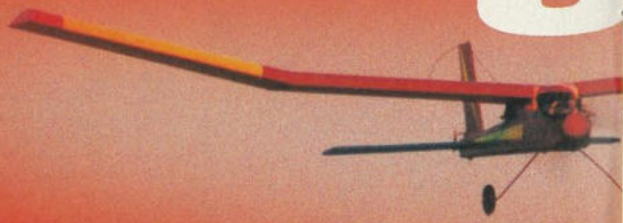


**Free time? Try our free plan!**

# Lone Rang

*A trainer designed specifically with the 'Lone flyer' in mind!*



## General

Lone Ranger was designed as a trainer which even the lone hand, without access to a club or instructor, should manage to build and fly. A 10 sized (1.5 cc) engine with an 8 x 4 prop has plenty of power, so do not be tempted to fit anything bigger. The whole model is designed to be built flat on a building board, which makes it easy to build straight and accurate.

## Materials

I suggest using very light 1/4" wood, medium density 1/16" and 3/32", and something in between for the 1/8" sheet. The main spars should be the hardest balsa you can find for the inner panels, and very light (cut from 1/4" sheet) for the outer panels.

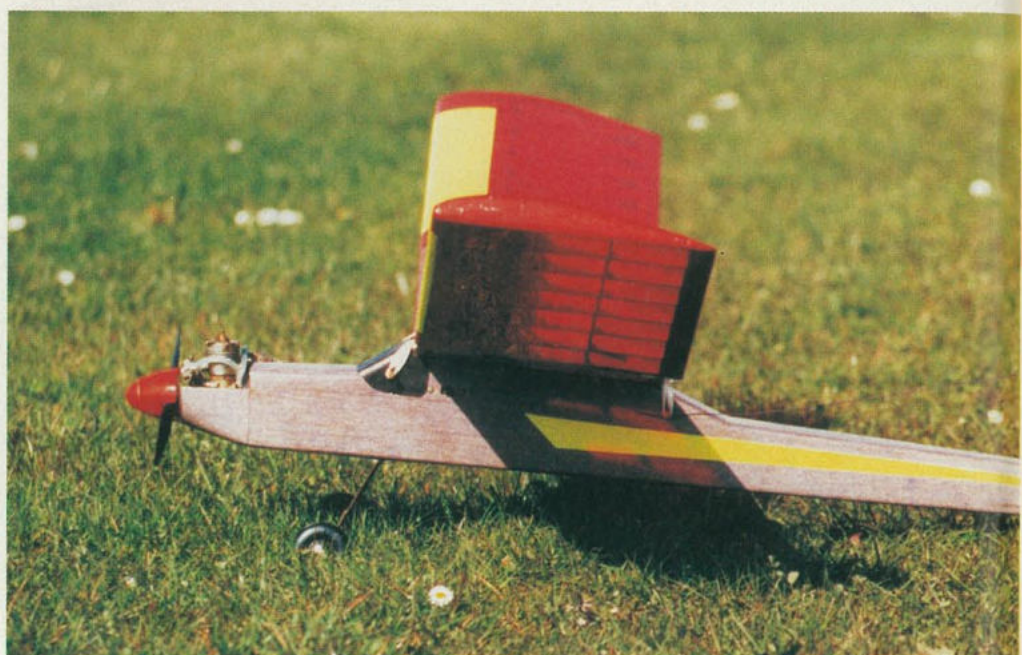
Use 1/16" birch ply (not liteply) for wing joiners. I recommend yellow aliphatic glue, for most parts, but white PVA, or thin 'Super Aliphatic' are also suitable. For joints where you want almost instant grab, use medium cyano.

## Tail

Pin the lower centre sheet and 1/2" by 1/16" strips in place. Glue on the 1/4" by 1/8" strips, and the ribs which must be trimmed to clear the 1/16" sheeting. Add the top 1/16" strips and centre sheet. When the glue is dry remove from the board and round off the LE. The elevator



Further aft the wings are joined by a pinned plastic hinge.



This Lone Ranger is amply powered by an old Enya 09.

is made from 1" by 1/4" TE stock with its LE shaped as shown in the side view.

Cut the fin from very light 1/4" sheet, and make the rudder in the same way as the elevator. Attach control horns to rudder and elevator as shown.

## Right Wing

Cut 24 ribs from 1/16" balsa and 8 from 1/8" balsa, cut the TE stock, the sheet and the spar material into correct lengths, and make 1/4" by 1/16" for cap strips. Cut a notch 1/16" wide and 1/16" deep in the TE at the position of each rib, except the end ribs. Pin the TE in place and the lower LE sheeting, then glue the 3/32" LE doubler on top. Fit the inner bay bottom sheeting and the lower cap strips. Place scraps of 3/32" balsa in position and pin the LE, vertical, on top of



A small brass hinge joins the outer panels at the main spar.

them, first running a line of glue where the LE touches the 3/32" doubler. Cut away the lower sheet and cap strip for the plywood triangle and glue in place (hinged wings only). Check the fit of each rib.

Run glue along the lower sheet and lay the lower spar in place, using the ribs to get it accurately in position. Apply spots

er

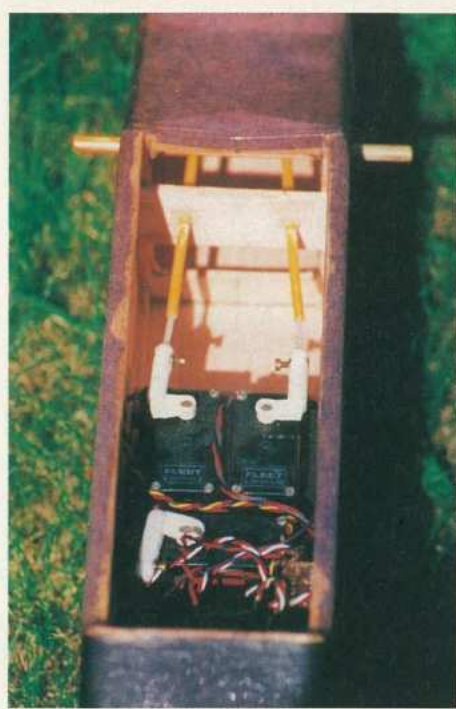


of glue where the rear spar runs, and put the spar in place, aligning it with the dry ribs. Now glue each rib in position: the end ribs slope in at 5 degrees but all the others are vertical. Check the top spar fit, and when satisfied glue it in.

Slice away a 1/16" slot in two ribs for the large W1 joiner and glue in place, checking that it is at the correct angle. Then fit W2, and the two W3 joiners (TE and aft spar), at the same angle as the main joiner. Glue webs to the backs of the spars in all the other bays.

Cut the front edge of the top sheet to an angle of about 60 degrees and glue to the LE and spar (cyano) and ribs (aliphatic). Fit the top sheet to the inner bay, and 1/4" cap strips to the other ribs (1/2" to the end one). Trim the end cap strips and centre sheeting to fit the end ribs. Lift from the board and cut the LE and bottom sheet roughly to shape.

The adjacent outer panel may be built exactly as the inner panel, except that



**My servo installation. Note the supported snakes and minimum outer showing.**

you use light spars, and there are no ply joiners, or sheeting aft of the spars. Fit a 1/2" cap strip to the inner rib.

### Left Wing

The two left panels may be built over the plan in the positions vacated by the



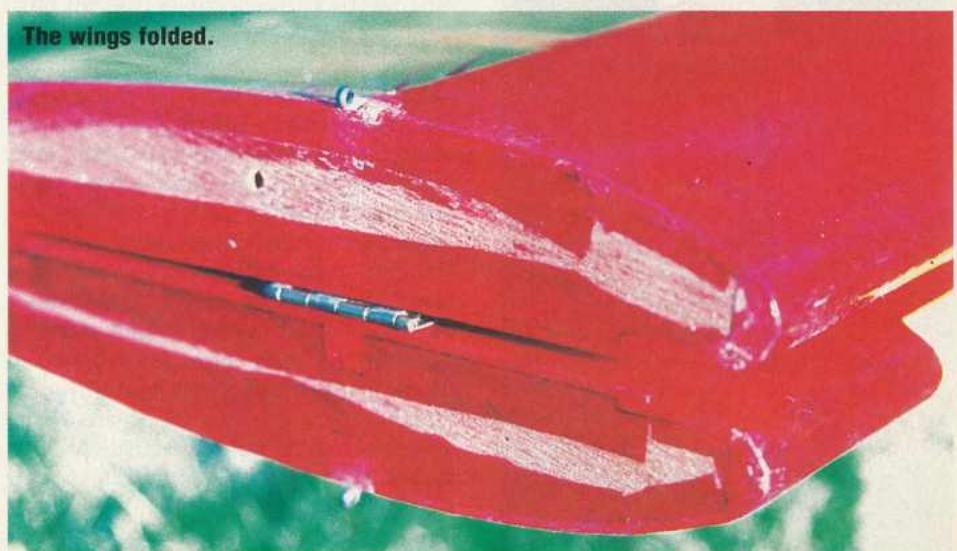
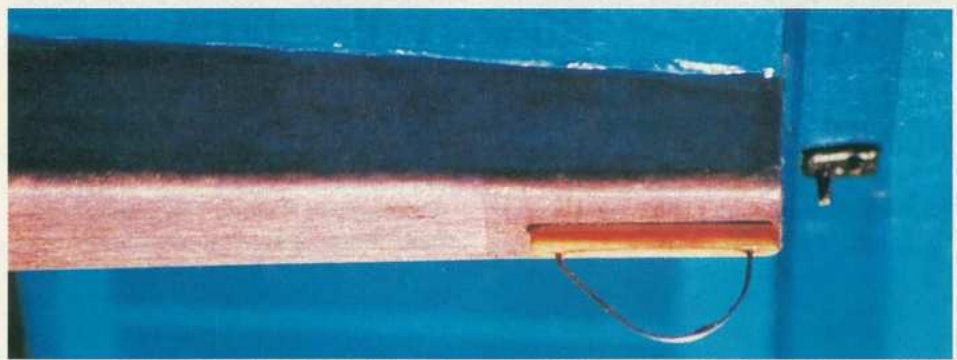
**Tape is easier, but my wings are held by three 1/16" split pins, two glued through the spars into hard balsa blocks, and a third through their eyes.**

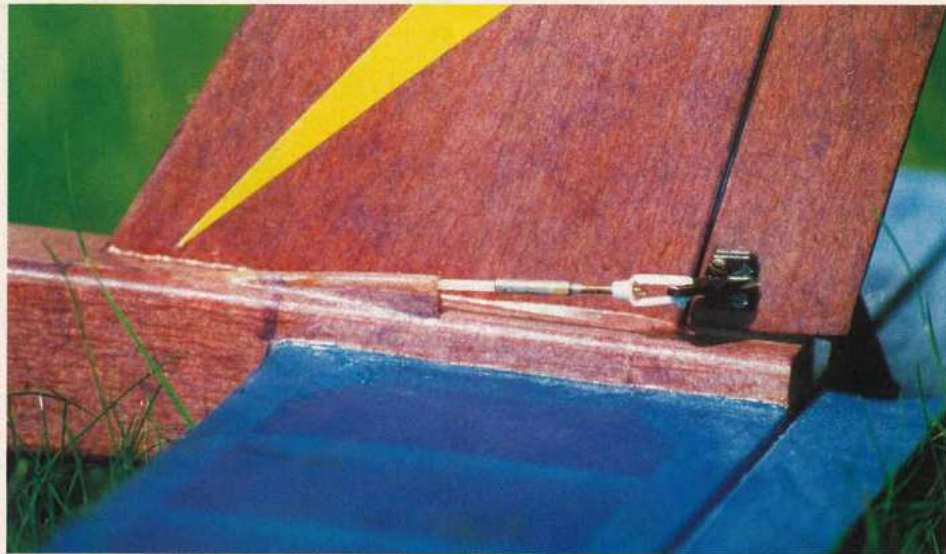
right panels. The planforms are the same but with the centre section sheeting at the opposite end. After building the left inner panel to the point where the plywood joiners are required, lay the right inner panel in position, supporting it at the correct angle (10 degrees) and glue the ply joiners to the left panel.

### Wing Finishing

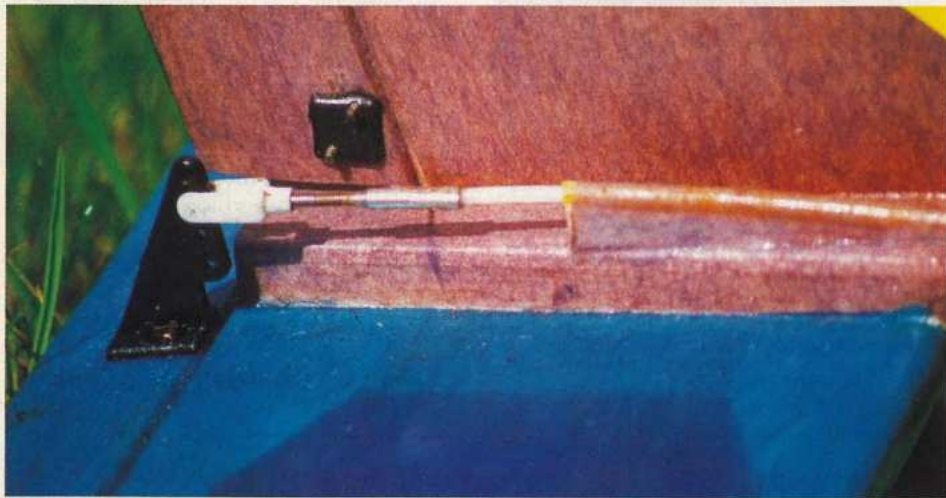
Use a sanding block to shape the section in accordance with the plan. Add a

**A safe simple tailskid from thin wire and plywood.**



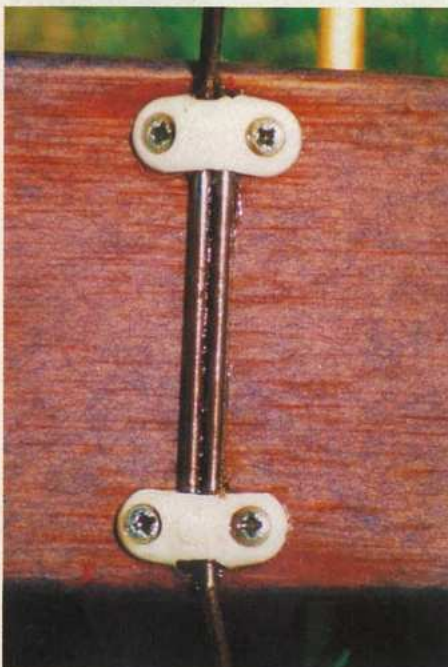


The rudder control connection. Have only a short length of snake inner showing.



The elevator connection. Support the snake outer by fixing to a wedge of 1/8" balsa glued to the fuselage.

The two U/C wires are saddle clamped to the fuselage bottom.



wing tip made from 1/8" balsa sheet, or spare bits of 1" by 1/4" TE stock, rounded off and sanded away to ensure it doesn't interfere with the wing folding.

Folding wings should be joined with a small brass hinge at the main spar, screwed on with woodscrews into the 1/4" ply blocks, and a plastic pinned hinge angled into balsa blocks set between the cap strips.

### Fuselage

Cut the fuselage formers carefully, to get the lower corners square, and mark the centrelines on front and back. Drill holes in F1 for the engine mount, fuel pipes and throttle cable.

Choose sheets of equal weight and with straight edges for the sides, and trim them at the front end to slope at 4 degrees. Mark them 'left', 'right' and 'bottom' on the inner faces, and lay them down inside-face-up and bottom edges together. Measure exactly 5" aft of the lower corner point, and mark a line across both sheets through this point perpendicular to the bottom edges and another line 1/8" forward of the first.

Draw two more for the position of F3, and mark the aft end of the sides, measuring from the drawing. Add the fuselage top pieces, F9, which form the wing seat if using 3" wide sheet.

Cut the liteply bottom slightly oversize, mark the centreline and pin over the planview. Cut the rear bottom to length, and slightly oversize in width, glue to the ply then pin in place and mark the centreline. Make pairs of rear fuselage spacers, and glue the lower ones, and formers F2, F3 and F4 accurately in position.

Now place the sides together, inside faces out, and cut to the shape shown in the side view. Then separate, place inside up again, and glue the F6 and F7 pieces in place. Extend the dowel holes through the balsa sides. Glue the wing seat and lower edge doublers in place, leaving spaces for F1, F2 and F3. Glue the 1/4" x 1/4" tailplane seat doublers in place, leaving space for F4. Cut top and bottom edges of the tailplane slot but do not separate completely at the front.

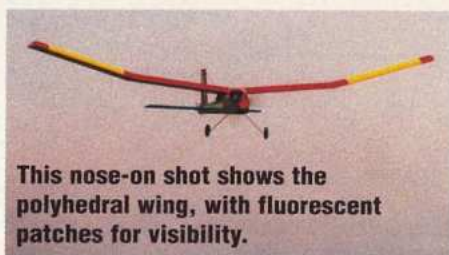
Apply white glue to the bottom edges of both sides, and medium cyano to the outer edges of F2 and F3. Put the sides into place, pushing them down firmly into contact with the bottom and holding them against the sides until the cyano sets, then pull in the rear ends to fit against F4 and the two spacers and glue and pin in position. Glue F1 in position, with its centre on the centreline, then pull in the sides and glue to F1, with its edges level with the fuselage sides. Glue the matching top spacers vertically above the bottom spacers, and add uprights in front of them. Wipe away any excess glue and leave to set.

Glue the 1/4" plywood undercarriage mounting strip to the bottom, between the two F6 pieces. Sand two lengths of 1" TE stock to match the angle between F1 and the sides and glue them in place. Glue a piece of 1/4" balsa in front of the top of F2 and behind F3, and sand it to match the sides. Sheet the fuselage top forward of the wing with 1/4" balsa.

Fit the servo tray, spacing it the correct distance above the bottom with pieces of 1/8" balsa sheet glued to the sides, with the grain vertical. Glue in place the rear-most portion of fuselage top, making sure the fin slot is aligned with the centreline.

Cut through F4 where the tailplane goes, remove the bits where the tailplane sits and check that the tailplane fits its slot well and lies parallel to the building board, then glue in position.

Try the fin for fit, and when satisfied glue in place, applying glue to the bottom where it will meet the tailplane, and to the sides where they meet the fuselage top. Make sure it is vertical before the glue sets.



This nose-on shot shows the polyhedral wing, with fluorescent patches for visibility.



**Lone Ranger on a graceful fly past on a Summer's evening.**

Fit pushrods or snakes (Bowden Cables), connecting them temporarily to the control horns. Snakes should be supported at intervals as shown. Complete the top fuselage sheeting with 1/8" balsa, crossgrain. Now lift the fuselage from the board and trim the bottom to fit the sides and round off all the corners, except the wing seat. Secure the snake outers then remove the inners and horns for covering.

Screw your engine to its mount with self tapping screws or bolts and blind nuts, then remove them and fix the mount on F1, with a small strip of 1/16" ply behind the left edge to give a little right side-thrust. Fit your propeller and 1.75" spinner on the engine. Cut pieces of light 1/4" sheet for the cowling sides and bottom and join them, with 3/8" balsa triangle in the corners. True up the back edges with the sanding block and glue in position in front of F1. Trim the front edges with the sanding block until the engine can be put in place leaving a 1/8" gap between the spinner and cowling. Make F5 to the shape on the drawing and glue it in place on the cowling, concentric with the spinner. Remove the engine and sand the cowling to shape. Paint the inside of the cowling with Clearcoat for fuel proofing; 2 or 3 coats.

Make two undercarriage wires from 12 swg piano wire to the shape shown. Open up a 3/32" hole in alignment with the slots in F5L and F5R. Insert the wires and fix them to the bottom with saddle clamps fixed with screws into the 1/4"

ply. Add light 2" wheels, fixed with collets or soldered washers.

A tail skid which will not poke holes is made from a piece of 20 swg piano wire shaped as shown and inserted into a small piece, about 5 mm wide, of 1/8" thick birchply (or 2 thicknesses of 1/16" ply). Drill the holes with a small drill or a sharpened piece of 20 swg wire.

**Covering**

I used Solarfilm on the wings and tailplane and coloured tissue doped onto the sheet surfaces of the fuselage and fin. There is no advantage to the heavier heat shrink fabrics, which I tried on an early version. Follow the instructions and avoid forward facing exposed edges. The edges should wrap around the LE and face aft.

On the tail surfaces it is beneficial to cover the TE first with a 3/4" wide strip. Then make slots for the hinges and mount them securely. I use mylar hinges, 5 narrow ones on the elevator and 3 on the rudder, and pin at least the end ones with cocktail sticks. Then put on the top and bottom covering which will be over the cocktail stick holes.

**Centre of Gravity**

Once the model is covered install the engine, radio and controls and attach the wing. Check that the CG is 2.6" to 3" (66 to 76 mm) aft of the wing LE. Adjust the

position of the nicad and servos, or as a last resort add ballast weight, to achieve this CG position. My model needed no ballast and had a finished weight of 41 oz., giving a wing loading just under 10 oz./sq ft, allowing very slow flight.

**Flying**

Arrange the control linkage so that the rudder moves 12 mm each way and the elevator about 6 mm each way. For the first flight try to get an experienced model pilot to take it up and check the trim. If you have no experienced pilot I suggest an initial test glide. Get a friend to hand launch firmly and with wings level towards a point on the ground 50 yards away. Adjust the trims such that the model flies straight in a steady glide.

Then adjust the controls on the model so that the Tx trims are central with the control surfaces in this position. For the first flight hand launch the model firmly with wings and nose level and only about 3/4 throttle and it should climb steadily away. Later take offs may be made from short grass or a firm level surface at full throttle.

Lone Ranger will loop well, and do an untidy barrel roll. It is at its best cruising slowly about the sky or doing precision low level manoeuvres like spot landings or limbo. It takes some skill, and an aft CG, to fly it inverted for any time, or do a bunt. When you can do that it is time to move on.

**RCMW**

**Garth Pearce**

Stuart puts Alasdair's concept to the test and builds two 'Lone Rangers'.

# new lamps

## I Want One

From time to time, Alasdair Sutherland communicates via e-mail, keeping me up to date with his latest aeromodelling activities. Our first encounter came out of the blue, after Alasdair had bought an old vintage model from a car boot sale. He found the model flew erratically, due to the wing flexing in flight. Knowing that I have advocated some vintage models, to be used for training, Alasdair asked me if I have had to stiffen up wings in the building, to avoid this problem. Somehow or another, we started discussing a new design of Alasdair's, the 'Lone Ranger'. This model was under design with a view to being so easy to fly that someone could possibly teach himself or herself to fly. Prototype plans were sent down from Scotland, after I made it clear that I wanted one!

## The Concept

As soon as the plans arrived, I was on the telephone to Tony Perryman, inviting him for coffee at the Pottery; he arrived before the kettle boiled. After a good chat, it was decided that Tony would take the outline plans and instructions home for close attention. Two days later, Tony popped himself and his coffee mug, back into the Pottery. He didn't like the folding wing; this and that were missing from the draft instructions. Tony is really difficult to please! The decision was taken to build two models, one with a folding wing for the night class and one without. The latter would be for Tony's personal enjoyment, at the end of the day, he loved the design, but he was not going to have a folding wing!

After all the cups of coffee with Tony, I contacted Alasdair. I passed on Tony's comments, Alasdair was grateful for this and the project was underway. The cost of the project was astonishingly low, about £15 gets you all the wood and accessories that you will need. An OS 10 was deployed for the power unit in both models; you could use a motor without a throttle, requiring one less servo, however I would consider this a false economy. The correct use of the throttle, is generally learnt



**These three pictures are selected to help you around the folded wing construction. They particularly illustrate wood selection at and around the hinges.**

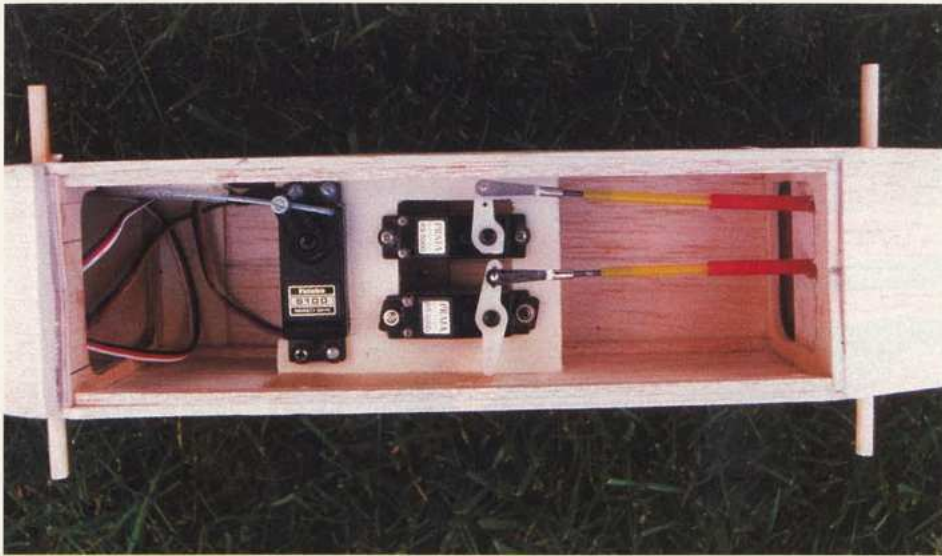
after one has gained significant experience, this does not mean it is any less important.

That dynamic builder was back at the Pottery within a week, with the folded wing, Tony still didn't like it, I however have a more open mind. Another week saw us down to the field for test flying. Terrific!

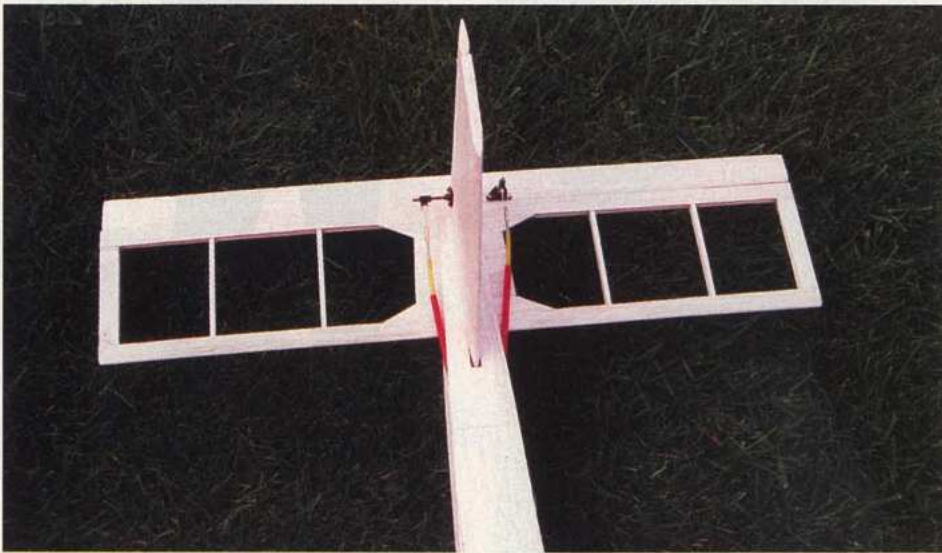
## Down To the Field We Go

What's that! I heard this comment more than once. The usual excuses were made, the whole club appeared to be watching, as I made the first test flight. I always want to

take in flight pictures, at the first opportunity. Having launched from the shoulder, and satisfied myself, that the model was perfectly stable, this taking about 30 seconds, I thrust the transmitter into Paul Tyler's hands. He was astonished but delighted, he would not give me the transmitter back! Paul flew the model long after I had shot a full film off, he thought the model was tremendous. Tony was next, this time we took off from the ground, and it was nearly half an hour before we could get him down, and everyone seemed to like this model. Having sorted all my photography, I was next, taking great enjoyment from showing the model off, flying one foot off the ground for 300 yards. To contrast this I



The simple servo layout, I used 2 miniature servos as well as a standard, there is room for standard servos.



Golden rods, were favoured for servo linkage, they exit neatly at the rear end.

gained some height and proceeded to loop the loop, hoots of laughter all around. After two hours flying, we all went home, we didn't want to crash because the batteries may be flat, they deserved to be exhausted.

## More Flying

That first session promoted an unpublished design into a classic of the future. The next test was to use the model as a part of my summer flying program for my night class. It is one thing to have your club mates enjoying this simple model, but quite another to go forward, with a group of youngsters, helping them learn to fly. The first things I noticed were the young ones were no more interested in the model, than any other was. When it came to flying they were a little more impressed.

Just about all youngsters aspire to having more confidence than they really have; my youth group is no exception. Not one of them mentioned that the model was really

stable, or that when you tried to turn the model in either direction, it did just that. Even the lovely slow flying went without comment. They did however, have much to say, things like, "I really liked that", or, "Can I have another go?"

If you ever find yourself teaching a group of youngsters to fly, please try to go with it, no one will ever say thank you, and you should not expect this. You will however, have to learn to read between the lines, the fact that they keep turning up says a great deal. All in all, every one likes the 'Lone Ranger'.

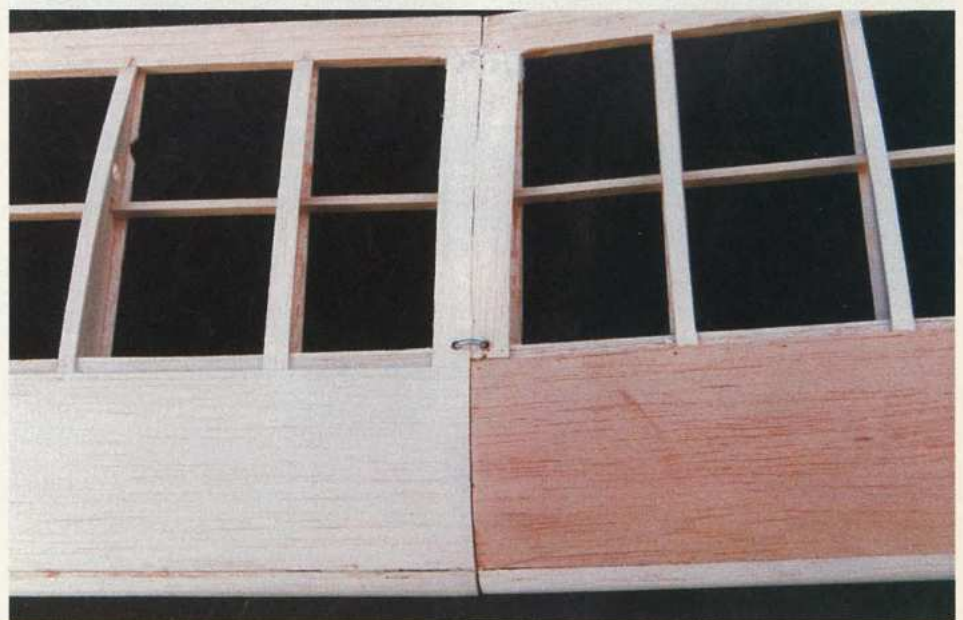
## What I Particularly Like

Where do I begin? I must try and get this down, because I really do think that the 'Lone Ranger' offers something that has been missed. Over the last five years we have witnessed quite a change within our hobby. There are more and more ARTF packages on offer, for some this means they come into our hobby, where they could have passed it by. On the other hand, I wonder if some of us will ever build a kit again, yet alone build from a plan.

1. The 'Lone Ranger' is a very light model, which only needs a 10 size motor to fly it well. How many trainers, powered by a 10 do you know of, that is so big?

2. The model is cheap and quick to build, no over complicated building techniques.

3. One of the easiest models to fly, and especially easy to teach someone else to fly. I put this down to Alasdair's knowledge of aerodynamics; he has designed a model without vices.



The wing tips are secured against their hinges with a simple U staple, made from piano wire. They are a firm fit, and have never looked like falling out, sometimes I keep them in the wing, and transport the wing made up to its full span.



Thomas Gumbly shows off my model, he is an inexperienced flyer, but he flew my Lone Ranger well at his first attempt.



Tony with his model, covered in his favourite Solarfilm. You can get a good idea of how large the model is from this photograph. I can assure you that all the power needed is supplied by the OS 10FP.



4. The overall shape of the model, is such that it is easy to tell which way it is going, once in the air. As orientation is about the most difficult thing to cope with when learning, this is a huge bonus.

5. It is also possible to pull loops, fly upside down, stall turn and barrel roll, much more than you could possibly expect from a 'teach yourself to fly model'.

6. As stated earlier, my model has folding wings, these drop into the boot of my car, along with the rest of the model and support gear, my wife can't even tell when I am going

**Taking off, could not be easier, you can hand launch just as well if you are on your own. The power is sufficient for the model to fly from your hand; it is unnecessary to treat your Lone Ranger as a javelin.**



**Just touched down, straight and level.**

to sneak up to the site for a fly. Although I must say, "I just popped out to buy a Lottery ticket" line, has about run its course. We have not won even ten pounds for nearly three years, but you do have to buy a ticket, perhaps this is where I am going wrong!

## Conclusion

Even though Tony decided that he did not want a folded wing, I am glad to have one, the extra building is insignificant overall, and the benefits are there for all to see. The models are light, strong and durable, I finished mine in Starspan, while Tony preferred Solofilm, and both models are still like new after a dozen flying sessions.



**This photograph is for Tony; my Lone Ranger with folded wing, hiding in the boot of my car.**

If you are one of those new generation modellers of the ARTF age, why not make this your first build from a plan? I can assure you that even if you are a competent flyer, you will get loads of fun from trying to catch thermals, when the fuel runs out.

Learning to fly on your own is nearly impossible, unless you enjoy rebuild after rebuild. This model however, will give you the best of chances, pay particular attention to the surface movements, and be sure everything is working the right way round. Take all of this into account, and you will take comfort from this ever so gentle flyer. Having plenty of flying sites and clubs

near my Cambridgeshire home, it is easy to forget those of you who live miles from a club. Especially for you, this model is capable of allowing you to learn on your own. One last piece of advice, make sure all your flying surfaces are twist free, and make sure you double check the centre of gravity position.

Please let me know how you get on, I am already using an aileron wing version, I will keep you posted through my monthly column. You can contact me by telephone (01487) 841823 or by email: [Stuart@somershampottery.demon.co.uk](mailto:Stuart@somershampottery.demon.co.uk)

**RCMW**



**Landing approach with the power at idle, you will hardly need to flare the landing, that is, if all your trims are correct. Building confidence for an 'A' certificate attempt?**