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- More colour schemes
- Detail close-up study
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FOR SCALE**



NORTH AMERICAN AT-6 / SJN / HARVARD

- Scale three-views
- Detail close-up study



**MASTER
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A GALLON OF LUCK

Racing F4U Corsair

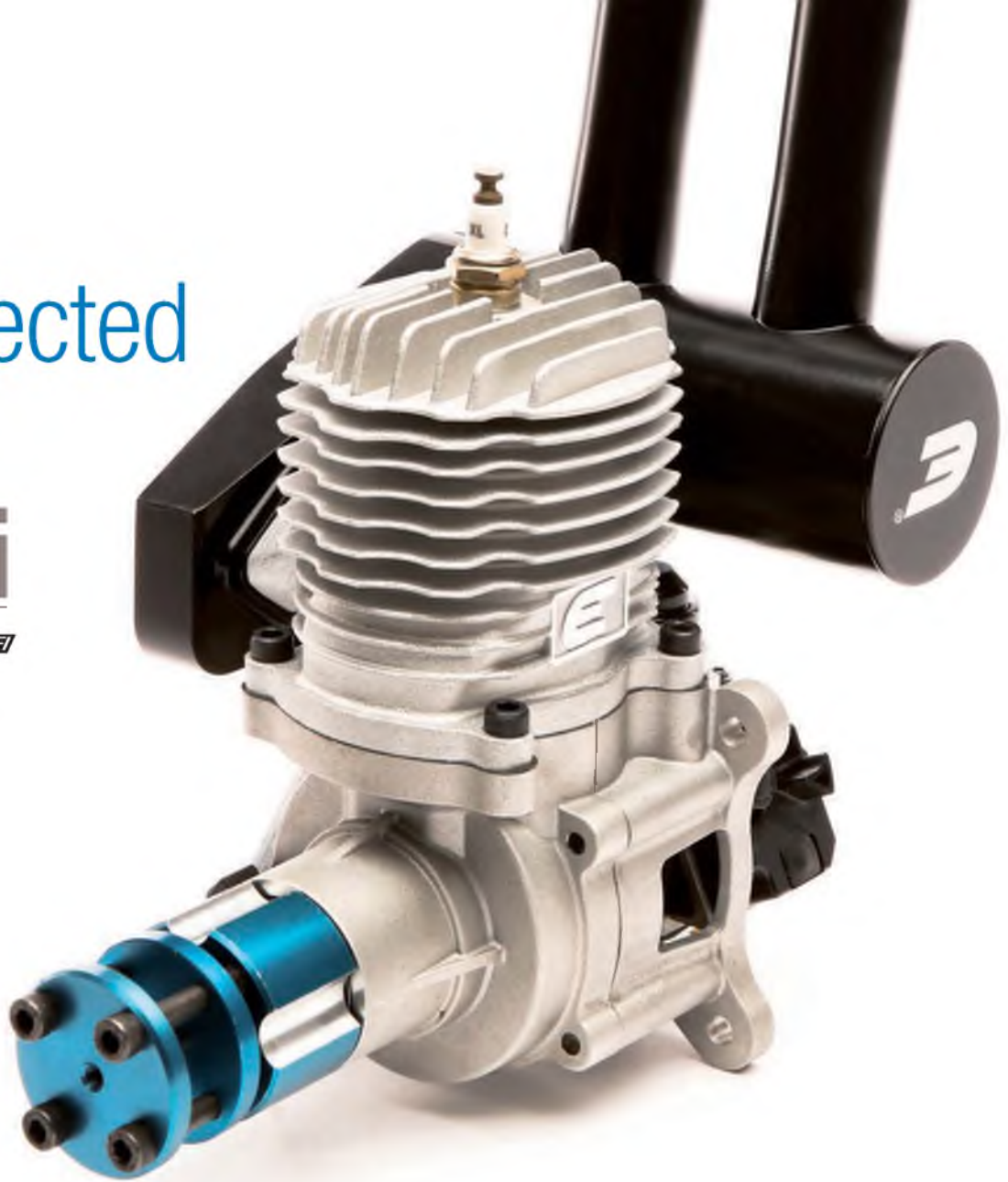
FEATURE: A SPOKE IN THE WHEEL!
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ON THE COVER

Vought Corsair models in military colours are the norm - so Paul Williams broke ranks with convention to finish his in the colours of Cook Cleland's 1946 Thompson Trophy Race winning Goodyear FG-1D, to produce a stunning result, as Alex Whittaker explains in this issue.

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1/18th scale 770mm wingspan model of an early 1930s light transport aircraft for IPS level electric power

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CONTACT

To many dedicated aviation enthusiasts, the sound of the Rolls Royce Merlin engine is what does it for them - a truly classic aviation sound, associated with the Supermarine Spitfire, Hawker Hurricane, North American Mustang and, in growling four engine harmony ... the Avro Lancaster.

There are, of course, other aircraft with which one firmly associates a particular engine sound, but for those of us of a 'certain age', with a long interest in aviation, there is nothing that shatters a peaceful background, than the traverse across the sky, of North American Aviation's pugnacious advanced trainer known severally, as the AT-6 Texan, SNJ or Harvard.



Built in large numbers, to train generations of military pilots worldwide, this is an aircraft that really does have a place in aviation history - and they're still going strong more than 75 years after the first took to the air.

Worthy then, one may fairly say, as a 'Subject for Scale' - and the proportions in model format, as with the full size make it excellent for scale aerobatics.

Will the Harvard / SNJ / AT-6 Texan be your next Subject of Scale?

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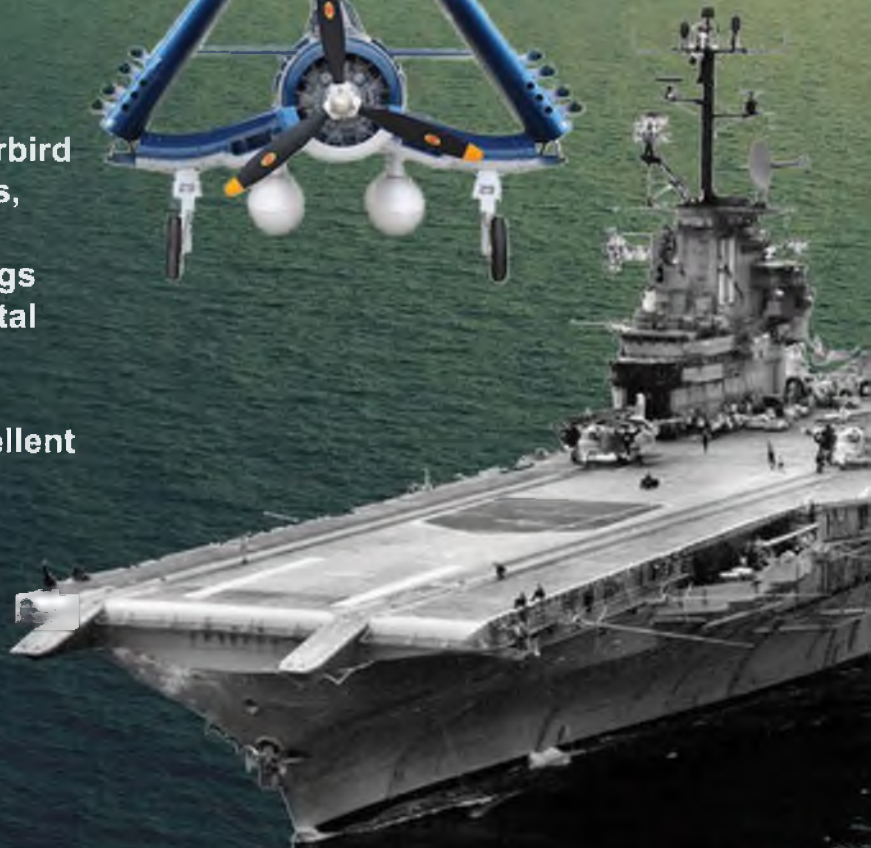
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DH MOTH BY SEAGULL MODELS

The full-size DH60 biplane first flew in 1925 and quickly established its niche in the field of private and 'Club' flying. Nowadays, it is regarded as truly classic lightplane loved by pilots worldwide, and those examples that still survive are much cherished by their lucky owners.

Not surprisingly, the DH60 is a type that is just as popular with aeromodellers, much modeled and it seems that scale modelling enthusiasts

will continue to recreate that 'wind in the wires' style of flying ad infinitum.

And they will certainly be encouraged on their way by **Seagull Models** latest ARTF rendition of the type that provides an easy-to-assemble, highly pre-fabricated airframe that goes together into a 72" span, 10lb. replica intended for a powerplant range of .90-1.20 IC motors or electric power equivalent.

Fully covered in Oracover heatshrink covering, in the model is finished in the authentic blue/black/silver colour scheme of full size example G-AAMX, which was built in 1929, one of 161 such aircraft

built by the Moth Corporation in the United States. The 'M' designation signifies that it was constructed using metal stringers instead of the original plywood box, for this reason it is also known as the 'Metal Moth'.

The kit features all wood built fuselage, wings and tail units, with a glass-moulded cowl, together with a comprehensive hardware set, including all the parts for full wing rigging. Even two specially moulded pilot busts are included!

Price will be £254.99 through J.Perkins Distribution Stockists.



RIP TAPES FOR SCALE MODELS

The fabric covered wings of many full size aircraft have rib tapes with 'pinking sheer' edges, and clipping the tapes to the required width, all the way down a long strip without unintentionally varying the width can be a tricky task.

So hats off to **Toni Clark Practical Scale** for offering self adhesive pinking tape in a wide variety of widths that include 5, 8, 10, 13, 20 and 26mm. In the case of 5-13mm widths, you get 14 x 1200mm strips, while for the 20mm width there are 10 x 1200mm strips or 8 x 1200 in the 26mm width.

Look it up on their web site at www.toni-clark.com



COWL HINGE STRIP

Engine cowls and access panels on full size aircraft often feature hinges that run the full length of the access panel. Two examples with which your editor struggled endlessly a long time ago now, were the retracting tailwheel doors of first a Vought F4U-1D Corsair, and later a Hawker Sea Fury. Back then, the piano wire and lithoplate never really worked properly. Pity, then, that Toni Clark Practical Scale's other handy little item was not available back then!

As the picture here shows, this is a strip of piano hinging made in brass, with a steel shaft. It is 9.5mm wide, weights 46g per metre and can be cut to length to suit the task in hand.

It's all in the Practical Scale catalogue at www.toni-clark.com

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MILITARY RACER!

Immediately after WWII there was a glut of big radial-engine fighters, so the Americans raced them!

THIS SHOT SHOWS THAT MEISTER HAVE GOT THE KEY RELATIONSHIP OF THE FUSELAGE TO THE DISTINCTIVE CORSAIR WING JUST RIGHT.



was at RAF Barkston Heath when the buzz went around The Pits. Some joker had turned up with the scale meeting with a bright red and white WWII fighter! Now, like many readers, I am not entirely comfortable when people mess about with historic military ikons, so my enthusiasm failed to ignite. Then I saw this astounding vision taxi out. I was instantly smitten! What an odd set of perceptions for the keen scale fancier: a well put-together WWII fighter scale aircraft, but in the flashy scheme of an American air racer - aye right down to the authentic yankee brush script for the 'Lucky Gallon' legend. I wanted to know more.

Authenticity

I loved it, and it certainly looked accurate, but I reserved judgement until I

spoke to the pilot and builder Paul Williams. He instantly assured me it was an authentic scale scheme. The original had been flown by a genuine US Air Ace, who had served with distinction in both WWII and the Korean War. I was hooked. Here was a fastidiously finished scale Corsair, complete with rivets, panels, and a careful surface texture, but in an ebullient race scheme. Even with my scale modeller's prejudices intact, I was forced to admit it all worked brilliantly well.

Lucky Gallon

'Lucky Gallon' started life as a World War two Vought FG-1D Corsair. Sold off as war surplus, she was bought by noted US Navy pilot, air racer, and test pilot, Cook Clelend in 1946. With minimal alterations she competed later that year in the Thompson Trophy Air Race. Round the

course she managed an average speed of 357 mph. In fact, she only placed Sixth, but Clelend was so impressed that next year he went out and bought four more. His racing career was interrupted by the Korean War. By an odd quirk of fate, when Clelend returned to military service in Korea, it was to fly - you've guessed it - Corsairs.

The model

Paul knew he wanted a scale Corsair, but it was while he was researching historical schemes that he came across Lucky Gallon. In fact, because Clelend was such a celebrated pilot, there was sufficient data on the internet for him to complete his scheme.

Plan

The model is built to the Meister Fun Scale



- 1: Distinctive 'bent wing' inverted gull centre section, ready to accept retracts.
- 2: Basic radio installation, showing the JR receiver and servos.
- 3: Vast wing aperture looking to the aft fuselage.
- 4: DLE petrol engine mounted to the firewall on machined spacers. Note ignition system on the firewall.
- 5: Retract system layout with a Red Bull drinks bottle pressed into service as an air reservoir.



1: Distinctive fin and "tail-cone". 2: Sports scale elevator detailing is crisp. 3: Typical American brush script for the Lucky Gallon Racer. Adds that touch of sparkle. 4: Pinked rib tapes, neatly done. 5: Fine detailing on the wing - rib tapes, flush rivets, and panelling. 6: Canny Paul has grouped his essential switches under a scale panel.

Corsair F4U-1 plan. Such Meister plans are noted for their balance of accuracy and practicality. As Meister so disarmingly put it: "No Liberties were taken with the Corsair's outline or wing area". Good.

Free download

I have done a bit of digging, and readers may download this Corsair's instruction manual (pdf format) free from http://www.meister-scale.com/Corsair/Corsair_Instructions.pdf. This contains a handy profile line drawing. Meister go out of their way to stress that

this is an easy scale model to build, so if a Corsair is on your Project Wish List you might wish to follow up the link above.

Construction

Traditional construction methods were used throughout, so the model is mostly built of balsa and ply. Paul remarks that the

information on the plan was very good and the build notes are very accurate.

Fuselage

The former were set out on a jig/crutch system, stringer were added, and then the model was sheeted as per the plan.

Wings

Meister have used a high lift section, and a light weight construction which together



THE CORSAIR IS SUCH AN AGGRESSIVE DESIGN THAT THE TRANSITION TO A RACER IS SEAMLESS.

they see as contributing to a low take off and landing speed. They see aAs the wings are flat bottom the assembly was straight forward. All the wing panels were fully sheeted, the only modification made were to the undercarriage area: the retracts used differ from the plan.

Tail

The tail and fin are of simple traditional construction and again fully sheeted.

Engine, exhaust and propellwe

Paul chose a DL 50, 50cc petrol engine with electronic ignition and applied an aftermarket Pitts style muffler. Power delivery is via a Menz 22" x 10" prop, painted black

Undercarriage / Retract

Robert 150HD9 twist and turn mains and 190WC rear retracts were used to reproduce that authentic Corsair feature.

Covering & painting

The whole model was glassed with 25g/m2 cloth and the resin used was G10 pond sealer, this was flatted back between coats to give a smooth finish. G10 Pond Sealer is very popular with scale modellers, with saying it gives reliable finish.

Primer and colour coats are cellulose paint. The whole model was sealed using a 2K semi-gloss clear coat.

Legending / Decals

The masks were produced by Nigel from Flightline Graphics. Paul supplied photos of the full size aircraft were supplied along with the size of the model and the masks were produced.

Scale details

Panel line, hatches and rivets are accurately reproduced. The panel line were marked onto the surface of the airframe and 1/64 panel tape was laid over the top. Once each panel was complete several coats of primer were applied then the tape was removed leaving a panel line on the surface, hatches were made using a foil tape, these were cut to size and stuck to the surface. The rivets were laid out for a semi-scale appearance and each one was melted into the surface of the primer. Once all of the



7: Well-known Goodyear logo. Is it Mercury's sandal, or an early baseball boot without the rubber disc?

8: Undercarriage strut and door is nicely modelled.

COOK CLELAND AND HIS RACING CORSAIRS

Cook Cleland qualified as a Naval Aviator just prior to the Pearl Harbour attacks in December 1941 and participated in many of the major US Naval aviation combat actions during WW2, including Guadalcanal and the Battle of the Philippine Sea. He was awarded the Navy Cross and achieved 'Ace' status - no mean achievement considering that he flew Vought SB2U Vindicators and Douglass SDN Dauntless dive bombers!

Transferred out of the Pacific combat zone back to mainland USA, he tested and evaluated captured enemy aircraft as a Navy test pilot, leaving Naval service at the end of WW2.

Air racing recommence in USA in 1946 when the long distance *Bendix Trophy* and closed circuit *Thompson Trophy* races were reintroduced for the National Air Races at Cleveland, Ohio. Cleland bought a surplus Vought FG-1D Corsair, modified it for air racing, named it 'Lucky Gallon' and flew it in the 1946 Thompson Trophy Race at an average of 357 miles per hour (575 km/h), finishing sixth.

Post WW2, the Thompson and Bendix races were dominated by surplus military fighter types which those with air racing ambitions could pick up at rock bottom prices. Cleland thus achieved something of a coup by acquiring four prototypes of the bubble canopy Goodyear F2G-1 Super Corsairs powered by the huge 28 cylinder Pratt & Whitney Wasp Major rated at more than 3,000 hp - which made the original F4U-1/FG-1D look like something of a pussy cat!

Cleland progressively modified these as he did with his FG-1D, with changes that included clipping the wingspan a few feet and adding wing tip end-plates. He flew one of these, Race 74, to win the 1947 Thompson Trophy with a speed of 396 miles per hour (637 km/h).

For the 1948 Thompson, Cleland returned with more modifications to the previous year's Super Corsair, but the experimental fuel, rated at 200 octane, proved too volatile and caused the induction scoops to be blown loose, taking him out of the race but he returned in 1949, winning the Thompson for the second time flying Race 94, with a speed of 397 miles per hour (639 km/h).

Cleland had been an airport operator at Willoughby, Ohio from soon after the end of WW2, but in early 1951 he resumed his career as a navy aviator commanding a Squadron during the Korean war, flying F4U Corsairs!



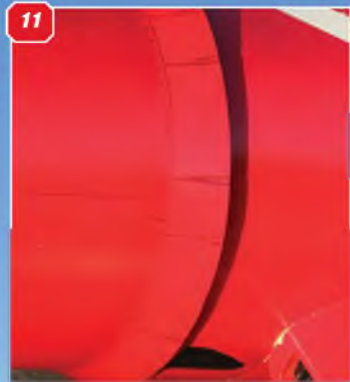
Cook Cleland's 1946 Thompson Trophy winning FG-1 Corsair.



One of Cook Cleland's 28-cylinder P&W Wasp Major powered FG-1D.



One of the racing mods applied to Cook Cleland's FG-1D was the clipping of the wing outer panels and addition of end-plates.



MODEL SPECIFICATION

Scale: 1/5th
Wingspan: 100"
Weight: 35lbs
Engine: DL 50 50cc petrol engine
Prop: Menz 22x10

detailing had been completed and the model painted, weathering was applied to the model. Paul says that he wanted the model to look clean but used, and, as this was a racing aircraft, it would have been kept tidy. Artists oil paint was used (black) this was rubbed into the surface of

each panel, doing a small area at a time, about 6" square. The paint was then wiped off using a clean cloth until the desired effect had been achieved. This was repeated until the whole model was complete. The model was left to dry for a few days before clear coating.

9: Cowling easily swallows the 50cc petrol engine. Dummy engine seals the deal. **10:** Lots going on here, cowling vents, wing radiator vents, and gauze, but minimal intrusion of the beefy petrol engine. **11:** The Corsair's distinctive "gill frills" are present, appropriately modelled for clubman scale. Note flush riveting, too.



Flying Notes

This Clubman scale model looks a very convincing Corsair in the air. She excels in typically belligerent Corsair behaviour: fast beat-ups, high-g turns, and steep climb-outs. Her scheme is a refreshing change from all those Pacific Theatre shots we love. Her controls looked well-harmonised in the air, so I asked Paul how she flew. Grinning broadly he replied: "She flies really well and is very forgiving - with no vices...".

Says it all, really.



Paul Williams is right to look content. This is an imaginatively schemed scale model.



LUCKY GALLON ON A LOW-PASS OVER LINCOLNSHIRE.



Fokker D.VII

PART 2: Continuing the construction sequence of Peter Rakes 1/6th scale, 58" wingspan model for electric power with the prototype model built and described by Pat Lynch.

Most of what happens from here on depends on how you want the model to look when finished. By now, I had decided on as much cockpit and engine detail as I could manage, an all-lozenge finish with the Jasta 21 markings of Lt. Fritz Hohn and as much other detail stuff as would guarantee something got broken every

time the model was handled! There isn't space in this month's episode to describe how the many bits were made - Peter may choose to talk about that in his regular column and anyway, most folk will choose not to bother but a brief description is in order.

The cockpit had many parts that needed fitting before the lower wing was fixed and so, after cutting out the cockpit,

gun and engine openings, the various pre-'pulled' plastic panels were carefully marked and trimmed to size - much easier to do now than with a cockpit full of fiddly bits. A diagram of where the exposed fuselage framing would appear in the real machine was drawn and the dummy frames constructed from plastic tube. The painted frame was then fitted to the cockpit up through the space the lower



Sweeping in for an attack. A sight not popular with allied airmen.

wing would fit later.

The frame was followed by gun magazine, instrument sub-panel, various pumps, controls cables and finally the wooden floor. The guns (modified Williams kits) were checked for fit and then the plastic panels primed ready to glue in place. The side panels had louvres moulded from styrene sheets, plastic doors with dummy hinges and canopy glue rivets. The guns had extra parts added such the modified cocking levers, round counters and leather buffers. When all this basic detail was sorted, the fuselage was covered.

I chose Lifespan as the covering material - it has a nice dull finish, is easy to apply and was available. The fuselage was covered in all those areas which

were fabric using Balsaloc as an adhesive. Along the bottom of the fuselage on the full size D.VII there is a laced join which was replicated on the prototype made with punched strips of Solartex and thread sewn in a zig-zag exactly as the original.

The wings were also covered in Lifespan, but be sure to install the aileron operating cables first - and secure them to prevent from being pulled out! How do I know that? - I had to cut away the covering underneath the wing after catching both sets of cables on the bench and pulling most of it out of the wing after covering!

On the subject of cables, I used plastic-coated beading wire sold in craft and beading supply shops. It doesn't stretch, is very strong and flexible and is available in a variety of useful colours -

grey, black, natural etc. Terminating simply involves slipping a length of 1.5mm tube over the wire, passing it through the hole in which it is to be fixed, back through the tube and crimping it flat. A drop of thin CA will secure it. Now came the fun bit - lozenges!

I had contemplated printing the pattern onto the tissue but wanted to keep it low-tech using just a brush, paint and patience. Masks were cut from thin A4 card representing each of the four colours used and the fabric bolt width. A white Aquarelle coloured pencil traced out a set of lozenges onto the dark green Lifespan which were then painted using a 1/4" Tamiya brush and suitably thinned Humbrol enamels. When dry, the process was repeated for the other colours. No



How the axle fairing fits onto the undercarriage, before the end ribs are fitted and the lower surface sheeted.



Pat made simple pink foam guides to assist with getting the top wing incidence and alignment correct.



Here you see how the struts bolt to the wing and the aileron cables run from fuselage to wing.



Pat used a series of stencils to mark out the lozenge finish before brush painting it onto the Litespan covering.

airbrushing, overspray or tricky printing processes.

Lozenges have been painted this way

since scale models began - made me feel like an old-timer! For the more fastidious, the direction of the pattern, number of

colours and their exact hue is extensively documented in many books and websites but ultimately, unless one is modelling an



If not for the length of the grass this could almost be a real Fokker preparing for another sortie.

existing machine, getting it reasonably close will satisfy most critics.

Exactly the same process was used on the wings remembering to alternate the pattern direction as it moves along the wing. The wing undersides used a couple of different colours but the process was the same. Although tedious, a couple of weeks saw it all finished! The various stripes, insignia and personal marks were hand painted (although I did use an airbrush for some of the white areas).

After the lozenges were completed, rib and leading edge tapes were added from strips of Solartex which had been painted in the same manner. Black (actually Tamiya NATO black - a very dark grey) and white national markings, unit and personal insignia were added by hand painting over an airbrushed white base then the whole model was given a light dusting of satin polyurethane varnish. This provides a bit of protection from dirty fingers but more importantly, evens out any inconsistent gloss level from the different paints used.

ASSEMBLING THE D.VII

The covered and painted tail assembly can be glued in position ensuring it is square and level with the fuselage. The top wing was then screwed onto the centre section (C/S) struts and checked for proper

alignment with the fuselage and tail. When all was correct, the lower wing was fitted (not glued) and adjusted to be equi-distant both sides from the upper wing, always checking that it is fully embedded in the fuselage cut-out. When happy with the alignment, the lower wing was glued in place with medium CA.

After unscrewing the top wing, the outboard struts, faired and painted, were fixed in position with 30-minute epoxy and the top wing epoxied to the centre and outboard struts, again checking that all alignments were correct. At this stage, the wings should be parallel to each other, square with the fuselage and the each tip equal distance from the tail. We have an assembled aeroplane!

The servos were cabled to their respective control surfaces and checked for free operation, the receiver fitted and the motor/ESC wired in place. With all the major parts done, the remaining detail could be added - as much or as little as desired.

A dummy engine was created from plastic sheet, tube rod and springs from old ball point pens. More cockpit detail such as throttle, control stick, various gauges, switches and knobs were fashioned from scrap plastic and wire. Windscreen, radiator, footsteps and lifting handles, various levers, filler caps other items

CUT PARTS SET FOR THE

FOKKER D. VII

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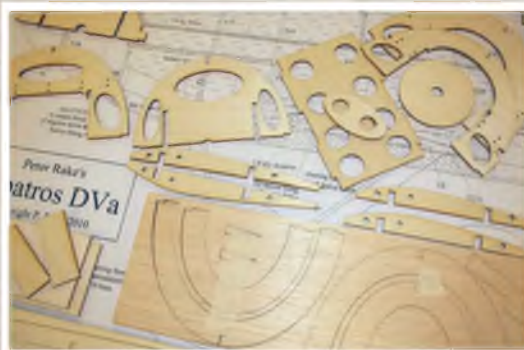
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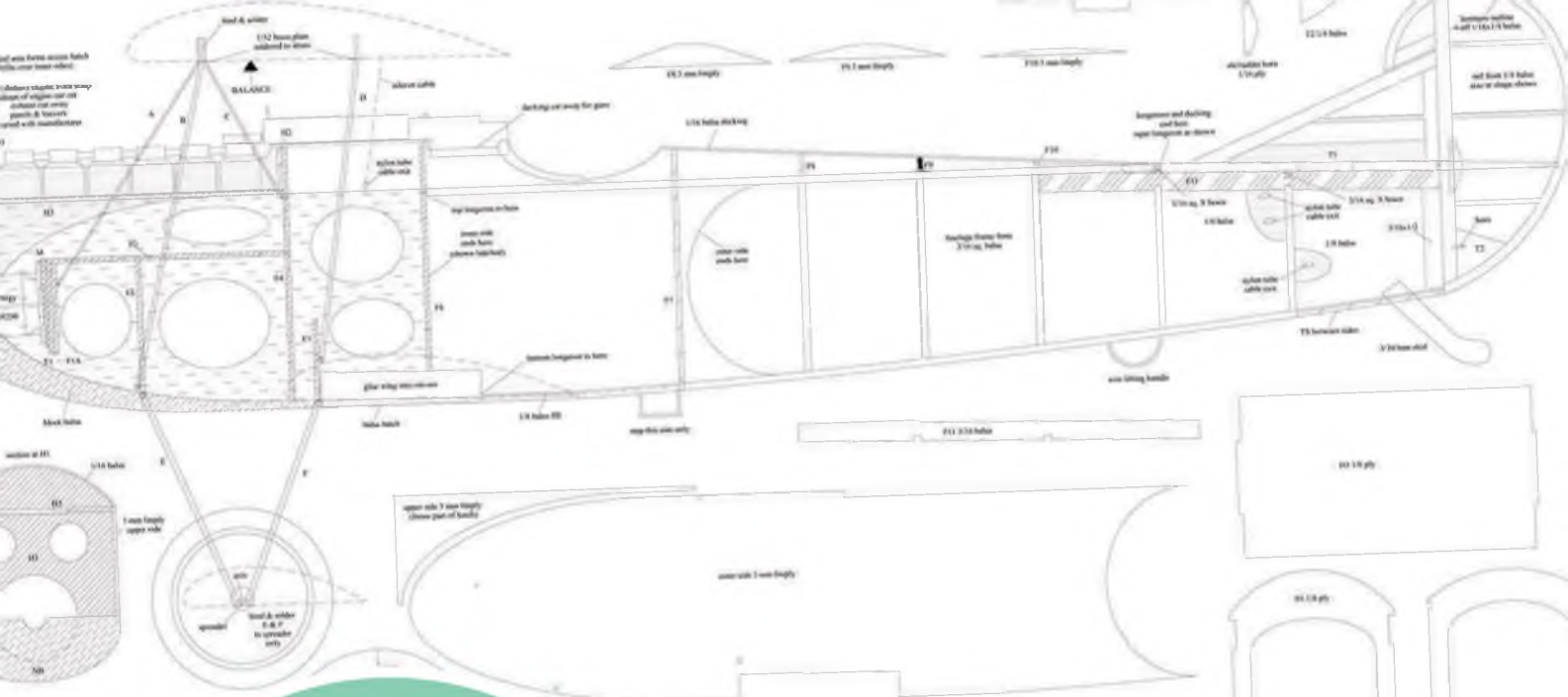
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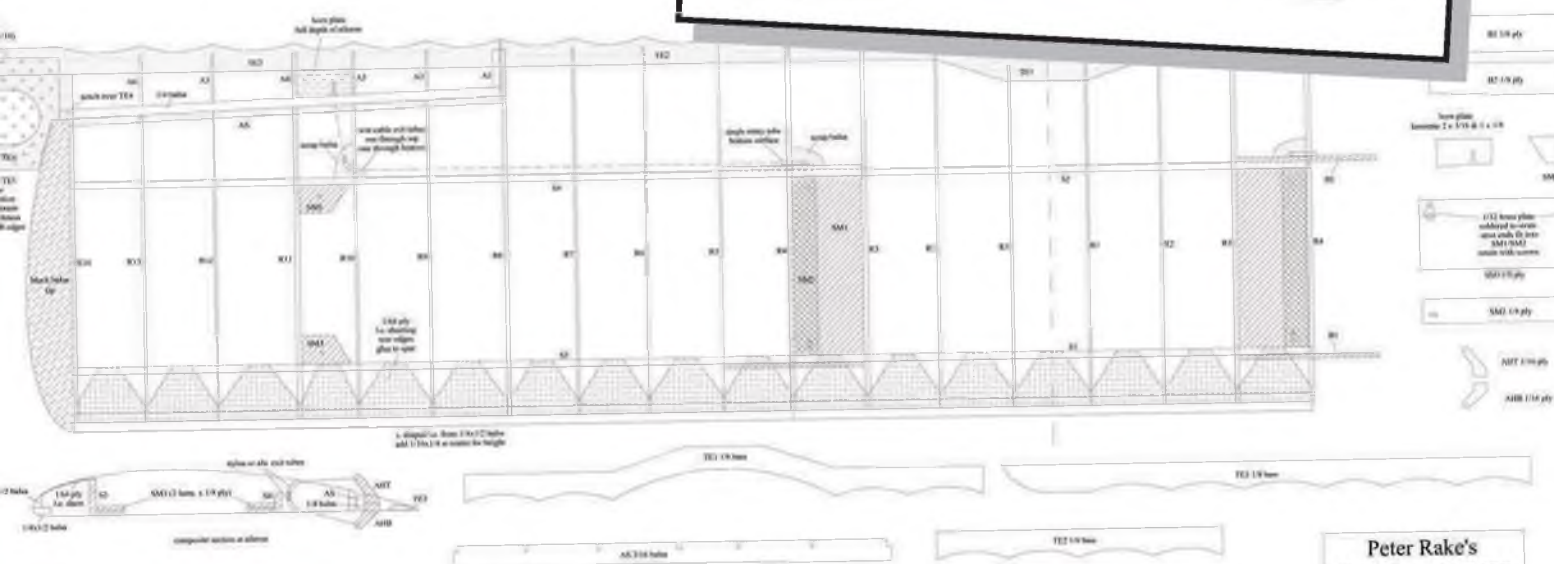
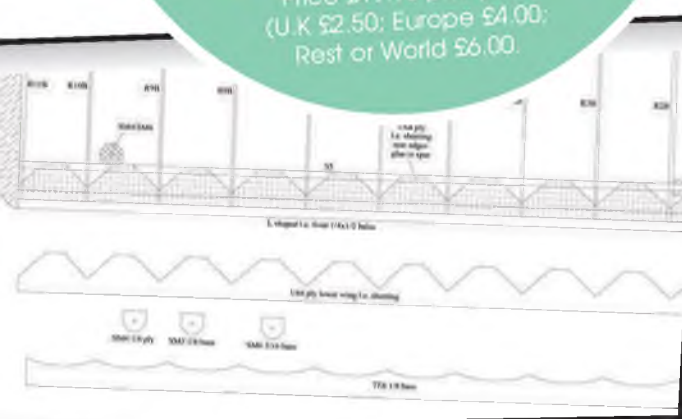
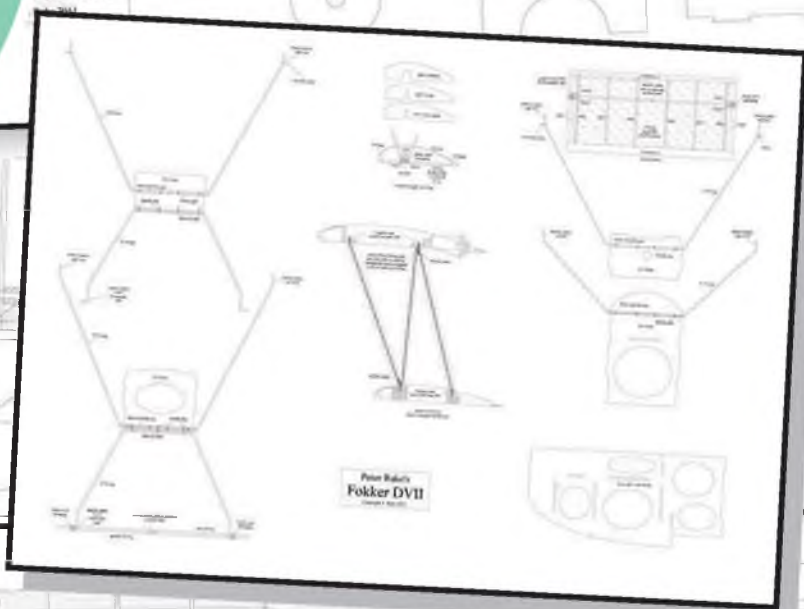




FOKKER D.VII (PLAN FSM/489)

Full size copies of this FOUR SHEET plan are available from Flying Scale Models Plans Service, ADH Publishing, Doolittle Mill, Doolittle Lane, Totternhoe, Bedfordshire, LU6 1QX. Tel 01525 222573 enquiries@adhpublishing.com Price £19.95 plus p&p (U.K. £2.50; Europe £4.00; Rest of World £6.00).

Fokker's
D.VII



Peter Rake's
F.S.M. D.VII



Only the surroundings reveal that this is just too small to be the real thing, therefore it must be Pat's model.

were again made from scrap plastic etc. The tail parts had dummy bracing added, and a pilot made from foam plastic with the face and clothing formed from plaster wall-board filler mixed with PVA glue. He sits in a plastic and card seat and has a harness and buckles from strips of fabric and plastic scrap - there is no limit to what detail can be added at this scale, only ones own patience and imagination.

FLYING

Because of seasonal wind and a harsh Australian winter, the first flight was delayed several weeks, but finally an opportunity presented itself after fog lifted and before the wind picked up!

The D.VII was positioned pointing into a very slight breeze and the throttle eased open. She quickly gathered speed and after about 10 metres, had wheels bouncing off the frosty grass. Keeping

close control of the elevator, I eased her of the ground in a flat climb. I was ecstatic - a flying aeroplane!

Although just a tad nose-heavy (deliberate), she performed flawlessly - a click of right aileron stopped a slight tendency to roll to the left and a few circuits were spent just cruising and getting a feel for the model.

The transmitter timer then warned that it was time to land, so she was lined up with the strip and the throttle reduced for a smooth descent. A metre or so up and some back stick for a gentle flare and a near-perfect touchdown was achieved. I was very happy with her first flight - almost faultless!

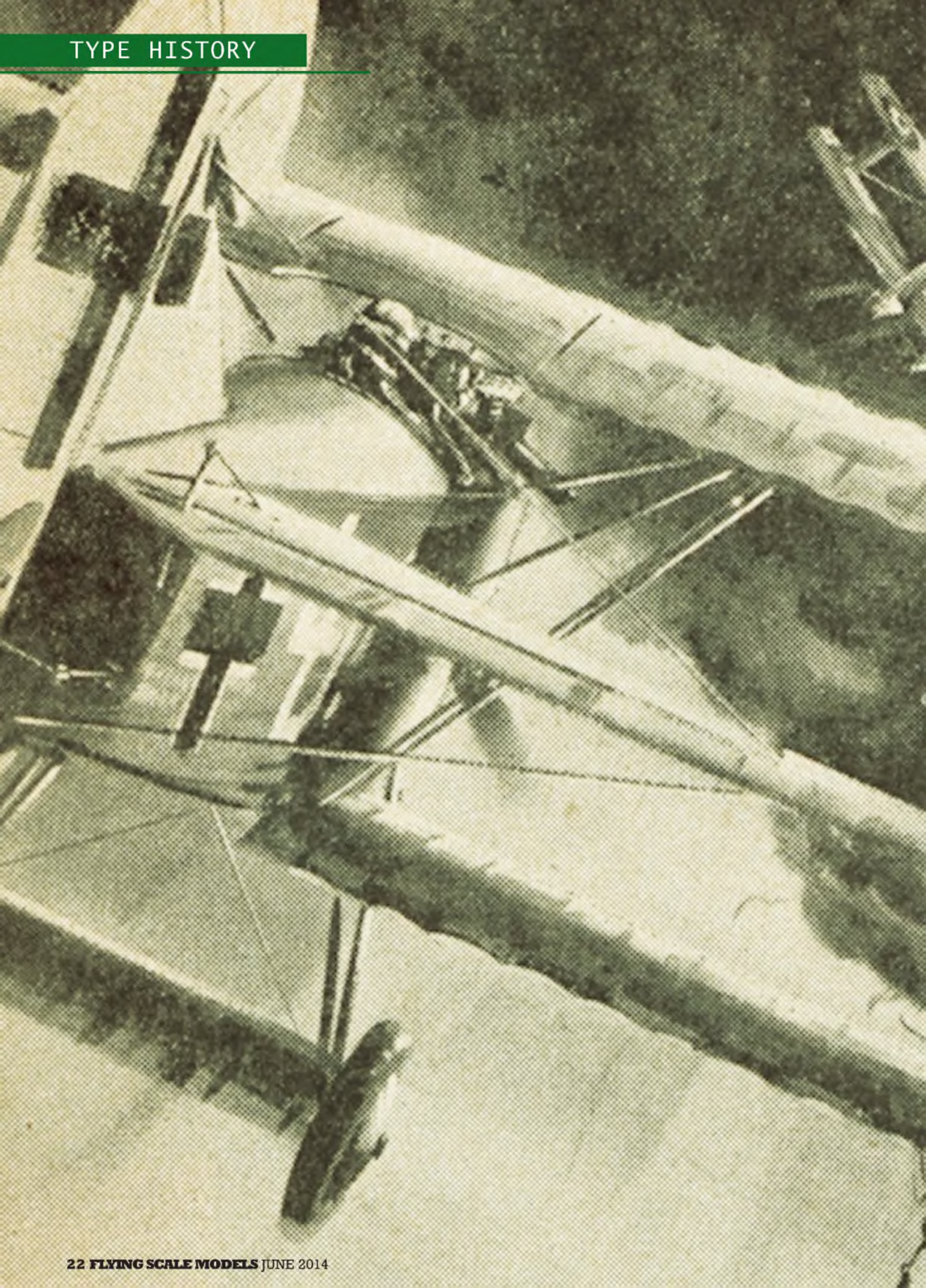
Although a little heavier than expected at, 3 Kg, the Fokker felt quite light to fly. She trundled past at about 1/3 throttle with no unstable tendencies. I think I have a new favourite model!

SPECIFICATIONS

Span: 58"
Weight: 6.5 lb
 Turnigy 4250 motor
 15X8 APCe prop
 4S 3700 LIPO
 60A ESC
 Hitec Aurora tx, Optima 6 Rx
 Loading 15-16 oz/sq ft

NEXT MONTH

In the final part of the series we take a look at some of the techniques Pat used to add a truly excellent level of detail to his prototype model. Even if you're not building this model, there is plenty of technique to learn from. ■





Fokker Pilot!

What was it really like - back then?
This story, based on an incident in Ernst Udet's biography 'Mein Fliergerlegen' gives some clue

DAWN... the almost tangible silence of this hour was rudely shattered by the staccato roar of a Mercedes engine bellowing into life. Shadowy figures moved in the misty half-light, priming engines, swinging propellers. As one mechanic ran a motor up to full revs to test the may, so another would fling himself prone across the tailplane to hold it down in the slipstream. Soon the air was vibrant with noise as the whole of Jagdstaffel 4's sinister-looking, lean-flanked Fokker D.VIIs strained against the chocks, then relaxed to a rhythmical tick-over as the engines warmed. Lined up ready for take-off in the early light, the straight-armed crosses stood out starkly against the white background of the rudders reminiscent of a row of ghostly tombstones.

Over in the crew quarters, pilots were scrambling sleepily into the Mess to hastily down a scrap of breakfast. One or two heavy sleepers had hurriedly drawn their flying clothes over their pyjamas and now drank mugs of scalding coffee to drive away the last vestige of sleep. An informal briefing was being held by the Staffell leader, Lieut. Ernst Udet, whose orders were to patrol the observation balloons at 3,000 metres as, in spite of concentrated anti-aircraft artillery protection, the audacious British pilots continued to cremate them with too great a regularity.

Udet was a small, wiry man, who had now been flying scouts since December, 1916, graduating from Fokker Eindeckers (monoplanes) and Albatros scouts to the notorious Fokkers, Dr.1 Triplane and D.VII. He had risen to his present position from that of the

lowest rank of N.C.O. pilot - a Lance-Corporal. Now a Staffell leader in the famous Richthofen Geschwader I (roughly equivalent to an R.A.F. wing and comprising Staffels 4, 6, 10 and 11), he had come to join at the personal invitation of Baron Manfred von Richthofen himself.

"How many have you shot down now, Udet?" the Baron had asked the youngster one wet day.

"Nineteen confirmed and one awaiting confirmation," the somewhat bedraggled Udet replied.

von Richthofen doodled in the mud with his walking stick, then, raising his eyes, commented: "That about qualifies you to join us. Would you care to?"

Could a duck swim? It was the most exciting question he had ever heard. His own Staffel 37 was by no means a poor one, but there was only one Richthofen unit.

"Jawhol, Herr Rittmeister!" he answered. And with a final handshake and salute, he resumed his duties in a much happier frame of mind, as the Baron drove off into the rain.

A posting order soon ensured Udet's joining the legendary Richthofen Geschwader and he made his first sortie with Jasta (colloquial abbreviation of Jagdstaffel) 2 on March 27th, 1918, celebrating the occasion by shooting down a British R.E.8 observation plane, which fell a burning wreck close to Albert. After shooting down his 24th victim - a Sopwith Camel, on April 6th, he went on leave.

It was while he was at his home in Munich that he received a telegram to say that he had been awarded the Pour le Merit, the Fatherland's premier decoration.



The man himself - Ernst Udet, seen at the time when he was serving with Jasta 4. Udet became Germany's second highest scoring fighter pilot in WW1. Only von Richthofen scored higher.

Towards the end of the month came news that von Richthofen, Germany's leading ace and conqueror of 80 foemen, had been killed on the Western Front in his scarlet Fokker. The death of their, so thought, invincible ace reflected gravely upon the morale of the German air force and, without waiting for his leave to expire, Ernst Udet returned to his unit.

Summer came. The Jastas were re-equipped with the new Fokker D.VIIs and moved south to operate on the French sector for a spell. It was here, above Villers Cotterets, that Udet narrowly escaped death. Attacking a French Breguet reconnaissance two-seater, the rear gunner disappeared after his first burst and Udet thought he had hit him, rapidly he closed the range for the "kill", but when within 20 yards of the clumsy two-seater up bobbed the plucky French observer and slammed a hail of bullets into Udet's Fokker, some of which severed the control wires. Uncontrollable, and with the only chance of survival in his doubtful parachute he clambered out of the cockpit only to be dragged to the empennage by the slipstream where he became desperately entangled in the tail. In his eagerness to fly he had not tightened the belt of his chute, which now threatened to drag him down with the stricken Fokker. With a final frantic wrench, Udet managed to extricate himself and almost before he realised that the parachute had opened, Udet hit the war-torn soil of Flanders escaping death by a few precious feet.

Even so, his troubles were by no means over. Freeing himself from the encompassing folds of the chute, he found he was in the middle of No-Man's-Land amidst a hail of shellfire. One shell instantly burst so close as to cover him with clods of earth as he dived for protection. Later in the day, Udet took off in another D.VII and as he flew over the

Lines, he could distinguish below, among the shell-holes and carnage of the trenches, the burned-out skeleton of the Fokker in which he had crashed and which could so easily have been his coffin.

So July came and went, the Staffel moved back north once more to oppose the British. And now it was mid-August as Jasta 4 took off to patrol the drachens (balloons) in accordance with the briefing. Swiftly the gaggle of deadly D.VIIs sliced through the tenuous morning mist and mounted, in a ragged Vee formation, to protect their charges strung out along the "support" trench lines. Mixture and high altitude throttles were adjusted as the ceiling increased until they thundered through a wisp of cirrus and found themselves at 10,000 feet.

But the British were up early too. Already a flight of S.E.5s were cruising higher still. The Fokkers cruised on at the same height waiting for the British machines to attack, which they seemed reluctant to do.

Udet then noticed that one of the S.E.s was streaking down like an arrow straight for one of the balloons. Slamming his throttle wide open, he turned to follow, realising that the British machine was carrying the streamers of a Flight Commander. He dived flat out after the S.E. to catch him before he could reach the balloons - but too late! A Fokker could not dive with the speed of an S.E.5.

He saw the shadow of the plane flit across the distended skin of the drab camouflaged drachen, then observed a pin-point of flame which rapidly engulfed the unfortunate "sausage" as it collapsed a flabby, fiery mass.

Another Fokker attacked the victorious S.E., but with supreme skill the positions were reversed and in a flash the Fokker was falling to earth trailing a funeral pyre of oily black smoke.

Hurling his plane around in an elevator

turn, the Englishman then nosed over and thundered down at an incredible angle, both Lewis and Makers guns spitting bullets into and around the ground crew of the ill-fated balloon. The S.E. then flattened out and fled homeward chasing its shadow at nought feet.

By now Udet was close on his tail and a hectic hedgehopping chase started. They leap-frogged over telephone wires, hedges and trees, a little extra stick work was required to hurdle the church at Marecourt! The wily German was still behind the S.E.5, however, and now had no intention of being shaken off.

They flew along the tree-lined road to Arras; Udet on the left, the Britisher on the right, with the Poplars flitting past like a wall of green. Whenever a gap in the trees occurred Udet squeezed his triggers, blasting a short burst at his opponent. Some Hun infantry were encamped in a field beside the road and these the S.E. proceeded nonchalantly to shoot up, contemptuous of the close proximity of his pursuer.

That was his mistake. The Fokker leapt the trees and, with propeller almost chewing off the S.E.'s tail, crashed a burst of Spandau fire into the S.E. which reared into a staggering stall then violently crashed. It leaped into the air again with the momentum, finally disappearing behind a thicket of birch trees. A cloud of smoke and dust rose in the sultry summer heat.

Three other S.E.s had not ignored their comrade's plight, though on approaching closely two bore off to the west leaving only one to settle the score. Udet knew from these tactics he had old hands to deal with, beginners would doubtless have all piled in together and baulked each other in the process.

The range was less than a hundred feet when the Englishman opened fire; his shooting was good and Udet felt a blow on his knee. Looking down into the cockpit, he saw a small round hole in the ammunition box and instantly realised the bullet had exploded and set fire to the tracers. This called for immediate action - thought would waste time and then the Fokker would be completely on fire. Udet squeezed the triggers of both guns firing off all the ammunition in one long burst, regardless, leaving trails of white tracer smoke behind.

The S.E. had turned off in astonishment, doubtless thinking the D.VII was on fire. Bewildered, yet relieved at this dual escape, Udet made course for home. On landing, he was in such a state of shock that he had to be assisted from his machine. This was a cumulative effect due to a prolonged period of "ops" and that night he went on leave.

When he returned to the Geschwader, the command had been taken by Hermann Goring (later to become notorious as Hitler's Reichsmarshal and head of the Luftwaffe) and Udet continued to lead Staffel 4. It was not for long, however, for towards the end of September he received a leg wound which prevented him from doing any further flying before the Armistice.

His final score of enemy aircraft was 62, second only to von Richthofen. Who knows - but for his premature "operational retirement", he may have finished the war as Germany's supreme WW1 scorer? ■

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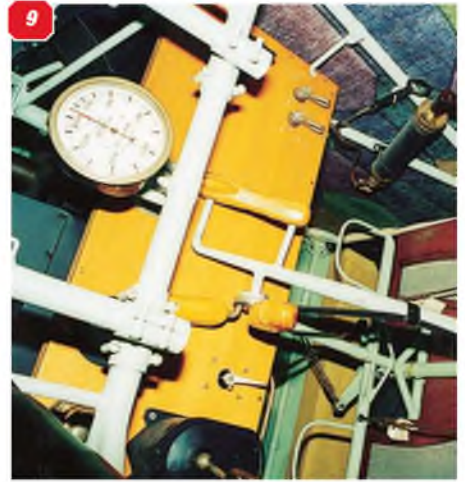
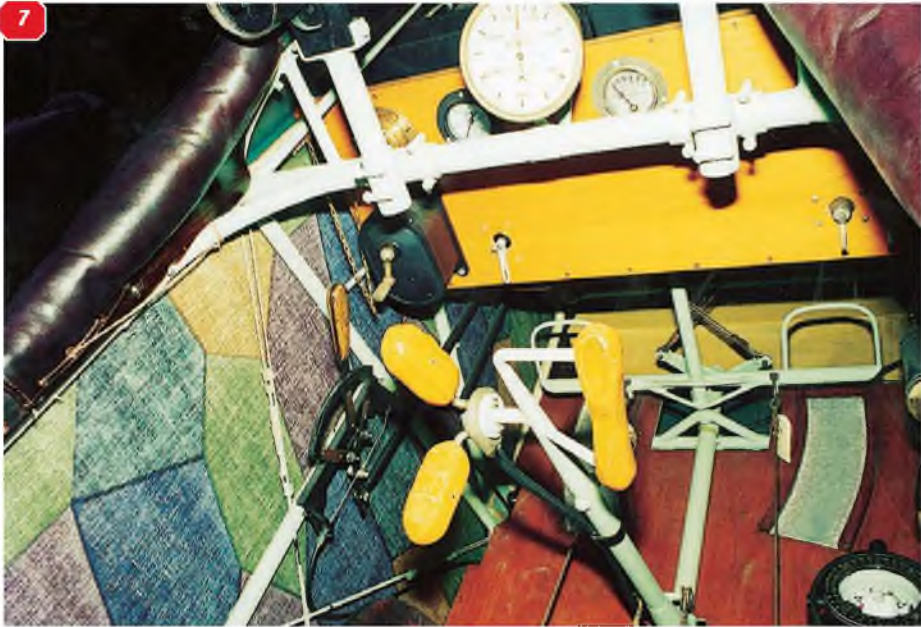
Fokker D.VII

The late Ron Moulton managed to snap this collection of close-up details of the RAF Museum's machine, right after completion of restoration work

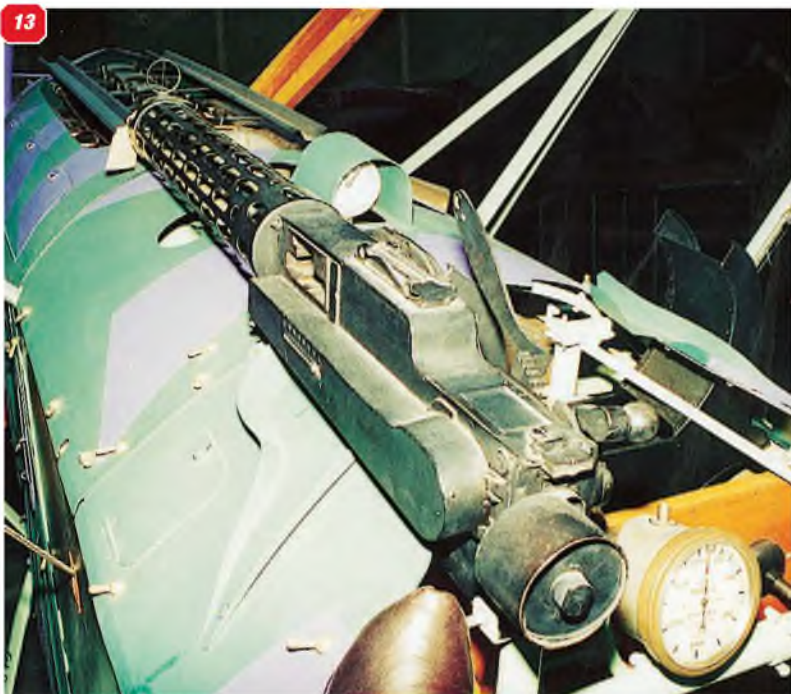
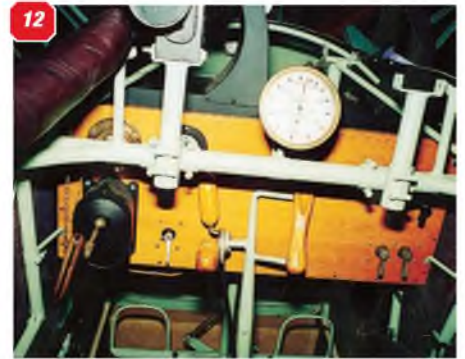


1-2: Some general views of the RAF Museum's machine which features five-colour pattern lozenge camouflage scheme. As mentioned by Gary Sunderland in the instructions for his model, the 'axle wing' is not lozenge pattern covered.





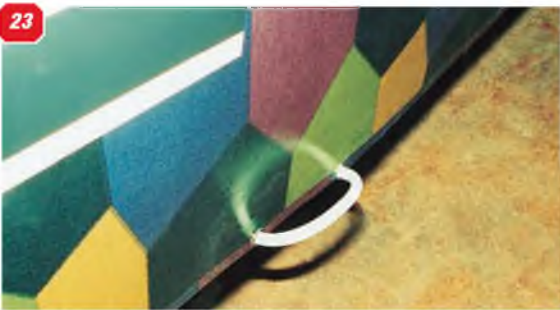
7: Cockpit interior, front and left hand side showing control column and rudder bar. **8:** Cockpit interior right hand side, showing the pilot's seat and the fuel tank pressure pump (bottom of well). **9, 10 & 11:** Further views of the cockpit interior from slightly different angles, help to demonstrate the layout. **12:** View ahead from the pilot's seat. **13, 14 & 15:** Spandau machine gun installation in the forward fuselage, ahead of the cockpit.

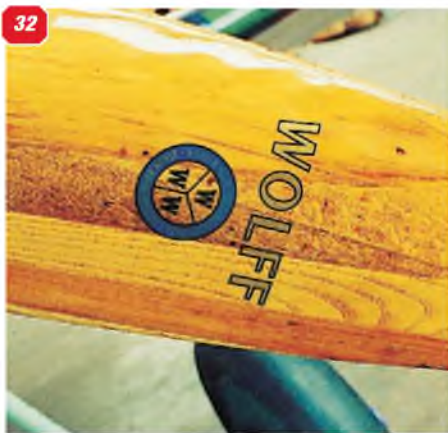




16: View of the 'N' style wing interplane struts and the cabane strut arrangement. **17:** Further view of the cabane struts. These look quite slim by the standards of the era. **18:** View of the upper anchor points for the cabane struts. **19:** Fuselage nose section, showing the layout of louvres and cabane struts. **20:** Further view of the nose section, showing engine bay louvres and the anchor points, top and bottom, for the cabane struts. **21:** Upper anchor points for the cabane struts. **22:** General arrangement view of the tail unit, showing the rudder and elevator hinges and the bracing wire from the top of the fin to the outer extremity of the tailplane. The Fokker D.VII had almost no bracing wires.

23: Hand grip positioned at the lower edge of the rear fuselage side.
24: Right, lower wing tip, showing the anchor points for the 'N' style interplane strut.
25: Close-up of the anchor point of one of the interplane strut members.
26: Wing leading edge detail.





27: Main undercarriage, showing the front strut anchor point. Note, the 'sub-wing' axle fairing is not lozenge camouflaged. **28:** Further view of the main undercarriage reveals the wire cross braces and the rear strut anchor point. **29:** Not specifically identified, but from the numerals and redline marking it is similar to the Main Fuel Tank gauge as seen in the NASM D.VII at Smithsonian in Washington DC. **30:** The Carl Bamberg Armeekompas II was fitted low down on the starboard side of the cockpit in most Fokker D.VII's. It was free to swing in its gimbal, but of course, secured for aerobatics. **31:** Front-end struts - both main undercarriage and cabane struts. **32:** Propeller tip showing manufacturer's motif. **33:** Mounted on a strut so that the pilot could read the dial showing airspeed, the Morell Anemometer was a standard instrument in use also on other types, and continued in service postwar. **34:** Allied tail gunner's view of the Fokker D.VII! This gives a clear idea of the spanwise spread of the undercarriage legs and the cabane struts.

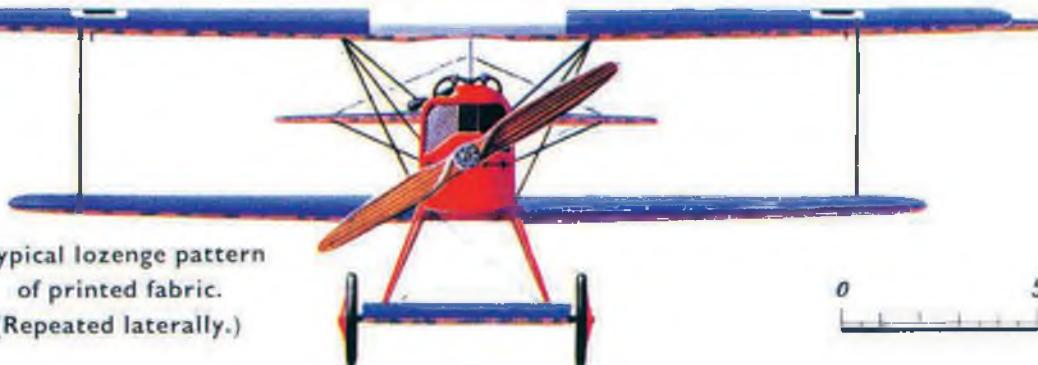




Fokker D. VII flown by Oblt. Rudolph Berthold as Commander of Jagdgeschwader II. He scored 44 victories and survived the war only to be murdered on 15th March 1920 by a political group.



Typical lozenge pattern of printed fabric. (Repeated laterally.)





D.VII, *Jasta 12/JGII*, flown by Lt. Greven.
◀ Wings lozenge camouflage.



D.VII, *Jasta 13/JGII*, flown by Lt. Wolff.
Wings and tailplane lozenge camouflage.



Marking, midway between fuselage and black cross stbd. upper wing.



D.VII, *Jasta 10*, flown by Lt. Heldmann. Wings lozenge cam. Under fuselage and axle fairing pale blue.



D.VII, *Jasta 15/JGII*, flown by Georg von Hantelmann. Wings and underneath tailplane lozenge camouflage.



D.VII, *Jasta 19/JGII*, flown by Lt. O. von Beaulieu-Marconnay. O.C. *Jasta 19*. Wings and under tailplane lozenge camouflage.



Tailplane detail



D.VII, *Jasta 56*, flown by Lt. Lutz Beckmann. Wings and tailplane lozenge camouflage.



D.VII, *Jasta 11/JGI*, flown by Vzfw. Willi Gabriel. Wings lozenge fabric, under fuselage and axle fairing sky blue.



Tail detail



D.VII, Netherlands East Indies Air Force.



D.VII, Royal Netherlands Air Force showing orange disc national insignia, 1918.



NEI D.VII rudder marking.



D.VII, Royal Netherlands Naval Air Service.

North American Aviation AT-6, SNJ & HARVARD

You always know when there's a Harvard in the air, without even seeing it - the sound is THAT distinctive!

It might just be, that the North American Aviation Inc. AT-6 / SNJ / Harvard has been used, by more pilots worldwide, to gain their 'Wings' than any other trainer type in the history of Aviation.

It may also be the case that during an extraordinary service life, way beyond the manufacturer's expectation, the type participated in combat operations over a period way beyond that of most contemporary types that were actually purpose-designed for combat operations. In the case of the type we are studying here, offensive armament was first hung on the aircraft from the early 1940s, right through to the mid-1970s.

North American Aviation Inc. had its beginnings in 1928, although not directly as an aircraft manufacturing organisation, but as a holding and investment organisation with interests in direct aviation industry participants that included Curtiss Aviation,

Sperry and also airlines including TWA (Trans World Airlines).

This changed in 1933 when NAA re-organised, opening a manufacturing plant in Maryland State in Eastern USA. Their first design was the GA-15, observation aircraft which gained a US Army contact under the military designation O-47. Encouraged by this success, in 1934 the embryo company took a shot at the US Army's requirement for a basic trainer type, their NA-16 design being the first to carry NA (North American) designation prefix.

In its original prototype low wing monoplane form, NA-16 featured tandem open cockpits, fixed main undercarriage and flaps that traversed the entire centre section of its three-piece wing and extended out on the two outer wing panels to the aileron. However, the Army quickly revised the specification to include an enclosed canopy for the two cockpit positions, plus faired main undercarriage legs

and spats for the wheels. Thus revised it became the NA-18, with military nomenclature BT-9.

Spurred by this success and with two aircraft types on the order book, NAA promptly upped sticks and relocated their manufacturing operation to the opposite end of the country, settling in Inglewood, California, where the US Navy became an added customer for a revised version of the basic BT-9 with internal cockpit revision for instrument training as the NJ-1.

Further development produced the BT-14/ 'Yale' which moved closer to the AT-6 shape, now with semi monocoque, full metal skinned fuselage in place of fabric over stringers, a fin/rudder reshaping in the near-triangular outline of the definitive AT-6, but still with fixed, faired and spatted main undercarriage.

The Yale was the export version, supplied to Canada and France, the latter taking delivery of most of their 230 ordered before the fall of France in 1940, after which both the Vichy French Air Force continued to use whatever the Luftwaffe did not press into their own service.

Wheels Up!

The widespread re-armament plans the late pre-WW2 years among many nations was characterised by a constant demand for improved aircraft performance as combat aircraft designs moved to incorporate performance increasing features that included retracting undercarriages.

Thus trainer aircraft, or at least, advanced trainers, needed to incorporate such a feature. Moving to satisfy this need, NAA took their basic BT-9 configuration, applying a retracting main undercarriage system, while retaining the stringer and fabric covered fuselage and the BT-9's rounded rudder shape. Both Army and US Navy placed orders, the latter as the SNJ-1

Enter the AT-6

What emerged as the basic definitive AT-6 / SNJ / Harvard was little more than a refocus of previously designed features, the major one of which was an all metal skinned fuselage as previously applied to the fixed undercarriage BT-14 / Yale.

First test flown as the BC-1 in early 1938, it retained the rounded wing tip shape of the BT-9 and BT-14 and the lengthened fuselage of the BT-14, but by the production stage had shed the rounded wing tips for a squared-off shape to become the BC-1A / AT-6.

Fighters for export

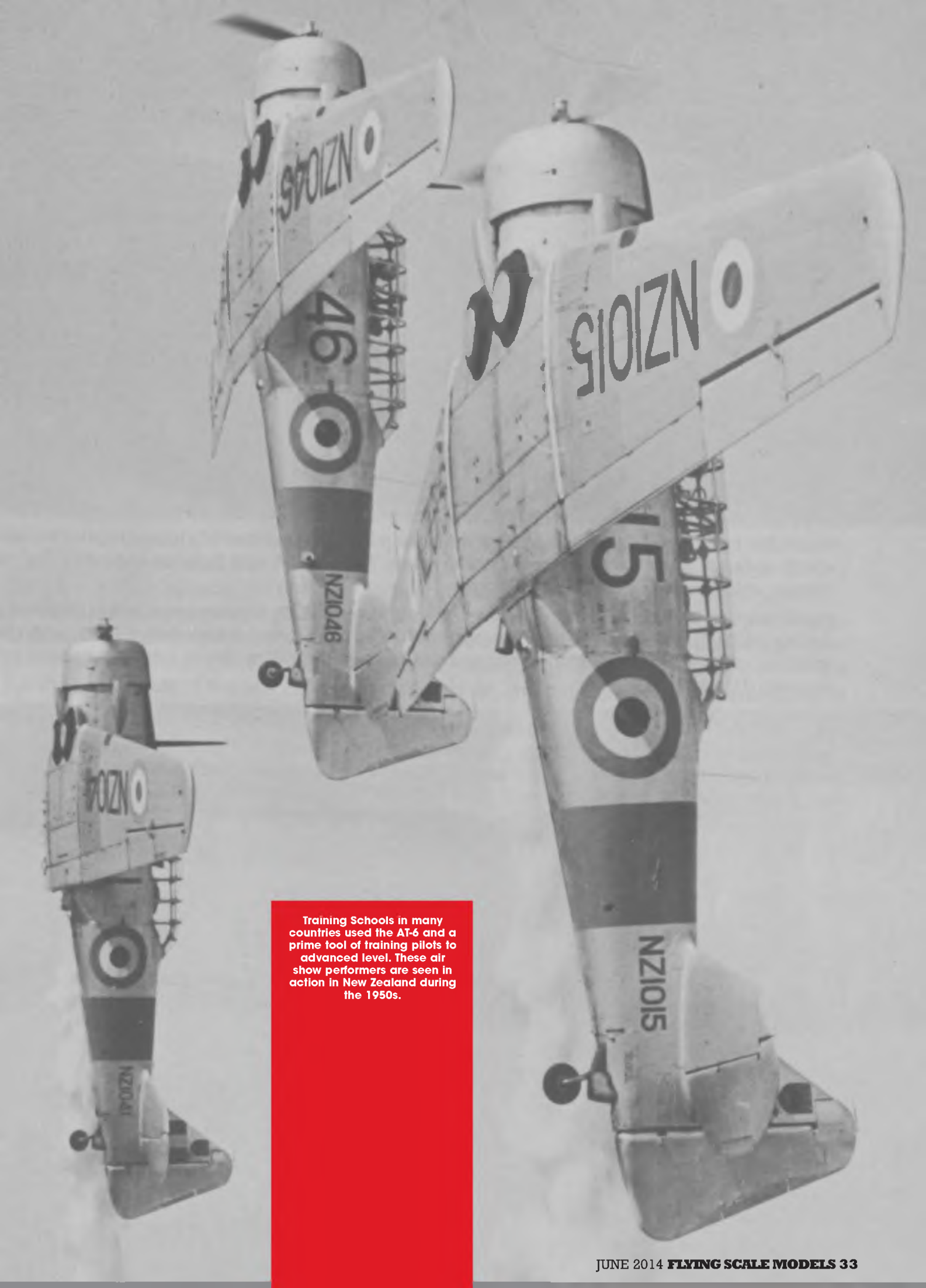
Although, at that stage of North American



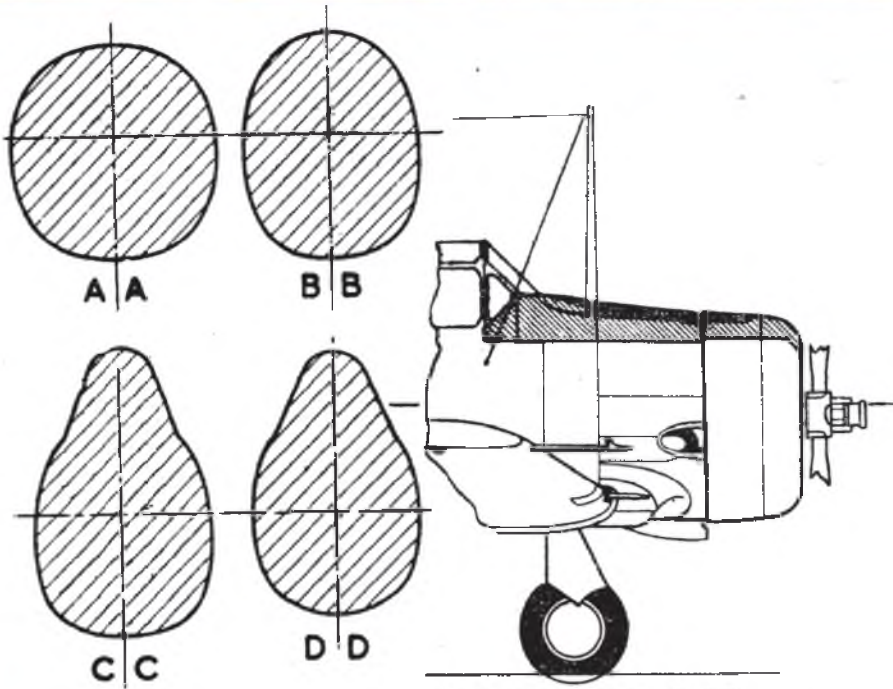
Where it all began, the prototype NA-16 as it first appeared, with open cockpits. The fixed undercarriage had no leg fairing and wheel spats.



As revised to US Army requirement, the NA-16 became NA-18, with enclosed cockpit, plus main undercarriage fairing and assumed the military designation BC-9 (Army) and NJ-1 (Navy).



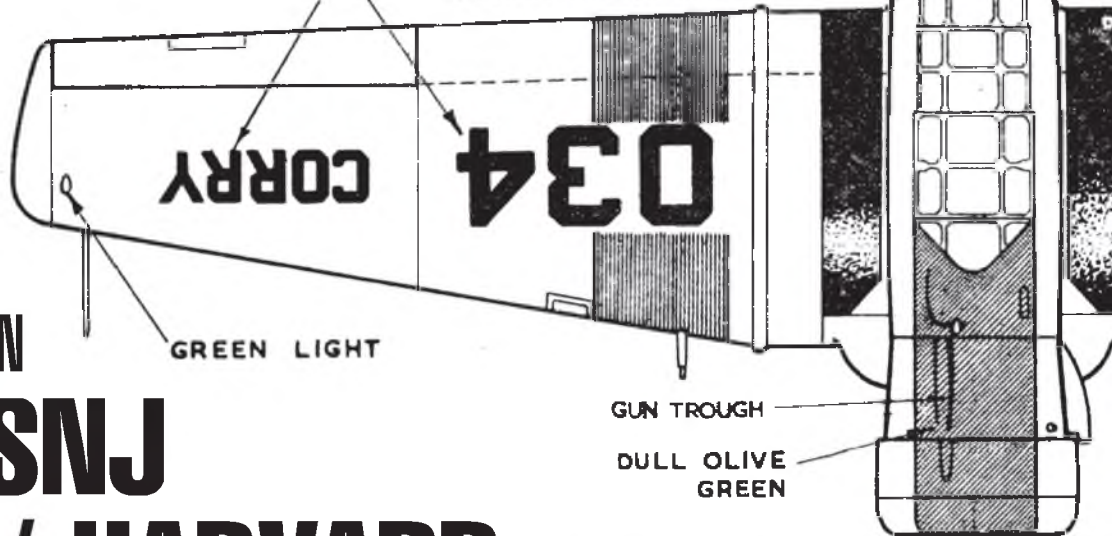
Training Schools in many countries used the AT-6 and a prime tool of training pilots to advanced level. These air show performers are seen in action in New Zealand during the 1950s.



DETAIL RIGHT SIDE

BLACK

DETAIL RIGHT SIDE



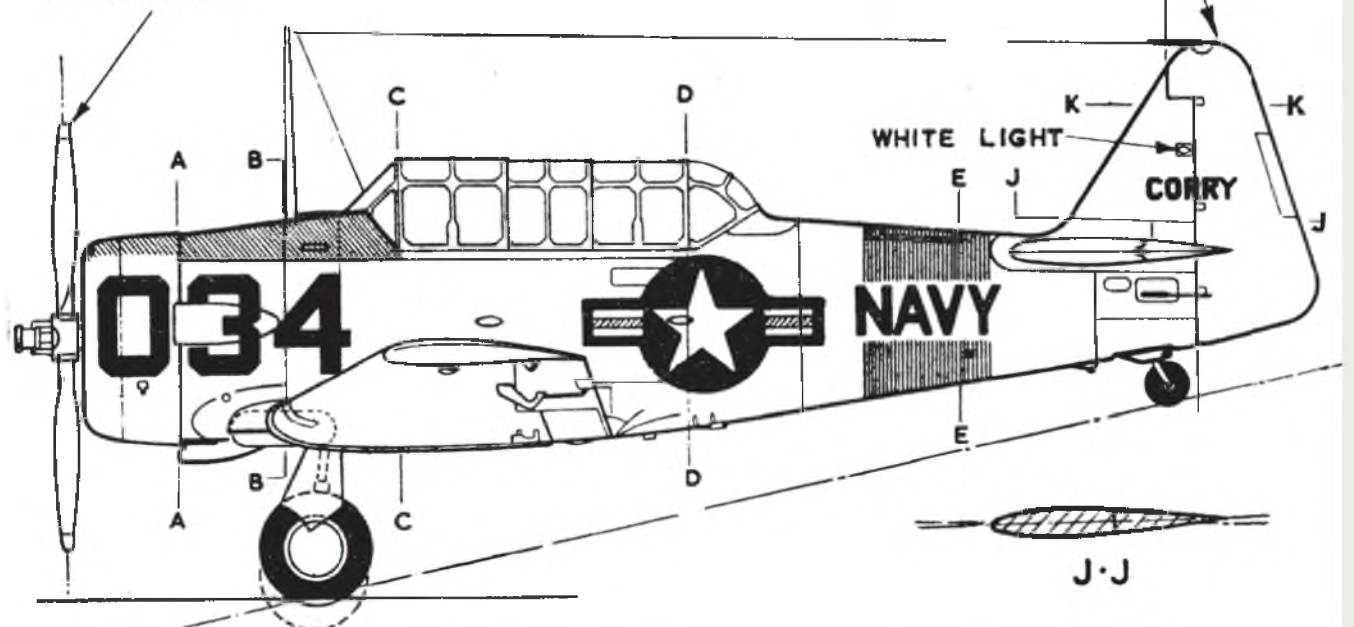
GUN TROUGH

DULL OLIVE GREEN

HARVARD II & III

NORTH AMERICAN AT-6 / SNJ TEXAN / HARVARD

YELLOW TIPS

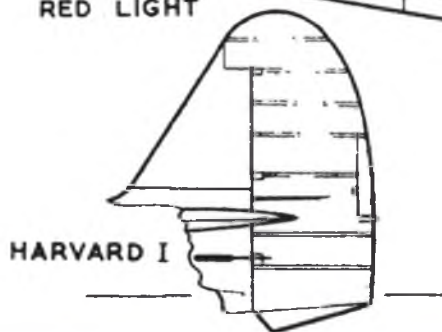
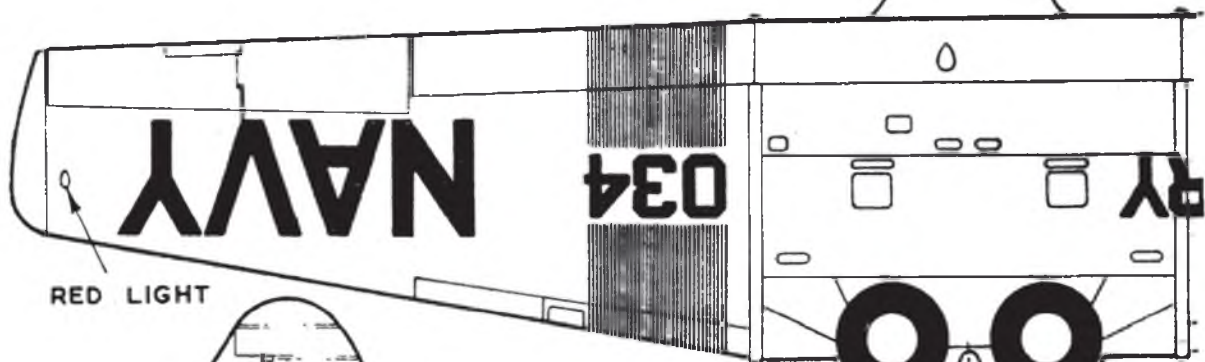
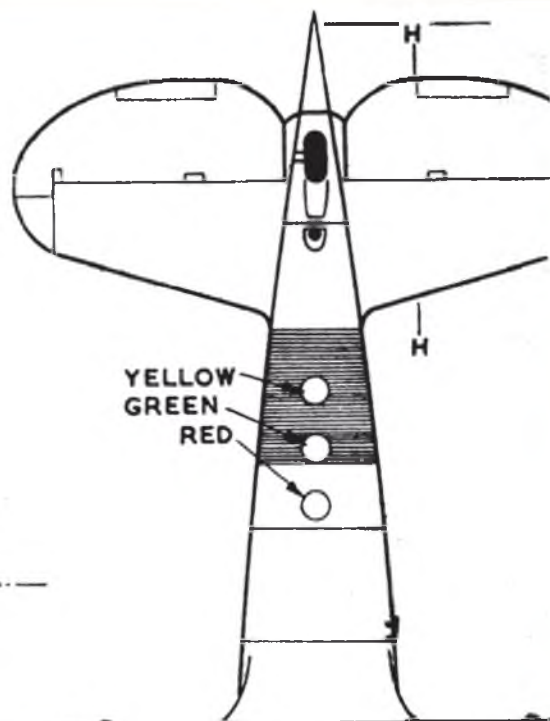
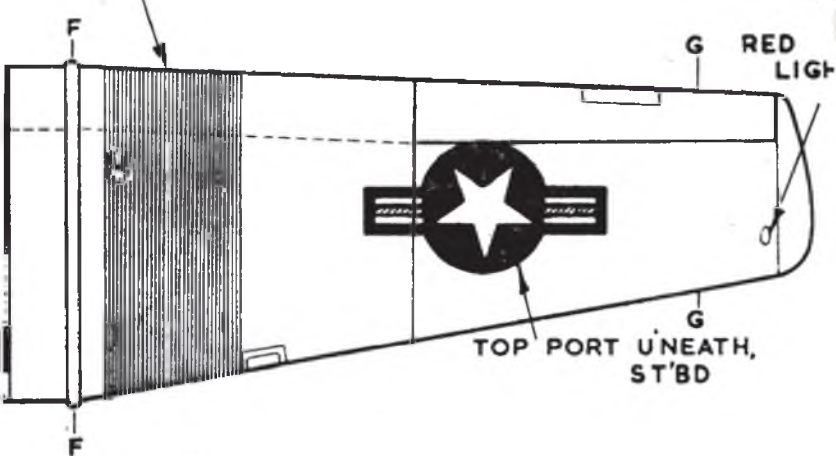
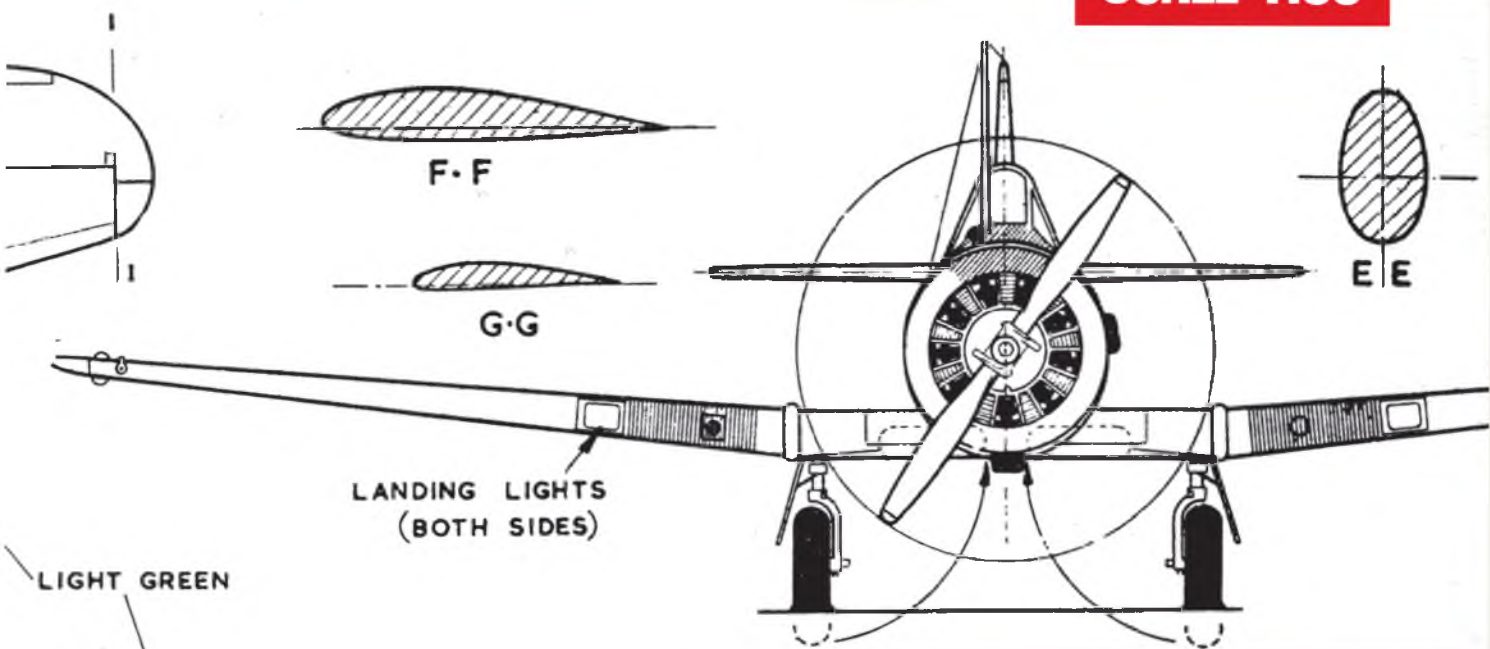


WHITE LIGHT

CORRY

J-J

SCALE 1:50





As air racing goes, this is TIGHT! AT-6s round the pylons during the National Air Races at Reno, Nevada.

Post-WW2, the AT-6 / SNJ / Harvard, in all its various sub-variants continued as a major training tool with the air arms many nations, and as major air arms sold off theirs to re-equip with new types that would prepare student aircrew better for the jet-era, there began a trickle-down of Texans and Harvards among smaller and emerging nations to be adapted and used for a wide variety of roles including some for more belligerent intent.

A career in Korea

When North Korean land forces flooded south across the 38th Parallel frontier demarcation line on June 25th 1950, US ground forces on the southern side of the Korean peninsula were quickly driven south into a defensive perimeter for which air support could only be provided from bases away in Japan. Jet powered ground attack aircraft, including Republic F-84 Thunderjets and Lockheed P-80 Shooting Stars had the speed to get to where they were needed quickly, but thirsty early jet engines allowed little 'loiter time'.

A speedy spotter aircraft that had the necessary endurance was needed to loiter over a target and guide the jet strike aircraft onto enemy ground forces and the answer was found in the AT-6. Less than a month later, the first AT-6 was in action and continued in this role until the cessation of hostilities in 1953 after a see-saw ground war in which United Nations forces chased North Korea back close to the North Korean Capital, Pyongyang, before being driven back (aided by overwhelming Chinese



Another of the racing AT-6s, most of which carried highly personalised colour schemes and sponsorship logos.



This RAF Harvard Mk.1 features the rounded rudder shape. Note the ample flaps, here fully deployed.

Aviation's existence, the company lacked the design background of other major aviation companies, both in USA and Europe engaged in the design and manufacture of state-of-the-art combat types, NAA did identify an minor 'window of opportunity' to supply fighter type aircraft to less developed nations.

The BC-1/ AT-6 was the basis for their NA-50A, with wings shortened by 60", single-seat fighter in which the cockpit was revised, with rear fuselage dorsal fairing behind the shortened cockpit canopy. It carried four 0.3" machine guns, two mounted under the engine cowl, firing through the propeller arc and one in each wing. Seven examples were sold to Peru in 1939 and participated in a brief border war with Ecuador during 1941.

More advanced was the NA-68, much more heavily armed, with two 20mm canon mounted in a fairing under each wing, plus 8mm machine guns, two in each wing and two enclosed within the engine cowl.

Siam (Thailand) ordered six, but deliveries were embargoed by the US Government during the tense period leading up to the

Japanese attack on Pearl Harbour in December 1941 while the aircraft were en route aboard ship at Hawaii. These were offloaded and turned over to the US Army Air Corps and fighter trainers under the designation P-64.

Back to the main task

Thus far, the story of the type was little more than half a decade old and none, at that stage could have envisaged the phenomenally long career that would follow as the AT6 / SNJ / Harvard settled in to its primary task of training pilots destined for Allied combat units engaged in a World War. North American Aviation was committed to turning out the type in increasing numbers, in increasingly diverse sub-variants, in vastly expanded manufacturing effort that included such combat types as the P-51 Mustang and M-25 Mitchell bomber.

Facilities beyond that which the Inglewood, California plant could provide were needed and a new plant at Dallas, Texas was constructed to take-over AT-6 manufacturing - a move that bequeathed the name 'Texan' to the type.

forces) to a stalemate conclusion along the original 38th Parallel frontier.

Other people's wars

The post-WW2 proliferation of new Nations gaining independence from Colonial rule and the unrest that fanned the clamour for independent status, found the AT-6 in demand again, largely in a ground attack role hung with all manner for guns, rockets and bombs. As early as 1948, Israel used the type during its war of Independence, regularly against Syrian AT-6s and again during the 1956 Sinai campaign against Egyptian tanks.

The RAF used armed Harvards against terrorists in Malaysia from 1948-51 and also against Mau-Mau insurgents in Kenya, 1952-1960. France's counter-insurgency campaign in Algeria from 1952-60) involved signification aviation assets, with as many as 30 Squadrons of AT-6s at one period.

Belgium also used the AT-6 in the counter insurgency role in Congo, before independence when the aircraft were then transferred to the newly independent state's air arm, to be promptly turned to use in the

subsequent civil war.

During the 1960s Portugal, used armed AT-6s in attempt to quell rebel forces in the Portuguese African possessions of Angola, Mozambique and Portuguese Guinea. Further central African combat using AT-6s involved action in Biafra during the War with Nigeria, 1967-70.

Spain also used armed AT-6s against guerrillas in North Africa during the mid-1970s, while Pakistan flew successful missions with the AT-6 during the 1971 India/Pakistan war.

There have been other actions in South America involving the AT-6, and finally - or can it really be final (?) - AT-6s remained in service, mainly as a result of the United Nations arms embargo against South Africa's Apartheid policies, with the South African Air Force as a basic trainer until 1995, to be replaced by Pilatus PC-7MkII turboprop trainers.

All told, the type has been used by the air arms of no less than 60 nations, worldwide.

Gentlemen you have a race...

Surviving examples of the AT-6 / SNJ / Harvard are much prized among those who



The second of NAA's attempts at a fighter aircraft was the NA-68, based on the AT-6 in 1938 and ordered in small numbers for Siam, but wound up with the US Army as a fighter trainer as the P-64. Not much more than two year later, NAA rolled out the first prototype P-51 Mustang, which was in a totally different league.

fly, own, or collect classic aircraft types. Today, the most spectacular use of the type is, perhaps, in air racing. At the annual National Air Races, held at Reno, Nevada, there is a racing class specifically for the type. Not surprisingly, the close matching of the performance of the individual aircraft entered, leads to some VERY tight racing - which in one instance, led to a catastrophic

mid-air collision.

Given that any serious aviation enthusiast can identify the presence of an airborne AT-6 without even seeing it, due to the distinctive and very loud noise from the propeller/engine, the sound of half a dozen tightly packed examples skirting low around the pylons at Reno Stead Airfield must surely be a unique song of the sky! ■



A Royal Air Force Harvard in early post-WW2 colour scheme with bare metal overall finish, except for the elevator and rudder which were paint silver cellulose over fabric covering.

HARVARD FLYING COLOURS

Harvard Mk II, 2564, No.4 STFS Royal Canadian Air Force, Saskatoon (Saskatchewan), 1941. Dark Earth and Dark Green upper surfaces with Trainer Yellow undersides. Yellow panels above wings, horizontal tail surfaces and fuselage top aft of cockpit. All lettering in black. Blue/Red roundels above wings



Harvard Mk II, 2588, 'Black 9', No.2 FTS, Royal Canadian Air Force, Uplands, 1941. Trainer Yellow overall with black anti-dazzle panel. All lettering in black with '2588' repeated below the wings. Roundels in six positions



Harvard Mk II, 2866, 'Black 43' No.2 FTS, Royal Canadian Air Force, Uplands, 1941. Trainer Yellow overall with black anti-dazzle panel. All lettering in black with '2588' repeated below port wing only. Blue/Red roundels above wings



Harvard Mk II, 2815, OJ-815, 'A' Flight, No.4 FTS Royal Canadian Air Force, Penhold (Alberta), 1957. Trainer Yellow overall with black anti-dazzle panel. All lettering in black. National markings in six positions, with code '815' repeated below the wings. Unit badge on nose, dark blue wingtips



Harvard Mk II, 3308, DK-W, No.31 SFTS, Royal Canadian Air Force, Kingston (Ontario), 1941. Trainer Yellow overall with black anti-dazzle panel. Black checks on fin. All lettering in black with '3308' repeated below the wings. National markings in six positions

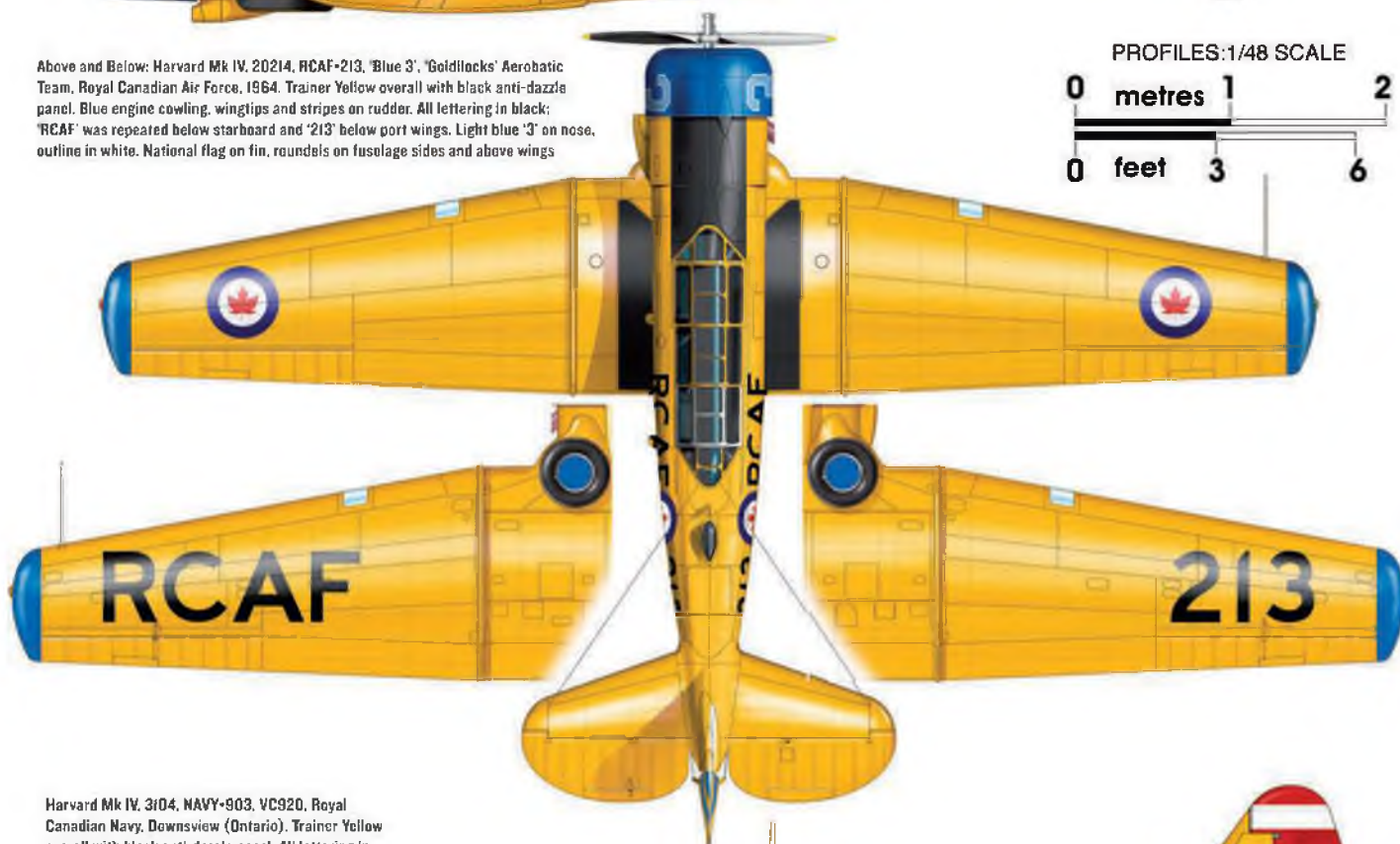
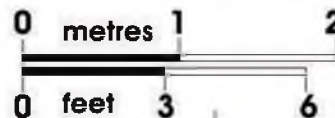


Harvard IV (T-6J), 20449, RCAF-449, Goldlocks Aerobatic Team, No.1 FTS Royal Canadian Air Force, Trenton (Ontario), 1961. Trainer Yellow overall with red nose, wingtips and fin. All lettering in black. Code '449' repeated below wings. Wheel hubs in medium blue. National flag, outlined in white, on fin



Above and Below: Harvard Mk IV, 20214, RCAF-213, 'Blue 3', 'Goldlocks' Aerobatic Team, Royal Canadian Air Force, 1964. Trainer Yellow overall with black anti-dazzle panel. Blue engine cowlings, wingtips and stripes on rudder. All lettering in black: 'RCAF' was repeated below starboard and '213' below port wings. Light blue '3' on nose, outline in white. National flag on fin, roundels on fuselage sides and above wings

PROFILES: 1/48 SCALE

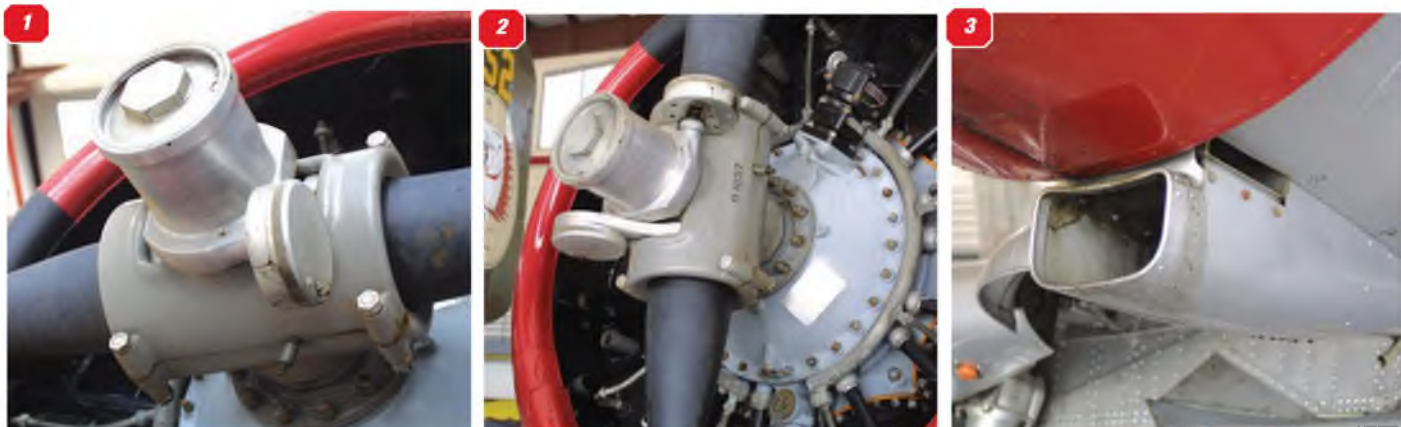


Harvard Mk IV, 3104, NAVY-903, VC920, Royal Canadian Navy, Downsview (Ontario). Trainer Yellow overall with black anti-dazzle panel. All lettering in black. Red/white striped rudder, red engine cowlings. National markings in six positions with code '903' repeated below wings

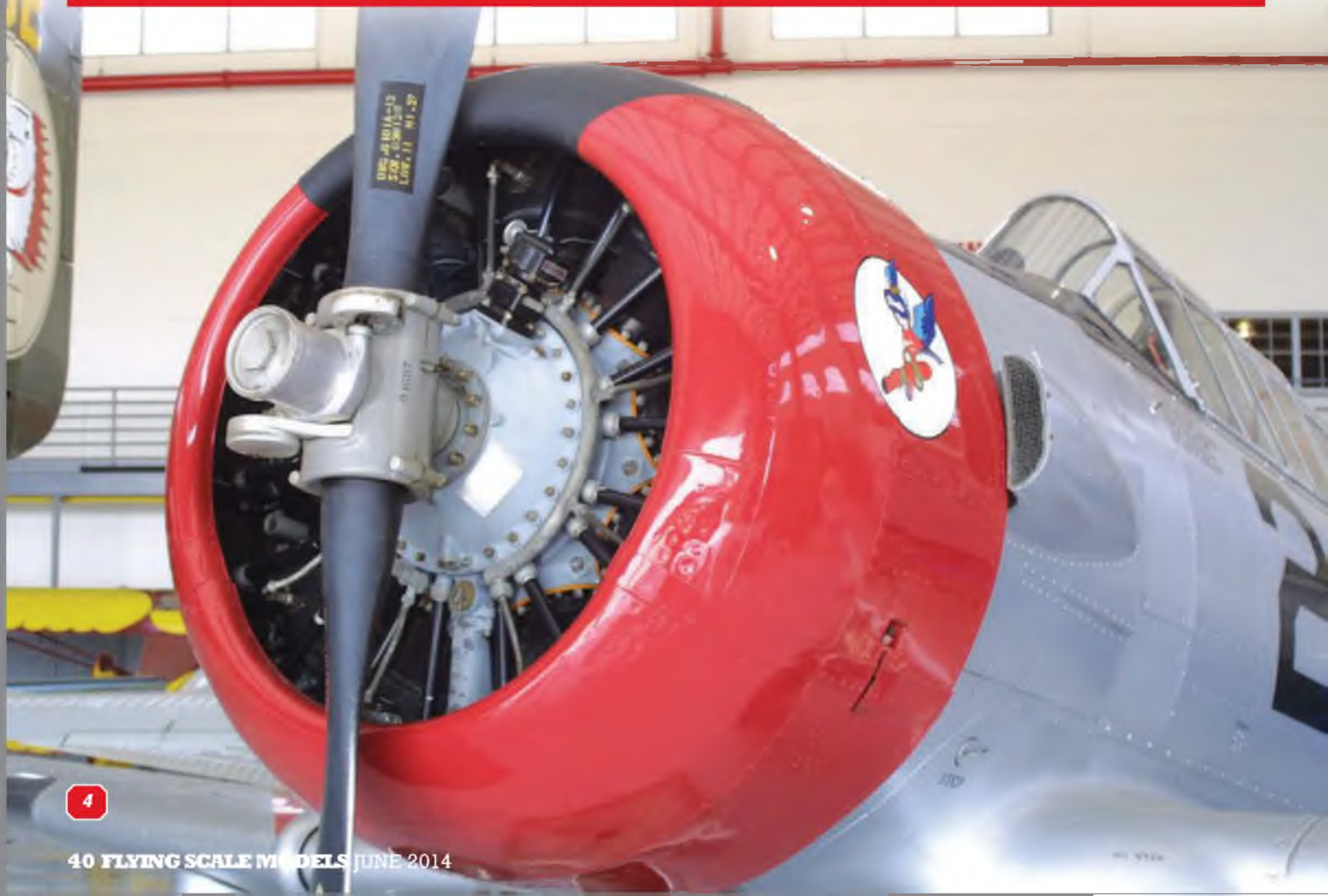


NORTH AMERICAN AT-6/SNJ/HARVARD

CLOSE-UP SURFACE DETAIL IS WHAT MAKES A MODEL SPECIAL



1 & 2: The constant speed propeller hub. 3: Air scoop on the fuselage underside, just behind the rear edge of the engine cowling. 4: General view of the engine cowling.





5



6



9



7



8

5: Air scoop, left fuselage side, just behind the engine cowl.

6 & 7: Two further views of the same air scoop.

8: Exhaust stack, at the rear of the engine cowl, right fuselage side.

9: The castoring tailwheel. In this view, the aircraft has been pushed backwards into position in the hangar.

10: Main undercarriage leg viewed from the inside face.

11: Main undercarriage viewed from the outside face, showing the undercarriage fairing door.



10



12



13

12: Aerodynamic balance at the top of the fin, also showing the top hinge.

13: Tail light at the fin trailing edge.

14: Lower rudder hinge line, showing the control horn and control wire.

15: General view of the Fin and rudder.



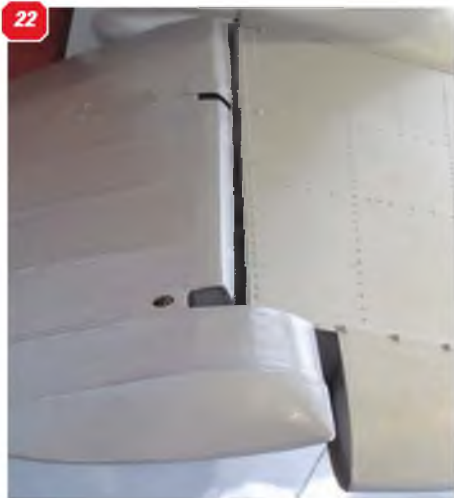
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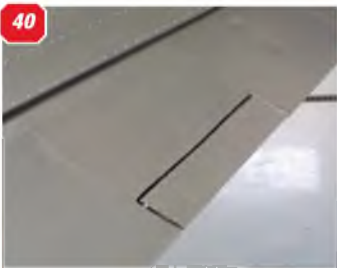
16: Fuselage panel line detail at the rear cockpit position. Note the fixed foot step for access into the cockpit.
17: Panel detail at the wing training edge, showing the small fairing with the fuselage.
18: Panel lines in the fuselage top side, just ahead of the cockpit.
19: Rear fuselage top side fuselage panel detail.
20: The bulged panel on the fuselage, top right side of the cockpit windscreen.
21: Another view of the exhaust stack.
22: Tailplane/elevator hinge line, showing the aerodynamic balance.
23 & 24: Two views of the elevator trim tab.



25: Pressed metal fairing cuff at the tailplane leading edge.
26: Main undercarriage wheel well.
27 - 31: The long cockpit canopy is a dominating feature of the AT-6 as these views reveal.



32: Cockpit canopy guide rail at the rear of the cockpit.
33: Another view of the bulged fairing on the right hand side of the fuselage top deck ahead of the cockpit windscreen. This kind of detail varied from version-to-version of the AT-6/SJN/Harvard.
34: Cockpit front windscreen.
35: General view of the full cockpit canopy.



36: Bulged fairing, wing underside, also showing the cover over the wing panel join line.
37: Landing light in the wing leading edge.
38: Pitot head right wing leading edge. **39:** Wing tip navigation light.
40: Aileron trim tab.
41 & 42: Aileron hinges.
43: Rubber cockpit access tread-plate, also showing the fairing strip over the inner/outer wing panel joint fairing.
44: The complete aileron, showing the hinge line.
45: Top-side view of the wheel fairing in the wing leadline edge. **46:** Further view of the cover strip over the inner/outer wing panel join line.
47: Wing panel line detail aft of the wing leading edge along the termination of the wrap-around leading edge surface skin.



FULL-SIZE FREE PLAN

Verville Air

A 1/18 scale (770mm span) "IPS" model designed by Peter Rake with the proto



Coach

prototype model built and described by Richard Hopkinson.

LEFT: Looking pretty as a picture the little Verville is all ready for another flight.

RIGHT: The background makes it very clear why Richard prefers to hand launch the model.



The Verville Air Coach was an attractive light transport that unfortunately fell victim to the Great Depression of the late 1920s-early 1930s. It was luxuriously furnished and by all accounts had good performance. Between 10 and 16 examples were built before the *Verville Aircraft Company* declared bankruptcy in 1931. Very little documentation is available - there are photos of the first aircraft in company colours and a few more photos of others at the factory before delivery but almost nothing about the Air Coach in service.

Despite this lack of a service history, the Air Coach has been the subject of a number of free-flight models which is no surprise considering its attractive appearance and good proportions. One of the best reference sources for this aircraft can be found in 'Flight' magazine, 16th May 1929 which is available in the online *Flight Archive*. The one-off prototype Air Coach is shown and described, so be aware it has some differences to the rest of the production run. An interesting fact revealed in 'Flight' is that the higher powered versions had a greater wingspan because the cabin was widened by a foot for production. Photos of the cockpit interior of the prototype don't match exterior

photos of subsequent aircraft. Peter's model replicates the later version with the wide cabin.

Since the prototype plan included a second sheet showing the parts laid out for 4" wide sheets of wood, (*also provided here -Ed*) I simply stuck the parts sheets to balsa of appropriate thickness and cut them out. It only took an hour or so to cut all the wood parts. In fact this model is very simple to build - to give you some idea I built the airframe in a single Sunday afternoon with the help of my five-year-old son, and all the distractions that entails!

TAIL

The tail is all 3/32" sheet. I rounded the leading and trailing edges and bevelled the leading edges of the rudder and elevators. I suppose you could taper the control surfaces towards the trailing edges, but in my not-so-humble opinion all that will do is give you control surfaces that curl up across the grain. The elevators are joined with a piece of 20swg wire and small ply horns are glued into the elevator and rudder. Easy!

WINGS

The wings are similarly straightforward. Bass is



Nothing unusual about producing the basic fuselage sides. Sheet balsa forward sections and built up strip rear end.



How the forward sides are scored, cracked inwards and joined with the ply firewall.



Block balsa and part N glued in place and ready for shaping. Half of N and the bottom block form the access hatch.

specified for the spars. Balsa will probably stand up to the flying loads but chances are, the covering will curl all-balsa wings upwards, so stick with bass. As usual I had to substitute local hoop pine for bass - it's slightly heavier and very strong.

Before gluing anything, you need to prepare the spars by notching them to fit over the tips and marking the position and angle of the root ribs. This is noted on the plan. I've never set the dihedral this way before so when the wings are joined to the fuselage we'll see how accurate my marking is...

My usual form is to pin the trailing edges to the plan and use the ribs to set the exact position of the spar. I only do it this way because it's difficult to push pins through the pine spars. The ribs are slotted over the spar, the root ribs are leaned over to match the pencil lines marked on the spars, and the balsa leading edges glued to the ribs. When the glue was set enough to remove a couple of pins, I

added the top surface 1/32" sheeting to the inner rib bay on each panel. The final job on the wings is to sand the trailing edges to a suitable taper and round off the leading edges.

FUSELAGE

This is typical 'Peter Rake', being a balsa box at the front and an open frame at the rear. The upper and lower longerons are curved in side view so I built the sides in one piece over the plan rather than building the front box and joining the open-frame section later. Use hard 3/32" square sticks for the rear fuselage.

It's potentially slightly awkward to get the rear fuselage symmetrical as it can't easily be pinned over the plan. Nevertheless I managed to build a straight fuselage 'in the hand' by gluing the tail together and then fitting the cross-pieces, starting from the front and making sure I wasn't building a banana as I went.

If you prefer to glue the fin to the

horizontal tail before fitting the complete tail unit to the fuselage, remember at this stage not to glue the upper ends of the fuselage sides together.

To achieve the tapered nose, the 3/32" sides are cracked and bent inwards just in front of the cockpit and 1/4" balsa cheek pieces are added and sanded to a curved shape

The nose is built up from pieces of balsa block, carved to shape. The lower block forms a hatch for motor and battery access and there's a thin ply hatch under the wing to allow access to the servos. I used magnets to retain both hatches. The undercarriage legs trap the rear hatch quite effectively in place and it needs to be bent a bit to get it free. It's not a big issue - once you've set up the servos, the rear hatch won't need to be removed unless you need to do major maintenance, like replacing a servo.

The lower nose block couldn't be easier, but you'll have to relieve the top block carefully to fit over the lower part of the windscreen pillars. The lower edge of the windscreen on the real Air Coach had a gentle curve in the wide fuselage versions. If you try to replicate the more deeply curved line shown in the only known cockpit photos, you will run into trouble!

To avoid damage while carving and sanding the nose I left the upper deck stringers until the rest of the fuselage was complete. These are simply 1/16" x 3/32" balsa strips that are glued into notches in F3 and F9. The plan shows the correct positions for the stringers- don't make them straight, or you will end up with an oddly shaped fuselage. If you follow the plan the wing roots should blend beautifully into the curved fuselage top.

UNDERCARRIAGE

The undercarriage is made up of a number of pieces which is great - I can solder with confidence while my wire-bending skills leave a lot to be desired! The bends on the main undercarriage parts are all in one plane so it's easy to make two identical pieces where required. The small airfoil-sectioned fairings are added when the wire parts are permanently fixed in place. As with most scaled-down versions of full-sized undercarriage structures it's extremely strong when complete.

When the wires are fitted to the fuselage, the horizontal and vertical fairings are added. The horizontal fairings



Once the nose is shaped the stringers can be added to form the rounded rear deck.



The main undercarriage wires fitted and balsa fairings added.



Richard used 'snakes' in his model, but lightweight pushrods would work equally well.



Building wings really doesn't get much easier than this. Just make sure the root rib is at the correct angle for dihedral.



The obligatory naked model shot reveals that this model uses very traditional construction techniques.

are made from two pieces of 1/4" balsa each, grooved to fit over the wires, and the vertical suspension fairings are made from 3/32" balsa.

The tail wheel leg is bent up from 22swg piano wire and wired to the ply/balsa mounting plate (TS1/TS2). I wired the leg to the plate before gluing the plate to the fuselage but there's enough room to attach the leg with the plate in place.

FINAL ASSEMBLY

The fin has a tab which goes into a slot in the horizontal tail. This assists greatly in alignment as the tail surfaces can be glued together at right angles to each other on the bench. The complete tail can then be glued to the fuselage, the upper parts of the fuselage sides pulled inwards and glued to the tail, and small block balsa fairings added on either side. The wing spars slide through their slots in the fuselage sides and are joined against F3 with the dihedral wedge F3A to set the correct dihedral. I actually joined the wings after covering but I checked the dihedral and incidence beforehand. Peter's method for determining the angle of the root ribs worked very well and no adjustment was required.

DETAILS

I made the tail wheel from a piece of 1/8" balsa with a small-diameter aluminium tube in the centre.

The engine cylinders are pieces of 3/8" plastic tube. The rocker boxes and exhaust pipes are also made from

CUT PARTS SET FOR THE

VERVILLE AIR COACH

Get straight down to construction without delay! This month's full size free plan feature is supported by a laser-cut set of ready-to-use balsa and plywood components. This provides all the parts that, otherwise, you would need to trace out onto the wood before cutting out.

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Cruising past for the camera, the model has proved to be an excellent little flyer.

various sizes of plastic tube and the pushrods are paperclip wire.

The windows are thin plastic cut from some discarded packaging. You can make them over-sized and glue them to the inside of the fuselage or take the slightly more difficult road and trim them exactly to shape so they can be fitted flush with the sides.

That's about all you need for a convincing replica and at this scale it's about all the non-essential weight you want to add as well. A pilot would improve things but as yet I haven't got one of a suitable size.

FITTING OUT

The motor is fitted with 2° right and 2° down thrust. I achieved this by packing the mount away from F1 with small pieces of 0.4mm ply. You could angle F1 but I

always find it awkward to get the angles correct in both side and top views. Take care to make the thrust angles as accurately as possible- you will appreciate the small effort later when flying the model!

It's important not to over-power small models like this. My power system gives about 40W at full throttle, which I never use. Previous experience suggests an 8" prop will be a bit much on these small models. Not having a suitable prop on hand I cut down a GWS 8x6 prop to around 7" and balanced it carefully. Since I had a spare 12A ESC I used it as it's no heavier than a typical 5A or 8A ESC.

The 5g servos are mounted under the wing as shown on the plan. For pushrods I used Sullivan lightweight snakes but small diameter piano wire running in plastic or even paper tubes is just as good and

considerably cheaper- I just happened to have the snakes on the shelf.

COVERING

I glued the horizontal undercarriage fairings to the fuselage before covering. This may or may not matter, depending on your covering method, but for me it made things slightly more complicated than they could have been!

Since I prefer a painted tissue finish I used tissue over Mylar for the Air Coach. Any of the lightweight iron-on coverings will work just as well.

FINISHING

There's very little colour information regarding the Air Coach. I found a list of factory colours and just about all the aircraft in the available photos could have been painted in any one of them! There's a choice of red, black, green, blue, and possibly orange. The blue aircraft had a yellow stripe on the fuselage. I seem to have made a lot of blue models lately so I chose red with silver wings.

The wheels had a light coloured trim ring around the rims. I decided to paint them silver. Mounting the wheels in a drill and turning them by hand while trying to hold a paintbrush as steadily as possible against the rim was a complete failure and I ended up simply painting them freehand. It wasn't too difficult and the result is acceptable.

With the colour information came a partial production list giving registrations so I chose one based on how easy it would be to cut out the numbers. The registrations were cut from black-painted decal paper.

The tail wheel is painted black as the real thing seems to have had a black or at least very dark painted wheel. Some aircraft had a light coloured trim ring around the rim- it looks good but fell into the too-hard basket for me!



The relatively basic dummy engine is totally in keeping with the 'spirit' of the model and adds a lot of character.

FLYING

With a 2S 500mAh battery hard up against the front of F2, the model balanced perfectly at the point shown on the plan. Ready to fly, the model weighed 210g or 7.4oz. Radio range was checked, the motor run up to full throttle to check for excessive vibration, and it was ready to fly!

My last few Peter Rake models have flown right out of my hand with minimal or no trim changes needed, so I wasn't worried about this one. True to form it flew away from a gentle hand-launch at about 75% throttle, climbing at a good rate. The controls proved to be effective and the model is very easy to fly.

At full throttle it flies very smoothly and doesn't show any tendency to climb excessively (remember what I said about the thrust angles?). At 60-75% throttle it climbs well and it will cruise around at half throttle. The cut-down GWS prop is

adequate if not perfect and I'm sure a little time spent optimising the prop will be worthwhile.

The Air Coach flies somewhat faster than I expected and for a small model it really flies as if on rails. If you want a slow-flying puffball that bobs about on every breath and zephyr like a free-flyer then forget it, this one goes where you point it and has very positive controls. Despite the small size of the rudder it is very effective. I started with a little exponential, but ended up with quite a lot. With rudder/elevator models I like to have the maximum rudder throw available just in case but if you don't like that approach you can easily reduce the throw after the first flight if you don't like the quick response.

As you would expect with a low wing loading and a constant-chord wing, the stall is straight-ahead without any bad habits - if you can get it to stall, that is.

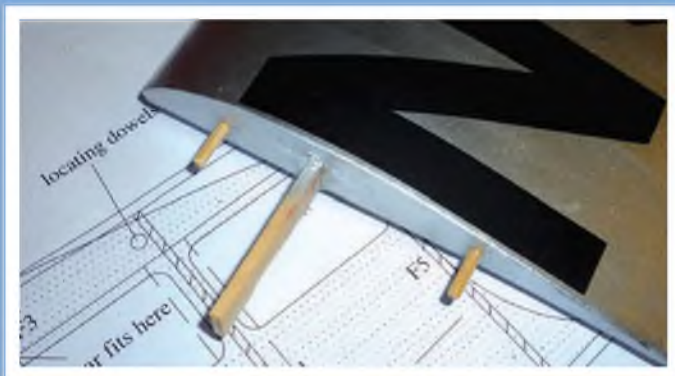
Even at low power settings it will hang on the prop and eventually fall back to a slightly nose-down attitude with barely any loss of height. Landing, either gliding or with a touch of power, is easy. As with all small models it tends

to trip and turn over even on the shortest grass.

ROG take-offs are quite OK, although I gave up trying to make a scale take-off run on grass. Give it some throttle, get off the ground ASAP and the get it pointed in the desired direction - that is the order of events! Gently advancing the throttle just extended the period where it was more or less out of control and led to ground-loops and nose-overs - par for the course with small scale models. On the whole, I prefer to hand-launch as it's less risky.

The balance point shown on the plan is safe and will give you a pleasant flying model if you have got the wings straight and all the incidence and thrust angles reasonably close to the plan. I felt the balance point could stand to come back slightly and this proved to be the case when the front hatch fell off in flight! With that said, I still urge you to start with the balance point shown on the plan.

The Air Coach has become a favourite model for calm evenings and it can handle a breeze better than any of my models of this general size and weight. In case it didn't quite come across in my flying notes, this model really does fly superbly well. Although it's small and simple to build it has excellent scale fidelity and one could add more detail if desired. With its exposed engine cylinders it has great character in the air. Try it, you'll like it! ■



The spar extension sets the dihedral, while the locating dowels assist with getting the incidence right.



The little Air coach climbs steadily away from hand launch, 75% throttle is ample.

Techno Scale

Mike Evatt

The **AllElectricRC Company** was started by Tony and Anthony Hill, along with Ian and Undra Astbury. As part of **Tony Hill Models** they have a physical presence in Newcastle-under-Lyme, North Staffordshire where all the latest in electric and I.C products and a web operation at www.allelectricrc.co.uk Here you will find a plethora of goodies to further your electric flight ambitions. Perhaps none is as important as their range of The LIPO-SAFE LiPo Battery Safe Charge Bags. The LIPO-SAFE is intended to reduce the chance of damage in the event of a LiPo fire. For peace of mind and greater safety - charge your LiPo batteries when they are in the LIPO Safe.

The Hobby Box has been established for many years and has built up a good reputation for serving the needs of modellers all over the country and in some cases the world! From their website at www.thehobbybox.co.uk they have recently re-launched their on-line operation. Here you will find many scale offerings including E-flite's magnificent Mustang. E-flite recreates the majesty of the Mustang with unmatched accuracy in its newest

Platinum Series offering-the P-51B Mustang 25e ARF. From the fully sheeted airframe to the perfectly replicated scale outline, E-flite's meticulous attention to detail is sure to energize the master modeller's passion for all things scale.

Motors & Rotors at www.motorsandrotors.co.uk has long been the UK's largest seller of JetCat, Graupner and BVM products, stocking a huge range of model aircraft, spares and accessories, from Jet to helicopter. Shown in the screen-shot is the fabulous Derjet Vampire 1:5 scale. This model comes detailed with scale undercarriage, and cockpit. It will suit smaller turbine case sizes like the P70 and new JetCat P100+ but it will take P80SE and P120SX turbines. The model breaks down into small parts and could be transported in a Mini!

Island Model's 'Short Kits' take the work out of building a scale model. They cut all the parts so you don't have to! With their kits and some additional materials you can "assemble" a beautiful scale model in a fraction of the time it would take cutting all those ribs and formers. Based in Ireland, with a web presence at www.islandmodels.ie they try to design

models that were never made available to modellers as kits before, that are relatively easy to build and with good flying capabilities. The Schneider Grunau Baby shown in the screen-shot was a single-seat sailplane first built in Germany in 1931. For those that wish to do it all themselves, plan sets are also available.

Midland Helicopters is based in Hinckley, Leicestershire, England, UK and has a web presence and on-line shop at www.modelhelicopters.co.uk Spotted on this website is a UH-60 Scale Fuselage suitable for T-Rex 500 models. The UH-60 Blackhawk helicopter has been popularized by Hollywood productions, leaving fans with impression of its role as wartime payload carrier. This highly detailed Blackhawk scale fuselage with camouflage paint scheme is a great opportunity for the collectors and enthusiasts alike.

Real Model Pilots at www.realmodelpilots.co.uk is a new manufacturer of bespoke and reproduced pilot figures for larger scale flying model aircraft. They use new technology to generate computer-based designs of pilots from any period of flight and can produce versions of these designs



The LIPO-SAFE is intended to reduce the chance of damage in the event of a LiPo fire.



E-flite's magnificent P-51B Mustang from The Hobby Box.



The fabulous Derjet Vampire 1:5 scale from Motors & Rotors.



Island Model's 'Short Kits' take the work out of building a scale model.



This UH-60 Blackhawk Scale Fuselage is suitable for T-Rex 500 models.



Should you want Douglas Bader you can have him!

refines the search for more TechnoScale Topics...

in a range of scales from 1:12 to 1:4 for full body models. Their computer-generated designs integrate historical reference with the requirements of the hobby of scale flying. The facsimiles are made in ABS plastic and the models are made hollow so they are tough and very light. Now, should you want Douglas Bader you can have him or even maybe your own face if it is more appropriate!

Originally created and made by Pete Richardson of **Pete's Pilots**, these cockpit figurings found fame in the early 1980s & 90s. **Roger Hawkins** has now acquired the original latex moulds from Peter and is able to continue to produce quality lightweight latex pilots, bringing to the R/C world scale detail, authenticity, originality, quality and to add to these features "Some good old nostalgia". Every pilot is individually handmade, painted & finished by Roger adding real personality and character to each. Visit his website at www.rogers-pilots.co.uk for full details of his extensive range.

Now there is a Giant-Scale gas engine for those who do not want to be an engine expert. **The Evolution(r) Engines 62GX** is a potent 62cc engine with the efficiency and

convenience of an electronic fuel injection system. Simple to setup and maintain, it's a Horizon Hobby innovation that means you never have to touch a needle-valve to enjoy starting ease, reliability and long engine life. That's because SureFire(tm) Electronic Fuel Injection (EFI) technology combines finely-tuned software and sophisticated sensors so the engine gets the perfect flow of fuel no matter where or what you fly. Check it out at <http://evolutionengines.com>

The **Canadian Museum of Flight** is a non-profit, volunteer-driven museum dedicated to restoring, preserving and displaying Canada's rich aviation heritage.

Its website at www.canadianflight.org gives details of some fascinating prototypes such as the Bristol Bolingbroke IV. In early 1937 the RCAF wanted a general reconnaissance aircraft and, in accordance with Canadian policy, looked to Britain for its supply. Although the British Air Ministry had decided to drop the Bolingbroke development, at the RCAF's request the Bolingbroke was continued and it first flew on 24th September 1937.

At the end of the flying season for the last seven years the **LMA** have held their Static

and Trade Display at the Heritage Motor Centre near Warwick. If you want an enjoyable day out, where you can literally spend the whole day looking at the wide variety of cars in the Museum, the exceptional range of models in the static display, and finally spend a little on that winter project you have been dreaming about all summer.

Then look no further than www.heritage-motor-centre.co.uk/event/large-model-aircraft-show-3 This is the web location for details of the **Large Model Aircraft Show**.

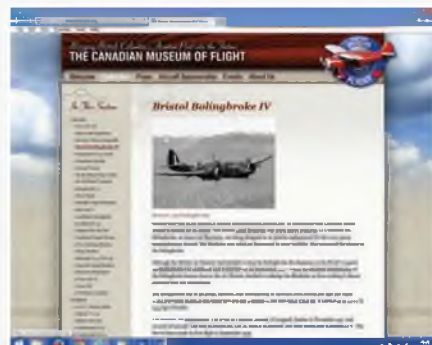
Mike May, who is the webmaster for the **UK/EU Control-line Carrier Flyers** website at www.carrier-deck.com has informed me of some interesting updates. This year's ModelAir event on July 20/21 at Old Warden has a special theme - the commemoration of the beginning of the Great War. There will be a new WW1 biplane tribute Carrier class (some landing as per prototype without arrestor wires!). They have found a number of authentic plans, photos and three-view drawings to help you construct a profile or full-bodied model to compete in this new class - these can be accessed from the Resource Index.



Every pilot is individually handmade, painted & finished by Roger Hawkins.



Evolution(r) Engines 62GX has Electronic Fuel Injection.



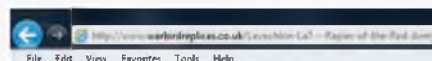
A Bristol Bolingbroke IV at the Canadian Museum of Flight.



This is the web location for details of the Large Model Aircraft Show.



A new WW1 biplane tribute C/L Carrier class is launched.



That's all there is time for from me this month so poke the tablet and if you find something out there of interest that might be good to share, email me at:

mikeevatt@hotmail.com

FROM RANGE

PHIL KENT FOLLOWS UP THE FEATURE ON HIS FAIRCHILD F24 RANGER, THE IN-LINE ENGINE VERSION

In the December 2013 issue of this magazine was a construction feature on the Fairchild F24R Ranger that was built from my drawings by Gary Protheroe. This follow-up article is for readers who might want to build the Warner Scarab radial engine version of the aircraft the Fairchild F24W Argus. My original model was of the F24W and the

modifications and alterations to the F24R drawing available from FSM Plans Service are very simple indeed.

The fuselages of both aircraft are more or less identical aft of former F3, so we only have to consider the area forward of this. However, former F4 is different to the one shown on the plan being of a rectangular shape with the holes for the engine

bearers positioned for the radial engine aircraft. Former 3 is different too but only where it is cut out to fit over the 1/4" square box front portion.

Construction

Build the basic two sides of the fuselage and join together using the formers and cross pieces. Note that the front portion,



ER TO ARGUS

SION, WITH CONVERSION INSTRUCTIONS FOR THE ALTERNATIVE RADIAL ENGINE F.24W ARGUS

forward of the wing, is built separately and fitted complete with ply formers and the engine bearers to the rest of the structure. The rest of the fuselage construction is the same as for the Ranger version, with formers and stringers filling out the shape. Opening doors are required for access to the radio gear and the wing fitting.

A box for the fuel tank is built into the structure before the nose area is covered with 1/8" sheet balsa. Note that in the photograph of the nose area, the bearers are tilted. I did this on the prototype model so that the Laser 100 cylinder lined up with the position of the cylinder on the full size aircraft. The plan shows the bearers fitted for a straight forward

inverted engine, but any change here is up to the builder.

A 1/16" ply former is fitted as a firewall before the balsa rings and ply cowl mounting blocks. The cowl is built on a central spindle with the rear former fastened to a board. The front former is then positioned on the spindle and sheet balsa spacers fitted in place. 1/32"





The basic fuselage of the F.24W Argus, with the aft section covered and the wire main undercarriage members fitted.



Front Fuselage at the firewall with engine bearers in place.

plywood is then wrapped round the structure. Fit the second lamination with epoxy and make sure that the joints are not in the same places. A balsa front cowl ring is completed from a series of

laminated segments. Remove the cowl from the board and cut away at the front and rear to the indicated shape and then carve and sand the front to the rounded section shown in the drawing.

Although the radial engine model is shorter than the inline version, I had no problems getting the fore/aft balance point (C.G.) in the correct place without added weight. The only disadvantage that I can think of for the radial engine version is the lack of the rear strut on the undercarriage.

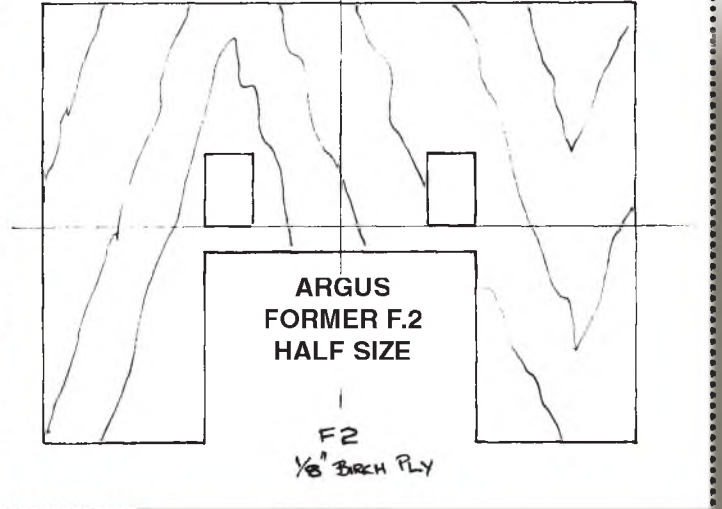
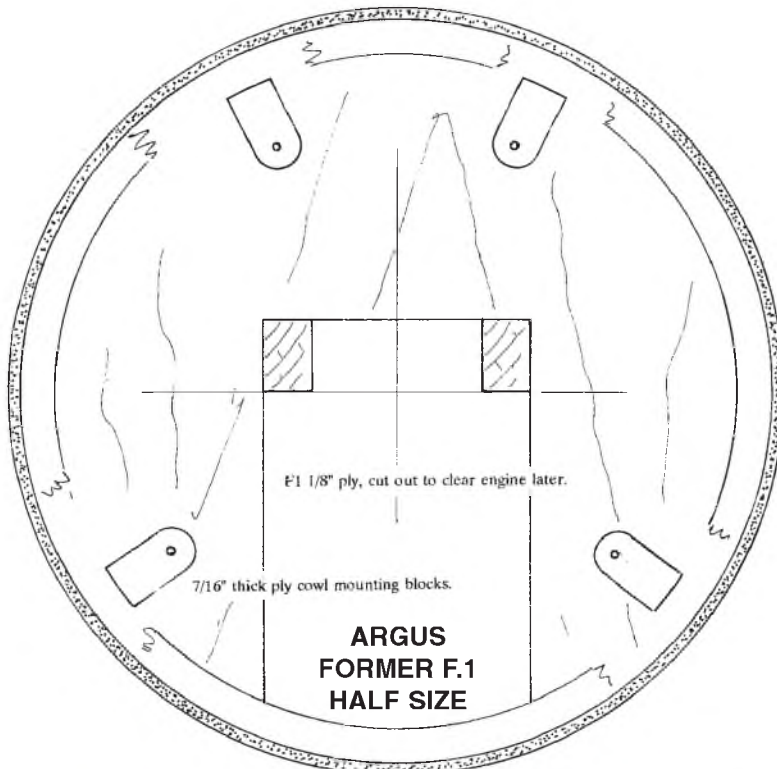
Where to see the full size?

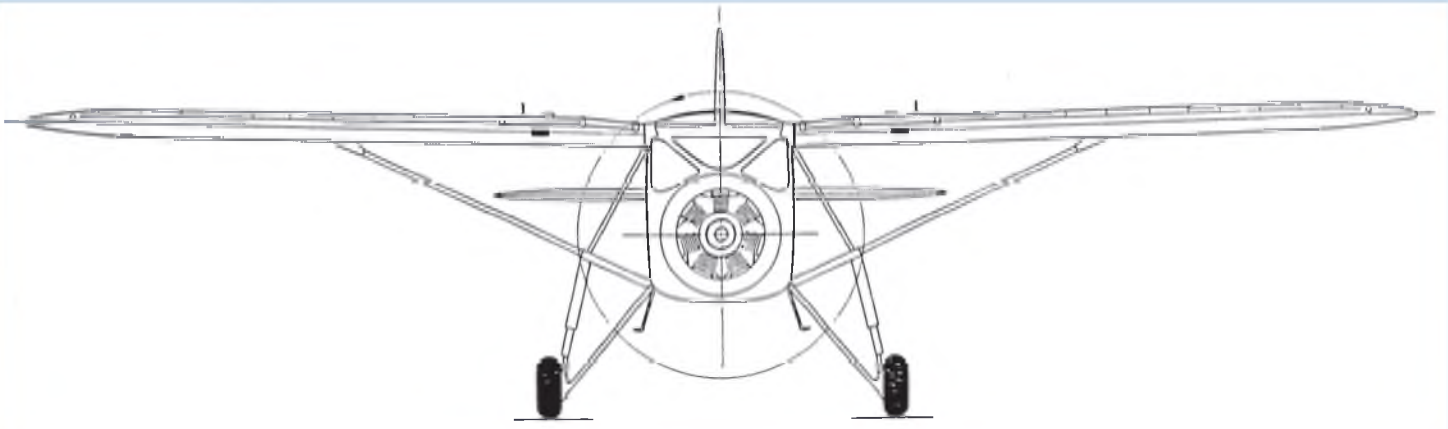
There are several active inline versions in the UK, but only two radial engine aircraft and these are both in museums. There is one at Elvington and the other restored aircraft is at Cosford. I have included a few photographs of this very accessible aircraft.

Flying

Make sure the model balances at the correct position and also be sure that all the fastening bolts are fitted and fastened before attempting to fly. I had a narrow escape with my prototype model on its first flight when the bottom fastenings for the struts were not fitted. On takeoff the dihedral increased rapidly and the model was unceremoniously and hurriedly dumped onto the ground, doing some damage to the undercarriage and cowl.

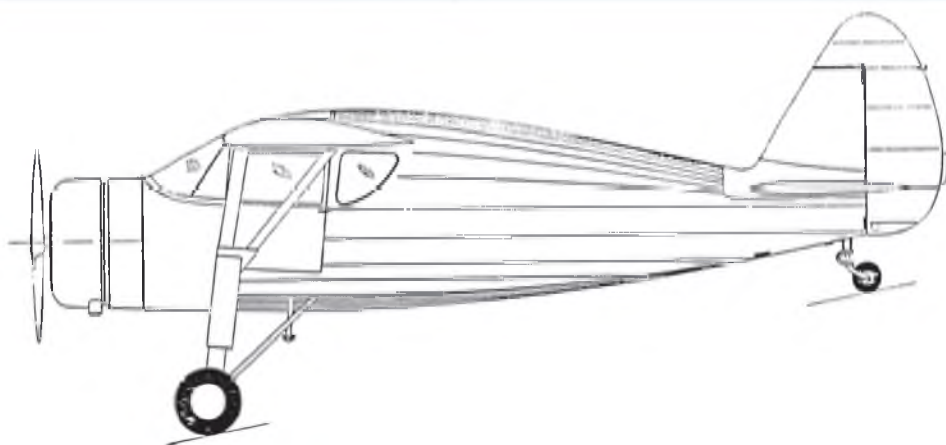
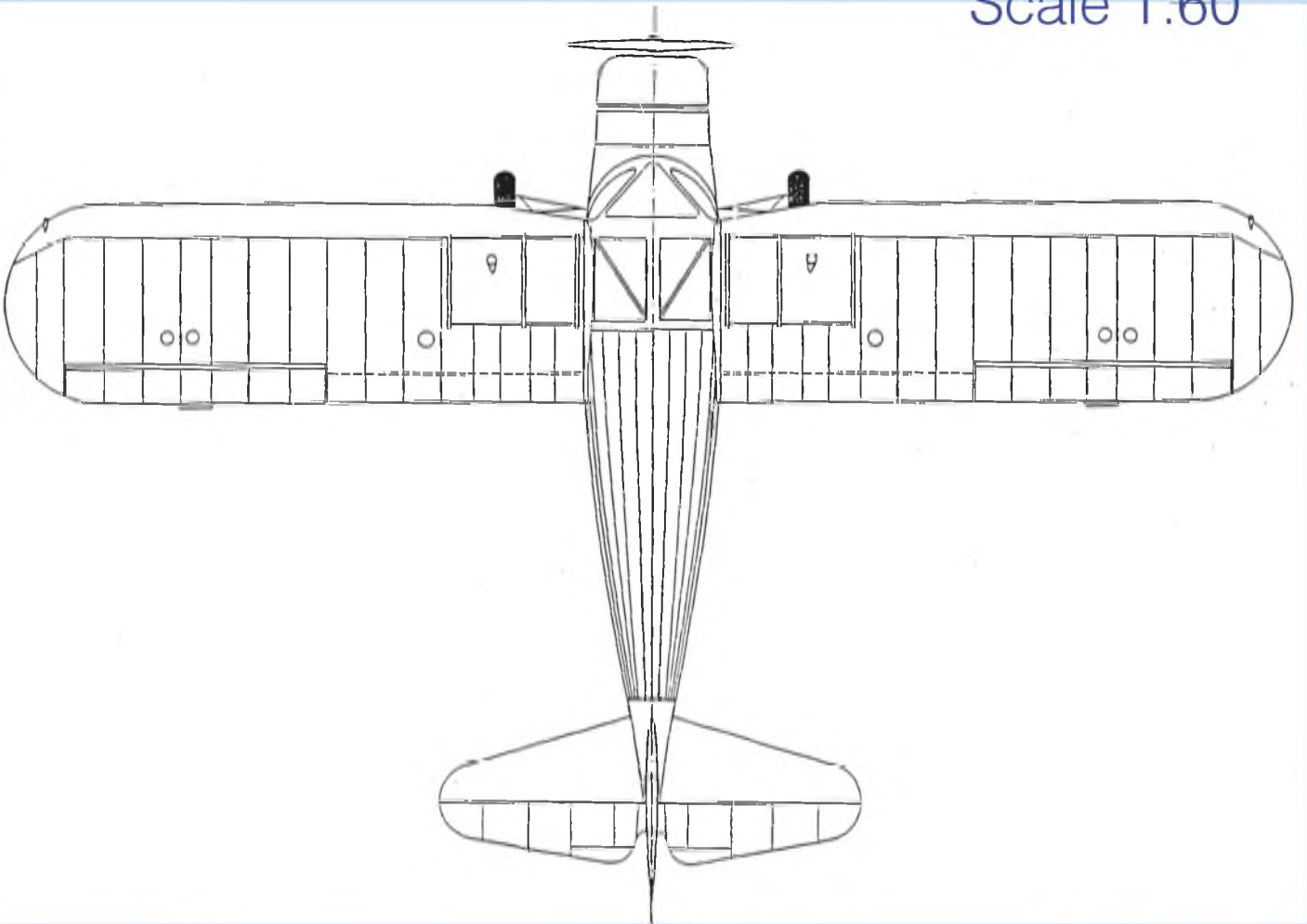
After repairs the model was flown again without any problems. It has been quite successful in competitions, finishing second at two events, in the Clubman class at the Nationals and being a regular prize winner at the much missed Woodvale Rally. The model is not



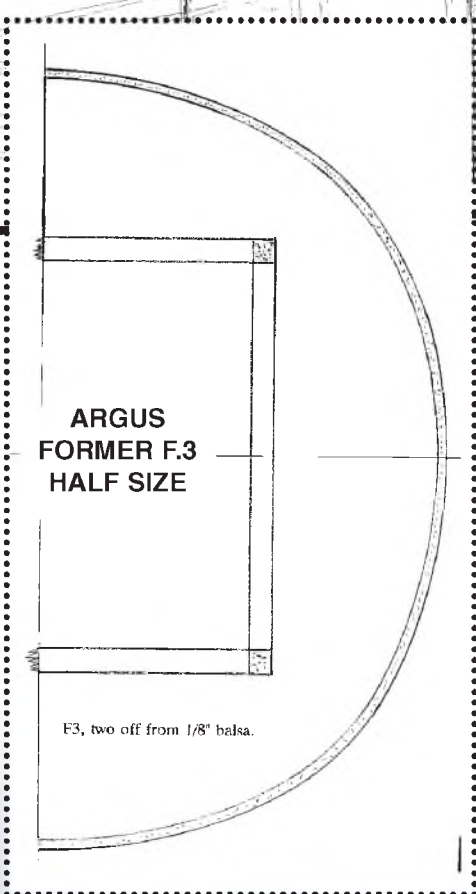
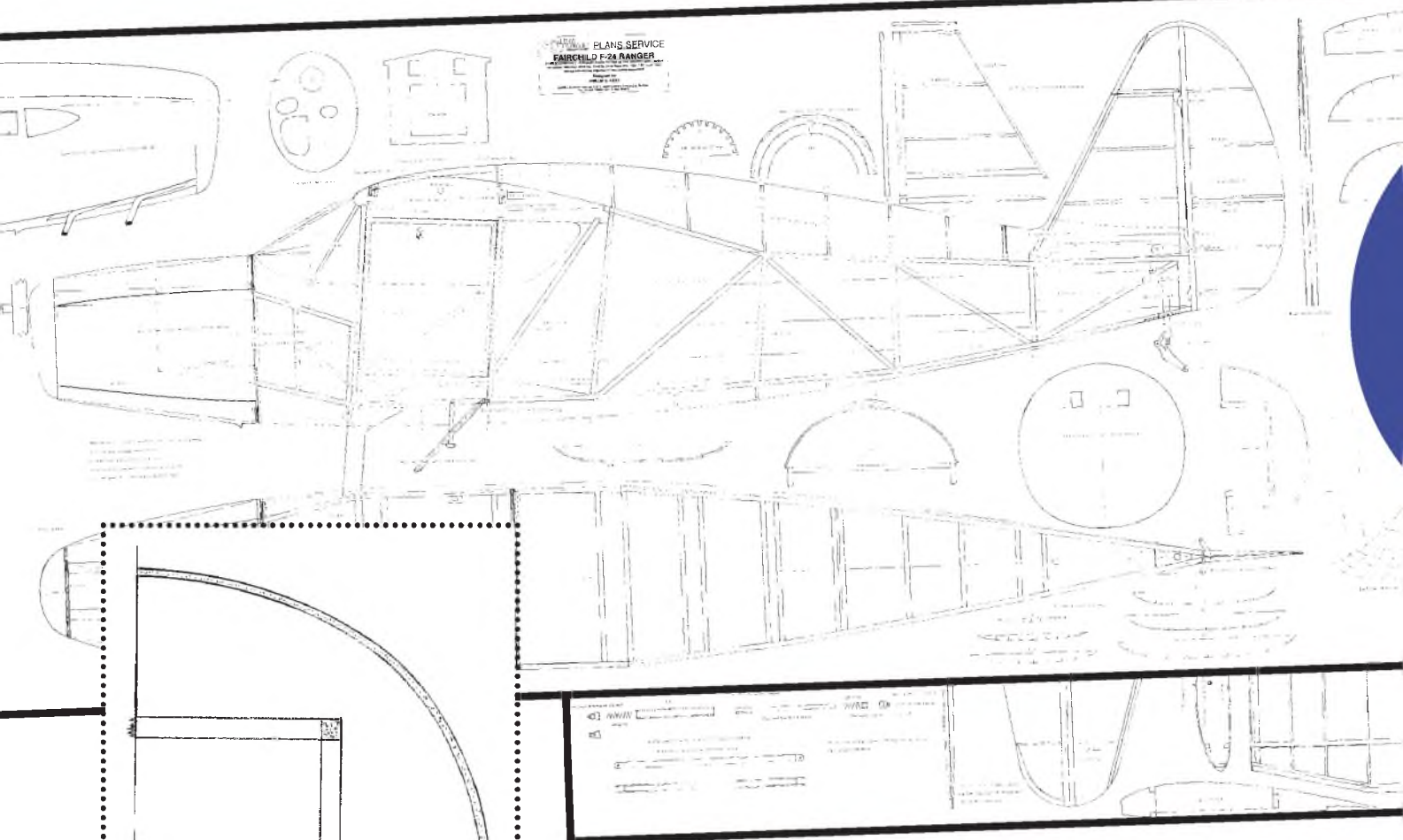


FAIRCHILD F24W ARGUS

Scale 1:60



PLANS SERVICE
FAIRCHILD F-24 RANGER
 1/8" Balsa
 1948-1952



**ARGUS
 FORMER F.3
 HALF SIZE**

F3, two off from 1/8" balsa.



aerobic and is at its best performing slow, low flypasts and other course manoeuvres. The model is fitted with flaps and these do add interest to the flight pattern. I found that I had to mix in down elevator when using them. I use a slide

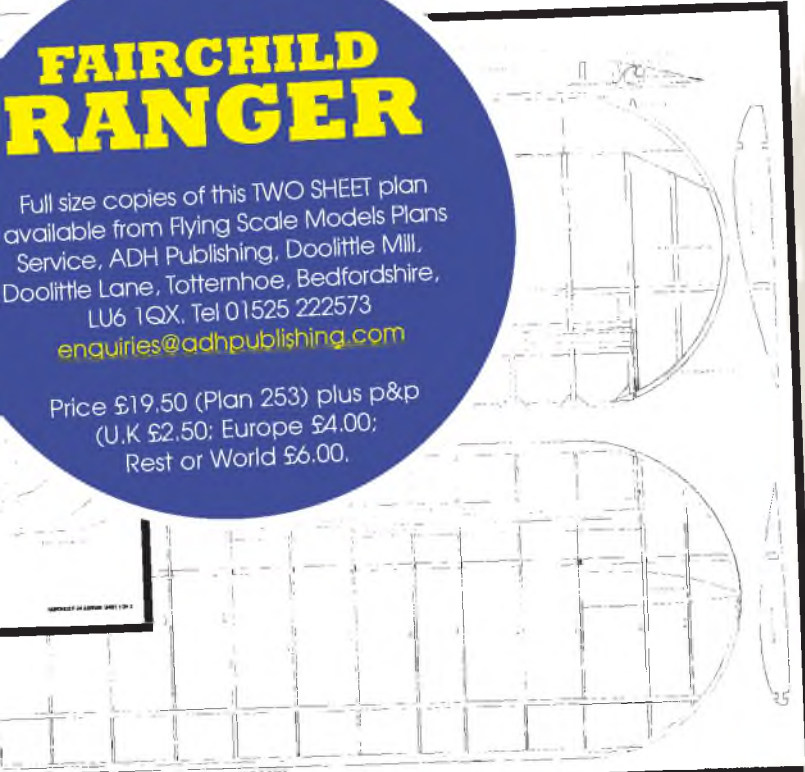
switch for the flaps with my old Simprop radio gear and have been worried about fitting new 2.4GHz radio gear that doesn't have this facility. I intend fitting my Horizon equipment in the model and will be interested to see how the flaps work when used via a two-position



FAIRCHILD RANGER

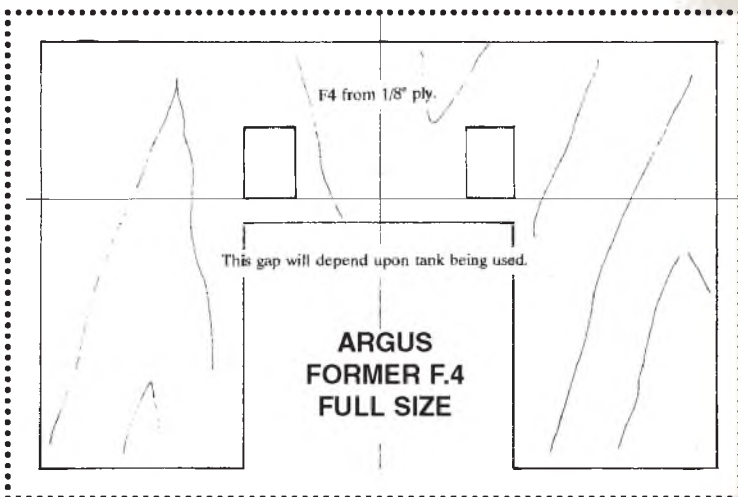
Full size copies of this TWO SHEET plan available from Flying Scale Models Plans Service, ADH Publishing, Doolittle Mill, Doolittle Lane, Totternhoe, Bedfordshire, LU6 1QX, Tel 01525 222573
enquiries@adhpublishing.com

Price £19.50 (Plan 253) plus p&p
 (U.K £2.50; Europe £4.00;
 Rest or World £6.00.



switch and a slow servo speed. It is also a good idea to mix the ailerons and rudder on this model. Yes you can do it properly, but this simple device makes things much easier. The Laser 100 has proved to

have ample power to fly the model but it is possible to fit a 120 within the cowl. This is a model that goes where you put it. It is easy to fly and should give the builder hours of pleasure. ■



CUT PARTS SET FOR THE

FAIRCHILD RANGER

Get straight down to construction without delay! This month's full size free plan feature is supported by a laser-cut set of ready-to-use balsa and plywood components. This provides all the parts that, otherwise, you would need to trace out onto the wood before cutting out.

IT DOES NOT INCLUDE STRIP AND SHEET MATERIAL OR SHAPED WIRE PARTS

Price £99.00

plus carriage: £11.50 (UK); Europe £26.00

Order set CUT253

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PHOTO1

A SPOKE IN THE WHEEL

NO COMMERCIALLY AVAILABLE WIRE WHEELS SUITABLE FOR YOUR SIZE OF MODEL? KEN SHEPPARD SHOWS YOU HOW TO MAKE YOUR OWN...

I needed a pair of spoked wheels in a hurry. The 1/3rd scale model (Staachen Flitzer) cried out for them - but where could I get a pair at that scale that dictated 5.25" diameter? So I decided to make them up myself - having seen a method explained in Gordon Whitehead's *'R/C Scale Aircraft - Models for everyday flying'*, the bible of all scale modellers (if you haven't got one, get one! If you can find one) - I thought that I would have a go.

They need a bit of thought, calculation and jiggling - but in terms of what they do for that style of model, they are worth every minute - and cost next to nothing too! For the sake of speed, I simplified the spoke arrangement, so that there was no

crossing of spokes - using the method of spoking described here (continuous wire), precludes this, I think. Like I said, I was in a hurry!

First, a quick description of the materials used. Having decided the finished diameter of the required wheel, a suitable cross section diameter tyre material needs to be sourced.

After a bit of a search, I found a rubber brake hose in my local car supermarket that was just the right diameter, hollow - but thick walled - perfect! This will do for wheels between 5"-7" diameter, I reckon.

The rim is laminated from 1/32" birch ply, glued with PVA and wrapped around a suitable sized mandrel (in my case a 1.5L glass bottle). The hub is made from a

length of brass tube and two steel 'penny washers' (about 1" dia), silver soldered, bobbin fashion.

The 'spokes' are a continuous length of plastic-covered steel fishing trace - I know, it's very flexible - but when the spoke-lacing is complete and evenly tensioned, the wheel is amazingly stiff and strong! The hub can even be laced off-centre, so that the outside spoke 'cone' is steeper than the inside face - just like the real thing!

You will need a spoke-lacing jig to hold the rim and hub in the correct position, but we'll come to that in a moment. First, the rim...

Wrapping the rim

For a rim of about 4" dia (the finished

PHOTO 1: Spoked wheels certainly add atmosphere to a scale model. The author's Staachen Flitzer certainly cried out for them!

wheel is 5.25" dia.) you will need to cut a strip of 1/32" ply 3/8" wide and about 40" long to make three full laminations (dia. x x 3). Find a suitable diameter mandrel to wind around - as stated earlier, I used a glass bottle (you may have to be innovative!) - whatever you use, make sure it will allow you to slide the rim off when fully dried out! Wrap and tape a layer of polythene around it and tightly wind your strip of ply, covered in PVA, around it, over the plastic. Make sure the laminations are vertically aligned and tape well, to secure in place. Make sure the end of the third lamination overlaps the inside end of the strip (the start point) by at least an inch. Put away and allow to dry out thoroughly. (Whilst this is happening, you could make up the hub assembly!)

When the rim laminations are dry, remove the tape and slide the rim off of the mandrel. With a coarse sanding block, feather in the inside and outside lamination step to give a smooth transition profile to the inside and outside surfaces (see Fig.1). Cut two more strips of 1/32" ply, this time 5/32" wide and 40" long each and wind each piece around the ply rim, on either side of the outside face, in line with the edges of the rim (see fig.2). Use thin cyano to glue these in position - making sure that you don't stick yourself to it, in the process! Now you can trim the rim to its final section (see fig. 2) and gently round off all the edges with fine wet and dry.

How many spokes?

The answer to this question is up to you. For larger diameters, it is quite practical to have more than 36 spokes - the more the merrier, except that you have to be very

Fig. 1.

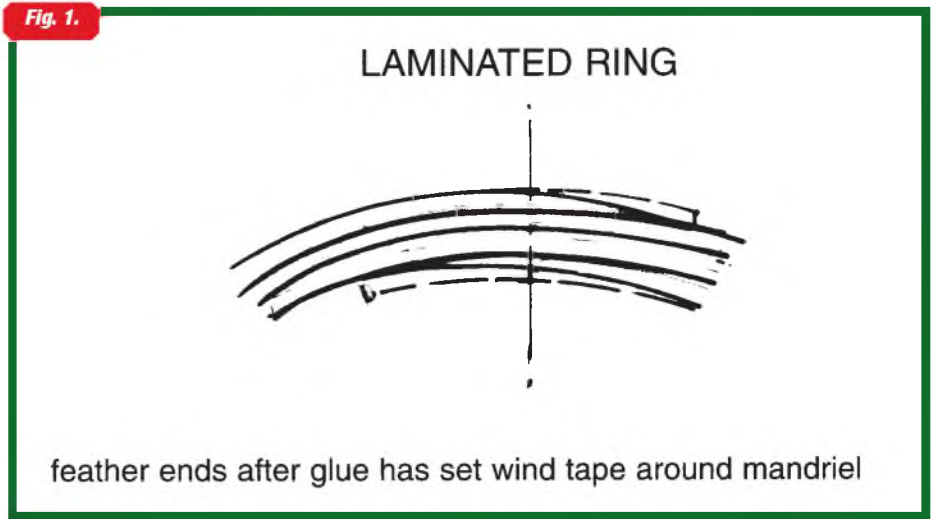


Fig. 2.

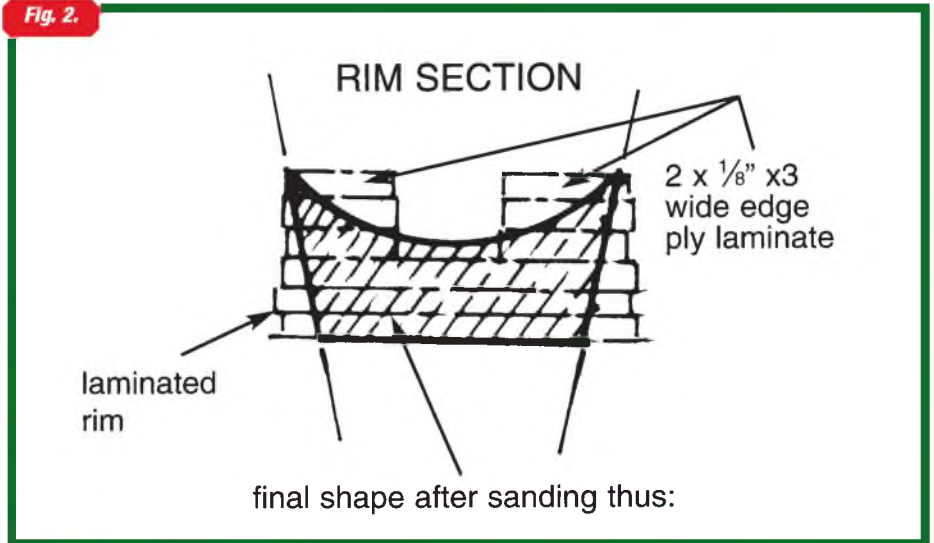


PHOTO 2: One of the completed wheels, after two seasons' flying! - A little distortion of the wire spokes is visible, but otherwise

PHOTO 3: The wheel holding fixture - the rim sits on the wooden blocks, encircling the ring of piano wire rods, whilst the hub is held in position on a centre rod, between two collets and a brass tube sleeve. Balsa packers are cyano'd to the outer rods, taking up any variation in the rim/rod positions, holding the rim firmly in position.

PHOTO 4: The height of the blocks, relative to the hub height, fixes the height of the inner and outer spoke cones. Due to the tension in the spoke lacing, the hub is held firmly in this position when released from the fixture. Note the inner edge of the wooden blocks is chamfered to clear the lower spoke cone.

Fig. 3.

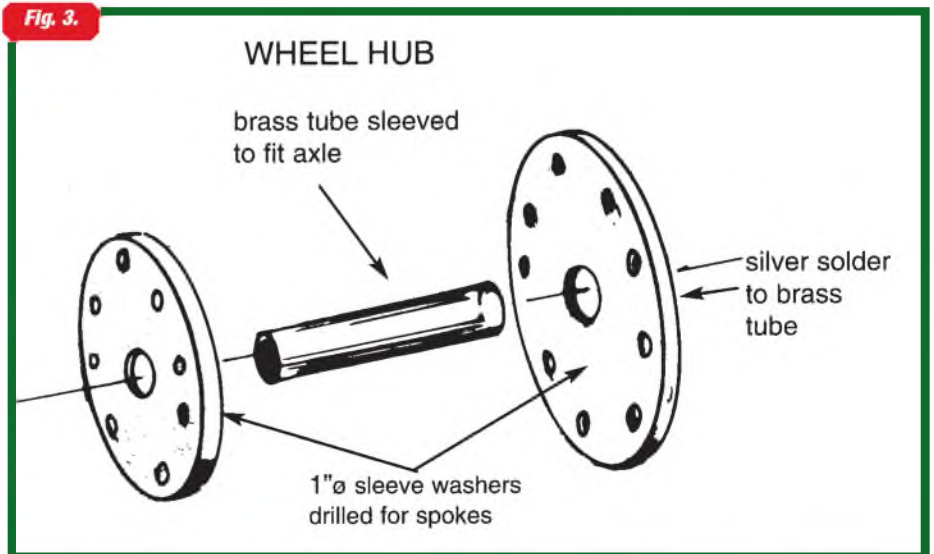


PHOTO2



PHOTO3



PHOTO4

Fig. 4.

HUB WASHER DRILLING 36 SPOKES

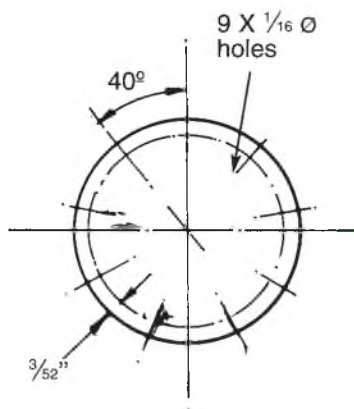
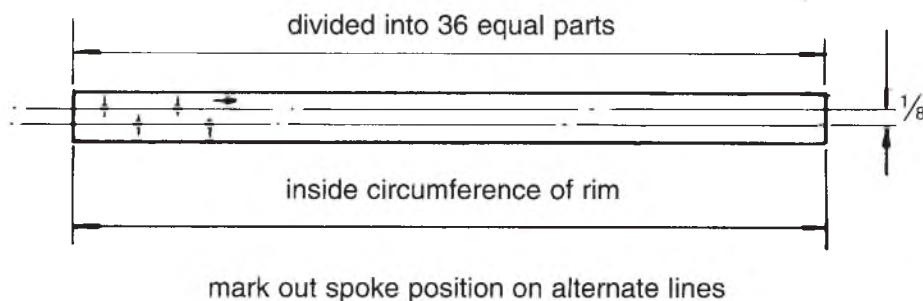


Fig. 5.

RIM DRILLING TEMPLATE (PAPER STRIP)



careful when marking out, to keep the spacing equal - the more the spokes, the smaller the spacing. I think 36 is really about the minimum for effect and strength - 48 or 52 would be optimum, I think.

The hub - and marking out...

I happened to have a number of steel penny washers (look in B&Q) to hand (see fig. 3), so I used two of them, plus a length of brass tube that was a sliding fit in the centre washer hole (about 6mm) - too big for an axle, but can be sleeved down to suit - and allow a scale split pin retention system to be used (see fig. 8).

Each washer was marked out with nine equi-spaced holes around the periphery of the washer, 3/32" in from the edge and drilled 1/16" dia. (see fig. 4). Depending on the number of spokes to be used, the number of holes in each washer must be equal to a quarter of the number of spokes e.g. for 52 spokes, there must be 13 (52/4) equi-spaced holes in each washer. The two washers were then assembled on the brass tube and aligned so that the spoke holes were staggered, then silver soldered in position, checking that

each washer was square to the tube. Deburr the holes, give the soldered assembly a bit of a buff up - and it's ready for lacing.

Turning our attention to the rim, we have to mark out and drill the spoke hole in that, too. Take a strip of paper as wide as the rim, position it around the inside rim diameter and trim it to the exact inner rim circumference. Lay it out flat and draw two parallel lines down the length of the strip, 1/8" apart (see fig. 5). Measure the length of the paper strip and divide it into 36 (or the number of spokes that you have chosen) equal parts, marking each of the two parallel lines alternately, to give a staggered line of equispaced spoke positions. Then tape the paper strip back into the inner face of the rim - if you have done this correctly, where the paper strip ends meet, the spoke hole at the very end of each end of the strip should coincide on the same line. Then drill through the rim at each spoke position with a 1/16" dia drill. Deburr the holes and start thinking about that holding fixture...

Holding and lacing...

Take a good look at the photos as they

explain it better than I can. The wheel rim is located on a sleeved length of piano wire fitted perpendicularly into a piece of board (use a pillar drill, if you have one, or a set square, if you haven't), so that it is a sliding fit. Use a couple of collets to hold the vertical position (allowing enough room to get underneath the rim when lacing, with longnose pliers). Four more lengths of piano wire are fitted perpendicularly in the board, almost equi-distant around the circumference of the rim (opposite diameters), so that the outer edge of each wire rests against the inner rim surface - I say almost equi-distant - make sure that the position of the four rods doesn't blank off any of the spoke holes, by positioning the rods a little to one side or the other of equi-distant. At this stage the rim should be positively located radially around the hub and able to rotate about the four vertical positioning rods. If, due to the feathering of the rim laminations, there is a slight variation in diameter of the rim at the lamination overlap, a thin balsa packer can be cyano'd to the outside face of the relevant wire, to take up the variation.



PHOTO 5

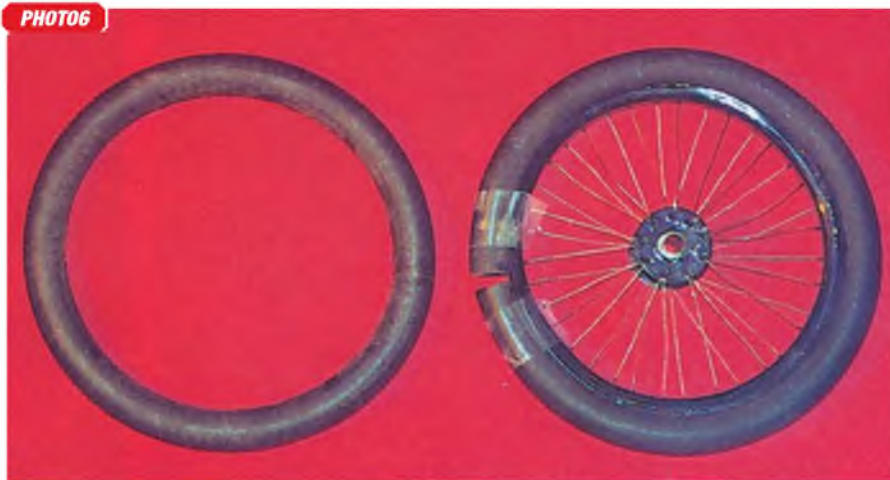


PHOTO 6

PHOTO 5: The completed wheel rim, removed from the fixture, showing the off-centre position of the hub, giving different inner and outer cone heights. Note also the tyre locating groove around the periphery of the rim, shaped with a round file, from two laminated ply strips wrapped around the laminated rim.

PHOTO 6: Jointing the tyre. On the left, the completed tyre - the joint is adjacent the open joint on the right hand tyre. The gap between the ends of the right hand tyre ensures that the tyre has to be stretched onto the rim, gripping it firmly. Do not make the gap too excessive - the rubber brake hose is fabric reinforced, so has limited stretch.

now we have to fix the inner/outer spoke cone heights (see fig. 6).

The height of the rim, relative to the hub, is maintained by four wooden blocks (OK - I only used three, but four is better!), each located adjacent to each vertical peripheral rod, giving a steeper external (upper) spoke cone (about $\frac{3}{16}$ " higher), than the inner (lower) cone. Note that the blocks have a 45° chamfer on the hub side, to give clearance for the spoke lacing.

Tie a knot in the end of the fishing trace, measure out a length of 100" (total spoke lacing length approx. 90") and thread it through the rim (outside to inside) and through the adjacent hub hole in the lower hub washer. It takes a little while to get into a regular routine, but using a pair of long nose pliers to thread the wire through the holes and finger pressure to hold the tension in adjacent spokes whilst lacing, you soon will get into a steady rhythm.

NOTE: Take the time, every third spoke or so, to unwind the remaining length of fishing trace - lacing tends to wind it up quite dramatically and could result in kinks and knots, if you're not careful. It's tempting to thread quite a few spokes loosely and then tension them up in one go - resist the temptation!

When you have completed the lower cone, with the trace outside the rim, simply pass it through the adjacent hole and do the yop cone in the same way, finishing with another knot outside the rim.

When happy with the lacing tension, remove the wheel from the fixture and run some thin cyano around the outer face of the rim to lock the spokes. If you want to represent the tyre valve, you can drill the rim from the outside and cyano in a short piece of plastic rod or piano wire.

Fitting the tyre

If you have filed/sanded the rim to the section as shown in fig.2, the rubber brake hose is simply wrapped around the rim and cut to length, leaving a small gap between mating ends (approx. $\frac{3}{32}$ " at the rim) with the cut ends square to the tube length. This gap ensures that the tyre has to be slightly stretched onto the rim, gripping it tightly. The joint is made using thin cyano, with the tyre off the rim - just press the two ends together, accurately and firmly until the cyano has grabbed. Then lightly abrade the surface of the tube with fine wet and dry, to give it that authentic look (and to hide the joint), then ease the tyre on the rim. Do not glue it in place, the stretch should be enough to hold it in place - There you go!

With the tyre off of the rim, two coats of dope will seal the ply rim ready for painting.

Finally, the words that you dread when having reached this stage - REPEAT THE PROCESS FOR THE OTHER WHEEL! - but of course, you will have doubled up on everything as you went along - right?

Happy Landings!

Fig. 6.

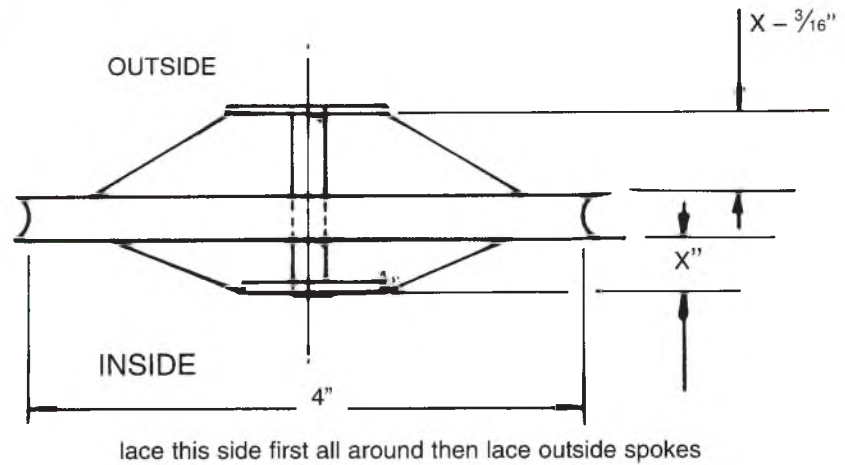


Fig. 7.

LACING THE SPOKES

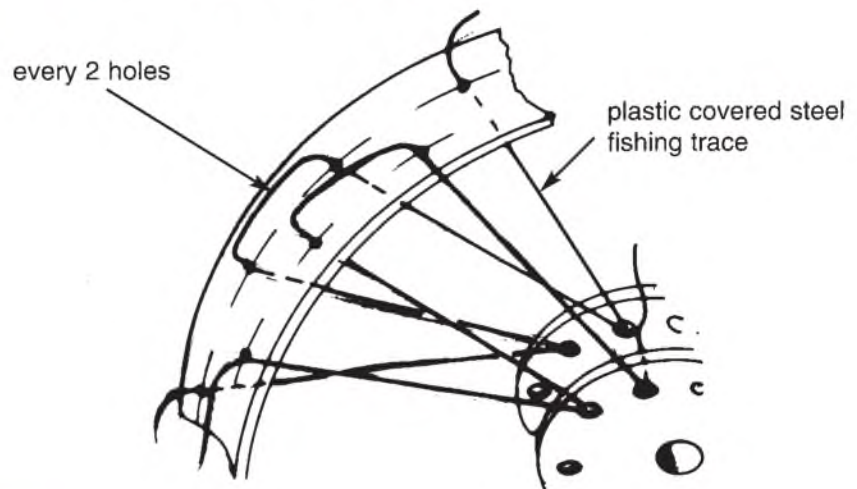
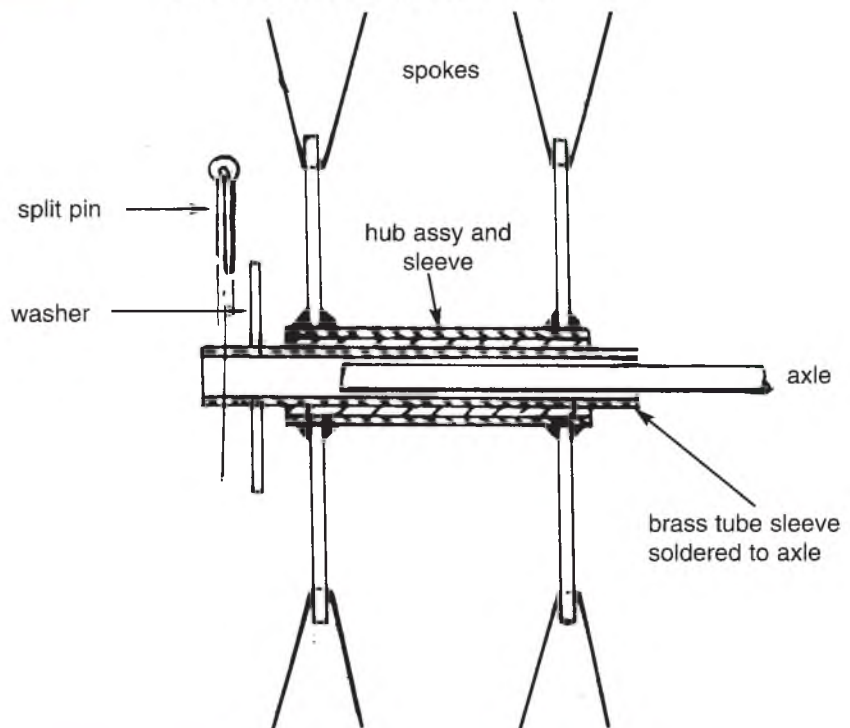


Fig. 8.

WHEEL RETENTIA SYSTEM



THE QUIET ZONE

R/C SCALE ELECTRICS WITH
PETER RAKE

Yes, try as you might to avoid it, it's that time again, time for more 'interesting' electric flight nonsense. Well, you might not think it's interesting, but I'm sure that someone, somewhere does - even if it's only me.

So, what have we lined up for you this month? Well, since I've run out of material already written for me (I do so like it when somebody else writes the column for me), it looks as if you'll have to put up with me rambling on about nothing much in particular. No great surprise there then, ninety percent of my columns consist of me rambling on about nothing much. I have a motto, and stick by it - if all else fails, waffle. You can't beat a good waffle. In the army we used to say that bull**** baffles brains, well you'll find plenty of the former and not much of the latter here.

Seriously though, yes sometimes (not often, but sometimes) I do get serious about modelling. There's been quite a bit going on here, so maybe this is the right time to catch up on what's been going on at Rake Mansions. Apart from drawing up miniature versions of vintage models, and generally annoying the wife by buzzing little helicopters around the lounge, there's been something of a dearth of real plan drawing. However, that doesn't mean that you avid plan collectors will be short of inspiration over the coming months.

Bear in mind, as you read this missive, that it's written quite a while in advance of

NOW USED AS PAT'S 'HACK' MODEL, THE GLT SHOWS OFF HER ATTRACTIVE LINES.





The three models Pat entered in his district comp. About 30 models were entered in total.



Here you see the very straightforward construction of the little Polikarpov.



Although not fully completed at this point, you can see the level of detail Pat is aiming for.



Bomb racks, a bomb sight and the crew's names clearly visible. Just a vac-form engine at this point, but that will soon change.

appearing in print, so I'm never quite sure of what happens between me writing it and you getting to read it. So, please forgive me if any of the things I mention here have actually appeared. They hardly ever tell me what will appear and when, so I have to work blind, as it were. Once again, nothing particularly new, I'm constantly in a daze of some description. So, with that disclaimer made, let's finally get down to business.

THE RAKE/LYNCH AIRCRAFT COMPANY

As anyone who is a regular reader will be only too aware, that stalwart builder, Pat Lynch, seems to get stuck with prototyping many of my designs. Well, the latest one is no exception. This model, a 45" span Polikarpov PO-2, came about as a bit of an accident. An on-line modelling site I frequent decided that a build-off for new designs would be a great idea. I love drawing plans, so said I'd like to participate but didn't think I had enough time to actually build whatever model I might design. Sometimes there is just too much going on to find time for everything I'd like to do. Probably why my 'must draw' list keeps getting longer. For every design I finish, three more seem to have joined the list. Yes, it really is a hard old life being a modeller.

Anyway, several other designers found themselves in much the same position, so it was decided that a team effort would be acceptable. It was around then, that Pat approached me with an offer to build what I designed, at whatever size suited me best,

as long as it was a Polikarpov PO-2. Not just any old Polikarpov PO-2, it had to be the type used during World War Two. Well, I ask you. Me? Draw a WW2 warbird? Who would think such a thing possible?

Strange as it may sound though, the PO-2 is actually a type I've been threatening to draw up for years - without ever getting around to making a start. I'm quite good at that; not making a start on oodles of potential designs. However, now the gauntlet was well and truly thrown down and I had no excuses left for putting off drawing up 'Polly'-the-PO-2. Helicopters were put aside, for which the wife gave a huge sigh of relief, Pat supplied some three-views and drawing was commenced.

As with all designs, it isn't getting the outlines right that takes the time, it's sorting out how the thing will actually go together. This time, however, the design is pretty straightforward and the longest task was probably drawing the engine - an exposed, five-cylinder radial. Pat does love his

exposed engines to tinker with. My part of the project took only a couple of weeks from start to finish and then it was over to Pat to start hacking balsa.

Right from the outset, Pat knew he wanted a military scheme from the WW2 period for his model. However, as he did further research, he discovered that the type

had been used in action by some all-female squadrons to harass the Germans at every opportunity. So successful were they that the Germans came to refer to them as the Night Witches (Nachthexen).

Generally, it seems, the idea was that these Night

Witches would fly around over the Germans, dropping bombs and making as much noise as possible to break the morale of the enemy.

The PO-2, being very slow but highly manoeuvrable, was ideally suited to the task at hand. One interesting tactic developed, after the Germans ringed their troops with searchlights and anti-aircraft guns, was to



Something we don't often find, a photo of the crew who flew the original PO-2 Pat based his model on, Tanja Makarava and Vera Belik.



The level of completion at which Pat just couldn't resist a test flight, or two. External rudder and elevator linkages simplify setting up.

attack in groups of three. The first aircraft would approach under power and draw the enemy fire (being able to jink about and make itself a hard target to actually hit) while the other two would glide in and drop their bombs. The still armed aircraft would then switch off its engine and the others would draw fire while that one sneaked in on the glide. It all sounds highly dangerous to me, and I believe casualty rates were fairly high, but it does seem to have worked very well as an anti-morale factor. These incredible women would then return to base, rearm and repeat the whole process again, flying many missions on the same night.

So, armed with such inspiration, Pat simply HAD to replicate a Nachthexen aircraft. The one he chose, like so many Russian aircraft of the time, featured lots of patriotic 'graffiti' painted on the fuselage sides. A little research revealed that a rough translation indicates it means 'Revenge for our fallen comrades', followed by two names (Tanja

Makarava and Vera Belik).

At first we weren't sure if the names referred to 'fallen comrades', or were the names of the current crew. Further research and a quick search for the names, told us when they were killed in action, and comparing that with the date given for the reference Pat was using, revealed that it had to be the crew's names - the scheme pre-dating the demise of the ladies in question.

I love scale modelling, you start off with a simple enough idea but that soon leads to whole reams of other interesting facts about your chosen subject, and the people who flew them. With one like the PO-2, which was in use from the late 1920s, right through to the Korean War in the early 1950s you have masses of scope for details and colour schemes.

Anyway, getting back to Pat's model, as you can see he's in the process of doing his usual great job of building. At present, it can be seen that he still has more work to do on

it but has already proven that it's a great flying model. Not only a good flyer but a generally good model in itself.

Having gotten it basically finished, but awaiting a better dummy engine, Pat entered three models (all from my designs) in his district competition and all placed well. His little (by comparison) PO-2 took first in military scratch build, his Fokker D.VII (Part 2 in this issue) took third in the same Class and the Great Lakes Trainer (coming to FSM fairly soon now), came second in civilian scratch build.

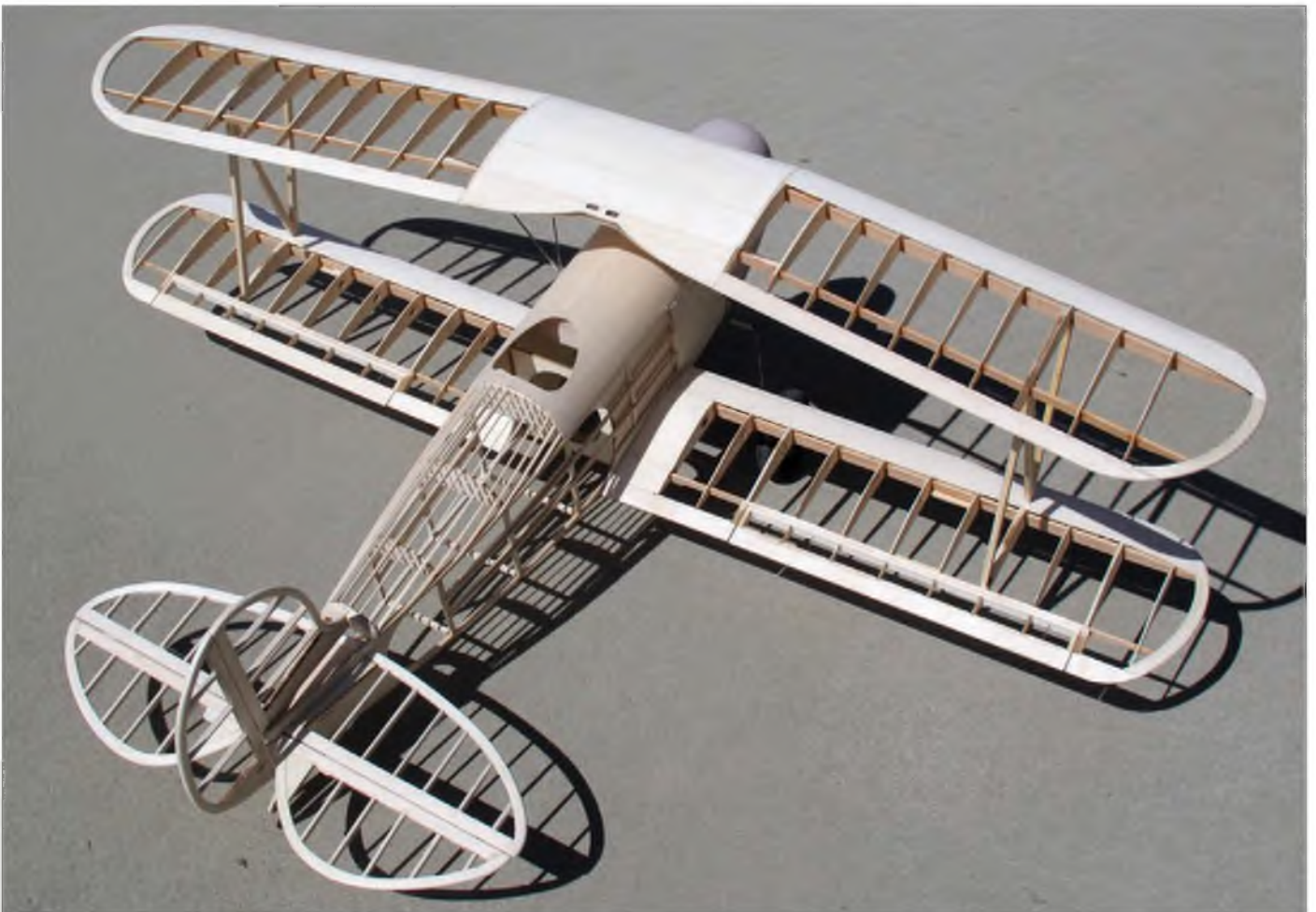
Not too surprisingly, Pat ended the day very happy and I was a little embarrassed by his success with my designs - embarrassed, but happy he'd done so well with them. Three models entered among thirty, and three prizes won; if only I could manage something similar.

Before the PO-2 appears here as a free plan article, Pat is now working on a much better looking dummy engine (the current one being a vac-form job he had knocking around). He'll get some better flying shots for me and we'll be all set to offer you another nice little model to build. As to how it flies, Pat says it is more than adequately powered by an E-Flite Park 450 outrunner, tracks straight on the ground and is beautifully slow and stable in the air.

Obviously, at under 10 ounces per square foot wing loading, it doesn't like a great deal of wind, but it handled the conditions of the day nicely.

SAME COMPANY, DIFFERENT MODEL

Since I've mentioned this one before but it follows on naturally from the previous item, I won't dwell too long on the Great Lakes



Slightly bigger than the PO-2 the Great Lakes Trainer isn't a whole lot more complicated - just a fair bit heavier and more powerful.



After the 'magically' induced disaster with the original markings, Charles Sherman's Sopwith Swallow looks much more the part.

Trainer. At around 53" span, and much heavier than the PO-2 (around 5lbs) Pat now uses it as his 'hack' model. When he needs something to just go out and fly whatever the weather, the GLT is the model he takes.

However, since I last mentioned it, something has changed. Because of its size, I didn't think it would appear as a free plan when I last spoke of it. That, thanks to a little rearranging of drawings and the fact our beloved editor is happy to run three part articles, you can now expect to see the Great Lakes Trainer appear in Free Plan form. Before too long, and there will be the usual laser-cut set of wood parts to get you on your way with the building sequence. All good news, of course, because it also applies to the next model we'll be taking a preview look at.

SOPWITH SWALLOW

This one has actually been almost ready for quite a while. I've had a bit of a thing about the Swallow ever since I built a free-flight version from Aeromodeller plans back in the early 1970s.

Although that first example came out quite well, very well considering it was built in a small flat while I was on military service in Germany, I returned to U.K. before getting a chance to actually fly the model. It was impossible to transport it safely, so I just left it sitting in the lounge. Goodness knows what the landlord must have thought when he discovered it there.

I have built a few Sopwith Monoplane Number 1 (Scooter) models since then, but never actually got around to another Swallow (Sopwith Monoplane Number 2). That being the case, I felt it was about time to draw one. Once I had drawn it, it then proceeded to hang around for a while before I could find someone to lemon into building the prototype. This often happens and doesn't really bother me all that much, they usually find a home eventually.

Anyway, after hanging around for a little while (compared to some I have) Charles Sherman stepped up to the mark and volunteered to build the model.

Actually there's quite an amusing little

story involving finishing the model. I think Charles must have been short on enthusiasm at the time and, with all the building and covering completed, he added markings better suited to a Camel (actually they were Camel markings) which rather detracted from the scale appearance. You know the sort of thing, the wrong size wing roundels, squadron markings and other stuff that just shouldn't be there.

I expressed disappointment and Charles is convinced that I sent out trans-Atlantic vibes because virtually all the decals he'd used curled up and dropped off, more or less



Doing her airborne 'thing' for the camera, the Swallow makes for an unusual Sopwith type.

forcing him to redo the model in more suitable markings. It wasn't me honest guv!

Just imagine the power over modellers such an ability would give me. I could draw up virtually any design I wanted, send out the vibes and have builders queuing up to build them. About as close to Nirvana as I'm ever likely to get. A far cry from the reality of things where I draw a design for a model and hope to goodness I can find someone desperate enough to prototype it. Otherwise, of course, there's a possibility I might actually have to build it myself. The benefit of that being that I only draw up types that actually appeal to me - just in case I end up building them myself.

Anyway. Enough of my woes; back to the model at hand. With fresh markings applied Charles was able to complete the model and has been flying it for quite some time

now. He's more than satisfied with how it all turned out, so I suppose you're wondering why it hasn't appeared in these hallowed pages before now. Well, I have to admit that it's entirely my fault. For some reason I was convinced that I still needed flying shots of the model, which had been drawn up as a plan article, rather than a free plan. Going through the multitude of files and folders on my computer (you tend to collect a lot of junk along the way) with the intent of clearing stuff I'd either used, or didn't need to use, I discovered a folder titled 'Swallow Stuff'. Lo and behold, it contained not only



Pat's models safely back home again, displaying the 'spoils' of their recent outing.

all the build photos, but three perfectly acceptable flying shots too.

The advantage of the delay is, of course, that I've been able to rearrange the drawings onto six A1 size sheets and, rather than having to buy the plan, it can now appear as a free plan in yet another three part article in your favourite modelling magazine. Every cloud, etc., etc.

There are other models that are just about ready for your delectation, as soon as I get my finger out and finish editing the construction articles and sort out which photos to use. However, as usual, I've run out of space so you'll have to wait to hear about them. If, in the meantime, you'd like to contact me (all volunteer builders gratefully received), you'll find me at

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