

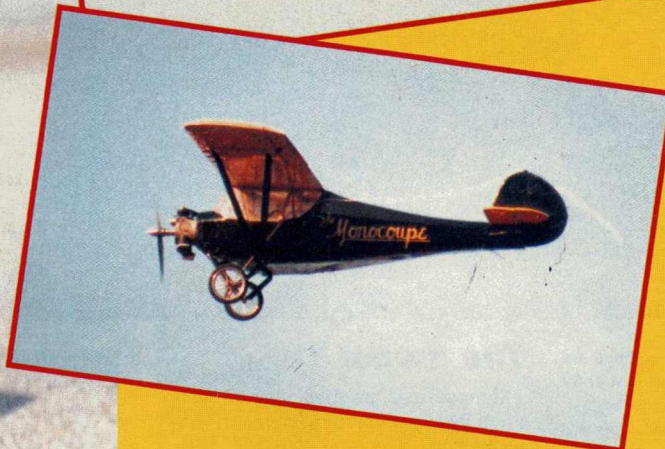
VELIE MONOCO

A U.S. Racing Classic

A 42" span scale model of Clayton Folkerts' Type 70 Monocoupe of the late 1920s, for .049 to .074 size engines and four-channel radio control, designed by Peter Miller



COUPE



Tecsps

Designer:
Model type:
Wing span:
Wing chord:
Wing area:
All-up weight:
Power range:
Control functions

Peter Miller
Sports Scale
42"
7"
294 sq. in.
29 ounces
.049 to .074 cu. in.
Rud/elev/ail

The Monocoupe aircraft are relatively unknown in Britain and yet they were highly successful in the USA. They were designed to provide comfortable and reliable transport and yet they won hundreds of races and aerobatic competitions. Let me tell you about them.

In 1916 a 19 year old Iowa farmer's son called Clayton Folkerts (whose name was later associated with those very fast Folkerts Speed King racing aircraft such as 'Jupiter, Pride of Lemont') saw a troupe of barnstormers performing - he became hooked on aviation and began to read everything that he could on the subject.

In the winter of 1918 young Clayton built a crude biplane in his cellar using scrap materials from around the farm which he powered with

an old motorcycle engine. The plane fell to bits on the first taxi run and, although he rebuilt it, it never got off the ground! The second Folkerts attempt was also a failure but his third effort did

make quite a few flights of around the minute mark. This prototype was also abandoned after trying two engines and rebuilding it a couple of times.

Clayton's fourth aircraft was a success. It was a shoulder-wing aeroplane which featured geodetic construction and it carried Folkerts around for some 50 hours flying time in 1926.

Don Luscombe (later of Luscombe Phantom and Silhouette fame) was a businessman who had learned to fly in the war and wanted to continue in peacetime. He was soon fed up with the draughty cockpits of the day and decided that he wanted an aircraft that he could fly in a suit. Don convinced a group of businessmen of his ideas and they coughed up \$5,000 to get a company going. Don now needed a designer and novelty salesman Milt Miller suggested Clayton Folkerts.

Clayton was hired and the first thing that he did was buy some welding gear and teach himself to weld! The aircraft that he designed and built was a funny

looking side-by-side two seater high wing cabin plane. This was the original Monocoupe.

Monocoupes were a success, - even the great Lindbergh bought one. Anthony Fokker used to put on aerobatic displays in borrowed Monocoupes and it is said that F.A.A. officials would tactfully turn their backs as it was well known that Fokker had never bothered to take out an American pilot's licence. Two Monocoupes flew in the 6,300 mile Ford Reliability Tour and both finished. And then they started racing Monocoupes. The tubby little plane was averaging 95 to 101 mph.

on its 60 hp engine. 370 of the Type 113 Monocoupe were sold and, in 1928, 10% of all aircraft registered in the USA were Velie Monocoupes.

Monocoupes gained further national publicity when one took off by itself, circled the field until the fuel ran out and then landed close to where it had started from without any damage! Ripley's 'Believe it or Not' feature gave that event world wide exposure! The little aircraft was quite a performer. At the 1929 National Air Races it featured strongly, winning some races against serious opposition such as the Chevrolaire-powered Travel Air racer.

Directly developed from the Velie Monocoupe came the 90, 110, 90a and sensational 110 Clip Wing Special which had a top speed of over 200 mph and a stalling speed of 75 mph.

Monocoupe enthusiasts and those building this model will find a wealth of information in the book 'Visions of Luscombe' which includes three-views and colour information on Monocoupes and the Luscombe designs.



Cox engines are close match for dummy engine; dummy cylinders are made from light plastic hose, engine simplified. Note opening window for access to aileron connection. Velle Monocoupe has been described as 'Pixie-like. Vintage shape belies excellent performance and aerobatic capability, both in full-size and model form. Full-size had covered wheel spokes but Peter refuses to cover those Hungerford wheels. Script 'The Monocoupe' was cut from Solartrim.

The model

Monocoupes are my favourite aircraft. I had just finished my version of Livingston's 110 racer (see RM June '94) and felt that I would like something a little more docile. I wasn't quite ready to design the 90a which I feel is the definitive Monocoupe and so I drew up the Velle Monocoupe. There is a rubber powered kit available for this version and some three-views. The drawings in the kit are not accurate, they feature dihedral because it is a free flight model and the tailplane is not correct. The three-views are, to be polite, suspect as the undercarriage is completely ridiculous. I worked from the three-views and photos in the book 'Monocoupes and Men' which look very accurate, plus a set of photos from Scale Plans and Photo Service in the USA.

This model is as easy as a vintage model to build and should be capable of adapting to Texaco Scale very easily, indeed the drawings were prepared with that in mind but I wanted more control and a throttle. Later in this article I have suggested the alterations to make this a true Texaco Scale model.

Fuselage

The fuselage is built in the normal way with two sides constructed over the plan. The longerons are spruce but all diagonals and cross braces are balsa. Use PVA for these joints.

Glue the sides to the 1/64th ply doublers and leave to dry while cutting out the formers. All longerons are cut through as far as the ply just in front of F-2 and behind F-3 locations. At this stage you can chamfer the tail posts slightly. Glue the sections of trailing edge stock onto the front of the fuselage. These form a firm location for



FI. If you have a good building jig it will help with assembly but it isn't essential. With sides held over the plan, upside down, assemble to the two formers making sure that everything is square.

Cut the rear cross braces and then clamp (but do not glue the rear of the sides) and fit the cross members. You will need elastic bands to hold the sides in. You can use CA glue here. Once the cross members are in, glue the tailposts together. Pull the sides in at the front and glue FI in place. I used epoxy for this joint. It is easier to fit the engine mount at this stage - if blind nuts are used it can be removed until you are ready to fit it finally.

The undercarriage can be bent from one piece of 12 swg wire although the plan shows it bent from two. Bind to the two undercarriage plates with copper wire - thicker wire is best, about the gauge of 30 Amp fuse wire - and glue the plate in place. At the same time glue in the small pieces of ply which take the strut mounting screws. Fill in the bottom of the fuselage back

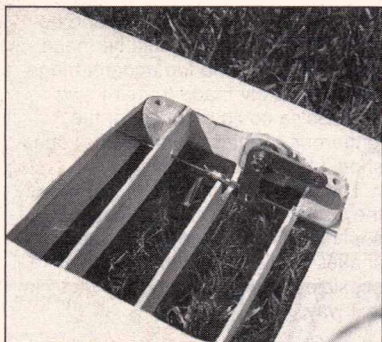
to F-3 with 1/8th sheet.

Fit the ply gussets which will take the blind nuts for wing mounting. Add the stringers and snake outers and the ply tail skid mount. Plan the location of the tank and drill F-1 for the pipes and then fit F-1A right at the nose and the instrument panel. This will have to be cut away for the tank unless the Texaco version is built. Now add the 1/64th ply turtle decking at the nose.

Other jobs that can be done at this stage are making the window frame for the left window as this opens for charging and for connecting the aileron controls. The laminated sheet that takes the top of the windscreen can't be made until the wing is complete.

The wing

The wing is very easy to build. The top hinged ailerons are built at the same time and cut away at the trailing edge and tip later. The aileron controls are quite conventional except that



there is an extra bellcrank and the servo is in the fuselage. It is important to reduce slop to a minimum without the controls being stiff.

I cut all bellcranks from 1/16th Paxolin and drilled the holes undersized, then I made a drill out of a piece of the correct size of wire and opened them up - result, perfect fits. When the wing is complete locate it carefully on the fuselage and drill the holes for the bolts. I used 6 BA for this. Fit the blind nuts and then drill the strut screw holes.

Fit the clear panel in the roof, separate the ailerons and the wing is ready for covering. The struts are made with 1/8th dowel and 3/8 x 1/8th trailing edge strip. The brass tubes are epoxied onto the ends and flattened for drilling, the bottom of the struts go into larger tube which has been flattened to take them.

Tail surfaces

The outlines are laminated from four layers of 1/32nd balsa and one of 1/64th ply. I find that the best way is to soak the wood in water, bind the laminations in place, ply nearest the former, and cook in a low oven for an hour! Remove, separate the laminations and cover with PVA glue, rebind in place and cook for a further

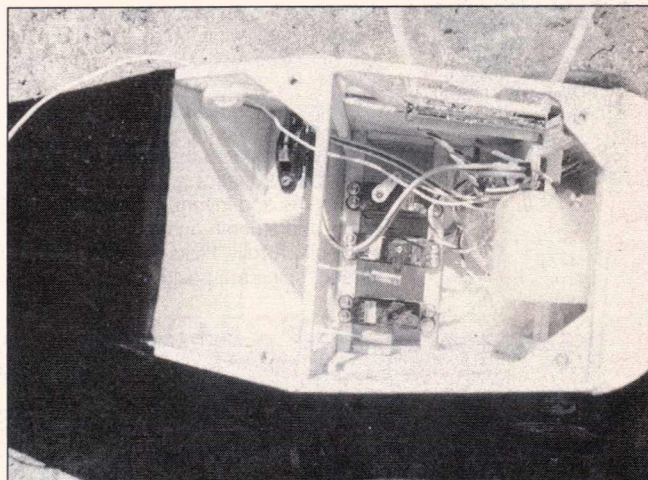


hour. Almost indestructible.

The spars and tailplane leading edge are from 3/16th square, the ribs are from 3/16th x 1/8th balsa. Drill the tailplane and base of the fin for 1/16th dowel pins - this adds to the strength of the joint.

Covering

I used Solarspan and Solarfilm with Solartrim. Cutting out the script lettering was tricky and I am sure that other people will make a much neater job of it. I found that it was easier to wrap the undercarriage struts as though bandaging them and then shrink and seal the covering. This technique might work better with the wing struts as well.



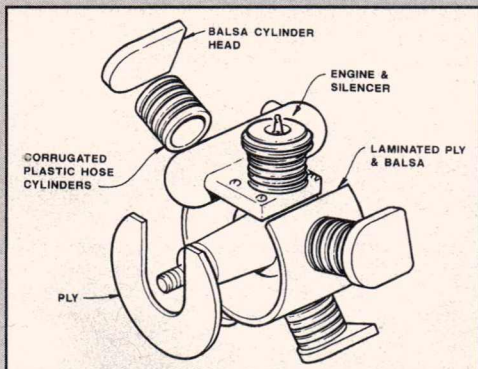
Installation

There is plenty of room for any radio. I used Fleet Micro gear to save weight. Three servos are fitted to rails as shown on the plan, the aileron servo is fitted to a 1/8th ply mount which is glued to F-2 as shown. I fitted the switch to a ply bracket on the rear wall of the cockpit but this could be placed anywhere.

The 300 mAh battery is right at the front under the tank with the receiver just behind it. I routed the aerial outside the model because I was using metal snakes. The aileron servo is connected with a short clevis rod and this can be connected and disconnected through the window and also adjusted this way too - very useful if you have to make changes on the field. With the Cox Queen Bee .074 and the Fleet radio, the weight was 29 ounces and the balance point came out spot on.

I used a pair of 2.3/4" Fulton Hungerford spoked wheels but, since the wheels should really be covered, Williams or similar wheels could be used. If you think that I am going to cover those fabulous wheels, forget it!

At top left, bellcrank takes pushrod from fuselage mounted aileron servo. Note hardwood blocks for wing hold down bolts. Radio bay (above) has space for most radios, Fleet micro servos are lost in there.



Dummy engine

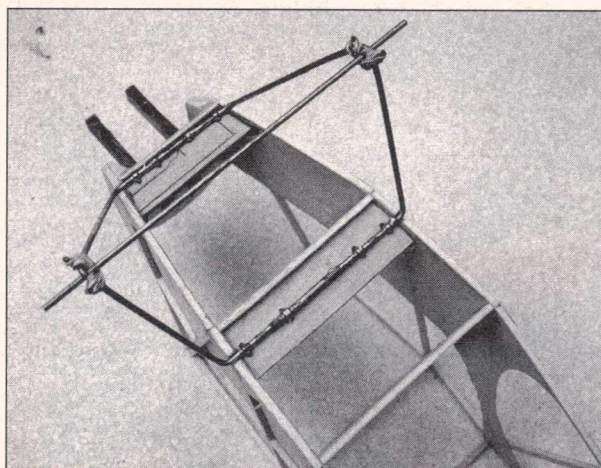
Dummy radial engines can be a right pig to make if you can't find cylinders of the correct size - but not any more! If you go to your local caravan and camping centre you will find very light corrugated plastic pipe in various sizes. The correct size for this model comes as a spare for an airbed footpump hose.

The crankcase is laminated in the same way as the tailplane, two

layers of 1/16th sheet and one of 1/64th ply, on the outside this time. Note that the Texaco case is shown but it must be a bit longer for the Queen Bee. Other engines will need different lengths to suit. Glue this to the engine former and fit a disc of thin ply to the front. Cut away to clear the engine and silencer. Glue the cylinders on with R/C Modellers glue and then glue the heads on. Fit a

couple of strips of wood at the rear to locate the engine in the nose. The engine is painted and fuel proofed and is ready to fit; retain in place with a couple of small screws.

This engine is very convincing and the Cox cylinders are a close match for scale. The dummy cylinders will also flex rather than break and are very, very cheap - about 20p an engine!



Undercarriage plates fitted but not strut attachment block or bottom sheeting. Note axle held with rubber bands. At right, basic box built, diagonals still to be fitted to rear fuselage. Spruce longerons are essential due to long distances between cross braces. Structure is scale.

Flying

After flying the Livingston 110 racer I was looking forward to this one. Old age is creeping up and my nerves aren't what they used to be. This model is a dream to fly. The Queen Bee is perfect for power and the model goes away in a very positive manner and is rock steady in flight. On the first flight I was doing low slow passes at about 6 feet but I was also doing loops and rolls - perfection!

On the second flight I sat in my garden chair and enjoyed cruising round the field and then climbing up to do some aerobatics. Loops, rolls, flick rolls, spins and inverted. The loops are lovely and smooth and round, the rolls are a bit barrelly, flicks are very fast indeed, spins are positive and recovery

is instant. Inverted is a bit tricky. In spite of this aerobatic performance, the model will fly round hands off and make very steady flypasts. I did stand up for the landing...

The model, as built, will fly with any 1cc engine and 1.5cc (.09) would be top limit. It would also fly with a Cox Texaco but a little weight saving would be a good idea, in which case it would be eligible for Texaco Scale competitions. All-up weight as built is just 29 ounces.

Suggested Texaco mods

If a spot of relaxed competition flying appeals I would suggest the following alterations for Texaco Scale. Use two channel radio with the servos mounted well forward. Add about 2" dihedral at the wingtips and use rudder and elevator. The number of ribs could be

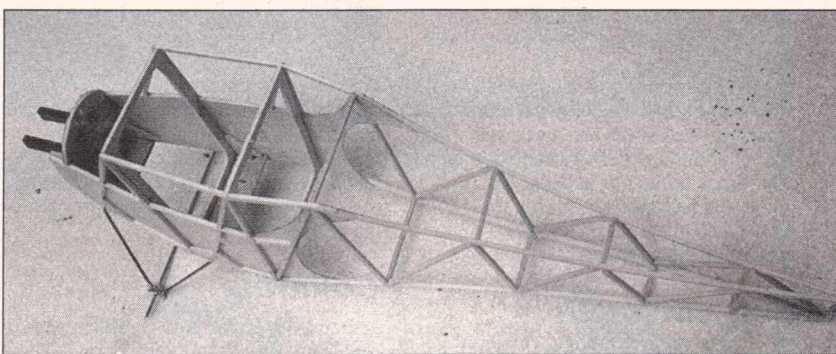
reduced, perhaps 2" spacing and no nose ribs. The spars could be made slightly smaller and the undercarriage could be safely made from 14 swg wire. Balsa could be used for the longerons instead of spruce. Covering should be done with Litespan.

The Cox Texaco is much lighter than the Queen Bee and, of course, no separate tank is needed. Lighter snakes would help. It should be quite possible to save up to eight ounces in this way.

Summary

This model is going to be one of my special favourites. It has my ideal flight characteristics, docile, steady, slow flight but capable of aerobatics when I am in the mood. Why not build it and then send for the plan of John Livingston's racer and have a matched pair, one for relaxing and one for an added adrenaline boost?

RM



More Monocoupery!

If you fancy a somewhat racier partner for your Velie Monocoupe, why not have a go at Peter's 44" span replica of John Livingston's Monocoupe 10 for up to .15 size engines? Copies of the plan are available from Radio Modeller Plans Service as RM 461, price £4.75 plus £1.25 postage (overseas postage £2). Order from RM Plans Service, Nexus House, Boundary Way, Hemel Hempstead, Herts. HP2 7ST. Construction and flying of this model were featured in our June 1994 issue. And if you're a member of the Model Pilots' Association, you qualify for a discount on ALL our plans and need only send £4.25 plus postage and your MPA number.

