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Radio control Models and electronics

MAP HOBBY MAGAZINE

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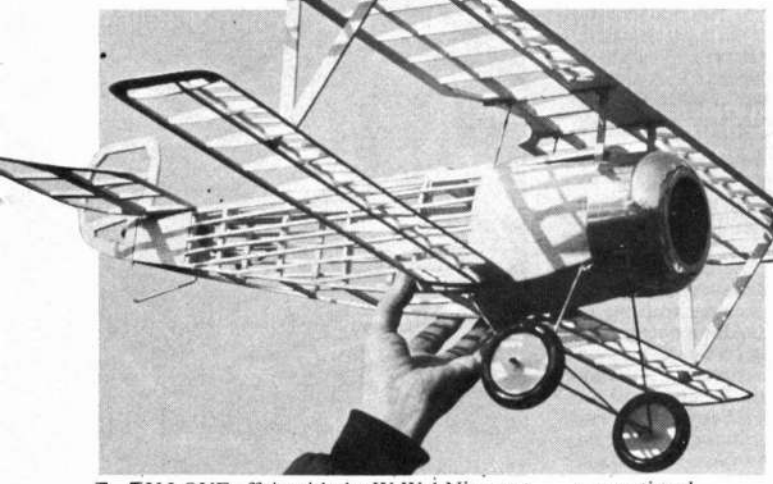
Special FREE Nieuport 24 PLANS inside



Your full size plans . . .
DAVID BODDINGTON'S
40in. span

NIEUPORT 24

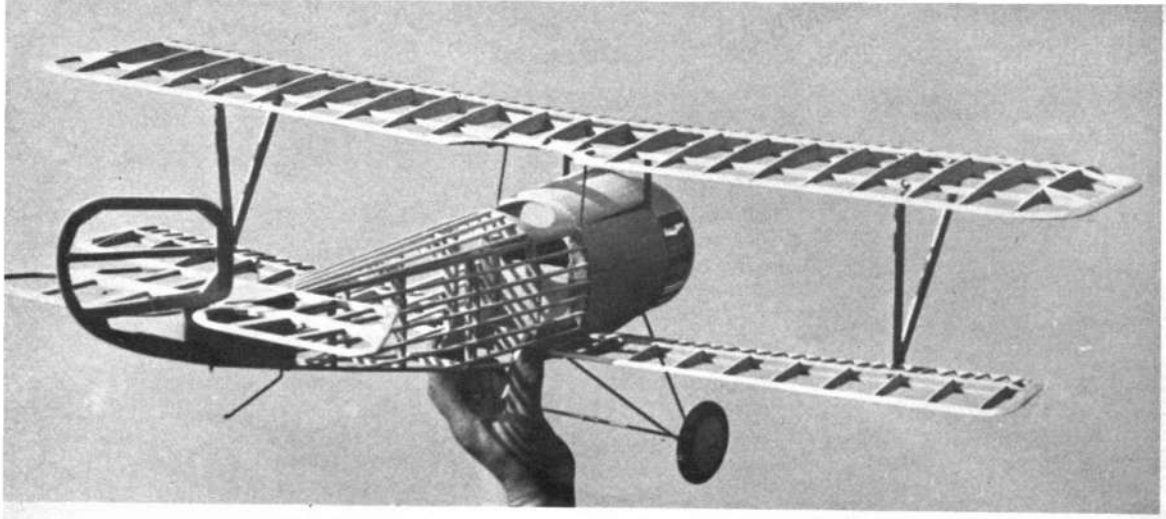
for .15-20 cu. in. motors and 2-3 function radio

MY LOVE affair with the W.W.I Nieuport models goes back to my pre-teenage period whan modelling this era of aeroplanes usually meant solid models of wooden variety. I have distinct memories of scraping away at pieces of boxwood to emulate the undercamber of the wings and of the many moments of frustration in trying to affix the top wing to numerous struts fashioned from pins. Fortunately, no examples remain of these early fumbling efforts to mock me – there is *something* to be said for plastic kits after all. The first diversions to flying models of the Nieuport came with the publication of L.C. Bagley's free flight model in 1948. This design, fitted with the ever reliable Mills 1.3 c.c. diesel and featuring the, then, novel pendulum control of rudder was a delightful, although somewhat unpredictable flyer. Despite, or perhaps because of the pendulum control, the Nieuport 17C would occasionally get into a side slip and proceed to knife edge around at low level – very realistic but disconcerting to the spectators.

My next venture into Nieuport taming came with the introduction of reliable single channel radio equipment and the first of the Nieuport 24 models was conceived. The results were disappointing as the model exhibited the apparent vices of the original Bagley model i.e. gradually turning into a torque induced spiral dive and the radio controlled rudder seemingly unable to correct it. I did eventually trim the model out by adjustments to the engine side and down thrusts and wing washout. The one good flight resulted in radio failure (with the rudder at neutral) and an excellent free flight terminating in a tree. The model was retired to the attic and remained there until a desire to fly something at the Old Warden Scale Day led me to refurbishing it. This time I fitted a Min-X/Rand galloping ghost radio combination giving me rudder and engine control and the Nieuport behaved impeccably. Engine control (Enya .09R/C) gave a good climb and descent variation and the only detraction was the ever waggling rudder. The model was duly flown at Old Warden, eventually being passed on to a fellow club member. It is still given the occasional outing – over twelve years after first being flown – now fitted with two function proportional.

The present Nieuport 24 is, therefore a direct descendent of the 1948 Bagley design and some of the features, i.e. symmetrical section bottom wing, can be traced to the original plan. Naturally, the structure is now in keeping with the additional strength required with a heavier radio controlled model. It is not a difficult model to build, but does take more patience and care than the average balsa or foam and glass fibre model – the rewards of flying the completed model are also considerably higher!. One of the two prototypes was fitted with an O.S. 15 R/C engine and the other with a Veco 19, both gave more than adequate power. The O.S. 15 powered Nieuport, built by Bert Smith, was covered in FliteCote Silver and featured 'banded on' top wings. Total weight was 2lbs 10oz. David Toyer's model used the fixed top wing and, with Horizon three function radio, weighed about 2lbs 14 oz. Weight up to 3 lb 6 oz. should be perfectly acceptable but, as always, keep the model as light as possible. Do *not* be tempted to start 'beefing up' the structure as this will only increase weight at the expense of good flying characteristics and heavier models crash harder!. Both models flew 'off the board' with only minor trim changes – more down elevator – required. At full power, the Nieuport will really stick its nose up and you must be prepared to feed in down elevator. With a lower engine setting, however, the elevator may be centralised. This is a common feature with this type of model. Before you put pen to paper let me assure potential builders that, yes, that much side thrust is required!.

The fullsize Nieuport 24 was an intermediate type containing some of the features of the earlier type 17 and also of the later 27 version. Basically, the 24 was a 17 with a more rounded fuselage, more powerful engine (130 hp Le Rhone) and modified top wing shape. Some of the 24 versions were built with tail surfaces to the shape of the well known Nieuport 28. Although the 24 was inferior in performance, in most respects to the contemporary Spads it was prefered by some pilots because of its manoeuvrability. Amongst the devotees of the Nieuport was the French Air Ace Nungesser and it is his aircraft that is used as the subject for the model. His famed insigina and bold red, white and blue stripes, make it a colourful aircraft to model. British and French Air Forces used the Nieuport 24 but, as far as I am aware, all were left in the silver doped finish of the manufacturers. To be authentic therefore you have the choice of finishing the model in silver with red white blue roundels or silver with blue white and red roundels!. I do not claim that this is more than a 'stand off' scale model, the outlines are as scale as my research will allow but some dihedral is introduced to the top wing to allow good control, by rudder, without having to resort to ailerons. Wing sections are not



Left: another view of the uncovered airframe again reveals the relatively uncomplicated nature of the structure, at least as R/C scale models go. Obviously this model is not a project for a rank beginner, but should be within the capabilities of anyone with a little modelling experience. Below: on prototype, glow clip is linked to remote connections at lower rear of engine cowl.

scale for reasons of strength/ease of building and some cheating has occurred around the rear cabane struts. The aileron pushrods on the fullsize aircraft become the rear strut supports on the model and the inverted Vee real cabane struts are purely ornamental on the model.

Before commencing construction you must have patience to read the plan and instructions, and to study them carefully.

You will note that the Nieuport has a very short nose and that the balance point is fairly well forward. The combined result of these two facts is to require the rear end of the model to be built as *light* as possible and for all heavy equipment i.e. fuel tank and *all* radio equipment to be positioned as far forward as possible. There is ample rooom for modern two or three function radio equipment to be totally installed between formers F1 and F7, keep the batteries as close to F1 as possible. (They may be mounted in the cowl area if necessary, but I prefer to keep batteries and fuel apart if possible.) Remember that 1 oz. heavy at the tail end will require 6 oz. of weight in the cowl to balance the model correctly. Neither of the prototype models required any rebalancing so you should be alright providing you are watchful. Draw on the plan the position of the radio equipment to be installed in the fuselage and the run of the pushrods to rudder, elevator and engine.

Construction

This model is suitable for construction and flying, by the modeller with at least experience of one or two conventional models and constructional notes will be limited to the less obvious points. Use P.V.A. glue for all joints except where metal is glued and bound to balsa wood or plywood – use epoxy (slow drying type) for this purpose. Accuracy of cut wood parts is essential, glues are not intended to be gap fillers, and wire parts must be precisely bent to ensure true alignment of the model. Cut out all parts before commencing building. The plans will run over two months and we begin with the fuselage and tail surfaces.

Fuselage

Make two basic fuselage frames from 3/16 in. sq. and 3/16 × 1/8 in. longerons, 3/16 in sq. and 3/16 × 1/4 in uprights, 1/8 × 3/8 in. stern posts and 3/16 in. sheet fuselage base. Note that the longerons at the front project to house into former F1.

Add the 1/8 in sq. reinforcement and the 1/16 in. surface sheeting to the rear end of the fuselage sides. Glue and screw to F1 the 3/8 in. sq. beech/3mm ply engine bearer structures, adjusting the width of bearers to suit your engine. Bear in mind that the mustard tin fuel tank is to fit between the 3mm plywood brackets. Drill holes for engine mounting bolts and screw for fuel tank retaining bands. Join the fuselage sides with Formers 1 and 7 in position and 3/16 × 1/4 in. crosspieces. When dry, add 3/16 in. sq. crosspieces, F15 and joint stern posts, checking for symmetry and 'squareness'. You must decide at this stage whether to opt for a "banded on" top wing or a solid fixing. The latter arrangement allows for the rear of the 12swg horizontal cabane strut members to fit into 12swg tubing fixed to the underside of the top wing. The front of the wing is held to the cabane struts by means of 12 swg double saddles screwed to a ply plate. Predrill the 5mm ply top front crosspiece to accept 12 swg saddles, and glue in position up to F1. A similar piece of plywood is fixed on the bottom of the fuselage to receive undercarriage fixing saddles.

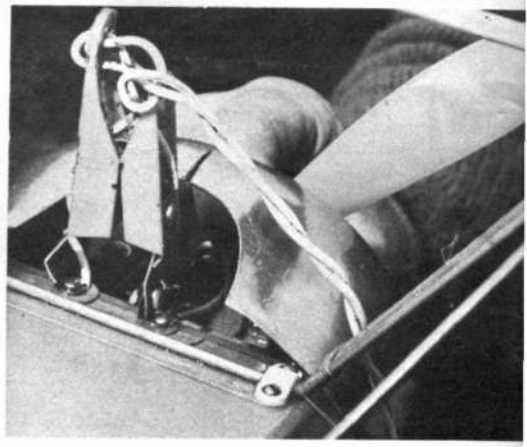
When you are satisfied with the bending of the cabane struts, the rear struts should be epoxied in position and a small notch is filed in the top longeron. The bottom half of the strut should be cleaned and roughened with a coarse file before epoxying to F.7. Screw the saddles to hold the front strut in position and bind and solder to the front and rear cabane struts the 12 swg horizontal support (length and shape according to method of wing fixing). Bind and solder short lengths of brass tubing to the internal bends of the tops of the cabane struts for fitting of rigging lines later. Fill in between F1, 3/16 in sq. upright and F7 with 3/32 in. sheet, grain vertical.

Servo bearers, predrilled, may also be added at this stage. Glue on the side and top formers followed by the 1.5 mm lower side pieces with holes already drilled to receive the 14swg brass tubing for lower wing fixing. Epoxy the brass tubes in place together with the 1/8 × 1/4 in. front support and 3 mm ply former F9. Add the 5 mm rear undercarriage leg doubler and 1.5 mm ply fuselage bottom. Fix the top and side stringers to formers and glue the 1/16 in. side sheeting (F1 to F7) in position. The removable top hatch extends from F1 to F7 and may be held in position by any preferred method i.e. screws, dowel and clip, internal rubber bands, etc., but do not leave as a tight push fit – it will vibrate loose.

Sheet in the cockpit area and cut out the cockpit. The headrest is made from soft balsa block. Let in some 1/16 in. sheet to the rear underside of the fuselage and fair in the rear tail skid. A 8 swg or larger, aluminium tube is installed forward of F7, to take the rigging hooks and bands for the flying wires. Fair this front cabane strut with 1/8 in × 3/16 in. – sand to streamline section and form rear, 'false', inverted 'Vee' struts. The latter may be glued in position after covering is complete.

Cowl

The cowl can be from aluminium, beaten or spun, or built up from balsawood and plywood. An aluminium cowl undoubtedly looks the best and is the most practical, you can purchase them commercially from D.B. Models or you may be lucky enough to find a kettle or saucepan of suitable dimensions and profile. It is possible to panel beat a cowl, using a wooden former, but this involves a lot of hard work. If you decide to build the cowl from wood start by cutting two ply formers 1/16 in. diameter less than F1. Wrap around the formers a strip of .8 mm ply 1½ in. wide followed by a strip 1⅝ in. wide, well glued on to the previous strip. The 1/8 in. projection will fit over F1when the cowl is fitted to the fuselage. Glue up the formers C1, C2 and C3and glue this lamination to the .8 mm ring. When the assembly is thoroughly dry it can be sanded to the correct radius on the nose. The cowl is fixed in position finally with wood screws into small hardwood blocks glued to F1.



Undercarriage

The undercarriage front and rear struts are bent from one piece of 12 swg piano wire. Commence bending from front crosspiece and bend on alternative sides of the centre. Fairings should be glued to the undercarriage legs, sanded and wrapped with nylon and doped for strength. The 20 swg piano wire strainers are bound and soldered to the undercarriage legs but the axle is only bound and soldered to the strainers at the centre. This allows the axle to deflect upwards on landing and, should the springing be too soft, rubber bands can be wound from the ends of the strainers over the axle to stiffen the springing.

Tail surfaces

The tail surfaces are of simple, flat plate, light construction. Note that the rudder includes two 16 swg piano wire hinge rods – these are bound and epoxied in position. Round off the edges of all tail surfaces. The method of hinging the elevator is left to the individual.

To assist modellers who may find difficulty in obtaining some of the more 'exotic' accessories for the Nieuport, I can offer the following package:

1. Spun Aluminium cowl.
2. Four No. 12g saddles, 2 No. 14g single saddles, 2 No. 14g double saddles.

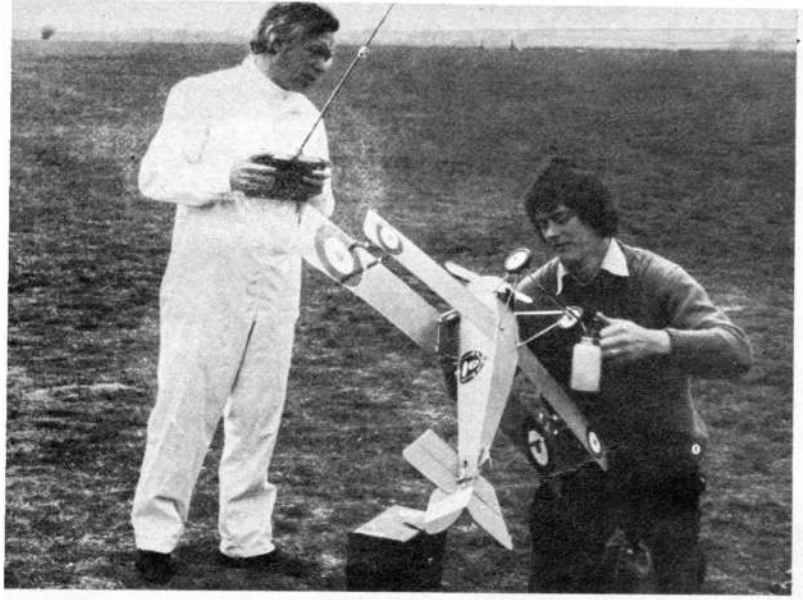
All wood screws for saddles and engine bearers.

3. Pair of Vintage 3¼ in. dia. wheels.
4. Vintage pilot and Vickers gun.
5. Two No. Nungesser insignia transfers.
6. Mustard tin tank and brass tube.

The total value of these items is £4.40 and I will suppy them for £3.80 plus 40p. postage and package. Order from:
DB Models, 3 East Street, Irchester, Northants.

The cowl may also be purchased, as a separate item from K & C Models, Farndon Mill Lane, Harlow, Essex.

NEXT MONTH:
THE WINGS!



The completion of our two-part full size plan feature– David Boddington provides the wings for his 40 in. span scale model.

NIEUPORT 24

Part 2

Wings

Lower wings – Holes in ribs R11 and R12 and, for sewing, R13 should be drilled prior to gluing in position. Note the considerable angle of the root rib resulting from the sloping lower sides of the fuselage *and* the wing dihedral. Pin the lower wing spar over the plan and prop in position the 3/16 × 3/8 in. trailing edge (sanded to shape). Glue all ribs, except R11, in position followed by the top spar, leading edge and riblets.

Note that the 14 swg piano wire tongues must be fitted to R12 before it is glued in position. Add wing tips. The interplane strut hook is bent, bound and epoxied to a piece of 1/8 in. spruce fitted between the spars. When the assembly is dry, remove from the building board. Bind and epoxy the piano wire tongue to the plywood rib R13 and reinforce with 1/8 in. sheet stiffened between R12 and R13. The 8 mm, facing rib R11 can now be glued to R12 (there are no spar cutouts in R11). Cover the top and bottom of the wing between R11 and R13 with 1/32 in. sheet. Sand the leading edge to a rounded section.

Top wing – Ribs R4 to R8 gradually increase in length as the chord of the wing increases towards the tip. These ribs can be produced by the 'sandwich' method or cutting individually. Pin down the leading edge, lower main spar, rear spar, rear centre section, and trailing edges. Glue the ribs to spars and leading and trailing edges and the wing tip pieces in position. Add the top riblets after gluing the top spar in the rib slots. Remove the wing from the building board. Bind and epoxy the rear interplane hook to the rear spar and the front hook to a piece of 1/8 × 1/4 in., this is then glued between ribs R5 and R6, reinforce with 1/16 in. sheet let in flush with the underside. Cut back the front underside of Rib R2 and install flush a piece of 3 mm ply to receive the 12 swg double saddles. Cut slots for dihedral braces. The two wings are joined by the 1.5 mm dihedral braces with one wing flat on the building board and the other tip propped up by 1½ ins. Fill in between the dihedral braces and front and rear spars with scrap balsa. For the fixed top wing, bind and epoxy 12swg brass tubing on the underside. Cover the centre top of the wing with 1/32 in. balsa.

Interplane Struts

These are formed from 1/8 × 1/2 in. spruce spliced together at the bottom, the joint reinforced with .8 mm each side of the joint. 18 swg brass tubing is bound to the ends of the struts and, after sanding to rounded edges, bound with thread to represent the cord binding of the full size struts. The struts may be clear varnished or painted red – if the latter is chosen the binding should be carried out after painting. After covering and painting the model, the struts are permanently secured to the top wing by a piece of 20 swg wire passing through the hooks and tubing and turned down at both ends.

Radio installation

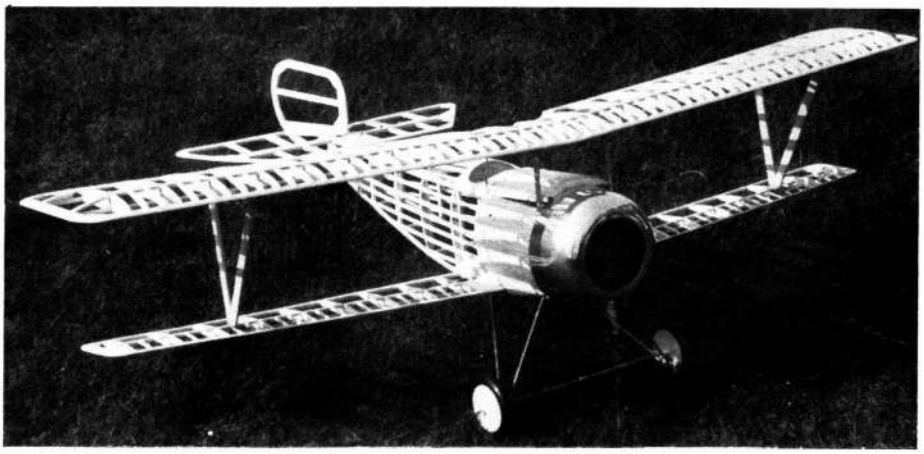
The radio installation and linkages are very straightforward. You can do with plenty of rudder movement (about 1 in. at the top) and about ½ in. each way of elevator movement. Making the aerial unsightly is all too easy in small models. I usually take it along the underside of the fuselage to the stern post and let the remainder of the aerial hang loose.

Covering and finishing

With a model of this size, there is a wide choice of suitable covering materials and finishes. David's prototype was covered with heavyweight tissue and car sprayed with silver finish and Bert's was covered, as previously mentioned, with heat shrink covering. My optimum covering would be tissue to the tail areas for lightness and lightweight nylon or lightweight tissue for the wings and fuselage for strength. Keep the amount of clear doping to a reasonable minimum, particularly on the lightweight structure of the tail surfaces. The Flitecote Silver is very suitable for representing silver doped surfaces on the full size aircraft but is too shiny. The surface can be matted by *gently* rubbing over with steel wool, or similar abrasive material or by spraying or brushing an eggshell clear polyurethane varnish. How much detail you put on the model will depend on your time and inclination but do, please, at least include a pilot, a machine gun and rigging wires. These will make a lot of difference to the looks of the model when it is airborne. The prototype models used 3 in. dia. wheels but these, as you may notice from the photos, are rather small – there should be some 3¼ in. wheels available by the time this article is printed. If you are worried about painting insignia, roundels, etc. direct on to the model try painting them first on to white Fablon and then sticking this on to the airframe. Don't forget to thoroughly fuel proof inside the cowl area and the remainder of the model with a semi-matt fuel proofer.

Flying

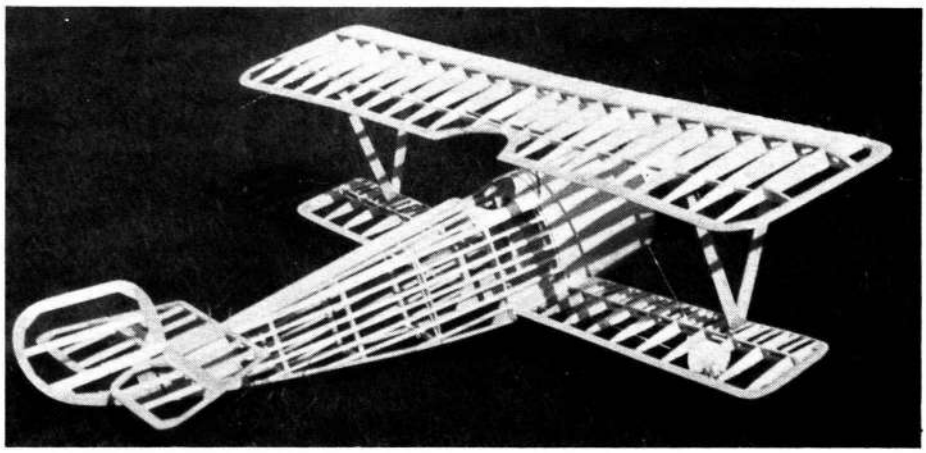
Of coure, you haven't got any warps in the wing and, of course, the radio is working per-

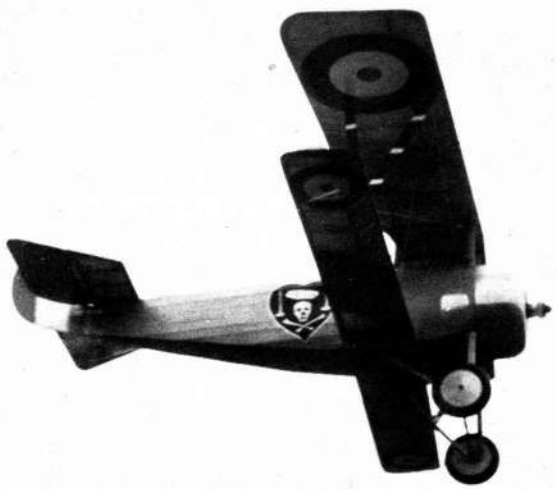


Two views of uncovered airframe provide a good impression of the wing structure, which is the subject of this second part of the construction feature. Spun metal engine cowl is available commercially.

fectly with everything operating in the right direction.! You will find it difficult to adjust the engine throttle with the cowl in position so set up the engine with the cowl removed until you are satisfied with the setting and idling. Use a large diameter propeller (10 × 3 in. or 10 × 4 in.) as this will give a good flywheel effect allowing the engine to tick over slowly and also to keep maximum r.p.m. down. Silencing the engine can be a problem in theory although, in practice, the cowl contributes very substantially to quietening the exhaust crackle. A standard silencer (Veco, Enya, O.S.) can be cut short so that the distance between the shortened edge of the silencer and F1 is only a sixteenth of an inch or so. Alternatively you must use a 'Dumpy' silencer or exhaust manifold. I can promise that, even without any silencing, the Veco 19, cowled in and swinging a large prop, is quieter than most 'silenced' engines.

The balance point must *not* be further aft than shown – at least *not* for first flights. Do wait for a 'calmish' day for test flights, the Nieuport will fly in a wind but is much happier toddling around on a quiet summer evening. With rough ground flying fields I would suggest a hand launch – steady and flat, not too fast. Because the wheels are fairly well forward you may find that there is a tendency for a swing on take off to build up; try to anticipate the swing and correct immediately. The model is not unduly sensitive in pitch or yaw, it will however stick its nose down in a sustained right hand banked turn. Aerobatics should be limited to the full size equivalents i.e. loops and stall turns. Much better to concentrate on the niceties of flying such as slow fly pasts, it looks great – and touch and go's and smooth three point landings. It is sometimes tempting when you are in a hurry, to dispense with the rigging lines – don't. You may find the bottom wings coming adrift without the rigging and it is also partly functional. If biplanes – or to be completely accurate, sesquiplanes – are your cup





Just to prove that it does really fly! 40 in. span model is in fact very controllable and can be positioned very accurately in moderate wind conditions. Aerobatic performance is nice too.

of tea I know you will like the Nieuport 24 as much as I do. Watch out for that cursed Red Baron!.

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