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CONTACT

Mr Tommy Sopwith prepares to unveil the Sopwith Dolphin at Hendon on March 16th

SOPWITH DOLPHIN UNVEILD

The world's only Sopwith Dolphin, WW1 fighter aircraft has been newly installed in the *Graham White Factory* annex at the *Royal Air Force Museum Hendon* and was unveiled to a gathering of aviation enthusiasts on March 16th by Mr. Tommy Sopwith, son of the late founder of the Sopwith Aviation Company's founder, Sir Thomas Sopwith.

The Dolphin was a late-WW1 combat aircraft that first entered service with the Royal Flying Corps in January 1918 and differed from so many of its Sopwith predecessors in forsaking the rotary type engine in favour of the Hispano Suizza in-line liquid cooled engine that imparted an excellent performance - at least when it worked properly!

In truth, Sopwith Dolphin D5329 is largely a reproduction, but that is no different from many of the historic aircraft we nowadays see in museums and air shows and takes nothing away from the achievement it represents because in practically all incidences there is a provenance of original components on which that achievement has been based.

D5329's resurrection dates back as far as 1967 when aircraft restorer Doug Bianchi of *Personal Plane Services* advertised in *Exchange & Mart* (no eBay back then!) for *"...old aircraft parts"* and one of the responses yielded a collection of Sopwith Dolphin components, which were quickly acquired from PPS by the RAF Museum for construction of a replica based on these original parts.

Work continued spasmodically at the Museum's RAF Henlow and then RAF Cardington facilities and by 1977 (these things take time y'know) a six foot original length of rear fuselage came to light and was quickly snapped up to give the project added impetus, although the work was still painfully slow as it took its turn with other more achievable restoration completions.

By 1997 an original set of horizontal tail surfaces, including the elevators was donated by the *Shuttleworth Trust* to move the project further along and work progressed in the construction of a full uselage frame.

Over the period 2000-01, the project was moved again, first to the Museum's restoration facility at RAF Wyton, Cambridgeshire and then to their new restoration centre at RAF Cosford, where work progressed over the following decade until the completed aircraft was transported to its intended final resting place at RAF Museum Hendon, being trial-rigged in February this year, ahead of going on public show from March 16th.

This 'potted history' perhaps gives some idea of the patience, dedication and determination that goes into so many of the restoration projects that bring our aviation heritage back to life.

You can see the Sopwith Dolphin D5329 at the RAF Museum, Hendon, any day of the week. It's well worth the trip!

READ ALL ABOUT IT

Concurrent with the installation of the Sopwith Dolphin at Hendon, the RAF Museum has introduced a superb monograph of the type. This 176-page volume on first class art paper has been produced in collaboration with *Cross & Cockade International,* the First World War Aviation Historical Society.

It takes full advantage of the Museum's extensive pictorial library tracing the development of the type, combat record, the men who flew them, superb airframe detail, colour schemes and pictorial coverage of the restoration work.

It is a truly worthwhile addition any aviation enthusiast's personal library and well worth the £25.00 cover price. Pick one up when you go to Hendon to see the aircraft!

ROLLS-ROYCE M.A.C. SCALE & JET WEEKEND

June 2/3 is the date for the Rolls-Royce (Hucknall) M.A.C.'s popular and annual Scale & Jet weekend which, as usual, will be held at Hucknall Airfield, where scale models, jets and electric scale models will all be welcome and can be flown by all who are BMFA members holding a 'B' pilot proficiency certificate.

It is a public event (parking charge), with trade support and caravan/camping from Friday p.m. to Tuesday a.m. Access for all is via R-R No.2 gate on the B6009 Watnall road.

Any questions: Reg Lowe on 01773 716786 (r-lowe@sky.com) and trade enquiries to Alan Randall 0115 8401873 (alan.randal123@ntlworld.com).

A Dolphin Model

Anyone who has examined the scale modelling handiwork of the late Mike Goldby knows how skilled he was as a scale modeller. His last finished scale model project was his Sopwith Dolphin, of which Ian Pallister is now the custodian and demonstration pilot.

The arrival of the full size machine at Hendon, and the opportunity to be given sccess to Mike's original pencil-drawn construction drawings has made it possible for FSM to present a major feature on the Sopwith Dolphin that will include construction plans for Mike's 1/4 scale model, full size Type History, scale three-views and colour schemes. It will take a bit of time yet, to tie it all together - but it's coming.

Mike Goldby's 1/4 scale Sopwith Dolphin ***(Photo: Alex Whittaker)***

WILDCAT ARRIVAL

It's strange sometimes how one discovery leads to another. A week before going to press on this issue, I arranged to meet Ian Pallister at the Shuttleworth Collection's airfield at Old Warden, to pick up Mike Goldby's pencil-drawn original construction plans for his Sopwith Dolphin. The intention was to see if these could be translated into a final set of construction plans by a draughtsman.

Suddenly, someone was talking about a newly arrived Grumman Wildcat! Now the Wildcat is not what the Shuttleworth Collection's remit is all about, but it had come in only a few weeks previously from USA and the wings, fin/rudder and tailplane were still crated and stacked close to the engineless fuselage in the No.1 hangar.

This example was built by the Eastern Aircraft Division of General Motors, which took over the supply of the type after Grumman commenced production of the later F6F Hellcat. Because the fin and rudder were not visible, it was difficult to determine immediately of this example was an FM-1 or an FM-2 with the taller fin/rudder assembly, but is has its own history, having been built in 1943 and sold into civilian life in 1946, before going on display at the US Navy Museum at Pensacola Florida until 1994. Shuttleworth bought it last year and a full restoration to flying condition is planned.

This new arrival brings the total UK Grumman Wildcat/Martlet population to three, the others being the flying flyable General Motors FM-2 owned and operated by The Fighter Collection at Duxford and the Yeovilton based Fleet Air Arm Museum's example (although we understand this one is presently undergoing restoration work).

COMET CAN-DO?

A few paces further down the No.1 Hangar from Shuttleworth's newly acquired Wildcat stands their all-red De Havilland DH88 Comet which has been part of the Collection for many years, at first as a static display, but then restored to flying condition until an undercarriage collapse relegated It back to hangar queen status.

The main undercarriage is, we're told, the Achilles heal of the aircraft due to the lack of 'over-centre geometry' that would lock the main leg struts and prevent the problem. Now jacked up, with engine cowls off and fuselage underbelly stripped for re-skinning, could it be that we might in time, see this historic aircraft once again airborne?

Next month in... FLYING SCALE MODELS

Plan A was to run the first part of Peter Rake's superb 1/6th scale Albatros D.Va in June issue, but circumstances dictate that it will need to slip a little while longer.

Instead, we'll be presenting full size free plans for his 1/8th *Fokker D.VIII*.

Gary Sunderland will commence the serialised story of his *Bristol Boxkite* - he is a man who really likes a challenge!

Our '*Subjects for Scale*' feature for June issue, will be that delightful little racing and aerobatic biplane, the Arrow Active II, with close-up photo study and detailed three-view scale drawing.

THAT'S IN FSM JUNE ISSUE, ON SALE MAY 10TH

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SUBJECTS FOR SCALE

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Photos from the HARRY WOODMAN Collection

HANRIOT H.D.1 POSTSCRIPT

Originally, last month's *'Subjects for Scale'* feature on the Hanriot Dupont H.D.1 WW1 fighter biplane was intended to be supported by 'period' photos from the Harry Woodman photo archive. Unfortunately, the Postie had other ideas and although we waited until the very last minute before pressing the button on the April issue of FSM, 'Plan B' had to be applied.

Later, of course, the errant package arrived so, for those who may be inspired to build a model of this very attractive aircraft, here's a bit more to encourage the newly found enthusiasm.

1: This pristine Hanriot H.D.1 in Belgian colours sports a long shaft lashed to the interplane struts and protruding forward of the wing leading edge. It may well be a launch-rail for a rocket projectile used to attack enemy artillery observation balloons.

2: The Belgian Ace, Willy Coppens sits in his Hanriot H.D.1 of the Belgian Aviation Militaire Escadrille 11. The single Vickers Gun was standard armament, here offset from the fuselage centerline, although on later examples of the type, the gun was re-positioned on the centerline.

3: In 1938, Richard Shuttleworth purchased this H.D.1 and brought it back to UK where it was registered G-AFDX. Soon after, the aircraft was severely damage on landing, after loss of a main undercarriage wheel during take off . Subsequently, during WW2, after the airframe has been sent to Brooklands for repair, the wings were destroyed in a bombing raid. The remains were acquired by American Marvin Hand, who instigated a total reconstruction of the aircraft and thereafter donated it to the RAF Museum at Hendon, where it rests on display now.

4: Hanriot H.D.1 serial 5954 shipped to USA by Charles Nungesser in 1924 for exhibition flying. When he returned to France, he left it behind and it eventually ended up at the *'Planes of Fame'* museum at Chino, California, where it was restored to its original condition in 1951. It is seen here shortly after the rebuild.

5: H.D.1 serial 78, suspended in the Army Museum in Brussels Belgium during the 1950s where it languished in poor condition until restoration in the colours of the 1st Belgian Escadrille, as seen in photo 6.


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BIG BUTCHER

BI

Ray Anderson's superb quarter-century old Focke-Wulf Fw190A reviewed and photographed by Bruce Corfe and Ray Anderson

The Focke-Wulf Fw190 Würger (or 'Shrike' - known also as the 'Butcher Bird') was one of the classic fighters of WWII, designed by Kurt Tank in the late 1930s. Tank decreed that *"it was not to be a racehorse, but a cavalry horse"*. Using the air-cooled, 14-cylinder two-row radial BMW 801 engine (of eventually 1,677 hp), the Fw190A had ample power and was able to lift larger loads than its well-known counterpart, the Messerschmitt Bf 109.

The '190 was used by the Luftwaffe in a wide variety of roles, including day fighter, fighter-bomber, ground-attack aircraft and, to a lesser degree, night fighter. From 1941 the Fw190 wrested air superiority away from the RAF, until the introduction of the vastly improved Spitfire Mk.IX in July 1942. The Fw190 was well liked by its pilots - some of the Luftwaffe's most successful fighter aces claimed a great many of their kills while flying it.

Tank had witnessed the successful use of radial engines by the US Navy, and considered that a properly streamlined installation would eliminate the large frontal area drag problem. Normally, radial engines would be left open at the front in order to take in sufficient cooling air. Instead, Tank's cowl completely enclosed the engine, initially admitting cooling air through a venturi in the spinner. In service, to increase airflow over the tightly cowled engine, a 12-blade fan was fitted at the front opening of the cowling and was geared to be driven three times faster than the propeller shaft.

Experience proved that air-cooled radial engines were more resilient than liquid-cooled inline engines under combat conditions. A single bullet or piece of shrapnel in the radiator or coolant pipes of a liquid-cooled engine was often enough to drain the system, quickly causing the engine to seize or catch fire. On several occasions, Fw190s withstood an entire cylinder being shot away.

The BMW engine introduced a pioneering example of an engine management system called the *Kommandogerät* ('brain box'). The Fw had wide-track landing gear spacing and made extensive use of electrically powered equipment instead of hydraulic systems - the armament was also loaded and fired electrically. Armament consisted of two wing root-mounted 20mm cannons and four machine guns, two on the fuselage and two on the outboard wings, plus a centre-mounted 500 kg (1100 lb) bomb, drop-tank or three rockets under each wing.

The Fw190D (nicknamed the 'Dora' or 'Long-Nose Dora') was introduced in late 1944 - both the nose and the tail of the aircraft were lengthened to accommodate the liquid-cooled inverted V12 Junkers Jumo 213A engine of 1726 hp (1287 kW), which could produce 2,071 hp (1545 kW) of emergency power. Sporting good handling and performance characteristics, the '190D made an effective medium altitude, high speed interceptor, although its performance still fell away at altitudes above about 20,000 ft (6,100 m). When flown by capable pilots, the Fw190D proved the equal of Allied types, superior to the A in turn rate, climb, dive and horizontal speed.

Despite a stiff breeze all day, the 190 handled the weather very well. I hope you agree that the model looks superb in the air.

Ray Anderson's Fw190 is a model with a history (25 years not out!)

The model featured here belongs to Ray Anderson, a South African ex-pat who has recently moved to Western Australia. You may remember Ray's superb Grumman F6F Hellcat which was featured in, and on the cover of, FSM in August last year under the *'Master Models'* banner and which is the model that inspired David Boddington's FSM/ AMI Hellcat plan, still available from the FSM Plans Service.

Ray was also flying his terrific Fw190 at the same meeting as the Hellcat. As Ray says: *"My Topp Model Fw (German kit - ed)) is an old fashioned kit (glass fuz, balsa covered foam flying surfaces) that nobody other than real builders wants to build these days with all the ARFs around"* - so it's exactly what FSM readers like, then! I caught up with Ray again a couple of times in late 2011 and between us, we have put together these details and images of his wonderful Fw, which I have now been privileged to see in the air on three occasions. Over, now, to Ray for his first-hand comments.

"I bought the *Topp Models* Fw190A kit in 1986 after eyeing it in a model shop for a few months. There are bigger and better models around of the Focke-Wulf, especially the SIST fully moulded kits - a friend in South Africa has built two. It would be my first warbird and quite a large model at that time, as was the 25cc SuperTigre I bought to power it. The kit consisted of a polyester glass fuselage and two-part cowl. These had good scale details in panel lines, hatches and rivets. The wings and horizontal stab were the typical white foam covered in balsa. The rudder was solid balsa. The kit included some ABS parts for the forward fuselage gun cover, the gun blisters on the wings and some cockpit detail.

"The kit was provided with parts for a fixed undercarriage and tail wheel. I wanted retracts and came across electric retracts that Mick Reeves was producing that would be suitable for the '190. Using the notes that were provided with them on how to determine correct scale positioning of the wheels in the retracted and extended position, I modified the undercarriage legs to suit (by bending the 1/4" piano wire to the correct angle) and I was ready to fit them.

"As there were no spars in the foam wings to support the retracts, some head scratching was necessary. Ply plates were made up for mounting them. I slotted the wing close to the leading edge and fitted a hardwood spar across the front of the marked out 'retract well'. I then removed foam using a coarse sanding block to the angle and depth that suited the retracts. Vertical-grain hard balsa was glued to the foam all around the ply plate and also against the front spar locking it into the wing. White glue was used for this and it has stood the test of time. Litho plate covers were made hide everything.

"I used some epoxy and cloth to join the wing and ran a ribbon of carbon fibre tape across the bottom of the wing to midway out on each panel to strengthen the centre section that had the large wheel well cut out. I covered the balsa with Solartex and sealed it with several coats of dope. The whole model was primed and then painted with car paints. Some markings were provided and some were painted. A two-part clear coat finished it off.

Teething Pains!

"The model was first flown in 1989 and was a great flyer. I flew it a few times a year at scale fly-ins and it allowed me to get some experience without ever biting! Unfortunately, on it's 13th flight, it suffered flutter on the elevator and went in at a shallow angle into soft ground. It wasn't destroyed, but the fuz was badly cracked and the lower cowl was crushed. I put it aside becasue much of the model was undamaged and decided it could probably be repaired. It was a case of either get rid of it of fix it!

"Life and modelling carried on - I eventually got around to looking at the cowl and decided I would repair it and make it in one piece. The original had the rear half the cowl as part of the fuselage and a non-scale join line through the middle of the cowl. This meant fitting an internal structure to tie the firewall to the rest of the fuz and removing the outer detailed skin which was part of the cowling. I also modified the upper gun cover to change the '190 from an A5 to an A8. The cracks in the fuselage required repair and reinforcing. This was done a little at a time over a few years.

"The repaired fuz and cowl were used as plugs and I made molds of them from which I produced new components in epoxy/glass. I sprayed primer into the molds before the lay-up and these parts were

1: In the pits, the big model has a purposeful stance. 2: The big Super Tigre 2500 and supports for the dummy cooling fan and radial engine. 3: The cowl, much modified by Ray, and the scale cooling outlet for the ST2500. 4: Ray's working hatch covers all the sockets and switches.


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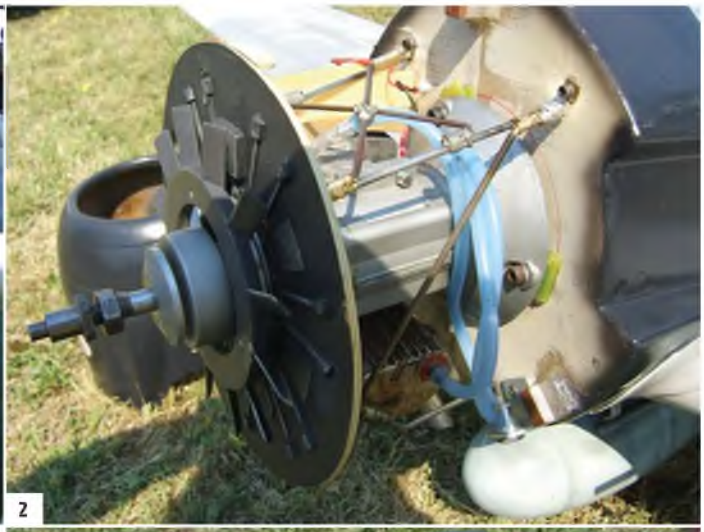
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5: Non-functional but highly accurate scale detail (fastenings) on the cowl. 6: Ray modified the realistic nose guns an cover to replicate a Mk A8 Fw190. 7: Rivet, panel and fastening detail plus over-sprayed dirtying-up. 8: Fuselage mid-section plus cockpit. 9: Fritz in his office, squinting down the gun-sight. 10: Cockpit interior detail with red fire-button on joystick! 11: Very neat tail-end with high aspect-ratio horizontal stabilizer and aerodynamically balanced control surfaces.

Flaps, tailwheel and mains fully deployed with that characteristic 'knock-kneed' look - Ray on short finals.

ready for finishing. I could then start the rebuild proper. Virtually everything could be re-used. I wanted a retracting tail wheel and Unitracts had one for a slightly larger kit. I asked them to reduce the air cylinder throw and ordered one. A bit of scale detail and it looks and works fantastically. Air pressure is used to extend and a spring to retract. I covered the flying surfaces with light glass cloth and epoxy.

"At this point I decided to add as much scale detail as my patience would allow. I think I tried every idea I had ever read about in the many model mags I had bought over the years. I created panel lines both raised and flush. I added rivets, mainly flush rivets burned into the primer with a soldering iron. I made up dummy aluminium parts for all the hatches and cowl latches. I tried to make it look as though you could open the scale hatches. To add some extra character to the model I made us a scale bomb/drop tank housing for under the wing and added a dummy drop tank.

"Eventually it was enough! I painted the model, as I did originally, using one part car paints which are easy to mix and spray. All the markings were masked and sprayed. Dirtying-up followed using several ideas from past magazine articles. The model was then clear coated with two part matt car finishing products. The end result was worth all the effort. I knew it was a good flyer so was confident that the extra scale details would not be too much of a risk to the overall weight! These older kits have a much higher wing loading than the modern ARFs.

In the air again after a twelve year re-build!

"The model flew again in September 2005 at the Oudtshoorn scale event in South Africa where it got the 'Best WW2' award. It's an enjoyable model to fly and looks good in the air. I tend to keep the '190 for scale fly-ins and therefore don't fly it that often, but I am pleased to report that we have passed the 13 flight record of the original".

The author has seen Ray fly the Fw190 at three scale fly-ins in South Western Australia, twice at the South West Associated Radio Modellers Society (SWARMS) Scale Rally near Capel and once at the Kalamunda Aeronautical Model Society (KAMS) scale day at Mundijong near Perth. Although these were non-competition scale events, his Butcher Bird and Hellcat were hugely popular and were flown in a very realistic manner which added to the scale authenticity of both models. Ray is very modest about his achievements but has been kind enough to add a few lines about himself, his family and his modelling history so we will close with those:

Notes re the builder:

"I have been flying with multi channel radio since 1983. I had messed around with some models on two channels prior to this but actually taking off and landing on a runway started for me then. I was always attracted to scale models and that has been my main interest over the years. I am more of a builder than a flyer and sometimes go for long periods without flying. I think that the building and the focus on creating something that looks as 'real' as one can manage is what has kept me interested in modelling and motivated over the years. I am still working towards more realism in my models. I want them to look like a miniature of a real aircraft rather than a toy. It's a long road.

"We lived in South Africa until 2009, moving to Australia when the opportunity arose. My wife had family in Australia and I had the opportunity to be involved in a new business in Western Australia marketing and selling Margaret River wines internationally. I am a chartered accountant but left the profession soon after qualifying, to go into business. I was in business in SA for almost 30 years.

"My modelling has been interrupted from time to time by the need to assist my wife rearing four children! A girl and three boys (two being

12: Extended main-wheel showing the deep wheel-well. 13: Mick Reeves electric retract mechanism; litho plate cover removed. Note the very neat installation. 14: A close look at the electric retract mechanism. 15: The extended Unitracts scale tail-wheel. 16: One of the unusual features of the Fw 190 is that the tailwheel unit retracts vertically into the rear fuselage rather than the leg swinging either rearward or forward. Here, the modified tail-wheel is retracted.

twins). They have all been supportive and have often assisted me at flying events. The younger two were the most interested in modelling, they learned to fly but never became passionate about it. Maybe that's a blessing as I don't know where we would have put all the models! Whilst I love building and the final finishing is my main interest (I hate the glassing, sanding etc) I must confess that I cannot always resist the temptation of the current generation of ARF warbirds and jets. They are simply amazing. I have a turbine Skymaster B.Ae. Hawk and a Grumman F9F Panther which have flown in SA but not yet in Australia. Also unflown is a Global Jet Club Douglas F4D Skyray for a small turbine (Wren 54). I have been working on a 1/4 scale PCM Me109K4 for a few years, on and off, which I hope to finish in the next year or two. These things can take a long time as you know". ■

The Butcher Bird fully rigged and ready to go at the SWARMS Scale Rally. The Fw looks purposeful from any angle.

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FULL-SIZE FREE PLAN FEATURE

by Peter Rake & Marion Crowder

Culver DART

PART 2: The concluding part of the construction article for the electric powered model designed by Peter rake and built and described by Marion Crowder

Wing panels

I started the main panels by pinning down the trailing edge pieces first, then added the inboard bottom sheeting out to R4. Next, pin down the bottom cap strips and then locate the S2 spar by using a couple ribs. It sets on top of the centre sheeting and the cap strips. Go ahead and locate all the ribs in their proper locations, but make sure you lock them into the notches in the trailing edge. Wood sizes and plans don't always line up perfectly so you may have to adjust things a little *(Changes in humidity will affect this; parts cut in one region can change size quite dramatically when shipped somewhere else. PR)*. Hopefully you didn't glue the spar to the caps in case you have to move things a little.

The leading edge is two pieces of 1/8" sheet laminated together. I glued the inside piece to the ribs and then added the outside piece after coating it with glue.

The ailerons are built at the same time and cut out after all the sheeting and sanding is done. I would suggest adding a gusset on the outside of rib R7 and the piece of 1/4" balsa that acts as the leading edge of the aileron. You might also carry the 1/4" piece through to rib R6. At this stage, my wing warped and I had to heat it out several times. I don't know if that is the cause or not but it seems as if it might make that spot stronger. I forgot to mention this to Pete for his opinion

Although it looks very short coupled, the model behaves very well indeed once airborne.

but I guess now is as good a time as any. Sorry Pete. *(I couldn't see that this would make any difference, so left the drawing as per original. It's an option though. PR)*

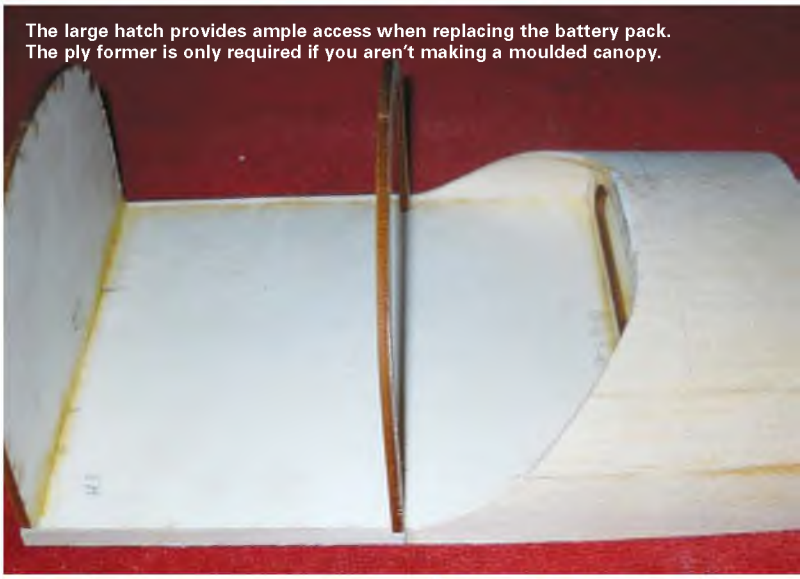
Once you have both panels built, you can attach them to the centre section. Line up the spar and the brace at the bottom edge and it should set the dihedral for you. Now you can add the rest of the sheeting except for over the landing gear. Add the caps too and do your preliminary sanding.

Once you put the landing gear leg in, things get a little harder to sand, but now is the time to put the A gear wire in. Sandwich it between the two plywood doublers. Hopefully, you shaped this earlier while you still had the rib for trial fitting. I waited to add the other gear wires until I had covered the wing. *(It's much easier to punch a small hole in the covering and slip it over a single leg, rather than having to slit it to fit around a complete undercarriage - PR)*. Once you have it fitted, go ahead and finish the rest of the sheeting. Sand, sand, sand until you are worn out. Dad always told me that 99 percent of building a nice model is sanding.

Cut out and hinge the ailerons and set up your servo bays. I use four little cap screws to hold the servo plate but you could just as easily tape them in - your choice. Now is the time to form the rest of the landing gear wires and get them fitted. Don't permanently install them until after the wing is covered or they will be in your way. It takes a little work to get everything just right, but when it's done you will have a very strong gear assembly. Pete suggested and I used brass P-clips that I made to bolt down the wires to the centre section blocks. So far it has worked very well.

The wheel pants can be made at this time from the supplied laser cut wood *(Marion built his model from a set of laser cut parts, just like the ones available from the publisher. PR)*. Mounting them is pretty much whatever your favourite way is. I have yet to leave mine on while flying for fear of damaging them. There are several pictures of Darts without them so the choice is yours. I have to have them for mine as they make the model in my

The liteply plate around the avionics bay adds rigidity and provides a good base for the hatch to sit on.



The large hatch provides ample access when replacing the battery pack. The ply former is only required if you aren't making a moulded canopy.

Absolutely vital on this model, the wing fillets are nothing like as difficult to make as Marion feared they would be.

A ply rib, cut to accept the main u/c wire, with a ply doubler each side, makes for a very sturdy u/c mounting in the wing.

Climbing away nicely. The model exhibits no bad habits whatever and even the stall is nothing to get excited about - still not recommended though.

opinion. I guess I shouldn't be so wimpish about flying with them. They sure look good when she is just sitting there though. Unless you cover as you go, set the wing aside and let's build a fuselage.

Fuselage

Locate the inner and outer fuselage sides and glue them together. Make sure you build a LEFT and a RIGHT side. It would be easy to ruin your day at this point so be very careful. Building this fuselage is straight forward and simple. Use the formers and square up the sides. Add the top formers F4, F6 and F8 and install the stringers I used 3/32: on the bottom instead of 1/16"; no real reason - I simply didn't pay attention to the plans!

The hatch is built separate from the fuselage. I used H3 as I made my canopy in two pieces. The hatch is a fairly snug fit, but I used two magnets anyway just to insure that it would not become detatched during flight. I found that it is very easy to remove if you just slide it sideways.

The motor mount pieces will automatically build in right thrust when installed. It must be about the right amount because my Dart tracks right down the runway when I add power. (Nice to know I get things right sometimes. PR) When you build the cowling, the 1/32" ply skin needs to be cut oversize to take into account the curvature of the cowl. (Ask me how I know this, ha, ha!). I got mine circled in two pieces. I used two short pieces of dowel and two magnets on either side of the cowling to mount it. So far this has worked quite well. A Nitro Models Monster .25 motor was used and it fitted perfectly to the firewall and had perfect prop clearance on the other end.

Ah, now comes the part that I was scared to death about; the wing fillets. These are such a major part of the Culver Dart's character that to not use them is not an option. Add WF, WF1, and WF2. Peter shows 1/32" plywood for the fillets, but I used 3/32" balsa. I figured it would give me more room to screw up. It made it harder to feather the fillet into the fuselage, so use the plywood.

I cut the wood to the general shape shown on the plans and fitted them in two pieces on each side. I was in total fear and yet it went together quite easily. After sanding and filling the edge, I was very proud of how the fillets turned out. Show no fear, as Yoda said....."no try, just do". All-in-all I was pleased with the results.

I finished the hatch with black paint and two pilot figures. The canopy was made from two pieces of acetate. The back piece is a simple wrap over the frame that I taped down and then used canopy glue to secure it. The front piece required a pattern be made and then it was cut out and glued in the same manner.

You will need to temporarily mount the stab and fin so you can carve and fit the two fairing blocks that finish out the back. I covered these separately from the fuselage and installed them after the tail was attached.

All the separate parts were covered with Sig Coverall. I applied four coats of clear dope, lightly sanding in between coats. Landing gear fairings are made from scrap wood. Don't omit them as they add a lot of character to the model.

My Dart was painted with cub yellow and Waco red dope from *Sig*. I used 1/8" automotive pin striping tape for the black outline. I would have preferred thinner, but it didn't look bad. I prefer that a pin stripe highlight the colours and separate them as opposed to actually looking more like a stripe. Oh well.

Once I had everything painted and assembled I was very pleased with the finished

As the scrap balsa fairings start to go on the u/c, you can see clearly how the front and rear legs are retained.

How the servo arm extends through the ply plate for the aileron linkage.

model.

I used *Hitec* HS81 servos for the controls and a six channel *Spectrum* receiver. A separate battery was used for the radio. If your speed controller should ever let out all its magic smoke and quit, you will still have a working radio and can glide home. This was proved to me on the test flight of my Velie Monocoupe, when the speed control smoked and I was able to glide back because I had a separate battery pack on board for the radio.

Flying

The maiden flight for my Culver Dart was pretty straight forward. I pointed her into the wind, applied throttle and off she went. The takeoff roll was pretty much straight down the runway with very little corrective rudder. I required aileron trim as I was fighting a warp in one panel that keeps coming back after every time I remove it. Other than that, the Dart flew very well with no vices that I could perceive. Slow flight is smooth and the stall very mild.

One thing I will say is that with the rigid landing gear, it is a good idea to land as smoothly as possible. The airframe is very strong, but a hard landing does emit a pretty loud thump. I have not flown her with the wheel pants yet but I am pretty sure no difficulties will arise. Make sure you have plenty clearance so the wheels don't hang up on the pants.

There are several pictures on the internet of Darts without wheel pants so if you prefer not to use them, you would still be authentic. Personally I like them, but just haven't got there yet.

I believe that should you decide to build Peter's Dart you will be very satisfied and you will have another nice Rake design to add to your hangar. Now, if I can just talk him into a set of plans for a Waco cabin I will get started building one. ■

CUT PARTS SET FOR THE CULVER DART

For readers looking to building Peter Rake's Culver Dart (for which Part 2 and accompanying 2nd sheet of the plan appear in this issue), we have a laser-cut component pack available. As emphasised before, these cut-part sets provide ready-cut pieces of all the bits that you would otherwise have to trace out onto the balsa or plywood sheets before knifing them out, thus saving a fair bit of tedious time, so that the airframe assembly process can start immediately. The parts sets do NOT include strip and sheet wood that you can get from your friendly model shop. **PART 1, including Sheet 1** of the plan appeared in FSM April 2012 issue and back issues are still available

The parts set costs £80.00 plus £9.50 for carriage in UK. Sets can be supplied to overseas customers, with carriage costs quoted on an individual destination basis.

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How's that for an action shot, the little Dart just about to touch down after another smooth, predictable flight.

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A FEW MORE WRINKLES

Martin Simons makes a bit more progress with his work on corrugated metal surface skins as first described in FSM April issue

This is a postscript to my previous article, *Experiments with Corrugated Skins* that appeared in FSM April 2012 issue. If you have not read this, please do so before continuing.

Since the original item was written, I have produced more lithoplate skins for my proposed model of the PZL P-24 and I have nearly enough now, to skin the wings and tail unit. In producing these I have learned more, made some new mistakes and found ways of avoiding them. The photographs here are to some extent self explanatory.

An apparently trivial point is to wear some stout gloves while working. Litho plate edges are sharp and as the work goes on, it invariably tries to curl up, sometimes unexpectedly, which can cause cuts. Gloves are also useful because, if more than a very few plates are to be worked on, fingers will become calloused and even bruised. Pressure on the stylus as you run it down the grooves need not be very great, but after a few score repetitions the fingers can be quite painful (Yes, it happened to me).

Cleaning the 'bright' side of the plate beforehand is necessary since this will eventually form the outer, visible skin of the aircraft and would also add that It does seem to be best always to work with the emulsion side of the plate upwards.

The steel stylus used to form the corrugations is pressed onto the plate and the emulsion prevents scratching of the aluminium. A little oil helps too, though it is not essential. Keep enough pressure on the tool to prevent 'de-railment', but do not push too hard in order to avoid cracking the plate, and keep the sharp point of the Stylus out of contact with the plate. Experiment with a piece of scrap litho to get a feel for this.

(I am sorry I cannot give the phone number, E-mail address, I-phone or Facebook contacts of the young woman who happens to appear on the emulsion side of the plate in the photos. To meet her you will have to join her tennis club!)

The wires making the baseboard must be very securely glued down. Check these frequently for rigidity. If they are not quite solid, they will shift slightly sideways as the stylus runs over them, and this almost always causes a split in the plate. I used cyanoacrylate but if I were to start again, I think a better adhesive would be epoxy resin of the type used for skinning foam wings.

Another point about glues is that if these ooze up between the wires, they cause the stylus to jam or bump as it goes by and this spoils things. Clean the grooves carefully and keep them clean.

In the original article I showed it is possible to corrugate a wide lithoplate sheet all the way across without re-positioning, but this is quite difficult to accomplish without cracking the metal. As the work goes on, the plate will always try to lift up somewhere and if it does, so a local crack is very likely to develop. I ran into a minor difficulty by making very wide baseboards with hundreds of wires, all of the same gauge. (This caused quite serious depletion of stocks in the local hobby shops.) I recognise now that I was creating difficulties for myself by trying to tackle wide sheets of skin in a single session. It is much easier to adopt the more gradual procedure shown here in **Figures 1** and **2** here.

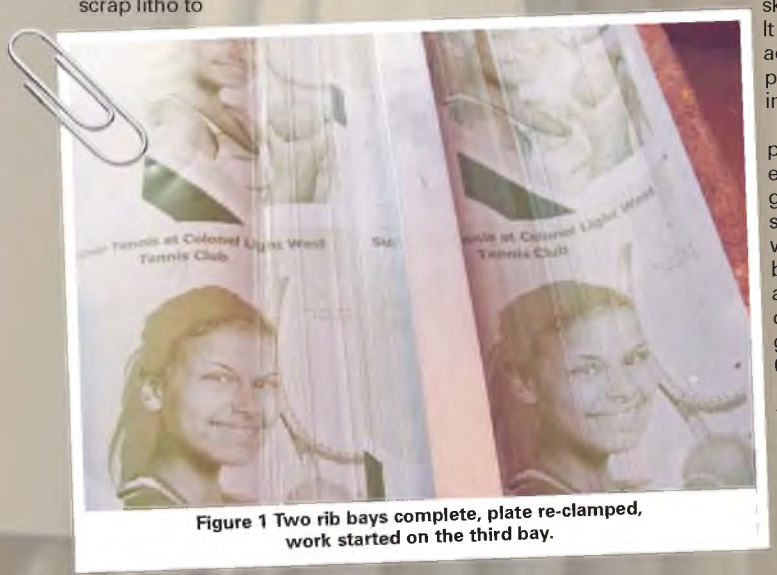


Figure 1 Two rib bays complete, plate re-clamped, work started on the third bay.

The baseboard is prepared by gluing enough of the chosen gauge of straight, hard steel wires to make the width of a complete rib bay. In my case this amounted to 42 wires of nominal 1.5 mm gauge, for a rib bay of 63 mm. The sheet of lithoplate is clamped firmly along one edge, accurately aligned with the wires. Leave a small un-corrugated edge to allow for lapped joints when assembling the skins on the wing. The grooving begins close to the clamped edge and progresses step-by-step across the plate for the full width of the underlying wire base.

Figure 2. Third bay done, move the plate to the right, re-clamp and start the fourth bay. Weights to restrain curling. Note the glove.

There is no need to clamp the other edge, which floats freely. It may curl up a little but, with gloves on, not enough to matter. As the process goes on, use a free hand with a cloth to press the plate down, moving in time with the stylus.

It is still possible to create cracks and splits in the plate, usually by overenthusiastic pressure, bad positioning of the stylus, and plain carelessness. The actual process of running the stylus along the rails can seem too easy and it is tempting to hurry. Stop now and then, do something else for a while, and come back refreshed.

With one rib bay done, unclamp the plate, move it over and align it. This requires some precision and measurement to make sure the corrugations are in line with one another. Clamp the plate in its new position, and continue. The plate, as it curls, can be weighted down as shown in **Figure 2**. This procedure continues until, typically, four or five rib bays are done, again, leaving un-corrugated strips where required. In the case of the PZL P-24 aircraft, spaces allowed for riveting to the underlying structure. This can be seen in the photographs.

A friend who has seen me doing this work, commented that it was going to take a lot of time. In fact, I am surprised at how rapid progress has been. Building any scale model is time consuming and I feel that as a proportion of the hours I will spend on the rest of the P-24, the forming of the skins is quite small. Anyway, it has been a very interesting exercise and a lot of fun! ■

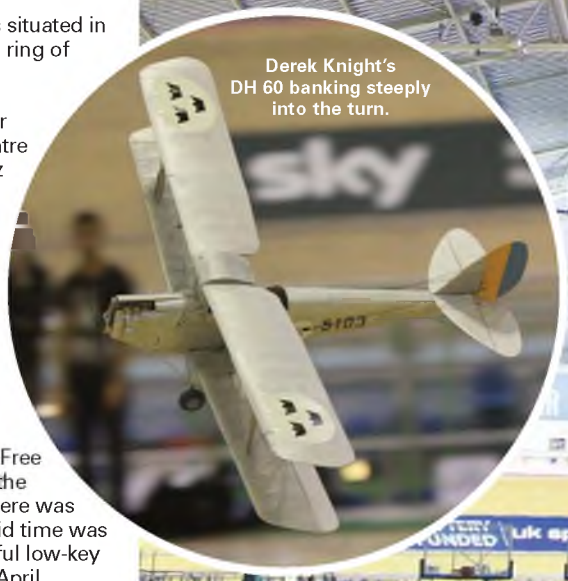
INDOOR FREE FLIGHT SCALE *by Alex Whittaker*

As the romantic poet and opium eater, Samuel Taylor Coleridge, almost said:

"In Mancunia, did the Great and Good, a stately pleasure dome decree..."

So, one winter's Sunday morning, camera in hand, I journeyed into the heart of darkness... or Manchester, as we call it in the northern tongue. Past Belle Vue and beautiful downtown Burnage, then on to that curious structure that is the Manchester Velodrome, which reminds me of a missing link from a massive chain.

This temple to spokes, sprockets and rubbing liniment is situated in a sort of concrete scrublands between the inner city and a ring of low-rent suburbs. It is here that the BMFA Indoor Duration Technical Committee, under Mike Colling and David Whitehead's good offices, first got permission to fly indoor Free Flight models. Aye, flying takes place, right in the centre of the track, whilst all the energetic weekend cyclists whizz around, tackling the wooden banking. It is very much 'Brooklands for bikes'. In case you might wonder about the compatibility of those two concurrent activities, in fact, floor-to-ceiling badminton nets keep bikes and balsa apart, and it all works remarkably well.



Derek Knight's DH 60 banking steeply into the turn.

BMFA Technical Committee

BMFA Scale Technical Committee Indoor Representative Andy Sephton (ex-RAF fighter pilot, sometime full-size Shuttleworth Collection Chief Pilot, and all-round action man) had the notion to hold a scale competition at the Velodrome. On the day, the turnout was excellent. Sturdy Free Flight Scale men from Scotland, and all the way down to the Home Counties, attended to make it a memorable day. There was even some Open Rubber and Duration flown, so a splendid time was had by all. For many canny competitors, it was also a useful low-key contest before the BMFA Free Flight Indoor Scale Nats in April.

Models I saw

The Velodrome has an airy new foyer, and there are new toilets, and a very convenient licensed cafe. The arena itself is not the brightest of places, but it is an impressive space, and eminently suitable for model flying. The Velodrome staff were particularly helpful when I asked if the main lights could be turned on. This really perked things up.

The first thing I saw in the pits was the unfinished fin and rudder of

Free Flight scalistas have

INTO THE V


1

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a Lacey M-10, articulated with tiny, tiny hinges. The model belongs to Andy Sephton, and the new pinned hinges were developed by the ever-creative Derek Knight. The hinges have an integral plastic pin and are only about 1mm thick!

DH60

Derek Knight had an impressive new DH 60 Moth in an attractive Swedish scheme. It was powered by a 5g geared out-runner motor, and a 7.2V 2S 170mAh lipo battery. The same innards in fact as his venerable and very successful DH 82 Tiger Moth. His DH 60 is the same size too, at 25", or 1/14th scale. The scale fuel tanks on these models amazed me. They were made by passing doped paper through a set of miniature rollers! Another scale detail that knocked me out was the crisply modelled scale control horns. Unbelievably fine work. Before I leave Derek, I must mention his yellow and blue Fairchild 24, which flew very well indeed.

Finally, Derek had a delicious Hawker Hunter, electric powered by his own new ducted fan unit. For more details, watch this space!

Hawker Fury

Chris Chapman had brought two scale models, both completed to very high standards, in very different media. His balsa 13" span Peanut Hawker Fury weighed 16 grams complete with its motor of a 22" loop of 1/8th rubber. This looked very good in the air.

Me 109

Chris's second model was an amazingly convincing 1/48th scale Messerschmitt Me 109 Pistachio, spanning just 8 inches. This was powered by a 13" loop of 1/8" rubber. Its performance was very impressive indeed, and it tickled the rafters on each flight. The fit and finish are first rate. It had all the patina of a superior plastic display kit, but also could fly wonderfully well.

Curtis Shrike

In any scale company, modest Mike Stuart is an undoubted star, and his new Curtis Shrike is an impressive and colourful model. It is built to 1/24th scale and is 22" in span. It was built from the well received Diels Engineering kit. Contact:
http://dielsengineeringinc.com/
Or: dielsengr@buckeye-express.com

Blackburn Blackburn

Mike Stuart's other model was an immaculately finished Blackburn Blackburn. This wonderfully humpty-backed-bipe has a head like the Elephant Man, and a profile only its designer (and me) could love. It is scratch-built by Mike from his own plan. Being a Peanut it is 13" in span, and flies on a single loop of 1/8" rubber. What a superb scale subject - with knobs on!

Keil Kraft Piper Super Cruiser

Noted scalista Dave Crompton had brought quite an air fleet, amongst which, was his

1: Derek Knight's new and extremely tiny pinned plastic hinge fitted to components of Andy Sephton's new Lacey M-10. Hinges are around 1mm thick. 2: Mike Stuart's Shrike from the Deals Engineering kit. Excellent kit, by the way. 3: Dave Crompton's Eastbourne Monoplane. 4: Reg Boor's well-sorted Me 109 flew very well all day. Lurve the undercart! 5: Derek Knight's Fairchild 24 - a reliable performer! 6: Mike Hadland's 'winningest' Bucker Jungmann G-TAFF. 7: Traditional low-tech analogue Dial Torque meter for rubber motors. Does the job! 8: Chris Chapman and his Pistachio Me 109.

a new venue in the North Wes. Alex Whittaker investigates

VELODROME

Pretty Peanut. Hergt Monoplane by Tim Horne.

Profile P-39 Airacobra on a fast pass.

9: Derek Knight's new own-design electric ducted-fan unit powers his own-design Hawker Hunter. Elegant, is it not? 10: Chris Chapman's immaculate Hawker Fury. 11: Andy Sephton on left and Derek Knight on right. 12: Impossibly cute Screamin' Meanie Pistachio by Tim Horne. 13: Ken Bates' charming Keil Kraft Cessna 140A N992F. Winner of the Powder Puff Derby in 1953. Apparently. 14: Lovely antipodean Comper Swift from the celebrated Veron kit. A delight to see. 15: Dave Crompton's sweet little Bebe. 16: Me 109 by Chris Chapman - superb finish, great flyer.

Keil Kraft Piper Super Cruiser. This is 18" in span and flies on two loops of 3/32" rubber. He also had a Jodel Bebe, and a fine Evans Volksplane - both Peanuts of 13" span. His tiny Eastbourne Monoplane is even smaller: a Pistachio, of 8" span. The star of his current fleet remains his superbly finished P-40 Curtiss Warhawk Open Rubber scale model from the Comet kit, much modified by David. This is a beauty. It managed to catch a badminton net on one flight, and hung there for a while like a forlorn tuna.

Screamin' Meanie

Tim Horne is one of our most accomplished F/F scale men, and his tiny Screamin' Meanie racer was exquisite. It is a Pistachio. He also had his lovely little Hergt Monoplane Peanut, which we have seen before. In addition, he flew a profile rubber Chambermaid, whose fish-like presence in the air was oddly fascinating to watch.

Nieuport 28

No show without punch, and my favourite F/F scale southerner, Mike Hadland, brought a new midget gem with him: a Nieuport 28. This was finished in a colourful variation of the US Hat-In-Ring scheme. She is 20" in span and powered by a single loop of flat 1/4" rubber. Naturally, Mike brought his famous Bucker Jungmann duo: G-TAFF which is Open Rubber, and its camo'd hangar-mate, which is a Peanut. Swindon's Finest never travels light. He even brought an electric kettle with him for impromptu tea. Routinely calls me an old tart, by the way. Perceptive, for a southerner!

Comper Swift

Ken Bates had a version of a rubber scale model I always admired as a nipper, the celebrated Veron Comper Swift. In real life, this famous kit it is bigger, fuller, and more impressive than I imagined. Ken's example is expertly finished in red tissue, and looked superb in the air. He also had a profile Fike E, and Ford Stout, both No-Cal models. For details of the No-Cal competition class try Wikipedia, No-Cal (model Airplane):
http://en.wikipedia.org/wiki/No-Cal_(Model_Airplane)

Me 109

My dear friend, Reg Boor is 80 and still very much the doughty competitor. I loved watching his finely detailed Me 109, complete with very convincing undercarriage. It flew very impressively - fast and full of verve. His last flight was so satisfying that it got a round of spontaneous applause. We love Reg.

Betty Jo Racer

One modeller had a very nice little red model, a Betty Jo Racer. As soon as I asked this chap his name, too late, I realised that I had already recognised the dynastic features. It was dear Martin Fardell's son, Peter. By the way, Betty Jo flew very well!

Derek Knight's DH 60 - luvverly.

How does Derek Knight corrugate his tanks?

Elegant tail on the DH 60.

Mike Stuart's Blackburn Blackburn. So good they named it twice.

Rubber gear

I was chatting to well known F/F scale man Tim Milner, and admired his tiny Carte Postale model. However, I soon became fascinated with his expanding range of paraphernalia, necessary for successful indoor rubber competitive flying. I made a short list of the main requirements, and one or two of the innovations Tim was using. He had a fiendishly clever direct-reading digital torque meter with built-in stooge, adapted from an electronic scales unit. He also had a D.I.Y. electronic counter on his geared rubber-motor winder. This was simply an adapted calculator. Tim had a handy bottle of Rubber Lube, and he also had an electronic stop watch. His model box was full of prepared rubber motors, with their characteristics carefully noted. Nothing was left to chance, and items were used in an ordered progression. Tim's methodical preparation clearly takes lot of the strain out of competing. I learned a lot from our Tim.

Dave Crompton's P-40 Warhawk - wonderful finish and a good size. From the Comet kit, but modified.

Ken Bate's profile version of the all metal Stout monoplane, as originally built by Ford.

Tim Milner's clever (Electronic Calculator) Digital Turns Counter grafted onto a geared winder.

The Verdict

Congratulations to Mike Colling and David Whitehead for scouting the location, and also to Andy Sephton, and BMFA Scale Technical Committee, for a very successful inaugural FF scale event. We need more venues for FF Indoor Scale, and this one seemed just about right. It is a well heated indoor space, with both toilet and cafe facilities, and with the benefit of a free car park. It has ready communications with the main motorway network, and it gives us an accessible FF Scale venue in the North West of England. Top marks all round! By the way: see you at the BMFA FF Indoor Scale Notts Nats! ■

BREWSTERS FLYING BARREL

1/18TH SCALE RUBBER DRIVEN FREE FLIGHT MODEL DESIGNED BY RICHARD CROSSLEY

PART 1

ALTHOUGH OBSOLETE BY THE BEGINNING OR THE SECOND WORLD WAR, THE BREWSTER F2A WAS CUTTING EDGE TECHNOLOGY WHEN IT FIRST FLEW IN 1937. OUTCLASSED WHEN FLOWN AGAINST THE JAPANESE IN THE HANDS OF BRITISH, US AND DUTCH AIR FORCES, THE 'BUFFALO' WAS AMONGST THE MOST SUCCESSFUL FIGHTERS IN HISTORY WHEN USED BY FINLAND AGAINST THE RUSSIAN AIR FORCE. STUBBY BUT SHAPELY, THE 'BUFFALO' HAS BAGS OF CHARACTER, AND FLIES JUST GREAT!

Before you start...

As for most of my scale plans, the Buffalo is not intended for the raw beginner; nevertheless it is quite an easy model to build. Even if you are an experienced modeller I would still advise reading the instructions through carefully as there are a couple of stages where extra care is needed.

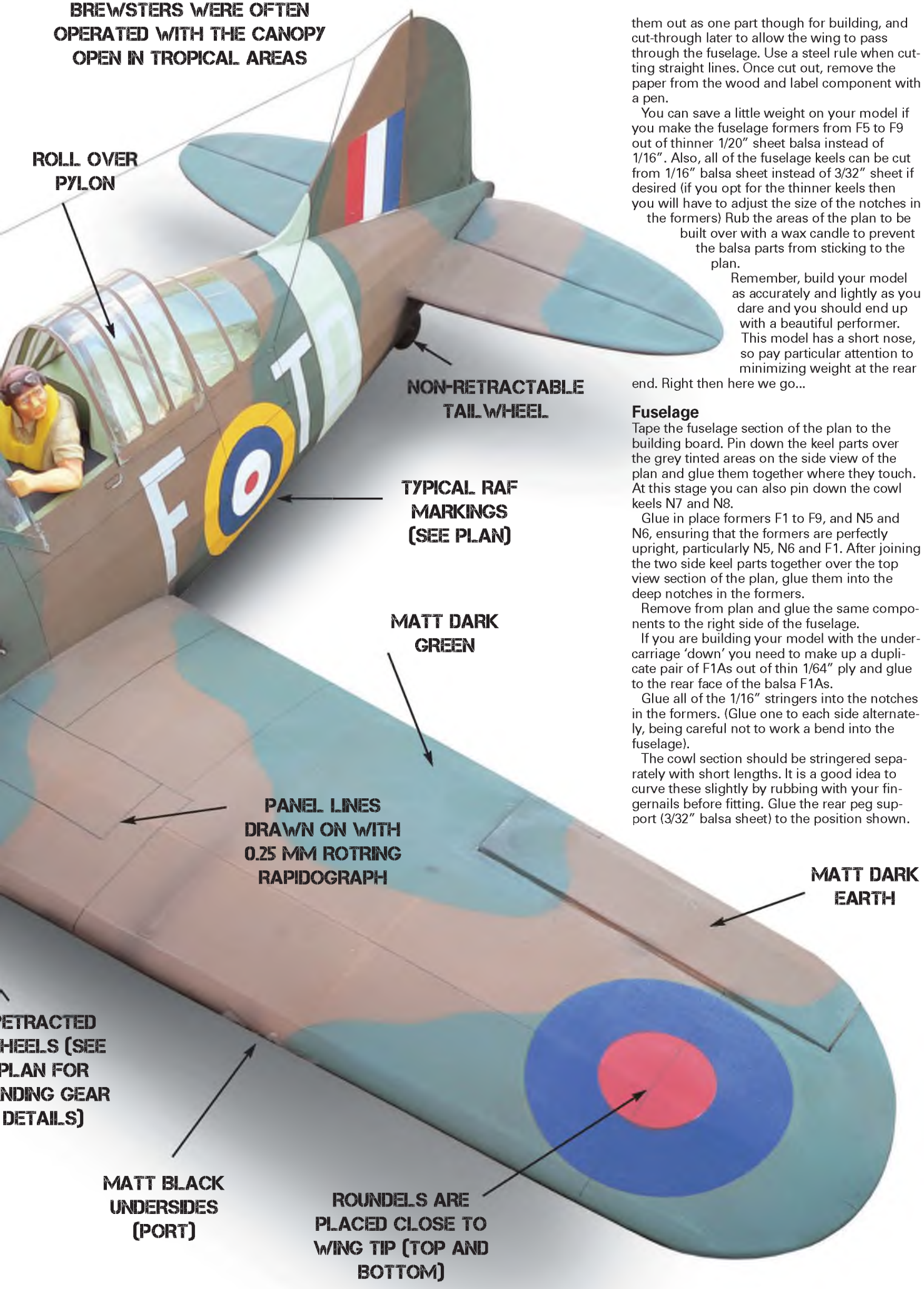
Here's a run-down of items that you will need to build your model:

A flat building board, about 1ft by 2ft and soft enough to press pins into (insulation board or rigid foam such as Floormate is good), a modelling knife (I like to use a 'Swann Morton' with a 10A blade), pins, small pliers, adhesives (Balsa cement or Aliphatic resin for the main structure), tissue paste, dope and thinners, soft dope brush, sandpaper (180, 360 and 800 grit wet and dry are best), a short steel rule.

Note

If you wish to build the longer nosed F2A-3 version, you will have to re-draw the front ends of the four fuselage keels. The F2A-3's entire cowl assembly is identical to the Buffalo Mk1, but is pushed forward 8mm. The angles of the keel parts will be slightly shallower as they meet the new position of former F1. Basic details are shown on the plan. The Squadron/Signal book on the Buffalo in Action is helpful reference.

First, paste the paper wood templates to the correct grade of balsa sheet. Use Spraymount for this (spray the paper, not the wood). There is also a non-permanent type 'Pritt' stick that will do the job. Carefully cut out all of the balsa components and store safely. Note that F2 and F3 are shown in 2 parts, cut



them out as one part though for building, and cut-through later to allow the wing to pass through the fuselage. Use a steel rule when cutting straight lines. Once cut out, remove the paper from the wood and label component with a pen.

You can save a little weight on your model if you make the fuselage formers from F5 to F9 out of thinner 1/20" sheet balsa instead of 1/16". Also, all of the fuselage keels can be cut from 1/16" balsa sheet instead of 3/32" sheet if desired (if you opt for the thinner keels then you will have to adjust the size of the notches in the formers) Rub the areas of the plan to be built over with a wax candle to prevent the balsa parts from sticking to the plan.

Remember, build your model as accurately and lightly as you dare and you should end up with a beautiful performer. This model has a short nose, so pay particular attention to minimizing weight at the rear end. Right then here we go...

Fuselage

Tape the fuselage section of the plan to the building board. Pin down the keel parts over the grey tinted areas on the side view of the plan and glue them together where they touch. At this stage you can also pin down the cowl keels N7 and N8.

Glue in place formers F1 to F9, and N5 and N6, ensuring that the formers are perfectly upright, particularly N5, N6 and F1. After joining the two side keel parts together over the top view section of the plan, glue them into the deep notches in the formers.

Remove from plan and glue the same components to the right side of the fuselage.

If you are building your model with the undercarriage 'down' you need to make up a duplicate pair of F1As out of thin 1/64" ply and glue to the rear face of the balsa F1As.

Glue all of the 1/16" stringers into the notches in the formers. (Glue one to each side alternately, being careful not to work a bend into the fuselage).

The cowl section should be stringered separately with short lengths. It is a good idea to curve these slightly by rubbing with your fingernails before fitting. Glue the rear peg support (3/32" balsa sheet) to the position shown.

My model was to be a competition scale job, so features realistic cut outs for the landing gear. It's a real fiddle, so if your model is for general flying just paint a black circle here. If you are flying outdoors just leave the gear off and make dummy half-wheels.

Note how the centre rib is a strange shape to allow the rubber motor to pass over the top. This straight-through wing design is very strong. You may also notice that I have 'faceted' the wing ribs between the spars. This makes for a smoother looking wing as the bumps caused by the ribs don't show through the tissue covering.

Now sheet-in the cowl area with 3/32" or 1/16" balsa sheet scraps between N5 and N6: use small bits of wood and cut-to-fit between the stringers. Make up the nose cowl by laminating the 1/8' balsa parts N1 to N4 and Glue to N5. You may also wish to sheet-in the top of the fuselage in front of the windscreen from F1 to F3 for a smoother look (see photos of my model). It may be find it easier to cut the cowl section off the model so that you can preserve the slight 'step' as you sand to shape.

The wing on this model passes right through the fuselage, so an aperture is needed to slide it through. Using scraps of 1/16" sheet balsa, sheet-in around the area where the wing passes through the fuselage on each side, so trace the outline of rib R1 (see side view on plan) onto the sheeted area at the correct incidence angle and cut out the aperture. Now, cut through and remove the sections of formers F2 and F3.

Study the plan and add any other small balsa parts that are shown. Note the soft balsa block at the tail (this should be hollowed for lightness). Also ensure that there is a suitable slot to pass the tailplane through - you may have to adjust the stringer above the tailplane, and add scrap balsa. I also added a 1/32" balsa cockpit floor on my model from F4 to F6.

Sand the entire fuselage structure with 360-grit paper, being careful not to press hard on the stringers. You will achieve a much better covered finish if you 'scallop' the formers between the stringers - this gives a cleaner, more streamlined final appearance. Pay particular attention to the cowl, where you will need to initially carve to shape with a knife. The intake holes above and below the engine aperture deserve some care. I made up the tail wheel using a thin piano wire strut and scrap balsa and foam. Complete by sanding the entire structure gently with 800 grit paper.

Tissue cover the fuselage from F2 backwards in smallish pieces, apply glue only around the edges (don't glue to every stringer) Water shrink and then apply two coats of dope, thinned 50/50 with cellulose. If you are installing the landing gear, leave the bay between F1A and F2 uncovered so you can glue the gear wire to the rear of F1A (described later). Use a different technique to cover the cowl: firstly coat the cowl with three coats of full strength dope, sanding between each coat. Cut strips of tissue that will run from F2 to the front of the cowl lip (about eight pieces should be enough). Damp the tissue, hold in place and then flood through with cellulose. The tissue can be pressed into place as the cellulose soaks through and softens the dope below. When dry, coat with three more coats of thinned dope, sanding between each coat.

Wings

Before building the wings, ensure the components are a good fit. Lightly sand the spars and edges of the ribs. The trailing edges should also be tapered, notched and sanded now.

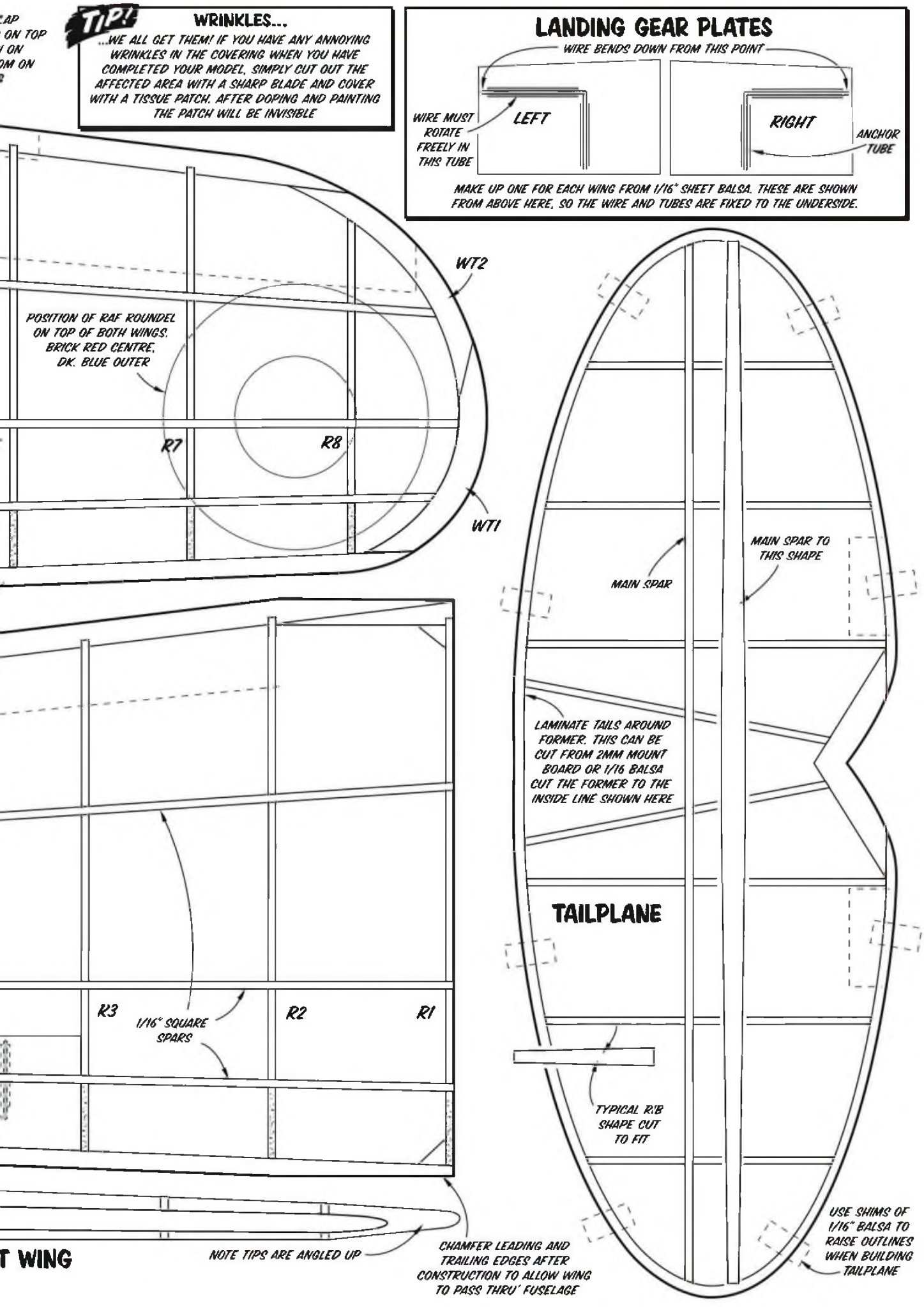
The first stage is to pre-glue the two wingtips parts (WT1 & WT2) together for each wing. Apply glue and pin the tips to the plan in the correct position. When dry, remove tips from the plan.

Start by building the right wing panel directly over the plan...

Pin the trailing edge and lower rear 1/16" square strip spar into position (do not push the pins directly into the 1/16" square stripwood,

Note how the shape of the wing apperture is cut out of 1/16" sheet balsa in-fill. Note also the fill-in 1/16" soft balsa sheet around the nose. You can afford a little weight at the front end like this, but keep the rear of the model as light as you can at all costs!

Take care to carve and sand smooth p


TIP!
WRINKLES...
...WE ALL GET THEM! IF YOU HAVE ANY ANNOYING WRINKLES IN THE COVERING WHEN YOU HAVE COMPLETED YOUR MODEL, SIMPLY CUT OUT THE AFFECTED AREA WITH A SHARP BLADE AND COVER WITH A TISSUE PATCH. AFTER DOPING AND PAINTING THE PATCH WILL BE INVISIBLE
LANDING GEAR PLATES
WIRE BENDS DOWN FROM THIS POINT
WIRE MUST ROTATE FREELY IN THIS TUBE
LEFT
RIGHT
ANCHOR TUBE
MAKE UP ONE FOR EACH WING FROM 1/16" SHEET BALSA. THESE ARE SHOWN FROM ABOVE HERE, SO THE WIRE AND TUBES ARE FIXED TO THE UNDERSIDE.
WT2
POSITION OF RAF ROUNDEL ON TOP OF BOTH WINGS. BRICK RED CENTRE, DK. BLUE OUTER
R7
R8
WT1
MAIN SPAR
MAIN SPAR TO THIS SHAPE
LAMINATE TAILS AROUND FORMER. THIS CAN BE CUT FROM 2MM MOUNT BOARD OR 1/16 BALSA CUT THE FORMER TO THE INSIDE LINE SHOWN HERE
TAILPLANE
R3
1/16" SQUARE SPARS
R2
R1
TYPICAL RIB SHAPE CUT TO FIT
T WING
NOTE TIPS ARE ANGLED UP
CHAMFER LEADING AND TRAILING EDGES AFTER CONSTRUCTION TO ALLOW WING TO PASS THRU' FUSELAGE
USE SHIMS OF 1/16" BALSA TO RAISE OUTLINES WHEN BUILDING TAILPLANE

1/18 SCALE 23.5 INCH WINGSPAN

TIP! PANEL LINES

FOR ADDED REALISM, THE NUMEROUS PANEL LINES AND CONTROL SURFACE OUTLINES CAN BE INKED ON AFTER THE MODEL IS PAINTED. BY FAR THE BEST PENS TO USE FOR THIS ARE TRADITIONAL 'ROTRING' RAPIDOGRAPH PENS. THESE PENS GLIDE EFFORTLESSLY OVER GLOSS OR MATT SURFACES GIVING A PRECISE, PERMANENT LINE. I USED A 0.25 SIZE AND A 0.35 SIZE ON MY MODEL

DUMMY CYCLONE ENGINE

1,100HP WRIGHT CYCLONE 1820-G105 ENGINE. MAKE UP CYLINDERS FROM BALSA DOWEL, WRAPPED WITH THREAD TO SIMULATE COOLING FINS. DOWEL IS THEN SPLIT IN HALF AND CUT TO LENGTH BEFORE BEING GLUED DIRECTLY TO THIS PATTERN. USE DRY GRASS STALKS FOR THE PUSHRODS. PAINT ENGINE GUNMETAL AND GLUE TO FRONT FACE OF N3.

GUN APPERTURES

N1

NOSE PLUG

SPINNER

AERIAL IS OFFSET TO STARBOARD. MAKE FROM 1/64" PLY

BRITISH BUFFALO'S SERVING IN THE FAR EAST HAD AN OPENING SIDE WINDOW INCORPORATED INTO THE SLIDING PORTION OF THE CANOPY

ROLL-CAGE FROM SANDED BALSA STRIP

ENTIRE CAN MOULD USIN

BALANCE HERE

F2A

COCKPIT FLOOR KEEL

F4

PEG SUPPORT

F3

F2

F1

UPPER KEEL (FRONT)

FILL-IN BETWEEN STRINGERS WITH SOFT BALSA SHEET BETWEEN N1 & N2

PROTOTYPE HAD FILL-IN BALSA BETWEEN STRINGERS FORWARD OF THIS LINE

CRACK LOWER 2 STRINGERS HERE TO MATCH KINK IN SIDE KEEL

FRONT SIDE KEEL

N1 N2 N3 N4 N5 N6 N7

N9

N8

F1A

NOSE PLUG: SEE DETAIL SECTION ON THIS PLAN

WING SET AT +3 DEGREES TO DATUM

POSITION OF WING THROUGH FUSELAGE SIDE

LOWER KEEL

STRING

POSITION OF VENTRAL WINDOW (SEE SHEET 3)

WHEEL POSITION WHEN RETRACTED. MAKE UP FROM SCRAP BALSA AND FIT TO OUTLINE OF FUSELAGE (SEE FRONT VIEW)

CARVE SPINNER FROM HARD BALSA BLOCK AND FIT AROUND PROP

NOTE: ALL NOSE COWL PIECES (N) ARE FROM 1/8" SHEET BALSA

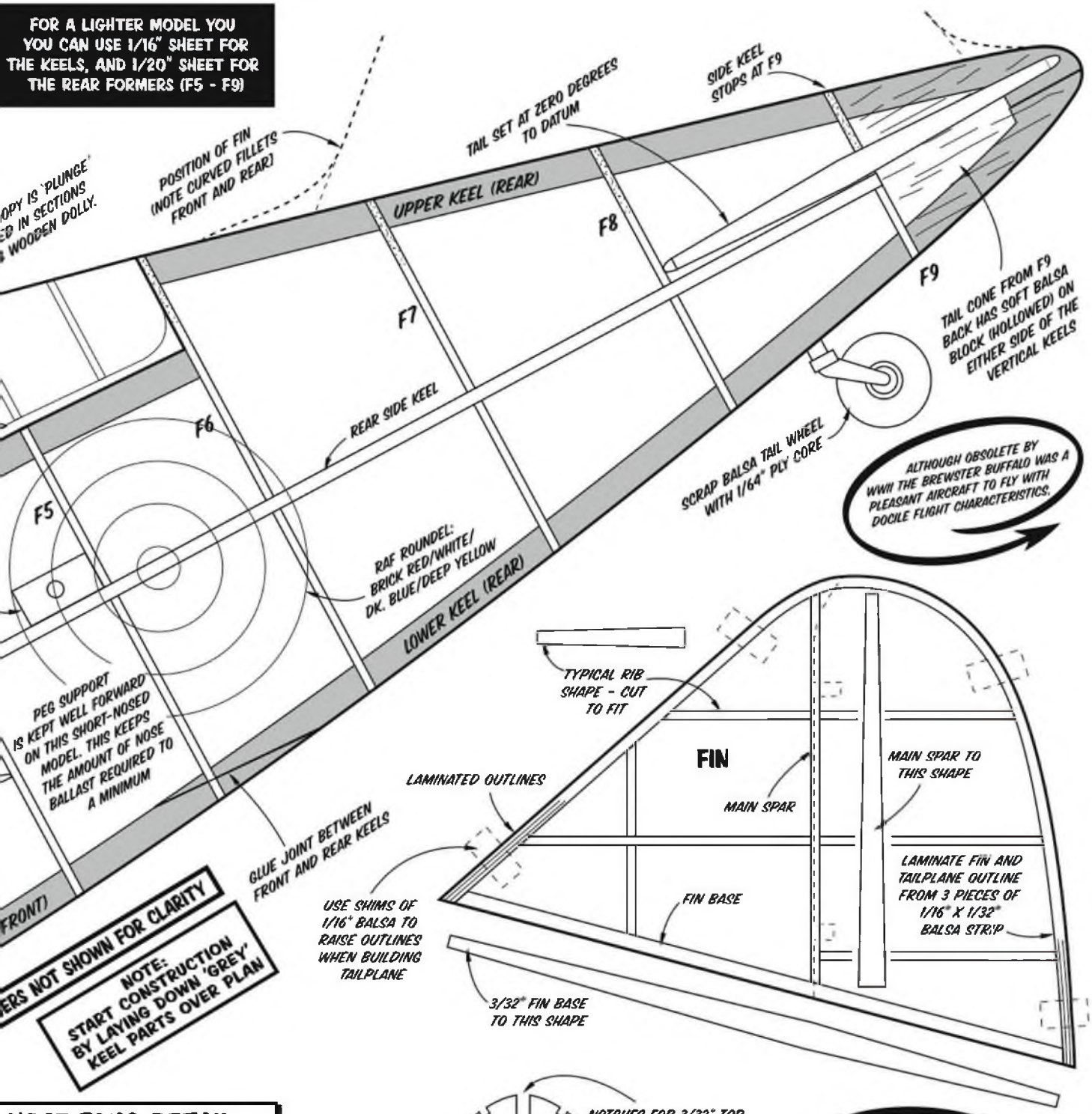
FACE THE REAR OF F1A WITH 1/64" PLY SHEET IF BUILDING YOUR MODEL WITH THE GEAR DOWN

PROPELLERS: USE AN 8" DIA. FOR INDOORS, OR A 9" DIA. PROP FOR OUTDOOR FLYING. A HEAVY PROP WILL HELP BALANCE YOUR MODEL

SEE SHEET 3 FOR DETAILS OF UN

© RICHARD CROSSLEY, JAN 2012. DESIGNED AND PRINTED IN ENGLAND

FOR A LIGHTER MODEL YOU YOU CAN USE 1/16" SHEET FOR THE KEELS, AND 1/20" SHEET FOR THE REAR FORMERS (F5 - F9)

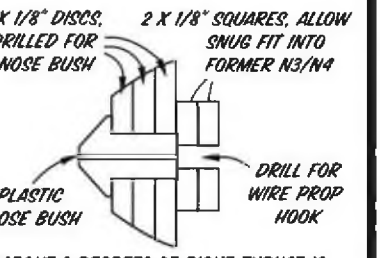


ALTHOUGH OBSOLETE BY WWII THE BREWSTER BUFFALO WAS A PLEASANT AIRCRAFT TO FLY WITH DOCILE FLIGHT CHARACTERISTICS.

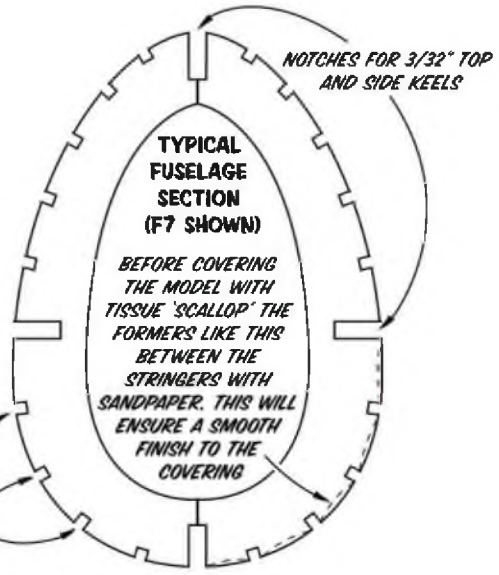
ERS NOT SHOWN FOR CLARITY

NOTE: START CONSTRUCTION BY LAYING DOWN 'GREY' KEEL PARTS OVER PLAN

NOSE PLUG DETAIL



ABOUT 3 DEGREES OF RIGHT THRUST IS REQUIRED, BUT NO DOWN THRUST



DERCARRIAGE

THE BUFFALO MK1 USED BY COMMONWEALTH FORCES IN ASIA WAS DESIGNATED MODEL 339E. THIS WAS SIMILAR TO THE US NAVY'S F2A-2

SHEET 1 OF 3

Brewster BUFFALO MK1

DESIGNED AND DRAWN BY

Richard Crossley

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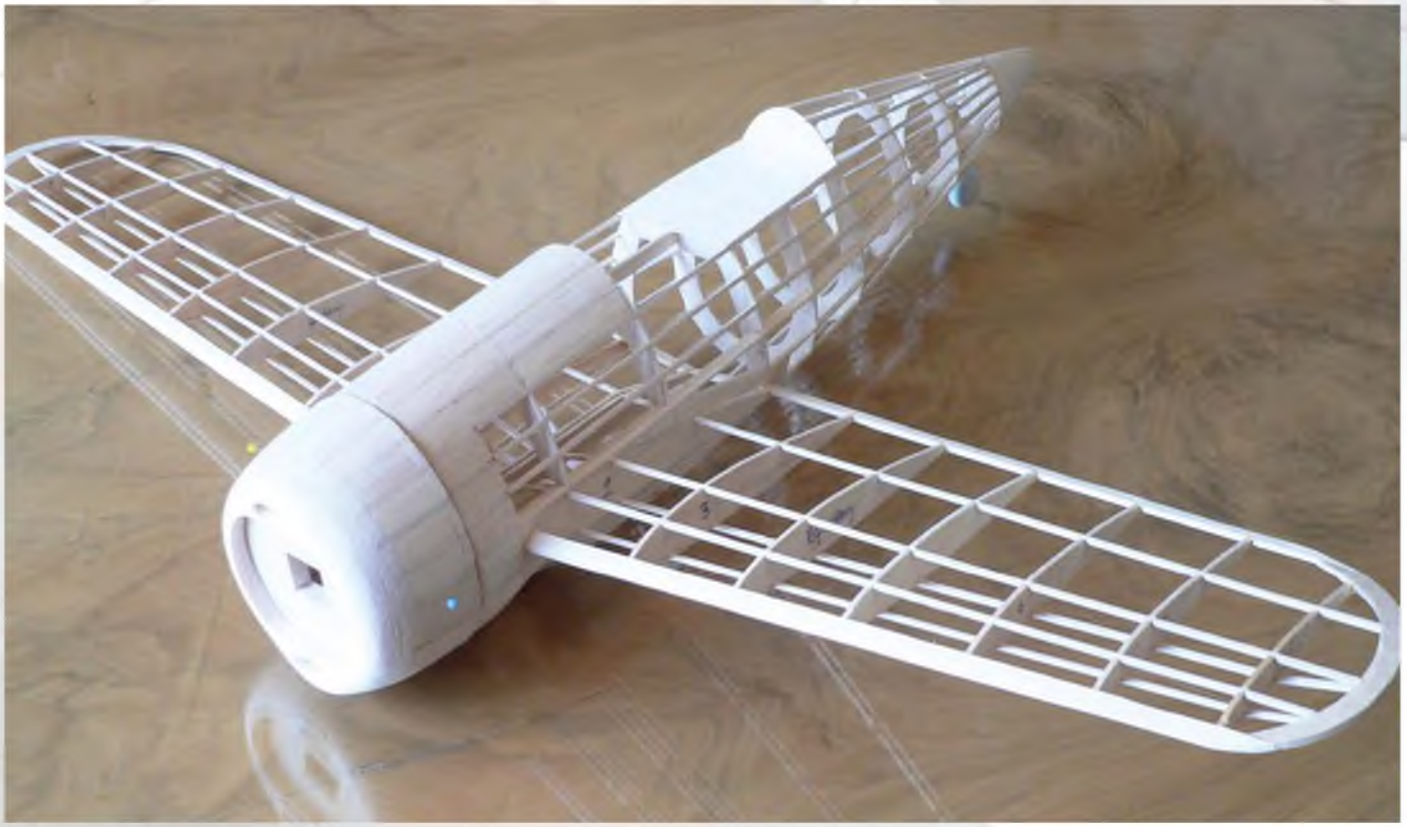


A test to see how the wing fits through the fuselage. The wing should be covered before you fix it through the fuselage.

push either side), glue and pin ribs R1 to R8 in place. R1 needs 'leaning' using the Dihedral gauge. The ribs glue into the notches in the trailing edge, you may have to sand the rear tips of the ribs slightly to fit. Glue on the 3/16" sheet leading edge (see template on sheet 2), pinning it to the front of the ribs - note that it does not touch the plan. Glue in place the pre-assembled wingtip, this is lifted free of the plan at its front edge, and is angled up very slightly - see front view of wing on plan 2 (you will have to crack the lower spar at R8 and bend it up to cement to the edge of the wingtip). Glue in place the top spars noting that they have to be cracked at R2 to bend down to meet R1.

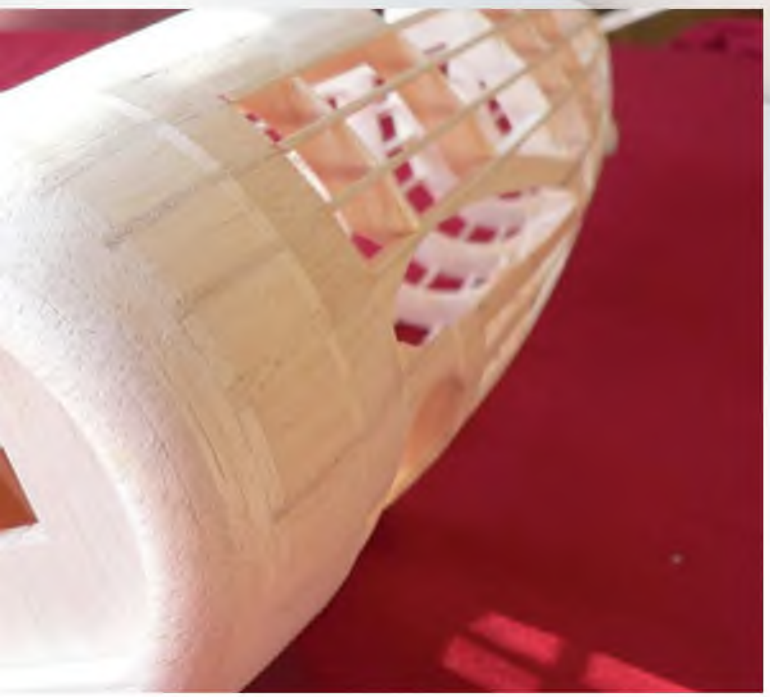
Repeat for the left wing and when dry, remove the wings from the building board, fix the lower front spar in place, and sand smooth, removing any glue blobs and rough edges. The leading edge is carved and sanded to the typical section shown on the plan.

Next, join the left and right panels together: pin one wing flat to the building board, and glue the two Centre ribs together, ensuring that the raised tip is propped up by 90mm (giving 45mm under each wing tip). This dihedral angle is slightly over scale, but provides stable flight. When dry, remove the structure from the board and ad gussets from scrap balsa. If you are installing the undercarriage, glue in place the landing gear plates between ribs 3 and 4.

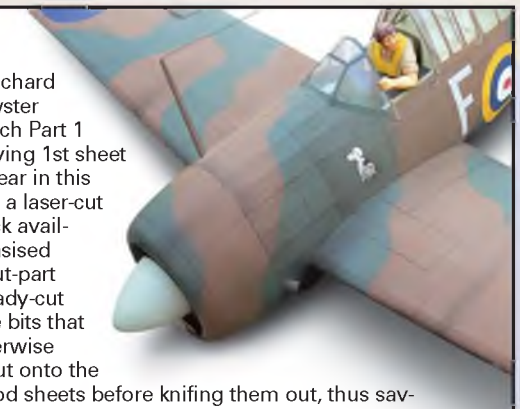
Now cover the wings with tissue. Apply tissue paste not only to the edges of the wings, but also to each rib, this makes for a rigid structure and helps prevent warps in the wing when water shrinking. I use clear commercial paper gum obtainable from stationery shops as an adhesive. Ensure the grain of the paper runs spanwise to prevent warps. Cover the bottom of each wing first, removing excess tissue with a sharp knife. Cover the upper surface and trim to leave about 1/16" all round which can be folded and glued over the leading and trailing edges.

Water shrink the tissue of the right wing panel only, and pin it to your building board with scraps of 1/8" balsa under the edges to hold it off the board whilst drying. This should result in a warp-free wing.

Shrink the left wing in the same way and dope with two coats of thinned dope. Glue the wing in place through the slot created in the fuselage, checking for alignment in plan and front view. ■



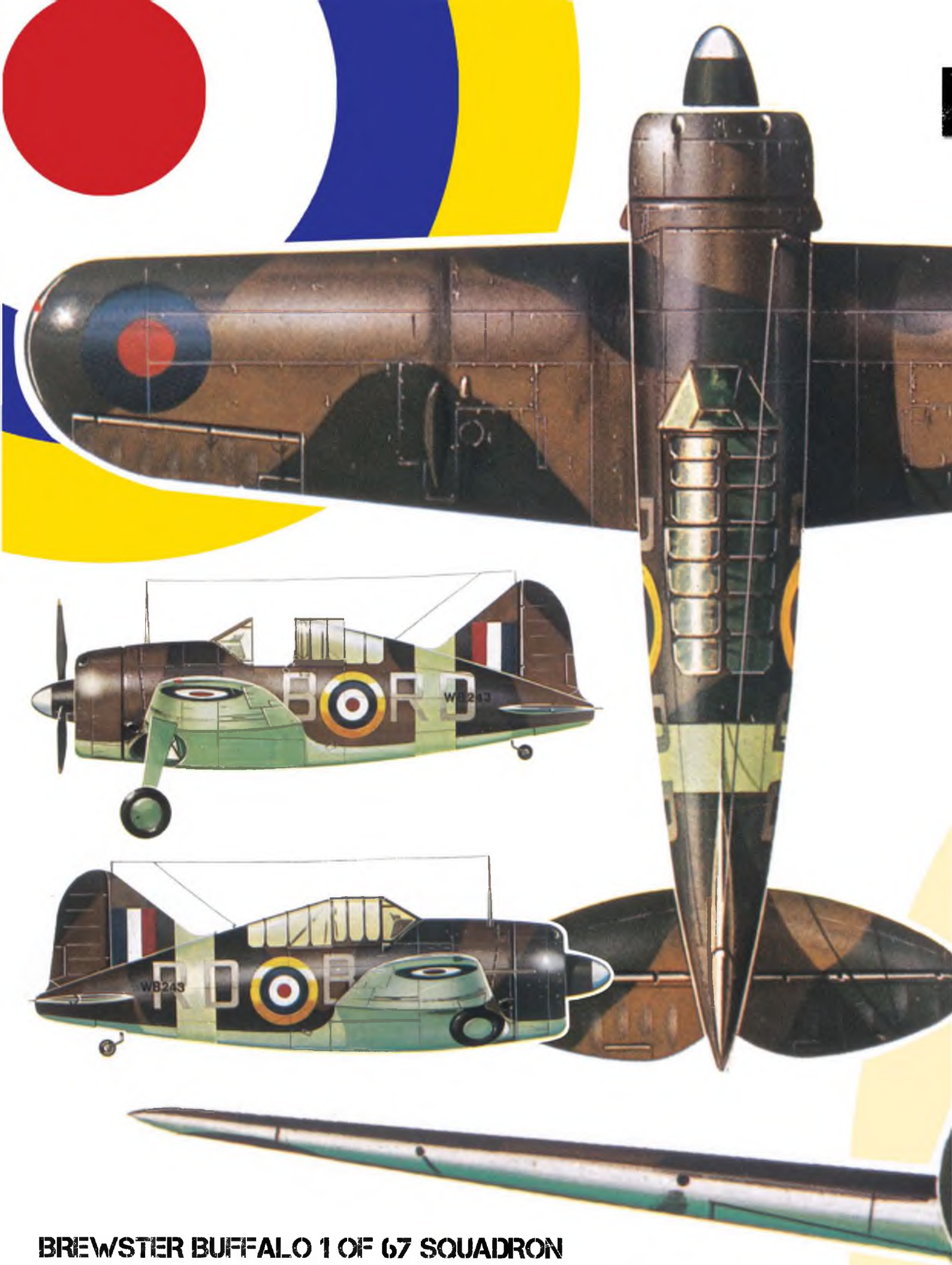
rofiles on the cowl lip. The intakes take a little care but the end result look good.



For readers looking to building Richard Crossley's Brewster Buffalo (for which Part 1 and accompanying 1st sheet of the plan appear in this issue), we have a laser-cut component pack available. As emphasised before, these cut-part sets provide ready-cut pieces of all the bits that you would otherwise have to trace out onto the balsa or plywood sheets before knifing them out, thus saving a fair bit of tedious time, so that the airframe assembly process can start immediately. The parts sets do NOT include strip and sheet wood that you can get from your friendly model shop. **PART 2, including Sheet 3** of the plan will be appearing in FSM June 2012 issue.

The parts set costs £80.00 plus £9.50 for carriage in UK. Sets can be supplied to overseas customers, with carriage costs quoted on an individual destination basis.

ORDER DIRECT FROM KEY PUBLISHING LTD,
PO BOX 100, STAMFORD, LINCOLNSHIRE, PE9 1XQ,
U.K. (TEL: 0178 480404)



BREWSTER BUFFALO 1 OF 67 SQUADRON
BASED AT MINGALADON AIRFIELD, BURMA, FOR
THE DEFENSE OF RANGOON, DECEMBER 1941.

BREWSTER BUFFALO
FLYING COLOURS

PLANS and PARTS

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

ELECTRIC CANBERRA B(I)8
Plan price £29.50 Plan No.262
Component Pack £175.00

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

PIPER SUPER CUB
Plan price £16.50 Plan No.146
Component Pack £95.00
G/F Cowl price £17.50

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

CORBEN SUPER ACE
PLAN PRICE £19.50 PLAN NO.275
COMPONENT PACK £65.00

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

HEINKEL HE 51
PLAN PRICE £17.50 PLAN NO.80
COMPONENT PACK £125.00

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

RUMPLER C.IV TAUBE
PLAN PRICE: £19.50
PLAN NO. 269
COMPONENT PACK: £110.00

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

De HAVILLAND DH 82a TIGER MOTH
PLAN PRICE £26.50 PLAN NO.051.
COMPONENT PACK £115.00

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

FE8
PLAN PRICE £19.50
PLAN NO.267
COMPONENT PACK £88.00

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

FELIXSTOWE F2A
PLAN PRICE £19.50 PLAN NO.276
COMPONENT PACK £110.00

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

FOKKER D.VII

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

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

HAWKER FURY

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

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

D.H. 103 HORNET

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

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
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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
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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 WWI fighter biplane, for .24-40 size motors and four function R/C. 56"(1422mm) wing span.

SOPWITH PUP

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

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

BUCKER BU180 STUDENT

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

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

050/12

WHAT DO THE CUT-PARTS SETS CONTAIN?

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

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Photo: A.J.Jackson Collection at Brooklands

Sleek profile of the first DH 71 are in stark comparison to the 'flying rockery' of the gargantuan three-engine Beardmore Inflexible under which the little racer is parked.

SUBJECTS FOR SCALE

THE OTHER 'TIGER MOTH

UNIVERSALLY KNOWN, THE DH 82 BIPLANE WAS IN FACT THE THE DH 71 MONOPLANE RACING AIRCRAFT PRE-DATED THE 'T

No air show organiser today would get away with a scene like this - the Civil Aviation Authority would come down on them like a ton of bricks with so many 'goofers' thronged around, as one of the two DH 71s runs up for take-off!

T - DE HAVILLAND DH-71

SECOND DE HAVILLAND DESIGN TO RECEIVE THAT NAME. IGGIE' BY SEVERAL YEARS

THE FIRST de Havilland aircraft to bear the name 'Tiger Moth' were the racing and experimental machines built as flying test beds for the Gipsy engine, designed by F. B. Halford to replace the A.D.C. Cirrus. Construction of the D.H.71, as it was designated, began at Stag Lane aerodrome, Edgeware, in North London early in 1927. Overall size was dictated as being the minimum required to accommodate both engine and pilot, so the cockpit dimensions were in fact determined by sitting the Company test pilot, Capt. Hubert Broad, against a wall and chalking around him the smallest practical fuselage cross section!

No more than a dozen people knew that the two aircraft were being constructed and only half that number saw the initial flight of the first machine (then fitted with a Cirrus engine) at dawn on June 24th of that year. Hubert Broad found the Tiger Moth handled well, apart from being generally oversensitive. After one or two flights, a strip of sponge rubber was fitted into each control surface hinge gap and following the third flight, the aeroplane was returned to the factory to be fitted with the prototype Gipsy engine. The second machine, which remained Cirrus-powered throughout its life, was still under construction.

Both aircraft had been entered for the 1927 King's Cup Race - the first registered as G-EBQU, to be flown by C. D. Barnard, while the second was registered as G-EBRV with Hubert Broad as pilot. Although the aircraft received their Certificates of Airworthiness the day before the race, the Gipsy engine was still awaiting Air Ministry approval and 'QU was thus withdrawn to be prepared for record attempts.

Photo: A.J.Jackson Collection at Brooklands

Although one cannot pretend that the 300 HP Napier engined De Havilland DH77 fighter prototype of 1929 was a direct decendant of the DH 71, there is asuperficial resemblance. Only one was built and the competing Hawker Fury won the production contract for the RAF.

The 1927 race was flown on July 30th during the August Bank Holiday meeting at Hucknall. Visibility on that occasion was poor with gusty winds, but after a bumpy and prolonged take-off, G-EBRV climbed away well. Later it was announced that Broad had landed at Spitalgate. It was, he said, 'So bloody rough' that at speeds over 140 m.p.h. every gust caused a movement of his hand on the control column, resulting in alternate diving and climbing, so he wisely descended at Spitalgate and withdrew. Despite conditions, 'RV had averaged 162 m.p.h. before retiring, with only 80 h.p. available under the cowl. A bump on the ground had caused the over-long take-off, jolting the throttle partly closed where it remained for several seconds before being noticed.

The following day, Broad flew 'RV back to Stag Lane, then returned to Hucknall in 'QU about 6.40 p.m., having covered some 120 miles at an average speed approaching 180 m.p.h. Later, he gave a demonstration flight, taking off and climbing 'like a rocket', displaying the Tiger Moth's considerable speed range and superb acceleration.

Construction followed conventional de Havilland practice - the wooden fuselage structure was plywood covered while the aluminium cockpit fairing was split on its centreline and hinged at each side. Heavy wooden bulkheads supported steel plate wing fittings with a fireproof bulkhead between engine and fuel tank. Two-spar wings of basic RAF 15 section were built in two halves and fixed at the fuselage centreline. Smaller wings spanning nineteen feet were built for pure speed work, but it was feared that the landing speed - normally 60 m.p.h. - would be too high. Thus, the 'speed'

The tightly cowled engine of G-EBQU and stalky, but 'clean' fixed main undercarriage.

'Short-back-and-sides' and 'grease-down' hair-style of the period certainly a definite advantage in a cockpit canopy this tight around the pilot!

wings were probably never fitted and the DH 71 certainly never flew with them.

Bracing wires were fitted in pairs to each wing spar and fixed to fuselage bulkheads and the ends of the rigid undercarriage struts. Shock absorption was by bungee cord housed within greatly enlarged wheel bearings, with a floating ring between wheel and bearing to reduce the friction resulting from the increased diameter.

The 5.23-litre Gipsy engine produced 135 h.p. in bench tests at 2,650 r.p.m, with a compression ratio of 5.5: 1 and the D.H.71's fastest recorded speed was 204 m.p.h. between Stag Lane and Harrow Church. Apart from improved performance with the Gipsy engine, handling of both machines was similar and although forward vision

In this view, the first DH71, G-EBQU is revealed with a revised colour scheme, although the black & white originals leave no clue as to what the colours were. No natty white overals in those days though!

Photo: A.J.Jackson Collection at Brooklands

SPECIFICATION

Crew:	1
Length:	18 ft 7 in (5.66 m)
Wingspan:	22 ft 6 in (6.86 m)
Height:	7 ft 0 in (2.13 m)
Wing area:	76.5 ft² (7.11 m²)
Empty weight:	618 lb (280 kg)
Gross weight:	905 lb (411 kg)
Powerplant:	1 x ADC Cirrus II inline piston, 85 hp

Back in 1927, monoplane airframe construction often still relied on the safety ofwire bracing between fuselage, undercarriage and wings as this picture illustrates.

was restricted by the extended engine fairing, the aircraft was quite narrow and Hubert Broad found "the visibility was not so bad". Having no flaps the landing approach had to be made close to the stall to prevent 'float' after flattening out.

The 100 km. record flight was made about 8 p.m. on August 24th after a violent thunderstorm; Broad flew from Stag Lane to Twyford near Reading, made a three-point turn and returned to Stag Lane. His speed was 186.47 m.p.h. On August 29th Broad and G-EBQU created a British altitude record of 19,191 ft. but an unserviceable barograph and lack of oxygen equipment forced him to descend, although the aircraft was still climbing at 1,000 f.p.m. A semi-enclosed cockpit canopy and a more streamlined entry for cooling air were later fitted.

G-EBQU was exhibited at the 1926 R.A.F. Display and again at the 1929 Olympia Aero Show, Taken to Australia in 1930 and re-registered VH-UNH, she crashed on September 17th while being flown for the first time by an inexperienced pilot at Mascot, N.S.W. The pilot was killed and the tail was later used in a homebuilt aircraft

Then, in 1928 G-EBRV, minus its engine, was suspended from the rafters at Stag Lane until used as part of an advertisement at Hatfield for the 1933 King's Cup Race, It was then slung from the roof at Hatfield where it rapidly deteriorated until destroyed during a bombing attack in October 1940.

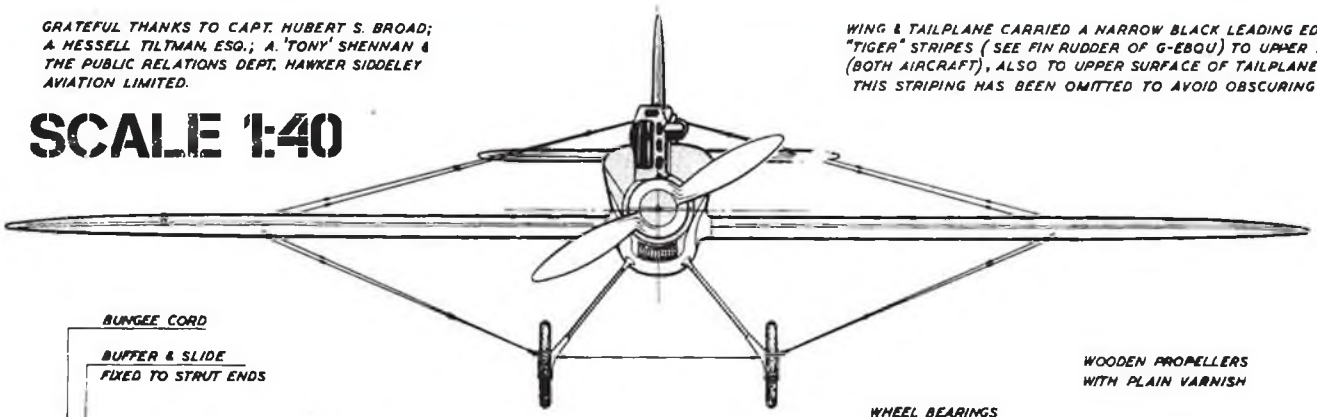
This Tiger Moth achieved 186 m.p.h. with 130 h.p. in the year when the 875 h.p. Supermarine S-5 won the Schneider Trophy at 281 m.p.h. - 66 % the speed on 15 % the power at a tiny fraction of the Supermarine's cost! Only the economic misfortunes of the period prevented realisation of the DH 71's true potential. ■

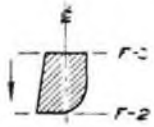
ABOVE & LEFT: Two views of G-EBQU prior to application of civil registration letters and, presumably, prior to the first test flight.

GRATEFUL THANKS TO CAPT. HUBERT S. BROAD; A. HESSELL TILTMAN, ESQ.; A. 'TONY' SHENNAN & THE PUBLIC RELATIONS DEPT. HAWKER SIDDELEY AVIATION LIMITED.

SCALE 1:40

WING & TAILPLANE CARRIED A NARROW BLACK LEADING EDGE STRIPE, WITH "TIGER" STRIPES (SEE FIN RUDDER OF G-EBQU) TO UPPER SURFACE OF WINGS (BOTH AIRCRAFT), ALSO TO UPPER SURFACE OF TAILPLANE (G-EBQU ONLY). THIS STRIPING HAS BEEN OMITTED TO AVOID OBSCURING RIB DETAILS.





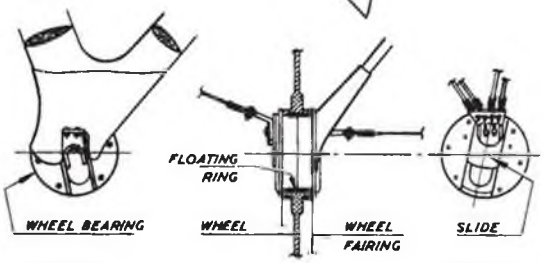
SECTION Y-Y: BETWEEN F-2 & F-3 ONLY

BUNGEE CORD

BUFFER & SLIDE FIXED TO STRUT ENDS

SECTION

BRACING WIRE FITTINGS FIXED TO BUFFER ENDS

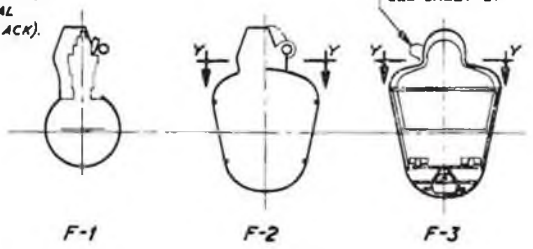


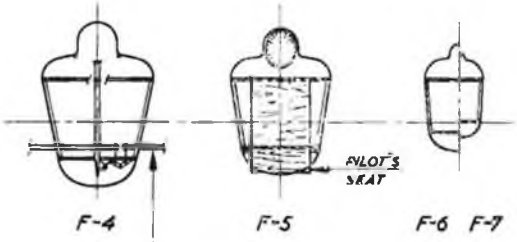
ARRANGEMENT OF WHEEL BEARINGS, SHOCK ABSORBERS & BRACING WIRE FITTINGS. THREE TIMES GIVEN SCALE.

WOODEN PROPELLERS WITH PLAIN VARNISH

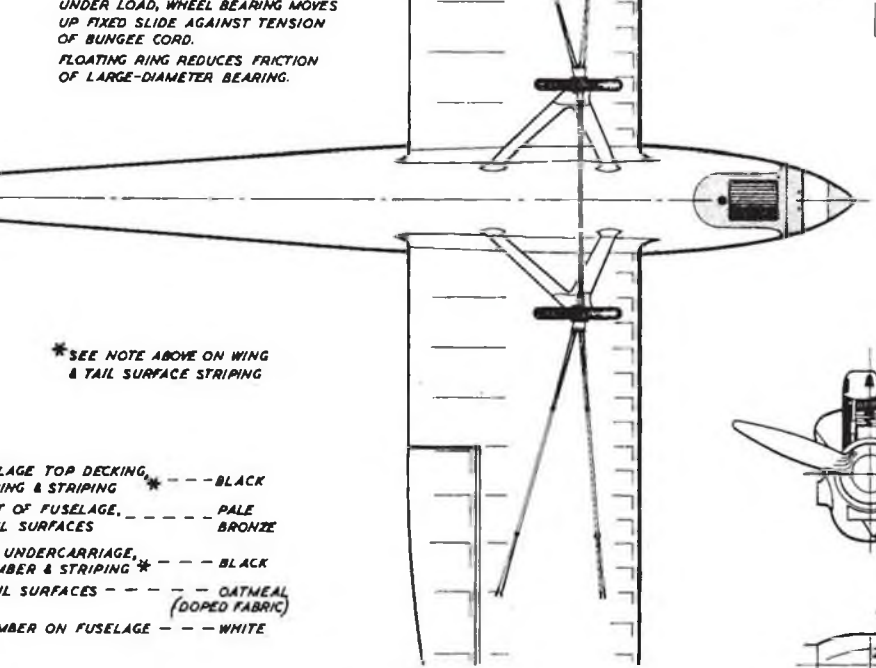
WHEEL BEARINGS NATURAL METAL, EXCEPT FINAL VERSION (BLACK).

FINAL VERSION ONLY. SEE SHEET 2.

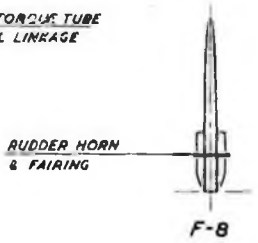




AILERON TORQUE TUBE & CONTROL LINKAGE

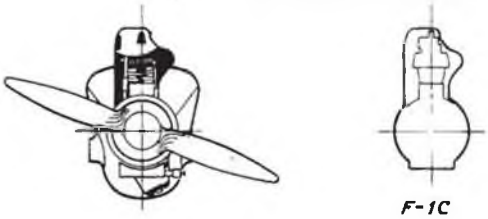


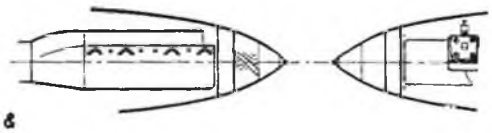
UNDER LOAD, WHEEL BEARING MOVES UP FIXED SLIDE AGAINST TENSION OF BUNGEE CORD.
FLOATING RING REDUCES FRICTION OF LARGE-DIAMETER BEARING.



*SEE NOTE ABOVE ON WING & TAIL SURFACE STRIPING

NOTE DIRECTION OF ROTATION OF CIRRUS ENGINE

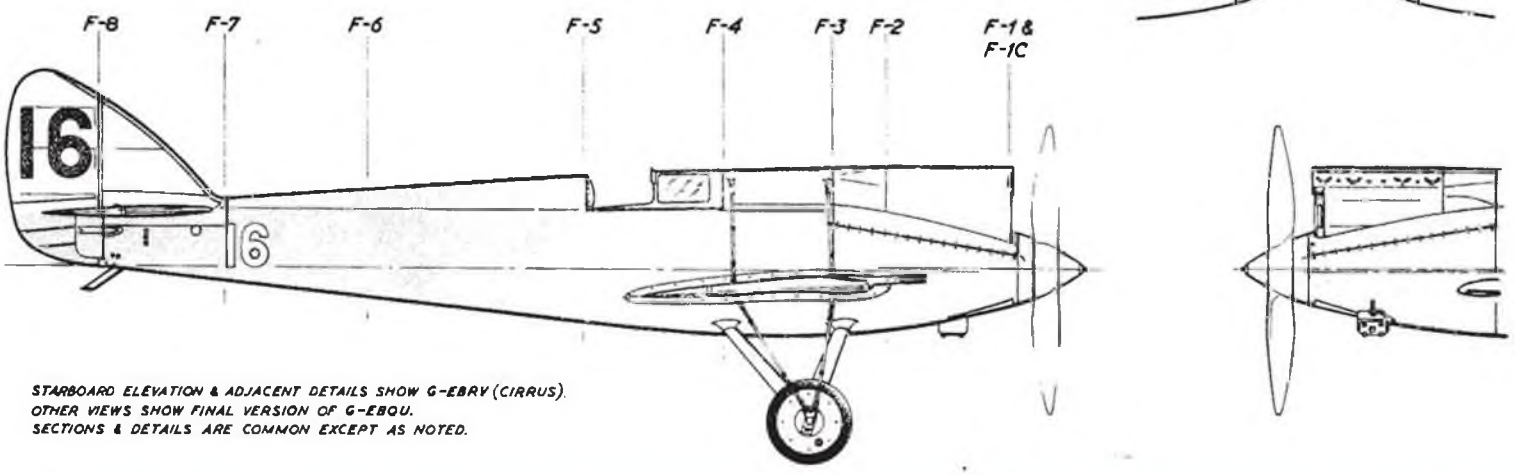




COLOURS

G-EBQU:
- NOSE, FUSELAGE TOP DECKING, ALL LETTERING & STRIPING * - - - BLACK
- LOWER PART OF FUSELAGE, WINGS & TAIL SURFACES _ _ _ _ _ PALE BRONZE

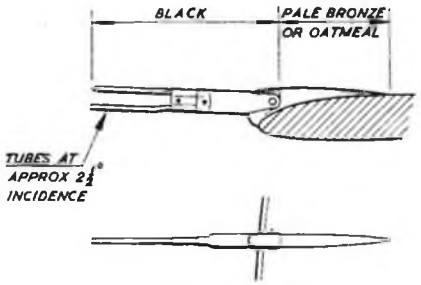
G-EBRV:
- FUSELAGE, UNDERCARRIAGE, RACING NUMBER & STRIPING * - - - BLACK
- WINGS & TAIL SURFACES - - - - - OATMEAL (DOPED FABRIC)
- RACING NUMBER ON FUSELAGE - - - WHITE



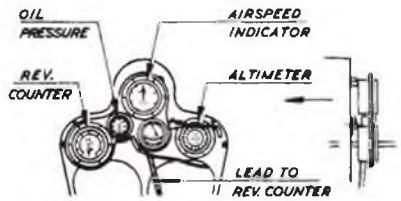
STARBOARD ELEVATION & ADJACENT DETAILS SHOW G-EBRV (CIRRUS). OTHER VIEWS SHOW FINAL VERSION OF G-EBQU. SECTIONS & DETAILS ARE COMMON EXCEPT AS NOTED.

DE HAVILLAND DH 71

RAF 15 AEROFOIL — ALL VALUES ARE IN PERCENTAGES OF CHORD															
STATION	0	1·25	2·5	5	10	15	20	30	40	50	60	70	80	90	95	100
UPPER	1·56	3·14	3·94	5·00	6·09	6·67	6·96	6·94	6·63	6·13	5·52	4·79	3·91	2·81	2·17	·94
LOWER	1·56	·76	·50	·18	·02	·18	·53	1·02	1·02	·71	·33	·06	·09	·21	·32	·94



AIRSPEED PITOT TUBE
THREE TIMES GIVEN SCALE



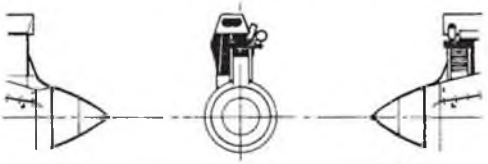
VIEWS ON INSTRUMENTS, ETC.

DATA

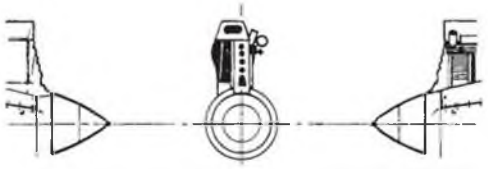
WINGSPAN	22'-6"
CHORD	4'-0"
WING AREA	76·5 ft²
OVERALL LENGTH	18'-7½"
WHEEL TRACK	3'-11"
EMPTY WEIGHT	618 lb
LOADED WEIGHT	905 lb

BOTH VIEWS APPLY TO THREE SETS OF NOSE DETAILS BELOW

ORIGINAL NOSE DETAILS - GIPSY ENGINE

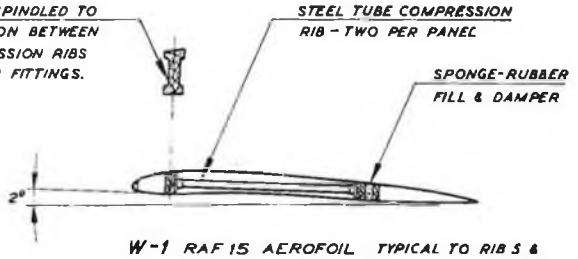


MODIFIED NOSE DETAILS - GIPSY ENGINE



NOSE DETAILS FOR 100 km RECORD FLIGHT

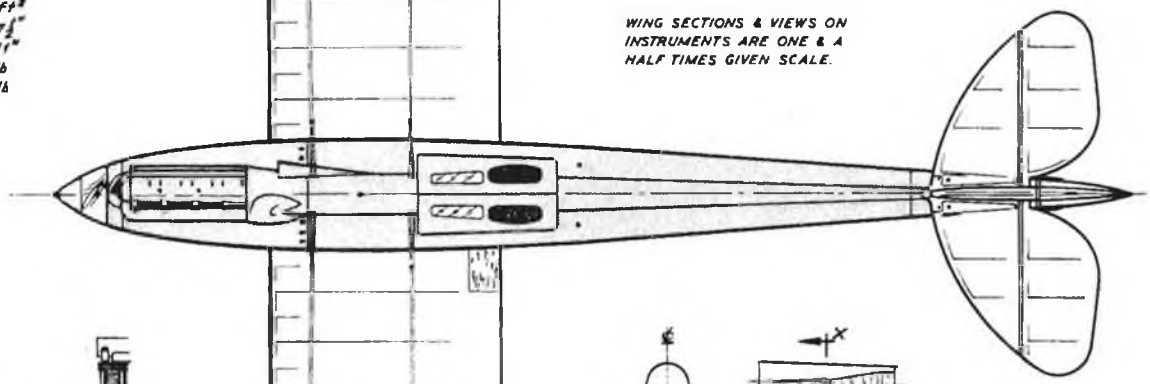
BRACING WIRES ARE OVAL SECTION, DOUBLED. BOUND WHERE SHOWN.

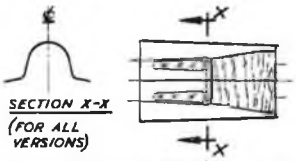


W-1 RAF 15 AEROFOIL TYPICAL TO RIB 5 & WITH REDUCING CHORDS AFT OF REAR SPAR TO RIB 9. TAPER OF BOTH SPARS BEGINS AT RIB 9.

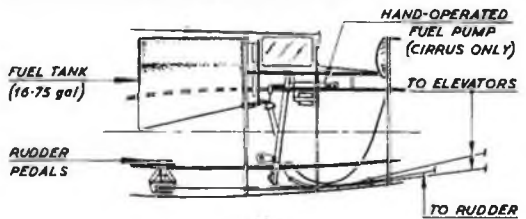
W-2 BASIC FORM IS RAF 15 AT 37" CHORD SHORTENED REAR END MATCHES REDUCED CHORD OF RIB 9 (SEE SECTION W-1).

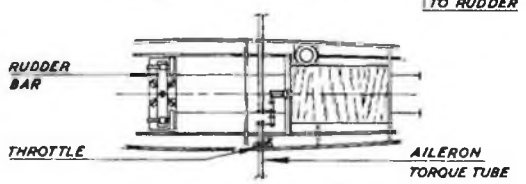
WING SECTIONS & VIEWS ON INSTRUMENTS ARE ONE & A HALF TIMES GIVEN SCALE.





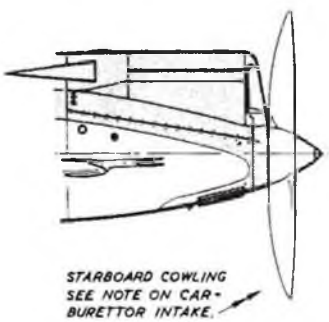
ORIGINAL COCKPIT FAIRING BOTH AIRCRAFT



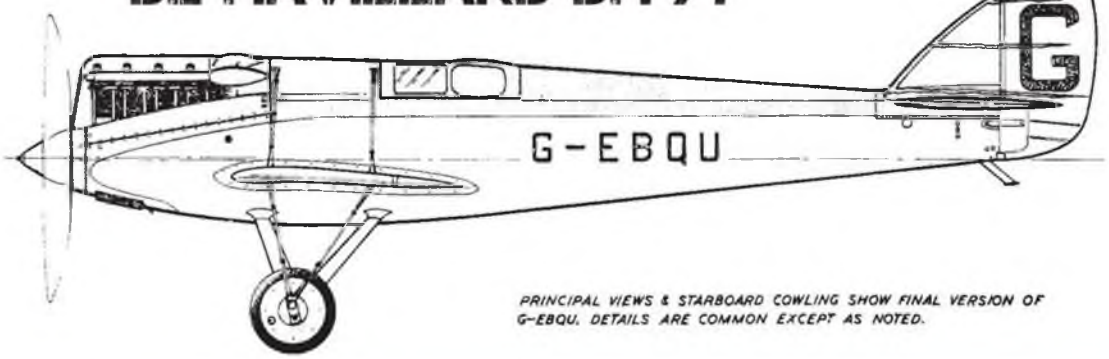


SECTIONAL PLAN ON TOP LONGERONS

FOR ALTITUDE RECORD FLIGHT, AN INTERNAL CARBURETTOR INTAKE WAS FITTED & THE CIRCULAR OPENING SHOWN ABOVE DELETED.



STARBOARD COWLING SEE NOTE ON CARBURETTOR INTAKE.



PRINCIPAL VIEWS & STARBOARD COWLING SHOW FINAL VERSION OF G-EBQU. DETAILS ARE COMMON EXCEPT AS NOTED.

Shelflife

HURRICANE R4118
A GREAT BATTLE OF BRITAIN SURVIVOR LIVES ON IN THE SKIES

Book of the Month

ISBN: 978-1-906502-73-7.
Tel: 020 7401 2100.
Price: £12.99

By Peter Vacher, with a Foreword by Wing Commander Bob Foster DFC. Softback, 244 x 174mm, 160 pages, b/w & colour illustrations. Published by Grub Street, available from Ian Allan Bookshop, 45/46 Lower Marsh, Waterloo, London. SE1 7RG.

In 1982 when he was travelling in India, Peter Vacher stumbled on the remains of a British aircraft - a Hawker Hurricane Mark I, a veteran of the Battle of Britain. It was in a dreadful state. Could he restore it? Would it fly again? Not until fourteen years later did he decide to act and after six years of wrangling he got the icon home.
Then the truly difficult process of restoration began - a worldwide search for parts, careful reconstruction, flight testing - until in 2005 it flew again to the delight of thousands of enthusiasts.
Along the way Peter reunited three auspicious veterans - Peter Thompson, 'Bunny' Currant and Bob Foster - with R4118, men who had flown her during the war. To this date, the aircraft's grace and splendour in flight is enjoyed by crowds across the UK. Buffs will be riveted by his struggle and amazed by the brilliance of this successful re-build.

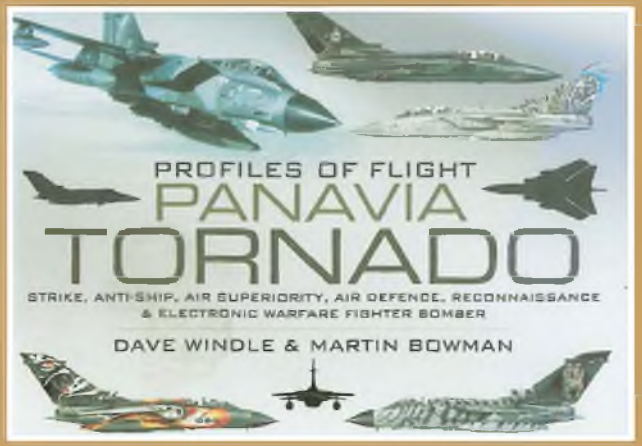
PROFILES OF FLIGHT: PANAVIA TORNADO

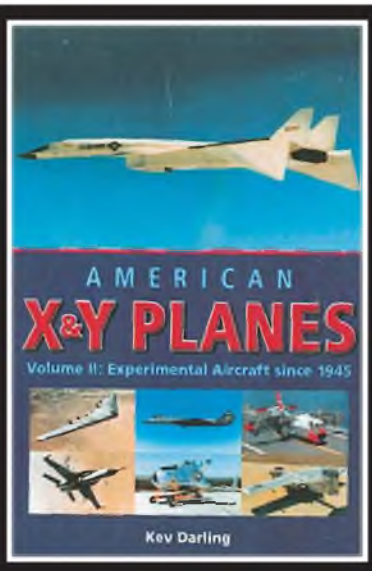
Strike, Anti-ship, Air Superiority, Air Defence, Reconnaissance & Electronic Warfare Fighter Bomber.

ISBN: 978-1-84884-235-9. Tel: 020 7401 2100. Price: £19.99

By Dave Windle & Martin Bowman. Hardback, 182 x 252mm landscape, 88 pages, b/w & colour illustrations. Published by Pen & Sword Books Limited, available from Ian Allan Bookshop, 45/46 Lower Marsh, Waterloo, London. SE1 7RG.

This book provides vivid descriptions and photographs of Tornado operations and training alongside the world famous colour profiles created by Dave Windle of the type in different operational modes, configurations and colour schemes.
The Tornado has been the backbone of the RAF within its many different theatres of operation. It started as a European venture between Germany, Italy and the UK, based on the original swing-wing technology invented by Barnes-Wallis, but was also successfully exported to two Middle-Eastern air forces. It is likely to remain in service for several years to come.
Dave Windle has gained the reputation of being Britain's most skilful creator of aircraft profiles. He draws upon his service with the RAF to maintain complete accuracy. Martin Bowman is one of Britain's foremost aviation historians and has written many books and articles.





AMERICAN X&Y PLANES

Vol. II: Experimental Aircraft Since 1945

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By Kev Darling. Hardback, 252 x 180mm, 143 pages, b/w & colours illustrations. Published by The Crowood Press, The Stable Block, Crowood Lane, Ramsbury, Marlborough, Wiltshire. SN8 2HR.

In 1945 the allies returned home with much technical information from German research concerning jet engines and swept wings. Though the USAAF had already deployed an early batch of jet fighters, Lockheed P-80 Shooting Stars, to Italy in 1945, their centrfugal-flow engines had limited scope for further development compared with the axial-flow engines used by the Germans. Also, it was obvious that a new breed of airframes was needed to take advantage of the huge power increase offered by jet engines: the answer was the swept wing carefully coupled with a blended fuselage.
Contents cover: Introduction to the author's second volume of American prototype and experimental aircraft; Bomber development After World War Two; US Navy Jet Prototypes; Post-1945 Prototype and Experimental Fighters; Strange and Dangerous Beasties; Conclusion; Bibliography; Index.
Many of the most interesting aircraft ever built existed only as prototypes or experimental types, and many have been overlooked by historians as a result. This second of a two-volume history of 'X' and 'Y' planes from the earliest years of aviation to the present day, tells the history of these little-known but often very important machines.

THERE WAS A GOOD BLEND OF INTERESTING MODELS AND TRADE STANDS.

SCALE SHOWTIME *by Alex Whittaker*

In these straitened economic circumstances, it gratifying to see note that the *Large Model Association* has managed to maintain not just free parking, but also free entry to their famous season starter. The variety of models was very, very, impressive, with half-scale models now appearing in some numbers. Also, it was good to see so many part-completed winter projects, so one could appreciate how they were being accomplished. The venue is large and airy, and there were a goodly number of Trade Stalls, so good in fact that I spent over a hundred quid on vital scale items!

Models in the hall

The LMA Spring Symposium follows a great format, first devised all those years ago for Haigh Hall. In essence, all the builders are available alongside their models. You can admire their handiwork and ask any questions you like. No fences, no barriers, no cordoning-off. This works spiffingly well most of the time, and on your behalf, I was keen to try and record all the models on display.

However, one or two forgetful pilots left their models both un-documented and un-attended, leaving me to scratch my bonce. All I will say, gentle reader, is that I did my best, and they have been chastised! They know who they are ... Tee hee.

Bucker Jungmeister

I love tubby Jungmeisters, especially in traditional bright yellow schemes, though for some reason they always remind me of Reichsmarschall Fatty Goering. David Bell was exhibiting his half-scale version. This well finished example was built from a CNC kit supplied by *Falcon Aviation*. It is 139" in span, and weighs 58 lbs. At the time of writing it is waiting test flight.

1913 Ponnier Racer

My mate Ian Turney-White has a penchant for French flying stuff. Built to 2/3rds scale, his new version is even bigger than his last, which was half-scale! That version was built in 1995 and had a total of 267 flights. The new model is fitted with a *King* 200cc motor and features authentic wing warping. It is mostly hardwood construction, and should be ready to fly later this season.(Wonder how long it will be before he turns out one at 1:1 scale - Ed?)

LMA BRADFORD
Spring Symposium 2012

NOW IN ITS SECOND YEAR AT ITS NEW VENUE IN YORKSHIRE, THIS FAMOUS INDOOR EXHIBITION DID NOT DISAPPOINT

BARRY BANKS' ONE-THIRD SCALE BRISTOL FIGHTER. STUNNINGLY GOOD!

Mitsubishi Ki-15-1

Readers may remember Mike Stuart's typically immaculate Kamikaze Mitsubishi Ki-15-1, which placed sixth in the Co2 / Electric class at the BMFA F/F Indoor Scale Notts Nats a few years ago. I don't know if Brian Rawcliffe was influenced by that model but his much larger R/C version is similarly superb. It is a scratch-built 1936 Mitsubishi Ki-15-1, Allied Codename 'Babs'. Model is quarter-scale and powered by a Roto 85cc twin petrol engine, driving a 26"x10" prop. I hope to get the flying shots in due course.

Fokker D.VII

Harry Harland's Fokker DVI in German Ace Ernst Udet's colours is beautifully finished. It is kit-built to 1/4 scale, weighs 26 lbs, and spans 88". It is powered by a Saito G36cc four stroke petrol engine. Lozenge pattern is from Glen Torrence, and the wheels are Dubro items of 9 3/8 diameter.

Hellcat

Paul Crawshaw brought along his newly completed two-tone blue Grumman F6F Hellcat is 96" in span and weighs 40lbs. It is powered by a ZDZ 80 petrol engine and has *Sierra* retracts.

De Havilland DH 85

John Rickett has begun yet another De Havilland design. This time it is a 1/3rd scale DH 85 and is nearing completion. Construction is entirely from balsa, ply, and cyparis, with a fibreglass cowl. John is a full-size vintage light aircraft owner and pilot, so naturally, the model will be covered in Ceconite full-size aircraft fabric. The pilot is from Perfect Pilots. John has yet to decide upon the engine, though a four-stroke single cylinder petrol is likely. The undercarriage is by *Unitracts*. The model spans 12' 6". and weighs 35 lbs.

BAE Nimrod MRA4

Now this is an ambitious project! Mike Altham's stunningly impressive Nimrod has advanced since we last saw her. She spans 3.5 metres, weighs 150 lbs, and is fitted with 2x 160 sized gas turbines. The sheer amount of balsa wood used in the fuselage commands respect, as do the ducts for the engines. Mike will have to get a move on, because he will soon be a father, and may have to deal with nappies rather than Nimrods.

It could be a fitting trubute to an aircraft that the RAF will never get, after the M.o.D. spent £8 Billion to build them, prior to chopping them up for the scrap-man!

VC-10 K Mk3 airborne tanker

The enormous Buck's Composites VC 10 is not far from completion. You may remember this concern was formerly known as Fibretech UK. The VC 10 spans 16 feet (4.88M) and target weight is around 140 pounds. It is powered by 4x*Wren* turbines. It has no fewer than ten flap sections, with 5" of travel. It has a trimmable tailplane angle, to offset trim changes when flap is selected. The team are considering the installation of a tri-alling refuelling hose at a later date.

This year marks the 50th anniversary of the full size VC10's

first flight and the last RAF tanker is due for retirement this year too.

Grumman Panther

This was another very ambitious project: two modellers scratch building matching all moulded epoxy-glass Grumman Panthers,

Mike Altham's Nimord spans 3.5 metres, weighs 150 lbs, and is fitted with 2x160 sized gas turbines. Impressive ducting and CNCing on the Nimrod.

Ian Turney-White's 2/3rds scale Ponnier Racer takes shape.

John Rickett's 1/3rd scale DH 85 nearing completion. Model spans 12' 6", and weighs 35 lbs.

Dave Johnson's mighty 20 foot span Vulcan is continues to make progress.

with epoxy skinned balsa / ply wings. The F9F-2P reconnaissance model (no gun ports in nose) took about four years to complete. The undercarriage alone took a year, and the fuselage plugs, moulds, and components, took another year of "spare time". The scale is 1.63, and weighs 9 kgs without fuel.

The display model was built by George Firth from fibreglass components made by Jim Ashcroft. The quality of fit and finish was excellent. The paint system is cellulose paint and oil pastels. The model is powered by a *Wren 70* gas turbine. It has working flaps, retracting undercarriage, slding canopy, dive brakes, and drooping leading edge.

Spitfire Mk.2a

Refurbishment has never gone away, and is definitely prominent on the modern aero-modelling agenda. There were two or three major 'refurbs' on view this year. The first such project I spotted at Bradford this year was Rob Buckley's *Flying Legends* kit, originally built in 1998, and now in the middle of a full refinishing. The model is built to 1:5 scale, weighs 25 lbs, and has wingspan of 89 inches. It is powered by a 3W 40cc petrol engine.

Fokker F.27-100 Friendship

Restoration Engineer Rob Buckley is also refurbishing a Fokker F.27 Friendship twin engine airliner. He found the model on eBay, and although built many years ago, it has remained a virgin hangar queen. Rob is currently stripping back the paintwork to make good, then he will refinish in epoxy glass cloth. Originally intended for two .90 sized glows, Rob intends to fit an electric power train. The model is built to 1:86 scale and

Massive VC 10 spans 16 feet (4.88M) and target weight is around 140 pounds. VC 10 - 2 of the 4xWren Turbines.

MIKE ECCLES HAS REFURBISHED AND REVAMPED ROGER BALE'S WELL KNOWN TIN GOOSE (FORD TRI-MOTOR), ORIGINALLY POWERED BY THREE FUJI 35S.

'TONY SLATER'S ONE THIRD SCALE ROLAND DV 1 - A CABINET MAKER'S DREAM, WITH ITS FINELY CRAFTED MONOCOQUE WOODEN FUSELAGE.

weighs 30 lbs. Its wingspan is 11 feet and it is 8 feet long. I have flown in a Fokker Friendship and I remember it was like being in a very noisy cigar tube.

Bleriot Parasol 1914

This model was scratch built by the late Arthur Searle, famed pioneer of the Large Model Association. It is built to 1/3rd scale, and weighs 42 lbs. It has a wingspan of 13 feet, and is powered by a 70cc two-stroke twin, which came from a snow-blower. Its current owner is Dave Bailey. The model employs wing warping rather than ailerons.

Avro Vulcan B2

Dave Johnson's mighty 20-foot span Vulcan continues to make progress. The model was designed and CNC-cut by *Falcon Aviation*, who reckon that is the largest kit in the world. It really is huge.

Luton Minor LA 4A

Tony Hill is nephew to Lionel Plant, the constructor of the original full size Luton Minor. Tony's faithfully authentic model spans 12 feet six, and weighs approximately 50 lbs. It is powered by a *DLA 112* petrol engine and the model's construction closely follows that of the original. It is exquisite.

Stinson Reliant SR9

There was a beautiful Stinson Reliant built from the famous, if slightly inaccurate, *TopFlite* kit. Dave Houghton has got her to the covering stage, and she spans 100" and weighs 27 lbs. She is powered by a *Saito 182* four-stroke twin engine and will be finished in *Koverall*.

Spacewalker II

Another demanding long-term project is nearing completion. Andy Boylett is on the home stretch with what he reckons is the largest single prop model aircraft ever built. This is a half-scale / 14 foot span Spacewalker 2 from the factory drawings. The model is fitted with twin/tandem Turnigy 15 Kilowatt-rated motors (20Kilowatts peak). I hope to be there when she test flown.

Howard DGS-6 Mr Mulligan

This elegant Golden Age high-wing monoplane has been a modelling favourite for decades. John Townsend's model is superbly crafted, and weighs around 120 lbs. It looks close to accepting her covering and has been built to 45% scale to produce a wing span of 171 inches or 4.34 metres. It will be fitted with a 342cc boxer twin and the dummy engine intended to hide it was is impressive.

Tiger Moth

Stan Mellor brought his green and white 1/3rd scale Tiger Moth 'Tango Juliet, complete with Tiger Club livery. The model spans 111" and weighs 11 kgs. She is powered by a Zenoah 62cc petrol engine and is 90" long.

Fairey Flycatcher

My old mate Ken Dallow has now almost finished his second Fairey Flycatcher. The first one was a kit, but this scratch built one is a dead-on accurate scale model, built to 1/4 scale to Ken's own plan It weighs 22 lbs, and spans 87 inches. The model is powered by a Saito 36cc petrol four stroke engine and is traditionally built of balsa, ply, and cyparis, covered in *Solartex*, and will be sprayed in a silver dope finish.

Bristol F2B 'Brisfit'

Scale maestro Barry Banks has produced another winner. His latest, a one-third scale Bristol F2B is just about perfect - better than I can describe to you in mere words. In every way, this a rare and beautiful thing. A frighteningly faithful, museum quality, radio-controlled flying model. The fit and finish has to be seen to be believed. More details when I have them. Knowing Barry the Brisfit will be ready next week!

Nieuport 24

'Tony Slater's spritely silver Zigomar 5 Nieuport 24 is built to 1/3rd scale, spans 108", and weighs 26 lbs. It was built from the *Balsa USA* kit, and powered by an RCG 62cc direct drive petrol engine. This is a lovely model, and I thought the cowling and dummy engine were utterly convincing.

Roland D.VI

Tony Slater's one third Roland D.V1 was a cabinet maker's dream, with its finely crafted monocoque wooden fuselage. A very impressive model with loads of 'presence'. I cannot give you any more details since Tony did not

Grumman Panther, the F9F-2P version, to 1:63 scale and weighing 9 kgs without fuel. Built by George Firth from fibreglass components made by Jim Ashcroft. Powered by a Wren 70 gas turbine.

Mr Mulligan is built to 45% scale, and spans 171 inches. 342cc boxer twin.

The "Nearly Done Aircraft Company Inc's" DH 94 Moth Minor. 146"span, weighs 22 kgs, and powered by a Revolution 50 electric motor.

ADFA Models impressive new half-scale all CNC Decathlon kit. (Telephone: 01938 811969).

present any, but it is a model of the highest class.

Fournier RF-4

Alan Cantwell was displaying his almost finished airframe of the RF-4. It will be powered by an *MVVS* 26cc petrol engine and spans a majestic 152 inches. She is built from the *ADFA Models* kit (Telephone: 01938 811969) and weighs 11 kgs.

De Havilland Moth Minor

It was good to see the *Nearly Done Aircraft Company Inc's* DH 94 Moth Minor. This was 146" in span, weighed 22 kgs and powered by a Revolution 50 electric motor. The Moth Minor is traditionally built from balsa, cyparis, and plywood.

Ford Tri-Motor

Mike Eccles has refurbished and revamped Roger Bale's well known Tin Goose (Ford Tri-Motor), originally powered by three *Fuji 35s*. Incidentally, Roger is very well, but with advancing years he has decided that the time has come to fly Clubman sized models. Fear not, he will still be watching the Big Uns with the rest of us punters.

Twin Mustang P-82E

John Evans' thrilling Twin Mustang was on display. This is built to 1/5th scale, spans 108", and weighs in at 60 lbs. She is powered by 2x38cc Zenoahs and is traditionally built from balsa and ply. The superb retracts were built by Alan Senior.

Laird-Turner Special

OK, break out the superlatives - this is a LARGE model. Half size in fact. It has been built by John Braithwaite using similar techniques, materials, and finishes as per the full-size. The majority of the model is covered in plywood, demonstrating exactly the same imperfections as the real thing. The underlying structure is mainly hardwood stringers and frames with plywood formers and all skinned surfaces.

The model has doped finish as per the original and has a Westlake 350 Twin with Becker ignition installed. *Flightline Decals* are supplying all the maskings for the Champion logo and race numbers. The model looked mightily impressive in the hall, and will look spectacular in the air too.

Stampe et Vertongen SV-4B

One biplane had the look of a Tiger Moth with an all-weather cockpit, but those of us long in the tooth spotted it instantly. We could see that it was actually a Stampe SV-4B biplane, built from the beloved old *Svenson* kit. What is more, this one was bought from Jim Davies Models, Birmingham, too. Unfortunately, no other details were available.

Cessna 336

The Cessna 336 is a twin with a difference. This twin deploys its engines fore and aft, and has bags of character. The part-completed example on display was built by Graham Ailsby from the celebrated Wendell Hostetler plan. It is 10 feet in span, weighs 22 kgs, and is powered by two 57c petrol engines. It's a smashing project with twin booms and lots of curvy cowlings.

Scale and CNC Stuff

Before closing, I have to remark that there were a number of trade stands offering professional laser and CNC cutting services for we scalistas. In effect scale modellers can now raid the back catalogue of scale designs from the last 70 years and have anything they like kitted. Also a number of specialist scale items were available on the trade stands, so it was doubly interesting.

The Verdict

The LMA have done us proud again. A superb exhibition, with a splendid variety of models. The trade presence was such that you could indulge in some luvverly Sunday morning retail therapy. On top of all this, the LMA continue to plough their resources back into the hobby - and remember, that the LMA have kept the Spring Symposium entirely free. ■

Rob Buckley's Spitfire Mk IIa built to 1:5 scale, weighs 25 lbs, and a wingspan of 89 inches. Powered by a 3W 40cc petrol engine.

Rob Buckley;s Fokker Friendship built to 1:86 scale and weighs 30 lbs. Wingspan is 11 feet, and 8 feet long.

Dave Bailey's Bleriot Parasol 1914 is 1/3rd scale, and weighs 42 lbs. Wingspan 13 feet, powered by a 70cc two-stroke twin.

Tony Hill's Luton Minor spans 12 feet six,weighs approximately 50 lbs. DLA 112 petrol engine.

That's a big plan! Ian Redshaw and Chris Poyser have their work cut out for their Handley page bomber.

Stampe SV-4B biplane, built from the beloved old Svenson kit, and bought from Jim Davies Models, Birmingham, too! Unfortunately, no other details.

Half-size Laird Turner Special built by John Braithwaite. Westlake 350 powered. Wow!

'Tony Slater's Zigomar 5 Nieuport 24. 1/3rd scale, spans 108", and weighs 26 lbs. RCG 62cc direct drive petrol engine.

Ken Dallow's Flycatcher built to 1/4 scale to Ken's own plan, weighs 22 lbs, and spans 87 inches. Saito 36cc power.

Andy Boylett's half-scale / 14 foot span Spacewalker 2 from the factory drawings. Fitted with twin/tandem Turnigy 15 Kilowatt-rated motors (20 Kilowatts peak).

Dave Houghton's Stinson reliant spans 100" and weighs 27 lbs. Powered by a Saito 182 Four-stroke twin engine.

ON SILENT WINGS *by Chris Williams*

SCALE SOARING

How to stiffen up the ailerons on long-wing 'vintage' style scale R/C saiplanes

The aileron trailing edges made up from a lamination of balsa & spruce.

The aileron LE made up, hinged and rounded off.

A gaggle of Petrels at TVSA's Siege Cross Farm in 2010.

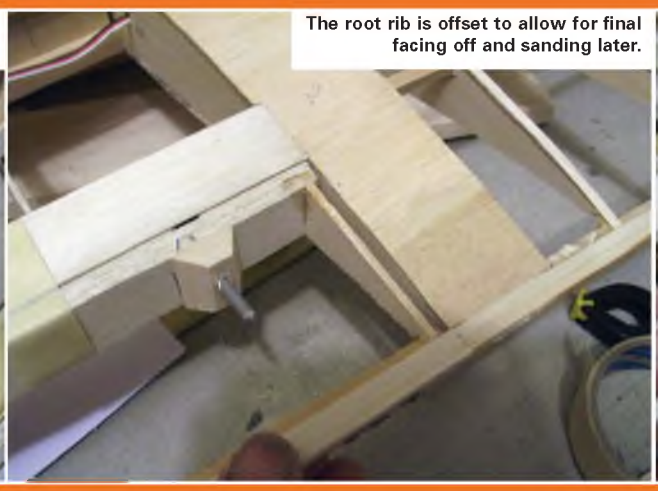
Making extra large ailerons...

A noticeable feature of sailplanes, even of the vintage wooden type, is the high aspect ratio of their wings. Whereas modern glass machines have relatively small ailerons, the ailerons of their older brethren were quite large, taking up a significant proportion of the total wing area. Presumably the difference lies in the speed range difference between the two, the low-speed, draggy wooden gliders needing to shift a lot more low-speed air to enable the laws of Mr. Newton to take effect when it comes to the roll plane.

This sometimes led to some unintended consequences if the wing lacked the necessary torsional stiffness; the application of the aileron caused the wing to twist and create exactly the opposite of the effect intended. (In some cases, these machines were flown for many years, their pilots adapting to this strange behaviour. In the case of my current project, the Slingsby Type 13 Petrel that, by modern standards, is a modest 1:3.5 scale and around five meters in span, the two ailerons take up almost three of those five meters. So, how to make them, and more to the point, how to make them stiff and straight?

Traditional modelling methods will have the wing ribs extended to the trailing edge, the aileron spars inset and the ailerons cut off afterwards, a procedure I've always found to be tricky and over-complicated. In the case of the Petrel, this wouldn't work anyway, because the aileron ribs are at an

The Robart hinges supported in 9mm dowel.



The root rib is offset to allow for final facing off and sanding later.

The TE support template, temporarily glued to the underside of the wing.

As the initial ribs are added, the TE must be checked for straightness.

The aileron with all the ribs added.

angle to form the sort of latticework that makes long thin objects torsionally stiff. The problems multiply as you look closer: gliders of this type often had shrouded ailerons in an attempt to prevent the higher pressure air under the wing leaking to the lower pressure topside.

To achieve this, the aileron's leading edge is rounded, and sits inside sheet extensions (shrouds, or cuffs if you like) from the aileron spar on the wing. In order to achieve this on a model wing without getting into the complicated structure of the full size I have, over the years, evolved a constructional style that seems to work pretty well. First of all, the shrouds consist of 0.8mm ply strips, grain crosswise, laminated to 1.5mm balsa, and these are glued to the wing with a suitable overlap to make up the shroud. Now, the plan is to make up the rounded leading edge (L.E.), hinge it up with large *Robart* style hinges, and fit it into the wing, with a fair amount of fettling to make it able to rotate inside the shroud without undue binding.

First, a false leading edge is made up from 6mm balsa sheet and pilot holes for the hinges drilled into the L.E. and the wing. Because the hinge line has to be quite deep inside the aileron leading edge, the hinges will need to be supported in the wing and this is achieved with the use of 9mm hardwood dowel, drilled out for the hinges, taped with masking tape to avoid splitting, and CA'ed into the wing. Now a second 6mm LE is glued to the first, and cut-outs removed where the hinge knuckles are going to sit. (This will involve some extra 12mm balsa to support the hinges in the LE). With the leading edges both made slightly oversize to allow for drilling errors, these are now hinged up to the wing and sanded flush to the shrouds. An hour or so of effort rounding of the edged will eventually lead to a situation where the LE will rotate some twenty degrees up and ten degrees down without undue binding.

Next up, the trailing edge (T.E.), which is made up from 1.5mm spruce sheet laminated with 6mm balsa to stiffen it up. It is quite fortunate that in the case of the Petrel, there are two ribs in the aileron that are parallel to the main ribs, these being where, on the full size, the control cable horns are situated. The trailing edge (TE) is supported out near the tip by a rib template, which is simply the shape of the underside of the wing at that station. The template is spot-glued to the wing, and the root rib made up by the simple expedient of copying the shape of the aileron aperture at that point. With a root rib glued to the aileron LE, the TE glued to that, and to the tip of the LE, and to the template providing support, it is now that extreme care must be taken to keep everything straight.

With assiduous use of that excellent tool, the 'Mk.1 Eyeball', the two parallel ribs are carefully added, taking care to ensure that the T.E. is absolutely straight both edgeways on, and from above. Then, it's a matter of adding the remaining ribs, keeping a careful eye on the shape of things as you progress.

Once all the ribs have been added, it's back to the sanding block and the shrouds, which are 0.4mm oversize and can now be sanded back until the ailerons are entirely flush with the wing. The root rib, which will have been set with a deliberately large gap, can now be faced off with some more balsa and sanded back until a nice, even gap is attained. This whole process, I have found, is made much easier if you have a disc sander, which enables the angling of the rib ends and a myriad other tasks much easier and quicker to do.

Looking at the sheer length of the ailerons and the size of the model, it might surprise some to know that a standard servo is all that is required to shift the thing up and down. I usually set it somewhere in the middle, and let dummy horns and cables give the impression that the full-size practice has been emulated. One word of warning... in this method of aileron production, the sanding block rules and the amount of balsa dust produced has to be seen to be believed...

The colour of magic...

It was quite interesting to follow a discussion recently on the *Scale Soaring UK* website concerning the colour applied to German gliders of 1930s. As the Nazis progressively imposed their will upon German society, rules were laid down concerning the colours to be used on the gliders of the period, because, of course, the terms of the Versailles treaty forbad the use of any sort of powered aircraft.

Standard colour references were bandied about, whereas someone pointed out that in the hangars on the hills, the workman of the time would have found it difficult to produce anything in the way of standardised results, especially with all the patching up that must have been going on. This led me to thinking about the reproduction of colour on existing, restored machines, of which there is a wide variety worldwide. The easiest point of reference is the good old-fashioned photograph, and although most people are probably aware of the pitfalls of the photographic process when it comes to accurate colour production, the problem widens with modern digital photography. Here, the calibration of monitors and the limitations of inkjet printers mean that colour variations are inevitable, and the only true test is to put your finished model next to the full size. Even this will not be a true test due to a phenomenon that a lifetime of matching car colours has become evident to my good self.

The fact is that a simple, solid colour (that is to say not a metallic, where things can get very complicated indeed) will change its shade according to the angle from which it is being viewed. You can easily demonstrate this yourself: take a look down the side of your car; it should look pretty much the same colour all the way along. Now, open the front door part way, stand back and look again. You will now see that the door looks a very different shade of colour to the other panels. It doesn't stop there: this same shade variation occurs in different levels of sunlight; the colour will appear a light shade in full sunlight and much darker in the shadows. The only way to accurately assess the colour you are using is to place a spray-out card on the surface of the full-size for comparison; obviously not the easiest of options, especially if your subject is halfway round the world.

Way back in the last century, I spent a glorious weekend at an International Vintage Glider Rally at Lasham. I came fully prepared with a box of car colour swatches and spent some considerable time finding the colours closest to the subject in which I was most interested. The Slingsby type 13 Petrel was there and how ironic it is that now, as my Petrel project nears its completion, I haven't the foggiest idea what I did with all that information!

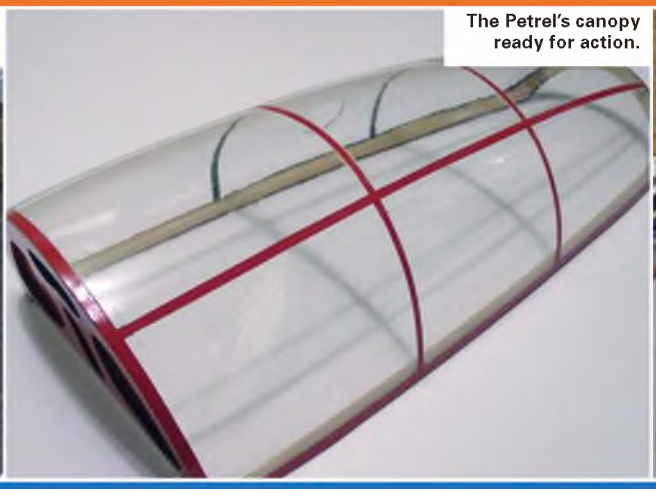
Scale soaring is a niche subject, with very little left these days in the way of scale competition. This has one very advantageous consequence in that the builder is free to indulge in some personal preference when it comes to the painting of the completed model. A recent subject, the Spalinger S25a, for instance, was decorated as close to the photos from its base in Brazil as I could manage, but instead of the all-white open structure areas, I opted instead for a translucent finish: a lot more work, but much prettier to look at, and much easier to see at altitude.

Project ending...

As previously mentioned, the Petrel airframe is now completed, and the covering and painting process is about to begin. The plan has suddenly become popular this last couple of years, and there are at least three new versions due to make an appearance on the UK scene this year, with many more in the pipeline. To help those still building, or proposing to, I have detailed the build on the *Scale Soaring UK* website. As I have modified quite a few things along the way, it has been arranged that the modification drawings will be available in due course for download. Should you be interested, you will find the thread on the forum: http://scalesoaring.co.uk ■

c_williams30@sky.com

Author's Petrel airframe nears completion.



The Petrel's canopy ready for action.

The Petrel tailplane starts the covering process.

The translucent open structure of author's 1:3.25 scale Spalinger S25a: a great aid to visibility at altitude!

THE QUIET ZONE

Yes, you can run but you can't hide, here we are again with another thrilling instalment of your favourite electric flight column. Not your favourite? Well, shame on you, it's the one you're getting anyway.

Right, I suppose there's just a chance this is the first time you've read this column, in which case, you're in for a treat. Unlike other, dry and dusty columns, the sort that just deal with the facts, reams of meaningless figures and the occasional photo of a model, this one takes on a life of its own the moment I sit down to write it. Half the time even I don't know what's going to appear on the page until it's actually there, staring me in the face. Yes, all highly unprofessional, I know. However, nobody actually said that column writers were professional writers, and this one certainly isn't.

So, what you're likely to get here, as opposed to what appears elsewhere, is a curious mix of conversational style comments, interesting snippets of information and as many photos of lovely model aircraft as I can fit in. Others give you reams of figures; I waffle on aimlessly as if we were having a chat over a pint. Sometimes it may seem more like a chat after several pints, but you can't have everything. I promise

TALKING OF INTERESTING LOZENGE, DARRIN COVINGTON PRINTED THE LOZENGE ONTO LITESPAN WHEN FINISHING HIS LOVELY ALBATROS DVA.

Although not mentioned in the article, this 45" version of my Moska design, built by Clancy Klein will be appearing as a free plan.

you, however, that not a drop of alcohol has passed my lips, I always ramble on like this. Just think of it as the light entertainment section.

Getting down to business

Okay, with the mood set, I suppose I'd better get down to doing what I'm supposed to be up to; writing about electric powered model aircraft. Much as I might try, sooner or later there's no avoiding it.

This time around, since we're just at the start of another flying season here in the UK, I thought you might like to catch up with what has been going on at Rake Manor. Yes, I know I do this every so often but, believe it or not, many people do actually like to know what they can expect from me in future issues of FSM. In other words, it's time to take a look at some of the plans you can expect to see over the coming months.

Sometimes it isn't easy drawing plans. From time to time you suddenly hit a brick wall with regards enthusiasm. Normally I thoroughly enjoy plan drawing but recently had one of these spells of 'drawer's block'. No, not an obstruction in my underpants, a complete inability to even think about drawing plans for model aircraft. Sometimes, it would seem, you really can have too much of a good thing. Anyway, I'm pleased to say that is now thankfully behind me and model plan drawing is progressing apace. Whatever the case, the last few months have seen some really rather nice models being completed and prepared for publication. Just when they'll actually appear is in the lap of the gods (otherwise known as editor and publisher) but they should all appear eventually. Some will appear as free plans, but some are simply too big to fit within the confines of A1 size sheets. Just to get us started, that's where we'll begin - with the bigger beggars.

Albatros D.VA

I make no excuses for including this model again; it is simply stunning. Built by Darrin Covington and featuring some really interesting finishing techniques (which were detailed in previous editions of the column). At 1/6 scale the model spans around 58". Although you could use 'normal' finishing techniques for much of the detail, Darrin chose to vac-form absolutely loads of stuff. Not only are the metal areas of the nose represented by vac-formed parts, even the dummy engine features parts formed in this fashion. As you can see, he is one highly skilled modeller and, for him at any rate, the practice works extremely well indeed.

Although I have no idea when the plan article will appear, (most likely commencing as a two-part in FSM June issue - Ed) our beloved editor assures me he's saving it for a special issue. In case you wondered, the model flies every bit as well as it looks.

ITMA

No, even I don't actually remember that particular radio show. I may be getting old but am not yet antique - even if I feel it at times. Knowing about it simply demonstrates my broad spectrum of useless bits of information.

Another one there wasn't room for is the Fokker DVIII by Simon Uglow. The lozenge uses an interesting cut tissue over Litespan technique.

For the uneducated, the section heading means It's That Man Again and the man in question is Pat Lynch, a name very familiar to regular readers. With many prototype builds behind him, Pat agreed to take on one that might prove to be something of an unknown quantity - the very stubby looking Albatros D.XI.

Much as I'd like to be able to say that my fantastic design skills had something to do with what a nice model this turned out to be, I think it's probably more due to Pat's careful building and attention to accurate alignment. Oh yes, I suppose the original aircraft designer may have had some influence on the matter too. Whoever gets the credit, despite its worryingly short-coupled wing/tailplane layout, the model has proved an absolute joy to fly and exhibits no unpleasant tendencies at all. Not at all the vicious little beast we both feared it might be, the model flies in a smooth and very predictable manner.

Although the type didn't actually go into production, only the two prototypes being built, it still presents us with a choice of very interesting colour schemes, one of them with a varnished wood fuselage which was the example Pat chose to depict, one with a painted fuselage.

As per Pat's usually modest nature, he claimed to be doing a 'quick-and-dirty' build job. However, as you can see, the resulting model looks very effective indeed. If you want more detailed builds, don't despair, Pat is currently coming to the conclusion of a similar size (1/6 scale) Fokker D.VII that promises to be another stunner.

Getting back to the D.XI, although built to 1/6th scale, being the stumpy little creature it is, it still fits into free plan format. True, it will end up spread over two months, but that's just a good excuse to subscribe to FSM. Of course, with all these goodies coming up, I don't doubt you'll want to subscribe anyway.

Yes, still WWI

Okay, I admit it; I have a thing about WW1 types. I make no apologies; they are just so

Showing off just how stumpy the Albatros DXI actually looks. Despite that it flies extremely well.

For a 'quick and dirty' build Pat Lynch's DXI looks pretty good to me. This time the lozenge is painted onto film covering.

well suited to electric power. The beauty of electric power for these models is its cleanliness in use. Afterall, if you want them to look their bes,t they need to be rigged and there's nothing worse than having to spend ages cleaning oil off the multitude of rigging cables these models carry.

So, what WW1 type am I running on about now? A Rumpler Taube, no less. Having been very taken with an old (very old) free-flight plan of the type many years ago, when the subject of more small models came up I couldn't help feeling it would be an ideal subject.

At just 30" span, and powered by a small, brushless outrunner motor, this is a superb model for those calm summer evenings that we'll soon be getting. (Well, I can live in hope, can't I?)

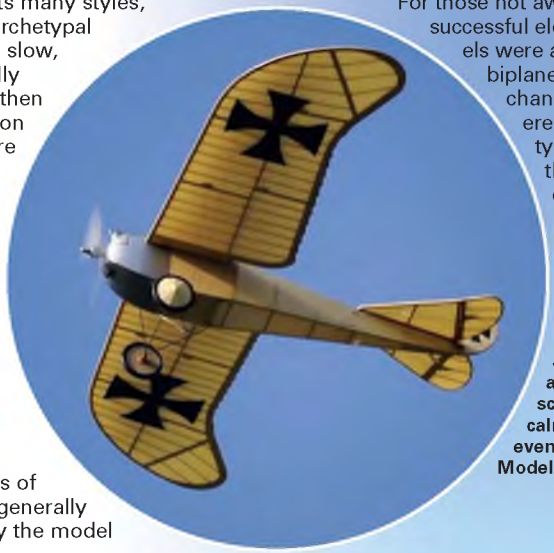
As far as the model is concerned, it's one of those that turn out to be a true international co-operation effort. The builder, Ulrich Schraudolph, definitely sounds German to me, but lives in Singapore. The designer, as you may have guessed, hails from the UK and the set of parts the prototype model used was cut in the USA. Lots of to-ing and fro-ing going on to get this model built.

Covered with *Graupner Ecospan*, this little beauty tips the scales at just less than 200 grams ready to fly. There is power to spare from the 2s LiPo pack and 15 gram style motor. Sufficiently so that a smaller motor could be used if you so desire.

Whilst the model isn't particularly complicated to build, there are an awful lot of wing ribs to cut out. Just to add to the tedium, they are all different, so the 'block' method is definitely out. Oh come on, you're just being silly now. Of course both wings are the same, you know full well I meant that all the ribs in a wing are different. I don't know, you just can't talk to some people.

Anyway, no matter how many ribs there are, or how you go about cutting them out (the publishers will be offering laser cut parts for the surgically challenged), don't let the number of ribs put you off, the wings really are easy to build.

The Taube, in its many styles, was one of the archetypal WW1 aircraft. Its slow, stable flight totally summed up the then current thinking on what aircraft were supposed to do. As long as you don't use too much power, the little Taube will allow you to emulate those qualities any time you feel like it. It is a great model for simply stooging around on calm days, making lots of low passes and generally enjoying the way the model looks in the air.



Just visualise this scene on a calm summer evening. Modelling heaven!

A little more modern

Yes, still a biplane and only just post WW1, but at least this one is a civilian. Only very recently I was asked if I would be designing more models of about three feet span, so I'm rather hoping this one will fit the bill for the reader in question.

I feel I have, to some extent, gone back to my designing 'roots' with the Udet Flamingo. At some 38" wingspan, with three function control and pretty simple construction this is about as close to the type of model I first designed as it's possible to get.

For those not aware of it, my first successful electric powered models were almost all 36" span biplanes that flew on three channels and were powered by geared 400 type motors. Okay, so this one may fit precisely into the simplistic styling of those models, but also reflects what I have learned since then. Outlines are

A really pretty little model, and well travelled in its' own way, is Ulrich's Rumpler Taube.

scale, rib spacing is scale (I think), and the plan is CAD drawn rather than hand drawn. It also uses a modern outrunner motor and LiPo battery to supply the urge to get it into the air. However, the overall feel of those early designs is retained. Construction is straightforward, many parts tend to be self-jigging and the model exhibits smooth, relaxing flying qualities. Drawing up this model was, for me, almost like 'coming home'.

Reuben Kinghorn, who built the prototype model, was taken with the design features, found the model easy to build and a pleasure to fly. He finished by saying that he could see this model becoming his favourite calm air model. If that doesn't say it all, nothing does.

Reuben opted to cover the fuselage of his model using document laminating film which, if you have easy access to the lighter grades, is a very inexpensive form of covering. Although it can be ironed on like film, and is heat shrink, its' main disadvantage is that, being intended for laminating purposes, it is completely clear once heated. I have used it in the past and it is pretty easy to use and very tough, but does need to be painted once it has been applied. However, once the surface has been cleaned and de-greased, it does take paint quite well.

The wings and tail are covered using silver *Solarfilm* and the markings are vinyl graphics prepared specifically for his model. No doubt you will have a local source for such items, but Reuben's came from *Callie Graphics*, in the USA. Also from the USA, Parkflier Plastics to be precise, come the vac-formed dummy engine fitted to his model. The model itself is quite basic and that exposed engine works wonders for adding interest and setting off what could otherwise be a rather plain model.

So, that's just some of what has been happening here. The plan drawing continues as if there were no tomorrow and, as if the Culver Dart that I think appears in this issue weren't proof enough, not all the designs I've recently finished were of WW1 types. The latest three were a Great Lakes trainer, Waterman Gosling racer and a larger, more accurate Eastbourne monoplane. Additionally, floating around in various stages of completion are a 36" Waco 9, a 45" Waco 9, Rex Racer, and Fokker FII. You see, not all WW1 types afterall. Good here, isn't it?

If you'd like to contribute to the column, have a query, or just want to chat, I can be contacted at PETERRAKE@aol.com ■

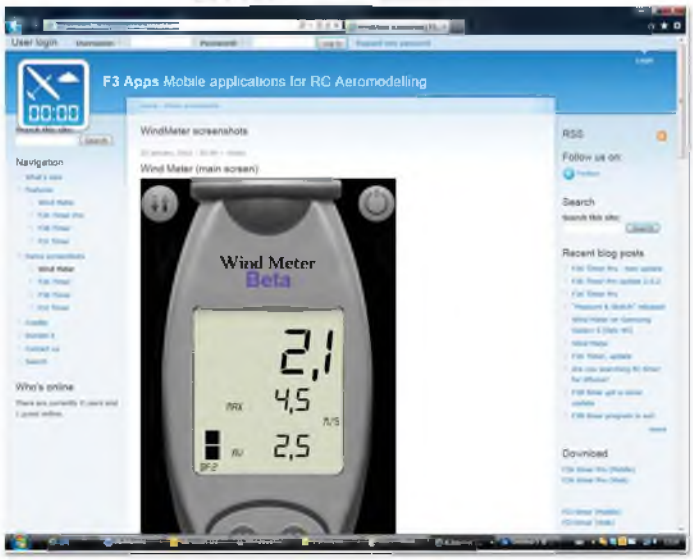
Painted laminating film and Solarfilm combine to result in a rather nice looking little Udet Flamingo.

Although overcast at the time, Reuben's Udet Flamingo model proved an excellent flier.

NOSE PANELS, LOUVERS AND EVEN THE DUMMY ENGINE MAKE EXTENSIVE USE OF VAC-FORMING, ALL MADE BY THE BUILDER HIMSELF.

Techno Scale

Mike Evatt walks the web for more TechnoScale Topics



ABOVE LEFT: 'Bucks-Composites' stock a vast range of cloths, tapes and resins.
ABOVE RIGHT: A new anemometer APP for Android, a Wind Meter!

http://www.bucks-composites.com is the new web address of *Fibretech GB*. **Bucks-Composites** is their new name to avoid confusion with another business. They stock a vast range of cloths, tapes and resins for the repair and production of composite components as well as an array of tools, release agents etc. There is also a handy 'How To Do It' section as well as a photo gallery of customers' model aircraft that is well worth a visit.

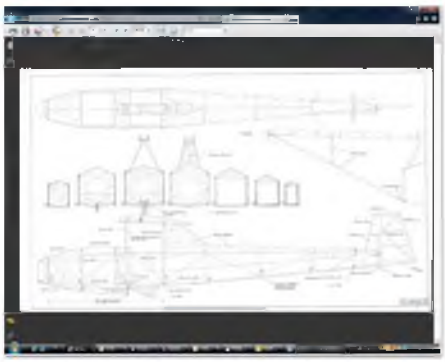
A smart phone App you might want to look at is featured on the http://www.f3k.biz website.

It is a new anemometer application for Android; a Wind Meter! It uses device sound input to estimate wind speed. It works by analysing the sound of wind passing the device microphone. This is achieved using the advanced algorithms to filter out the wind generating sound from the background noise and other sounds. Wind Meter includes compass integration, so you can easily find wind direction too. Wind Meter supports multiple units of measure including MPH, Knots, Km/h, m/s and Beaufort scale. This application is not meant to be used in place of scientific instrumentation, but it can come close to real anemometer device.

Hawk Turbine is a high tech company located in Sweden with a web presence at http://www.hawkturbine.com Hawk Turbine have a mission... "To design and produce state of the art model turbine engines". They claim that they will always be in the front, having the engines with the lowest fuel consumption and fastest spool times on the market. Each engine is quality tested and has been run several times in their computerised test bench. The Hawk 100R has, they believe, the fastest spool time on the market.

Peanut scale models, or more properly F4F in FAI speak, are delightful models. These featherweights have a maximum wingspan of 330mm and have been flown competitively from around 1975. At one stage it looked possible that the class would be challenged by 'Pistacio' to be the most popular class, howev-

ABOVE LEFT: Hawk Turbine is a high tech company located in Sweden. ABOVE CENTRE: Check out the Zeppelin CS-1 on the Minimakety website.
ABOVE RIGHT: Excellent photos and more courtesy of Parker Information Rescources.



TOP LEFT: **Rocky Top Models is a web based cottage industry.** TOP RIGHT: **The DC Maxecuters are model aviation enthusiasts.** ABOVE LEFT: **Acejets are the sole authorised UK distributor of Fei Bao Jet Models.** ABOVE RIGHT: **The folks at Vintage Sailplaner are proud of well designed and built vintage sailplanes.**

er, because of the increased difficulty of flying scale models with a wingspan of only 203mm 'Peanut' still reigns supreme. Check out the Zeppelin CS-1for Peanut Scale on the **Minimakety** website at http://www.mini-makety.cz

Within the website at http://www.parkerin-fo.com/ap.htm which is **Parker Information Rescources** you will find an amazing collection of scale model aircraft. Not only are good photographs of the finished models and of the construction process posted but historical information regarding the prototypes as well. The screen-shot shows a 60in span scaled up version of the Guillow's 20 inch span rubber powered kit. Don't be surprised if you spend a lot of time here. I did!

Rocky Top Models is a web-based cottage industry offering quality laser cut scale free flight kits and supplies and gets its name from its location in the hills of central Tennessee. They offer quality laser cut kits, with hand-selected wood, Esaki tissue and a complete hardware package. They are proud of their kits and their goal is to make them some of the best available. Their kits are designed with the use of Computer Aided Design tools that produce an extremely accurate set of drawings. The delightful Junkers D.I shown in the screen-shot was designed by Mike Midkiff and is 23 inches span. Check it out at http://www.rockytopmodels.com

The **DC Maxecuters** at http://www.dcmaxe-cuter.org are model aviation enthusiasts. First organized in the late 50's, the club's roots are in rubber-powered Free Flight, though members actively pursue other facets of the model aircraft hobby, including electric and gas-powered free-flight as well as radio control, especially micro R/C. They fly year-round, both in select indoor venues and outdoors in the fields. Judging by the screen-shot they fly a tasty line of scale models.

The web home of **Acejets** is at http://www.acejets.co.uk and they are the sole authorised UK distributor of **Fei Bao Jet Models.** They can supply the full range of models, all very competitively priced to attract both new jet flyers and satisfy the needs of those more experienced. Their website allows you to view the full range of Fei Bao jets. They supply RTF (ready to fly) or ARTF (almost ready to fly) or airframe only. The RTF version come complete with retractable undercarriage, wheel brakes, undercarriage doors fitted, air rams fitted, all air pipe and air valves supplied, twin wall tailpipe, fuel tanks, carbon fibre bypass, cockpit, and dependent on model; missile set and drop tanks. The ARTF version comes complete with all parts but you will need to fit them yourself.

Located in Nesquehoning, PA. The folks at **Vintage Sailplaner**, with a website at http://www.vintagesailplaner.com are proud of their part in the soaring community. They feel that there is nothing that looks better in the air than a well designed and built vintage sailplane. They take pride in being able to offer you many free plans for some of the finest classic sailplanes that have ever soared across the sky as well as kits for some of them as well. In this age of ARF planes, they feel that it is their duty to try to pass on the designs and building skills that have served the aero modelling community for so many decades.

The H-301 Libelle is an early composite 15-metre Class single-seat sailplane produced by Glasflügel from 1964 to 1969. **South Coast Sailplanes** at http://www.south-coast-sailplanes.com are marketing a fully moulded 1:6 scale version of the glider with optional retractable landing gear. This is a very high quality all glass model. The ailerons and flaps are ready-hinged. The elevator is also ready hinged and the rudder has the hinge post already attached and just needs fixing to the model. The model comes with the rudder control wire in place. The canopy has the fixings in place and it comes as shown in the photos.

The Lynx helicopter was Britain's solution to replacing their aging Wasp and Scout helicopters that were in use in 1965. This new design would be technologically superior, require less maintenance and offer an alternative to using the American Bell Huey helicopters. The **Starwood Models** version is very impressive. The AH Mk7 is the army version that has skid landing gear as compared to the more commonly seen wheeled landing gear. There is an incredible amount of detail on the surface of the fuselage allowing modellers to achieve high levels of finish to the model. Check it out at http://www.starwoodmodels.com

That's all there is time for from me this month so light up that screen and if you find something out there of interest that might be good to share, email me at mikeevatt@hotmail.com ■

ABOVE LEFT: **The H-301 Libelle from South Coast Sailplanes.**
ABOVE RIGHT: **The AH Mk7 is the Army version that has skid landing gear.**

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The distinctive back-staggered 1930s biplane with retracting undercarriage.

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

BLERIOT MONOPLANE - (74 images) CD23
The Shuttleworth Museum's machine, the oldest original example still flying. Much close-up detail showing all the exposed rigging, structure and the 'bedstead' main undercarriage, plus Anzani engine.

BOEING PT-13/17 STEARMAN - (54 images) CD24
Subject aircraft is a current British civil register example used for airshow displays.

BRISTOL BULLDOG - (60 images) CD25
This collection depicts the example assembled from two donor airframes and restored to superb standard by Skysport Engineering. It can now be seen at the Royal Air Force museum, Hendon.

BRISTOL F2B 'BRISFIT' - (28 images) CD26
Full close-up detail, including photos of engine cowls, for both Rolls Royce Falcon and Hispano-Suiza engines.

NEW... BRISTOL M.1c - (100 images) CD27
Early WW1 fighter monoplane. Example depicted is the faithfully authentic replica built by the Northern Aero Works and operated by the Shuttleworth Trust museum.

BUCKER BESTMAN - (43 images) CD28
Authentic example as exhibited at the Fantasy of Flight museum in WW2 Luftwaffe colour scheme.

BUCKER JUNGMEISTER - (79 images) CD29
Radial engine version. Example from Fantasy of Flight museum.

CHANCE VOUGHT F4U-1D CORSAIR
(132 images) CD30
The famous 'bent wing bird' and super detail.

NEW... CHILTON DW1 - (90 images) CD31
Original upright engined version of this diminutive British low wing sports/racer.

CHRISLEA SUPER ACE - (123 images) CD32
Late 1940s civil light aircraft with distinctive twin fins and nosewheel type undercarriage. A fully restored example.

CHRISTEN EAGLE - (90 images) CD33
The spectacular, stylish aerobatic biplane revealed in close-up. Example shown is the two seat version.

COMPER SWIFT - (91 images) CD35
1930s racingg aircraft. Example depicted is the radial engined example at Shuttleeworth Mussem.

CURTISS HAWK 75 - (130 images) CD36
The 'export' version of the Curtiss P-36 that saw service in during WW2 with Finland and during the 'Battle of France' in May/June 1940. Example shown is a combat veteran.

CURTISS JN-4 'JENNY' - (130 images) CD37
An authentic, restored example in full detail

NEW... CURTIS P-40B TOMAHAWK
(130 images) CD38
Rare. full restored example of the early version of the Curtiss fighter aircrfaft that was at Pearl Harbour on Dec. 7th 1941 - and survived the attack!

CURTISS P-40N - (100 images) CD39
One of the later versions of the famous Curtiss Warhawk, the WW2 fighter aircraft that saw service in just about every combat theatre of operations.

De HAVILLAND DH84 DRAGON - (40 images) CD42
Forerunner of the m ore famous DH 89 Dragon Rapide, this collection depicts a superbly restored example.

De HAVILLAND DH89 DRAGON RAPIDE -
(100 images) CD43
Graceful twin engine biplane airliner that saw service from pre-WW2 through to the mid 1950s. Several are still flying and three are shown in this picture collection.

NEW... De HAVILLAND DH 53 - (60 images) CD40
1920s lightweight low wing sports aircraft designed to a low-power specification. Machine illustrated is the sole remaining example.

NEW... De HAVILLAND DH 60 - (140 images) CD41
The aircraft that set the British 'club' flying movement on the road to success during the 1930s.

DH TIGER MOTH - (110 images) CD44
Much close-up detail of civil register example, plus further detail of the IWM Duxford's example in Royal Navy trainer colours, showing the blind flying hood.

DHC CHIPMUNK - (70 images) CD45
A bumper bundle of images that provides a vast array of detail pictures, plus photos of examples in both RAF trainer and civil colours.

ERCO ERCOUPE 415 & AVALON ERCOUPE
(115 images) CD46
The elegant twin finned light/sport aircraft. Both original Type 415 and later Avalon resurection examples.

FAIRCHILD RANGER - (60 images) CD47
Elegant U.S. high wing light aircraft in full detail. Two examples shown.

FIESELER STORCH - (90 images) CD49
Arguably the first military STOL aircraft, this stalkey looking aircraft has long been a modellers' favourite. Two examples are represented, the machine at the Fantasy of Flight Museum, Florida and the RAF Museum Cosford's example.

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073	3/16 x 4	2.52
074	1/4 x 4	2.84
075	3/8 x 4	4.41

36" Sheets

001	1/32 x 2	0.93
002	1/16 x 2	0.93
003	3/32 x 2	1.08
004	1/8 x 2	1.23
005	3/16 x 2	1.45
006	1/4 x 2	1.73
007	5/16 x 2	1.81
008	3/8 x 2	2.17
009	1/2 x 2	2.67
012	1/32 x 3	1.08
013	1/16 x 3	1.08
014	3/32 x 3	1.23
015	1/8 x 3	1.60
016	3/16 x 3	1.88
017	1/4 x 3	2.38
018	5/16 x 3	2.76
019	3/8 x 3	2.81
020	1/2 x 3	3.76
021	3/4 x 3	5.56
025	1/32 x 4	1.82
026	1/16 x 4	1.82
027	3/32 x 4	2.21
028	1/8 x 4	2.52
029	3/16 x 4	3.00
030	1/4 x 4	4.17
031	5/16 x 4	4.89
032	3/8 x 4	5.74
033	1/2 x 4	7.73

42" Sheets

080	1/32 x 3	1.23
081	1/16 x 3	1.30
082	3/32 x 3	1.51
083	1/8 x 3	1.81
084	3/16 x 3	2.17
085	1/4 x 3	2.75
086	3/8 x 3	3.39
087	1/32 x 4	2.13
088	1/16 x 4	2.13
089	3/32 x 4	2.84
090	1/8 x 4	2.91
091	3/16 x 4	3.63
092	1/4 x 4	4.41
093	3/8 x 4	6.30

48" Sheets

037	1/32 x 3	1.64
038	1/16 x 3	1.64
039	3/32 x 3	1.97
040	1/8 x 3	2.47
041	3/16 x 3	2.95
042	1/4 x 3	3.61
043	5/16 x 3	4.35
044	3/8 x 3	4.44
045	1/2 x 3	5.75
046	3/4 x 3	8.61
050	1/32 x 4	4.11
051	1/16 x 4	3.20
052	3/32 x 4	4.02
053	1/8 x 4	4.52
054	3/16 x 4	5.42
055	1/4 x 4	6.31
056	5/16 x 4	8.13
057	3/8 x 4	10.09
058	1/2 x 4	11.81

6" Wide Sheets - 36" Length

185	1/16 x 6	3.09
186	3/32 x 6	3.38
187	1/8 x 6	3.69
188	3/16 x 6	4.20
189	1/4 x 6	5.19
190	3/8 x 6	7.06
191	1/2 x 6	9.39

6" Wide Sheets - 48" Length

265	1/16 x 6	4.61
266	3/32 x 6	5.04
267	1/8 x 6	5.55
268	3/16 x 6	6.41
269	1/4 x 6	7.77

30" Balsa Wing Skins

286	1/16 x 10	8.94
287	3/32 x 10	10.89
288	1/8 x 10	12.69

36" Balsa Wing Skins

289	1/16 x 10	11.20
290	3/32 x 10	13.06
291	1/8 x 10	15.32

48" Balsa Wing Skins

292	1/16 x 10	20.06
293	3/32 x 10	23.98
294	1/8 x 10	28.25

36" Sticks

124	1/16 x 1/16	0.22
123	1/16 x 1/8	0.22
831	1/16 x 3/16	0.29
125	1/16 x 1/4	0.32
126	1/16 x 3/8	0.36
832	1/16 x 1/2	0.44
833	1/16 x 3/4	0.50
834	1/16 x 1	0.65
835	3/32 x 3/32	0.29
836	3/32 x 1/8	0.29
837	3/32 x 3/16	0.36
127	3/32 x 1/4	0.38
128	3/32 x 3/8	0.40
838	3/32 x 1/2	0.44
839	3/32 x 3/4	0.65
840	3/32 x 1	0.72
129	1/8 x 1/8	0.29
841	1/8 x 3/16	0.32
130	1/8 x 1/4	0.36
131	1/8 x 3/8	0.38
132	1/8 x 1/2	0.50
842	1/8 x 3/4	0.65
843	1/8 x 1	0.87
133	3/16 x 3/16	0.36
844	3/16 x 1/4	0.44
134	3/16 x 3/8	0.50
135	3/16 x 1/2	0.58
845	3/16 x 3/4	0.72
846	3/16 x 1	0.93
136	1/4 x 1/4	0.50
137	1/4 x 3/8	0.65
138	1/4 x 1/2	0.72
139	1/4 x 3/4	1.02
140	1/4 x 1	1.23
141	5/16 x 5/16	0.65
847	5/16 x 3/8	0.72
848	5/16 x 1/2	0.93
849	5/16 x 3/4	1.10
850	5/16 x 1	1.38
142	3/8 x 3/8	0.87
143	3/8 x 1/2	0.93
144	3/8 x 3/4	1.30
851	3/8 x 1	1.66
145	1/2 x 1/2	1.16
146	1/2 x 3/4	1.45
147	1/2 x 1	1.81
852	5/8 x 5/8	1.38
853	5/8 x 1	2.09
854	3/4 x 3/4	1.81
855	3/4 x 1	2.31

48" Sticks

856	1/8 x 1/8	0.38
160	1/8 x 1/4	0.50
161	1/8 x 3/8	0.58
162	1/8 x 1/2	0.74
163	3/16 x 3/16	0.58
164	3/16 x 3/8	0.74
165	3/16 x 1/2	0.90
857	3/16 x 3/4	1.06
166	1/4 x 1/4	0.83
167	1/4 x 3/8	0.90
168	1/4 x 1/2	1.06
169	1/4 x 3/4	1.56
170	1/4 x 1	2.05
171	5/16 x 5/16	0.99
172	3/8 x 3/8	1.24
173	3/8 x 1/2	1.56
174	3/8 x 3/4	1.89
175	1/2 x 1/2	1.72
176	1/2 x 3/4	2.37
177	1/2 x 1	2.71

36" Triangles

105	1/4 x 1/4	0.76
106	3/8 x 3/8	0.83
107	1/2 x 1/2	1.05
108	3/4 x 3/4	1.43
109	1 x 1	1.81
110	1-1/2 x 1-1/2	3.38
111	2 x 2	5.64

36" Trailing Edges

100	3/16 x 3/4	0.83
099	1/8 x 1/2	0.76
101	3/16 x 1/2	0.76
103	1/4 x 5/8	0.83
118	1/4 x 1	0.99
102	5/16 x 3/4	0.90
119	5/16 x 1-1/4	1.13
120	3/8 x 1-1/2	1.43
121	1/2 x 2	2.26

90 Degree Tapered Aileron & Elevator Stock - 36" Lengths

224	1/4 x 1	1.50
225	1/4 x 1-1/4	1.73
226	1/4 x 1-1/2	1.88
227	1/4 x 2	2.10
211	5/16 x 1-1/4	1.20
228	5/16 x 1-1/2	1.95
229	5/16 x 2	2.18
212	3/8 x 1-1/4	1.43
230	3/8 x 1-1/2	2.18
231	3/8 x 2	2.49
232	3/8 x 2-1/2	2.64
213	1/2 x 1-1/2	1.50
214	1/2 x 2	2.26

48" Lengths

238	1/4 x 1	2.39
237	1/4 x 1-1/4	2.66
238	1/4 x 1-1/2	2.99
239	1/4 x 2	3.65
215	5/16 x 1-1/4	2.99
240	5/16 x 1-1/2	3.06
241	5/16 x 2	3.51
216	3/8 x 1-1/4	3.34
242	3/8 x 1-1/2	3.34
243	3/8 x 2	3.84
244	3/8 x 2-1/2	4.19
217	1/2 x 1-1/2	3.41
218	1/2 x 2	4.36

Blocks

196	2 x 2 x 2 (Three For)	2.17
197	3 x 3 x 3	1.60
245	1 x 2 x 6	0.93
246	2 x 2 x 6	1.51
247	3/4 x 3 x 6	1.08
248	1 x 3 x 6	1.45
249	2 x 3 x 6	2.24
599	3 x 3 x 6	2.67
250	1 x 4 x 6	2.13
251	2 x 4 x 6	3.22
252	3 x 4 x 6	4.89
198	1 x 2 x 12	2.09
253	3/4 x 3 x 12	2.03
199	1 x 3 x 12	2.89
200	1 x 4 x 12	4.10
201	2 x 2 x 12	2.96
202	2 x 3 x 12	4.48
254	2 x 4 x 12	6.06
255	3 x 4 x 12	9.06
112	1 x 2 x 36	5.85
113	1 x 3 x 36	8.44
114	1 x 4 x 36	11.82
115	2 x 2 x 36	8.53
116	2 x 3 x 36	13.59
256	3 x 3 x 36	17.31
257	3 x 4 x 36	32.76

Birch Motor Mount Stock

748	3/8 x 3/4 x 12	0.75
749	1/2 x 3/4 x 12	0.85
750	5/8 x 3/4 x 12	0.91
751	3/4 x 3/4 x 12	0.97

Landing Gear Blocks Grooved Bass - 3/8 x 3/4 x 12

208	1/8"	0.91
209	5/32"	0.91
210	3/16"	0.91

Hardwood Dowels

355	1/8 x 36	0.22
356	3/16 x 36	0.24
357	1/4 x 36	0.30
358	5/16 x 36	0.37
359	3/8 x 36	0.48
360	1/8 x 48	0.30
361	3/16 x 48	0.34
362	1/4 x 48	0.37
363	5/16 x 48	0.48
364	3/8 x 48	0.61

Miscellaneous Assorted Wood

598	Bag-A-Balsa Sheets & Sticks	7.35
698	Bag-A-Blocks *(when available)*	8.40
699	"Seconds" Wood Box *(when available)*	41.95

24" Basswood Sticks

900	1/32 x 1/8	0.15
901	1/32 x 3/16	0.18
902	1/32 x 1/4	0.19
903	1/32 x 3/8	0.25
904	1/32 x 1/2	0.36
908	1/16 x 1/16	0.14
909	1/16 x 3/32	0.15
910	1/16 x 1/8	0.17
911	1/16 x 3/16	0.19
912	1/16 x 1/4	0.24
913	1/16 x 3/8	0.34
914	1/16 x 1/2	0.40
918	3/32 x 3/32	0.17
919	3/32 x 1/4	0.24
920	3/32 x 3/8	0.39
921	3/32 x 1/2	0.48
924	1/8 x 1/8	0.18
925	1/8 x 3/16	0.22
926	1/8 x 1/4	0.27
927	1/8 x 3/8	0.42
928	1/8 x 1/2	0.57
931	3/16 x 3/16	0.25
932	3/16 x 1/4	0.32
933	3/16 x 3/8	0.48
934	3/16 x 1/2	0.61
937	1/4 x 1/4	0.42
938	1/4 x 3/8	0.53
939	1/4 x 1/2	0.74
942	5/16 x 5/16	0.53
944	3/8 x 3/8	0.70
945	3/8 x 1/2	0.89
947	1/2 x 1/2	1.17

36" Basswood Sticks

680	1/16 x 1/8	0.30
681	1/16 x 3/16	0.33
682	1/16 x 1/4	0.37
683	3/32 x 1/8	0.38
684	3/32 x 3/16	0.39
685	3/32 x 1/4	0.40
278	1/8 x 1/8	0.30
610	1/8 x 3/16	0.37
279	1/8 x 1/4	0.43
280	1/8 x 3/8	0.48
611	1/8 x 1/2	0.81
612	1/8 x 3/4	0.87
281	3/16 x 3/16	0.43
613	3/16 x 1/4	0.48
614	3/16 x 3/8	0.56
615	3/16 x 1/2	0.87
282	1/4 x 1/4	0.69
283	1/4 x 3/8	0.72
284	1/4 x 1/2	0.85
285	3/8 x 3/8	0.91

42" Basswood Sticks

623	1/4 x 5/8	1.28
624	1/4 x 3/4	1.46
625	5/16 x 5/8	1.40
626	5/16 x 3/4	1.70
641	3/8 x 3/4	2.06
642	3/8 x 1	2.73

48" Basswood Sticks

686	3/32 x 1/8	0.43
687	3/32 x 3/16	0.45
688	3/32 x 1/4	0.56
616	1/8 x 1/8	0.46
617	1/8 x 3/16	0.48
300	1/8 x 1/4	0.50
301	1/8 x 3/8	0.67
618	1/8 x 1/2	0.72
619	1/8 x 3/4	0.85
302	3/16 x 3/16	0.48
620	3/16 x 1/4	0.61
621	3/16 x 3/8	0.72
622	3/16 x 1/2	0.91
303	1/4 x 1/4	0.80
304	1/4 x 3/8	0.97
305	1/4 x 1/2	1.16
307	1/4 x 3/4	1.69
306	3/8 x 3/8	1.16

36" Basswood Triangles

315	3/8 x 3/8	0.80
316	1/2 x 1/2	1.04
317	3/4 x 3/4	1.33

42" Shaped Bass Wing Struts

276	3/8 x 5/8	5.16
277	1/2 x 7/8	7.71

24" - 5/32 Grooved Bass Strut Fairings

274	1/4 x 1/2	1.09
275	1/4 x 3/4	1.46

Printed Catalogs $4.00
Catalogs on CD also available

24" Basswood Sheets

860	1/32 x 1	0.71
861	3/32 x 1	0.81
862	1/8 x 1	0.88
863	3/16 x 1	1.12
864	1/4 x 1	1.28
867	1/32 x 2	0.74
868	1/16 x 2	0.83
869	3/32 x 2	0.89
870	1/8 x 2	1.04
871	3/16 x 2	1.14
872	1/4 x 2	1.34
873	3/8 x 2	1.88
874	1/2 x 2	2.72
878	1/32 x 3	0.86
879	1/16 x 3	0.92
880	3/32 x 3	1.06
881	1/8 x 3	1.24
882	3/16 x 3	1.41
883	1/4 x 3	1.61
884	3/8 x 3	2.28
885	1/2 x 3	3.66
890	1/32 x 4	1.46
891	1/16 x 4	1.49
892	3/32 x 4	1.55
893	1/8 x 4	1.77
894	3/16 x 4	2.05
895	1/4 x 4	2.48

Birch Plywood Wing Skins

352	1/64 x 48 x 48	72.77
A352	TWO FOR	133.40

Premium Model Grade AAA Poplar Light Plywood

A327	1/8 x 6 x 24	2.06
A328	1/4 x 6 x 24	2.98
A330	1/8 x 12 x 24	3.95
A331	1/4 x 12 x 24	5.78
327	1/8 x 6 x 48	3.95
328	1/4 x 6 x 48	5.76
330**	1/8 x 12 x 48	7.83
331**	1/4 x 12 x 48	11.22

12" Birch Aircraft Plywood

B333	1/64 x 6 - 3 ply	3.10
B334	1/32 x 6 - 3 ply	2.06
B335	1/16 x 6 - 3 ply	2.18
B336	3/32 x 6 - 5 ply	3.34
B337	1/8 x 6 - 5 ply	3.47
B338	3/16 x 6 - 4 ply	2.06
B339	1/4 x 6 - 5 ply	2.49
B340	3/8 x 6 - 7 ply	2.86
B344	1/64 x 12 - 3 ply	5.33
B345	1/32 x 12 - 3 ply	3.39
B346	1/16 x 12 - 3 ply	3.62
B347	3/32 x 12 - 5 ply	5.76
B348	1/8 x 12 - 5 ply	5.89
B349	3/16 x 12 - 4 ply	3.39
B350	1/4 x 12 - 5 ply	4.13
B351	3/8 x 12 - 7 ply	4.84

24" Birch Aircraft Plywood

A333	1/64 x 6 - 3 ply	5.70
A334	1/32 x 6 - 3 ply	3.58
A335	1/16 x 6 - 3 ply	3.82
A336	3/32 x 6 - 5 ply	6.18
A337	1/8 x 6 - 5 ply	6.31
A338	3/16 x 6 - 4 ply	3.58
A339	1/4 x 6 - 5 ply	4.37
A340	3/8 x 6 - 7 ply	5.16
A344	1/64 x 12 - 3 ply	10.19
A345	1/32 x 12 - 3 ply	6.31
A346	1/16 x 12 - 3 ply	6.74
A347	3/32 x 12 - 5 ply	11.04
A348	1/8 x 12 - 5 ply	11.28
A349	3/16 x 12 - 4 ply	6.25
A350	1/4 x 12 - 5 ply	7.76
A351	3/8 x 12 - 7 ply	9.22

48" Birch Aircraft Plywood

333	1/64 x 6 - 3 ply	10.90
334	1/32 x 6 - 3 ply	6.67
335	1/16 x 6 - 3 ply	7.10
336	3/32 x 6 - 5 ply	11.83
337	1/8 x 6 - 5 ply	12.12
338	3/16 x 6 - 4 ply	6.62
339	1/4 x 6 - 5 ply	8.24
340	3/8 x 6 - 7 ply	9.83
344**	1/64 x 12 - 3 ply	19.11
345**	1/32 x 12 - 3 ply	11.64
346**	1/16 x 12 - 3 ply	11.43
347**	3/32 x 12 - 5 ply	20.74
348**	1/8 x 12 - 5 ply	21.22
349**	3/16 x 12 - 4 ply	11.52
350**	1/4 x 12 - 5 ply	14.43
351**	3/8 x 12 - 7 ply	17.22

ORDERS ONLY!
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Fax 1-906-863-5878
Customer Service & Tech Support: 1-906-863-6421
or tech@balsausa.com

Business Hours:
8:00 to 5:00 CST M-F
Email Address:
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