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SHORT

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MODEL OF THE
LUFTWAFFE'S
BIPLANE FIGHTER

INDOOR SCALE ACTION

BMFA SCALE
INDOOR R/C NATS,
AT SHAWBURY

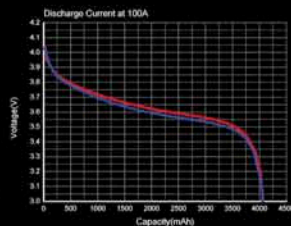


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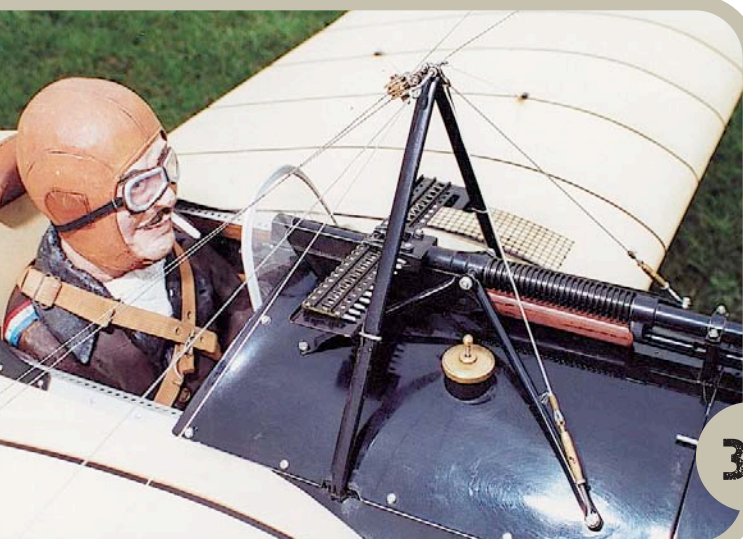
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FLYING SCALE MODELS - THE WORLD'S ONLY MAGAZINE FOR SCALE MODEL FLYERS



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ON THE COVER

Obscure aircraft often make the most interesting subjects for scale modelling. Dennis Richardson, certainly achieved that with his 96" wingspan Laser 80 powered 1/8th scale replica of the Short Type 184, the inspiration and basis for which was the plan of Gary Sunderland's free flight scale example that appeared in FSM some years back. Alex Whittaker reviews Denis' model in this issue.

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Publisher: Alan Harman
Design: Peter Hutchinson
Website: ADH Webteam
Advertising Manager: Gareth Liddiatt
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Office Manager: Paula Gray

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Competitor to the famous Ford Tri-motor, the Boeing 80A-1. Australian David Balfour modelled it for electric power.



CONTACT

ANTIDOTE FOR SPITFIRES AND MUSTANGS!

No, we're not biased - and a well-produced model of a Spit' or 'Tang is something we'll always admire. But we're equally in admiration of scale modellers who go out of their way to tackle those obscure scale subjects, of which Dennis Richardson's big Short 184, reviewed in detail in this issue, is a classic example.

This creativity is worldwide among scale modellers and the proof of it can be seen in a couple of photos that Gary Sunderland submitted, of models seen at the Shepperton Mammoth Scale event in Australia. Just how many of us have actually heard of the *Boeing 80A-1* Tri-Motor, but it obviously appealed to David Balfour, who modelled it for electric power.

Gary Sunderland will be well known to readers of FSM for his extensive line of WW1 aircraft types, plans and construction features of which have appeared in this magazine. Gary reports that he has abandoned biplanes for the moment to produce a *Nakajima Ki 27* monoplane fighter which, he reports, flies well on an O.S.200 motor. Maybe we'll be able to persuade him to present plans

for this one in FSM too - after we've dealt with his B.E.2a, presently in the final draughting stages on the FSM drawing board.

So, the adventurous scale creativity is alive and well - but we're still attracted to Spitfires, Mustangs, Me 109s and Tiger Moths, just as much!

Most of Australian Gary Sunderland's scale models have been biplanes, so it's a surprise to see his Nakajima Ki 27.



DON'T MISS
 Our subscription offer on page 36-37

NEXT MONTH IN FSM

March issue of FSM will appear on February 12th, in plenty of time before the end of the Indoor Scale flying season to present Richard Crossley's Nakajima Ki-43 'Oscar', for which we'll be able to provide full size pull-out construction plans, colour schemes etc, for this Japanese WW2 fighter. Richard's prototype model is rubber powered, but can easily be adapted to radio control and electric power with a little ingenuity.



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Sweeping in for a low pass the He-51 shows off her lines and colour scheme to good advantage.

Heinkel He-51

PART 2: Continuing the construction of Peter Rake's 54" span, electric powered model of the Luftwaffe's biplane fighter, built and described by Craig Johnston



FUSELAGE REVISITED

The 1/8" motor mount pieces were glued together with the 'M'-piece to the front as against the rear that the plan shows. This was only done so as to suit my chosen motor and its shaft position in relation to the nose. The motor and X-mount were fitted to the motor mount with a couple of washers under the top, and left hand side of the 'X' so as to set the right and down thrust. This takes a bit of fiddling due to the motor not being centred on the ply mount, but offset, as I wanted the prop and spinner as close to the centre line of the fuselage as possible. *(The hole in parts M and MA is off-set by just the right amount so that the shaft is central with the required down and side thrust. So, make sure you fit them the right way round. The view on the plan is from the front. PR)*

Once happy with the motor and mounting, the ESC was placed under the battery tray of the lower fuselage section. The motor and mount assembly was then glued to the lower fuselage, the outer sleeve for the elevator control was glued to it's rear anchor post in the upper fuselage and the top and bottom fuselage halves were finally glued together with *Titebond* (slow drying) so as to give me some fiddle-time and check that all was aligned correctly.

I also ran some glue over the top part of the engine mount where it locates in the upper fuselage half. Once this assembly is dry, the side and vertical keels had their height built up with lengths of 1/8" x 1/8" balsa strip to bring them to the same level as the stringers, and sheeted sections. *(Balsa capping being much easier to sand than the ply keels themselves. PR).*

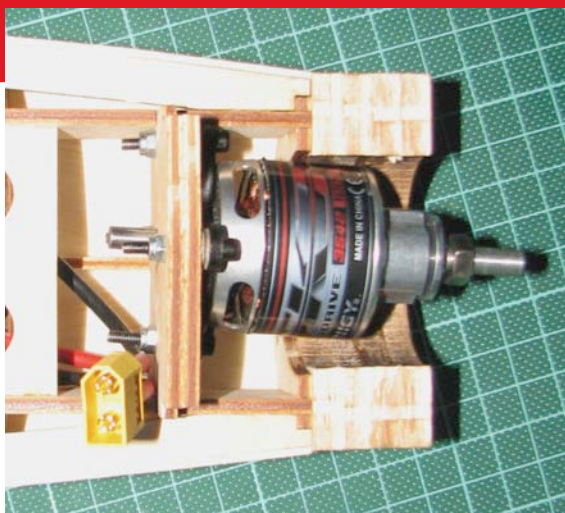
The nose area was sanded to the correct depth to allow the prop. adaptor, and spinner backplate to be fitted along with the thin ply nose ring pieces. The nose area and cowl were then planed and sanded using pictures and the plastic model as references so as to give the area its distinctive shape. The air inlets were opened up using the *Dremel* and one of the wife's emery nail files. It is amazing how many useful modelling tools they have in their inventories!

While I was filling the back yard full of balsa shavings and dust, I made up the rear fin fillets. These are shown on the plan as just basic block balsa, but i wanted to have the area blended as per the real deal. They are pretty thin and fragile in places, so I made up a 'T'-piece of 1/4" balsa sheet the same as the desired fillet profile, the fillets were tacked to this, and this in turn double-side taped to the tailplane seat. This made it much easier to blend them with the fuselage, and also support them.

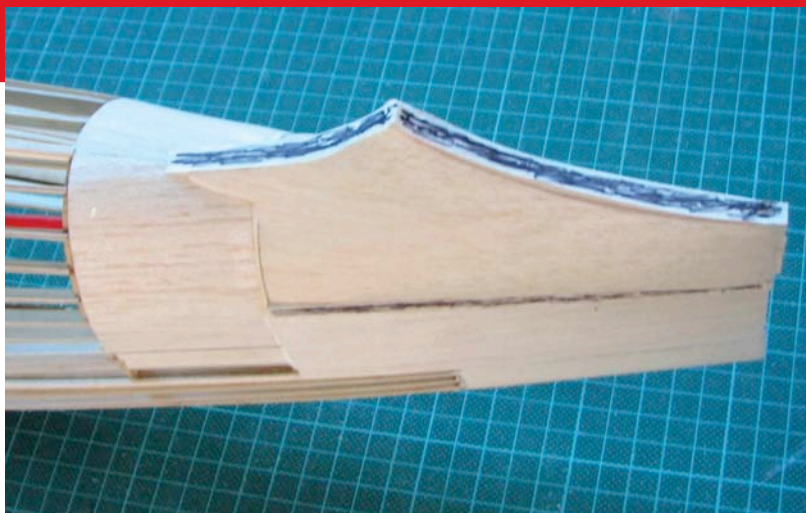
The Radiator assembly was made from balsa sheet, with some triangle stock to act as gussets. The louver is made from *Evergreen* card stock

UPPER WING

The top wing centre section was started by laminating the dihedral braces to the



Note how the motor is off-set to allow for down and right thrust and still leave a spinner that is central in the nose.



The tail fillets Craig fitted to his model.

centre spar sections. These were then being pinned down so that it was just a matter of framing the rest of the piece. Some care and attention is required though as most of the ribs are different, and the ply centre section strut mount parts must have their orientation correct.

The top wing outer sections were next for the board. These were framed up as normal, but care needs to be taken with a few things, again being sure to fit the correct rib to the correct spot, because there are lots of different ones in the make up.

The ply R15 ribs carry the aileron servos and were drilled for their mounting screws. These then had the servos test fitted due to being a potential nightmare once glued in position over the spars. I was also sure to check that I would be able to get the servos in place and secured once the wing was built up. Again I was sure to get the ply strut attachment plate orientated correctly, there is only about 1mm difference in them but a difference there was! The root ribs were glued in position after packing out the wing tips to the correct height.

The wing tips were laminated up using the same method as the tail surfaces, the only difference being the strips are 1/16" x 3/8". With these done they were glued in position and the leading and trailing edge areas cut to suit and fitted. The outer three ribs for each side were made in-situ and shaped with the tip taper. I put a reference line around the wing tip, duct-taped (Gaffer Tape) over the R19 ribs and sanded the tips to my desired taper using the duct-tape as and reference line for sanding limits. This was all done with the ailerons still attached so as to accurately carry the taper along the whole tip chord. The leading and trailing edges of all the wing sections were planed and sanded to shape.

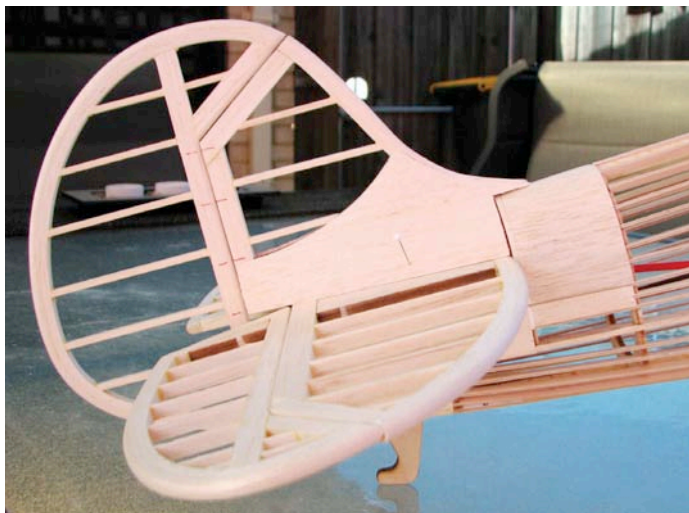
Next, the ailerons were cut away from the wing panels and slotted for hinging. I chose to make the servo horn access panels removable so put a bit of 1/8" x 1/4" balsa in the required rib bays against the spars, so that I could screw in the access panels. The three sections of the top wing were then epoxied together, ensuring that the correct dihedral was maintained.

I wanted to run each aileron servo off

of its own channel so as to give myself some options when it came to radio set-up. I cut a slot in each of the centre section ply plates just inboard of the rear centre section (c/s) strut locating holes. Then I ran some servo wire through the central wing section for either side and crimped female plugs on either end of it, one end going to each aileron servo and the other seating firmly in the slots. After this was done, the top of the centre section was sheeted with 1/16" balsa.

BOTTOM WINGS

The lower wings were built up a little differently than designed by Peter, because he kindly agreed to let me incorporate flaps into the model as per the full size. To do this, I had to firstly put a hole in each rib for the servo lead, this was done using a piece of sharpened brass tube. I also replaced two of the 1/16" R5B ribs in each wing with some 1/8" jobbies for the servo bays, as I had decided to take the easier option and have each flap driven by it's own servo. The servos themselves were mounted on removable 1/16" ply plates as per many of Peter's designs using ailerons.



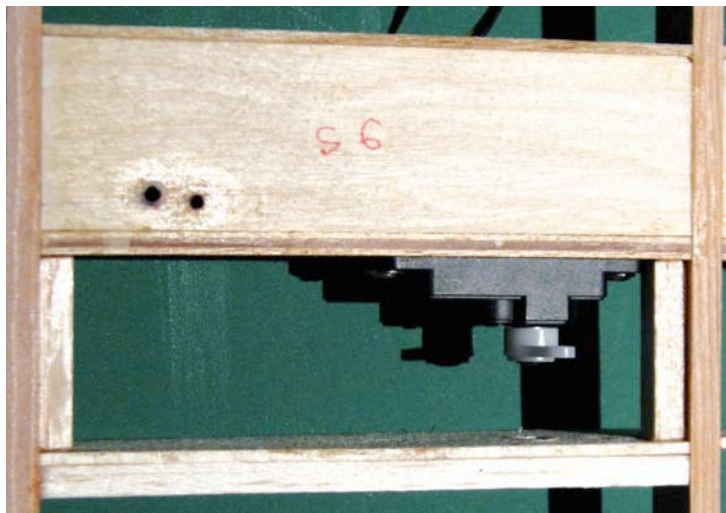
How those tail fillets work once everything is in place.



The top wing centre section showing the strut mount positions and how Craig has let in the servo lead extensions.

After these little changes were made, the wings were again framed up over the plan much as the top outer panels, just being doubly sure not to glue anywhere that I would soon be cutting away for the flaps. The lower wings require brass tubes to be fitted to the inner most three ribs on each side for the music wire wing joiners. The tubes were loose fitted to the wings with the wire rod, both wings were slotted together, and the packing which set the dihedral was again positioned beneath the wings which helped the brass wing tubes find their required location, they were then epoxied into position being sure not to accidentally glue the wings together or the music wire rods into the tubes. *(Been there, done that, wasn't impressed. PR)*

After all was dry, I separated the flaps from the wing just behind the rear spar, trailing edge piece, and wing tip. I trimmed down the stubs of the ribs on the flaps so as to fit a 1/4" x 3/8" leading edge to them. I made up a couple more control horns out of ply using the kit aileron ones as templates and glued in some balsa sections into the flaps to mount the horns into. The flaps were slotted for CA hinges. I went with top hinging for them as I didn't want to risk weakening the rear spar in the lower wing. The hinges were CAed to the top edge of the rear spar, and a cap strip of balsa was cut and glued across the top of the spar to bring it to the same height as the ribs.



Here you see how the aileron servo will end up, and yet more strut mounting plates.

The inner bays of the lower wings were sheeted on top as per the plan, and some hard pine was cut shaped, and drilled for the lower interplane strut mounts, these were then glued into position.

While on the subject of the lower wings, I used a spade drill to put a hole in each side of the fuselage lower wing mounts so the servo lead could pass through it to the wings.

STRUTTERY AND UNDERCARRIAGE

The interplane struts were shaped from piano wire as per the plan. Brass tabs were then cut and drilled to secure these to the wings; but none of these components were not soldered at this stage. The c/s struts were also formed using the plan as a guide; again the tabs were not soldered for now. The undercarriage legs were shaped as well and took a couple of attempts, as wire bending is not my forte and the wire in this case was too heavy a gauge to be done using my little K+S Bender. When happy with the angles, these were plugged into their mounting tubes in the fuselage bound with stripped down copper wire and soldered together.

The spats were laminated together including the ply re-enforcements ensuring both a left and right handed unit were made. Then it was out with the ever-faithful razor plane and sandpaper again to shape them. Once shaped, the spats were assembled onto the undercarriage legs,

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along with 3" lightweight foam tyre wheels and inner and outer retaining collets. The wires are located in channels in the spat and are secured using more brass tabs that were cut and drilled. Small screws hold the whole lot together.

The undercarriage legs were then in-filled with balsa sheeting, and slight fillets made up where they plug into the fuselage.

PUTTING IT TOGETHER

To aid in getting the top wing incidence correct, I made up a balsa wedge that I traced from the side profile view of the

plan. This was taped in its location to the upper fuselage and sets the top wings height and 1 degree of positive incidence in relation to the fuselage lateral line. The lower wings were plugged into their mounts using the piano wire joiners, followed by the c/s struts. The top wing was plugged into the centre section struts, followed by each of the interplane struts, which can be plugged into the lower wing and then swung into their top wing homes by spreading the wings a little.

Once all the struts were in their respective locations, the top wing was seated against the incidence wedge

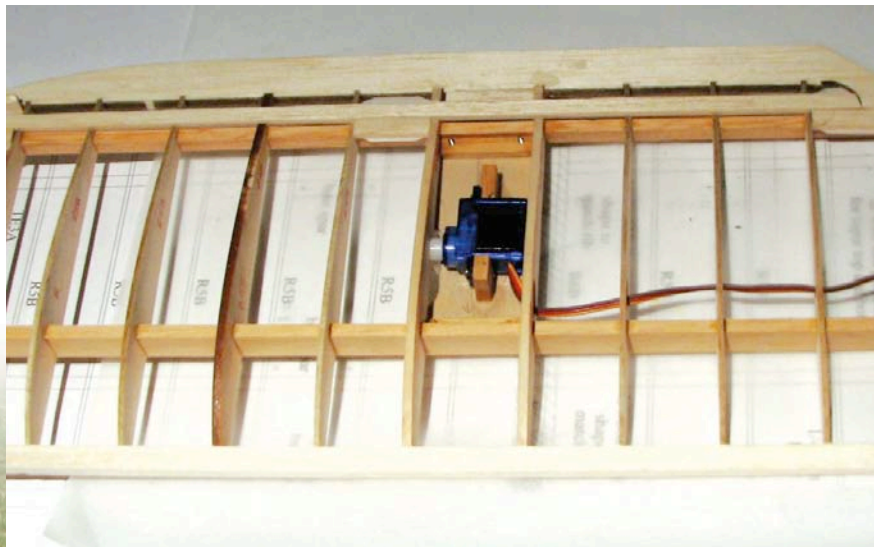
and checked for distance between top and bottom wing tips. When I was happy that all was as it should be, the brass tabs that had been slid onto the strut wires as the assembly was slotted together, were then soldered into position. The spreader wires between the front and rear centre section struts were also wire wrapped and soldered at this stage.

The whole lot was disassembled and the struts were clad in hard balsa, and sanded to shape, with a slot being cut in the rear post of each c/s strut to hide the aileron servo wires.

Craig has protected the main ribs with tape while shaping and sanding the tip ribs.



Although Craig fitted flaps to his lower wing panels, they proved not to be needed for successful take-off and landing.



All set for another flight the model has a vast amount of 'presence' about it.



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Heinkel He-51



Forerunner of the Heinkel He 52, the He 49 featured a different undercarriage arrangement.

THE LUFTWAFFE'S FIRST FIGHTER

Contrary to popular belief, the rebirth of German military aviation after WW1 was by no means a product of Adolf Hitler's Nazi Party ascent to power in January 1933. The terms of the Treaty of Versailles in June

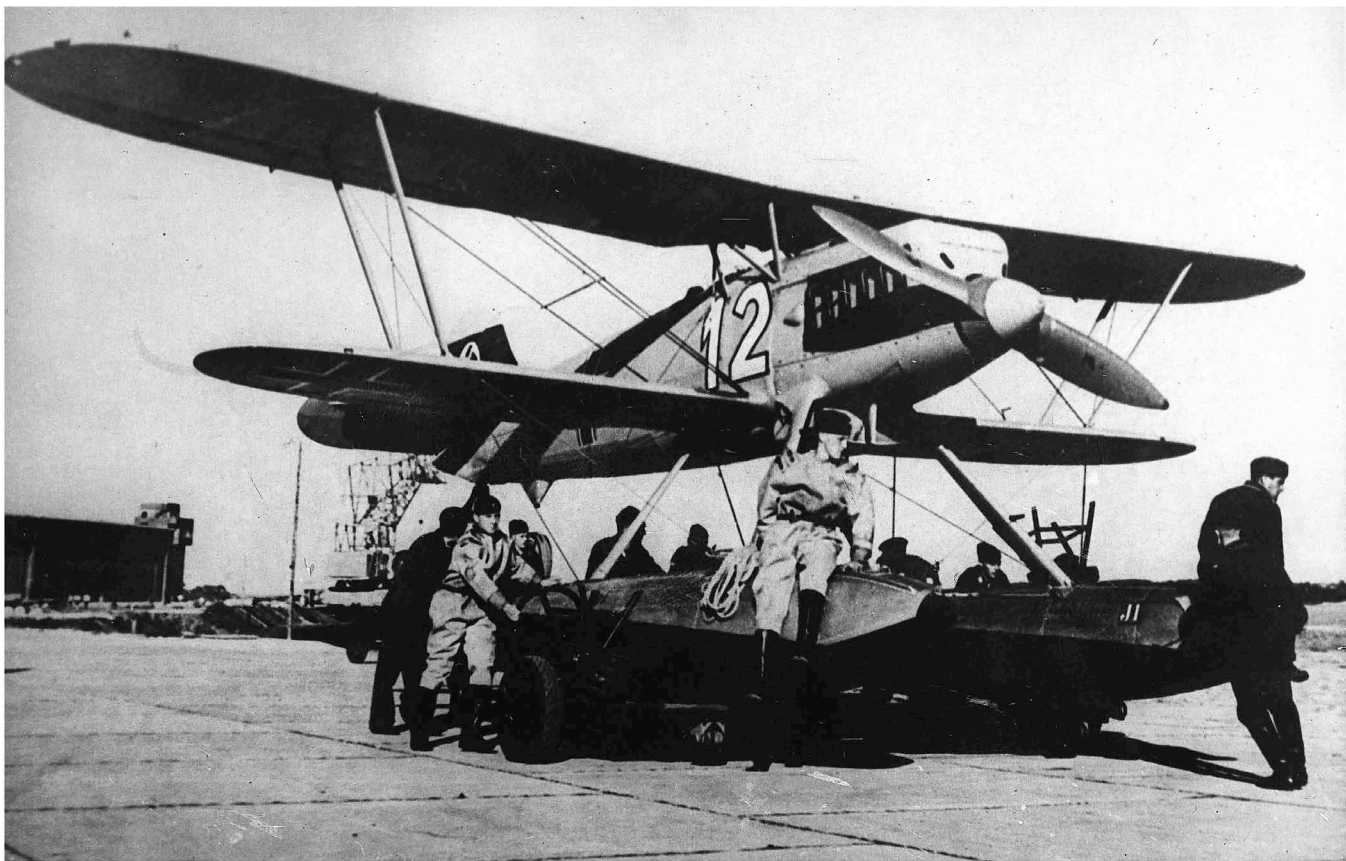
1919 included the disbandment of the German Air Force, although it did allow a Defence Ministry in Berlin, albeit of seriously curtailed scope and size, commanding a treaty army of 100,000.

Here, General von Seeckt, Chief of the Army Command, himself a career infantry

officer, could see that air power would eventually be of paramount importance and was determined to lay the foundation for the resurgence of German air power. To circumvent Treaty restrictions, in late 1921 emissaries were sent to Soviet Russia to discuss aircraft manufacture and

Glad Rags, Luftwaffe style! A group of officers pose in front of a He51A of the newly formed Jagdeschwader 132 'Richthofen' based at Jüterberg-Damn in 1935. The swastika tail marking was adopted when the Luftwaffe discarded its clandestine status on March 1st 1935.





A He 51B-2 floatplane of the Kuste njagdguppen 136 46.

military training and by 1924, the foundation of a clandestine German air-force-in-training had been established in the Soviet Union and this secret 'co-operation' continued for most of the following decade, during which 'civilian' organisations such as the *Deutscher Luftsportverband* provided basic airmanship training on gliders to thousands of young men - potentially the bedrock of a resurgent German Air force - whenever that might occur.

Thus, when Hitler's National Socialist Party came to power in January 1933, they were not the originators of an all-new German military air arm, but the inheritors of a force clandestinely in being, although the secrecy continued until 'coming out' with Hitler's revelation of a Luftwaffe in-being on March 1st 1935.

A fighter borne in secret

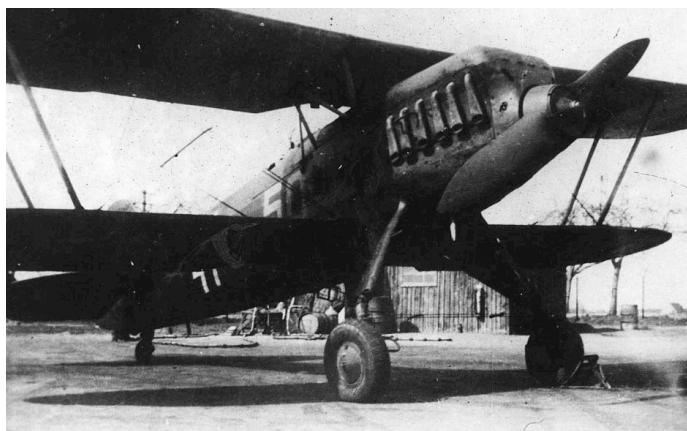
The Heinkel He 51 was a development of

the earlier He49, design work on which commenced in 1931 and the first prototype flew in November 1932. Officially, this was an 'advanced trainer', although in reality it was a fighter aircraft. Interestingly, that date is an indication that warplane development in Germany during the pre-Nazi Weimar Republic period, (specifically prohibited under the terms of the Versailles Treaty after the end of WW1), was taking place prior to the January 1933 parliamentary elections in Germany that brought Hitler and the Nazi Party to power.

Development of the He 49 continued, first with a stretched fuselage, and then with the introduction of a different engine. Further revision quickly led to the Heinkel He51 that closely resembled the '49 but with revisions that included changes to the strut braced main undercarriage. The new type first flew in May 1933 as a pre-production type for the embryo, but

still secret Luftwaffe, which received initial production examples in July 1934. This conventional single-bay biplane, of all-metal construction and fabric covering used a glycol-cooled BMW VI engine, and carried an armament of two 7.92 mm (.312 in) machine guns mounted above the engine - typical of the kind of armament carried by fighter aircraft of other Air Forces. The He51 therefore hardly broke new ground in fighter aircraft design but then, such was hardly the intention, which was, to give the still secret Luftwaffe some fighter type experience.

The He 51 entered service at a time when the end of the lightly armed fighter biplane was clearly in sight. In other countries, the advance toward the more heavily armed monoplane fighter was underway at least in the form of design studies, and no doubt in Germany too. However, although the He 51 was outdated the day it entered service, it



A pretty grubby He 51B trainer of the Jagdfliegerschulen in the early 1940s.



He 51A. D-IDIE the sixth production aircraft completed in the Spring of 1934 and thus in 'civilian markings'.

The sleek lines of the He51 are apparent here on this unit of an unknown Jagdeschwader. Note the wire brace between the undercarriage legs that follows through to the lower wing undersides at the interplane strut positions.



nevertheless provided the newly formed Luftwaffe with a useful tool on which to gain vital experience and an initial run of 150 production examples was followed by the modified He 51B, of which approximately 450 were built, including more than 40 He 51B-2 floatplanes and then finally a further 100 He 51C light ground-attack aircraft.

Into combat

The He51 saw service with Nationalist forces at the outbreak of the Spanish Civil War and achieved initial success, against a number of older French Nieuport Ni-52, Breguet 19 and Potez 54 biplanes of the Spanish Republican Air Force. As the intensity of combat operations increased, further supplies of the He 51 led to the formation of two Spanish Nationalist

squadrons and three of the German 'volunteer' Legion Kondor.

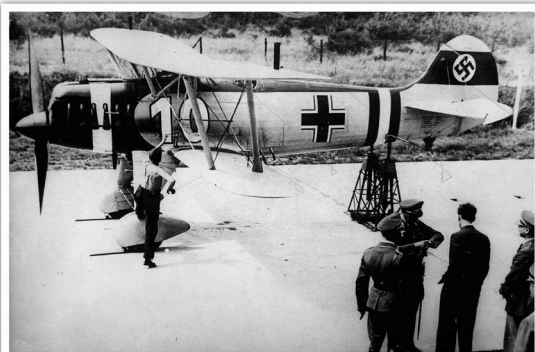
Air superiority was however quickly lost to large numbers of more modern aircraft from the Soviet Union, including the Polikarpov I-15 biplane and new Polikarpov I-16 monoplane, rendering the He51 unable to protect the Legion Kondor's bombers. Thus outclassed, He51s were withdrawn from fighter duties and re-assigned to ground-attack operations, making way, in the Spring of 1937, with the Condor Legion, for the very early version of the Messerschmitt Bf 109.

In its 'relegation' role, the He51 proved a successful tool in developing the ground-attack, close support tactics used by the Luftwaffe during the opening stages of World War II. It continued in use as a ground attack aircraft for the

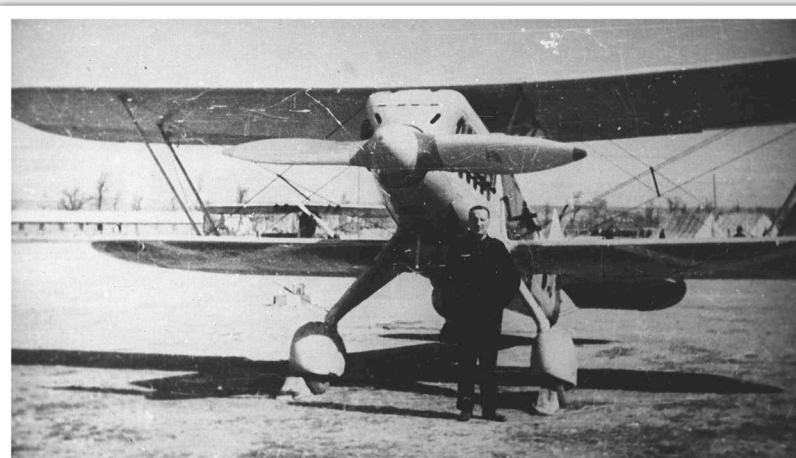
remainder of the Spanish Civil War, although losses were heavy. Following the end of the civil war, He51s continued in Spanish service until 1952.

Experiences in Spain demonstrated once and for all that the days of the biplane fighter were over. The Soviet Polikarpov I-16s were basically untouchable because of their speed and the biplane fighter could successfully give combat only if they could enter a fight from a position of a perfect 'bounce'. The lesson learned by all of the participants was that speed was far more important in combat than manoeuvrability.

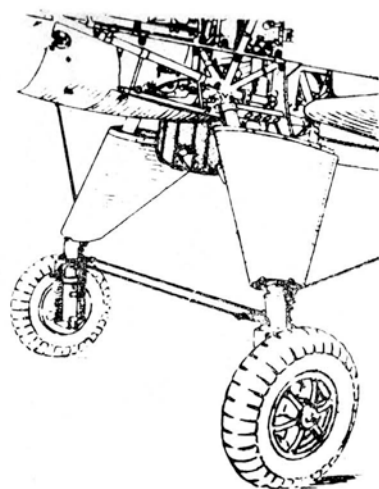
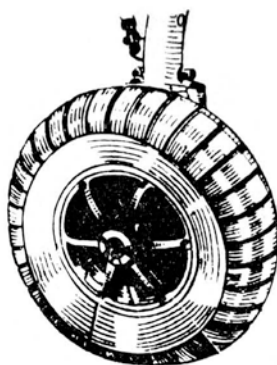
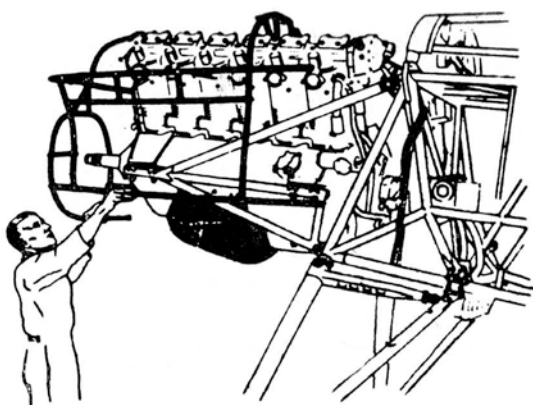
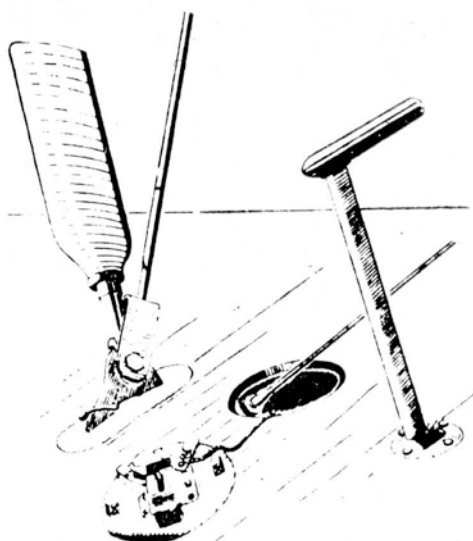
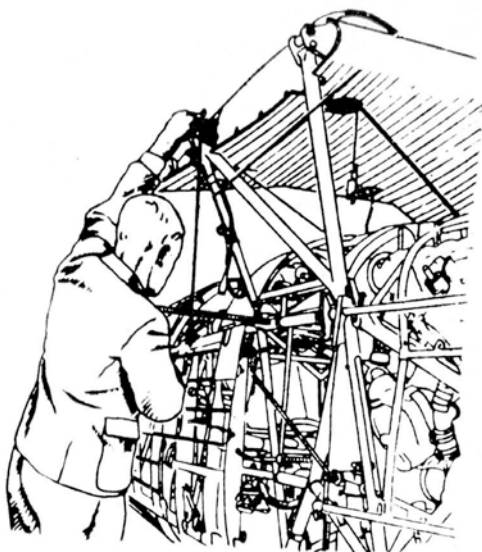
The He 51 continued in front-line service with the Luftwaffe until 1938, then remaining in service as an advanced trainer for the first few years of World War II.



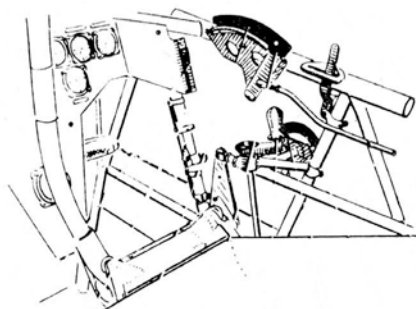
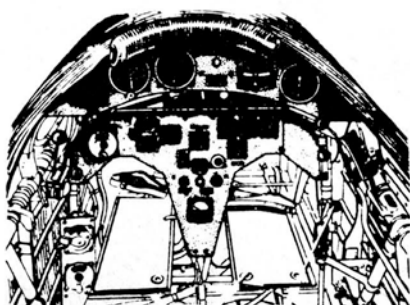
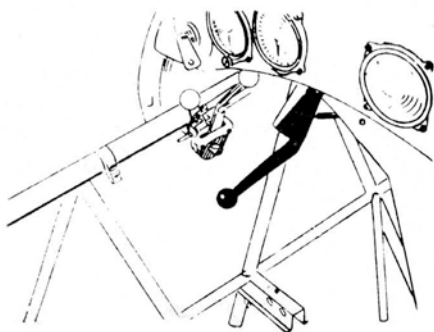
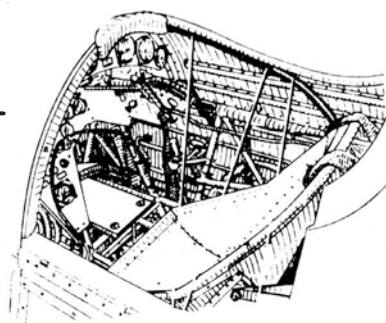
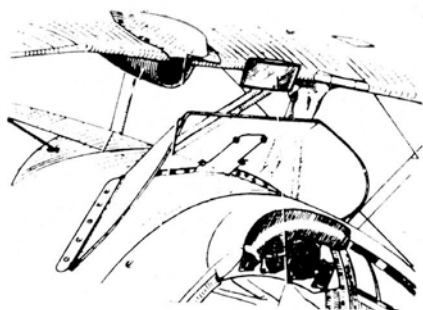
A He51B of the 2nd Staffel I Gruppe being inspected at Doberitz in 1937. The civilian at the bottom right is Colonel Charles Lindbergh who was visiting the base with the US Air Attache. The officer consulting his watch is Reichsmarschall Herman Goering.

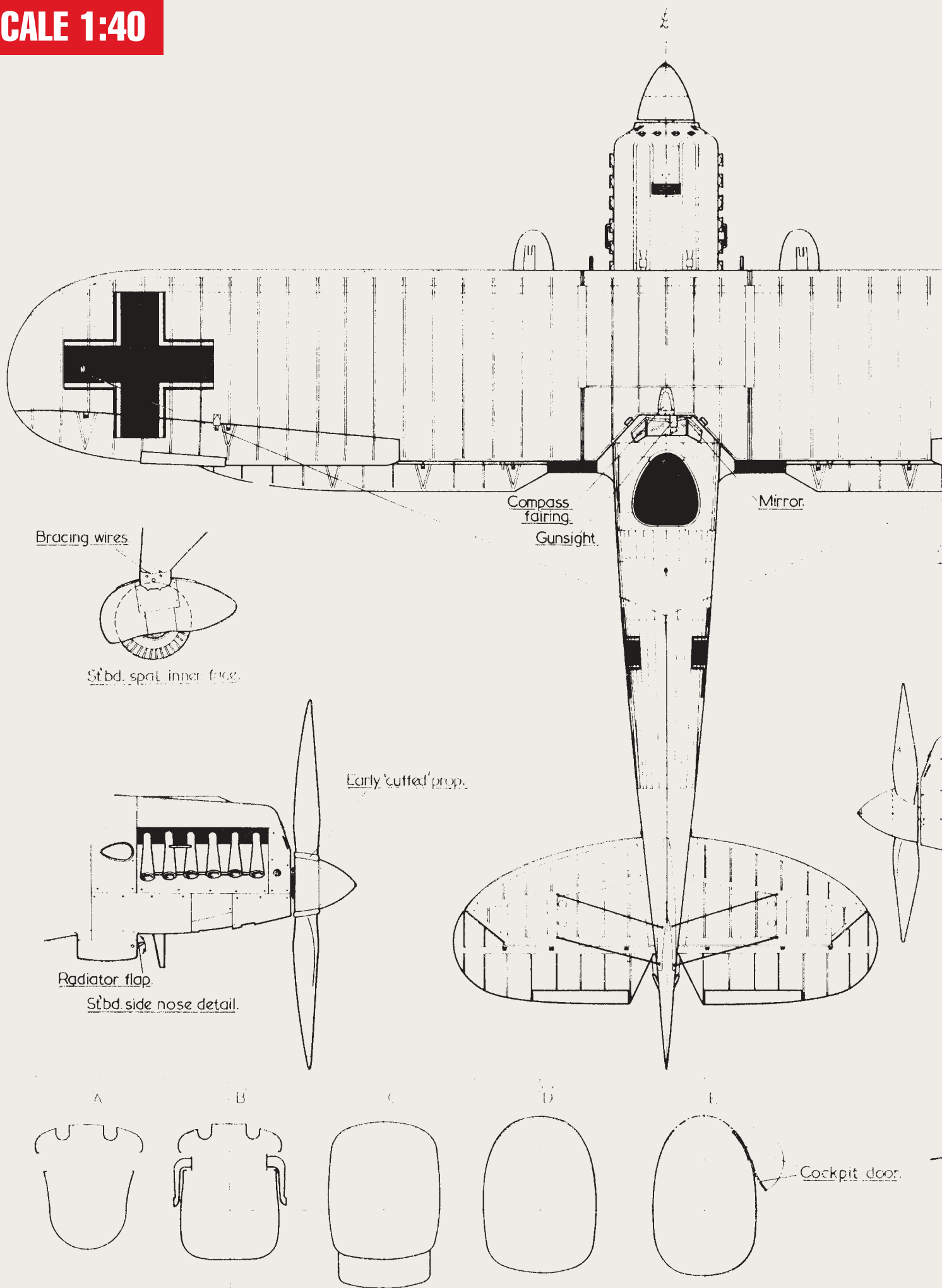


A He51B of the Condor Legion in Spain in 1938.

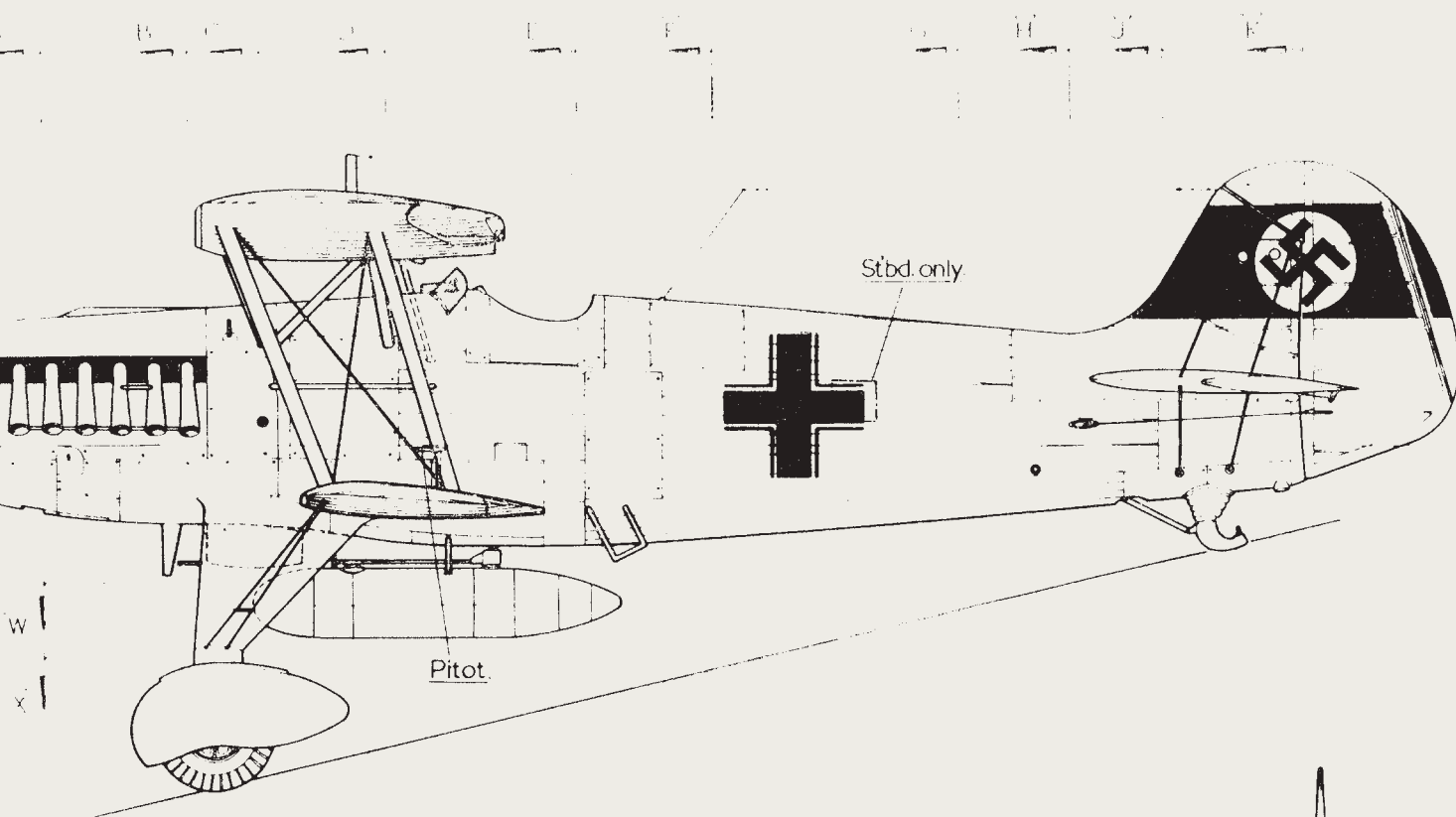
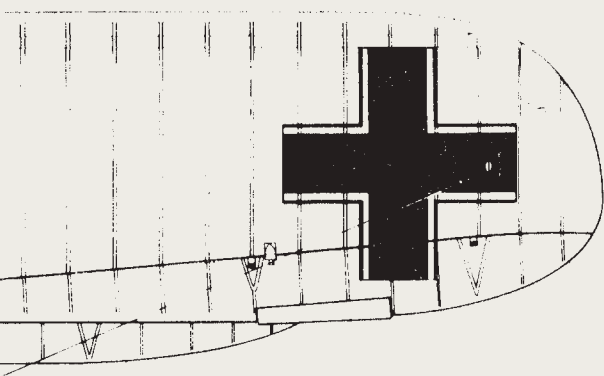


Heinkel He-51 Sketch Page





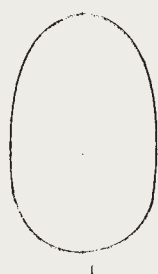
Heinkel He-51



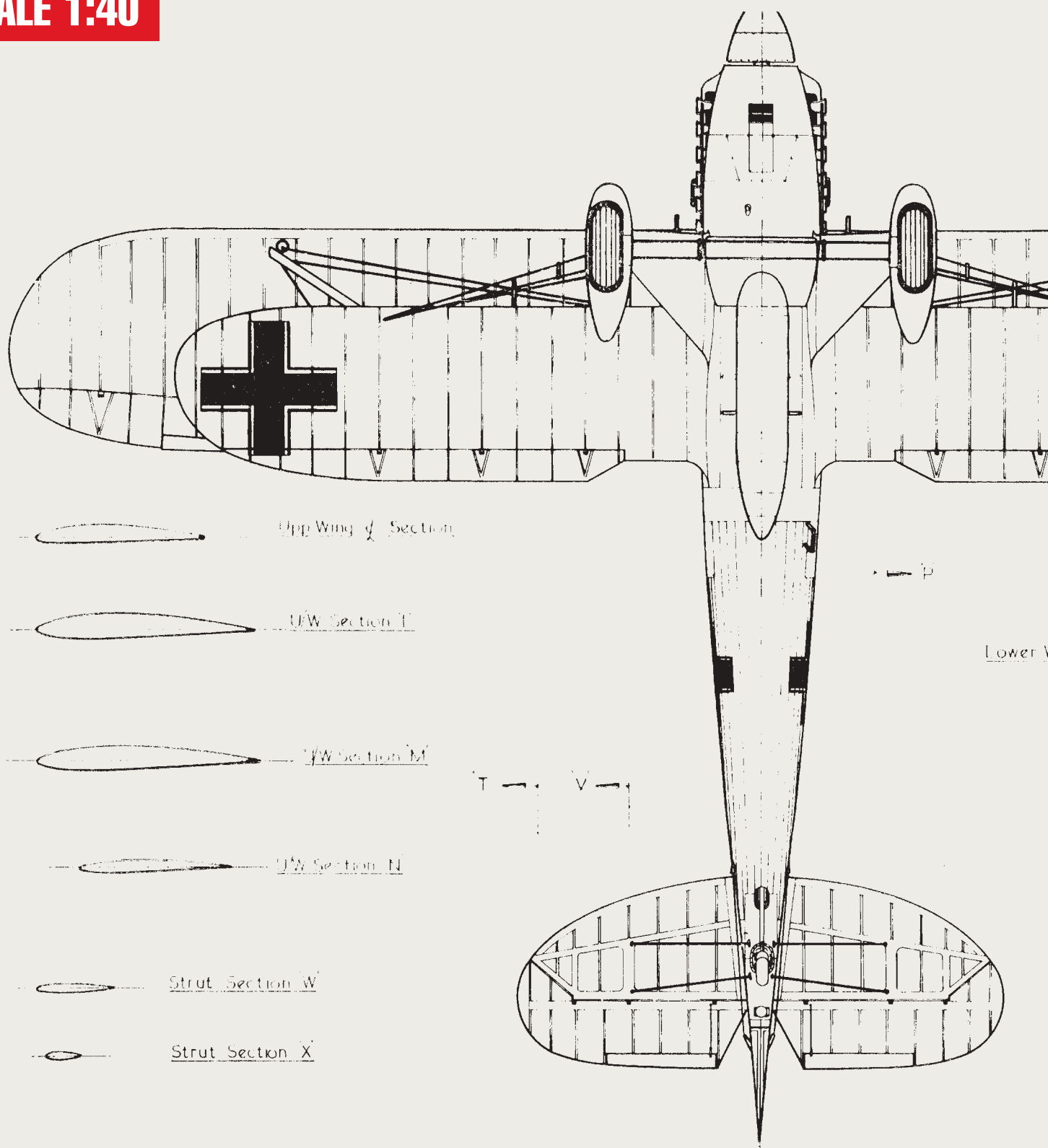
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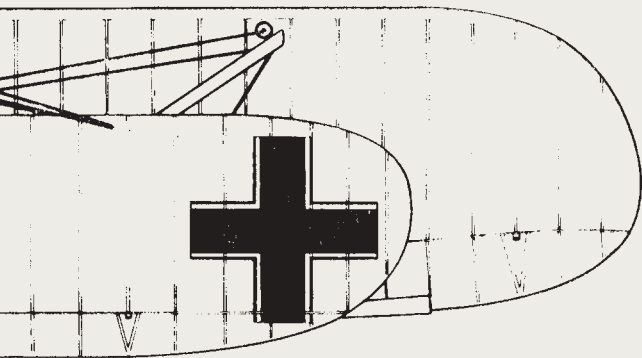
Tailwheel on some machines.



SCALE 1:40



Heinkel He-51



→ R

→ S

Wing Section P



l/w Section R



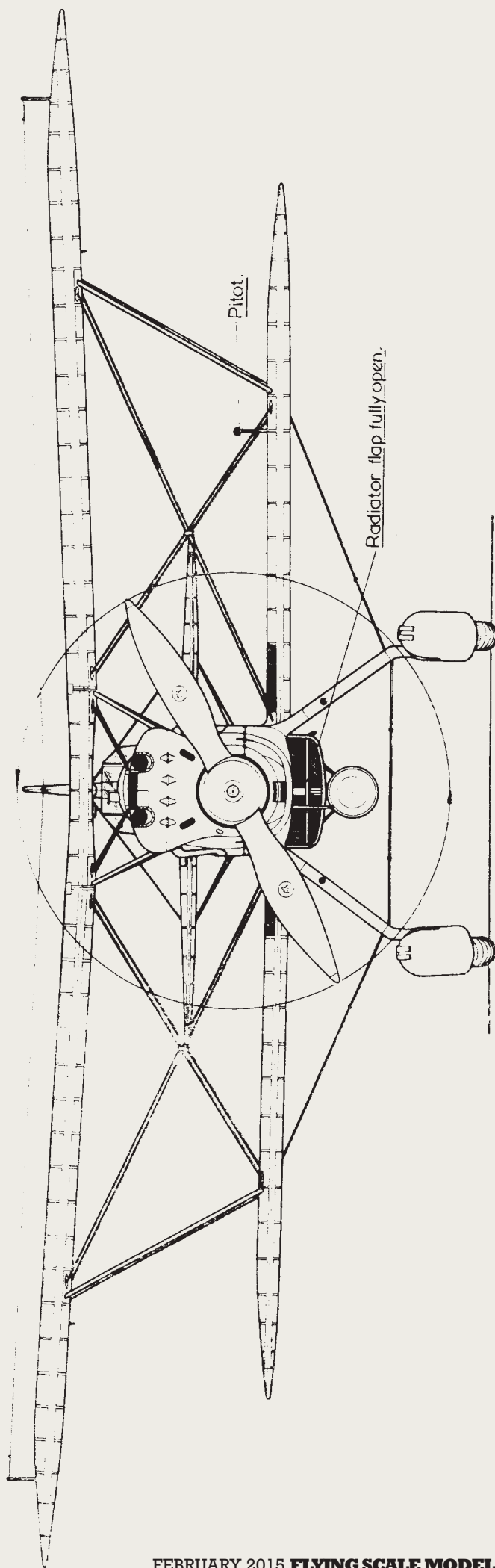
l/w Section S



Section T



Section V



R/C Indoor SCALE!

BMFA Scale Indoor RC Nats, RAF Shawbury 2014.
Alex Whittaker attends this innovative Indoor Scale event

A chilly overcast autumn day, with dark leafless trees stark against the grey sky. Arriving at the venue down a silent and deserted country lane, it felt like one of those old British black-and-white sci-fi movies. The windowless hangar is quite an eerie place. It is easy to imagine it as a top secret cold war installation rather than its present incarnation as a gym. Entry by a small

afterthought of a door takes one into the high geodetic-arched hall. It was warm enough inside, but the light from the mercury lamps was pitiful. Still, all the hard core Scale Indoorists had already set up their model boxes, picnic tables, folding chairs, benches, and electric kettles, so it was all go.

New R/C Events

We were all here because energetic and capable Andy Sephton had

**The BMFA
Indoor Flyer
Trophy R/C
Scratch-Built
Class.
Splendid is
it not?**



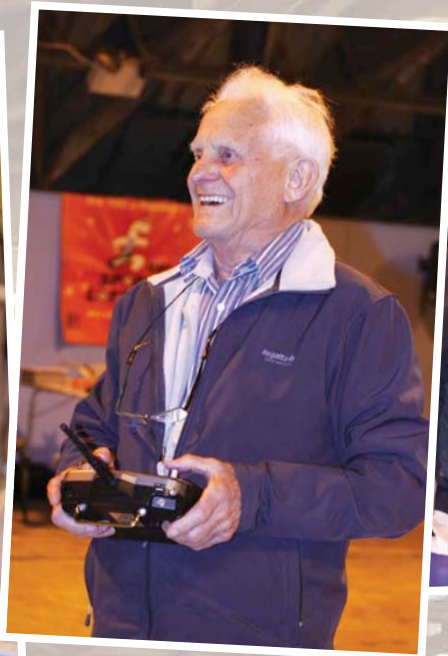
**Graham
Smith's Voisin,
Winner of
Scratch built
R/C Class.**



Graham Smith's Voisin has full scale detail throughout. The elegant Edwardian petrol tank is shown at left.



The pilot in Graham's Smith's Voison had neat tweed suit.



Gordon Warburton taking some rare time off to have a fly, between computer scoring duties.



Distinguished Scale Judges Philip Kent (left) and Ian Pallister. Quality in depth!

devised an ambitious new scale indoor event. This comprised a number of elements:

R/C Scale: static and flight judged to BMFA Scale Rules for the R/C Model Flyer Trophy

R/C Scale Flying Only: open to any Scale R/C model that is 'indoor legal', as per BMFA rule book, and flown to BMFA scale rules. Note that both ARTF and scratch built models are eligible and the builder of the model rule does not apply.

In addition there were the usual free flight indoor scale disciplines, making it an attractive day out for a broad range of indoor aeromodellers, viz:

F/F Peanut for the Modellers Den Peanut Trophy

F/F Open Scale: open to any Scale Indoor F/F model, with flight judged to Rubber/CO2/Electric F/F Indoor rules

F/F Glider: flying only judged to the

provisional rules published last year and appended below.

F/F No-Cal Scale: to BMFA Indoor F/F Rules

The R/C scale events drew most oohs and aaahs from the cognoscenti. First of all there was the new hardcore 'Scratch-Built' event, and then the Ready-to-Fly ARTF event, with a relaxed Builder-of-Model (BOM) Rule. The days of scale aeromodellers being strictly F/F or R/C seem to be ending.

Entries

I was really looking forward to the R/C Scratch Built event because I was intrigued as to how many entries it might attract. On the day, entries were light, and just four flew. Now, I was disappointed. I know from other innovative events, that for the first two or three times through the cycle, modellers are

often still waking up to the possibilities.

Let's see how it goes in future. I certainly did not feel we were wasting our time, we all had a great day together. As for the R/C Scale Ready-to-Fly Class, there were eight entries. For comparison, F/F Open Scale drew 6 entries, and Peanut Scale drew 3.

RTF/ ARTF R/C Scale

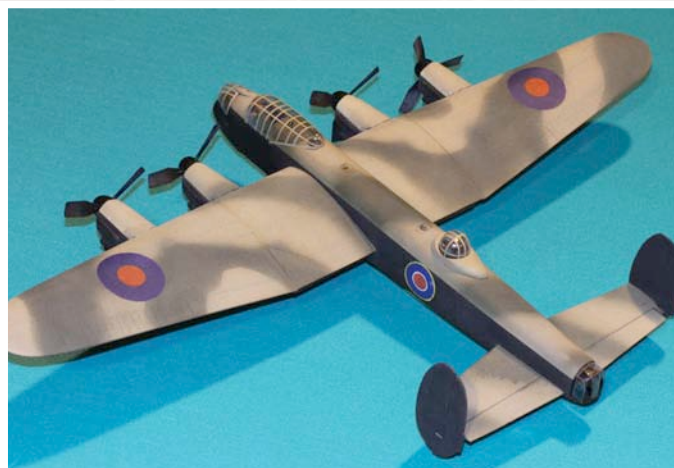
The R/C RTF models flown comprised all the usual subjects with foam/electric Tiger Moths (3), Spacewalkers (2), and an Albatros, a Fokker Triplane, and a Trojan, fielding one example each. Such models are a good way of testing your R/C indoor scale flying skills against unyielding walls before committing your scratch built masterpiece to the ether.

Models I Saw

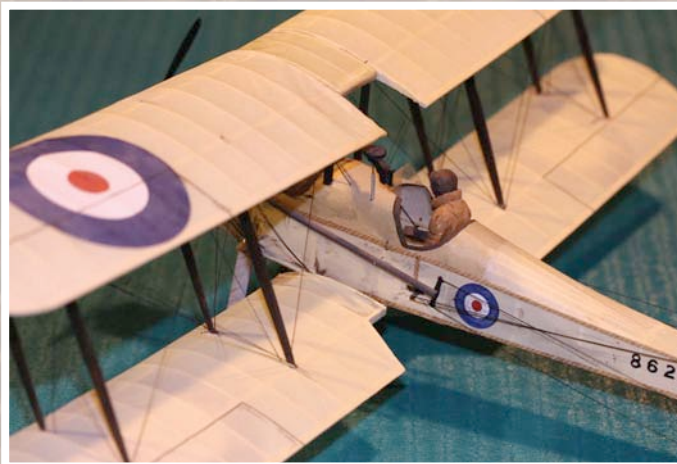
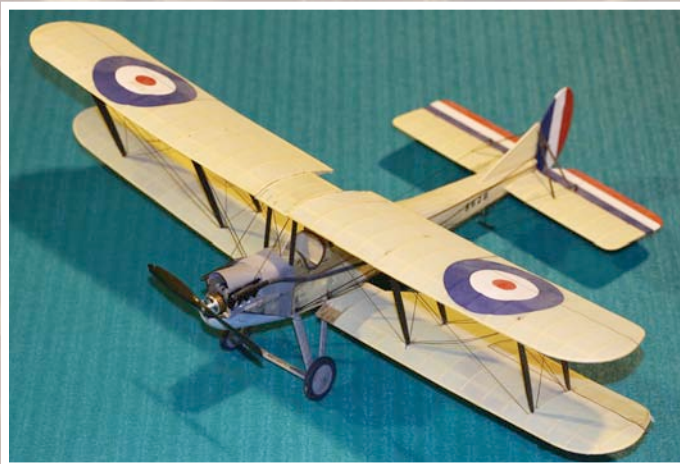
The light was very dull in the hall and flying photography was well nigh impossible.



Eric Strefford and Chris Fouweather had Lancaster's to Chris's Depron formula. This is Eric's Lancaster.



Eric Strefford's 1/48th scale Lancaster is 25.5" in span, weighs 78 grams. Retracting undercarriage.



Peter Smart's lovely own-design Be2c. 1/20th scale Peter powered it with a Gasparin Outrunner motor and used 35 Meg radio.

However, I was able to get a number of static shots with an improvised 'studio' in the trimming enclosure. There were lots of interesting R/C and F/F scale models to admire, and the flying was continuous. In fact flying started at 9.00am and continued until 18.00pm.

Bristol Gypsy Racer

This bright red scale model immediately caught my eye. It was familiar and puzzling at the same time. The penny never did drop, so its builder Dave Crompton had to let me in on the secret. In fact, it was a Bristol M.1c Gypsy Racer from the Derek Buckmaster plan. The full size example was fitted with a Gypsy engine, hence the name. It is 19" in span, and weighs in at 30 grams. The Racer is covered in Esaki tissue, then airbrushed

with Humbrol enamels. It was beautifully finished.

Kirby Cadet Glider

Scale gliders were being bungee launched in the appropriate flying slots. This fashion has caught on with the indoor sect and Dave Crompton also flew his Kirby Cadet Mk I. This is 23" in span, and weighs 14 grams. A very pretty model.

Mustang P-51 D

Reno Racer Mustangs are sure-fire modelling subjects in all scales. Dave Crompton's Rockwell schemed racer was very well finished and was 13" in span, weighing 12 grams.

Bristol Beaufort

For those of us of a certain age, those

Airfix subjects we built as kids really do stick in the bonce. I was shown a fine twin engined WWII R/C model and asked what it was. With no feeling of remembering at all, my mouth said 'Beaufort'. We see this British scale subject very rarely, but it really does have bags of character. Chris Fouweather uses his own-developed hot-moulding technique to form his Depron marvels. This innovative Beaufort r/c model weighs just 79 grams and it flies magnificently. Quick and manoeuvrable, too.

Lancaster

Built using Chris Fouweather's Depron moulded technique, Eric Strefford's 1/48th scale Avro Lancaster is 25.5" in span, and weighs 78 grams. It even has flaps, landing lights, and retracting



Dave Crompton's Bristol M1C Gypsy Racer from the Derek Buckmaster plan. 19" in span, weighs 30 grams. Esaki tissue and airbrushed Humbrol enamels.



Dave Crompton's P-51D Reno Racer Rockwell International scheme, 13" span, weighs 12 grams.



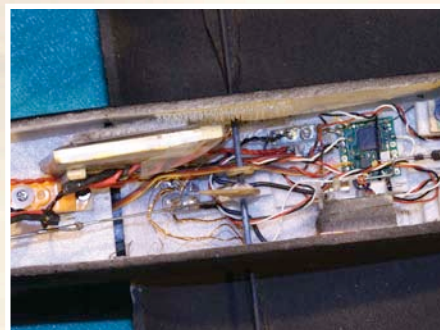
Dave Crompton's Kirby Cadet Mk I. 23" span, weighs 14 grams, indoor bungee launched.



Chris Fouweather's stunning and innovative Bristol Beaufort R/C. Weighs 79 grams. Heat moulded Depron structure.



I took a quick snap of this nifty little Etch Taube during the thick of the activity, but then forgot to record the details. I plead old age.



The electronics and R/C gubbins packed neatly inside Eric Strefford's Lancaster.



Peter Fardell's Chardon 1933 Monoplane. Weighs 19 grams and is 19" in span. Covered in esaki tissue.

undercarriage! All this is little short of science fiction to those of us raised on those forementioned 1960s plastic construction kits and it flew very well indeed. Most impressive.

Chris flew his too, though Eric pipped him in the R/C scratch-built competition event.

Be2c

Peter Smart brought boxes of fine models.

His electric Gasparin Outrunner powered Be2c is particularly well appreciated. I noted that he was flying it with 35 MHz radio, with no glitches.

AW Argosy

Armstrong Whitworth built some rather quirky aircraft, and Peter Smart's Argosy was worthy of that epithet. It spans 23" and is radio-controlled. Unusually, for R/C it is built to the rubber

No -rules and was more manoeuvrable than I expected.

North American FJ-1 Fury

EDF R/C jets are still rare on the indoor scene, but Eric Stefford's Depron sheet, 16" span, own-design model of the US Navy FJ-1 Fury was fast and agile. He used a recycled EDF unit from an old Silverlit Jetstar Twin. She weighs 30 grams. She has a Deltang Rx, and two Hobby King 0.8g servos.



E-Flite Spacewalker flew very well. A good little electric ARTF to get your "indoor scale" hand in.



Guillows rubber kit of the 0-1E Cessna Bird Dog, of Blessed Memory.



Trojan ARTF electric r/c model flies well for not much money.



Organiser Andy Sephton checks out his model between flights.



A good space but the lighting is very strange.

BMFA Official Results

BMFA Scale Indoor RC Nationals - Shawbury 19th October 2014

RC Scale - Scratch Built

Name	Model
1: Graham Smith	Voisin
2: Peter Smart	BE2
3: Eric Strefford	Lancaster
4: Chris Fouweather	Lancaster

RC Scale - RTF

Name	Model
1: Ian Pallister	Tiger Moth
2: Alan Glover	Tiger Moth
3: Graham Kennedy	Albatross
4: Ian Lever	Spacewalker
5: Eric Strefford	Spacewalker
6: Doug Hunt	Focker Triplane
7: Doug Cowen	Tiger Moth
8: Alex Kennedy	Trojan

Free Flight Open Scale

Name	Model
1: Peter Fardell	Fairchild 24
2: Tim Horne	Misty Racer
3: Mike Hadland	Stampe
4: Derek Knight	Tiger Moth
5: Peter Smart	Fred
6: Dave Crompton	Bristol M1C

Peanut Scale

Name	Model
1: Mike Hadland	Bucker Jungman
2: Dave Crompton	P51
3: Tim Horne	Heigt Monoplane

As usual, grateful thanks to Gordon Warburton FSMAE for his prompt results service.

The Verdict

A great day out amongst the gentlemen of Indoor Scale. I would say that the venue is better for flying than photography, but you can't have everything. I don't think anybody was disappointed with the light entry in R/C Scratch Built Scale. It is early days. What was obvious is that F/F Indoor Scale modellers are quite happy to have a

dabble in Indoor Scale R/C. By the way, after almost three years in post, Andy Sephton is standing down from the BMFA Scale Technical Committee, as Indoor Representative and PRO. Everyone thinks he has done exceptionally well indeed in his tenure. Bear in mind that he was only supposed to be doing one year! As I often remark at this point, the dedication of others ensures our flying fun. ■



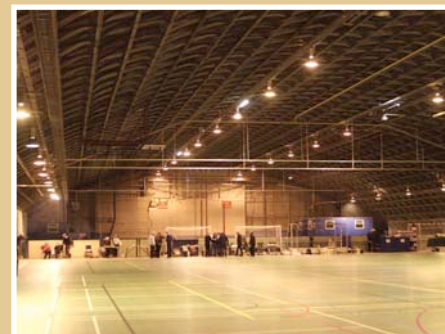
23" span radio controlled profile scale Armstrong Whitworth Argosy from Peter Keen. Built to No-Cal rules.



Eric Strefford's profile scale EDF R/C FJ 1 Fury. 16" span, weighs 30 grams.



Graham Smith, Winner of Scratch-Built Class, receives Trophy from its originator, Ken Sheppard, Editor of RCMF magazine.



There are two distinct flying areas, which greatly assists with trimming.

AeroDetail series

Making a scale model?

Finding the detail needed to finish a scale model can be difficult and getting full size images is not always practical. Our range of detail photo collections provides extensive close ups of a wide range of popular aircraft all on CD in J-peg format



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The aircraft that defined the term

Hawker Typhoon CD109

The Hawker Typhoon was a British single-seat fighter bomber, produced by Hawker Aircraft. While the Typhoon was designed to be a medium-high altitude interceptor. 117 images

Hawker Tomtit CD64

Mid 1930s RAF biplane trainer aircraft, from the era open cockpits of silver dope and polished metal. (140 images)

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Hawker Sea Fury FB XI CD62

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Hawker Hart & Hind CD60

A combo collection featuring the RAF Museum's Hart bomber and Hart Trainer, plus Shuttleworth's Hind. (115 images)

Hawker Fury CD59

No authentic example now exists, but the accurate replica photographed in extensive detail in this collection is as good a guide as can be found of this elegant 1930s RAF fighter. Includes some general arrangement pictures authentic to the period. (55 Images)

Grumman FM-2 Wildcat CD58

First of Grumman's highly successful line of prop-driven 'Cats', the Wildcat, in guises from F4F-3 to FM-2 held the line after the Pearl Harbour attack and served from then until the end of WW2. It was idea for operations from the small escort carriers. (90 images)

Grumman F8F Bearcat CD57

Hottest of Grumman's prop-drive fighters – it arrived too late for action in WW2 but was standard ship-borne fighter equipment in the immediate post-WW2 era. (90 images)

Grumman F7F Tigercat CD56

The awesome twin engine long range fighter of the late WW2 era operated by US Navy and US Marines. (60 Images)

Grumman F6F Hellcat CD55

The US Navy's most important, and most successful fighter of WW2, photographed, close-up, from nose to tail and wing tip to wing tip. Example shown is part of The Fighter Collection, based at Duxford. (90 images)

Grumman F3F CD54

A study of the faithfully replicated example of the 1930s U.S. Navy biplane as seen at the 2001 Flying Legends Show. (34 images)

Gloster Gladiator CD53

The Royal Air Force's last biplane fighter, star of late 1930s air shows and flown in combat during early WW2, including Battle of France, Battle of Britain, Mediterranean operations and North Africa. (50 images)

Fokker D.VIII CD52

The Fantasy of Flight Museum's example of the late WW1 Imperial German Air Service monoplane fighter, in full detail. (69 images)

Fokker D.VII CD51

The most famous of all the German fighter aircraft of WW1. The collection depicts the RAF Museum, Hendon's authentic, restored example. (44 images)

Focke Wulf FW 190A CD50

Germany's 'butcher bird' fighter of WW2, active on all combat fronts from 1941 onwards.

Fieseler Storch CD49

Arguably the first military STOL aircraft, this storky looking aircraft has long been a modellers' favourite. Two examples are represented, the machine at the Fantasy of Flight Museum in Florida and the RAF Museum Cosford's example. (90 images)

Fairey Gannet ASW1 & T.2 CD48

The Royal Navy's post-WW2 anti-submarine workhorse, that also served with a number of other air-arms. Most images are of Mk.T.2, that was more-or-less the same as the ASW.1. (110 images)

Fairchild Ranger CD47

Elegant U.S. high wing light aircraft in full detail. Two examples shown. (60 images)

Erco Ercoupe 415 & Avalon Ercoupe CD46

The elegant twin finned light/sport aircraft. Both original Type 415 and later Alon resurrection examples. (115 images)

DHC Chipmunk CD45

A bumper bundle of images that provides a vast array of detail pictures, plus photos of examples in both RAF trainer and civil colours. (70 images)

DH Tiger Moth CD44

Much close-up detail of civil register example, plus further detail of the IWM Duxford's example in Royal Navy trainer colours, showing the blind flying hood. (110 images)

De Havilland DH89 Dragon Rapide CD43

Graceful twin engine biplane airliner that saw service from pre-WW2 through to the mid 1950s. Several are still flying and three are shown in this picture collection. (100 images)

De Havilland DH84 Dragon CD42

Forerunner of the more famous DH 89 Dragon Rapide, this collection depicts a superbly restored example. (40 images)

DE Havilland DH 60 CD41

The aircraft that set the British 'club' flying movement on the road to success during the 1930s. (140 images)

De Havilland DH 53 CD40

1920s lightweight low wing sports aircraft designed to a low-power specification. Machine illustrated is the sole remaining example. (60 images)

Curtiss P-40M CD39

One of the later versions of the famous Curtiss Warhawk, the WW2 fighter aircraft that saw service in just about every combat theatre of operations. (100 images)

Curtiss P-40B Tomahawk CD38

Rare, full restored example of the early version of the Curtiss fighter aircraft that was at Pearl Harbour on Dec. 7th 1941 – and survived the attack! (130 images)

Curtiss Jn-4 'Jenny' CD37

An authentic, restored example in full detail. (130 images)

Curtiss Hawk 75 CD36

The 'export' version of the Curtiss P-36 that saw service in during WW2 with Finland and during the 'Battle of France' in May/June 1940. Example shown is a combat veteran. (130 images)

Comper Swift CD35

1930s racing aircraft. Example depicted is the radial engined example at Shuttleworth Mussel (91 images)

Cierva C.30 Autogiro CD34

A study of the example hung in the Fantasy of Flight Museum, finished in RAF WW2 colours. (35 images)

Christen Eagle CD33

The spectacular, stylish aerobatic biplane revealed in close-up. Example shown is the two-seat version. (90 images)

Chrislea Super Ace CD32

Late 1940s civil light aircraft with distinctive twin fins and nosewheel type undercarriage. A fully restored example. (123 images)

Chilton DW1 CD31

Original upright engined version of this diminutive British low wing sports/racer. (90 images)

Chance Vought F4U-1D Corsair CD30

The famous 'bent wing bird' in super detail. (132 images)

Bucker Jungmeister CD29

Radial engine version. Example from Fantasy of Flight Museum. (79 images)

Bucker Bestmann CD28

Authentic example as exhibited at the Fantasy of Flight Museum, in WW2 Luftwaffe colour scheme. (43 images)

Bristol M.1C CD27

Early WW1 fighter monoplane. Example depicted is the faithfully authentic replica built by the Northern Aero Works and operated by the Shuttleworth Trust museum. (100 images)

Bristol F2B Brisfit CD26

Full close-up detail, including photos of engine cowls for both Rolls Royce Falcon and Hispano-Suiza engines. (28 images)

Bristol Bulldog CD25

This collection depicts the example assembled from two donor airframes and restored to superb standard by Skysport Engineering. It can now be seen at the Royal Air Force museum, Hendon. (60 images)

Boeing Pt-13/17 Stearman CD24

Subject aircraft is a current British civil register example used for air-show displays. (54 images)

Blériot Monoplane CD23

The Shuttleworth Museum's machine, the oldest original example still flying. Much close-up detail showing all the exposed rigging, structure and the 'bedstead' main undercarriage, plus Anzani engine. (74 images)

Bell P-39Q Airacobra CD22

Superbly restored example of this much-maligned WW2 fighter aircraft that was used with great success by Russian forces in the ground attack role and with saw much action in the south Pacific, from where this restored example was recovered. (130 images)

Beech D18 Staggerwing CD21

The distinctive back-staggered 1930s biplane with retracting undercarriage. (45 images)

Avro 504k CD20

The Shuttleworth Museum's superbly maintained machine, in full detail. (140 images)

Arrow Active II CD19

Sole remaining example of this 1930s racing and aerobatic biplane restored to pristine condition. (50 images)

Aeronca Sedan CD18

The last and most graceful of the Aeronca line of light/sports aircraft in fine detail. (80 images)

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THE QUIET ZONE

R/C SCALE ELECTRICS WITH
PETER RAKE

Well, I'm afraid it's that time again - time for another bout of electric flight doings. Here we are, already well into yet another New Year, all the goodies you received from the chap in red are now old hat and you're looking for something new. Well, bear with me and I might just have something to offer.

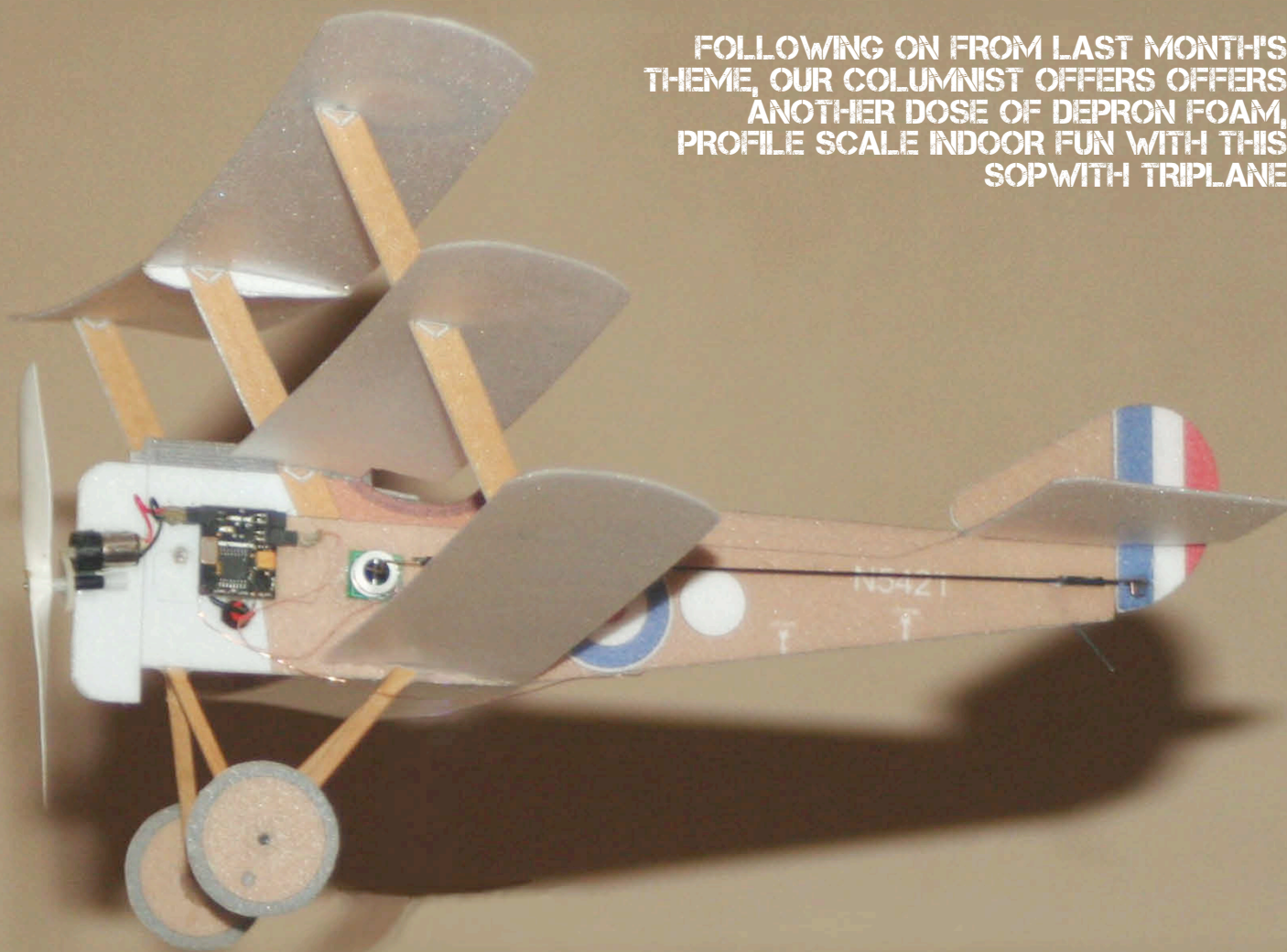
Since we're also still into deepest, darkest winter and nobody in their right mind wants to stand around in the middle of a field freezing their bits off, how about another profile scale indoor flyer to while away the hours?

Last month I gave you a rehash of an earlier model but this time, although the techniques are much the same, you get the treat of something completely new. Working on the theory that if one triplane was good, two triplanes had to be better I drew up the graphics for a Sopwith Triplane to use the same type of equipment as the Fokker Dr.1 presented last month. Although construction is very similar to the Fokker, there are some pretty obvious differences. I'll deal with these as I describe the build, but first off, let's take a look at the gear I used.

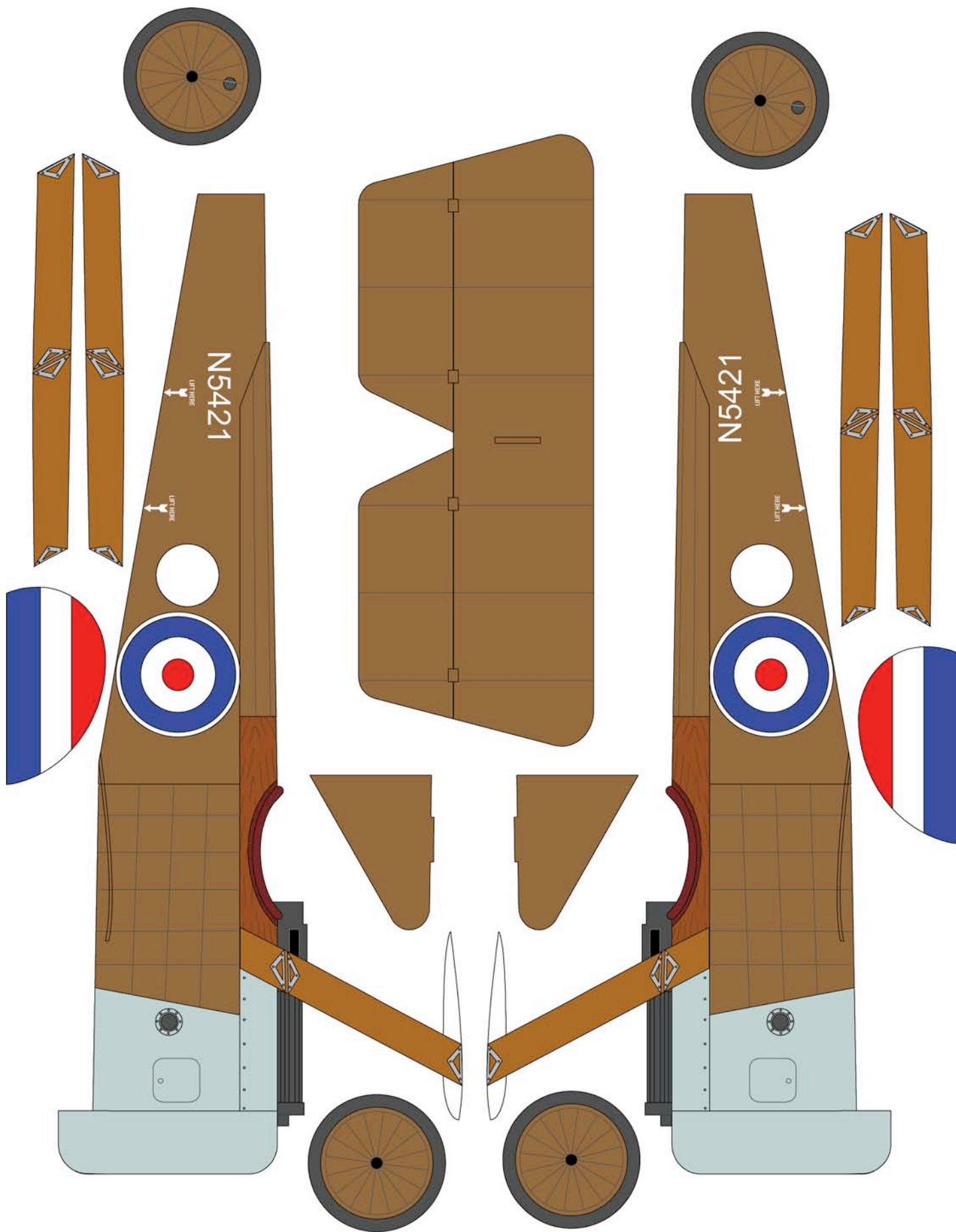
KITTING OUT A TRIPEHOUND

Although the plan shows the receiver and motor from a *Nano Stik* coupled to a *Plantraco Microact*, I had none of those items available at the time. My printer

FOLLOWING ON FROM LAST MONTH'S
THEME, OUR COLUMNIST OFFERS
ANOTHER DOSE OF DEPRON FOAM,
PROFILE SCALE INDOOR FUN WITH THIS
SOPWITH TRIPLANE



The little Tripehound does its' airborne thing.



had just died-the-death and needed replacing, thereby eating up the funds I had intended to use to equip this model. Time to check precisely what equipment I did, in fact, have available.

As luck would have it, there was still one functioning actuator stashed away, a *Micro Invent* item with its plug changed, a

three channel *Plantraco* receiver with the battery magnets removed and replaced by a battery lead and a 4 mm motor unit of unknown origin. I have a feeling that it might have come from a *Mini Aviator*, but it could well be one made up from salvaged parts. Whatever, it was the right size, used the right prop and appeared to

deliver the required amount of power. The fact that it was even fitted with the correct type of plug was just an added bonus.

So, as you see, the model isn't restricted to using only the equipment shown on the plan. As long as it isn't hugely different pretty much any radio

gear will do. If you have a *Mini Vapor* brick looking for a home, that too could be used and you get the option of three channel control to boot. As for me, I'm happy enough just using rudder and throttle controls. Keep the gear you fit small and very light and you won't go far wrong. Remember, the aim here is to finish

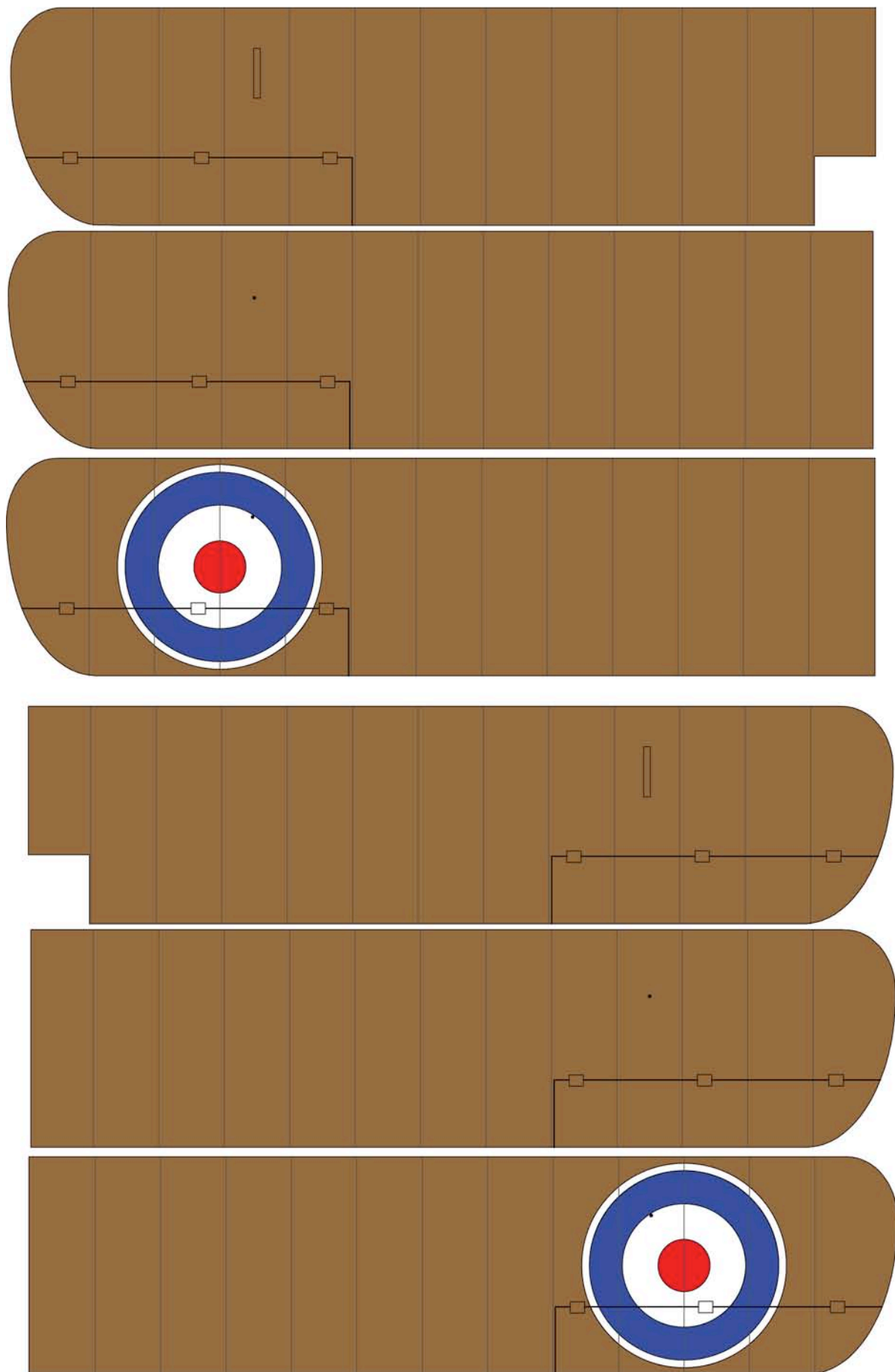
up with a ready-to-fly model that weighs less than half an ounce. My model, complete with battery finished up at just less than 10.5 grams.

BUILDING A SOPWITH

The first thing to do, once you've printed and cut out all the parts, is to make up a

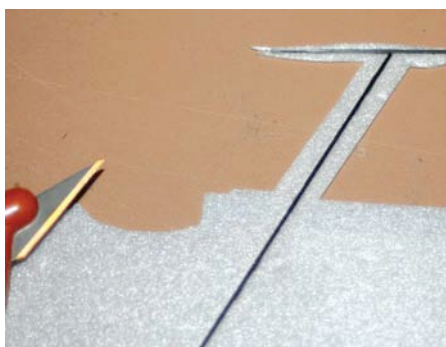
series of sub-assemblies. The most obvious of these is the fuselage and that requires a little preparation before you glue the halves together.

One difference between this model and the Dr.1 is that the top wings mount onto a platform and the logical arrangement is to make that platform part of the centre

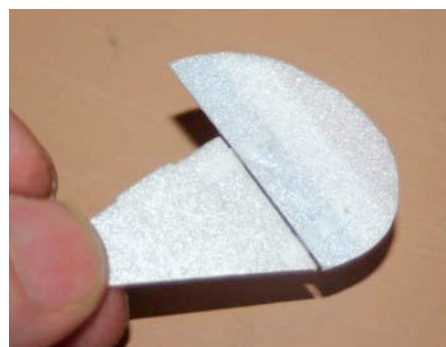




I used a steel rule to make a groove for the carbon rod stiffener to fit into before gluing it in place.



Rods glued in and the two sides are ready to glue together using a very thin coat of RC Modeller's Glue.



Although they're hard to see, there are two narrow strips of Blendern tape used to hinge the rudder before joining the laminated halves.



Not a lot of camber is required but it does help to stiffen the wing panels and, combined with camber and incidence on all three wings works well.



The printing over a simple hair spray base gives good results on the finished model to give a nicely understated finish.



The model drifts by overhead. That wall is actually at least five feet away so I've no idea why the shadow is so obvious.

section strut. Both the strut and the platform need to be stiffened up a bit before the sides are joined, so each has a length of 0.5 mm carbon rod glued to one side and then the other side is glued in place using *RC Modeller's Glue*. A very thin coat should be smeared all over the second side, the two brought together and adjusted for alignment before being placed on a flat surface and weighted down to dry. Applying some pressure where the carbon rod is trapped between them will bed it slightly into both sides, assisting the gluing process.

A similar process is used to trap 0.5 mm carbon rod between the interplane strut laminations. Here, it's important that both struts end up with the carbon rod in the same relative position or it will complicate accurate wing alignment during the final assembly stage. Note that there is a distinct top and bottom to these struts, so make sure you end up with matched sets. Although only slight, there is a convex curve at the top and concave curve at the bottom. The carbon protrudes at both ends and will plug into the holes in the wing panels as the struts are fitted.

When joining the fin and rudder parts, I like to combine this step with hinging the one to the other. Apply two narrow strips of *Blendern* tape to one fin half and hinge the matching rudder half. Then it's just a case of gluing the remaining halves in place and weighting it all down while the glue dries.

Now for the technical part; the wings. On this model, only the top wing panels are joined before they are fitted to the fuselage. The centre and lower wing panels are butt glued at the points indicated by the printing. The bottom

wing position is clearly shown, while the 'brackets' on the c/s strut determines the position of the centre wing panels.

However, before any of this joining or gluing in place can happen, you need to induce camber into all six panels and sand their roots for the correct dihedral. To induce the camber just draw each panel over the edge of a table until it is curved by the correct amount. Strangely enough, a sharp edge works best, and does less creasing of the lower surface. Just work gently, gradually increasing pressure until the desired curve is achieved.

To sand the wing roots, I find an emery board (I 'borrow' one of the wife's) works best. Pack up the panel to the correct angle, butted against the edge of a board, gently hold down the root making sure you don't alter the camber and run the emery board along the edge of the board, which will help keep it vertical.

When it comes to joining the top wing panels I use *Uhu Por* as adhesive, using it as an 'impact' glue. Thinly coat both wing roots and allow the glue to virtually dry. Then, CAREFULLY bring the two roots together at the correct angle and alignment. I stress carefully because you only get one shot at this, once the two parts touch they are stuck. I usually lay both flat on the board and gradually bring them together. Then it's just a matter of raising one tip until the sanded in joint meets along its' entire length. A little extra pressure to ensure they meet precisely and the job is done. Using the glue this way produces a slightly 'harder' joint than if it is applied and the parts joined immediately. Don't ask me why, that's just the way it works out.

The final sub-assembly involves the

undercarriage and this is definitely one of the areas that differs from the Fokker.

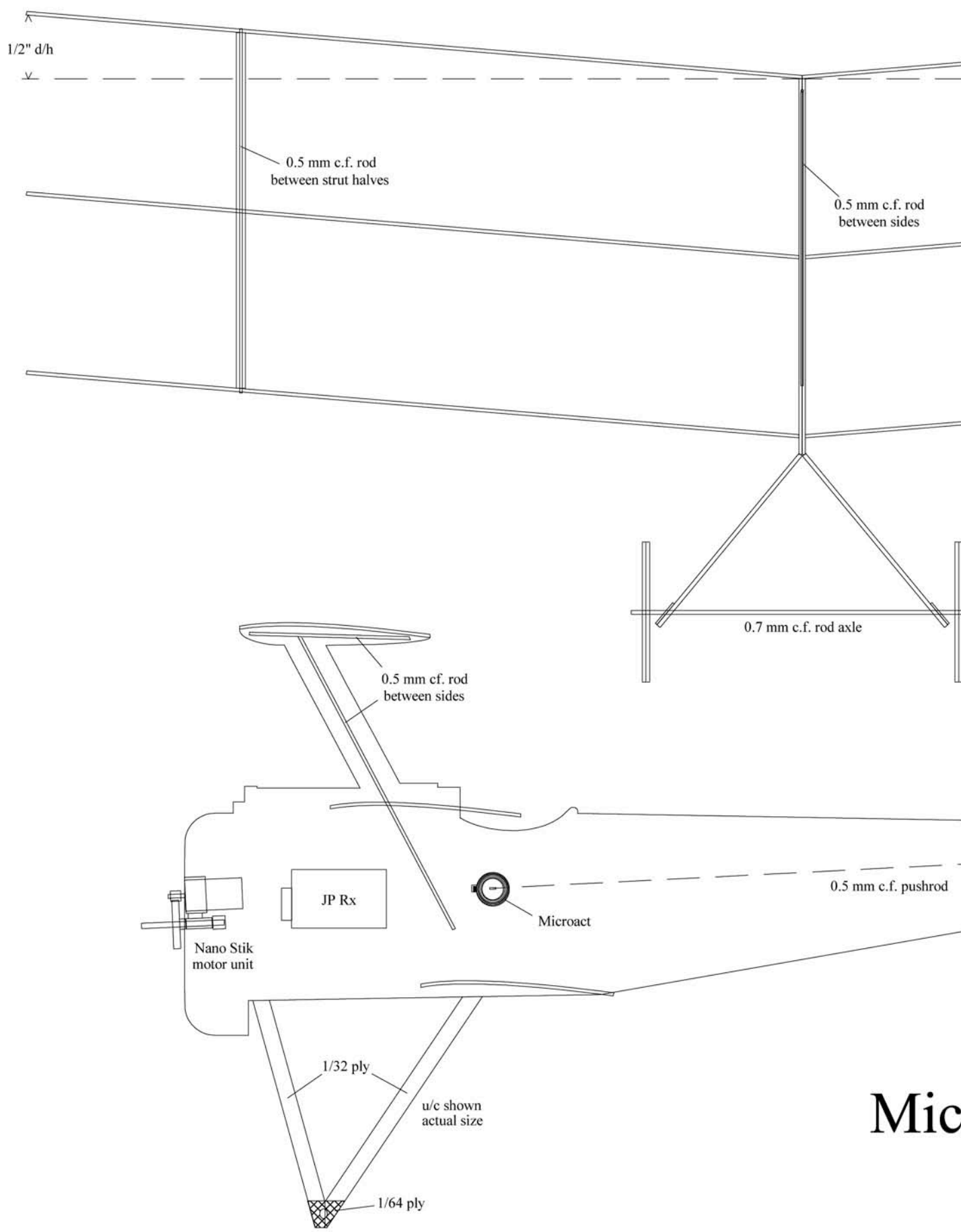
Whereas on the Dr.1 the u/c was tubular, and is easily represented by carbon rod, the Sopwith u/c was much heavier looking and made from wood. I considered carbon rod, but think what I came up with not only looks better but is easier too.

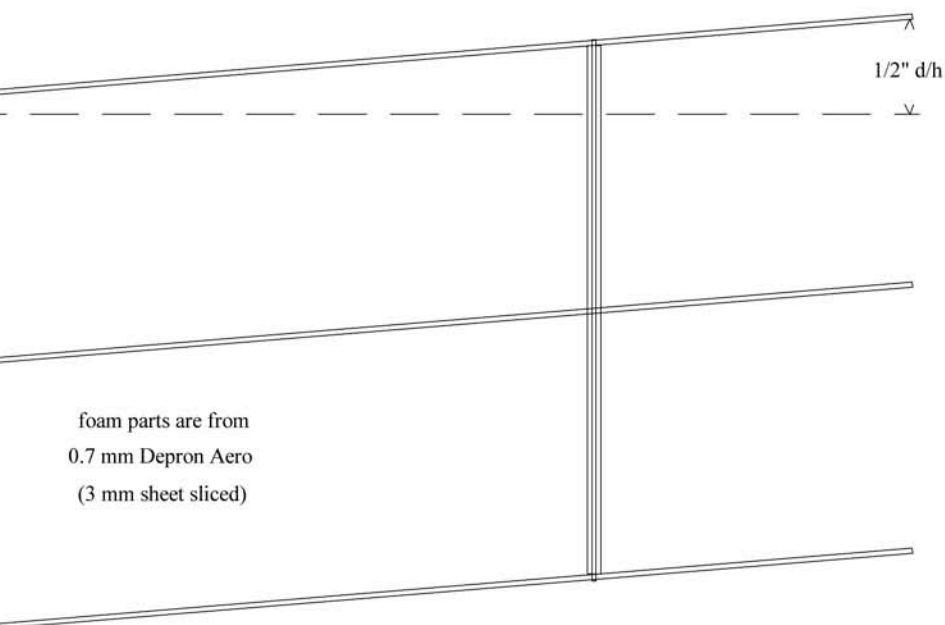
The main legs are made from narrow strips of 1/32" ply, with a patch of 1/64" ply over the joint as reinforcement. The leg strips were lightly sanded to remove any roughness and then a piece was laid over the full-size drawing on the plan to cut it to size. Cut both front and rear legs as matching pairs and position one set over the drawing. Cut and sand a wider strip of 1/64" ply and glue that in place over the joint. Trim the 1/64" ply to match the u/c leg shape and drill the assembly for the axle to fit. The second set is assembled over the first, making sure you don't end up with two right hand sets.

Open up the drilled holes to ovals, slip in a piece of 0.7 mm carbon rod and lightly glue the legs at the correct spacing on the axle. You shouldn't wait for the glue (I used medium CA) to cure fully, just enough so the legs don't slip on the axle. Bring the tops together, checking that it all remains even, and glue them together. Allow this to cure and that's all the sub-assemblies ready. Talent

I can see that it's also about where I run out of space for this month. Next time we'll look at getting the model together, equipping it and how it flies. Possibly with a bonus.

In the meantime, if you'd like pdf files of the printed foam parts, or want to contact me for any other reason, you'll





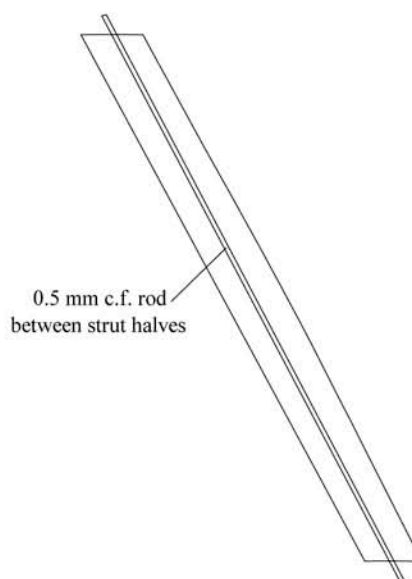
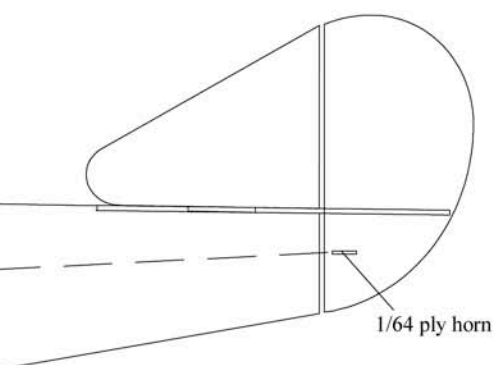
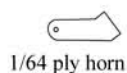
materials

0.5 mm c.f. rod - 18"
(cs strut, i/p struts & p/rod)

0.7 mm c.f. rod - 3"
(axle)

brass wire - 1.5"
(pushrod ends)

1.5 mm heat shrink - 1"
(pushrod ends)



FITTING WINGS

Glue top wing to platform

Butt glue bottom wing panels to fuselage

Glue interplane struts into middle wings

Glue middle wings to fuselage
and strut stubs into top & bot. wings

Bracket positions show angle of
struts in middle wing & wing on fuselage

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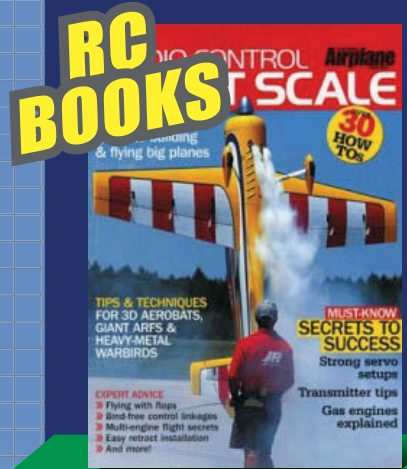
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ONE MAN'S MORANE

John Marriage created this big 1/3rd scale model of the early WW1 French monoplane scout. It has lots of character and flies magnificently



I like building scale models, the prototypes of which are no longer flying. The seeds of this project were sown when I borrowed a copy of 'Warbirds: Military aircraft of W.W.1 in colour' whilst

researching a colour scheme for a Flair Fokker D.VII. I found a section covering the Morane-Saulnier Type N, and thought it looked an interesting possibility, especially as it seemed to possess very similar proportions to my much-loved Flair Magnatilla - but I fancied a BIGGER model!

I then checked the overall proportions of the Hannibal (overgrown Magnatilla) and found that there was, indeed, a very close similarity between the two, (even the rib spacing was correct). This led to the original plan, i.e. buy a Hannibal kit, fit my 28cc 'Champion' Glow engine (converted

McCulloch trimmer), then tart it up to resemble a Morane, after all, if Flair make it, it must fly well!

Planning

I next bought the excellent *Windsock Datafile* on the Morane and had the 1/48th scale three-views enlarged to 1/3rd scale to match the actual dimensions of the Hannibal.

This was quite a big scale change, but not impossible in a few passes through a digital plan copier; check out your local print shop. Whilst browsing through the books in a local model shop, I came across 'Aircraft of World War I Volume 3', which had a small section on the Morane, including a drawing of the fuselage frame. This was also given the digital treatment!

It was obvious that to achieve even a passing resemblance to a Morane, several important changes would be needed, especially as Flair used a one-piece wing bolted to the top of the fuselage and I really wanted to incorporate some cockpit detail (the Morane, of course has more of a shoulder wing, anyway). The project was obviously snowballing!

To cut a long process short, the fuselage and tail feathers were designed from scratch, while the wings were built largely as per Flair, with a few important changes. The model was never intended as a serious 'F4C' Scale project; my own requirements were:

- a) Model must be flyable in normal conditions from the club field (a good field but with several obstructions (e.g.





1: The uncovered airframe, showing the open frame, stringered rear fuselage. **2:** Detail of the uncovered airframe, showing the shape of the wing structure in the tip area. **3 & 4:** These two views of the uncovered airframe reveal a quite simple basic structure. One of the obvious deviations from true-scale is the thickness of the wing section but this change, in the interest of practicality, is not noticeable when the model is airborne. **5:** Rear end, showing the open-frame structure and the tail skid. **6:** Further detail of the tail cone, showing the tailskid with its bracing and the pivot tube on the all-flying tailplane. **7:** The tailplane showing the tubular spar that acts as a pivot for the all-flying control movement.

Magnetic Oak trees!) and not exactly a bowling green.

- b)** Fairly close scale outline, with plenty of detail to help preserve the illusion,
- c)** If possible, no visible 'Model' parts (e.g. silencers, servos, wiring, etc.)

Bearing the above in mind, plans were drawn up; at least with the amount of space within the model (c) above should not be too much of a problem!

It was also obvious that the project would need as much model engineering as aeromodelling and I make no apologies for the fact that I have a well-equipped workshop. I think this type of project is a bit beyond the classic 'blowlamp' scenario. One or two problems immediately became apparent in the area of the tail. Morane used an all-flying tailplane; how effective would this be?

A scale tailplane would have only about

50% of the total tail area of the Hannibal's and as I felt this could be distinctly inadequate, I enlarged it by 30% as a fair compromise, but kept the shape correct. The Hannibal tail sits on the flat top of the fuselage, as does the flat-bottomed wing, but on the Morane the tail is below the wing; what effect might this have? The only way was to build it and see.

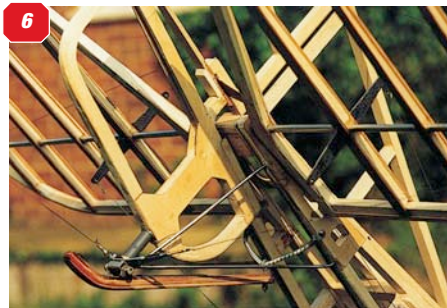
Basic design wings

These are similar to the Hannibal, but built in two halves, but I omitted the leading edge sheeting, in keeping with the full size. The wing tips were re-profiled and constructed from laminated ply and balsa to preserve the 'delicate' look of the open framework. The tip laminates were also shaped to give the impression of a heavily undercambered section, but this gradually changes toward the outboard full rib. I'll elaborate a bit on laminating later. The original Morane used wing warping as its primary control, but I decided to opt for ailerons - I reckoned there were enough 'unknowns' in this project already!

Tail

Having guessed the size, the next problem was; how do I know if it is aerodynamically balanced? I needed a wind tunnel! The following recipe seemed to work.

Make up a full-size tailplane from 5mm foam-cored display board (local art shop), poke a hole right through the foam core with a sharpened rod, where you think the axle should be, then fit a stiff axle through



the hole. Persuade wife to drive car at a steady 30mph and hold tail out of window, lean forward, grasping axle securely. Observe effect of deflecting trial piece from horizontal. If you get it right, little force will be required to hold the wing at quite significant angles. Repeat experiment till you are happy. This determines the correct pivot point.

Fuselage

The structure is conventional, using 3/8" sq. longerons and frames with 3/8" x 1/4" balsa diagonals and liteply slab sides from the cockpit forward.

There is no conventional sternpost, the fuselage coming together at the rear to form the mounting for the tailplane axle). Liteply formers were then added which, together with the 1/2" x 1/8" stringers, would give the correct rounded cross-section, incorrectly referred to in contemporary reports as a monocoque). In order to utilise the beautifully spun Hannibal cowl, the fuselage diameter was reduced slightly from true scale. F1 is a disc of 10mm ply with no side- or down-thrust.

Structure

There is no point in an article of this type in describing

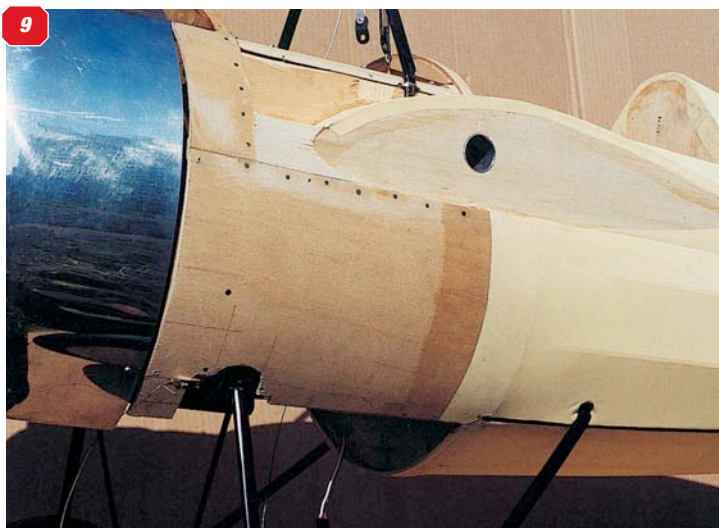
conventional structures. I will, however, cover some of the less common construction techniques, before describing some of my detailing work.

Laminating

Significant parts of the rudder, tailplanes and wing tips were built using this most useful technique. First find a suitable stout, flat baseboard that will accept screws fairly readily but firmly. Now arrange a sturdy framework matching the INSIDE dimensions of your component and screw it down firmly. Pieces of 2" x 1" timber and short lengths of thick-walled tubing are ideal for this, as long as the timber is cut to fit close to the tubes. It is important that the framework provides support all the way round, and that lots of clamps can be attached during curing. Finally cover all jig surfaces with silicone paper or polythene adhesive tape, to prevent the job becoming an integral part of the jig!

On the rudder and tail, I found that the best strength/weight compromise was obtained using 3/8" wide 1/32" birch ply as a first laminate, followed by four layers of 1/16" medium balsa, then another 1/32" ply. The ply laminates are best softened by

8: Another view of the uncovered fuselage rear. 9: View of the uncovered fuselage showing the wing root with tube for the tubular wing joiner.



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MORANE SAULNIER TYPE N

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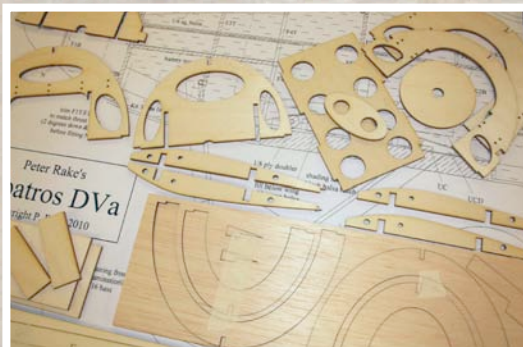
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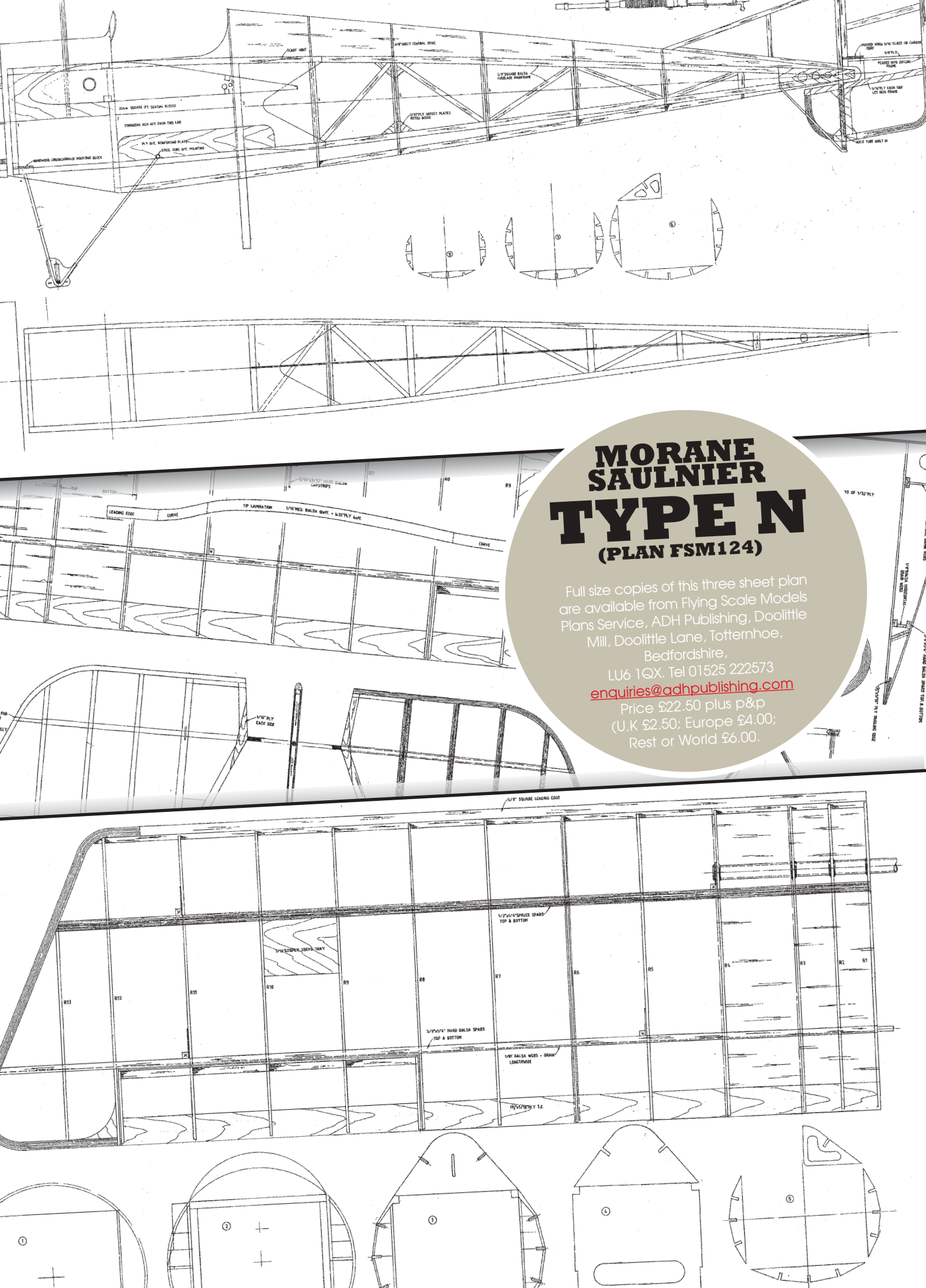
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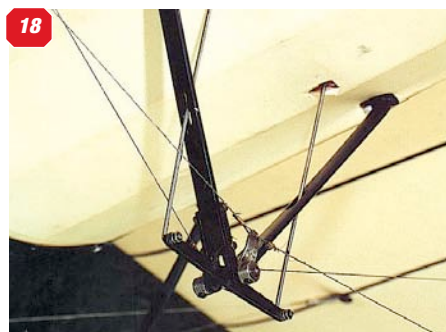
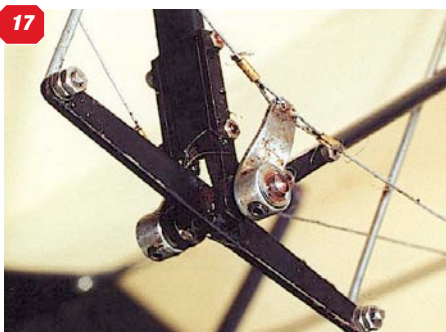
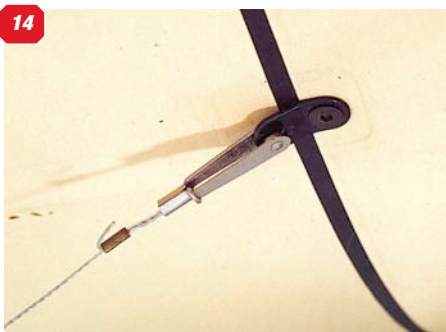
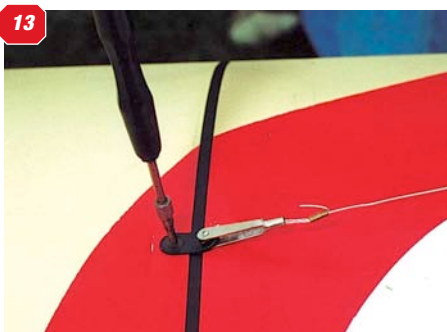


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10: Prominent features of the Morane Saulnier Type 'N' are the bracing wire anchor mast ahead of the cockpit and the prominent machine gun. **11:** Another view of the wing wire brace anchor mast and the dummy machine gun. **12:** View of the rear fuselage underside, showing the tailskid, which is a mixture of wire braces and laminated wooden skid.. Note the adjustable clevis end to the tailplane underside bracing wire. **13 & 14:** The anchor points for the adjustable links at the ends of the bracing wires on the wings are re-shaped links from a bicycle chain. Above right: builder John Marriage invented this two-function tool with an Allen key end and a shaped shank to ease open the link. **15 & 16:** Two views the tail cone, showing the closed loop control wire runs and control horns. **17 & 18:** Two views of the dummy scale wing warping mechanism below the fuselage under the cockpit area. This example uses conventional ailerons, by author says the mechanism should work to actuate scale wing warping for roll control.

soaking or steaming, especially where the bends are sharpest, but with care and practice balsa can usually be pulled round dry. Have a dummy run before coating all surfaces with plenty of P.V.A. and clamping as securely as possible.

DON'T BE IMPATIENT!

With this ratio of glue to wood it takes a long time to cure fully. Keep the assembly for several days in a warm place before removing the clamps, then a few more before carving it to its final D section. The ply laminates really help to stop the balsa curling during gluing, and after final shaping most of the outer ply layer is removed leaving a narrow, hard band to help resist 'hangar rash'.

The wing tips were a little more complicated, in that I wanted to produce a component that is curved in two directions. To avoid lots of wasteful cutting and shaping after laminating, I cut my laminations to an approximation of their finished shape before gluing. The results were very satisfying in both shape and strength. The final operation was to cut halving joints into the laminates, to enable them to be joined to the

conventional leading and trailing edges.

Tail feathers

As with the wings, the curved outlines were made by laminating. Each tail surface had to pivot on an axle, and to this end, a thin-walled dural tube was incorporated in lieu of a spar. One standard servo in a closed loop arrangement is used on each tail surface, and on the rudder.

Fuselage

Forward of the cockpit the full-size Morane is covered in metal cowlings that were to be reproduced using litho-plate, but to add some support and strength to the sides, these were covered in 1/16" ply. These would extend forward of F1 to form the mounting for the engine cowling. The ply pieces were soaked, heated and wrapped around a suitable sized tin, then allowed to dry out before gluing to the formers' helping to prevent distortion and bulging of the springy plywood.

It was necessary to incorporate strengthening members along the basic framework to support the undercarriage and wing rigging pylons (top and bottom),

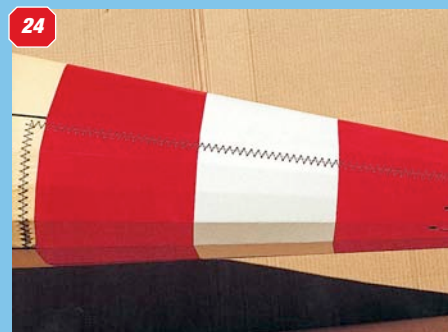
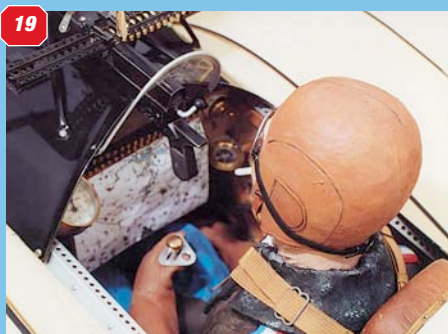
which were going to have to work for their living! A 20mm I.D. Dural tube was bonded across the forward cockpit area to accommodate the plug-in wing panels.

At the tail end, it was necessary to fabricate a rather complex framework from 12 g piano wire. This fits to the lower longerons, and supports the rudder and sprung tailskid, whilst also forming the bottom anchorage for the bracing wires that stiffen up the tail and rudder axles. Both of these were made from carbon fibre tubes for maximum stiffness with minimum weight.

The tailskid was laminated from close-grained mahogany, with a steel hinge bracket bonded and screwed in place. Springing was effected as in the original, using lightweight bungee cord (see photo).

Wings

As already mentioned, these are fairly conventional. I incorporated 20mm O.D. Dural tubes close to the front spar to mate with those in the fuselage, together with a locating peg nearer the trailing edge to set the wing incidence. Lengths of 8mm sq. aluminium bar were drilled through lengthwise and tapped M3, then bonded



19: View of the fully furnished cockpit. The needle on the rev counter works, as does the compass. **20:** The Morane Saulnier Type 'N' is 'blessed with many bracing wires and the model takes about 20 minutes to assemble. The author devised these little bobbins onto which the bracing wires are wound when the model is disassembled. **21:** Detail of the top of the fin/rudder, showing the rudder hinge and anchor point for the tailplane top side bracing wires. **22:** View of the fuselage front end, showing the radio and engine installation, with fuel tank. **23:** Ready for another dawn patrol, the author provides scale to the size of the model Morane Saulnier Type 'N'. **24:** Dummy fabric stitching on the rear fuselage - a prominent feature of the full size that needs to be reproduced to give realism to the model.

into the structure at appropriate points (where ribs meet spars) to form anchorages for the functional rigging wires. One standard servo was used for each aileron, as I figured that the control forces would not be enormous on this model.

CONCLUSION

The maiden flight of the Morane took place

at my club's traditional New Year's Day barbeque. At that state, none of the detailing had been applied and the flight went off fairly unevenly, giving enough confidence to finish the job.

Next flight with 'all the trimmings' in place was at the Club's Gala Day the following July, and was followed by flights and various summer meetings all of which demonstrated

the practicality of the model and its good flying characteristics.

NEXT MONTH

Wait for the follow-up on the making of the metalwork parts and other close-up details.



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MORANE SAULNIER 'N'

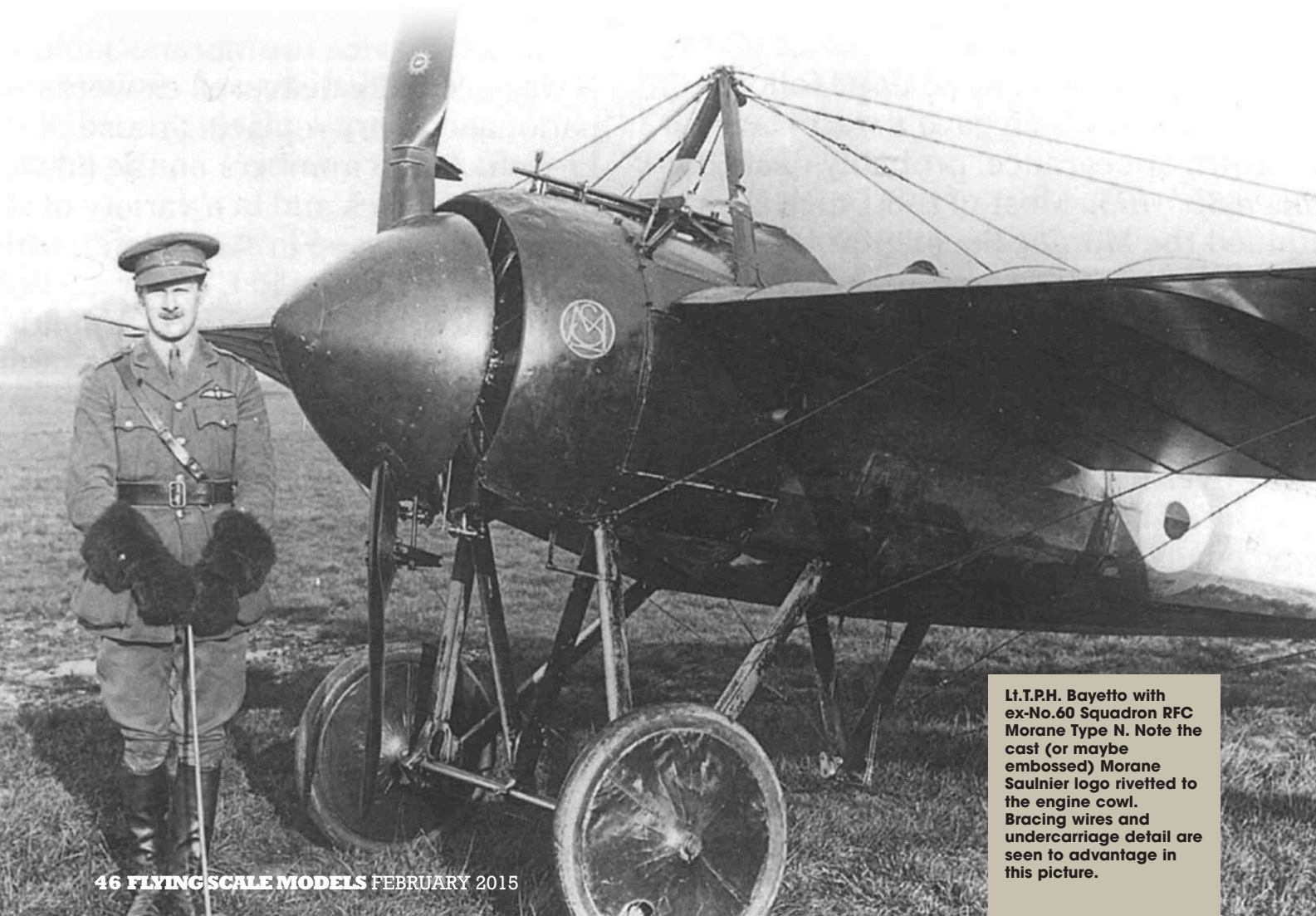
COMPARED TO OTHER VERY EARLY 'FIGHTER' TYPES OF WW1, THE M.S. TYPE N LOOKS SURPRISINGLY SLEAK AND RACEY, BUT IT WAS NOT POPULAR, PERHAPS BECAUSE RUN-OF-THE-MILL MILITARY PILOTS WERE LACKING, RATHER THAN THE AIRCRAFT!

When the nations went to war in August 1914 their air services, such as they were, consisted of a motley collection of machines hardly any of which were designed for war service and none at all for fight-to-fighter air combat. Indeed those that revelled in such romantic

names as 'battle plane' or 'canon-aeroplane' were adaptations of existing types, for it was not really known what part the aeroplane would play in war.

The only task that had crystallised in any form at all was that they would be solely the eyes of the artillery or a sort of aerial cavalry, reporting on the movements of enemy troops, and one must bear in mind

that the subsequent stagnation of the war into trench warfare was not foreseen. Some machines that had been designed for endurance and height (such as some of the German types) were particularly useful, whilst it was assumed that the small, single seater with its speed would make an ideal 'scout'. The conception of a fighter aircraft took some



Lt.T.P.H. Bayetto with ex-No.60 Squadron RFC Morane Type N. Note the cast (or maybe embossed) Morane Saulnier logo rivetted to the engine cowl. Bracing wires and undercarriage detail are seen to advantage in this picture.



Physically, there was very little difference between the M.S. Type N and the Type I, of which this is an example supplied to the Imperial Russian Air Service. The figure on the left is a captured German airman. Roundels are red outer, blue middle and white centre. Fin and rudder in black.

time to develop.

However, the small racing machines which had made their mark in the years immediately preceding the outbreak of WW1 were, generally speaking, not suitable for military purposes for several reasons. One was that they carried a limited amount of fuel and in consequence, had short ranges. Another

was that they were designed principally for speed and because of the fact that aircraft design was still in its infancy, many of them were very difficult to handle unless an experienced pilot was in the cockpit. In any case, in the early days of the war, high speed was not important, stability was, and so was a second crew member who could observe and record

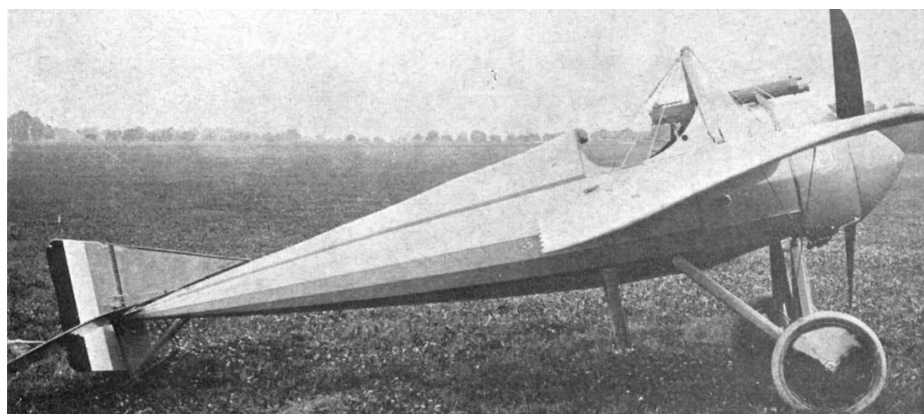
without having to concentrate on controlling the machine.

One aircraft type that had just made a name for itself, before the out-break of war, was the Morane Saulnier Type 'N', a delicate and finely proportioned, little, single seater designed by the company which, only a short time before, had produced the famous 'G' and 'H' monoplanes which were very highly regarded in pre-war aviation circles. Anthony Fokker in particular admired this machine so much that he bought a damaged one and made a virtual copy of it, so starting the line of 'E' monoplanes, which became so notorious in 1915. The M.S. 'N' was to some extent a refined Type 'H', but the designers had seen the beautiful Deperdussin monoplanes, which had a monocoque fuselage, (i.e. the framework was covered in layers of plywood, giving a smooth, strong shell - a construction technique soon to be repeated on the German Albatros line of designs.

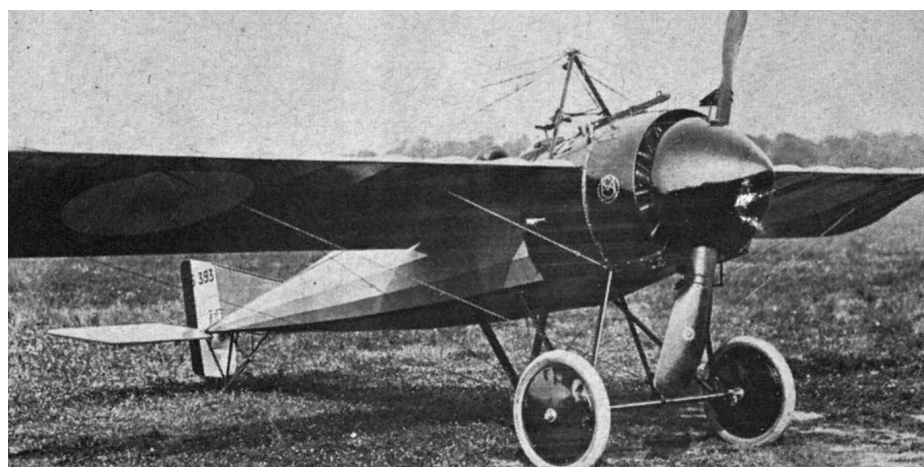
Although the M.S. Type 'N' was later usually referred to as the 'Morane Monocoque' this was a misnomer because the shape was achieved by stretching fabric over wooden stringers which in turn were attached to a metal framework, thus achieving the rounded fuselage outer shape in contrast to the typical 'boxy' style the generally prevailed at the time.

The first Morane-Saulnier Type 'N' came to the notice of the aviation public in June 1914 when it was flown by well-known French aviator Roland Garros at Vienna during a flying meeting at Aspern. The story of Garros's activities with forward-firing guns are well known, but there is a common misconception that, in 1915, he was shot down while flying M.S. Type 'N'; this was not so, for he had been carrying out experiments with guns on the M.S. type 'L' parasols and it was in one of these machines that he was shot down and captured.

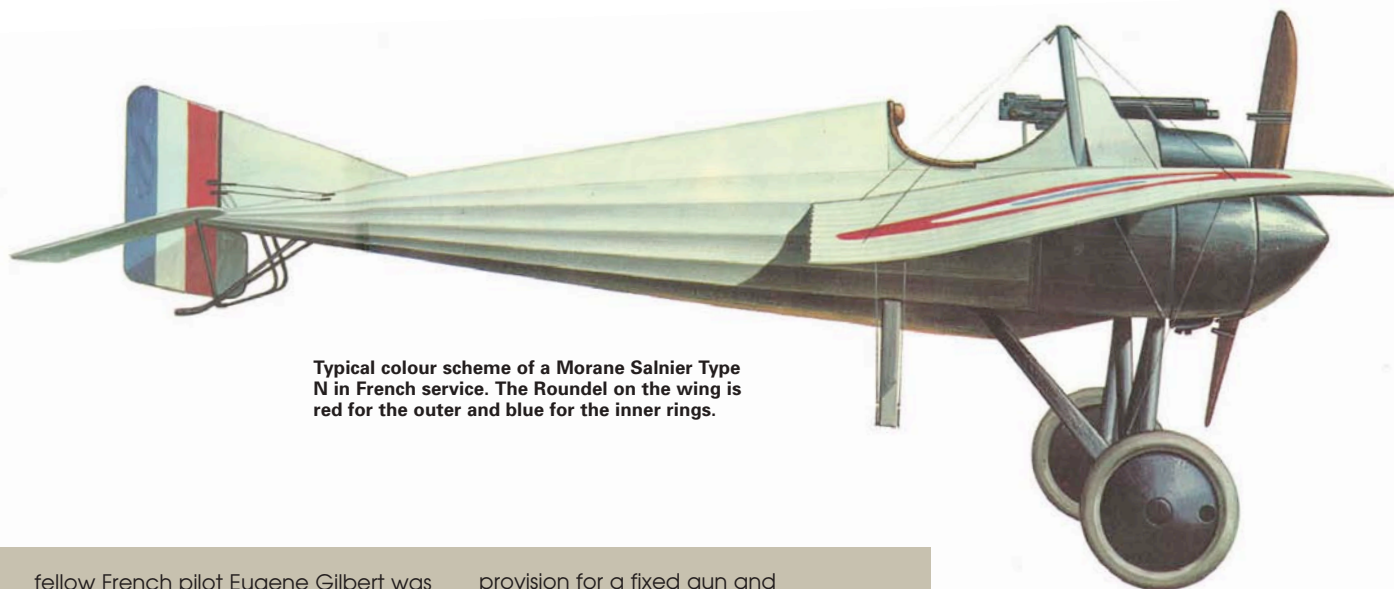
Later, an M.S. 'N' of M.S. 23 flown by



Another example of the M.S. Type I, with 110 h.p. Le Rhone rotary engine and synchronised Vickers machine gun.



A Morane Saulnier Type N in French service with Hotchkiss machine gun and deflector plate type propeller.



Typical colour scheme of a Morane Salnier Type N in French service. The Roundel on the wing is red for the outer and blue for the inner rings.

fellow French pilot Eugene Gilbert was seen at the Front with the name 'Le Vengeur' painted on the sides. This appears to have been the original 'N' of the meeting at Aspern and the name represented Gilbert's feelings about the capture of his friend Garros.

Gilbert had some success with this machine, which was fitted with a forward-firing Hotchkiss 'Portative' machine gun and a propeller blade fitted with deflection plates. As a result of this, the French Government ordered a small number of machines for war purposes, the production examples having the spinner altered, together with the shape of the fuselage spine behind the pilot.

These were fitted with 80 h.p. Le Rhone 9C engines and the vertical tail surfaces became less stylised. It appears that only a few of these machines were used by French units who were more impressed by the early Nieuports, although such well-known French pilots as Jean Navarre and Adolphe Pegoud flew them. These two were excellent pilots, able to get the best out of whatever they were flying and the Morane continued to be disliked by the average pilot because of its handling qualities, which did not suit those with less flying experience.

Meanwhile the R.F.C. required more aircraft than it was possible to supply from the home industry so that orders were placed for French machines. At the height of the 'Fokker Menace' there was an increasing demand for a machine to act as a counter weapon. At that time the Morane appeared to be a good bet, for it was fast and had

provision for a fixed gun and subsequent tests were to prove that the Morane was indeed superior to the Fokker Eindekkers that were taking heavy toll on British and French air activities over the Western Front. However, despite its speed, it was a very difficult machine to fly, being extremely sensitive on the controls and with a tendency to dive like a brick if not held at all times.

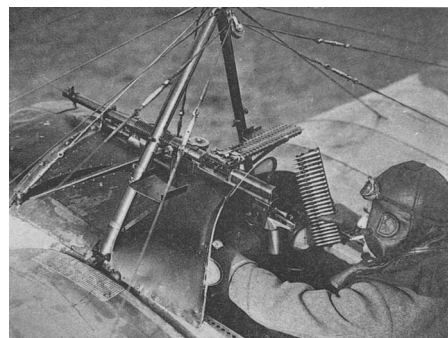
In R.F.C. Service, the machine was known as the 'Morane Bullet' but in fact other small, high-speed machines were dubbed 'bullet' and generally speaking, it was disliked. The Type N served with Nos. 1, 3 and 60 Squadrons of the R.F.C. and for a short time a few were attached to No. 24 Squadron. Because of some confusion which had arisen over identification, R.F.C. Headquarters issued an order on 19th June, 1916 instructing that all Morane 'N's were to have their metal parts painted red so as to distinguish them from the Fokker monoplanes. However, by this time the Fokkers were rapidly disappearing from the Front and were being replaced by the new Albatros and Halberstadt biplane scouts.

The few Morane Ns left in service were returned to Home Establishment and some remained flying well into the war as training aircraft or hacks.

Moranes were also supplied to and used by the Imperial Russian Air Service, and although some sources refer to these as Type 'N's they were in fact type 'I's which were a development of the same airframe, fitted with a synchronised Vickers Gun and 110 h.p. Le Rhone engines.



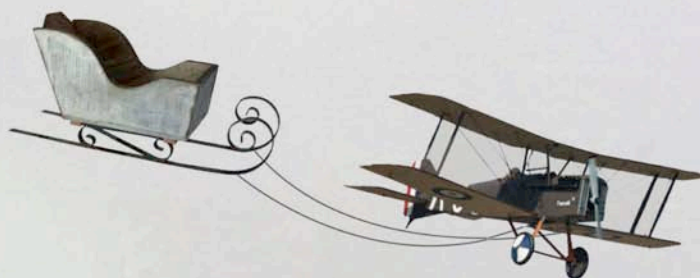
Lt. Bayetto again, installed in his Type N. Note the Hotchkiss gun, with barrel pointing at the deflector plate on the propeller.



ABOVE: Detail of cockpit and Hotchkiss gun installation. LEFT: A Morane Saulnier Type I in French service. 'Kepi' head gear is the give-away as to the pilot's nationality!



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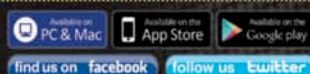
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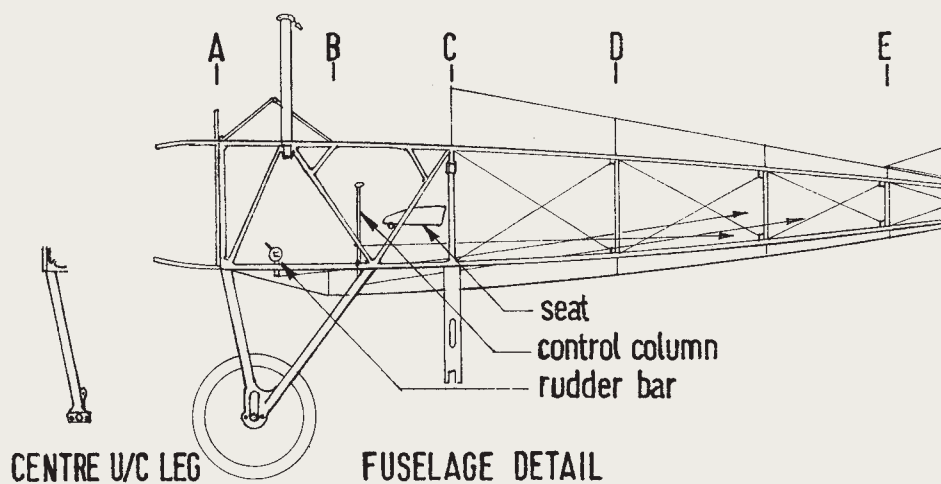
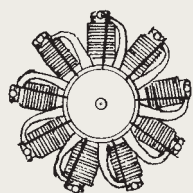
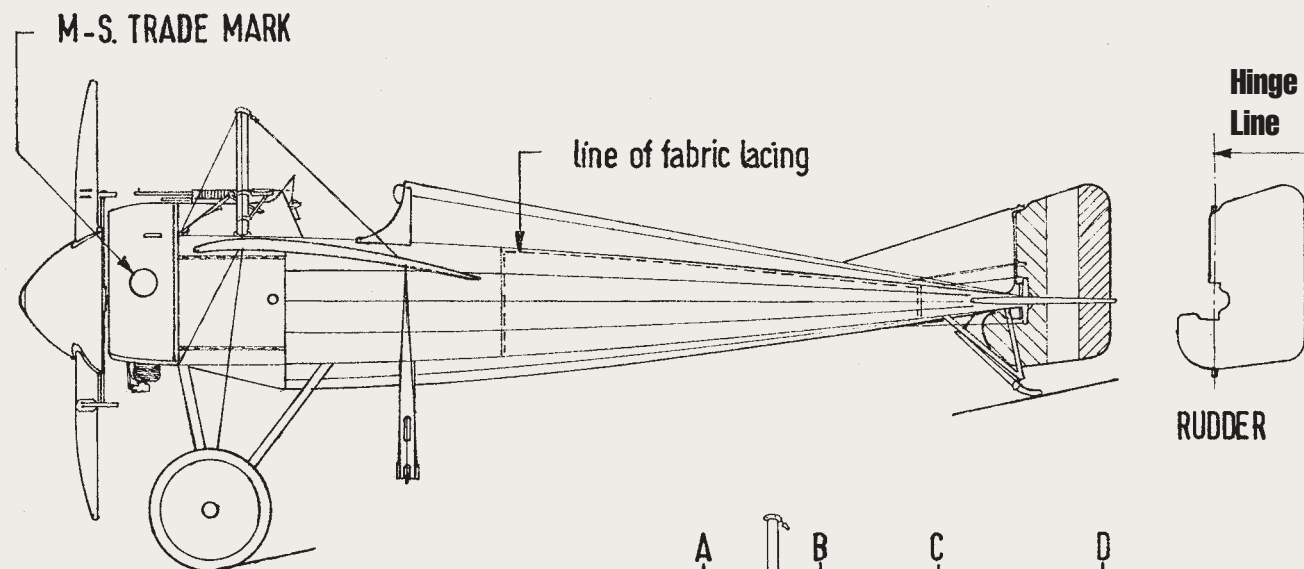
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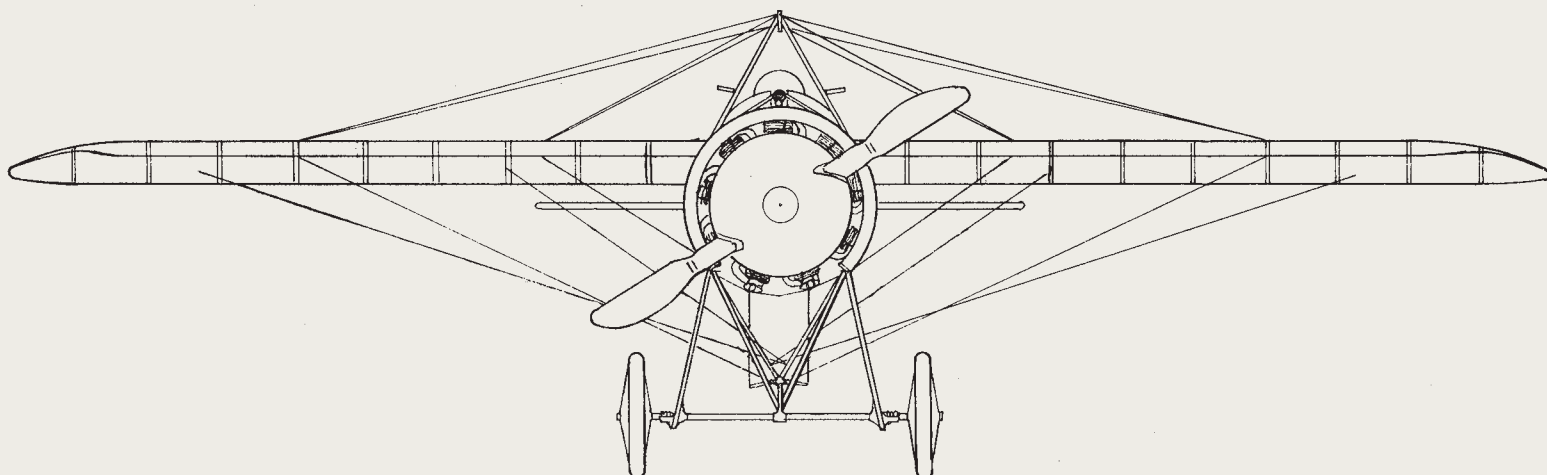
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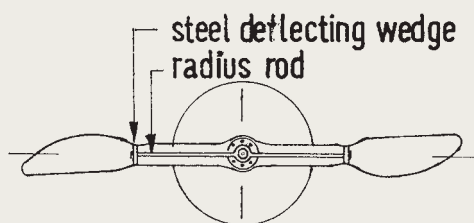
SCALE 1:40



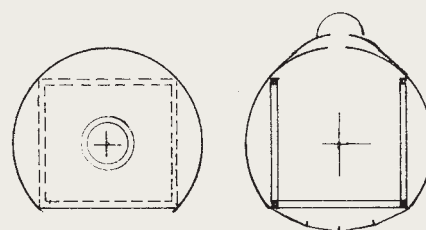
MORANE-SAULNIER

TYPE N





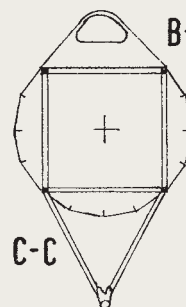
PROPELLER from rear



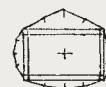
A-A

B-B

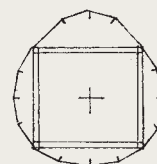
**Fuselage
Sections**



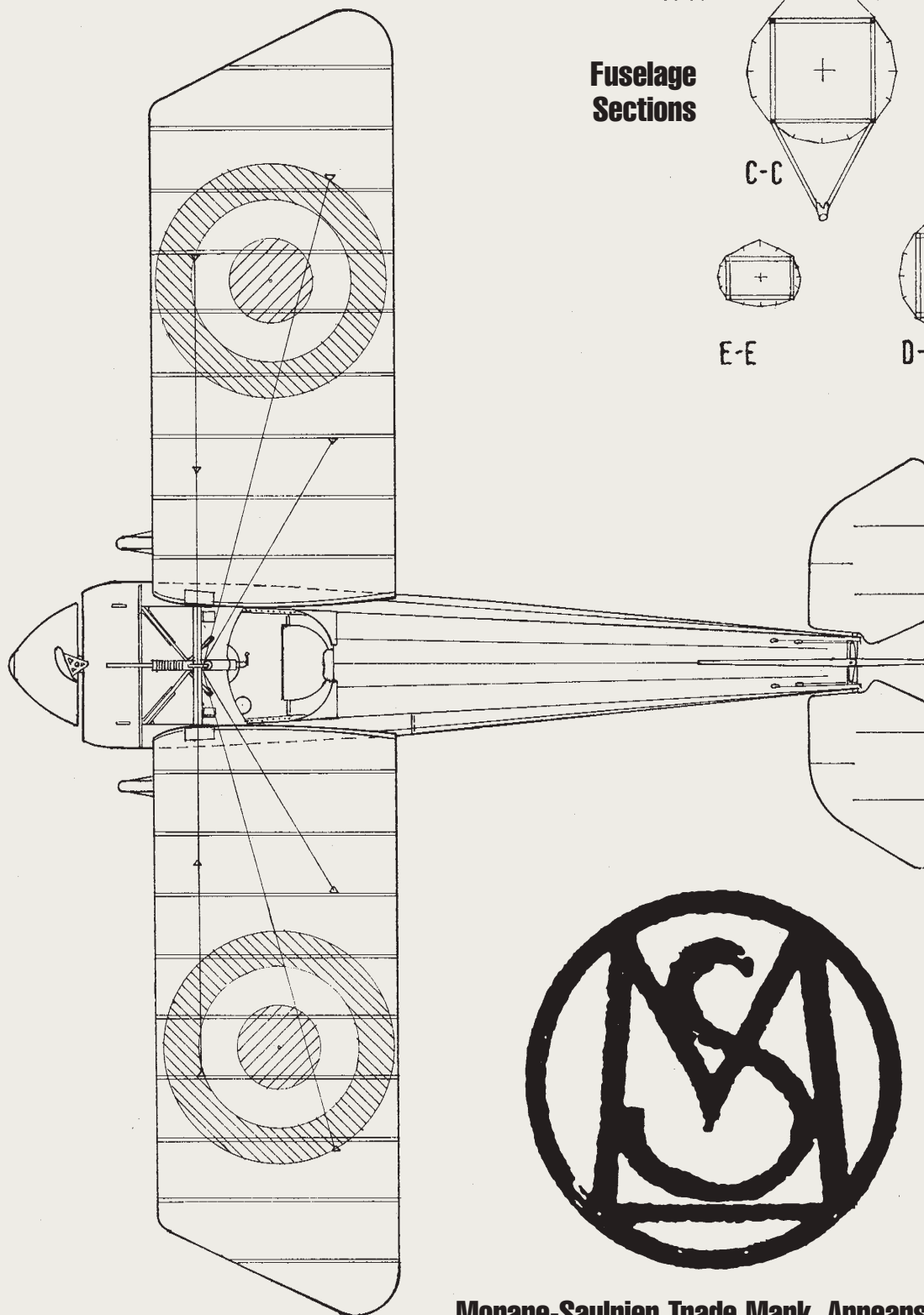
C-C



E-E



D-D



**Morane-Saulnier Trade Mark. Appears on
engine cowl both sides**

SHORT

ADMIRALTY TYPE 184 SEAPLANE

The Short 184 was the only British aircraft present at the infamous Battle of Jutland. Alex Whittaker reviews Dennis Richardson's fascinating 1/8th scale model

Although now largely forgotten, the Short 184 was the first aircraft in history to sink an enemy ship with a torpedo. It was developed from a Admiralty specification of 1915 which attracted a number British aircraft manufacturers including Sopwith, White, and the



Short Brothers.

Short's design was deemed best suited to the Admiralty's requirement as the '184 built on the success of their earlier seaplanes. The prototype first flew in 1915 and featured equal span, three bay wings, and tractor power configuration. Designed specifically for off-water flying, the aircraft had two main step-less floats, and a tail float, complete with water rudder.

The wings folded for ship-borne operations and were slightly unusual in that, although the lower wing panels were of parallel chord, the upper wings increased in chord from the centre section outwards to their tips. Originally, ailerons were fitted to the upper wing only, and were 'single acting', relying on airflow alone to retain them in neutral. This was soon updated to





1: The radiator was placed above and behind the engine. Note filler cap. **2:** Torpedo and restraints are nicely modelled. The dolly drops off on take-off. **3:** The bay and rigging detail is impressive. **4:** Dinghy-like tail float has a water-rudder, too. Note scale wire skid. **5:** Graceful and rather interesting fin and rudder. Note slender scale size of bracing wire. **6:** Tail end of the torpedo - note propeller!

fully acting ailerons on both the upper and lower wings.

The fuselage was built with a box-girder construction, with wire bracing, and spruce longerons, the latter machined down over their length to reduce weight at the rear. Fuselage fittings were manganese steel to counter the intended

salt water operating environment.

Earlier Short seaplanes had lacked power, so the '184 was initially designed around the new Sunbeam Mohawk engine. The '184 was fitted with a wireless transmitter / receiver, which was powered by a wind generator. Communications back-up was provided by a box of

carrier pigeons.

In service, the Short 184 proved a popular type, despite marginal performance at high air temperatures. In all, 936 were built by a variety of Manufacturers and, most remarkably, variants stayed in service in UK and abroad until 1933.



The Model

Noted scale modeller Dennis Richardson is no stranger to these columns, as we have covered many of his designs before. Readers may remember his Macchi Folgore, his Handley Page Heyford, and his Grumman Avenger/Tarpon.

Dennis has the knack of searching out appealing but unusual scale subjects, and with the Short 184 he has excelled himself. The model is a very characterful and engaging aircraft, with that real 'wind-in-the-wires' feel to it. This is a serious traditional scale model with a wingspan of 96" and power from twin Laser 80 glow engines.

Dennis's inspiration came variously from Profile Publications monograph No.7, an old black and white TV documentary, and Australian Gary Sunderland's free flight scale model features as a plans construction feature in Flying Scale Models April 2010 issue. Dennis also used a copy of Windsock Datafile 85, 'The Short 184' by J M Bruce.

Armed with these, he set about scaling up Gary Sunderland's 47" span 1/12th scale plan (FSM 319 from ADH Publications). Gary's successful original model had used a 2cc diesel engine and had won a number of scale trophies, so it was a good starting point for the projected 1/8th scale R/C model.

Construction

Dennis reports that the building proceeded straight from the plan with a few obvious modifications to suit radio control.

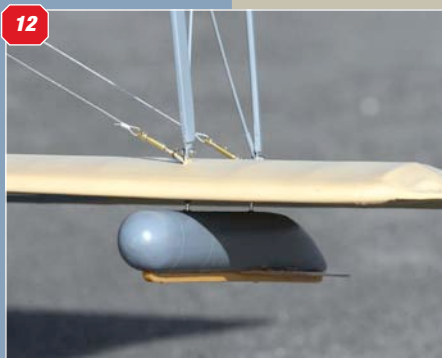
It is an all-traditional balsa and ply



- 7:** Rugged rigging terminations and pushrod that links upper and lower wing radiators.
- 8:** Attention to small details make a scale model; note the scalloped edges to ailerons.
- 9:** The Short 184 has tandem cockpits.
- 10:** Separate radiator on fuselage side.



It is hard to imagine a more appealing vintage military scale model.



11: A lot of work in the step-less floats. Note 3 1/2" Williams scale wheels. **12:** wing tip float; note skid. **13:** Dennis's take-off dolly!

construction, with the addition of cyparis wing spars.

Floats

The floats are 24" and were constructed of balsa veneered in 1/64" ply, built around 1/8" birch ply formers.

Torpedo

Gary's original model was able to drop its torpedo. Dennis has yet to incorporate this feature.

Covering

The 184 is covered in Solartex, and then painted with Warbirds Paints to resemble natural doped canvas.

Engine

Power is from a brace of dependable

MODEL SPECIFICATION

Short 184 Seaplane: built to an enlarged version of Gary Sunderland's FSM plan.

Scale: 1/8th

Wingspan: 96"

Engine: Laser 80 glow engine

Dennis Richardson's Short 184 is Laser 80 glow-engine powered, spans 94" and is built to 1/8th scale.



Initial flights indicated the need to use co-ordinated rudder and aileron for the turns.



The Short looks superb in the air - atmosphere by the bucketful!



Dennis is certainly a six footer, so you can appreciate that the Short 184 is a large model.

Laser 80 glow engines, a type beloved of many UK scale modellers.

Rigging and wirework

The rigging is all functional as it is on Gary Sunderland's free flight scale model. It uses 10mm brass turnbuckles from a model boat chandlers, the copious wirework being mostly silver-soldered. The completed model needed 8 oz of lead distributed in the engine bay and in the tips of the floats.

Take-off Dolly

The take-off dolly is designed to drop off as did the original aircraft when flying off the earliest aircraft carriers - and craft more like seaplane tenders where the aircraft were simply craned into the sea. The model's wheels are Williams vintage types.

First Flight

It just so happened that I was present at Ashborne Scale Day 2014 with my cameras for the Short 184's maiden flight. All the photos here were taken during

that momentous occasion. For the first flight, Dennis decided to band-on the dolly to facilitate a short hop and recruited well known scale pilot Ian Redshaw to test-fly the 184. Dennis reports that he was worried that she might need judicious coupled rudder control.

The take-off was very stately, though it was clear that the model was certainly not underpowered. With all that wing area available she behaved in a very scale-like manner. Overall, her appearance in the air was utterly serene, looking particularly impressive when coming in on a low pass and after a few trim and exponential function tweaks, Ian had her turning on aileron and a little rudder very nicely.

The landings were long, shallow and very light, concluding very satisfying maiden flight of a really unusual and impressive scale model that epitomises much of what many of us feel is pukka scale aeromodelling. ■

STRUTS & WIRES

DR. MIKE HAWKINS F.R.A.E.S. OFFERS SOME PRACTICAL ADVICE

Many aircraft that are worth-while scale projects are festooned with struts and wires. My latest example is the double-bay triplane

Mitsubishi Type 10, but it is not in the same class as the *Bristol Boxkite* built by Gary Sunderland and featured some time back in FSM. You really could cage a canary in that one!

The thought of all these fiddly bits may discourage a would-be builder but it is not necessarily a marathon task.

The first point that needs definition is the scale standard to which you are building. The 'Museum Scale' model will require the rigging to exactly reproduce the original. Depending on the chosen subject you would be committed to airfoil section, RAF wires, scale turnbuckles and the like and good luck to you! I prefer to work to the 'Practical Scale' standard with wires and struts where they should be, but with fixings and brackets for modelling convenience rather than absolute accuracy.

If you want complete accuracy, go and talk to Mick Reeves about RAF wires and set up your lathe for the left hand thread on

one end of each turnbuckle. The methods I am currently using are rather simpler and you can judge from the photos whether the appearance meets your needs. The choice is yours.

The second point of definition is the names of the bits. The 'lifting wires' carry the weight of the aircraft and are in tension in flight, that is, under positive 'g' forces. The landing wires are in tension when you make a heavy landing or under negative 'g' in flight. In addition, the 'Incidence Wires' join the strut fixings, making the struts rigid so that one wing cannot slew over the other.

Incidentally I had a quarter-scale Bucker Jungmeister that developed visible and audible flutter on one wing in flight. I was able to slow it down before disintegration and fitted bracing wires between the struts - end of story.

The 'cabane' struts support the wing over the fuselage, whether they join at the centre line or not.

Struts

The cabane struts must be bound and epoxied to a former or stringer in the fuselage and so are usually made of wire.

(See pic 2). If they join at the centre line, two brass plates can be soldered between them with holes to take a 1/4 in. inside diameter rubber washer. 1/4 in. carbon fibre joining rods can slide through these holes, fixing the upper wing on assembly.

(See pic 3)

If the struts are separate (pic.2 again), a brass plate is soldered on top of each and a fixing bolt goes through into a 'T-nut' inside the wing.

I now make wing struts from 3/16 in. carbon fibre tube. You can cut this stuff with a mini saw, but I do not recommend this as you will have no teeth left on the blade when you finish.

A cutting wheel on a mini-drill is better. Wire loops are epoxied into the tubes at each end. I recommend a jig, a simple piece of ply, with a bolt at the length of the strut at each end. (See pic 4)

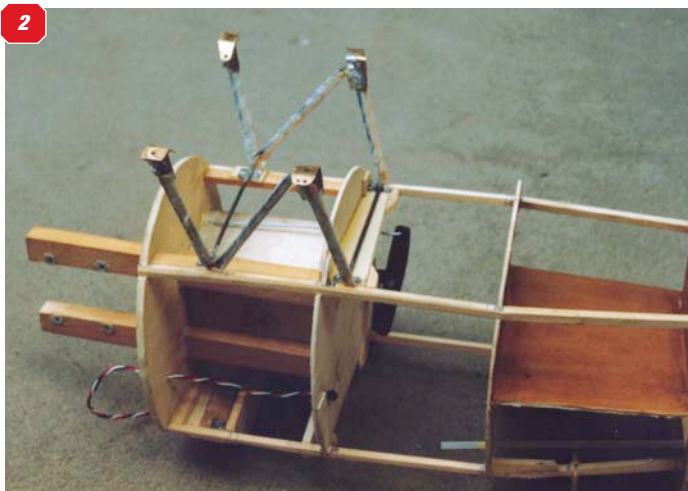
The loop is formed from an unrolled paper clip - just the right strength of wire, wound twice around a bolt one size larger for a clearance fit. The ends of the loop should have a slight kink in them so they push fit into the tube and metal-mending epoxy holds them safe.



1

JUST IN CASE YOU'RE CURIOUS...

The Mitsubishi Type 10 was the World's first purpose-designed naval fighter aircraft, for operation from the World's first purpose-built aircraft carrier (that's a double first). Designed by Herbert Smith who had been Sopwith's chief designer during WW1, Smith went to Japan soon after the Great War ended and the aircraft first flew late in 1921. The type served with the Japanese Navy until 1930.. Needless to say, Dr. Mike has a passion for obscure aircraft types!



2: Example of cabane struts that splay outwards, showing the metal mounting shoes at the tops of the struts. **3:** Cabane struts that converge at the upper wing mounting position, showing the wing joiners. **4:** Forming the wire loop attachments that fit at each end of the wing struts. **5:** Finished struts and jig that spaces the loops at the strut ends exactly. **6:** All the parts that go to make up the struts, including the metal mounting brackets. **7:** Bracing wire/ strut brackets in place on wing. Note the aluminium cable swages to secure the rigging wires.



In all cases, the struts are faired to shape with hard balsa or ply and wrapped with Solartex, ironed on for finishing. (See pic 5).

Aluminium or brass angle brackets are made up, to be bolted to the strut and screwed to 3/16 in. ply braces within the already covered wing. Lock nuts are advisable. (See pic 6 & 7).

For my models, in the 60 to 80 ins. wing span range, 4-40, (2.5 mm.) bolts and nuts are fine. These brackets are individually cut

to shape with lugs for whatever bracing wires will be attached. Phillips head screws and a box spanner for the nuts make assembly much easier.

Use a 6-32 bolt (3 mm.) for winding the loops to give a clearance fit on the 4-40 mounting bolts.

Wires

I find the best material for these to be nylon covered fishing trace, available at a fishing

tackle shop.

For models up to 60 ins. span or so, the 60 lb. test grade is fine. For larger models such as my Mitsubishi Triplane, use the 90 lb. test strength.

I do have some very strong *Aramid* thread but it does not stretch at all. Consequentially, if the tension is not exact it sags and looks awful.

Incidentally, each aircraft in the RFC had its own dedicated rigger whose job it was to set



This view shows all the struts in place on the bare airframe. It's a triplane, so the wing struts pass through the centre wing and attach to the top and bottom wings.



8: Wing-strut attachment brackets, also showing cable swages. **9:** Rigging wire adjustable attachment clevis. Note the wire loop at the non-clevis end for attaching the rigging wire. **10:** Adjustable clevis and rigging wire showing the cable swages and the attachment bracket made from metal angle strip cut and filed to shape.



the wing incidence with an Abney Level and 'true up' the plane each day before flight so there is an historical background for a bit of work on your rigging wires.

The wire ends are fastened by two, small sleeves of 1/8 in. aluminium tubing (see pic 7), about 3/8 in. long, (the technical term is cable swage) slipped over the wires and double crimped with round nosed pliers. The aluminium is easily cut by rolling it under a modelling knife. If it is necessary to replace the wire or refasten it, the crimps can be undone by squeezing out the crimp with pliers.

One end of each wire is a loop through the mounting bracket. (See pic 8). The other end, chosen for ease of access when assembling the model, has a rigging connector and a spring steel clevis. (See pic 9). I suppose you could use nylon clevises on smaller, lighter models but for my size of 60 ins. span plus, steel is needed. 'Dubro' or 'GreatPlanes' are suitable brands.

60 lb. test wire is fine with a 2-56 clevis (standard size) adapter but the 90 lb. test wire should have the larger, stronger 4-40 size.

If you cannot get the rigging adapters, you can make them by soldering a loop

from a straightened-out paper clip or a split pin, to a suitable bolt with a tinned copper wire binding. (See pic 9 again) Similar methods can be used for closed-loop control wires. For the latter, install a 1/8 in. polyethylene (?) tube inside the fuselage so the wire can be threaded through from its exit point to come out in position for the servo attachment after covering.

Having built your model and covered the wings so that you can screw on the attachment brackets, (pic 10) it is necessary to assemble the model on a table so you can walk round it while adding all the struts and wires. It may help to suggest that your wife goes to visit her Mother, so you can get access to the kitchen table. (Length of away-day dependent on how much rigging there is to do!)

As I write, my wife is on the Upper Amazon in Ecuador, but my new model is not ready for rigging yet. You cannot win.

A warped view!

Incidentally, although two bay biplanes are more work, the pair of struts mean that the wings from each side can be removed as a cellule so that assembly at the field requires only sliding the wings onto their rods and connecting a few rigging lines via their clevises, to their fuselage anchor points. Also, in storage, the wing cellules can be elastic banded together, lower wing surface to lower wing surface, with chordwise 1/2 square balsa spacers between.

(see pics 12 & 13)

This is effective in preventing warps in storage.

If you have any queries, or, indeed, a better way of doing it, please email me at mikeh@samart.com



11: All wires fitted and rigged. Mike recommends working from a bench where there is all-round access to the airframe. **12 & 13:** Mike uses this system for storing, and transporting the wings and assembling wing panels to the fuselage.



Techno Scale

Mike Evatt s

I have always had a soft spot for the rather quirky looking Westland Lysander so was delighted to find not one but two kits by 'Easy Built' at the **Sussex Model Centre**.

Logging on to www.sussex-model-centre.co.uk will reveal Kit No. FF-58 The Westland Lysander, a 1/12 scale, flying model that uses the box and former method of construction. This Pre-1942 design is eligible for Society of Antique Modellers contests. The Lysander was a British army co-operation and liaison aircraft of WWII, achieving fame through its ability to operate from short stretches of unprepared airstrip and its clandestine missions to plant or retrieve agents behind enemy lines. This 48-inch span rubber powered version really looks the part.

The purpose of this website at <http://tandysmodelplanes.com> is to share **Tandy C. Walker's** lifelong interest in model aviation. Tandy has been a life long modeller for many decades and has built and flown control line stunt and combat, free flight, radio control sport, and quarter scale. His web pages contain an excellent photo gallery of *Flying Aces Club* rubber powered scale models as well as a number

of blow-by-blow construction photo articles.

The Vintage Model Company has updated its website.

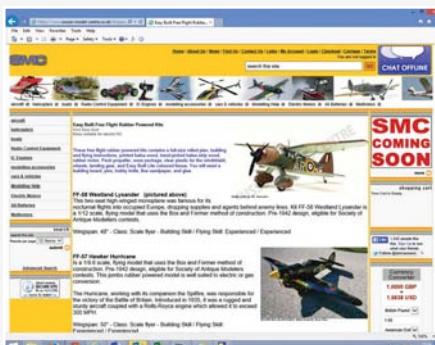
Log-on to www.vintagemodelcompany.com and take a peek. It now includes many excellent photos of their products and whether you are new to model building or an old hand, they will have a kit to delight and entertain you. Their current range of precision laser-cut balsa kits hark back to an era of aero modelling where "stick and tissue" planes were all the rage and a Sunday morning at the park would see dads and sons flying (and crashing!) rubber powered aircraft in every direction. Almost all the kits in their ranges can be converted to radio control and many can take electric or I/C powered engines.

Since 1964, **Hobby Express** at www.hobbyexpress.com has offered quality products supported by outstanding service to their friends and customers. The Pilot-1 Waco YKS-6 1/4 Scale ARF is a delight. WACO (Weaver Aircraft Company) of Loraine, Ohio was one of the premier aircraft manufacturers of the 'Golden Age' of aviation (pre-1939). The YKS-6 was a

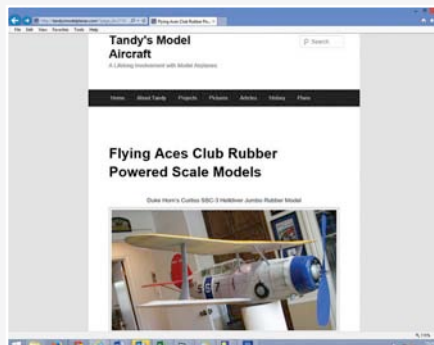
large cabin biplane with seating for 4-5 people. Its large wing area and overall lightweight allowed it take off and land in undeveloped areas common to the US in the 1930's. This is a model of the aircraft owned by the Deutsches Museum Flugwerft Schleißheim that was originally built as an ambulance aircraft in 1936.

The classic *Christen Eagle* aerobatic biplane has never been more lovingly rendered than in **Seagull Model's** meticulously crafted masterpiece. Check it out at www.elitemodelsonline.co.uk The sinuous curves are captured perfectly with crisp elegance. Even the laser-cut fuselage stringers are scalloped between bulkheads for better strength/lighter weight. Choice and selection of materials is exemplary also as is the slippery aerobatic profile of the beautifully finished balsa wings with their strong aluminium tube wing joiners, sheeted D box leading edge and painstakingly applied Oracover trim colour scheme! Enjoy!

Compact, quiet and almost vibration-free! That is the claim for the **O.S. Engines 49-PI Type II .30 Wankel Rotary Engine**. The 49-PI is ideal for boosting power in small-scale planes, reducing weight in



This 48-inch span rubber powered Westland Lysander really looks the part.



An excellent photo gallery of Flying Aces Club rubber powered scale models.



The Vintage Model Company has updated its website.



The Pilot-1 Waco YKS-6 1/4 Scale ARF.



The Christen Eagle aerobatic biplane is carefully rendered in the 'Seagull' version.



Compact, quiet and almost vibration-free!

courses the web for more TechnoScale Topics...

mid-size craft and for dependable, user-friendly service in any application. Equipped with two needle bearings, a ball bearing and rotary design's inherent smoothness, make it a very quiet and virtually vibration-free option in power. The recommended props: 9x6, 9x7, 10x4, 10x5, 10x6, 11x4, 11x5

Log-on to www.osengines.com for a closer look.

Laser Engines celebrates 30 years of manufacturing! The first Laser engine was fired up in 1983. Since then Laser engines have been continuously updated and improved with new production techniques and materials. Laser engines have powered the winning models at three World F4c scale championships, over 25 British National Championships and countless other competitions over the world. More Laser engines are used in scale competition than any other make of engine.

Log-on to www.laserengines.com and catch a glimpse of their new Laser 155. This new engine is developed from the Laser 150 to give an engine with wide torque band and useful rpm range. With greater power than the 150 and capable of using propellers in the 16"-18" range, the 155 can be used in sport, aerobatic or scale models

with ease due to only a small increase in physical size over the 150.

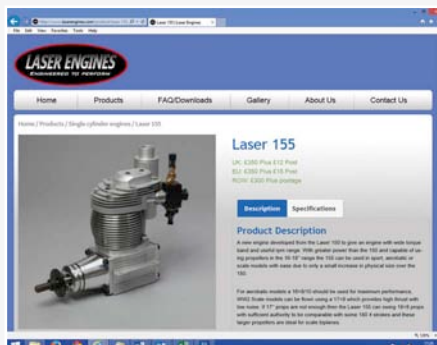
RC JETS UK at www.rcjetsuk.com stock a superb 1/6th scale replica of the world famous **Hawker Hunter**. This is of fully moulded composite construction and is designed to suit turbines of 80 to 120 Newtons thrust levels. Developed from the original design by Mick Reeves, a great deal of work has been expended to produce an accurate scale model that can be owned and flown by any competent model jet pilot. Supplied pre-painted in characteristic RAF colour scheme, much of the detailed work has been completed at the factory.

Scale Sailplane kits by marcsailershop.com offers laser cut wood short kits in 1:3, 1:3.5 and 1:4 scale from top scale sailplane glider enthusiast and designer, Chris Williams. They also offer select kits from scale designers John Watkins, Jim Owen and David Smith - and they specialize in custom laser cutting for radio controlled sailplanes. If you have a plan you wish to build, but want to take out all the time and work of cutting the parts, they can help.

For more details point your browser at www.scalesailplanekits.com

Century Helicopter Products with a web presence at www.centuryheli.com was established in 1987 to provide the radio control market with high quality R/C helicopters, high quality accessories, and performance upgrades. They are an all American company based in San Jose, California. They design, develop, and manufacture R/C helicopter products in the USA and overseas. Their 620 Size Electric Scale RC Helicopter ARF Kit looks fearsome. The mechanics features the acclaimed Swift NX ARF Electric RC Helicopter (CN1045) with a longer tail-boom.

<http://lafayetteesquadriec.files.wordpress.com> is the web address of the **Lafayette Esquadriec Control Line Club** based in Missouri USA. The website contains much information and many images such as those of Grant Hiestand's 1/3 Scale Spacewalker shown in the screen-shot. This CL scale model was built by Grant Hiestand in 1993 for the Nationals. Grant Started out with electric power with a brushed Astro-Flight 90 electric motor and NiCad batteries. It was flown with down-the-line electronic controls for many years until it was switched over to 2.4Ghz radio control functions in 2013.



A glimpse of the new Laser 155.



RC JETS UK stock a superb 1/6th scale replica of the world famous Hawker Hunter.



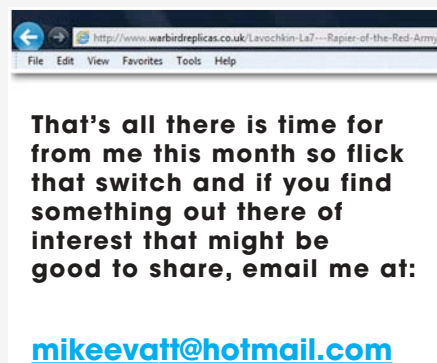
Scale Sailplane Kits offer laser cut wood short kits in 1:3, 1:3.5 and 1:4 scale.



Century Helicopter Products's 620 Size Electric Scale R/C Helicopter ARF Kit looks fearsome.



Grant Hiestand's 1/3 Scale Spacewalker.



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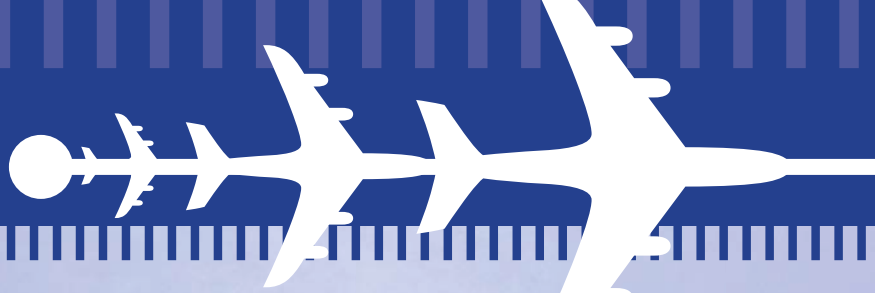
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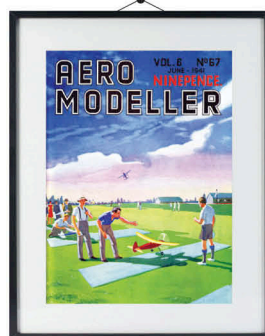
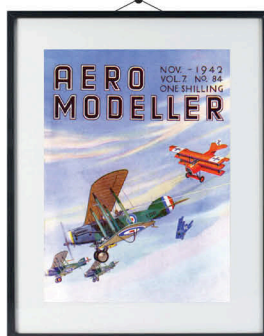
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AUSTRALIAN

FREE FLIGHT SCALE MASTERS 2014 - Gary Sunderland reports

Each year, free flight scale enthusiasts from southern Australia gather at Murray Bridge in South Australia to enjoy an informal competition. There is no static judging as such and the entrants decide which model is the best in each category - and which is the overall Champion.

In recent years, small radio controlled models have added to the fun and are encouraged to attend, but as yet, there are no prizes awarded for ARF models.

For 2014, being the 100th anniversary of the commencement of WW1, the emphasis was on aeroplanes from the 1914-1918 period and several new models were built for the occasion. Fittingly, the magnificent Albatros C.III 'Dragon Machine'. Built by Garry Odgers from Victoria was declared as the overall Champion for 2014. Garry spent most of the Saturday trimming the new Albatros and rounded it off with some perfect flying during Sunday morning's calm conditions.

1: Maris Disslers built this very nice 1914 R.E.P. Monoplane. Yes, the all-red colour is correct and was standard on R.E.P. aeroplanes (two years or more before Manfred von Richthofen). The original aeroplane is in the Musee de l'Air in Paris, complete with red colour scheme. **2:** Another of Maris Dissler's models is this Pfalz E.1 scout. The early German Pfalz types were built under licence from the Morane organisation. **3:** Rubber powered models were airborne in the calm morning air. Tim Howard-Brown launches his biplane to test the air. The roundel on the t-shirt is for the occasion. **4:** This nice Morane Parasol was another 1914 type flown at the event, joining the R.E.P. the Pfalz and my Jennin Taube and Bleriot XI for an early morning patrol. **5:** The writer's Collection ready to take to the air. The Bleriot and Taube are joined by a 1917 Airco DH4 and 1918 BE 12b nightfighter. **6:** The extraordinary Aviatik G-type was presumably Austria's answer to the Caproni Ca.3, and likewise had three engines. Needless to say, Dave's model is electric powered. **7:** Another Austrian type is the Phoenix Scout of 1918, another of Garry Rodgers' models. **8:** Gary's Odgers' incomplete Albatros C.III, with dummy exhaust Stack and machine guns as yet to be added, but in this state, it put in some excellent flights, to be selected among the participants as winner of the Masters trophy. **9:** Another winner from previous years is Dave Putterill's Blohm und Voss six-motor flying boat that also put in some superb flights. It 'alights' in a prototypical manner, but with a spray of sand, rather than water! **10:** Another spectacular flyer from the WW2 era was this flying wing 'projekt' by Dave Putterill. **11:** Small electric R/C models were also on show, including this nice Messerschmitt ME 109G with Galland hood. It flew well. **12:** Another nice ARF on display was this Stinson Reliant. The 'electric' boys had a number of ARFs airborne including a brace of SE5a examples and a number of twins from the WW2 era. A portend of the future, as R/C certainly obviates the retrieval problem. Oh, my aching bones!

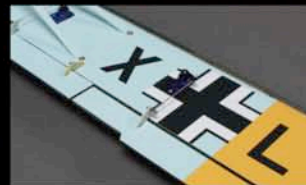


Dave Putterill launches his three-motor Aviatik for a low circuit early in the morning.

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The Fieseler Fi 156 Storch was one of the most iconic aircraft to serve in the Luftwaffe, seeing service in every German theatre of conflict during WW2. To this day it is still considered to be one of the best STOL (Short takeoff and landing) designs of all time. The Balsa Series Fieseler Storch from Duraflly is simply a beautiful model which captures the essence of this iconic aircraft and is a model that any scale fan would be proud to have in their hangar.



Specification

Wingspan	1154mm	Wing Area	17.3dm ²	Servos	HXT900 9g x 6
Length	835mm	Prop	10x6	ESC	25A Turnigy w/BEC
Flying Weight	865g~880g	Motor	3530 NTM Brushless Outrunner 1100kv		

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Specifications

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Length : 765 mm / 30.1 in.	ESC : 20A Brushless
Weight : 695 g / 24.5 oz	Motor : DST-1100
Propeller : 8x6(Two blade propeller)	Servo : 9g x 4
Recommended radio system : 4CH	



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