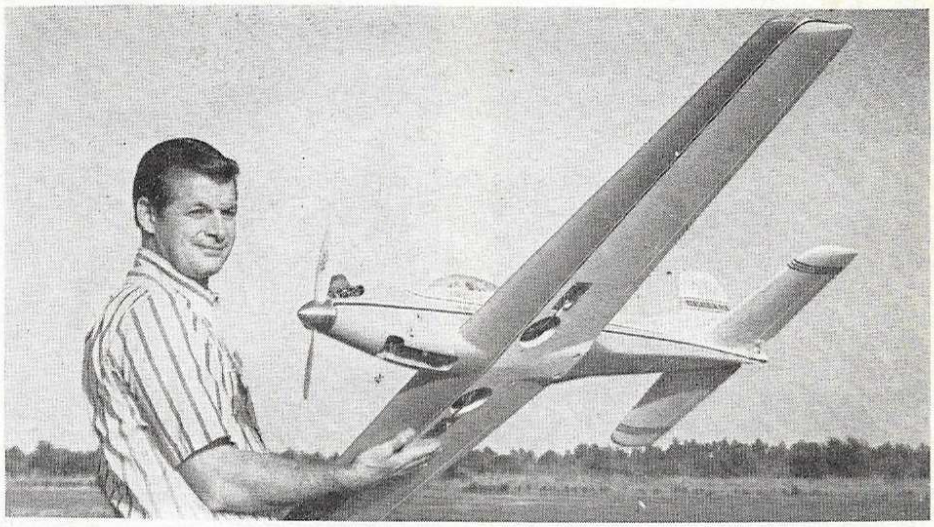
"You will be surprised how good it looks after you've won a few first places with it"

tiger tail

Two
U.S

By RON CHIDGEY

time winner of Nationals can't be a bad record!



IN opening this discussion of the 'Tiger Tail', I guess I'm supposed to give you a sales pitch that will convince you to build one. I'm really not too sure if this is a good idea, since your flying will probably improve and us old folks don't need any of that! It gets tougher to win every year. And besides, 'Tiger Tail' really has only two things of any importance going for it – it's ugly and it's honest! The 'ugly' part helps, since everyone knows ugly airplanes fly better, witness Kwik-Fli, Daddy Rabbit, and Cutlass! One of my grammar school drop-out friends once remarked in a kidding session 'It's ugly enough to be called a trainer'. The only reply I could manage was 'Pretty is as pretty does'.

Which brings us to its most important attribute: 'Tiger Tail' is a completely honest airplane. Honest! I have built six of them over the past two years, one with fixed gear, and they have all flown almost identically, being completely predictable in their flying characteristics. I think this thing of 'honesty' or 'predictability' is the single most important factor a competition airplane can bring to the party. It far outweighs most other differences in design and styling. Needless to say, it is very disconcerting to have your airplane do something completely uncalled for in the middle of a heated contest.

If the quality of our flying has improved over the past four or five years, and I think it most certainly has, it is primarily due to (1) better radio equipment, (2) better engines, and (3) retractable landing gears. Airplane design (or style) may have made a marginal contribution, but it is a secondary factor. There are several 'vintage' designs which, given the benefit of our really good radios and engines and modernized with retracts, could win today as easily as they did yesterday. In fact, I think we sometimes design ourselves into a built-in handicap in an effort to be different. I guess my philosophy has been to strive for good flying characteristics first and aesthetics second.

A good competitive design should certainly minimize the work the pilot has to do. You will be surprised how good a 'conventional' type like 'Tiger Tail' begins to look after you have won a few first places with it. I know that last July, in Chicago, it was the most gorgeous airplane I had ever seen!

While 'Tiger Tail' isn't a radically new design, it does have a few subtle differences worth mentioning. You will notice the airfoil progresses from a rather thick symmetrical centre section to a lifting (semi-symmetrical) tip section. I don't make any great claims for this combination; however, 'Tiger Tail' can be slowed down very nicely for landing without any fear of abrupt tip stalls, whereas many other designs with sharply tapered wings cannot. I don't know whether this is all due to the lifting tip, but I think it helps. The thick (17 per cent) centre section gives a good degree of air speed control. When you throttle back, the airplane slows at a good rate, but oddly enough, the top end doesn't suffer. 'Tiger Tail' was as fast as most at last year's U.S. Nats.

The strip ailerons begin fairly far outboard – for a good reason. The inboard portion of the strip is ineffective for generating rolling forces, but does contribute lots of drag when pushed out into the breeze. The outboard configuration improves the rolls by keeping speed up.

The fuselage shape is narrow and deep up front, as you might expect, but it also has a relatively wide tail cone, which may seem a bit odd. This was done to structurally stiffen the fuselage and provide a more rigid mount for the tail surfaces. If possible, I wanted to eliminate some of the flutter of the control surfaces caused by vibration. This flutter is transmitted through the pushrods and really works on the servo feed back pots.

Simplicity is the essence of good design and 'Tiger Tail's' construction is simple and straightforward. If you must build one, let me carry you through the building sequence, almost step-by-step, since it may save you some time.

Construction

Cut foam cores from 1 lb. foam. Be sure you cut a left and a right panel. Mark them immediately after cutting, because it is difficult to see the slight amount of lift in the tip section. The sections shown

Full-size copies of the plan shown left at 1/6th full size are available from R.C.M.&E. Plans Service, price £1.25. Quote plan R/C/1185.

on the plans are for a female template, and the template is made exactly the size shown on the plans. The wing section itself will come out approximately $\frac{1}{32}$ in. smaller all around. If you cut with a male template, take this into consideration.

Add trailing edge to cores, sanding to the wing contour. Sheet cores with the softest $\frac{1}{16}$ in. balsa you can find using contact cement such as Aviette's Styrobond. Join panels with correct dihedral angle. Again, watch that left and right panel!

Add aileron torque rods and centre section trailing edge filler. Fibreglass the centre section and add tips. Tack glue ailerons in place and sand wing.

Mark landing gear block and wheel-well location to suit your favourite brand of retracts. I used the *Pro-Line* gear. Main gear tread should be 16 in. Line wheel-wells with $\frac{1}{32}$ in. balsa. Paint remainder of gear cutout with white glue thinned with water to protect the foam from attack by the finishing materials.

Tailplane and fin

Cut out tailplane parts from soft balsa. The slotted L.E. is easily made on a table saw. Pin L.E. and T.E. in place over a flat surface and add ribs. Allow to dry before gluing the top sheeting in place. Flip the assembly and add bottom sheeting. Trim L.E. and add tips. Tack-glue elevators in place and sand stab.

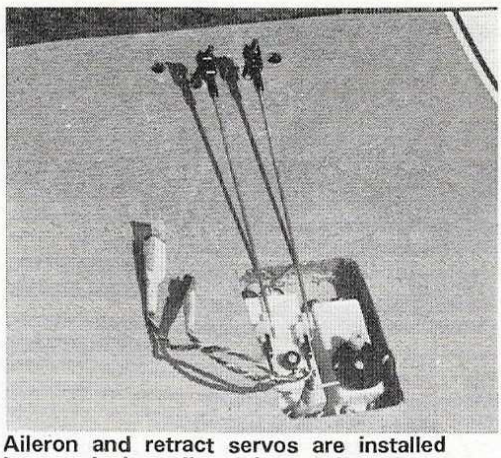
Build the fin from soft balsa. The fin tip is spruce. Tack glue rudder in place and sand assembly to airfoil shape.

Fuselage

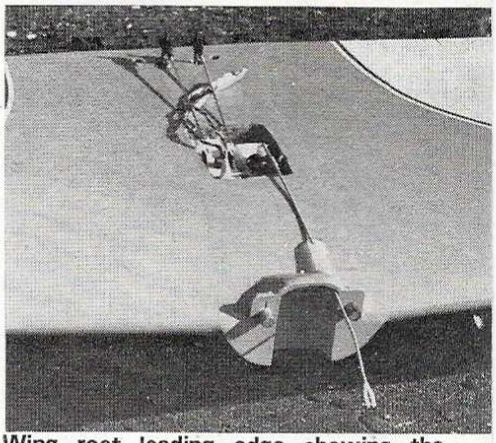
Cut the sides from medium $\frac{1}{8}$ in. sheet and the $\frac{1}{16}$ in. medium balsa front doublers and $\frac{1}{8}$ in. soft balsa rear doublers. Cut out all formers. Select a soft, straight piece of $\frac{3}{4}$ in. x 4 in. balsa for the top block. Mark the centreline, the fuselage outline, and the position of the formers on the block; tack-glue block to a flat table top using a few spots along each side. Glue formers in place using epoxy at F-1 and F-2. Tite-Bond is preferred elsewhere. Glue $\frac{3}{16}$ in. x $\frac{1}{2}$ in. spruce longerons in place following the contour of the fuselage. Add $\frac{1}{4}$ in. x $\frac{1}{2}$ in. spruce bottom longerons between F-1 and F-2. Glue fuselage sides in place and allow to dry.

Add $\frac{1}{4}$ in. square balsa rear bottom longerons, the $\frac{1}{16}$ in. plywood tank compartment doubler and the $\frac{1}{16}$ in. plywood tank floor. Add the $\frac{3}{16}$ in. doubler below the tank floor then add nose wheel-well blocks. Install nose gear temporarily and install nose wheel steering Nyrod and throttle Nyrod. Install elevator and rudder pushrod guides at rear of fuselage. Sheet bottom of rear of fuselage and add wing hold-down plate and $\frac{1}{8}$ in. side braces.

Remove fuselage from the work bench and temporarily install the engine. Use a



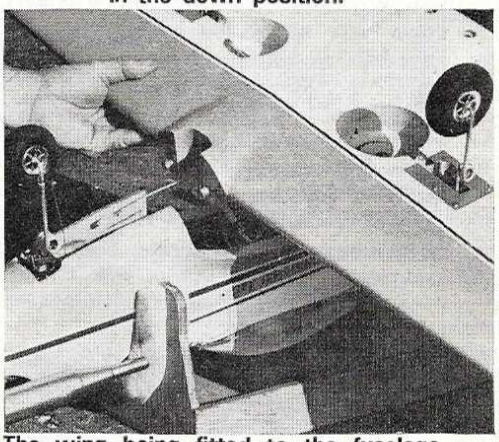
Aileron and retract servos are installed in one single well at wing root. Arrangement is simple.



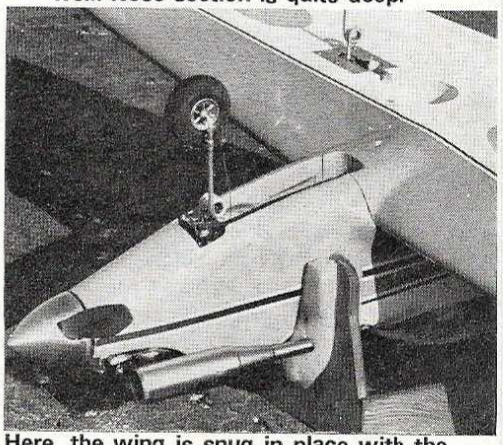
Wing root leading edge showing the guide for the pushrod from the retract servo to noseleg unit.

Nose section detail showing the noseleg retract well, with the undercarriage unit in the down position.

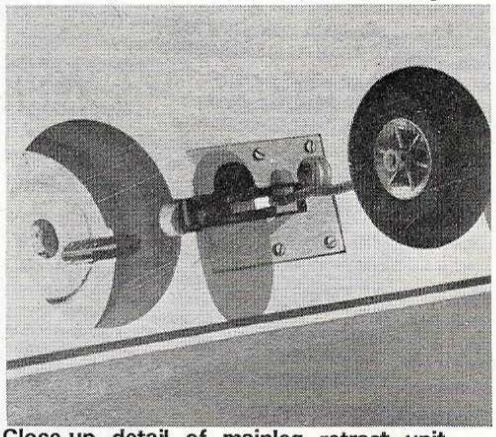
Same nose section detail showing the noseleg retracted away into the wheel well. Nose section is quite deep.



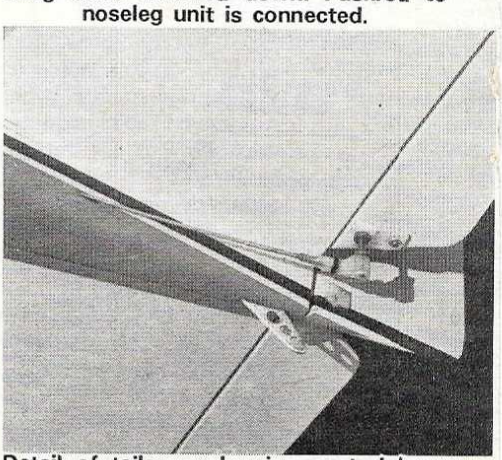
The wing being fitted to the fuselage, with the undercarriage extended. Note the noseleg actuation rod ahead of wing.



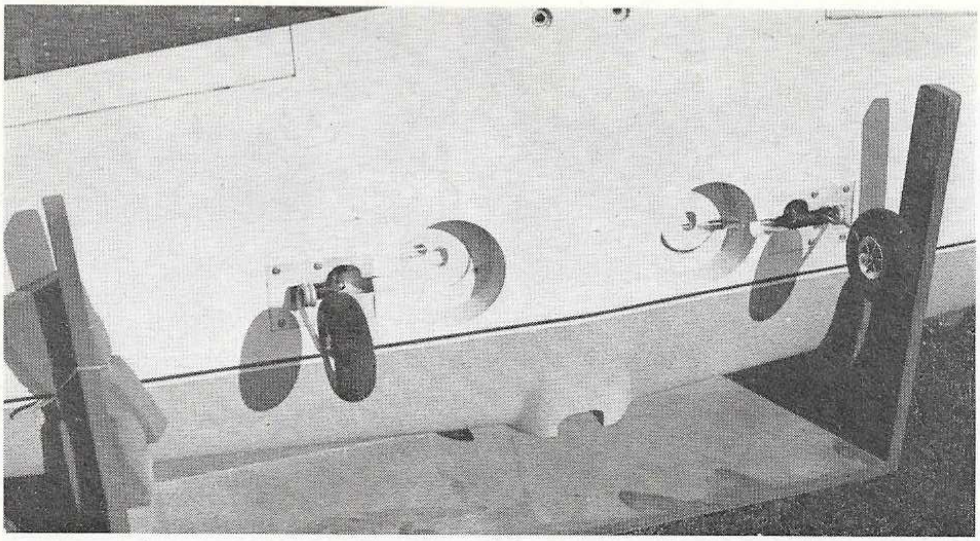
Here, the wing is snug in place with the wing bolts screwed down. Pushrod to noseleg unit is connected.

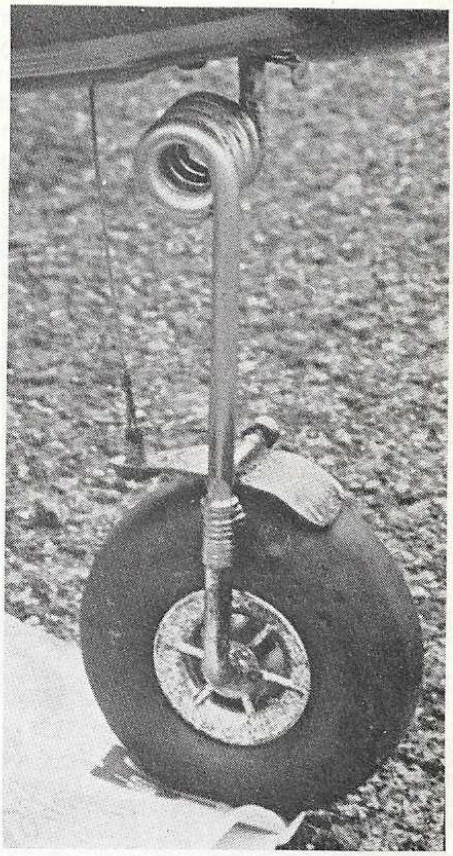


Close-up detail of mainleg retract unit installation. Pro-Line retracts used on prototype model. Arrangement is neat.

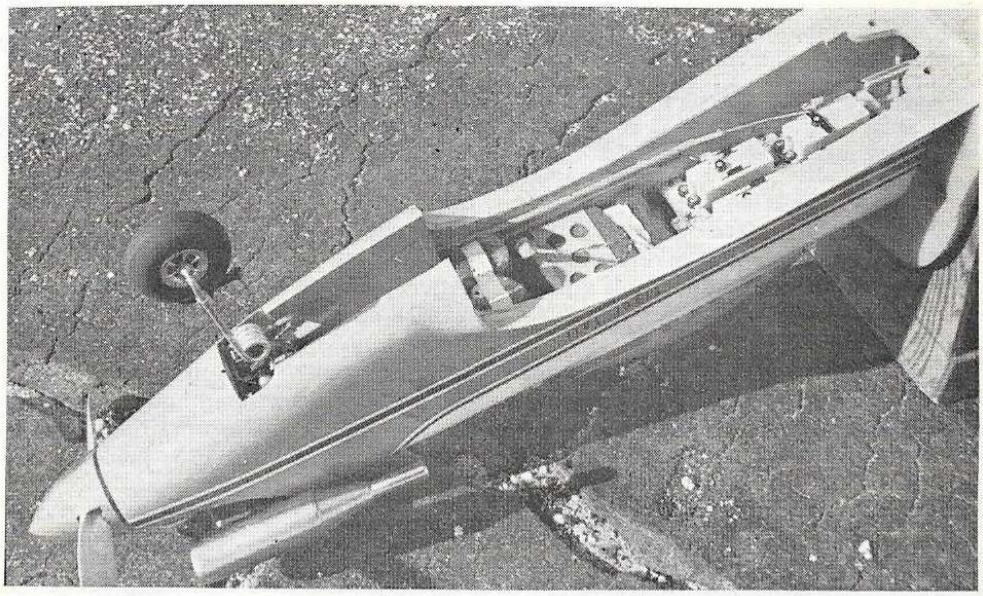


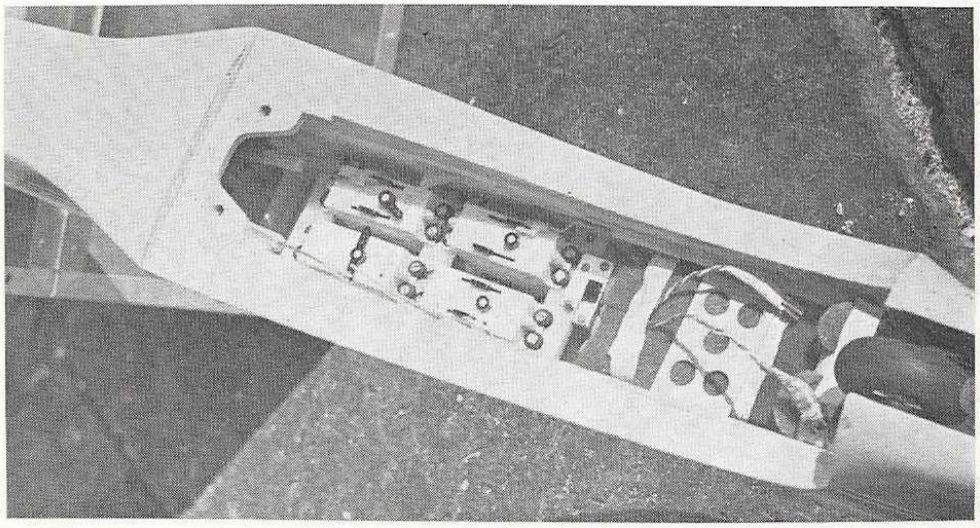
Detail of tailcone showing control horn positioning and the dural tail skid to save the paintwork.





Above: the wing underside, showing the main undercarriage in the extended position. Pro-Line retracts used on prototype are supplied complete with metal mechanism covers. Wheel-wells are neatly contoured. Top right: noseleg of Tiger Tail, showing the simple 'tyre plonker' brake system used by designer. Below: two views of the complete fuselage radio installation areas. Fourth servo is for engine needle control to alter mixture setting while airborne.





dummy wooden spinner back plate to locate and centre the $\frac{1}{16}$ in. plywood nose ring and glue the nose ring to the fuselage sides. Add the bottom nose block and corner fillers of soft balsa. Shape top block, nose blocks and bottom to outline shown on plans.

Cut the wing fillets to outline shown on the side and top views. Shape to a triangular cross section and glue in place. Fair into fuselage and add a small Epoxylite fillet (Format filler will do here – Ed.) to blend the fillet into the fuselage. Block up the fuselage and carefully glue the stab and fin in place. Be certain stab is 0–0 with the thrust line (or top of fuselage sides) and fin is true with fuselage centre line. Add the small block to shape fuselage above stab. Add a small Epoxylite fillet around stab and fin, and you are done.

Finish

My 'Tiger Tails' have all been covered with Southern R/C's Skyloft spun bonded nylon and finished with acrylic lacquer plasticised with Flexall plasticiser. I follow to the letter the finishing method detailed in the Skyloft instruction sheet and have had no finishing problems. It is a fast system and is light. I think it contributes a great deal toward holding the weight of my ships within the 7–7½ range. I use Aerogloss clear to seal the wood, to apply the Skyloft and finally to seal the Skyloft. I use DuPont 308 lacquer primer (also plasticised with Flexall) and Martin Senour acrylic lacquer for the finish coats. This combination of products works well for me. Others may work equally well; I just can't vouch for them.

Flight trim

Now we come to the part that really separates the winners from the losers. A lot of potential winners will stay just that, potential winners, because they quit too soon. They are relieved to finally get the new bird in the air (and a little surprised that it actually flies pretty good) so they never take the time to really trim it

Here we have Mr. Nice Guy, the quiet man from the southern provinces, with his "Tiger Tail." Ron never pushes to the front but makes his presence felt when out on the flight line!

tiger tail

BY RON CHIDGEY

Continuing M.A.N.'s policy of always presenting the Nats winners, herewith the 1971 National Pattern winner. Good-looking, very efficient Stunter performed flawlessly under the masterful hands of our gentleman from the South.

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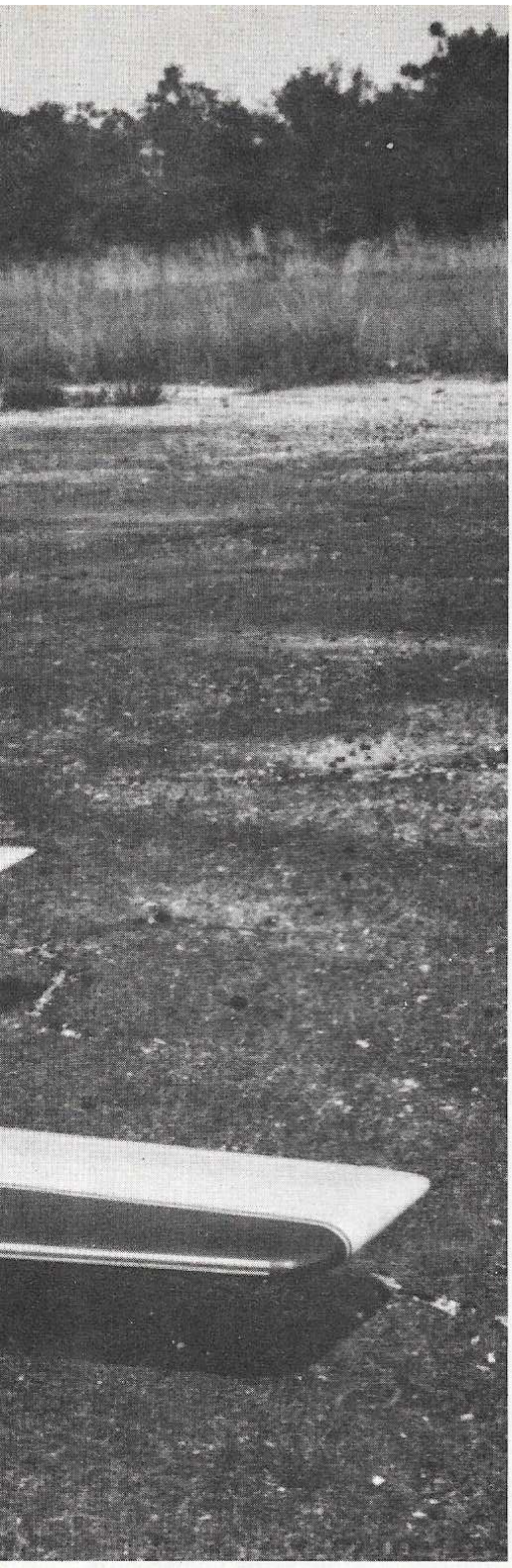
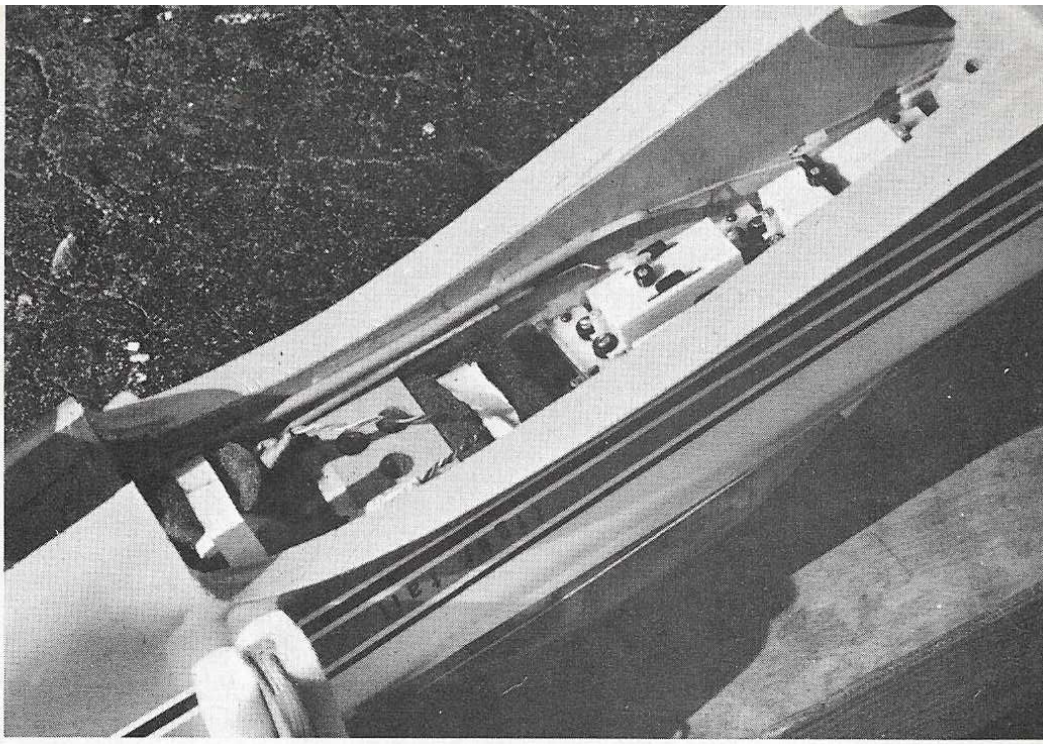
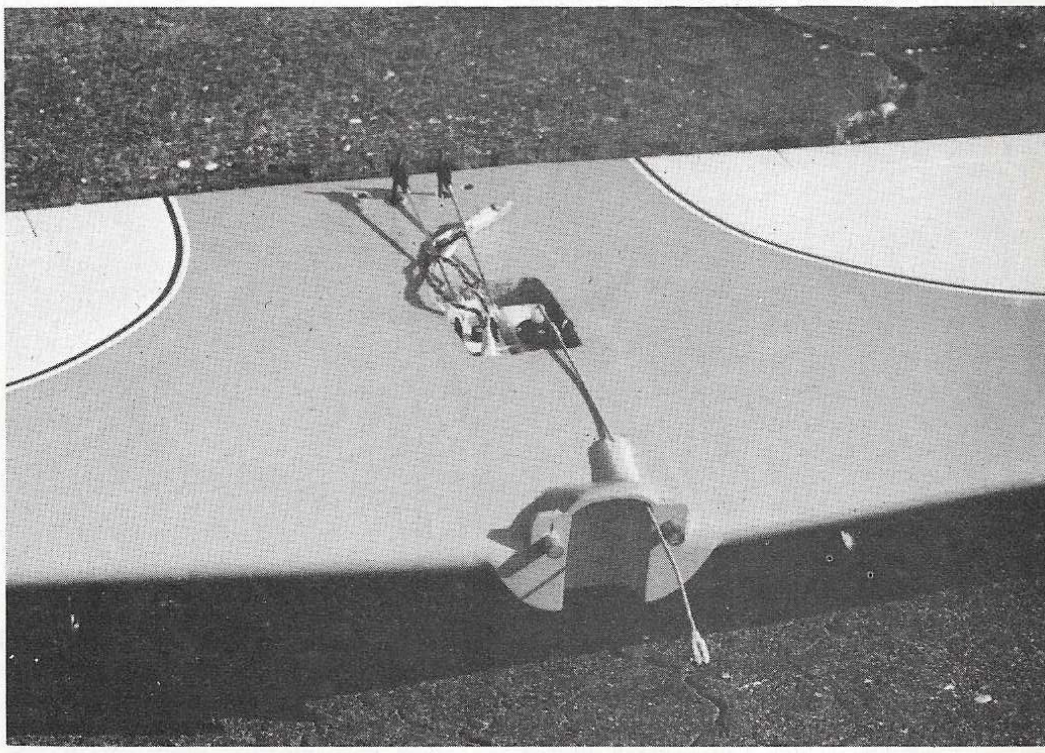




A look inside the "Tiger Tail" shows compact arrangement for all the electronic goodies.

View of the wing with aileron and retract servo installation. Note nose wheel well-section.



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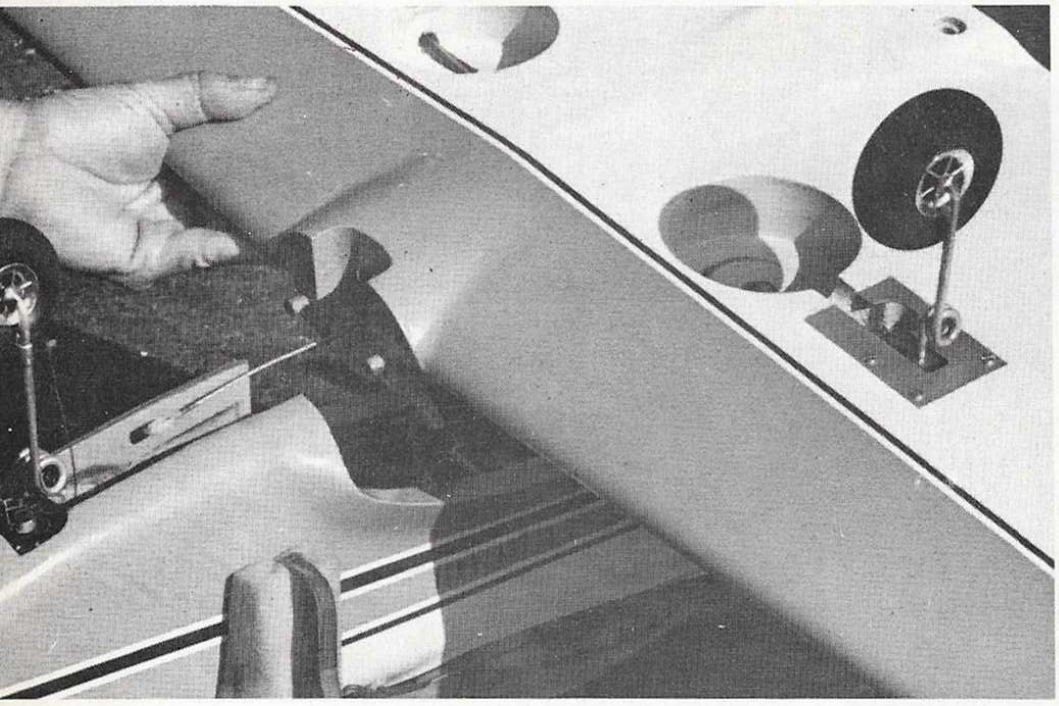
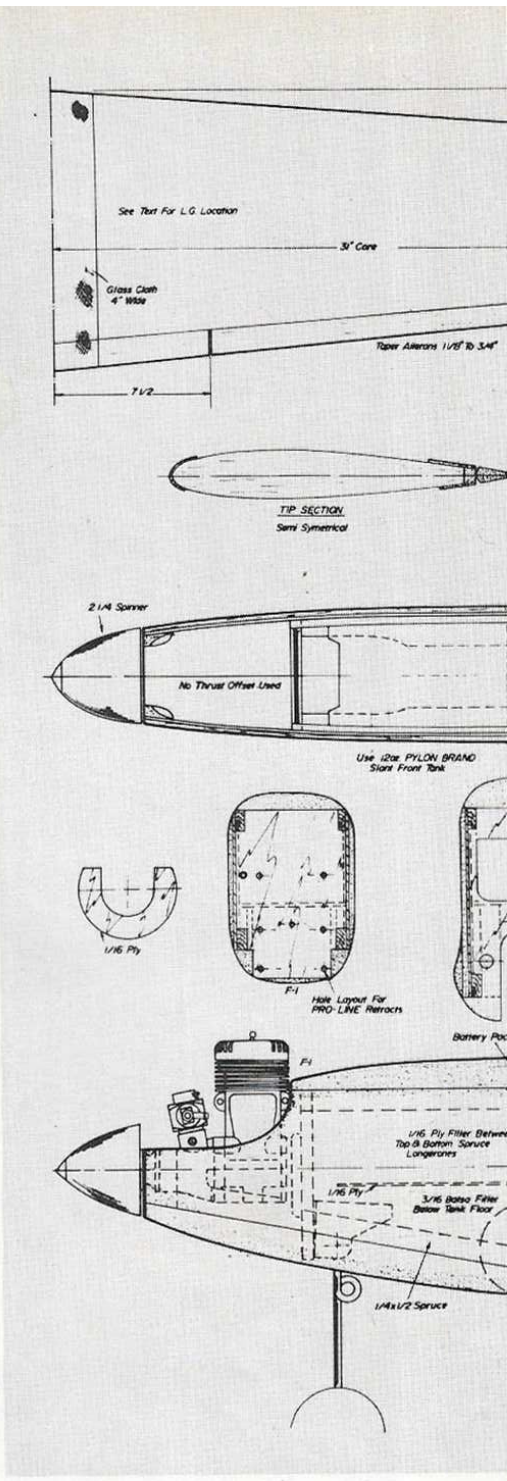
Close-up of the ProLine nose wheel installation. ProLine retract gear is a Chidgey design.

View of wing placement to the fuselage shows main retracts in wing, pushrod for nose wheel.





TIGER TAIL

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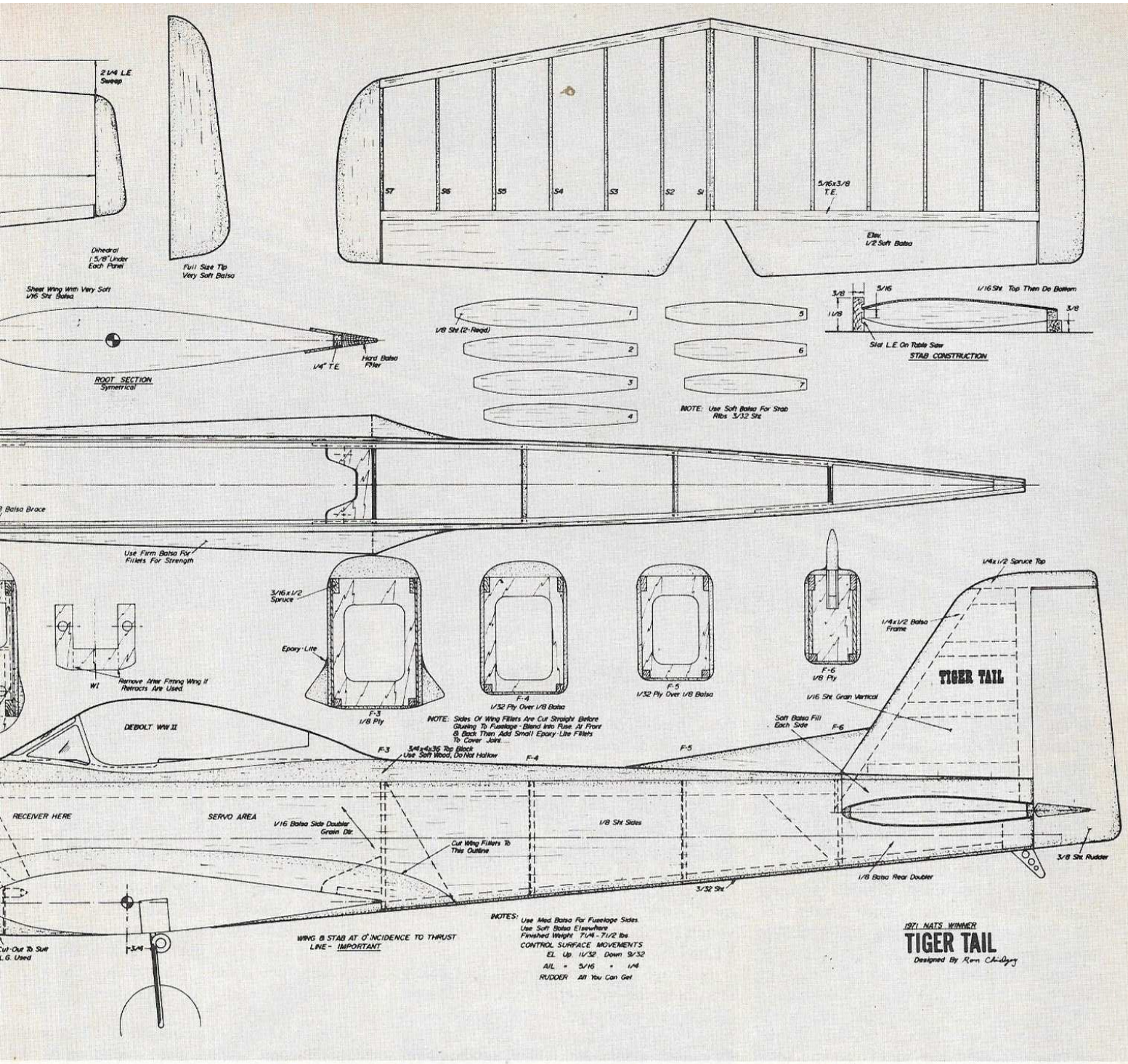
CONSTRUCTION

Wing: Cut foam cores from #1 (1 lb.) foam. Be sure you cut a left *and* a right panel. Mark them immediaely after cutting, because it is difficult to see the slight amount of lift in the tip section. The sections shown on the plans are for a female template, and the template is made *exactly* the size shown on the plans. The wing section itself will come out approximately



1/32" smaller all around. If you cut with a male template, take this into consideration.

Add trailing edge to cores, sanding to the wing contour. Sheet cores with the softest 1/16" balsa you can find, using Southern R/C's Sorghum contact cement. Join panels with correct dihedral angle. Again, watch that left and right panel!

Add aileron torque rods and center section trailing edge filler. Fiberglass the center section and add tips. Tack-glue ailerons in place and sand wing.

Mark landing gear block and wheel-well location to suit your favorite brand of retracts. I used the ProLine gear. Main gear tread should be 15 inches. Line wheel-wells with 1/32" balsa. Paint remainder of gear cutout with Tite Bond thinned with water to protect the foam from attack by the finishing materials.

Stab and Fin: Cut out stab parts from *soft* balsa. The slotted LE is easily made on a table saw. Pin LE and TE in place over a *flat* surface and add ribs. Allow to dry before gluing the top sheeting in place. Flop stab and add bottom sheeting. Trim LE and add tips. Tack-glue elevators in place and sand stab.

Build the fin from *soft* balsa. The fin tip is spruce. Tack glue rudder in place and sand assembly to airfoil shape.

Fuselage: Cut the sides from medium 1/8" sheet and add the 1/16" medium balsa front doublers and 1/8" soft balsa rear doublers. Cut out all formers. Select a soft, straight piece of 3/4" x 4" balsa for the top block. Mark the centerline, the fuselage outline, and the position of the formers on the block; tack-glue block to a flat table top using a few spots along each side. Glue formers in place using epoxy at F-1 and F-2. Tite-Bond is preferred elsewhere. Glue 3/16" x 1/2" spruce longerons in place following the contour of the fuselage. Add 1/4" x 1/2" spruce bottom longerons between F-1 and F-2. Glue fuselage sides in place and allow to dry.

Add 1/4" square balsa rear bottom longerons, the 1"16/ plywood tank compartment doubler and the 1/16" plywood tank floor. Add the 3/16" doubler below the tank floor then add nose wheel-well blocks. Install nose

Close-up of the cockpit canopy and the reason for the "Tigertail." Note the excellent finish of the plane which is a Chidgey trademark!

TIGER TAIL

gear temporarily and install nose wheel steering Nyrod and throttle Nyrod. Install elevator and rudder pushrod guides at rear of fuselage. Sheet bottom of rear of fuselage and add wing hold-down plate and 1/8" side braces.

Remove fuselage from the work bench and temporarily install the engine. Use a dummy wooden spinner back plate to locate and center the 1/16" plywood nose ring and glue the nose ring to the fuselage sides. Add the bottom nose block and corner fillers of soft balsa. Shape top block, nose blocks and bottom to outline shown on plans.

Cut the wing fillets to outline shown on the side and top views. Shape to a triangular cross section and glue in place. Fair into fuselage and add a small Epoxylite fillet to blend the fillet into the fuselage. Block up the fuselage and carefully glue the stab and fin in place. Be certain stab is 0-0 with the thrust line (or top of fuselage sides) and fin is true with fuselage center line. Add the small block to shape fuselage above stab. Add a small Epoxylite fillet around stab and fin, and you are done.

FINISH

My "Tiger Tails" have all been covered with Southern R/C's Skyloft spun bonded nylon and finished with acrylic lacquer plasticized with Flexall plasticizer. I follow to the letter the finishing method detailed in the Skyloft instruction sheet and have had no finishing problems. It is a fast system and is light. I think it contributes a great deal toward holding the weight of my ships within the 7-7½ # range. I use Aerogloss clear to seal the wood, to apply the Skyloft and finally to seal the Skyloft. I use DuPont #308 lacquer primer (also plasticized with Flexall) and Martin Senour acrylic lacquer for the finish coats. This combination of products works well for me. Others may work equally well; I just can't vouch for them.

FLIGHT TRIM

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1. While not a critical adjustment, the engine thrust should be 0-0 with the fuselage centerline and also the side reference line (top of the fuselage sides).

2. Be certain the wing and stab are at 0° with the reference line. Measure this, don't just eyeball it.

3. Check the C.G. location. It should be 4¾" back from the leading edge. Dont' be concerned about having to add weight to properly locate the C.G. It is a small penalty to pay for having it right.

4. Balance the wing, or, better still, the airplane, about the roll axis. I use a 6 penny nail, cut to the right length, to balance the wing. Just push it into the soft tip, but don't seal it permanently as you will possibly have to make some fine adjustments later.

5. Set control surface throws as shown on the plans. You may like a slightly different feel than I do but this is a good place to start.

6. Now go fly . . .

After a few "get acquainted" flights you will want to fine tune the trim. If you will make two critical adjustments, and work with them until you get them right, you will have a good flying Tiger. I'm assuming now that the C.G. and wing and stab incidence were put right in the pre-flight checks. First, adjust the lateral balance and aileron neutrals until the ship tracks through both inside and outside loops with virtually no corrections. You should be prepared for a whole afternoon of nothing but inside and outside loops. After going through this exercise, you should be convinced of the value of lateral balance. A slight out-of-balance condition can really tear up your looping maneuvers since the normal thing to do is to compensate with opposite aileron. Then when the airplane is inverted, the out-of-balance condition and the aileron deflection are acting in the

Tiger Tail

same direction!! It is sometimes difficult to tell whether it is balance or an aileron or wing warp, but in general, if you must correct part of the loop with ailerons in one direction and part in the opposite direction, it is balance. If you must correct with the same aileron direction through the whole loop, it is a warp condition. It is a simple matter to correct on out-of-balance condition, but warps are a problem. A warped balsa sheeted foam wing is warped forever (of course, if you build it true, it's true forever). Ailerons can sometimes be straightened with a little steam and pressure. The effect of a very slight aileron warp can be reduced by raising both ailerons a couple of turns on the clevis giving a slight wash-out to the trailing edge. Make adjustments slowly, carefully thinking each one out, and you will be pleased with the results.

The second critical adjustment you will want to make is aileron differential. Some flyers determine the amount of aileron differential required by pulling the airplane up into a climb and doing a split "S." If the nose pulls off heading, they add differential until it tracks straight. This requires an excessive amount and usually results in rolls that are somewhat "barrel rolly." I prefer to set the differential by the airplane's behavior in the rolls, especially the four point. Use as much differential as possible without the nose yawing off heading when you rapidly roll from upright to knife edge. The important thing is to not compromise the high speed rolls and four point too much for the sake of a few turn around maneuvers. The best way to adjust aileron differential is by bending the aileron horns —forward to increase, back to decrease. The differential shown on the plans should be about right, but do make the in-flight checks before considering the airplane trimmed.

Now, *go win!* ■