

**BRISTOL BEAUFIGHTER 'THE BIG BRUISER'**

**NEW LOOK >**

**WITH: TYPE HISTORY  
COLOURS SCHEMES  
SCALE DRAWINGS**



# Flying Scale Models

**THE WORLD'S ONLY SCALE MODEL MAGAZINE**

[www.flyingscalemodels.com](http://www.flyingscalemodels.com) August 2012. No. 153. £4.20

**ALBATROS  
D.Va**

**Part 2. With  
Type History**

**SCALE @  
ROUGHAM**



**FAIREY  
FIREFLY**

**Another scale masterpiece!**

■ **THE QUIET ZONE:**  
Ambitious scale electric models

■ **THE BOXKITE PROJECT PART 3:**  
Modelling a dawn-of-aviation aeroplane



# 1333



Wing Transport Racks Included



Detailed Instrument Panel

#### SPECIFICATIONS | HAN4615

<b>Wingspan</b>	2.2 m (88.0 in)
<b>Length</b>	1.8 m (72.0 in)
<b>Wing Area</b>	148 sq dm (2290 sq in)
<b>Weight</b>	6.80–7.10 kg (15.0–15.5 lb)
<b>Engine</b>	.26 cc 2-stroke gas
<b>Electric Motor</b>	Power 52
<b>Transmitter</b>	4+ channel
<b>Servos</b>	with 6 servos

## HANGAR 9™

For more about this unique take on a warbird classic,  
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THE ISSUE AHEAD...

# FORMATION...

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



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## ON THE COVER

The Fairey Firefly is an aircraft modelled very infrequently. Chris Peers and 'Spartacus' put that right with their 108" (2,743mm) span, 41 lbs (18.6 kg) ZDZ 80cc petrol powered masterpiece.

(Photo: Alex Whittaker)

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## NEWS AND NEW PRODUCTS...

# CONTACT

**W**ith the scale Warbird movement constantly gaining pace, it's quite appropriate that this month's FSM is very much a Warbird issue. Quite apart from concluding Peter Rake's construction feature on his Albatros D.Va, we've launched into another Scale challenge, this time from the 1939-1945 WW2 era.

Whilst the Albatros D.Va has its attraction in the sheer elegance of this shape, the Bristol Beaufighter takes hold of the scale modeller's imagination in a different way. It's bulldog-like pugnacious short-nose appearance seems almost Churchillian. There seems to be an aggressive determination built into the shape.

So here we go then with a two, or maybe even three-part, how-to-build feature for Andy Ward's 85" (2159mm) wingspan replica for two .75 - .80 cu.in engines. The four-sheet plans are well detailed and to get you on your way with construction, there will be a laser-cut set of wood components available too. At that size, it's not too big and those radial engines are just ideal for an electric-power option if preferred.

The other option - just to be different, for those who are really adventurous, is the in-line engine Rolls Royce Merlin powered version. It would also make an excellent project for twin electric power.

**Think about it!**

**Editor**  
**Tony Dowdeswell**

[tony.dowdeswell@adhpublishing.com](mailto:tony.dowdeswell@adhpublishing.com)

## NEW RC ELECTRIC FLYER MAGAZINE AND AEROMODELLER REVIVAL

**Flying Scale Models has a new sister title and the return of an old friend...**

**A**n all new magazine aimed at electric flight enthusiasts called RC Electric Flyer is now on the news stands, featuring all styles of electric aircraft including scale models, the new 100 page magazine is also available from the website at [www.rcelectricflyer.com](http://www.rcelectricflyer.com)



Aeromodeller first published in 1935 is also being re-launched later in 2012. Back to an all classic aero modelling content the new title will be published 6 times a year. If the traditional aeromodelling disciplines are your interest then register your intent by emailing to [aeromodeller@adhpublishing.com](mailto:aeromodeller@adhpublishing.com) or fill in the form at [www.aero-modeller.co.uk](http://www.aero-modeller.co.uk)



The new Flying Scale Models website is now up and running - with daily news stories, a forum and shop that features all the Flying Scale Models plans and cut parts and of course is the place to renew your FSM subscription.

## WOODVALE CANCELLED

Regular readers will have followed and welcomed the arrangements of John Wheeler and members of the Liverpool M.A.C to bring back R/C Scale events to the annual Woodvale Rally. The Scale competition classes had been left out for a number of years.

Latest news is that due to circumstances beyond anyone's control, civilian access to the Woodvale airfield has been withdrawn for the foreseeable future. Consequently, the whole event is cancelled.

It's a big disappointment for all who enjoy the Woodvale 'Do' and our commiserations go out to all those involved who made the effort to prepare for the big weekend there.

## INDOORS AT IMPINGTON

If this year's British summer, so far, is any benchmark, then Indoor model flying could well be THE major part of this year's modelling action scene! It could well be unless our summer season bucks-up very soon now.

The Annual Impington VCMAC Indoor Meeting is one of the major events of the Indoor scene, which this year, takes place at its perennial venue of Impington Village College, Cambridge on October 28th, 9am to 5pm. The action there will include Round-the-Pole and small electric helicopters, plus R/C flying in a dedicated hall, while free flight competition categories will include 'Malmstrom Viking', 'Bostonian' and 'Frog Juniors'.

There will also be a Models Exhibition and, best of all for Scale enthusiast, a Seminar by Peter Smart on 'Progress in Indoor Scale', both Free Flight and Radio'.

Further detail are available from Chris Strachan Tel:- 01223 860498 email: [chris.strachan@btinternet.com](mailto:chris.strachan@btinternet.com)

## BIG BUBBLE-TOP P-47

Here at FSM we always think of the Republic P-47D Thunderbolt as the aviation equivalent of the Classic American muscle car! It seems to exude so much power and purpose, even when it's standing still.

Not surprisingly, the Thunderbolt is a much modelled aircraft and now there's a particularly good one just coming into the *Hangar 9* range of ARTF kits.

There were many variants of the P-47 during the WW2 period and this one is the bubble canopy P-47D-40, which spans 81.5" (2100mm), intended for 1.60-2.10 cu.in. two stroke engines, 1.80-2.20 two strokes, 26-40cc petrol power, or '160' size electric drive.

The kit features glass fibre moulded engine cowl, functional flaps, and installation mounting fitments for *Robart* retracting main and tail unit undercarriage.

Finished in *UltraCote* surface covering, the kit also comes with three different decal sets to provide the option of a bit of individuality. Price is in the range of £725.00.



## STRICTLY FOR SPITFIRE FANS

At the Imperial War Museum at Duxford airfield on Sunday August 5th, there will be a chance to get really close to examples of the Supermarine Spitfire. Between 10am and 1.30pm, a number of historic Spitfires will be on static display, including the rare Spitfire Mk.1a from the Aircraft Restoration Company, the Mark V from Historic Aircraft Collection, Mk. IX from the Old Flying Machine

Company, Mk. XIX from the Rolls Royce Heritage Trust and Mk. IXT from Air Leasing. Then, during the afternoon, these Spitfires will perform short displays.

Also flying will be the Battle of Britain Memorial Flight Spitfire.

In addition, the Aircraft Restoration Company is offering a rare opportunity to sit in a Spitfire. This costs £15 per person and includes a souvenir T-shirt and photo opportunity.

All proceeds go to the Blenheim Restoration Fund.

Between 10am and 2pm, in the Visitor Centre, author Andy Saunders will be signing copies of his new book Spitfire Mark I P9374 - The remarkable story of how a unique aircraft returned to flight. Also present will be Martin Overall, Historic Flying Limited's Chief Engineer, who oversaw the restoration of this incredible aircraft, and who contributed significantly to the book.



# READERS THOUGHTS AND FEEDBACK WE GET LETTERS...

## VERY ACTIVE

Dear FSM,

I very much enjoyed the ARROW ACTIVE MK II feature in the July 2012 FSM. It concludes by asking "who will be the first to give it a go?" Just so you know, an American control line scale modeller of great renown, is near to completing an ARROW ACTIVE Mk. II model that he intends to fly in C/L Scale Competition at this years US Nationals. His name is Frank Beatty and he lives in Granite City, Illinois. He draws his own plans and scratch builds. Frank reports that the inspiration for his ARROW ACTIVE project was generated long ago when AEROMODELLER first published Flt.Lt. E.H. Norman's free flight model in the April 1958 issue. Frank's control line model is somewhat larger at about 1/6TH scale. Frank is also a subscriber to FSM. Photos of his control line scale model in FSM, would make a great follow up to your recent ARROW ACTIVE MK II feature. Anyhow, do know that I am looking forward to AEROMODELLER's upcoming return and have so advised the appropriate folks who handle my AMI subscription.

**Kindest regards, Paul Gittel,  
Winnipeg, Manitoba, Canada**



## BUFFALO DROPPINGS

Dear FSM,

With all due respect to people who actually like the thing, if I see another article, photo, caption, build log or whatever re the Brewster Buffalo - a crappy, ugly airplane, designed and built by a corrupt company and which killed a number of pilots in combat due to its crappy performance - I think I will throw up and then cancel my subscription. You outdid yourselves in the most recent issue with the over-modelled Fokker D.VIII, another ugly airplane, built by modellers too lazy to get on with another

wing and rigging, but whom still want to fit in with the WWI crowd.

Now here is a nice looking airplane, my original design, 46" Halberstadt CL.II that took first in Electric Scale at the WRAM show and second in Designer Scale at Toledo in the USA this year. You don't see these everyday, which is my entire point. There are so many nice looking subjects that never see the light of day since they are overlooked by the mainstream media.

OK, I have had my day in court...  
**Regards, Rob Caso**



## HAWKER TEMPEST UNDERCARRIAGE DOORS

Dear FSM,

I was not familiar with your magazine Flying Scale Models until I picked up a copy of the March issue recently. Congratulations on a very fine publication.

I was very impressed, especially as it had details of the Hawker Tempest, one of my all-time favourite aircraft. I apologise that this email is rather late, but hope you may find the enclosed photo of the undercarriage of the Hawker Sea Fury in the Australian War Memorial at Canberra of interest. The Fury, and the naval Sea Fury, are direct descendants of the Tempest II and the undercarriage is the same. I refer in particular to the small undercarriage doors at the top of the main door, hinged directly to the wing. These appear to be missing from the Tempest II photographed in your magazine.

The angle of these is different to the angle of the main gear cover and it obvi-

ously all fits in place when the gear retracts. The reason for this is that the gear goes significantly backwards as it retracts.

This was discovered the hard way by Vito Tomeo quite some time ago with his .90 powered early giant scale Tempest (published in the now defunct American *Scale R/C Modeler* magazine,) which was noted on its first flight to become unstable from a rearward CG when the gear was retracted. Models of the Tempest should be balanced with the gear up!

The small auxiliary doors should be easy to replicate on a scale model. All it would take is a fairly weak spring closing it. This would be pushed open by the main gear door when the undercarriage is down, it would not require any separate mechanism.

I hope this is of some help to those readers who like me are Tempest fans and build models of this great aircraft.

**With best regards, Peter Kraus**

# Pro. Class.

## The NEW Spektrum DX18

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The output of CCPM swash servos or multiple servos on a single control surface can be precisely balanced using a 7-point curve mix.

### X-Plus™ Channel Expansion

The system can be expanded to 18 channels with an XPlus8 receiver module (sold separately); perfect for complex scale models and high-performance sailplanes.

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The DX18 not only displays telemetry data in real time, but will log the data to the SD card so it can be reviewed after the flight.

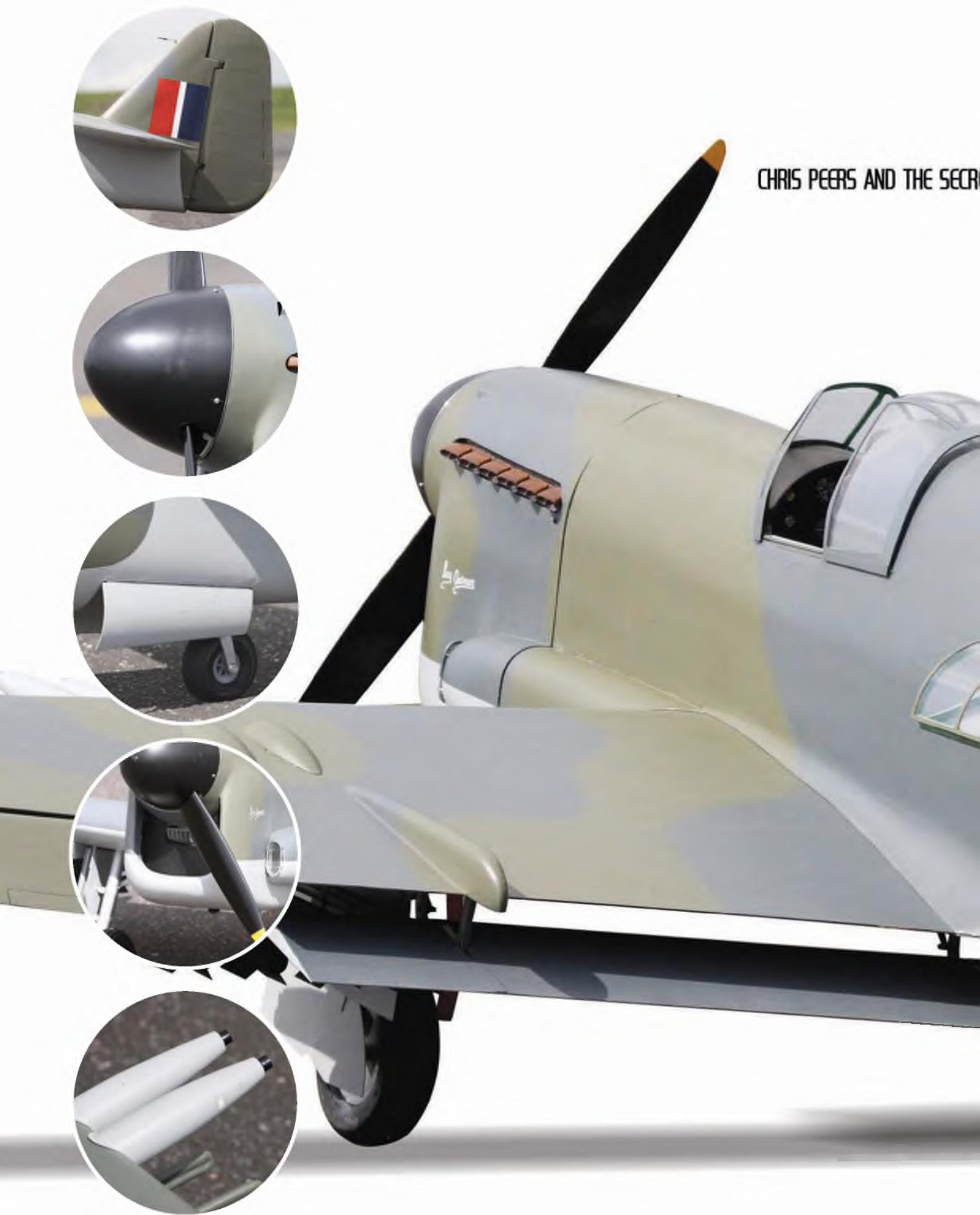
### Dual Diversity Antenna

Essentially two antennas in one, the Dual Diversity antenna consists of vertical and horizontal arrays mounted perpendicular to each other for superior protection from signal fades. The horizontal array is housed in the durable carrying grip on the back.

The DX18 delivers all of these capabilities and is complete with a 9-channel receiver, 2S Li-Po transmitter battery, SD card, neck strap and a global charging system.

The wait is over! Get to [horizonhobby.co.uk](http://horizonhobby.co.uk) right now for complete details on the new standard in pro-class excellence and to find the Spektrum retailer near you.

CHRIS PEERS AND THE SECR





# FAIREY FIREFLY **MK.I**

EXPERTS 'SPARTACUS' HAVE DESIGNED AND BUILT YET ANOTHER SCALE MASTERPIECE. ALEX WHITTAKER REVEALS ALL.

**T**he Fairey Firefly holds a special place in the affections of many aeromodellers for its bold appearance, distinctive layout, and extensive cockpit glazing. The Firefly was designed by H.E. Chaplin in

1940 as a two seat, folding-wing, carrier-borne fighter, with anti-submarine capabilities. The necessity of operating radar whilst flying over open sea for long periods demanded the separate navigator's position. In fact, the two cockpits were so sep-

arated to provide better downward vision over the wings.

The Firefly was originally intended to carry a gun turret, but this requirement was abandoned before construction of the prototype commenced. Powered by





Home moulded engine exhaust stubs convincingly weathered down.



Pilot's cockpit with Charles in the office.



No detail has been overlooked, including this air intake grill.

a Rolls Royce Griffon V-12 engine, the Firefly was armed with eight Browning 0.303 machine guns, or four Hispano cannon. The Firefly directly replaced the earlier Fairey Fulmar and went on, in various development stages to serve with the Fleet Air Arm until the mid-1950s, and British and Australian Fireflies saw action during the Korean War. It is a little known fact of aviation history, that Fairey Fireflies of the Royal Dutch Air Force flew offensive operations over Indonesia as late as 1962.

#### SPARTACUS AND PEERS

Chris Peers is a celebrated UK scale builder, Warbirdler, model-shop manager, and show pilot. However, his partner-in-crime and co-builder, the shadowy 'Spartacus', though a legendary figure, is quite unknown. Spartacus prefers to stay in the background polishing his already impressive building skills.

Their Firefly is a joint venture, with both building partners playing to their individual strengths with this impressive airframe.

#### PLAN AND DOCUMENTATION

The model was built to Chris Peers' own plan, based on some existing three-view scale drawings. For his documentation, Chris consulted a number of books and also contacted the Fleet Air Arm Museum at Yeovilton.

#### CONSTRUCTION

The model is scratch-built. It is of traditional construction, mostly balsa and ply. The fuselage has ply formers, and balsa sheeting, with a fibreglass cowl, and tail gear doors to suit. The wings are all wooden, built-up, with fibreboard mechanisms for the working Youngman flaps. The gear doors are aluminium sheet.

The tailplane is balsa with 10g fibreboard for hinging, and a steel bar is employed for the joiner.

#### COCKPIT CANOPIES

These complex items were moulded by Chris and Spartacus from their own plugs.

The front canopy slides on rails and the rear canopy is double hinged in the scale manner.

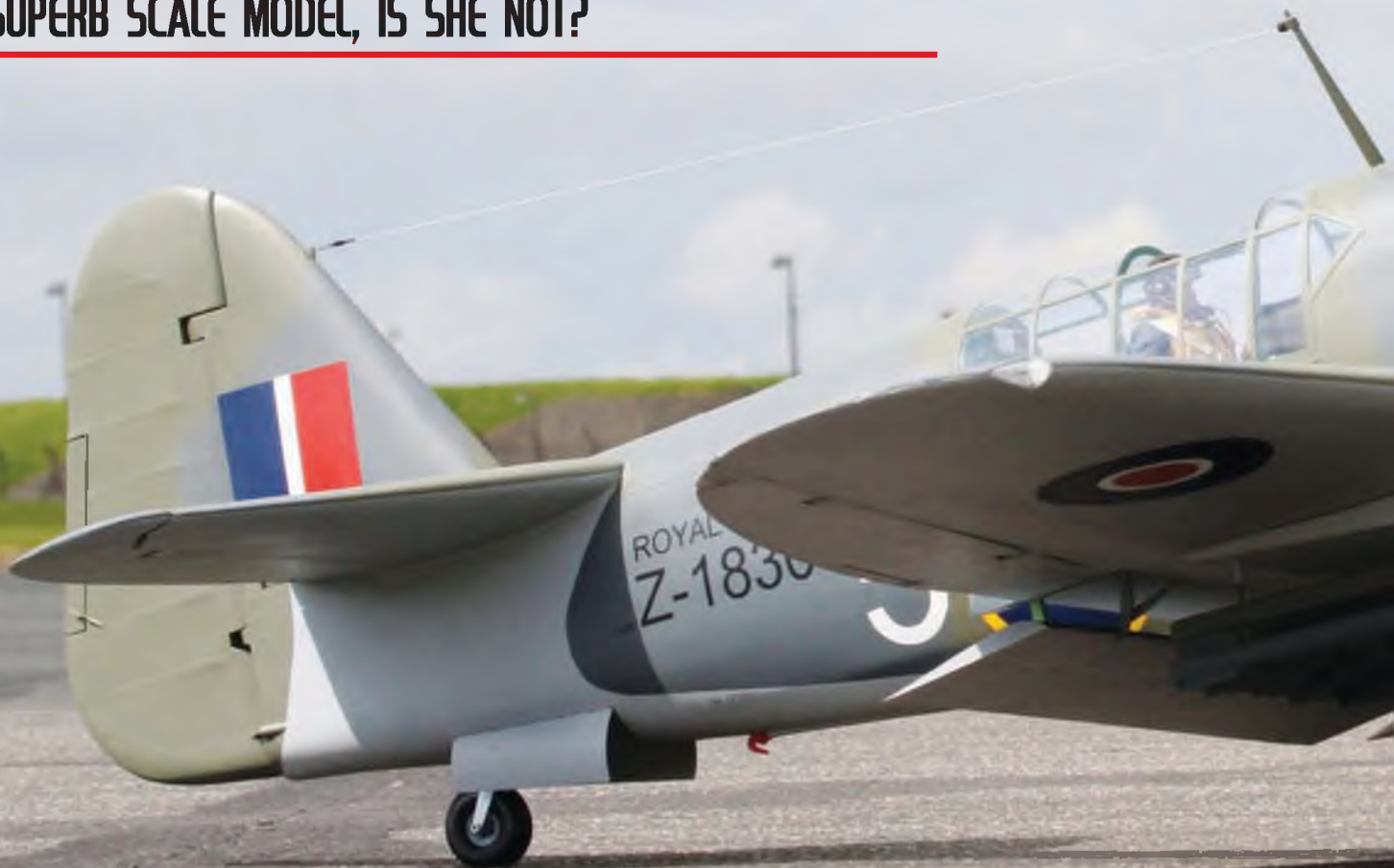
#### EXHAUST STUBS

These were resin-moulded from Chris's own moulds. He used the same process for other scale detailing throughout the airframe.

#### ENGINE

Chris chose a ZDZ 80 RV petrol engine, whose power has proved sufficient for such a large airframe.

## SUPERB SCALE MODEL, IS SHE NOT?





Note detailing on the aluminium wheels.

Chris had to design and build his own retracting undercarriage.

Ordnance in place: 8x60lb rockets, and 2x250lb bombs.





Capable looking pilot complete with Mae West.



Opening and folding rear cockpit access.

### PROPELLER

This is a Menz 28x10.

### SPINNER

Chris turned up a wooden plug on the lathe, laminated from sheets of MDF, and then moulded up his own fibreglass spinner, with a spare for insurance! Chris could have turned the spinner up from aluminium, but felt that balancing could be better achieved with a glass lay-up.

### EXHAUST

The bespoke exhaust is built around a 2" diameter brass tube silencer box, fitted with a steel manifold, and exhaust pipes.

### UNDERCARRIAGE

No commercial units existed with the required geometry which, on the Firefly, is quite complicated, so the undercarriage was designed and built by Chris.

### COVERING AND FINISHING

Traditional all the way: dope and tissue! Chris used 'Withan Grou' enamel paints, which he describes as superb. Colours were closely matched to Fleet Air Arm originals.

### LEGENDING AND DECALS

Chris made up all his own paint masks. He borrowed brother Andrew's new vinyl cutter to make all the masks.

**NAVIGATION OFFICER / RADAR OPERATOR. NOTE CHART IN WINDOW.**





## PILOT'S NOTES

As you might be able to detect from the flying shots, she looks utterly correct in the air. Chris reports that this is the best flying scale model he

has ever owned. The Youngman flaps allow walking-pace landings, and she is surprisingly agile and aerobatic for such a large warbird.

**Overall:** very easy to fly.

**THE DISTINCTIVE TWO-PART UNDERCARRIAGE DOOR SYSTEM CAN BE SEEN IN THESE SHOTS.**



## MODEL SPECIFICATION

Model designed and scratch built by Chris Peers and Spartacus.

Span:	108"
Weight:	41 lbs
Engine:	ZDZ 80cc petrol
Prop:	Menz 26"x10"
Retracts:	Scratch built by Chris Peers

# DURAFLY



## ZEPHYR V-70

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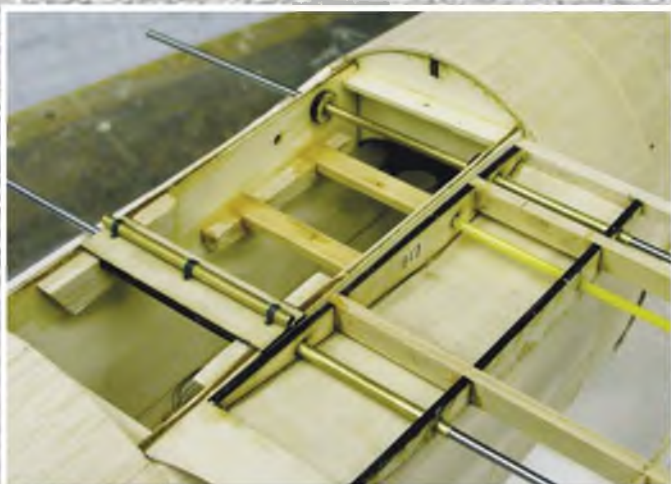
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The wire-in-tube lower wing fixing. Note how the wings fit and the rear undercarriage tube. The yellow tube is for the aileron cables.



The model mounted in a jig in preparation for precise fitting of centre section struts, interplane struts and tail surfaces. If you get this right, everything else has to be right.





# Albatros D.Va

Part 2: A 1/6 scale, electric powered model designed by Peter Rake, with the prototype model built and described by Darrin Covington

## Tail Bits

The tailplane and elevators are built flat over the plans using strip stock, some formed parts, and laminated leading edges. After building the structure, strip material is applied to either side of the ribs allowing sufficient thickness for sanding to a streamlined profile. Pockets are provided for aluminium tubing that will house carbon fibre rods at assembly. The plans show the carbon fibre rod attached to the fuselage during its construction, but I chose to install aluminium tubes in the fuselage that the cyano glue slid into after the fuselage finishing was completed.

The fin and rudder are built in the same fashion, with the fin being fully sheeted. After shaping and smoothing everything, slots were cut for CA hinges, and the parts were ready to cover.

## Wings

Wing structures are typical spar-and-rib construction, with the exception of particularly wide bass trailing edge and tip pieces, which make for a very rigid wing with good attachment for the trailing edge of the ribs. The top wing is built in two pieces and joined flat at the centre section with plywood joiners. The centre section is sheeted on top, and the cut-out over the cockpit is laminated using sheet material and sanded to shape. I made a cut-out for the radiator that fits between the two spars by removing sheeting on top and boxing in the opening for reinforcement.

The piano wire centre section struts are bent to shape and attached to plywood plates built into the upper wing using a jig to ensure correct alignment. I fabricated small plates that use



**1: Basic tailplane and elevator structure, with ribs in place, but yet to be sanded to final airfoil section.**  
**2: Here the horizontal tail surface has been mated to the fuselage. Note the metal tube elevator joiner**  
**3: The complete tailcone, added to the upper fuselage half-shell.**  
**4: Detail of lower wing showing scrap block reinforcement around strut socket and aileron cable tube.**  
**5 & 6: Upper and lower wings under construction.**  
**7: Absolutely nothing unusual about the wing structure, here you see how the aileron cable guide tubes exit the wing.**  
**8: slight variation with regards top wing mounting. In preference to saddle clamps and exposed strut ends, Darrin opted for a more scale appearance.**  
**9: Using an independently controlled servo for each aileron simplifies adjustment (using the transmitter) and allows for differential throw to be set up.**



screws for the attachment, much like the full size Albatros has. Once happy with everything, the struts are clad with balsa, shaped and fitted to the completed fuselage.

The lower wings are built similarly, but also incorporate wing tubes at the root for carbon fibre rods. Scale-like aileron controls are shown on the plans. A nylon tube is bent and routed in the lower wings for the pull/pull cables to run, and plywood control horns are built into the ailerons in the upper wing. I like to build a temporary fixture to locate the fuselage to the wings, then bend the wire and make end attachments in place. I also assembled and test fitted the interplane struts now. Once this is taken care of, the wings can be shaped and sanded in preparation for covering.

### Undercarriage

The undercarriage is shaped from piano wire, bound with copper wire and soldered, then glued into the tubing installed in the fuselage. I deviated from the plans and built a suspension into the gear that uses elastic bands to act as bungee, similar to many full size WWI aircraft. I also incorporated a 'live' axle, meaning it has a solid axle extending from one wheel to the other and the wheels are fixed to it. The wheels can't move independently, forcing the plane to track straight.

The leg wires are faired over using balsa

and are shaped to a streamlined profile and 'attachment points' reinforcement plates made from sheet plastic added to the tops of the struts where these joint the fuselage. I used *DuBro* 'vintage' wheels, into which I cut lightening holes in the hubs. The hub caps are sheet styrene circles, split and rolled into a shallow cone. The tail skid is from plywood as show on the plans. I inlaid a piece of piano wire into the bottom edge since I fly from asphalt.

### Painting & covering

The scheme I chose to replicate, D.2236/17 flown by Vzfw Ludwig Weber of Jasta 3, called for a basic factory finish and the name 'Lulu' painted in rather large letters on both sides of the fuselage. The wings and tailplane had five-colour lozenge fabric. I won't delve too deep into how I accomplished the finishes now, because Peter ran my piece on the technique back in the September 2011 issue of *FSM*. That issue of *FSM* also ran the findings of the late Ron Moulton's extensive research into this subject and back issue copies are available direct from the Publisher for anyone who would like to delve into the technique involves.

However, I can say the lozenge pattern was printed onto *Airspan* using my bubble jet printer and the fuselage was painted using traditional faux wood-graining techniques with a few twists of my own. The

'metal' panels and fittings were painted with enamel. The markings were masked, using masking vinyl cut on my cutter, and sprayed with enamels.

### Assembly

I usually build a temporary rigging fixture early on in the construction of a model, as mentioned in the section detailing the wing construction. I designed it to hold the fuselage and the wings (and in this instance the tailplane) in alignment to each other. It secures all of the parts in their proper place for fabricating struts and to confirm incidences and washout. It's also nice to have the model secure, instead of moving around on the bench. At final assembly time I use it again to ensure everything is where it should be while gluing her up. I did the assembly in stages, beginning with the lower wings then the upper wing. I use slow setting epoxy and leave it in the fixture to dry at least 24 hours before touching it. I also leave it in the fixture as I do the flying wires and rig the controls. The payout for taking the time to make the fixture is a straight plane that usually requires little, or no, trimming for the maiden flight. The fixture doesn't have to be fancy; I make mine from scrape MDF and glue and screw it together.

### Radio & rigging

HS-85BB servos were used throughout. Two



“ I enlisted the help of pilot-extraordinaire Duane Sides once again, as I always do, to perform the first flight of the Albatros and the maiden flight was fairly uneventful, just as I like them. ”

were used on the ailerons to actuate pull/pull cables, in a single tube routed through each lower wing, and then up to the ailerons in the upper wing. My first impression of the aileron actuation system was suspect. I was concerned about running two cables through one tube, and that the sharp bend where these exit the lower wing would cause binding. My worries were unfounded, as the system works very well.

One elevator servo, mounted on its side controls the separate elevator halves with four cables. The cable material I use is nylon coated stainless steel beading wire, available at craft stores. I used the 19-strand, .018" variety. I also use the matching crimp tubes and the small pliers sold to crimp them. I used to make my own crimp tubes from small diameter brass tubing, but the commercially available ones actually look better and save a lot of trouble cutting my own.

I apply a small drop of medium cyano glue to the crimp when completed. I don't incorporate any kind of adjustment into the rigging and control system, and in the two, or so years, I've been using the beading wire, I've never had a stretching problem. The wires will relax a bit in our high temps here in the desert, but not enough to cause problems. A Spektrum AR6200 RX rounds out the radio installation.

#### Dummy engine & Decals

The dummy Mercedes DIII motor was fabricated from a number of different materials. The cylinders were vacuum formed after turning a plug on the lathe. The exhaust

manifold was also vacuum formed using a plug carved from high density foam. Plastic tubing and extrusions were used for other details, and some parts were carved from the same high density foam material used for plugs. It is attached to a light-ply plate that is held in place with magnets, so it can be removable for battery access. The radiator pipe, which goes from the front of the engine to the wing radiator, is a press fit on both ends because it needs to come off to remove the engine. It was made from plastic rod, heated and bent to shape.

The radiator was built using a wood frame and a vacuum formed 'core' skin. The expansion tank is plastic sheet and the rest of the details are from plastic rod and sheet. The louvers, located on the underside, were fabricated from sheet plastic and the actuating mechanism from various bits of plastic and litho plate.

I added quite a bit of small external detailing to the Albatros, primarily to the forward areas, knowing anything added in the back would require weight up front to counteract. I look at this small detailing as 'clutter' that doesn't really stand out on its own, but adds immensely to the overall look of realism. Doubler plates, vents, and the foot step were made using plastic sheet. Various sizes of round access doors were made from sheet plastic also and semicircular rod, scored with the X-acto blade, simulate the piano hinge.

#### Weathering

My approach to weathering is simple. I basically slop a water-thin application of



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mucky brown latex paint over the entire plane, and wipe it down. It leaves a thin film overall, and build up in cracks and crevices. This takes the new shine off everything and adds life to the small details. I leave a little extra around areas that I think

**Basking in the sun and revealing just how realistic that printed covering looks once applied to the model. Easier and much better than a painted on finish.**



# OR... why not drop the 'a' and model it as a D.V?

The differences are quite minor, but do include the attractive upper fuselage fairing behind the cockpit as shown on the scale three views of the type that appear on pages 34-35 of last month's issue. It also expands the choice of colour schemes.



might have been handled more and also allow it to puddle up in a few places on the belly. After this 'wash' dries, I use artist's pastels for additional dirt and grime. I apply it with my fingers and rub it into the surface. The pastels 'bite' into the wash, so it doesn't just brush off.

Being electric powered, I don't bother sealing any of the weathering and in time, it will develop and even nicer patina from handling.

### Pilot

A scale plane without a pilot isn't com-

plete, and finding a suitable one can be difficult. I was fortunate to once again get help from Warren Window with the task. He sculpted and then cast the pilot for my supersized BE12a I built from Peters' plans. This time around, he sculpted a full body pilot for me from clay and sent it to me to

## CUT PARTS SET FOR THE

# Albatros D.Va

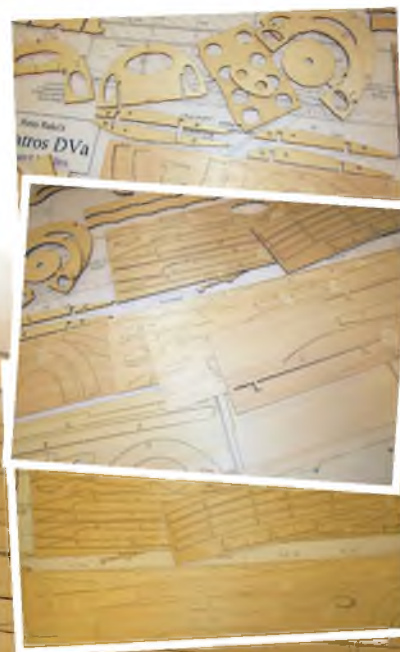
Get straight down to construction without delay!

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

**IT DOES NOT INCLUDE STRIP AND SHEET MATERIAL.**

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make the moulds and cast the parts. He's made up of individual parts, for casting, and glued together prior to painting with enamels. The goggles are separate and acrylic lenses were cut and glued in carefully. The moulds were made using silicone moulding material and the parts cast with light-weight resin and micro balloons. I'll go into more details of the process in a later article. Sitting in the cockpit, he's looks very convincing.

### Motor & prop

A Rimfire 32 motor was installed in the Albatros using the 'X' mount. A tapered shim was installed between the motor and firewall that was cut at two degrees down and two degrees right. A 60A ECS and two 2S LiPo packs complete the power system.

The prop was designed by Leo at Replikit to duplicate the diameter, pitch, and profile of the full size Axial. It's an 18 x 15, laminated from laser-cut maple and walnut, then sanded to shape. The Axial logo was printed on clear waterside decal paper and applied over a cream colour base. Several coats of clear polyurethane finish off a beautiful propeller. The spinner was vacuum formed using a high density foam plug turned on the lathe. It attaches to a plywood backplate with a series of small screws into nut plates, from the backside. The prop and spinner were balanced as a unit.

### In the air

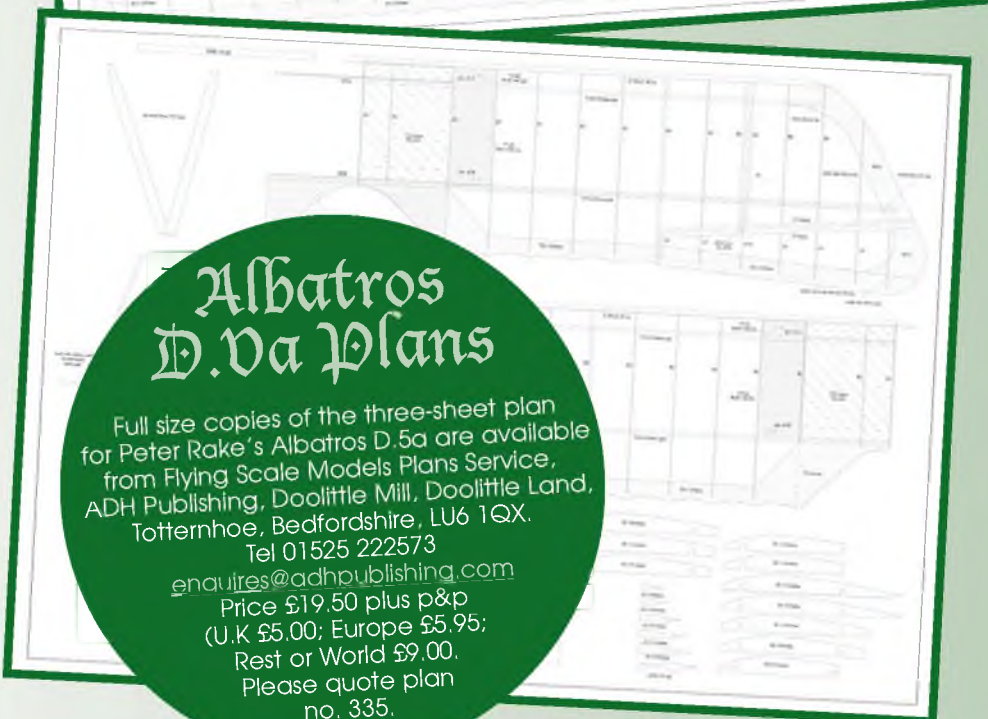
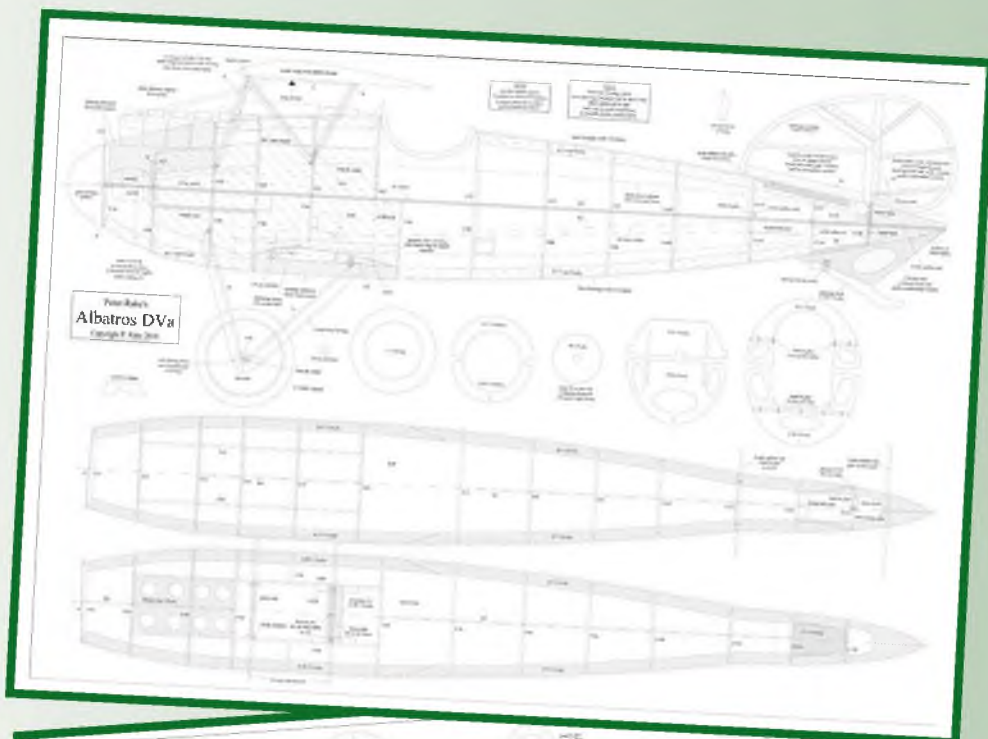
The weight came in a bit high at 6.5 lbs, including 1lb of dead weight I had to add up front.

I enlisted the help of pilot-extraordinaire Duane Sides once again, as I always do, to perform the first flight of the Albatros and the maiden flight was fairly uneventful, just as I like them. Take off roll was straight (thanks to the live axle) and fairly short. She climbed out straight, not requiring any trim adjustments whatsoever. Cruise was realistic and ailerons were very effective. She grooves well and is quite a departure from the other WWI biplanes in my hangar, which fly more like kites.

Landing was straight forward, with a conscious effort to maintain a reasonable forward speed due to her high wing loading. Everything went well and she landed nicely on her mains and settled down onto the tailskid for a short roll out. Admittedly, the majority of the flight had to be flown at near full throttle, so a power upgrade is in the plans. She flies fine as equipped, but I like would a little more extra power...just in case, and I don't like to push the motor and components that hard consistently.

### Conclusion

Without a doubt this was my most ambitious build to date, and I'm very pleased with how it all came together. All of my goals were met, I learned quite a bit in the process, that I can now apply to future builds. I have a nice looking example of a beautiful design that flies wonderfully. It doesn't get any better than that. ■



## Albatros D.Va Plans

Full size copies of the three-sheet plan for Peter Rake's Albatros D.5a are available from Flying Scale Models Plans Service, ADH Publishing, Doolittle Mill, Doolittle Land, Totternhoe, Bedfordshire, LU6 1QX.

Tel 01525 222573

[enquiries@adhpublishing.com](mailto:enquiries@adhpublishing.com)

Price £19.50 plus p&p

(U.K £5.00; Europe £5.95;

Rest or World £9.00.

Please quote plan no. 335.



The Smithsonian Institution's Albatros D.5a, immediately after completion of the marathon restoration of the aircraft, brought back to USA after WW1. It is here seen immediately after roll-out at the Smithsonian's restoration facility at Silver Hill, Maryland.

# Albatros

## D.V & D.Va

Who can argue that this aircraft was not the most elegant shape among fighters of the WW1 era?



Occasionally, very occasionally, a Warbird appears that has the development potential to extend its service life for either all, or most of the conflict for which it was originally designed. The

crowning example of such longevity must surely be the Supermarine Spitfire that first entered military service in 1938 in its Mk.1 format. The development potential of the type, led to its final Mk.24 version, which served with the Royal Air Force until

well after the end of WW2 in 1945.

Similarly, the Albatros D.V/D.Va had its roots in the Albatros D.I that first appeared in mid-1916. Both the D.I and the D.II which quickly followed, had a defining shape which ran right through to the final D.Va with a distinctive fuselage construction that employed plywood skin panels pre-formed to shape in heavy male/female moulds after pre-steaming.

On the D.I, D.II and subsequent D.III, (deliveries of which began at the end of 1916) these mouldings were applied only to the rounded fuselage top and bottoms, but on both the following D.IV and D.5/5a, this innovation was extended to the fuselage side panels producing a fully rounded fuselage shape that commenced exactly circular on the front spinner, through elegant oval, to horizontal flat knife edge at the rudder post. The result, when matched to the gracefully outlined



Without the benefit of radio communication while on patrol, distinctive individual fuselage colour schemes were a way of identifying individual pilots while airborne. This is Lt. Dillthey of Jasta 40 with his green/white Albatros D.Va during June 1918. Note simplified late WW1 national marking.

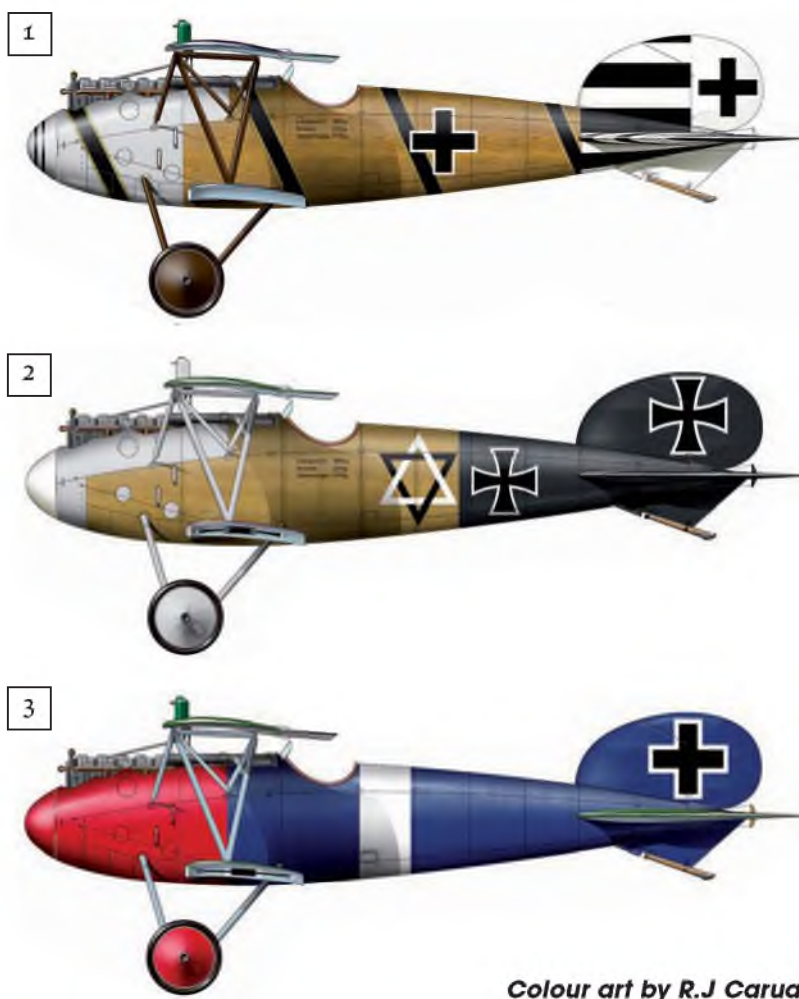
upper and lower wings, fully rounded fin/rudder and 'whaletail' shaped horizontal tail surfaces produced, in the D.V/D.Va, what must be hailed as the most elegant fighter aircraft shape of the WW1 period and one that has huge attraction for scale modellers.

Immediately pre-dating the D.V series, the D.IV was a late 1916 development which was the first of the line to adopt the fully rounded fuselage profile, but also reverted to the wing planform of the D.II with broad chord on both upper and lower panels, and was used as a test bed for an experimental geared version of the Mercedes D.III engine, an arrangement that permitted the engine to be fully cowled. However, this layout incurred cooling problems and the type did not progress beyond the prototype stage.

Meanwhile its immediate predecessor, the flat-sided D.III had adopted the sesquiplane wing planform copied from the French Nieuport fighters, a style that provided improved downward view of the pilot.

It is an indicator of the pace of fighter aircraft development during the WW1 period, that when series production of the D.III type commenced, the Albatros Werke design team already had the design for its successor underway, so that the prototype D.V flew in early 1917, with the first production order issued in April that year. With follow-on orders, the total amounted to 900 examples.

Among the front-line pilots of the Imperial German Air Service Jagdstaffeln, the expectation had been that when it entered service in the summer 1917, the Albatros D.V would provide a performance improvement sufficient to effectively combat the Sopwith Camel, SE5a and SPADs of the Allied forces. But in fact, the D.V, using the same 160 hp Mercedes D.III engine as the Albatros D.III, gave little in the way of extra 'edge'. Airframe integrity worries, after a number of early lower wing failures during prolonged dives added to the



Colour art by R.J Caruana

### More Albatros D.V Colour Schemes:

**1:** Albatros D.V of Jasta 4. Metal front fuselage panels and spinner with natural wood fuselage and white tail. Black thinly outlined in ochre ribbon wound around fuselage, typical of this unit. Black/white tail unit, including above and below horizontal surfaces. Five-colour lozenge pattern on wing top surfaces, light blue undersides. **2:** Albatros D.V, Jasta 12. Natural wood fuselage with natural metal nose panels; wings are mauve and green wavy bands on top and light blue below. All rear fuselage and tail in black. White spinner; black/white 'star' marking on fuselage sides. **3:** Albatros D.V, flown by Lt Dingel, Jasta 15. Red and blue fuselage, with white band; red wheel centres. Green and mauve wavy camouflage upper wings and horizontal tail surfaces; light blue undersides to wings and tail.



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Albatros D.Va od Jaasta 5 is the personal aircraft of L...

### More Albatros D.V Colour Schemes:

**4:** Albatros D.V, D.4594/17, flown by Lt Paul Strahle, Jasta 18, early 1918. Fuselage in blue and red with undersides in light blue; wings and tailplane covered in five-colour lozenge fabric on top and painted light blue undersides. White 'axe' marking on fuselage sides. **5:** Albatros D.Va, D.2299 flown by Oblt. Bruno Loerzer, Jasta 26. Black/white fuselage stripes, with all-black tail. Horizontal tail surfaces are also black and white stripes. Five-colour lozenge fabric above and below both wings with white-outlined crosses in six positions. **6:** Albatros D.Va D.5390/17, which is now in the Australian War Memorial, as it appeared when it was shot down by Lt Sandy and Sgt Hughes flying an R.E.8 of No 3 Squadron. Large parts of the wooden fuselage, together with struts and undercarriage legs, have been painted Green while the metal areas of the nose are Brown. Mauve and Green upper wing surfaces. All crosses with white border. Light blue undersides; also Light Blue is the entire horizontal tail which has the outer tips in red. **7:** Albatros D.Va, believed to be from Jasta 1, Italian Front, 1918. Natural wood fuselage, red front metal panels and spinner. Personal marking is red and white. Wings, horizontal tail and rudder are in four-colour lozenge fabric. **8:** Albatros D.V, flown by Lt Fritz Rumej, Jasta 5, an ace which claimed 45 victories before he died in action. Neutral grey front metal panelling, red nose section, white fuselage with black stripes. All tail is green with red border, identification marking of Jasta 5. Wings are mauve and green wavy pattern.

Colour art by R.J Caruana

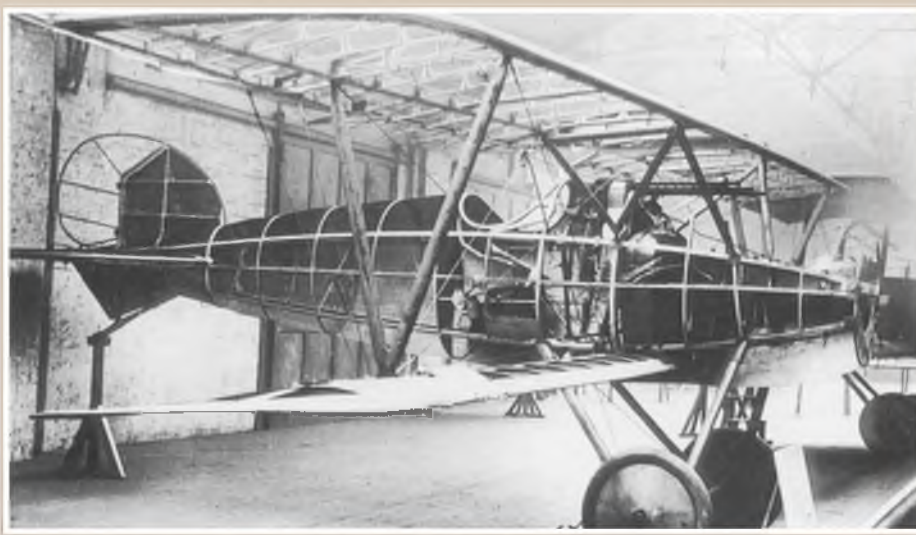
**BELOW:** The Swastika motif on Lt. Billick's Albatros D.V has nothing to do with the later Nazi era. This aircraft of Jast 12 had a black fuselage and green/mauve camouflage wing upper surfaces.







t.Schlomer



This captured D.5a was stripped down to bare airframe and exhibited in London During 1918.

disappointment and quickly led to airframe strengthening.

The attempt to stretch performance led quickly to

the D.Va variant with higher compression ratio engine that delivered 170-185hp which entered front-line service in the autumn of

1917. Production of both D.V and D.Va continued to run in parallel and the type continued in front-line service until the November 11th

**BELOW:** The dorsal headrest fairing at the rear of the cockpit rim identifies this as an Albatros D.V. Note the indistinct but unusual pattern on the fuselage, which may be some kind of unorthodox camouflage scheme.





Lt. von Hippel with his Albatros D.Va, which sports a distinctive 'lightning strike' motif which would have immediately identified him to his Jasta 5 comrades.

## A MARATHON RESTORATION

**B**y far and away the most detailed study of the Albatros D.Va is contained in the book 'Albatros D.Va - German Fighter of World War I' in the series Famous aircraft of the National Air and Space Museum' published by the Smithsonian Institution Press, Washington, D.C., USA. (ISBN 0-87474-633-7)

It recounts the hugely extensive restoration task of this, one of only two original examples of the type, which was brought back from Germany to USA after WW1. Exactly what happened to the aircraft before acquisition by Smithsonian in 1947 is not known, but the aircraft, in dilapidated condition was donated to Smithsonian.

Smithsonian's Albatros D.Va then spent many years in storage until a 'total restoration' project was initiated in January 1977 at the Paul E. Garber Preservation & Restoration Facility at nearby Silver Hill, Maryland.

In addition to many 'period' pictures of Albatros Werke workforce building airframes of the type, the book describes and illustrates in close-up



detail every aspect of the restoration work as it progressed and is the finest source of detail information for anyone who wants to build a model of the D.5a can possibly hope for - all 100-plus pages of it!

Problem is - it's long out of print, but if you can find one, then grab it - it's gold dust!



'Lightning Strike' and coloured tail surfaces.

Armistice in 1918.

The Albatros D.5a was not the last of the Albatros Werke's fighter series, but was by far and away the most numerous, with more than 2,500 examples of the D.V and D.Va produced. ■

### SPECIFICATION

<b>Wing Span:</b>	29ft 8.25 ins (9.05 mtrs)
<b>Length :</b>	24ft 05/8th ins. (7.33 mtrs)
<b>Height:</b>	8ft 10.25 ins (2.7 mtrs)



**ABOVE:** Only a single example of the Albatros D.IV is believed to have been built. It was used as a test-bed for a special geared version of the Mercedes D.III engine the profile of which allowed the engine to be fully enclosed with the fuselage profile.



In clearly a present-day setting, it is not known if this Albatros D.Va is an original example or a modern replica, but it carries the 'Lightning Strike' motif of Lt. von Hippel's aircraft, depicted top left.

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# Bristol BEAUFIGHTER

When Bristol Aircraft Co. chief designer L.G.Frise had the idea of developing his Beaufort bomber into a heavy fighter, he surely had no idea of what a good idea he had come up with!

**T**he cost of present-day military equipment procurement is such that the notion of the 'private venture' initiative to develop military hardware is almost a thing of the past. No one moves on anything until a clear requirement has been indicated, together with a contract to cover the eye watering costs ... and that can only come from the public purse.

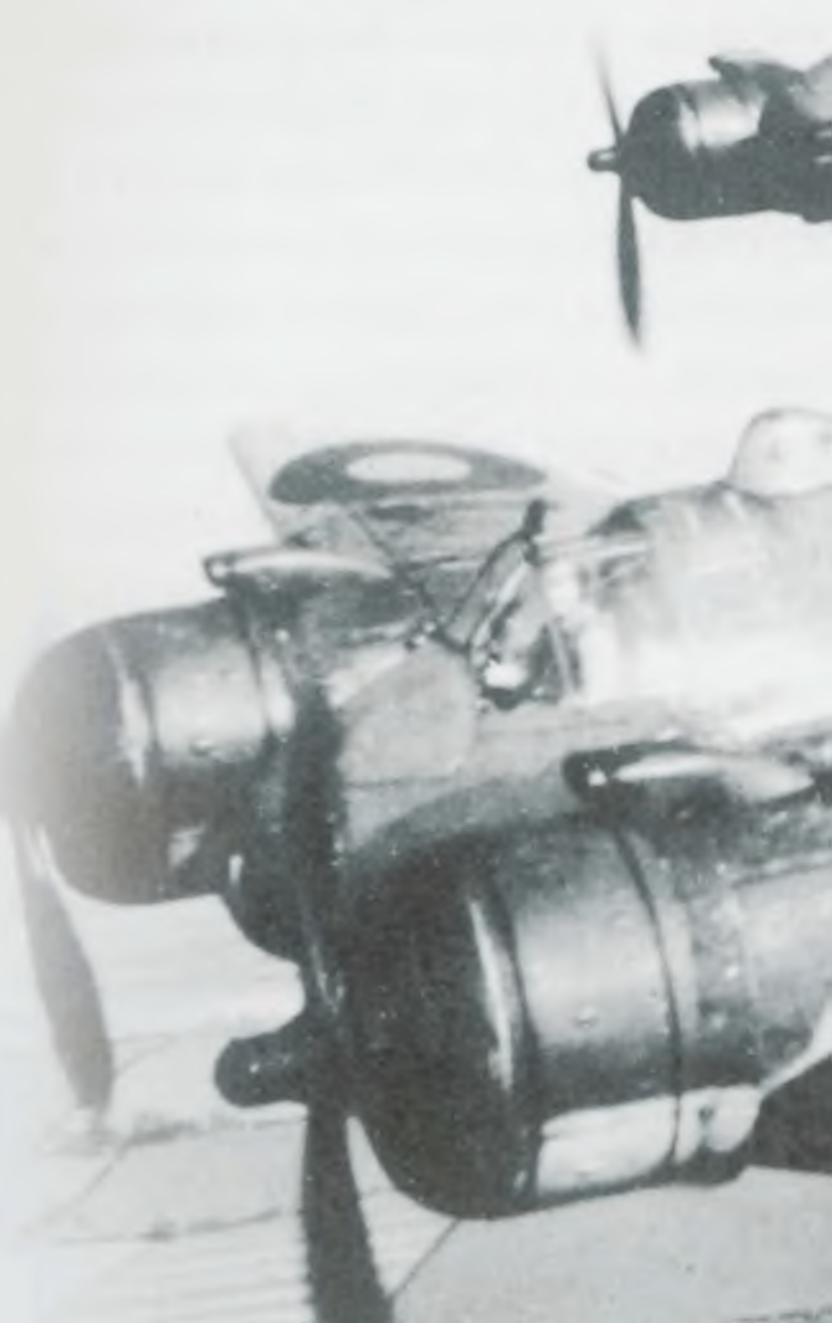
Perhaps the last really successful 'private venture' in the military aviation world that comes to mind is the Hawker P1127 that led the highly successful Hawker Siddeley/B. A.e Harrier and its later American deviative.

Prior to WW2, things were a bit different and it was not entirely uncommon for a military aircraft procurement specification to be written around an aircraft design that had shown clear promise, thus covering the cost of initial work. One example of that can be found in the vision of the Bristol Aircraft Company's proposal late in 1938 for a development of their Bristol Beaufort torpedo bomber into a long-range fighter with very heavy armament consisting of four 20mm cannon mounted in the fuselage nose, augmented by six wing mounted 0.303" machine guns. In the new fighter proposal, the two 1,000 hp Bristol Taurus radial engines of the Beaufort, would be replaced by the 1,500 hp Bristol Hercules.

Part of the attraction of Bristol's proposal was the prospective commonality of airframe components between the existing Beaufort and the new fighter, which held the promise of speedy development and service introduction. So, although there was some reservation concerning the size of the new aircraft which seemed very large for a 'fighter', the British Air Ministry quickly produced a Specification to cover the proposal and Bristol's set to work, commencing detail design in November 1938 and flying the prototype aircraft in mid July 1939, just a couple of weeks after an initial production order was issued for 300 examples.

The R.A.F took charge of the first prototype in April 1940, finding the aircraft capable of 335 mph during pre-delivery trials with two-speed supercharged Bristol Hercules I-M engine. Meanwhile, alternative powerplants were being considered to boost performance, the manufacturer intending to use the Hercules VI type, but the need for further development of this engine dictated consideration of other types. Choice initially centred on the newly developed Rolls Royce Griffon, but the call on production of this engine elsewhere led to the adaption of the Beaufighter to take the Rolls Royce Merlin XX to produce the Beaufighter Mk.II, the first examples of which appeared in early 1940.

By then, the Beaufighter had been adapted to accommodate the first bulky examples of British Airborne Interception (AI) radar for operation in the nightfighter role. The R.A.F began receiving Beaufighter Mk.I's in later July 1940, a trickle of the type first reaching operational Squadrons in September and the first operational night patrol was flown by a Beaufighter of No.29 Squadron on Sept. 17/18th. From then on, the Beaufighter became the effective mainstay of nightfighting operations after the Luftwaffe, having failed to



eliminate RAF Fighter Command during the summer of 1940, turned to night bombing attacks from Autumn 1940 and on into 1942.

Later, the faster de Havilland Mosquito took over in the night fighter role in mid to late 1942, and by the autumn of 1943, the Mosquito was available in sufficient numbers to replace the Beaufighter as the primary night fighter of the RAF. But by the end of WW2, some 70 pilots serving with RAF units had become aces while flying Beaufighters, including those operating the aircraft in the nightfighter role.

### New tasks

The Beaufighter went on to become the outstanding multi-role combat aircraft of the WW2, operating as escort fighter, anti-shipping strike and torpedo fighter as well as a general purpose ground attack aircraft.

1941 saw the development of the Beaufighter Mk.IC long-range heavy fight-

er. This new variant entered service in May 1941 with a detachment from No. 252 Squadron operating from Malta. The aircraft proved so effective in the Mediterranean against shipping, aircraft and ground targets that RAF Coastal Command became the major user of the Beaufighter, replacing the (by then) obsolete Beaufort and Blenheim.

Coastal Command began to take delivery of the up-rated Mk.VIC in mid 1942. By the end of 1942 Mk VICs were being equipped to carry torpedoes externally. The first successful torpedo attacks by Beaufighters took place in April 1943, when No. 254 Squadron sunk two merchant ships off Norway.

Re-engined with Bristol Hercules Mk XVII, developing 1,735 hp, the Mk VIC airframe became the TF Mk.X (Torpedo Fighter), commonly known as the 'Torbeau'. The Mk X became the main production version of the Beaufighter, this variant of the 'Torbeau' designated the Mk.XIC.

Beaufighter TF Xs was used to make precision attacks on shipping at wave-top height with torpedoes or rockets. Early models of the Mk Xs carried metric-wave-length ASV (air-to-surface vessel) radar with 'herringbone' aerial array carried on the nose and outer wings, but this was replaced in late 1943 by the centimetric AI Mark VIII radar housed in a 'thimble-nose' radome, enabling all-weather and night attacks.

Of particular note here are the exploits of 'The North Coates Strike Wing' of Coastal Command, based at RAF North Coates on the Lincolnshire coast. The Wing developed tactics, which combined large formations of Beaufighters using cannon and rockets to suppress flak while the Torbeaus attacked at low level with torpedoes. These tactics were first initiated in mid 1943, and in a 10-month period, 29,762 tons (27,000 tonnes) of shipping was sunk. Tactics were further adapted when shipping was moved from port dur-





ing the night.

The North Coates Strike Wing operated as the largest anti-ship force of the Second World War, and accounted for over 150,000 tons of shipping and 117 vessels for a loss of 120 Beaufighters. This was half the total tonnage sunk by all strike wings between 1942 and 1945.

The Beaufighter arrived at squadrons in Asia and the Pacific in mid-1942. It has often been said, that Japanese soldiers referred to the Beaufighter as 'whispering death', supposedly because attacking aircraft often were not heard (or seen) until too late. The Beaufighter's Hercules engines used sleeve valves, which lacked the noisy valve gear common to poppet valve engines. This was most apparent in a reduced noise level at the front of the engine.

In the South-East Asian Theatre, the Beaufighter Mk VIF operated from India on night operations against Japanese lines of communication in Burma and Thailand. The high-speed, low-level attacks were very effective, despite often atrocious weather conditions, and makeshift repair and maintenance facilities.

In the Southwest Pacific combat theatre the Bristol Beaufighter Mk IC was employed in anti-shiping missions. The most famous of these actions was the

**1:** An early example of the Beaufighter built by the parent company (Bristol). But widespread subcontracting was necessary to fill wartime demands for the type. The port aileron on this aircraft is unpainted, suggesting that the component is a replacement and that the aircraft may be on air-test.  
**2:** This picture reveals the action of the rearward folding main undercarriage as it goes up. Tailwheel may be fixed as the doors are closed.  
**3:** A Rolls Royce

Merlin XX powered Beaufighter Mk.IIF in nightfighter livery and with the Airborne Interception (AI) radar aerial on the nose.  
**4:** A Beaufighter Mk.1F of RAF Coastal Command in the early northern Europe camouflage scheme of brown and green, with Sky undersurface finish.  
**5:** Another RAF Coastal Command Beaufighter. This is a Mk.10 in later WW2 Coastal livery of Dark Sea Grey upper surfaces and Sky lower surfaces.



## MORE BEAUFIGHTER COLOURS



BEAUFIGHTER MK. IF, R2192, OF NO. 252 SQUADRON, COASTAL COMMAND, 1941.



BEAUFIGHTER MK. IF, T3224, OF NO. 54 O.T.U., U.K., 1944.



BEAUFIGHTER MK. IC, T3316, OF NO. 272 SQUADRON, MIDDLE EAST, 1941.



BEAUFIGHTER MK. IC, T4800, OF 236 SQUADRON, WATTISHAM, U.K.; FLOWN BY FLT.-LT. GATWARD, THIS AIRCRAFT DROPPED TRICOLOUR OVER THE ARC DE TRIOMPHE, PARIS ON 12TH JUNE 1942.



BEAUFIGHTER MK. IC, OF NO. 2 P.R.U., HELIOPOLIS, EGYPT, EARLY 1942. ONE OF TWO A/C USED FOR CLANDESTINE PHOTOGRAPHIC MISSIONS OVER THE ENTIRE TURKISH COASTLINE.



BEAUFIGHTER MK. IF, T4638, OF NO. 604 SQUADRON, MIDDLE WALLOP, U.K., 1941.

Battle of the Bismarck Sea, where 'Beaus' were used in the fire-suppression role in a mixed force with USAAF A-20 Boston and B-25 Mitchell bombers.

No. 30 Squadron RAAF Beaufighters flew in at mast height to provide heavy suppressive fire for the waves of attacking bombers. The Japanese convoy, under the impression that they were under torpedo attack, made the fatal tactical error of turning their ships towards the Beaufighters, leaving them exposed to skip bombing attacks by the American air-

craft. The Beaufighters inflicted maximum damage on the ships' anti-aircraft guns, bridges and crews during strafing runs with their four 20 mm nose cannons and six wing-mounted .303 in (7.7 mm) machine guns. Eight transports and four destroyers were sunk for the loss of five aircraft, including one Beaufighter.

### Postwar

From late 1944, RAF Beaufighter units were engaged in the Greek Civil War, finally withdrawing in 1946.

The Beaufighter was also used by the air forces of USA, South Africa, Portugal, Turkey and the Dominican Republic. It was used briefly by the Israeli Air Force when some ex RAF examples were clandestinely purchased in 1948.

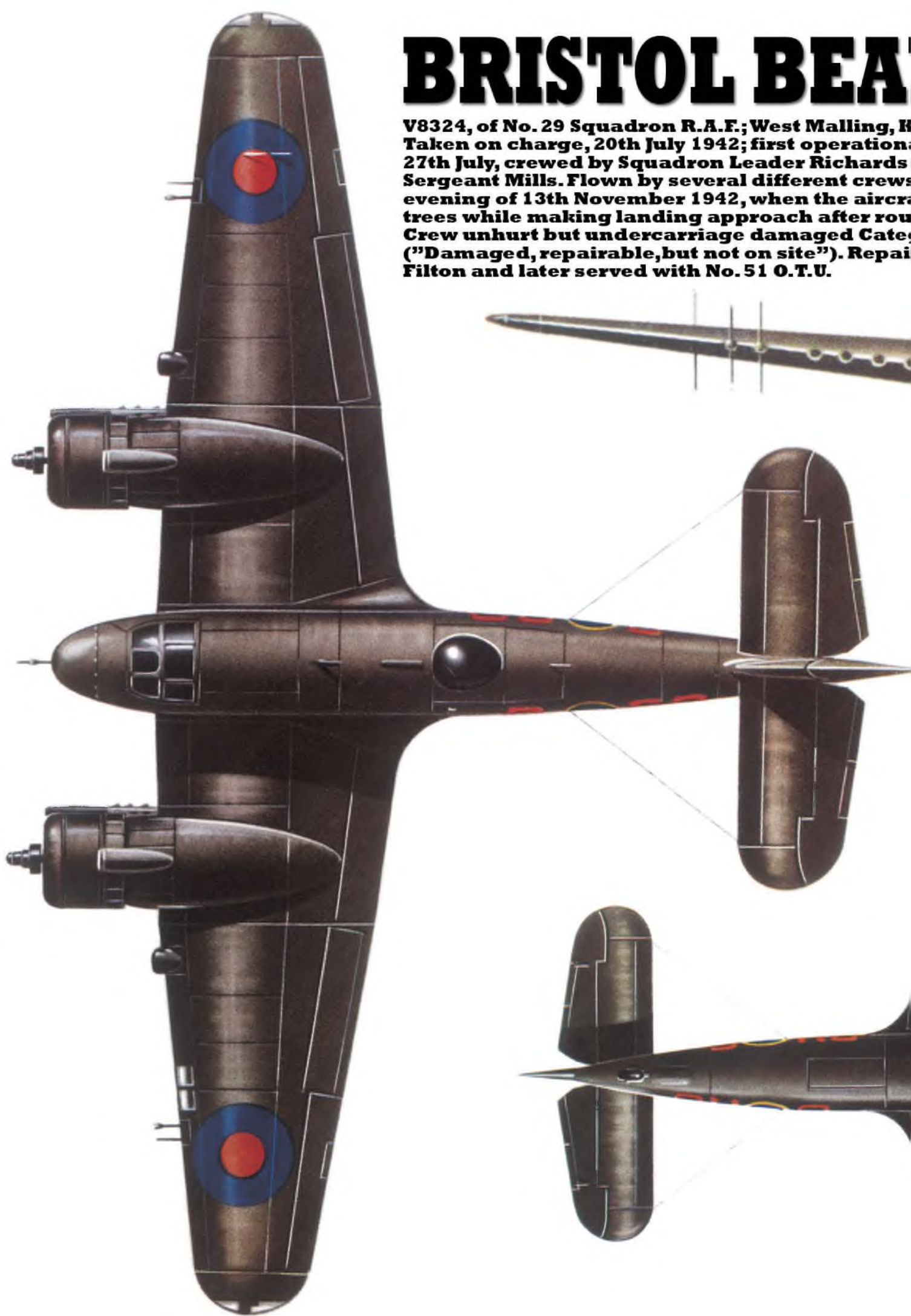
Many Mark 10 aircraft were converted to the target tug role postwar as the TT.10 and served with several RAF support units until 1960. The last flight of a Beaufighter in RAF service was by TT.10 RD761 from RAF Seletar, Singapore on 12 May 1960. ■

**An example of the Bristol Beaufort, the aircraft from which the Beaufighter was developed. The commonality of shape and major airframe components is clear.**



# BRISTOL BEA

V8324, of No. 29 Squadron R.A.F.; West Malling, Kent  
Taken on charge, 20th July 1942; first operation  
27th July, crewed by Squadron Leader Richards  
Sergeant Mills. Flown by several different crews  
evening of 13th November 1942, when the aircraft  
crashed into trees while making landing approach after round  
trip. Crew unhurt but undercarriage damaged. Cate  
("Damaged, repairable, but not on site"). Repaired  
at Filton and later served with No. 51 O.T.U.

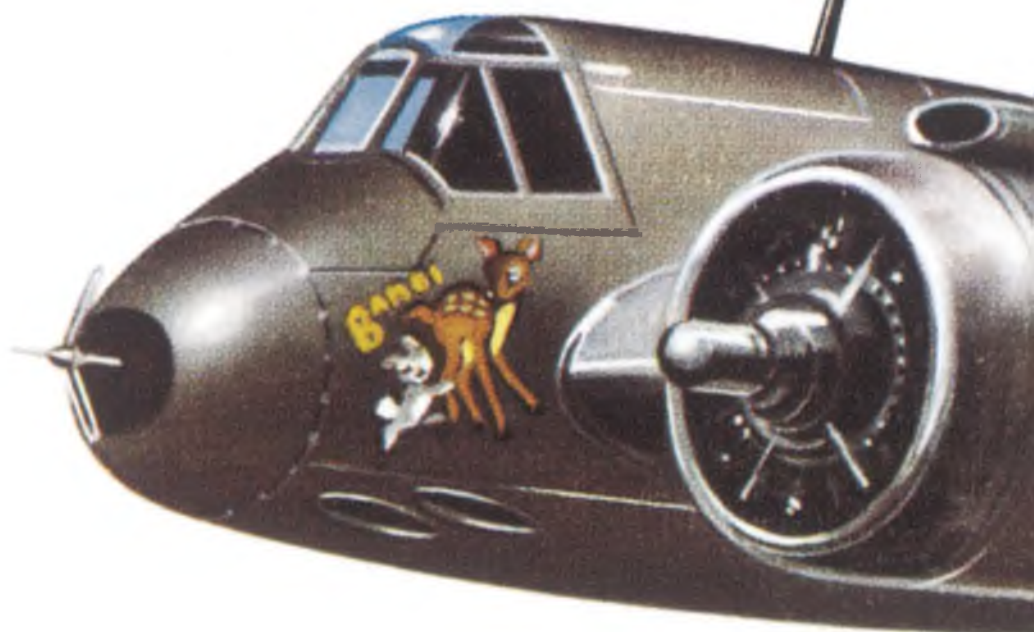
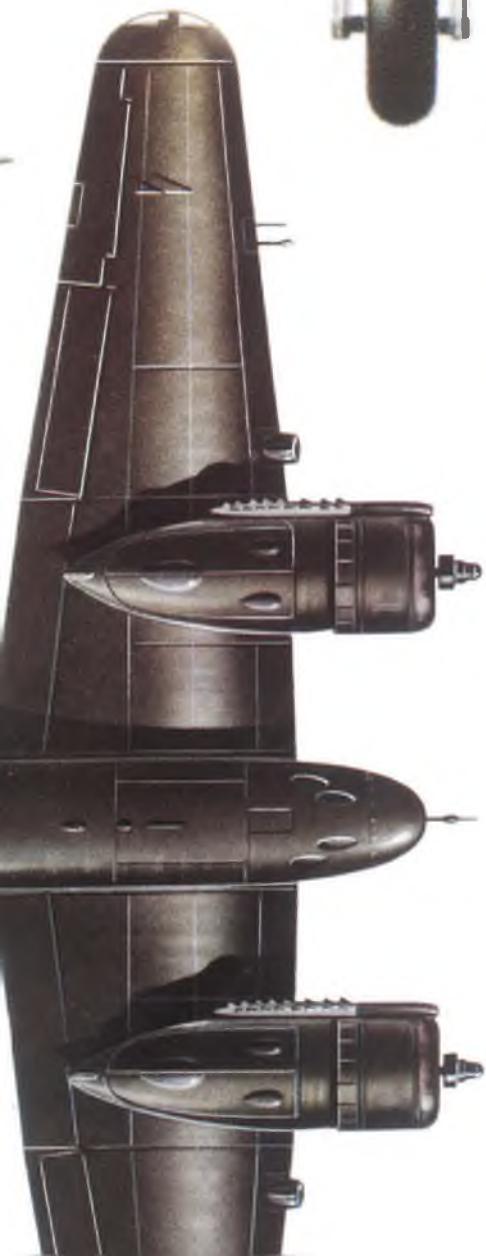


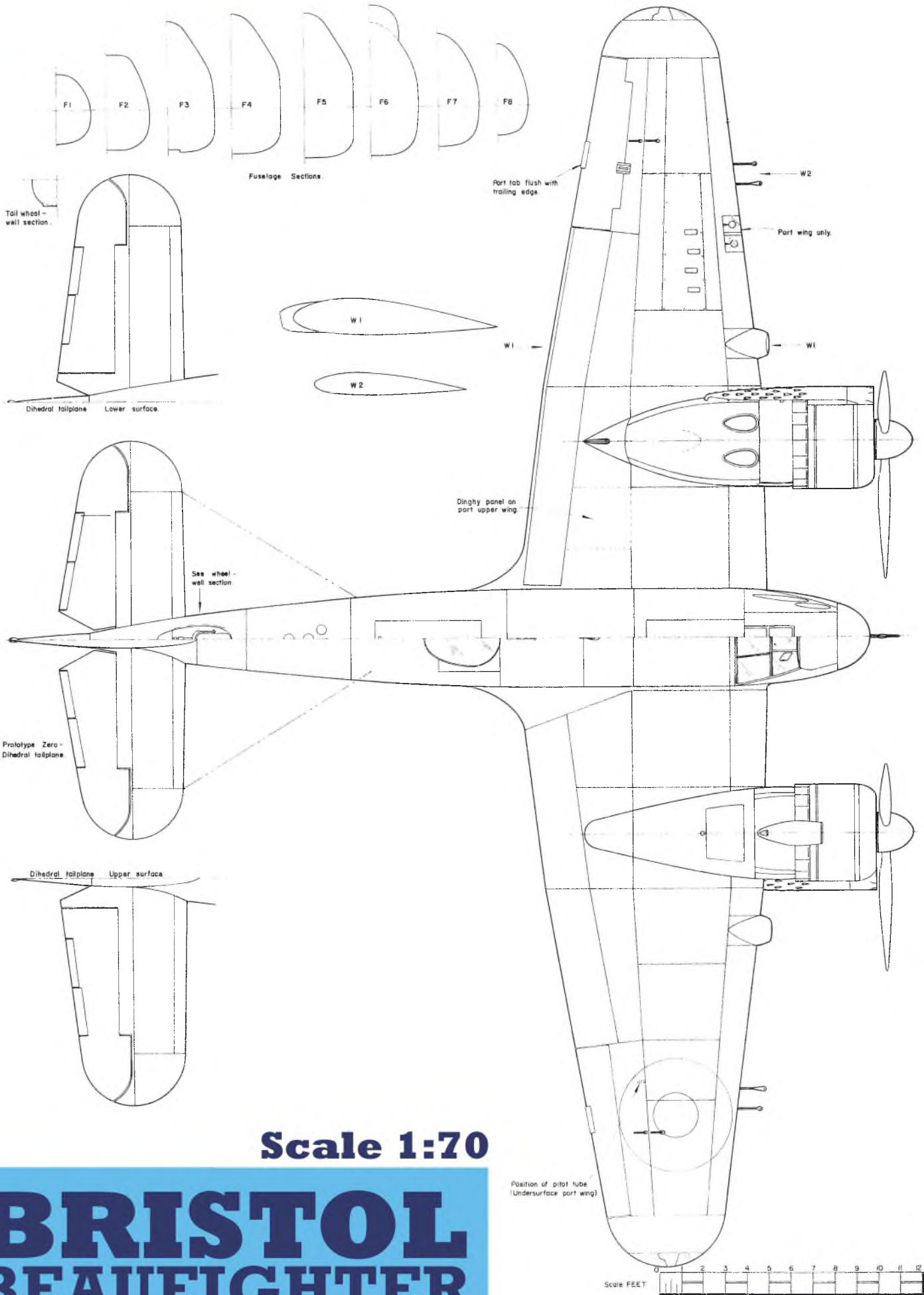


# FIGHTER

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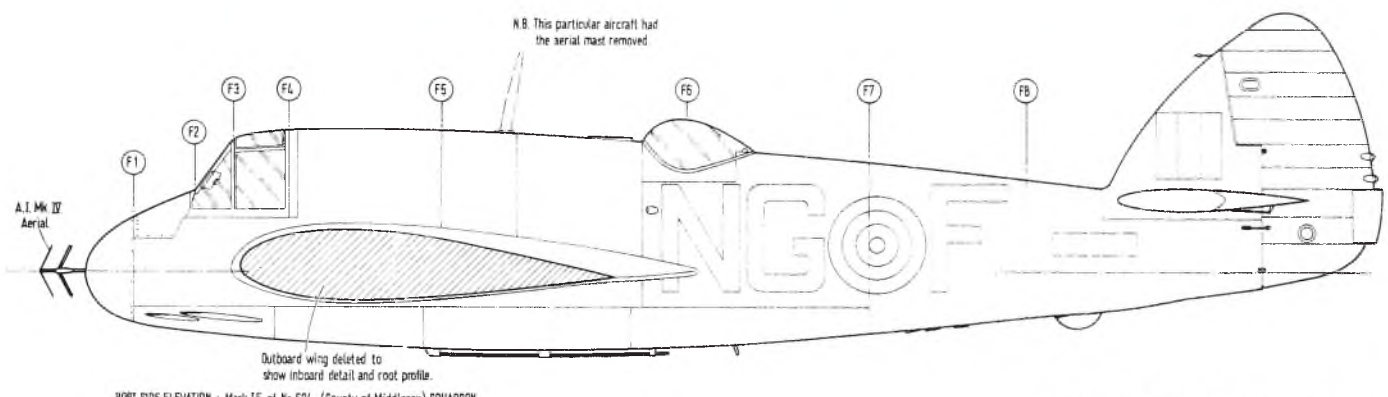
## FLYING COLOURS





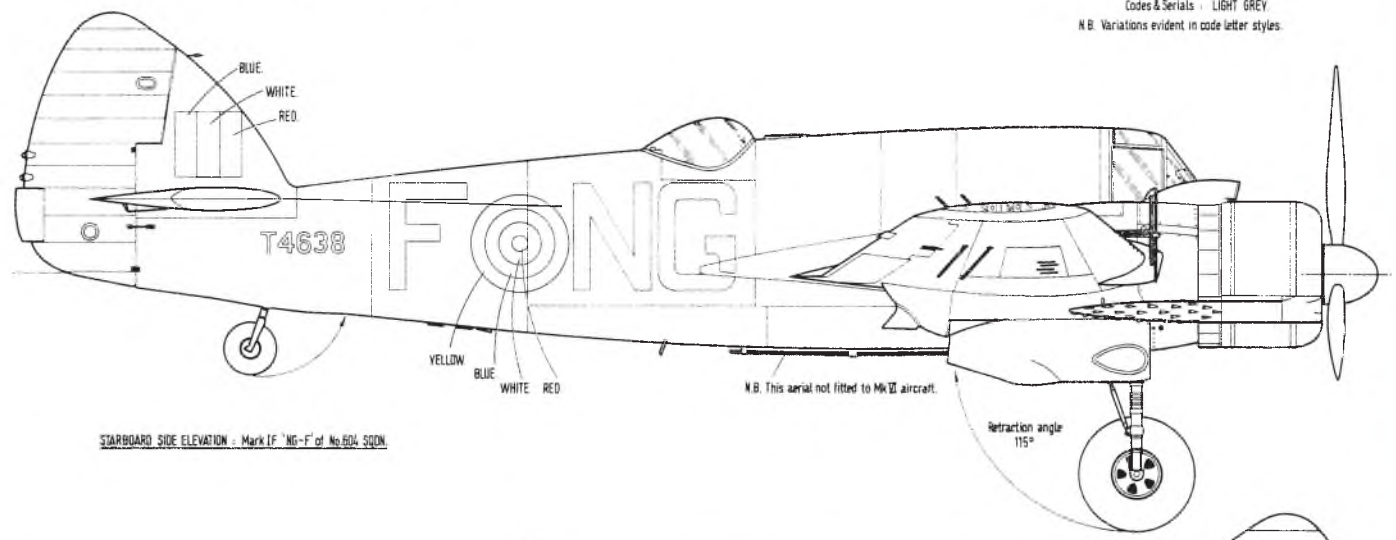
**Scale 1:70**

# BRISTOL BEAUFIGHTER

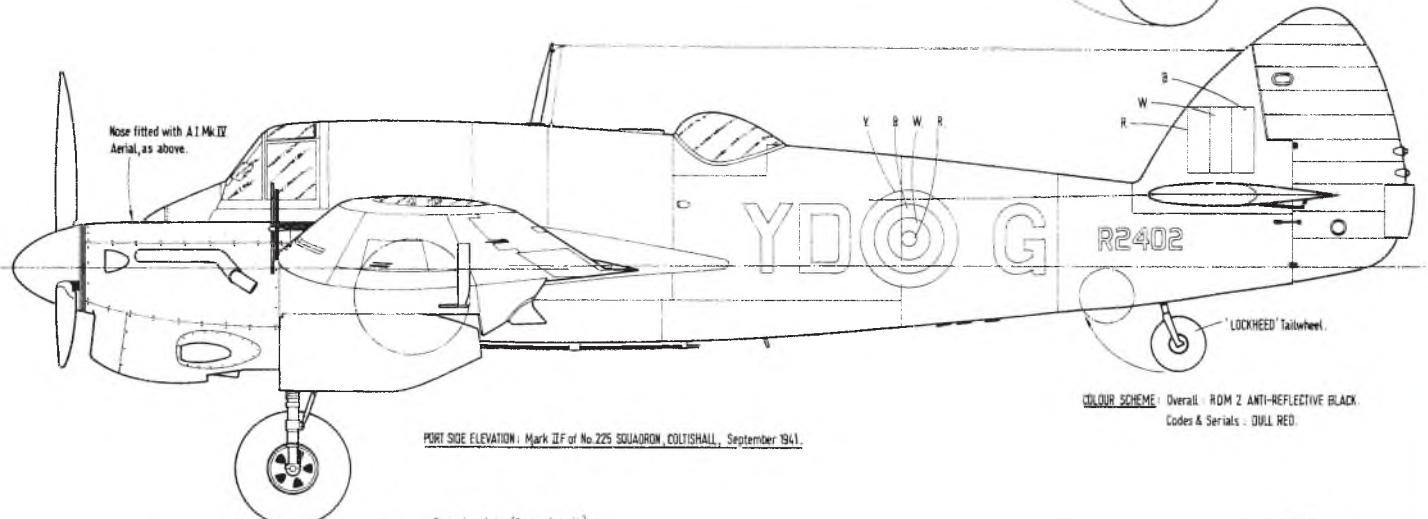


PORT SIDE ELEVATION: Mark I F of No. 604 (County of Middlesex) SQUADRON

COLOUR SCHEME: Overall: ROM 2 ANTI-REFLECTIVE BLACK.  
Codes & Serials: LIGHT GREY  
N.B. Variations evident in code letter styles.

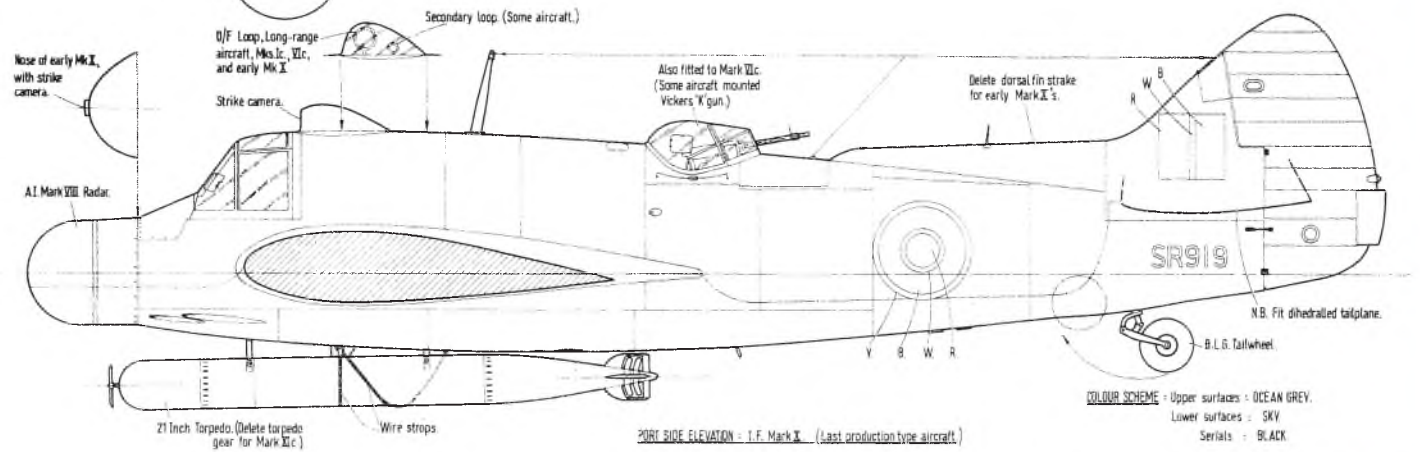


STARBOARD SIDE ELEVATION: Mark I F 'NG-F' of No. 604 SQDN



PORT SIDE ELEVATION: Mark II F of No. 225 SQUADRON, COLTISHALL, September 1941.

COLOUR SCHEME: Overall: ROM 2 ANTI-REFLECTIVE BLACK.  
Codes & Serials: DULL RED.



PORT SIDE ELEVATION: I.F. Mark I. (Last production type aircraft)

COLOUR SCHEME: Upper surfaces: OCEAN GREY.  
Lower surfaces: SKY  
Serials: BLACK

Drawn by: G. R. DUVAL.





# BRISTOL BEAUFIGHTER

# The **BIG** bruiser!



**PART 1:** Andy Ward created this 86ins wing span practical model of the famous Bristol Beaufighter for .75 to .80 size four-stroke engines

**I** have always had a soft spot for the Bristol Beaufighter and in fact, I can still recall building the Airfix 1/72 scale Beau as a boy. It was a 'dogfight double' with an ME109 and I still have that model from all those years ago!

The desire to finally build an R/C scale model of the Beaufighter was initiated around five years ago when I acquired a additional Laser 75 engine, second hand, thus making the project possible. From that point on, I steadily collected all the reference material I could find in the way of books and even a 1/32 scale Revell kit which I might even build one day! A full list of reference books used appears at the end of the article. Having gleaned as much information as possible on twin engined models from various magazine articles, I figured that a model of around 85in span would be ideal for the two Laser engines, having a reasonable wing loading and I could also use commercially available 5in wheels for the model.

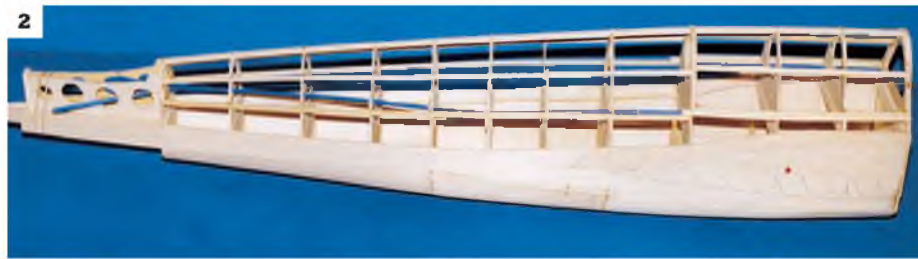
I purchased an info pack on the Beaufighter and used the 1/24 scale drawings therein as a basis for my design. The size of the model was to be governed by three factors:

**a)** would it fit in my car without excluding the carriage of passengers?

**b)** could I use the set of air operated Unitract Chris Golds Lancaster retracts that I had acquired in a swap deal, if I



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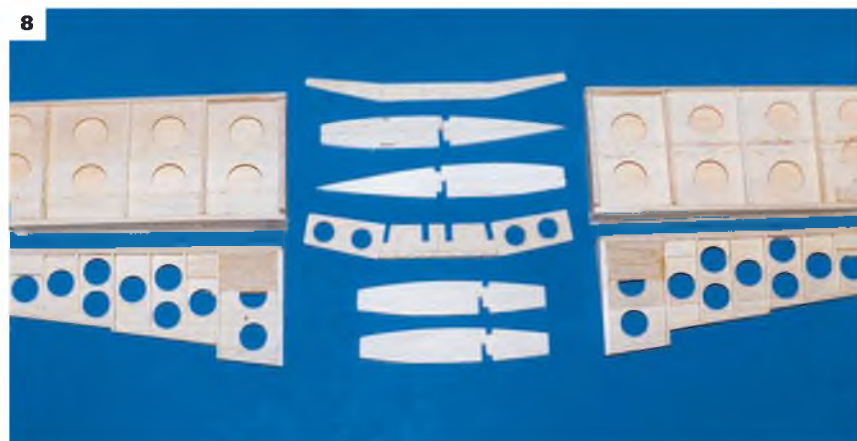
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8

modified the leg lengths? and, **c)** could I enclose the engine inside the cowlings?

Calculations revealed that in order to fully enclose the engines in the cowls, the model would have to be around 95in span, which would turn out too heavy for the Laser 75s, so I had to compromise. The 1/24 scale drawings were multiplied by a factor of 2.9 times and so my model is fractionally smaller than 1/8th scale at 86in span. It is a one-piece model except for plug-in outer wing panels and if I'd made it exactly 1/8 scale, it would not have gone easily in the car!

Having read (and re-read) the excellent book 'Warburton's War' by Tony Spooner, I was captivated by Adrian Warburton's PRU exploits in the Mediterranean and wished to model his machine, T4705 that he flew from Malta. The only downside to this was that this particular Beaufighter, a Mk. 1, was fitted with a straight (non-dihedral) tailplane. So I built the dihedral tailplane version which the RAF found to be more stable in pitch and so 'Warby's' Beau would have to be overlooked.

The general construction method of the model was, by now, thought out and so the plans were drawn. Some two years were to elapse before the model flew, although I worked on other models as well during this time. Finally, before we go onto building the model in detail, there are two important points that I would like to emphasise:

- 1:** The basic upper fuselage shell prior to adding the surface skin.
- 2:** One stage further on, with more of the fuselage surface skin sides added.
- 3:** Fuselage rear end, showing the plastic tube guides for the rudder control wires.
- 4:** A further structural close-up showing the fuselage behind the cockpit area.
- 5:** The nose section/cockpit area is built as a separate module, prior to mating to the main fuselage structure.
- 6:** A further view of the basic fuselage upper shell, seen here after the skinning has been applied.
- 7:** One panel of the tailplane and elevator. The tailplane has been skinned on one surface. Note the weight-saving holes - important to save weight at the back end of the airframe.
- 8:** Two tailplane/elevator panels ready for joining with dihedral spars.
- 9:** The two tailplane panels mated to the spar joiners that set the dihedral angle.
- 10:** Tailplane structure joined, fully surface skinned and complete.

Firstly, the model is only for experienced builders and takes a while to build, so you have to really want to build a Beaufighter, otherwise enthusiasm will wane. We don't want any half built models consigned to the loft, thank you very much! And secondly, its stating the obvious that the design and construction methods described here worked for me, but if you think you can improve on it, such as using GRP cowls or whatever, please feel free to do so, but please be conscious of airframe weight especially at the rear end.

Right then, let's build a Beau. I'm going to describe the construction of the model in sequence, but not in fine details as anyone building the model will be experienced and will not appreciate being told how to 'stick Part A to Part B'

## Fuselage

The fuselage is built in three sections, a top and bottom built over a horizontal crutch and a separate cockpit/nose section. The 6mm balsa crutches are reinforced with 1.5mm ply doublers at the wing seat, which is cut from the fuselage after the top and bottom halves are joined. Most fuselage formers are cut from 3mm balsa, except for load bearing areas which utilise ply. A 6mm square balsa upper and lower spine is employed to tie all the formers together. It's a good idea to use a long sanding block, when ready to sheet the fuselage halves, over the edges of all formers to ensure that the skinning lies correctly.

Everything off of the wing should be built as lightly as possible and lightening holes are cut wherever possible without compromising structural integrity. Snakes for the elevator and rudder are installed prior to skinning the upper half. Incidentally, apart from the nose section, all fuselage skinning is possible without resorting to planking, although tighter curves may require damping on soft sheet to achieve the required curvature.

There is a removable hatch at the rear of the bottom section for access to the tail-wheel steering cables which are linked to the rudder, and also the elevator clevises for each side of the V-tail. The full size Beaufighter was equipped with a forward retracting tailwheel, but I have many photographs of Beaus in flight with the tailwheel locked down. I decided to have a fixed tailwheel, but the choice to 'retract or not' is yours as both options would seem to be 'authentic'.

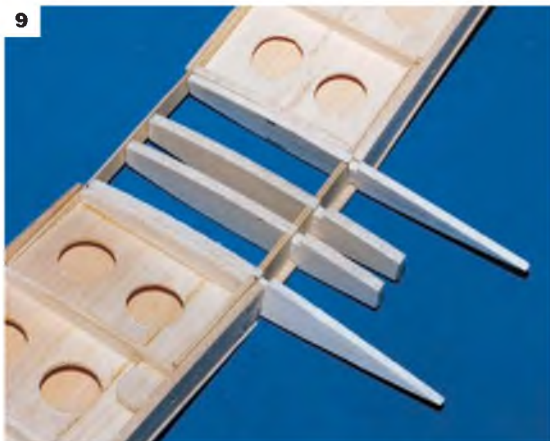
The belly pan area under the wing is cut free after the two fuselage halves are mated. Once the wing centre section has been glued into place, the belly pan is replaced permanently. The top half of the fuselage incorporates the tailplane seats and a removable hatch over the wing provides access to the radio. This hatch also holds the retract air cylinder on my model. When sheeting the top half, I found that longitudinal 1/4in x 1/6in balsa stringers were needed to add rigidity and I also glued the sheeting too, so these are shown on the plan, but it's easier to notch

the formers for these when in-situ rather than at the initial 'kit of parts' cutting out sessions. The top and bottom halves are then glued together and the various hatches separated after a shaping and sanding session. A cut-out is also made for the observer's position. The shape of this can be taken from the plan.

The front part of the fuselage, from the rear of the cockpit forward, is constructed from interlocking liteply frames to form a skeleton which is then planked with 3/32" soft balsa. The nose cone is from hollowed balsa block. This form of construction closely follows the full size method and enables full cockpit detail and a full-length pilot to be used. On my model, the pilot sits on top of the rudder gyro and the nicad pack goes in the nose in front of the instrument panel. The whole glazed cockpit canopy is removable, together with the block just in front of the windscreen. This gives full access to everything in the cockpit area.

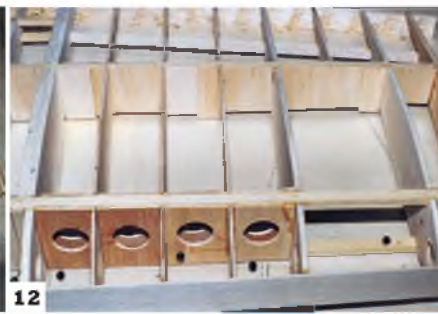
The resulting nose is both strong and light and is glued directly onto F4, the front of the completed rear section.

**Cockpit close-up of the finished model. The cockpit of the full size was clearly a tight fit for the pilot**

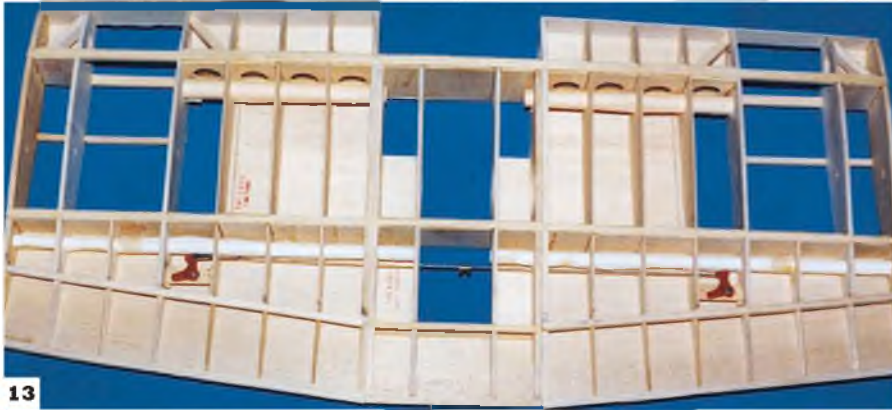




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- 11: First stage of laying down the wing centre section.
- 12: A bit further on, showing a close-up of the main spar, rear spar and plywood spar webs.
- 13: The wing centre section now partially skinned and with belcranks in place.
- 14: The centre section with further surface skin in place and ready to receive engine nacelle structure

dihedral but tapers in thickness from the root to the outside of the nacelle. I was able to build in this change quite easily, by cutting a tapered length of scrap balsa to the height off the building board at the root (for one end) and similarly at the R9 position for the other end, in effect, a simple jig onto which I pinned my one-piece bottom main spar. There was sufficient flexibility in the spar to enable me to do this without cutting it in the middle. The ribs are then erected onto the bottom spar in the normal way.

The trailing edges of the ribs are supported at the same height off the board for each rib, of course. Reference to the accompanying photographs should clarify this I hope. It's a good idea to reinforce the rib area above the flaps with thin ply to give them extra strength.

With the basic spar and rib structure still pinned onto its building jigs, the top surface sheeting can be applied using 1.5mm balsa. Various areas, such as at the nacelle position, the outer panel fixing position and the access to the retract air cylinders were not sheeted over at this stage. Paper tubes are rolled and installed at the positions shown for the various servo cables and air lines. The flap bellcranks and rod can also be installed prior to sheeting the top surface.

On lifting the wing from the 'board' at this stage, I was pleased that the structure felt both rigid and light. The 1.5mm balsa sheeting for the underside is then applied in certain areas as, before.

### Nacelle construction

The basic nacelle side frames are cut from 3mm Birch ply, complete with lightening holes. The shape of these, N1 and N2, on the plan incorporates fixing points for the scale undercarriage pivot points. If you are going to use a simpler heavy-duty commercial retract unit, the shape of N1 and N2 will require changing to include the retract mounting rails. The basic nacelle frame box is built up, to be a tight sliding fit between ribs R6 and R8 and notched to fit around the main spars which are not webbed between these ribs.

The nacelle frame is then epoxied between the ribs, being careful that correct firewall incidences are maintained on both sides (the engines are mounted with zero lateral or vertical trim). A short length of 6mm balsa ties in the top of the nacelle frames to ribs R6 and R8. From this point on, formers N3 can be installed, thus creating a laminated ply engine mount area of 6mm thickness. N3 is cut out for engine cooling where possible. The upper nacelle shape is created using formers A,B,C and D with a 6mm x 3mm balsa spine and then planked with soft 3/32" balsa (to allow for sanding back). A soft balsa block was used off of former D on the top surface.

I cut out quite a large hatch in the top of

### Tail surfaces

The construction drawings show both the flat and dihedral tailplane versions, although I have not built from the flat drawing myself. Construction is relatively easy, with a centre core and ribs top and bottom. The tailplane is sheeted each side with 1.5mm balsa and is strengthened by a ply dihedral brace. The elevators are built on the familiar balsa core-and-rib principle, each side being operated by a pianowire torque rod. The size of the elevators varied on the later Beaufighters, so check your reference material to be absolutely correct. Please use light wood here as the tail is a long way behind the C of G. I used *Robart* scale hinges on my rudder and elevators, ensuring that full and free movement is obtained on each surface.

Incidentally, you will notice that I have endeavoured to make everything on the model accessible for servicing or adjustment by the use of removable sections or hatches and as a result, the finished model is a pleasure to work on when servicing.

### Wings

The Beaufighter's wings feature built-up construction for the centre section and foam cored outer panels, which separate out-board of the nacelles. Split flaps are incorporated on both the centre section and outer panels. On the full size

Beaufighter, the wing centre section was of very strong construction. Pilots often walked away from crashes in a Beau which they would not have survived in many similar aircraft. The model's wing centre section has also to be strong, especially the main spar because everything is basically hung from it. Consequently,

I chose to use a 6mm x 9mm Cyparis main top and bottom spars, double webbed with 1.5mm balsa. A

similar spar, but of 6mm square wood is positioned further aft and a balsa spar is used on which to hang the flaps.

All ribs are from various thicknesses of balsa, with holes bored into them for paper servo cable tubes and to minimise the weight of the structure. The wing section is scale and according to documentation seen, is RAF 28. The centre section has no







15



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19

15: Components of the basic engine nacelle.

16: Shaped plywood components of the basic nacelle, now slotted together ready for mating to the wing leading edge.

17: Nacelle positioned on the wing leading edge, with fuel tank trial fitted.

18: The engine nacelle is now partially surface skinned, with moulded engine mount in place.

19: Metal covering for flaps is 'reverse riveted'

each nacelle to gain access to the fuel tanks, throttle servos and retracts. I also made the fuel tank floor removable for access to the retracts. Underneath the nacelles, the structure is parallel between formers N4 and N5 in order to make the undercarriage door hinges easier to arrange and hinge. The sides of the lower nacelles, are from 1.5mm balsa, grain vertical, and the portion aft of N6 was made from soft block which was hollowed after shaping to save weight.

### Cowls

The engine cowls can, of course, be made from GRP, but I used the good old fashioned method of wrapping 0.8mm ply around 3mm ply formers which were spaced apart using 6mm square balsa. The front ring which, on the full size Beaufighter, forms part of the exhaust system, was made using two layers of soft 1/2in balsa segments. The resulting cowl was then mounted in my pillar drill and the front ring shaped using sanding blocks whilst the drill was turning at maximum speed.

Having shaped the front ring in this fashion I could then cut out the centres of the ply cowl formers which I had previously left in, so I could bolt the whole lot together and mount in the drill chuck. The first cowl was surprisingly easy and quick to make, using cyano throughout, and I soon had a matching pair on the bench. The addition of thin aluminium cooling gills and some alloy angle mounting brackets saw the cowls almost completed. Those of you who are adept at glass fibre moulding could of course use moulded cowls.

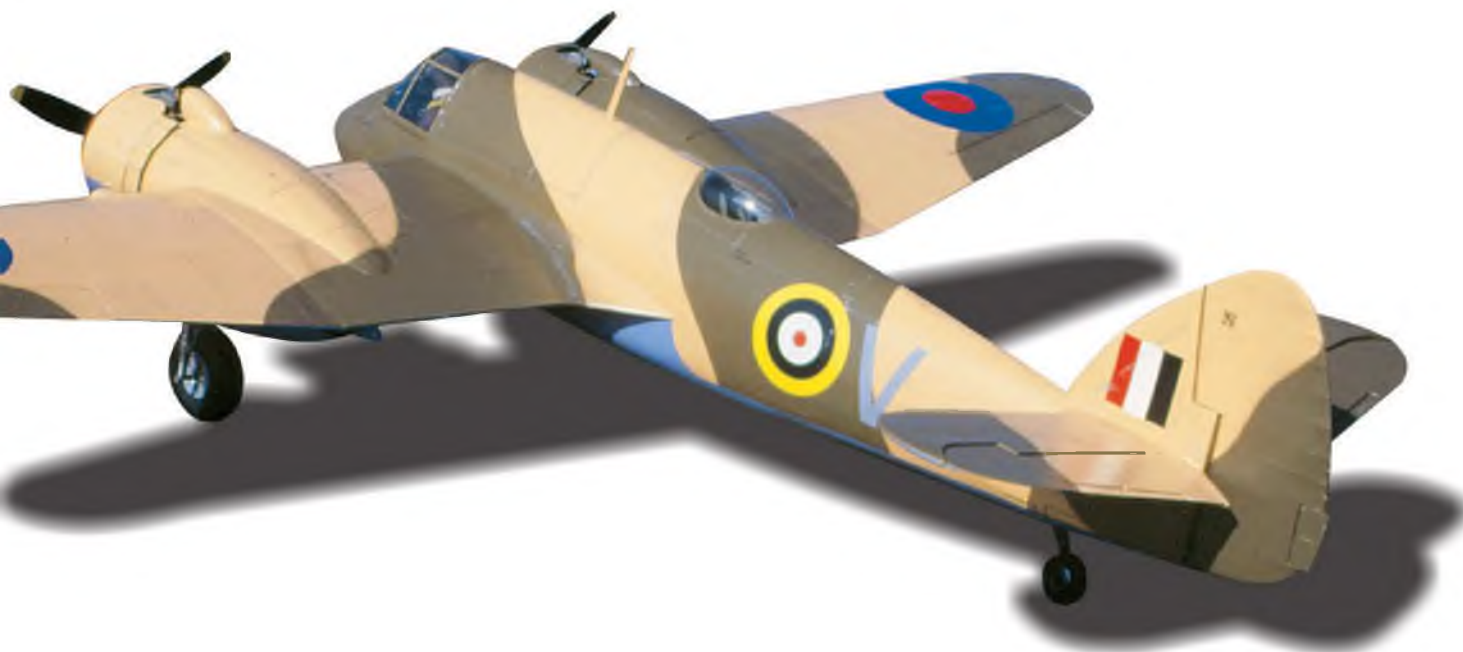
On late-version Beaufighters with the more powerful Hercules Mk.6 engines, the cowls had two rows of small blisters. I moulded these using polyester resin poured into small depressions in Plasticene formed using a piece of shaped

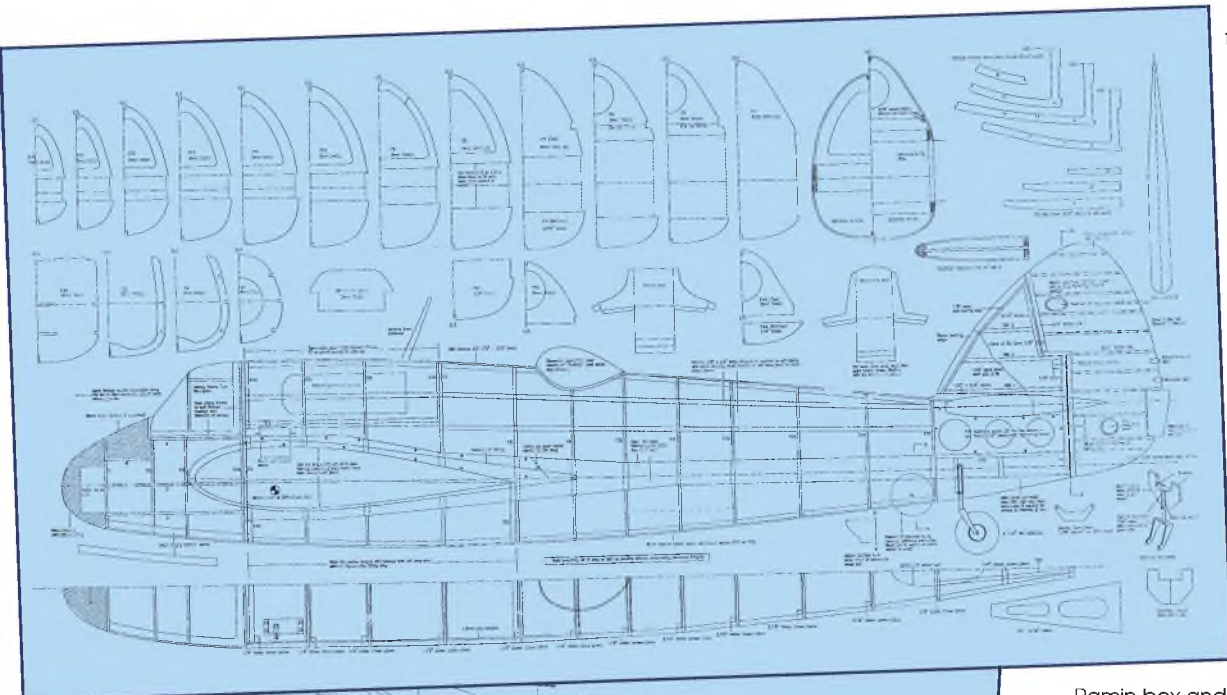
wood. A small blob of P38 filter secures these blisters on the cowls.

### Wing outer panels

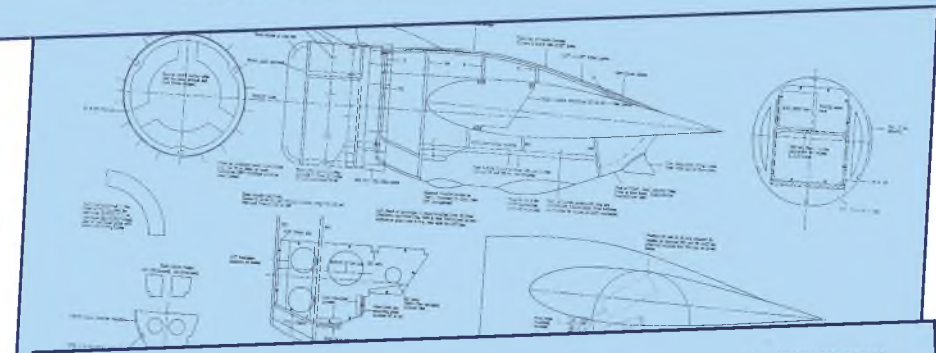
The wing outer panels are made from high density white foam and veneered on my model with 1.5mm balsa. You could of course use Obechi, but the wing cutting profiles will need enlarging a little due to the thickness differences in the veneers. The panels incorporate a six-degree dihedral angle cut onto the root and 2.5 degrees of washout at the top. The full size Beaufighter does not have washout, but I

was advised to incorporate it by Dr Keith Mitchell who also provided co-ordinates for the wing tip profile which is NACA 2410 - thanks Keith! Thanks also must go to my mate Andy Ward Mk.2 who cut the

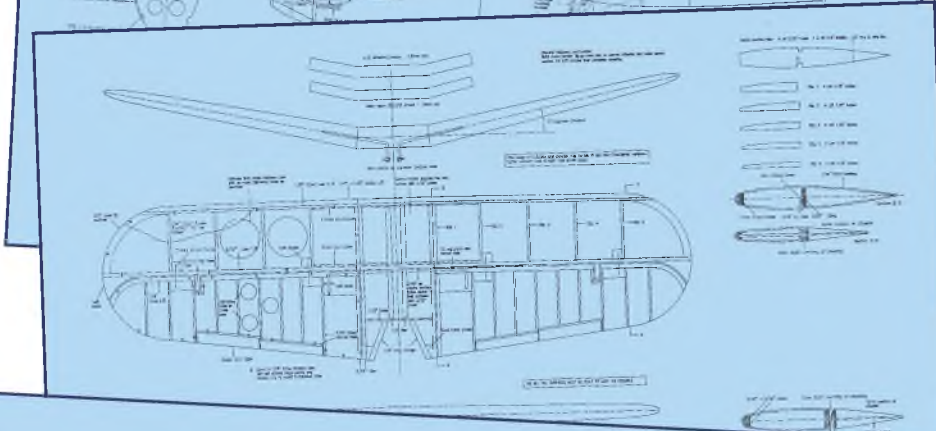




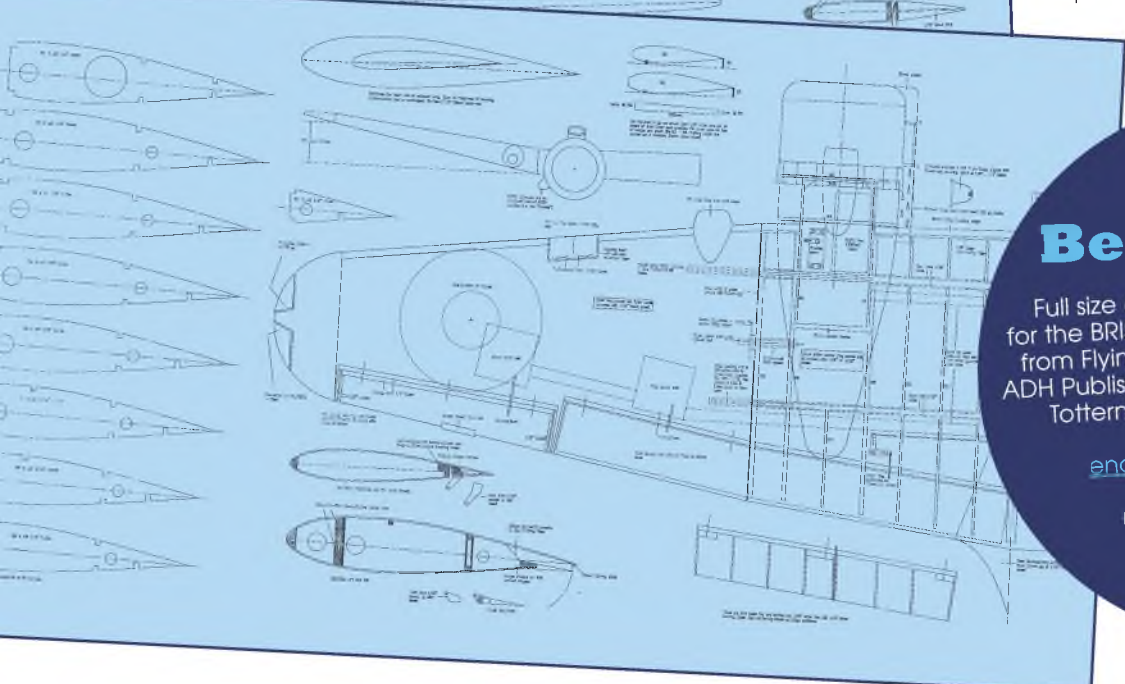
foam cores for me. The soft balsa wing tips incorporate an 0.8mm ply centre core to provide a reference datum for shaping and a degree of protection against 'wing-tip crunch'. The aileron is cut out and edges faced with balsa as normal, the flap area being similarly treated, by installing a balsa spar for the flap hinges. Holes for servo cables are bored using a piece of 15mm copper tube and aileron and flap servo boxes were cut out using copper wire in my soldering gun. The outer panels push onto and bolt together with the centre section. The main tongue on my model is at the main spar position and consists of a



Ramin box and tongue which extends 100mm into the outer panel and through to rib R6 on the centre section. A slot for this box is hot-wire cut in the outer panel and once the box is carefully epoxied in, soft balsa is used as a back filling. The tongue is made to be a tight sliding fit in the box. A brass tube at the new spar position came a pianowire joiner here, which extends around 50mm into the outer panel.



The outer panel is pulled tight onto the centre section by an 8mm nylon bolt, accessible from the wheel well. This screws into a spiked nut set into a 50mm x 30mm x 6mm ply plate which is epoxied into the face of the outer panel. The entire exposed foam face of the panel is then covered with 0.8mm ply and then the slots and holes re-cut in it. This system has proved to be a very positive and strong fixing and the model only takes a few minutes to assemble at the field.



Having read a 'how to' article in a magazine, I was keen to include scale wingtip and landing lights on my model. It was decided not to have them working in order to save the weight of another battery pack, but this would be easily achievable if

**Bristol Beaufighter**

Full size copies of the FOURsheet plan for the BRISTOL BEAUFIGHTER are available from Flying Scale Models Plans Service, ADH Publishing, Doolittle Mill, Doolittle Lane, Totterhoe, Bedfordshire, LU6 1QX. Tel 01525 222573 [enquires@adhpublishing.com](mailto:enquires@adhpublishing.com)

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desired. I pressure moulded the lenses straight onto the wingtips before these were cut out and I found the method so easy, I even made some spares. The lenses are glued onto the tips over coloured LEDs and framing is by self adhesive aluminium tape. The twin reflectors of the large landing light in the port wing came from small torches.

The task of representing the oil cooler inlet on the wing leading edge foxed me for quite a while. It is really quite a complicated shape. In the end, I used a length of 1.25" diameter waste pipe for the basic component, to which was added a gauze grill and plasticard shutters at the front. I was quite pleased with the result, though it's not strictly scale.

### Flaps

I'm a great believer that, if a full size aircraft had flaps, then so should a model. It annoys

me to read of someone's model in a magazine where no flaps were fitted as these were expected to be ineffective! Well, they are an aerodynamic surface, so of course they would be effective.

What the builder is really saying is that he couldn't cope with any trim changes, so he took the easy way out! I've often fitted flaps on sports model just to have some fun! But I think I'd better climb down from my soapbox and get on with it.

The flaps on the full size Beaufighter moved through a total of 57 degrees and any degree of flap could be selected by the pilot. The flaps were fitted on the outer panels as well as the inners and, on the model, are operated by a servo in each outer panel and one servo operating both inner flaps, each with a 5kg rating. I had experimented with mechanical linkages taken from the bellcrank of the inner sec-

tion, through a quicklink at the wing-break point, up to a further bellcrank, in the outer panel. But the slop in the system was too great, hence the use of the servos. A special three-servo Y-lead had to be made up for them (home-made of course!) and the flaps now all deploy together through the required 57 degrees.

The flaps are simply made from a framework of balsa, covered in lithoplate both sides, having included a little token rivet detail. The horns are from Paxolin and ordinary pin-type hinges are used. Small hinge blocks are built into each surface forming slots into which the hinges are glued.

The flaps are removable for servicing by removing the hinge pins if necessary. Flap deployment on the full size Beaufighter produced a nose up pitch change, and so I could expect the same effect with my model.

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### ELECTRIC CANBERRA B(1)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.



### FEB

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.



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**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 65.718" (1673mm) and suits 15cc (90 cu.in.) four stroke engines. BE SURE TO QUOTE SCALE REQUIRED WHEN ORDERING!



**HAWKER FURY**  
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**COMPONENT PACK £130.00**  
 80" wingspan sport-scale replica of the hottest production piston engined fighter ever. Suits engines 40-53. Original retracting undercarriage unit included with the plans.



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



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



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



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



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



**BUCKER BUI 180 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.

**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!

**WE CAN ARRANGE A CUT PARTS SET FOR ANY MODEL IN THE PLANS SERVICE RANGE. SO IF YOU ARE ABOUT TO EMBARK ON A NEW SCALE MODELLING PROJECT FOR OUR PLANS RANGE AND WANT TO GET A HEADSTART ON THE BUILDING PROCESS, JUST CALL TO ENQUIRE AND WE'LL DO THE REST!**

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[www.flyingscalemodels.com](http://www.flyingscalemodels.com)

# Techno Scale

Mike Evatt sta

In the late 1930s modellers could obtain celluloid wheels and motors produced in Japan. Postwar, some wheels were available in the new-fangled plastic but with the rise in popularity of radio control flying, accessories for the free flight scale modeller became hard to find.

'Small Scale Custom Services' was formed by Lindsey Smith in May 1987 to remedy this lack. From small beginnings, the firm now exports all over the world to discerning free flight scale modellers who require lightweight accessories to embellish their models. Check them out at <http://www.afterworkstuff.co.uk/little-flyers/small-scale.htm>

For over 35 Years **Robart Manufacturing** at <http://www.robart.com> has been designing and manufacturing innovative R/C accessories used by modellers around the world. What caught my attention here was their 10hp R780 seven cylinder radial engine. The Robart R780 is a 1/5 scale, seven cylinder radial engine, based on the Jacobs 225

HP engine that powered many of the military training and civilian airplanes of the 30s, 40s, and 50s. Robart have incorporated many features of the full sized engine into this replica; for instance: large valves with steel seats and bronze guides, special chrome-plated cylinders, 2 ring pistons, roller lifters and ball bearings throughout. All this to bring you the look, the sound, and the power of a true model airplane radial engine.

**EG Aircraft Inc.** with a web address of <http://www.egaircraft.com> manufactures world-class models with lightweight laser cut construction using Ecuadorean balsa wood. They are covered in *Oracover* from Germany and include the very best of accessories. EG Aircraft's goal is to produce the finest giant scale radio controlled aircraft money can buy and does this by combining the expertise of world leading pilots and designers from the USA, England, Germany, New Zealand and Australia.

**Revelstone Models** is an on-line retailer offering a choice of quality products at low prices. Based in Hampshire UK and

with a web presence at <http://shop.revelstonemodels.com> they stock quite a range of *Guilow's* flying scale models. These are of traditional balsa and tissue construction and some, such as the Junkers Ju87-B Stuka shown in the screen-shot, are multipurpose and may be configured as either control-line or free flight. This delight is 1/16th scale and has a wingspan of 87cm.

**Ben Buckle Vintage Kits** have been around for quite a while and I always enjoy visiting their website at <http://www.benbucklevintage.com> Whilst quite a lot of their products are vintage sport/contest models there are a few scale subjects, such as a 70" span Taylorcraft 057. This model was designed by Earl Stahl and can be built for 3 or 4 channel R/C. It can be finished in various scale colour schemes and, like its 48" span smaller brother, can be very realistic. They also have on offer a rather delightful Fokker DVIII.

Established in 1982, **Pegasus Models** have a wealth of experience in servicing world-wide radio control needs via both



'Small Scale Custom Services' was formed by Lindsey Smith in May 1987.



The Robart R780 is a 1/5 scale, 7 cylinder radial engine, of a Jacobs 225 HP engine.



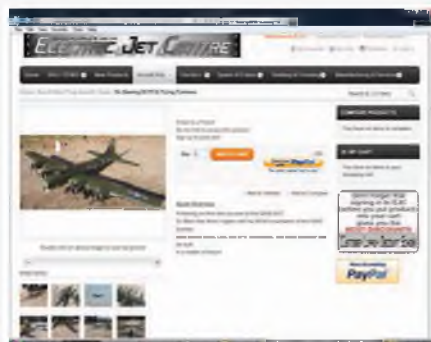
EG Aircraft's goal is to produce the finest giant scale R/C aircraft money can buy.



The Bell 206 Jet Ranger fuselage for 700 size electric power or 60-90 nitro.



EMHC is a small, helicopters only, club of approximately 120 members.



A classic four-engine bomber from Green Air Designs.

# talks cyberspace for more TechnoScale Topics...

mail-order and a retail store. The business was mainly done via Mail Order, however when the opportunity arose to buy what was Galaxy Models in Norwich it made sense to have a retail shop. On their website at <http://www.pegasus-models.co.uk> you will find a range of scale models including many helicopters such as the *Hirobo* Schweizer 300 Kit. Ideal as a first model, the Schweizer uses many features from the established Shuttle series and is just as simple to build. Fitted with a 32 or 36 engine and standard 5-channel radio. There has never been an easier way to get into scale helicopters.

Staying with scale helis a little longer, **Sportsmoto Ltd** have a more exotic offering: the Bell 206 Jet Ranger fuselage for 700 size electric power or 60-90 nitro. The fuselage includes detail panel lines and working doors with scale hinges. Aluminium scale landing gear is also included.

There are some standard colour schemes and also a base gel coat version let modeller customise. Check it out

at <http://www.sportsmoto.co.uk>

**EMHC** is a small, helicopters only, club of approximately 120 members encompassing beginners to the hobby to the more advanced flyer. The EMHC Flying field is located near to Eynsford Village, with stunning views of Kent's countryside. Scale flying is once again becoming more popular. If you are more of a model builder who likes to put effort into creating a flying masterpiece, then why not try to replicate your favourite helicopter. Their club has some very nice examples in their photo galleries at <http://www.emhc.uk.com>

Following on from the success of the GEN2 B17, **Green Air Designs** are now selling the third generation version. Constructed mainly using CNC cut XPS 'clamshells', the basic airframe can be built in a matter of hours! CNC cut XPS and Depron parts, all required hardware (6ch.) vac-formed transparencies and wheels make this a very comprehensive kit. The well-proven construction methods make the build a pleasure and the kit design allows the modeller as much

(or as little) scope for detailing as they choose. Take a look at this classic four-engined bomber at <http://greenairdesigns.com>

**Replikit** at <http://www.replikit.com> manufacture many of our favourite Vintage, Classic and Modern model aircraft kits. Over 180 kits are available all 100% Laser-cut. One worthy of note is Peter Rake's SE5a, available in short kit form only, and includes only the cut parts and plan. Originally designed for a Speed 400 motor, this gem will now happily fly with an 1100 KV out-runner. It has a wingspan of 362 and an approximate flying weight of 22oz.

And Finally! **Vincenzo Pedrielli** is an Italian who is passionate about vintage sailplanes in particular those by Italian designers and flying models of them. His website at <http://www.vincenzopedrielli.it> is a delight as it is filled with vintage photographs and 3 views and much much more. It may even persuade you to buy his new book - 'Italian Vintage Sailplanes'.



Revelstone Models is an on-line retailer offering a choice of quality products at low prices.



A 70" span Taylorcraft 057 designed by Earl Stahl.



The Hirobo Schweizer 300 is an ideal first scale model helicopter.



Replikit manufacture many of our favourite Vintage, Classic and Modern model kits.



Vincenzo Pedrielli is an Italian who is passionate about vintage sailplanes.



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

[mikeevatt@hotmail.com](mailto:mikeevatt@hotmail.com)

Mark Hinton flew a brilliant routine with this immaculate Airworld Grumman Cougar.



LMA

# ROUGHAM

2012

Alex Whittaker braves showers and icy blasts to cover this well known Suffolk Show

**T**here has been a changing of the guard at Rougham, with the Large Model Association adding it to its list of summer events. The change in style was most evident this year with the reduction of the 'country show' / family-friendly element. Gone are the horse carriage rides, the country clothing stalls, the alternative therapy hippies, and the wood carvers. LMA Rougham now concentrates on the flight line. True, there was an excellent line of pukka modelling traders, but the second line of family orientated stuff has gone. This made the back field seem rather spacious.





### 60% Extra

Steve Carr was campaigning his massive new Red Bull Extra. He had clearly planned the new show season with great precision. The new model is built to 60% scale, and is powered by a 560cc 3W flat four engine - the sort of engine you might find in a microlight aircraft. I noticed that this amazing appliance was topped off by two foam insulated air breathers.

Steve's display has clearly taken many hours of rehearsal to get it just right. The use of pyrotechnic tail smoke systems and flowing ribbons deployed in flight from the wing tips were of particular note. Steve performs his evolutions to music, and watching really is an aesthetic as well as a technical experience.

In flight, the weight, power, momentum, and inertia of this model is more applicable to a full-size aircraft. Defying the gloomy skies and spitting rain, this display alone was worth the seven-hour trip to Roughton.

### EE Lightning

Ted Allinson is a well known large scale modeller. We covered his new quarter-scale Lightning 'in the wood' at the LMA Spring Symposium this year. Construction commenced back in 200, the model is powered

by two 120 turbines, and weighs 44 kgs. She is covered in *Proskin* 0.44 mm aluminium sheet, and finished with satin matt fuel proofer. Ted manufactured his own impressive retracts, too. On the day, LMA Supremo Dave Johnson flew the model.

### Tiger Moth

Surprising us all, John Greenfield brought the half-scale Ghost Squadron Tiger Moth. I hadn't seen it before and I was impressed. At this scale, detailing can look very good indeed. Then, as soon as he cranked up the engine, the illusion was complete. She sounded just like an old Tiger. The engine is a modified Westlake 342 (350cc) microlight engine, driving a 35x14 prop.

In flight, the power delivery was spot on. In the stiff wind, she took to the air at little more than walking pace. Trust me, I was looking at a real Tiger Moth. The only fly in the ointment was the grey clouds that spoiled the definition of the superb smoke trail. Mind you, I did notice that some smoke was billowing from inside the cockpit, making it difficult for the scale pilot to see where he going. Good job John had the radio. The Ghost Squadron Tiger Moth is 14 feet eight inches in span, and weighs 55kgs. Again, it was worth the





- 1: Dickie Scarborough's now well-known 'Tarheel Hal' P-47 Thunderbolt.
- 2: Is that Clark Gable at the controls of the Douglas Dauntless flown by Mark Hinton?
- 3: Fine Cessna Bird Dog AOP by John Lambert, on a low fly past.
- 4: Johnnie Johnson colours Spitfire Mk IX about to touch down.
- 5: Half-scale Ghost Squadron Tiger Moth flown by John Greenfield.
- 6: She stoops to conquer: Unknown Douglas Skyraider, but it does have a Z-62 petrol power, and a 22x10 prop.
- 7: Don Smiths' Douglas A-26 Invader, weighs 32 lbs, powered by two Zenoah 20s. 105" span. Lost a wheel, but all OK.
- 8: Innovative WWI pilotless aircraft. Lovely Hanriot HD 1 by Mick Woods. Saito 180 FS power.

Rougham Trip, just to see this marvellous model aircraft.

### Ford Trimotor

Another model first viewed at the LMA Spring Symposium 2012, was Mike Eccles' majestic 16 foot span Ford Trimotor. This model weighs 35 kg, and her skin is from corrugated cardboard. She flew excellently on her triple ZDZ 38s, each driving a 20x8 prop. Mike reports that she flies "like a trainer". Interestingly, the Tin Goose is fuel proofed with G4 Pond Sealer, which I recently spotted on Amazon UK.

### Spitfire

Ken Bones suffered a bit of hard luck with his



## Mustang 'Miss Miami' ready for escort duties.



Spitfire. He had fitted a brand new wooden prop that morning, and as we all know to our cost, those babies don't come cheap. Anyhow, on his second flight, the retract failed to lower. Ken chopped the engine and had to belly land the Spit on the wet grass, knowing that it was odds on he would break his brand new prop. There was an awful inevitability about it, as he cruised down deciding exactly when to lose his money!

### Afterburners

Amongst the jet-turbine fraternity, LED afterburners are all the rage. However, James Ladell's idea takes it just a bit further. He

uses two rings of high-output LEDs (Light Emitting Diodes), that can be cranked up to full liquid incandescence to mimic the real thing. I'll ask James for more details and get back to you.

### Sea Fury

Andy Johnson flew a shed load of models all weekend, but my eye was taken by his new silver clipped-wing Hawker Sea Fury. Oddly enough, I kept forgetting to ask Andy about the details all weekend, even though he was usually only a few feet away on the flight line. I do know that he had to put 7.1/2 lbs of lead in the nose. More details soon.

### Warthog

Local hero Mark Hinton really puts a lot of energy into his show displays. In fact he and his flying pal Vince brought enough models between them to mount their own show. However, it was their gas turbine powered Fairchild/Republic A-10 Thunderbolt II ('Warthog') that really impressed me. She had the aura of a front-line aircraft and was detailed and finished to an impeccable standard. She is powered by two Jetcat 140s, and was built from the well-known Skymaster kit. Mark gave a truly thrilling display, despite the wind and rain. Somehow all the wind-burn and dampness seemed worth it!



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### Shape of things to come

Just a mention here, but I will soon be bringing you full details, and a complete photographic walk around, of Chris Willis' exciting new FW 190 kit. Chris displayed the almost completed model at Rougham. There was an amusing moment when he noticed it had been 'dotted' in the Pits as ready to fly, but of course had no engine or radio fitted! Readers will remember that we featured Chris' previous scale kit, his beautiful Hawker Typhoon 1B, last year. I know that new built-it-yourself, high fidelity, scale kits are significant occurrences for FSM readers, so watch this space. If you can't wait, you could check out Chris' website:

<http://www.williswarbirds.co.uk/>

### STOP PRESS 2

The new DB Models CNC kit of the updated David Boddington 63" span DH Vampire kit is about to be released. It is a very clever reworking of the Bodd classic that takes full advantage of the new CNC technology, to provide an integral building jig for the fully planked fuselage!

Should be available by the time you read this report. The model is re-purposed for EDF, but can also be flown as a slope soarer. Check out:

[www.dbsportandscale.com/index.html](http://www.dbsportandscale.com/index.html)

### The Verdict

Like every show I have attended this year, attendance appeared a little down, but Rougham was still a big, boisterous show. The weather was disappointing, and the dodgy forecast alone will have put off many. With everyone counting their pennies, it remains to be seen how the punters will respond next year to this stripped down / new look show. Fear not, as a

great enthusiast for this venue, I will be there next year to report back!

### Apology

Due to the interruptions of the weather, and the large number of warbirds in some slots, it was sometime impossible to track down the pilots for all their details, and yet carry on taking photographs. Mea culpa. ■

### A big Weslake petrol engine provides oomph in Steve Carr's Extra.





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9: You either like or loathe A-10 Warthogs. I like. This *Skymaster* version flown by Mark Hinton. 10: You can see the Sea Fury's clipped wing better in this shot. 11: Steve Willis's super new traditional kit for the FW 190 should be out by the time you read this. 12: Sorry no details - just one of seven Thunderbolts on the day! Four of the others were Hangar 9. 13: Mike Eccles' Tin Goose (Ford Trimotor). Triple ZDZ 38s and 20x8 props. Weighs 35kgs. Originally built by Roger Bale, now refurbished. 14: Ace show pilot Perry Lambert's Piper Pawnee. Boy did he wring her out! 15: James Ladell's incandescent tailpipe! His LED afterburner is very impressive indeed. I'll pump him for details. 16: Mark Hinton and James Laddell on the trannies in the rain, and my mate Vince looking a bit stern. That's Crash Parry in his stockman's coat and camera. 17: Only quarter scale? Ted Allison's superb English Electric Lightning. 18: Every time a shower rolled in, on went the tarps! Ted Allison's Lightning, if you're guessing.



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A SCALE CHALLENGE BY GARY SUNDERLAND

# THE BOXKITE PROJECT

## PART 3: BUILDING THE MODEL

GARY SUNDERLAND CONTINUES THE SAGA OF HIS DAWN-OF-AVIATION AEROPLANE STUDY THAT LED TO THE SUCCESSFUL COMPLETION AND FLYING OF HIS BRISTOL BOXKITE MODEL.

**S**ome years ago I decided to mark 100 years of military flying in Australia by building and flying a model of the Bristol 'Boxkite' which made this first flight. This ambition was encouraged by the *'Magnificent Men in Their Flying Machines'* film and the replica I had seen at The Shuttleworth Museum at Old Warden in UK, plus the other replica, at Oakey airfield in Queensland.

Since then, another has been built at Point Cook, Melbourne. All these are full size, but at the time of writing, only the one at Shuttleworth, built for the *'Mag Men'* film, has flown.

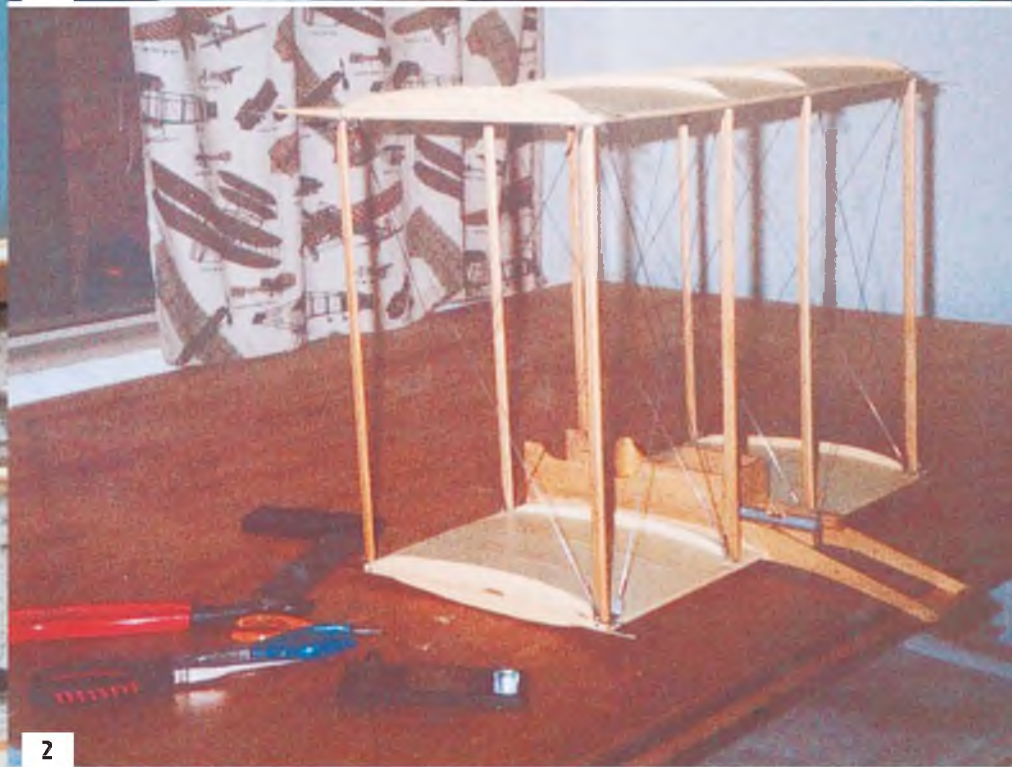


1: The heart of the Boxkite is the wing centre section box structure. The original had no nacelle and the pilot's seat, fuel, oil tanks and the engine were simply bolted onto the lower wing. To accommodate the radio, servos etc, I had to install a small nacelle, as on the replicas, and the lower wing centre section is held in place with masking tape, ready for the rigging wires. The struts are all equal length and the wings are all flat and square.

2: The wing rigging is all 0.032" piano wire, bent back and secured with copper tube. There are no turnbuckles, so any adjustments require fitting a new wire. This is more practical, and much less expensive than installing turnbuckles! The wing section is highly cambered. The straight member at the tip is the joiner between the booms, fore and aft.

3: The fore and aft booms are built flat on the plan, as is the undercarriage. These are bolted to the centre with 8BA bolts through steel fittings. The wood undercarriage seen here was later replaced with carbon and brass tubes.

MAIN IMAGE: TEST PILOT OF THE AUSTRALIAN FLYING CORPS 'LT. ERIC HARRISON' IN THE SEAT. GIVES LAST MINUTE INSTRUCTIONS TO 'LT. RICHARD WILLIAMS' IN THIS PHOTOGRAPHIC RE-ENACTMENT OF THE HISTORIC FIRST FLIGHT AT POINT COOK.

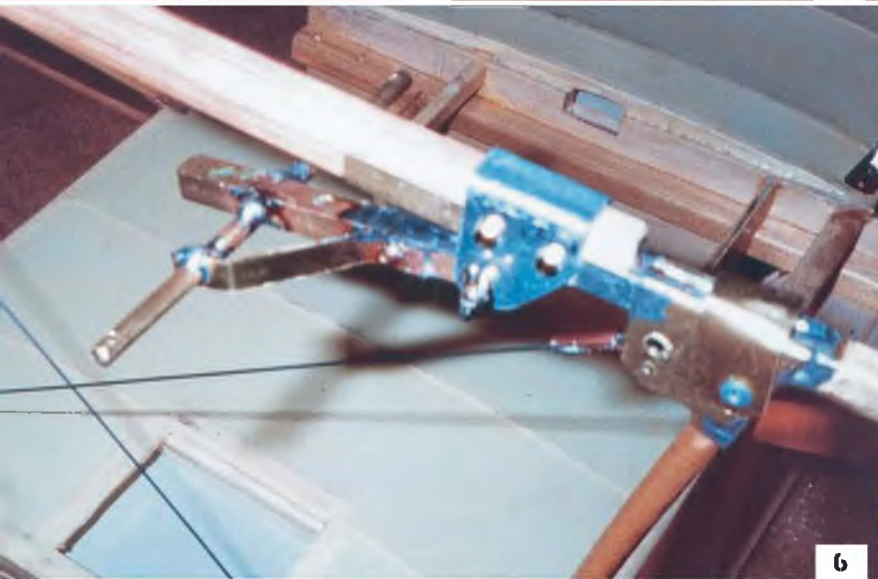




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4: The model is here inverted for gluing in the lower tailplane. The tail surfaces are mostly of 1/4" square balsa construction. The covering is heat-shrink *Koveral* throughout, with two coats of dope on the wings and only one coat on the tail surfaces. The fabric is thinly brushed with a light cream water-based paint and sprayed with urethane varnish.

5: Here, the tailplane is being glued into the top. The booms, struts and wing spars were cut from aircraft-grade Hoop Pine. This selected Australian timber is equivalent to German Kiefer and both are superior in strength to Sitka Spruce. As can be seen, the booms in this model continue back to the rudder posts. Note also the many Dural angle brackets at strut attachments and drilled for bracing wires.

6: The pivoting trailing arm bogie undercarriage is fabricated from brass tube and sheet, soft soldered together. Above this can be seen a cutout in the lower centre section for an aileron servo.

7: The rudder cord shock absorber has been added and one wheel check-fitted.

8: The completed two-wheel undercarriage looks the part. The forward skid plugs into the square brass tube at the front and is readily removable for repairs or replacement.

9: Note the heavily wire-braced tailskid post and the bungee sprung tailskid on the Bristol Boxkite. The Farmans had twin tail wheels, as on the Voisin, or twin skids on some examples.





In the interim, I built a 1/6th scale model of the 1909 Voisin (see FSM August and September 2010 issues), which was an early version of the Henry Farman Boxkite. The Voisin model proved to have diabolical flight characteristics, such that I only managed to fly it twice and its public display was a fiasco. Nevertheless, the lessons learned in the process were incorporated into this latest model Boxkite Project.

The early aeroplanes had a forward elevator which, together with an aft centre of gravity, made the craft unstable in pitch. The forward elevator, being out of the slipstream, meant that the Voisin had no pitch control until flying speed was reached. Even in the air, the model Voisin was only comfortable in a nose-up climbing attitude. All of those Boxkites had very large lifting tailplanes. In level flight, all this lift is balanced by the forward elevator, which the pilot holds at a positive incidence.

The fun starts if the front plane stalls, in

which case the nose will drop smartly and the aircraft enters a dive. This has the advantage that the mainplanes will never stall, but it is not much help if the aircraft smacks into the ground in the process!

Henry Farman's development, copied by Bristols into their Boxkite, was to make the forward plane smaller and add an aft elevator so that by 1913, the Farman brothers has abandoned the forward plane altogether.

For my latest Boxkite, I have made the tailplanes flat, to reduce the lifting effect and the elevator is geared to deflect twice the angle of the forward plane. This was expected to give increased authority to the rear surfaces and provide more controllability in pitch, particularly during take-off. (A mistake, as I later discovered!).

Another problem with the boxkites, on both the originals and the replicas, is that the ailerons have no balance cable to hold them up; at best, the ailerons dangle



down at near to 90 degrees and are blown up into the neutral position by the airflow when the aeroplane is near flying speed.

This was acceptable in the pioneer years when the Boxkites were only flown in the early morning calm-air conditions or, in the case of the Old Warden replica, on calm summer evenings.

As I wished my model to be capable of

**THE BOXKITE COMPLETE, READY FOR PHOTOGRAPHY - IF NOT FLIGHT! THE AILERON DRIVE PUSHRODS ARE NOT YET FITTED AND THE AILERONS DROOP DOWN, AS ON THE ORIGINALS.**





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flying in normal good flying weather, certainly not in high winds or turbulence but capable of handling a light breeze, the allerons function normally, with a pushrod drive under the lower wings. The pushrod will be disconnected for displays or for taking photographs, so that the allerons will hang down as per scale. Once in the air, the full size Boxkites had to be flown accurately at all times. With no dihedral and no wingtip washout, there was no lateral



stability. Similarly, there was no keel area or fin at the rear, so yaw stability was also non-existent. The pilot was kept busy maintaining the aeroplane's attitude in the desired position using only a yaw-string indicator as a guide.

Fortunately for me, Greg McLure in Western Australia has built and flown a model of the 'Magnificent Men' Boxkite. He finally managed the feat by ballasting the front end to get the C of G. (fore/aft balance point) somewhere near 30% of wing chord. His model is also flying with fully controlled ailerons. Greg's model is about half the size of my Boxkite model, so much of his experience has been incorporated into the design of my Project. One big improvement of Greg's was to cover

both top and bottom surfaces of the wings. The original Boxkites had fabric only on the underside of the wings. With any slip or skid, the protruding ribs destroy most of the streamlined airflow and create enormous drag. The Old Warden replica has fabric on the top of the wing only, which is a bit better.

Performing a turn was difficult. One of the Shuttleworth pilots, Neil Williams, described using both hands and all his strength, to make a left turn (against the propeller torque) but stated that a right hand turn "...more satisfactory". This report was for the replica, which featured a modern, more powerful engine, fabric covering on the TOP of the wing surfaces, plus an additional third rudder, which test pilot

Derek Piggott found necessary to turn the machine.

The original 1910 Boxkite was powered by a Gnome rotary engine rated at '50 hp'. The original design also featured fabric covering only on the UNDERSIDE of the wings, with all the wing ribs protruding above. I tried this out on my Voisin model and the wing seemed to create more drag than lift!

My model Boxkite has the O.S.91S engine and Bolly pusher propeller (and the pilots!) from my old FE 8. (see FSM March 2005). Despite these alterations, the model still looks like the original Boxkite on the ground and in the air, which is the object of the project. ■

**10 & 11: The basic framework completed, with most of the wiring in place. The bracing is 0/032" piano wire forward and the tail booms are braced with 0.025".**

**12: Installing the elevator drive. The functioning control column drives the forward elevator by a push-rod underneath, to the right of the dummy pilot. The pivot shaft in the front elevator is a scale control horn, soldered from brass and piano wire, to control wires aft to the elevator.**

**13: Rear elevator and rudder control cables are from nylon covered fishing trace. The twin rudders are joined to complete the circuit. Note the small, half sized elevator horn, which later proved to be the weak point of the design.**

**14: Rigging the outer wing panels. These plug into the brass tubes in the centre section and rig with piano wire, starting at the front and sighting along the straight leading edges. Struts are all exactly the same length. Then add the incidence bracing and complete the rear strut bracing. Note the sighting sticks on the top wing,**

**used in conjunction with the Robart incidence meter. Wing and tail are set at zero degrees.**

**15: This shows the elevator control column and 0.090" wire pushrods going forward to the elevator and back to the servo. In practice, the dummy does not get to hold the control column in flight! Note also the substantial 0.062" wire cross bracing, forward and aft of the centre section. From these, eight diagonal wires go back to the outer wing panels to provide a rigid structure.**

**16: The dummy 50 hp Gnome engine (part) is only for show. It would not survive 6,000 rpm in practice, but it does illustrate the strange layout of the early Boxkites very well. The Gnome rotary was mounted on a steel tube, bolted to the lower wing, much as the O.S.91S engine shown here.**

**17: This rear view shows quite well the prototypical layout of the Gnome engine, pusher propeller, small oil tank and the larger fuel tank.**



# THE QUIET ZONE

R/C SCALE ELECTRICS BY PETER RAKE

Since this situation occurs on a fairly frequent basis, it's at times like these that I hurriedly sit down and reel off a few pages of nonsense, often about what I've been getting up to and what plans you can expect to see over the coming months. Well, this time I'm really up the creek with a busted paddle. Not only did I do that 'coming-soon-to-a-magazine-near -ou' thing a few months ago, I solemnly promised you that I'd conclude the item about Mark Rittinger's models.

Okay, I know, I usually don't pay too much attention to what I've promised you, but ramble on about whatever happens to take my fancy at the time. After all, we wouldn't want to become dull and predictable would we? I'm perfectly happy for the only predictable thing about this column to be the fact that you never know what to expect. Just as well really because I never have a clue what I'm going to write about - except in this instance. This time I know what I'm supposed to be doing, so I suppose I'd better do just that; get on and write the flippin' column.

With that decided, just give me a minute or two to check where I left things and then we can get down to business. Right, got that. Now let's get on with the business at hand.

## A BIT OFF-TOPIC

Not really that off-topic, but not actually a scale model is Mark's homage to Godzilla. Don't ask me, I've no idea why he has a thing about a giant lizard, but the model is called *Quadzilla*. As you may have noticed, there's a clue in there about the number of motors powering the model - yes, that's right, four of them.

**Y**es, it's that time again - you know, when I realise I'm late getting this written and everything happens in a rush. This is the biggest problem with being

engrossed in plan drawing, I keep putting off other distractions (like eating, sleeping and writing columns) for as long as possible - or until I get a clip around the ear (figuratively speaking) from our editor.

**Clearly showing the style of construction used in so many of Mark's models. This one ends up as the black P-63 Kingcobra.**





Although a bit dated now, it uses direct-drive Speed 400 motors as motive power. I'm making a point of including it here because it fits in well with the items that fall either side of this month's issue - my information for novice electrolytes articles. If cost is an issue, but you absolutely have to have a multi, you can do a lot worse than the humble Speed 400 brushed motor. Not only are the motors cheap, but you can run as many as you like from a single ESC of suitable capability.

In this case, however, Mark uses parallel 45 Amp ESCs (way more capability than required) to control the 6 volt 400 motors. Power comes from a 3s, 3,700 mAh LiPo pack and the weight of this 50" span model is 45 ounces ready to fly.

### BACK ON TOPIC

After our brief visit to the realms of non-scale models, I suppose it's only right to get back on track and take a closer look at some scale models. Well, the magazine is called Flying SCALE Models after all. However, rather than focus on a specific model, this time I want to delve deeper into another finishing technique Mark uses. This time it's on his very latest model, his *Osprey GP5*.

As it happens, I get the impression that this may have been something of an accidental discovery - in more ways than one. Finding himself needing to repair his black Bell P-63 Kingcobra, after a minor altercation with Mother Earth, he developed this method of producing a super smooth finish on planked surfaces. Although here it is used on a film-covered model, no doubt it could also be used for other finishing techniques. In fact, thinking about it, isn't that far removed from the technique he uses on his metal skinned models.

Basically, how it goes is that the planked surface is sanded smooth, presumably filling as required. At least, it would need filling if I were doing the planking. Once you have the basic surface smooth and blemish-free, the model is glassed and again rubbed down. Now we get into territory that I am quite familiar with, I regularly use it on the cowls for my WW1 style models. To provide a really smooth, even surface, multiple coats of automotive primer, the high build filler-

**ABOVE: Demonstrating just how extremely the wings are clipped on the Tucker Kingcobra.**  
**RIGHT: Mark likes a challenge, which is why he fitted the more heavily clipped model with retracts and made the lighter one hand launch. Guess which is most pleasant to fly?**



primer variety, are sprayed onto the air-frame. Using very fine abrasive, I like to use a minimum of 400 grade wet-or-dry (used wet) on my cowls, you go through the old established spray, sand, spray, sand, spray, sand..... Yes, I'm sure you get the picture, it's messy, boring and time consuming, but does ultimately result in about the smoothest finish it is possible to achieve. True, if you aren't careful, it can also be one of the heaviest finishes possible, but that's where the sanding comes into play. The idea is to carefully (VERY carefully) sand away all but the slightest coating of the filler-primer at each stage. Ideally, you'll be left with little more than a single (or possibly double) coat thickness, but one which has had all the tiny surface imperfections levelled out and smoothed off.

Then, having finally reached this level of surface perfection, what does Mark do? He only goes and covers it all with iron on film. In the case of the Osprey it's *Ultracote*, but only experimentation will

decide which locally available film works best for you. I mention this because of a point he raises about the covering on the Kingcobra. Nothing to do with repairs this time though, more a case of remedying a problem. As we all know (come on, try to remember your basic science from school), black has this annoying tendency to absorb heat. Now the unfortunate aspect of heat shrink coverings, no matter what colour they are, is that heat will also make them go slack again.

Given that the use of *Ultracote* in this instance wasn't a problem on the fuselage, but was on the wings means you may need to check out more than one type of film in order to achieve a reliable, stable finish. Since I'm sure you just have to know, the wings were re-covered using *Econokote* and all was well and they all lived happily ever after. Something like that at any rate.

### ABOUT THOSE KINGCOBRAS

As you see, both models depict clipped



**Christina Escalante poses with the aluminium tape finished Martin B-26 Marauder. Two attractive models in one photo can't be a bad thing.**

However, if they are model racers, it's only to be expected that they fly fast. Let's face it, a slow racer is precious little use to anyone.

Both models feature pretty standard, for Mark's designs, construction. The wings are a foam core partially skinned and cap stripped with balsa, while the fuselage and tail surfaces appear to be of all balsa/ply construction. As mentioned earlier, both models are film covered. The white model being all Ultracote covered, and the black one an *Ultracote/Econokote* combination. Markings are an interesting combination of trim sheet, home printed decals and a bit of paintwork.

#### **AND THEN ...**

Since I made mention of metal skinned types earlier and promised to bring you more details of this model the last time we visited Mark's designs, I suppose it's logical that we do actually do just that. However, before I go any further I feel it only fair to point out something. What with bringing you the article I promised AND even the individual item I'd said I would, don't come to expect this sort of service every time. I'd hate for you to come to expect me to actually stick to some sort of schedule, only to be disappointed when it doesn't happen.

So, with the warning not to be lulled into a false sense of security issued, let's move onto Mark's rather nice Martin B-26 Marauder. This model is something of a reversal of the previous two in that the wings are built-up balsa structures, while the fuselage and engine nacelles are glassed foam. If it's difficult to get a dead smooth finish on a wooden structure, just imagine how much more difficult, and time consuming, it must be to achieve the same degree of finish on something as fragile as a carved foam fuselage.

wing racing aircraft. One is extremely clipped, while the other has just had the rounded wingtips of the original P-63 removed. Both of these are scale wing arrangements. Mark says that although the extreme clip of the Tucker Race 28 looks scary, it is actually quite a reasonable flying model. However, he also points out that the black, Whiteside Race 87 is a much nicer-to-fly model.

Once you start to look more closely at the specifications it isn't hard to see why that should be the case. The smaller model, spanning just 38.5", is equipped with electric retracts and tips the scales at a whopping 5.5 lbs. Power comes from a Power 32 motor and 3s 5,000 mAh pack.

All of that, combined with the extreme wing-clip, results in a wing loading of a staggering (it seems that way to me at

any rate) 30 ounces/ square foot. I can see how that would need to be kept moving fairly swiftly just to stay in the air; far too much of a strain for these poor old reflexes of mine.

By comparison, the black model, number 87, was designed with hand launching in mind. Losing the weight of the retracts, and the increased span (50") has resulted in what must almost seem like a floater compared to the other model. A whole 1.5 lbs lighter, this one only has a wing loading of 18 ounces/square foot. That in itself is no mean feat, it's almost getting down to the sort of loadings I expect from some of my WW1 designs. This model uses an identical power set-up to the smaller one, but probably doesn't need to spend so much time at higher throttle settings just to remain airborne.

**Trusted flying pal Mike Brinker prepares to launch the P-63 on its' maiden flight.**



Because this is one of the models using aluminium tape as covering, and bearing in mind how metallic finishes highlight every little imperfection, you can imagine the careful handling required to avoid having to do lots of filling and smoothing before the structure gets its reinforcing layer of GRP.

A clear work surface and some padding are virtually mandatory requirements for this type of modelling. Which is probably the main reason why I stick to good old durable, balsa structures. I have no trouble setting them on top of the heap of junk that always seems to fill my bench the moment I start to build something. Anyway, no matter how he maintains the good surface finish, once all the preparation is done the entire model gets covered with scale-like panels of aluminium tape. Let's face it, nothing quite matches an aluminium finish like aluminium.

This is obviously one of his older models because motive power is supplied by a pair of geared 6 volt Speed 400 motors and a 3s 1,320 mAh LiPo pack.

There is actually quite a nice little story behind the finish on this particular model. The scheme we see here was that used on the aircraft flown by one of Mark's customers and he was so pleased to see 'his' plane flying again after some 60 years. Although he has since passed away, like so many from that era, it is nice to think of him enjoying the sight of the model in action, and reliving memories from the past.

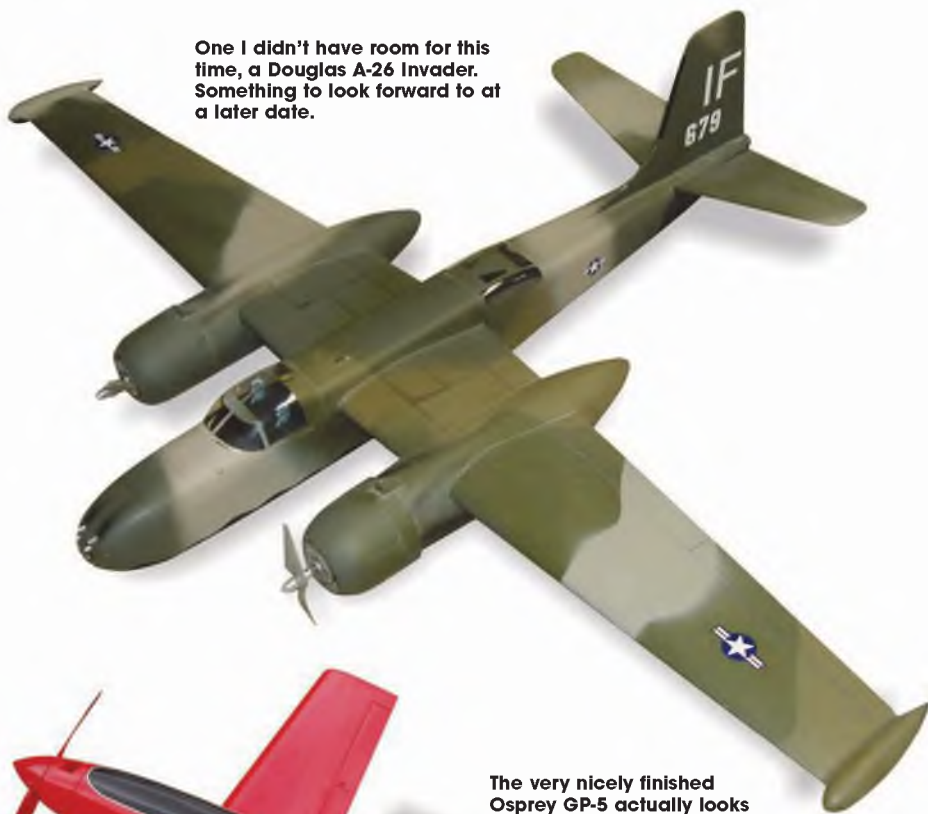
#### UP TO DATE

Okay, after looking at one of the older models, let's come right up to the present and take a look at Mark's latest creation, the Osprey GP5.

Although construction of this model follows Mark's usual practice of sheet tail surfaces, a planked/sheeted fuselage and partially sheeted pink foam wings, much of the 'working bits' sort of evolved as the model came together. Such decisions as whether to use retracts or hand launch, should the model have flaps and how the flaps/ailerons should be hinged were only finalised as the model developed in front of him. Of no little concern was the matter of, if he used them, just how much flap deflection would be required. Mark was concerned that because of the minimal wing area on this model he might need all the help he could get to keep take-off runs fairly short and slow the model for landings.

As regards the retracts, these were arranged slightly out of scale position to make for easier installation and a stronger model. The ailerons and flaps (yes, he did fit them afterall) use an interesting hinging method that looks extremely good and isn't too difficult to arrange easily and accurately. The sheet balsa aileron or flap has its leading edge shaped to fit neatly onto some thin walled aluminium tube the full length of the control surface. This tube is then slipped over a continuous length of brass tube, both aileron and flap using the same length of brass tube as a pivot. Each end of the inner tube extends about an inch and provides something to mount the assembly into the wing by. To complete things, there is a shaped false trailing edge that matches the curve

One I didn't have room for this time, a Douglas A-26 Invader. Something to look forward to at a later date.



The very nicely finished Osprey GP-5 actually looks fast just sitting there. See text for details of that beautifully film covered fuselage.

at the surface leading edge and almost entirely hides the hinge line. Pretty much like full-size practice in fact.

However, all these 'twiddly' bits aren't without their price. The electric retracts, additional servos and extra linkages required conspired to push the finished weight to a frightening 72 ounces. This equates to a wing loading of about 32 ounces/square foot and a model that needs to fly fast and land fast. Its' just slightly over 300 square inches of wing area is working hard throughout the flight. Just to give a little perspective to that, it's the sort of weight I'd expect for a WW1 biplane of around 52" span and with considerably more wing area. I always knew there was a reason I built light (ish) slow flying models, something this fast wouldn't last very long with me piloting it. I am, I hasten to point out, an extremely mediocre pilot - on a good day.

So, now you know what was involved in building the model, no doubt you'd like to know how it flew. When I point out that it uses a Power 32 motor, 4s 3300 mAh pack and an 11x10 prop, performance is fairly sprightly - to say the least. Take-off was accomplished without the use of flaps and, from watching the video clip,

was rapid and uneventful. Very few trim changes were needed to have the model flying well, if fast. Once she was trimmed out, some altitude was gained and the flaps tested. A bit of ballooning, but that was expected and is easily countered by judicious use of throttle and elevator.

The landing, once Mark was comfortable with the decent slope, couldn't really have gone much better. Having only 2 inch wheels, and landing on grass was anticipated to be a problem but proved no to be so. Okay, so the model picked up a bit of junk in one wheel and ended up sliding along on the spinner (two wheels and a spinner does NOT count as a three-pointer) but was the perfect ending to an exciting, but not terribly eventful maiden flight. Just the way all maiden flights should go.

Well, there you have it for another month. I still have more material from Mark so that's something to look forward to at a later date. Next time we'll be continuing the 'back to basics' item begun last month. If you wish to contact me in the meantime, you'll find me at the usual place; [PETERRAKE@aol.com](mailto:PETERRAKE@aol.com) ■

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Torque 4.8V/6.0V (kg/cm) 7.6 / 9.1  
Speed 4.8V/6.0V (sec/60deg) 0.11 / 0.09

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Weight - 48g Size (mm) 42 x 20 x 22  
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Weight - 56g Size (mm) 39 x 19 x 38  
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Speed 6.0V/7.4V (sec/60deg) 0.13 / 0.11

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Speed 6.0V/7.4V (sec/60deg) 0.16 / 0.14

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Weight - 56g Size (mm) 39 x 19 x 38  
Torque 6.0V/7.4V (kg/cm) 10.6 / 13.1  
Speed 6.0V/7.4V (sec/60deg) 0.09 / 0.07

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Weight - 22.1g Size (mm) 31 x 15 x 26  
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**ADS-452HTG**  
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Weight - 22.1g Size (mm) 31 x 15 x 26  
Torque 4.8V/6.0V (kg/cm) 4.1 / 4.6  
Speed 4.8V/6.0V (sec/60deg) 0.09 / 0.07

**ADS-645LTG**  
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Weight - 34g Size (mm) 42 x 20 x 22  
Torque 4.8V/6.0V (kg/cm) 7.0 / 9.0  
Speed 4.8V/6.0V (sec/60deg) 0.14 / 0.11

**ADS-660LTG**  
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Weight - 34g Size (mm) 42 x 20 x 22  
Torque 4.8V/6.0V (kg/cm) 7.6 / 9.1  
Speed 4.8V/6.0V (sec/60deg) 0.11 / 0.09

**ADS-850HMG**  
SRP £34.99



Weight - 102g Size (mm) 59 x 30 x 58  
Torque 4.8V/6.0V (kg/cm) 19.8 / 24.3  
Speed 4.8V/6.0V (sec/60deg) 0.16 / 0.13

**ADS-940HMG**  
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Weight - 48g Size (mm) 38 x 19 x 38  
Torque 4.8V/6.0V (kg/cm) 8.2 / 9.7  
Speed 4.8V/6.0V (sec/60deg) 0.14 / 0.12

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Weight - 48g Size (mm) 39 x 19 x 38  
Torque 4.8V/6.0V (kg/cm) 6.3 / 7.4  
Speed 4.8V/6.0V (sec/60deg) 0.11 / 0.09

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Weight - 49g Size (mm) 39 x 19 x 38  
Torque 4.8V/6.0V (kg/cm) 16.6 / 21.0  
Speed 4.8V/6.0V (sec/60deg) 0.19 / 0.16

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Weight - 49g Size (mm) 39 x 19 x 38  
Torque 4.8V/6.0V (kg/cm) 7.8 / 10.1  
Speed 4.8V/6.0V (sec/60deg) 0.10 / 0.07

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Speed 4.8V/6.0V (sec/60deg) 0.11 / 0.09

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Weight - 56g Size (mm) 38 x 19 x 38  
Torque 4.8V/6.0V (kg/cm) 19.4 / 22.1  
Speed 4.8V/6.0V (sec/60deg) 0.16 / 0.13

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