

MASTER MODELS: REMARKABLE RYAN!

NEW LOOK >

1/3rd scale Ryan
PT-22 in close-up



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ON THE COVER

Mike Conrad finished his 54" (1372mm) wingspan Bowers Fly Baby Biplane in the colours of Peter Bowers' prototype. Originally fitted with a .60 two-stroke engine, it later received a .90 size four stroke engine. Full construction feature in this issue

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CONTACT

SENSATIONAL NEW TYPE FOR THE RAF MUSEUM, HENDON

Three new WW1 aircraft types are soon to be added to the Royal Air Force Museum at Hendon, filling what the Museum sees as significant gaps in their coverage of historic aircraft.

Of the three, their Sopwith Snipe is closest to being a genuine 'period' air-frame, incorporating substantial genuine original Snipe sub assemblies donated to, or acquired by the Museum over a long period including wings, fuselage and tailplane, plus an original Bentley BR2 rotary engine from the Museum's collection.

The project commenced in 2009, when aircraft restorers *Skysport Engineering* refurbished Snipe fin, rudder, tailplane and elevator components. From there, the project was taken up by *The Vintage Aviator Ltd* (TVAL) in New Zealand, an organisation that enjoys a respected track record in the restoration and replication of early aviation era types.

The Sopwith Snipe first entered front-line service in September 1918, and thereafter became the RAF's first post-WW1 fighter aircraft, serving in squadrons until 1924. The Museum's example is finished in post WW1 RAF colours of basic silver dope with yellow individual squadron markings. The Snipe is non-flyable.

No less significant is the replica R.E.8, one of the Royal Flying Corps/R.A.F.'s workhorses of the WW1 period which, although gaining an unenviable reputation when it originally went into service, nonetheless did hugely valuable work for the Allied war effort as a reconnaissance and artillery spotter. It was designed to have an airborne endurance of some 4.1/2 hours, which put it 'in harm's way' for lengthy periods over enemy held territory on the western front, which no doubt led to many casualties.

This replica is the work of *The Vintage Aviator Ltd* and has been prepared for permanent display at Hendon in the operational colours of No.9 Squadron R.F.C., one of the earliest and most successful operators of the type.

Finally, and also a replica, is the Albatros D.Va, another replication by *The Vintage Aviator Ltd.*, which was shipped to UK from New Zealand in company with the Snipe and R.E.8. It incorporates an original Mercedes D.III inline six-cylinder engine.

All three aircraft, newly arrived from New Zealand on July 31st this year, were initially assembled at the Shuttleworth Collection Museum at Old Warden, from where the R.E.8 and Albatros were flown during the Shuttleworth's Air Display on September 2nd, going on thereafter to perform at the Imperial War Museum's Air Show over the following weekend.

No date has yet been set for installation of the three types at Hendon, but let's hope it will not be too long.

Editor
Tony Dowdeswell tony.dowdeswell@adhpublishing.com





Sopwith Snipe on temporary display at Old Warden.



Albatros D.Va flown at Old Warden on Sept. 2nd



The R.E.8, also temporarily at Old Warden will also go to the RAF Museum, Hendon



THREE NEW BOOKS FROM ADH

ADH Publishing have added two new aircraft books to their range of Squadron/Signal 'In Action' and 'Walk Around' series. These are always a very useful reference source of detail information or scale modellers:-

Heinkel He 111 Walk Around

The Heinkel 111 was one of the Luftwaffe's workhorses, serving during throughout the WW2 period as the bomber it was intended to be, after development from its civil airliner origins, but also as a transport aircraft and even as a pilotless bomb itself after release from a piggy-backed smaller fighter aircraft.

The He 111-E and He 111-F, served in the Condor Legion with Francisco Franco's Nationalist forces in the Spanish Civil War, paving the way to further military engagement once World War II broke out. Although produced in large numbers and exported to many countries before and during the war, few examples of the He 111 survive today. This walk around features detailed photographic images of the He 111-P1 restored and preserved in Norway, and the He 111-H20 on display in the RAF museum in Britain.



Illustrated with 228 photographs, detailed line drawings, and colour profiles. 88 pages.

Soft cover ISBN = 978-0-89747-694-2. £16.99

Hard cover ISBN = 978-0-89747-693-5 £18.99

B-25 Mitchell Walk Around (Soft cover)

The North American B-25 Mitchell was the most-produced American medium bomber of World War II. Profusely illustrated with 200 stunning colour photographs, this 80-page volume examines the nuances of the external features and explores the inner workings of the B-25D model, the scarce hard-hitting, cannon-armed B-25H, and also the most abundantly-produced Mitchell, the B-25J. Enhancing



the colour photographs, taken both on the ground and in the air, four vintage black-and-white images and 14 line drawings further illustrate details, while five colour renderings of aircraft and markings provide a glimpse at the nature of the crews.

Illustrated with over 200 photographs.

Available in soft cover £16.99 (ISBN 978-0-89747-696-6) or hard cover £18.99 (ISBN 978-0-89747-695-9).

Airframe Album No 1

The Heinkel He 219 'Uhu' - A Detailed Guide Of The Luftwaffe's Ultimate Nightfighter

The *Airframe Album* series is a new range of reference books planned to the detail material that modellers want when they are tackling a specific scale model subject and will include: Period diagrams, Data from flight manuals, Data from spare parts catalogues, Walkaround images of preserved examples, Fully detailed 3D isometric views of prototype and production machines, Full colour profiles and concise camouflage and marking notes.

The first title in the Airframe Album series will cover the Luftwaffe's ultimate night fighter, the Heinkel He 219 'Uhu'.

Contents will include all the elements listed above, plus a wealth of pictures of the recently restored NASM example showing pictures before, during and after restoration, isometric views by Jacek Jackiewicz and colour profiles and camouflage detail by Richard J. Caruana. 100 pages in total.

Airframe Album No 1- The Heinkel He 219 'Uhu'-A Detailed Guide Of The Luftwaffe's Ultimate Nightfighter' by Richard A. Franks retails at £15.95



READERS THOUGHTS AND FEEDBACK WE GET LETTERS...

ONE MAN'S MEAT IS ANOTHER'S POISON

Dear FSM,

Just to balance Rob Caso's letter in FSM August issue, can I say that I really enjoyed the recent features on the Brewster Buffalo (Richard Crossley's plan is a gem) and also the Fokker D.VIII. I'm making a rubber-powered version of the latter from the excellent Aerowerkes kit, so your lowdown on the D.VIII came along at just the right time for me. I don't think either aircraft falls into the 'done-to-death' category and so don't really understand Mr Caso's complaint.

Having said that, you've got to admire the man's nerve. It's not every modeller who'd dare commit to print his opinion that other people's aircraft preferences are 'crappy', condemn other builders as 'lazy' and then proudly provide a photo of his own model complete with a list of competitions he's won with it.

Modesty's probably an over-rated virtue anyway!

Peter Fardell, Cottingham, E.Yorks.

Hello Mr. Dowdeswell,

I just wish to say I enjoyed Richard Crossley's Brewster Buffalo articles. I hope someone continues with the wisdom to offer articles of this type of material and calibre. I hope to see more offerings from Mr. Crossley and others in future issues.

Thank you,

Michael Boucher, New York



HYPER ACTIVE (1)

Dear FSM,

I am a regular subscriber to FSM from the first issue and saw your July issue were you made your challenge about building a scale model of the Arrow Active Mk.II

So I am sending you photos of two models of this aeroplane.

First of these are two control-line models built by fellow modellers Roberto Carosio and Tino Ongaro back in 1958.

Unfortunately, the three views used to build it were in black and white and no colour pics were available, so it was finished in US markings.

The other is a radio control model was built 10 years ago by our fellow friend Tino Ongaro, who passed away three years ago. The model is kept by Roberto, but engines were removed from both planes.

I hope FSM readers will enjoy this news from Italy ... with thanks and best regards.

Paolo Rossi



HYPER ACTIVE (2)

Hi Tony,

I've just seen the article on the Arrow Active (FSM July) and thought you may be interested in these photos of my 1/3rd scale model. It is modelled on the Active Mk.II as it was in the late 1960s, when it had a different fin and colour scheme. The model weighs 28lb and is powered by a Zenoah G62. It flies very well on around half throttle, although full power makes vertical manoeuvres easy. With the folding wings, set up at the field only takes a few minutes.

Cheers,

Alistair Smith

Egmont Modellers, New Zealand



COING BANANAS

Dear Mr. Dowdeswell,

I am one of your older readers in the United States (78) and first started building models in the 1940s. In your September 2012 issue on the Bristol Beaufighter by Andy Ward he mentions applying tissue using Banana Oil and thinned dope. Back in the 1940s we used to use Banana Oil and it was listed in the Frank Zaic catalog of materials at that time. Since those long ago days, this is the first time I have heard of Banana Oil being used on models, and, I have not seen it in hobby shops or catalogs in this country. Could you tell me what is the Banana Oil Mr. Ward is using, and where does he get it? Is it available in drug stores or hobby shops in your country? Is he mixing it with dope to get it more pliable?

I particularly enjoyed the article and full size plan of the Rumppler

Taube by Peter Rake in the September Issue. A non-scale design of my own named the Firefly appeared as an article in the December 2010 USA publication Flying Models, and I appreciate the effort involved in doing these articles. Also, I find it interesting that you will again publish the classic Aero Modeller magazine that I use to read years ago. Hopefully you will offer building plans in this publication also and not do a Consumer Report evaluation of ARF model like so many magazines.

Attached are some photos of a 18" wingspan scale model I designed of the Piper Pacer. I am currently drafting plans of this small model with hopes that it will appear in the AMA magazine Model Aviation. It uses Parkzone components and the motor from their P-51 Mustang.

Cordially, Robert Dance

Whilst Banana Oil has long ceased to be a staple material for aeromodellers in general, it is still available, in U.K. at least from FliteHook, who have long specialised in 'traditional' aeromodelling materials.

They tell me that, under postal regulations, Banana Oil may not be supplied through the mail, but for what it's worth, here's the contact information for these very helpful and accommodating people:-

FliteHook.net, 45 Romsey Road, Southampton SO45 9GJ, U.K
(Tel: 02380 779836/ sales@flitehook.net

Hope that helps somehow.

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*"Starts and idles like a dream.
Throttle transitions are crisp
and without hesitation.
I think we have a winner here."*

- Dino DiGiorgio,
Top Gun Winner

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NEW ZP ELECTRONIC IGNITION ENGINES

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U.S. ARMY PT-22
AIR CORPS SERIAL
NO. 1001

001

WEAPONS THIS AIRPLANE
WITH 25 MILES PER HOUR
IF YOU AVAILABLE THE AIR
POWER YOUR WALL OF
WICK 14 ENGINE

LASER 300V POWERED,
THE RYAN WEIGHS 32LBS.

REMARKABLE RYANI!



**YET ANOTHER MASTERPIECE FROM LORD OF SCALE, RICHARD CRAPP
REVIEWED AND PHOTOGRAPHED BY ALEX WHITTAKER**

The Ryan PT-22, dubbed the 'Recruit', first flew in 1942. It was a primary trainer, developed from the Ryan ST. All the previous USAAC

PTs in the series had been biplanes, but this was the first monoplane. It had a simple monocoque structure relying on a stressed aluminium skin. The wings had spruce spars with

aluminium ribs, and were fabric covered. Original power was 160hp R-540-1 radial. As a type, the PT-22 had a mixed reputation. It was too heavy, not that easy to fly, and had





- 1:** Hand-crafted venturi. Note typically unequivocal US 'NO HAND' legend.
- 2:** The PT-22's complex undercarriage arrangement.
- 3:** Wing strut fairing, note rivet heads.
- 4:** The beautifully modelled wing-bracing fixtures and fairings are functional and authentic.
- 5:** Impressive tank detailing.
- 6:** Real working oleos complete with real leather gaiters. Smashing Jubilee clips too.
- 7:** Crisp panel and rivet detailing overlaid with a that workaday patina.
- 8:** Tail fairing with masses of detailing. The riveted panel (with the hole in it, top left) is a work of art.
- 9:** Nifty elevator trim tab complete with piano hinge.
- 10:** Masses of crisp detailing builds up the patina of a working US airplane.
- 11:** Wing root fairing, 'No Step' area, and rubber seals all faithfully reproduced.
- 12:** Exquisite Kinner dummy engine and cowling.
- 13:** Richard produced twelve separate sand-castings for this astoundingly realistic undercarriage.
- 14:** Distinctive Ryan tail group.
- 15:** Note Maker's transfers and leading edge sheathing on prop.

some unforgiving qualities. It acquired the reputation of a pilot killer, even though its fuselage was especially reinforced to protect the two man crew. Its complex undercarriage was designed to absorb excessive training loads, and abrupt rates of descent. Its toughness and complexity put the PT-22 at the upper end of the weight range for the power available, which had its effect on performance, and handling.

THE MODEL

Richard carried out his research directly on the Shuttleworth Collection example, at Old Warden. This airframe was the first PT-22 to enter service. It had started operational life at Hemet Field California in May 1942, thus the '001' on the fuselage. The Ryan PT-22 model was built using a 1/4 scale plan devised by Robert Sweitzer in the USA, obtained from [Jerry Bates](http://www.jbplans.com/). Richard then enlarged it by 20%, to deliver a one-third scale model.

CONSTRUCTION

The model is of traditional construction, using plywood, glass-fibre, and balsa formers. The smooth monocoque shape is achieved by 1/8" balsa planking, with tissue applied, and sealed with G4 Pond Sealer. The wings employ cyparis spars, balsa ribs with 1/8" balsa leading edge sheet, and aluminium tube tips. The tail is all balsa with a carbon spar.

ENGINE

Richard fitted a Laser 300 V-twin four-stroke engine. The close cowling initially caused some problems until the ventilation was improved.

PROPELLER

The engine drives a 20 x 8 Xaor prop

EXHAUST

Standard Laser, with extension pipes. Incidentally, the Kinner radial engine on the Shuttleworth example has a curious 'misfiring' sound. This is because only three of the exhaust stubs vent directly to atmosphere. The other two are directed into the carburettor, and heat exchanger.



UNDERCARRIAGE

This was a major undertaking since it is fully functional, but also because it contributes so much to the character of the model aircraft. Therefore - amazingly - Richard made his own sand castings - 12 different pieces in total, all of which were drilled and lightened.

OLEOS

These look real because they are! Oil damped oleos, with real leather covers.

COVERING

The PT-22 uses *Solartex* on the wings and tail, with *Mick Reeves Models* metal foil on the fuselage to replicate the stressed skin.

PAINTING

Richard used *Klass Kote* paint and clear resin.

LEGENDING / DECALS

All paint masks were made for this project by *Flight Line* graphics.

SCALE DETAILS

Rivets are individually stamped from aluminium (printer's) litho sheet, and stuck on. This required three different sizes.

DUMMY ENGINE

A convincing dummy engine on such a project is an absolute requisite at this standard of scale modelling. Consequently, Richard designed and resin-cast the entire Kinner radial engine himself.

THE RYAN PT-22 AWAITING HER NEXT FLYING SLOT AT FARMER NORTH'S GRASS STRIP AT OSBOURNBY.



“ It must be flown with care; if too much G-force is pulled, such as a tight turn, it will flick roll. The CG is almost on the front strut. Very strange, bearing in mind the 4 deg sweep, but that is how the full-size is. A crash and rebuild was caused by too much longitudinal dihedral, and an overheating engine. It is now fan cooled. Cooling air is admitted through the large spinner gap, and out the front cockpit ”



**RICHARD CRAPP'S PT-22:
UTTERLY CONVINCING.**

MODEL SPECIFICATION:

Scale: 33%
Wingspan: 98"
Weight: 32lb
Engine: Laser 300 V
Prop: 20 x 8 XAOR



Flaps down approach displaying the undercarriage without load.

Fokker F.II

A 30 inch span model designed by Peter Rake, built and described by Richard Hopkinson. An earlier prototype, built by Gunter Hager also features here



The F.II was Anthony Fokker's first real commercial aircraft, post-WWI. As such, it was successful and set the style for subsequent and much more famous designs. Fokker's friend Bernhard de Waal 'stole' the prototype F.II to avoid breaching Germany's export restrictions and flew it to Holland. To enhance the illegality of the flight he also took along a sewing machine, the export of which was also prohibited. The engine played up constantly during the flight, but after a series of adventures, de Waal eventually made a forced landing in Holland, slightly damaging the aircraft.

As Peter's design is for the early F.II with its attractive rounded radiator, I decided to build a model of the prototype. Later versions had more powerful engines with somewhat ugly rectangular radiators.

Wing

The wing is slightly unusual in that the spars are joined at the correct dihedral angle before left and right panels are built up on the board. I pinned the spars 'S' over the plan and glued the 1/16" ply joiner 'B' in place. Ensure that B is positioned as shown on the plan, allowing clearance for the 1/16" bottom sheeting to butt up to the spar. When dry, the spar was pinned in place so I could assemble the centre-section. While doing this, I blocked the spar tips off the board to ensure symmetrical dihedral. When the centre-section was dry, the whole assembly was unpinned and rocked to the left so the left spar was flat on the board. The main panels couldn't be easier- the ribs slot into place over the spar and fit into notches in the trailing edge. The trailing edge (TE) pieces are a good reason to buy the laser-cut short kit!

When the left side was complete I pinned the right spar to the board, taking some care to relieve the load on the right side by supporting the left panel.

Then it's simply a matter of sanding the leading and trailing edges to shape. The TE tapers in depth from the root to the inboard aileron rib R10, then increases slightly in depth because of the increased chord across the ailerons. If you sand the TE down with careful attention to the height of the ribs, everything will work out fine.

The method of joining the spars first is slightly unconventional but it works beautifully. I ended up with a straight wing and both panels with the same dihedral.

Tail cone

The tail is cut from 3/32" sheet balsa. The tips of the elevator are separate and

Floating gently by on just a whiff of power. Not the model in the article, but another built from the same plan by Gunter Hager.

have the grain running at right angles to the main parts, which should go a long way to preventing warps. The rudder is a single piece. The elevator halves are joined with a 1.5mm diameter carbon-fibre rod. Since the elevators are actuated by cables on both sides, the rod is more than adequate - in fact one could dispense with it altogether if desired. The rudder must be relieved slightly to provide clearance for the joiner.

I rounded the edges of the tail surfaces and bevelled the leading edge (LE) of the elevator. The control horns were left off until after covering. Control surfaces were hinged with small rectangles of Mylar from an old floppy disc.

Fuselage

This is a simple balsa box at the front and an open frame of 3/32" square at the rear. Given the minimal nature of the open frame, I elected to build the fuselage sides on the board. You could build the front and rear parts separately, but I think you'd have a difficult time in joining them accurately. The rear undercarriage mounting sockets were made up from pieces of 1/16" ply (UC2A and UC2B) and glued to the sides before the sides were joined. I made the open frames from 3/32" balsa but Peter recommends bass and having broken the longerons after covering I would urge you to listen to him!

When the sides were dry, I marked the positions of F1, F2 and F3 (they can't be located accurately from the plan with the fuselage inverted) and built the fuselage up inverted over the plan. The motor mount F1 was not glued in place at this stage. The basic fuselage can then be pinned right-way-up over the plan and the bottom sheeting added to the cabin area. This kept everything square so the bottom sheeting in the cockpit bay could be added off the board. With the bottom sheet in place the front undercarriage

sockets (UC1A/UC1B) were glued up against F2.

Peter has shown the motor mount F1 fitted square to the fuselage, side and down thrust being achieved by packing the motor appropriately. I decided it would be easier to angle F1 to give 2 deg. down and 2 deg. right. Since my motor is very slightly longer than that shown on the plan it was going to be built in at this stage. It could easily be made removable but as it ran well and had only set me back a couple of dollars I didn't bother with the extra complication.

“ It was successful and set the style for subsequent and much more famous designs ”

With the motor mount and motor firmly attached and alignment carefully checked, I added the nose block, which consists of a stack of 1/16" balsa parts- N2 and 2 x N3. The hole for the motor shaft had to be enlarged a bit because of the long motor. The ply nose ring N1 was glued to the front. The position of this part is slightly vague. I used the fuselage side view and a couple of photos of the real F.11 to help. You should be aware that N1 isn't round, nor is it symmetrical top and bottom, so it is a good idea to mark the top centre lest you end up with a lop-sided radiator front.

The lower front fuselage is filled in with balsa block. The plan shows a piece of 1/2" balsa, but I used several laminations of the nice, light 3/16" wood left over on

from the laser-cut parts. I oriented the grain across the fuselage. This block must be relieved at the front to clear the motor. The top of the cowl is a piece of 1/2" balsa and forms the access hatch for the radio gear and battery. I used four pairs of magnets to retain the hatch and some small balsa blocks to keep it correctly lined up. The front end was sanded to a pleasing and scale-like shape using N1 as a guide at the front and taking care not to sand the sides too thin.

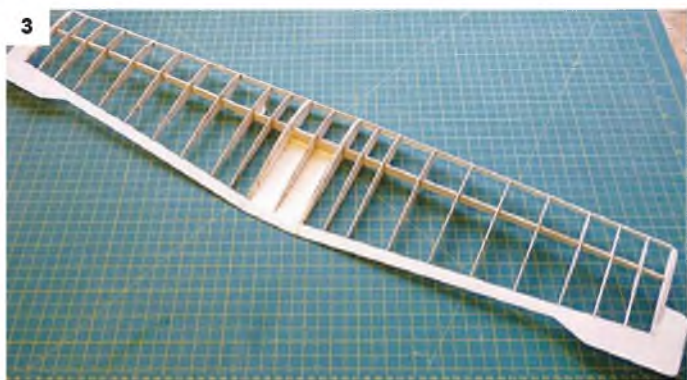
Only a couple of jobs then remained; small lengths of nylon tube for the control cables were glued to their support plates using CA and the cockpit and engine cut-outs were made in the hatch/cowl top.

Undercarriage

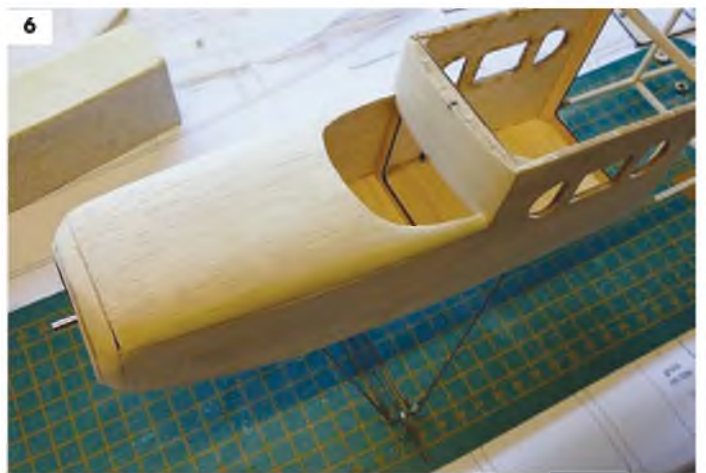
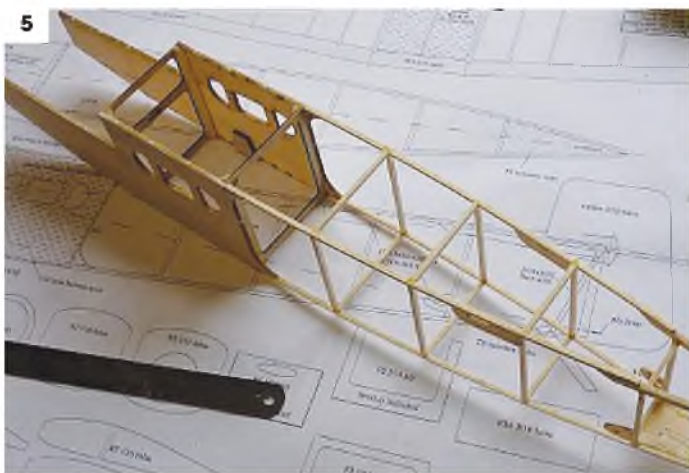
Reinhold Platz (Fokker's chief designer) was apparently a bit nervous about the strength of the F.11 undercarriage (needlessly as it turned out) and he designed it with two four-legged trusses rather than the usual single truss. Peter has designed this as conventional one-piece front and rear legs with small fore-and-aft links to support the axle. The other four struts are purely cosmetic and are added at a later stage.

I shaped the legs from 18SWG piano wire (actually the nearest decimal inch size which is very slightly larger) to match the plan. The top parts of the legs then had to be bent so as to be vertical in side and front views, which was done by trial and error. The legs were plugged into the sockets in the fuselage and fine adjustments made until the spreaders were at the same height and also at right angles to the fuselage centre line. The short links were bound with 5A fuse wire and soldered using the fuselage as a jig to hold the legs. The axle was bound to the links with fuse wire and soldered.

In addition to the unusual leg arrange-



1: Begin the wings by joining the spars with the dihedral brace, and then build the centre section. **2:** Lower the spar over the plan and build a wing panel. Repeat for the opposite side. **3:** A complete wing, all sanded and ready to cover. **4:** Nothing at all complicated about the tail surfaces. Note the dowel joiner and the grain on the elevator balances. Also visible are the cable exits.



5: The fuselage is a simple sheet and strip balsa box. All very basic and straightforward. 6: After a bit of planning and sanding the upper hatch takes shape. The passengers may have been inside, but the poor pilots were still exposed to the elements. 7: There you have it, a Fokker F.II all ready to cover. Model structures don't get much simpler than this. 8: The struts are purely cosmetic and glued in place after the model is assembled.

ment, the F.II had a pair of wheels on each side. I made four tyres from foam cord and used two of them to estimate the width of the wheels. The hubs were made from two thicknesses of 3/16" balsa with slightly larger diameter 0.6mm ply discs on either side. An alternative method would be to use four 38mm park flyer wheels with suitable discs to hide the plastic spokes.

I wanted reasonably scale-like (or failing that, at least inconspicuous...) wheel retainers. Thus the wheels are kept in place with small ply washers and tiny lengths of brass tube soldered to the ends of the axle. I put the wheels on the axles followed by pieces of waxed paper to protect the paint, followed by the ply discs and brass tube, which was soldered as quickly as possible to avoid damaging the wheels or un-soldering any of the other joints. When cool the solder was filed to a slightly domed shape and the retainers and ply washers painted black before removing the waxed paper.

Covering

Most builders will probably cover their F.II with an iron-on, heat-shrink covering of some sort. That's fine and I suppose it's what Peter had in mind when he designed the model. I prefer a tissue finish though, and I decided to use a well established free-flight technique of tissue over Mylar.

First the open areas of the structure were covered with 5 micron Mylar, stuck on with *Balsaloc*. Then *Esaki* tissue was applied wet and sealed with a couple of

coats of 50:50 dope. This technique prevents the initial coats of dope from soaking through and accumulating on the inside. The weight saving compensates many times over for the weight of the Mylar. A carefully done tissue over Mylar covering job should weigh less than conventional tissue covering.

The tissue on the fuselage shrank very aggressively so I pre-shrank the tissue for the wing. This worked well with no warps or bends being caused by the covering. Two coats of 50:50 dope is all that's required to fill the tissue but some extra sealing is required on the edges or they will lift when paint is applied.

The tail and sheet balsa parts of the fuselage were sealed with a mixture of dope and *Q-Cells* (similar to micro-balloons) and covered with tissue after fine sanding.

Paint

Only the first three Fokker F.IIs were built with the round radiator, which limits the number of colour schemes available, but they are all attractive. You have the choice of a couple of early KLM colour schemes or the unregistered prototype, which I decided to replicate on account of de Waal's adventurous journey.

The fuselage is clearly painted in three tones which I interpreted as light and dark blue and black. A clue to the colour scheme is the fact that Fokker got into trouble for displaying the F.II in KLM colours before the airline had agreed to buy it. The fuselage was painted using *Humbrol* enamels thinned with lacquer thinner.

Masking was achieved with a variety of tape and Frisket film.

The wing was varnished ply with fabric covered ailerons so I painted the ailerons with *Tamiya* XF-55 'Deck Tan' which gives a passable impression of unpainted fabric. I masked the ailerons off and painted the rest of the wing with XF-59 Desert Yellow which is more of a light tan earth shade than any sort of yellow.

I used *Tamiya* acrylics so that I could achieve a 'wood grain' effect by applying burnt umber oil paint over the top with a sponge and gently streaking it in the 'grain' direction with a stiff paint brush. It helps to do this step one panel at a time as although the oil paint dries slowly it tends to get sticky quite quickly and becomes hard to streak out after a few minutes.

After letting the oil paint dry - about three days in my case - I sealed it with acrylic floor polish. The polish was applied with a sponge as it is self levelling and streaking or brush marks flow out leaving a beautiful, uniform finish. This technique is much used by plastic modellers. Johnson's 'Future' being the polish of choice.

The Fokker logo on the fuselage is decal. First I sprayed a sheet of clear decal with gloss red and cut circles from this for the red fields. The red was probably a bit dark to start with and the dark blue fuselage only made it worse. Most likely the red was a slightly orange shade like the modern Fokker logo.

I tried various methods to reproduce the Fokker script- white decal cut to shape, paint, pencil and pastel before in

desperation cutting the letters from Frisket masking and spraying them on a piece of clear decal. The result is not perfect but looks good enough when the model is flying!

Final details

The dummy wing, tail and undercarriage struts were made from 3/32" x 1/16" bass. The ends were pinned with 15A fuse wire. The undercarriage struts were covered with tissue before painting but the rest were simply fine sanded and painted. Obviously the wing struts were the last detail added as the wing must be glued to the fuselage before they can be cut accurately to length.

I made a simple representation of the BMW engine from styrene sheet and tube. There are quite a few useful photos of this engine on the web if you wish to go further with the detail.

Radio installation

A pair of five gram servos is mounted in the cockpit area which allows a fairly straight run for the control cables. I used the thinnest available stainless steel leader wire, retained with commercial crimps at either end. The 500mAh battery sits on the floor between F1 and F2, and the receiver and ESC fit neatly on top of the battery.

Flying

The Fokker F.II model prototype weighs 199.7g ready to fly. Only 4g of nose weight was required to balance the model on the point shown on the plan. Control movements were as large as possible with 20% expo. I was expecting a very positive elevator control and was unsure about the rudder- it's quite large but there isn't much dihedral.

The day after the model was finished the weather seemed acceptable- hot, fine and with a light breeze. I had access to a large paddock with knee-high grass for the first flight. ROGs would probably be tricky anyway. I taxied the model around on my driveway and although it showed little tendency to nose over it was directionally unstable. This is hardly surprising since the axle almost coincides with the

centre of gravity.

So... I set the throttle to half and gave the Fokker a gentle nose-up toss into the wind. It climbed away smartly and dead straight. After a little while, I applied some down trim as the climb was gradually getting steeper. With a bit of height in hand I tried gentle and steep turns. The rudder and elevator are very effective at all speeds without being at all twitchy. My power setup is a bit over the top for such a light model and no more than half throttle was needed. It will maintain height through gentle manoeuvres at 20-25% throttle and a seven minute flight only consumed 125mA. It was a ton of fun but seven minutes was all I had before the wind got up and very rough thermals started making life dangerous when near the ground!

Stalls are a non-event with just a gentle nod before it starts flying again. With much provocation I made a wing drop, but it recovered immediately on its own. It will loop nicely (a scale manoeuvre, sort of- Fokker insisted his test pilot attempt a loop but the 185hp BMW didn't have enough power) but aerobatics aren't the thing for a sedate airliner like this! Landing couldn't be easier. The elevator remains effective down to the lowest speed and I just flared slightly to drop into the grass with barely any forward motion.

The model looks good in the air. It's one of those types that may look a bit plain on paper but the three-dimensional article is interesting to look at as it floats gently about. In KLM colours with large wing

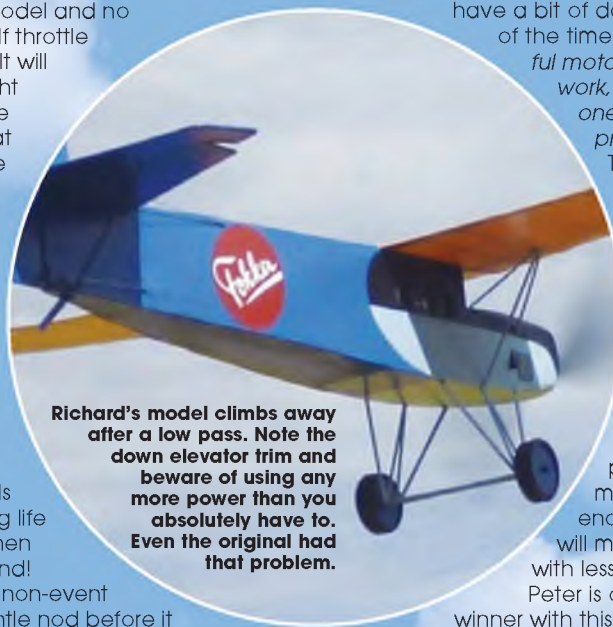
registrations on white backgrounds it would be even more eye-catching. At 200g it's best in calm conditions and with that thick wing it doesn't have a wide speed range. This shows up as a refusal to go any faster no matter what you do! It's very easy and pleasant to fly.

I would recommend considering slightly more down-thrust than shown on the plan if you want to use a motor in the 40 to 45W range, otherwise expect to

have a bit of down trim most of the time. (A less powerful motor would also work, but finding one may prove problematic. PR)

The real F.II flew straight and level with a considerable amount of down elevator by the way. I had trouble finding a motor of suitably modest power. 40W is more than enough and mine will maintain height with less than 5W.

Peter is onto another winner with this one. It's an absolute delight on a calm evening and it's a slightly offbeat subject which makes it all the more attractive. Don't be put off by the light construction; it's a very tough and practical little model. If you feel like it there are many variations on the Fokker F.II. Later Fokker-built versions had the Armstrong-Siddeley Puma engine with a large square radiator and a prominent six-into-one exhaust manifold. Fokker-Grulich built a version in Germany with a variety of windscreens and cockpit enclosures and they were used quite widely by European airlines. The F.II was praised for its handling qualities and I'm sure you'll be in agreement if you decide to build one. ■



Richard's model climbs away after a low pass. Note the down elevator trim and beware of using any more power than you absolutely have to. Even the original had that problem.

The length of the grass gives a good impression of how small this model really is. Small maybe, but undeniably attractive. The colours are from Danzig in case you wondered.



SCALE IN ACTION

BMFA SCALE NATS 2012

**Alex Whittaker's
photo report
from a typically
boisterous
Barkston**



**RICHARD CRAPP'S ETTERLY AMAZING
WESTLAND WESSEX TRI-MOTOR**



I think the best word to describe The Nats, and the weather was "eventful". We had models landing and running on into the long grass, models shedding wheels and spinners, and sadly, one total wipe-out. On top of this, the weather threatened all weekend, finally stopping the comp due to 24mph+ winds on Monday. However, for all this, it was a great scale weekend, with one or two periods of - wait for it - bright sunshine and light breezes.

The competitions

To refresh your memory, The BMFA Scale Nats now comprise three distinct Comps:

Flying Only

Where only flying is scored, and no judging of the model takes place. This allows models not built by the pilot to be entered, including ARTFs.

Stand-Of Scale

The intermediate scale class where flying and model are both scored, but the static marking is to a lower standard than that required in F4C

F4C

The International Class that requires full documentation, strict static marking, and the rigorous scoring of flights. This is the



Sadly, Dave Charles lost the spinner on his Spitfire before it could be submitted to static judging.



Richard Scarborough's trusty P-51D Mustang on finals.



Class will out! Ian Bryant's DH 51 Miss Kenya.

experts' class, beloved of 'The Lords Of Scale'.

Bristol Bullet

The first new model I spotted in the pits was Jim Reeves' new, large, and mightily impressive electric powered Bristol M-1 Bullet. Jim had been burning the midnight oil to get her ready for the Nats, and will probably refinish the model in different colours for next year. This is because its current very attractive silver and red scheme is proving difficult to document to the high standard required by the F4C Judges. She spans 10.5 feet and is powered by a C10080, 7kw, kv180 motor. Batteries are Turnigy 6s 5,000mAh 20C. Jim has fitted a 24"x12" prop which turns at 6,000rpm. ESC is a Jeti 200. Duration is around seven minutes with about 25% of power remaining. She weighs under 15 kgs even with 3 kgs of batteries. The model flew beautifully at The Nats, and handles the blustery weather

with aplomb. She placed 7th in Stand Off Scale in her first outing. Her test flight was held only a few days before The Nats. The Bristol will be released as a Mick Reeves CNC-Cut kit soon and the provisional price for the plan is £30. Check *YouTube* for a video of the test flight. <http://youtu.be/Yz7lg5XAXKc>

Westland Wessex

Now, Gentle Reader, you are in for a treat. You see, Lord Of Scale Richard Crapp was campaigning his new triple-engined Westland Wessex airliner. The Wessex is built to 1/5th scale, weighs 33lbs, and is powered by 2 x Laser 75s plus a Laser 120. Scale models

don't get much more ambitious than this! She is an utter delight from every angle, and the quality of the detailing is little short of mesmerising. The more you look, there more there is to appreciate - even before you try to tease out how Richard might have achieved it.



She is the closest we will ever get to seeing a real Wessex take to the air. A truly gracious vintage aircraft, which Richard flies with great authority. All the more bewildering to the ordinary punter like me that she received such a relatively modest static score. Especially since she

Mick Reeves sends his Sopwith Strutter into the aether.



MICK HENDERSON'S DH9A ON A LOW PASS. EXQUISITE!



STEVE FISH FLEW HIS TYPHOON WITH GREAT PRECISION IN THE WORSENING CONDITIONS.



Andy Bowman got his first podium placing with his amazingly white Stampe.



Jeremy Collins elegant electric powered BAM Swallow.



Just before landing: David Toyer's Messenger.

clearly stole the show. Now, I know without doubt that our Scale judges mark with impeccably fairness, and there is certainly no implied criticism. It is just that to my untutored eyes, the process sometimes appears to deliver counter-intuitive outcomes. Fear not, gentle reader, FSM will return in detail to celebrate this superb Wessex in due course.

Sundry happenings

As hinted, there were one or two interesting events. Interesting in the Chinese sense. First of all was the sad demise of Brian Wood's lovely electric Mustang, which got into trouble with torque on take-off, side-swiped the Judges, and destroyed herself on the unyielding Barkston tarmac. Judge Alan Glover was struck a cruel blow on his glutaeus maximus. Brave Alan soldiered on, though sitting down thereafter was a tender affair. Alan vouchsafed to the Press that it would have been much worse if he hadn't had his wallet in his back pocket.

Much later, David Toyer lost an important wheel, and had to land his Milles Messenger on just the hub. The grinding seemed to go on for ages, but all was well, even though we didn't breathe for a while.

Other models landed awkwardly in the wind, and ran on into the long grass. Many had to be chased and restrained, as the wind tried to flip them over on landing. There were other diversions. At one point, a jet and then a prop aircraft, flew right above the scale flight line. Normally this

would not provoke comment, however, in this case, both aircraft originated from the distant BMFA Showline.

F4C

As ever, Ian Bryant's precise and comely DH 51 delighted at every turn. Unperturbed by the troubling wind, Ian notched up a string of great flights to win F4C. David Womersley's immaculately presented and carefully flown DHC-1 Chipmunk came 2nd. One of my all-time favourite scale modellers, Mick Henderson, came 3rd with his DH9a. The thing is, to a punter like me, this exquisite model is so close to perfection, that I have never understood why its has never taken top podium. In the air she looks so majestic.

Stand-Off Scale

In Stand Off Scale, Steve Fish flew crisply and accurately in the face of the rapidly worsening conditions. His landings were uncannily immaculate when others suffered bumps, skips, and unhappy 'floaters'.

I was delighted to see veteran scallista Martin Fardell place 2nd, despite his sadly

battered fizzog, caused by an altercation with a car door. I do not mind admitting in print that Martin is one of my scale heroes, so I am thankful that the wound was minor.

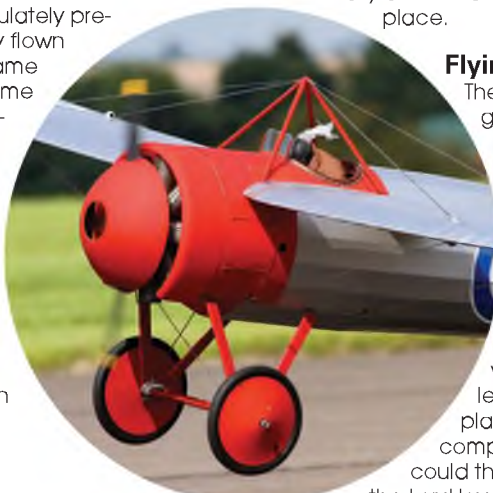
At one point, Andy Bowman was in 2nd with his toothpaste-white Stampe biplane. We bit our lips when he slipped one place, but cheered when we realised he had finally achieved a Nats podium place.

Flying Only

The Lancastrian contingent were also very pleased when Alan Glover came 3rd in Flying Only, giving way to genial John Thomas in Second place. John was flying one of no less than three

Chipmunks at this year's Nats. So, this leads us neatly to top place in the Flying-Only competition. Now who could this be? We know that

the Lord loveth a trier, so did perseverance finally pay off? Yup, Dickie clinched it! Consigned to the dustbin of history are the cruel old 'Second Place Scarborough' jibes. The naysayers will have to eat their words, because ever-popular Richard Scarborough, finally pulled it off.



INSET: JIM REEVE'S ELECTRIC POWERED BULLET. SOON TO BE A FULLY-ACCESSORISED KIT, AND A PLAN.



NIFTY GLASAIR FLOWN BY B PERRY IN R/C FLYING ONLY.



Alan Glover's Hurricane climbing out.



Peter Fullard's Hawker Hurricane, flaps down, coming over the boundary hedge.



Tim Ruck,s Martin-Baker MB-5 bowling in.

BMFA OFFICIAL SCALE RESULTS 2012

F4C

1. Ian Bryant
DH51
2. David Womersley
DHC-1 Chipmunk
3. Mick Henderson
DH9a

R/C Stand Off Scale

1. Steve Fish
Hawker Typhoon
2. Martin Fardell
Fairey III F
3. Andrew Bowman
Stampe SV4

R/C Scale Flying Only

1. Richard Scarborough
P-31D Mustang
2. John Thomas
DHC-1 Chipmunk
3. Alan Glover
Hawker Hurricane Mk I

The Verdict

There were one or two downpours, lots of poor light, and much distant thunder and lightning. However, we led a charmed life. Most of the gathering storm ringed the airfield like a ragged crown, but did not strike. In between the very gloomy interludes there were whole periods when it was warm and sunny with light airs. The only fly in the ointment was the cancellation of Monday's Fly-Offs due to very high winds. It did not matter: we went home happy.

Scale Footnote: Ansaldo SVA

At lunchtime, loaded like a pack mule with all my cameras, I yomped across the grass



Carlos Guerra's astounding SVA Ansaldo. Full photo report soon.



Richard Crapp, with Dave Toyer as Caller, lines up his Wessex for take-off.



Lord Of Scale Richard Crapp with his ambitious Westland Wessex.



Cockpit detail on Carlos Guerra's Ansaldo.



Great to see dear Mike Goldby's DH Dolphin in the air again, ably flown by Ian Pallister.



John Thomas lets his favourite Scotsman carry his Chipmunk back to the pits.

to the BMFA Showline. This was because my spies had told me that Brazilian visitor Carlos Guerra had arrived with a superb scale model. And so it was. Trust me, his scratch-built WWI Ansaldo SVA5 scout is a work of art. The quality of the exterior

woodwork alone needs to be seen to be believed. She is built to 1/3rd scale, spans 119", and weighs 79 lbs (36 kgs). She is powered by a DLE 170 petrol engine.

Although she was not entered into the Nats, she was a truly lovely scale model.

The good news is that I was able to snatch a full photo walk-around of her on the Barkston greensward, between her flying slots. Carlos flies with the LMA's Dawn Patrol troupe, so I managed to get some bonus flying shots, too. Watch this space! ■

TERRY MANLEY'S BLACKBURN BLACKBURN. THOSE ARE LONG-RANGE (MARITIME DUTY) TANKS ON THE TOP WING.





Bowers **FLY BABY**

A 54" (1372mm) wingspan sport-scale R/C version of the Pete Bowers home-build biplane - a delightful and practical model for .61-.91 cu.in engines by Mike Conrad.

Bipe

Mike Conrad's Bowers Fly-Baby Biplane isn't meant to be a Class One scale model, there is no pretence of having absolutely scale fittings, it doesn't have a cross axle (to prevent tripping in the grass - although you can fit one if you wish) and it has ailerons on both the lower and top wings. It is what one would term as a 'character' scale model, look at it closely and you can pick a few scale holes in it, but in the air it is a 'Fly Baby' through and through. It has that hard-to-define authority when flying. But over to Mike.

It is usually early on in January that the urge to build a new model suddenly strikes me. But, of course, it takes me at least another month to decide which full size subject to tackle. Mind you, who am I kidding? It was always going to be a biplane and, however much I looked at the World War I selection, I really could not find something that had not been done before.

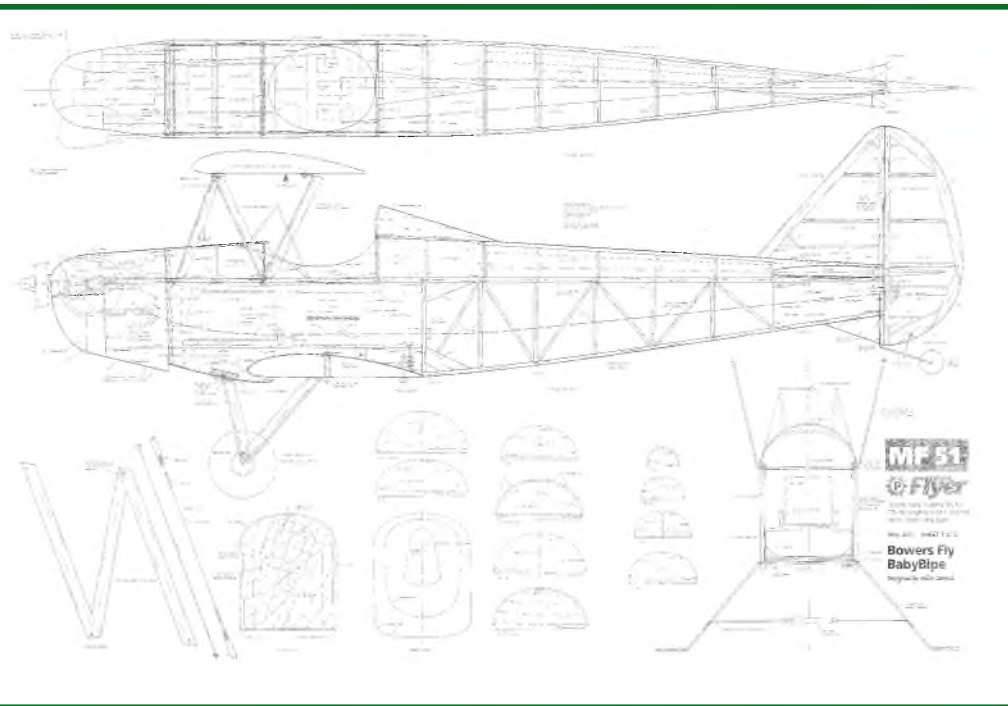
Pete Bowers' Fly Baby, in monoplane form, is a fairly common sight, but there are not many Fly Baby Bipes around. This is a design one can draw up without hav-

ing to worry about enlarging the tail, lengthening the nose or departing in any way from the original outline.

So, having got a small scale drawing from a magazine, I proceeded, with calculator and ruler, to draw up a plan. Now, my 'plan', to any self-respecting modeller, would be totally incomprehensible, but the plan reproduced here can be built by you and you will find the internal structure quite strong enough to survive the rigours of the flying field.

I won't go into an, as they say, 'stick A to B' series of instructions, because the

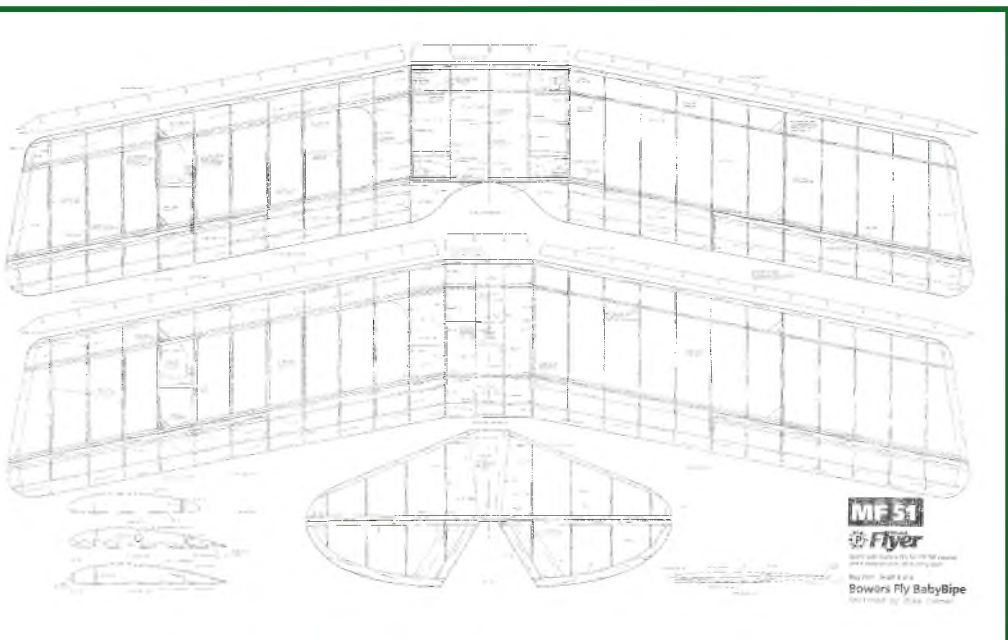




With this size of model, the dummy flat-four engine just has to be accurately replicated. For four cylinders, it is worth making a mould for the cylinder heads. If you have the skill to do it.



The SC.91 four-stroke fits nicely into the cowl with just a cooling hole to clear the rocker cover. Note the wing rigging wire fitting that passes under the undercarriage front leg clamp plates.



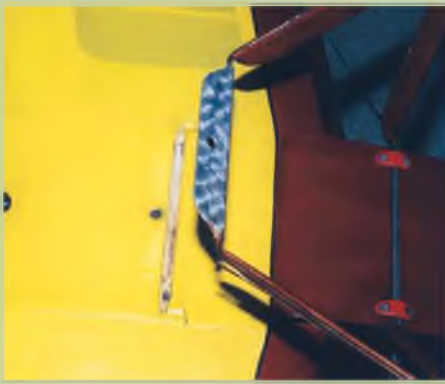
BOWERS FLY BABY BIPE

Full size copies of the plan for the Bowers Fly Baby Biipe are available from Flying Scale Models Plans Service, ADH Publishing, Doolittle Mill, Doolittle Lane, Totternhoe, Bedfordshire, LU6 1QX. Tel 01525 222573 enquires@adhpublishing.com

Price £29.95 plus p&p (U.K £2.50; Europe £4.00; Rest or World £6.00. Please quote plan no. MF51

experienced modeller will need no instruction from me. But there are one or two items I would like to mention. First, the top wing attachment. It will be seen that the front and rear cabane wires are bent towards each other at their top extremities. The front one is at more than ninety degrees and the rear one slightly less than that. Getting the wires to slip in and out of the saddle clamps smoothly, involves a certain amount of trail and error, but this system makes it very easy to remove the top wing, which is always the most difficult part of dismantling a biplane. I have used this system on several different biplanes and triplanes with 100% success. You will also note that there is no central dowel to locate the bottom wing, just a notch to fit the leading edge into. I have used this arrangement on all my biplanes, as it enables the wing to move just a bit in the event of a cartwheel, absorbing any initial

shock. I promise you that it is quite strong enough through outside loops and other negative 'G' aerobatics. The centre section struts (cabanes) are constructed as left and right sides, which are then plugged into the brass tubing fitted to the fuselage. In this way, the fuselage can be covered without the encumbrance of the struts or undercarriage. The strut fittings used on the original were Ripmax brass clevis and mount but anything similar will suit. Tap the flat part of the clevis 8BA, and bolt straight through the strut into this. I flood the ends of the strut at the attachment points with cyano to strengthen them and you will find that it is quite secure enough to fly without the rigging wires, but the model looks so much nicer with them. One further point; the original Fly Baby Biplane does not have four ailerons, there are only two (on the bottom wing) and here, I did depart from scale. I did not consider that a fairly small aileron on a swept-back wing would give me sufficient roll authority. So the choice is yours - I have tried it with just the lower ailerons working, but it was rather sluggish. If you want to go the two-aileron route I suggest you enlarge them. I originally powered this model with a Merco 61 but, while this provided adequate power, the sound was not particularly 'scale'. So, I have now fitted a SC 91 four-stroke and at last it sounds like a real aeroplane, plus the fact that it is rather more lively through the loops and rolls etc. The SC 91 4-stroke fits nicely into



The rear leg of the undercarriage fits in a groove in the lower wing centre section, retained by a bolt through a plate soldered to the leg. The u/c swings forward to allow the lower wing to be fitted/removed.



The top wing location is via four saddle clamps, one on each cabane wire. Slipping the wires in and out of the saddle clamps smoothly, involves a certain amount of trial and error, but make fitting the top wing very easy, once achieved.



The interplane strut fittings are standard Ripmax clevises bonded into the wing - the strut ends fit onto the clevis end, secured with a screw through strut into the tapped clevis arm. The rigging wires are attached to piano wire 'S' hooks. Which wrap around the clevis.



Not exactly short of space in the cavernous equipment bay! Note that the rigging wire fitting extends across the full width of the fuselage to spread the load. Note also that there is no dowel location for the lower wing - Mike finds the notched leading edge more than adequate - and allows for shock absorption in the case of a cartwheel.



The aileron servos are mounted in the lower wing. Note ball-joint horn arm used because of the swept-back hinge line. The linkages are nicely short too.



The tail end linkages are strictly traditional and present no problem. Note the wire guide on the rudder for the steerable tailwheel - minimal loads are transmitted to the rudder in this manner.

the cowl, with just a cooling hole to clear the rocker cover.

I did not want to depart from the scale outline too much in respect of the main undercarriage position, but this is further back than I would like it to be. I would suggest that on the landing approach, you switch your elevator D/R to full movement, to prevent any nose-over

tendencies as she rolls to a stop. Mind you, the experts among you will probably ignore that piece of advice.

It is worth noting that the main undercarriage on the prototype model included a touch of toe-in on the wheels to help keep the take-off straight. The undercarriage is designed for a quick release, single bolt 'U' clip fixing and

swings forward to get access to the lower wing. Dismantling of the model (if your car is not large enough to keep it in one piece) is quick and easy for a biplane, helped by the use of clevis attachments for the fishing trace line rigging wire.

I covered my Fly Baby in Vintage Yellow SolarTex and sprayed the red sections with Ford Burgundy red from Halfords and



CUT PARTS SET FOR THE

FLY BABY BIPE

Get straight down to construction without delay!

This month's full size free plan feature is supported by a laser-cut set of ready-to-use balsa and plywood components. This provides all the parts that, otherwise, you would need to trace out onto the wood before cutting out.

IT DOES NOT INCLUDE STRIP AND SHEET MATERIAL, NOR FOAM WING OUTER PANEL CORES.

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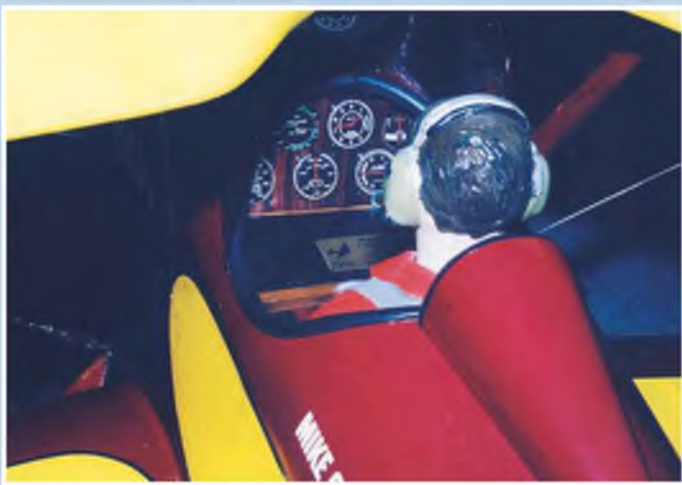
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Every cockpit should have one! Instrument panel and pilot are mandatory in models of this size - it just des not look right otherwise!



Designer Mike Conrad proudly show his prototype model. No mistaking the pleasure gained from flying his creation.

fuel-proofed to lot with Tufcote.

The dummy pilot for the original model came from Pete's Pilots, but since then, there has been a far wider choice and I rather wanted a blond, all-American guy, looking like something out of Baywatch. Unfortunately, the chap that he sent me

looks like my accountant but, who-ever it resembles, a scale bipe must have a pilot.

This model really looks the part on a low, slow flypast, and is a delight either to fly or even watch.

You could, of course, make the Fly-Baby more scale by using different rigging

accessories and methods; the same could apply to the struts. However, if you enjoy flying a few times a week on a grass patch, then the practicalities of this model will soon become obvious. For scale drawings you can refer to our subjects for scale feature in this issue. ■



Bowers Fly-Baby Biplane

Take one long-standing and expert aeromodeller with achievements in the full size homebuild aircraft movement and what to you get? well here it is!

Peter Bowers' famous low wing design for homebuilding has long been a popular selection for scale modellers. Although the original is large (28ft. span) and bulky by other single seater standards, for example the Draine Turbulent, it has perfect proportions for aeromodelling. This might have been expected, for Peter Bowers was a highly respected model designer in the earlier days of cabin power free flight models. The biplane came about in a desire to make the first Fly Baby convertible, and to explore the virtues of the 'Bi-Baby' case.

In the re-design process, wingpan was reduced to 22ft., wing chord to 42ins. from

the monoplane's 54 inches and this gave an increase of total wing surface area by 30sq ft. to 150sq.ft. for only 46 lbs. extra weight. Though the increased drag reduced the cruise to 80mph on the 65hp Continental engine applied to the prototype, take-off and landing distances became much shorter and landing speed was reduced by 5mph.

The change to biplane configuration, using established spar pick-up points for the lower wing meant that the upper wing had to be moved forward, and since access to the cockpit called for the centre section to be forward of the cutaway, the classic sweep-back of the Tiger Moth and Jungmeister resulted. Wing

sweep is eleven degrees, and the dihedral is one degree for the upper and three degrees for the lower wings. Combined with the tall centre section, the appearance is not unlike that of the Tiger Moth in miniature.

Though changes to the spar points on the lower wings were easily arranged, rigging wire attachments had to be fitted. These comprise steel straps bolted across bulkheads. Centre section struts conveniently attach to the engine bearer stiffeners at lower front, and to the monoplane landing wire lugs at lower rear. The centre section itself is fitted to the upper panels by external straps as on the old Waco biplanes, and stranded steel





Although built in lesser numbers than the original Fly-Baby monoplane, the biplane version has had its following over the years since first introducing. The example shown here is one on the British civil register.





wire is used for all rigging.

Peter Bowers had a few problems with the authorities in certification of his Fly-Baby convertible, officially known as a Fly-Baby (modified) but Bi-Baby is the better known term.

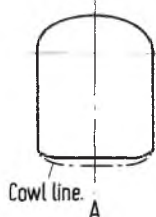
Though it is normally regarded as a local circuit flyer, the Bi-Baby has made several long haul flights to EAA rallies. In 1969 Peter let Carl Schwartz of Renton take the Bi-Baby to the EAA convention in Wisconsin at Rockford. Total flying time there and back amounted to only ten minutes short of 52 hours! This included an exciting flight through McDonald pass where Carl had to seek updraughts to reach 9,300ft. in order to clear the mountains!

Coloured 'Boeing' shades of mustard and brown the prototype Bi-Baby had white registration picked out in black line and offers an unusual challenge for scale modelling, especially if designed to follow the convertible configuration concept. ■

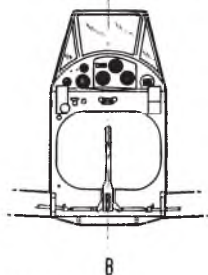
Pictures on this page illustrate the original prototype Fly Baby biplane and illustrate the simplicity of assembly of the aircraft, which has one of designer Peter M. Bowers' objectives.



SCALE 1:40

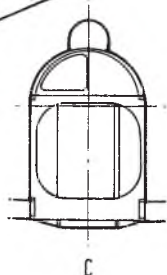


Cowl line.
A

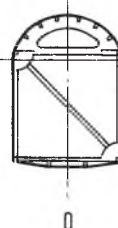


B

FUSELAGE CROSS-SECTIONS.



C



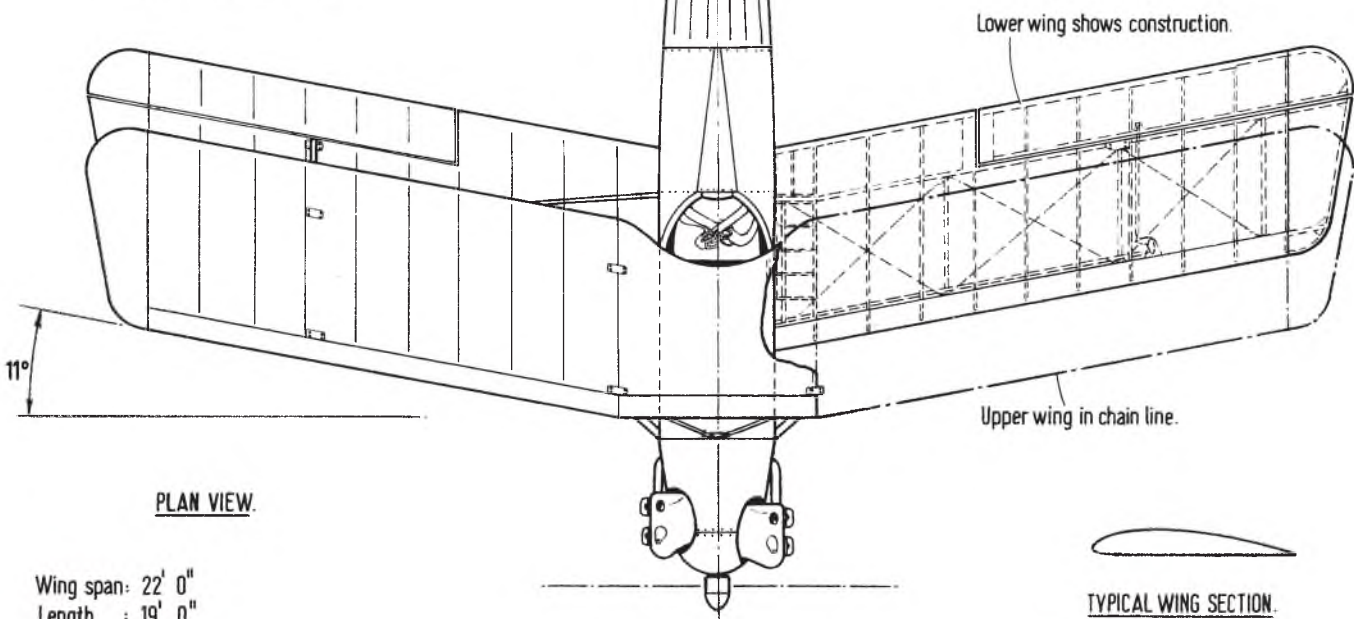
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E



F

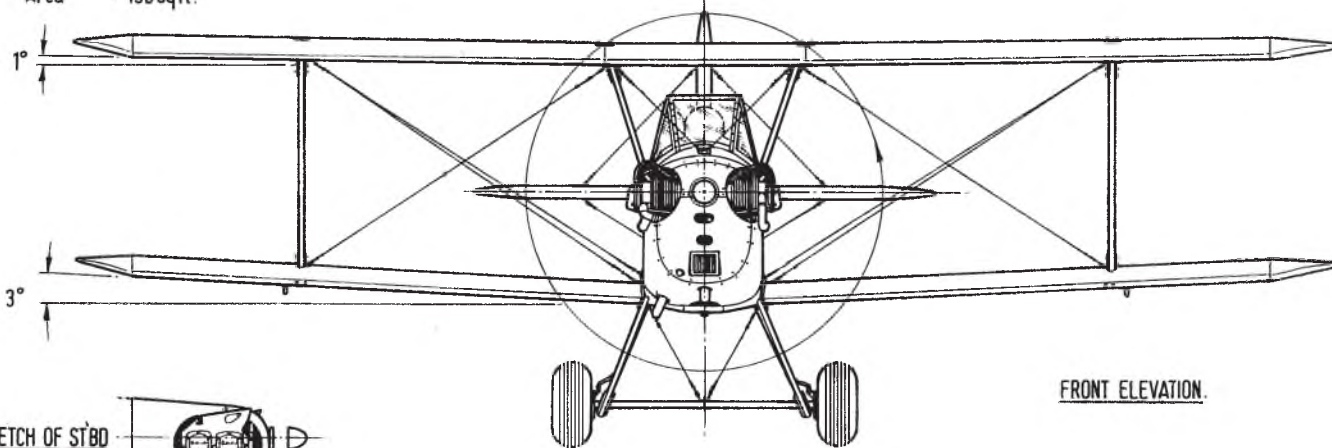


PLAN VIEW.

Wing span: 22' 0"
Length : 19' 0"
Height : 7' 1"
Area : 150 sqft.

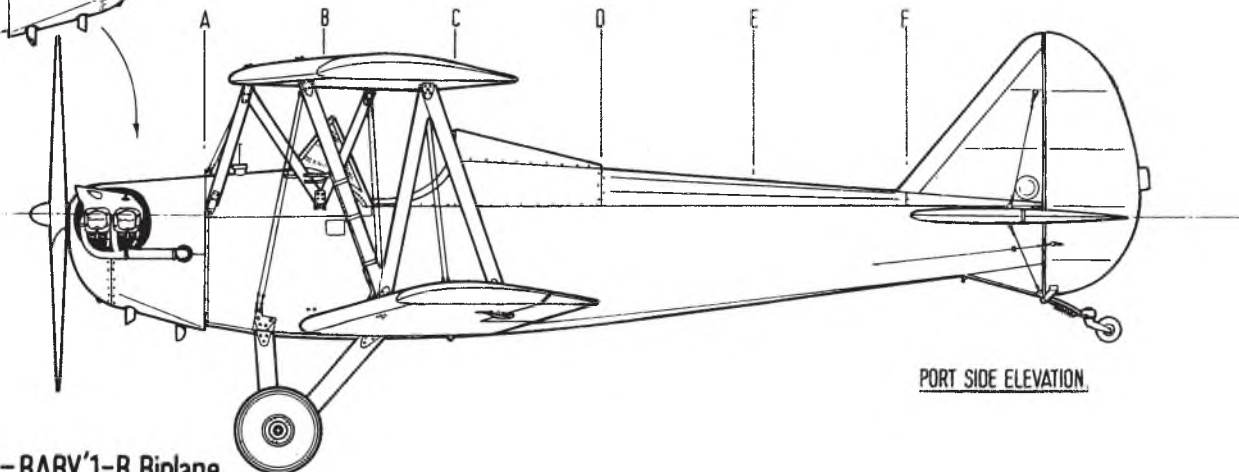
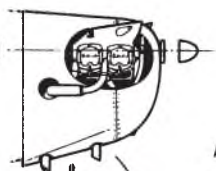


TYPICAL WING SECTION.



FRONT ELEVATION.

SKETCH OF STBD
SIDE OF NOSE.



PORT SIDE ELEVATION.

PLANS and PARTS

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



ELECTRIC CANBERRA B(I)8

Plan price £29.50 Plan No.262

Component Pack £175.00

From the building board of electric ducted fan scale expert Chris Golds, this 84" (2,134mm) span model is the 'Interdictor' version of the famous jet bomber. Prototype used two Hacker B50-16L motors and two ten-cell 3300 NiMH power packs. Four sheet plan shows retracts and flaps. Plans are supplied complete with step-by-step written construction sequence.



PIPER SUPER CUB

Plan price £16.50 Plan No.146

Component Pack £95.00

G/F Cowl price £17.50

A great first-time scale model for novices and sport fliers who want real scale accuracy. 79 ins span 1:5.33 scale model suits a range of engines .40-.60. Two sheet plan. Glass fibre cowl available.



CORBEN SUPER ACE

PLAN PRICE £19.50 PLAN NO.275

COMPONENT PACK £65.00

A 50" (1270mm) wing span sport-scale model of the delightful American homebuilt aircraft, this design is an excellent introduction to the world of radio control scale modelling, featuring simple airframe structure that will result in a scale replica ideally suited to regular club-field flying on a regular week-upon-week basis. 1/6th scale replica suits .26-.30 four stroke engines, or .20-.25 cu.in. two strokes. Four function radio systems required.



HEINKEL HE 51

PLAN PRICE £17.50 PLAN NO.80

COMPONENT PACK £125.00

A 68" (1727mm) wingspan 1:6.4 scale model of the pre-WW2 German biplane fighter for 4-function radio control and .70-.90 cu.in. four-stroke motors. Can be built without recourse to glass fibre mouldings for items like engine cowl and wheel spats. Two sheet plan.



RUMPLER C.IV TAUBE

PLAN PRICE: £19.50

PLAN NO. 269

COMPONENT PACK: £110.00

A 1/7th scale 80" (2032mm) wing span sport-scale model of the early German WW1 aircraft designed for .60 cu.in. size four stroke engines and four function radio control operating rudder, elevators, ailerons and throttle.



De HAVILLAND DH 82a TIGER MOTH

PLAN PRICE £26.50 PLAN NO.051.

COMPONENT PACK £115.00

An 80 inch (2032mm.) wingspan, 1:4.33 scale model for 1.20 cu.in. motors and four function radio control systems. No moulded cowl required - all wood construction. Three sheet plan.



FE8

PLAN PRICE £19.50

PLAN NO.267

COMPONENT PACK £88.00

Accurate 1/5th scale 75.6" (1920mm) wing span replica of the British early WW1 pusher fighter. Requires .78-.91 four stroke engines and four function radio control system. Excellent for electric conversion.



FELIXSTOWE F2A

PLAN PRICE £19.50 PLAN NO.276

COMPONENT PACK £110.00

An amazing 1/6th scale fully flyable replica of the British WW1 maritime patrol flying boat. Model spans 100.5" (2553mm) and suits two .25-.30 cu.in. two stroke engines. Can be flown from water or from land using a take-off dolly to safely landing on its hull. Prototype model won "Best of Show" at the prestigious Toledo R/C Expo in USA. All the detail is there on the plans for an impressive model.



FOKKER D.VII
1/4 PLAN NO.241, 1/5 PLAN NO.242
PLAN PRICE (EITHER SCALE) £26.50
COMPONENT PACK 1/4 £125.00
COMPONENT PACK 1/5 £120.00
 1/4 scale spans 82.5" (2095mm) for 30cc (1.8 cu.in.) two stroke engines. 1/5th scale spans 65.7/8" (1673mm) and suits 15cc (90 cu.in.) four stroke engines. BE SURE TO QUOTE SCALE REQUIRED WHEN ORDERING!



HAWKER FURY
PLAN PRICE £17.50 PLAN NO.091
COMPONENT PACK £125.00
 A 1/6th scale replica of the RAF's most elegant 1930's biplane fighter 60" (1524mm) wing span model requires four function R/C gear and .60 cu.in. motor.



D.H. 103 HORNET
PLAN PRICE £22.50 PLAN NO.052
COMPONENT PACK £130.00
 80" wingspan sport-scale replica of the hottest production piston engined fighter ever. Suits engines .40-.53. Original retracting undercarriage unit included with the plans.



BOEING PT-13 STEARMAN
PLAN PRICE £19.50 PLAN NO.243
COMPONENT PACK £99.50
 A 58" (1473mm) wingspan replica of the famous bi-plane radical engined trainer aircraft of the WW2 era. Designed for 700 size electric motors, but with option of i.c. engine power using a .52-.60 four stroke engine, with modifications shown on a separate plan sheet. (Ready-cut wing ribs and fuselage formers available - see below) Three sheet plan.



TIPSY JUNIOR
PLAN PRICE £19.50 PLAN NO.286
COMPONENT PACK £95.00
 A 1:3.44 scale, 79" (2006mm) wingspan replica of the late 1940s Belgian light aircraft, designed to suit .90-1.20 cu.in engines. Designed by Philip S.Kent, the model features all built-up balsa/ply construction throughout and makes an excellent entry into R/C scale modelling. Rudder, elevator, aileron and throttle controls.



AVRO AVIAN MONOPLANE
PLAN PRICE £19.50 PLAN NO.278
COMPONENT PACK £110.00
 Designed by respected R/C scale expert Philip S.Kent, this quarter scale replica of the radial engined version of the 1930s air racer spans 96" (2438mm) is an ideal/introduction to the world of large scale. The model suits 1.50 cu. in. size four stroke engines and requires four function radio control operating the basic control functions of rudder, elevator, ailerons and throttle. Conventional wood airframe structure throughout.



SOPWITH CAMEL
PLAN PRICE £14.50 PLAN NO.188
COMPONENT PACK £79.50
 1/6th scale replica of the famous RFC WW1 fighter biplane, for .24-.40 size motors and four function R/C. 56" (1422mm) wing span.



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PLAN PRICE £16.50 G/F COWL PRICE £17.50
PLAN NO.177 COMPONENT PACK £135.00
 Superb, true-to-scale 1/5th scale replica, features accurate outlines and rib-for-rib reproduction of the full size wing structure. 63 ins (1600mm) span model is of manageable size for transport and offers realistic flight performance. For .60 size motors and 4 function radio. Glass fibre engine cowl available.



BUCKER BU180 STUDENT
PLAN PRICE £26.50 PLAN NO.015
COMPONENT PACK £120.00
 The R.A.F. maritime rescue/ anti-submarine patrol aircraft, modelled by renowned electric scale expert Chris Golds. 86" (2185mm) span model flies on four Speed 400 electric motors, driving pusher props. Full step-by-step written building instructions.

030/12

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

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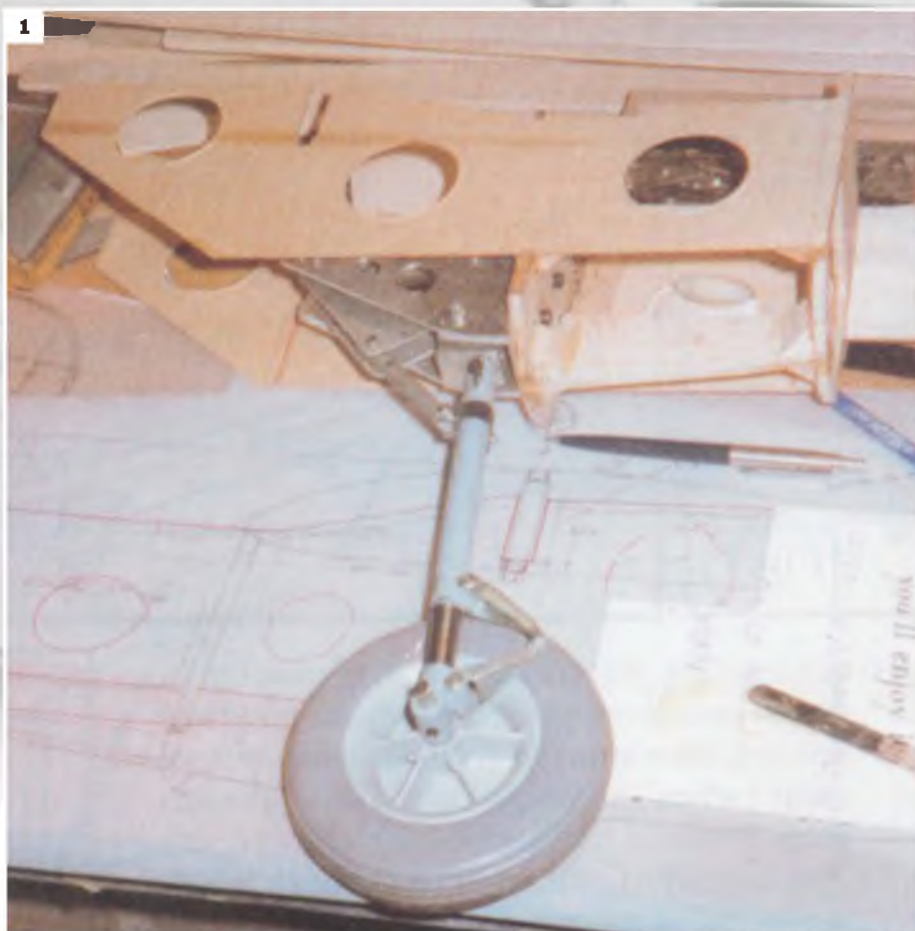
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Retracts for the De Havilland Hornet

Bob Hart follows up the plan feature in October issue with the how-to of the scale retracting main undercarriage

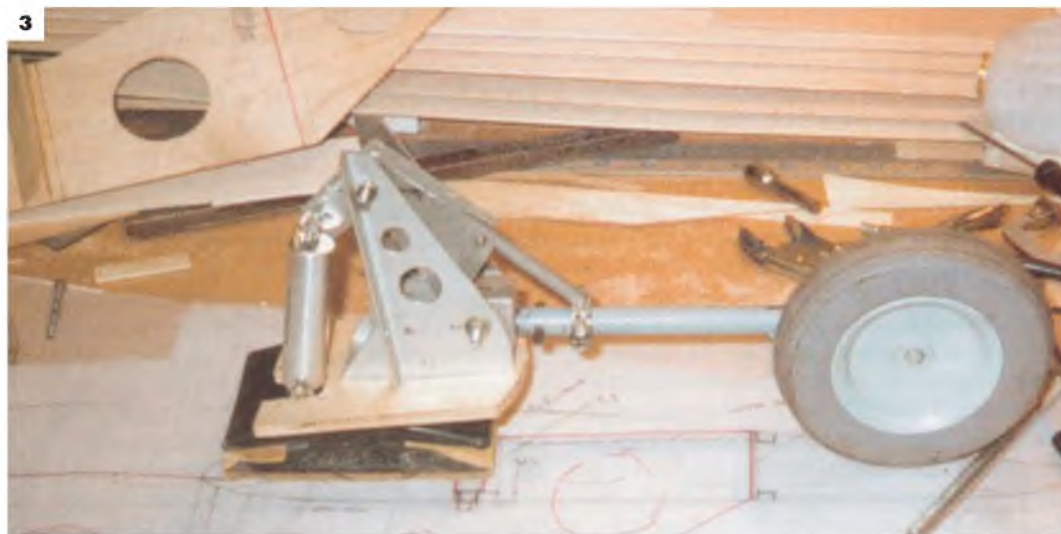


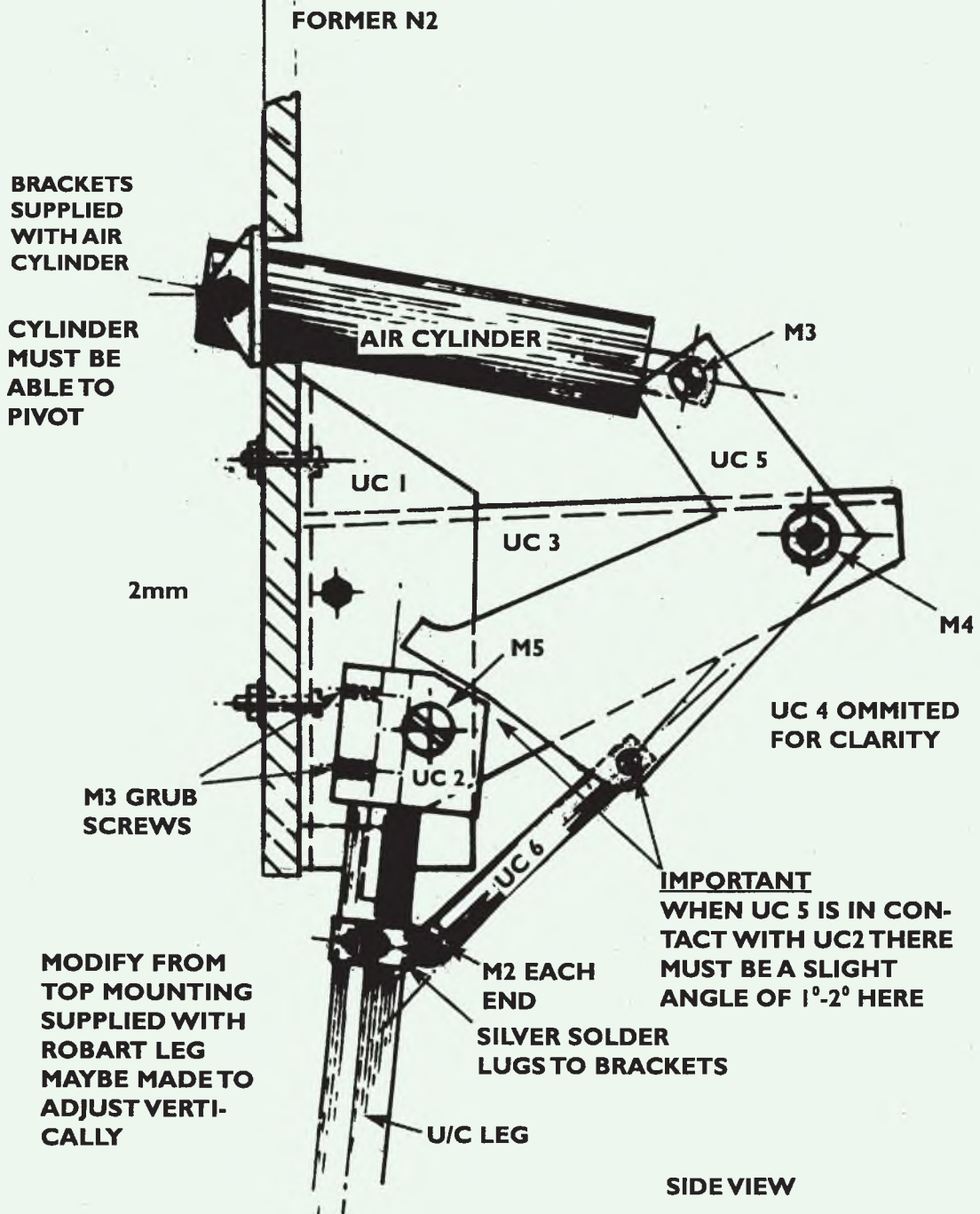
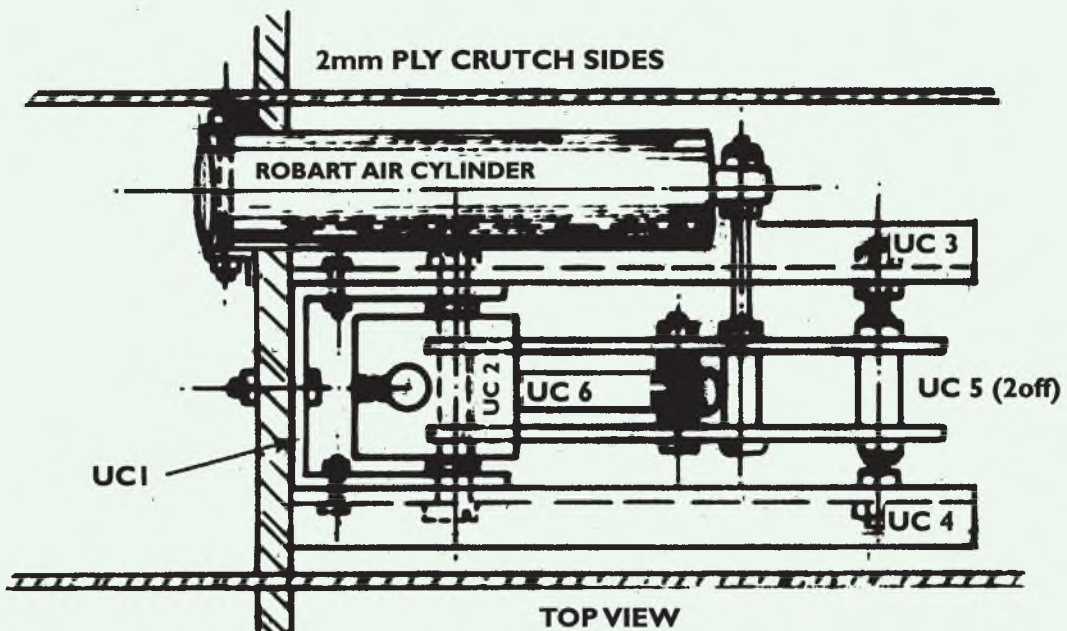
Undercarriage!, can't live without them. Certainly if you are into scale aeroplanes, this can be the truth. I must admit right at the beginning, that the principle of this system was explained to me by a good friend of mine, Rick Stevens, who builds large scale models and always makes his own retracts.

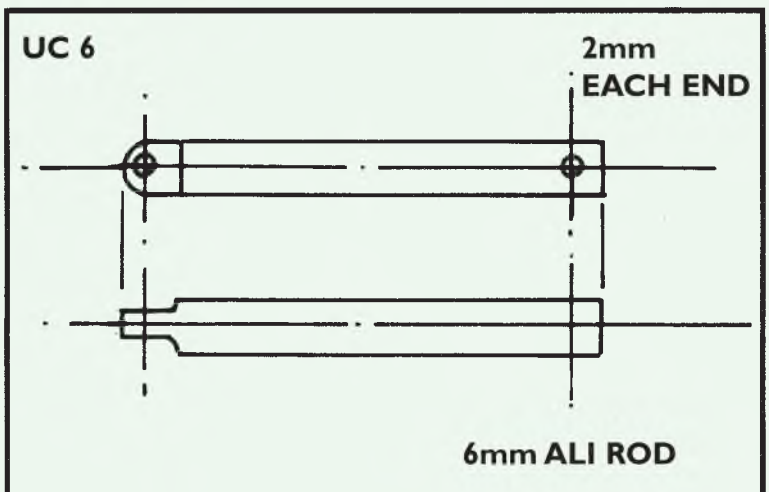
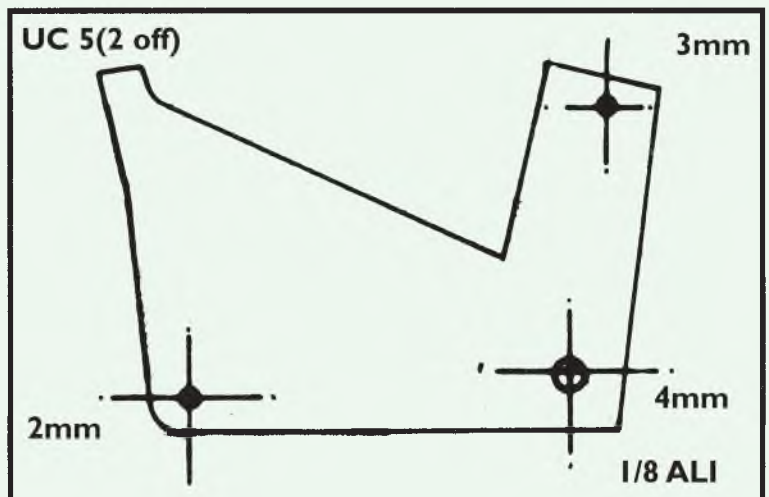
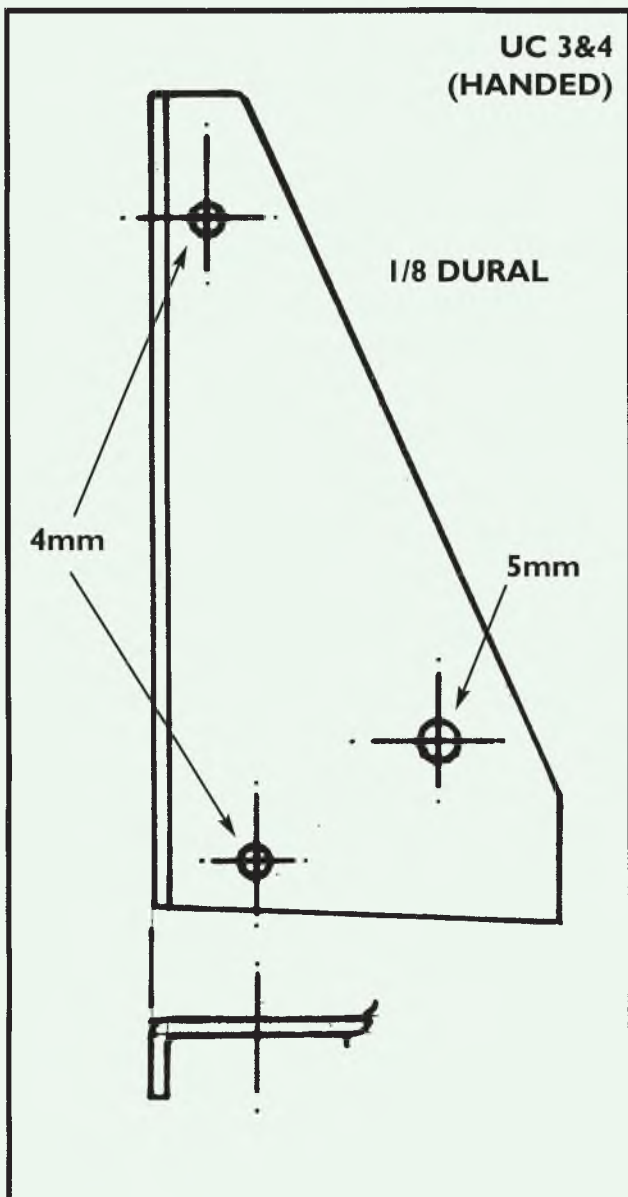
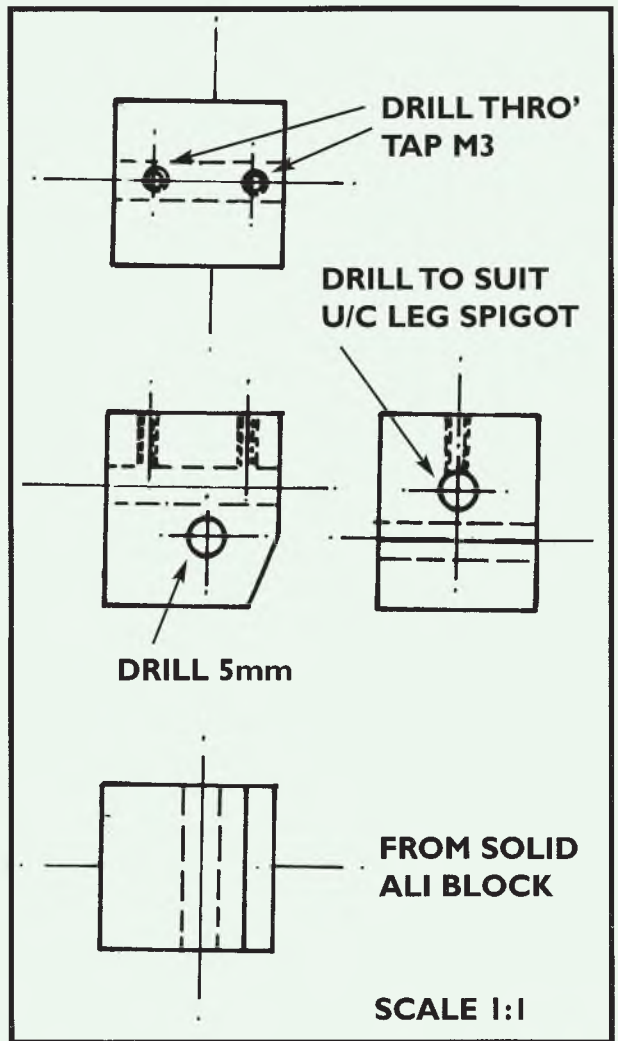
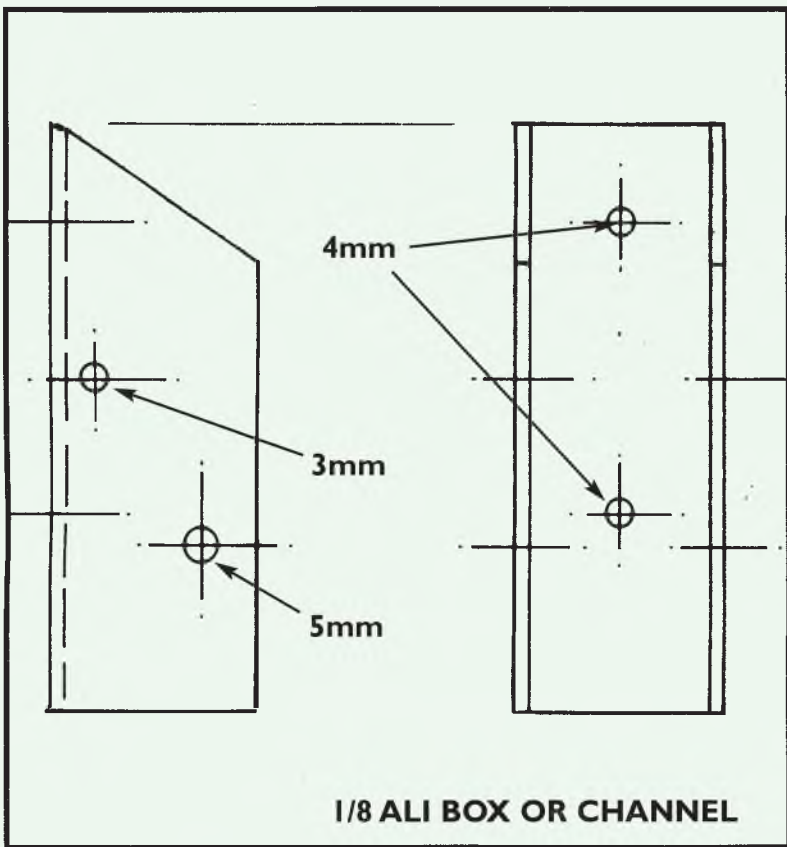
The first set I made was for a North American A-26A Invader. This was a tri-cycle set with the front leg rotating flat as it retracted, similar to the action of a Chance Vought F4U Corsair or Curtiss. I used an individual retract servo to drive each leg, but it was always a bit of a struggle for them, so for the Hornet, I opted for air power.

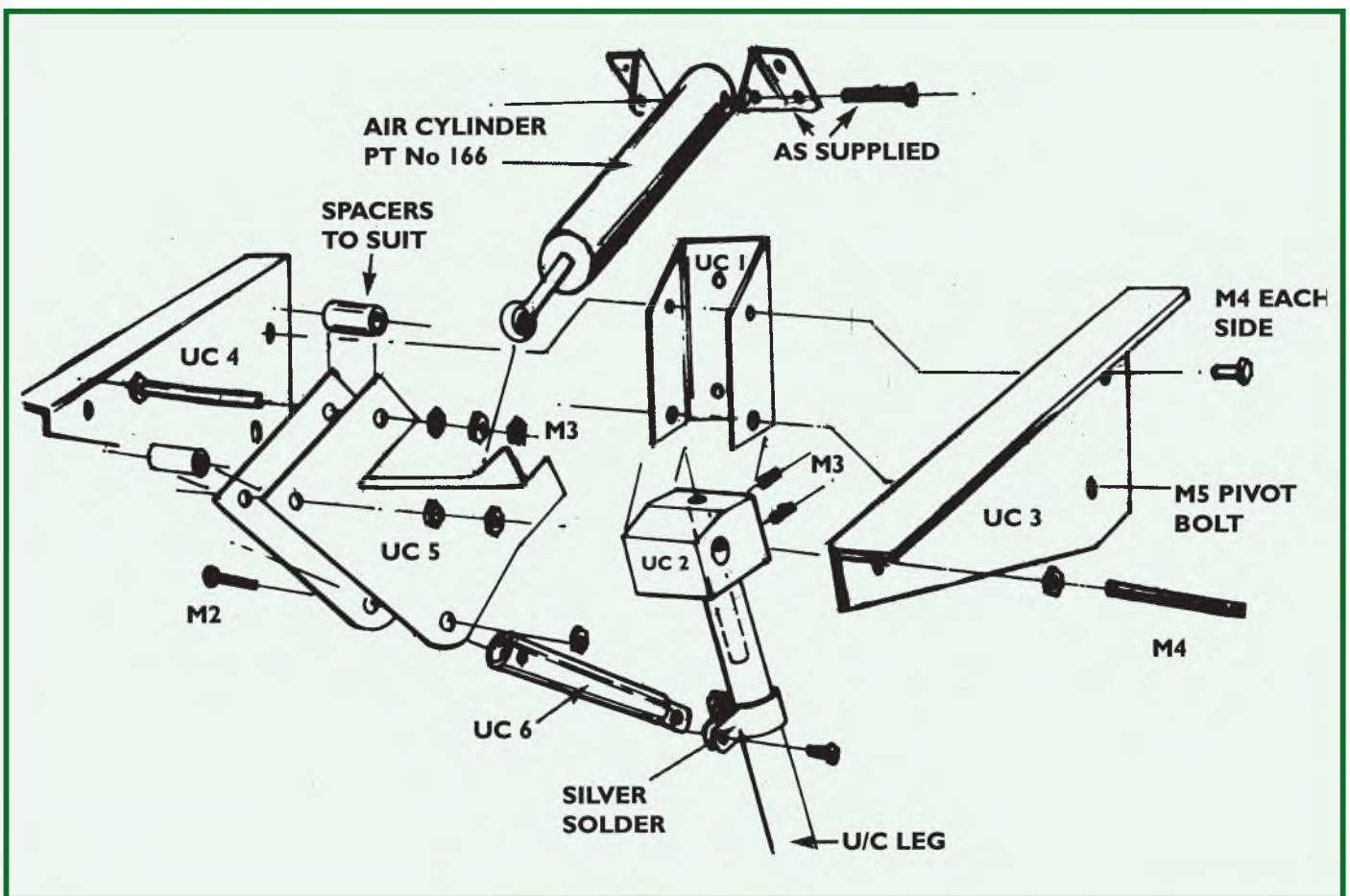
Why go to the trouble of building them when you can buy ready-made sets I hear you say? Well in the first place, the good ones are very expensive and the usual retraction angle is 90 degrees. If you were to use these with the pivot point at the bottom of the engine nacelles as per the real thing in the case of the Hornet, half the

1, 2 & 3: Two views of the basic leg unit, based on a Robart leg, showing the mechanism with its air ram actuator and the installation in the nacelle crutch unit. The pic. 3 shows the metal extrusion used in the author's prototype unit, which obviated the necessity for much metal bending.









wheel would be hanging out the bottom when they retract through 90 deg. If there were any forward rake on the strut, even more wheel would be visible. Some aircraft actually have half the wheel in view when retracted, but not many. You could mount the pivot point further up in the nacelle, but then you would need a longer strut to maintain the correct stand on the ground. This in turn would need a longer opening back into the nacelle to house it, which would not be scale, if indeed there was enough room,

With this system, you can get as little or as much movement as you need by shortening or lengthening the connection point of the air cylinder to the pivoting arm U/C5. Certainly, as shown, you can get enough movement to get the wheels well up into the nacelles to operate the door closing system and so far, in use, it has been 100% reliable,

Apart from the *Robart* air cylinders and struts, which I purchased, all the materials were from my scrap box. Cheaper struts are available from the likes of J.Perkins but I don't know of any cheap cylinders that are worth having. U/C1 was cut from a suitably sized piece of square sectioned extruded aluminium with one side cut out, but it could just as easily be folded from sheet. It is important to make the two

4: View inside the engine nacelle, showing the undercarriage unit installed and the rubber band spring loaded linkage to the main undercarriage door.

5: Close-up of the undercarriage mechanism as installed.



6



7



8



side-pieces U/C3 and U/C4 from dural and the turn-over at the top helps to stiffen it up. I cut mine from some old D.I.Y. shelving supports which are 'T' sectioned, cutting off one side of the top edge to leave the turn-over. (Your editor thinks this shelving system is too old for most to remember, B**** cheek.) It is also important to cut U/C5 from normal aluminium, as this will form a natural weak link in the event of a heavy 'arrival', as happened to me. Heavy landing loads will buckle this part rather than ripping it all out and it is easy to straighten up with long pointed pliers without stripping down. Access to remove or install the unit is done through the tank bay from the front.

The whole assembly was made using normal hand tools. No doubt, if you have access to a lot of machine tools, you can do a deluxe job with ball-raced pivot points, brass bushes and purpose made axles etc .

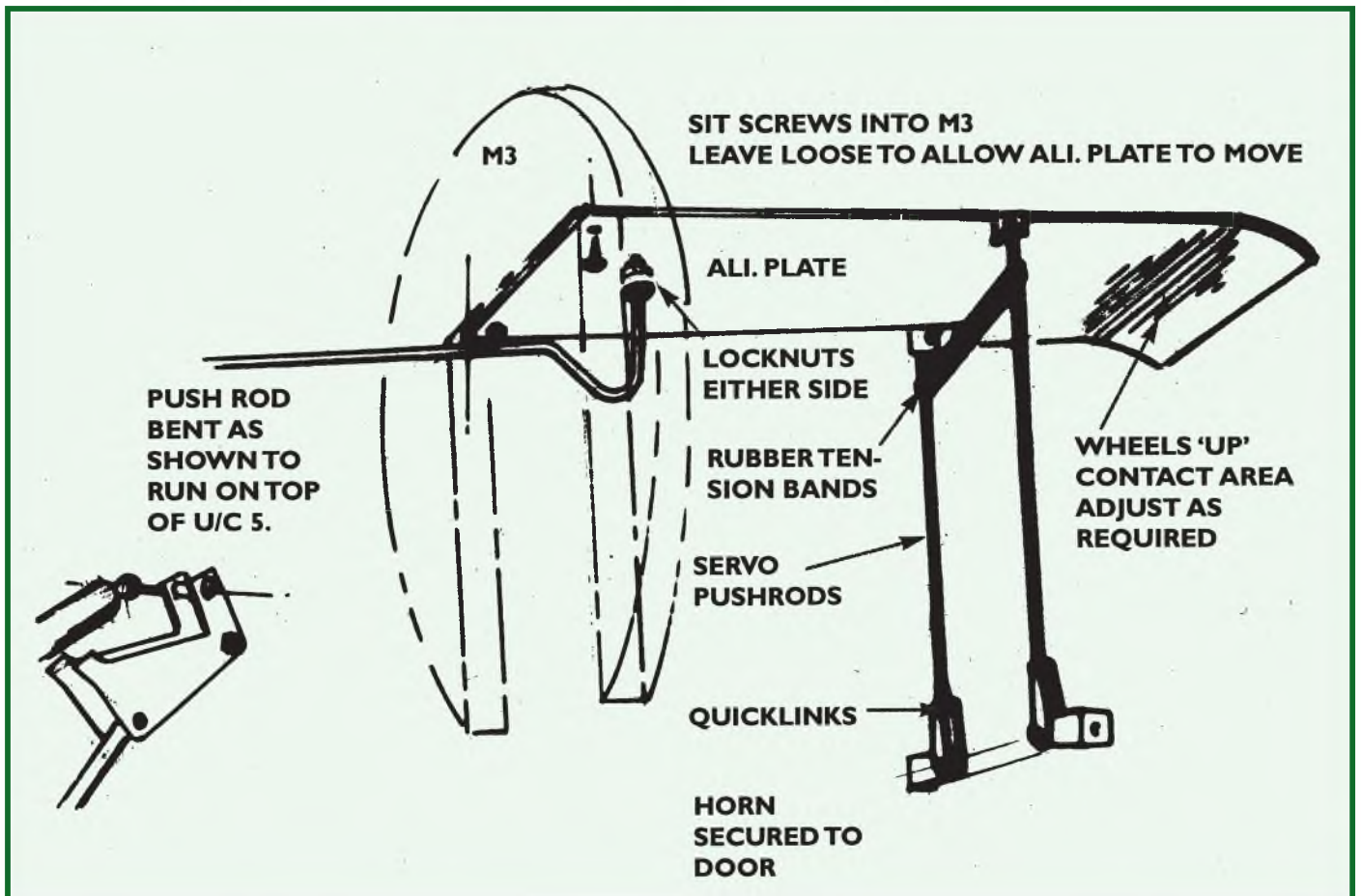
The door-closing geometry took some playing around with but I got there in the end. Hopefully the drawings will show how it works. It's difficult to describe, but the servo pushrod holds the doors open, allowing the wheels to pass inside, without fouling, until the wheels hit the back of the plate and thus closes the doors.

At the end of the day when it's flying past in that low pass with everything tucked up and shut in, you will know why you went to all the effort.

Good luck and happy landings. ■

6: A further close-up of the inside of the engine nacelle, showing the actuating mechanism link to the undercarriage door.

7 & 8: Two views of the main undercarriage leg and the main wheel.



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Techno Scale Mike Evatt v

Made famous in many movies, the venerable Bell 47G is considered by many to be the Piper Cub of the helicopter world. It is currently available from **Century Models** as a modular 50 size ARF R/C scale model. Following on the high standards set by the 30 size Bell 222, Airwolf, Bell Long Ranger, Century 109 and Schweizer 300, it features top quality pre-painted fiberglass scale parts and the "oil derrick" tail boom that are already assembled and painted in a high visibility yellow. Check it out at <http://www.centuryheli.com>

What more can you do to add that ultimate touch of scale realism! Add lights of course! **R/C LightMasterTM** at <http://www.rc-lightmaster.com> provides complete lighting solutions for model aircraft. Their premium lighting controller can drive up to eight different lights, each with it's own functionality. The LED lights are compact, and very bright. The included servo wire allows your receiver to control any of the 8 lights. A typical installation weighs, minus battery, less than 4 ounces!

The **Fond du Lac Aeromodelers** based in Wisconsin USA are dedicated to promote the building and flying of radio controlled aircraft and to further the national program of the Academy of Model Aeronautics. Fond du Lac Aeromodelers Association was founded in the early 1990's and continues to grow, with a membership of nearly 100, making it one of the larger model clubs in the area. They always welcome anyone who has an interest in model aviation. They offer flight instruction to pilots of all skill levels from basic trainers to aerobatics, to jets and helicopters. Visit <http://www.fdl-aa.com> for some excellent scale content - particularly the photo galleries.

Nick Zirolli, with a web presence at <http://www.zirolliplans.com> is well known for their full range of Giant Scale warbird and civilian airplane plans. Over the years, their designs have gained the enviable reputation for being among the most "flyable" giant scale models available. They are understandably proud of the widespread acceptance their designs have enjoyed and make every effort to

broaden it with every new release of construction plan or scale-related item. It is however, the accessories such as wheels, tyres and dummy engines that are well worth more than a second look! They are all of a quality that will add that little bit of magic to your masterpiece.

A major restructuring exercise has taken place with the objective of rebuilding **Flair Models Ltd** to its once famous place in the model flying market. This process is now well advanced; some product lines have been dropped and others added. Take a look at their current models on-line at <http://www.flairmodels.co.uk> The company supplies to the aeromodelling trade only but will put you in touch with your nearest stockist. I have always liked the Flair Tiggle, shown in the screen-shot. With a little care it can look very convincing on the ground and in the air. An ideal first large-scale model the Tiger flies like a large trainer.

Southern Sailplanes at <http://www.southern-sailplanes.com.au> is an antipodean delight. Interestingly they sell only one scale sailplane but it is a gem. The



Bell 47G is currently available from Century as a modular 50 size ARF R/C scale model.



R/C LightMasterTM provides complete lighting solutions for model aircraft.



The Fond du Lac Aeromodelers Association displays some excellent scale images.



Nick Zirolli sells fabulous wheels, tyres and dummy engines.



An ideal first large-scale model, the Tiger flies like a large trainer.



The majestic "KESTREL 17" from Southern Sailplanes of Australia.

walks the web again for more TechnoScale Topics...

majestic *Krestrell 17* is truly the flag-ship of their fleet. Accurately replicated from the history making *Glasflugel* full size 17 metre high performance sailplane, their scale version is similarly a classic now! The kit contains an extensive inventory including a beautifully finished white fibreglass fuselage, clear canopy, ready to laminate foam cores, long wing tube/spar system, torque tube spoiler hardware (front hinged style), and many other basic hardware items such as pushrod drives.

Logging-on to <http://www.teamwet-works.com/claymore/volare> will transport you to Volare. This is **George A. Bredehoff's** website which is dedicated to providing plans for scale rubber powered models. All models are designed to conform with the Flying Aces Club Rules. All planes have been built, tested and flown to at least the FAC minimum of 20 seconds. Several of the planes have been FAC Contest winners! All plans designed and drawn using CAD. The Sopwith Tabloid was the 1914 British Schneider Cup Winner.

Outerzone at <http://www.outerzone.co.uk> is a listing of

free vintage and old-timer flying model aircraft plans to download. The listing is free for everyone - you don't need to register or log in to download plans. Just start by... well, looking around and clicking on the 'download' links. You can view model plans by category tag (like say free flight, control line, radio control, scale, rubber, etc...) using the browse plans pages. More Peanut delights may be found here like the Vickers Delta by Watt Mooney.

When the **Douglas DC-3** debuted in 1935, it marked a milestone in commercial aviation. Suddenly, flying was popular and practical. Production ended just eleven years later, but the DC-3 lives on in this expertly engineered kit by **Topflite Models**. If you've never built scale or flown a twin, it's a great introduction! This 1:14 sport scale model kit handles like an advanced sport plane, with large aileron, rudder and elevator surfaces for easier piloting. Each engine functions independently and is aligned to help keep the model under control should one engine fail. Check out the full specification at <http://www.top-flite.com>

Zeno's Warbird Video Drive-In at <http://www.zenoswarbirdvideos.com> is a resource well worth visiting for background information on scale subjects and their crews. They have recently celebrated the 14 years on the internet. Their collection includes Pilot Training Films & Documentaries for Classic World War II Era Aircraft. There are movies that you can watch on-line for free every month and also a vast number which are on DVD available for purchase.

Ever thought of making your own radial or V12 engine? **Martin Ohrndorf** has as his website at <http://www.engineman.de> shows the results. All the engines shown are multi-cylinder 4-stroke-glow ignition, which Martin has designed and developed. With the exception of the carburetors, no parts used in other engines have been used in their construction. The engines are all air-cooled and operate with oil-in-gasoline lubrication. They have been designed as flight engines and aren't reproductions of any special models. If you want to try, Martin can provide you with drawings and finished components. ■



The Sopwith Tabloid was the 1914 British Schneider Cup Winner.



Outerzone is a listing of free vintage and old-timer flying model aircraft plans.



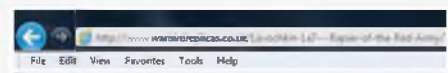
The DC-3 lives on in this expertly engineered kit by Topflight.



Zeno's Warbird Video Drive-In screens interesting documentaries.



Martin Ohrndorf designs and makes amazing engines.



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

mikeevatt@hotmail.com

SCALE DOWN UNDER

R/C Scale Modelling
in Australia
By JOHN LAMONT

A brief explanation of the administration of Australian aeromodelling and the current competitive aspect of Australian R/C scale modeling

The Model Aeronautical Association of Australia (MAAA) is our national administration of Australian aeromodelling and the current competitive aspect of Australian R/C scale modelling administrative body for aeromodelling. Within this umbrella organization, each of the seven individual geographic States of Australia each has their own administration representing the clubs in that State. All modellers who are members of a club are affiliated with the MAAA through their club and respective State body, but with MAAA membership currently around 11,000 we are not a large group.

Rules and regulations are set by the MAAA with the Competition Rules based on the recommendations of the various special interest groups (SIG's) in each state. In the case of R/C flying scale models, the MAAA recognizes five



David Law's Pitts S2A was the winner of the Scale section, making David the recipient of the VICSCALE Trophy for the thirteenth consecutive year. This is the model that David flew to fourth place at the 2010 World Scale Championships and has now been further modified with the addition of a smoke system. David will be flying this model once again at the forthcoming 2012 WSC in Spain.



1: Gary Sunderland is well known for his excellent models of WWI aircraft. Despite his early resistance he has finally entered the world of ARFs with initially a couple of British Spiffires, followed by two German Me109s, and now with a sleek Swiss Pilatus PC-9 in RAAF colours. **2:** Bill Wheeler's Draine Turbulent is another model with a few years behind it. Model is from the 1/3 scale Precedent kit and is powered by an OS 120 four stroke engine. **3:** A view of the pits with Tony Grieger's 1/3 scale Piper Super Cub and Steve Malcman's Cessna 182 in the foreground. Both models are ARF.



4: A further view of the pits with Matt Werner's large ARF Yak 55 aerobatic machine in the foreground.

5: The pilot in Noel Findlay's DH Fox Moth is a sculpture of an ex WWII fighter pilot still living in Queensland at the age of 93 years.

classes of competition, FAI Class F4C, Giant Scale, Large Scale, Stand-off Scale and Flying-Only Scale.

Without going into fine detail on each class, the basic divisions are as follows; F4C is the well known International class, Giant Scale is for models weighing in excess of 55lbs (25kg), Large Scale is for models with a wingspan greater than 78" (2m) and

weighing up to 55lbs (25kg), Stand-off Scale models may be any wingspan but must not weigh more than 15.4lbs (7kg).

All models weighing in excess of 15.4lbs must undergo a stringent inspection by one of our MAAA appointed inspectors, followed by a demonstration of its normal flight envelope, before being granted a permit to fly.

The F4C, Giant, Large and Stand-off classes

include static scoring and require construction of the model by the competitor, while the Flying-Only class is for ARF models and no static judging is required. All classes fly to the FAI flight schedule.

Having outlined our formal scale competition system, I'll now move on to a recent local event ('local' meaning my home state of Victoria) that uses a modified

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6: Noel Findlay is the other member of the Australian team for the 2012 WSC and his DH. Fox Moth represents the personal aircraft of Edward, Prince of Wales (later King Edward VIII). Noel is the only other recipient of the VICSCALE Trophy having won in 1999. **7:** Roly Gaumann flew this ARF Pilatus Porter. The model is an ARF by VQ Models and is 106" (2.7m) wingspan with a weight of 19lbs (8.5kg). Powered by a MLD 35 petrol engine driving a 18" x 10" 3-blade propeller. **8:** Steve Malcman's very large ARF Cessna 182.

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9: John Guscott had a few problems with his Corsair and did not manage to fly in the competition. It's a CM PRO ARF that John has reworked to match a photograph of a war weary WWII aircraft that seemed to be carrying a few parts salvaged from other aircraft.

10: Roger Carrigg, like Noel Findlay, hails from the goldfields city of Ballarat, which is 60 miles (100km) west of Melbourne and a 3.1/2 hour drive from Shepparton. His Shoestring racer is a Goldberg ARF powered by a ASP 91 four stroke engine... **11:** Victoria is the smallest mainland state but it still has a lot of open space and we are fortunate in having many fine model flying fields. This aerial view of the Shepparton field shows that the trees often seen in the photos are a lot further away than they appear through a telephoto lens.

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version of the MAAA rules in an event that allows participation by a large range of scale models.

The VICSCALE Trophy

The VICSCALE Trophy is a major scale event in the state of Victoria and is held annually, over two days of the Queen's Birthday long weekend in early June, by the Victorian Flying Scale Aircraft Association. The usual venue for this event is Shepparton, a medium sized town with a population of 50,000 situated on the Goulburn River flood plain in central Victoria and 110 miles (180km) north-east from our State capital of Melbourne.

The flying field at Shepparton has an area



A scale competition leaves a lot of idle time between flights and Roly Gaumann entertained the other pilots with his tiny foam ARF Gee Bee R-2. The model is electric powered with full house controls and gyros on rudder, elevator and ailerons.



of approximately 70 acres (28 hectares) and is owned by the local model flying club, the Valley Radio Flyers. It is also the site, in September, for the VRF Annual Shepparton Mammoth Scale Fly-in, which attracts a large number of scale modellers from the southern and eastern states of Australia.

The drive from Melbourne to Shepparton takes us over our Dividing Range, a line of low hills that usually acts as a barrier to the wintry weather in the south and frequently provides fine and calm conditions for model flying. This year the weather followed the predicted pattern with the cold and rain of early winter in Melbourne giving way to cool but calm conditions at Shepparton on Saturday, followed by a warm, still, Sunday -

ideal flying weather for all types of scale models!

Traditional scale modelling in Australia has been overtaken by the ARF revolution and ARF models now comprise the larger part of the scale scene. As a consequence of this change it has become necessary to include a section for ARF models in our competitions in order to maintain the number of entries required to justify occupation of a club field for a Scale competition in which club members may not wish to fly. On this occasion we had 13 entries in ARF, seven entries in Scale and two entries in Giant scale.

This competition first started as an event based on the American *Scale Masters* rules, but in the early '90s the Masters concept

was abandoned in favour of a Class based on the Australian Large Scale rules, but with some modification in that the minimum 78" (2m) wingspan requirement was relaxed to encourage greater participation.

In more recent years an ARF section has been included and last year a modified Giant category was introduced to cater for a few large ARF models with a wingspan exceeding 138" (3.5m), but not necessarily weighing in excess of 55lbs (25kg), which were perceived, by virtue of their size, to hold an excessive advantage in competition over ARF models of more modest dimensions.

So the once single class event has evolved over the years into a competition of three

A panoramic of the facilities at the Shepparton field. The small grandstand on the left is used by spectators at the Mammoth Fly-In in September. To the right is the clubhouse and canteen building with the commentary box and equipment shed. Further right is a covered shelter for models and at the extreme right a toilet block. It's an excellent facility for a club with only forty or so members. The grass is kept green through our hot summers by an in-ground watering system with water pumped from a dam on the field which is in turn fed from an irrigation channel off the Goulburn River.



sections with the winner of the Scale section being awarded the VICSCALE Trophy. Whilst competition is keen, the event is also something of a social occasion, enabling our scale modellers to gather for two days of competition, discussion, and enjoyment of the local hospitality and cuisine, away from the hustle and bustle of a large city and the ever increasing pressures of work and family life.

The Twin Cities Autumn Scale Rally

The Murray River forms the boundary line between the Australian states of New South Wales and Victoria and on either side of the river are the towns of Albury, to the north in NSW, and Wodonga, to the south in Victoria. This close proximity has given rise to the term 'Twin Cities' when referring to these towns. Both towns boast model flying clubs, but while the Wodonga club has retained the name of its town the Albury club has adopted the Twin Cities title and is known as the Twin Cities Model Aeroplane Club (TCMAC).

The TCMAC owns a large piece of land a few kilometres north of the town and

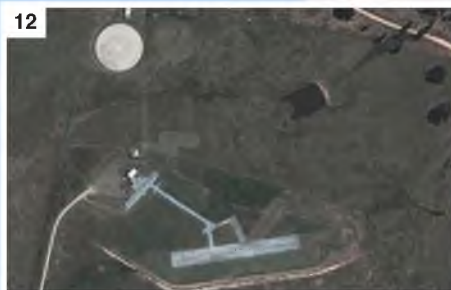
over the years has turned this into a major venue for aeromodelling. The clubhouse is situated at the top of a low rise overlooking the R/C flight line to the front and both concrete and grass control line circles to the rear. With the additional benefits of a shaded beer garden, roofed pit area and full toilet facilities the field is frequently made available, with the consent of the TCMAC members, to Special Interest Groups and their events. It is also the site for our National Championships when it becomes Victoria's turn to host that event.

For the last five years TCMAC has held their Autumn Scale Rally in the month of May, attracting Scale modellers from the cities of Sydney and Canberra to the north, and Melbourne and Ballarat to the south, together with other enthusiasts from nearby rural towns. This inland location is usually blessed with fine weather and light wind at that time of the year and the event is now very popular with Scale flyers.

It's a fly-for-fun event with the only prize being an award for the model judged to be the best by the attending flyers. ■



Autumn in Albury! Scale aircraft in the pits.



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12: Aerial view of the Twin Cities field. It's quite a walk from the pits to the flight line but there are starting boxes close to the strip and spectators have a good view of the proceedings from the clubhouse on the hill. **13:** Ken Osborne taxi's his own design Waterman 'Aerobile' assisted by Peter Graeber. The "Aerobile" is a 1/4 scale model powered by a Enya 90 four stroke engine. **14:** Greg Lepp's Bristol M1 was scratch built by his late father and Greg flies it at most scale rallies in his father's memory. **15:** David Balfour is a driving force at TCMAC and a prolific builder of scale models. He built two of these quarter scale Fairchild F-24's simultaneously, one for himself and the other for a friend. This is David's aircraft, finished in the colours of a machine flown by the RAAF during WWII. **16:** Ken Osborne tends to build models of some unusual aircraft and is seen here with his 'Facetmobile' powered by a Enya 90 four stroke engine. **17:** David Balfour prefers his models to be from the 1930s era known as the 'Golden Age of Aviation'. This unusual prototype is the seldom modelled Heston Phoenix. It's around quarter scale again but, as David has a strict requirement that each model must fit into his Holden station wagon, the scale of his models can vary a little. **18:** John Gottschalk built his Fokker D.VI from a kit. The model is 1/3rd scale and is powered by a petrol engine. **19:** David Balfour with his Handley Page HP.42 'Hannibal'. This large model is powered by four Enya 46 four stroke engines and flies very well even, on occasion, with a couple of engines not turning over. **20:** Peter Graeber's scratch built Sikorsky S-43 amphibian.

On Silent Wings by Chris Williams

SCALE SOARING

New scale soarers tested, including the challenges of tailless types

White Sheet scale fly-in Sunday 29th July

You might think it a simple matter for an Event Director to pick some dates on the calendar and for everyone to turn up on those dates and have a jolly good fly. This might well be the case should you live in California, or maybe the Sahara, but in Blighty other rules apply. The main rule is this: if you're waiting for a perfect weather forecast before venturing out to fly, you might just as well take up Tiddlywinks, or some other engaging indoor sport.

Thus it was, that after five possible dates had come and gone in a welter of wind and rain, Event Director Steve Fraquet posted a 'Go' on the *Scale Soaring UK* forum for the above date, despite an iffy forecast. It says much for the pent up frustration of the scale soaring community that, despite said forecast, a goodly number of modellers turned up on the

day, armed with gliders and wet weather gear in equal proportion. Amongst their number was my old pal Motley Crew, who had spent the best part of the preceding winter building a third scale Minimoa from the CNC *Modellbau* kit. As we are near neighbours, I had been able to follow the construction process which, by any measure, was a pretty complicated one. After the expenditure of so much blood, sweat & tears, it was little wonder that the lad was in a somewhat nervous condition as the Moment of Truth came nigh. At third scale, with monster wing spars and a box full of metal fittings, the Minimoa is no lightweight, weighing in at a respectable 30lbs plus, so clutching the transmitter to avoid the possibility of any back injury, yours truly left it to the launching party to perform the deed.

In the event, the maiden was devoid of unnecessary excitement, the model performing perfectly, with no trim

adjustments required. No surprise there, really, as this Minimoa features the same wing section that I use on most of my own designs, and the flight characteristics are very similar to my own version.

Motley's wasn't the only maiden that day: Chris Wynn had been patiently building the Backstrom EPB-1C Plank from the *Island Models* short kit for some time, and the big day had arrived for him, too. The Plank is self-evidently a flying wing, and it stands to reason that any issue with the centre of gravity is going to exacerbated big-time by the short moment arm, due to the lack of fuselage at the rear. Thus it was then, when the Plank tasted the air for the first time, even the only slightly rearward positioning of the C.G. saw the model rear up into the sky, followed by a death-dive towards the hill as the hapless pilot tried desperately not to over-correct. This exaggerated phugoid continued for a couple of trouser-filling minutes until Chris managed to beach her on the hill, not the most graceful of landings, but one from which a scale pilot could have walked away.

With the C.G. levered forward a tad, the second flight looked much more promising, until after a few short minutes, the Plank simply dived into the hill. The subsequent investigations revealed that when Fate is out to get you, there's not much you can do. It transpired that in the previous landing, the Rx aerial had been ripped away, dangling as it was at the rear, due to the aforementioned lack of fuselage. Just one more addition, then, to the pre-flight checklist...make sure you have a receiver aerial!

For those who have never been there, let me describe the geographical and meteorological conditions that were applying to this event that day. The two main slopes at White Sheet face SW and NW. As has become the norm this year, the wind was due West, and therefore blowing exactly between the two. This traditionally leads to the 'Great Divide', whereby one bunch will wander off to NW slope, swearing that conditions were better over there, whilst those of a lazier disposition and larger models will avoid the trek and stay where they are. When the wind increases in strength, things can get hairy at times, with violent turbulence, and periods of industrial strength sink. Conversely, there are times when the lift is strong and smooth, and Life is good. The trick is to fly in the latter and avoid the former like the plague; a task easier said than done.

After a successful first flight with his new



Scene at the White Sheet club's scale fly-in.



Chris Wynn's Backstrom EPB-1C Plank on its maiden flight.



Geoff Crew with his 3rd scale CNC Modellbau Minimoa.



The Minimoa on its maiden flight.



Allan Boyle's 1/4 scale Harbinger just before hitting the sink.

1/4 scale Harbinger, Allan Boyles launched into such sink that the Captain of the Titanic would have felt right at home. Thus it was that the Harbinger beat the previous White Sheet all-comers record for a landing out by a considerable margin. (Luckily for him, his 1:3.5 scale Slingsby Petrel did not suffer the same fate)

Antonia Gigg's diminutive DG 808C performed well in the conditions: not only is it small in size, it is also packed with such goodies as an electric up-and-go, retract, tow release, retract and vario, and there may well be a small kitchen sink in there too. Pat Teakle's PWS 101 was out for its second White Sheet session

of the year, this version from the old Martin Simons plan having been scaled down from one-quarter to one-fifth. Richard Alford had made the long journey to White Sheet with his Horten flying wing, a design the full-size of which was somewhat more elegant than the Backstrom Plank. Having declined to fly in the challenging conditions of the SW west slope during the bulk of the day, he sauntered over to the NW slope to try his luck there before going home. I had just switched the camera on when a strong gust of wind literally blew him over as he attempted to launch the Horten (in true journalistic fashion, I succeeded in

missing the shot). He later commented on the SSUK forum that he was 'blown away' by the event. It has to be said though, that Richard definitely has the Right Stuff, as he subsequently managed to get the Horten away for some decent flying, the wind by now favouring the NW slope.

Not a classic day's flying, then, but Steve's decision to go ahead was a wise one, and those present managed to get some memorable flying, despite the challenging conditions.

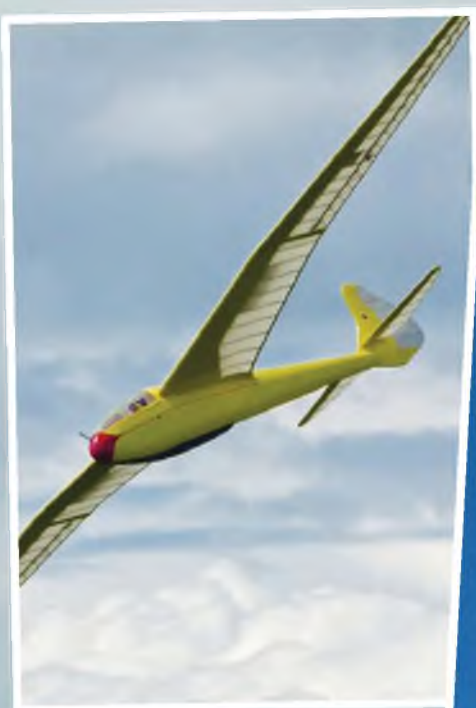
I just happened to be passing...

For quite some time now we have been watching veter-

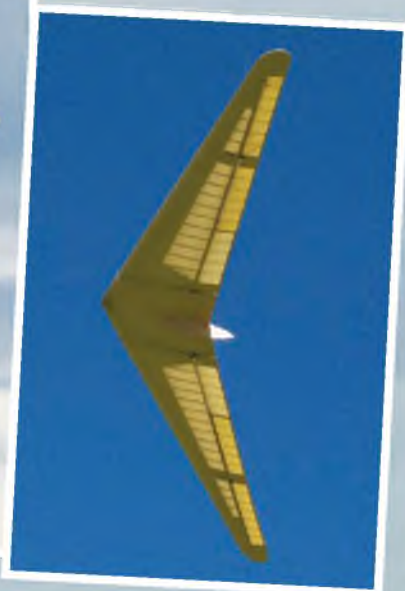
an modeller Dave Stokes building his Slingsby Petrel via the services of the *Scale Soaring UK* forum. This is based on my old plan, but Dave has taken the challenging route of reproducing the Petrel when it used to be in its wood & varnish form. As a result, the build has been a long and difficult one, with all the ply sheeting on the wings reproduced in 1/64" ply, a material these days that is literally almost worth its weight in gold. The full size, BGA 651, is the one that I have also recently reproduced, but in its post restoration red livery.

I have, therefore, been waiting with baited breath for the opportunity to photograph them both together, but the current weather conditions have so far put paid to that. So, it came to pass that one Thursday afternoon in August, I just happened to have an afternoon off work, therefore I loaded up the car with motorgliders and headed to the County Models Flying Club's excellent site near Shaftesbury, Dorset. When I arrived I was somewhat amazed to see that there was some aerotowing taking place, and all of it without me! Putting aside the thought

Pat Teakle's 1/5th scale PWS 101 at the White Sheet event.



Allan Boyle's 1:3.5 scale Petrel.



The Horten finally takes to the air.





Antonia Gigg's 1/6th scale DG 808C at White Sheet.

that Heads-Would-Roll, and Questions-Would-Be-Asked, I was equally amazed to see what seemed to be the model in question, about to go off on aerotow.

"Stop", I thundered, and then, more meekly, "at least let me get my camera!" It turned out that this was to be its second flight, the first being somewhat unnecessarily exciting due to a slight Tx programming error. At an all-up-weight of some 19lbs, the model was on the light



Richard Alford with his Horten flying wing, just before being 'blown away'.

side, despite all that plywood and on this second flight, seemed to fly pretty much as all the other Petrels do, the result being a smile on Dave's face that threatened to break his jaw. It was pure luck that I managed to get the opportunity to photograph this model, as it turns out Dave is soon due in hospital for a 100,000 mile service, and may not be seen with the Petrel again until next season...

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Postscript

During the aforementioned episode of Dave Stokes and his Sligsby Petrel, I overheard the following conversation between two of the fliers:-

'Those two grandchildren of yours are extremely well behaved' observed the first old chap. (On a Thursday afternoon it's mostly Old Chaps that go flying)

"Yes", replied the second. "...we've been talking about the Solar System all afternoon".

The first chap's expression became one of puzzlement.

"Do you know much about the Solar System, then?"

The second chap looked at the first with a level gaze.

"I ruddy well do now..."



Dave Stokes with his newly completed 1:3.5 scale Sligsby Type 13 Petrel.



A poem in plywood, the wing fairings being particularly difficult to reproduce.



The Stokes' Petrel makes its second ever landing at CMFC.

Panel Lacing without tears

A simple technique for simulating the lacing runs on fabric covered aircraft

1, 2 & 3: The lacing runs on the Bristol F2B are extensive and highly prominent surface details that need to be replicated in order to capture the essence of this aircraft.

Many of the early fabric covered aircraft, particularly those of the WW1 period - and then on into the mid-1930s featured lace-up fabric panels. These were the air mechanics' equivalent of the metal inspection panels of later, metal skinned aircraft and served the same purpose.

- Lacing styles varied considerably and there is no guarantee that

any two examples of the same aircraft type, would have had exactly the same style of lacing, again particularly during the WW1 era, when aircraft were mass-produced across a number of sub-contracting suppliers.

Some had very prominent lacing runs, the most notable example perhaps being the Bristol F2B, illustrated here. Conversely, Sopwith aircraft, as represented here by the Triplane and Pup were much more neat and tidy in that regard.

In some instances, the lacing runs were taped over with fabric over-strips, an example being the Avro 504K (at least in the case of the Shuttleworth Collection's example illustrated here). Such cover strips make the scale modellers' surface detailing task a little easier.

The lacing on the fuselage of, for example, an SE5a or Bristol F2B may be reproduced as shown in Fig.1. Here a strip of masking tape is first cut, narrow enough to fit

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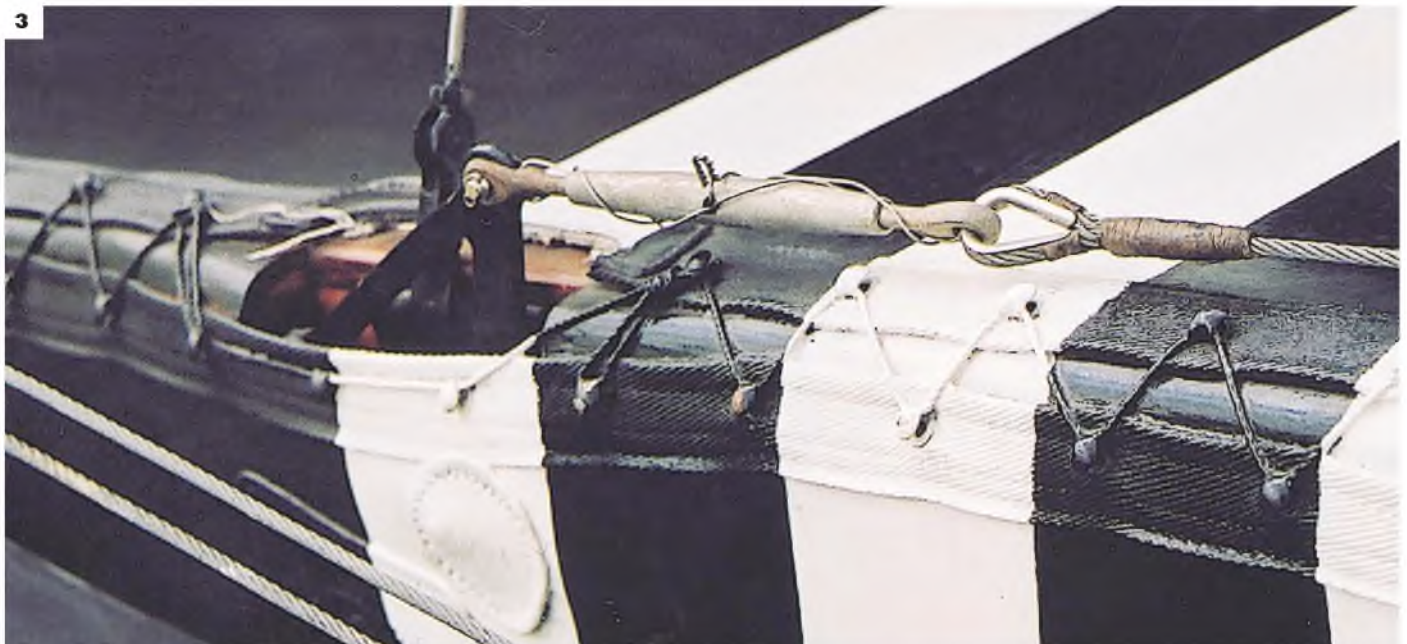


between the rows of eyelets and glued in place on the covering. Then, pins are inserted at the eyelet positions, and thread (representing the lacing) being wound round the pins as shown and a

couple of coats of cellulose dope applied, which should be allowed to dry before the pins are removed.

The small circles of thread will realistically represent the eyelets. The pins should be

twisted before withdrawing them, and if an 'eyelet' lifts, it should be glued back with a drop of balsa cement. If there is no structure behind the fabric, then before covering, a suitable strip of balsa should





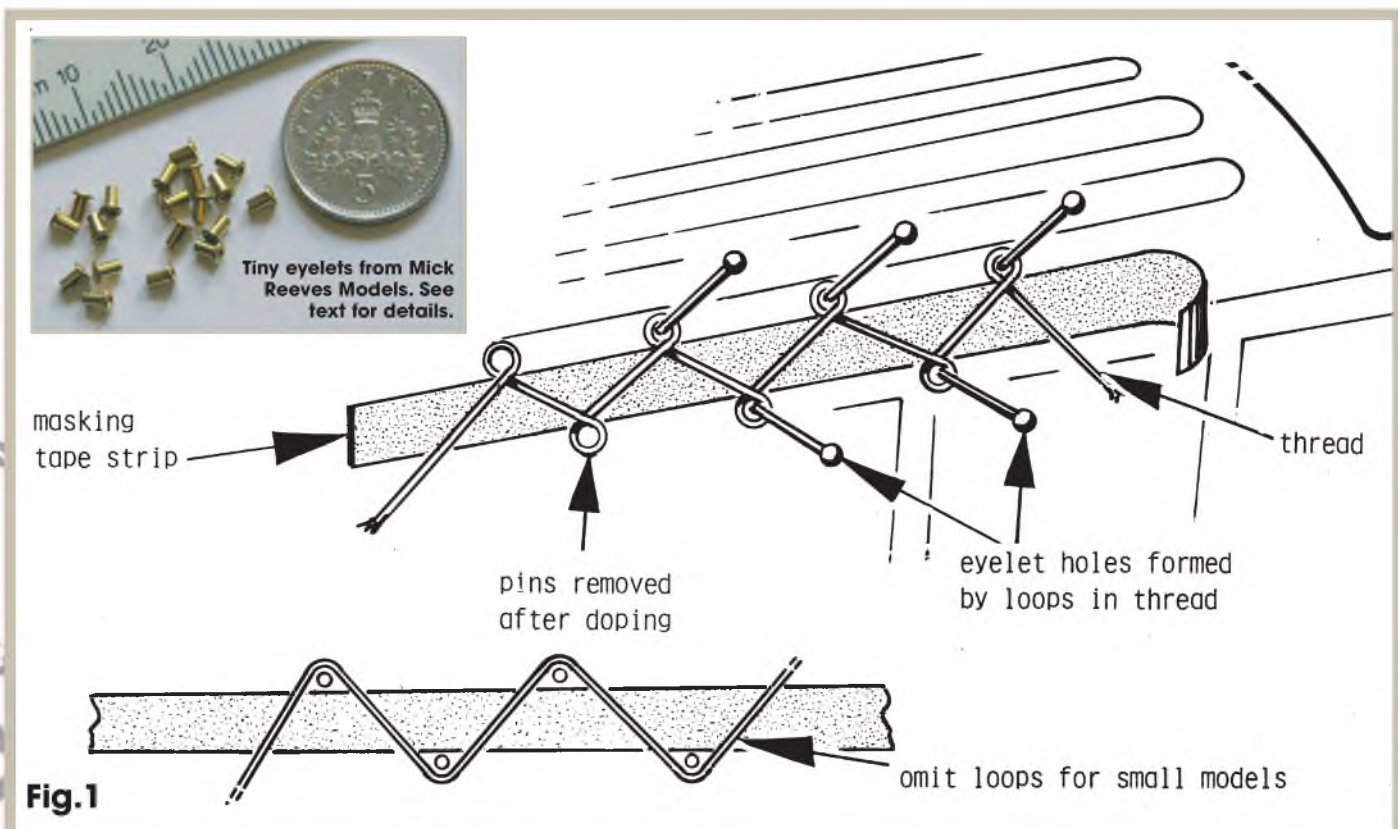
4, 5 & 6: The Shuttleworth Collection's Avro 504K is an example of the instance in which the lacing runs have been taped over, and which thus have to be removed to allow the lacing to be undone to allow maintenance work to be carried out.

be glued behind the fuselage uprights to provide temporary support for the pins.

Open cockpits, again particularly in the case of WW1 aircraft, featured padded cockpit rims covered in leather. Here, the

padding was secured to the wooden rim with lacing that ran through eyelets to the inner side and then out again. Replicating eyelets to the size required is a big ask, but here Mick Reeves Models can come to the

rescue with a very nice line in miniature eyelets. You get approx 100 for just £1.00. Look it up at www.mickreevesmodels.co.uk (tel: 01354 653063)



7



7, 8, 9, 10, 11 & 12: The Shuttleworth Collection's SE5a is another example in which the lacing runs have been taped over. Pictures here also illustrate the laying-and-eyelet binding of the leather cockpit rim surround.

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13, 14, 15 & 16: Sopwith Pup and Sopwith Triplane seem to feature very neat and unobtrusive lacing runs. The laced leather cockpit rim shown is on the Sopwith Triplane.

16



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THE QUIET ZONE

R/C SCALE ELECTRICS BY PETER RAKE

Yes, here we go again, another thrilling instalment of *The Quiet Zone*. By now I dare say you hardened electric fliers are getting a little tired of my basic electric flight ramblings. Well, please bear with me, I promise it won't continue for too much longer. If I can manage it, without getting too

side-tracked, I'll attempt to finish it this month. After which, the usual, totally unpredictable nature of the column will return. That, however, is not to say that I won't return to more basic information from time to time, after all, there are fresh novice electrolytes coming along all the time and for them to stay with electric flight they will need to know

how things work.

Quite apart from that aspect, there are other, more experienced modellers to whom electric flight really is still tantamount to witchcraft. They'd love to give it a try, but need to know more about what makes it work before investing their hard earned cash. Let's face it, one .25 glow engine is pretty much like any other, but with electric motors it's a whole new ball-game.

A particular electric motor, depending on number of turns (windings on the armature) and the number of cells used, can be a replacement for anything from a .25 two stroke to a .60 four stroke. Yes, it does make things VERY complicated when choosing a motor. Anyway, much of that has already been dealt with in the previous parts of this item. Basically, it's a variation on that old adage of "...if all else fails, read the specifications ...!"

I don't know, what is the world coming to? Now you not only have to be able to build a model, you have to learn to read too. It's a hard old life being a modeller.

GETTING ON WITH IT

Okay, last time we had got as far back through our power system as the batteries and that is where I intend to take up what is rapidly becoming something of a saga.

If you recall, we had looked at the types of battery generally available to the novice electrolyte, and I had briefly mentioned the potential hazards of LiPo cells. Over the years there have been some quite scary stories put about concerning the propensity of LiPo packs to catch fire. It's true, they are more prone to the problem than other types of cell, but there is a reason for that.

To understand just what the problems

AT THE OTHER END OF THE SCALE, THIS 1 ONE SIXTH FOKKIER DVII WEIGHS 6.5 L.B. AND USES A 4S LIPO TO GET IT ALOFT - WITH POWER TO SPARE.





Of similar capacity, and only just over 1 volt difference, which lump would you sooner fit to your model?

The 7 cell Ni-Cad (yes, I do still have some) was state of the art in its day, but weighed in at a whopping 415 grams. The similar LiPo weighs well under a quarter of that.

are, we really need to take a bit closer look at just what a LiPo battery is. Whereas with normal batteries all the nasty stuff is nicely contained within a metal case, a LiPo is basically a polythene sachet containing the unpleasantness that makes a battery work. As such, it is far more prone to damage than is a NiMH cell. That fact alone accounts for most of the reported issues with this type of cell. It's only too easy to overlook seemingly minor damage unless you check carefully after each flight (something worth doing with all types of cell).

Harking back to what I said previously about cell count and pulling a pack down to too low a voltage, try to visualise the scenario. You have a three-cell pack, but one of the cells is damaged. Instantly you have a less-than-three-cell pack - at best it will be a 2.5-cell pack. However, none of the rest of your system, motor, charger or ESC knows that it is no longer a three-cell pack. It still looks like a three cell pack and may even register the same off-load voltage as a three-cell pack, but it won't necessarily behave like one.

LiPo cells are quite voltage sensitive and don't like to be stressed beyond their rated capabilities. LiPos have specific charging and discharging requirements and going beyond these stresses the cells. Never mind stressing them; they become downright unhappy about it. When looking at the vast lists of LiPo packs, you'll keep coming across something called a 'C-rating'. They may be listed as 1C charge and 20C discharge, or just have a single, 20C rating. Basically, all it means is that they should only be charged a 1 times the capacity (1C) of the pack and discharged at no more than 20 times the capacity (20C) of the pack.

In simple terms that means that a 2,000 mAh (milliamp/hour) pack should never be charged at more than 2 Amps or used in a system that draws more than 40 Amps. If it is, you are asking for trouble.

So, getting back to our damaged pack; with one cell no longer operating as it should be, it doesn't take a genius to see where this is leading, but I will explain it anyway. If it's no longer a fully functioning three-cell pack, it's also no longer 11.1 volts or 2,000 mAh. However, your charger is still going to try to put 2,000 mAh into it, at 11.1 volts. When LiPos are stressed in this way, the first thing that happens is that the polythene sachet swells up, then the pack gets very hot and finally does the only thing left to it, it bursts into flames. If the pack happens to be in your model at the time...

To give brief details of a couple of such incidents, let's start with the damaged cell situation. A friend of mine (yes, I do have one or two) had a screw retaining the hatch on his model, but a longer screw than originally fitted. Upon tightening the hatch he suddenly realised what he'd done - screwed straight into one cell of his LiPo pack. He set the model aside, only for his son, who didn't know about the problem, to put it on charge. The model now has a very charred looking area where its nose used to be.

The other incident involves 'clever' chargers. You know, the all-singing, all-dancing types that do everything automatically. They're very good chargers, but can't actually think for themselves. This particular friend had a short flight using a fully charged two-cell pack and then decided to recharge it in preparation for another flight. Unfortunately for him, when the charger 'analysed' the pack, it mistook a partially charged two-cell pack for a discharged three-cell one and tried to pump in 11.1 volts. This time there was no model left at all, just cinders.



Models like this half ounce (ready to fly weight) foamy would be almost impossible using NiMHs or Ni-Cads.

SO WHY USE THEM?

You might well be wondering why we use LiPos at all if they are so volatile. You just have to remember that the above incidents could happen with any type of battery charged in correctly. Fires aren't solely the realm of LiPos. Not solely of electric flight either if my experiences of an Enya .60FS are anything to go by - it had a nasty habit of blowing back through the carb during starting, igniting any fuel on the engine plate.

It really isn't all doom and gloom. I recited these episodes as a warning of what to be aware of, not because it is a regular occurrence. In fact, in about eight years of using LiPos I have never had a problem. All it takes is to ensure you never stress the pack, charge it at the correct rate and make sure it isn't damaged in any way. Although it may not be the prescribed manner, I like my packs mounted securely, and virtually permanently, in the model and charge them in-situ. My reasoning is that if a pack is in perfect order when you install it (a small amount of silicone sealer), and is firmly mounted, it can't damage itself. As long as you can actually see the pack, you can tell if there's a problem from the fact it's starting to look more like a balloon than a battery pack. At that point it's time to change the pack for a new one.

To my mind, another advantage of this system is that you can't alter the balance of a model by not getting the pack



Two similar, multi purpose chargers from the mid-price range. Both will charge just about anything you want, but you can go more or less technical if all you want is to charge LiPo packs.

Careful matching of the power train resulted in ample power and 30 minute flight times on this 48", 20 ounce model. It really is worth taking the time to get it right.

in the right place. Also, of course, even if the hatch falls off in flight, your battery pack stays firmly where it's supposed to be. Oh yes, I still remember how unnerving it was to loop a model (one of my first electric models) and discover that I had 12 ounces of Ni-Cad dangling by the wire that connected it to the ESC. About the only time I've ever been thankful for those horrible lock-together plugs. Any other type and the model would suddenly have become a free-flight glider. Not that good an idea since it would have been upside-down at the time.

MORE LIPO BASICS

As I say, treated properly LiPo batteries

are as safe as any other kind of battery. The secret lies in learning how to do just that.

When you first start to look at LiPo packs, there are all manner of strange appellations applied to them. You'll see the ever present C-ratings already discussed, but also terms such as 3S2P or 2S1P. There really is nothing there to worry you, 'S' simply means series wired and 'P' is parallel wired. Therefore, a 3,000 mAh pack that declares itself to be 3S2P is in fact two 3-cell (series wired to provide 11.1 volts) 1,500 mAh packs parallel wired to provide the 3,000 mAh capacity. Although some people still insist on using the 2S1P term, it's pretty pointless. It's just a two-cell series wired

pack, there is no parallel wiring involved. So, for anything that claims to be '1P', ignore that part and concentrate on how many 'S' it is and what the capacity is.

With that covered, let's look at the charging side of things. The most important factor here is that you absolutely must use a dedicated LiPo charger. No other sort of charger will do if you don't want to take up arson. In the old days we used peak detect chargers for Ni-Cads and NiMHs, but they are useless for charging LiPo packs. Worse, they are downright dangerous to use with LiPos.

Why are they dangerous? It's simple really, they 'watched' for a voltage

Relatively simple to build and not too expensive to equip, this 60" span Martin also takes advantage of LiPo cells. The Ni-Cad is dead, long live the LiPo.



peak and didn't shut off until it had been detected, thus ensuring a maximum charge. However, LiPos don't peak in the same manner (a peak and sudden slight drop in voltage), so there's nothing for a peak-detect charger to detect. It will simply carry on pumping in the charge until something goes bang - or more likely puff, crackle, crackle and the vicinity fills with highly unpleasant smoke.

No, a dedicated LiPo charger monitors the pack throughout the charge period, adjusting the charge rate to suit the pack, and shuts down the moment the selected voltage is detected.

So, given a '2S' pack with a capacity of 500 mAh and a charge rating of '1C', we ENSURE that our dedicated charger is set for no more than 500 mAh and a charge rate of 7.4 volts. It's exactly what the pack needs and assuming the pack is undamaged, is perfectly safe. Yes, it will take almost an hour to charge the pack, but isn't that better than trying to rush things and setting fire to something?

C-RATINGS?

Yes, I know I keep harping on about 'C-ratings' but they are important when choosing your pack - and can sometimes save you money. Not too long ago, a '20C' pack was a jolly good, quite expensive battery pack. Technology, however, has moved on apace and now it isn't unusual to see packs listed as '30C' or even '40C', which is absolutely great if you want to pull masses of Amps, but not essential in a slow flying, moderately powered model.

As with everything, new technology costs and older technology becomes cheaper than it ever was before - very

good news indeed if you are only dabbling in electric flight - or just plain mean like me. By balancing capacity against the known current draw of your chosen motor, it is quite possible to use these lower C rated packs without loss of performance or compromising safety. The lighter weight of LiPos really starts to pay dividends here because we can afford to carry higher capacity packs that are still lighter than a smaller capacity pack of NiMHs.

Given that we know our motor/prop/cell count combination is going to be drawing 30 Amps, and we don't want to stress anything in the system, how do we go about it? Well, obviously our ESC has to be capable of handling the current, but able to handle it with ease. Therefore we start with a minimum rating of 40 Amps on the ESC, allowing us quite a large safety margin in that area. If it's capable of handling 40 Amps, our humble 30 Amp drain is hardly likely to give it pause for thought.

Now we start to look at battery capacities and C ratings. Whilst a 1,000 mAh, 30C rated pack will only just cope (1Ah capacity x 30C = 30 Amps) and be quite costly, there are options. Dropping down on specification, thereby making the pack cheaper - but increasing capacity, works very well at this level. If that same 1,000 mAh, 30C pack is replaced with a 2,000 mAh, 20C pack we will have capability to spare (2 Ah x 20C = 40 Amps capability). More than sufficient to ensure nothing in the system comes even close to its maximum tolerance. Yes, it is going to be a bit heavier, but also much cheaper than the higher specification pack. Not only that, at one stroke we have almost doubled the flight time we can expect from our model.

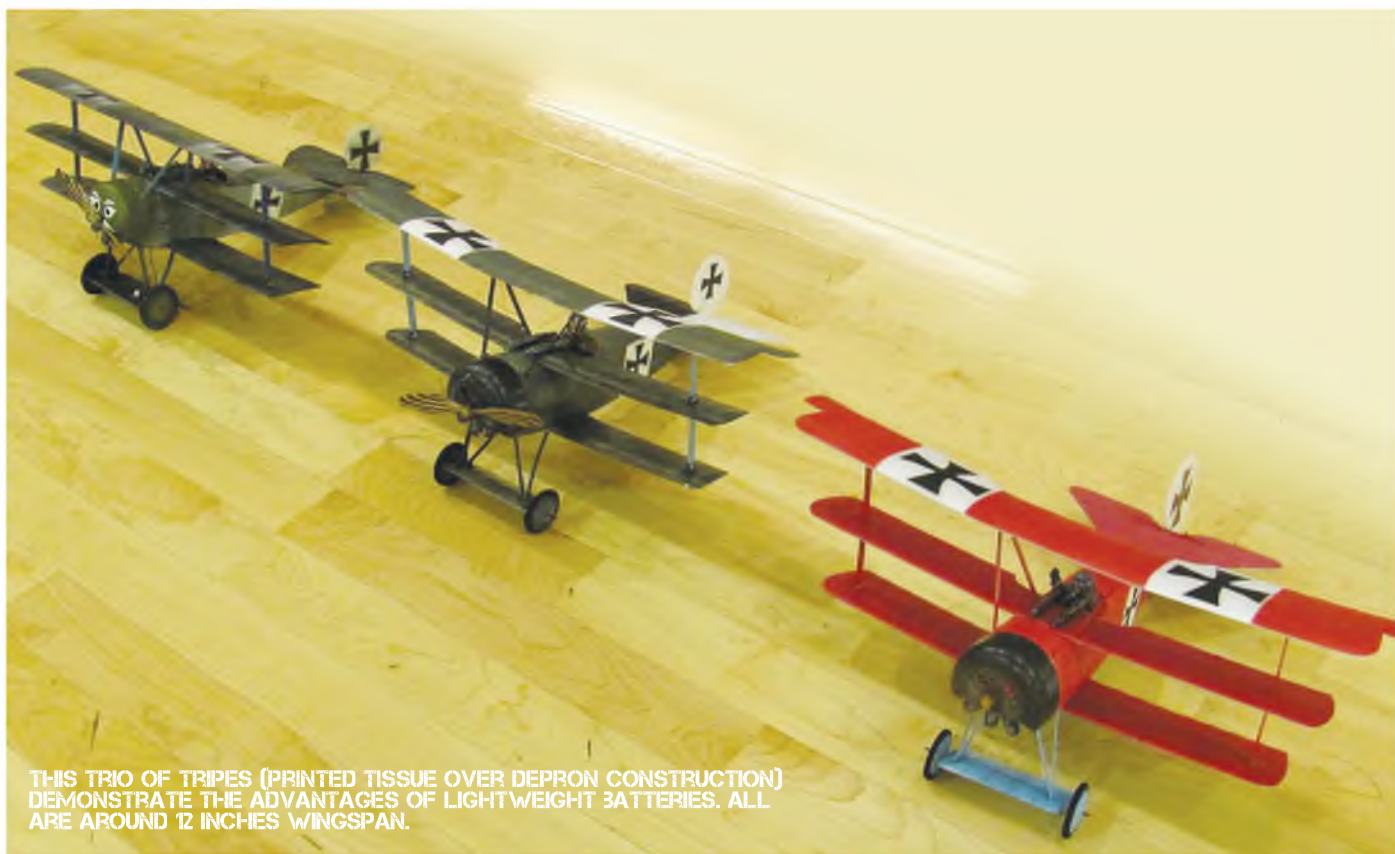
As regards how we calculate said flight duration, a 2,000 mAh pack will provide us with 120 Amp minutes of flight (2 x 60 - the Amps in the battery x the minutes in an hour). Divide that by the current drain (30 Amps) and the result is four minutes flying time. No, don't panic, you will get more flying time from your model - I chose 2,000 mAh simply because it kept the figures easy. On a model pulling 30 Amps I would expect it to be capable of lifting a pack at least twice that capacity. Plus, of course, the figures are for an entire flight at full throttle, not making any allowance for throttling back to cruise. Throttle management is very important if flight duration is your aim.

As a final example (I'm running out of space again), one of my models was equipped with a cheap 'bell' style motor and 10C rated, 2,000 mAh pack. At full power, the motor was drawing about 14 Amps, which the figures tell us results in a flight time of just under nine minutes. However, because the model didn't actually need the motor running at full power, the actual flight duration I was getting was in excess of 30 minutes.

That brings us right back to where we started, about selecting the right motor for the model in the first place. Read the specifications, work out the figures and balance the whole system to give you the results you want. Electric flight, successful electric flight that is, isn't witchcraft and it certainly isn't the black art some would have you believe. All it is, is a little enjoyable study, a few simple calculations and a whole lot of clean, quiet, oil-free fun.

I'm sure there was more I wanted to say, but I've run out of space again. If you feel there's something I've missed, or have any questions, you'll find me at

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