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PART 2: 1:8 SCALE FOR ELECTRIC POWER

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MODEL MAGAZINE

# Flying Scale Models

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**HOW-TO**  
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WW1 TYPES

**SUBJECTS  
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PERCIVAL  
PROVOST  
WITH SCALE  
DRAWINGS  
AND CLOSE-UP  
DETAIL



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### SPECIFICATIONS | HAN4760

## HANGAR 9®

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



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## ON THE COVER

1/4-scale Percival Proctor by noted warbirders Chris Peers and 'Spartacus', is powered by ZDZ 40cc spans 120" and weighs 35 lbs.

(Photo: Alex Whittaker)

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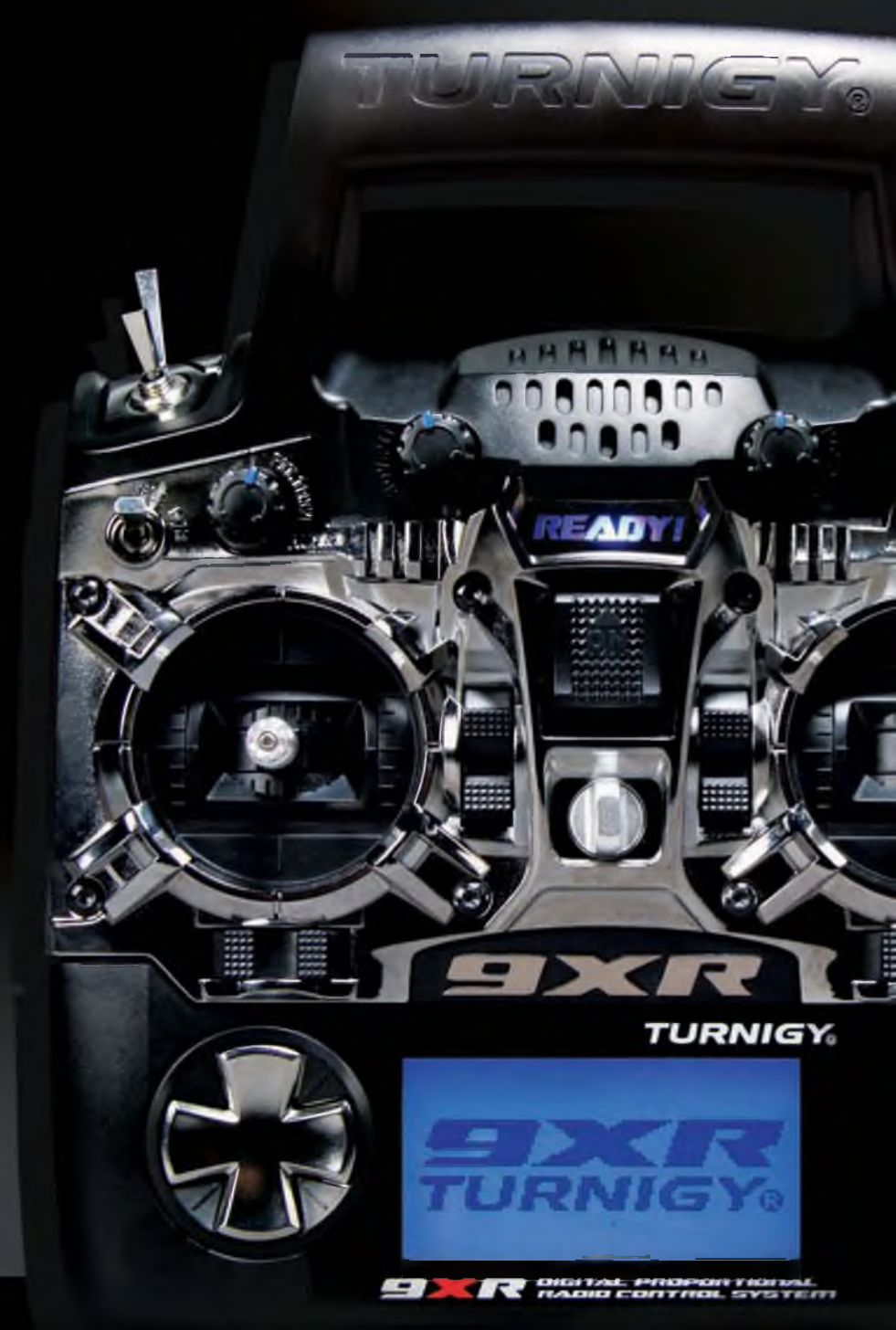


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# CONTACT

**T**he name of Percival disappeared from British aircraft manufacturing more than 50 years since, yet in its pre-WW2 heyday, the name was at the forefront of British aviation achievement, producing a line of aircraft types that set new records in aviation, flown by some of the greatest pioneer pilots of the time.

This month's FSM marks some of the success of Mr. Edgar Percival with coverage of two of the aircraft types his Company produced, in numbers, before it was swallowed up in the general post-WW2 move that 'consolidated' and combined some of those most famous earlier aircraft constructors into larger organisations, capable of meeting the challenges of competing in an industry by then faced with meeting the demands of the expansion of general aviation, fuelled by the advances in development that resulted from the 1939-45 years.

Thus, we are presenting the late Mr. Roy Yates' Percival Proctor Mk.IV, with plans for the model in Roy's original 1:7 scale, plus 1:5.5. Roy was one of those thoughtful pioneers of R/C scale, campaigning his Proctor successfully at International competition level.

The other Percival type celebrated in this issue as a subject for scale modelling in the Percival Provost, which was the Royal Air Force's basic training of the 1950s-1960s era and was the RAF's last piston engine powered trainer, before moving over to an all-through jet aircraft training program.

As it happens the Provost was also modelled successfully by Roy Yates, and it too, represents an excellent Subject for Scale.





# Ace the Black 8

## Hangar 9® Messerschmitt Bf 109F-2 60

The goal given to Messerschmitt was clear—fit the most powerful engine available into the smallest possible airframe to produce a pilot's fighter with the lethal ability to execute violent manoeuvres no opponent at the time could match. Of the many Bf 109 variants, the streamlined "Friedrich" series was historically viewed as the best all-round fighter of the breed.

The Hangar 9® Messerschmitt Bf 109F-2 60 brings to life the nimble aircraft Otto "Bruno" Kittel used to help earn him one of the highest kill records in world history. The wing of the 60-size "Black 8" incorporates two Selig airfoils, as well as just the right amount of washout so that you can groove at high speeds, yet settle in for graceful landings. Its all-wood structure features construction methods that allow complex curved areas to be fully sheeted, which makes the airframe not only as light as possible, but is also an exceptional complement to the accurate scale outline. Other scale details include operational four-section flaps and the option to add E-flite® electric retracts specially engineered to raise your warbird experience to ace-level.

Whether you're a sport modeler or a die-hard warbird fan, the Hangar 9 Messerschmitt Bf 109F-2 60 is the fighter experience you've been waiting for.

### SPECIFICATIONS | HAN2785

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## GILDINGS AUCTION 2013

One of the late Autumn events eagerly awaited each year, particularly among those with an interest in Vintage models and model aero engine collectors is the Gildings Auction, which this

year is scheduled to take place on November 9th, for which entries of sale items are now invited.

Venue will, as previously, be the Gilding Auctioneers premises at The Mill, Great Bowden Road, Market Harborough, Leicestershire, LE16 7DE, commencing 10.30 am.

For further details, contact Gildings on 01858 410414.

# EXTRA AND SPECIAL...

The EXTRA line of aerobatic aircraft has been widely modelled, in many of the versions that have appeared over the years, but the Extra 300 probably tops popularity scales.

Now there is another ARTF offering,

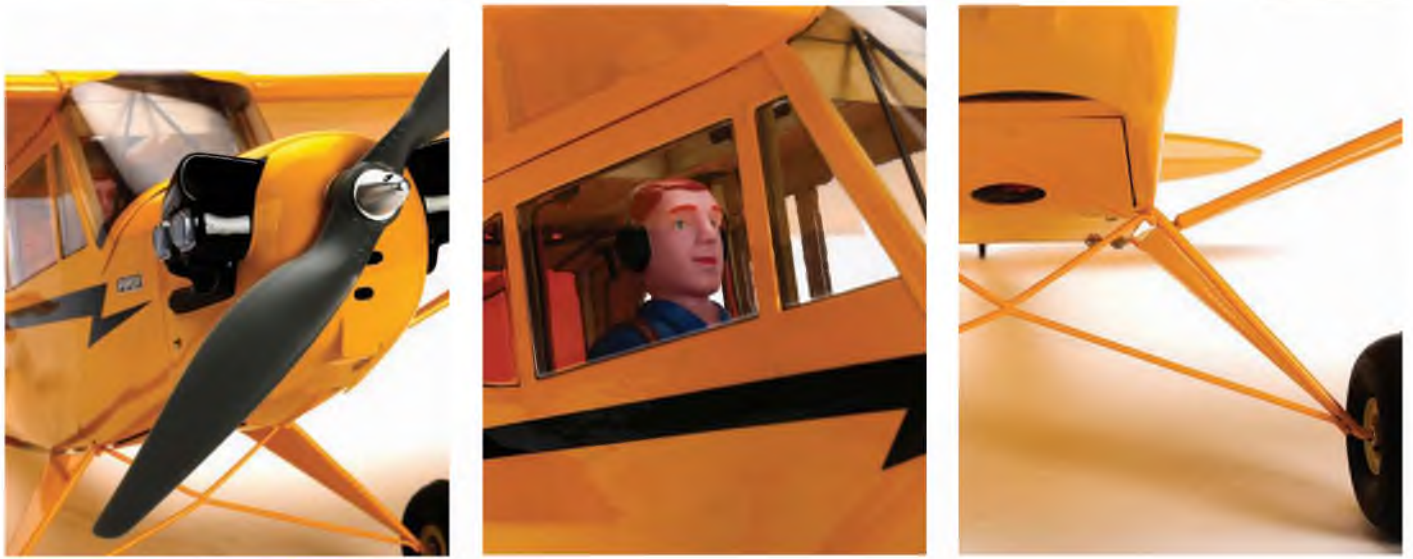
from FSM - a version that spans 1300mm (51"), designed for 3648m - KV760 electric power, fed from a 2600-3000 mAh 4S lipo power pack. In ARTF format, It features resin moulded cowling, resin radial grille, accurate

scale main undercarriage and is supplied complete with 13 x 5" three blade propeller. Nice scale colour scheme too!

Price is £169.99.







# HANDY LITTLE YELLA FELLA

**P**iper J-3 Cub - who can really resist the shape of this neat little aircraft manufactured in thousands and surely modelled in hundreds of thousands over the years. Yet still the new kit renditions of this ever-popular type keep coming, the very latest being Horizon Hobby's E-flite electric ARTF balsa/ply example that spans 51" (1300 mm) wingspan offering, all

finished in 'Cub Yellow'. With a flying weight of 2-2.2 lbs, it is designed to suit a 450-480 size electric motor fed from a 3S 1800 or 2200 lipo battery, it is the kind of model that can be kept fully assembled ready for a quick flying session whenever the opportunity arises. Price, via Horizon Hobby UK stockists is £164.99.





# Rougham Scale

## 2013

Alex Whittaker finds lots of scale action and scale goodies at East Anglia's finest

**R**ougham has become my first three-day 'camp over' show of the season. I look forward to it eagerly each time, despite the long trek from North Wales. This year the North West wind was chill, boisterous, and at times 45 degrees to the runway, but we still had fun. True, on Sunday, the lunch break had to be extended due to the poor weather, but apart from that, flying was pretty much

continuous. We seemed to dodge most of the heavy showers, although on occasion the pilots had to be nifty with their tarpaulins.

### Colin 'The Aviator' Hammond

The show began with a sad start. We all learned that colourful Colin *The Aviator* Hammond had passed away. Colin was well known on the show circuit as a nifty commentator on the PA system, as well as

an excellent scale builder. He was a good friend to me and often offered me civilised tea and cake on the flight line, where we performed our separate duties for many hours together each summer. A minute's silence was observed, and our thoughts were with his wife Rose.

### Classic Ryan PT-19

One superb classic R/C model aircraft instantly took my eye. Now owned by Matt

**The weather was bright for some of the weekend!**





Harrowden, this *Dynaflyte* Ryan PT-19 was built by Roy Scott over twenty years ago. It is now powered by a Zenoah 38 driving a 20"x8" prop. She weighs 26 lbs, and spans 108". A greta-looking scale model. If all that were not enough, her highly individual hand-crafted pilots were minor works of art. We will return to this superb traditional model in a later issue.

### Extra 260

Well known display pilot Steve Carr was campaigning his massive and impressive Extra 260. What most punters might not realise is that such show aircraft are subject to a regime of continuous annual improvement. In fact, they are regularly upgraded for safety, performance, and aesthetic reasons. I was astounded to learn that the sheer number of detailed modifications that Steve has applied since last season. These included a whole new undercarriage made from 7075 ally, in T6 condition, saving 100 grams. The port wing panel may look the same as last year, but is actually re-skinned and re-covered to match the high standard of the starboard one. The tail wheel leg has been upgraded with a welded gusset, plus new wheel bearings.

On the engine, there is a new air box which recycles hot air from the exhaust area to prevent icing of the carburettor. The removal of previous heaters on the throttle bodies has saved 150 grams, including their batteries. The spats and the undercarriage are now colour coded. Steve has used a new fuel



Willis Warbirds' new traditionally-kitted YAK 50 is doing very well: I saw four at Rougham.







The new Vulcan climbing out with great authority.



Big isn't she? LMA Chairman Dave Johnson's mighty new Vulcan.



The LMA Vulcan makes another slick landing, despite the boisterous winds.

injection map to produce more power. The exhausts have been reduced to produce more power. Steve is working on Wing Tip smoke (not quite commissioned yet). He is also experimenting with green smoke, in addition to red and white tip streamers. The engine has also been fitted with 2 new

ignition units. As if all this were not enough, I was astounded when Steve mentioned that there is a new engine almost ready to drop into the beast. Wow!

**Whirlybird**

Scale choppers have always delighted

me, and we do not see enough on the scale circuit. Consequently I was delighted to see Daryl Langwade fly his lovely Bell 47G in the United Nations Korean scheme. It looked straight from the much-loved MASH TV series. Unfortunately, I was unable to gain more details before we all ran from the rain.

**VC-10**

It was really atmospheric to see the Mason / James / Leach Vickers Armstrong/BAC VC-10 in Royal Air Force colours take to the air. She spans 16 feet and weighs 63 kgs, and the overall effect in flight is of considered authenticity. I have always loved that neat T-tail arrangement, and she looked especially appealing when just about to touch down.

**YAK 130**

The YAK 130 is curious beast, a sort of 'Hawski'. Two of my auld mates Mark Hinton and James Laddell built theirs recently, so I was intrigued to see the performance. The answer is: sublime! Powered by P200 turbines, they really do look different in the air. Chunky, close coupled, and aggressive. It is a little known fact of aviation trivia that the YAK 50, for all its fast jet fighter looks, is actually a sub-sonic aircraft. Hmmm.

**Hawk**

Mark also flew a lovely BAe Hawk. Unfortunately, almost immediately after take-off conditions deteriorated very markedly. Soon the treacherous wind was blowing across the runway, the light



Mark Hinton's lovely Razorback bustles in.



Wing streamers akimbo, Steve Carr's Extra 260 mid routine.





**This brave Fokker Dr.1 Triplane repeatedly defied the elements!**



**I caught this Fokker D.VII just as the sun came out, though she had been flying in the rain.**



**Matt Harrowven's fine 1/3rd scale Sopwith Pup on a very close approach.**



**Magnificent one-third scale Sopwith Camel flown by Patrick Dare.**

failed, and then it began to hammer down! Mark shrugged off all these complications and brought her back alive to rapturous applause from the assembled company. A great flight under very challenging conditions.

**P-47**

As is all this were not enough, Mark earlier

flew a truly stunning ARF Composite P-47 Razorback in an all-silver finish. The model is powered by a magnificent Moki 250cc 5 cylinder radial. The wingspan is 110" / 2.8 metres and she weighs around 22 kgs, so she really is impressive in the air.

**Handley Page HP-42 Helena**

Helena was the last of the Hannibal Class of Airliners built by Handley Page for Imperial Airways. This classic model has recently come to light and is back on the show scene. She was originally begun by

famed Peter Neate to 1/8th scale, and spans 16.5 feet. She weighs 80 lbs and is powered by 4 x Zenoh 22cc petrol engines. She is of traditional construction and is covered in Solartex. The model was completed by Ian Redshaw on behalf of the Neate family, and Ian pilots the model up and down the country. The corrugated metal panels are hand-made from litho sheet.

**Sea Fury**

We have seen Mick Burrell's stunning model before, but really, it is hard not to immensely impressed by her sheer presence in the air. The syncopated growl



**Vickers VC-10 on short finals. Very convincing in the air.**



**Wheels down approach from the Mason / James / Leach / Mitchell VC-10.**





**Begun by Pete Neate and completed by Ian Redshaw: HP 42 Helena.**

of the Moki five-cylinder / 250 cc radial only adds to her glamour. Being an unashamed scale-anorak, I spent happy minutes watching her wing-folding mechanism operating as smooth as silk, as she taxied back to the pits. I also made sure that I took a photo of the hinge area for you. Fellow anoraks: Enjoy!

**Junkers Ju88**

This was lovely surprise, since the Ju88 is a

surprisingly under-modelled scale subject. This fine example was flown by John Mason as part of the famed *TJD Models Team*, from Dartford in Kent. It built from the Don Smith plan, spans 132", and weighs 21.3 kgs. The Ju88 is powered by two DA 50 petrol engines, driving a 22"x10" JFX WWII-style prop. In fact John tells me that the Ju88 is deliberately over-powered for reliability, so when throttled back, she flies like a dream. Incidentally, full marks to



**Matt Harrowven now owns this classic Ryan P-19, from the old Dynaflyte kit. 108" span, Zenoah 38 power.**



**Built by Roy Scott, Matt Harrowven's PT-19 is to 25% scale.**



**Mark Hinton lands his immaculate BAe Hawk crosswind in miserably poor flying conditions.**



**Easy does it! This neat petrol powered Messerschmitt Me 109G had a late bounce before settling down to land.**



**Great Junkers Ju 88, flown as part of the TJD Models Team from Dartford in Kent, by John Mason. The 88 is criminally under-modelled.**





Ted Allison's 8'8" span EE Lightning - stunning from any angle.



Ted Allison's twin turbine EE Lightning on short finals.

TJD Models for fielding such an impressive Team Display, and putting things back into our hobby. It must be costly in the current difficult economic environment, but they stick at it.

### Scale Goodies

Since such LMA events major on Build-It-Yourself scale modelling, the Trade was out in force. Besides the big guns of All Machinichy, SLEC, Nexus, and Inwood, I spotted some newer purveyors of scale goodies. First off was *Prop Guy* ([www.propguy.co.uk](http://www.propguy.co.uk)), with as you might

expect, an impressive range of Falcon scale props. Propguy also had some very interesting items for the scale modeller such as a new line in petrol tanks. The Propguy website is worth a look.

Next off was *ADFA Models* ([www.adfamodels.co.uk](http://www.adfamodels.co.uk)) with a range of CNC kits, but also some great scale accessories. I particularly liked their range of traditional and (dummy) electronic cockpit instruments. These looked really good. ADFA also have a range of ready made dashboards, some already populated with instruments. If you needed

a pilot, new kids on the block [www.perfect-pilots.co.uk](http://www.perfect-pilots.co.uk) had a superb range. I particularly liked their leather-clad WWI gentlemen, though, of course they can supply smart female pilots too. Finally, as well as a range of CNC kits, ([www.mwmwarbirds.co.uk](http://www.mwmwarbirds.co.uk)) had some great scale goodies. I particularly liked their WWII (moulded) exhaust stacks and their CNC scale kitting services. (Turn over the page to see it all).

### Rougham redefined

It was noticeable that the LMA had



Hawski! Mark Hinton's unusual YAK 130 showing off her wing stores.



Mark Hinton's YAK 130. Jetcat P200 SX power. Amazingly, the real one is subsonic.





**As promised, for all you anoraks out there: the folding wing / hinge mechanism on Mick Burrell's superb Sea Fury.**



**Wings folding as she taxis back: Mick Burrell's Sea Fury.**

changed the show's emphasis this year. They appeared to have moved away from the earlier broader-based / family-friendly / country-show appeal to a more model-focussed event. The shown felt slimmed-down, and even the vast beer-tent of yore was absent, though you could still get beer. The show ground between the hedge and Trade Line was not as busy, or as full of campers as before, and lot of the family-orientated stalls just did not appear this year. Certainly, the dodgy weather forecast did not help attendance. In addition, given the fact that we are all watching our pennies these days, lower attendance was probably inevitable.

### The Verdict

I was pretty hacked off with the cold wind blowing all weekend, but apart from that I had a great time. I spent considerable dosh on scale goodies, and it was good to catch up with new directions in the scale accessories market. Personally, I could have watched Mark Hinton pull super scale model-after-super scale model onto the

flight line all day. The range of large scale models flown, including the huge VC-10, Steve Carr's Extra, and the massive LMA Vulcan were the icing on the cake. Overall, Rougham makes a superb 'season starter'. I commend it to you. Just remember to pack a good fleece! ■

## EXTRA DETAILS



**CLOCKWISE FROM TOP LEFT:** Adfa Models market a range of ready-made scale instrument panels. / Adfa Models also do a range of dummy electronic instruments, too. / A complete 1/4 scale panel for a light aircraft from Adfa Models. / MWM Warbirds offer CNC-kitting services and also sell scale goodies like these moulded exhaust stacks. / Perfect Pilots market a range of scale pilots in a variety of sizes and styles. / Part of the Prop Guy scale prop range. / Scale pilot's seat from Adfa Models.





# AeroDetail series

## Making a scale model?

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



### Whitman Tailwind CD106

Two examples shown of this U.S. homebuilt lightplane, with boxy shape ideal for modellers. Complete close-up detail. (62 images)

### Westland Lysander CD105

The Shuttleworth Museum's airworthy example shown in both camouflage and Special Operations black finishes. Full close-up detail. (62 images)

### Waco Ymf-5 CD104

Beautiful and graceful spatted undercarriage biplane of the 1930s 'golden aviation era'. Example photographed is an accurate-in-every-detail modern replica. (130 images)

### Vickers Supermarine Walrus CD103

The famous 'Shagbag' biplane seaplane, used during WW2 as an air-sea rescue craft and fleet gunnery spotter. (80 images)

### Tipsy Belfair CD102

Highly attractive Belgian low wing light aircraft from the era of simple, open cockpit private flying. Machine offers scale modellers pleasant lines and simple shape. (35 images)

### Thulin Tummelisa CD101

Swedish 1919-era fighter trainer that served the Swedish air arm for many years. Example depicted is a faithful reproduction. (55 images)

### Supermarine Spitfire MK.XVI CD100

Last of the Merlin-engined Spitfires. This collection depicts the cut-down fuselage, bubble cockpit canopy later version. (116 images)

### Supermarine Spitfire MK.IX CD99

The most numerous version of the classic Spitfire that turned the tables on the Luftwaffe's Focke Wulf Fw 190. (90 images)

### Supermarine Spitfire MK XIV CD98

2nd of the Griffon-engined Spits (Mk.XII was

first), the bigger engine forced a change of the classic Spitfire shape. (58 images)

### Supermarine Spitfire MK Vc CD97

Shuttleworth Museum's airworthy example presented in its latest form with classic rounded wingtip planform. (160 plus images)

### Supermarine Seafire Mk17 CD96

The Seafire 17 was no navalised Spit. A true ground-up naval fighter. (64 images)

### Stinson 105 CD95

Light, private aircraft of the 1940-50s era, with lots of character. (75 images)

### Steen Skybolt CD94

Attractive U.S. aerobatic biplane, presented in full detail. (89 images)

### Sopwith Triplane CD93

The last example of the 'Tripehound' is the one built (in 1980!) from original Sopwith drawings by Northern Aero Works and given sequential manufacturer's number by Sir Thomas Sopwith himself in recognition of the outstanding workmanship. Extensive detail. (120 images)

### Sopwith Pup CD92

The charismatic Sopwith Scout (to give its correct designation) is a great scale modellers' favourite. Example depicted is the one preserved and regularly flown at the Shuttleworth Collection, Old Warden. (50 images)

### S.E.5A CD91

Shuttleworth Museum's airworthy example presented in full detail. (100 plus images)

### Ryan Pt-22 CD90

US military primary trainer aircraft that served with both US Army and Navy, thus providing ab-initio flight training for the majority of US airmen of the WW2 period. A highly attractive aircraft, 90 images of the preserved, airworthy aircraft, hangared at the Shuttleworth Collection, Old Warden.

### Republic P-47D CD89

Bubble-canopy version of the much loved 'Jug', photographed in fine detail. (105 images)

### Polikarpov Po-2 CD88

The world's most numerous produced aircraft of all time, the P0-2 was a great maid-of-all-work used by both military and civil groups in the old Soviet Union and its satellite states. Example depicted is pristine, and now in storage at Old Warden. (170 images)

### Polikarpov I-15 CD87

The ultra agile Russian biplane fighter aircraft that saw widespread service prior to and in the early years of WW2 and during the Spanish civil war. Example illustrated is a superbly restored machine. (100 images)

### Pitts S.1 CD86

Homebuilt example by Bob Millinchip, as seen at 2002 PFA Rally. Complete detail study. (36 images)

### Piper Tomahawk CD85

Cranfield Flying School example of this civil ab-initio trainer aircraft. (54 images)

### Piper Super Cub CD84

The later, 'cleaned-up' version of the famous Piper J-3, with more elegant engine cowl. Two examples shown. (80 images)

### Piper L-4 Grasshopper CD83

Military version of the famous Piper J-3 Cub used during WW2 and close reconnaissance and spotter aircraft and for many other tasks. (80 images)

### Percival Provost CD82

Airworthy, preserved example of the RAF piston engined basic trainer used in the 1950s. Full detail. (30 images)

### Percival Mew Gull CD81

Famous 1930s racing and record setting aircraft that will forever be linked with the achievements of British aviator Alex Henshaw. (35 images)

### North American T28 CD80

The advanced trainer aircraft that served in many air arms worldwide and also became a counter-insurgency ground attack aircraft. Examples illustrated are from France, where the type served for many years as the 'Fenec'. (100 plus images)

### North American P51D Mustang CD79

The definitive bubble canopy Merlin Mustang. In detail, showing several restored examples. This is the Fantasy of Flight Museum's overpolished example, but the close-up detail is all there. (102 images)

### North American P51B/C CD78

First of the Rolls Royce Merlin engine Mustangs, this collection depicts the Fantasy of Flight Museum's restored example, with overly polished plain metal surfaces. Much detail. (102 images) Also, 41 images of The Fighter Collection's P-51C in bare metal restoration, showing much surface and internal airframe detail. A real bumper bundle! (over 140 images)

### North American B25 Mitchell CD77

Fantasy of Flight Museum's example. Photographed soon after superb restoration. Full nose to tail detail. (74 images)

### North American AT6 Harvard CD76

AT-6, SNJ, Texan, Harvard – call it what you will. 55,000 were built – this example is in U.S. Army colours, with comprehensive close-up detail, nose to tail. (76 images)

### North American A36 Invader CD75

The ground attack variant of the Allison engined P-51A. Photos, in detail, of the world's only airworthy example. (69 images)

### Morane Saulnier MS406 CD74

French WW2 fighter that fought in the Battle of France, 1940. Swiss restored example (92 images)

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# NIEUPOORT 17

**PART2: Concluding the construction of the 1:8 scale model designed by Peter Rake and built by Jim Arrington**

**L**ast month we dealt with building the wings and tail surfaces for the little Nieuport and this month we finally get to the interesting bit - how it flies. After, that is, Jim guides us through the remaining construction.

### Fuselage

The fuselage is built in two pieces. The front and the rear are built separately then joined. I started with the front half. Peter's models generally have a central front

box, so I started by cutting out the front centre section struts and the fuselage sides and joining them over the plan. These are identical for each side.

Next, the fuselage formers are cut making sure the cut-outs for the servos will fit the servos of your choice. Once all the parts are ready, the box is glued together taking care to ensure the whole assembly is perfectly square. *(Because the centre section struts, and therefore the wing alignment, rely upon the accuracy of the front fuselage*

*box, it is vital that you take the time to ensure it is perfectly square before letting the glue dry. A little extra time spent on this stage will more than repay itself when you come to mounting the top wing. PR)*

The rear of the fuselage is begun by constructing the two side frames. Make two identical sides by building one on top of the other. Commence joining the two sides by first cutting out the lower cross braces and pinning these to the board. Glue the side frames to these and then add the

**Climbing away for another sortie, the Nieuport has proved a stable and satisfying flyer.**







Spacers used to hold the assembled cowl rings while they are wrapped with ply.



Ply and front rings added and the cowl all nicely sanded to shape.



Although Jim used the forward fuselage side as a guide while building the rear frame they remain two separate items - not glued together.



Squares and the way the formers fit the sides assure a square forward fuselage assembly.

top formers, once again ensuring that the assembly is perfectly square. Pulling in, and joining the tail while everything is held square helps to maintain the accuracy of that area. Finally, while the sides are still pinned to the board, I joined the front to the rear. Remove the assembled fuselage from the board and sand the side frames flush to the forward fuselage sides.

It is time, now, to bend some wire. The N.17 only has one wire to bend for the centre section struts (thank goodness) and it is fairly easy to make. The plans use a split pin to fasten the upper wing to the rear cabane strut but I don't have a source of split pins in my area, so I decided to use a cut-off fishing hook eye instead. After threading the hook eye on my wire, I attached the wire to the former using fishing line. Once the bindings have been tied off, soak them well with CA.

At this point, I also built myself a little box to house my battery. It is not on the plan but I wanted to make sure that my battery stayed in place. It is a simple matter attached to the back of the firewall.

The basic structure of the fuse is now complete, so now it is time to dress it out so to speak. Start by adding all the outside formers. At this point, you may notice that the sides of the N.17 are not symmetrical. The left side round portion is longer than the right. Be sure to arrange your

formers accordingly. (On the full-size aircraft this was to clear an internal component, but I can't recall what it was. It's a quite obvious feature so I included it on the model. PR) The sides of the fuselage are now sheeted followed by the top all the way back to the tail section. Cut out the cockpit and stand back and admire your work.

### Cowling

The cowling is the next item to be built and it is a simple construction, so should cause no problems. Cut out and glue up the rings that make up the formers for the cowling. There are two inner rings, which are ply and outer balsa rings that form the front of the cowl. One inner ring contains the tabs for attaching the cowling to the fuselage with some screws. (Please note that this mounting ring only assembles one way round. If you get it wrong, not all the mounting holes will align with those on the firewall. Therefore, assemble it over the drawing on the plan, it's what it's there for. PR)

Wrap the ply rings in 1/32" ply. Glue up the forward balsa rings onto the front of the cowl and allow to dry. Sand the cowling to shape and attach to the fuselage with screws. Measure the distance from the firewall to the outside of the cowl and use the measurement to make your motor mount. The thickness the motor mount needs to be will be

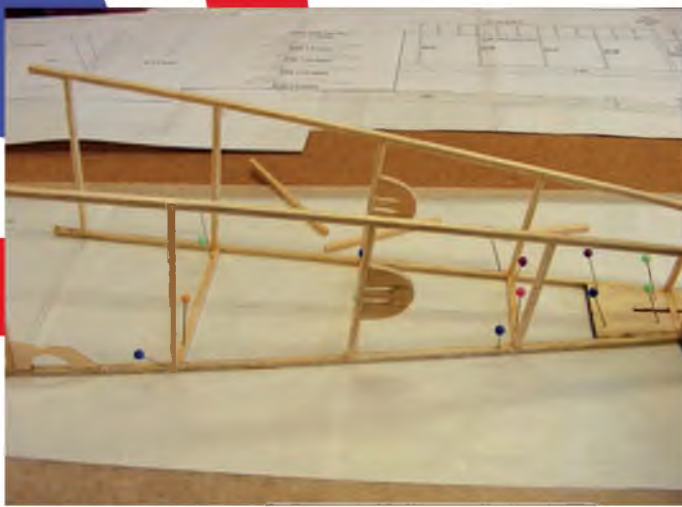
determined by the motor you choose. (And whether or not you opted for the slightly stretched cowl. PR) The motor mount is sanded and installed to give both down and right thrust.

### Landing gear

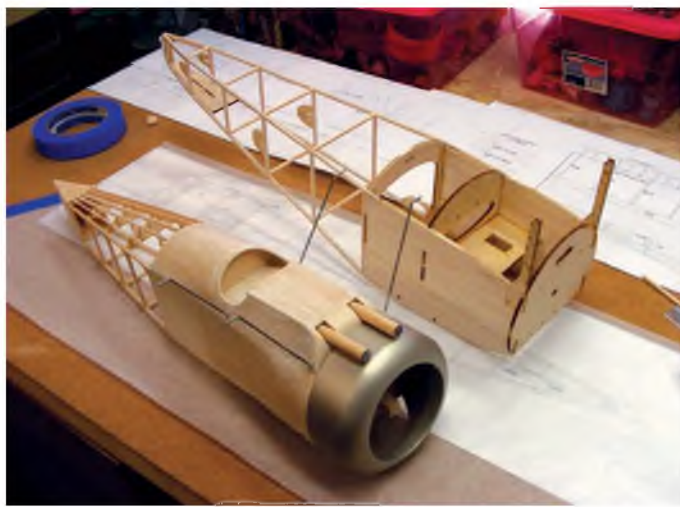
Bending wire is not one of my favourite past times but if you take your time, it is not that difficult to do. Just lay it out on the plan, mark, and bend. I use a pair of needle nose pliers to hold the wire and bend with my hands. (A tip here is to always work out from the centre, making sure you grip the same side of any markings on both halves of the leg - if you grip the first bend on one side inside the mark, do just that on the same bend on the opposite side. They may still not be 100% accurate, but at least any inaccuracy will be duplicated equally on both sides. PR).

Next, I attached the front and rear wires to their formers using the same method as the cabane strut wire. I prefer to solder my axle to the landing gear wire in place on the model. The joints are cleaned then wrapped with a thin gauge wire. I used some old telephone wire I had on hand from my model railroad days. Add a dab of flux, heat with a torch or soldering iron, and completely soak the wire with melted solder. If the parts of the wires are heated properly, the solder will flow completely around and make a good joint. The last





Cross braces join the lower side frames and, once fitted, formers do the same for the tops.



Front and rear fuselage frames joined and posing next to a part built Camel - another FSM free plan by the same designer.



The rear c/s strut firmly bound to the former. Note the fishing hook eye used to attach it to the wing.



Side formers added to form the side sheeting around. Left and right sides are different, so take care with this.

step on the landing gear is to sheath the wire in balsa and sand to shape. Add some wheels and now you have a N.17 - in the bones at least.

### Covering & finishing

I chose to cover the sheeted portions of the model with *Silkspan* and the open portions with *Polyspan*. Just make sure you install your wing servos before covering the wings. The cowling was covered with

*Monokote* trim sheets cut to shape. (Personally, I prefer the seal, sand, seal, sand and finally paint technique with things like cowls. It's just the easiest way I know of getting the sort of smooth finish required on 'metal' areas. PR).

A single Vickers gun was added to the top deck. Just in case we run across some Huns. Cut some slots in the top deck to pass the aileron wires inside the fuse. I used pull-pull throws for the tail controls.

These were made with fishing line. (On a model of this size nylon coated trace wire is probably the safer option. I have used monofilament fishing line in the past, but feel happier with the trace wire. PR).

The last part to be made is the lower hatch. I made mine from 1/32" plywood. I wrapped it around a large coffee can, wet it with ammonia, and then held it to the coffee can with rubber bands overnight to dry. I hinged it to the bottom of the firewall with Dubro pin hinges and a tab made from a piece of metal was installed under the rear landing gear wire to retain the rear of the hatch when it is closed.

The model is painted with an airbrush using acrylic craft paints from the craft section of the local department store. I thin my paint with *Windex* window cleaner. The graphics were ordered from *Callie Graphics* to match the scheme of the plane flown by Cassidy. She did a fantastic job.

### Assembly

The stabilizer and wings were cemented to the fuselage using five-minute epoxy. The stabiliser was installed first. I used the old tried and true string technique to insure the stabiliser was installed square to the fuselage. This method uses a string tied to a pin with the pin attached to the centre of the fuselage at the front. To get the stabiliser square to the fuselage, the outer leading edges should be the same



Finished in 'Flyboys' colours Jim's model shows off the markings created by Callie Graphics.



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distance from the centre. Wrap a small piece of masking tape to the string and draw a line on it. Move the tape until the line matches up to the outer leading edge of the stabiliser. Now match to the other side. The stabiliser is square when the tape lines up on both sides.

The rudder is added next, but first don't forget to install the control horn. As a matter of fact, now would be a good time to install the control horns on the ailerons and elevators too. Then go ahead and hinge them as well.

Getting back to the rudder, I just slid the CA hinge into the rudder and then into the back of the fuse then glued it in place with CA. (Since retaining the rudder during flight depends on this hinge, I'd be tempted to make sure the hinge is pinned through both tail-post and rudder. A rudder trailing by its' closed loop cables isn't particularly conducive to relaxed flying. PR)

The top wing is epoxied on next. Make sure you have a good fit and I also suggest making sure your aileron servos are working before applying the epoxy. (I think I might have done that before covering the wings. PR) The bottom wings have locating tabs to help in fixing them to the fuselage. I hope you cut the holes for them when making the fuselage sides! (So do I because although they do very little for actually retaining the wings, they do ensure equal incidence. PR). If you did, locating the lower wings is easy. However, before we can glue them on, we have to make the interplane struts. With the interplane struts done we can now glue on the bottom wings and the struts will set the dihedral. The design of the interplane struts on the N17 require a little extra care when installing since they only have one attaching point on the bottom wings. If not careful it is possible to get a twist in the wing. I made a simple jig that allowed me to ensure the two wings were parallel. Finish up the model by installing all the rest of the electronics and balancing the model.

## Flying

With a fully charged battery, I headed to the flying field. The day chosen for the maiden flight was a little bit windier than I would have wanted but I was there and my photographer was there as well. The Nieuport was pointed into the wind, the throttle was advanced and to my surprise the model was airborne and climbing away in very short order. A little right trim was dialled in and she behaved herself nicely.

Several circuits around the field were made, three mistakes high, while I got the feel of her. She flies very well



**A neat way to create the prominent lacing so obvious on Nieuport types.**

and I did not notice any bad habits. Next, I brought her down for some low level passes; a low level pass right in front of you is a very satisfying sight.

After a few pictures were taken it was time to land, so I reduced power and she came in slowly in a gentle descent. Just before touch down I cut power and flared, missed the runway, but hit the short grass in a very satisfactory and pretty landing.

The Nieuport 17 was a very rewarding project and she has fulfilled all my expectations. Peter has designed another fabulous flyer and I highly recommend her. ■

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# Percival Proctor

## Vega Gull In Uniform

Secretive 'Spartacu' and his building partner Chris Peers have produce yet another masterwork

**I**n the Thirties, Percival were purveyors of sophisticated light aircraft with exceptional performance. The marque had a special lustre which was burnished

by many famous and glamorous pilots such as Alex Henshaw, Jim Mollison, Amy Johnson, Beryl Markham, and CWA Scott. Percival Vega Gulls were the steed of choice for all these celebrities, and flying

**UNDENIABLY BRITISH, THE VEGA BLOODLINE IS APPARENT.**





# tor



records were broken to Australia, South Africa, and South America. When war with Germany seemed imminent, both The Air Ministry and The Admiralty saw the potential of the Vega Gull in a communications role. 15 were ordered and 21 were impressed from the Civilian Register. However, as early as 1938, Percival was already responding to Air Ministry Specification 20/36 for a single-engined, low wing monoplane for communications and radio training duties. This led to a stretched and specially modified variant of the Vega Gull, dubbed the Proctor. Production extended to 1,100 machines, and some were even made at Barton in Manchester. There were six marques of Proctor in all, terminating with a float-plane variant in 1946. Incidentally, it is little known fact of academic history





that 'Proctors' are part of the traditional enforcement arm of the University of Cambridge. The role of the Proctor and his 'Bulldogs' was to lead erring students back on to the straight and narrow. No doubt someone at Percival had first hand experience of 'correction' in his student days, and saw the joke of naming a military variant of a light aircraft a Proctor.

### The Model

Chris Peers and his shadowy collaborator 'Spartacus' are well know to this

publication. This time, on a direct commission from noted Warbirder Dave Gent, they set about scale model of the famed Percival Proctor. Their Proctor is designed to 1/4 scale, delivering a model with an impressive span of 120 inches. The finished model finally weighed in at 35lbs, and was fitted with a ZDZ 40cc petrol engine, driving a 22" x 10" prop.

### The plan

Spartacus developed his own plan, based on an existing three-view line drawing. On this basis Spartacus devised his own traditional structure.

### Documentation

The model is based on the full-size preserved example at the Imperial War Museum airfield, Duxford. Thus, all the documentation used for scale authenticity originated from the Duxford Museum.

### Construction

This traditional model naturally employs lots of balsa and ply. The only departure from this technique was the addition of home-made glass fibre mouldings for the engine cowl and the hugely characterful spats. Spartacus makes his own plugs and moulds.

### Fuselage

The fuselage is made from plywood formers that were sheeted in 3/32" balsa. The canopies were hand-moulded by Spartacus from his own carved and sanded plugs.

### Wings

The wings were traditionally built, with balsa ribs fed onto spruce spars, with 3/32" balsa sheet on the panelled areas. The wing was then covered in natural Solartex and doped to accept the paint.



The hinges, aerial terminations, decals, rib-tapes, overall fit and finish are superb.



As you might expect, the tailwheel is proper engineering.



You can't have a Percival Proctor without convincing spats. Hand moulded of course.



THE MODEL FLIES EXACTLY LIKE A LIGHT AIRCRAFT OF THAT PERIOD SHOULD.



## Tail

The tail is constructed with balsa ribs over a spruce spar, with 3/32" balsa over the panelled areas, and Solartex covering to finish.

## Engine

The choice of engine was a ZDZ 40RV, which may seem small for a model of 10 foot span. Actually, it provides a much more grunt than the model requires. The Proctor cruises comfortably on one-third power, which by common consent of all the observers on the maiden flight, replicates a convincing scale speed.

## Propeller

The prop used was a Menz 22"x10" two-blader. Test Pilot Chris Peers says he chose this prop since it "Cuts the RPM down to a suitable level...". He is certainly right. The model performs very commendably on this engine and

propeller combination. Long-time FSM readers will have noted that over-propping is a commonly reported technique employed with convincing large-scale models.

## Exhaust

The exhaust system was designed and hand-made by Spartacus. It has a manifold which leads into a canister made from a brass tube (actually part of an old pub bar) which then has a silicone joiner to an exhaust extension, which in turn, exits in the correct scale position.

## Undercarriage

The fixed undercarriage was home-made by Spartacus. Most interestingly, it has working scale oleos that are enclosed by the scale spats. Spartacus had fine-tuned these to perfection, with just the right appearance of what I can only describe as a satisfying 'scale undulation' whilst taxiing.

## Tailwheel

The tailwheel is a copy of the real one. Even down to the fixing points and the steering assembly.

## Covering

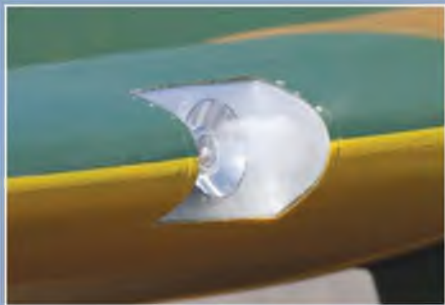
The wings, flying surfaces, and tailplane are covered in natural Solartex. This was then given two coats of dope to fill the weave slightly. The fuselage was given the good old fashioned tissue and dope treatment to give the effect of plywood used on the full-size.

## Painting

The model was painted in *Flair Spectrum Paints*, and then over-coated with *Ronseal Satin Varnish* to accurately replicate the 'flat look' of the full-size.

## Legending / Decals

All the paint masks were manufactured by Chris Peers on his brother Andrew's



Leading edge landing lights work, of course. Even the reflectors and covers are hand-moulded.



No scale detail has been overlooked.



Even the inlet wing steps are faithfully reproduced.





vinyl cutter. The scale maintenance marks were reproduced directly from those on the Duxford example.

### Scale details

The model has cockpit doors that open in the prescribed scale manner, working lights, scale split-flaps, and full wing-folding detailing. The wing footsteps were cast in resin from moulds that Chris made himself. Note that detailing runs deep: all the light lenses are moulded to the correct shape. The model has a scale cockpit interior, even down to the upholstered seats, and owner Dave Gent is adding to the inside all the time, with extra radios and military

equipment. For example, he has recently added a fire extinguisher behind the pilot.

### Radio installation

Radio is exclusively 2.4 Gig Futaba, with nine servos running on a 6 Volts supply.

### Flying notes

As a noted show pilot and keen Warbird, Chris handled all the Test Flights. According to Chris, the model flies extremely well, and handles like a big trainer.

*"However, you do have to exercise some care, because as with the full-size, the ailerons are not the most effective,*

*therefore rudder is the primary control. Due to the large wing area the model does 'float on' if appropriate care is not taken -and with full flaps into wind it just doesn't want to land!".* ■

### MODEL SPECIFICATION PERCIVAL PROCTOR

<b>Designer:</b>	Spartacus
<b>Scale:</b>	1:4
<b>Wingspan:</b>	120"
<b>Weight:</b>	35lbs
<b>Engine:</b>	ZDZ 40cc
<b>Prop:</b>	22" x 10"

**THE PROCTOR LOOKS VERY CONVINCING IN THE AIR.**







Spartacus and Chris have built a very convincing scale model.



Chris Peers reports that she is very easy to fly.



Roy Yates and his Percival Proctor Mk.IV in pristine condition - a fine example of the scale modeller's art.



# Percival Proctor Mk.IV

1:7 scale, 68" (1727mm) wingspan, for .60 cu. in. engines, designed by the late Roy Yates and also available to a scale of 1:5.5 with a wingspan of 86" (1727mm)

**T**he Percival Proctor Mk.IV evolved through their Gull, and Vega Gull, then the racing Mew Gull and finally the previous Mk. 1, 2 and 3 of the Proctor series.

Compared to these previous versions, the Mark IV, which, for a time was officially known as the Perceptor, had certain structural and aerodynamic improvements, together with a longer and deeper fuselage, with the tailplane set higher in relation to the wing. This, it was said, improved its recovery from the spin. It was probably the first wooden aeroplane to be produced using synthetic resin cement, a waterproof adhesive.

The Mk. IV was supposedly tougher and a more robust aeroplane than its direct predecessors. However, the strengthening

of the structure was accompanied by an increase in weight. Rumour has it however, that it could qualify for the acrobatic certificate current at the time, providing it has a light load.

During WW2, it was used as a wireless training and communications aeroplane in regions ranging from Scotland to the West Indies, even performing the occasional deck landing.

Power was a 208 hp De Havilland Gypsy Queen II engine, driving a constant speed airscrew. The large space in the cabin devoted to full wireless equipment in its wireless training role could make way for alternative cabin arrangements to accommodate four people. The Pilot's seat along with the front passenger were positioned well forward, affording an

excellent view over the nose and wing leading edge. This enabled the pilot to keep in view adjacent aircraft in front and below when being used for formation flying undertaken safely by pupils.

The fuselage airframe was built up on four spruce longerons, plywood sides, preformed ply bottom skin and plywood top decking over laminated spruce frames. The complete structure was fabric covered. Hinged doors allowed easy access from the and could be jettisoned by pulling down levers mounted in the roof in case of emergency. The tailplane was plywood skinned and fabric covered, while the elevators, fin and rudder were also fabric covered, over open framework.

The wing was made in three sections,





Never throw away anything - it may come in handy sometime! Long after the model was wrecked, designer Roy was able to resurrect the airframe for these cockpit photos showing the instrument panel and cockpit furniture.



A further view of the cockpit, showing the cockpit access door and the wing tread panel.



Detail of the cockpit rear windows. Note the handgrip and re-inforcement strakes.



The servo tray in the rear of the wing seat. Closed loop control runs were used on the prototype model.



Fuselage rear, showing surface panel lines and the true-scale tailwheel unit.



Three views of the fuselage rear, detailing the tailwheel unit and the tailplane. Note the closed loop rudder linkage, the elevator hinges and the dummy elevator trim tab.



the centre portion having parallel chord, plywood skinned and then fabric covered. The outer panels tapered in chord and thickness, having a wrap-around ply leading edge back to the mainspars top and bottom - and fabric covered. Wooden split trailing-edge flaps were fitted from the aileron to the side of the fuselage. These were controlled from a spring-assisted lever at the pilot's left hand, giving three positions: flaps up. Flaps 1/3rd down (for take-off) and full down.

The wide track undercarriage legs were positioned each end of the centre section, the legs being attached to the front spar by four bolts. Streamlined fairings from the underside of the wing merge into the undercarriage spars fitted to the long-travel oleo legs. Cruising speed, all-up, was 140 mph. The aircraft was completely equipped for night flying, with blind flying panel, cabin lighting, navigation lights, landing lights in each wing leading edge and downward identification lamps.

### Start with a real one

After a few enquiries I managed to locate

a Proctor Mk. IV, at the time held at West Malling. Externally, it looked airworthy, but the cabin interior was in a rather dishevelled state. The name of the person who owned it escapes me now, but he kindly allowed me access to take photographs in preparation for constructing the model.

Armed with these, and the best three-view drawing I could find, the outline of the wing, fuselage and tailplane were drawn. I decided to take a short cut, and used sheet balsa for the fuselage sides, but to simulate the original with respect to the upper and lower decking, using 0.8mm ply. To keep the cabin clear for scale detail, the radio receiver, throttle servo, battery pack and switch were housed in the nose along with the fuel tank.

The prototype modelled had a rather convenient curved pipe protruding from the rear of the lower cowling underneath the fuselage, which proved ideal to operate the switch. To keep the switch clear of exhaust fumes, it was fitted inside the nose area below the throttle servo. The fuel tank was housed in a plastic bag to prevent any fuel contamination to any

of the radio gear in the nose area. The elevator and rudder servos were mounted underneath the rear seats, output drive arms uppermost, to allow access for linkages by removing the seats. Closed loop picture wire was used to operate the rudder, with micro switches set either side of the servo to operate the electric brakes. (More later).

The elevators were operated by the conventional push rod to a forward angled metal horn, which was silver soldered to the piano wire connected elevators. The servo mounts were hardwood across the fuselage, glued to the wing retaining blocks and cabin floor, making an integral and strong assembly. The doors were built inset to ensure that they had clearance to open and close. The side windows in the doors and the fuselage were made to slide open which will dictate the thickness of ply laminations used during construction.

An attempt to make the doors jettisonable rather fell short of scale detail, due to the complex nature of the mechanism. Nevertheless they were made to jettison by pulling the continuous hinge pin upwards. Whether or not it





Wheel trouser removed here to reveal the main undercarriage leg.



Rear of wing seat, showing the attachment for the wing.



Wing underside trailing edge showing the split-type flap and reproduction of the flap internal structure.

gained the model extra scale points is questionable. At that time a scale factor was in operation in World Class competition, which, as a percentage, was applied to the best flight score. It was important then to obtain the highest static score one possibly could. Of course it still is today, but no longer affects the flight score.

## Wing

The wing construction is conventional. At the time, I was torn between 0.8mm ply or

balsa skinning, but finally decided on balsa. The aileron operating linkage was contained inside the wing to simulate the prototype. The adjusting link being accessible although a little difficult.

Split flaps were made from aluminium sheet rather than ply as the full size. The reason being that I found ply unreliable when applying finishing materials. It would warp and prevent the flaps closing neatly so as to be flush with the underside of the trailing edge. The rib sections that are exposed when the flaps are extended were faced with 0.8mm ply, made to simulate prototype construction.

The undercarriage followed the prototype, having an oleo action. The upper portion was machined from 1/2" (13mm) square Dural, while the moving leg was fabricated from steel bar and the U-shaped wheel support from 16 swg steel sheet, silver soldered to the bar end spigot.

Axle bosses were spigot located and silver soldered into the steel 'U' suitably dimensioned to retain the electric brake and wheel assembly in the correct position. The complete oleo leg

assembly was Araldite epoxy glued and clamped by a recessed screw fixing dural plate to the main spar. Suitably blocked to place the leg in the right position. The upper leg wheel fairings were made from thin gauge aluminium sheet (litho plate - available from Nexus Modelling Supplies) and the spats (front and rear portions) made in fibreglass.

These were fitted to the U wheel carrier with 12 BA countersunk headed screws, six positions each side of the U, three holding the front portion and three the rear. Initially, both electric brakes were set up to come on when full up elevator was applied. What I didn't realise until the maiden flight attempt, was that due to the wheel/ground contact being close to the model's balance point, full up elevator was required during taxiing and the initial take off run, primarily to keep the castering tail wheel firmly on the ground during the taxi manoeuvre and more importantly to prevent the model tipping onto its nose when the throttle was opened for take off.

This was immediately modified so the brakes operated when full rudder was applied. The port brake on with left and the starboard brake on with right rudder, following the method used on the prototype. Special aluminium hubs were made to cater for the wheel brake drums replacing the Dubro hubs. The tyre treads were cut in by hand, which was quite a laborious process.

The wing is also of conventional construction. It can be made in three separate sections leaving the sheeting until the panels are joined or one piece whichever the builder prefers.

The outer wing panels have six degrees dihedral with little or no tip washout. My model had very little or no washout and had no tip stalling problem. Before sheeting, holes need to be made in the leading edge of the centre section to allow fixing of the undercarriage upper legs. Should the builder want to include brakes, then the wiring or mechanism will need to be considered before sheeting is attempted. The only adjustment for the flap linkage was at the servo end on my model so this also needed to be set up properly beforehand. The prototype had folding outer panel sections which I never planned for other than simulating the appearance, so the matter of how to set up the flap linkage, should these be included, was never considered. If any reader is adventurous enough to attempt this feature, I would be interested to know how they overcome the problem.

## Tail end

The tailplane, fin and rudder are also of conventional construction, except that the stab. was made from laminated balsa sheet. I thought that this would give as good an appearance as a built-up framework that needed to be covered with sheet to simulate the prototype's ply covered finish. The hinge position for both the rudder and elevators is the centre point of the rounded leading edges. Special hinges were made for these control surfaces as there were not any commercially available at the time.

## Surface preparation

The whole model was given three coats of sanding sealer, rubbed down after each



At 1/7th scale the Proctor model prototype was not large, but is ideal for a .60 size engine. Electric power would be a very nice option.



# PERCIVAL PROCTOR

Full size copies of this TWO SHEET plan for the Percival Proctor in either 1:7 or 1:5.5 scales are available from Flying Scale Models Plans Service, ADH Publishing, Doolittle Mill, Doolittle Lane, Totternhoe, Bedfordshire, LU6 1QX.  
Tel 01525 222573  
[enquiries@adhpublishing.com](mailto:enquiries@adhpublishing.com)  
1/7th Price £16.95 (Plan FSM 152)  
1:5.5 scale £24.50 (Plan FSM 151) plus p&p  
(U.K. £2.50; Europe £4.00;  
Rest or World £6.00.

coat. The fuselage and stab were then covered with heavyweight tissue, with additional coats of sanding sealer and rubbing down.

Wing, elevators, fin and rudder were covered with nylon, and then doped. K & B Epoxy was used for colour and decor. The dark green, dark earth and trainer yellow were mixed using basic colours to match the fabric colour samples which I managed to acquire and which were added to my documentation folder. The camouflage was sprayed on painstakingly, using thick drawing paper patterns which were held off the surfaces with balsa distance pieces, in order to obtain a soft blend between the green and earth. The decor was applied by hand using either stencil masks, sellotape or pen compass and the small lettering (airframe parts identification) using Letraset.

## Custom muffler

The engine muffler was fabricated from aluminium sheet, made to fit inside the aluminium cowl with the exhaust outlet to simulate the prototype. Where the cowling sides closed over the engine firewall, a soft rubber strip was glued to the ply edge to prevent ingress of oily exhaust and fuel into the nose compartment.

## On finals

The model was flown in competition as a non-aerobatic aircraft. It had only two vices, if you could call them such. As mentioned earlier, a tendency to tip nose down when the power was applied too rapidly on take off and an unwillingness to enter a spin and, particularly, to recover from it.

Outside of competition, it could be as aerobatic as the flyer was able to make it. On the whole, it was a very pleasing model to fly and to my way of thinking, looked great on a low slow fly-by with flaps fully extended. I had a great deal of enjoyment flying it and not to be too boastful, a lot of success in competition. ■

# OUT PARTS SET FOR THE PERCIVAL PROCTOR

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

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

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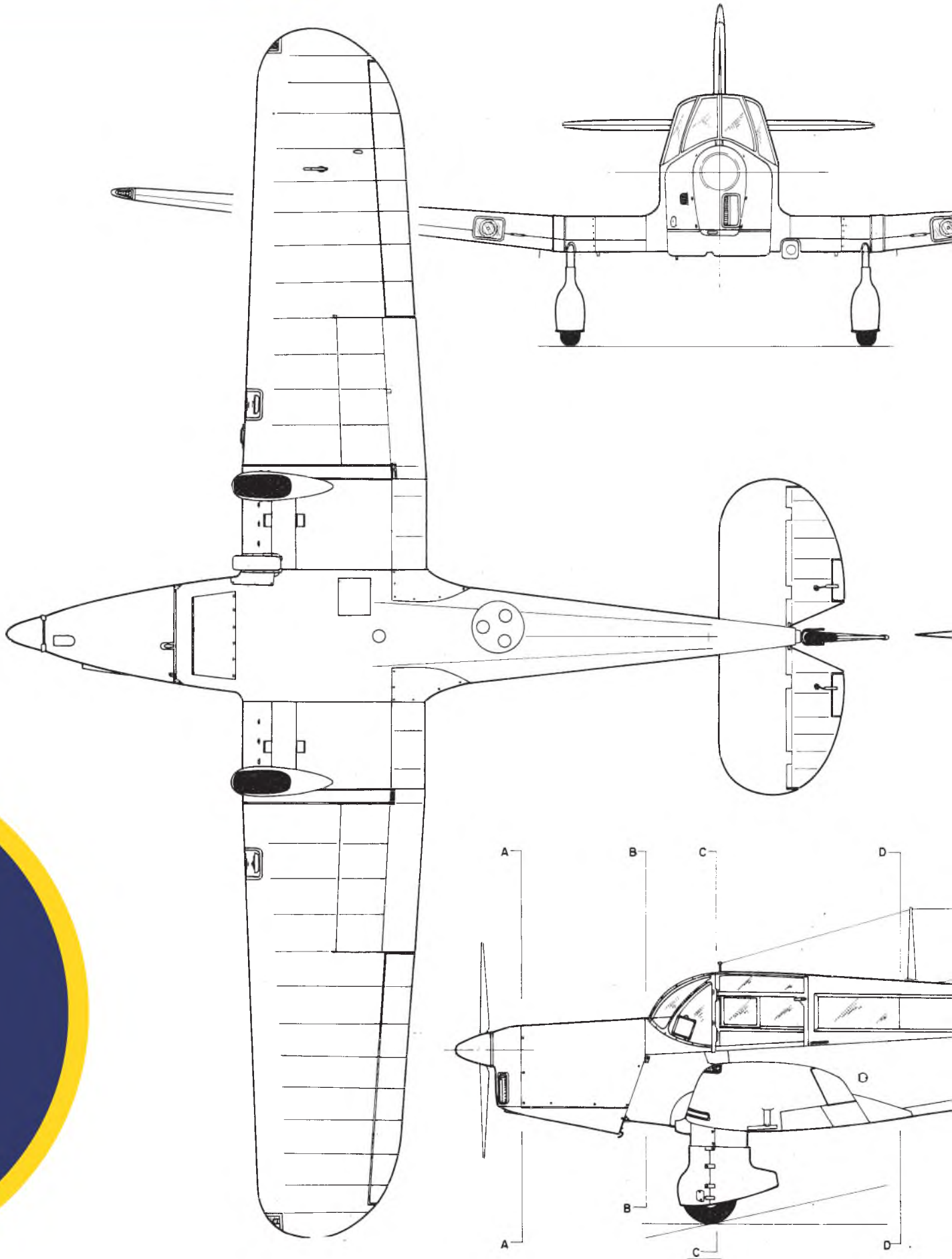
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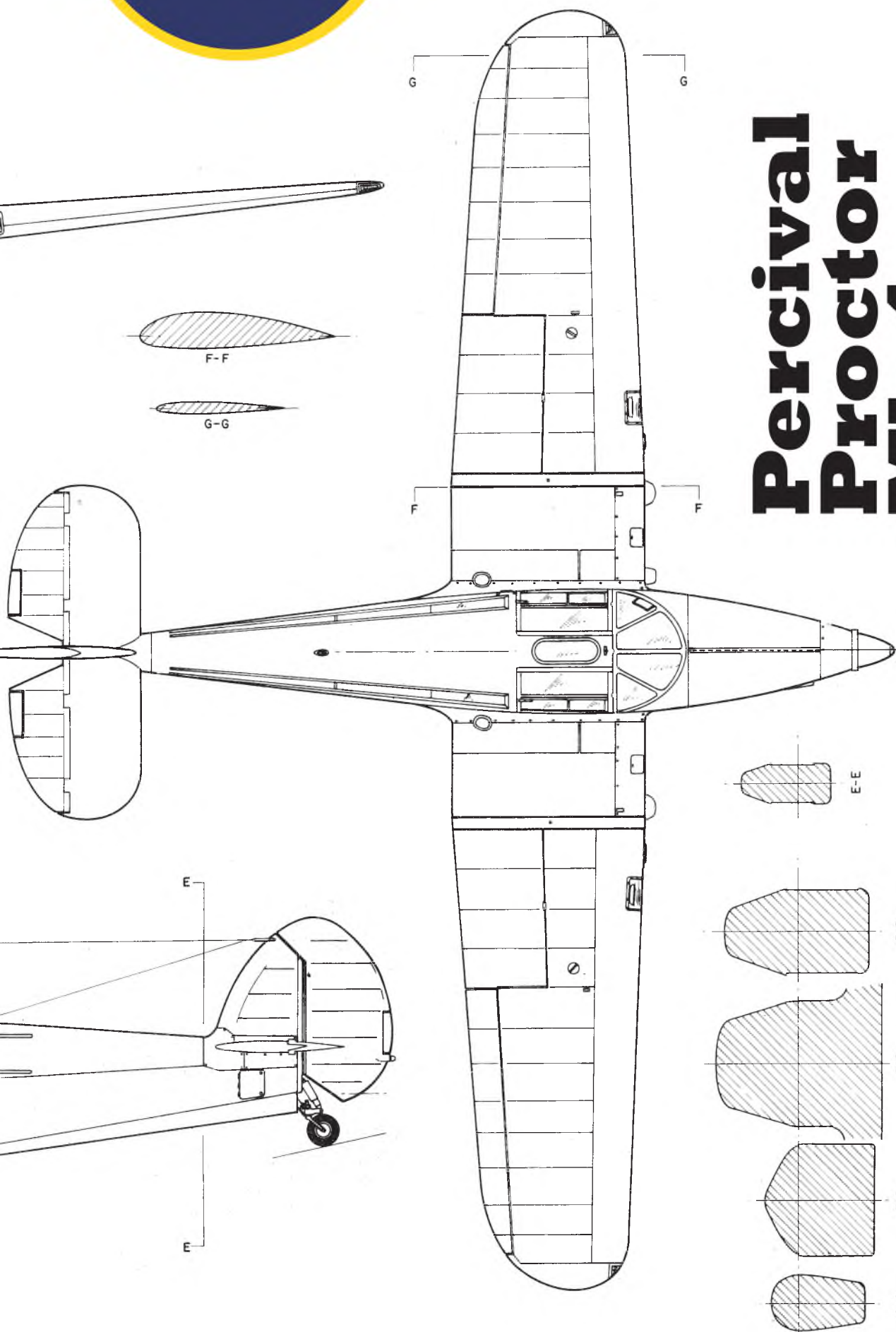






# Percival Proctor Mk.4

SCALE 1:50

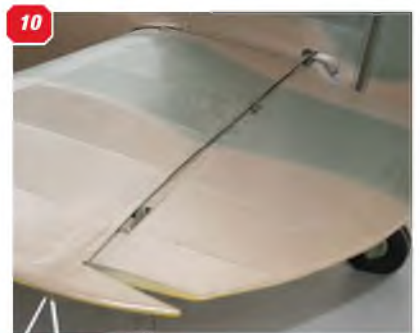




# Percival Proctor







1 & 2: Two views of the folded wing configuration, also revealing the cabin access tread steps. The Split type flaps hinge flush with the lower wing surface.  
 3: Detail of the cuffed hinge line on the fin/rudder and elevator/tailplane.  
 4: Cabin window detail.  
 5 & 6: two views of the tailwheel unit.  
 7: Detail of the elevator panel centre-joiner that runs through the rudder.  
 8: Rudder aerodynamic balance.  
 9: Spring tensioner that secures the radio aerial to the fin leading edge.  
 10: Further detail of the cuffed tailplane/elevator hinge line.

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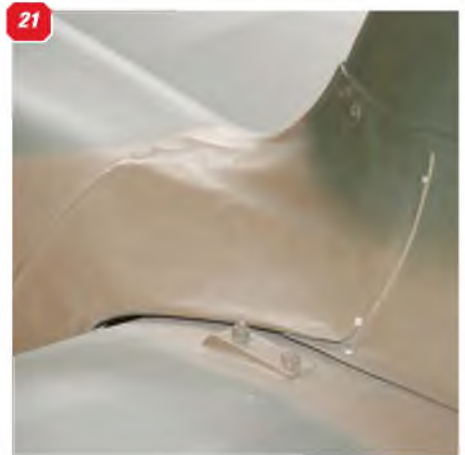
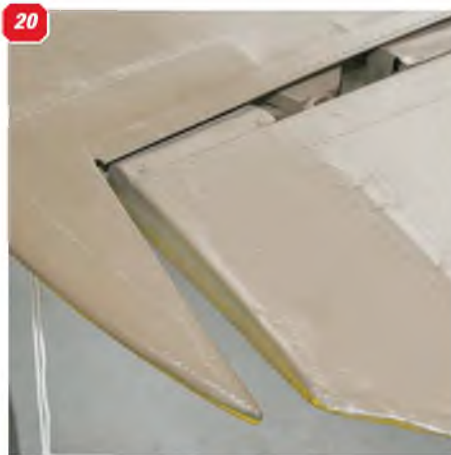
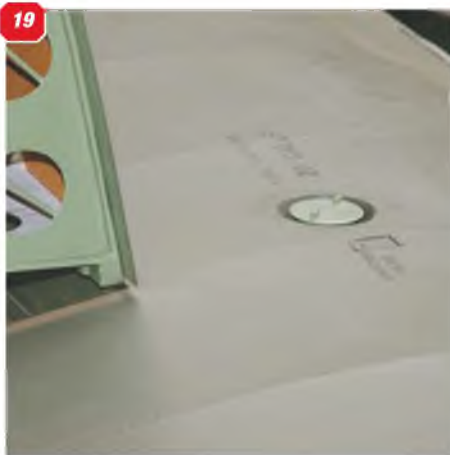




11: Another view of the folded wing, also showing the wing-to-fuselage fairing.  
 12: Close-up of the tail light mounted on the rudder.  
 13: close-up detail of the wing component that folds into the vertical position to facilitate the wing fold.  
 14: View forward over the cockpit/cabin.  
 15: Navigation light at the wing tip leading edge.  
 16: Further view of the tailcone.  
 17: Landing light in the wing leading edge.  
 18: Tailplane root and the cuff panel that fairs over the tailplane mounting.







19: Detail of the fuel tank filler cap on the wing upper surface. 20: Tailplane hinge-line detail showing the slotted hinge position. 21: Further view of the fin/airplane fairing. 22: Cockpit window frame detail. Note the access door latch handle. 23: Right side of the cabin/cockpit showing the line of the access door.



24: View of the elevator centre, where it runs through the fin. 25: Panel detail on the side of the rear fuselage. 26: Close-loop control cable and rudder horn. Also showing lower tailwheel unit mounting bracket. 27: Panel and stencilling detail ahead of the rudder post. 28: Detail of the complete tailwheel unit.



# PERCIVAL PROVOST

The last of the RAF's piston engine trainers





## TIGHT AND VERY TIDY!

Provosts of the RAF Central Flying School Aerobatics Team 'The Sparrows', in 1957.

The Provost was the product of British Air Ministry specification T.16/48 issued in 1948, for a basic trainer required as a replacement of the Percival Prentice. The other 'initial' RAF training aircraft of the period was the DHC-1 Chipmunk, usually referred to as a 'primary' trainer type which tends to infer that the Provost was one step further on in the training stages for RAF pilots. Certainly, the Provost had a substantially more powerful engine.

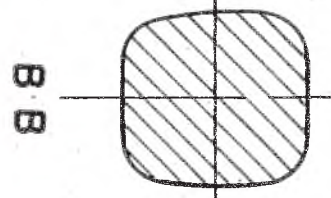
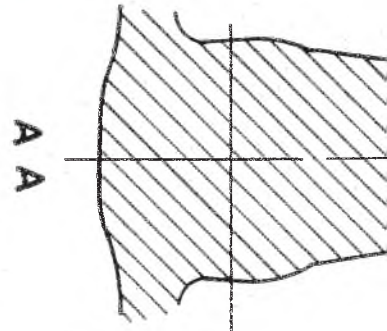
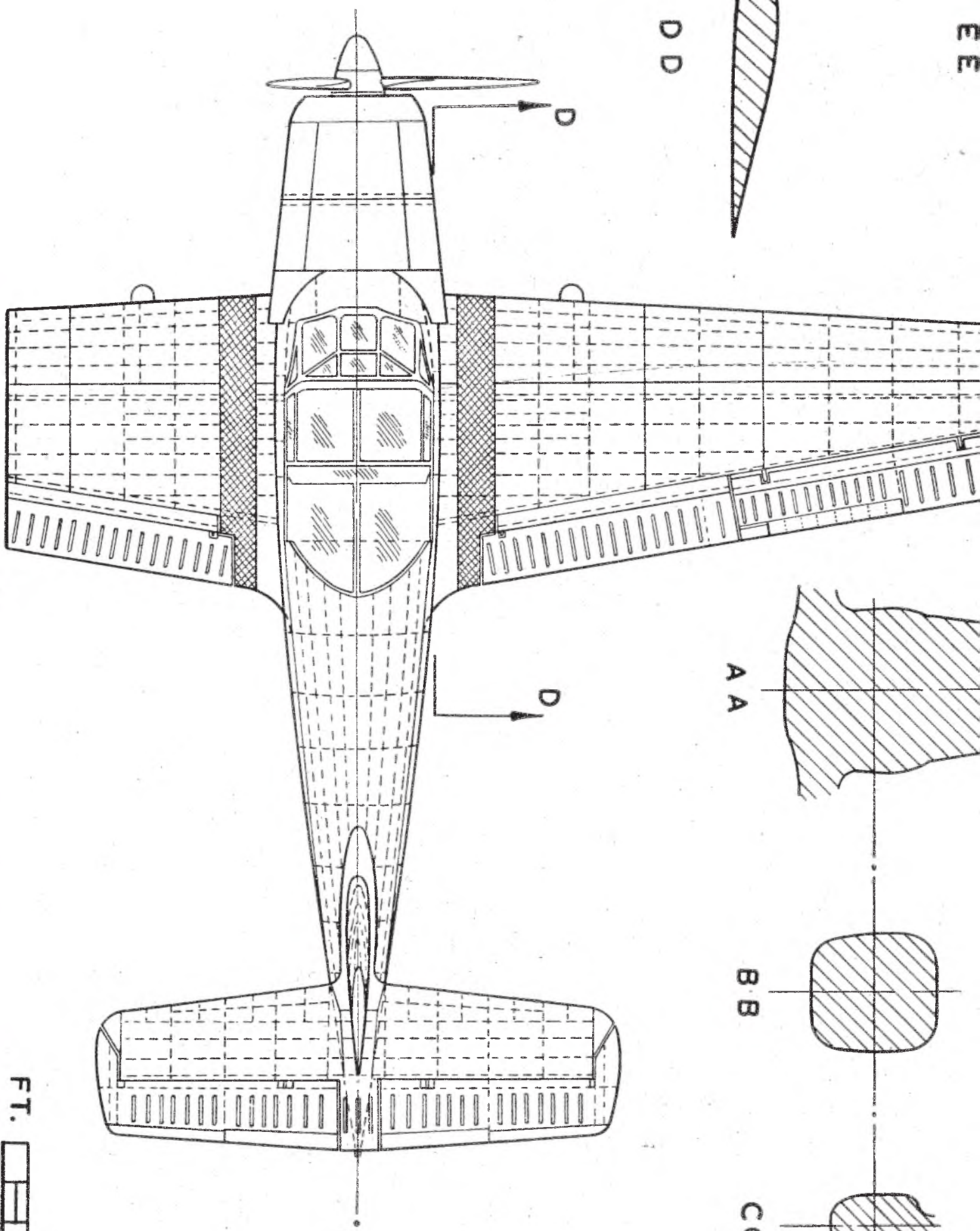
The first prototype, WE 522, was powered by a 420 h.p. Armstrong Siddeley Cheetah 18 engine and sported such anti-spinning

features as an extended fin and tail parachute housing between the elevators. WE 530, the second prototype also had the Cheetah engine, as it was expected that the existing large stocks of these engines that powered such other RAF types as the twin-engine Avro Anson, would provide the production power unit. However, the third prototype Provost was fitted with the 550 h.p. Alvis Leonides 25 nine-cylinder radial engine and so became the P.56, Mark II. This machine bore the experimental registration G-23-1 and the thrust line was raised by nearly four inches. The Leonides engine provided

greatly increased performance over the lower-powered and slightly lighter Cheetah prototypes, and so the Provosts to be built for RAF Flying Training Command received the neatly cowled Alvis engine.

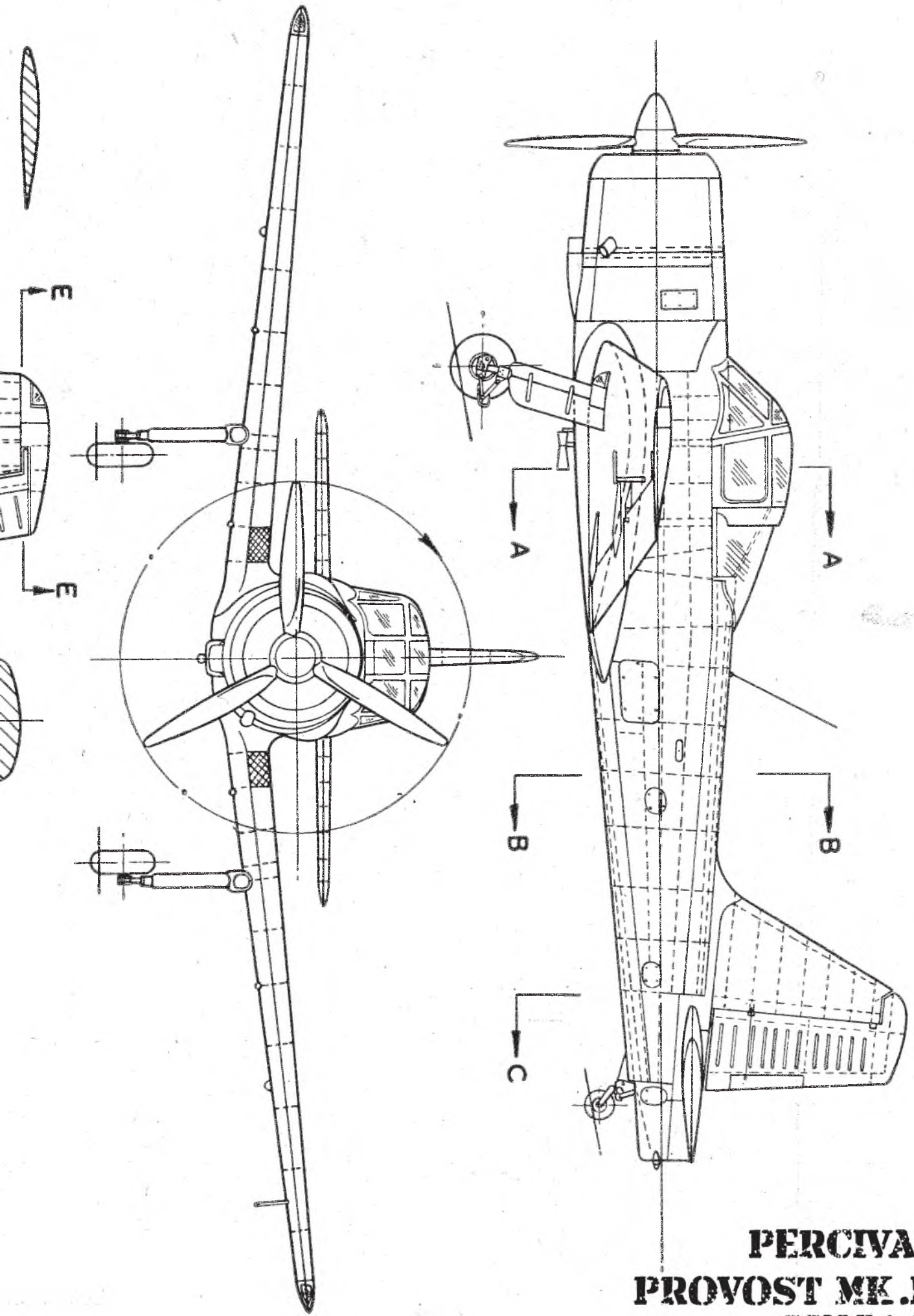
Although of conventional light alloy construction, the P.56 design was notable for the attention given to the needs of easy maintenance. All main attachment fittings were simple and easily accessible with large doors to facilitate servicing of batteries, radio, pneumatic system, etc. which ideally suited those days of short term National Service, during a time



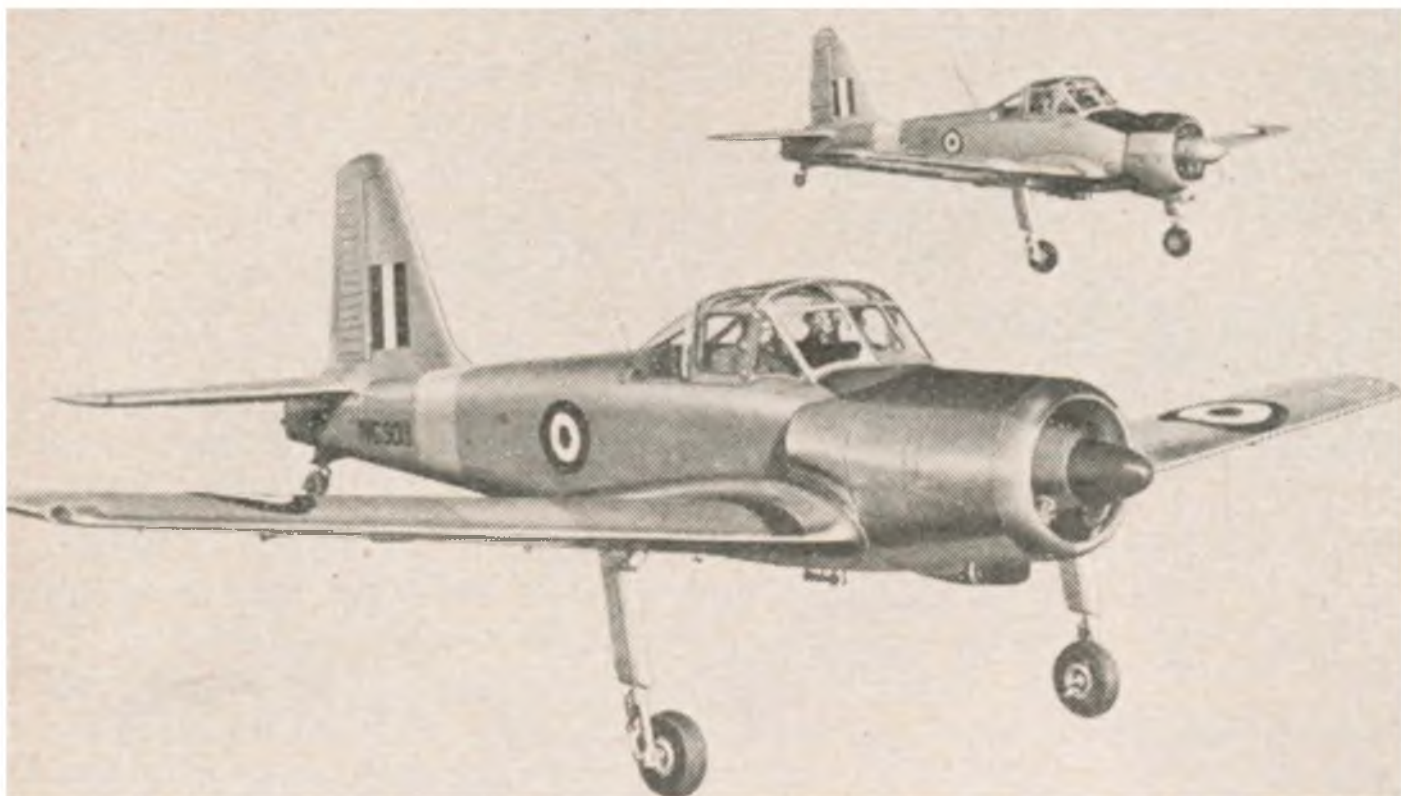


FT. 





**PERCIVAL  
PROVOST MK.II  
SCALE 1:40**



### CHEETAH AND LEONIDES.

One of the first two Provost prototypes (at rear) with Armstrong Siddeley Cheetah engine, in formation with Alvis Leonides engined example.

when a bare minimum of ground equipment and tools in the hands of semi-skilled tradesmen was all that was necessary to ensure a high rate of serviceability.

One of the more unusual features of the Provost was the side-by-side seat for Pupil and instructor, with duplicated controls and instruments when most training aircraft, both then and now, adopt a tandem seating arrangement.

The Provost entered service with the RAF in 1953 with the first batch of aircraft delivered to the Central Flying School (CFS) at RAF South Cerney. The CFS carried out intensive flight trials in May and June 1953 before instructor training commenced. The Provost was more capable than the Prentice it replaced which allowed student pilot to move straight on to the De Havilland Vampire after training on the Provost.

## SPECIFICATION

<b>Wingspan:</b>	35 ft, 2 ins
<b>Length:</b>	29 ft.
<b>Max Speed:</b>	200 m.p.h., at 2,500 ft.
<b>Maximum Cruising Speed:</b>	186 m.p.h.- at 7,000 ft

The aircraft served with the RAF until the early 1960s, when it was replaced by the Jet Provost, when the RAF moved to an



Ex-RAF, privately operated example G-MOOS of the production Provost photographed at Cranfield, Bedfordshire, in 2006.





all-jet pilot training program. A few Provosts continued in service during the 1960s with the Central Navigation & Control School (later Central Air Traffic Control School) until the last example was retired in 1969.

### Have guns - will travel

The first export order was placed in May 1953 by Southern Rhodesia for four T.1 aircraft, which were, designated the T.51. Later the Royal Rhodesian Air Force followed with an order for twelve armed trainers designated the T.52, which were delivered in 1955.

In 1954 the Irish Air Corps ordered four T.51 aircraft and in 1960 a further order for six armed T.53 variants. The Burmese Air Force also ordered 12 armed T.53 variants in 1954 and eventually operated 40 aircraft.

In May 1957 the newly formed Sudan Air Force ordered four T.53 armed variant,



two were lost in accidents shortly after delivery, a further three were bought in 1959 followed by five former RAF aircraft.

Former RAF aircraft were delivered to Royal Air Force of Oman as armed T.52 variants. In 1955 the Royal Iraqi Air Force ordered 15 armed Provost T.53s with the

first delivered in May 1955. The final export customer was the Royal Malaysian Air Force who obtained 24 T.51 trainers between 1961 and 1968.

In 1968 Rhodesia obtained further aircraft using a convoluted route to get around an arms embargo. ■

**BELOW: The third prototype Provost substituted the Alvis Leonidies 25 nine cylinder radia engine in place of the Armstrong Siddeley Cheetah, and this became the production configuration for the type.**



# PERCIVAL PROVOST

G-MOOS is a finely preserved ex-RAF example fully representative of the Provost as it was during its service life.



1: Cockpit canopy and frame viewed from left hand side. Note the emergency cockpit release handle and mixture of dome head and flush revets along surface panel lines.

2 & 3: Two views of the cockpit canopy viewed from the right hand side, showing the windscreen wiper and the shape of the fuselage-to-cockpit frame fairing. The air scoop is on the right hand side only.

4: View of cockpit canopy from the rear, showing the guide channel for the sliding canopy.





5: Engine cowl housing the Alvis Leonides engine. 6: Large centrally positioned air scoop in the cowling underside. 7: Exhaust, left side, ahead of wing leading edge roof.



8: Grip handle on fuselage side at cockpit position. 9: View of the engine cowling from the rear, showing the air outlet and the wing root fairing. 10: The tall fin and rudder. Note the cuffed rudder-to-fin hinge line and trim tab. 11: Detail of the elevator, showing the external trim tab linkage. 12: Tailplane flap, showing the line of the aerodynamic balance.





13: Wing root showing the pressed metal fairing and the cockpit access tread patch. 14: Aileron hinge. 15: Wing underside, showing the main drive and trim tab linkages. 16: Leading edge spoiler, right hand wing. 17: Tailwheel.

18 & 19: Two views of the main undercarriage fairing and axle drag link.  
  
20: Fairing at the top of the main undercarriage leg that houses the landing light, both left and right undercarriage legs.  
  
21: Close-up of the main undercarriage wheel and the axle.  
  
22: Main undercarriage wheel viewed from the opposite side  
  
23: Extreme fuselage rear, showing the rear navigation light.  
  
24: Aerial cable mounted on rear fuselage underside.  
  
25: Whip type radio aerial located on the fuselage upper surface, behind the cockpit.





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On Silent Wings by Chris Williams

# SCALE SOARING

**B**y the time this, the second of the *Ghost Squadron's* eagerly anticipated events at Middle Wallop, came around, the summer was well and truly established. Wind and rain were the order of the day, the former being the most prominent on the first day. (The forecasters had promised dry!). With the wind gusting to 30mph+ and only occasional breaks in the rain, optimism was well and truly dead, enthusiasm out for the count, and only a bloody-minded stubbornness left to carry on the fight!

Dave Horten was the first to display his defiance, flying his lightweight Seagull Models K8, enduring much mickey-taking in the process. It was only the next day that I discovered he had had an accident to one of his hands, which was encased in medical swaddling, and he was forced to use the palm of that hand to move the elevator stick. To Dave goes the

Williams' Award for Windy Valour. Brian Sharp, having travelled all the way down from Scotland, was not going to put off by conditions that might cause dismay amongst us soft southerners. He first flew his Slingsby Type 59 Kestrel with great panache until a particularly evil gust caused mayhem during the launch process. The Kestrel rolled ninety degrees to the left and headed straight for the ground. As he described afterwards: *'I kept thinking hang on, I'm going to get away with it, no I'm not, yes I am...'* The upshot was that he didn't release, the Kestrel hit the ground at a right angle to the flight direction, shed its canopy along with an undercarriage door, found itself dragged straight by the power of the tug and took to the sky with a severe draught blowing up the pilot's trousers. (Both pilots actually, the one in the air and the one on the ground). Upon landing, the canopy was re-fitted, and the Kestrel went on to perform in more orderly fashion.

Encouraged by this lunacy, Simon Warrans flew his very nice-looking Salto. During the proceedings, both pilots were dealt a nasty meteorological blow in the form of some sneaky low lying cloud that nipped in and enshrouded both models in turn in their clammy embrace. Whilst anxious eyes scanned the grey murkiness that is now Britain's normal summer sky, the models were each time spat out way downwind, to be re-claimed by their relieved owners. (That was enough for Simon, he retired with gratitude)

On the basis that the honour of England (as opposed to the other parts of our collective island home) was at stake, yours truly decided to enter the fray with his 1/3rd scale Rhonsperber. This is a 1930s vintage glider, more at home in sunny skies and light winds, but a man's got to do what a man's got to do. At this stage we decided to do the accounts. Brian reckoned it had cost him £100 in

Brian Sharp's Kestrel in dire straights (note towline at right-angles to fuselage).







Amazingly, the Kestrel recovered, to land safely afterwards.



The Salto, released from the cloud, lands safely.



Author's Rhonsperber catches a gust whilst landing (Geoff Crew pic).

expenses to attend the meeting, and by the completion of his second flight, it worked out at £50 a flight. (Well, you know what they say about Scotsmen). I reckoned it had cost me a fiver, so by the time of my second flight I was down to two-pounds-fifty-per. Feeling that honour was satisfied, I retired and left him to it, whittling the cost down flight by flight.

Also flown on the day was Antonia Gigg's new DG 303. Antonia is one of those technically proficient people who

expose the enormous gaps in the knowledge of us mere mortals, and we had been following her adventures with this kit, which had arrived with one wing critically out of true. Where the rest of us would have thrown up our hands and reached for the phone, she set to and effected a repair. In true Antonia fashion, this glider is fitted out with exquisite goodies, including a wheel brake this time, and sensibly, she entrusted the maiden flight to event organiser and

Aeronautical Energiser Bunny John Greenfield. All went well, and John was also able to fly his new Greenley tug after the demise of his earlier version at an previous event in the season. (Given the strength of the wind, he was able to treat us to a fine display of backward flying, thus demonstrating the model's docile flying qualities). That was the first day, then, what had those perfidious forecasters promised us for the morrow? Well, a lot less wind, so one out of two



Sheer dedication! Antonia Gigg displays her new DG303 in spite of the conditions.



Ian Davis' 1/4 scale Olympia 2B at Middle Wallop.



**Andy Schafer's Swift with the wing tapes furlled.**

couldn't be bad.

Sunday dawned, as promised, with much lighter winds, which came with a side order of rain - not so much as to cause the abandonment of the event you understand and it was just possible to fly, but enough rain to cause maximum annoyance to those upon whom it fell. The air, however, was smooth and speckled with thermals, and just after lunch, the rain finally stopped and conditions became as close as you can get to perfect. On a personal note, I was able to explore the envelope of my new 1/4 scale electric motorglider, the ASK 11 and was further gratified to see a total of three examples of my recently published Scheibe-Loravia Topaze design. (This is the French-licensed version of the Scheibe SF27)

Late in the day, Andy Shafer brought out

his magnificent large-scale Swift aerobic glider, fitted out with canisters on the wingtips containing not pyrotechnics but furlled up banners. Although much easier to see in flight, they are a bit of a pain in the neck to fold up again, and it was noticeable that there was a dearth of volunteers when it came to folding up time.

On the face of it, the weekend was completely trashed by the weather, the forecasters putting off many people who would otherwise have attended. It just goes to show though, that with the right attitude copious amounts of enjoyment can be had for those who stay the course. Thanks to John Greenfield and the Ghost Squadron, and the ever-reliable tug pilots, for sticking with it and making the weekend so memorable. We can only hope for more clement weather when

the next event rolls around...

**Project conclusion**

As previously mentioned, once the Rhoadler project had been safely put to bed, up popped the ASK 11 motorglider, just begging to be built. I first saw the three-view on the Scale Soaring UK forum and discovered that this was a one-off aeroplane, soon to be eclipsed by the more successful ASK14. Looking at the few photographs that were available, I found one showing her with outrigger wheels under the wings (unlike the K14) and a reasonably attractive colour scheme. The full size is only 13 meters in span, so at 1/4 scale would only be 3.2 metres.

As a newbie to electric flight, I have already learned that the cost of the whirring stuff increases exponentially to the model's size, but I reckoned it could



**Author's new 1/4 scale Electric ASK 11 at Middle Wallop (Barry Cole pic).**



**One of three Scheibe-Loravia Topazes at the MW event.**





The ASK 11 construction begins.



The deep fairing for the fixed monowheel.



The K11 airframe.

still be kept to a modest level for the K11. So, with the freshly acquired motor in my hot little hand, the model was designed around it, using a CAD programme. The fuselage, being mostly slab-sided, it was a pleasure indeed to go back to a bit of old-fashioned aeromodelling, and the beast soon started to take shape. (Being retired now speeds these things up considerably!) One new twist in the design for me was the use of tiny 8 & 10mm magnets to retain the cowl and the hatch. (Google Spider Magnets). Two of each hold the cowl on, and it also locates on two pegs. The canopy/hatch has a peg at the front and two magnets at the rear. In service, this has worked out extremely well, and the convenience of the arrangement cannot be over-emphasised.

The finished model ended up with an AUV of around 8lbs, pretty modest for a

1/4 scale model. The only question left to answer was whether or not the power train was going to be sufficient to the needs thereof. The maiden flight took place at Cashmoor, home of the Wimborne MAC, and it seemed that the available power matched the model size for a nice scale flight speed. (A little push at the beginning of the take-off run is helpful, though) The model itself seems very light on the controls and responsive to control inputs, making thermal turning a simple task. The stall is practically non-existent, despite there being no washout

in the wings, and the spoilers are very effective. If, like me, you have a local slope that allows the limited use of electric flight, then a model like this is a life-saver on those days when the wind dies away and the lift becomes light and patchy. This is the third electric model I have built, and I'm more than impressed with the expansion of flying opportunities these machines give me: with a bit of luck and a following wind, it won't be the last...



[c\\_williams30@sky.com](mailto:c_williams30@sky.com)



The ASK 11 on its maiden flight.

**(For those who like the details when it comes to electrics, here are the stats:**

<b>Wing Span:</b>	3.21m
<b>Scale:</b>	1/4
<b>Weight:</b>	8-9lbs
<b>Wing Section:</b>	HQ35/14 root, 35/12 top No washout.
<b>Motor:</b>	E-Power BL4030 385KV Brushless Outrunner Motor
<b>ESC:</b>	Hobbywing Pentium/flyfun 60Amp OPTO
<b>Battery:</b>	Gens Ace 2200mah or 3300 55C 5S Lipo Batteries
<b>Rx battery:</b>	2200 4.8v Eneloop
<b>Prop:</b>	13/11 folding)

# PLANS AND PARTS

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

## Cliff Charlesworth Scale Gliders



### ASK 16 Motor Glider

A 1:3.5 scale replica with a wingspan of 179.9" (4570mm). Suits 1.20-1.80 cu.in. motors. Four sheet plan.

**Plan:** £32.50  
**Cut Parts:** £130.00

PLAN268

## Cliff Charlesworth Scale Gliders



### ASK-13

1/4 scale 147.6" (3750mm) span replica of the most popular club two-seater glider and trainer in Europe, with a first class performance. Plans on two large sheets.

**Plan:** £24.50  
**Cut Parts:** £135.00

PLAN4

## Cliff Charlesworth Scale Gliders



### DFS Reiher II

1/4 scale replica of the famous pre-WW2 vintage gull-wing German sailplane. This is one for the enthusiast who loves building. Three large sheet plan.

**Plan:** £28.50  
**Cut Parts:** £135.00

PLAN158

## Cliff Charlesworth Scale Gliders



### ASK-18

1/4 scale 157.5" (4000mm) span replica of one of the best and most elegant pre-glass fibre era club single-seater sailplanes. A great flier. Two sheet plans.

**Plan:** £24.50  
**Cut Parts:** £130.00

PLAN6

## Cliff Charlesworth Scale Gliders



### Grunau Baby

1/4 scale superb example of the machine which is the epitome of pre-WW2 vintage open cockpit gliders. 133.5" (3390mm) wingspan. Two sheet plan.

**Plan:** £24.50  
**Cut Parts:** £125.00

PLAN83

## Cliff Charlesworth Scale Gliders



### Hutter H-17

1/3 scale 129.9" (3300mm) span replica of a lovely vintage scale 'floater'. Light, yet tough. Two sheet plan.

**Plan:** £22.50  
**Cut Parts:** £130.00

PLAN81

HOW TO ORDER: [www.adhpublishing.com/shop](http://www.adhpublishing.com/shop)



## WHAT DO THE CUT-PARTS SETS CONTAIN?

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

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**PLANS POSTAGE:** UK: £2.50, EUROPE: £4.00, WORLD £6.00

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### Cliff Charlesworth Scale Gliders



#### Kaiser Ka6E

1/4 scale 147.5" (3750mm) wingspan model of an elegant high performance sailplane. Two large sheet plan.

**Plan:** £24.50  
**Cut Parts:** £125.00

**PLAN220**

### Cliff Charlesworth Scale Gliders



#### Kaiser Ka-7

1/4 scale 157.5" (4000mm) wingspan model of the famous German two-seater glider. Performance is superb and simulates the full size very nicely. Plans on two large sheets.

**Plan:** £24.50  
**Cut Parts:** £125.00

**PLAN101**

### Cliff Charlesworth Scale Gliders



#### Kaiser Ka-8

1/4 scale 147.6" (3750mm) wingspan Class 1 scale model of the most popular Club glider. Very docile and a joy to fly. Two large sheet plans.

**Plan:** £24.50  
**Cut Parts:** £125.00

**PLAN98**

### Cliff Charlesworth Scale Gliders



#### MU13-D3

1/4 scale 157.5" (4000mm) span, super lightweight model of the famous German Soarer. Three sheet plan.

**Plan:** £26.50  
**Cut Parts:** £125.00

**PLAN125**

### Cliff Charlesworth Scale Gliders



#### Lo 100

1/4 scale 98.4" (2500mm) span model of a famous aerobatic sailplane. Two sheet plan.

**Plan:** £22.50  
**Cut Parts:** £125.00

**PLAN217**

### Cliff Charlesworth Scale Gliders



#### Olympia 2B (DFS Meiser)

1/4 scale 147.6" (3750mm) span of a really lovely soarer of the pre-glass fibre 'hotship' era. Two large sheet plans.

**Plan:** £22.50  
**Cut Parts:** £145.00

**PLAN139**

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# Surviving Free-flight

## Part 4: Looks at covering and finishing

### Hiding all the misakes

So you have now completed all the woodwork on your masterpiece. It does not matter if you have made a 'pigs ear' of the construction, since scale modelling is all about the external appearance of your creation and its authenticity. However, a poorly built model may not stand up to the rigors of a long flying career, or hold its trim as well as its better-made brother.

### Surface preparation

All surfaces that contact the covering should be sanded smooth, removing all bumps, dings and glue blobs (that should move the CG forward!). These surfaces are now given one or two coats of non-shrinking dope, in which some talcum powder has been mixed, and sanded down between coats. On sheeted areas, several coats may be required to give a

smooth, ply or metal-like finish. You must be constantly aware that weight kills performance and models - so give it one more careful sanding.

### Covering material

Today we have a very wide range of covering materials from which to choose. Unfortunately, only the traditional methods give us the structural strength we require, combined with low weight, to withstand the inevitable arrivals. Modern film-type covering materials are very strong and puncture proof, but they do not impart much torsional rigidity to thin undercambered wings at the small scales to which we build these models. One way around this problem is to incorporate composite construction techniques, as used by the free flight duration flyers, but this is hardly suitable for beginners. On the models I have seen covered in lightweight

iron-on films, I am still waiting to be impressed, the majority suffering from 'hot day, slack covering, blues'.

### Putting the clothes on

By far the simplest covering method I have found, being nearly fool proof and giving the beginner a satisfactory finish, is the age-old heavyweight modelspan tissue, and plenty of dope. I use the plain white heavy tissue, which is very cheap and easy to apply. To attach the covering to the framework, I use slightly thinned PVA wood glue or dope. This tissue will cover compound curves easily if slightly dampened prior to application and, being thick and hairy, the tissue can cover all manner of ills and make a good finish possible. A light spray of warm water will shrink the tissue tight.

When covering undercamber wings, pay particular attention to sticking down the

**Mike Smith's Nat's winning Martyinsyde Elephant bears all the types of surfaces to be reproduced - metal and ply panelling, fabric covering and natural polished wood - it has just the right level of detail and weathering, too.**





# Scale

by Andrew Hewitt

tissue to each rib underside. The only problem with heavyweight tissue is its great thirst for dope - to reduce this, you can watershrink using thin wallpaper paste, which will help reduce the porosity. To dope the tissue, I use banana oil or none-shrinking dope, to which has been added a teaspoon of castor oil, which prevents the dope becoming brittle and adds some toughness to the finished surface. It may take four or five coats of dope to fill the tissue to make it airtight, sanding between coats to remove all the hairy spiders - I sand using wire wool ... carefully!

## Durable finish

If you want a more durable finish, by far the best is achieved using light silk on top of lightweight tissue. The silk gives a fantastic representation of doped linen and the two-ply skin gives a very tough, light finish. The only problem is the added chore of covering twice. Firstly cover with the tissue, shrink with water and then one coat of non-shrinking dope.

To cover with silk, first mix up some wallpaper paste, iron a panel of silk smooth, lay the silk on the structure and paint through the silk with the paste, trimming the edges with very sharp scissors. This is quite easy to master. Once dry, the silk is drum tight and ready for topcoats of dope, sanding off any stray hairs as you go. I have also applied nylon this way and saved a heap of weight, since far less dope is required to fill the weave.



Even small models can be enhanced with the application of a scale finish. Here is a rubber-powered Ryan NYP, showing the 'turned aluminium' cowling panels - so distinctive of this type.

## Rib tapes

To simulate rib tapes, strips of heavyweight tissue are applied using thinned PVA wood glue. These should be applied over each rib and around each surface edge. Use your documentation to make sure the tapes are where you think they should go. When dry, seal with dope and sand down to give a

subtle finish.

Many early aircraft had their covering laced to the fuselage, often forming a prominent feature to the particular subject (the SE5a is an example). This is very simple to simulate using a sewing machine set on 'zig-zag', or was it 'zag-zig'? Now it is a simple matter of cutting to length and sticking to the covering using thinned PVA, easy!



Even at this scale size, rib tapes and stitching and lacing should be reproduced.



Access panels, side panel staining and under fuselage gunge all faithfully reproduced on Andy's Tabloid. Note the simple 'sprung axle' undercarriage and wire joiner plug-in wings.



**On metal-skinned types, chipped paint, scuffed panels and panel fasteners can be reproduced by scraping, indenting and scratching back to the undercoating of silver or appropriate primer, using a variety of 'homemade' tools (OK, so the model is large and R/C - but the principles are the same).**

### Panels

Metal or plywood panels can be simulated on the fuselage prior to painting, using litho plate, card, paper or plastic card, suitably embossed with details from the back or front. You must keep references to the full-size aircraft to prevent large clangers being made! All panels must be stuck down well and the edges sealed, to prevent oil and fuel seeping in, which would make a terrible mess of all your handiwork.

### Painting

Applying the scale paint finish causes more sleepless nights than flying the darn monster! The problem is that this is what the judges see. There are no excuses for the wrong colours, since there are many books, while magazines are full of colour pictures, paint chips and references, etc.

There are many different paints we can use - my preference is to hand brush matt enamels, then fuel proof by spraying on a coat of semi-matt fuel proofer.

Matt enamels give a light finish, two brushed coats being sufficient. Apply the light colours first, the white areas in roundels for example, then apply all the others. I use a brush, because I feel the potential for

error is reduced, if I make a mistake with a spray gun it can be a real big clanger.

### Markings

All the markings are carefully drawn on to the model using a soft pencil - mistakes can easily be rubbed out and a second attempt made this way. Registration letters are very difficult to accurately reproduce, so just keep trying, comparing your efforts with your photographic references. (Using photocopier facilities you can trace registrations. When satisfied (never!) fill in your markings using a good quality brush - if you are wizard with an airbrush you can mask and spray ... but I am not)

For Roundels, I use ink spring bows loaded with paint to mark out the edges, the centres are then filled by hand. The colour I have not been able to hand paint is silver, so out comes the airbrush - silver cellulose is far superior to enamel silver in appearance and gives a light finish.

### The dirty work!

With the model all pristine and toy-like, it is now time to add the dirt and realism. Even factory-fresh aircraft are not perfect, possessing character in irregular panels, subtle surface blemishes, etc., etc. Adding dirt brings a model to life. You must first

scrutinise your photographs to see where the real aircraft picked up dirt - look for scuff marks and scratched paint.

To apply dirt, I use pastels, grey, brown and black. Simply rub your finger on the pastels, then rub your finger on the airframe, easy! If you do not like the effect, wipe it off and have another go - very quickly you will master the process and be the proud owner of a realistic scale model. To preserve your efforts, spray over with fine fuel proofer.

Chipped paint requires more preparation, in that silver dope needs to have been painted under the final colour, rubbing the desired area with fine wet and dry paper or wire wool, or scratch the edge with a sharp knife. This all gives a variety of finishes, and litho plate panels really earn their keep for this kind of effect. ■

**NEXT MONTH: NOW THAT THE MODEL IS PAINTED, MARKED UP AND DIRTY, WE TAKE A LOOK AT REPRODUCING THE SMALL DETAIL THAT REALLY GIVES THE MODEL SCALE-APPEAL!**



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Many air forces can conduct missions such as air superiority and ground attack, but only the US Air Force has truly global reach. For more than five decades, the essential enabler of this global reach has been the KC-135 Stratotanker. Unarmed and unglamorous, the KC-135 has been one of the most successful and enduring aircraft in US Air Force history. Primarily based on the author's extensive access to operational KC-135 aircraft on the ground and in flight, this book contains

the most detailed photographic documentation of the KC-135 inside and out that has ever been published, as well as color profiles of the KC-135R in the markings of every major USAF command that has operated that variant. Illustrated with 240 photographs, detailed line drawings and color profiles; 88 pages.



### SS10230 - S-3 VIKING IN ACTION (Soft Cover) SS50230 - S-3 VIKING IN ACTION (Hard Cover)

The Lockheed S-3 Viking was developed in the late 1960s to serve as a dedicated carrier-based anti-submarine aircraft. Over the years, it evolved into an outstanding surveillance and anti-surface platform, effective not only against submarines but also large and small surface ships. The Viking and its main variant, the highly-classified ES-3A Shadow electronic surveillance aircraft, played a key role in the Cold War and in the conflicts of the 1990s. The book is one of the few publications to tell the Viking story and is packed with photos and detailed line drawings, all depicting the aircraft's weapons, paint schemes, sensors and interior. It also provides an overview of some of the more significant variants that were studied, but never fully pursued, such as the Carrier On-Board Delivery (COD) and dedicated (KS) refueling variants. It also discusses the aircraft's role in Operation Desert Storm and how the lessons learned from that conflict impacted the Vikings' mission during the latter part of the 1990s and early 2000s. Illustrated with 186 photographs, line drawings, and numerous color profiles; 80 pages.



### SS25070 - Heinkel He 111 Walk Around (Soft cover) SS65070 - Heinkel He 111 Walk Around (Hard cover)

The Heinkel 111 saw service on all Germany's military fronts in the European Theater of World War II. The He 111 entered the war as a medium bomber, supporting Wehrmacht ground campaigns. After the tide in the conflict had turned against the Reich, and air superiority had been achieved by the Soviet Union and the Western Allies, the Heinkel 111 was largely relegated to transport functions. This iconic warplane had its origins as

a cutting-edge civil airliner in the mid-1930s. But war was looming and before long it was adapted for use as a bomber. The first mass-produced versions, the He 111-E and He 111-F, served in the Condor Legion with Francisco Franco's Nationalist forces in the Spanish Civil War, paving the way to further military engagement once World War II broke out. Although produced in large numbers and exported to many countries before and during the war, few examples of the He 111 survive today. This walk around features detailed photographic images of the He 111-P1 restored and preserved in Norway, and the He 111-H20 on display in the RAF museum in Britain. Illustrated with 228 photographs, detailed line drawings, and color profiles. 88 pages.



### SS25041 - A-4 SKYHAWK WALK AROUND (Soft Cover) SS65041 - A-4 SKYHAWK WALK AROUND (Hard Cover)

The carrier-capable Douglas A-4 Skyhawk is one of the most successful modern combat aircraft. During the 25 years in which the A-4 was on the production line, 2,960 Skyhawks were built. A relatively light aircraft, with a maximum takeoff weight of 24,500 pounds and with a top speed exceeding 600 mph, the Skyhawk was operated not only by the US Navy and Marines but also by the air forces of Australia, New Zealand, Israel, Malaysia, Argentina, Singapore, Brazil, Indonesia, and Kuwait.

Introduced in 1956, Skyhawks played major roles in the Vietnam War, the 1973 Arab-Israeli October War, and the Falklands/Malvinas Conflict in 1982. With a reputation for toughness and agility, Skyhawks remained a part of the American arsenal for nearly half a century - the U.S. Navy retired the A-4 as recently as 2003. Meanwhile, the battle-tested warrior continues to serve today other militaries around the world. Illustrated with 205 photographs, color profiles, and detailed line drawings; 80 pages.



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# Techno Scale

Mike Evatt

**W**alnut scale rubber powered models being larger than their brothers Peanut and Pistachio; are somewhat easier to build and fly. **Dumas Products** at [www.dumasproducts.com](http://www.dumasproducts.com) have a range of these 17.5 inch span delights including the Fokker EIII shown in the screen-shot. These kits are so chock full of quality features, that building has once again become part of the fun. Beginners will be astonished by the ease of construction, while experienced modellers will appreciate the quality materials and precision laser cut parts.

When the Douglas DC-3 debuted in 1935, it marked a milestone in commercial aviation. Suddenly, flying was popular and practical. Production ended just eleven years later, but the DC-3 lives on in an expertly engineered kit from Top Flite. If you have never built scale or flown a twin, it's a great introduction! Celebrating the Golden Era of Aviation Gold Edition Airplanes from **Top Flite** are state-of-the-art kits that are all computer designed with interlocking parts that simplify

construction. Check it out at [www.top-flite.com](http://www.top-flite.com)

George Bredehoff started his involvement with model aircraft in the 1980s and that hobby became **Volare Products**. Volare's mission is simple, to provide the best free flight products at the best prices. I always enjoy visiting this website <http://volareproducts.com> particularly to browse the array of plans such as that of the delightful rubber powered peanut scale Sopwith Tabloid shown in the screen-shot. This is the 1914 British Schneider Cup Winner. The plan also includes two versions of the early WWI Scout featuring both skid-type landing gear and normal gear.

Staying with small models a little longer. The aim of **'Indoor Flyer'** is to bring you the latest in micro R/C - both mainstream items and more specialised products. Indoor Flyer at [www.indoorflyer.co.uk](http://www.indoorflyer.co.uk) is a subsidiary of **Robotbirds**. The webshop and product range is maintained by Michael Henriksen. Michael has been active in micro R/C for many years and has a lot of knowledge in the field. The Techtone Mini P-51 is just the perfect size for medium to

large gardens or indoors. This model has an EPP fuselage and Depron wings. The model is delivered with the fuselage already assembled and weighs in at circa 40gms with a span of 15ins.

If you thought that was small then take a look at the 'Ares' Tiger Moth 75 at [www.ares-rc.com](http://www.ares-rc.com)

This diminutive Tiggy has a flying weight of just 14gms! A variety of scale finishes include an authentic trim scheme, moulded wing rib details and pilots, and lightweight yet durable construction means you don't always have to worry about damage after less than perfect training missions or landings. The Tiger Moth 75's unique airframe design assembles with magnets and interlocking parts for easy maintenance and repairs without glue, plus it arrives 100% factory-assembled and ready-to-fly right out of the box!

The Company **Staufenbiel** was founded in the year 1899 in Hamburg selling bikes, machines and later toys. From 1970 the company started selling model/hobbycrafts and parts and since 1990 it has become a specialist in this area. With



A walnut scale rubber powered Fokker EIII from Dumas Products.



A superb Douglas DC-3 from Top Flite.



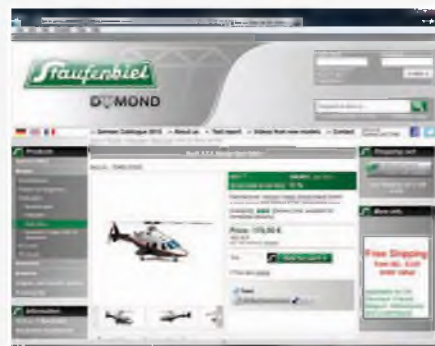
A delightful rubber powered peanut scale Sopwith Tabloid from a Volare plan.



The Techtone Mini P-51 is just the perfect size for medium to large gardens or indoors.



The 'Ares' diminutive Tiggy has a flying weight of just 14gms!.



Bell 222 fuselage which is designed to fit directly on to a 'Blade 500'.



# ters cyberspace for more TechnoScale Topics...

their house-brand **DYMOND** and the distribution of several well-known brands from Asia and Czech Republic they offer variety and value. In their webshop at [www.modellhobby.de](http://www.modellhobby.de) stock over 3,500 items. The screen-shot shows a factory assembled and painted Bell 222 fuselage which is designed to fit directly on to a 'Blade 500' with no hassle or modification being required.

One of the most famous Italian fighters of WWII, the Macchi MC-200 was a design that spanned the old and new eras of fighter construction. Although a monoplane with retract, she had an open cockpit and a large radial engine with little regard for low drag. The **Black Horse** version is a 2 metre span and will happily fly with a 30-35cc petrol engine up front. All metal air retracts are included as standard with functioning oleo struts. That straight wing imparts a solid, forgiving feel in the air and the Macchi makes a good first scale model to get into flying 'tail draggers'. This is all helped by the wide track undercarriage and progressive control response. It is stocked in the UK by Als Hobbies <http://alshobbies.com>

Logging on to [www.sopwithmike.org.uk](http://www.sopwithmike.org.uk) will take you to the personal website of Mike Roach.

Mike has an overriding interest in Sopwith aircraft but not to the total exclusion of other manufacturers. The model shown is a Sopwith Pup from his Depron indoor stable, wingspan 32ins and weighs only 7.5 oz. A small brushless motor provides the power, driving a 7x7 GWS prop. Controls are rudder, elevator and throttle. The construction is standard Depron, with 3mm curved plate wings, functional rigging and basswood struts and undercarriage. Fascinating web pages!

**Model Markings** with a web presence at [www.modelmarkings.com](http://www.modelmarkings.com) was formed to address the needs of the RC modeller. Model Markings can provide that final finishing touch with Computer Cut Vinyl Decals or Paint Masks to add those fine details to your scale masterpiece or ATRF model. Cut Vinyl Decals have revolutionised the use of decals on model aircraft, as they can be accurately reproduced to any size without losing any resolution, giving precise and smooth contours and perfectly straight edges.

Paint Masks are digitally cut from 80µ vinyl specially designed for this application. It is very flexible with a medium tack adhesive that boasts a zero residue when removed.

**Puffin Models** at [www.puffinmodels.com](http://www.puffinmodels.com) have an extensive range of quality products including a range of glow and petrol engines from MVVS. The MVVS 116 IRS Twin Boxer petrol engine with ICU-P ignition unit would appear to be ideal for that next giant scale project. It may be a little pricy but they claim that delivery is normally inside 2 weeks. It will swing a 30 x 10 Meizlik propeller at 6200 RPM when fitted with 3204 tuned silencers.

**Xoar** specializes manufacturing propellers for both hobby and commercial applications. Model airplane propellers for gas & electric, UAV propellers, powered paraglider propellers and ultralight aircraft props. With over 40 years aviation experience and modern technology through relentless operation and quality control, Xoar produces one of the most efficient & stable airplane propellers in the aviation industry. Visit their website at [www.xoarintl.com](http://www.xoarintl.com) and see how one of their propellers could enhance your scale project. ■



The Black Horse Macchi MC-200 is available from Als Hobbies.



Mike Roach has an overriding interest in Sopwith aircraft.



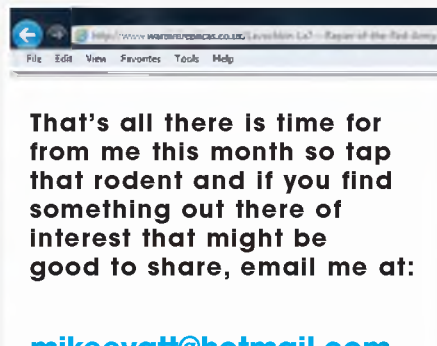
Model Markings can provide that finishing touch with Cut Vinyl Decals or Paint Masks.



The MVVS 116 IRS Twin Boxer petrol engine is ideal for that next giant scale project.



Xoar specializes manufacturing propellers for both hobby and commercial applications.



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)



**Y**es, it's that time again, time for another thrilling instalment of *The Quiet Zone*. Once again I have to keep the waffle content to a bare minimum because I have a lot to fit in. Yes, that does mean that I got someone else to write it for me.

As promised last month, we'll be continuing our in depth look at that lovely little Sopwith Camel model built by Jonathan Rider, so I'll get straight to it. If you'd like to see a video of the working controls in action, you'll find one here [www.youtube.com/watch?v=dhql1UkftgM](http://www.youtube.com/watch?v=dhql1UkftgM). It's really rather interesting to actually see how it's all set up and definitely worth a look.

### Catching up

Last time, we took a close look at how Jon produced certain elements of his model, including a rather neat basketwork seat based on original drawings. At the end I promised you a more detailed, blow by blow description, but ran out of space (the perils of column writing). Anyway, here is exactly how he went about it, bearing in mind that the base was woven as a separate item and fitted later. So, this is how Jonathan described it.

**1)** I purchased a bag full of straw (cane, grass mix) and a bag of paper-coated wire from the local craft store.

**2)** I mocked up a seat based on 1/9th

JON'S CAMEL CLIMBS AWAY FROM A LOW PASS. A LOVELY MODEL, WELL WORTH STUDYING IN DETAIL.





scale measurements from the original drawings - and fitted it in the fuselage to ensure I was on the right track. Sometimes, 'real' measurements do not fit a smaller model - like rivets and panel lines, sometimes you have to make them bigger or smaller to ensure the 'look' is more accurate than the exact measurements.

- 3) I pulled the paper off the wire and wrapped a 2ft length tightly with the 'straw' - which I will refer to as 'wicker' from here on.
  - 4) Once wrapped, I bent it to shape to the same measurements as my test subject, and glued together with CA.
  - 5) For the next step, I wrapped the lower back and the upper back with the vertical supports, using the count, and angles on the plans and reference photos I had. Take your time on this, and use thin strings to ensure they don't bunch up.
  - 6) I began the weave on the lower back first. Inside two, outside two, inside two, outside two - across the back, then REVERSE the weave going back - so you get a tight two strand weave.
  - 7) Don't worry if it looks loose, after three or four rows, you can use a needle to pull it together. Like a weaving loom, you tighten in and pull tight the strands.
  - 8) I did about 20 rows back and forth, and tightened it together so it was parallel to the bottom of the seat, and tacked it in place with CA.
  - 9) The same pattern on the top back with one MAJOR difference. You use the opposite threads to pull together so you get a nice 'V'-shape in the weave. See the images - Take your time on this - don't miss a stitch, or you will see the gap in the work - it took me a full afternoon just to weave the back of the chair.
- Note: Perfectionists will say it should have a double cross back, some will say a triple cross back and others a single cross back - I made a single cross back based on multiple reasons, and I had reference images with a single cross back to go by.
- 10) When you are done weaving the back, tack all sides with CA so the wicker threads do not slip.
  - 11) The base was done on a separate jig I made (4" X 4" balsa) and I just did a standard weave pattern - spread the threads across one way, and used a needle to "weave" the opposite direction.
  - 12) When you have a woven patch larger than your seat bottom, then place your chair on top of your weave patch, and draw the exact measurements of the inside on the chair right on the weave you just made. Now you have the exact size of your seat bottom.
  - 13) Use some CA on the back of your full seat bottom drawing a bead along the line you just drew so the wicker is tightly glued together.
  - 14) Cut out the seat bottom, along the glued line you made, and glue in place on the chair.
  - 15) Trim up all the little pieces of wicker that are sticking out, and top off with a small piece of leather for the padding.
  - 16) One thinned coat of Shellac and four little metal holding straps finish the basic seat.

### Aft fuselgae

The tail section or aft fuselage of these WW1 aircraft (fabric covered) is like a 'bridge' that holds the vertical and

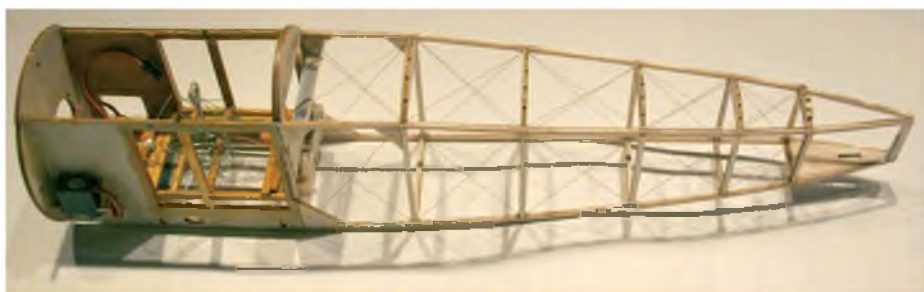


**ABOVE:** The wrapped wire seat frame, with the first lot of weaving in place.



**LEFT:** The leather trim and shellac colouring add to the impression of the real thing.

**BELOW:** With rear structure added, Jon uses strong thread to add rigging detail and allow fine tuning for an accurate, twist free structure.



**Control cable exits at scale locations will be completely hidden once the covering is applied.**

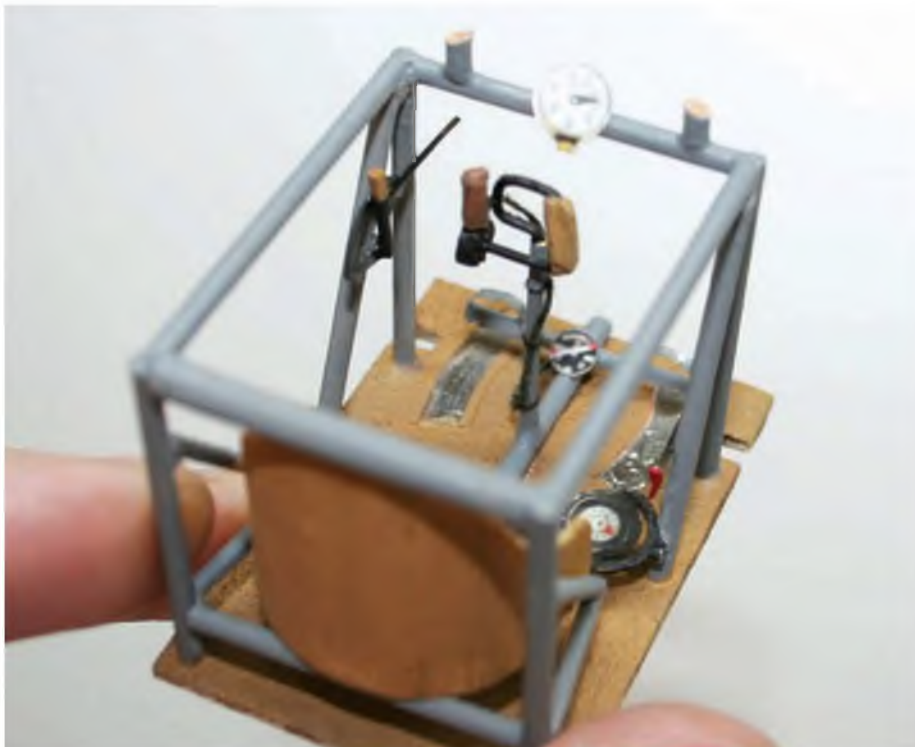




Fishing hook eyes provide pivot points so the cables can exit in the correct positions. Jon's hand lends scale to the Fokker DVIII model.



The DVIII poses with a similarly small Sopwith Pup. Both are nice little models and very well detailed.



Proof of the pudding, this is the cockpit interior for that diminutive DVIII.

horizontal stabilisers straight and narrow, adding as little weight as possible. Let's take a quick history lesson and look at the different tail and aft fuselage types, and it will show you the progression from early WW1 models to a modern airliner. The Camel had a fuselage called a truss structure. This type of structure is still in use in many lightweight aircraft today although using welded steel tube trusses. The Camel truss fuselage structure was built out of wood, covered with fabric and painted with Dope. Some simple box structures were rounded by the addition of supported lightweight stringers, allowing the fabric covering to form a more aerodynamic shape, or a shape more pleasing to the eye. The top of the Camel fuselage used stringers to hold the shape of the fabric, add aerodynamics and transition the fuselage to the tail.

### Back to the build

(In this section I have deliberately included some of Jon's comments about the basic build of the model. Although it may not be the particular model you are contemplating, they are points relevant to pretty much all WW1 types. PR)

The aft fuselage of our Camel follows a standard 'build-two-sides' method with the structure built by pinning right on the plans, and then mate together with the small 1/8" square cross pieces. There is no difference between the right and left sides, so this goes together quickly. Try to use similar balsa strips on the right and left sides so that when you pull the tail together the 'bends' are equal on each side and you have a nice straight tail. There is little room here for adjustment, so ensure all pieces are straight and true before bringing the tail together.

The Camel has to support all the stresses and the loads of flight with the balsa truss, and thread cables crossing each open area and across the fuselage to support the frame. As we know, the cloth 'skin' cannot take any stress, it's there for aerodynamics and, believe it or not, your model will also have these same stresses on its tail, so it's important to build it strong, straight and as light as possible. Remember that building an aeroplane fuselage is like playing on a teeter-totter, any weight on one side of the CG needs to be balanced on the other. The more you add in the back, the more you need to add up front.

To support the Camel's wooden truss structure, I used a strong 'carpet' thread. I wove a single piece of thread through each side of the fuselage, and one on top. The reason for a single piece is that if you pull on it, you can see the fuselage get pulled (or warped) to one side or the other, so now you have full control of making the structure straight, strong and true. The real ones used turnbuckles; we will use CA and thread tension. Lay the fuselage on top of the plans and ensure you are in perfect alignment before pulling and tightening the adjustment thread. What you will end up with is a very strong tail section that will not lose its shape when you cover it. As we know, some heat-shrink coverings can warp and twist a fuselage when you shrink the covering. If built strong, the thread and structure will stay straight and true.

The forward fuselage sheeting sides for



the cockpit front are pre-cut from the kit, but I added additional 'simulated' stringers on the inside and used Amber Shellac to coat everything so you would see a nice finished wood side from the cockpit. I also added non-load bearing internal bracing and small brass turnbuckles inside the cockpit. Let your imagination flow a little and go as far as you see fit in your detailing. As they say, you are never finished adding scale items to a model, you either run out of time or money.

### Tail surfaces

Let's talk a little bit about the 'scale' pull-pull system. You can have multiple types of ways to move the rudder and elevator of your aircraft. You can have a hard pushrod that will push and pull the control surfaces, you can have a pull-pull system that will use cables on either side of the surfaces that will operate like the full size aircraft or you can mount servos right at the tail surfaces and have short connectors directly to the surfaces.

For the pull-pull, it's the scale control system for many aircraft from Piper Cubs to P-51's. It allows cables to connect the control column to the surfaces with the ability to adjust them, and keep tension on the control surfaces to reduce flutter and keep accurate control. They are also the lightest choice for your scale WW1 model and mandatory if you want your model to look right.

To install the system, we have to know where the cables will exit the fuselage. With a fully wood sided fuselage, you can basically make a hole anywhere to exit the cable. However, on a fabric sided aircraft, you need to back the area up with balsa so the exit tube will have something to attach to, which will be hidden by the covering. I marked the exit locations on the plans, then transferred them to the fuselage sides, and as you can see, I needed to build up a few areas to support the exit of the pull-pull cables. If you do this now, you will have a very easy time when rigging the control surfaces. There is no room to move around after the fuselage is covered.

There are different ways to set up a smooth exit for your pull-pull system. I use small plastic tubing, as it is slippery enough for the thread to pass through, and it allows me to make slight bends in the direction of the thread without worrying about excessive friction or binding. If you have to make significant bends or changes in direction for your pull-pull thread to line up, use the end of a fish hook (preferably a stainless steel hook) as a pivot point for the controls. As you can see on my little DVIII there were a few changes in direction for the pull-pull threads to exit in exact scale locations, so the fishhook pivot points worked well with very little friction.

The servo connections work best if you can adjust the cables, even after they are

installed and you have been flying for a while. Thread sometimes stretches and any slack in the system may lead to a phenomenon called 'flutter'. This is where the control surface starts to vibrate back and forth quickly the faster the plane goes. As full sized aircraft got faster and faster, this posed a serious engineering problem for designers, and with your model planes, if you have a faster sport or scale plane and you fly it to it's extreme, you may even hear the 'buzz' of the controls as it passes by. This can destroy an aeroplane quickly if the flutter is bad enough. Luckily for us, these WW1 models fly at a slow pace and rarely get to the speeds that flutter is an issue.

Micro links with cotter pins right on the servo arm works very well in holding and adjusting the thread (or cable) on a pull-pull system. You can even make up for some slight trim adjustments just by moving the thread in one direction or another. Best advice to ensure it works as you want it is to plan ahead, and make up trial pieces to practice with. Once you have established the best way for you to achieve the system for your aircraft you can repeat the technique on other projects in the future."

Next time we'll take a break from studying the Camel, but you'll have to wait to find out what I have planned for you. In the meantime, if you'd like to contact me I'll be at [PETERRAKE@aol.com](mailto:PETERRAKE@aol.com)

The little DVIII poses outdoors in the winter sunshine. Still looks B\*\*\*\*Y cold to me.





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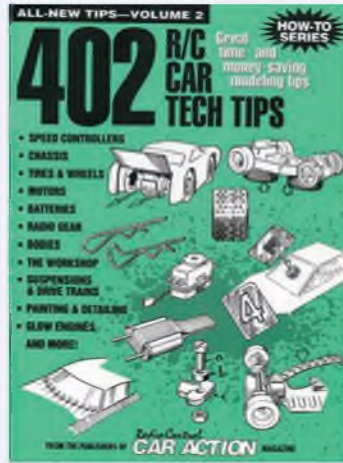
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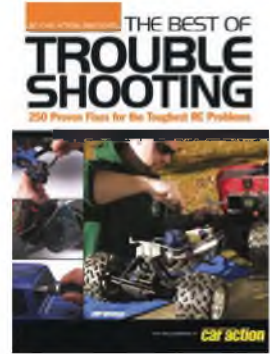
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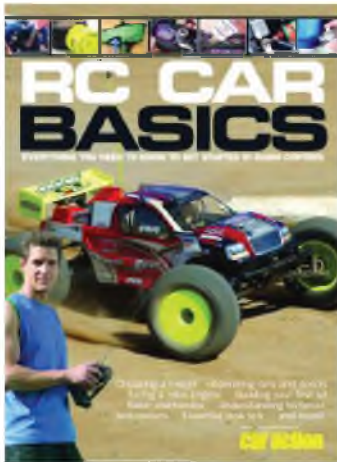
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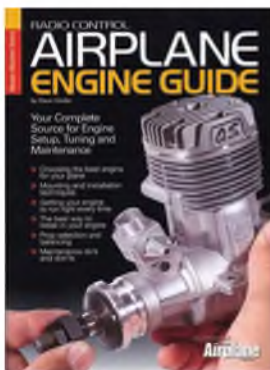
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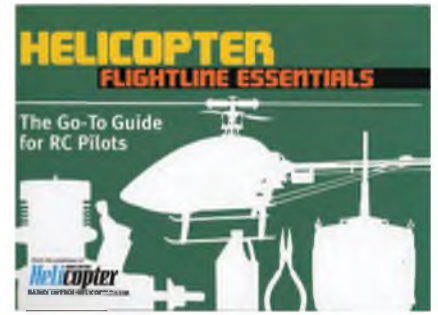
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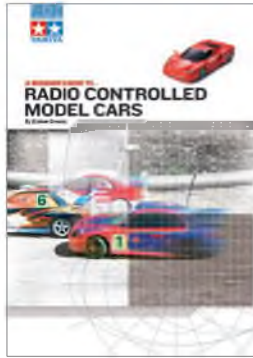
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