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FORMATION...

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10

18

50

ON THE COVER

It was intended as a kit, but never saw the light of day as such, but this is the late Phil Smith's prototype model. To 1/5th scale, it spans 65" (1651mm) and was powered by a 10cc Webra Blackhead. Full construction feature in this issue.

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CONTACT

This month's FSM has a distinctly French flavour. Since the very dawn of aviation, France has made a huge impact on the aviation world. Indeed, well before the earliest days of heavier than air 'flying machines', France was centre stage in experiments with hot air balloons and in the years immediately after Orville and Wilbur Wright first achieved sustained powered flight via lift generated by wings, France became the centre of aviation experimentation and activity.

So this month's full size free plan feature presents Peter Rake's 1912 Morane Saulnier Racer. At 34" wingspan, for electric power (what else, if it's a Rake design?). It is a handy little model that can be kept complete and resident in the back of the car, with which to snatch a few hours of R/C scale flying pleasure whenever the opportunity arises.

Back in 1912, the biplane configuration, resplendent with vast arrays of rigging wires was very much the norm. In contrast, the little Morane monoplane racer was an exercise in simplicity and practicality that helps to emphasise the advance state of aviation development in France at the time.

And it is there again today, in the form of the biggest passenger-carrying airliner ever to take the air.

Our other main feature in this issue is the French Nieuport 28, with plans for a 1/5th scale model designed by the late Phil Smith back in the 1970s. For many years, Phil was the resident, fully employed in-house designer for *Model Aircraft (Bournemouth) Ltd*, where he created many designs for free flight, control line and radio control under their *Veron* brand name, including several successful R/C scale models, all produced in a manner that the aeromodeller of average skill could cope with. Such designs certainly gave the R/C Scale hobby a great boost back then.

One of Phil's last designs was one never progressed to kit stage due to the change of ownership of the Company he worked for. That design was his Nieuport 28, created to a scale of 1:5, and embodying all the airframe design principles that had made his previous designs so successful.

P hil drew up the plans, photographed the construction of the prototype model stage-by-stage and left only the building instructions undone. But in the construction feature presented in this issue, the those construction photos are enough to tell the full story.

For scale modellers whose interest centres on the WW1 era, the Nieuport 28 is a good, practical subject to modelling. The wings are not overly much 'strung up' in rigging wires, the radial cowl is large enough to hide an engine complete with muffler and there is a long tail moment that aids directional stability, particularly during aerobatic manoeuvres.

There are also some tempting colour scheme options as the *'Flying Colours'* pages of this issue confirm and even the camouflage schemes are a lot more variable than the simple 'olive drab' so much associated with Allied combat aircraft of the WW1 period.

The late Phil Smith, of Veron fame with his prototype Nieuport 28.

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INDOOR TIME

After the 'glorious summer' we in the UK have 'enjoyed' this year, the certainty of a winter indoor flying season surely has much to commend it, after all, 'Indoors' is safe, weather-wise, eh (?), - although I can remember (in the VERY dim and distant past), an Indoor Free Flight Trials at the old airship shed at Cardington having to be rescheduled after atmospheric conditions INSIDE the shed created precipitation that destroyed some of the delicate microfilm-covered free flight duration models in the air at the time!

Thus, news from Andy Sephton, provides details of BMFA Indoor events, including Scale flying:-

NOVEMBER 10th (Saturday):
BMFA ITC Indoor Event at the Manchester Velodrome M11 4DQ (Largest hall in North West with 10 Badminton courts in size).
11am to 5pm with half-hourly slots for Free Flight/Fun Fly and Lightweight R/C,
(R/C limited to RTFs less than 50grams, Scratch built models up to 100grams, no Shock fliers). BMFA insurance required, cost £10.
Contact David Whitehouse on whitehousejdavid@googlemail.com

NOVEMBER 24th (Saturday)
BMFA Indoor Scale Committee / North West Area BMFA **Combined Inaugural NW Free Flight Gala** at the Manchester Velodrome (M11 4DQ).
Flying commences at 9am with trimming sessions and the competition flights start at approx 11am, with prize giving around 6pm. The meeting is open to anyone with BMFA membership who wants to fly in the competition classes, sadly there will be no available time for fun flyers. There will be a one-off cost of £15 for all entrants.
The event timing will be split between Duration and Scale models. Duration events will cater for F1D, F1M, F1L, Limited Penny Plane, No-Cal and Legal Eagle.
Scale will cover Pistachio, Peanut and Open Scale Flying (CO2, Electric or rubber power only), all to BMFA rules.
For further information contact Dave Whitehouse for Duration (whitehousejdavid@googlemail.com) or Andy Sephton for Scale (andrewjsephton@gmail.com or 07872 625279)

MARCH 24th 2013 (Sunday):
BMFA ITC Indoor Event, Manchester Velodrome M11 4DQ.
11am to 5pm 1/2 hourly slots for Free Flight/Fun Fly and Lightweight RC,
(R/C limited to RTF's less than 50grams, Scratch built models up to 100grams, no Shock fliers)
BMFA insurance required, cost £10.
Contact David Whitehouse on whitehousejdavid@googlemail.com

APRIL 7th 2013 (Sunday):
Combined indoor free flight scale trimming/competition and Indoor radio scale competition at Birmingham City Uniiversity Hall (Perry Barr district of Birmingham). Booking is provisional, to be confirmed when paperwork is completed.

APRIL 21st 2013 (Sunday):
Indoor Free Flight Scale Nationals, Nottingham University Sports Hall.

Mick Reeves Bristol M1-C 'Bullet'

Alex Whittaker announced the emergence of Mick Reeves Models' latest creation in his report on the BMFA Nationals in last month's issue of FSM. Alex also recently reviewed Mick Reeves's big electric-powered Spitfire Mk.IX and this latest offering is also designed for electric power. At 1/3rd scale the Bristol spans 122" (3,100mm) and the protoype was test proven using a 180kv 7kw outrunner powered fro four packs of 6S 5000mAh Turnigy lipo packs (12s x 10Ah). The all up weight is under15kg (including 3kg batteries).

As with all the Mick Reeves range, the Bristol M1C can be obtained directly from Mick Reeves Models. The complete kit costs £470.00 - but also in a wide combination of options including plan only £30; laser cut ribs and formers, etc. £105; stripwood pack £55; epoxy cowl £30; epoxy spinner £40; tubes & metal brackets £74; nuts, bolts & screws £24; wheels £30; rigging wires £18; forkends £33; dummy engine £9 and pilot £60.

If you want to see the prototype model in action, go to: http://tinyurl.com/8c7nko7

RED ARROWS IN CAMERA

Universally admired worldwide, for their superb air display performances, the Royal Air Force Aerobatic team never ceases to draw applause and appreciation, however many times one sees the team in action.

The stunning photography throughout this book captures the passion and dedication of a team intent on representing the very best of British and being the best aerobatic team in the world. .

Nine aircraft, 60 engineers, 47 years flying and 4,410 displays performed in 54 different countries, are some of the amazing statistics for the world's premier jet aerobatic formation display team - the Red Arrows.

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Red Arrows in Camera, is a stunning photographic record of the world of the Red Arrows. It traces the origins of the Team from the pre-WW2 Hendon Air displays, through first RAF aerobatic groups of the early jet-age, the classic innovations with Hawker Hunters, English Electric Lightnings and the immediate pre-Reds team The Yellowjackets. The book then goes on showcase every aspect of the team at work and off duty, from the pilots and their Hawk aircraft, to the ground crew ('The Blues') and backroom support staff who keep the team flying. The Author's supporting narrative provides a unique insight into the roles of individual team members, as well as the high standards and tight schedules that drive them.

It is a superb photograph essay of The Reds Arrows as we know them today is covered in 0ver 200 pages, hardback bound and costs £25.00.

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NEW MOTORISED SAW FROM DREMEL

Dremel tools, of all kinds have become favourites among modellers. Among these, the Dremel Motor-Shop scroll saw has long been one of them.

Now there's a new innovation on the theme that takes it all a long step forward in the shape of the new **Dremel Moto-Saw**. This is a compact 2-in-1 scroll and fret saw designed to make detailed cuts in a wide variety of materials up to 18mm for hobby, craft, woodworking and light DIY.

It can be used either in stationary mode, in which the tool is docked in its base, or in handheld mode as a coping (fret) saw. In its stationary cutting mode, the Dremel Moto-Saw is perfect for creative tasks, such as wood and metal decorations or decorative effects and model building. This compact unit is easy to store, no wrenches or keys are needed to fix and tighten its accessories thanks to its keyless blade change and it features an automatic blade tensioning mechanism. Also, by attaching a vacuum cleaner to the Moto-Saw, dust can be removed from the line of cut. The Dremel Moto-Saw has a hold-down foot for reduced vibration, guide rails for parallel angles and full variable speed for optimal handling.

The tool can be easily removed from its docking station via a quick release button but the docking station can also be fixed permanently to a work bench with the use of two regular screws.

Three different blade types are supplied, for precise straight and curved cuts in different materials including soft wood, composite boards, laminate, acrylic, PVC and soft sheet metal.

The toolkit includes:
- Two general purpose wood cutting blades for precise straight cuts up to 18mm deep with a blade depth of 2.5mm
- Two fine wood cutting saw blades, for curved cuts up to 12mm deep with a blade depth of 1.9mm
- One metal cutting saw blade for cuts in soft sheet metal up to 3mm deep with a blade depth of 1.9mm
- One Parallel Guide
- Base and Clamps

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Wingspan	3.30 m (130 in)
Length	2.40 m (94 in)
Wing Area	169 sq dm (2620 sq in)
Weight	15.5–17.3 kg (34.0– 38.0 lb)
Engine	60cc to 100cc gas
Servos	8 high-torque
Transmitter & Receiver	6+ channel

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31634

Soviet Equaliser: Lavochk

Alex Whittaker tracks down Mick Burrell's amazing la

Produced by the Lavochkin Design Bureau during WWII, the La-7 piston engined fighter was a development of the earlier Lavochkin La-5. It was armed with 20mm canon, powered by a Shetsov ASh-82FN 14-cylinder air cooled radial, and had a top speed of 411 mph. It could also carry 440lbs (200 kgs) of bombs. It was constructed of an early composite 'delta-wood': a mixture of wood and resin.

It was a formidable fighter, and its pilots feared no comparable Nazi machine. Its performance was very impressive, and at low altitudes, it could out-run, or catch, the famed Focke Wulf Fw 190. Its main weakness lay in its engine bay. The Shetsov radial engine demonstrated woeful reliability. At one stage in January 1945, of the 398 La-7s in front line duties,

вочкин Ла-7

**Mick Burrell's Lavochkin La-7.
Not your typical warbird!**

kin La-7

rge scale Russian WWII fighter

no less than 107 were unserviceable due to engine problems. There were also significant issues with its armament. Even at very short ranges - and even when an Fw190 was being hit hard - it could not being downed. The original cannon were then upgraded, and kill rates improved.

Indeed, the top scoring Soviet ace of WWII, Ivan Nikitovich Kozhedub - 'Ivan The Terrible' - notched up 17 kills in his La-7. This particular development of the Lavochkin line arrived near the end of WWII. Its service crossed over into the new Jet Age and some La-7 airframes were tested with rocket propulsion, fitted on the tail. The later La-7/PVRD was even fitted withy two under-wing ram jets but the high induced drag practically cancelled out any performance gains and the idea was dropped.

Total Lavochkin La-7 production was

Diesel fuel pumped into the Moki's hot collector ring produces this dramatic effect!

5,735 fighters, plus a further 584 examples of the trainer variant. A few examples were exported to the Czechoslovak Air Force in 1945 and the La-7 remained in service with the Soviets until 1947, while with the Czechoslovaks until 1950.

The Model

Mick Burrell is a popular pilot on the UK summer show circuit. He is also a keen Warbirder and I caught up with his Lavochkin La-7 at a very wet and very cold RAFMAA Warbirds 2012, held at historic RAF Scampton. Under 'Eastern Front' skies she looked utterly convincing. The first thing that astounds on close examination is the metal finish. To achieve such a convincing look on an all-moulded composite airframe is very impressive.

The leg detailing is impressive. Mick altered the retracts to hydraulic operation.

Sturdy tailwheel! Note doors.

Collector ring on engine means that the engine cowl is unsullied by model exhaust cut-outs. Note 'La7' legend in cyrillics.

Mick's Lavochkin avoids that 'Big Airfix' look of some all-moulded scale monoplanes. It really does look like aluminium. The next thing you note is its imposing radial engine. The Moki five-cylinder power plant is certainly the most convincing radial cylinder internal combustion engine on the current scale scene, delivering a truly atmospheric sound when run up in the pits. Then, when the model takes to the air, and the prop unloads, she produces an even more impressive roar. The sound of those prop tips smiting the air defies description.

A bespoke model

Mick commissioned the airframe from the *Scale Wings Factory* in Austria. He even

The fin and rudder really do portray an aircraft on active service.

The extent of the moulded-in detailing is very impressive.

The kill decals of this Soviet ace.

Rivet and lightening hole detail on split flap.

Nicely finished cockpit.

Cyrillic equivalent of "No Step" legending on the trim tab.

Neat hinge detailing.

The combined trailing edge hardware on the Lavochkin is suitably complex.

The powerful ailerons constitute a large proportion of the wing area.

Stricken La-7 pours out the smoke.

Flap down approach.

specified the paint finish. Mick then fitted the engine, radio, and all the many scale systems. Overall, it was still a significant winter project.

Construction

The model is an all-moulded composite. All rivets, panel lines, blisters, and fastener detailing is moulded-in at the factory.

Engine

Moki 250cc five-cylinder four-stroke radial. In terms of power,

The Lavochkin looks very convincing parked out on the RAF Scampton tarmac. Note split flaps.

and authenticity of sound, model piston engines do not get any better than this.

Propeller
Biela three-blade 34x12 carbon, a brand that has become a popular choice for the larger warbirds, and the favourite for this particular engine.

Exhaust
Moki standard item collector ring. This is a work of art in itself. It also keeps the moulded engine cowl free of cut-outs or engine apertures.

Undercarriage / Retract
ScaleWings supplied air retracts, converted to hydraulics by Mick himself.

Painting
By the factory, to Mick's specification.

Legending / Decals
By the factory, but will be redone with new *Taylormade Decals* over this coming winter.

Smoke system
The model is equipped with a smoke system using an *Emcotec* smoke pump. This pumps diesel fuel into the exhaust collector ring. ■

Model Specification:

Scale:	1:3.5
Wingspan:	110"
Weight:	51.75lbs
Engine:	Moki 250cc 5 cylinder 4 stroke radial.
Prop:	Bella 34"x12" 3 blade carbon fibre.

Note the three-bladed prop, and the huge area of the powerful drooped flaps.

Pilot's notes
The model flies beautifully, so Mick's comments are short and sweet:

"The model is easy and a joy to fly, although landings can be a challenge. It doesn't take kindly to crosswind take-offs or landings".

All blisters and hatches are moulded in at the factory.

The surprisingly complex engine cooling slots are faithfully reproduced.

Sliding canopy. Look closely: the variation in the rivetry and fastenings is astounding!

The windscreen and surround looks appropriately solid.

Just a glimpse of the Magnificent Moki.

More well-observed moulded-in detail, which contributes to the convincing whole.

Morane Saulnier Racer

A small, 34" (863mm) wingspan electric powered model designed by Peter Rake, with the prototype model built and described by Simon Uglow

As with many human endeavours no sooner had Orville cleared the launching ramp on the beach at Kill Devil Hills, then the race was on. Who could fly further, longer, higher and, of course, faster. Within a few years from that momentous day in December 1903, organised race meets had sprung up on both sides of the pond. With a general public craving anything aeronautical, attendances were huge as was the adulation and purses for the conquering pilots.

The model

Peter's design scales out to approximately 1/10th giving a wing span just shy of thirty four inches. Falling within his IPS class of model design, the current rendition of the plan shows an ***Eskay 300XT*** brushless motor, 2s LiPo battery and control via the all-moving vertical tail and horizontal stabiliser. These are extremely powerful in use, so disregard the recommended control throws at your own risk!

Whilst on the subject of motors, I used a ***Hobby King Turnigy 2204-14T***, 19gm outrunner. This seems a reasonable cheaper alternative to the ***Eskay*** and was propped with a ***Master Airscrew*** 7" x 3".

Having wetted your appetite and stimulated your interest, let's get building. For my part, building was hastened by a set of laser cut parts. This is an extremely cost effective way of obtaining the components. No need to invest in large sheets of ply for one or two parts. As an added benefit no tedious ribs to cut out. If you haven't gone down this route before I urge you to give it a try.

Tail

The rudder requires a laminated outline produced from four layers of 1/32" x 3/32" balsa wrapped around a foam board template and pinned flat on the building board to dry. Pre-soaking the strips in a hot water ammonia solution aids the bending process, but beware the fumes. PVA, applied by running the individual strips through a saucer of glue was the adhesive of choice. A thin brass fence applied to the outside strip prevents the tell tale indentations from the pins used to maintain the curve whilst the glue dries. Using a sharpened piece of piano wire or a fine drill bit, carefully drill the rudder for the hinge pin.

The horizontal stabiliser is a conventional build over the plan from strip. A complicating factor is the need to accommodate a hinge tube over the dowel or carbon rod that joins the two stabiliser paddles. To aid keeping these paddles in the same plane build them with single continuous leading and trailing edges. With framework complete add the bearing tube joiner assembly.

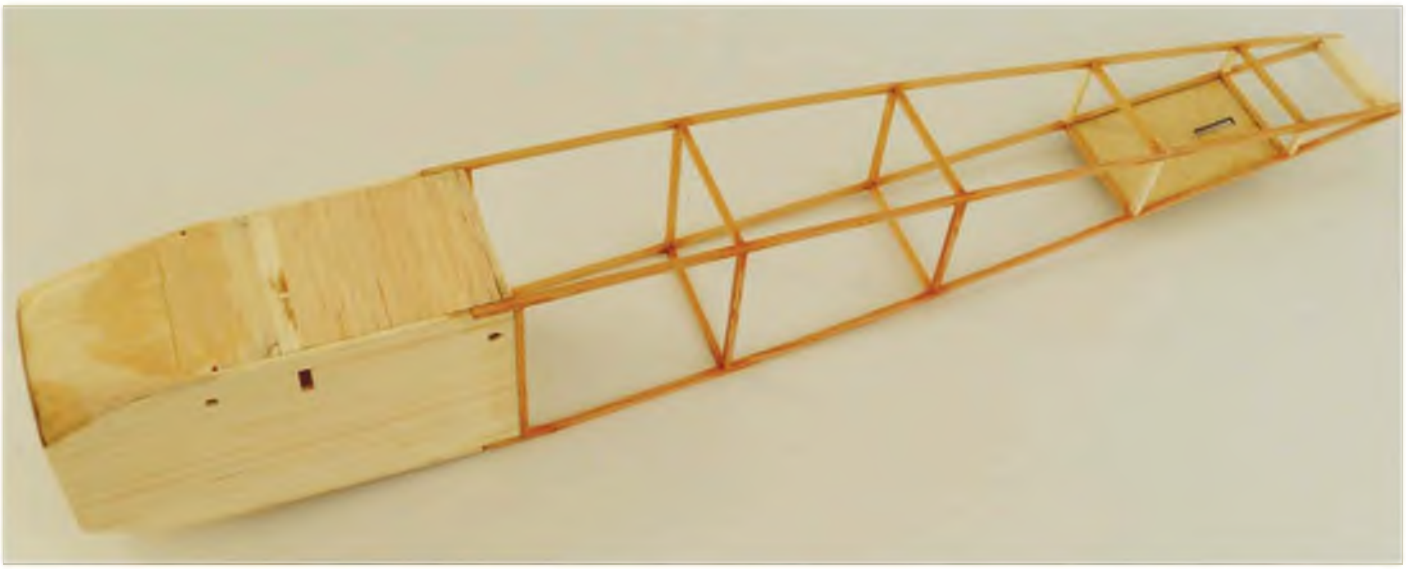
THE FULL-SIZE

Peter has designed a number of planes from this era and the Morane Saulnier Racer presented here continues the theme. Quoting from a contemporary edition of Flight magazine, the original was rated highly: *"..we were most agreeably surprised when this racer was first tested at Villacoublay to see Vedrines, without any tuning-up process, take the machine up to 1,000ft and fly for twenty minutes at the extraordinary speed of seventy-eight miles per hour. This, with a motor of only fifty horse power".*

This article, dated February 3rd 1912 goes on: *"... Identical with the endeavours of almost every constructor at the present time, the chief aim of the designer has been the minimisation of head resistance, an all important point when high speeds are to be considered. The main body enclosed throughout its complete length by a covering of fabric, possesses a fairly accurate streamline form and is deep enough in the front to accommodate the pilot so that his head alone protrudes above the cockpit, his body being protected from that rush of air which would otherwise have such an adverse effect on his own personal comfort and on the facility of the machine to cleave the air with the minimum of disturbance. As regards the motor, a Gnome of fifty horsepower, the same point has received consideration, and by means of a roughly streamlined casing, which also forms a shield to prevent lubricating oil and exhaust products being thrown off in the direction of the pilot, much of the resistance presented to forward advance by the rapidly revolving motor has been avoided. Not as some might imagine at the expense of efficient cooling".*

Whilst primitive by today's standards in 1912 this was truly state of the art!

Climbing away from a hand launch. The model has more than adequate power with the motor Simon fitted.



Although not complicated, a simple jig (the plan and a suitably sized piece of block balsa) eases keeping the tail section square.

Pre-curving the ply for the cowl makes assembly so much easier.

Only glue the fairing blocks to the cowl during the shaping process. It makes finishing the cowl a whole lot less fraught.

Only when thoroughly set should you remove the unwanted portions of the leading and trailing edges. Now you can proceed to shape the rounded outline as per the plan. Tail surfaces can be covered at this stage and the control horns added and painted to match.

Wire bending

Another job that's nice to get out of the way early on is the wire work. Nothing too complicated here. Two simple 'V' shaped pylons with bent pin rigging loops and the four-piece undercarriage; five if you include the rigging loop. Solder the undercarriage in a simple jig on the building board, this having taken the spacing of frame 'A' and 'B' directly from the lateral view of the plan.

Fair the undercarriage legs with 1/16 inch balsa, tissue cover it and paint. Braided fishing line, or in my case suture material, can be used to simulate the undercarriage bungee cord. The wheels I used came from ***Peck Polymers*** (available from ***SAMS Models*** in the UK) and are secured with a couple of short lengths of heat shrink and a drop of medium cyano. From personal experience, it may be better to substitute less delicate wheels until the model has been trimmed out! ***(They're very nice wheels, but also very expensive and extremely fragile - PR).***

Wings

The wings are very simple, especially so with laser cut ribs and trailing edges. A single bass or spruce spar for each panel, 1/8" x 3/8", is prepared by tapering and notching to accommodate the tip pieces. With the spars, tip pieces and wing trailing edges pinned over the plan the ribs are added. These are placed according to the spacing dictated by the trailing edge cut-outs. Don't worry if there is a slight discrepancy between these and the plan, as changes due to humidity can occur. Just ensure that the ribs are perpendicular to the spar, and building board. To pin the spar I use a sacrificial piece of 3/8" balsa cut into one and a half inch lengths. These are placed across the spar and pinned at either end, trapping the spar beneath. Similar lengths of balsa are used to trap the leading edge in position without the weakening that could occur if pinned directly. All this can be assembled without glue.

After double checking for accuracy ***Deluxe Material*** Superphatic is applied to both sides of all joints. The wicking nature of this adhesive makes it ideal for these dry assembled structures. Before removing the basic wings from the building board the rigging attachment blocks need to be added. These are drawn as triangular stock but as my scrap box was lacking I substituted 3/16" square. These need to lie flush with the ribs, accommodating the rib curvature and are full depth.

The root wing bay is sheeted on the top surface with 1/32" balsa and bamboo kebab skewers yielded the incidence pegs. Shape the leading and trailing edges to section and your two wings can be covered in readiness for final assembly. With the shape of the wingtip, washout is easily shrunk in at the covering stage.

Fuselage

Holding the completed components in there appropriate location, the fuselage is Peter's familiar forward box mated to a strip-built rear framework. The cowling is built as a separate structure and requires the fuselage to be used for accurate positioning of the cowl cheeks.

Firstly then, we build two rear fuselage frames directly over the plan. Choose four matched pieces of wood for the longerons to help reduce the tendency for warps to set in. Whilst hard balsa is indicated on the plans, I choose to substitute spruce. Spruce was also used for the forward vertical members, switching to balsa for the two rearmost. In lateral view the fuselage tapers from top and bottom in a sweeping curve to the tail post.

Thinking this would preclude pinning to the building board for the addition of the cross pieces, I elected to glue each rear side frame independently to the forward fuselage bo - not the best of moves as I now had a devil of a time adding the cross pieces and maintaining squareness! Better

then to build as Peter intended - pinning the side frames vertically over the building board. Make supports to hold the raised portions of the sides taking dimensions from the plan. You will need to draw the bottom datum line from which to take these measurements. With the sides supported in this way, proceed to add the cross pieces. ***(Unfortunately for Simon, I didn't mention this simple 'jig' process until he had already struggled through the fuselage build. Slap my wrist - PR)***

The forward fuselage is simplicity itself - two sides, three formers and two undercarriage mounting plates form the basic box. To this add 1/16" balsa infill and some block balsa to flesh out the fuselage shape. As drawn, a cockpit opening is omitted although the position and shape is shown. It would be relatively easy to place a false floor; blanked off at either end should you wish to portray a real cockpit opening. This will however, in consequence, reduce the space available in the radio bay.

With the rear fuselage frame still supported over the plan, bring the two fuselage assemblies together. When set, remove the fuselage unit from the building board. Add the ply skid mounting plate and infill the caudal fuselage bay with some 1mm balsa to accommodate the control run exits. Pieces of triangular stock were added to accept screws for attaching the single ventral ply hatch and 3/16" square balsa was used for servo bearers.

The servos themselves are secured with medium cyano. A ***Turnigy Nano-Tech 2s*** 950mAh 25-50C pack and ***Hobby King Blue Series*** 12amp brushless speed controller are affixed with silicone sealant as far forward in the fuselage as possible. Installation of the radio components should however only be done after sewing and gluing the undercarriage to its' mounting blocks. This, in turn, is only done after covering the fuselage sides, top, and on the bottom, from the front of the hatch forwards. Leave the rest of the bottom uncovered at this stage to ease running the closed loop controls.

Covering & finishing

All covering on this model is cream ***Litespan***. This is supplied adhesive-free and you will be required to purchase ***Balsaloc*** heat activated adhesive separately. Apply this to the covering rather than the framework using a small piece of damp sponge. Hopefully at this stage your wings tail surfaces and the majority of the fuselage have been covered.

We can now think about applying some trim. Rib tapes are 2mm strips of black tissue. The edging strips are 5mm, 6mm and 4mm respectively for the wing, tail and fuselage.

The sum total of that irksome task - wire bending. It really isn't that difficult with wire this thin.

In retrospect, I'd probably recommend making the grain in the rigging blocks run chord wise. It prevents the rigging cutting into the grain.

A simple partial engine fits easily behind the motor and fills the lower cowl nicely.

Not huge amounts of room in the avionics bay, but enough to do the job. Make sure you get everything as far forward as possible.

The patches over the control run exits and the rigging attachment points are simply cut with a hole punch. These are all applied dry using a glue stick.

Cockpit combing comes courtesy of a length of coated electrical wire whilst the fuel tank cap is a servo mounting bushing, and a round head brass screw with the slot filled with Milliput. The pilot is to 1/10th scale and was sourced from ***Pete's Pilots***.

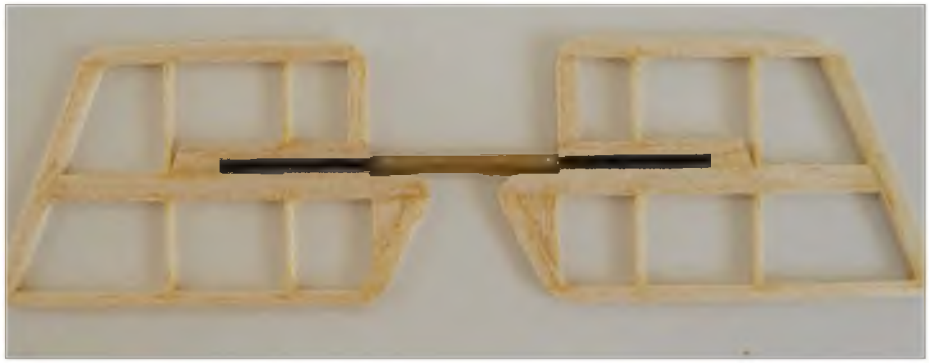
File a vertical notch in the tail post and glue the rudder hinge pin bearing tube. Now bind and glue the bearing tube of the horizontal stabiliser making sure everything is true and square. Prior to covering the rest of the fuselage bottom sew and glue the undercarriage in position, finalise your radio installation and connect up the closed loop controls.

Form the basic cowl, formers C1 through to C3 with a 1/64" ply wrapping and tack glue to the front of the fuselage. Pre-curve the ply by soaking, then taping around a suitably sized paint pot and allowing it to dry thoroughly. With the basic cowl positioned accurately on the fuselage add the side cheek blocks. Take care to glue these only to the cowl and not the fuselage. Remove the cowl, now as one unit, and proceed to shape the cowl cheeks. The cowl can be finish sanded and primed with automotive primer at this stage, before adding the simulated metalwork on the cowl and forward fuselage from plastic card. Mask the whole of the rear fuselage, and with the hatch screwed in place, spray the forward fuselage and cowl. When dry, go over the plastic card with a soft pencil to impart a nice metallic sheen. Pick out the other details with brush painting to taste.

Assembly

On the home stretch now. The wings can now be permanently glued in position clamping the spars to F2/F2A through the open hatch. Dihedral is set by the angle cut into F2A, whilst the incidence pegs plug into corresponding holes in the fuselage sides. Wing rigging points were made from No 18 fish hooks, cut just before the bend of the hook. The shaft is glued into the pre-installed blocks taking care not to foul the eye with glue. The rigging itself is nylon monofilament terminated at either end with heat shrink and cyano.

How the closed loop cables exit the lower fuselage. An aluminium, or even plastic, elevator hinge tube makes balancing easier.

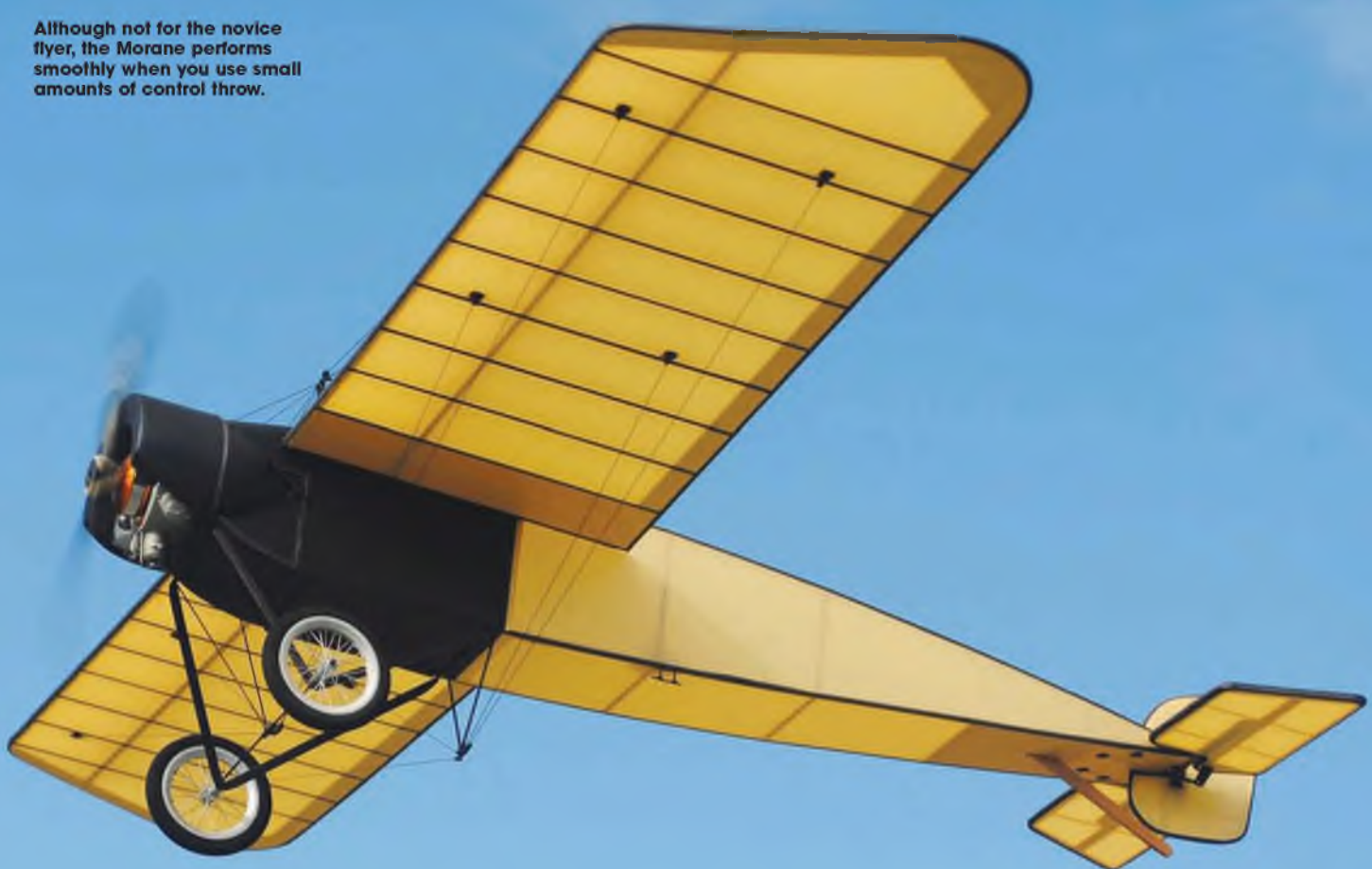


Carbon rod or kebab skewer both make adequate elevator joiners. Just remember to fit the hinge tube before you glue either into the elevators.

The interesting bit

Whilst building this model is quite straightforward, she needs a careful hand in flight. Early trimming flights were less than successful and I can definitely vouch for the strength of the structure as designed. The rigging contributes considerably to this. Flown smoothly little height is lost in turns though get out of shape and things begin to look untidy very quickly the model oscillating in roll (Dutch rolling). Even with 40% exponential dialled in a light touch on the sticks is required.

Trimmed out control throws are 5/16" each way for both rudder and elevator, whilst CG is set no further aft than 1.75 inches from the wing leading edge. From a gentle hand launch the model gets away easily. Power is plentiful with the chosen set up: half throttle being more than enough for cruising around the circuit with plenty left in the tank should you so desire. This model is really a fair weather flier however with slow low passes being the order of the day. In this way you really get to enjoy the sun shining through the covering, the rigging and those spoked wheels. If you fancy relieving the days of the pioneer aviators and are confident on the transmitter then Peter's Morane Saulnier racer comes highly recommended. ■



Although not for the novice flyer, the Morane performs smoothly when you use small amounts of control throw.

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Nieuport 28

A 65" (1651mm) wing span 1/5th scale WW1 warbird for 10cc (.61 cu.in engines, designed by the late Phil Smith.

There are a few, a very few aeromodellers, whose model design talents make a huge contribution to our hobby. Among those, the late Phil Smith must be considered one of the most outstanding. A lifelong aeromodeller, his major contribution to our hobby was as full-time in-house designer for the ***Model Aircraft (Bournemouth) Ltd.*** Company whose kit brand name was ***Veron***.

Phil was designing production kits of all kinds way before the advent of reliable, affordable R/C equipment, but when the time came to apply himself to the R/C discipline; his designs were a major success in taking the R/C hobby forward for 'Mr Average'.

As development of radio control equipment progressed and the scope of what could be done with equipment continued, Phil's design skills in developing practical designs for kit

NIEUPORT 28

Full size copies of the plan for the Nieuport 28 are available from Flying Scale Models Plans Service, ADH Publishing, Doolittle Mill, Doolittle Lane, Totternhoe, Bedfordshire, LU6 1QX.
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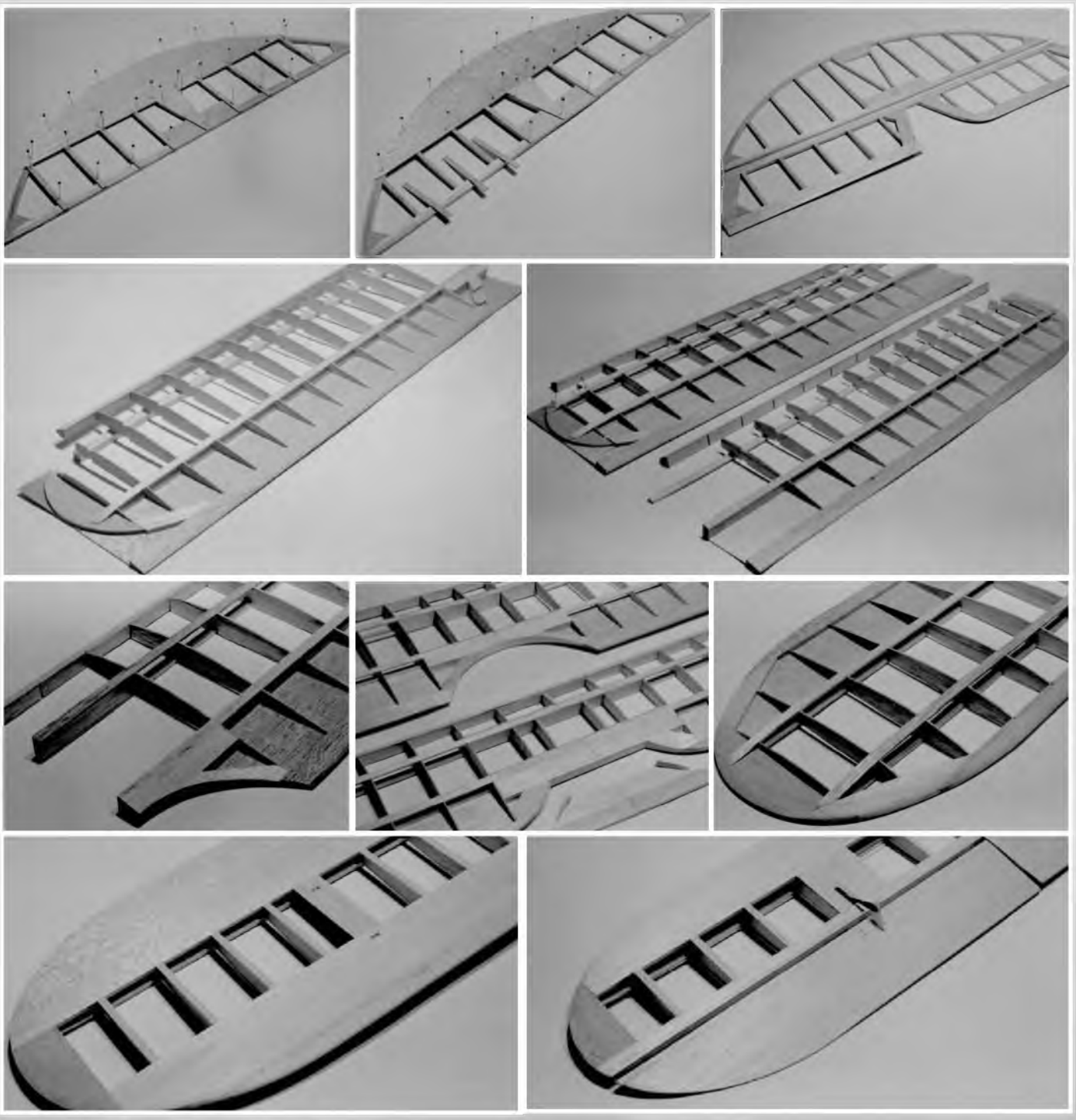
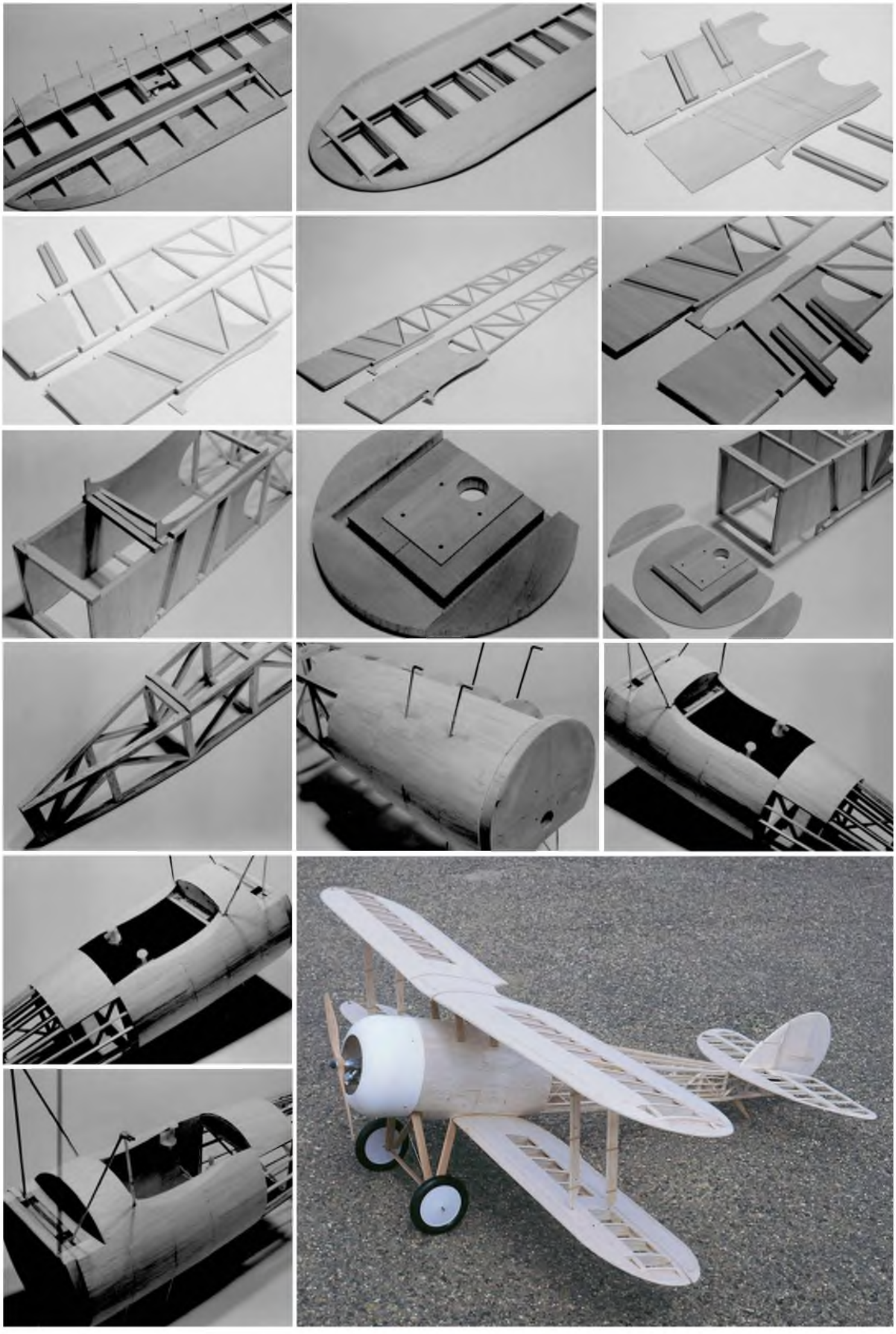
no. MF31

production inevitably turned to R/C Scale, giving us such major successes as the Veron Hawker Tomtit and Avro 504K, but always with the needs of 'Mr. Average modeller' in mind and always to a size of model that the average modeller could handle.

One of Phil's final designs was the Nieuport 28 presented here. It never saw the light of day as a production kit - the *Veron* range passed into the ownership of *Amerang* and the prototype model design work, including construction of the prototype model, photographed stage-by-stage and daughting of the plans was progressed no further.

Phil's choice of the Nieuport 28 was prompted by the success achieved by the American *Williams Brothers*, whose similar sized kit model was a





considerable success in R/C Scale competitions. The Nieuport 28 has a lot going for it as a subject for R/C scale, not least its long tail moment that imparts excellent directional stability, which helps to hold a heading, particularly during aerobatic manoeuvres. It's true of course that the long tail moment risks tail-heaviness, but care during the building process should minimise that potential problem if it is kept constantly in mind.

There's also not too much wire bracing to cope with either.

Ever mindful of his 'Mr. Average' concept, designer Phil selected a scale that gave a wing span of 65" (1651mm) and a power of a two-stroke 10cc (.61 cu.in) engine. He also adopted the 'Sport Scale' approach, maintaining an accurate outline, but with a few deviations from true scale that included a semi-symmetrical wing section in place of the true-scale undercambered profile. Those who want to take the scale fidelity principle may do so using the three-view scale drawings of the '28 presented in this issue.

The one thing that Phil never produced for this model was the step-by-step written instructions, which are the norm with any kit. However, the step-by-step pictorial present here should be enough for anyone with the experience necessary to contemplate building Phil Smith's Nieuport 28.

Phil Smith; gone, but not forgotten. ■

Nieuport 28 C-1

A French WW1 fighter never adopted by its country of origin and forever associated with U.S.A. military aviation. They made the best of what they were given!

The elegant, unmistakably French fighter biplane received by the American 95th Aero Squadron in February 1918 was the first of some 297 purchased by the U.S.A. in World War One to supplement its limited supplies of SPAD 13C.1s. It was the shapely Nieuport N.28C-1 and, although it was to achieve a degree of fame in the hands of a few outstanding pilots (Lufbery and Rickenbacker to name but two), as a fighter it was flawed from the outset and rejected for front-line use by the French Air Service, considering it inferior to the SPAD, which had been ordered into full production as their principal fighter aircraft in 1917. (What a way to treat your new-found and much needed Allies!)

The Nieuport 28 was the culmination of a design evolution whose origins lay in a successful series of sesquiplane fighters by Gustave Delage, of which the little Nieuport Model 11 of 1915 was the first to win fame in combat. Its sesquiplane wing arrangement meant that, while its lower wing was roughly the same span as the upper, its chord was only half that of the top wing - a set-up that afforded excellent downward visibility from the cockpit, but much reduced total wing area. A series of logical step-by-step design improvements produced the Model 15, the Model 21 trainer and, as the Great War progressed, the Nieuport 23, 24 and 27 models.

All through this development, the objective at ***Societe Anonyme des Etablissement Nieuport*** seems to have been one of light weight and consequent good manoeuvrability and this philosophy even extended to armament - long after other manufacturers had settled on two machine guns as optimum firepower in their fighters, Nieuport aircraft carried a single weapon.

The ever-growing need for increased performance, however, soon forced Nieuport to consider the use of heavier, more powerful engines and new designs dispensed with the 80h.p. Le Rhone air-cooled rotary of the Model 11 for a unit of some 110h.p.

The adoption of this larger engine demanded a change in design thinking at Nieuport. By the late summer of 1917 it had become clear that the design philosophy of lightweight/high manoeuvrability approach that Nieuport had, up until then, so successfully followed, was about to be tested by faster, more rugged designs from other manufacturers. In particular, the SPAD 7 had proven itself superior to Nieuport's 24, 24bis and 27 in all departments.

Nieuport's response was to experiment with a new Gnome 160h.p. rotary engine in a modified Model 24. The need for greater wing area dictated by the bigger engine saw a move away from sesquiplane layout to true biplane format and, as the result of the data obtained from this exercise, construction of the prototype '28 was commenced. The wire braced box-girder wooden fuselage was fabric covered and almost four feet longer that of the modified Model 24 but, since it retained the original fuselage depth, it looked considerably sleeker. A form of fibreboard was used in place of metal for turtledeck and side panels in the cockpit and nose areas and the Gnome engine was housed in a distinctively deep spun aluminium cowling. The tail unit was covered in moulded two-ply skinning and the aluminium tube undercarriage was similar to that of the Model 18, carrying 650 x 80 tyres on fabric covered spoked wheels. The wood frame wings had graceful fully elliptical tips and gone were the V-struts previously common to Nieuport biplanes, being replaced by parallel interplane struts. The lower wing was a larger, two-spar, almost full span affair marking a break with Nieuport's sesquiplane

This early post WW1 photo shows a U.S. Navy Nieuport 28 to which flotation gear has been installed immediately either side of the engine cowl ahead of the wing leading edge.

tradition. Although originally flown with no dihedral, tests soon indicated that it was necessary and some was induced in the upper wing of a second prototype by lowering the height of the centre section struts. (There were three prototypes in all, the specification of the third being that accepted by the French Aviation Ministry).

Power for the Nieuport 28 prototype was the new nine-cylinder Gnome Monosoupape (single valve) 9-N rotary of 160-170h.p. that was to prove far from ideal, being unreliable, wasteful of fuel and prone to catching fire in the air. Armament on the '28 initially consisted of a single Vickers .303 machine gun (typically Nieuport!) mounted on the fuselage port side, but this was soon supplemented by a second gun on the forward fuselage upper decking. Interestingly, some American squadrons replaced the Vickers guns on their Nieuport 28s with American Marlin weapons.

The type was accepted and ordered into production by the ***Aviation Militaire Francaise*** in the latter months of 1917. It was at this time that it also received its official numerical designation - Nieuport N.28C-1, the 'C' referring to 'Chasse' or pursuit. With a change of heart that nearly put Nieuport out of the aircraft design and construction business at a stroke, the order was later cancelled - even in its ultimate form, the '28 was considered to be inferior to the new SPAD 13 and, as a consequence, the type saw no combat in French squadron markings.

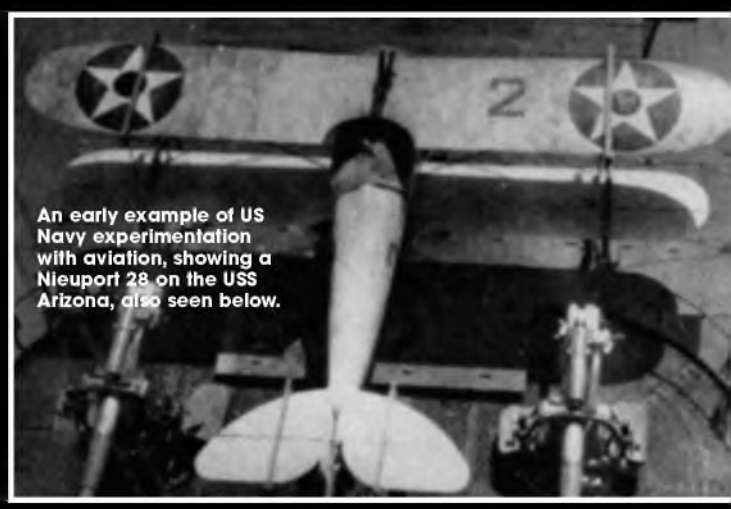
The Nieuport 28 was delivered to units of the American Expeditionary Force during the early months of 1918. It went to four squadrons of the First Pursuit Group - the 27th, 94th, 95th and the 147th - and, right from the outset, shortcomings were evident. The initial aircraft had been delivered without guns (!) and, astonishingly in the lethal environment that was the air over northern France at the time, some early patrols by the 94th and 95th were

Ground crew of the US 95th Aero Squadron wheel out Nieuport 28s . Without brakes and with rotary engine, the aircraft needed restraining during ground handling.

The first prototype '28 had no dihedral on the upper wing.

Spit and polish time perhaps? The large number of troops lined up in drill order, may suggest some sort of parade at the 95th Aero Squaron's base at Toul, France in May 1918 as an example of the Nieuport 28 is wheeled out of the hangar.

Also post-WW1, this Nieuport 28 is a civilianised conversion, bearing French civil registration. It has been converted to 80 hp Le Rohne power.



An early example of US Navy experimentation with aviation, showing a Nieuport 28 on the USS Arizona, also seen below.

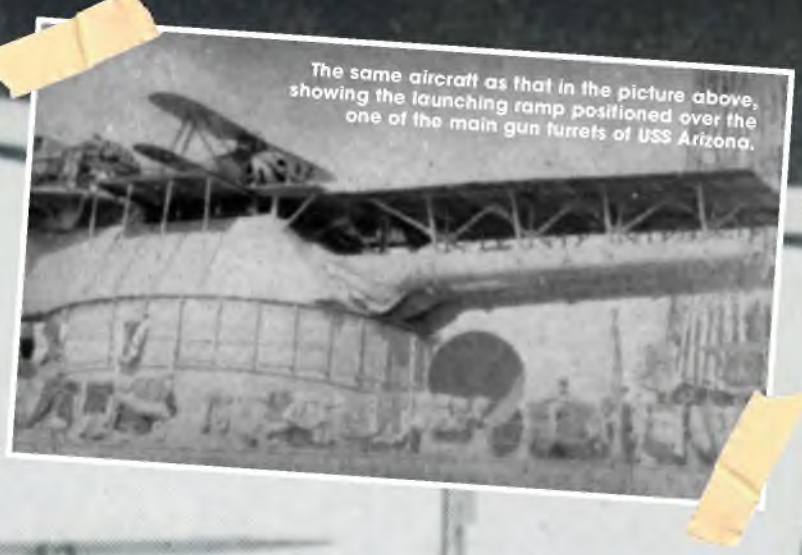
carried out unarmed! With the arrival of the weapons during April, the Nieuport 28 scored its first victories in the shape of a Pfalz D.III and an Albatros D.Va, surprised by pilots of the 94th in foggy conditions near their base at Toul.

One of the victorious Americans was 1/Lt. Douglas Campbell whose success in being the first American trained fighter pilot to down an enemy machine in aerial combat secured a place in American aviation history, not only for himself, but also for the Nieuport 28.

Despite this early success, the '28 failed to shine as a fighter and losses in the First Pursuit Group mounted steadily during the spring and summer of 1918. It was instantly outclassed by the new Fokker D.VII and, in addition to endless problems with its Gnome engine (bursting into flames while landing, for example!), it displayed a terrifying tendency to shed its wing covering fabric in extended dives (and once in a loop during a dog-fight) and several pilots experienced this unsettling characteristic, barely nursing their damaged aircraft back, to crash land in the American sector of the lines.

In some cases the fabric shedding was so catastrophic it took the ribs ahead of the front spar with it. The problem was eventually traced to the use of sub-standard adhesive in fixing the covering to the wing frame. One can readily imagine the level of relief among the American pilots when their SPAD replacements started to arrive during July 1918!

If the Nieuport 28 had proved a disappointment in its intended role as a front line fighter (and it had!), it is ironic to note that, after the war, the type began a new and much more successful career. In civilian American hands it was used for air racing (in clipped-wing form) in the USA and featured in many of the popular Hollywood aviation movies of the 1930s. This elegant little biplane had finally achieved stardom! ■



The same aircraft as that in the picture above, showing the launching ramp positioned over the one of the main gun turrets of USS Arizona.

Description

SPAN – 8160 (26'-9¼")
LENGTH – 6400 (21'-0")
WING AREA – 215 Sq.Ft. (1997qDm.)
ENGINE – Gnome 9N (165hp)
Wt – 1539 Lb (698kg) Loading – 7.6 Lb-Sq'

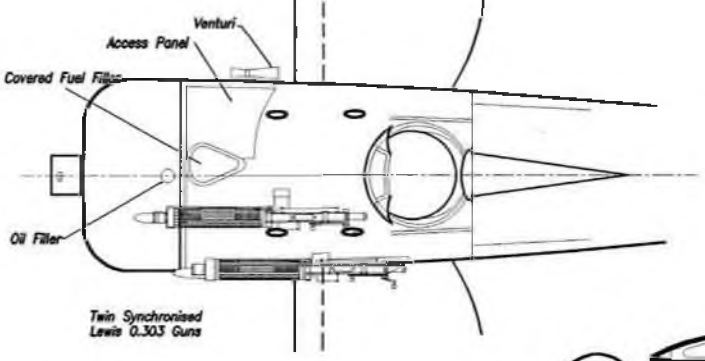
FUEL TANK – 30 Gal US
OIL – 5 Gal US

PERFORMANCE
MAX SPEED – 123 MPH (198kph)
LANDING @ – 54 MPH
ENDURANCE – 1½ hrs = 248miles
CLIMB – 10,000ft in 11.5min
CEILING – 17,000ft

ARMAMENT
TWO VICKERS .303 Machine Guns (OR SINGLE)

Flying Wires are all Double wires with shaped wood strip infill

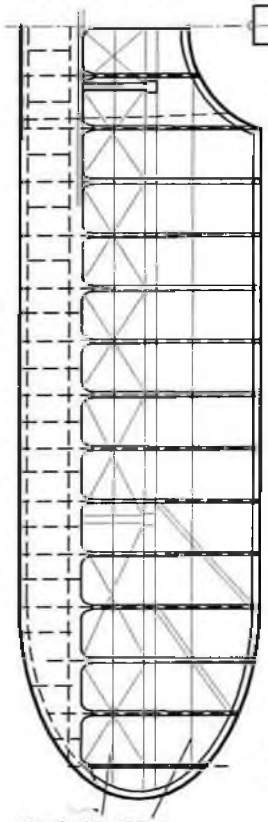
Plan View on Fuselage Front End



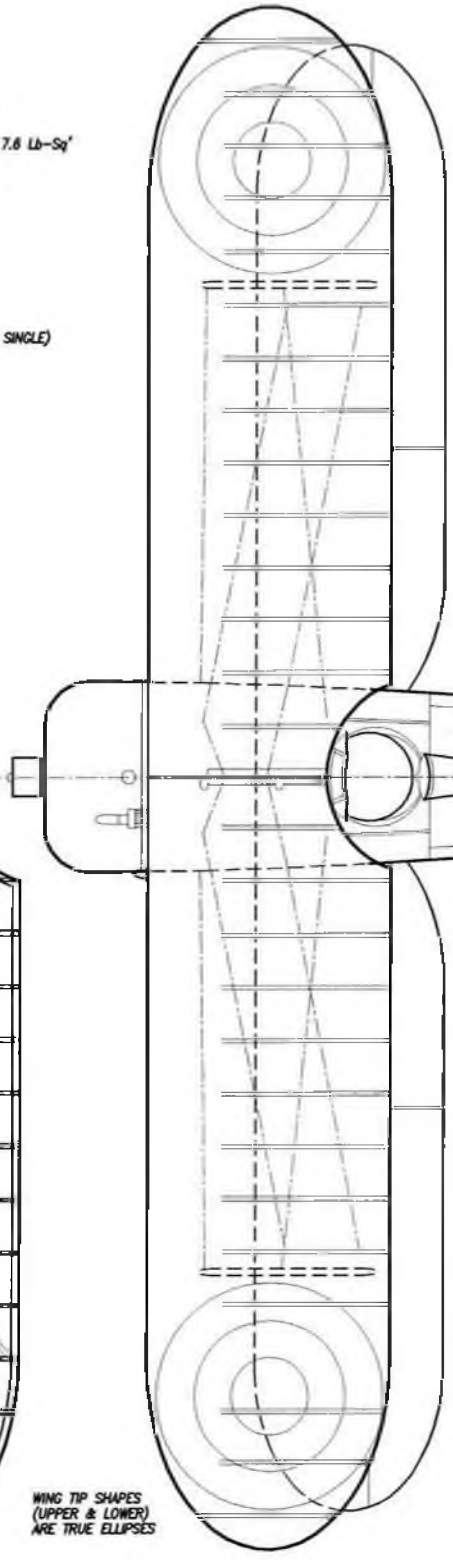
FIN & TAILPLANE
Timber framed then sheeted with Tilip wood and fabric covered

Upper Wing

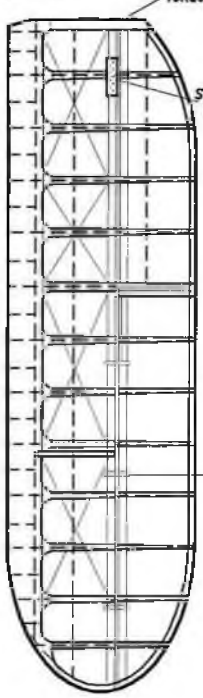
HAS SHEETED LEADING EDGE ON UPPER SURFACE ONLY



Spanwise Internal Tape Cross-bracing



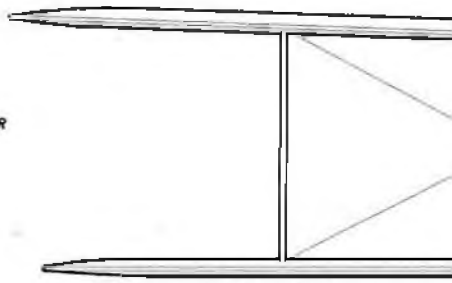
WING TIP SHAPES (UPPER & LOWER) ARE TRUE ELLIPSES



Lower Wing

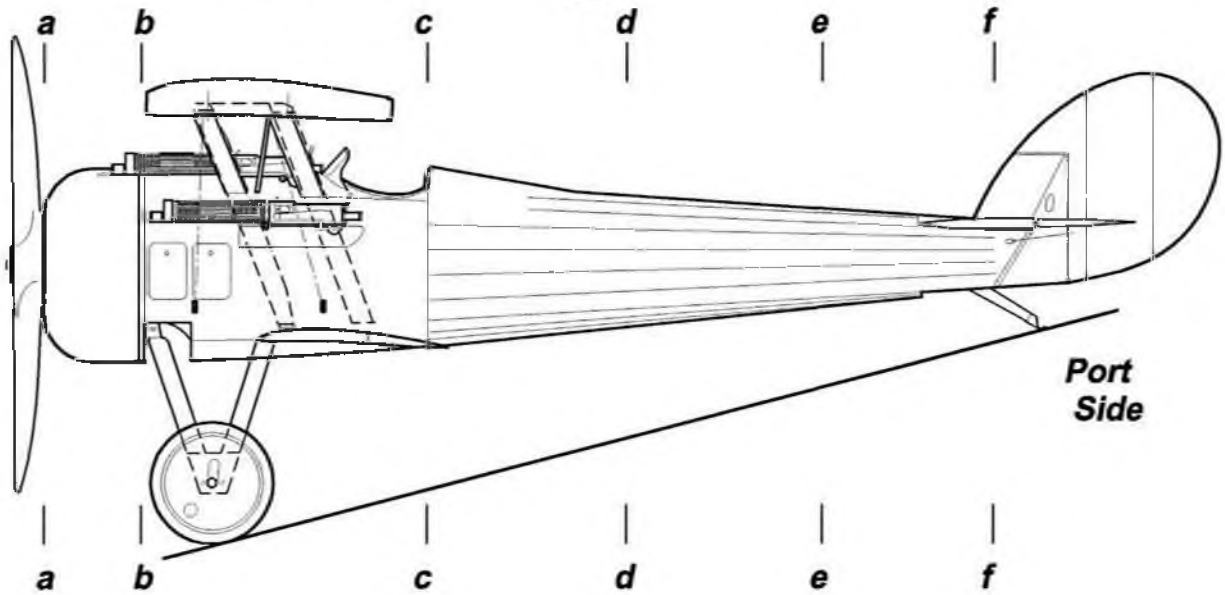
AILERONS IN LOWER WINGS ONLY

HINGE LOCATIONS

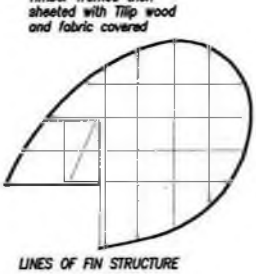


Gnome Mono 9N–150hp was unreliable
Later versions tried LaRhone, Clerget & Hispano

Front View

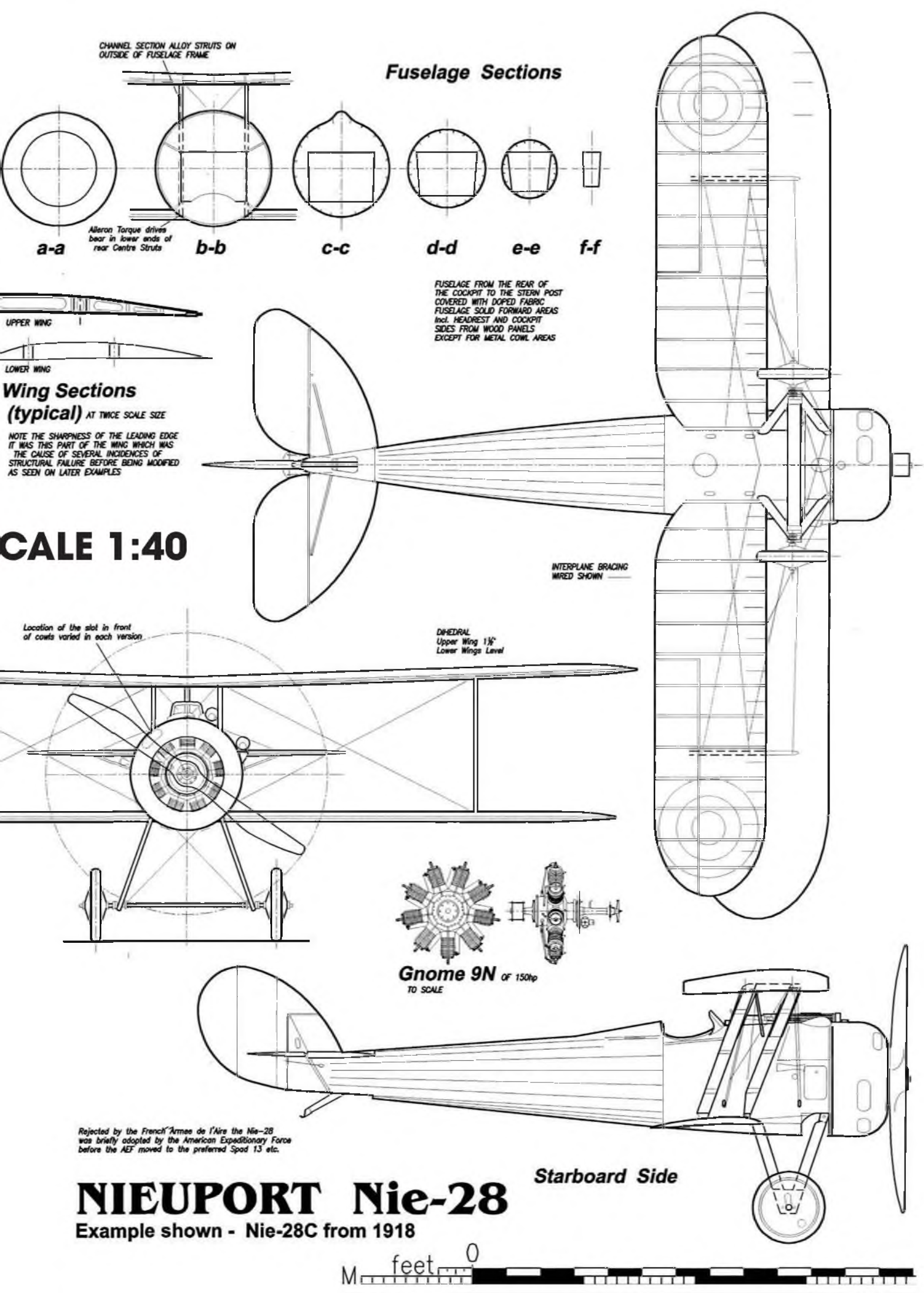


Port Side



FIN & TAILPLANE
Timber framed then sheeted with Tilip wood and fabric covered

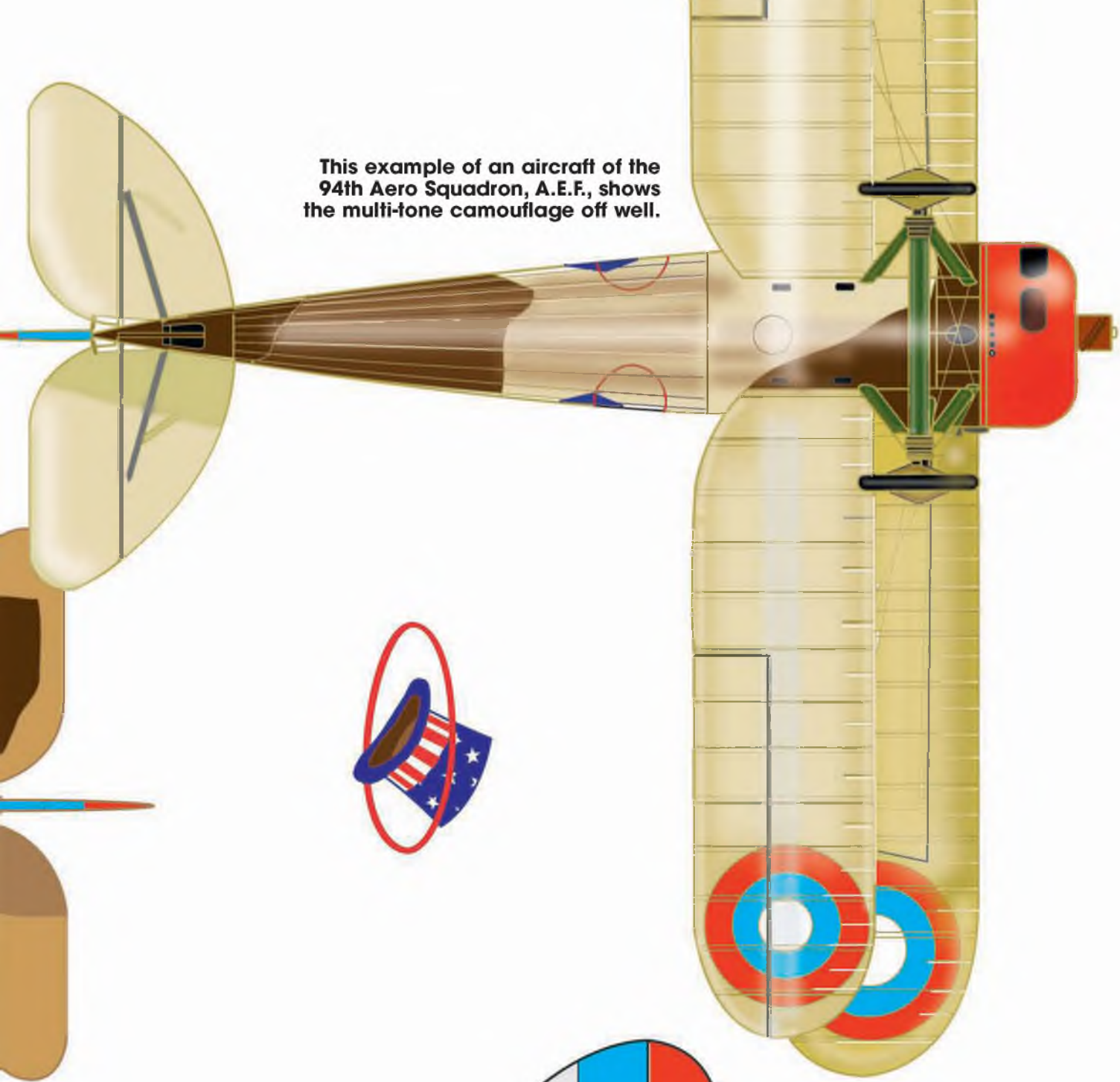
LINES OF FIN STRUCTURE

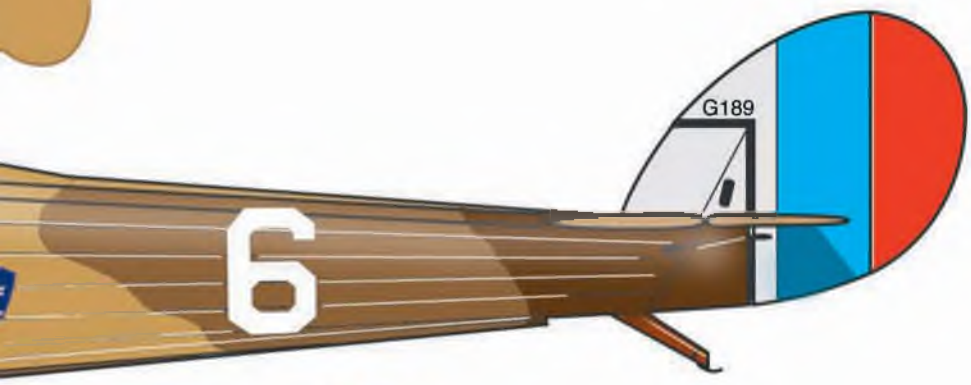

CHANNEL SECTION ALLOY STRUTS ON OUTSIDE OF FUSELAGE FRAME
Fuselage Sections
Aileron Torque drives bear in lower ends of rear Centre Struts
a-a
b-b
c-c
d-d
e-e
f-f
UPPER WING
LOWER WING
Wing Sections (typical) AT TWICE SCALE SIZE
NOTE THE SHARPNESS OF THE LEADING EDGE IT WAS THIS PART OF THE WING WHICH WAS THE CAUSE OF SEVERAL INCIDENCES OF STRUCTURAL FAILURE BEFORE BEING MODIFIED AS SEEN ON LATER EXAMPLES
FUSELAGE FROM THE REAR OF THE COCKPIT TO THE STERN POST COVERED WITH DOPED FABRIC FUSELAGE SOLID FORWARD AREAS Incl. HEADREST AND COCKPIT SIDES FROM WOOD PANELS EXCEPT FOR METAL COWL AREAS
CALE 1:40
INTERPLANE BRACING WIRED SHOWN
Location of the slot in front of cowls varied in each version
DIHEDRAL Upper Wing 1½° Lower Wings Level
Gnome 9N OF 150hp
TO SCALE
Rejected by the French Armee de l'Aire the Nie-28 was briefly adopted by the American Expeditionary Force before the AEF moved to the preferred Spad 13 etc.
Starboard Side
NIEUPORT Nie-28
Example shown - Nie-28C from 1918
M
feet
0

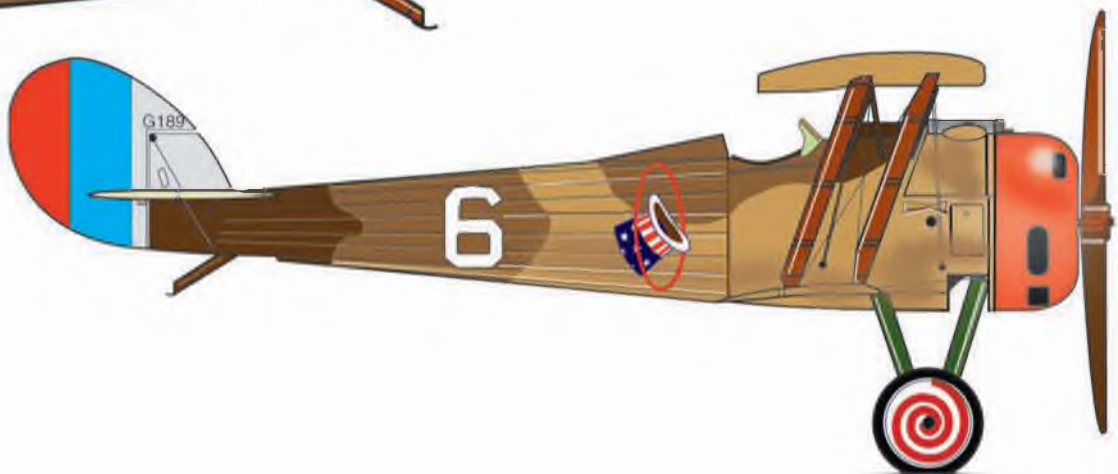
Nieuport 28

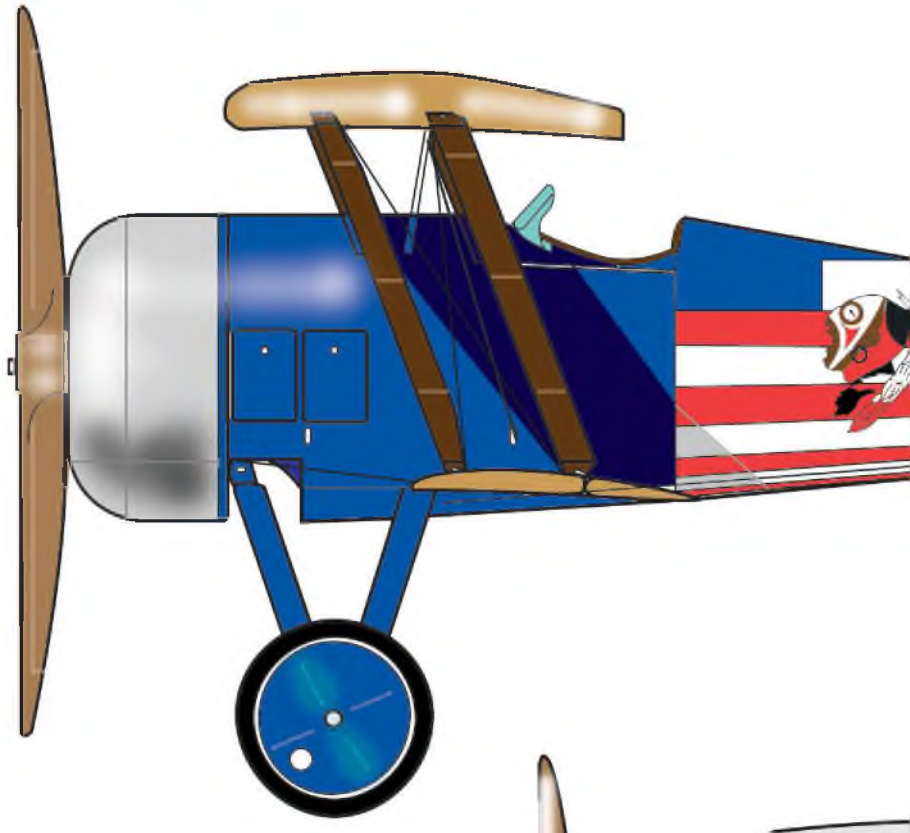
Flying Colours

This example of an aircraft of the 94th Aero Squadron, A.E.F., shows the multi-tone camouflage off well.

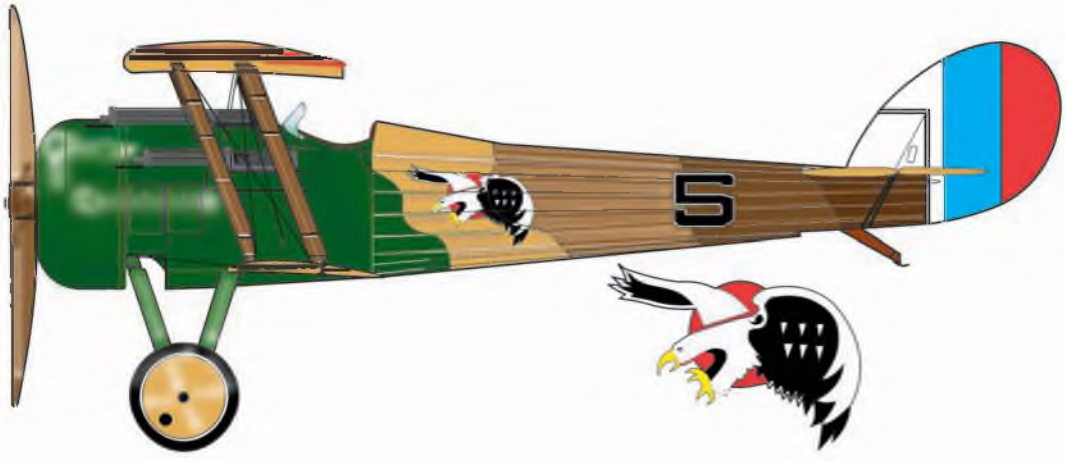


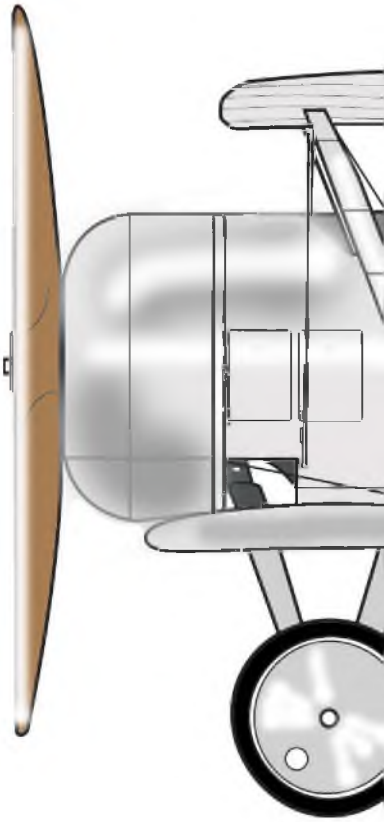




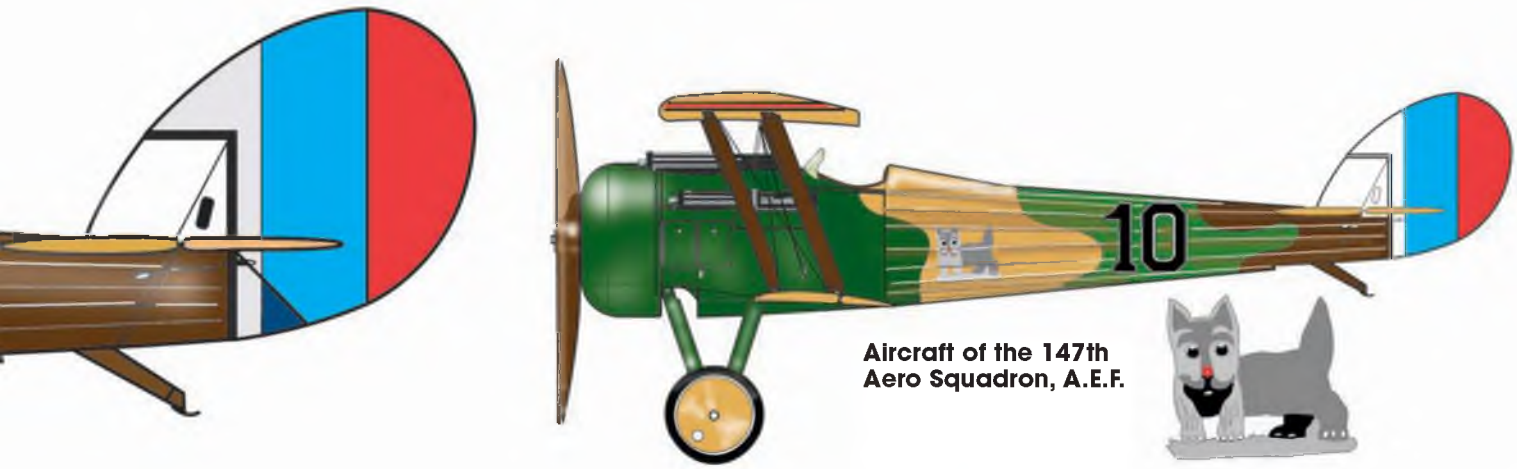


Most allied aircraft of WW1 were rather drab, so the multi coloured camouflage applied to the Nieuport 28, together with colourful individual aircraft insignia may it an attractive scale subject. This one is from the 95th Aero Squardron, American Expeditional Force (A.E.F.).



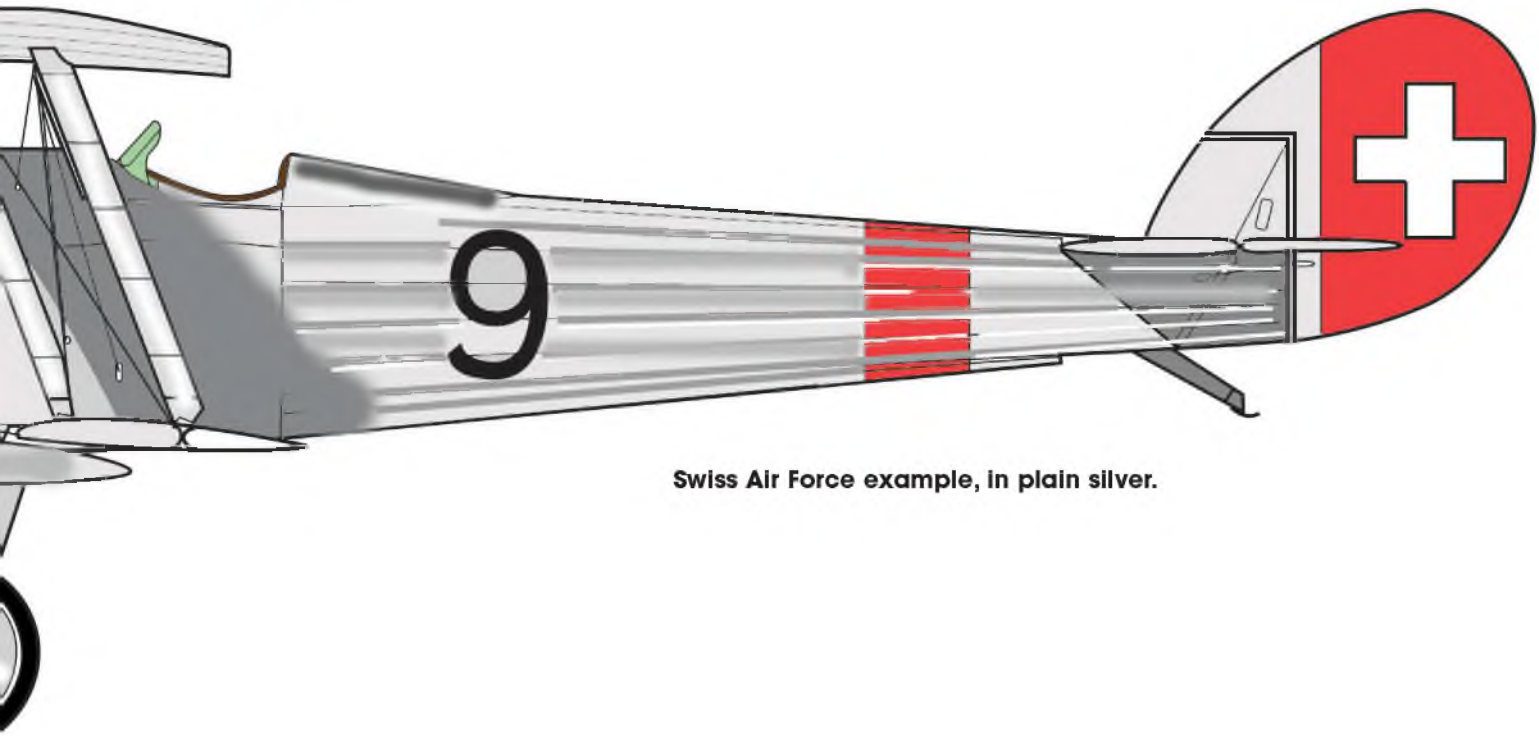


Nieuport 28 of the 27th Aero Squadron, A.E.F.



Aircraft of the 147th Aero Squadron, A.E.F.

Unarmed trainer example operated by the 213th Aero Squadron of the A.E.F is France, 1918.



Swiss Air Force example, in plain silver.

PLANS and PARTS

BE READY TO START BUILDING AS SOON AS YOU UNFOLD THE PLANS WITH THESE LASER-CUT PARTS SETS

ELECTRIC CANBERRA B(I)8
Plan price £29.50 Plan No.262
Component Pack £175.00
From the building board of electric ducted fan scale expert Chris Golds, this 84" (2,134mm) span model is the 'Interdictor' version of the famous jet bomber. Prototype used two Hacker B50-16L motors and two ten-cell 3300 NiMH power packs. Four sheet plan shows retracts and flaps. Plans are supplied complete with step-by-step written construction sequence.

PIPER SUPER CUB
Plan price £16.50 Plan No.146
Component Pack £95.00
G/F Cowl price £17.50
A great first-time scale model for novices and sport fliers who want real scale accuracy. 79 ins span 1:5.33 scale model suits a range of engines .40-.60. Two sheet plan. Glass fibre cowl available.

CORBEN SUPER ACE
PLAN PRICE £19.50 PLAN NO.275
COMPONENT PACK £65.00
A 50" (1270mm) wing span sport-scale model of the delightful American homebuilt aircraft, this design is an excellent introduction to the world of radio control scale modelling, featuring simple airframe structure that will result in a scale replica ideally suited to regular club-field flying on a regular week-upon-week basis. 1/6th scale replica suits .26-.30 four stroke engines, or .20-.25 cu.in. two strokes. Four function radio systems required.

HEINKEL HE 51
PLAN PRICE £17.50 PLAN NO.80
COMPONENT PACK £125.00
A 68" (1727mm) wingspan 1:6.4 scale model of the pre-WW2 German biplane fighter for 4-function radio control and .70-.90 cu.in. four-stroke motors. Can be built without recourse to glass fibre mouldings for items like engine cowl and wheel spats.
Two sheet plan.

RUMPLER C.IV TAUBE
PLAN PRICE: £19.50
PLAN NO. 269
COMPONENT PACK: £110.00
A 1/7th scale 80" (2032mm) wing span sport-scale model of the early German WW1 aircraft designed for .60 cu.in. size four stroke engines and four function radio control operating rudder, elevators, ailerons and throttle.

De HAVILLAND DH 82a TIGER MOTH
PLAN PRICE £26.50 PLAN NO.051.
COMPONENT PACK £115.00
An 80 inch (2032mm.) wingspan, 1:4.33 scale model for 1.20 cu.in. motors and four function radio control systems. No moulded cowl required - all wood construction. Three sheet plan.

FE8
PLAN PRICE £19.50
PLAN NO.267
COMPONENT PACK £88.00
Accurate 1/5th scale 75.6" (1920mm) wing span replica of the British early WW1 pusher fighter. Requires .78-.91 four stroke engines and four function radio control system. Excellent for electric conversion.

FELIXSTOWE F2A
PLAN PRICE £19.50 PLAN NO.276
COMPONENT PACK £110.00
An amazing 1/6th scale fully flyable replica of the British WW1 maritime patrol flying boat. Model spans 100.5" (2553mm) and suits two .25-.30 cu.in. two stroke engines. Can be flown from water, or from land using a take-off dolly to safely landing on its hull. Prototype model won "Best of Show" at the prestigious Toledo R/C Expo in USA. All the detail is there on the plans for an impressive model.

FOKKER D.VII

1/4 PLAN NO.241, 1/5 PLAN NO.242
PLAN PRICE (EITHER SCALE) £26.50
COMPONENT PACK 1/4 £125.00
COMPONENT PACK 1/5 £120.00

1/4 scale spans 82.5" (2095mm) for 30cc (1.8 cu.in.) two stroke engines. 1/5th scale spans 65.7/8" (1673mm) and suits 15.cc (.90 cu.in.) four stroke engines. BE SURE TO QUOTE SCALE REQUIRED WHEN ORDERING!

HAWKER FURY

PLAN PRICE £17.50 PLAN NO.091
COMPONENT PACK £125.00

A 1/6th scale replica of the RAF's most elegant 1930's biplane fighter. 60" (1524mm) wing span model requires four function R/C gear and .60 cu.in. motor.

D.H. 103 HORNET

PLAN PRICE £22.50 PLAN NO.052
COMPONENT PACK £130.00

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PLAN PRICE £19.50 PLAN NO.243
COMPONENT PACK £99.50

A 58" (1473mm) wingspan replica of the famous bi-plane radical engined trainer aircraft of the WW2 era. Designed for 700 size electric motors, but with option of i.c.engine power using a .52-.60 four stroke engine, with modifications shown on a separate plan sheet. (Ready-cut wing ribs and fuselage formers available - see below) Three sheet plan.

TIPSY JUNIOR

PLAN PRICE £19.50 PLAN NO.286
COMPONENT PACK £95.00

A 1:3.44 scale, 79" (2006mm) wingspan replica of the late 1940s Belgian light aircraft, designed to suit .90-1.20 cu.in engines. Designed by Philip S.Kent, the model features all built-up balsa/ply construction throughout and makes an excellent entry into R/C scale modelling. Rudder, elevator, aileron and throttle controls.

AVRO AVIAN MONOPLANE

PLAN PRICE £19.50 PLAN NO.278
COMPONENT PACK £110.00

Designed by respected R/C scale expert Philip S.Kent, this quarter scale replica of the radial engined version of the 1930s air racer spans 96" (2438mm) is an ideal/introduction to the world of large scale. The model suits 1.50 cu. in. size four stroke engines and requires four function radio control operating the basic control functions of rudder, elevator, ailerons and throttle. Conventional wood airframe structure throughout.

SOPWITH CAMEL

PLAN PRICE £14.50 PLAN NO.188
COMPONENT PACK £79.50

1/6th scale replica of the famous RFC WW1 fighter biplane, for .24-40 size motors and four function R/C. 56"(1422mm) wing span.

SOPWITH PUP

PLAN PRICE £16.50 G/F COWL PRICE £17.50
PLAN NO.177 COMPONENT PACK £135.00

Superb, true-to-scale 1/5th scale replica, features accurate outlines and rib-for-rib reproduction of the full size wing structure.63 ins. (1600mm) span model is of manageable size for transport and offers realistic flight performance.For.60size motors and 4 function radio. Glass fibre engine cowl available.

BUCKER BU180 STUDENT

PLAN PRICE £26.50 PLAN NO.015
COMPONENT PACK £120.00

The R.A.F. maritime recce/ anti-submarine patrol aircraft, modelled by renowned electric scale expert Chris Golds. 86" (2185mm) span model flies on four Speed 400 electric motors, driving pusher props. Full step-by-step written building instructions.

050/12

WHAT DO THE CUT-PARTS SETS CONTAIN?

The components, in balsa and ply that you would otherwise have to trace off the plan onto the wood and then tediously cut out prior to commencing building! Basic strip and sheet wood not included. Be ready to start building as soon as you unfold the plans!

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HANGAR 9 TIGER MOTH

When you apply the ARTF accronym to this one, it really is right, as ANDY WARD reports

The full size Tiger Moth needs little introduction from me, save that it must be the favourite aeroplane of many a modeller and full size aviation enthusiast alike. From its wartime training role to the restored examples which grace our skies today, there is a healthy number of 'Tiggies' still extant and it's the aircraft that often attracts the eye of the enthusiast at many an air show.

I was delighted to be offered the chance to build this kit for FSM , as I too am a Tiger Moth fan. I built the Flair one at 1/4 scale many years ago and I still fly that model on occasions.

This new kit by Horizon Hobbies is marketed under the 'Hangar 9' brand and is a close to quarter scale as you can get, being 88" in wingspan.... One large model. I'm sure you'll agree.

The kit components

Lets have a look at the kit then. The 'Moth comes in a huge full colour cardboard box which, frankly, I struggled to carry from the delivery man to my workshop! It's that big!

Lifting the lid, I was presented with a very large looking model in component form. Everything was very well packaged and wrapped in clear plastic bags for protection. Now I've built quite a few ARTF kits over the years, but this one is very different from the rest, in that I could immediately see that this was a very high quality kit from the points of view of build quality, standard of finish and the scale accessories provided to finish the model.

A lot of great design thought has gone into this model and it shows. The wings have an undercambered section, the undercarriage replicates the full-size in appearance and the cockpits are even furnished with instrument panels straight out of the box!

Potential criticisms are that the model is covered in film rather than fabric, the undercarriage is not sprung and the cockpits are not full depth. However, the everyday club flier who wants their own Tiger Moth cannot fail to be very happy with this one.

The model is covered with ***Ultracote*** film, which is wrinkle resistant and has been trimmed in the De-havilland School of Flying colour scheme; a highly attractive one I think you'll agree. The silver wings and red fuselage look great and it's a true scale scheme.

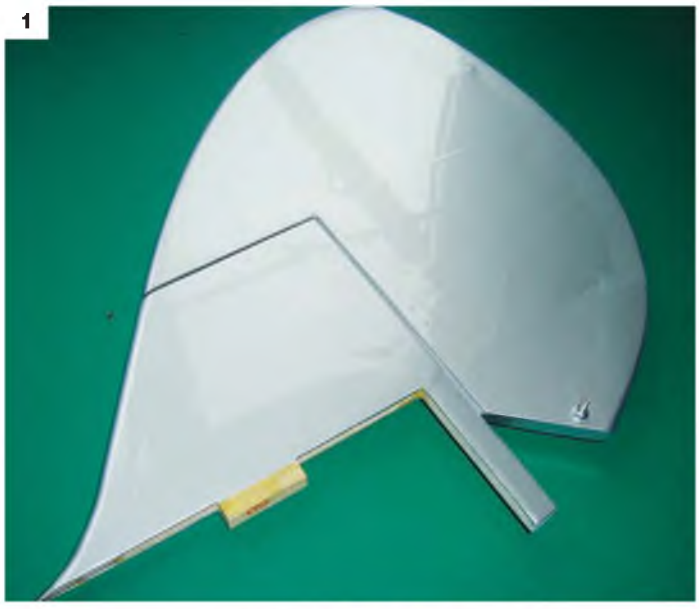
All hardware is provided to finish the model and everything is of excellent quality, with the many parts of the undercarriage for instance, colour matched EXACTLY to the colour of the film... faultless!

Woodwork wise, the construction is both very light and accurate, with excellent fits between parts. A good quality painted glass fibre cowling is included as is a 60 page illustrated instruction booklet, and quite frankly I couldn't wait to make a start on it! (can you tell how much I like it yet?!)

One last thing before we start to assemble the model. This Tiger Moth was designed around the ***Evolution 26*** petrol engine. It is this engine that is illustrated in the booklet and the one I opted to use in the model with it's dedicated in-cowl silencer. It would not be too difficult to use another engine, such as a 120/150 four-stroke glow engine or even go with an electric motor, although this would need the structure modifying to accept it.

Right then... lets get out the booklet and build ourselves a Tiggie!


HAVILLAND SCHOOL OF FLYING
G-AC



1: The fin and rudder, hinged and ready to mate with the tailplane.

2:Tailplane and elevator clamped to neutral, ready to set the push-rud length.

3: The complete tailcone is held to the fuselage rear with four Allen-head bolts. Note the closed-loop rudder control wires.

4: The steerable tailwheel unit is linked to the rudder via extension springs.

5: The main undercarriage rear struts are secured with Allen-head bolts.

6: Mainwheel and hub. A stylised 'DH' logo would finish the job.

The undercarriage

The main undercarriage of the model closely replicates the full size in everything but actual springing. Each strut and joint of the full size has been copied very nicely indeed and the whole assembly is held to the fuselage with 3mm Allen headed bolts which locate into nuts recessed into the structure. Assembly of this is consequently very quick and of course the fact that it all bolts together will aid any future parts replacement if damage occurs. The struts are painted to exactly match the colour of the film and the resulting assembly is very rigid . All parts fitted exactly, with a touch of thread lock to make sure nothing comes loose.

The wheel centres are also colour co-ordinated and the tyres provide adequate suspension for landing. I would have liked to see a fully sprung set-up, but I suppose that it would cost far more to produce at the factory. I would have also liked to see the 'D.H.' logo on the wheel hubs, but this can be remedied fairly easily if desired.

The tail wheel locates onto the rear of the fuselage and when the rudder is in place, the tailwheel steers the model using two springs from the rudder. Once again, everything is provided and everything is of very good quality.

Obviously, many Tiger Moths have a tail skid and not a wheel. I don't think it would be too difficult to build a tail skid from scratch as there's many close-up photos of the Moth available, including the set which can be obtained from this magazine for reference.

Cabane struts

The cabane, or centre section struts that hold the dummy fuel tank over the top of the cockpit are once again fixed in place by 3mm bolts and are well finished and cut to length. The builder has nothing to do, but insert the bolts, with a washer under the bolt heads and a squeeze of thread-lock and again, everything fits precisely. I liked the fact that this area could be very easily dismantled again if required, for instance to repair any crash damage. (All parts are available as spares for the entire model, even complete wing panels, though I haven't checked out the cost of anything).

The dummy fuel tank is finished so that the ribbing on the outer surface is just like the

full-size Moth and it would not be hard to add details like the fuel tank cap, a dummy fuel line and fuel gauge to this, fashioned from items in the scrapbox, making it even more life-like. The outer ends of the dummy fuel tank incorporate slots for the upper wing location tongues and holes for the incidence plugs on the wings and wing joining dowel as well.

Cross bracing in this area is by metal rods with a holed fitting on either end. True lengths for these are shown in the booklet and the builder has to cut and glue these to length before fitting. Whilst I was doing this, I also attached the windscreens ahead of each cockpit with a thin smear of clear silicone sealant as an adhesive. A few bits of masking tape held the screens in place whilst the silicone dried overnight

Tail surfaces

All the horizontal and vertical tail surfaces in the kit come enclosed in plastic sleeves for protection and are very well built and finished in silver ***Ultracote***. The elevators and rudder are pre-hinged in place and holes are pre- drilled to accept the two part horns provided. These are bolted in place with small 2M bolt and nuts. To be honest, I almost replaced the horns with homemade ones from alumium or paxolin because these would have been more realistic than the ones in the kit. However, as this is a review of the kit and its contents, I used the ones provided.

The tail surfaces bolt to the rear of the fuselage with no glue being required and at first I was sceptical about the security of this arrangement. However, when all is positioned and the tailplane struts are bolted in place, there's no way the tail will depart in flight. It is very rigid and once again, fully dismantleable if the need arises. I did add a little epoxy into the slot in the tailplane where the rudder locates for my own peace of mind, but there's no mention of the need for this in the instructions - only the requirement to use threadlock on all the bolts used.

The lower tailplane struts are, once again colour co-ordinated to the red of the fuselage and simply require bending at the end to fit onto the fuselage and under the tailplane.

The elevators and rudder are operated by push rods and closed loop wires respectively. Once again these are not true-scale I know, but could easily be made so if the builder desires it. More on that in the radio installation section.

Engine and fuel tank

As mentioned, I opted to use the *Evolution 26* petrol engine in this model, which is the engine shown in the instruction booklet and the one that the model has been designed around. (Other engines are available). This made the engine installation easier for me as I could just follow the booklet.

The forward part of the fuselage already has the blind nuts located for the engine mounts and ignition unit that comes with the engine, as well as a hole that is drilled for the throttle operating snake. I thought this was superb and would really help any builder who, like me, were using this engine. Having bolted the two part engine mount to the fuselage, I then marked and drilled the mount for the engine bolts (which you actually have to drill yourself!) onto each half of the mount.

Later on, when fitting the cowl, I had difficulty with the prop driver being about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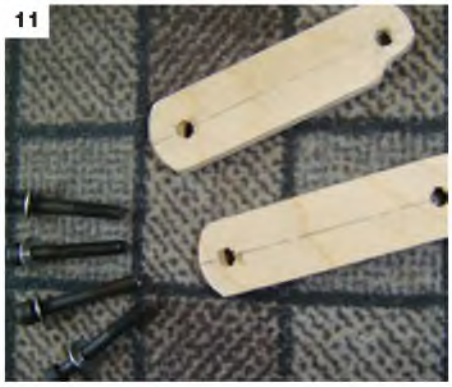
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7: Centre section wing struts as supplied, ready to instal.
8:Allen-head bolts secure the centre section struts to the fuselage.
9: Andy Ward fashioned this metal scoop to clear the front edge of the engine muffler inside the cowl.
10: The Evoltion 26 engine on its mount and bolted to the firewall. Packing pieces were needed to achieve the 140mm spacing from firewall to prop-driver.
11: The plywood packing pieces that did the job.
12: 10 ozs. of lead ballast at the nose end may sound a lot, but on a model of this size it's nothing much to worry about!
13: The Evoltion 26 petrol engine fully installed and complete with purpose-made muffler.

6mm too far back in the cowl. I had to take everything apart again and make up some 1/4" ply spacers to go behind the engine mounts. This brought the prop- driver into the correct position at the front of the cowl. As a result of this, I would strongly advise any builder reading this to disregard the 134mm dimension given in the instructions for the distance from the face of the prop-driver to the firewall and add another 6mm to it, making a total of 140mm or 5 1/2".

It was a fairly simple matter to install the throttle snake and couple up the engine to the servo. A servo mount is provided at both the left hand and right hand side of the fuselage to cater for different engines being used. This is a nice touch and shows the thought that has gone into designing this model.

The engine's ignition module was bolted to the rear of the engine bay and all leads installed between it and the engine. I used a Futaba radio switch in the floor of the front cockpit as an ignition cut-out. Holes are provided in the cockpit floor for this as well... another nice touch! A 6 volt battery pack is required for the ignition circuit on this engine.

The fuel tank comes out of the box all pre-plumbed and ready for installation. Only two tubes are fitted to it; one for the filling of it and the other one to feed the carburettor. If you require another one, to let you know when the tank is full, this would not be too difficult to fit. I'm not too sure about the capacity of the tank. It looks to be around 16oz, which would give an excellent duration with the economical petrol engine as well as a four stroke of similar capacity. The tank just pushes into place at the side of the throttle servo; nothing was needed to secure it, but it was such a tight fit, so I was confident it would'nt move even when full of fuel. ***Evolution*** provide a specially designed silencer for this engine, which fitted very well into the space behind the engine and has two outlet tubes for the exhaust gases. It is a very well made and finished unit and I can recommend the use of it highly, with the Evolution 26Gx engine.

Wings and wires

The Tiger Moth, being a biplane, naturally has four wing panels. These are all encased in plastic protective sleeves within the box for shipping and I carefully slit open only one end of these sleeves, so I can reuse them on the wings during construction to protect them. The lower wings have large, scale-size ailerons installed and pre-hinged. Each aileron is driven with its own servo and fly-strings are installed in the lower wings in order to pull through the extension leads required to each servo.

The build quality of these wing panels is superb and the undercambered wing section replicates the full -size. The wings are covered in silver ***Ultracote*** with black registration lettering on the upper surfaces of the top wing and black walkways on the lower wing roots. Holes are drilled at the interplane strut positions for the struts and the rigging wire terminals and the wing roots have a locating tongue and a socket to accept the carbon fibre joining dowels which pass through either the fuselage or the dummy fuel tank in the case of the upper wings.

Assembling the model on the flying field is very quick as only four bolts require tightening (one in the root of each wing panel.)

Taking the lower wings first, the first job I did was to fix the aileron horns in place. This is done using the horns provided and small bolts into the wing structure. The holes need to be drilled, marking the positions through one of the horns The servos for the ailerons are standard sized ones and I used all ***Spektrum*** A6000 digital servos in the model, six in total being required.

Each aileron servo is screwed to its ply mount in the familiar fashion. The ply mount is then screwed to the wing and the pushrods made up that operate the aileron from the servo.

Precise dimensions are given for the length or these pushrods and once again, quality metal clevises are used throughout. No aileron differential is deemed necessary by the makers, and I went along with this and didn't introduce any. The surfaces were set up as per the manufacturers throw settings and only in flight would the need for any differential show up. The full size Moth has far more 'up' aileron than 'down', to help with roll control.

The upper wings need no work at this stage and the next operation was to assemble each half of the wings and build in the

WOT, NO PUPIL? THE INSTRUCTOR ALWAYS SITS IN THE REAR COCKPIT. SHEER REALISM IS CLEARLY DISPLAYED IN THIS FLY-PAST.

interplane struts and rigging for that side. I only assembled one side of the model at a time to do this, as my workshop is not big enough to assemble the entire model and be able to work round it as well.

Having attached the wings with the joining dowels , the interplane struts are simply bolted in place with 3mm bolts. The rear strut is slightly longer than the front one. The strut fixings are screwed into each wing panel prior to this of course and a spot of cyano used to make sure they're fixed well. Once the struts have been fitted I noticed that the wings still had a degree of flexibility, hence the rigging wires made from closed loop cable , are mandatory for ensure rigid wing panels.

Installing the brass plates on the wings for the rigging wires requires a bit of care. It would be very easy to allow the screwdriver used to slip and go through the film covering. I managed not to make this error and, following the excellent guide, made up and fitted the closed loop rigging without any trouble. The wires pass through a central spreader bar, painted red, which is true to scale. I left all the wires a bit loose until these were all in place, then tightened each one up in turn and then cut off the surplus wire with pliers. Once again, a spot of cyano on the clevis threads should ensure the rigging does not slacken.

No incidence wires are used between the interplane struts themselves and I think these would be a good addition as, when the wings are removed and the carrying frames installed, my wings would collapse at the interplane strut point unless I really tightened the strut holding bolts very tightly. This is a modification I shall make to this model at some stage (these incidence wires go from the top of one strut to the bottom of the other one, creating a very rigid cross, and are used on all full-size classic biplanes that I know of).

The aforementioned carrying frames are made up from pieces of shaped ply and even have the 'Tiger Moth' lettering on them on one side. Their purpose is to hold the wings in shape when off the model, helping storage and transportation. Elastic bands hold them at each wing root and the system works well and even better when I fit some incidence wires!

Radio installation

One good design feature of the model is that all the radio gear is fitted well forward in the model, helping the builder to achieve the required fore/aft balance point (more of this later). To that end, a three-servo tray is provided to take both elevator servos (one for each half) with the rudder servo in the middle of them. The elevators are driven by a wire pushrod at each side, running inside a plastic tube, whilst the rudder is operated by closed loop wires. Good quality metal clevises and components are provided and whilst not being strictly scale in appearance or operation, the system works very well and is easy to set up. Some modellers will wish to improve their model, fitting more scale control wires and this would be a relatively easy thing to accomplish. I set my servos up using the photographs in the booklet and then realised that, with my radio (35MHz Futaba) and using a Y-lead for the elevators, I had one elevator going up and the other one going down! It was a simple matter to turn one of the servos round, but I had to cut away a small part of the structure of the fuselage around the elevator pushrod on that side. This I have shown in one of the photographs. Once again all surfaces were set up to the recommended throws in the booklet.

The receiver and both battery packs (one for the engine ignition and one for the radio) were installed as per the instructions on the ply tray provided and secured to it with Velcro strips. The kit even included these... that's how complete it is!

Finally, the radio on/off switch was installed in the floor of the front cockpit opposite the ignition switch and their respective charging leads brought through into the cockpit for ease of charging the battery packs.

Fitting the cowl and preparing for flight

The fibreglass cowl provided in the kit, matched to the exact colour of the airframe covering film, is of excellent quality and even has a baffle moulded in the inside to direct cooling air onto the engine. It's a routine matter to cut out the various holes and apertures required to clear the carburettor and a large air exit hole underneath. The

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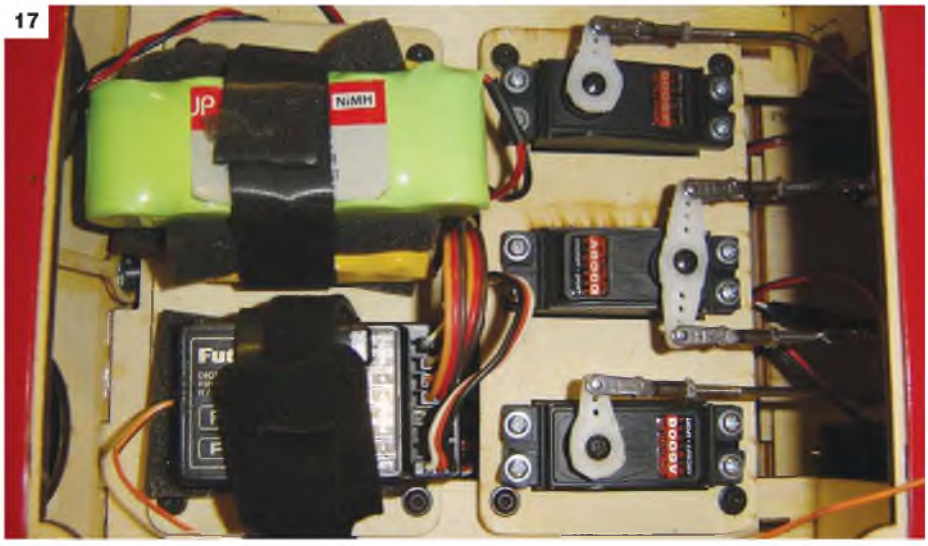

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cowl is retained to the fuselage by four 3mm bolts and no problems were encountered here except that the front edge of the exhaust prevented the cowl from going into position. I simply cut a rectangular hole in the cowl for the exhaust and made a lithoplate cover to fit over it. When painted red, the modification looks good. A moulded dummy oil tank is secured with silicone on the left side of the fuselage just behind the cowl and for a finishing touch, an oil filler cap could also be made and added to this, made from scrap.

A 16" x 8" propeller was used on the model for the first flight, together with the rather nice aluminium spinner that comes in the kit. The engine will take props of up to 18" x 6" and I will experiment with prop sizes at the flying field.

Balancing the model was a very interesting exercise. The instructions clearly state that the model must balance slightly nose down at a position of seven inches from the front of the dummy fuel tank on the upper wing centre section. According to the booklet, very little lead ballast should be necessary to achieve this, however I could see that I would have to add a good two pounds of church roof in the case of this review model! Something was obviously amiss somewhere! I knew where my Flair Moth balances and this is much further back than the position indicated here.

Whilst taking time out to mull over this problem, I happened on an internet forum site that was discussing the building of this very model over in USA. The modellers there were indeed adding over two pounds of lead to this model and whilst the model was flying well in this state, they reported that the model would not flare for landing very well and would easily nose over on the ground. A clear indication of nose heaviness!

Fortunately the designer of this model for Hangar 9 also happened to be looking at this forum and quickly realised that the instruction booklet was wrong by an inch!; the model should balance eight inches back from the leading edge, not seven ! Consequently, IGNORE THE SETTING IN THE BOOKLET!

He apologised to the guys already building the model on the forum and I was very pleased to hear this as I had not yet put any ballast on at all, and so was able to balance my model correctly by the addition of a 10oz slab of lead fitted just above the silencer. This may sound a lot of lead, but it's not much at


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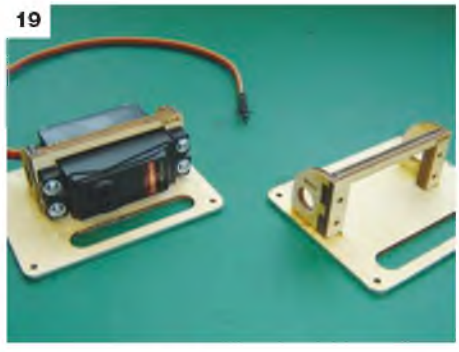
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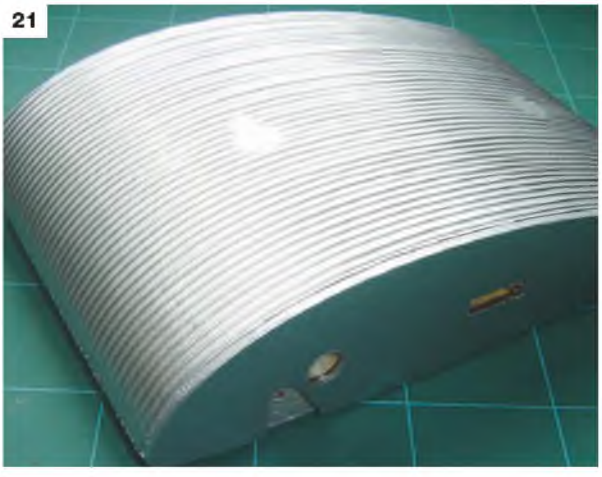
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14: Cockpit windshield is supplied painted. 15 & 16: Fuselage is supplied with cockpit instrumentation ready fitted. 17: Radio installation position is well forward in the fuselage to help in minimising the need for nose ballast. 18: Marking out one of the aileron horn positions, prior to drilling the control surface. 19: Aileron servos are installed on these trays. 20: The wing section is undercambered, as on the full size aircraft. 21: Top wing centre-section dummy fuel tank with replicated corrugations. 22: Neat wing interplane strut attachment peg. 23: First stage of making up the rigging wires on the wings. 24: Spreader bar at the cross-over of the rigging wires on the right hand side. 25: Nothing worse at the flying field that wasting time struggling with airframe assembly. On the Hangar 9 Tiger Moth, these jigging struts hold all together, leaving only four bolts for final rigging.

all for a model of this size and the finished ready-to-fly weight of the review Tiger Moth is 17 1/2 pounds (no fuel).

With the model now complete and ready for the first flight, I test ran the engine at home and did a range check in the garden.

Flying

A calmish late-summer evening saw us down at the local flying field for the first flight of the model. The model was assembled, taking about 10 minutes to plug in the aileron leads, tighten those four wing retaining bolts and to make sure everything was ready. The Tiger Moth certainly does look impressive on the field and it drew quite a crowd of admirers that evening!

After another range check and correct control throw check, the engine was started and the model taxied out to the flight line. Ground handling with the steerable tailwheel is excellent and the rudder and elevators responsive under taxi, holding in full 'up' to prevent nosing over.

Heading off into wind and steering with rudder, the model was soon airborne and climbing away. After a climb to a decent height I could relax and trim the model out. In level flight, there is a distinct tendency for the Moth to climb, necessitating quite a lot of down elevator trim. I made a note in my head to alter the elevator neutral and perhaps put washers under the tailplane leading edge before the next flight. Interestingly, modellers building the model in the USA and Australia have reported the same thing on the web forums.

Overall, the Moth is a delight to fly and will stooge around very scale-like at 1/4 throttle. Opening the taps for rolls and loops showed the engine had plenty of power and the stall is benign. I attempted this at a good height and let it develop into a graceful spin. In aerobatics, the Hangar 9 Tiger Moth excels, and looks very realistic. I could have been looking at a real aeroplane performing for Mike's camera.

Low, slow flypasts preceded a set up for the landing which, although I say it myself, was a peach!. Just about twenty feet high , the engine stopped, but I was able to deadstick the Moth into a greaser, with the main wheels touching first and no sign of a nose over, proving the fore/aft balance position was spot on. Upon returning home, I drained the remainder of the fuel from the tank into a measuring jug and was surprised to find 10 oz of fuel still in the tank. This engine is certainly very economical in use judging by this. I ran it on ordinary lead-free fuel, with a 30-to-1 oil mix for running in as per the instructions that came with it.

Conclusion

Post-flight discussions with everyone confirmed the Moth was 'a good-un' and I will leave the ballast in place as the model flies so well. I look forward to many more flights, experimenting with different prop sizes and fully exploring the models capabilities. I think the model is, quite frankly, excellent. There are a few mistakes in the text of the instruction booklet, but so minor as to not warrant serious comment. The main error is the fore/after balance position at 7" when it should be 8" from the leading edge. Hopefully later kits will have this corrected.

Obviously, this model is not a cheap kit, but I think the builder gets value for money in the quality of all the components and the hardware which is superb. Anyone wishing to add more scale detail will be able to and the skies the limit here really. This model is available globally and is being assembled by modellers in America and Australia. It surely will prove to be a classic kit and I can recommend it wholeheartedly. ■

THINGS I LIKED

- The flight characteristics are excellent and the model looks superb in the air... very lifelike.
- I also quite like the fact that it's mainly bolted together, enabling it all to be taken apart and put back in the box again!... also all spare parts are available to repair a model that has been damaged.
- I appreciated the effort that has gone into designing such a fine model and keeping the structure light, but strong.
- Finally, my thanks go to my friend and fellow flier Mike Mennell, who took all the photos at the flying field. I'll admit to taking the construction shots myself and I wish I had a better camera!

THINGS TO CONSIDER

- I would have liked the undercarriage to be sprung and full depth cockpits so as to fit a proper pilot figure.
- The fore/aft balance point location is an instruction book error now known that would result in excessive lead being used needlessly.


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Scale Triumphant!

The BMFA Free Flight Scale Nationals 2012

Alex Whittaker avoided the showers to record this great outdoor scale event for posterity

It seemed like the whole 2012 BMFA Nationals Weekend was to be spent in a state of impending gloom. Indeed, at times, the whole Heath was ringed in storms and showers. However, for the most part, these held off, and the wind magically abated for both evenings of scale action.

Heads! Part of the fun of Free Flight Scale spectating is the proximity to the flying.

Scale, Scale, Scale...

There are three main Scale Comps within the Free Flight Scale Nats: F/F I.C. Power, F/F Co2 /Electric, and F/F Rubber. I was surprised when it transpired that we would have flying on both evenings. Never doubt the power of prayer!

The only issue was the afore-mentioned gloom, making decent flying photography well nigh impossible. Models melted into angry skies, occasionally illuminated by the flash of distant lightning. All the time, we could see the rain lashing down around the periphery of the airfield, getting ever closer. The muted palette of colours made it all seem so autumnal, yet here we were at the climax of the summer season. Odd.

Mind you, free-flighters are famously tough, and made of stern stuff. The crowd was particularly healthy on the first evening, and the atmosphere was festive and anticipatory. They were right to feel that way; there were many interesting scale models and a number of great flights.

Since there were multiple Timekeepers and Judges available, simultaneous flights were going off in all directions. It was all hectic 'stream-of-consciousness' stuff, and impossible for a single hack to track. Therefore, I'll let the pictures tell the story. As usual, I will also give one or two models special mention. It was fun though!

Models occasionally barrelled into the delighted crowd, scattering them in all directions, and only adding to the sense of fun. Indeed, Mike Smith made an unsuccessful attempt on my life with his large DH10c Twin. This buzzed me at about nose height, sending my torso one way, and my cameras another. Great fun, but I had to limp to the bar that night. I only discovered later, that The Judges had awarded Mike the Handley Page Trophy, perhaps partly for this simple act of press bashing.

Overseas visitors

One of the delights of The BMFA Nationals is to meet overseas visitors. Two such visitors were Stan Mauger and Ricky Boult, hailing all the way from New Zealand. (Note that, as Kiwis, they were visitors, not foreigners!). They had brought their models, and they entered them too.

Bryan Lea's immaculate DHC-2 Beaver.

New Zealand visitor Ricky Bould and his Auster AOP 9; 48" span, AM 10 power.

Guitar man Bernie Nichols striding out to compete with his Auster Grasshopper.

Team Knight fettle their Bristol M1C. Placed Third in Rubber.

Steven Glass with his Supermarine Scimitar. Electric powered, 32mmm KP ducted fan.

Despite the moody weather, it proved to be a time for Kiwi pride. Ricky flew an Auster AOP 9 of his own design. This was 48" in span and powered by an AM 10 diesel. Stan did well too, and delighted the crowd by placing Second in Power with his Auster T7 C4. This too was an own 36" design, and powered by a DC Merlin 0.75cc diesel. Excellent stuff!

Big rubber

And I do mean big. At 66" span, Kevin Wallace's ambitious rubber powered Lacey M-10 model really was a Big 'Un. She weighs 17 ozs ready to fly, and is scaled up from an original design by a certain Andrew Sephton. There is something brave and magisterial about a large rubber powered scale model. Somehow such an appliance seems to dispute the Natural Order. Kevin persevered with piling on the turns, and gradually built up her performance to achieve some delightful flights. Everyone cheered! It was a magnificent achievement that had most of us failed rubber types shaking our heads with shame, and wondering where we went wrong in our youth.

Kevin also flew a very pretty little Yak 15, but in the hurly burly of the comp I managed only a snatched pic, but could not get any more details. I'll get back to you, as they say.

Scimitar

Steve Glass never disappoints, and his

Left to right: Derek Knight, Dickie Scarborough, Gordon Warburton, and John Elkington enjoying a good flight!

Is this his secret weapon? Charlie Newman enjoys a brief period of bonding with his RWD 13. Placed Second.

Steven Glass with his Mills powered Hawker Hurricane. Very impressive F/F scale model.

Kevin Wallace with his scarlet Yak 15.

Kiwi Competitor Stan Mauger gives his Auster T7 4C a firm launch.

Gareth Tilston clearly 'In The Zone' at launch!

Supermarine Scimitar (the last purely British naval fighter type) powered by a KP 32mm electric fan unit, was very impressive indeed. She placed third in the Co2 / Electric Class. However, Steve is nothing if not versatile, and his new Mills 1.3cc powered Hawker Hurricane was also most impressive. Once trimmed, he put some good flights in. Everyone who saw her sail past wanted to exhale a long "Aaaaah". She looked just right.

Rare diesel

Mike Kelsey is one of my favourite scale flyers. He quietly goes about the business of competing and produces lovely scale models. His Armstrong Whitworth FK3 is 40" span and built to his own design. It is 1/12th scale. It is powered by a rare Marajet 0.8cc diesel, from France. He made some great flights in the slightly dodgy sunset.

Beaver

Bryan Lea flew his immaculate DHC-2

Feverish activity in the FF Scale Nats pits.

Laurence Marks readies his Wildcat.

Beaver, which was built to his own design. This sprightly model spanned 48". It was powered by a PAW 100 diesel and I noticed some nifty triangular bracing on the tail. Bryan confided that he had used 1mm Plastruct triangular stock from the model shop - clever.

Sopwith 'Strutter

Tom Rimmer was flying his own design, a pretty 44" Sopwith 1.1/2 Strutter. This weighs in at 33 ozs and was powered by a CS Mills 1.3cc diesel. Incidentally I have three or four such CS diesels, in variety of configurations, and I am very happy with them.

DH6

We first saw Andy Hewitt's De Havilland DH6 'in the balsa' at the BMFA F/F Indoor Scale Nats at Nottingham in the spring. It was clear then that she was an exceptional model. Now, sitting on the hallowed Barkston tarmac, she looked very impressive indeed. The scale engine alone is a minor work of art. However, it was Andy's trusty Morane Saulnier Type N that delivered the goods on the day, placing him first in Rubber Powered class.

Eindekker

Gareth Tilston has become a feisty competitor, shrugging off his relatively tender years in that famed rest-home for mature modellers, which is the Peterborough Club. Gareth worked hard to get the trim just right on his Fokker Eindekker and achieved a superb sunset flight, placing 3rd in I.C. Power.

Andy Hewitt's Nats-winning Morane Saulnier Type N demonstrates her power unit!

The background here illustrates the leaden evening skies under which the Scale free fl;ight events were conducted. Rimmer The Elder, Tom, with his own design 44" Sopwith 1 .1/2 . Model weighs 33 ozs and powered by a CS Mills 1.3cc diesel.

Kevin Wallace with his huge rubber powered Lacey M-10.

Laurence Marks (right) helps Kevin Wallace wind his M-10.

Mike Smith lining up his winning DH 10c twin for take-off.

Smiffy's DH 10c Twin just before she turned around to strafe me.

This AW FK3 is 40" span and built to Mike Kelsey's own design. 1/12th scale.

Tiger Moth

John Rimmer flew a nifty DH Tiger Moth, built to his Dad's design and powered by a CS Mills, 1.3cc diesel. I was standing right next to him at one launch, and trust me, she flew beautifully.

Grasshopper

Famed strummer, and heart throb to ladies of a certain age, Bernie Nichols was campaigning his electric powered Auster Grasshopper. Unfortunately Beaming Bernie had a few issues with trimming. He did not place, but no matter what, Bernie held that infectious smile.

Wildcat

Lawrence Marks spent a good deal of time helping his mate Kevin with the rubber Lacey. However, he also flew his attractive Grumman F4F Wildcat in Rubber, but did not place.

Key outcomes

In the end, it was the heavy hitters of UK F/F Scale who filled most of the podium places. Bill Dennis flew with great concentration over the two-day event, and placed first in I.C. Power with his RE8. Mike Smith came first in Co2 / Electric with his fore-mentioned DH 10c twin, closely followed by Charlie Newman with his neat RWD 13. Incidentally, canny Charlie had a good Nats, placing Second in Rubber too, with his Comper Swift. Andy Hewitt was First in Rubber with his Morane. Full results below!

The verdict

Overall, it was a surprisingly satisfying F/F Scale Nats. Especially so, since the two evenings of flying were sandwiched between periods of unsuitable weather. However, I think seeing Kevin's monster rubber Lacey take to the air made my Nats! ■

Bill Dennis's RE8 on its way to victory.

BMFA Official Results 2012

Free Flight Power

Bill Dennis	RE8
Stan Mauger	Auster 7c
Gareth Tilston	Fokker EIII

F/F Co2/Electric

Mike Smith	DH10
Charlie Newman	RWD13
Stephen Glass	Scimitar

Free Flight Rubber

Andy Hewitt	Morane
Charlie Newman	Comper Swift
Derek Knight	Bristol M1c

John Rimmer launches his Tiger Moth in the dusk.

Coping with take-off swing!

Here we go again! Left rudder, more right rudder, not enough left rudder - thump! Martin Johnson describes the swing problems during take-off

Take-off and landing are the two most critical periods of the flight of any aeroplane. Information we can glean which will help us understand problem areas, and know what corrective action to take, may help to avoid damaging our models during these phases.

Here is an explanation of the forces acting on a propeller driven, tailwheel aircraft during the takeoff run. This is followed by a description of take-off technique for the Me 109, from information is based on RAF AP 3456 - Principles of Flight and an article by Dave Southwood on flying Me109 G-2 'Black 6' in 'Warbirds Worldwide'. Diagrams are included for the aerodynamically minded, but I hope that the text alone is adequate.

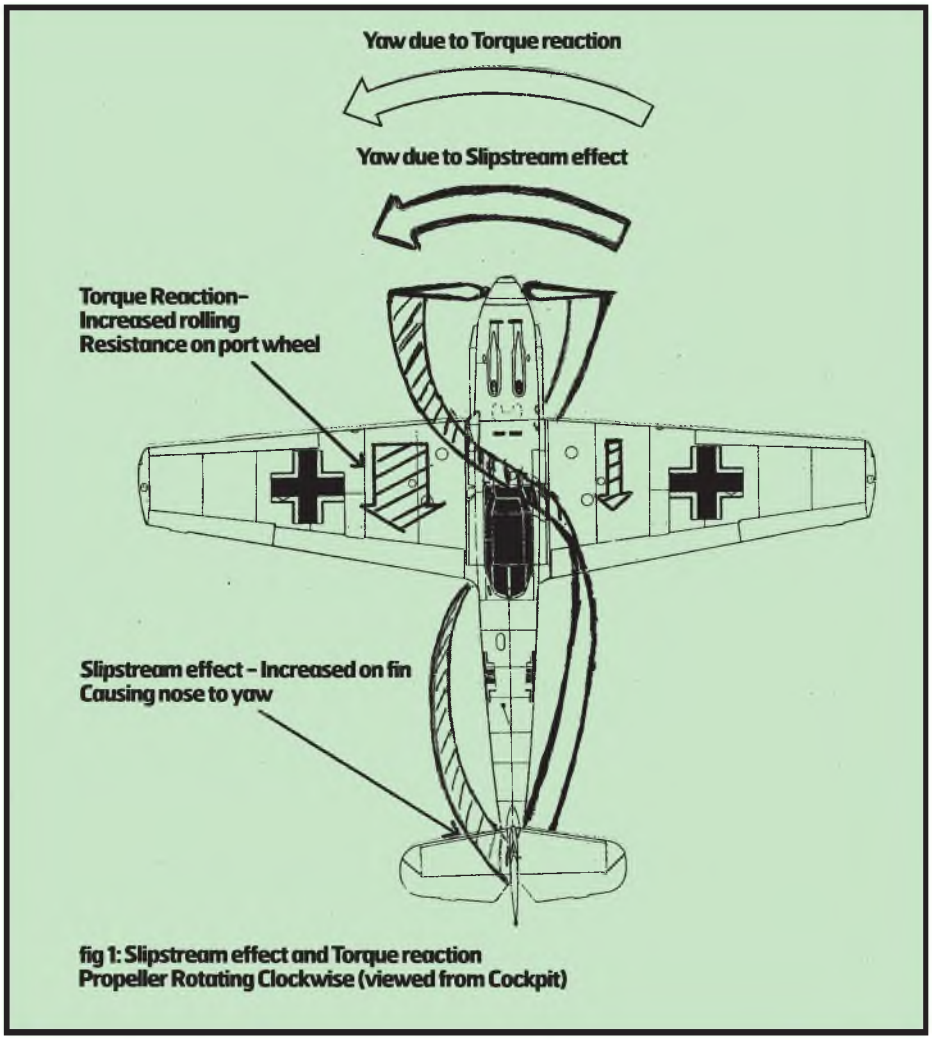


fig 1: Slipstream effect and Torque reaction
Propeller Rotating Clockwise (viewed from Cockpit)

SWING ON TAKE-OFF

There is often a tendency for a propeller driven aircraft to swing to one side on take-off. Causes are:

a. Slipstream effect.
b. Torque reaction.
c. Weathercock effect.

SLIPSTREAM EFFECT

A propeller rotating in a clockwise direction viewed from the cockpit (as with our model engines) will impart a rotation to the slipstream in the same sense. This produces an asymmetric flow over the fin and rudder inducing an aerodynamic force to the right.

This will cause the aircraft to yaw to the left.

TORQUE REACTION

If the propeller again rotates clockwise, the torque reaction will tend to rotate the aircraft in the opposite sense; i.e. roll to the left. The rolling motion is prevented by the wheels in contact with the ground, and the port (left) wheel will therefore support more weight than the starboard. This will increase the rolling resistance of the port wheel, causing the aircraft to swing to the left until wing lift takes the weight off the main wheels.

WEATHERCOCK EFFECT

A crosswind will act on the aircraft's keel surfaces. This effect normally turns the aircraft into wind, so a crosswind from the left will cause a swing to the left.

TAIL WHEEL AIRCRAFT

Two further effects will cause a tailwheel aircraft to yaw on take off. At the start of the take off run, tail down, the plane of the propeller will not be at right angles to the direction of forward motion. The diagrams here show the difference in propeller blade angle of attack due to the horizontal forward speed vector on rotational velocity (in the propeller disc plane). They also show (in exaggerated form), how the angles of attack and resultant velocities are changed when the axis of rotation is inclined.

The downgoing blade has a higher angle of attack and is therefore producing more thrust than the upgoing blade. This means that the downgoing blade has a higher speed relative to the airflow than the upgoing blade and will,

The 'ark-swinger' with it's notoriously narrow main undercarriage, was the Messerschmitt Me109 which always needed to be treated with care, however experienced to pilot was. This one is actually a Spanish-built 'Buchon'.

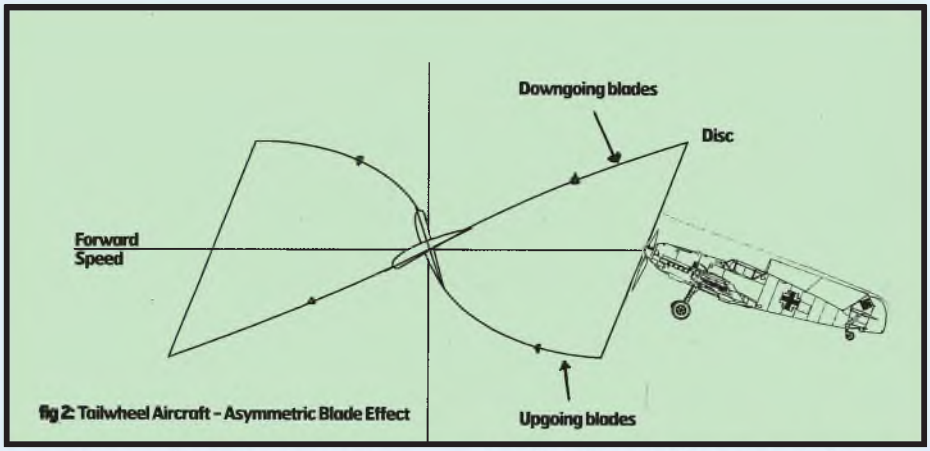


fig 2: Tailwheel Aircraft - Asymmetric Blade Effect

for a given angle of attack, produce more thrust. This is known as asymmetric blade effect.

For a clockwise propeller (viewed from the cockpit) the downgoing blade will be on the right of the propeller disc and the aircraft will tend to yaw to the left. As the tail is raised, asymmetric blade effect will be reduced to zero when the disc is at right angles to the aircraft's horizontal path, but this attitude change applies a force to the top of the propeller disc in a nose down sense. The resulting gyro precessional force (applied through 90 degrees in the direction of rotation) will also cause a yaw to the left. This is known as gyroscopic effect.

SUM OF FORCES PRODUCING YAW ON TAKE OFF

All the effects above causing a swing on take-off produce yaw in the opposite direction of rotation of the propeller. However, correct rudder application will counter these and they will become more manageable as speed is increased.

MESSERSCHITT BF109E

So much for the theory - now that we are aware of the problems, how do we achieve a smooth take off with our Me109E and study the technique for the full size aircraft at take-off, because what applies to the full size has, at lease some extrapolation to the model?

Because of the '109's narrow track undercarriage with toe in, be sure to make every take-off and landing on grass and into wind. A crosswind above 10 kts causes problems. Take-off technique consists of locking the tailwheel, lowering 20 degrees of flap and smoothly opening the throttle to counter a moderate left swing. The tailwheel is kept on the ground to keep the aircraft straight until there is enough airflow over the rudder to maintain directional control.

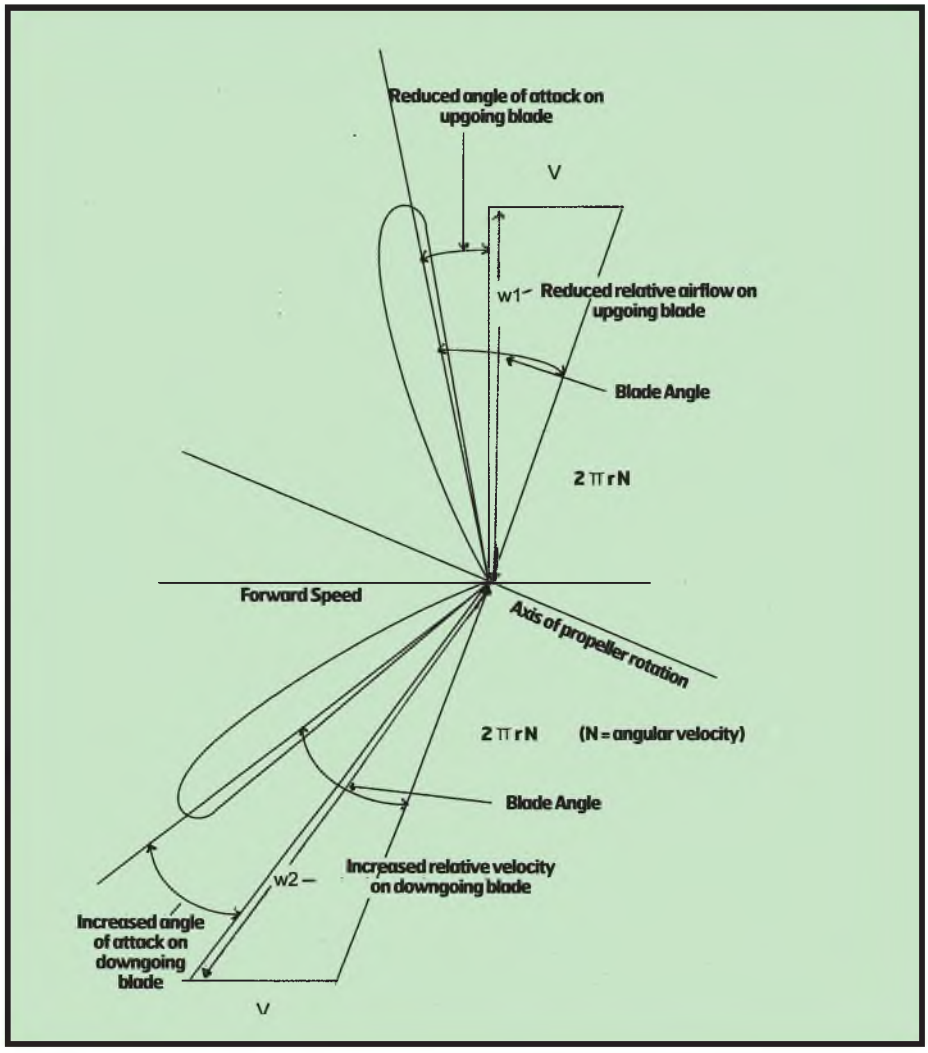
Gently raise the tail just clear of the ground minimise the precessional effect on the propeller disc which is, in effect, a gyroscope. Raising the tail abruptly at too low a speed will cause the aircraft to veer out of control to the left. The poor view from the cockpit makes spotting the start of a swing very difficult and the toe-in on the mainwheels, added to left wing rolling resistance exacerbates the ground looping tendency. This is why

Huge engine on the Republic P-47 Thunderbolt is a recipe for take-off swing, although in this case there is bthe mitigatining effect of that very wide track undercarriage.

Among the British WW2 fighter aircraft, the Supermarine Spitfire was also prone to take-off swing do to its narrow track main undercarriage that was only a little wider that that on the Me109.

take-offs on grass are preferred as the wheels can skid across the grass, lessening the ground loop effect.

Model Me109 pilots do have two small advantages. Being remote from the aircraft you can spot the start of a swing earlier and you also have the advantage of right rudder trim for take-off. Also as weathercock effect in a crosswind is aerodynamic, you can take-off with a slight crosswind from starboard, but I suggest never from port. ■



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THE QUIET ZONE

R/C SCALE ELECTRICS BY PETER RAKE

Yes, it's me again; back to enthral you with more interesting snippets of information regarding electric powered scale models. Or, put another way, you can run but you can't hide. Trust me, I'll find you wherever you are. At least you can console yourself with the fact that there won't be too much of my inane rambling this time around. What's more, no material aimed solely at novice electrolytes either. I ask you, just how good can things get?

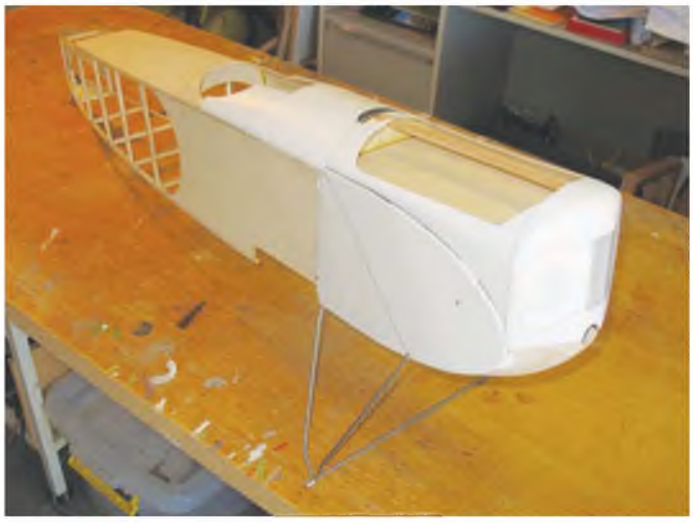
As you may have guessed, from the lack of waffle comment, not too much of this will actually be written by me. Yes, I pulled my usual stunt and conned some poor beggar into writing most of it for me. In this instance, it's Pat Lynch who'll be doing most of the work, with just a little waffle from me to keep you all happy.

What's going on

The last two major design jobs I've undertaken appear to be for builders who have gone into competition with one another to produce the most detailed renditions of my basically sport scale designs. Pat Lynch is one of them and Darrin Covington is the other. After Darrin sort of set the bar with his Albatros D.Va build (FSM July & August), Pat decided he wanted to do a detailed build of his own.

Yes, I quite agree, Pat already does

PAT'S DVII SWOOPS IN FOR A LOW PASS. THIS REALLY IS A STUNNING MODEL. WHEN YOU SEE THE DETAIL HE'S INCLUDED.



Sheet plastic and simple formed plastic parts formed over the actual model are trimmed and fitted all around the nose of Pat's DVII.

A selection of formed parts and some of the forms used to produce them demonstrate just how well this low-tech approach can work.

Here you see the forms for round counter boxes and louvers, along with a couple of demonstration boxes.

Yes, those really will be cylinders once Pat has finished with them. Once again, the tools needed involve nothing you can't make yourself.

nicely detailed builds. However, this time he asked that I deliberately design the model, a Fokker D.VII, so that areas such as the cockpit and the area below the guns were free of structural clutter so that he could work his usual magic on them. This time though, I think he's excelled himself. Some of the photos I've seen of this model are damned hard to tell apart from the real thing.

Not to be outdone, although it was purely coincidental, as Pat was about halfway through his build, Darrin came up with a very similar request - a model that had minimal internal structure in certain areas so he would be able to include as much detail as possible. As chance would have it, Darrin's request was for a Fokker Dr.1, a type I have never actually drawn up before.

Well, to be honest, what he actually asked about was whether or not I had drawn a Dr.1 that he might be able to use as the basis for his model. You know me though, never let an opportunity slip by, so I offered to design one for him.

Having just built the Arizona Modelcrafters 1/6th scale Dr.1, using as much scale structure as possible, only to find that it really was much better suited to it's role of static display model (it took off fine but then showed very little inclination to wanting to climb, or turn without digging in a wing tip) he was hooked on the type - just not that particular model example. E-mails were exchanged, plans drawn and sent, laser cut parts obtained and the race was on. As it turned out, both models got their maiden flights within a few weeks of each other but, to be fair to Pat, Darrin was able to salvage many of the scale items (the time consuming part of any model) from his earlier model.

What's coming up

So, with two absolutely stunning models ready at just the right time (just as I needed to get this column written), and since Pat had already done much of the work for me (Yippee!!!!) this seemed like a good opportunity to feature them both. With that in mind, I'll hand you over to Pat for his bit, before coming back with some brief information, and some pictures, of Darrin's model. Don't worry though; there'll be ample opportunity to take a much closer look at it another time. Who knows, with any luck I might even be able to get Darrin to write it.

Here, rather than looking at how the D.VII was built (a job for the construction article), Pat has been kind enough to describe how he produced the plastic components he used. Unlike Darrin, who has a proper vac-form machine at his disposal, Pat's technique is quite low-tech and much better suited to those of us less 'tool wealthy'.

So now, over to Pat

During a recent build of a prototype design for Peter, I tried some techniques that may be of interest to others.

Most WW1 aircraft have large areas of metal panelling around the nose. In the past, I'd tried litho plate for these panels but when compound curves were involved, good old fill, sand, fill, prime etc seemed almost inevitable. In the search for alternatives, the use of thin sheet plastic was appealing - it was light, easy to work and made a great base for fixing the detail that is usually attached to these surfaces. Vac-formed panels are ideal, but require master patterns to be made and the process is not for everyone. Since the surfaces in question had to be built of traditional materials anyway (as shown on the plans), I decided to try stretching heated styrene sheet over the woodwork and make thin skins suitable for attaching later. In some situations such as radiators, various side panels, battery hatches etc, it proved better to make these skins before assembling the basic model.

Essentially, a piece of .010" styrene sheet was cut and a strip of wood stapled to two opposite edges as handles. The

Once the louvers are fitted, a few panel lines scored on and some sheet plastic access panels added the side panels really begin to look the part.

As you can see, with a little skilful paintwork, and good reference material, all those little bits of plastic make for a very realistic dummy engine.

You decide, is this Pat's model, or is it a real Fokker DVII? No, don't bother; it is definitely Pat's model. Convincing, isn't it?

Not to be outdone, Darrin's cockpit is no less detailed than that of Pat's DVII.

wooden part or 'plug' to be used as a form is placed on the bench so that the plastic, carefully heated over the stove hotplate can be pulled down over it until the desired panel is formed. Some experimenting is needed to get the right degree of heating and how much force is used to form the panel. It must be held in place until cooled and rigid. A great thing about styrene sheet is that it can be heated again and re-used if things aren't quite right (provided it hasn't had holes burnt in it!)

On my Fokker D.VII, all the panels along the forward fuselage were made in this way - I made extra as some panels had to overlap. The radiator had skins made and also the two rounded side panels. These side panels were particularly useful as there were many louvres, doors and other details that could be easily glued to the plastic panel. This leads into another similar technique - 'pushing' shapes into heated styrene rather than 'pulling' the plastic over a form.

Many parts on the D.VII were created by this 'pushing' technique; louvres of various sizes, cylinder heads, rocker covers, exhaust manifold parts and many sundry small items. The method here is to make a male plug of the item to be moulded and also a matching shaped hole in a piece of scrap wood. The recessed part should be slightly larger than the plug to allow room for the plastic. In this method I stapled or clamped a piece of styrene sheet over the female part - about 1" bigger than needed, and heated this over a hotplate until soft (you can see it start to buckle slightly). The male plug is then gently pushed into the plastic over the hole until the desired depth is obtained.

When making many identical parts, I cut a long strip and just heated one end. When a part was made, it was cut off, the strip moved along and the process repeated. Dozens of louvres were made in this way - in the process, there were many faulty ones but the plastic used is fairly cheap in large sheets - 6' X 3' sheets were only $12 from a local fibre-glass stockist. Otherwise, most hobby shops sell smaller quantities in the Plastruct, Evergreen or similar stands.

The plastic skins form an ideal substrate for adding detail. The louvres were trimmed to size and glued into slots in the skin using normal plastic modelling cement - my stuff was mostly MEK and needed care and time to fully cure. Small access panels were cut from .005 or .010 sheet and glued to the panels.

Realistic dummy hinges are very easy to make. A narrow strip of styrene is glued where the hinge edges are located and a piece of half-round rod glued down the centre. Tiny grooves across the rod were cut or filed to represent the hinge sections. Rivets or screws may be made along the edges with spots of PVA glue or even better, Canopy glue. If screws are needed, the 'rivets' can be given a slot with a small sharp jewellers screwdriver after the rivet is partially set.

There is no end to what can be created using styrene. It is easy to cut, form, glue, shape and takes paint well. It is also strong, much more resistant to damage than litho plate or wood, easy to repair and a glance at one of those rotating stands in the hobby shops will reveal masses of different sizes of rod,

tube and other shapes useful on models. Its weight is also a benefit over more traditional materials, particularly as it needs little surface preparation other than very thin finishing coats of paint. Where a more realistic painted metal look is needed, I use some powdered graphite (scraped from a soft pencil) gently brushed onto the surface and lightly buffed with a soft rag. Using normal plastic glues, the bond between is almost a weld, resulting in a very strong, vibration proof structure.

"I love the stuff"

So where was I?

From that, I assume we will be seeing a lot more plastic used on future models from Pat. As regards the specifics of this particular model, it too is 1/6th scale, giving it a wingspan of around 58". Although a slightly portly 6.5 lbs, its **Turnigy 4250**, 4S battery and 15x8 prop make it 'feel' quite light to fly. Pat says that it will 'trundle past' at around 1/3rd throttle. He also mentions something about thinking he has found his new favourite model.

For Pat, this was quite a protracted build, taking over a year from design to maiden flight. As intimated earlier, much of this time was taken up figuring out what details to include and, having decided, how to produce them. I'm sure you'll agree that the result was well worth the effort. I was just looking for a photo of the cockpit interior Pat created and had to spend a few minutes comparing pictures just to make sure it wasn't a photo of the real thing I was looking at. Even now I'm not 100% convinced it isn't.

Darrin's model

As I said earlier, the Fokker Dr.1 built by Darrin Covington was intended as a replacement for an earlier, less than successful kit built model. Whilst it isn't too bad for a 58" D.VII to weight 6.5 lb., it's somewhat less than desirable for a 48" span Fokker Dr.1 - even with the third wing.

Anyway, the new model, as seen here, is a whole 1.5 lb lighter than the original and shows it in the air. There are a few 'teething' problems still being worked through (the joys of proving an original design), but this version definitely shows a lot more promise. The first flight showed that it would climb well, but also that there wasn't enough aileron throw. Increasing the throw solved that, but an unfortunate 'incident' during landing means a few minor repairs are required before more flight testing can be carried out. All part of the process involved in making sure that when the plan does appear it will be right.

I'm still trying to make up my mind about which of these two models looks the most realistic. They're both so good it's very hard to choose between them. The only unfortunate part about them is that they are both sufficiently big that neither is likely to appear as a free plan without running to three issues rather than the usual two. Whilst I'd be perfectly happy to rearrange the drawings to suit, I doubt that is likely to happen.

Since it's heading towards me running out of space again, I won't ramble on any longer. Hopefully that will leave a little more space for the photos that accompany this. If you wish to contact me about something, other than begging letters (sending them is my job), you'll find me at PETERRAKE@aol.com ■

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